# POST CONSTRUCTION STORMWATER MANAGEMENT (PCSM) NARRATIVE

FOR

## KEYSTONE TRADE CENTER – PHASE 2 DEVELOPMENT

Falls Township, Bucks County, PA
G&A File No. 2020-07083-15

October 7, 2021
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Revised: April 1, 2022
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**Revised: October 1, 2024**

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**The Erosion and Sediment Control (E&S) Plans and Calculations, and the Post Construction Stormwater Management (PCSM) Plans and Calculations have been provided, planned, designed, and implemented to be consistent with one another. Please refer to the Erosion and Sedimentation Control Plans and Calculations for the project, dated October 7, 2021, revised October 1, 2024.**

GILMORE & ASSOCIATES, INC.
ENGINEERING & CONSULTING SERVICES

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**EXECUTIVE SUMMARY**

*Keystone Trade Center - Phase 2 Development* is a redevelopment project in Falls Township, Bucks County, Pennsylvania located in the MPM – Materials Processing and Manufacturing Zoning District within the Keystone Industrial Port Complex (KIPC). The project is located on tax map parcel TMP 13-051-001 (Lot 1a) which has a gross project area of 1,366.21 acres. The overall limit of disturbance and project site boundary for *Phase 2 Development* of the project shall be 310.19 acres. The proposed project for *Phase 2 Development* involves the construction of one (1) 1,318 S.F. pump house, one (1) 520 S.F. guard house, one (1) 7,586 S.F. refrigeration building, one (1) 312 S.F. goods in building, one (1) 2,678 S.F. goods out building, one (1) 65,335 parking garage, one (1) 1,178,100 S.F. warehouse building and two (2) 1,035,696 S.F. warehouse buildings for product distribution and warehousing, a permitted use by-right.

The Keystone Industrial Port Complex is located on the west bank of the Delaware River and encompasses about 2,800 acres. Industrial operations began in 1952 involving integrated steel making and finishing. Prior to 1952, the area was used for agricultural purposes. Industrial activities expanded through the early 1970's. Most steel making activities were shut down by 1991. Today the complex supports several independent industrial operations.

A soil management Plan entitled "Material Management Plan for Keystone Trade Center", prepared by *Langan Engineering & Environmental Services, Inc.*, for *NP Falls Township Industrial, LLC*, dated 2/24/21, revised 7/27/21, was developed as a facility-wide approach for identifying, assessing, handling, properly staging and managing materials toward compliance with relevant and applicable federal, state and local requirements and recommended best practices for materials that are likely to be encountered during planned demolition and construction. This material management plan is incorporated into the Erosion & Sediment Control Plan, Post-Construction Stormwater Management Plan, and the Construction Documents for this project.

The management plan also contains the results of the environmental due diligence performed on the site including locations of testing, regulated substances encountered and their corresponding concentrations. Within the designated project boundary, soil exceedances of direct contact MSCs were discovered for four substances: benzo(a)pyrene, iron, thallium and vanadium. No soil-to-groundwater MSCs were exceeded for a non-residential, non-use aquifer. The management plan includes a Site-specific Human Health Risk Assessment which concludes that there are no unacceptable cancer risks present. Mitigation of non-cancer risks from exposure to concentrations of constituents of potential concern during construction activities include the requirement of OSHA Level D personal protective equipment, dust control measures, implementing good hygiene practices, and the preparation of Site-specific Health and Safety Plans that comply with OSHA and other relevant and applicable rules, regulations and requirements for construction worker protection and safe work practices, for any contractor involved with material handling at the project site. In addition, and in accordance with the management plan, an environmental professional shall be required on-site during any earthwork activities within 100' of sample locations which demonstrated a risk assessment exceedance for thallium (as shown on the Plan), to ensure implementation of the soil handling procedures described in the management plan. These measures have been included in the PCSM Plan.

## I. PROJECT DESCRIPTION

### Introduction

*Keystone Trade Center - Phase 2 Development* is a redevelopment project in Falls Township, Bucks County, Pennsylvania located in the MPM – Materials Processing and Manufacturing Zoning District within the Keystone Industrial Port Complex (KIPC). The project is located on tax map parcel TMP 13-051-001 (Lot 1a) which has a gross project area of 1,366.21 acres. The overall limit of disturbance and project site boundary for *Phase 2 Development* of the project shall be 310.19 acres. The proposed project for *Phase 2 Development* involves the construction of one (1) 1,318 S.F. pump house, one (1) 520 S.F. guard house, one (1) 7,586 S.F. refrigeration building, one (1) 312 S.F. goods in building, one (1) 2,678 S.F. goods out building, one (1) 65,335 parking garage, one (1) 1,178,100 S.F. warehouse building and two (2) 1,035,696 S.F. warehouse buildings for product distribution and warehousing, a permitted use by-right.

S. Port Road and Ben Fairless Drive, both industrial collectors with a 60'-wide ultimate right-of-way, shall be re-aligned and extended, respectively, as part of *Phase 2 Development* and construction. The project area will be bound by Old Bordentown Road to the north, Ben Fairless Drive and its proposed extension to the east and south, and re-aligned S. Port Road to the west. See *Figure 1 - Location Map* and *Figure 2 – U.S.G.S. Quad Map (Trenton East, NJ/PA).*

Existing land use for the subject parcel over the past 50 years is industrial. Present land use for the last 5 years is industrial. The proposed land use of this redevelopment project will be industrial.

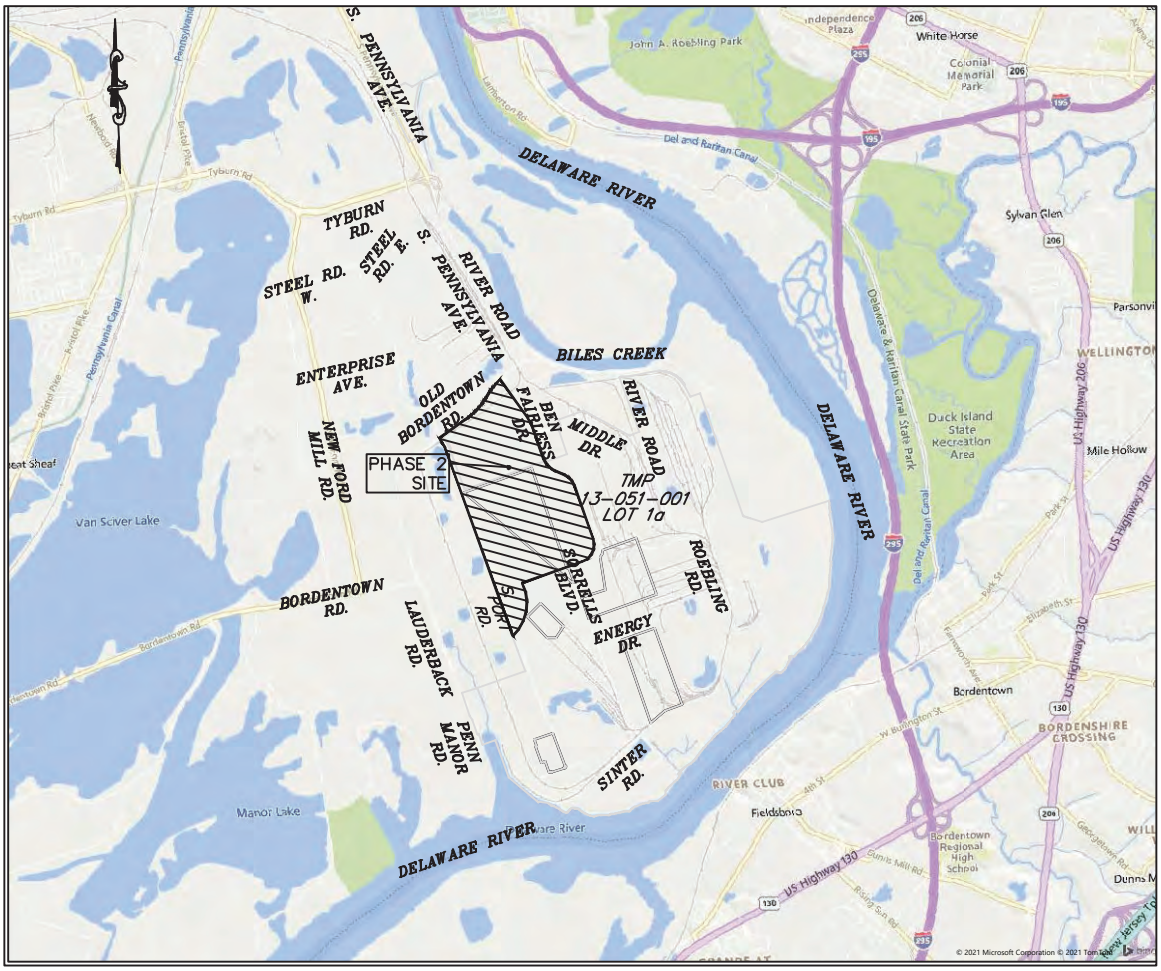
The Keystone Industrial Port Complex is located on the west bank of the Delaware River and encompasses approximately 2,800 acres. Industrial operations began in 1952 involving integrated steel making and finishing. Prior to 1952, the area was used for agricultural purposes. Industrial activities expanded through the early 1970's. Today the complex supports several independent industrial operations.

### Existing Topographical Features and Land Cover

The boundary and existing features depicted on the plans have been prepared based on: (1) plan entitled "Galvanized Minor Subdivision Plan" by *R.L Showalter & Associates, Inc.* dated 08/17/2020, last revised 09/18/2020, and (2) plan entitled "ALTA/NSPS Land Title Survey Parcel Plan – Keystone Industrial Port Complex," prepared for *NorthPoint Development, LLC*, dated 10/09/2020. The development area is flat for most of the site, with slopes ranging from nearly flat (0.0%) to 2.0%. There are areas of steep slopes within associated with the existing canal on-site.

The existing site contains one (2) point of interest. Drainage Point #1 (DP 001) consists of area on-site that generally drains from north-to-south toward an existing conveyance system (Canal No. 2). Canal No. 2 directly discharges into the Delaware River at the far southern portion of the KIPC site. The overall studied drainage area for *Phase 2 Development* contains approximately 137.42 acres of existing impervious cover, consisting of buildings, asphalt access driveways and parking lots, concrete walkways, railway lines, and staging/operating areas for the current businesses located on the site. Large pervious meadow areas are located throughout the site, with a sizeable portion of woodland area contained to the northern edge of the development.

# *FIGURE NO. 1*




LOCATION MAP

## *NORTHPOINT PHASE 2*

FALLS TOWNSHIP, BUCKS COUNTY, PENNSYLVANIA


**GILMORE & ASSOCIATES, INC.**

**ENGINEERING & CONSULTING SERVICES**

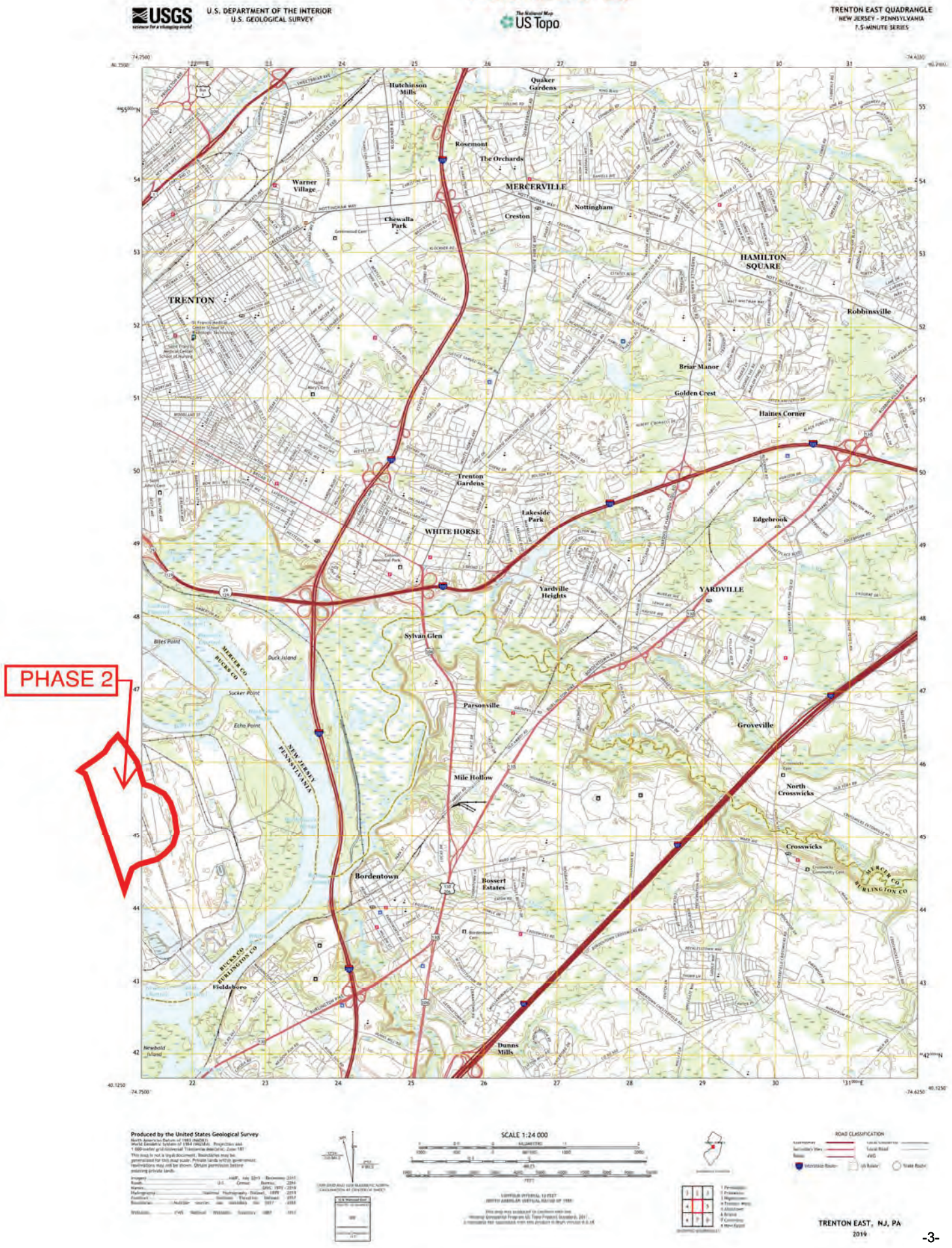
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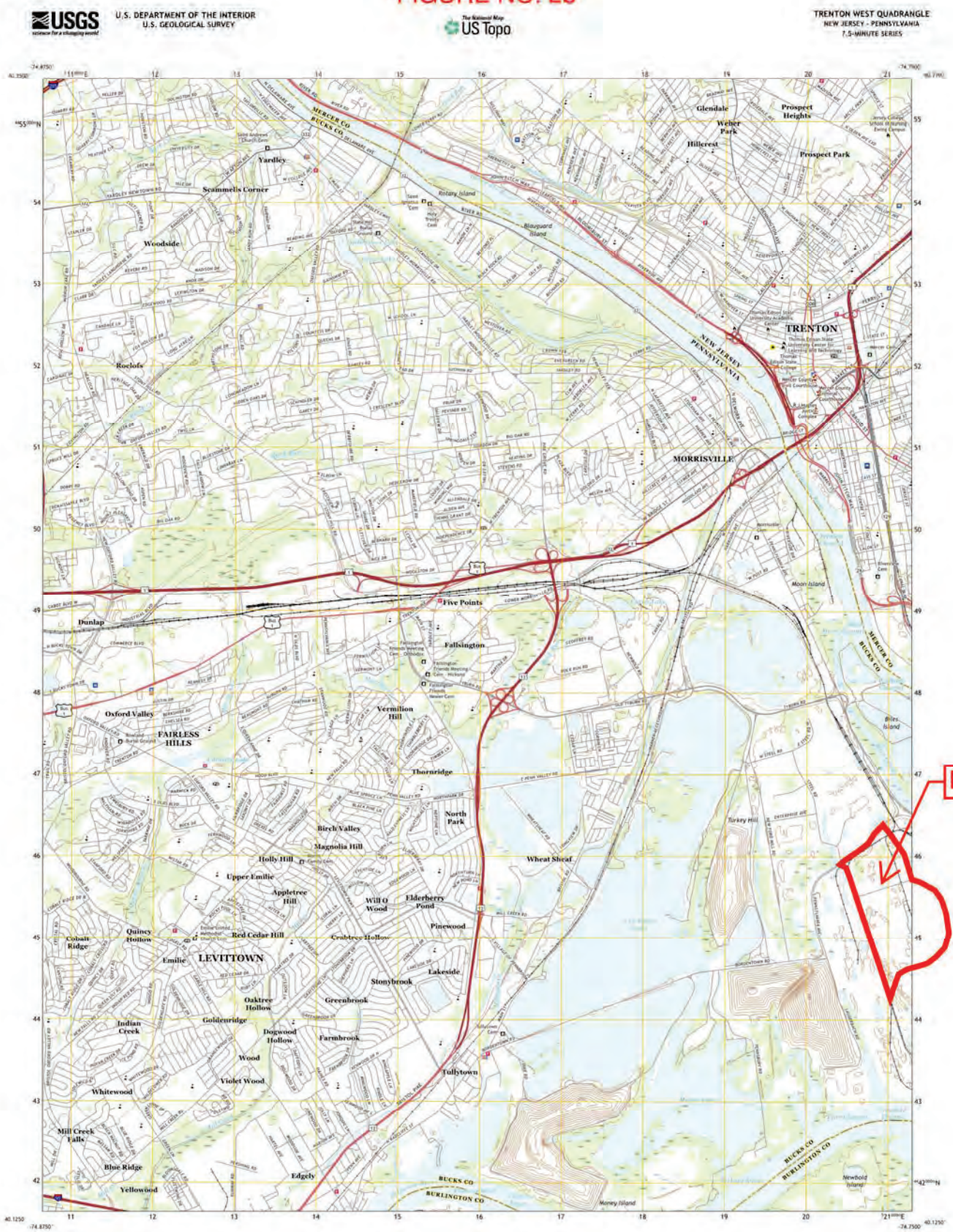

| JOB NO.: | DATE: | SCALE: |
|---|---|---|
| 2020-0708315 | 09-09-2021 | 1"=5,000' |


Q:\anddev\2020\2007083_USS_Fairless_Hills_Master_Plan\2007083-15 - Building 4 Land Development\DESIGN\CAD\Sheet Set\Phase 2_Location Map.dwg Layout: Location Map Plotted By: tcasey, on Tue Sep 28, 2021 at 12:26pm

# FIGURE NO. 2a


USGS
science for a changing world
U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY
The National Map
US Topo
TRENTON EAST QUADRANGLE
NEW JERSEY - PENNSYLVANIA
7.5-MINUTE SERIES
PHASE 2
Hutchinson Mills
Quaker Gardens
Rosemont
The Orchards
MERCERVILLE
Warner Village
Nottingham
Chewalla Park
Creston
HAMILTON SQUARE
TRENTON
Robbinsville
Briar Manor
Golden Crest
Haines Corner
Trenton Gardens
Lakeside Park
WHITE HORSE
Edgebrook
Yardville Heights
YARDVILLE
Sylvan Glen
Biles Point
Duck Island
Sucker Point
Echo Point
MERCER CO
BUCKS CO
NEW JERSEY
PENNSYLVANIA
Parsonville
Groveville
Mile Hollow
North Crosswicks
Crosswicks
Bordentown
Bossert Estates
BUCKS CO
BURLINGTON CO
MERCER CO
BURLINGTON CO
Fieldsboro
Newbold Island
Dunns Mills
Produced by the United States Geological Survey
SCALE 1:24 000
ROAD CLASSIFICATION
TRENTON EAST, NJ, PA
2019

# FIGURE NO. 2b


U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY
USGS
US Topo
TRENTON WEST QUADRANGLE
NEW JERSEY - PENNSYLVANIA
7.5-MINUTE SERIES
TRENTON
MORRISVILLE
LEVITTOWN
FAIRLESS HILLS
Yardley
Scammells Corner
Woodside
Roelofs
Dunlap
Oxford Valley
Five Points
Fallsington
Vermilion Hill
Thornridge
North Park
Birch Valley
Magnolia Hill
Holly Hill
Upper Emilie
Appletree Hill
Will O Wood
Elderberry Pond
Pinewood
Lakeside
Stonybrook
Greenbrook
Oaktree Hollow
Goldenridge
Dogwood Hollow
Farmbrook
Wood
Violet Wood
Tollytown
Wheat Sheaf
Red Cedar Hill
Crabtree Hollow
Quincy Hollow
Cobalt Ridge
Emilie
Indian Creek
Whitewood
Mill Creek Falls
Blue Ridge
Yellowood
Edgely
Glendale
Weiler Park
Hillcrest
Prospect Heights
Prospect Park
Rotary Island
Lifeguard Island
Moon Island
Biles Island
Money Island
Newbold Island
Turkey Hill
NEW JERSEY
PENNSYLVANIA
MERCER CO
BUCKS CO
BURLINGTON CO
PHASE 2
Produced by the United States Geological Survey
SCALE 1:24 000
ROAD CLASSIFICATION
TRENTON WEST, NJ, PA
2019


74° 46' 13" W
74° 43' 4" W
40° 10' 47" N
40° 7' 35" N
519700
520400
521100
521800
522500
523200
523900
4447600
4446900
4446200
4445500
4444800
4444100
4443400
4442700
4442000
Delaware River
130
Ot
Ps
Ua
W
UcB
Na
DaA
UfuB
Pr
MW
Map Scale: 1:28,800 if printed on A portrait (8.5" x 11") sheet.
N
Meters
0 400 800 1600 2400
Feet
0 1000 2000 4000 6000
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

**Soils**

Soils information for the project area was obtained from the USDA NRCS Soil Survey of Bucks County, Pennsylvania, and is presented in *Figure 3*. The majority of the soil area within the development area is classified as Urban Land (UfuB), with the remaining areas consisting of Udorthents, Gravelly (Ua), Delaware Loam (DaA), and Water (W). No soil limitations are listed for these soil types. The geologic formation for the project area is Qt – Trenton Gravel (Gravelly Sand).

**Improvements**

The *Phase 2 Development* proposed site improvements include: one (1) 1,318 S.F. pump house, one (1) 520 S.F. guard house, one (1) 7,586 S.F. refrigeration building, one (1) 312 S.F. goods in building, one (1) 2,678 S.F. goods out building, one (1) 65,335 parking garage, one (1) 1,178,100 S.F. warehouse building and two (2) 1,035,696 S.F. warehouse buildings serviced by approximately 1,513 employees and managers. S. Port Road shall be re-aligned, Ben Fairless Drive shall be extended, and Drive A shall be constructed to connect these two roads as part of development and construction. Eight (8) proposed driveways will be installed for access to the site along Ben Fairless Drive and its extension, while three (3) proposed driveways will be installed for access to the site along re-aligned S. Port Road. Other improvements include: proposed asphalt parking areas, warehouse loading docks areas, concrete walkways, underground utilities, landscaping, lighting, and stormwater management facilities.

## Stormwater Management

The post construction stormwater runoff from the proposed redevelopment site will be collected and ultimately conveyed to two (2) discharge points on-site. Discharge Point #1 (DP 001) is Canal No. 2 which drains to the Delaware River. Discharge Point #2 (DP 002) drains to the northwest of the site which ultimately drains to the Delaware River. The proposed post construction stormwater management system consists of four (4) Managed Release Concept (MRC) Bio-retention (MRC) Basins, eleven (11) Dry Extended Detention Basins, and one (1) Wet Pond/Retention Basin, which together will provide water quality benefits and reduce post construction stormwater peak rates and volumes for the site.

The site is located in the Delaware River (South) Watershed. As such, proposed stormwater management is subject to the Delaware River (South) Watershed Stormwater Management Plan, and Act 167 Plan adopted on May 19, 2011. The Stormwater Management Ordinance of Falls Township is consistent with the Act 167 Plan. The Delaware River has a designated receiving water classification of Warm Water Fishes/Migratory Fishes (WWF, MF) per Chapter 93 of the PA Code.

Per the PA Integrated Water Quality Monitoring and Assessment Report, the Delaware River has the following TMDL status:

- Category 5: Use Assessed: Fish Consumption, Source: Unknown, Cause: Organics; Polychlorinated Biphenyls (PCBs)

The stormwater management facilities have been designed in accordance with the PADEP Best Management Practices (BMP) Manual, PADEP Erosion and Sediment Control Best Management Practice Manual, and USDA TR-55 Manual to treat the required volume of runoff from the

proposed improvements. The facilities have also been designed in accordance with the Delaware River (South) Watershed Stormwater Management Plan.

The existing site is generally flat, largely containing slopes of 0.0 – 2.0%. There are areas of steep slopes associated with the existing Canal No. 2 located on-site. Pre-development time of concentrations are provided for the five (5) pre-development drainage. One (1) on-site pre-development drainage area drains northwest of the site. Two (2) on-site pre-development drainage areas drain to Canal No. 2, while two (2) on-site pre-development drainage areas remain on-site and were therefore excluded from the pre-to-post peak rate analysis. Calculations also provide for 20% of all existing impervious area for on-site drainage areas to be modeled as meadow in good condition. The site is designed to direct as much impervious surface to the proposed stormwater management BMPs as possible. Time of concentration values are provided for all drainage areas, with the minimum value of five (5) minutes for all proposed drainage areas.

An additional 3,500 gal/day of non-contact condensate from the proposed refrigeration building connected to warehouse building #4 will be produced and conveyed via the storm sewer network to Basin #8D. This additional volume (468 CF per day) compared to the sizes of the basin on-site will have a negligible effect on the volume or peak rate of the system.

The stormwater management design is based on the SCS Method for runoff rate and hydrograph generation, automated by the use of the *Hydraflow Hydrographs™* computer program. Hydrograph reservoir routing in the program is based on the storage-indication method, a.k.a Modified Puls Routing. Exhibits and tables summarizing all the results have been included in this narrative.

**Best Management Practices (BMPs)**

BMP 6.4.5: Bio-retention Basin and Bio-retention Basin – Managed Release Concept (MRC) – Bio-retention BMP facilities and Bio-retention BMP facilities utilizing the PADEP managed release concept are proposed for the project for volume control, peak rate control, and water quality purposes. This structural BMP is applicable and utilized for the PCSM design of this project.

BMP 6.6.2: Wet Pond / Retention Basin – Wet Pond / Retention Basin BMP facilities are proposed for the project for volume control, peak rate control, and water quality purposes. This structural BMP is applicable and utilized for the PCSM design of this project.

BMP 6.6.4: Water Quality Filters & Hydrodynamic Devices – These devices are utilized on-site at specified proposed inlet locations. These devices effectively filter debris, particle pollutants, suspended solids, oil and grease, and other pollutant loads for the site, preventing these materials from proceeding downstream of the site. This structural BMP is applicable and utilized for PCSM design for this project.

BMP 6.7.2: Landscape Restoration – Proposed trees will be planted throughout the site. These features effectively reduce stormwater volume and provide water quality benefits in the post-development condition. This structural BMP is applicable and utilized in the PCSM design for this project.

BMP 6.7.3: Soil Amendment & Restoration – Proposed soil amendment areas are proposed for the project. These features effectively reduce stormwater volume in the post-development condition. This structural BMP is applicable and utilized in the PCSM design for this project.

## Peak Rate Control

The project site is located within Stormwater Runoff Rate District C and is subject to the following peak rate control criteria:

| Post-Development | | Pre-Development |
|---|---|---|
| 2-Year | Reduced to | 1-Year |
| 5-Year | Reduced to | 2-Year |
| 100-Year | Reduced to | 50% of the 100-Year |

The project is designed to comply with the requirements to reduce the post-development 5-year storm beyond the pre-development on-site 2-year storm, as well as reducing the Post 2-year storm beyond the Pre on-site 1-year storm. See tables below for summary of peak runoff rates for Discharge Point #1 (DP 001) and Discharge Point #2 (DP 002):

### Summary of Peak Runoff Rate Control

| | DP 001 - Peak Flow (cfs) - SCS Method | | | | | | |
|---|---|---|---|---|---|---|---|
| **Design Storm** | **1-Year** | **2-Year** | **5-Year** | **10-Year** | **25-Year** | **50-Year** | **100-Year** |
| **Pre-Development** | **87.42** | **136.36** | **217.45** | **294.50** | **375.02** | **436.91** | **520.66** |
| **Maximum Allowable Post-Development** | --- | 87.42 | 136.36 | --- | --- | --- | 260.33 |
| **Post-Development** | **29.06** | **45.47** | **74.41** | **103.73** | **134.18** | **153.03** | **176.88*** |

* 176.88 cfs / 520.66 cfs = 33.97%

(Post-Dev 100-year reduced to 33.97% of Pre-Dev 100-year peak rate)

| | DP 002 - Peak Flow (cfs) - SCS Method | | | | | | |
|---|---|---|---|---|---|---|---|
| **Design Storm** | **1-Year** | **2-Year** | **5-Year** | **10-Year** | **25-Year** | **50-Year** | **100-Year** |
| **Pre-Development** | **3.146** | **4.657** | **7.116** | **9.403** | **11.74** | **13.52** | **15.91** |
| **Maximum Allowable Post-Development** | --- | 3.146 | 4.657 | --- | --- | --- | 7.955 |
| **Post-Development** | **0.391** | **0.605** | **0.881** | **2.693** | **4.600** | **5.707** | **6.822*** |

* 6.822 cfs / 15.91 cfs = 42.88%

(Post-Dev 100-year reduced to 42.88% of Pre-Dev 100-year peak rate)

Refer to the pre- and post-development hydrographs for full routing of each design storm.

## Groundwater Recharge

Required groundwater recharge volume (**Re**):

**P = I (Infiltration) = (200 / CN) – 2**
Where:

**P** = **I** = infiltration requirement (inches)

**CN** = SCS (NRCS) curve number of the existing conditions contributing to the recharge facility

**Re = I * impervious area (SF) / 12 Cubic Feet (CF)**

**Discharge Point #1 (DP 001):**

Pre-CN = 76.9
Impervious Area = 6,851,552
P = (200 / 76.9) – 2 = 0.601 inches
Re = 0.601 * 6,851,552/ 12 = 343,149 CF

Groundwater recharge requirements have been achieved through managed release of stormwater through Bio-retention (MRC) Basins #11D and #11E. To comply with PADEP's Managed Release Concept (MRC) for the project given the absence of the use of traditional infiltration for the site, the first orifice for Bio-retention (MRC) Basins #11D and #11E is set above the basin bottom, resulting in ponding water. The impoundment area below the first orifice will be filtered through an engineered soil media, collected by an underdrain designed to release this volume at a rate comparable to the lateral unsaturated flow movement to the receiving water from undeveloped areas. This volume is considered to be permanently removed by the PADEP. Below the first design orifice, Bio-Retention (MRC) Basins #11D and #11E provide 545,109 CF of storage. Therefore, the total provided groundwater recharge volume for DP 001 equals **545,109 CF**. The calculations for this volume are contained in the *Managed Release Concept* section of this narrative.

**Discharge Point #2 (DP 002):**

Pre-CN = 78.9
Impervious Area = 111,949 SF
P = (200 / 78.9) – 2 = 0.535 inches
Re = 0.535 * 111,949 / 12 = 4,990 CF

Groundwater recharge requirements have been achieved through managed release of stormwater through Bio-retention (MRC) Basin A. To comply with PADEP's Managed Release Concept (MRC) for the project given the absence of the use of traditional infiltration for the site, the first orifice for Bio-retention (MRC) Basin A is set above the basin bottom, resulting in ponding water. The impoundment area below the first orifice will be filtered through an engineered soil media, collected by an underdrain designed to release this volume at a rate comparable to the lateral unsaturated flow movement to the receiving water from undeveloped areas. This volume is considered to be permanently removed by the PADEP. Below the first design orifice, Bio-Retention (MRC) Basin A provides 19,901 CF of storage. Therefore, the total provided groundwater recharge volume for DP 002 equals **19,901 CF**. The calculations for this volume are contained in the *Managed Release Concept* section of this narrative.

## Water Quality Requirement

Bio-retention (MRC) Basins #11D and #11E and MRC Basin A are designed to retain a volume beyond the required groundwater recharge and release it slowly over time. This required water quality volume (WQv) is the storage capacity needed to capture and treat a portion of stormwater runoff from the developed areas of the site produced from 90% of the average annual rainfall.

**WQv = [(P)(Rv)(A)]/12**

Where:

**WQv** = Water quality volume (acre-feet)
**P** = Rainfall amount equal to 90% of events producing this rainfall (inches)
**A** = Area of the project contributing to the water quality BMP (acres)
**Rv = 0.05 + 0.009(I)** where I is the percent of the area that is impervious surface (impervious area/A x 100)

**Discharge Point #1 (DP 001):**

Rv = 0.05 + 0.009 x (71.60) = 0.694
P = 2.04 inches (PennDOT Region 5)
A = 216.97 acres
WQv = (2.04) (0.694) (216.97) / 12 = 25.598 acre-feet = 1,115,054 CF

For Water Quality calculations, the total storage of stormwater below the first control orifice in Bio-retention (MRC) Basins #11D and #11E is considered to be permanently removed and thus water quality volume. The total volume provided in Bio-retention (MRC) Basins #11D and #11E below the first control orifice is 545,109 CF. Additionally, the entire 2-year storm drainage area flowing to Pond #9 equals 269,657 CF and does not outlet, and thus is considered permanently removed water quality volume. Furthermore, the stormwater volume that flows to proposed water quality filters installed in inlets contained on the Building 4 site equals 191,032 CF, Building 5 site equals 146,354 CF, and Building 6 site equals 16,880 CF. This provides a total water quality filters volume of 354,266 CF. Worksheets displaying these volumes are provided in *Section III* of this report. Lastly, the volume credit for 393 proposed deciduous tree plantings within DP 001 is 2,358 CF.

Therefore, the total provided water quality volume for DP 001 is:

545,109 CF + 269,657 CF + 354,266 CF + 2,358 CF = **1,171,390 CF**

**Discharge Point #2 (DP 002):**

Rv = 0.05 + 0.009 x (42.27) = 0.430
P = 2.04 inches (PennDOT Region 5)
A = 6.08 acres
WQv = (2.04) (0.430) (6.08) / 12 = 0.445 acre-feet = 19,379 CF

For Water Quality calculations, the total storage of stormwater below the first control orifice in Bio-retention (MRC) Basin A is considered to be permanently removed and thus water quality volume. The total volume provided in Bio-retention (MRC) Basin A below the first control orifice is 19,901 CF. Additionally, the stormwater volume that flows to proposed water quality filters installed in inlets draining to MRC Basin A equals 9,841 CF. Worksheets displaying these volumes are provided in *Section III* of this report.

Therefore, the total provided water quality volume for DP 002 is:

19,901 CF + 9,841 CF = **29,742 CF**

## Maintenance and Operation Procedures

It is the sole responsibility of the owner to complete all maintenance items and tasks described in this "Operation & Maintenance Manual":

**1.0 Short- and Long-term Maintenance & Operation Requirements:**

Until the permittee or co-permittee has received a written approval of a notice of termination, the permittee or co-permittee will remain responsible during the short term for compliance with the permit terms and conditions including long-term operation and maintenance of all PCSM BMPs on the project site and is responsible for violations occurring on the project site. The department or conservation district will conduct a final inspection and approve or deny the notice of termination within 30 days.

The permittee or co-permittee shall be responsible for long-term operation and maintenance of PCSM BMPs unless a different person is identified in the notice of termination and has agreed to long-term operation and maintenance of PCSM BMPs.

For any property containing a PCSM BMP, the permittee or co-permittee shall record an instrument with the recorder of deeds which will assure disclosure of the PCSM BMP and the related obligations in the ordinary course of a title search of the subject property. The recorded instrument must identify the PCSM BMP, provide for necessary access related to long-term operation and maintenance for PCSM BMPs and provide notice that the responsibility for long-term operation and maintenance of the PCSM BMP is a covenant that runs with the land that is binding upon and enforceable by subsequent grantees, and provide proof of filing with the Notice of Termination under 102.7(b)(5) (relating to permit termination).

The person responsible for performing long-term operation and maintenance may enter into an agreement with another person, including a conservation district, nonprofit organization, municipality, authority, private corporation, or other person, to transfer the responsibility for PCSM BMPs or to perform long-term operation and maintenance of the PCSM BMPs located on the property.

A permittee or co-permittee that fails to transfer long-term operation and maintenance of the PCSM BMP or otherwise fails to comply with this requirement shall remain jointly and severally responsible with the landowner for long-term operation and maintenance of the PCSM BMPs located on the property.

BMPs should be inspected at least one (1) time per year and after runoff events.

The PCSM BMPs must be inspected and maintained as noted under operation and maintenance notes. This includes repairs and replacement if required to ensure they function/operate properly.

A written report documenting each inspection and all BMP repairs and maintenance activities must be completed and made available for DEP or BCCD staff for review.

**2.0 Dry Extended Detention Basins and Bio-retention (MRC) Basins**

A. Embankment - the embankment for this facility is an earthen berm; therefore, the following maintenance items are required to ensure its structural integrity:

1. 100% vegetative coverage by herbaceous species must be maintained throughout all areas of the berm and all other areas of direct drainage to the berm. Any areas that become void of vegetation must be immediately corrected by replanting or other adequate measures necessary to prevent erosion that may jeopardize the structural integrity of the facility.
2. Vegetation on the embankments of the facility should be mowed at a minimum of two to three times per year. No trees are to be planted or maintained within the facility. Minimum height of vegetation when mown shall be four (4") inches.
3. Any erosion, slumping or other soil disturbances within the facility that are noted during routine maintenance shall be immediately repaired. Additional materials, as specified by a registered professional engineer, shall be added where necessary to return eroded areas to grade. All repaired areas shall be either rock-lined or immediately re-vegetated with recommended herbaceous species.

B. Facility Structure - the basin shall be vegetated and mulched by a qualified landscaper in accordance with the design plans.

1. All trash and debris shall be removed from the rain garden following all measurable runoff events or when such materials are observed.
2. The gravel trench shall be inspected during routine maintenance for physical damages, change of physical conditions, and signs of erosion. Minor damage shall be repaired immediately.
3. Vegetation shall be inspected at the beginning of each growing season and replaced as needed.

C. Rip Rap Aprons

1. Examine aprons for shifting or excessive settlement.
2. Ensure that aprons are not overgrown with brush or trees.
3. Look for gullies or areas of bare earth downstream from aprons. Repair these areas and stabilize immediately.
4. Ensure that the area downstream is clear of obstructions.
5. Aprons that become laden with silt or excessive vegetation shall be removed and reinstalled after the apron area has been cleaned and regraded.

D. Maintenance Schedule

1. Regular Maintenance - regular maintenance shall be conducted on an "as needed" basis including, but not limited to, mowing of vegetation, trash and debris removal, rodent removal, and repairs of physical damage. Trash, leaf, and debris removal shall occur immediately following all measurable rain events or when such materials are observed. During the fall season, any yard drains or inlets connected to the facility shall be checked and cleared a minimum of one (1) time per month for leaf litter and other debris which may clog pipes.
2. Routine Maintenance - two (2) routine maintenance events shall be conducted annually by the owner/operator. The first event will occur in march or April after the snow pack has completely melted, and the second will occur in October or November after all leaves have fallen from the trees but prior to the onset of winter weather conditions. All maintenance events shall be conducted by the owner/operator. Any problems noted during the maintenance events shall be immediately corrected.
3. Special Maintenance – A special inspection shall be made following extreme runoff events. An extreme runoff event shall be any rainfall event with an average return period of 10 years or greater. In addition to the regular maintenance noted above, any failed vegetation shall be replaced and any erosion along the basin side slopes shall be repaired.
4. Inspection Tasks - two (2) annual inspections will be conducted by the owner/operator for the life of the facilities. These inspections will be for all items as listed for the routine maintenance events. All basin inspections will adhere to the specific criteria noted above. Any problems noted during inspection shall be immediately corrected including any and all routine maintenance items. A consulting engineer will be contacted if there are any structural problems beyond the scope of routine maintenance.

### 3.0 Wet Pond / Retention Basin

1. All catch basins and inlets should be inspected and cleaned at least 2 times per year.
2. The overlaying vegetation (if applicable) of the detention basin features should be maintained in good condition, and any bare spots re-vegetated as soon as possible.
3. Vehicular or construction equipment access on the detention basin area should be prohibited, and care should be taken to avoid excess compaction by mowers (if applicable). If access is needed, use of permeable, turf reinforcement should be considered.
4. If bmp problems or functionality failures are observed, take immediate corrective action as necessary.
5. Failure of the basins could entail standing water observed 72 hours after the storm event or water overtopping the outlet structure. should this occur, a pump shall be used per manufacturer's specifications to drain standing water.
6. Piping and outlet structure shall be inspected for clogging. Any clogging or miscellaneous trash or debris shall be removed. Underground pipes shall be flushed and pumped to remove any potential clogging or sediment.

### 4.0 Soil Amendment Restoration

A. Inspection of soil amendment restoration areas shall be biannual. Regular maintenance shall be conducted as needed. Any erosion, slumping or other soil disturbances that are noted during inspection shall be immediately repaired. Additional materials, as specified by a registered professional engineer, shall be added where necessary to return eroded areas to grade.

### 5.0 Water Quality Filters

A. Maintenance intervals may vary depending on site conditions. Inspect quarterly during the first year of operation, biannually thereafter.

B. Inspect and maintain water quality filters from the surface, without entry into the inlet. Perform maintenance when half full of sediment and debris. Replace filter media in accordance with manufacturer's guidelines and in accordance with federal, state and local regulations.

C. System replacement will be warranted where the following conditions exist:
   1. The system does not operate according to the design criteria.
   2. The system components become damaged beyond standard maintenance repairs.

## II. MANAGED RELEASE CONCEPT

## Managed Release Concept Design Guidelines

The pre-development site characterization and assessment of soil and geology of the project site presents several impediments for successful infiltration including high groundwater and the proximity of the Delaware River. Therefore, Bio-retention Basins utilizing the PADEP's Managed Release Concept (MRC) were selected as the primary BMPs for water quality treatment and slow release of lower order runoff events at a rate similar to the lateral unsaturated flow movement to the receiving waters from undeveloped areas. The PADEP's MRC design standards are included below and were utilized to the maximum practicable extent. Deviations from these design standards are noted where applicable.

1. **Runoff Capture** – The runoff from the 1.2-in/2-hr storm from the contributing watershed that the MRC is intended to treat should be captured and managed by the MRC BMP, filtered through vegetated media or treated and filtered to the extent practicable through the on-site undisturbed soils or other acceptable treatment systems, and released as indicated in MRC Standard 2. The MRC may be designed for offsetting when contributing non-regulated earth disturbance is present in the contributing drainage area, but the total volume managed may not exceed the volume of runoff generated in the 2-yr/24-hr storm. Uncompacted pervious surfaces outside the disturbed area should be bypassed to the maximum extent practical.

   Bio-Retention (MRC) Basins #11D and #11E:

   Bio-retention (MRC) Basins #11D and #11E will capture and filter the volume generated by the 1.2-in/2-hr storm. This volume, as calculated by the routing software, was found to be 516,752 CF for Basins #11D and #11E. Storage for this volume is attained at elevation 13.36.

   The first orifice designed to handle larger storm events is at elevation 13.40. Total available volume at this elevation is 545,109 CF and the basins will filter this volume through the vegetated soil media.

   In addition to the 1.2-in/2-hr runoff volume, the basins were designed to retain the increase in volume between the pre- and post-construction 2-yr/24-hr storm (Delta 2 volume) for the three (3) Bypass Areas for DP 001, which yields a volume of 11,130 CF. With the 1.2-in/2-hr runoff of 516,752 CF plus the Delta 2 volume of 11,130 CF yields a total of 527,882 CF of required managed release volume.

   The first orifice in the MRC basins designed to handle larger storm events is at elevation 13.40. Total available volume at this elevation is 545,109 CF, and the basins will filter this volume through the vegetated soil media.

   **Therefore, this design standard has been met.**

Bio-Retention (MRC) Basin A:

Bio-retention (MRC) Basin A will capture and filter the volume generated by the 1.2-in/2-hr storm. This volume, as calculated by the routing software, was found to be 2,798 CF for Basin A. Storage for this volume is attained at elevation 11.69.

The first orifice designed to handle larger storm events is at elevation 14.50. Total available volume at this elevation is 19,901 CF and the basins will filter this volume through the vegetated soil media.

In addition to the 1.2-in/2-hr runoff volume, the basins were designed to retain the increase in volume between the pre- and post-construction 2-yr/24-hr storm (Delta 2 volume) for the one Bypass Area, which yields a volume of 125 CF. With the 1.2-in/2-hr runoff of 2,798 CF plus the Delta 2 volume of 125 CF yields a total of 2,923 CF of required managed release volume.

The first orifice in the MRC basins designed to handle larger storm events is at elevation 14.50. Total available volume at this elevation is 19,901 CF, and the basins will filter this volume through the vegetated soil media.

**Therefore, this design standard has been met.**

2. **Release Rate for the 1.2-in/2-hr Storm** – The stormwater release rate from the MRC BMP for the 1.2-in/2-hr storm should not exceed 0.01 cubic feet per second (cfs) from the equivalent impervious area. To obtain the equivalent impervious area being managed by an MRC BMP, determine the total volume of runoff generated during the 1.2-in/2-hr event from all pervious and impervious areas contributing to the MRC and divide by 0.0833 feet. This release rate is rounded to the nearest hundredth of a cfs (e.g., 1.576 ac. Is 0.01576 cfs, rounded to 0.02 cfs). Routing is necessary to demonstrate compliance with the standard for release rate.

   Bio-Retention (MRC) Basins #11D and #11E:

   Routing of the 1.2-in/2-hr storm using the computer software generates a volume of 516,752 CF. This volume yields Equivalent Impervious Areas of:

   Volume of 1.2-in/2-hr storm inflow (CF) / (0.0833 ft * 43,560 sf/ac)
   Basins #11D and #11E: 516,752 / (0.0833 * 43,560) = 142.41 ac.

   MRC BMP Release Rate = Equivalent Impervious Area (ac) * 0.01 cfs
   Basin #11D and #11E = 142.41 * 0.01 = 1.424 cfs

   The orifice diameter on the underdrain within the outlet structure is 6.00 in. Routing of the basins within the software yields a maximum release rate of 1.002 cfs for the 1.2-in/2-hr storm.

   **Therefore, this design standard has been met.**

   Bio-Retention (MRC) Basin A:

   Routing of the 1.2-in/2-hr storm using the computer software generates a volume of 2,798 CF. This volume yields Equivalent Impervious Areas of:

   Volume of 1.2-in/2-hr storm inflow (CF) / (0.0833 ft * 43,560 sf/ac)
   Basin A: 2,798 / (0.0833 * 43,560) = 0.771 ac.

   MRC BMP Release Rate = Equivalent Impervious Area (ac) * 0.01 cfs
   Basin A = 0.771 * 0.01 = 0.008 cfs

   The orifice diameter on the underdrain within the outlet structure is 3.00 in. Routing of the basins within the software yields a maximum release rate of 0.000 cfs for the 1.2-in/2-hr storm.

   **Therefore, this design standard has been met.**

3. **Internal Water Storage (IWS)** – A volume for IWS should be provided that is at least one foot deep below the lowest structural outlet (i.e. the outlet for the underdrain) in the MRC BMP to encourage ET, infiltration and denitrification. To encourage ET, the overall soil media depth of a facility including the IWS can be no deeper than four (4) feet, and up to 50% of the IWS void volume can be included (only for vegetated MRC BMPs) as available storage during hydrologic routings to demonstrate compliance with the standards for the release rate (No. 2 above) and peak flow attenuation (No. 4 below). For soil media, a void space of 30% can be used to describe the soil volume storage and recovery. If an alternate void space is used for soil media, specific data demonstrating the void space should be submitted. For non-vegetated MRC designs, the IWS must be above the underdrain, but below the outlet, to promote a change of the stormwater stored during rain events.

   **Use of Liners** – The MRC BMP should <u>not</u> have an impervious liner installed unless environmental or geological conditions necessitate use of a liner, or if an existing structure would be damaged as a result of not lining the facility.

   <u>Bio-Retention (MRC) Basins #11D and #11E and MRC Basin A:</u>

   The Bio-Retention (MRC) Basins #11D and #11E and MRC Basin A bottom will be vegetated with native grasses, sedges, and rushes to promote evapotranspiration. The basins utilize 2 feet of soil media below the bottom of the basin to the invert of the underdrain. Another 1 foot of soil media is provided below the underdrain for IWS for a total of 3 feet of soil media depth. A void space of 15% was used for storage calculation to represent 50% storage routing within the IWS and storage media from underdrain invert to basin bottom. In the modeling software, the bottom of IWS for Basins #11D and #11E and Basin A is set at elevation 10.50 to accurately model 1.0’ depth of IWS at 15% voids (1.0’ IWS depth @ 15% voids = 0.5’ IWS depth @ 30% voids).

   **This design standard has been met.**

4. **Peak Flow Attenuation for the 2-yr/24-hour Event** – The peak flow from the post-construction 2-yr/24-hr storm should be managed back to the pre-construction 1-yr/24-hr storm peak flow, unless an approved and current Act 167 Plan or another requirement (such as limited capacity of a downstream channel) is more restrictive. In general, this rate is determined at the project point of interest. In the event the MRC drainage area is part of a larger overall site with non-MRC BMPs, only the MRC drainage peak flows must be managed back to the 1-yr/24-hr level and overflows can be combined with flows from the non-MRC BMPs.

   In situations where the pre-construction drainage area to the MRC BMP varies significantly compared to the post-construction drainage area, the post-construction drainage area boundary to the MRC BMP (using existing land uses) can be used to calculate the target pre-construction 1-yr/24-hr rate, as long as all areas in question are in close proximity to the MRC BMP and drain to the same surface water. In cases where the BMP is managing additional volume to offset adjacent areas that could not be captured in the MRC BMP, the targeted pre-construction 1-yr/24-hr release rate should be calculated based on the combined flow rates from the BMP drainage area and the adjacent area.

   **Flows Greater Than 2-yr/24-hr Storm** – The recommended design for MRC BMPs is to bypass storm events larger than the 2-yr/24-hr storm to a rate control BMP; however, DEP understands that site and cost limitations may not allow for this bypass. When it is demonstrated by the licensed professional engineer that larger storm events cannot reasonably be bypassed, the MRC BMP surface component should be designed to mange the post-construction 10-, 50- and 100-yr/24-hr storm event peak flows to their corresponding pre-construction rates and the MRC BMP should have an increased (i.e., more frequent) inspection and maintenance schedule that includes inspection and repair after extreme events (10-, 50- and 100-yr/24-hr storm events).

The pre-construction 1-yr/24-hr peak runoff rate on-site for DP 001 is 94.03 cfs. After management, the post-construction 2-yr/24-hr peak runoff rate at Discharge Point #1 (DP 001) will be 45.47 cfs. The pre-construction 1-yr/24-hr peak runoff rate on-site for DP 002 is 3.15 cfs. After management, the post-construction 2-yr/24-hr peak runoff rate at Discharge Point #2 (DP 002) will be 0.61 cfs. Due to site limitations and the size of the facility required to manage the anticipated runoff, the MRC BMP will be used to mitigate the peak runoff from the 10-, 50- and 100-yr/24-hr storm events. Special attention is given in the Stormwater Operations and Maintenance procedures for inspection and repair after large rain events.

**This design standard is met.**

5. **Stormwater BMP Manual** – Follow the design considerations for BMPs as presented in the *Pennsylvania Stormwater Best Management Practices Manual* as revised. MRC may be incorporated into the design of any BMP by a licensed professional engineer.

   Bio-retention Basin (BMP 6.4.5 in the Stormwater BMP Manual) was selected for general flexibility and ability to filter and treat pollutants through the use of native plantings and soil media. Bio-retention treats stormwater by pooling water on the surface and allowing it to settle and filter through the plant/soil/microbe complex media. This process adapts well for use in MRC BMPs.

   **Design standard is met.**

6. **MRC BMP Selection** – Standard MRC BMPs include the following system types:
   a. **Vegetated MRC** – Vegetation must be provided for 75% of the surface of the MRC BMP. Native vegetation should be selected by the licensed professional engineer in consultation with a professional that is knowledgeable in native plant ecology. Vegetation should be selected based on the plants' ability to grow within the anticipated conditions considering the depth and duration of stormwater stored in the MRC BMP.
   b. **Non-vegetated MRC: Porous Pavement** – Porous pavements with a storage bed require a vacuum street sweeping maintenance regime adequate for the drainage area characteristics; the vacuum street sweeping equipment must provide adequate suction capacity to remove particles on the pavement's surface to provide a sufficient water quality demonstration and to maintain flow pathways.
   c. **Non-vegetated MRC: Underground Storage Chambers** – The use of the MRC BMP with non-vegetated, non-porous pavement stormwater practices must have pre-treatment, post-treatment, or a combination of both pre- and post-treatment measures incorporated into the design, to provide sufficient water quality. Underground storage chambers must be accessible for maintenance, and for this reason underground storage is not recommended to be rock beds. Pre- and post-treatment can be achieved through a treatment train concept that includes other BMPs listed in the Stormwater BMP Manual (as revised) so that the combination of BMPs provide 85% removal of TSS and associated Phosphorus. The MRC is considered a primary BMP for nitrate removal through the use of the IWS. Preferred pre- and post-treatment BMPs include: level spreader with vegetated filter strip, vegetated swale, other vegetated systems, and manufactured treatment devices. An applicant must demonstrate that the treatment train will meet water requirements by using Worksheets 11-13 or by providing an alternative water quality demonstration that is acceptable to DEP.

Vegetated Bio-retention Basins have been selected for the incorporation of the MRC BMP. Both basin bottom and basin side slopes shall be vegetated. Vegetation will include native grasses, sedges, and rushes in both plug beds and as seed mix. Vegetation species and mixtures, plant spacing and planting details, and the specification for the soil media have been selected by a Registered Landscape Architect specifically for use at this site and in these conditions. It is anticipated that these species will do well under normal conditions and will survive the depth and duration of larger storm events.

**This design standard is met.**

7. **Pre-Development Site Characterization and Assessment of Soil and Geology** – Adequate and appropriate soils and geologic testing and evaluation must be performed to demonstrate the infiltration capacity of the entire project site to the satisfaction of DEP. At a minimum, one infiltration test for every 40,000 square feet of disturbed acreage should be performed with a minimum of four tests, equally distributed across a site. The infiltration tests must be done in the most accommodating soil horizon for infiltration as demonstrated by a deep hole test within 100 feet of the infiltration test. All other sections of Appendix C Protocol 1, Site Evaluation and Soil Infiltration Testing and Appendix C Protocol 2, Infiltration Systems Guidelines per the Stormwater BMP Manual (as revised) should be followed to clearly demonstrate the infiltration capability of on-site undisturbed soils at applicable elevations and for a variety of locations. Soil probes and infiltration test locations should be identified on the PCSM Plan drawing(s). The use of soil borings as a substitute for test pits can be used as a planning tool but will not generally be accepted for final design of infiltration MRC BMPs.

   Due to the existing site being utilized for industrial purposes, and the site's proximity to the Delaware River, infiltration for stormwater management is not utilized. Therefore, MRC design was implemented for Bio-retention (MRC) Basins #11D and #11E and MRC Basin A on-site due to the lack of infiltration capability.

   **This design standard is met.**

8. **Separation Distance** – At least one foot of separation distance should be maintained between groundwater or the seasonally high-water table and the bottom footprint of the MRC BMP's soil media; however, a two-foot separation is preferred. There is no minimum separation required between bedrock or hardpan and the MRC BMP's soil media.

   The proposed Bio-Retention BMPs are not designed for infiltration. Groundwater or the seasonally high-water table was not encountered for this project area.

   **This design standard is met.**

9. **Ponding Depth and Drawdown Time** – The maximum ponding time (i.e., the time after the end of storm event for stored surface water to lower to soil surface) should not exceed 72 hours for any storm event. In general, a maximum ponding depth (i.e., storage depth above BMP surface) of one to two feet at the peak of the 2-yr/24-hr storm event should not be exceeded for the design of surface BMPs. In accordance with MRC Design Standard 4, the MRC might incorporate a multi-stage detention facility with the upper portions of the facility providing flow attenuation for storm events greater than the 2-yr/24-hr storm, to meet 25 Pa. Code §102.8(g)(3). An engineered overflow structure or reinforced spillway/berm should be installed to provide safe conveyance for storm events greater than the 2-yr/24-hr storm. Ponding depths for storms larger than the 2-yr/24-hr storm should not exceed four feet, and drawdown to the MRC BMP surface should not exceed 72 hours for all design storms. For underground storage chambers and porous pavement MRC systems, drawdown to the IWS storage level should not exceed 7 days.

**Basins #11D and #11E**

| | **Drawdown Time** | **Ponding Elevation** | **Ponding Depth** |
|---|---|---|---|
| 2-yr / 24-hr Storm | 50.14 hrs | 14.28 | 1.28 ft |
| 10-yr / 24-hr Storm | 51.79 hrs | 15.03 | 2.03 ft |
| 50-yr / 24-hr Storm | 53.42 hrs | 15.64 | 2.64 ft |
| 100-yr / 24-hr Storm | 54.26 hrs | 16.00 | 3.00 ft |

**This design standard is met.**

**Basin A**

| | **Drawdown Time** | **Ponding Elevation** | **Ponding Depth** |
|---|---|---|---|
| 2-yr / 24-hr Storm | 54.42 hrs | 14.29 | 1.29 ft |
| 10-yr / 24-hr Storm | 55.53 hrs | 15.00 | 2.00 ft |
| 50-yr / 24-hr Storm | 56.15 hrs | 15.86 | 2.86 ft |
| 100-yr / 24-hr Storm | 56.44 hrs | 16.35 | 3.35 ft |

**This design standard is met.**

10. **Soil Media** – The selection of soil media should be done by considering anticipated pollutants to be treated and the vegetation that will be used. On-site soils should be evaluated for desired characteristics and infiltration capabilities as listed below. The depth of the soil media above the invert elevation of the underdrain pipe should be a minimum of 2 feet to provide pollutant removal. If on-site undisturbed soils are unsuitable for the purpose of providing IWS, an additional one to two feet of suitable soil media should be provided below the underdrain.

    **Soil Media Discharge** – The designer will need to exercise caution when selecting a soil media, as there is a delicate balance between infiltration rate and residence time. As noted in Appendix C, Protocol 2 of the Stormwater BMP Manual (as revised), the design soil infiltration rate should be between 0.1 inch per hour and 10 inches per hour for native soils. To maximize water quality treatment, the residence time within the soil media used in MRC BMPs should be selected to be close to the parameters established for infiltration into native soils. The designer will need to select a soil media that provide the proper infiltration rate and ponding time to achieve water quality for the anticipated life cycle of the BMP.

    Bio-retention, vegetation, and the soil media were specifically selected for their ability to reduce the expected pollutants on the project site. 2 foot of soil media will be provided above the invert elevation of the underdrain for the Bio-retention (MRC) Basins proposed on-site. It is anticipated that on-site soils will be suitable for use within the soil media in providing IWS.

    Residence time within the soil media will be maximized given the 1.2in./2-hr storm elevation does not exceed the overflow orifice in the outlet structure of the MRC basins.

    **This design standard has been met.**

11. **Underdrain Design** – The licensed professional engineer can refer to PennDOT Publication 408 Section 610 for specifications of underdrains. However, underdrains should have a minimum flow rate of 10 gallons (1.34 cubic feet) per minute per linear foot of pipe not considering the flow control orifice or upturned elbow. For non-vegetated MRC BMPs, the underdrain should be located at the bottom of the IWS to promote movement of water from previous storms. There may need to be multiple underdrains, or longer underdrains, to provide adequate design capacity for drainage. Section 6.4.7 (Constructed Filter) of the Stormwater Management BMP Manual (as revised) has recommended design standards for lateral spacing of multiple underdrains.

    **IWS Outflow with Capped/Orifice Underdrain** – It is highly recommended that an upturned elbow or an elevated weir be designed at the outlet of the underdrain. The upturned elbow or elevated weir will create a zone within the soil media, referred to as the IWS. Research has shown that IWS can reduce runoff volume and improve water quality treatment. The upturned elbow or elevated weir can also help if site conditions present daylighting issues for the underdrain's discharge elevation. Underdrains should be capped within an outlet structure when used to allow access for maintenance. The cap should be drilled to provide an appropriately sized orifice. Note that all cleanouts and angles within the underdrain should not exceed 45 degrees. For lined, non-vegetated MRCs the underdrain leading to the upturned elbow should be located at the bottom of the IWS.

    **Underdrain Aggregate Envelope** – A 6-inch stone envelope of AASHTO #57 should be placed around the underdrain. A geotextile (or pea gravel diaphragm) is needed around the aggregate envelope. Note that the stone should be placed throughout the bottom of the BMP, but just in the envelope of the underdrain.

    **Cleanout for the Underdrain** – The underdrain(s) should be equipped with a cleanout for maintenance. The design of any cleanout should ensure that surface water does not enter the underdrain system through the top of the cleanout. Consideration must be given to cleaning and inspecting underdrains and access to the upturned elbow or elevated weir.

    **Orifices** – An appropriately sized orifice is necessary on the outlet of the underdrain to control flow to the required release rate. The orifice should be clean, smooth, and sanded so that no burrs or irregularities are present. The orifice should be on a plate or cap of sufficient thickness, and the edges of the orifice should be ground so that flow through the orifice is smooth. Orifices should be vertical. The orifice plate and other connections should be water-tight and accessible for maintenance. Control valves cannot be substituted for an orifice.

A 12-inch perforated underdrain has been provided throughout the entire length of Bio-Retention (MRC) Basins #11D and #11E and 6-inch perforated underdrain throughout the entire length of MRC Basin A with an invert elevation 2 feet below the bottom of the basins (invert 11.00). 12-inch solid wall underdrain equalizer pipes are also provided that connect the Combined MRC basins at elevation 11.00. The underdrain extends into the outlet structure for access and maintenance. The underdrain will be capped watertight with a 6.00-inch (Combined Basins) and 3.00-inch (Basin A) smooth orifice drilled into the cap to provide the design release rate. Cleanouts are provided within the basin bottoms and the outlet structure will act as a cleanout if necessary. A geotextile wrapped, AASHTO #57 envelope is provided around the underdrains.

**Therefore, this design standard is met.**

12. **Discharge Flow Path** – The MRC BMP should be directed to a suitably vegetated flow path, which can safely convey the releases without erosion or loss of stability. The discharge should be dispersed through the use of a level spreader. A licensed professional engineer can provide analysis, with calculations, which identifies that a level spreader is not necessary, or that discharge to a channel will not cause increased erosion.

    Bio-retention Basins #11D and #11E and MRC Basin A have been designed to act as MRC BMPs and provide the required stormwater management for the larger design storms for the Discharge Point on-site. The outlet structure discharges through an appropriately sized RCP pipe, flow which eventually conveys to the project POI, the Delaware River. Runoff rates from the post-construction 2-yr/24-hr storm are managed back to the pre-construction 1-yr/24-hr storm, the post-construction 5-yr/24-hr storm to the pre-construction 2-yr/24-hr storm, and the post construction 100-yr/24-hr storm to the pre-construction 100-yr/24-hr storm. In meeting these requirements, streambank erosion criteria are met.

    **Therefore, this design standard is met.**

13. **Antidegradation Requirements** – Where the stormwater from the project site discharges to a special protection surface water, an MRC BMP can be used to satisfy the Antidegradation Best Available Combination of Technologies (ABACT) regulatory requirements from Chapters 93 and 102 (assuming that non-discharge alternatives do not exist).

    The project site is not located within an HQ or EV watershed and the receiving waters are not impaired for siltation, suspended soils, turbidity, water/flow variability, flow modification/alterations or nutrients; therefore, this design standard does not apply.

# Hydrograph Summary Report

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

| Hyd. No. | Hydrograph type (origin) | Peak flow (cfs) | Time interval (min) | Time to Peak (min) | Hyd. volume (cuft) | Inflow hyd(s) | Maximum elevation (ft) | Total strge used (cuft) | Hydrograph Description |
|---|---|---|---|---|---|---|---|---|---|
| 1 | SCS Runoff | 0.000 | 2 | n/a | 0 | ------ | ------ | ------ | Pre-Dev DA #1 - DP 001 |
| 2 | SCS Runoff | 0.000 | 2 | n/a | 0 | ------ | ------ | ------ | Pre-Dev DA #4 - DP 001 |
| 3 | SCS Runoff | 0.000 | 2 | n/a | 0 | ------ | ------ | ------ | Off-site (Fleck) - DP 001 |
| 4 | SCS Runoff | 0.000 | 2 | n/a | 0 | ------ | ------ | ------ | Off-site (Petrucci) - DP 001 |
| 5 | SCS Runoff | 0.000 | 2 | n/a | 0 | ------ | ------ | ------ | Off-site (Hiossen) - DP 001 |
| 6 | SCS Runoff | 0.000 | 2 | n/a | 0 | ------ | ------ | ------ | Off-site (HB Fuller-North) - DP 001 |
| 7 | SCS Runoff | 0.000 | 2 | n/a | 0 | ------ | ------ | ------ | Off-site (HB Fuller-Middle) - DP 001 |
| 8 | SCS Runoff | 0.000 | 2 | n/a | 0 | ------ | ------ | ------ | Off-site (HB Fuller-South) - DP 001 |
| 9 | SCS Runoff | 0.000 | 2 | n/a | 0 | ------ | ------ | ------ | Off-site (Eastern DA) - DP 001 |
| 10 | Combine | 0.000 | 2 | n/a | 0 | 2, 3, 4, 5, 6, | ------ | ------ | Off-site (2-6) - DP 001 |
| 11 | Combine | 0.000 | 2 | n/a | 0 | 7, 8, 9, 10 | ------ | ------ | Total Off-site (Pre-Dev) - DP 001 |
| 12 | Combine | 0.000 | 2 | n/a | 0 | 1, 2, | ------ | ------ | Total On-site (Pre-Dev) - DP 001 |
| 13 | Combine | 0.000 | 2 | n/a | 0 | 11, 12 | ------ | ------ | Total Pre-Dev - DP 001 |
| 15 | SCS Runoff | 0.000 | 2 | n/a | 0 | ------ | ------ | ------ | Pre-Dev DA #2 (Remains On-Site) |
| 16 | SCS Runoff | 0.000 | 2 | n/a | 0 | ------ | ------ | ------ | Pre-Dev DA #3 (Remains On-Site) |
| 18 | SCS Runoff | 0.000 | 2 | n/a | 0 | ------ | ------ | ------ | Post-Dev DA #1 - DP 001 |
| 19 | Combine | 0.000 | 2 | n/a | 0 | 11, 18 | ------ | ------ | Total To Pond #9 - DP 001 |
| 20 | Reservoir | 0.000 | 2 | n/a | 0 | 19 | 8.00 | 0.000 | Route Pond #9 |
| 22 | SCS Runoff | 0.000 | 2 | n/a | 0 | ------ | ------ | ------ | Stormwater Trench 2+3 - DP 001 |
| 23 | Reservoir | 0.000 | 2 | n/a | 0 | 22 | 15.67 | 0.000 | Route ST-2+3 |
| 24 | SCS Runoff | 0.000 | 2 | n/a | 0 | ------ | ------ | ------ | Stormwater Trench 4 - DP 001 |
| 25 | Reservoir | 0.000 | 2 | n/a | 0 | 24 | 15.67 | 0.000 | Route ST-4 |
| 26 | SCS Runoff | 0.000 | 2 | n/a | 0 | ------ | ------ | ------ | Stormwater Trench 5 - DP 001 |
| 27 | Reservoir | 0.000 | 2 | n/a | 0 | 26 | 15.67 | 0.000 | Route ST-5 |
| 28 | SCS Runoff | 0.000 | 2 | n/a | 0 | ------ | ------ | ------ | Stormwater Trench 6 - DP 001 |
| 29 | Reservoir | 0.000 | 2 | n/a | 0 | 28 | 15.67 | 0.000 | Route ST-6 |
| 30 | Combine | 0.000 | 2 | n/a | 0 | 23, 25, 27, 29 | ------ | ------ | Total Stormwater Trench Outflow - D |
| 32 | SCS Runoff | 0.000 | 2 | n/a | 0 | ------ | ------ | ------ | Post-Dev DA #2A - DP 001 |
| 33 | SCS Runoff | 0.000 | 2 | n/a | 0 | ------ | ------ | ------ | Post-Dev DA #2B - DP 001 |
| 34 | SCS Runoff | 0.000 | 2 | n/a | 0 | ------ | ------ | ------ | Post-Dev DA #2C - DP 001 |
| 35 | SCS Runoff | 0.000 | 2 | n/a | 0 | ------ | ------ | ------ | Post-Dev DA #3 - DP 001 |
| 36 | SCS Runoff | 0.000 | 2 | n/a | 0 | ------ | ------ | ------ | Post-Dev DA #4 - DP 001 |

# Hydrograph Summary Report

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

| Hyd. No. | Hydrograph type (origin) | Peak flow (cfs) | Time interval (min) | Time to Peak (min) | Hyd. volume (cuft) | Inflow hyd(s) | Maximum elevation (ft) | Total strge used (cuft) | Hydrograph Description |
|---|---|---|---|---|---|---|---|---|---|
| 37 | SCS Runoff | 0.000 | 2 | n/a | 0 | ------ | ------ | ------ | Post-Dev DA #5 - DP 001 |
| 38 | SCS Runoff | 0.000 | 2 | n/a | 0 | ------ | ------ | ------ | Post-Dev DA #6 - DP 001 |
| 39 | SCS Runoff | 0.000 | 2 | n/a | 0 | ------ | ------ | ------ | Post-Dev DA #7 - DP 001 |
| 40 | SCS Runoff | 0.000 | 2 | n/a | 0 | ------ | ------ | ------ | Post-Dev DA #8 - DP 001 |
| 41 | Combine | 0.000 | 2 | n/a | 0 | 32, 33, 34, 35, 36, | ------ | ------ | Subtotal - Post DA (2A-4) |
| 42 | Combine | 0.000 | 2 | n/a | 0 | 37, 38, 39, 40, | ------ | ------ | Subtotal - Post DA (5-9) |
| 43 | Combine | 0.000 | 2 | n/a | 0 | 20, 30, 41, 42 | ------ | ------ | Total to Combined Basins |
| 44 | Reservoir | 0.000 | 2 | n/a | 0 | 43 | 13.00 | 0.000 | Route Combined Basins |
| 46 | SCS Runoff | 0.000 | 2 | n/a | 0 | ------ | ------ | ------ | Post-Dev Bypass #1 - DP 001 |
| 47 | SCS Runoff | 0.000 | 2 | n/a | 0 | ------ | ------ | ------ | Post-Dev Bypass #2 - DP 001 |
| 48 | SCS Runoff | 0.000 | 2 | n/a | 0 | ------ | ------ | ------ | Post-Dev Bypass #3 - DP 001 |
| 49 | Combine | 0.000 | 2 | n/a | 0 | 46, 47, 48 | ------ | ------ | Total Bypass Area - DP 001 |
| 51 | Combine | 0.000 | 2 | n/a | 0 | 44, 49, | ------ | ------ | Total Post-Dev - DP 001 |
| 53 | SCS Runoff | 0.000 | 2 | n/a | 0 | ------ | ------ | ------ | Pre-Dev DA #5 - DP 002 |
| 55 | SCS Runoff | 0.000 | 2 | n/a | 0 | ------ | ------ | ------ | Stormwater Trench ST-1 - DP 002 |
| 56 | Reservoir | 0.000 | 2 | n/a | 0 | 55 | 14.67 | 0.000 | Route ST-1 |
| 57 | SCS Runoff | 0.000 | 2 | n/a | 0 | ------ | ------ | ------ | Post-Dev Basin A - DP 002 |
| 58 | Combine | 0.000 | 2 | n/a | 0 | 56, 57 | ------ | ------ | Total to Basin A |
| 59 | Reservoir | 0.000 | 2 | n/a | 0 | 58 | 10.50 | 0.000 | Route Basin A |
| 61 | SCS Runoff | 0.000 | 2 | n/a | 0 | ------ | ------ | ------ | Post-Dev Bypass #5 - DP 002 |
| 63 | Combine | 0.000 | 2 | n/a | 0 | 59, 61, | ------ | ------ | Total Post-Dev - DP 002 |
| 65 | SCS Runoff | 0.000 | 1 | n/a | 0 | ------ | ------ | ------ | Comb Basins (MRC - Lawn A) |
| 66 | SCS Runoff | 6.426 | 1 | 120 | 15,872 | ------ | ------ | ------ | Comb Basins (MRC - Lawn D) |
| 67 | SCS Runoff | 82.66 | 1 | 119 | 500,879 | ------ | ------ | ------ | Comb Basins (MRC - Imp) |
| 68 | Combine | 89.08 | 1 | 120 | 516,752 | 65, 66, 67 | ------ | ------ | Total Comb Basins (MRC) |
| 69 | Reservoir | 1.002 | 1 | 130 | 161,150 | 68 | 13.36 | 513,007 | Route MRC Basins |
| 71 | SCS Runoff | 0.000 | 1 | n/a | 0 | ------ | ------ | ------ | Basin A (MRC - Lawn A) |
| 72 | SCS Runoff | 0.446 | 1 | 120 | 1,101 | ------ | ------ | ------ | Basin A (MRC - Lawn D) |
| 73 | SCS Runoff | 0.280 | 1 | 119 | 1,697 | ------ | ------ | ------ | Basin A (MRC - Imp) |
| 74 | Combine | 0.726 | 1 | 120 | 2,798 | 71, 72, 73 | ------ | ------ | Total Basin A (MRC) |

# Hydrograph Summary Report

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

| Hyd. No. | Hydrograph type (origin) | Peak flow (cfs) | Time interval (min) | Time to Peak (min) | Hyd. volume (cuft) | Inflow hyd(s) | Maximum elevation (ft) | Total strge used (cuft) | Hydrograph Description |
|---|---|---|---|---|---|---|---|---|---|
| 75 | Reservoir | 0.000 | 1 | n/a | 0 | 74 | 11.69 | 2,798 | Route MRC Basin A |

# Pond Report



## Pond No. 5 - Combined Basins (MRC)

### Pond Data

Contours -Interval = 1.00 ft; Area method = Conic; Side slopes = 0.00:1; Bottom elevation = 10.50 ft; Beginning Elevation = 10.50 ft; Voids = 30.00%

### Stage / Storage Table

| Stage (ft) | Elevation (ft) | Contour area (sqft) | Incr. Storage (cuft) | Total storage (cuft) |
|---|---|---|---|---|
| 0.00 | 10.50 | 341,600 | 0 | 0 |
| 0.25 | 10.75 | 341,600 | 25,620 | 25,620 |
| 0.50 | 11.00 | 341,600 | 25,620 | 51,240 |
| 0.75 | 11.25 | 341,600 | 25,620 | 76,860 |
| 1.00 | 11.50 | 341,600 | 25,620 | 102,480 |
| 1.25 | 11.75 | 341,600 | 25,620 | 128,100 |
| 1.50 | 12.00 | 341,600 | 25,620 | 153,720 |
| 1.75 | 12.25 | 341,600 | 25,620 | 179,340 |
| 2.00 | 12.50 | 341,600 | 25,620 | 204,960 |
| 2.25 | 12.75 | 341,600 | 25,620 | 230,580 |
| 2.50 | 13.00 | 341,600 | 25,620 | 256,200 |
| 2.50 | 13.00 | 710,685 | 515 | 256,715 |
| 2.90 | 13.40 | 735,114 | 288,394 | 545,109 |
| 3.50 | 14.00 | 771,758 | 451,972 | 997,081 |
| 4.50 | 15.00 | 832,879 | 802,044 | 1,799,125 |
| 5.50 | 16.00 | 895,080 | 863,707 | 2,662,832 |
| 6.50 | 17.00 | 958,077 | 926,307 | 3,589,139 |
| 7.50 | 18.00 | 1,022,280 | 989,906 | 4,579,045 |

### Culvert / Orifice Structures

| | [A] | [B] | [C] | [PrfRsr] |
|---|---|---|---|---|
| **Rise (in)** | = 48.00 | 6.00 | 24.00 | 0.00 |
| **Span (in)** | = 48.00 | 6.00 | 24.00 | 0.00 |
| **No. Barrels** | = 2 | 1 | 2 | 0 |
| **Invert El. (ft)** | = 12.00 | 11.00 | 13.40 | 0.00 |
| **Length (ft)** | = 122.00 | 0.00 | 0.00 | 0.00 |
| **Slope (%)** | = 4.92 | 0.00 | 0.00 | n/a |
| **N-Value** | = .013 | .013 | .013 | n/a |
| **Orifice Coeff.** | = 0.60 | 0.60 | 0.60 | 0.60 |
| **Multi-Stage** | = n/a | Yes | Yes | No |

### Weir Structures

| | [A] | [B] | [C] | [D] |
|---|---|---|---|---|
| **Crest Len (ft)** | = 24.00 | 0.00 | 0.00 | 0.00 |
| **Crest El. (ft)** | = 17.00 | 0.00 | 0.00 | 0.00 |
| **Weir Coeff.** | = 3.33 | 3.33 | 3.33 | 3.33 |
| **Weir Type** | = 1 | --- | --- | --- |
| **Multi-Stage** | = Yes | No | No | No |

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

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

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

### Stage / Storage / Discharge Table

| Stage ft | Storage cuft | Elevation ft | Clv A cfs | Clv B cfs | Clv C cfs | PrfRsr cfs | Wr A cfs | Wr B cfs | Wr C cfs | Wr D cfs | Exfil cfs | User cfs | Total cfs |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.00 | 0 | 10.50 | 0.00 | 0.00 | 0.00 | --- | 0.00 | --- | --- | --- | --- | --- | 0.000 |
| 0.25 | 25,620 | 10.75 | 0.00 | 0.00 | 0.00 | --- | 0.00 | --- | --- | --- | --- | --- | 0.000 |
| 0.50 | 51,240 | 11.00 | 0.00 | 0.00 | 0.00 | --- | 0.00 | --- | --- | --- | --- | --- | 0.000 |
| 0.75 | 76,860 | 11.25 | 0.00 | 0.00 ic | 0.00 | --- | 0.00 | --- | --- | --- | --- | --- | 0.000 |
| 1.00 | 102,480 | 11.50 | 0.00 | 0.01 ic | 0.00 | --- | 0.00 | --- | --- | --- | --- | --- | 0.000 |
| 1.25 | 128,100 | 11.75 | 0.00 | 0.01 ic | 0.00 | --- | 0.00 | --- | --- | --- | --- | --- | 0.000 |
| 1.50 | 153,720 | 12.00 | 0.00 | 0.01 ic | 0.00 | --- | 0.00 | --- | --- | --- | --- | --- | 0.000 |
| 1.75 | 179,340 | 12.25 | 0.34 ic | 0.33 ic | 0.00 | --- | 0.00 | --- | --- | --- | --- | --- | 0.329 |
| 2.00 | 204,960 | 12.50 | 0.55 ic | 0.55 ic | 0.00 | --- | 0.00 | --- | --- | --- | --- | --- | 0.546 |
| 2.25 | 230,580 | 12.75 | 0.72 ic | 0.71 ic | 0.00 | --- | 0.00 | --- | --- | --- | --- | --- | 0.707 |
| 2.50 | 256,200 | 13.00 | 0.84 ic | 0.84 ic | 0.00 | --- | 0.00 | --- | --- | --- | --- | --- | 0.839 |
| 2.50 | 256,715 | 13.00 | 0.84 ic | 0.84 ic | 0.00 | --- | 0.00 | --- | --- | --- | --- | --- | 0.839 |
| 2.90 | 545,109 | 13.40 | 1.06 ic | 1.02 ic | 0.00 | --- | 0.00 | --- | --- | --- | --- | --- | 1.021 |
| 3.50 | 997,081 | 14.00 | 5.41 ic | 1.14 ic | 4.21 ic | --- | 0.00 | --- | --- | --- | --- | --- | 5.350 |
| 4.50 | 1,799,125 | 15.00 | 24.66 ic | 1.27 ic | 23.21 ic | --- | 0.00 | --- | --- | --- | --- | --- | 24.48 |
| 5.50 | 2,662,832 | 16.00 | 39.78 ic | 1.48 ic | 38.26 ic | --- | 0.00 | --- | --- | --- | --- | --- | 39.74 |
| 6.50 | 3,589,139 | 17.00 | 50.47 ic | 1.69 ic | 48.78 ic | --- | 0.00 | --- | --- | --- | --- | --- | 50.47 |
| 7.50 | 4,579,045 | 18.00 | 132.30 ic | 1.58 ic | 50.61 ic | --- | 79.92 | --- | --- | --- | --- | --- | 132.11 |

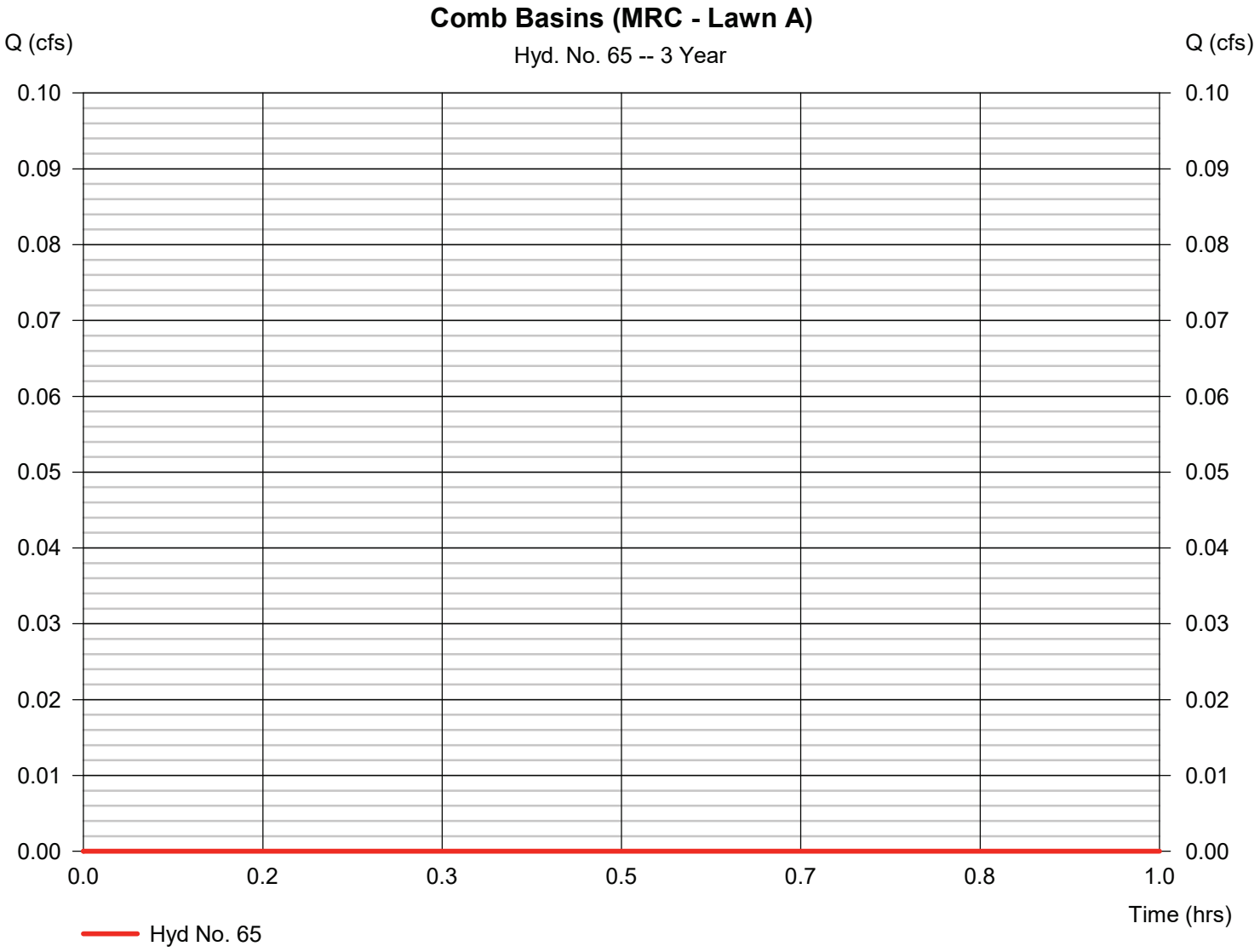
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 65

Comb Basins (MRC - Lawn A)

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 0.000 cfs |
| Storm frequency | = 3 yrs | Time to peak | = n/a |
| Time interval | = 1 min | Hyd. volume | = 0 cuft |
| Drainage area | = 9.040 ac | Curve number | = 39 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 1.20 in | Distribution | = Custom |
| Storm duration | = Q:\LANDDEV\2020\2007083_USS_Fairless_Hills_Master_Plan\2007083-05 - Pha | SCS Storm | = 48 |



# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 66

Comb Basins (MRC - Lawn D)

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 6.426 cfs |
| Storm frequency | = 3 yrs | Time to peak | = 2.00 hrs |
| Time interval | = 1 min | Hyd. volume | = 15,872 cuft |
| Drainage area | = 27.690 ac | Curve number | = 80 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 1.20 in | Distribution | = Custom |
| Storm duration | = Q:\LANDDEV\2020\2007083_USS_Fairless_Hills_Master_Plan\2007083-05 - Pha | SCS Factors | = 484 |



# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 67

Comb Basins (MRC - Imp)

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | SCS Runoff | Peak discharge | = | 82.66 cfs |
| Storm frequency | = | 3 yrs | Time to peak | = | 1.98 hrs |
| Time interval | = | 1 min | Hyd. volume | = | 500,879 cuft |
| Drainage area | = | 135.750 ac | Curve number | = | 98 |
| Basin Slope | = | 0.0 % | Hydraulic length | = | 0 ft |
| Tc method | = | User | Time of conc. (Tc) | = | 5.00 min |
| Total precip. | = | 1.20 in | Distribution | = | Custom |
| Storm duration | = | Q:\LANDDEV\2020\2007083_USS_Fairless_Hills_Master_Plan\2007083-05 - Ph | SCS Storm | = | 24 |



# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 68

Total Comb Basins (MRC)

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 89.08 cfs |
| Storm frequency | = 3 yrs | Time to peak | = 2.00 hrs |
| Time interval | = 1 min | Hyd. volume | = 516,752 cuft |
| Inflow hyds. | = 65, 66, 67 | Contrib. drain. area | = 172.480 ac |



# Hydrograph Report

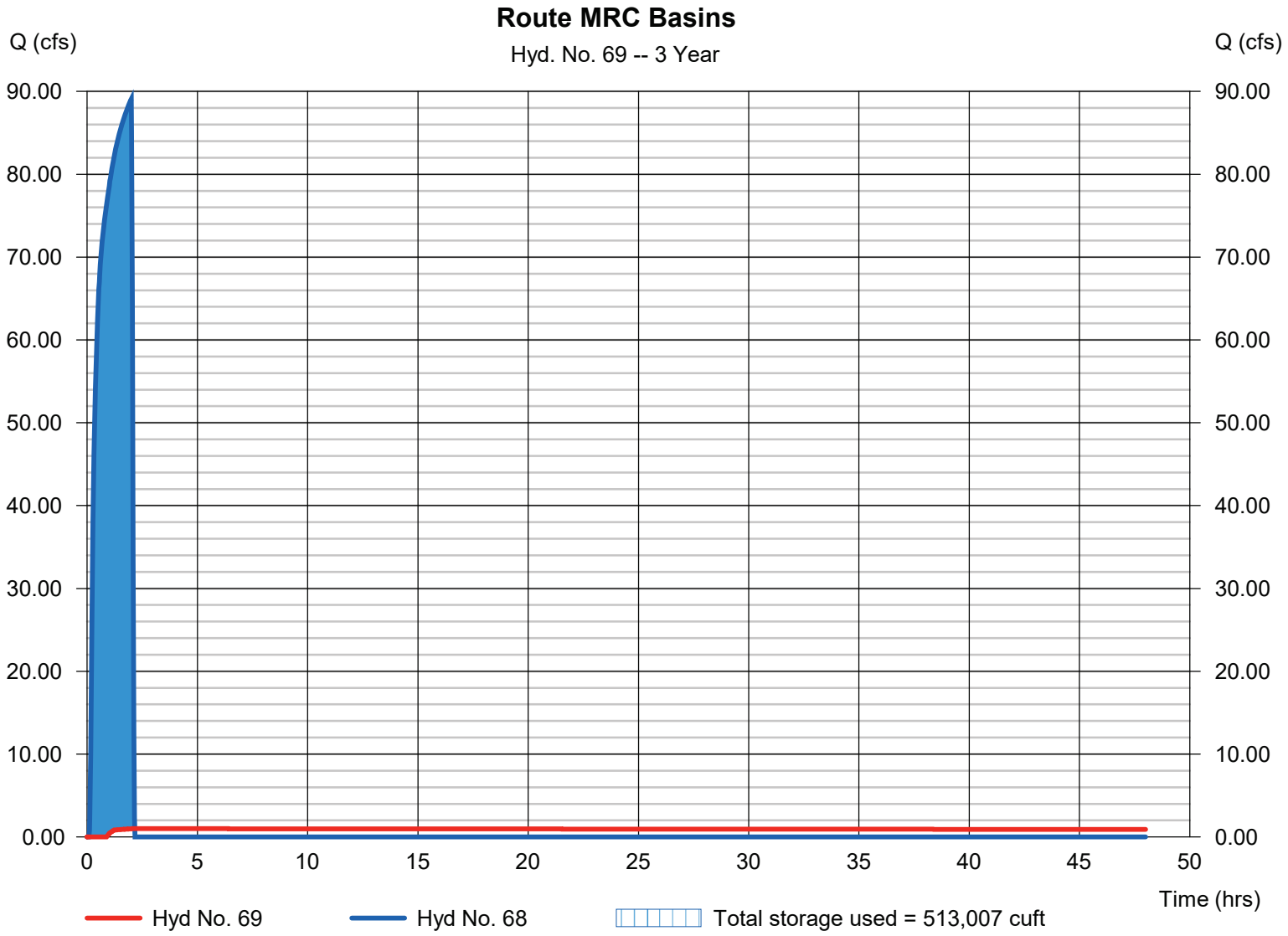


## Hyd. No. 69

Route MRC Basins

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | Reservoir | Peak discharge | = | 1.002 cfs |
| Storm frequency | = | 3 yrs | Time to peak | = | 2.17 hrs |
| Time interval | = | 1 min | Hyd. volume | = | 161,150 cuft |
| Inflow hyd. No. | = | 68 - Total Comb Basins (MRC) | Max. Elevation | = | 13.36 ft |
| Reservoir name | = | Combined Basins (MRC) | Max. Storage | = | 513,007 cuft |

Storage Indication method used.



# Pond Report



## Pond No. 8 - Basin A (MRC)

### Pond Data

Contours - User-defined contour areas. Conic method used for volume calculation. Begin at bottom elevation

### Stage / Storage Table

| Stage (ft) | Elevation (ft) | Contour area (sqft) | Incr. Storage (cuft) | Total storage (cuft) |
|---|---|---|---|---|
| 0.00 | 10.50 | 7,812 | 0 | 0 |
| 0.25 | 10.75 | 7,812 | 586 | 586 |
| 0.50 | 11.00 | 7,812 | 586 | 1,172 |
| 0.75 | 11.25 | 7,812 | 586 | 1,758 |
| 1.00 | 11.50 | 7,812 | 586 | 2,344 |
| 1.25 | 11.75 | 7,812 | 586 | 2,930 |
| 1.50 | 12.00 | 7,812 | 586 | 3,515 |
| 1.75 | 12.25 | 7,812 | 586 | 4,101 |
| 2.00 | 12.50 | 7,812 | 586 | 4,687 |
| 2.25 | 12.75 | 7,812 | 586 | 5,273 |
| 2.50 | 13.00 | 7,812 | 586 | 5,859 |
| 2.50 | 13.00 | 7,813 | 8 | 5,867 |
| 3.50 | 14.00 | 9,665 | 8,713 | 14,580 |
| 4.50 | 15.00 | 11,673 | 10,642 | 25,221 |
| 5.50 | 16.00 | 13,837 | 12,726 | 37,947 |
| 6.50 | 17.00 | 16,016 | 14,897 | 52,844 |
| 7.50 | 18.00 | 18,250 | 17,102 | 69,946 |

### Culvert / Orifice Structures

| | [A] | [B] | [C] | [PrfRsr] |
|---|---|---|---|---|
| **Rise (in)** | = 18.00 | 0.75 | 10.00 | 0.00 |
| **Span (in)** | = 18.00 | 0.75 | 10.00 | 0.00 |
| **No. Barrels** | = 1 | 1 | 2 | 0 |
| **Invert El. (ft)** | = 12.00 | 11.00 | 14.10 | 0.00 |
| **Length (ft)** | = 276.00 | 0.00 | 0.00 | 0.00 |
| **Slope (%)** | = 0.42 | 0.00 | 0.00 | n/a |
| **N-Value** | = .013 | .013 | .013 | n/a |
| **Orifice Coeff.** | = 0.60 | 0.60 | 0.60 | 0.60 |
| **Multi-Stage** | = n/a | Yes | Yes | No |

### Weir Structures

| | [A] | [B] | [C] | [D] |
|---|---|---|---|---|
| **Crest Len (ft)** | = 11.54 | 0.00 | 0.00 | 0.00 |
| **Crest El. (ft)** | = 16.50 | 0.00 | 0.00 | 0.00 |
| **Weir Coeff.** | = 3.33 | 3.33 | 3.33 | 3.33 |
| **Weir Type** | = 1 | --- | --- | --- |
| **Multi-Stage** | = Yes | No | No | No |

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

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

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

### Stage / Storage / Discharge Table

| Stage ft | Storage cuft | Elevation ft | Clv A cfs | Clv B cfs | Clv C cfs | PrfRsr cfs | Wr A cfs | Wr B cfs | Wr C cfs | Wr D cfs | Exfil cfs | User cfs | Total cfs |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.00 | 0 | 10.50 | 0.00 | 0.00 | 0.00 | --- | 0.00 | --- | --- | --- | --- | --- | 0.000 |
| 0.25 | 586 | 10.75 | 0.00 | 0.00 | 0.00 | --- | 0.00 | --- | --- | --- | --- | --- | 0.000 |
| 0.50 | 1,172 | 11.00 | 0.00 | 0.00 | 0.00 | --- | 0.00 | --- | --- | --- | --- | --- | 0.000 |
| 0.75 | 1,758 | 11.25 | 0.00 | 0.00 ic | 0.00 | --- | 0.00 | --- | --- | --- | --- | --- | 0.000 |
| 1.00 | 2,344 | 11.50 | 0.00 | 0.00 ic | 0.00 | --- | 0.00 | --- | --- | --- | --- | --- | 0.000 |
| 1.25 | 2,930 | 11.75 | 0.00 | 0.00 ic | 0.00 | --- | 0.00 | --- | --- | --- | --- | --- | 0.000 |
| 1.50 | 3,515 | 12.00 | 0.00 | 0.00 ic | 0.00 | --- | 0.00 | --- | --- | --- | --- | --- | 0.000 |
| 1.75 | 4,101 | 12.25 | 0.01 ic | 0.01 ic | 0.00 | --- | 0.00 | --- | --- | --- | --- | --- | 0.007 |
| 2.00 | 4,687 | 12.50 | 0.01 ic | 0.01 ic | 0.00 | --- | 0.00 | --- | --- | --- | --- | --- | 0.010 |
| 2.25 | 5,273 | 12.75 | 0.01 ic | 0.01 ic | 0.00 | --- | 0.00 | --- | --- | --- | --- | --- | 0.012 |
| 2.50 | 5,859 | 13.00 | 0.01 ic | 0.01 ic | 0.00 | --- | 0.00 | --- | --- | --- | --- | --- | 0.014 |
| 2.50 | 5,867 | 13.00 | 0.01 ic | 0.01 ic | 0.00 | --- | 0.00 | --- | --- | --- | --- | --- | 0.014 |
| 3.50 | 14,580 | 14.00 | 0.02 ic | 0.02 ic | 0.00 | --- | 0.00 | --- | --- | --- | --- | --- | 0.021 |
| 4.50 | 25,221 | 15.00 | 3.72 ic | 0.02 ic | 3.65 ic | --- | 0.00 | --- | --- | --- | --- | --- | 3.669 |
| 5.50 | 37,947 | 16.00 | 6.41 oc | 0.02 ic | 6.39 ic | --- | 0.00 | --- | --- | --- | --- | --- | 6.414 |
| 6.50 | 52,844 | 17.00 | 11.81 oc | 0.01 ic | 2.07 ic | --- | 9.73 s | --- | --- | --- | --- | --- | 11.81 |
| 7.50 | 69,946 | 18.00 | 13.23 oc | 0.00 ic | 0.56 ic | --- | 12.64 s | --- | --- | --- | --- | --- | 13.20 |

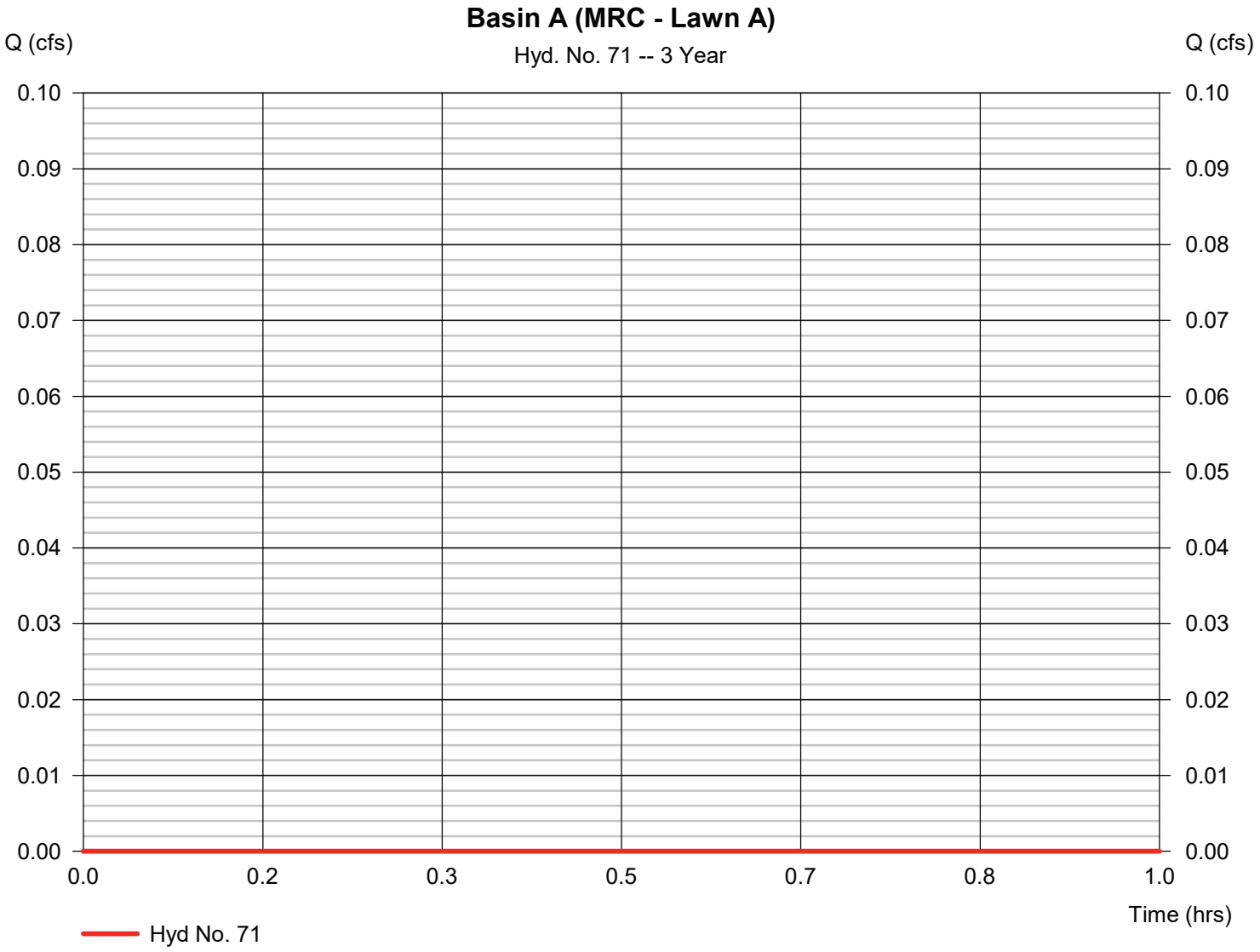
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 71

Basin A (MRC - Lawn A)

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 0.000 cfs |
| Storm frequency | = 3 yrs | Time to peak | = n/a |
| Time interval | = 1 min | Hyd. volume | = 0 cuft |
| Drainage area | = 0.880 ac | Curve number | = 39 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 1.20 in | Distribution | = Custom |
| Storm duration | = Q:\LANDDEV\2020\2007083_USS_Fairless_Hills_Master_Plan\2007083-05 - Pha | SCS Storm | = 484 |



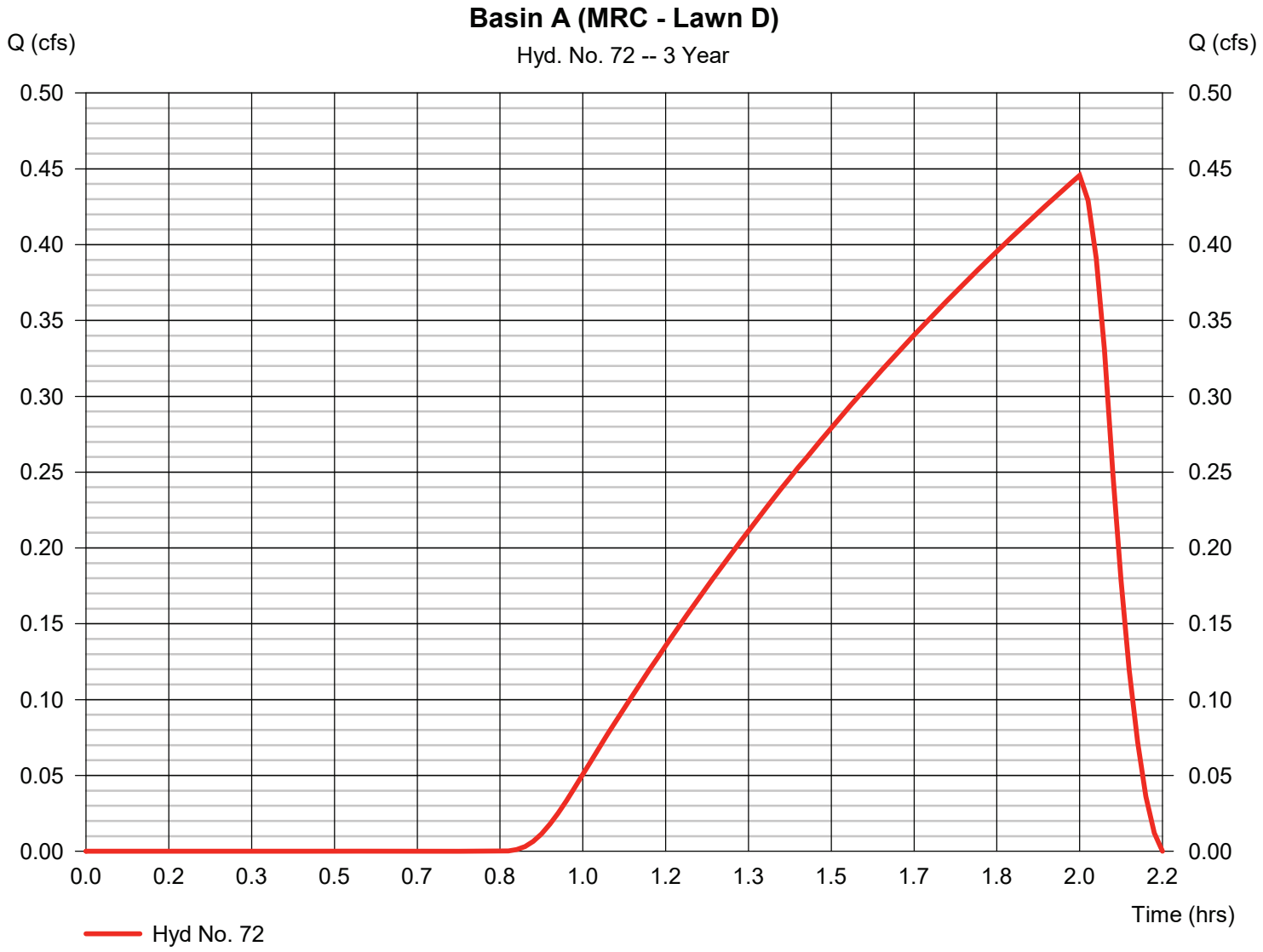
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 72

Basin A (MRC - Lawn D)

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | SCS Runoff | Peak discharge | = | 0.446 cfs |
| Storm frequency | = | 3 yrs | Time to peak | = | 2.00 hrs |
| Time interval | = | 1 min | Hyd. volume | = | 1,101 cuft |
| Drainage area | = | 1.920 ac | Curve number | = | 80 |
| Basin Slope | = | 0.0 % | Hydraulic length | = | 0 ft |
| Tc method | = | User | Time of conc. (Tc) | = | 5.00 min |
| Total precip. | = | 1.20 in | Distribution | = | Custom |
| Storm duration | = | Q:\LANDDEV\2020\2007083_USS_Fairless_Hills_Master_Plan\2007083-05 - Pha | SCS Storm | = | 24 |



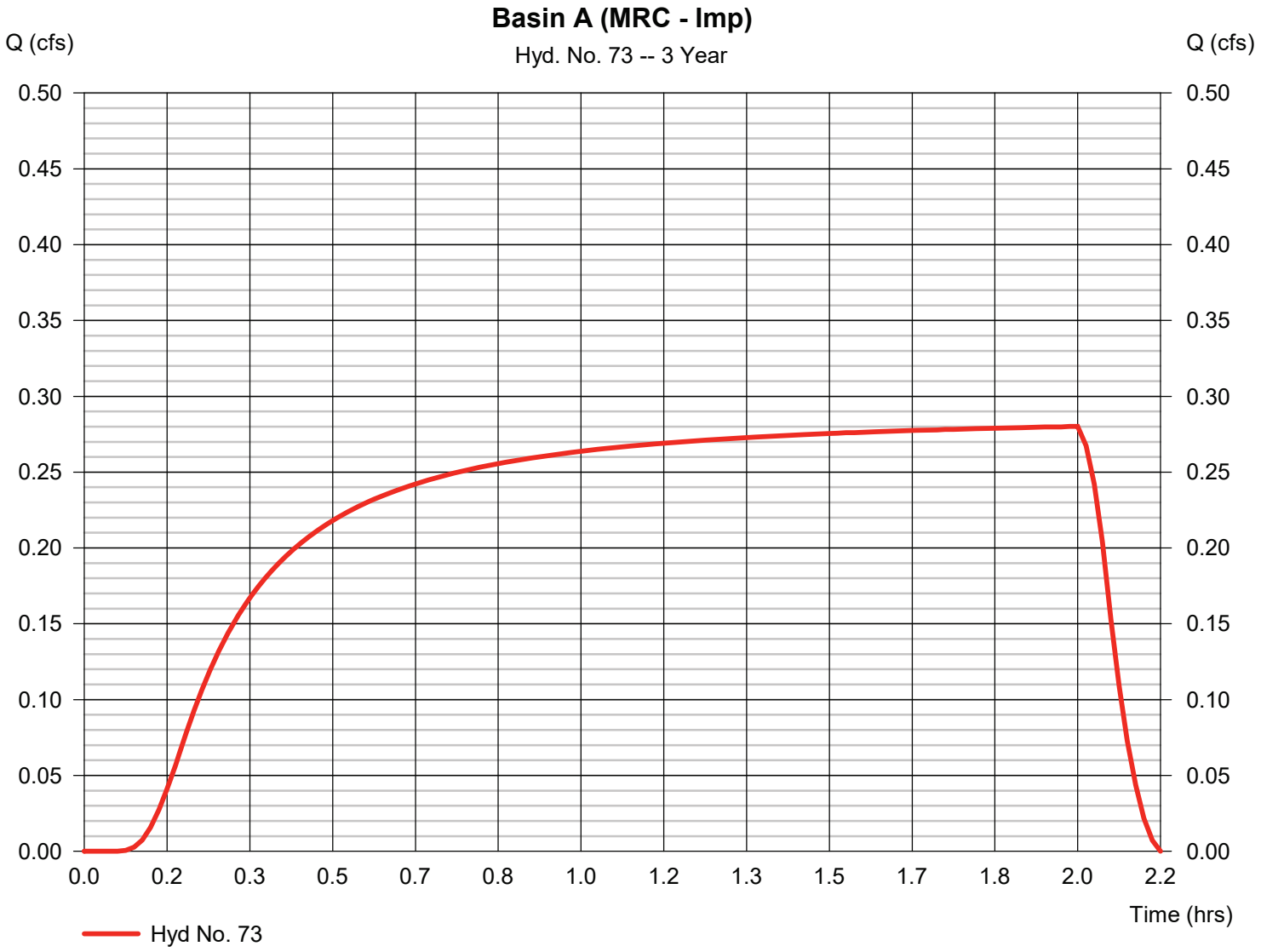
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 73

Basin A (MRC - Imp)

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | SCS Runoff | Peak discharge | = | 0.280 cfs |
| Storm frequency | = | 3 yrs | Time to peak | = | 1.98 hrs |
| Time interval | = | 1 min | Hyd. volume | = | 1,697 cuft |
| Drainage area | = | 0.460 ac | Curve number | = | 98 |
| Basin Slope | = | 0.0 % | Hydraulic length | = | 0 ft |
| Tc method | = | User | Time of conc. (Tc) | = | 5.00 min |
| Total precip. | = | 1.20 in | Distribution | = | Custom |
| Storm duration | = | Q:\LANDDEV\2020\2007083_USS_Fairless_Hills_Master_Plan\2007083-05 - Pha | SCS Storm | = | 48 |



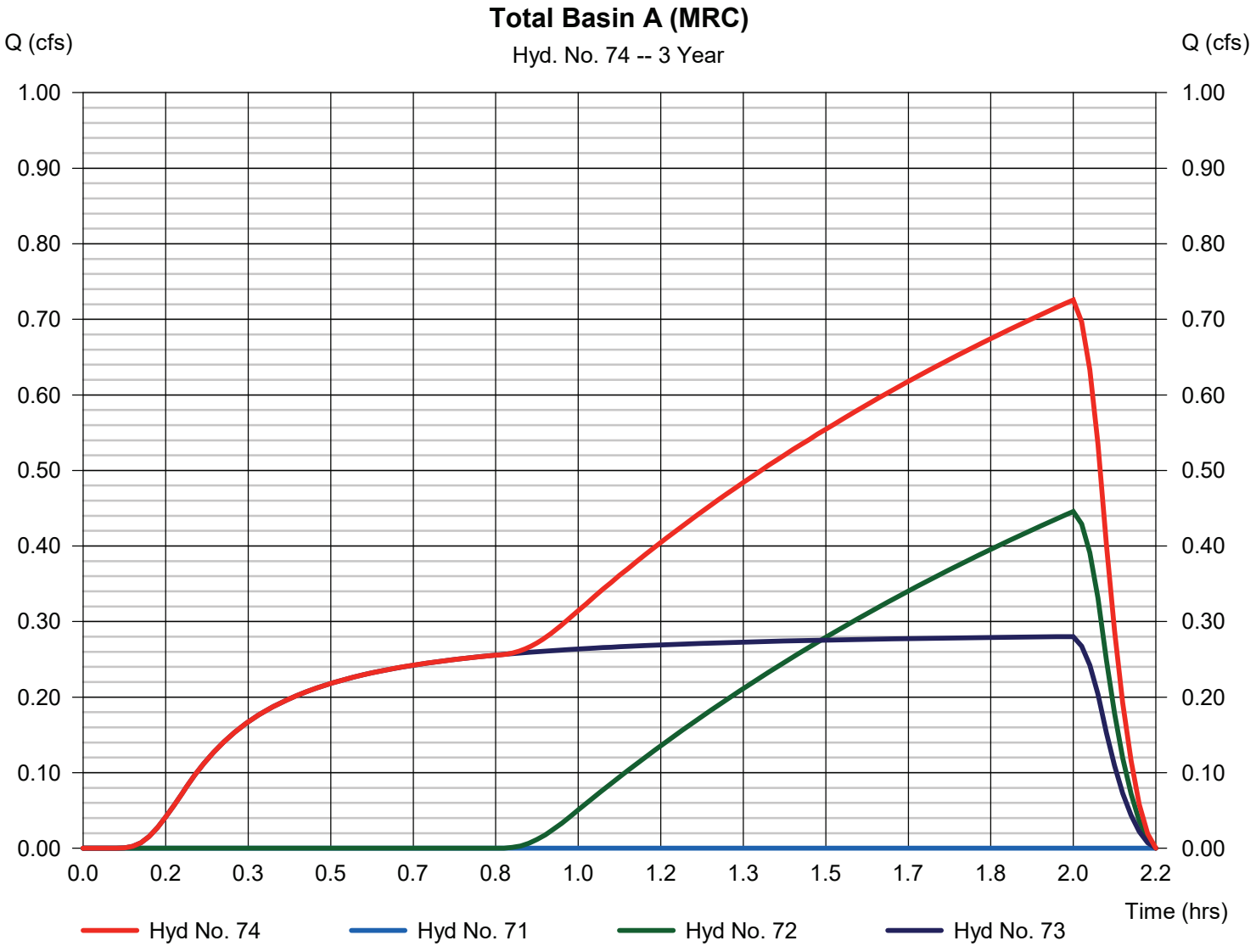
# Hydrograph Report



## Hyd. No. 74

Total Basin A (MRC)

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 0.726 cfs |
| Storm frequency | = 3 yrs | Time to peak | = 2.00 hrs |
| Time interval | = 1 min | Hyd. volume | = 2,798 cuft |
| Inflow hyds. | = 71, 72, 73 | Contrib. drain. area | = 3.260 ac |



# Hydrograph Report

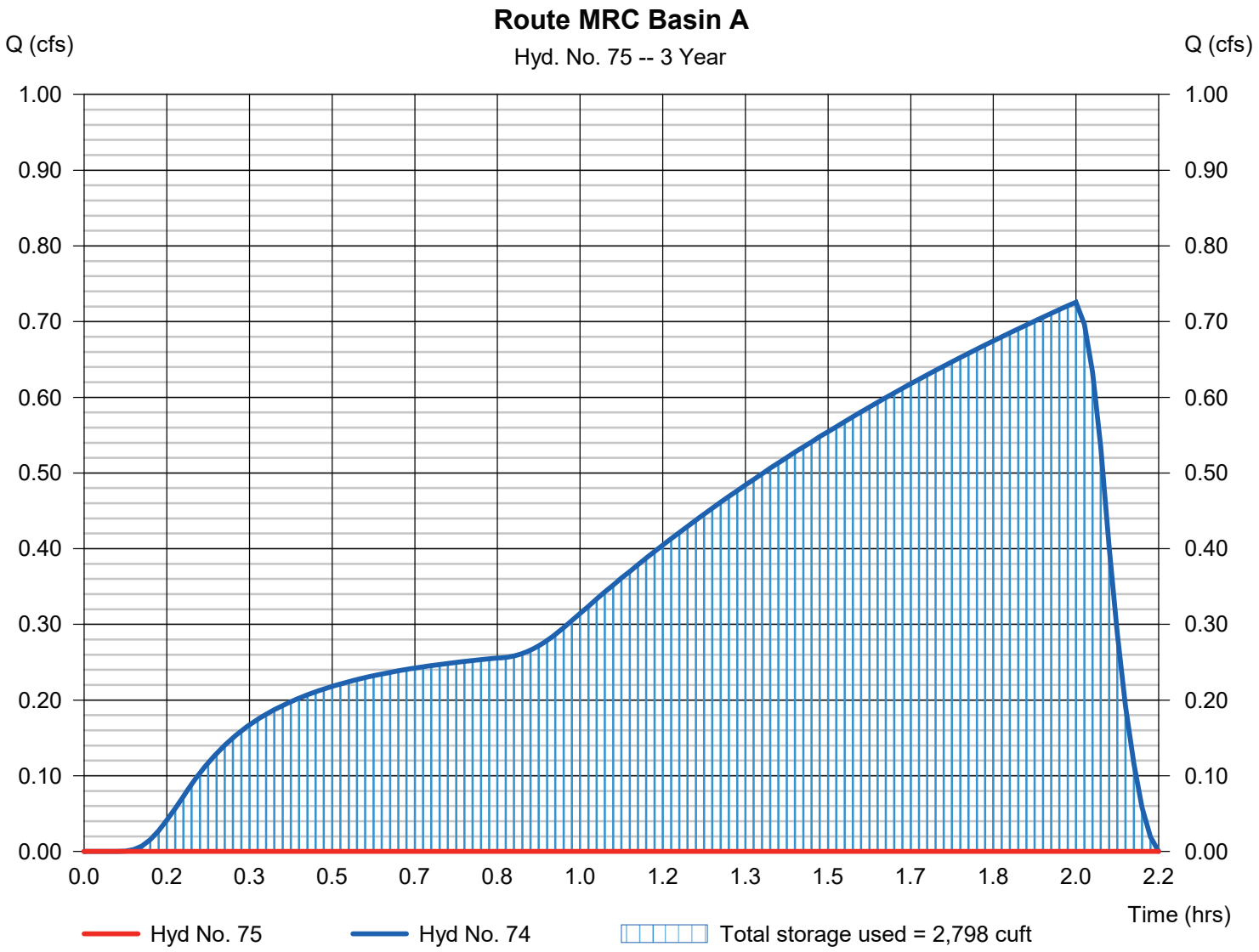
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 75

Route MRC Basin A

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | Reservoir | Peak discharge | = | 0.000 cfs |
| Storm frequency | = | 3 yrs | Time to peak | = | n/a |
| Time interval | = | 1 min | Hyd. volume | = | 0 cuft |
| Inflow hyd. No. | = | 74 - Total Basin A (MRC) | Max. Elevation | = | 11.69 ft |
| Reservoir name | = | Basin A (MRC) | Max. Storage | = | 2,798 cuft |

Storage Indication method used.



## Change in Runoff Volume for 2-YR Storm Event

**PROJECT:** Keystone Trade Center - Phase 2 Development
**Drainage Area:** Bypass Areas #1, #2, &#3 - DP 001
**2-Year Rainfall:** 3.3 inches NOAA Atlas 14, Table 2

**Total Site Area:** 9.46 Acres
**Protected Site Area:** 0.00 Acres
**Managed Area:** 9.46 Acres

**Existing Conditions:**

| Cover Type/Condition | | Soil Type | Area (sf) | Area (ac) | CN | S | Ia (0.2*S) | Q Runoff (in) | Runoff Volume (cu.ft.) |
|---|---|---|---|---|---|---|---|---|---|
| Woodlands | good | A | 0 | 0.00 | 30 | 23.33 | 4.67 | 0.085 | 0 |
| | | B | 0 | 0.00 | 55 | 8.18 | 1.64 | 0.281 | 0 |
| | | D | 0 | 0.00 | 77 | 2.99 | 0.60 | 1.284 | 0 |
| Meadow | good | A | 16,553 | 0.38 | 30 | 23.33 | 4.67 | 0.085 | 117 |
| | | B | 0 | 0.00 | 58 | 7.24 | 1.45 | 0.377 | 0 |
| | | D | 242,194 | 5.56 | 78 | 2.82 | 0.56 | 1.347 | 27,189 |
| Impervious | | - | 153,331 | 3.52 | 98 | 0.20 | 0.04 | 3.067 | 39,191 |
| Impervious (20% as Meadow) | | A | 0 | 0.00 | 30 | 23.33 | 4.67 | 0.085 | 0 |
| Impervious (20% as Meadow) | | D | 0 | 0.00 | 78 | 2.82 | 0.56 | 1.347 | 0 |
| Wetlands/Waters | | - | 0 | 0.00 | 98 | 0.20 | 0.04 | 3.067 | 0 |
| | | | | | | | | | |
| **TOTAL:** | | | **412,078** | **9.46** | | | | | **66,496** |

**Developed Conditions:**

| Cover Type/Condition | | Soil Type | Area (sf) | Area (ac) | CN | S | Ia (0.2*S) | Q Runoff (in) | Runoff Volume (cu.ft.) |
|---|---|---|---|---|---|---|---|---|---|
| Woodlands | good | A | 0 | 0.00 | 30 | 23.33 | 4.67 | 0.085 | 0 |
| | | B | 0 | 0.00 | 55 | 8.18 | 1.64 | 0.281 | 0 |
| | | D | 0 | 0.00 | 77 | 2.99 | 0.60 | 1.284 | 0 |
| Meadow | good | A | 0 | 0.00 | 30 | 23.33 | 4.67 | 0.085 | 0 |
| | | B | 0 | 0.00 | 58 | 7.24 | 1.45 | 0.377 | 0 |
| | | D | 0 | 0.00 | 78 | 2.82 | 0.56 | 1.347 | 0 |
| Lawn | good | A | 22,651 | 0.52 | 61 | 6.39 | 1.28 | 0.486 | 917 |
| | | B | 0 | 0.00 | 74 | 3.51 | 0.70 | 1.104 | 0 |
| | | D | 172,498 | 3.96 | 80 | 2.50 | 0.50 | 1.479 | 21,264 |
| Impervious | | - | 216,929 | 4.98 | 98 | 0.20 | 0.04 | 3.067 | 55,446 |
| Wetlands/Waters | | - | 0 | 0.00 | 98 | 0.20 | 0.04 | 3.067 | 0 |
| **TOTAL:** | | | **412,078** | **9.46** | | | | | **77,626** |

**2-Year Volume Increase (cu.ft.): 11,130**

2-Year Volume Increase (cu.ft.) = Developed Conditions Runoff Volume - Existing Conditions Runoff Volume

Runoff Volume (cu.ft) = Q x Area x 1/12 where Area = Land use area in square feet

Note: Runoff Volume must be calculated for EACH land use type/condition and HSGI. The use of a weighted CN value for volume calculations is not acceptable.

## Change in Runoff Volume for 2-YR Storm Event

**PROJECT:** Keystone Trade Center - Phase 2 Development
**Drainage Area:** Bypass Area A - DP 002
**2-Year Rainfall:** 3.3 inches NOAA Atlas 14, Table 2

**Total Site Area:** 0.09 Acres
**Protected Site Area:** 0.00 Acres
**Managed Area:** 0.09 Acres

**Existing Conditions:**

| Cover Type/Condition | | Soil Type | Area (sf) | Area (ac) | CN | S | Ia (0.2*S) | Q Runoff (in) | Runoff Volume (cu.ft.) |
|---|---|---|---|---|---|---|---|---|---|
| Woodlands | good | A | 0 | 0.00 | 30 | 23.33 | 4.67 | 0.085 | 0 |
| | | B | 0 | 0.00 | 55 | 8.18 | 1.64 | 0.281 | 0 |
| | | D | 0 | 0.00 | 77 | 2.99 | 0.60 | 1.284 | 0 |
| Meadow | good | A | 0 | 0.00 | 30 | 23.33 | 4.67 | 0.085 | 0 |
| | | B | 0 | 0.00 | 58 | 7.24 | 1.45 | 0.377 | 0 |
| | | D | 0 | 0.00 | 78 | 2.82 | 0.56 | 1.347 | 0 |
| Impervious | | - | 3,049 | 0.07 | 98 | 0.20 | 0.04 | 3.067 | 779 |
| Impervious (20% as Meadow) | | A | 0 | 0.00 | 30 | 23.33 | 4.67 | 0.085 | 0 |
| Impervious (20% as Meadow) | | D | 871 | 0.02 | 78 | 2.82 | 0.56 | 1.347 | 98 |
| Wetlands/Waters | | - | 0 | 0.00 | 98 | 0.20 | 0.04 | 3.067 | 0 |
| | | | | | | | | | |
| **TOTAL:** | | | **3,920** | **0.09** | | | | | **877** |

**Developed Conditions:**

| Cover Type/Condition | | Soil Type | Area (sf) | Area (ac) | CN | S | Ia (0.2*S) | Q Runoff (in) | Runoff Volume (cu.ft.) |
|---|---|---|---|---|---|---|---|---|---|
| Woodlands | good | A | 0 | 0.00 | 30 | 23.33 | 4.67 | 0.085 | 0 |
| | | B | 0 | 0.00 | 55 | 8.18 | 1.64 | 0.281 | 0 |
| | | D | 0 | 0.00 | 77 | 2.99 | 0.60 | 1.284 | 0 |
| Meadow | good | A | 0 | 0.00 | 30 | 23.33 | 4.67 | 0.085 | 0 |
| | | B | 0 | 0.00 | 58 | 7.24 | 1.45 | 0.377 | 0 |
| | | D | 0 | 0.00 | 78 | 2.82 | 0.56 | 1.347 | 0 |
| Lawn | good | A | 0 | 0.00 | 61 | 6.39 | 1.28 | 0.486 | 0 |
| | | B | 0 | 0.00 | 74 | 3.51 | 0.70 | 1.104 | 0 |
| | | D | 0 | 0.00 | 80 | 2.50 | 0.50 | 1.479 | 0 |
| Impervious | | - | 3,920 | 0.09 | 98 | 0.20 | 0.04 | 3.067 | 1,002 |
| Wetlands/Waters | | - | 0 | 0.00 | 98 | 0.20 | 0.04 | 3.067 | 0 |
| **TOTAL:** | | | **3,920** | **0.09** | | | | | **1,002** |

**2-Year Volume Increase (cu.ft.): 125**

2-Year Volume Increase (cu.ft.) = Developed Conditions Runoff Volume - Existing Conditions Runoff Volume

Runoff Volume (cu.ft) = Q x Area x 1/12 where Area = Land use area in square feet

Note: Runoff Volume must be calculated for EACH land use type/condition and HSGI. The use of a weighted CN value for volume calculations is not acceptable.

**Project**

Keystone Trade Center - Phase 2 Development — Project No. 2020-07083-15

Falls Township, Bucks County, PA — 9/24/2024

# Basin Drawdown Time Computation - Basins #11D & #11E

| Stage | Basin Storage (cu ft) | Incr. Storage (cu ft) | Discharge (cfs) | Avg. Discharge (cfs) | Incr. Time (hrs) | |
|---|---|---|---|---|---|---|
| 14.28 | 964,827 | | 31.060 | | | |
| | | 223,889 | | 24.466 | 2.54 | |
| 14.00 | 740,938 | | 17.872 | | | |
| | | 195,829 | | 9.948 | 5.47 | |
| 13.40 | 545,109 | | 2.023 | | | **Lowest Orifice** |
| | | 288,394 | | 1.513 | 52.96 | |
| 13.00 | 256,715 | | 1.002 | | | **Basin Bottom** |
| | | | | **Total** | **60.98** | |

**2-Yr/24-Hr Storm Ponding Time**:

| | | | | |
|---|---|---|---|---|
| Time to reach Elev: | 14.28 | 13.17 | Hrs | (From Hydrograph) |
| - Storm Duration | | -24.00 | Hrs | |
| Time to reach basin bottom: | | 60.98 | Hrs | |
| **Drawdown Time:** | | **50.14** | **Hrs** | |

**Project**

Keystone Trade Center - Phase 2 Development — Project No. 2020-07083-15

Falls Township, Bucks County, PA — 9/24/2024

## Basin Drawdown Time Computation - Basins #11D & #11E

| Stage | Basin Storage (cu ft) | Incr. Storage (cu ft) | Discharge (cfs) | Avg. Discharge (cfs) | Incr. Time (hrs) | |
|---|---|---|---|---|---|---|
| 15.03 | 1,564,691 | | 76.990 | | | |
| | | 21,709 | | 76.846 | 0.08 | |
| 15.00 | 1,542,982 | | 76.702 | | | |
| | | 802,044 | | 47.287 | 4.71 | |
| 14.00 | 740,938 | | 17.872 | | | |
| | | 195,829 | | 9.948 | 5.47 | |
| 13.40 | 545,109 | | 2.023 | | | **Lowest Orifice** |
| | | 288,394 | | 1.513 | 52.96 | |
| 13.00 | 256,715 | | 1.002 | | | **Basin Bottom** |
| | | | | **Total** | **63.22** | |

**50-Yr/24-Hr Storm Ponding Time**:

| | | | | |
|---|---|---|---|---|
| Time to reach Elev: | 15.03 | 12.57 | Hrs | |
| - Storm Duration | | -24.00 | Hrs | |
| Time to reach basin bottom: | | 63.22 | Hrs | (From Hydrograph) |
| **Drawdown Time:** | | **51.79** | **Hrs** | |

**Project**

Keystone Trade Center - Phase 2 Development — Project No. 2020-07083-15

Falls Township, Bucks County, PA — 9/24/2024

## Basin Drawdown Time Computation - Basins #11D & #11E

| Stage | Basin Storage (cu ft) | Incr. Storage (cu ft) | Discharge (cfs) | Avg. Discharge (cfs) | Incr. Time (hrs) | |
|---|---|---|---|---|---|---|
| 15.64 | 2,093,125 | | 102.590 | | | |
| | | 550,143 | | 89.646 | 1.70 | |
| 15.00 | 1,542,982 | | 76.702 | | | |
| | | 802,044 | | 47.287 | 4.71 | |
| 14.00 | 740,938 | | 17.872 | | | |
| | | 195,829 | | 9.948 | 5.47 | |
| 13.40 | 545,109 | | 2.023 | | | **Lowest Orifice** |
| | | 288,394 | | 1.513 | 52.96 | |
| 13.00 | 256,715 | | 1.002 | | | **Basin Bottom** |
| | | | | **Total** | **64.85** | |

**50-Yr/24-Hr Storm Ponding Time**:

| | | | | |
|---|---|---|---|---|
| Time to reach Elev: | 15.64 | 12.57 | Hrs | (From Hydrograph) |
| - Storm Duration | | -24.00 | Hrs | |
| Time to reach basin bottom: | | 64.85 | Hrs | |
| **Drawdown Time:** | | **53.42** | **Hrs** | |

**Project**

Keystone Trade Center - Phase 2 Development — Project No. 2020-07083-15

Falls Township, Bucks County, PA — 9/24/2024

## Basin Drawdown Time Computation - Basins #11D & #11E

| Stage | Basin Storage (cu ft) | Incr. Storage (cu ft) | Discharge (cfs) | Avg. Discharge (cfs) | Incr. Time (hrs) | |
|---|---|---|---|---|---|---|
| 16.00 | 2,402,444 | | 113.060 | | | |
| | | 859,462 | | 94.881 | 2.52 | |
| 15.00 | 1,542,982 | | 76.702 | | | |
| | | 802,044 | | 47.287 | 4.71 | |
| 14.00 | 740,938 | | 17.872 | | | |
| | | 195,829 | | 9.948 | 5.47 | |
| 13.40 | 545,109 | | 2.023 | | | **Lowest Orifice** |
| | | 288,394 | | 1.513 | 52.96 | |
| 13.00 | 256,715 | | 1.002 | | | **Basin Bottom** |
| | | | | **Total** | **65.66** | |

**50-Yr/24-Hr Storm Ponding Time**:

| | | | | |
|---|---|---|---|---|
| Time to reach Elev: | 16.00 | 12.60 | Hrs | (From Hydrograph) |
| - Storm Duration | | -24.00 | Hrs | |
| Time to reach basin bottom: | | 65.66 | Hrs | |
| **Drawdown Time:** | | **54.26** | **Hrs** | |

**Project**

Keystone Trade Center - Phase 2 Development — Project No. 2020-07083-15

Falls Township, Bucks County, PA — 1/31/24

# Basin Drawdown Time Computation - Basin A

| Stage | Basin Storage (cu ft) | Incr. Storage (cu ft) | Discharge (cfs) | Avg. Discharge (cfs) | Incr. Time (hrs) | |
|---|---|---|---|---|---|---|
| 14.29 | 17,677 | | 0.316 | | | |
| | | 2,033 | | 0.194 | 2.91 | |
| 14.10 | 15,644 | | 0.072 | | | **Lowest Orifice** |
| | | 9,785 | | 0.043 | 63.21 | |
| 13.00 | 5,859 | | 0.014 | | | **Basin Bottom** |
| | | | | **Total** | **66.12** | |

**2-Yr/24-Hr Storm Ponding Time**:

| | | | | |
|---|---|---|---|---|
| Time to reach Elev: | 14.29 | 12.30 | Hrs | (From Hydrograph) |
| - Storm Duration | | -24.00 | Hrs | |
| Time to reach basin bottom: | | 66.12 | Hrs | |
| **Drawdown Time:** | | **54.42** | **Hrs** | |

**Project**

Keystone Trade Center - Phase 2 Development — Project No. 2020-07083-15

Falls Township, Bucks County, PA — 1/31/24

# Basin Drawdown Time Computation - Basin A

| Stage | Basin Storage (cu ft) | Incr. Storage (cu ft) | Discharge (cfs) | Avg. Discharge (cfs) | Incr. Time (hrs) | |
|---|---|---|---|---|---|---|
| 15.00 | 25,237 | | 3.673 | | | |
| | | 5,328 | | 2.759 | 0.54 | |
| 14.50 | 19,909 | | 1.845 | | | |
| | | 2,232 | | 1.081 | 0.57 | |
| 14.29 | 17,677 | | 0.316 | | | |
| | | 2,033 | | 0.194 | 2.91 | |
| 14.10 | 15,644 | | 0.072 | | | **Lowest Orifice** |
| | | 9,785 | | 0.043 | 63.21 | |
| 13.00 | 5,859 | | 0.014 | | | **Basin Bottom** |
| | | | | **Total** | **67.23** | |

**10-Yr/24-Hr Storm Ponding Time**:

| | | | | |
|---|---|---|---|---|
| Time to reach Elev: | 15.00 | 12.30 | Hrs | (From Hydrograph) |
| - Storm Duration | | -24.00 | Hrs | |
| Time to reach basin bottom: | | 67.23 | Hrs | |
| **Drawdown Time:** | | **55.53** | **Hrs** | |

**Project**

Keystone Trade Center - Phase 2 Development — Project No. 2020-07083-15

Falls Township, Bucks County, PA — 1/31/24

# Basin Drawdown Time Computation - Basin A

| Stage | Basin Storage (cu ft) | Incr. Storage (cu ft) | Discharge (cfs) | Avg. Discharge (cfs) | Incr. Time (hrs) | |
|---|---|---|---|---|---|---|
| 15.86 | 36,251 | | 6.121 | | | |
| | | 4,659 | | 5.509 | 0.23 | |
| 15.50 | 31,592 | | 4.897 | | | |
| | | 6,355 | | 4.285 | 0.41 | |
| 15.00 | 25,237 | | 3.673 | | | |
| | | 5,328 | | 2.759 | 0.54 | |
| 14.50 | 19,909 | | 1.845 | | | |
| | | 2,232 | | 1.081 | 0.57 | |
| 14.29 | 17,677 | | 0.316 | | | |
| | | 2,033 | | 0.194 | 2.91 | |
| 14.10 | 15,644 | | 0.072 | | | **Lowest Orifice** |
| | | 9,785 | | 0.043 | 63.21 | |
| 13.00 | 5,859 | | 0.014 | | | **Basin Bottom** |
| | | | | **Total** | **67.88** | |

**50-Yr/24-Hr Storm Ponding Time**:

| | | | | |
|---|---|---|---|---|
| Time to reach Elev: | 15.86 | 12.27 | Hrs | (From Hydrograph) |
| - Storm Duration | | -24.00 | Hrs | |
| Time to reach basin bottom: | | 67.88 | Hrs | |
| **Drawdown Time:** | | **56.15** | **Hrs** | |

**Project**

Keystone Trade Center - Phase 2 Development — Project No. 2020-07083-15

Falls Township, Bucks County, PA — 1/31/24

# Basin Drawdown Time Computation - Basin A

| Stage | Basin Storage (cu ft) | Incr. Storage (cu ft) | Discharge (cfs) | Avg. Discharge (cfs) | Incr. Time (hrs) | |
|---|---|---|---|---|---|---|
| 16.35 | 43,224 | | 7.136 | | | |
| | | 5,277 | | 6.776 | 0.22 | |
| 16.00 | 37,947 | | 6.416 | | | |
| | | 6,355 | | 5.657 | 0.31 | |
| 15.50 | 31,592 | | 4.897 | | | |
| | | 6,355 | | 4.285 | 0.41 | |
| 15.00 | 25,237 | | 3.673 | | | |
| | | 5,328 | | 2.759 | 0.54 | |
| 14.50 | 19,909 | | 1.845 | | | |
| | | 2,232 | | 1.081 | 0.57 | |
| 14.29 | 17,677 | | 0.316 | | | |
| | | 2,033 | | 0.194 | 2.91 | |
| 14.10 | 15,644 | | 0.072 | | | **Lowest Orifice** |
| | | 9,785 | | 0.043 | 63.21 | |
| 13.00 | 5,859 | | 0.014 | | | **Basin Bottom** |
| | | | | **Total** | **68.17** | |

**100-Yr/24-Hr Storm Ponding Time**:

| | | | | |
|---|---|---|---|---|
| Time to reach Elev: | 16.35 | 12.27 | Hrs | (From Hydrograph) |
| - Storm Duration | | -24.00 | Hrs | |
| Time to reach basin bottom: | | 68.17 | Hrs | |
| **Drawdown Time:** | | **56.44** | **Hrs** | |

## III. STORMWATER MANAGEMENT DESIGN CALCULATIONS

# Hydraflow Rainfall Report



| Return Period (Yrs) | Intensity-Duration-Frequency Equation Coefficients (FHA) | | | |
|---|---|---|---|---|
| | B | D | E | (N/A) |
| 1 | 51.6066 | 12.5000 | 0.8820 | -------- |
| 2 | 67.7244 | 13.5000 | 0.8977 | -------- |
| 3 | 0.0000 | 0.0000 | 0.0000 | -------- |
| 5 | 64.8823 | 12.8000 | 0.8348 | -------- |
| 10 | 66.3444 | 12.6000 | 0.8081 | -------- |
| 25 | 58.0444 | 11.1000 | 0.7423 | -------- |
| 50 | 54.6664 | 10.4000 | 0.7036 | -------- |
| 100 | 48.3757 | 9.1000 | 0.6533 | -------- |

File name: NorthPoint_Phase_2 NOAA IDF Curve.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 | 4.13 | 3.31 | 2.77 | 2.39 | 2.11 | 1.89 | 1.71 | 1.57 | 1.45 | 1.35 | 1.26 | 1.18 |
| 2 | 4.93 | 3.98 | 3.35 | 2.90 | 2.56 | 2.29 | 2.08 | 1.90 | 1.76 | 1.63 | 1.52 | 1.43 |
| 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 | 5.87 | 4.77 | 4.04 | 3.52 | 3.13 | 2.82 | 2.57 | 2.37 | 2.19 | 2.05 | 1.92 | 1.81 |
| 10 | 6.54 | 5.34 | 4.54 | 3.97 | 3.54 | 3.20 | 2.93 | 2.70 | 2.51 | 2.34 | 2.20 | 2.08 |
| 25 | 7.38 | 6.04 | 5.15 | 4.53 | 4.05 | 3.68 | 3.38 | 3.13 | 2.92 | 2.74 | 2.59 | 2.45 |
| 50 | 7.98 | 6.55 | 5.61 | 4.95 | 4.44 | 4.05 | 3.73 | 3.47 | 3.24 | 3.05 | 2.89 | 2.74 |
| 100 | 8.59 | 7.04 | 6.05 | 5.35 | 4.82 | 4.41 | 4.08 | 3.80 | 3.57 | 3.37 | 3.19 | 3.04 |

Tc = time in minutes. Values may exceed 60.

n\2007083-15 - Building 4 Land Development\ENGINEERING DATA\SWM\Hydraflow\Rainfall Data\Falls Township.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 | 2.70 | 3.30 | 0.00 | 4.20 | 5.00 | 5.80 | 6.40 | 7.20 |
| SCS 6-Hr | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 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 | 1.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

Project: **Keystone Trade Center - Phase 2 Development**
Location: **Falls Township**
**Bucks County, PA**

By: DPB
Date: 3/4/2022
Chk'd: -
Revised: 9/27/2024

Watershed: **Pre-Development - Drainage Area Total - On-site (DP 001)**

## CURVE NUMBERS FOR SCS METHOD

| Hydrologic Soil Group | Cover Description | CN | Area (sf) | Area (acres) | CN X A |
|---|---|---|---|---|---|
| A | Woods (Good Condition) | 30 | 819,799 | 18.82 | 564.60 |
| D | Woods (Good Condition) | 77 | 219,107 | 5.03 | 387.31 |
| | | | | | |
| A | Meadow | 30 | 1,403,939 | 32.23 | 966.90 |
| D | Meadow | 78 | 1,124,719 | 25.82 | 2013.96 |
| | | | | | |
| - | Impervious (80% as Impervious) | 98 | 4,820,350 | 110.66 | 10844.68 |
| | | | | | |
| D | Impervious (20% as Meadow) | 78 | 1,204,434 | 27.65 | 2156.70 |
| | *[Modeled as Meadow (D Soil)]* | | | | |
| | | | | | |

| Totals = | 9,592,348 | 220.21 | 16934.15 |
|---|---|---|---|

**CN = 76.9**

Project: **Keystone Trade Center - Phase 2 Development**
Location: **Falls Township**
**Bucks County, PA**

By: DPB
Date: 3/4/2022
Chk'd: -
Revised: 9/27/2024

Watershed: **Pre-Development - Drainage Area #1 (DP 001)**

## CURVE NUMBERS FOR SCS METHOD

| Hydrologic Soil Group | Cover Description | CN | Area (sf) | Area (acres) | CN X A |
|---|---|---|---|---|---|
| A | Woods (Good Condition) | 30 | 333,670 | 7.66 | 229.80 |
| D | Woods (Good Condition) | 77 | 145,490 | 3.34 | 257.18 |
| | | | | | |
| A | Meadow | 30 | 1,237,975 | 28.42 | 852.60 |
| D | Meadow | 78 | 692,604 | 15.90 | 1240.20 |
| | | | | | |
| - | Impervious (80% as Impervious) | 98 | 3,294,007 | 75.62 | 7410.76 |
| | | | | | |
| D | Impervious (20% as Meadow) | 78 | 823,284 | 18.90 | 1474.20 |
| | *[Modeled as Meadow (D Soil)]* | | | | |
| | | | | | |

| Totals = | 6,527,030 | 149.84 | 11464.74 |
|---|---|---|---|

**CN = 76.5**

Project: **Keystone Trade Center - Phase 2 Development**
Location: **Falls Township**
**Bucks County, PA**

By: DPB
Date: 3/4/2022
Chk'd: -
Revised: 9/27/2024

Watershed: **Pre-Development - Drainage Area #4 (DP 001)**

## CURVE NUMBERS FOR SCS METHOD

| Hydrologic Soil Group | Cover Description | CN | Area (sf) | Area (acres) | CN X A |
|---|---|---|---|---|---|
| A | Woods (Good Condition) | 30 | 72,745 | 1.67 | 50.10 |
| D | Woods (Good Condition) | 77 | 18,731 | 0.43 | 33.11 |
| | | | | | |
| A | Meadow | 30 | 118,919 | 2.73 | 81.90 |
| D | Meadow | 78 | 25,265 | 0.58 | 45.24 |
| | | | | | |
| - | Impervious (80% as Impervious) | 98 | 96,703 | 2.22 | 217.56 |
| | | | | | |
| D | Impervious (20% as Meadow) | 78 | 23,958 | 0.55 | 42.90 |
| | *[Modeled as Meadow (D Soil)]* | | | | |
| | | | | | |

| Totals = | 356,321 | 8.18 | 470.81 |
|---|---|---|---|

**CN = 57.6**

Project: **Keystone Trade Center - Phase 2 Development**
Location: **Falls Township**
**Bucks County, PA**

By: DPB
Date: 3/4/2022
Chk'd: -
Revised: 9/27/2024

Watershed: **Pre-Development - Offsite - Fleck (DP 001)**

## CURVE NUMBERS FOR SCS METHOD

| Hydrologic Soil Group | Cover Description | CN | Area (sf) | Area (acres) | CN X A |
|---|---|---|---|---|---|
| A | Woods (Good Condition) | 30 | 0 | 0.00 | 0.00 |
| D | Woods (Good Condition) | 77 | 0 | 0.00 | 0.00 |
| | | | | | |
| A | Meadow | 30 | 189,050 | 4.34 | 130.20 |
| D | Meadow | 78 | 0 | 0.00 | 0.00 |
| | | | | | |
| - | Impervious | 98 | 136,343 | 3.13 | 306.74 |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| Totals = | | | 325,393 | 7.47 | 436.94 |

**CN = 58.5**

Project: **Keystone Trade Center - Phase 2 Development**
Location: **Falls Township**
**Bucks County, PA**

By: DPB
Date: 3/4/2022
Chk'd: -
Revised: 9/27/2024

Watershed: **Pre-Development - Offsite - Petrucci (DP 001)**

## CURVE NUMBERS FOR SCS METHOD

| Hydrologic Soil Group | Cover Description | CN | Area (sf) | Area (acres) | CN X A |
|---|---|---|---|---|---|
| A | Woods (Good Condition) | 30 | 88,427 | 2.03 | 60.90 |
| D | Woods (Good Condition) | 77 | 1,742 | 0.04 | 3.08 |
| | | | | | |
| A | Meadow | 30 | 598,950 | 13.75 | 412.50 |
| D | Meadow | 78 | 9,148 | 0.21 | 16.38 |
| | | | | | |
| - | Impervious | 98 | 85,813 | 1.97 | 193.06 |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| Totals = | | | 784,080 | 18.00 | 685.92 |

**CN = 38.1**

Project: **Keystone Trade Center - Phase 2 Development**
Location: **Falls Township**
**Bucks County, PA**

By: DPB
Date: 3/4/2022
Chk'd: -
Revised: 9/27/2024

Watershed: **Pre-Development - Offsite - Hiossen (DP 001)**

## CURVE NUMBERS FOR SCS METHOD

| Hydrologic Soil Group | Cover Description | CN | Area (sf) | Area (acres) | CN X A |
|---|---|---|---|---|---|
| A | Woods (Good Condition) | 30 | 0 | 0.00 | 0.00 |
| D | Woods (Good Condition) | 77 | 0 | 0.00 | 0.00 |
| | | | | | |
| A | Meadow | 30 | 29,621 | 0.68 | 20.40 |
| D | Meadow | 78 | 0 | 0.00 | 0.00 |
| | | | | | |
| - | Impervious | 98 | 335,848 | 7.71 | 755.58 |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| Totals = | | | 365,468 | 8.39 | 775.98 |

**CN = 92.5**

Project: **Keystone Trade Center - Phase 2 Development**
Location: **Falls Township**
**Bucks County, PA**

By: DPB
Date: 3/4/2022
Chk'd: -
Revised: 9/27/2024

Watershed: **Pre-Development - Offsite - HB Fuller North (DP 001)**

## CURVE NUMBERS FOR SCS METHOD

| Hydrologic Soil Group | Cover Description | CN | Area (sf) | Area (acres) | CN X A |
|---|---|---|---|---|---|
| A | Woods (Good Condition) | 30 | 0 | 0.00 | 0.00 |
| D | Woods (Good Condition) | 77 | 0 | 0.00 | 0.00 |
| | | | | | |
| A | Meadow | 30 | 23,958 | 0.55 | 16.50 |
| D | Meadow | 78 | 0 | 0.00 | 0.00 |
| | | | | | |
| - | Impervious | 98 | 30,056 | 0.69 | 67.62 |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| Totals = | | | 54,014 | 1.24 | 84.12 |

**CN = 67.8**

Project: **Keystone Trade Center - Phase 2 Development**
Location: **Falls Township**
**Bucks County, PA**

By: DPB
Date: 3/4/2022
Chk'd: -
Revised: 9/27/2024

Watershed: **Pre-Development - Offsite - HB Fuller Middle (DP 001)**

## CURVE NUMBERS FOR SCS METHOD

| Hydrologic Soil Group | Cover Description | CN | Area (sf) | Area (acres) | CN X A |
|---|---|---|---|---|---|
| A | Woods (Good Condition) | 30 | 0 | 0.00 | 0.00 |
| D | Woods (Good Condition) | 77 | 0 | 0.00 | 0.00 |
| | | | | | |
| A | Meadow | 30 | 10,454 | 0.24 | 7.20 |
| D | Meadow | 78 | 25,265 | 0.58 | 45.24 |
| | | | | | |
| - | Impervious | 98 | 120,661 | 2.77 | 271.46 |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| Totals = | | | 156,380 | 3.59 | 323.90 |

**CN = 90.2**

Project: **Keystone Trade Center - Phase 2 Development**
Location: **Falls Township**
**Bucks County, PA**

By: DPB
Date: 3/4/2022
Chk'd: -
Revised: 9/27/2024

Watershed: **Pre-Development - Offsite - HB Fuller South (DP 001)**

## CURVE NUMBERS FOR SCS METHOD

| Hydrologic Soil Group | Cover Description | CN | Area (sf) | Area (acres) | CN X A |
|---|---|---|---|---|---|
| A | Woods (Good Condition) | 30 | 0 | 0.00 | 0.00 |
| D | Woods (Good Condition) | 77 | 0 | 0.00 | 0.00 |
| | | | | | |
| A | Meadow | 30 | 0 | 0.00 | 0.00 |
| D | Meadow | 78 | 26,572 | 0.61 | 47.58 |
| | | | | | |
| - | Impervious | 98 | 55,321 | 1.27 | 124.46 |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| Totals = | | | 81,893 | 1.88 | 172.04 |

**CN = 91.5**

Project: **Keystone Trade Center - Phase 2 Development**
Location: **Falls Township**
**Bucks County, PA**

By: DPB
Date: 3/4/2022
Chk'd: -
Revised: 9/27/2024

Watershed: **Pre-Development - Offsite - Eastern DA (DP 001)**

## CURVE NUMBERS FOR SCS METHOD

| Hydrologic Soil Group | Cover Description | CN | Area (sf) | Area (acres) | CN X A |
|---|---|---|---|---|---|
| A | Woods (Good Condition) | 30 | 0 | 0.00 | 0.00 |
| D | Woods (Good Condition) | 77 | 0 | 0.00 | 0.00 |
| | | | | | |
| A | Meadow | 30 | 100,624 | 2.31 | 69.30 |
| D | Meadow | 78 | 47,480 | 1.09 | 85.02 |
| | | | | | |
| - | Impervious | 98 | 122,404 | 2.81 | 275.38 |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| Totals = | | | 270,508 | 6.21 | 429.70 |

**CN = 69.2**

Project: **Keystone Trade Center - Phase 2 Development**
Location: **Falls Township**
**Bucks County, PA**

By: DPB
Date: 3/4/2022
Chk'd: -
Revised: 9/27/2024

Watershed: **Pre-Development - Drainage Area #2 (Remain On-Site)**

## CURVE NUMBERS FOR SCS METHOD

| Hydrologic Soil Group | Cover Description | CN | Area (sf) | Area (acres) | CN X A |
|---|---|---|---|---|---|
| A | Woods (Good Condition) | 30 | 0 | 0.00 | 0.00 |
| D | Woods (Good Condition) | 77 | 0 | 0.00 | 0.00 |
| | | | | | |
| A | Meadow | 30 | 0 | 0.00 | 0.00 |
| D | Meadow | 78 | 218,236 | 5.01 | 390.78 |
| | | | | | |
| - | Impervious (80% as Impervious) | 98 | 1,406,552 | 32.29 | 3164.42 |
| | | | | | |
| D | Impervious (20% as Meadow) | 78 | 351,529 | 8.07 | 629.46 |
| | *[Modeled as Meadow (D Soil)]* | | | | |
| | | | | | |
| Totals = | | | 1,976,317 | 45.37 | 4184.66 |

**CN = 92.2**

Project: **Keystone Trade Center - Phase 2 Development**
Location: **Falls Township**
**Bucks County, PA**

By: DPB
Date: 3/4/2022
Chk'd: -
Revised: 9/27/2024

Watershed: **Pre-Development - Drainage Area #3 (Remains On-Site)**

## CURVE NUMBERS FOR SCS METHOD

| Hydrologic Soil Group | Cover Description | CN | Area (sf) | Area (acres) | CN X A |
|---|---|---|---|---|---|
| A | Woods (Good Condition) | 30 | 413,384 | 9.49 | 284.70 |
| D | Woods (Good Condition) | 77 | 54,886 | 1.26 | 97.02 |
| | | | | | |
| A | Meadow | 30 | 47,045 | 1.08 | 32.40 |
| D | Meadow | 78 | 188,615 | 4.33 | 337.74 |
| | | | | | |
| - | Impervious (80% as Impervious) | 98 | 23,087 | 0.53 | 51.94 |
| | | | | | |
| D | Impervious (20% as Meadow) | 78 | 5,663 | 0.13 | 10.14 |
| | *[Modeled as Meadow (D Soil)]* | | | | |
| | | | | | |

Totals = 732,679 16.82 813.94

**CN = 48.4**

Project: **Keystone Trade Center - Phase 2 Development**
Location: **Falls Township**
**Bucks County, PA**

By: DPB
Date: 3/4/2022
Chk'd: -
Revised: 9/27/2024

Watershed: **Post-Development - Drainage Area Total - On-site (DP 001)**

## CURVE NUMBERS FOR SCS METHOD

| Hydrologic Soil Group | Cover Description | CN | Area (sf) | Area (acres) | CN X A |
|---|---|---|---|---|---|
| A | Woods (Good Condition) | 30 | 0 | 0.00 | 0.00 |
| D | Woods (Good Condition) | 77 | 0 | 0.00 | 0.00 |
| | | | | | |
| A | Meadow | 30 | 0 | 0.00 | 0.00 |
| D | Meadow | 78 | 0 | 0.00 | 0.00 |
| | | | | | |
| A | Lawn | 39 | 767,092 | 17.61 | 686.79 |
| D | Lawn | 80 | 1,712,344 | 39.31 | 3144.80 |
| | | | | | |
| A | Railroad Track (Modeled as Gravel) | 76 | 0 | 0.00 | 0.00 |
| D | Railroad Track (Modeled as Gravel) | 91 | 120,226 | 2.76 | 251.16 |
| | | | | | |
| - | Proposed Impervious | 98 | 6,797,974 | 156.06 | 15293.88 |
| | | | | | |
| - | Existing Impervious | 98 | 53,579 | 1.23 | 120.54 |
| | | | | | |
| Totals = | | | 9,451,213 | 216.97 | 19497.17 |

**CN = 89.9**

Project: **Keystone Trade Center - Phase 2 Development**
Location: **Falls Township**
**Bucks County, PA**

By: DPB
Date: 3/4/2022
Chk'd: -
Revised: 9/27/2024

Watershed: **Post-Development - Drainage Area #1 (DP 001)**

## CURVE NUMBERS FOR SCS METHOD

| Hydrologic Soil Group | Cover Description | CN | Area (sf) | Area (acres) | CN X A |
|---|---|---|---|---|---|
| A | Woods (Good Condition) | 30 | 0 | 0.00 | 0.00 |
| D | Woods (Good Condition) | 77 | 0 | 0.00 | 0.00 |
| | | | | | |
| A | Meadow | 30 | 0 | 0.00 | 0.00 |
| D | Meadow | 78 | 0 | 0.00 | 0.00 |
| | | | | | |
| A | Lawn | 39 | 133,294 | 3.06 | 119.34 |
| D | Lawn | 80 | 70,132 | 1.61 | 128.80 |
| | | | | | |
| A | Railroad Track (Modeled as Gravel) | 76 | 0 | 0.00 | 0.00 |
| D | Railroad Track (Modeled as Gravel) | 91 | 0 | 0.00 | 0.00 |
| | | | | | |
| - | Proposed Impervious | 98 | 531,432 | 12.20 | 1195.60 |
| | | | | | |
| - | Existing Impervious | 98 | 0 | 0.00 | 0.00 |
| | | | | | |

| Totals = | 734,857 | 16.87 | 1443.74 |
|---|---|---|---|

**CN = 85.6**

Project: **Keystone Trade Center - Phase 2 Development**
Location: **Falls Township**
**Bucks County, PA**

By: DPB
Date: 3/4/2022
Chk'd: -
Revised: 9/27/2024

Watershed: **Post-Development - Drainage Area #2A (DP 001)**

## CURVE NUMBERS FOR SCS METHOD

| Hydrologic Soil Group | Cover Description | CN | Area (sf) | Area (acres) | CN X A |
|---|---|---|---|---|---|
| A | Woods (Good Condition) | 30 | 0 | 0.00 | 0.00 |
| D | Woods (Good Condition) | 77 | 0 | 0.00 | 0.00 |
| | | | | | |
| A | Meadow | 30 | 0 | 0.00 | 0.00 |
| D | Meadow | 78 | 0 | 0.00 | 0.00 |
| | | | | | |
| A | Lawn | 39 | 125,017 | 2.87 | 111.93 |
| D | Lawn | 80 | 30,928 | 0.71 | 56.80 |
| | | | | | |
| A | Railroad Track (Modeled as Gravel) | 76 | 0 | 0.00 | 0.00 |
| D | Railroad Track (Modeled as Gravel) | 91 | 0 | 0.00 | 0.00 |
| | | | | | |
| - | Proposed Impervious | 98 | 549,292 | 12.61 | 1235.78 |
| | | | | | |
| - | Existing Impervious | 98 | 0 | 0.00 | 0.00 |
| | | | | | |

Totals = 705,236 16.19 1404.51

**CN = 86.8**

Project: **Keystone Trade Center - Phase 2 Development**
Location: **Falls Township**
**Bucks County, PA**

By: DPB
Date: 3/4/2022
Chk'd: -
Revised: 9/27/2024

Watershed: **Post-Development - Drainage Area #2B (DP 001)**

## CURVE NUMBERS FOR SCS METHOD

| Hydrologic Soil Group | Cover Description | CN | Area (sf) | Area (acres) | CN X A |
|---|---|---|---|---|---|
| A | Woods (Good Condition) | 30 | 0 | 0.00 | 0.00 |
| D | Woods (Good Condition) | 77 | 0 | 0.00 | 0.00 |
| | | | | | |
| A | Meadow | 30 | 0 | 0.00 | 0.00 |
| D | Meadow | 78 | 0 | 0.00 | 0.00 |
| | | | | | |
| A | Lawn | 39 | 111,078 | 2.55 | 99.45 |
| D | Lawn | 80 | 89,734 | 2.06 | 164.80 |
| | | | | | |
| A | Railroad Track (Modeled as Gravel) | 76 | 0 | 0.00 | 0.00 |
| D | Railroad Track (Modeled as Gravel) | 91 | 0 | 0.00 | 0.00 |
| | | | | | |
| - | Proposed Impervious | 98 | 993,604 | 22.81 | 2235.38 |
| | | | | | |
| - | Existing Impervious | 98 | 0 | 0.00 | 0.00 |
| | | | | | |
| Totals = | | | 1,194,415 | 27.42 | 2499.63 |

**CN = 91.2**

Project: **Keystone Trade Center - Phase 2 Development**
Location: **Falls Township**
**Bucks County, PA**

By: DPB
Date: 3/4/2022
Chk'd: -
Revised: 9/27/2024

Watershed: **Post-Development - Drainage Area #2C (DP 001)**

## CURVE NUMBERS FOR SCS METHOD

| Hydrologic Soil Group | Cover Description | CN | Area (sf) | Area (acres) | CN X A |
|---|---|---|---|---|---|
| A | Woods (Good Condition) | 30 | 0 | 0.00 | 0.00 |
| D | Woods (Good Condition) | 77 | 0 | 0.00 | 0.00 |
| | | | | | |
| A | Meadow | 30 | 0 | 0.00 | 0.00 |
| D | Meadow | 78 | 0 | 0.00 | 0.00 |
| | | | | | |
| A | Lawn | 39 | 217,364 | 4.99 | 194.61 |
| D | Lawn | 80 | 41,382 | 0.95 | 76.00 |
| | | | | | |
| A | Railroad Track (Modeled as Gravel) | 76 | 0 | 0.00 | 0.00 |
| D | Railroad Track (Modeled as Gravel) | 91 | 0 | 0.00 | 0.00 |
| | | | | | |
| - | Proposed Impervious | 98 | 10,890 | 0.25 | 24.50 |
| | | | | | |
| - | Existing Impervious | 98 | 53,579 | 1.23 | 120.54 |
| | | | | | |
| Totals = | | | 323,215 | 7.42 | 415.65 |

**CN = 56.0**

Project: **Keystone Trade Center - Phase 2 Development**
Location: **Falls Township**
**Bucks County, PA**

By: DPB
Date: 3/4/2022
Chk'd: -
Revised: 9/27/2024

Watershed: **Post-Development - Drainage Area #3 (DP 001)**

## CURVE NUMBERS FOR SCS METHOD

| Hydrologic Soil Group | Cover Description | CN | Area (sf) | Area (acres) | CN X A |
|---|---|---|---|---|---|
| A | Woods (Good Condition) | 30 | 0 | 0.00 | 0.00 |
| D | Woods (Good Condition) | 77 | 0 | 0.00 | 0.00 |
| | | | | | |
| A | Meadow | 30 | 0 | 0.00 | 0.00 |
| D | Meadow | 78 | 0 | 0.00 | 0.00 |
| | | | | | |
| A | Lawn | 39 | 25,700 | 0.59 | 23.01 |
| D | Lawn | 80 | 14,375 | 0.33 | 26.40 |
| | | | | | |
| A | Railroad Track (Modeled as Gravel) | 76 | 0 | 0.00 | 0.00 |
| D | Railroad Track (Modeled as Gravel) | 91 | 0 | 0.00 | 0.00 |
| | | | | | |
| - | Proposed Impervious | 98 | 104,108 | 2.39 | 234.22 |
| | | | | | |
| - | Existing Impervious | 98 | 0 | 0.00 | 0.00 |
| | | | | | |
| Totals = | | | 144,184 | 3.31 | 283.63 |

**CN = 85.7**

Project: **Keystone Trade Center - Phase 2 Development**
Location: **Falls Township**
**Bucks County, PA**

By: DPB
Date: 3/4/2022
Chk'd: -
Revised: 9/27/2024

Watershed: **Post-Development - Drainage Area #4 (DP 001)**

## CURVE NUMBERS FOR SCS METHOD

| Hydrologic Soil Group | Cover Description | CN | Area (sf) | Area (acres) | CN X A |
|---|---|---|---|---|---|
| A | Woods (Good Condition) | 30 | 0 | 0.00 | 0.00 |
| D | Woods (Good Condition) | 77 | 0 | 0.00 | 0.00 |
| | | | | | |
| A | Meadow | 30 | 0 | 0.00 | 0.00 |
| D | Meadow | 78 | 0 | 0.00 | 0.00 |
| | | | | | |
| A | Lawn | 39 | 131,987 | 3.03 | 118.17 |
| D | Lawn | 80 | 194,278 | 4.46 | 356.80 |
| | | | | | |
| A | Railroad Track (Modeled as Gravel) | 76 | 0 | 0.00 | 0.00 |
| D | Railroad Track (Modeled as Gravel) | 91 | 0 | 0.00 | 0.00 |
| | | | | | |
| - | Proposed Impervious | 98 | 1,302,008 | 29.89 | 2929.22 |
| | | | | | |
| - | Existing Impervious | 98 | 0 | 0.00 | 0.00 |
| | | | | | |
| Totals = | | | 1,628,273 | 37.38 | 3404.19 |

**CN = 91.1**

Project: **Keystone Trade Center - Phase 2 Development**
Location: **Falls Township**
**Bucks County, PA**

By: DPB
Date: 3/4/2022
Chk'd: -
Revised: 9/27/2024

Watershed: **Post-Development - Drainage Area #5 (DP 001)**

## CURVE NUMBERS FOR SCS METHOD

| Hydrologic Soil Group | Cover Description | CN | Area (sf) | Area (acres) | CN X A |
|---|---|---|---|---|---|
| A | Woods (Good Condition) | 30 | 0 | 0.00 | 0.00 |
| D | Woods (Good Condition) | 77 | 0 | 0.00 | 0.00 |
| | | | | | |
| A | Meadow | 30 | 0 | 0.00 | 0.00 |
| D | Meadow | 78 | 0 | 0.00 | 0.00 |
| | | | | | |
| A | Lawn | 39 | 0 | 0.00 | 0.00 |
| D | Lawn | 80 | 115,870 | 2.66 | 212.80 |
| | | | | | |
| A | Railroad Track (Modeled as Gravel) | 76 | 0 | 0.00 | 0.00 |
| D | Railroad Track (Modeled as Gravel) | 91 | 0 | 0.00 | 0.00 |
| | | | | | |
| - | Proposed Impervious | 98 | 179,032 | 4.11 | 402.78 |
| | | | | | |
| - | Existing Impervious | 98 | 0 | 0.00 | 0.00 |
| | | | | | |

Totals = 294,901 6.77 615.58

**CN = 90.9**

Project: **Keystone Trade Center - Phase 2 Development**
Location: **Falls Township**
**Bucks County, PA**

By: DPB
Date: 3/4/2022
Chk'd: -
Revised: 9/27/2024

Watershed: **Post-Development - Drainage Area #6 (DP 001)**

## CURVE NUMBERS FOR SCS METHOD

| Hydrologic Soil Group | Cover Description | CN | Area (sf) | Area (acres) | CN X A |
|---|---|---|---|---|---|
| A | Woods (Good Condition) | 30 | 0 | 0.00 | 0.00 |
| D | Woods (Good Condition) | 77 | 0 | 0.00 | 0.00 |
| | | | | | |
| A | Meadow | 30 | 0 | 0.00 | 0.00 |
| D | Meadow | 78 | 0 | 0.00 | 0.00 |
| | | | | | |
| A | Lawn | 39 | 0 | 0.00 | 0.00 |
| D | Lawn | 80 | 513,137 | 11.78 | 942.40 |
| | | | | | |
| A | Railroad Track (Modeled as Gravel) | 76 | 0 | 0.00 | 0.00 |
| D | Railroad Track (Modeled as Gravel) | 91 | 0 | 0.00 | 0.00 |
| | | | | | |
| - | Proposed Impervious | 98 | 1,833,876 | 42.10 | 4125.80 |
| | | | | | |
| - | Existing Impervious | 98 | 0 | 0.00 | 0.00 |
| | | | | | |
| Totals = | | | 2,347,013 | 53.88 | 5068.20 |

**CN = 94.1**

Project: **Keystone Trade Center - Phase 2 Development**
Location: **Falls Township**
**Bucks County, PA**

By: DPB
Date: 3/4/2022
Chk'd: -
Revised: 9/27/2024

Watershed: **Post-Development - Drainage Area #7 (DP 001)**

## CURVE NUMBERS FOR SCS METHOD

| Hydrologic Soil Group | Cover Description | CN | Area (sf) | Area (acres) | CN X A |
|---|---|---|---|---|---|
| A | Woods (Good Condition) | 30 | 0 | 0.00 | 0.00 |
| D | Woods (Good Condition) | 77 | 0 | 0.00 | 0.00 |
| | | | | | |
| A | Meadow | 30 | 0 | 0.00 | 0.00 |
| D | Meadow | 78 | 0 | 0.00 | 0.00 |
| | | | | | |
| A | Lawn | 39 | 0 | 0.00 | 0.00 |
| D | Lawn | 80 | 176,418 | 4.05 | 324.00 |
| | | | | | |
| A | Railroad Track (Modeled as Gravel) | 76 | 0 | 0.00 | 0.00 |
| D | Railroad Track (Modeled as Gravel) | 91 | 0 | 0.00 | 0.00 |
| | | | | | |
| - | Proposed Impervious | 98 | 114,998 | 2.64 | 258.72 |
| | | | | | |
| - | Existing Impervious | 98 | 0 | 0.00 | 0.00 |
| | | | | | |

| Totals = | 291,416 | 6.69 | 582.72 |
|---|---|---|---|

**CN = 87.1**

Project: **Keystone Trade Center - Phase 2 Development**
Location: **Falls Township**
**Bucks County, PA**

By: DPB
Date: 3/4/2022
Chk'd: -
Revised: 9/27/2024

Watershed: **Post-Development - Drainage Area #8 (DP 001)**

## CURVE NUMBERS FOR SCS METHOD

| Hydrologic Soil Group | Cover Description | CN | Area (sf) | Area (acres) | CN X A |
|---|---|---|---|---|---|
| A | Woods (Good Condition) | 30 | 0 | 0.00 | 0.00 |
| D | Woods (Good Condition) | 77 | 0 | 0.00 | 0.00 |
| | | | | | |
| A | Meadow | 30 | 0 | 0.00 | 0.00 |
| D | Meadow | 78 | 0 | 0.00 | 0.00 |
| | | | | | |
| A | Lawn | 39 | 0 | 0.00 | 0.00 |
| D | Lawn | 80 | 237,402 | 5.45 | 436.00 |
| | | | | | |
| A | Railroad Track (Modeled as Gravel) | 76 | 0 | 0.00 | 0.00 |
| D | Railroad Track (Modeled as Gravel) | 91 | 0 | 0.00 | 0.00 |
| | | | | | |
| - | Proposed Impervious | 98 | 961,805 | 22.08 | 2163.84 |
| | | | | | |
| - | Existing Impervious | 98 | 0 | 0.00 | 0.00 |
| | | | | | |

Totals = 1,199,207 27.53 2599.84

**CN = 94.4**

Project: **Keystone Trade Center - Phase 2 Development**
Location: **Falls Township**
**Bucks County, PA**

By: DPB
Date: 3/4/2022
Chk'd: -
Revised: 9/27/2024

Watershed: **Post-Development - Bypass #1 (DP 001)**

## CURVE NUMBERS FOR SCS METHOD

| Hydrologic Soil Group | Cover Description | CN | Area (sf) | Area (acres) | CN X A |
|---|---|---|---|---|---|
| A | Woods (Good Condition) | 30 | 0 | 0.00 | 0.00 |
| D | Woods (Good Condition) | 77 | 0 | 0.00 | 0.00 |
| | | | | | |
| A | Meadow | 30 | 0 | 0.00 | 0.00 |
| D | Meadow | 78 | 0 | 0.00 | 0.00 |
| | | | | | |
| A | Lawn | 39 | 0 | 0.00 | 0.00 |
| D | Lawn | 80 | 15,246 | 0.35 | 28.00 |
| | | | | | |
| A | Railroad Track (Modeled as Gravel) | 76 | 0 | 0.00 | 0.00 |
| D | Railroad Track (Modeled as Gravel) | 91 | 0 | 0.00 | 0.00 |
| | | | | | |
| - | Proposed Impervious | 98 | 116,305 | 2.67 | 261.66 |
| | | | | | |
| - | Existing Impervious | 98 | 0 | 0.00 | 0.00 |
| | | | | | |

Totals = 131,551 3.02 289.66

**CN = 95.9**

Project: **Keystone Trade Center - Phase 2 Development**
Location: **Falls Township**
**Bucks County, PA**

By: DPB
Date: 3/4/2022
Chk'd: -
Revised: 9/27/2024

Watershed: **Post-Development - Bypass #2 (DP 001)**

## CURVE NUMBERS FOR SCS METHOD

| Hydrologic Soil Group | Cover Description | CN | Area (sf) | Area (acres) | CN X A |
|---|---|---|---|---|---|
| A | Woods (Good Condition) | 30 | 0 | 0.00 | 0.00 |
| D | Woods (Good Condition) | 77 | 0 | 0.00 | 0.00 |
| | | | | | |
| A | Meadow | 30 | 0 | 0.00 | 0.00 |
| D | Meadow | 78 | 0 | 0.00 | 0.00 |
| | | | | | |
| A | Lawn | 39 | 22,651 | 0.52 | 20.28 |
| D | Lawn | 80 | 157,252 | 3.61 | 288.80 |
| | | | | | |
| A | Railroad Track (Modeled as Gravel) | 76 | 0 | 0.00 | 0.00 |
| D | Railroad Track (Modeled as Gravel) | 91 | 0 | 0.00 | 0.00 |
| | | | | | |
| - | Proposed Impervious | 98 | 84,942 | 1.95 | 191.10 |
| | | | | | |
| - | Existing Impervious | 98 | 0 | 0.00 | 0.00 |
| | | | | | |
| Totals = | | | 264,845 | 6.08 | 500.18 |

**CN = 82.3**

Project: **Keystone Trade Center - Phase 2 Development**
Location: **Falls Township**
**Bucks County, PA**

By: DPB
Date: 3/4/2022
Chk'd: -
Revised: 9/27/2024

Watershed: **Post-Development - Bypass #3 (DP 001)**

## CURVE NUMBERS FOR SCS METHOD

| Hydrologic Soil Group | Cover Description | CN | Area (sf) | Area (acres) | CN X A |
|---|---|---|---|---|---|
| A | Woods (Good Condition) | 30 | 0 | 0.00 | 0.00 |
| D | Woods (Good Condition) | 77 | 0 | 0.00 | 0.00 |
| | | | | | |
| A | Meadow | 30 | 0 | 0.00 | 0.00 |
| D | Meadow | 78 | 0 | 0.00 | 0.00 |
| | | | | | |
| A | Lawn | 39 | 0 | 0.00 | 0.00 |
| D | Lawn | 80 | 0 | 0.00 | 0.00 |
| | | | | | |
| A | Railroad Track (Modeled as Gravel) | 76 | 0 | 0.00 | 0.00 |
| D | Railroad Track (Modeled as Gravel) | 91 | 0 | 0.00 | 0.00 |
| | | | | | |
| - | Proposed Impervious | 98 | 15,682 | 0.36 | 35.28 |
| | | | | | |
| - | Existing Impervious | 98 | 0 | 0.00 | 0.00 |
| | | | | | |

| Totals = | 15,682 | 0.36 | 35.28 |
|---|---|---|---|

**CN = 98.0**

Project: **Keystone Trade Center - Phase 2 Development**
Location: **Falls Township**
**Bucks County, PA**

By: DPB
Date: 3/4/2022
Chk'd: -
Revised: 9/27/2024

Watershed: **Post-Development - Total To MRC Basins (DP 001)**

## CURVE NUMBERS FOR SCS METHOD

| Hydrologic Soil Group | Cover Description | CN | Area (sf) | Area (acres) | CN X A |
|---|---|---|---|---|---|
| A | Woods (Good Condition) | 30 | 0 | 0.00 | 0.00 |
| D | Woods (Good Condition) | 77 | 0 | 0.00 | 0.00 |
| | | | | | |
| A | Meadow | 30 | 0 | 0.00 | 0.00 |
| D | Meadow | 78 | 0 | 0.00 | 0.00 |
| | | | | | |
| A | Lawn | 39 | 393,782 | 9.04 | 352.56 |
| D | Lawn | 80 | 1,195,722 | 27.45 | 2196.00 |
| | | | | | |
| A | Railroad Track (Modeled as Gravel) | 76 | 0 | 0.00 | 0.00 |
| D | Railroad Track (Modeled as Gravel) | 91 | 0 | 0.00 | 0.00 |
| | | | | | |
| - | Proposed Impervious | 98 | 5,923,724 | 135.99 | 13327.02 |
| | | | | | |
| - | Existing Impervious | 98 | 0 | 0.00 | 0.00 |
| | | | | | |

Totals = 7,513,229 172.48 15875.58

**CN = 92.0**

Project: **Keystone Trade Center - Phase 2 Development**
Location: **Falls Township**
**Bucks County, PA**

By: DPB
Date: 12/14/2022
Chk'd: -
Revised: 9/27/2024

Watershed: **Post-Development - ST-2+3 (DP 001)**

## CURVE NUMBERS FOR SCS METHOD

| Hydrologic Soil Group | Cover Description | CN | Area (sf) | Area (acres) | CN X A |
|---|---|---|---|---|---|
| A | Woods (Good Condition) | 30 | 0 | 0.00 | 0.00 |
| D | Woods (Good Condition) | 77 | 0 | 0.00 | 0.00 |
| | | | | | |
| A | Meadow | 30 | 0 | 0.00 | 0.00 |
| D | Meadow | 78 | 0 | 0.00 | 0.00 |
| | | | | | |
| A | Lawn | 39 | 0 | 0.00 | 0.00 |
| D | Lawn | 80 | 21,780 | 0.50 | 40.00 |
| | | | | | |
| A | Railroad Track (Modeled as Gravel) | 76 | 0 | 0.00 | 0.00 |
| D | Railroad Track (Modeled as Gravel) | 91 | 47,480 | 1.09 | 99.19 |
| | | | | | |
| - | Proposed Impervious | 98 | 0 | 0.00 | 0.00 |
| | | | | | |
| - | Existing Impervious | 98 | 0 | 0.00 | 0.00 |
| | | | | | |
| Totals = | | | 69,260 | 1.59 | 139.19 |

**CN = 87.5**

Project: **Keystone Trade Center - Phase 2 Development**
Location: **Falls Township**
**Bucks County, PA**

By: DPB
Date: 12/14/2022
Chk'd: -
Revised: 9/27/2024

Watershed: **Post-Development - ST-4 (DP 001)**

## CURVE NUMBERS FOR SCS METHOD

| Hydrologic Soil Group | Cover Description | CN | Area (sf) | Area (acres) | CN X A |
|---|---|---|---|---|---|
| A | Woods (Good Condition) | 30 | 0 | 0.00 | 0.00 |
| D | Woods (Good Condition) | 77 | 0 | 0.00 | 0.00 |
| | | | | | |
| A | Meadow | 30 | 0 | 0.00 | 0.00 |
| D | Meadow | 78 | 0 | 0.00 | 0.00 |
| | | | | | |
| A | Lawn | 39 | 0 | 0.00 | 0.00 |
| D | Lawn | 80 | 10,890 | 0.25 | 20.00 |
| | | | | | |
| A | Railroad Track (Modeled as Gravel) | 76 | 0 | 0.00 | 0.00 |
| D | Railroad Track (Modeled as Gravel) | 91 | 24,829 | 0.57 | 51.87 |
| | | | | | |
| - | Proposed Impervious | 98 | 0 | 0.00 | 0.00 |
| | | | | | |
| - | Existing Impervious | 98 | 0 | 0.00 | 0.00 |
| | | | | | |

| Totals = | 35,719 | 0.82 | 71.87 |
|---|---|---|---|

**CN = 87.6**

Project: **Keystone Trade Center - Phase 2 Development**
Location: **Falls Township**
**Bucks County, PA**

By: DPB
Date: 12/14/2022
Chk'd: -
Revised: 9/27/2024

Watershed: **Post-Development - ST-5 (DP 001)**

## CURVE NUMBERS FOR SCS METHOD

| Hydrologic Soil Group | Cover Description | CN | Area (sf) | Area (acres) | CN X A |
|---|---|---|---|---|---|
| A | Woods (Good Condition) | 30 | 0 | 0.00 | 0.00 |
| D | Woods (Good Condition) | 77 | 0 | 0.00 | 0.00 |
| | | | | | |
| A | Meadow | 30 | 0 | 0.00 | 0.00 |
| D | Meadow | 78 | 0 | 0.00 | 0.00 |
| | | | | | |
| A | Lawn | 39 | 0 | 0.00 | 0.00 |
| D | Lawn | 80 | 10,890 | 0.25 | 20.00 |
| | | | | | |
| A | Railroad Track (Modeled as Gravel) | 76 | 0 | 0.00 | 0.00 |
| D | Railroad Track (Modeled as Gravel) | 91 | 24,394 | 0.56 | 50.96 |
| | | | | | |
| - | Proposed Impervious | 98 | 0 | 0.00 | 0.00 |
| | | | | | |
| - | Existing Impervious | 98 | 0 | 0.00 | 0.00 |
| | | | | | |
| Totals = | | | 35,284 | 0.81 | 70.96 |

**CN = 87.6**

Project: **Keystone Trade Center - Phase 2 Development**
Location: **Falls Township**
**Bucks County, PA**

By: DPB
Date: 12/14/2022
Chk'd: -
Revised: 9/27/2024

Watershed: **Post-Development - ST-6 (DP 001)**

## CURVE NUMBERS FOR SCS METHOD

| Hydrologic Soil Group | Cover Description | CN | Area (sf) | Area (acres) | CN X A |
|---|---|---|---|---|---|
| A | Woods (Good Condition) | 30 | 0 | 0.00 | 0.00 |
| D | Woods (Good Condition) | 77 | 0 | 0.00 | 0.00 |
| | | | | | |
| A | Meadow | 30 | 0 | 0.00 | 0.00 |
| D | Meadow | 78 | 0 | 0.00 | 0.00 |
| | | | | | |
| A | Lawn | 39 | 0 | 0.00 | 0.00 |
| D | Lawn | 80 | 12,632 | 0.29 | 23.20 |
| | | | | | |
| A | Railroad Track (Modeled as Gravel) | 76 | 0 | 0.00 | 0.00 |
| D | Railroad Track (Modeled as Gravel) | 91 | 23,522 | 0.54 | 49.14 |
| | | | | | |
| - | Proposed Impervious | 98 | 0 | 0.00 | 0.00 |
| | | | | | |
| - | Existing Impervious | 98 | 0 | 0.00 | 0.00 |
| | | | | | |

| Totals = | 36,155 | 0.83 | 72.34 |
|---|---|---|---|

**CN = 87.2**

Project: **Keystone Trade Center - Phase 2 Development**
Location: **Falls Township**
**Bucks County, PA**

By: DPB
Date: 3/4/2022
Chk'd: -
Revised: 9/27/2024

Watershed: **Pre-Development - Drainage Area #5 (DP 002)**

## CURVE NUMBERS FOR SCS METHOD

| Hydrologic Soil Group | Cover Description | CN | Area (sf) | Area (acres) | CN X A |
|---|---|---|---|---|---|
| A | Woods (Good Condition) | 30 | 5,663 | 0.13 | 3.90 |
| D | Woods (Good Condition) | 77 | 3,920 | 0.09 | 6.93 |
| | | | | | |
| A | Meadow | 30 | 8,276 | 0.19 | 5.70 |
| D | Meadow | 78 | 59,677 | 1.37 | 106.86 |
| | | | | | |
| - | Impervious (80% as Impervious) | 98 | 39,204 | 0.90 | 88.20 |
| | | | | | |
| D | Impervious (20% as Meadow) | 78 | 9,583 | 0.22 | 17.16 |
| | *[Modeled as Meadow (D Soil)]* | | | | |
| | | | | | |
| Totals = | | | 126,324 | 2.90 | 228.75 |

**CN = 78.9**

Project: **Keystone Trade Center - Phase 2 Development**
Location: **Falls Township**
**Bucks County, PA**

By: DPB
Date: 12/14/2022
Chk'd: -
Revised: 9/27/2024

Watershed: **Post-Development - ST-1 (DP 002)**

## CURVE NUMBERS FOR SCS METHOD

| Hydrologic Soil Group | Cover Description | CN | Area (sf) | Area (acres) | CN X A |
|---|---|---|---|---|---|
| A | Woods (Good Condition) | 30 | 0 | 0.00 | 0.00 |
| D | Woods (Good Condition) | 77 | 0 | 0.00 | 0.00 |
| | | | | | |
| A | Meadow | 30 | 0 | 0.00 | 0.00 |
| D | Meadow | 78 | 0 | 0.00 | 0.00 |
| | | | | | |
| A | Lawn | 39 | 6,534 | 0.15 | 5.85 |
| D | Lawn | 80 | 24,394 | 0.56 | 44.80 |
| | | | | | |
| A | Railroad Track (Modeled as Gravel) | 76 | 32,234 | 0.74 | 56.24 |
| D | Railroad Track (Modeled as Gravel) | 91 | 55,757 | 1.28 | 116.48 |
| | | | | | |
| - | Proposed Impervious | 98 | 0 | 0.00 | 0.00 |
| | | | | | |
| - | Existing Impervious | 98 | 0 | 0.00 | 0.00 |
| | | | | | |
| Totals = | | | 118,919 | 2.73 | 223.37 |

**CN = 81.8**

Project: **Keystone Trade Center - Phase 2 Development**
Location: **Falls Township**
**Bucks County, PA**

By: DPB
Date: 3/4/2022
Chk'd: -
Revised: 9/27/2024

Watershed: **Post-Development - Direct Drainage Area Basin A (DP 002)**

## CURVE NUMBERS FOR SCS METHOD

| Hydrologic Soil Group | Cover Description | CN | Area (sf) | Area (acres) | CN X A |
|---|---|---|---|---|---|
| A | Woods (Good Condition) | 30 | 0 | 0.00 | 0.00 |
| D | Woods (Good Condition) | 77 | 0 | 0.00 | 0.00 |
| | | | | | |
| A | Meadow | 30 | 0 | 0.00 | 0.00 |
| D | Meadow | 78 | 0 | 0.00 | 0.00 |
| | | | | | |
| A | Lawn | 39 | 38,333 | 0.88 | 34.32 |
| D | Lawn | 80 | 83,635 | 1.92 | 153.60 |
| | | | | | |
| A | Railroad Track (Modeled as Gravel) | 76 | 0 | 0.00 | 0.00 |
| D | Railroad Track (Modeled as Gravel) | 91 | 0 | 0.00 | 0.00 |
| | | | | | |
| - | Proposed Impervious | 98 | 20,038 | 0.46 | 45.08 |
| | | | | | |
| - | Existing Impervious | 98 | 0 | 0.00 | 0.00 |
| | | | | | |
| Totals = | | | 142,006 | 3.26 | 233.00 |

**CN = 71.5**

Project: **Keystone Trade Center - Phase 2 Development**
Location: **Falls Township**
**Bucks County, PA**

By: DPB
Date: 3/4/2022
Chk'd: -
Revised: 9/27/2024

Watershed: **Post-Development - Total Drainage Area to Basin A (DP 002)**

## CURVE NUMBERS FOR SCS METHOD

| Hydrologic Soil Group | Cover Description | CN | Area (sf) | Area (acres) | CN X A |
|---|---|---|---|---|---|
| A | Woods (Good Condition) | 30 | 0 | 0.00 | 0.00 |
| D | Woods (Good Condition) | 77 | 0 | 0.00 | 0.00 |
| | | | | | |
| A | Meadow | 30 | 0 | 0.00 | 0.00 |
| D | Meadow | 78 | 0 | 0.00 | 0.00 |
| | | | | | |
| A | Lawn | 39 | 44,867 | 1.03 | 40.17 |
| D | Lawn | 80 | 108,029 | 2.48 | 198.40 |
| | | | | | |
| A | Railroad Track (Modeled as Gravel) | 76 | 32,234 | 0.74 | 56.24 |
| D | Railroad Track (Modeled as Gravel) | 91 | 55,757 | 1.28 | 116.48 |
| | | | | | |
| - | Proposed Impervious | 98 | 20,038 | 0.46 | 45.08 |
| | | | | | |
| - | Existing Impervious | 98 | 0 | 0.00 | 0.00 |
| | | | | | |
| Totals = | | | 260,924 | 5.99 | 456.37 |

**CN = 76.2**

Project: **Keystone Trade Center - Phase 2 Development**
Location: **Falls Township**
**Bucks County, PA**

By: DPB
Date: 3/4/2022
Chk'd: -
Revised: 9/27/2024

Watershed: **Post-Development - Bypass A (DP 002)**

## CURVE NUMBERS FOR SCS METHOD

| Hydrologic Soil Group | Cover Description | CN | Area (sf) | Area (acres) | CN X A |
|---|---|---|---|---|---|
| A | Woods (Good Condition) | 30 | 0 | 0.00 | 0.00 |
| D | Woods (Good Condition) | 77 | 0 | 0.00 | 0.00 |
| | | | | | |
| A | Meadow | 30 | 0 | 0.00 | 0.00 |
| D | Meadow | 78 | 0 | 0.00 | 0.00 |
| | | | | | |
| A | Lawn | 39 | 0 | 0.00 | 0.00 |
| D | Lawn | 80 | 0 | 0.00 | 0.00 |
| | | | | | |
| A | Railroad Track (Modeled as Gravel) | 76 | 0 | 0.00 | 0.00 |
| D | Railroad Track (Modeled as Gravel) | 91 | 0 | 0.00 | 0.00 |
| | | | | | |
| - | Proposed Impervious | 98 | 3,920 | 0.09 | 8.82 |
| | | | | | |
| - | Existing Impervious | 98 | 0 | 0.00 | 0.00 |
| | | | | | |
| Totals = | | | 3,920 | 0.09 | 8.82 |

**CN = 98.0**

Project: **Keystone Trade Center - Phase 2 Development**
Location: **Falls Township**
**Bucks County, PA**

By: DPB
Date: 3/4/2022
Chk'd: -
Revised: 9/27/2024

Watershed: **Post-Development - Total (DP 002)**

## CURVE NUMBERS FOR SCS METHOD

| Hydrologic Soil Group | Cover Description | CN | Area (sf) | Area (acres) | CN X A |
|---|---|---|---|---|---|
| A | Woods (Good Condition) | 30 | 0 | 0.00 | 0.00 |
| D | Woods (Good Condition) | 77 | 0 | 0.00 | 0.00 |
| | | | | | |
| A | Meadow | 30 | 0 | 0.00 | 0.00 |
| D | Meadow | 78 | 0 | 0.00 | 0.00 |
| | | | | | |
| A | Lawn | 39 | 44,867 | 1.03 | 40.17 |
| D | Lawn | 80 | 108,029 | 2.48 | 198.40 |
| | | | | | |
| A | Railroad Track (Modeled as Gravel) | 76 | 32,234 | 0.74 | 56.24 |
| D | Railroad Track (Modeled as Gravel) | 91 | 55,757 | 1.28 | 116.48 |
| | | | | | |
| - | Proposed Impervious | 98 | 23,958 | 0.55 | 53.90 |
| | | | | | |
| - | Existing Impervious | 98 | 0 | 0.00 | 0.00 |
| | | | | | |
| Totals = | | | 264,845 | 6.08 | 465.19 |

**CN = 76.5**

# TR55 Tc Worksheet



## Hyd. No. 1

Pre-Dev DA #1 - DP 001

| Description | A | | B | | C | | Totals |
|---|---|---|---|---|---|---|---|
| **Sheet Flow** | | | | | | | |
| Manning's n-value | = 0.240 | | 0.011 | | 0.011 | | |
| Flow length (ft) | = 100.0 | | 0.0 | | 0.0 | | |
| Two-year 24-hr precip. (in) | = 3.30 | | 0.00 | | 0.00 | | |
| Land slope (%) | = 1.25 | | 0.00 | | 0.00 | | |
| **Travel Time (min)** | **= 16.96** | **+** | **0.00** | **+** | **0.00** | **=** | **16.96** |
| **Shallow Concentrated Flow** | | | | | | | |
| Flow length (ft) | = 835.00 | | 0.00 | | 0.00 | | |
| Watercourse slope (%) | = 0.33 | | 0.00 | | 0.00 | | |
| Surface description | = Unpaved | | Paved | | Paved | | |
| Average velocity (ft/s) | =0.93 | | 0.00 | | 0.00 | | |
| **Travel Time (min)** | **= 15.01** | **+** | **0.00** | **+** | **0.00** | **=** | **15.01** |
| **Channel Flow** | | | | | | | |
| X sectional flow area (sqft) | = 23.76 | | 56.55 | | 828.00 | | |
| Wetted perimeter (ft) | = 17.28 | | 18.85 | | 94.94 | | |
| Channel slope (%) | = 0.61 | | 0.31 | | 0.11 | | |
| Manning's n-value | = 0.013 | | 0.013 | | 0.030 | | |
| Velocity (ft/s) | =11.08 | | | | | | |
| | | | 13.32 | | | | |
| | | | | | 7.03 | | |
| Flow length (ft) | ({0})385.0 | | 1075.0 | | 1590.0 | | |
| **Travel Time (min)** | **= 0.58** | **+** | **1.34** | **+** | **3.77** | **=** | **5.69** |

**Total Travel Time, Tc ..... 37.70 min**

# TR55 Tc Worksheet



## Hyd. No. 2

Pre-Dev DA #4 - DP 001

| Description | A | | B | | C | | Totals |
|---|---|---|---|---|---|---|---|
| **Sheet Flow** | | | | | | | |
| Manning's n-value | = 0.240 | | 0.011 | | 0.011 | | |
| Flow length (ft) | = 100.0 | | 0.0 | | 0.0 | | |
| Two-year 24-hr precip. (in) | = 3.30 | | 0.00 | | 0.00 | | |
| Land slope (%) | = 1.67 | | 0.00 | | 0.00 | | |
| **Travel Time (min)** | **= 15.10** | **+** | **0.00** | **+** | **0.00** | **=** | **15.10** |
| **Shallow Concentrated Flow** | | | | | | | |
| Flow length (ft) | = 900.00 | | 0.00 | | 0.00 | | |
| Watercourse slope (%) | = 0.50 | | 0.00 | | 0.00 | | |
| Surface description | = Unpaved | | Paved | | Paved | | |
| Average velocity (ft/s) | =1.14 | | 0.00 | | 0.00 | | |
| **Travel Time (min)** | **= 13.15** | **+** | **0.00** | **+** | **0.00** | **=** | **13.15** |
| **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 ..... 28.25 min**

# TR55 Tc Worksheet



## Hyd. No. 15

Pre-Dev DA #2 (Remains On-Site)

| Description | A | | B | | C | | Totals |
|---|---|---|---|---|---|---|---|
| **Sheet Flow** | | | | | | | |
| Manning's n-value | = 0.011 | | 0.011 | | 0.011 | | |
| Flow length (ft) | = 100.0 | | 0.0 | | 0.0 | | |
| Two-year 24-hr precip. (in) | = 3.30 | | 0.00 | | 0.00 | | |
| Land slope (%) | = 0.50 | | 0.00 | | 0.00 | | |
| **Travel Time (min)** | **= 2.08** | **+** | **0.00** | **+** | **0.00** | **=** | **2.08** |
| **Shallow Concentrated Flow** | | | | | | | |
| Flow length (ft) | = 595.00 | | 405.00 | | 0.00 | | |
| Watercourse slope (%) | = 0.42 | | 1.23 | | 0.00 | | |
| Surface description | = Paved | | Unpaved | | Paved | | |
| Average velocity (ft/s) | =1.32 | | 1.79 | | 0.00 | | |
| **Travel Time (min)** | **= 7.53** | **+** | **3.77** | **+** | **0.00** | **=** | **11.30** |
| **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 ..... 13.40 min**

# TR55 Tc Worksheet



## Hyd. No. 16

Pre-Dev DA #3 (Remains On-Site)

| Description | A | | B | | C | | Totals |
|---|---|---|---|---|---|---|---|
| **Sheet Flow** | | | | | | | |
| Manning's n-value | = 0.240 | | 0.011 | | 0.011 | | |
| Flow length (ft) | = 100.0 | | 0.0 | | 0.0 | | |
| Two-year 24-hr precip. (in) | = 3.30 | | 0.00 | | 0.00 | | |
| Land slope (%) | = 0.70 | | 0.00 | | 0.00 | | |
| **Travel Time (min)** | **= 21.39** | **+** | **0.00** | **+** | **0.00** | **=** | **21.39** |
| **Shallow Concentrated Flow** | | | | | | | |
| Flow length (ft) | = 610.00 | | 0.00 | | 0.00 | | |
| Watercourse slope (%) | = 0.55 | | 0.00 | | 0.00 | | |
| Surface description | = Unpaved | | Paved | | Paved | | |
| Average velocity (ft/s) | =1.20 | | 0.00 | | 0.00 | | |
| **Travel Time (min)** | **= 8.50** | **+** | **0.00** | **+** | **0.00** | **=** | **8.50** |
| **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** | | | | | | | **29.90 min** |

# TR55 Tc Worksheet



## Hyd. No. 34

Post-Dev DA #2C - DP 001

| Description | A | | B | | C | | Totals |
|---|---|---|---|---|---|---|---|
| **Sheet Flow** | | | | | | | |
| Manning's n-value | = 0.240 | | 0.011 | | 0.011 | | |
| Flow length (ft) | = 100.0 | | 0.0 | | 0.0 | | |
| Two-year 24-hr precip. (in) | = 3.30 | | 0.00 | | 0.00 | | |
| Land slope (%) | = 1.67 | | 0.00 | | 0.00 | | |
| **Travel Time (min)** | **= 15.10** | **+** | **0.00** | **+** | **0.00** | **=** | **15.10** |
| **Shallow Concentrated Flow** | | | | | | | |
| Flow length (ft) | = 900.00 | | 0.00 | | 0.00 | | |
| Watercourse slope (%) | = 0.50 | | 0.00 | | 0.00 | | |
| Surface description | = Unpaved | | Paved | | Paved | | |
| Average velocity (ft/s) | =1.14 | | 0.00 | | 0.00 | | |
| **Travel Time (min)** | **= 13.15** | **+** | **0.00** | **+** | **0.00** | **=** | **13.15** |
| **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 ..... 28.30 min**

# TR55 Tc Worksheet



## Hyd. No. 53

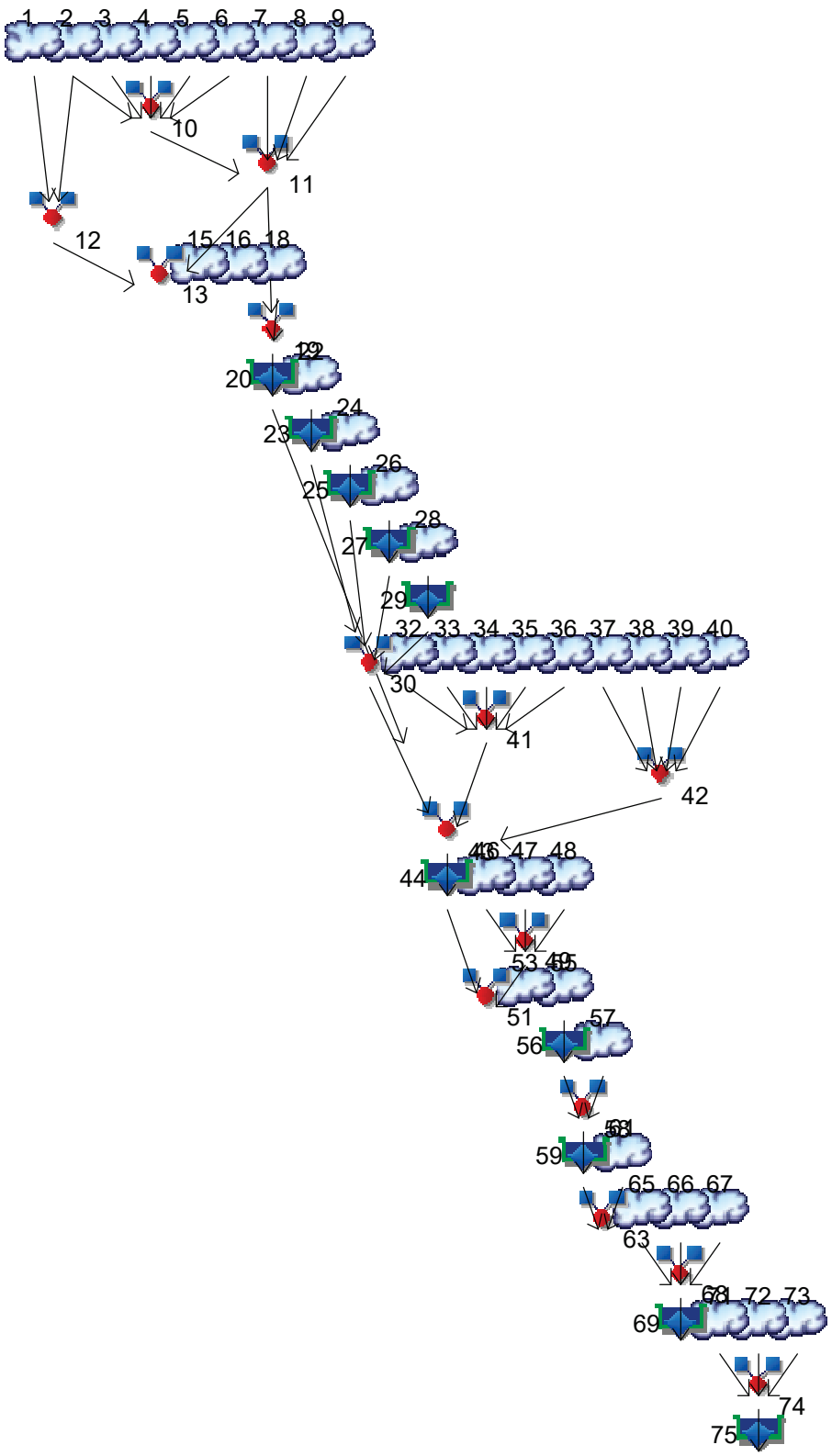
Pre-Dev DA #5 - DP 002

| Description | A | | B | | C | | Totals |
|---|---|---|---|---|---|---|---|
| **Sheet Flow** | | | | | | | |
| Manning's n-value | = 0.240 | | 0.011 | | 0.011 | | |
| Flow length (ft) | = 50.0 | | 50.0 | | 0.0 | | |
| Two-year 24-hr precip. (in) | = 3.30 | | 3.30 | | 0.00 | | |
| Land slope (%) | = 0.50 | | 0.50 | | 0.00 | | |
| **Travel Time (min)** | **= 14.05** | **+** | **1.19** | **+** | **0.00** | **=** | **15.25** |
| **Shallow Concentrated Flow** | | | | | | | |
| Flow length (ft) | = 112.00 | | 0.00 | | 0.00 | | |
| Watercourse slope (%) | = 0.50 | | 0.00 | | 0.00 | | |
| Surface description | = Unpaved | | Paved | | Paved | | |
| Average velocity (ft/s) | =1.14 | | 0.00 | | 0.00 | | |
| **Travel Time (min)** | **= 1.64** | **+** | **0.00** | **+** | **0.00** | **=** | **1.64** |
| **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 | = 0.013 | | 0.013 | | 0.030 | | |
| Velocity (ft/s) | =0.00 | | | | | | |
| | | | 0.00 | | | | |
| | | | | | 0.00 | | |
| Flow length (ft) | ({0})0.0 | | 0.0 | | 0.0 | | |
| **Travel Time (min)** | **= 0.00** | **+** | **0.00** | **+** | **0.00** | **=** | **0.00** |

**Total Travel Time, Tc ..... 16.88 min**

# Watershed Model Schematic





# 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 | ------ | 87.05 | 134.95 | 0.000 | 213.63 | 287.94 | 364.87 | 424.09 | 504.08 | Pre-Dev DA #1 - DP 001 |
| 2 | SCS Runoff | ------ | 0.402 | 1.427 | 0.000 | 4.033 | 7.105 | 10.69 | 13.59 | 17.70 | Pre-Dev DA #4 - DP 001 |
| 3 | SCS Runoff | ------ | 1.120 | 3.743 | 0.000 | 9.186 | 14.84 | 21.08 | 26.05 | 33.00 | Off-site (Fleck) - DP 001 |
| 4 | SCS Runoff | ------ | 0.000 | 0.004 | 0.000 | 0.093 | 0.426 | 3.277 | 8.087 | 16.12 | Off-site (Petrucci) - DP 001 |
| 5 | SCS Runoff | ------ | 24.87 | 31.80 | 0.000 | 42.15 | 51.27 | 60.34 | 67.12 | 76.11 | Off-site (Hiossen) - DP 001 |
| 6 | SCS Runoff | ------ | 0.900 | 1.591 | 0.000 | 2.777 | 3.934 | 5.157 | 6.105 | 7.422 | Off-site (HB Fuller-North) - DP 001 |
| 7 | SCS Runoff | ------ | 10.26 | 13.37 | 0.000 | 18.03 | 22.15 | 26.26 | 29.32 | 33.39 | Off-site (HB Fuller-Middle) - DP 001 |
| 8 | SCS Runoff | ------ | 5.655 | 7.284 | 0.000 | 9.717 | 11.87 | 14.00 | 15.60 | 17.71 | Off-site (HB Fuller-South) - DP 001 |
| 9 | SCS Runoff | ------ | 5.152 | 8.768 | 0.000 | 14.90 | 20.84 | 27.08 | 31.90 | 38.69 | Off-site (Eastern DA) - DP 001 |
| 10 | Combine | 2, 3, 4, 5, 6, | 26.71 | 37.42 | 0.000 | 55.35 | 72.80 | 93.53 | 112.80 | 141.51 | Off-site (2-6) - DP 001 |
| 11 | Combine | 7, 8, 9, 10 | 47.40 | 66.23 | 0.000 | 97.05 | 126.41 | 159.31 | 187.82 | 228.97 | Total Off-site (Pre-Dev) - DP 001 |
| 12 | Combine | 1, 2, | 87.42 | 136.36 | 0.000 | 217.45 | 294.50 | 375.02 | 436.91 | 520.66 | Total On-site (Pre-Dev) - DP 001 |
| 13 | Combine | 11, 12 | 94.03 | 146.22 | 0.000 | 233.20 | 317.42 | 405.89 | 473.93 | 566.24 | Total Pre-Dev - DP 001 |
| 15 | SCS Runoff | ------ | 106.68 | 137.02 | 0.000 | 182.35 | 222.37 | 262.15 | 291.86 | 331.32 | Pre-Dev DA #2 (Remains On-Site) |
| 16 | SCS Runoff | ------ | 0.052 | 0.272 | 0.000 | 1.989 | 5.335 | 10.07 | 14.32 | 20.80 | Pre-Dev DA #3 (Remains On-Site) |
| 18 | SCS Runoff | ------ | 39.23 | 53.40 | 0.000 | 75.12 | 94.59 | 114.08 | 128.68 | 148.09 | Post-Dev DA #1 - DP 001 |
| 19 | Combine | 11, 18 | 86.40 | 118.86 | 0.000 | 170.47 | 218.41 | 269.88 | 312.28 | 371.90 | Total To Pond #9 - DP 001 |
| 20 | Reservoir | 19 | 0.000 | 0.000 | 0.000 | 0.000 | 0.004 | 3.311 | 5.982 | 11.36 | Route Pond #9 |
| 22 | SCS Runoff | ------ | 4.044 | 5.403 | 0.000 | 7.465 | 9.302 | 11.13 | 12.50 | 14.32 | Stormwater Trench 2+3 - DP 001 |
| 23 | Reservoir | 22 | 3.635 | 4.730 | 0.000 | 6.463 | 7.992 | 9.591 | 10.75 | 12.29 | Route ST-2+3 |
| 24 | SCS Runoff | ------ | 2.095 | 2.796 | 0.000 | 3.860 | 4.807 | 5.752 | 6.459 | 7.397 | Stormwater Trench 4 - DP 001 |
| 25 | Reservoir | 24 | 1.846 | 2.509 | 0.000 | 3.493 | 4.367 | 5.162 | 5.679 | 6.421 | Route ST-4 |
| 26 | SCS Runoff | ------ | 2.069 | 2.762 | 0.000 | 3.813 | 4.749 | 5.682 | 6.380 | 7.307 | Stormwater Trench 5 - DP 001 |
| 27 | Reservoir | 26 | 1.822 | 2.477 | 0.000 | 3.451 | 4.315 | 5.111 | 5.618 | 6.352 | Route ST-5 |
| 28 | SCS Runoff | ------ | 2.082 | 2.790 | 0.000 | 3.865 | 4.824 | 5.782 | 6.497 | 7.448 | Stormwater Trench 6 - DP 001 |
| 29 | Reservoir | 28 | 1.827 | 2.486 | 0.000 | 3.479 | 4.360 | 5.162 | 5.681 | 6.426 | Route ST-6 |
| 30 | Combine | 23, 25, 27, 29 | 9.099 | 12.20 | 0.000 | 16.87 | 21.01 | 25.02 | 27.72 | 31.49 | Total Stormwater Trench Outflow - D |
| 32 | SCS Runoff | ------ | 39.87 | 53.63 | 0.000 | 74.58 | 93.29 | 111.97 | 125.94 | 144.51 | Post-Dev DA #2A - DP 001 |
| 33 | SCS Runoff | ------ | 81.53 | 105.29 | 0.000 | 140.82 | 172.20 | 203.40 | 226.69 | 257.61 | Post-Dev DA #2B - DP 001 |
| 34 | SCS Runoff | ------ | 0.234 | 0.965 | 0.000 | 3.061 | 5.626 | 8.717 | 11.25 | 14.85 | Post-Dev DA #2C - DP 001 |
| 35 | SCS Runoff | ------ | 7.734 | 10.52 | 0.000 | 14.78 | 18.60 | 22.43 | 25.29 | 29.10 | Post-Dev DA #3 - DP 001 |
| 36 | SCS Runoff | ------ | 110.72 | 143.11 | 0.000 | 191.56 | 234.36 | 276.90 | 308.67 | 350.84 | Post-Dev DA #4 - DP 001 |

# 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 | |
| 37 | SCS Runoff | ------ | 19.90 | 25.76 | 0.000 | 34.54 | 42.30 | 50.01 | 55.77 | 63.42 | Post-Dev DA #5 - DP 001 |
| 38 | SCS Runoff | ------ | 177.55 | 223.80 | 0.000 | 292.59 | 353.27 | 413.62 | 458.72 | 518.67 | Post-Dev DA #6 - DP 001 |
| 39 | SCS Runoff | ------ | 16.70 | 22.40 | 0.000 | 31.07 | 38.80 | 46.52 | 52.29 | 59.96 | Post-Dev DA #7 - DP 001 |
| 40 | SCS Runoff | ------ | 91.58 | 115.16 | 0.000 | 150.23 | 181.18 | 211.96 | 234.97 | 265.56 | Post-Dev DA #8 - DP 001 |
| 41 | Combine | 32, 33, 34, | 239.85 | 312.63 | 0.000 | 422.28 | 519.87 | 617.44 | 690.52 | 787.76 | Subtotal - Post DA (2A-4) |
| 42 | Combine | 35, 36, 37, 38, 39, | 305.73 | 387.12 | 0.000 | 508.43 | 615.55 | 722.12 | 801.75 | 907.60 | Subtotal - Post DA (5-9) |
| 43 | Combine | 40, 20, 30, 41, | 553.49 | 710.62 | 0.000 | 945.80 | 1154.34 | 1362.22 | 1517.57 | 1723.92 | Total to Combined Basins |
| 44 | Reservoir | 42 43 | 18.26 | 31.06 | 0.000 | 55.17 | 76.99 | 94.25 | 102.59 | 113.06 | Route Combined Basins |
| 46 | SCS Runoff | ------ | 10.48 | 13.04 | 0.000 | 16.84 | 20.20 | 23.55 | 26.06 | 29.39 | Post-Dev Bypass #1 - DP 001 |
| 47 | SCS Runoff | ------ | 12.01 | 16.81 | 0.000 | 24.44 | 31.38 | 38.38 | 43.65 | 50.68 | Post-Dev Bypass #2 - DP 001 |
| 48 | SCS Runoff | ------ | 1.306 | 1.604 | 0.000 | 2.051 | 2.446 | 2.841 | 3.138 | 3.532 | Post-Dev Bypass #3 - DP 001 |
| 49 | Combine | 46, 47, 48 | 23.71 | 31.45 | 0.000 | 43.33 | 54.03 | 64.78 | 72.84 | 83.60 | Total Bypass Area - DP 001 |
| 51 | Combine | 44, 49, | 29.06 | 45.47 | 0.000 | 74.41 | 103.73 | 134.18 | 153.03 | 176.88 | Total Post-Dev - DP 001 |
| 53 | SCS Runoff | ------ | 3.146 | 4.657 | 0.000 | 7.116 | 9.403 | 11.74 | 13.52 | 15.91 | Pre-Dev DA #5 - DP 002 |
| 55 | SCS Runoff | ------ | 5.260 | 7.383 | 0.000 | 10.79 | 13.90 | 17.04 | 19.40 | 22.56 | Stormwater Trench ST-1 - DP 002 |
| 56 | Reservoir | 55 | 4.340 | 5.864 | 0.000 | 8.417 | 10.78 | 12.80 | 14.25 | 16.58 | Route ST-1 |
| 57 | SCS Runoff | ------ | 3.287 | 5.314 | 0.000 | 8.694 | 11.92 | 15.30 | 17.97 | 21.60 | Post-Dev Basin A - DP 002 |
| 58 | Combine | 56, 57 | 7.466 | 10.87 | 0.000 | 16.66 | 22.11 | 27.58 | 31.44 | 36.97 | Total to Basin A |
| 59 | Reservoir | 58 | 0.260 | 0.320 | 0.000 | 0.863 | 2.641 | 4.528 | 5.627 | 6.732 | Route Basin A |
| 61 | SCS Runoff | ------ | 0.326 | 0.401 | 0.000 | 0.513 | 0.612 | 0.710 | 0.784 | 0.883 | Post-Dev Bypass #5 - DP 002 |
| 63 | Combine | 59, 61, | 0.391 | 0.605 | 0.000 | 0.881 | 2.693 | 4.600 | 5.707 | 6.822 | Total Post-Dev - DP 002 |
| 65 | SCS Runoff | ------ | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | Comb Basins (MRC - Lawn A) |
| 66 | SCS Runoff | ------ | 0.000 | 0.000 | 6.426 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | Comb Basins (MRC - Lawn D) |
| 67 | SCS Runoff | ------ | 0.000 | 0.000 | 82.66 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | Comb Basins (MRC - Imp) |
| 68 | Combine | 65, 66, 67 | 0.000 | 0.000 | 89.08 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | Total Comb Basins (MRC) |
| 69 | Reservoir | 68 | 0.000 | 0.000 | 1.002 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | Route MRC Basins |
| 71 | SCS Runoff | ------ | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | Basin A (MRC - Lawn A) |
| 72 | SCS Runoff | ------ | 0.000 | 0.000 | 0.446 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | Basin A (MRC - Lawn D) |
| 73 | SCS Runoff | ------ | 0.000 | 0.000 | 0.280 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | Basin A (MRC - Imp) |
| 74 | Combine | 71, 72, 73 | 0.000 | 0.000 | 0.726 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | Total Basin A (MRC) |

# 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 | |
| 75 | Reservoir | 74 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | Route MRC Basin A |

# Hydrograph Summary Report

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

| Hyd. No. | Hydrograph type (origin) | Peak flow (cfs) | Time interval (min) | Time to Peak (min) | Hyd. volume (cuft) | Inflow hyd(s) | Maximum elevation (ft) | Total strge used (cuft) | Hydrograph Description |
|---|---|---|---|---|---|---|---|---|---|
| 1 | SCS Runoff | 87.05 | 2 | 738 | 458,737 | ------ | ------ | ------ | Pre-Dev DA #1 - DP 001 |
| 2 | SCS Runoff | 0.402 | 2 | 746 | 5,197 | ------ | ------ | ------ | Pre-Dev DA #4 - DP 001 |
| 3 | SCS Runoff | 1.120 | 2 | 720 | 4,979 | ------ | ------ | ------ | Off-site (Fleck) - DP 001 |
| 4 | SCS Runoff | 0.000 | 2 | n/a | 0 | ------ | ------ | ------ | Off-site (Petrucci) - DP 001 |
| 5 | SCS Runoff | 24.87 | 2 | 718 | 58,577 | ------ | ------ | ------ | Off-site (Hiossen) - DP 001 |
| 6 | SCS Runoff | 0.900 | 2 | 718 | 1,989 | ------ | ------ | ------ | Off-site (HB Fuller-North) - DP 001 |
| 7 | SCS Runoff | 10.26 | 2 | 716 | 21,099 | ------ | ------ | ------ | Off-site (HB Fuller-Middle) - DP 001 |
| 8 | SCS Runoff | 5.655 | 2 | 716 | 11,746 | ------ | ------ | ------ | Off-site (HB Fuller-South) - DP 001 |
| 9 | SCS Runoff | 5.152 | 2 | 718 | 11,055 | ------ | ------ | ------ | Off-site (Eastern DA) - DP 001 |
| 10 | Combine | 26.71 | 2 | 718 | 70,742 | 2, 3, 4, | ------ | ------ | Off-site (2-6) - DP 001 |
| 11 | Combine | 47.40 | 2 | 718 | 114,641 | 5, 6, 7, 8, 9, 10 | ------ | ------ | Total Off-site (Pre-Dev) - DP 001 |
| 12 | Combine | 87.42 | 2 | 738 | 463,934 | 1, 2, | ------ | ------ | Total On-site (Pre-Dev) - DP 001 |
| 13 | Combine | 94.03 | 2 | 738 | 578,575 | 11, 12 | ------ | ------ | Total Pre-Dev - DP 001 |
| 15 | SCS Runoff | 106.68 | 2 | 722 | 304,574 | ------ | ------ | ------ | Pre-Dev DA #2 (Remains On-Site) |
| 16 | SCS Runoff | 0.052 | 2 | 1092 | 1,753 | ------ | ------ | ------ | Pre-Dev DA #3 (Remains On-Site) |
| 18 | SCS Runoff | 39.23 | 2 | 716 | 79,272 | ------ | ------ | ------ | Post-Dev DA #1 - DP 001 |
| 19 | Combine | 86.40 | 2 | 718 | 193,913 | 11, 18 | ------ | ------ | Total To Pond #9 - DP 001 |
| 20 | Reservoir | 0.000 | 2 | n/a | 0 | 19 | 10.20 | 193,913 | Route Pond #9 |
| 22 | SCS Runoff | 4.044 | 2 | 716 | 8,207 | ------ | ------ | ------ | Stormwater Trench 2+3 - DP 001 |
| 23 | Reservoir | 3.635 | 2 | 718 | 8,207 | 22 | 16.06 | 604 | Route ST-2+3 |
| 24 | SCS Runoff | 2.095 | 2 | 716 | 4,253 | ------ | ------ | ------ | Stormwater Trench 4 - DP 001 |
| 25 | Reservoir | 1.846 | 2 | 720 | 3,999 | 24 | 16.49 | 756 | Route ST-4 |
| 26 | SCS Runoff | 2.069 | 2 | 716 | 4,202 | ------ | ------ | ------ | Stormwater Trench 5 - DP 001 |
| 27 | Reservoir | 1.822 | 2 | 720 | 3,948 | 26 | 16.48 | 752 | Route ST-5 |
| 28 | SCS Runoff | 2.082 | 2 | 716 | 4,222 | ------ | ------ | ------ | Stormwater Trench 6 - DP 001 |
| 29 | Reservoir | 1.827 | 2 | 720 | 3,960 | 28 | 16.49 | 776 | Route ST-6 |
| 30 | Combine | 9.099 | 2 | 720 | 20,114 | 23, 25, 27, 29 | ------ | ------ | Total Stormwater Trench Outflow - D |
| 32 | SCS Runoff | 39.87 | 2 | 716 | 80,749 | ------ | ------ | ------ | Post-Dev DA #2A - DP 001 |
| 33 | SCS Runoff | 81.53 | 2 | 716 | 168,923 | ------ | ------ | ------ | Post-Dev DA #2B - DP 001 |
| 34 | SCS Runoff | 0.234 | 2 | 752 | 3,813 | ------ | ------ | ------ | Post-Dev DA #2C - DP 001 |
| 35 | SCS Runoff | 7.734 | 2 | 716 | 15,632 | ------ | ------ | ------ | Post-Dev DA #3 - DP 001 |
| 36 | SCS Runoff | 110.72 | 2 | 716 | 229,205 | ------ | ------ | ------ | Post-Dev DA #4 - DP 001 |

# Hydrograph Summary Report

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

| Hyd. No. | Hydrograph type (origin) | Peak flow (cfs) | Time interval (min) | Time to Peak (min) | Hyd. volume (cuft) | Inflow hyd(s) | Maximum elevation (ft) | Total strge used (cuft) | Hydrograph Description |
|---|---|---|---|---|---|---|---|---|---|
| 37 | SCS Runoff | 19.90 | 2 | 716 | 41,124 | ------ | ------ | ------ | Post-Dev DA #5 - DP 001 |
| 38 | SCS Runoff | 177.55 | 2 | 716 | 379,629 | ------ | ------ | ------ | Post-Dev DA #6 - DP 001 |
| 39 | SCS Runoff | 16.70 | 2 | 716 | 33,863 | ------ | ------ | ------ | Post-Dev DA #7 - DP 001 |
| 40 | SCS Runoff | 91.58 | 2 | 716 | 196,650 | ------ | ------ | ------ | Post-Dev DA #8 - DP 001 |
| 41 | Combine | 239.85 | 2 | 716 | 498,321 | 32, 33, 34, 35, 36, | ------ | ------ | Subtotal - Post DA (2A-4) |
| 42 | Combine | 305.73 | 2 | 716 | 651,266 | 37, 38, 39, 40, | ------ | ------ | Subtotal - Post DA (5-9) |
| 43 | Combine | 553.49 | 2 | 716 | 1,169,701 | 20, 30, 41, 42 | ------ | ------ | Total to Combined Basins |
| 44 | Reservoir | 18.26 | 2 | 826 | 867,559 | 43 | 14.03 | 764,535 | Route Combined Basins |
| 46 | SCS Runoff | 10.48 | 2 | 716 | 23,094 | ------ | ------ | ------ | Post-Dev Bypass #1 - DP 001 |
| 47 | SCS Runoff | 12.01 | 2 | 718 | 24,116 | ------ | ------ | ------ | Post-Dev Bypass #2 - DP 001 |
| 48 | SCS Runoff | 1.306 | 2 | 716 | 3,026 | ------ | ------ | ------ | Post-Dev Bypass #3 - DP 001 |
| 49 | Combine | 23.71 | 2 | 716 | 50,236 | 46, 47, 48 | ------ | ------ | Total Bypass Area - DP 001 |
| 51 | Combine | 29.06 | 2 | 718 | 917,795 | 44, 49, | ------ | ------ | Total Post-Dev - DP 001 |
| 53 | SCS Runoff | 3.146 | 2 | 726 | 10,197 | ------ | ------ | ------ | Pre-Dev DA #5 - DP 002 |
| 55 | SCS Runoff | 5.260 | 2 | 718 | 10,545 | ------ | ------ | ------ | Stormwater Trench ST-1 - DP 002 |
| 56 | Reservoir | 4.340 | 2 | 720 | 10,545 | 55 | 15.05 | 856 | Route ST-1 |
| 57 | SCS Runoff | 3.287 | 2 | 718 | 6,821 | ------ | ------ | ------ | Post-Dev Basin A - DP 002 |
| 58 | Combine | 7.466 | 2 | 718 | 17,366 | 56, 57 | ------ | ------ | Total to Basin A |
| 59 | Reservoir | 0.260 | 2 | 910 | 13,832 | 58 | 13.43 | 9,652 | Route Basin A |
| 61 | SCS Runoff | 0.326 | 2 | 716 | 756 | ------ | ------ | ------ | Post-Dev Bypass #5 - DP 002 |
| 63 | Combine | 0.391 | 2 | 720 | 14,589 | 59, 61, | ------ | ------ | Total Post-Dev - DP 002 |
| 65 | SCS Runoff | 0.000 | 1 | n/a | 0 | ------ | ------ | ------ | Comb Basins (MRC - Lawn A) |
| 66 | SCS Runoff | 0.000 | 1 | n/a | 0 | ------ | ------ | ------ | Comb Basins (MRC - Lawn D) |
| 67 | SCS Runoff | 0.000 | 1 | n/a | 0 | ------ | ------ | ------ | Comb Basins (MRC - Imp) |
| 68 | Combine | 0.000 | 1 | n/a | 0 | 65, 66, 67 | ------ | ------ | Total Comb Basins (MRC) |
| 69 | Reservoir | 0.000 | 1 | n/a | 0 | 68 | 10.50 | 0.000 | Route MRC Basins |
| 71 | SCS Runoff | 0.000 | 1 | n/a | 0 | ------ | ------ | ------ | Basin A (MRC - Lawn A) |
| 72 | SCS Runoff | 0.000 | 1 | n/a | 0 | ------ | ------ | ------ | Basin A (MRC - Lawn D) |
| 73 | SCS Runoff | 0.000 | 1 | n/a | 0 | ------ | ------ | ------ | Basin A (MRC - Imp) |
| 74 | Combine | 0.000 | 1 | n/a | 0 | 71, 72, 73 | ------ | ------ | Total Basin A (MRC) |

# Hydrograph Summary Report

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

| Hyd. No. | Hydrograph type (origin) | Peak flow (cfs) | Time interval (min) | Time to Peak (min) | Hyd. volume (cuft) | Inflow hyd(s) | Maximum elevation (ft) | Total strge used (cuft) | Hydrograph Description |
|---|---|---|---|---|---|---|---|---|---|
| 75 | Reservoir | 0.000 | 1 | n/a | 0 | 74 | 10.50 | 0.000 | Route MRC Basin A |

# Hydrograph Summary Report

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

| Hyd. No. | Hydrograph type (origin) | Peak flow (cfs) | Time interval (min) | Time to Peak (min) | Hyd. volume (cuft) | Inflow hyd(s) | Maximum elevation (ft) | Total strge used (cuft) | Hydrograph Description |
|---|---|---|---|---|---|---|---|---|---|
| 1 | SCS Runoff | 134.95 | 2 | 738 | 681,379 | ------ | ------ | ------ | Pre-Dev DA #1 - DP 001 |
| 2 | SCS Runoff | 1.427 | 2 | 736 | 10,785 | ------ | ------ | ------ | Pre-Dev DA #4 - DP 001 |
| 3 | SCS Runoff | 3.743 | 2 | 718 | 10,024 | ------ | ------ | ------ | Off-site (Fleck) - DP 001 |
| 4 | SCS Runoff | 0.004 | 2 | 1440 | 10 | ------ | ------ | ------ | Off-site (Petrucci) - DP 001 |
| 5 | SCS Runoff | 31.80 | 2 | 718 | 75,942 | ------ | ------ | ------ | Off-site (Hiossen) - DP 001 |
| 6 | SCS Runoff | 1.591 | 2 | 718 | 3,283 | ------ | ------ | ------ | Off-site (HB Fuller-North) - DP 001 |
| 7 | SCS Runoff | 13.37 | 2 | 716 | 27,847 | ------ | ------ | ------ | Off-site (HB Fuller-Middle) - DP 001 |
| 8 | SCS Runoff | 7.284 | 2 | 716 | 15,346 | ------ | ------ | ------ | Off-site (HB Fuller-South) - DP 001 |
| 9 | SCS Runoff | 8.768 | 2 | 718 | 17,888 | ------ | ------ | ------ | Off-site (Eastern DA) - DP 001 |
| 10 | Combine | 37.42 | 2 | 718 | 100,043 | 2, 3, 4, | ------ | ------ | Off-site (2-6) - DP 001 |
| 11 | Combine | 66.23 | 2 | 718 | 161,125 | 5, 6, 7, 8, 9, 10 | ------ | ------ | Total Off-site (Pre-Dev) - DP 001 |
| 12 | Combine | 136.36 | 2 | 738 | 692,164 | 1, 2, | ------ | ------ | Total On-site (Pre-Dev) - DP 001 |
| 13 | Combine | 146.22 | 2 | 738 | 853,289 | 11, 12 | ------ | ------ | Total Pre-Dev - DP 001 |
| 15 | SCS Runoff | 137.02 | 2 | 722 | 395,785 | ------ | ------ | ------ | Pre-Dev DA #2 (Remains On-Site) |
| 16 | SCS Runoff | 0.272 | 2 | 768 | 7,039 | ------ | ------ | ------ | Pre-Dev DA #3 (Remains On-Site) |
| 18 | SCS Runoff | 53.40 | 2 | 716 | 108,532 | ------ | ------ | ------ | Post-Dev DA #1 - DP 001 |
| 19 | Combine | 118.86 | 2 | 718 | 269,657 | 11, 18 | ------ | ------ | Total To Pond #9 - DP 001 |
| 20 | Reservoir | 0.000 | 2 | n/a | 0 | 19 | 11.01 | 269,657 | Route Pond #9 |
| 22 | SCS Runoff | 5.403 | 2 | 716 | 11,066 | ------ | ------ | ------ | Stormwater Trench 2+3 - DP 001 |
| 23 | Reservoir | 4.730 | 2 | 720 | 11,066 | 22 | 16.18 | 828 | Route ST-2+3 |
| 24 | SCS Runoff | 2.796 | 2 | 716 | 5,730 | ------ | ------ | ------ | Stormwater Trench 4 - DP 001 |
| 25 | Reservoir | 2.509 | 2 | 718 | 5,476 | 24 | 16.58 | 867 | Route ST-4 |
| 26 | SCS Runoff | 2.762 | 2 | 716 | 5,660 | ------ | ------ | ------ | Stormwater Trench 5 - DP 001 |
| 27 | Reservoir | 2.477 | 2 | 718 | 5,406 | 26 | 16.58 | 862 | Route ST-5 |
| 28 | SCS Runoff | 2.790 | 2 | 716 | 5,706 | ------ | ------ | ------ | Stormwater Trench 6 - DP 001 |
| 29 | Reservoir | 2.486 | 2 | 718 | 5,444 | 28 | 16.58 | 890 | Route ST-6 |
| 30 | Combine | 12.20 | 2 | 718 | 27,393 | 23, 25, 27, 29 | ------ | ------ | Total Stormwater Trench Outflow - D |
| 32 | SCS Runoff | 53.63 | 2 | 716 | 109,485 | ------ | ------ | ------ | Post-Dev DA #2A - DP 001 |
| 33 | SCS Runoff | 105.29 | 2 | 716 | 221,224 | ------ | ------ | ------ | Post-Dev DA #2B - DP 001 |
| 34 | SCS Runoff | 0.965 | 2 | 736 | 8,394 | ------ | ------ | ------ | Post-Dev DA #2C - DP 001 |
| 35 | SCS Runoff | 10.52 | 2 | 716 | 21,384 | ------ | ------ | ------ | Post-Dev DA #3 - DP 001 |
| 36 | SCS Runoff | 143.11 | 2 | 716 | 300,404 | ------ | ------ | ------ | Post-Dev DA #4 - DP 001 |

# Hydrograph Summary Report

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

| Hyd. No. | Hydrograph type (origin) | Peak flow (cfs) | Time interval (min) | Time to Peak (min) | Hyd. volume (cuft) | Inflow hyd(s) | Maximum elevation (ft) | Total strge used (cuft) | Hydrograph Description |
|---|---|---|---|---|---|---|---|---|---|
| 37 | SCS Runoff | 25.76 | 2 | 716 | 53,982 | ------ | ------ | ------ | Post-Dev DA #5 - DP 001 |
| 38 | SCS Runoff | 223.80 | 2 | 716 | 486,092 | ------ | ------ | ------ | Post-Dev DA #6 - DP 001 |
| 39 | SCS Runoff | 22.40 | 2 | 716 | 45,803 | ------ | ------ | ------ | Post-Dev DA #7 - DP 001 |
| 40 | SCS Runoff | 115.16 | 2 | 716 | 251,212 | ------ | ------ | ------ | Post-Dev DA #8 - DP 001 |
| 41 | Combine | 312.63 | 2 | 716 | 660,891 | 32, 33, 34, 35, 36, | ------ | ------ | Subtotal - Post DA (2A-4) |
| 42 | Combine | 387.12 | 2 | 716 | 837,089 | 37, 38, 39, 40, | ------ | ------ | Subtotal - Post DA (5-9) |
| 43 | Combine | 710.62 | 2 | 716 | 1,525,372 | 20, 30, 41, 42 | ------ | ------ | Total to Combined Basins |
| 44 | Reservoir | 31.06 | 2 | 790 | 1,222,800 | 43 | 14.28 | 964,827 | Route Combined Basins |
| 46 | SCS Runoff | 13.04 | 2 | 716 | 29,159 | ------ | ------ | ------ | Post-Dev Bypass #1 - DP 001 |
| 47 | SCS Runoff | 16.81 | 2 | 716 | 33,943 | ------ | ------ | ------ | Post-Dev Bypass #2 - DP 001 |
| 48 | SCS Runoff | 1.604 | 2 | 716 | 3,758 | ------ | ------ | ------ | Post-Dev Bypass #3 - DP 001 |
| 49 | Combine | 31.45 | 2 | 716 | 66,860 | 46, 47, 48 | ------ | ------ | Total Bypass Area - DP 001 |
| 51 | Combine | 45.47 | 2 | 718 | 1,289,660 | 44, 49, | ------ | ------ | Total Post-Dev - DP 001 |
| 53 | SCS Runoff | 4.657 | 2 | 724 | 14,798 | ------ | ------ | ------ | Pre-Dev DA #5 - DP 002 |
| 55 | SCS Runoff | 7.383 | 2 | 716 | 14,907 | ------ | ------ | ------ | Stormwater Trench ST-1 - DP 002 |
| 56 | Reservoir | 5.864 | 2 | 720 | 14,907 | 55 | 15.25 | 1,423 | Route ST-1 |
| 57 | SCS Runoff | 5.314 | 2 | 718 | 10,710 | ------ | ------ | ------ | Post-Dev Basin A - DP 002 |
| 58 | Combine | 10.87 | 2 | 718 | 25,617 | 56, 57 | ------ | ------ | Total to Basin A |
| 59 | Reservoir | 0.320 | 2 | 938 | 22,083 | 58 | 14.08 | 15,457 | Route Basin A |
| 61 | SCS Runoff | 0.401 | 2 | 716 | 939 | ------ | ------ | ------ | Post-Dev Bypass #5 - DP 002 |
| 63 | Combine | 0.605 | 2 | 718 | 23,022 | 59, 61, | ------ | ------ | Total Post-Dev - DP 002 |
| 65 | SCS Runoff | 0.000 | 1 | n/a | 0 | ------ | ------ | ------ | Comb Basins (MRC - Lawn A) |
| 66 | SCS Runoff | 0.000 | 1 | n/a | 0 | ------ | ------ | ------ | Comb Basins (MRC - Lawn D) |
| 67 | SCS Runoff | 0.000 | 1 | n/a | 0 | ------ | ------ | ------ | Comb Basins (MRC - Imp) |
| 68 | Combine | 0.000 | 1 | n/a | 0 | 65, 66, 67 | ------ | ------ | Total Comb Basins (MRC) |
| 69 | Reservoir | 0.000 | 1 | n/a | 0 | 68 | 10.50 | 0.000 | Route MRC Basins |
| 71 | SCS Runoff | 0.000 | 1 | n/a | 0 | ------ | ------ | ------ | Basin A (MRC - Lawn A) |
| 72 | SCS Runoff | 0.000 | 1 | n/a | 0 | ------ | ------ | ------ | Basin A (MRC - Lawn D) |
| 73 | SCS Runoff | 0.000 | 1 | n/a | 0 | ------ | ------ | ------ | Basin A (MRC - Imp) |
| 74 | Combine | 0.000 | 1 | n/a | 0 | 71, 72, 73 | ------ | ------ | Total Basin A (MRC) |

# Hydrograph Summary Report

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

| Hyd. No. | Hydrograph type (origin) | Peak flow (cfs) | Time interval (min) | Time to Peak (min) | Hyd. volume (cuft) | Inflow hyd(s) | Maximum elevation (ft) | Total strge used (cuft) | Hydrograph Description |
|---|---|---|---|---|---|---|---|---|---|
| 75 | Reservoir | 0.000 | 1 | n/a | 0 | 74 | 10.50 | 0.000 | Route MRC Basin A |

# Hydrograph Summary Report

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

| Hyd. No. | Hydrograph type (origin) | Peak flow (cfs) | Time interval (min) | Time to Peak (min) | Hyd. volume (cuft) | Inflow hyd(s) | Maximum elevation (ft) | Total strge used (cuft) | Hydrograph Description |
|---|---|---|---|---|---|---|---|---|---|
| 1 | SCS Runoff | 213.63 | 2 | 738 | 1,050,390 | ------ | ------ | ------ | Pre-Dev DA #1 - DP 001 |
| 2 | SCS Runoff | 4.033 | 2 | 734 | 21,898 | ------ | ------ | ------ | Pre-Dev DA #4 - DP 001 |
| 3 | SCS Runoff | 9.186 | 2 | 718 | 19,912 | ------ | ------ | ------ | Off-site (Fleck) - DP 001 |
| 4 | SCS Runoff | 0.093 | 2 | 1056 | 3,219 | ------ | ------ | ------ | Off-site (Petrucci) - DP 001 |
| 5 | SCS Runoff | 42.15 | 2 | 718 | 102,411 | ------ | ------ | ------ | Off-site (Hiossen) - DP 001 |
| 6 | SCS Runoff | 2.777 | 2 | 718 | 5,572 | ------ | ------ | ------ | Off-site (HB Fuller-North) - DP 001 |
| 7 | SCS Runoff | 18.03 | 2 | 716 | 38,229 | ------ | ------ | ------ | Off-site (HB Fuller-Middle) - DP 001 |
| 8 | SCS Runoff | 9.717 | 2 | 716 | 20,856 | ------ | ------ | ------ | Off-site (HB Fuller-South) - DP 001 |
| 9 | SCS Runoff | 14.90 | 2 | 718 | 29,832 | ------ | ------ | ------ | Off-site (Eastern DA) - DP 001 |
| 10 | Combine | 55.35 | 2 | 718 | 153,013 | 2, 3, 4, | ------ | ------ | Off-site (2-6) - DP 001 |
| 11 | Combine | 97.05 | 2 | 718 | 241,929 | 5, 6, 7, 8, 9, 10 | ------ | ------ | Total Off-site (Pre-Dev) - DP 001 |
| 12 | Combine | 217.45 | 2 | 738 | 1,072,289 | 1, 2, | ------ | ------ | Total On-site (Pre-Dev) - DP 001 |
| 13 | Combine | 233.20 | 2 | 738 | 1,314,218 | 11, 12 | ------ | ------ | Total Pre-Dev - DP 001 |
| 15 | SCS Runoff | 182.35 | 2 | 722 | 534,970 | ------ | ------ | ------ | Pre-Dev DA #2 (Remains On-Site) |
| 16 | SCS Runoff | 1.989 | 2 | 740 | 20,504 | ------ | ------ | ------ | Pre-Dev DA #3 (Remains On-Site) |
| 18 | SCS Runoff | 75.12 | 2 | 716 | 154,526 | ------ | ------ | ------ | Post-Dev DA #1 - DP 001 |
| 19 | Combine | 170.47 | 2 | 718 | 396,455 | 11, 18 | ------ | ------ | Total To Pond #9 - DP 001 |
| 20 | Reservoir | 0.000 | 2 | n/a | 0 | 19 | 12.29 | 396,455 | Route Pond #9 |
| 22 | SCS Runoff | 7.465 | 2 | 716 | 15,517 | ------ | ------ | ------ | Stormwater Trench 2+3 - DP 001 |
| 23 | Reservoir | 6.463 | 2 | 720 | 15,517 | 22 | 16.36 | 1,212 | Route ST-2+3 |
| 24 | SCS Runoff | 3.860 | 2 | 716 | 8,029 | ------ | ------ | ------ | Stormwater Trench 4 - DP 001 |
| 25 | Reservoir | 3.493 | 2 | 718 | 7,775 | 24 | 16.72 | 1,029 | Route ST-4 |
| 26 | SCS Runoff | 3.813 | 2 | 716 | 7,931 | ------ | ------ | ------ | Stormwater Trench 5 - DP 001 |
| 27 | Reservoir | 3.451 | 2 | 718 | 7,677 | 26 | 16.71 | 1,021 | Route ST-5 |
| 28 | SCS Runoff | 3.865 | 2 | 716 | 8,020 | ------ | ------ | ------ | Stormwater Trench 6 - DP 001 |
| 29 | Reservoir | 3.479 | 2 | 718 | 7,759 | 28 | 16.72 | 1,058 | Route ST-6 |
| 30 | Combine | 16.87 | 2 | 718 | 38,727 | 23, 25, 27, 29 | ------ | ------ | Total Stormwater Trench Outflow - D |
| 32 | SCS Runoff | 74.58 | 2 | 716 | 154,385 | ------ | ------ | ------ | Post-Dev DA #2A - DP 001 |
| 33 | SCS Runoff | 140.82 | 2 | 716 | 301,344 | ------ | ------ | ------ | Post-Dev DA #2B - DP 001 |
| 34 | SCS Runoff | 3.061 | 2 | 734 | 17,748 | ------ | ------ | ------ | Post-Dev DA #2C - DP 001 |
| 35 | SCS Runoff | 14.78 | 2 | 716 | 30,422 | ------ | ------ | ------ | Post-Dev DA #3 - DP 001 |
| 36 | SCS Runoff | 191.56 | 2 | 716 | 409,517 | ------ | ------ | ------ | Post-Dev DA #4 - DP 001 |

# Hydrograph Summary Report

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

| Hyd. No. | Hydrograph type (origin) | Peak flow (cfs) | Time interval (min) | Time to Peak (min) | Hyd. volume (cuft) | Inflow hyd(s) | Maximum elevation (ft) | Total strge used (cuft) | Hydrograph Description |
|---|---|---|---|---|---|---|---|---|---|
| 37 | SCS Runoff | 34.54 | 2 | 716 | 73,704 | ------ | ------ | ------ | Post-Dev DA #5 - DP 001 |
| 38 | SCS Runoff | 292.59 | 2 | 716 | 647,487 | ------ | ------ | ------ | Post-Dev DA #6 - DP 001 |
| 39 | SCS Runoff | 31.07 | 2 | 716 | 64,432 | ------ | ------ | ------ | Post-Dev DA #7 - DP 001 |
| 40 | SCS Runoff | 150.23 | 2 | 716 | 333,849 | ------ | ------ | ------ | Post-Dev DA #8 - DP 001 |
| 41 | Combine | 422.28 | 2 | 716 | 913,416 | 32, 33, 34, | ------ | ------ | Subtotal - Post DA (2A-4) |
| 42 | Combine | 508.43 | 2 | 716 | 1,119,473 | 35, 36, 37, 38, 39, | ------ | ------ | Subtotal - Post DA (5-9) |
| 43 | Combine | 945.80 | 2 | 716 | 2,071,615 | 40, 20, 30, 41, 42 | ------ | ------ | Total to Combined Basins |
| 44 | Reservoir | 55.17 | 2 | 764 | 1,768,605 | 43 | 14.67 | 1,277,195 | Route Combined Basins |
| 46 | SCS Runoff | 16.84 | 2 | 716 | 38,306 | ------ | ------ | ------ | Post-Dev Bypass #1 - DP 001 |
| 47 | SCS Runoff | 24.44 | 2 | 716 | 49,667 | ------ | ------ | ------ | Post-Dev Bypass #2 - DP 001 |
| 48 | SCS Runoff | 2.051 | 2 | 716 | 4,857 | ------ | ------ | ------ | Post-Dev Bypass #3 - DP 001 |
| 49 | Combine | 43.33 | 2 | 716 | 92,831 | 46, 47, 48 | ------ | ------ | Total Bypass Area - DP 001 |
| 51 | Combine | 74.41 | 2 | 718 | 1,861,437 | 44, 49, | ------ | ------ | Total Post-Dev - DP 001 |
| 53 | SCS Runoff | 7.116 | 2 | 724 | 22,307 | ------ | ------ | ------ | Pre-Dev DA #5 - DP 002 |
| 55 | SCS Runoff | 10.79 | 2 | 716 | 21,906 | ------ | ------ | ------ | Stormwater Trench ST-1 - DP 002 |
| 56 | Reservoir | 8.417 | 2 | 720 | 21,906 | 55 | 15.54 | 2,360 | Route ST-1 |
| 57 | SCS Runoff | 8.694 | 2 | 718 | 17,386 | ------ | ------ | ------ | Post-Dev Basin A - DP 002 |
| 58 | Combine | 16.66 | 2 | 718 | 39,292 | 56, 57 | ------ | ------ | Total to Basin A |
| 59 | Reservoir | 0.863 | 2 | 806 | 35,758 | 58 | 14.75 | 22,603 | Route Basin A |
| 61 | SCS Runoff | 0.513 | 2 | 716 | 1,214 | ------ | ------ | ------ | Post-Dev Bypass #5 - DP 002 |
| 63 | Combine | 0.881 | 2 | 804 | 36,972 | 59, 61, | ------ | ------ | Total Post-Dev - DP 002 |
| 65 | SCS Runoff | 0.000 | 1 | n/a | 0 | ------ | ------ | ------ | Comb Basins (MRC - Lawn A) |
| 66 | SCS Runoff | 0.000 | 1 | n/a | 0 | ------ | ------ | ------ | Comb Basins (MRC - Lawn D) |
| 67 | SCS Runoff | 0.000 | 1 | n/a | 0 | ------ | ------ | ------ | Comb Basins (MRC - Imp) |
| 68 | Combine | 0.000 | 1 | n/a | 0 | 65, 66, 67 | ------ | ------ | Total Comb Basins (MRC) |
| 69 | Reservoir | 0.000 | 1 | n/a | 0 | 68 | 10.50 | 0.000 | Route MRC Basins |
| 71 | SCS Runoff | 0.000 | 1 | n/a | 0 | ------ | ------ | ------ | Basin A (MRC - Lawn A) |
| 72 | SCS Runoff | 0.000 | 1 | n/a | 0 | ------ | ------ | ------ | Basin A (MRC - Lawn D) |
| 73 | SCS Runoff | 0.000 | 1 | n/a | 0 | ------ | ------ | ------ | Basin A (MRC - Imp) |
| 74 | Combine | 0.000 | 1 | n/a | 0 | 71, 72, 73 | ------ | ------ | Total Basin A (MRC) |

# Hydrograph Summary Report

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

| Hyd. No. | Hydrograph type (origin) | Peak flow (cfs) | Time interval (min) | Time to Peak (min) | Hyd. volume (cuft) | Inflow hyd(s) | Maximum elevation (ft) | Total strge used (cuft) | Hydrograph Description |
|---|---|---|---|---|---|---|---|---|---|
| 75 | Reservoir | 0.000 | 1 | n/a | 0 | 74 | 10.50 | 0.000 | Route MRC Basin A |

# Hydrograph Summary Report

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

| Hyd. No. | Hydrograph type (origin) | Peak flow (cfs) | Time interval (min) | Time to Peak (min) | Hyd. volume (cuft) | Inflow hyd(s) | Maximum elevation (ft) | Total strge used (cuft) | Hydrograph Description |
|---|---|---|---|---|---|---|---|---|---|
| 1 | SCS Runoff | 287.94 | 2 | 738 | 1,402,820 | ------ | ------ | ------ | Pre-Dev DA #1 - DP 001 |
| 2 | SCS Runoff | 7.105 | 2 | 732 | 33,937 | ------ | ------ | ------ | Pre-Dev DA #4 - DP 001 |
| 3 | SCS Runoff | 14.84 | 2 | 718 | 30,541 | ------ | ------ | ------ | Off-site (Fleck) - DP 001 |
| 4 | SCS Runoff | 0.426 | 2 | 744 | 10,431 | ------ | ------ | ------ | Off-site (Petrucci) - DP 001 |
| 5 | SCS Runoff | 51.27 | 2 | 718 | 126,191 | ------ | ------ | ------ | Off-site (Hiossen) - DP 001 |
| 6 | SCS Runoff | 3.934 | 2 | 718 | 7,867 | ------ | ------ | ------ | Off-site (HB Fuller-North) - DP 001 |
| 7 | SCS Runoff | 22.15 | 2 | 716 | 47,615 | ------ | ------ | ------ | Off-site (HB Fuller-Middle) - DP 001 |
| 8 | SCS Runoff | 11.87 | 2 | 716 | 25,819 | ------ | ------ | ------ | Off-site (HB Fuller-South) - DP 001 |
| 9 | SCS Runoff | 20.84 | 2 | 718 | 41,697 | ------ | ------ | ------ | Off-site (Eastern DA) - DP 001 |
| 10 | Combine | 72.80 | 2 | 718 | 208,966 | 2, 3, 4, | ------ | ------ | Off-site (2-6) - DP 001 |
| 11 | Combine | 126.41 | 2 | 718 | 324,097 | 5, 6, 7, 8, 9, 10 | ------ | ------ | Total Off-site (Pre-Dev) - DP 001 |
| 12 | Combine | 294.50 | 2 | 738 | 1,436,759 | 1, 2, | ------ | ------ | Total On-site (Pre-Dev) - DP 001 |
| 13 | Combine | 317.42 | 2 | 736 | 1,760,854 | 11, 12 | ------ | ------ | Total Pre-Dev - DP 001 |
| 15 | SCS Runoff | 222.37 | 2 | 722 | 660,109 | ------ | ------ | ------ | Pre-Dev DA #2 (Remains On-Site) |
| 16 | SCS Runoff | 5.335 | 2 | 734 | 37,113 | ------ | ------ | ------ | Pre-Dev DA #3 (Remains On-Site) |
| 18 | SCS Runoff | 94.59 | 2 | 716 | 196,762 | ------ | ------ | ------ | Post-Dev DA #1 - DP 001 |
| 19 | Combine | 218.41 | 2 | 718 | 520,858 | 11, 18 | ------ | ------ | Total To Pond #9 - DP 001 |
| 20 | Reservoir | 0.004 | 2 | 1482 | 549 | 19 | 13.51 | 520,849 | Route Pond #9 |
| 22 | SCS Runoff | 9.302 | 2 | 716 | 19,577 | ------ | ------ | ------ | Stormwater Trench 2+3 - DP 001 |
| 23 | Reservoir | 7.992 | 2 | 720 | 19,577 | 22 | 16.51 | 1,566 | Route ST-2+3 |
| 24 | SCS Runoff | 4.807 | 2 | 716 | 10,124 | ------ | ------ | ------ | Stormwater Trench 4 - DP 001 |
| 25 | Reservoir | 4.367 | 2 | 718 | 9,871 | 24 | 16.84 | 1,168 | Route ST-4 |
| 26 | SCS Runoff | 4.749 | 2 | 716 | 10,001 | ------ | ------ | ------ | Stormwater Trench 5 - DP 001 |
| 27 | Reservoir | 4.315 | 2 | 718 | 9,747 | 26 | 16.83 | 1,160 | Route ST-5 |
| 28 | SCS Runoff | 4.824 | 2 | 716 | 10,133 | ------ | ------ | ------ | Stormwater Trench 6 - DP 001 |
| 29 | Reservoir | 4.360 | 2 | 718 | 9,872 | 28 | 16.83 | 1,203 | Route ST-6 |
| 30 | Combine | 21.01 | 2 | 718 | 49,066 | 23, 25, 27, 29 | ------ | ------ | Total Stormwater Trench Outflow - D |
| 32 | SCS Runoff | 93.29 | 2 | 716 | 195,435 | ------ | ------ | ------ | Post-Dev DA #2A - DP 001 |
| 33 | SCS Runoff | 172.20 | 2 | 716 | 373,574 | ------ | ------ | ------ | Post-Dev DA #2B - DP 001 |
| 34 | SCS Runoff | 5.626 | 2 | 732 | 28,052 | ------ | ------ | ------ | Post-Dev DA #2C - DP 001 |
| 35 | SCS Runoff | 18.60 | 2 | 716 | 38,718 | ------ | ------ | ------ | Post-Dev DA #3 - DP 001 |
| 36 | SCS Runoff | 234.36 | 2 | 716 | 507,912 | ------ | ------ | ------ | Post-Dev DA #4 - DP 001 |

# Hydrograph Summary Report

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

| Hyd. No. | Hydrograph type (origin) | Peak flow (cfs) | Time interval (min) | Time to Peak (min) | Hyd. volume (cuft) | Inflow hyd(s) | Maximum elevation (ft) | Total strge used (cuft) | Hydrograph Description |
|---|---|---|---|---|---|---|---|---|---|
| 37 | SCS Runoff | 42.30 | 2 | 716 | 91,499 | ------ | ------ | ------ | Post-Dev DA #5 - DP 001 |
| 38 | SCS Runoff | 353.27 | 2 | 716 | 791,945 | ------ | ------ | ------ | Post-Dev DA #6 - DP 001 |
| 39 | SCS Runoff | 38.80 | 2 | 716 | 81,446 | ------ | ------ | ------ | Post-Dev DA #7 - DP 001 |
| 40 | SCS Runoff | 181.18 | 2 | 716 | 407,769 | ------ | ------ | ------ | Post-Dev DA #8 - DP 001 |
| 41 | Combine | 519.87 | 2 | 716 | 1,143,689 | 32, 33, 34, 35, 36, | ------ | ------ | Subtotal - Post DA (2A-4) |
| 42 | Combine | 615.55 | 2 | 716 | 1,372,660 | 37, 38, 39, 40, | ------ | ------ | Subtotal - Post DA (5-9) |
| 43 | Combine | 1154.34 | 2 | 716 | 2,566,021 | 20, 30, 41, 42 | ------ | ------ | Total to Combined Basins |
| 44 | Reservoir | 76.99 | 2 | 754 | 2,262,574 | 43 | 15.03 | 1,564,691 | Route Combined Basins |
| 46 | SCS Runoff | 20.20 | 2 | 716 | 46,466 | ------ | ------ | ------ | Post-Dev Bypass #1 - DP 001 |
| 47 | SCS Runoff | 31.38 | 2 | 716 | 64,296 | ------ | ------ | ------ | Post-Dev Bypass #2 - DP 001 |
| 48 | SCS Runoff | 2.446 | 2 | 716 | 5,835 | ------ | ------ | ------ | Post-Dev Bypass #3 - DP 001 |
| 49 | Combine | 54.03 | 2 | 716 | 116,598 | 46, 47, 48 | ------ | ------ | Total Bypass Area - DP 001 |
| 51 | Combine | 103.73 | 2 | 718 | 2,379,171 | 44, 49, | ------ | ------ | Total Post-Dev - DP 001 |
| 53 | SCS Runoff | 9.403 | 2 | 724 | 29,398 | ------ | ------ | ------ | Pre-Dev DA #5 - DP 002 |
| 55 | SCS Runoff | 13.90 | 2 | 716 | 28,431 | ------ | ------ | ------ | Stormwater Trench ST-1 - DP 002 |
| 56 | Reservoir | 10.78 | 2 | 720 | 28,431 | 55 | 15.81 | 3,245 | Route ST-1 |
| 57 | SCS Runoff | 11.92 | 2 | 718 | 23,930 | ------ | ------ | ------ | Post-Dev Basin A - DP 002 |
| 58 | Combine | 22.11 | 2 | 718 | 52,362 | 56, 57 | ------ | ------ | Total to Basin A |
| 59 | Reservoir | 2.641 | 2 | 746 | 48,827 | 58 | 15.11 | 26,633 | Route Basin A |
| 61 | SCS Runoff | 0.612 | 2 | 716 | 1,459 | ------ | ------ | ------ | Post-Dev Bypass #5 - DP 002 |
| 63 | Combine | 2.693 | 2 | 744 | 50,286 | 59, 61, | ------ | ------ | Total Post-Dev - DP 002 |
| 65 | SCS Runoff | 0.000 | 1 | n/a | 0 | ------ | ------ | ------ | Comb Basins (MRC - Lawn A) |
| 66 | SCS Runoff | 0.000 | 1 | n/a | 0 | ------ | ------ | ------ | Comb Basins (MRC - Lawn D) |
| 67 | SCS Runoff | 0.000 | 1 | n/a | 0 | ------ | ------ | ------ | Comb Basins (MRC - Imp) |
| 68 | Combine | 0.000 | 1 | n/a | 0 | 65, 66, 67 | ------ | ------ | Total Comb Basins (MRC) |
| 69 | Reservoir | 0.000 | 1 | n/a | 0 | 68 | 10.50 | 0.000 | Route MRC Basins |
| 71 | SCS Runoff | 0.000 | 1 | n/a | 0 | ------ | ------ | ------ | Basin A (MRC - Lawn A) |
| 72 | SCS Runoff | 0.000 | 1 | n/a | 0 | ------ | ------ | ------ | Basin A (MRC - Lawn D) |
| 73 | SCS Runoff | 0.000 | 1 | n/a | 0 | ------ | ------ | ------ | Basin A (MRC - Imp) |
| 74 | Combine | 0.000 | 1 | n/a | 0 | 71, 72, 73 | ------ | ------ | Total Basin A (MRC) |

# Hydrograph Summary Report

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

| Hyd. No. | Hydrograph type (origin) | Peak flow (cfs) | Time interval (min) | Time to Peak (min) | Hyd. volume (cuft) | Inflow hyd(s) | Maximum elevation (ft) | Total strge used (cuft) | Hydrograph Description |
|---|---|---|---|---|---|---|---|---|---|
| 75 | Reservoir | 0.000 | 1 | n/a | 0 | 74 | 10.50 | 0.000 | Route MRC Basin A |

# Hydrograph Summary Report

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

| Hyd. No. | Hydrograph type (origin) | Peak flow (cfs) | Time interval (min) | Time to Peak (min) | Hyd. volume (cuft) | Inflow hyd(s) | Maximum elevation (ft) | Total strge used (cuft) | Hydrograph Description |
|---|---|---|---|---|---|---|---|---|---|
| 1 | SCS Runoff | 364.87 | 2 | 736 | 1,771,278 | ------ | ------ | ------ | Pre-Dev DA #1 - DP 001 |
| 2 | SCS Runoff | 10.69 | 2 | 732 | 47,579 | ------ | ------ | ------ | Pre-Dev DA #4 - DP 001 |
| 3 | SCS Runoff | 21.08 | 2 | 718 | 42,523 | ------ | ------ | ------ | Off-site (Fleck) - DP 001 |
| 4 | SCS Runoff | 3.277 | 2 | 720 | 21,194 | ------ | ------ | ------ | Off-site (Petrucci) - DP 001 |
| 5 | SCS Runoff | 60.34 | 2 | 718 | 150,115 | ------ | ------ | ------ | Off-site (Hiossen) - DP 001 |
| 6 | SCS Runoff | 5.157 | 2 | 718 | 10,341 | ------ | ------ | ------ | Off-site (HB Fuller-North) - DP 001 |
| 7 | SCS Runoff | 26.26 | 2 | 716 | 57,094 | ------ | ------ | ------ | Off-site (HB Fuller-Middle) - DP 001 |
| 8 | SCS Runoff | 14.00 | 2 | 716 | 30,819 | ------ | ------ | ------ | Off-site (HB Fuller-South) - DP 001 |
| 9 | SCS Runoff | 27.08 | 2 | 718 | 54,424 | ------ | ------ | ------ | Off-site (Eastern DA) - DP 001 |
| 10 | Combine | 93.53 | 2 | 718 | 271,752 | 2, 3, 4, | ------ | ------ | Off-site (2-6) - DP 001 |
| 11 | Combine | 159.31 | 2 | 718 | 414,090 | 5, 6, 7, 8, 9, 10 | ------ | ------ | Total Off-site (Pre-Dev) - DP 001 |
| 12 | Combine | 375.02 | 2 | 736 | 1,818,856 | 1, 2, | ------ | ------ | Total On-site (Pre-Dev) - DP 001 |
| 13 | Combine | 405.89 | 2 | 736 | 2,232,946 | 11, 12 | ------ | ------ | Total Pre-Dev - DP 001 |
| 15 | SCS Runoff | 262.15 | 2 | 722 | 786,069 | ------ | ------ | ------ | Pre-Dev DA #2 (Remains On-Site) |
| 16 | SCS Runoff | 10.07 | 2 | 734 | 57,310 | ------ | ------ | ------ | Pre-Dev DA #3 (Remains On-Site) |
| 18 | SCS Runoff | 114.08 | 2 | 716 | 239,824 | ------ | ------ | ------ | Post-Dev DA #1 - DP 001 |
| 19 | Combine | 269.88 | 2 | 718 | 653,914 | 11, 18 | ------ | ------ | Total To Pond #9 - DP 001 |
| 20 | Reservoir | 3.311 | 2 | 1308 | 130,989 | 19 | 14.04 | 577,167 | Route Pond #9 |
| 22 | SCS Runoff | 11.13 | 2 | 716 | 23,698 | ------ | ------ | ------ | Stormwater Trench 2+3 - DP 001 |
| 23 | Reservoir | 9.591 | 2 | 720 | 23,698 | 22 | 16.65 | 1,912 | Route ST-2+3 |
| 24 | SCS Runoff | 5.752 | 2 | 716 | 12,252 | ------ | ------ | ------ | Stormwater Trench 4 - DP 001 |
| 25 | Reservoir | 5.162 | 2 | 718 | 11,998 | 24 | 16.96 | 1,314 | Route ST-4 |
| 26 | SCS Runoff | 5.682 | 2 | 716 | 12,102 | ------ | ------ | ------ | Stormwater Trench 5 - DP 001 |
| 27 | Reservoir | 5.111 | 2 | 718 | 11,848 | 26 | 16.95 | 1,303 | Route ST-5 |
| 28 | SCS Runoff | 5.782 | 2 | 716 | 12,280 | ------ | ------ | ------ | Stormwater Trench 6 - DP 001 |
| 29 | Reservoir | 5.162 | 2 | 718 | 12,018 | 28 | 16.96 | 1,354 | Route ST-6 |
| 30 | Combine | 25.02 | 2 | 718 | 59,562 | 23, 25, 27, 29 | ------ | ------ | Total Stormwater Trench Outflow - D |
| 32 | SCS Runoff | 111.97 | 2 | 716 | 237,175 | ------ | ------ | ------ | Post-Dev DA #2A - DP 001 |
| 33 | SCS Runoff | 203.40 | 2 | 716 | 446,392 | ------ | ------ | ------ | Post-Dev DA #2B - DP 001 |
| 34 | SCS Runoff | 8.717 | 2 | 732 | 39,850 | ------ | ------ | ------ | Post-Dev DA #2C - DP 001 |
| 35 | SCS Runoff | 22.43 | 2 | 716 | 47,174 | ------ | ------ | ------ | Post-Dev DA #3 - DP 001 |
| 36 | SCS Runoff | 276.90 | 2 | 716 | 607,127 | ------ | ------ | ------ | Post-Dev DA #4 - DP 001 |

# Hydrograph Summary Report

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

| Hyd. No. | Hydrograph type (origin) | Peak flow (cfs) | Time interval (min) | Time to Peak (min) | Hyd. volume (cuft) | Inflow hyd(s) | Maximum elevation (ft) | Total strge used (cuft) | Hydrograph Description |
|---|---|---|---|---|---|---|---|---|---|
| 37 | SCS Runoff | 50.01 | 2 | 716 | 109,448 | ------ | ------ | ------ | Post-Dev DA #5 - DP 001 |
| 38 | SCS Runoff | 413.62 | 2 | 716 | 936,970 | ------ | ------ | ------ | Post-Dev DA #6 - DP 001 |
| 39 | SCS Runoff | 46.52 | 2 | 716 | 98,735 | ------ | ------ | ------ | Post-Dev DA #7 - DP 001 |
| 40 | SCS Runoff | 211.96 | 2 | 716 | 481,952 | ------ | ------ | ------ | Post-Dev DA #8 - DP 001 |
| 41 | Combine | 617.44 | 2 | 716 | 1,377,716 | 32, 33, 34, 35, 36, | ------ | ------ | Subtotal - Post DA (2A-4) |
| 42 | Combine | 722.12 | 2 | 716 | 1,627,104 | 37, 38, 39, 40, | ------ | ------ | Subtotal - Post DA (5-9) |
| 43 | Combine | 1362.22 | 2 | 716 | 3,195,373 | 20, 30, 41, 42 | ------ | ------ | Total to Combined Basins |
| 44 | Reservoir | 94.25 | 2 | 752 | 2,889,178 | 43 | 15.37 | 1,863,447 | Route Combined Basins |
| 46 | SCS Runoff | 23.55 | 2 | 716 | 54,642 | ------ | ------ | ------ | Post-Dev Bypass #1 - DP 001 |
| 47 | SCS Runoff | 38.38 | 2 | 716 | 79,334 | ------ | ------ | ------ | Post-Dev Bypass #2 - DP 001 |
| 48 | SCS Runoff | 2.841 | 2 | 716 | 6,814 | ------ | ------ | ------ | Post-Dev Bypass #3 - DP 001 |
| 49 | Combine | 64.78 | 2 | 716 | 140,791 | 46, 47, 48 | ------ | ------ | Total Bypass Area - DP 001 |
| 51 | Combine | 134.18 | 2 | 718 | 3,029,969 | 44, 49, | ------ | ------ | Total Post-Dev - DP 001 |
| 53 | SCS Runoff | 11.74 | 2 | 724 | 36,757 | ------ | ------ | ------ | Pre-Dev DA #5 - DP 002 |
| 55 | SCS Runoff | 17.04 | 2 | 716 | 35,148 | ------ | ------ | ------ | Stormwater Trench ST-1 - DP 002 |
| 56 | Reservoir | 12.80 | 2 | 720 | 35,147 | 55 | 16.10 | 4,201 | Route ST-1 |
| 57 | SCS Runoff | 15.30 | 2 | 716 | 30,890 | ------ | ------ | ------ | Post-Dev Basin A - DP 002 |
| 58 | Combine | 27.58 | 2 | 718 | 66,038 | 56, 57 | ------ | ------ | Total to Basin A |
| 59 | Reservoir | 4.528 | 2 | 738 | 62,504 | 58 | 15.54 | 32,155 | Route Basin A |
| 61 | SCS Runoff | 0.710 | 2 | 716 | 1,704 | ------ | ------ | ------ | Post-Dev Bypass #5 - DP 002 |
| 63 | Combine | 4.600 | 2 | 738 | 64,207 | 59, 61, | ------ | ------ | Total Post-Dev - DP 002 |
| 65 | SCS Runoff | 0.000 | 1 | n/a | 0 | ------ | ------ | ------ | Comb Basins (MRC - Lawn A) |
| 66 | SCS Runoff | 0.000 | 1 | n/a | 0 | ------ | ------ | ------ | Comb Basins (MRC - Lawn D) |
| 67 | SCS Runoff | 0.000 | 1 | n/a | 0 | ------ | ------ | ------ | Comb Basins (MRC - Imp) |
| 68 | Combine | 0.000 | 1 | n/a | 0 | 65, 66, 67 | ------ | ------ | Total Comb Basins (MRC) |
| 69 | Reservoir | 0.000 | 1 | n/a | 0 | 68 | 10.50 | 0.000 | Route MRC Basins |
| 71 | SCS Runoff | 0.000 | 1 | n/a | 0 | ------ | ------ | ------ | Basin A (MRC - Lawn A) |
| 72 | SCS Runoff | 0.000 | 1 | n/a | 0 | ------ | ------ | ------ | Basin A (MRC - Lawn D) |
| 73 | SCS Runoff | 0.000 | 1 | n/a | 0 | ------ | ------ | ------ | Basin A (MRC - Imp) |
| 74 | Combine | 0.000 | 1 | n/a | 0 | 71, 72, 73 | ------ | ------ | Total Basin A (MRC) |

# Hydrograph Summary Report

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

| Hyd. No. | Hydrograph type (origin) | Peak flow (cfs) | Time interval (min) | Time to Peak (min) | Hyd. volume (cuft) | Inflow hyd(s) | Maximum elevation (ft) | Total strge used (cuft) | Hydrograph Description |
|---|---|---|---|---|---|---|---|---|---|
| 75 | Reservoir | 0.000 | 1 | n/a | 0 | 74 | 10.50 | 0.000 | Route MRC Basin A |

# Hydrograph Summary Report

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

| Hyd. No. | Hydrograph type (origin) | Peak flow (cfs) | Time interval (min) | Time to Peak (min) | Hyd. volume (cuft) | Inflow hyd(s) | Maximum elevation (ft) | Total strge used (cuft) | Hydrograph Description |
|---|---|---|---|---|---|---|---|---|---|
| 1 | SCS Runoff | 424.09 | 2 | 736 | 2,055,521 | ------ | ------ | ------ | Pre-Dev DA #1 - DP 001 |
| 2 | SCS Runoff | 13.59 | 2 | 732 | 58,675 | ------ | ------ | ------ | Pre-Dev DA #4 - DP 001 |
| 3 | SCS Runoff | 26.05 | 2 | 718 | 52,236 | ------ | ------ | ------ | Off-site (Fleck) - DP 001 |
| 4 | SCS Runoff | 8.087 | 2 | 720 | 31,340 | ------ | ------ | ------ | Off-site (Petrucci) - DP 001 |
| 5 | SCS Runoff | 67.12 | 2 | 718 | 168,124 | ------ | ------ | ------ | Off-site (Hiossen) - DP 001 |
| 6 | SCS Runoff | 6.105 | 2 | 718 | 12,290 | ------ | ------ | ------ | Off-site (HB Fuller-North) - DP 001 |
| 7 | SCS Runoff | 29.32 | 2 | 716 | 64,246 | ------ | ------ | ------ | Off-site (HB Fuller-Middle) - DP 001 |
| 8 | SCS Runoff | 15.60 | 2 | 716 | 34,587 | ------ | ------ | ------ | Off-site (HB Fuller-South) - DP 001 |
| 9 | SCS Runoff | 31.90 | 2 | 716 | 64,410 | ------ | ------ | ------ | Off-site (Eastern DA) - DP 001 |
| 10 | Combine | 112.80 | 2 | 718 | 322,665 | 2, 3, 4, | ------ | ------ | Off-site (2-6) - DP 001 |
| 11 | Combine | 187.82 | 2 | 718 | 485,908 | 5, 6, 7, 8, 9, 10 | ------ | ------ | Total Off-site (Pre-Dev) - DP 001 |
| 12 | Combine | 436.91 | 2 | 736 | 2,114,195 | 1, 2, | ------ | ------ | Total On-site (Pre-Dev) - DP 001 |
| 13 | Combine | 473.93 | 2 | 736 | 2,600,104 | 11, 12 | ------ | ------ | Total Pre-Dev - DP 001 |
| 15 | SCS Runoff | 291.86 | 2 | 722 | 880,911 | ------ | ------ | ------ | Pre-Dev DA #2 (Remains On-Site) |
| 16 | SCS Runoff | 14.32 | 2 | 734 | 74,490 | ------ | ------ | ------ | Pre-Dev DA #3 (Remains On-Site) |
| 18 | SCS Runoff | 128.68 | 2 | 716 | 272,509 | ------ | ------ | ------ | Post-Dev DA #1 - DP 001 |
| 19 | Combine | 312.28 | 2 | 718 | 758,417 | 11, 18 | ------ | ------ | Total To Pond #9 - DP 001 |
| 20 | Reservoir | 5.982 | 2 | 1046 | 235,462 | 19 | 14.23 | 598,321 | Route Pond #9 |
| 22 | SCS Runoff | 12.50 | 2 | 716 | 26,818 | ------ | ------ | ------ | Stormwater Trench 2+3 - DP 001 |
| 23 | Reservoir | 10.75 | 2 | 720 | 26,818 | 22 | 16.76 | 2,176 | Route ST-2+3 |
| 24 | SCS Runoff | 6.459 | 2 | 716 | 13,862 | ------ | ------ | ------ | Stormwater Trench 4 - DP 001 |
| 25 | Reservoir | 5.679 | 2 | 718 | 13,608 | 24 | 17.06 | 1,439 | Route ST-4 |
| 26 | SCS Runoff | 6.380 | 2 | 716 | 13,693 | ------ | ------ | ------ | Stormwater Trench 5 - DP 001 |
| 27 | Reservoir | 5.618 | 2 | 718 | 13,439 | 26 | 17.05 | 1,425 | Route ST-5 |
| 28 | SCS Runoff | 6.497 | 2 | 716 | 13,906 | ------ | ------ | ------ | Stormwater Trench 6 - DP 001 |
| 29 | Reservoir | 5.681 | 2 | 718 | 13,644 | 28 | 17.06 | 1,483 | Route ST-6 |
| 30 | Combine | 27.72 | 2 | 718 | 67,508 | 23, 25, 27, 29 | ------ | ------ | Total Stormwater Trench Outflow - D |
| 32 | SCS Runoff | 125.94 | 2 | 716 | 268,802 | ------ | ------ | ------ | Post-Dev DA #2A - DP 001 |
| 33 | SCS Runoff | 226.69 | 2 | 716 | 501,274 | ------ | ------ | ------ | Post-Dev DA #2B - DP 001 |
| 34 | SCS Runoff | 11.25 | 2 | 732 | 49,503 | ------ | ------ | ------ | Post-Dev DA #2C - DP 001 |
| 35 | SCS Runoff | 25.29 | 2 | 716 | 53,592 | ------ | ------ | ------ | Post-Dev DA #3 - DP 001 |
| 36 | SCS Runoff | 308.67 | 2 | 716 | 681,910 | ------ | ------ | ------ | Post-Dev DA #4 - DP 001 |

# Hydrograph Summary Report

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

| Hyd. No. | Hydrograph type (origin) | Peak flow (cfs) | Time interval (min) | Time to Peak (min) | Hyd. volume (cuft) | Inflow hyd(s) | Maximum elevation (ft) | Total strge used (cuft) | Hydrograph Description |
|---|---|---|---|---|---|---|---|---|---|
| 37 | SCS Runoff | 55.77 | 2 | 716 | 122,980 | ------ | ------ | ------ | Post-Dev DA #5 - DP 001 |
| 38 | SCS Runoff | 458.72 | 2 | 716 | 1,045,992 | ------ | ------ | ------ | Post-Dev DA #6 - DP 001 |
| 39 | SCS Runoff | 52.29 | 2 | 716 | 111,829 | ------ | ------ | ------ | Post-Dev DA #7 - DP 001 |
| 40 | SCS Runoff | 234.97 | 2 | 716 | 537,706 | ------ | ------ | ------ | Post-Dev DA #8 - DP 001 |
| 41 | Combine | 690.52 | 2 | 716 | 1,555,082 | 32, 33, 34, 35, 36, | ------ | ------ | Subtotal - Post DA (2A-4) |
| 42 | Combine | 801.75 | 2 | 716 | 1,818,506 | 37, 38, 39, 40, | ------ | ------ | Subtotal - Post DA (5-9) |
| 43 | Combine | 1517.57 | 2 | 716 | 3,676,561 | 20, 30, 41, 42 | ------ | ------ | Total to Combined Basins |
| 44 | Reservoir | 102.59 | 2 | 754 | 3,370,070 | 43 | 15.64 | 2,093,125 | Route Combined Basins |
| 46 | SCS Runoff | 26.06 | 2 | 716 | 60,782 | ------ | ------ | ------ | Post-Dev Bypass #1 - DP 001 |
| 47 | SCS Runoff | 43.65 | 2 | 716 | 90,808 | ------ | ------ | ------ | Post-Dev Bypass #2 - DP 001 |
| 48 | SCS Runoff | 3.138 | 2 | 716 | 7,549 | ------ | ------ | ------ | Post-Dev Bypass #3 - DP 001 |
| 49 | Combine | 72.84 | 2 | 716 | 159,139 | 46, 47, 48 | ------ | ------ | Total Bypass Area - DP 001 |
| 51 | Combine | 153.03 | 2 | 718 | 3,529,209 | 44, 49, | ------ | ------ | Total Post-Dev - DP 001 |
| 53 | SCS Runoff | 13.52 | 2 | 724 | 42,407 | ------ | ------ | ------ | Pre-Dev DA #5 - DP 002 |
| 55 | SCS Runoff | 19.40 | 2 | 716 | 40,277 | ------ | ------ | ------ | Stormwater Trench ST-1 - DP 002 |
| 56 | Reservoir | 14.25 | 2 | 720 | 40,277 | 55 | 16.35 | 4,995 | Route ST-1 |
| 57 | SCS Runoff | 17.97 | 2 | 716 | 36,320 | ------ | ------ | ------ | Post-Dev Basin A - DP 002 |
| 58 | Combine | 31.44 | 2 | 718 | 76,596 | 56, 57 | ------ | ------ | Total to Basin A |
| 59 | Reservoir | 5.627 | 2 | 738 | 73,062 | 58 | 15.91 | 36,846 | Route Basin A |
| 61 | SCS Runoff | 0.784 | 2 | 716 | 1,887 | ------ | ------ | ------ | Post-Dev Bypass #5 - DP 002 |
| 63 | Combine | 5.707 | 2 | 738 | 74,949 | 59, 61, | ------ | ------ | Total Post-Dev - DP 002 |
| 65 | SCS Runoff | 0.000 | 1 | n/a | 0 | ------ | ------ | ------ | Comb Basins (MRC - Lawn A) |
| 66 | SCS Runoff | 0.000 | 1 | n/a | 0 | ------ | ------ | ------ | Comb Basins (MRC - Lawn D) |
| 67 | SCS Runoff | 0.000 | 1 | n/a | 0 | ------ | ------ | ------ | Comb Basins (MRC - Imp) |
| 68 | Combine | 0.000 | 1 | n/a | 0 | 65, 66, 67 | ------ | ------ | Total Comb Basins (MRC) |
| 69 | Reservoir | 0.000 | 1 | n/a | 0 | 68 | 10.50 | 0.000 | Route MRC Basins |
| 71 | SCS Runoff | 0.000 | 1 | n/a | 0 | ------ | ------ | ------ | Basin A (MRC - Lawn A) |
| 72 | SCS Runoff | 0.000 | 1 | n/a | 0 | ------ | ------ | ------ | Basin A (MRC - Lawn D) |
| 73 | SCS Runoff | 0.000 | 1 | n/a | 0 | ------ | ------ | ------ | Basin A (MRC - Imp) |
| 74 | Combine | 0.000 | 1 | n/a | 0 | 71, 72, 73 | ------ | ------ | Total Basin A (MRC) |

# Hydrograph Summary Report

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

| Hyd. No. | Hydrograph type (origin) | Peak flow (cfs) | Time interval (min) | Time to Peak (min) | Hyd. volume (cuft) | Inflow hyd(s) | Maximum elevation (ft) | Total strge used (cuft) | Hydrograph Description |
|---|---|---|---|---|---|---|---|---|---|
| 75 | Reservoir | 0.000 | 1 | n/a | 0 | 74 | 10.50 | 0.000 | Route MRC Basin A |

# Hydrograph Summary Report

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

| Hyd. No. | Hydrograph type (origin) | Peak flow (cfs) | Time interval (min) | Time to Peak (min) | Hyd. volume (cuft) | Inflow hyd(s) | Maximum elevation (ft) | Total strge used (cuft) | Hydrograph Description |
|---|---|---|---|---|---|---|---|---|---|
| 1 | SCS Runoff | 504.08 | 2 | 736 | 2,442,656 | ------ | ------ | ------ | Pre-Dev DA #1 - DP 001 |
| 2 | SCS Runoff | 17.70 | 2 | 732 | 74,427 | ------ | ------ | ------ | Pre-Dev DA #4 - DP 001 |
| 3 | SCS Runoff | 33.00 | 2 | 718 | 65,990 | ------ | ------ | ------ | Off-site (Fleck) - DP 001 |
| 4 | SCS Runoff | 16.12 | 2 | 718 | 47,275 | ------ | ------ | ------ | Off-site (Petrucci) - DP 001 |
| 5 | SCS Runoff | 76.11 | 2 | 718 | 192,200 | ------ | ------ | ------ | Off-site (Hiossen) - DP 001 |
| 6 | SCS Runoff | 7.422 | 2 | 716 | 14,987 | ------ | ------ | ------ | Off-site (HB Fuller-North) - DP 001 |
| 7 | SCS Runoff | 33.39 | 2 | 716 | 73,823 | ------ | ------ | ------ | Off-site (HB Fuller-Middle) - DP 001 |
| 8 | SCS Runoff | 17.71 | 2 | 716 | 39,628 | ------ | ------ | ------ | Off-site (HB Fuller-South) - DP 001 |
| 9 | SCS Runoff | 38.69 | 2 | 716 | 78,192 | ------ | ------ | ------ | Off-site (Eastern DA) - DP 001 |
| 10 | Combine | 141.51 | 2 | 718 | 394,878 | 2, 3, 4, | ------ | ------ | Off-site (2-6) - DP 001 |
| 11 | Combine | 228.97 | 2 | 718 | 586,521 | 5, 6, 7, 8, 9, 10 | ------ | ------ | Total Off-site (Pre-Dev) - DP 001 |
| 12 | Combine | 520.66 | 2 | 736 | 2,517,083 | 1, 2, | ------ | ------ | Total On-site (Pre-Dev) - DP 001 |
| 13 | Combine | 566.24 | 2 | 736 | 3,103,605 | 11, 12 | ------ | ------ | Total Pre-Dev - DP 001 |
| 15 | SCS Runoff | 331.32 | 2 | 722 | 1,007,722 | ------ | ------ | ------ | Pre-Dev DA #2 (Remains On-Site) |
| 16 | SCS Runoff | 20.80 | 2 | 732 | 99,694 | ------ | ------ | ------ | Pre-Dev DA #3 (Remains On-Site) |
| 18 | SCS Runoff | 148.09 | 2 | 716 | 316,474 | ------ | ------ | ------ | Post-Dev DA #1 - DP 001 |
| 19 | Combine | 371.90 | 2 | 718 | 902,995 | 11, 18 | ------ | ------ | Total To Pond #9 - DP 001 |
| 20 | Reservoir | 11.36 | 2 | 882 | 380,017 | 19 | 14.52 | 630,474 | Route Pond #9 |
| 22 | SCS Runoff | 14.32 | 2 | 716 | 31,007 | ------ | ------ | ------ | Stormwater Trench 2+3 - DP 001 |
| 23 | Reservoir | 12.29 | 2 | 718 | 31,007 | 22 | 16.91 | 2,529 | Route ST-2+3 |
| 24 | SCS Runoff | 7.397 | 2 | 716 | 16,023 | ------ | ------ | ------ | Stormwater Trench 4 - DP 001 |
| 25 | Reservoir | 6.421 | 2 | 718 | 15,769 | 24 | 17.22 | 1,613 | Route ST-4 |
| 26 | SCS Runoff | 7.307 | 2 | 716 | 15,828 | ------ | ------ | ------ | Stormwater Trench 5 - DP 001 |
| 27 | Reservoir | 6.352 | 2 | 718 | 15,574 | 26 | 17.21 | 1,596 | Route ST-5 |
| 28 | SCS Runoff | 7.448 | 2 | 716 | 16,088 | ------ | ------ | ------ | Stormwater Trench 6 - DP 001 |
| 29 | Reservoir | 6.426 | 2 | 718 | 15,827 | 28 | 17.22 | 1,664 | Route ST-6 |
| 30 | Combine | 31.49 | 2 | 718 | 78,176 | 23, 25, 27, 29 | ------ | ------ | Total Stormwater Trench Outflow - D |
| 32 | SCS Runoff | 144.51 | 2 | 716 | 311,289 | ------ | ------ | ------ | Post-Dev DA #2A - DP 001 |
| 33 | SCS Runoff | 257.61 | 2 | 716 | 574,709 | ------ | ------ | ------ | Post-Dev DA #2B - DP 001 |
| 34 | SCS Runoff | 14.85 | 2 | 732 | 63,275 | ------ | ------ | ------ | Post-Dev DA #2C - DP 001 |
| 35 | SCS Runoff | 29.10 | 2 | 716 | 62,223 | ------ | ------ | ------ | Post-Dev DA #3 - DP 001 |
| 36 | SCS Runoff | 350.84 | 2 | 716 | 781,983 | ------ | ------ | ------ | Post-Dev DA #4 - DP 001 |

# Hydrograph Summary Report

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

| Hyd. No. | Hydrograph type (origin) | Peak flow (cfs) | Time interval (min) | Time to Peak (min) | Hyd. volume (cuft) | Inflow hyd(s) | Maximum elevation (ft) | Total strge used (cuft) | Hydrograph Description |
|---|---|---|---|---|---|---|---|---|---|
| 37 | SCS Runoff | 63.42 | 2 | 716 | 141,091 | ------ | ------ | ------ | Post-Dev DA #5 - DP 001 |
| 38 | SCS Runoff | 518.67 | 2 | 716 | 1,191,596 | ------ | ------ | ------ | Post-Dev DA #6 - DP 001 |
| 39 | SCS Runoff | 59.96 | 2 | 716 | 129,415 | ------ | ------ | ------ | Post-Dev DA #7 - DP 001 |
| 40 | SCS Runoff | 265.56 | 2 | 716 | 612,157 | ------ | ------ | ------ | Post-Dev DA #8 - DP 001 |
| 41 | Combine | 787.76 | 2 | 716 | 1,793,479 | 32, 33, 34, 35, 36, | ------ | ------ | Subtotal - Post DA (2A-4) |
| 42 | Combine | 907.60 | 2 | 716 | 2,074,257 | 37, 38, 39, 40, | ------ | ------ | Subtotal - Post DA (5-9) |
| 43 | Combine | 1723.92 | 2 | 716 | 4,325,925 | 20, 30, 41, 42 | ------ | ------ | Total to Combined Basins |
| 44 | Reservoir | 113.06 | 2 | 756 | 4,019,168 | 43 | 16.00 | 2,402,444 | Route Combined Basins |
| 46 | SCS Runoff | 29.39 | 2 | 716 | 68,974 | ------ | ------ | ------ | Post-Dev Bypass #1 - DP 001 |
| 47 | SCS Runoff | 50.68 | 2 | 716 | 106,304 | ------ | ------ | ------ | Post-Dev Bypass #2 - DP 001 |
| 48 | SCS Runoff | 3.532 | 2 | 716 | 8,528 | ------ | ------ | ------ | Post-Dev Bypass #3 - DP 001 |
| 49 | Combine | 83.60 | 2 | 716 | 183,806 | 46, 47, 48 | ------ | ------ | Total Bypass Area - DP 001 |
| 51 | Combine | 176.88 | 2 | 718 | 4,202,972 | 44, 49, | ------ | ------ | Total Post-Dev - DP 001 |
| 53 | SCS Runoff | 15.91 | 2 | 724 | 50,073 | ------ | ------ | ------ | Pre-Dev DA #5 - DP 002 |
| 55 | SCS Runoff | 22.56 | 2 | 716 | 47,208 | ------ | ------ | ------ | Stormwater Trench ST-1 - DP 002 |
| 56 | Reservoir | 16.58 | 2 | 720 | 47,208 | 55 | 16.80 | 6,041 | Route ST-1 |
| 57 | SCS Runoff | 21.60 | 2 | 716 | 43,779 | ------ | ------ | ------ | Post-Dev Basin A - DP 002 |
| 58 | Combine | 36.97 | 2 | 718 | 90,988 | 56, 57 | ------ | ------ | Total to Basin A |
| 59 | Reservoir | 6.732 | 2 | 738 | 87,454 | 58 | 16.38 | 43,596 | Route Basin A |
| 61 | SCS Runoff | 0.883 | 2 | 716 | 2,132 | ------ | ------ | ------ | Post-Dev Bypass #5 - DP 002 |
| 63 | Combine | 6.822 | 2 | 736 | 89,585 | 59, 61, | ------ | ------ | Total Post-Dev - DP 002 |
| 65 | SCS Runoff | 0.000 | 1 | n/a | 0 | ------ | ------ | ------ | Comb Basins (MRC - Lawn A) |
| 66 | SCS Runoff | 0.000 | 1 | n/a | 0 | ------ | ------ | ------ | Comb Basins (MRC - Lawn D) |
| 67 | SCS Runoff | 0.000 | 1 | n/a | 0 | ------ | ------ | ------ | Comb Basins (MRC - Imp) |
| 68 | Combine | 0.000 | 1 | n/a | 0 | 65, 66, 67 | ------ | ------ | Total Comb Basins (MRC) |
| 69 | Reservoir | 0.000 | 1 | n/a | 0 | 68 | 10.50 | 0.000 | Route MRC Basins |
| 71 | SCS Runoff | 0.000 | 1 | n/a | 0 | ------ | ------ | ------ | Basin A (MRC - Lawn A) |
| 72 | SCS Runoff | 0.000 | 1 | n/a | 0 | ------ | ------ | ------ | Basin A (MRC - Lawn D) |
| 73 | SCS Runoff | 0.000 | 1 | n/a | 0 | ------ | ------ | ------ | Basin A (MRC - Imp) |
| 74 | Combine | 0.000 | 1 | n/a | 0 | 71, 72, 73 | ------ | ------ | Total Basin A (MRC) |

# Hydrograph Summary Report

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

| Hyd. No. | Hydrograph type (origin) | Peak flow (cfs) | Time interval (min) | Time to Peak (min) | Hyd. volume (cuft) | Inflow hyd(s) | Maximum elevation (ft) | Total strge used (cuft) | Hydrograph Description |
|---|---|---|---|---|---|---|---|---|---|
| 75 | Reservoir | 0.000 | 1 | n/a | 0 | 74 | 10.50 | 0.000 | Route MRC Basin A |

# Pond Report



## Pond No. 1 - Wet Pond #9

### Pond Data

**Contours -**User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 8.00 ft

### Stage / Storage Table

| Stage (ft) | Elevation (ft) | Contour area (sqft) | Incr. Storage (cuft) | Total storage (cuft) |
|---|---|---|---|---|
| 0.00 | 8.00 | 83,629 | 0 | 0 |
| 1.00 | 9.00 | 87,916 | 85,755 | 85,755 |
| 2.00 | 10.00 | 91,696 | 89,790 | 175,545 |
| 3.00 | 11.00 | 95,527 | 93,596 | 269,141 |
| 4.00 | 12.00 | 99,414 | 97,454 | 366,595 |
| 5.00 | 13.00 | 103,361 | 101,371 | 467,966 |
| 5.50 | 13.50 | 105,366 | 52,176 | 520,142 |
| 6.00 | 14.00 | 107,371 | 53,178 | 573,320 |
| 7.00 | 15.00 | 111,447 | 109,392 | 682,712 |
| 8.00 | 16.00 | 115,708 | 113,560 | 796,271 |
| 9.00 | 17.00 | 119,974 | 117,823 | 914,094 |
| 10.00 | 18.00 | 124,969 | 122,451 | 1,036,545 |

### Culvert / Orifice Structures

| | [A] | [B] | [C] | [PrfRsr] |
|---|---|---|---|---|
| **Rise (in)** | = 48.00 | 48.00 | 24.00 | 0.00 |
| **Span (in)** | = 48.00 | 48.00 | 36.00 | 0.00 |
| **No. Barrels** | = 2 | 2 | 2 | 0 |
| **Invert El. (ft)** | = 13.50 | 13.50 | 14.75 | 0.00 |
| **Length (ft)** | = 79.00 | 0.00 | 0.00 | 0.00 |
| **Slope (%)** | = 0.64 | 0.00 | 0.00 | n/a |
| **N-Value** | = .013 | .013 | .013 | n/a |
| **Orifice Coeff.** | = 0.60 | 0.60 | 0.60 | 0.60 |
| **Multi-Stage** | = n/a | Yes | Yes | No |

### Weir Structures

| | [A] | [B] | [C] | [D] |
|---|---|---|---|---|
| **Crest Len (ft)** | = 20.00 | 0.00 | 0.00 | 0.00 |
| **Crest El. (ft)** | = 19.00 | 0.00 | 0.00 | 0.00 |
| **Weir Coeff.** | = 3.33 | 3.33 | 3.33 | 3.33 |
| **Weir Type** | = 1 | Rect | --- | --- |
| **Multi-Stage** | = Yes | No | No | No |

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

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

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

### Stage / Storage / Discharge Table

| Stage ft | Storage cuft | Elevation ft | Clv A cfs | Clv B cfs | Clv C cfs | PrfRsr cfs | Wr A cfs | Wr B cfs | Wr C cfs | Wr D cfs | Exfil cfs | User cfs | Total cfs |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.00 | 0 | 8.00 | 0.00 | 0.00 | 0.00 | --- | 0.00 | --- | --- | --- | --- | --- | 0.000 |
| 1.00 | 85,755 | 9.00 | 0.00 | 0.00 | 0.00 | --- | 0.00 | --- | --- | --- | --- | --- | 0.000 |
| 2.00 | 175,545 | 10.00 | 0.00 | 0.00 | 0.00 | --- | 0.00 | --- | --- | --- | --- | --- | 0.000 |
| 3.00 | 269,141 | 11.00 | 0.00 | 0.00 | 0.00 | --- | 0.00 | --- | --- | --- | --- | --- | 0.000 |
| 4.00 | 366,595 | 12.00 | 0.00 | 0.00 | 0.00 | --- | 0.00 | --- | --- | --- | --- | --- | 0.000 |
| 5.00 | 467,966 | 13.00 | 0.00 | 0.00 | 0.00 | --- | 0.00 | --- | --- | --- | --- | --- | 0.000 |
| 5.50 | 520,142 | 13.50 | 0.00 | 0.00 | 0.00 | --- | 0.00 | --- | --- | --- | --- | --- | 0.000 |
| 6.00 | 573,320 | 14.00 | 3.02 ic | 2.92 ic | 0.00 | --- | 0.00 | --- | --- | --- | --- | --- | 2.919 |
| 7.00 | 682,712 | 15.00 | 24.75 ic | 22.20 ic | 2.55 ic | --- | 0.00 | --- | --- | --- | --- | --- | 24.75 |
| 8.00 | 796,271 | 16.00 | 61.07 oc | 42.17 ic | 18.90 ic | --- | 0.00 | --- | --- | --- | --- | --- | 61.07 |
| 9.00 | 914,094 | 17.00 | 92.42 oc | 61.02 ic | 31.40 ic | --- | 0.00 | --- | --- | --- | --- | --- | 92.42 |
| 10.00 | 1,036,545 | 18.00 | 113.77 oc | 76.99 ic | 36.77 ic | --- | 0.00 | --- | --- | --- | --- | --- | 113.76 |

# Pond Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Tuesday, 09 / 24 / 2024

## Pond No. 4 - Combined Basins

### Pond Data

**Contours -**User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 13.00 ft

### Stage / Storage Table

| Stage (ft) | Elevation (ft) | Contour area (sqft) | Incr. Storage (cuft) | Total storage (cuft) |
|---|---|---|---|---|
| 0.00 | 13.00 | 710,685 | 0 | 0 |
| 1.00 | 14.00 | 771,758 | 740,938 | 740,938 |
| 2.00 | 15.00 | 832,879 | 802,044 | 1,542,982 |
| 3.00 | 16.00 | 895,080 | 863,706 | 2,406,688 |
| 4.00 | 17.00 | 958,077 | 926,308 | 3,332,996 |
| 5.00 | 18.00 | 1,022,280 | 989,906 | 4,322,902 |

### Culvert / Orifice Structures

| | [A] | [B] | [C] | [PrfRsr] |
|---|---|---|---|---|
| **Rise (in)** | = 48.00 | 24.00 | 24.00 | 0.00 |
| **Span (in)** | = 48.00 | 24.00 | 48.00 | 0.00 |
| **No. Barrels** | = 2 | 2 | 2 | 0 |
| **Invert El. (ft)** | = 12.00 | 13.40 | 13.40 | 0.00 |
| **Length (ft)** | = 122.00 | 0.00 | 0.00 | 0.00 |
| **Slope (%)** | = 4.92 | 0.00 | 0.00 | n/a |
| **N-Value** | = .013 | .013 | .013 | n/a |
| **Orifice Coeff.** | = 0.60 | 0.60 | 0.60 | 0.60 |
| **Multi-Stage** | = n/a | Yes | Yes | No |

### Weir Structures

| | [A] | [B] | [C] | [D] |
|---|---|---|---|---|
| **Crest Len (ft)** | = 24.00 | 0.00 | 0.00 | 0.00 |
| **Crest El. (ft)** | = 17.00 | 0.00 | 0.00 | 0.00 |
| **Weir Coeff.** | = 3.33 | 3.33 | 3.33 | 3.33 |
| **Weir Type** | = 1 | --- | --- | --- |
| **Multi-Stage** | = Yes | No | No | No |

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

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

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

### Stage / Storage / Discharge Table

| Stage ft | Storage cuft | Elevation ft | Clv A cfs | Clv B cfs | Clv C cfs | PrfRsr cfs | Wr A cfs | Wr B cfs | Wr C cfs | Wr D cfs | Exfil cfs | User cfs | Total cfs |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.00 | 0 | 13.00 | 0.00 | 0.00 | 0.00 | --- | 0.00 | --- | --- | --- | --- | --- | 0.000 |
| 1.00 | 740,938 | 14.00 | 16.94 ic | 4.21 ic | 12.66 ic | --- | 0.00 | --- | --- | --- | --- | --- | 16.87 |
| 2.00 | 1,542,982 | 15.00 | 75.70 ic | 22.43 ic | 53.27 ic | --- | 0.00 | --- | --- | --- | --- | --- | 75.70 |
| 3.00 | 2,406,688 | 16.00 | 113.22 ic | 31.92 ic | 81.29 ic | --- | 0.00 | --- | --- | --- | --- | --- | 113.21 |
| 4.00 | 3,332,996 | 17.00 | 139.36 ic | 39.18 ic | 99.77 ic | --- | 0.00 | --- | --- | --- | --- | --- | 138.95 |
| 5.00 | 4,322,902 | 18.00 | 200.32 ic | 33.94 ic | 86.45 ic | --- | 79.92 | --- | --- | --- | --- | --- | 200.31 |

# Pond Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Tuesday, 07 / 18 / 2023

## Pond No. 7 - Stormwater Trench ST-1

### Pond Data

**UG Chambers -**Invert elev. = 15.00 ft, Rise x Span = 1.50 x 1.50 ft, Barrel Len = 1354.00 ft, No. Barrels = 1, Slope = 0.00%, Headers = No
**Encasement -**Invert elev. = 14.67 ft, Width = 4.00 ft, Height = 3.33 ft, Voids = 40.00%

### Stage / Storage Table

| Stage (ft) | Elevation (ft) | Contour area (sqft) | Incr. Storage (cuft) | Total storage (cuft) |
|---|---|---|---|---|
| 0.00 | 14.67 | n/a | 0 | 0 |
| 0.33 | 15.00 | n/a | 722 | 722 |
| 0.67 | 15.34 | n/a | 962 | 1,684 |
| 1.00 | 15.67 | n/a | 1,101 | 2,784 |
| 1.33 | 16.00 | n/a | 1,121 | 3,906 |
| 1.66 | 16.33 | n/a | 1,052 | 4,958 |
| 2.00 | 16.67 | n/a | 807 | 5,765 |
| 2.33 | 17.00 | n/a | 722 | 6,487 |
| 2.66 | 17.33 | n/a | 722 | 7,208 |
| 3.00 | 17.67 | n/a | 722 | 7,930 |
| 3.33 | 18.00 | n/a | 722 | 8,651 |

### Culvert / Orifice Structures

| | [A] | [B] | [C] | [PrfRsr] |
|---|---|---|---|---|
| **Rise (in)** | = 36.00 | 24.00 | 0.00 | 0.00 |
| **Span (in)** | = 36.00 | 24.00 | 0.00 | 0.00 |
| **No. Barrels** | = 1 | 1 | 0 | 0 |
| **Invert El. (ft)** | = 14.00 | 14.00 | 0.00 | 0.00 |
| **Length (ft)** | = 219.00 | 0.00 | 0.00 | 0.00 |
| **Slope (%)** | = 0.46 | 0.00 | 0.00 | n/a |
| **N-Value** | = .013 | .013 | .013 | n/a |
| **Orifice Coeff.** | = 0.60 | 0.60 | 0.60 | 0.60 |
| **Multi-Stage** | = n/a | Yes | No | No |

### Weir Structures

| | [A] | [B] | [C] | [D] |
|---|---|---|---|---|
| **Crest Len (ft)** | = 11.54 | 0.00 | 0.00 | 0.00 |
| **Crest El. (ft)** | = 18.00 | 0.00 | 0.00 | 0.00 |
| **Weir Coeff.** | = 3.33 | 3.33 | 3.33 | 3.33 |
| **Weir Type** | = 1 | --- | --- | --- |
| **Multi-Stage** | = Yes | No | No | No |

**Exfil.(in/hr)** = 0.000 (by Wet area)
**TW Elev. (ft)** = 0.00

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

### Stage / Storage / Discharge Table

| Stage ft | Storage cuft | Elevation ft | Clv A cfs | Clv B cfs | Clv C cfs | PrfRsr cfs | Wr A cfs | Wr B cfs | Wr C cfs | Wr D cfs | Exfil cfs | User cfs | Total cfs |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.00 | 0 | 14.67 | 0.00 | 0.00 | --- | --- | 0.00 | --- | --- | --- | --- | --- | 0.000 |
| 0.33 | 722 | 15.00 | 4.09 ic | 3.98 ic | --- | --- | 0.00 | --- | --- | --- | --- | --- | 3.983 |
| 0.67 | 1,684 | 15.34 | 6.60 ic | 6.60 ic | --- | --- | 0.00 | --- | --- | --- | --- | --- | 6.596 |
| 1.00 | 2,784 | 15.67 | 9.69 ic | 9.52 ic | --- | --- | 0.00 | --- | --- | --- | --- | --- | 9.520 |
| 1.33 | 3,906 | 16.00 | 12.28 ic | 12.28 ic | --- | --- | 0.00 | --- | --- | --- | --- | --- | 12.28 |
| 1.66 | 4,958 | 16.33 | 14.21 ic | 14.21 ic | --- | --- | 0.00 | --- | --- | --- | --- | --- | 14.21 |
| 2.00 | 5,765 | 16.67 | 15.93 ic | 15.93 ic | --- | --- | 0.00 | --- | --- | --- | --- | --- | 15.93 |
| 2.33 | 6,487 | 17.00 | 17.60 ic | 17.60 ic | --- | --- | 0.00 | --- | --- | --- | --- | --- | 17.60 |
| 2.66 | 7,208 | 17.33 | 19.30 ic | 19.13 ic | --- | --- | 0.00 | --- | --- | --- | --- | --- | 19.13 |
| 3.00 | 7,930 | 17.67 | 20.63 ic | 20.63 ic | --- | --- | 0.00 | --- | --- | --- | --- | --- | 20.63 |
| 3.33 | 8,651 | 18.00 | 22.00 ic | 22.00 ic | --- | --- | 0.00 | --- | --- | --- | --- | --- | 22.00 |

# Pond Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Tuesday, 07 / 18 / 2023

## Pond No. 10 - Stormwater Trench ST-2+3

### Pond Data

**UG Chambers -**Invert elev. = 16.00 ft, Rise x Span = 1.50 x 1.50 ft, Barrel Len = 1048.00 ft, No. Barrels = 1, Slope = 0.00%, Headers = No
**Encasement -**Invert elev. = 15.67 ft, Width = 3.50 ft, Height = 2.33 ft, Voids = 40.00%

### Stage / Storage Table

| Stage (ft) | Elevation (ft) | Contour area (sqft) | Incr. Storage (cuft) | Total storage (cuft) |
|---|---|---|---|---|
| 0.00 | 15.67 | n/a | 0 | 0 |
| 0.23 | 15.90 | n/a | 342 | 342 |
| 0.47 | 16.14 | n/a | 392 | 734 |
| 0.70 | 16.37 | n/a | 504 | 1,238 |
| 0.93 | 16.60 | n/a | 547 | 1,785 |
| 1.16 | 16.83 | n/a | 560 | 2,345 |
| 1.40 | 17.07 | n/a | 553 | 2,898 |
| 1.63 | 17.30 | n/a | 519 | 3,418 |
| 1.86 | 17.53 | n/a | 429 | 3,847 |
| 2.10 | 17.77 | n/a | 342 | 4,189 |
| 2.33 | 18.00 | n/a | 342 | 4,531 |

### Culvert / Orifice Structures

| | [A] | [B] | [C] | [PrfRsr] |
|---|---|---|---|---|
| **Rise (in)** | = 24.00 | 24.00 | 0.00 | 0.00 |
| **Span (in)** | = 24.00 | 24.00 | 0.00 | 0.00 |
| **No. Barrels** | = 1 | 1 | 0 | 0 |
| **Invert El. (ft)** | = 14.00 | 15.25 | 0.00 | 0.00 |
| **Length (ft)** | = 16.00 | 0.00 | 0.00 | 0.00 |
| **Slope (%)** | = 5.26 | 0.00 | 0.00 | n/a |
| **N-Value** | = .013 | .013 | .013 | n/a |
| **Orifice Coeff.** | = 0.60 | 0.60 | 0.60 | 0.60 |
| **Multi-Stage** | = n/a | Yes | No | No |

### Weir Structures

| | [A] | [B] | [C] | [D] |
|---|---|---|---|---|
| **Crest Len (ft)** | = 11.54 | 0.00 | 0.00 | 0.00 |
| **Crest El. (ft)** | = 18.00 | 0.00 | 0.00 | 0.00 |
| **Weir Coeff.** | = 3.33 | 3.33 | 3.33 | 3.33 |
| **Weir Type** | = 1 | --- | --- | --- |
| **Multi-Stage** | = Yes | No | No | No |

**Exfil.(in/hr)** = 0.000 (by Wet area)
**TW Elev. (ft)** = 0.00

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

### Stage / Storage / Discharge Table

| Stage ft | Storage cuft | Elevation ft | Clv A cfs | Clv B cfs | Clv C cfs | PrfRsr cfs | Wr A cfs | Wr B cfs | Wr C cfs | Wr D cfs | Exfil cfs | User cfs | Total cfs |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.00 | 0 | 15.67 | 0.00 | 0.00 | --- | --- | 0.00 | --- | --- | --- | --- | --- | 0.000 |
| 0.23 | 342 | 15.90 | 12.35 ic | 2.11 ic | --- | --- | 0.00 | --- | --- | --- | --- | --- | 2.107 |
| 0.47 | 734 | 16.14 | 12.35 ic | 4.33 ic | --- | --- | 0.00 | --- | --- | --- | --- | --- | 4.332 |
| 0.70 | 1,238 | 16.37 | 12.35 ic | 6.56 ic | --- | --- | 0.00 | --- | --- | --- | --- | --- | 6.558 |
| 0.93 | 1,785 | 16.60 | 12.35 ic | 8.96 ic | --- | --- | 0.00 | --- | --- | --- | --- | --- | 8.958 |
| 1.16 | 2,345 | 16.83 | 12.35 ic | 11.46 ic | --- | --- | 0.00 | --- | --- | --- | --- | --- | 11.46 |
| 1.40 | 2,898 | 17.07 | 13.77 ic | 13.77 ic | --- | --- | 0.00 | --- | --- | --- | --- | --- | 13.77 |
| 1.63 | 3,418 | 17.30 | 15.51 ic | 15.51 ic | --- | --- | 0.00 | --- | --- | --- | --- | --- | 15.51 |
| 1.86 | 3,847 | 17.53 | 17.02 ic | 17.02 ic | --- | --- | 0.00 | --- | --- | --- | --- | --- | 17.02 |
| 2.10 | 4,189 | 17.77 | 17.79 ic | 17.79 ic | --- | --- | 0.00 | --- | --- | --- | --- | --- | 17.79 |
| 2.33 | 4,531 | 18.00 | 18.52 ic | 18.52 ic | --- | --- | 0.00 | --- | --- | --- | --- | --- | 18.52 |

# Pond Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Tuesday, 07 / 18 / 2023

## Pond No. 11 - Stormwater Trench ST-4

### Pond Data

**UG Chambers -**Invert elev. = 16.00 ft, Rise x Span = 1.50 x 1.50 ft, Barrel Len = 522.00 ft, No. Barrels = 1, Slope = 0.00%, Headers = No
**Encasement -**Invert elev. = 15.67 ft, Width = 3.50 ft, Height = 2.33 ft, Voids = 40.00%

### Stage / Storage Table

| Stage (ft) | Elevation (ft) | Contour area (sqft) | Incr. Storage (cuft) | Total storage (cuft) |
|---|---|---|---|---|
| 0.00 | 15.67 | n/a | 0 | 0 |
| 0.23 | 15.90 | n/a | 170 | 170 |
| 0.47 | 16.14 | n/a | 195 | 366 |
| 0.70 | 16.37 | n/a | 251 | 617 |
| 0.93 | 16.60 | n/a | 272 | 889 |
| 1.16 | 16.83 | n/a | 279 | 1,168 |
| 1.40 | 17.07 | n/a | 275 | 1,444 |
| 1.63 | 17.30 | n/a | 259 | 1,702 |
| 1.86 | 17.53 | n/a | 214 | 1,916 |
| 2.10 | 17.77 | n/a | 170 | 2,086 |
| 2.33 | 18.00 | n/a | 170 | 2,257 |

### Culvert / Orifice Structures

| | [A] | [B] | [C] | [PrfRsr] |
|---|---|---|---|---|
| **Rise (in)** | = 18.00 | 12.00 | 0.00 | 0.00 |
| **Span (in)** | = 18.00 | 12.00 | 0.00 | 0.00 |
| **No. Barrels** | = 1 | 2 | 0 | 0 |
| **Invert El. (ft)** | = 14.00 | 16.00 | 0.00 | 0.00 |
| **Length (ft)** | = 8.00 | 0.00 | 0.00 | 0.00 |
| **Slope (%)** | = 13.23 | 0.00 | 0.00 | n/a |
| **N-Value** | = .013 | .013 | .013 | n/a |
| **Orifice Coeff.** | = 0.60 | 0.60 | 0.60 | 0.60 |
| **Multi-Stage** | = n/a | Yes | No | No |

### Weir Structures

| | [A] | [B] | [C] | [D] |
|---|---|---|---|---|
| **Crest Len (ft)** | = 11.54 | 0.00 | 0.00 | 0.00 |
| **Crest El. (ft)** | = 18.00 | 0.00 | 0.00 | 0.00 |
| **Weir Coeff.** | = 3.33 | 3.33 | 3.33 | 3.33 |
| **Weir Type** | = 1 | --- | --- | --- |
| **Multi-Stage** | = Yes | No | No | No |

**Exfil.(in/hr)** = 0.000 (by Wet area)
**TW Elev. (ft)** = 0.00

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

### Stage / Storage / Discharge Table

| Stage ft | Storage cuft | Elevation ft | Clv A cfs | Clv B cfs | Clv C cfs | PrfRsr cfs | Wr A cfs | Wr B cfs | Wr C cfs | Wr D cfs | Exfil cfs | User cfs | Total cfs |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.00 | 0 | 15.67 | 0.00 | 0.00 | --- | --- | 0.00 | --- | --- | --- | --- | --- | 0.000 |
| 0.23 | 170 | 15.90 | 8.16 ic | 0.00 | --- | --- | 0.00 | --- | --- | --- | --- | --- | 0.000 |
| 0.47 | 366 | 16.14 | 8.16 ic | 0.17 ic | --- | --- | 0.00 | --- | --- | --- | --- | --- | 0.169 |
| 0.70 | 617 | 16.37 | 8.16 ic | 1.12 ic | --- | --- | 0.00 | --- | --- | --- | --- | --- | 1.115 |
| 0.93 | 889 | 16.60 | 8.16 ic | 2.65 ic | --- | --- | 0.00 | --- | --- | --- | --- | --- | 2.646 |
| 1.16 | 1,168 | 16.83 | 8.16 ic | 4.37 ic | --- | --- | 0.00 | --- | --- | --- | --- | --- | 4.366 |
| 1.40 | 1,444 | 17.07 | 8.16 ic | 5.70 ic | --- | --- | 0.00 | --- | --- | --- | --- | --- | 5.699 |
| 1.63 | 1,702 | 17.30 | 8.16 ic | 6.77 ic | --- | --- | 0.00 | --- | --- | --- | --- | --- | 6.768 |
| 1.86 | 1,916 | 17.53 | 8.16 ic | 7.69 ic | --- | --- | 0.00 | --- | --- | --- | --- | --- | 7.690 |
| 2.10 | 2,086 | 17.77 | 8.51 ic | 8.51 ic | --- | --- | 0.00 | --- | --- | --- | --- | --- | 8.512 |
| 2.33 | 2,257 | 18.00 | 9.26 ic | 9.26 ic | --- | --- | 0.00 | --- | --- | --- | --- | --- | 9.262 |

# Pond Report



## Pond No. 12 - Stormwater Trench ST-5

### Pond Data

**UG Chambers -**Invert elev. = 16.00 ft, Rise x Span = 1.50 x 1.50 ft, Barrel Len = 522.00 ft, No. Barrels = 1, Slope = 0.00%, Headers = No
**Encasement -**Invert elev. = 15.67 ft, Width = 3.50 ft, Height = 2.33 ft, Voids = 40.00%

### Stage / Storage Table

| Stage (ft) | Elevation (ft) | Contour area (sqft) | Incr. Storage (cuft) | Total storage (cuft) |
|---|---|---|---|---|
| 0.00 | 15.67 | n/a | 0 | 0 |
| 0.23 | 15.90 | n/a | 170 | 170 |
| 0.47 | 16.14 | n/a | 195 | 366 |
| 0.70 | 16.37 | n/a | 251 | 617 |
| 0.93 | 16.60 | n/a | 272 | 889 |
| 1.16 | 16.83 | n/a | 279 | 1,168 |
| 1.40 | 17.07 | n/a | 275 | 1,444 |
| 1.63 | 17.30 | n/a | 259 | 1,702 |
| 1.86 | 17.53 | n/a | 214 | 1,916 |
| 2.10 | 17.77 | n/a | 170 | 2,086 |
| 2.33 | 18.00 | n/a | 170 | 2,257 |

### Culvert / Orifice Structures

| | [A] | [B] | [C] | [PrfRsr] |
|---|---|---|---|---|
| **Rise (in)** | = 18.00 | 12.00 | 0.00 | 0.00 |
| **Span (in)** | = 18.00 | 12.00 | 0.00 | 0.00 |
| **No. Barrels** | = 1 | 2 | 0 | 0 |
| **Invert El. (ft)** | = 14.00 | 16.00 | 0.00 | 0.00 |
| **Length (ft)** | = 7.00 | 0.00 | 0.00 | 0.00 |
| **Slope (%)** | = 14.29 | 0.00 | 0.00 | n/a |
| **N-Value** | = .013 | .013 | .013 | n/a |
| **Orifice Coeff.** | = 0.60 | 0.60 | 0.60 | 0.60 |
| **Multi-Stage** | = n/a | Yes | No | No |

### Weir Structures

| | [A] | [B] | [C] | [D] |
|---|---|---|---|---|
| **Crest Len (ft)** | = 11.54 | 0.00 | 0.00 | 0.00 |
| **Crest El. (ft)** | = 18.00 | 0.00 | 0.00 | 0.00 |
| **Weir Coeff.** | = 3.33 | 3.33 | 3.33 | 3.33 |
| **Weir Type** | = 1 | --- | --- | --- |
| **Multi-Stage** | = Yes | No | No | No |

**Exfil.(in/hr)** = 0.000 (by Wet area)
**TW Elev. (ft)** = 0.00

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

### Stage / Storage / Discharge Table

| Stage ft | Storage cuft | Elevation ft | Clv A cfs | Clv B cfs | Clv C cfs | PrfRsr cfs | Wr A cfs | Wr B cfs | Wr C cfs | Wr D cfs | Exfil cfs | User cfs | Total cfs |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.00 | 0 | 15.67 | 0.00 | 0.00 | --- | --- | 0.00 | --- | --- | --- | --- | --- | 0.000 |
| 0.23 | 170 | 15.90 | 8.16 ic | 0.00 | --- | --- | 0.00 | --- | --- | --- | --- | --- | 0.000 |
| 0.47 | 366 | 16.14 | 8.16 ic | 0.17 ic | --- | --- | 0.00 | --- | --- | --- | --- | --- | 0.169 |
| 0.70 | 617 | 16.37 | 8.16 ic | 1.12 ic | --- | --- | 0.00 | --- | --- | --- | --- | --- | 1.115 |
| 0.93 | 889 | 16.60 | 8.16 ic | 2.65 ic | --- | --- | 0.00 | --- | --- | --- | --- | --- | 2.646 |
| 1.16 | 1,168 | 16.83 | 8.16 ic | 4.37 ic | --- | --- | 0.00 | --- | --- | --- | --- | --- | 4.366 |
| 1.40 | 1,444 | 17.07 | 8.16 ic | 5.70 ic | --- | --- | 0.00 | --- | --- | --- | --- | --- | 5.699 |
| 1.63 | 1,702 | 17.30 | 8.16 ic | 6.77 ic | --- | --- | 0.00 | --- | --- | --- | --- | --- | 6.768 |
| 1.86 | 1,916 | 17.53 | 8.16 ic | 7.69 ic | --- | --- | 0.00 | --- | --- | --- | --- | --- | 7.690 |
| 2.10 | 2,086 | 17.77 | 8.51 ic | 8.51 ic | --- | --- | 0.00 | --- | --- | --- | --- | --- | 8.512 |
| 2.33 | 2,257 | 18.00 | 9.26 ic | 9.26 ic | --- | --- | 0.00 | --- | --- | --- | --- | --- | 9.262 |

# Pond Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Tuesday, 07 / 18 / 2023

## Pond No. 13 - Stormwater Trench ST-6

### Pond Data

**UG Chambers -**Invert elev. = 16.00 ft, Rise x Span = 1.50 x 1.50 ft, Barrel Len = 538.00 ft, No. Barrels = 1, Slope = 0.00%, Headers = No
**Encasement -**Invert elev. = 15.67 ft, Width = 3.50 ft, Height = 2.33 ft, Voids = 40.00%

### Stage / Storage Table

| Stage (ft) | Elevation (ft) | Contour area (sqft) | Incr. Storage (cuft) | Total storage (cuft) |
|---|---|---|---|---|
| 0.00 | 15.67 | n/a | 0 | 0 |
| 0.23 | 15.90 | n/a | 176 | 176 |
| 0.47 | 16.14 | n/a | 201 | 377 |
| 0.70 | 16.37 | n/a | 259 | 636 |
| 0.93 | 16.60 | n/a | 281 | 916 |
| 1.16 | 16.83 | n/a | 288 | 1,204 |
| 1.40 | 17.07 | n/a | 284 | 1,488 |
| 1.63 | 17.30 | n/a | 267 | 1,754 |
| 1.86 | 17.53 | n/a | 220 | 1,975 |
| 2.10 | 17.77 | n/a | 176 | 2,150 |
| 2.33 | 18.00 | n/a | 176 | 2,326 |

### Culvert / Orifice Structures

| | [A] | [B] | [C] | [PrfRsr] |
|---|---|---|---|---|
| **Rise (in)** | = 18.00 | 12.00 | 0.00 | 0.00 |
| **Span (in)** | = 18.00 | 12.00 | 0.00 | 0.00 |
| **No. Barrels** | = 1 | 2 | 0 | 0 |
| **Invert El. (ft)** | = 14.00 | 16.00 | 0.00 | 0.00 |
| **Length (ft)** | = 7.00 | 0.00 | 0.00 | 0.00 |
| **Slope (%)** | = 14.29 | 0.00 | 0.00 | n/a |
| **N-Value** | = .013 | .013 | .013 | n/a |
| **Orifice Coeff.** | = 0.60 | 0.60 | 0.60 | 0.60 |
| **Multi-Stage** | = n/a | Yes | No | No |

### Weir Structures

| | [A] | [B] | [C] | [D] |
|---|---|---|---|---|
| **Crest Len (ft)** | = 11.54 | 0.00 | 0.00 | 0.00 |
| **Crest El. (ft)** | = 18.00 | 0.00 | 0.00 | 0.00 |
| **Weir Coeff.** | = 3.33 | 3.33 | 3.33 | 3.33 |
| **Weir Type** | = 1 | --- | --- | --- |
| **Multi-Stage** | = Yes | No | No | No |

**Exfil.(in/hr)** = 0.000 (by Wet area)
**TW Elev. (ft)** = 0.00

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

### Stage / Storage / Discharge Table

| Stage ft | Storage cuft | Elevation ft | Clv A cfs | Clv B cfs | Clv C cfs | PrfRsr cfs | Wr A cfs | Wr B cfs | Wr C cfs | Wr D cfs | Exfil cfs | User cfs | Total cfs |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.00 | 0 | 15.67 | 0.00 | 0.00 | --- | --- | 0.00 | --- | --- | --- | --- | --- | 0.000 |
| 0.23 | 176 | 15.90 | 8.16 ic | 0.00 | --- | --- | 0.00 | --- | --- | --- | --- | --- | 0.000 |
| 0.47 | 377 | 16.14 | 8.16 ic | 0.17 ic | --- | --- | 0.00 | --- | --- | --- | --- | --- | 0.169 |
| 0.70 | 636 | 16.37 | 8.16 ic | 1.12 ic | --- | --- | 0.00 | --- | --- | --- | --- | --- | 1.115 |
| 0.93 | 916 | 16.60 | 8.16 ic | 2.65 ic | --- | --- | 0.00 | --- | --- | --- | --- | --- | 2.646 |
| 1.16 | 1,204 | 16.83 | 8.16 ic | 4.37 ic | --- | --- | 0.00 | --- | --- | --- | --- | --- | 4.366 |
| 1.40 | 1,488 | 17.07 | 8.16 ic | 5.70 ic | --- | --- | 0.00 | --- | --- | --- | --- | --- | 5.699 |
| 1.63 | 1,754 | 17.30 | 8.16 ic | 6.77 ic | --- | --- | 0.00 | --- | --- | --- | --- | --- | 6.768 |
| 1.86 | 1,975 | 17.53 | 8.16 ic | 7.69 ic | --- | --- | 0.00 | --- | --- | --- | --- | --- | 7.690 |
| 2.10 | 2,150 | 17.77 | 8.51 ic | 8.51 ic | --- | --- | 0.00 | --- | --- | --- | --- | --- | 8.512 |
| 2.33 | 2,326 | 18.00 | 9.26 ic | 9.26 ic | --- | --- | 0.00 | --- | --- | --- | --- | --- | 9.262 |

# Pond Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Wednesday, 01 / 31 / 2024

## Pond No. 8 - Basin A (MRC)

### Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begin at elevation = 10.50 ft, Increment = 0.25 ft, 13 contours

Top elevation = 18.00 ft, Bottom elevation = 10.50 ft, Depth = 7.50 ft, Volume = 69,946 cuft

Total area = 0.18 ac, Side slope = 0.00:1, Bottom area = 7,812 sqft, Perimeter = 2,650 ft, Wetted area = 13,000 sqft = 30.00%

### Stage / Storage Table

| Stage (ft) | Elevation (ft) | Contour area (sqft) | Incr. Storage (cuft) | Total storage (cuft) |
|---|---|---|---|---|
| 0.00 | 10.50 | 7,812 | 0 | 0 |
| 0.25 | 10.75 | 7,812 | 586 | 586 |
| 0.50 | 11.00 | 7,812 | 586 | 1,172 |
| 0.75 | 11.25 | 7,812 | 586 | 1,758 |
| 1.00 | 11.50 | 7,812 | 586 | 2,344 |
| 1.25 | 11.75 | 7,812 | 586 | 2,930 |
| 1.50 | 12.00 | 7,812 | 586 | 3,515 |
| 1.75 | 12.25 | 7,812 | 586 | 4,101 |
| 2.00 | 12.50 | 7,812 | 586 | 4,687 |
| 2.25 | 12.75 | 7,812 | 586 | 5,273 |
| 2.50 | 13.00 | 7,812 | 586 | 5,859 |
| 2.50 | 13.00 | 7,813 | 8 | 5,867 |
| 3.50 | 14.00 | 9,665 | 8,713 | 14,580 |
| 4.50 | 15.00 | 11,673 | 10,642 | 25,221 |
| 5.50 | 16.00 | 13,837 | 12,726 | 37,947 |
| 6.50 | 17.00 | 16,016 | 14,897 | 52,844 |
| 7.50 | 18.00 | 18,250 | 17,102 | 69,946 |

### Culvert / Orifice Structures

| | [A] | [B] | [C] | [PrfRsr] |
|---|---|---|---|---|
| **Rise (in)** | = 18.00 | 0.75 | 10.00 | 0.00 |
| **Span (in)** | = 18.00 | 0.75 | 10.00 | 0.00 |
| **No. Barrels** | = 1 | 1 | 2 | 0 |
| **Invert El. (ft)** | = 12.00 | 11.00 | 14.10 | 0.00 |
| **Length (ft)** | = 276.00 | 0.00 | 0.00 | 0.00 |
| **Slope (%)** | = 0.42 | 0.00 | 0.00 | n/a |
| **N-Value** | = .013 | .013 | .013 | n/a |
| **Orifice Coeff.** | = 0.60 | 0.60 | 0.60 | 0.60 |
| **Multi-Stage** | = n/a | Yes | Yes | No |

### Weir Structures

| | [A] | [B] | [C] | [D] |
|---|---|---|---|---|
| **Crest Len (ft)** | = 11.54 | 0.00 | 0.00 | 0.00 |
| **Crest El. (ft)** | = 16.50 | 0.00 | 0.00 | 0.00 |
| **Weir Coeff.** | = 3.33 | 3.33 | 3.33 | 3.33 |
| **Weir Type** | = 1 | --- | --- | --- |
| **Multi-Stage** | = Yes | No | No | No |

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

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

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

### Stage / Storage / Discharge Table

| Stage ft | Storage cuft | Elevation ft | Clv A cfs | Clv B cfs | Clv C cfs | PrfRsr cfs | Wr A cfs | Wr B cfs | Wr C cfs | Wr D cfs | Exfil cfs | User cfs | Total cfs |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.00 | 0 | 10.50 | 0.00 | 0.00 | 0.00 | --- | 0.00 | --- | --- | --- | --- | --- | 0.000 |
| 0.25 | 586 | 10.75 | 0.00 | 0.00 | 0.00 | --- | 0.00 | --- | --- | --- | --- | --- | 0.000 |
| 0.50 | 1,172 | 11.00 | 0.00 | 0.00 | 0.00 | --- | 0.00 | --- | --- | --- | --- | --- | 0.000 |
| 0.75 | 1,758 | 11.25 | 0.00 | 0.00 ic | 0.00 | --- | 0.00 | --- | --- | --- | --- | --- | 0.000 |
| 1.00 | 2,344 | 11.50 | 0.00 | 0.00 ic | 0.00 | --- | 0.00 | --- | --- | --- | --- | --- | 0.000 |
| 1.25 | 2,930 | 11.75 | 0.00 | 0.00 ic | 0.00 | --- | 0.00 | --- | --- | --- | --- | --- | 0.000 |
| 1.50 | 3,515 | 12.00 | 0.00 | 0.00 ic | 0.00 | --- | 0.00 | --- | --- | --- | --- | --- | 0.000 |
| 1.75 | 4,101 | 12.25 | 0.01 ic | 0.01 ic | 0.00 | --- | 0.00 | --- | --- | --- | --- | --- | 0.007 |
| 2.00 | 4,687 | 12.50 | 0.01 ic | 0.01 ic | 0.00 | --- | 0.00 | --- | --- | --- | --- | --- | 0.010 |
| 2.25 | 5,273 | 12.75 | 0.01 ic | 0.01 ic | 0.00 | --- | 0.00 | --- | --- | --- | --- | --- | 0.012 |
| 2.50 | 5,859 | 13.00 | 0.01 ic | 0.01 ic | 0.00 | --- | 0.00 | --- | --- | --- | --- | --- | 0.014 |
| 2.50 | 5,867 | 13.00 | 0.01 ic | 0.01 ic | 0.00 | --- | 0.00 | --- | --- | --- | --- | --- | 0.014 |
| 3.50 | 14,580 | 14.00 | 0.02 ic | 0.02 ic | 0.00 | --- | 0.00 | --- | --- | --- | --- | --- | 0.021 |
| 4.50 | 25,221 | 15.00 | 3.72 ic | 0.02 ic | 3.65 ic | --- | 0.00 | --- | --- | --- | --- | --- | 3.669 |
| 5.50 | 37,947 | 16.00 | 6.41 oc | 0.02 ic | 6.39 ic | --- | 0.00 | --- | --- | --- | --- | --- | 6.414 |
| 6.50 | 52,844 | 17.00 | 11.81 oc | 0.01 ic | 2.07 ic | --- | 9.73 s | --- | --- | --- | --- | --- | 11.81 |
| 7.50 | 69,946 | 18.00 | 13.23 oc | 0.00 ic | 0.56 ic | --- | 12.64 s | --- | --- | --- | --- | --- | 13.20 |

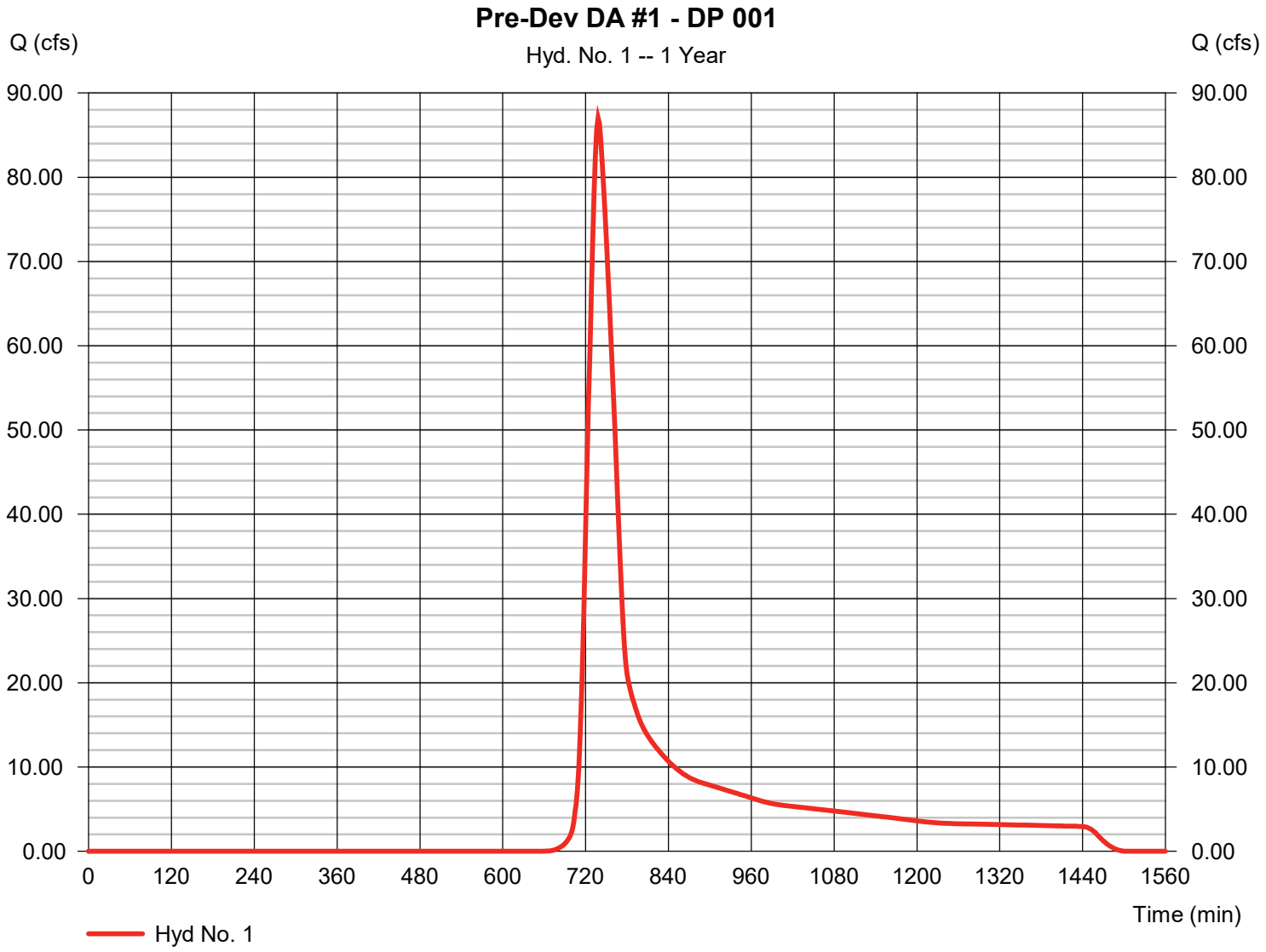
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 1

Pre-Dev DA #1 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 87.05 cfs |
| Storm frequency | = 1 yrs | Time to peak | = 738 min |
| Time interval | = 2 min | Hyd. volume | = 458,737 cuft |
| Drainage area | = 149.840 ac | Curve number | = 76.5 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = TR55 | Time of conc. (Tc) | = 37.70 min |
| Total precip. | = 2.70 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



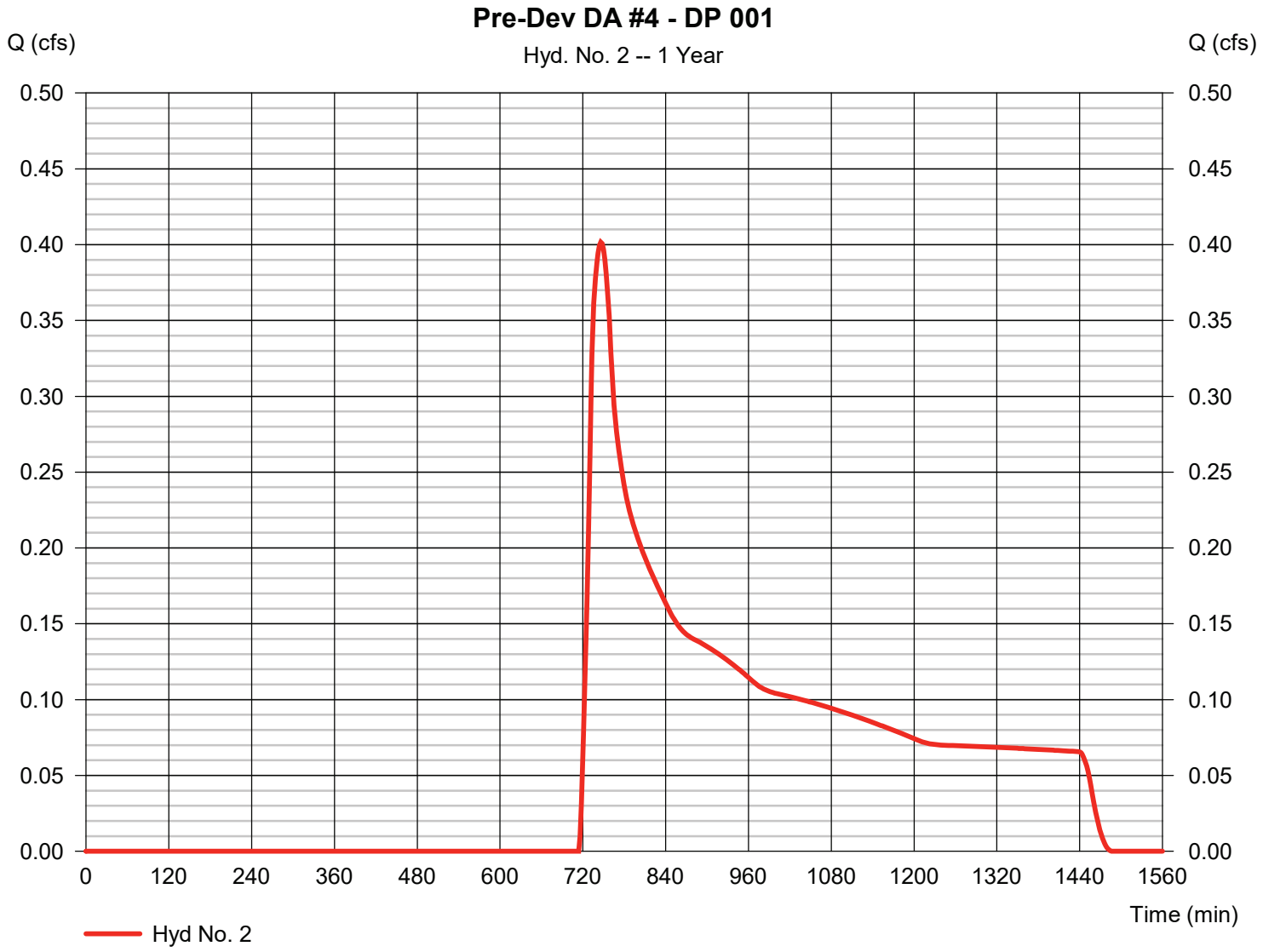
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 2

Pre-Dev DA #4 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 0.402 cfs |
| Storm frequency | = 1 yrs | Time to peak | = 746 min |
| Time interval | = 2 min | Hyd. volume | = 5,197 cuft |
| Drainage area | = 8.180 ac | Curve number | = 57.6 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = TR55 | Time of conc. (Tc) | = 28.25 min |
| Total precip. | = 2.70 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



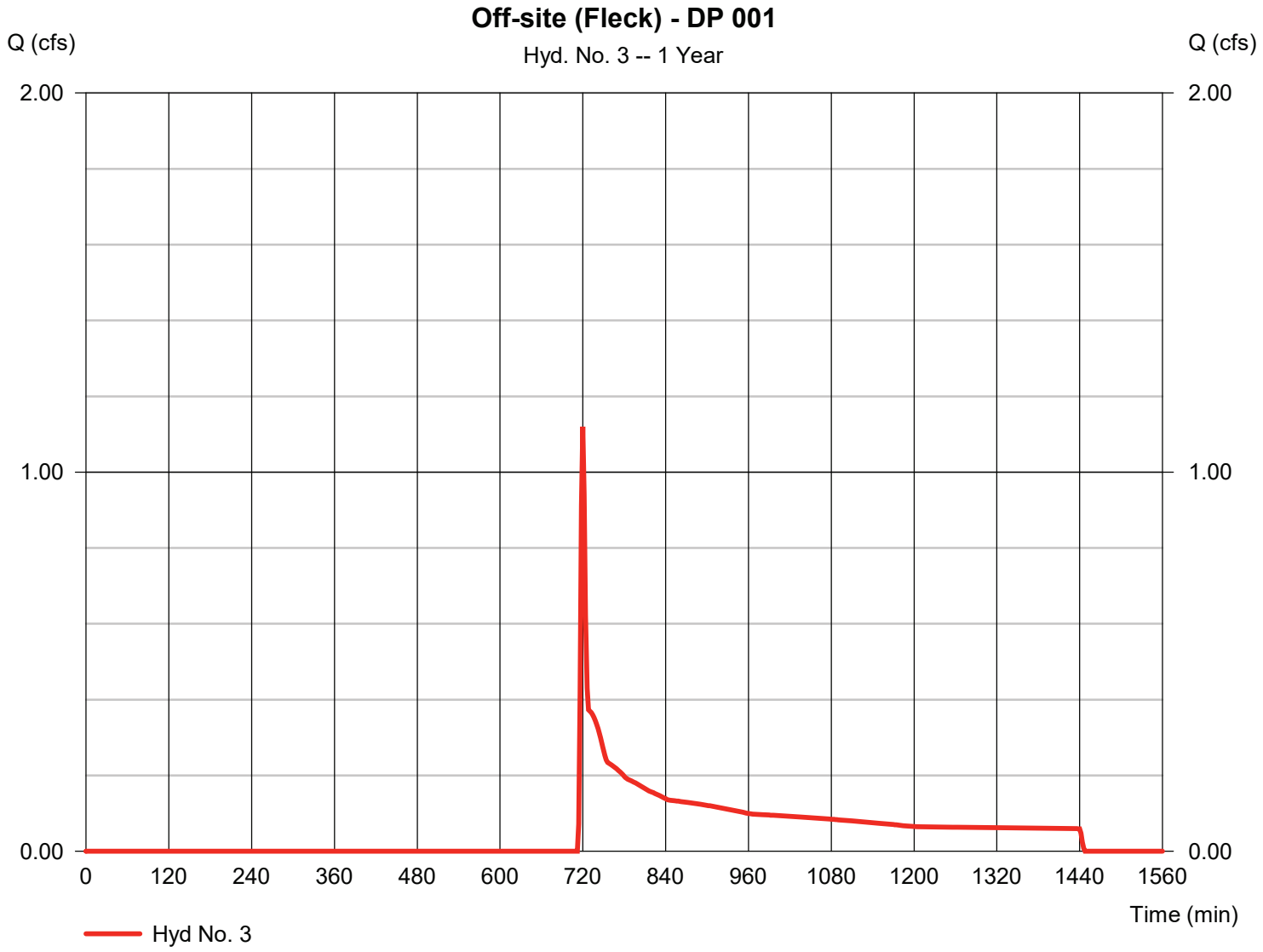
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 3

Off-site (Fleck) - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 1.120 cfs |
| Storm frequency | = 1 yrs | Time to peak | = 720 min |
| Time interval | = 2 min | Hyd. volume | = 4,979 cuft |
| Drainage area | = 7.470 ac | Curve number | = 58.5 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 2.70 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



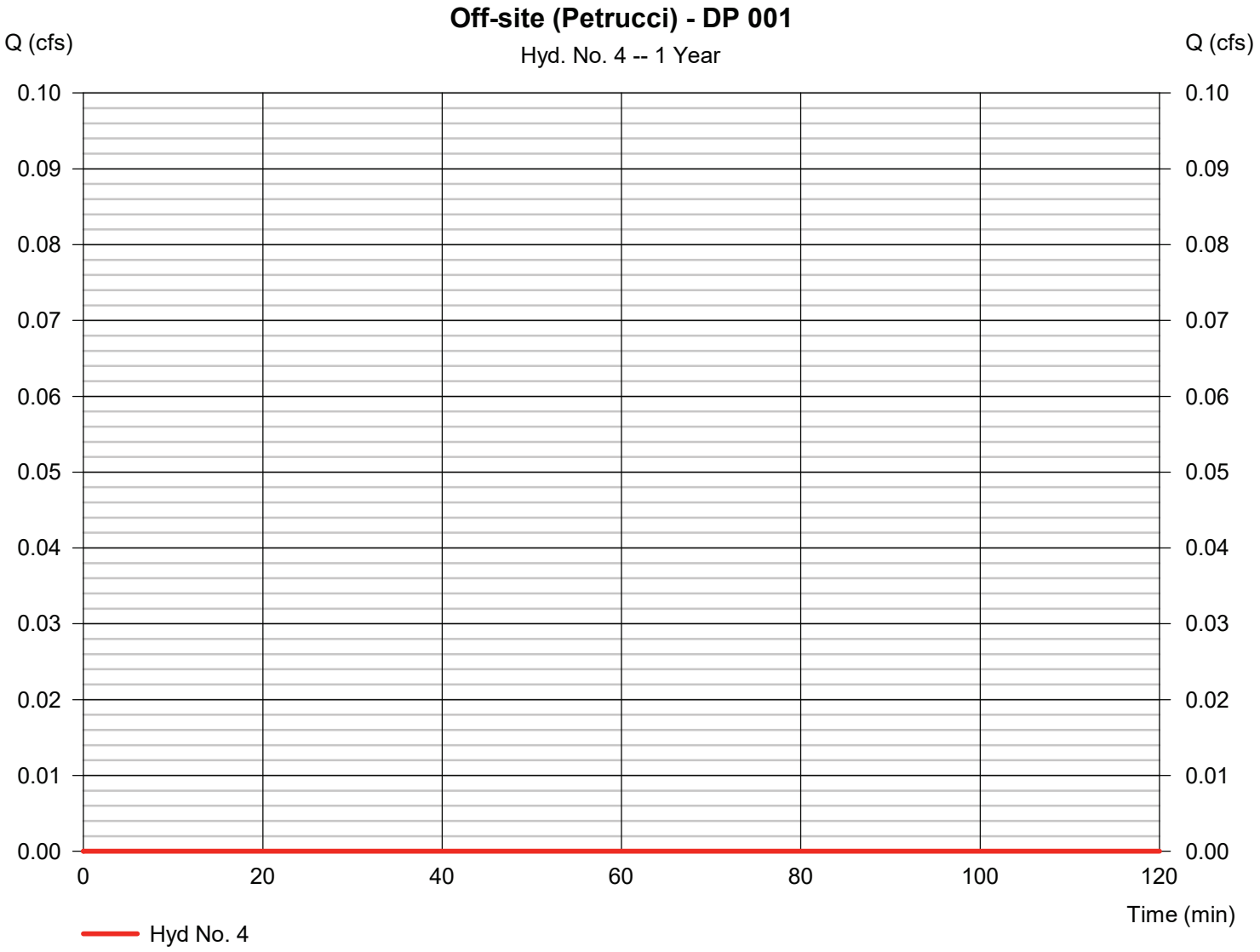
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 4

Off-site (Petrucci) - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 0.000 cfs |
| Storm frequency | = 1 yrs | Time to peak | = n/a |
| Time interval | = 2 min | Hyd. volume | = 0 cuft |
| Drainage area | = 18.000 ac | Curve number | = 38.1 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 2.70 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



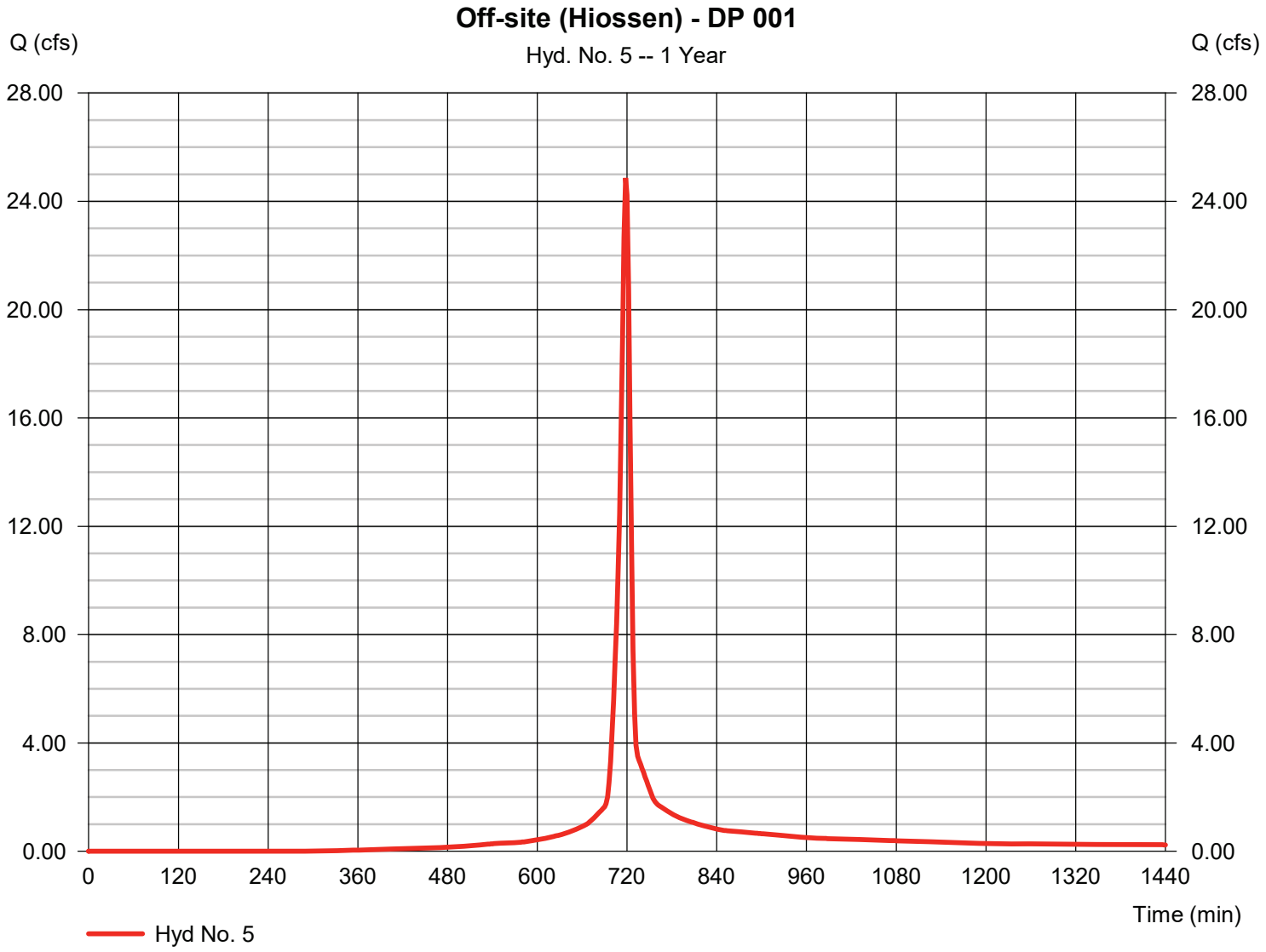
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 5

Off-site (Hiossen) - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 24.87 cfs |
| Storm frequency | = 1 yrs | Time to peak | = 718 min |
| Time interval | = 2 min | Hyd. volume | = 58,577 cuft |
| Drainage area | = 8.390 ac | Curve number | = 92.5 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = TR55 | Time of conc. (Tc) | = 8.90 min |
| Total precip. | = 2.70 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



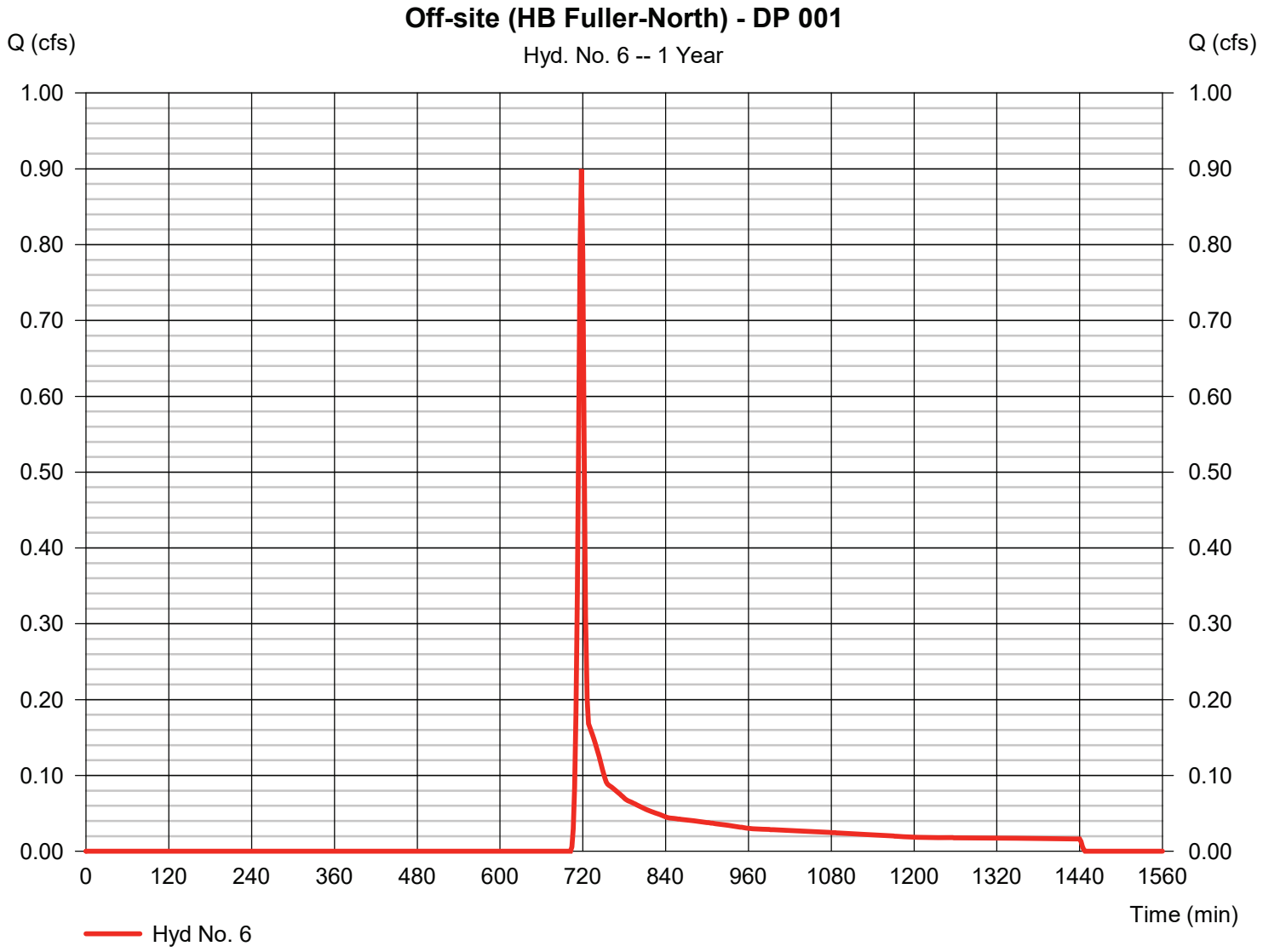
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 6

Off-site (HB Fuller-North) - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 0.900 cfs |
| Storm frequency | = 1 yrs | Time to peak | = 718 min |
| Time interval | = 2 min | Hyd. volume | = 1,989 cuft |
| Drainage area | = 1.240 ac | Curve number | = 67.8 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 2.70 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



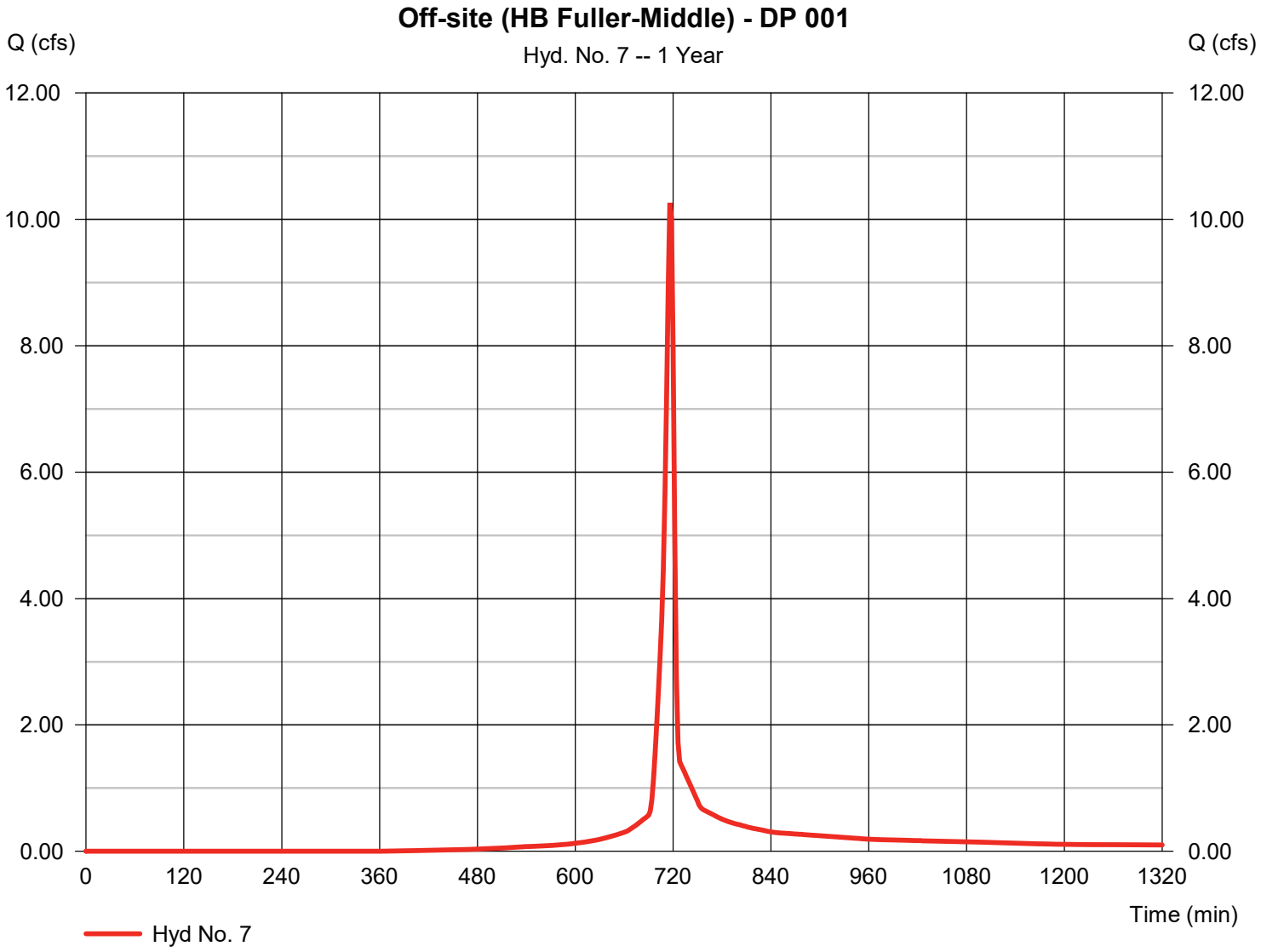
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 7

Off-site (HB Fuller-Middle) - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 10.26 cfs |
| Storm frequency | = 1 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 21,099 cuft |
| Drainage area | = 3.590 ac | Curve number | = 90.2 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 2.70 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



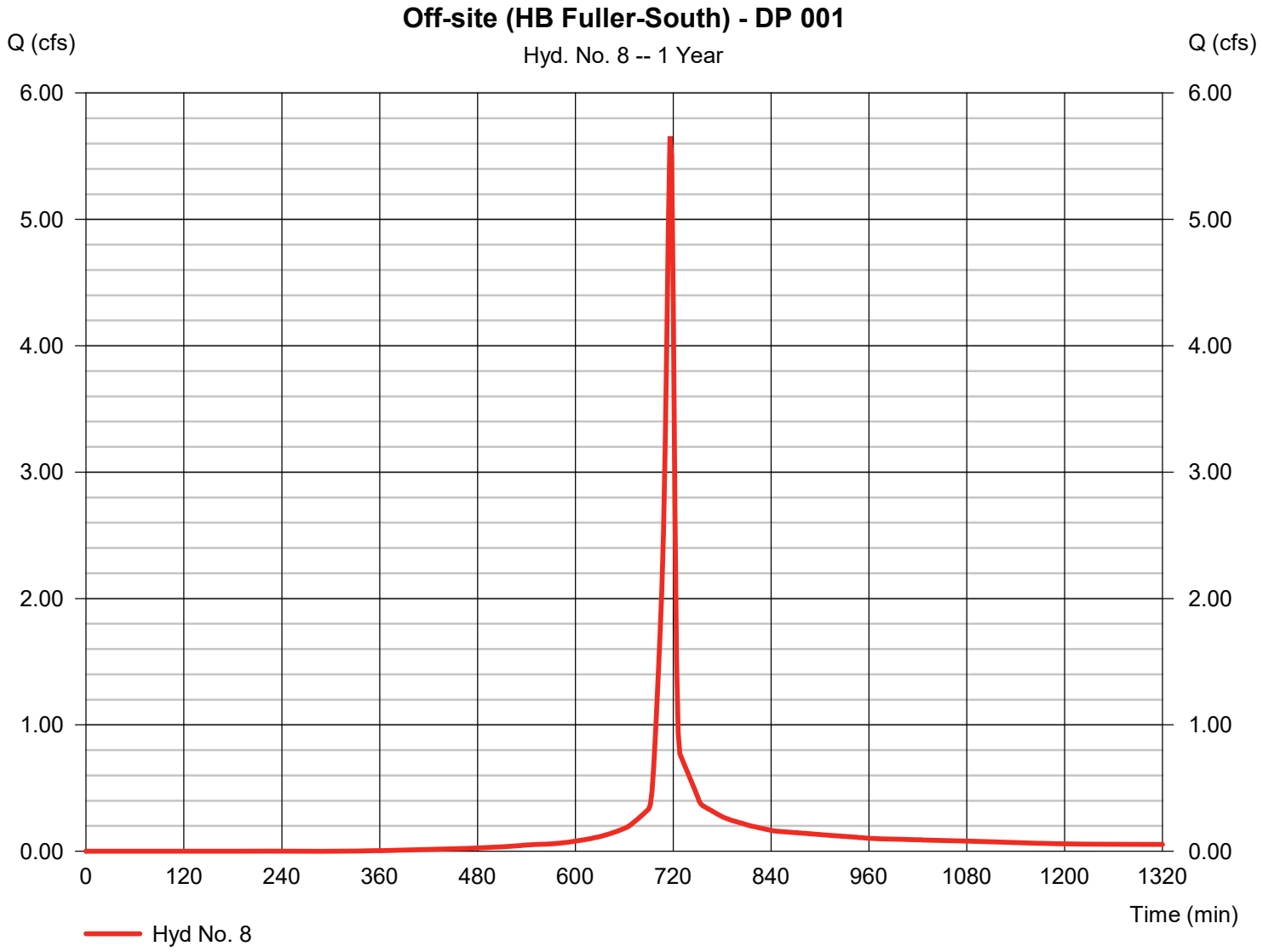
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 8

Off-site (HB Fuller-South) - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 5.655 cfs |
| Storm frequency | = 1 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 11,746 cuft |
| Drainage area | = 1.880 ac | Curve number | = 91.5 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 2.70 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



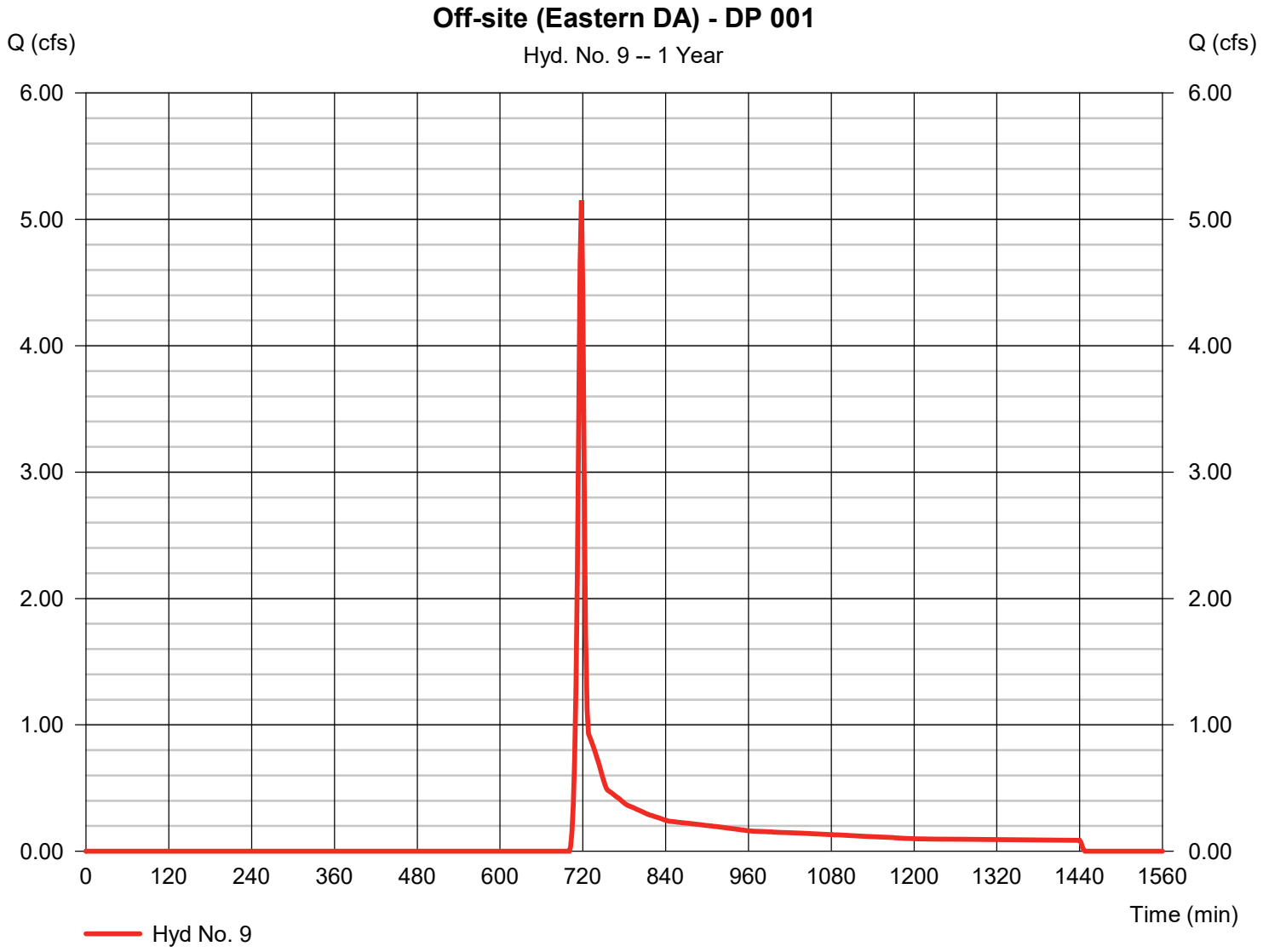
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 9

Off-site (Eastern DA) - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 5.152 cfs |
| Storm frequency | = 1 yrs | Time to peak | = 718 min |
| Time interval | = 2 min | Hyd. volume | = 11,055 cuft |
| Drainage area | = 6.210 ac | Curve number | = 69.2 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 2.70 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



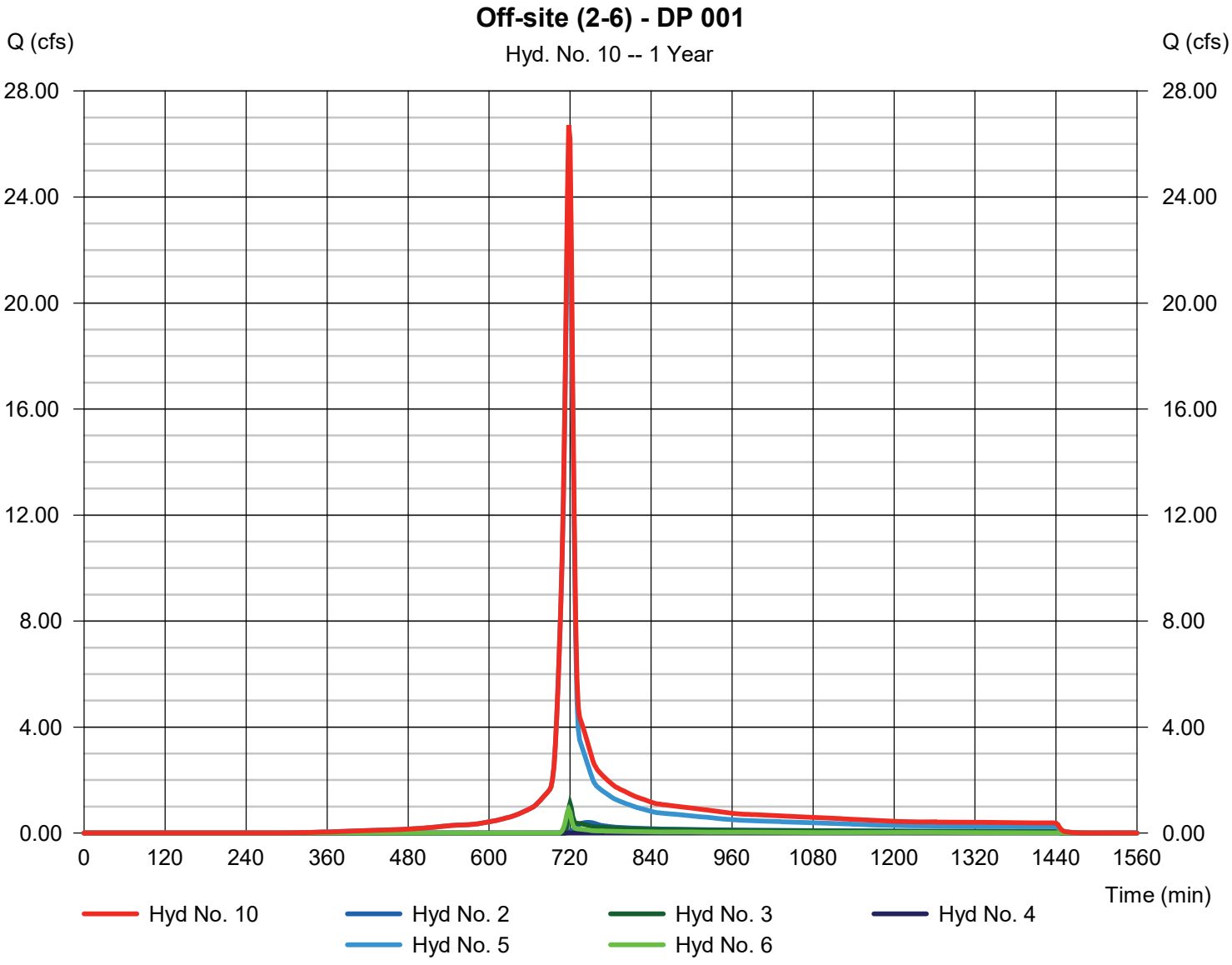
# Hydrograph Report



## Hyd. No. 10

Off-site (2-6) - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 26.71 cfs |
| Storm frequency | = 1 yrs | Time to peak | = 718 min |
| Time interval | = 2 min | Hyd. volume | = 70,742 cuft |
| Inflow hyds. | = 2, 3, 4, 5, 6 | Contrib. drain. area | = 43.280 ac |



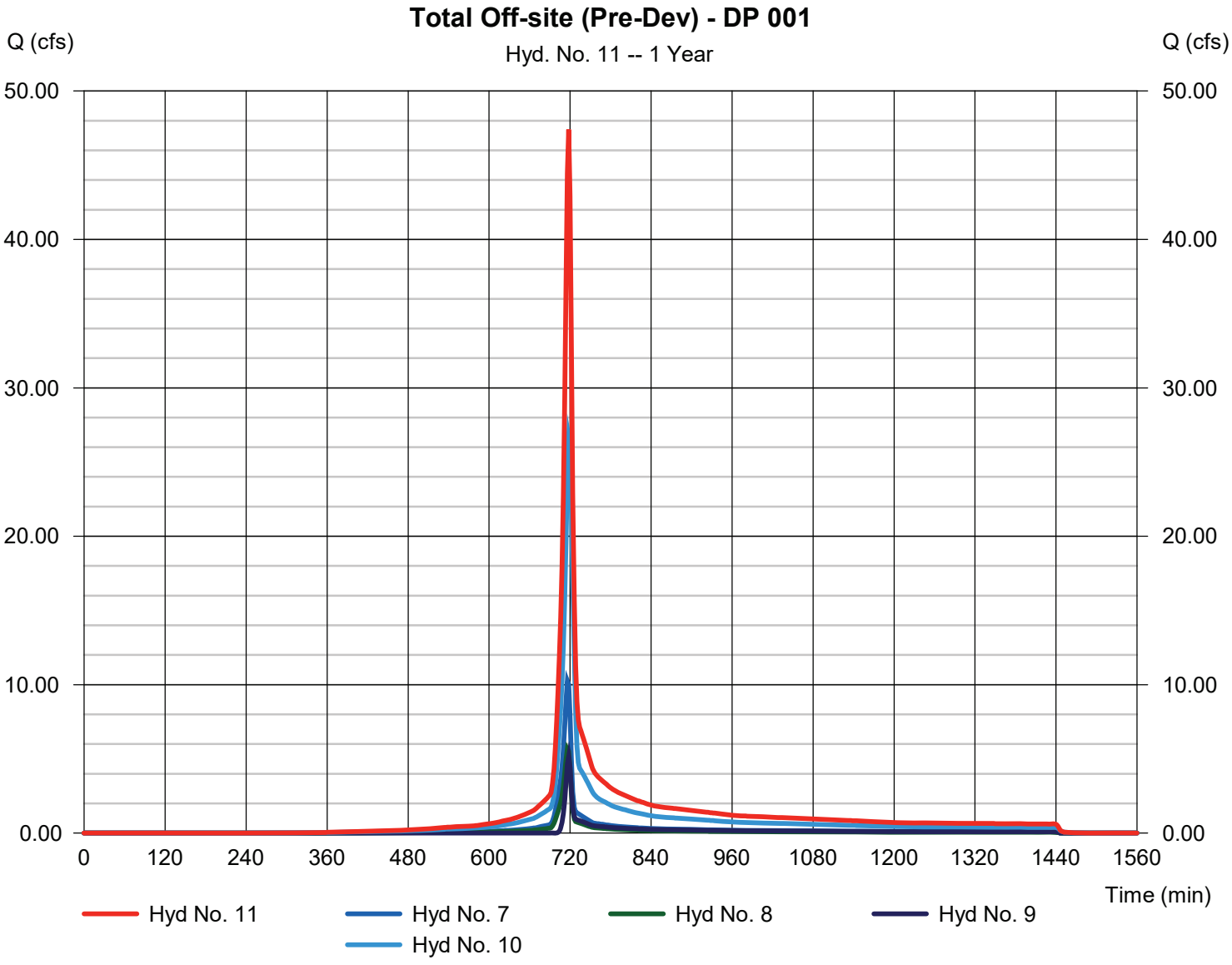
# Hydrograph Report



## Hyd. No. 11

Total Off-site (Pre-Dev) - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 47.40 cfs |
| Storm frequency | = 1 yrs | Time to peak | = 718 min |
| Time interval | = 2 min | Hyd. volume | = 114,641 cuft |
| Inflow hyds. | = 7, 8, 9, 10 | Contrib. drain. area | = 11.680 ac |



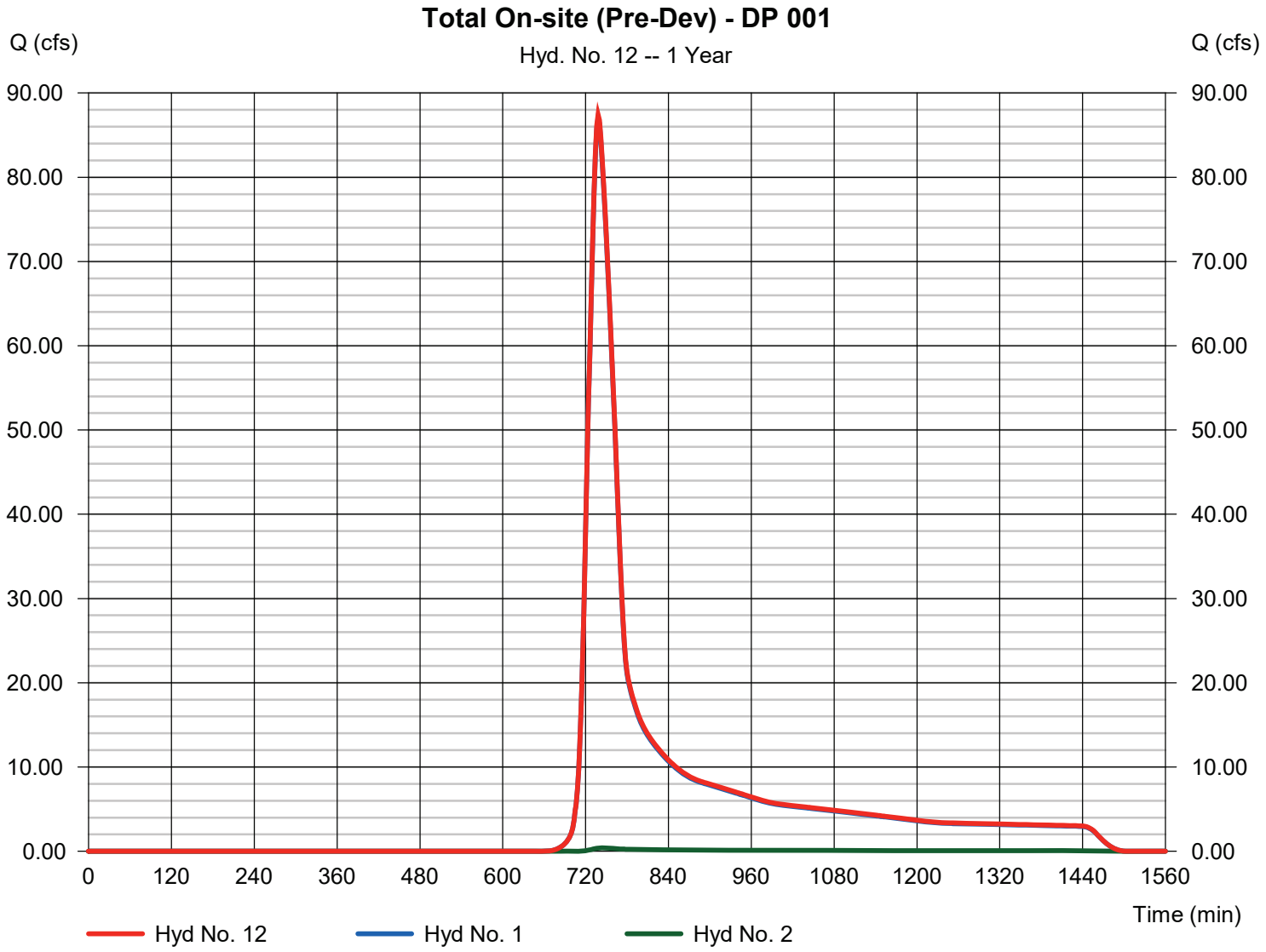
# Hydrograph Report



## Hyd. No. 12

Total On-site (Pre-Dev) - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 87.42 cfs |
| Storm frequency | = 1 yrs | Time to peak | = 738 min |
| Time interval | = 2 min | Hyd. volume | = 463,934 cuft |
| Inflow hyds. | = 1, 2 | Contrib. drain. area | = 158.020 ac |



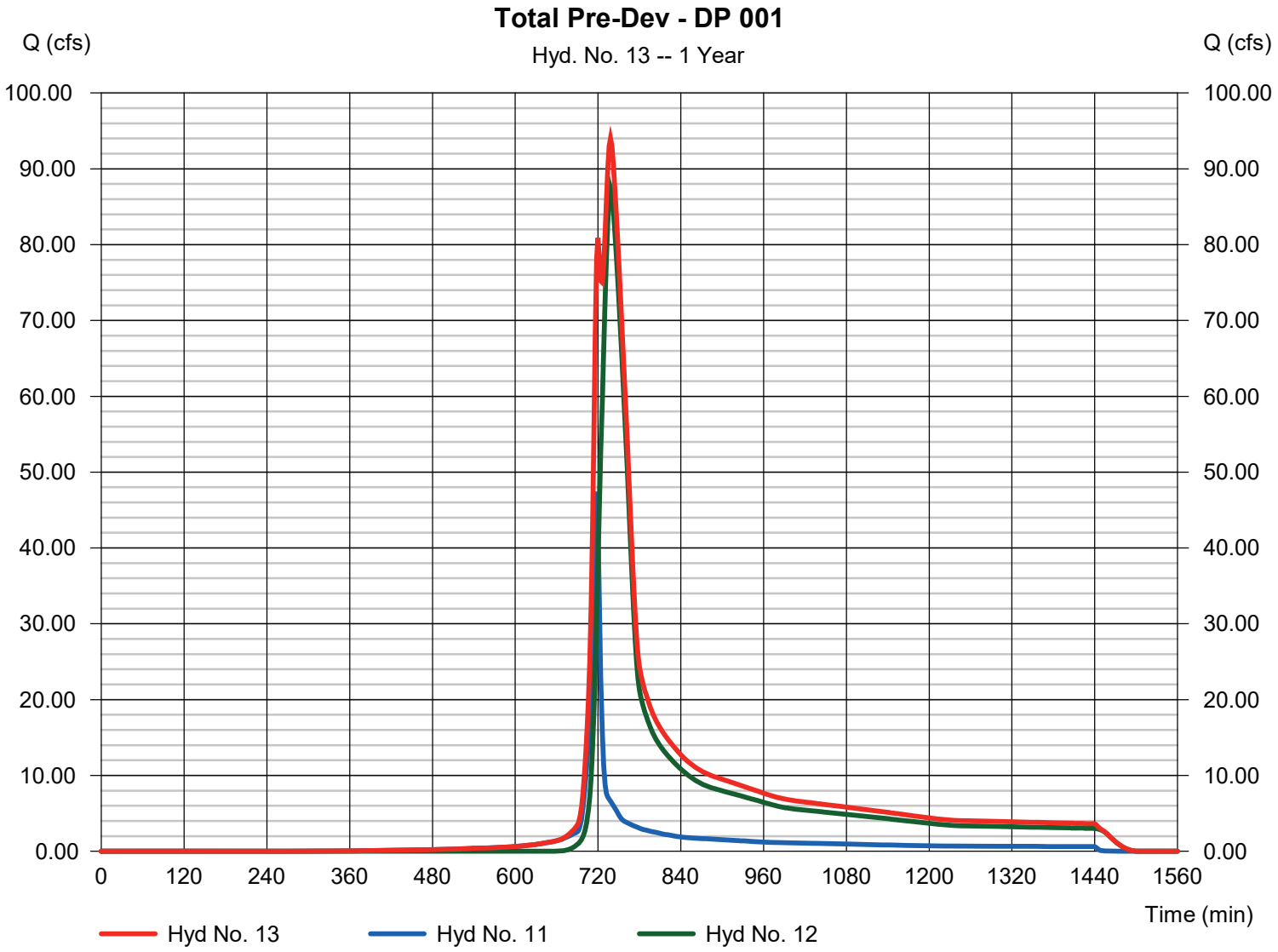
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 13

Total Pre-Dev - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 94.03 cfs |
| Storm frequency | = 1 yrs | Time to peak | = 738 min |
| Time interval | = 2 min | Hyd. volume | = 578,575 cuft |
| Inflow hyds. | = 11, 12 | Contrib. drain. area | = 0.000 ac |



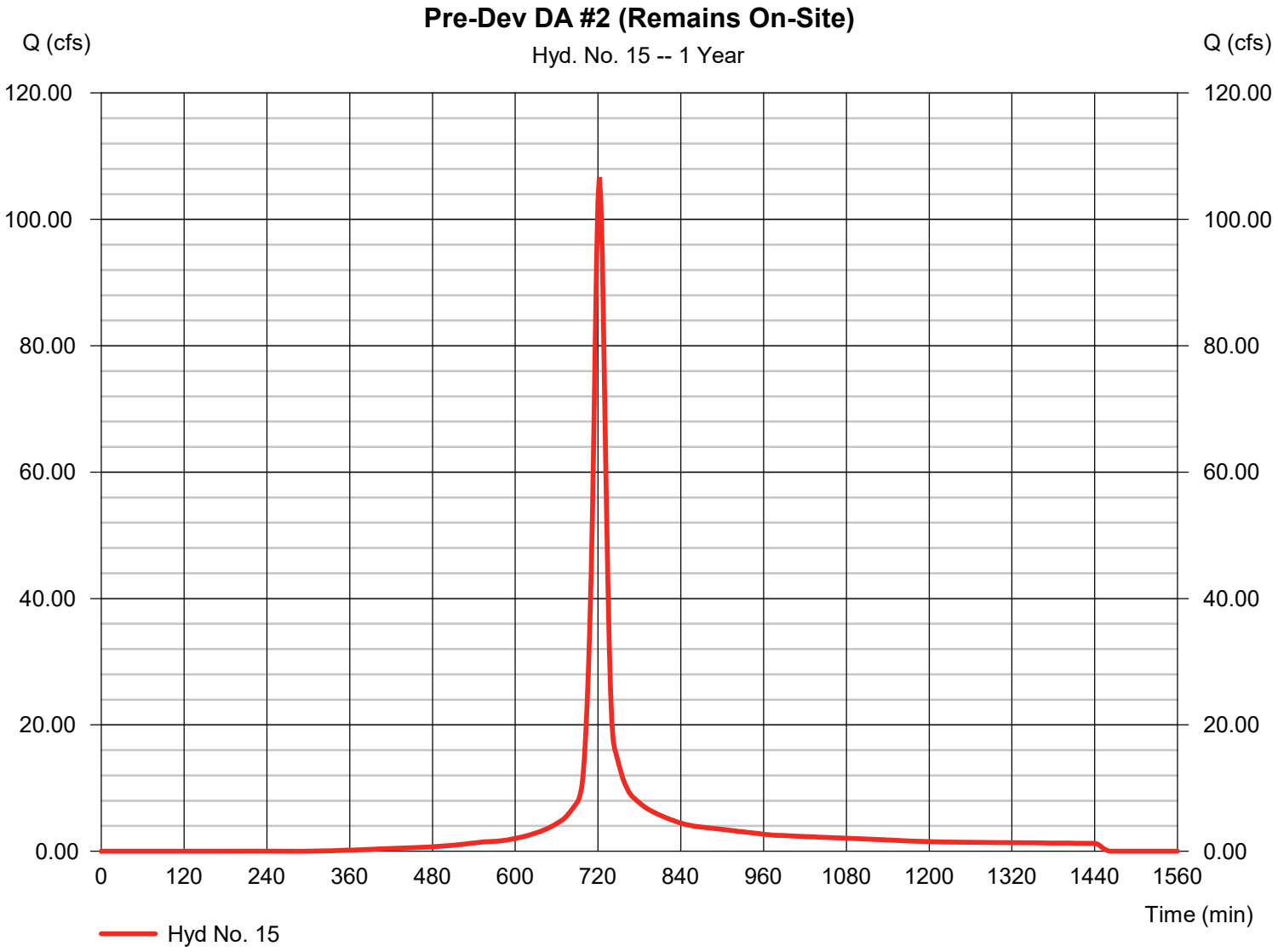
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 15

Pre-Dev DA #2 (Remains On-Site)

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 106.68 cfs |
| Storm frequency | = 1 yrs | Time to peak | = 722 min |
| Time interval | = 2 min | Hyd. volume | = 304,574 cuft |
| Drainage area | = 45.370 ac | Curve number | = 92.2 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = TR55 | Time of conc. (Tc) | = 13.40 min |
| Total precip. | = 2.70 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



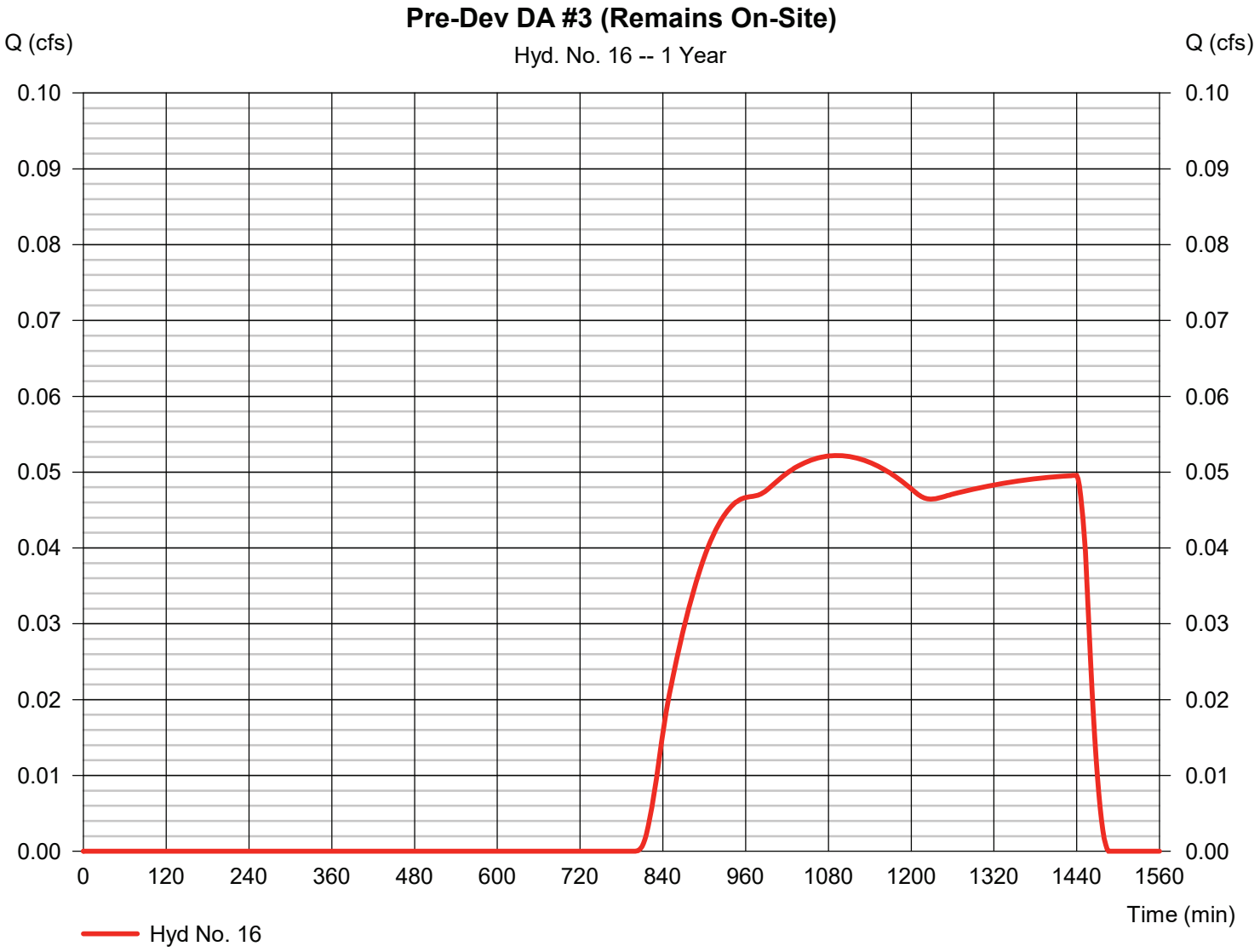
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 16

Pre-Dev DA #3 (Remains On-Site)

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 0.052 cfs |
| Storm frequency | = 1 yrs | Time to peak | = 1092 min |
| Time interval | = 2 min | Hyd. volume | = 1,753 cuft |
| Drainage area | = 16.820 ac | Curve number | = 48.4 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = TR55 | Time of conc. (Tc) | = 29.90 min |
| Total precip. | = 2.70 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



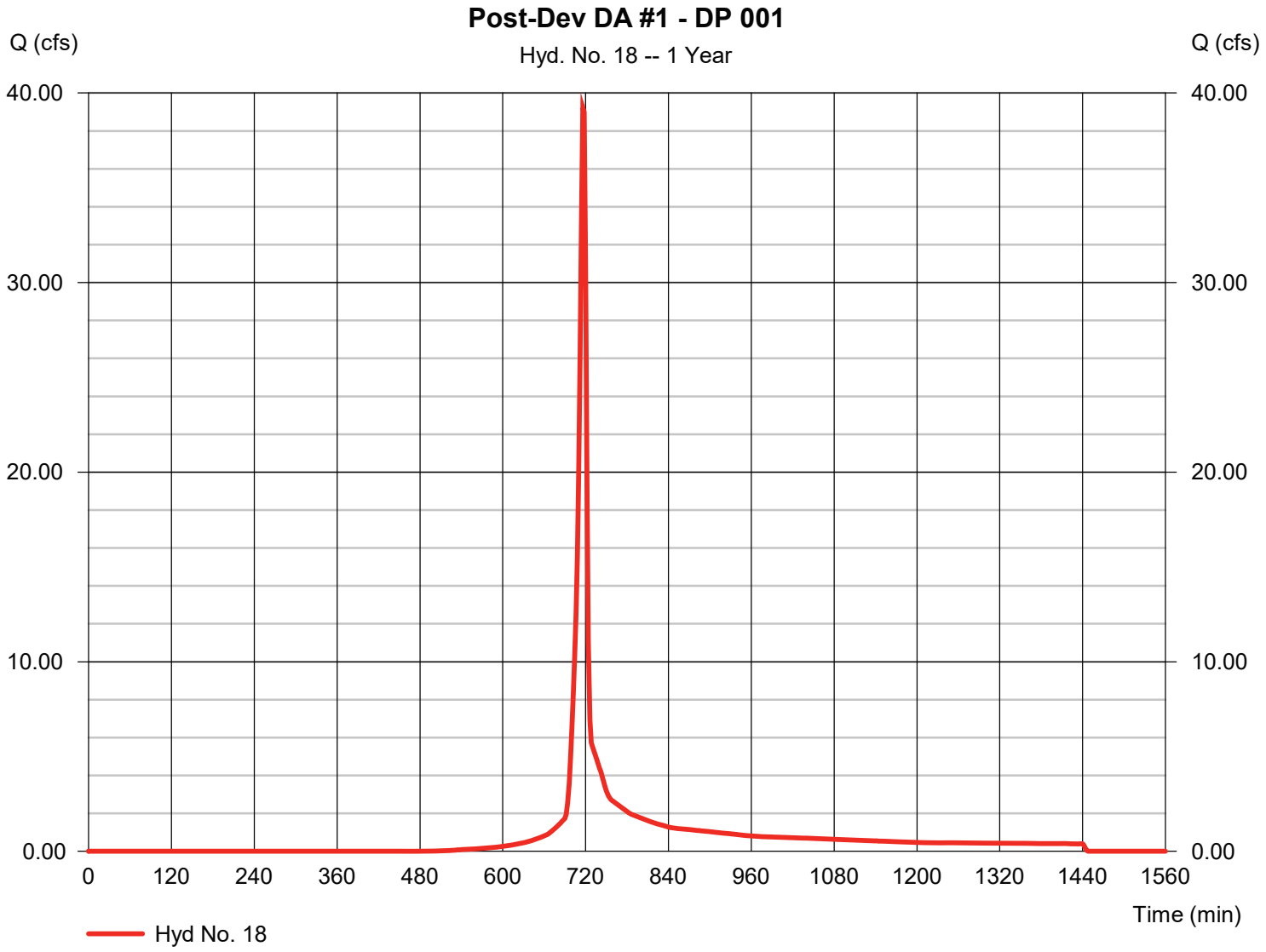
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 18

Post-Dev DA #1 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 39.23 cfs |
| Storm frequency | = 1 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 79,272 cuft |
| Drainage area | = 16.870 ac | Curve number | = 85.6 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 2.70 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



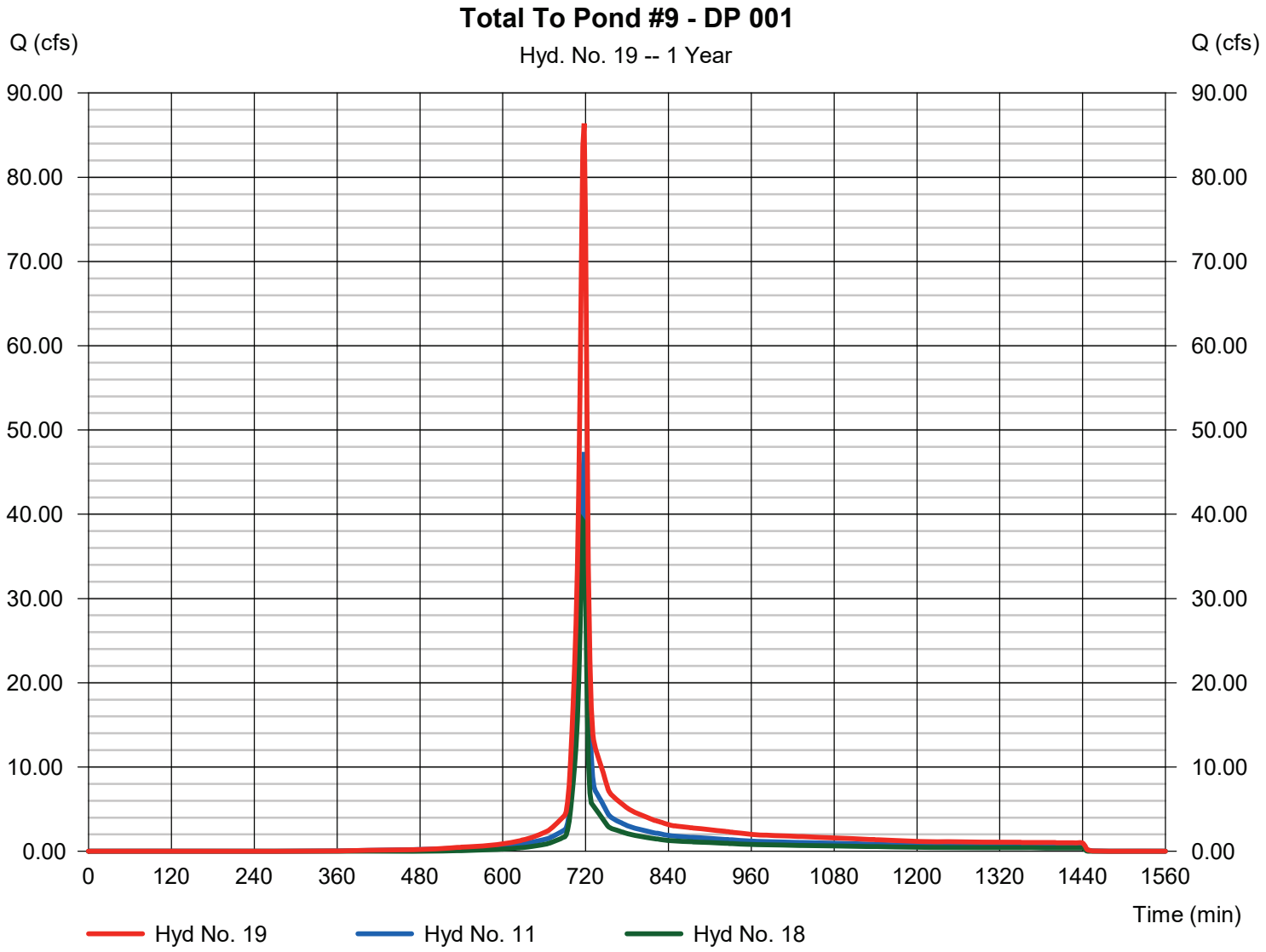
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 19

Total To Pond #9 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 86.40 cfs |
| Storm frequency | = 1 yrs | Time to peak | = 718 min |
| Time interval | = 2 min | Hyd. volume | = 193,913 cuft |
| Inflow hyds. | = 11, 18 | Contrib. drain. area | = 16.870 ac |



# Hydrograph Report

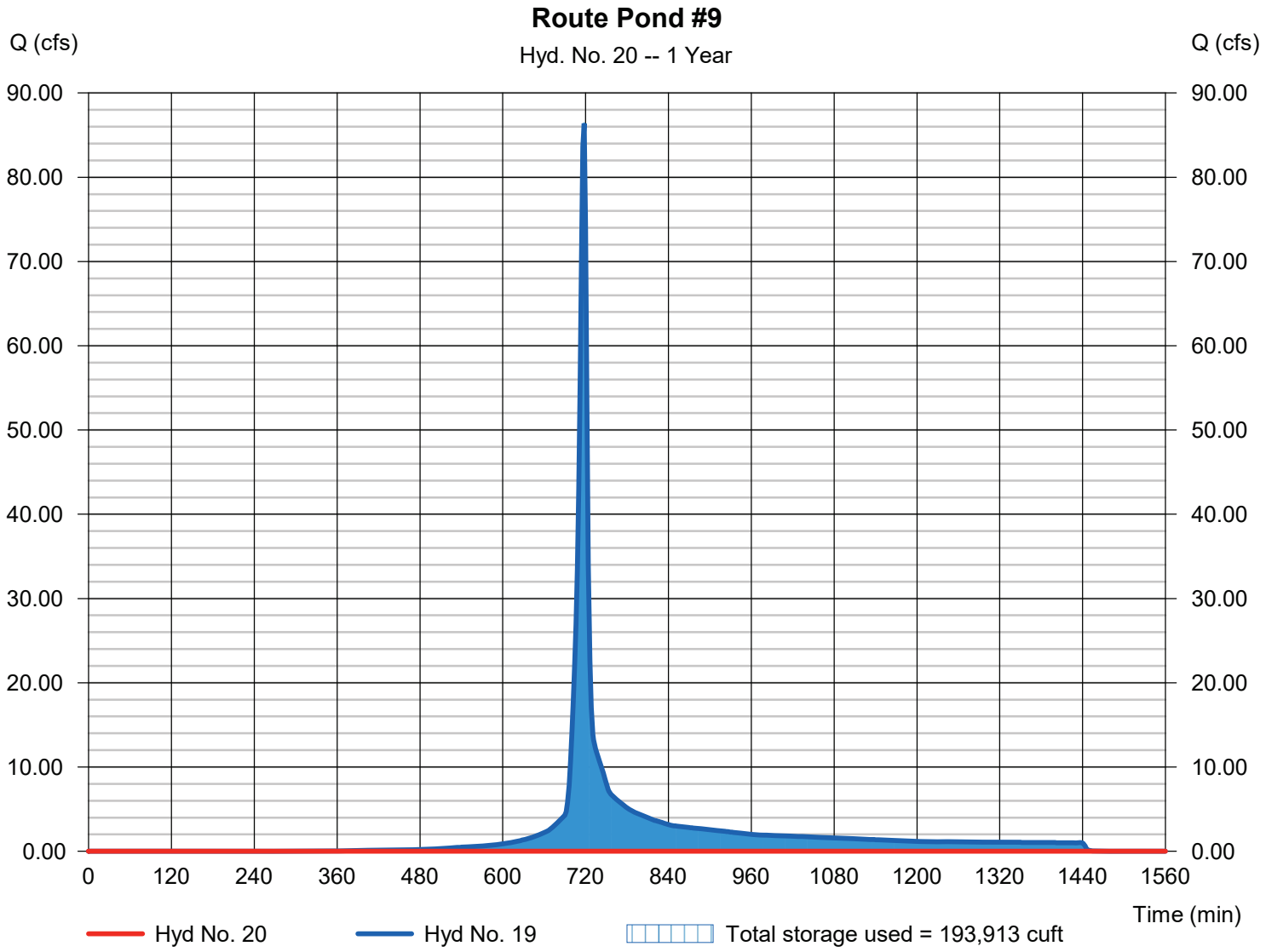
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 20

Route Pond #9

| | | | |
|---|---|---|---|
| Hydrograph type | = Reservoir | Peak discharge | = 0.000 cfs |
| Storm frequency | = 1 yrs | Time to peak | = n/a |
| Time interval | = 2 min | Hyd. volume | = 0 cuft |
| Inflow hyd. No. | = 19 - Total To Pond #9 - DP 001 | Max. Elevation | = 10.20 ft |
| Reservoir name | = Wet Pond #9 | Max. Storage | = 193,913 cuft |

Storage Indication method used.



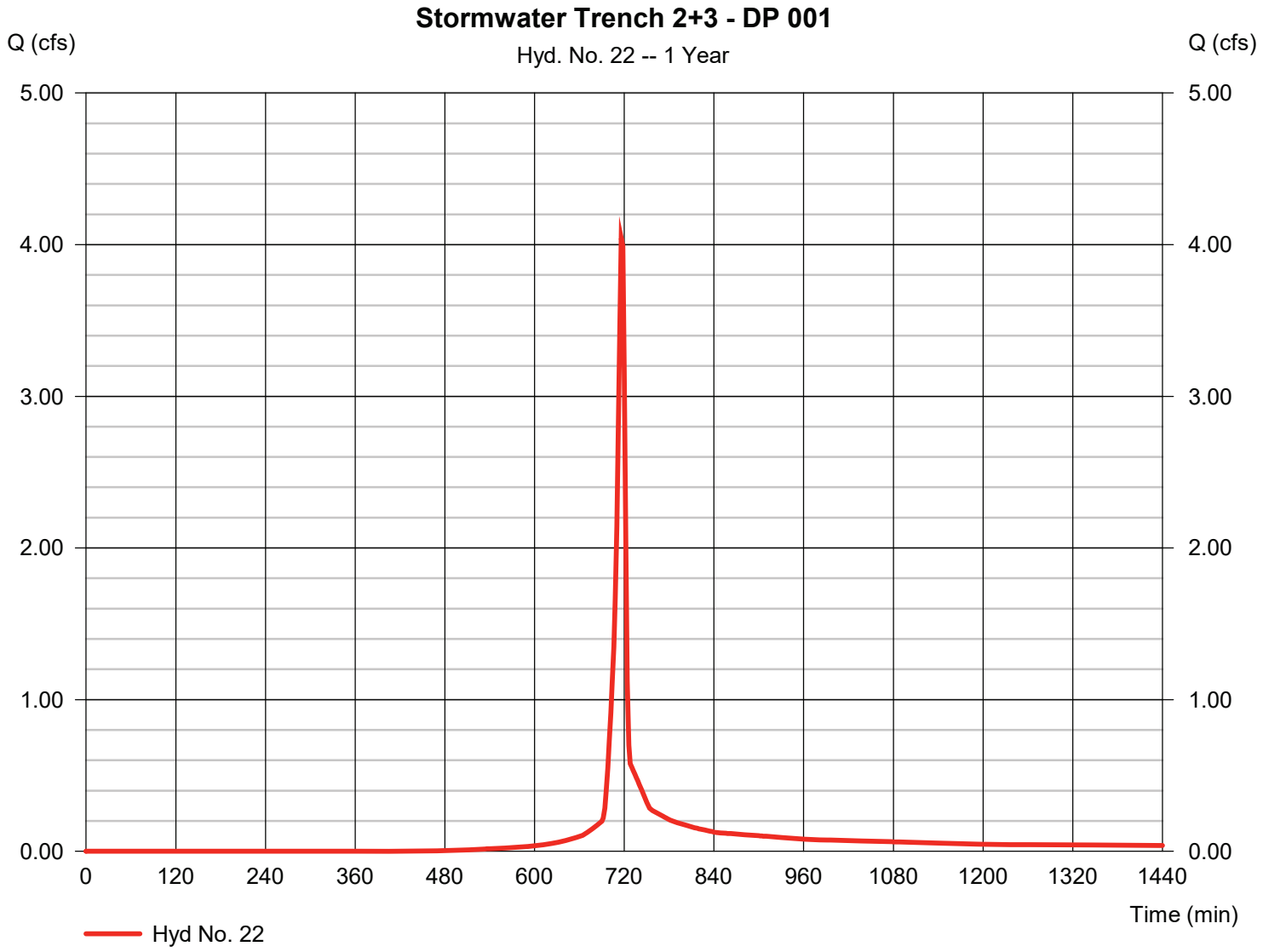
# Hydrograph Report



## Hyd. No. 22

Stormwater Trench 2+3 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 4.044 cfs |
| Storm frequency | = 1 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 8,207 cuft |
| Drainage area | = 1.590 ac | Curve number | = 87.5 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 2.70 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



# Hydrograph Report

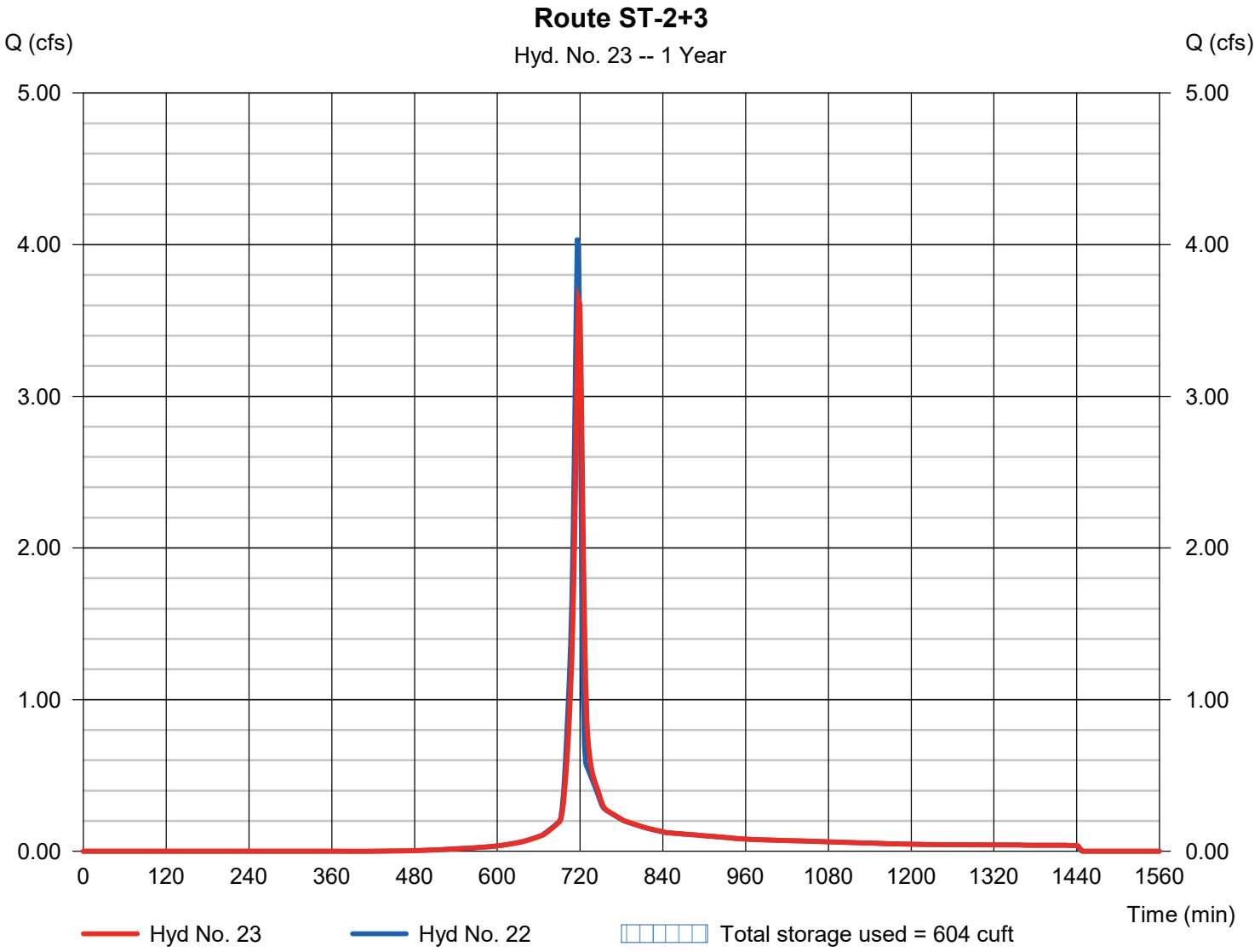
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 23

Route ST-2+3

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | Reservoir | Peak discharge | = | 3.635 cfs |
| Storm frequency | = | 1 yrs | Time to peak | = | 718 min |
| Time interval | = | 2 min | Hyd. volume | = | 8,207 cuft |
| Inflow hyd. No. | = | 22 - Stormwater Trench 2+3 - DP-03 | Max. Elevation | = | 16.06 ft |
| Reservoir name | = | Stormwater Trench ST-2+3 | Max. Storage | = | 604 cuft |

Storage Indication method used.



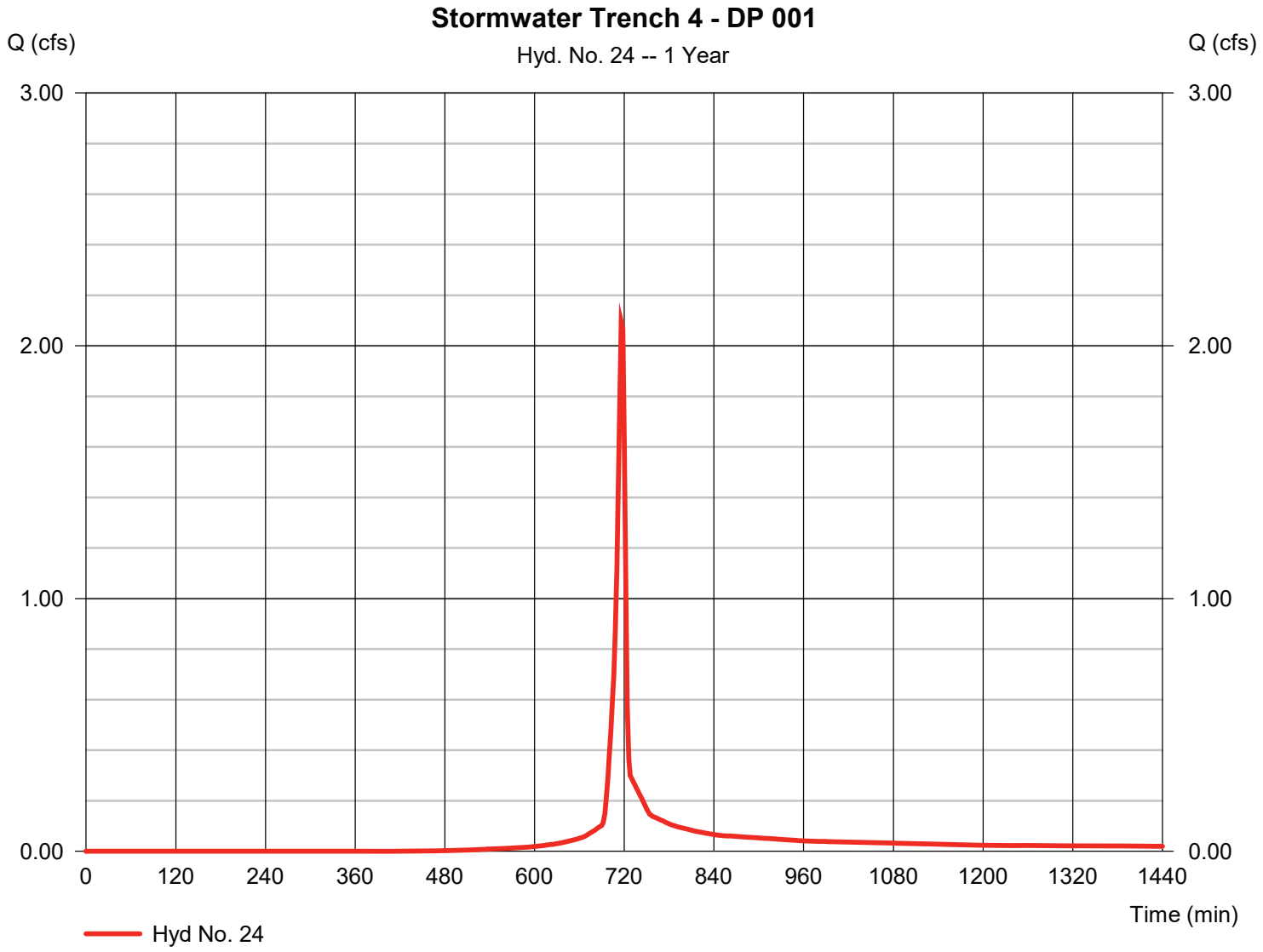
# Hydrograph Report



## Hyd. No. 24

Stormwater Trench 4 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 2.095 cfs |
| Storm frequency | = 1 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 4,253 cuft |
| Drainage area | = 0.820 ac | Curve number | = 87.6 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 2.70 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



# Hydrograph Report

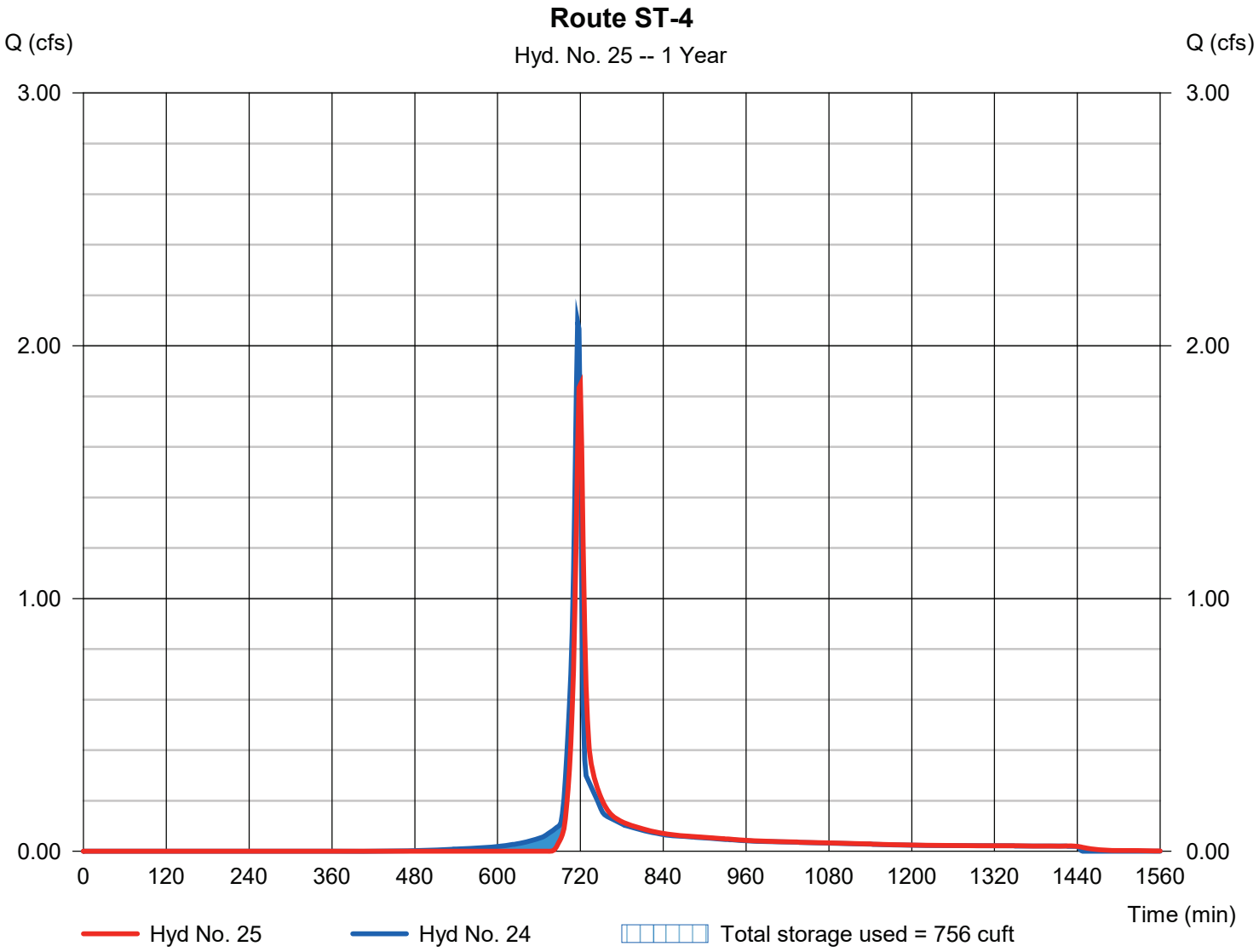
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 25

Route ST-4

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | Reservoir | Peak discharge | = | 1.846 cfs |
| Storm frequency | = | 1 yrs | Time to peak | = | 720 min |
| Time interval | = | 2 min | Hyd. volume | = | 3,999 cuft |
| Inflow hyd. No. | = | 24 - Stormwater Trench 4 - DP001 | Max. Elevation | = | 16.49 ft |
| Reservoir name | = | Stormwater Trench ST-4 | Max. Storage | = | 756 cuft |

Storage Indication method used.



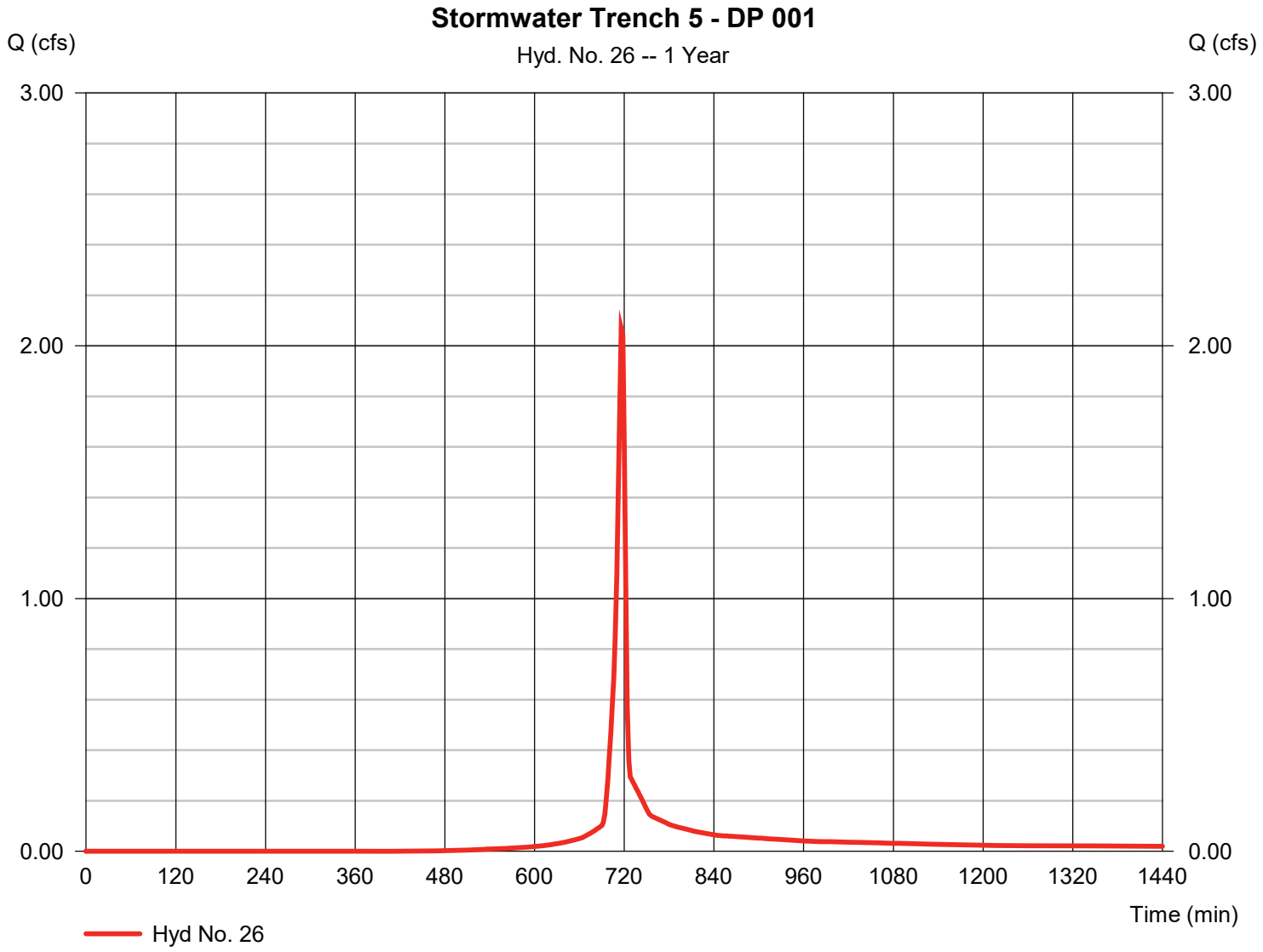
# Hydrograph Report



## Hyd. No. 26

Stormwater Trench 5 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 2.069 cfs |
| Storm frequency | = 1 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 4,202 cuft |
| Drainage area | = 0.810 ac | Curve number | = 87.6 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 2.70 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



# Hydrograph Report

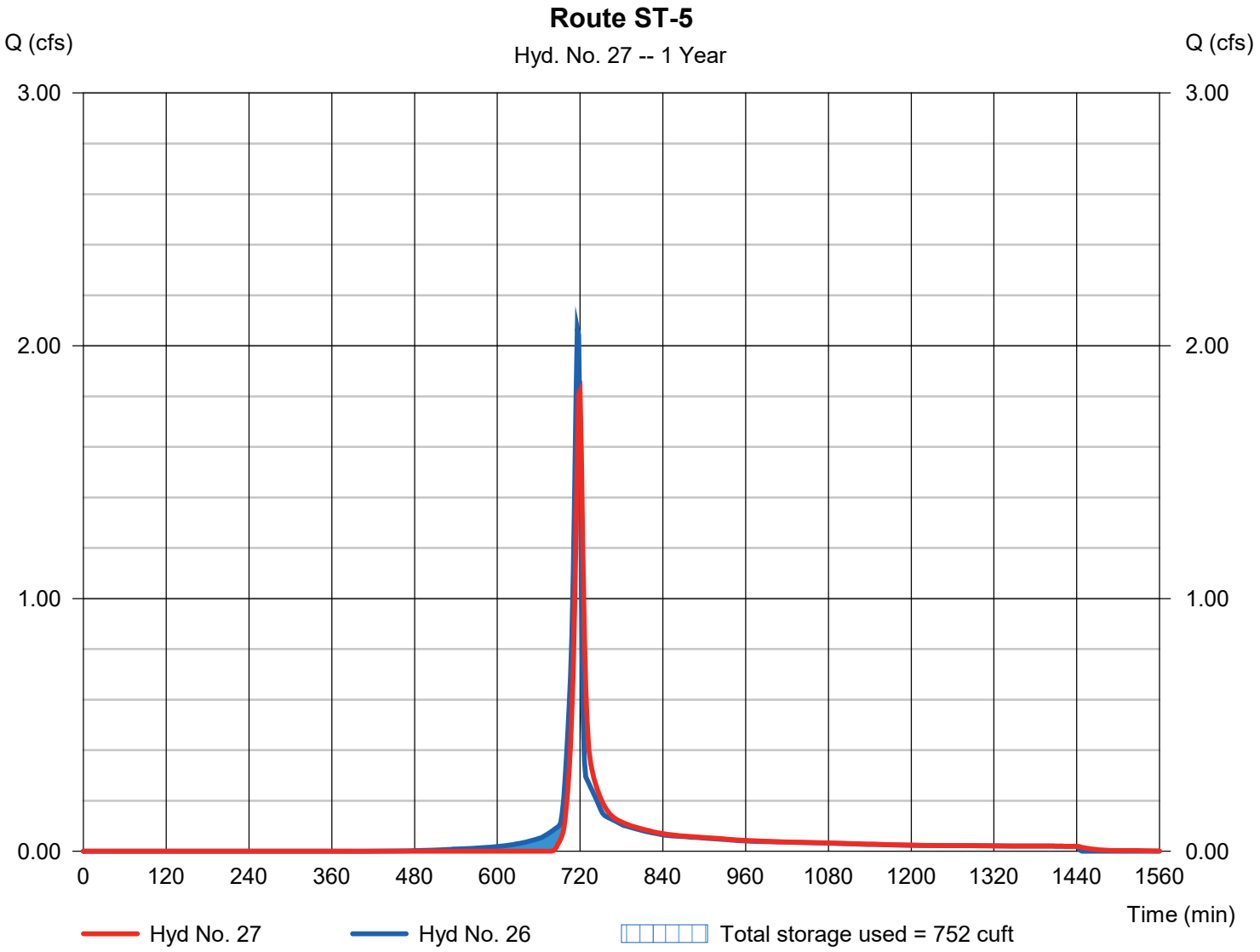
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 27

Route ST-5

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | Reservoir | Peak discharge | = | 1.822 cfs |
| Storm frequency | = | 1 yrs | Time to peak | = | 720 min |
| Time interval | = | 2 min | Hyd. volume | = | 3,948 cuft |
| Inflow hyd. No. | = | 26 - Stormwater Trench 5 - DP001 | Max. Elevation | = | 16.48 ft |
| Reservoir name | = | Stormwater Trench ST-5 | Max. Storage | = | 752 cuft |

Storage Indication method used.



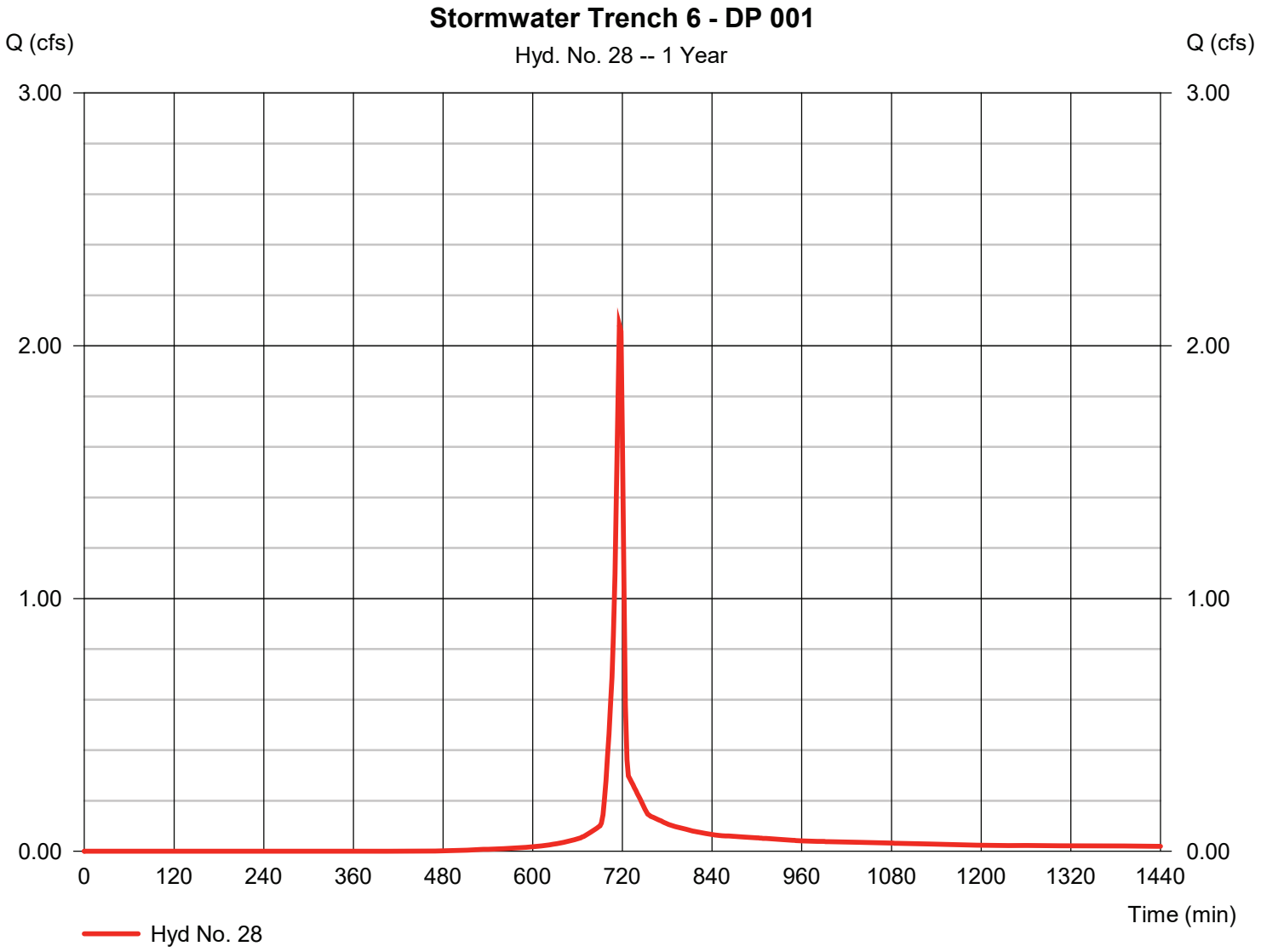
# Hydrograph Report



## Hyd. No. 28

Stormwater Trench 6 - DP 001

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | SCS Runoff | Peak discharge | = | 2.082 cfs |
| Storm frequency | = | 1 yrs | Time to peak | = | 716 min |
| Time interval | = | 2 min | Hyd. volume | = | 4,222 cuft |
| Drainage area | = | 0.830 ac | Curve number | = | 87.2 |
| Basin Slope | = | 0.0 % | Hydraulic length | = | 0 ft |
| Tc method | = | User | Time of conc. (Tc) | = | 5.00 min |
| Total precip. | = | 2.70 in | Distribution | = | Type II |
| Storm duration | = | 24 hrs | Shape factor | = | 484 |



# Hydrograph Report

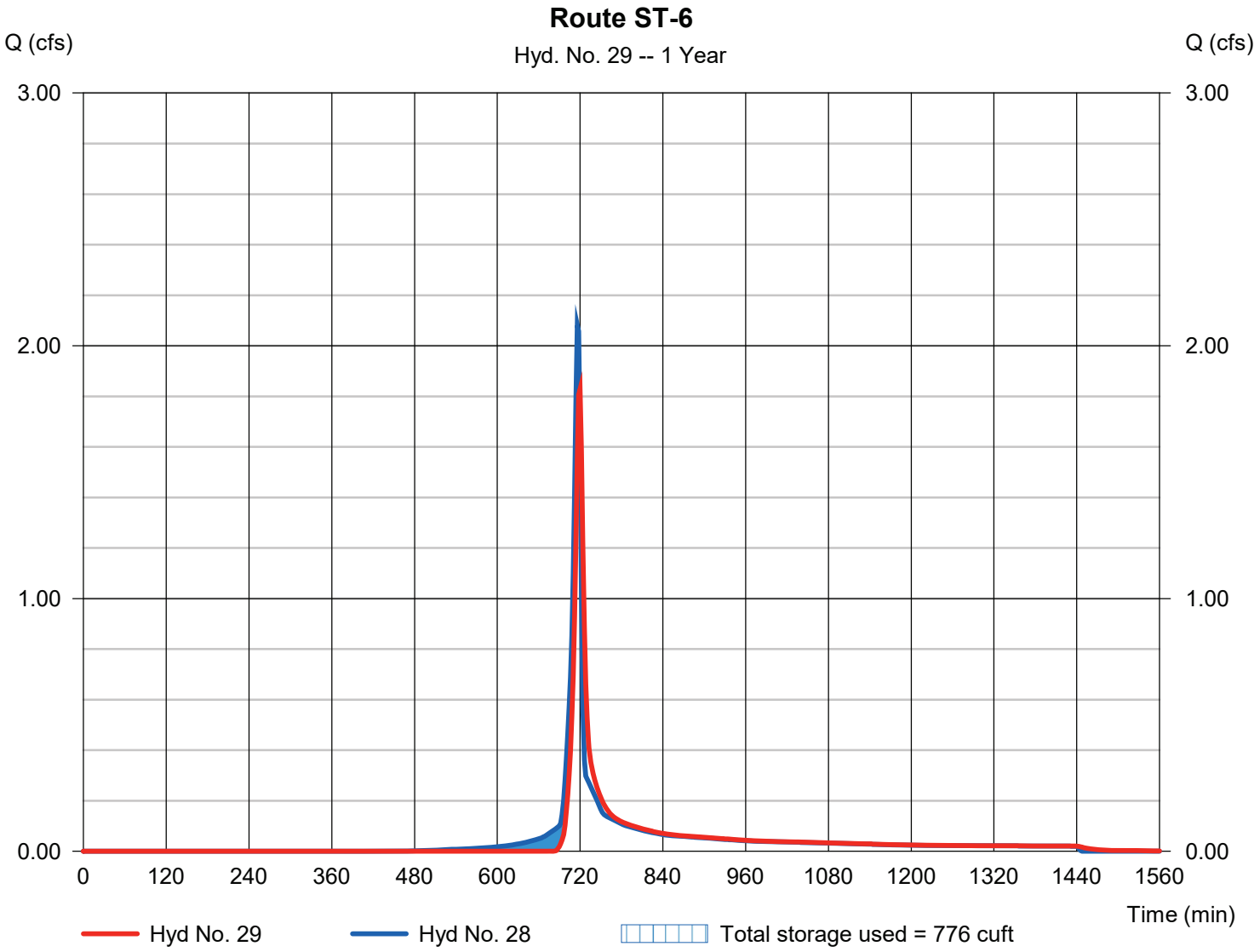
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 29

Route ST-6

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | Reservoir | Peak discharge | = | 1.827 cfs |
| Storm frequency | = | 1 yrs | Time to peak | = | 720 min |
| Time interval | = | 2 min | Hyd. volume | = | 3,960 cuft |
| Inflow hyd. No. | = | 28 - Stormwater Trench 6 - DP001 | Max. Elevation | = | 16.49 ft |
| Reservoir name | = | Stormwater Trench ST-6 | Max. Storage | = | 776 cuft |

Storage Indication method used.



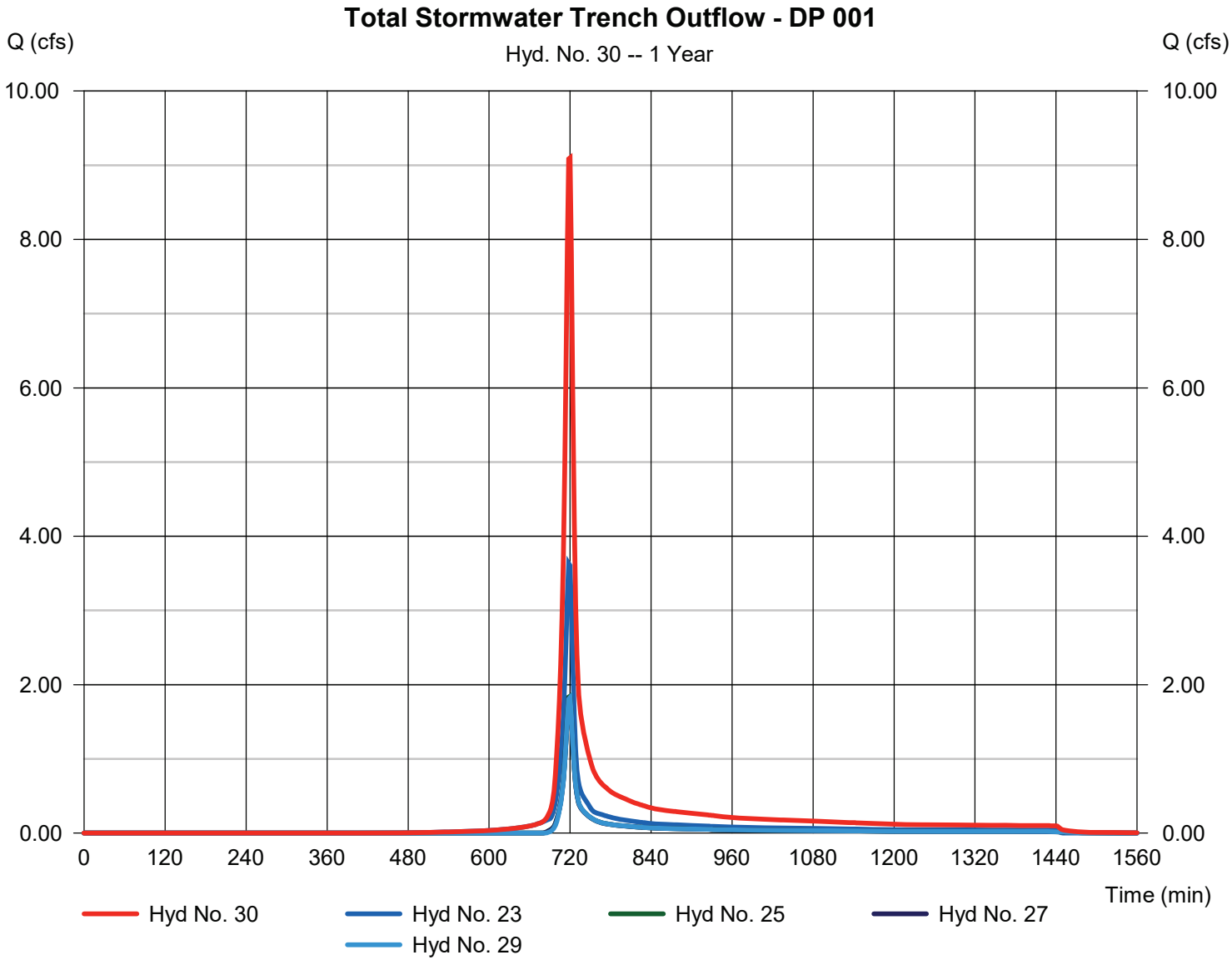
# Hydrograph Report



## Hyd. No. 30

Total Stormwater Trench Outflow - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 9.099 cfs |
| Storm frequency | = 1 yrs | Time to peak | = 720 min |
| Time interval | = 2 min | Hyd. volume | = 20,114 cuft |
| Inflow hyds. | = 23, 25, 27, 29 | Contrib. drain. area | = 0.000 ac |



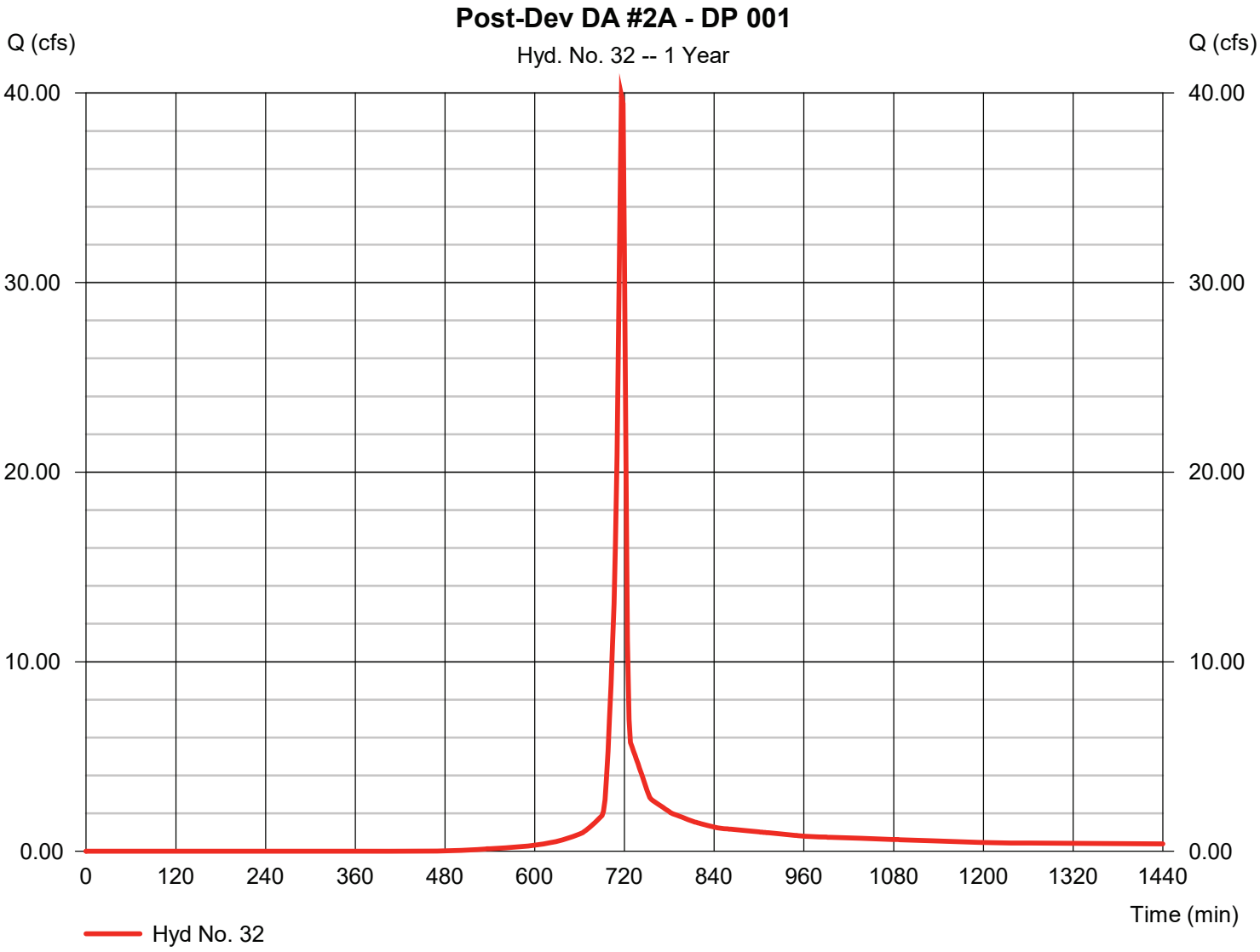
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 32

Post-Dev DA #2A - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 39.87 cfs |
| Storm frequency | = 1 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 80,749 cuft |
| Drainage area | = 16.190 ac | Curve number | = 86.8 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 2.70 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



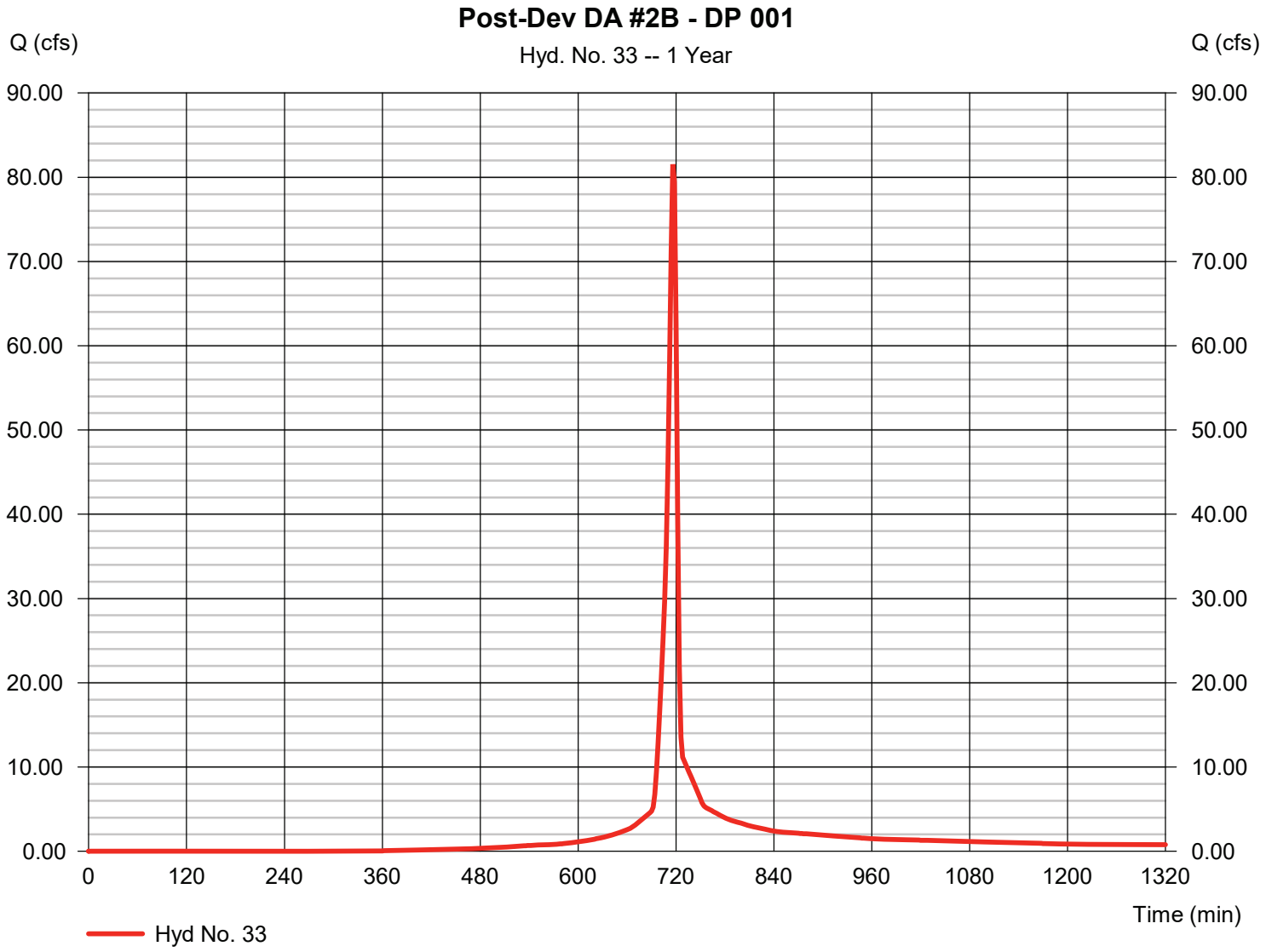
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 33

Post-Dev DA #2B - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 81.53 cfs |
| Storm frequency | = 1 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 168,923 cuft |
| Drainage area | = 27.420 ac | Curve number | = 91.2 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 2.70 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



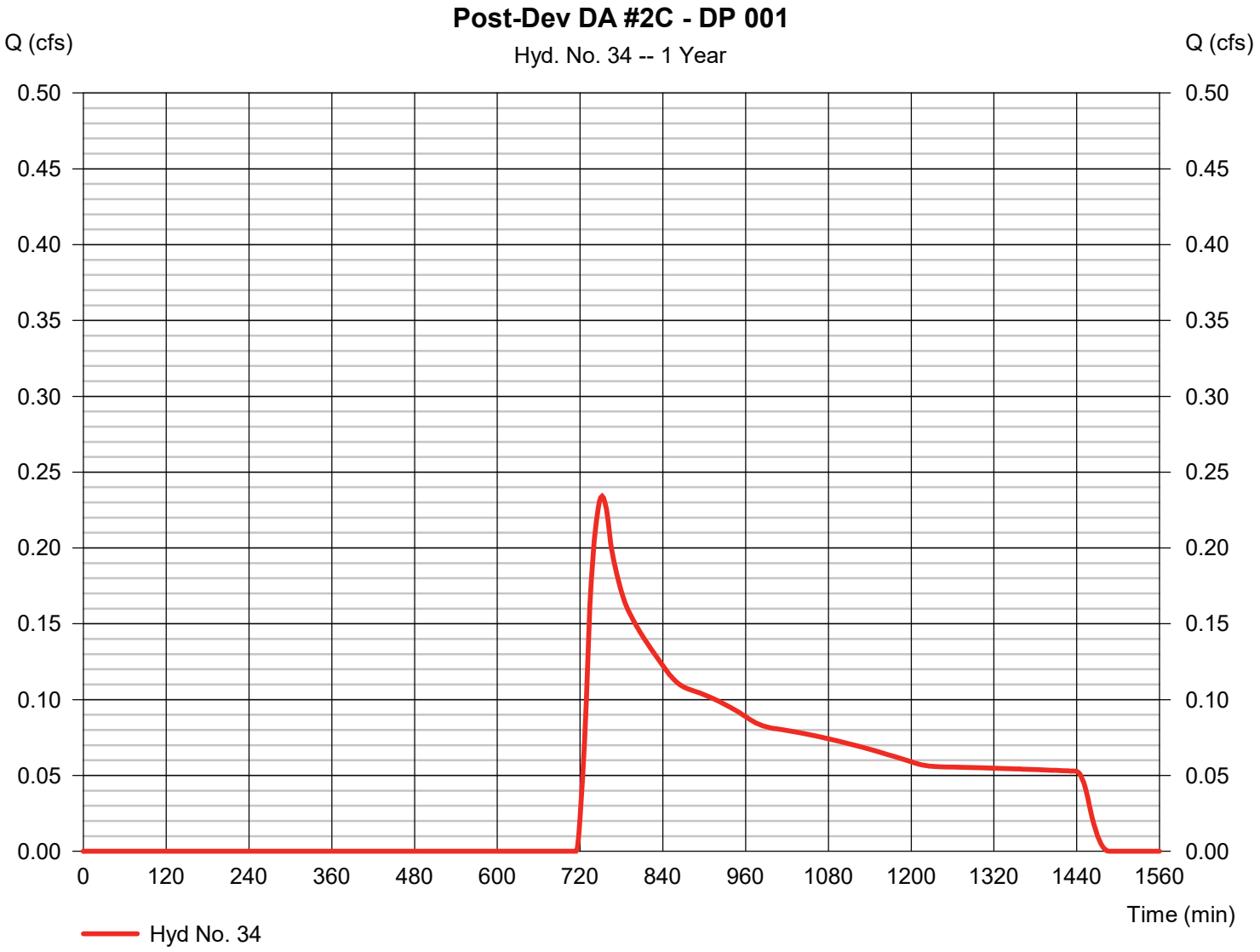
# Hydrograph Report

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## Hyd. No. 34

Post-Dev DA #2C - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 0.234 cfs |
| Storm frequency | = 1 yrs | Time to peak | = 752 min |
| Time interval | = 2 min | Hyd. volume | = 3,813 cuft |
| Drainage area | = 7.420 ac | Curve number | = 56 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = TR55 | Time of conc. (Tc) | = 28.30 min |
| Total precip. | = 2.70 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



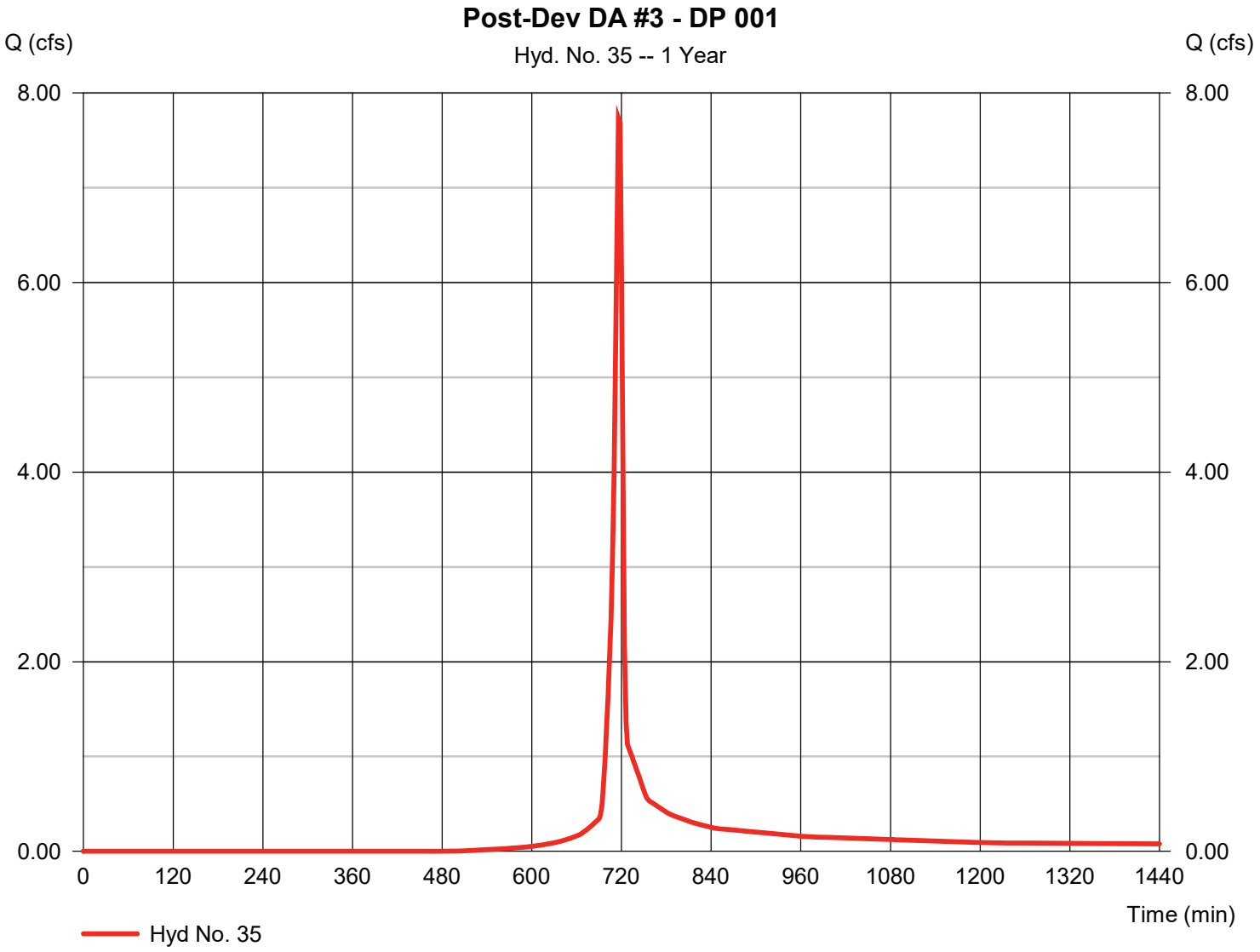
# Hydrograph Report



## Hyd. No. 35

Post-Dev DA #3 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 7.734 cfs |
| Storm frequency | = 1 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 15,632 cuft |
| Drainage area | = 3.310 ac | Curve number | = 85.7 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 2.70 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



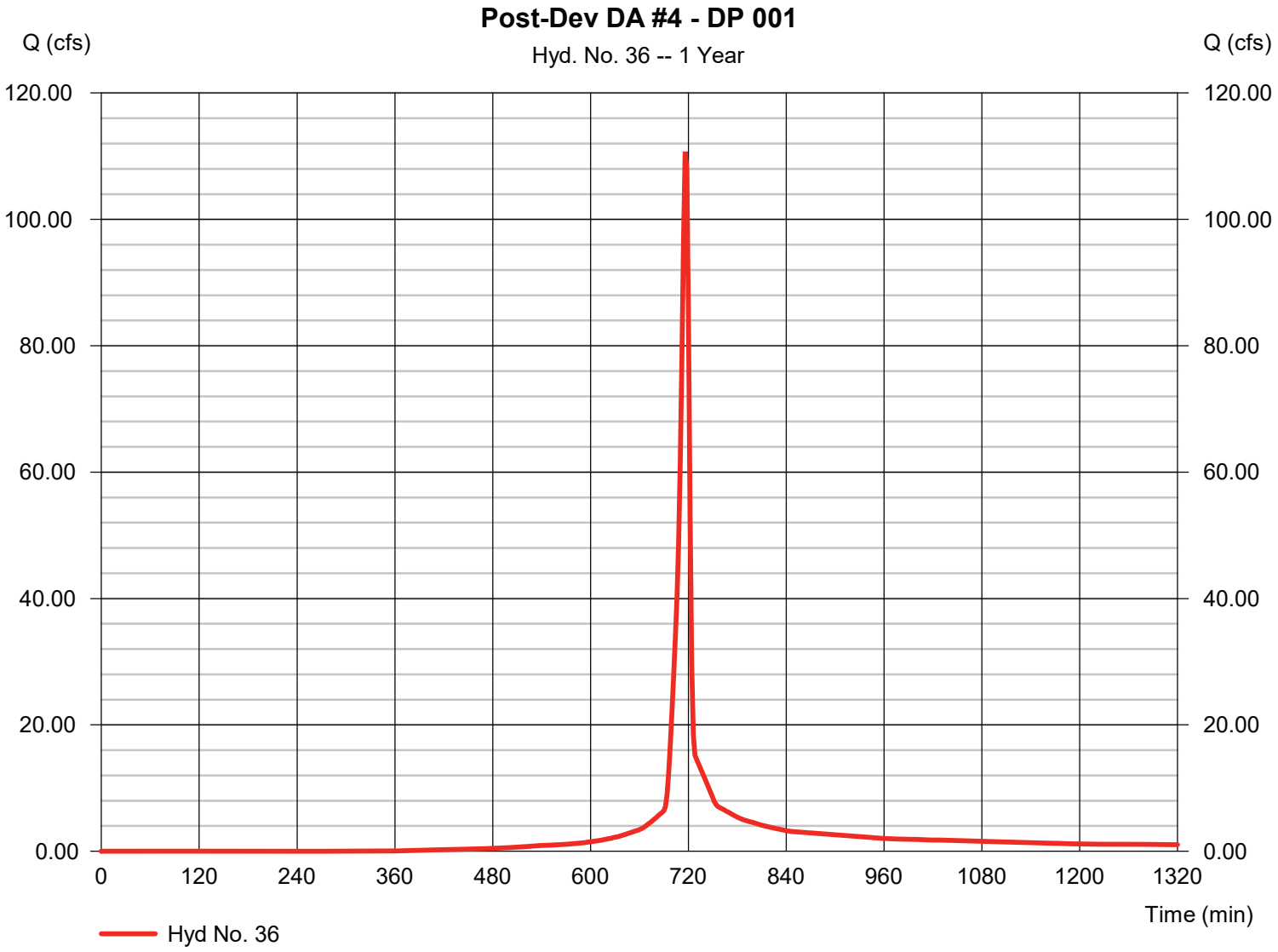
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 36

Post-Dev DA #4 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 110.72 cfs |
| Storm frequency | = 1 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 229,205 cuft |
| Drainage area | = 37.380 ac | Curve number | = 91.1 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 2.70 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



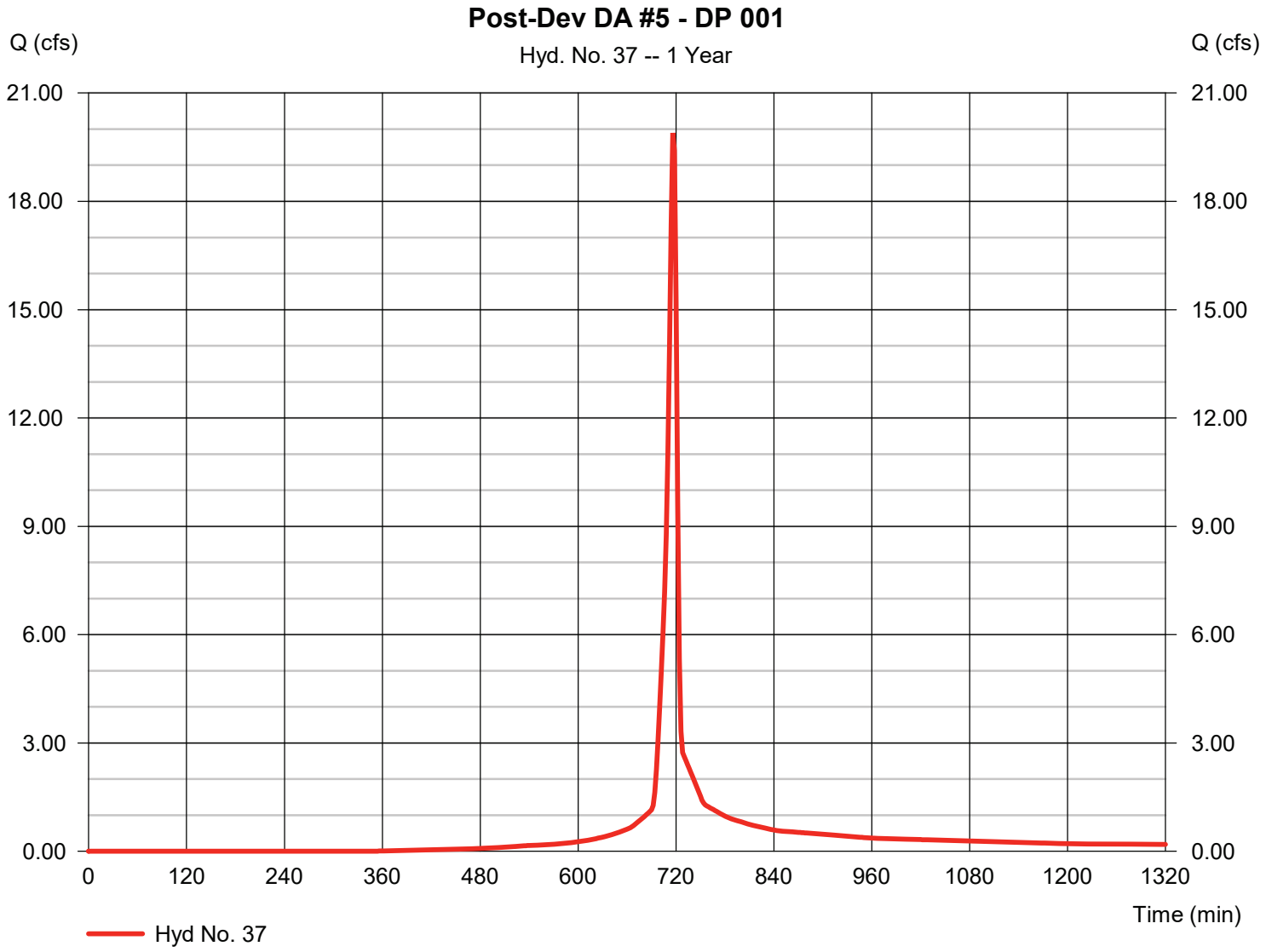
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 37

Post-Dev DA #5 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 19.90 cfs |
| Storm frequency | = 1 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 41,124 cuft |
| Drainage area | = 6.770 ac | Curve number | = 90.9 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 2.70 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



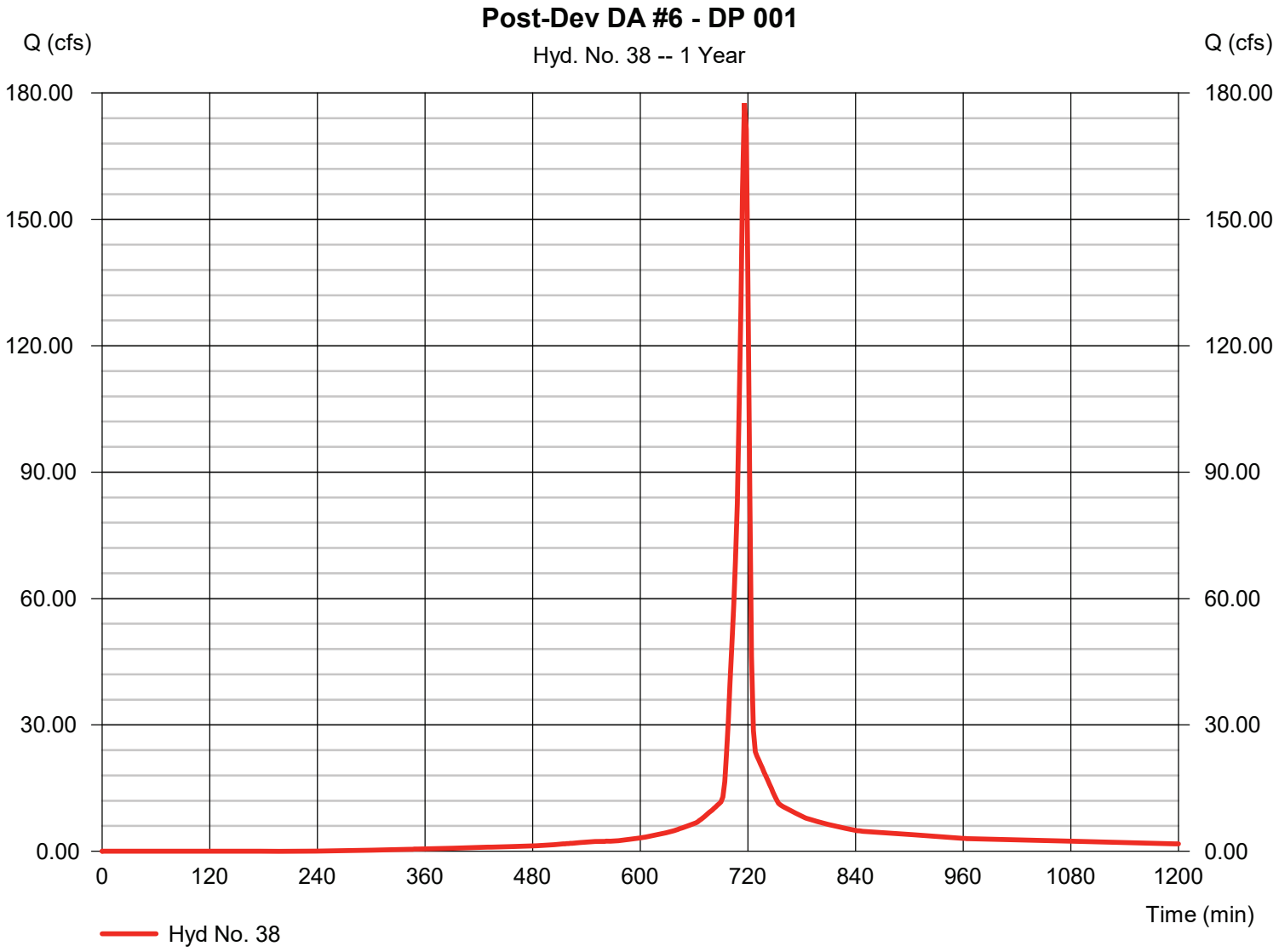
# Hydrograph Report



## Hyd. No. 38

Post-Dev DA #6 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 177.55 cfs |
| Storm frequency | = 1 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 379,629 cuft |
| Drainage area | = 53.880 ac | Curve number | = 94.1 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 2.70 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



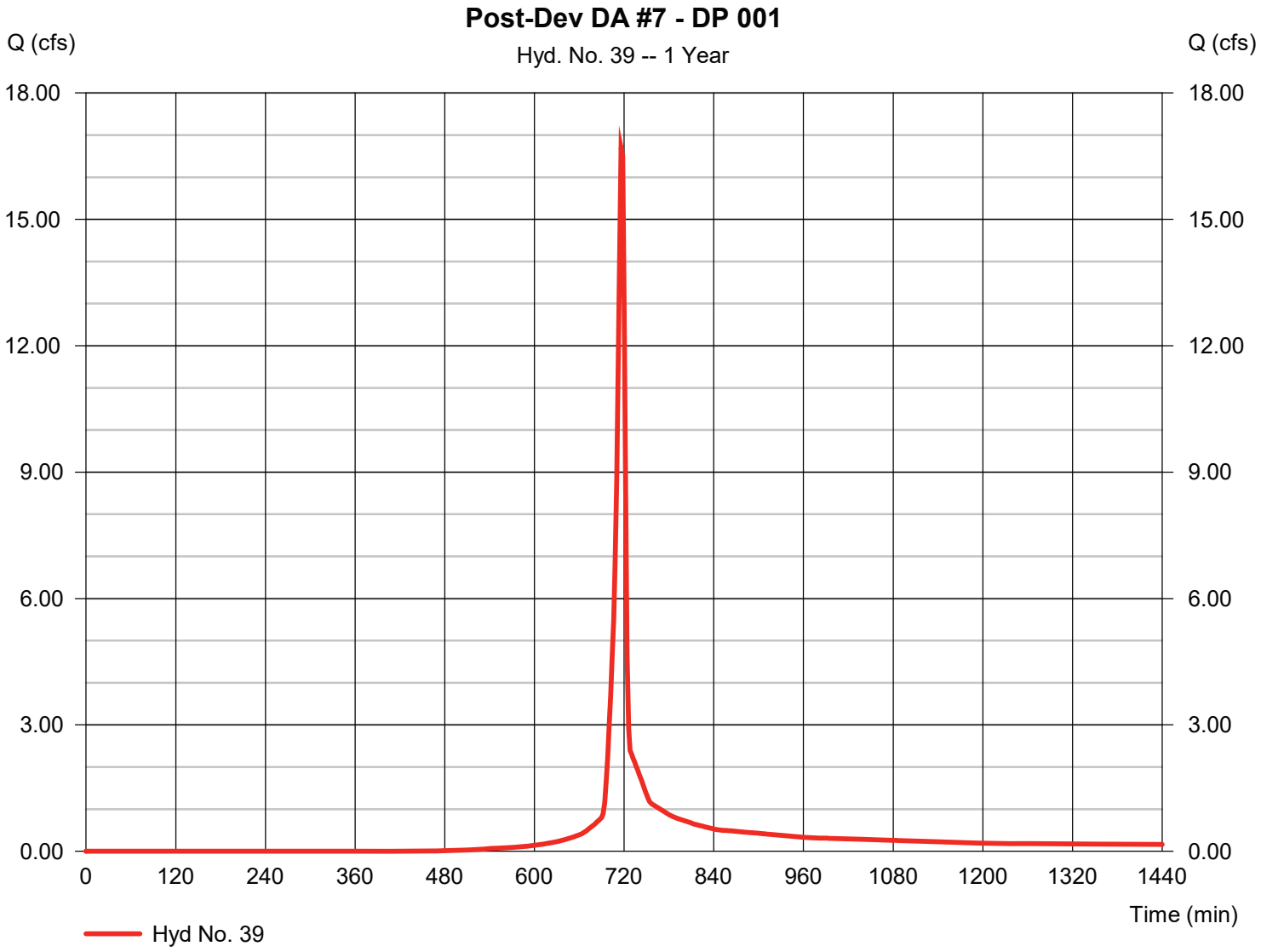
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 39

Post-Dev DA #7 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 16.70 cfs |
| Storm frequency | = 1 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 33,863 cuft |
| Drainage area | = 6.690 ac | Curve number | = 87.1 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 2.70 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



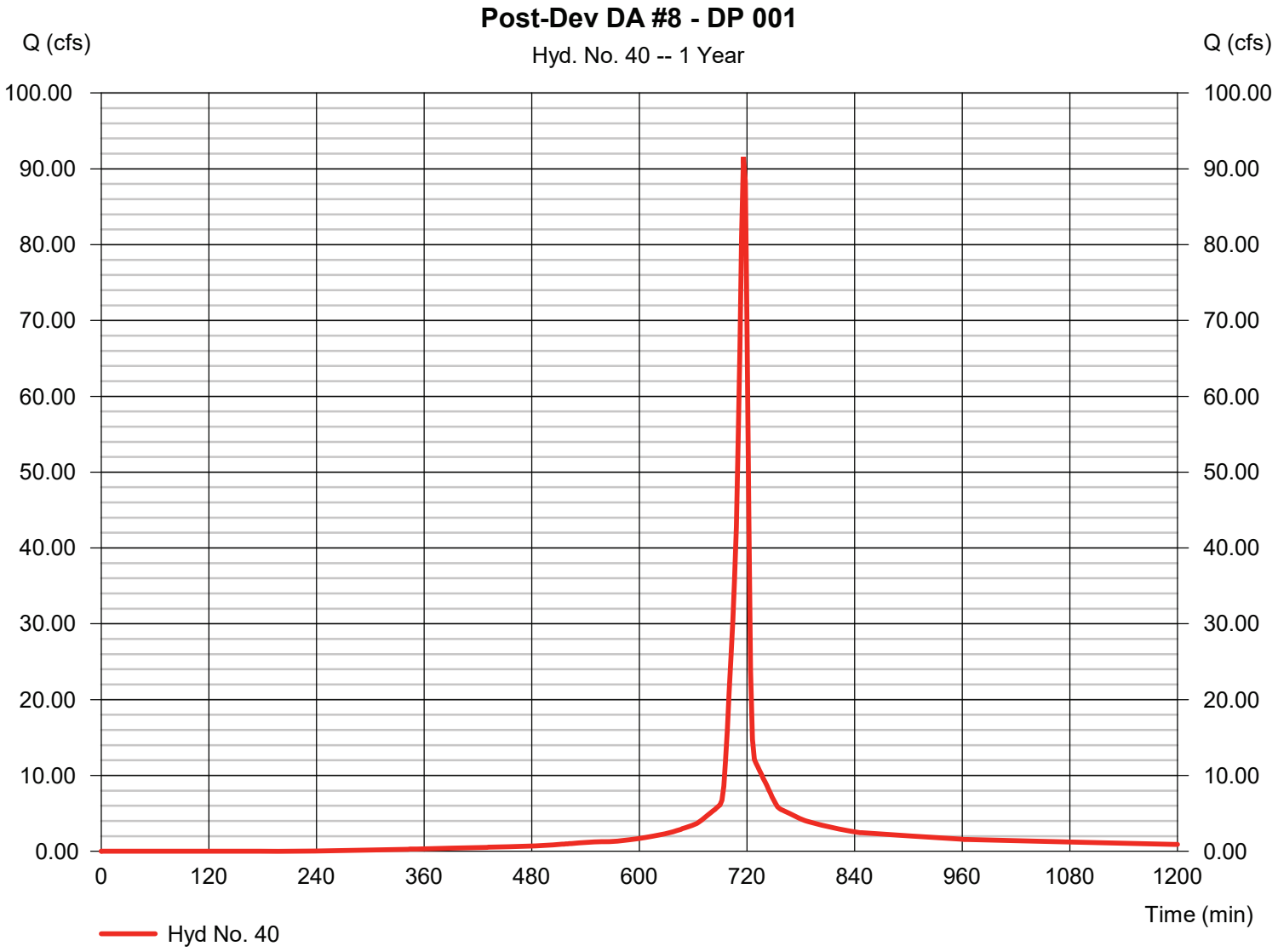
# Hydrograph Report



## Hyd. No. 40

Post-Dev DA #8 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 91.58 cfs |
| Storm frequency | = 1 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 196,650 cuft |
| Drainage area | = 27.530 ac | Curve number | = 94.4 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 2.70 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



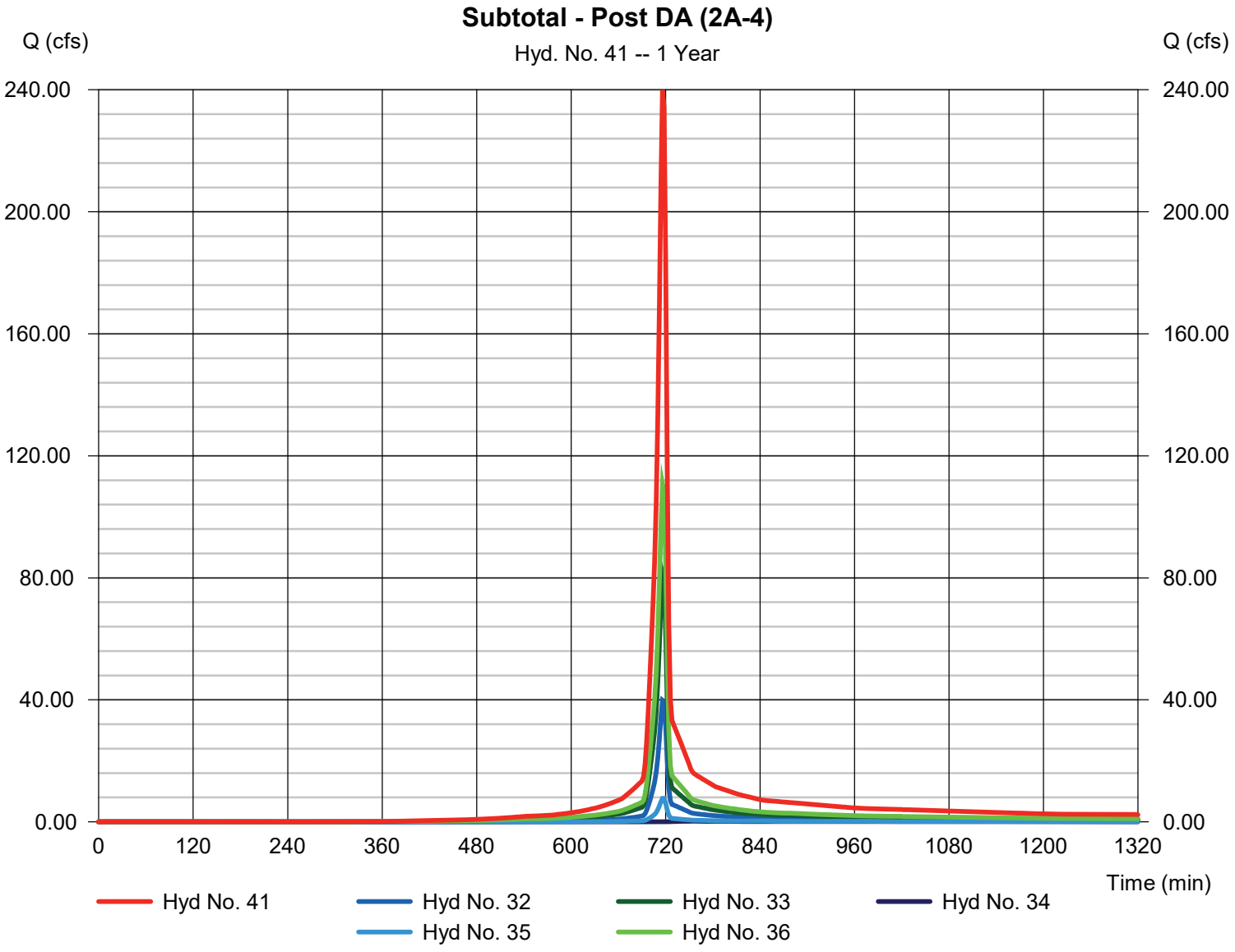
# Hydrograph Report



## Hyd. No. 41

Subtotal - Post DA (2A-4)

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 239.85 cfs |
| Storm frequency | = 1 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 498,321 cuft |
| Inflow hyds. | = 32, 33, 34, 35, 36 | Contrib. drain. area | = 91.720 ac |



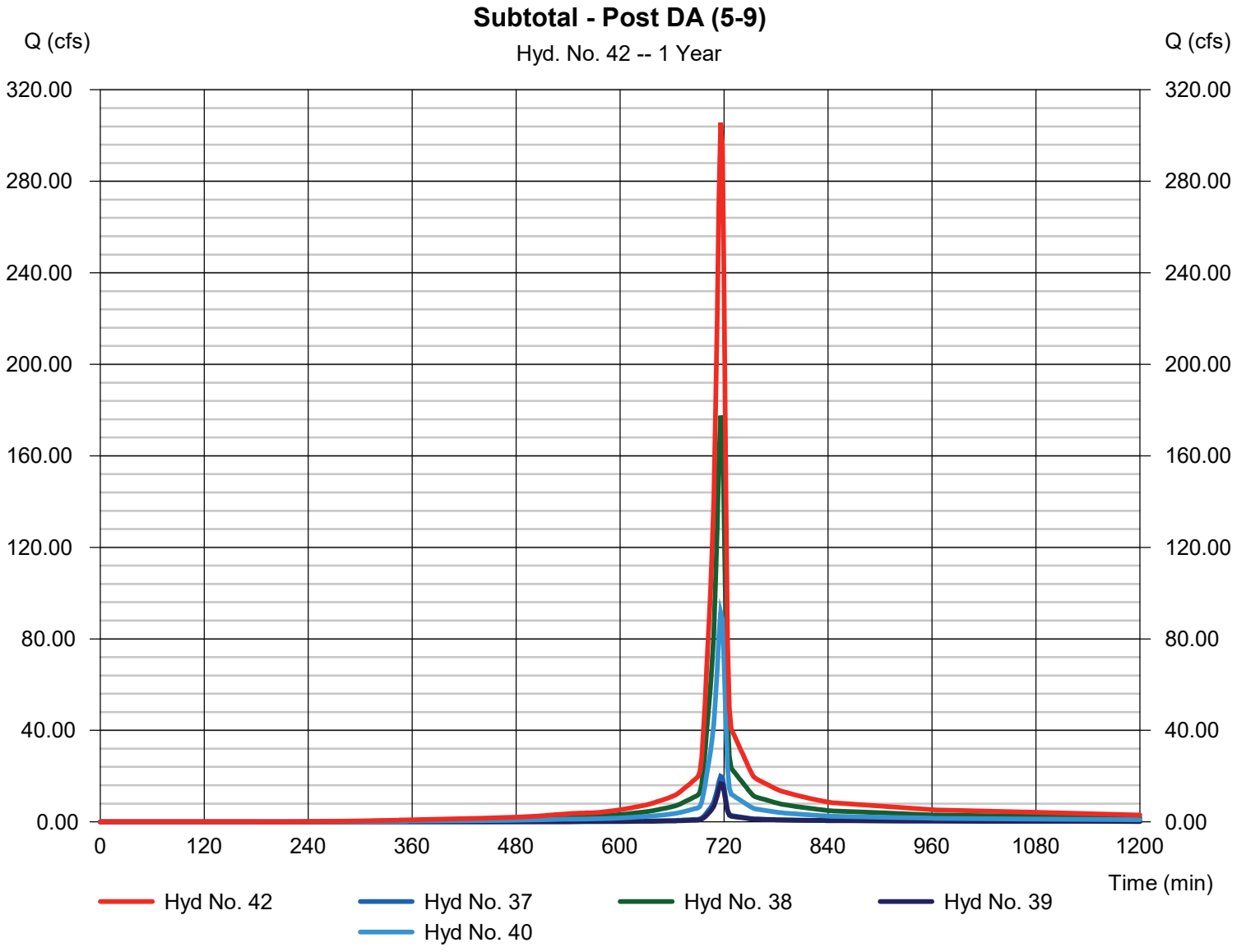
# Hydrograph Report



## Hyd. No. 42

Subtotal - Post DA (5-9)

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 305.73 cfs |
| Storm frequency | = 1 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 651,266 cuft |
| Inflow hyds. | = 37, 38, 39, 40 | Contrib. drain. area | = 94.870 ac |



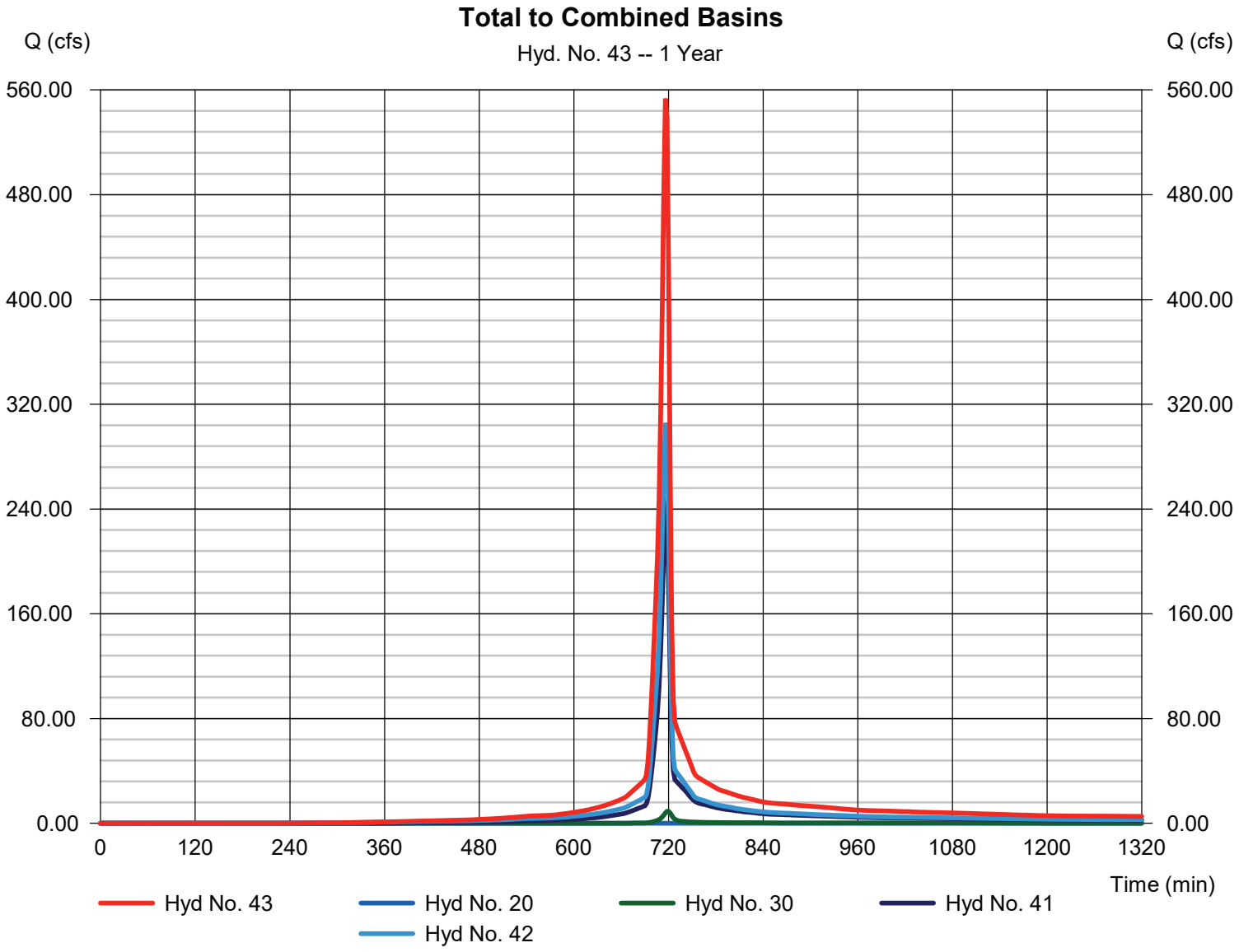
# Hydrograph Report



## Hyd. No. 43

Total to Combined Basins

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | Combine | Peak discharge | = | 553.49 cfs |
| Storm frequency | = | 1 yrs | Time to peak | = | 716 min |
| Time interval | = | 2 min | Hyd. volume | = | 1,169,701 cuft |
| Inflow hyds. | = | 20, 30, 41, 42 | Contrib. drain. area | = | 0.000 ac |



# Hydrograph Report

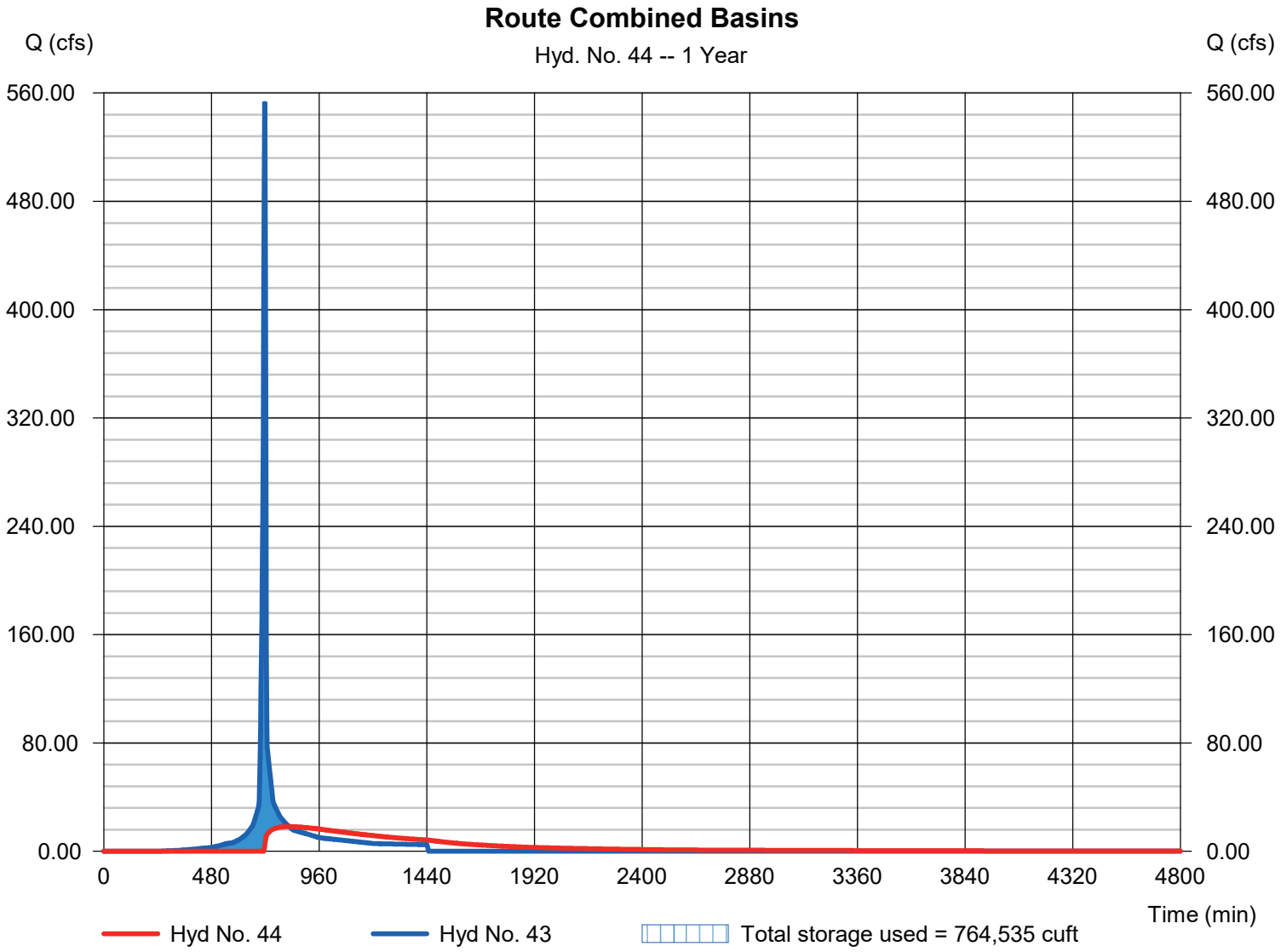
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## Hyd. No. 44

Route Combined Basins

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | Reservoir | Peak discharge | = | 18.26 cfs |
| Storm frequency | = | 1 yrs | Time to peak | = | 826 min |
| Time interval | = | 2 min | Hyd. volume | = | 867,559 cuft |
| Inflow hyd. No. | = | 43 - Total to Combined Basins | Max. Elevation | = | 14.03 ft |
| Reservoir name | = | Combined Basins | Max. Storage | = | 764,535 cuft |

Storage Indication method used.



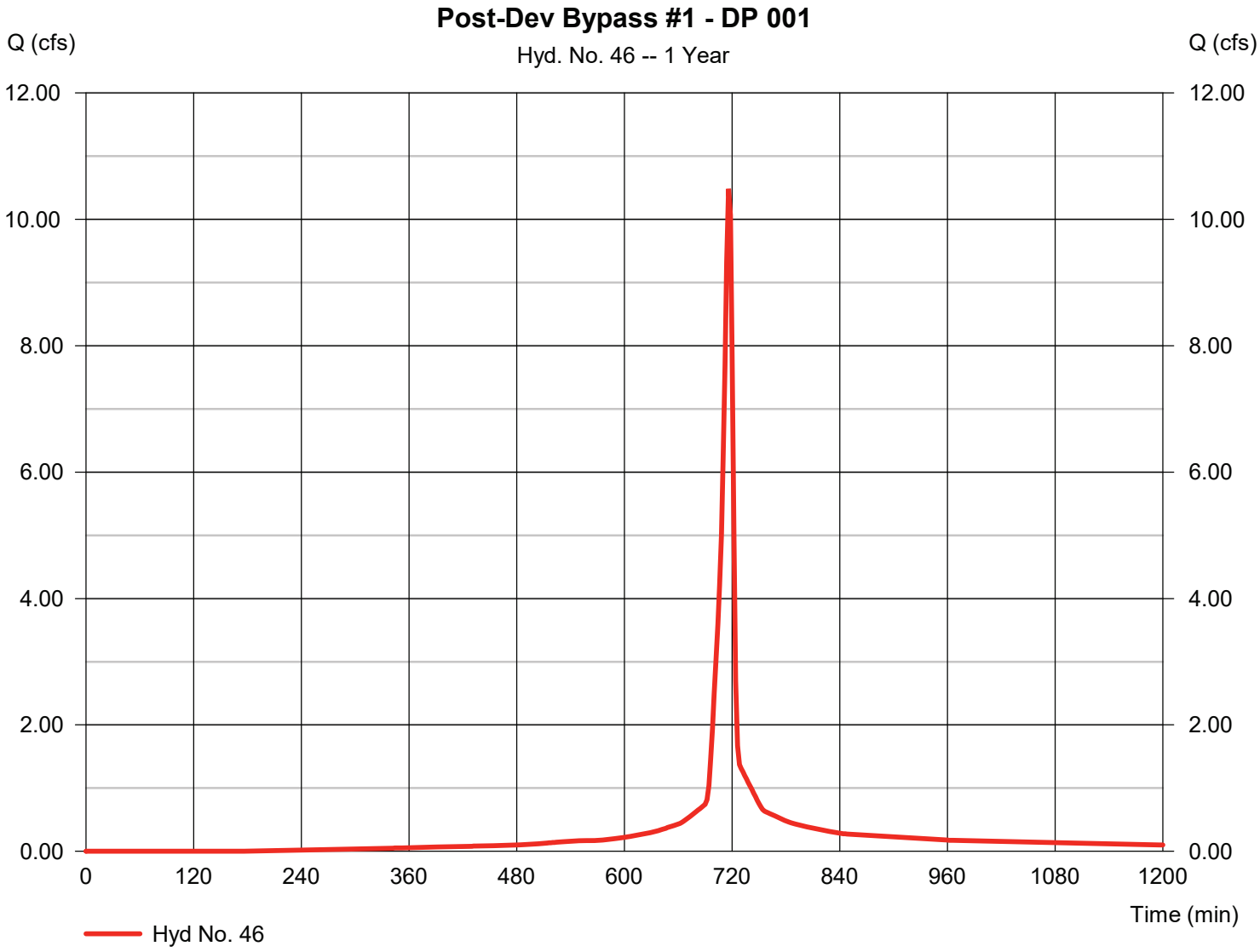
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 46

Post-Dev Bypass #1 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 10.48 cfs |
| Storm frequency | = 1 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 23,094 cuft |
| Drainage area | = 3.020 ac | Curve number | = 95.9 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 2.70 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



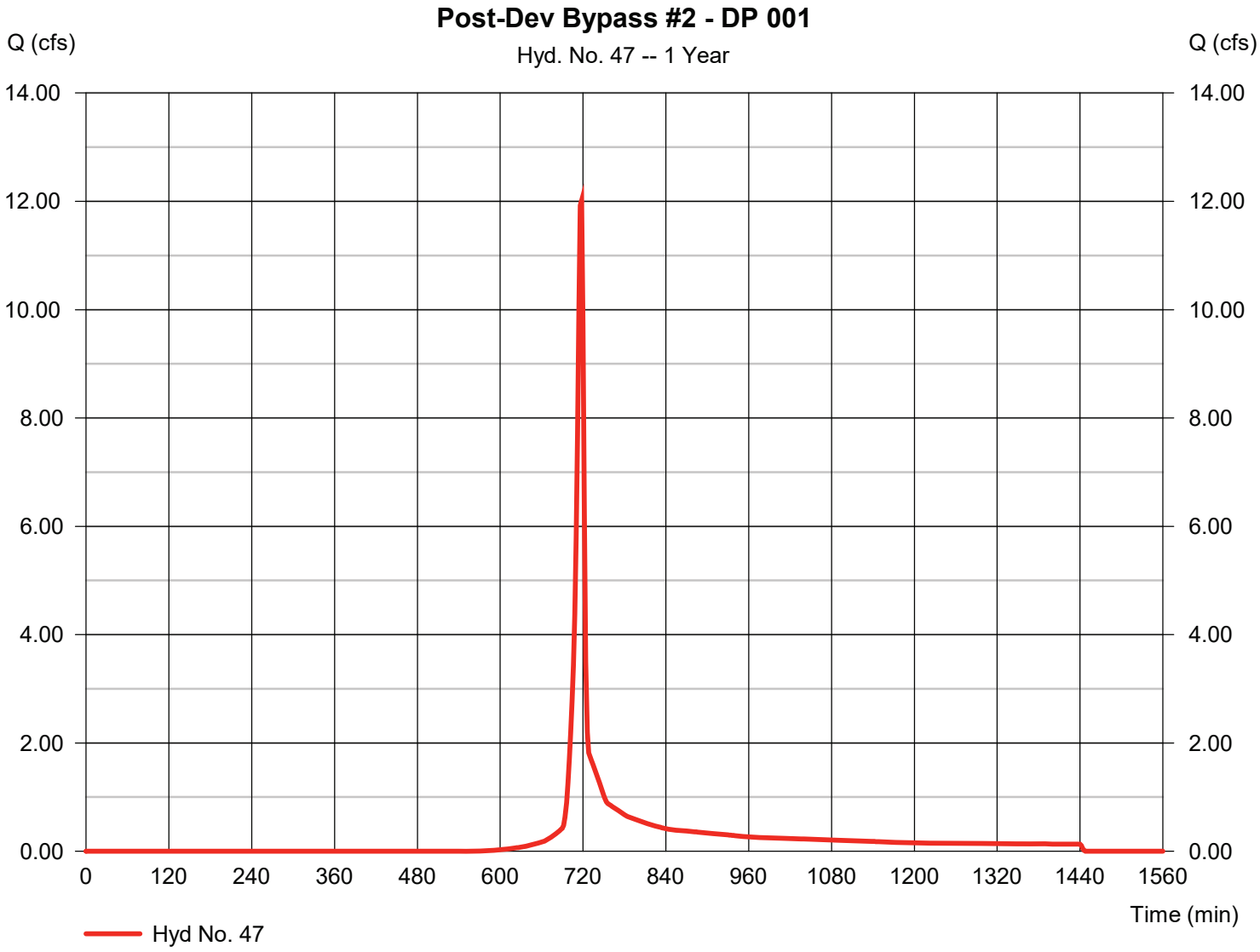
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 47

Post-Dev Bypass #2 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 12.01 cfs |
| Storm frequency | = 1 yrs | Time to peak | = 718 min |
| Time interval | = 2 min | Hyd. volume | = 24,116 cuft |
| Drainage area | = 6.080 ac | Curve number | = 82.3 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 2.70 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



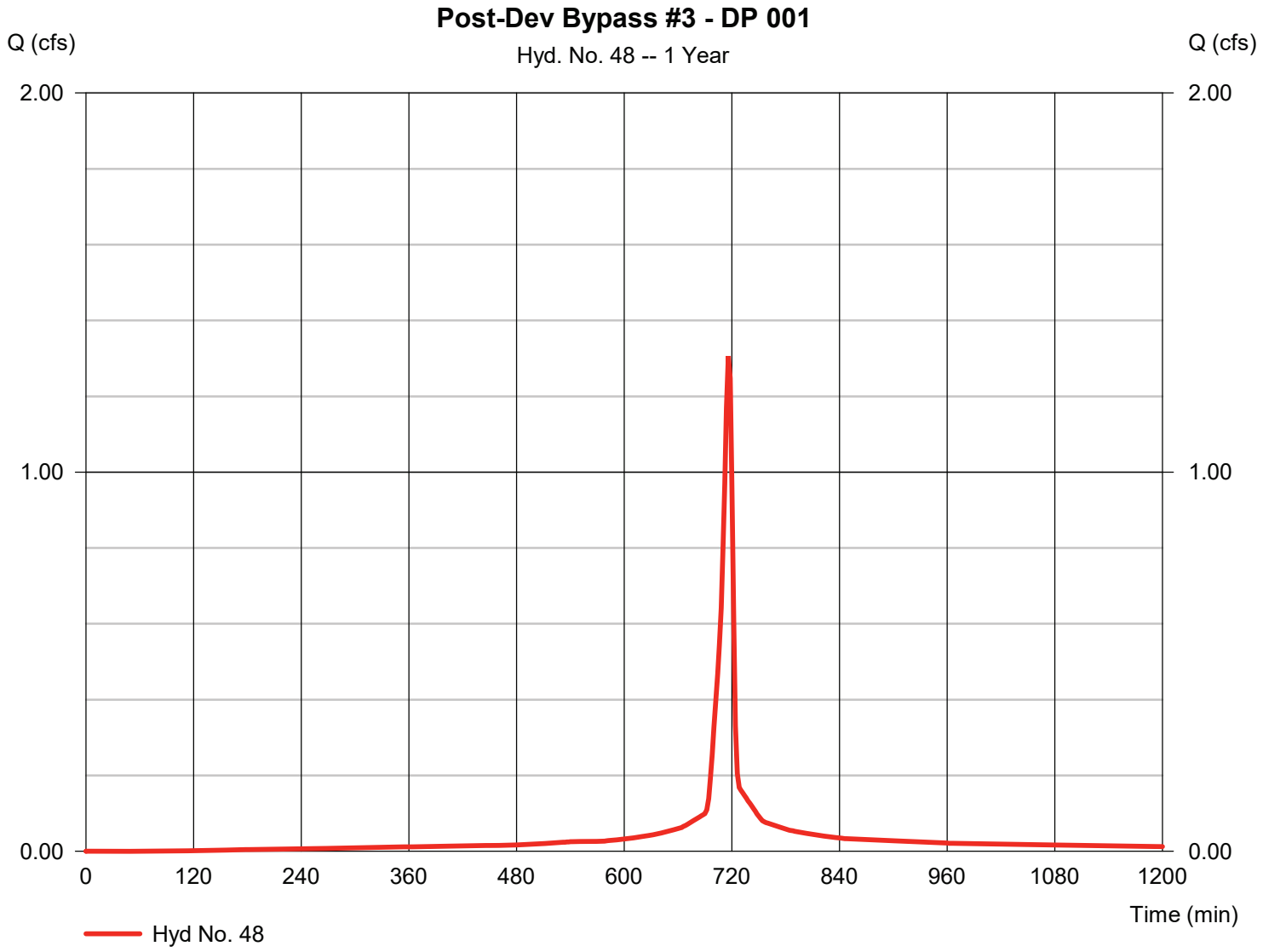
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 48

Post-Dev Bypass #3 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 1.306 cfs |
| Storm frequency | = 1 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 3,026 cuft |
| Drainage area | = 0.360 ac | Curve number | = 98 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 2.70 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



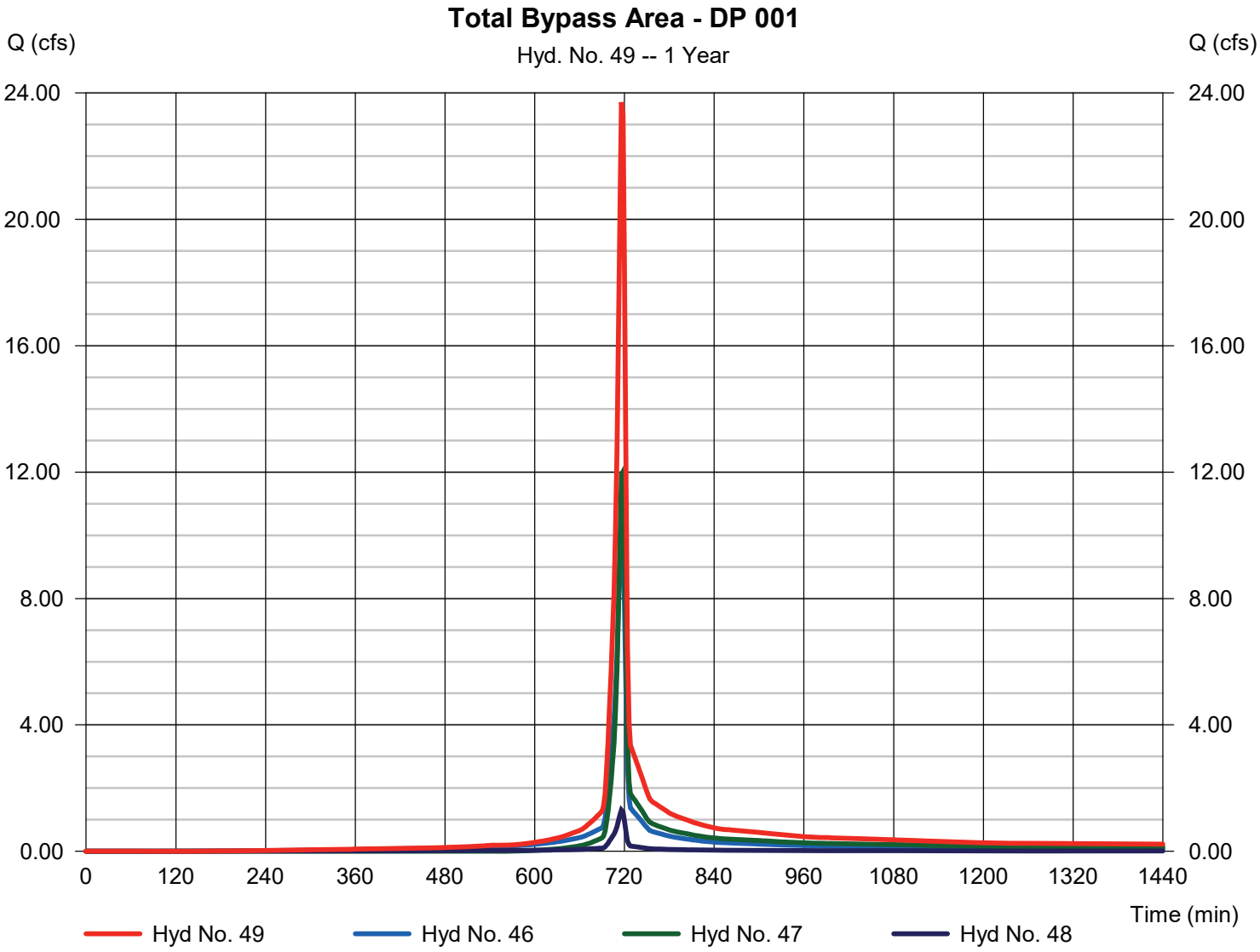
# Hydrograph Report



## Hyd. No. 49

Total Bypass Area - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 23.71 cfs |
| Storm frequency | = 1 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 50,236 cuft |
| Inflow hyds. | = 46, 47, 48 | Contrib. drain. area | = 9.460 ac |



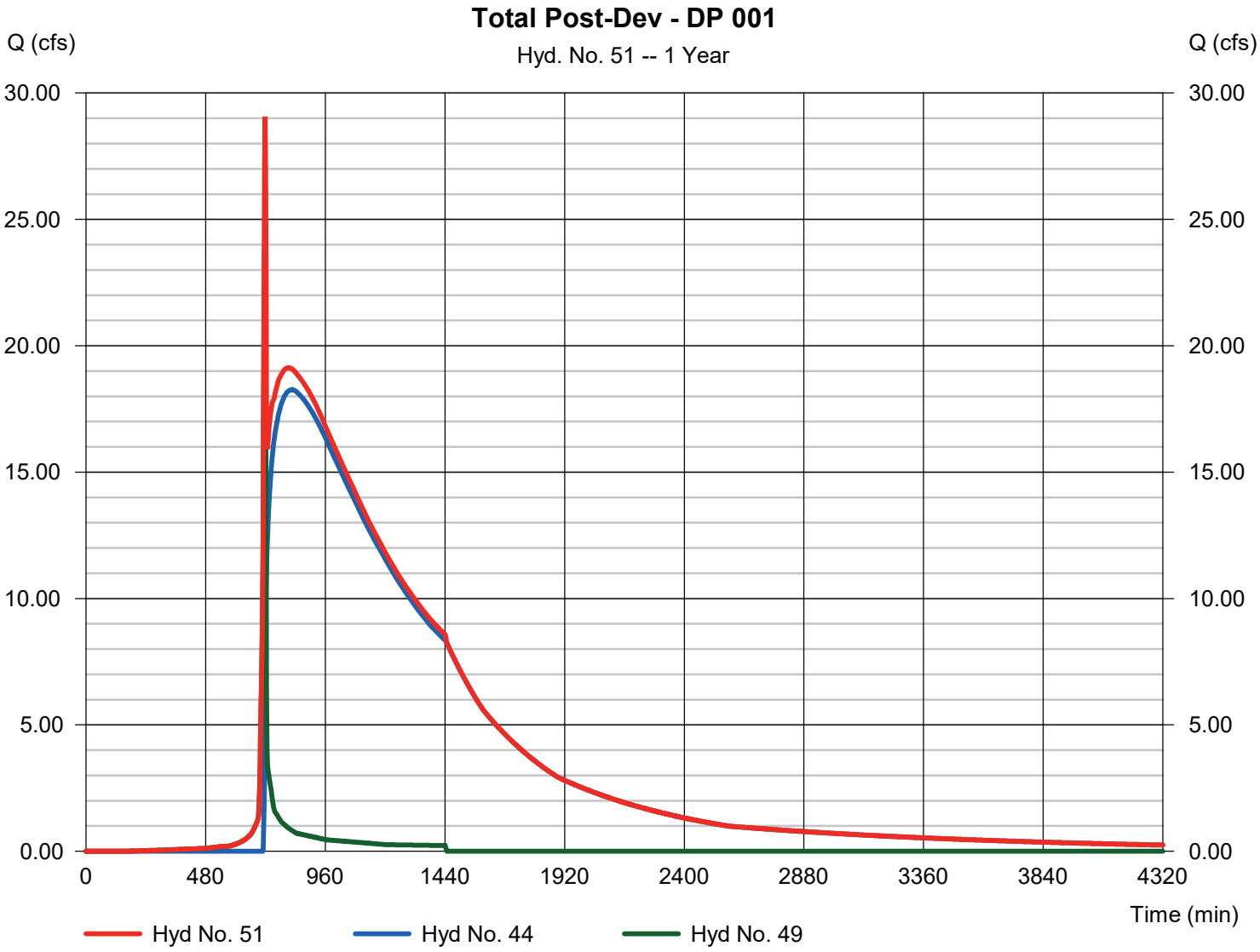
# Hydrograph Report



## Hyd. No. 51

Total Post-Dev - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 29.06 cfs |
| Storm frequency | = 1 yrs | Time to peak | = 718 min |
| Time interval | = 2 min | Hyd. volume | = 917,795 cuft |
| Inflow hyds. | = 44, 49 | Contrib. drain. area | = 0.000 ac |



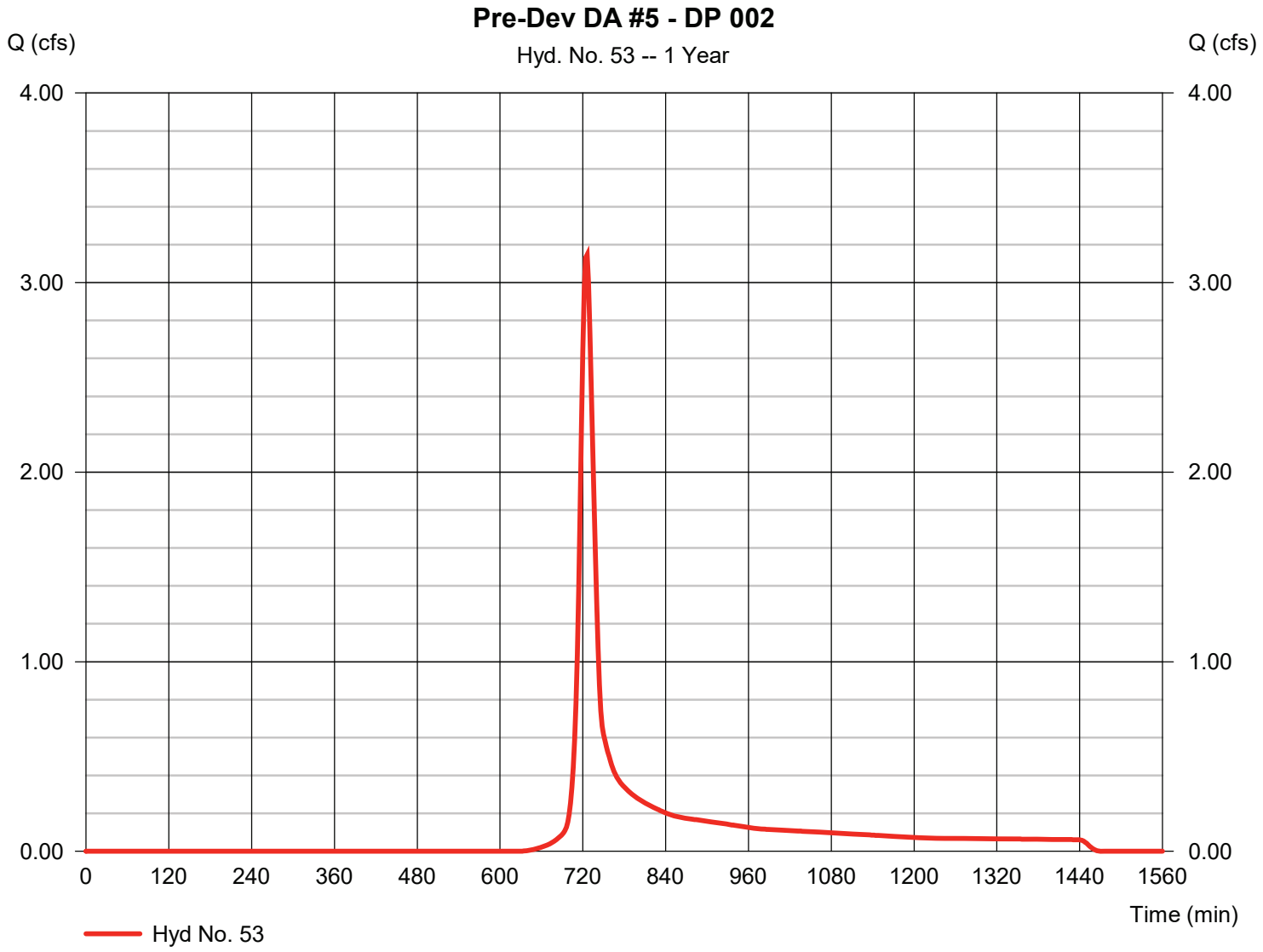
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 53

Pre-Dev DA #5 - DP 002

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 3.146 cfs |
| Storm frequency | = 1 yrs | Time to peak | = 726 min |
| Time interval | = 2 min | Hyd. volume | = 10,197 cuft |
| Drainage area | = 2.900 ac | Curve number | = 78.9 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = TR55 | Time of conc. (Tc) | = 16.90 min |
| Total precip. | = 2.70 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



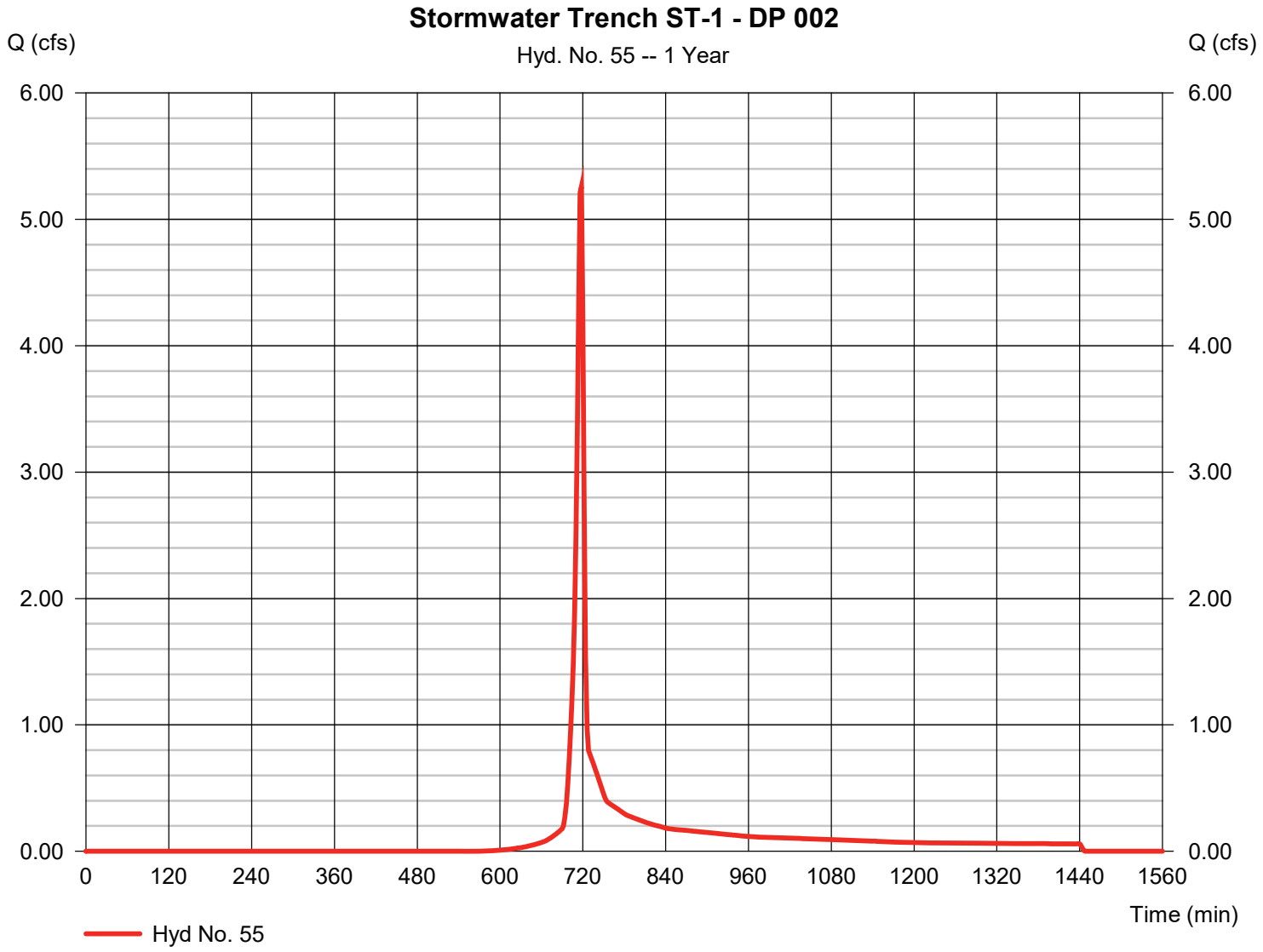
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 55

Stormwater Trench ST-1 - DP 002

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 5.260 cfs |
| Storm frequency | = 1 yrs | Time to peak | = 718 min |
| Time interval | = 2 min | Hyd. volume | = 10,545 cuft |
| Drainage area | = 2.730 ac | Curve number | = 81.8 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 2.70 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



# Hydrograph Report

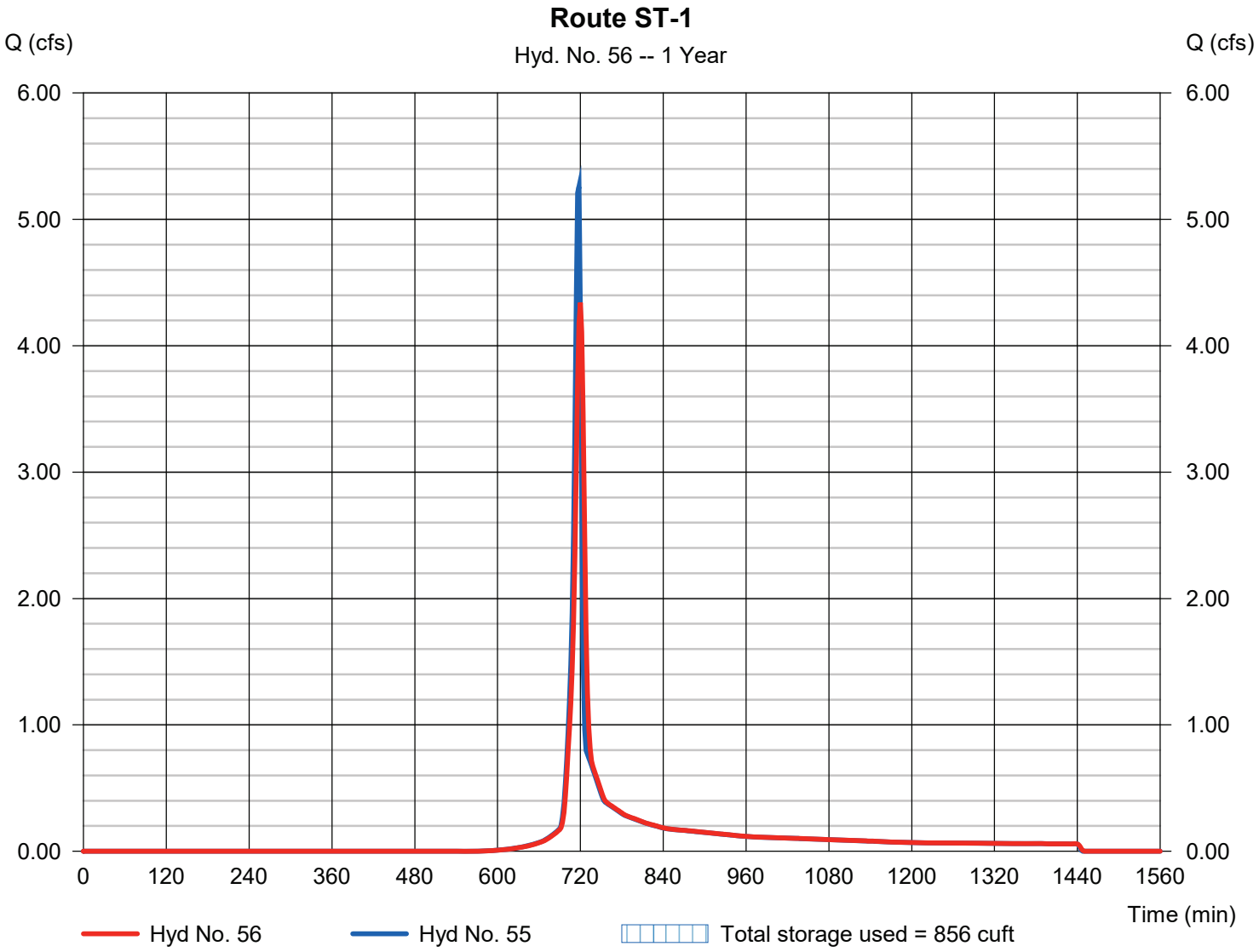
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 56

Route ST-1

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | Reservoir | Peak discharge | = | 4.340 cfs |
| Storm frequency | = | 1 yrs | Time to peak | = | 720 min |
| Time interval | = | 2 min | Hyd. volume | = | 10,545 cuft |
| Inflow hyd. No. | = | 55 - Stormwater Trench ST-1 - DP 02 | Max. Elevation | = | 15.05 ft |
| Reservoir name | = | Stormwater Trench ST-1 | Max. Storage | = | 856 cuft |

Storage Indication method used.



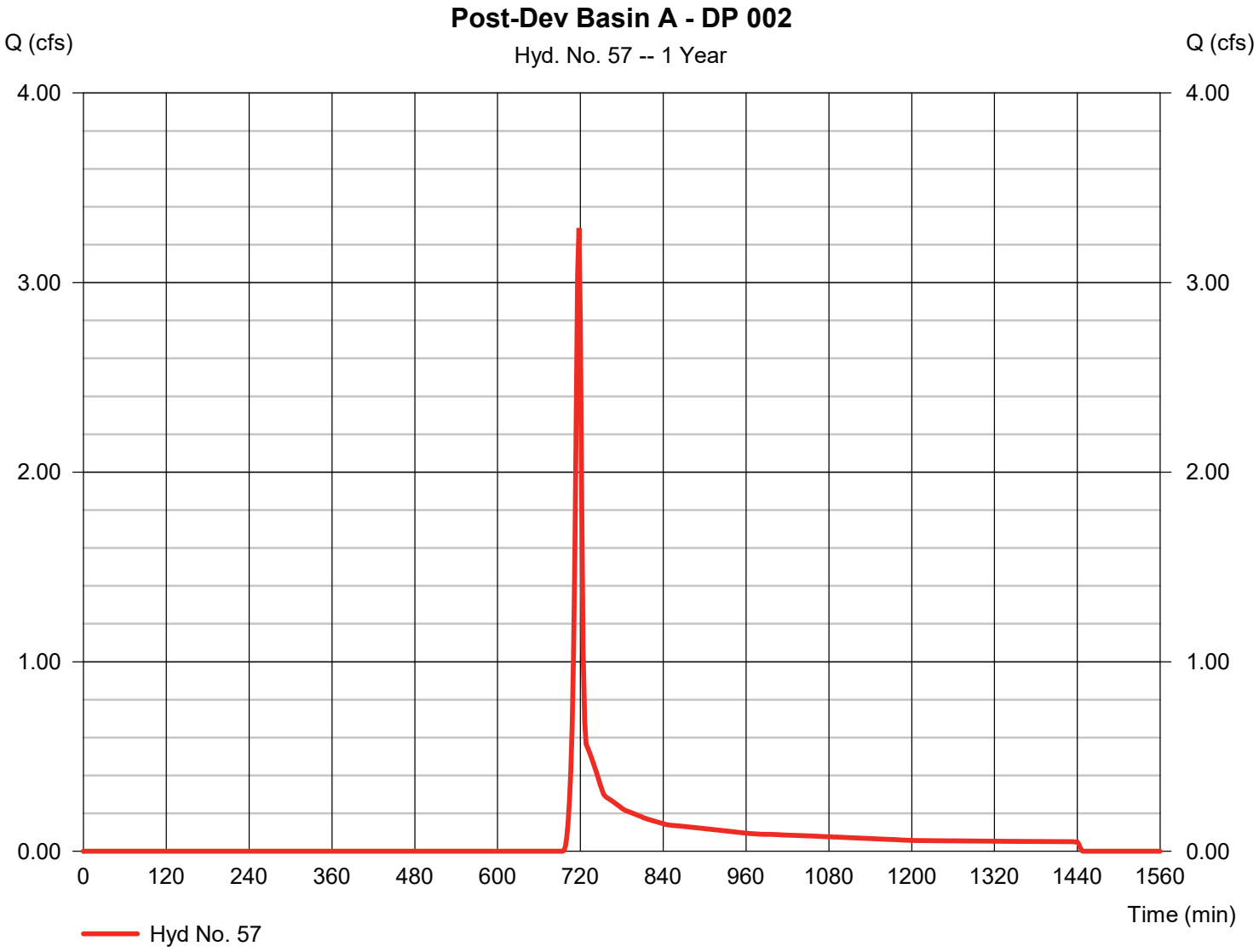
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 57

Post-Dev Basin A - DP 002

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 3.287 cfs |
| Storm frequency | = 1 yrs | Time to peak | = 718 min |
| Time interval | = 2 min | Hyd. volume | = 6,821 cuft |
| Drainage area | = 3.260 ac | Curve number | = 71.5 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 2.70 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



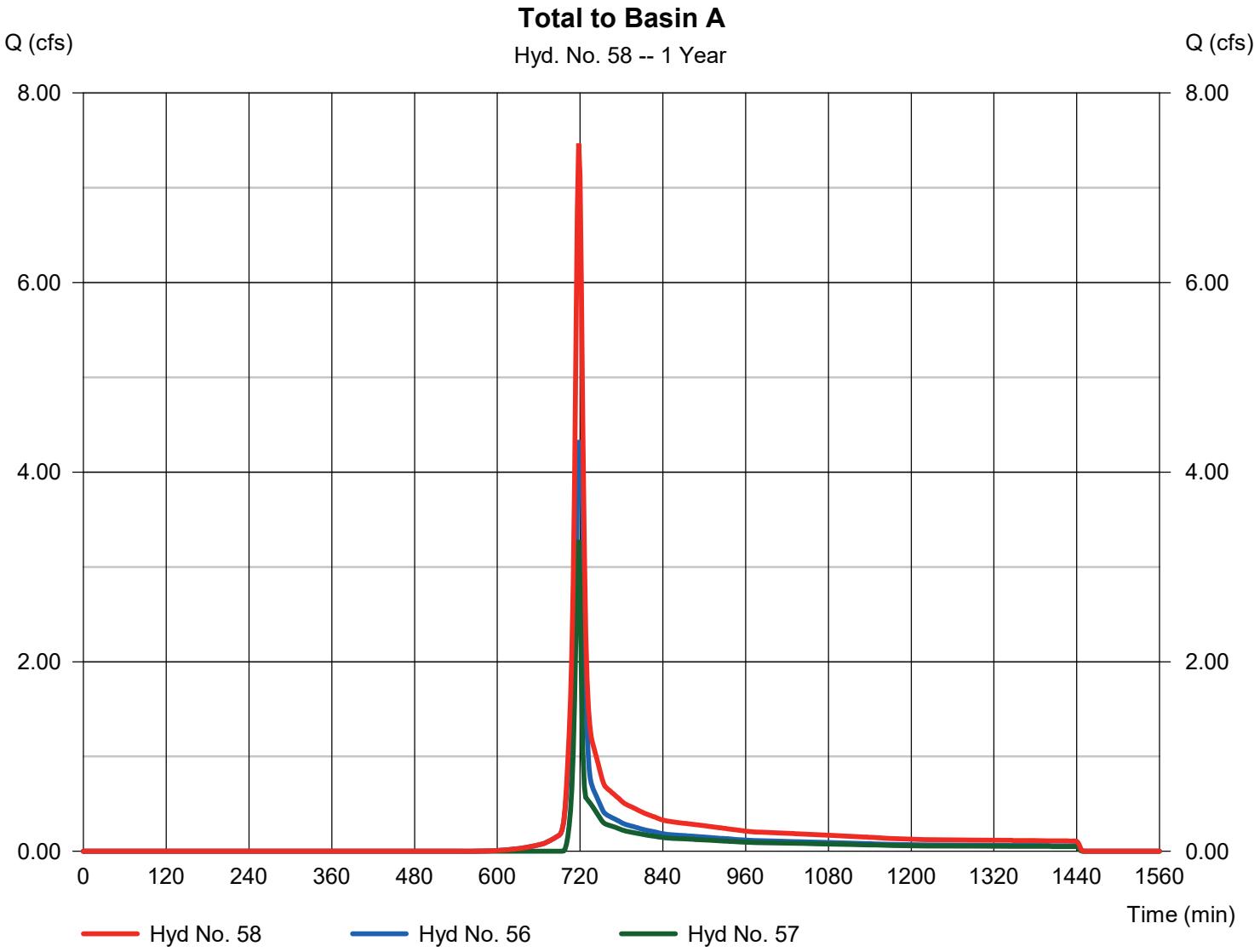
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 58

Total to Basin A

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 7.466 cfs |
| Storm frequency | = 1 yrs | Time to peak | = 718 min |
| Time interval | = 2 min | Hyd. volume | = 17,366 cuft |
| Inflow hyds. | = 56, 57 | Contrib. drain. area | = 3.260 ac |



# Hydrograph Report

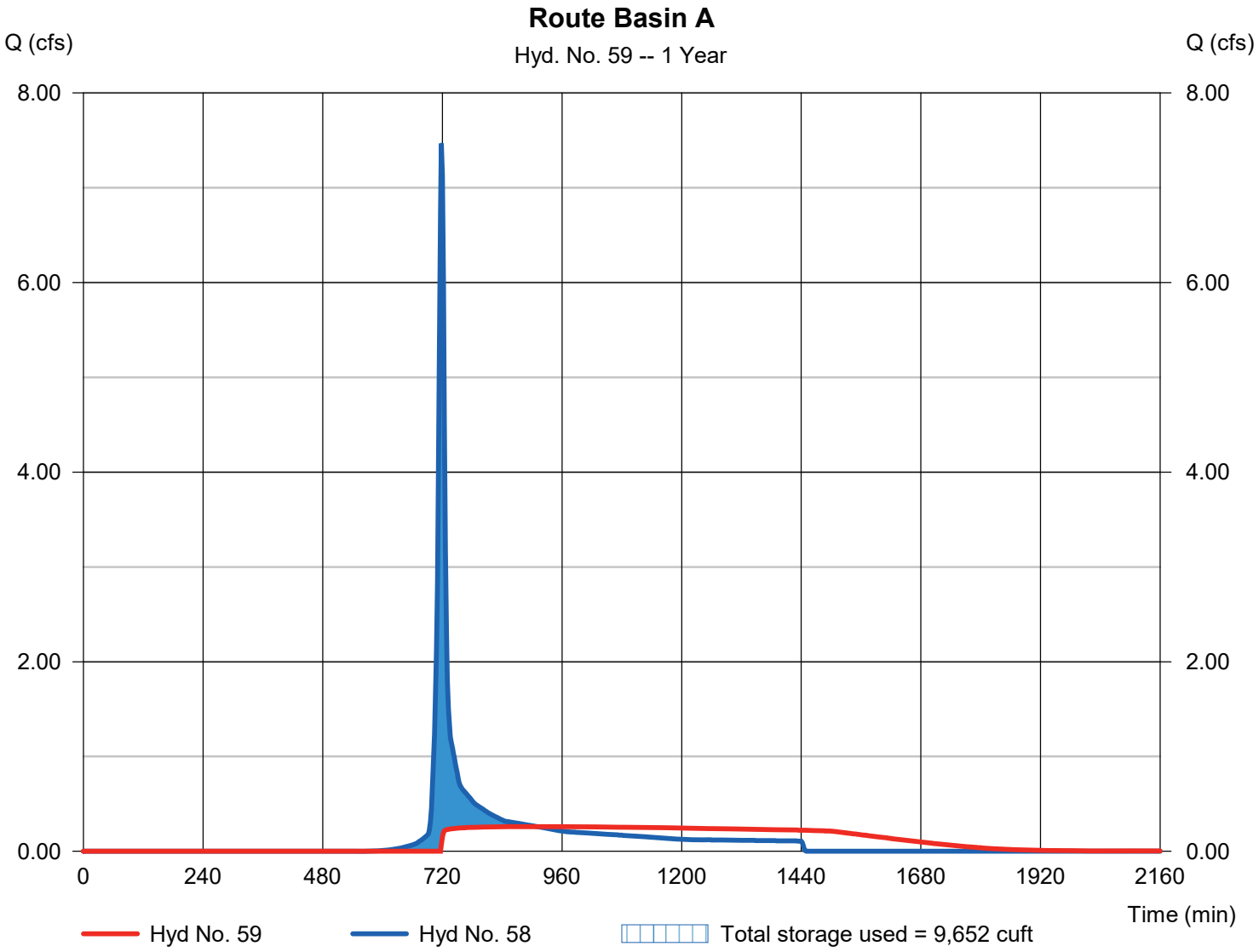
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 59

Route Basin A

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | Reservoir | Peak discharge | = | 0.260 cfs |
| Storm frequency | = | 1 yrs | Time to peak | = | 910 min |
| Time interval | = | 2 min | Hyd. volume | = | 13,832 cuft |
| Inflow hyd. No. | = | 58 - Total to Basin A | Max. Elevation | = | 13.43 ft |
| Reservoir name | = | Basin A (MRC) | Max. Storage | = | 9,652 cuft |

Storage Indication method used.



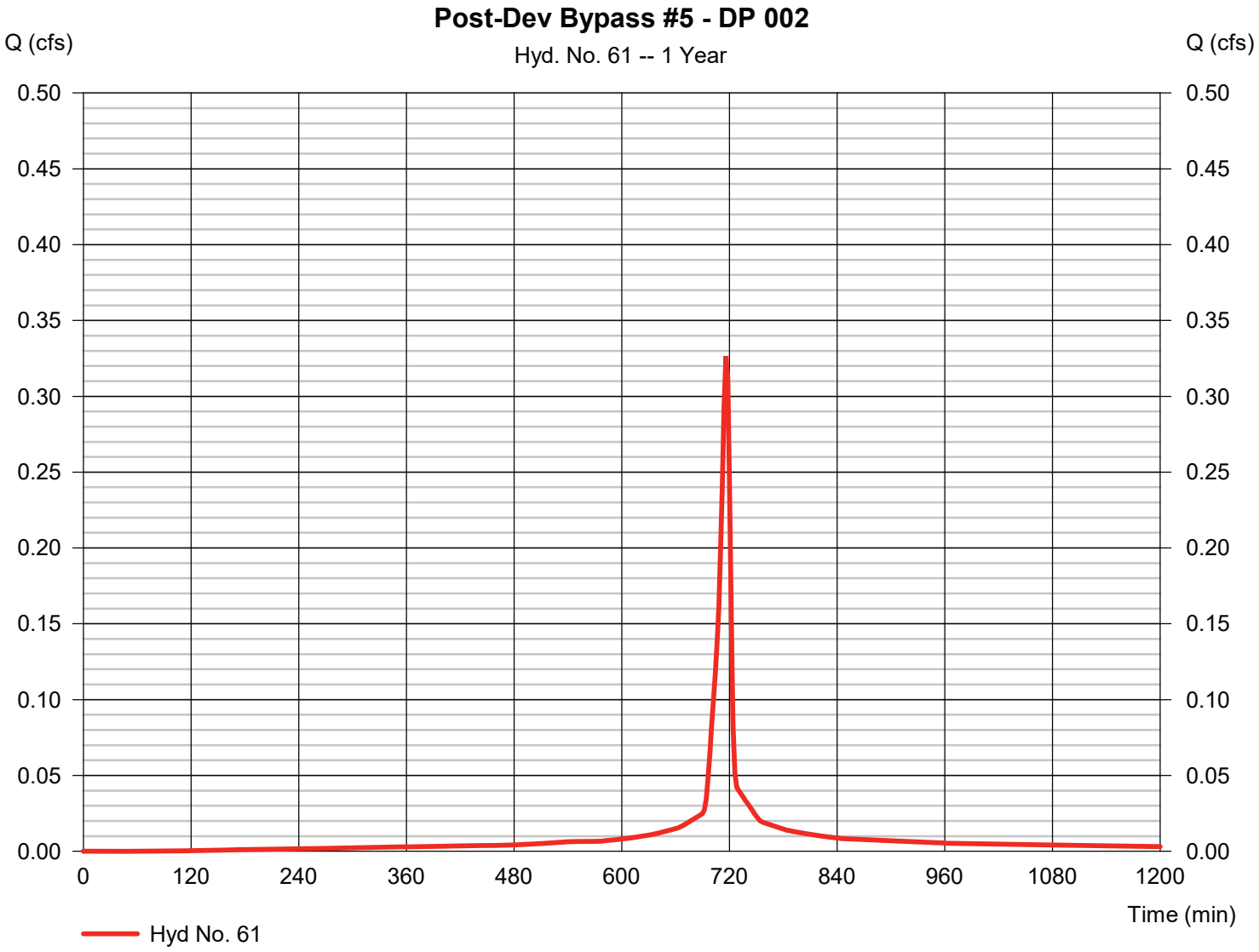
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 61

Post-Dev Bypass #5 - DP 002

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 0.326 cfs |
| Storm frequency | = 1 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 756 cuft |
| Drainage area | = 0.090 ac | Curve number | = 98 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 2.70 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



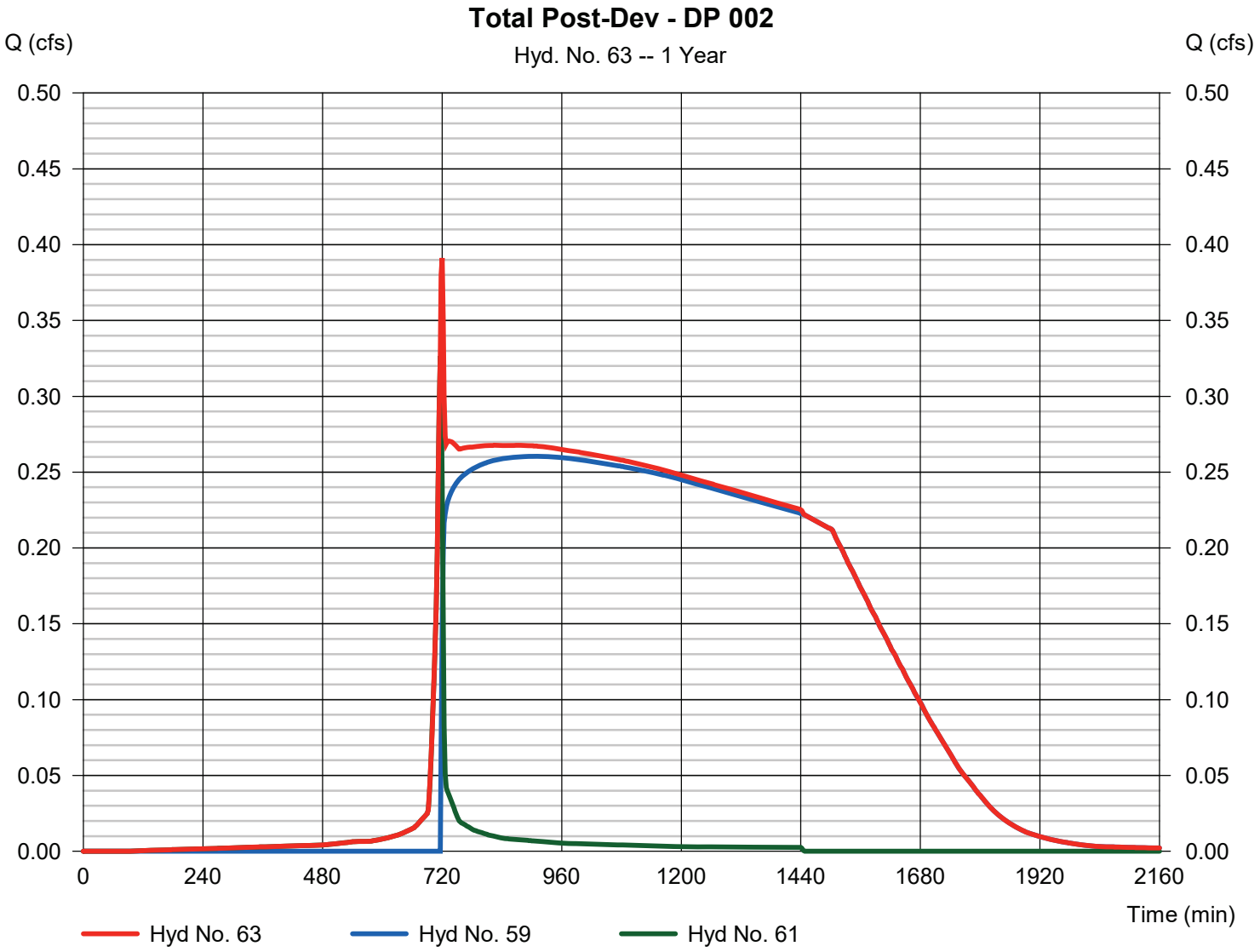
# Hydrograph Report



## Hyd. No. 63

Total Post-Dev - DP 002

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 0.391 cfs |
| Storm frequency | = 1 yrs | Time to peak | = 720 min |
| Time interval | = 2 min | Hyd. volume | = 14,589 cuft |
| Inflow hyds. | = 59, 61 | Contrib. drain. area | = 0.090 ac |



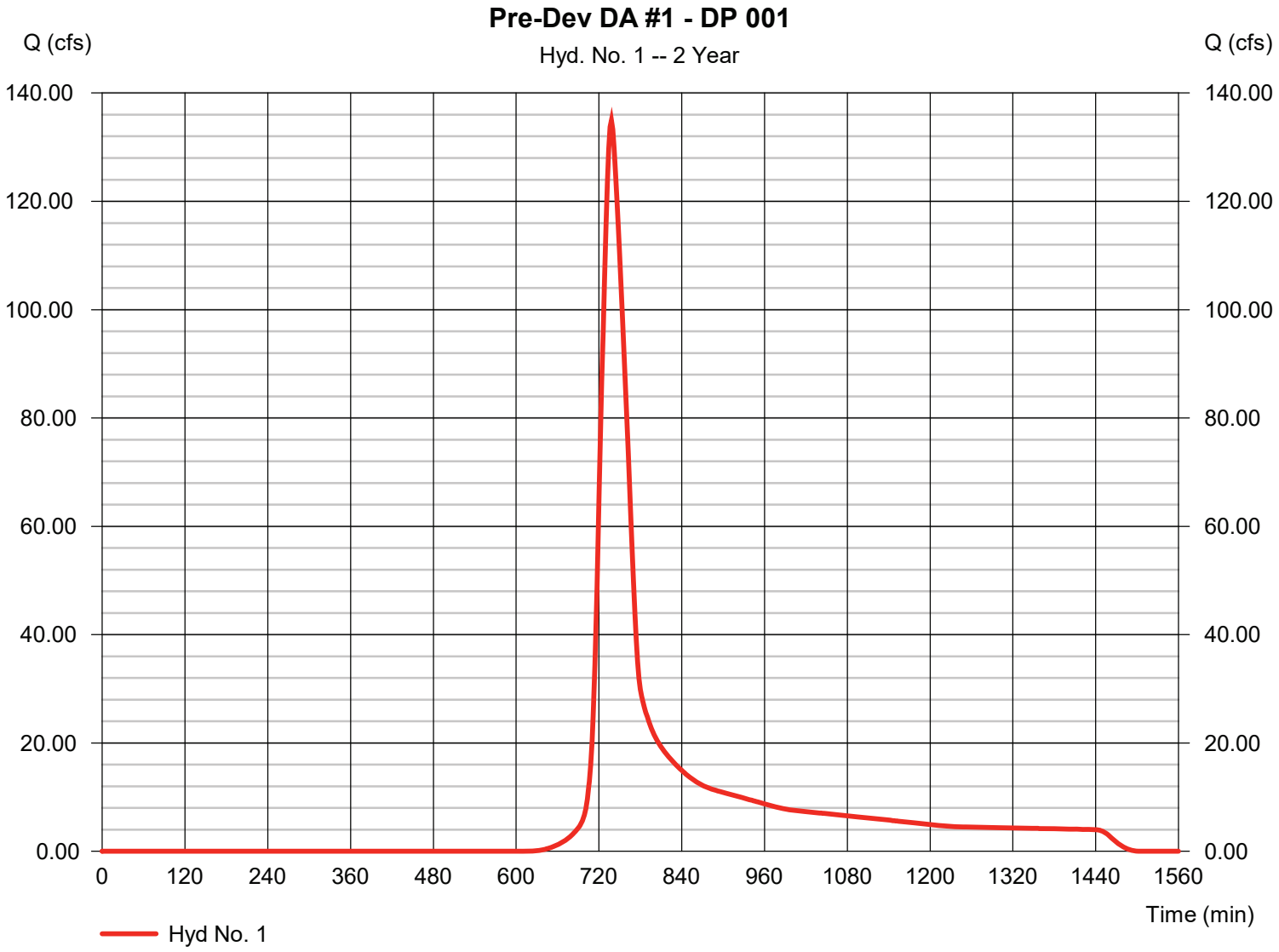
# Hydrograph Report



## Hyd. No. 1

Pre-Dev DA #1 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 134.95 cfs |
| Storm frequency | = 2 yrs | Time to peak | = 738 min |
| Time interval | = 2 min | Hyd. volume | = 681,379 cuft |
| Drainage area | = 149.840 ac | Curve number | = 76.5 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = TR55 | Time of conc. (Tc) | = 37.70 min |
| Total precip. | = 3.30 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



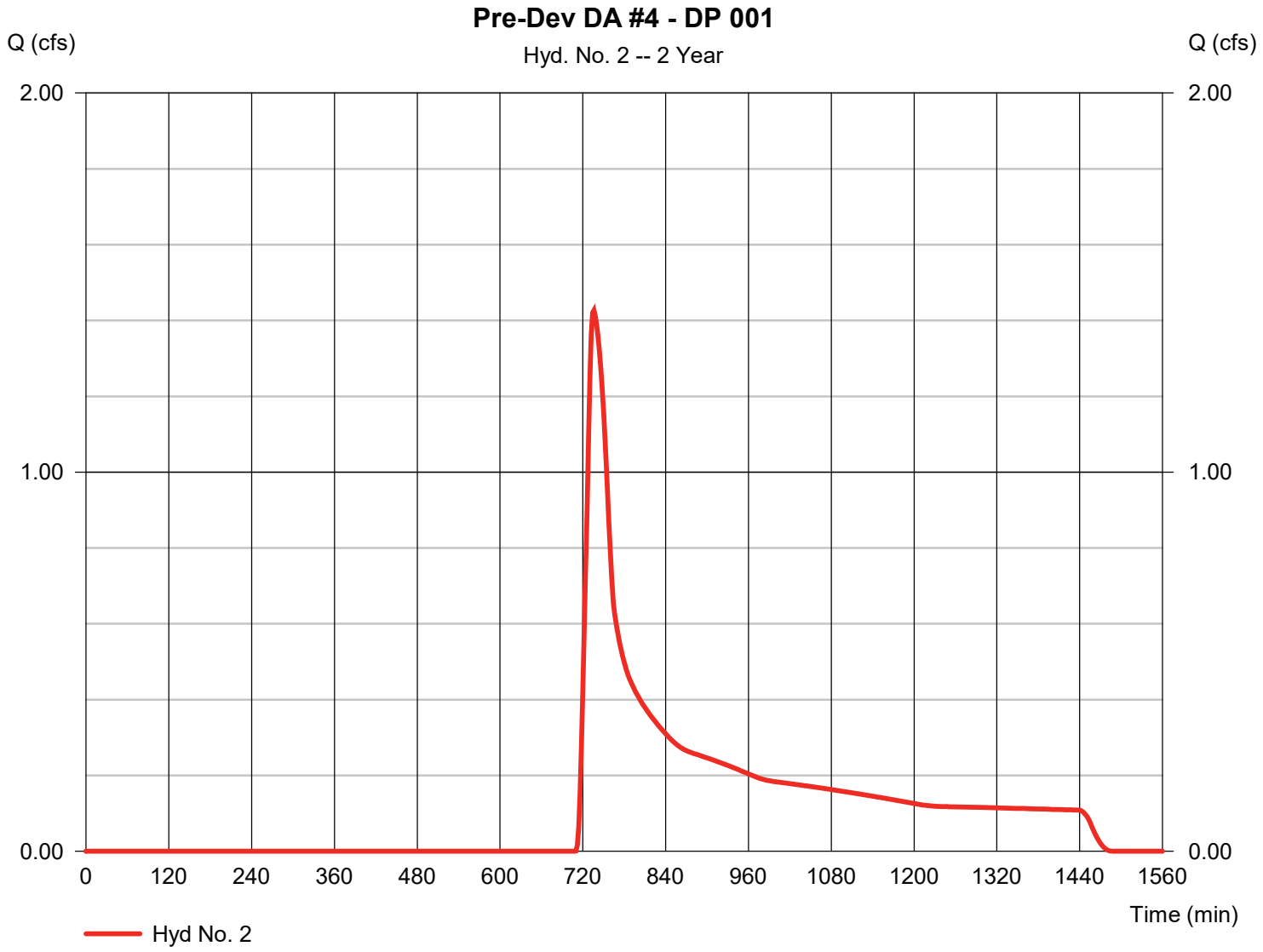
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 2

Pre-Dev DA #4 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 1.427 cfs |
| Storm frequency | = 2 yrs | Time to peak | = 736 min |
| Time interval | = 2 min | Hyd. volume | = 10,785 cuft |
| Drainage area | = 8.180 ac | Curve number | = 57.6 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = TR55 | Time of conc. (Tc) | = 28.25 min |
| Total precip. | = 3.30 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



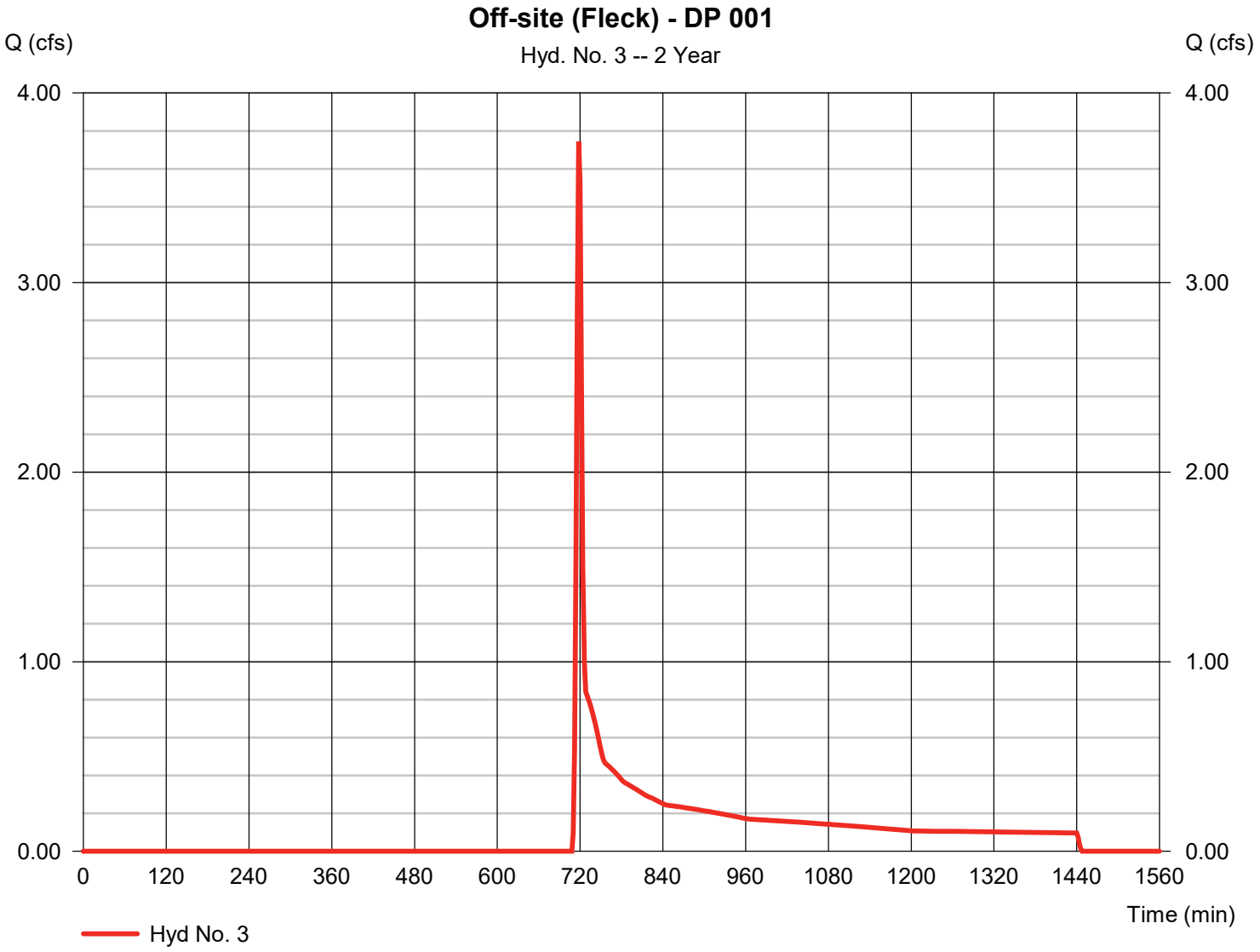
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 3

Off-site (Fleck) - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 3.743 cfs |
| Storm frequency | = 2 yrs | Time to peak | = 718 min |
| Time interval | = 2 min | Hyd. volume | = 10,024 cuft |
| Drainage area | = 7.470 ac | Curve number | = 58.5 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 3.30 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



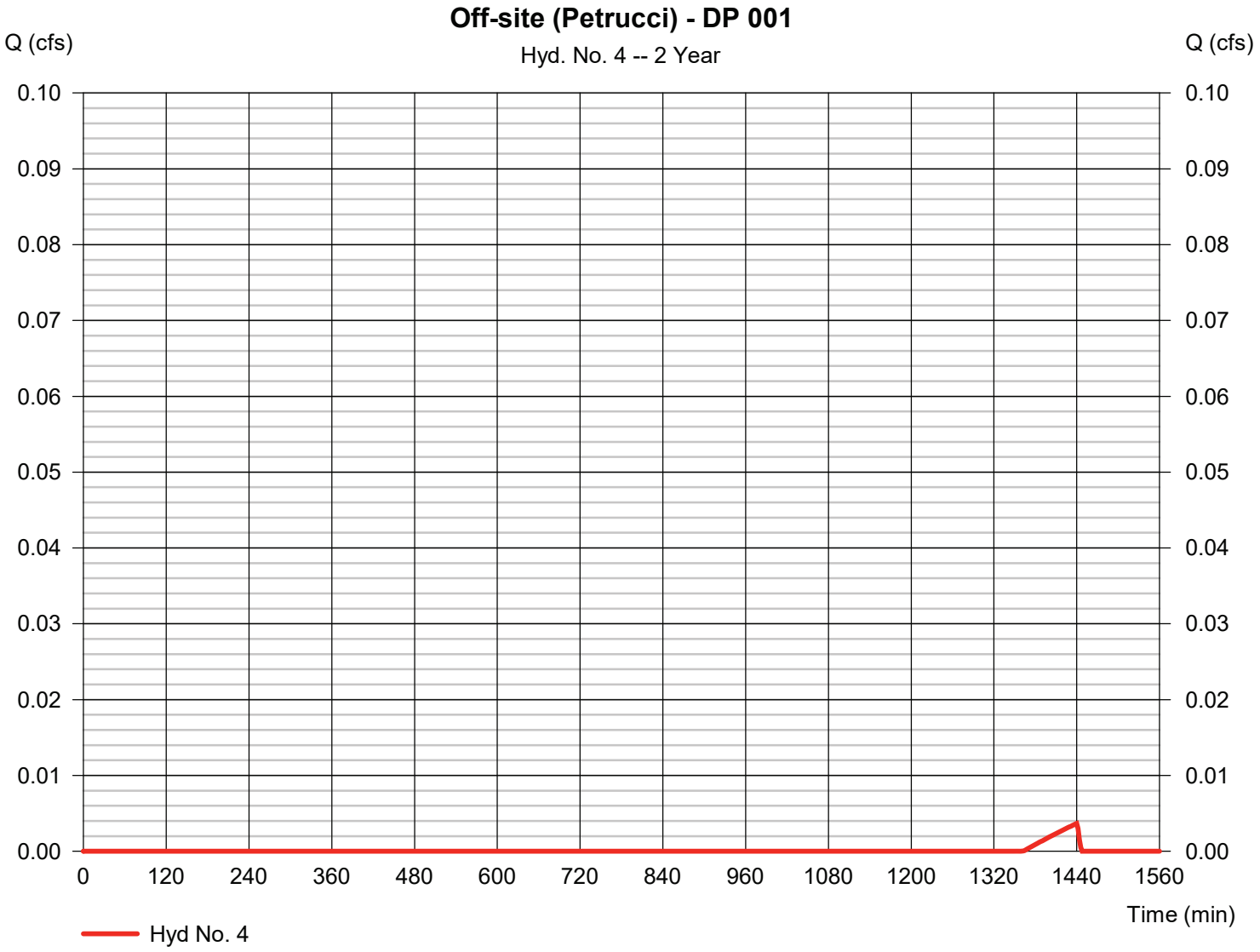
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 4

Off-site (Petrucci) - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 0.004 cfs |
| Storm frequency | = 2 yrs | Time to peak | = 1440 min |
| Time interval | = 2 min | Hyd. volume | = 10 cuft |
| Drainage area | = 18.000 ac | Curve number | = 38.1 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 3.30 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



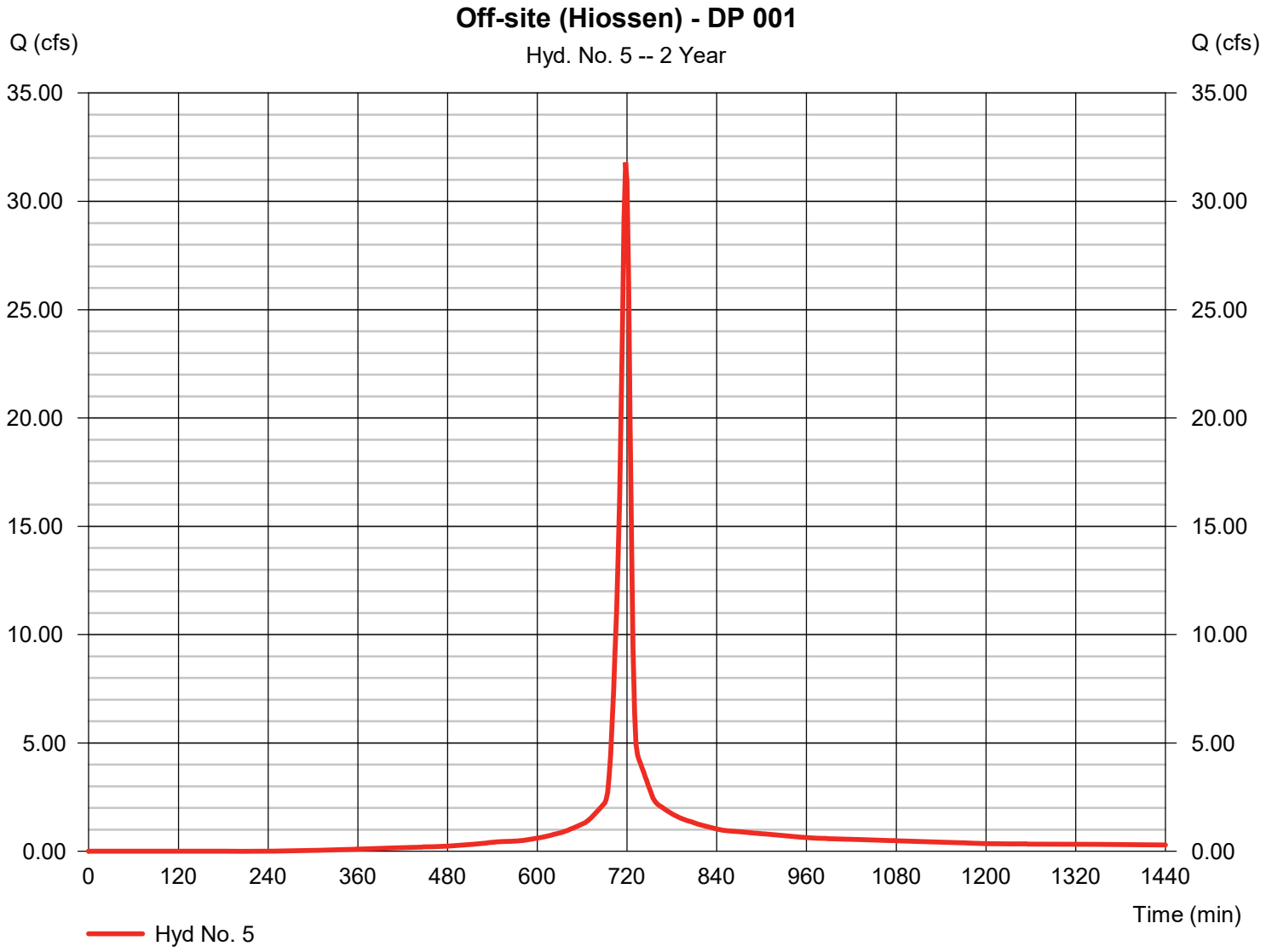
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 5

Off-site (Hiossen) - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 31.80 cfs |
| Storm frequency | = 2 yrs | Time to peak | = 718 min |
| Time interval | = 2 min | Hyd. volume | = 75,942 cuft |
| Drainage area | = 8.390 ac | Curve number | = 92.5 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = TR55 | Time of conc. (Tc) | = 8.90 min |
| Total precip. | = 3.30 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



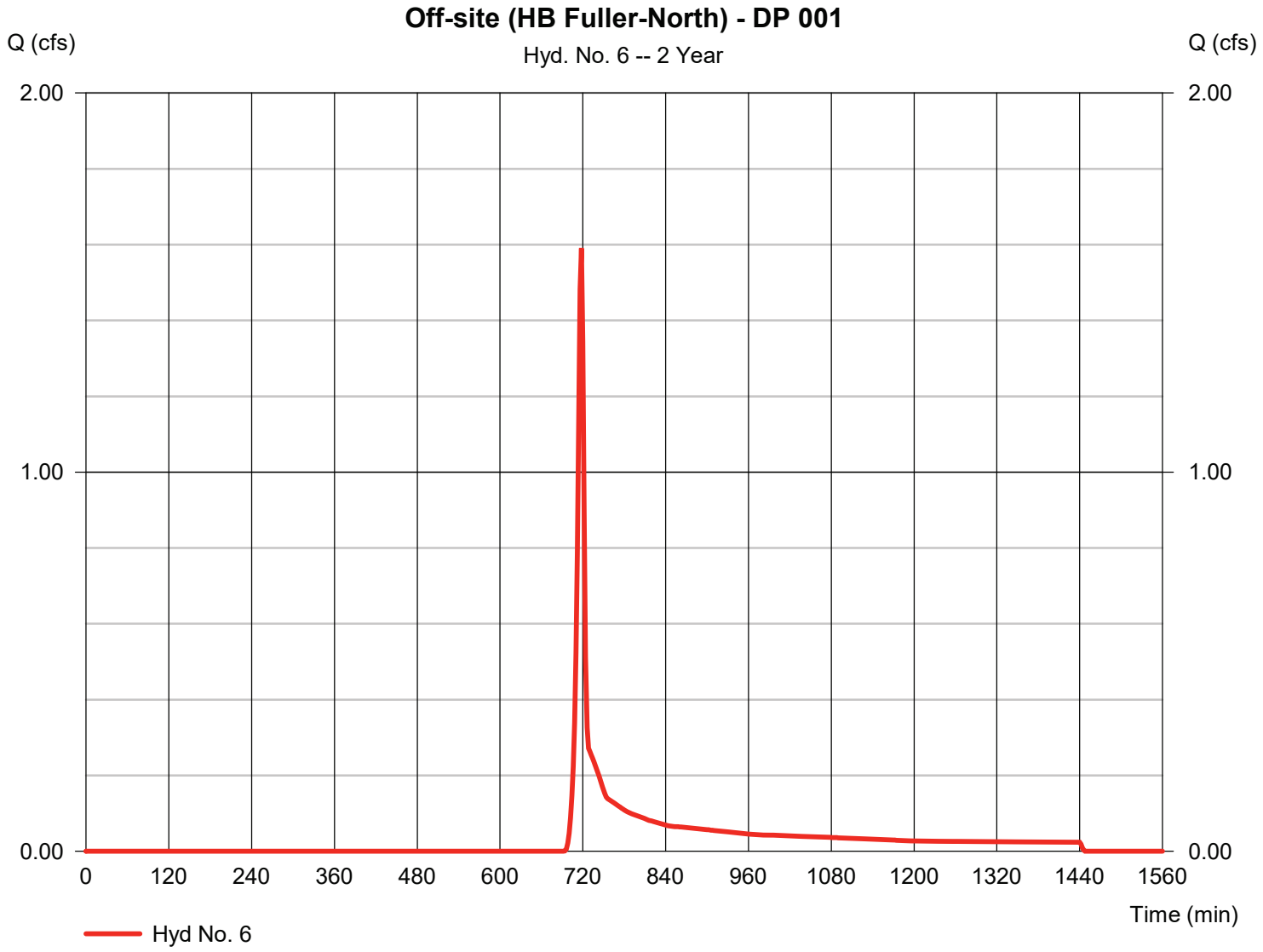
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 6

Off-site (HB Fuller-North) - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 1.591 cfs |
| Storm frequency | = 2 yrs | Time to peak | = 718 min |
| Time interval | = 2 min | Hyd. volume | = 3,283 cuft |
| Drainage area | = 1.240 ac | Curve number | = 67.8 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 3.30 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



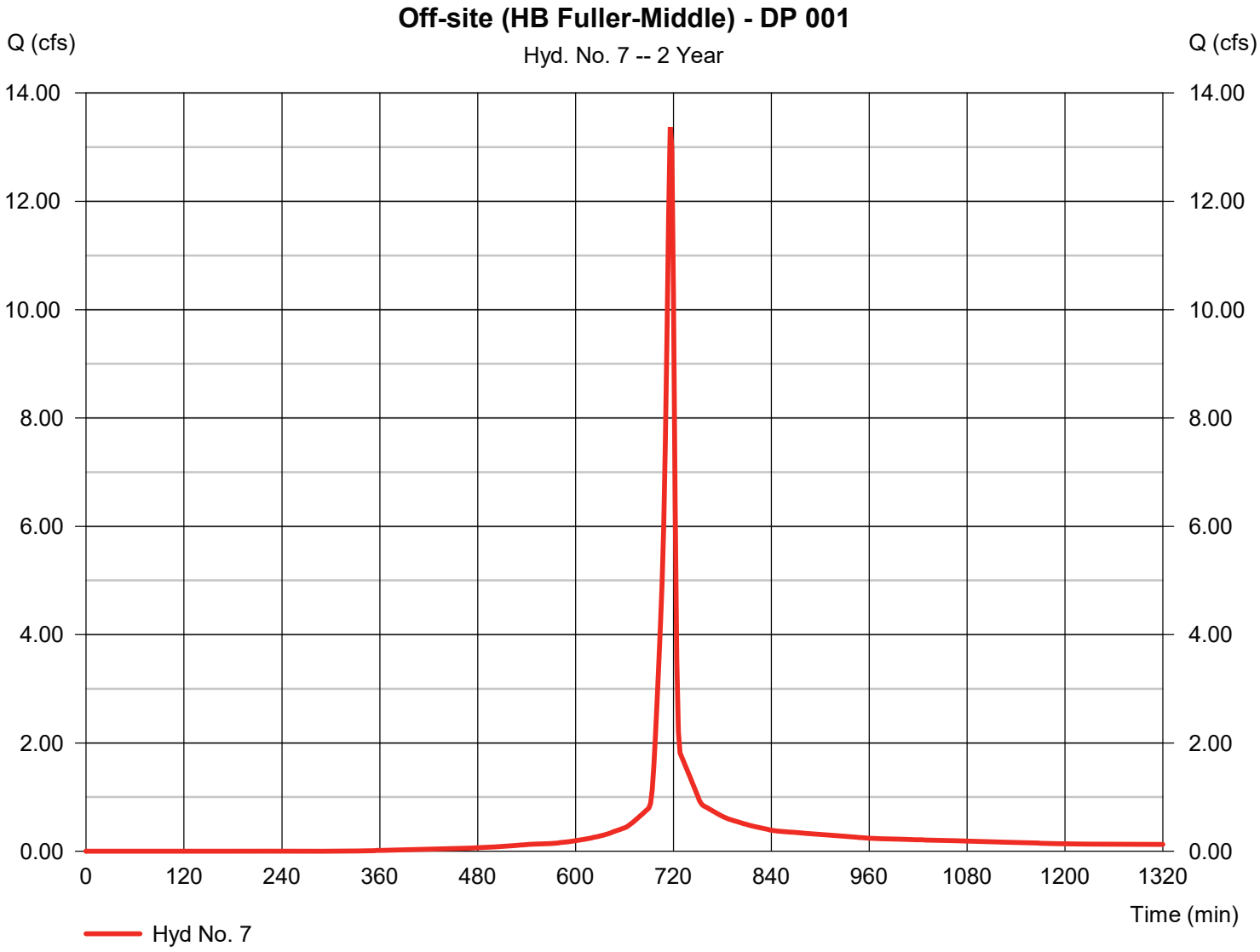
# Hydrograph Report



## Hyd. No. 7

Off-site (HB Fuller-Middle) - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 13.37 cfs |
| Storm frequency | = 2 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 27,847 cuft |
| Drainage area | = 3.590 ac | Curve number | = 90.2 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 3.30 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



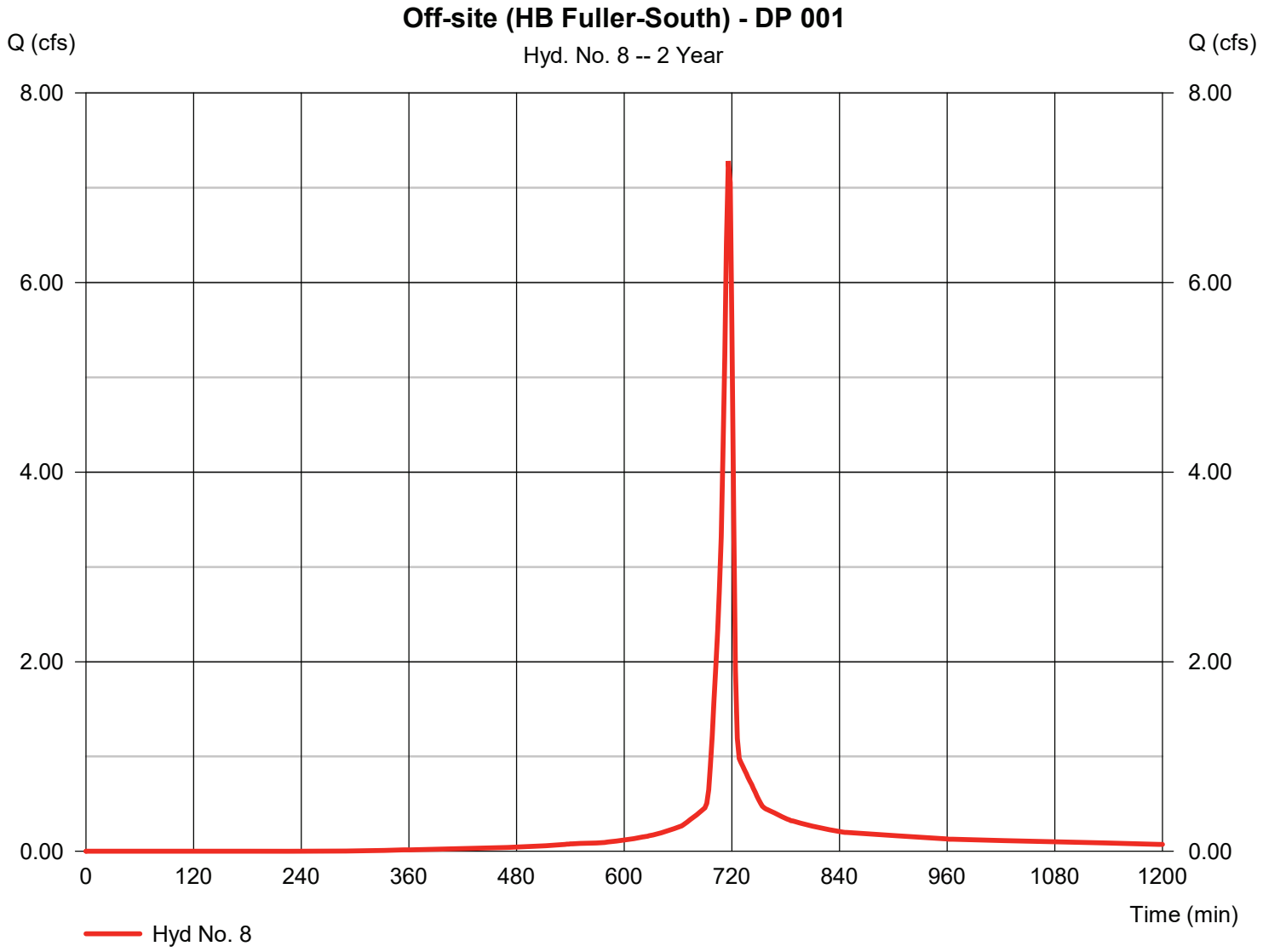
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 8

Off-site (HB Fuller-South) - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 7.284 cfs |
| Storm frequency | = 2 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 15,346 cuft |
| Drainage area | = 1.880 ac | Curve number | = 91.5 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 3.30 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



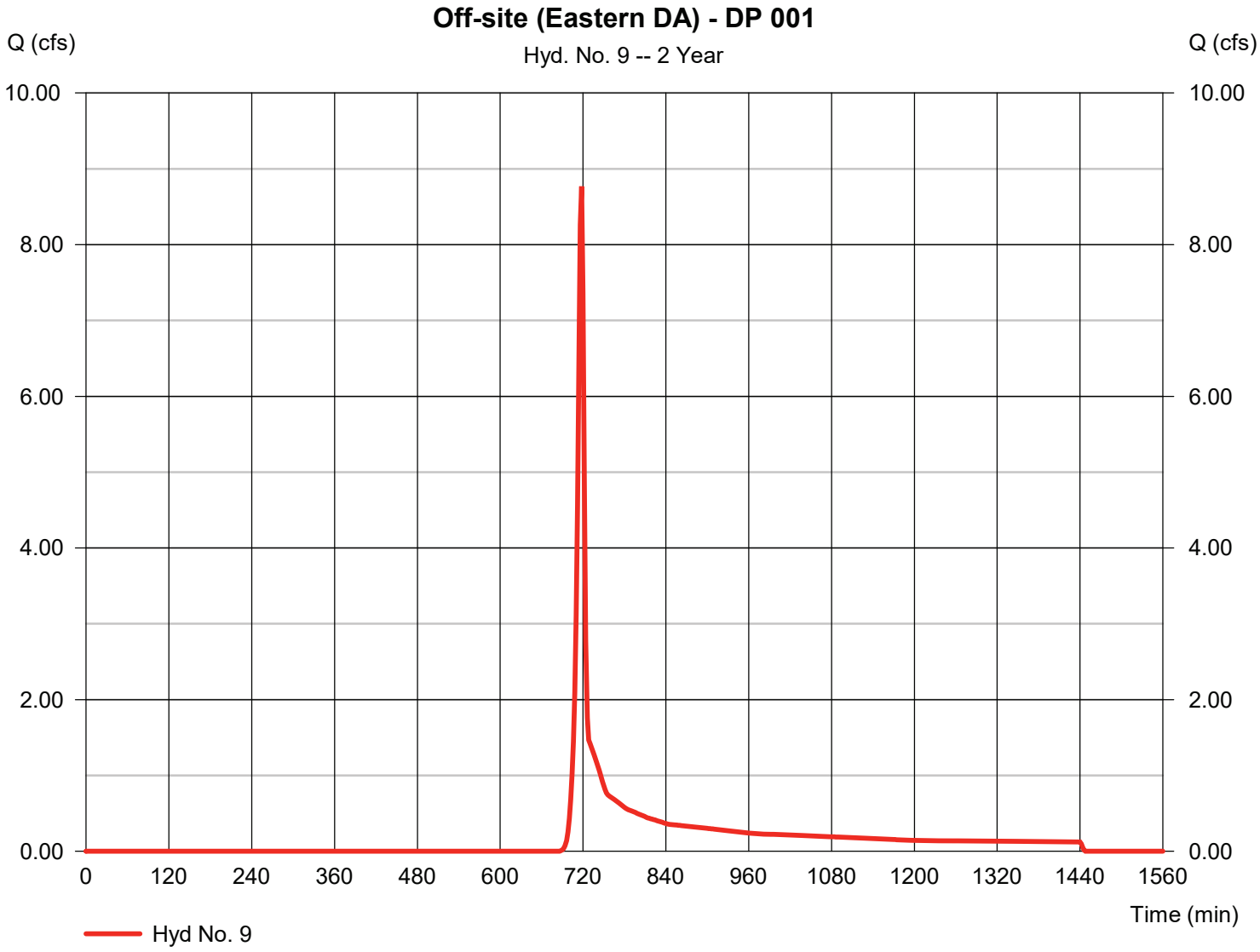
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 9

Off-site (Eastern DA) - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 8.768 cfs |
| Storm frequency | = 2 yrs | Time to peak | = 718 min |
| Time interval | = 2 min | Hyd. volume | = 17,888 cuft |
| Drainage area | = 6.210 ac | Curve number | = 69.2 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 3.30 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



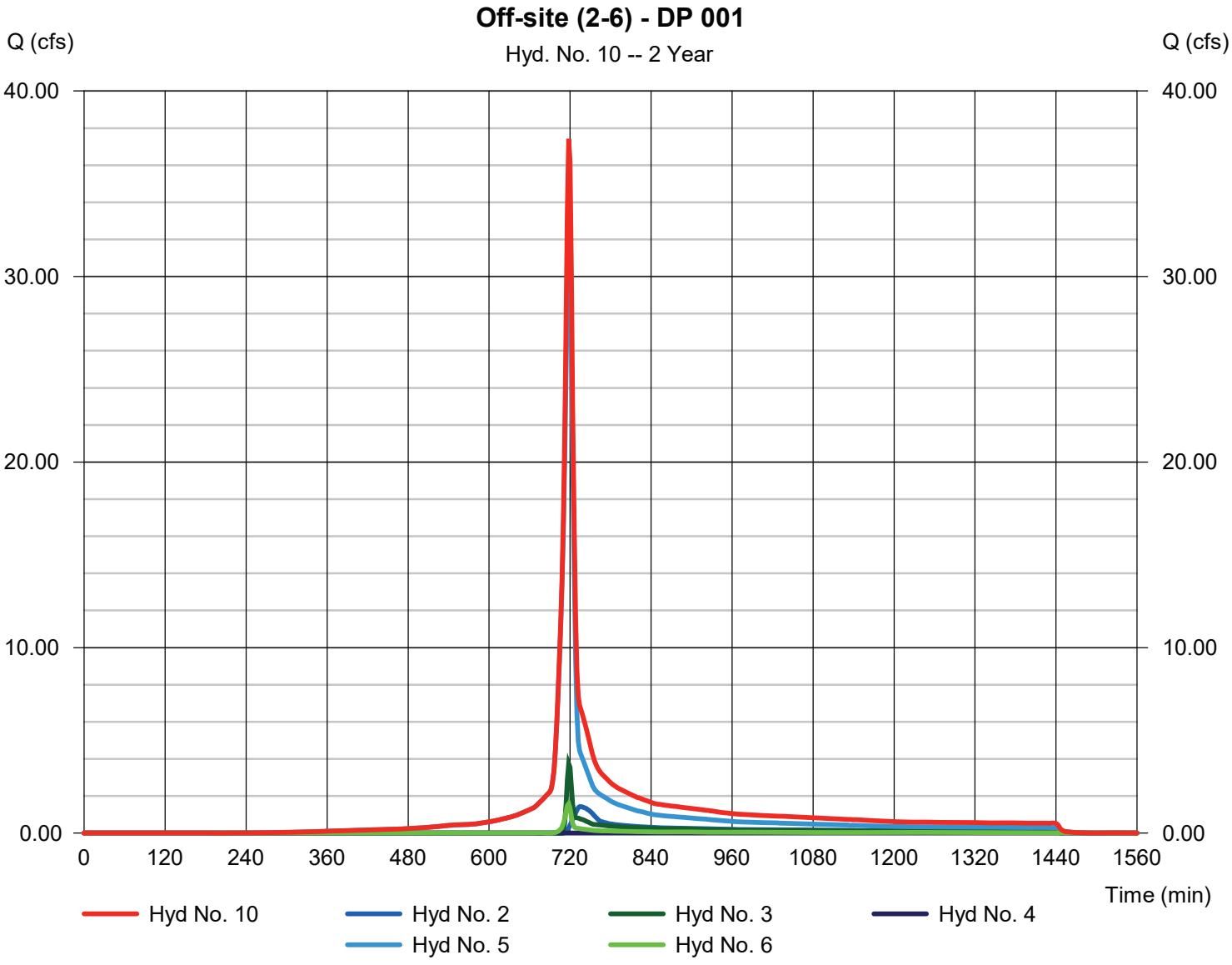
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 10

Off-site (2-6) - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 37.42 cfs |
| Storm frequency | = 2 yrs | Time to peak | = 718 min |
| Time interval | = 2 min | Hyd. volume | = 100,043 cuft |
| Inflow hyds. | = 2, 3, 4, 5, 6 | Contrib. drain. area | = 43.280 ac |



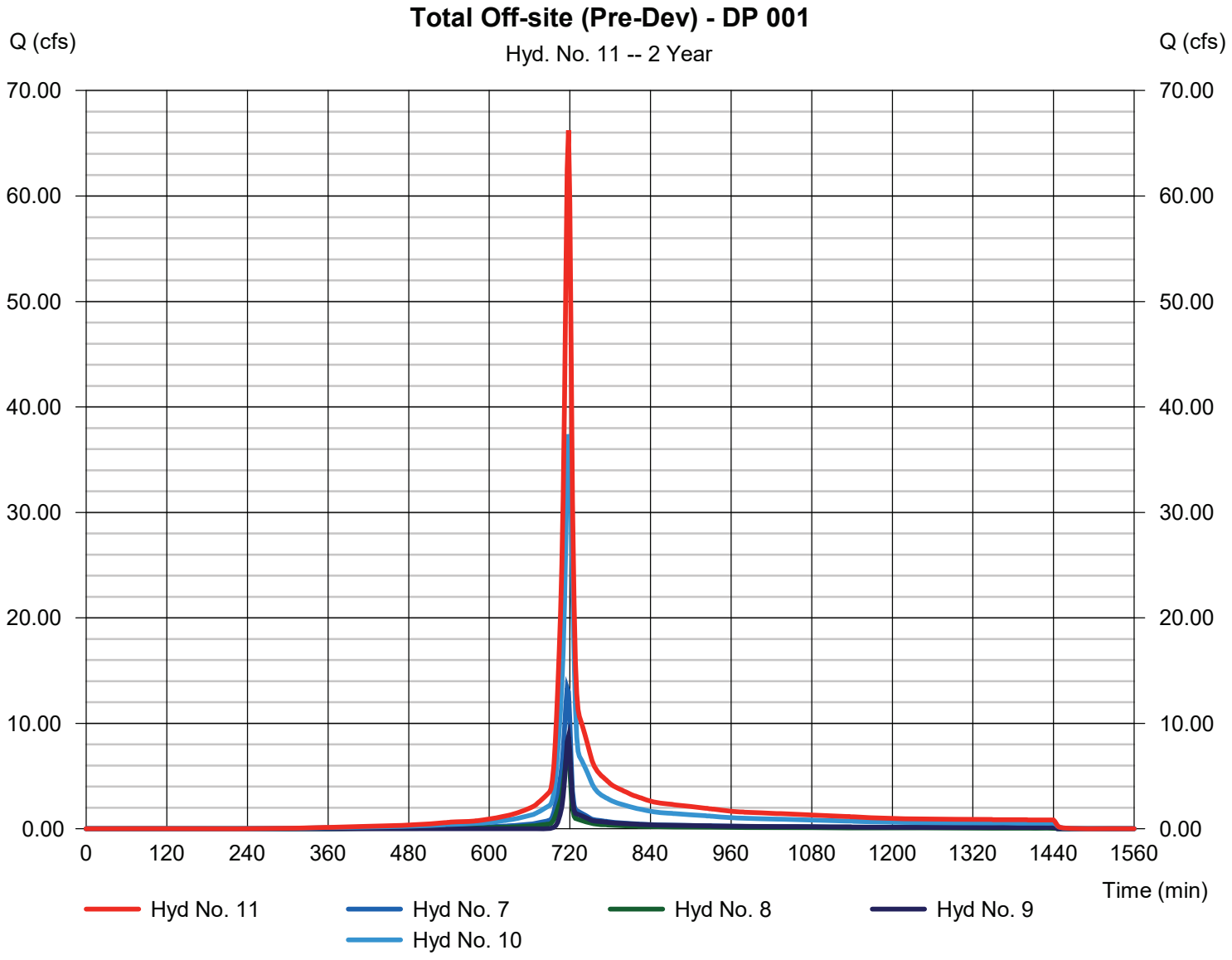
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 11

Total Off-site (Pre-Dev) - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 66.23 cfs |
| Storm frequency | = 2 yrs | Time to peak | = 718 min |
| Time interval | = 2 min | Hyd. volume | = 161,125 cuft |
| Inflow hyds. | = 7, 8, 9, 10 | Contrib. drain. area | = 11.680 ac |



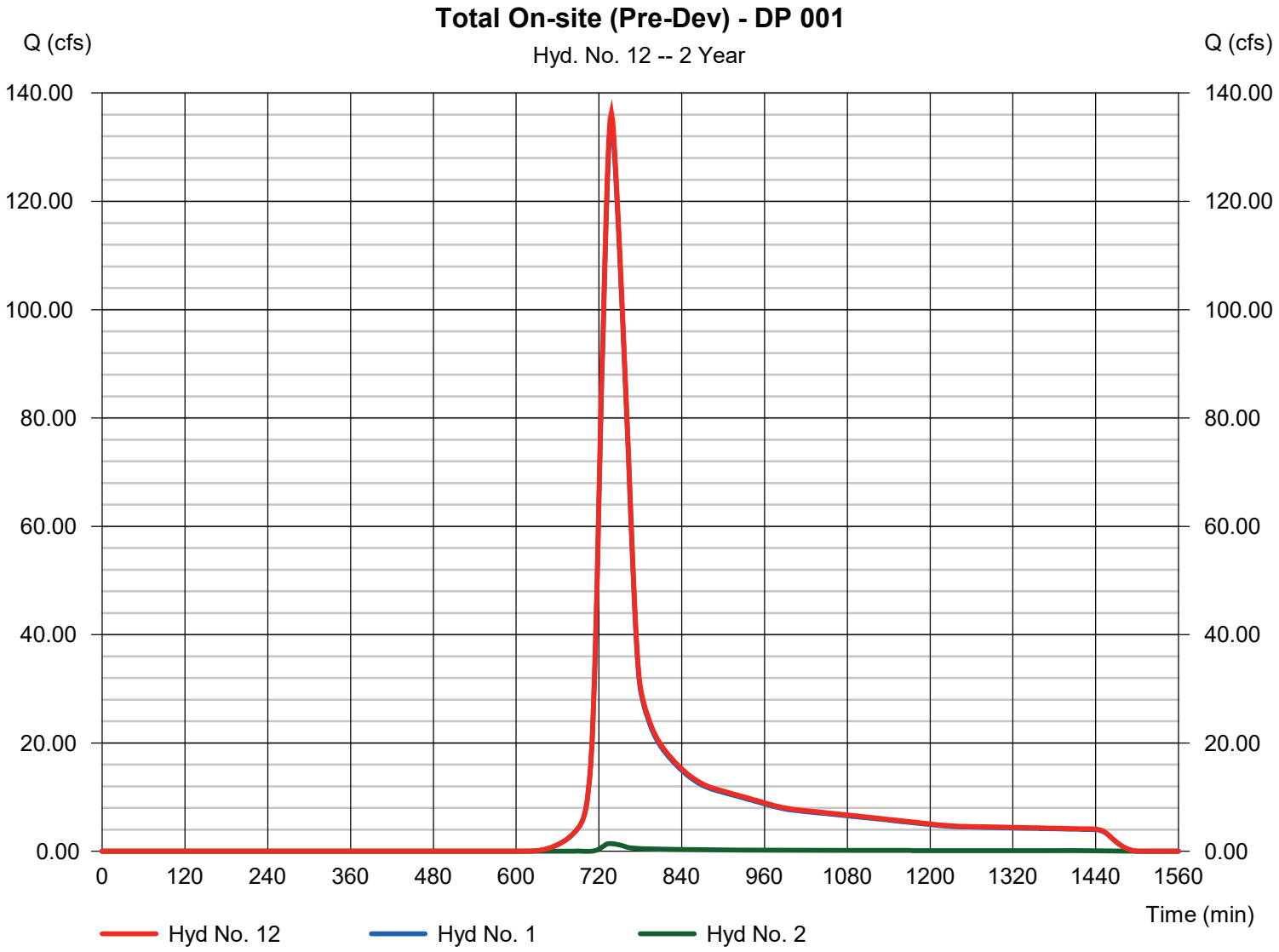
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 12

Total On-site (Pre-Dev) - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 136.36 cfs |
| Storm frequency | = 2 yrs | Time to peak | = 738 min |
| Time interval | = 2 min | Hyd. volume | = 692,164 cuft |
| Inflow hyds. | = 1, 2 | Contrib. drain. area | = 158.020 ac |



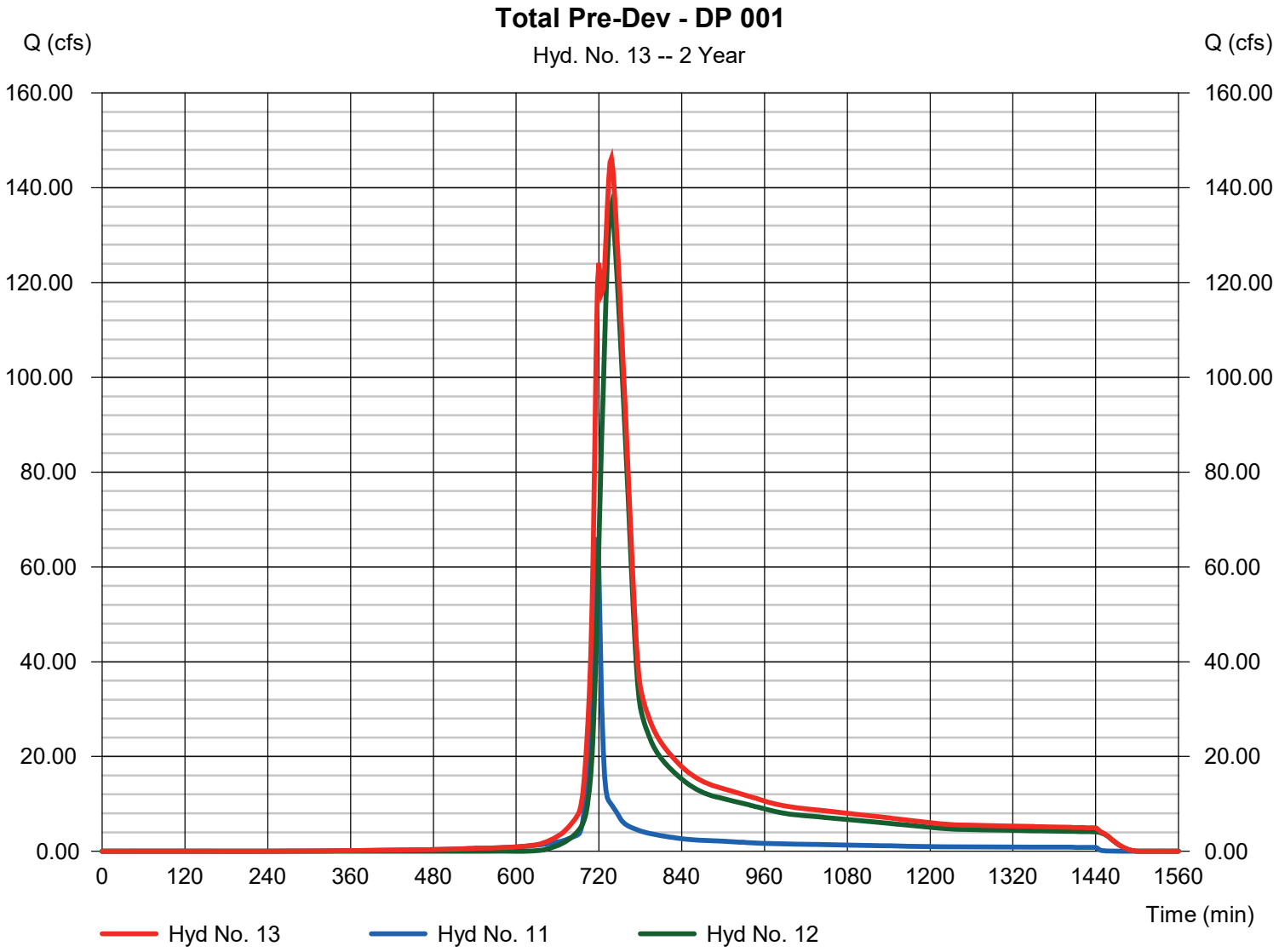
# Hydrograph Report



## Hyd. No. 13

Total Pre-Dev - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 146.22 cfs |
| Storm frequency | = 2 yrs | Time to peak | = 738 min |
| Time interval | = 2 min | Hyd. volume | = 853,289 cuft |
| Inflow hyds. | = 11, 12 | Contrib. drain. area | = 0.000 ac |



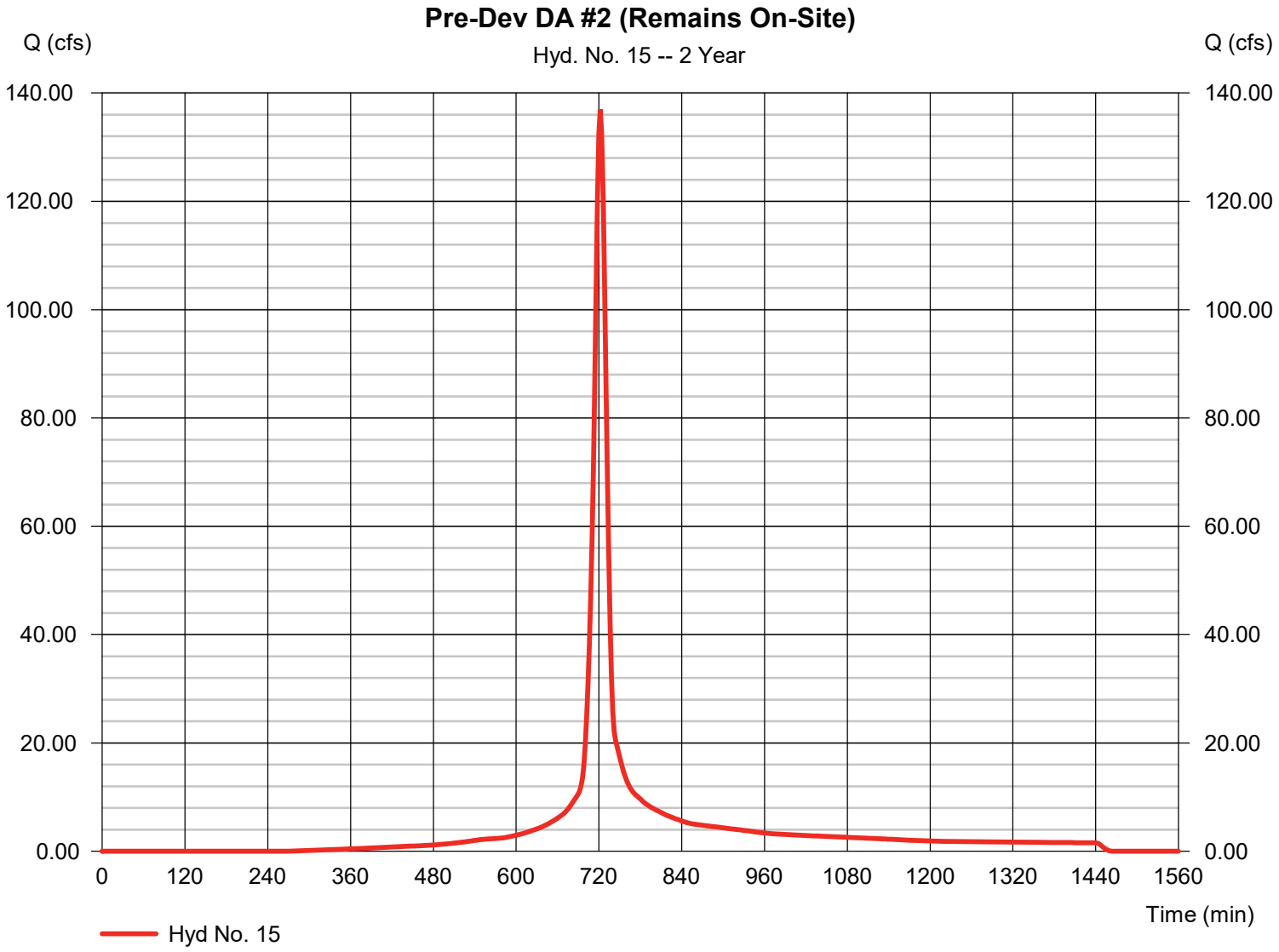
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 15

Pre-Dev DA #2 (Remains On-Site)

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 137.02 cfs |
| Storm frequency | = 2 yrs | Time to peak | = 722 min |
| Time interval | = 2 min | Hyd. volume | = 395,785 cuft |
| Drainage area | = 45.370 ac | Curve number | = 92.2 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = TR55 | Time of conc. (Tc) | = 13.40 min |
| Total precip. | = 3.30 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



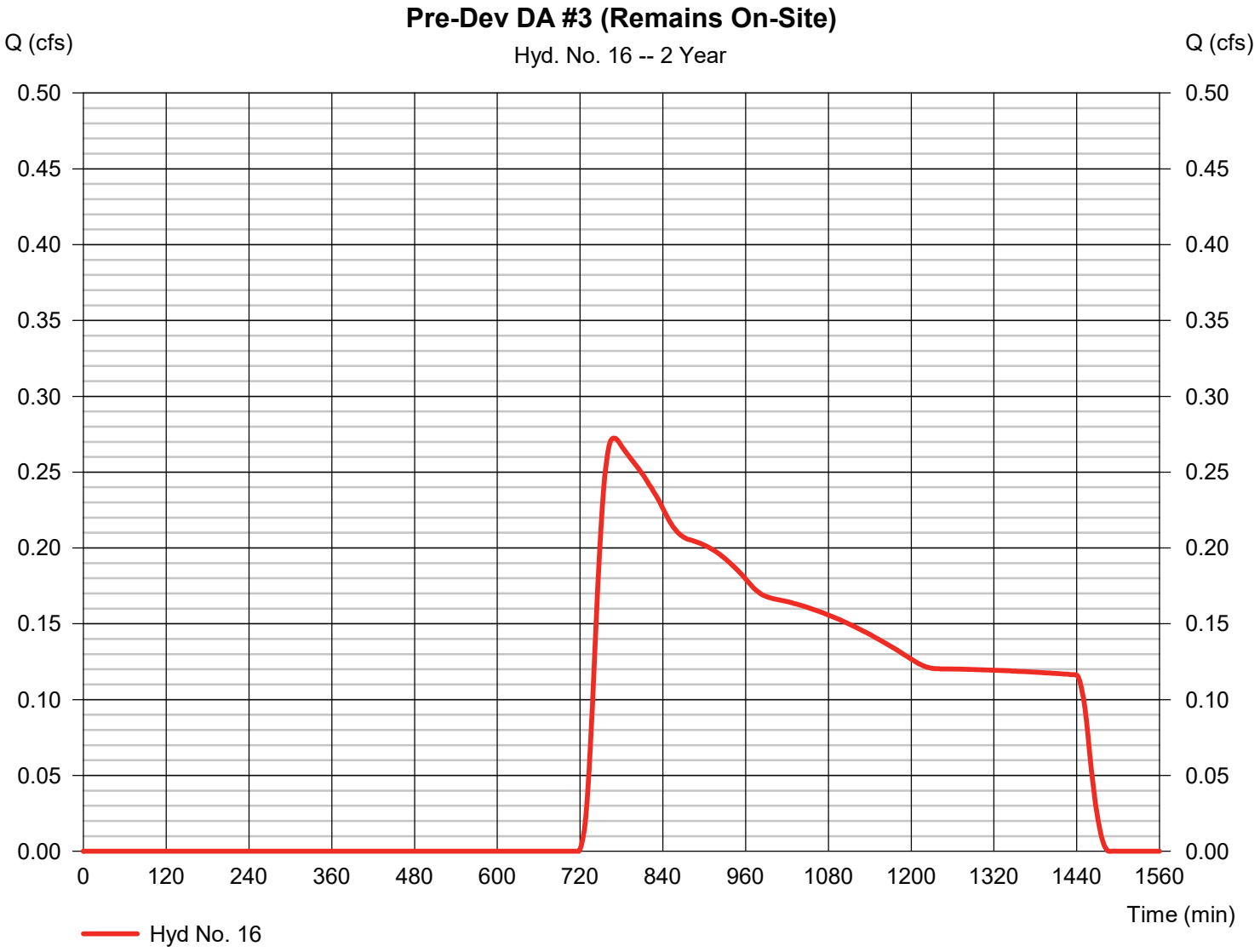
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 16

Pre-Dev DA #3 (Remains On-Site)

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 0.272 cfs |
| Storm frequency | = 2 yrs | Time to peak | = 768 min |
| Time interval | = 2 min | Hyd. volume | = 7,039 cuft |
| Drainage area | = 16.820 ac | Curve number | = 48.4 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = TR55 | Time of conc. (Tc) | = 29.90 min |
| Total precip. | = 3.30 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



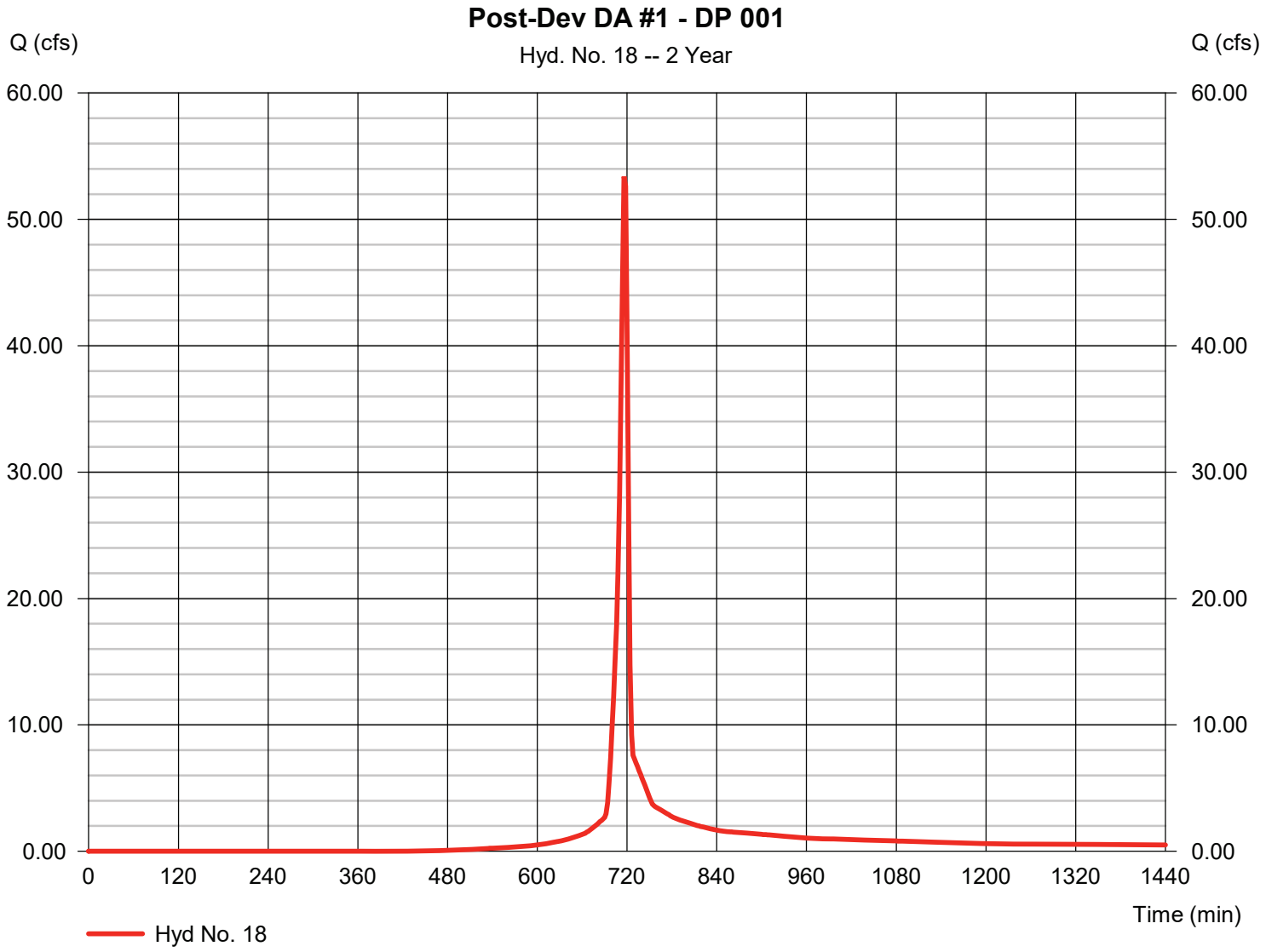
# Hydrograph Report



## Hyd. No. 18

Post-Dev DA #1 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 53.40 cfs |
| Storm frequency | = 2 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 108,532 cuft |
| Drainage area | = 16.870 ac | Curve number | = 85.6 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 3.30 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



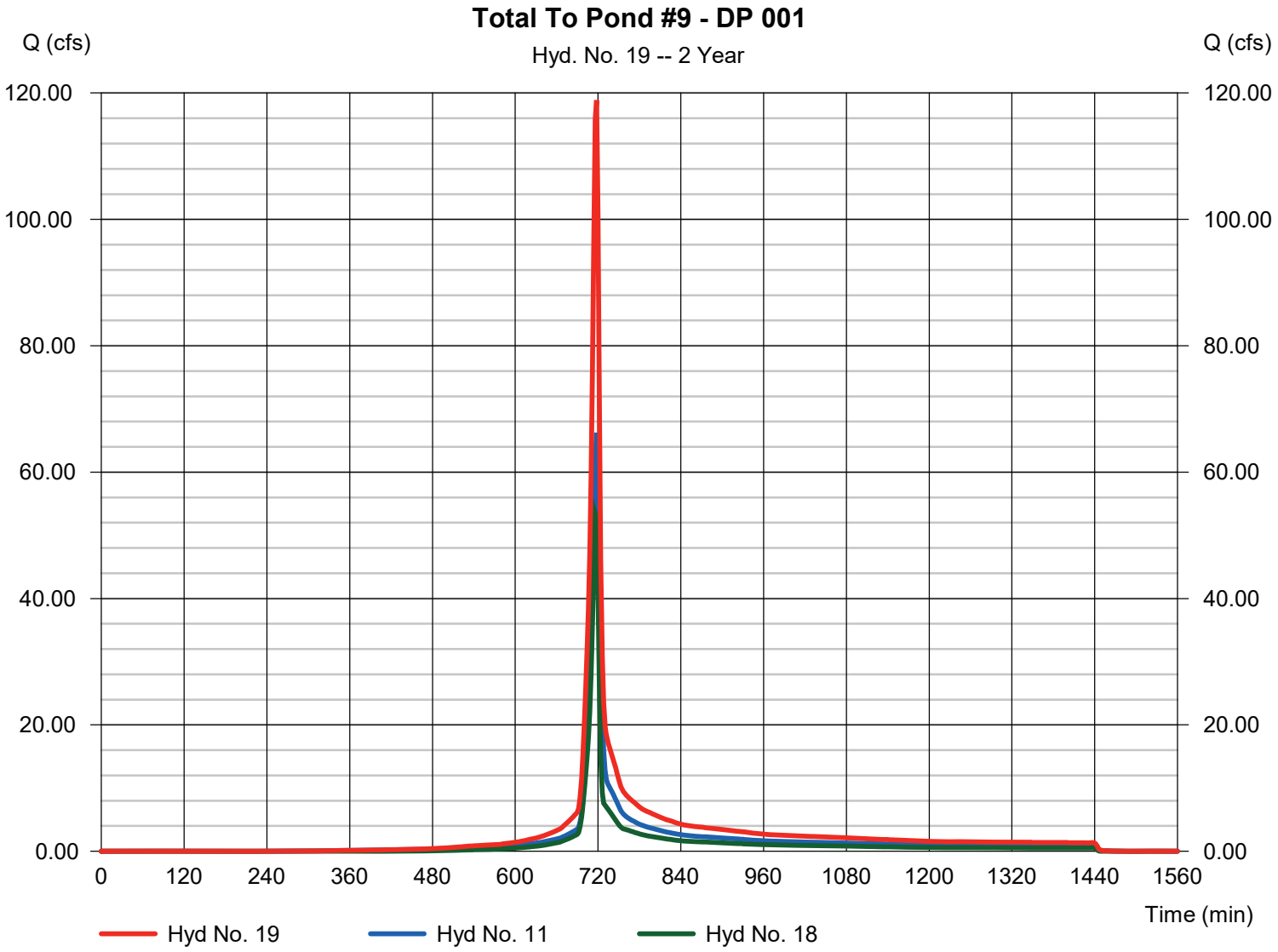
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 19

Total To Pond #9 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 118.86 cfs |
| Storm frequency | = 2 yrs | Time to peak | = 718 min |
| Time interval | = 2 min | Hyd. volume | = 269,657 cuft |
| Inflow hyds. | = 11, 18 | Contrib. drain. area | = 16.870 ac |



# Hydrograph Report

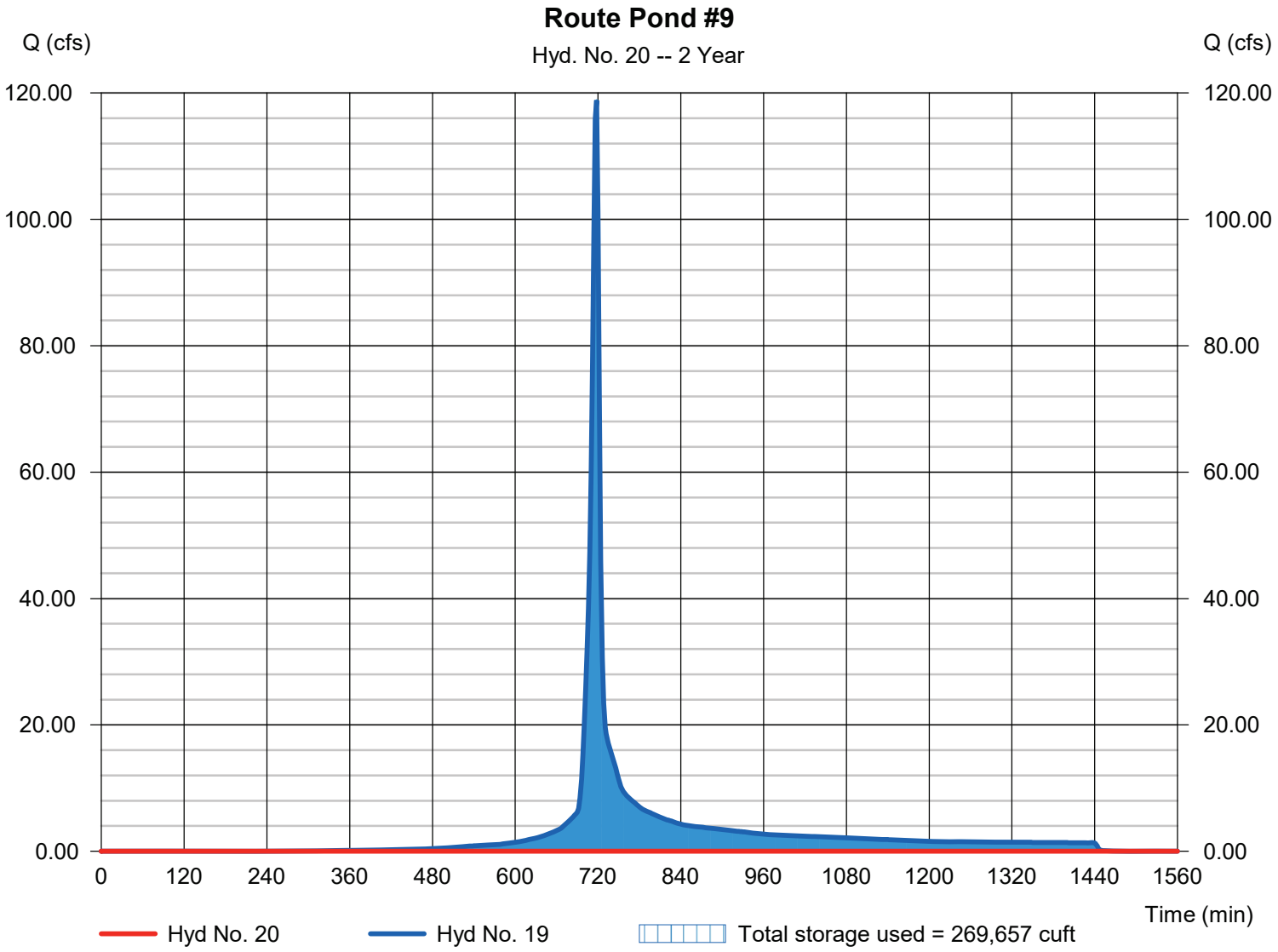
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 20

Route Pond #9

| | | | |
|---|---|---|---|
| Hydrograph type | = Reservoir | Peak discharge | = 0.000 cfs |
| Storm frequency | = 2 yrs | Time to peak | = n/a |
| Time interval | = 2 min | Hyd. volume | = 0 cuft |
| Inflow hyd. No. | = 19 - Total To Pond #9 - DP 001 | Max. Elevation | = 11.01 ft |
| Reservoir name | = Wet Pond #9 | Max. Storage | = 269,657 cuft |

Storage Indication method used.



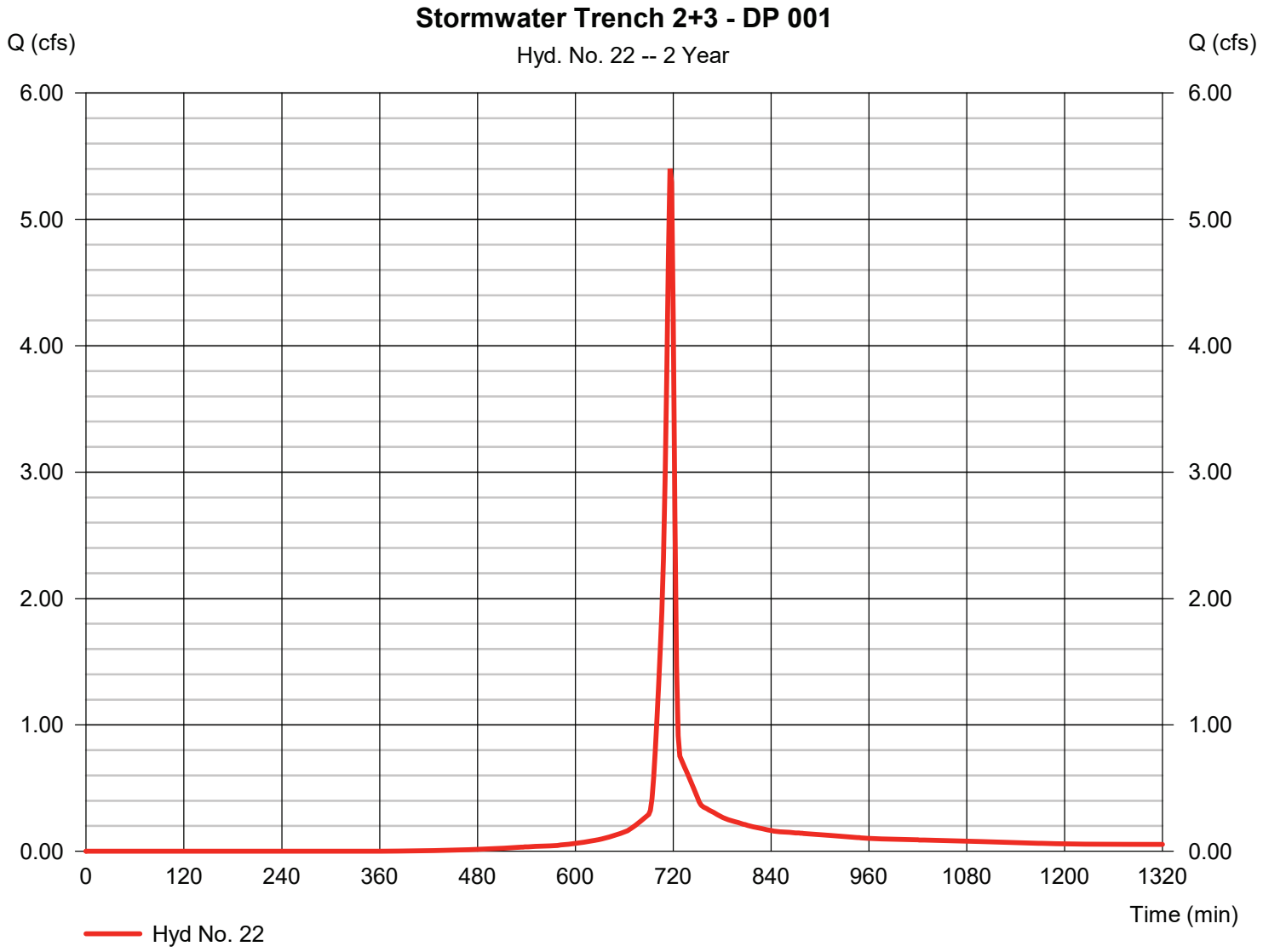
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 22

Stormwater Trench 2+3 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 5.403 cfs |
| Storm frequency | = 2 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 11,066 cuft |
| Drainage area | = 1.590 ac | Curve number | = 87.5 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 3.30 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



# Hydrograph Report

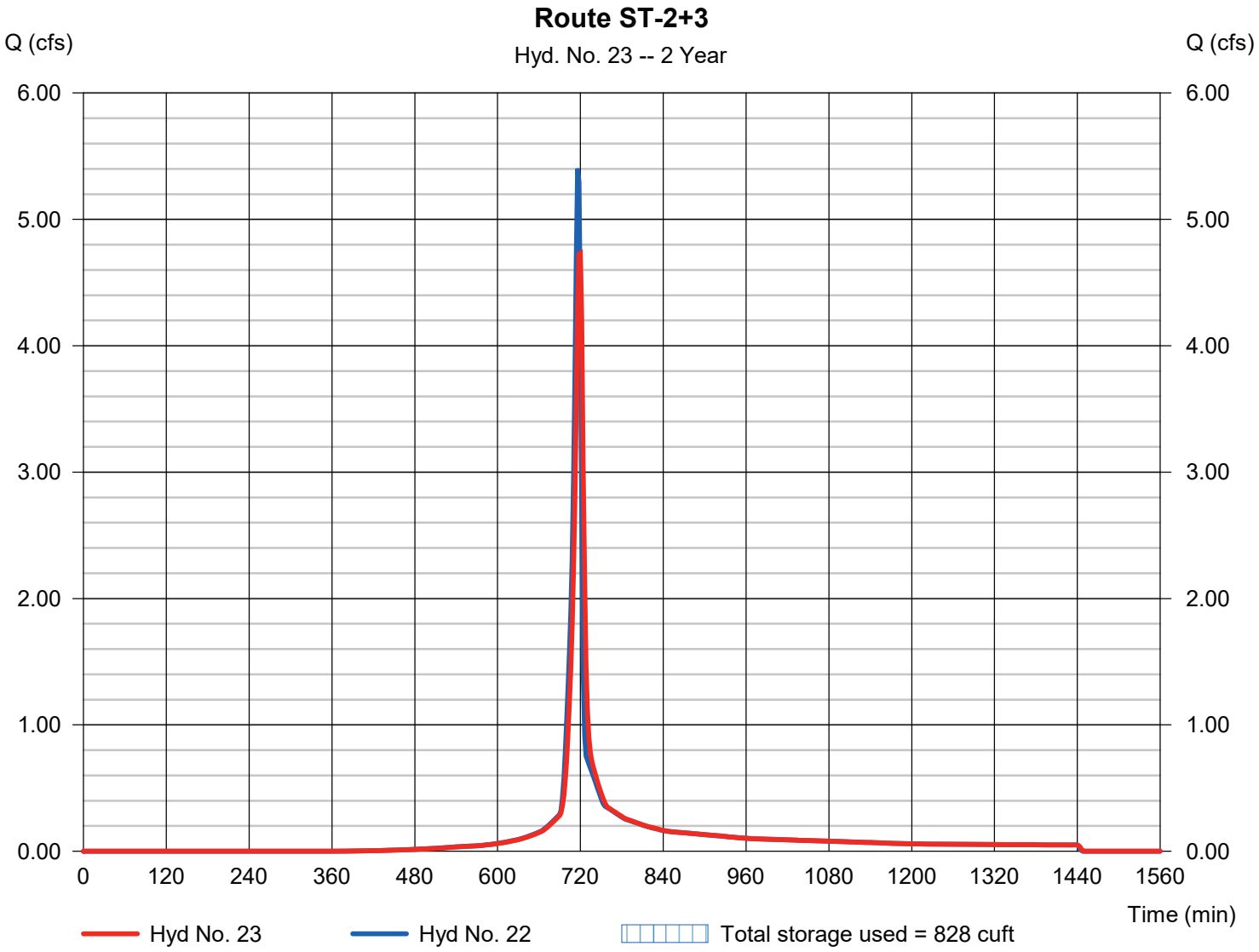
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 23

Route ST-2+3

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | Reservoir | Peak discharge | = | 4.730 cfs |
| Storm frequency | = | 2 yrs | Time to peak | = | 720 min |
| Time interval | = | 2 min | Hyd. volume | = | 11,066 cuft |
| Inflow hyd. No. | = | 22 - Stormwater Trench 2+3 - DP-03 | Max. Elevation | = | 16.18 ft |
| Reservoir name | = | Stormwater Trench ST-2+3 | Max. Storage | = | 828 cuft |

Storage Indication method used.



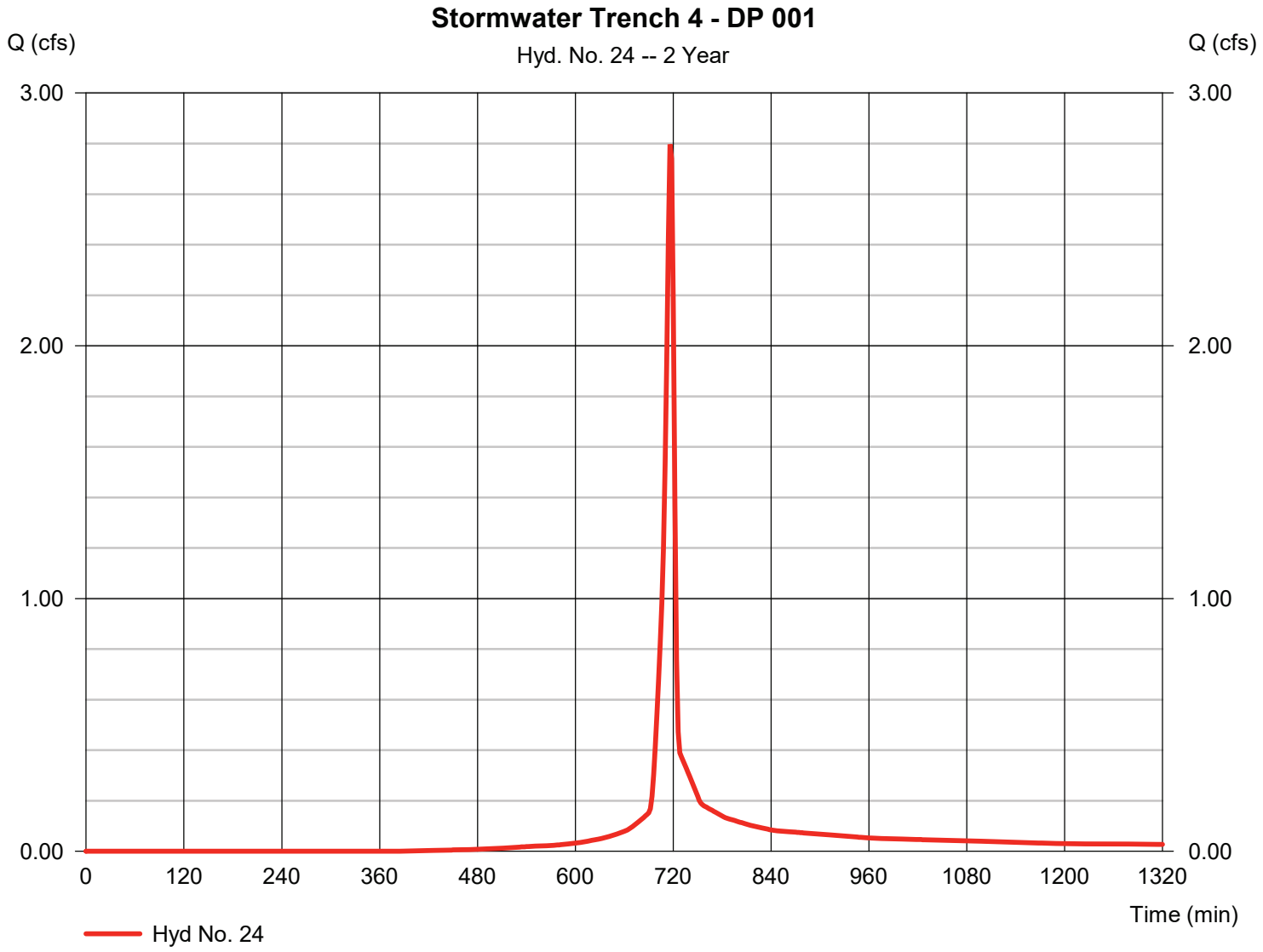
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 24

Stormwater Trench 4 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 2.796 cfs |
| Storm frequency | = 2 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 5,730 cuft |
| Drainage area | = 0.820 ac | Curve number | = 87.6 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 3.30 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



# Hydrograph Report

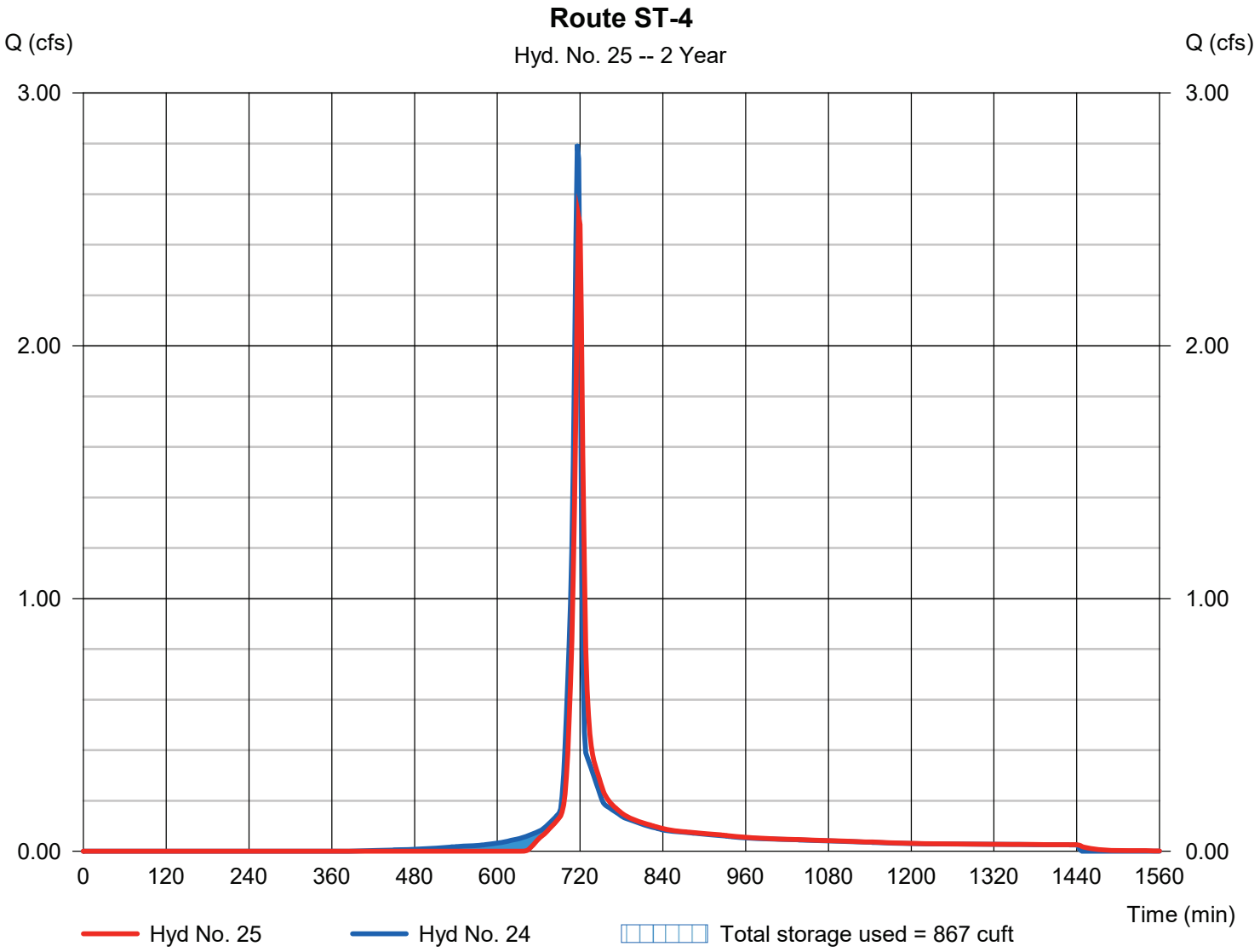
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 25

Route ST-4

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | Reservoir | Peak discharge | = | 2.509 cfs |
| Storm frequency | = | 2 yrs | Time to peak | = | 718 min |
| Time interval | = | 2 min | Hyd. volume | = | 5,476 cuft |
| Inflow hyd. No. | = | 24 - Stormwater Trench 4 - DP001 | Max. Elevation | = | 16.58 ft |
| Reservoir name | = | Stormwater Trench ST-4 | Max. Storage | = | 867 cuft |

Storage Indication method used.



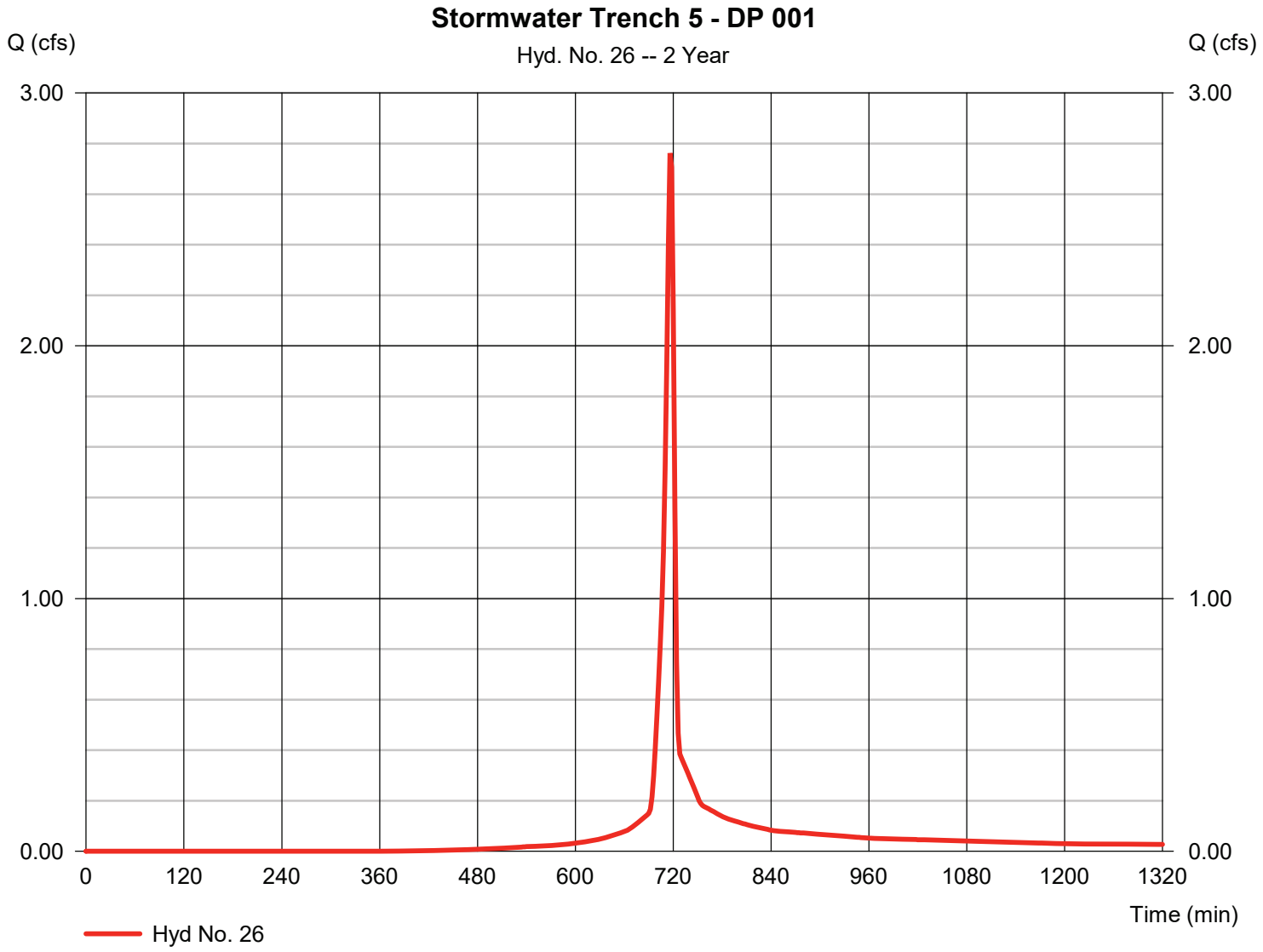
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 26

Stormwater Trench 5 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 2.762 cfs |
| Storm frequency | = 2 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 5,660 cuft |
| Drainage area | = 0.810 ac | Curve number | = 87.6 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 3.30 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



# Hydrograph Report

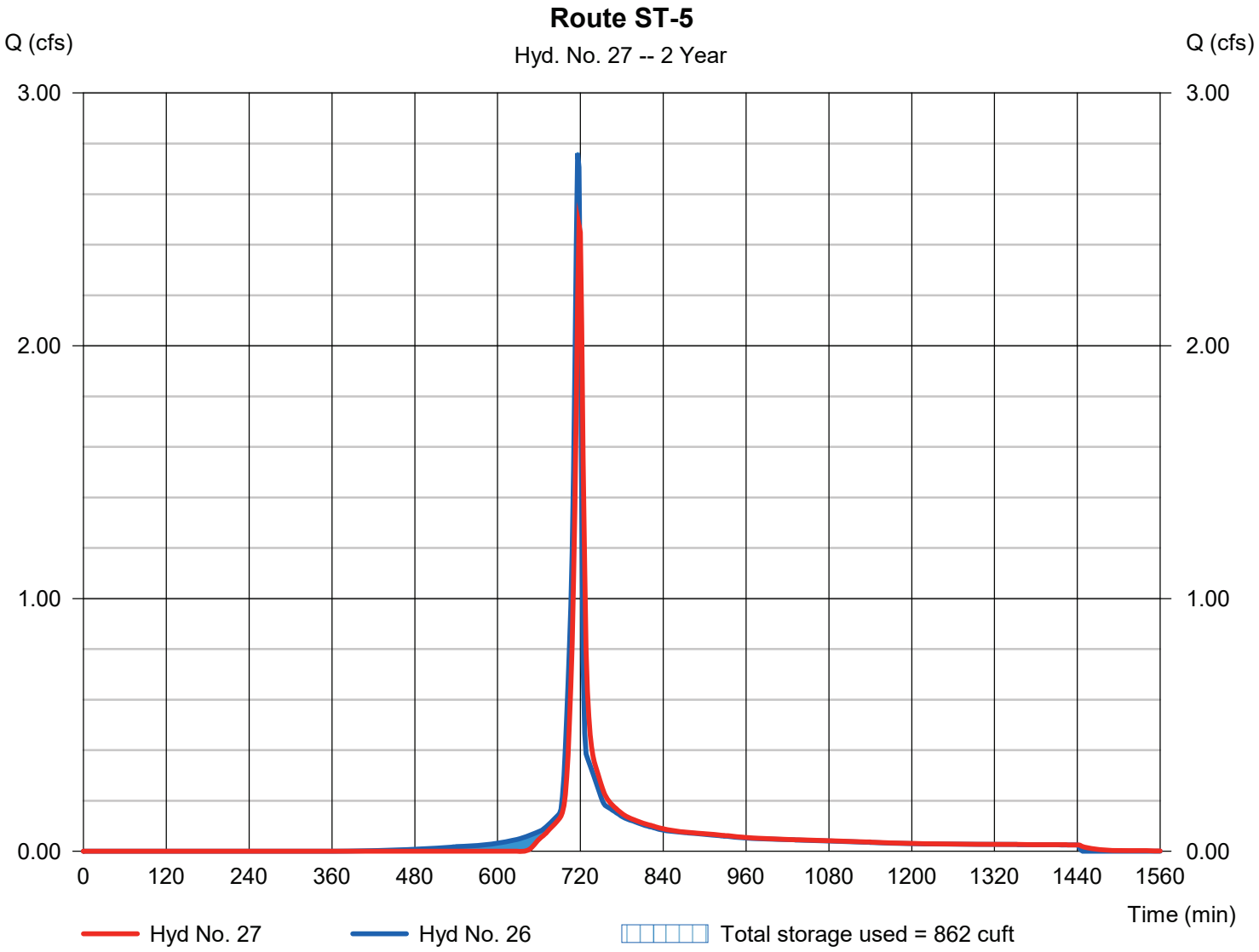
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 27

Route ST-5

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | Reservoir | Peak discharge | = | 2.477 cfs |
| Storm frequency | = | 2 yrs | Time to peak | = | 718 min |
| Time interval | = | 2 min | Hyd. volume | = | 5,406 cuft |
| Inflow hyd. No. | = | 26 - Stormwater Trench 5 - DP001 | Max. Elevation | = | 16.58 ft |
| Reservoir name | = | Stormwater Trench ST-5 | Max. Storage | = | 862 cuft |

Storage Indication method used.



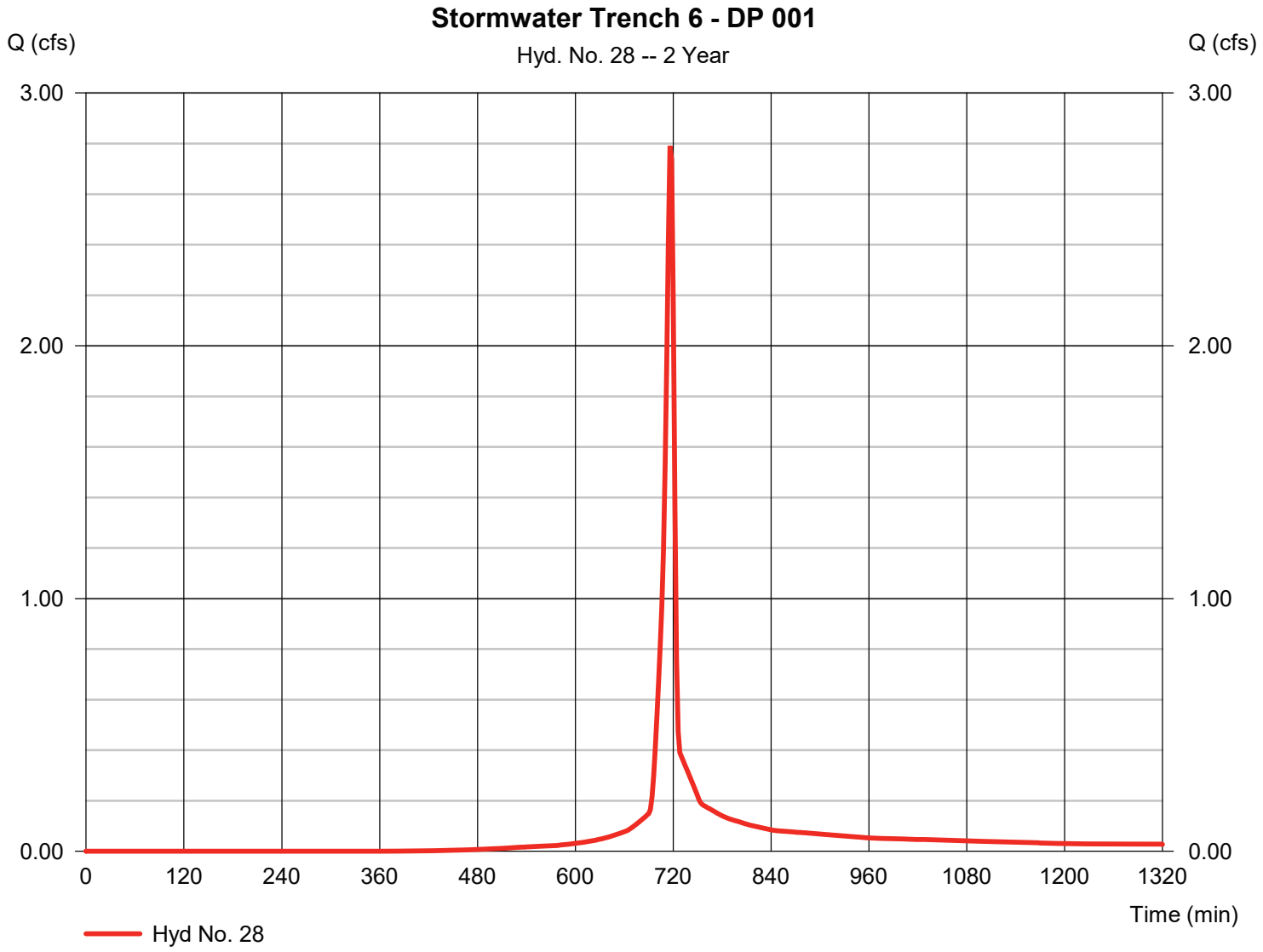
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 28

Stormwater Trench 6 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 2.790 cfs |
| Storm frequency | = 2 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 5,706 cuft |
| Drainage area | = 0.830 ac | Curve number | = 87.2 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 3.30 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



# Hydrograph Report

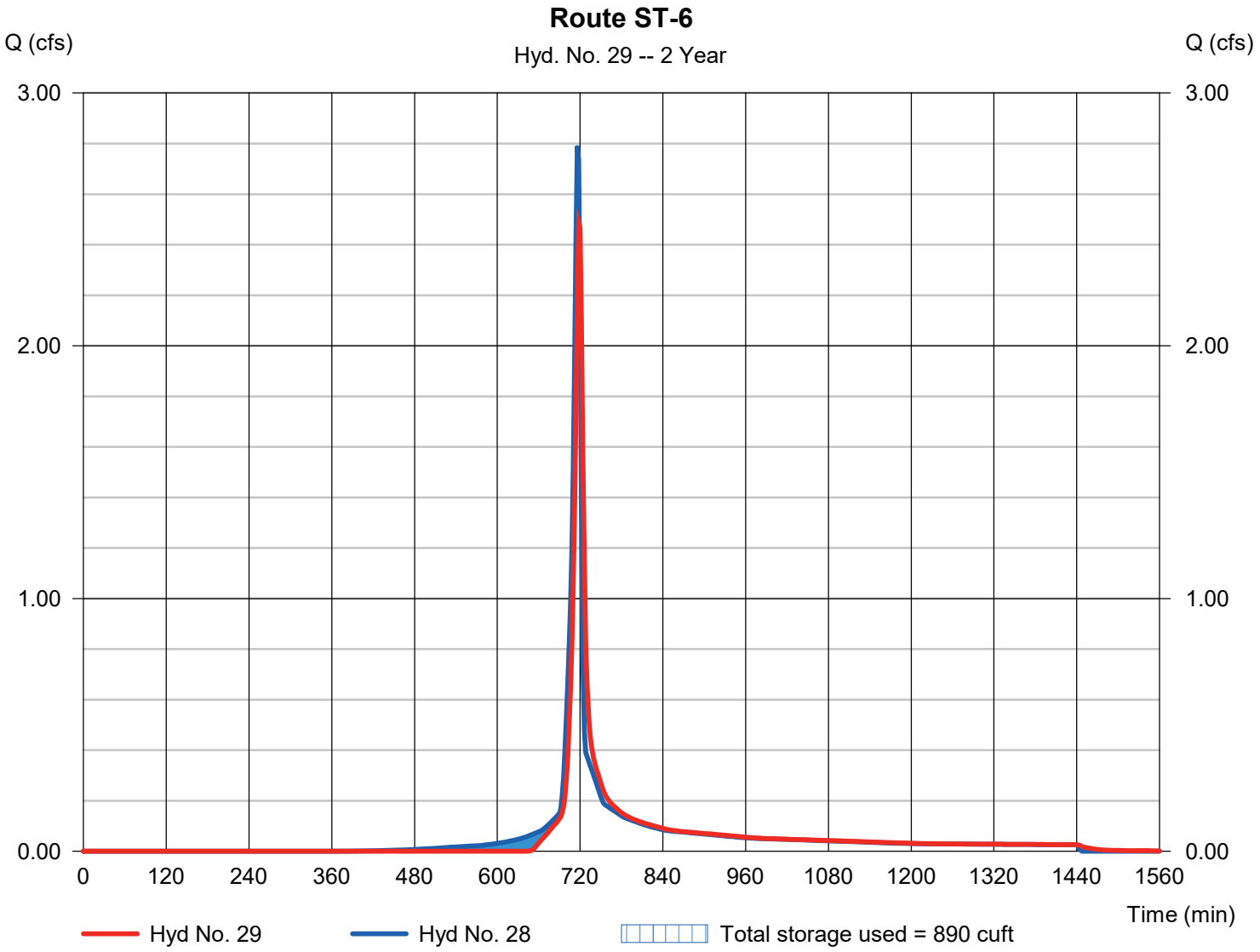
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 29

Route ST-6

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | Reservoir | Peak discharge | = | 2.486 cfs |
| Storm frequency | = | 2 yrs | Time to peak | = | 718 min |
| Time interval | = | 2 min | Hyd. volume | = | 5,444 cuft |
| Inflow hyd. No. | = | 28 - Stormwater Trench 6 - DP001 | Max. Elevation | = | 16.58 ft |
| Reservoir name | = | Stormwater Trench ST-6 | Max. Storage | = | 890 cuft |

Storage Indication method used.



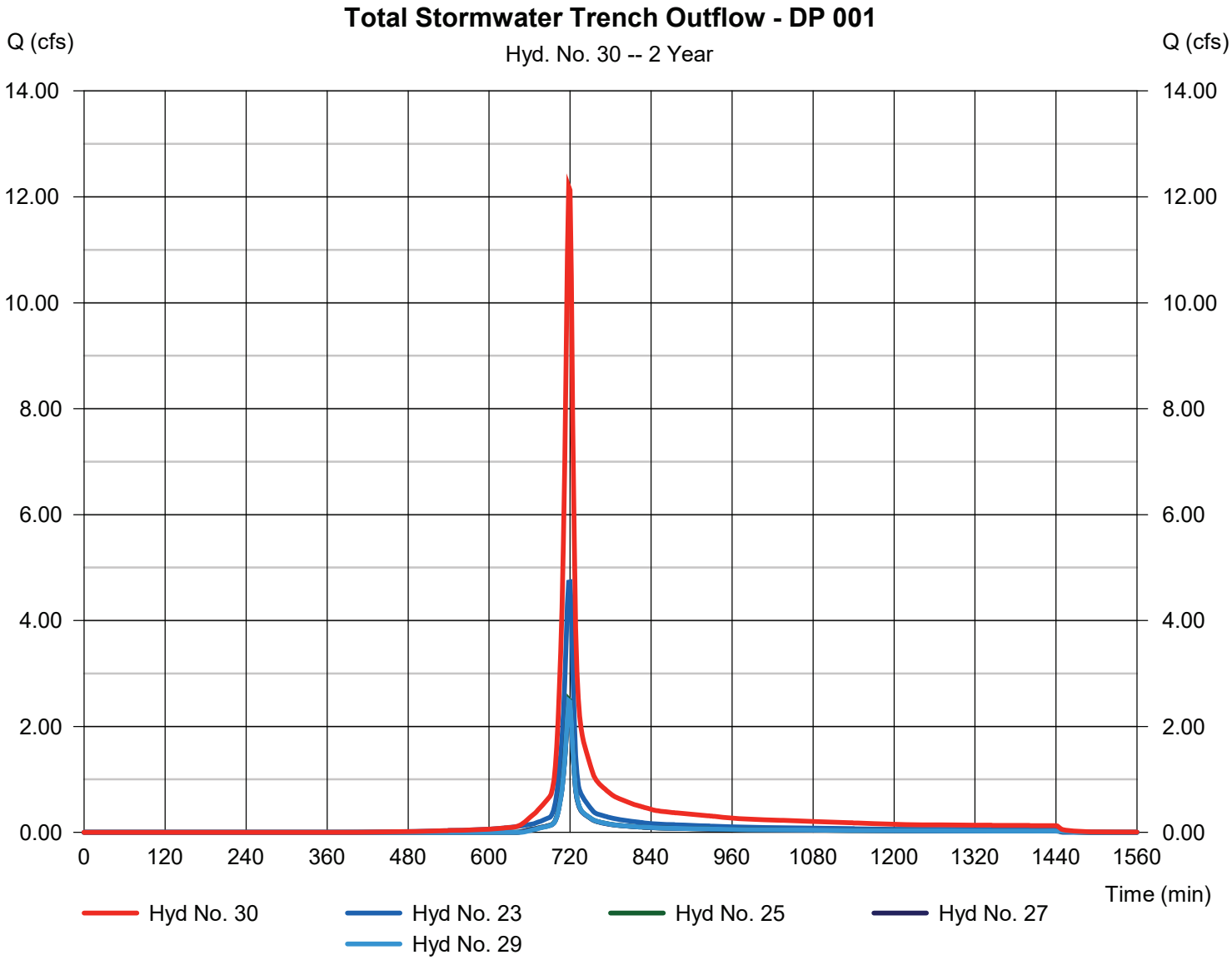
# Hydrograph Report



## Hyd. No. 30

Total Stormwater Trench Outflow - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 12.20 cfs |
| Storm frequency | = 2 yrs | Time to peak | = 718 min |
| Time interval | = 2 min | Hyd. volume | = 27,393 cuft |
| Inflow hyds. | = 23, 25, 27, 29 | Contrib. drain. area | = 0.000 ac |



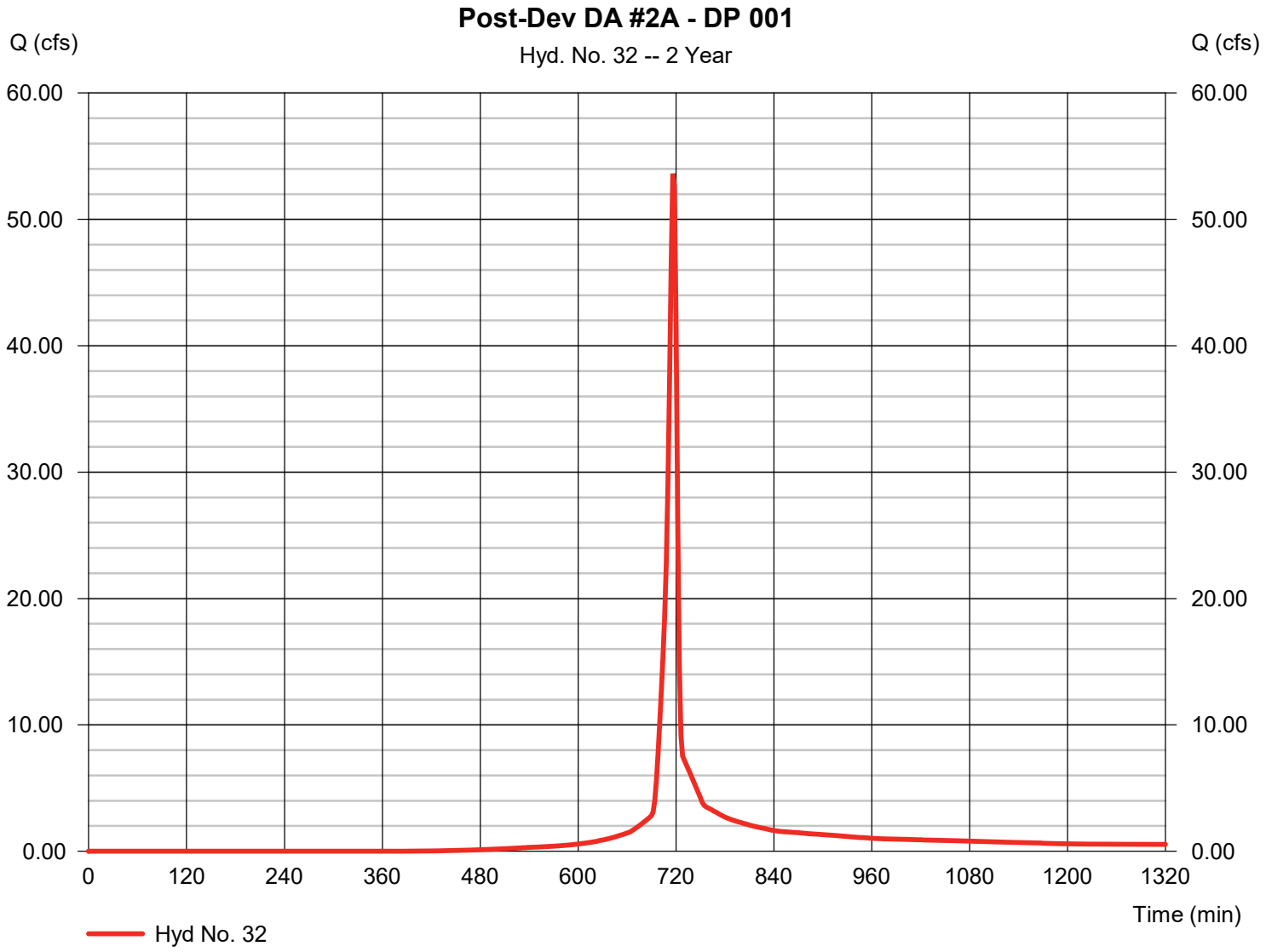
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 32

Post-Dev DA #2A - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 53.63 cfs |
| Storm frequency | = 2 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 109,485 cuft |
| Drainage area | = 16.190 ac | Curve number | = 86.8 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 3.30 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



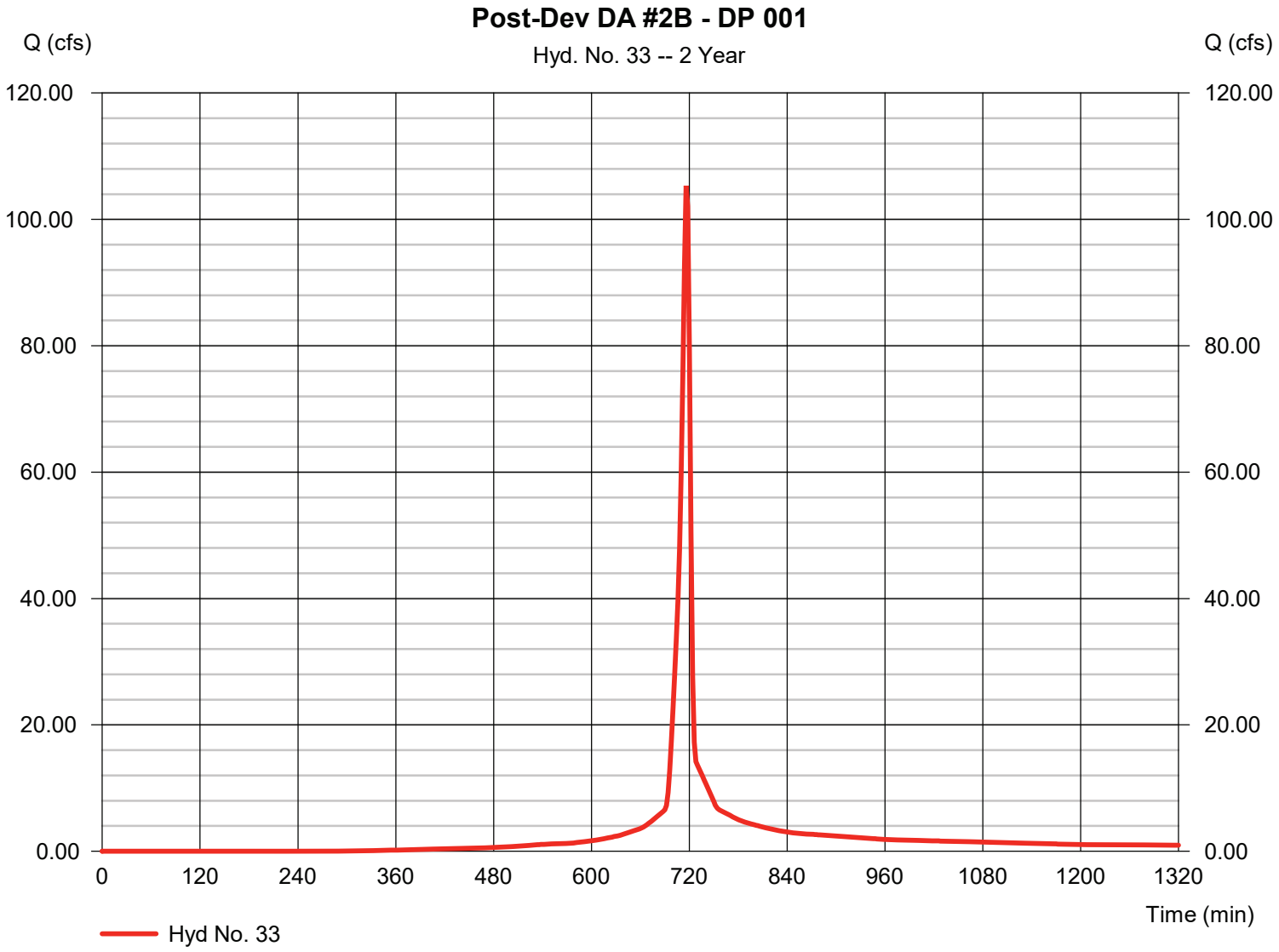
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 33

Post-Dev DA #2B - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 105.29 cfs |
| Storm frequency | = 2 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 221,224 cuft |
| Drainage area | = 27.420 ac | Curve number | = 91.2 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 3.30 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



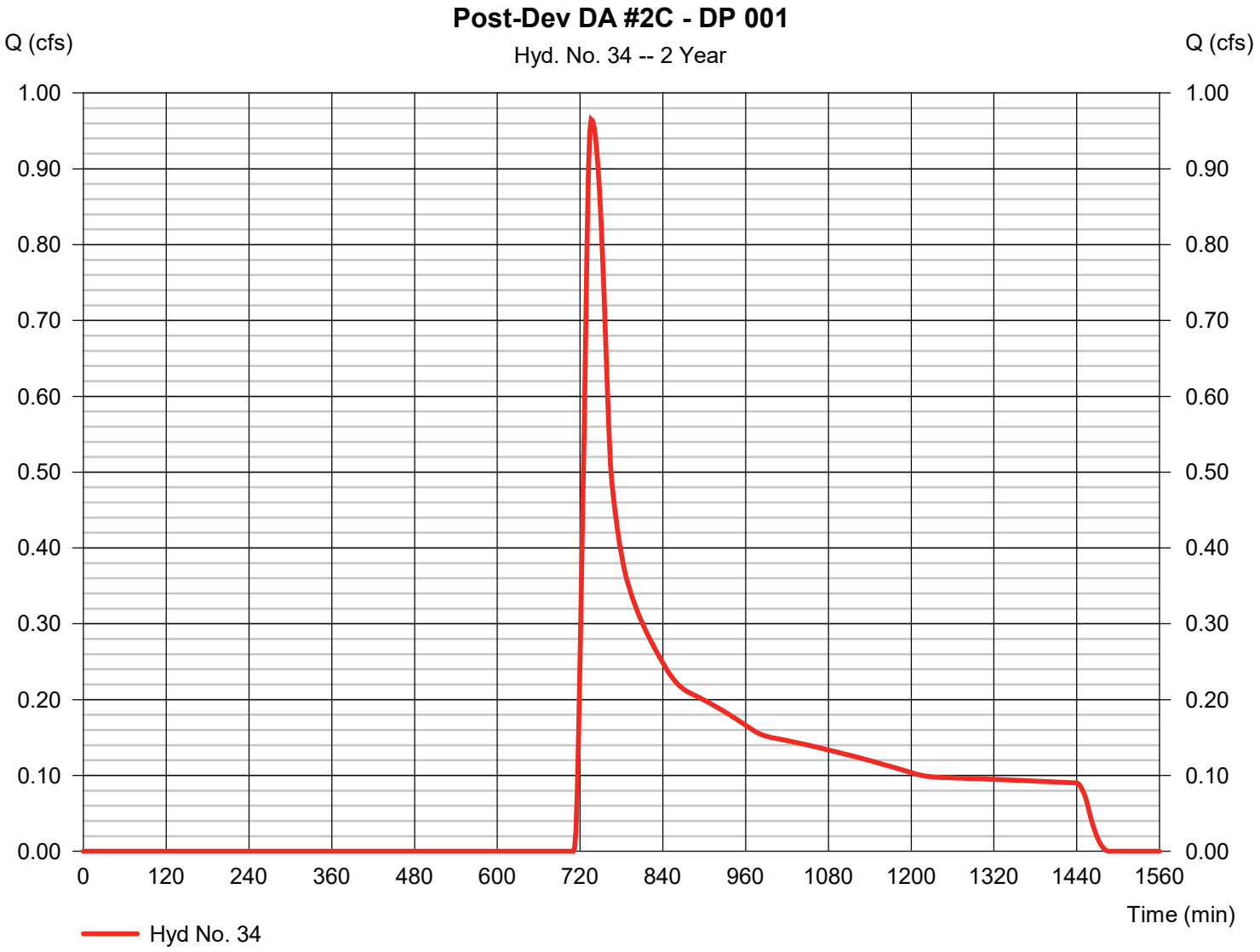
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 34

Post-Dev DA #2C - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 0.965 cfs |
| Storm frequency | = 2 yrs | Time to peak | = 736 min |
| Time interval | = 2 min | Hyd. volume | = 8,394 cuft |
| Drainage area | = 7.420 ac | Curve number | = 56 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = TR55 | Time of conc. (Tc) | = 28.30 min |
| Total precip. | = 3.30 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



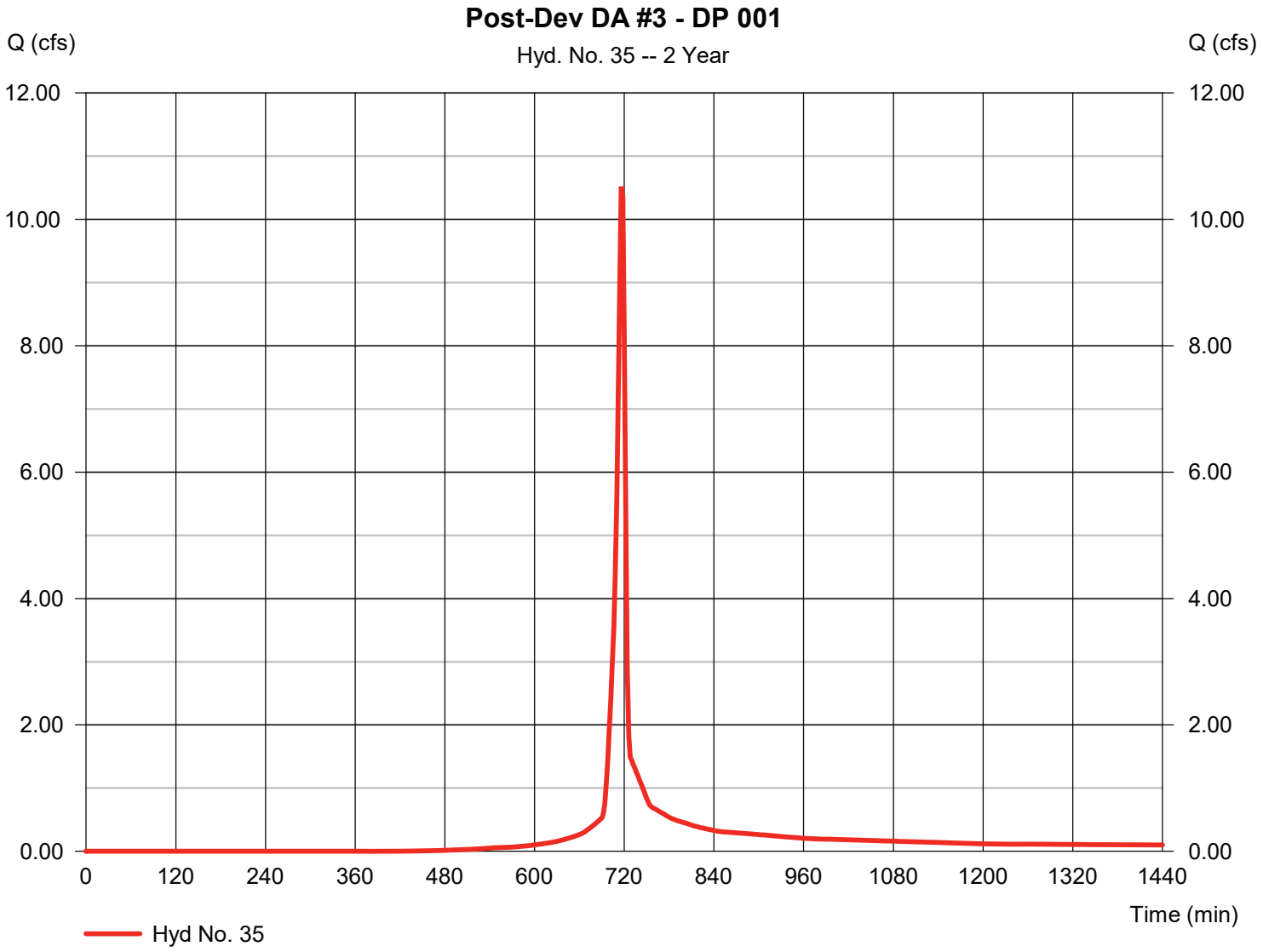
# Hydrograph Report



## Hyd. No. 35

Post-Dev DA #3 - DP 001

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | SCS Runoff | Peak discharge | = | 10.52 cfs |
| Storm frequency | = | 2 yrs | Time to peak | = | 716 min |
| Time interval | = | 2 min | Hyd. volume | = | 21,384 cuft |
| Drainage area | = | 3.310 ac | Curve number | = | 85.7 |
| Basin Slope | = | 0.0 % | Hydraulic length | = | 0 ft |
| Tc method | = | User | Time of conc. (Tc) | = | 5.00 min |
| Total precip. | = | 3.30 in | Distribution | = | Type II |
| Storm duration | = | 24 hrs | Shape factor | = | 484 |



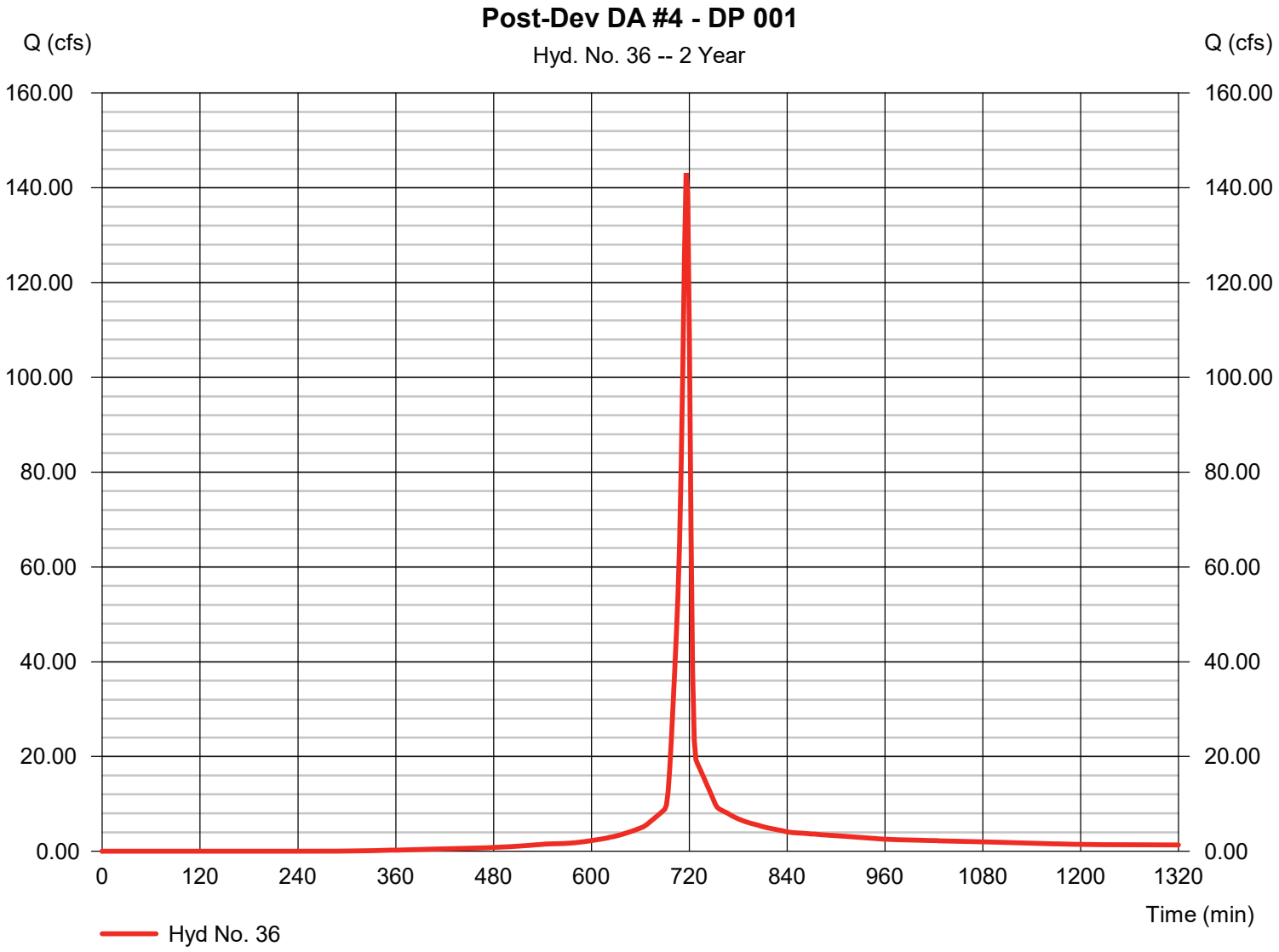
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 36

Post-Dev DA #4 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 143.11 cfs |
| Storm frequency | = 2 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 300,404 cuft |
| Drainage area | = 37.380 ac | Curve number | = 91.1 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 3.30 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



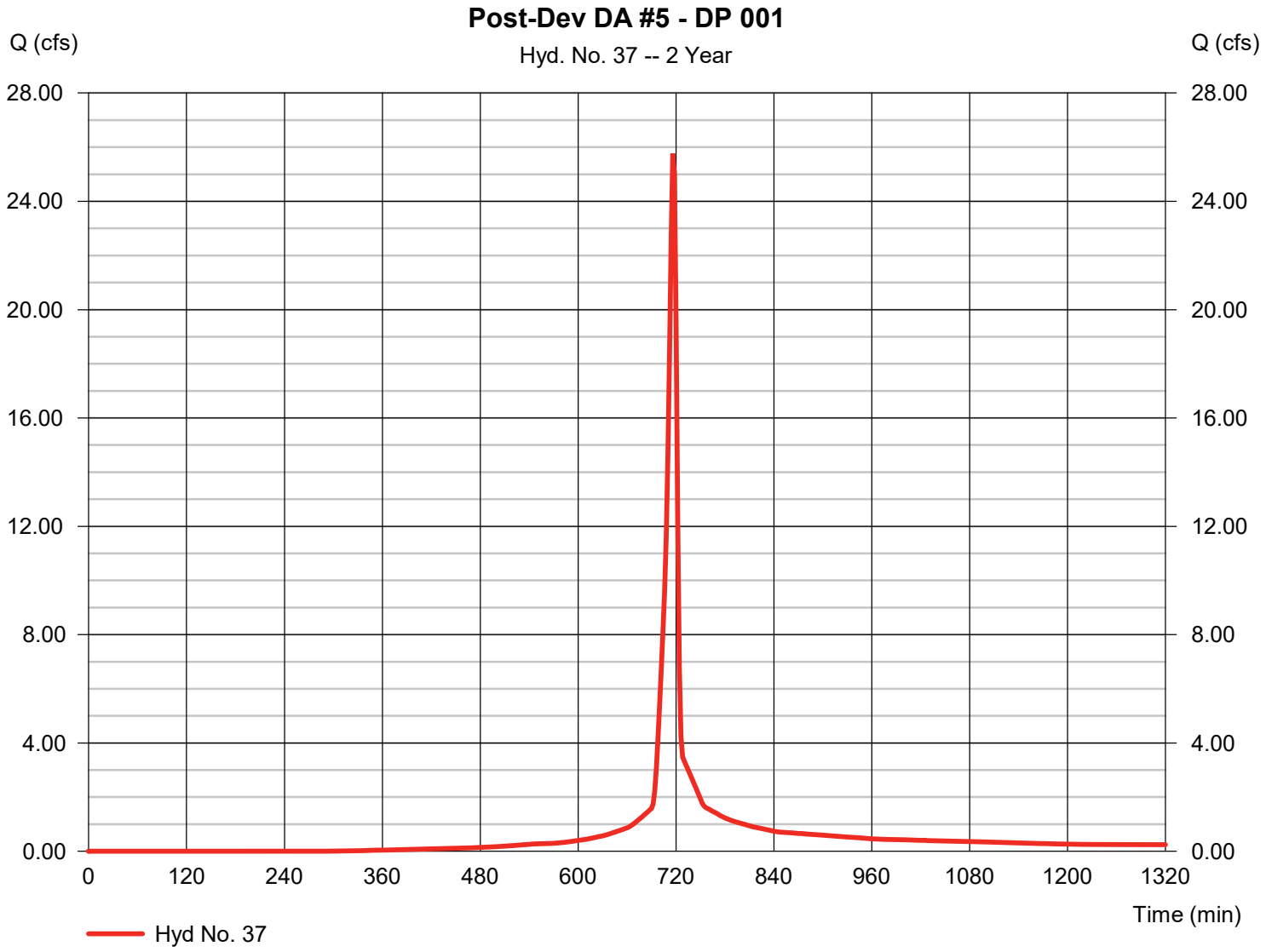
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 37

Post-Dev DA #5 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 25.76 cfs |
| Storm frequency | = 2 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 53,982 cuft |
| Drainage area | = 6.770 ac | Curve number | = 90.9 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 3.30 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



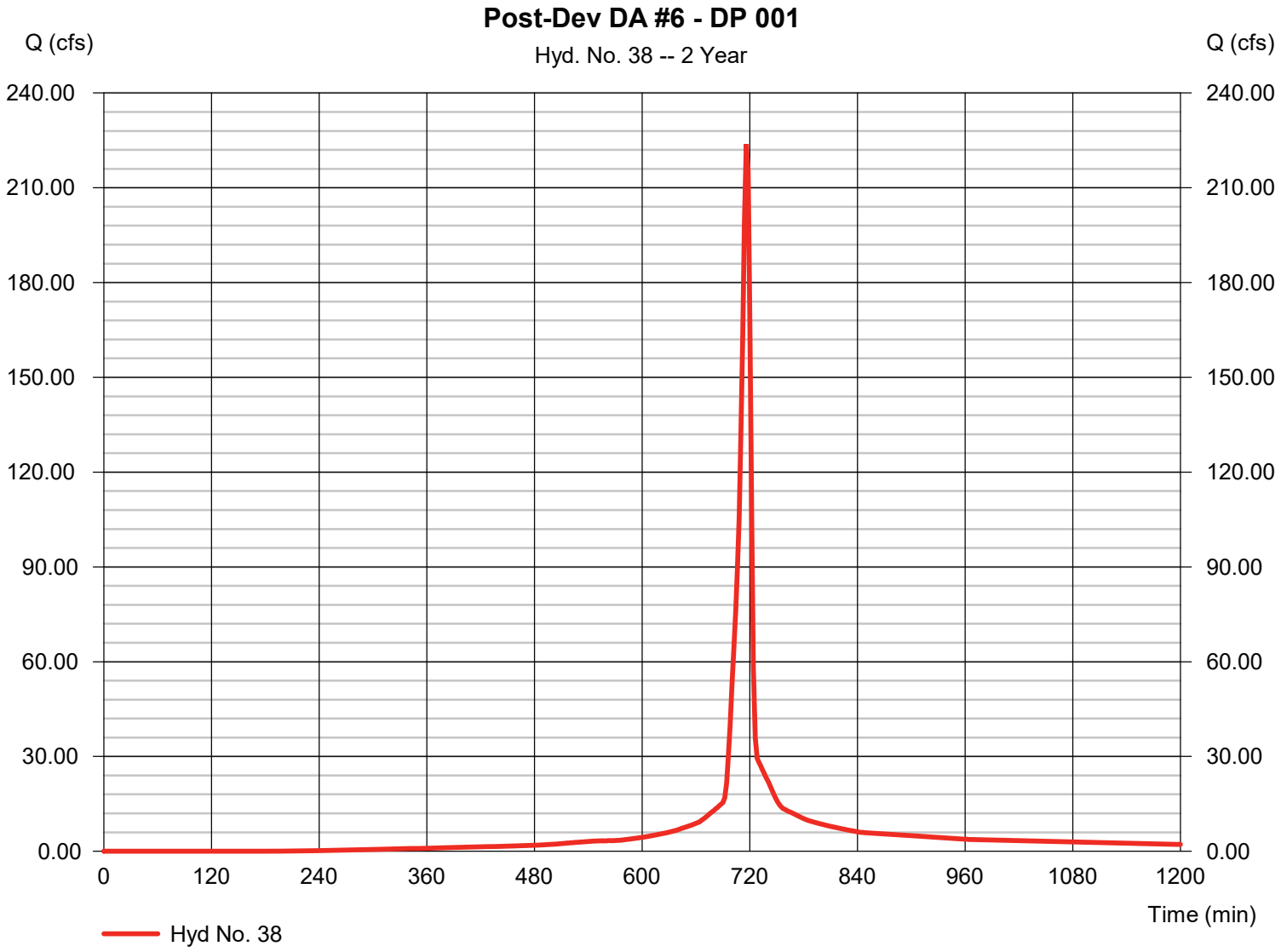
# Hydrograph Report



## Hyd. No. 38

Post-Dev DA #6 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 223.80 cfs |
| Storm frequency | = 2 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 486,092 cuft |
| Drainage area | = 53.880 ac | Curve number | = 94.1 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 3.30 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



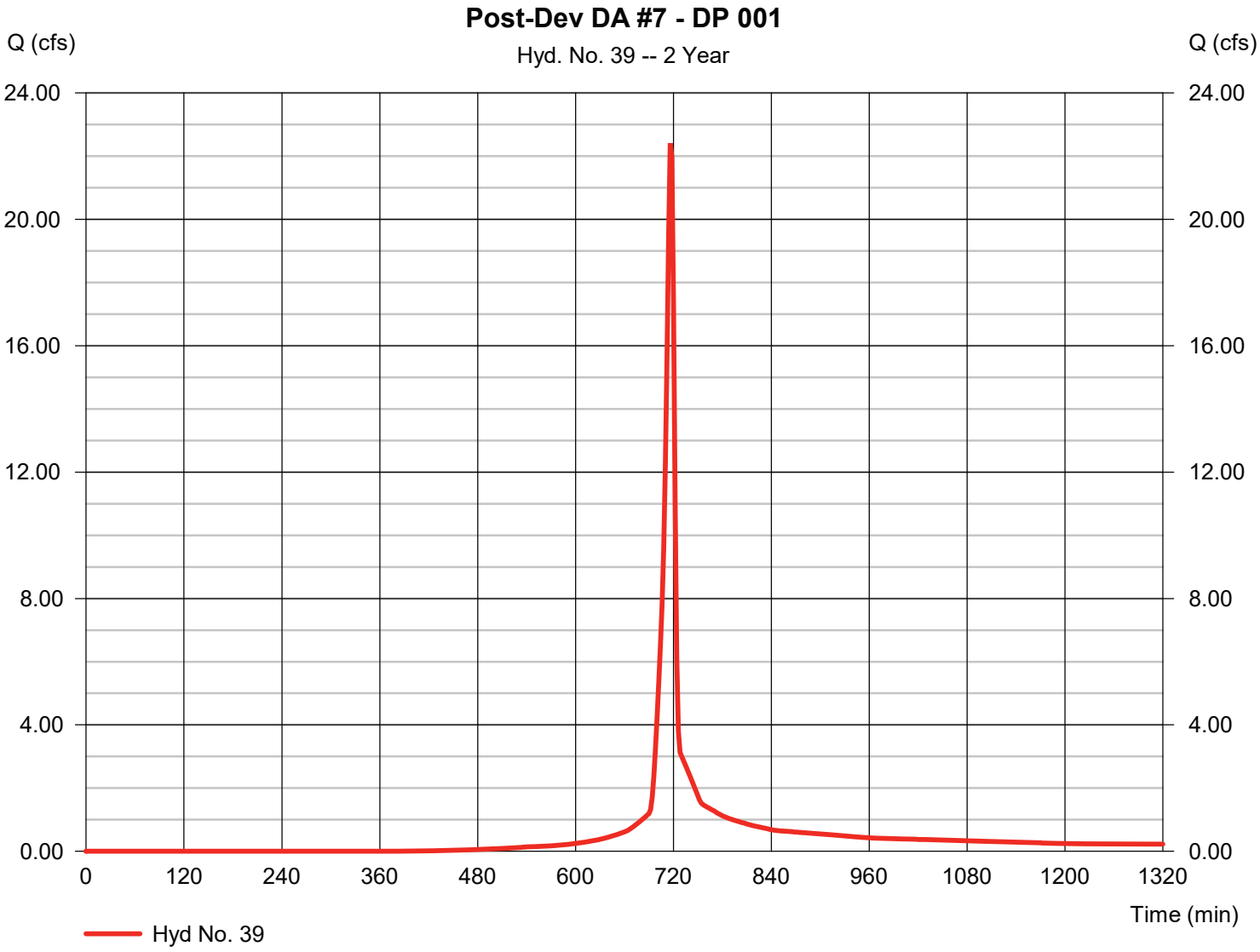
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 39

Post-Dev DA #7 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 22.40 cfs |
| Storm frequency | = 2 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 45,803 cuft |
| Drainage area | = 6.690 ac | Curve number | = 87.1 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 3.30 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



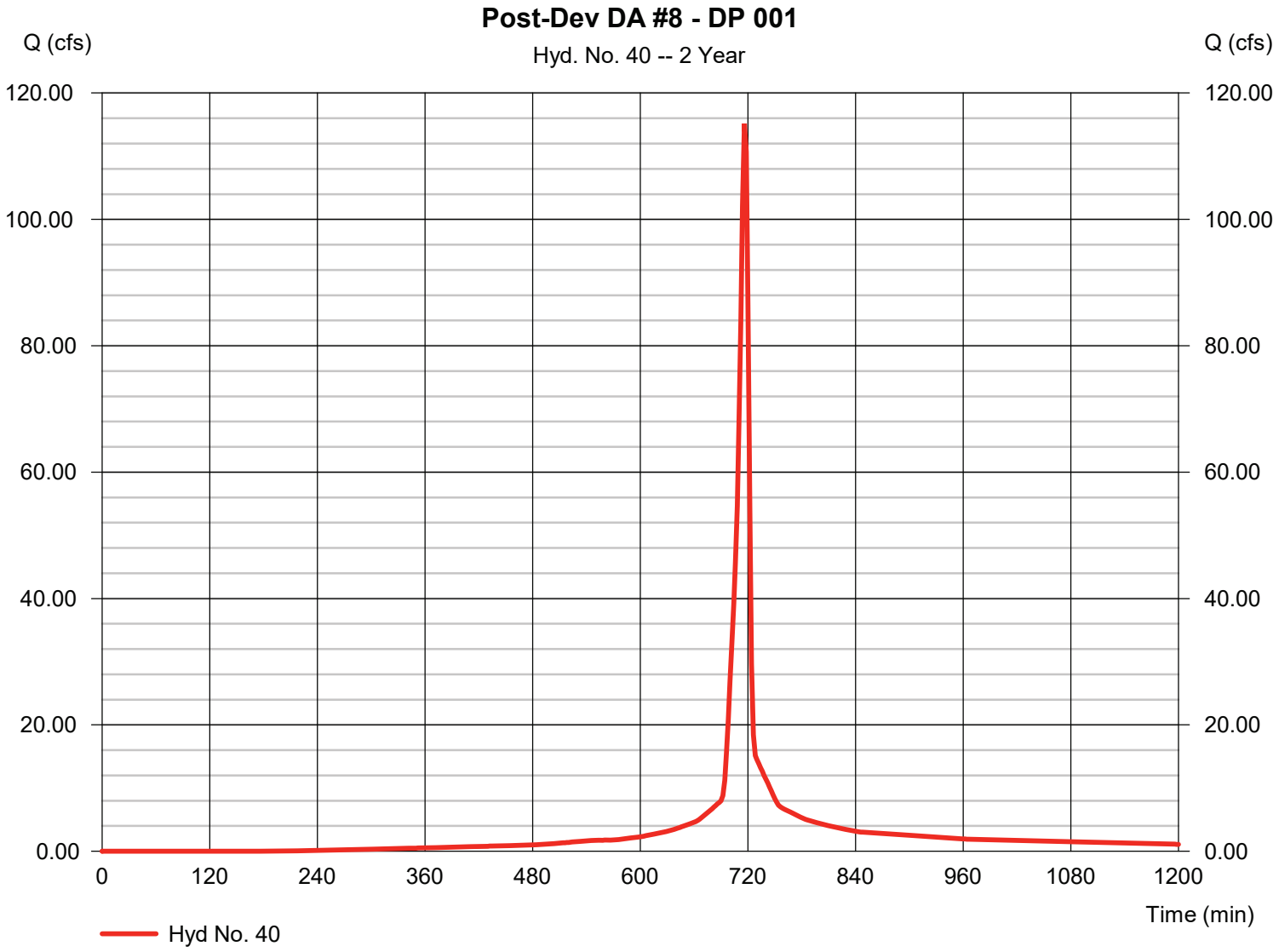
# Hydrograph Report



## Hyd. No. 40

Post-Dev DA #8 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 115.16 cfs |
| Storm frequency | = 2 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 251,212 cuft |
| Drainage area | = 27.530 ac | Curve number | = 94.4 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 3.30 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



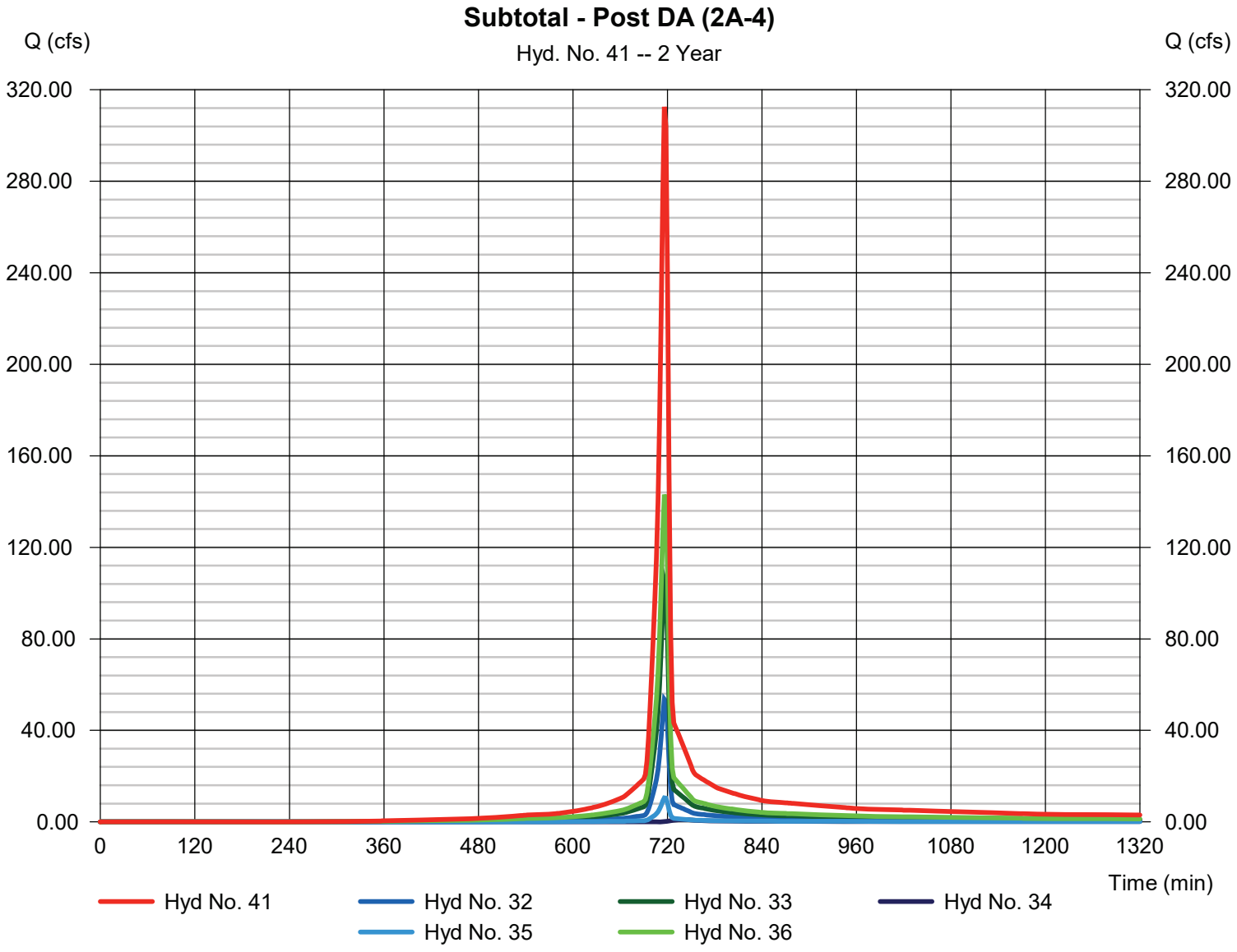
# Hydrograph Report



## Hyd. No. 41

Subtotal - Post DA (2A-4)

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 312.63 cfs |
| Storm frequency | = 2 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 660,891 cuft |
| Inflow hyds. | = 32, 33, 34, 35, 36 | Contrib. drain. area | = 91.720 ac |



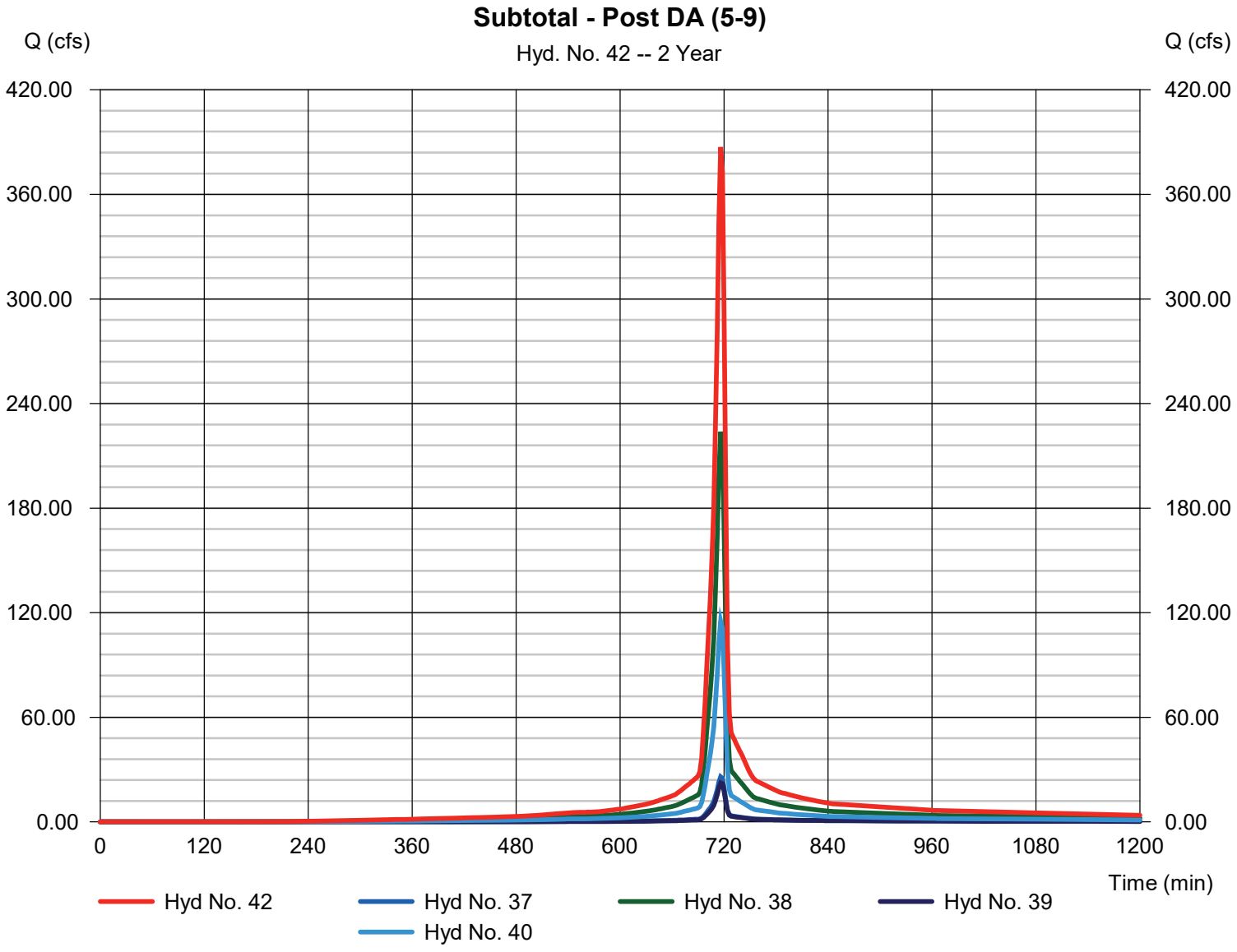
# Hydrograph Report



## Hyd. No. 42

Subtotal - Post DA (5-9)

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 387.12 cfs |
| Storm frequency | = 2 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 837,089 cuft |
| Inflow hyds. | = 37, 38, 39, 40 | Contrib. drain. area | = 94.870 ac |



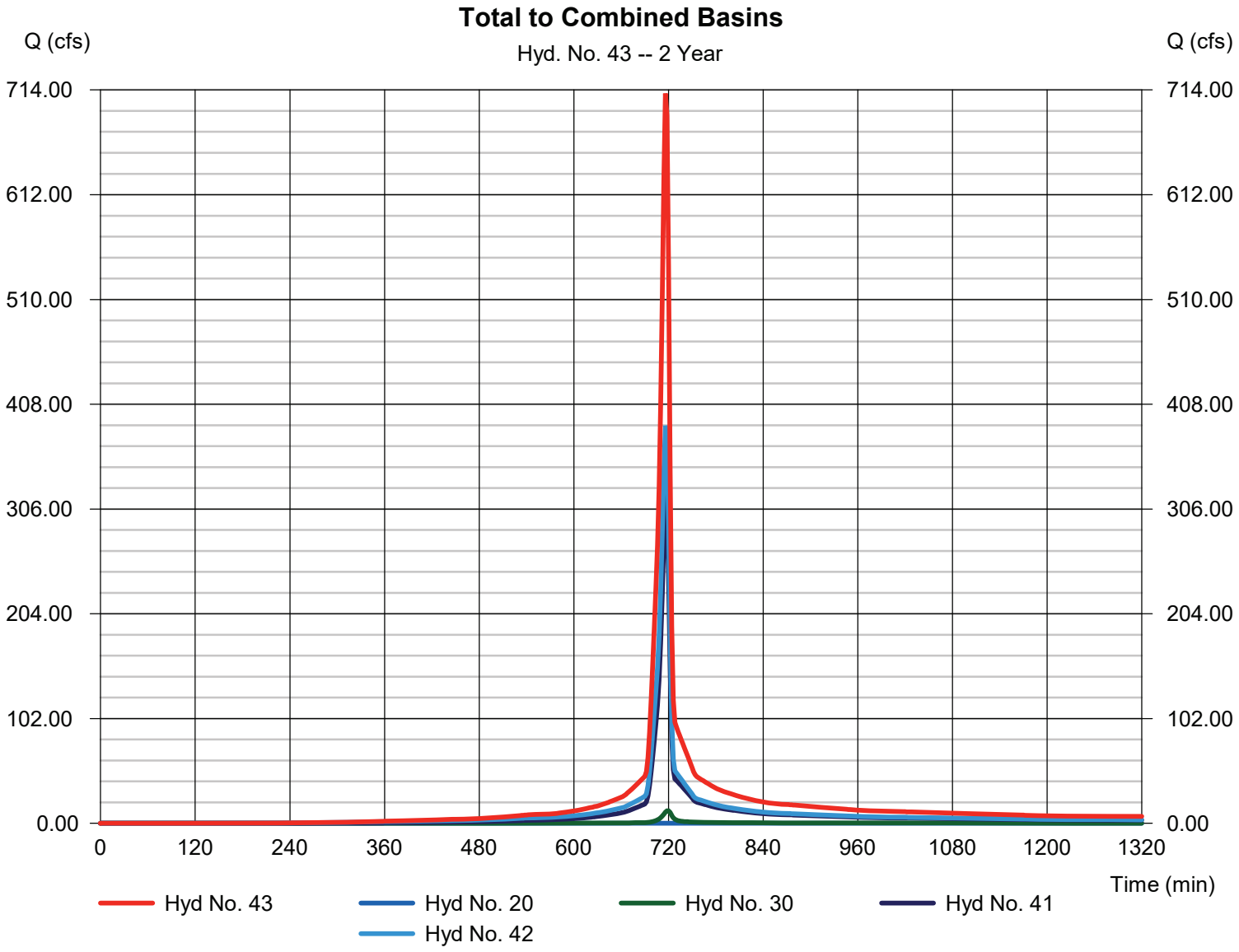
# Hydrograph Report



## Hyd. No. 43

Total to Combined Basins

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | Combine | Peak discharge | = | 710.62 cfs |
| Storm frequency | = | 2 yrs | Time to peak | = | 716 min |
| Time interval | = | 2 min | Hyd. volume | = | 1,525,372 cuft |
| Inflow hyds. | = | 20, 30, 41, 42 | Contrib. drain. area | = | 0.000 ac |



# Hydrograph Report

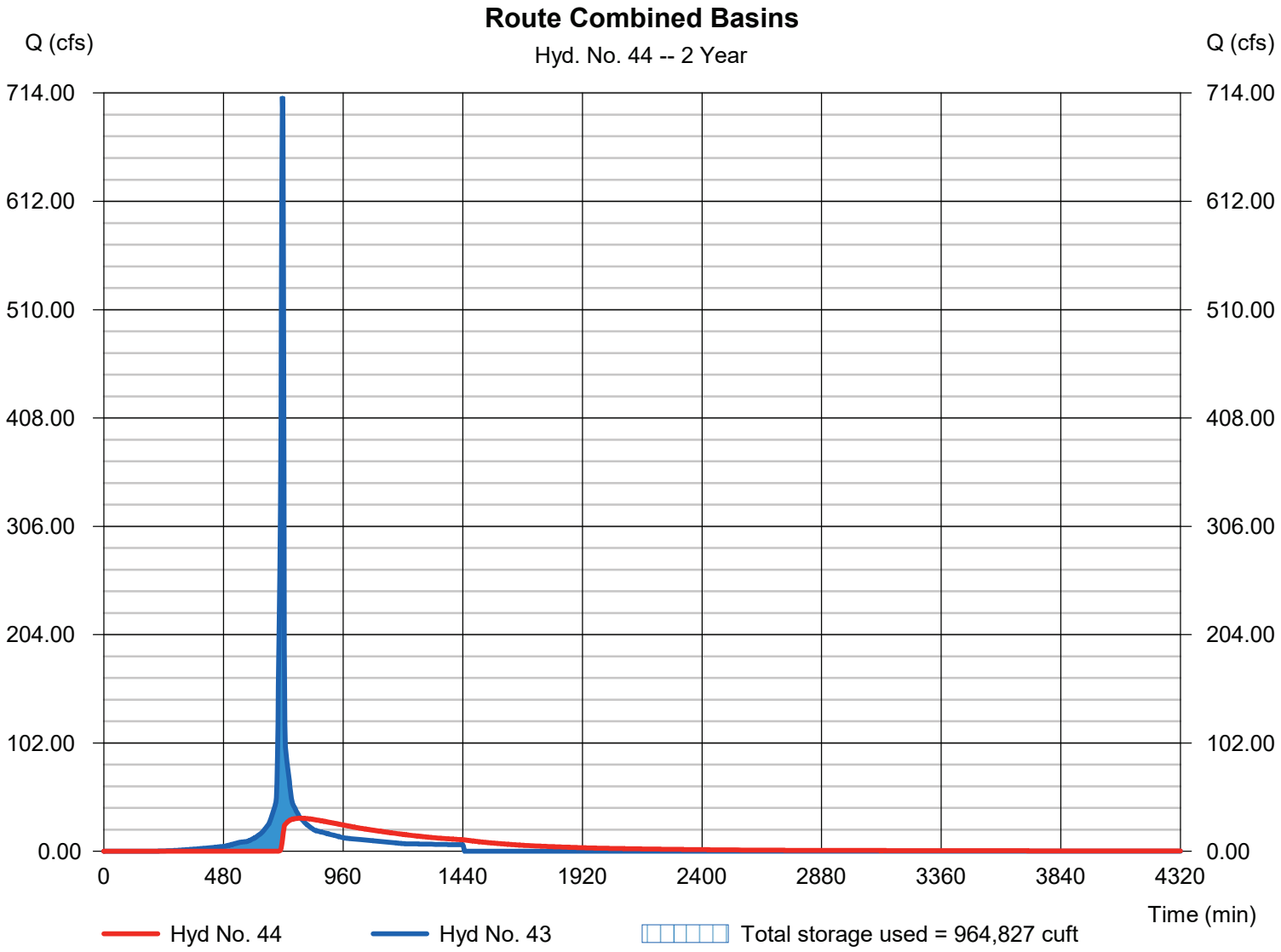
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 44

Route Combined Basins

| | | | |
|---|---|---|---|
| Hydrograph type | = Reservoir | Peak discharge | = 31.06 cfs |
| Storm frequency | = 2 yrs | Time to peak | = 790 min |
| Time interval | = 2 min | Hyd. volume | = 1,222,800 cuft |
| Inflow hyd. No. | = 43 - Total to Combined Basins | Max. Elevation | = 14.28 ft |
| Reservoir name | = Combined Basins | Max. Storage | = 964,827 cuft |

Storage Indication method used.



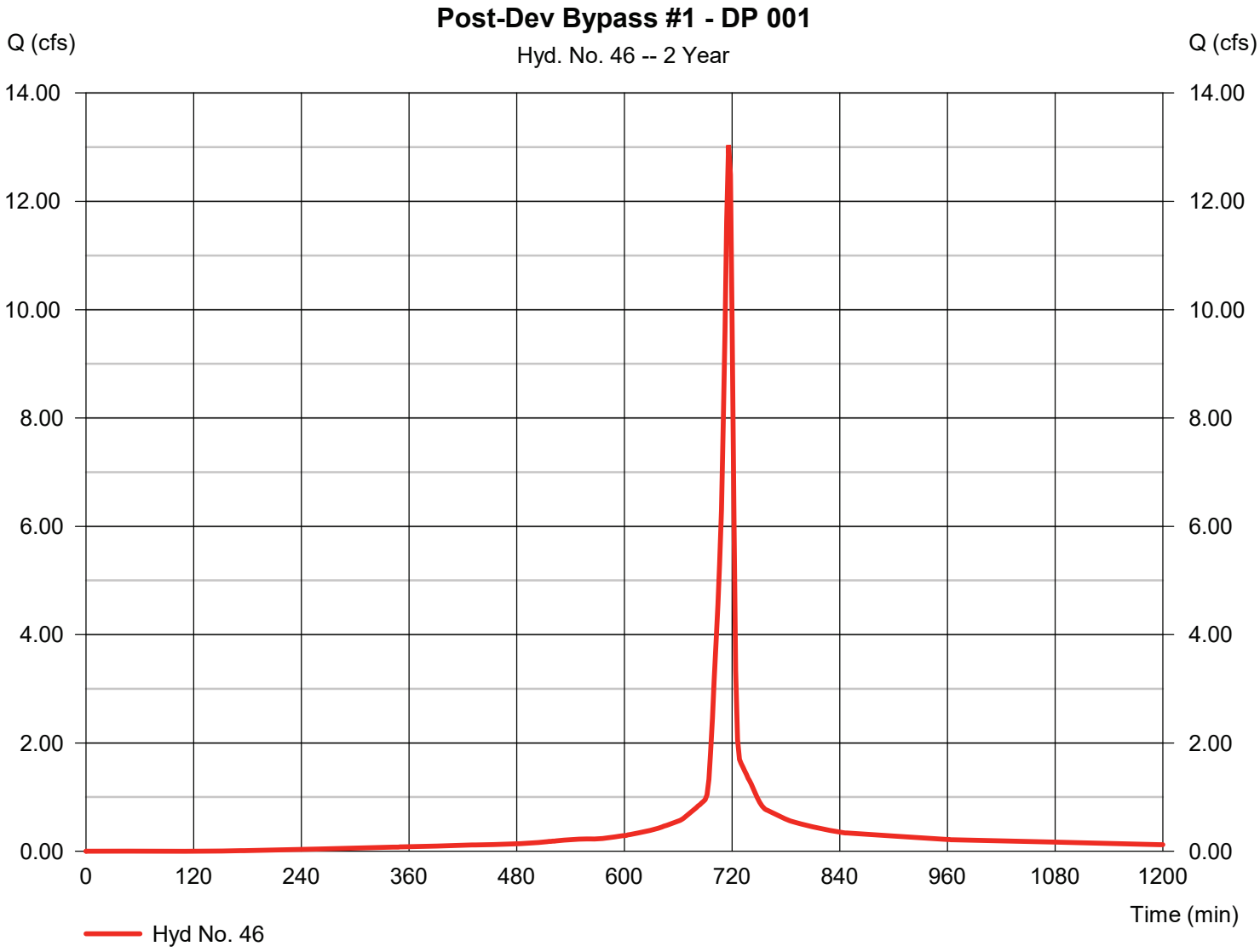
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 46

Post-Dev Bypass #1 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 13.04 cfs |
| Storm frequency | = 2 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 29,159 cuft |
| Drainage area | = 3.020 ac | Curve number | = 95.9 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 3.30 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



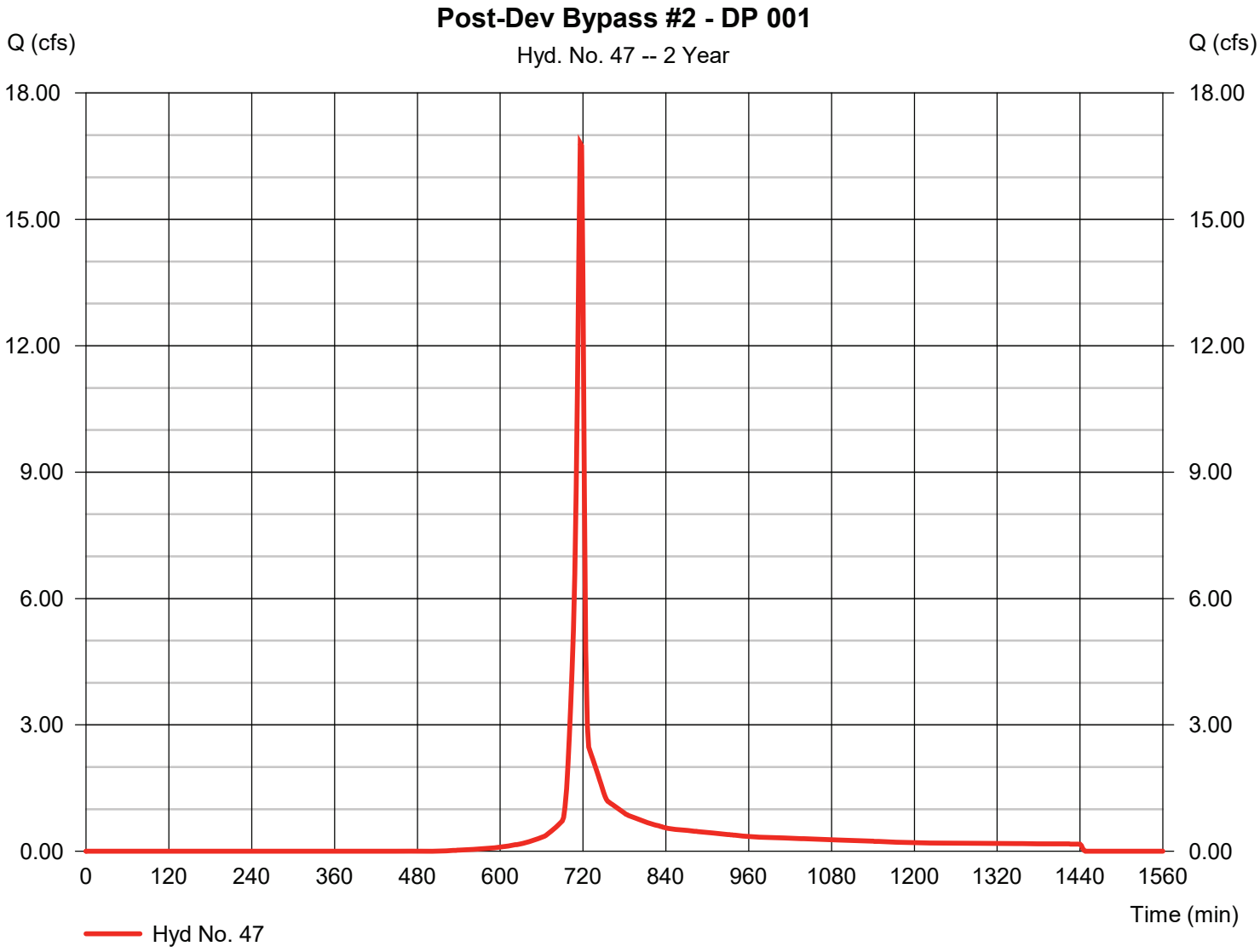
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 47

Post-Dev Bypass #2 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 16.81 cfs |
| Storm frequency | = 2 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 33,943 cuft |
| Drainage area | = 6.080 ac | Curve number | = 82.3 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 3.30 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



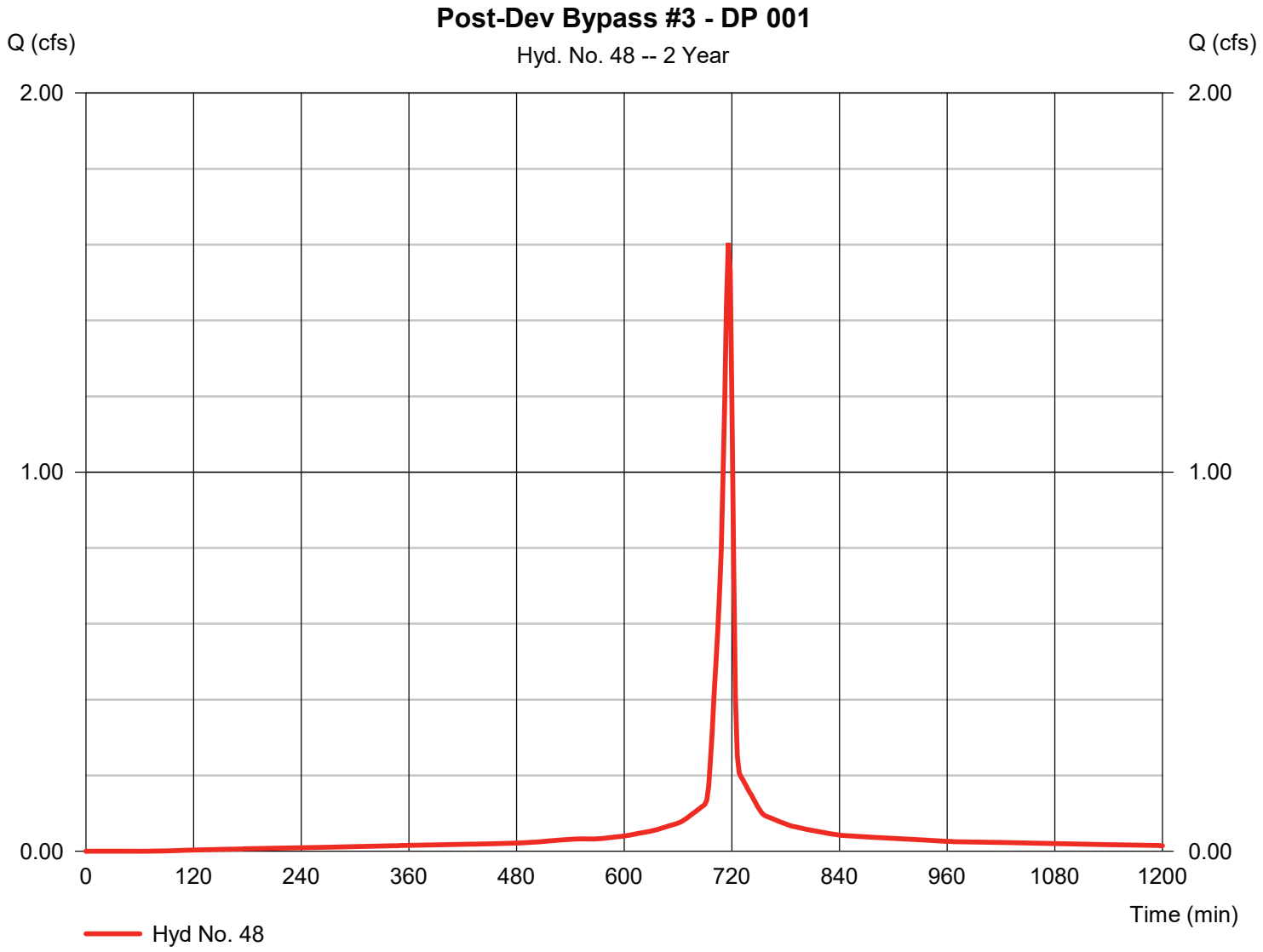
# Hydrograph Report



## Hyd. No. 48

Post-Dev Bypass #3 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 1.604 cfs |
| Storm frequency | = 2 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 3,758 cuft |
| Drainage area | = 0.360 ac | Curve number | = 98 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 3.30 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



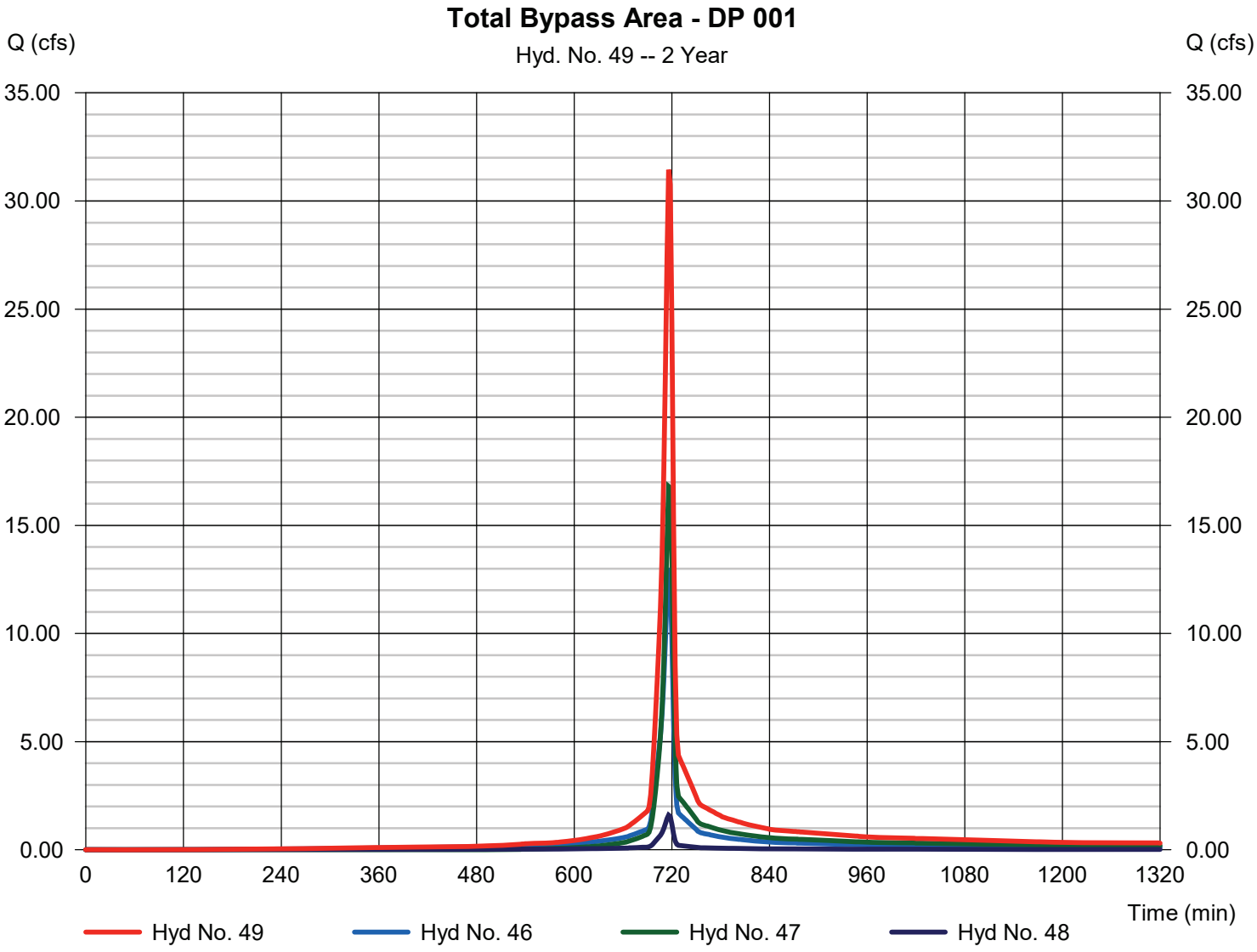
# Hydrograph Report



## Hyd. No. 49

Total Bypass Area - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 31.45 cfs |
| Storm frequency | = 2 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 66,860 cuft |
| Inflow hyds. | = 46, 47, 48 | Contrib. drain. area | = 9.460 ac |



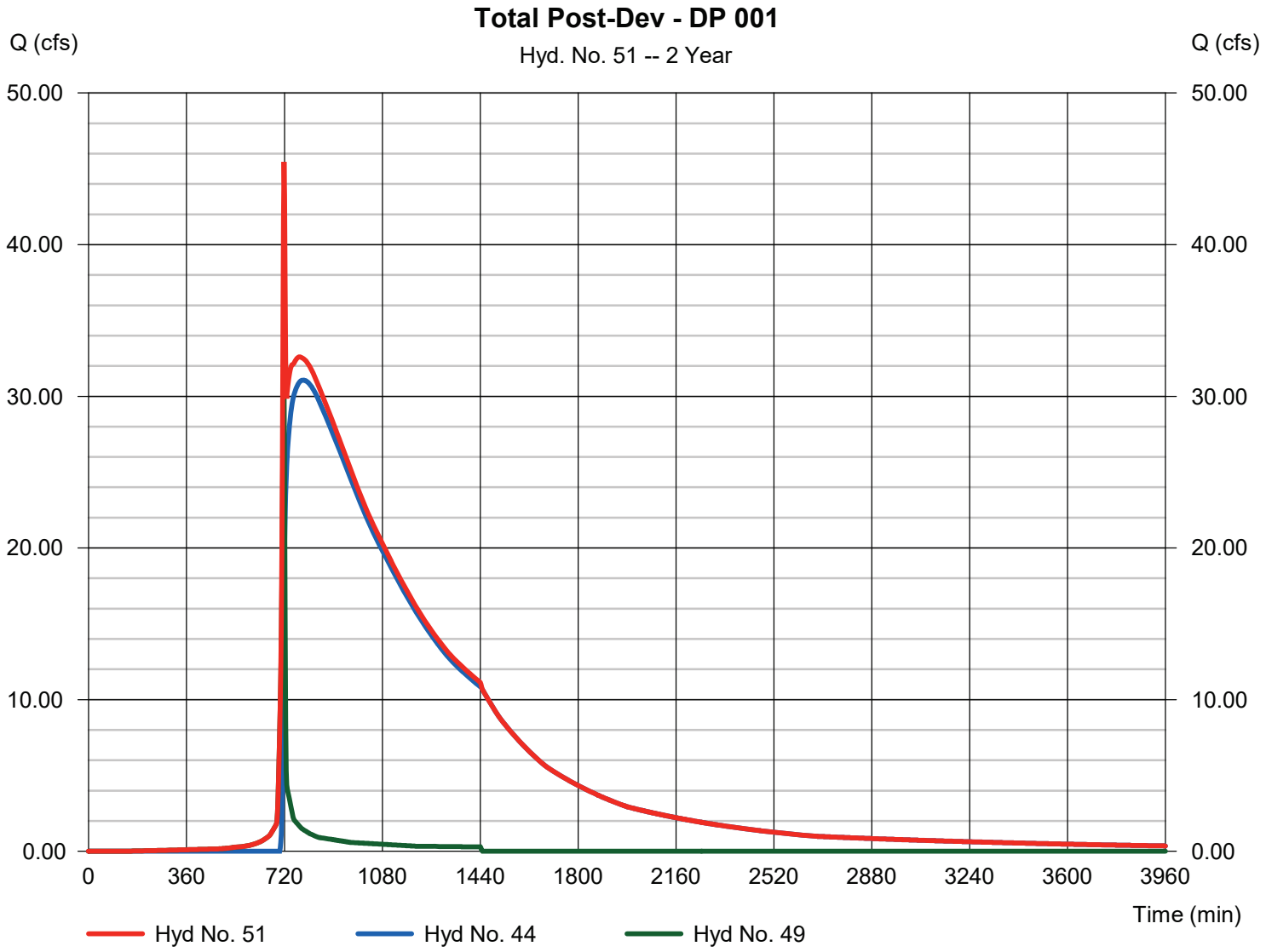
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 51

Total Post-Dev - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 45.47 cfs |
| Storm frequency | = 2 yrs | Time to peak | = 718 min |
| Time interval | = 2 min | Hyd. volume | = 1,289,660 cuft |
| Inflow hyds. | = 44, 49 | Contrib. drain. area | = 0.000 ac |



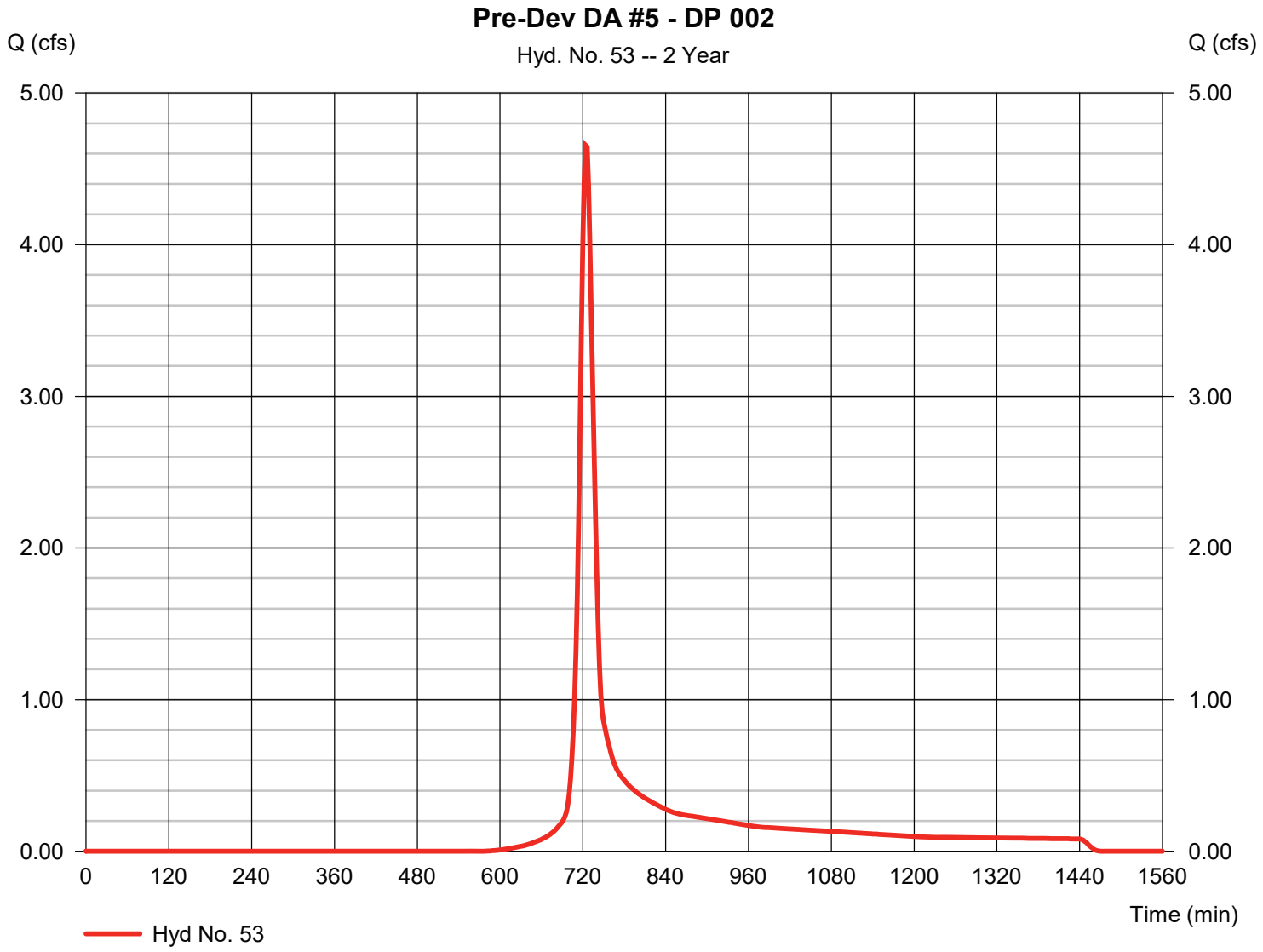
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 53

Pre-Dev DA #5 - DP 002

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 4.657 cfs |
| Storm frequency | = 2 yrs | Time to peak | = 724 min |
| Time interval | = 2 min | Hyd. volume | = 14,798 cuft |
| Drainage area | = 2.900 ac | Curve number | = 78.9 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = TR55 | Time of conc. (Tc) | = 16.90 min |
| Total precip. | = 3.30 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



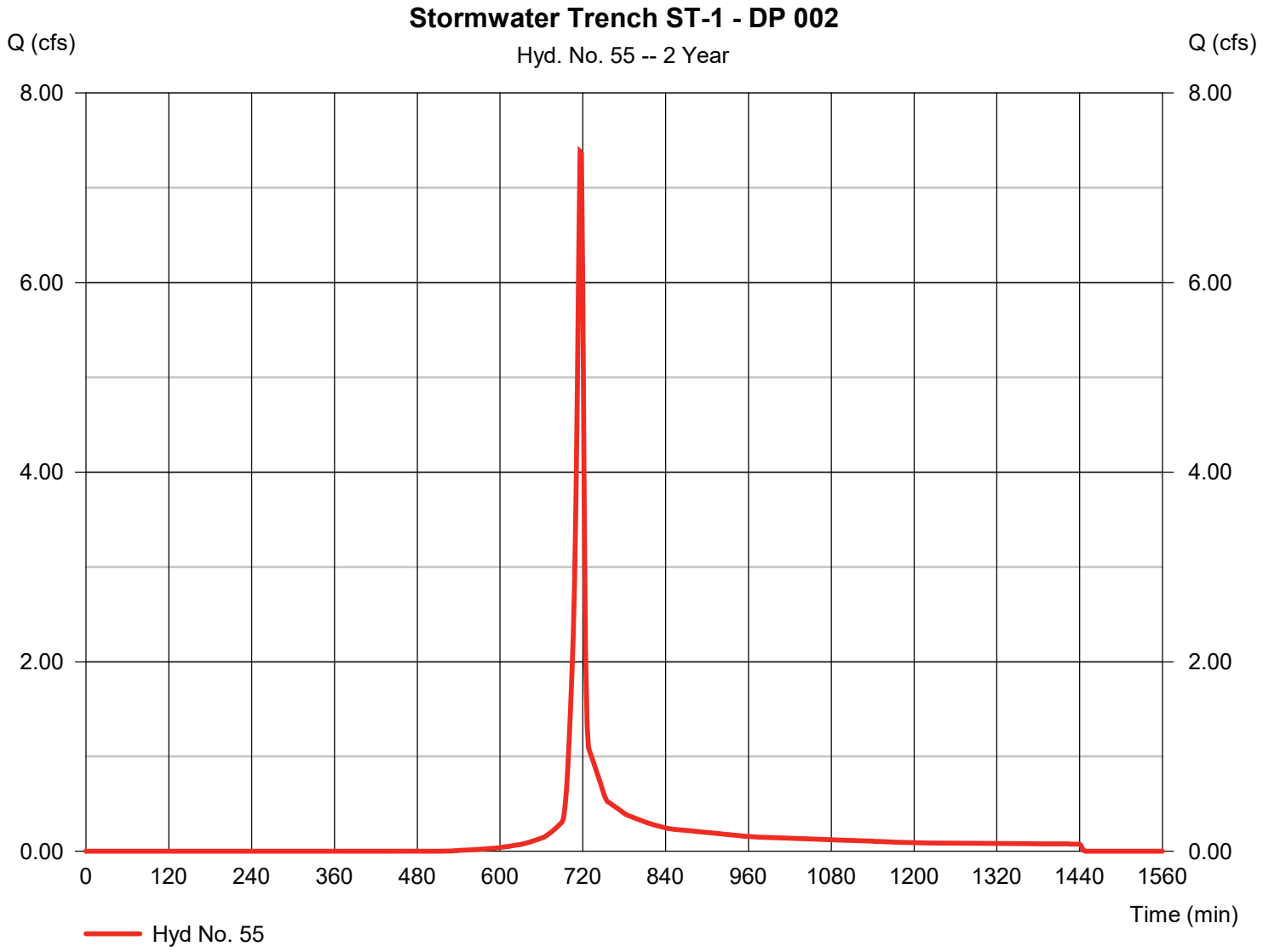
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 55

Stormwater Trench ST-1 - DP 002

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 7.383 cfs |
| Storm frequency | = 2 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 14,907 cuft |
| Drainage area | = 2.730 ac | Curve number | = 81.8 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 3.30 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



# Hydrograph Report

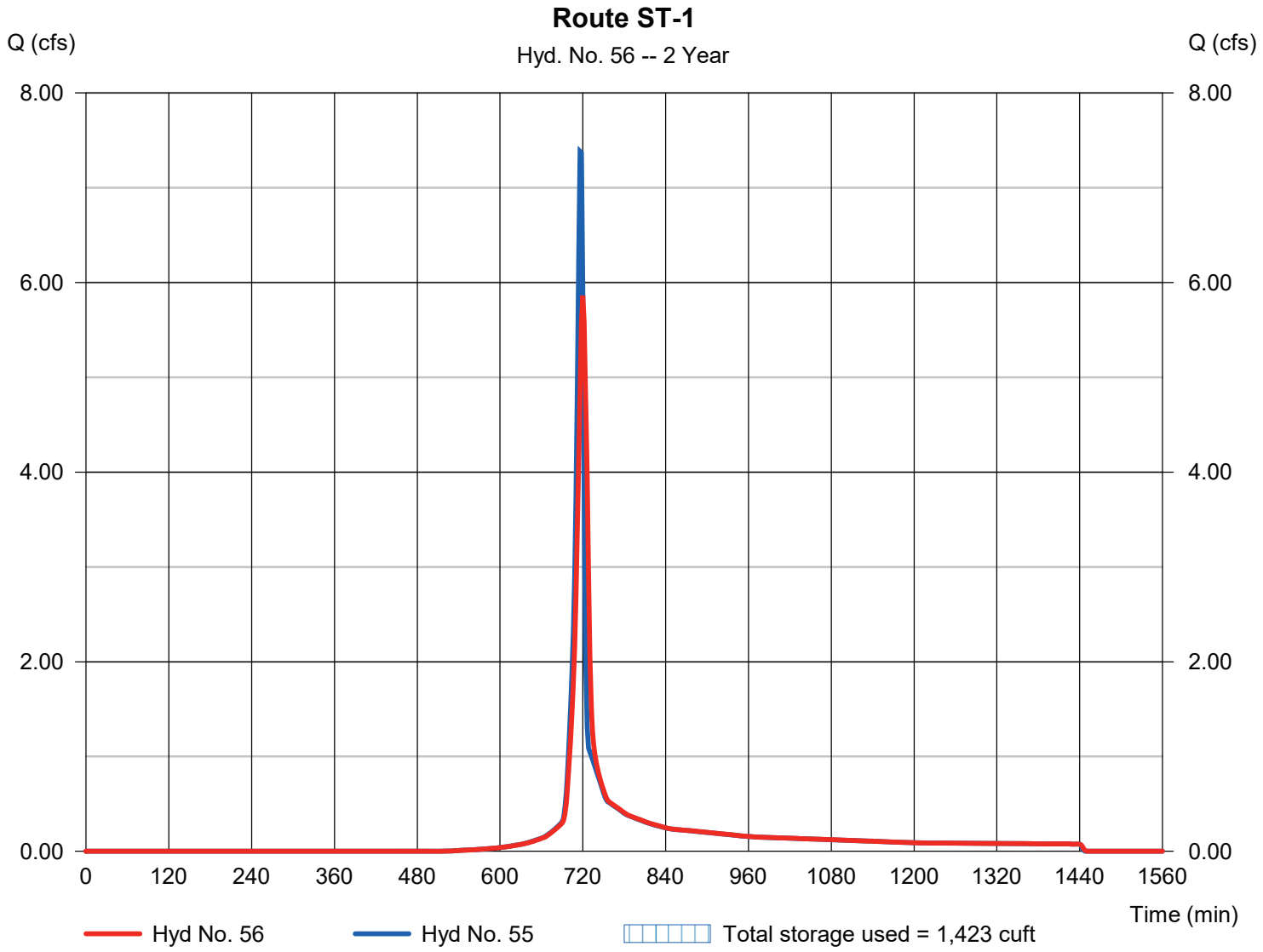
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 56

Route ST-1

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | Reservoir | Peak discharge | = | 5.864 cfs |
| Storm frequency | = | 2 yrs | Time to peak | = | 720 min |
| Time interval | = | 2 min | Hyd. volume | = | 14,907 cuft |
| Inflow hyd. No. | = | 55 - Stormwater Trench ST-1 - DP 02 | Max. Elevation | = | 15.25 ft |
| Reservoir name | = | Stormwater Trench ST-1 | Max. Storage | = | 1,423 cuft |

Storage Indication method used.



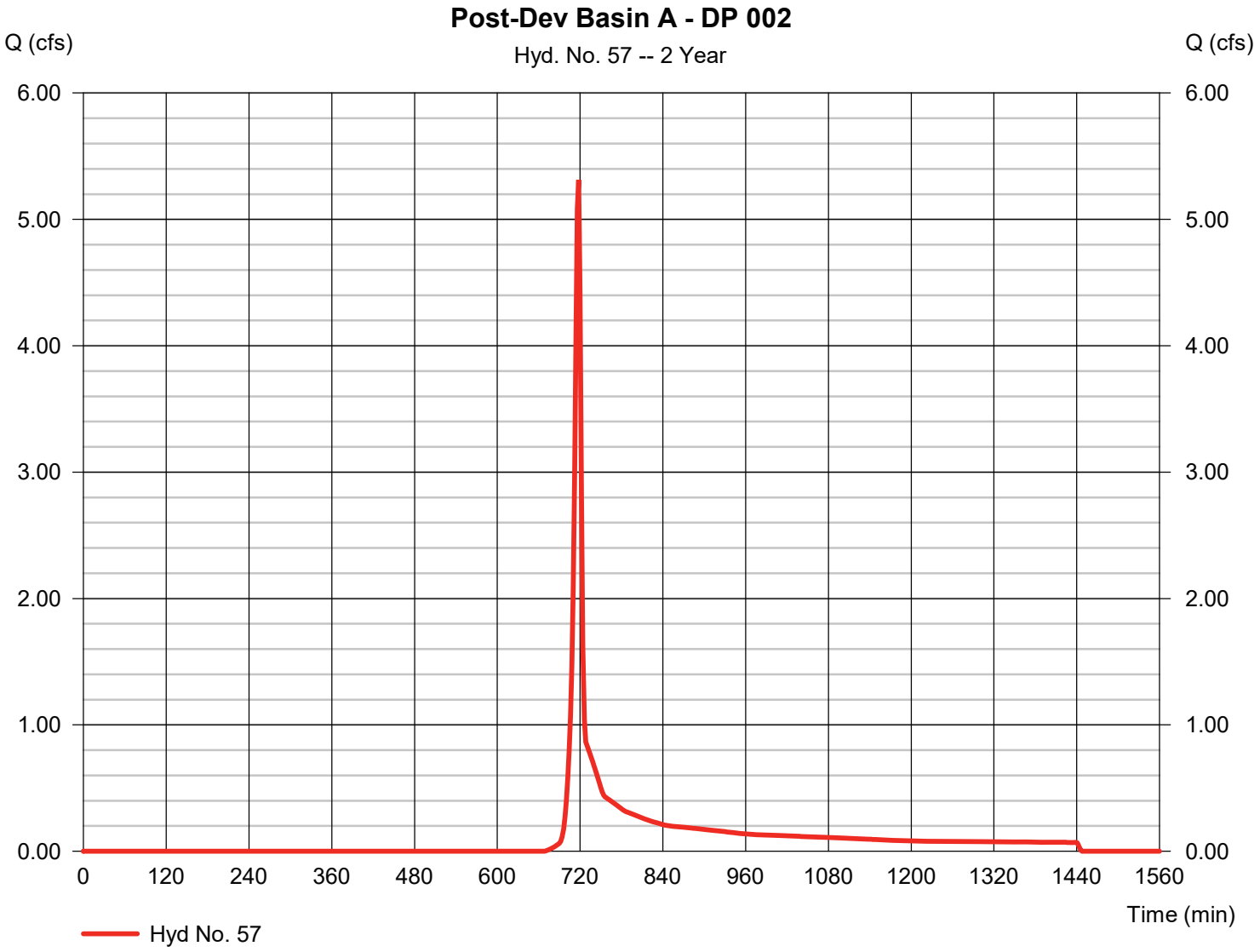
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 57

Post-Dev Basin A - DP 002

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 5.314 cfs |
| Storm frequency | = 2 yrs | Time to peak | = 718 min |
| Time interval | = 2 min | Hyd. volume | = 10,710 cuft |
| Drainage area | = 3.260 ac | Curve number | = 71.5 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 3.30 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



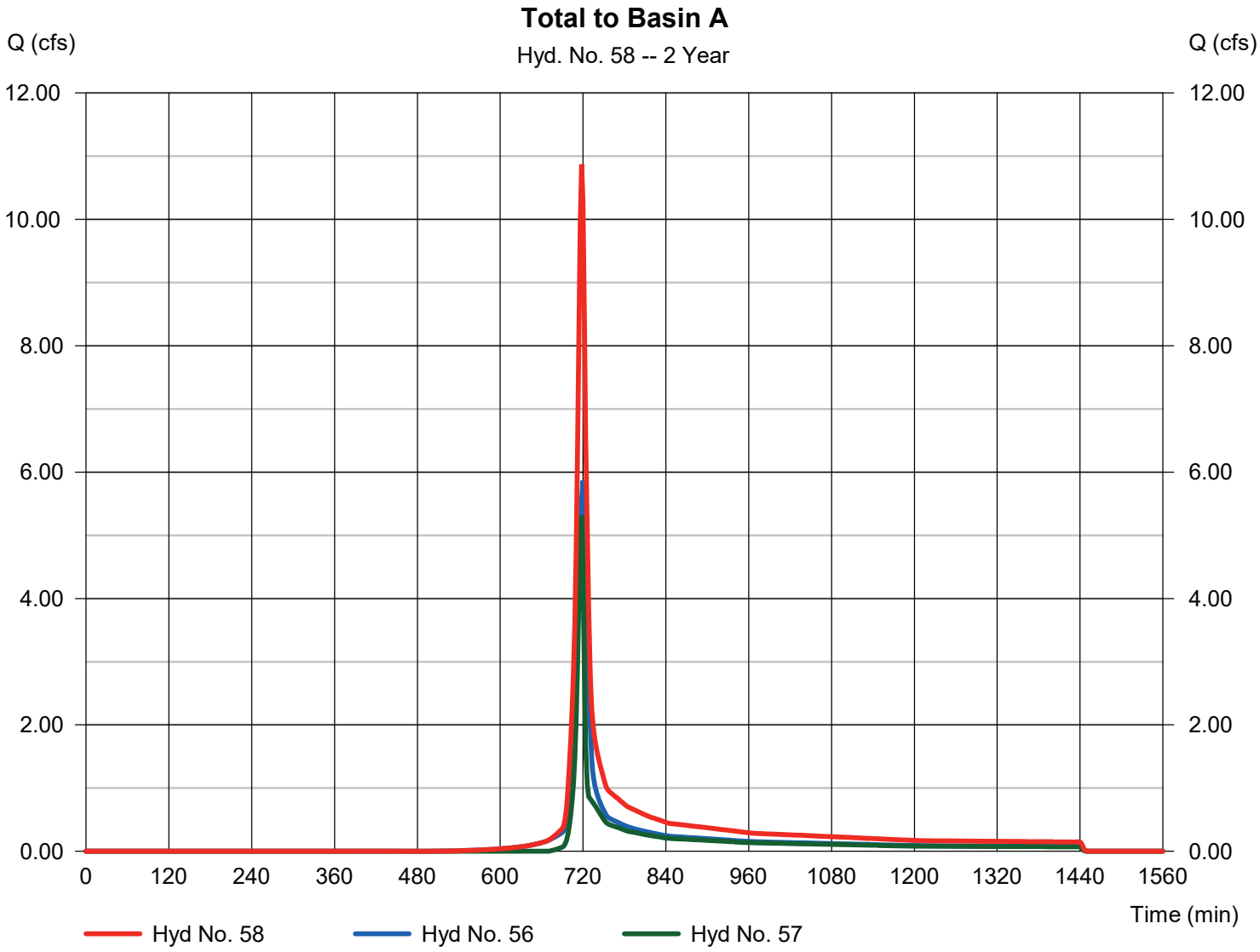
# Hydrograph Report



## Hyd. No. 58

Total to Basin A

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 10.87 cfs |
| Storm frequency | = 2 yrs | Time to peak | = 718 min |
| Time interval | = 2 min | Hyd. volume | = 25,617 cuft |
| Inflow hyds. | = 56, 57 | Contrib. drain. area | = 3.260 ac |



# Hydrograph Report

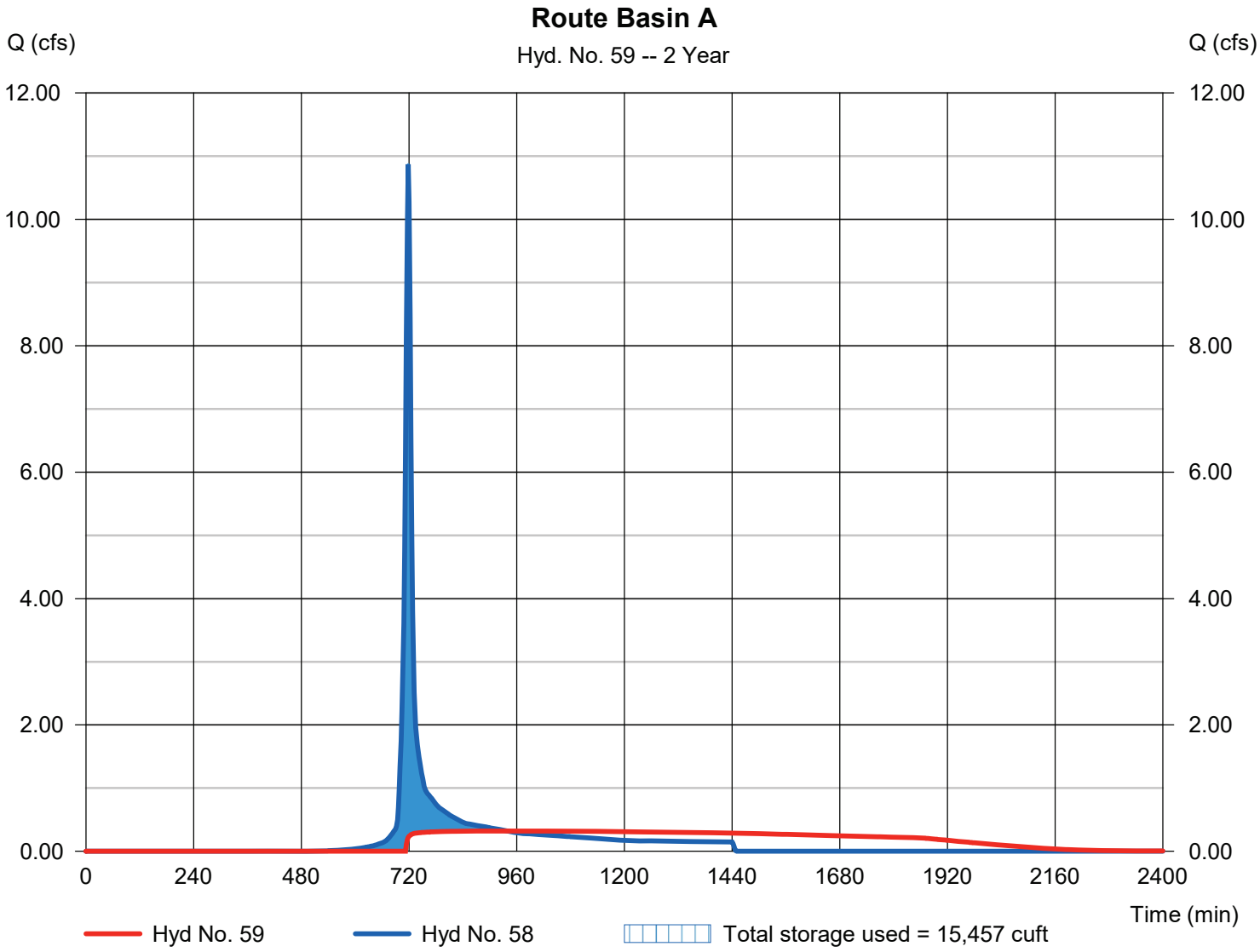
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 59

Route Basin A

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | Reservoir | Peak discharge | = | 0.320 cfs |
| Storm frequency | = | 2 yrs | Time to peak | = | 938 min |
| Time interval | = | 2 min | Hyd. volume | = | 22,083 cuft |
| Inflow hyd. No. | = | 58 - Total to Basin A | Max. Elevation | = | 14.08 ft |
| Reservoir name | = | Basin A (MRC) | Max. Storage | = | 15,457 cuft |

Storage Indication method used.



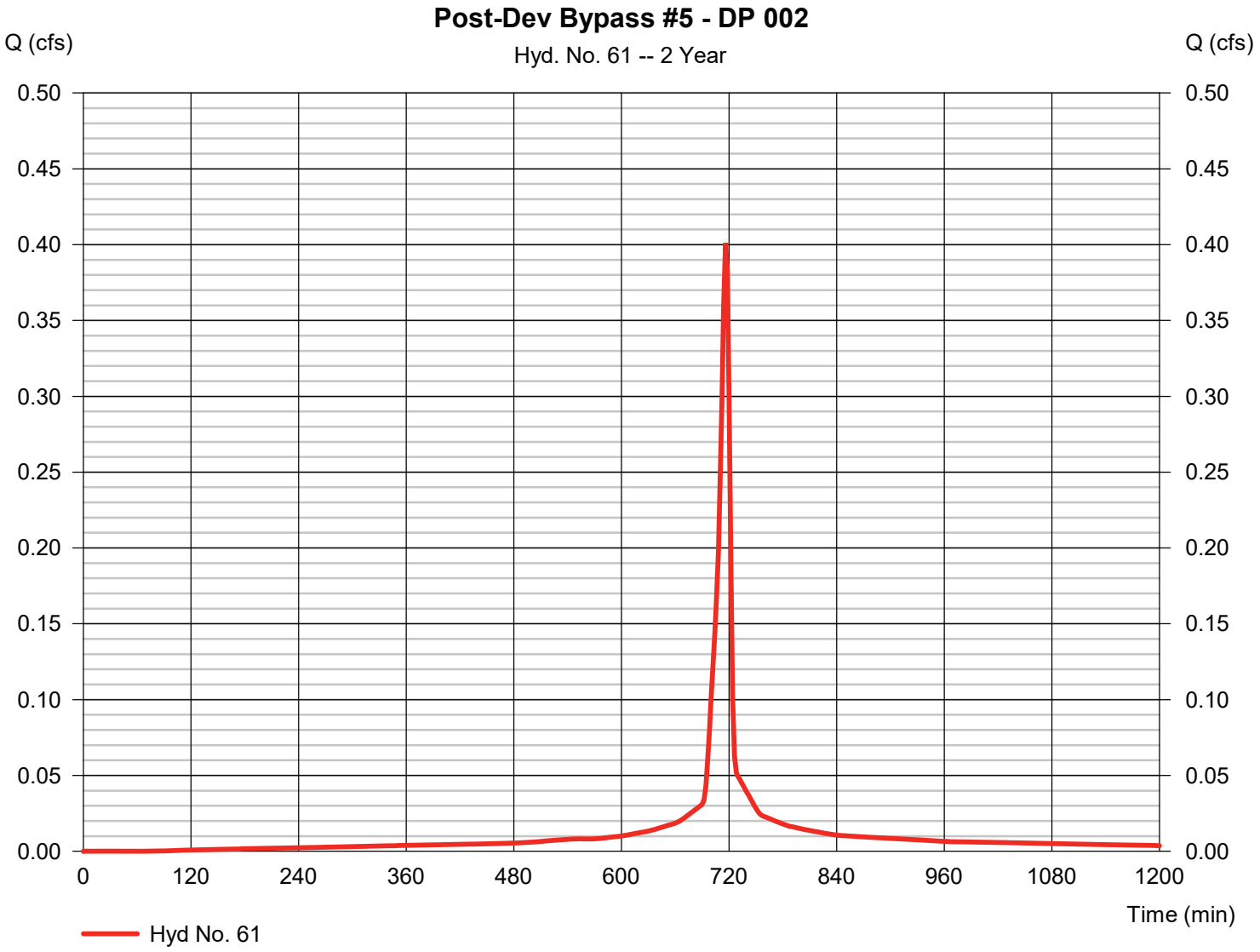
# Hydrograph Report



## Hyd. No. 61

Post-Dev Bypass #5 - DP 002

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 0.401 cfs |
| Storm frequency | = 2 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 939 cuft |
| Drainage area | = 0.090 ac | Curve number | = 98 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 3.30 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



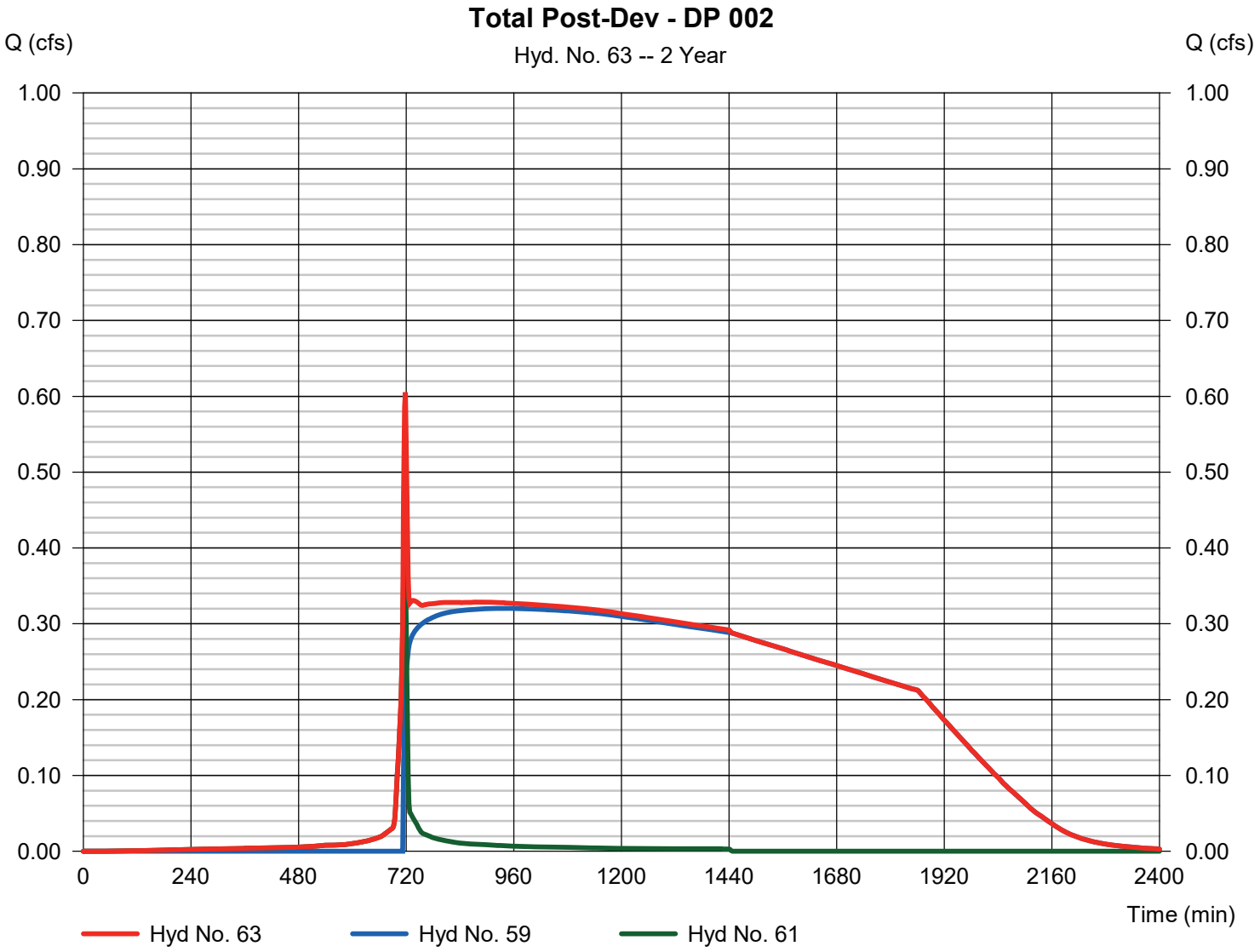
# Hydrograph Report



## Hyd. No. 63

Total Post-Dev - DP 002

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 0.605 cfs |
| Storm frequency | = 2 yrs | Time to peak | = 718 min |
| Time interval | = 2 min | Hyd. volume | = 23,022 cuft |
| Inflow hyds. | = 59, 61 | Contrib. drain. area | = 0.090 ac |



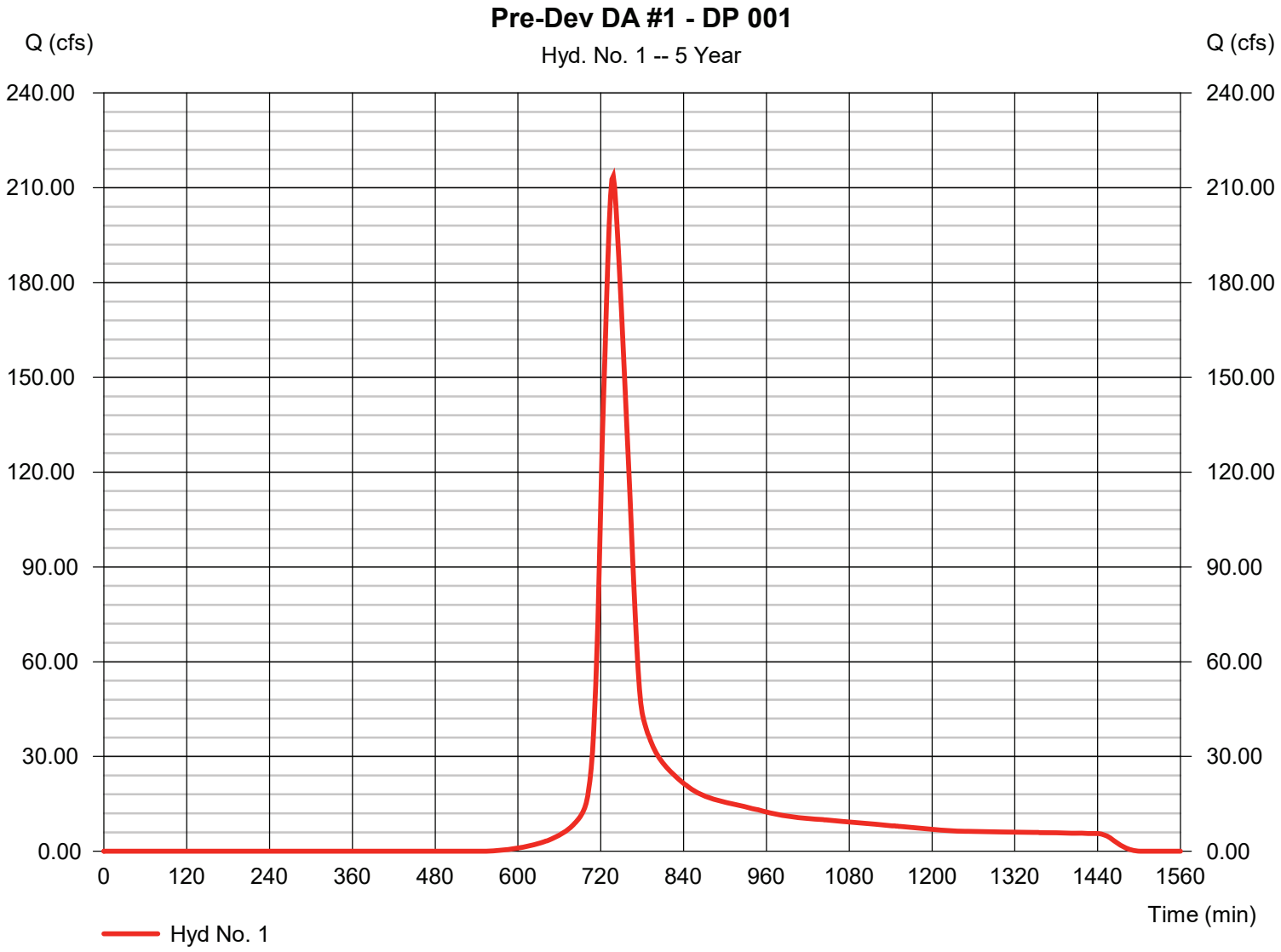
# Hydrograph Report



## Hyd. No. 1

Pre-Dev DA #1 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 213.63 cfs |
| Storm frequency | = 5 yrs | Time to peak | = 738 min |
| Time interval | = 2 min | Hyd. volume | = 1,050,390 cuft |
| Drainage area | = 149.840 ac | Curve number | = 76.5 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = TR55 | Time of conc. (Tc) | = 37.70 min |
| Total precip. | = 4.20 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



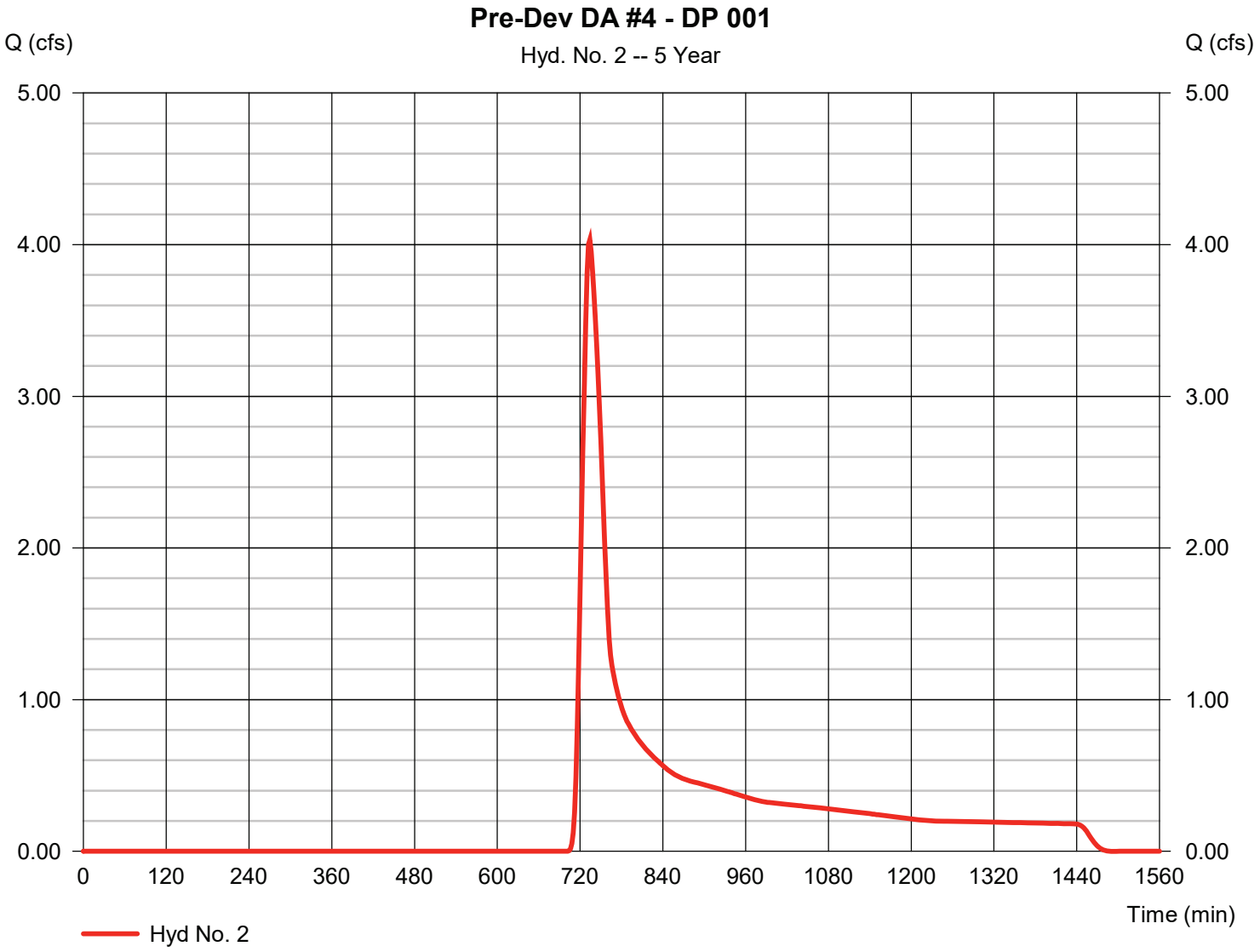
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 2

Pre-Dev DA #4 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 4.033 cfs |
| Storm frequency | = 5 yrs | Time to peak | = 734 min |
| Time interval | = 2 min | Hyd. volume | = 21,898 cuft |
| Drainage area | = 8.180 ac | Curve number | = 57.6 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = TR55 | Time of conc. (Tc) | = 28.25 min |
| Total precip. | = 4.20 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



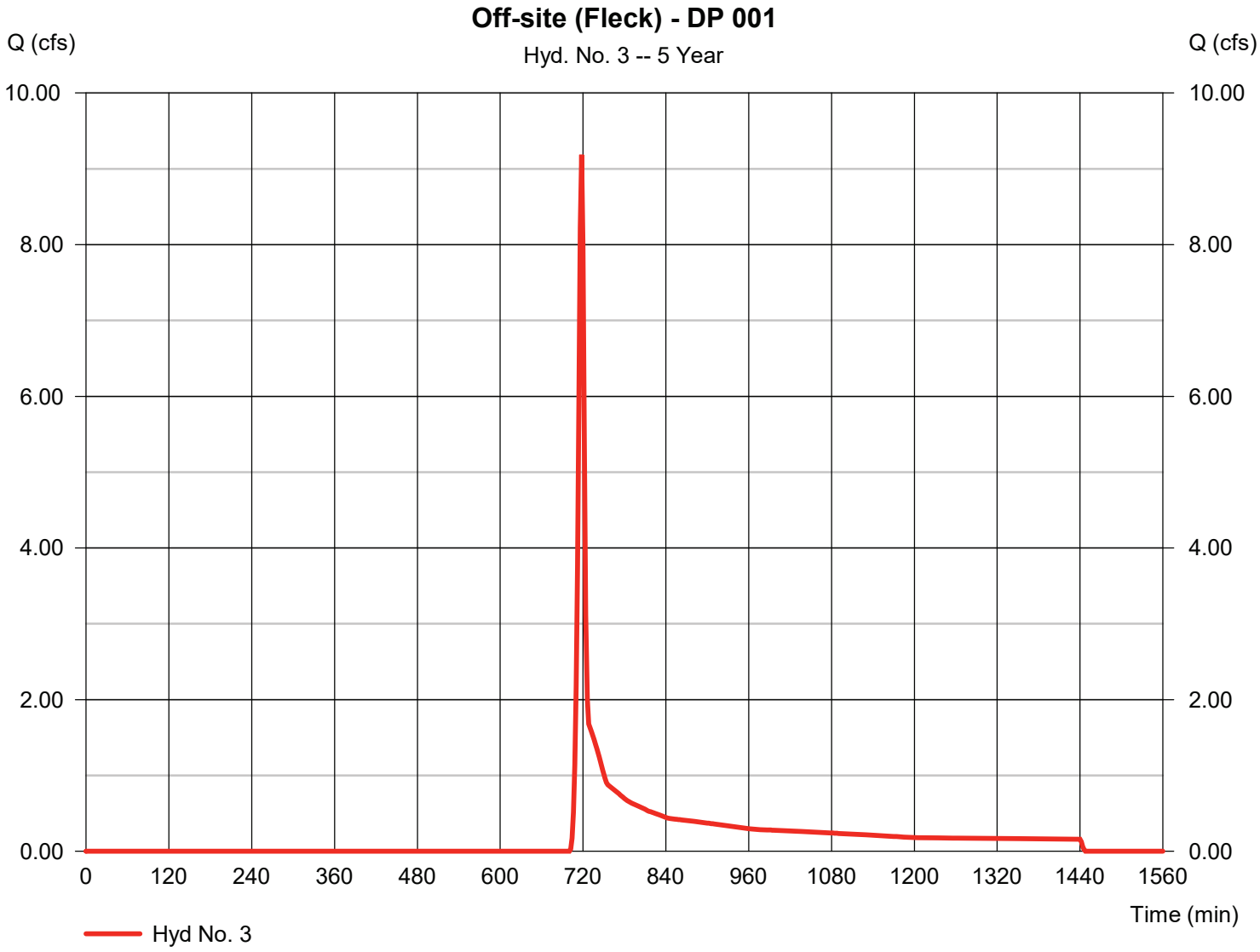
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 3

Off-site (Fleck) - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 9.186 cfs |
| Storm frequency | = 5 yrs | Time to peak | = 718 min |
| Time interval | = 2 min | Hyd. volume | = 19,912 cuft |
| Drainage area | = 7.470 ac | Curve number | = 58.5 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 4.20 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



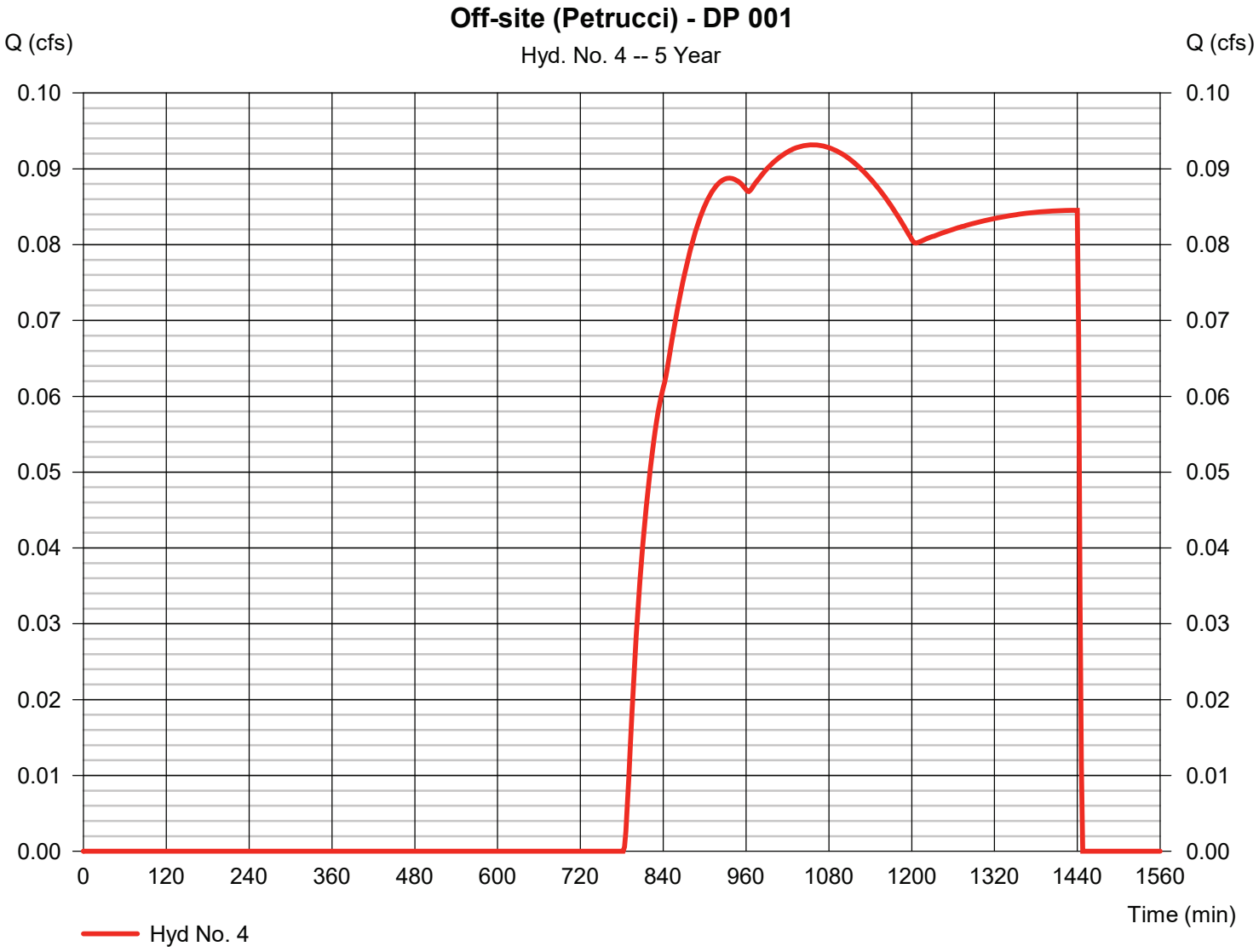
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 4

Off-site (Petrucci) - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 0.093 cfs |
| Storm frequency | = 5 yrs | Time to peak | = 1056 min |
| Time interval | = 2 min | Hyd. volume | = 3,219 cuft |
| Drainage area | = 18.000 ac | Curve number | = 38.1 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 4.20 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



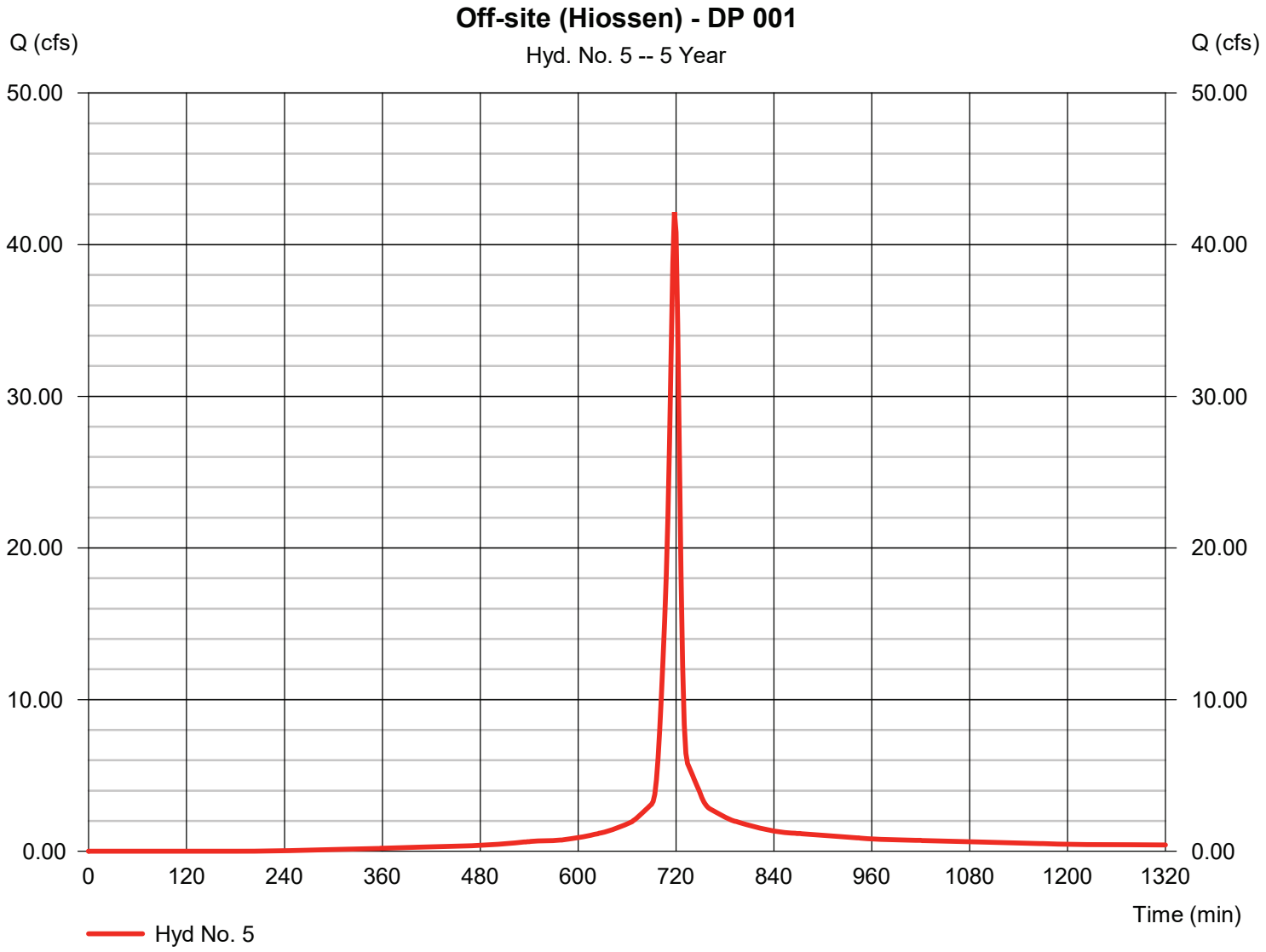
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 5

Off-site (Hiossen) - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 42.15 cfs |
| Storm frequency | = 5 yrs | Time to peak | = 718 min |
| Time interval | = 2 min | Hyd. volume | = 102,411 cuft |
| Drainage area | = 8.390 ac | Curve number | = 92.5 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = TR55 | Time of conc. (Tc) | = 8.90 min |
| Total precip. | = 4.20 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



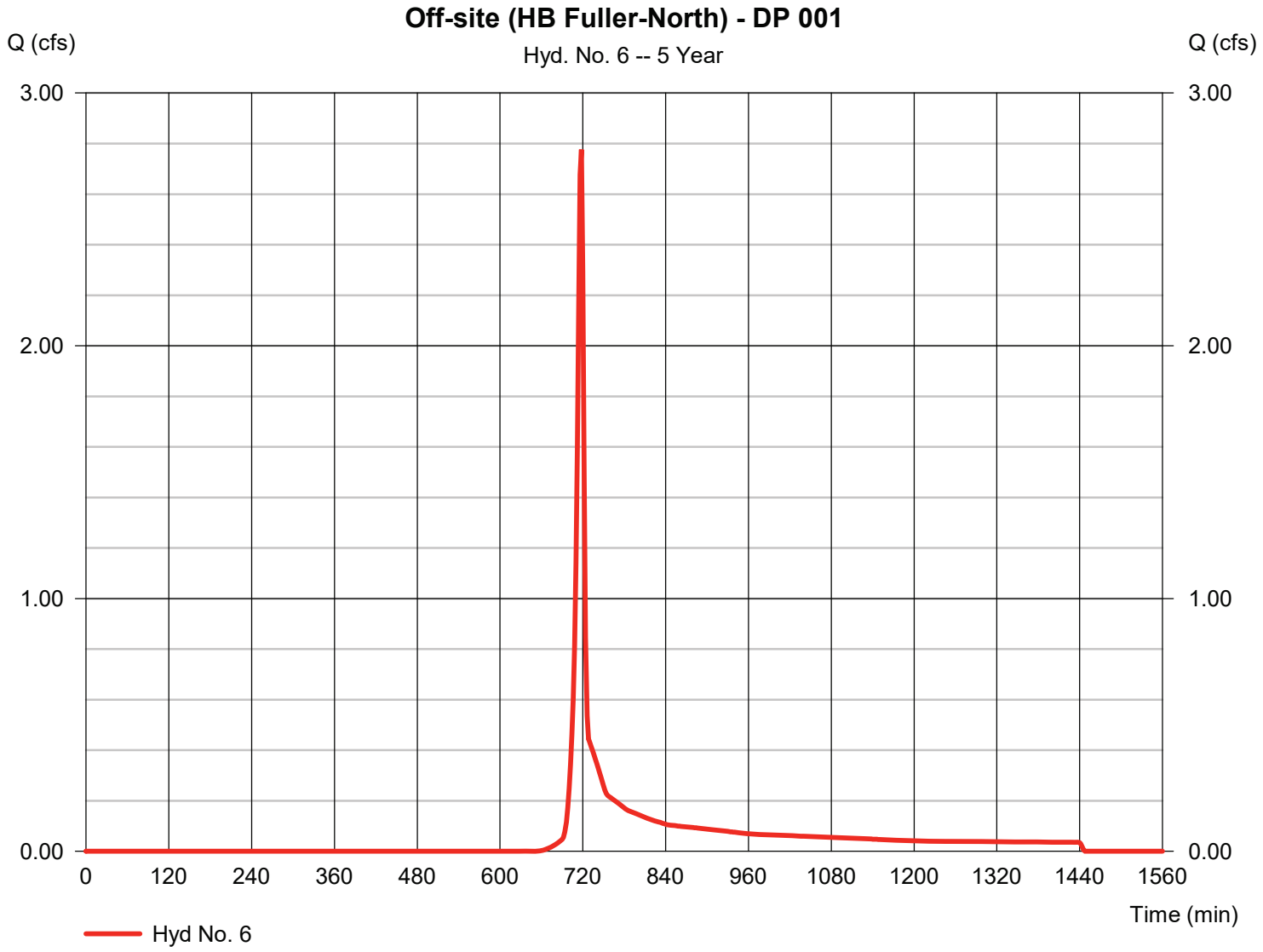
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 6

Off-site (HB Fuller-North) - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 2.777 cfs |
| Storm frequency | = 5 yrs | Time to peak | = 718 min |
| Time interval | = 2 min | Hyd. volume | = 5,572 cuft |
| Drainage area | = 1.240 ac | Curve number | = 67.8 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 4.20 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



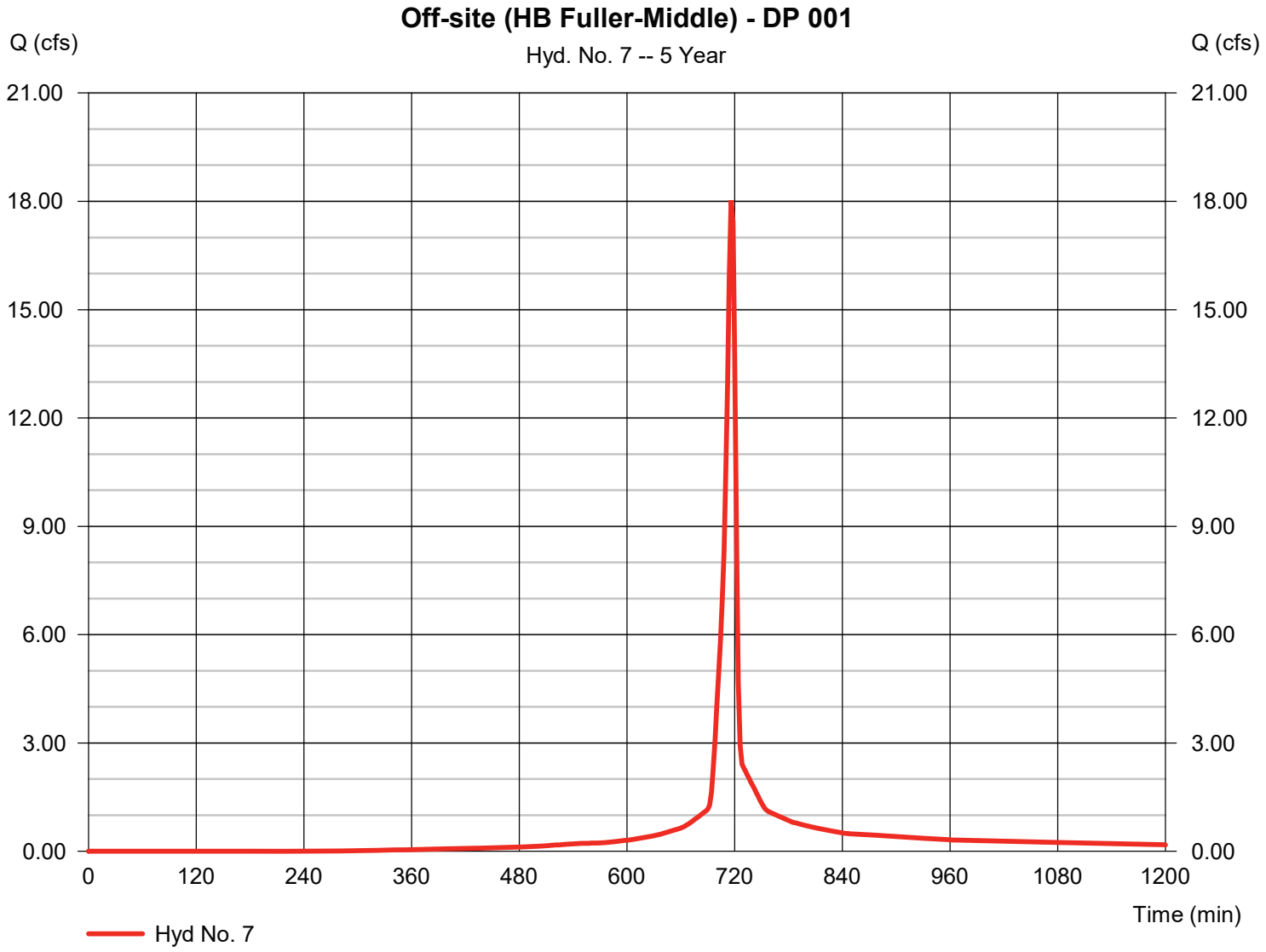
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 7

Off-site (HB Fuller-Middle) - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 18.03 cfs |
| Storm frequency | = 5 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 38,229 cuft |
| Drainage area | = 3.590 ac | Curve number | = 90.2 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 4.20 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



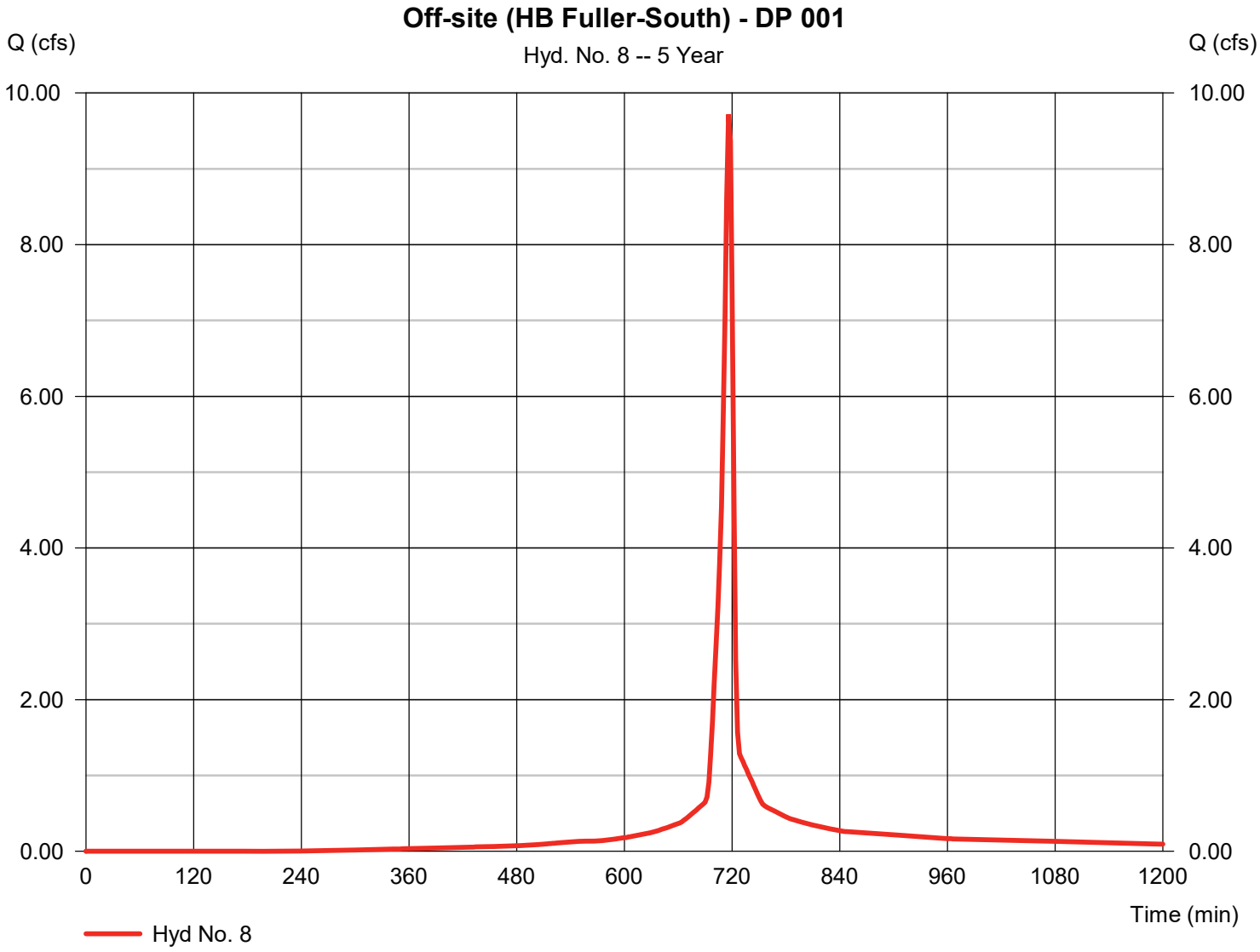
# Hydrograph Report



## Hyd. No. 8

Off-site (HB Fuller-South) - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 9.717 cfs |
| Storm frequency | = 5 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 20,856 cuft |
| Drainage area | = 1.880 ac | Curve number | = 91.5 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 4.20 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



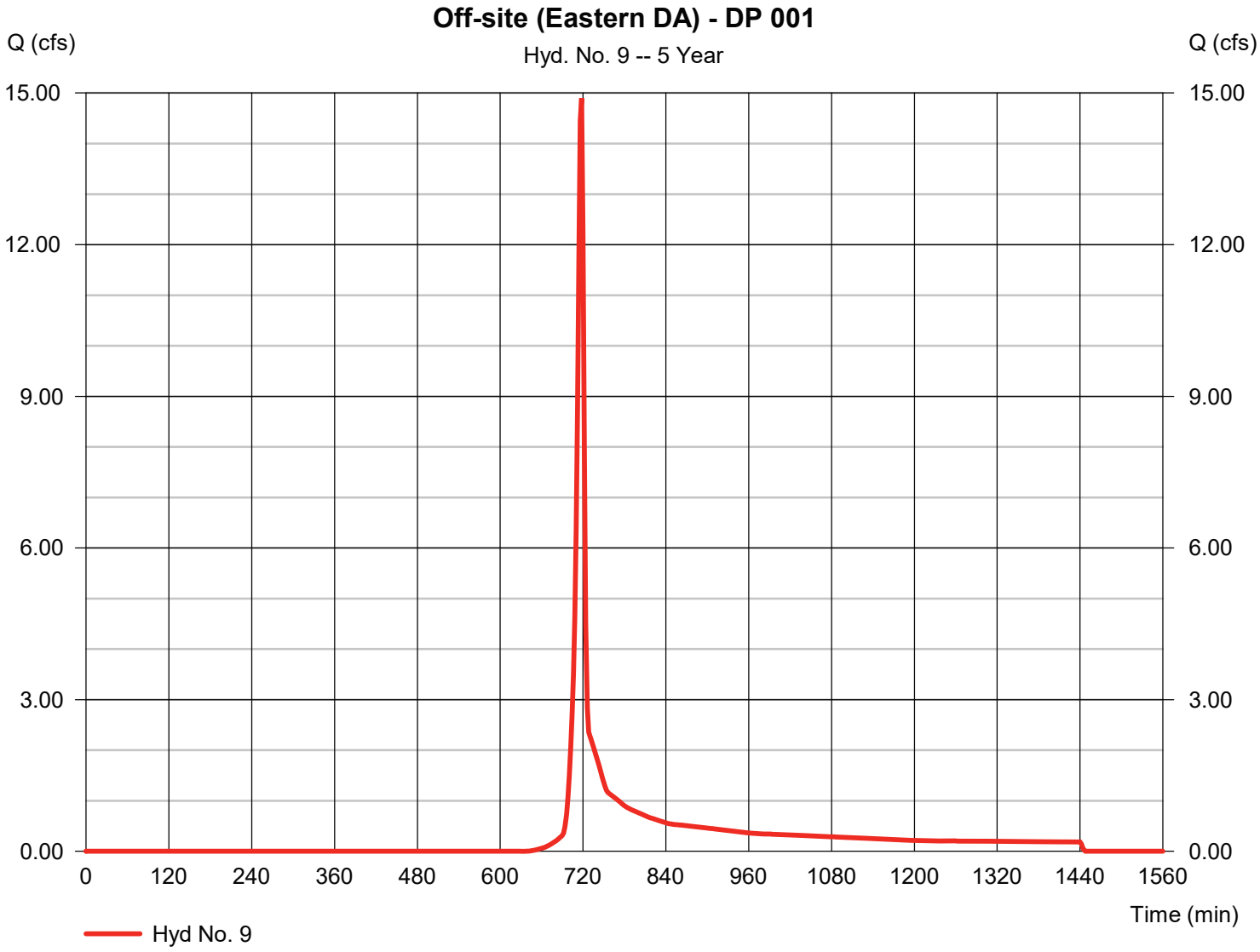
# Hydrograph Report



## Hyd. No. 9

Off-site (Eastern DA) - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 14.90 cfs |
| Storm frequency | = 5 yrs | Time to peak | = 718 min |
| Time interval | = 2 min | Hyd. volume | = 29,832 cuft |
| Drainage area | = 6.210 ac | Curve number | = 69.2 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 4.20 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



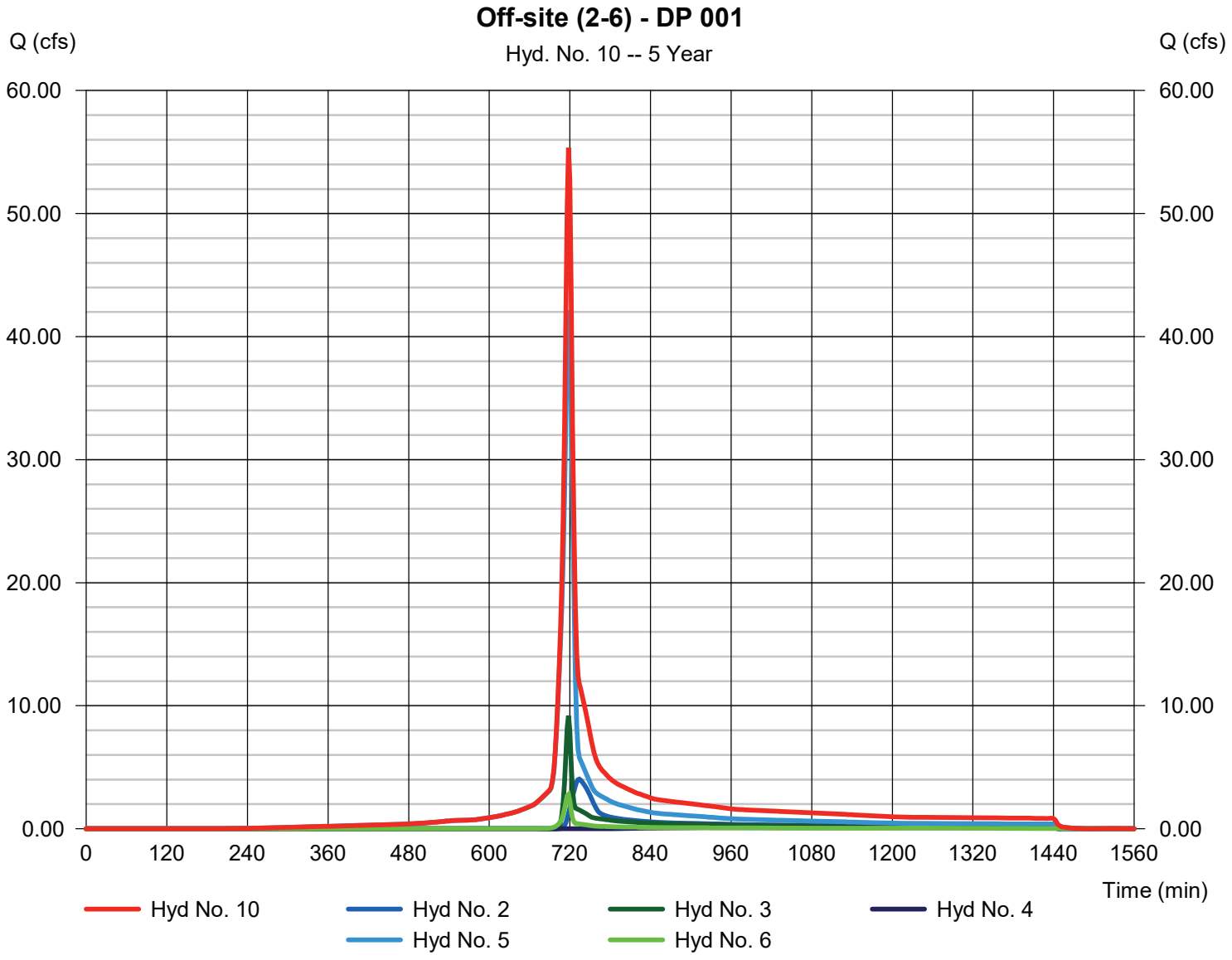
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 10

Off-site (2-6) - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 55.35 cfs |
| Storm frequency | = 5 yrs | Time to peak | = 718 min |
| Time interval | = 2 min | Hyd. volume | = 153,013 cuft |
| Inflow hyds. | = 2, 3, 4, 5, 6 | Contrib. drain. area | = 43.280 ac |



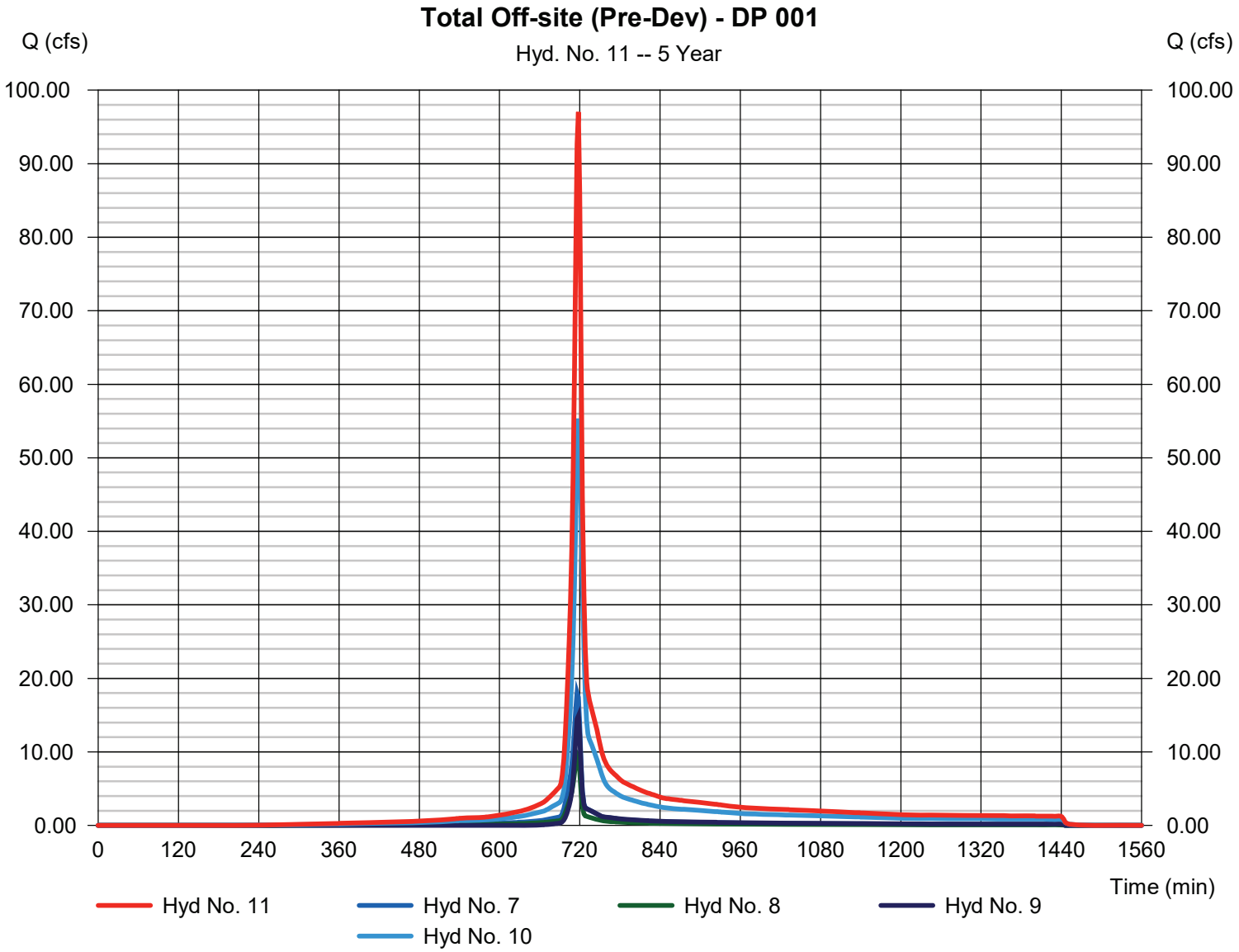
# Hydrograph Report



## Hyd. No. 11

Total Off-site (Pre-Dev) - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 97.05 cfs |
| Storm frequency | = 5 yrs | Time to peak | = 718 min |
| Time interval | = 2 min | Hyd. volume | = 241,929 cuft |
| Inflow hyds. | = 7, 8, 9, 10 | Contrib. drain. area | = 11.680 ac |



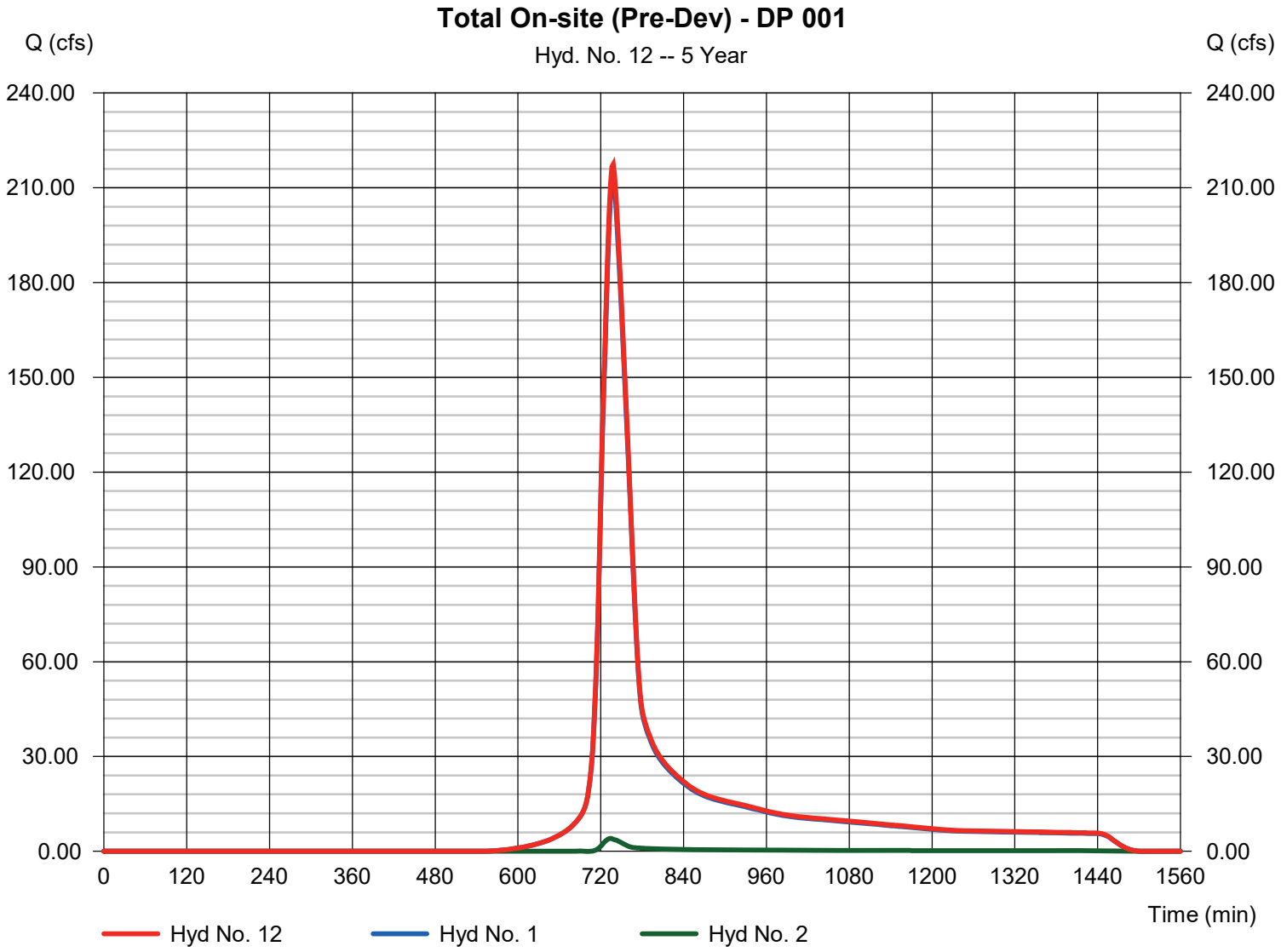
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 12

Total On-site (Pre-Dev) - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 217.45 cfs |
| Storm frequency | = 5 yrs | Time to peak | = 738 min |
| Time interval | = 2 min | Hyd. volume | = 1,072,289 cuft |
| Inflow hyds. | = 1, 2 | Contrib. drain. area | = 158.020 ac |



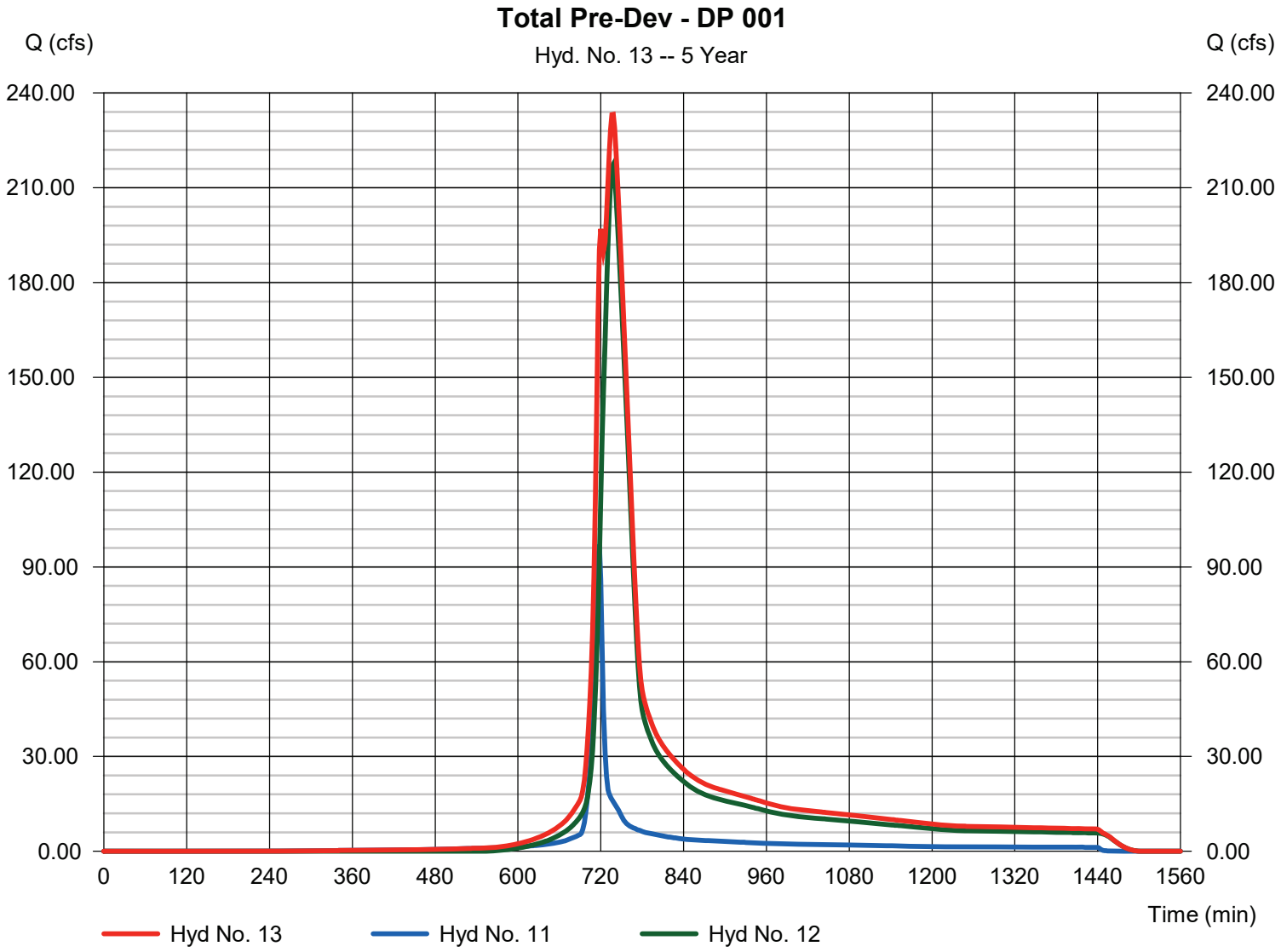
# Hydrograph Report



## Hyd. No. 13

Total Pre-Dev - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 233.20 cfs |
| Storm frequency | = 5 yrs | Time to peak | = 738 min |
| Time interval | = 2 min | Hyd. volume | = 1,314,218 cuft |
| Inflow hyds. | = 11, 12 | Contrib. drain. area | = 0.000 ac |



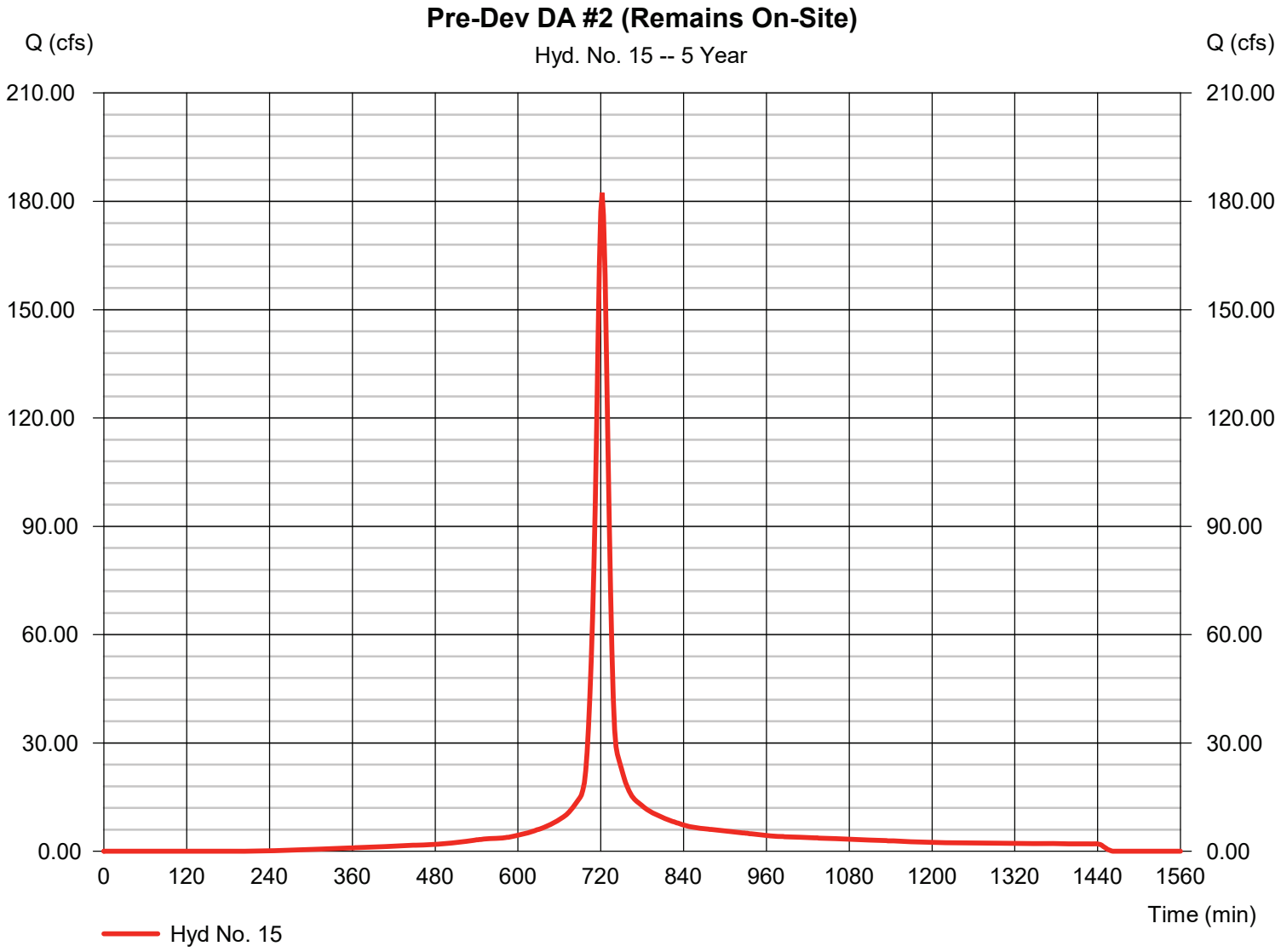
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 15

Pre-Dev DA #2 (Remains On-Site)

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 182.35 cfs |
| Storm frequency | = 5 yrs | Time to peak | = 722 min |
| Time interval | = 2 min | Hyd. volume | = 534,970 cuft |
| Drainage area | = 45.370 ac | Curve number | = 92.2 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = TR55 | Time of conc. (Tc) | = 13.40 min |
| Total precip. | = 4.20 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



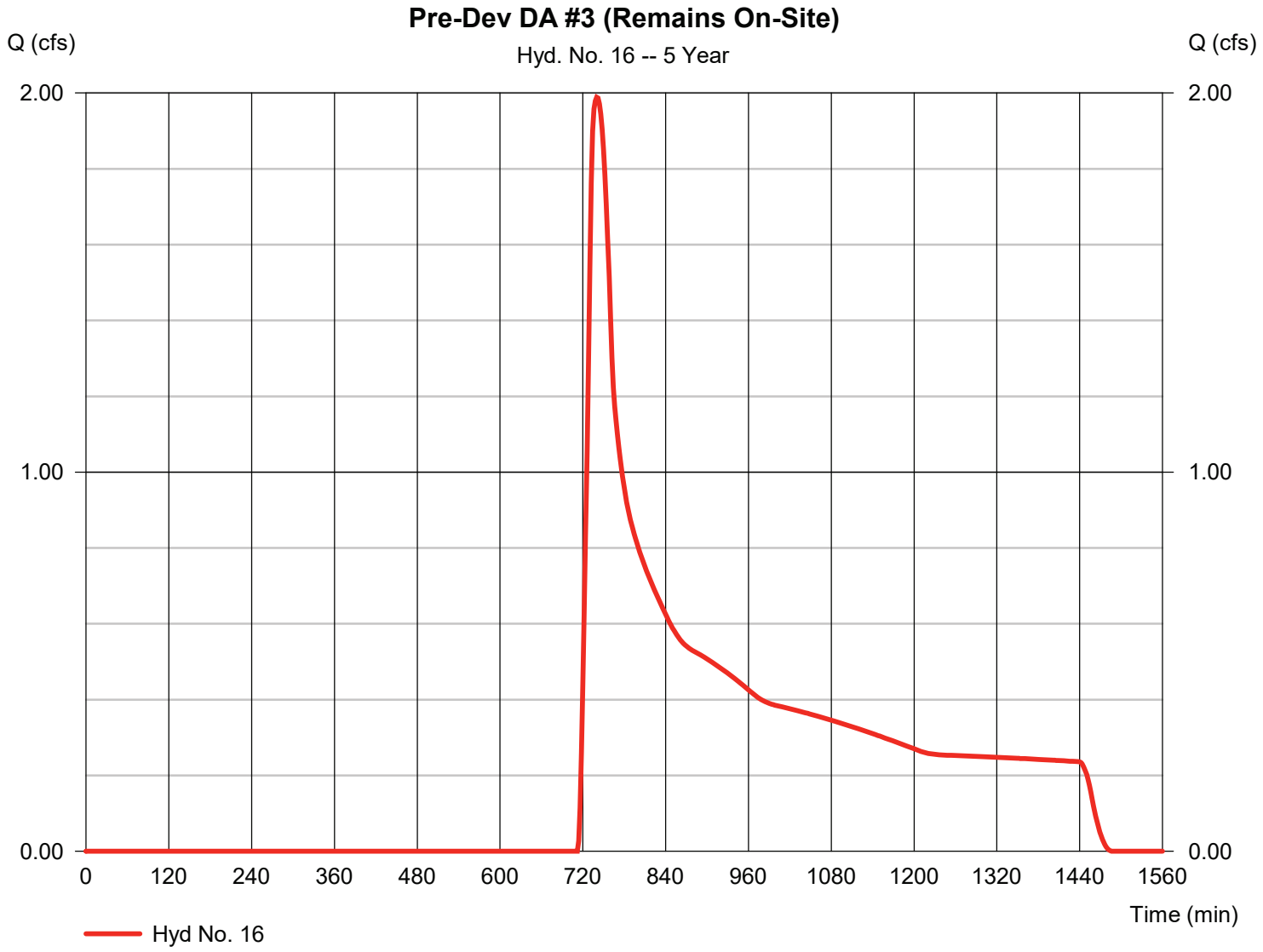
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 16

Pre-Dev DA #3 (Remains On-Site)

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 1.989 cfs |
| Storm frequency | = 5 yrs | Time to peak | = 740 min |
| Time interval | = 2 min | Hyd. volume | = 20,504 cuft |
| Drainage area | = 16.820 ac | Curve number | = 48.4 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = TR55 | Time of conc. (Tc) | = 29.90 min |
| Total precip. | = 4.20 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



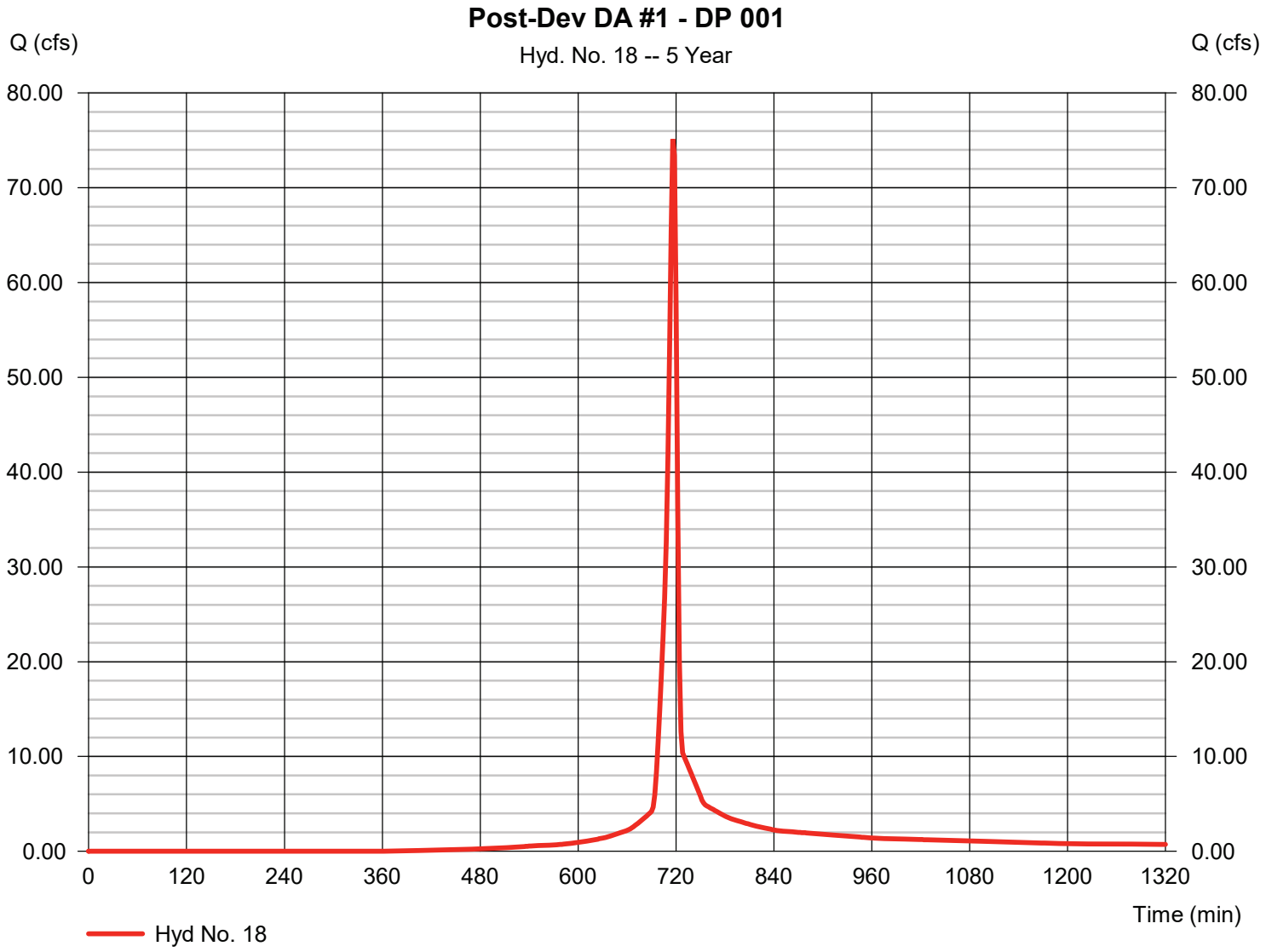
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 18

Post-Dev DA #1 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 75.12 cfs |
| Storm frequency | = 5 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 154,526 cuft |
| Drainage area | = 16.870 ac | Curve number | = 85.6 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 4.20 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



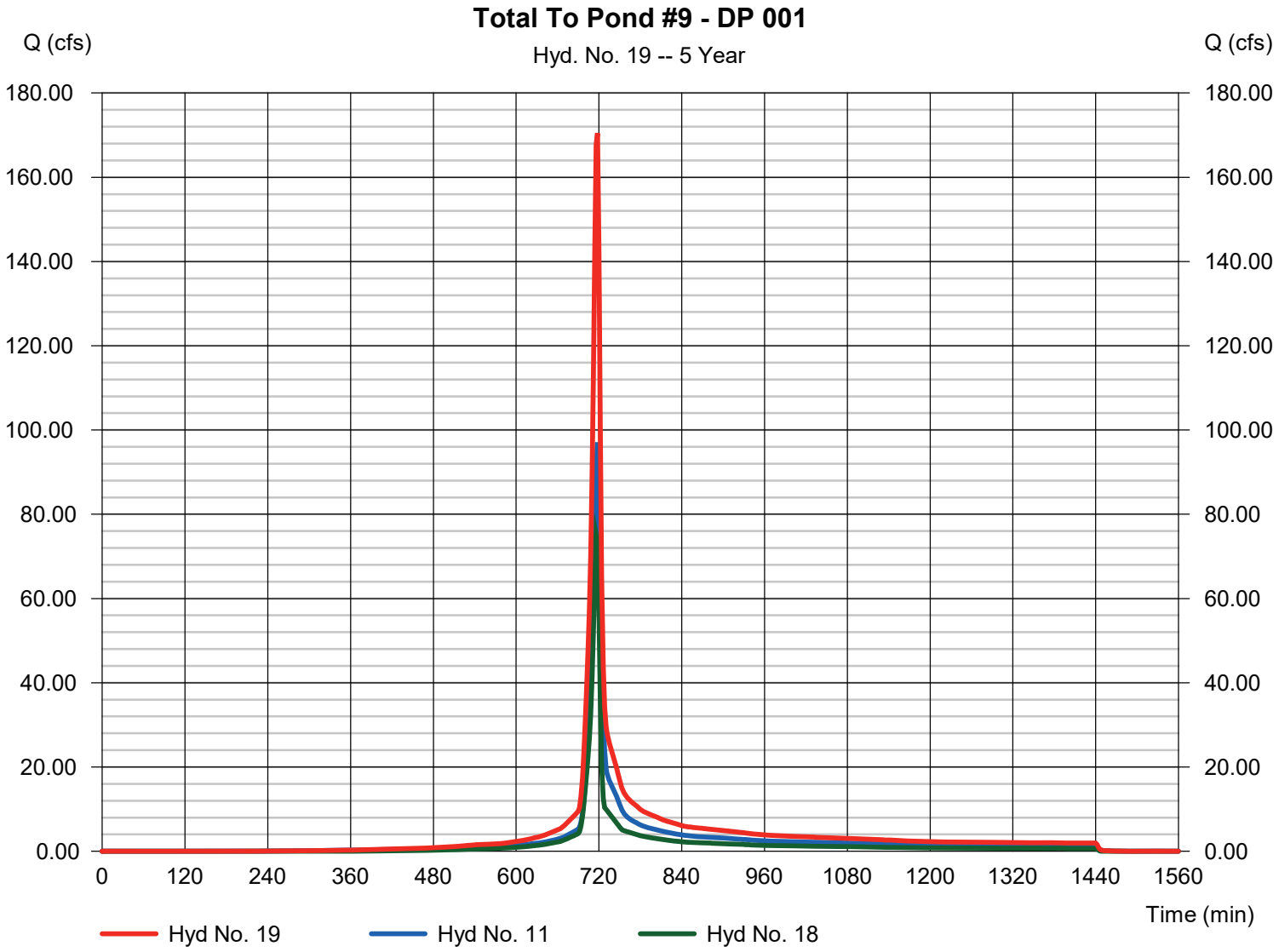
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 19

Total To Pond #9 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 170.47 cfs |
| Storm frequency | = 5 yrs | Time to peak | = 718 min |
| Time interval | = 2 min | Hyd. volume | = 396,455 cuft |
| Inflow hyds. | = 11, 18 | Contrib. drain. area | = 16.870 ac |



# Hydrograph Report

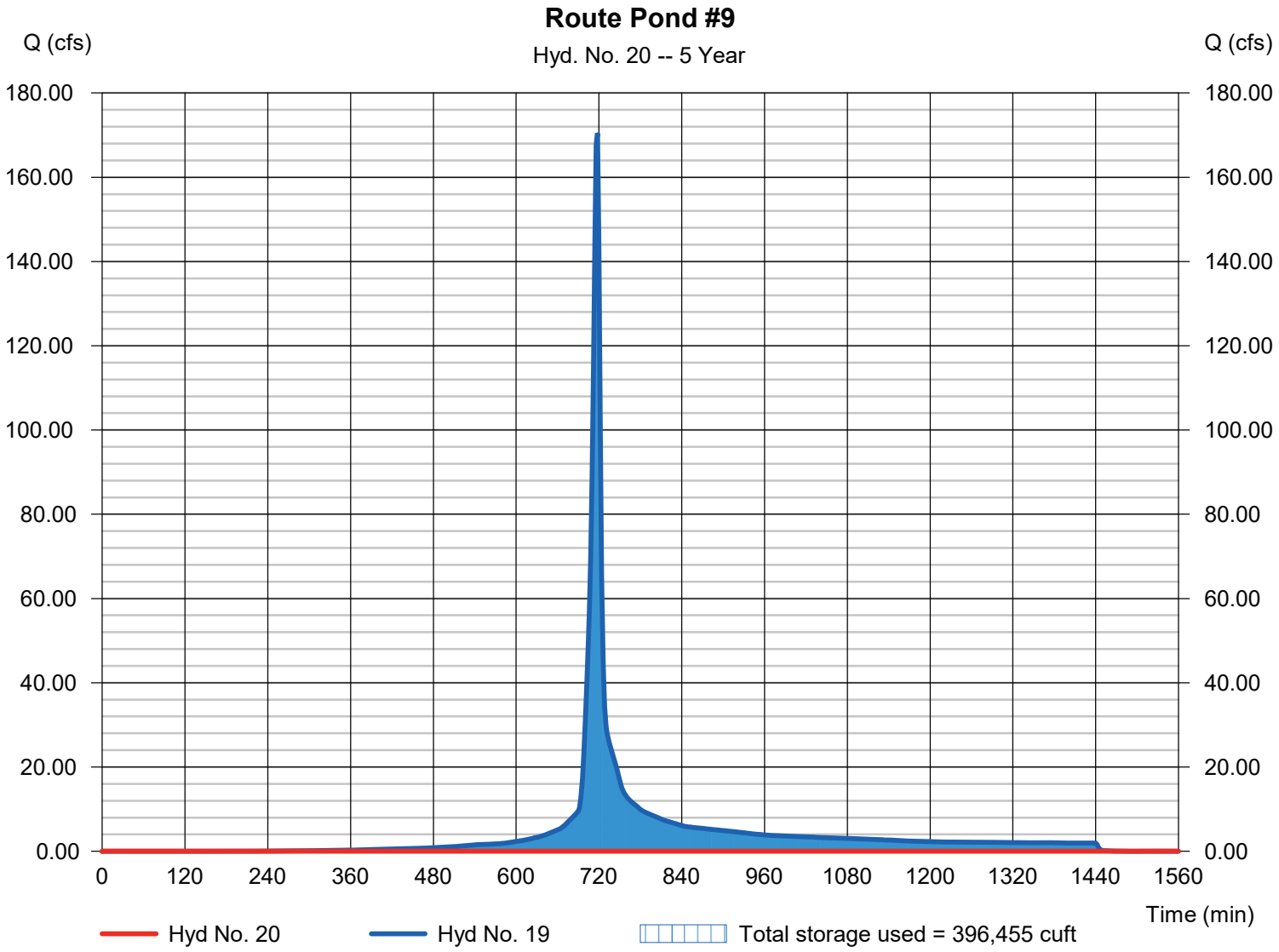
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 20

Route Pond #9

| | | | |
|---|---|---|---|
| Hydrograph type | = Reservoir | Peak discharge | = 0.000 cfs |
| Storm frequency | = 5 yrs | Time to peak | = n/a |
| Time interval | = 2 min | Hyd. volume | = 0 cuft |
| Inflow hyd. No. | = 19 - Total To Pond #9 - DP 001 | Max. Elevation | = 12.29 ft |
| Reservoir name | = Wet Pond #9 | Max. Storage | = 396,455 cuft |

Storage Indication method used.



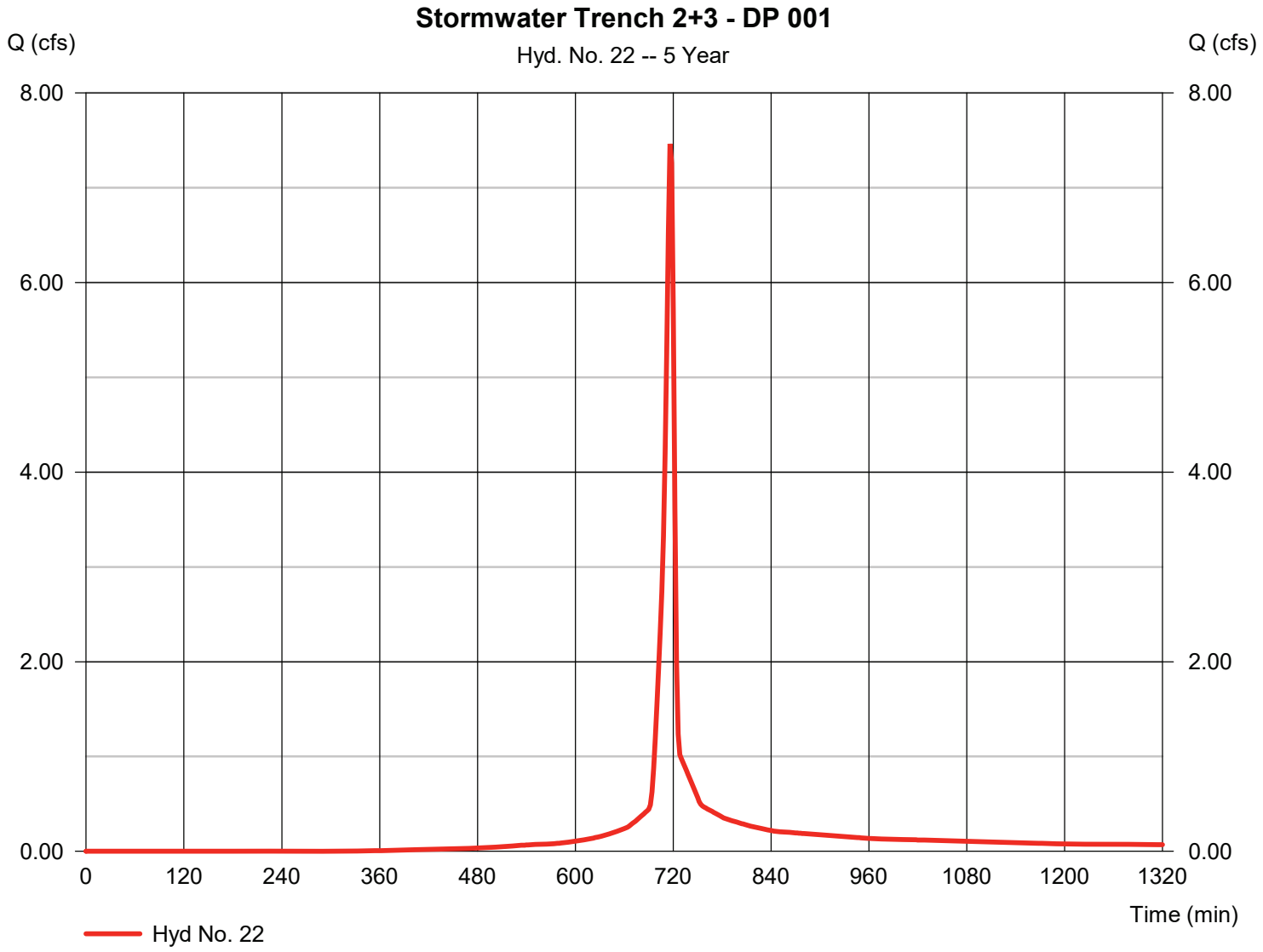
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 22

Stormwater Trench 2+3 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 7.465 cfs |
| Storm frequency | = 5 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 15,517 cuft |
| Drainage area | = 1.590 ac | Curve number | = 87.5 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 4.20 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



# Hydrograph Report

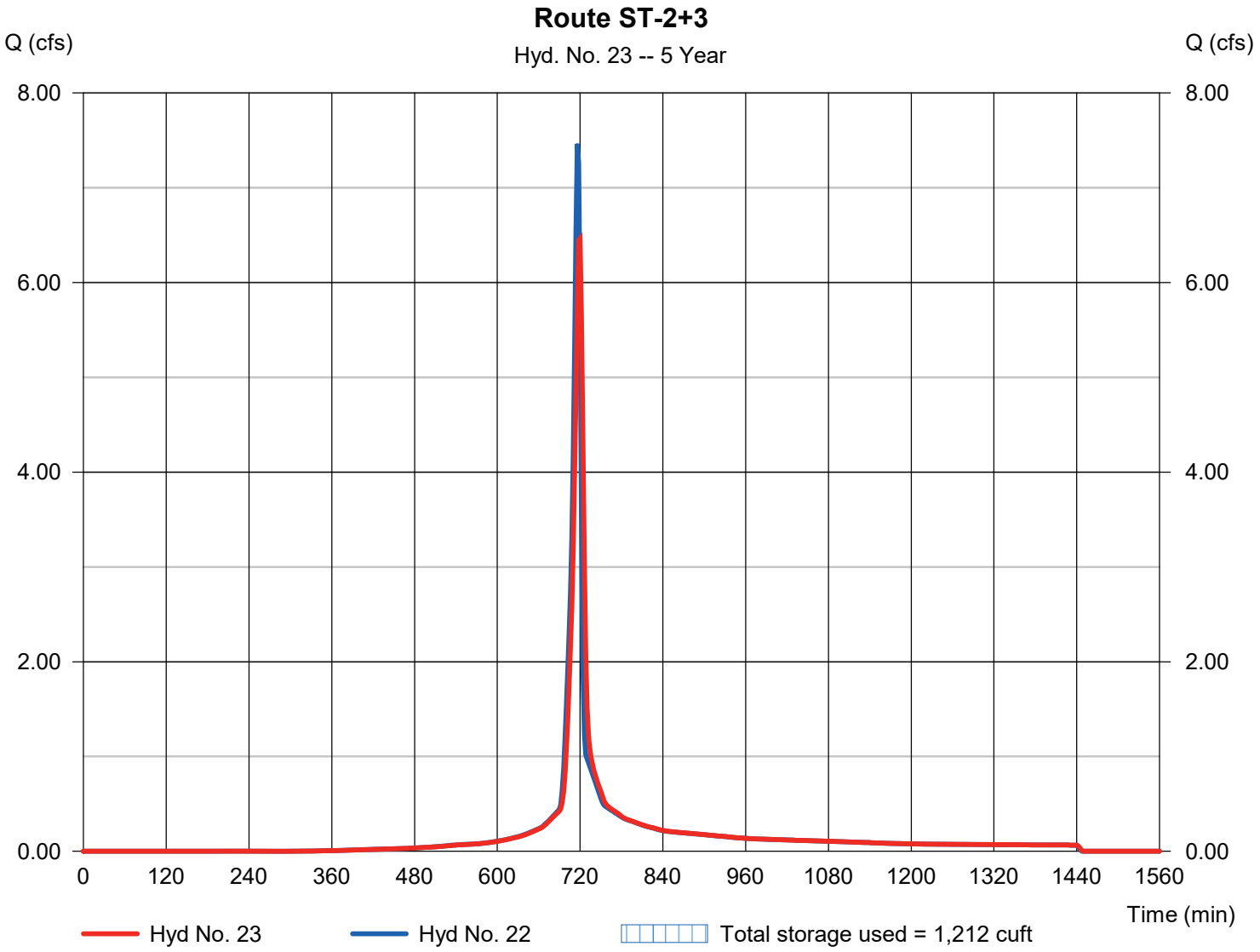
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 23

Route ST-2+3

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | Reservoir | Peak discharge | = | 6.463 cfs |
| Storm frequency | = | 5 yrs | Time to peak | = | 720 min |
| Time interval | = | 2 min | Hyd. volume | = | 15,517 cuft |
| Inflow hyd. No. | = | 22 - Stormwater Trench 2+3 - DP-03 | Max. Elevation | = | 16.36 ft |
| Reservoir name | = | Stormwater Trench ST-2+3 | Max. Storage | = | 1,212 cuft |

Storage Indication method used.



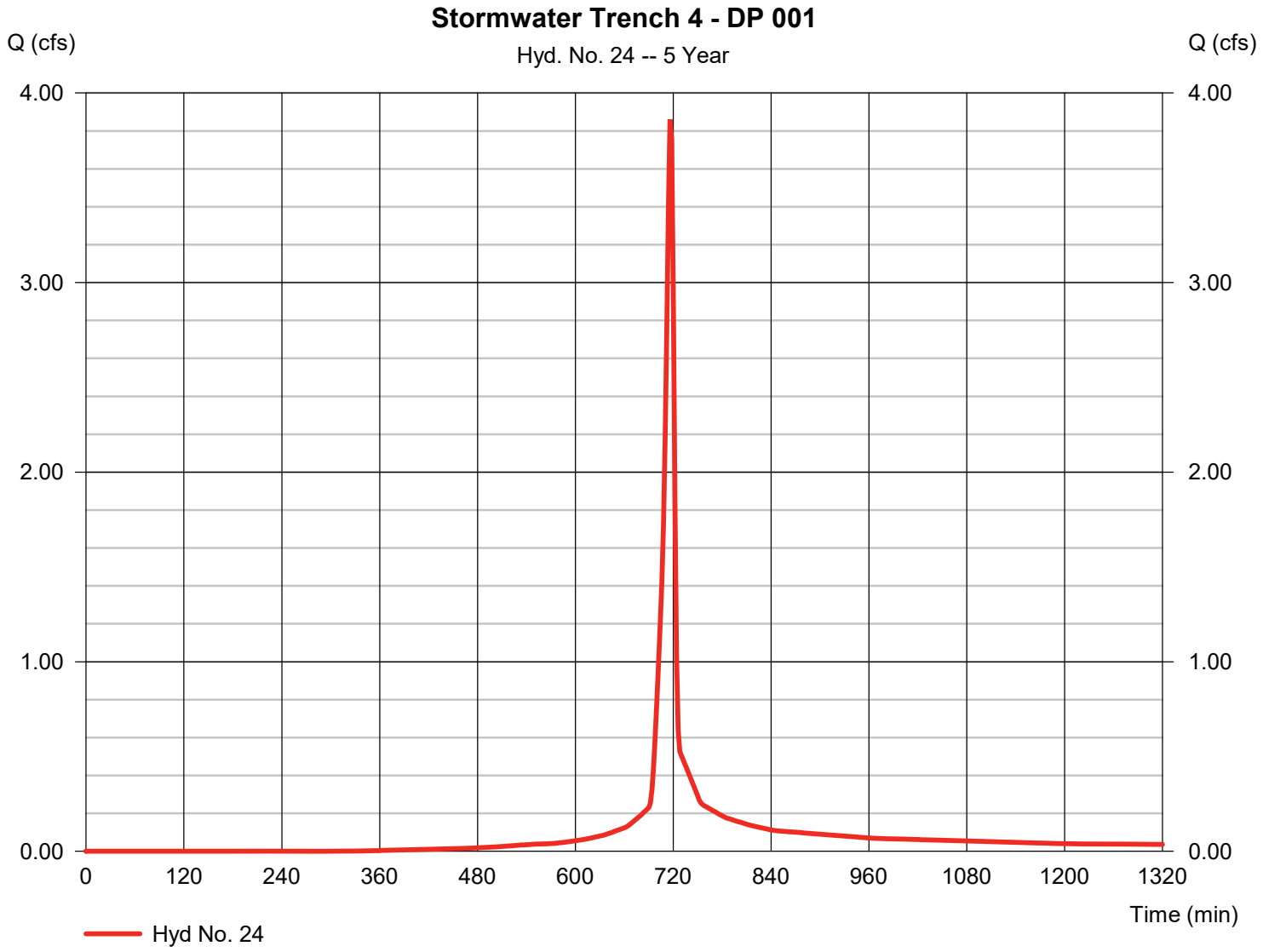
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 24

Stormwater Trench 4 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 3.860 cfs |
| Storm frequency | = 5 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 8,029 cuft |
| Drainage area | = 0.820 ac | Curve number | = 87.6 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 4.20 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



# Hydrograph Report

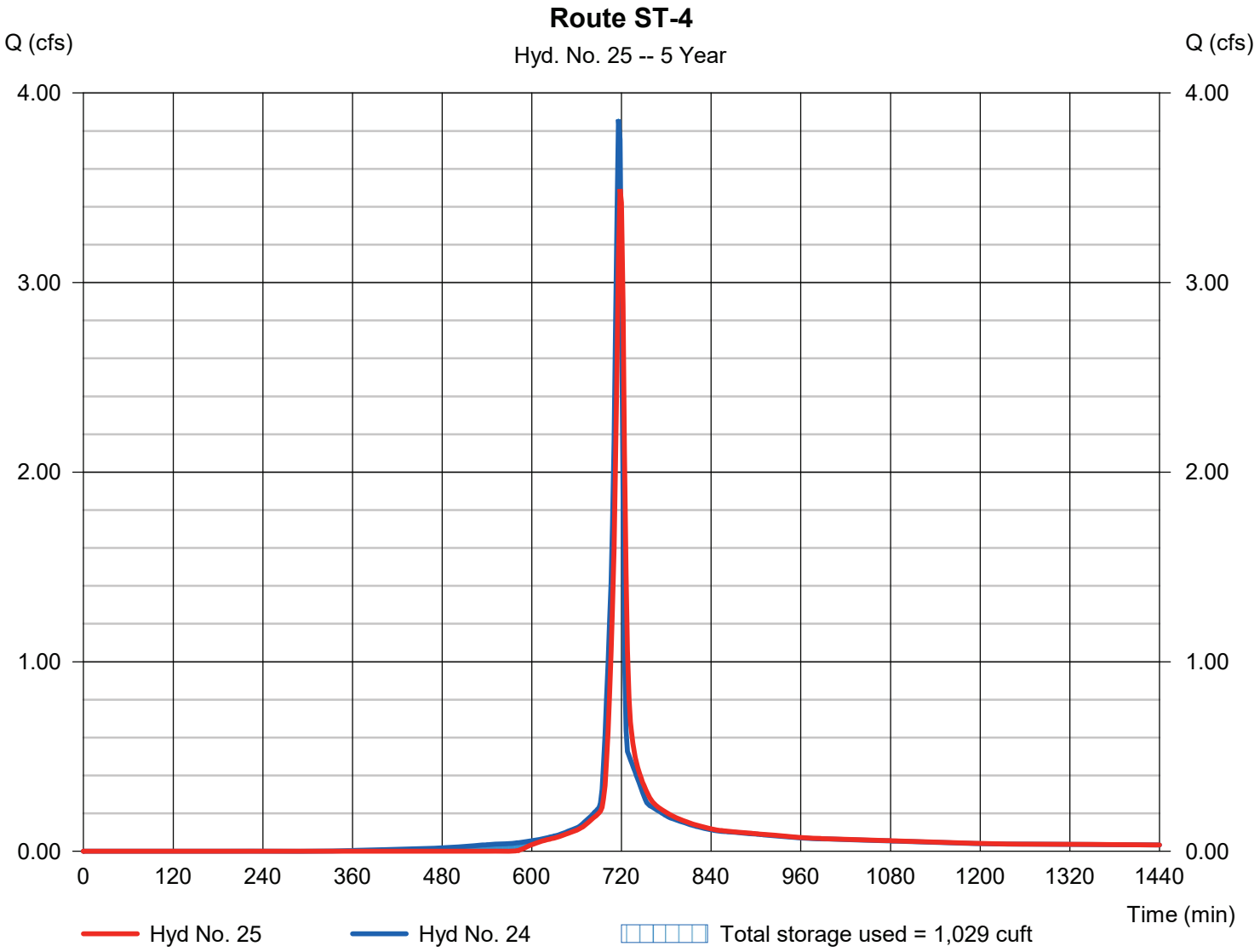
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 25

Route ST-4

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | Reservoir | Peak discharge | = | 3.493 cfs |
| Storm frequency | = | 5 yrs | Time to peak | = | 718 min |
| Time interval | = | 2 min | Hyd. volume | = | 7,775 cuft |
| Inflow hyd. No. | = | 24 - Stormwater Trench 4 - DP-001 | Max. Elevation | = | 16.72 ft |
| Reservoir name | = | Stormwater Trench ST-4 | Max. Storage | = | 1,029 cuft |

Storage Indication method used.



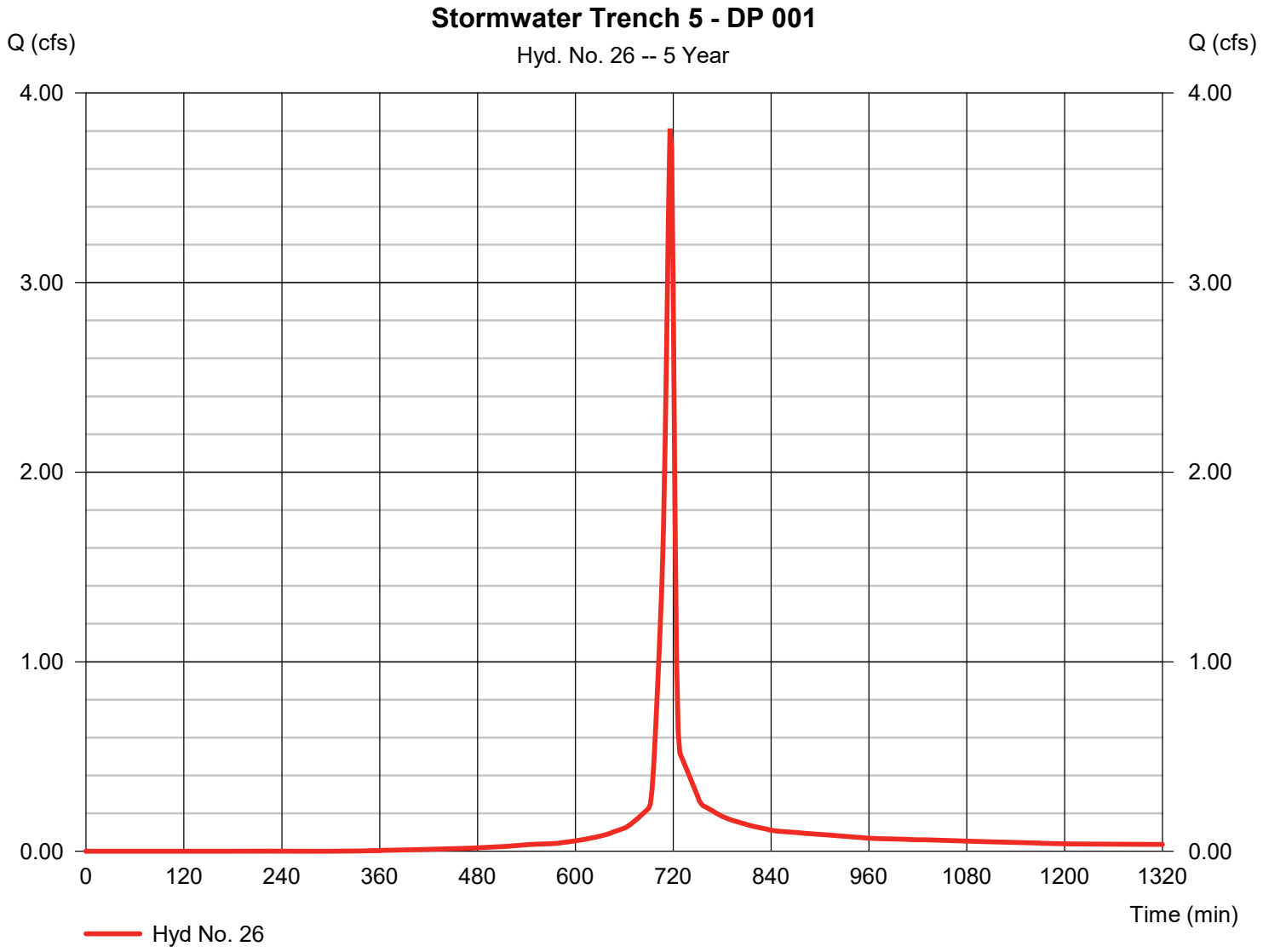
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 26

Stormwater Trench 5 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 3.813 cfs |
| Storm frequency | = 5 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 7,931 cuft |
| Drainage area | = 0.810 ac | Curve number | = 87.6 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 4.20 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



# Hydrograph Report

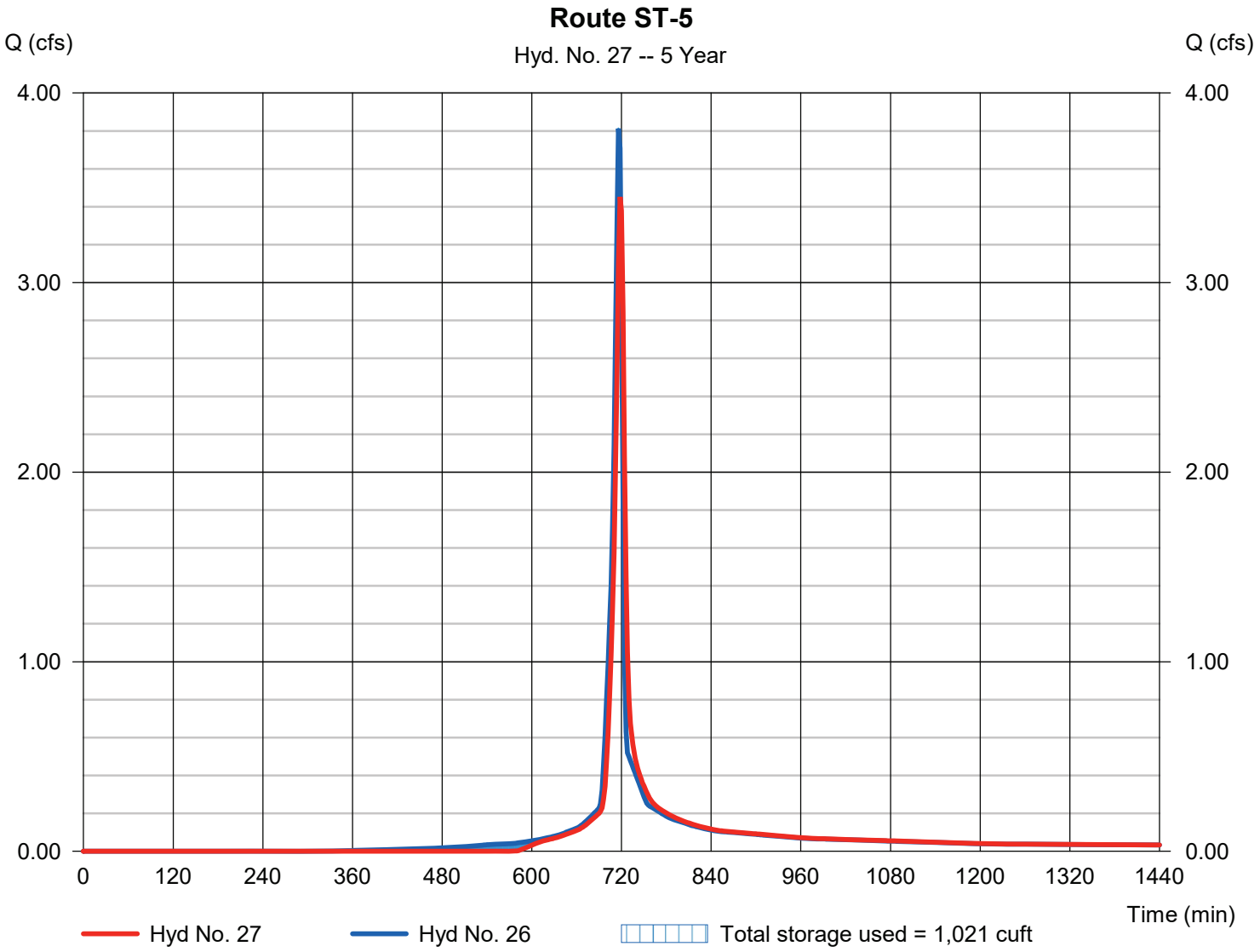
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 27

Route ST-5

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | Reservoir | Peak discharge | = | 3.451 cfs |
| Storm frequency | = | 5 yrs | Time to peak | = | 718 min |
| Time interval | = | 2 min | Hyd. volume | = | 7,677 cuft |
| Inflow hyd. No. | = | 26 - Stormwater Trench 5 - DP001 | Max. Elevation | = | 16.71 ft |
| Reservoir name | = | Stormwater Trench ST-5 | Max. Storage | = | 1,021 cuft |

Storage Indication method used.



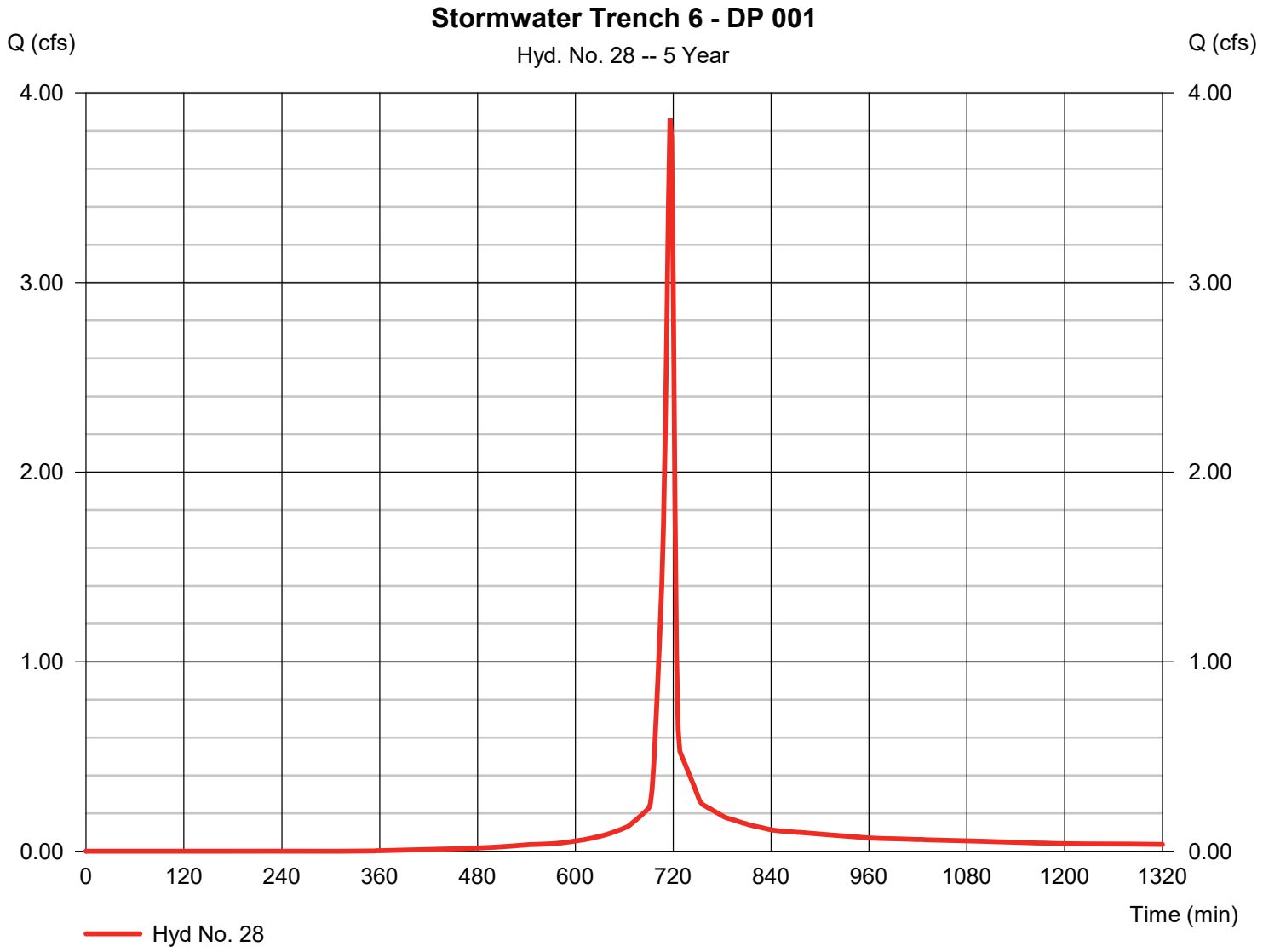
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 28

Stormwater Trench 6 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 3.865 cfs |
| Storm frequency | = 5 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 8,020 cuft |
| Drainage area | = 0.830 ac | Curve number | = 87.2 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 4.20 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



# Hydrograph Report

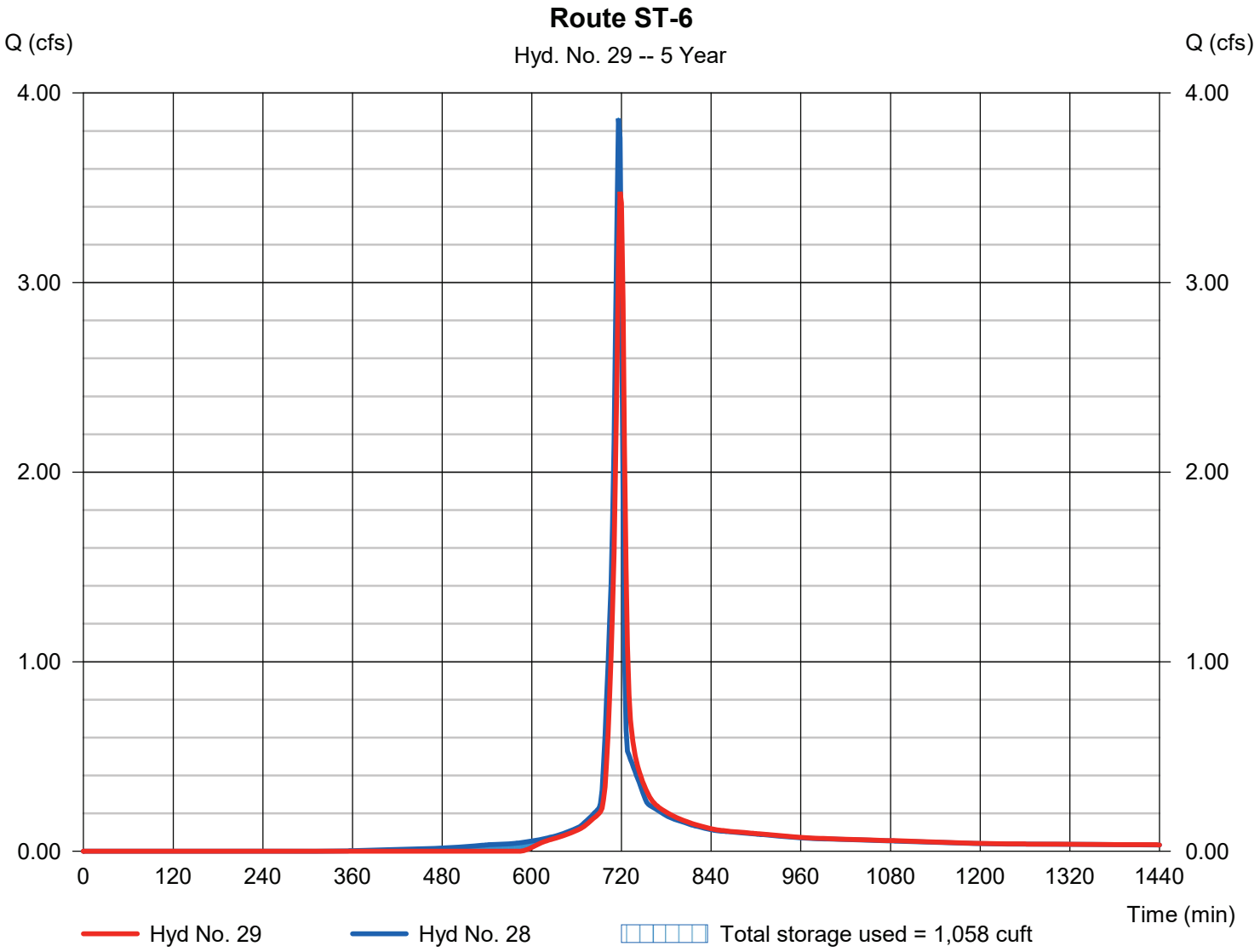
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 29

Route ST-6

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | Reservoir | Peak discharge | = | 3.479 cfs |
| Storm frequency | = | 5 yrs | Time to peak | = | 718 min |
| Time interval | = | 2 min | Hyd. volume | = | 7,759 cuft |
| Inflow hyd. No. | = | 28 - Stormwater Trench 6 - DP001 | Max. Elevation | = | 16.72 ft |
| Reservoir name | = | Stormwater Trench ST-6 | Max. Storage | = | 1,058 cuft |

Storage Indication method used.



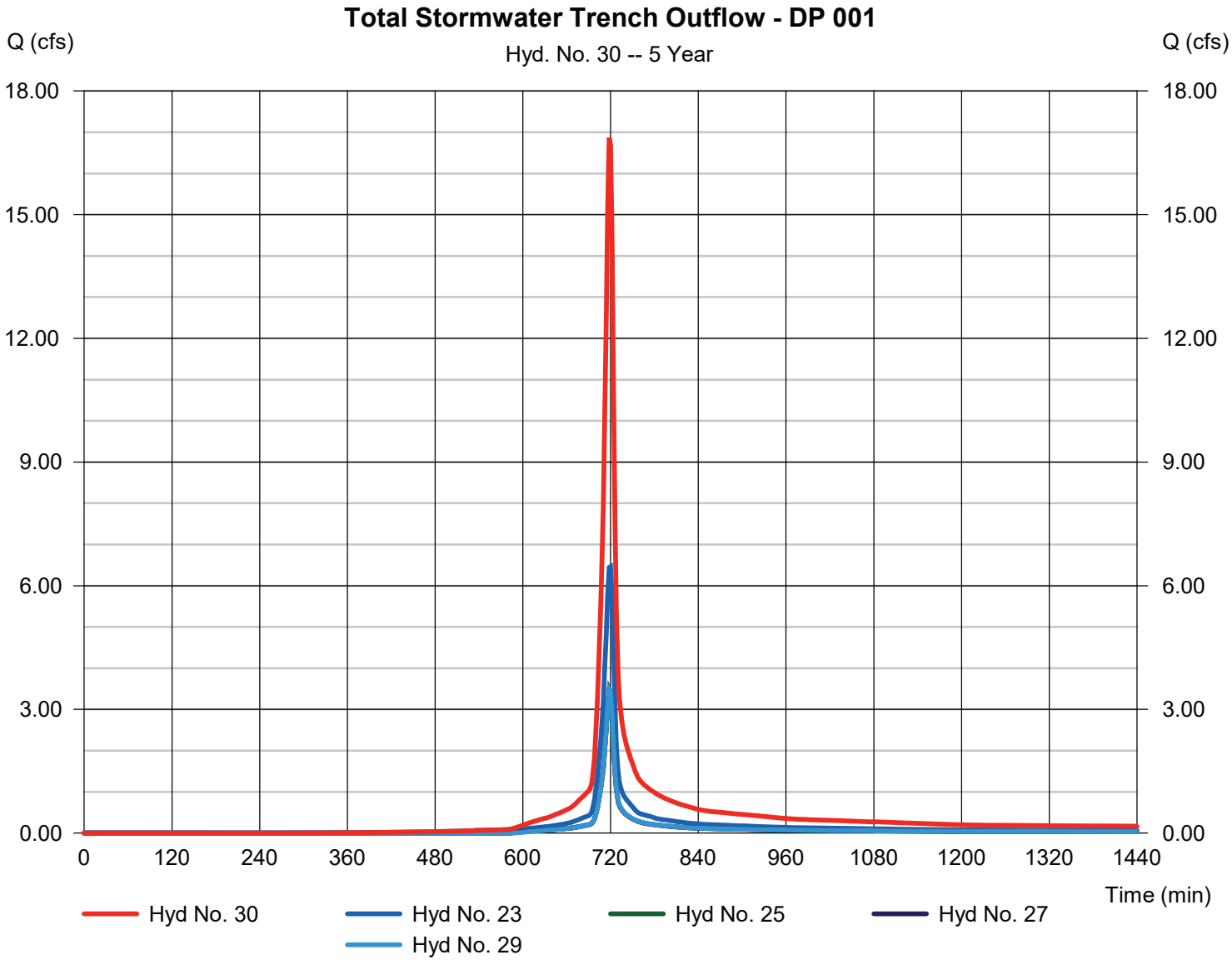
# Hydrograph Report



## Hyd. No. 30

Total Stormwater Trench Outflow - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 16.87 cfs |
| Storm frequency | = 5 yrs | Time to peak | = 718 min |
| Time interval | = 2 min | Hyd. volume | = 38,727 cuft |
| Inflow hyds. | = 23, 25, 27, 29 | Contrib. drain. area | = 0.000 ac |



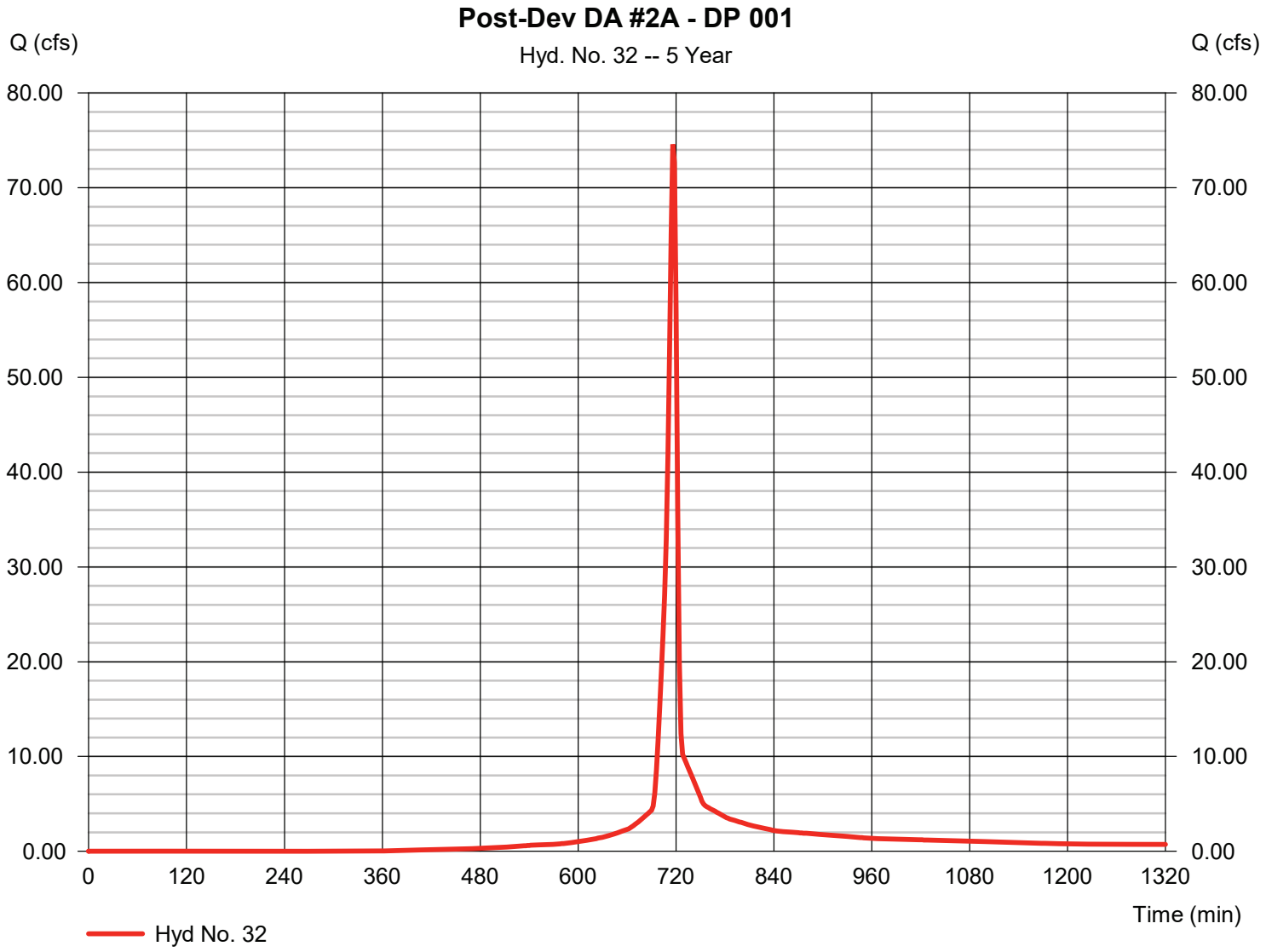
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 32

Post-Dev DA #2A - DP 001

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | SCS Runoff | Peak discharge | = | 74.58 cfs |
| Storm frequency | = | 5 yrs | Time to peak | = | 716 min |
| Time interval | = | 2 min | Hyd. volume | = | 154,385 cuft |
| Drainage area | = | 16.190 ac | Curve number | = | 86.8 |
| Basin Slope | = | 0.0 % | Hydraulic length | = | 0 ft |
| Tc method | = | User | Time of conc. (Tc) | = | 5.00 min |
| Total precip. | = | 4.20 in | Distribution | = | Type II |
| Storm duration | = | 24 hrs | Shape factor | = | 484 |



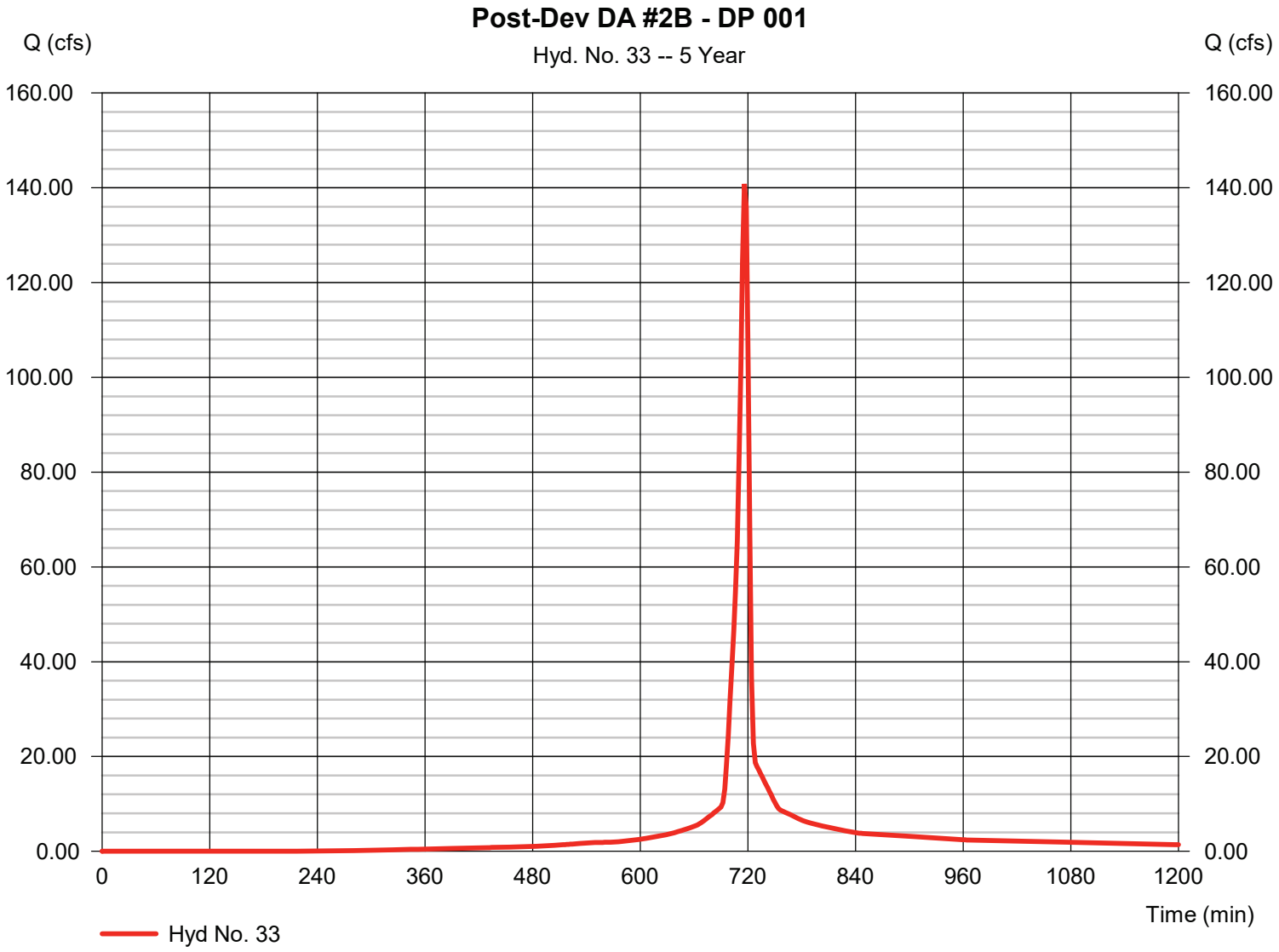
# Hydrograph Report



## Hyd. No. 33

Post-Dev DA #2B - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 140.82 cfs |
| Storm frequency | = 5 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 301,344 cuft |
| Drainage area | = 27.420 ac | Curve number | = 91.2 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 4.20 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



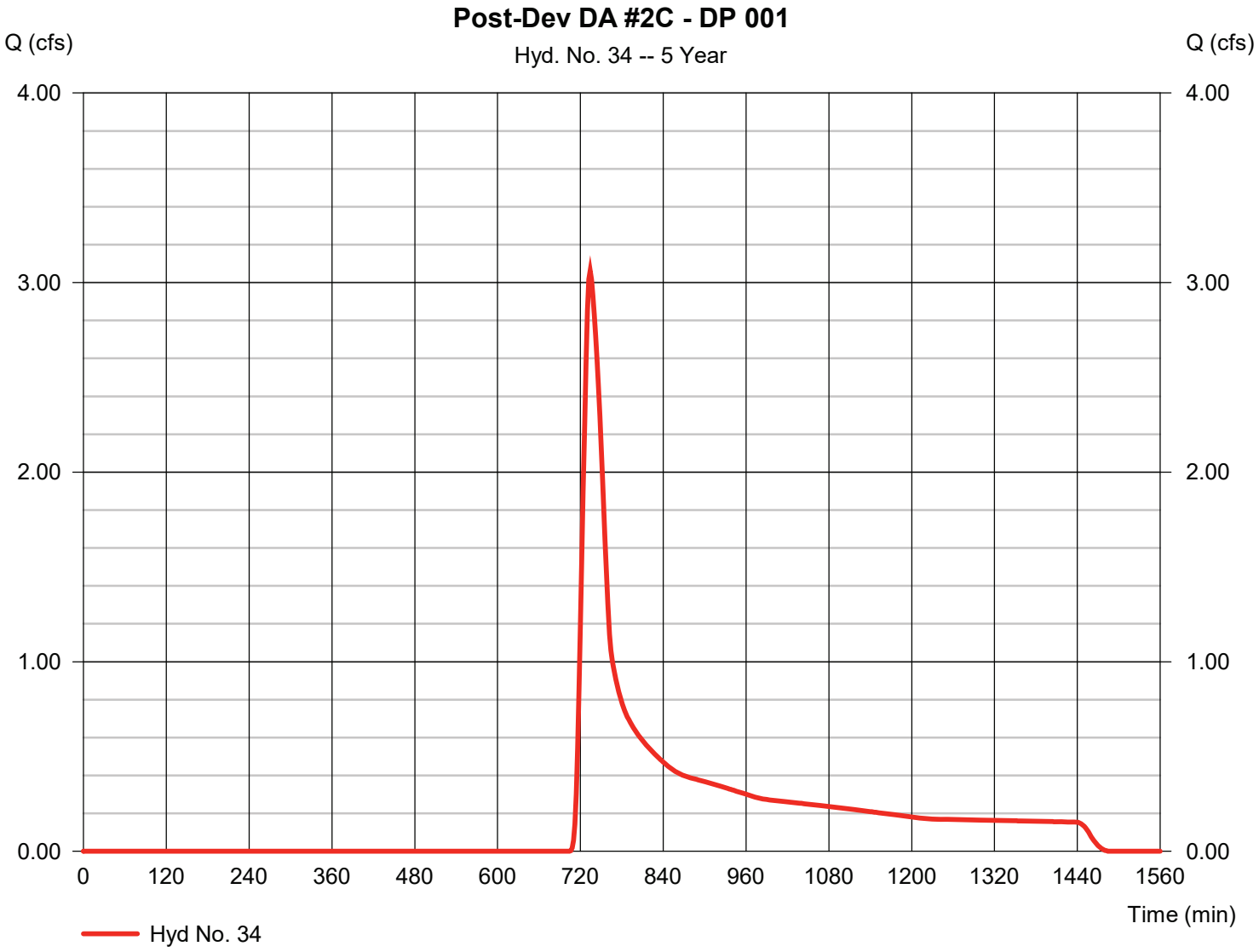
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 34

Post-Dev DA #2C - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 3.061 cfs |
| Storm frequency | = 5 yrs | Time to peak | = 734 min |
| Time interval | = 2 min | Hyd. volume | = 17,748 cuft |
| Drainage area | = 7.420 ac | Curve number | = 56 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = TR55 | Time of conc. (Tc) | = 28.30 min |
| Total precip. | = 4.20 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



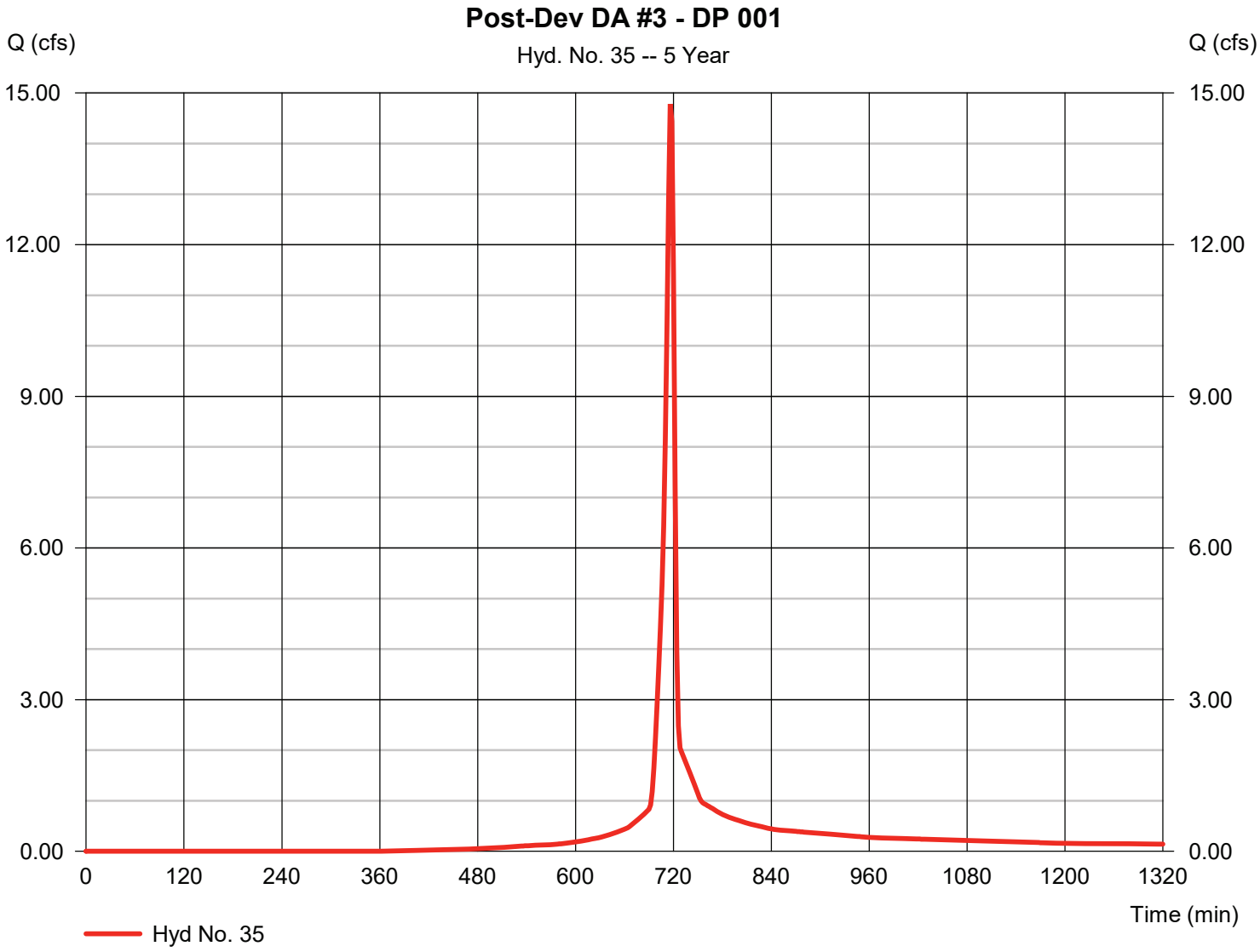
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 35

Post-Dev DA #3 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 14.78 cfs |
| Storm frequency | = 5 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 30,422 cuft |
| Drainage area | = 3.310 ac | Curve number | = 85.7 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 4.20 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



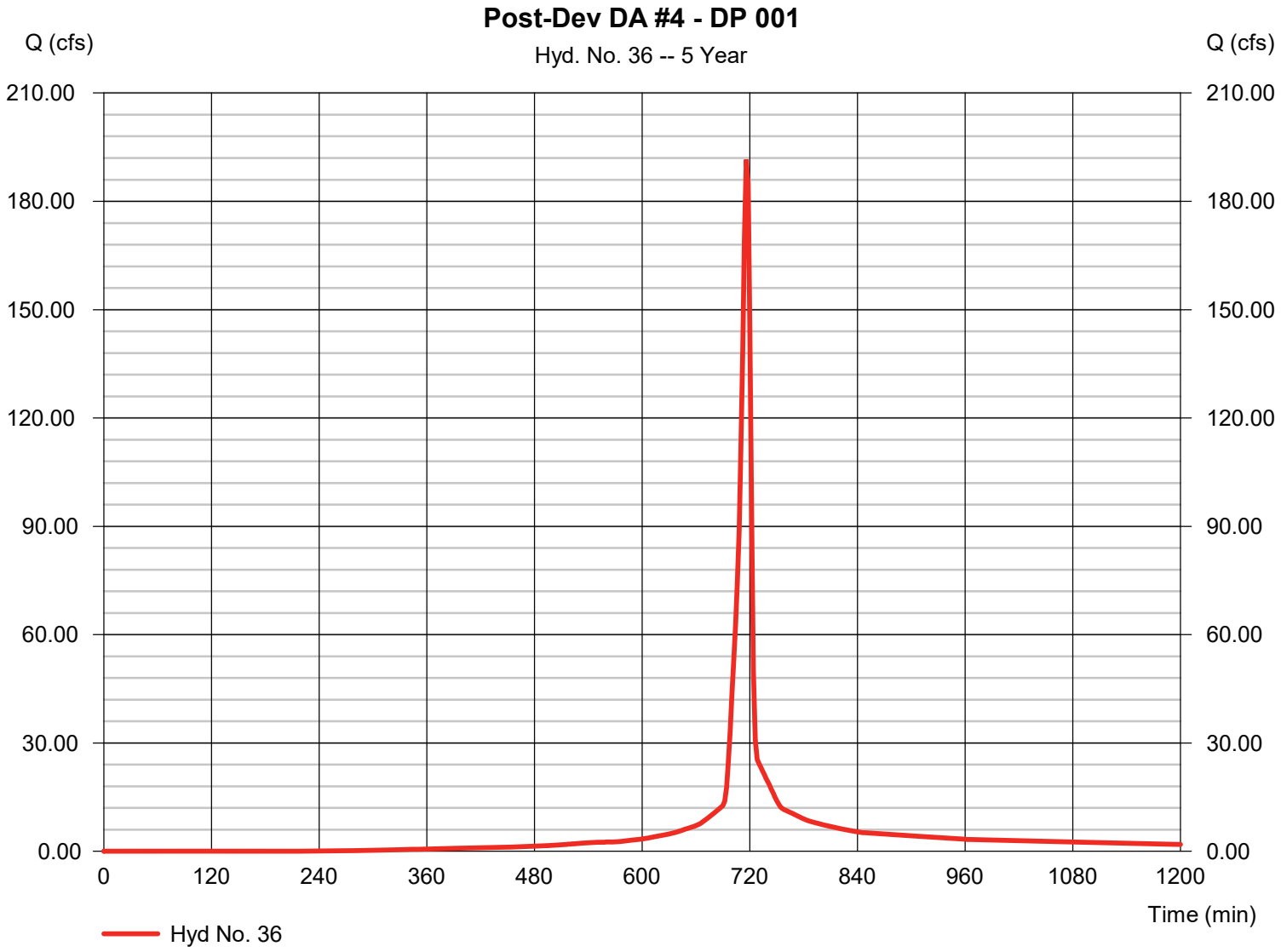
# Hydrograph Report



## Hyd. No. 36

Post-Dev DA #4 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 191.56 cfs |
| Storm frequency | = 5 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 409,517 cuft |
| Drainage area | = 37.380 ac | Curve number | = 91.1 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 4.20 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



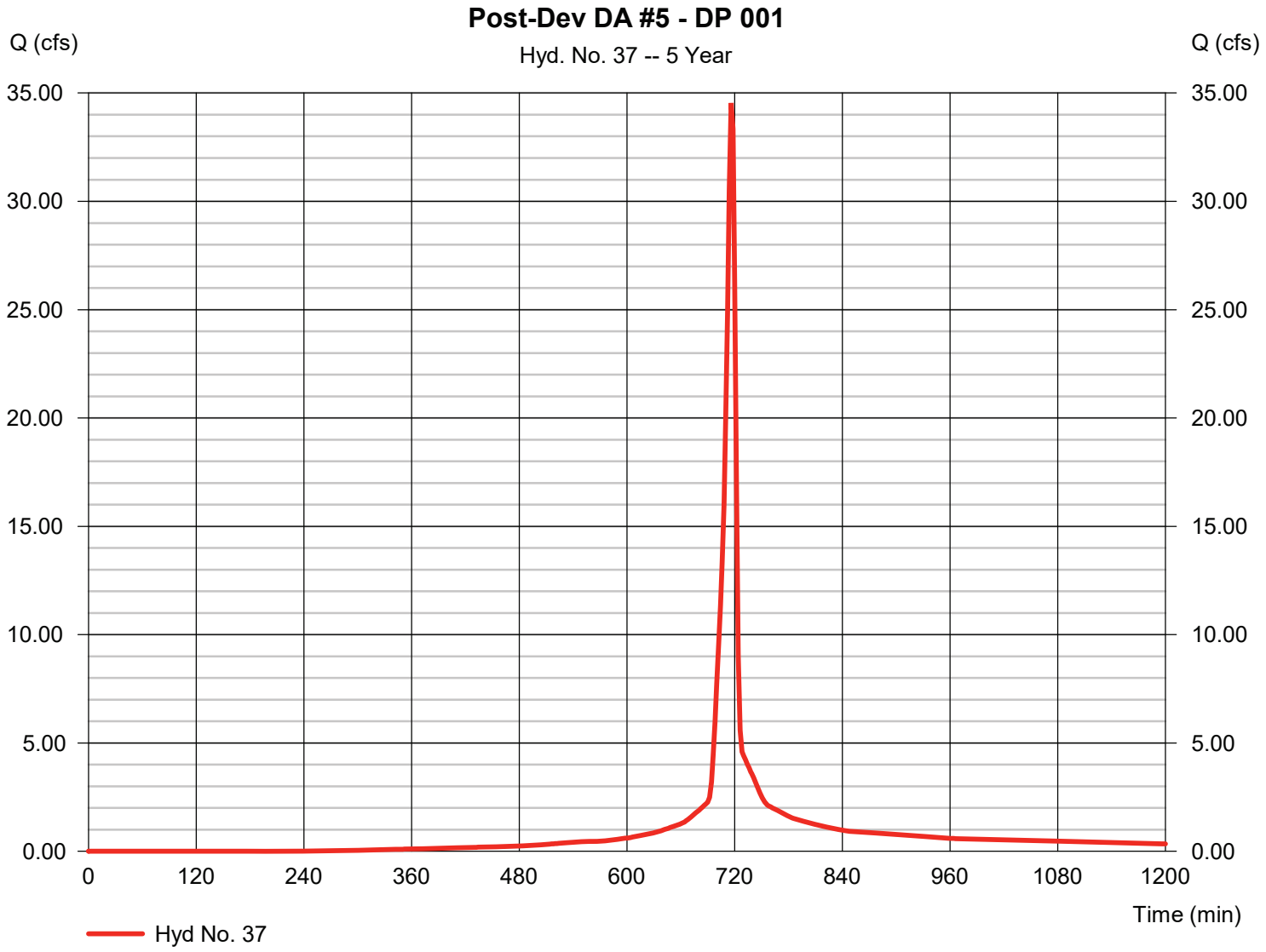
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 37

Post-Dev DA #5 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 34.54 cfs |
| Storm frequency | = 5 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 73,704 cuft |
| Drainage area | = 6.770 ac | Curve number | = 90.9 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 4.20 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



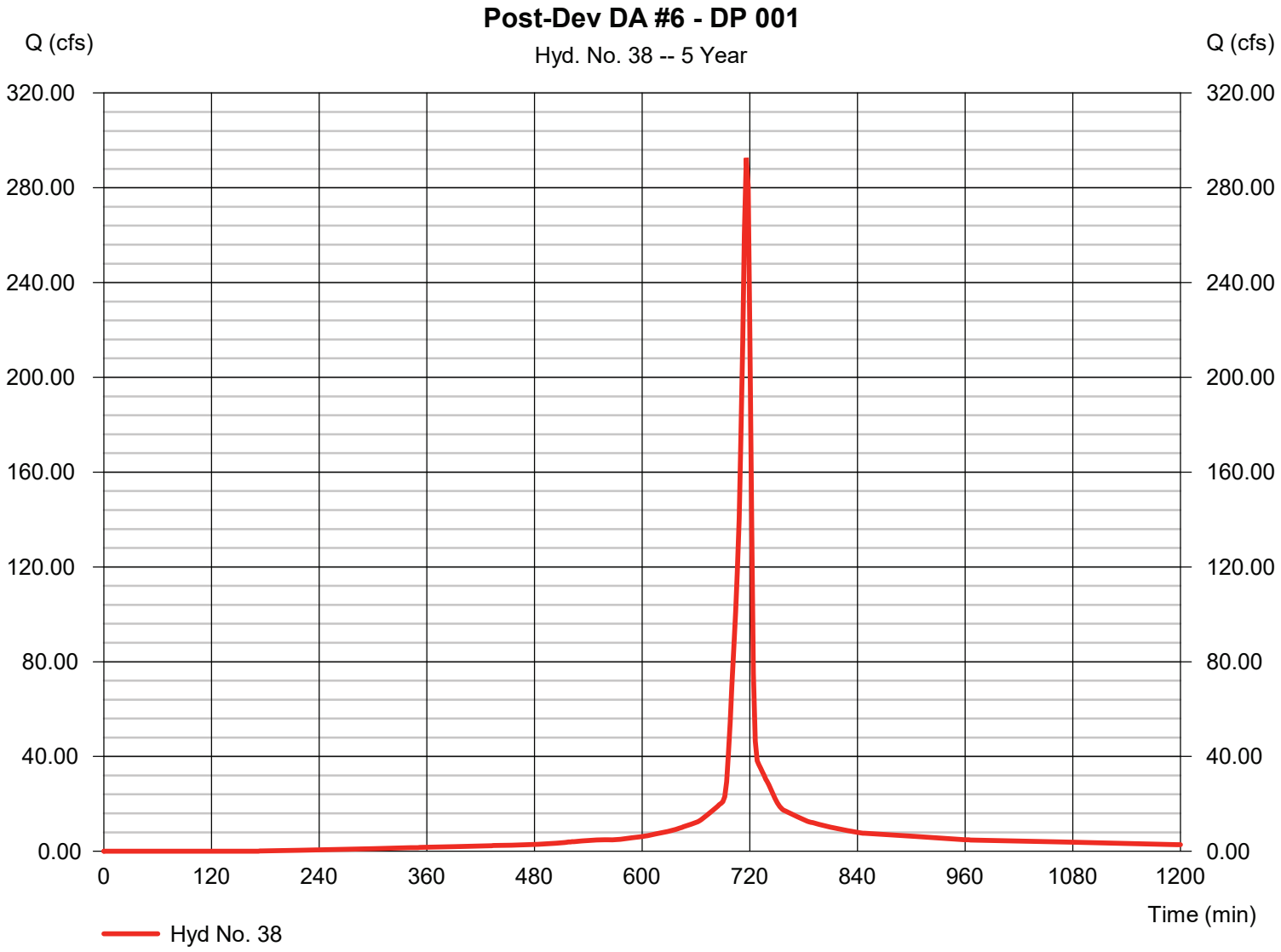
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 38

Post-Dev DA #6 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 292.59 cfs |
| Storm frequency | = 5 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 647,487 cuft |
| Drainage area | = 53.880 ac | Curve number | = 94.1 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 4.20 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



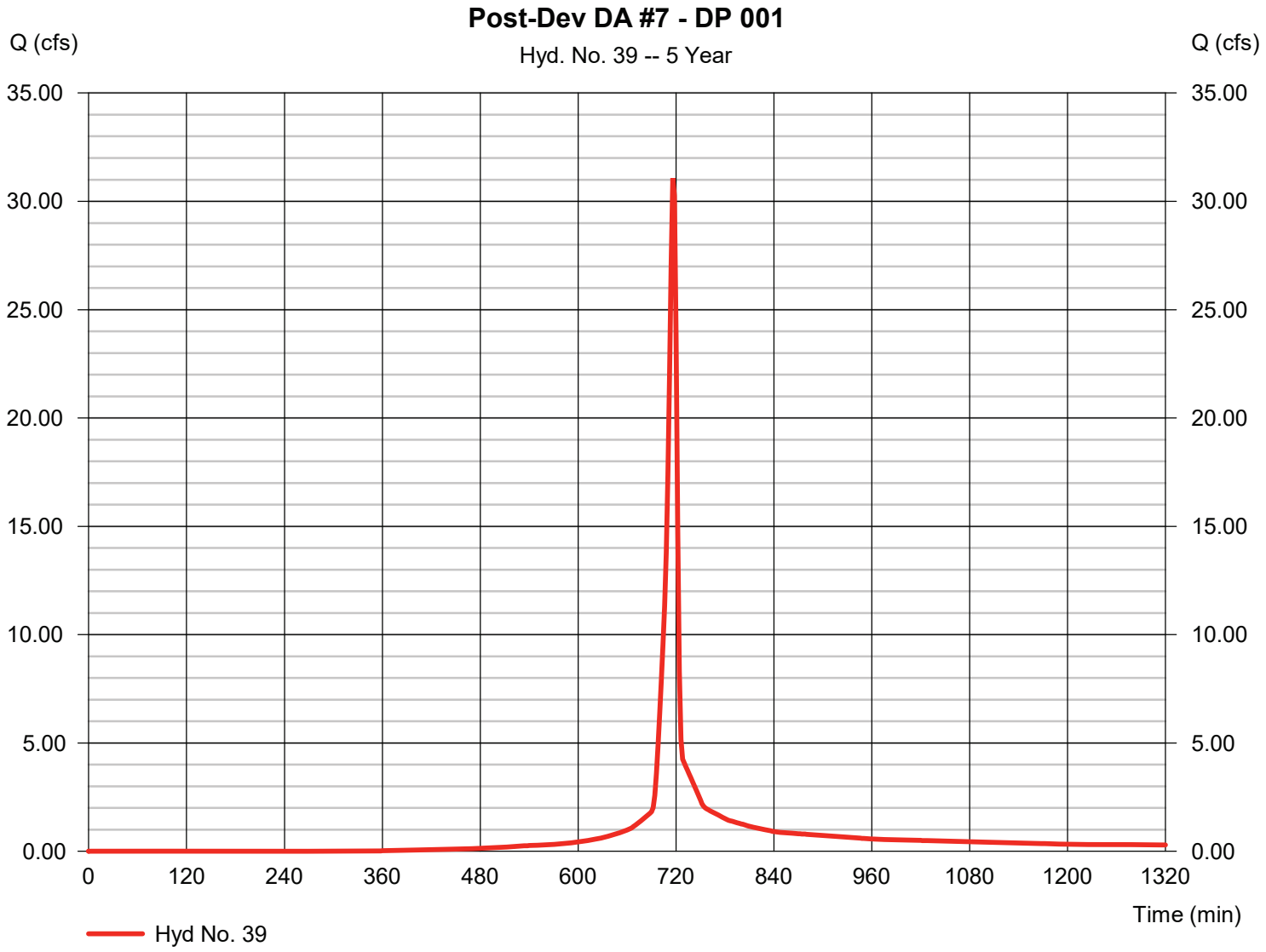
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 39

Post-Dev DA #7 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 31.07 cfs |
| Storm frequency | = 5 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 64,432 cuft |
| Drainage area | = 6.690 ac | Curve number | = 87.1 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 4.20 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



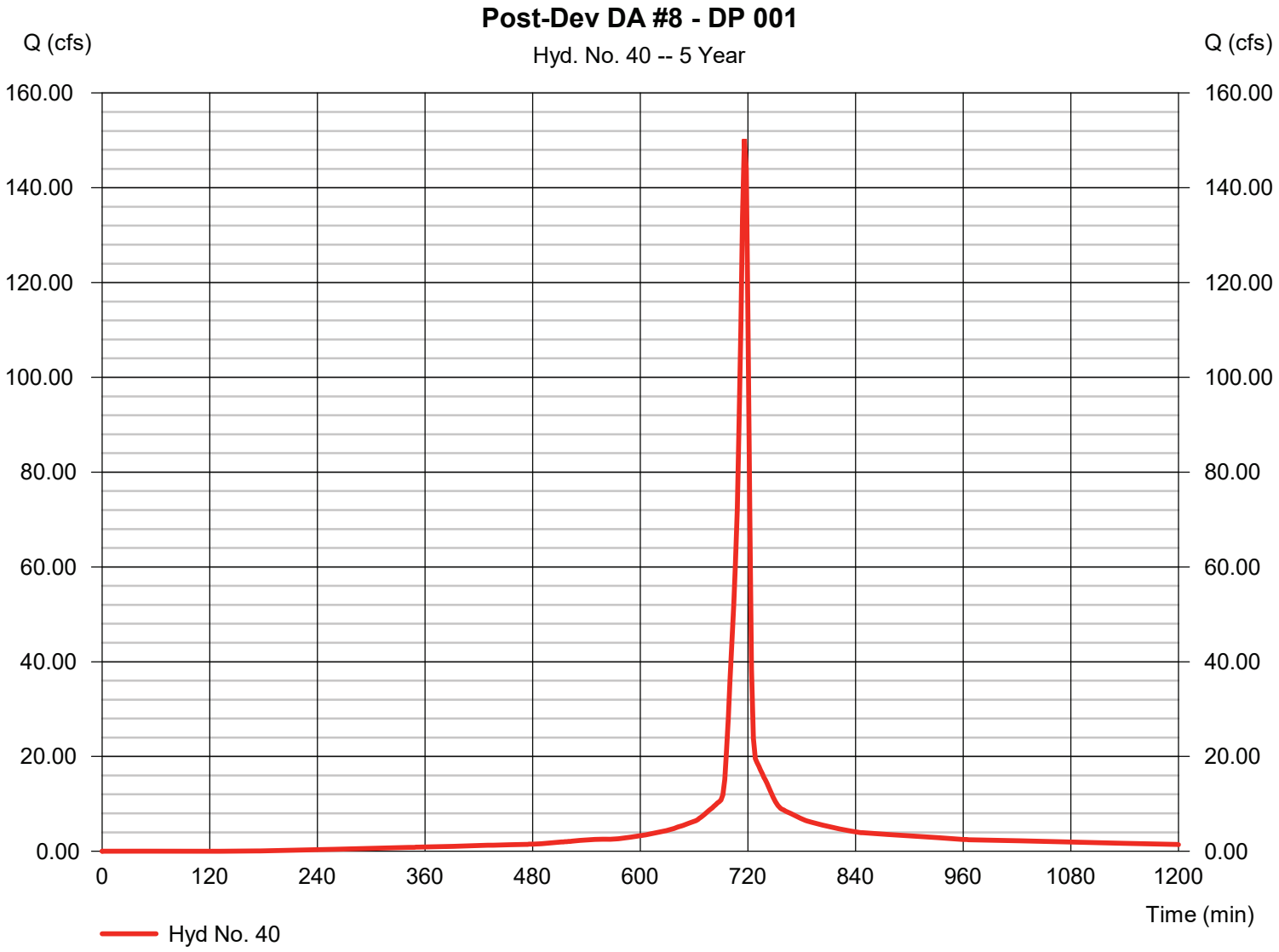
# Hydrograph Report



## Hyd. No. 40

Post-Dev DA #8 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 150.23 cfs |
| Storm frequency | = 5 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 333,849 cuft |
| Drainage area | = 27.530 ac | Curve number | = 94.4 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 4.20 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



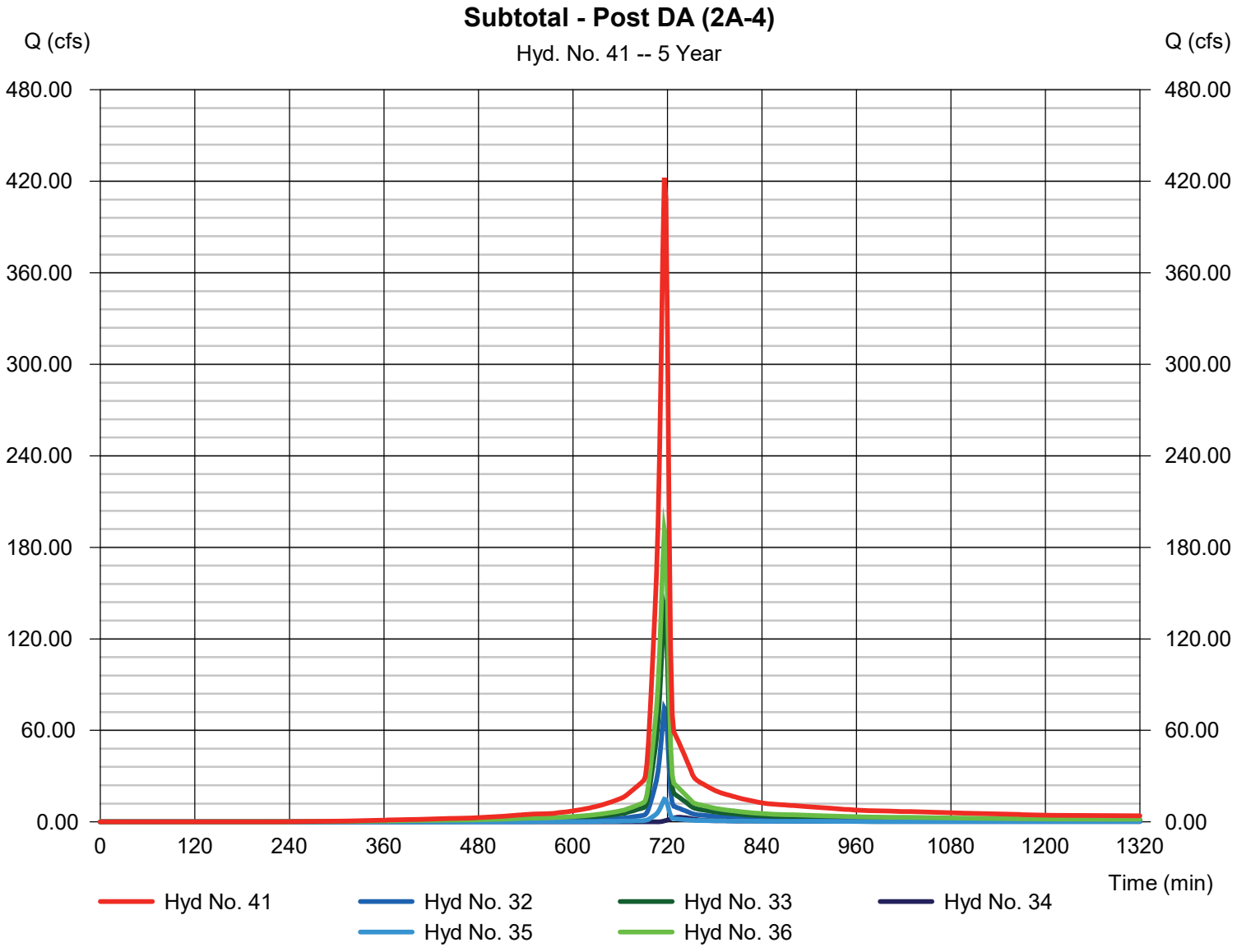
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 41

Subtotal - Post DA (2A-4)

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 422.28 cfs |
| Storm frequency | = 5 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 913,416 cuft |
| Inflow hyds. | = 32, 33, 34, 35, 36 | Contrib. drain. area | = 91.720 ac |



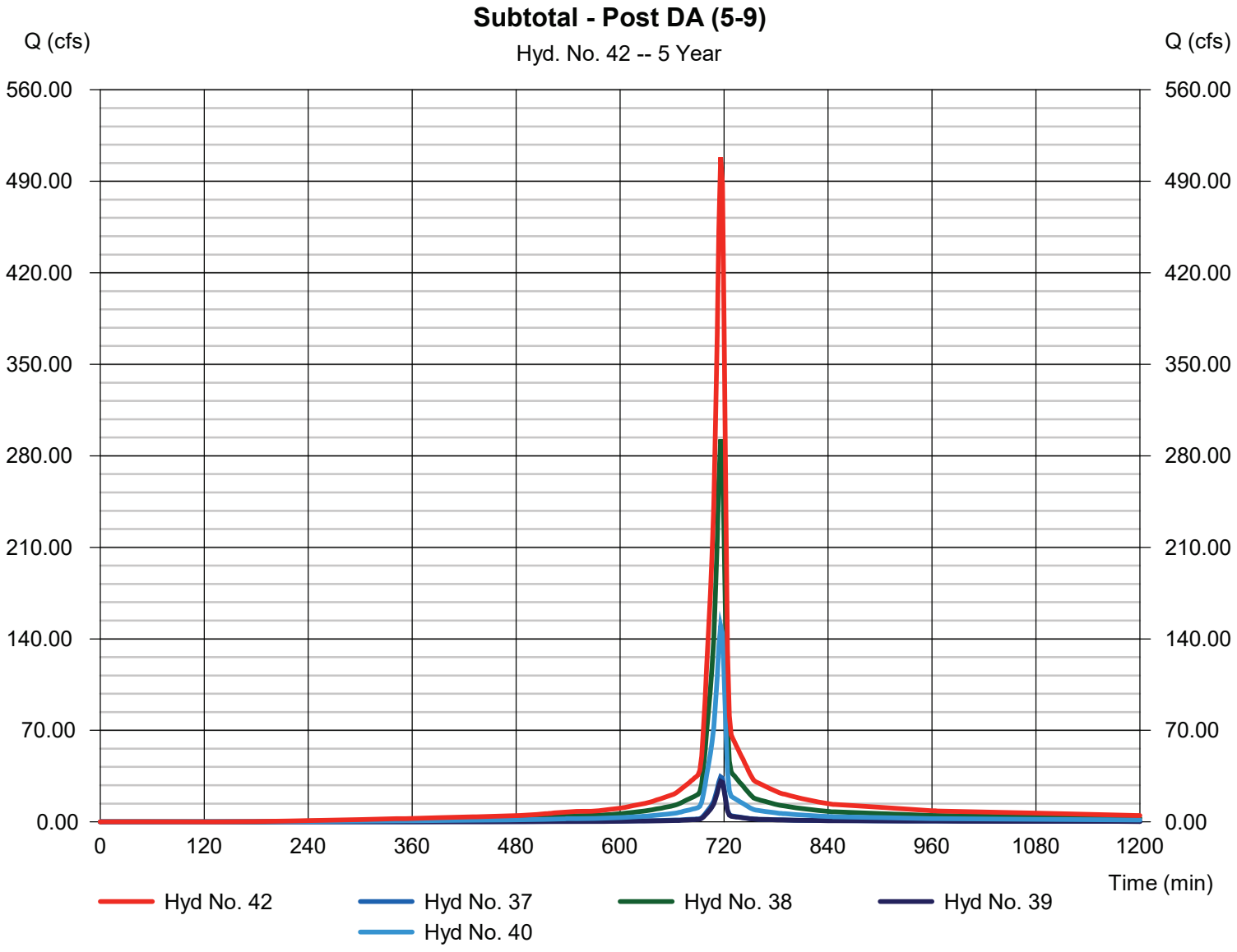
# Hydrograph Report



## Hyd. No. 42

Subtotal - Post DA (5-9)

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 508.43 cfs |
| Storm frequency | = 5 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 1,119,473 cuft |
| Inflow hyds. | = 37, 38, 39, 40 | Contrib. drain. area | = 94.870 ac |



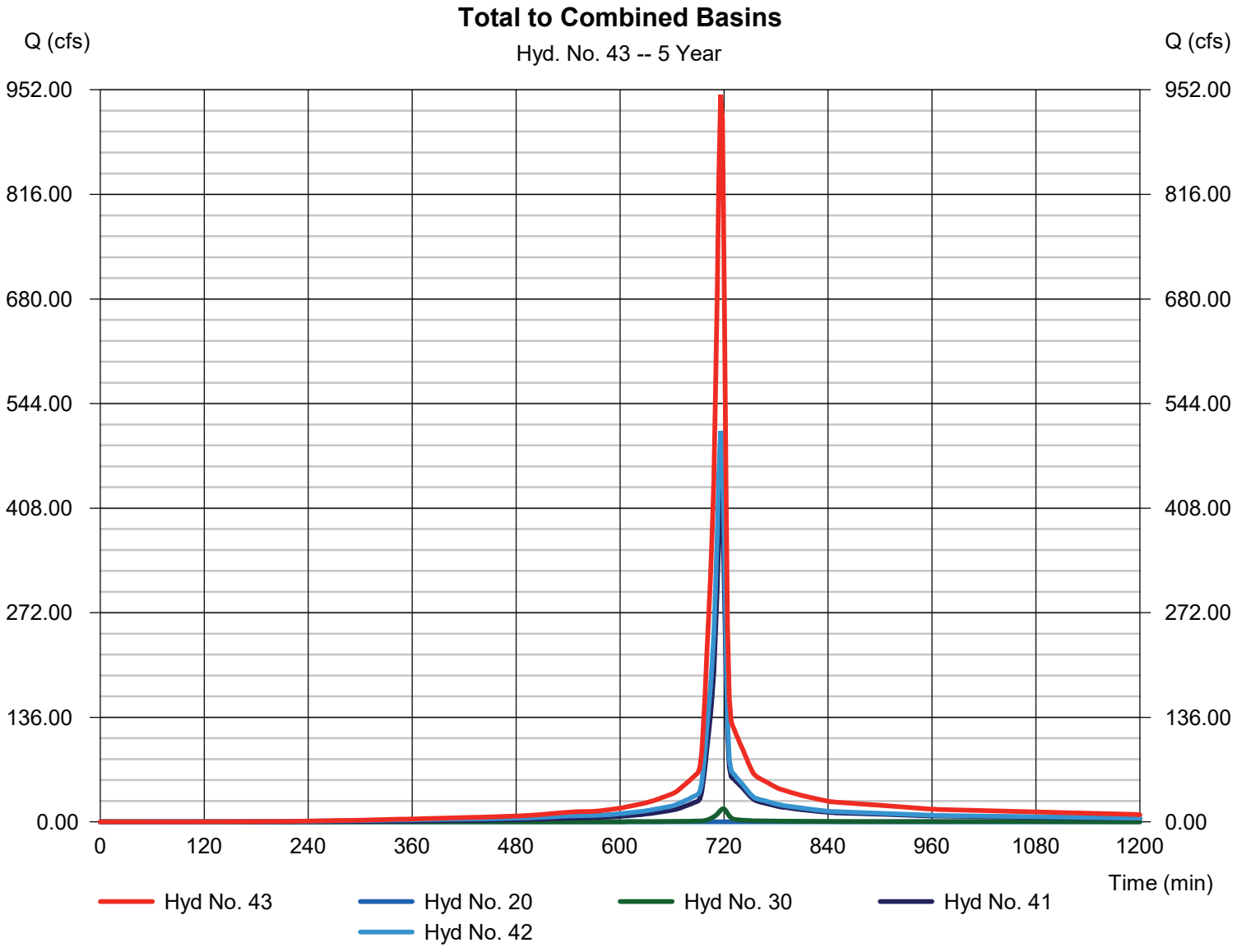
# Hydrograph Report



## Hyd. No. 43

Total to Combined Basins

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 945.80 cfs |
| Storm frequency | = 5 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 2,071,615 cuft |
| Inflow hyds. | = 20, 30, 41, 42 | Contrib. drain. area | = 0.000 ac |



# Hydrograph Report

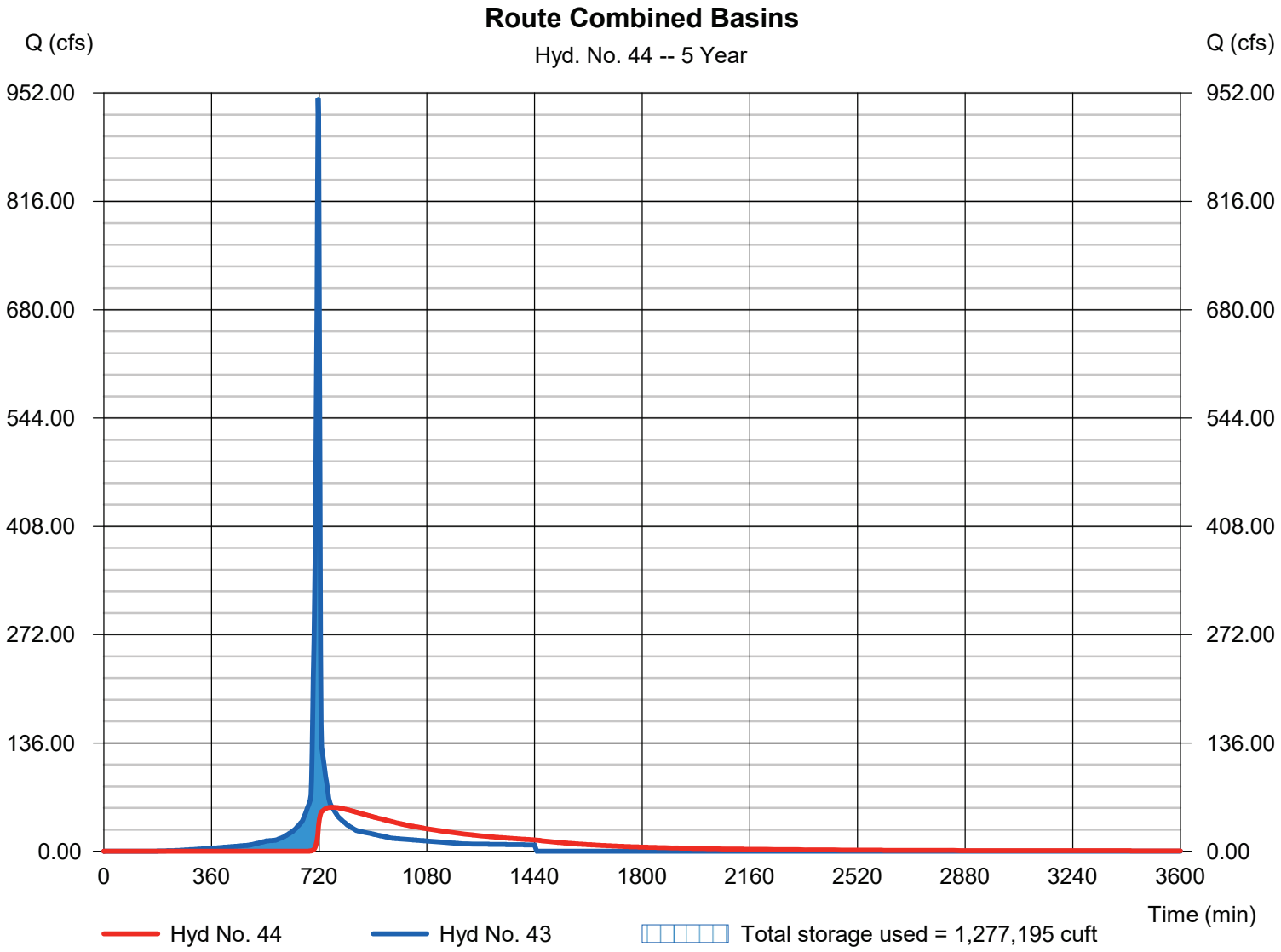
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 44

Route Combined Basins

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | Reservoir | Peak discharge | = | 55.17 cfs |
| Storm frequency | = | 5 yrs | Time to peak | = | 764 min |
| Time interval | = | 2 min | Hyd. volume | = | 1,768,605 cuft |
| Inflow hyd. No. | = | 43 - Total to Combined Basins | Max. Elevation | = | 14.67 ft |
| Reservoir name | = | Combined Basins | Max. Storage | = | 1,277,195 cuft |

Storage Indication method used.



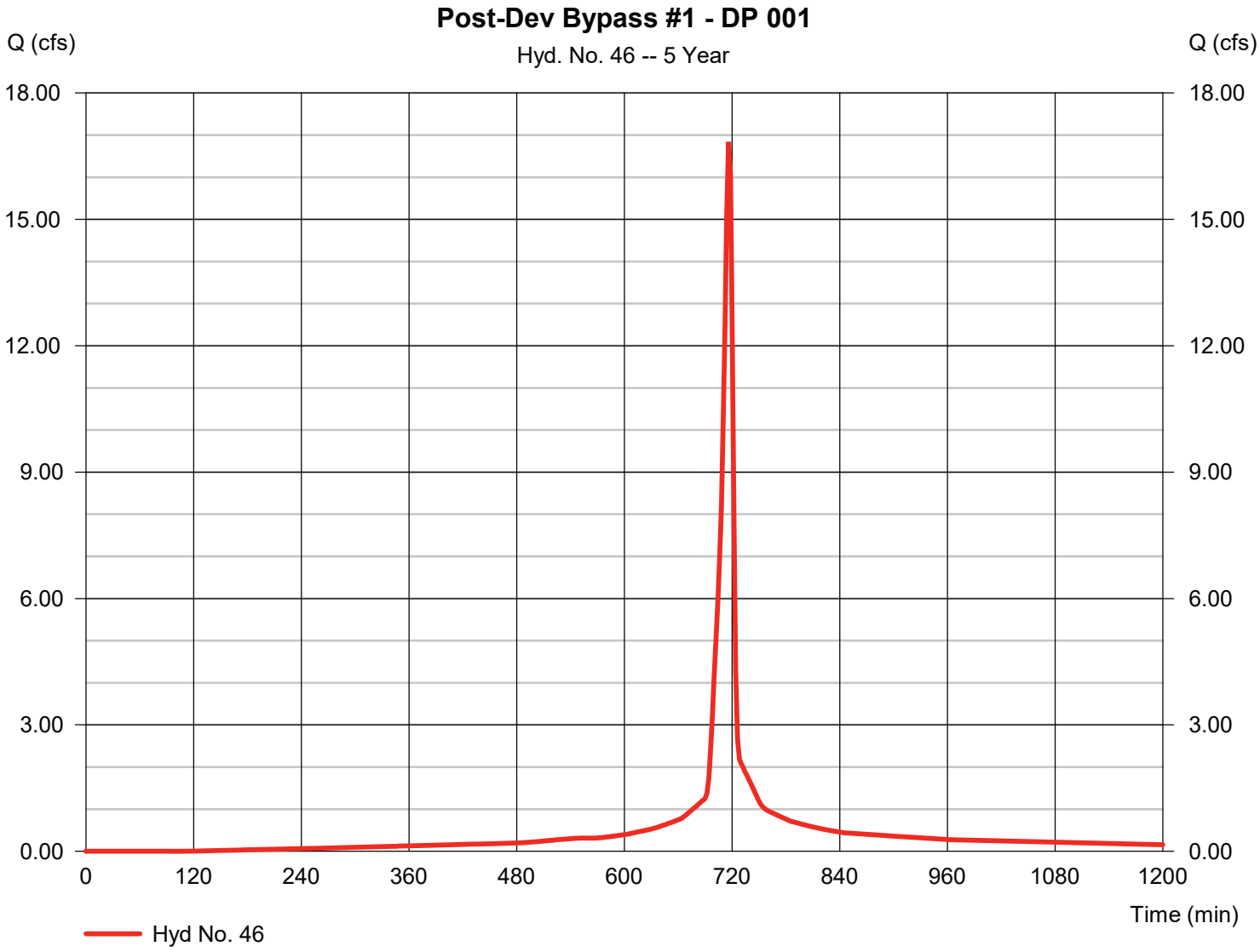
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 46

Post-Dev Bypass #1 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 16.84 cfs |
| Storm frequency | = 5 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 38,306 cuft |
| Drainage area | = 3.020 ac | Curve number | = 95.9 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 4.20 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



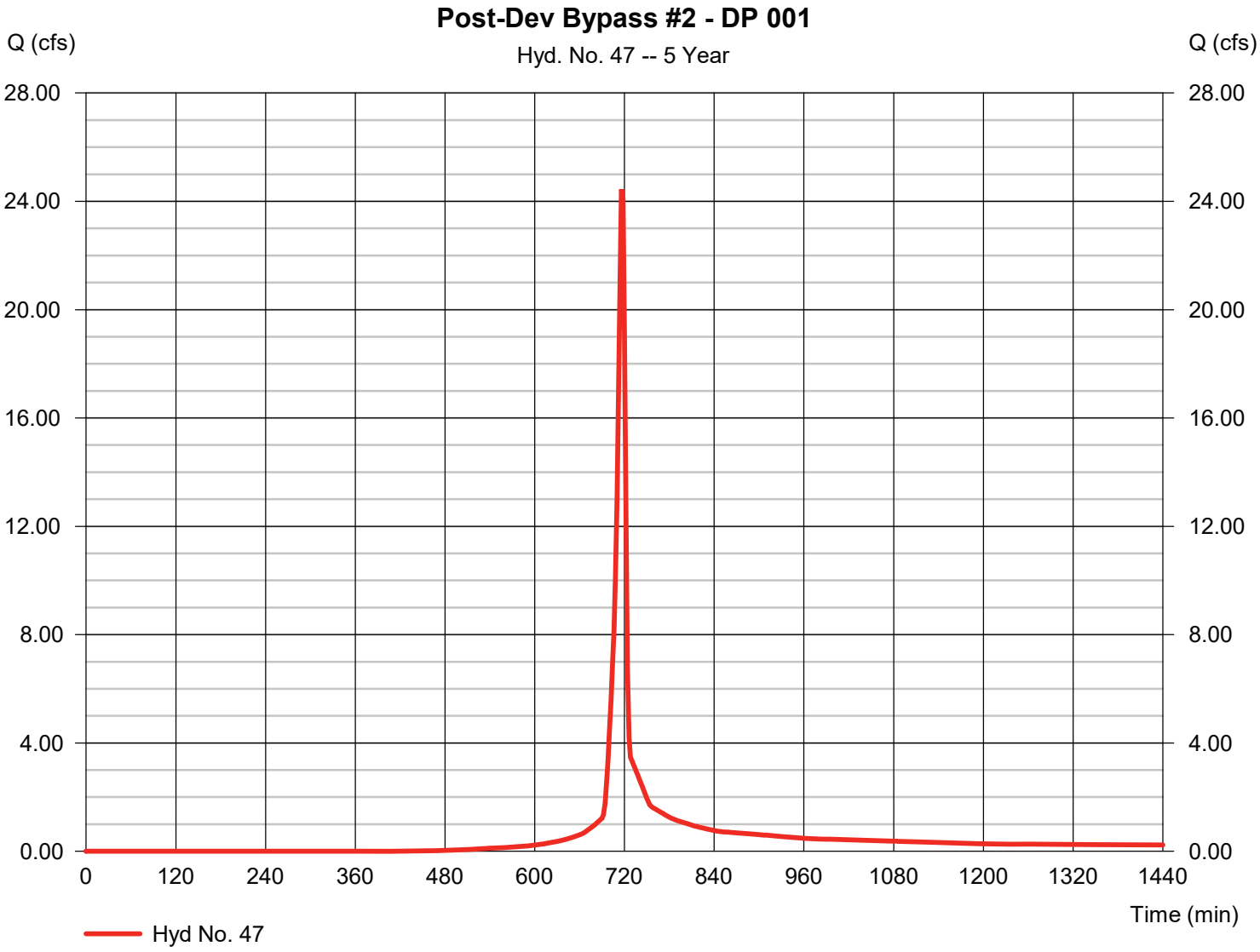
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 47

Post-Dev Bypass #2 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 24.44 cfs |
| Storm frequency | = 5 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 49,667 cuft |
| Drainage area | = 6.080 ac | Curve number | = 82.3 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 4.20 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



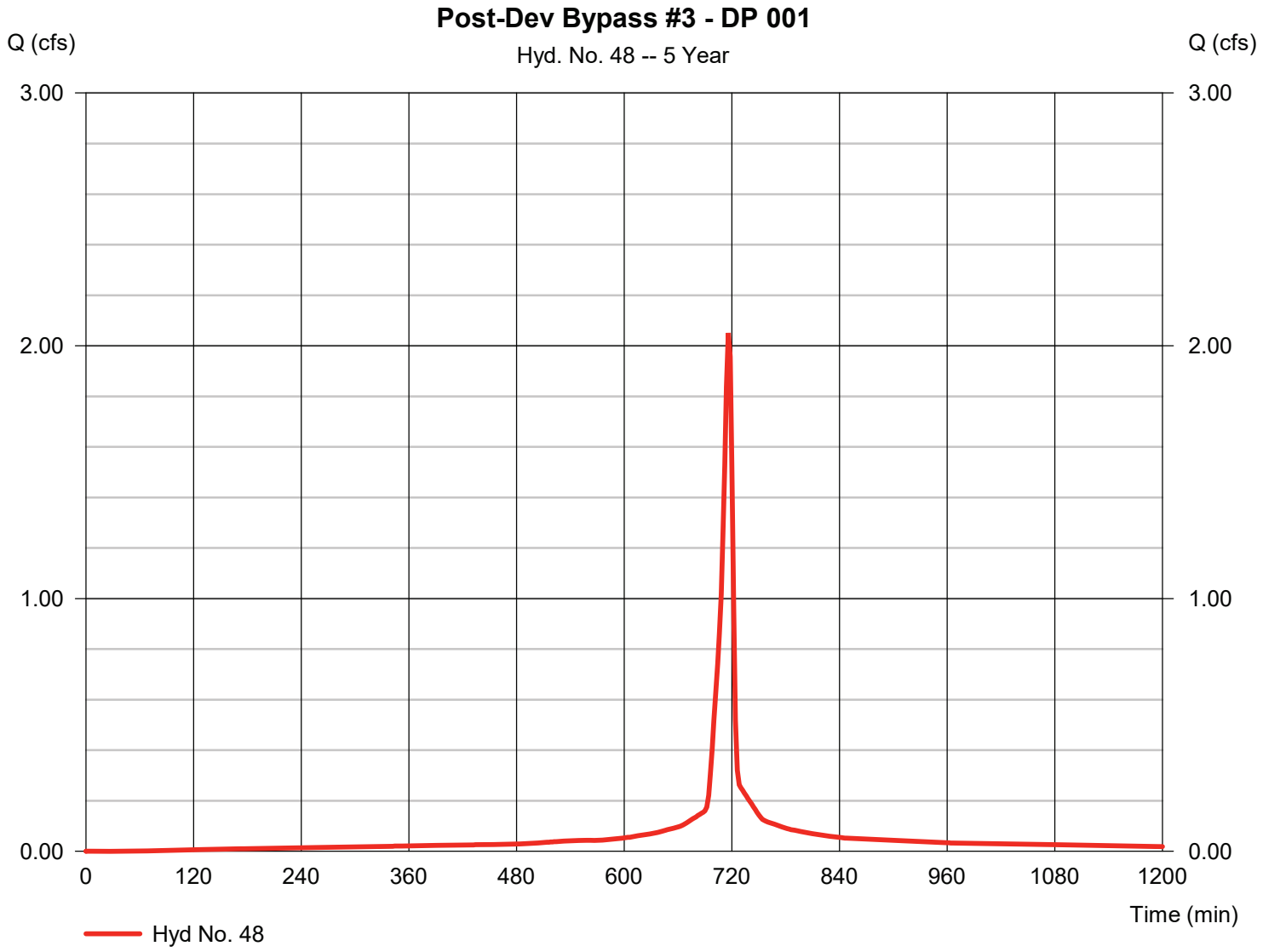
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 48

Post-Dev Bypass #3 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 2.051 cfs |
| Storm frequency | = 5 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 4,857 cuft |
| Drainage area | = 0.360 ac | Curve number | = 98 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 4.20 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



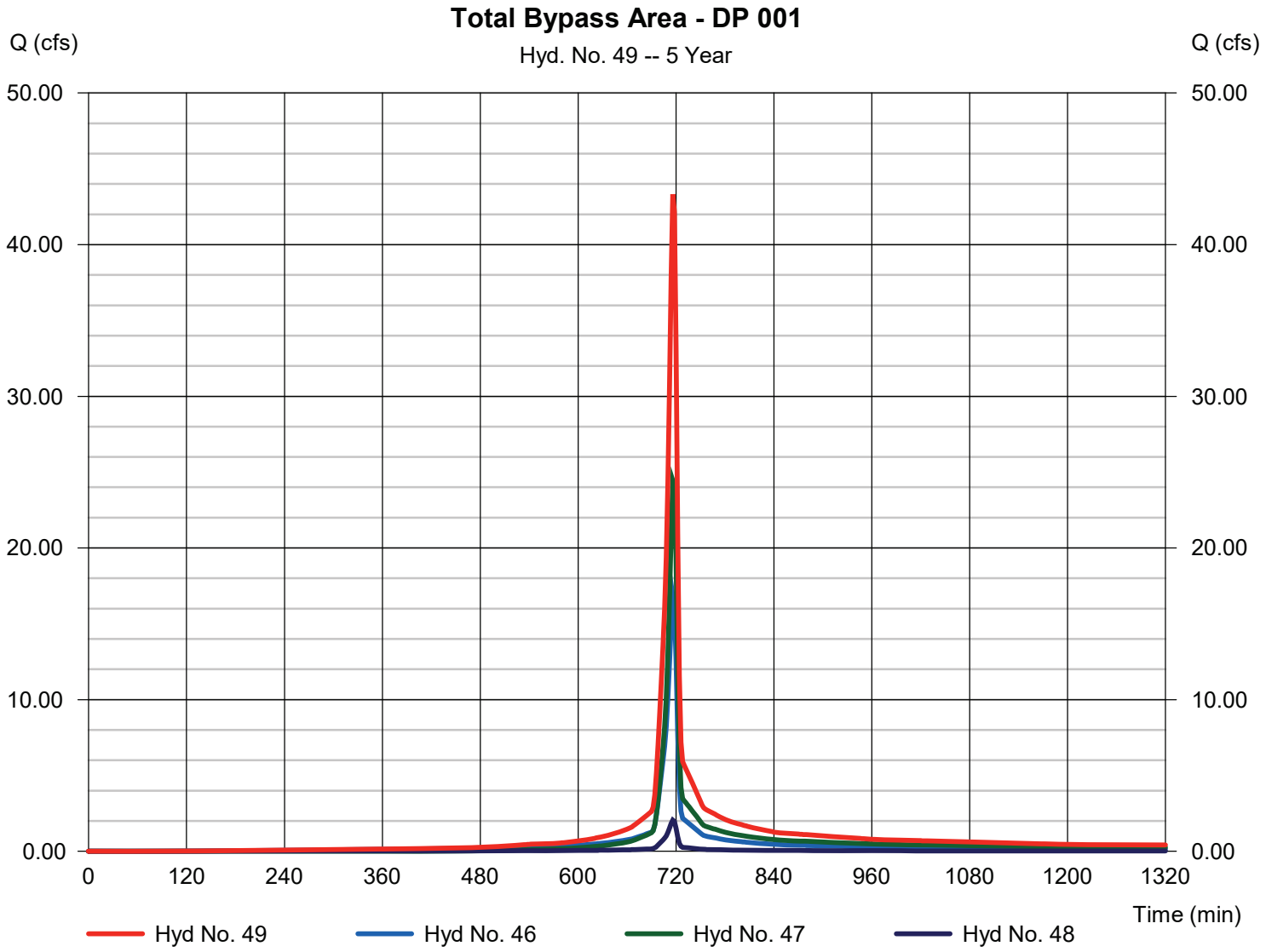
# Hydrograph Report



## Hyd. No. 49

Total Bypass Area - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 43.33 cfs |
| Storm frequency | = 5 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 92,831 cuft |
| Inflow hyds. | = 46, 47, 48 | Contrib. drain. area | = 9.460 ac |



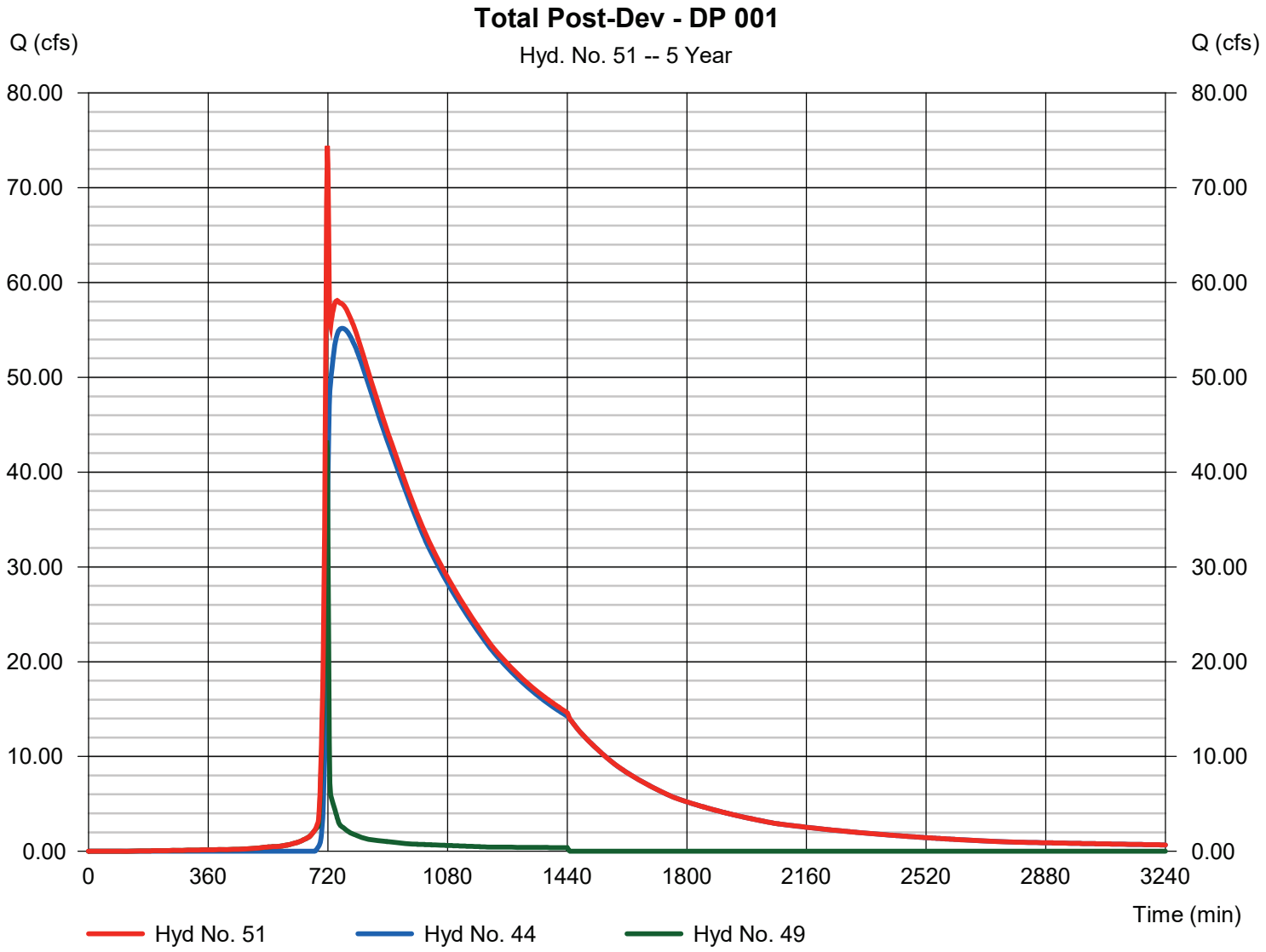
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 51

Total Post-Dev - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 74.41 cfs |
| Storm frequency | = 5 yrs | Time to peak | = 718 min |
| Time interval | = 2 min | Hyd. volume | = 1,861,437 cuft |
| Inflow hyds. | = 44, 49 | Contrib. drain. area | = 0.000 ac |



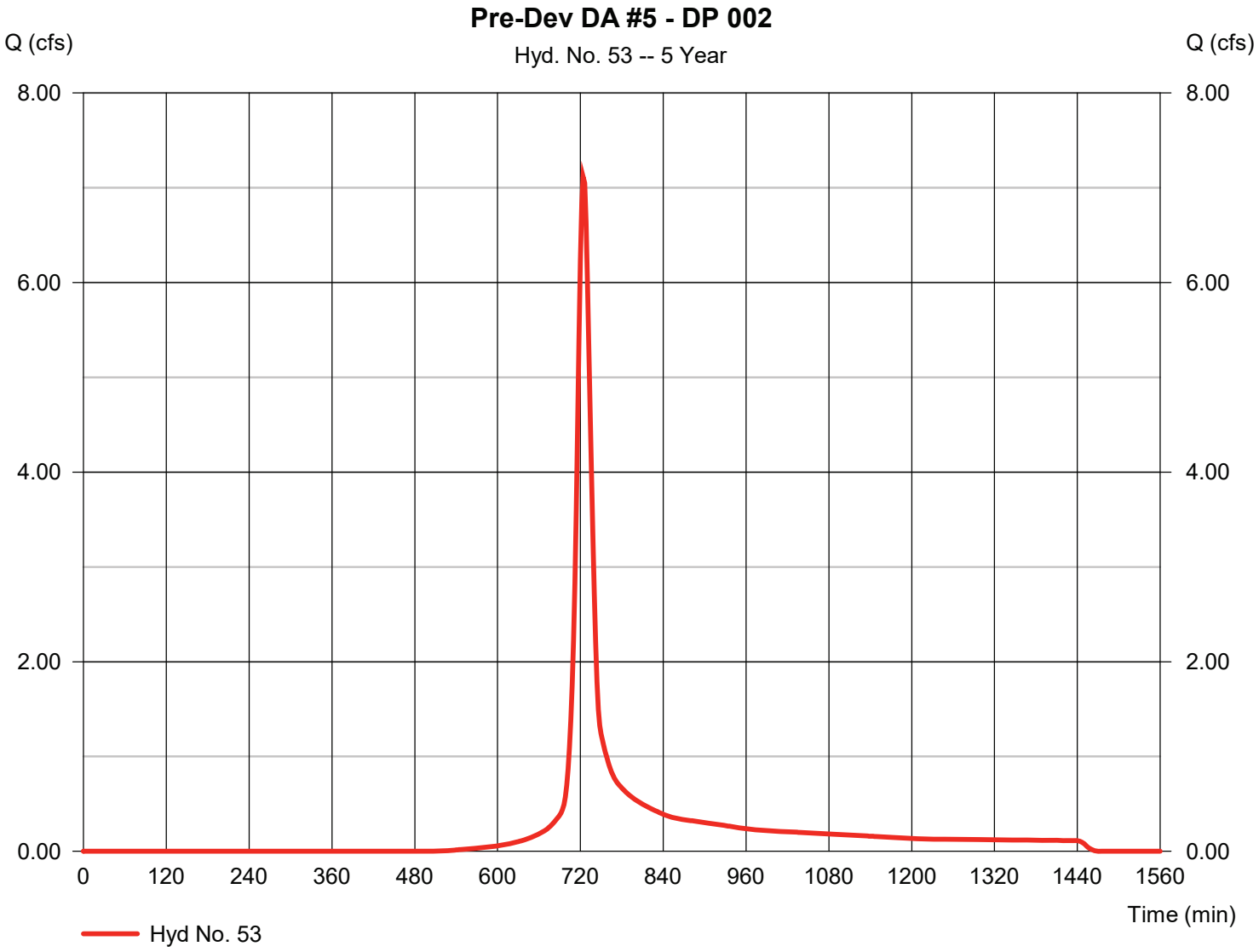
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 53

Pre-Dev DA #5 - DP 002

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 7.116 cfs |
| Storm frequency | = 5 yrs | Time to peak | = 724 min |
| Time interval | = 2 min | Hyd. volume | = 22,307 cuft |
| Drainage area | = 2.900 ac | Curve number | = 78.9 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = TR55 | Time of conc. (Tc) | = 16.90 min |
| Total precip. | = 4.20 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



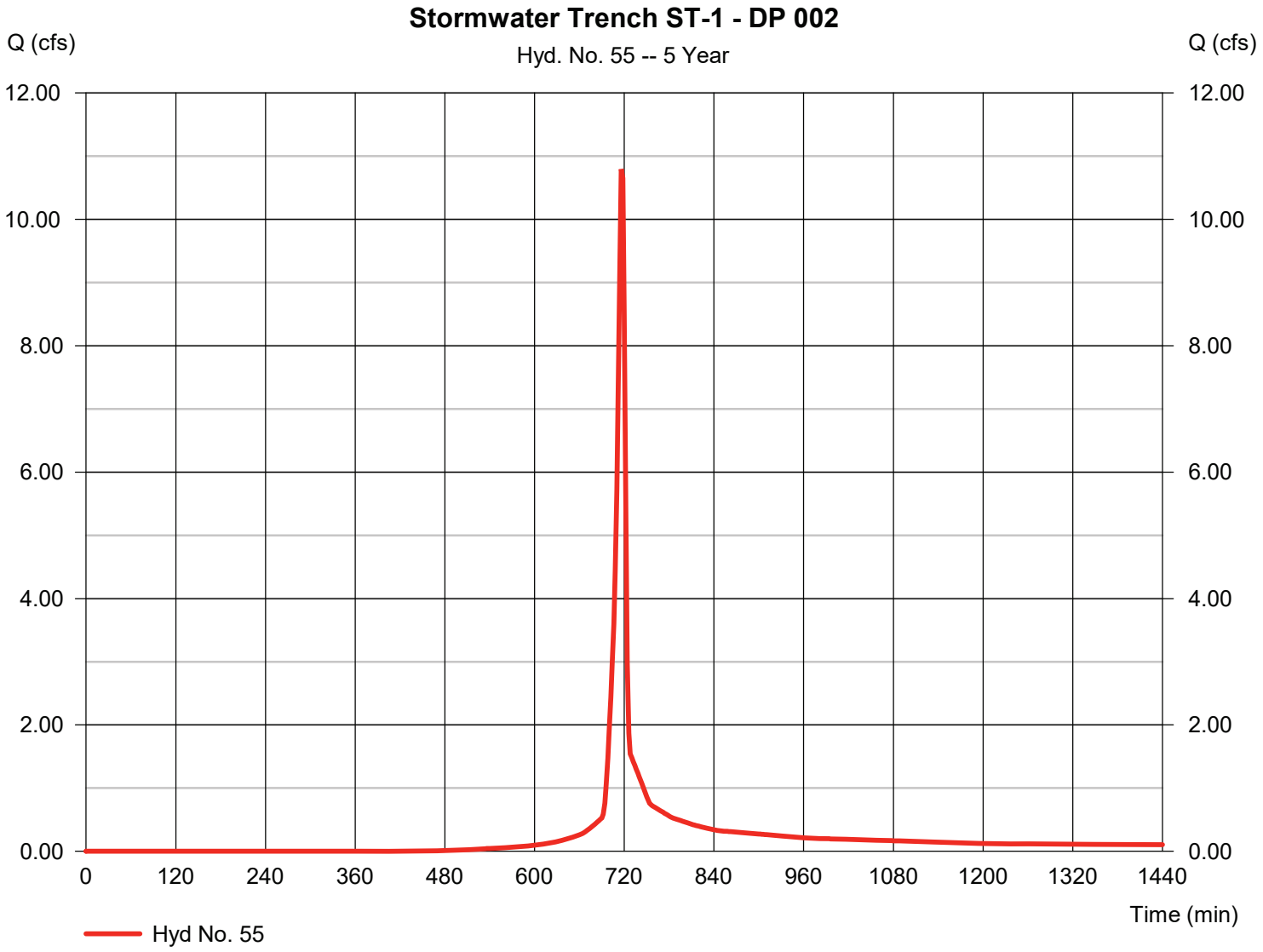
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 55

Stormwater Trench ST-1 - DP 002

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 10.79 cfs |
| Storm frequency | = 5 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 21,906 cuft |
| Drainage area | = 2.730 ac | Curve number | = 81.8 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 4.20 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



# Hydrograph Report

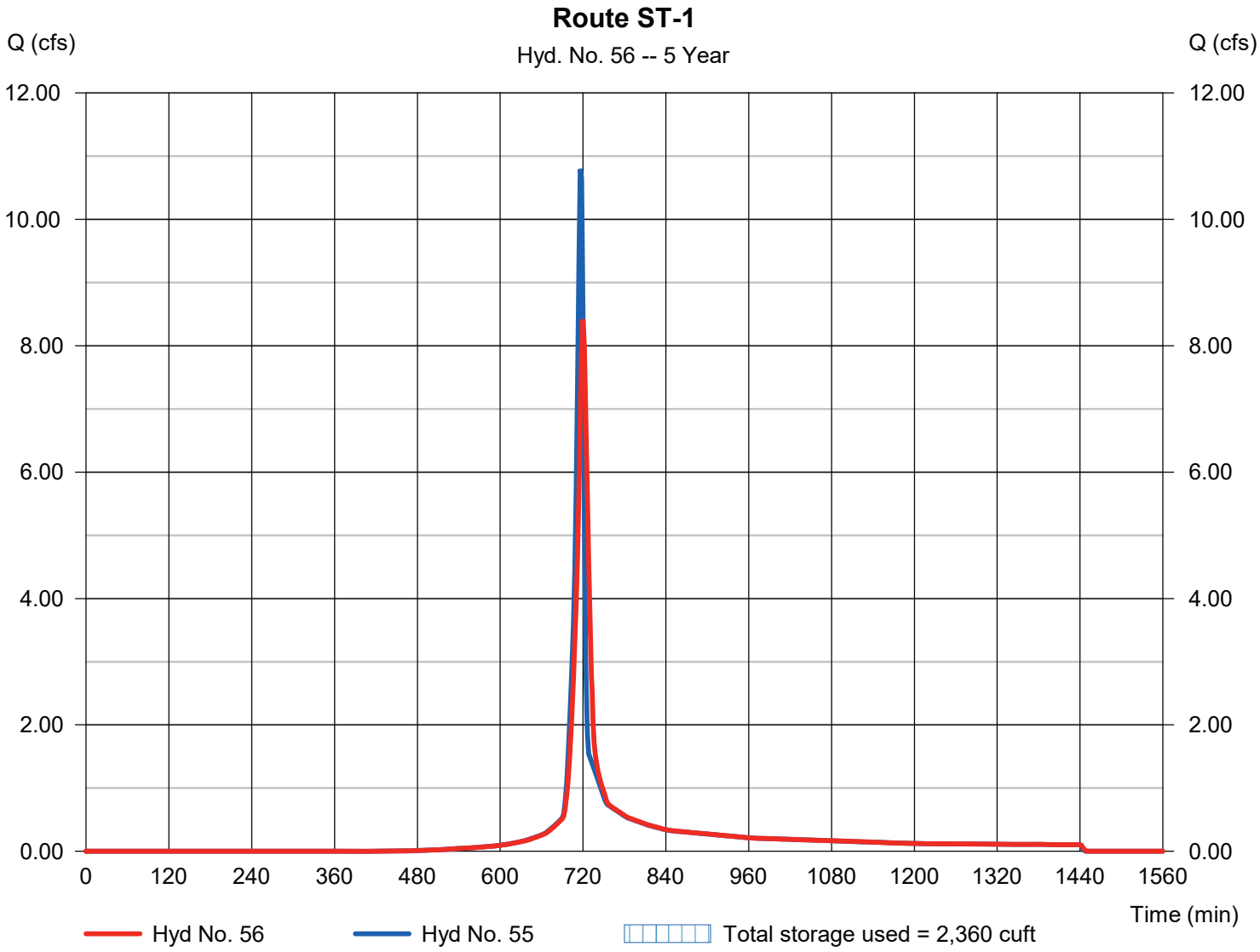
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 56

Route ST-1

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | Reservoir | Peak discharge | = | 8.417 cfs |
| Storm frequency | = | 5 yrs | Time to peak | = | 720 min |
| Time interval | = | 2 min | Hyd. volume | = | 21,906 cuft |
| Inflow hyd. No. | = | 55 - Stormwater Trench ST-1 - DP 02 | Max. Elevation | = | 15.54 ft |
| Reservoir name | = | Stormwater Trench ST-1 | Max. Storage | = | 2,360 cuft |

Storage Indication method used.



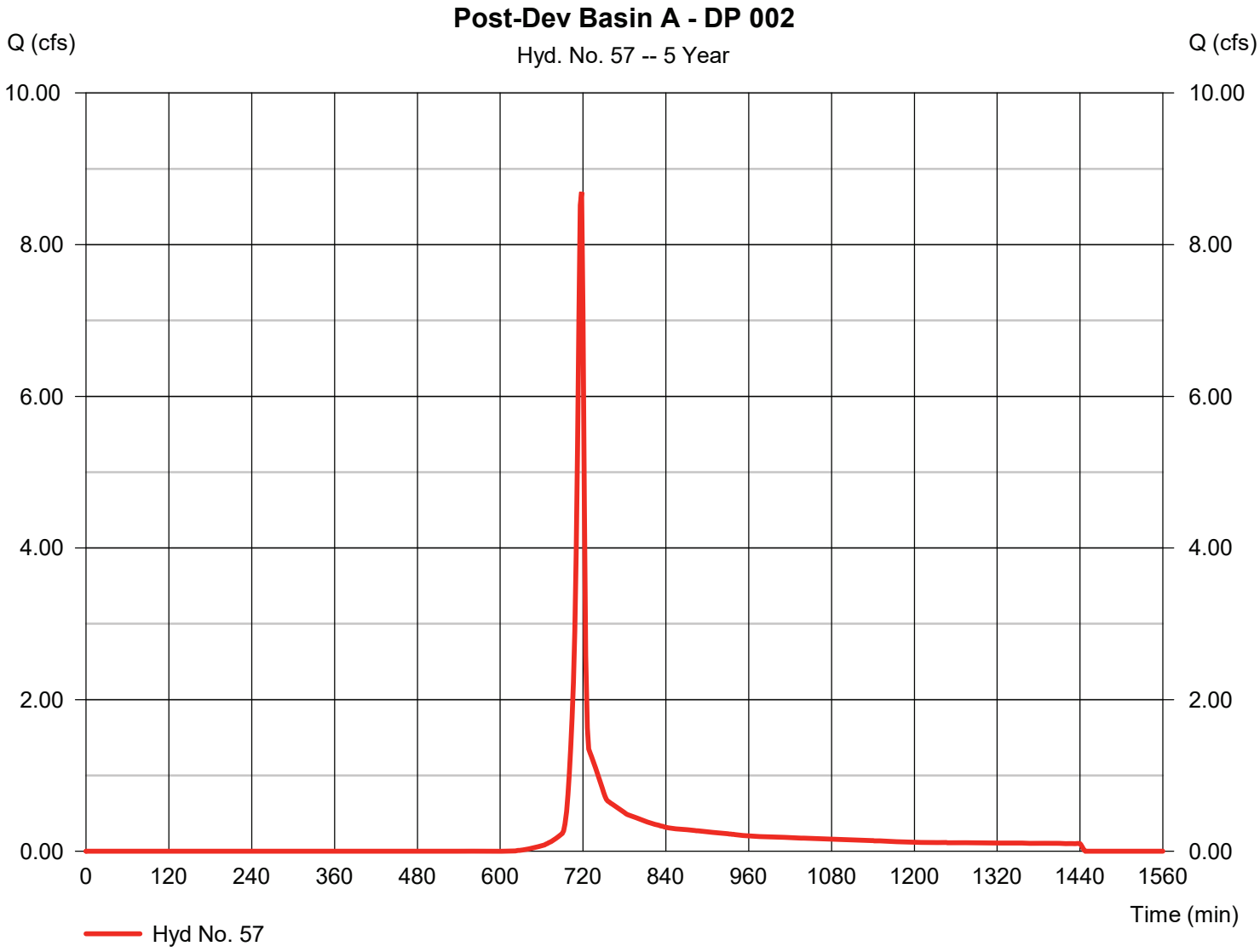
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 57

Post-Dev Basin A - DP 002

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 8.694 cfs |
| Storm frequency | = 5 yrs | Time to peak | = 718 min |
| Time interval | = 2 min | Hyd. volume | = 17,386 cuft |
| Drainage area | = 3.260 ac | Curve number | = 71.5 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 4.20 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



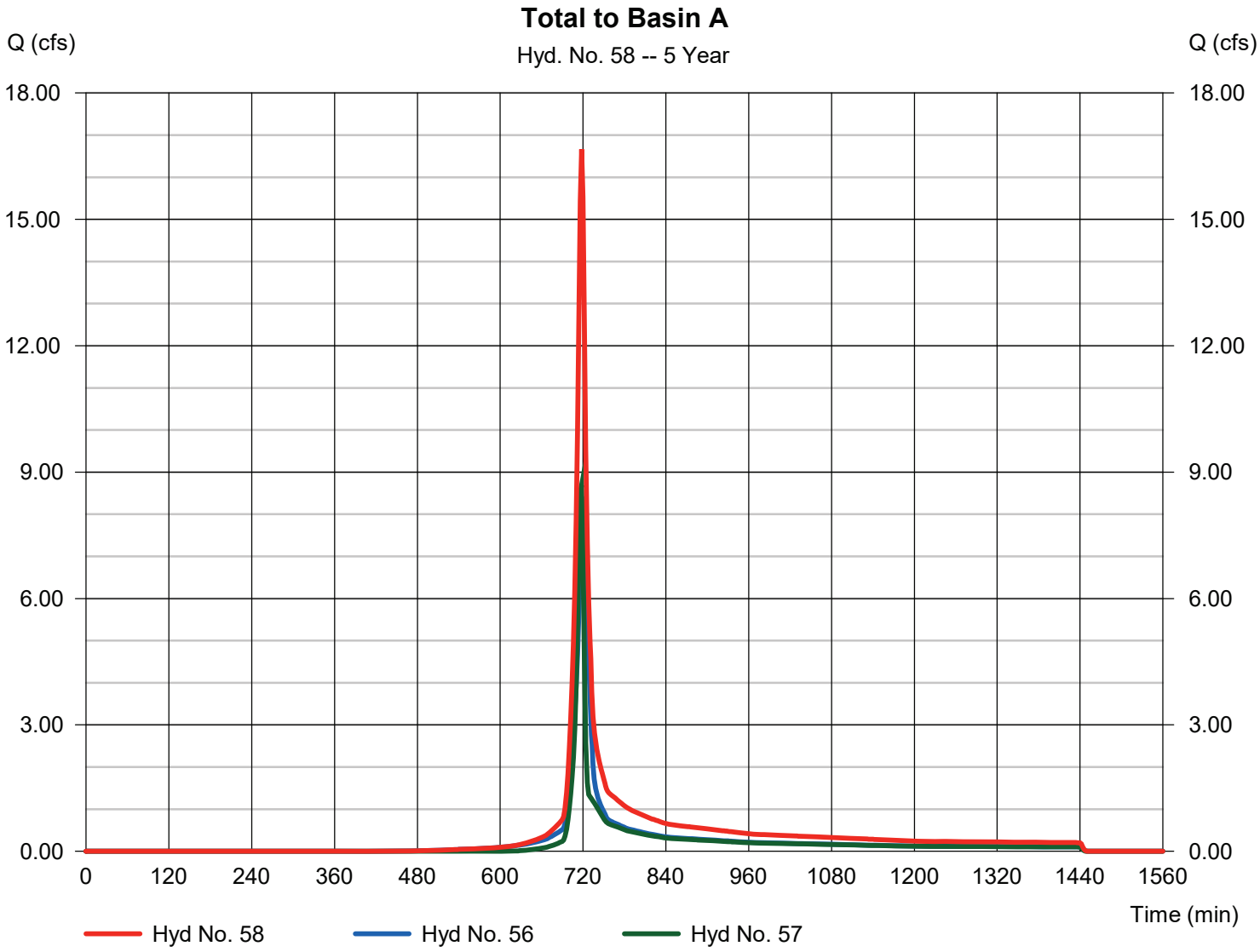
# Hydrograph Report



## Hyd. No. 58

Total to Basin A

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 16.66 cfs |
| Storm frequency | = 5 yrs | Time to peak | = 718 min |
| Time interval | = 2 min | Hyd. volume | = 39,292 cuft |
| Inflow hyds. | = 56, 57 | Contrib. drain. area | = 3.260 ac |



# Hydrograph Report

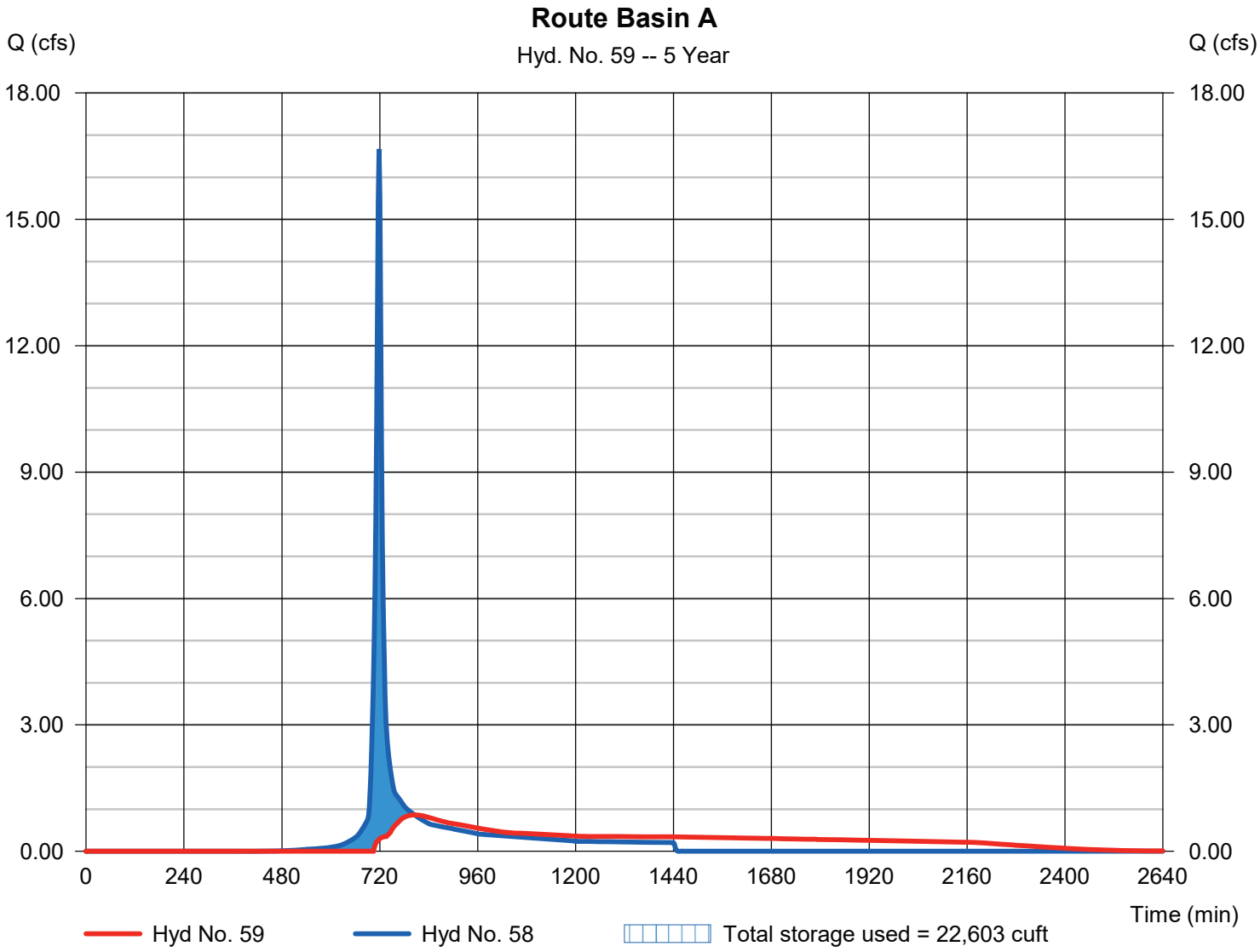
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 59

Route Basin A

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | Reservoir | Peak discharge | = | 0.863 cfs |
| Storm frequency | = | 5 yrs | Time to peak | = | 806 min |
| Time interval | = | 2 min | Hyd. volume | = | 35,758 cuft |
| Inflow hyd. No. | = | 58 - Total to Basin A | Max. Elevation | = | 14.75 ft |
| Reservoir name | = | Basin A (MRC) | Max. Storage | = | 22,603 cuft |

Storage Indication method used.



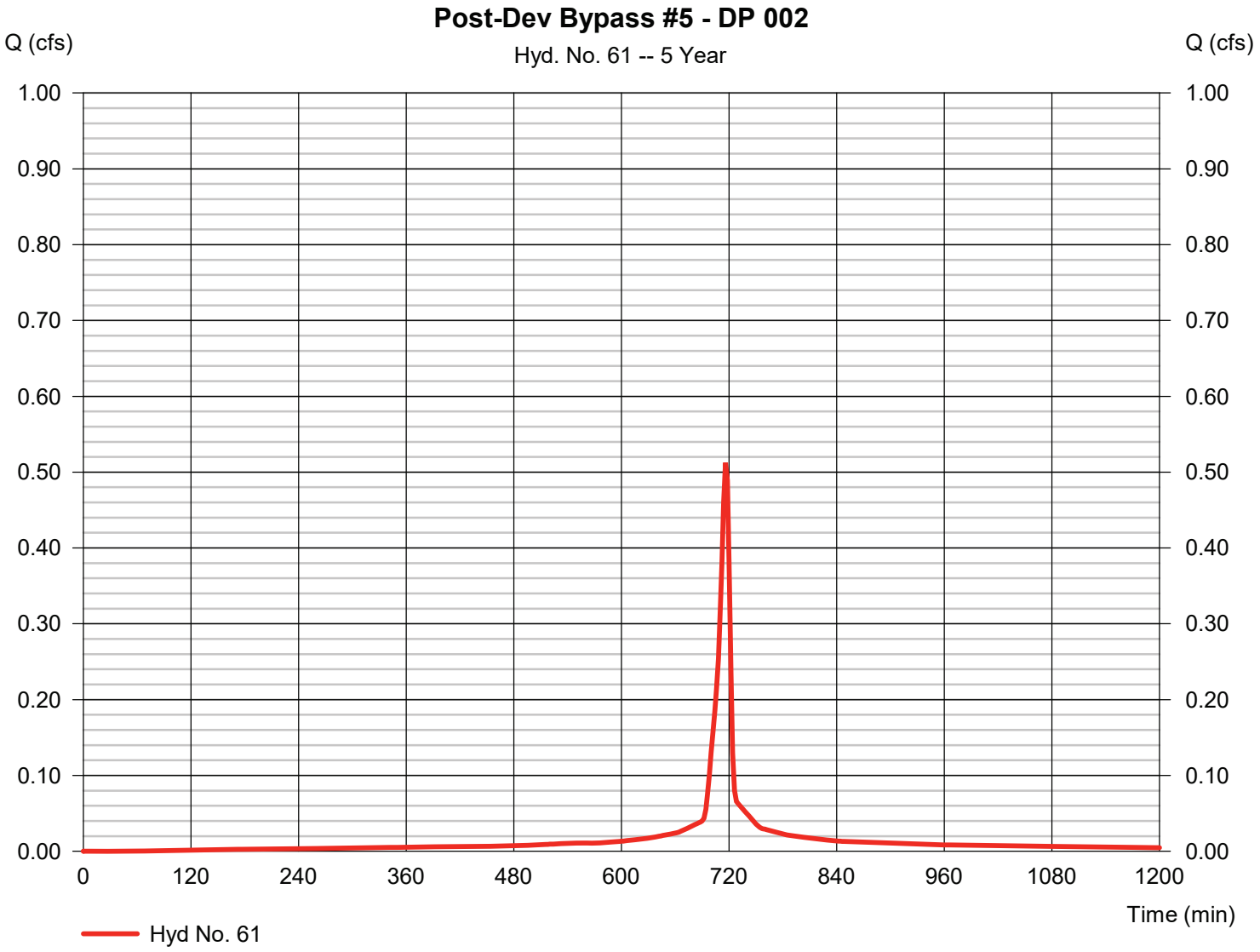
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 61

Post-Dev Bypass #5 - DP 002

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 0.513 cfs |
| Storm frequency | = 5 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 1,214 cuft |
| Drainage area | = 0.090 ac | Curve number | = 98 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 4.20 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



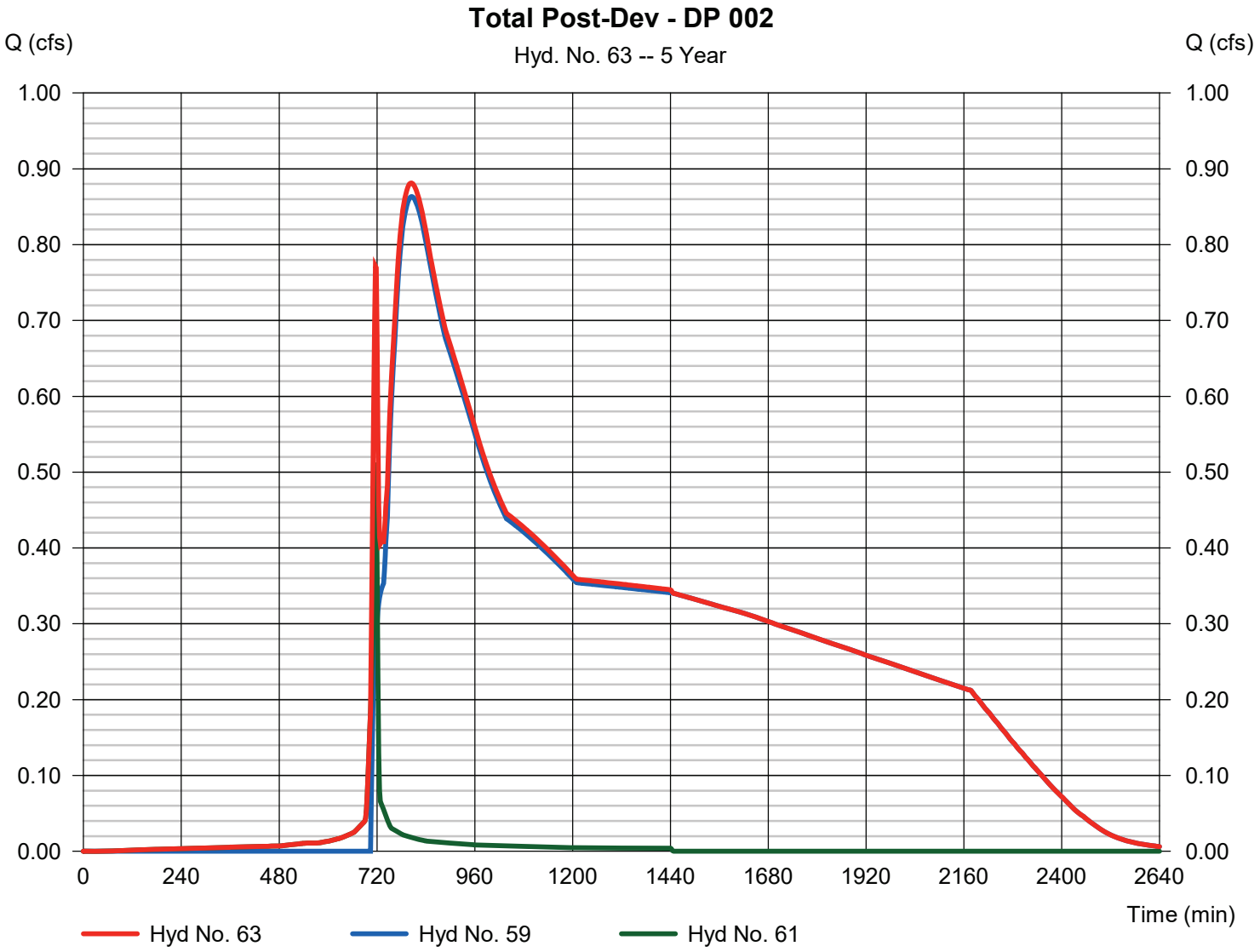
# Hydrograph Report



## Hyd. No. 63

Total Post-Dev - DP 002

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 0.881 cfs |
| Storm frequency | = 5 yrs | Time to peak | = 804 min |
| Time interval | = 2 min | Hyd. volume | = 36,972 cuft |
| Inflow hyds. | = 59, 61 | Contrib. drain. area | = 0.090 ac |



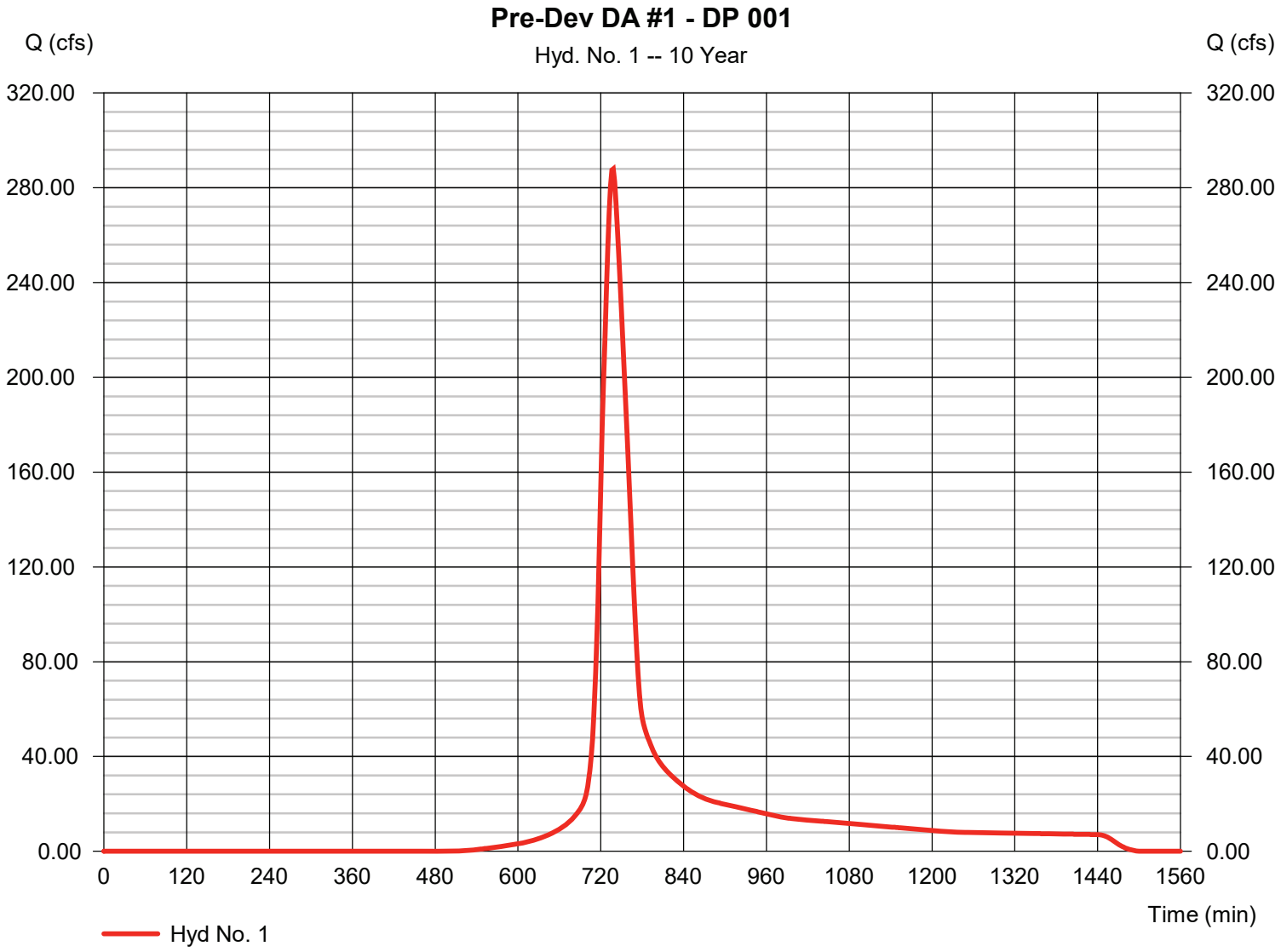
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 1

Pre-Dev DA #1 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 287.94 cfs |
| Storm frequency | = 10 yrs | Time to peak | = 738 min |
| Time interval | = 2 min | Hyd. volume | = 1,402,820 cuft |
| Drainage area | = 149.840 ac | Curve number | = 76.5 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = TR55 | Time of conc. (Tc) | = 37.70 min |
| Total precip. | = 5.00 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



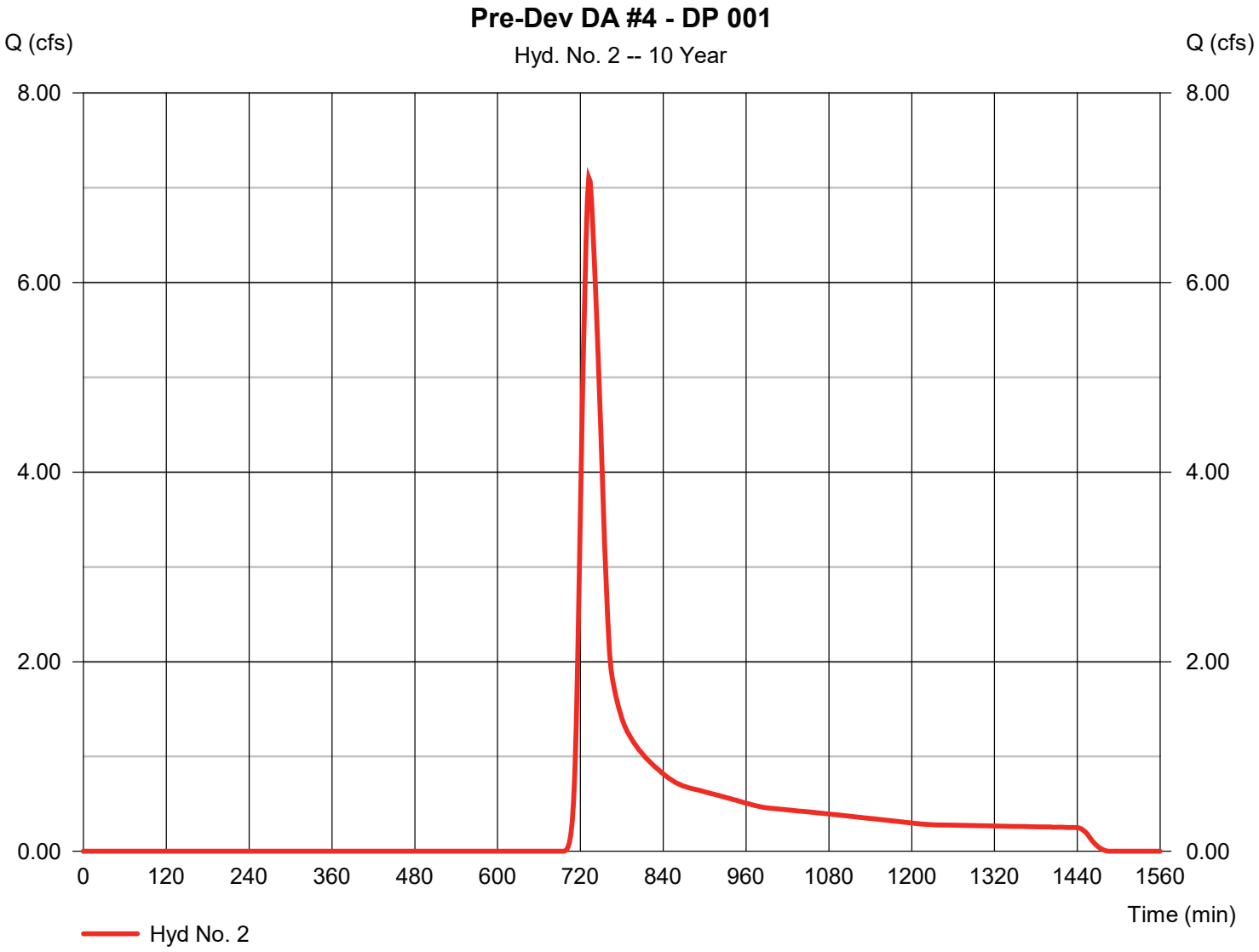
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 2

Pre-Dev DA #4 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 7.105 cfs |
| Storm frequency | = 10 yrs | Time to peak | = 732 min |
| Time interval | = 2 min | Hyd. volume | = 33,937 cuft |
| Drainage area | = 8.180 ac | Curve number | = 57.6 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = TR55 | Time of conc. (Tc) | = 28.25 min |
| Total precip. | = 5.00 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



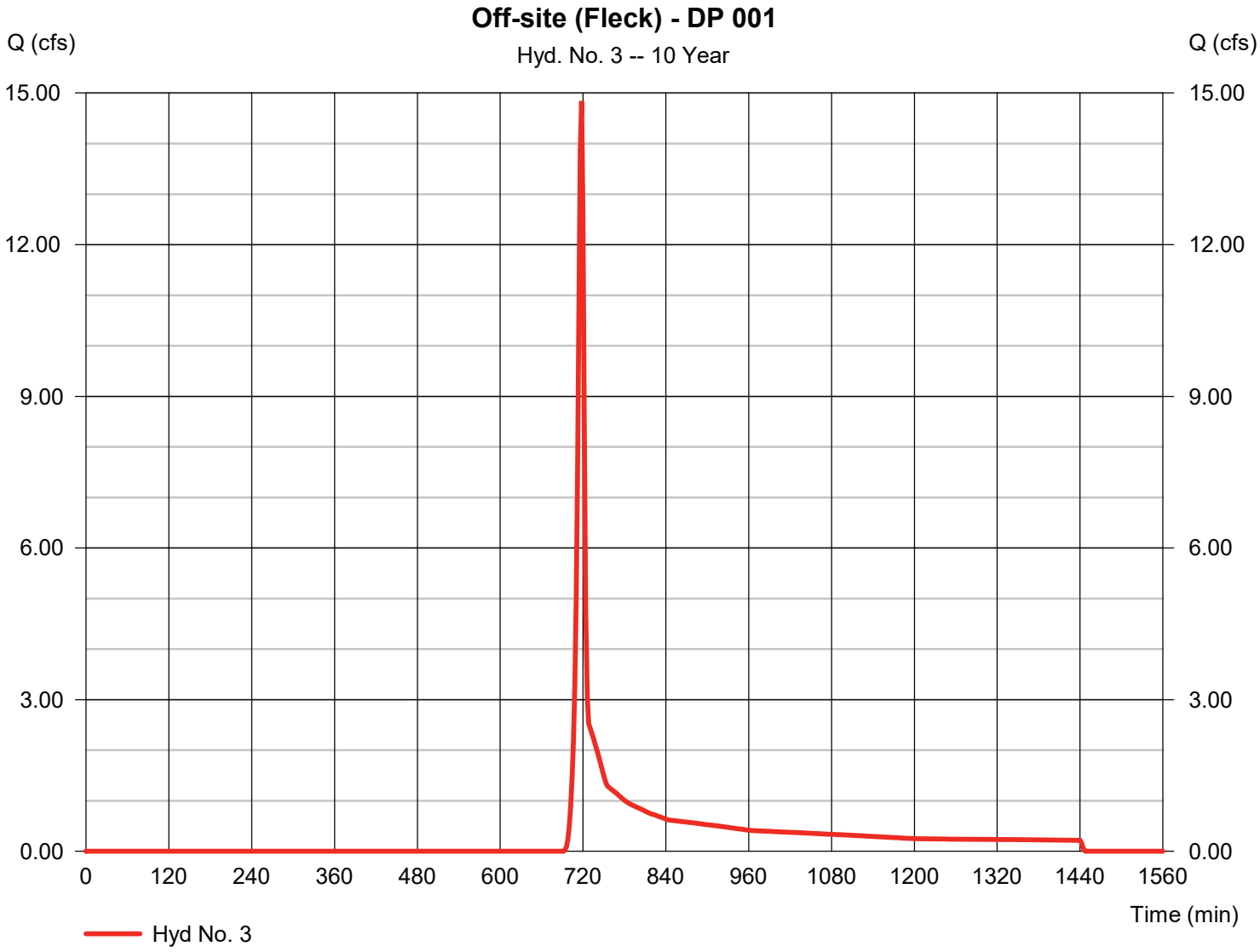
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 3

Off-site (Fleck) - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 14.84 cfs |
| Storm frequency | = 10 yrs | Time to peak | = 718 min |
| Time interval | = 2 min | Hyd. volume | = 30,541 cuft |
| Drainage area | = 7.470 ac | Curve number | = 58.5 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 5.00 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



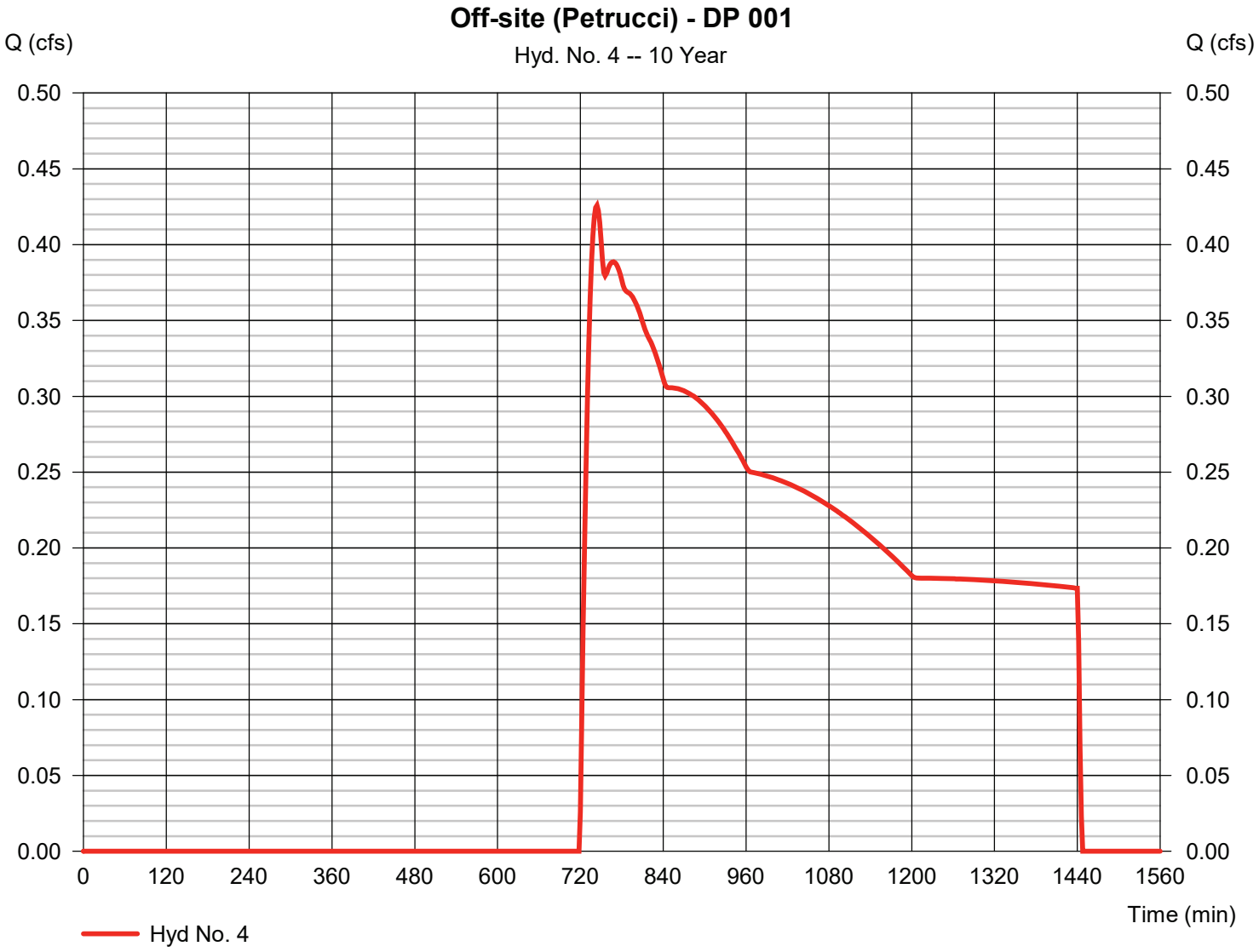
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 4

Off-site (Petrucci) - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 0.426 cfs |
| Storm frequency | = 10 yrs | Time to peak | = 744 min |
| Time interval | = 2 min | Hyd. volume | = 10,431 cuft |
| Drainage area | = 18.000 ac | Curve number | = 38.1 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 5.00 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



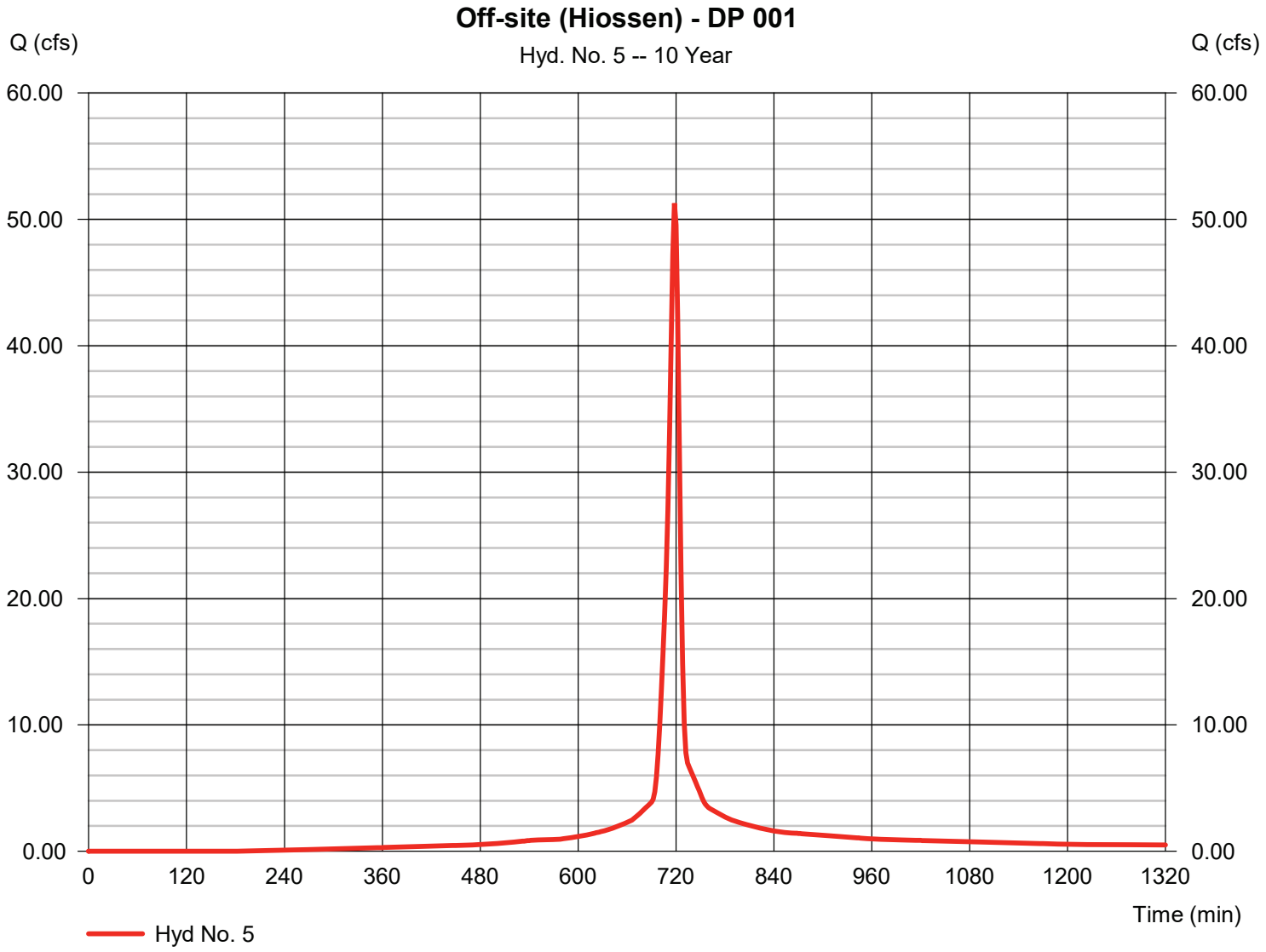
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 5

Off-site (Hiossen) - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 51.27 cfs |
| Storm frequency | = 10 yrs | Time to peak | = 718 min |
| Time interval | = 2 min | Hyd. volume | = 126,191 cuft |
| Drainage area | = 8.390 ac | Curve number | = 92.5 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = TR55 | Time of conc. (Tc) | = 8.90 min |
| Total precip. | = 5.00 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



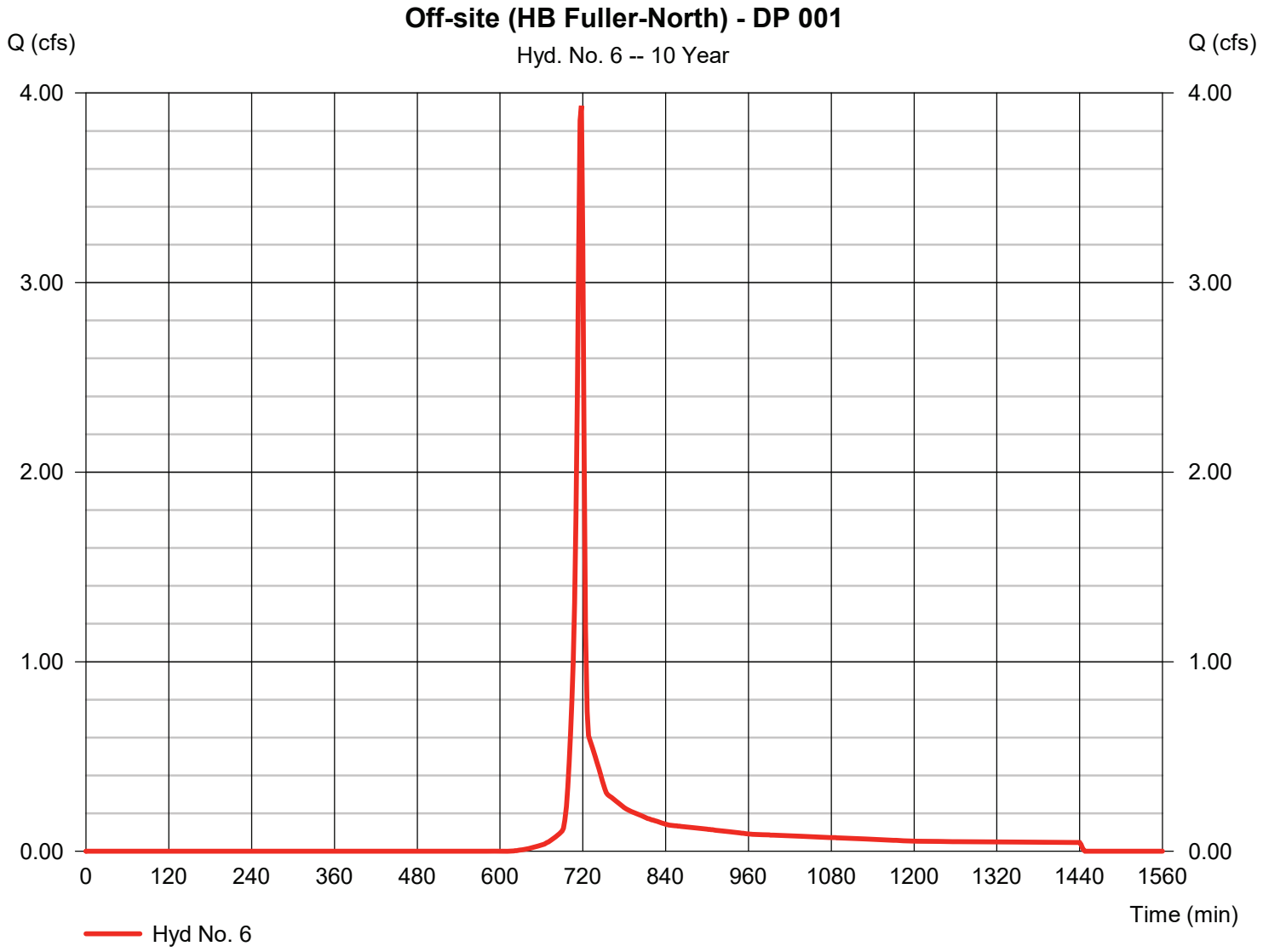
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 6

Off-site (HB Fuller-North) - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 3.934 cfs |
| Storm frequency | = 10 yrs | Time to peak | = 718 min |
| Time interval | = 2 min | Hyd. volume | = 7,867 cuft |
| Drainage area | = 1.240 ac | Curve number | = 67.8 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 5.00 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



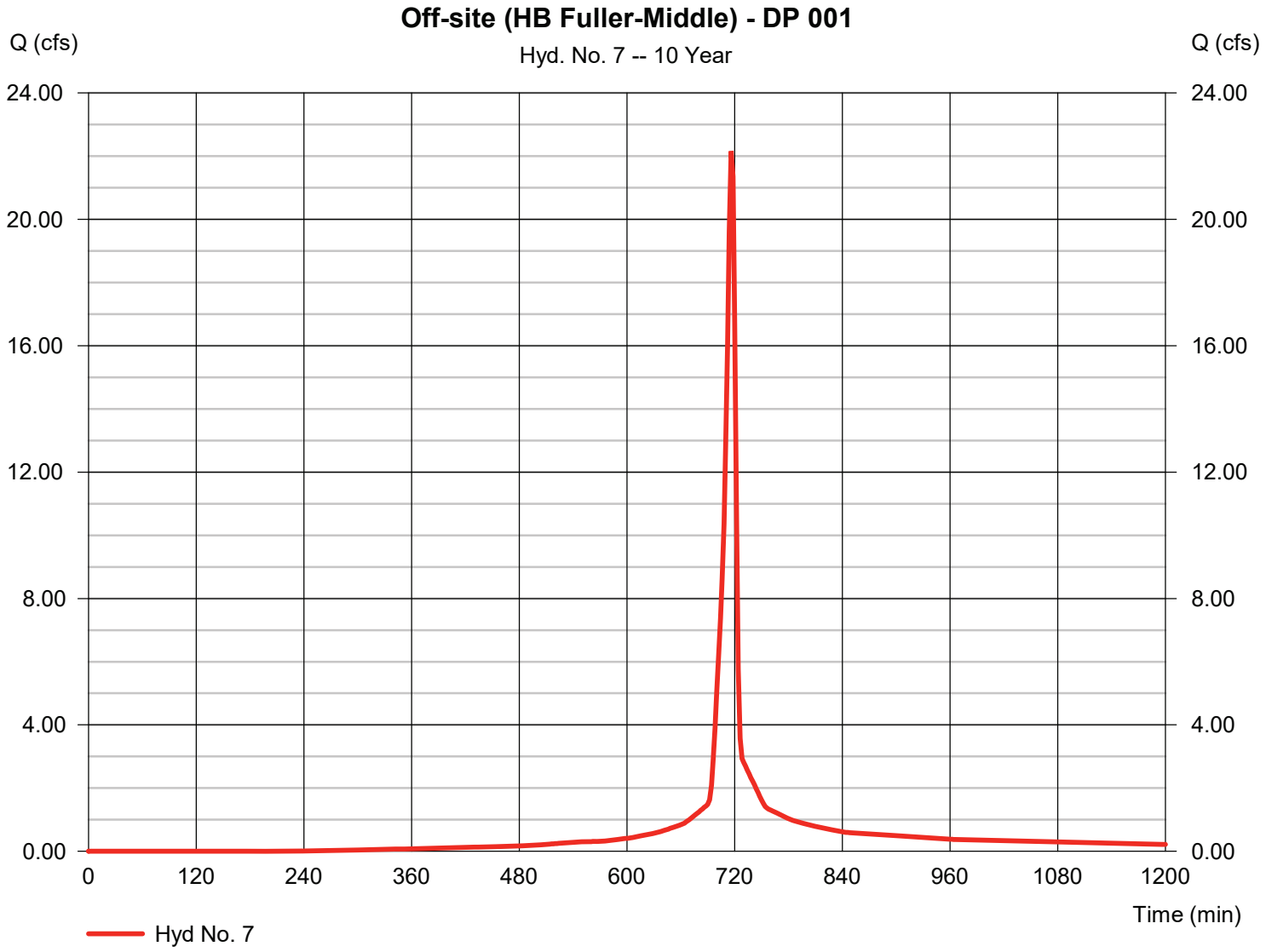
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 7

Off-site (HB Fuller-Middle) - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 22.15 cfs |
| Storm frequency | = 10 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 47,615 cuft |
| Drainage area | = 3.590 ac | Curve number | = 90.2 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 5.00 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



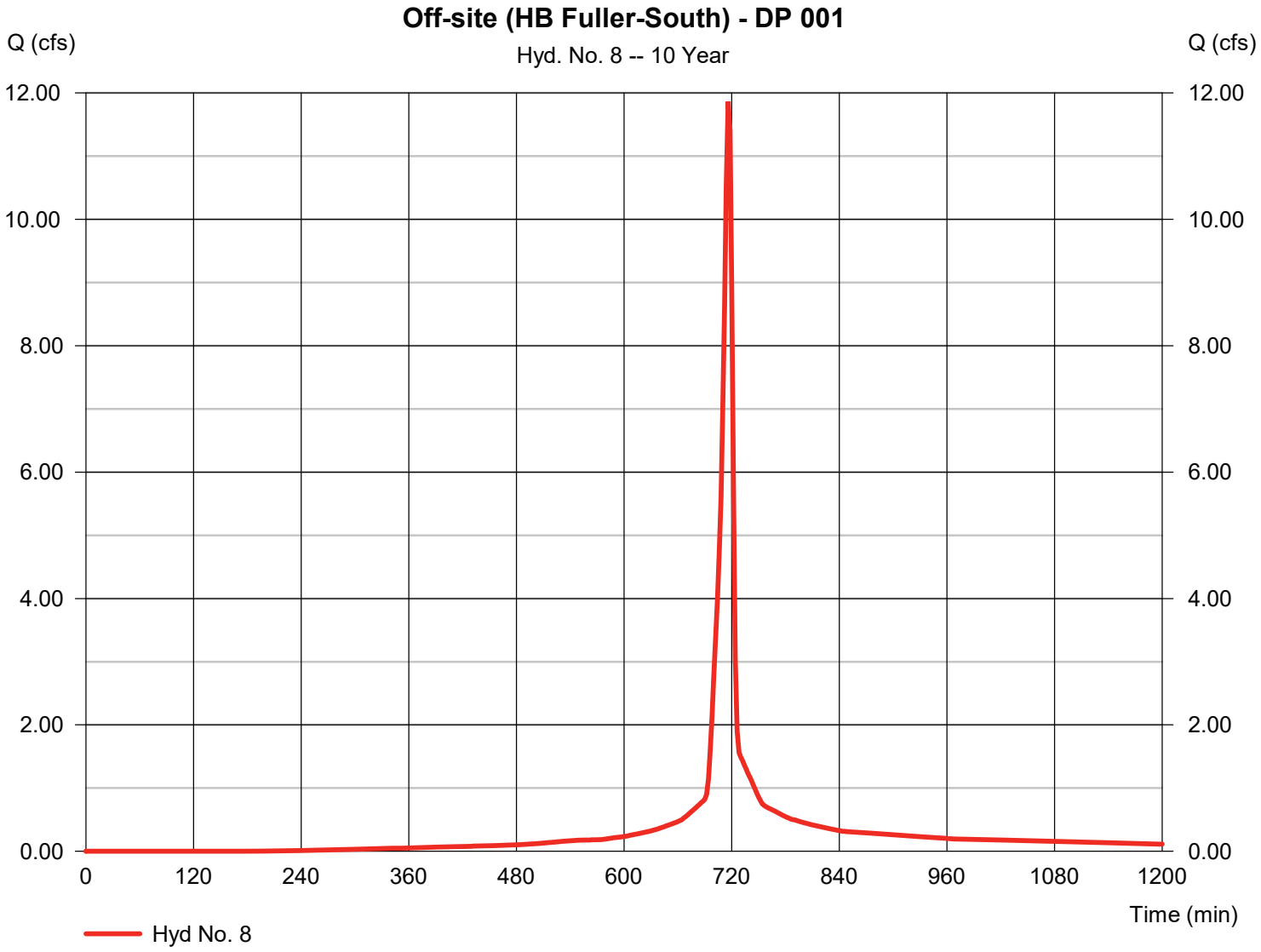
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 8

Off-site (HB Fuller-South) - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 11.87 cfs |
| Storm frequency | = 10 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 25,819 cuft |
| Drainage area | = 1.880 ac | Curve number | = 91.5 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 5.00 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



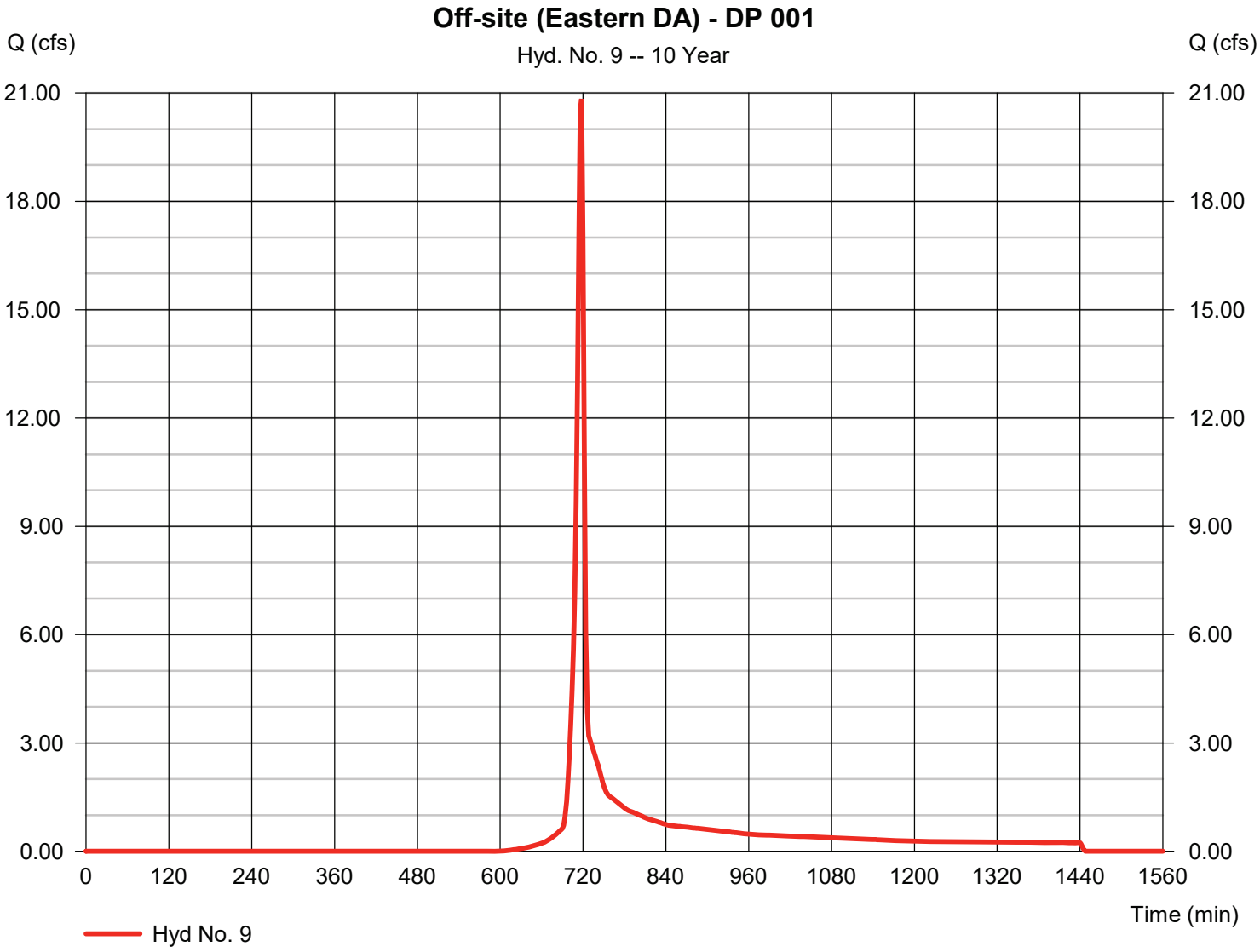
# Hydrograph Report



## Hyd. No. 9

Off-site (Eastern DA) - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 20.84 cfs |
| Storm frequency | = 10 yrs | Time to peak | = 718 min |
| Time interval | = 2 min | Hyd. volume | = 41,697 cuft |
| Drainage area | = 6.210 ac | Curve number | = 69.2 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 5.00 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



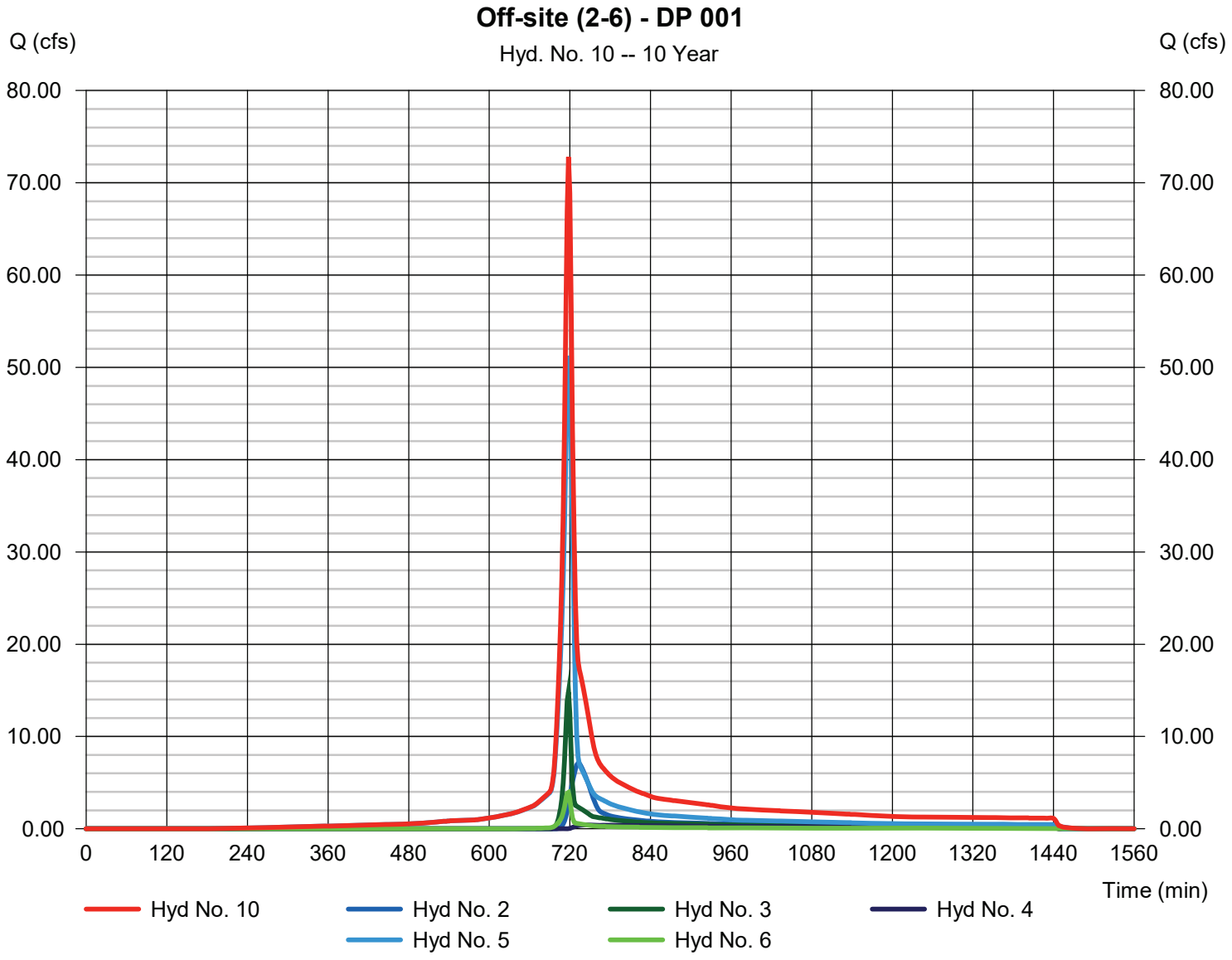
# Hydrograph Report



## Hyd. No. 10

Off-site (2-6) - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 72.80 cfs |
| Storm frequency | = 10 yrs | Time to peak | = 718 min |
| Time interval | = 2 min | Hyd. volume | = 208,966 cuft |
| Inflow hyds. | = 2, 3, 4, 5, 6 | Contrib. drain. area | = 43.280 ac |



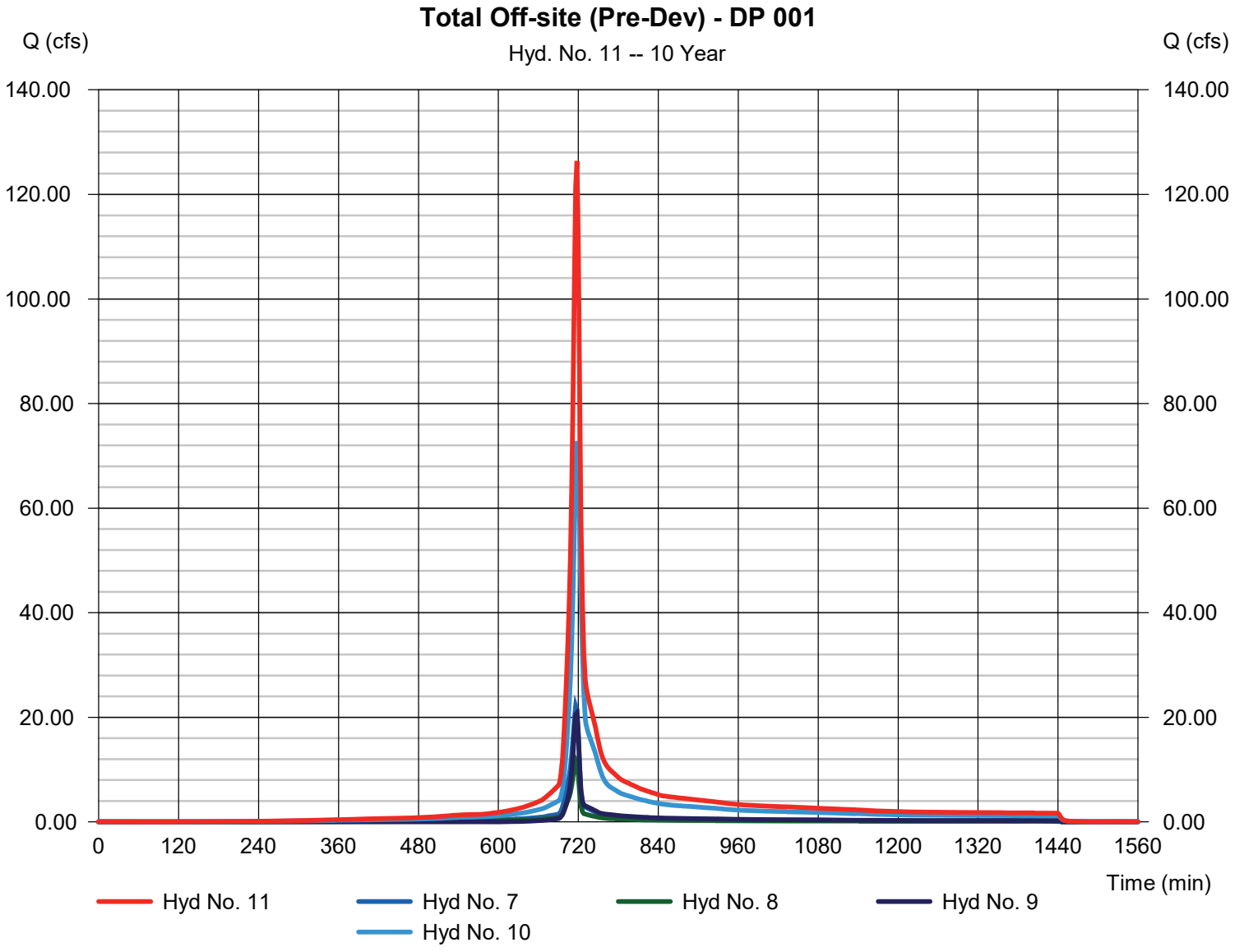
# Hydrograph Report



## Hyd. No. 11

Total Off-site (Pre-Dev) - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 126.41 cfs |
| Storm frequency | = 10 yrs | Time to peak | = 718 min |
| Time interval | = 2 min | Hyd. volume | = 324,097 cuft |
| Inflow hyds. | = 7, 8, 9, 10 | Contrib. drain. area | = 11.680 ac |



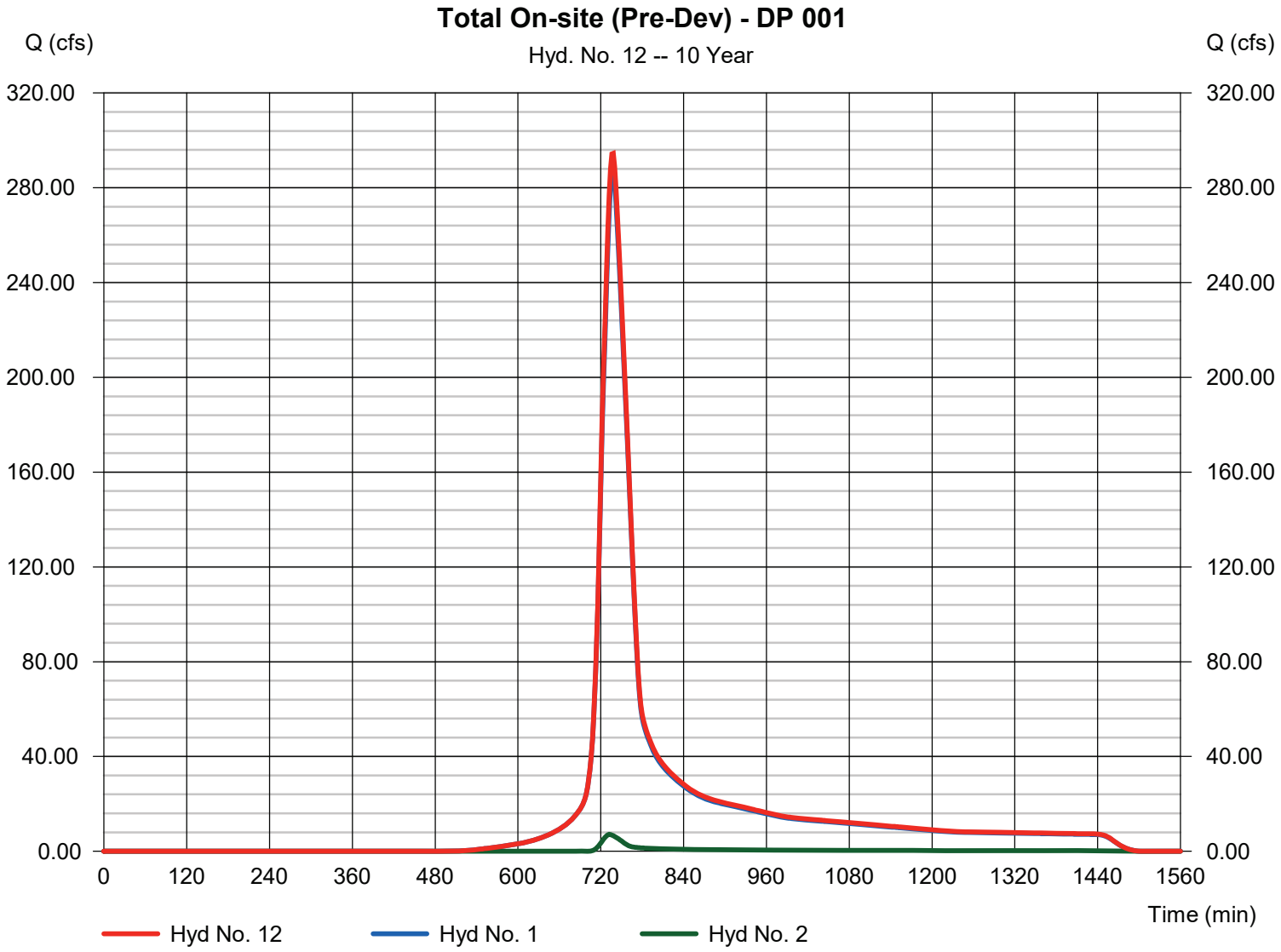
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 12

Total On-site (Pre-Dev) - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 294.50 cfs |
| Storm frequency | = 10 yrs | Time to peak | = 738 min |
| Time interval | = 2 min | Hyd. volume | = 1,436,759 cuft |
| Inflow hyds. | = 1, 2 | Contrib. drain. area | = 158.020 ac |



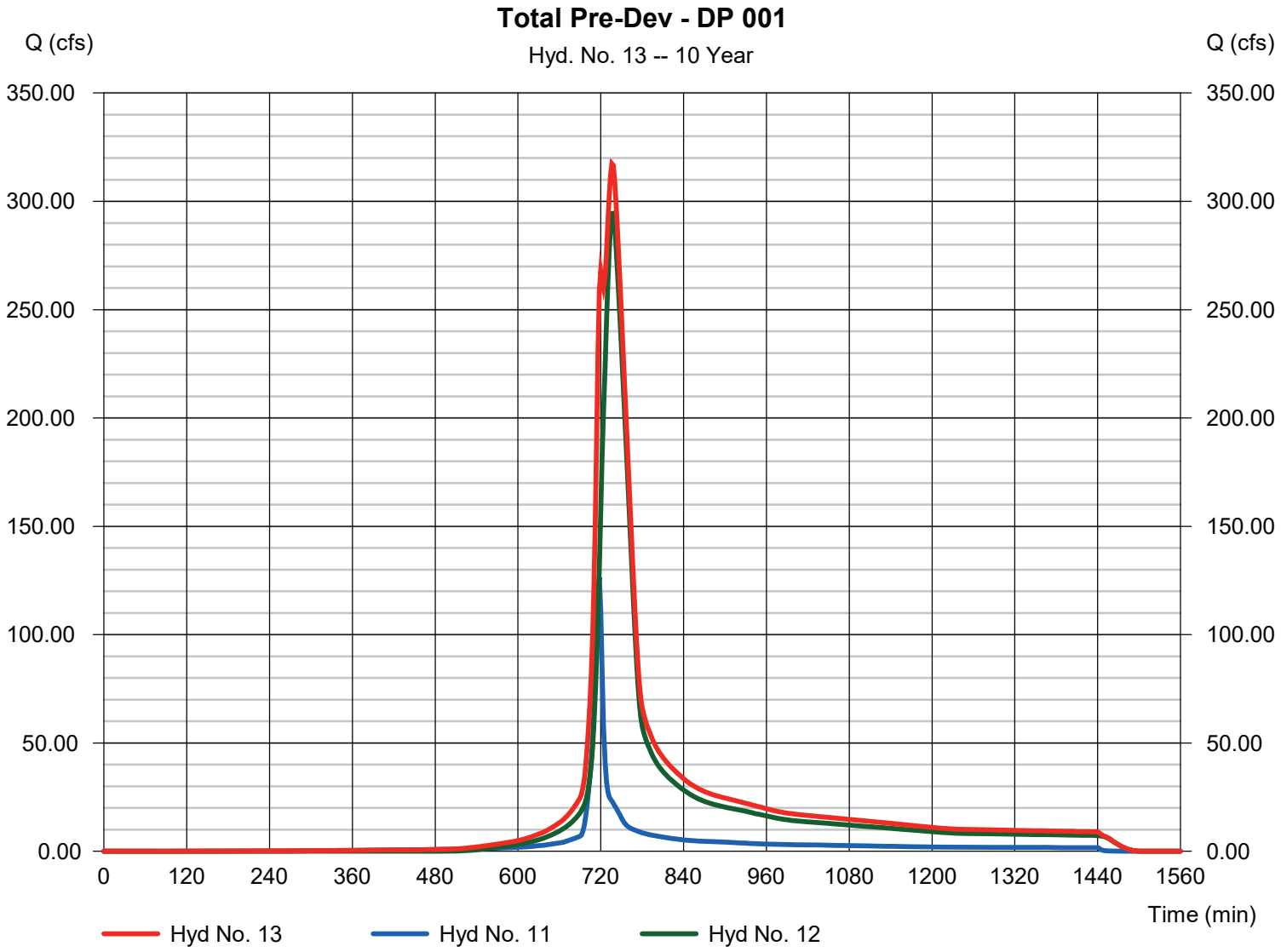
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 13

Total Pre-Dev - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 317.42 cfs |
| Storm frequency | = 10 yrs | Time to peak | = 736 min |
| Time interval | = 2 min | Hyd. volume | = 1,760,854 cuft |
| Inflow hyds. | = 11, 12 | Contrib. drain. area | = 0.000 ac |



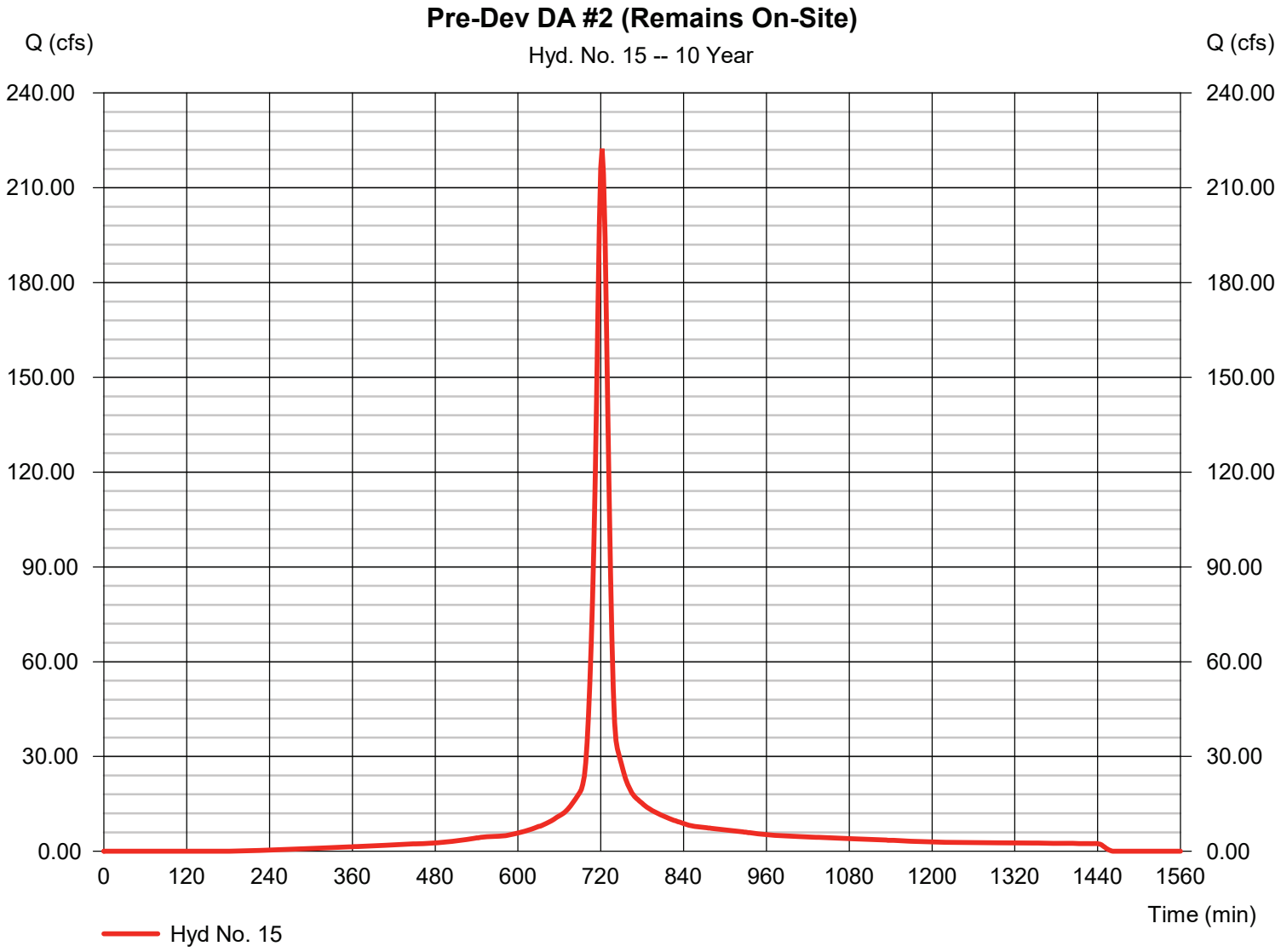
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 15

Pre-Dev DA #2 (Remains On-Site)

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 222.37 cfs |
| Storm frequency | = 10 yrs | Time to peak | = 722 min |
| Time interval | = 2 min | Hyd. volume | = 660,109 cuft |
| Drainage area | = 45.370 ac | Curve number | = 92.2 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = TR55 | Time of conc. (Tc) | = 13.40 min |
| Total precip. | = 5.00 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



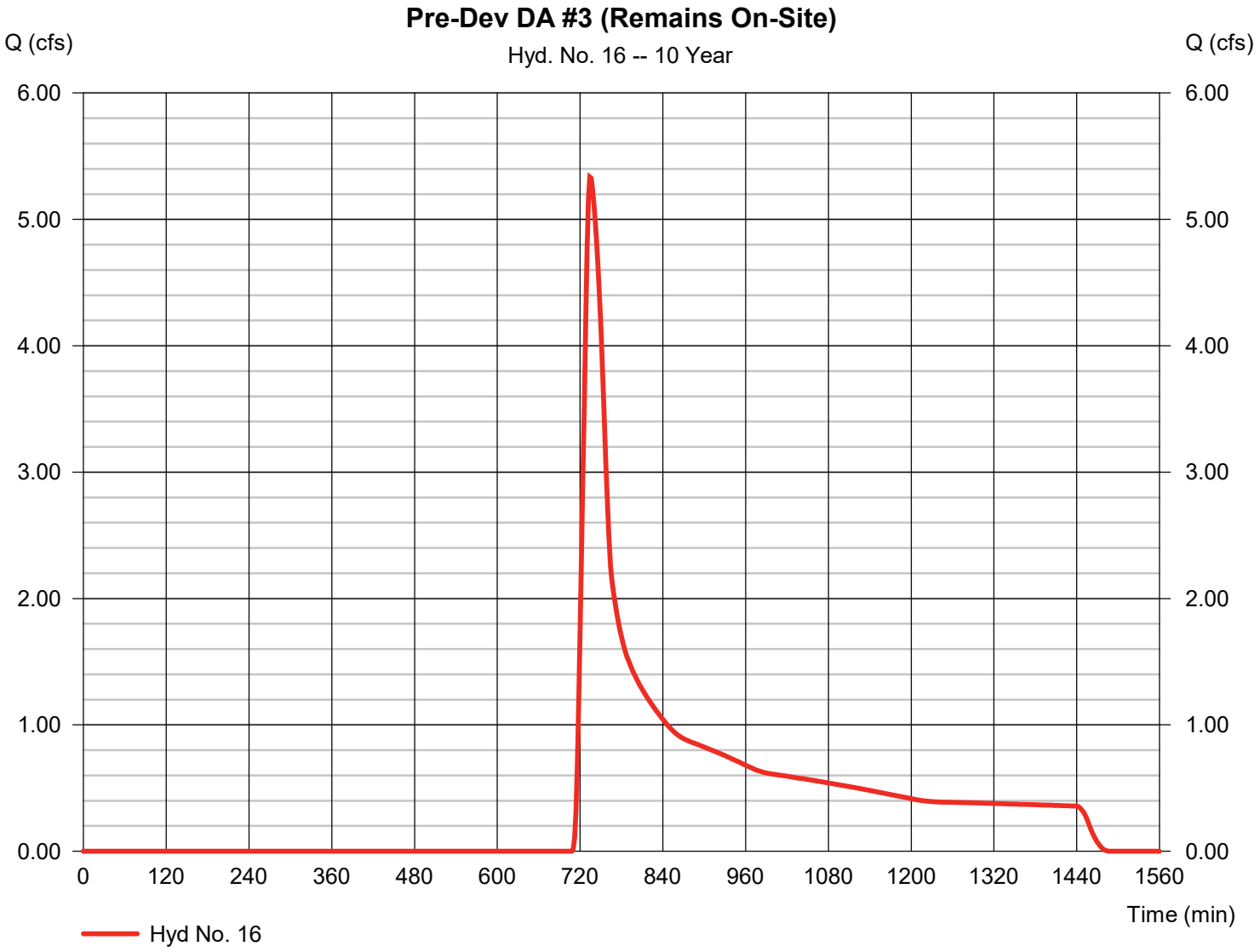
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 16

Pre-Dev DA #3 (Remains On-Site)

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 5.335 cfs |
| Storm frequency | = 10 yrs | Time to peak | = 734 min |
| Time interval | = 2 min | Hyd. volume | = 37,113 cuft |
| Drainage area | = 16.820 ac | Curve number | = 48.4 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = TR55 | Time of conc. (Tc) | = 29.90 min |
| Total precip. | = 5.00 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



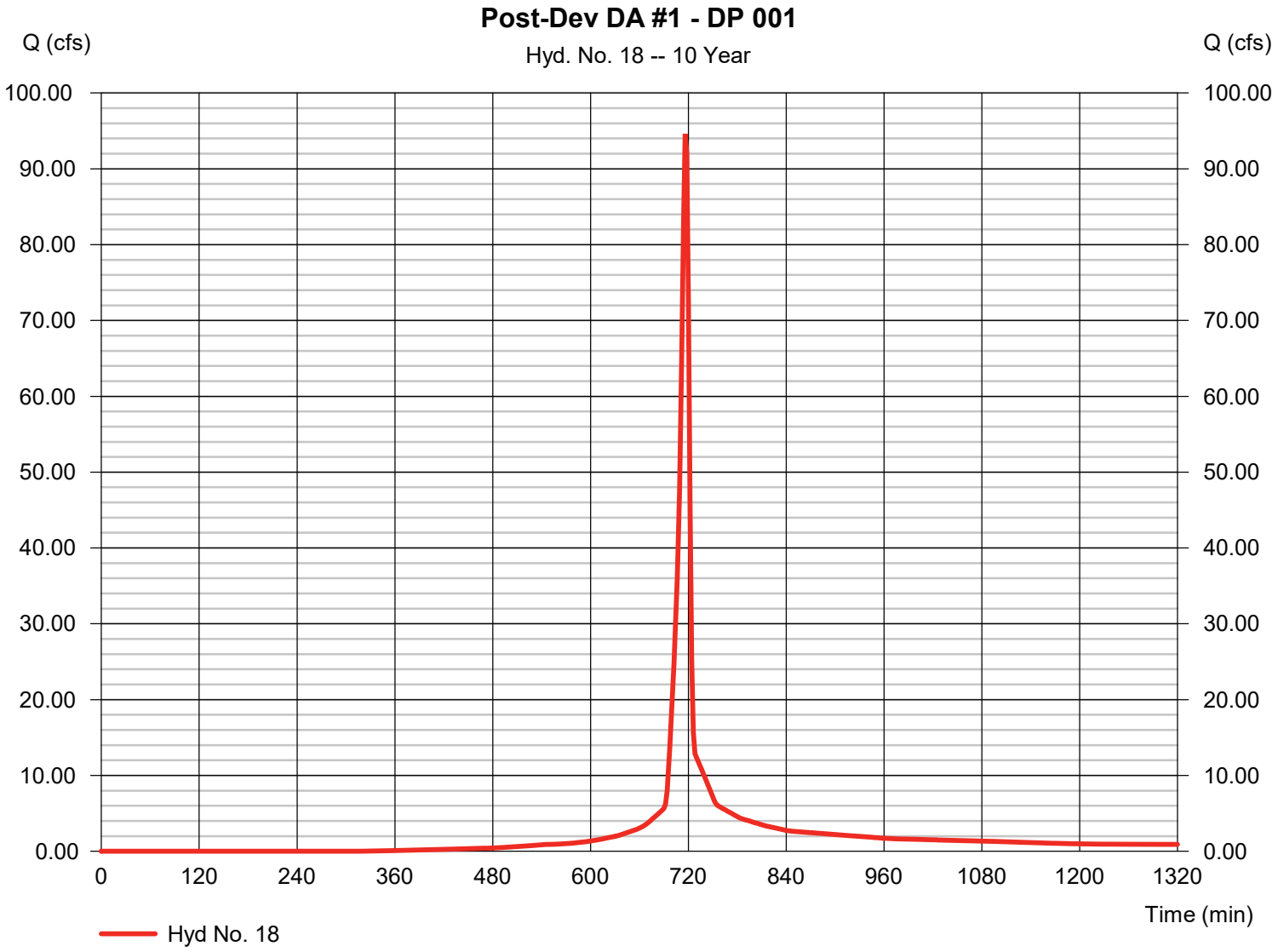
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 18

Post-Dev DA #1 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 94.59 cfs |
| Storm frequency | = 10 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 196,762 cuft |
| Drainage area | = 16.870 ac | Curve number | = 85.6 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 5.00 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



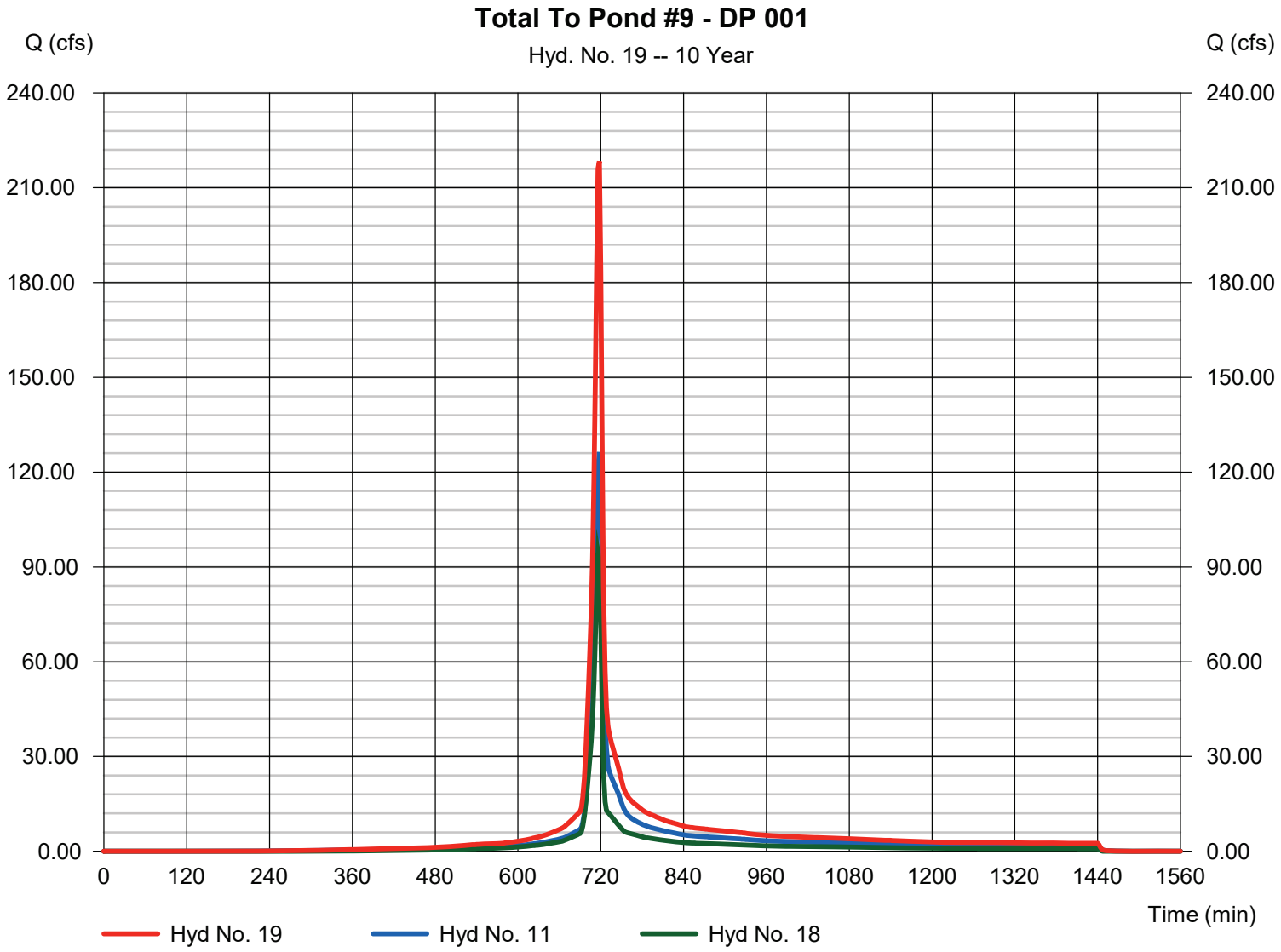
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 19

Total To Pond #9 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 218.41 cfs |
| Storm frequency | = 10 yrs | Time to peak | = 718 min |
| Time interval | = 2 min | Hyd. volume | = 520,858 cuft |
| Inflow hyds. | = 11, 18 | Contrib. drain. area | = 16.870 ac |



# Hydrograph Report

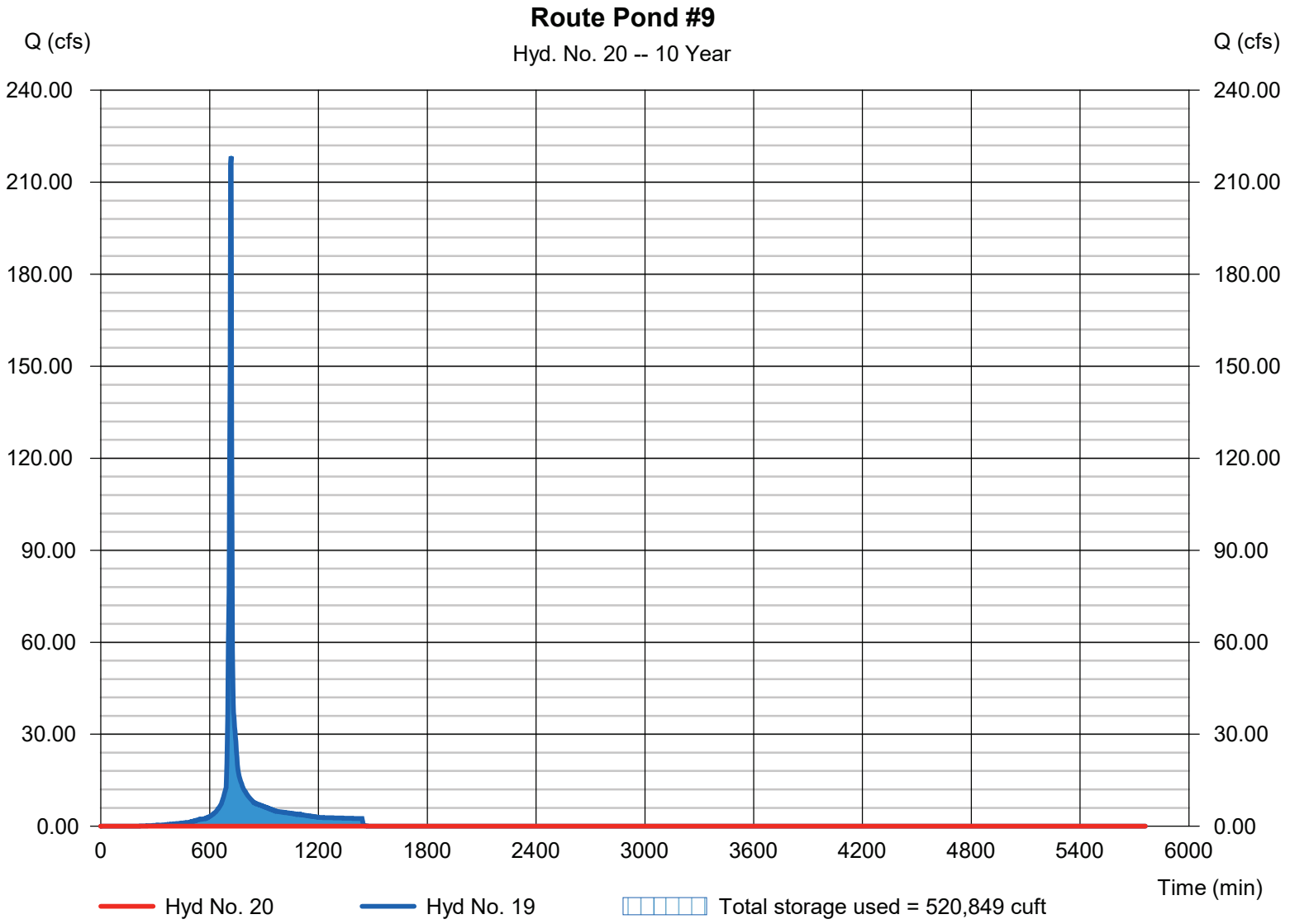
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 20

Route Pond #9

| | | | |
|---|---|---|---|
| Hydrograph type | = Reservoir | Peak discharge | = 0.004 cfs |
| Storm frequency | = 10 yrs | Time to peak | = 1482 min |
| Time interval | = 2 min | Hyd. volume | = 549 cuft |
| Inflow hyd. No. | = 19 - Total To Pond #9 - DP 001 | Max. Elevation | = 13.51 ft |
| Reservoir name | = Wet Pond #9 | Max. Storage | = 520,849 cuft |

Storage Indication method used.



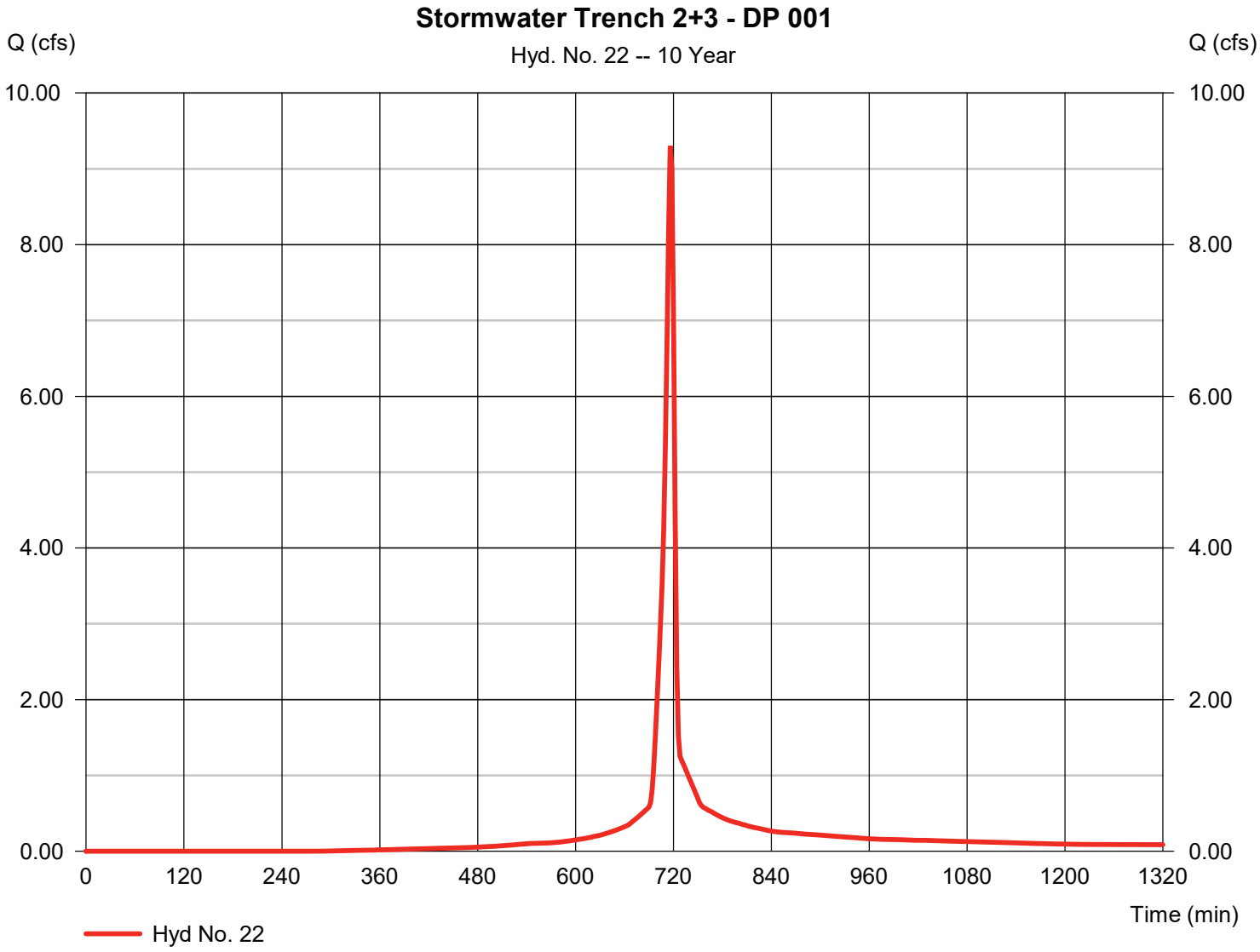
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 22

Stormwater Trench 2+3 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 9.302 cfs |
| Storm frequency | = 10 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 19,577 cuft |
| Drainage area | = 1.590 ac | Curve number | = 87.5 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 5.00 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



# Hydrograph Report

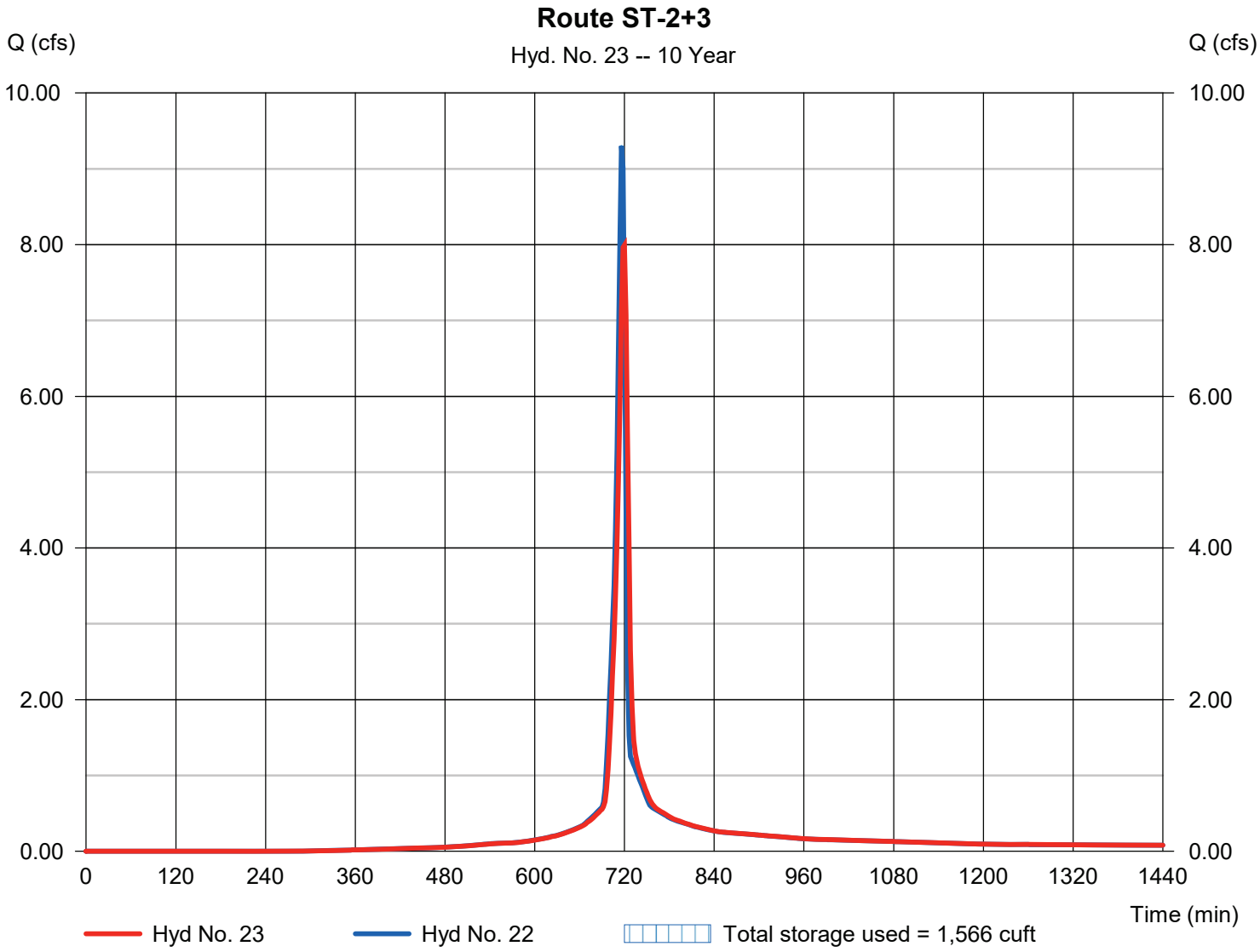
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 23

Route ST-2+3

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | Reservoir | Peak discharge | = | 7.992 cfs |
| Storm frequency | = | 10 yrs | Time to peak | = | 720 min |
| Time interval | = | 2 min | Hyd. volume | = | 19,577 cuft |
| Inflow hyd. No. | = | 22 - Stormwater Trench 2+3 - DP-2+3 | Max. Elevation | = | 16.51 ft |
| Reservoir name | = | Stormwater Trench ST-2+3 | Max. Storage | = | 1,566 cuft |

Storage Indication method used.



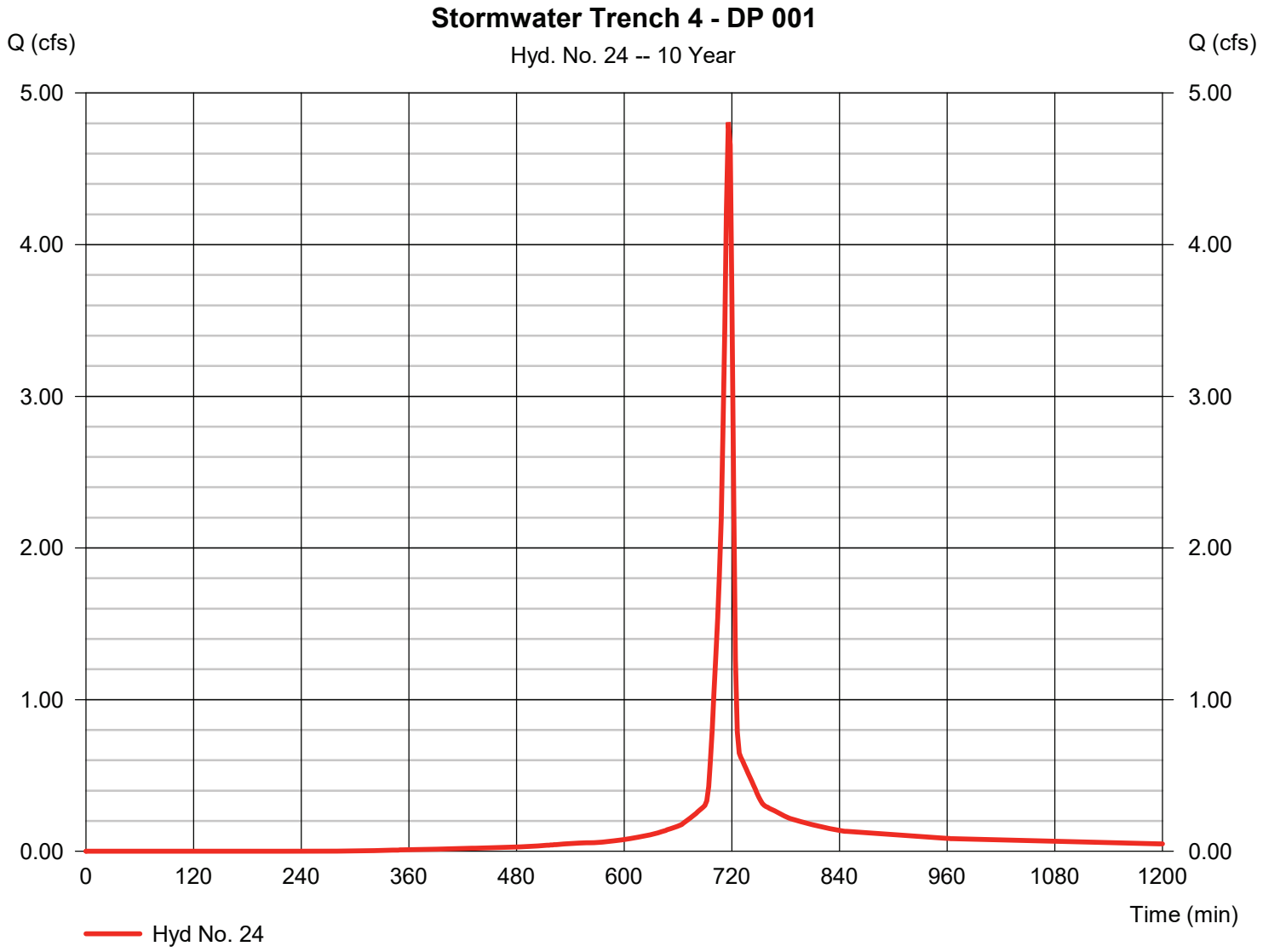
# Hydrograph Report



## Hyd. No. 24

Stormwater Trench 4 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 4.807 cfs |
| Storm frequency | = 10 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 10,124 cuft |
| Drainage area | = 0.820 ac | Curve number | = 87.6 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 5.00 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



# Hydrograph Report

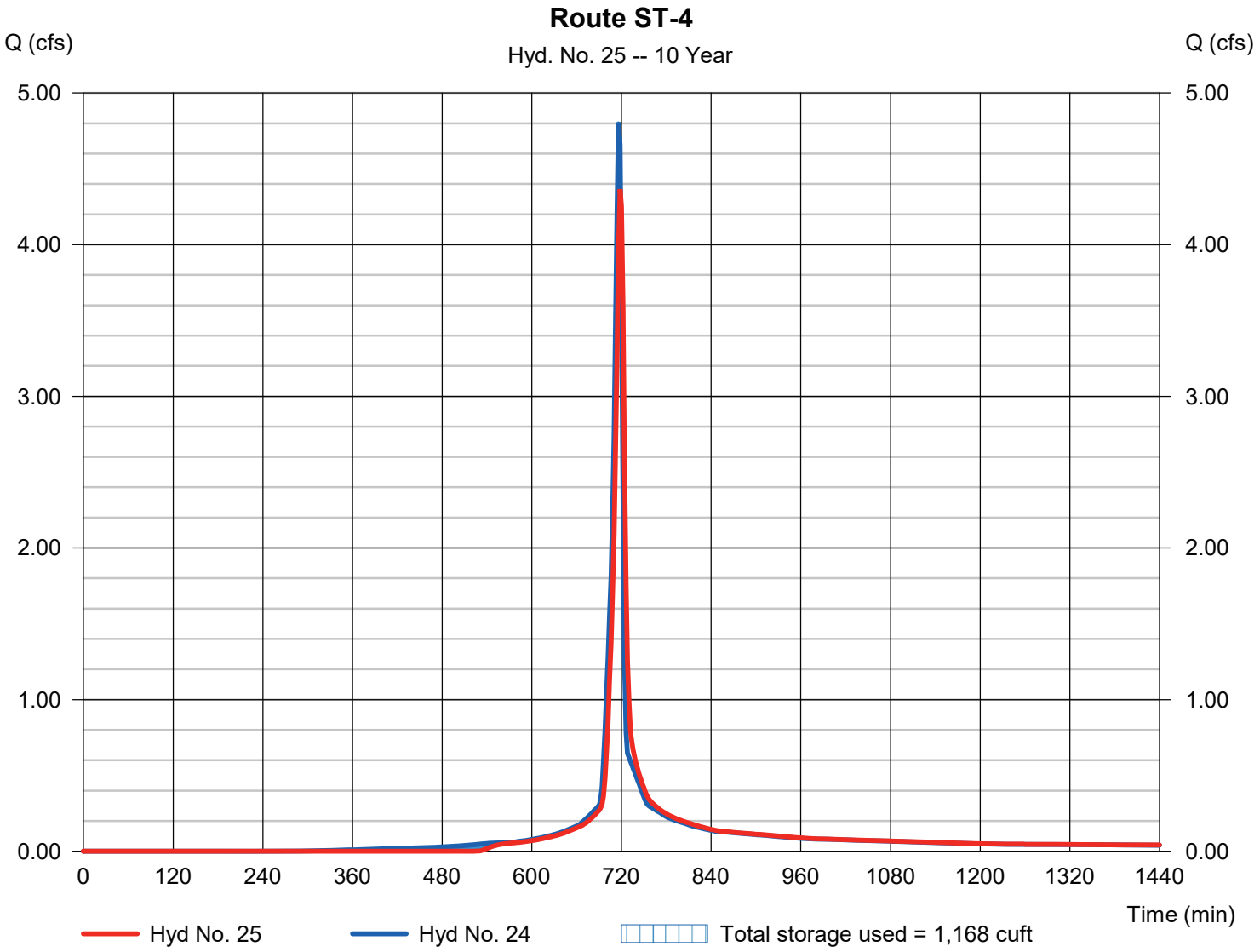
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 25

Route ST-4

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | Reservoir | Peak discharge | = | 4.367 cfs |
| Storm frequency | = | 10 yrs | Time to peak | = | 718 min |
| Time interval | = | 2 min | Hyd. volume | = | 9,871 cuft |
| Inflow hyd. No. | = | 24 - Stormwater Trench 4 - DP-001 | Max. Elevation | = | 16.84 ft |
| Reservoir name | = | Stormwater Trench ST-4 | Max. Storage | = | 1,168 cuft |

Storage Indication method used.



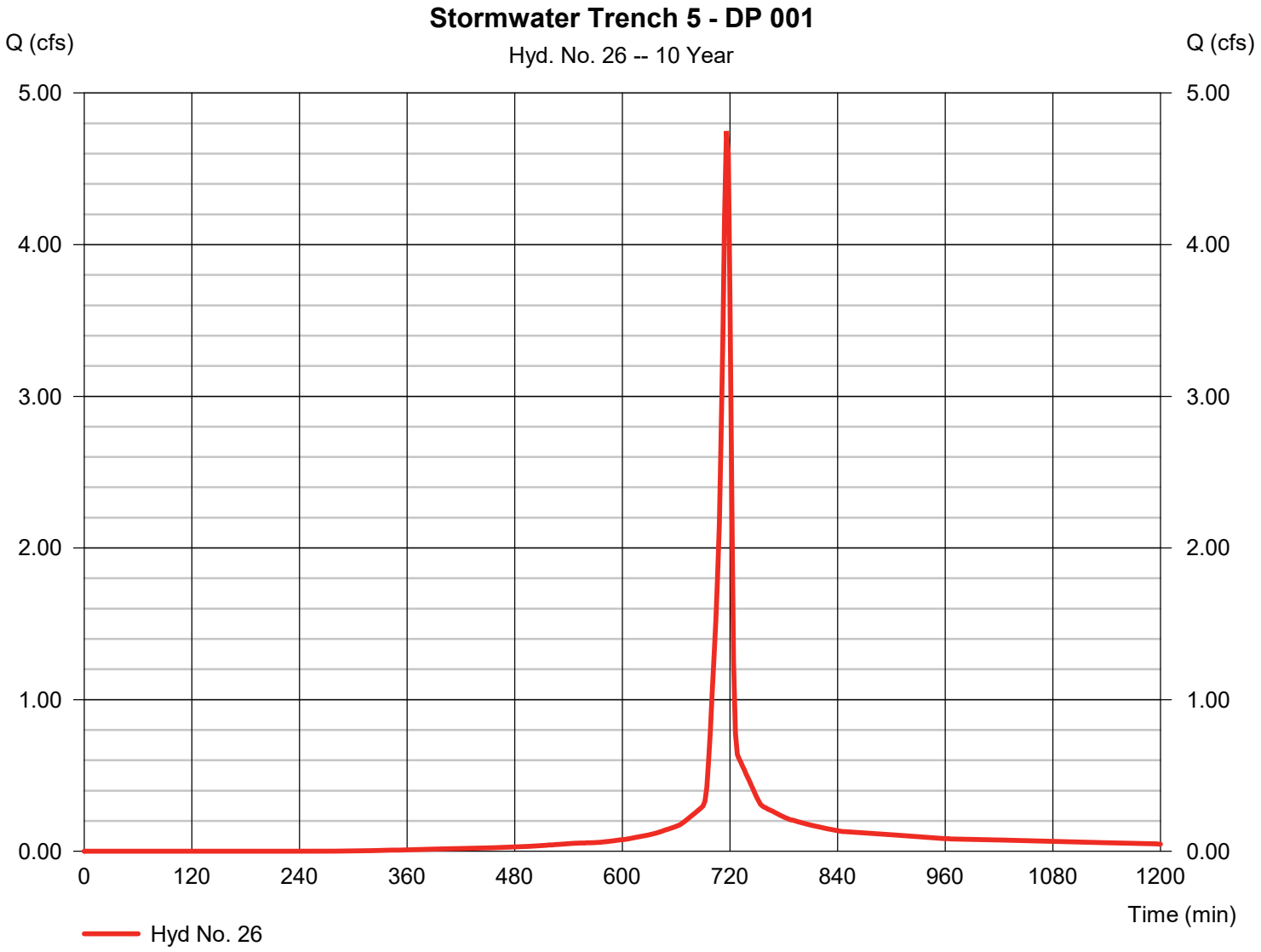
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 26

Stormwater Trench 5 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 4.749 cfs |
| Storm frequency | = 10 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 10,001 cuft |
| Drainage area | = 0.810 ac | Curve number | = 87.6 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 5.00 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



# Hydrograph Report

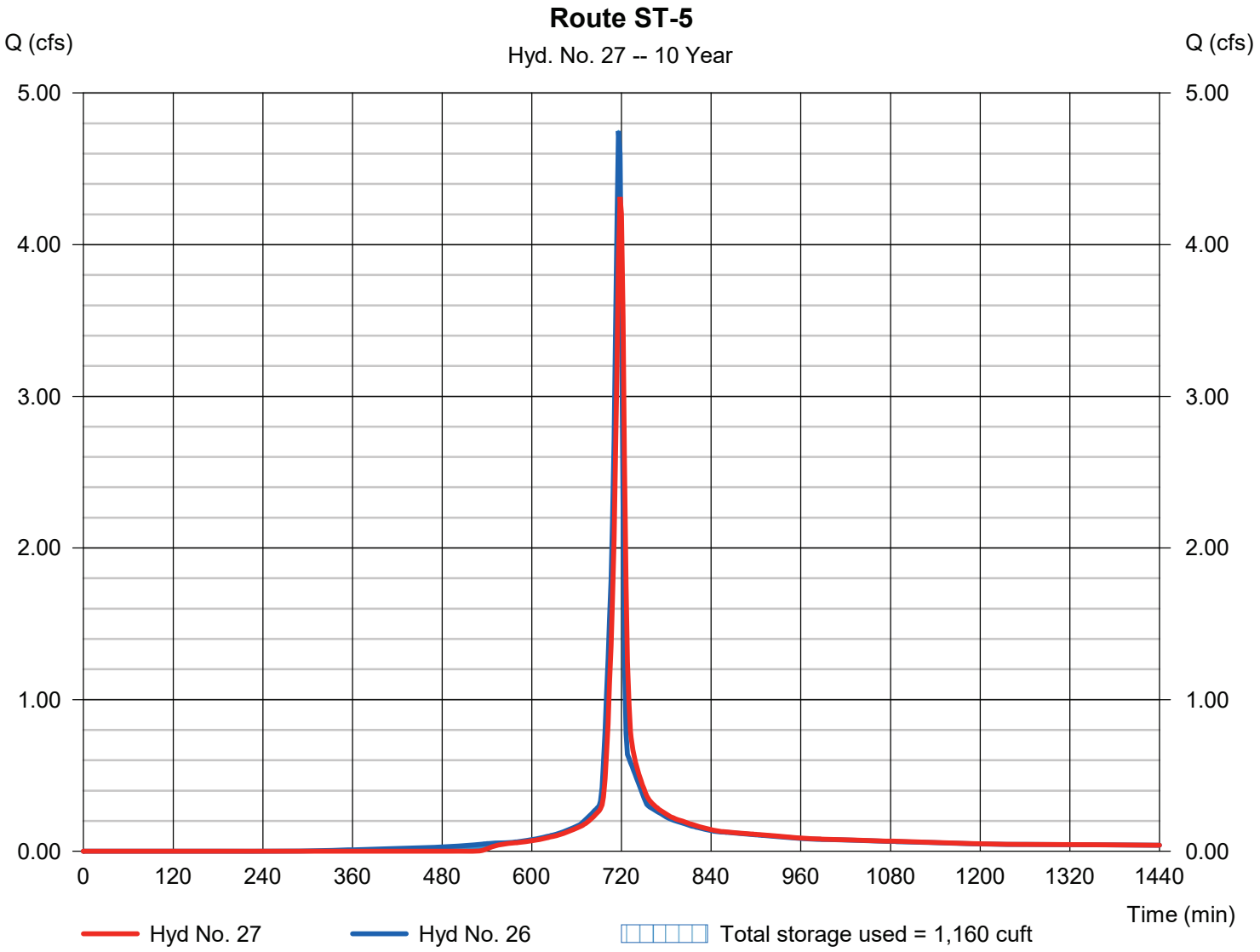
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 27

Route ST-5

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | Reservoir | Peak discharge | = | 4.315 cfs |
| Storm frequency | = | 10 yrs | Time to peak | = | 718 min |
| Time interval | = | 2 min | Hyd. volume | = | 9,747 cuft |
| Inflow hyd. No. | = | 26 - Stormwater Trench 5 - DP001 | Max. Elevation | = | 16.83 ft |
| Reservoir name | = | Stormwater Trench ST-5 | Max. Storage | = | 1,160 cuft |

Storage Indication method used.



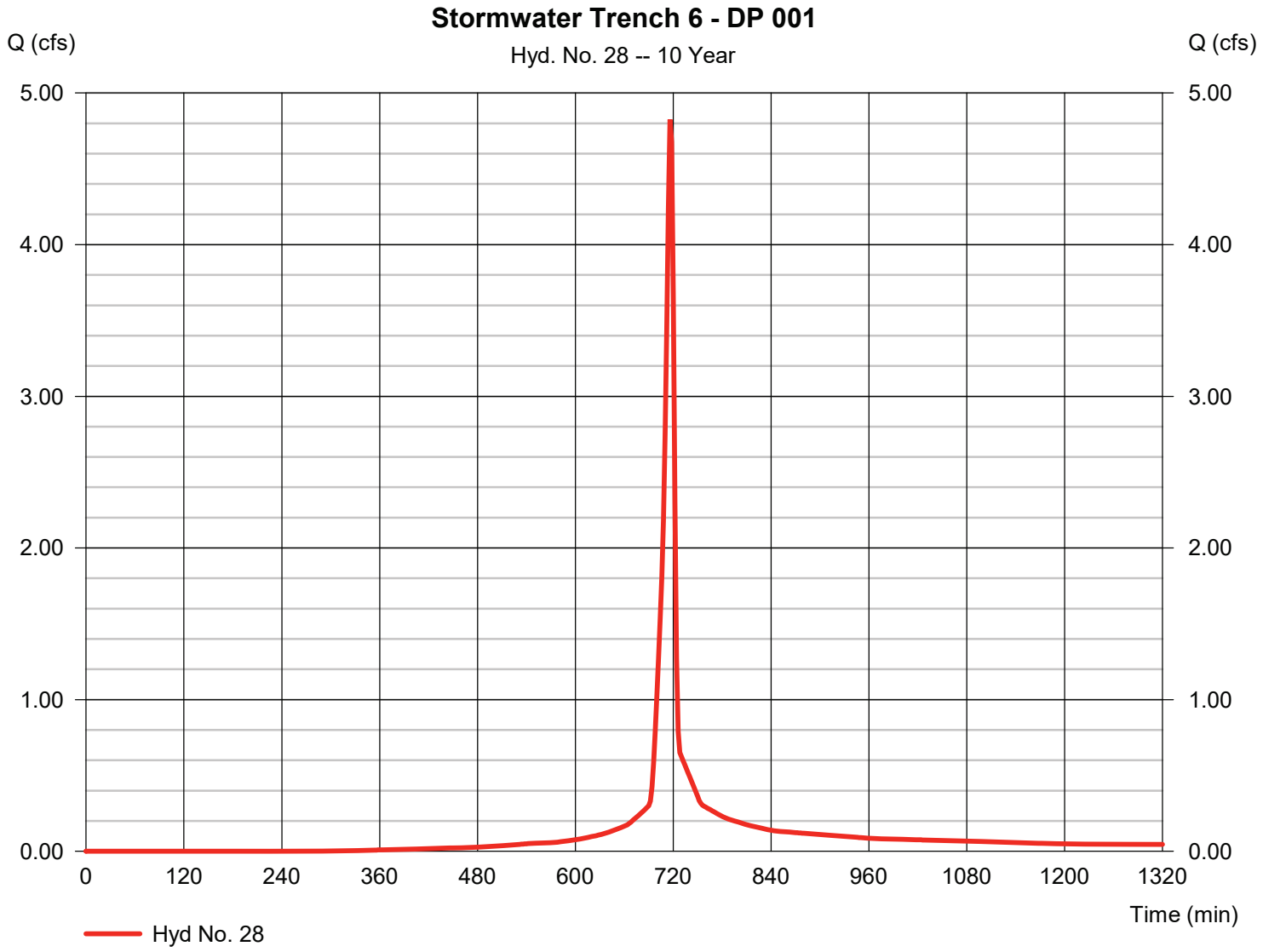
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 28

Stormwater Trench 6 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 4.824 cfs |
| Storm frequency | = 10 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 10,133 cuft |
| Drainage area | = 0.830 ac | Curve number | = 87.2 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 5.00 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



# Hydrograph Report

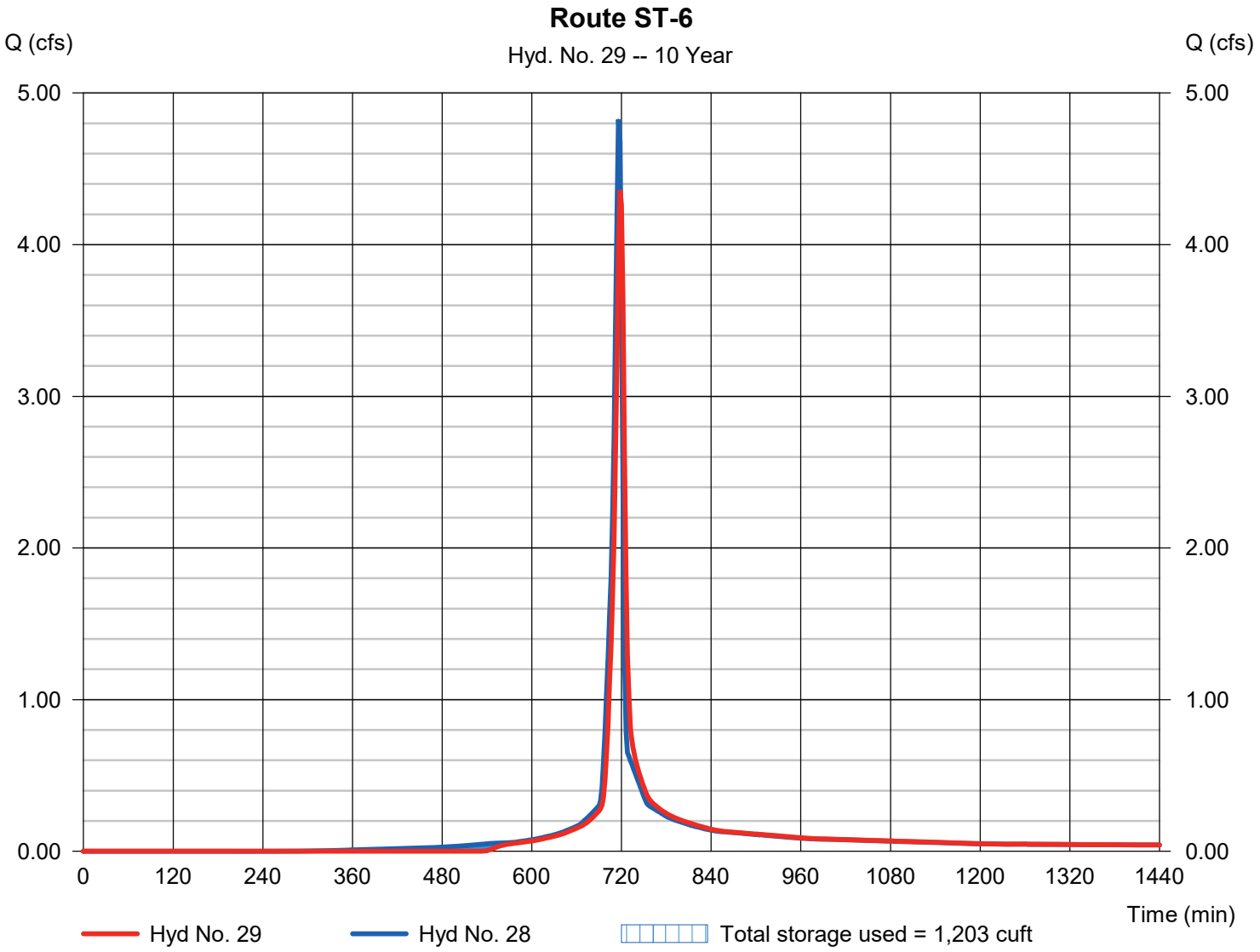
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 29

Route ST-6

| | | | |
|---|---|---|---|
| Hydrograph type | = Reservoir | Peak discharge | = 4.360 cfs |
| Storm frequency | = 10 yrs | Time to peak | = 718 min |
| Time interval | = 2 min | Hyd. volume | = 9,872 cuft |
| Inflow hyd. No. | = 28 - Stormwater Trench 6 - DP001 | Max. Elevation | = 16.83 ft |
| Reservoir name | = Stormwater Trench ST-6 | Max. Storage | = 1,203 cuft |

Storage Indication method used.



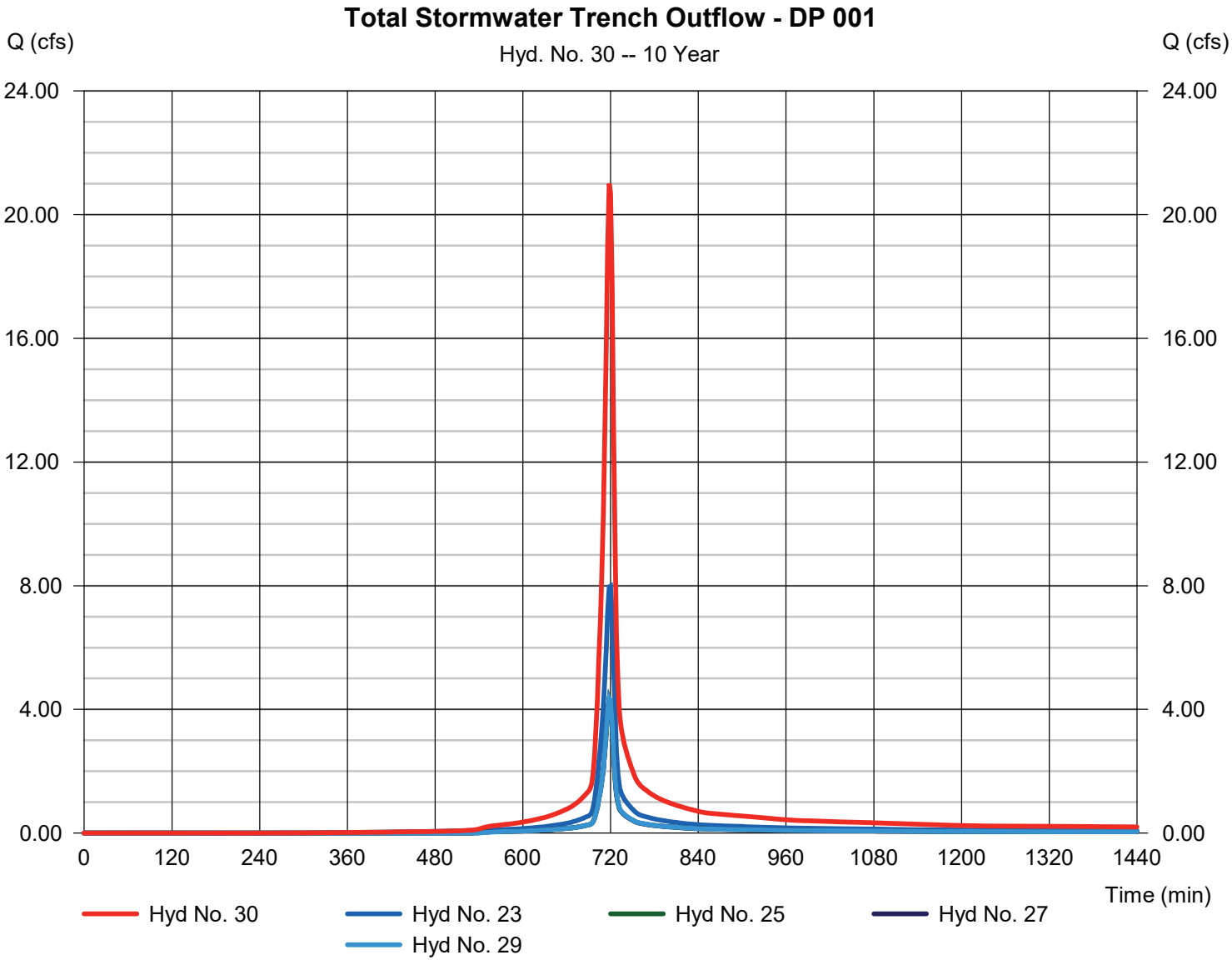
# Hydrograph Report



## Hyd. No. 30

Total Stormwater Trench Outflow - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 21.01 cfs |
| Storm frequency | = 10 yrs | Time to peak | = 718 min |
| Time interval | = 2 min | Hyd. volume | = 49,066 cuft |
| Inflow hyds. | = 23, 25, 27, 29 | Contrib. drain. area | = 0.000 ac |



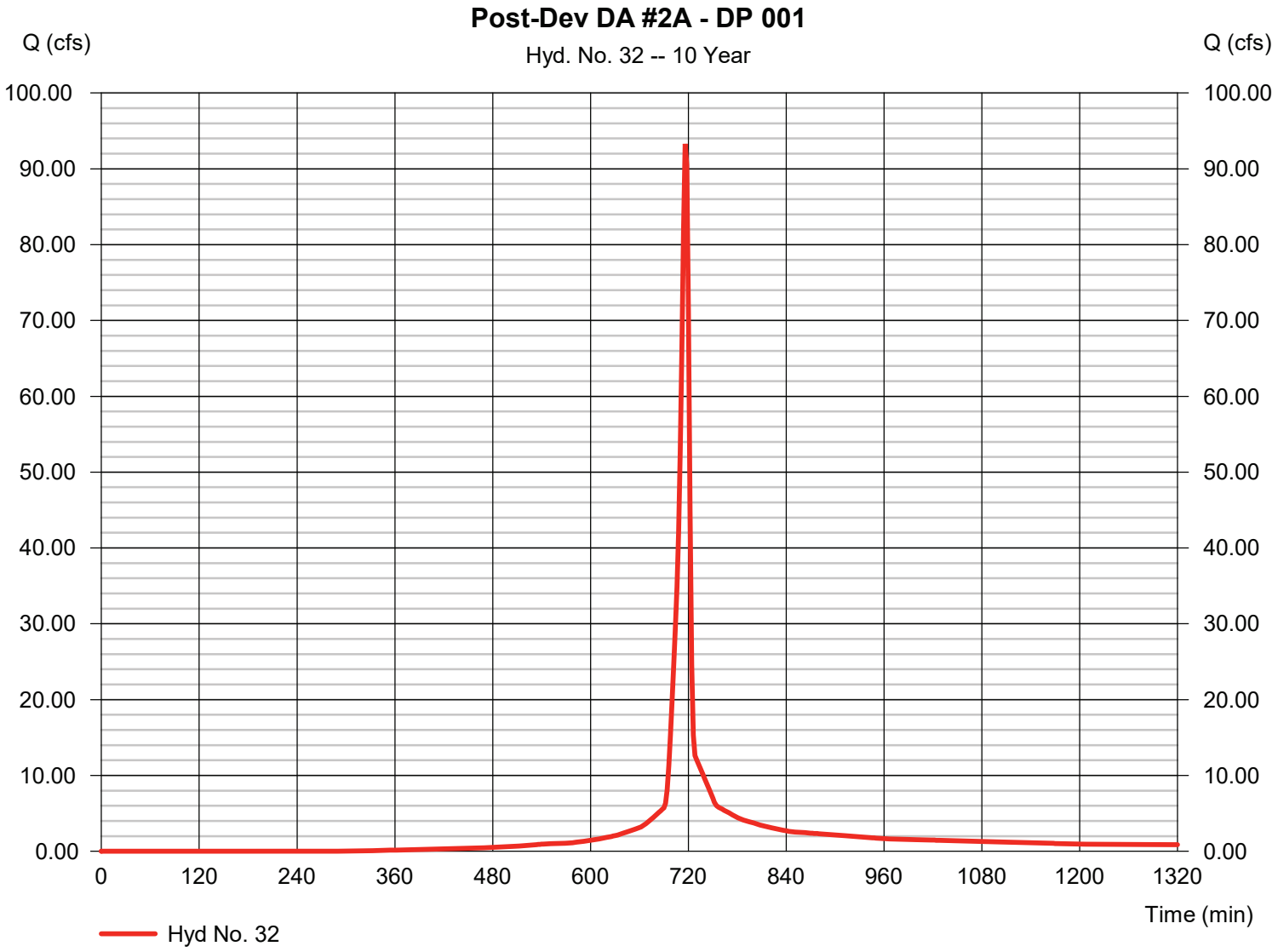
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 32

Post-Dev DA #2A - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 93.29 cfs |
| Storm frequency | = 10 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 195,435 cuft |
| Drainage area | = 16.190 ac | Curve number | = 86.8 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 5.00 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



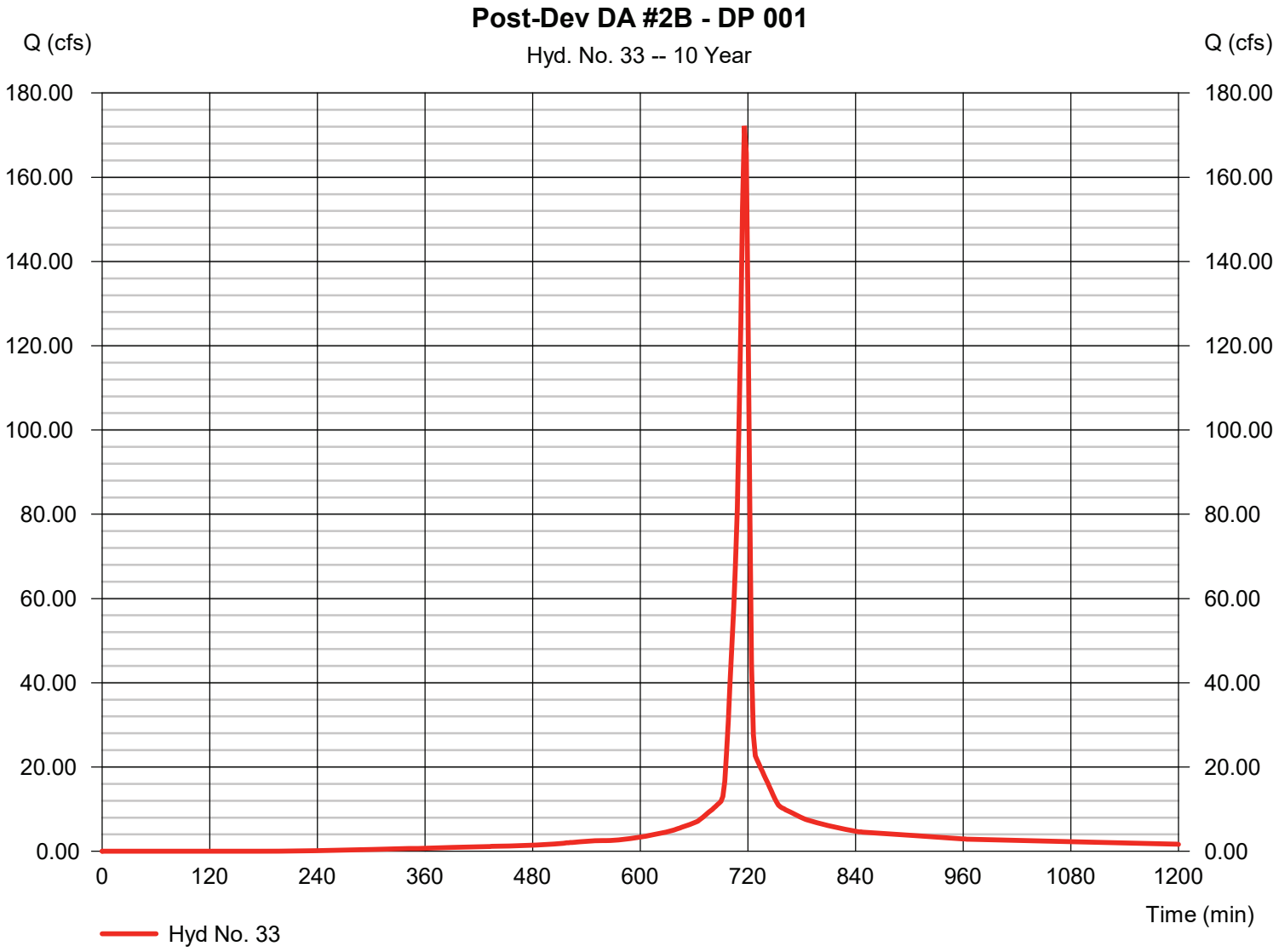
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 33

Post-Dev DA #2B - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 172.20 cfs |
| Storm frequency | = 10 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 373,574 cuft |
| Drainage area | = 27.420 ac | Curve number | = 91.2 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 5.00 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



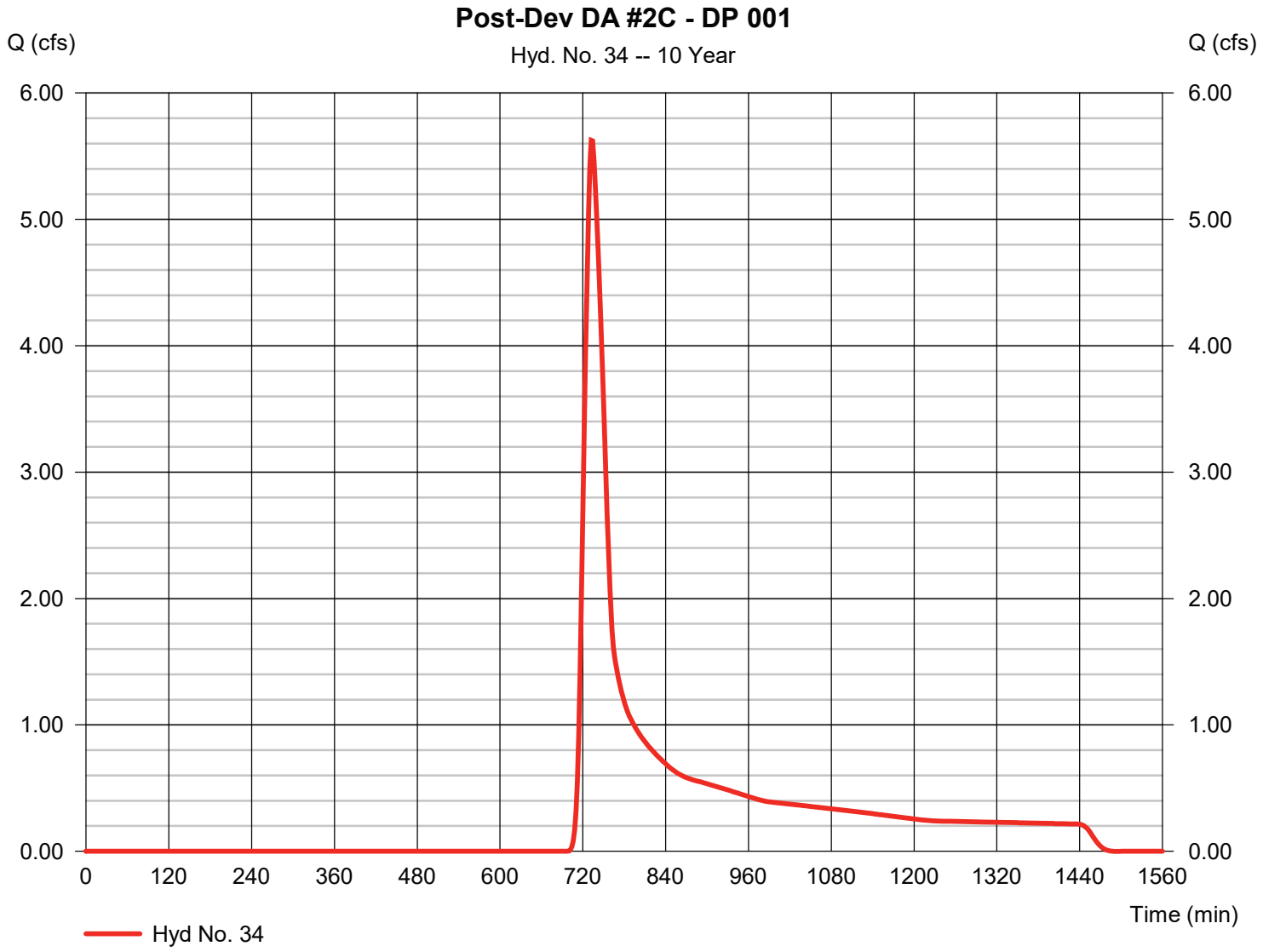
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 34

Post-Dev DA #2C - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 5.626 cfs |
| Storm frequency | = 10 yrs | Time to peak | = 732 min |
| Time interval | = 2 min | Hyd. volume | = 28,052 cuft |
| Drainage area | = 7.420 ac | Curve number | = 56 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = TR55 | Time of conc. (Tc) | = 28.30 min |
| Total precip. | = 5.00 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



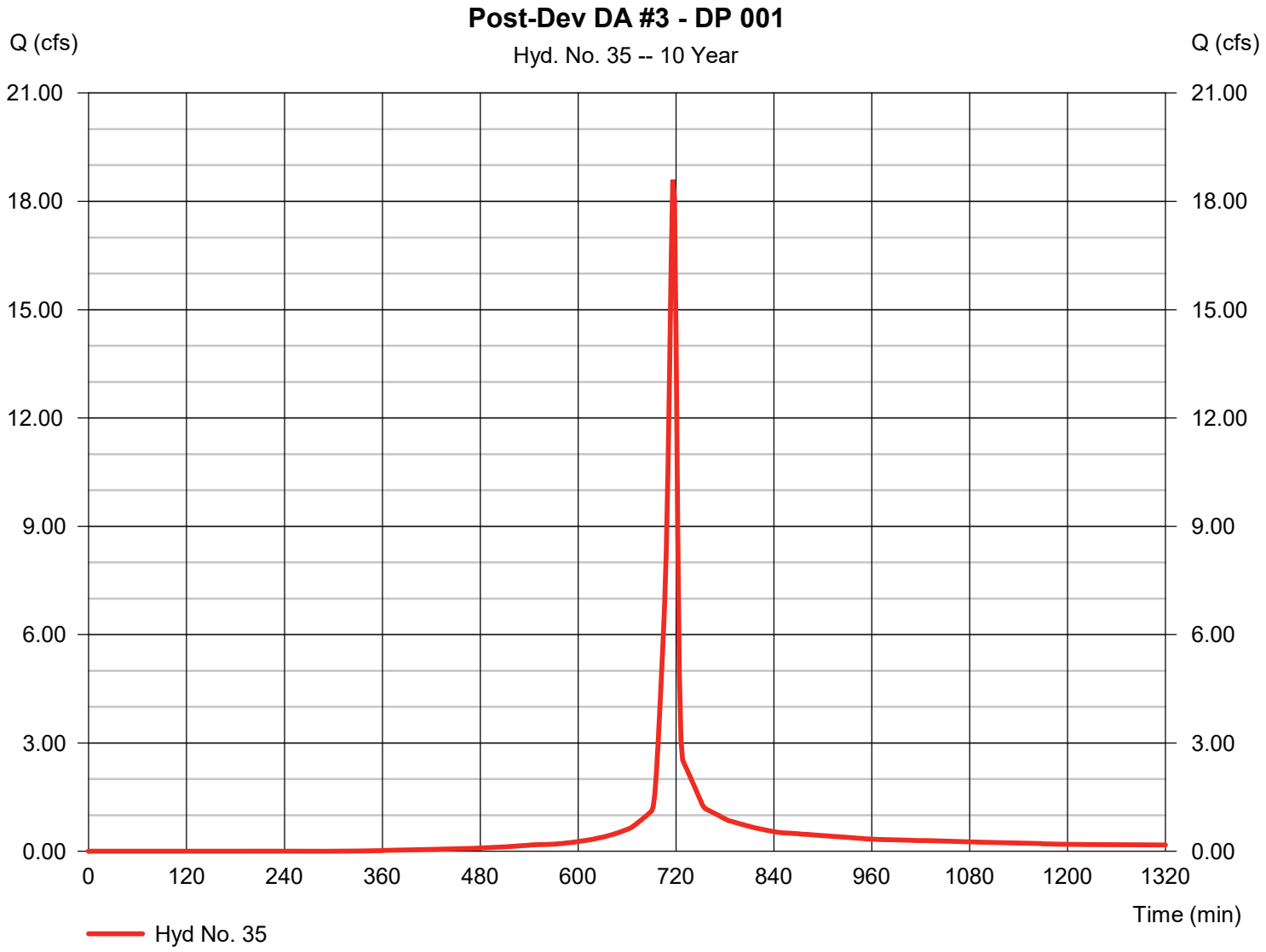
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 35

Post-Dev DA #3 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 18.60 cfs |
| Storm frequency | = 10 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 38,718 cuft |
| Drainage area | = 3.310 ac | Curve number | = 85.7 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 5.00 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



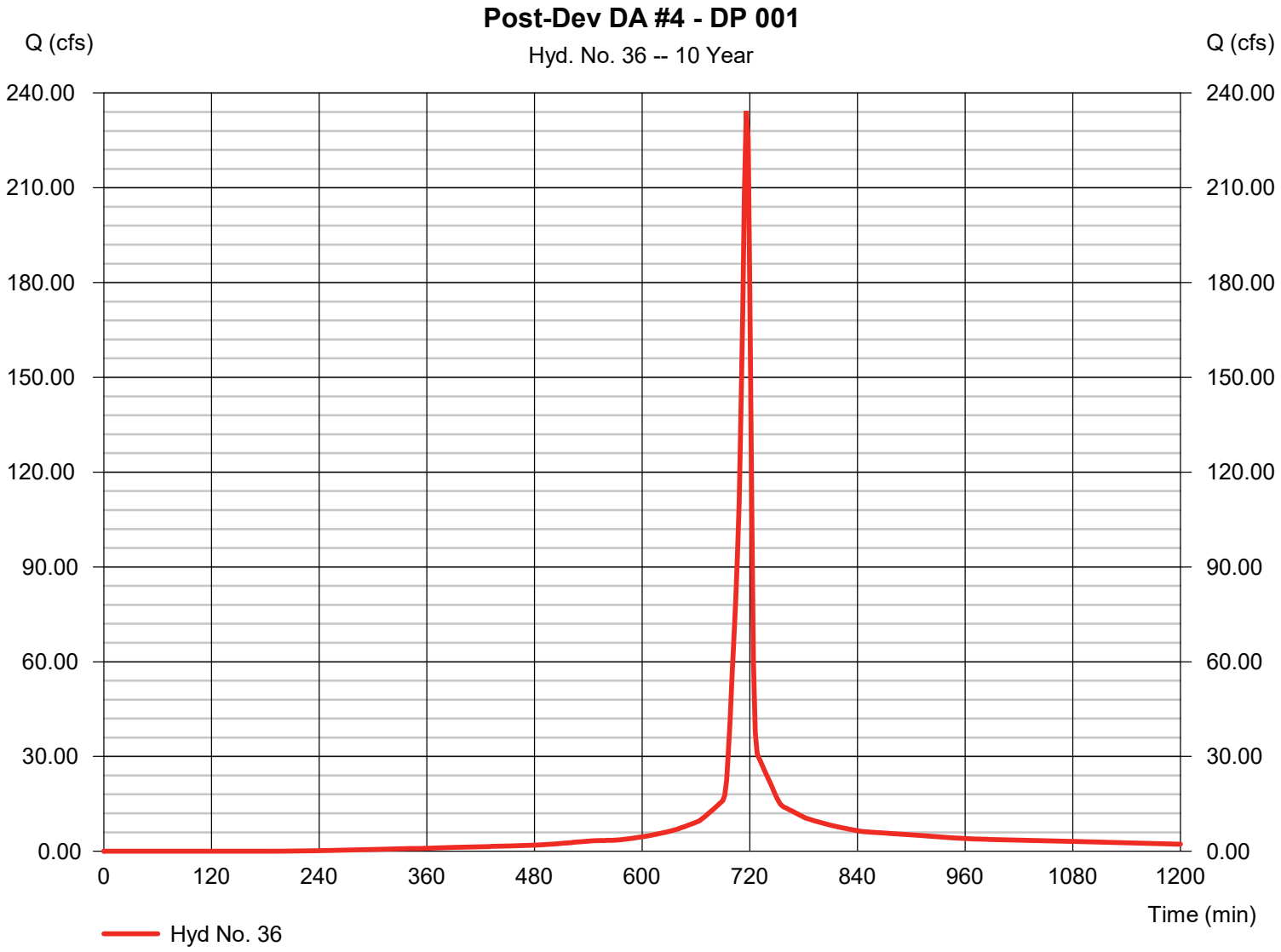
# Hydrograph Report



## Hyd. No. 36

Post-Dev DA #4 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 234.36 cfs |
| Storm frequency | = 10 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 507,912 cuft |
| Drainage area | = 37.380 ac | Curve number | = 91.1 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 5.00 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



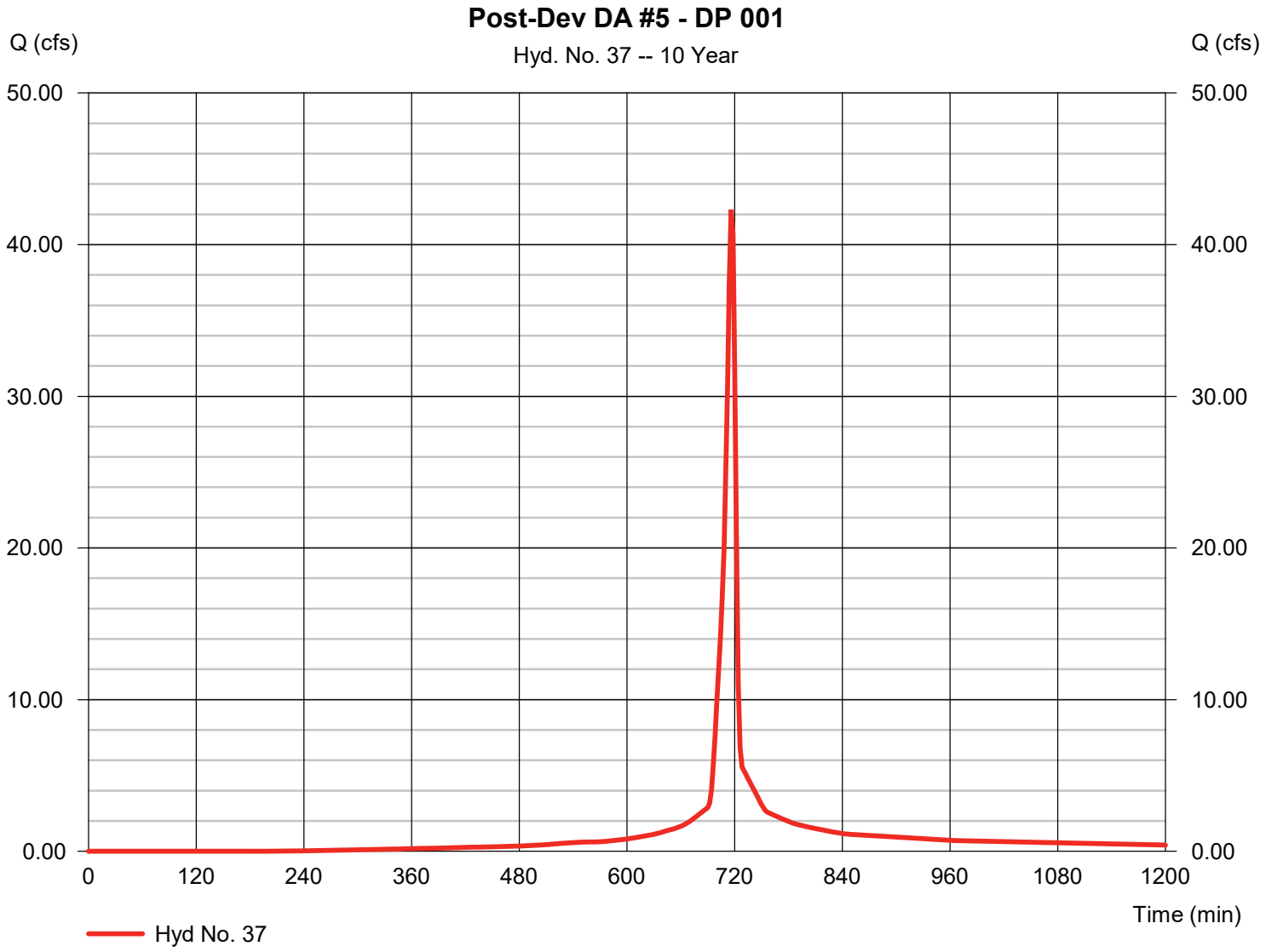
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 37

Post-Dev DA #5 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 42.30 cfs |
| Storm frequency | = 10 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 91,499 cuft |
| Drainage area | = 6.770 ac | Curve number | = 90.9 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 5.00 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



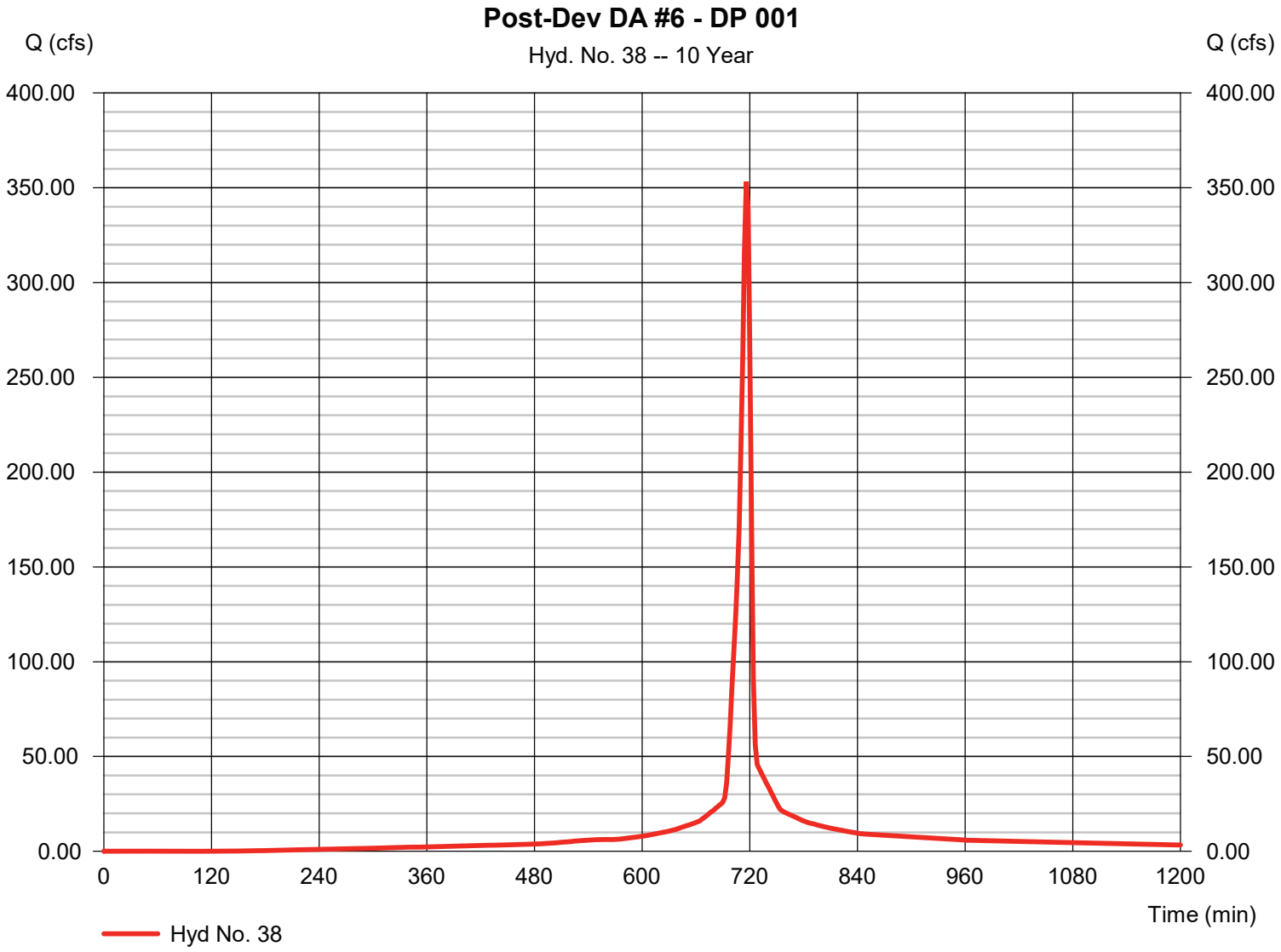
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 38

Post-Dev DA #6 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 353.27 cfs |
| Storm frequency | = 10 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 791,945 cuft |
| Drainage area | = 53.880 ac | Curve number | = 94.1 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 5.00 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



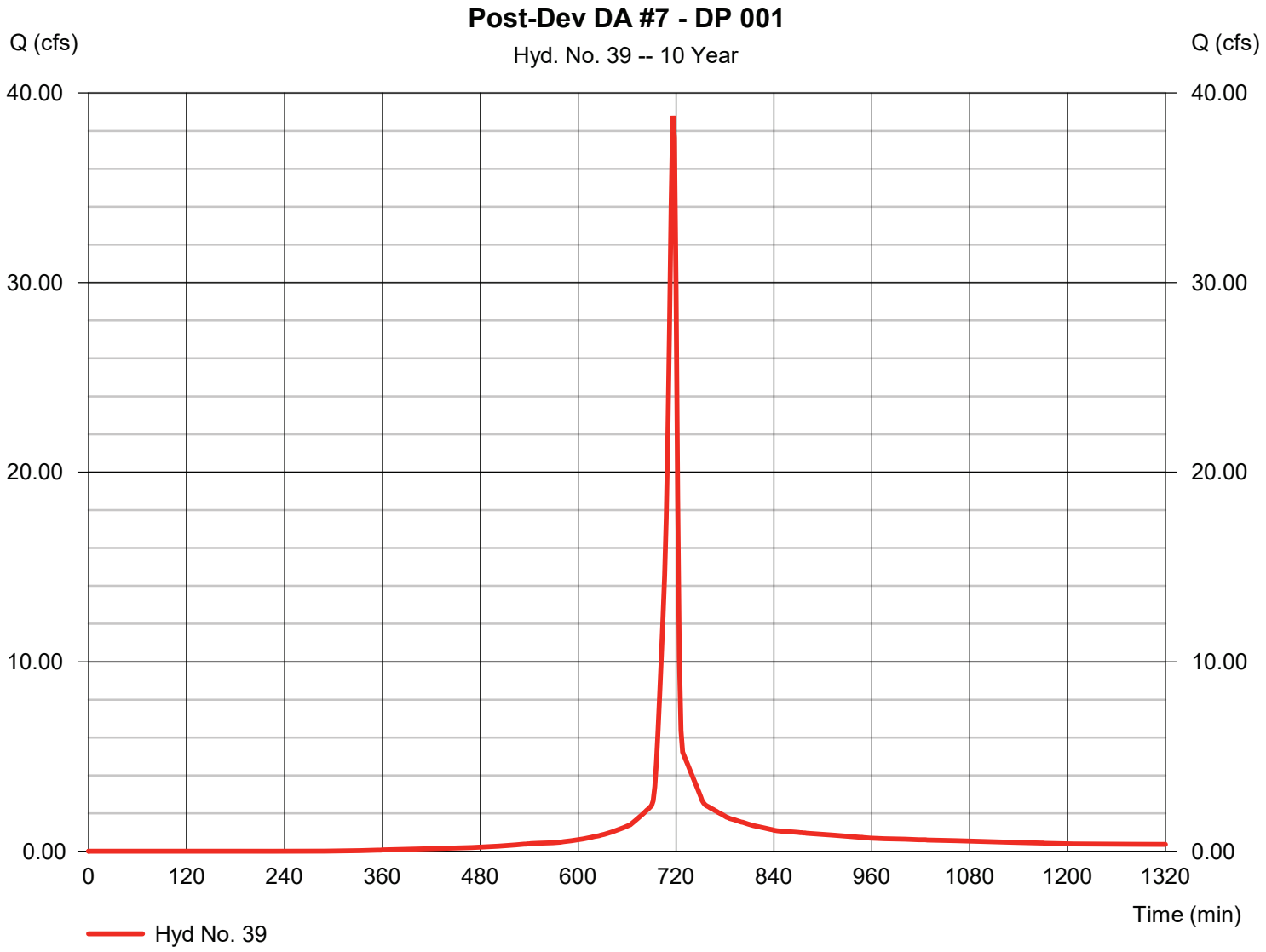
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 39

Post-Dev DA #7 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 38.80 cfs |
| Storm frequency | = 10 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 81,446 cuft |
| Drainage area | = 6.690 ac | Curve number | = 87.1 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 5.00 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



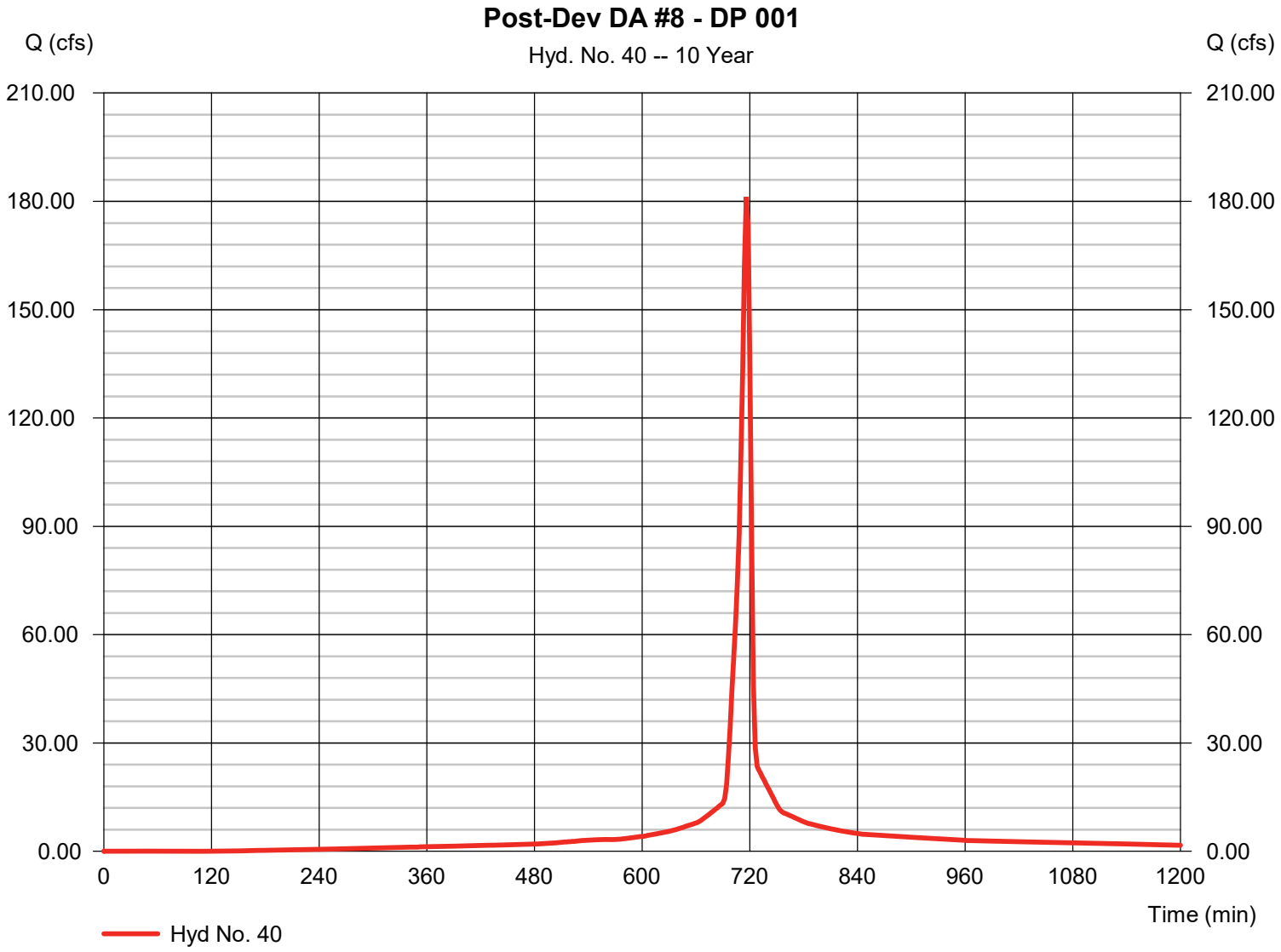
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 40

Post-Dev DA #8 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 181.18 cfs |
| Storm frequency | = 10 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 407,769 cuft |
| Drainage area | = 27.530 ac | Curve number | = 94.4 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 5.00 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



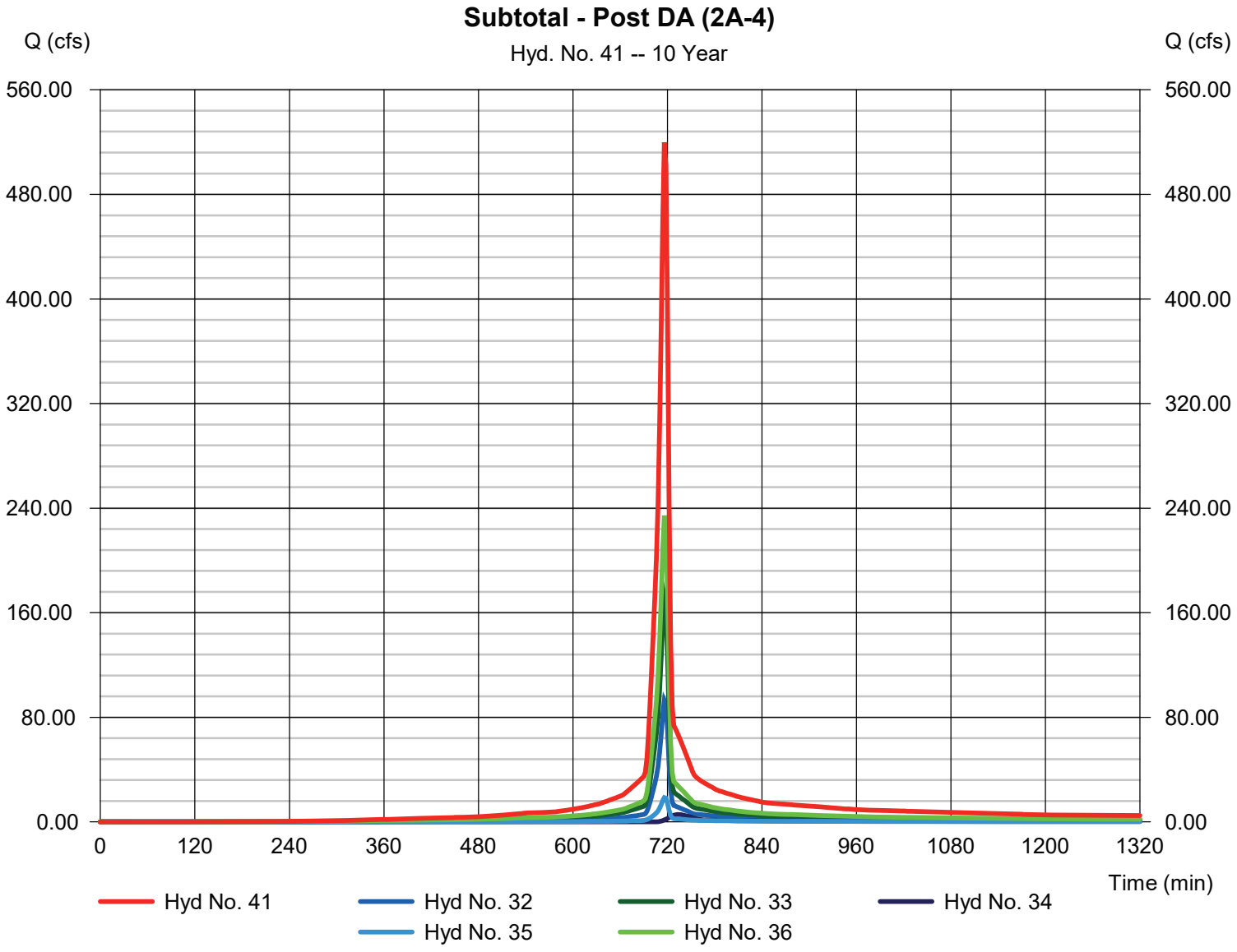
# Hydrograph Report



## Hyd. No. 41

Subtotal - Post DA (2A-4)

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 519.87 cfs |
| Storm frequency | = 10 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 1,143,689 cuft |
| Inflow hyds. | = 32, 33, 34, 35, 36 | Contrib. drain. area | = 91.720 ac |



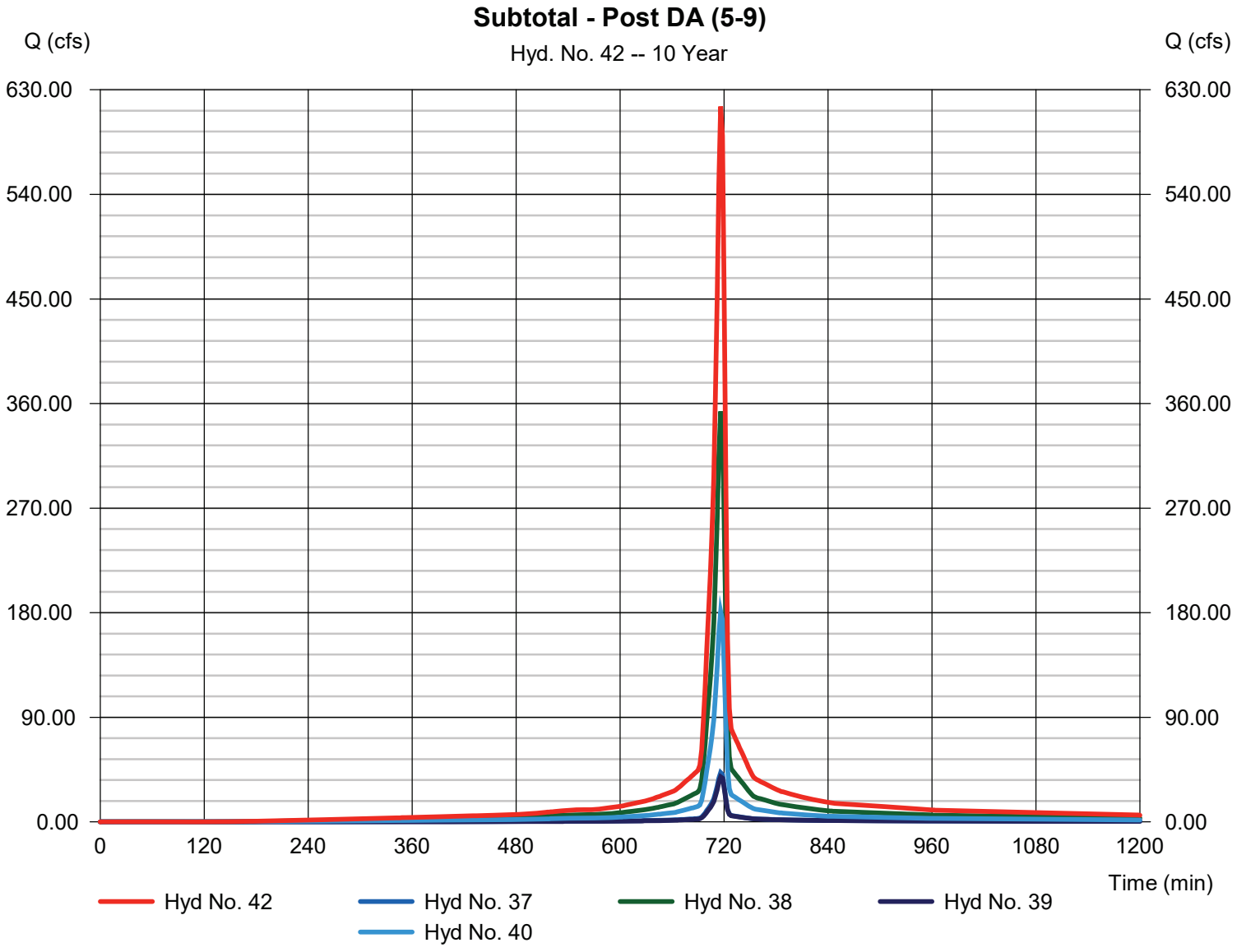
# Hydrograph Report



## Hyd. No. 42

Subtotal - Post DA (5-9)

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 615.55 cfs |
| Storm frequency | = 10 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 1,372,660 cuft |
| Inflow hyds. | = 37, 38, 39, 40 | Contrib. drain. area | = 94.870 ac |



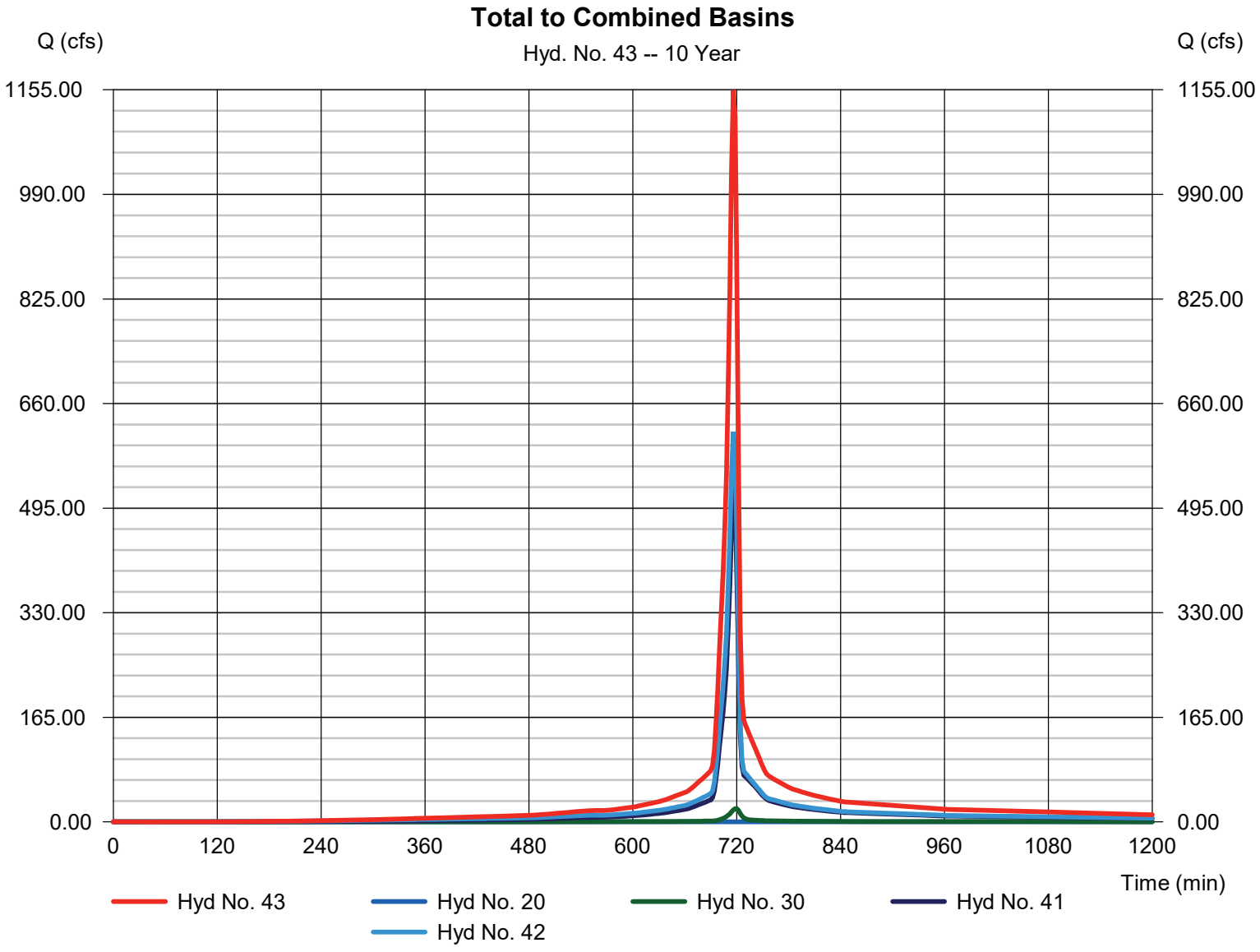
# Hydrograph Report



## Hyd. No. 43

Total to Combined Basins

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 1154.34 cfs |
| Storm frequency | = 10 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 2,566,021 cuft |
| Inflow hyds. | = 20, 30, 41, 42 | Contrib. drain. area | = 0.000 ac |



# Hydrograph Report

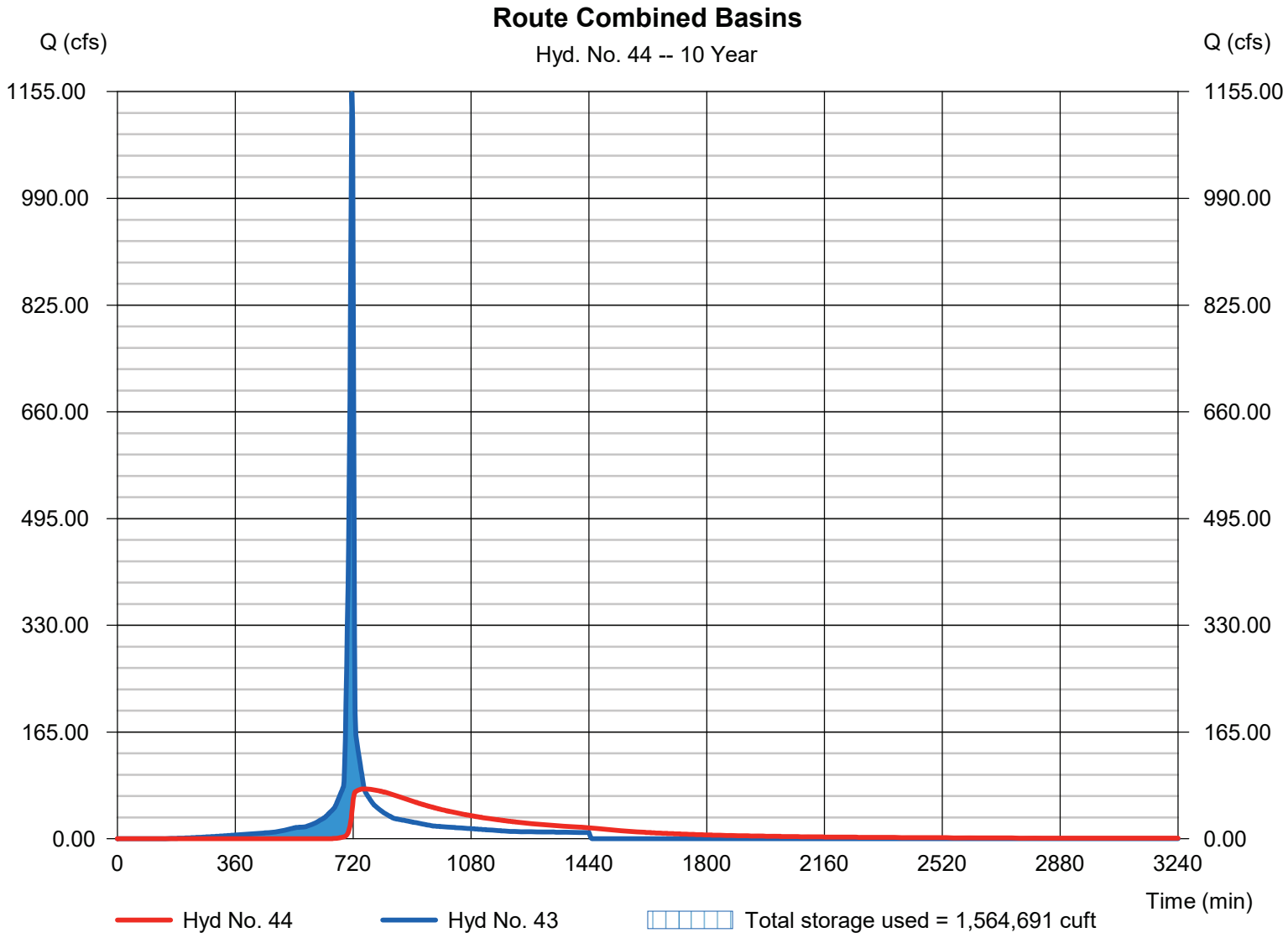
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 44

Route Combined Basins

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | Reservoir | Peak discharge | = | 76.99 cfs |
| Storm frequency | = | 10 yrs | Time to peak | = | 754 min |
| Time interval | = | 2 min | Hyd. volume | = | 2,262,574 cuft |
| Inflow hyd. No. | = | 43 - Total to Combined Basins | Max. Elevation | = | 15.03 ft |
| Reservoir name | = | Combined Basins | Max. Storage | = | 1,564,691 cuft |

Storage Indication method used.



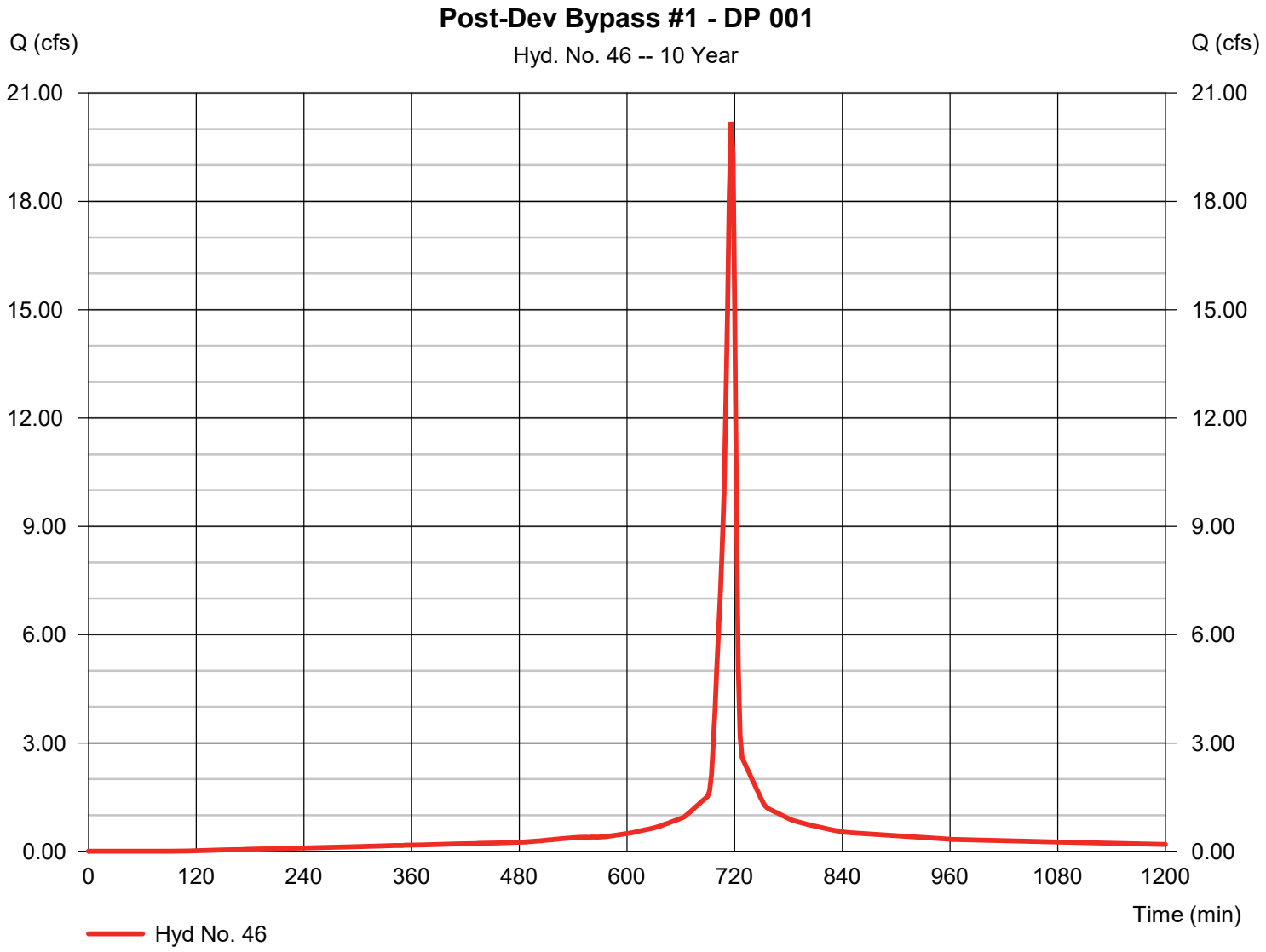
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 46

Post-Dev Bypass #1 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 20.20 cfs |
| Storm frequency | = 10 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 46,466 cuft |
| Drainage area | = 3.020 ac | Curve number | = 95.9 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 5.00 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



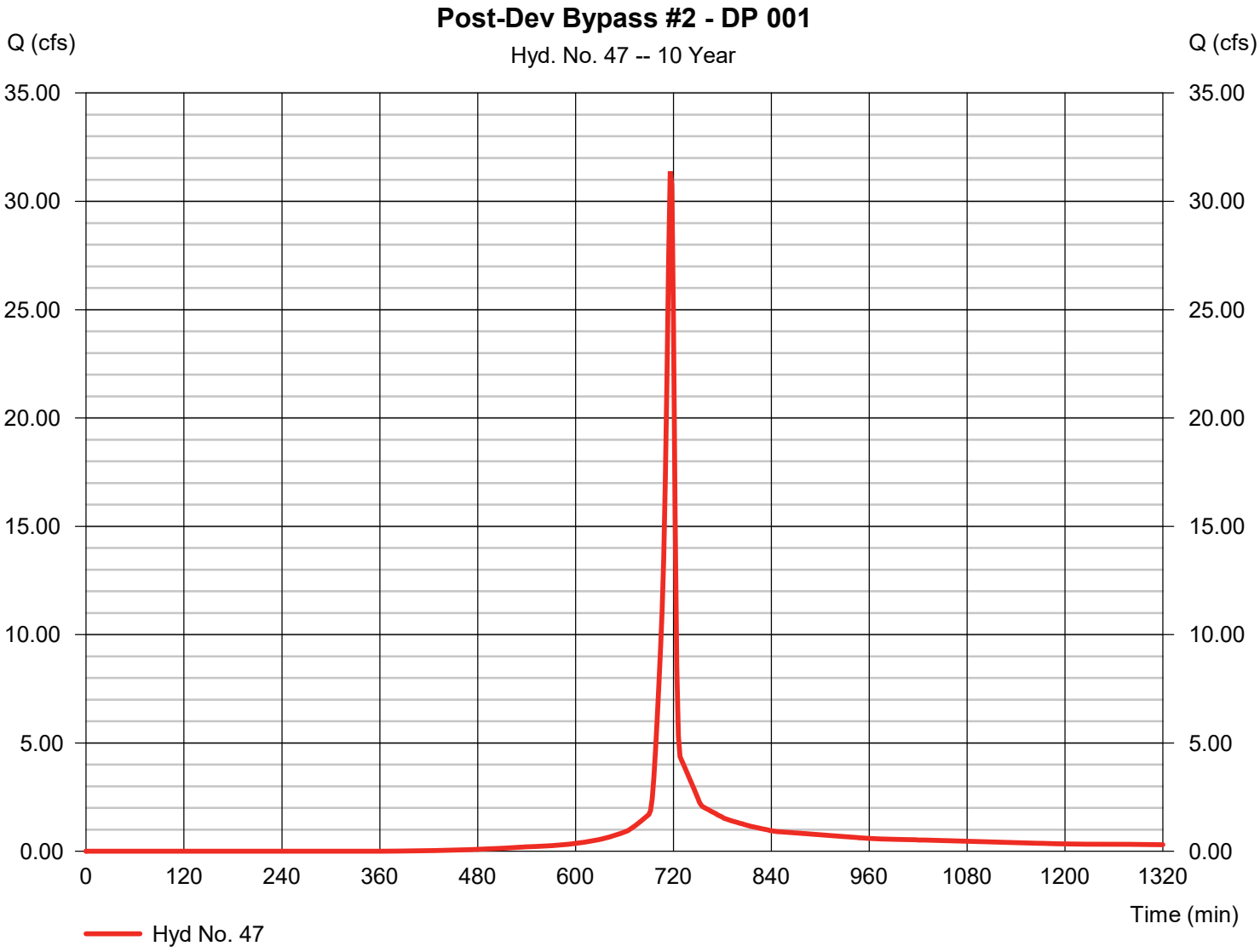
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 47

Post-Dev Bypass #2 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 31.38 cfs |
| Storm frequency | = 10 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 64,296 cuft |
| Drainage area | = 6.080 ac | Curve number | = 82.3 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 5.00 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



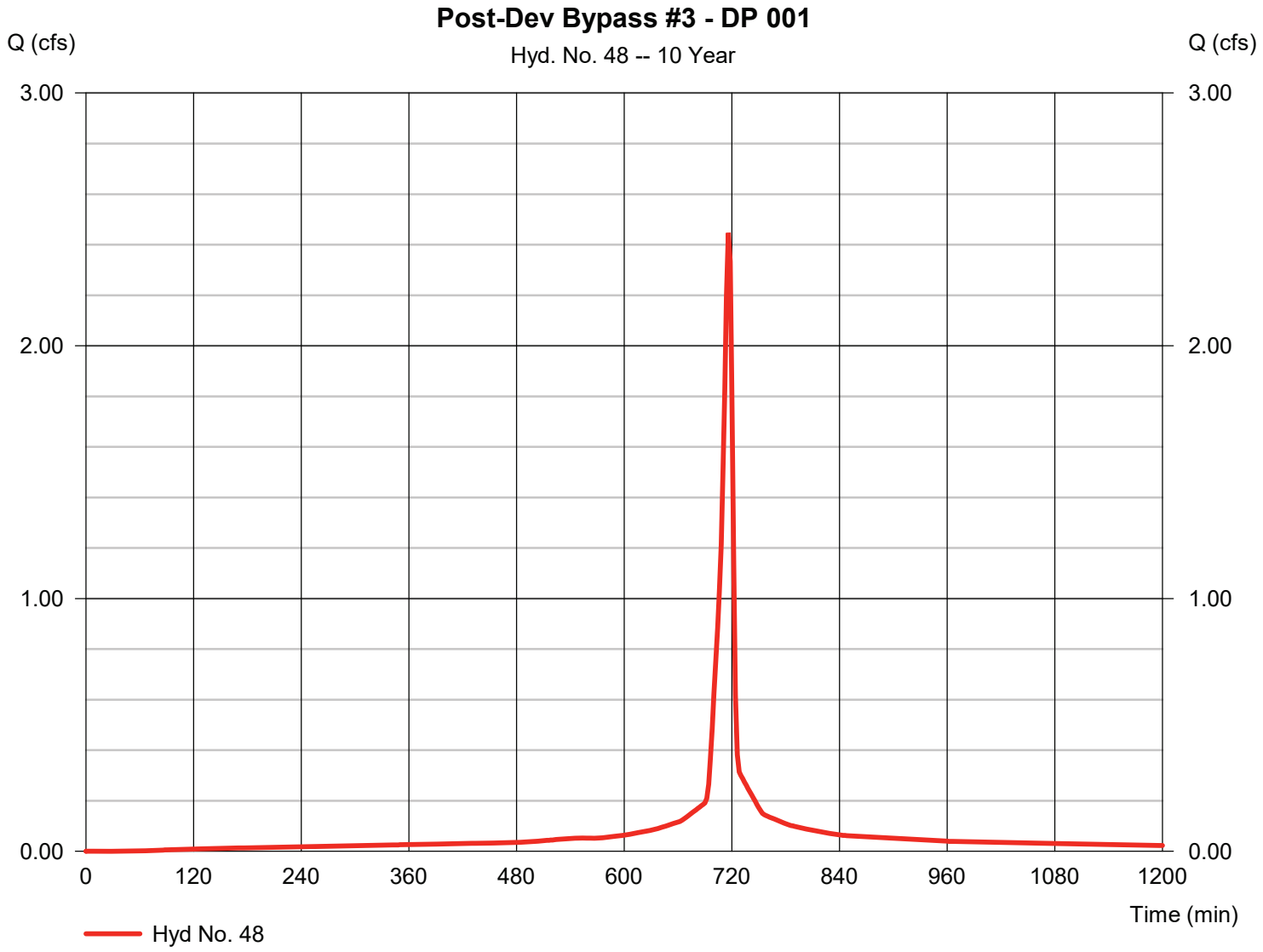
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 48

Post-Dev Bypass #3 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 2.446 cfs |
| Storm frequency | = 10 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 5,835 cuft |
| Drainage area | = 0.360 ac | Curve number | = 98 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 5.00 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



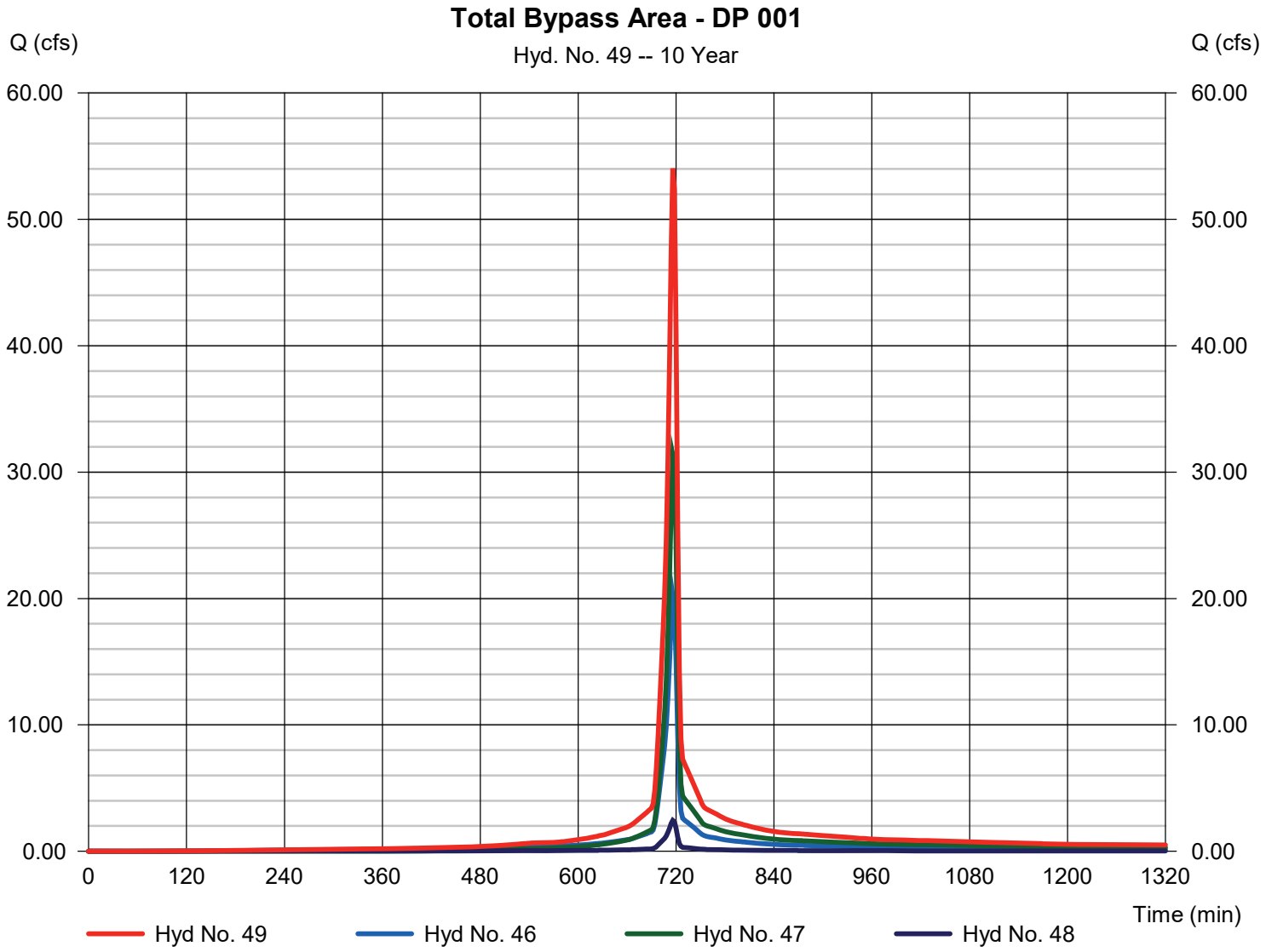
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 49

Total Bypass Area - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 54.03 cfs |
| Storm frequency | = 10 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 116,598 cuft |
| Inflow hyds. | = 46, 47, 48 | Contrib. drain. area | = 9.460 ac |



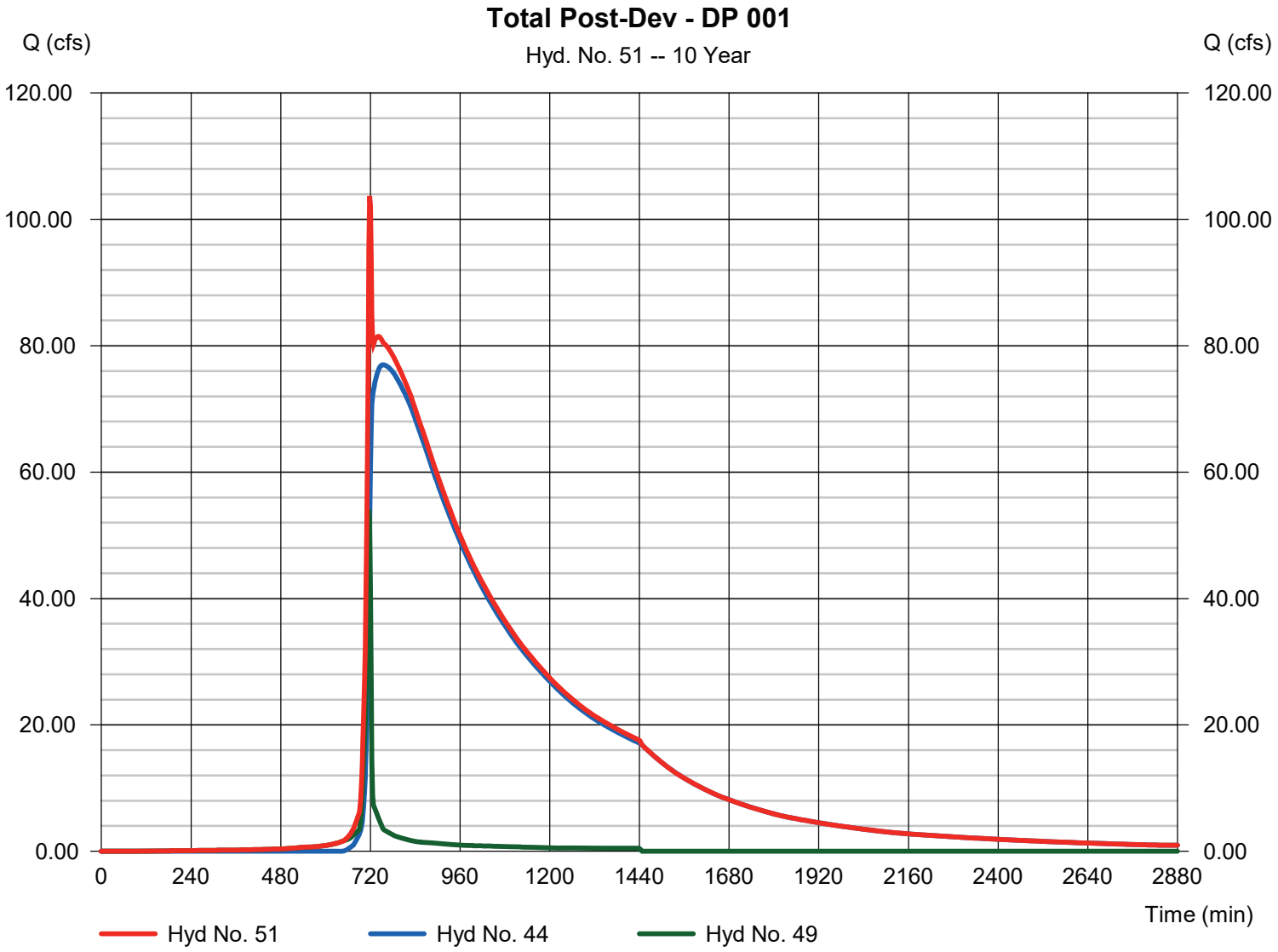
# Hydrograph Report



## Hyd. No. 51

Total Post-Dev - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 103.73 cfs |
| Storm frequency | = 10 yrs | Time to peak | = 718 min |
| Time interval | = 2 min | Hyd. volume | = 2,379,171 cuft |
| Inflow hyds. | = 44, 49 | Contrib. drain. area | = 0.000 ac |



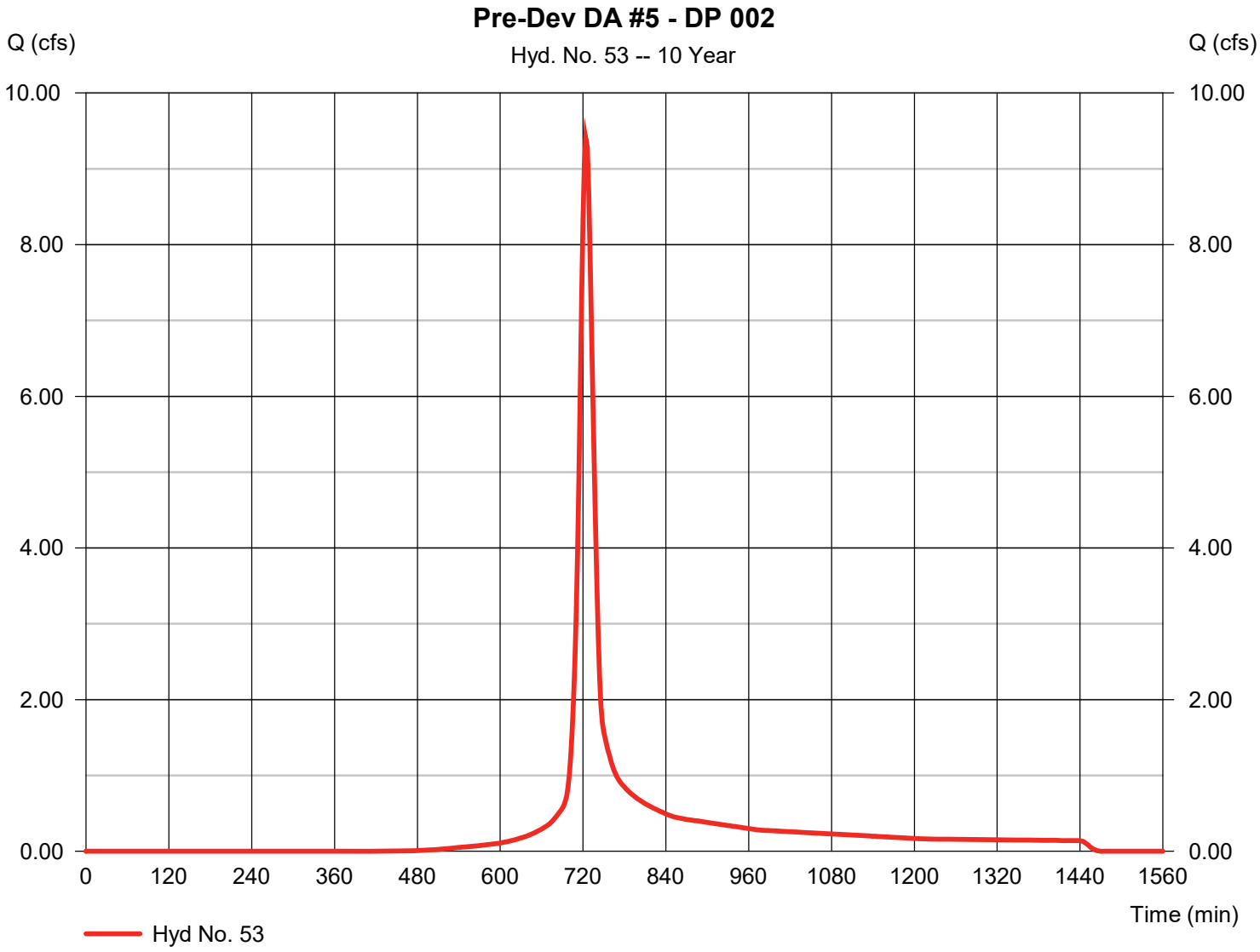
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 53

Pre-Dev DA #5 - DP 002

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 9.403 cfs |
| Storm frequency | = 10 yrs | Time to peak | = 724 min |
| Time interval | = 2 min | Hyd. volume | = 29,398 cuft |
| Drainage area | = 2.900 ac | Curve number | = 78.9 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = TR55 | Time of conc. (Tc) | = 16.90 min |
| Total precip. | = 5.00 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



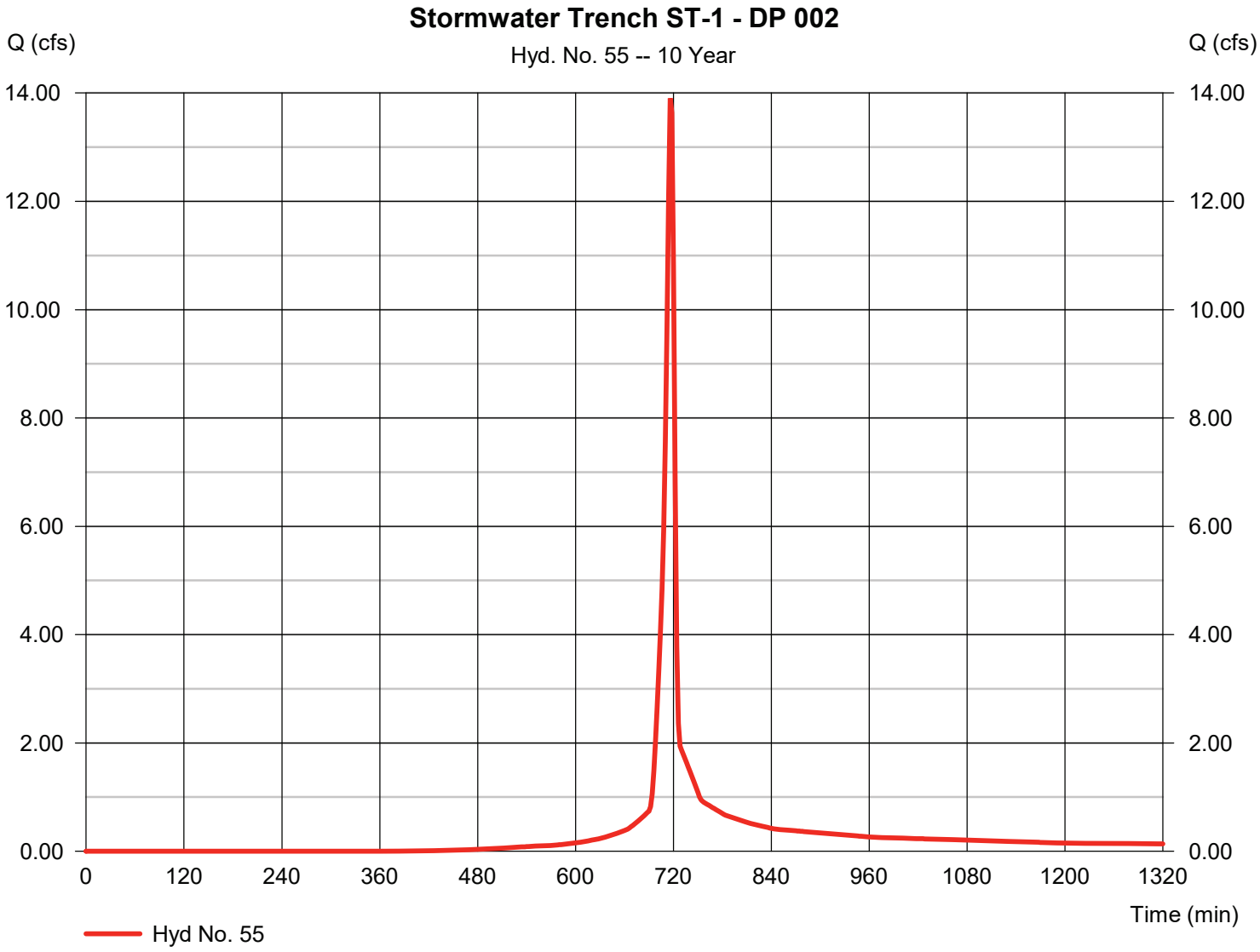
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 55

Stormwater Trench ST-1 - DP 002

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 13.90 cfs |
| Storm frequency | = 10 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 28,431 cuft |
| Drainage area | = 2.730 ac | Curve number | = 81.8 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 5.00 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



# Hydrograph Report

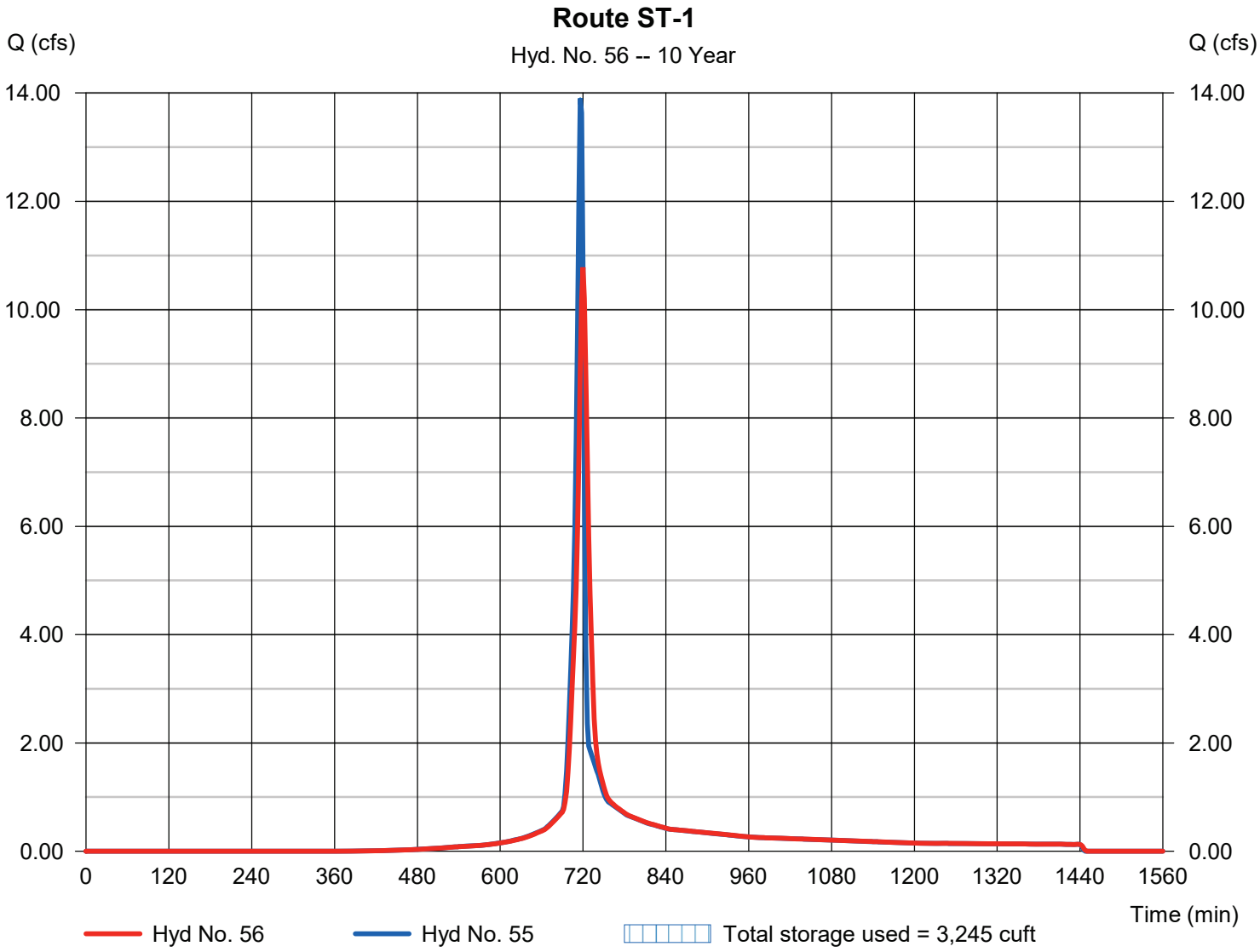
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 56

Route ST-1

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | Reservoir | Peak discharge | = | 10.78 cfs |
| Storm frequency | = | 10 yrs | Time to peak | = | 720 min |
| Time interval | = | 2 min | Hyd. volume | = | 28,431 cuft |
| Inflow hyd. No. | = | 55 - Stormwater Trench ST-1 - DP 02 | Max. Elevation | = | 15.81 ft |
| Reservoir name | = | Stormwater Trench ST-1 | Max. Storage | = | 3,245 cuft |

Storage Indication method used.



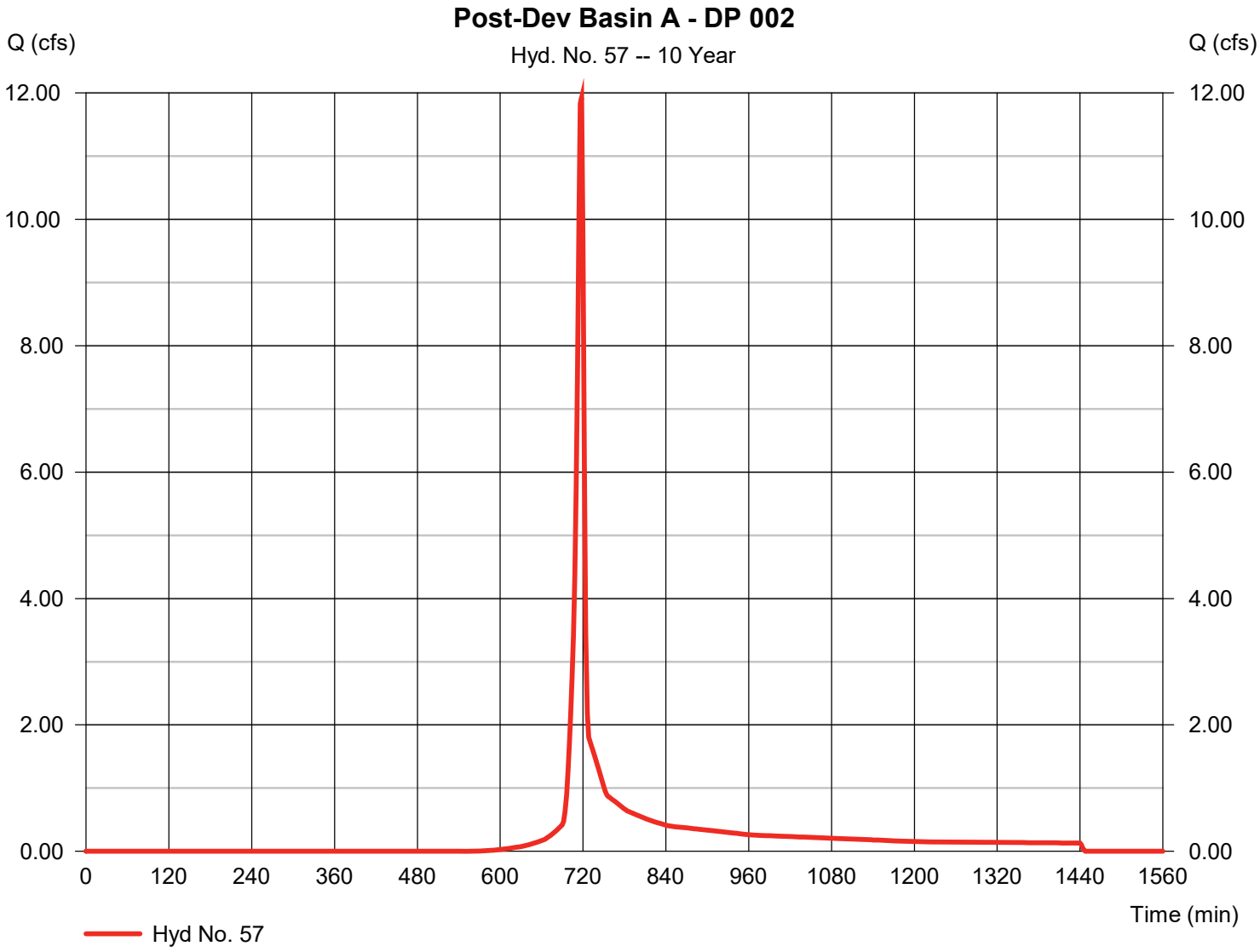
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 57

Post-Dev Basin A - DP 002

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 11.92 cfs |
| Storm frequency | = 10 yrs | Time to peak | = 718 min |
| Time interval | = 2 min | Hyd. volume | = 23,930 cuft |
| Drainage area | = 3.260 ac | Curve number | = 71.5 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 5.00 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



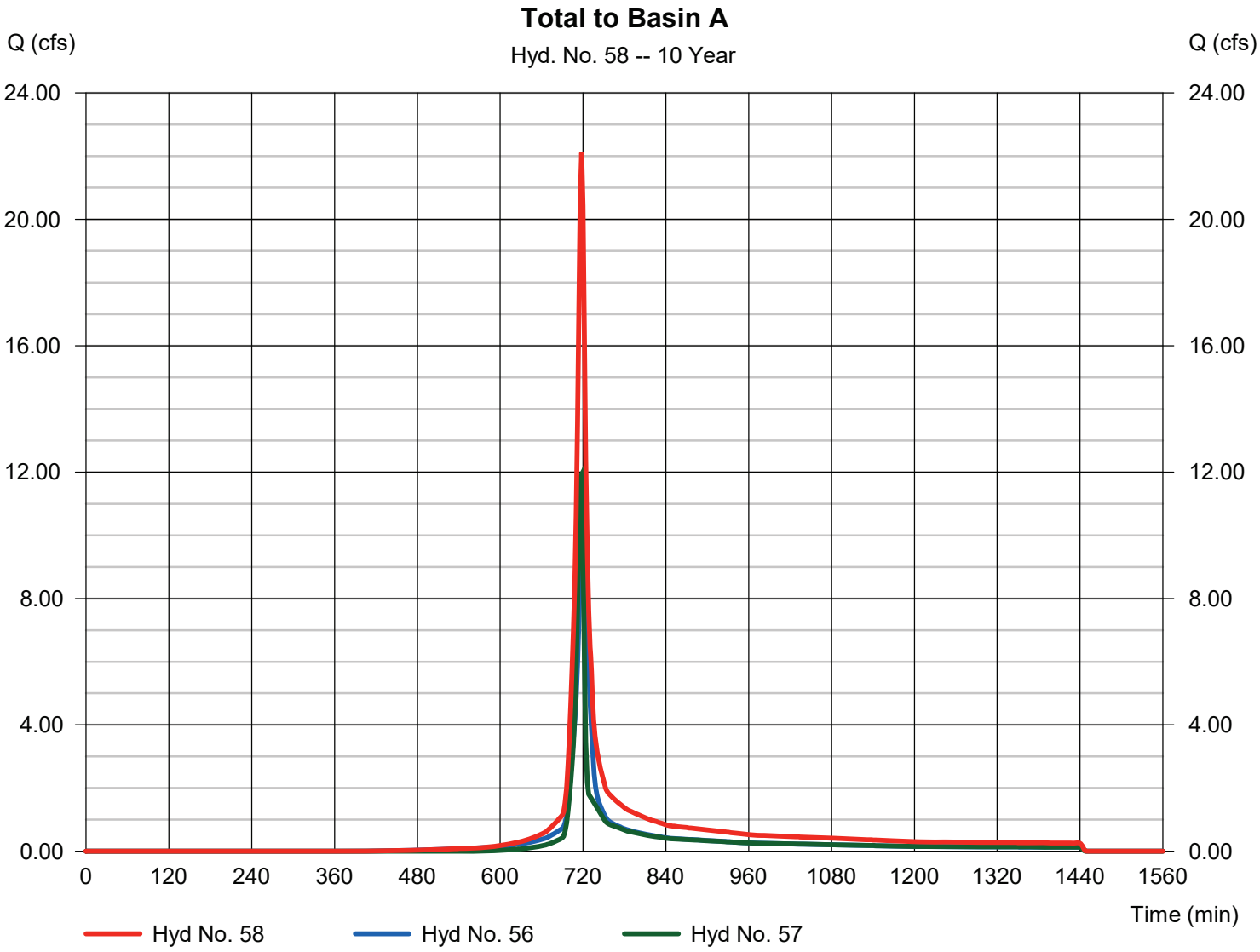
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 58

Total to Basin A

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 22.11 cfs |
| Storm frequency | = 10 yrs | Time to peak | = 718 min |
| Time interval | = 2 min | Hyd. volume | = 52,362 cuft |
| Inflow hyds. | = 56, 57 | Contrib. drain. area | = 3.260 ac |



# Hydrograph Report

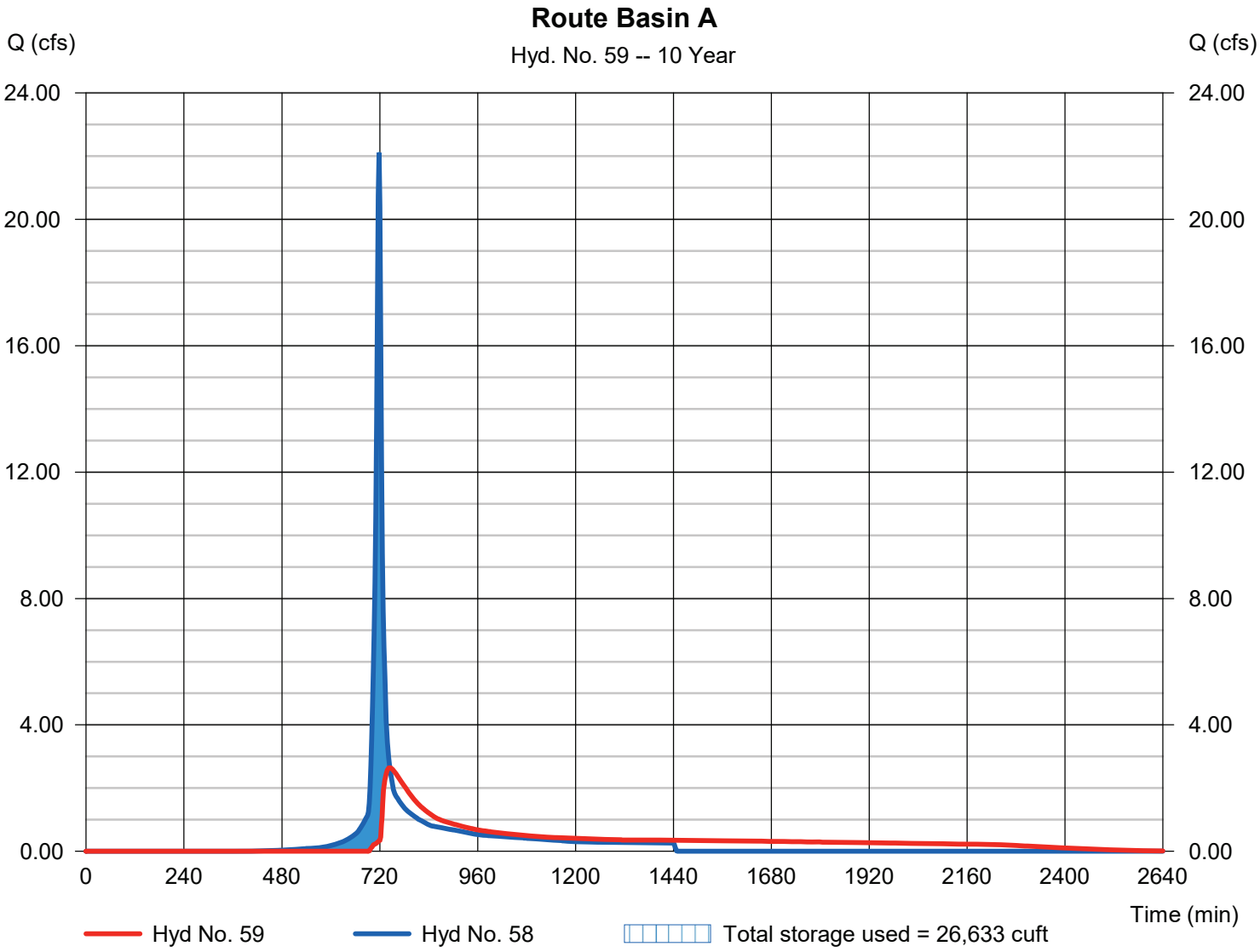
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 59

Route Basin A

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | Reservoir | Peak discharge | = | 2.641 cfs |
| Storm frequency | = | 10 yrs | Time to peak | = | 746 min |
| Time interval | = | 2 min | Hyd. volume | = | 48,827 cuft |
| Inflow hyd. No. | = | 58 - Total to Basin A | Max. Elevation | = | 15.11 ft |
| Reservoir name | = | Basin A (MRC) | Max. Storage | = | 26,633 cuft |

Storage Indication method used.



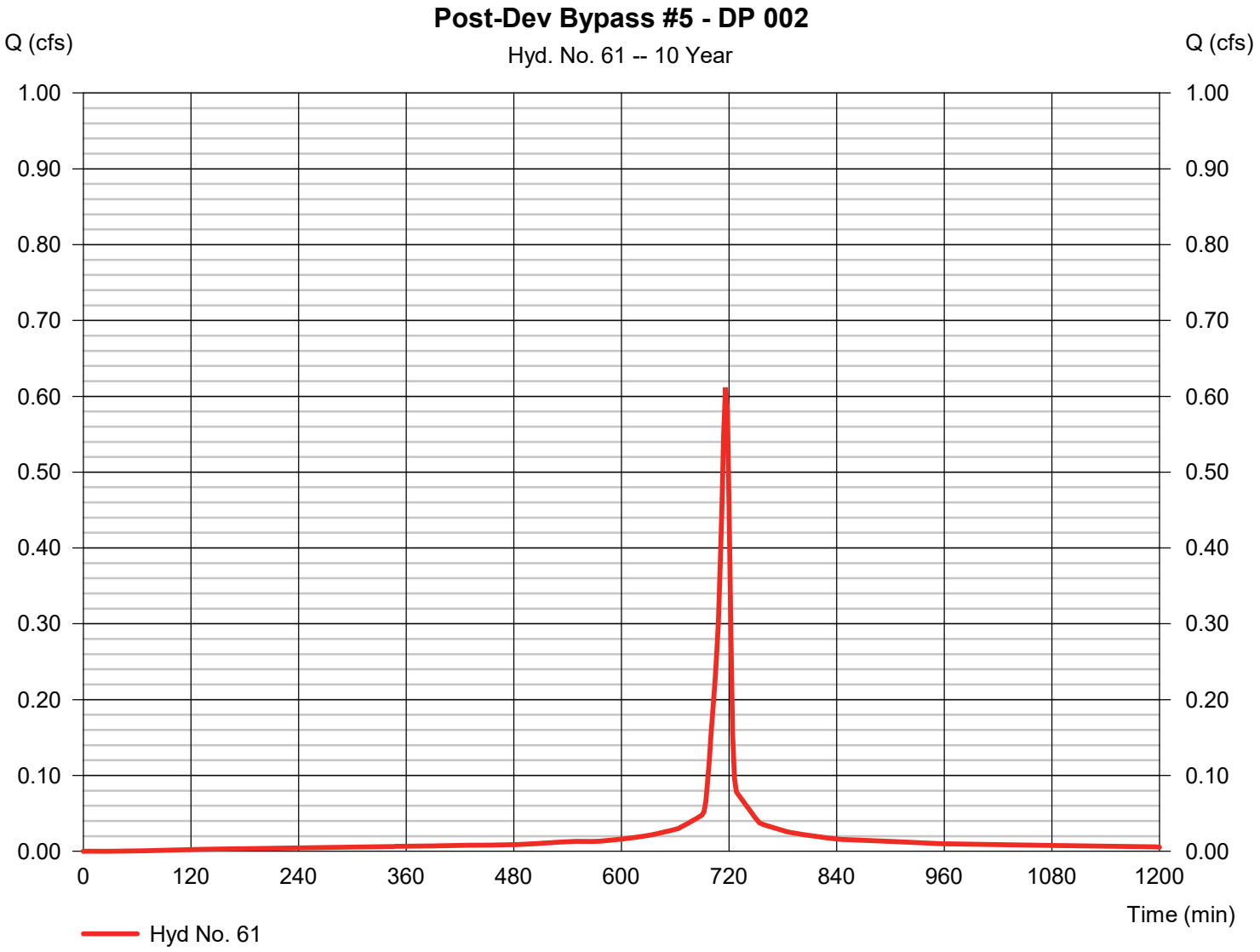
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 61

Post-Dev Bypass #5 - DP 002

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 0.612 cfs |
| Storm frequency | = 10 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 1,459 cuft |
| Drainage area | = 0.090 ac | Curve number | = 98 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 5.00 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



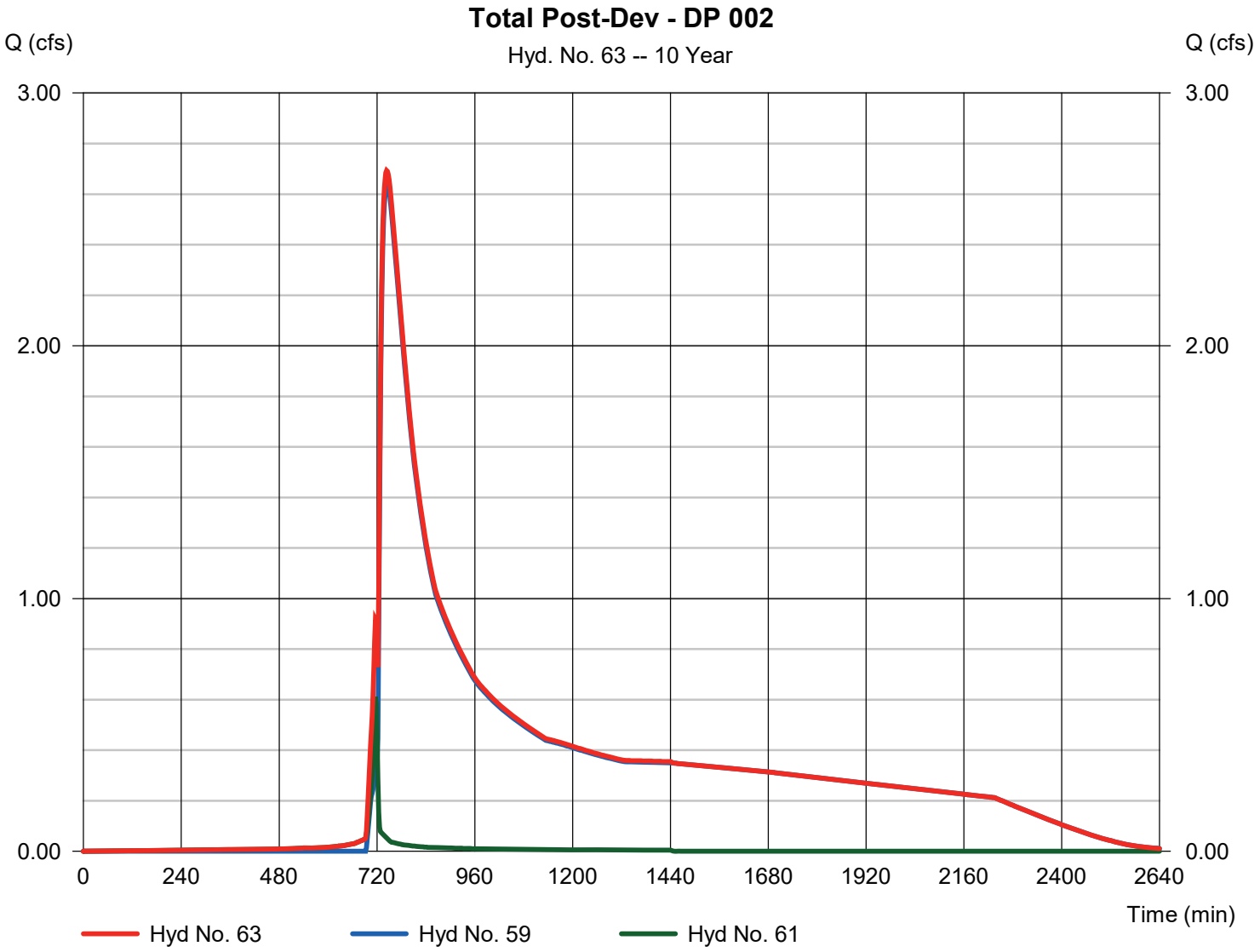
# Hydrograph Report



## Hyd. No. 63

Total Post-Dev - DP 002

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 2.693 cfs |
| Storm frequency | = 10 yrs | Time to peak | = 744 min |
| Time interval | = 2 min | Hyd. volume | = 50,286 cuft |
| Inflow hyds. | = 59, 61 | Contrib. drain. area | = 0.090 ac |



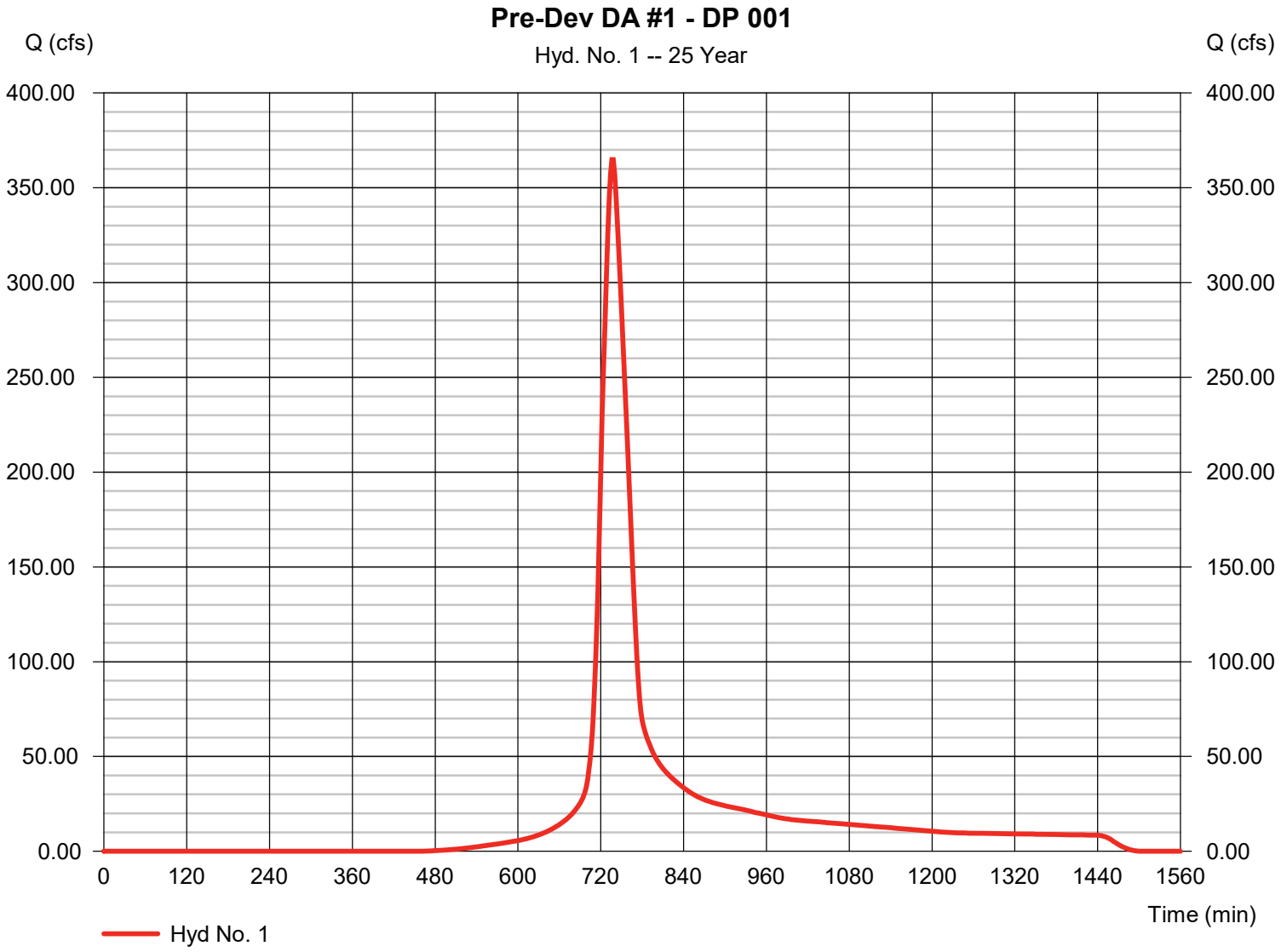
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 1

Pre-Dev DA #1 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 364.87 cfs |
| Storm frequency | = 25 yrs | Time to peak | = 736 min |
| Time interval | = 2 min | Hyd. volume | = 1,771,278 cuft |
| Drainage area | = 149.840 ac | Curve number | = 76.5 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = TR55 | Time of conc. (Tc) | = 37.70 min |
| Total precip. | = 5.80 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



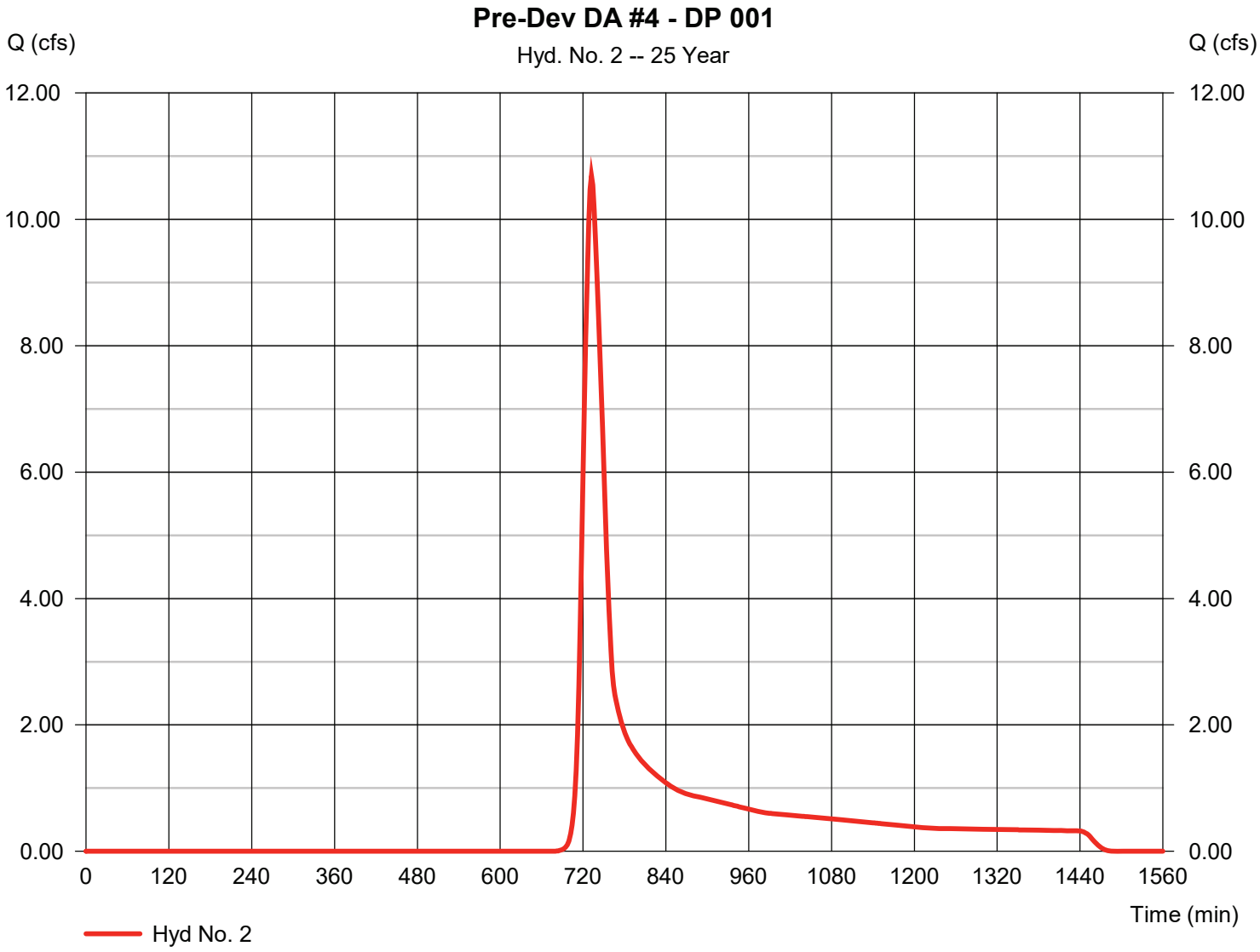
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 2

Pre-Dev DA #4 - DP 001

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | SCS Runoff | Peak discharge | = | 10.69 cfs |
| Storm frequency | = | 25 yrs | Time to peak | = | 732 min |
| Time interval | = | 2 min | Hyd. volume | = | 47,579 cuft |
| Drainage area | = | 8.180 ac | Curve number | = | 57.6 |
| Basin Slope | = | 0.0 % | Hydraulic length | = | 0 ft |
| Tc method | = | TR55 | Time of conc. (Tc) | = | 28.25 min |
| Total precip. | = | 5.80 in | Distribution | = | Type II |
| Storm duration | = | 24 hrs | Shape factor | = | 484 |



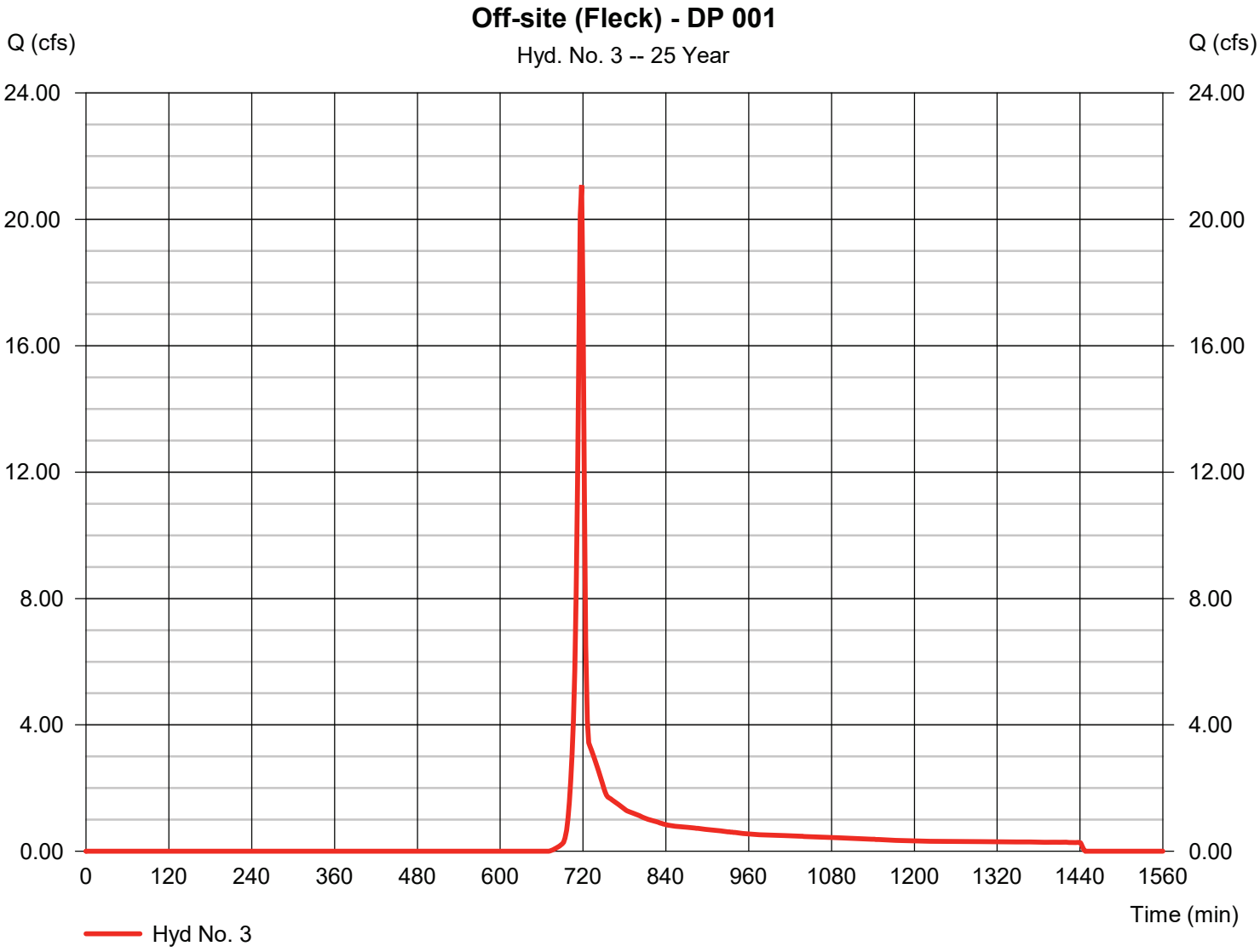
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 3

Off-site (Fleck) - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 21.08 cfs |
| Storm frequency | = 25 yrs | Time to peak | = 718 min |
| Time interval | = 2 min | Hyd. volume | = 42,523 cuft |
| Drainage area | = 7.470 ac | Curve number | = 58.5 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 5.80 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



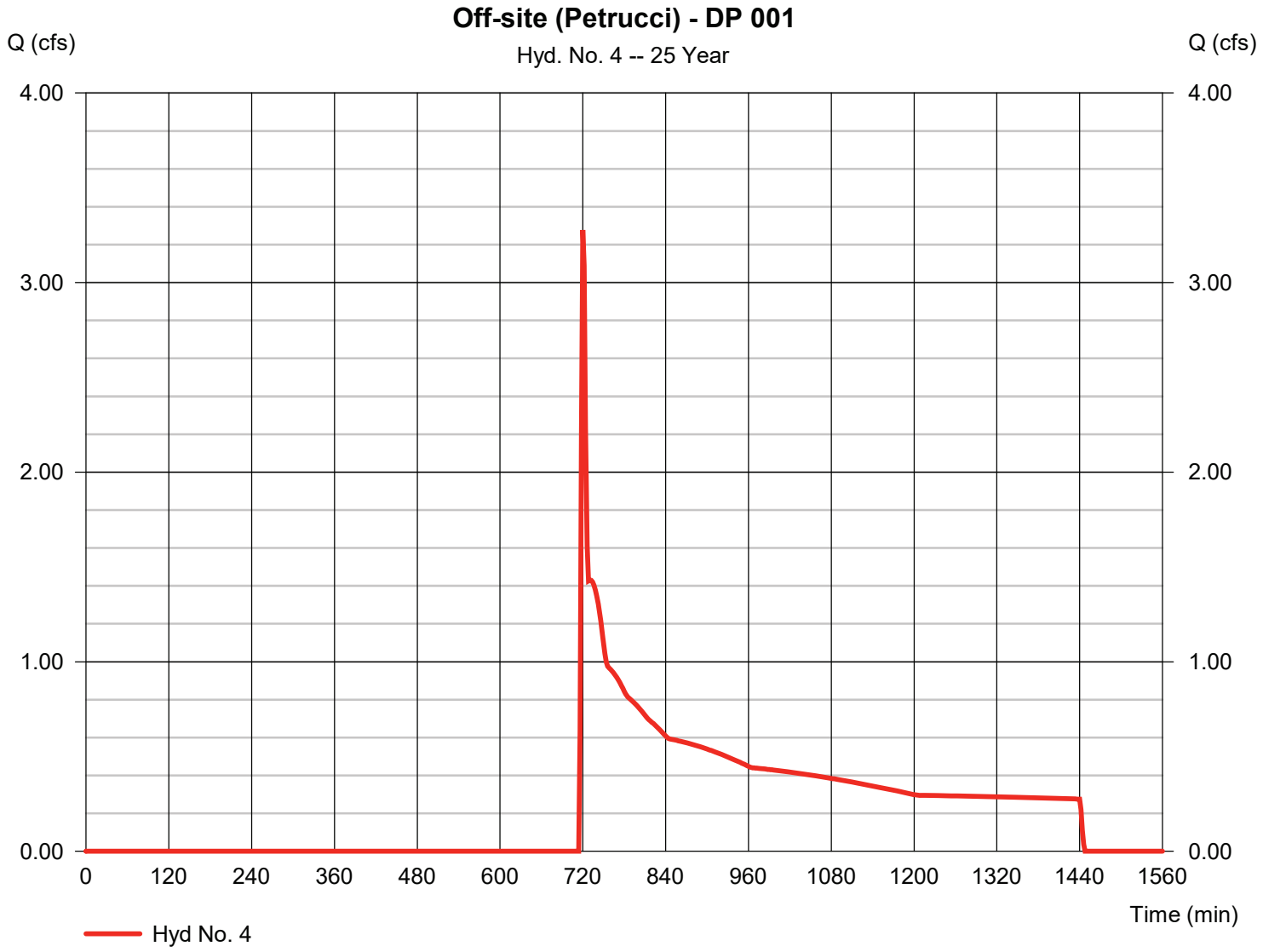
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 4

Off-site (Petrucci) - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 3.277 cfs |
| Storm frequency | = 25 yrs | Time to peak | = 720 min |
| Time interval | = 2 min | Hyd. volume | = 21,194 cuft |
| Drainage area | = 18.000 ac | Curve number | = 38.1 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 5.80 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



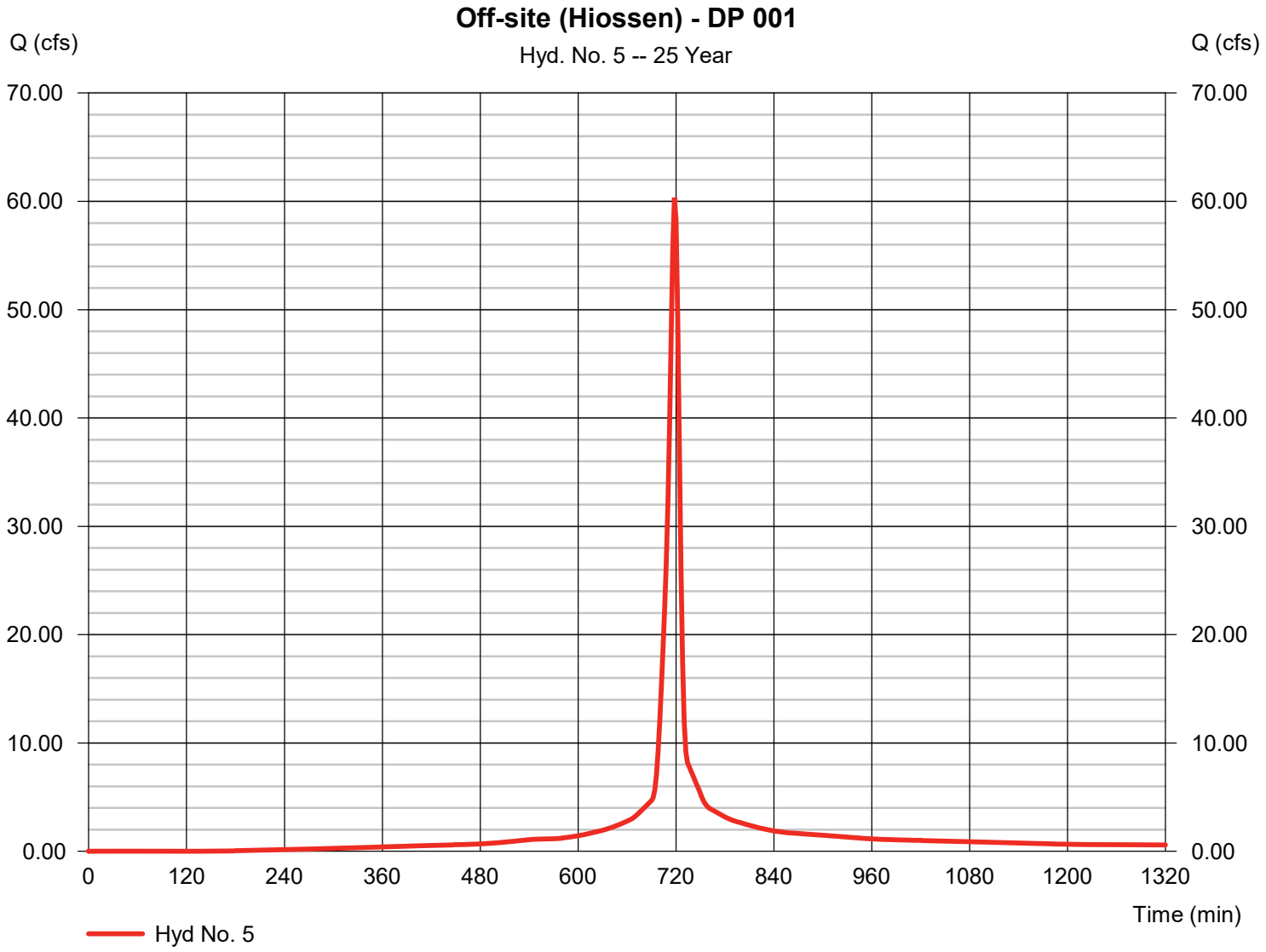
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 5

Off-site (Hiossen) - DP 001

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | SCS Runoff | Peak discharge | = | 60.34 cfs |
| Storm frequency | = | 25 yrs | Time to peak | = | 718 min |
| Time interval | = | 2 min | Hyd. volume | = | 150,115 cuft |
| Drainage area | = | 8.390 ac | Curve number | = | 92.5 |
| Basin Slope | = | 0.0 % | Hydraulic length | = | 0 ft |
| Tc method | = | TR55 | Time of conc. (Tc) | = | 8.90 min |
| Total precip. | = | 5.80 in | Distribution | = | Type II |
| Storm duration | = | 24 hrs | Shape factor | = | 484 |



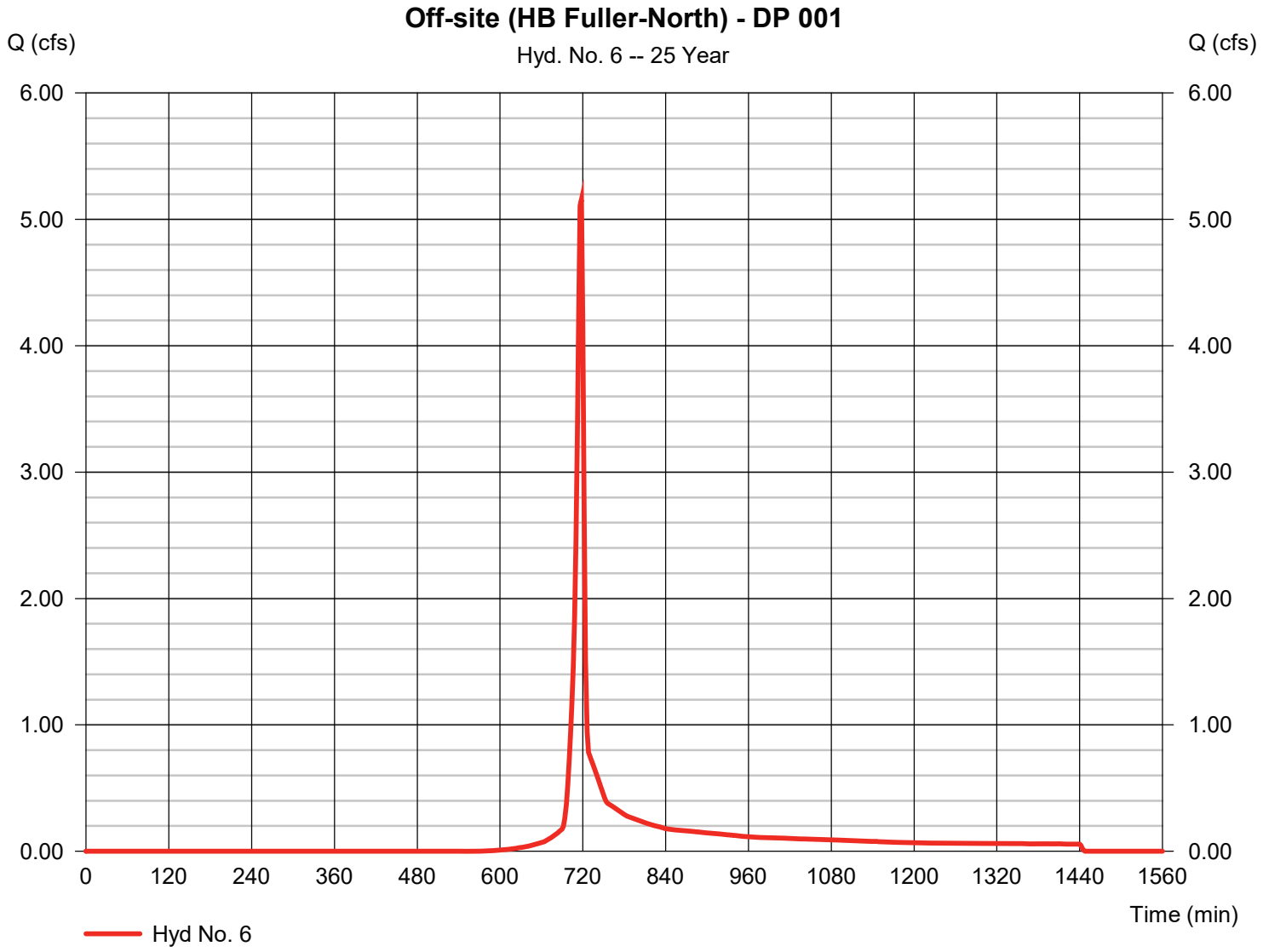
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 6

Off-site (HB Fuller-North) - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 5.157 cfs |
| Storm frequency | = 25 yrs | Time to peak | = 718 min |
| Time interval | = 2 min | Hyd. volume | = 10,341 cuft |
| Drainage area | = 1.240 ac | Curve number | = 67.8 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 5.80 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



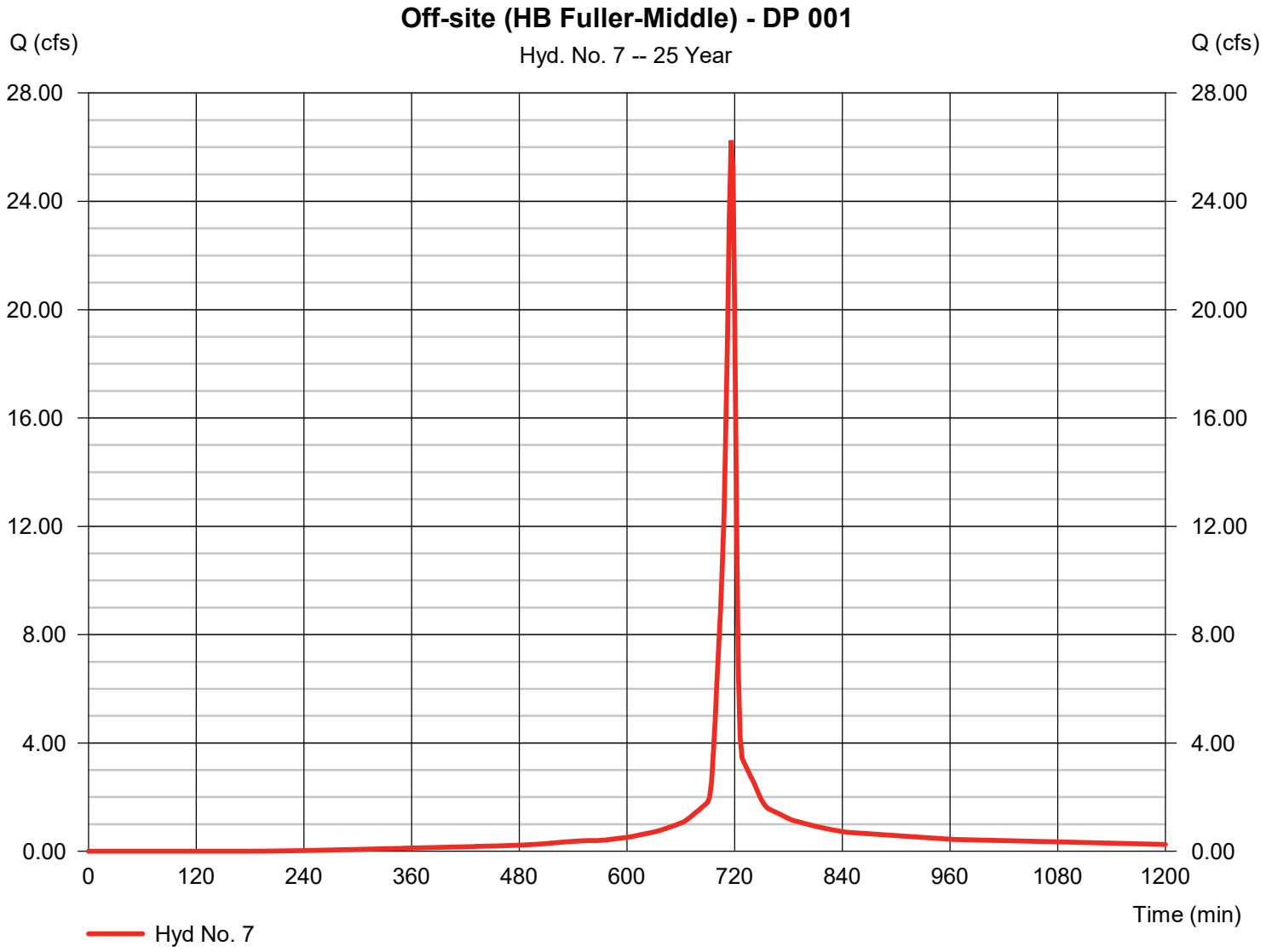
# Hydrograph Report



## Hyd. No. 7

Off-site (HB Fuller-Middle) - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 26.26 cfs |
| Storm frequency | = 25 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 57,094 cuft |
| Drainage area | = 3.590 ac | Curve number | = 90.2 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 5.80 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



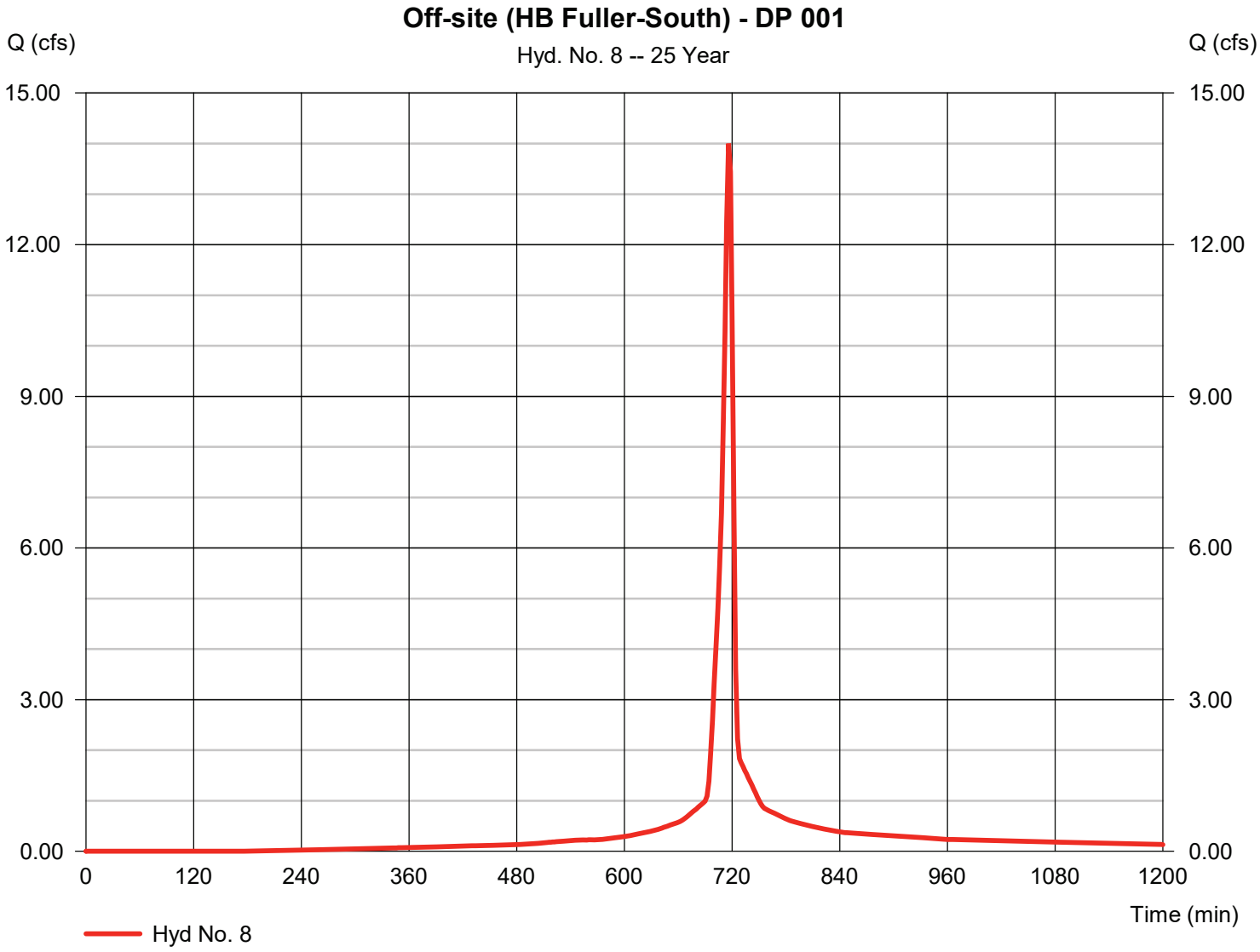
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 8

Off-site (HB Fuller-South) - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 14.00 cfs |
| Storm frequency | = 25 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 30,819 cuft |
| Drainage area | = 1.880 ac | Curve number | = 91.5 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 5.80 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



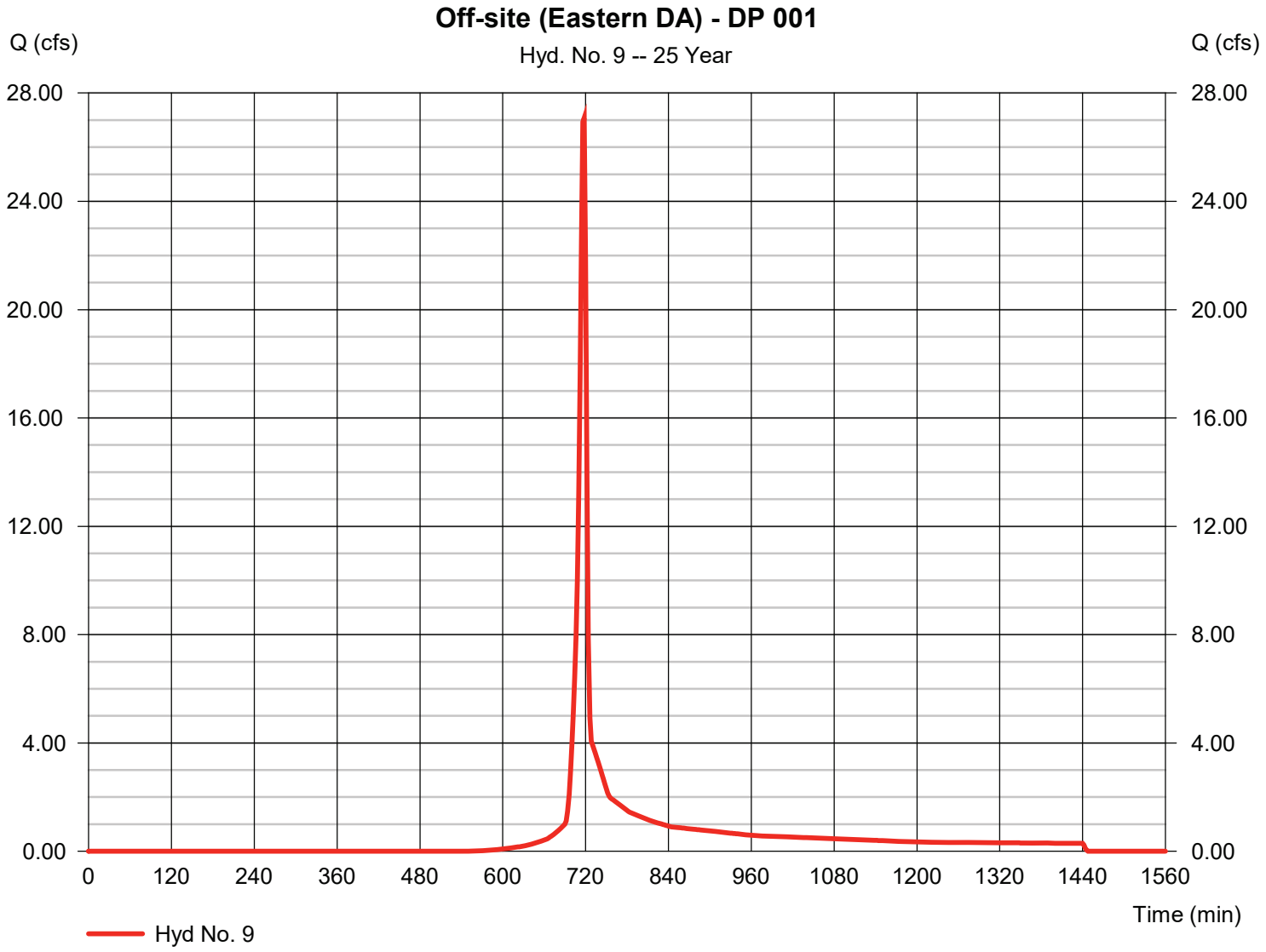
# Hydrograph Report



## Hyd. No. 9

Off-site (Eastern DA) - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 27.08 cfs |
| Storm frequency | = 25 yrs | Time to peak | = 718 min |
| Time interval | = 2 min | Hyd. volume | = 54,424 cuft |
| Drainage area | = 6.210 ac | Curve number | = 69.2 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 5.80 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



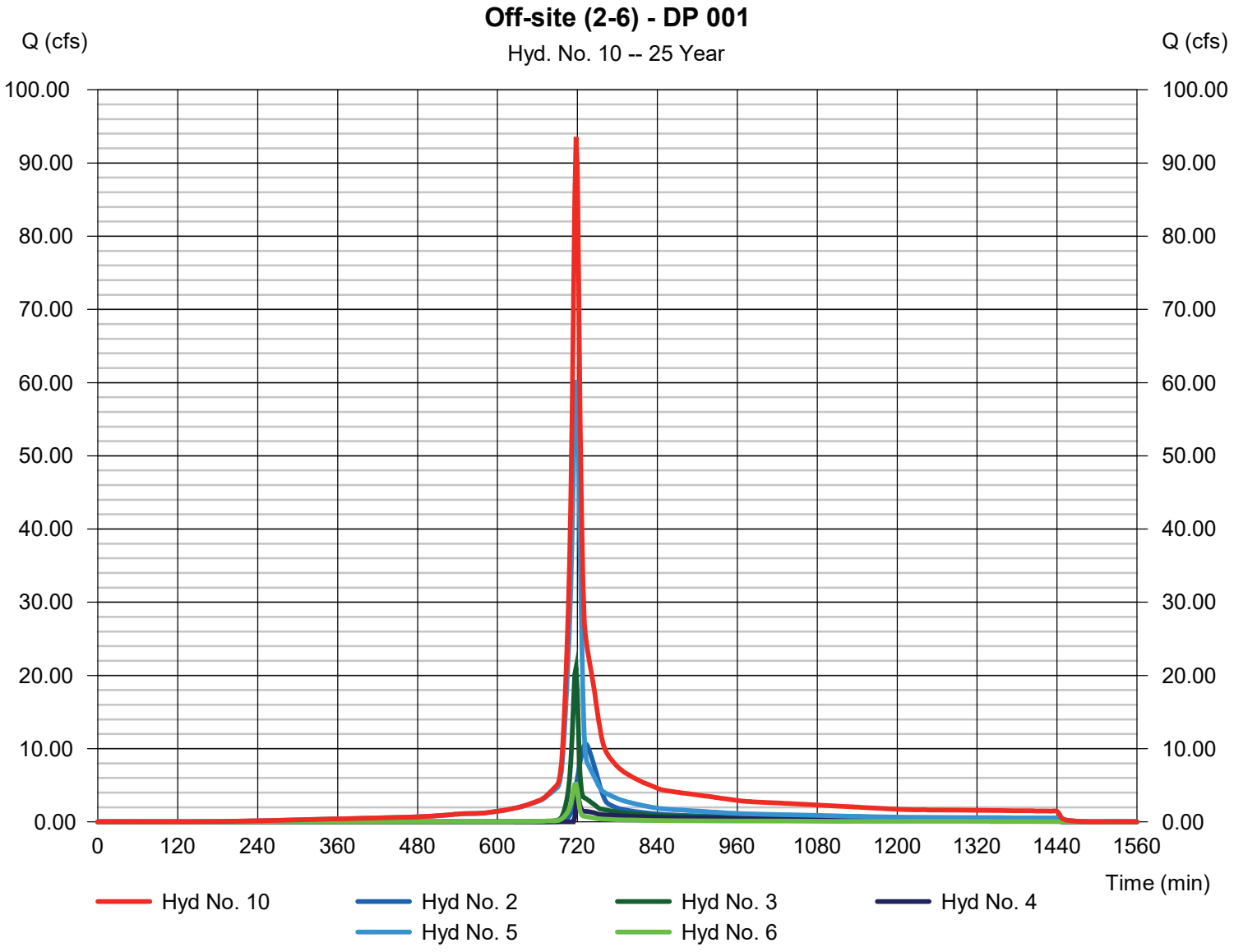
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 10

Off-site (2-6) - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 93.53 cfs |
| Storm frequency | = 25 yrs | Time to peak | = 718 min |
| Time interval | = 2 min | Hyd. volume | = 271,752 cuft |
| Inflow hyds. | = 2, 3, 4, 5, 6 | Contrib. drain. area | = 43.280 ac |



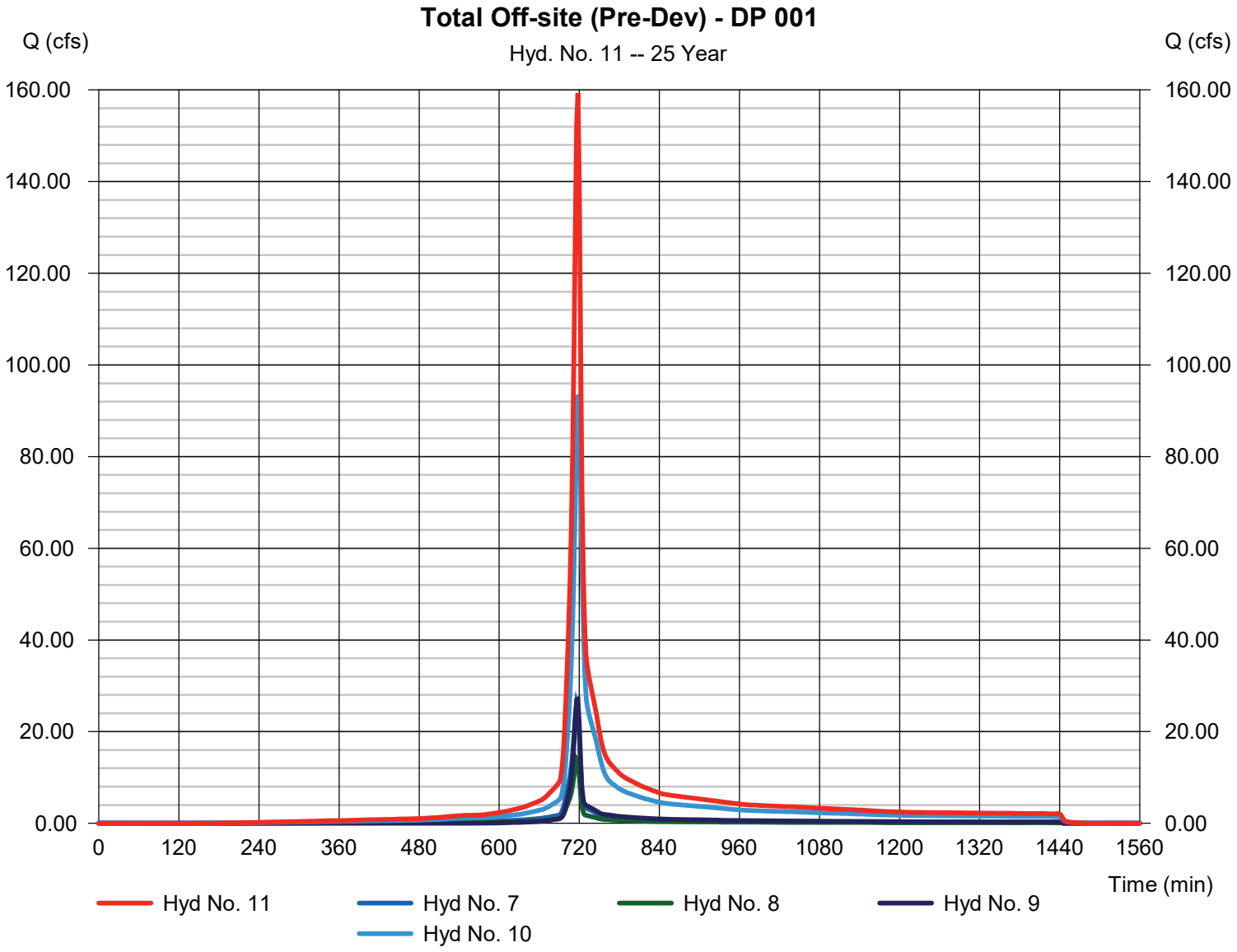
# Hydrograph Report



## Hyd. No. 11

Total Off-site (Pre-Dev) - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 159.31 cfs |
| Storm frequency | = 25 yrs | Time to peak | = 718 min |
| Time interval | = 2 min | Hyd. volume | = 414,090 cuft |
| Inflow hyds. | = 7, 8, 9, 10 | Contrib. drain. area | = 11.680 ac |



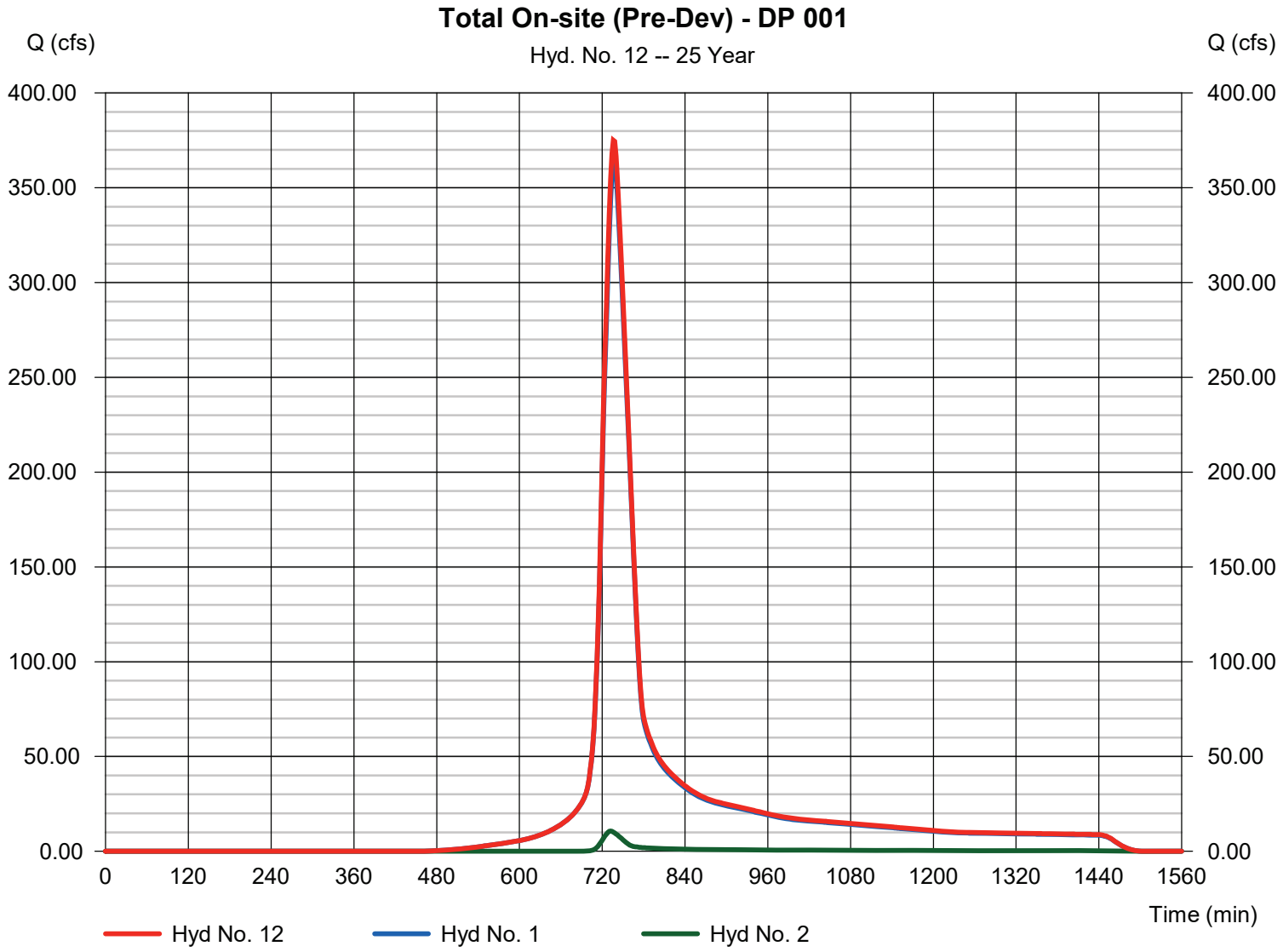
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 12

Total On-site (Pre-Dev) - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 375.02 cfs |
| Storm frequency | = 25 yrs | Time to peak | = 736 min |
| Time interval | = 2 min | Hyd. volume | = 1,818,856 cuft |
| Inflow hyds. | = 1, 2 | Contrib. drain. area | = 158.020 ac |



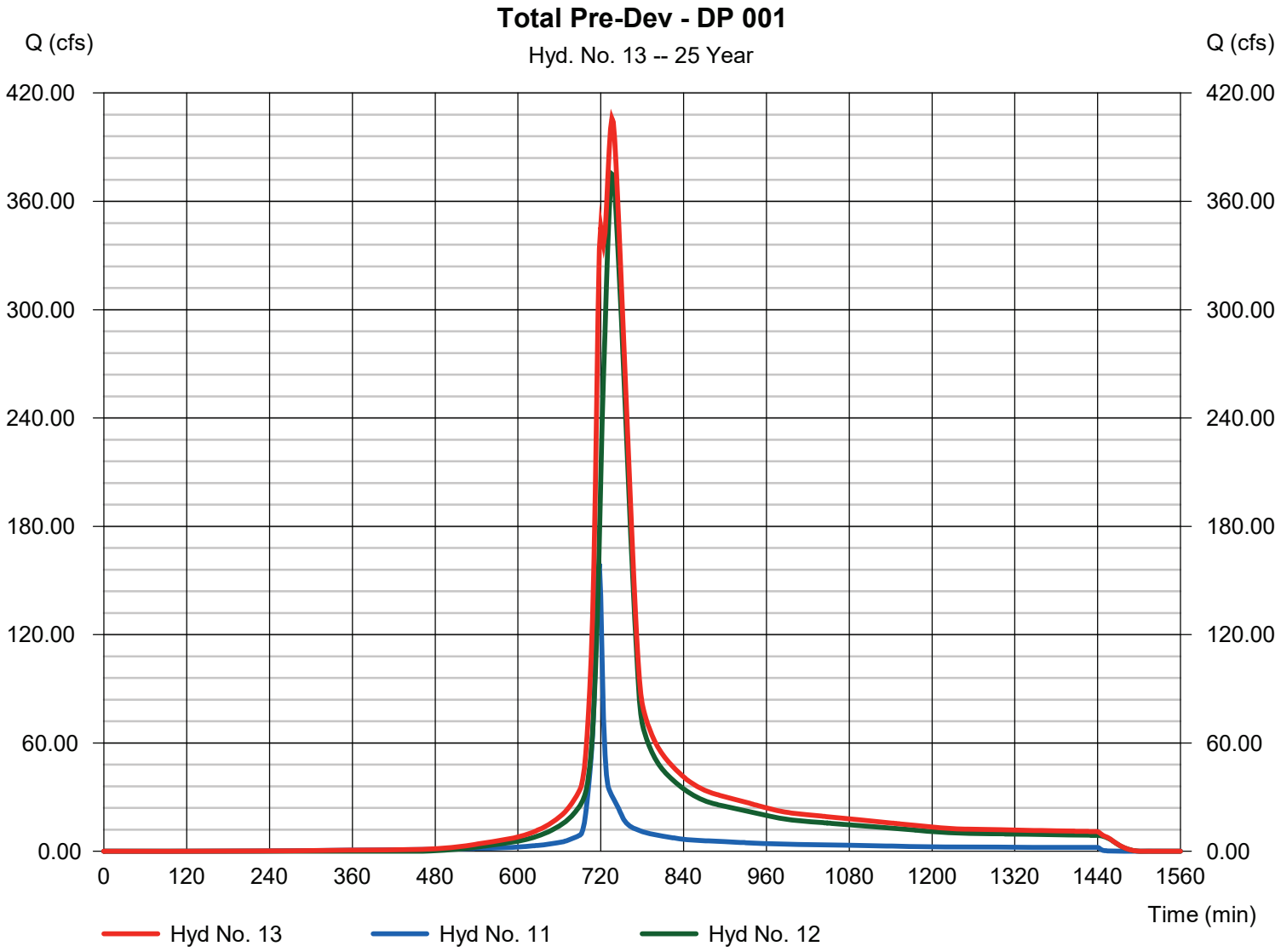
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 13

Total Pre-Dev - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 405.89 cfs |
| Storm frequency | = 25 yrs | Time to peak | = 736 min |
| Time interval | = 2 min | Hyd. volume | = 2,232,946 cuft |
| Inflow hyds. | = 11, 12 | Contrib. drain. area | = 0.000 ac |



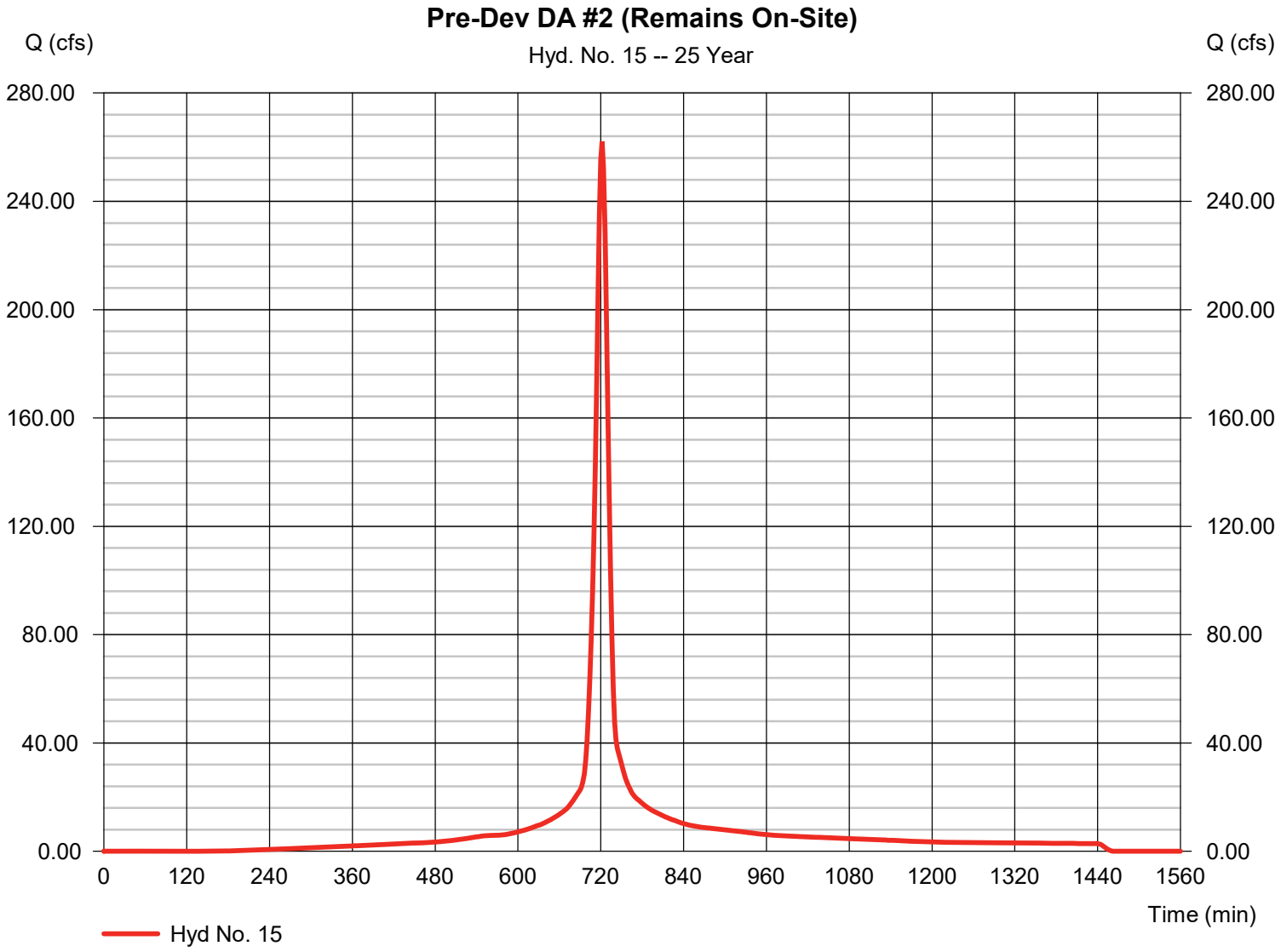
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 15

Pre-Dev DA #2 (Remains On-Site)

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 262.15 cfs |
| Storm frequency | = 25 yrs | Time to peak | = 722 min |
| Time interval | = 2 min | Hyd. volume | = 786,069 cuft |
| Drainage area | = 45.370 ac | Curve number | = 92.2 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = TR55 | Time of conc. (Tc) | = 13.40 min |
| Total precip. | = 5.80 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



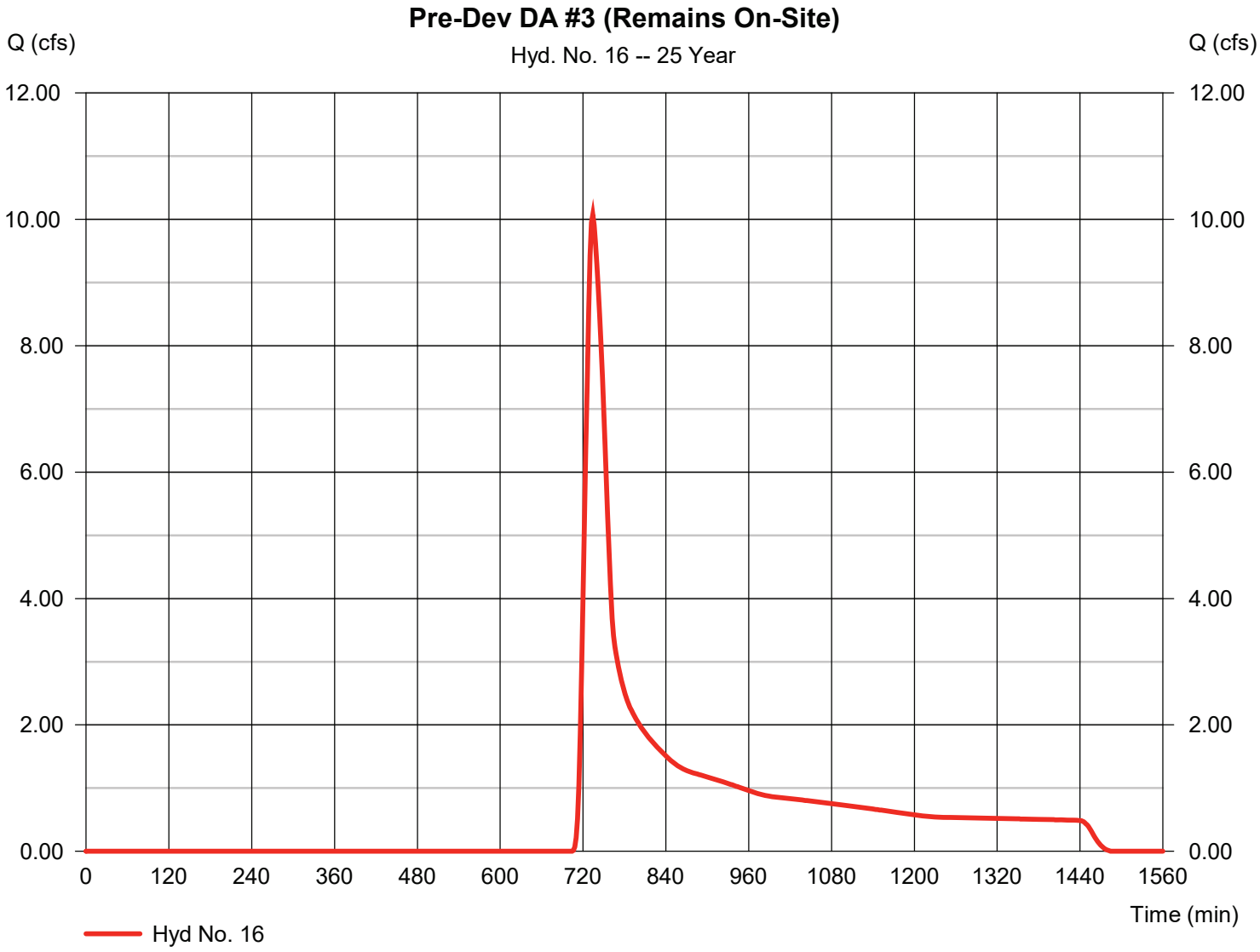
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 16

Pre-Dev DA #3 (Remains On-Site)

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | SCS Runoff | Peak discharge | = | 10.07 cfs |
| Storm frequency | = | 25 yrs | Time to peak | = | 734 min |
| Time interval | = | 2 min | Hyd. volume | = | 57,310 cuft |
| Drainage area | = | 16.820 ac | Curve number | = | 48.4 |
| Basin Slope | = | 0.0 % | Hydraulic length | = | 0 ft |
| Tc method | = | TR55 | Time of conc. (Tc) | = | 29.90 min |
| Total precip. | = | 5.80 in | Distribution | = | Type II |
| Storm duration | = | 24 hrs | Shape factor | = | 484 |



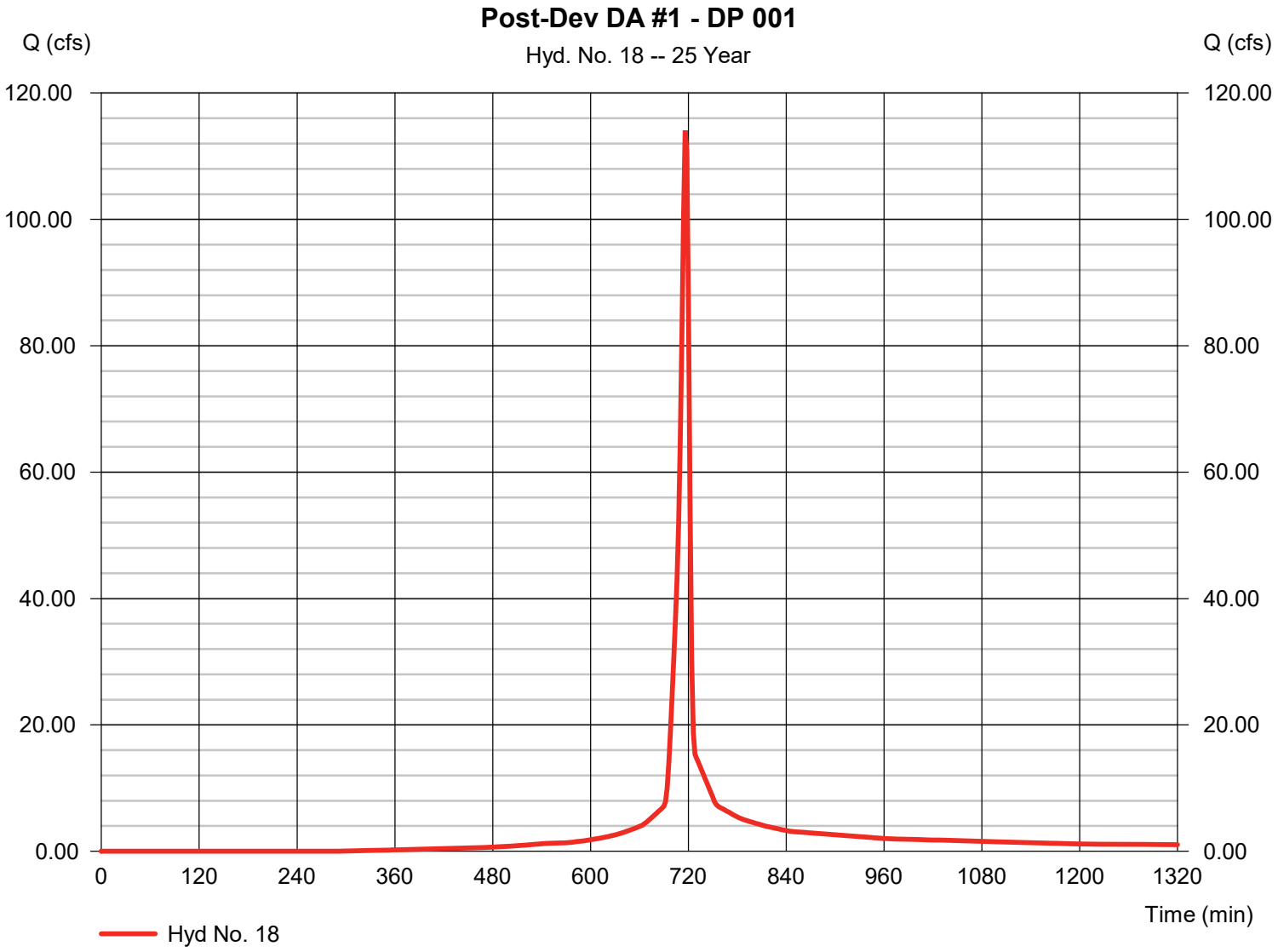
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 18

Post-Dev DA #1 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 114.08 cfs |
| Storm frequency | = 25 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 239,824 cuft |
| Drainage area | = 16.870 ac | Curve number | = 85.6 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 5.80 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



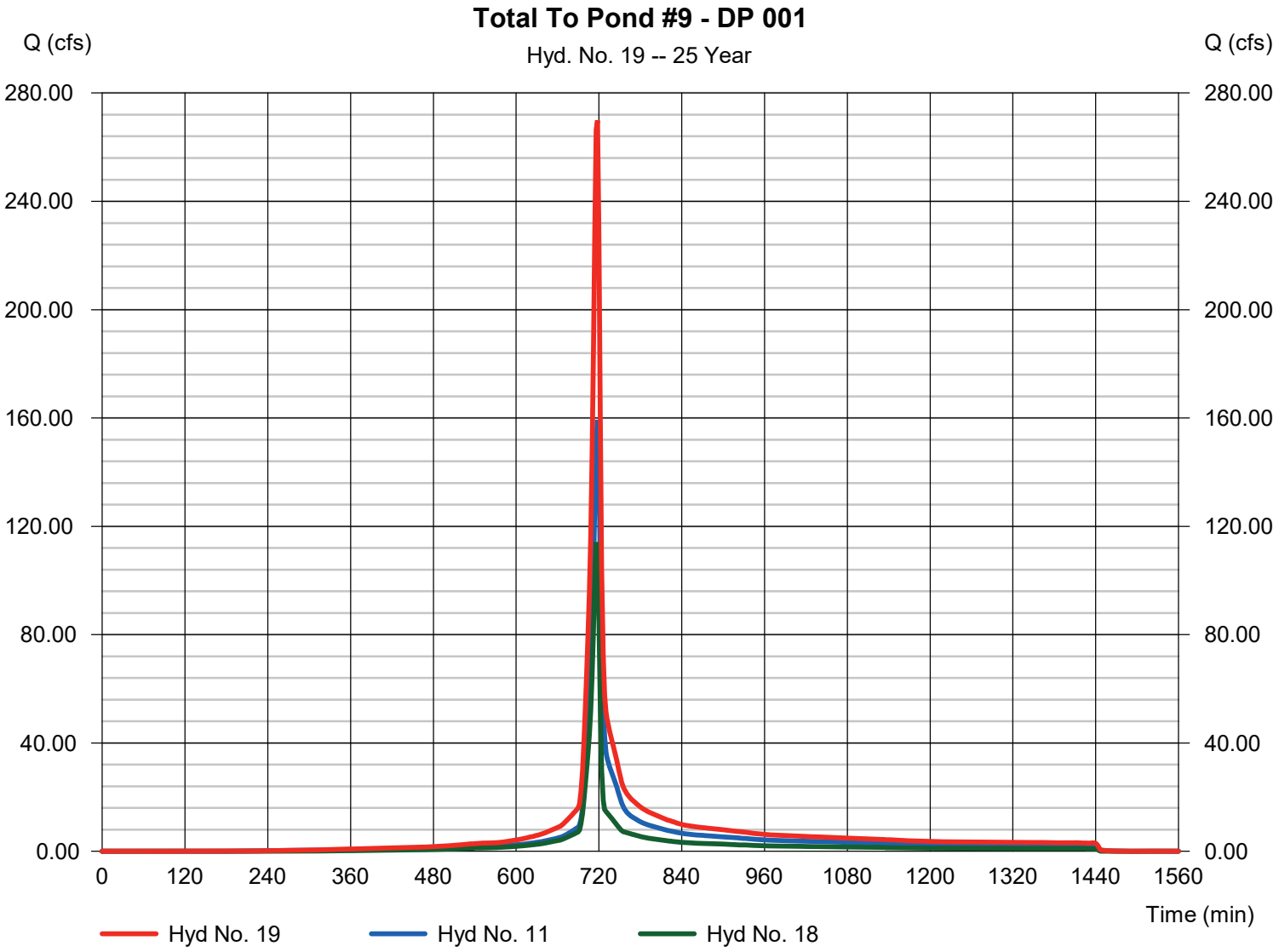
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 19

Total To Pond #9 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 269.88 cfs |
| Storm frequency | = 25 yrs | Time to peak | = 718 min |
| Time interval | = 2 min | Hyd. volume | = 653,914 cuft |
| Inflow hyds. | = 11, 18 | Contrib. drain. area | = 16.870 ac |



# Hydrograph Report

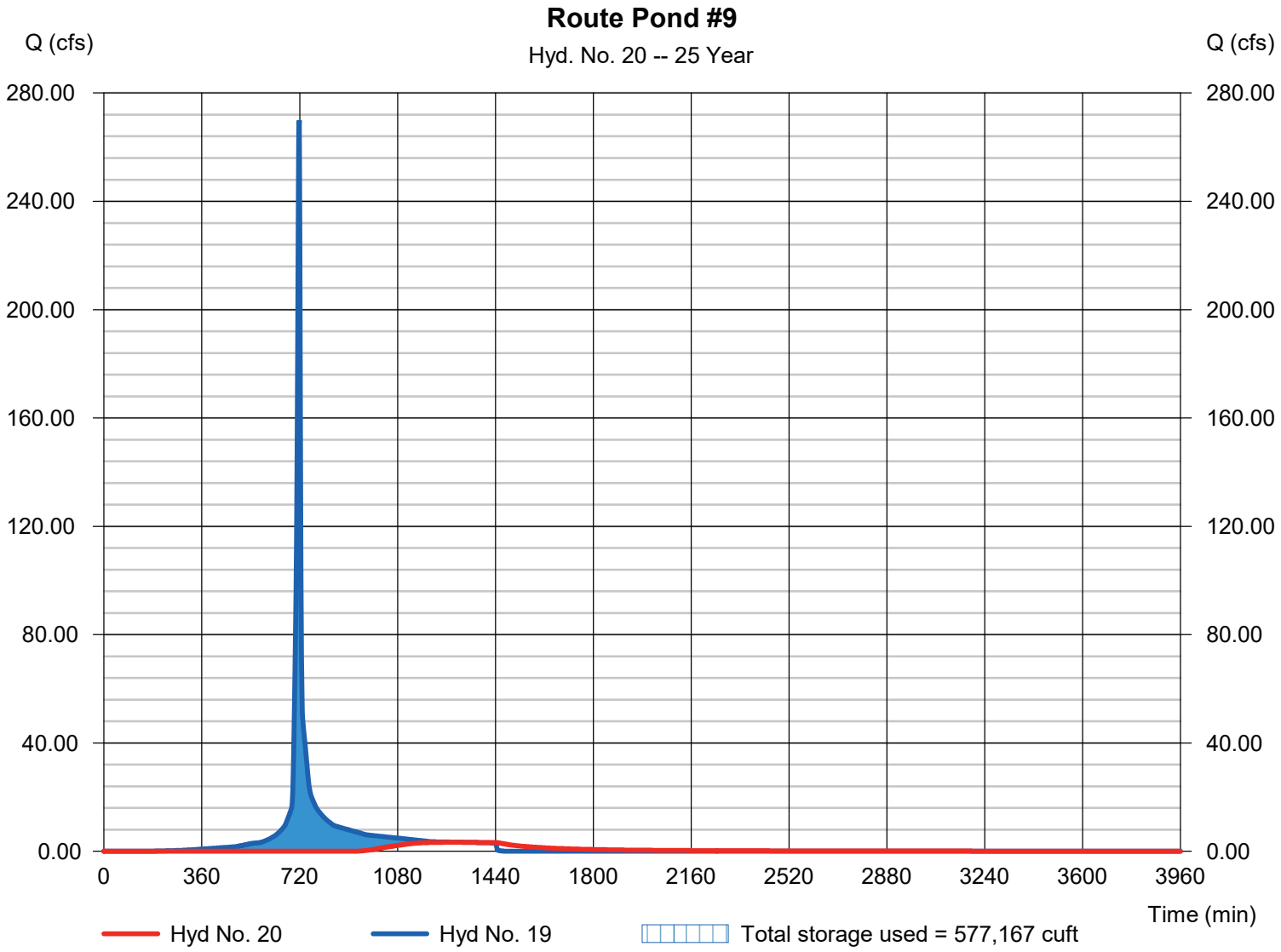
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 20

Route Pond #9

| | | | |
|---|---|---|---|
| Hydrograph type | = Reservoir | Peak discharge | = 3.311 cfs |
| Storm frequency | = 25 yrs | Time to peak | = 1308 min |
| Time interval | = 2 min | Hyd. volume | = 130,989 cuft |
| Inflow hyd. No. | = 19 - Total To Pond #9 - DP 001 | Max. Elevation | = 14.04 ft |
| Reservoir name | = Wet Pond #9 | Max. Storage | = 577,167 cuft |

Storage Indication method used.



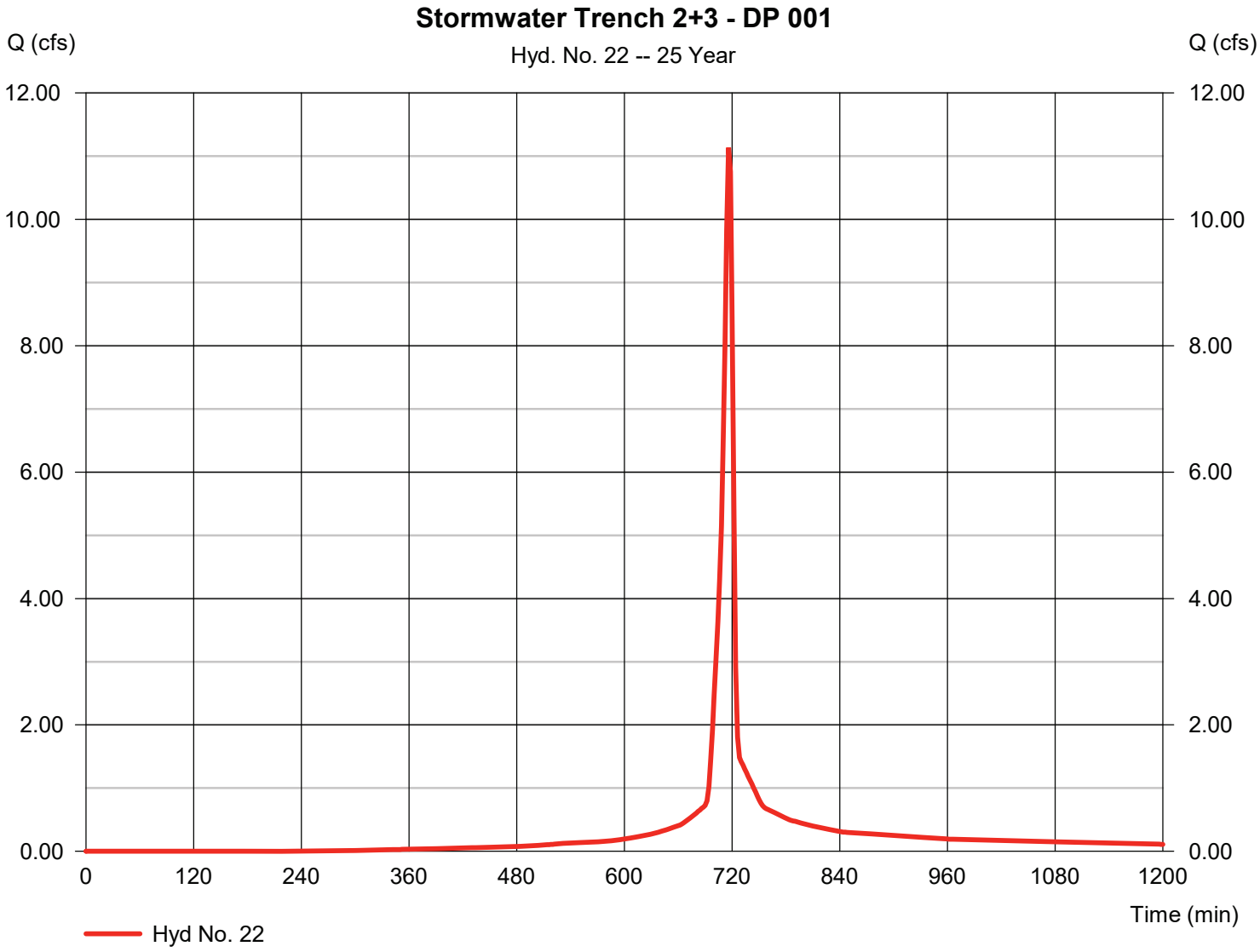
# Hydrograph Report



## Hyd. No. 22

Stormwater Trench 2+3 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 11.13 cfs |
| Storm frequency | = 25 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 23,698 cuft |
| Drainage area | = 1.590 ac | Curve number | = 87.5 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 5.80 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



# Hydrograph Report

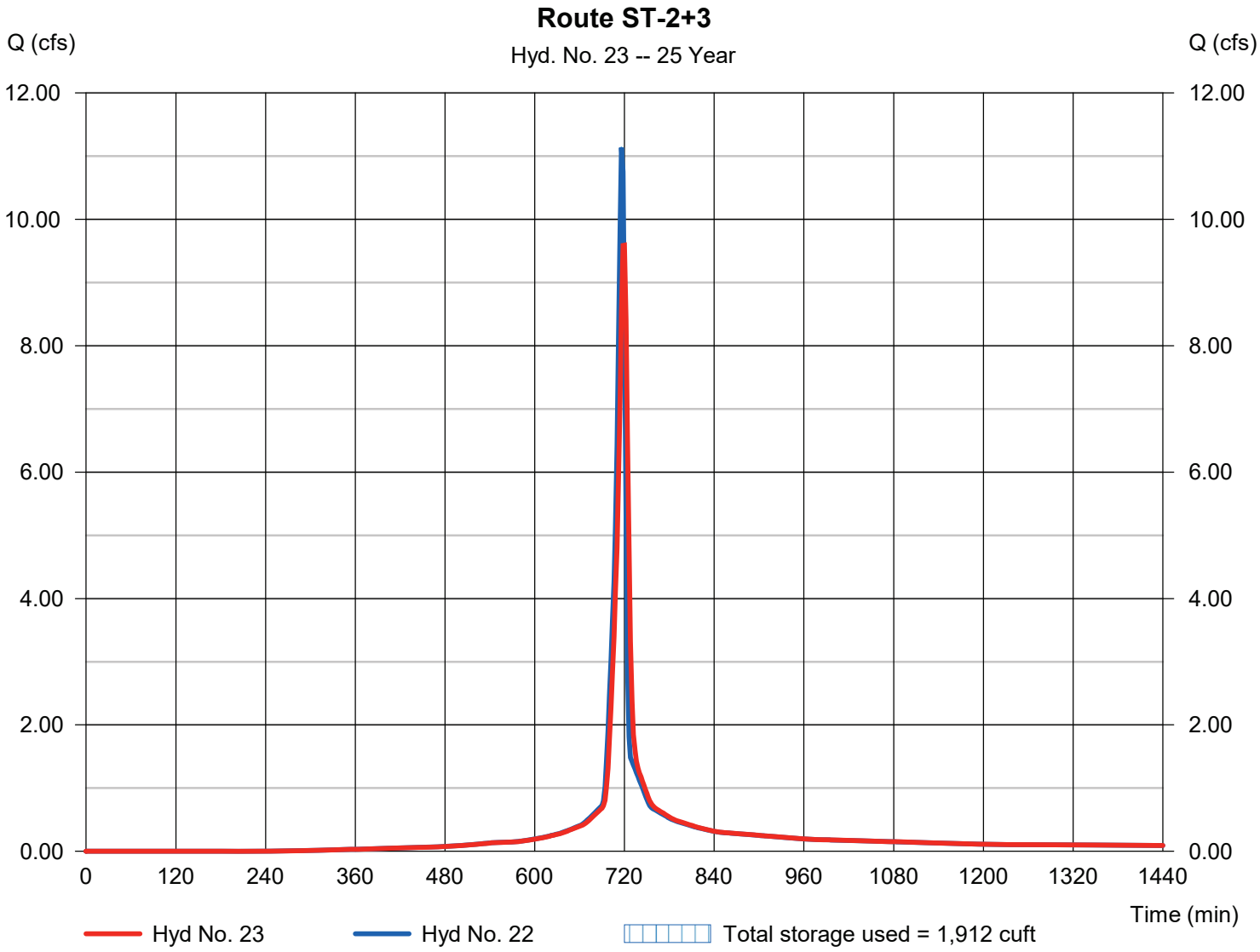
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 23

Route ST-2+3

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | Reservoir | Peak discharge | = | 9.591 cfs |
| Storm frequency | = | 25 yrs | Time to peak | = | 720 min |
| Time interval | = | 2 min | Hyd. volume | = | 23,698 cuft |
| Inflow hyd. No. | = | 22 - Stormwater Trench 2+3 - DP 2.0 | Max. Elevation | = | 16.65 ft |
| Reservoir name | = | Stormwater Trench ST-2+3 | Max. Storage | = | 1,912 cuft |

Storage Indication method used.



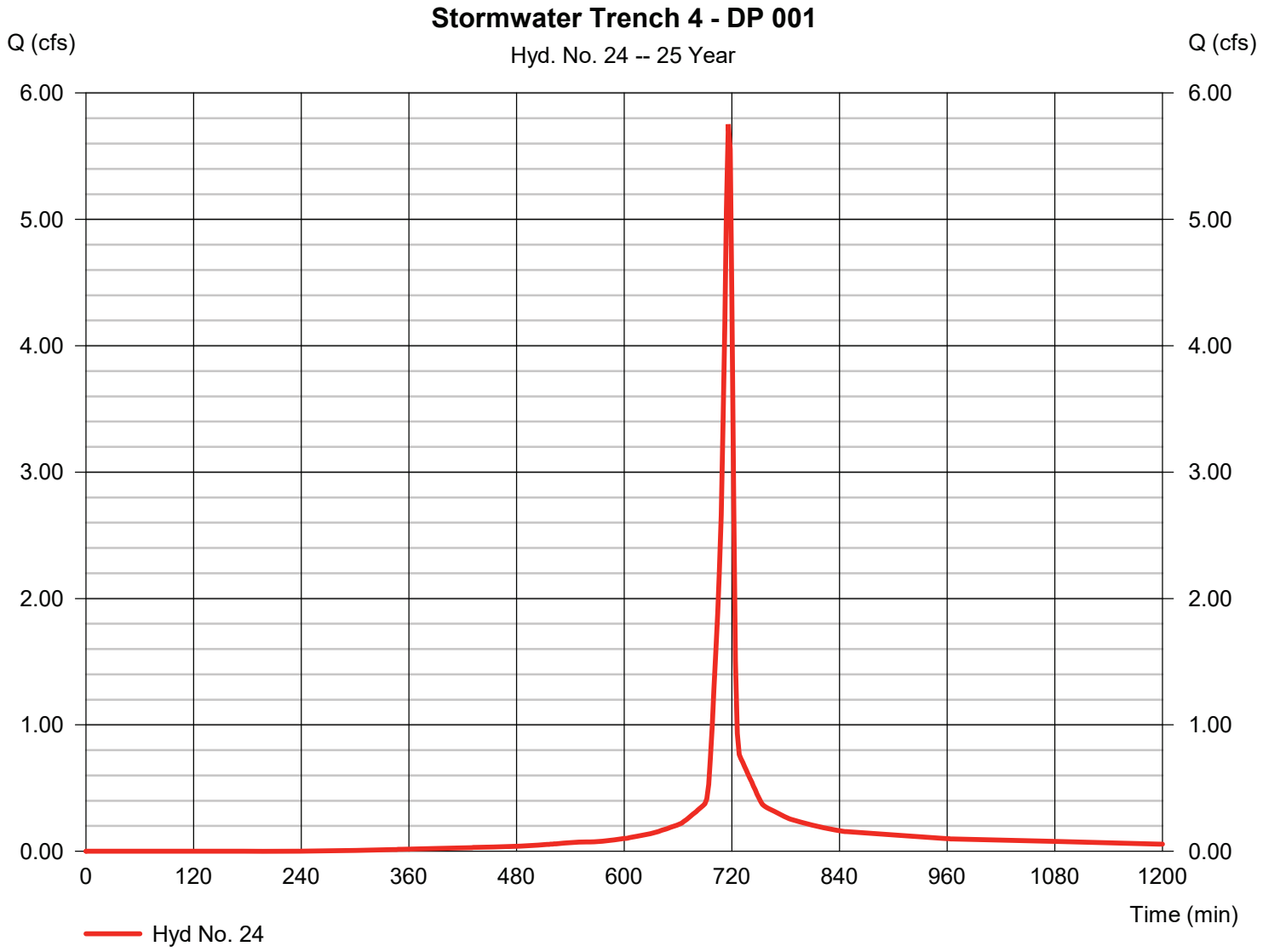
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 24

Stormwater Trench 4 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 5.752 cfs |
| Storm frequency | = 25 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 12,252 cuft |
| Drainage area | = 0.820 ac | Curve number | = 87.6 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 5.80 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



# Hydrograph Report

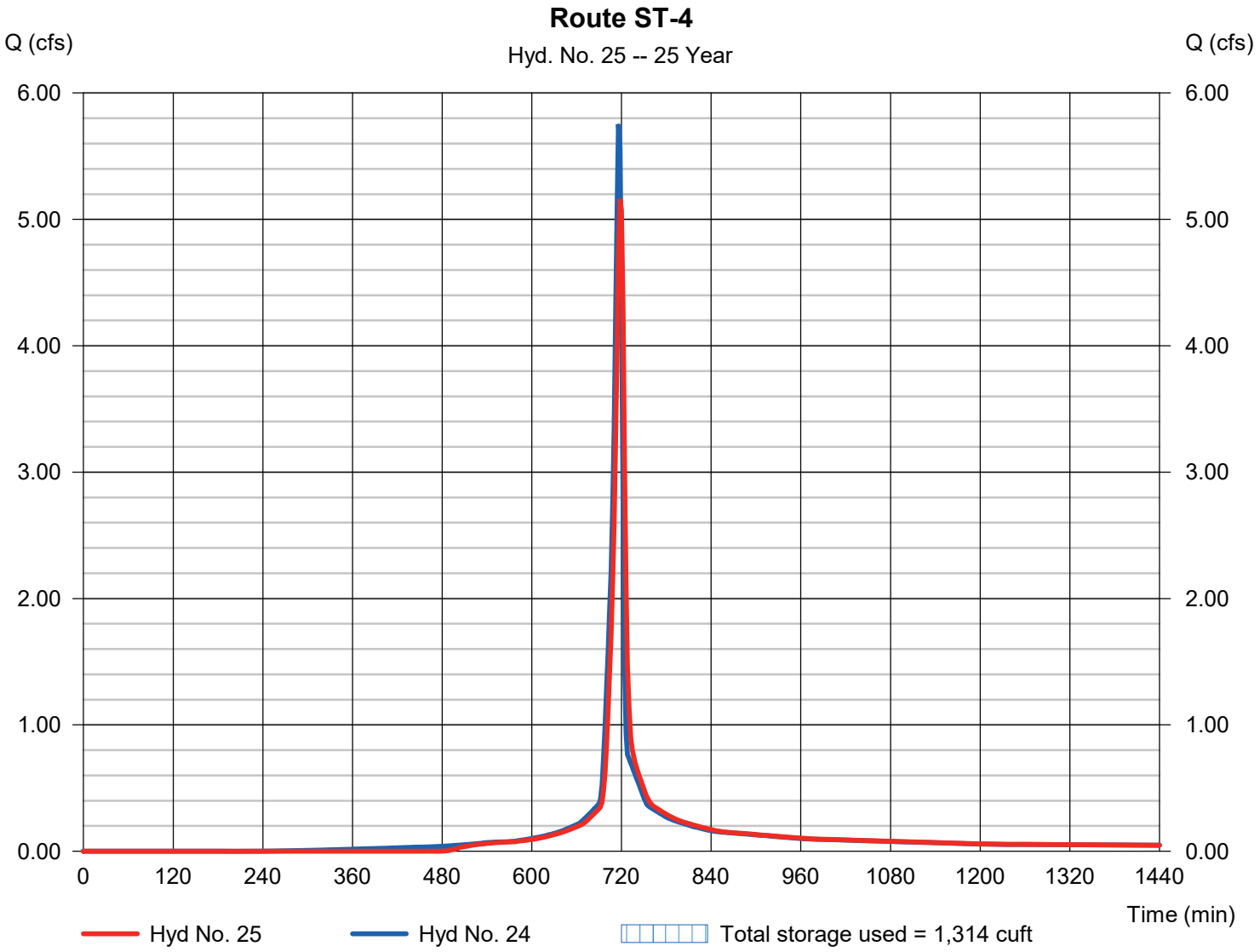
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 25

Route ST-4

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | Reservoir | Peak discharge | = | 5.162 cfs |
| Storm frequency | = | 25 yrs | Time to peak | = | 718 min |
| Time interval | = | 2 min | Hyd. volume | = | 11,998 cuft |
| Inflow hyd. No. | = | 24 - Stormwater Trench 4 - DP-001 | Max. Elevation | = | 16.96 ft |
| Reservoir name | = | Stormwater Trench ST-4 | Max. Storage | = | 1,314 cuft |

Storage Indication method used.



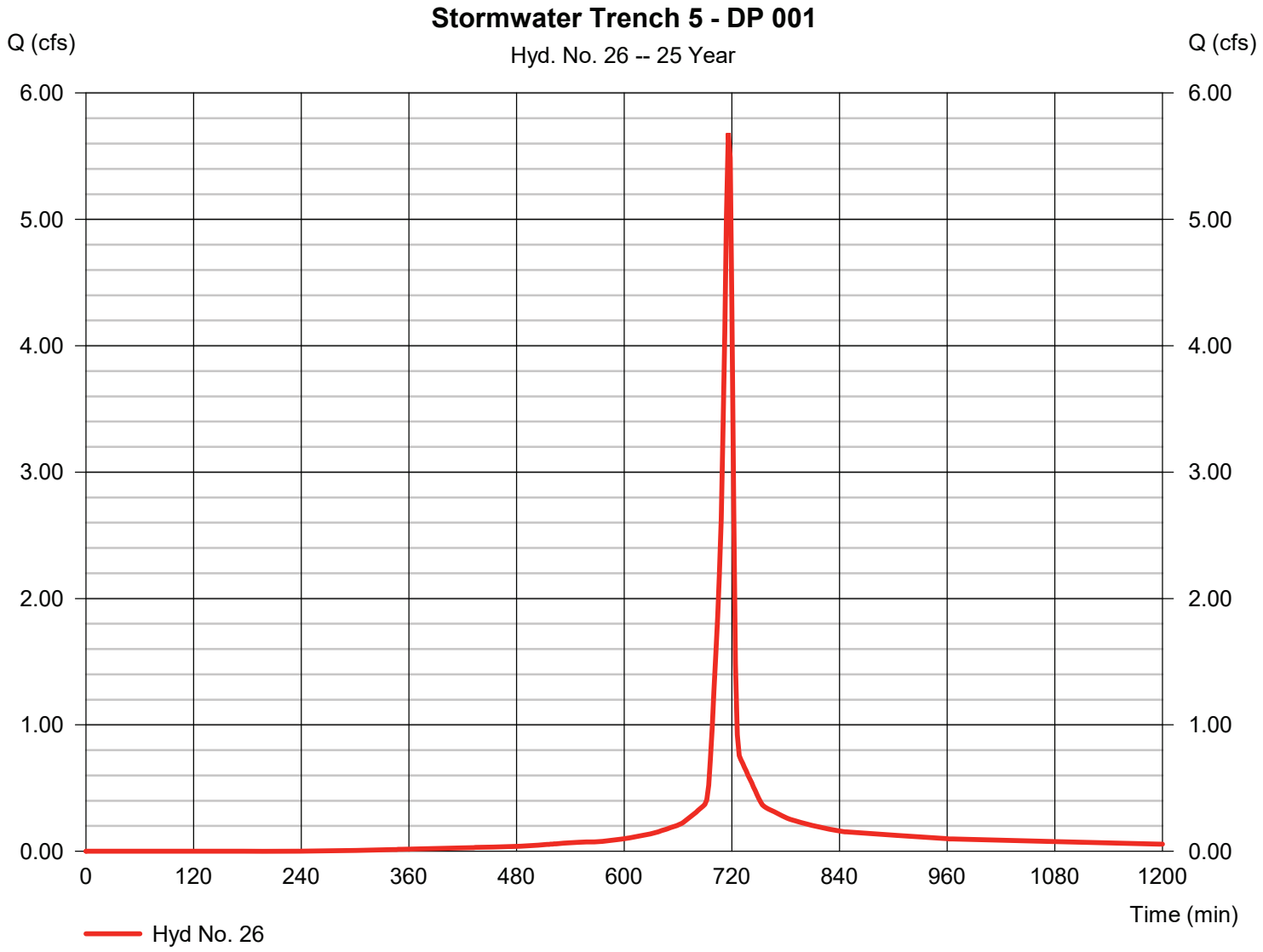
# Hydrograph Report



## Hyd. No. 26

Stormwater Trench 5 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 5.682 cfs |
| Storm frequency | = 25 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 12,102 cuft |
| Drainage area | = 0.810 ac | Curve number | = 87.6 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 5.80 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



# Hydrograph Report

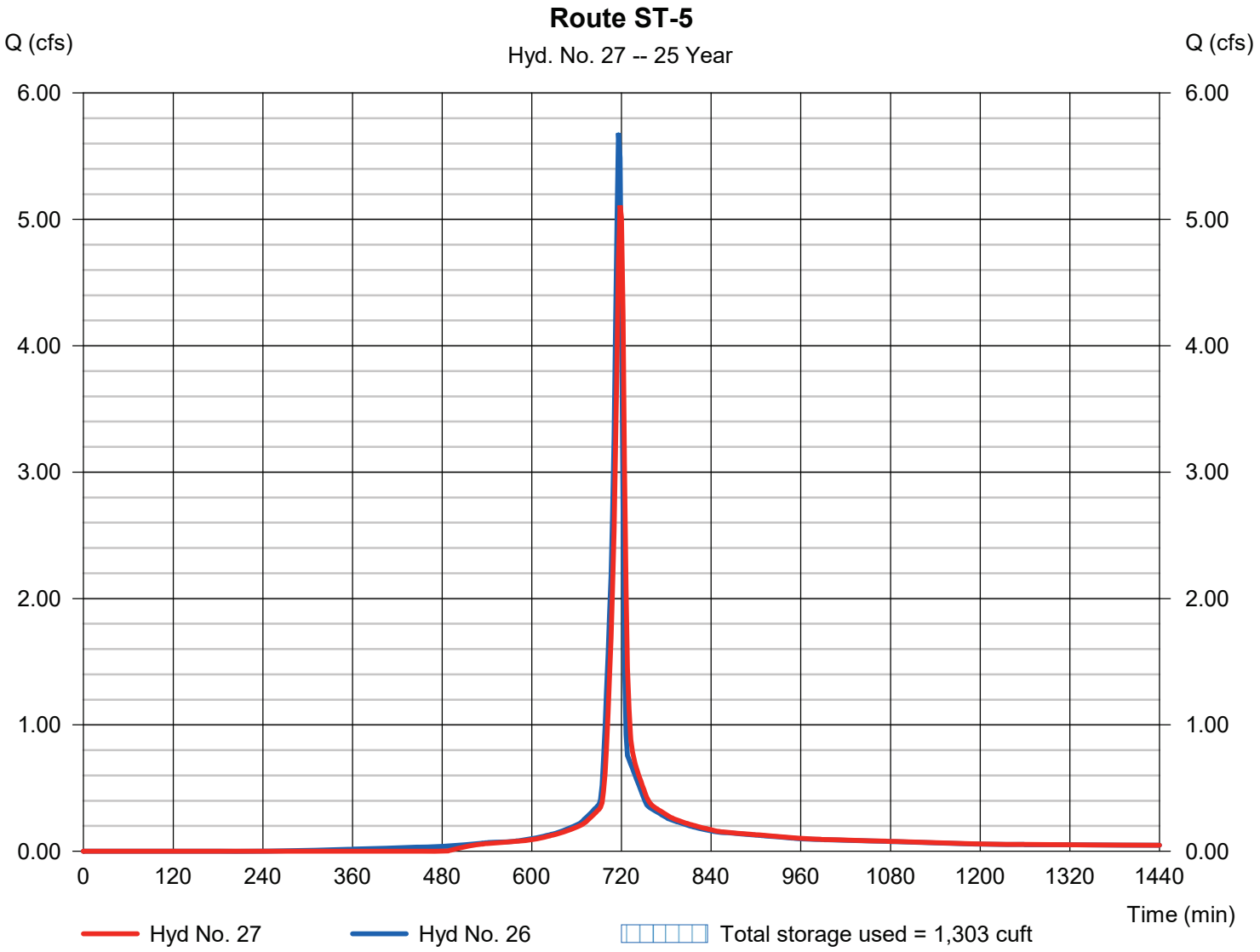
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## Hyd. No. 27

Route ST-5

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | Reservoir | Peak discharge | = | 5.111 cfs |
| Storm frequency | = | 25 yrs | Time to peak | = | 718 min |
| Time interval | = | 2 min | Hyd. volume | = | 11,848 cuft |
| Inflow hyd. No. | = | 26 - Stormwater Trench 5 - DP-001 | Max. Elevation | = | 16.95 ft |
| Reservoir name | = | Stormwater Trench ST-5 | Max. Storage | = | 1,303 cuft |

Storage Indication method used.



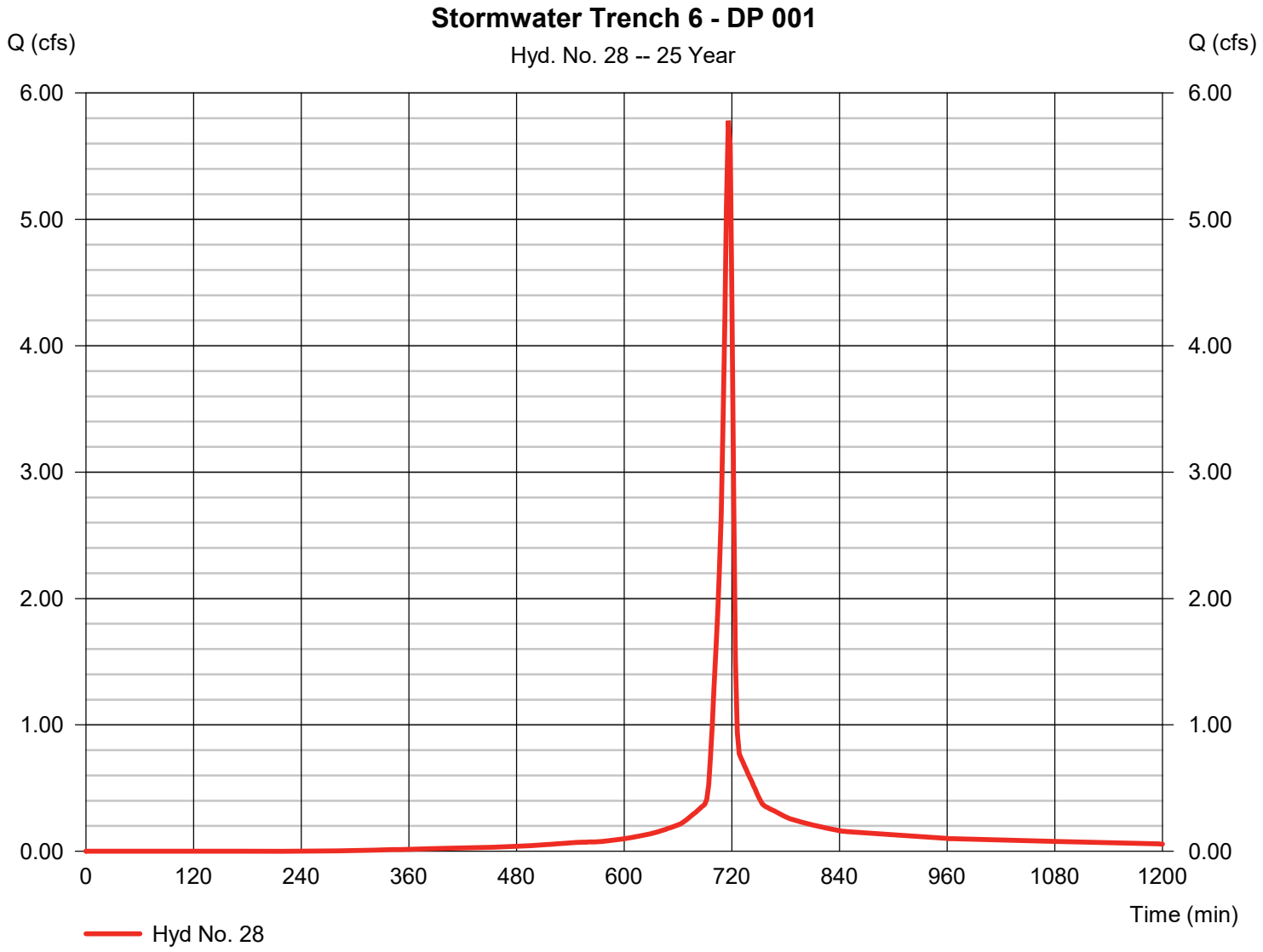
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 28

Stormwater Trench 6 - DP 001

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | SCS Runoff | Peak discharge | = | 5.782 cfs |
| Storm frequency | = | 25 yrs | Time to peak | = | 716 min |
| Time interval | = | 2 min | Hyd. volume | = | 12,280 cuft |
| Drainage area | = | 0.830 ac | Curve number | = | 87.2 |
| Basin Slope | = | 0.0 % | Hydraulic length | = | 0 ft |
| Tc method | = | User | Time of conc. (Tc) | = | 5.00 min |
| Total precip. | = | 5.80 in | Distribution | = | Type II |
| Storm duration | = | 24 hrs | Shape factor | = | 484 |



# Hydrograph Report

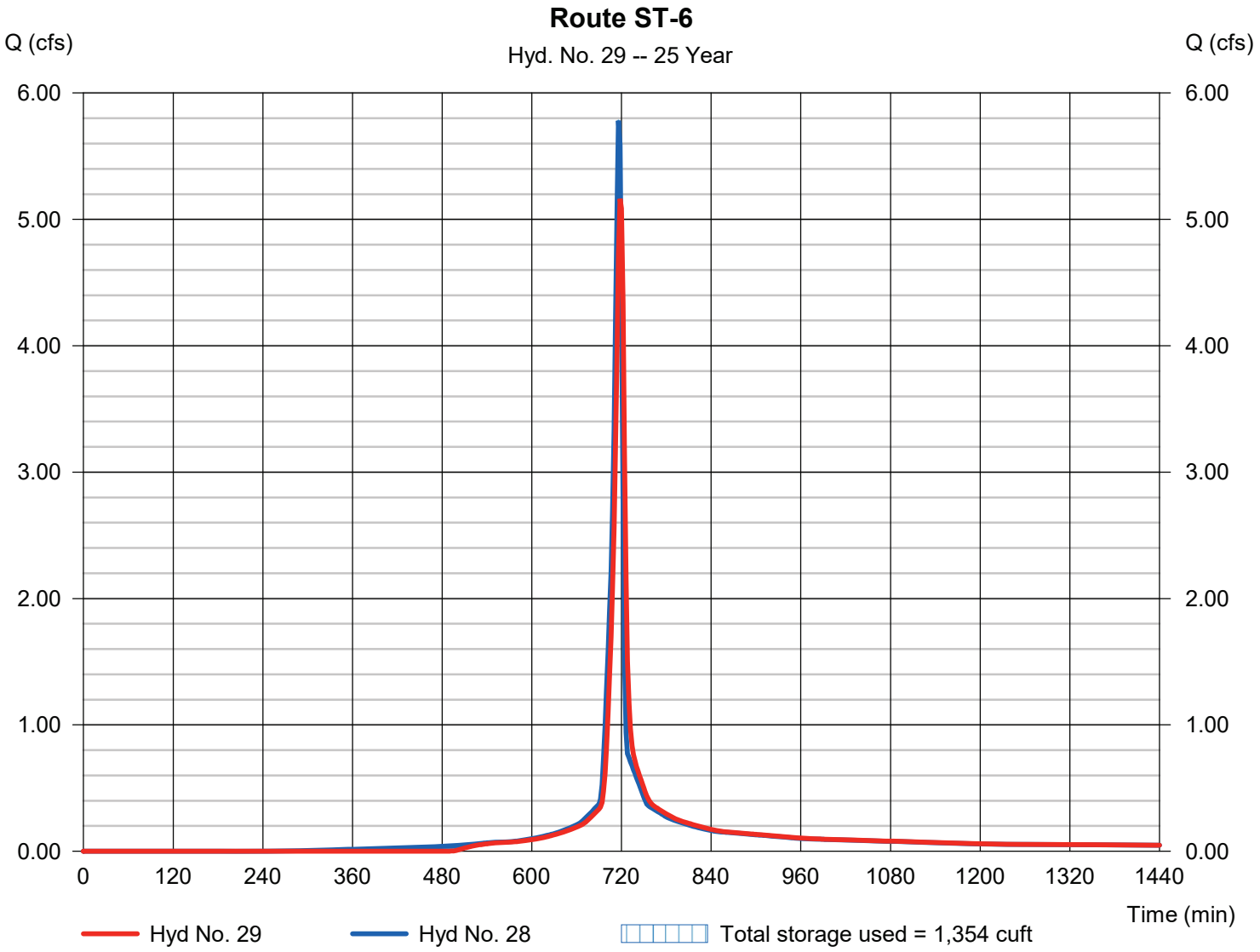
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 29

Route ST-6

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | Reservoir | Peak discharge | = | 5.162 cfs |
| Storm frequency | = | 25 yrs | Time to peak | = | 718 min |
| Time interval | = | 2 min | Hyd. volume | = | 12,018 cuft |
| Inflow hyd. No. | = | 28 - Stormwater Trench 6 - DP-001 | Max. Elevation | = | 16.96 ft |
| Reservoir name | = | Stormwater Trench ST-6 | Max. Storage | = | 1,354 cuft |

Storage Indication method used.



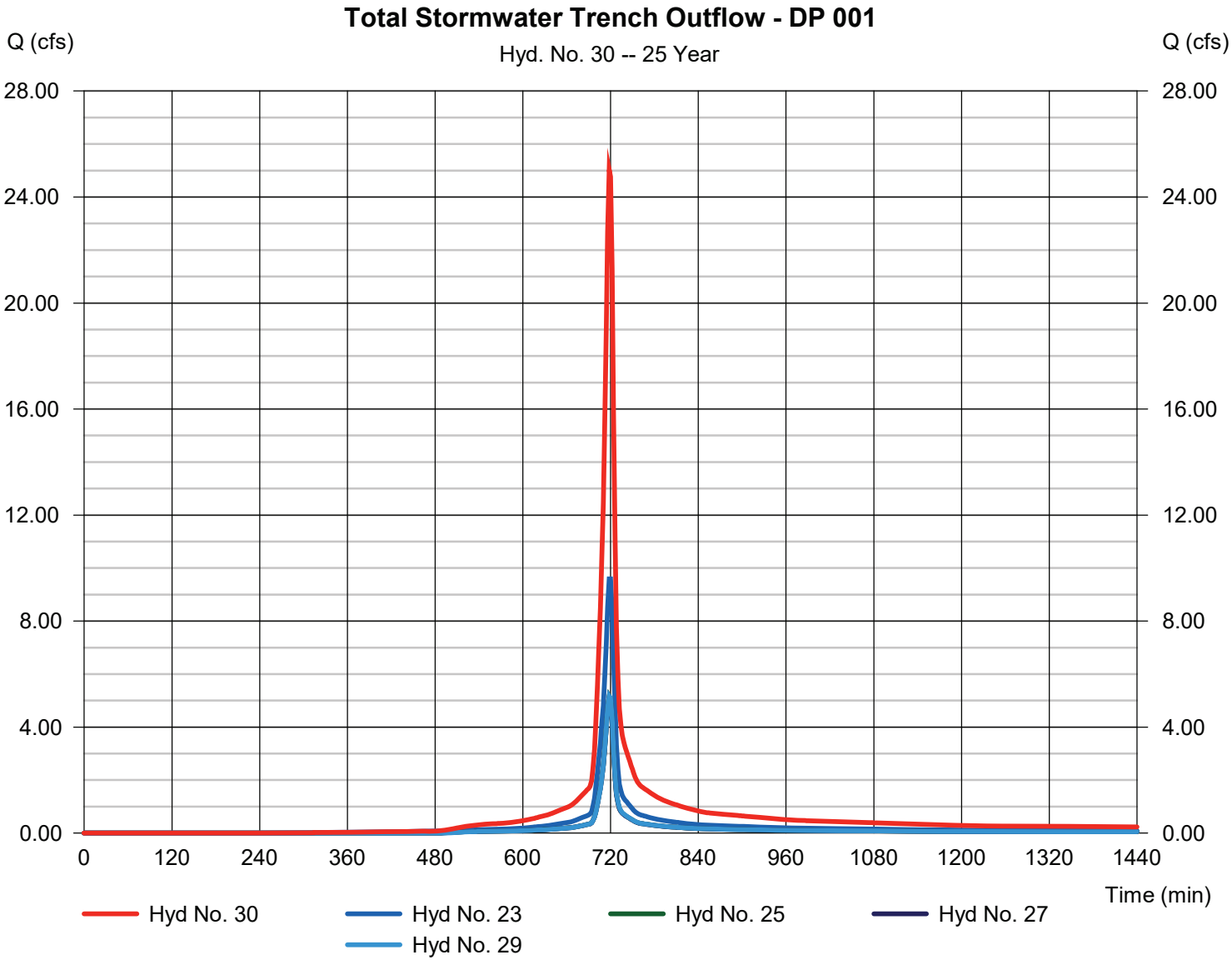
# Hydrograph Report



## Hyd. No. 30

Total Stormwater Trench Outflow - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 25.02 cfs |
| Storm frequency | = 25 yrs | Time to peak | = 718 min |
| Time interval | = 2 min | Hyd. volume | = 59,562 cuft |
| Inflow hyds. | = 23, 25, 27, 29 | Contrib. drain. area | = 0.000 ac |



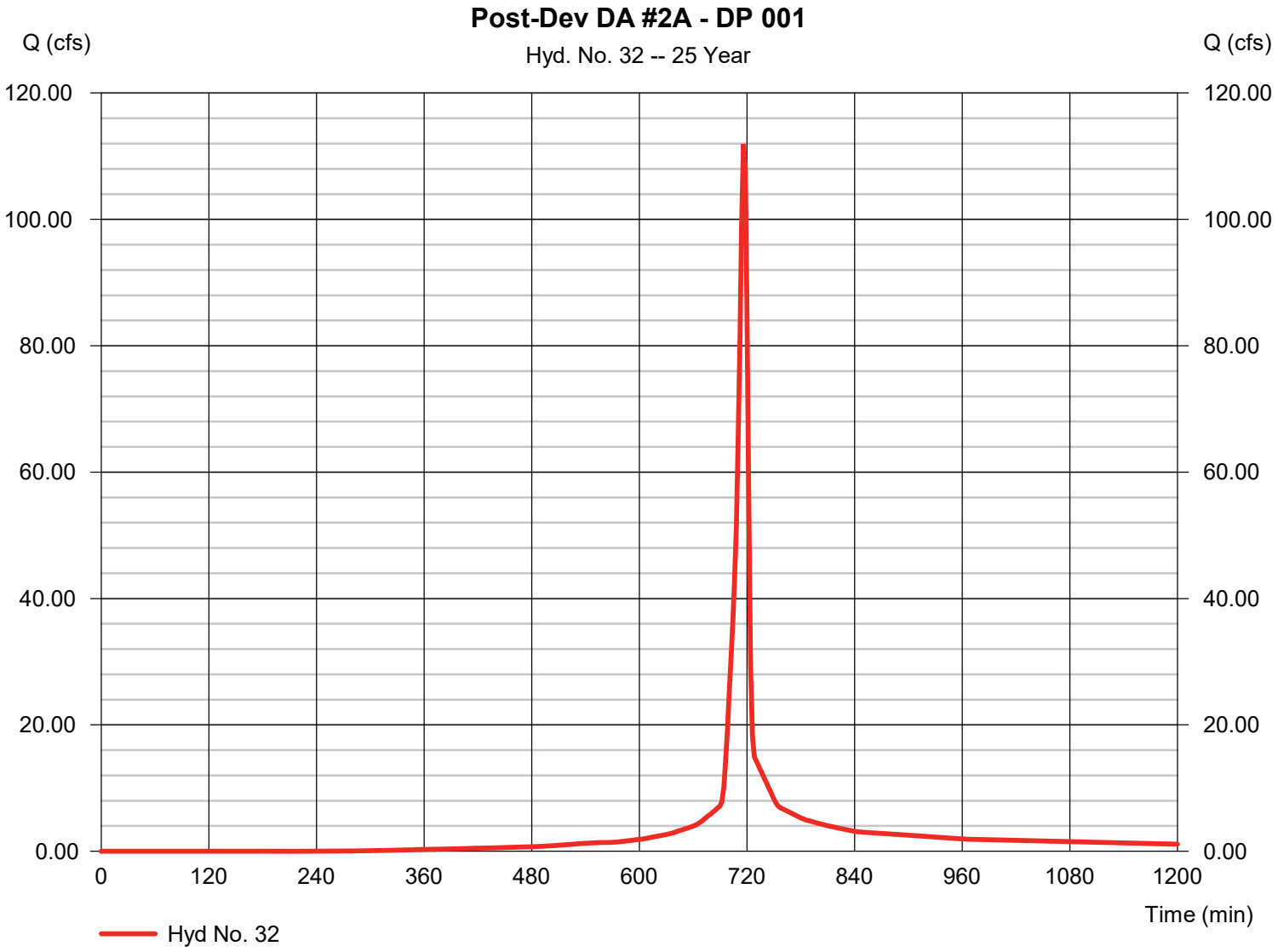
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 32

Post-Dev DA #2A - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 111.97 cfs |
| Storm frequency | = 25 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 237,175 cuft |
| Drainage area | = 16.190 ac | Curve number | = 86.8 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 5.80 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



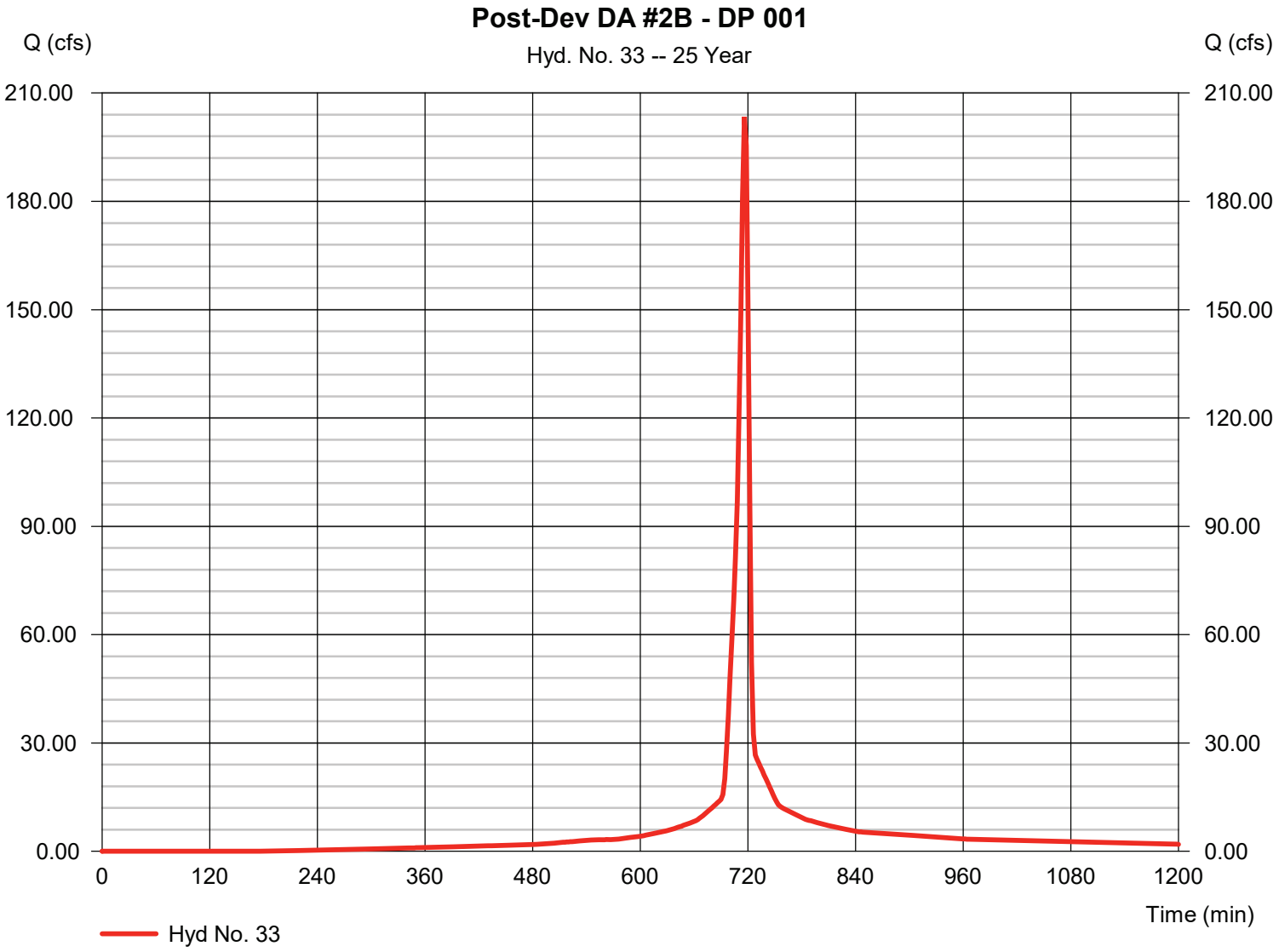
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 33

Post-Dev DA #2B - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 203.40 cfs |
| Storm frequency | = 25 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 446,392 cuft |
| Drainage area | = 27.420 ac | Curve number | = 91.2 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 5.80 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



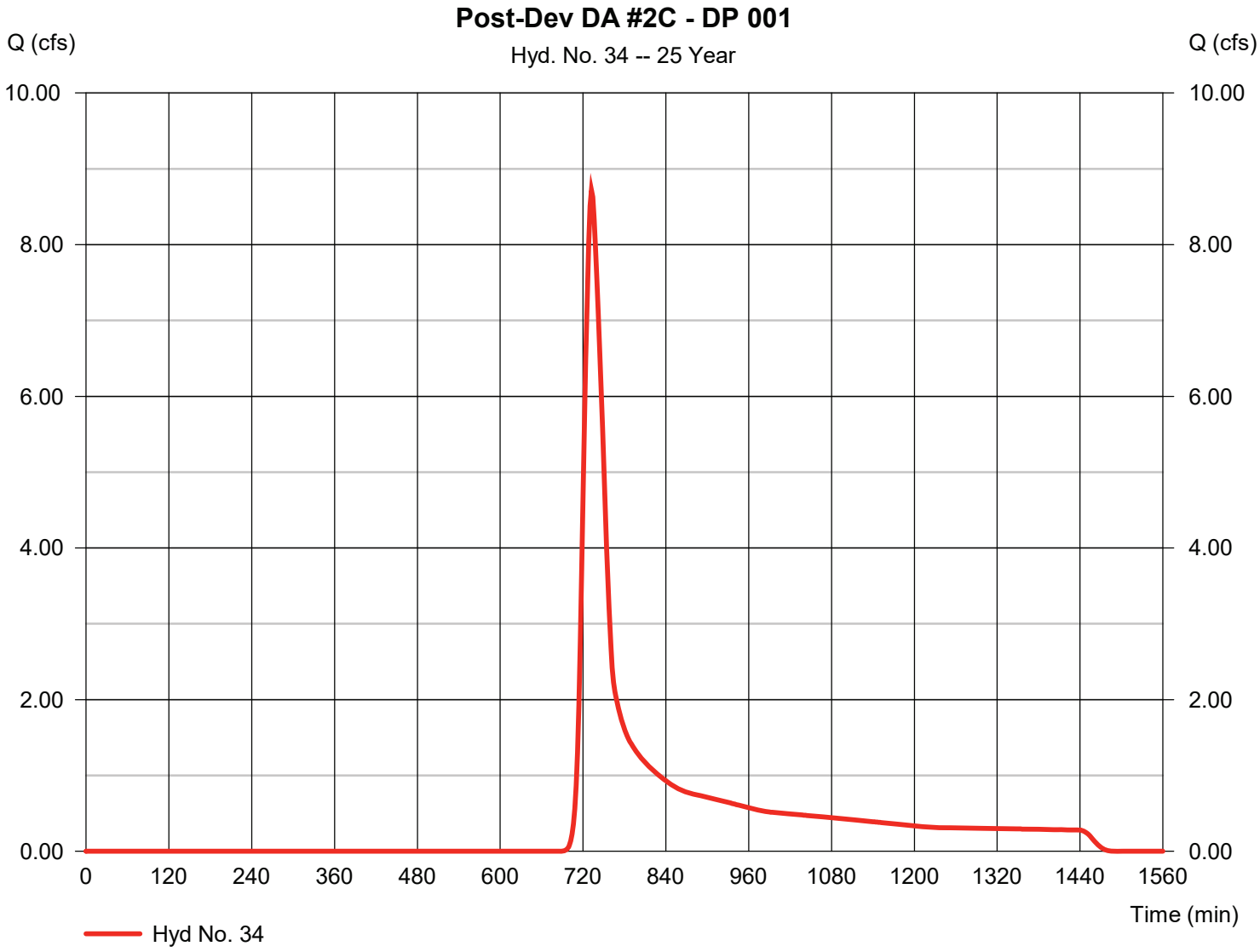
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 34

Post-Dev DA #2C - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 8.717 cfs |
| Storm frequency | = 25 yrs | Time to peak | = 732 min |
| Time interval | = 2 min | Hyd. volume | = 39,850 cuft |
| Drainage area | = 7.420 ac | Curve number | = 56 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = TR55 | Time of conc. (Tc) | = 28.30 min |
| Total precip. | = 5.80 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



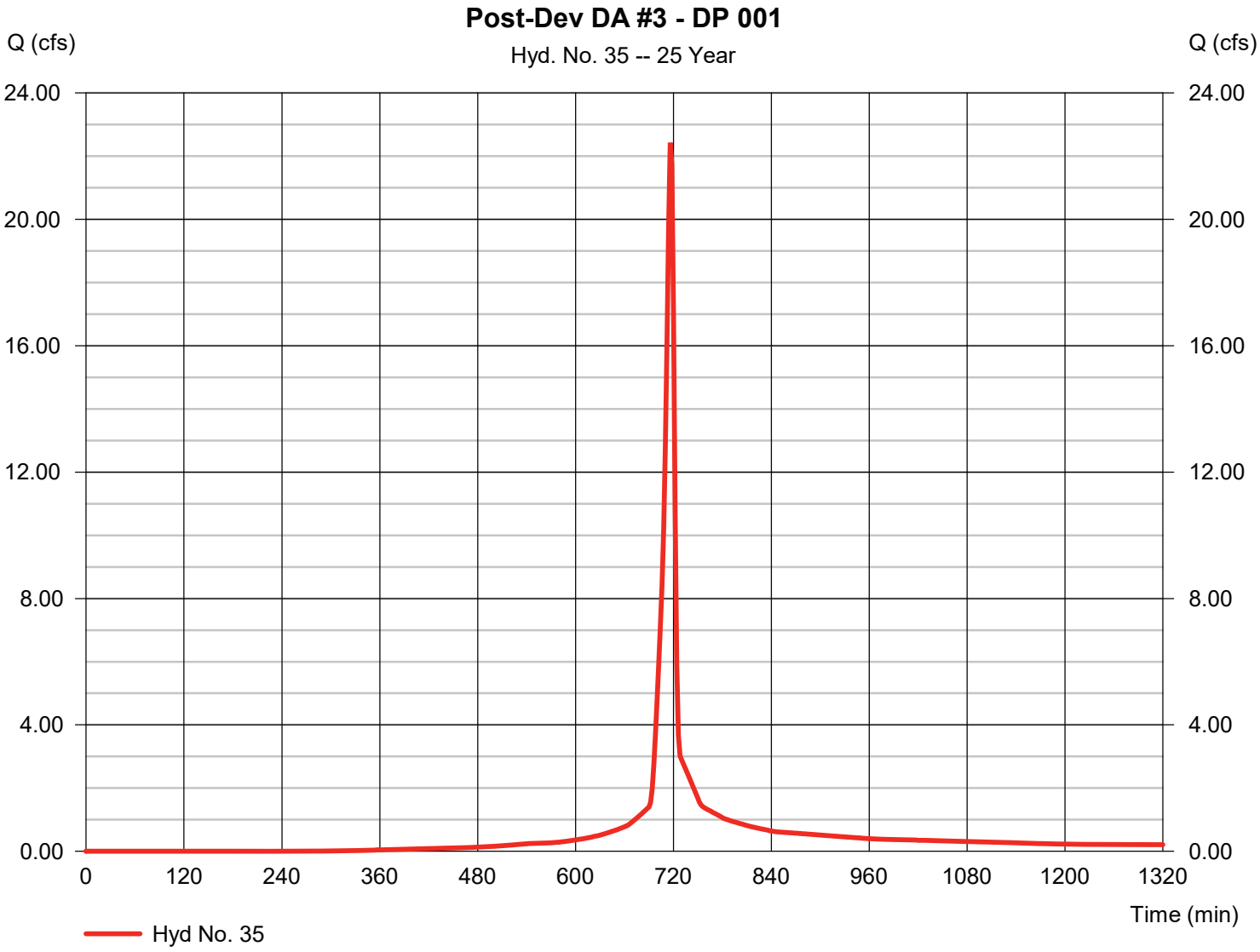
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 35

Post-Dev DA #3 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 22.43 cfs |
| Storm frequency | = 25 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 47,174 cuft |
| Drainage area | = 3.310 ac | Curve number | = 85.7 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 5.80 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



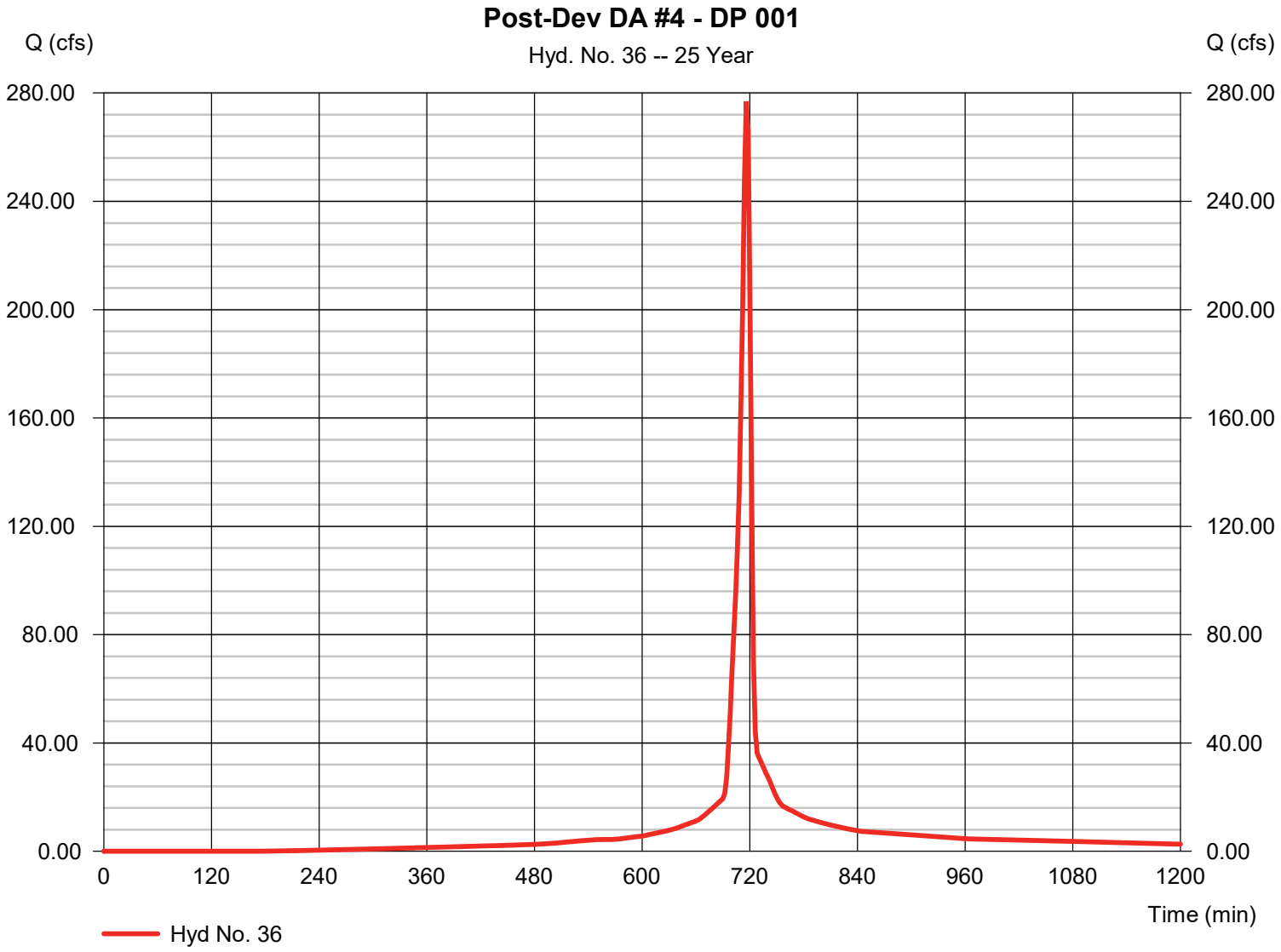
# Hydrograph Report



## Hyd. No. 36

Post-Dev DA #4 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 276.90 cfs |
| Storm frequency | = 25 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 607,127 cuft |
| Drainage area | = 37.380 ac | Curve number | = 91.1 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 5.80 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



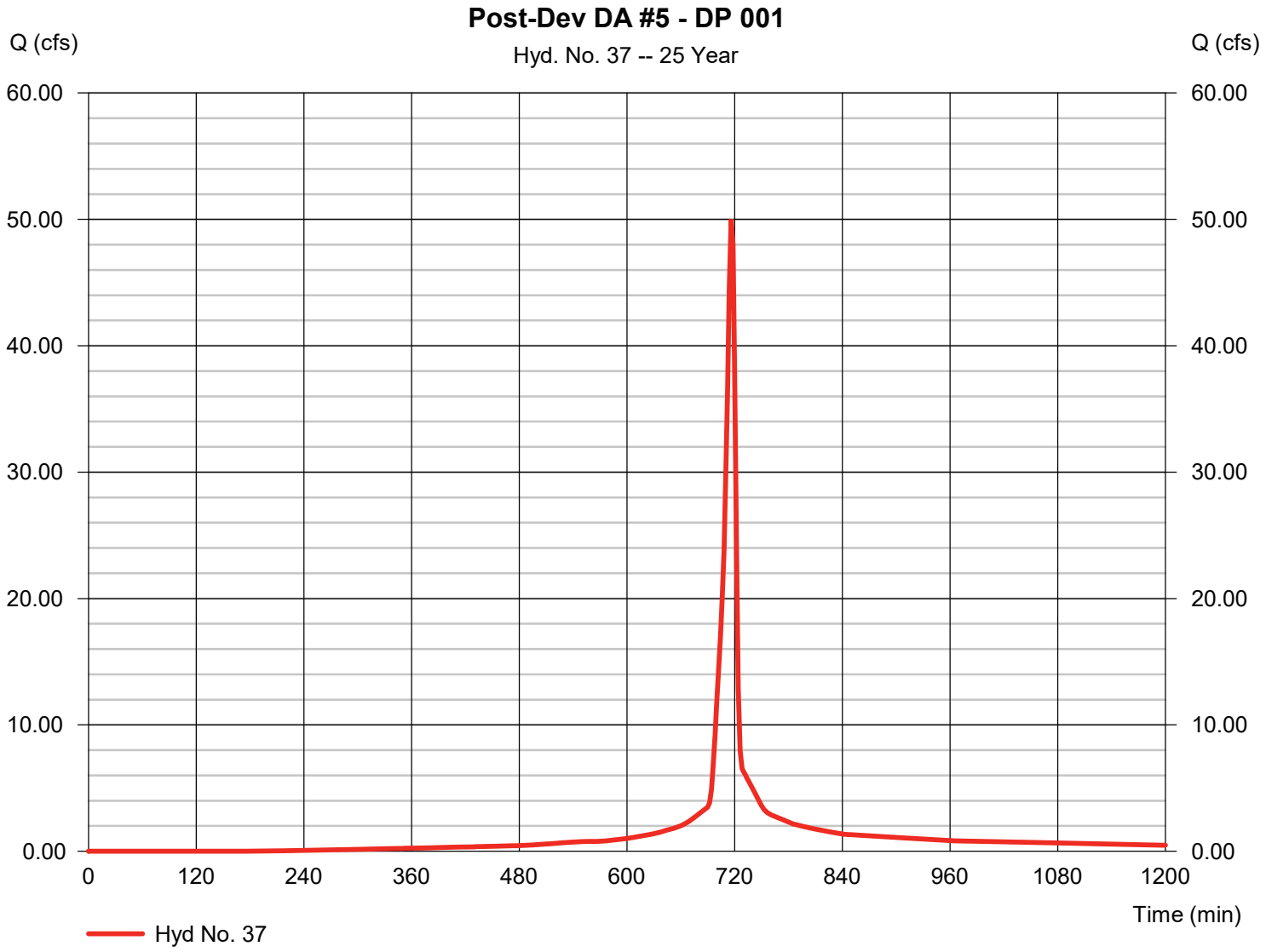
# Hydrograph Report



## Hyd. No. 37

Post-Dev DA #5 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 50.01 cfs |
| Storm frequency | = 25 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 109,448 cuft |
| Drainage area | = 6.770 ac | Curve number | = 90.9 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 5.80 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



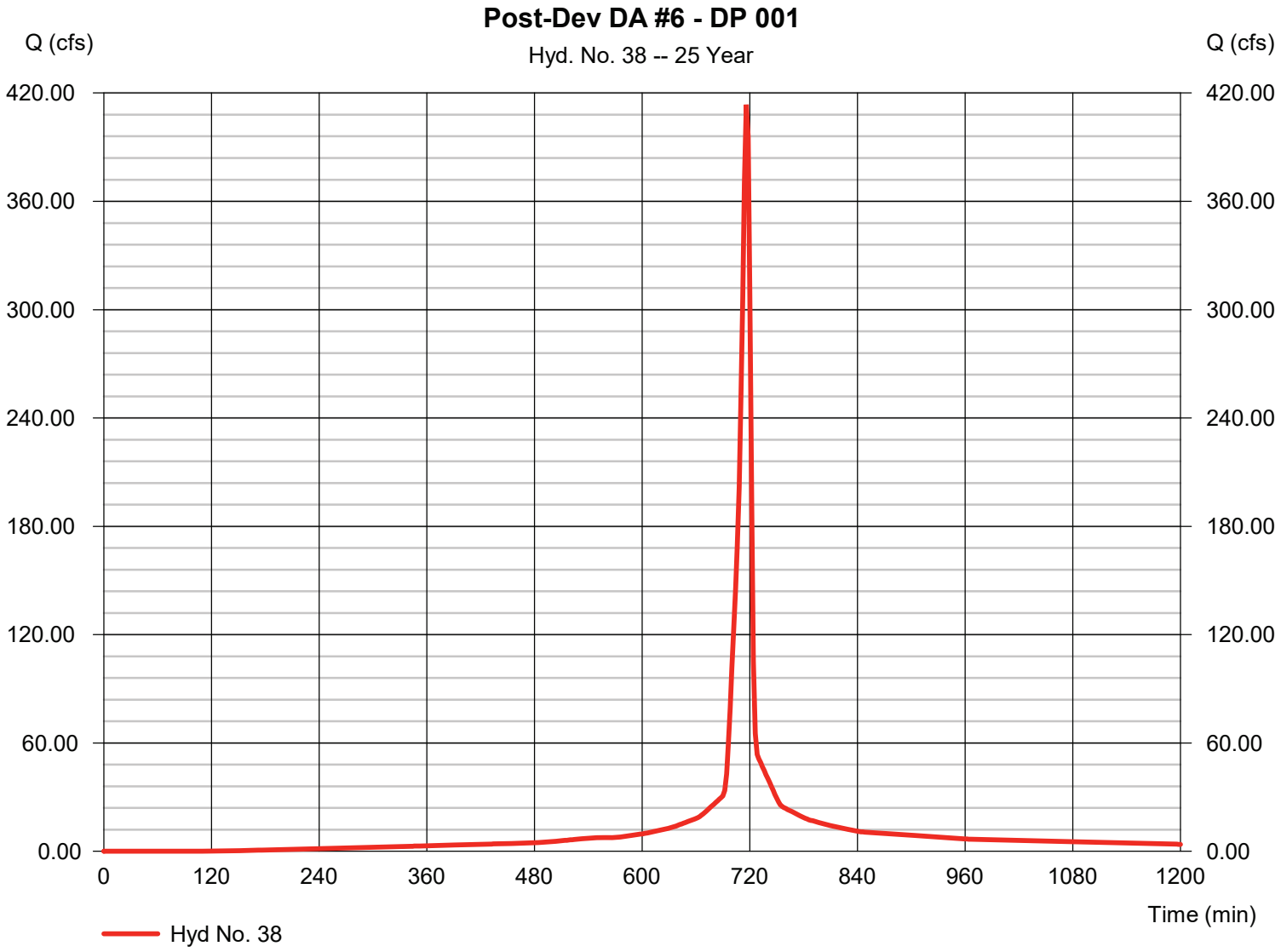
# Hydrograph Report



## Hyd. No. 38

Post-Dev DA #6 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 413.62 cfs |
| Storm frequency | = 25 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 936,970 cuft |
| Drainage area | = 53.880 ac | Curve number | = 94.1 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 5.80 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



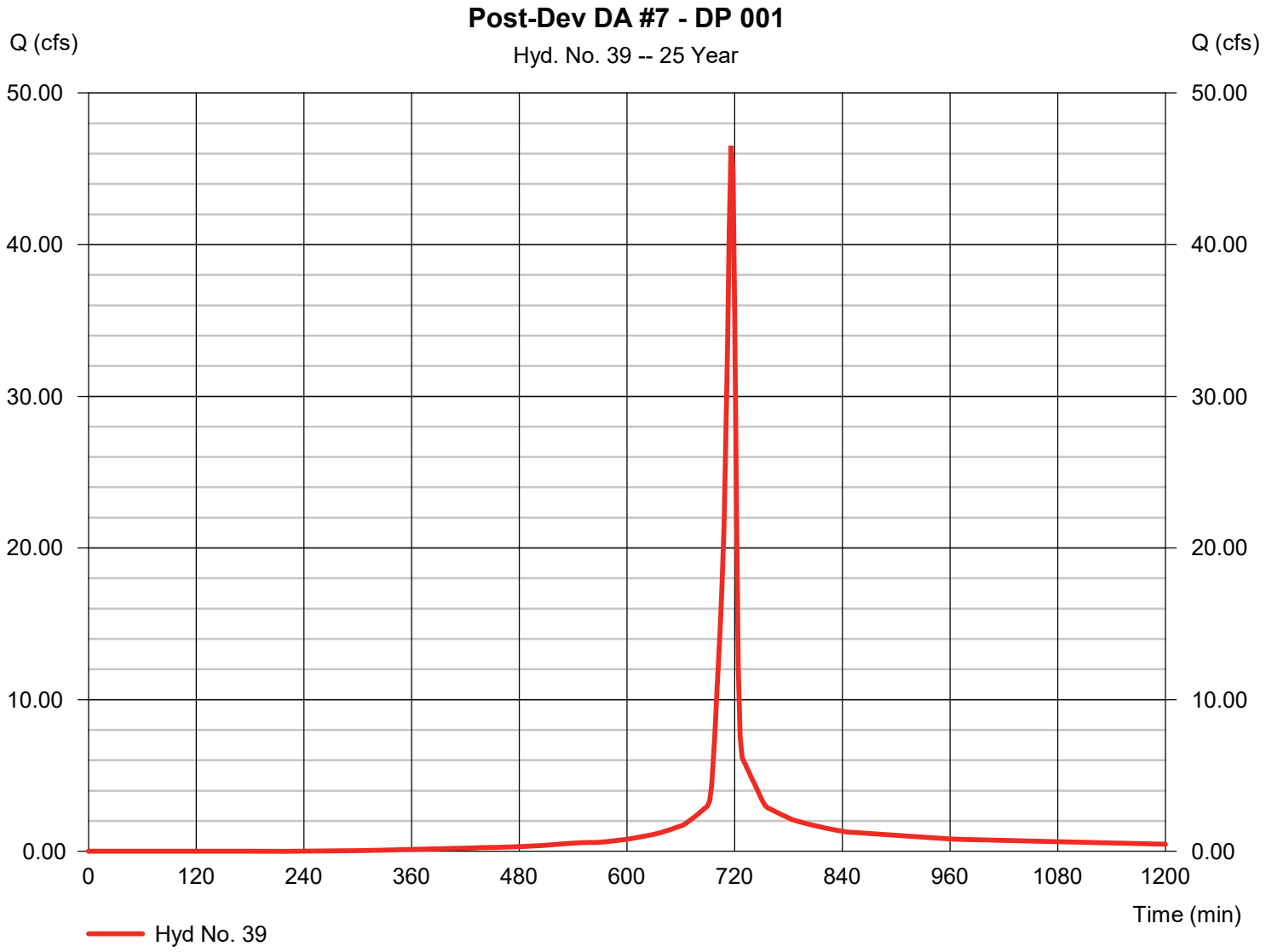
# Hydrograph Report



## Hyd. No. 39

Post-Dev DA #7 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 46.52 cfs |
| Storm frequency | = 25 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 98,735 cuft |
| Drainage area | = 6.690 ac | Curve number | = 87.1 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 5.80 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



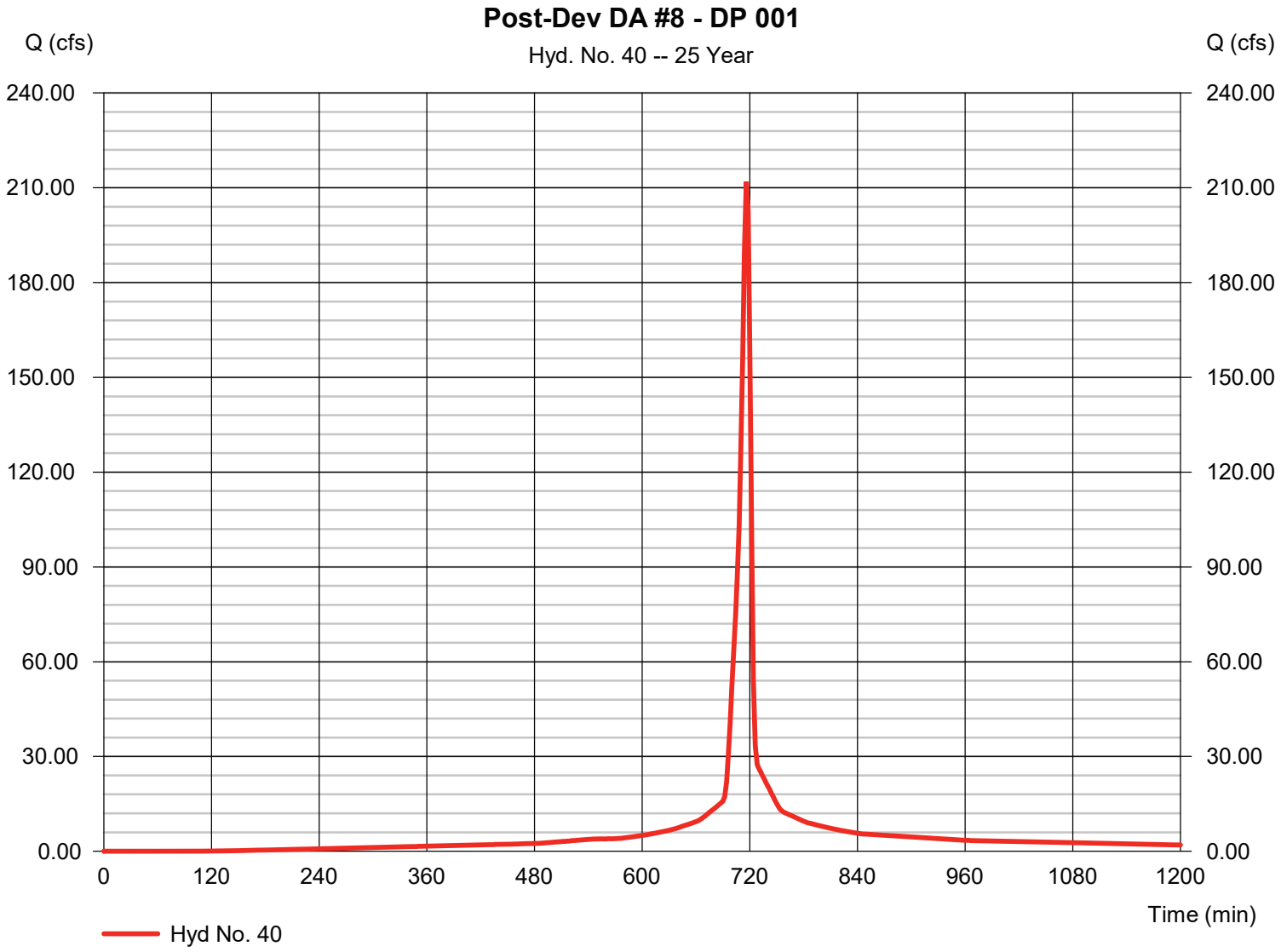
# Hydrograph Report



## Hyd. No. 40

Post-Dev DA #8 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 211.96 cfs |
| Storm frequency | = 25 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 481,952 cuft |
| Drainage area | = 27.530 ac | Curve number | = 94.4 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 5.80 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



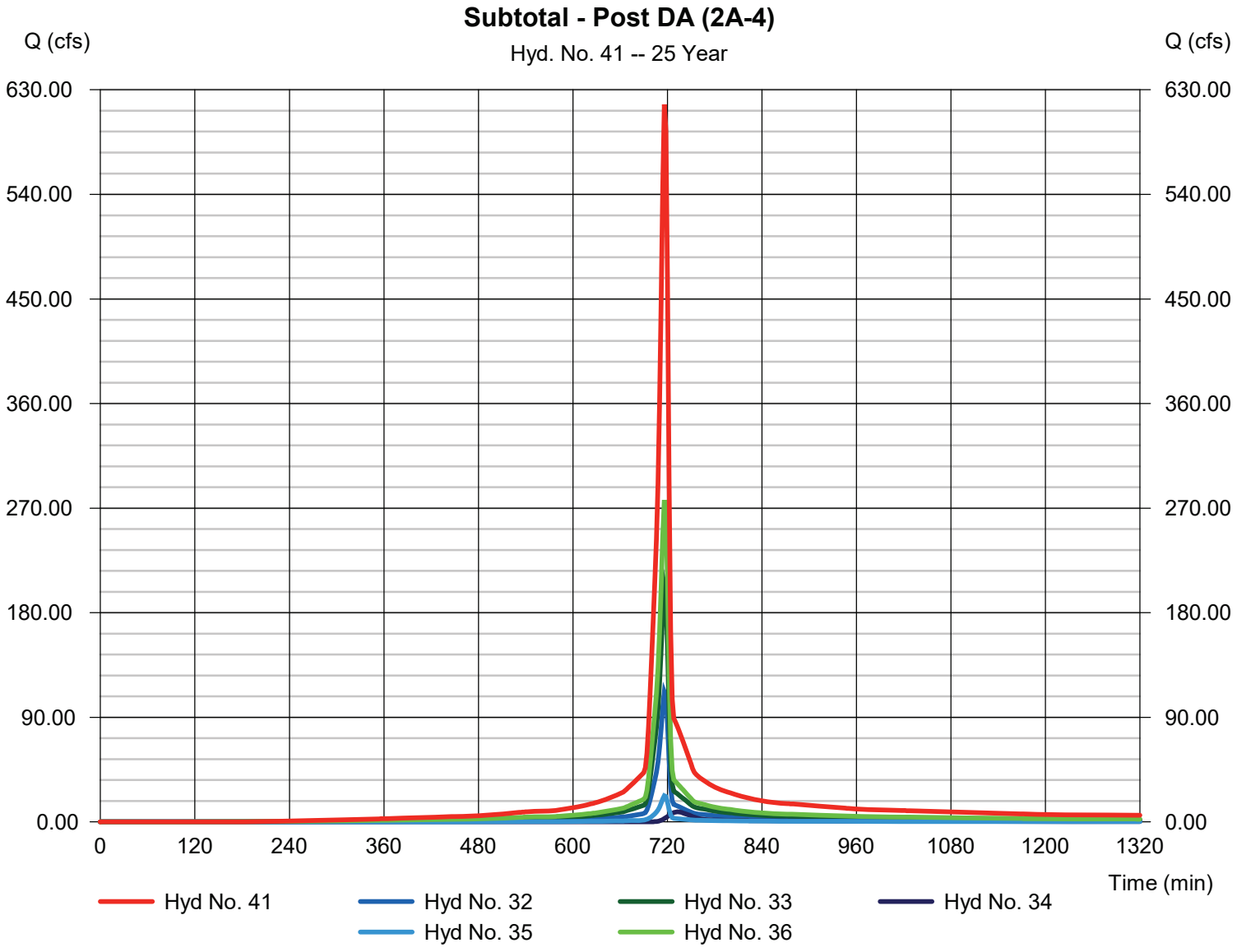
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 41

Subtotal - Post DA (2A-4)

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 617.44 cfs |
| Storm frequency | = 25 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 1,377,716 cuft |
| Inflow hyds. | = 32, 33, 34, 35, 36 | Contrib. drain. area | = 91.720 ac |



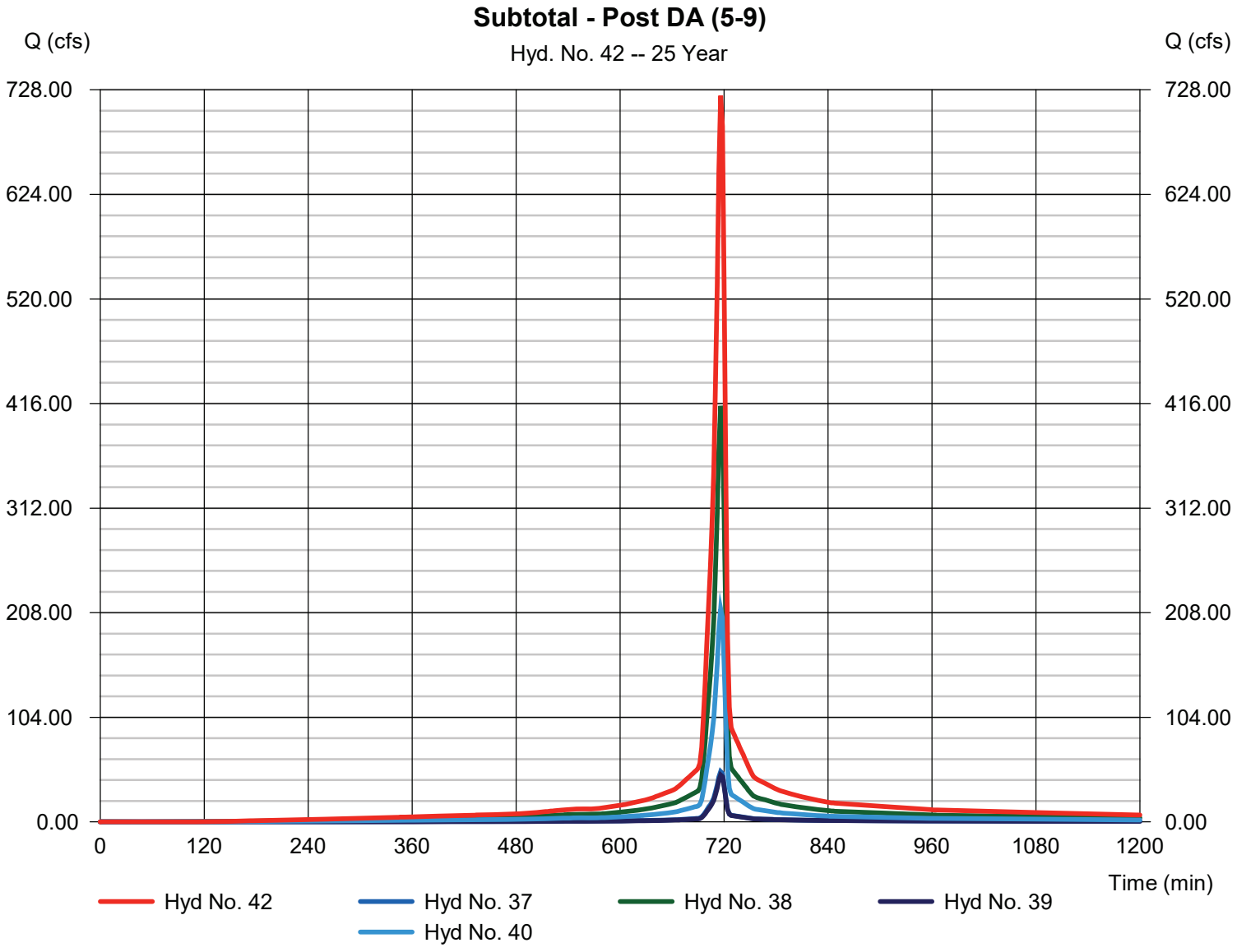
# Hydrograph Report



## Hyd. No. 42

Subtotal - Post DA (5-9)

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 722.12 cfs |
| Storm frequency | = 25 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 1,627,104 cuft |
| Inflow hyds. | = 37, 38, 39, 40 | Contrib. drain. area | = 94.870 ac |



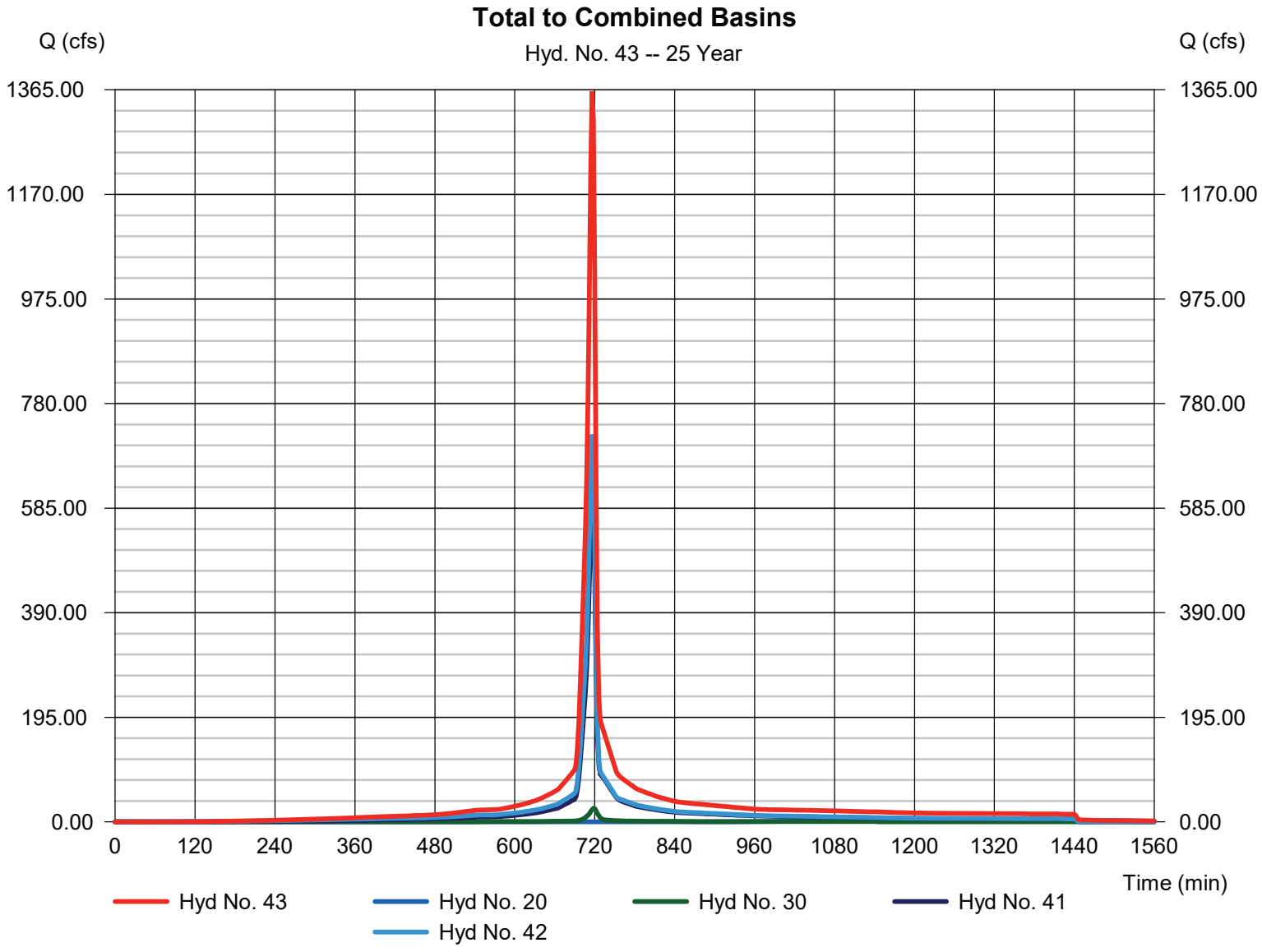
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 43

Total to Combined Basins

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 1362.22 cfs |
| Storm frequency | = 25 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 3,195,373 cuft |
| Inflow hyds. | = 20, 30, 41, 42 | Contrib. drain. area | = 0.000 ac |



# Hydrograph Report

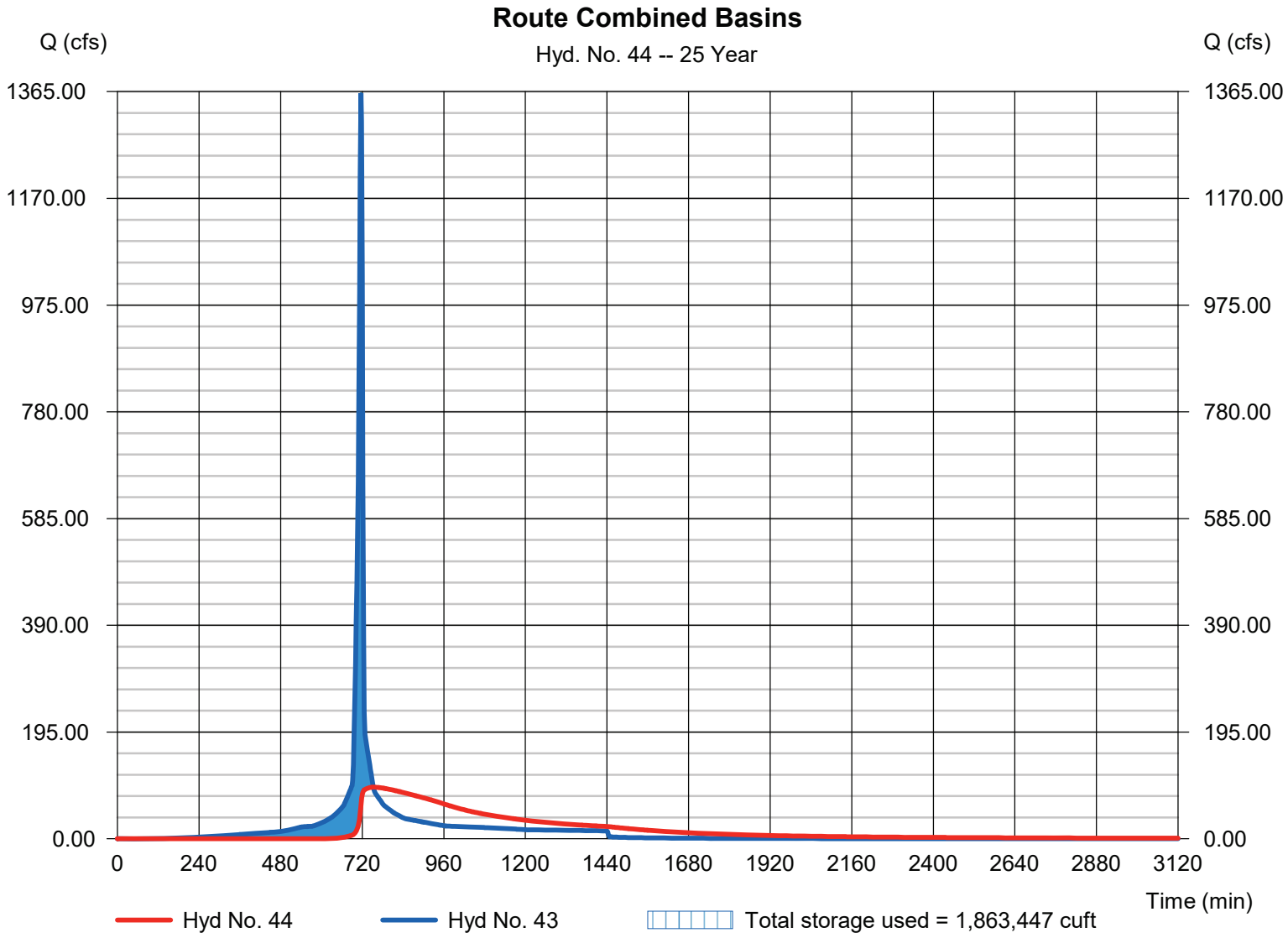
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 44

Route Combined Basins

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | Reservoir | Peak discharge | = | 94.25 cfs |
| Storm frequency | = | 25 yrs | Time to peak | = | 752 min |
| Time interval | = | 2 min | Hyd. volume | = | 2,889,178 cuft |
| Inflow hyd. No. | = | 43 - Total to Combined Basins | Max. Elevation | = | 15.37 ft |
| Reservoir name | = | Combined Basins | Max. Storage | = | 1,863,447 cuft |

Storage Indication method used.



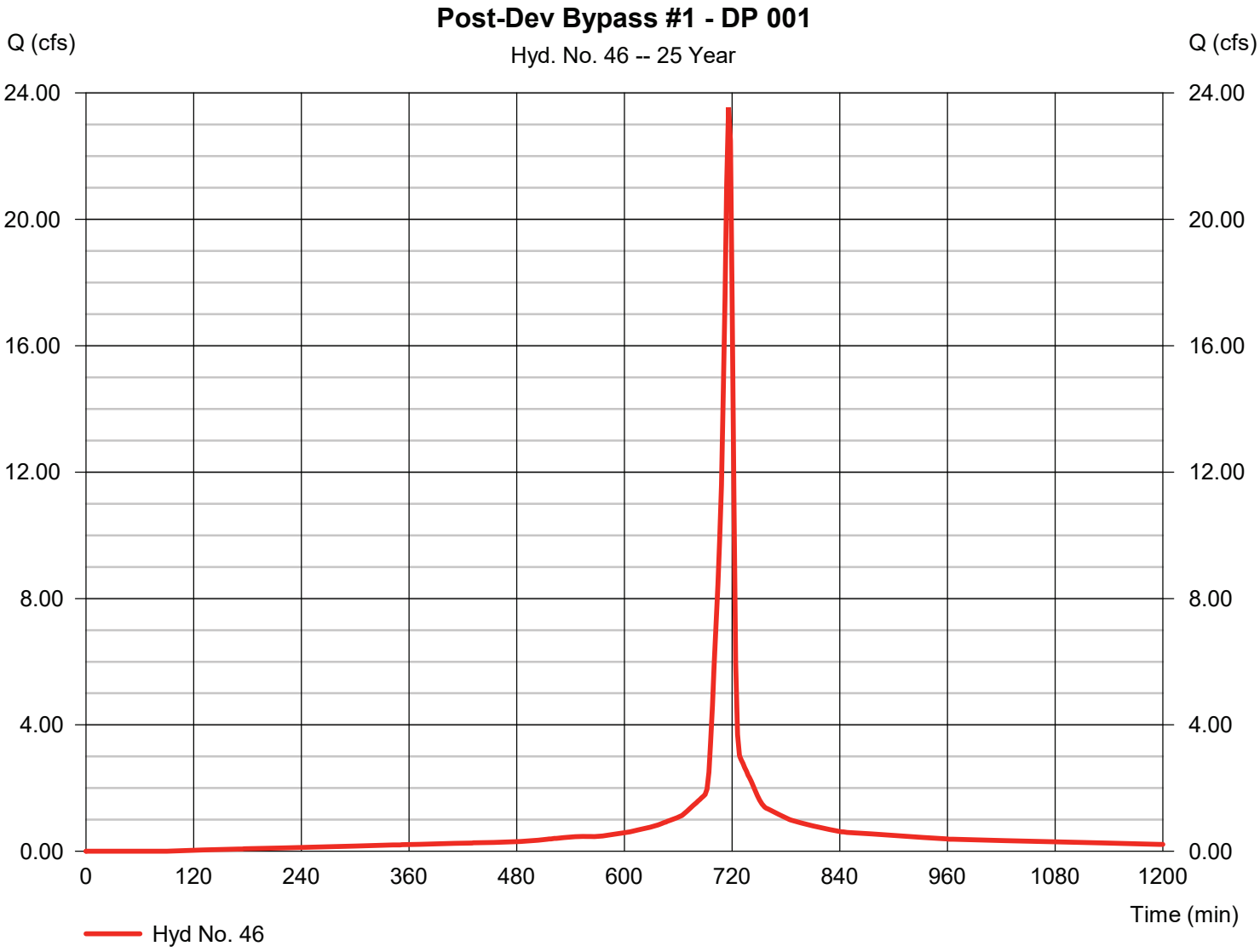
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 46

Post-Dev Bypass #1 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 23.55 cfs |
| Storm frequency | = 25 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 54,642 cuft |
| Drainage area | = 3.020 ac | Curve number | = 95.9 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 5.80 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



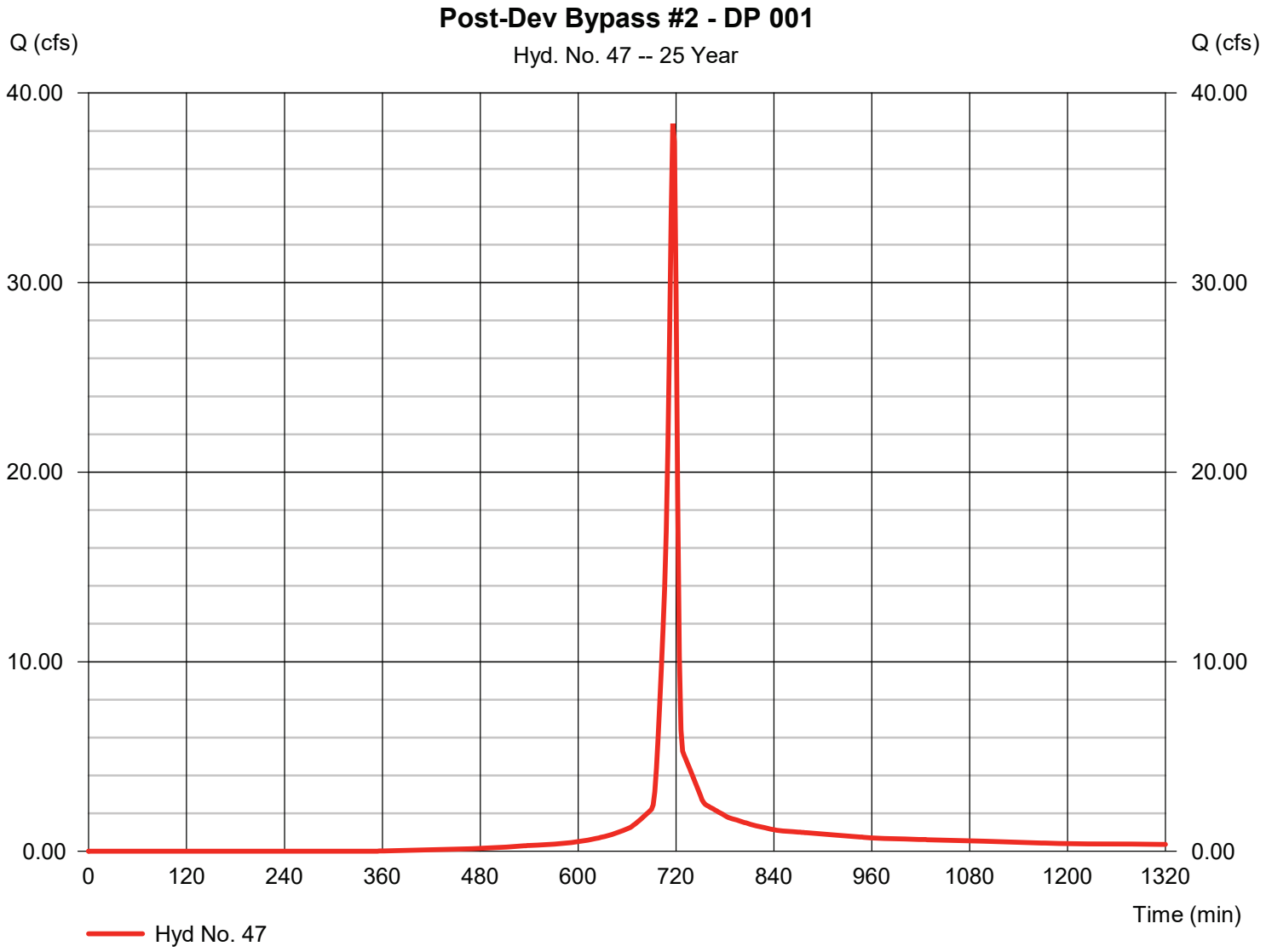
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 47

Post-Dev Bypass #2 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 38.38 cfs |
| Storm frequency | = 25 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 79,334 cuft |
| Drainage area | = 6.080 ac | Curve number | = 82.3 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 5.80 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



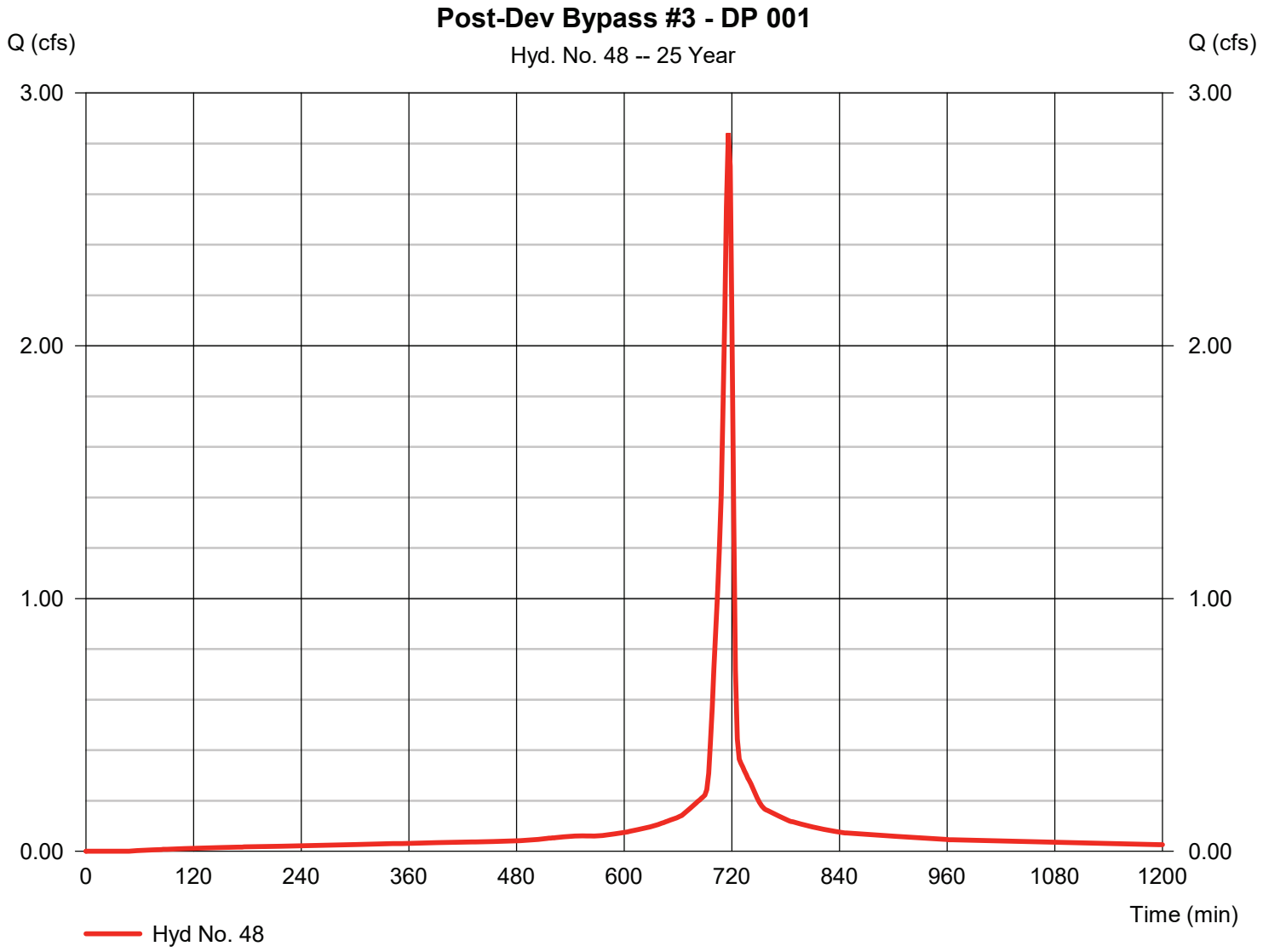
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 48

Post-Dev Bypass #3 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 2.841 cfs |
| Storm frequency | = 25 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 6,814 cuft |
| Drainage area | = 0.360 ac | Curve number | = 98 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 5.80 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



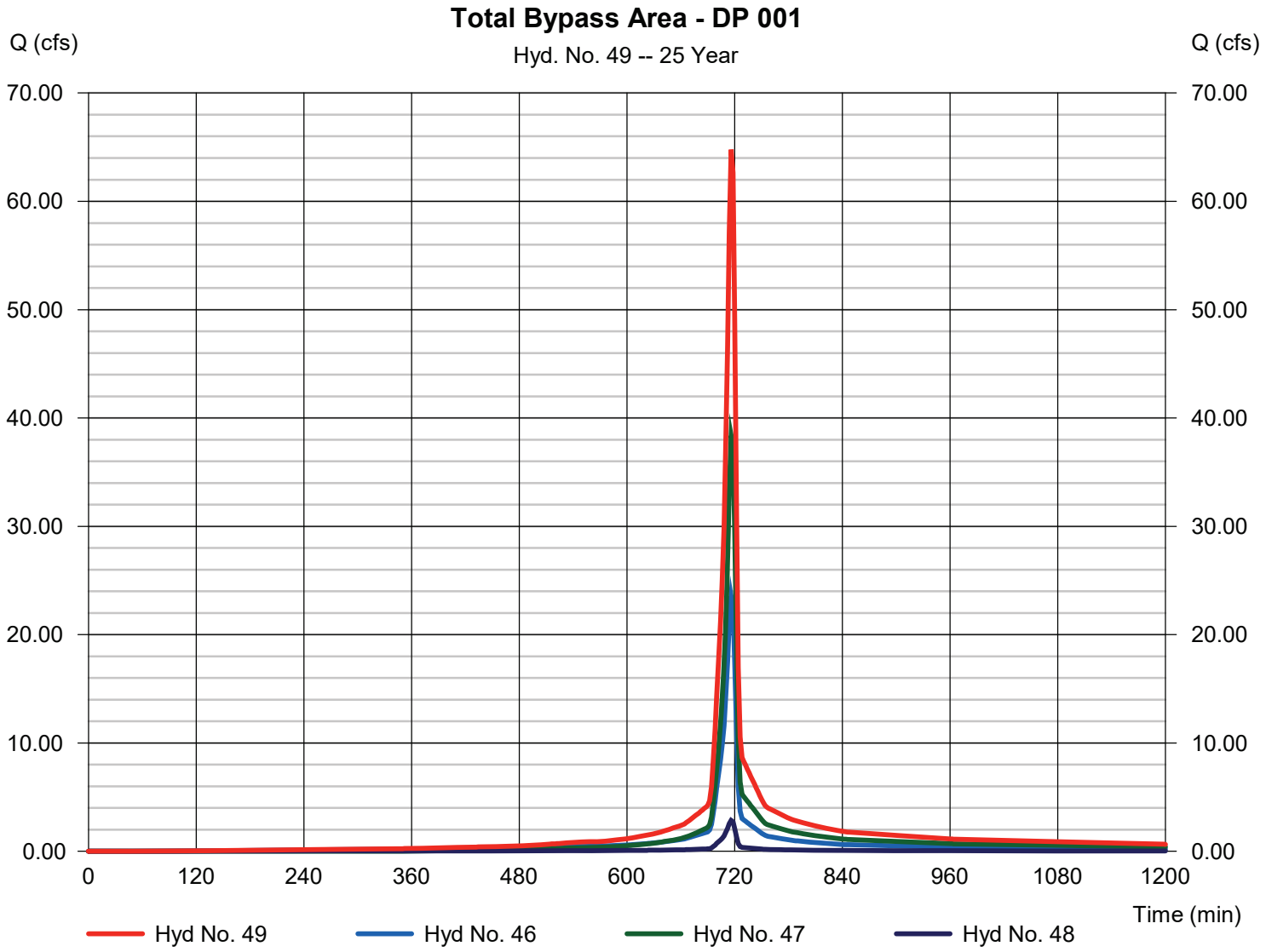
# Hydrograph Report



## Hyd. No. 49

Total Bypass Area - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 64.78 cfs |
| Storm frequency | = 25 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 140,791 cuft |
| Inflow hyds. | = 46, 47, 48 | Contrib. drain. area | = 9.460 ac |



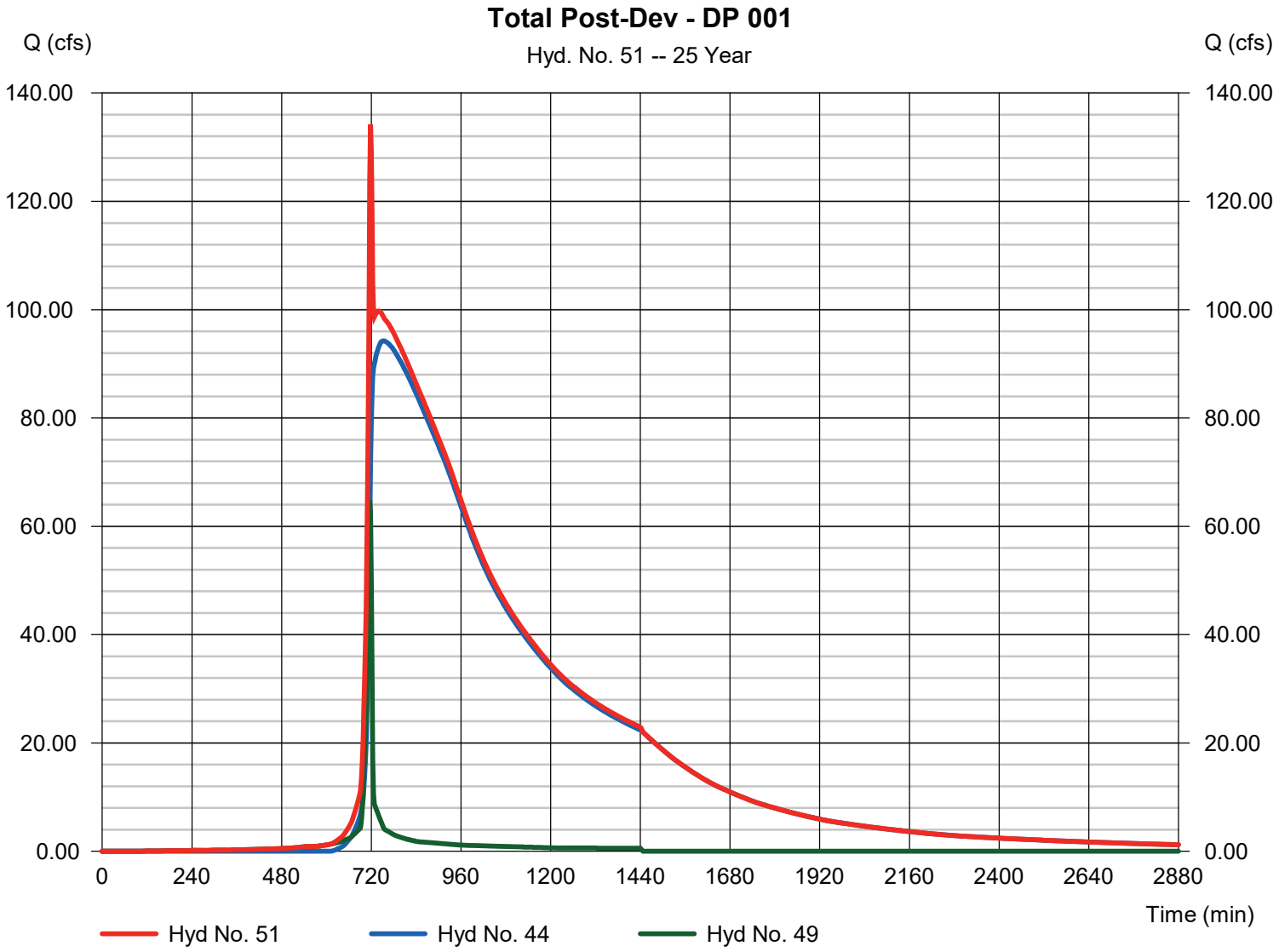
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 51

Total Post-Dev - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 134.18 cfs |
| Storm frequency | = 25 yrs | Time to peak | = 718 min |
| Time interval | = 2 min | Hyd. volume | = 3,029,969 cuft |
| Inflow hyds. | = 44, 49 | Contrib. drain. area | = 0.000 ac |



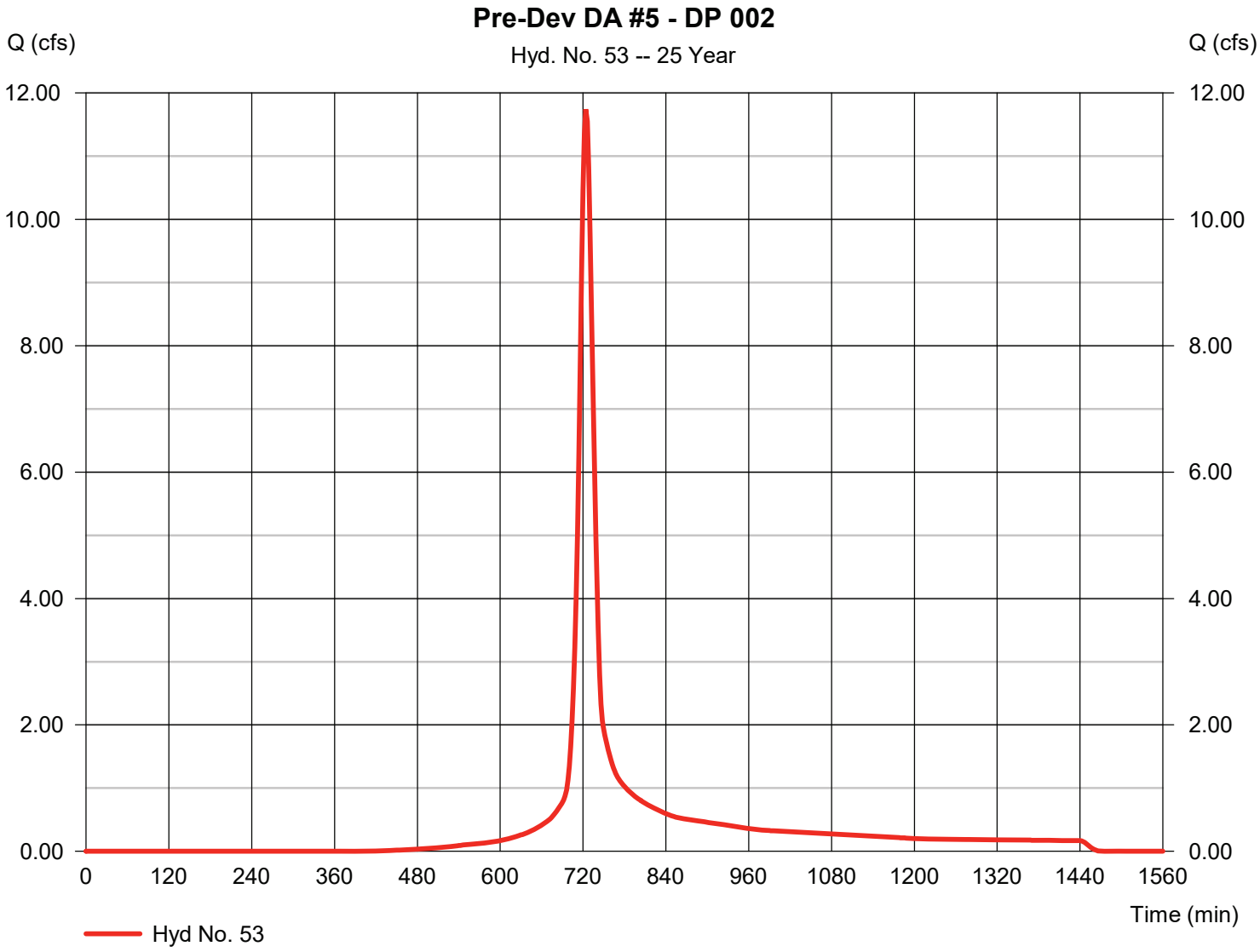
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 53

Pre-Dev DA #5 - DP 002

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | SCS Runoff | Peak discharge | = | 11.74 cfs |
| Storm frequency | = | 25 yrs | Time to peak | = | 724 min |
| Time interval | = | 2 min | Hyd. volume | = | 36,757 cuft |
| Drainage area | = | 2.900 ac | Curve number | = | 78.9 |
| Basin Slope | = | 0.0 % | Hydraulic length | = | 0 ft |
| Tc method | = | TR55 | Time of conc. (Tc) | = | 16.90 min |
| Total precip. | = | 5.80 in | Distribution | = | Type II |
| Storm duration | = | 24 hrs | Shape factor | = | 484 |



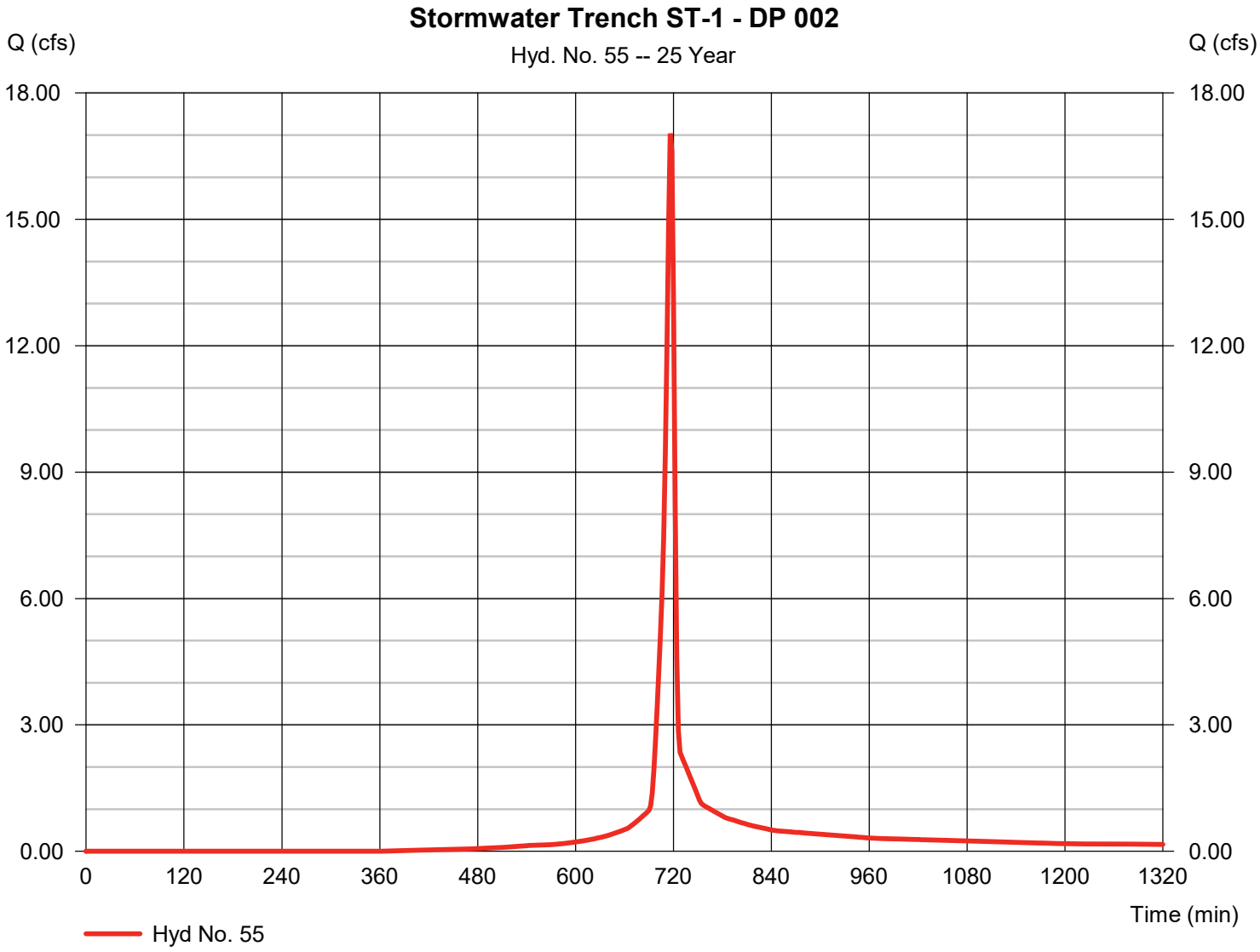
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 55

Stormwater Trench ST-1 - DP 002

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 17.04 cfs |
| Storm frequency | = 25 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 35,148 cuft |
| Drainage area | = 2.730 ac | Curve number | = 81.8 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 5.80 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



# Hydrograph Report

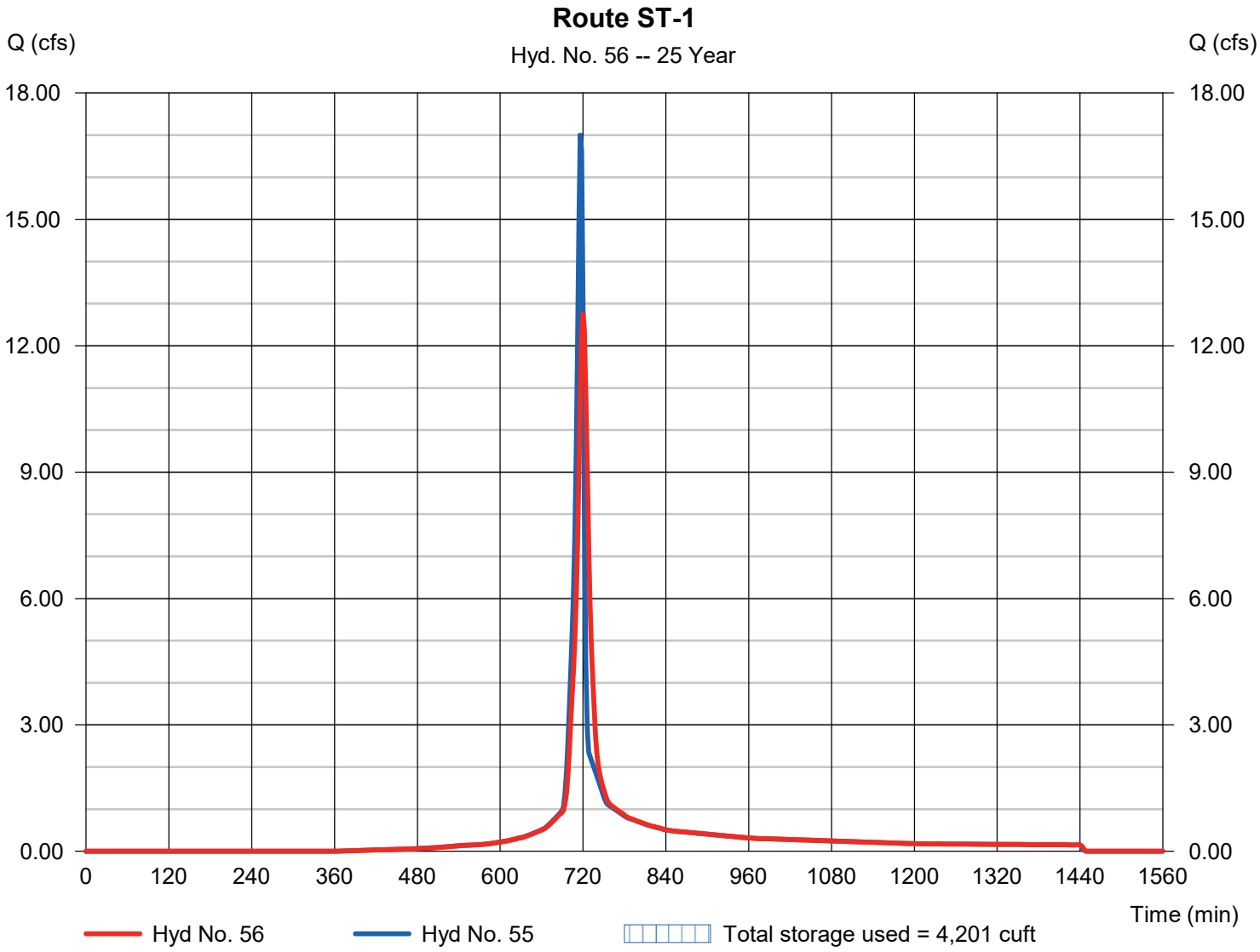
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 56

Route ST-1

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | Reservoir | Peak discharge | = | 12.80 cfs |
| Storm frequency | = | 25 yrs | Time to peak | = | 720 min |
| Time interval | = | 2 min | Hyd. volume | = | 35,147 cuft |
| Inflow hyd. No. | = | 55 - Stormwater Trench ST-1 - DP 02 | Max. Elevation | = | 16.10 ft |
| Reservoir name | = | Stormwater Trench ST-1 | Max. Storage | = | 4,201 cuft |

Storage Indication method used.



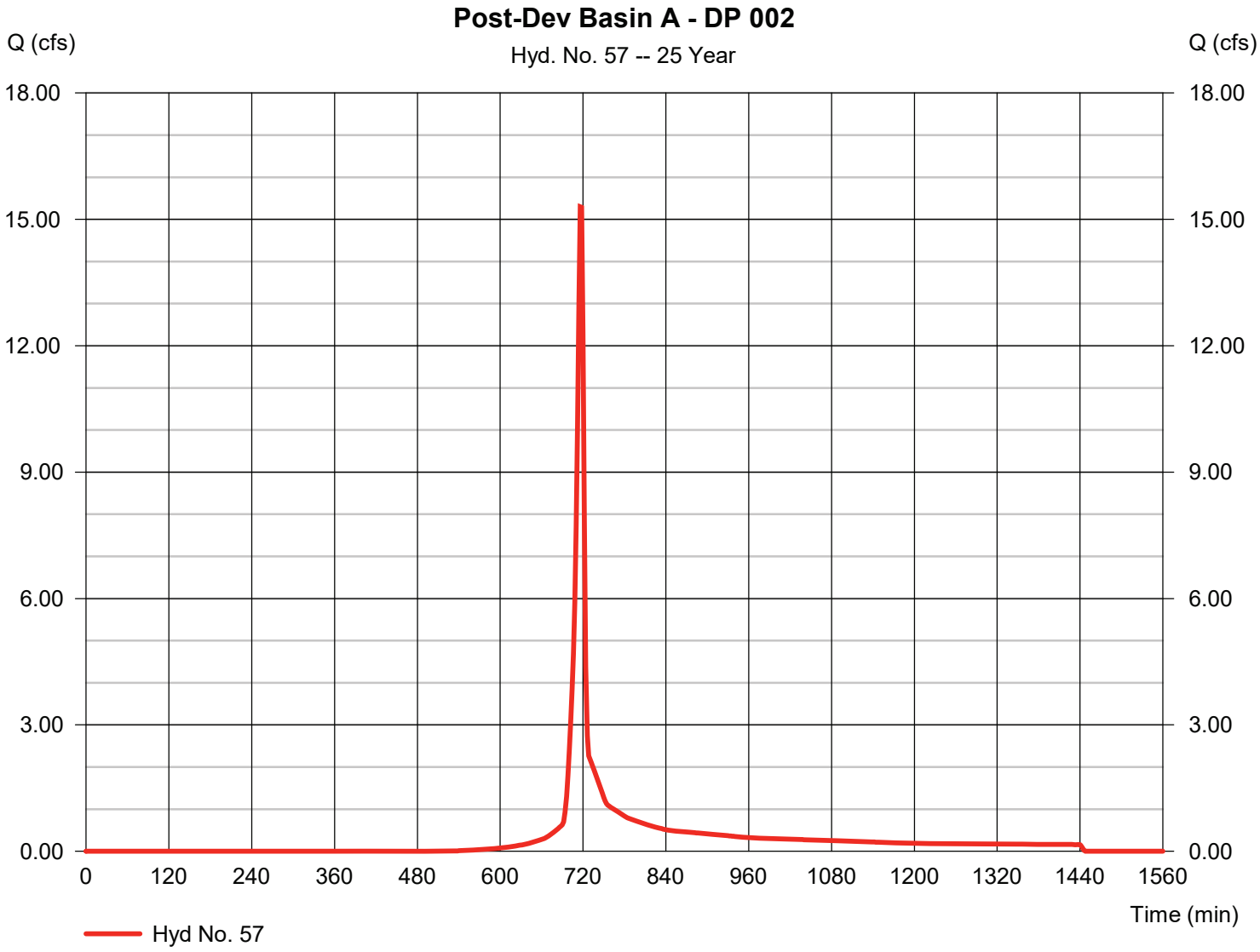
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 57

Post-Dev Basin A - DP 002

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 15.30 cfs |
| Storm frequency | = 25 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 30,890 cuft |
| Drainage area | = 3.260 ac | Curve number | = 71.5 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 5.80 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



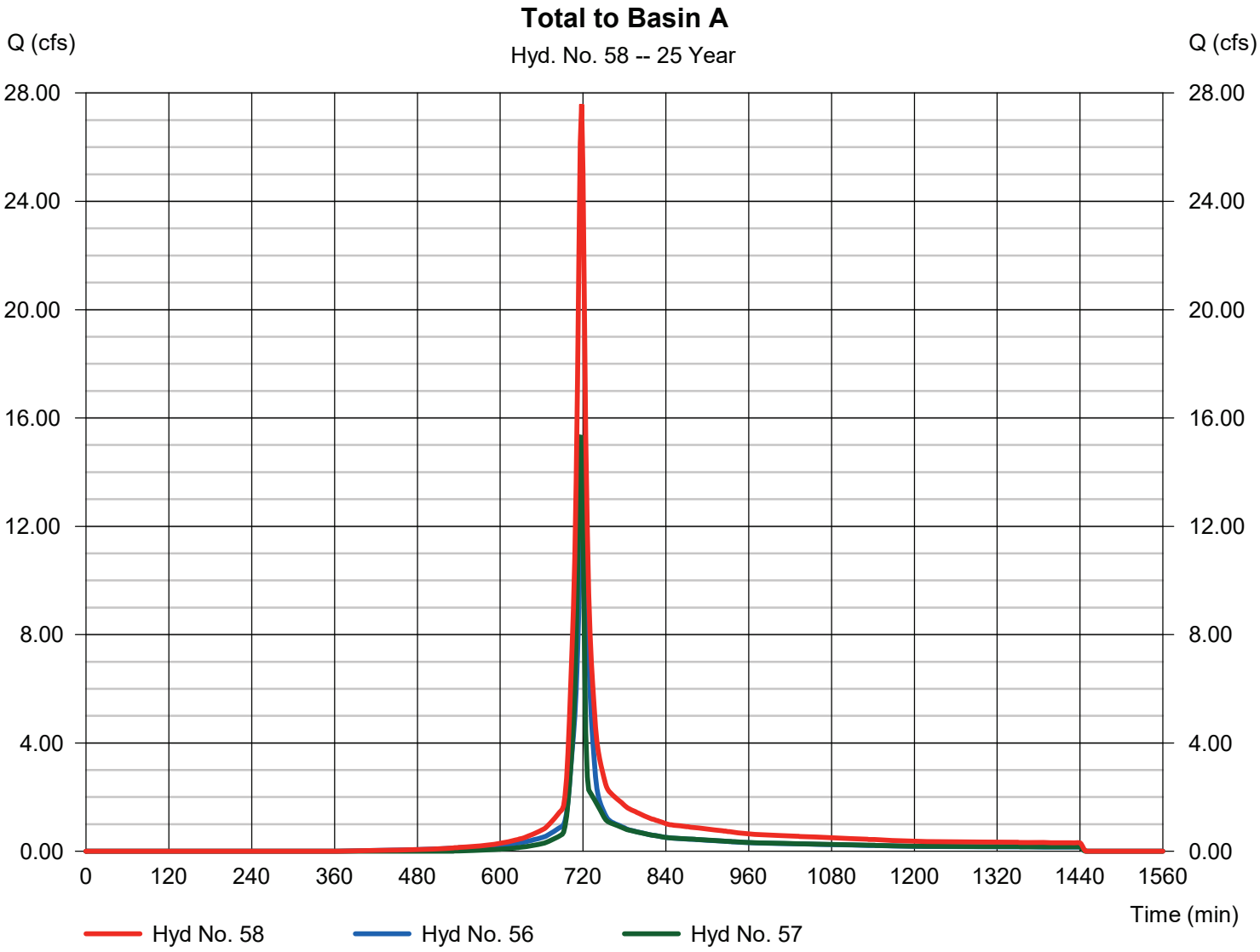
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 58

Total to Basin A

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 27.58 cfs |
| Storm frequency | = 25 yrs | Time to peak | = 718 min |
| Time interval | = 2 min | Hyd. volume | = 66,038 cuft |
| Inflow hyds. | = 56, 57 | Contrib. drain. area | = 3.260 ac |



# Hydrograph Report

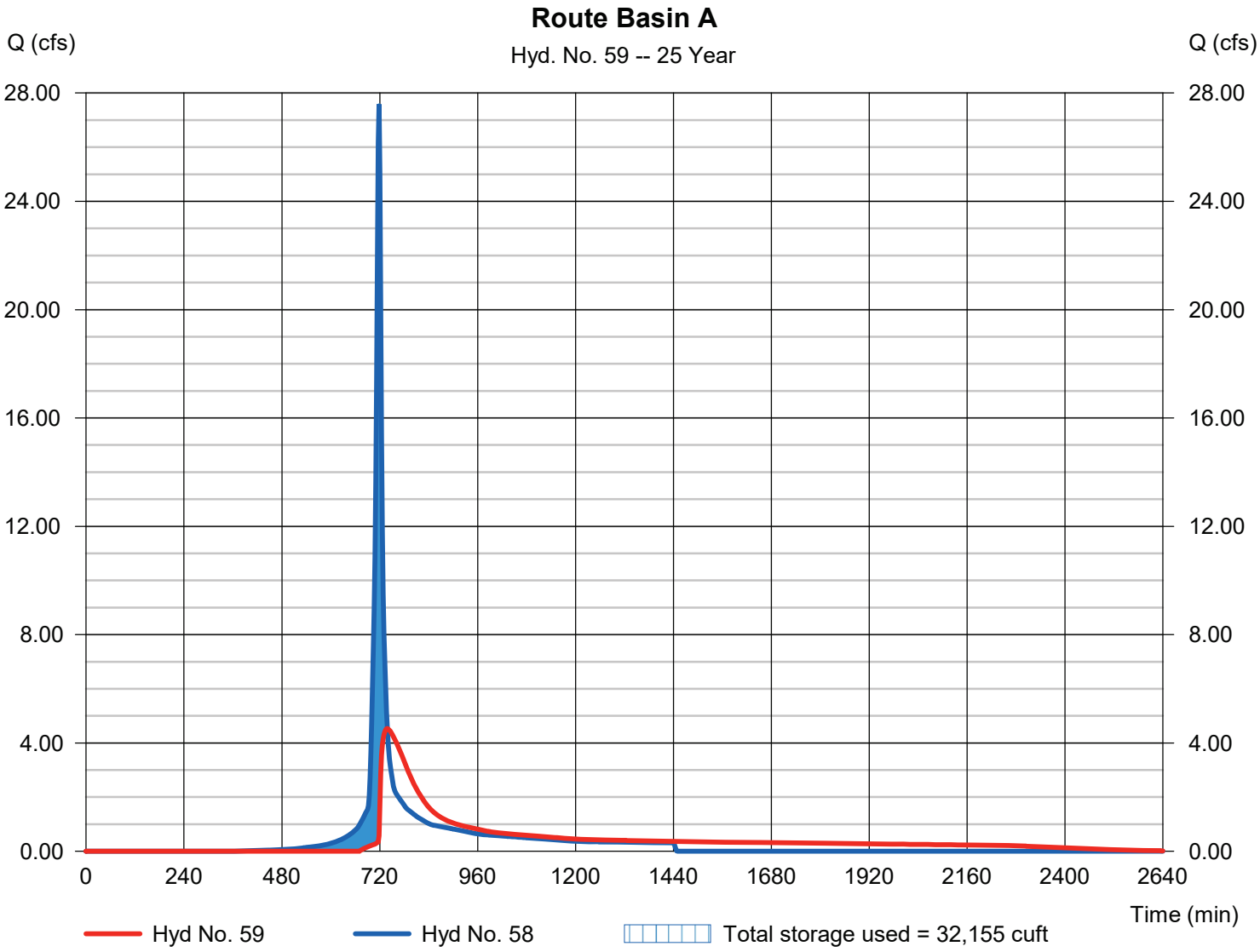
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 59

Route Basin A

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | Reservoir | Peak discharge | = | 4.528 cfs |
| Storm frequency | = | 25 yrs | Time to peak | = | 738 min |
| Time interval | = | 2 min | Hyd. volume | = | 62,504 cuft |
| Inflow hyd. No. | = | 58 - Total to Basin A | Max. Elevation | = | 15.54 ft |
| Reservoir name | = | Basin A (MRC) | Max. Storage | = | 32,155 cuft |

Storage Indication method used.



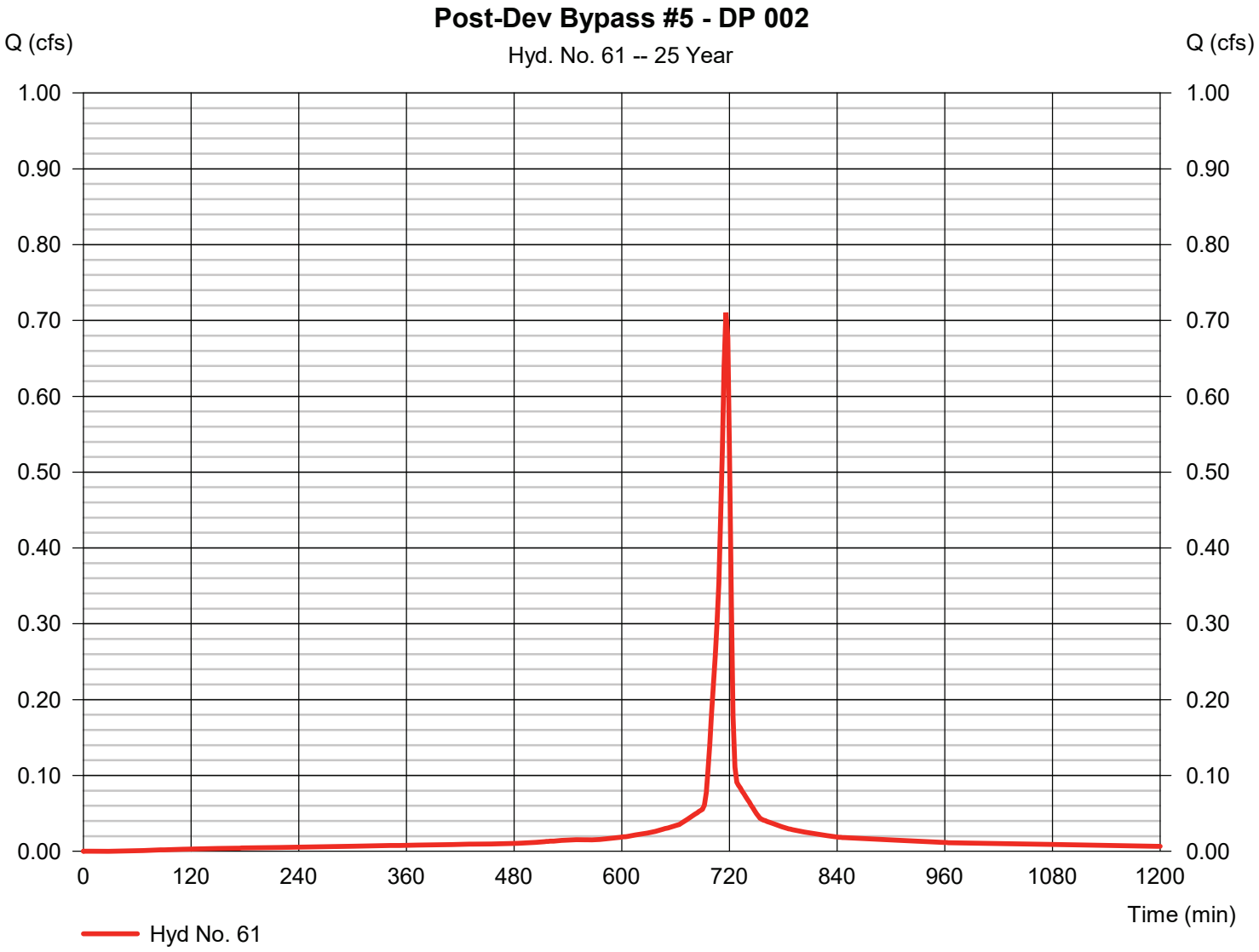
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 61

Post-Dev Bypass #5 - DP 002

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 0.710 cfs |
| Storm frequency | = 25 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 1,704 cuft |
| Drainage area | = 0.090 ac | Curve number | = 98 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 5.80 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



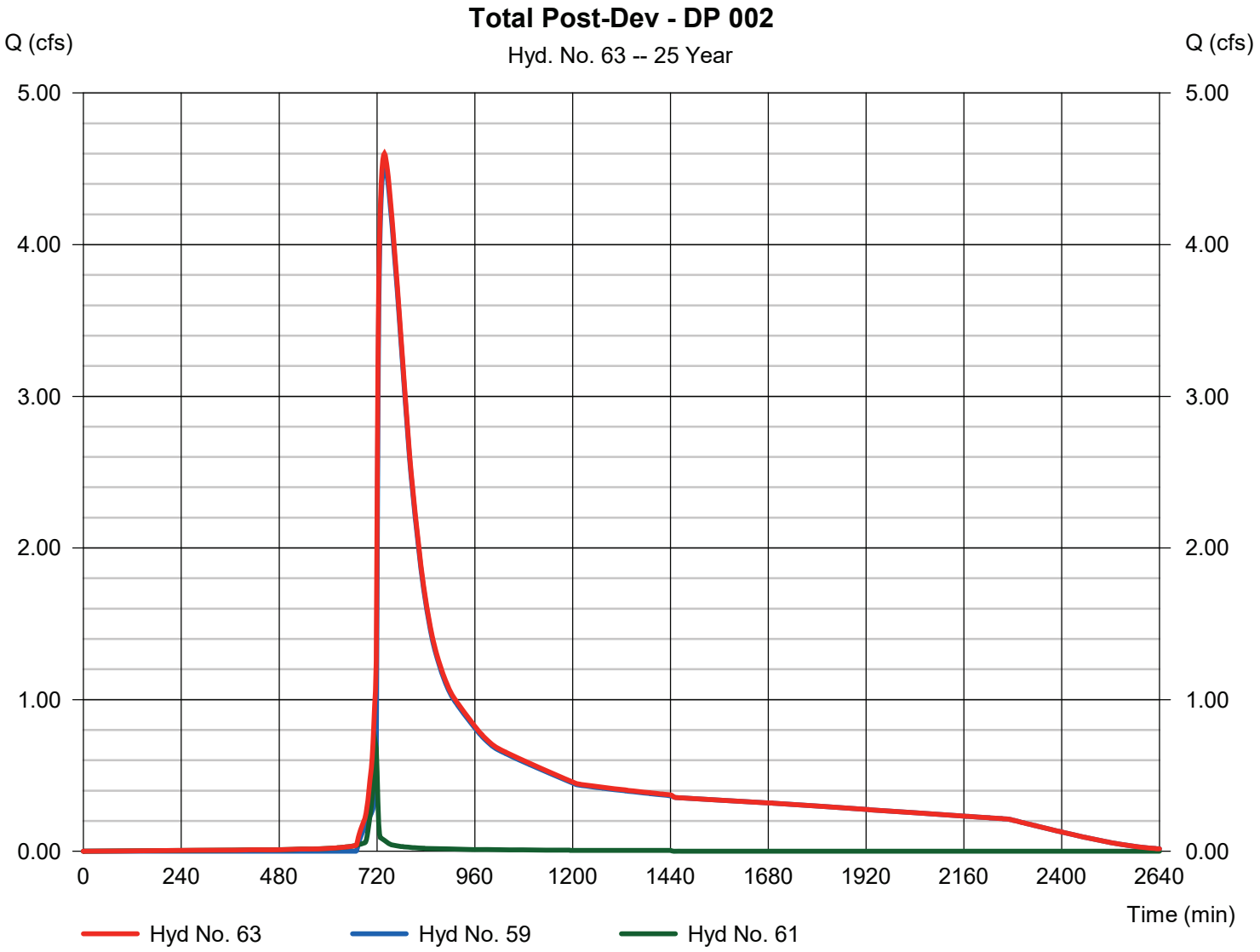
# Hydrograph Report



## Hyd. No. 63

Total Post-Dev - DP 002

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 4.600 cfs |
| Storm frequency | = 25 yrs | Time to peak | = 738 min |
| Time interval | = 2 min | Hyd. volume | = 64,207 cuft |
| Inflow hyds. | = 59, 61 | Contrib. drain. area | = 0.090 ac |



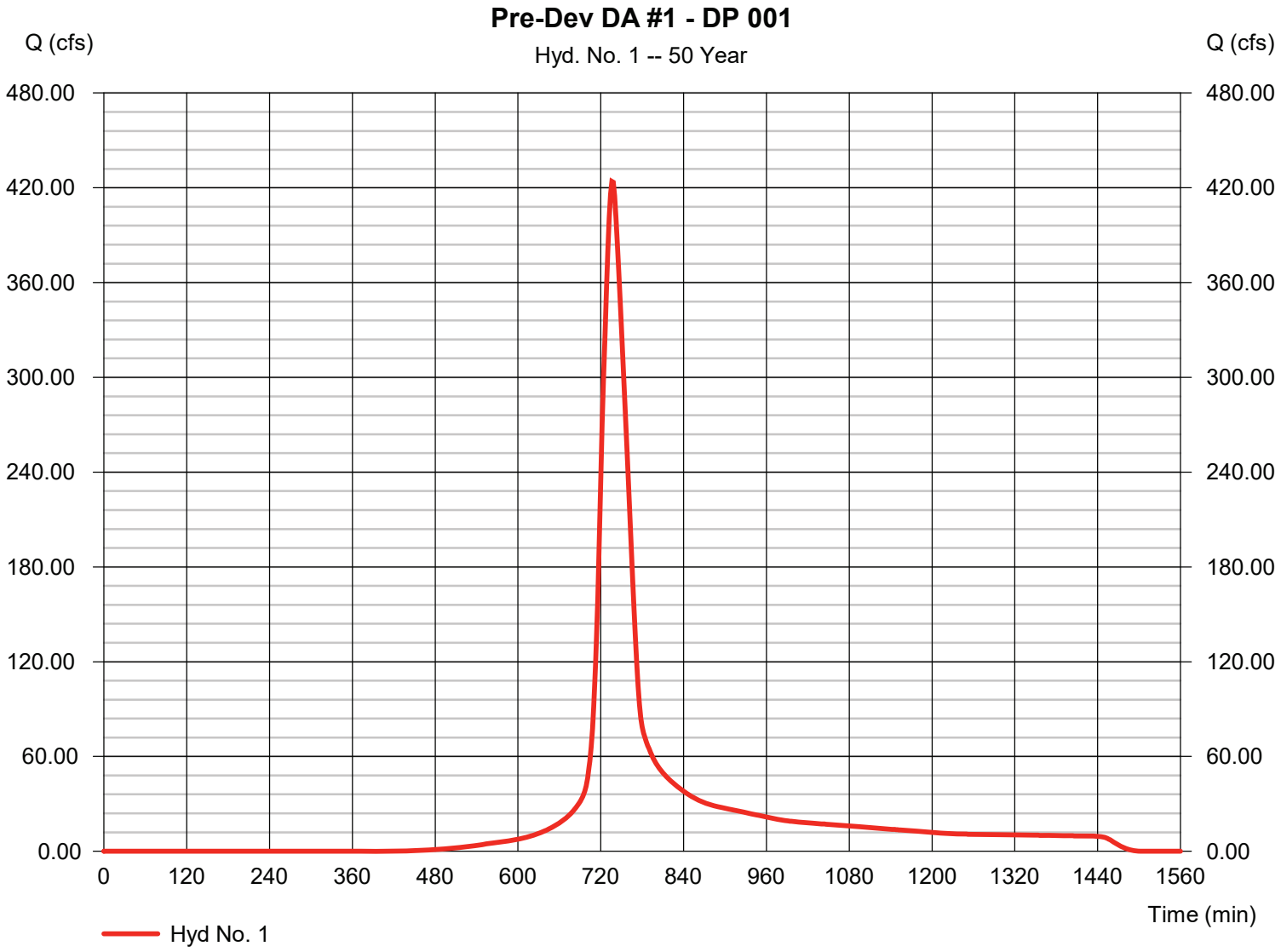
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 1

Pre-Dev DA #1 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 424.09 cfs |
| Storm frequency | = 50 yrs | Time to peak | = 736 min |
| Time interval | = 2 min | Hyd. volume | = 2,055,521 cuft |
| Drainage area | = 149.840 ac | Curve number | = 76.5 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = TR55 | Time of conc. (Tc) | = 37.70 min |
| Total precip. | = 6.40 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



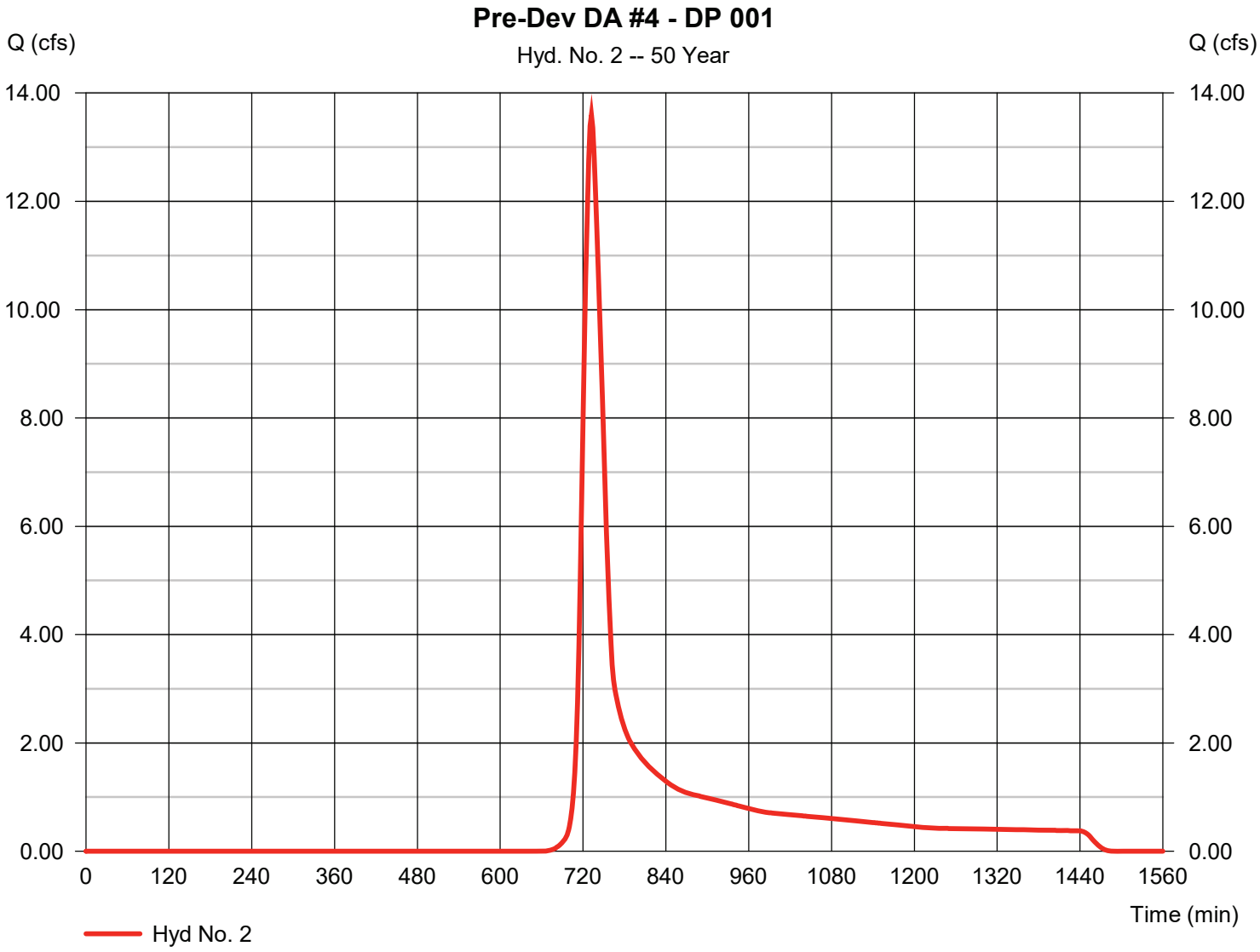
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 2

Pre-Dev DA #4 - DP 001

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | SCS Runoff | Peak discharge | = | 13.59 cfs |
| Storm frequency | = | 50 yrs | Time to peak | = | 732 min |
| Time interval | = | 2 min | Hyd. volume | = | 58,675 cuft |
| Drainage area | = | 8.180 ac | Curve number | = | 57.6 |
| Basin Slope | = | 0.0 % | Hydraulic length | = | 0 ft |
| Tc method | = | TR55 | Time of conc. (Tc) | = | 28.25 min |
| Total precip. | = | 6.40 in | Distribution | = | Type II |
| Storm duration | = | 24 hrs | Shape factor | = | 484 |



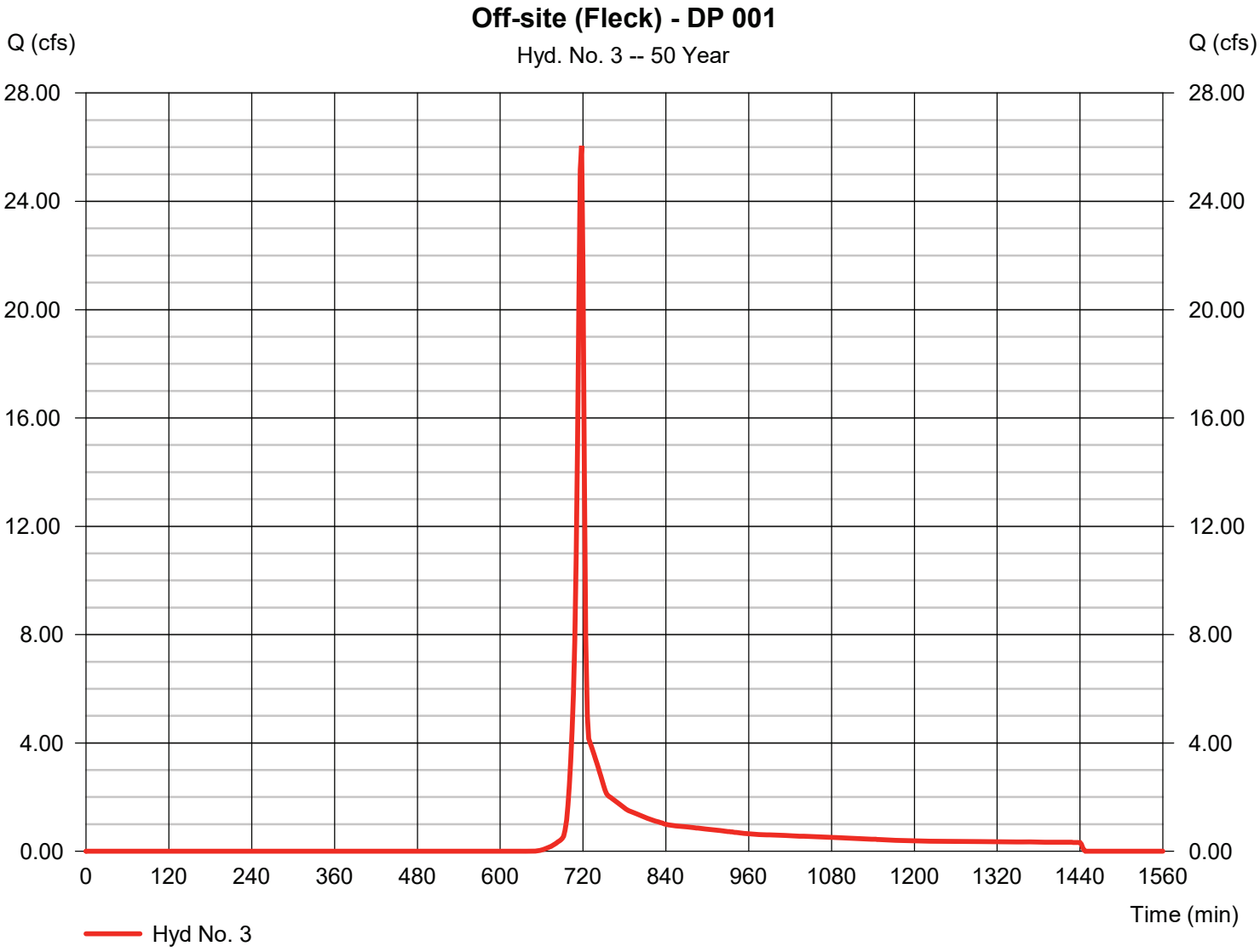
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 3

Off-site (Fleck) - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 26.05 cfs |
| Storm frequency | = 50 yrs | Time to peak | = 718 min |
| Time interval | = 2 min | Hyd. volume | = 52,236 cuft |
| Drainage area | = 7.470 ac | Curve number | = 58.5 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 6.40 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



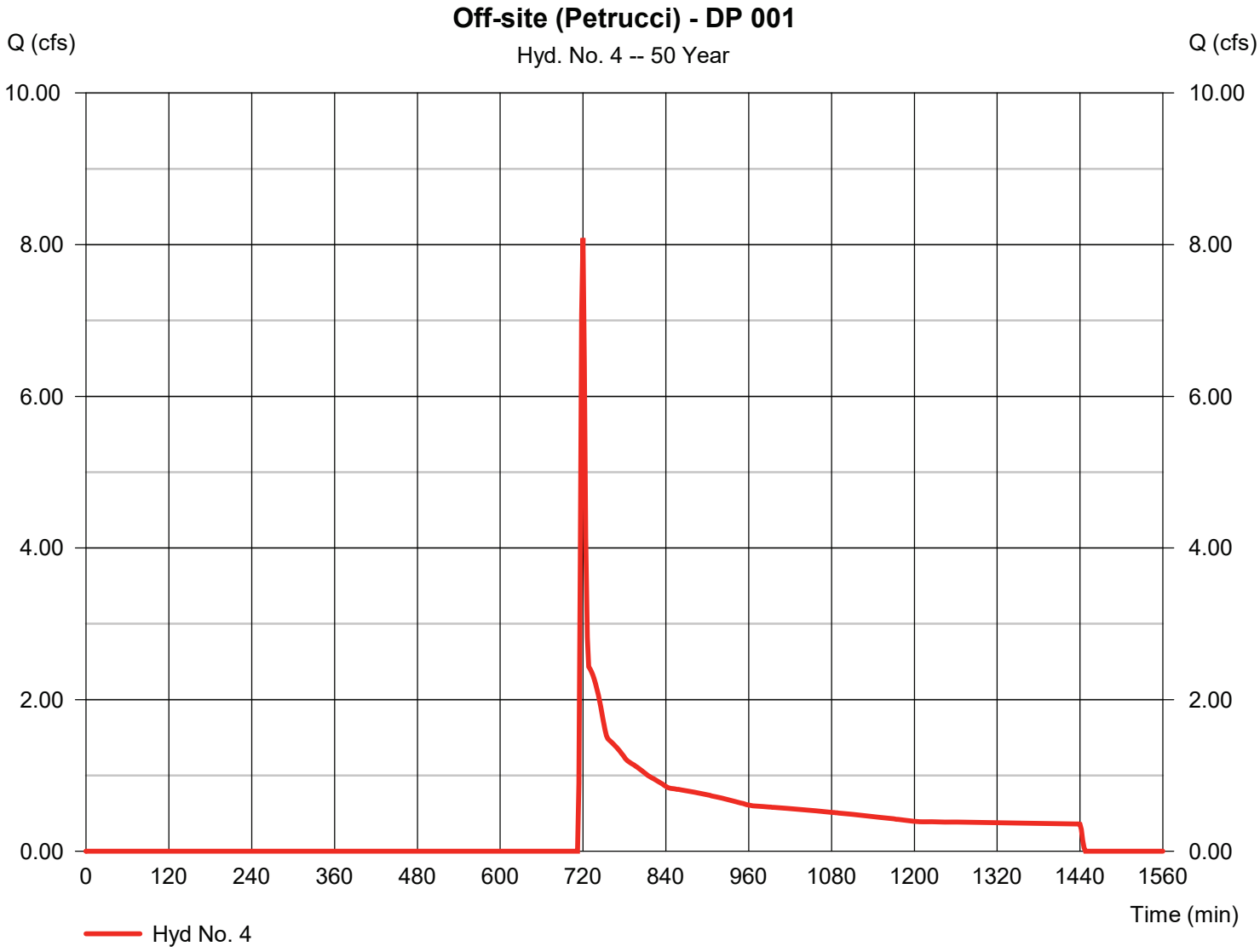
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 4

Off-site (Petrucci) - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 8.087 cfs |
| Storm frequency | = 50 yrs | Time to peak | = 720 min |
| Time interval | = 2 min | Hyd. volume | = 31,340 cuft |
| Drainage area | = 18.000 ac | Curve number | = 38.1 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 6.40 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



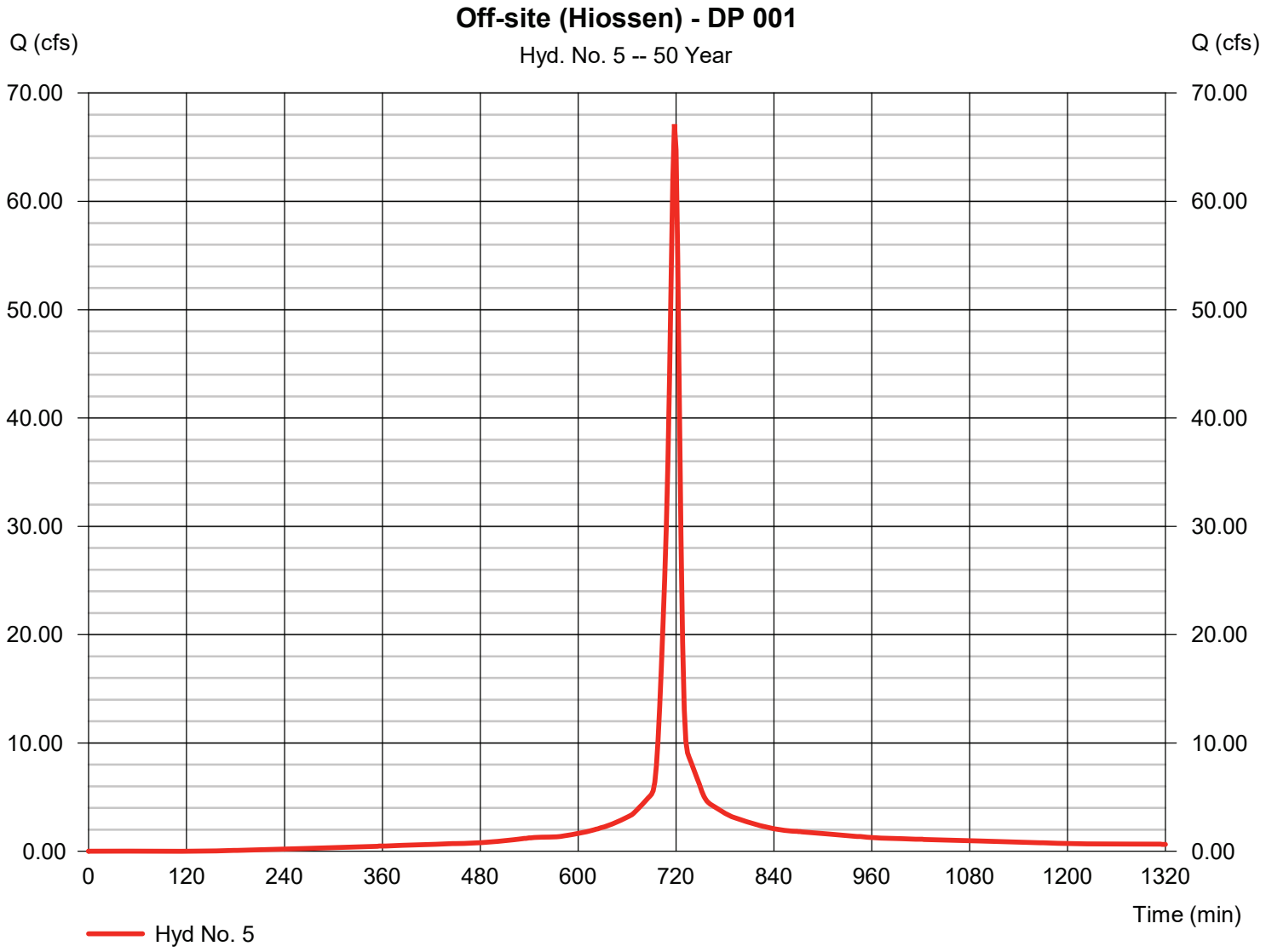
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 5

Off-site (Hiossen) - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 67.12 cfs |
| Storm frequency | = 50 yrs | Time to peak | = 718 min |
| Time interval | = 2 min | Hyd. volume | = 168,124 cuft |
| Drainage area | = 8.390 ac | Curve number | = 92.5 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = TR55 | Time of conc. (Tc) | = 8.90 min |
| Total precip. | = 6.40 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



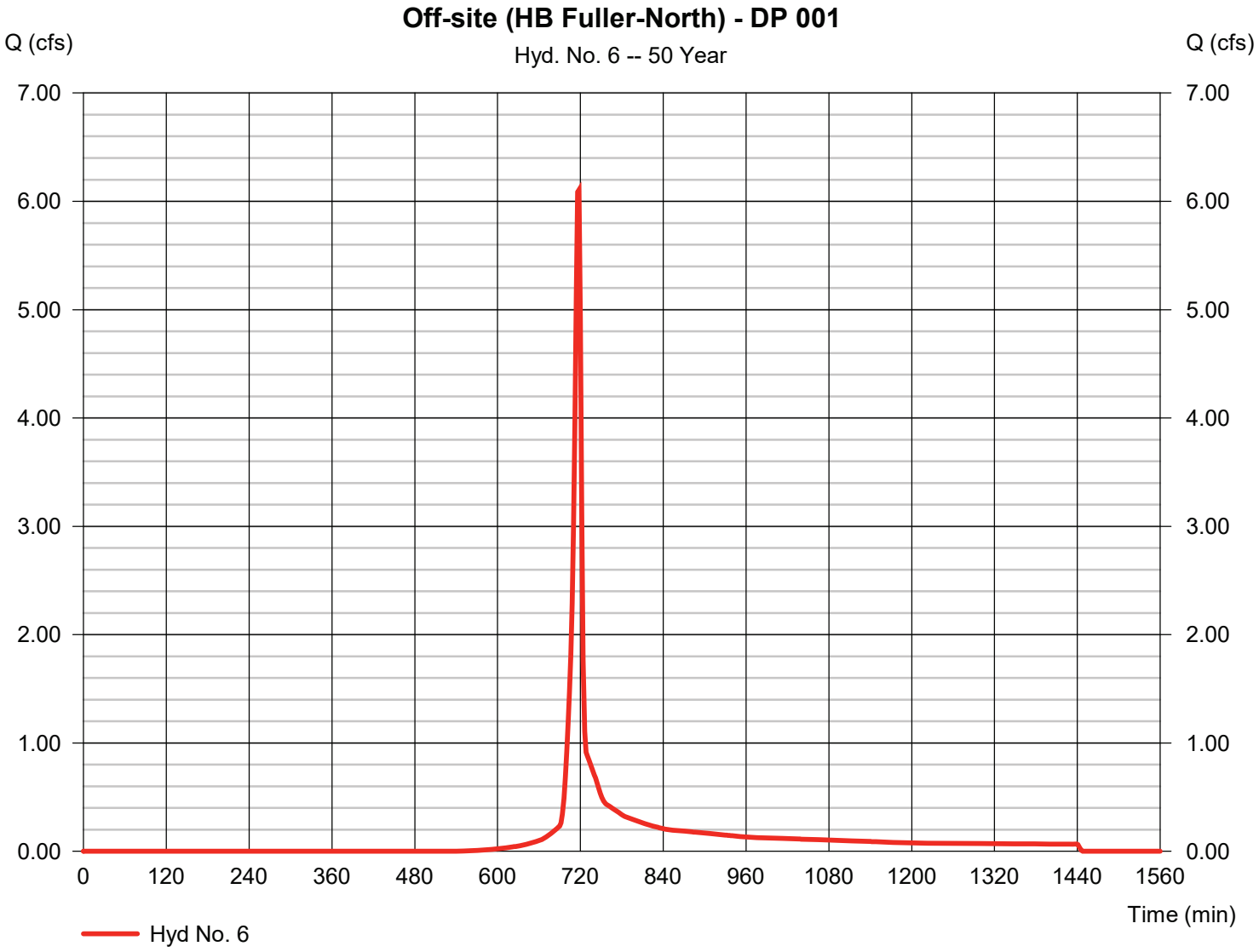
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 6

Off-site (HB Fuller-North) - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 6.105 cfs |
| Storm frequency | = 50 yrs | Time to peak | = 718 min |
| Time interval | = 2 min | Hyd. volume | = 12,290 cuft |
| Drainage area | = 1.240 ac | Curve number | = 67.8 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 6.40 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



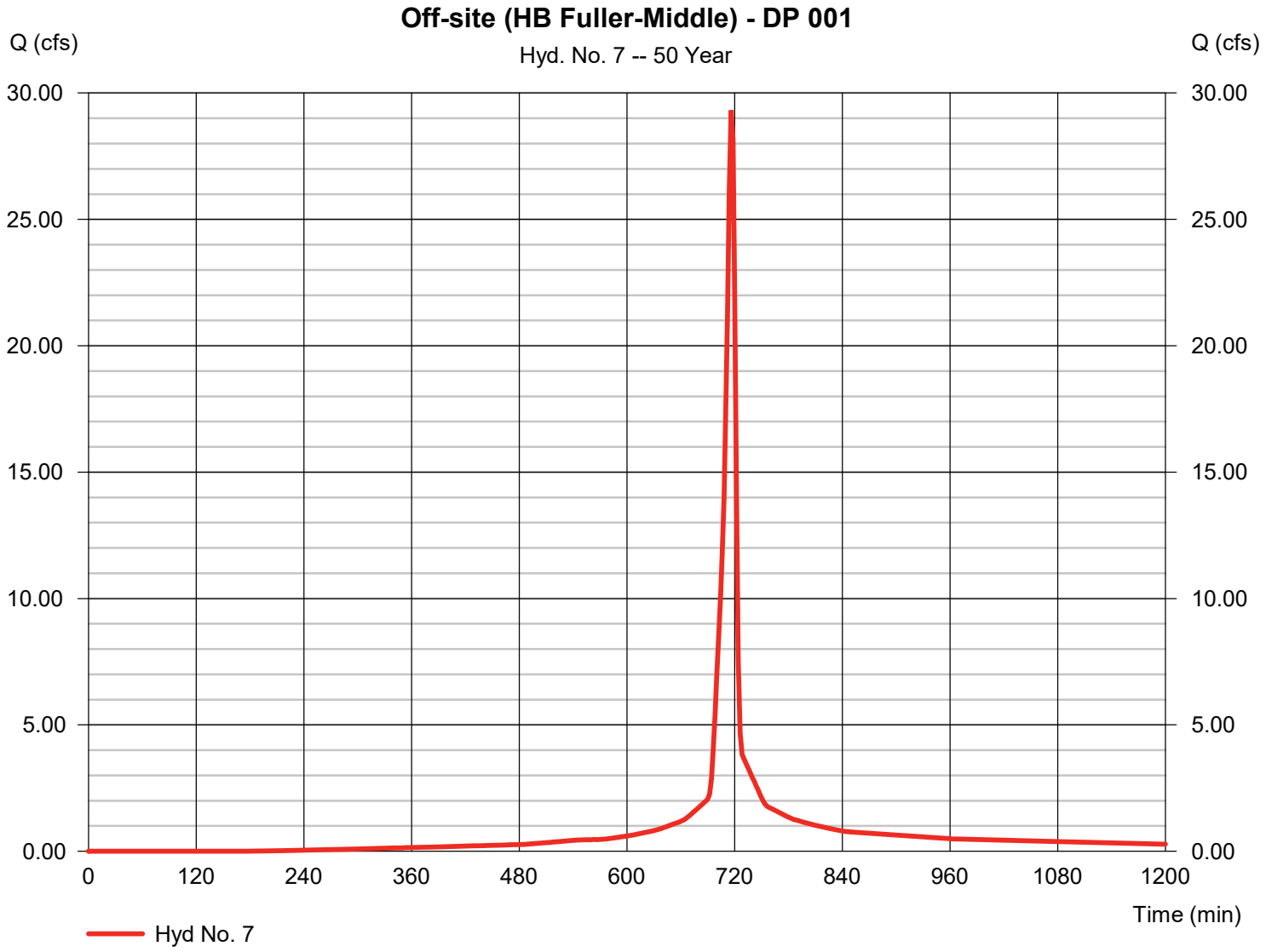
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 7

Off-site (HB Fuller-Middle) - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 29.32 cfs |
| Storm frequency | = 50 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 64,246 cuft |
| Drainage area | = 3.590 ac | Curve number | = 90.2 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 6.40 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



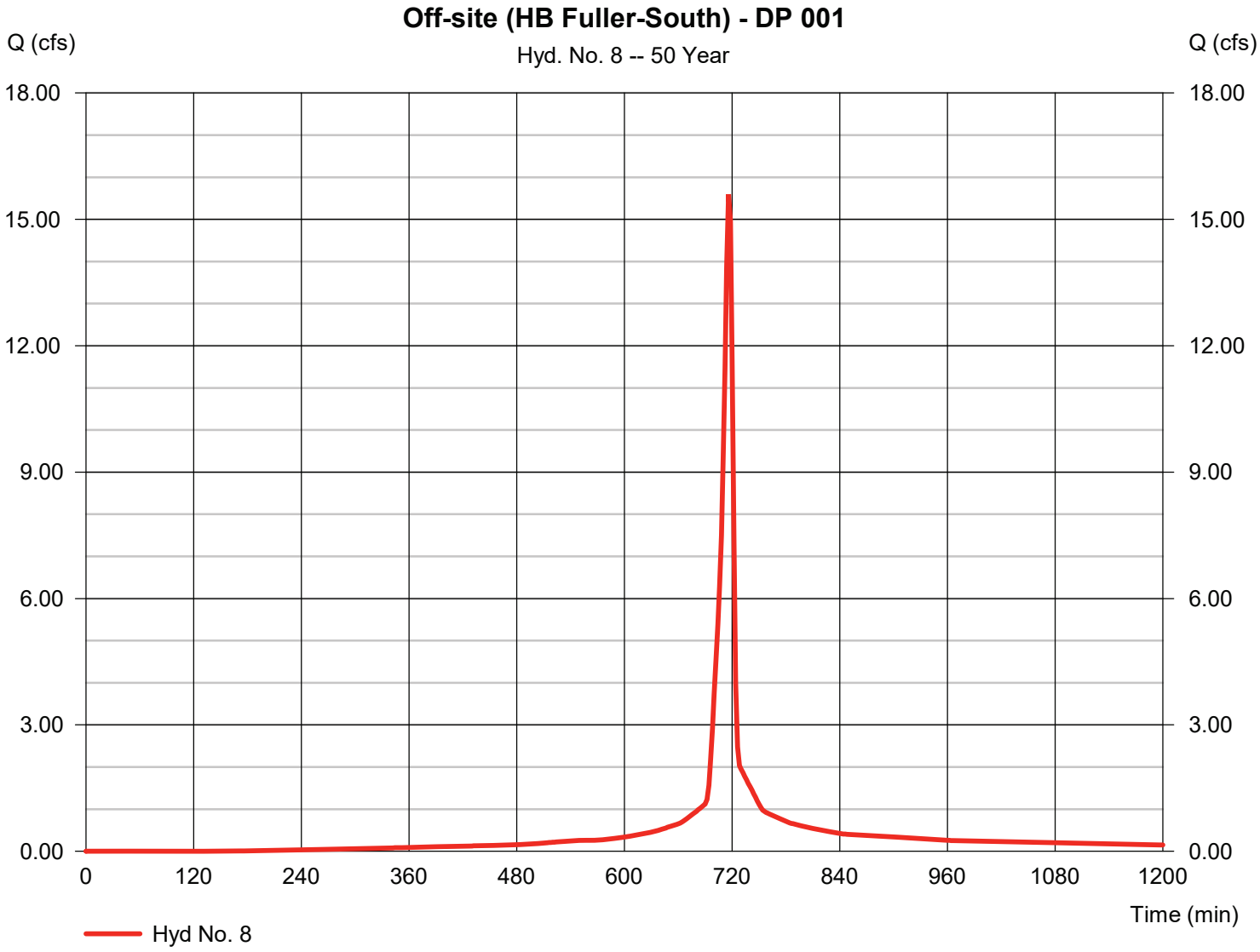
# Hydrograph Report



## Hyd. No. 8

Off-site (HB Fuller-South) - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 15.60 cfs |
| Storm frequency | = 50 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 34,587 cuft |
| Drainage area | = 1.880 ac | Curve number | = 91.5 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 6.40 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



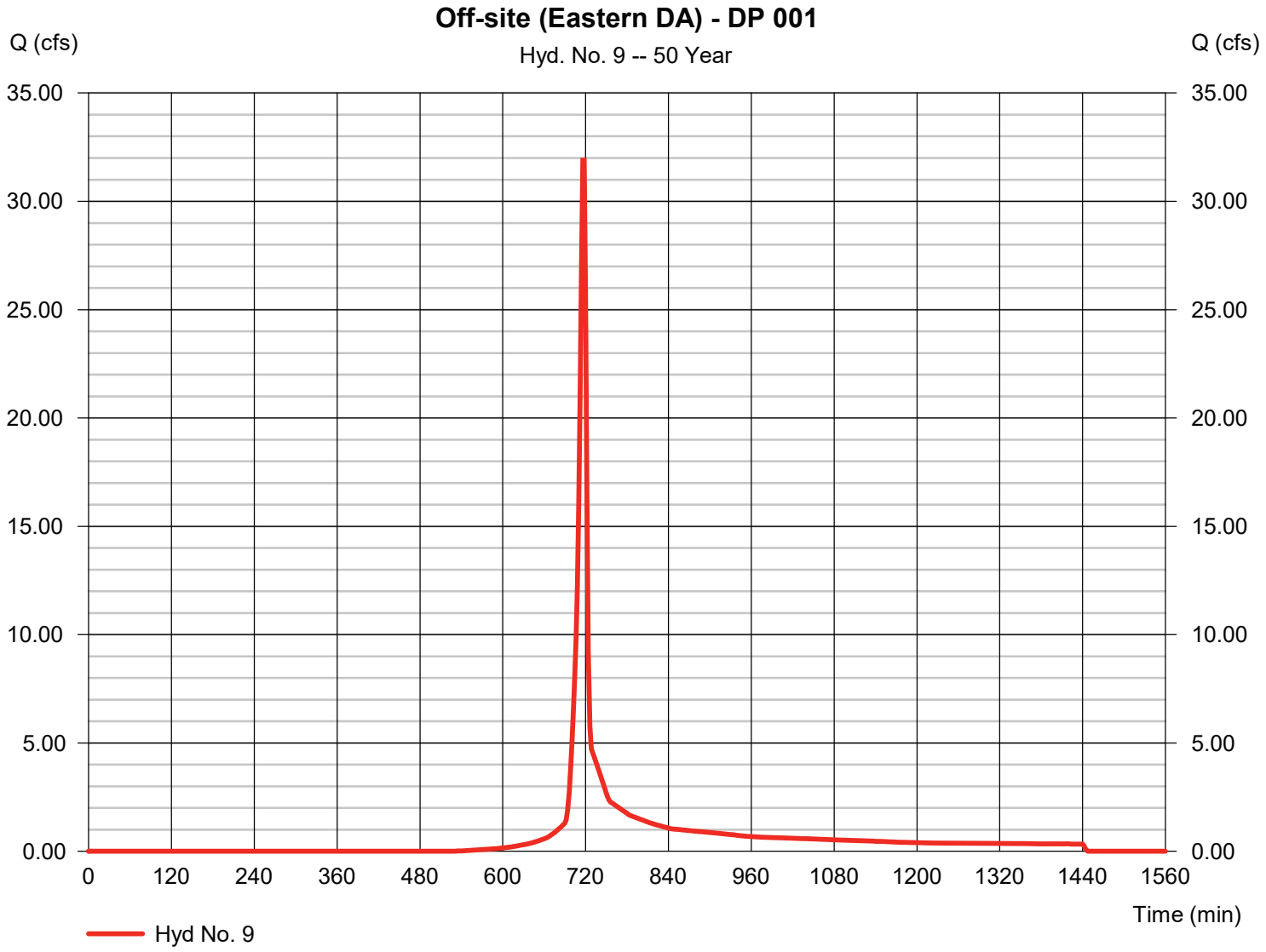
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 9

Off-site (Eastern DA) - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 31.90 cfs |
| Storm frequency | = 50 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 64,410 cuft |
| Drainage area | = 6.210 ac | Curve number | = 69.2 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 6.40 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



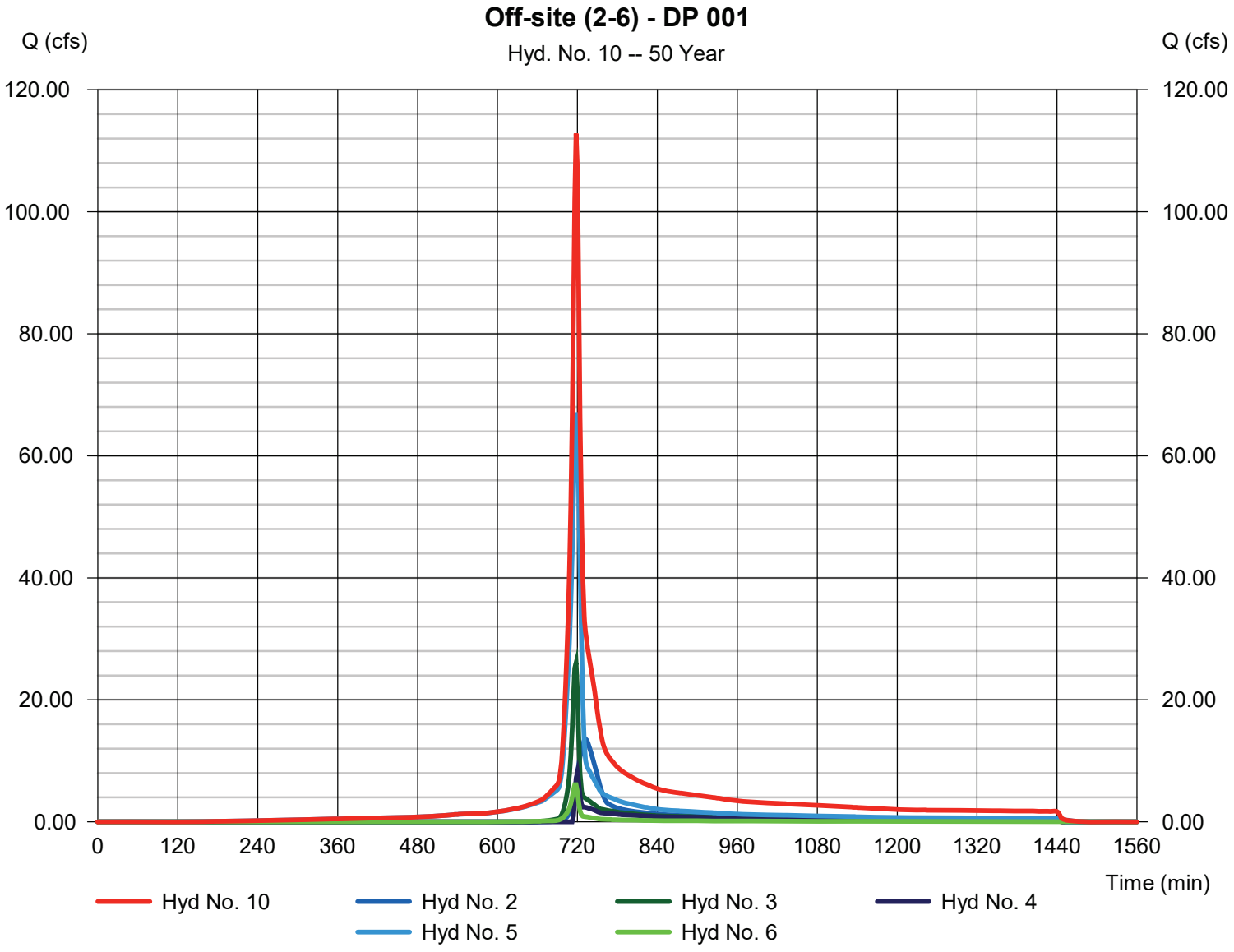
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 10

Off-site (2-6) - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 112.80 cfs |
| Storm frequency | = 50 yrs | Time to peak | = 718 min |
| Time interval | = 2 min | Hyd. volume | = 322,665 cuft |
| Inflow hyds. | = 2, 3, 4, 5, 6 | Contrib. drain. area | = 43.280 ac |



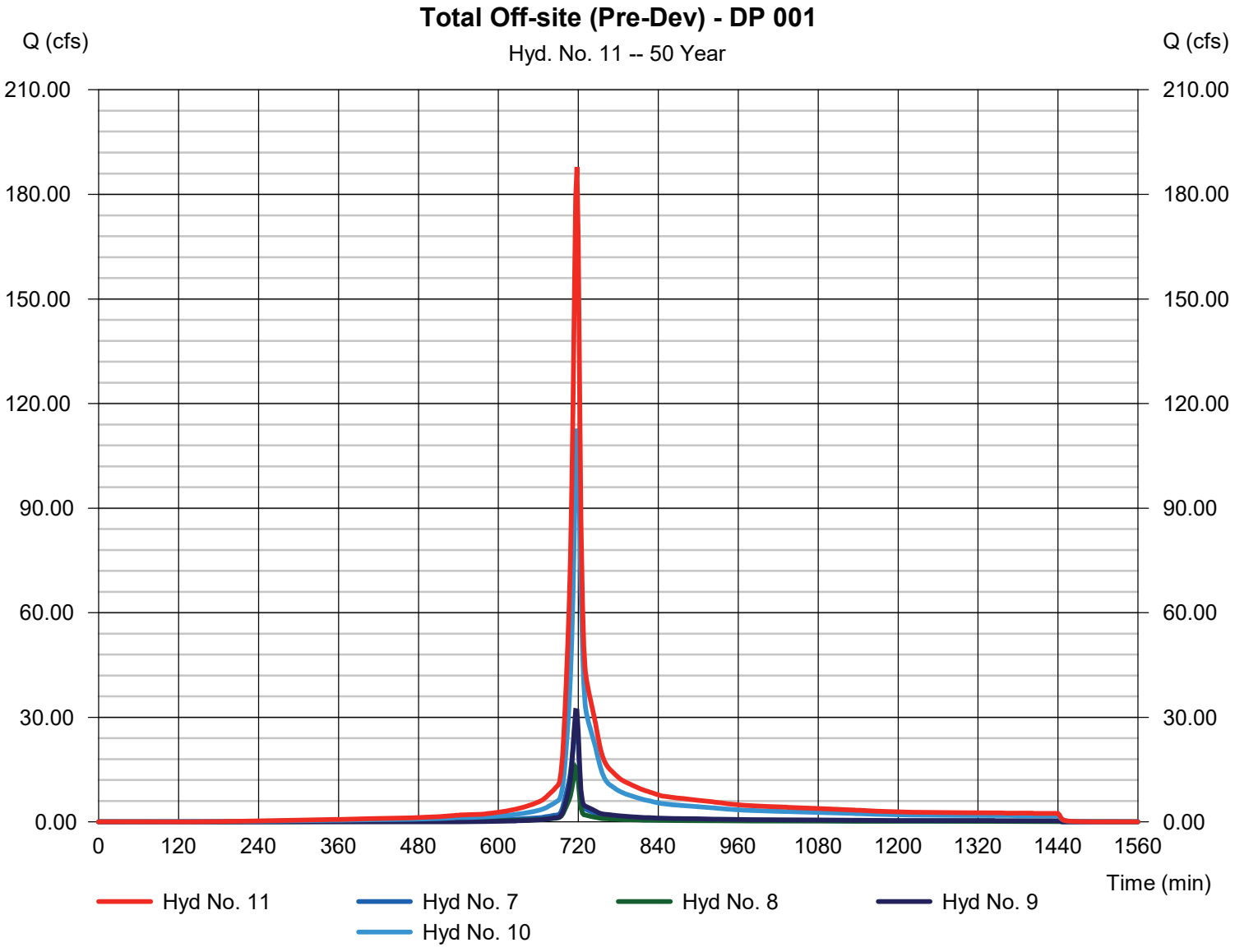
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 11

Total Off-site (Pre-Dev) - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 187.82 cfs |
| Storm frequency | = 50 yrs | Time to peak | = 718 min |
| Time interval | = 2 min | Hyd. volume | = 485,908 cuft |
| Inflow hyds. | = 7, 8, 9, 10 | Contrib. drain. area | = 11.680 ac |



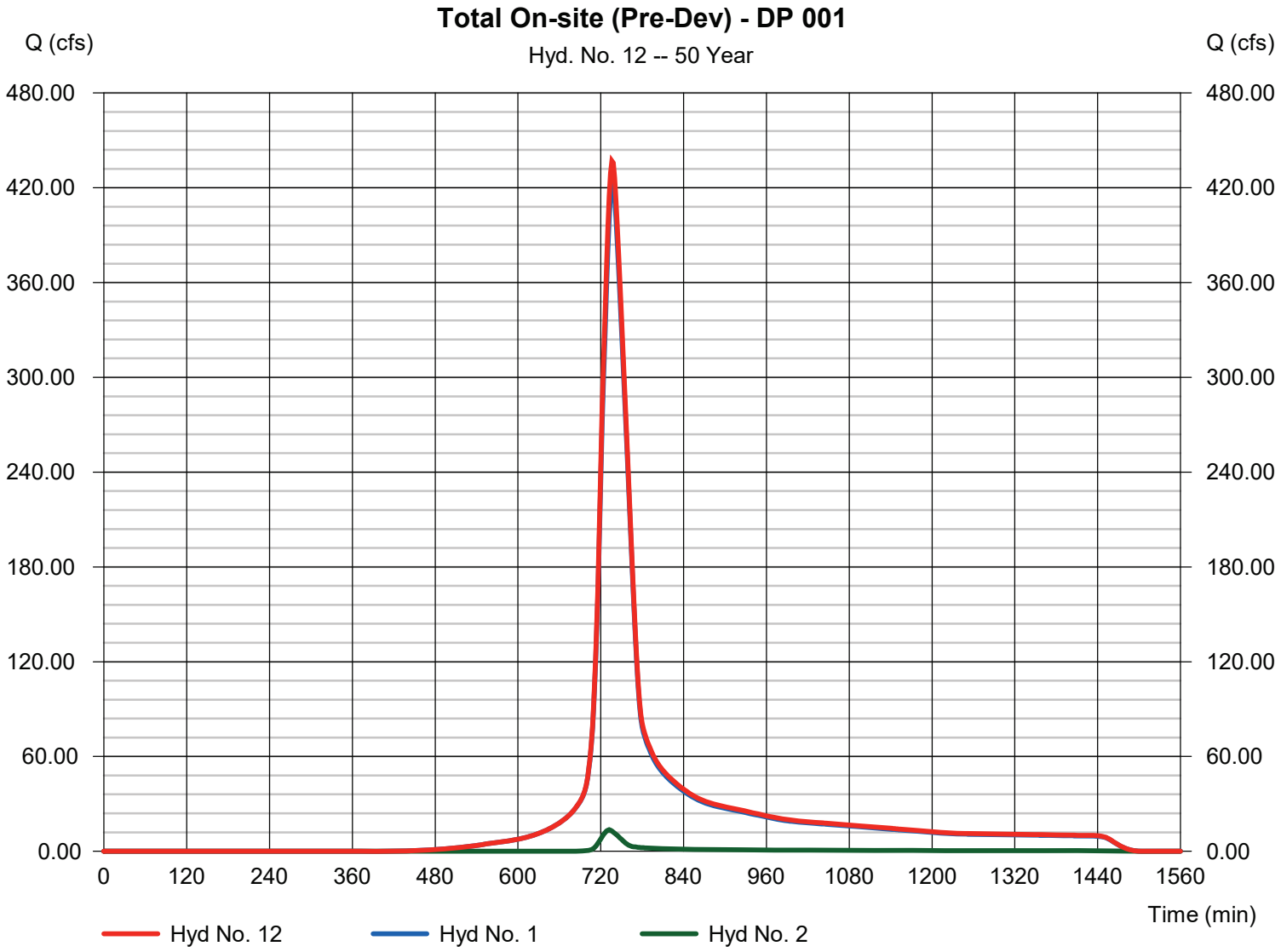
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 12

Total On-site (Pre-Dev) - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 436.91 cfs |
| Storm frequency | = 50 yrs | Time to peak | = 736 min |
| Time interval | = 2 min | Hyd. volume | = 2,114,195 cuft |
| Inflow hyds. | = 1, 2 | Contrib. drain. area | = 158.020 ac |



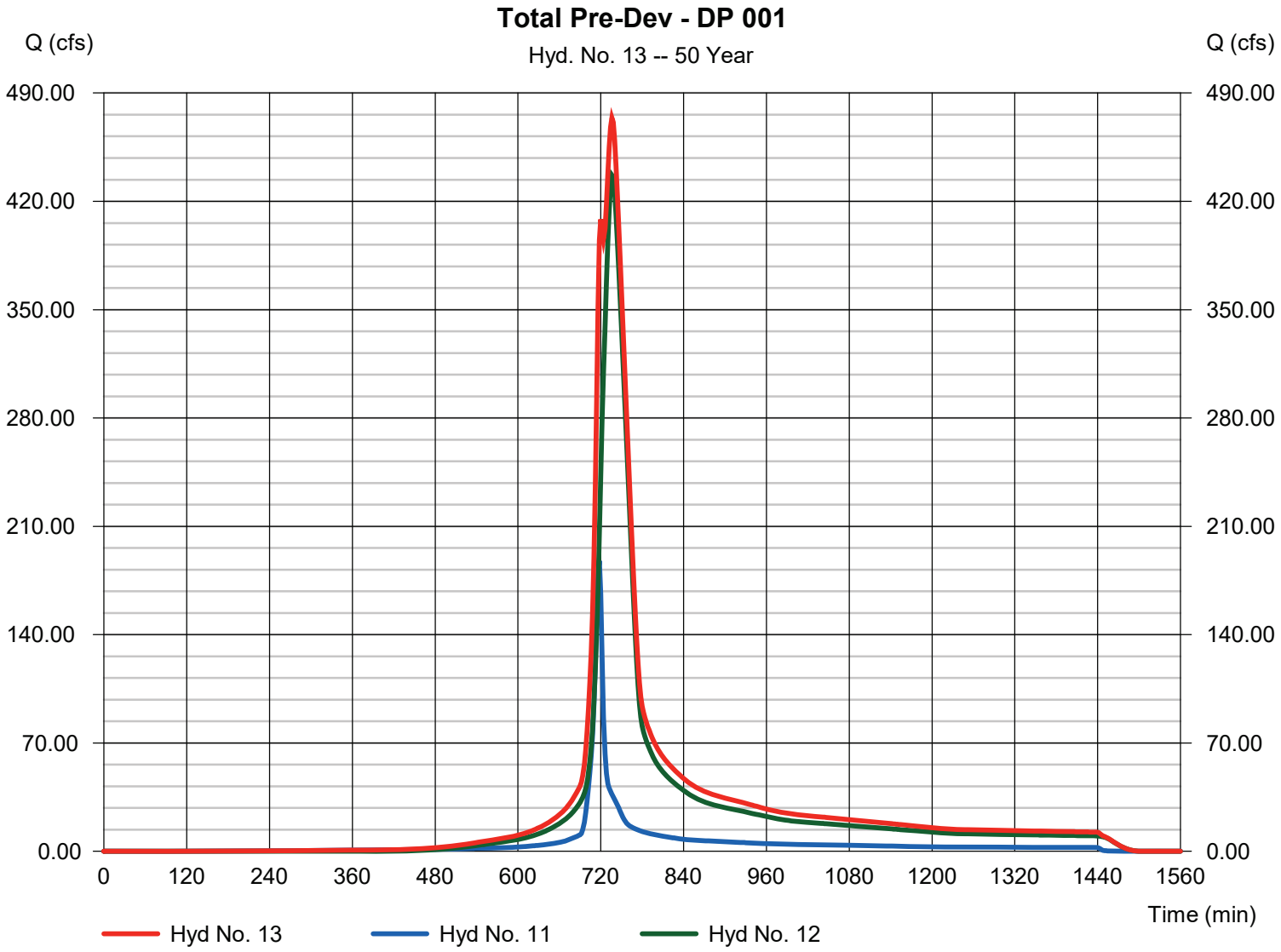
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 13

Total Pre-Dev - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 473.93 cfs |
| Storm frequency | = 50 yrs | Time to peak | = 736 min |
| Time interval | = 2 min | Hyd. volume | = 2,600,104 cuft |
| Inflow hyds. | = 11, 12 | Contrib. drain. area | = 0.000 ac |



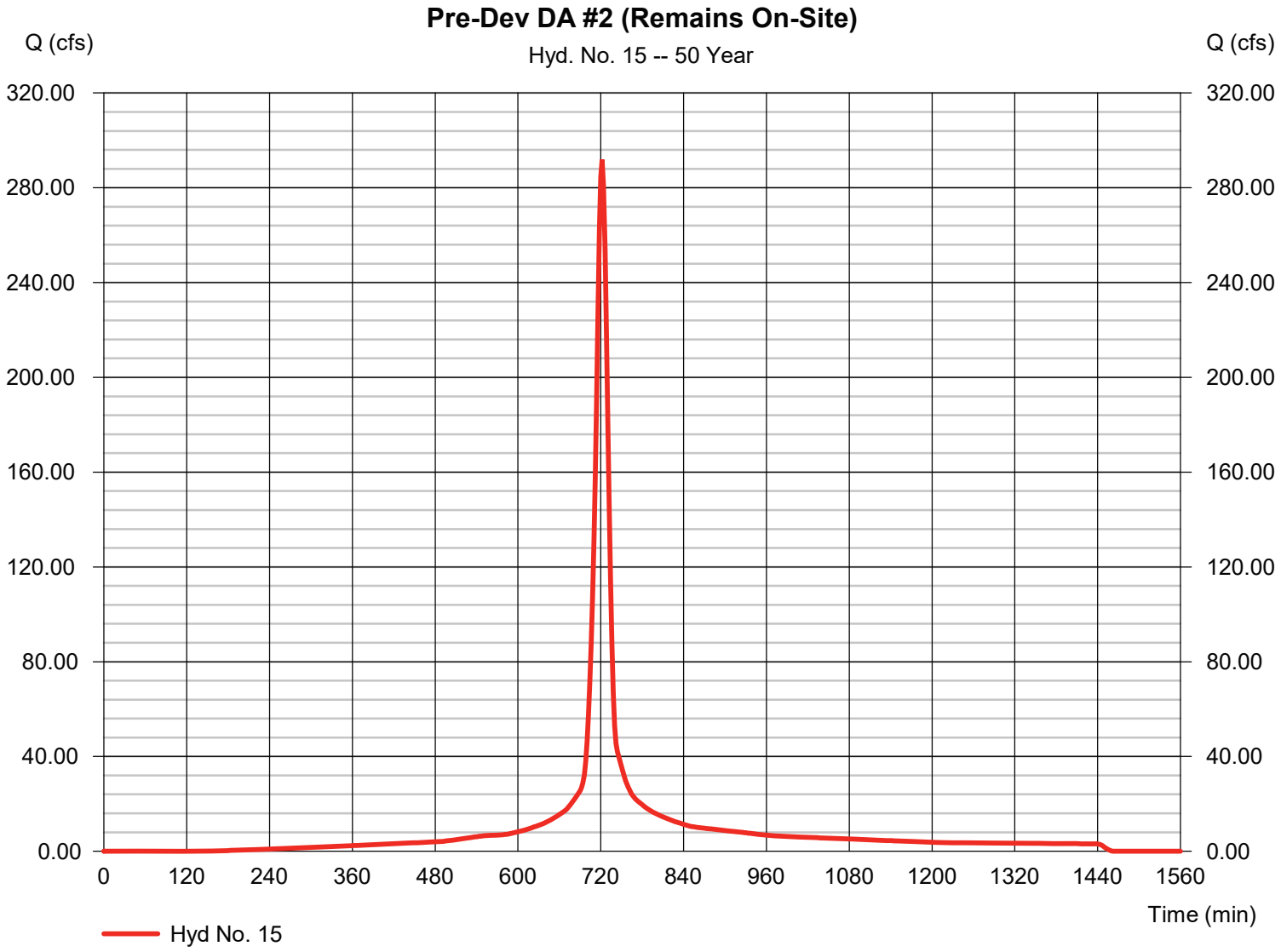
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 15

Pre-Dev DA #2 (Remains On-Site)

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 291.86 cfs |
| Storm frequency | = 50 yrs | Time to peak | = 722 min |
| Time interval | = 2 min | Hyd. volume | = 880,911 cuft |
| Drainage area | = 45.370 ac | Curve number | = 92.2 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = TR55 | Time of conc. (Tc) | = 13.40 min |
| Total precip. | = 6.40 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



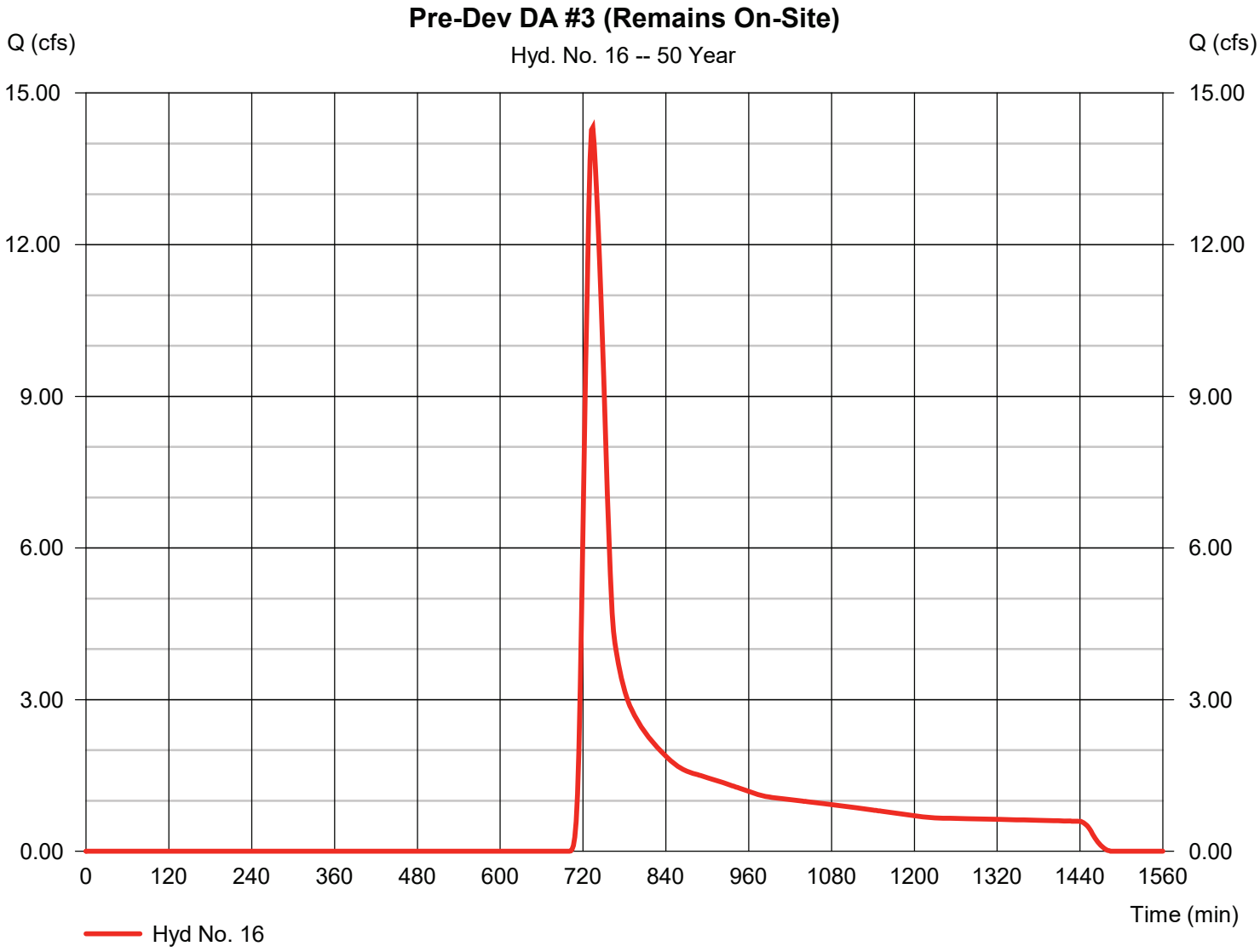
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 16

Pre-Dev DA #3 (Remains On-Site)

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 14.32 cfs |
| Storm frequency | = 50 yrs | Time to peak | = 734 min |
| Time interval | = 2 min | Hyd. volume | = 74,490 cuft |
| Drainage area | = 16.820 ac | Curve number | = 48.4 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = TR55 | Time of conc. (Tc) | = 29.90 min |
| Total precip. | = 6.40 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



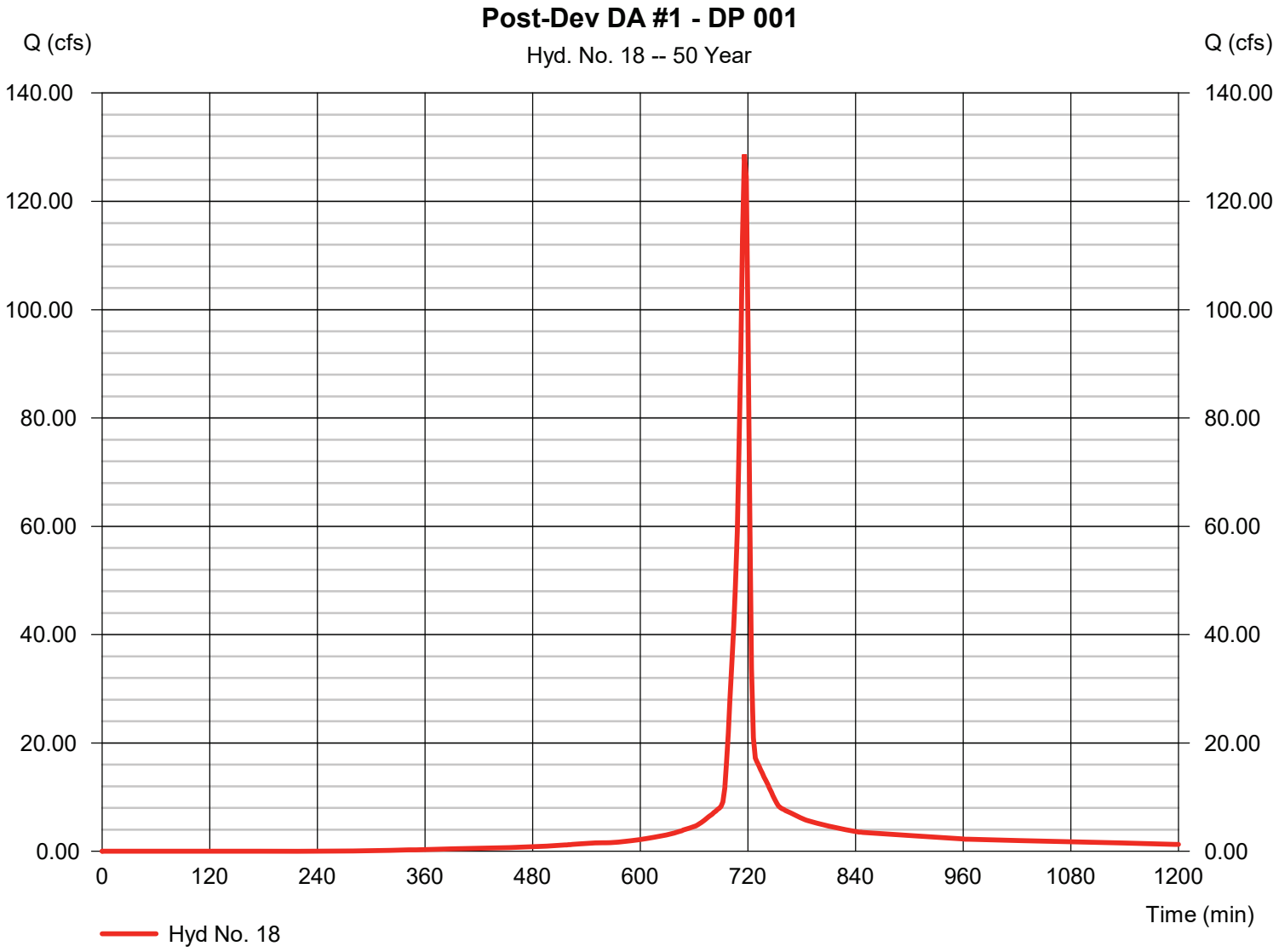
# Hydrograph Report



## Hyd. No. 18

Post-Dev DA #1 - DP 001

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | SCS Runoff | Peak discharge | = | 128.68 cfs |
| Storm frequency | = | 50 yrs | Time to peak | = | 716 min |
| Time interval | = | 2 min | Hyd. volume | = | 272,509 cuft |
| Drainage area | = | 16.870 ac | Curve number | = | 85.6 |
| Basin Slope | = | 0.0 % | Hydraulic length | = | 0 ft |
| Tc method | = | User | Time of conc. (Tc) | = | 5.00 min |
| Total precip. | = | 6.40 in | Distribution | = | Type II |
| Storm duration | = | 24 hrs | Shape factor | = | 484 |



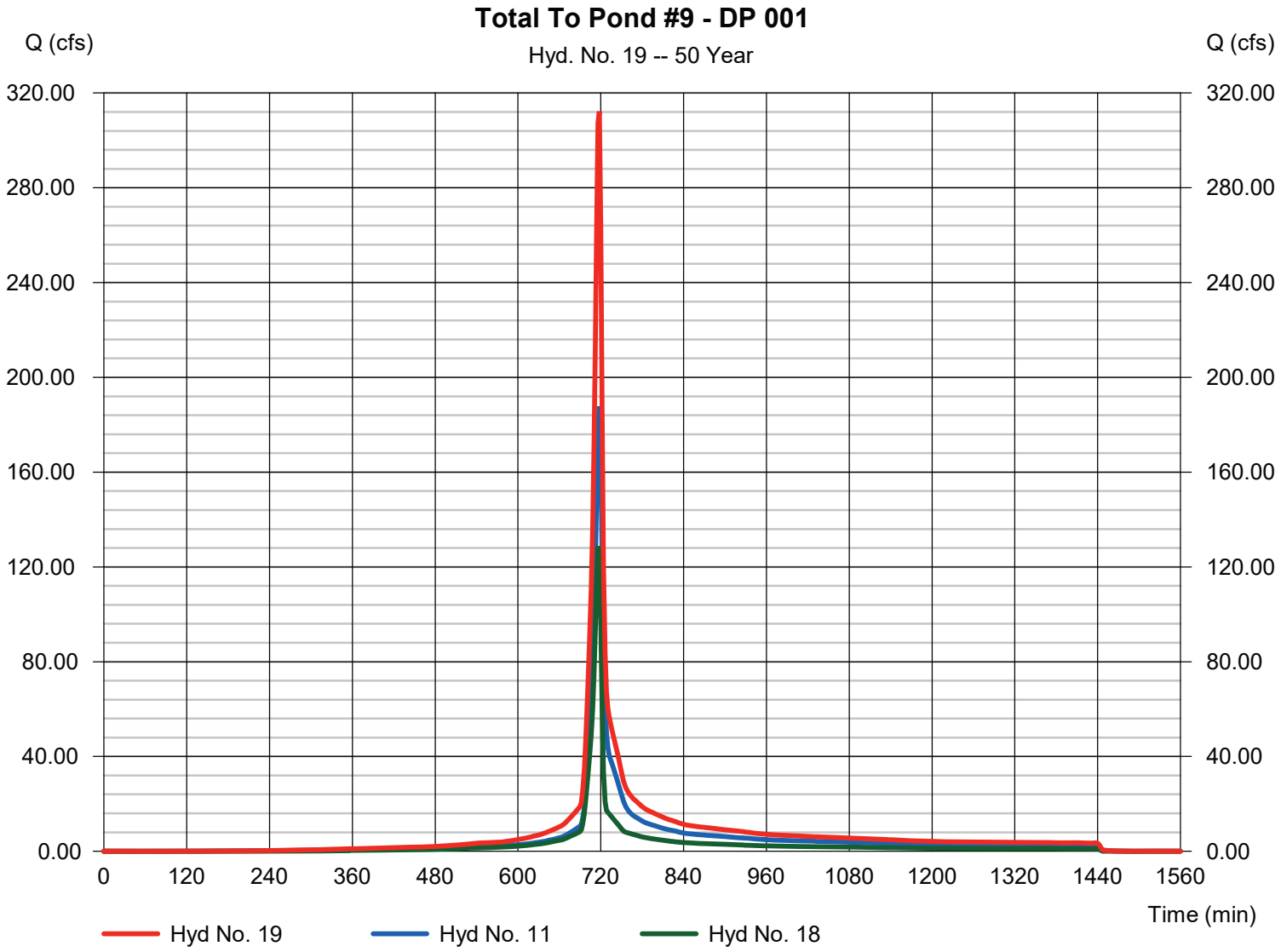
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 19

Total To Pond #9 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 312.28 cfs |
| Storm frequency | = 50 yrs | Time to peak | = 718 min |
| Time interval | = 2 min | Hyd. volume | = 758,417 cuft |
| Inflow hyds. | = 11, 18 | Contrib. drain. area | = 16.870 ac |



# Hydrograph Report

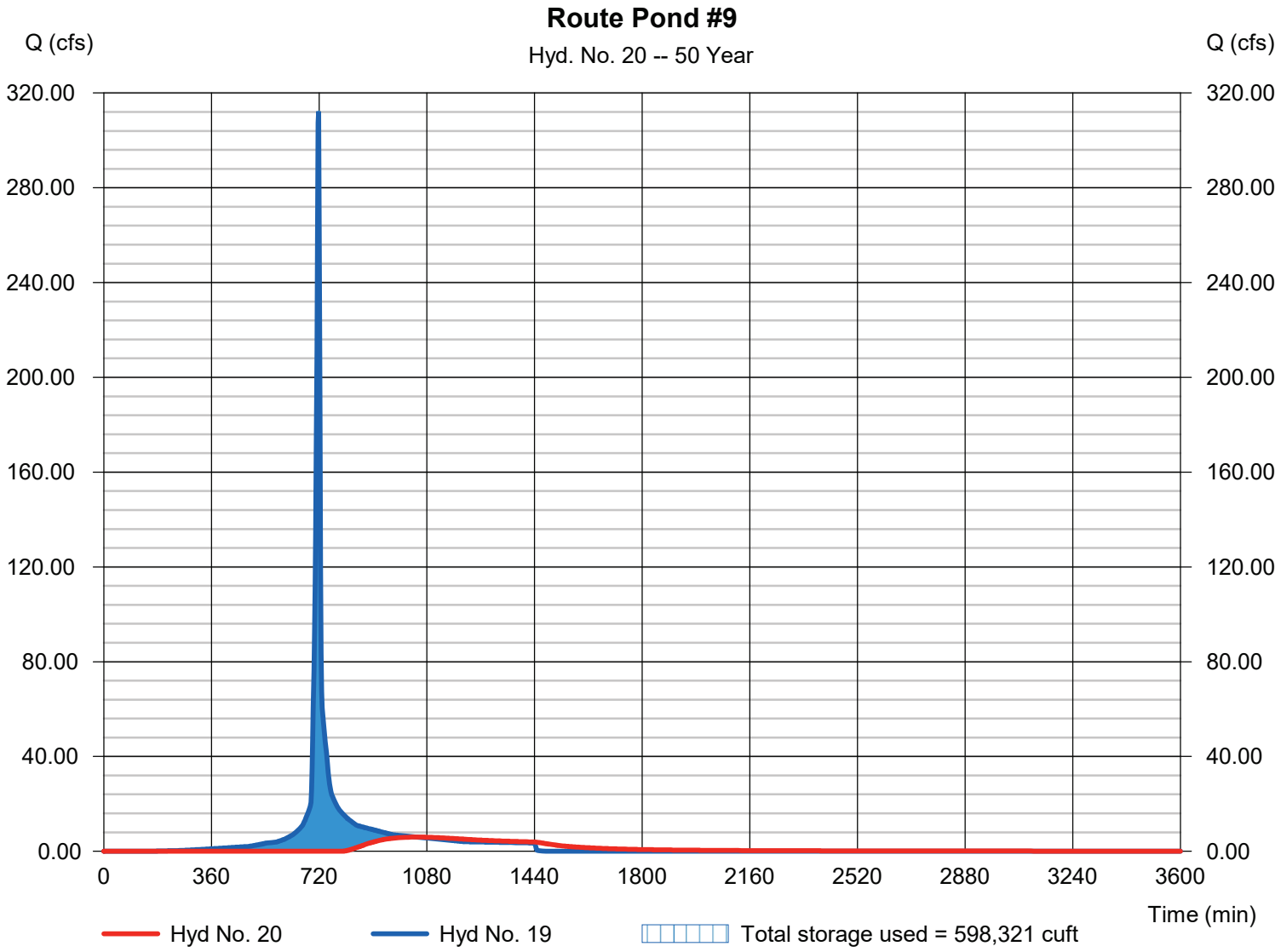
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 20

Route Pond #9

| | | | |
|---|---|---|---|
| Hydrograph type | = Reservoir | Peak discharge | = 5.982 cfs |
| Storm frequency | = 50 yrs | Time to peak | = 1046 min |
| Time interval | = 2 min | Hyd. volume | = 235,462 cuft |
| Inflow hyd. No. | = 19 - Total To Pond #9 - DP 001 | Max. Elevation | = 14.23 ft |
| Reservoir name | = Wet Pond #9 | Max. Storage | = 598,321 cuft |

Storage Indication method used.



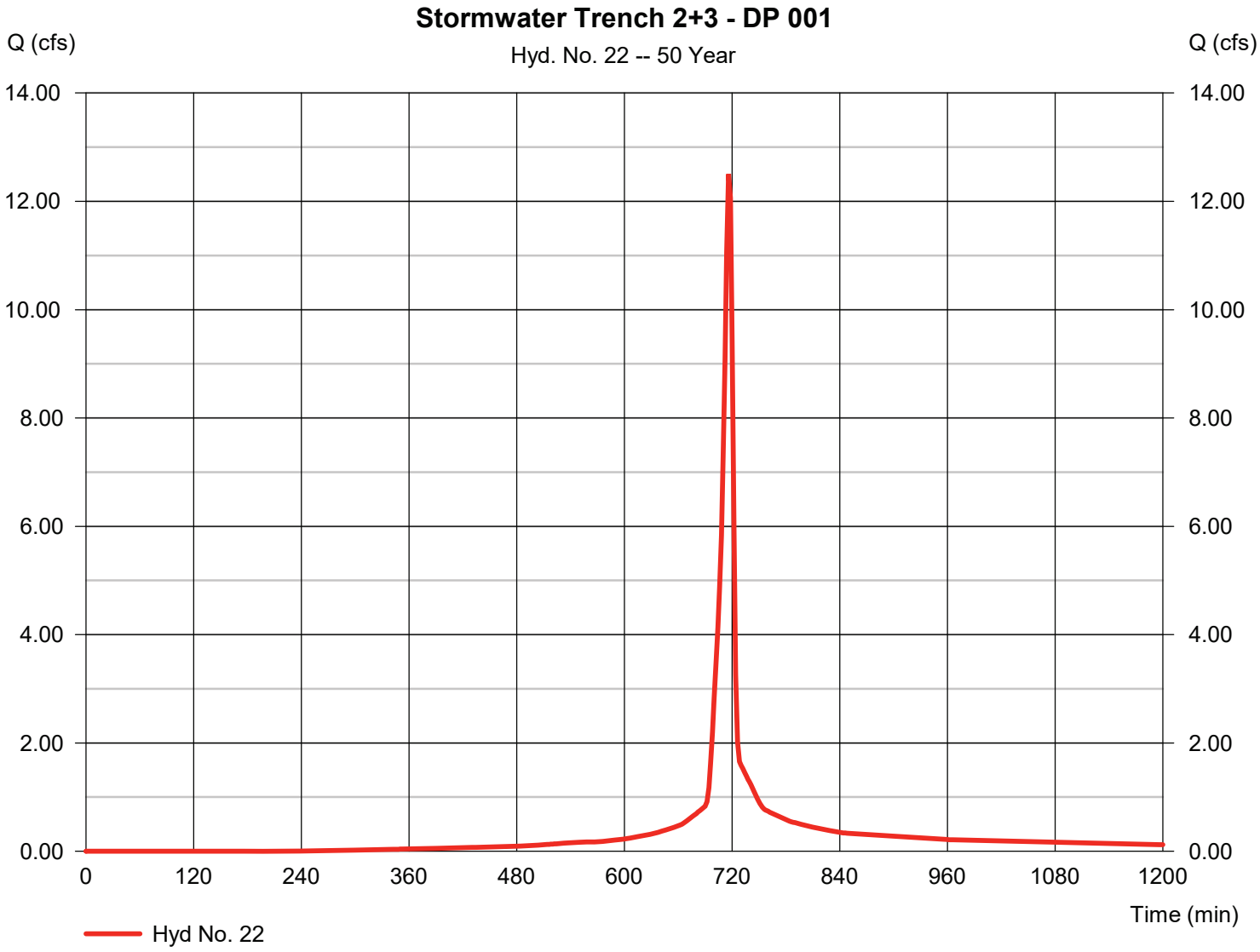
# Hydrograph Report



## Hyd. No. 22

Stormwater Trench 2+3 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 12.50 cfs |
| Storm frequency | = 50 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 26,818 cuft |
| Drainage area | = 1.590 ac | Curve number | = 87.5 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 6.40 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



# Hydrograph Report

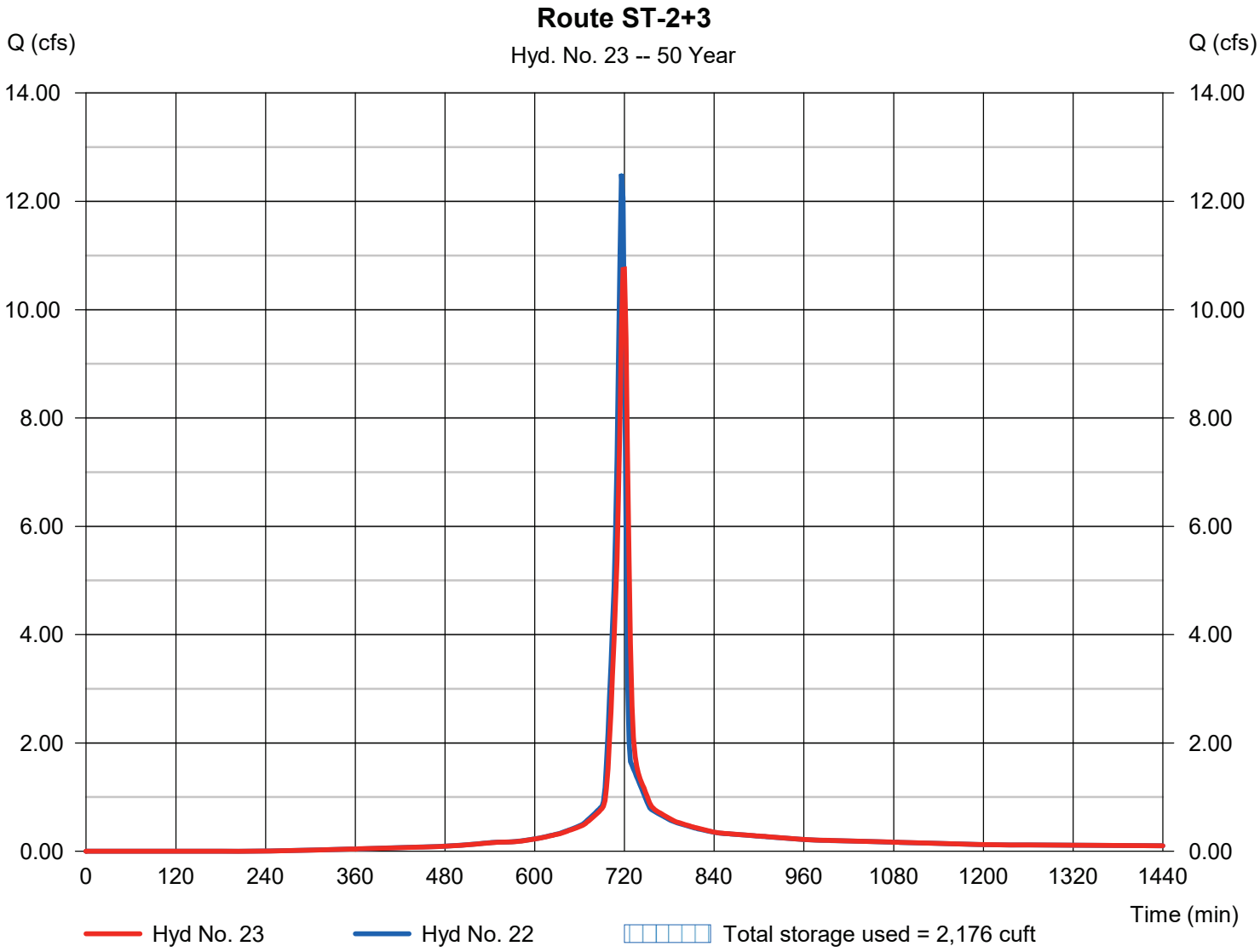
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 23

Route ST-2+3

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | Reservoir | Peak discharge | = | 10.75 cfs |
| Storm frequency | = | 50 yrs | Time to peak | = | 720 min |
| Time interval | = | 2 min | Hyd. volume | = | 26,818 cuft |
| Inflow hyd. No. | = | 22 - Stormwater Trench 2+3 - DP 2.0 | Max. Elevation | = | 16.76 ft |
| Reservoir name | = | Stormwater Trench ST-2+3 | Max. Storage | = | 2,176 cuft |

Storage Indication method used.



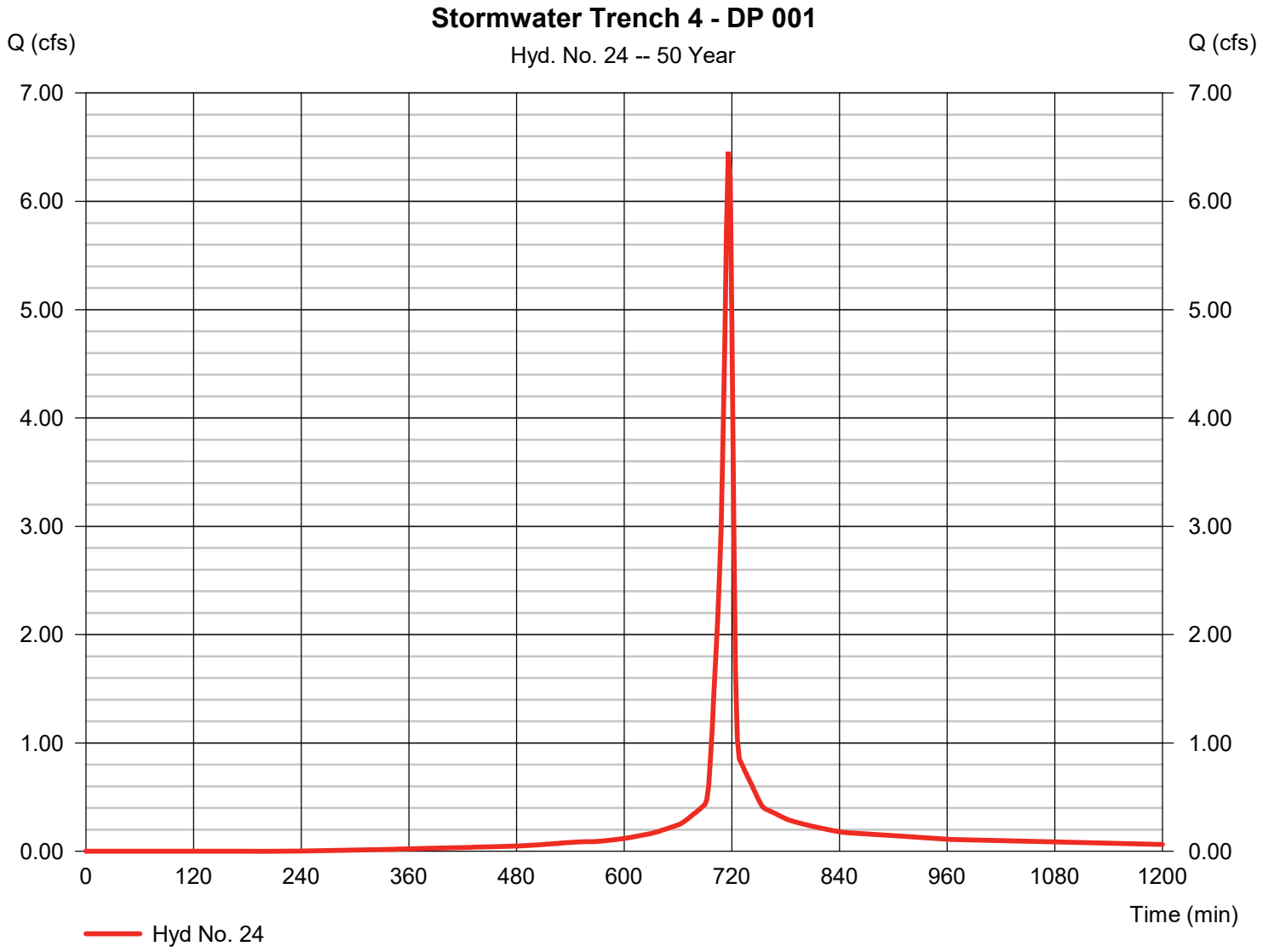
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 24

Stormwater Trench 4 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 6.459 cfs |
| Storm frequency | = 50 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 13,862 cuft |
| Drainage area | = 0.820 ac | Curve number | = 87.6 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 6.40 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



# Hydrograph Report

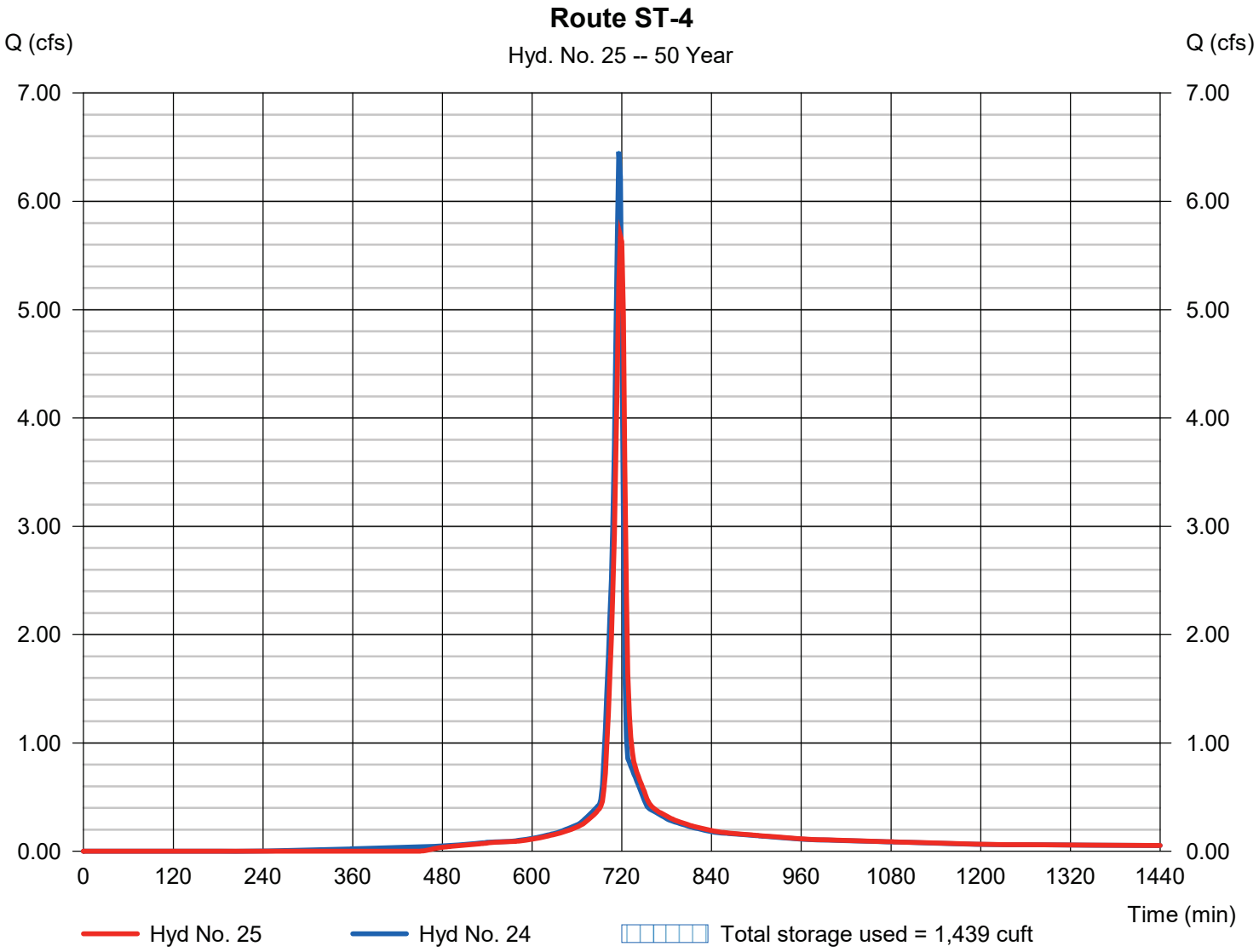
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 25

Route ST-4

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | Reservoir | Peak discharge | = | 5.679 cfs |
| Storm frequency | = | 50 yrs | Time to peak | = | 718 min |
| Time interval | = | 2 min | Hyd. volume | = | 13,608 cuft |
| Inflow hyd. No. | = | 24 - Stormwater Trench 4 - DP001 | Max. Elevation | = | 17.06 ft |
| Reservoir name | = | Stormwater Trench ST-4 | Max. Storage | = | 1,439 cuft |

Storage Indication method used.



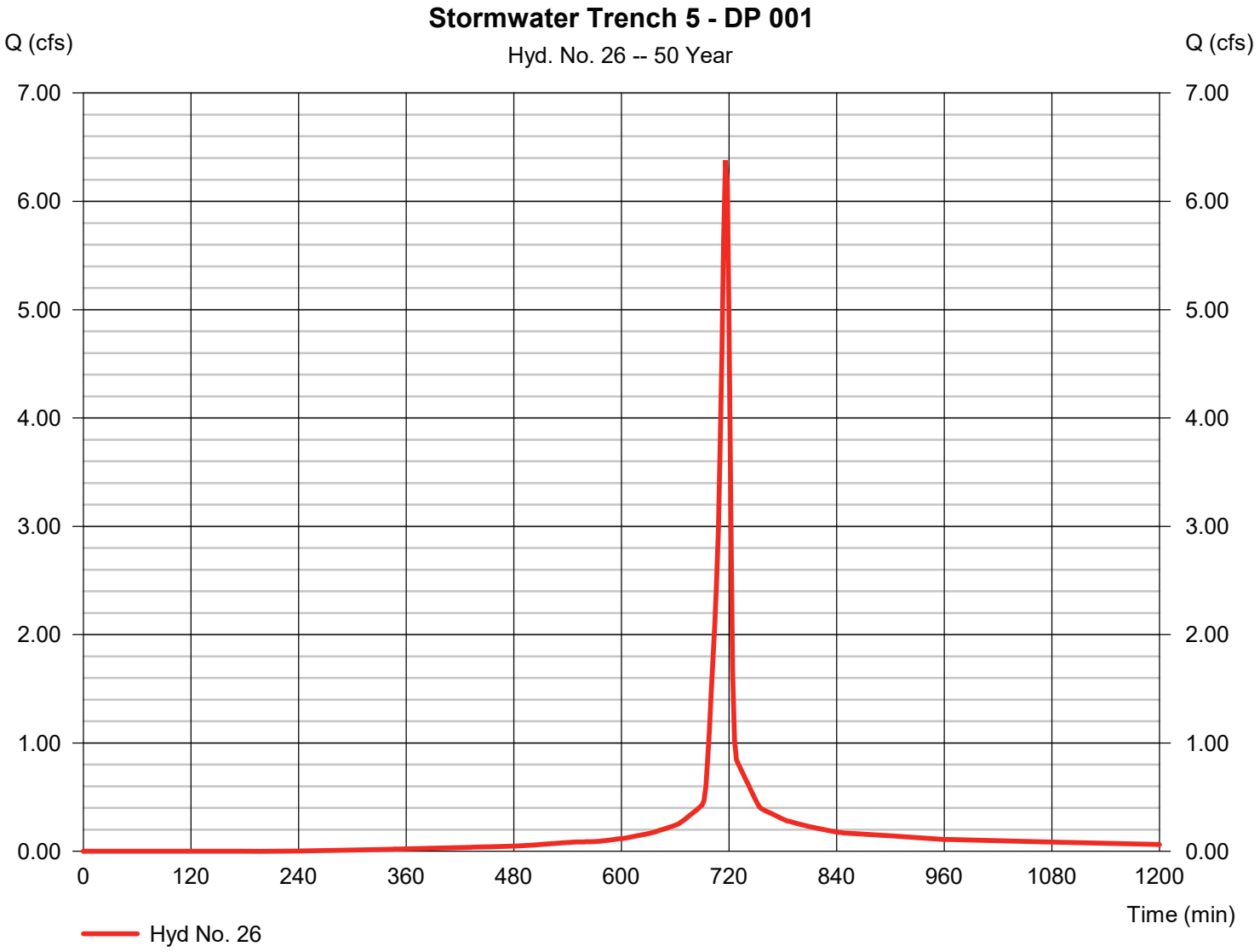
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 26

Stormwater Trench 5 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 6.380 cfs |
| Storm frequency | = 50 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 13,693 cuft |
| Drainage area | = 0.810 ac | Curve number | = 87.6 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 6.40 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



# Hydrograph Report

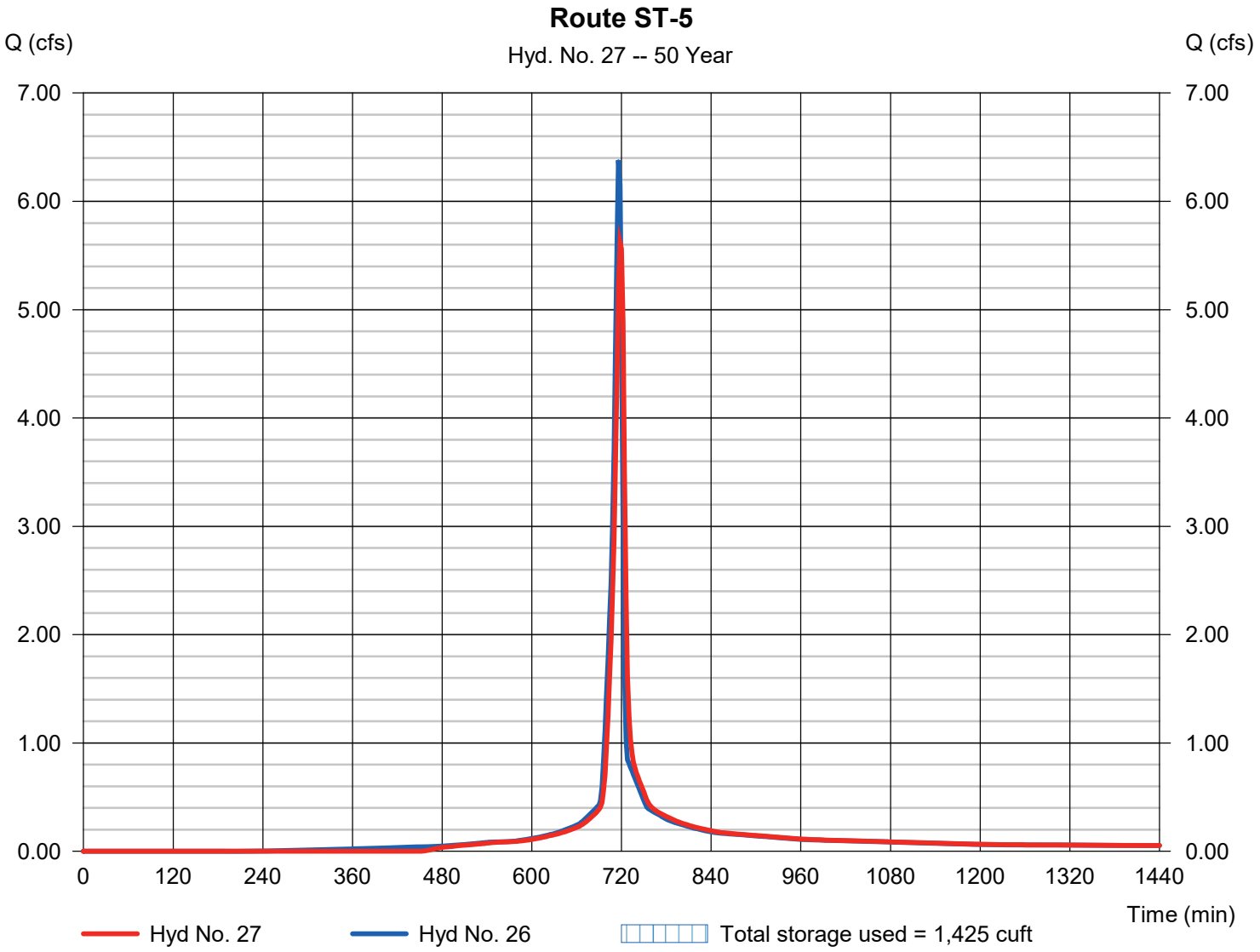
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 27

Route ST-5

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | Reservoir | Peak discharge | = | 5.618 cfs |
| Storm frequency | = | 50 yrs | Time to peak | = | 718 min |
| Time interval | = | 2 min | Hyd. volume | = | 13,439 cuft |
| Inflow hyd. No. | = | 26 - Stormwater Trench 5 - DP001 | Max. Elevation | = | 17.05 ft |
| Reservoir name | = | Stormwater Trench ST-5 | Max. Storage | = | 1,425 cuft |

Storage Indication method used.



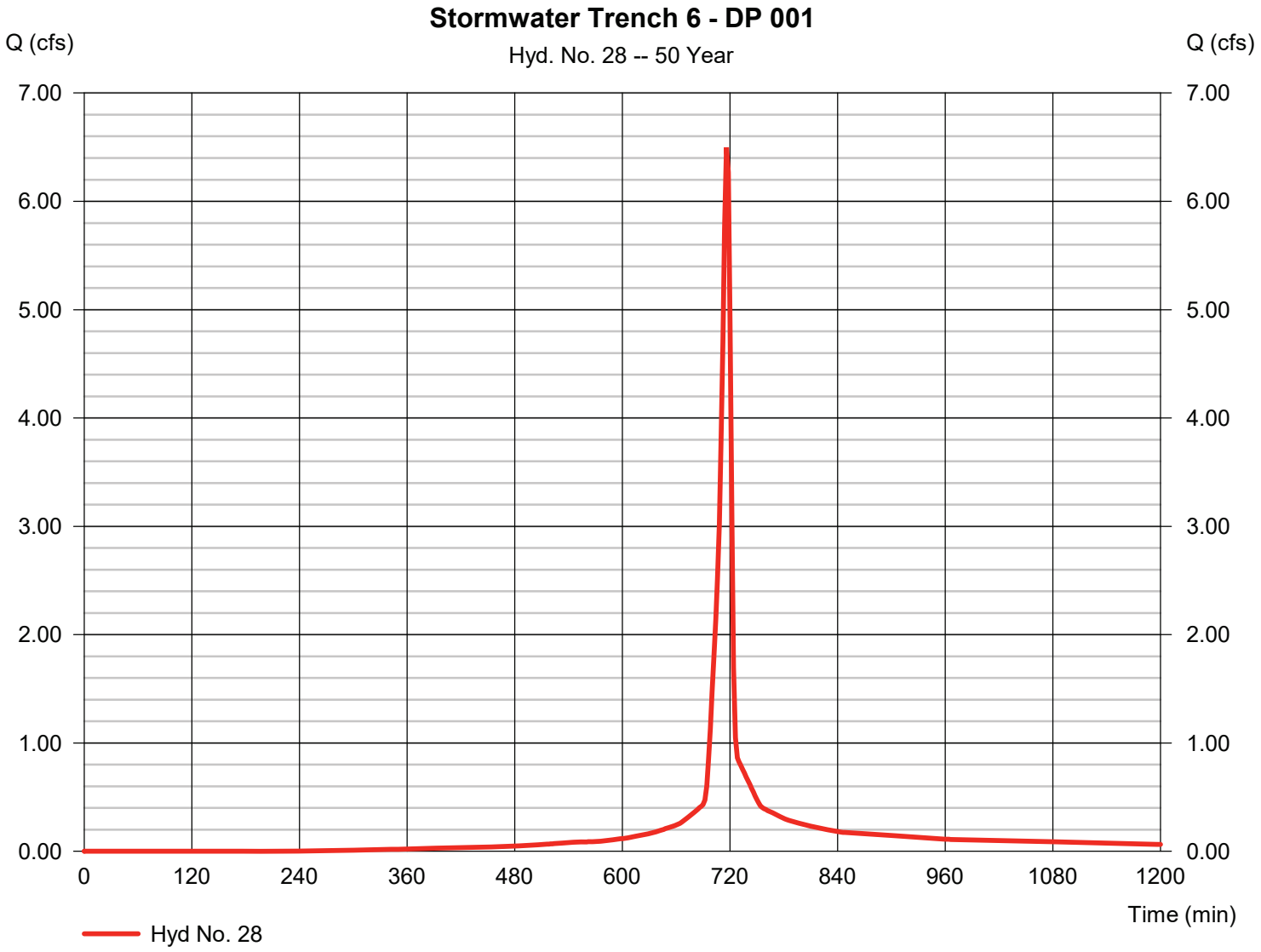
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 28

Stormwater Trench 6 - DP 001

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | SCS Runoff | Peak discharge | = | 6.497 cfs |
| Storm frequency | = | 50 yrs | Time to peak | = | 716 min |
| Time interval | = | 2 min | Hyd. volume | = | 13,906 cuft |
| Drainage area | = | 0.830 ac | Curve number | = | 87.2 |
| Basin Slope | = | 0.0 % | Hydraulic length | = | 0 ft |
| Tc method | = | User | Time of conc. (Tc) | = | 5.00 min |
| Total precip. | = | 6.40 in | Distribution | = | Type II |
| Storm duration | = | 24 hrs | Shape factor | = | 484 |



# Hydrograph Report

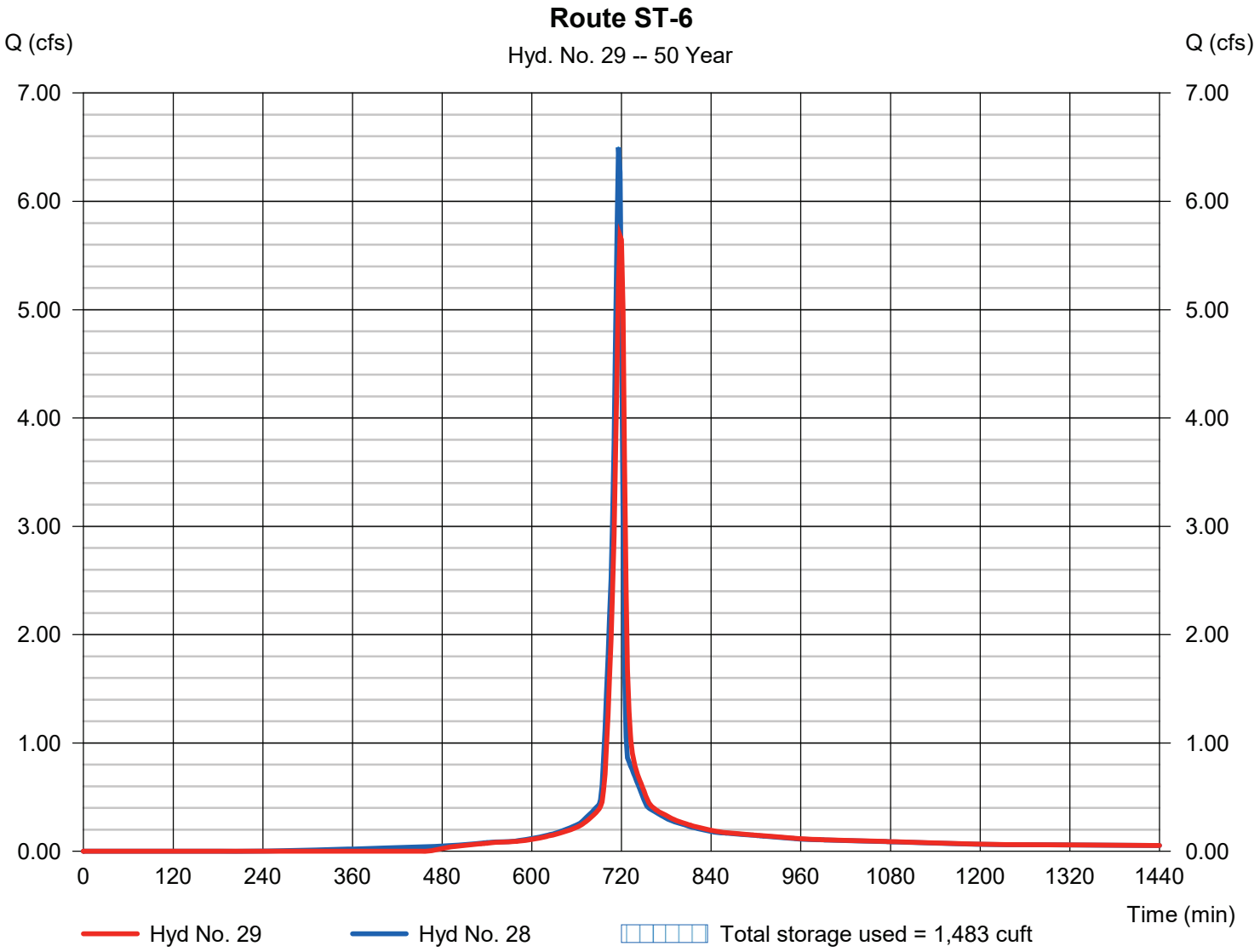
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 29

Route ST-6

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | Reservoir | Peak discharge | = | 5.681 cfs |
| Storm frequency | = | 50 yrs | Time to peak | = | 718 min |
| Time interval | = | 2 min | Hyd. volume | = | 13,644 cuft |
| Inflow hyd. No. | = | 28 - Stormwater Trench 6 - DP-001 | Max. Elevation | = | 17.06 ft |
| Reservoir name | = | Stormwater Trench ST-6 | Max. Storage | = | 1,483 cuft |

Storage Indication method used.



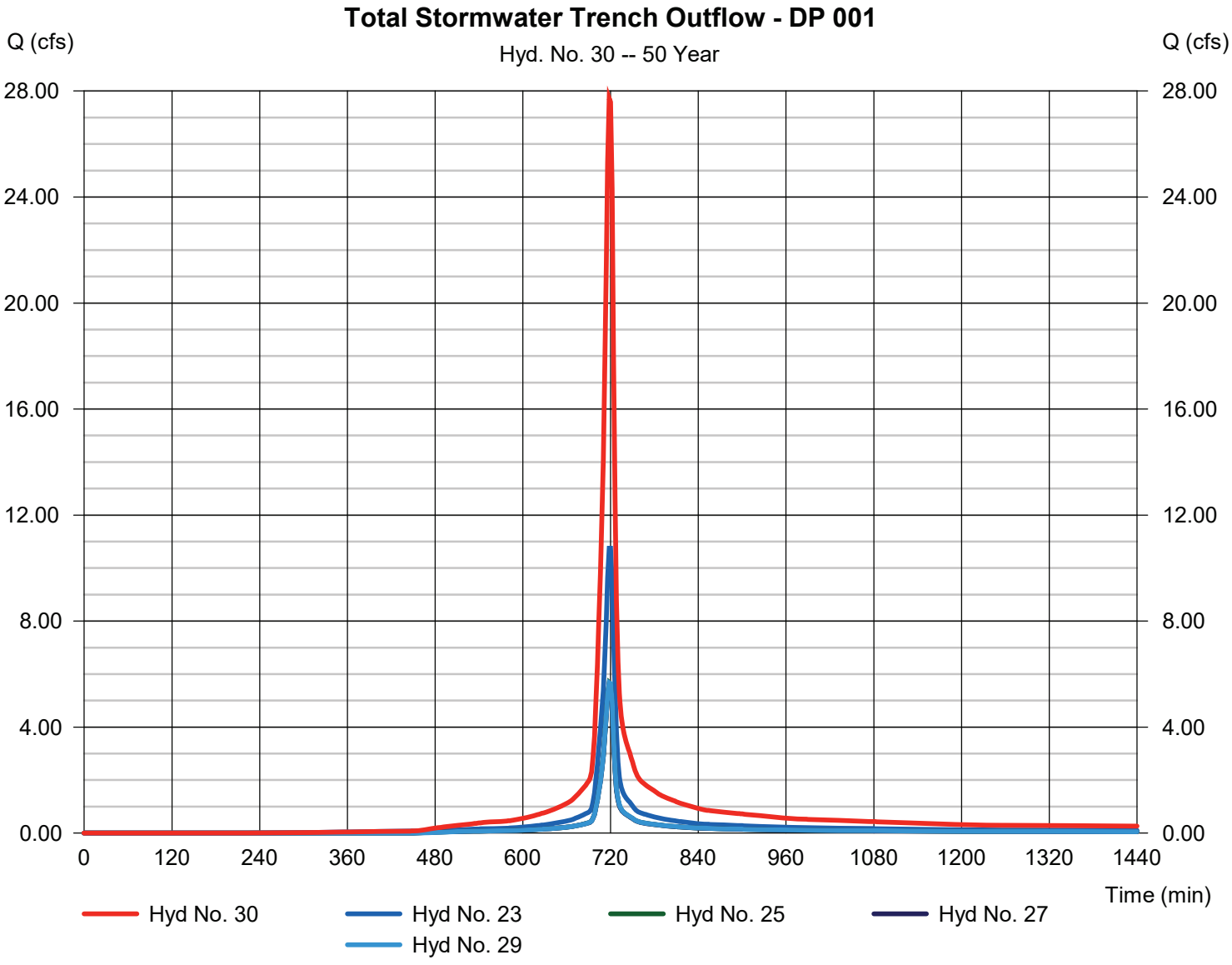
# Hydrograph Report



## Hyd. No. 30

Total Stormwater Trench Outflow - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 27.72 cfs |
| Storm frequency | = 50 yrs | Time to peak | = 718 min |
| Time interval | = 2 min | Hyd. volume | = 67,508 cuft |
| Inflow hyds. | = 23, 25, 27, 29 | Contrib. drain. area | = 0.000 ac |



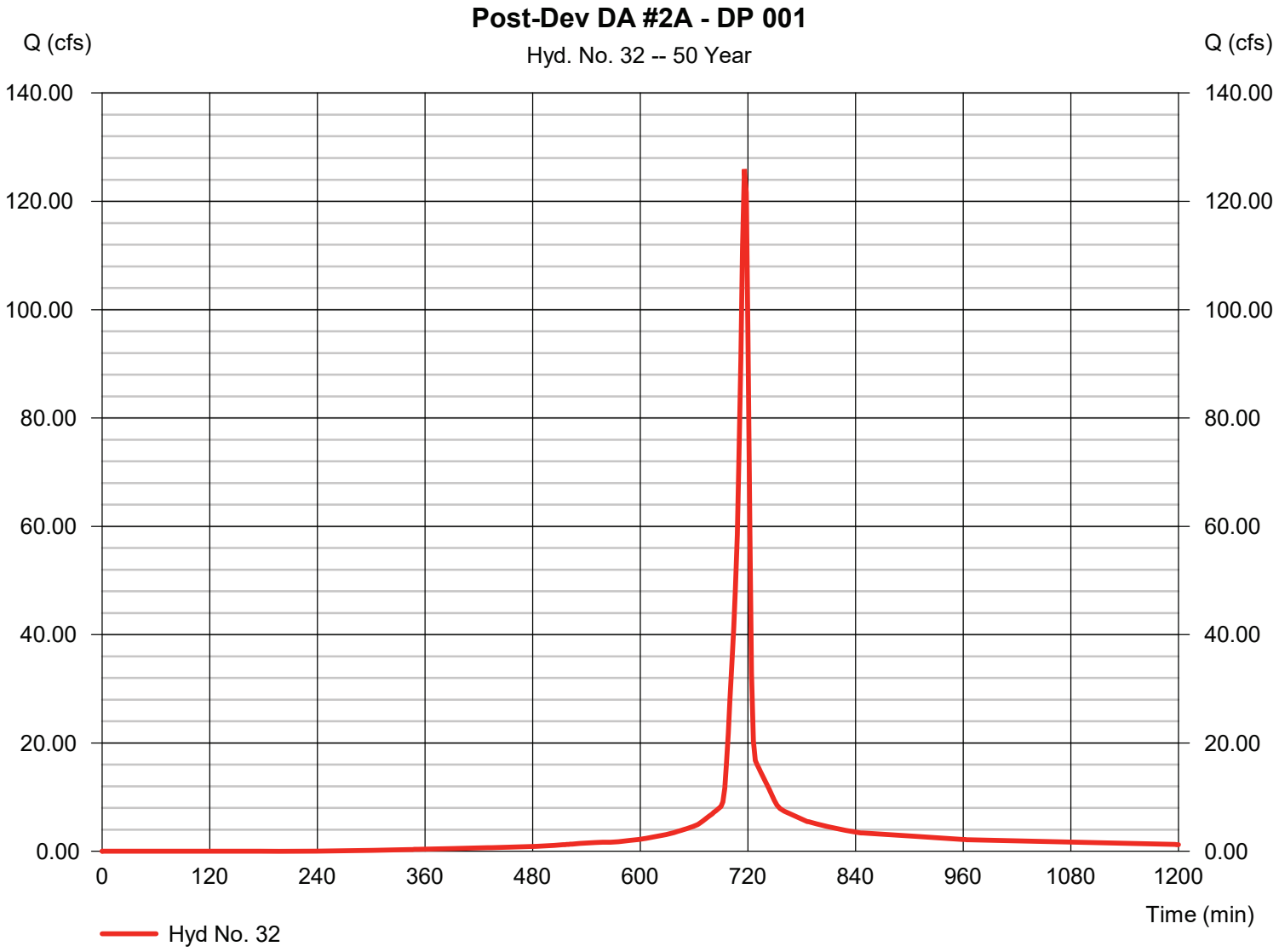
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 32

Post-Dev DA #2A - DP 001

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | SCS Runoff | Peak discharge | = | 125.94 cfs |
| Storm frequency | = | 50 yrs | Time to peak | = | 716 min |
| Time interval | = | 2 min | Hyd. volume | = | 268,802 cuft |
| Drainage area | = | 16.190 ac | Curve number | = | 86.8 |
| Basin Slope | = | 0.0 % | Hydraulic length | = | 0 ft |
| Tc method | = | User | Time of conc. (Tc) | = | 5.00 min |
| Total precip. | = | 6.40 in | Distribution | = | Type II |
| Storm duration | = | 24 hrs | Shape factor | = | 484 |



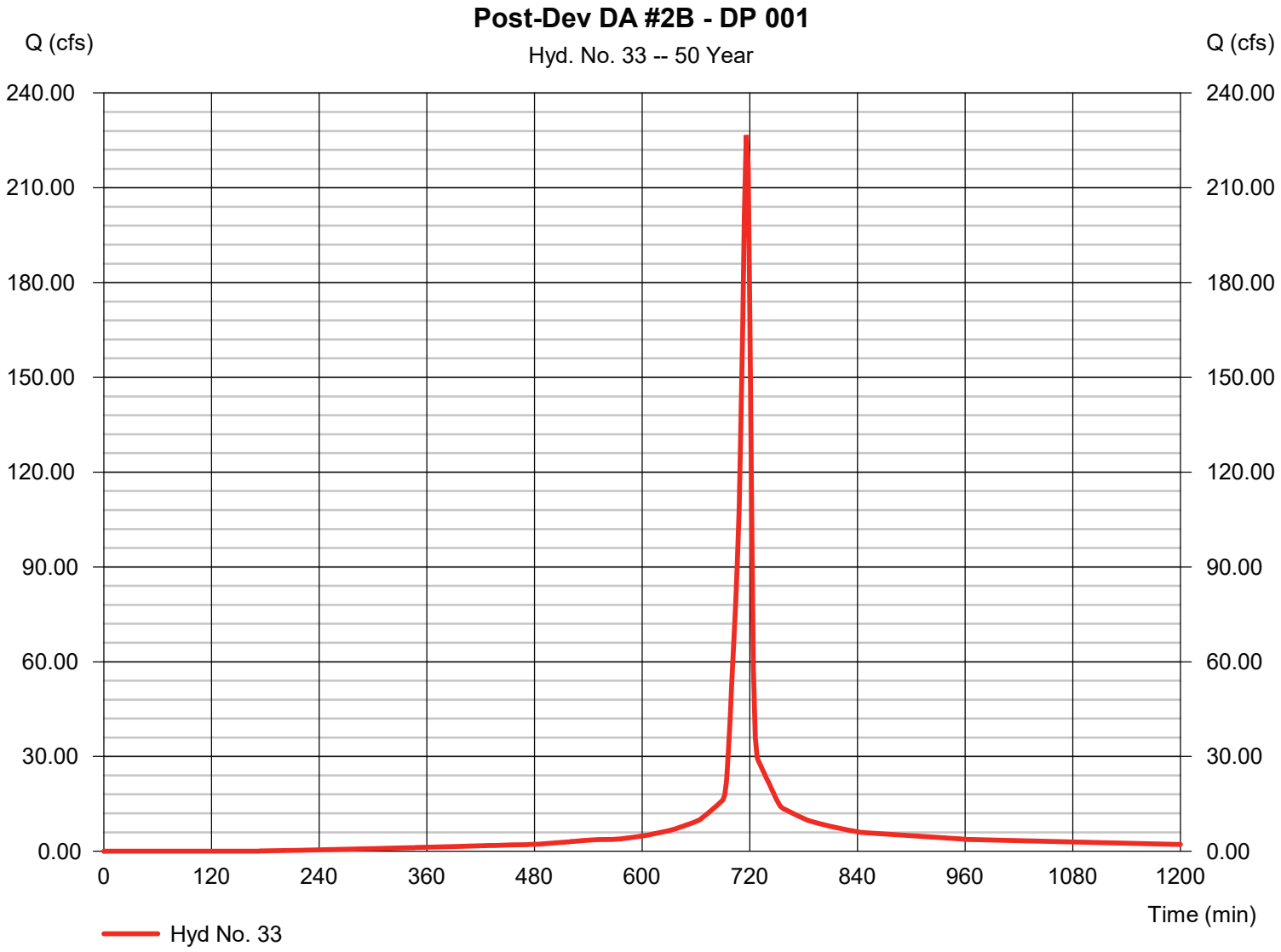
# Hydrograph Report



## Hyd. No. 33

Post-Dev DA #2B - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 226.69 cfs |
| Storm frequency | = 50 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 501,274 cuft |
| Drainage area | = 27.420 ac | Curve number | = 91.2 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 6.40 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



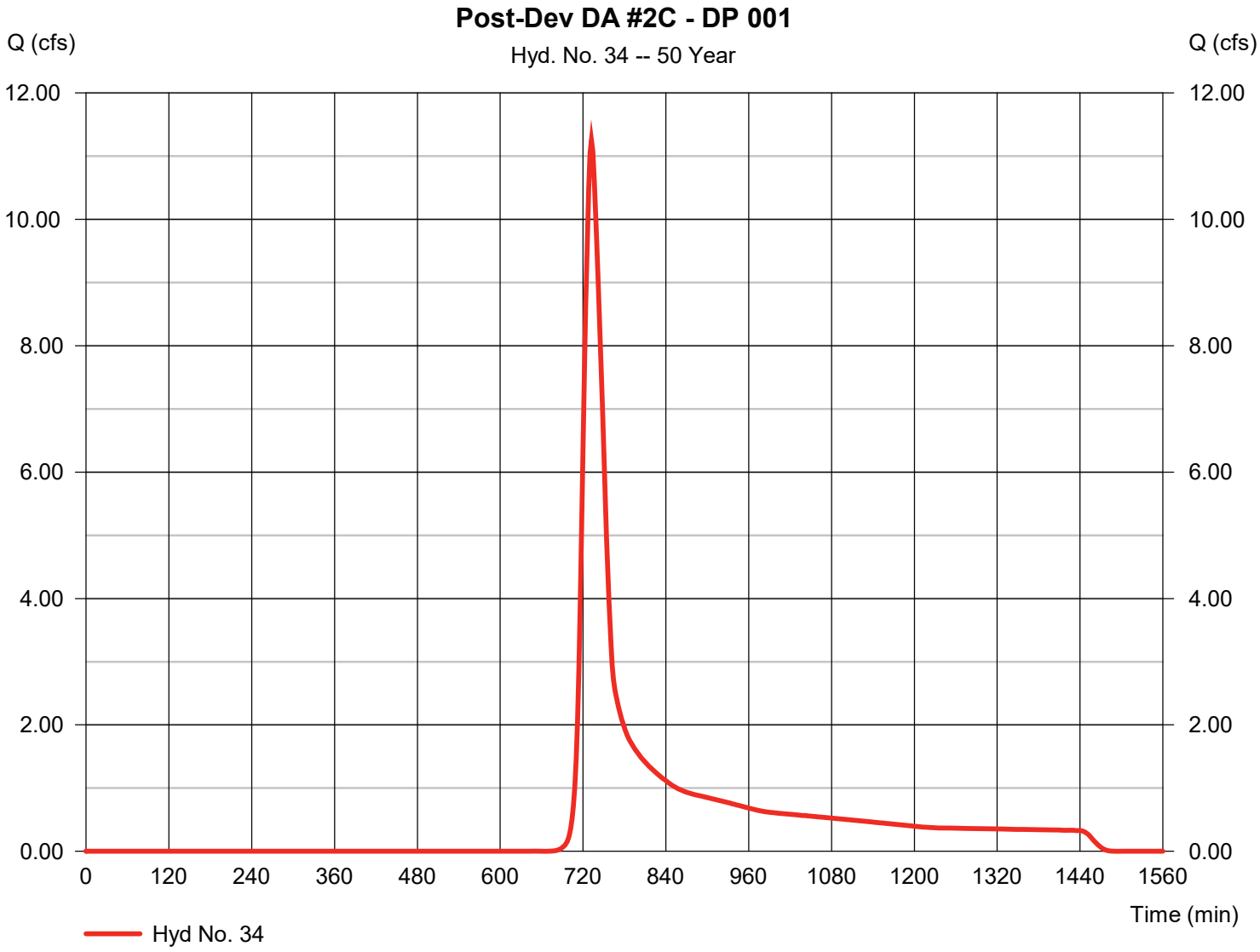
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 34

Post-Dev DA #2C - DP 001

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | SCS Runoff | Peak discharge | = | 11.25 cfs |
| Storm frequency | = | 50 yrs | Time to peak | = | 732 min |
| Time interval | = | 2 min | Hyd. volume | = | 49,503 cuft |
| Drainage area | = | 7.420 ac | Curve number | = | 56 |
| Basin Slope | = | 0.0 % | Hydraulic length | = | 0 ft |
| Tc method | = | TR55 | Time of conc. (Tc) | = | 28.30 min |
| Total precip. | = | 6.40 in | Distribution | = | Type II |
| Storm duration | = | 24 hrs | Shape factor | = | 484 |



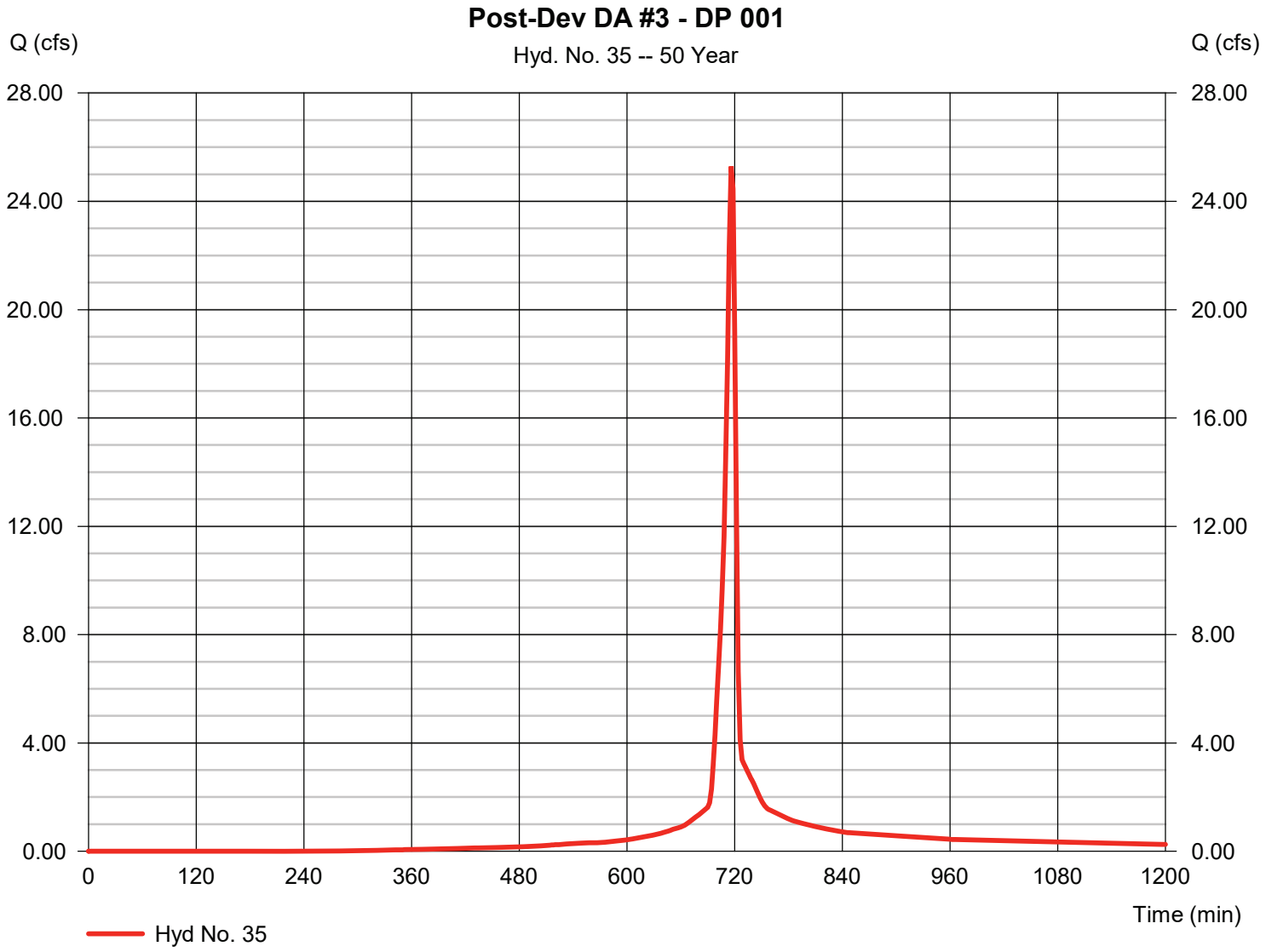
# Hydrograph Report



## Hyd. No. 35

Post-Dev DA #3 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 25.29 cfs |
| Storm frequency | = 50 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 53,592 cuft |
| Drainage area | = 3.310 ac | Curve number | = 85.7 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 6.40 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



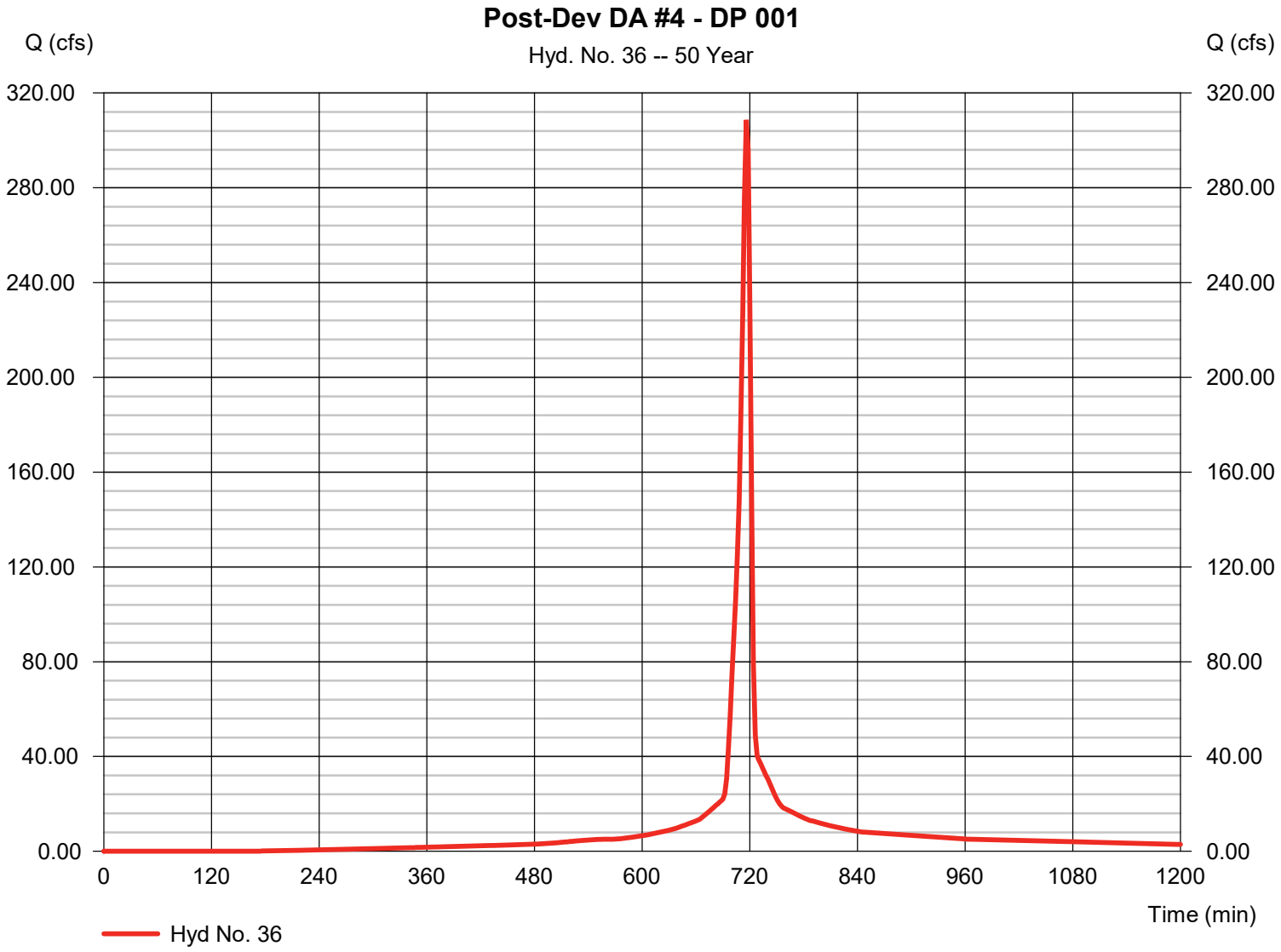
# Hydrograph Report



## Hyd. No. 36

Post-Dev DA #4 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 308.67 cfs |
| Storm frequency | = 50 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 681,910 cuft |
| Drainage area | = 37.380 ac | Curve number | = 91.1 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 6.40 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



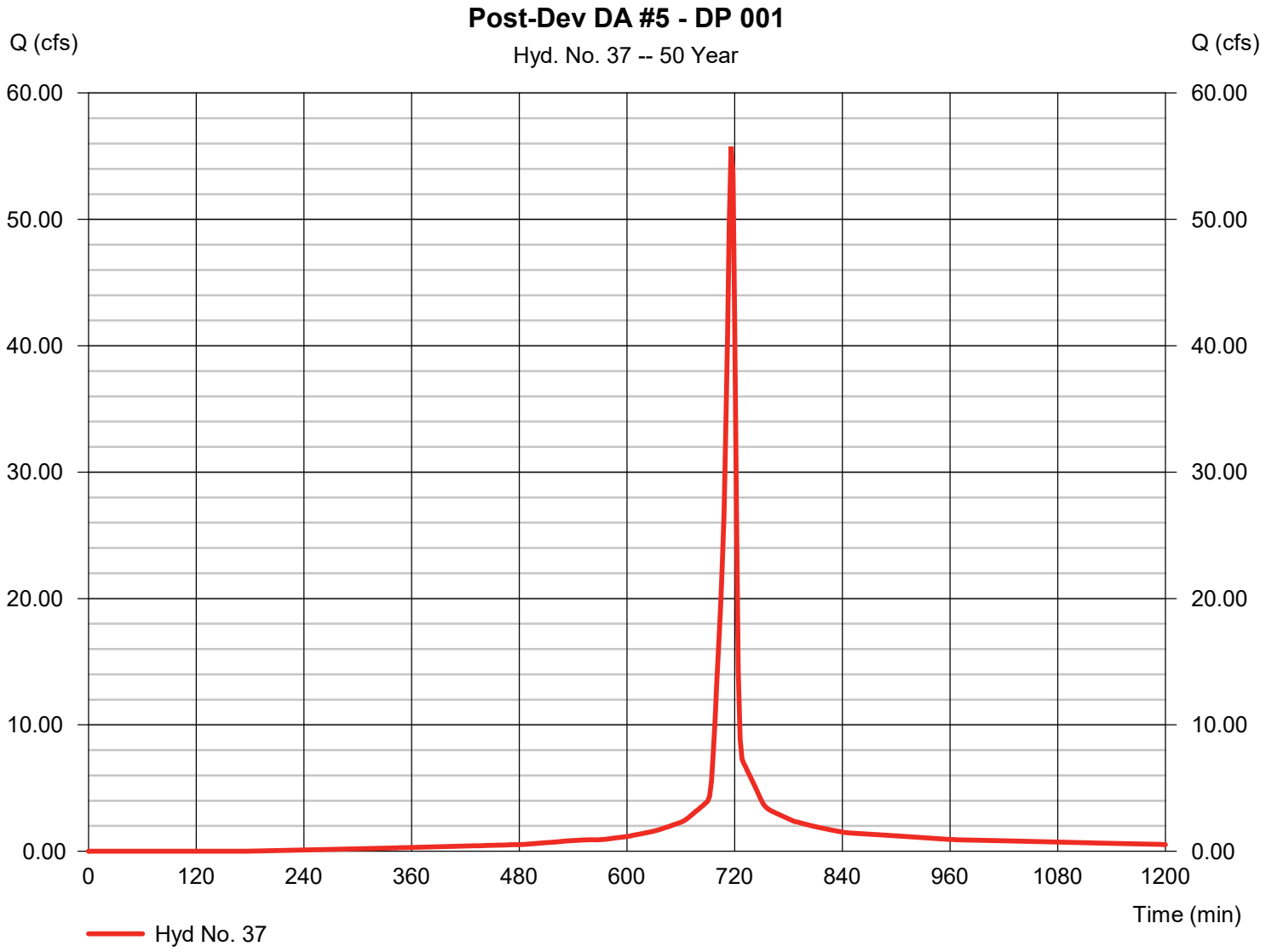
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 37

Post-Dev DA #5 - DP 001

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | SCS Runoff | Peak discharge | = | 55.77 cfs |
| Storm frequency | = | 50 yrs | Time to peak | = | 716 min |
| Time interval | = | 2 min | Hyd. volume | = | 122,980 cuft |
| Drainage area | = | 6.770 ac | Curve number | = | 90.9 |
| Basin Slope | = | 0.0 % | Hydraulic length | = | 0 ft |
| Tc method | = | User | Time of conc. (Tc) | = | 5.00 min |
| Total precip. | = | 6.40 in | Distribution | = | Type II |
| Storm duration | = | 24 hrs | Shape factor | = | 484 |



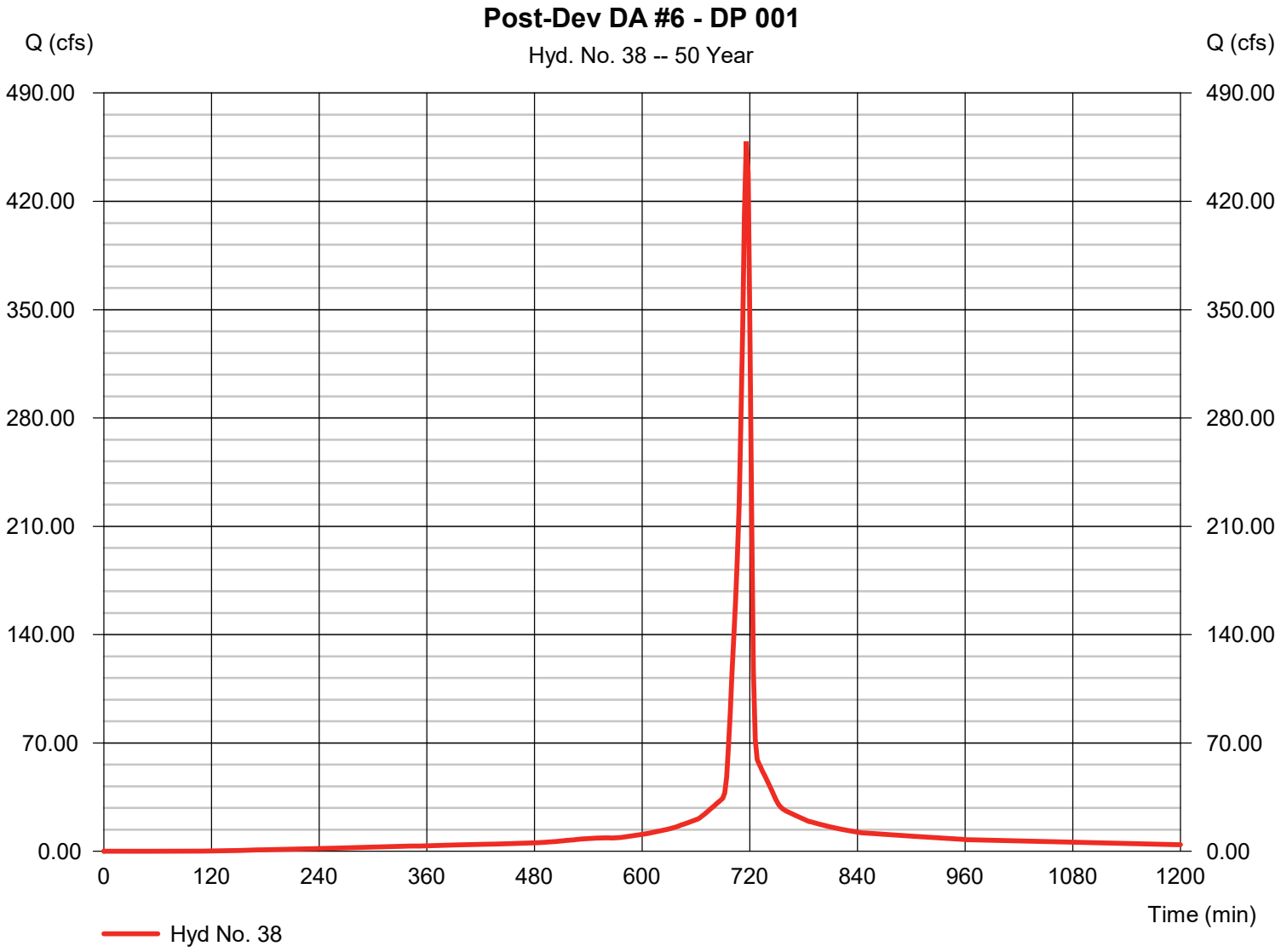
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 38

Post-Dev DA #6 - DP 001

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | SCS Runoff | Peak discharge | = | 458.72 cfs |
| Storm frequency | = | 50 yrs | Time to peak | = | 716 min |
| Time interval | = | 2 min | Hyd. volume | = | 1,045,992 cuft |
| Drainage area | = | 53.880 ac | Curve number | = | 94.1 |
| Basin Slope | = | 0.0 % | Hydraulic length | = | 0 ft |
| Tc method | = | User | Time of conc. (Tc) | = | 5.00 min |
| Total precip. | = | 6.40 in | Distribution | = | Type II |
| Storm duration | = | 24 hrs | Shape factor | = | 484 |



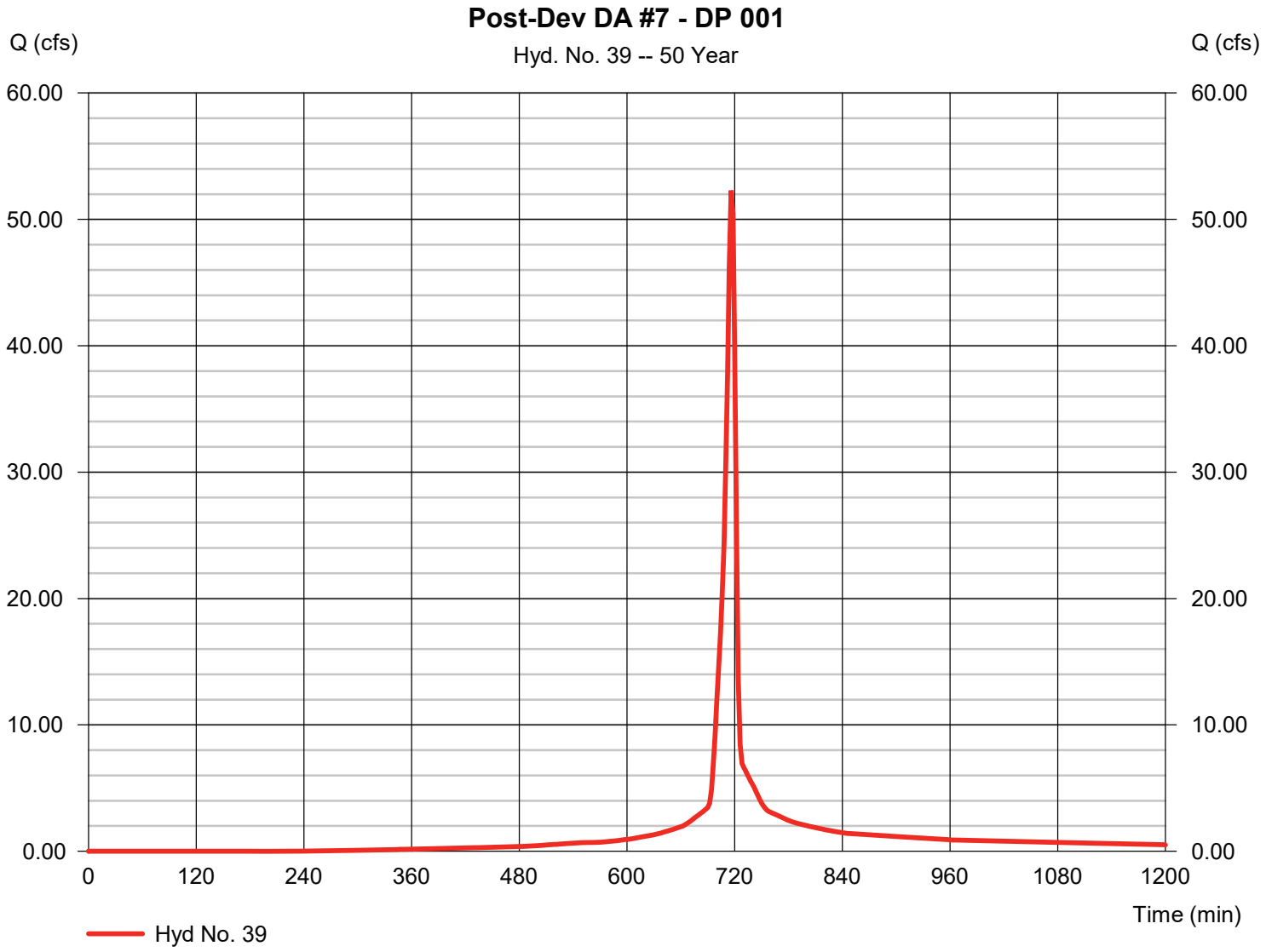
# Hydrograph Report



## Hyd. No. 39

Post-Dev DA #7 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 52.29 cfs |
| Storm frequency | = 50 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 111,829 cuft |
| Drainage area | = 6.690 ac | Curve number | = 87.1 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 6.40 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



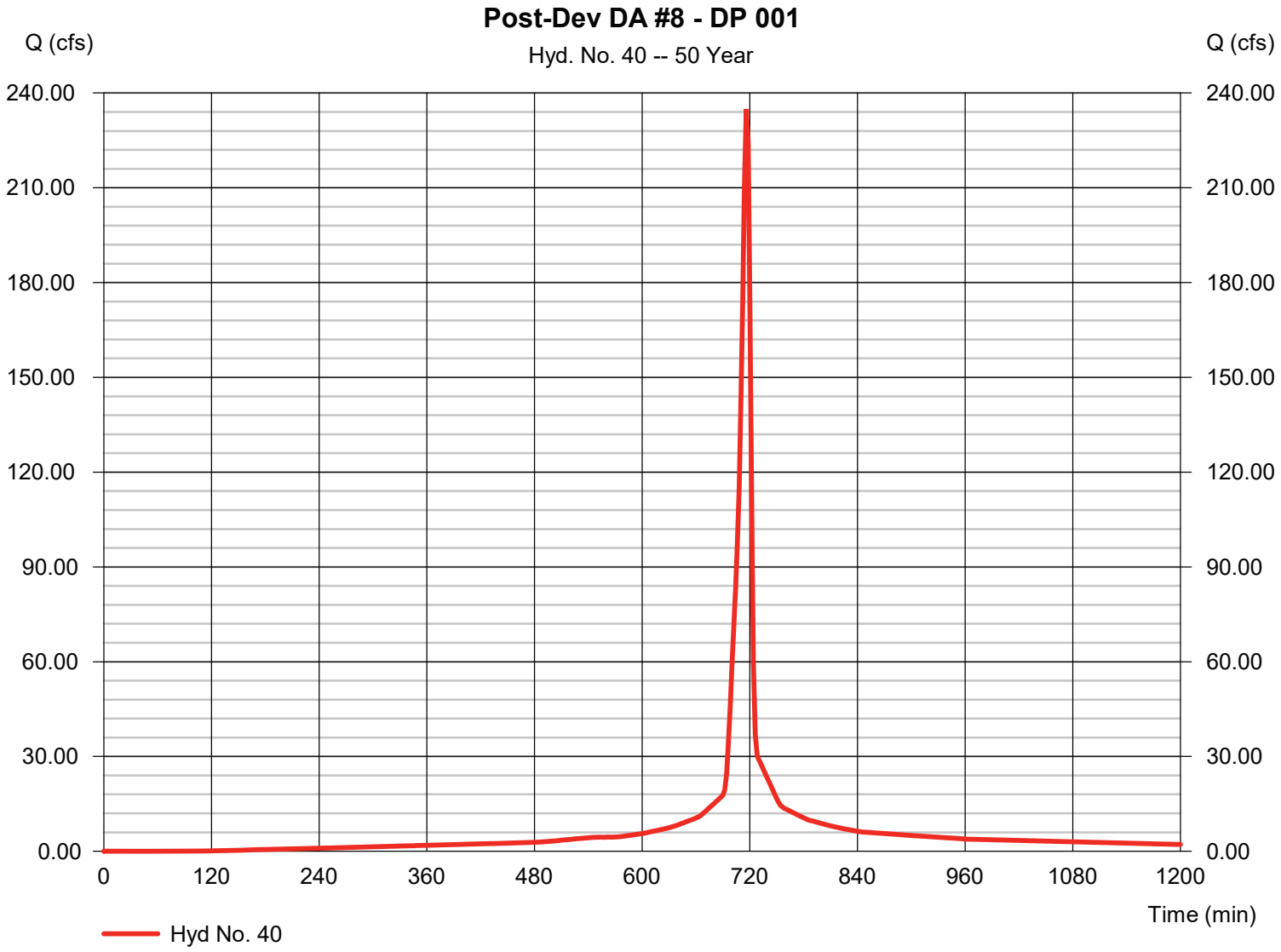
# Hydrograph Report



## Hyd. No. 40

Post-Dev DA #8 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 234.97 cfs |
| Storm frequency | = 50 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 537,706 cuft |
| Drainage area | = 27.530 ac | Curve number | = 94.4 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 6.40 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



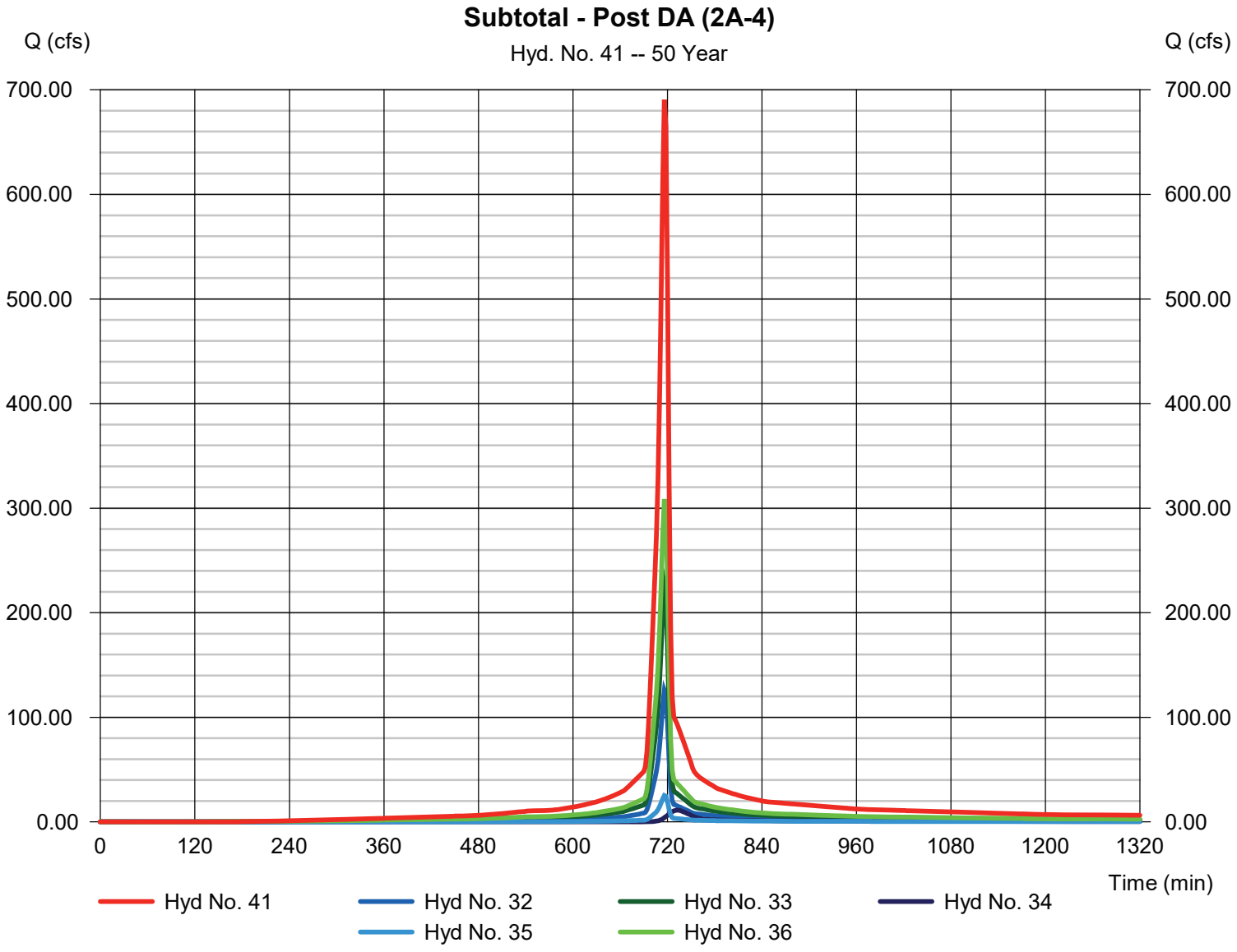
# Hydrograph Report



## Hyd. No. 41

Subtotal - Post DA (2A-4)

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | Combine | Peak discharge | = | 690.52 cfs |
| Storm frequency | = | 50 yrs | Time to peak | = | 716 min |
| Time interval | = | 2 min | Hyd. volume | = | 1,555,082 cuft |
| Inflow hyds. | = | 32, 33, 34, 35, 36 | Contrib. drain. area | = | 91.720 ac |



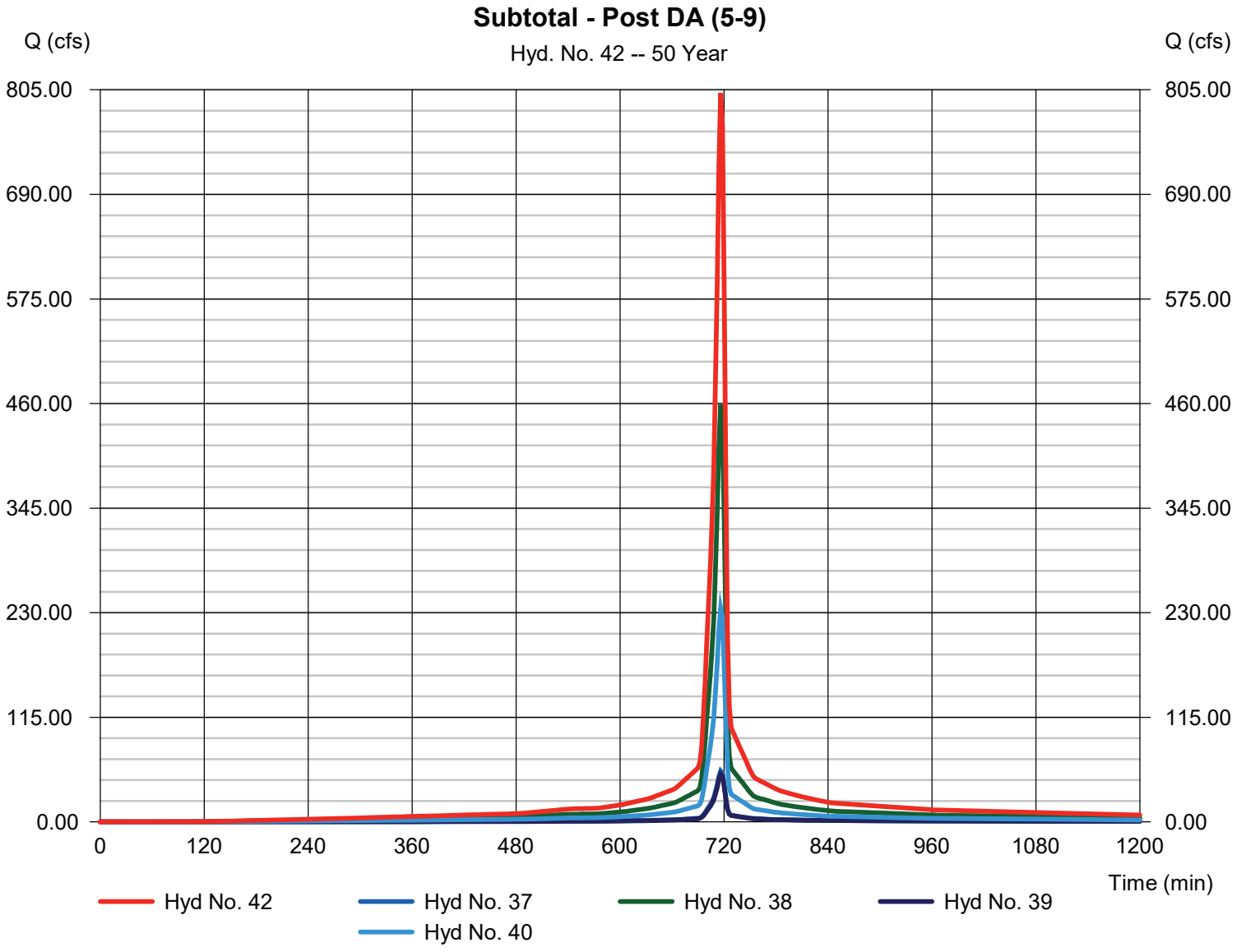
# Hydrograph Report



## Hyd. No. 42

Subtotal - Post DA (5-9)

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 801.75 cfs |
| Storm frequency | = 50 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 1,818,506 cuft |
| Inflow hyds. | = 37, 38, 39, 40 | Contrib. drain. area | = 94.870 ac |



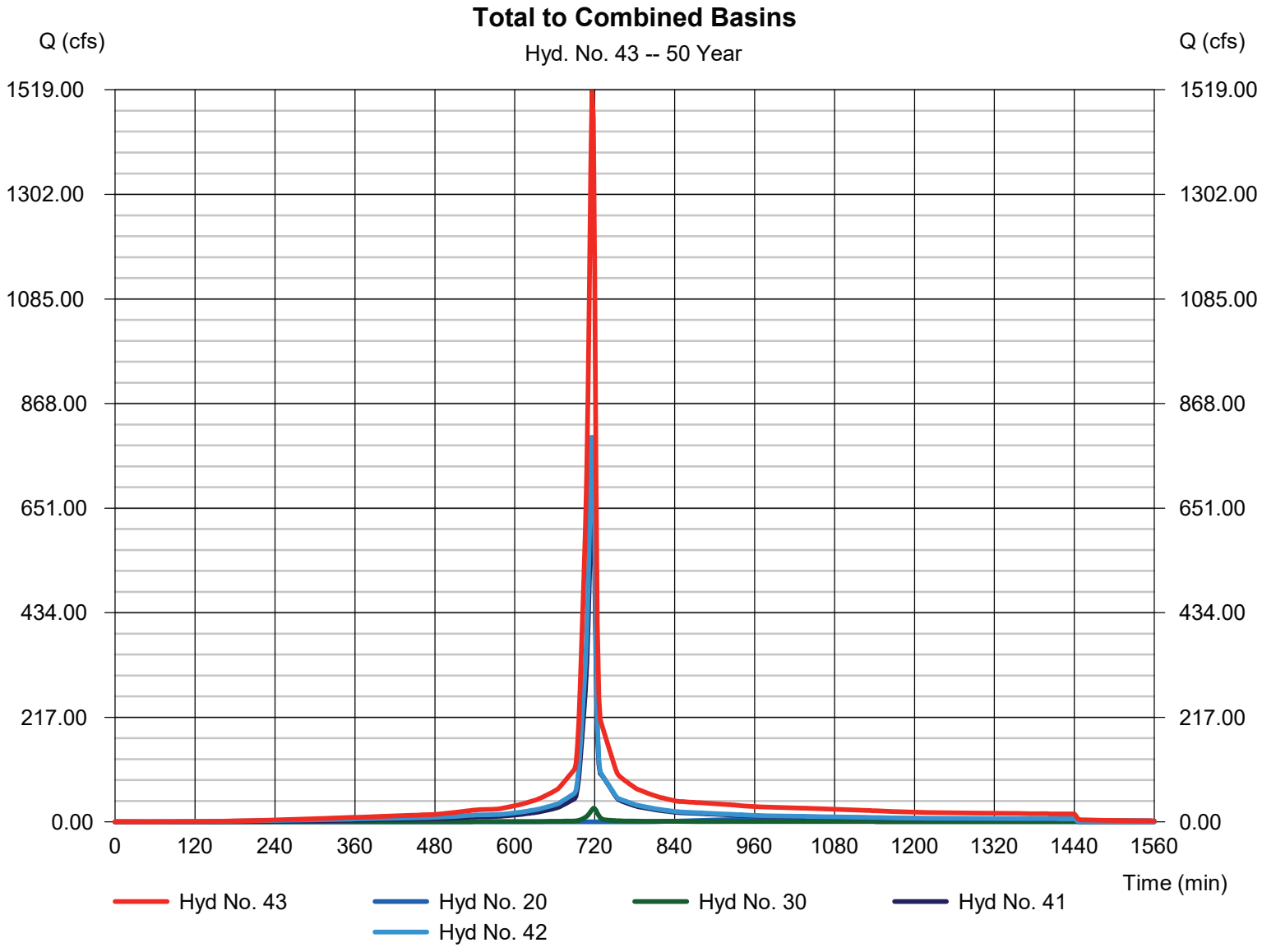
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 43

Total to Combined Basins

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 1517.57 cfs |
| Storm frequency | = 50 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 3,676,561 cuft |
| Inflow hyds. | = 20, 30, 41, 42 | Contrib. drain. area | = 0.000 ac |



# Hydrograph Report

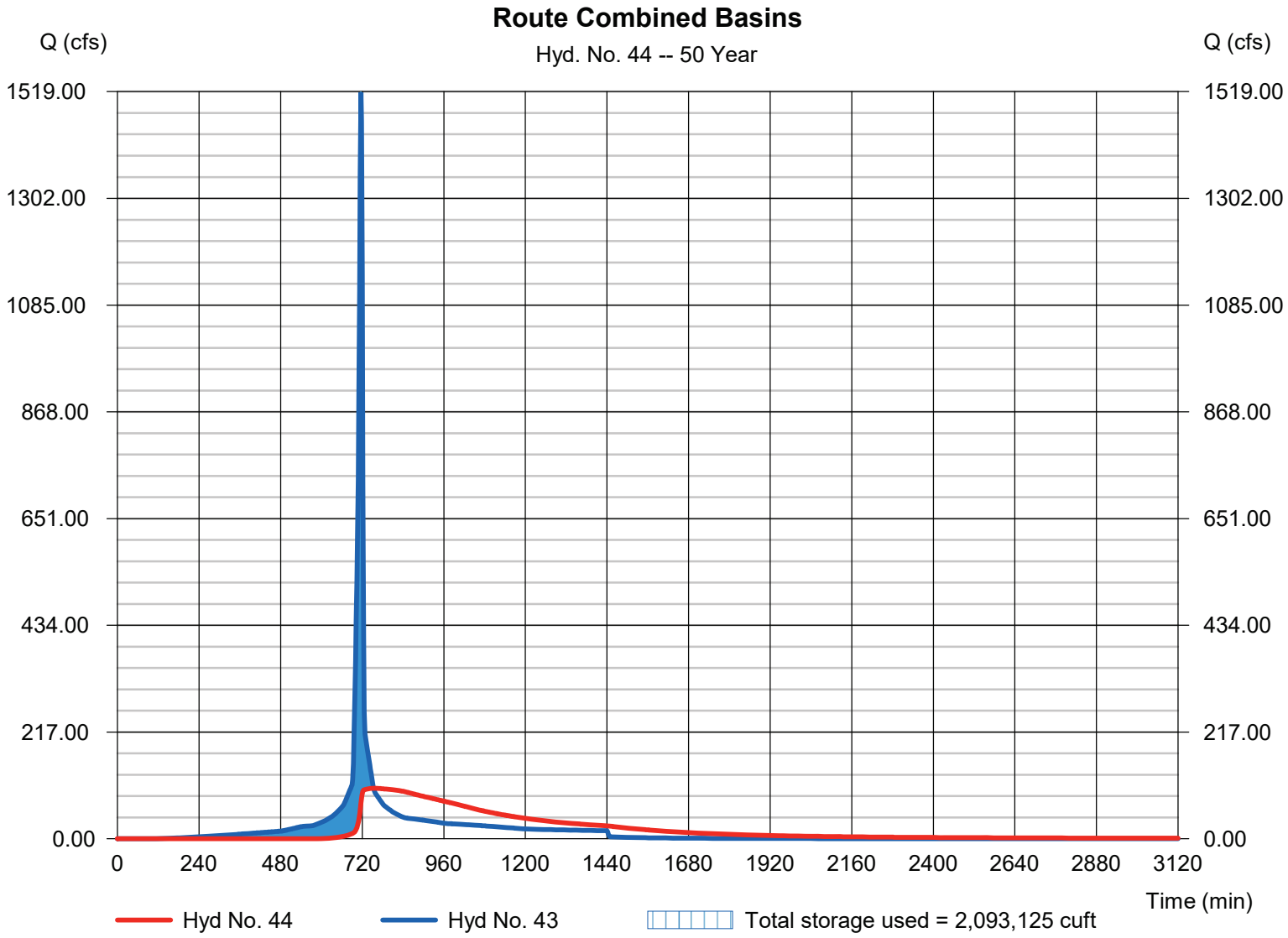
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 44

Route Combined Basins

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | Reservoir | Peak discharge | = | 102.59 cfs |
| Storm frequency | = | 50 yrs | Time to peak | = | 754 min |
| Time interval | = | 2 min | Hyd. volume | = | 3,370,070 cuft |
| Inflow hyd. No. | = | 43 - Total to Combined Basins | Max. Elevation | = | 15.64 ft |
| Reservoir name | = | Combined Basins | Max. Storage | = | 2,093,125 cuft |

Storage Indication method used.



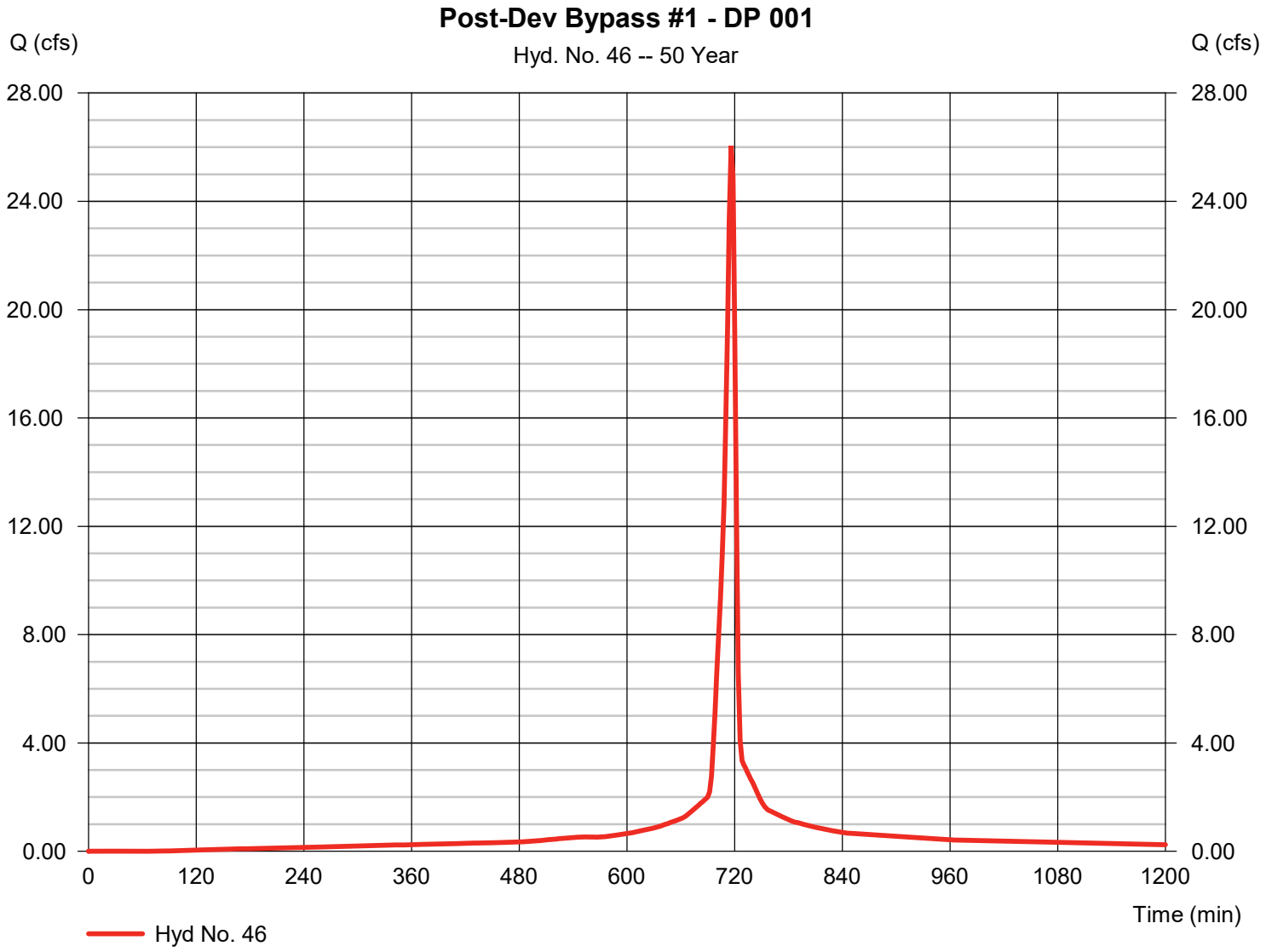
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 46

Post-Dev Bypass #1 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 26.06 cfs |
| Storm frequency | = 50 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 60,782 cuft |
| Drainage area | = 3.020 ac | Curve number | = 95.9 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 6.40 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



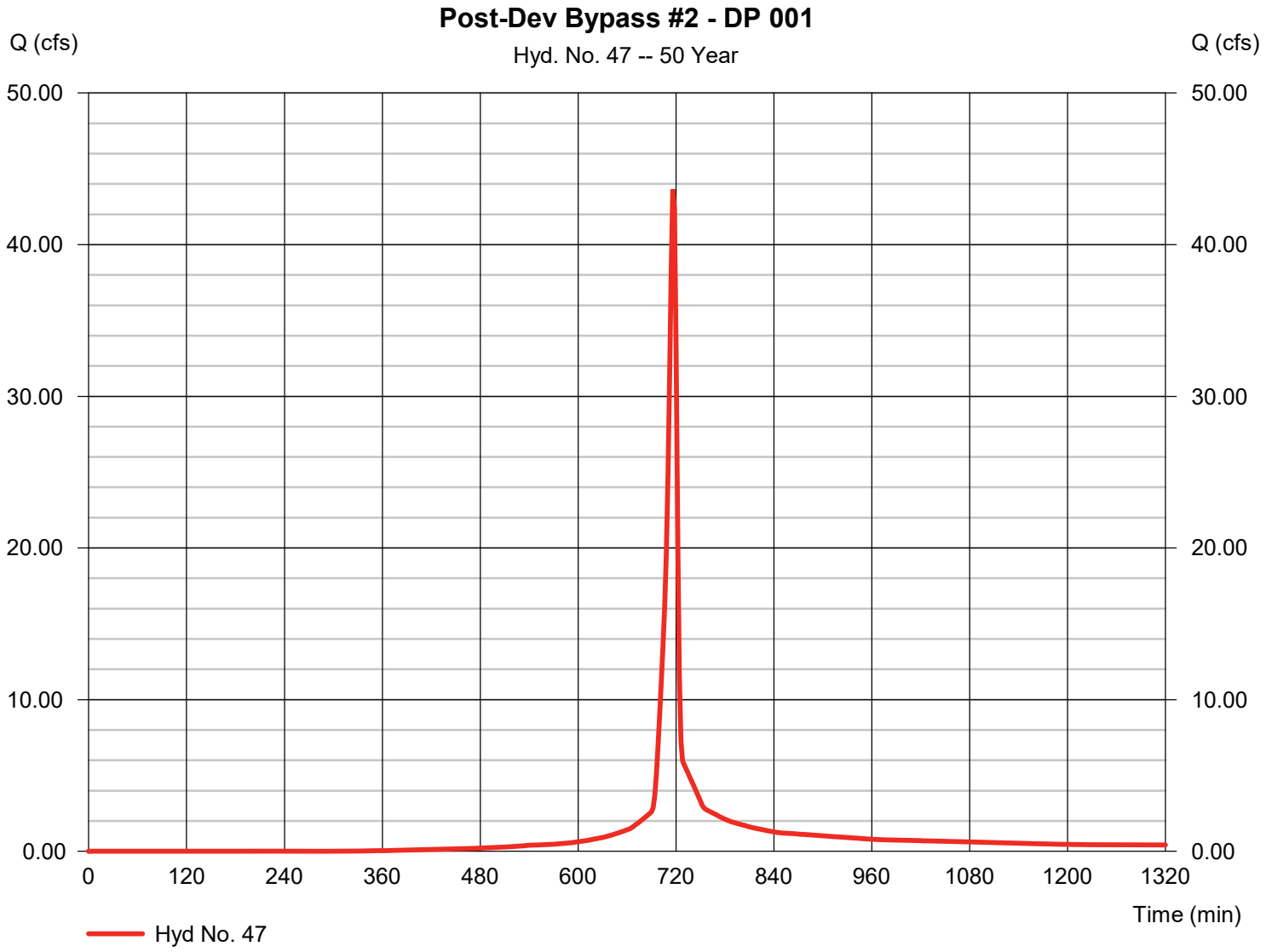
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 47

Post-Dev Bypass #2 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 43.65 cfs |
| Storm frequency | = 50 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 90,808 cuft |
| Drainage area | = 6.080 ac | Curve number | = 82.3 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 6.40 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



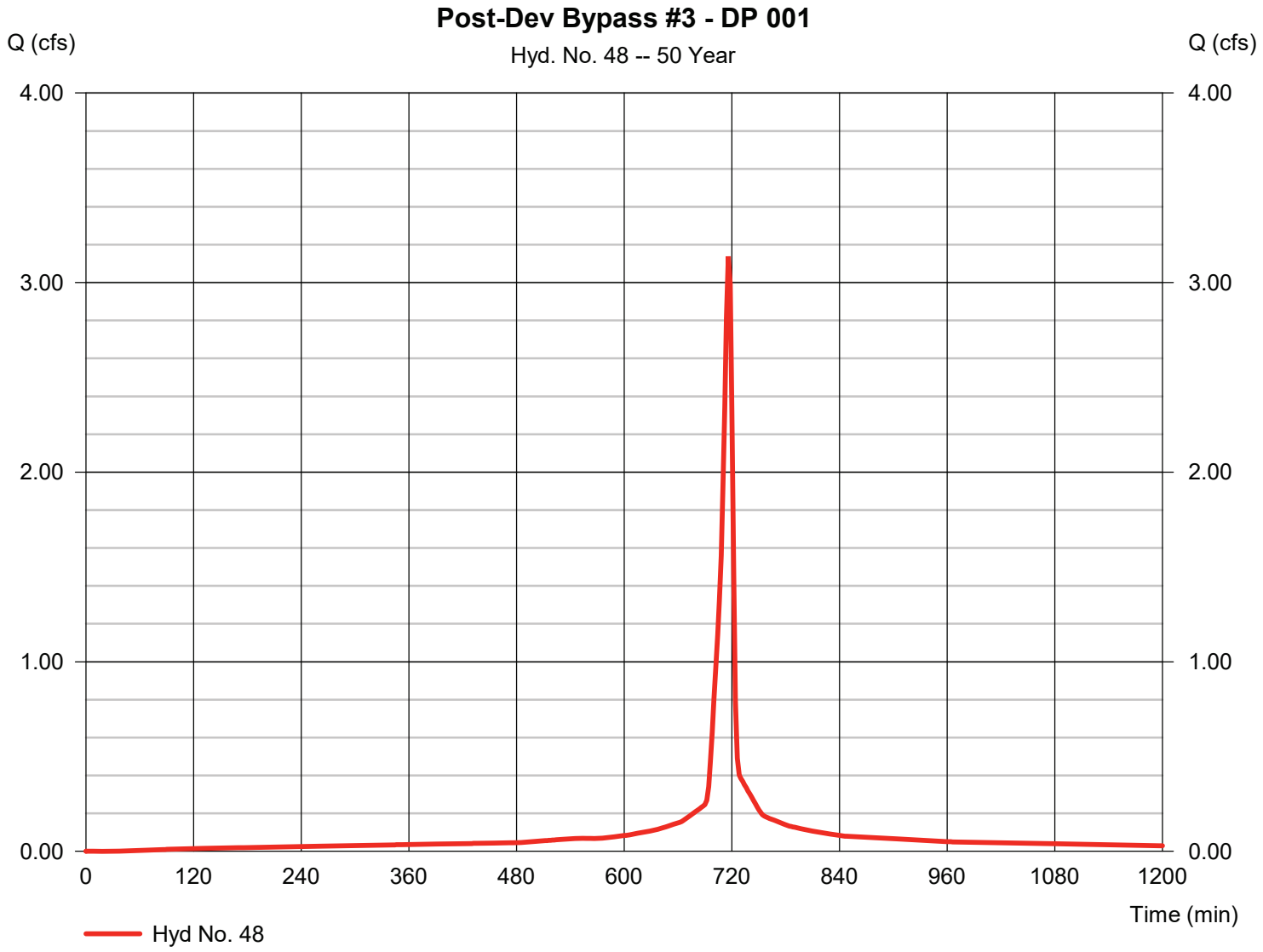
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 48

Post-Dev Bypass #3 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 3.138 cfs |
| Storm frequency | = 50 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 7,549 cuft |
| Drainage area | = 0.360 ac | Curve number | = 98 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 6.40 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



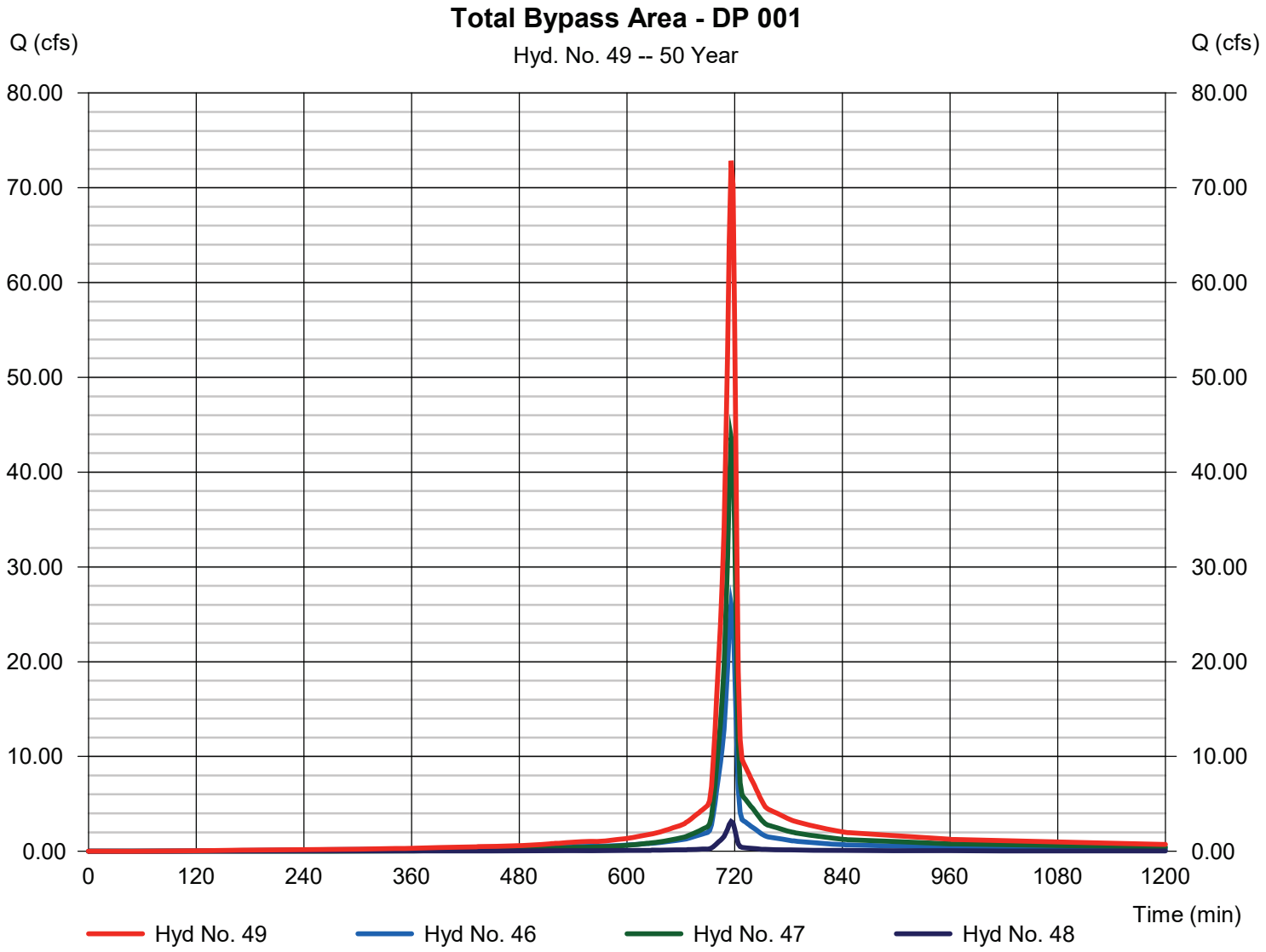
# Hydrograph Report



## Hyd. No. 49

Total Bypass Area - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 72.84 cfs |
| Storm frequency | = 50 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 159,139 cuft |
| Inflow hyds. | = 46, 47, 48 | Contrib. drain. area | = 9.460 ac |



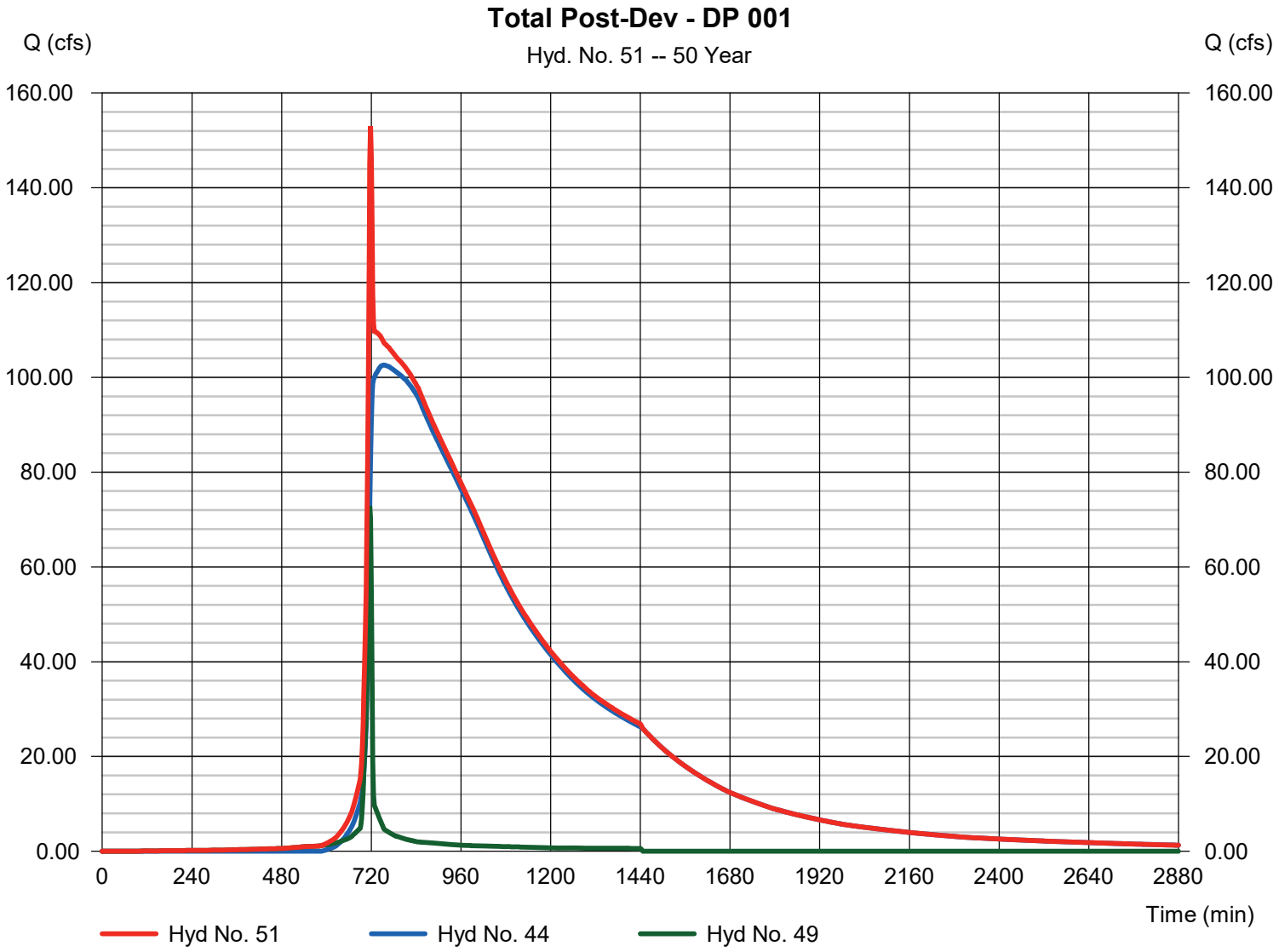
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 51

Total Post-Dev - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 153.03 cfs |
| Storm frequency | = 50 yrs | Time to peak | = 718 min |
| Time interval | = 2 min | Hyd. volume | = 3,529,209 cuft |
| Inflow hyds. | = 44, 49 | Contrib. drain. area | = 0.000 ac |



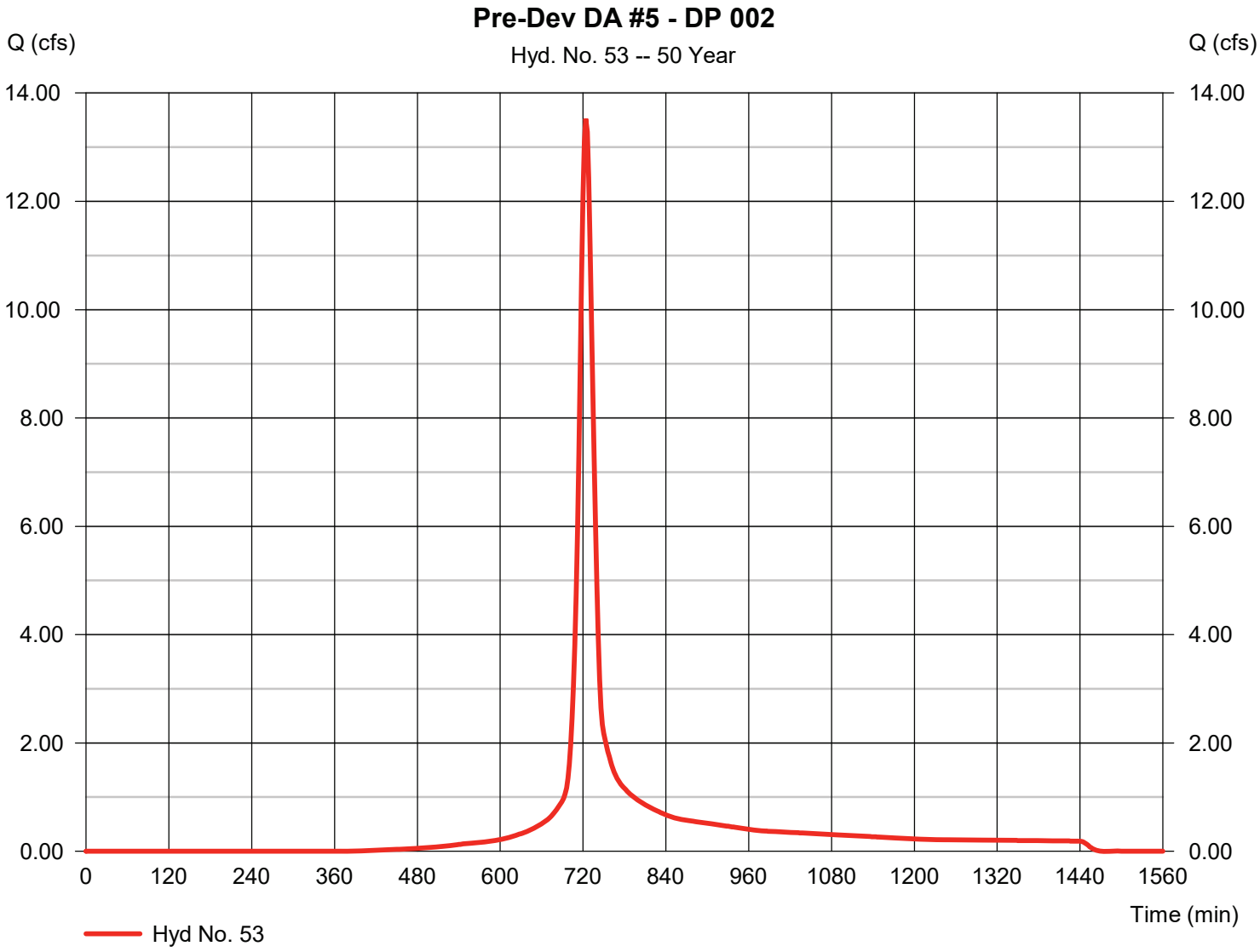
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 53

Pre-Dev DA #5 - DP 002

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | SCS Runoff | Peak discharge | = | 13.52 cfs |
| Storm frequency | = | 50 yrs | Time to peak | = | 724 min |
| Time interval | = | 2 min | Hyd. volume | = | 42,407 cuft |
| Drainage area | = | 2.900 ac | Curve number | = | 78.9 |
| Basin Slope | = | 0.0 % | Hydraulic length | = | 0 ft |
| Tc method | = | TR55 | Time of conc. (Tc) | = | 16.90 min |
| Total precip. | = | 6.40 in | Distribution | = | Type II |
| Storm duration | = | 24 hrs | Shape factor | = | 484 |



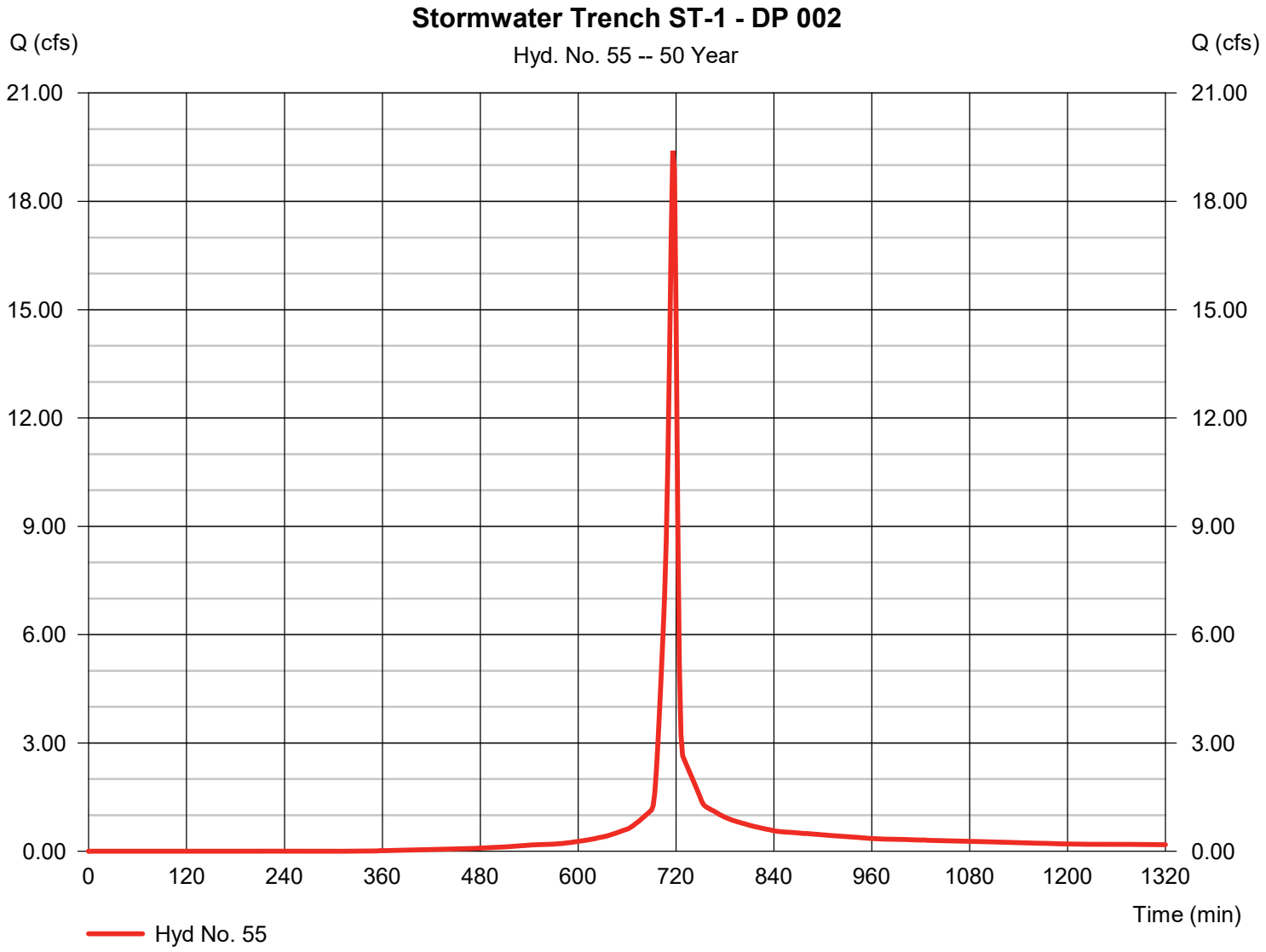
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 55

Stormwater Trench ST-1 - DP 002

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 19.40 cfs |
| Storm frequency | = 50 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 40,277 cuft |
| Drainage area | = 2.730 ac | Curve number | = 81.8 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 6.40 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



# Hydrograph Report

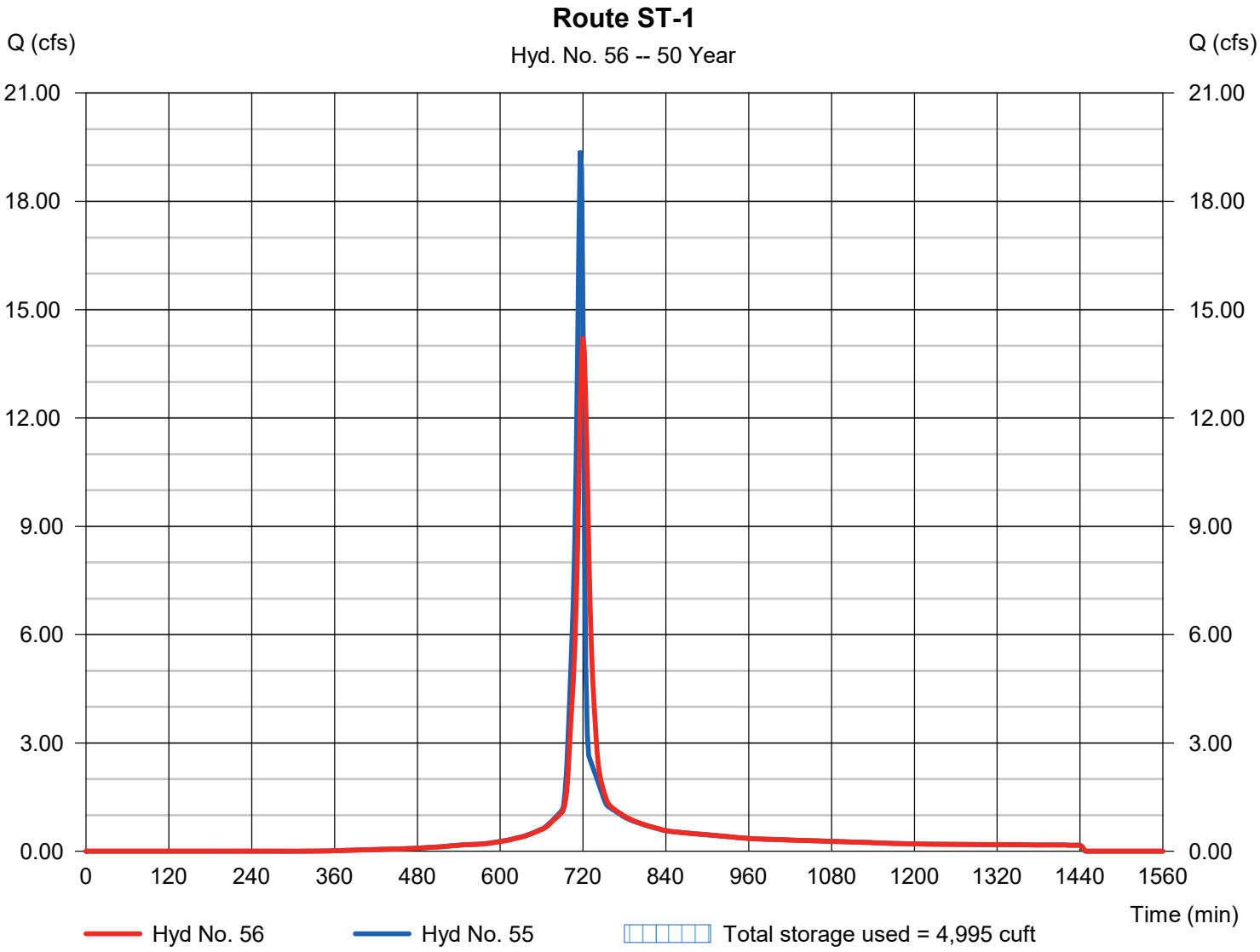
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 56

Route ST-1

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | Reservoir | Peak discharge | = | 14.25 cfs |
| Storm frequency | = | 50 yrs | Time to peak | = | 720 min |
| Time interval | = | 2 min | Hyd. volume | = | 40,277 cuft |
| Inflow hyd. No. | = | 55 - Stormwater Trench ST-1 - DP 02 | Max. Elevation | = | 16.35 ft |
| Reservoir name | = | Stormwater Trench ST-1 | Max. Storage | = | 4,995 cuft |

Storage Indication method used.



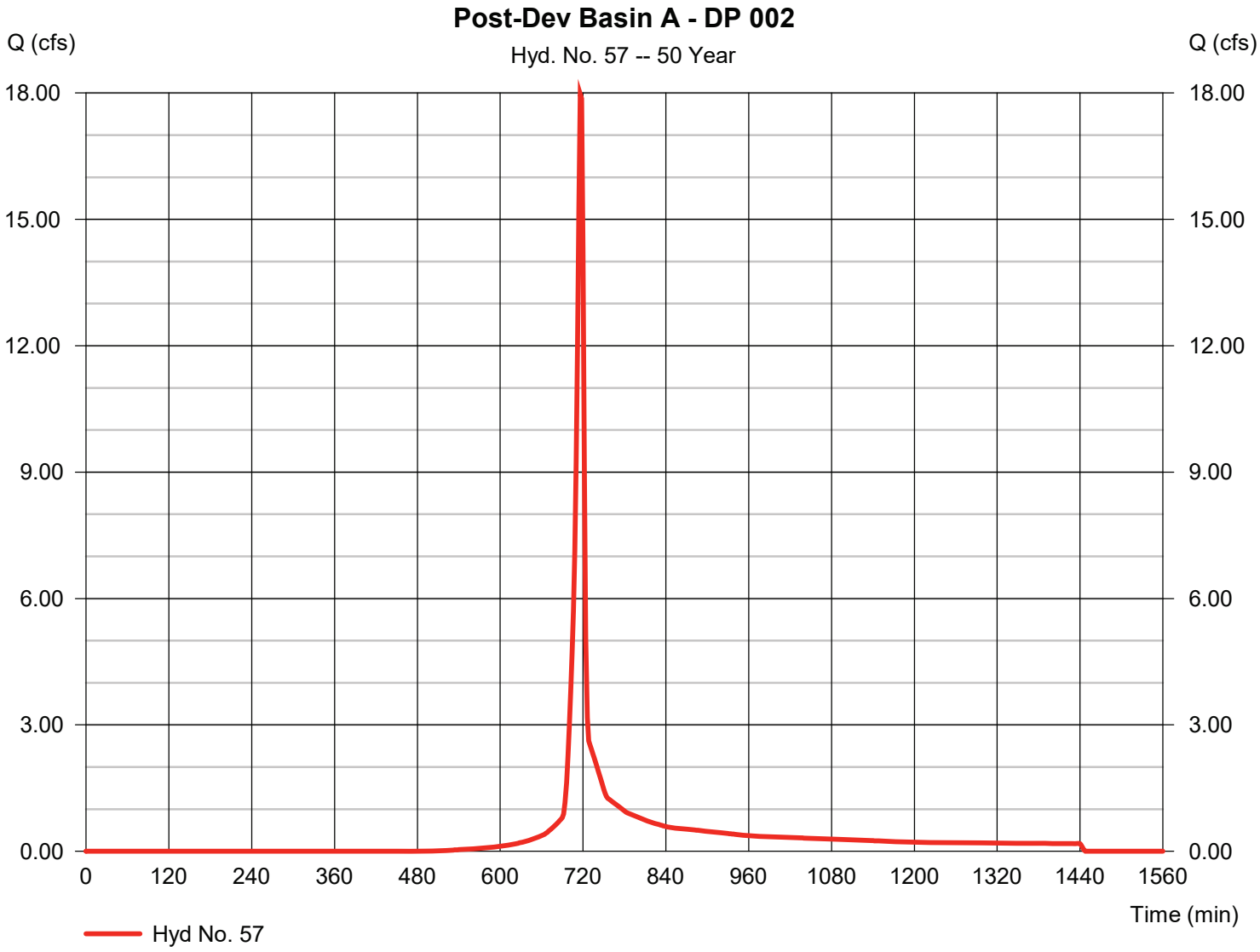
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 57

Post-Dev Basin A - DP 002

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | SCS Runoff | Peak discharge | = | 17.97 cfs |
| Storm frequency | = | 50 yrs | Time to peak | = | 716 min |
| Time interval | = | 2 min | Hyd. volume | = | 36,320 cuft |
| Drainage area | = | 3.260 ac | Curve number | = | 71.5 |
| Basin Slope | = | 0.0 % | Hydraulic length | = | 0 ft |
| Tc method | = | User | Time of conc. (Tc) | = | 5.00 min |
| Total precip. | = | 6.40 in | Distribution | = | Type II |
| Storm duration | = | 24 hrs | Shape factor | = | 484 |



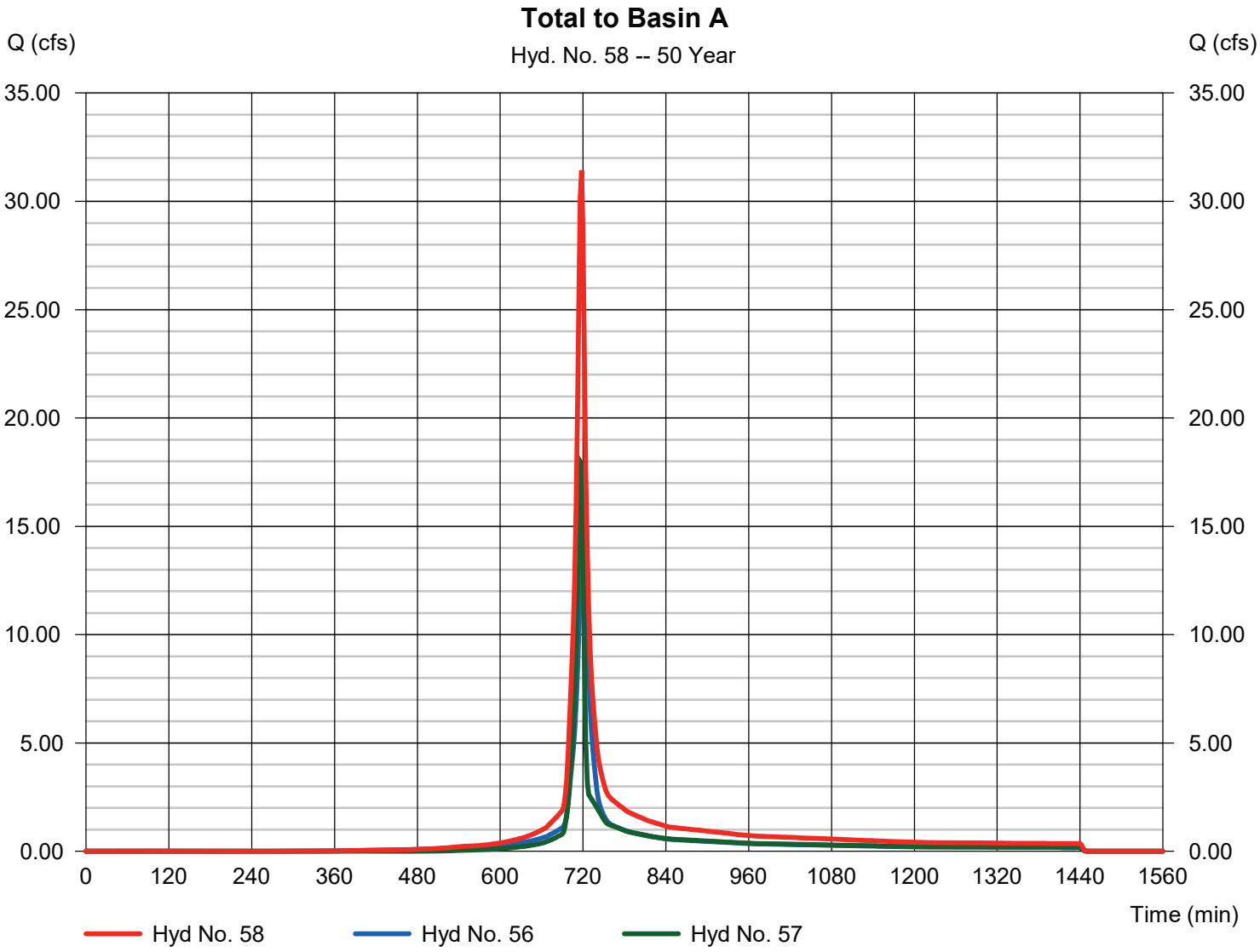
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 58

Total to Basin A

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 31.44 cfs |
| Storm frequency | = 50 yrs | Time to peak | = 718 min |
| Time interval | = 2 min | Hyd. volume | = 76,596 cuft |
| Inflow hyds. | = 56, 57 | Contrib. drain. area | = 3.260 ac |



# Hydrograph Report

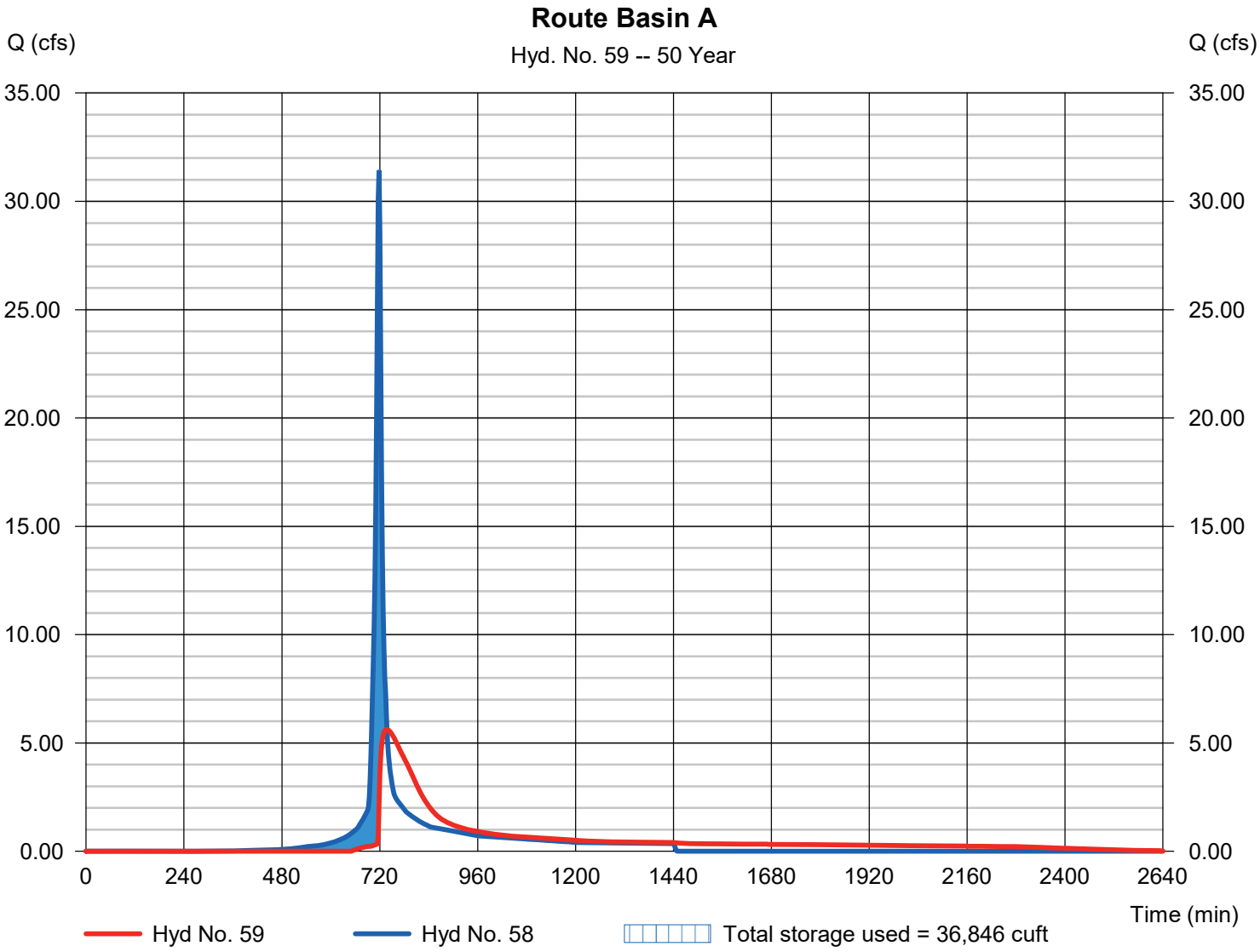
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 59

Route Basin A

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | Reservoir | Peak discharge | = | 5.627 cfs |
| Storm frequency | = | 50 yrs | Time to peak | = | 738 min |
| Time interval | = | 2 min | Hyd. volume | = | 73,062 cuft |
| Inflow hyd. No. | = | 58 - Total to Basin A | Max. Elevation | = | 15.91 ft |
| Reservoir name | = | Basin A (MRC) | Max. Storage | = | 36,846 cuft |

Storage Indication method used.



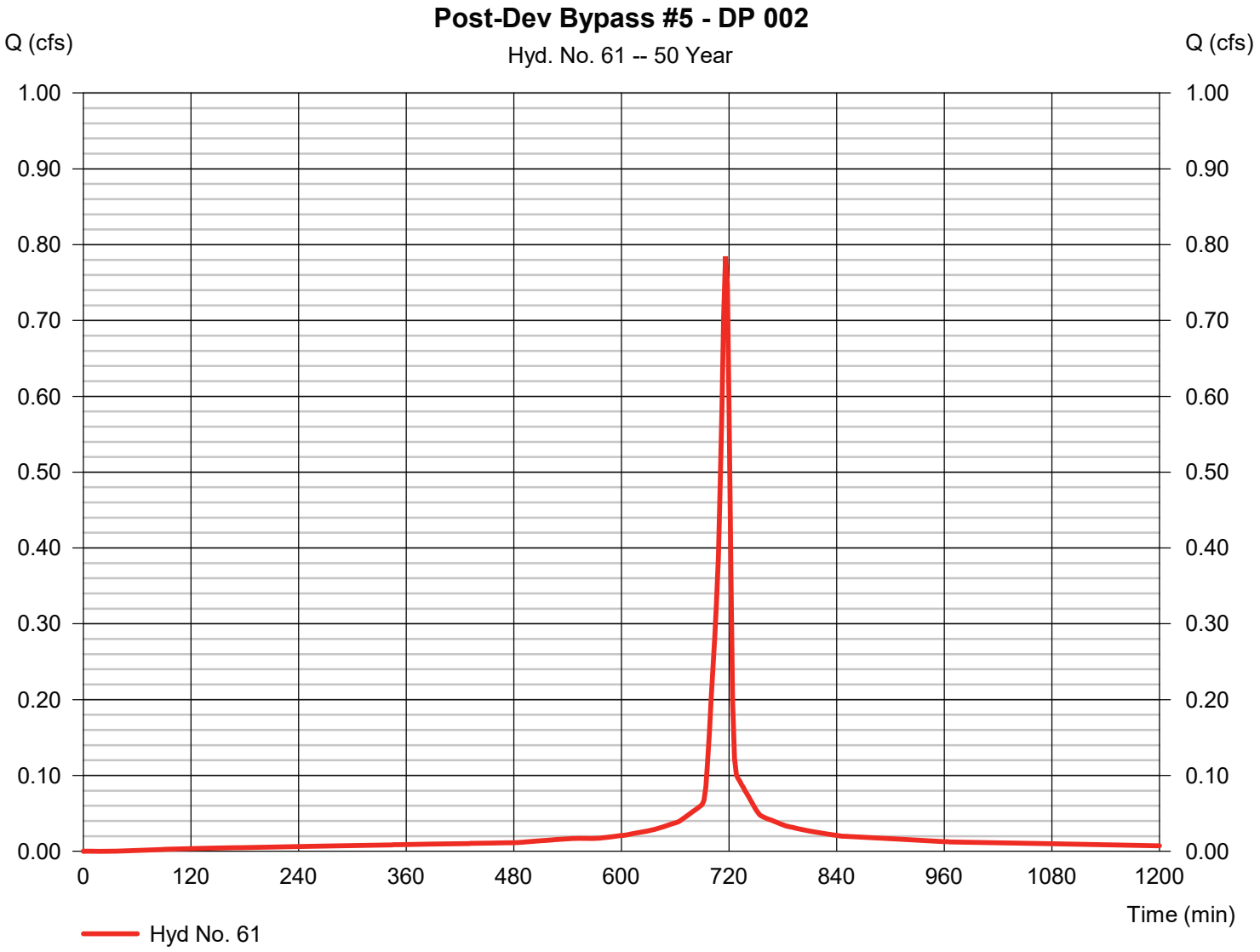
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 61

Post-Dev Bypass #5 - DP 002

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 0.784 cfs |
| Storm frequency | = 50 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 1,887 cuft |
| Drainage area | = 0.090 ac | Curve number | = 98 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 6.40 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



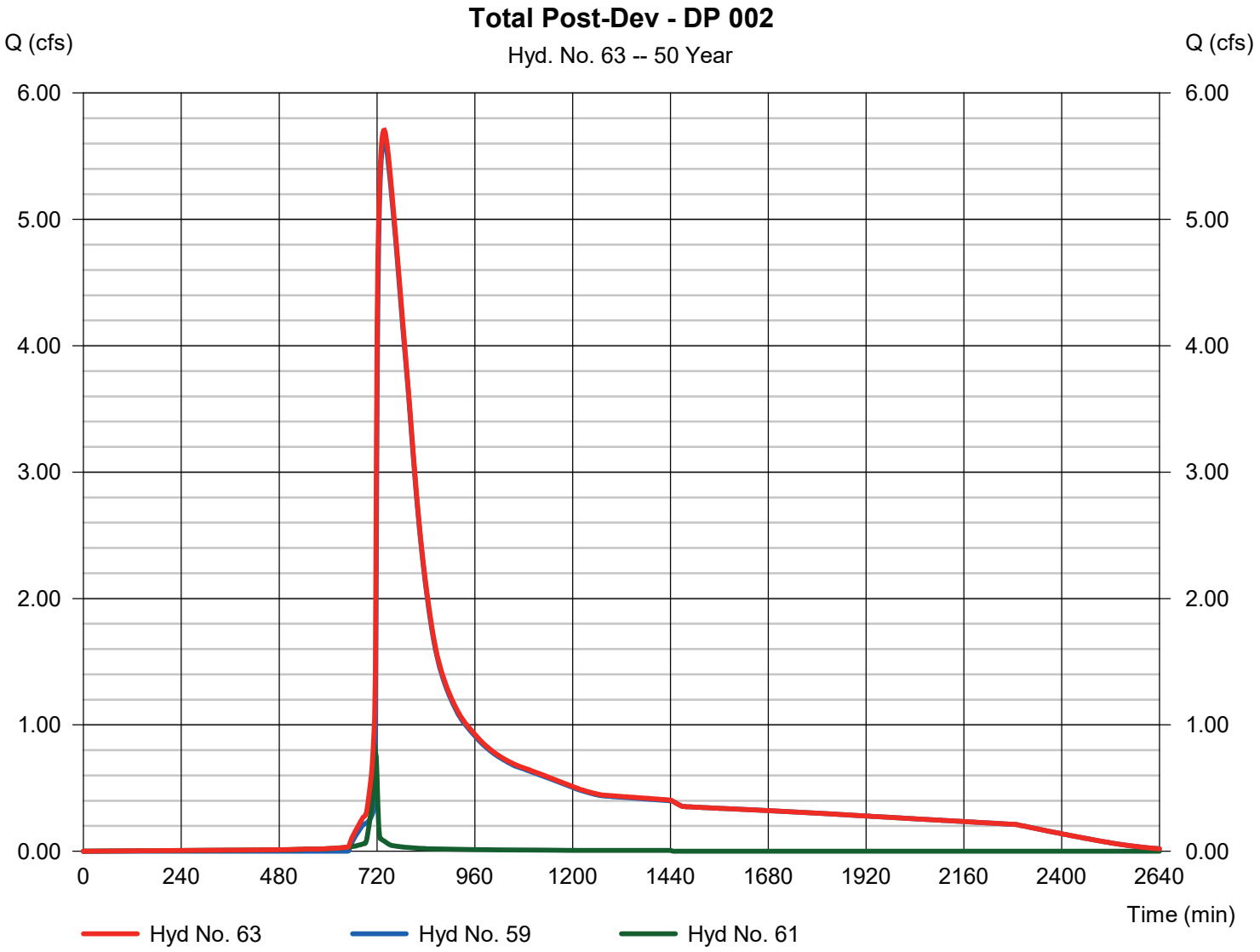
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 63

Total Post-Dev - DP 002

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 5.707 cfs |
| Storm frequency | = 50 yrs | Time to peak | = 738 min |
| Time interval | = 2 min | Hyd. volume | = 74,949 cuft |
| Inflow hyds. | = 59, 61 | Contrib. drain. area | = 0.090 ac |



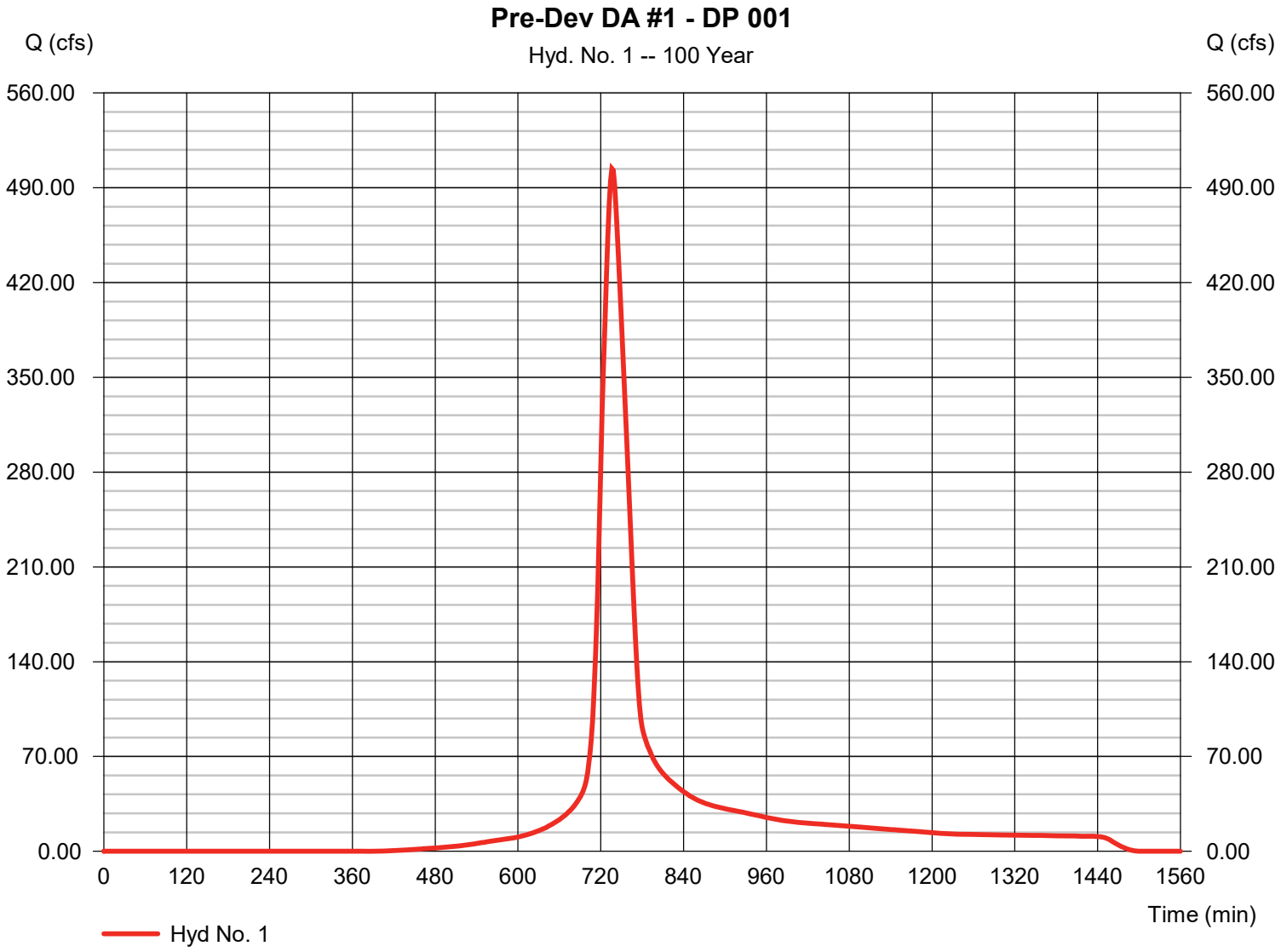
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 1

Pre-Dev DA #1 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 504.08 cfs |
| Storm frequency | = 100 yrs | Time to peak | = 736 min |
| Time interval | = 2 min | Hyd. volume | = 2,442,656 cuft |
| Drainage area | = 149.840 ac | Curve number | = 76.5 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = TR55 | Time of conc. (Tc) | = 37.70 min |
| Total precip. | = 7.20 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



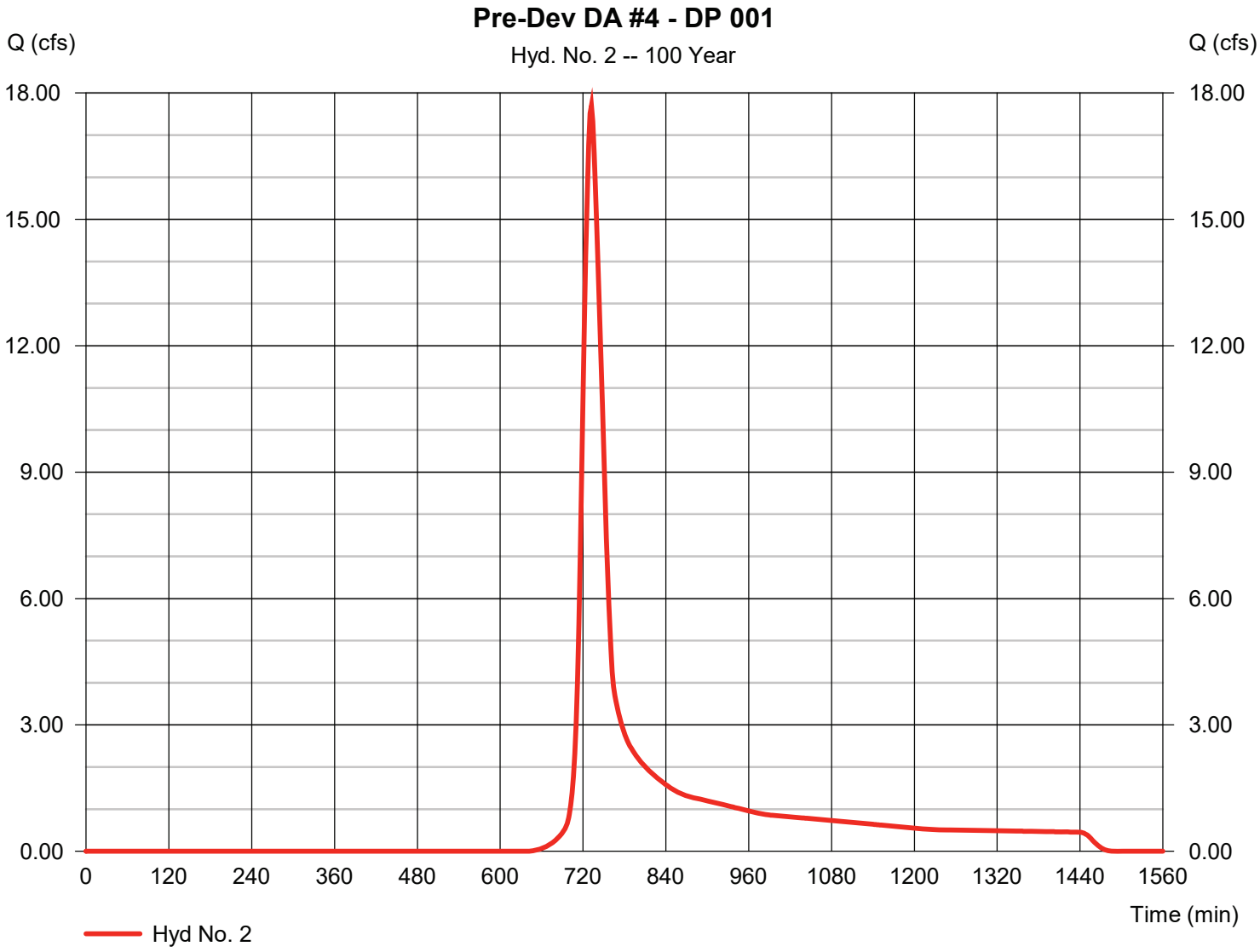
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 2

Pre-Dev DA #4 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 17.70 cfs |
| Storm frequency | = 100 yrs | Time to peak | = 732 min |
| Time interval | = 2 min | Hyd. volume | = 74,427 cuft |
| Drainage area | = 8.180 ac | Curve number | = 57.6 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = TR55 | Time of conc. (Tc) | = 28.25 min |
| Total precip. | = 7.20 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



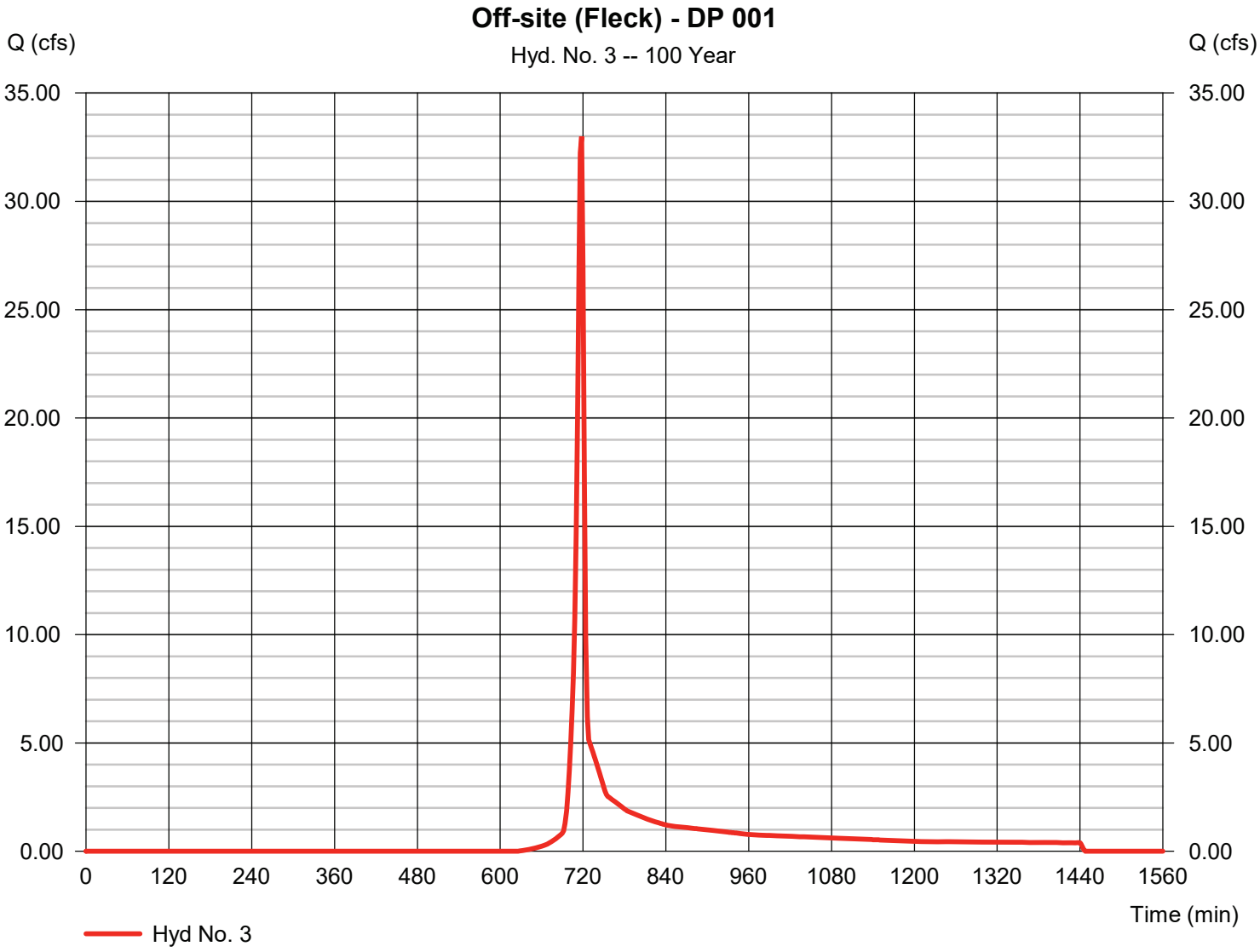
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 3

Off-site (Fleck) - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 33.00 cfs |
| Storm frequency | = 100 yrs | Time to peak | = 718 min |
| Time interval | = 2 min | Hyd. volume | = 65,990 cuft |
| Drainage area | = 7.470 ac | Curve number | = 58.5 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 7.20 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



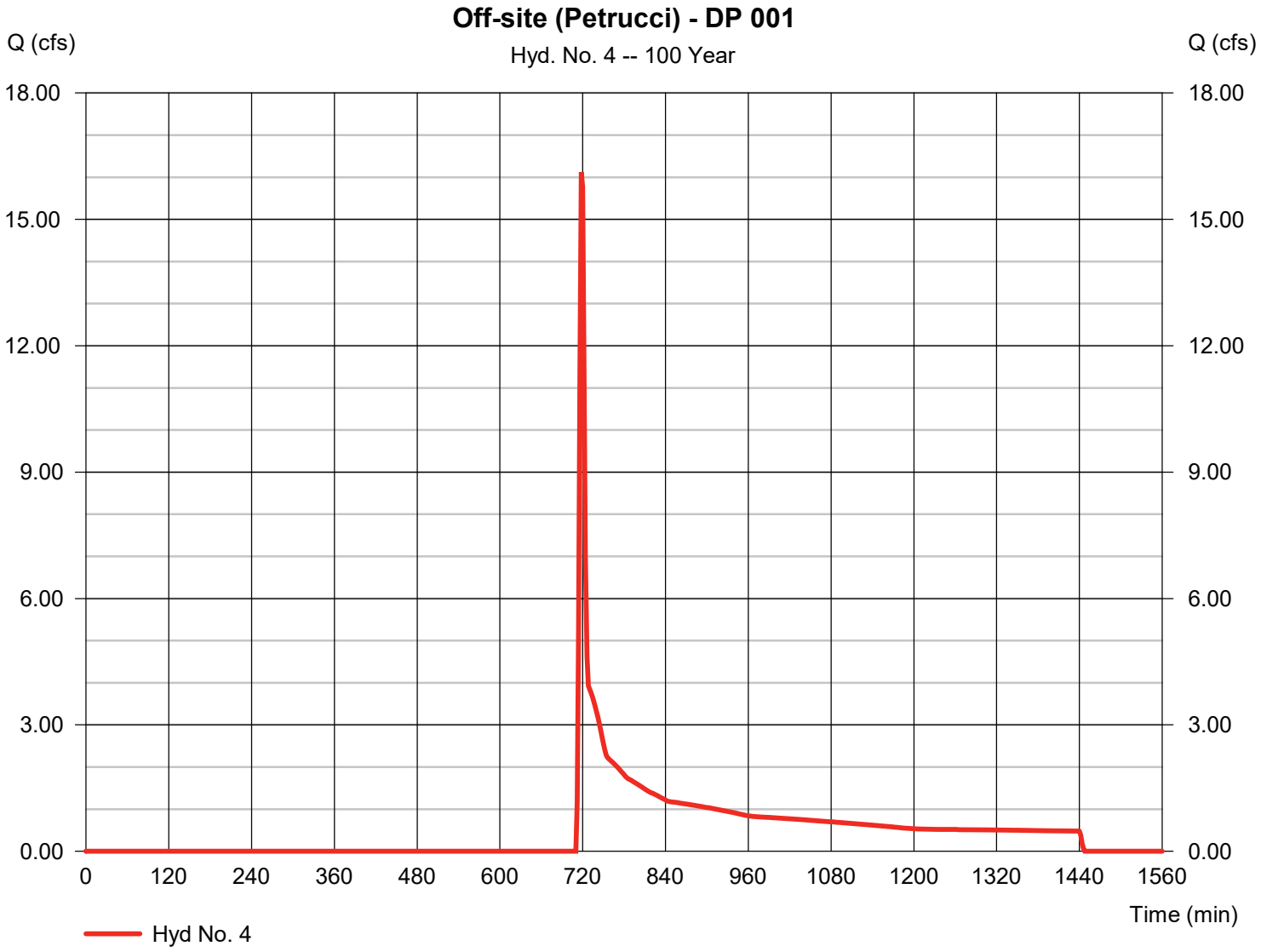
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 4

Off-site (Petrucci) - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 16.12 cfs |
| Storm frequency | = 100 yrs | Time to peak | = 718 min |
| Time interval | = 2 min | Hyd. volume | = 47,275 cuft |
| Drainage area | = 18.000 ac | Curve number | = 38.1 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 7.20 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



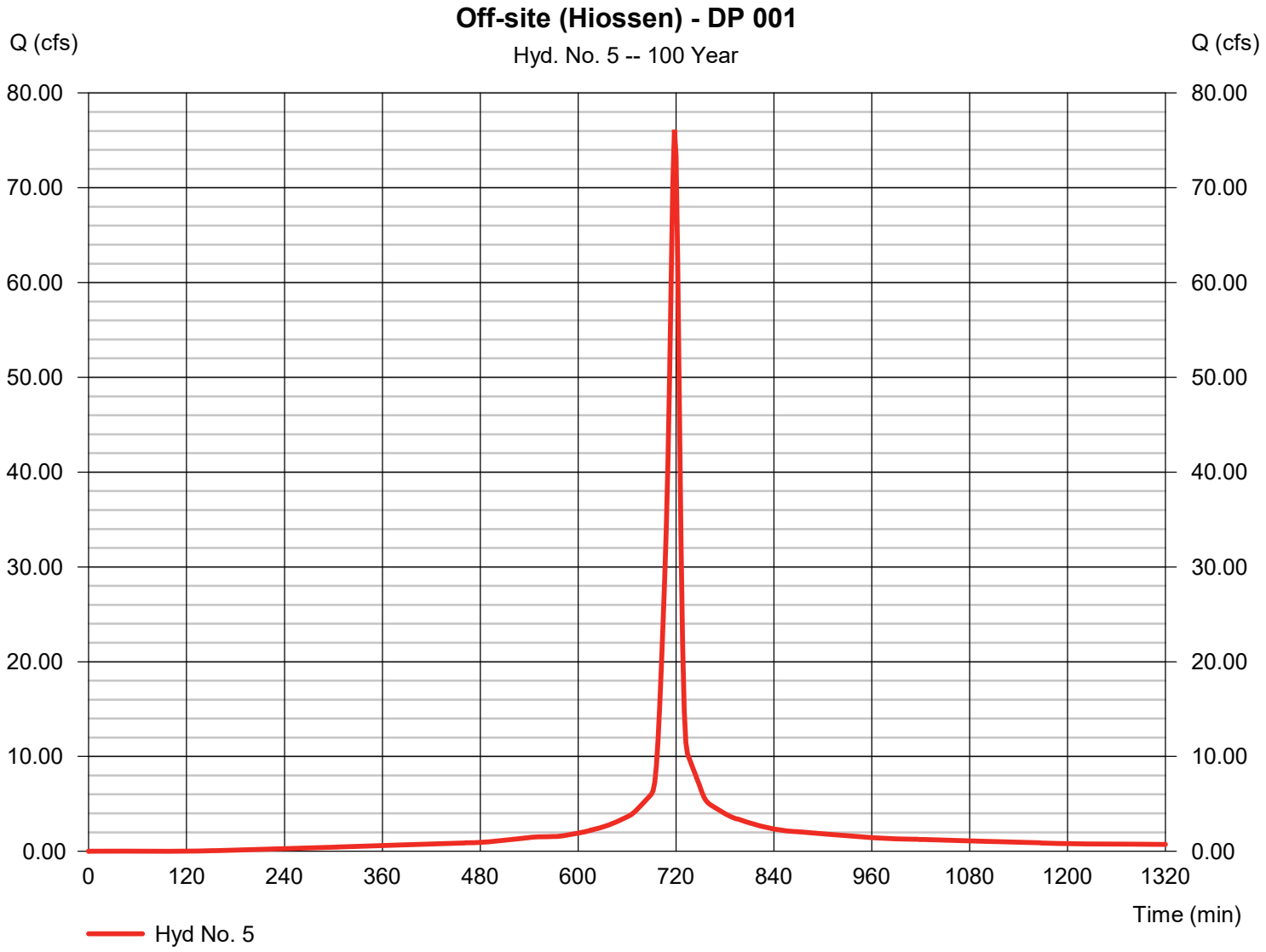
# Hydrograph Report



## Hyd. No. 5

Off-site (Hiossen) - DP 001

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | SCS Runoff | Peak discharge | = | 76.11 cfs |
| Storm frequency | = | 100 yrs | Time to peak | = | 718 min |
| Time interval | = | 2 min | Hyd. volume | = | 192,200 cuft |
| Drainage area | = | 8.390 ac | Curve number | = | 92.5 |
| Basin Slope | = | 0.0 % | Hydraulic length | = | 0 ft |
| Tc method | = | TR55 | Time of conc. (Tc) | = | 8.90 min |
| Total precip. | = | 7.20 in | Distribution | = | Type II |
| Storm duration | = | 24 hrs | Shape factor | = | 484 |



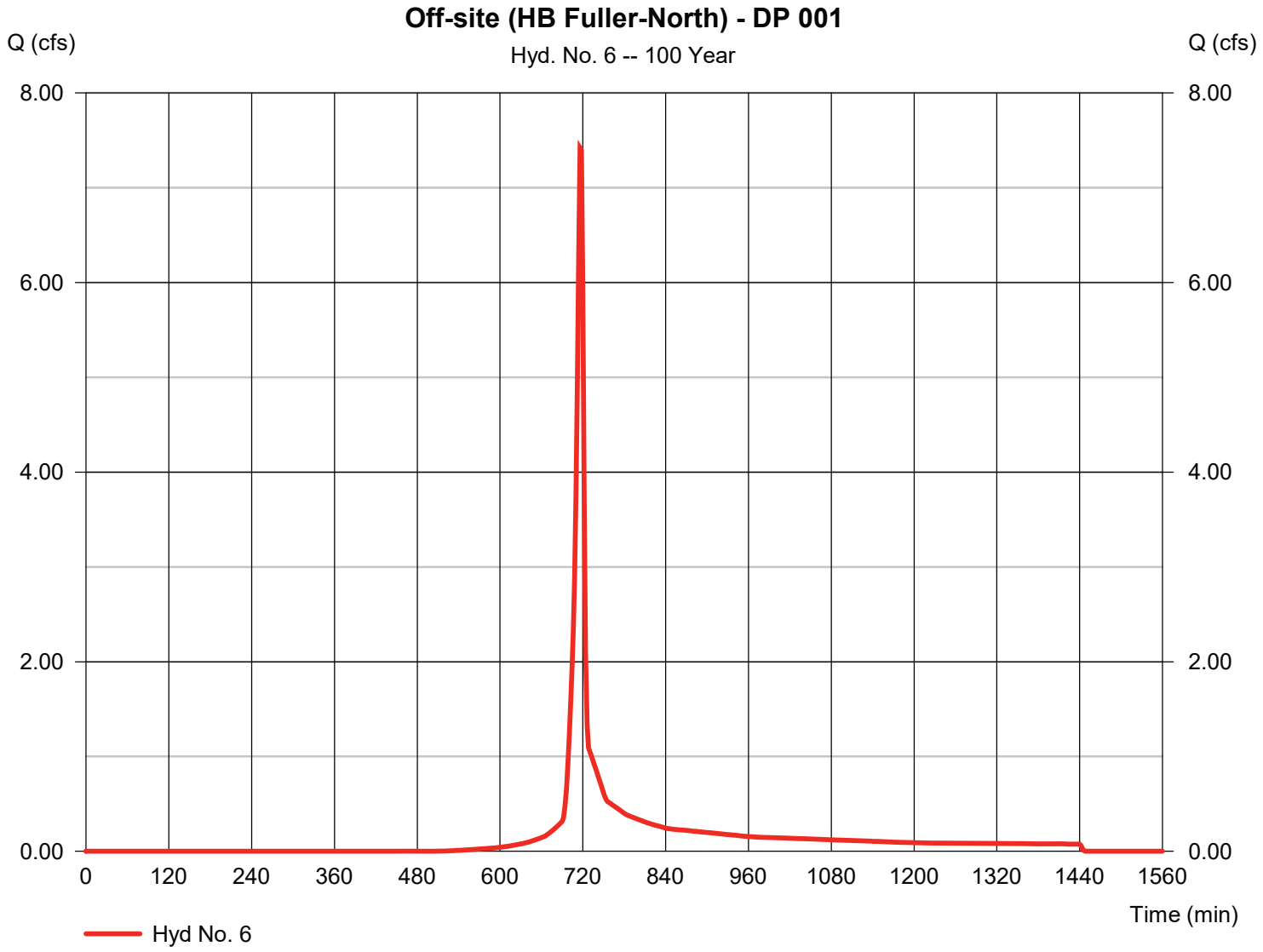
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 6

Off-site (HB Fuller-North) - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 7.422 cfs |
| Storm frequency | = 100 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 14,987 cuft |
| Drainage area | = 1.240 ac | Curve number | = 67.8 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 7.20 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



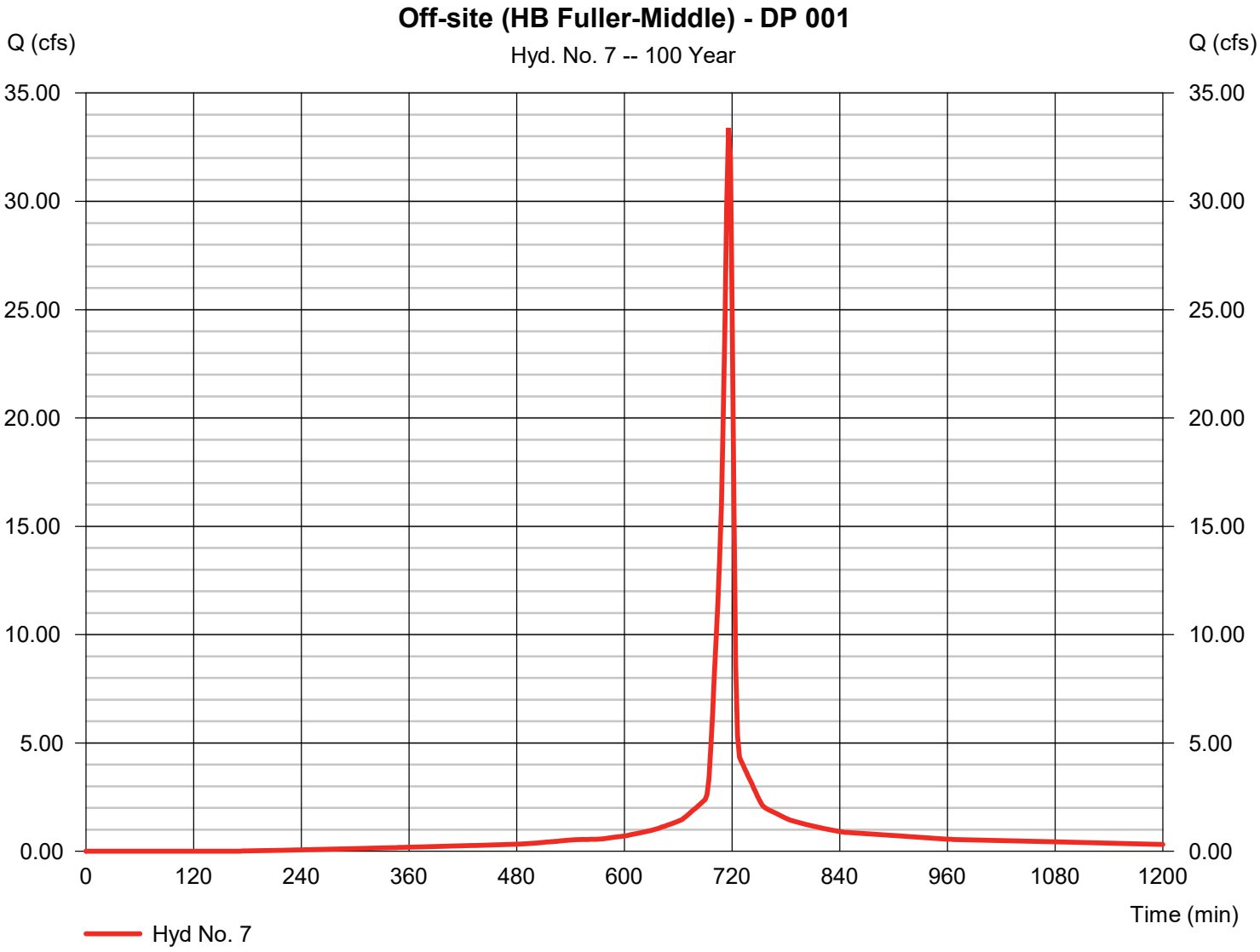
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 7

Off-site (HB Fuller-Middle) - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 33.39 cfs |
| Storm frequency | = 100 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 73,823 cuft |
| Drainage area | = 3.590 ac | Curve number | = 90.2 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 7.20 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



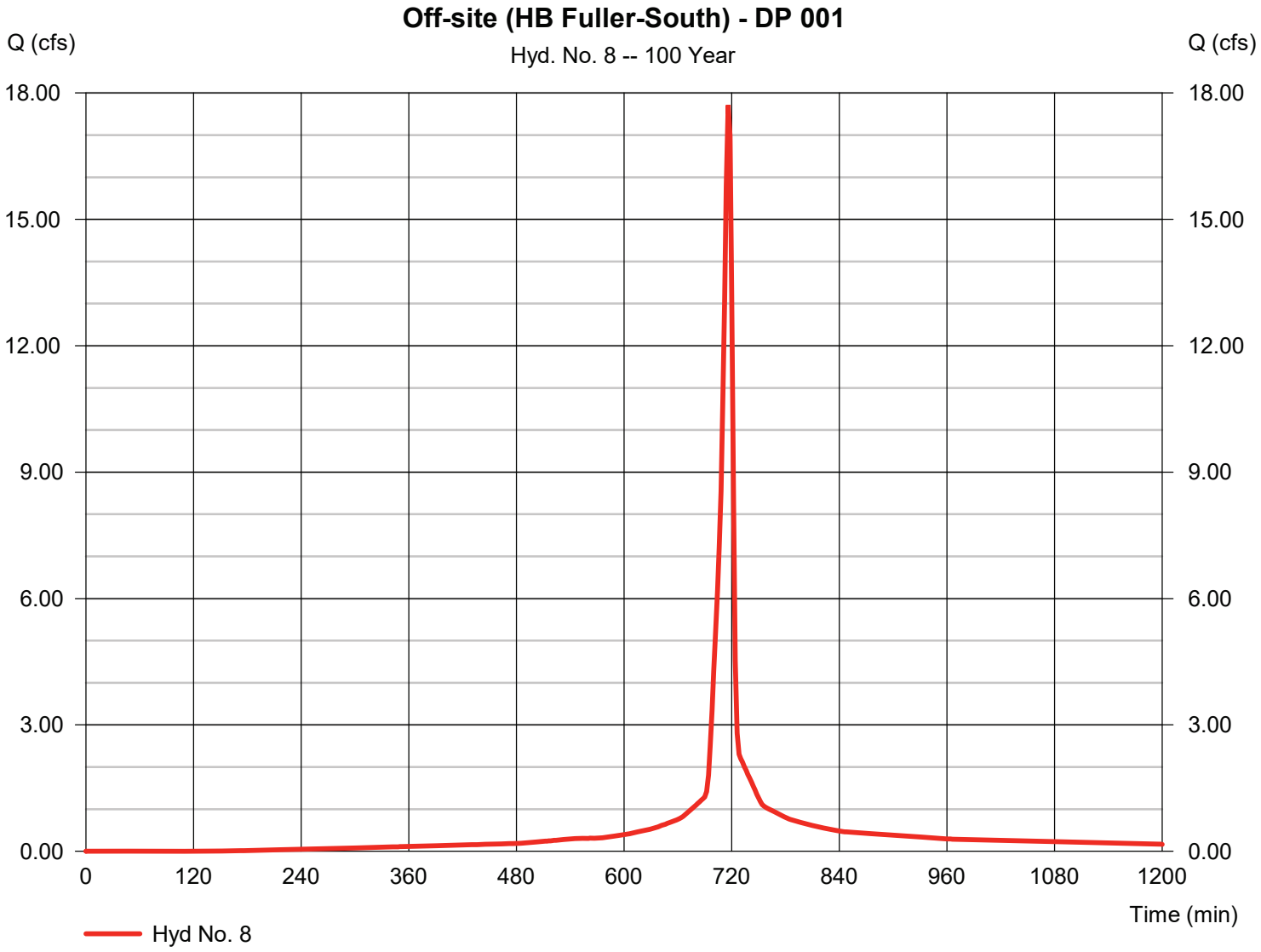
# Hydrograph Report



## Hyd. No. 8

Off-site (HB Fuller-South) - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 17.71 cfs |
| Storm frequency | = 100 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 39,628 cuft |
| Drainage area | = 1.880 ac | Curve number | = 91.5 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 7.20 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



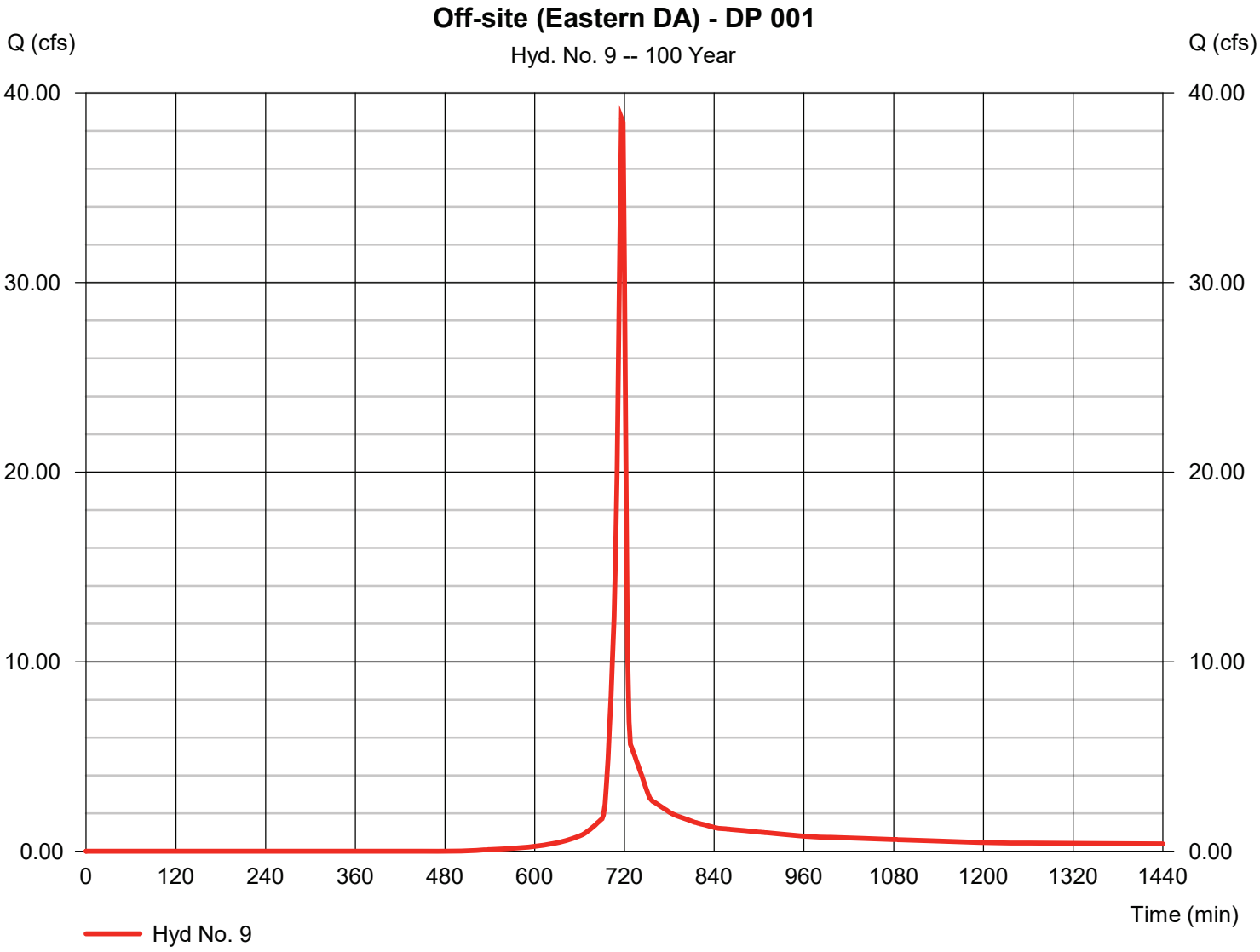
# Hydrograph Report



## Hyd. No. 9

Off-site (Eastern DA) - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 38.69 cfs |
| Storm frequency | = 100 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 78,192 cuft |
| Drainage area | = 6.210 ac | Curve number | = 69.2 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 7.20 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



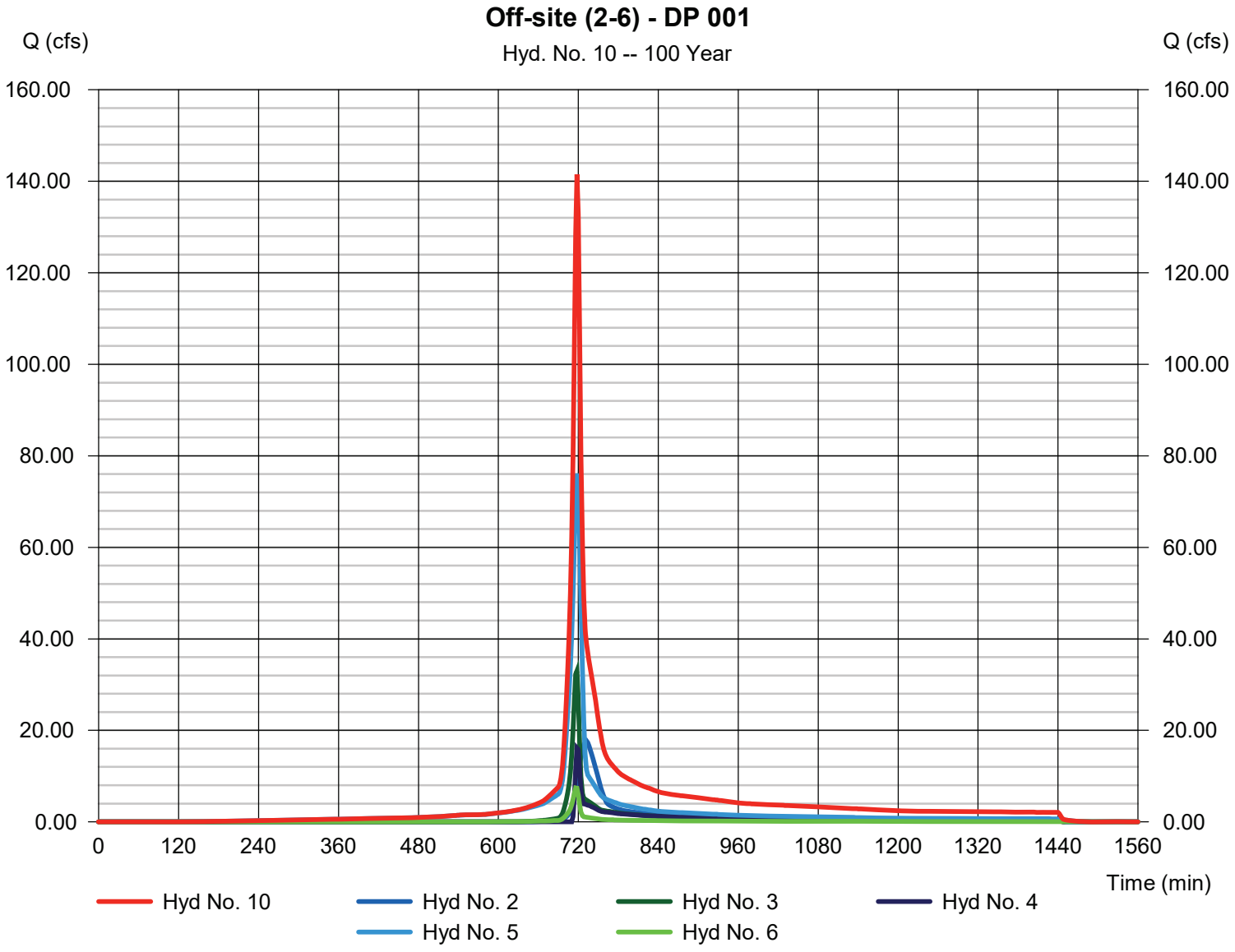
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 10

Off-site (2-6) - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 141.51 cfs |
| Storm frequency | = 100 yrs | Time to peak | = 718 min |
| Time interval | = 2 min | Hyd. volume | = 394,878 cuft |
| Inflow hyds. | = 2, 3, 4, 5, 6 | Contrib. drain. area | = 43.280 ac |



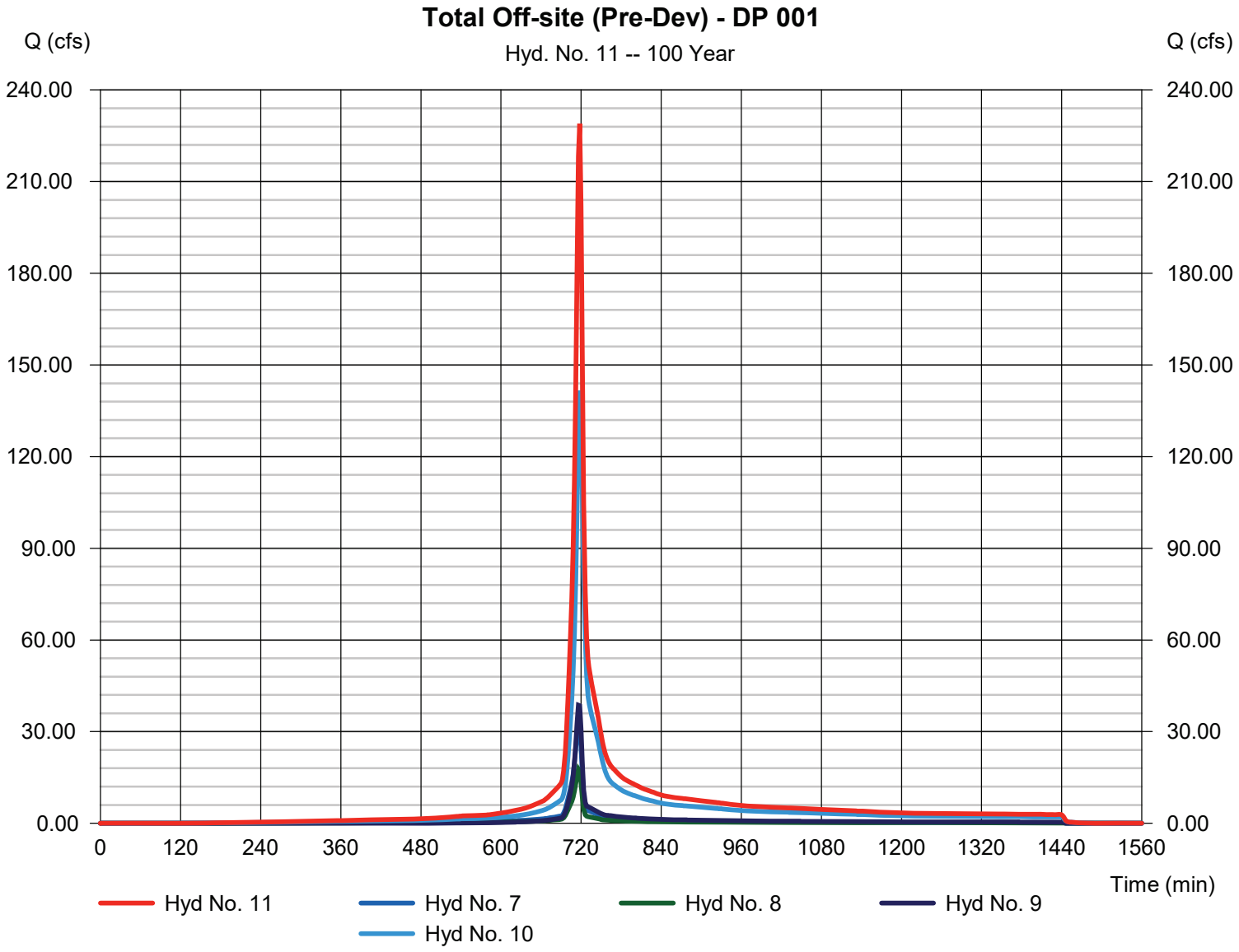
# Hydrograph Report



## Hyd. No. 11

Total Off-site (Pre-Dev) - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 228.97 cfs |
| Storm frequency | = 100 yrs | Time to peak | = 718 min |
| Time interval | = 2 min | Hyd. volume | = 586,521 cuft |
| Inflow hyds. | = 7, 8, 9, 10 | Contrib. drain. area | = 11.680 ac |



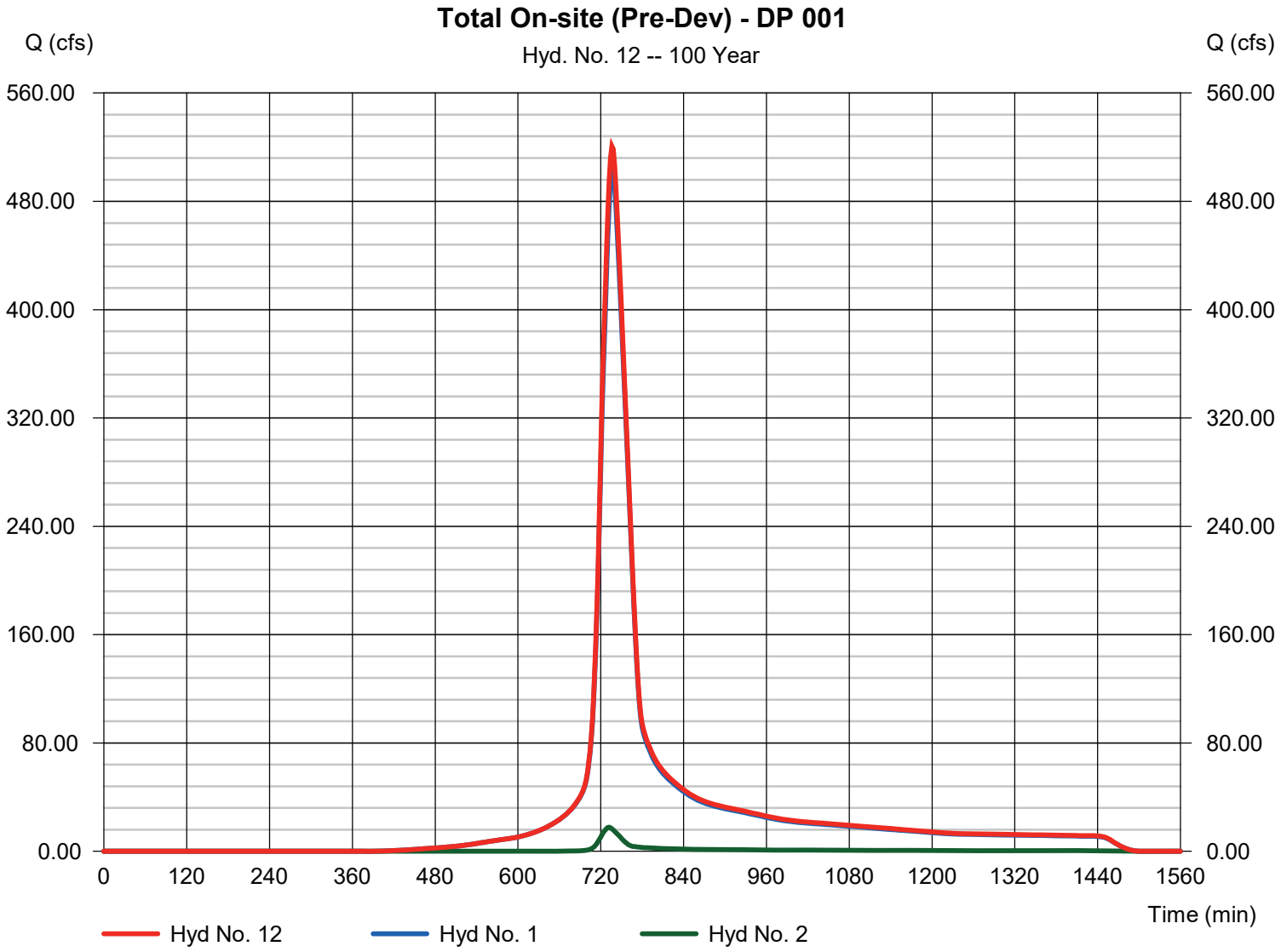
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 12

Total On-site (Pre-Dev) - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 520.66 cfs |
| Storm frequency | = 100 yrs | Time to peak | = 736 min |
| Time interval | = 2 min | Hyd. volume | = 2,517,083 cuft |
| Inflow hyds. | = 1, 2 | Contrib. drain. area | = 158.020 ac |



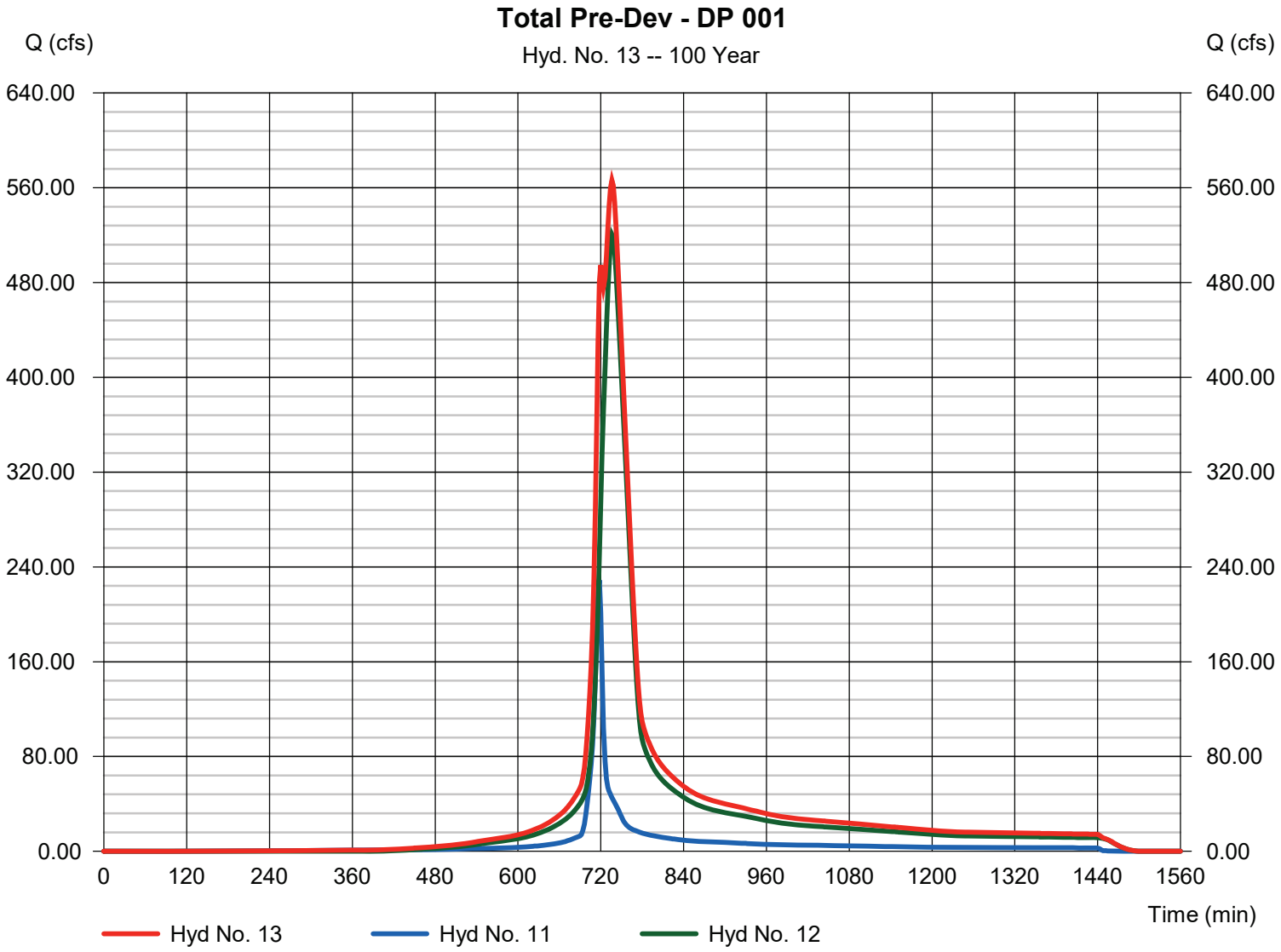
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 13

Total Pre-Dev - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 566.24 cfs |
| Storm frequency | = 100 yrs | Time to peak | = 736 min |
| Time interval | = 2 min | Hyd. volume | = 3,103,605 cuft |
| Inflow hyds. | = 11, 12 | Contrib. drain. area | = 0.000 ac |



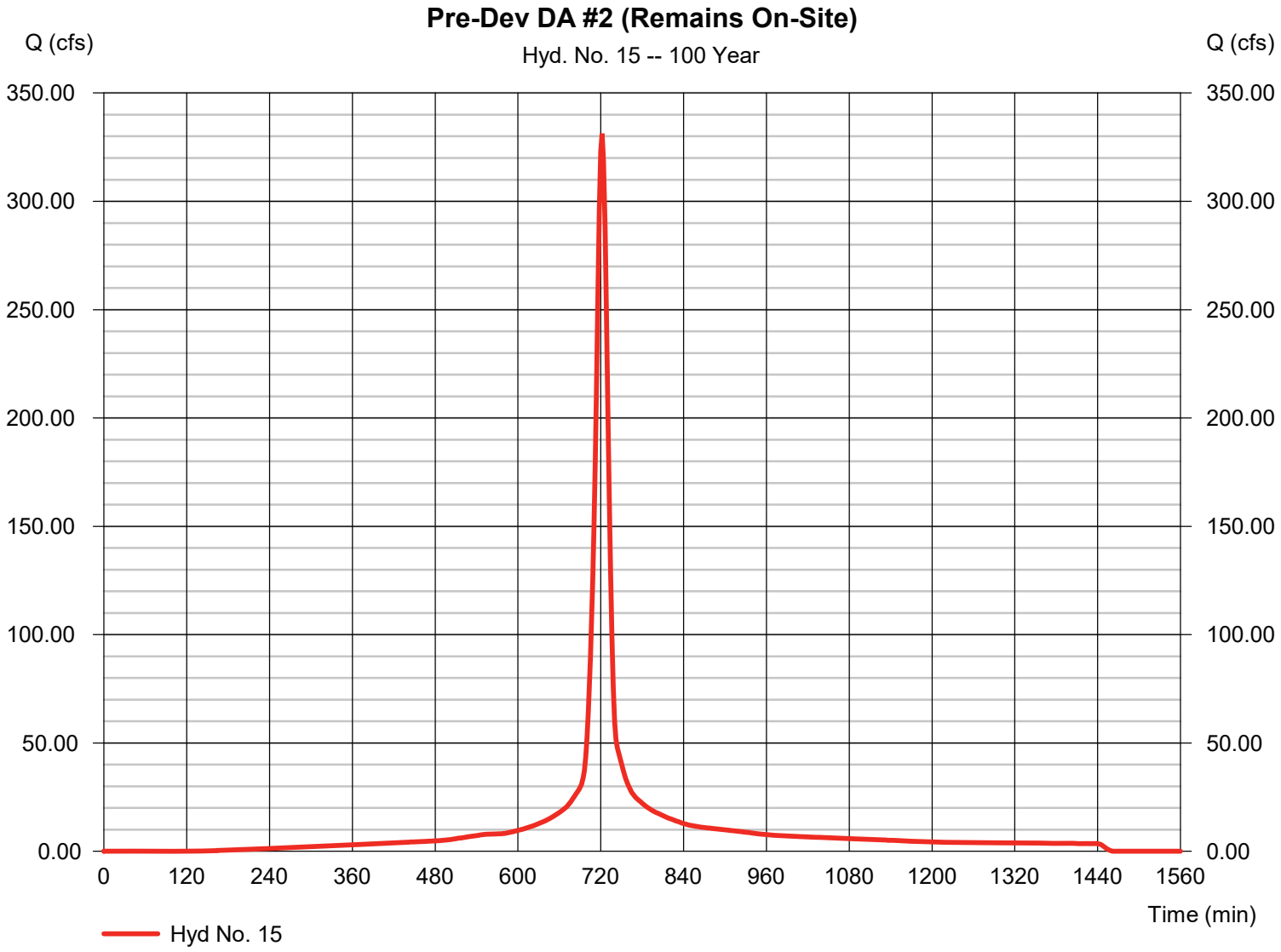
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 15

Pre-Dev DA #2 (Remains On-Site)

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 331.32 cfs |
| Storm frequency | = 100 yrs | Time to peak | = 722 min |
| Time interval | = 2 min | Hyd. volume | = 1,007,722 cuft |
| Drainage area | = 45.370 ac | Curve number | = 92.2 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = TR55 | Time of conc. (Tc) | = 13.40 min |
| Total precip. | = 7.20 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



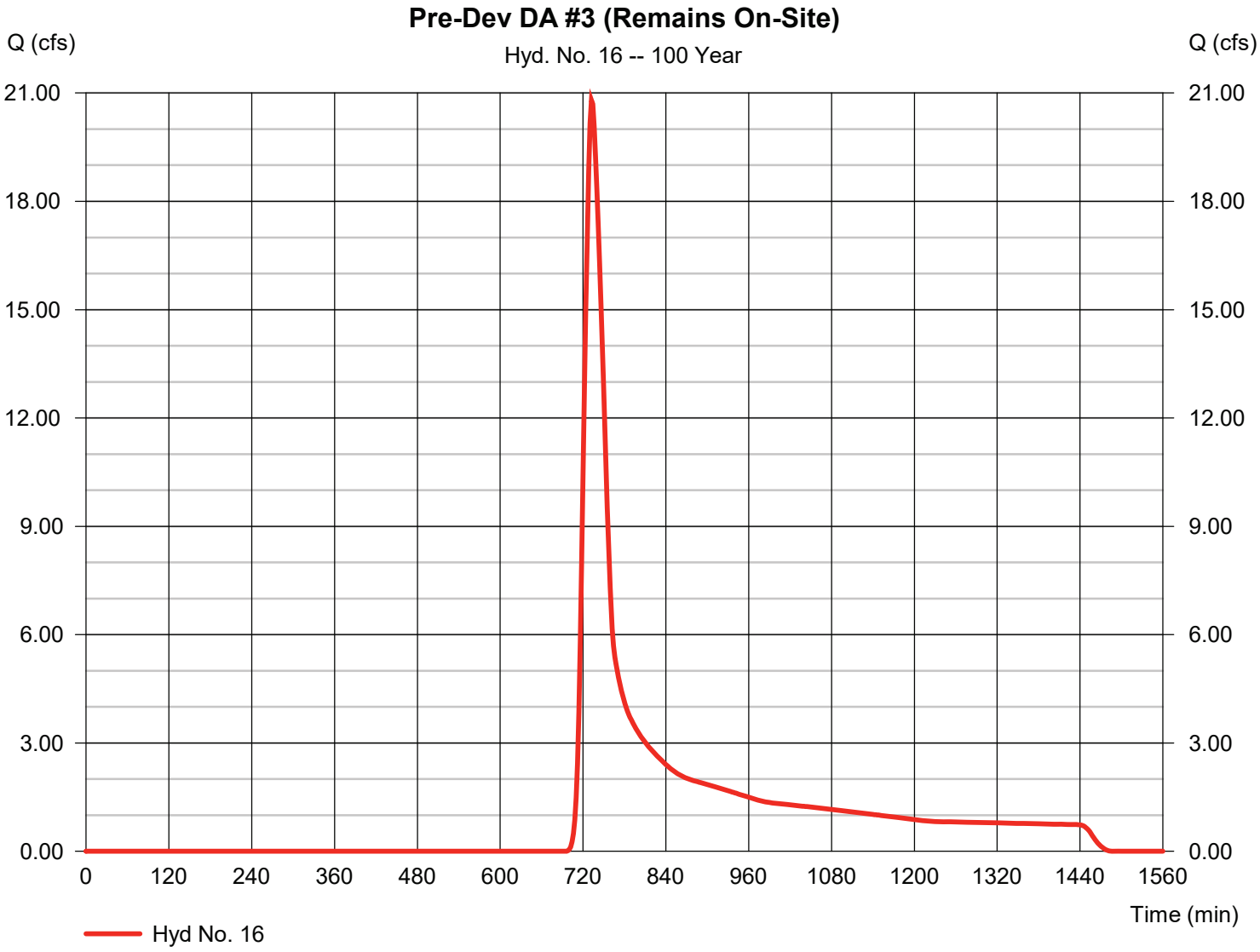
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 16

Pre-Dev DA #3 (Remains On-Site)

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 20.80 cfs |
| Storm frequency | = 100 yrs | Time to peak | = 732 min |
| Time interval | = 2 min | Hyd. volume | = 99,694 cuft |
| Drainage area | = 16.820 ac | Curve number | = 48.4 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = TR55 | Time of conc. (Tc) | = 29.90 min |
| Total precip. | = 7.20 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



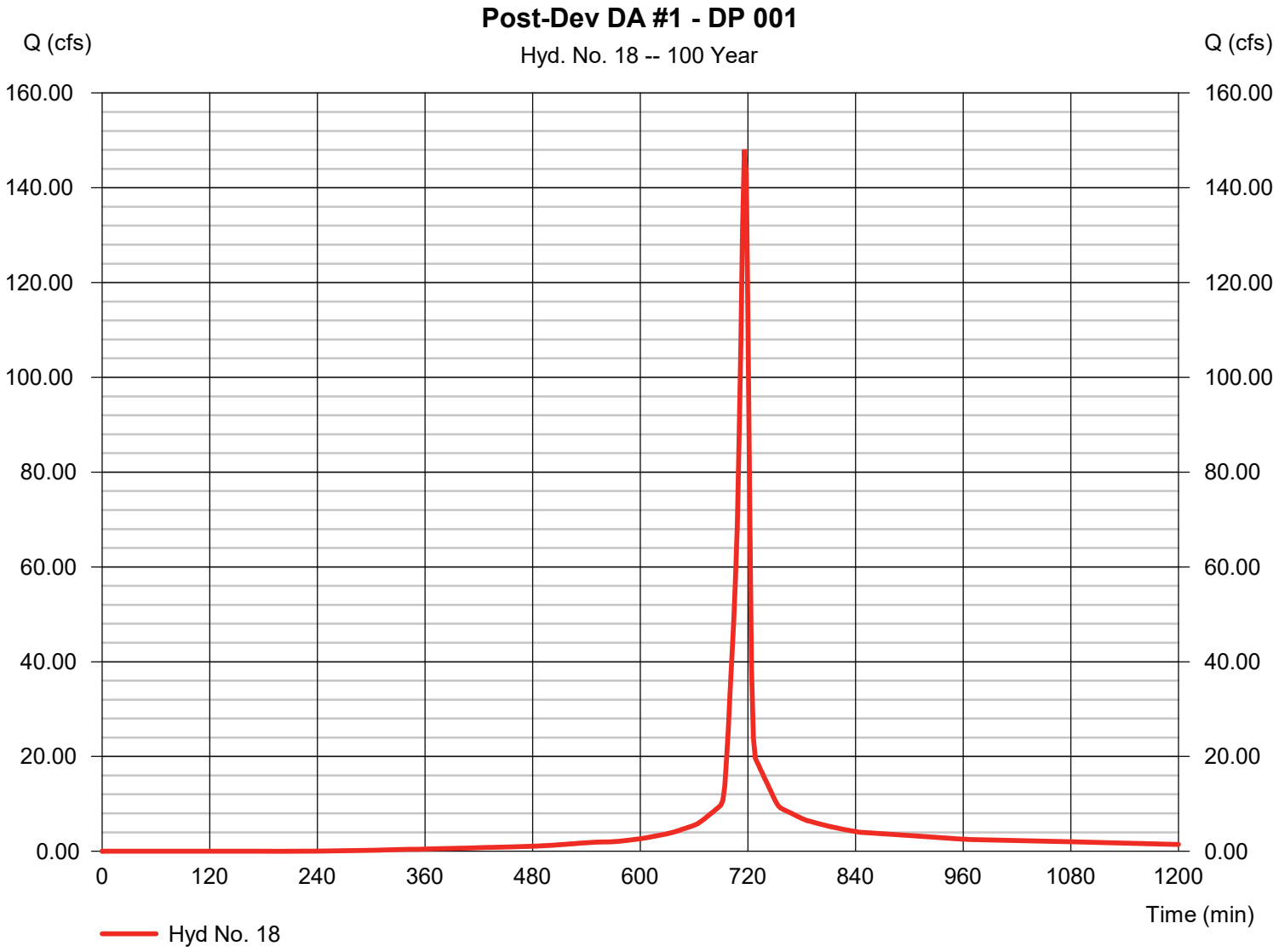
# Hydrograph Report



## Hyd. No. 18

Post-Dev DA #1 - DP 001

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | SCS Runoff | Peak discharge | = | 148.09 cfs |
| Storm frequency | = | 100 yrs | Time to peak | = | 716 min |
| Time interval | = | 2 min | Hyd. volume | = | 316,474 cuft |
| Drainage area | = | 16.870 ac | Curve number | = | 85.6 |
| Basin Slope | = | 0.0 % | Hydraulic length | = | 0 ft |
| Tc method | = | User | Time of conc. (Tc) | = | 5.00 min |
| Total precip. | = | 7.20 in | Distribution | = | Type II |
| Storm duration | = | 24 hrs | Shape factor | = | 484 |



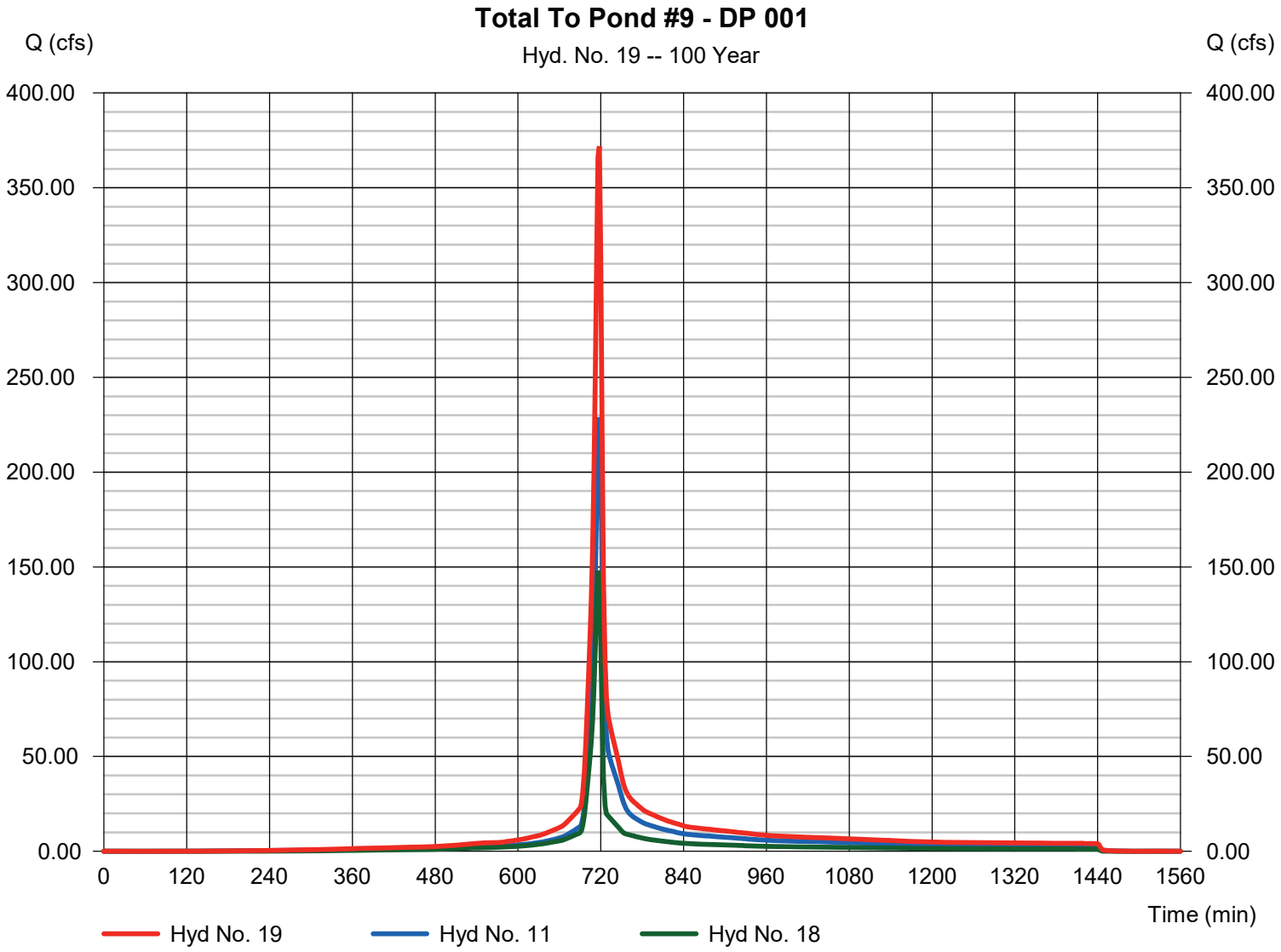
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 19

Total To Pond #9 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 371.90 cfs |
| Storm frequency | = 100 yrs | Time to peak | = 718 min |
| Time interval | = 2 min | Hyd. volume | = 902,995 cuft |
| Inflow hyds. | = 11, 18 | Contrib. drain. area | = 16.870 ac |



# Hydrograph Report

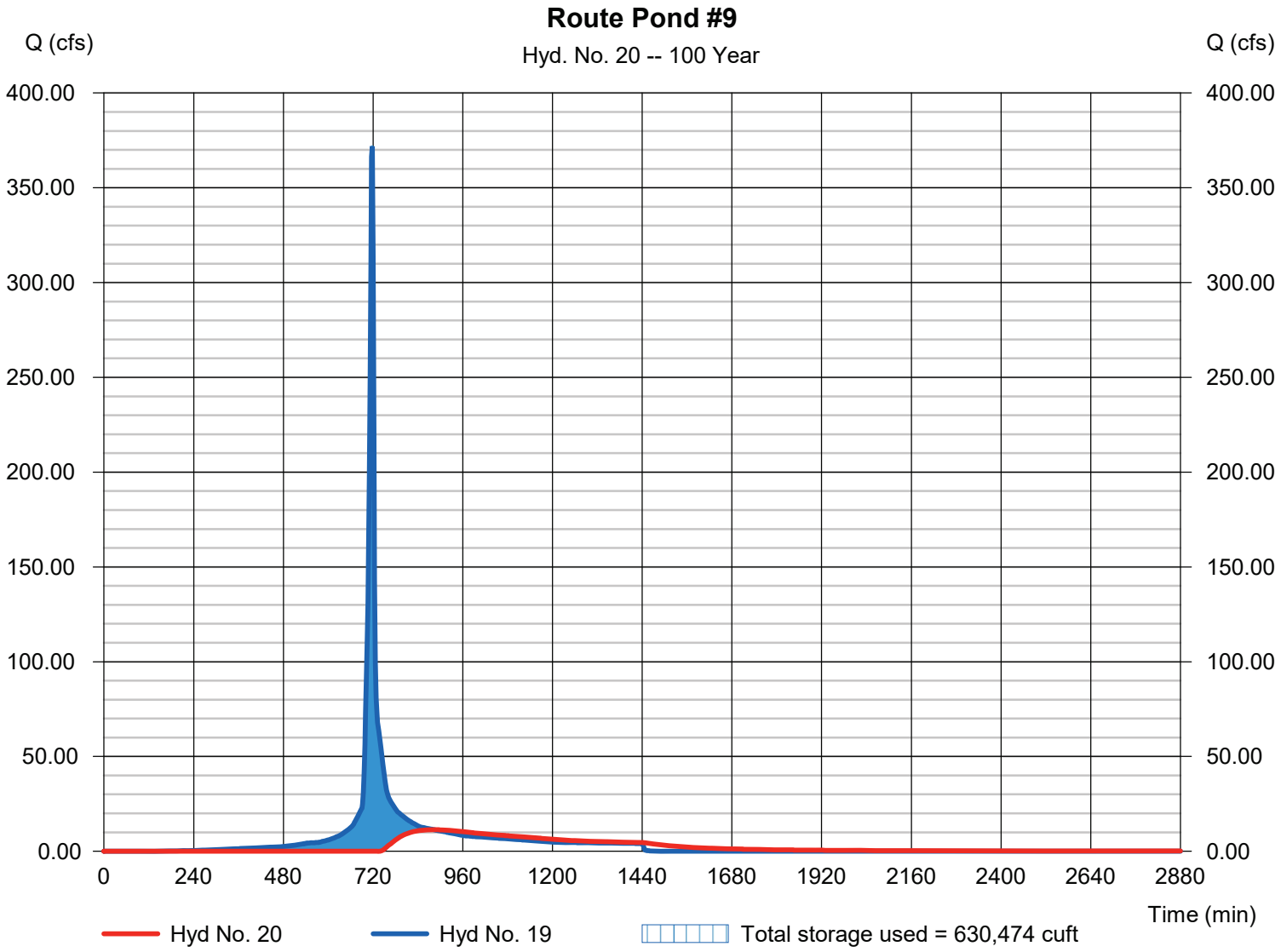
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 20

Route Pond #9

| | | | |
|---|---|---|---|
| Hydrograph type | = Reservoir | Peak discharge | = 11.36 cfs |
| Storm frequency | = 100 yrs | Time to peak | = 882 min |
| Time interval | = 2 min | Hyd. volume | = 380,017 cuft |
| Inflow hyd. No. | = 19 - Total To Pond #9 - DP 001 | Max. Elevation | = 14.52 ft |
| Reservoir name | = Wet Pond #9 | Max. Storage | = 630,474 cuft |

Storage Indication method used.



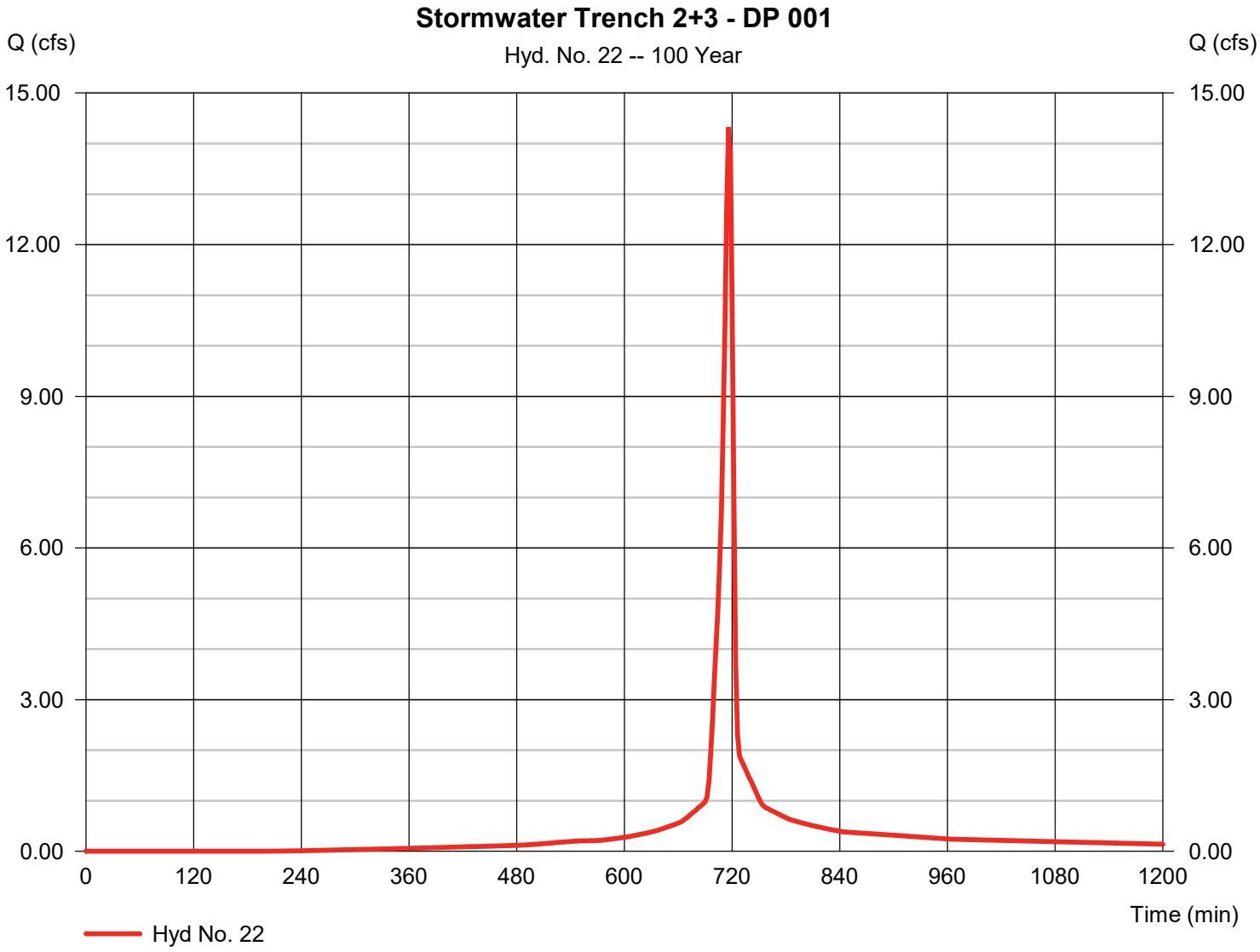
# Hydrograph Report



## Hyd. No. 22

Stormwater Trench 2+3 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 14.32 cfs |
| Storm frequency | = 100 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 31,007 cuft |
| Drainage area | = 1.590 ac | Curve number | = 87.5 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 7.20 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



# Hydrograph Report

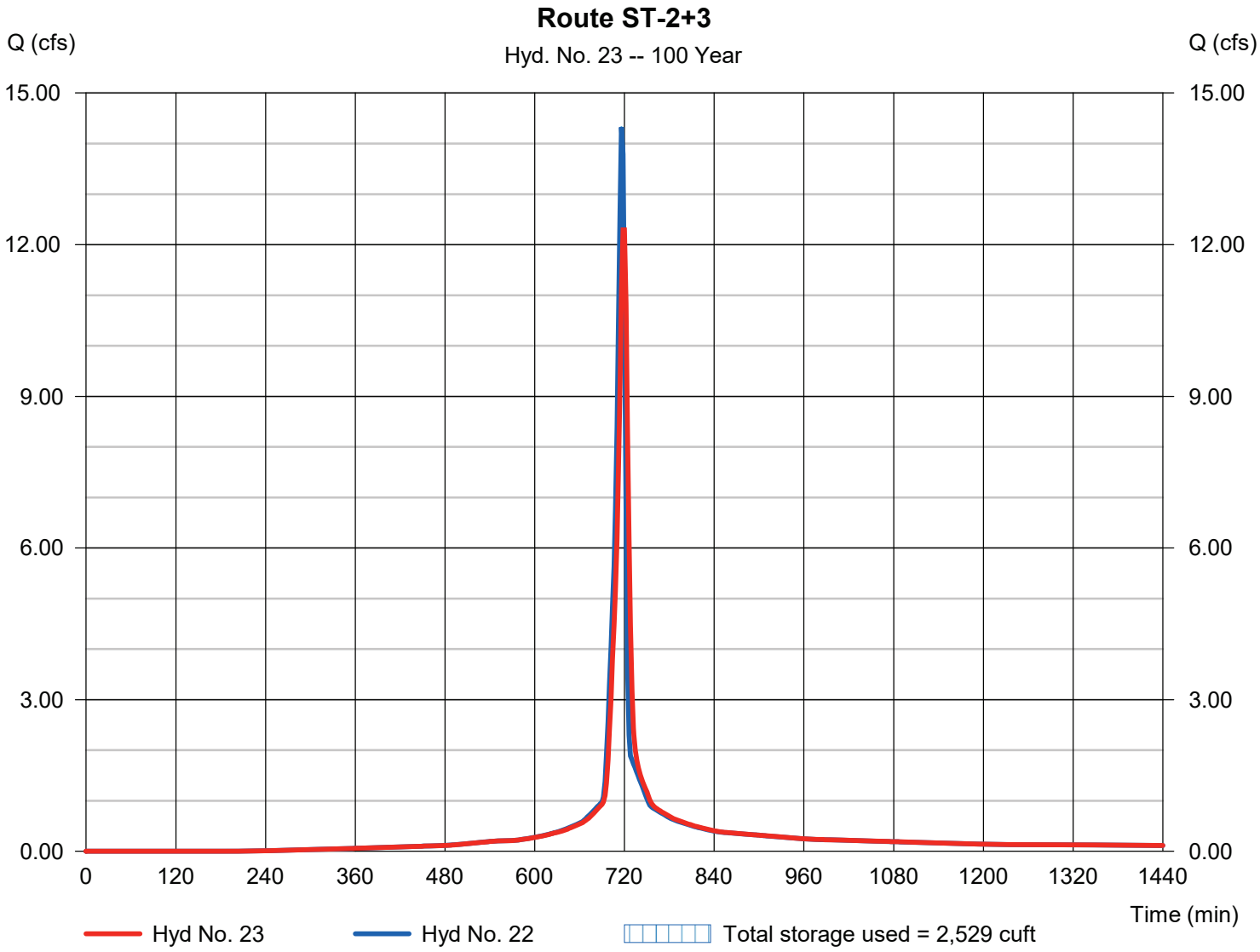
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 23

Route ST-2+3

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | Reservoir | Peak discharge | = | 12.29 cfs |
| Storm frequency | = | 100 yrs | Time to peak | = | 718 min |
| Time interval | = | 2 min | Hyd. volume | = | 31,007 cuft |
| Inflow hyd. No. | = | 22 - Stormwater Trench 2+3 - DP 2+3 | Max. Elevation | = | 16.91 ft |
| Reservoir name | = | Stormwater Trench ST-2+3 | Max. Storage | = | 2,529 cuft |

Storage Indication method used.



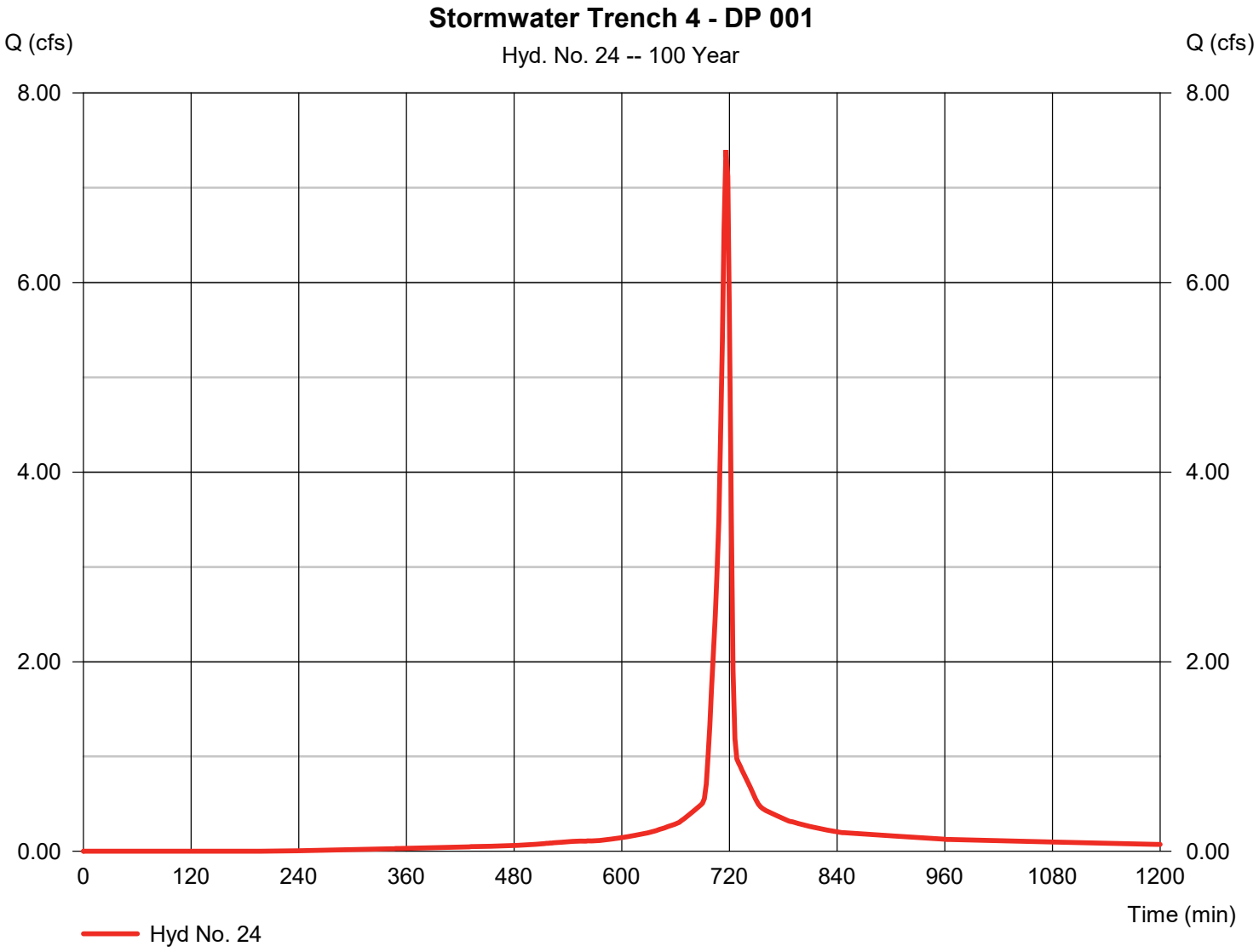
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 24

Stormwater Trench 4 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 7.397 cfs |
| Storm frequency | = 100 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 16,023 cuft |
| Drainage area | = 0.820 ac | Curve number | = 87.6 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 7.20 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



# Hydrograph Report

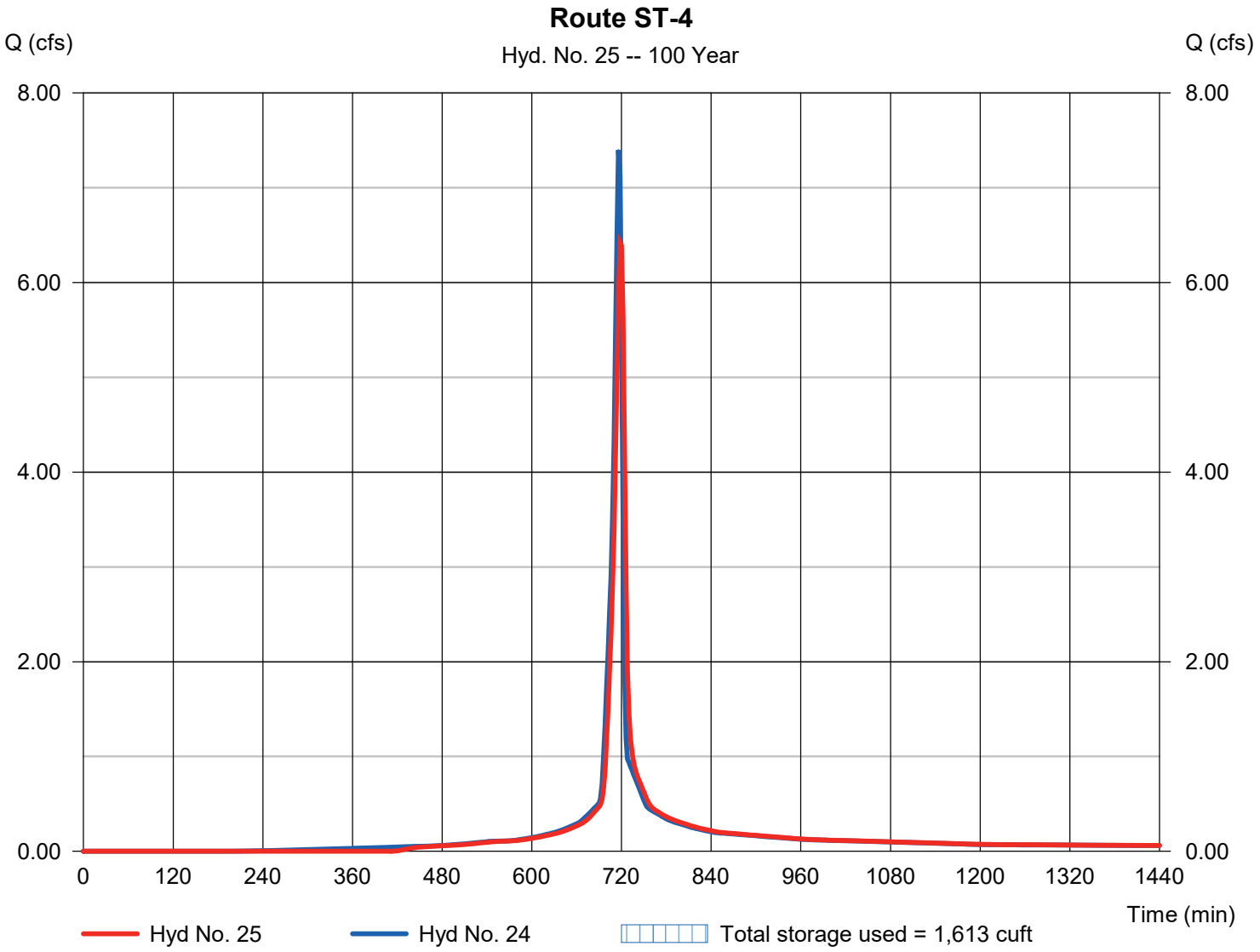
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 25

Route ST-4

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | Reservoir | Peak discharge | = | 6.421 cfs |
| Storm frequency | = | 100 yrs | Time to peak | = | 718 min |
| Time interval | = | 2 min | Hyd. volume | = | 15,769 cuft |
| Inflow hyd. No. | = | 24 - Stormwater Trench 4 - DP001 | Max. Elevation | = | 17.22 ft |
| Reservoir name | = | Stormwater Trench ST-4 | Max. Storage | = | 1,613 cuft |

Storage Indication method used.



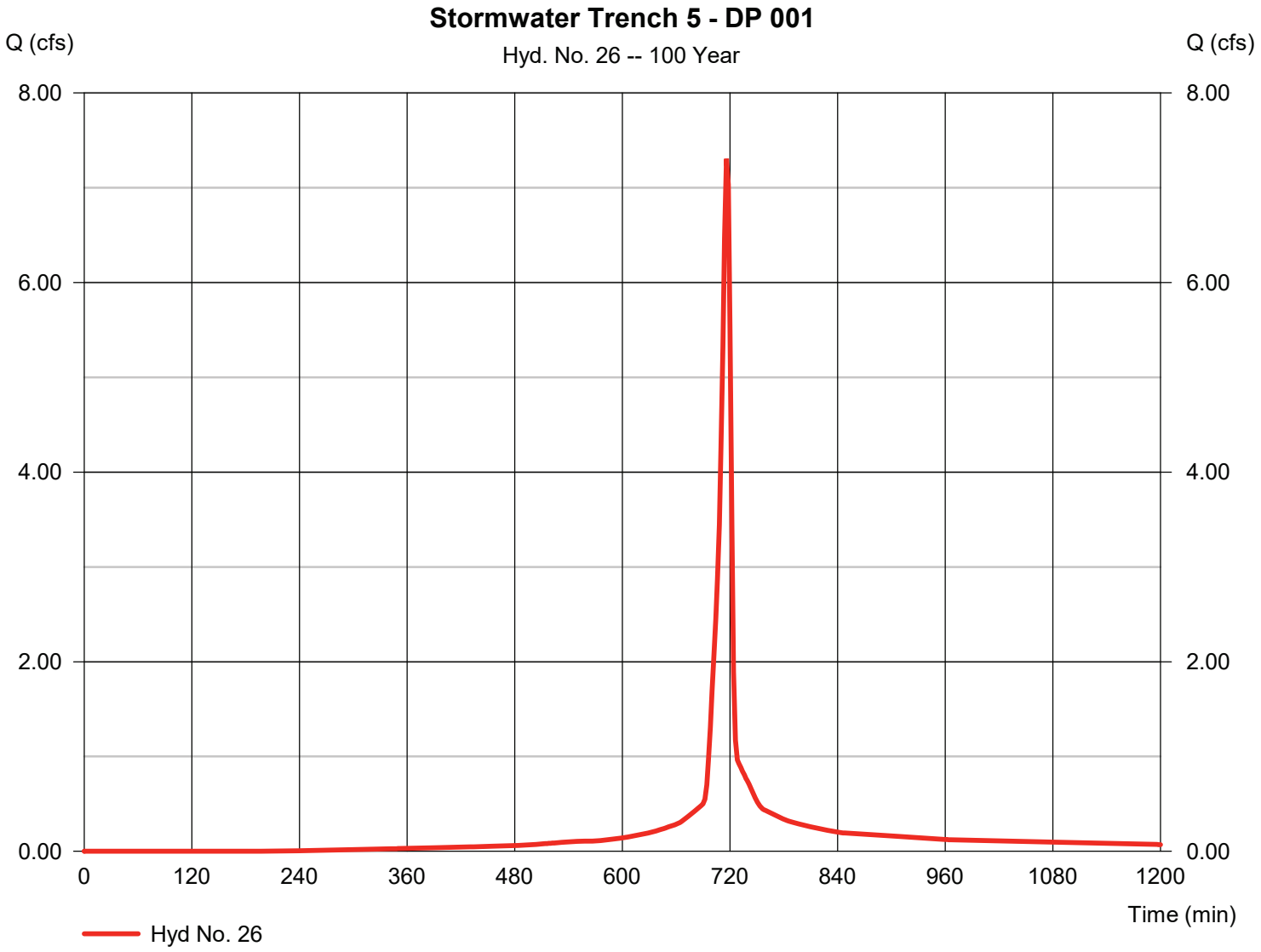
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 26

Stormwater Trench 5 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 7.307 cfs |
| Storm frequency | = 100 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 15,828 cuft |
| Drainage area | = 0.810 ac | Curve number | = 87.6 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 7.20 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



# Hydrograph Report

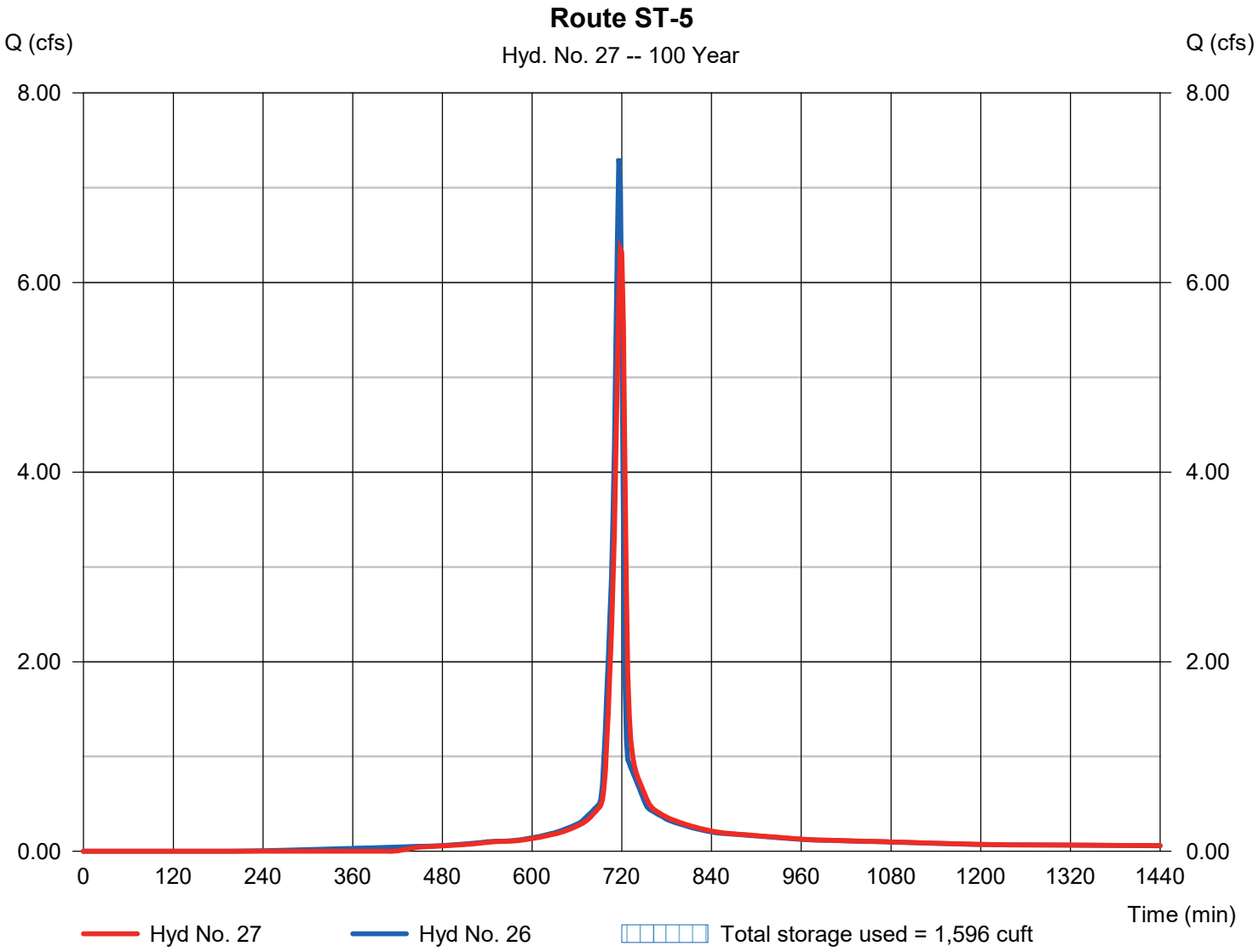
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## Hyd. No. 27

Route ST-5

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | Reservoir | Peak discharge | = | 6.352 cfs |
| Storm frequency | = | 100 yrs | Time to peak | = | 718 min |
| Time interval | = | 2 min | Hyd. volume | = | 15,574 cuft |
| Inflow hyd. No. | = | 26 - Stormwater Trench 5 - DP001 | Max. Elevation | = | 17.21 ft |
| Reservoir name | = | Stormwater Trench ST-5 | Max. Storage | = | 1,596 cuft |

Storage Indication method used.



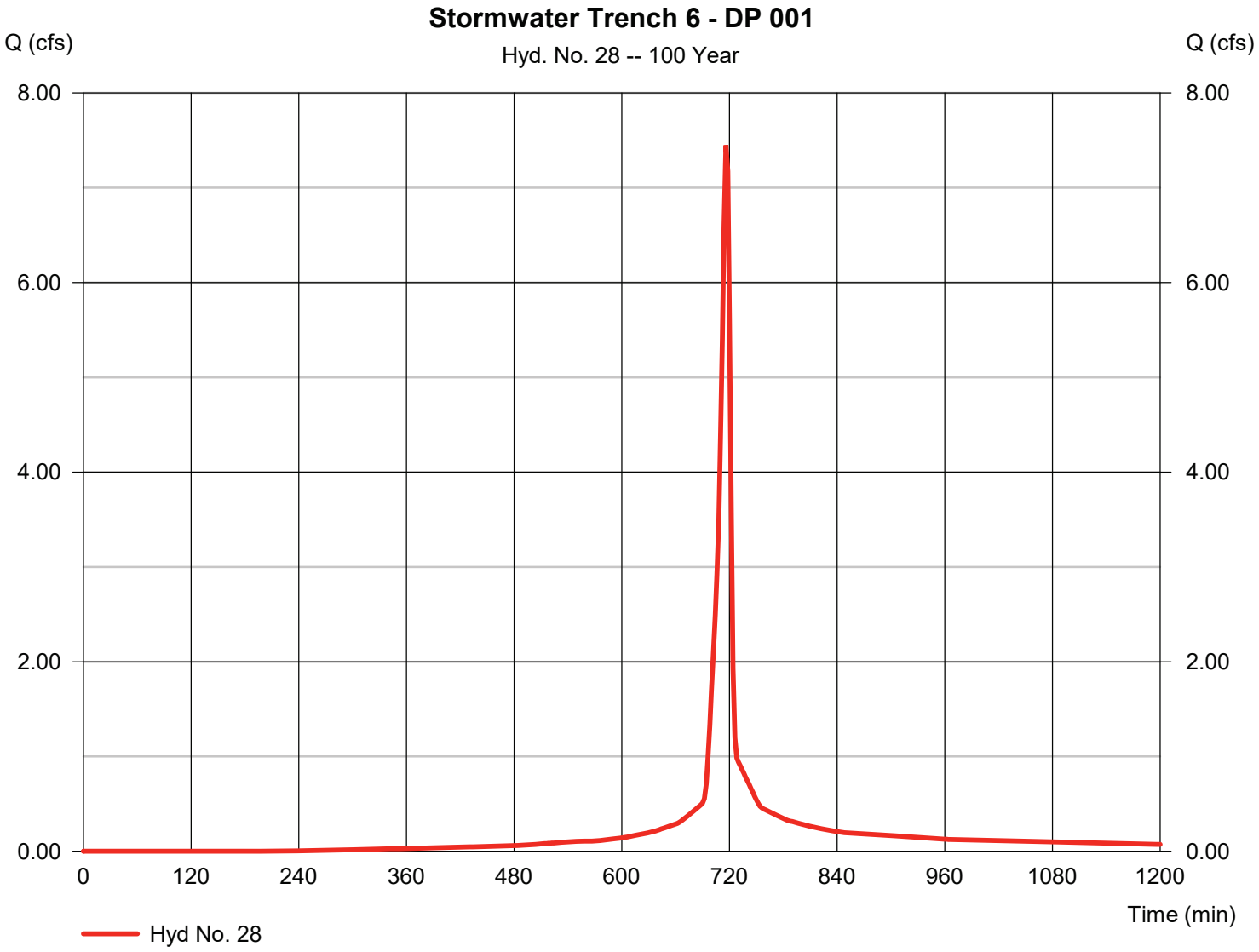
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 28

Stormwater Trench 6 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 7.448 cfs |
| Storm frequency | = 100 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 16,088 cuft |
| Drainage area | = 0.830 ac | Curve number | = 87.2 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 7.20 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



# Hydrograph Report

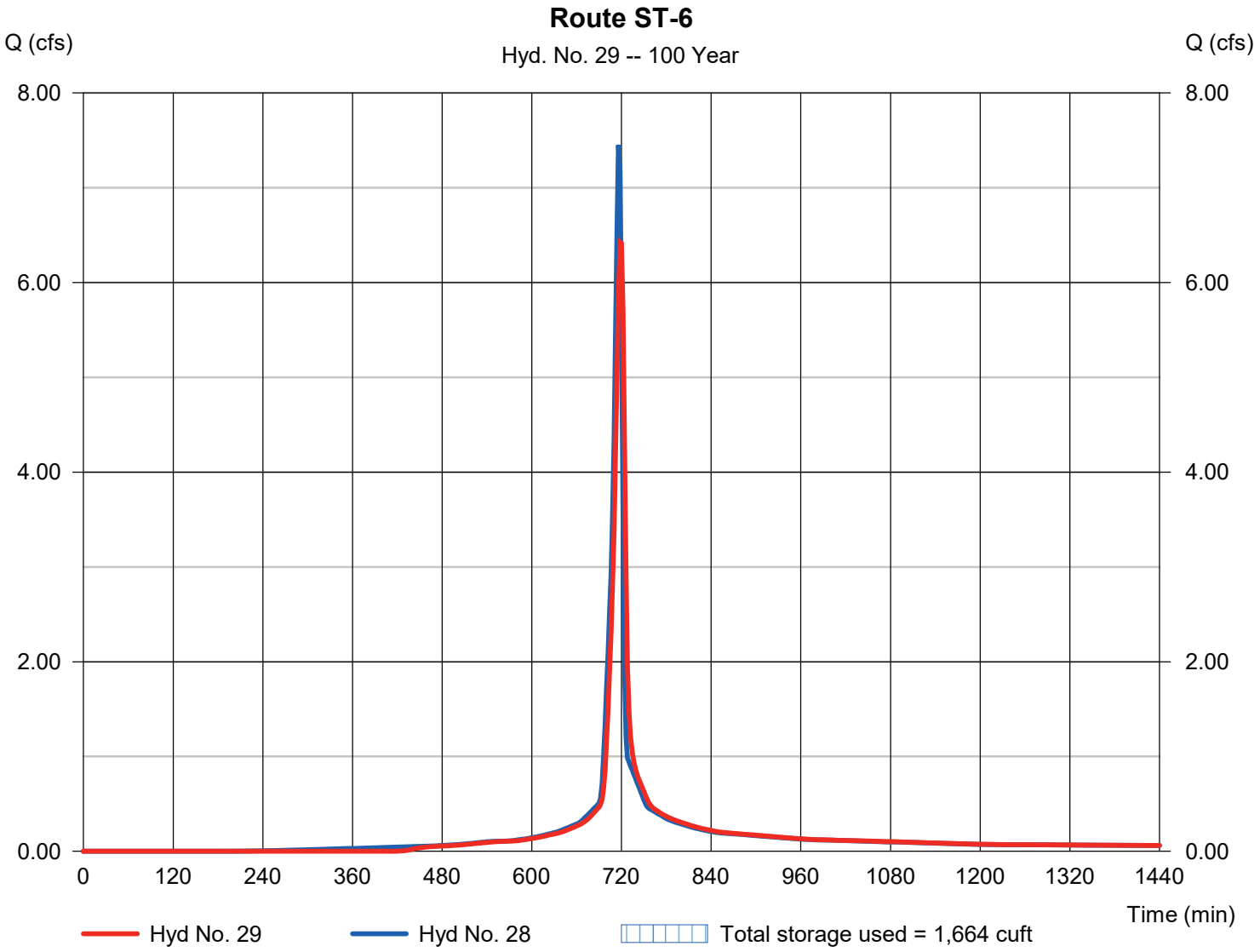
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## Hyd. No. 29

Route ST-6

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | Reservoir | Peak discharge | = | 6.426 cfs |
| Storm frequency | = | 100 yrs | Time to peak | = | 718 min |
| Time interval | = | 2 min | Hyd. volume | = | 15,827 cuft |
| Inflow hyd. No. | = | 28 - Stormwater Trench 6 - DP001 | Max. Elevation | = | 17.22 ft |
| Reservoir name | = | Stormwater Trench ST-6 | Max. Storage | = | 1,664 cuft |

Storage Indication method used.



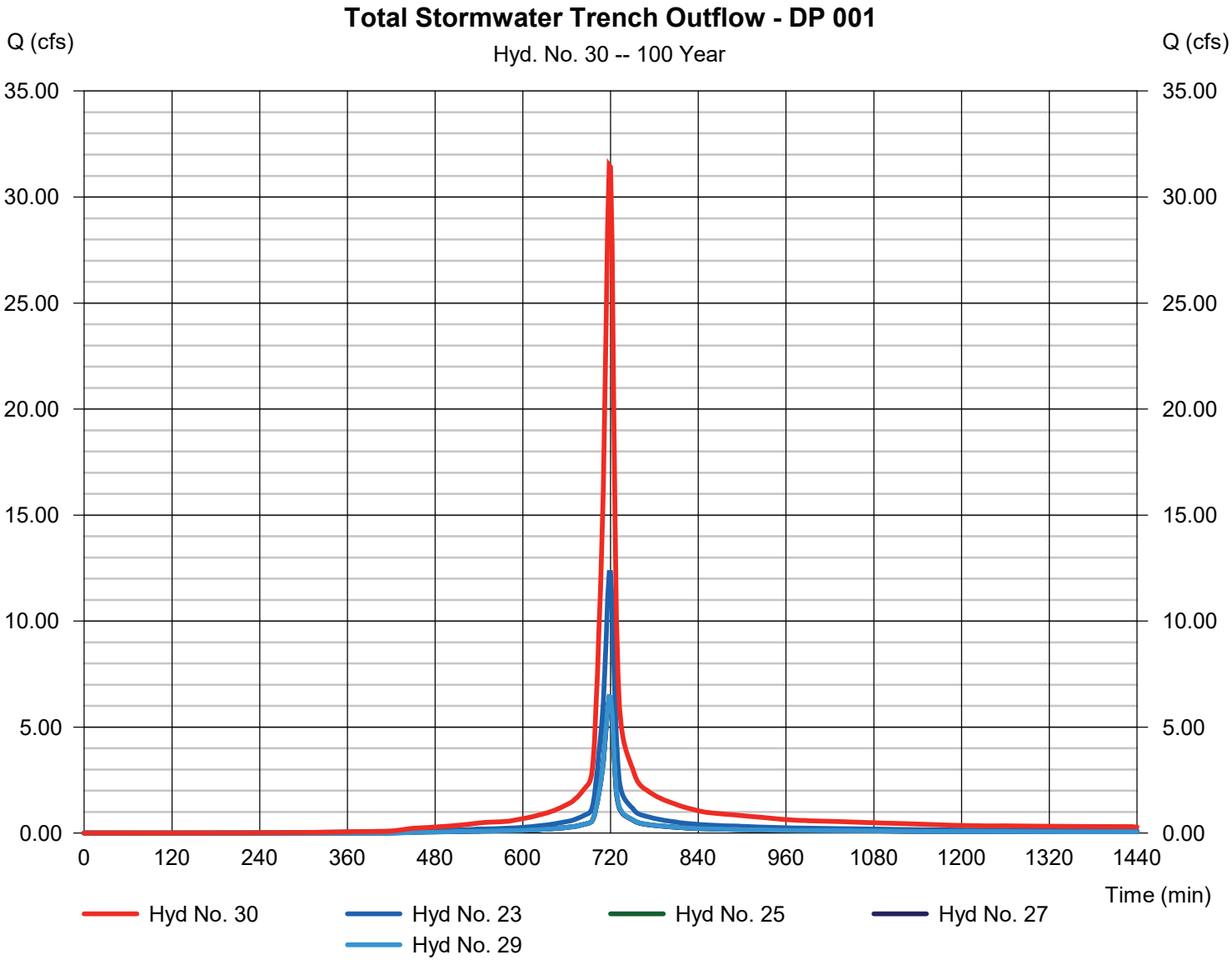
# Hydrograph Report



## Hyd. No. 30

Total Stormwater Trench Outflow - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 31.49 cfs |
| Storm frequency | = 100 yrs | Time to peak | = 718 min |
| Time interval | = 2 min | Hyd. volume | = 78,176 cuft |
| Inflow hyds. | = 23, 25, 27, 29 | Contrib. drain. area | = 0.000 ac |



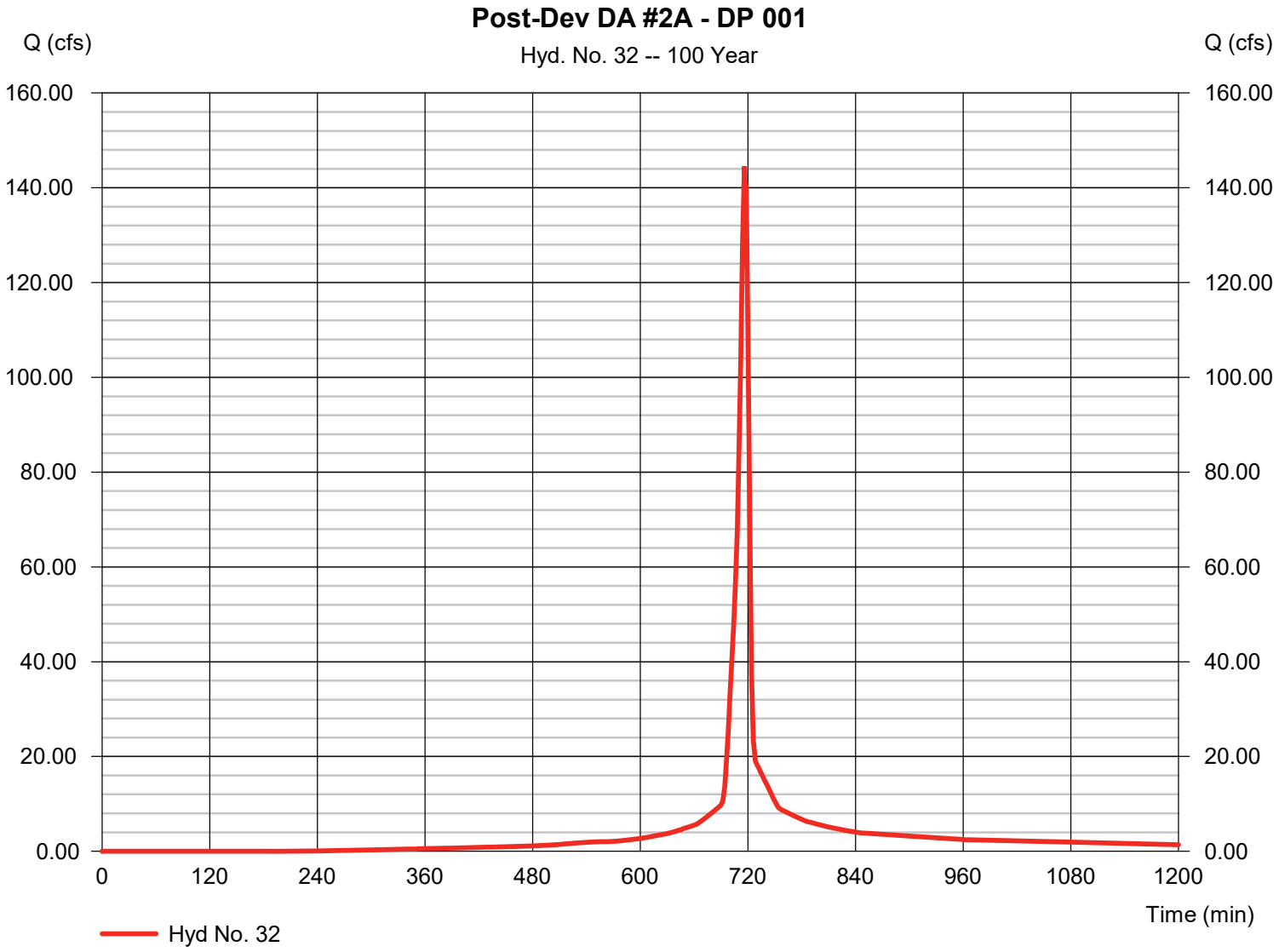
# Hydrograph Report



## Hyd. No. 32

Post-Dev DA #2A - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 144.51 cfs |
| Storm frequency | = 100 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 311,289 cuft |
| Drainage area | = 16.190 ac | Curve number | = 86.8 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 7.20 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



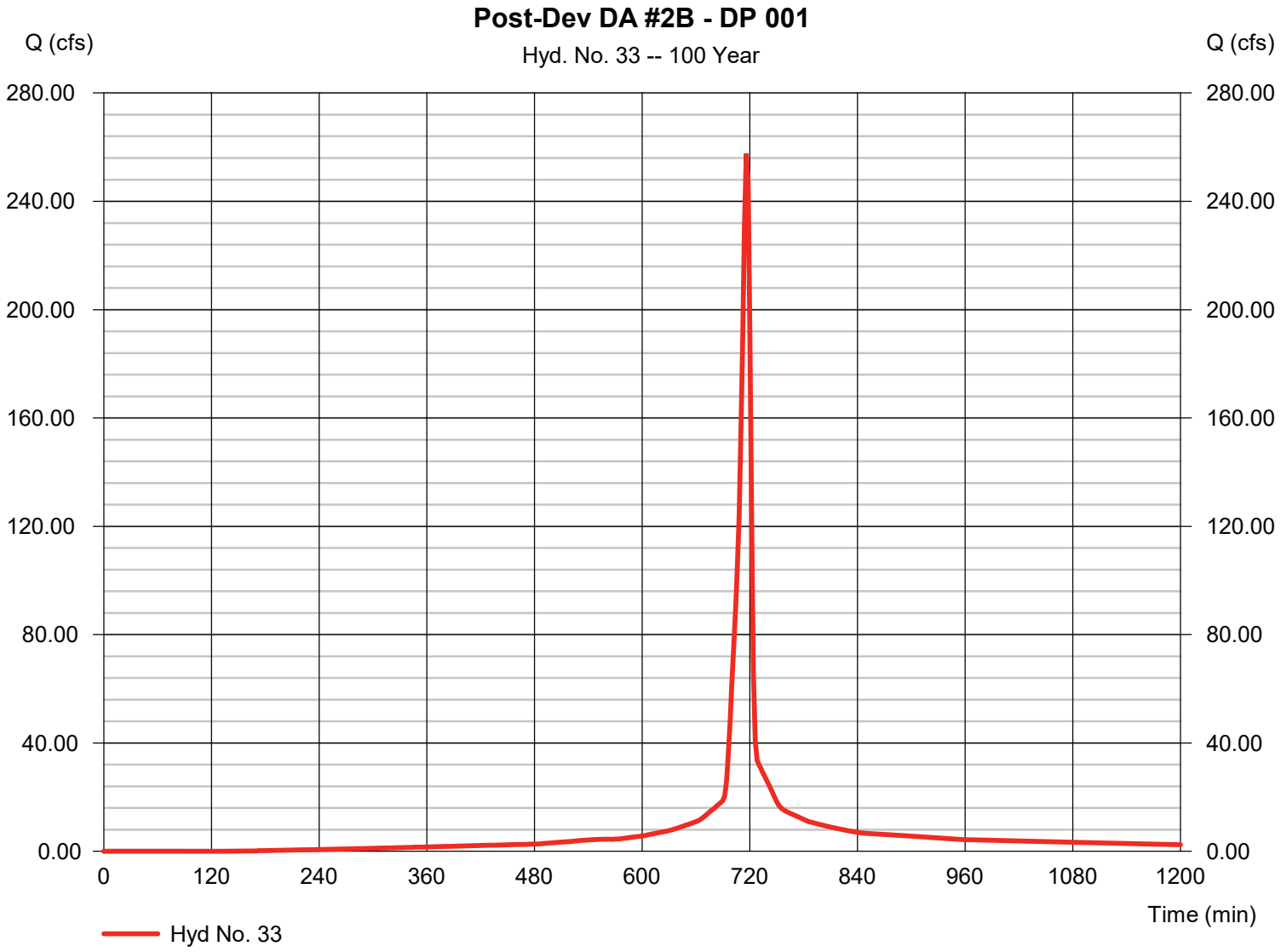
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 33

Post-Dev DA #2B - DP 001

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | SCS Runoff | Peak discharge | = | 257.61 cfs |
| Storm frequency | = | 100 yrs | Time to peak | = | 716 min |
| Time interval | = | 2 min | Hyd. volume | = | 574,709 cuft |
| Drainage area | = | 27.420 ac | Curve number | = | 91.2 |
| Basin Slope | = | 0.0 % | Hydraulic length | = | 0 ft |
| Tc method | = | User | Time of conc. (Tc) | = | 5.00 min |
| Total precip. | = | 7.20 in | Distribution | = | Type II |
| Storm duration | = | 24 hrs | Shape factor | = | 484 |



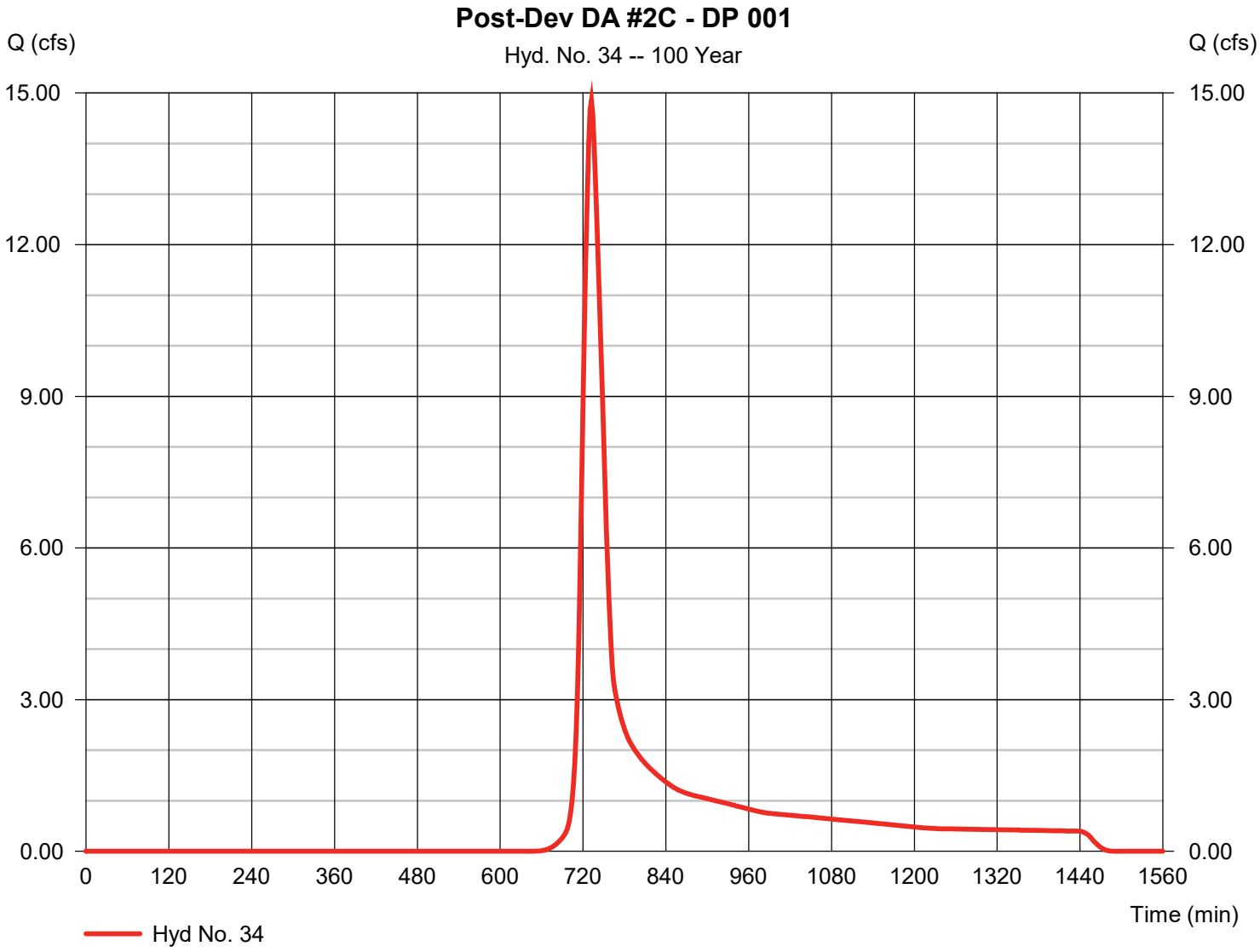
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 34

Post-Dev DA #2C - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 14.85 cfs |
| Storm frequency | = 100 yrs | Time to peak | = 732 min |
| Time interval | = 2 min | Hyd. volume | = 63,275 cuft |
| Drainage area | = 7.420 ac | Curve number | = 56 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = TR55 | Time of conc. (Tc) | = 28.30 min |
| Total precip. | = 7.20 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



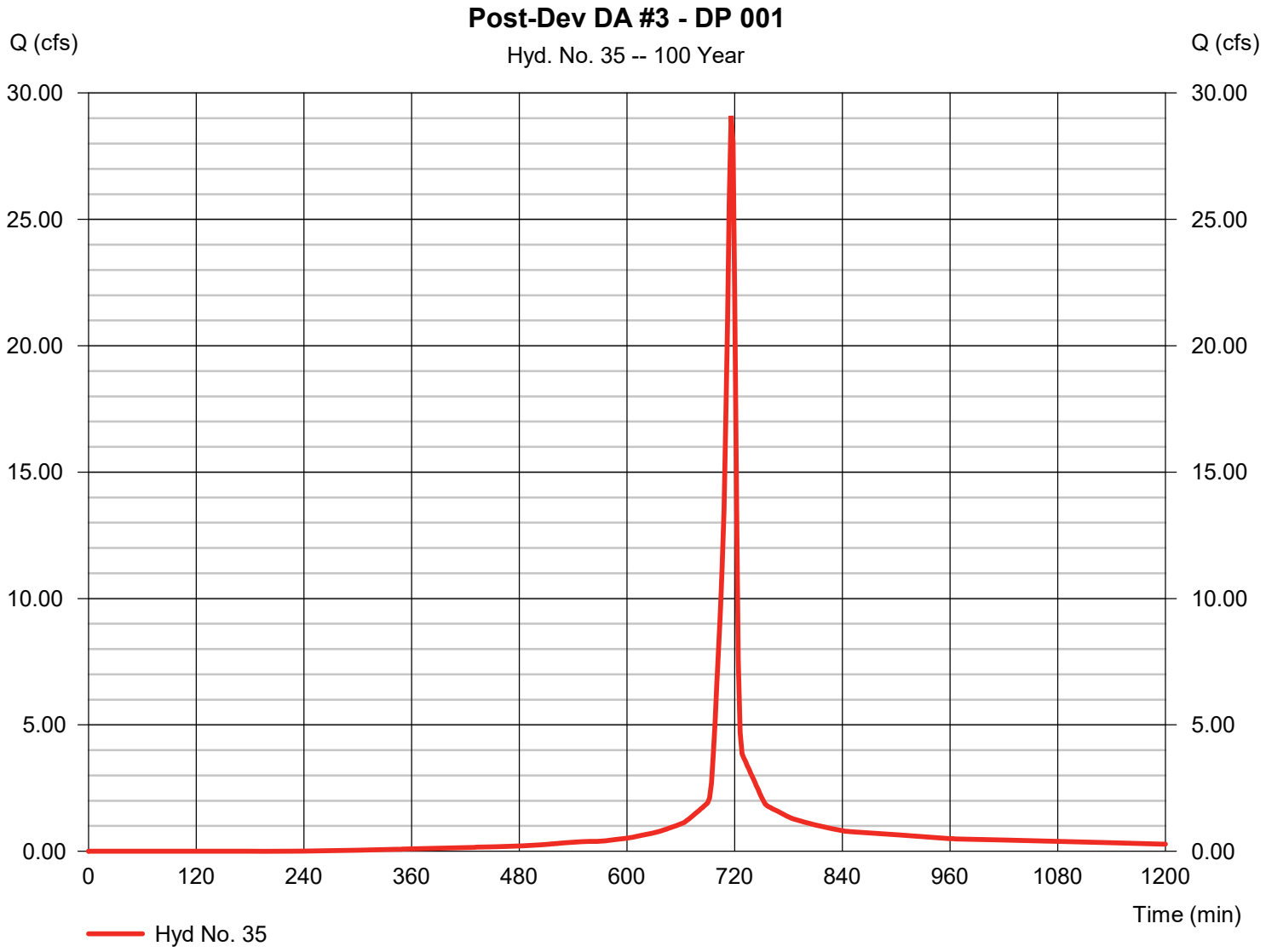
# Hydrograph Report



## Hyd. No. 35

Post-Dev DA #3 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 29.10 cfs |
| Storm frequency | = 100 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 62,223 cuft |
| Drainage area | = 3.310 ac | Curve number | = 85.7 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 7.20 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



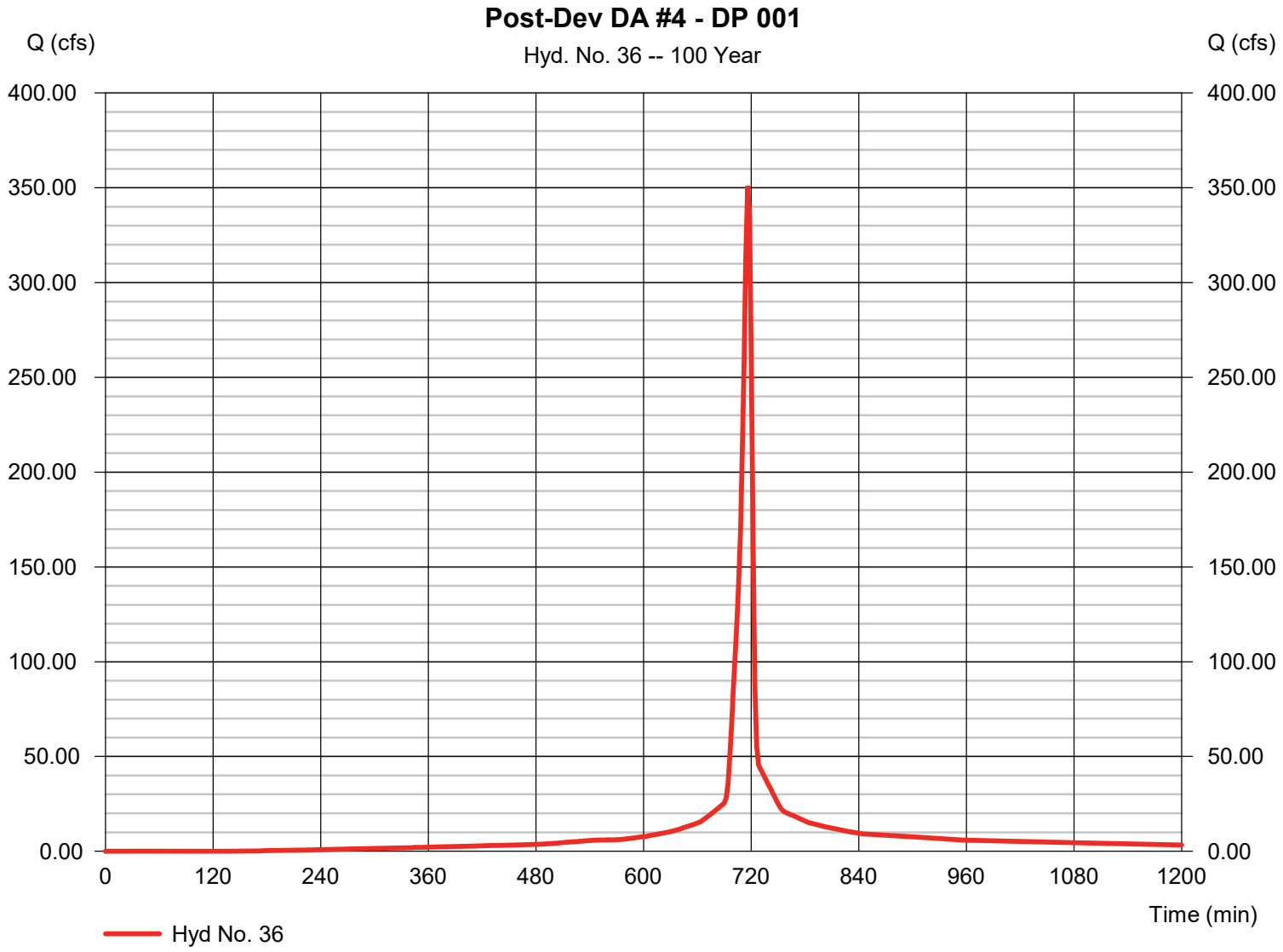
# Hydrograph Report



## Hyd. No. 36

Post-Dev DA #4 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 350.84 cfs |
| Storm frequency | = 100 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 781,983 cuft |
| Drainage area | = 37.380 ac | Curve number | = 91.1 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 7.20 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



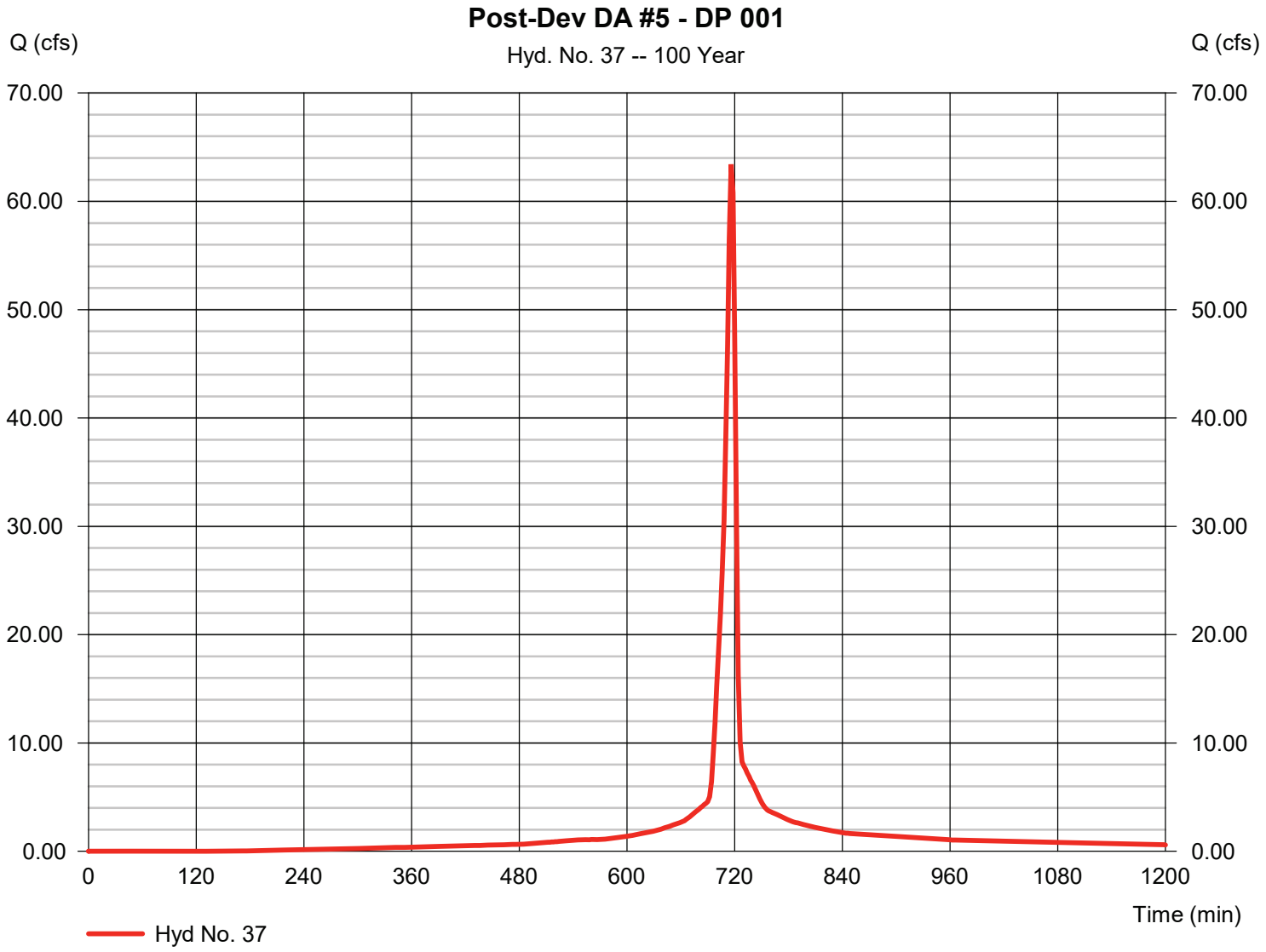
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 37

Post-Dev DA #5 - DP 001

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | SCS Runoff | Peak discharge | = | 63.42 cfs |
| Storm frequency | = | 100 yrs | Time to peak | = | 716 min |
| Time interval | = | 2 min | Hyd. volume | = | 141,091 cuft |
| Drainage area | = | 6.770 ac | Curve number | = | 90.9 |
| Basin Slope | = | 0.0 % | Hydraulic length | = | 0 ft |
| Tc method | = | User | Time of conc. (Tc) | = | 5.00 min |
| Total precip. | = | 7.20 in | Distribution | = | Type II |
| Storm duration | = | 24 hrs | Shape factor | = | 484 |



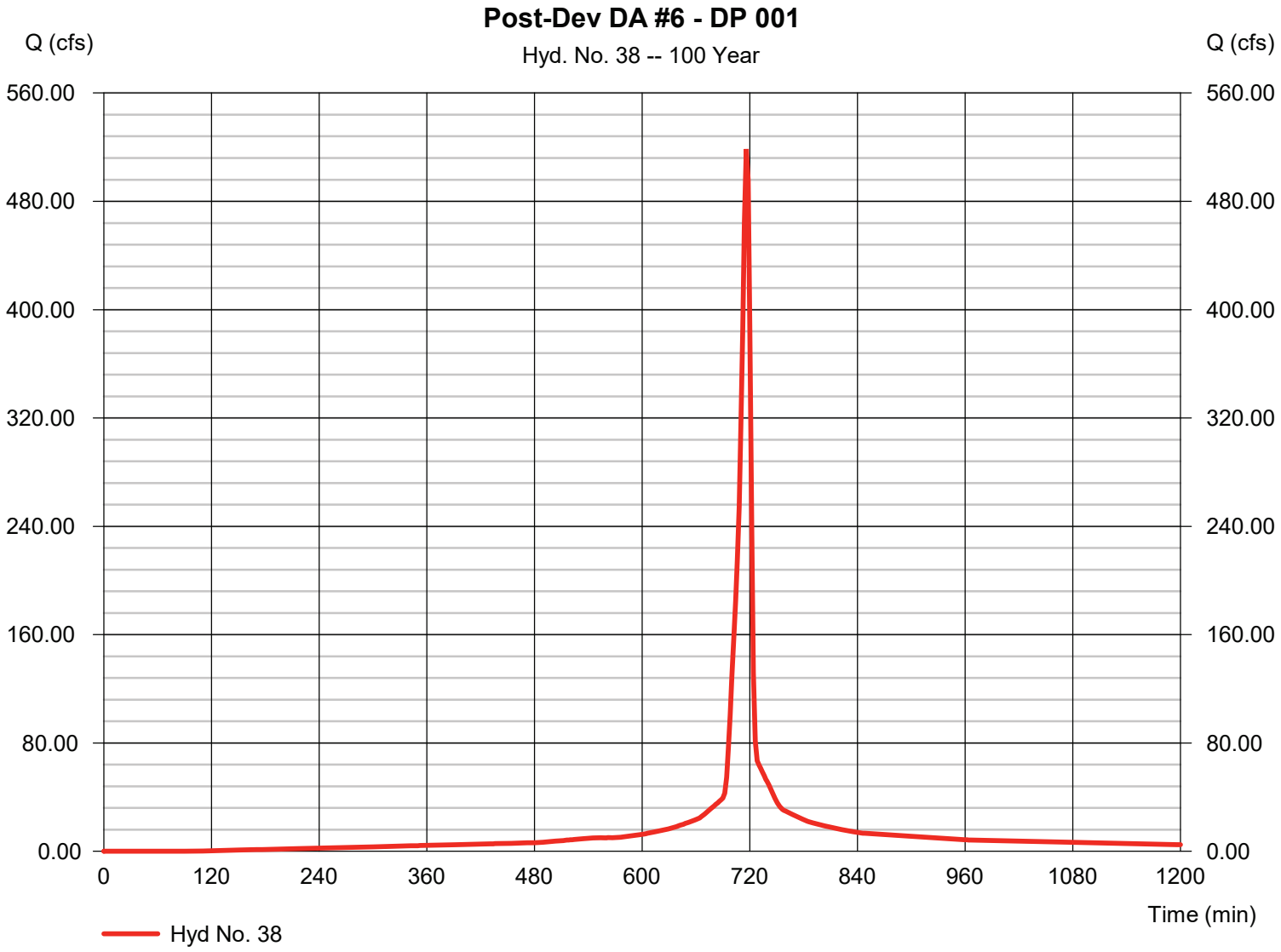
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 38

Post-Dev DA #6 - DP 001

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | SCS Runoff | Peak discharge | = | 518.67 cfs |
| Storm frequency | = | 100 yrs | Time to peak | = | 716 min |
| Time interval | = | 2 min | Hyd. volume | = | 1,191,596 cuft |
| Drainage area | = | 53.880 ac | Curve number | = | 94.1 |
| Basin Slope | = | 0.0 % | Hydraulic length | = | 0 ft |
| Tc method | = | User | Time of conc. (Tc) | = | 5.00 min |
| Total precip. | = | 7.20 in | Distribution | = | Type II |
| Storm duration | = | 24 hrs | Shape factor | = | 484 |



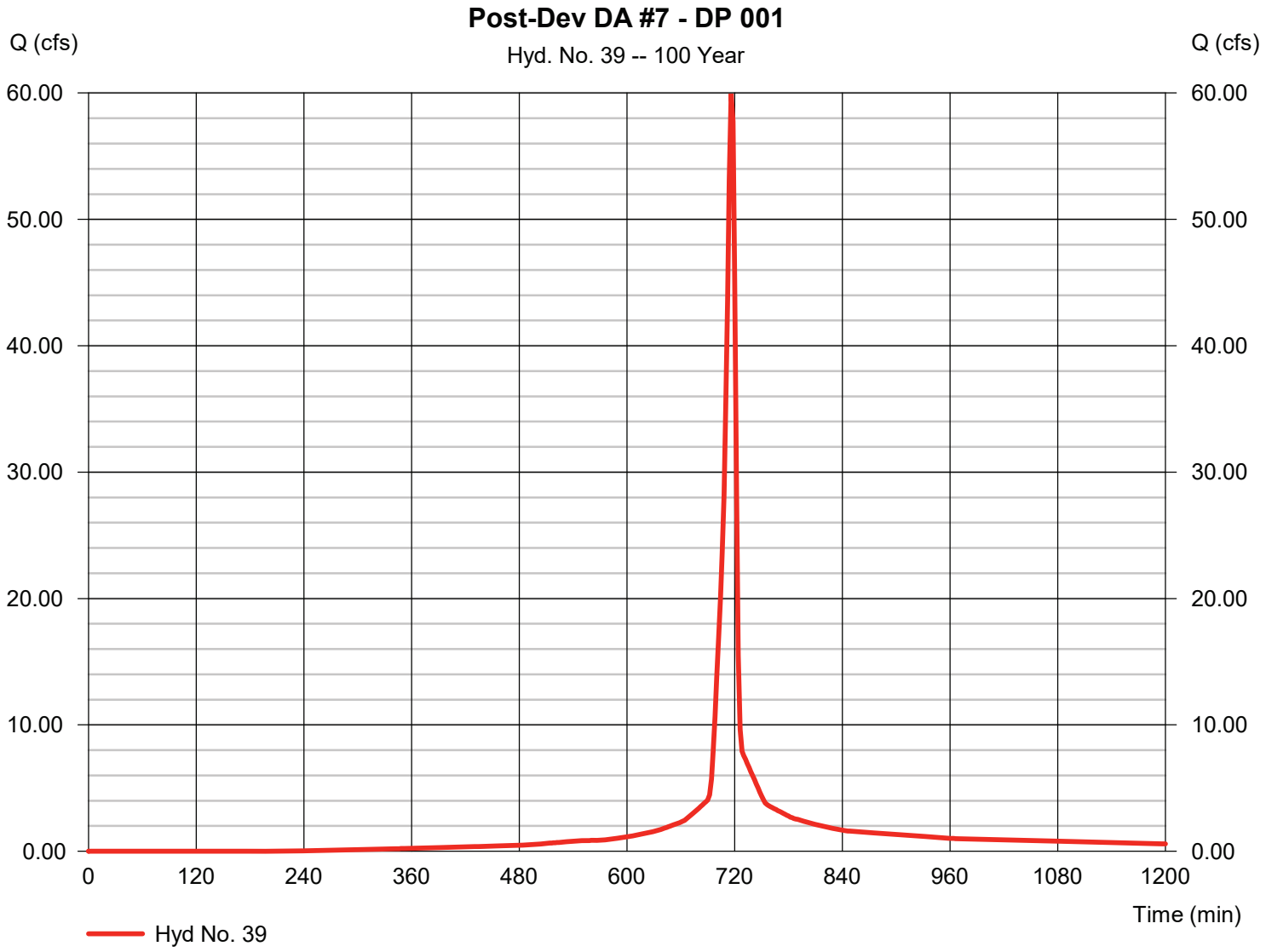
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 39

Post-Dev DA #7 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 59.96 cfs |
| Storm frequency | = 100 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 129,415 cuft |
| Drainage area | = 6.690 ac | Curve number | = 87.1 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 7.20 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



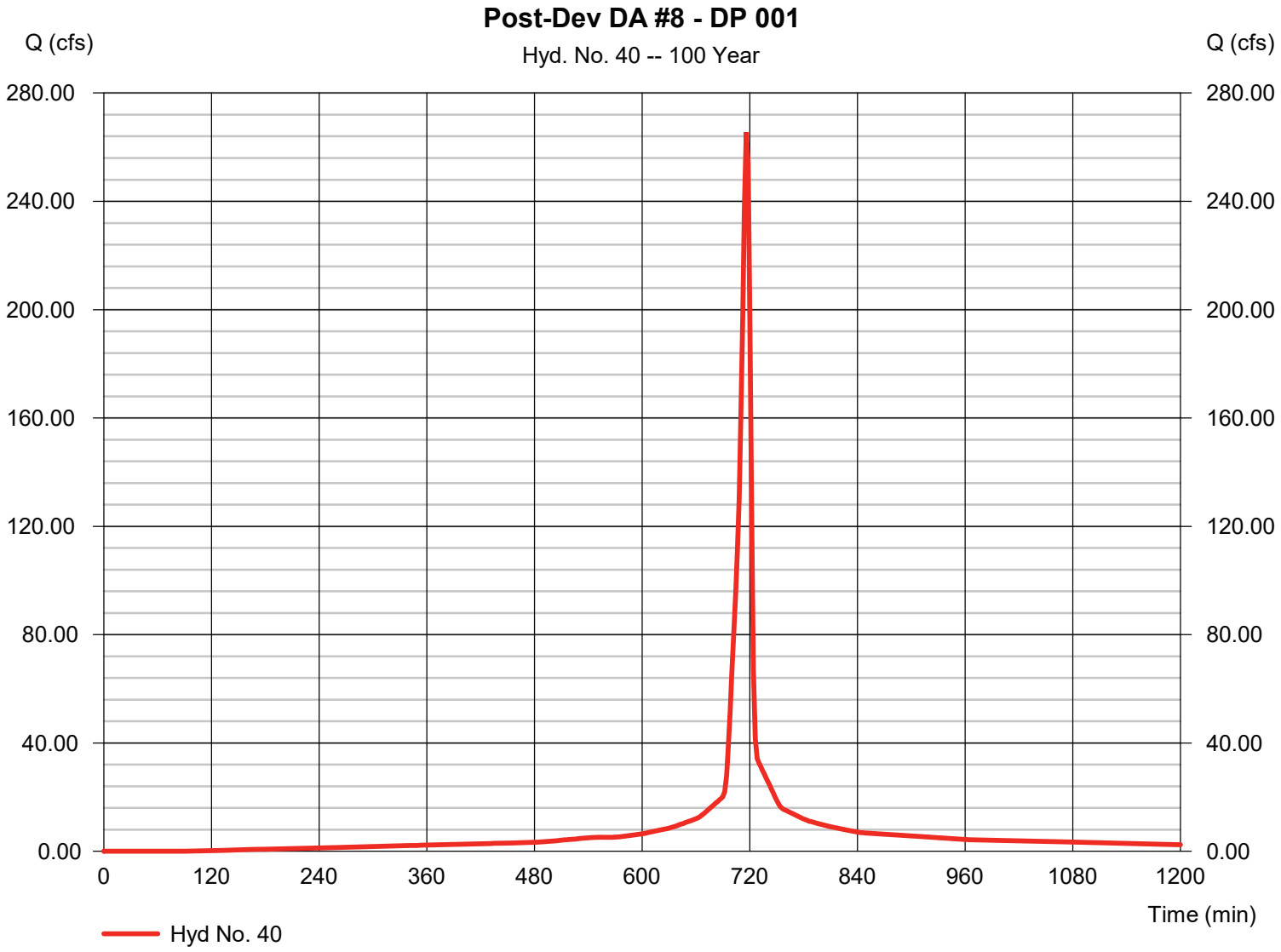
# Hydrograph Report



## Hyd. No. 40

Post-Dev DA #8 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 265.56 cfs |
| Storm frequency | = 100 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 612,157 cuft |
| Drainage area | = 27.530 ac | Curve number | = 94.4 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 7.20 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



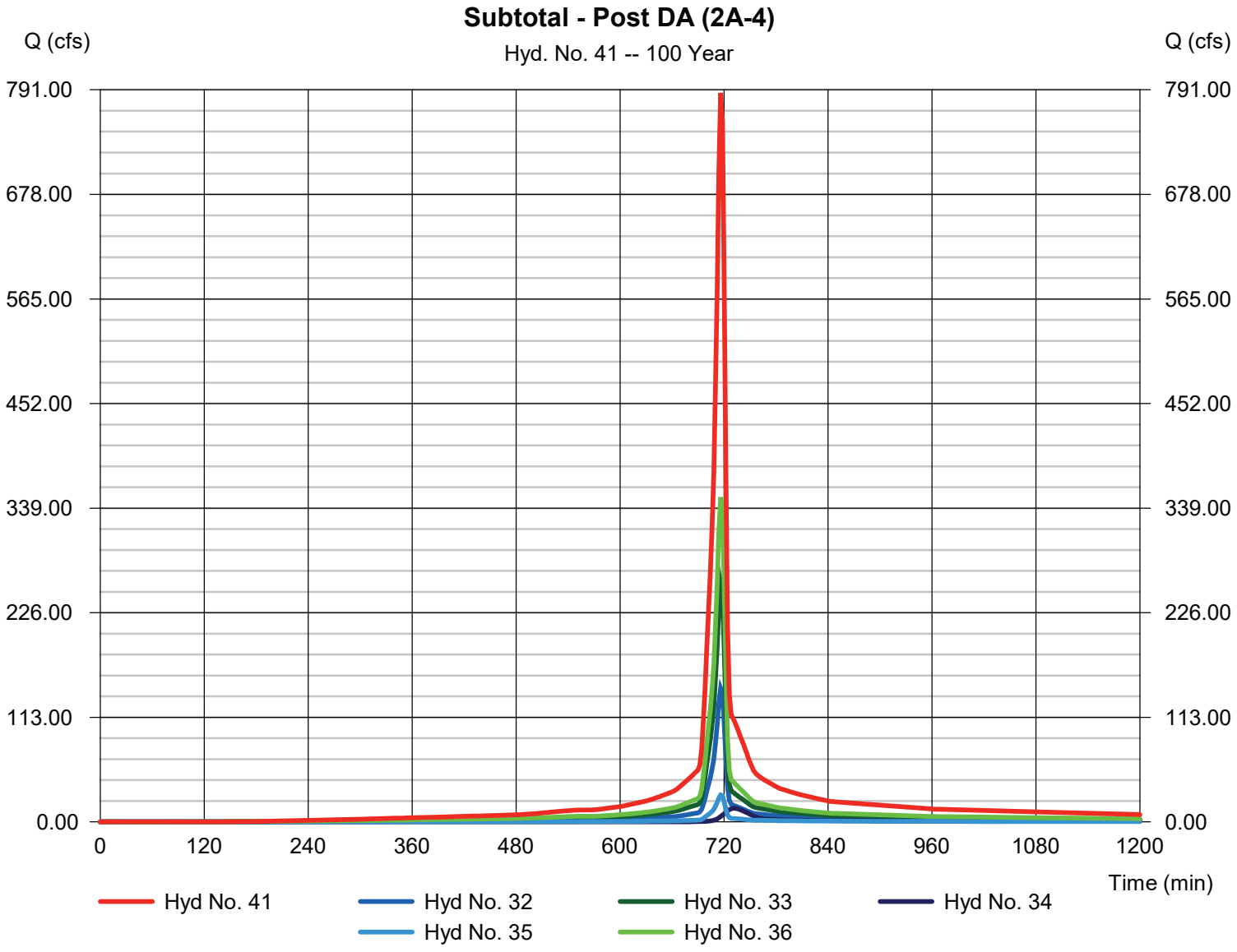
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 41

Subtotal - Post DA (2A-4)

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 787.76 cfs |
| Storm frequency | = 100 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 1,793,479 cuft |
| Inflow hyds. | = 32, 33, 34, 35, 36 | Contrib. drain. area | = 91.720 ac |



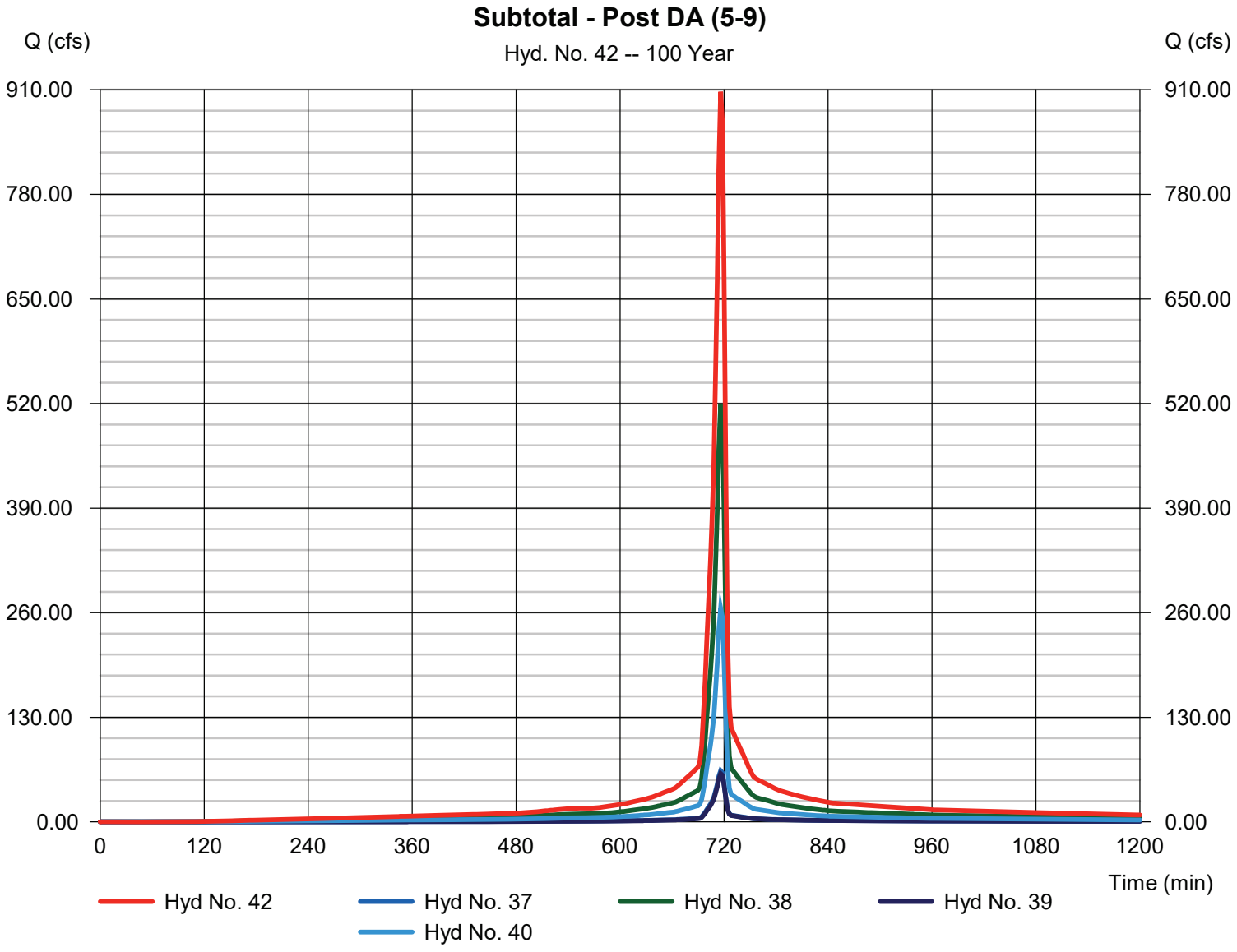
# Hydrograph Report



## Hyd. No. 42

Subtotal - Post DA (5-9)

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 907.60 cfs |
| Storm frequency | = 100 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 2,074,257 cuft |
| Inflow hyds. | = 37, 38, 39, 40 | Contrib. drain. area | = 94.870 ac |



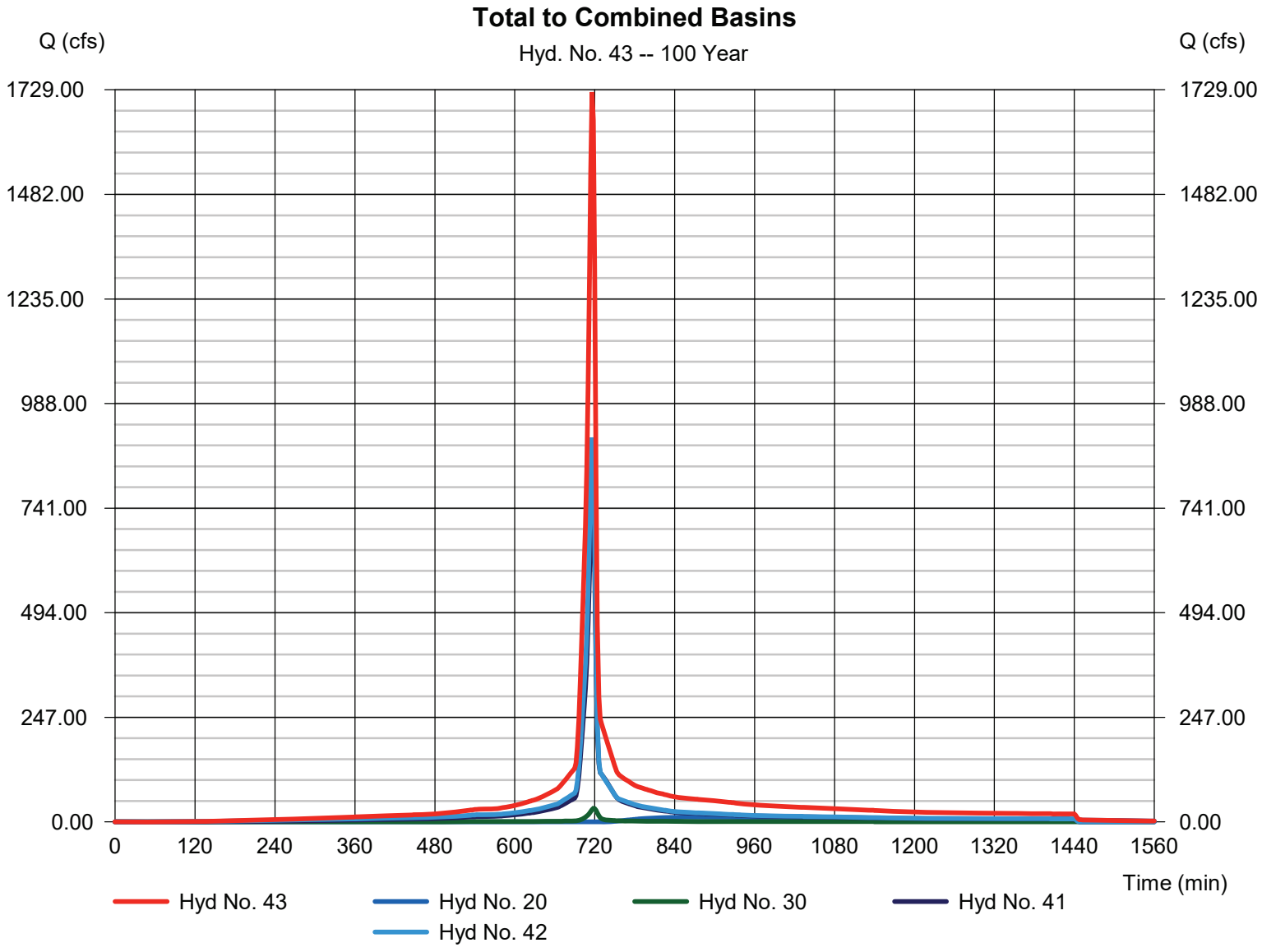
# Hydrograph Report

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## Hyd. No. 43

Total to Combined Basins

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 1723.92 cfs |
| Storm frequency | = 100 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 4,325,925 cuft |
| Inflow hyds. | = 20, 30, 41, 42 | Contrib. drain. area | = 0.000 ac |



# Hydrograph Report

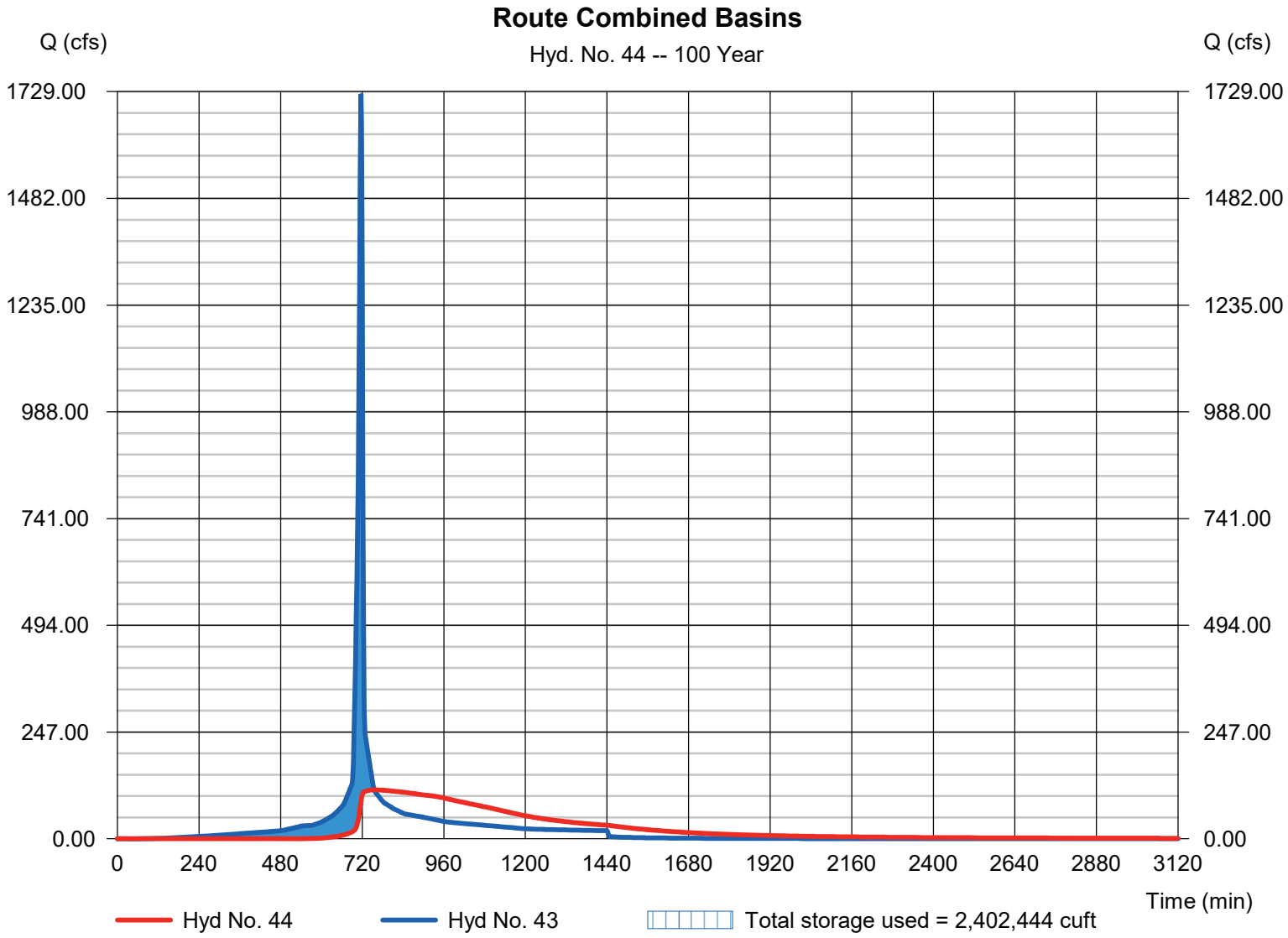
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## Hyd. No. 44

Route Combined Basins

| | | | |
|---|---|---|---|
| Hydrograph type | = Reservoir | Peak discharge | = 113.06 cfs |
| Storm frequency | = 100 yrs | Time to peak | = 756 min |
| Time interval | = 2 min | Hyd. volume | = 4,019,168 cuft |
| Inflow hyd. No. | = 43 - Total to Combined Basins | Max. Elevation | = 16.00 ft |
| Reservoir name | = Combined Basins | Max. Storage | = 2,402,444 cuft |

Storage Indication method used.



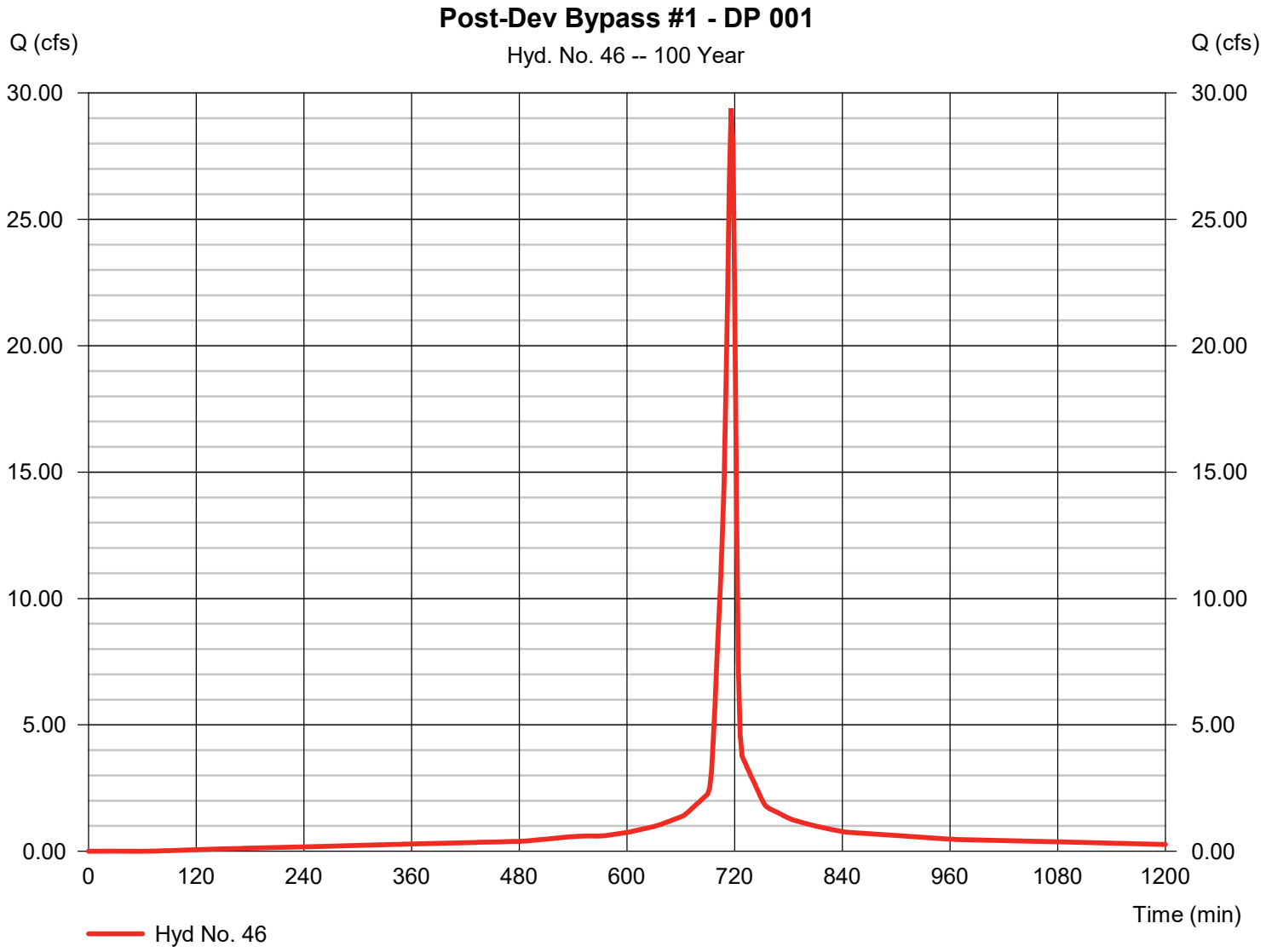
# Hydrograph Report

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## Hyd. No. 46

Post-Dev Bypass #1 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 29.39 cfs |
| Storm frequency | = 100 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 68,974 cuft |
| Drainage area | = 3.020 ac | Curve number | = 95.9 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 7.20 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



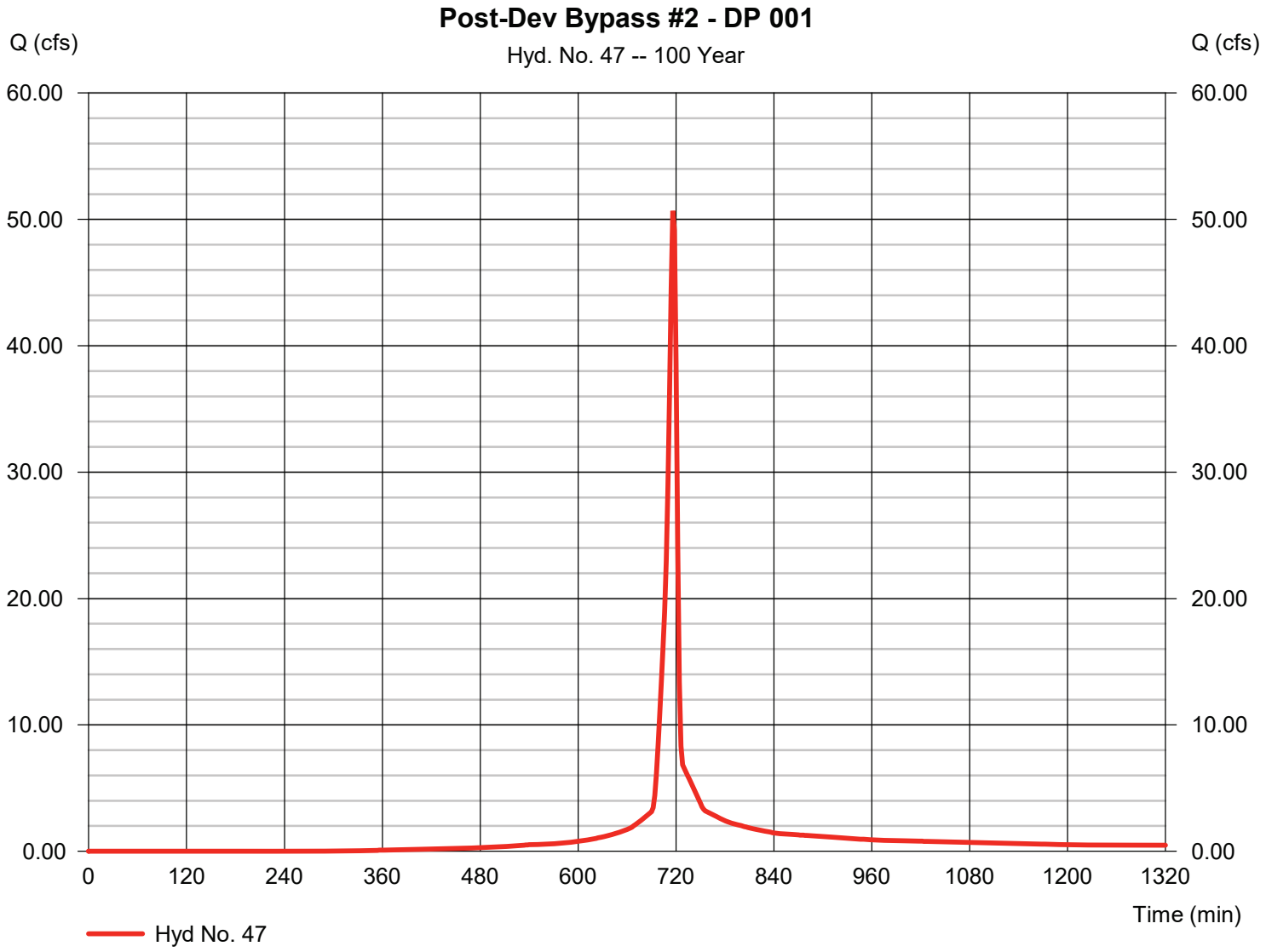
# Hydrograph Report

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## Hyd. No. 47

Post-Dev Bypass #2 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 50.68 cfs |
| Storm frequency | = 100 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 106,304 cuft |
| Drainage area | = 6.080 ac | Curve number | = 82.3 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 7.20 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



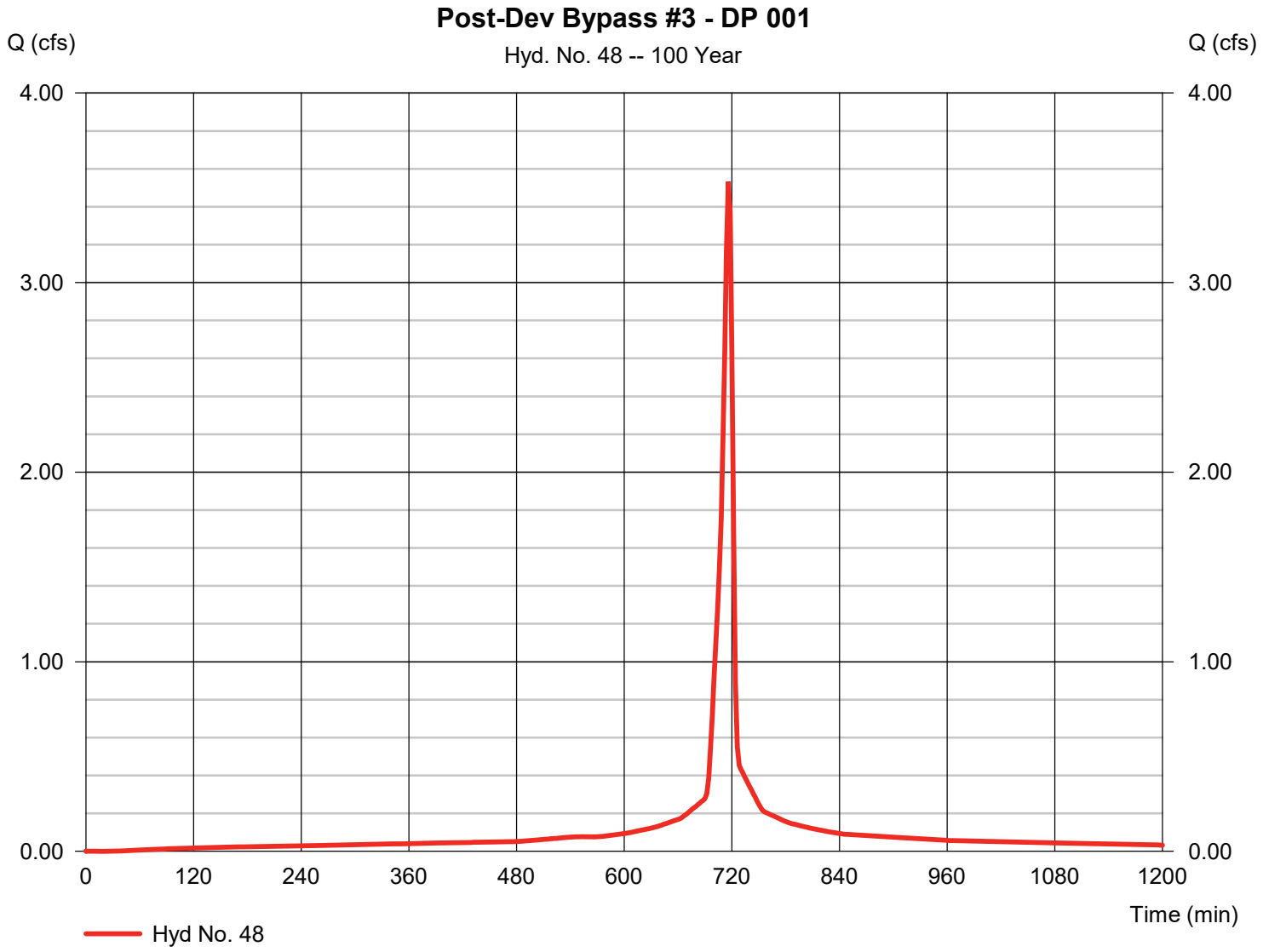
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 48

Post-Dev Bypass #3 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 3.532 cfs |
| Storm frequency | = 100 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 8,528 cuft |
| Drainage area | = 0.360 ac | Curve number | = 98 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 7.20 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



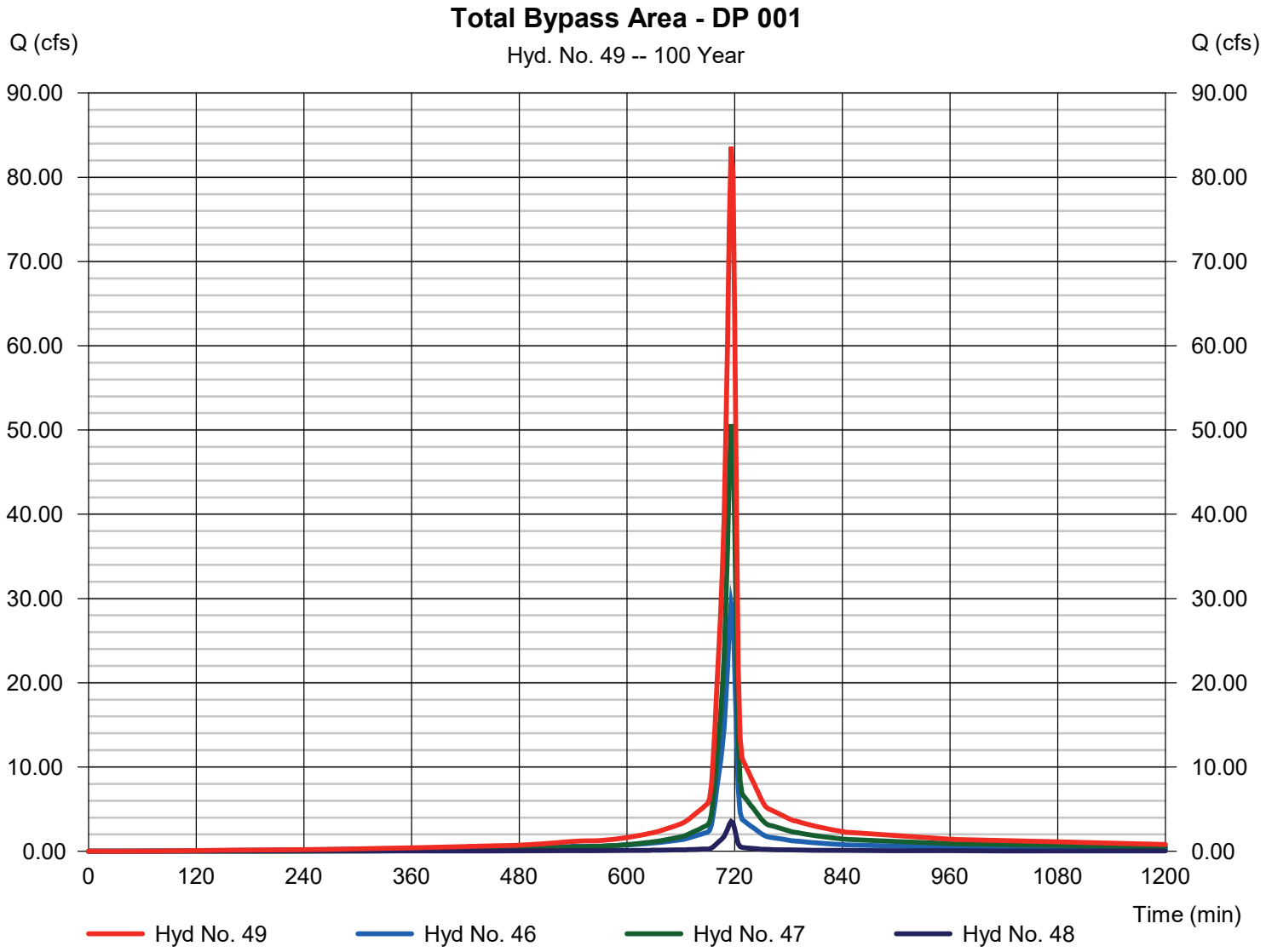
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 49

Total Bypass Area - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 83.60 cfs |
| Storm frequency | = 100 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 183,806 cuft |
| Inflow hyds. | = 46, 47, 48 | Contrib. drain. area | = 9.460 ac |



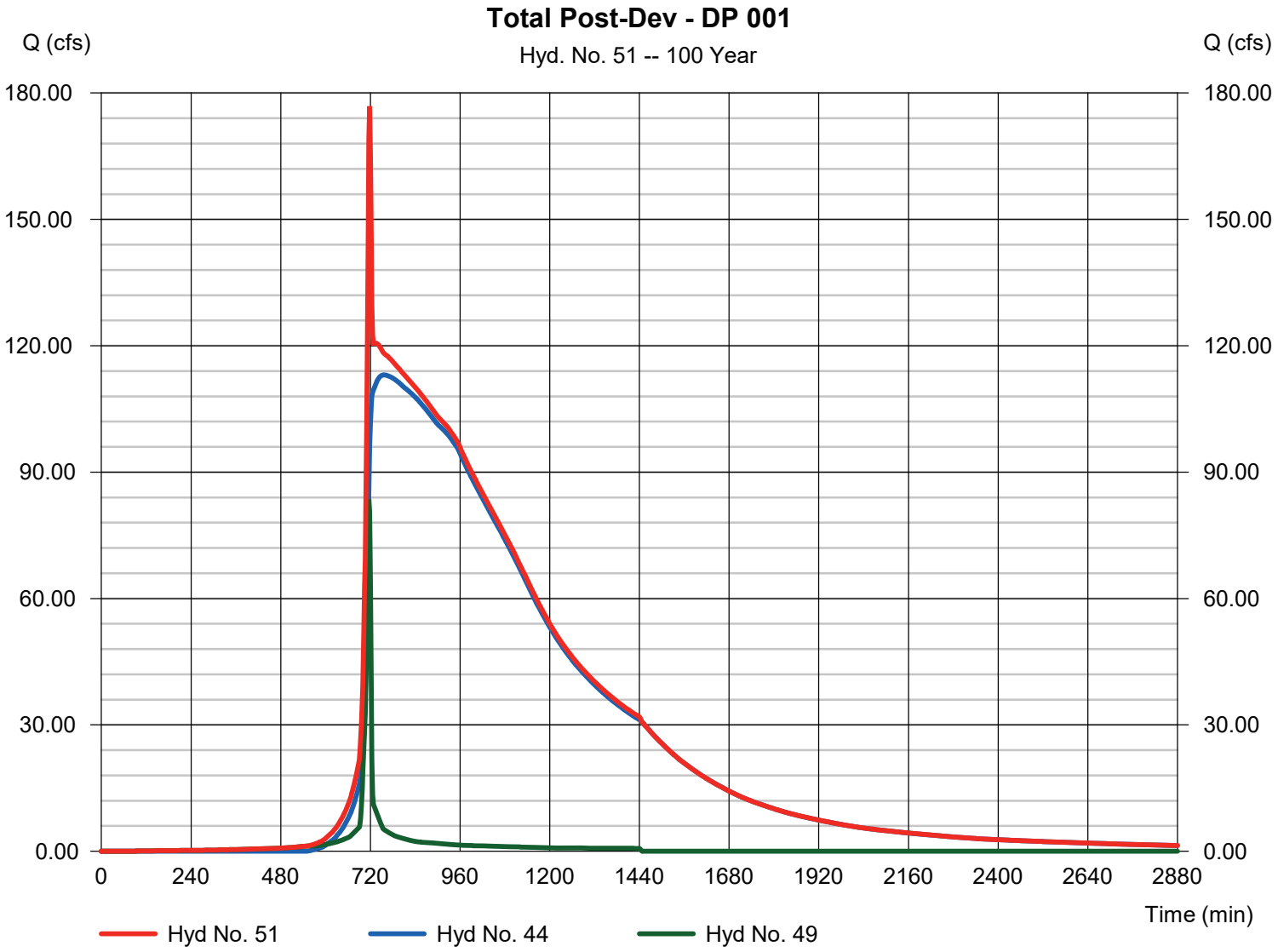
# Hydrograph Report



## Hyd. No. 51

Total Post-Dev - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 176.88 cfs |
| Storm frequency | = 100 yrs | Time to peak | = 718 min |
| Time interval | = 2 min | Hyd. volume | = 4,202,972 cuft |
| Inflow hyds. | = 44, 49 | Contrib. drain. area | = 0.000 ac |



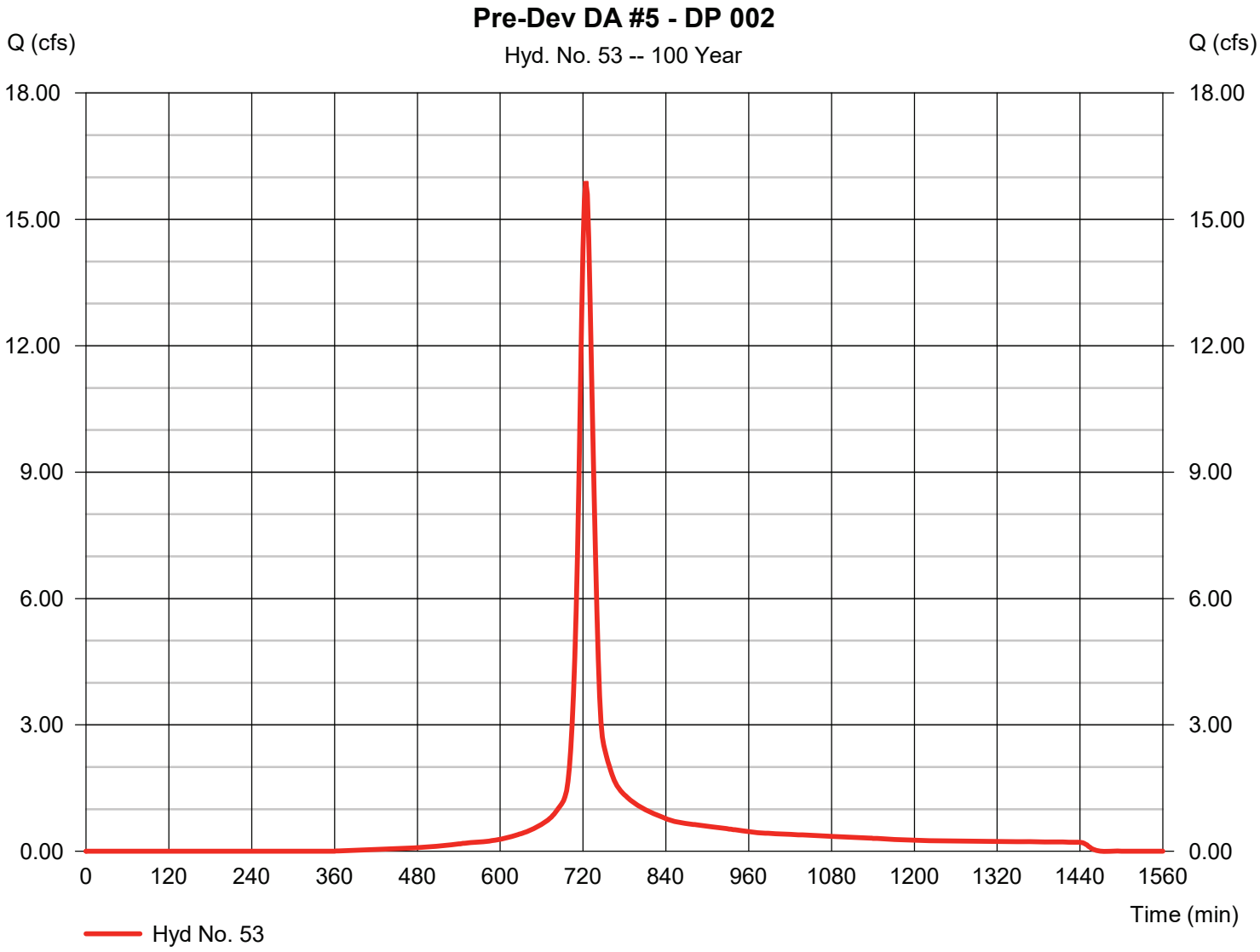
# Hydrograph Report



## Hyd. No. 53

Pre-Dev DA #5 - DP 002

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 15.91 cfs |
| Storm frequency | = 100 yrs | Time to peak | = 724 min |
| Time interval | = 2 min | Hyd. volume | = 50,073 cuft |
| Drainage area | = 2.900 ac | Curve number | = 78.9 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = TR55 | Time of conc. (Tc) | = 16.90 min |
| Total precip. | = 7.20 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



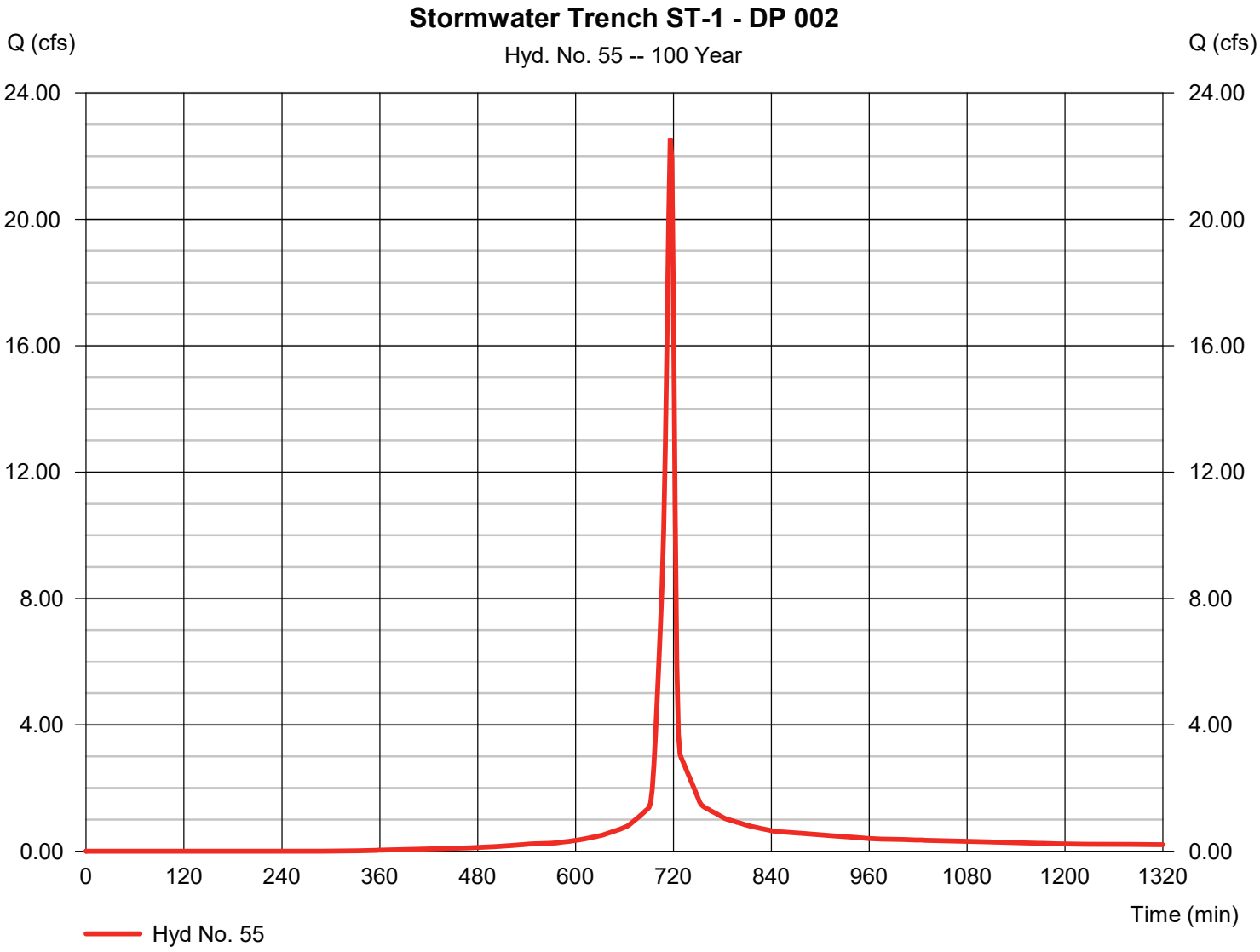
# Hydrograph Report

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## Hyd. No. 55

Stormwater Trench ST-1 - DP 002

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 22.56 cfs |
| Storm frequency | = 100 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 47,208 cuft |
| Drainage area | = 2.730 ac | Curve number | = 81.8 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 7.20 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



# Hydrograph Report

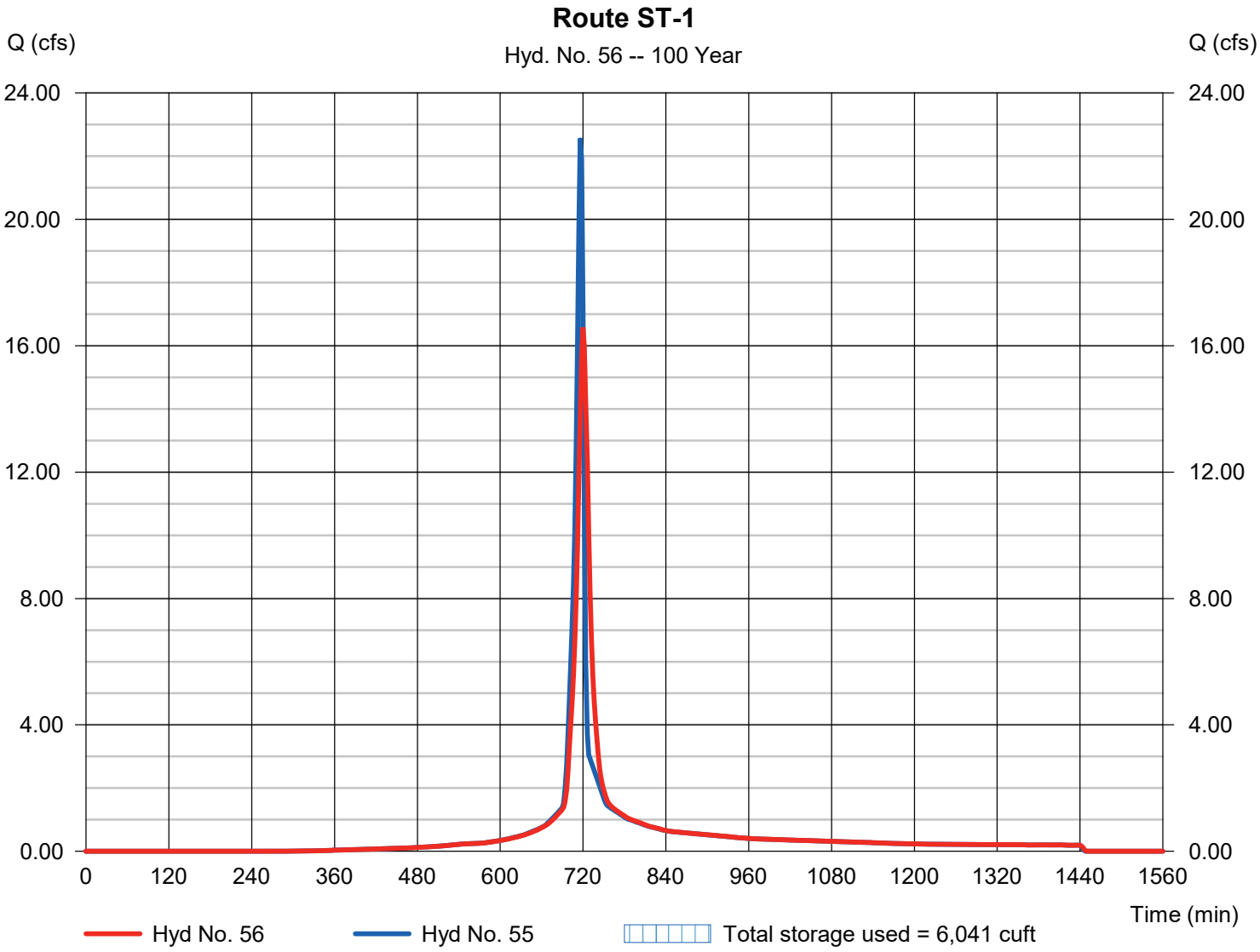
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## Hyd. No. 56

Route ST-1

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | Reservoir | Peak discharge | = | 16.58 cfs |
| Storm frequency | = | 100 yrs | Time to peak | = | 720 min |
| Time interval | = | 2 min | Hyd. volume | = | 47,208 cuft |
| Inflow hyd. No. | = | 55 - Stormwater Trench ST-1 - DP 02 | Max. Elevation | = | 16.80 ft |
| Reservoir name | = | Stormwater Trench ST-1 | Max. Storage | = | 6,041 cuft |

Storage Indication method used.



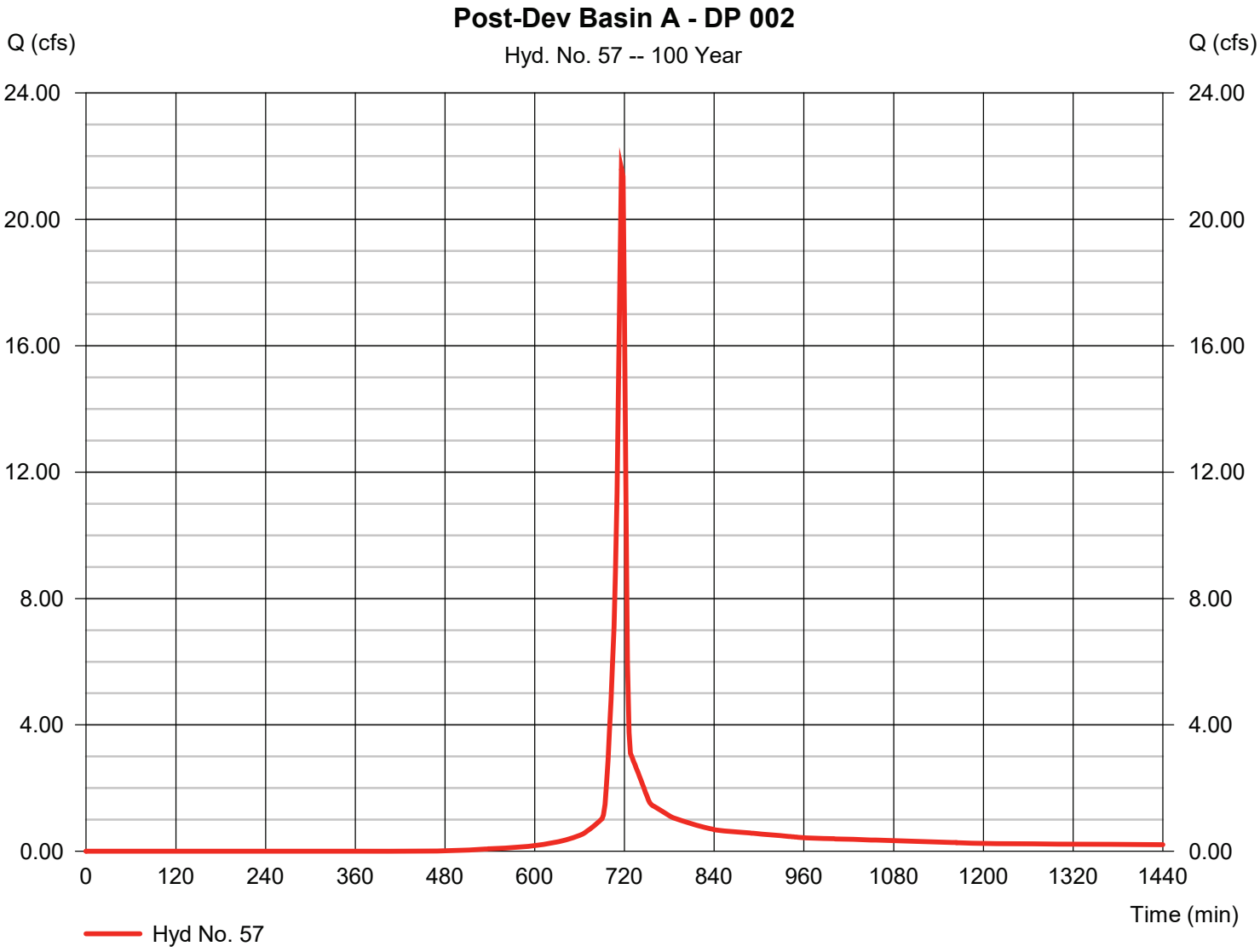
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 57

Post-Dev Basin A - DP 002

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | SCS Runoff | Peak discharge | = | 21.60 cfs |
| Storm frequency | = | 100 yrs | Time to peak | = | 716 min |
| Time interval | = | 2 min | Hyd. volume | = | 43,779 cuft |
| Drainage area | = | 3.260 ac | Curve number | = | 71.5 |
| Basin Slope | = | 0.0 % | Hydraulic length | = | 0 ft |
| Tc method | = | User | Time of conc. (Tc) | = | 5.00 min |
| Total precip. | = | 7.20 in | Distribution | = | Type II |
| Storm duration | = | 24 hrs | Shape factor | = | 484 |



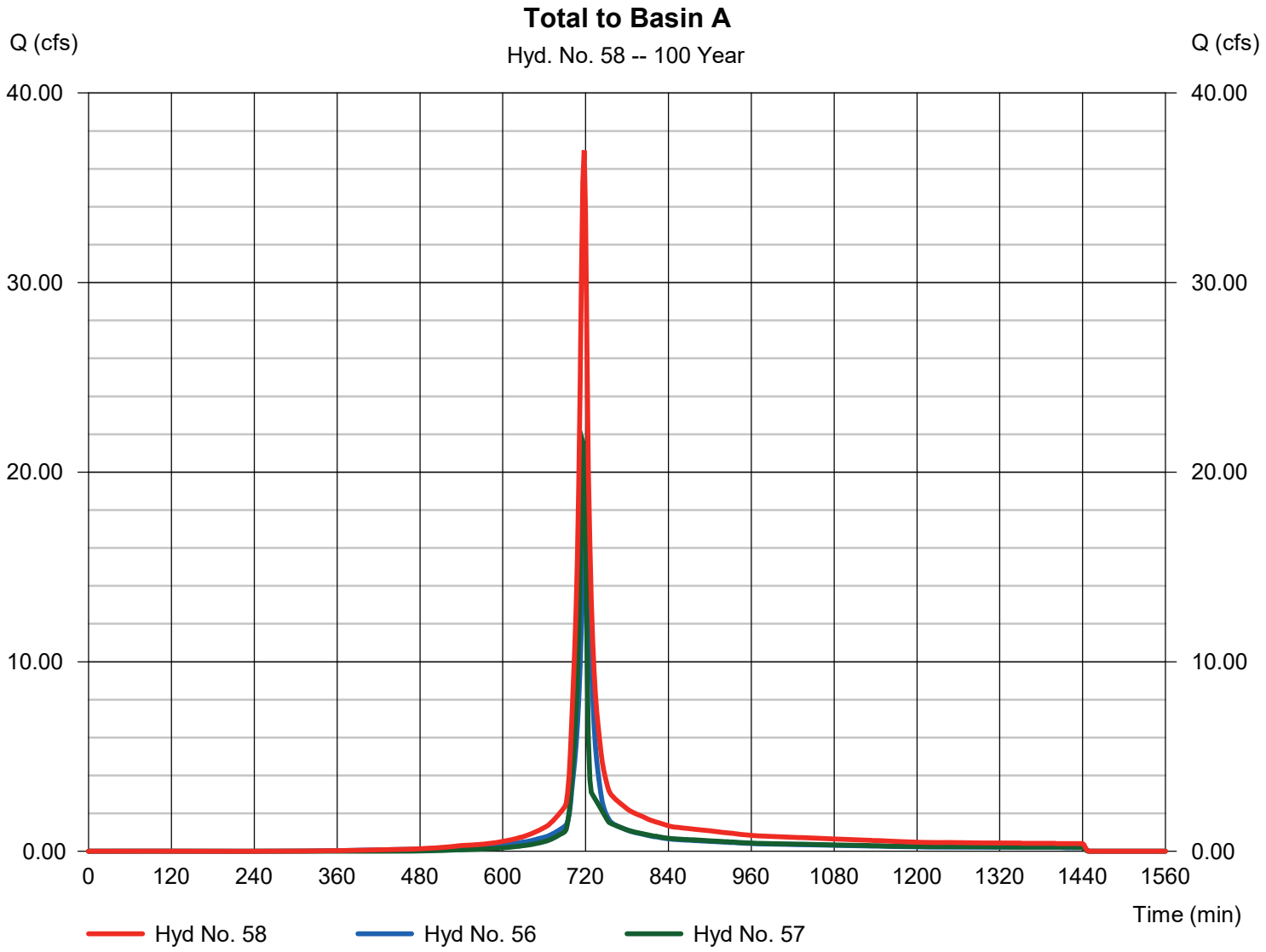
# Hydrograph Report



## Hyd. No. 58

Total to Basin A

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 36.97 cfs |
| Storm frequency | = 100 yrs | Time to peak | = 718 min |
| Time interval | = 2 min | Hyd. volume | = 90,988 cuft |
| Inflow hyds. | = 56, 57 | Contrib. drain. area | = 3.260 ac |



# Hydrograph Report

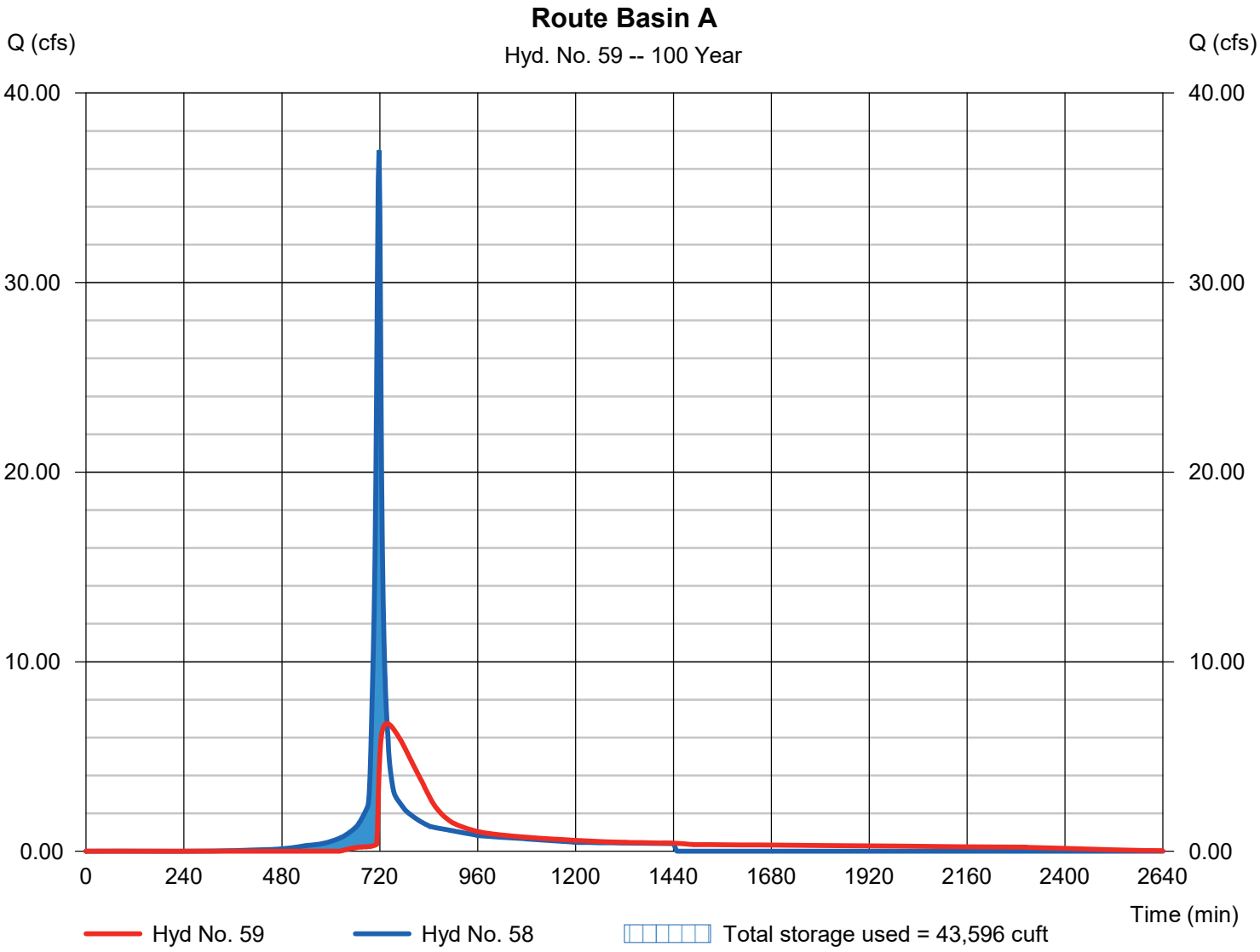
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 59

Route Basin A

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | Reservoir | Peak discharge | = | 6.732 cfs |
| Storm frequency | = | 100 yrs | Time to peak | = | 738 min |
| Time interval | = | 2 min | Hyd. volume | = | 87,454 cuft |
| Inflow hyd. No. | = | 58 - Total to Basin A | Max. Elevation | = | 16.38 ft |
| Reservoir name | = | Basin A (MRC) | Max. Storage | = | 43,596 cuft |

Storage Indication method used.



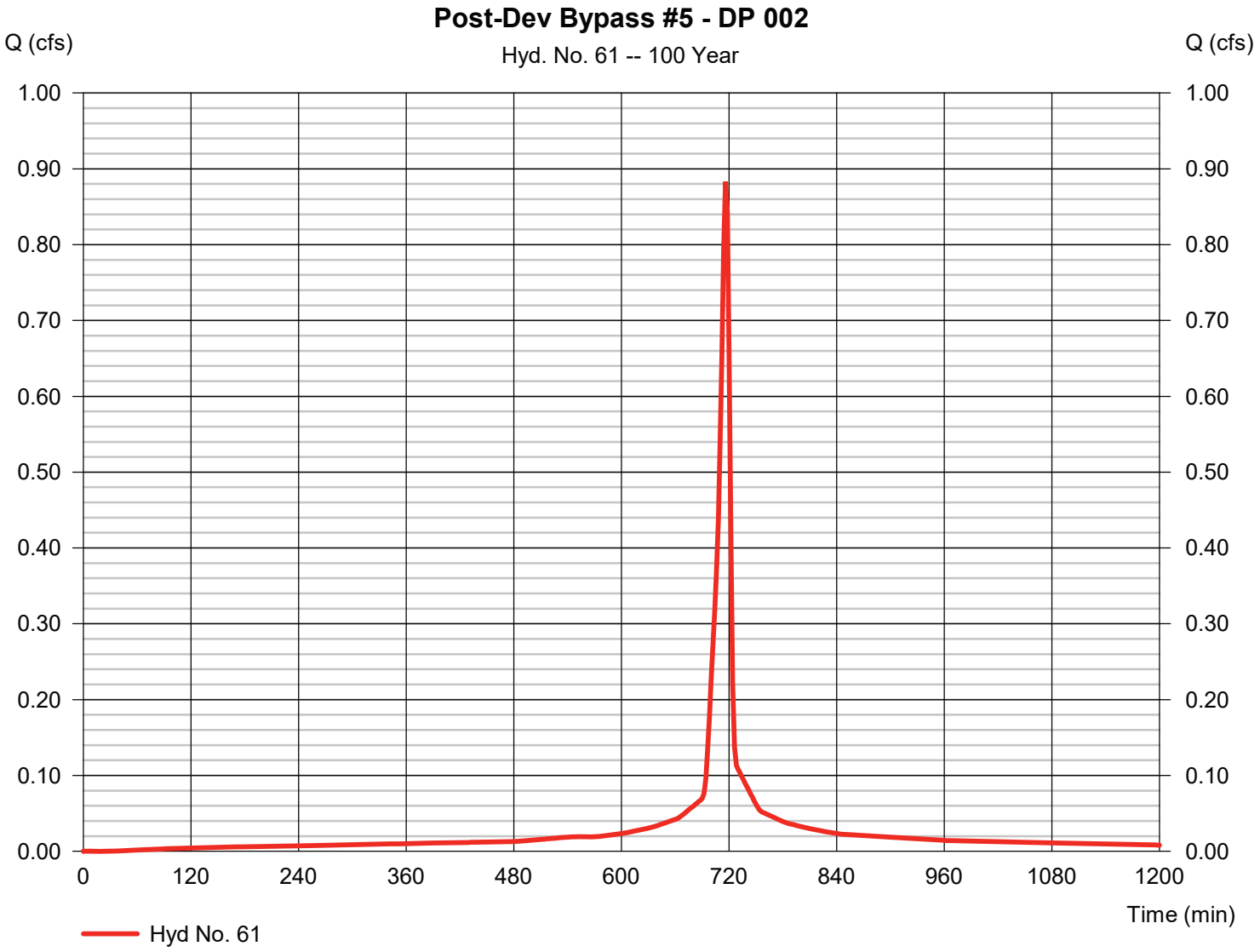
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 61

Post-Dev Bypass #5 - DP 002

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 0.883 cfs |
| Storm frequency | = 100 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 2,132 cuft |
| Drainage area | = 0.090 ac | Curve number | = 98 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 7.20 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



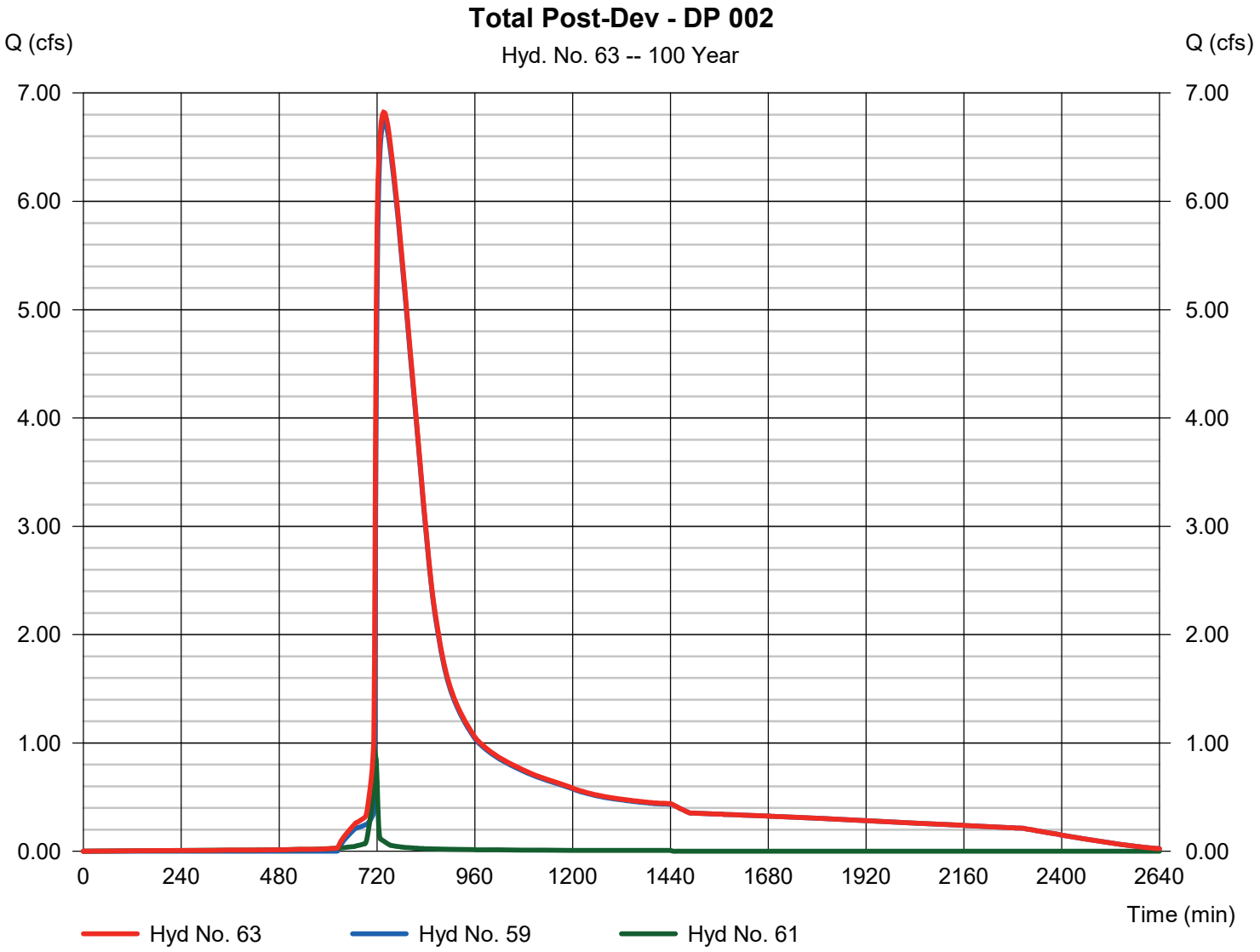
# Hydrograph Report



## Hyd. No. 63

Total Post-Dev - DP 002

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 6.822 cfs |
| Storm frequency | = 100 yrs | Time to peak | = 736 min |
| Time interval | = 2 min | Hyd. volume | = 89,585 cuft |
| Inflow hyds. | = 59, 61 | Contrib. drain. area | = 0.090 ac |



## Worksheet 4. Change in Runoff Volume for 2-YR Storm Event

**PROJECT:** NorthPoint Phase 2 Development - Building 4 (Basins)
**Drainage Area:** Water Quality Filter Inlets to Basins #8A, #8B, #8C, and #8D
**2-Year Rainfall:** 3.3 inches NOAA Atlas 14

**Total Site Area:** - Acres
**Protected Site Area:** - Acres
**Managed Area:** 18.52 Acres

**Existing Conditions:**

| Cover Type/Condition | | Soil Type | Area (sf) | Area (ac) | CN | S | Ia (0.2*S) | Q Runoff (in) | Runoff Volume (cu.ft.) |
|---|---|---|---|---|---|---|---|---|---|
| Woodlands | good | B | 0 | 0.00 | 55 | 8.18 | 1.64 | 0.281 | 0 |
| | | C | 0 | 0.00 | 70 | 4.29 | 0.86 | 0.887 | 0 |
| | | D | 0 | 0.00 | 77 | 2.99 | 0.60 | 1.284 | 0 |
| Meadow | good | B | 0 | 0.00 | 58 | 7.24 | 1.45 | 0.377 | 0 |
| | | C | 0 | 0.00 | 71 | 4.08 | 0.82 | 0.939 | 0 |
| | | D | 0 | 0.00 | 78 | 2.82 | 0.56 | 1.347 | 0 |
| Impervious | | - | 0 | 0.00 | 98 | 0.20 | 0.04 | 3.067 | 0 |
| Impervious (20% as Meadow) | | C | 0 | 0.00 | 71 | 4.08 | 0.82 | 0.939 | 0 |
| Impervious (20% as Meadow) | | D | 0 | 0.00 | 78 | 2.82 | 0.56 | 1.347 | 0 |
| **TOTAL:** | | | 0 | 0.00 | | | | | **0** |

**Developed Conditions:**

| Cover Type/Condition | | Soil Type | Area (sf) | Area (ac) | CN | S | Ia (0.2*S) | Q Runoff (in) | Runoff Volume (cu.ft.) |
|---|---|---|---|---|---|---|---|---|---|
| Woodlands | good | B | 0 | 0.00 | 55 | 8.18 | 1.64 | 0.281 | 0 |
| | | C | 0 | 0.00 | 70 | 4.29 | 0.86 | 0.887 | 0 |
| | | D | 0 | 0.00 | 77 | 2.99 | 0.60 | 1.284 | 0 |
| Meadow | good | B | 0 | 0.00 | 58 | 7.24 | 1.45 | 0.377 | 0 |
| | | C | 0 | 0.00 | 71 | 4.08 | 0.82 | 0.939 | 0 |
| | | D | 0 | 0.00 | 78 | 2.82 | 0.56 | 1.347 | 0 |
| Lawn | good | B | 0 | 0.00 | 61 | 6.39 | 1.28 | 0.486 | 0 |
| | | C | 0 | 0.00 | 74 | 3.51 | 0.70 | 1.104 | 0 |
| | | D | 115,434 | 2.65 | 80 | 2.50 | 0.50 | 1.479 | 14,230 |
| Impervious | | - | 691,733 | 15.88 | 98 | 0.20 | 0.04 | 3.067 | 176,803 |
| **TOTAL:** | | | 807,167 | 18.53 | | | | | **191,032** |

**2-Year Volume Increase (cu.ft.): 191,032**

**(Install WQ Filters on All Proposed Inlets Draining to Basins #8A, #8B, #8C, and #8D)**

2-Year Volume Increase (cu.ft.) = Developed Conditions Runoff Volume - Existing Conditions Runoff Volume

Q Runoff (in) = (P-0.2S)^2 / (P+0.8S) where P = 2-year rainfall, inches and S = (1000/CN) -10

Runoff Volume (cu.ft) = Q x Area x 1/12 where Area = Land use area in square feet

Note: Runoff Volume must be calculated for EACH land use type/condition and HSGI. The use of a weighted CN value for volume

## Worksheet 4. Change in Runoff Volume for 2-YR Storm Event

**PROJECT:** NorthPoint Phase 2 Development - Building 4 (Pond)
**Drainage Area:** Water Quality Filter Inlets to Pond #9
**2-Year Rainfall:** 3.3 inches NOAA Atlas 14

**Total Site Area:** - Acres
**Protected Site Area:** - Acres
**Managed Area:** 8.08 Acres

**Existing Conditions:**

| Cover Type/Condition | | Soil Type | Area (sf) | Area (ac) | CN | S | Ia (0.2*S) | Q Runoff (in) | Runoff Volume (cu.ft.) |
|---|---|---|---|---|---|---|---|---|---|
| Woodlands | good | B | 0 | 0.00 | 55 | 8.18 | 1.64 | 0.281 | 0 |
| | | C | 0 | 0.00 | 70 | 4.29 | 0.86 | 0.887 | 0 |
| | | D | 0 | 0.00 | 77 | 2.99 | 0.60 | 1.284 | 0 |
| Meadow | good | B | 0 | 0.00 | 58 | 7.24 | 1.45 | 0.377 | 0 |
| | | C | 0 | 0.00 | 71 | 4.08 | 0.82 | 0.939 | 0 |
| | | D | 0 | 0.00 | 78 | 2.82 | 0.56 | 1.347 | 0 |
| Impervious | | - | 0 | 0.00 | 98 | 0.20 | 0.04 | 3.067 | 0 |
| Impervious (20% as Meadow) | | C | 0 | 0.00 | 71 | 4.08 | 0.82 | 0.939 | 0 |
| Impervious (20% as Meadow) | | D | 0 | 0.00 | 78 | 2.82 | 0.56 | 1.347 | 0 |
| **TOTAL:** | | | 0 | 0.00 | | | | | **0** |

**Developed Conditions:**

| Cover Type/Condition | | Soil Type | Area (sf) | Area (ac) | CN | S | Ia (0.2*S) | Q Runoff (in) | Runoff Volume (cu.ft.) |
|---|---|---|---|---|---|---|---|---|---|
| Woodlands | good | B | 0 | 0.00 | 55 | 8.18 | 1.64 | 0.281 | 0 |
| | | C | 0 | 0.00 | 70 | 4.29 | 0.86 | 0.887 | 0 |
| | | D | 0 | 0.00 | 77 | 2.99 | 0.60 | 1.284 | 0 |
| Meadow | good | B | 0 | 0.00 | 58 | 7.24 | 1.45 | 0.377 | 0 |
| | | C | 0 | 0.00 | 71 | 4.08 | 0.82 | 0.939 | 0 |
| | | D | 0 | 0.00 | 78 | 2.82 | 0.56 | 1.347 | 0 |
| Lawn | good | B | 0 | 0.00 | 61 | 6.39 | 1.28 | 0.486 | 0 |
| | | C | 0 | 0.00 | 74 | 3.51 | 0.70 | 1.104 | 0 |
| | | D | 32,670 | 0.75 | 80 | 2.50 | 0.50 | 1.479 | 4,027 |
| Impervious | | - | 319,295 | 7.33 | 98 | 0.20 | 0.04 | 3.067 | 81,610 |
| **TOTAL:** | | | 351,965 | 8.08 | | | | | **85,637** |

**2-Year Volume Increase (cu.ft.): 85,637**

**(Install WQ Filters on All Proposed Inlets Draining to Pond #9)**

2-Year Volume Increase (cu.ft.) = Developed Conditions Runoff Volume - Existing Conditions Runoff Volume

Q Runoff (in) = (P-0.2S)^2 / (P+0.8S) where P = 2-year rainfall, inches and S = (1000/CN) -10

Runoff Volume (cu.ft) = Q x Area x 1/12 where Area = Land use area in square feet

Note: Runoff Volume must be calculated for EACH land use type/condition and HSGI. The use of a weighted CN value for volume

## Worksheet 4. Change in Runoff Volume for 2-YR Storm Event

**PROJECT:** NorthPoint Phase 2 Development - Building 5
**Drainage Area:** Water Quality Filter Inlets to Basins #10A, #10B, #10C, and #10D
**2-Year Rainfall:** 3.3 inches NOAA Atlas 14

**Total Site Area:** - Acres
**Protected Site Area:** - Acres
**Managed Area:** 13.87 Acres

**Existing Conditions:**

| Cover Type/Condition | | Soil Type | Area (sf) | Area (ac) | CN | S | Ia (0.2*S) | Q Runoff (in) | Runoff Volume (cu.ft.) |
|---|---|---|---|---|---|---|---|---|---|
| Woodlands | good | B | 0 | 0.00 | 55 | 8.18 | 1.64 | 0.281 | 0 |
| | | C | 0 | 0.00 | 70 | 4.29 | 0.86 | 0.887 | 0 |
| | | D | 0 | 0.00 | 77 | 2.99 | 0.60 | 1.284 | 0 |
| Meadow | good | B | 0 | 0.00 | 58 | 7.24 | 1.45 | 0.377 | 0 |
| | | C | 0 | 0.00 | 71 | 4.08 | 0.82 | 0.939 | 0 |
| | | D | 0 | 0.00 | 78 | 2.82 | 0.56 | 1.347 | 0 |
| Impervious | | - | 0 | 0.00 | 98 | 0.20 | 0.04 | 3.067 | 0 |
| Impervious (20% as Meadow) | | C | 0 | 0.00 | 71 | 4.08 | 0.82 | 0.939 | 0 |
| Impervious (20% as Meadow) | | D | 0 | 0.00 | 78 | 2.82 | 0.56 | 1.347 | 0 |
| **TOTAL:** | | | 0 | 0.00 | | | | | **0** |

**Developed Conditions:**

| Cover Type/Condition | | Soil Type | Area (sf) | Area (ac) | CN | S | Ia (0.2*S) | Q Runoff (in) | Runoff Volume (cu.ft.) |
|---|---|---|---|---|---|---|---|---|---|
| Woodlands | good | B | 0 | 0.00 | 55 | 8.18 | 1.64 | 0.281 | 0 |
| | | C | 0 | 0.00 | 70 | 4.29 | 0.86 | 0.887 | 0 |
| | | D | 0 | 0.00 | 77 | 2.99 | 0.60 | 1.284 | 0 |
| Meadow | good | B | 0 | 0.00 | 58 | 7.24 | 1.45 | 0.377 | 0 |
| | | C | 0 | 0.00 | 71 | 4.08 | 0.82 | 0.939 | 0 |
| | | D | 0 | 0.00 | 78 | 2.82 | 0.56 | 1.347 | 0 |
| Lawn | good | B | 0 | 0.00 | 61 | 6.39 | 1.28 | 0.486 | 0 |
| | | C | 0 | 0.00 | 74 | 3.51 | 0.70 | 1.104 | 0 |
| | | D | 60,984 | 1.40 | 80 | 2.50 | 0.50 | 1.479 | 7,518 |
| Impervious | | - | 543,193 | 12.47 | 98 | 0.20 | 0.04 | 3.067 | 138,837 |
| **TOTAL:** | | | 604,177 | 13.87 | | | | | **146,354** |

**2-Year Volume Increase (cu.ft.): 146,354**

**(Install WQ Filters on All Proposed Inlets Draining to Basins #10A, #10B, #10C, and #10D)**

2-Year Volume Increase (cu.ft.) = Developed Conditions Runoff Volume - Existing Conditions Runoff Volume

Q Runoff (in) = (P-0.2S)^2 / (P+0.8S) where P = 2-year rainfall, inches and S = (1000/CN) -10

Runoff Volume (cu.ft) = Q x Area x 1/12 where Area = Land use area in square feet

Note: Runoff Volume must be calculated for EACH land use type/condition and HSGI. The use of a weighted CN value for volume

## Worksheet 4. Change in Runoff Volume for 2-YR Storm Event

**PROJECT:** NorthPoint Phase 2 Development - Building 6
**Drainage Area:** Water Quality Filter Inlets to Basins #11A, #11B, and #11C
**2-Year Rainfall:** 3.3 inches NOAA Atlas 14

**Total Site Area:** - Acres
**Protected Site Area:** - Acres
**Managed Area:** 5.04 Acres

**Existing Conditions:**

| Cover Type/Condition | | Soil Type | Area (sf) | Area (ac) | CN | S | Ia (0.2*S) | Q Runoff (in) | Runoff Volume (cu.ft.) |
|---|---|---|---|---|---|---|---|---|---|
| Woodlands | good | B | 0 | 0.00 | 55 | 8.18 | 1.64 | 0.281 | 0 |
| | | C | 0 | 0.00 | 70 | 4.29 | 0.86 | 0.887 | 0 |
| | | D | 0 | 0.00 | 77 | 2.99 | 0.60 | 1.284 | 0 |
| Meadow | good | B | 0 | 0.00 | 58 | 7.24 | 1.45 | 0.377 | 0 |
| | | C | 0 | 0.00 | 71 | 4.08 | 0.82 | 0.939 | 0 |
| | | D | 0 | 0.00 | 78 | 2.82 | 0.56 | 1.347 | 0 |
| Impervious | | - | 0 | 0.00 | 98 | 0.20 | 0.04 | 3.067 | 0 |
| Impervious (20% as Meadow) | | C | 0 | 0.00 | 71 | 4.08 | 0.82 | 0.939 | 0 |
| Impervious (20% as Meadow) | | D | 0 | 0.00 | 78 | 2.82 | 0.56 | 1.347 | 0 |
| **TOTAL:** | | | 0 | 0.00 | | | | | **0** |

**Developed Conditions:**

| Cover Type/Condition | | Soil Type | Area (sf) | Area (ac) | CN | S | Ia (0.2*S) | Q Runoff (in) | Runoff Volume (cu.ft.) |
|---|---|---|---|---|---|---|---|---|---|
| Woodlands | good | B | 0 | 0.00 | 55 | 8.18 | 1.64 | 0.281 | 0 |
| | | C | 0 | 0.00 | 70 | 4.29 | 0.86 | 0.887 | 0 |
| | | D | 0 | 0.00 | 77 | 2.99 | 0.60 | 1.284 | 0 |
| Meadow | good | B | 0 | 0.00 | 58 | 7.24 | 1.45 | 0.377 | 0 |
| | | C | 0 | 0.00 | 71 | 4.08 | 0.82 | 0.939 | 0 |
| | | D | 0 | 0.00 | 78 | 2.82 | 0.56 | 1.347 | 0 |
| Lawn | good | B | 0 | 0.00 | 61 | 6.39 | 1.28 | 0.486 | 0 |
| | | C | 0 | 0.00 | 74 | 3.51 | 0.70 | 1.104 | 0 |
| | | D | 9,583 | 0.22 | 80 | 2.50 | 0.50 | 1.479 | 1,181 |
| Impervious | | - | 61,420 | 1.41 | 98 | 0.20 | 0.04 | 3.067 | 15,698 |
| **TOTAL:** | | | 71,003 | 1.63 | | | | | **16,880** |

**2-Year Volume Increase (cu.ft.): 16,880**

**(Install WQ Filters on All Proposed Inlets Draining to Basins #11A, #11B, and #11C)**

2-Year Volume Increase (cu.ft.) = Developed Conditions Runoff Volume - Existing Conditions Runoff Volume

Q Runoff (in) = (P-0.2S)^2 / (P+0.8S) where P = 2-year rainfall, inches and S = (1000/CN) -10

Runoff Volume (cu.ft) = Q x Area x 1/12 where Area = Land use area in square feet

Note: Runoff Volume must be calculated for EACH land use type/condition and HSGI. The use of a weighted CN value for volume

## Worksheet 4. Change in Runoff Volume for 2-YR Storm Event

**PROJECT:** NorthPoint Phase 2 Development - Building 6
**Drainage Area:** Water Quality Filter Inlets to Basin A
**2-Year Rainfall:** 3.3 inches NOAA Atlas 14

**Total Site Area:** - Acres
**Protected Site Area:** - Acres
**Managed Area:** 1.50 Acres

**Existing Conditions:**

| Cover Type/Condition | | Soil Type | Area (sf) | Area (ac) | CN | S | Ia (0.2*S) | Q Runoff (in) | Runoff Volume (cu.ft.) |
|---|---|---|---|---|---|---|---|---|---|
| Woodlands | good | B | 0 | 0.00 | 55 | 8.18 | 1.64 | 0.281 | 0 |
| | | C | 0 | 0.00 | 70 | 4.29 | 0.86 | 0.887 | 0 |
| | | D | 0 | 0.00 | 77 | 2.99 | 0.60 | 1.284 | 0 |
| Meadow | good | B | 0 | 0.00 | 58 | 7.24 | 1.45 | 0.377 | 0 |
| | | C | 0 | 0.00 | 71 | 4.08 | 0.82 | 0.939 | 0 |
| | | D | 0 | 0.00 | 78 | 2.82 | 0.56 | 1.347 | 0 |
| Impervious | | - | 0 | 0.00 | 98 | 0.20 | 0.04 | 3.067 | 0 |
| Impervious (20% as Meadow) | | C | 0 | 0.00 | 71 | 4.08 | 0.82 | 0.939 | 0 |
| Impervious (20% as Meadow) | | D | 0 | 0.00 | 78 | 2.82 | 0.56 | 1.347 | 0 |
| **TOTAL:** | | | 0 | 0.00 | | | | | **0** |

**Developed Conditions:**

| Cover Type/Condition | | Soil Type | Area (sf) | Area (ac) | CN | S | Ia (0.2*S) | Q Runoff (in) | Runoff Volume (cu.ft.) |
|---|---|---|---|---|---|---|---|---|---|
| Woodlands | good | B | 0 | 0.00 | 55 | 8.18 | 1.64 | 0.281 | 0 |
| | | C | 0 | 0.00 | 70 | 4.29 | 0.86 | 0.887 | 0 |
| | | D | 0 | 0.00 | 77 | 2.99 | 0.60 | 1.284 | 0 |
| Meadow | good | B | 0 | 0.00 | 58 | 7.24 | 1.45 | 0.377 | 0 |
| | | C | 0 | 0.00 | 71 | 4.08 | 0.82 | 0.939 | 0 |
| | | D | 0 | 0.00 | 78 | 2.82 | 0.56 | 1.347 | 0 |
| Lawn | good | B | 0 | 0.00 | 61 | 6.39 | 1.28 | 0.486 | 0 |
| | | C | 0 | 0.00 | 74 | 3.51 | 0.70 | 1.104 | 0 |
| | | D | 51,836 | 1.19 | 80 | 2.50 | 0.50 | 1.479 | 6,390 |
| Impervious | | - | 13,504 | 0.31 | 98 | 0.20 | 0.04 | 3.067 | 3,451 |
| **TOTAL:** | | | 65,340 | 1.50 | | | | | **9,841** |

**2-Year Volume Increase (cu.ft.): 9,841**

**(Install WQ Filters on All Proposed Inlets Draining to Basin A)**

2-Year Volume Increase (cu.ft.) = Developed Conditions Runoff Volume - Existing Conditions Runoff Volume

Q Runoff (in) = (P-0.2S)^2 / (P+0.8S) where P = 2-year rainfall, inches and S = (1000/CN) -10

Runoff Volume (cu.ft) = Q x Area x 1/12 where Area = Land use area in square feet

Note: Runoff Volume must be calculated for EACH land use type/condition and HSGI. The use of a weighted CN value for volume

STANDARD WORKSHEET
Rip-Rap Apron Outlet Protection

| | | | |
|---|---|---|---|
| PROJECT NAME: | **NorthPoint Phase 2 - Building 4 Construction** | | |
| LOCATION: | **Falls Township** | **Bucks County** | |
| PREPARED BY: | **LS** | DATE: | **3/31/2022** |
| CHECKED BY: | **DPB** | DATE: | **1/31/2024** |

## METHODOLOGY:

Utilize *PA D.E.P. Erosion and Sediment Control Manual* to construct a Rock Apron at culvert, endwall, headwall or channel outfalls. First, tailwater condition must be determined (minimum or maximum). Second, with a known discharge, determine D50 rock size and length of apron "La". Third, determine the width and thickness of the apron. Lastly, ensure the permissible velocity of the rock size chosen is not exceeded by the velocity of the discharge entering the apron.

## Equations Utilized:

Minimum Tailwater Condition: W2 = 3do + La
Maximum Tailwater Condition: W2 = 3do + 0.4La
Blanket Thickness: T = 1.5*Dmax
Discharge (Q) and Velocity (V) - obtained from the 100 Year Storm
**do** = pipe diameter
**Width 1** = initial width of apron at end of structure
**Width 2** = terminal width of apron, W2

| STRUCTURE DATA | | | | | | | RIP-RAP DATA | | | APRON DATA | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EW # | PIPE DIA. (in) | Tailwtr Cond. MIN/MAX | Mngs "n" | Pipe Slope (ft/ft) | Q (cfs) | V (fps) | D50 (in.) | ROCK SIZE | Rock T (in.) | La (ft) | W at pipe (ft) | W at tailwtr (ft) |
| 1000 | 24 | MIN | 0.011 | 1.28 | 12.71 | 4.05 | 6 | R-4 | 18 | 12 | 6 | 18 |
| 1010 | 24 | MIN | 0.011 | 3.84 | 11.77 | 3.75 | 6 | R-4 | 18 | 12 | 6 | 18 |
| 1020 | 24 | MIN | 0.011 | 1.49 | 7.82 | 2.49 | 6 | R-4 | 18 | 12 | 6 | 18 |
| 1030 | 24 | MIN | 0.011 | 3.85 | 11.13 | 3.54 | 6 | R-4 | 18 | 12 | 6 | 18 |
| 1040 | 24 | MIN | 0.011 | 3.82 | 11.64 | 3.70 | 6 | R-4 | 18 | 12 | 6 | 18 |
| 1050 | 24 | MIN | 0.011 | 2.60 | 11.95 | 3.80 | 6 | R-4 | 18 | 12 | 6 | 18 |
| 1060 | 36 | MIN | 0.011 | 0.50 | 32.18 | 5.93 | 9 | R-5 | 27 | 20 | 9 | 29 |
| 1070 | 30 | MIN | 0.011 | 0.50 | 19.36 | 4.13 | 6 | R-4 | 18 | 16 | 7.5 | 23.5 |
| 1080 | 30 | MIN | 0.011 | 0.50 | 21.35 | 4.48 | 6 | R-4 | 18 | 16 | 7.5 | 23.5 |
| 1100 | 18 | MIN | 0.011 | 0.74 | 7.95 | 4.50 | 6 | R-4 | 18 | 8 | 4.5 | 12.5 |
| 1110 | 24 | MIN | 0.011 | 2.65 | 9.19 | 2.93 | 6 | R-4 | 18 | 12 | 6 | 18 |
| 1120 | 30 | MIN | 0.011 | 0.40 | 19.13 | 3.90 | 6 | R-4 | 18 | 16 | 7.5 | 23.5 |
| 1130 | 24 | MIN | 0.011 | 0.50 | 1.69 | 0.54 | 6 | R-4 | 18 | 12 | 6 | 18 |
| 1140 | 36 | MIN | 0.011 | 0.40 | 36.87 | 5.59 | 9 | R-5 | 27 | 20 | 9 | 29 |
| 1200 | 24 | MIN | 0.011 | 0.44 | 7.68 | 2.45 | 6 | R-4 | 18 | 12 | 6 | 18 |
| 1210 | 36 | MIN | 0.011 | 0.53 | 28.71 | 4.06 | 9 | R-5 | 27 | 20 | 9 | 29 |
| 1220 | 18 | MIN | 0.011 | 1.50 | 3.48 | 2.06 | 6 | R-4 | 18 | 8 | 4.5 | 12.5 |
| 1230 | 18 | MIN | 0.011 | 2.04 | 3.74 | 2.11 | 6 | R-4 | 18 | 8 | 4.5 | 12.5 |
| 1240 | 36 | MIN | 0.011 | 0.51 | 33.98 | 4.81 | 9 | R-5 | 27 | 20 | 9 | 29 |
| 1250 | 36 | MIN | 0.011 | 0.50 | 31.68 | 5.87 | 9 | R-5 | 27 | 20 | 9 | 29 |
| 1260 | 18 | MIN | 0.011 | 0.50 | 6.85 | 3.88 | 6 | R-4 | 18 | 8 | 4.5 | 12.5 |
| 1270 | 24 | MIN | 0.011 | 0.50 | 2.14 | 0.68 | 6 | R-4 | 18 | 12 | 6 | 18 |
| 1280 | 36 | MIN | 0.011 | 0.50 | 30.52 | 5.73 | 9 | R-5 | 27 | 20 | 9 | 29 |
| 9 | (2) 48 | MIN | 0.011 | 0.54 | 16.56 | 2.04 | 12 | R-6 | 36 | 26 | 12 | 38 |
| 12 | (2) 66 | MIN | 0.011 | 0.50 | 266.99 | 5.62 | 18 | R-7 | 54 | 32 | 12 | 44 |
| 1295 | 24 | MIN | 0.011 | 0.55 | 1.06 | 0.34 | 6 | R-4 | 18 | 12 | 6 | 18 |
| 1297 | 24 | MIN | 0.011 | 0.51 | 5.10 | 1.63 | 6 | R-4 | 18 | 12 | 6 | 18 |
| 1900 | 36 | MIN | 0.011 | 0.43 | 23.46 | 4.83 | 9 | R-5 | 27 | 20 | 9 | 29 |
| | | | | | | | | | | | | |

Note: Rock size selected has been increased from the suggested d50 values based upon flow (Q) and/or velocity parameters. Energy Dissipator shall be hand placed and dimensions adjusted to conform to the existing roadside conveyance.
Stone larger than R-4 shall have stone filter blanket installed prior to the rip-rap in lieu of non-woven geotextile. Filter stone shall meet the following requirements:

STANDARD WORKSHEET
Rip-Rap Apron Outlet Protection

| | | | |
|---|---|---|---|
| PROJECT NAME: | **NorthPoint Phase 2 - Building 5 Construction** | | |
| LOCATION: | **Falls Township** | **Bucks County** | |
| PREPARED BY: | **RCG** | DATE: | **10/7/2021** |
| CHECKED BY: | **DPB** | DATE: | **7/7/2022** |

## METHODOLOGY:

Utilize *PA D.E.P. Erosion and Sediment Control Manual* to construct a Rock Apron at culvert, endwall, headwall or channel outfalls. First, tailwater condition must be determined (minimum or maximum). Second, with a known discharge, determine D50 rock size and length of apron "La". Third, determine the width and thickness of the apron. Lastly, ensure the permissible velocity of the rock size chosen is not exceeded by the velocity of the discharge entering the apron.

## Equations Utilized:

Minimum Tailwater Condition: W2 = 3do + La
Maximum Tailwater Condition: W2 = 3do + 0.4La
Blanket Thickness: T = 1.5*Dmax
Discharge (Q) and Velocity (V) - obtained from the 100 Year Storm
**do** = pipe diameter
**Width 1** = initial width of apron at end of structure
**Width 2** = terminal width of apron, W2

| STRUCTURE DATA | | | | | | | RIP-RAP DATA | | | APRON DATA | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EW # | PIPE DIA. (in) | Tailwtr Cond. MIN/MAX | Mngs "n" | Pipe Slope (ft/ft) | Q (cfs) | V (fps) | D50 (in.) | ROCK SIZE | Rock T (in.) | La (ft) | W at pipe (ft) | W at tailwtr (ft) |
| 1300 | 24 | min | 0.011 | 3.15% | 9.65 | 3.07 | 6 | R-4 | 18 | 12 | 6 | 18 |
| 1310 | 24 | min | 0.011 | 1.22% | 14.14 | 4.50 | 6 | R-4 | 18 | 12 | 6 | 18 |
| 1320 | 24 | min | 0.011 | 1.22% | 14.12 | 4.50 | 6 | R-4 | 18 | 12 | 6 | 18 |
| 1330 | 24 | min | 0.011 | 1.22% | 15.07 | 4.80 | 6 | R-4 | 18 | 12 | 6 | 18 |
| 1340 | 24 | min | 0.011 | 1.35% | 10.91 | 3.47 | 6 | R-4 | 18 | 12 | 6 | 18 |
| 1350 | 24 | min | 0.011 | 1.22% | 14.14 | 4.50 | 6 | R-4 | 18 | 12 | 6 | 18 |
| 1360 | 24 | min | 0.011 | 1.22% | 14.12 | 4.50 | 6 | R-4 | 18 | 12 | 6 | 18 |
| 1370 | 24 | min | 0.011 | 1.22% | 15.68 | 4.99 | 6 | R-4 | 18 | 12 | 6 | 18 |
| 1380 | 30 | min | 0.011 | 0.53% | 25.64 | 5.45 | 6 | R-4 | 18 | 16 | 7.5 | 23.5 |
| 1390 | 30 | min | 0.011 | 0.85% | 23.15 | 5.76 | 6 | R-4 | 18 | 12 | 7.5 | 19.5 |
| 1400 | 30 | min | 0.011 | 0.92% | 23.35 | 5.79 | 6 | R-4 | 18 | 12 | 7.5 | 19.5 |
| 1410 | 30 | min | 0.011 | 1.08% | 17.18 | 4.79 | 6 | R-4 | 18 | 12 | 7.5 | 19.5 |
| 1420 | 30 | min | 0.011 | 0.85% | 19.93 | 4.79 | 6 | R-4 | 18 | 12 | 7.5 | 19.5 |
| 1430 | 30 | min | 0.011 | 0.56% | 25.68 | 5.56 | 6 | R-4 | 18 | 12 | 7.5 | 19.5 |
| 1440 | 30 | min | 0.011 | 0.78% | 26.05 | 6.23 | 6 | R-4 | 18 | 12 | 7.5 | 19.5 |
| 1450 | 30 | min | 0.011 | 1.08% | 17.18 | 4.79 | 6 | R-4 | 18 | 12 | 7.5 | 19.5 |
| 1460 | 24 | min | 0.011 | 7.64% | 6.64 | 3.44 | 6 | R-4 | 18 | 12 | 6 | 18 |
| 1470 | 24 | min | 0.011 | 5.56% | 13.64 | 5.25 | 6 | R-4 | 18 | 12 | 6 | 18 |
| 1480 | 18 | min | 0.011 | 2.54% | 2.92 | 3.03 | 6 | R-4 | 18 | 12 | 4.5 | 16.5 |
| 1490 | 18 | min | 0.011 | 5.59% | 1.63 | 2.14 | 6 | R-4 | 18 | 12 | 4.5 | 16.5 |
| 1500 | 18 | min | 0.011 | 2.10% | 2.02 | 4.76 | 6 | R-4 | 18 | 12 | 4.5 | 16.5 |
| 1510 | 18 | min | 0.011 | 3.74% | 3.83 | 2.17 | 6 | R-4 | 18 | 12 | 4.5 | 16.5 |
| 1520 | 24 | min | 0.011 | 2.44% | 15.90 | 5.06 | 6 | R-4 | 18 | 12 | 6 | 18 |
| 1530 | 24 | min | 0.011 | 3.54% | 10.85 | 3.46 | 6 | R-4 | 18 | 12 | 6 | 18 |
| 1950 | 18 | min | 0.011 | 2.34% | 6.13 | 5.14 | 6 | R-4 | 18 | 12 | 4.5 | 16.5 |
| 1960 | 18 | min | 0.011 | 2.35% | 6.13 | 5.14 | 6 | R-4 | 18 | 12 | 4.5 | 16.5 |

Note: Rock size selected has been increased from the suggested d50 values based upon flow (Q) and/or velocity parameters. Energy Dissipator shall be hand placed and dimensions adjusted to conform to the existing roadside conveyance.
Stone larger than R-4 shall have stone filter blanket installed prior to the rip-rap in lieu of non-woven geotextile. Filter stone shall meet the following requirements:

STANDARD WORKSHEET

Rip-Rap Apron Outlet Protection

| | | | |
|---|---|---|---|
| PROJECT NAME: | **NorthPoint Phase 2 - Building 4 Construction** | | |
| LOCATION: | **Falls Township** | **Bucks County** | |
| PREPARED BY: | **WJD** | DATE: | **9/29/2024** |
| CHECKED BY: | | DATE: | |

## METHODOLOGY:

Utilize *PA D.E.P. Erosion and Sediment Control Manual* to construct a Rock Apron at culvert, endwall, headwall or channel outfalls. First, tailwater condition must be determined (minimum or maximum). Second, with a known discharge, determine D50 rock size and length of apron "La". Third, determine the width and thickness of the apron. Lastly, ensure the permissible velocity of the rock size chosen is not exceeded by the velocity of the discharge entering the apron.

### Equations Utilized:

Minimum Tailwater Condition: W2 = 3do + La
Maximum Tailwater Condition: W2 = 3do + 0.4La
Blanket Thickness: T = 1.5*Dmax
Discharge (Q) and Velocity (V) - obtained from the 100 Year Storm
**do** = pipe diameter
**Width 1** = initial width of apron at end of structure
**Width 2** = terminal width of apron, W2

| STRUCTURE DATA | | | | | | | RIP-RAP DATA | | | APRON DATA | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EW # | PIPE DIA. (in) | Tailwtr Cond. MIN/MAX | Mngs "n" | Pipe Slope (ft/ft) | Q (cfs) | V (fps) | D50 (in.) | ROCK SIZE | Rock T (in.) | La (ft) | W at pipe (ft) | W at tailwtr (ft) |
| 1000 | 24 | MIN | 0.011 | 1.28 | 12.71 | 4.05 | 6 | R-4 | 18 | 12 | 6 | 18 |
| 1010 | 24 | MIN | 0.011 | 3.84 | 11.77 | 3.75 | 6 | R-4 | 18 | 12 | 6 | 18 |
| 1020 | 24 | MIN | 0.011 | 1.49 | 7.82 | 2.49 | 6 | R-4 | 18 | 12 | 6 | 18 |
| 1030 | 24 | MIN | 0.011 | 3.85 | 11.13 | 3.54 | 6 | R-4 | 18 | 12 | 6 | 18 |
| 1040 | 24 | MIN | 0.011 | 3.82 | 11.64 | 3.70 | 6 | R-4 | 18 | 12 | 6 | 18 |
| 1050 | 24 | MIN | 0.011 | 2.60 | 11.95 | 3.80 | 6 | R-4 | 18 | 12 | 6 | 18 |
| 1060 | 36 | MIN | 0.011 | 0.50 | 32.18 | 5.93 | 9 | R-5 | 27 | 20 | 9 | 29 |
| 1070 | 30 | MIN | 0.011 | 0.50 | 19.36 | 4.13 | 6 | R-4 | 18 | 16 | 7.5 | 23.5 |
| 1080 | 30 | MIN | 0.011 | 0.50 | 21.35 | 4.48 | 6 | R-4 | 18 | 16 | 7.5 | 23.5 |
| 1100 | 18 | MIN | 0.011 | 0.74 | 7.95 | 4.50 | 6 | R-4 | 18 | 8 | 4.5 | 12.5 |
| 1110 | 24 | MIN | 0.011 | 2.65 | 9.19 | 2.93 | 6 | R-4 | 18 | 12 | 6 | 18 |
| 1120 | 30 | MIN | 0.011 | 0.40 | 19.13 | 3.90 | 6 | R-4 | 18 | 16 | 7.5 | 23.5 |
| 1130 | 24 | MIN | 0.011 | 0.50 | 1.69 | 0.54 | 6 | R-4 | 18 | 12 | 6 | 18 |
| 1140 | 36 | MIN | 0.011 | 0.40 | 36.87 | 5.59 | 9 | R-5 | 27 | 20 | 9 | 29 |
| 1200 | 24 | MIN | 0.011 | 0.44 | 7.68 | 2.45 | 6 | R-4 | 18 | 12 | 6 | 18 |
| 1210 | 36 | MIN | 0.011 | 0.53 | 28.71 | 4.06 | 9 | R-5 | 27 | 20 | 9 | 29 |
| 1220 | 18 | MIN | 0.011 | 1.50 | 3.48 | 2.06 | 6 | R-4 | 18 | 8 | 4.5 | 12.5 |
| 1230 | 18 | MIN | 0.011 | 2.04 | 3.74 | 2.11 | 6 | R-4 | 18 | 8 | 4.5 | 12.5 |
| 1240 | 36 | MIN | 0.011 | 0.51 | 33.98 | 4.81 | 9 | R-5 | 27 | 20 | 9 | 29 |
| 1250 | 36 | MIN | 0.011 | 0.50 | 31.68 | 5.87 | 9 | R-5 | 27 | 20 | 9 | 29 |
| 1260 | 18 | MIN | 0.011 | 0.50 | 6.85 | 3.88 | 6 | R-4 | 18 | 8 | 4.5 | 12.5 |
| 1270 | 24 | MIN | 0.011 | 0.50 | 2.14 | 0.68 | 6 | R-4 | 18 | 12 | 6 | 18 |
| 1280 | 36 | MIN | 0.011 | 0.50 | 30.52 | 5.73 | 9 | R-5 | 27 | 20 | 9 | 29 |
| 9 | (2) 48 | MIN | 0.011 | 0.54 | 16.56 | 2.04 | 12 | R-6 | 36 | 26 | 12 | 38 |
| 12 | (2) 66 | MIN | 0.011 | 0.50 | 266.99 | 5.62 | 18 | R-7 | 54 | 32 | 12 | 44 |
| 1295 | 24 | MIN | 0.011 | 0.55 | 1.06 | 0.34 | 6 | R-4 | 18 | 12 | 6 | 18 |
| 1297 | 24 | MIN | 0.011 | 0.51 | 5.10 | 1.63 | 6 | R-4 | 18 | 12 | 6 | 18 |
| 1900 | 36 | MIN | 0.011 | 0.43 | 23.46 | 4.83 | 9 | R-5 | 27 | 20 | 9 | 29 |
| | | | | | | | | | | | | |

Note: Rock size selected has been increased from the suggested d50 values based upon flow (Q) and/or velocity parameters. Energy Dissipator shall be hand placed and dimensions adjusted to conform to the existing roadside conveyance.
Stone larger than R-4 shall have stone filter blanket installed prior to the rip-rap in lieu of non-woven geotextile. Filter stone shall meet the following requirements:

# Hydrograph Summary Report

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

| Hyd. No. | Hydrograph type (origin) | Peak flow (cfs) | Time interval (min) | Time to Peak (min) | Hyd. volume (cuft) | Inflow hyd(s) | Maximum elevation (ft) | Total strge used (cuft) | Hydrograph Description |
|---|---|---|---|---|---|---|---|---|---|
| 1 | SCS Runoff | 500.35 | 2 | 736 | 2,424,562 | ------ | ------ | ------ | Pre-Dev DA #1 - DP 001 |
| 2 | SCS Runoff | 17.70 | 2 | 732 | 74,427 | ------ | ------ | ------ | Pre-Dev DA #4 - DP 001 |
| 3 | SCS Runoff | 33.00 | 2 | 718 | 65,990 | ------ | ------ | ------ | Off-site (Fleck) - DP 001 |
| 4 | SCS Runoff | 16.12 | 2 | 718 | 47,275 | ------ | ------ | ------ | Off-site (Petrucci) - DP 001 |
| 5 | SCS Runoff | 77.27 | 2 | 718 | 195,310 | ------ | ------ | ------ | Off-site (Hiossen) - DP 001 |
| 6 | SCS Runoff | 7.422 | 2 | 716 | 14,987 | ------ | ------ | ------ | Off-site (HB Fuller-North) - DP 001 |
| 7 | SCS Runoff | 33.39 | 2 | 716 | 73,823 | ------ | ------ | ------ | Off-site (HB Fuller-Middle) - DP 001 |
| 8 | SCS Runoff | 17.71 | 2 | 716 | 39,628 | ------ | ------ | ------ | Off-site (HB Fuller-South) - DP 001 |
| 9 | SCS Runoff | 40.63 | 2 | 716 | 82,185 | ------ | ------ | ------ | Off-site (Eastern DA) - DP 001 |
| 10 | Combine | 142.67 | 2 | 718 | 397,989 | 2, 3, 4, | ------ | ------ | Off-site (2-6) - DP 001 |
| 11 | Combine | 231.99 | 2 | 718 | 593,624 | 5, 6, 7, 8, 9, 10 | ------ | ------ | Total Off-site (Pre-Dev) - DP 001 |
| 12 | Combine | 516.93 | 2 | 736 | 2,498,986 | 1, 2, | ------ | ------ | Total On-site (Pre-Dev) - DP 001 |
| 13 | Combine | 562.86 | 2 | 736 | 3,092,612 | 11, 12 | ------ | ------ | Total Pre-Dev - DP 001 |
| 15 | SCS Runoff | 303.06 | 2 | 722 | 927,731 | ------ | ------ | ------ | Pre-Dev DA #2 (Remains On-Site) |
| 16 | SCS Runoff | 20.80 | 2 | 732 | 99,694 | ------ | ------ | ------ | Pre-Dev DA #3 (Remains On-Site) |
| 18 | SCS Runoff | 144.56 | 2 | 716 | 308,355 | ------ | ------ | ------ | Post-Dev DA #1 - DP 001 |
| 19 | Combine | 371.57 | 2 | 718 | 901,979 | 11, 18 | ------ | ------ | Total To Pond #9 - DP 001 |
| 20 | Reservoir | 73.37 | 2 | 730 | 878,117 | 19 | 17.70 | 370,271 | Route Pond #9 - E.Spil |
| 22 | SCS Runoff | 144.51 | 2 | 716 | 311,289 | ------ | ------ | ------ | Post-Dev DA #2A - DP 001 |
| 23 | SCS Runoff | 285.30 | 2 | 716 | 633,048 | ------ | ------ | ------ | Post-Dev DA #2B - DP 001 |
| 24 | SCS Runoff | 14.85 | 2 | 732 | 63,275 | ------ | ------ | ------ | Post-Dev DA #2C - DP 001 |
| 25 | SCS Runoff | 29.10 | 2 | 716 | 62,223 | ------ | ------ | ------ | Post-Dev DA #3 - DP 001 |
| 26 | SCS Runoff | 350.94 | 2 | 716 | 782,192 | ------ | ------ | ------ | Post-Dev DA #4 - DP 001 |
| 27 | SCS Runoff | 79.16 | 2 | 716 | 176,937 | ------ | ------ | ------ | Post-Dev DA #5 - DP 001 |
| 28 | SCS Runoff | 75.87 | 2 | 716 | 170,218 | ------ | ------ | ------ | Post-Dev DA #6 - DP 001 |
| 29 | SCS Runoff | 463.24 | 2 | 716 | 1,070,286 | ------ | ------ | ------ | Post-Dev DA #7 - DP 001 |
| 30 | SCS Runoff | 79.48 | 2 | 716 | 177,317 | ------ | ------ | ------ | Post-Dev DA #8 - DP 001 |
| 31 | SCS Runoff | 248.36 | 2 | 716 | 573,164 | ------ | ------ | ------ | Post-Dev DA #9 - DP 001 |
| 32 | Combine | 894.70 | 2 | 716 | 2,028,964 | 22, 23, 24, | ------ | ------ | Subtotal - Post DA (2-5) |
| 33 | Combine | 1761.65 | 2 | 716 | 4,019,950 | 25, 26, 27, 28, 29, 30, 31, 32 | ------ | ------ | Total to Combined Basins |
| 34 | Reservoir | 177.58 | 2 | 742 | 4,019,948 | 33 | 17.95 | 1,868,772 | Route Combined Basins |
| 36 | SCS Runoff | 26.20 | 2 | 716 | 63,248 | ------ | ------ | ------ | Post-Dev Bypass #1 - DP 001 |

# Hydrograph Summary Report

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

| Hyd. No. | Hydrograph type (origin) | Peak flow (cfs) | Time interval (min) | Time to Peak (min) | Hyd. volume (cuft) | Inflow hyd(s) | Maximum elevation (ft) | Total strge used (cuft) | Hydrograph Description |
|---|---|---|---|---|---|---|---|---|---|
| 37 | SCS Runoff | 22.57 | 2 | 716 | 54,483 | ------ | ------ | ------ | Post-Dev Bypass #2 - DP 001 |
| 38 | Combine | 48.76 | 2 | 716 | 117,731 | 36, 37 | ------ | ------ | Total Bypass Area - DP 001 |
| 40 | Combine | 187.03 | 2 | 722 | 4,137,676 | 34, 38, | ------ | ------ | Total Post-Dev - DP 001 |

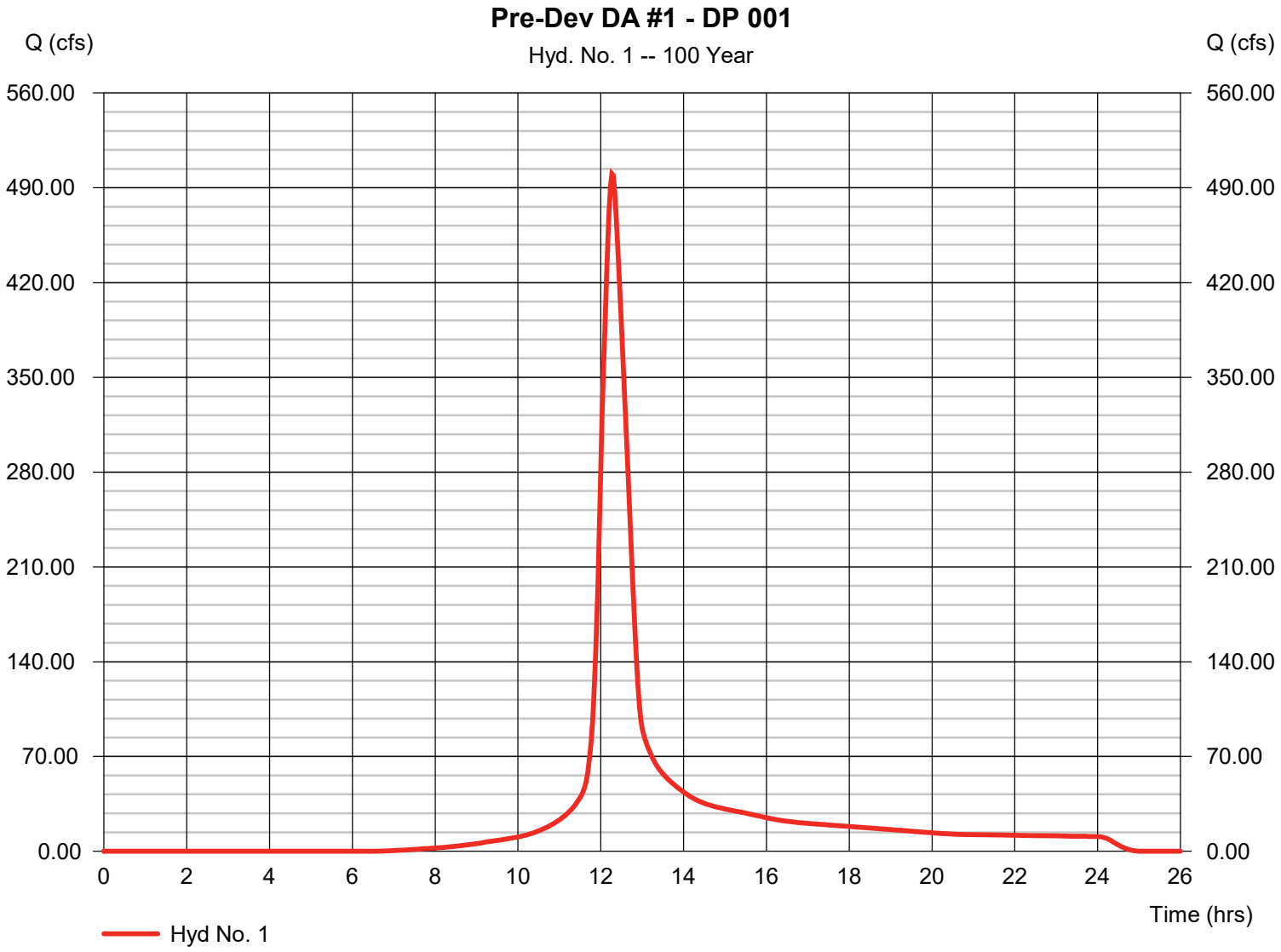
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 1

Pre-Dev DA #1 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 500.35 cfs |
| Storm frequency | = 100 yrs | Time to peak | = 12.27 hrs |
| Time interval | = 2 min | Hyd. volume | = 2,424,562 cuft |
| Drainage area | = 148.730 ac | Curve number | = 76.5 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = TR55 | Time of conc. (Tc) | = 37.70 min |
| Total precip. | = 7.20 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



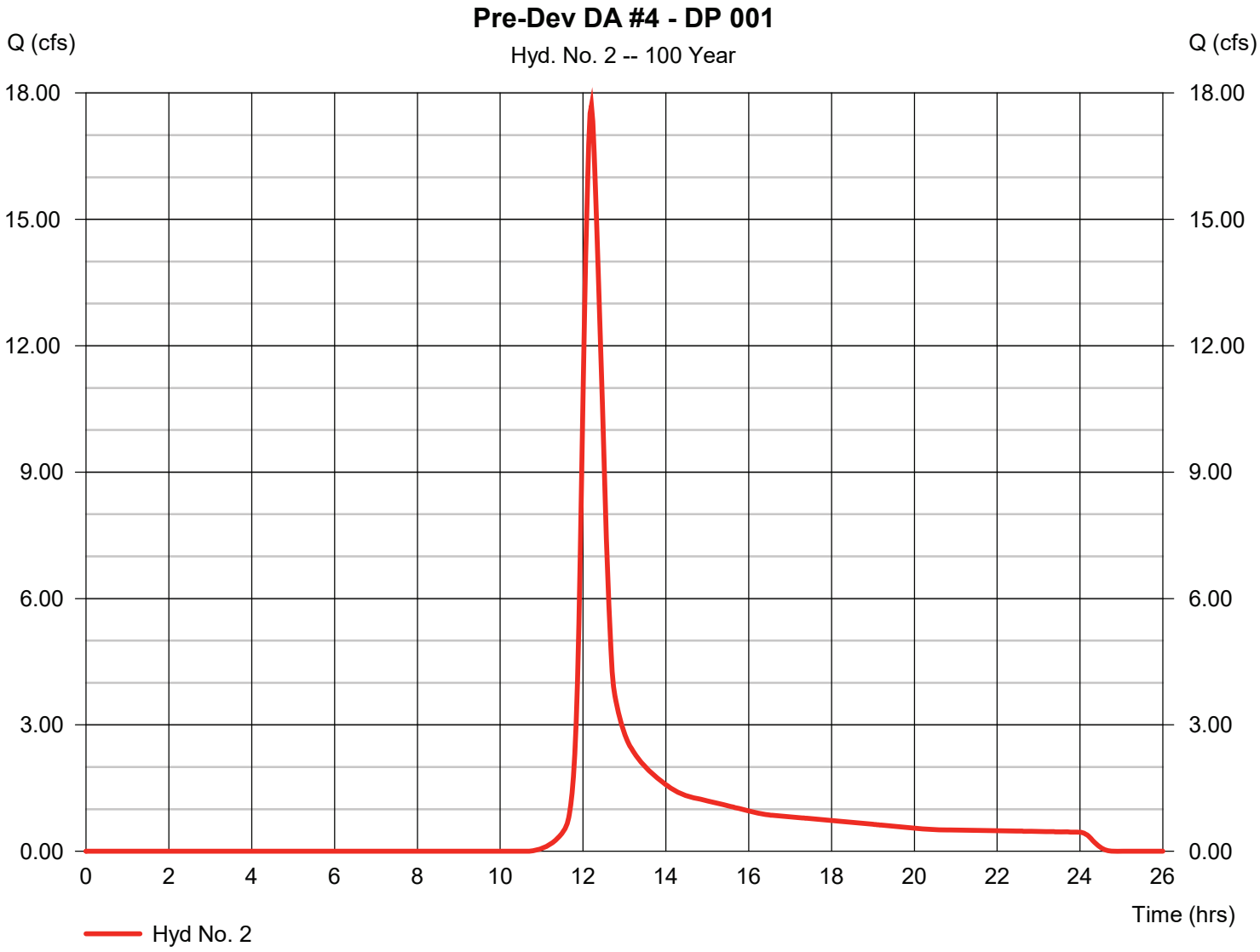
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 2

Pre-Dev DA #4 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 17.70 cfs |
| Storm frequency | = 100 yrs | Time to peak | = 12.20 hrs |
| Time interval | = 2 min | Hyd. volume | = 74,427 cuft |
| Drainage area | = 8.180 ac | Curve number | = 57.6 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = TR55 | Time of conc. (Tc) | = 28.25 min |
| Total precip. | = 7.20 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



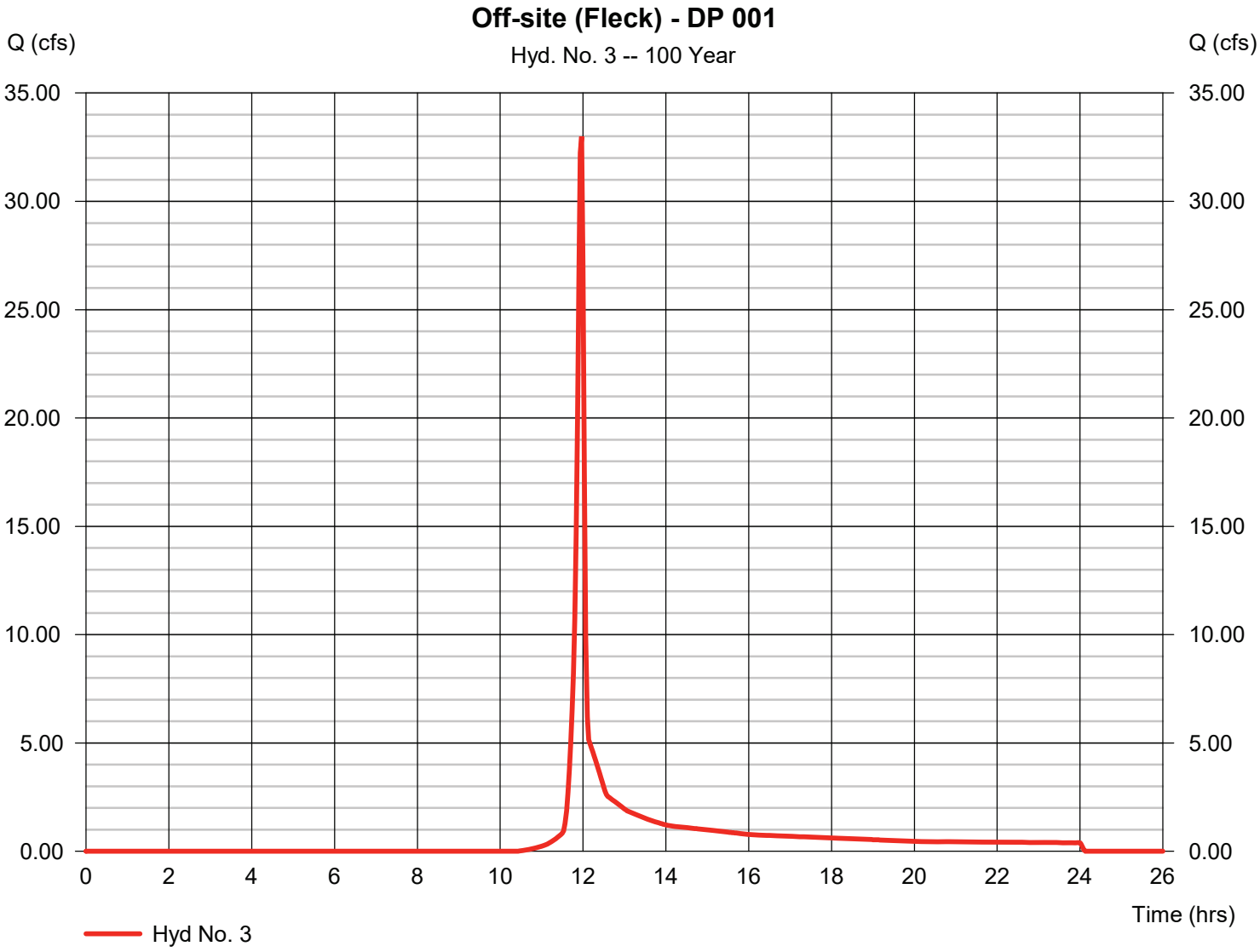
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 3

Off-site (Fleck) - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 33.00 cfs |
| Storm frequency | = 100 yrs | Time to peak | = 11.97 hrs |
| Time interval | = 2 min | Hyd. volume | = 65,990 cuft |
| Drainage area | = 7.470 ac | Curve number | = 58.5 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 7.20 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



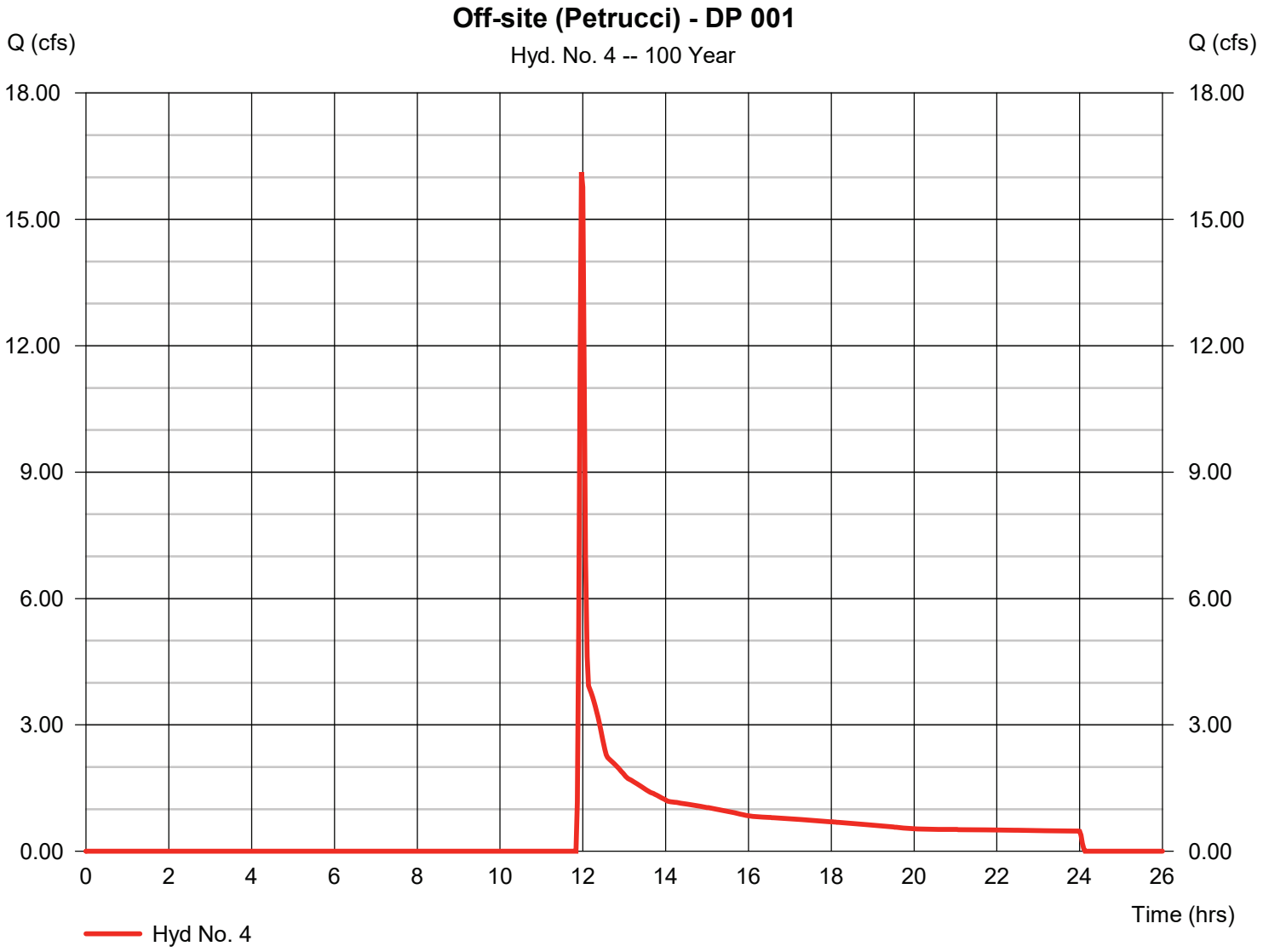
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 4

Off-site (Petrucci) - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 16.12 cfs |
| Storm frequency | = 100 yrs | Time to peak | = 11.97 hrs |
| Time interval | = 2 min | Hyd. volume | = 47,275 cuft |
| Drainage area | = 18.000 ac | Curve number | = 38.1 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 7.20 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



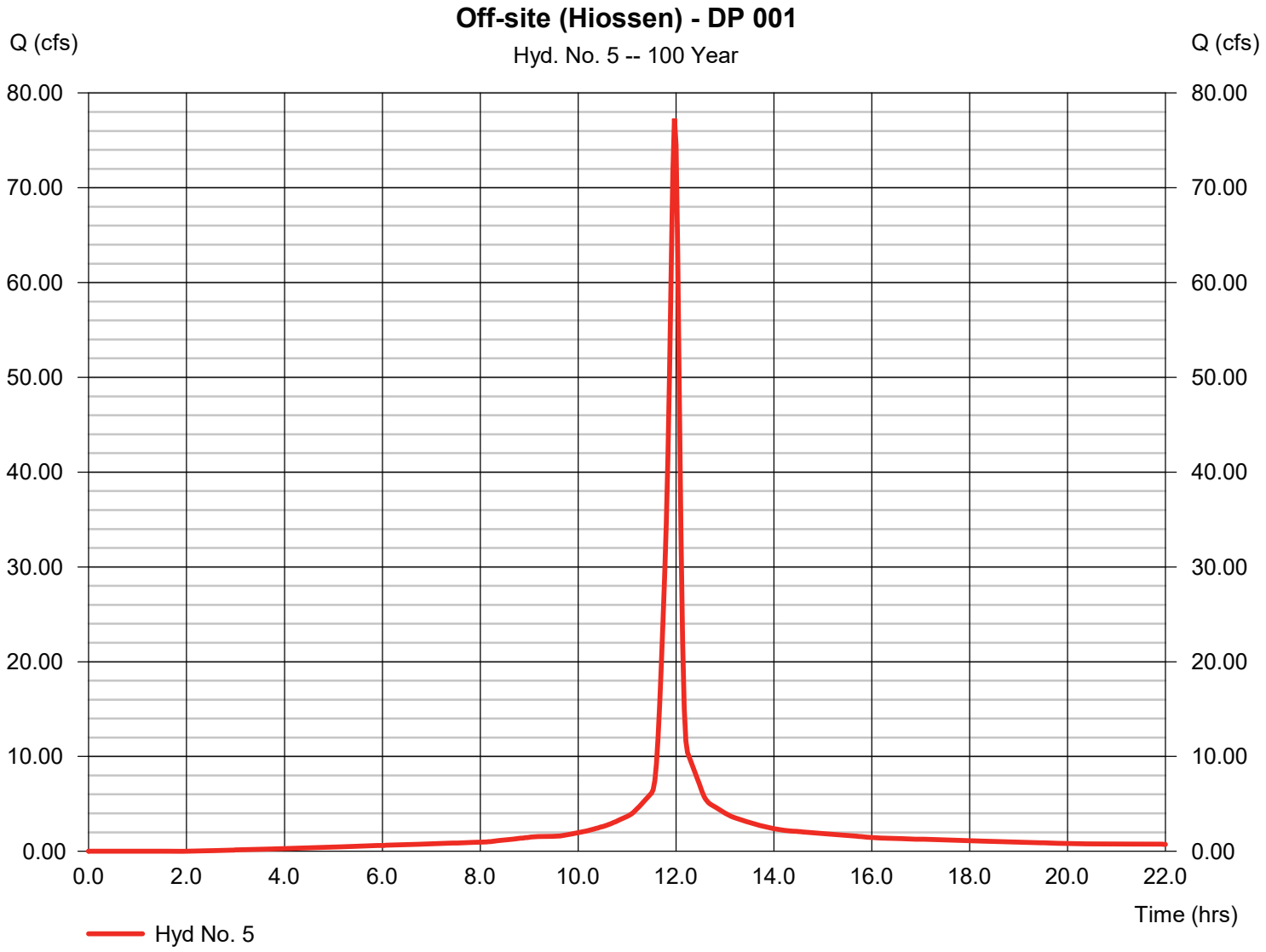
# Hydrograph Report



## Hyd. No. 5

Off-site (Hiossen) - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 77.27 cfs |
| Storm frequency | = 100 yrs | Time to peak | = 11.97 hrs |
| Time interval | = 2 min | Hyd. volume | = 195,310 cuft |
| Drainage area | = 8.510 ac | Curve number | = 92.6 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = TR55 | Time of conc. (Tc) | = 8.90 min |
| Total precip. | = 7.20 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



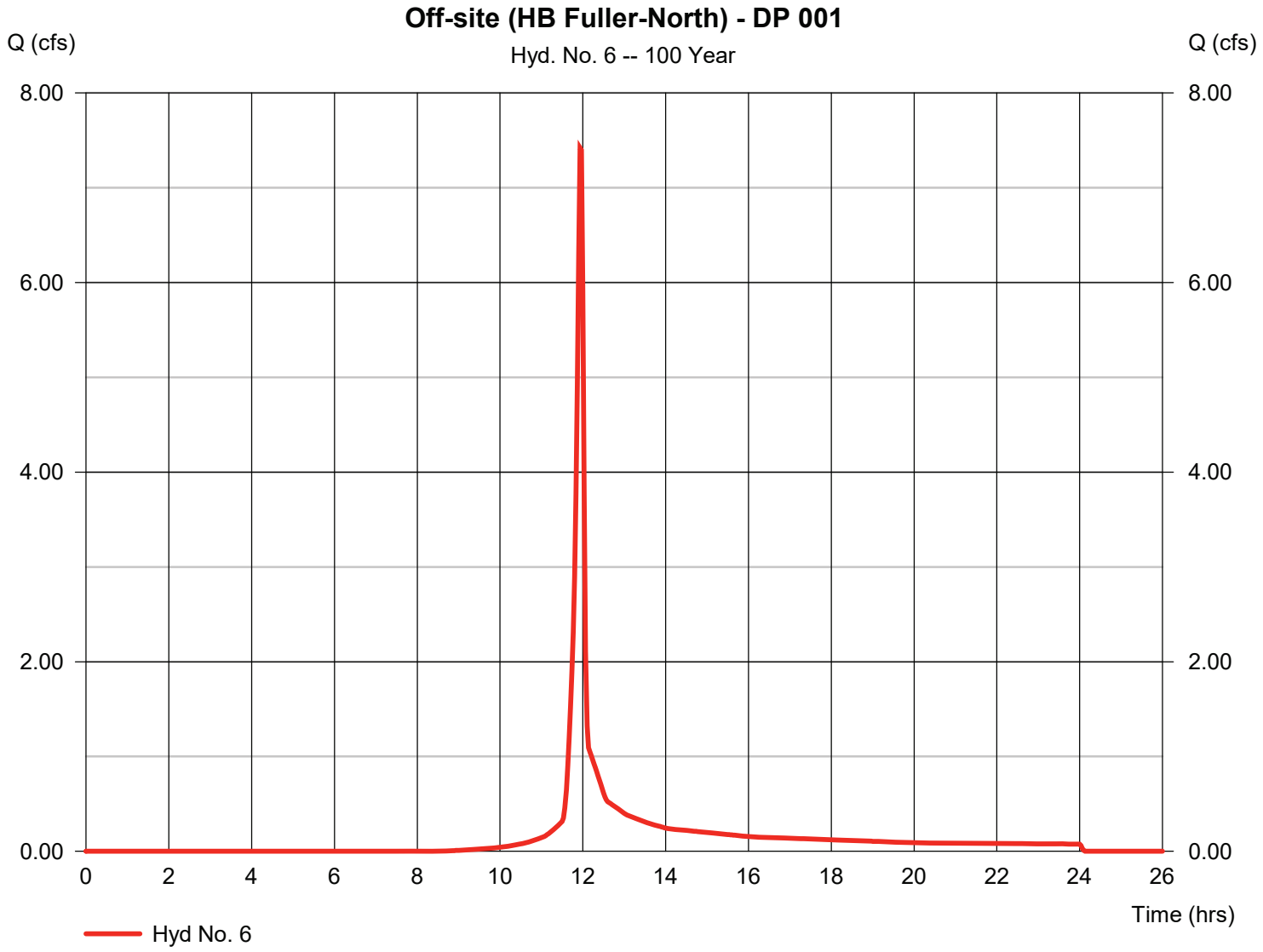
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 6

Off-site (HB Fuller-North) - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 7.422 cfs |
| Storm frequency | = 100 yrs | Time to peak | = 11.93 hrs |
| Time interval | = 2 min | Hyd. volume | = 14,987 cuft |
| Drainage area | = 1.240 ac | Curve number | = 67.8 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 7.20 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



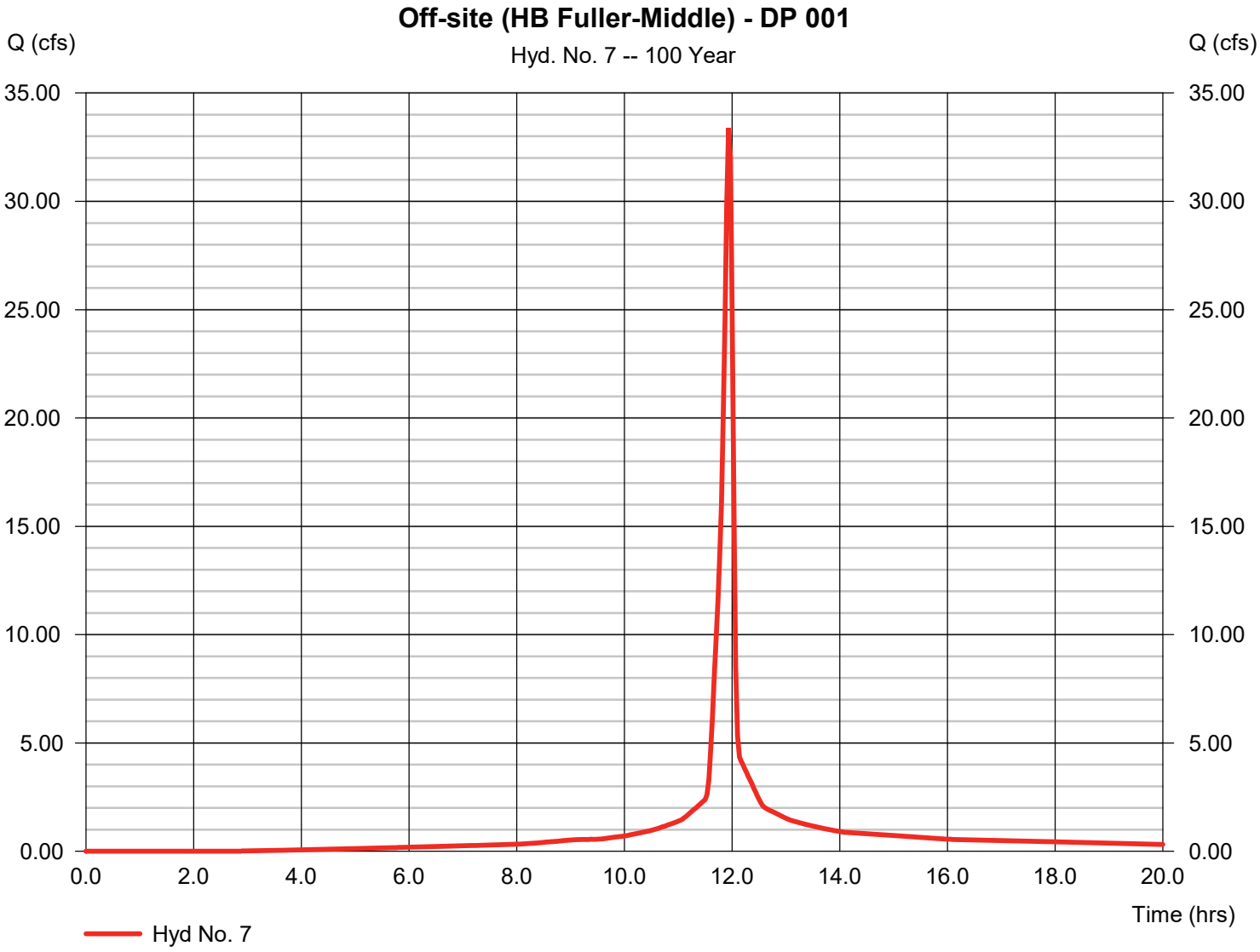
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 7

Off-site (HB Fuller-Middle) - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 33.39 cfs |
| Storm frequency | = 100 yrs | Time to peak | = 11.93 hrs |
| Time interval | = 2 min | Hyd. volume | = 73,823 cuft |
| Drainage area | = 3.590 ac | Curve number | = 90.2 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 7.20 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



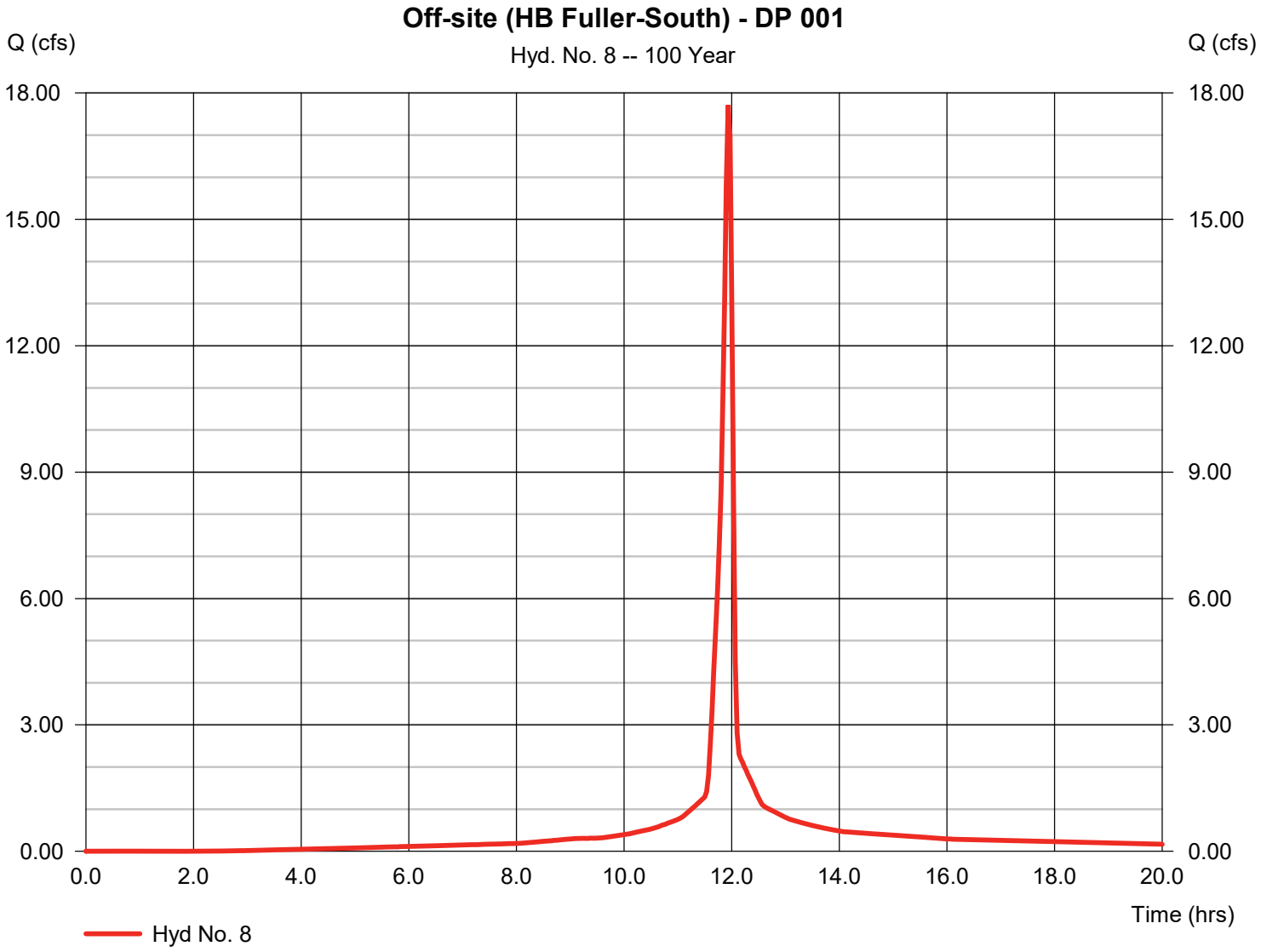
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 8

Off-site (HB Fuller-South) - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 17.71 cfs |
| Storm frequency | = 100 yrs | Time to peak | = 11.93 hrs |
| Time interval | = 2 min | Hyd. volume | = 39,628 cuft |
| Drainage area | = 1.880 ac | Curve number | = 91.5 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 7.20 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



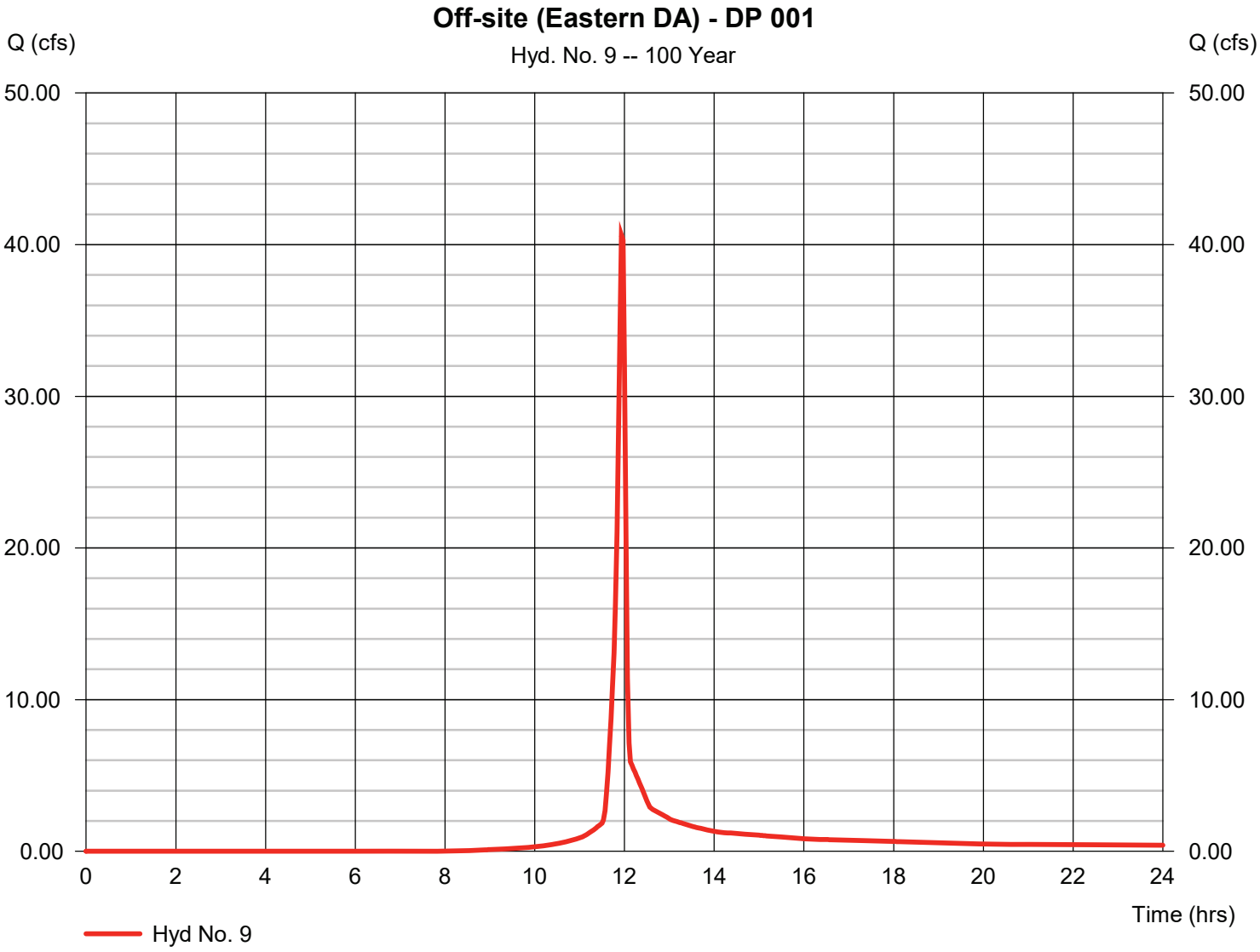
# Hydrograph Report



## Hyd. No. 9

Off-site (Eastern DA) - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 40.63 cfs |
| Storm frequency | = 100 yrs | Time to peak | = 11.93 hrs |
| Time interval | = 2 min | Hyd. volume | = 82,185 cuft |
| Drainage area | = 6.380 ac | Curve number | = 70 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 7.20 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



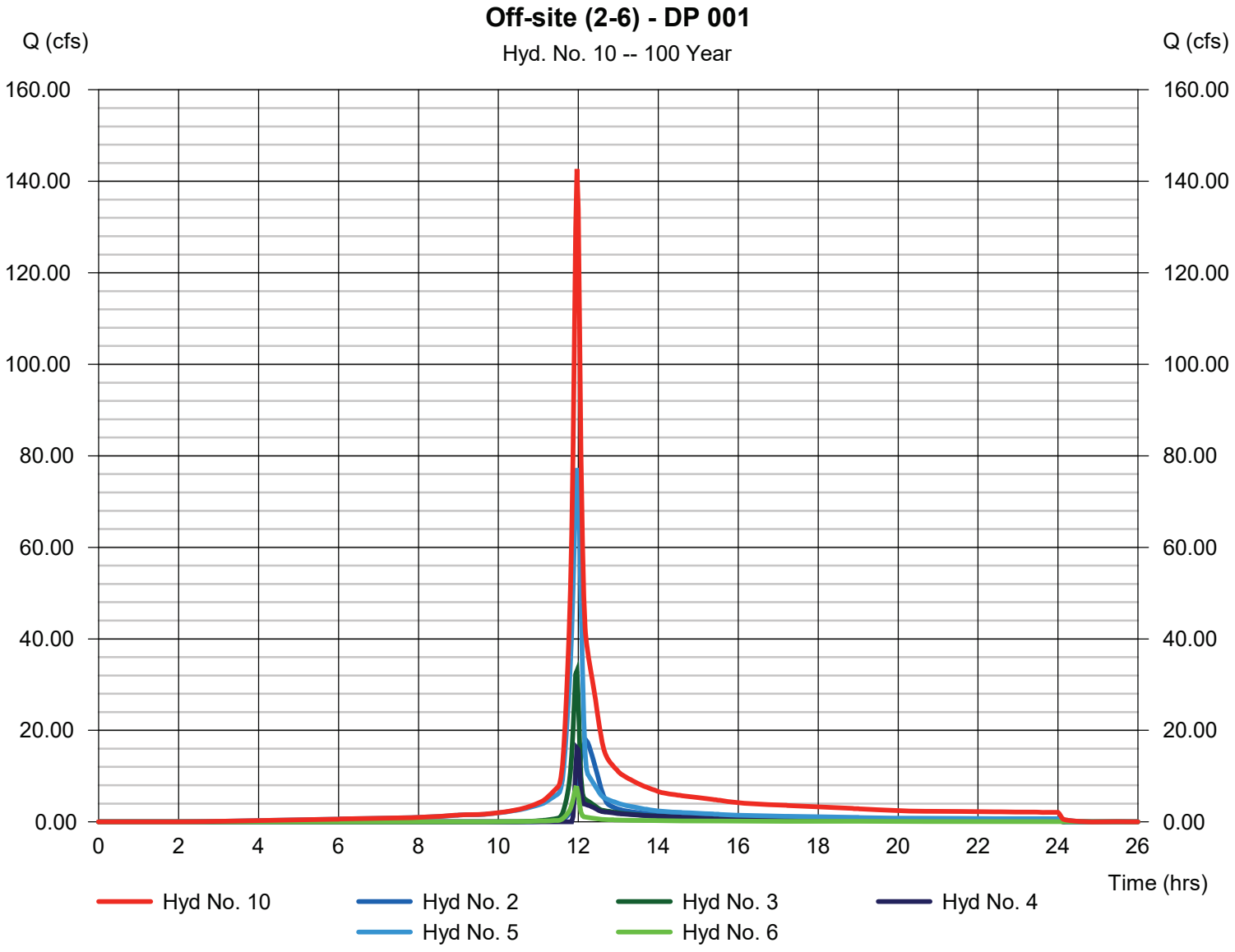
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 10

Off-site (2-6) - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 142.67 cfs |
| Storm frequency | = 100 yrs | Time to peak | = 11.97 hrs |
| Time interval | = 2 min | Hyd. volume | = 397,989 cuft |
| Inflow hyds. | = 2, 3, 4, 5, 6 | Contrib. drain. area | = 43.400 ac |



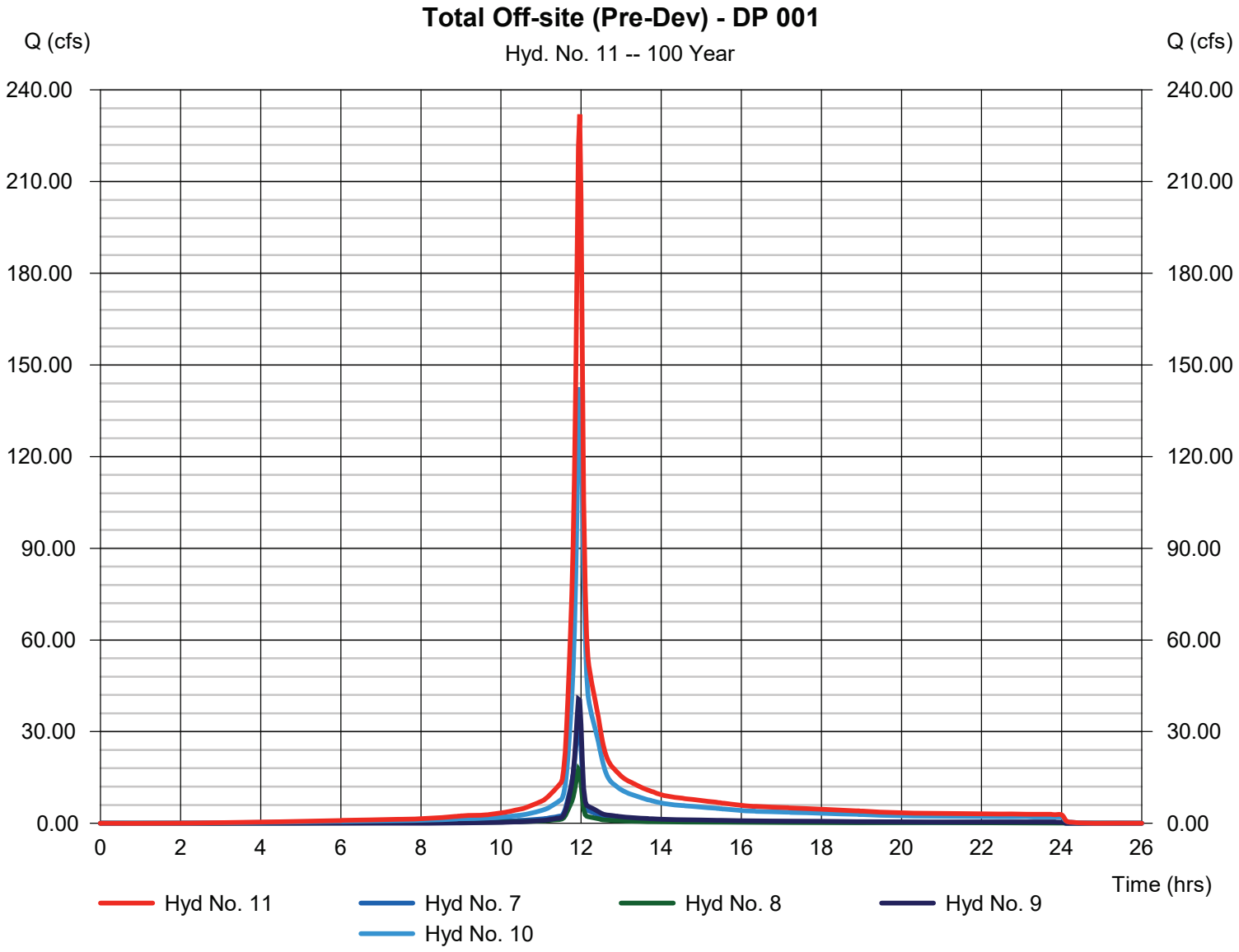
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 11

Total Off-site (Pre-Dev) - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 231.99 cfs |
| Storm frequency | = 100 yrs | Time to peak | = 11.97 hrs |
| Time interval | = 2 min | Hyd. volume | = 593,624 cuft |
| Inflow hyds. | = 7, 8, 9, 10 | Contrib. drain. area | = 11.850 ac |



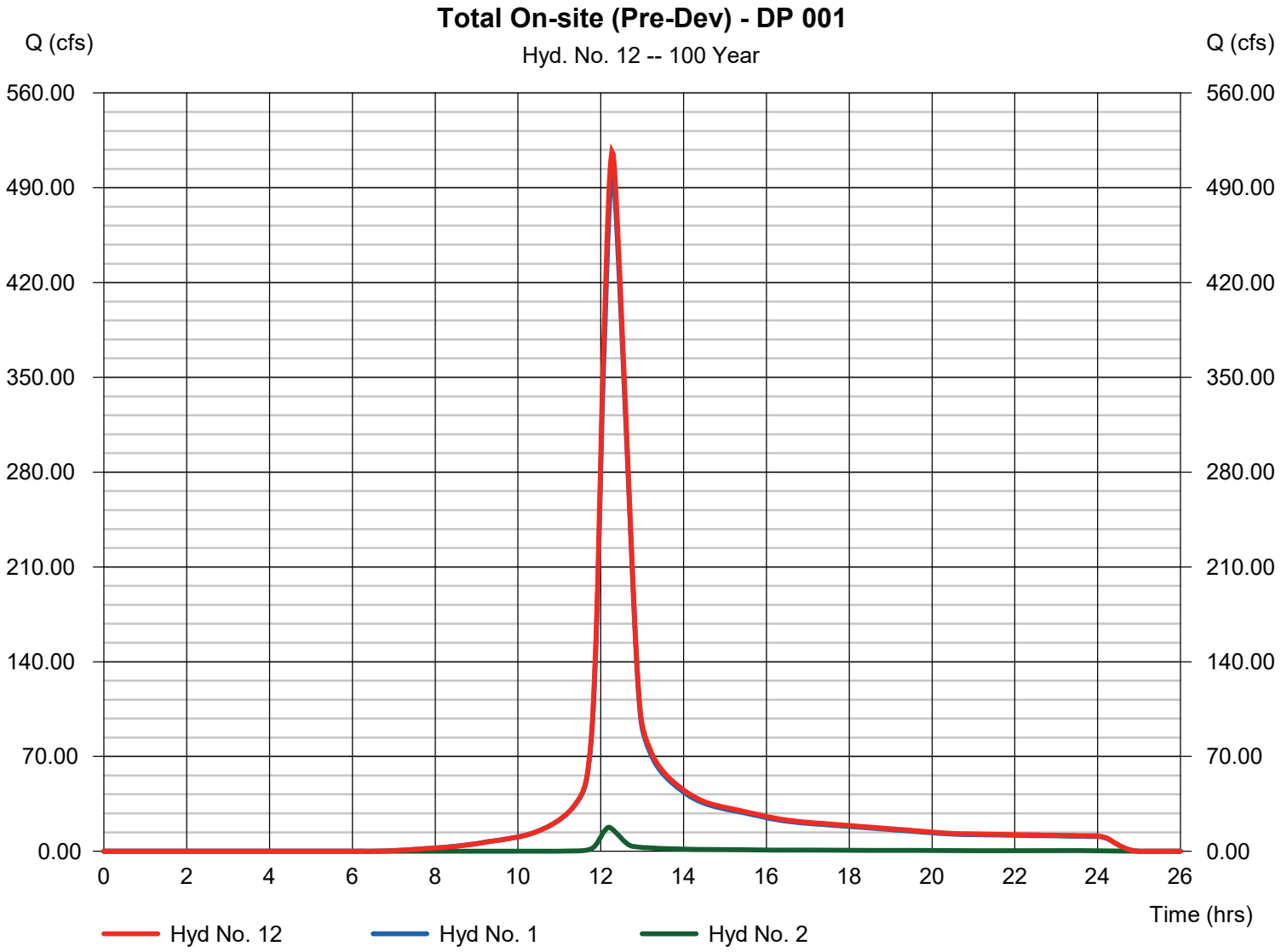
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 12

Total On-site (Pre-Dev) - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 516.93 cfs |
| Storm frequency | = 100 yrs | Time to peak | = 12.27 hrs |
| Time interval | = 2 min | Hyd. volume | = 2,498,986 cuft |
| Inflow hyds. | = 1, 2 | Contrib. drain. area | = 156.910 ac |



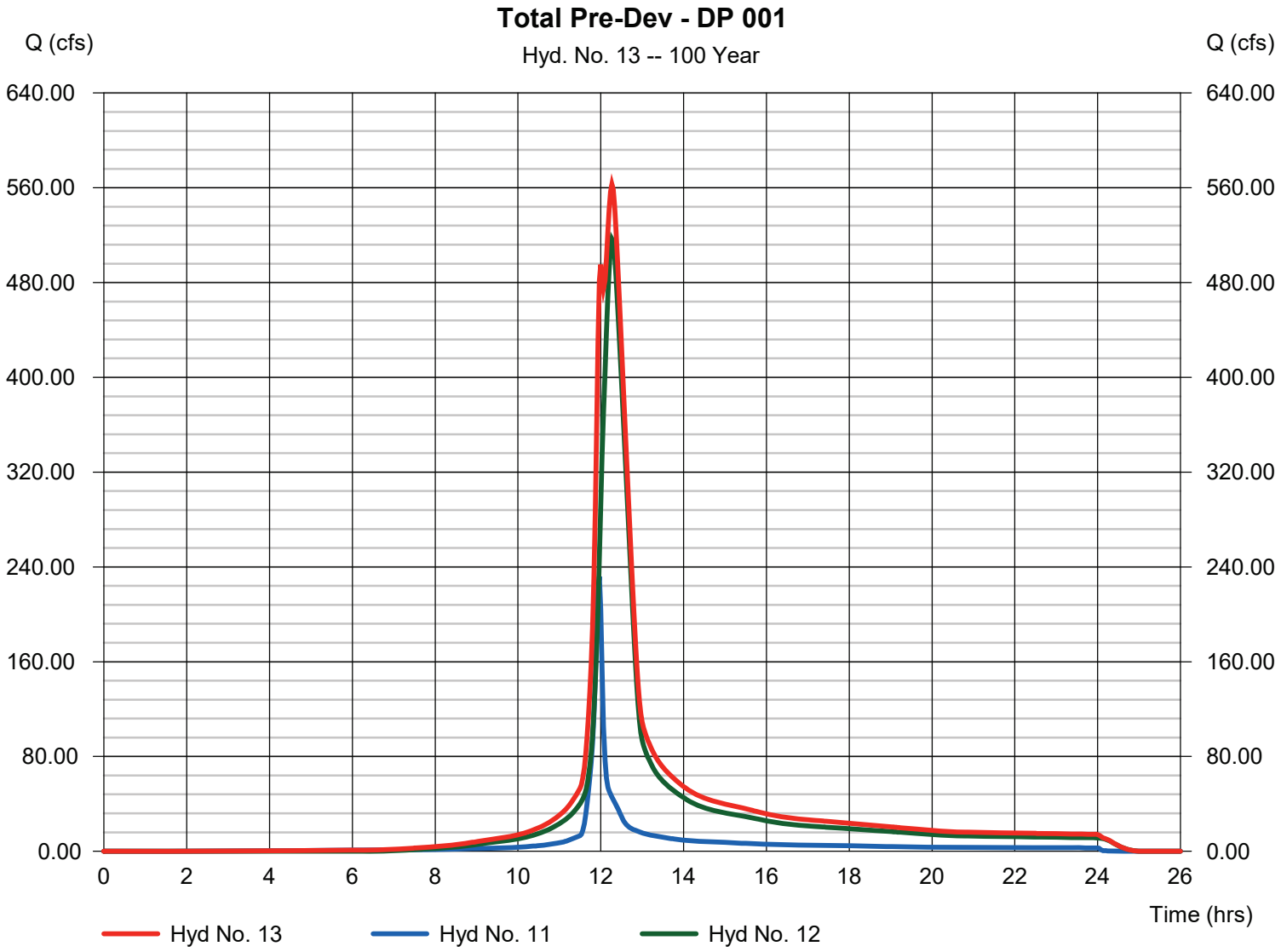
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 13

Total Pre-Dev - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 562.86 cfs |
| Storm frequency | = 100 yrs | Time to peak | = 12.27 hrs |
| Time interval | = 2 min | Hyd. volume | = 3,092,612 cuft |
| Inflow hyds. | = 11, 12 | Contrib. drain. area | = 0.000 ac |



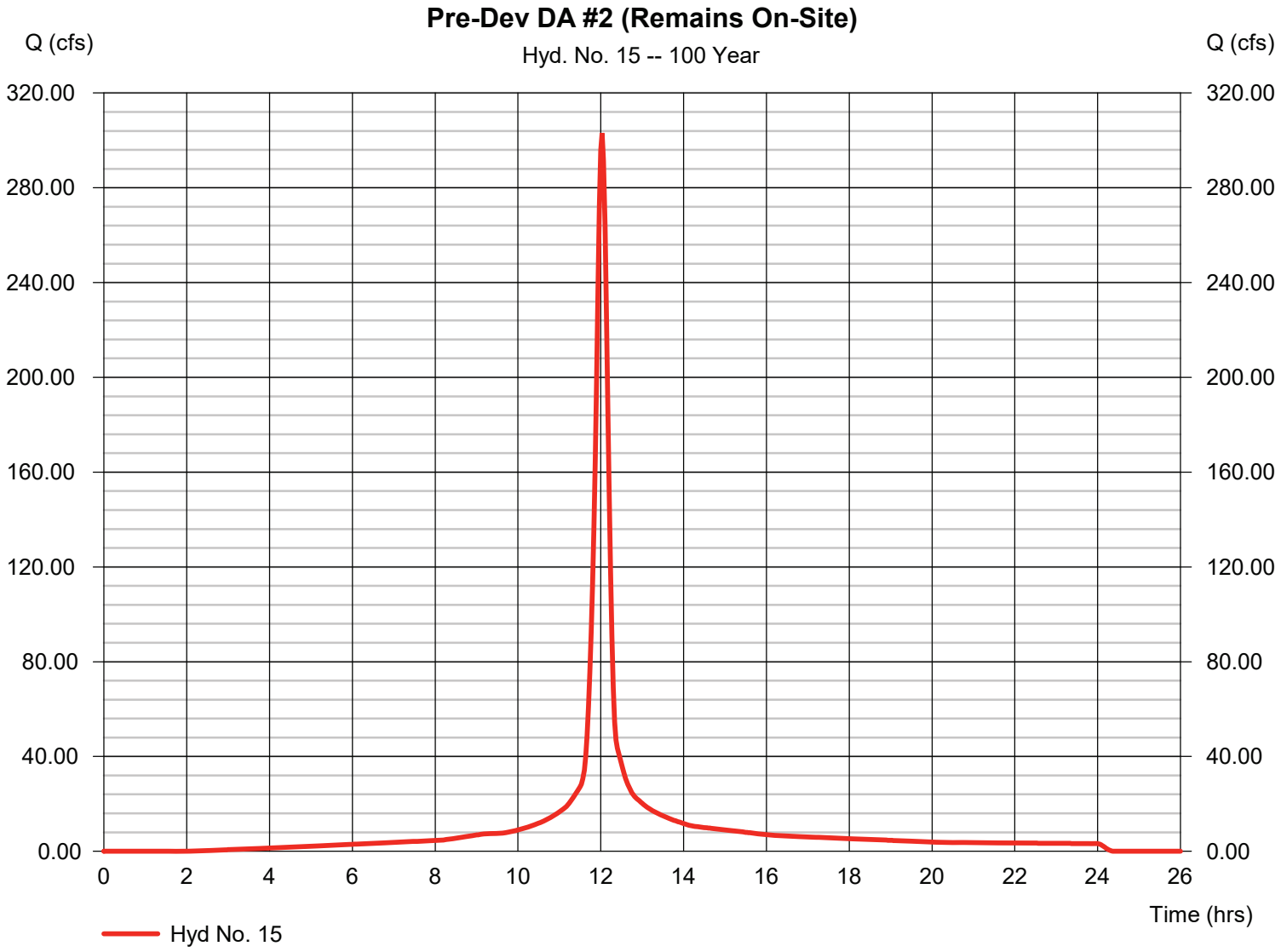
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 15

Pre-Dev DA #2 (Remains On-Site)

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 303.06 cfs |
| Storm frequency | = 100 yrs | Time to peak | = 12.03 hrs |
| Time interval | = 2 min | Hyd. volume | = 927,731 cuft |
| Drainage area | = 41.230 ac | Curve number | = 92.9 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = TR55 | Time of conc. (Tc) | = 13.38 min |
| Total precip. | = 7.20 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



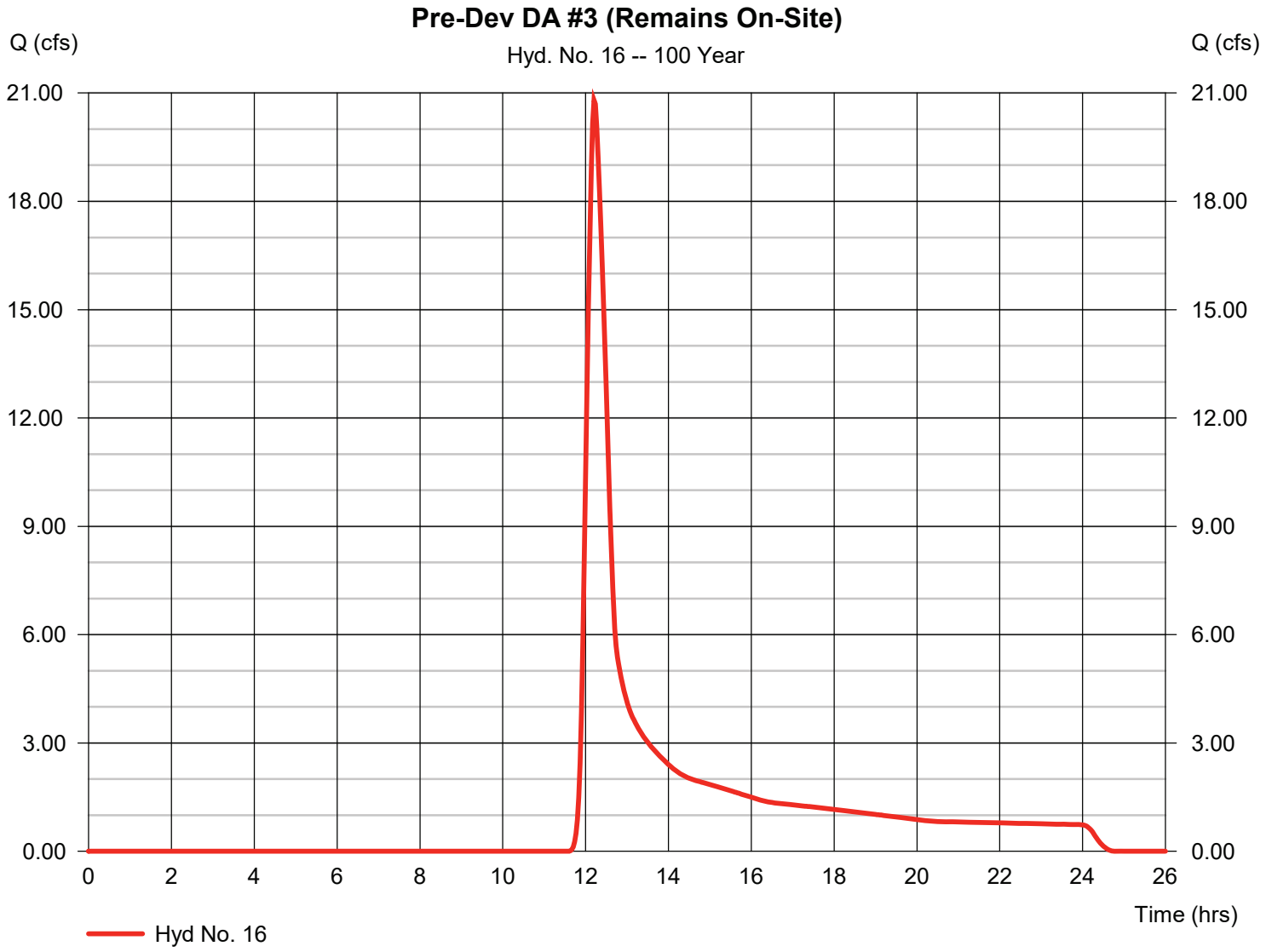
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 16

Pre-Dev DA #3 (Remains On-Site)

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 20.80 cfs |
| Storm frequency | = 100 yrs | Time to peak | = 12.20 hrs |
| Time interval | = 2 min | Hyd. volume | = 99,694 cuft |
| Drainage area | = 16.820 ac | Curve number | = 48.4 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = TR55 | Time of conc. (Tc) | = 29.90 min |
| Total precip. | = 7.20 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



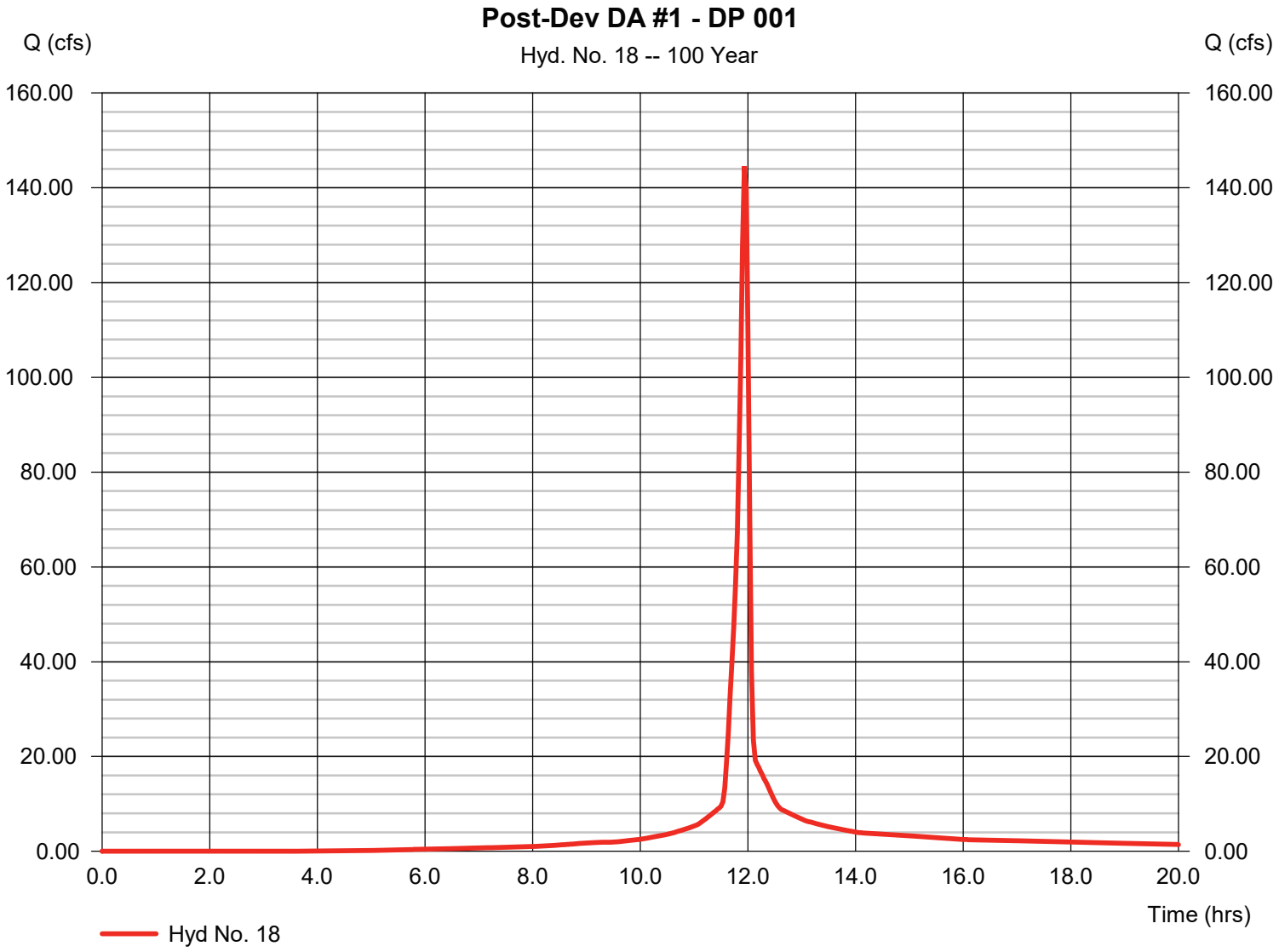
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 18

Post-Dev DA #1 - DP 001

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | SCS Runoff | Peak discharge | = | 144.56 cfs |
| Storm frequency | = | 100 yrs | Time to peak | = | 11.93 hrs |
| Time interval | = | 2 min | Hyd. volume | = | 308,355 cuft |
| Drainage area | = | 16.540 ac | Curve number | = | 85.3 |
| Basin Slope | = | 0.0 % | Hydraulic length | = | 0 ft |
| Tc method | = | User | Time of conc. (Tc) | = | 5.00 min |
| Total precip. | = | 7.20 in | Distribution | = | Type II |
| Storm duration | = | 24 hrs | Shape factor | = | 484 |



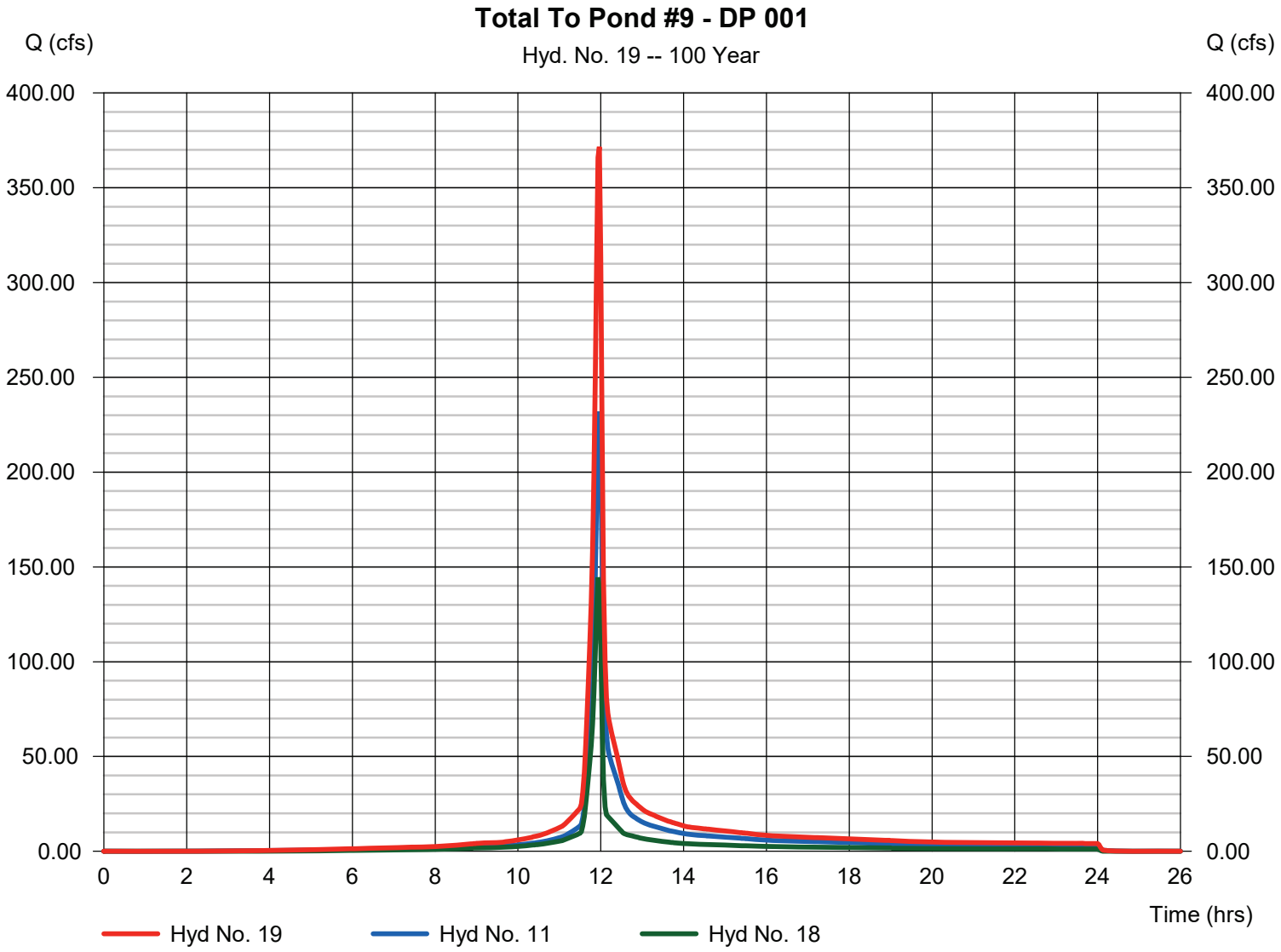
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 19

Total To Pond #9 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 371.57 cfs |
| Storm frequency | = 100 yrs | Time to peak | = 11.97 hrs |
| Time interval | = 2 min | Hyd. volume | = 901,979 cuft |
| Inflow hyds. | = 11, 18 | Contrib. drain. area | = 16.540 ac |



# Hydrograph Report

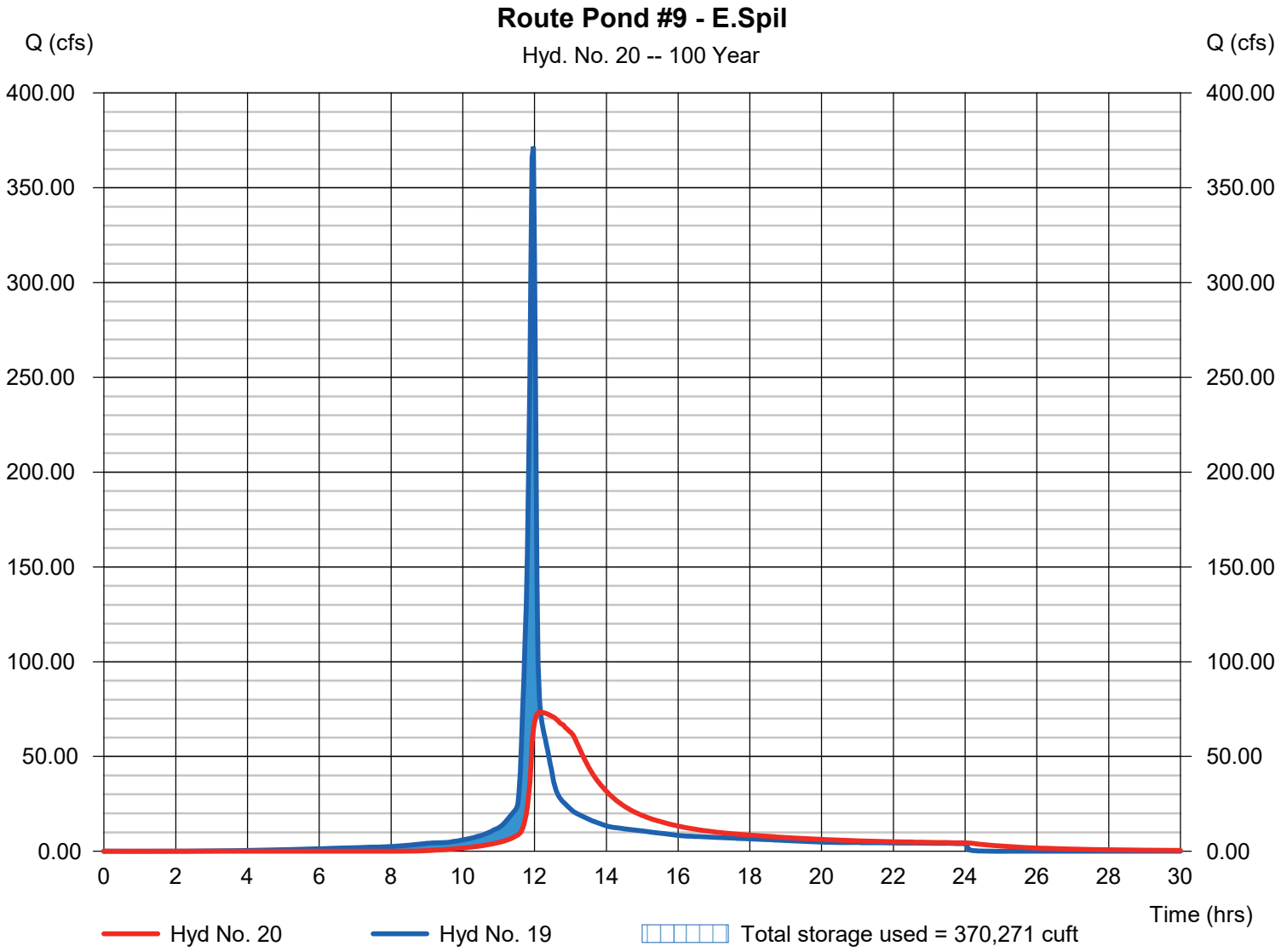
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 20

Route Pond #9 - E.Spil

| | | | |
|---|---|---|---|
| Hydrograph type | = Reservoir | Peak discharge | = 73.37 cfs |
| Storm frequency | = 100 yrs | Time to peak | = 12.17 hrs |
| Time interval | = 2 min | Hyd. volume | = 878,117 cuft |
| Inflow hyd. No. | = 19 - Total To Pond #9 - DP 001 | Max. Elevation | = 17.70 ft |
| Reservoir name | = Wet Pond #9 - E.Spill | Max. Storage | = 370,271 cuft |

Storage Indication method used.



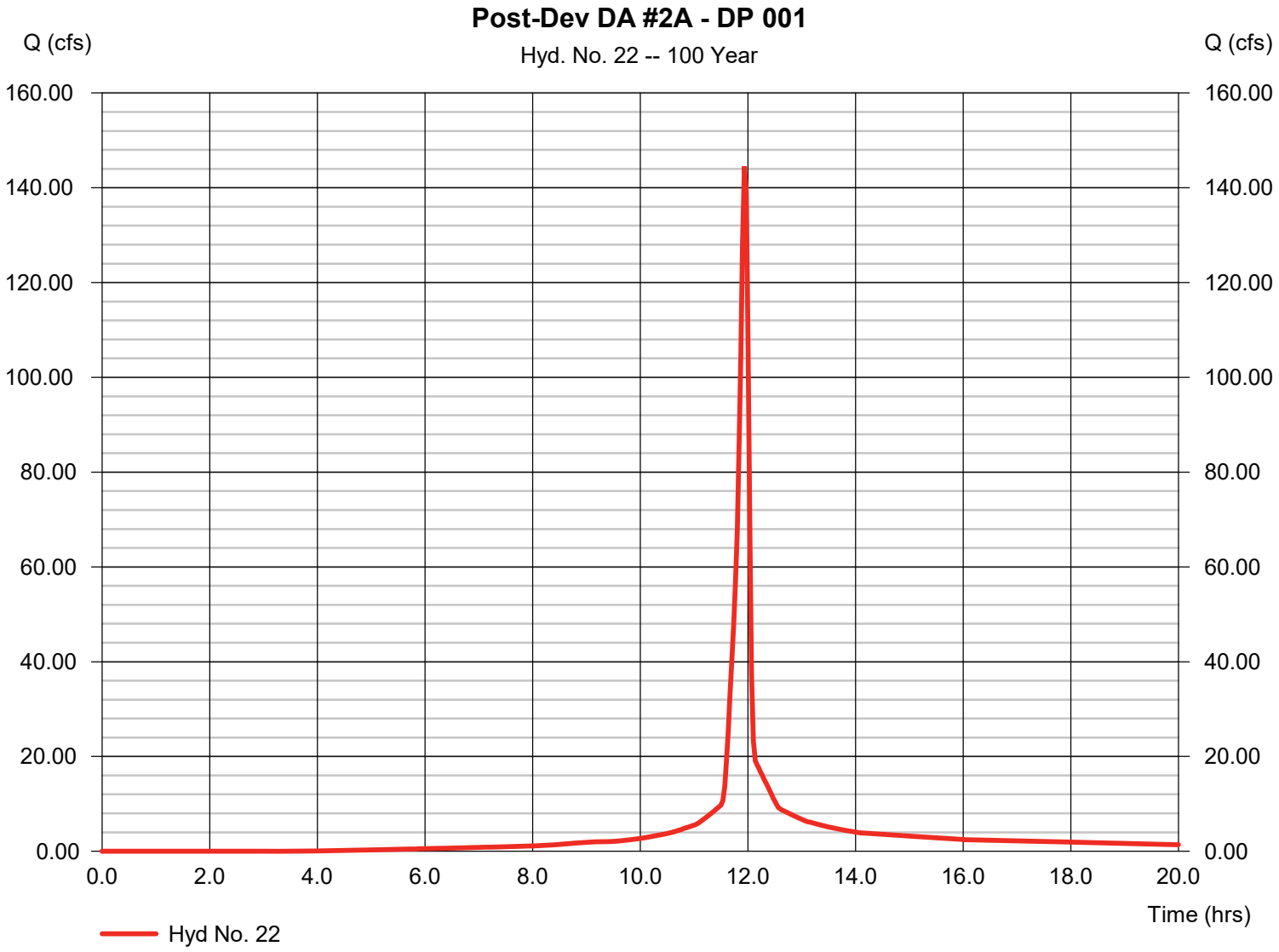
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 22

Post-Dev DA #2A - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 144.51 cfs |
| Storm frequency | = 100 yrs | Time to peak | = 11.93 hrs |
| Time interval | = 2 min | Hyd. volume | = 311,289 cuft |
| Drainage area | = 16.190 ac | Curve number | = 86.8 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 7.20 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



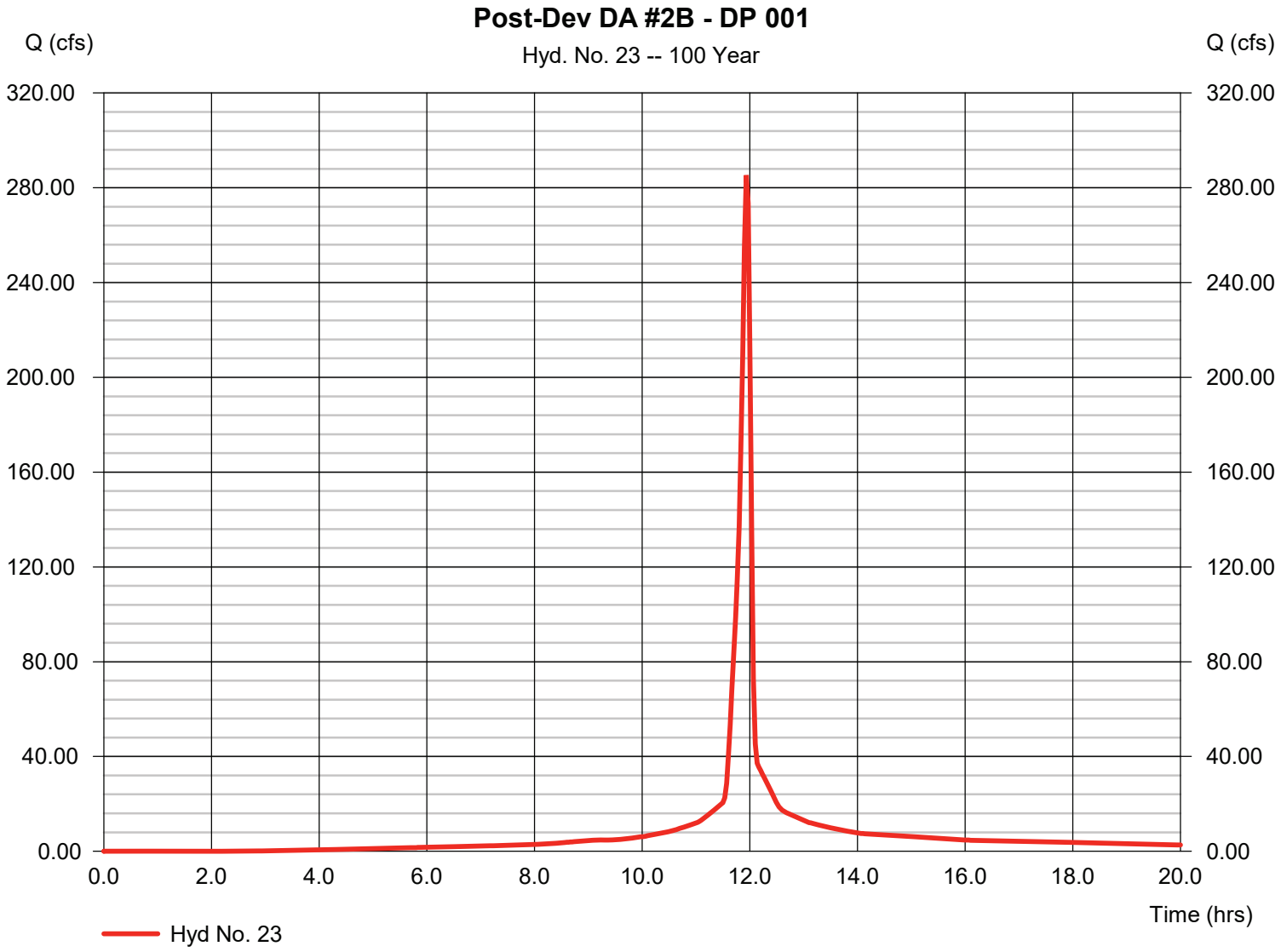
# Hydrograph Report



## Hyd. No. 23

Post-Dev DA #2B - DP 001

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | SCS Runoff | Peak discharge | = | 285.30 cfs |
| Storm frequency | = | 100 yrs | Time to peak | = | 11.93 hrs |
| Time interval | = | 2 min | Hyd. volume | = | 633,048 cuft |
| Drainage area | = | 30.550 ac | Curve number | = | 90.6 |
| Basin Slope | = | 0.0 % | Hydraulic length | = | 0 ft |
| Tc method | = | User | Time of conc. (Tc) | = | 5.00 min |
| Total precip. | = | 7.20 in | Distribution | = | Type II |
| Storm duration | = | 24 hrs | Shape factor | = | 484 |



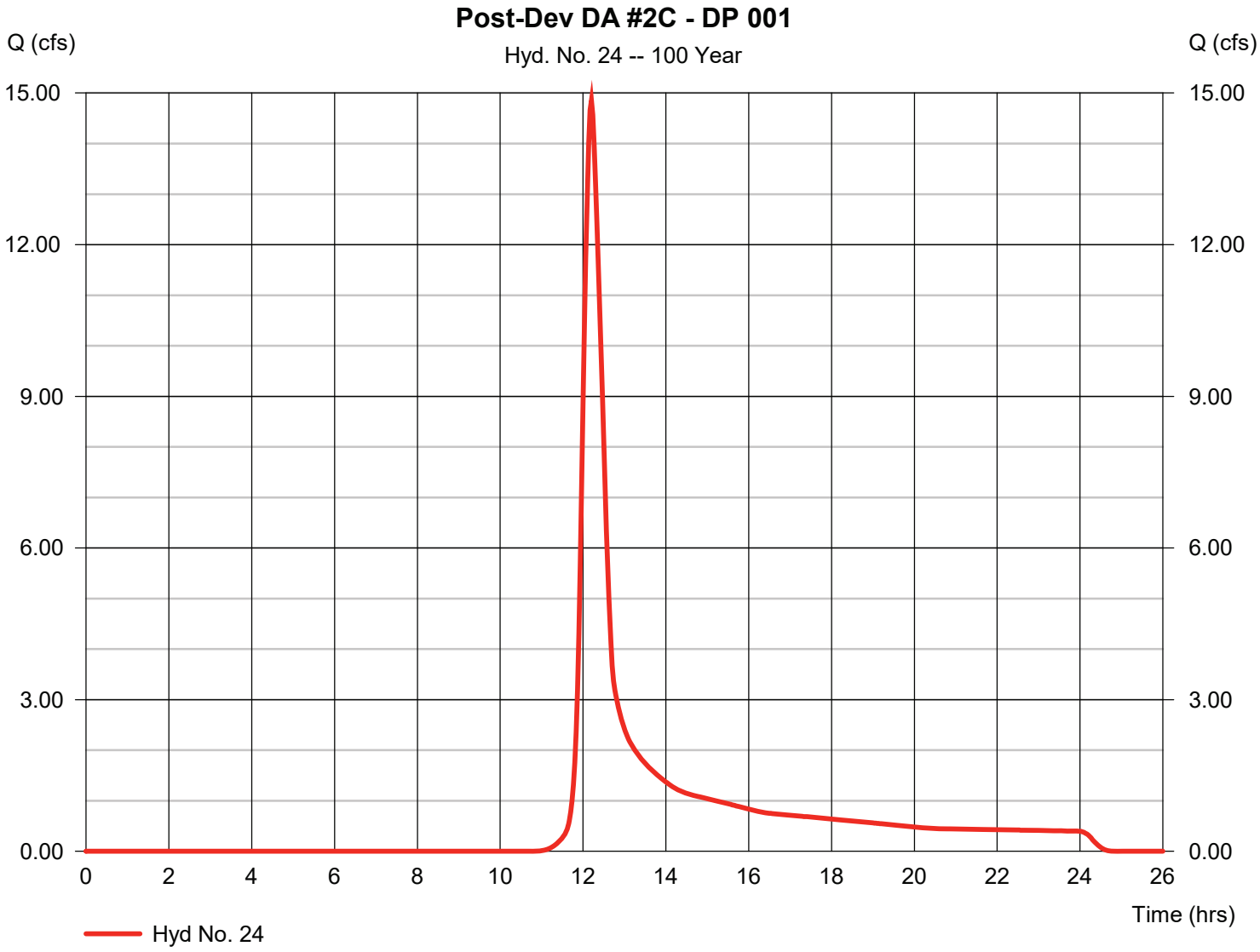
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 24

Post-Dev DA #2C - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 14.85 cfs |
| Storm frequency | = 100 yrs | Time to peak | = 12.20 hrs |
| Time interval | = 2 min | Hyd. volume | = 63,275 cuft |
| Drainage area | = 7.420 ac | Curve number | = 56 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = TR55 | Time of conc. (Tc) | = 28.30 min |
| Total precip. | = 7.20 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



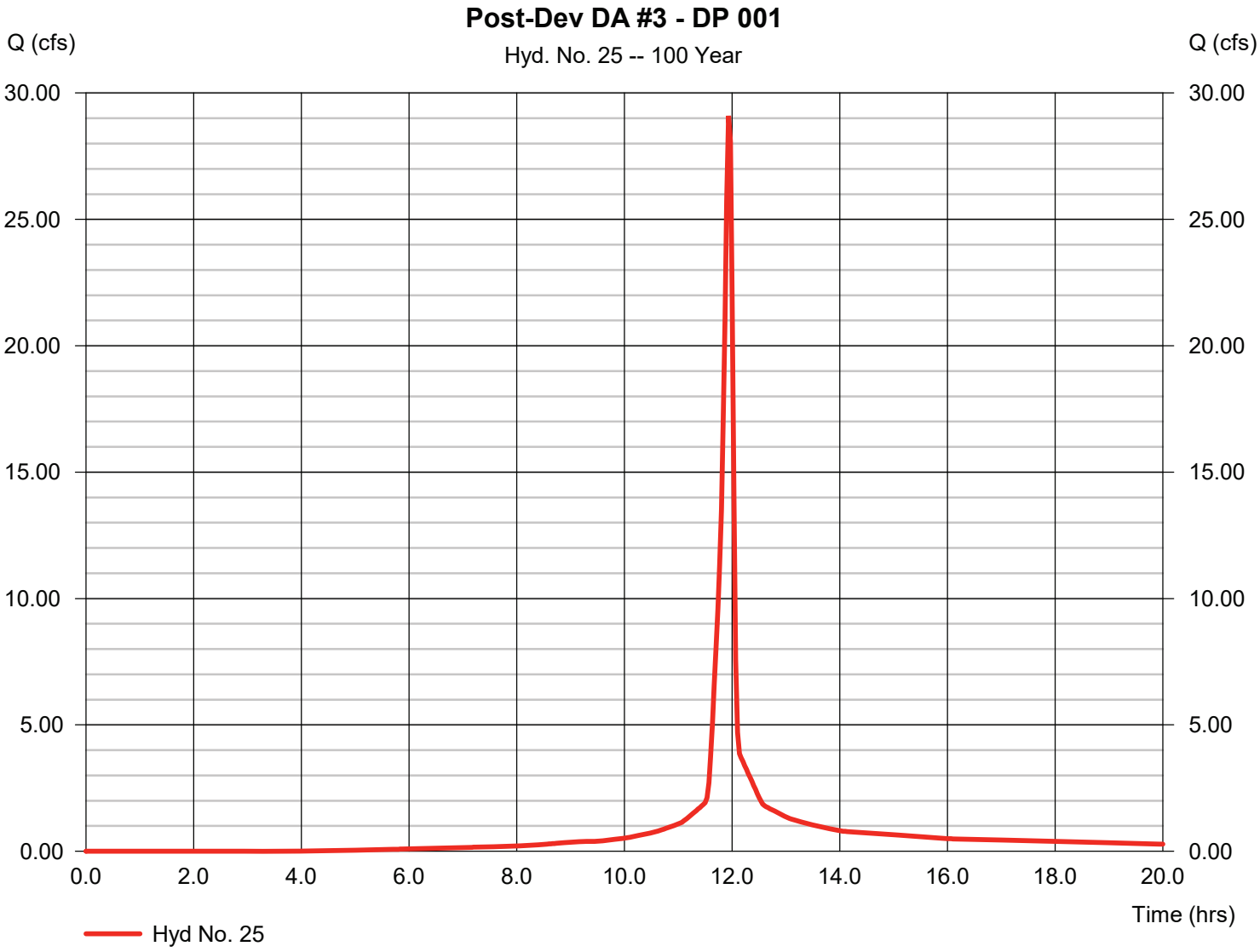
# Hydrograph Report



## Hyd. No. 25

Post-Dev DA #3 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 29.10 cfs |
| Storm frequency | = 100 yrs | Time to peak | = 11.93 hrs |
| Time interval | = 2 min | Hyd. volume | = 62,223 cuft |
| Drainage area | = 3.310 ac | Curve number | = 85.7 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 7.20 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



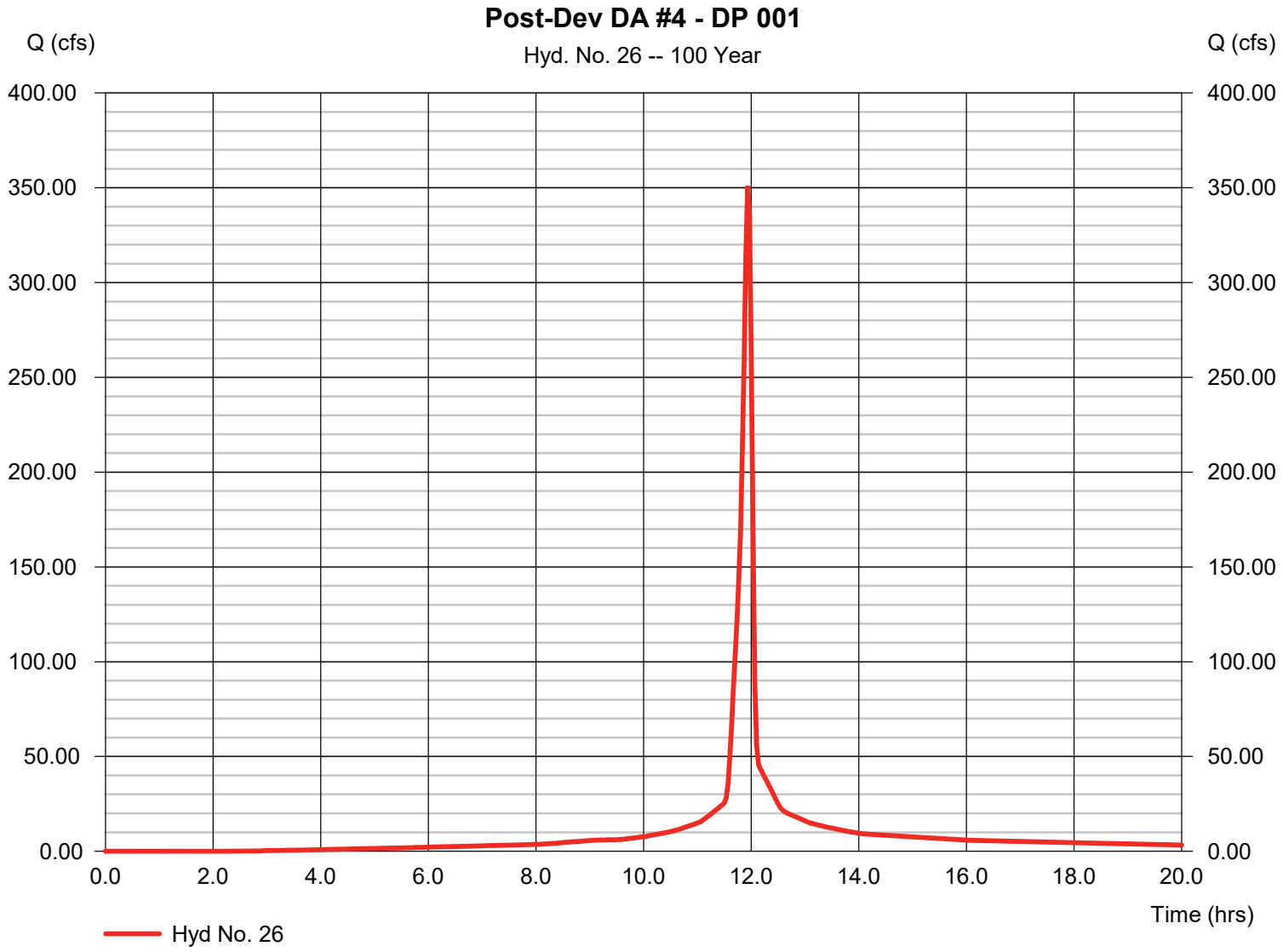
# Hydrograph Report



## Hyd. No. 26

Post-Dev DA #4 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 350.94 cfs |
| Storm frequency | = 100 yrs | Time to peak | = 11.93 hrs |
| Time interval | = 2 min | Hyd. volume | = 782,192 cuft |
| Drainage area | = 37.390 ac | Curve number | = 91.1 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 7.20 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



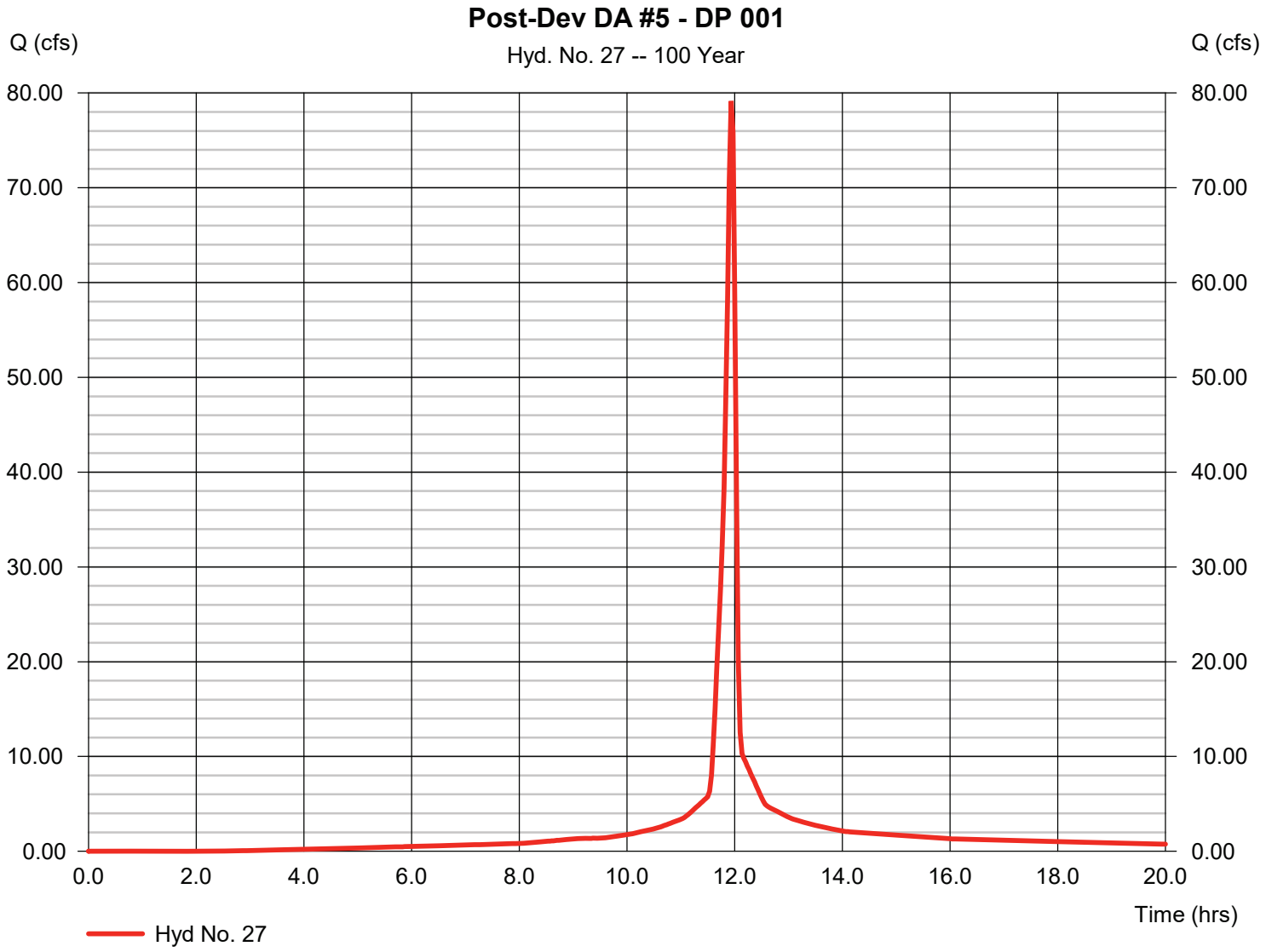
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 27

Post-Dev DA #5 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 79.16 cfs |
| Storm frequency | = 100 yrs | Time to peak | = 11.93 hrs |
| Time interval | = 2 min | Hyd. volume | = 176,937 cuft |
| Drainage area | = 8.410 ac | Curve number | = 91.4 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 7.20 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



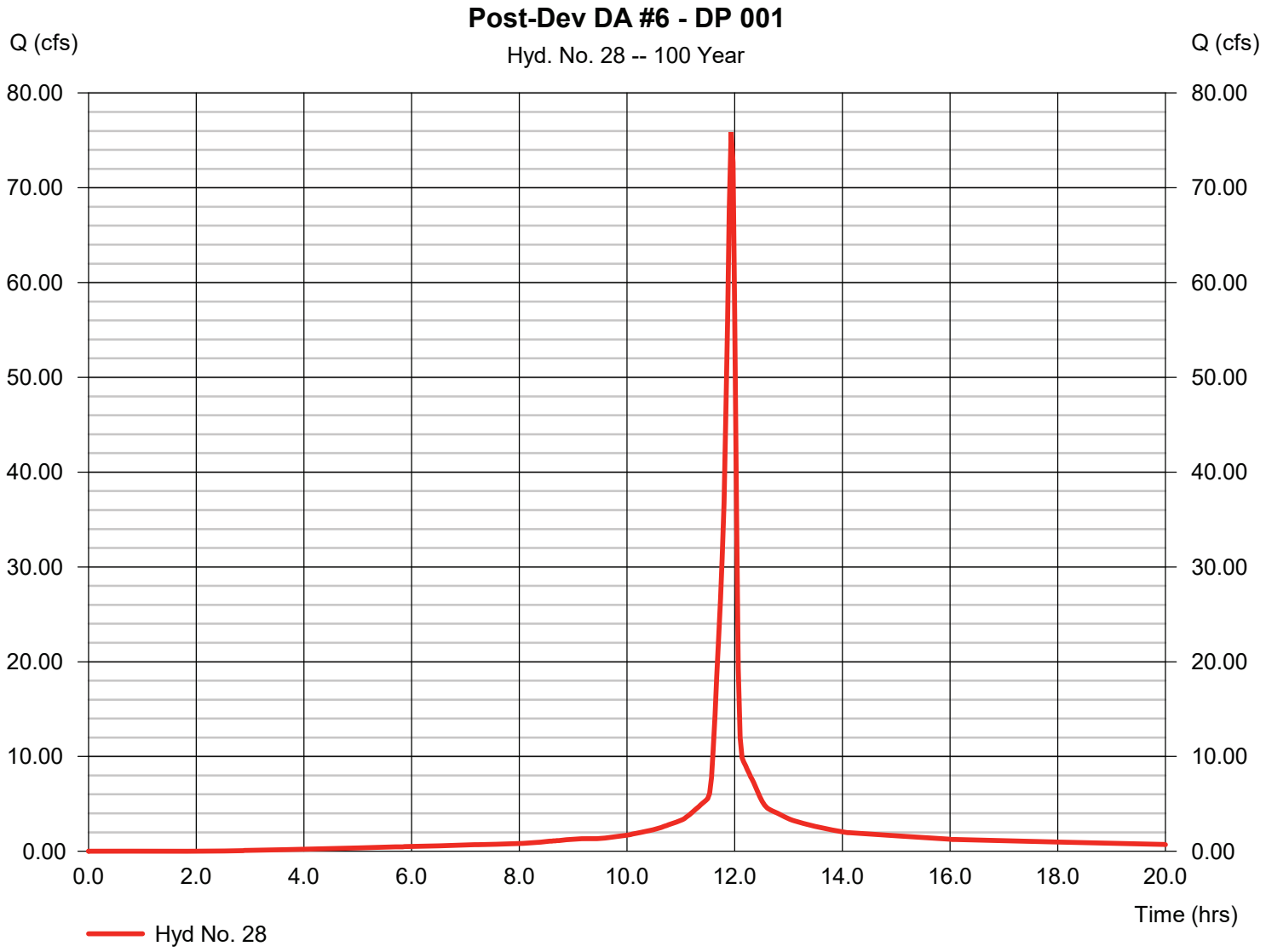
# Hydrograph Report



## Hyd. No. 28

Post-Dev DA #6 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 75.87 cfs |
| Storm frequency | = 100 yrs | Time to peak | = 11.93 hrs |
| Time interval | = 2 min | Hyd. volume | = 170,218 cuft |
| Drainage area | = 8.030 ac | Curve number | = 91.8 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 7.20 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



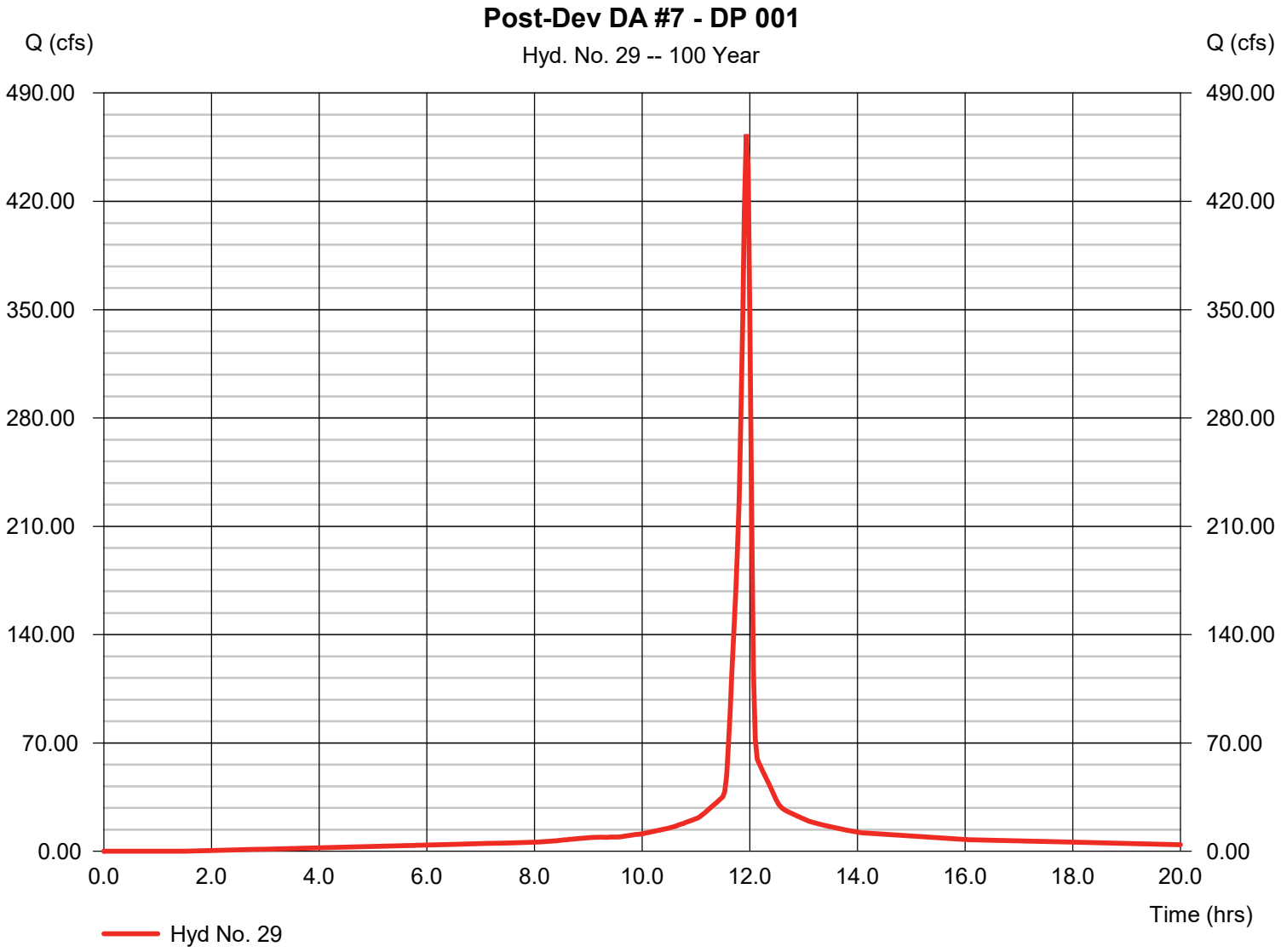
# Hydrograph Report



## Hyd. No. 29

Post-Dev DA #7 - DP 001

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | SCS Runoff | Peak discharge | = | 463.24 cfs |
| Storm frequency | = | 100 yrs | Time to peak | = | 11.93 hrs |
| Time interval | = | 2 min | Hyd. volume | = | 1,070,286 cuft |
| Drainage area | = | 47.960 ac | Curve number | = | 94.6 |
| Basin Slope | = | 0.0 % | Hydraulic length | = | 0 ft |
| Tc method | = | User | Time of conc. (Tc) | = | 5.00 min |
| Total precip. | = | 7.20 in | Distribution | = | Type II |
| Storm duration | = | 24 hrs | Shape factor | = | 484 |



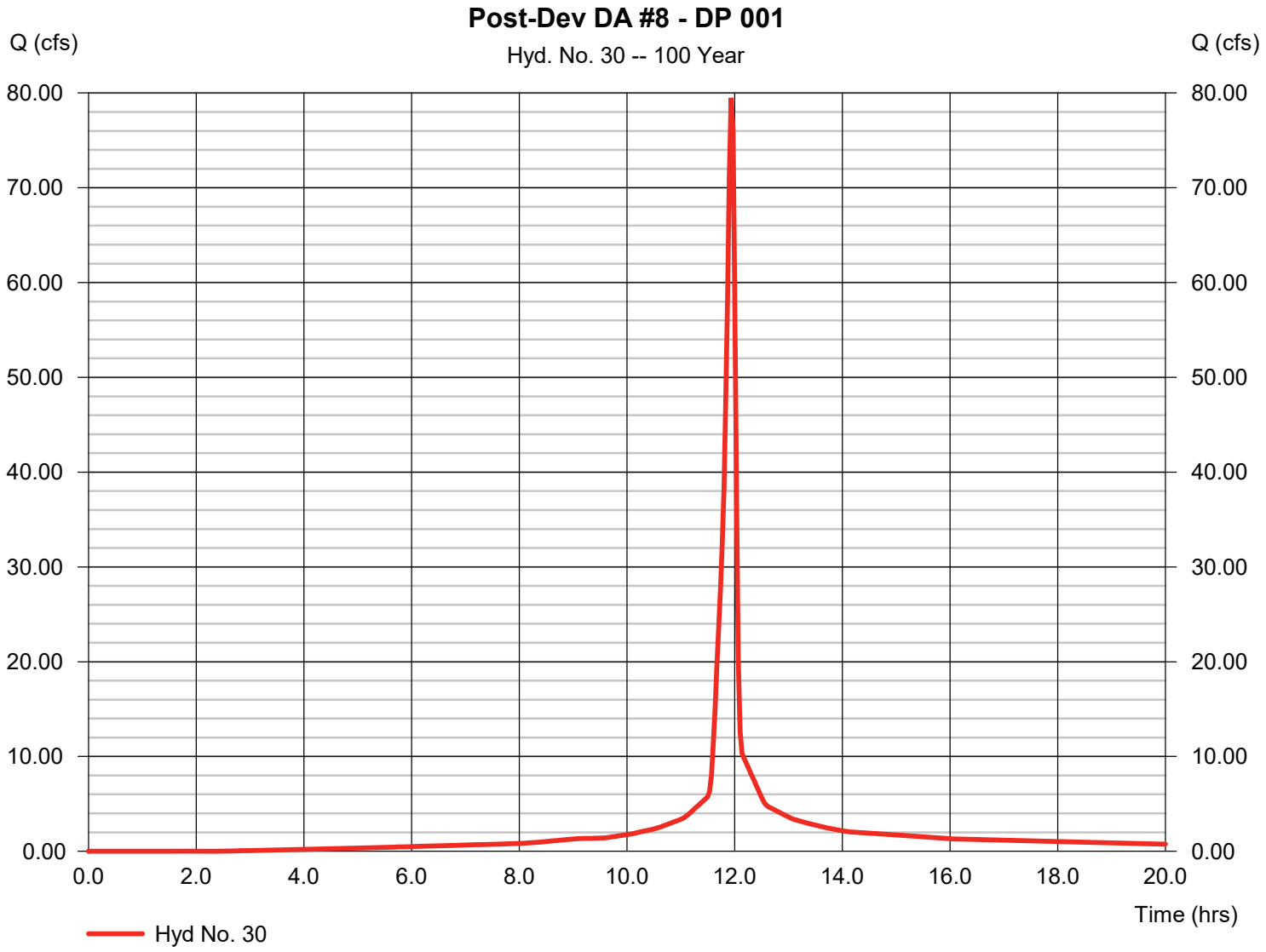
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 30

Post-Dev DA #8 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 79.48 cfs |
| Storm frequency | = 100 yrs | Time to peak | = 11.93 hrs |
| Time interval | = 2 min | Hyd. volume | = 177,317 cuft |
| Drainage area | = 8.460 ac | Curve number | = 91.2 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 7.20 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



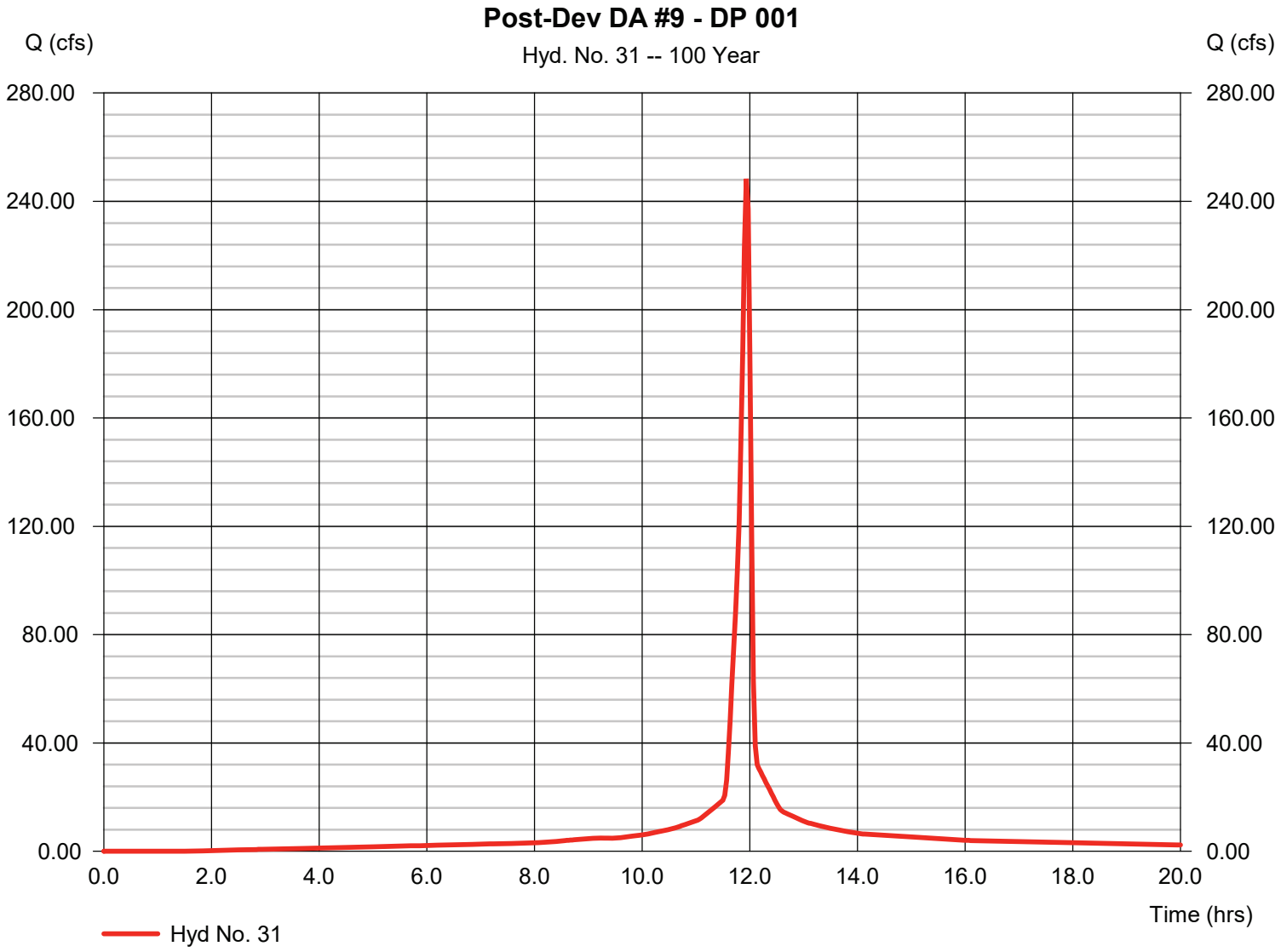
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 31

Post-Dev DA #9 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 248.36 cfs |
| Storm frequency | = 100 yrs | Time to peak | = 11.93 hrs |
| Time interval | = 2 min | Hyd. volume | = 573,164 cuft |
| Drainage area | = 25.730 ac | Curve number | = 94.5 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 7.20 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



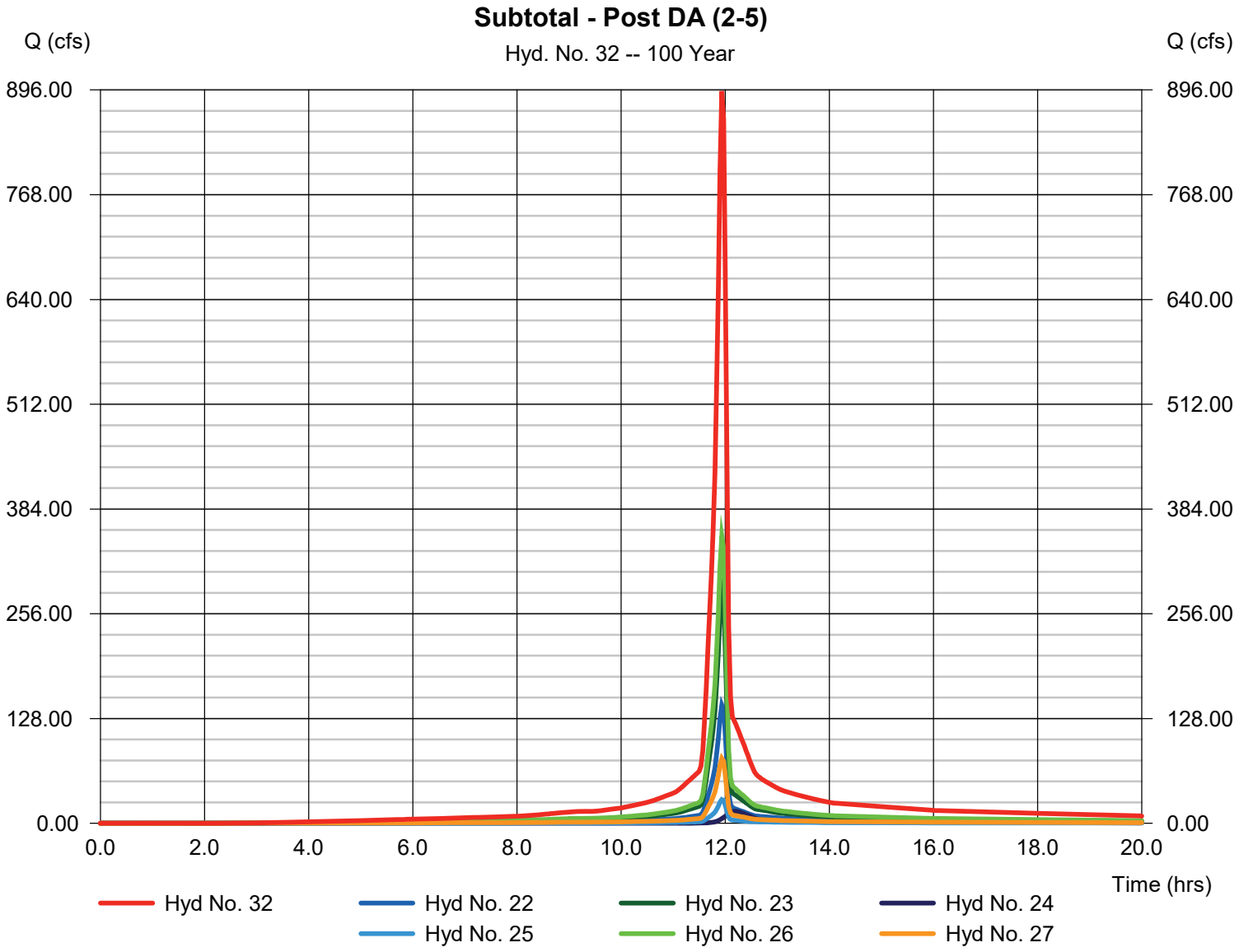
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 32

Subtotal - Post DA (2-5)

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 894.70 cfs |
| Storm frequency | = 100 yrs | Time to peak | = 11.93 hrs |
| Time interval | = 2 min | Hyd. volume | = 2,028,964 cuft |
| Inflow hyds. | = 22, 23, 24, 25, 26, 27 | Contrib. drain. area | = 103.270 ac |



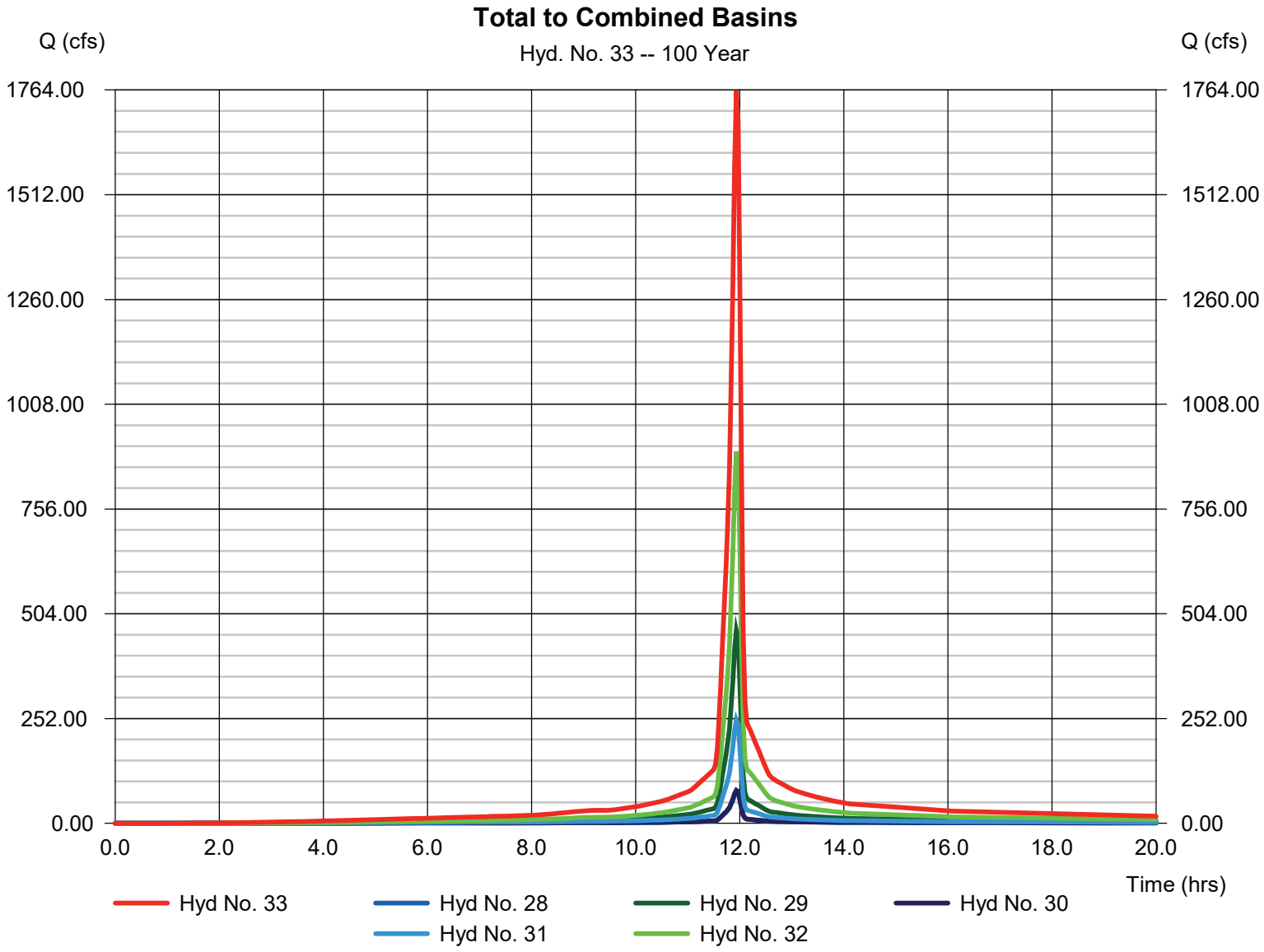
# Hydrograph Report



## Hyd. No. 33

Total to Combined Basins

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 1761.65 cfs |
| Storm frequency | = 100 yrs | Time to peak | = 11.93 hrs |
| Time interval | = 2 min | Hyd. volume | = 4,019,950 cuft |
| Inflow hyds. | = 28, 29, 30, 31, 32 | Contrib. drain. area | = 90.180 ac |



# Hydrograph Report

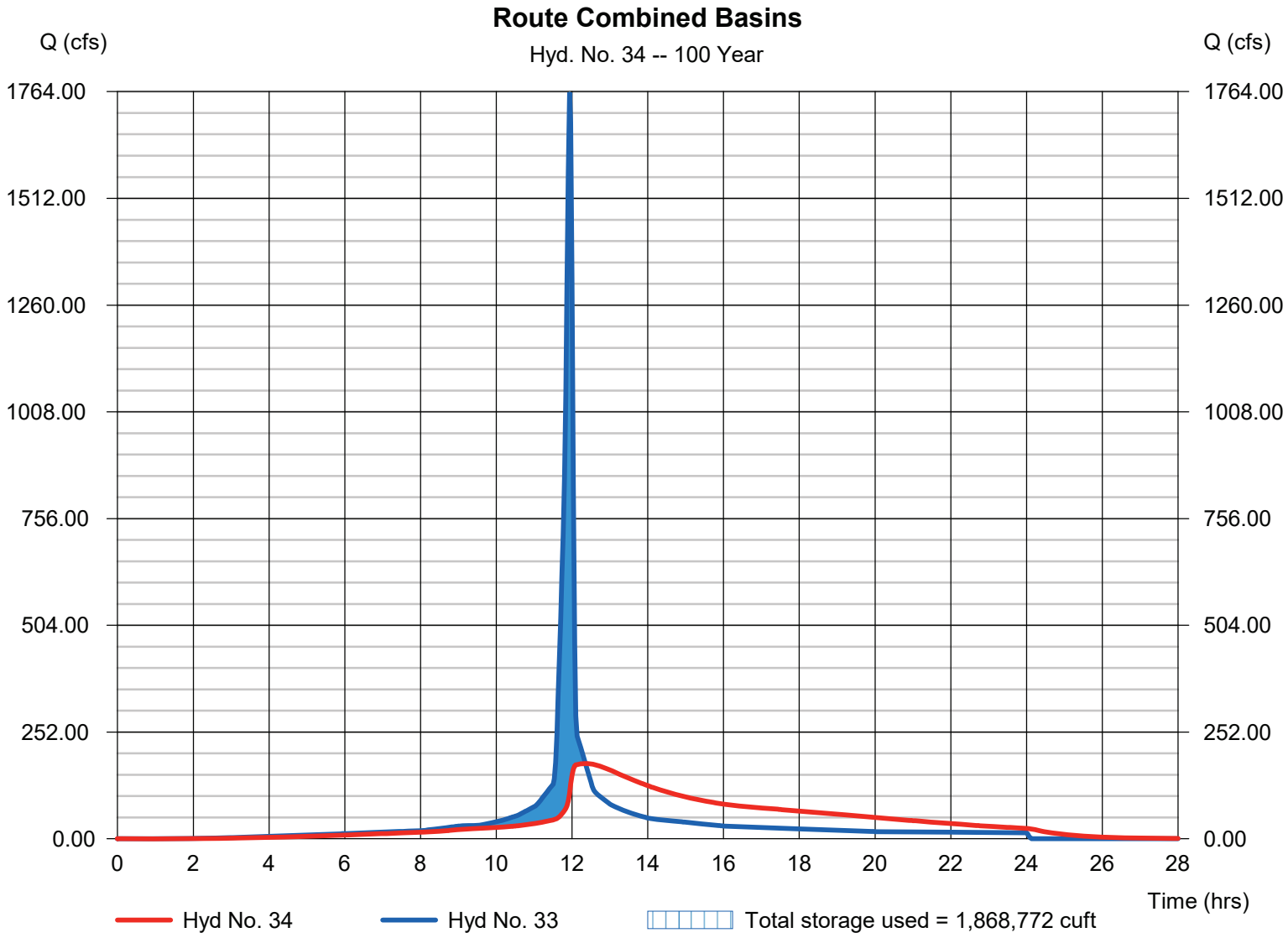
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 34

Route Combined Basins

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | Reservoir | Peak discharge | = | 177.58 cfs |
| Storm frequency | = | 100 yrs | Time to peak | = | 12.37 hrs |
| Time interval | = | 2 min | Hyd. volume | = | 4,019,948 cuft |
| Inflow hyd. No. | = | 33 - Total to Combined Basins | Max. Elevation | = | 17.95 ft |
| Reservoir name | = | Combined Basins - E.Spill | Max. Storage | = | 1,868,772 cuft |

Storage Indication method used.



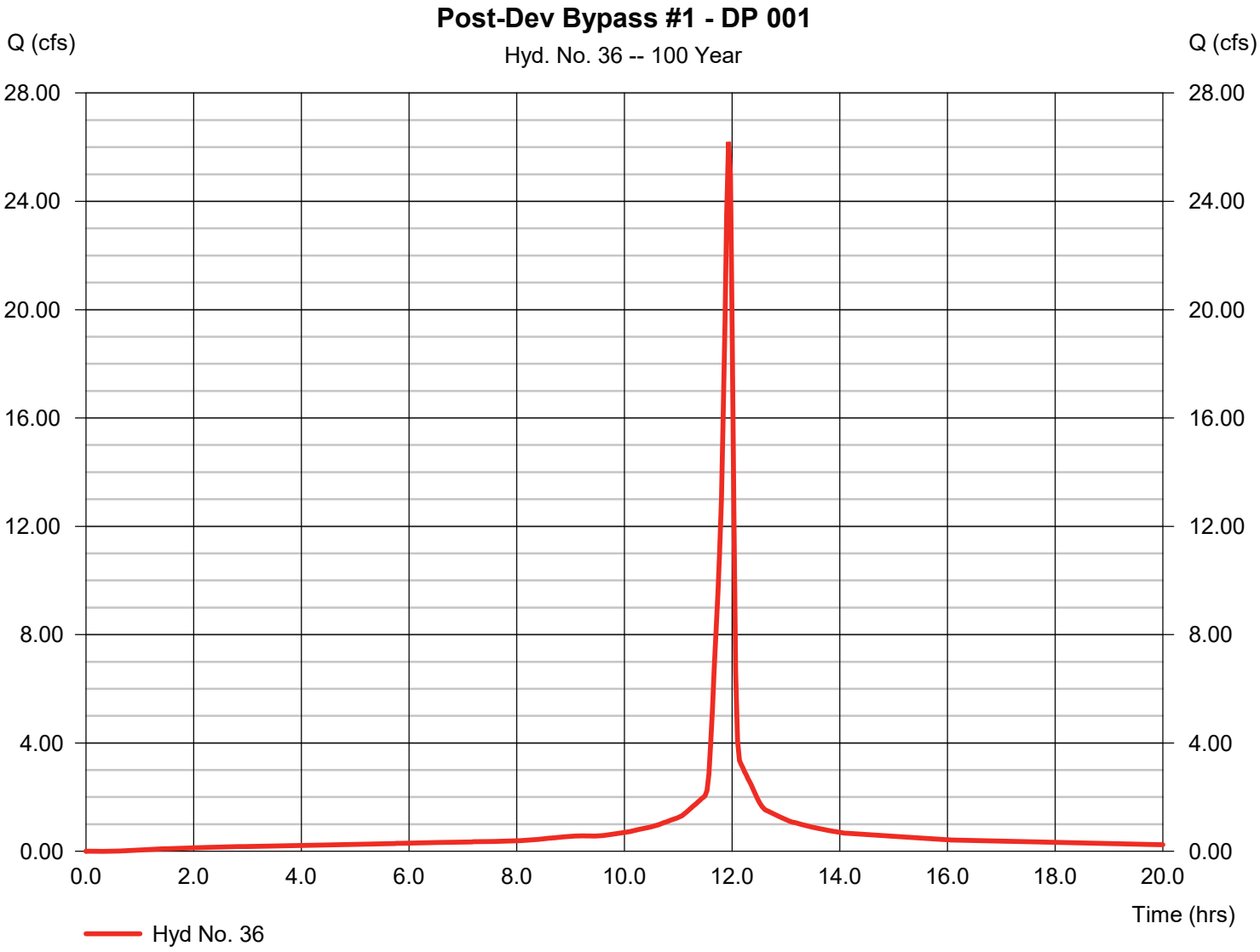
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 36

Post-Dev Bypass #1 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 26.20 cfs |
| Storm frequency | = 100 yrs | Time to peak | = 11.93 hrs |
| Time interval | = 2 min | Hyd. volume | = 63,248 cuft |
| Drainage area | = 2.670 ac | Curve number | = 98 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 7.20 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



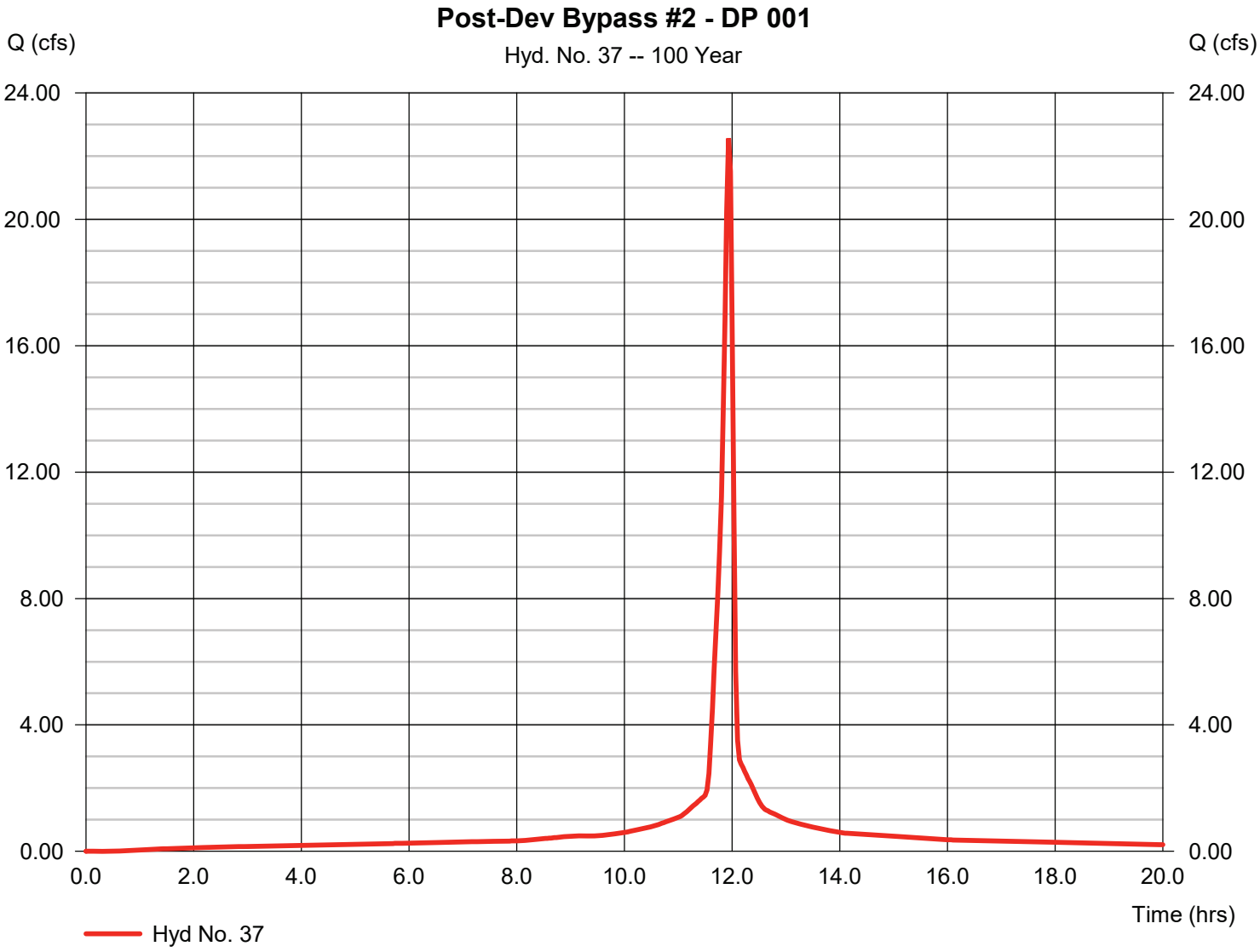
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 37

Post-Dev Bypass #2 - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 22.57 cfs |
| Storm frequency | = 100 yrs | Time to peak | = 11.93 hrs |
| Time interval | = 2 min | Hyd. volume | = 54,483 cuft |
| Drainage area | = 2.300 ac | Curve number | = 98 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 7.20 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



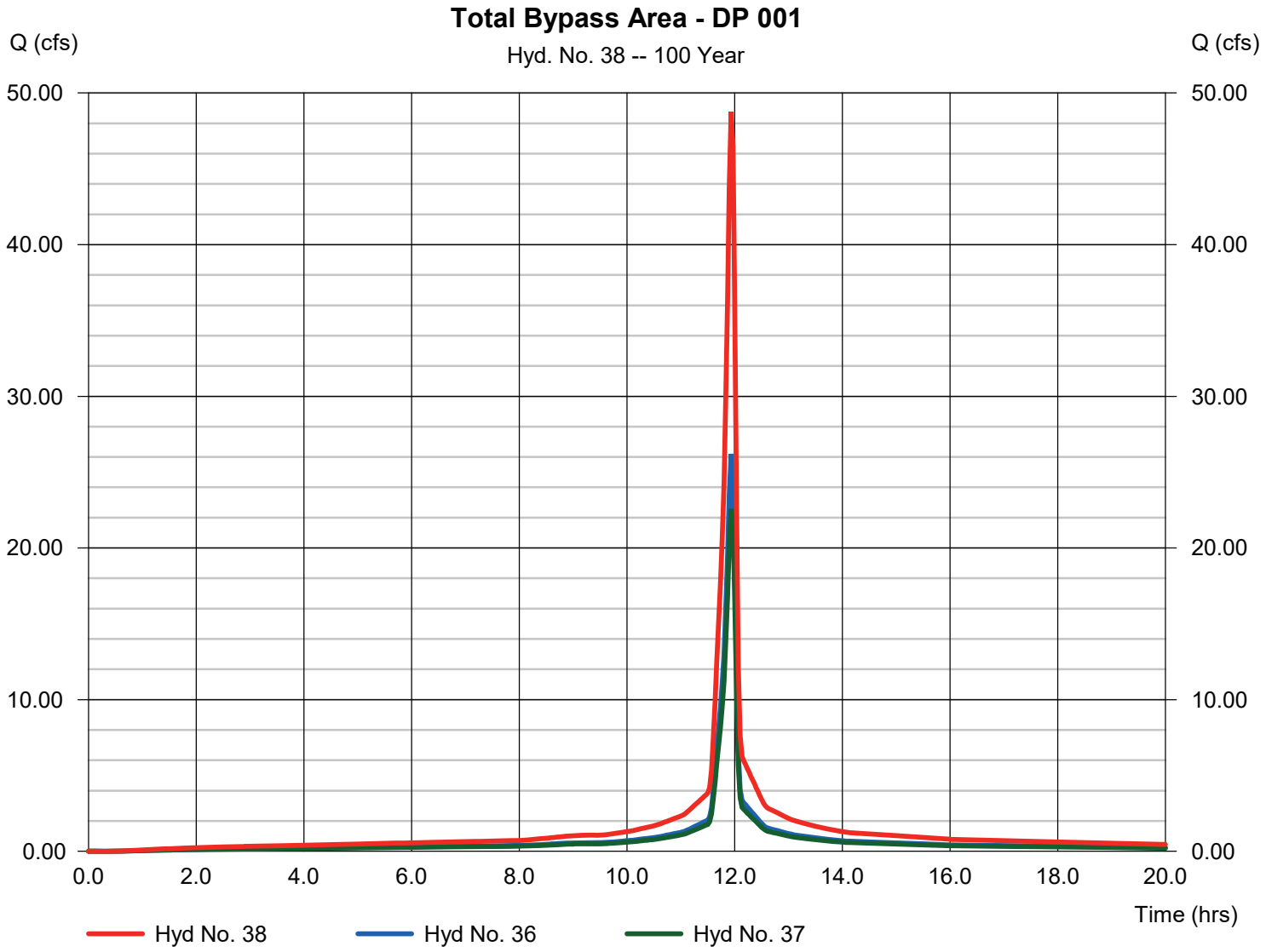
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 38

Total Bypass Area - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 48.76 cfs |
| Storm frequency | = 100 yrs | Time to peak | = 11.93 hrs |
| Time interval | = 2 min | Hyd. volume | = 117,731 cuft |
| Inflow hyds. | = 36, 37 | Contrib. drain. area | = 4.970 ac |



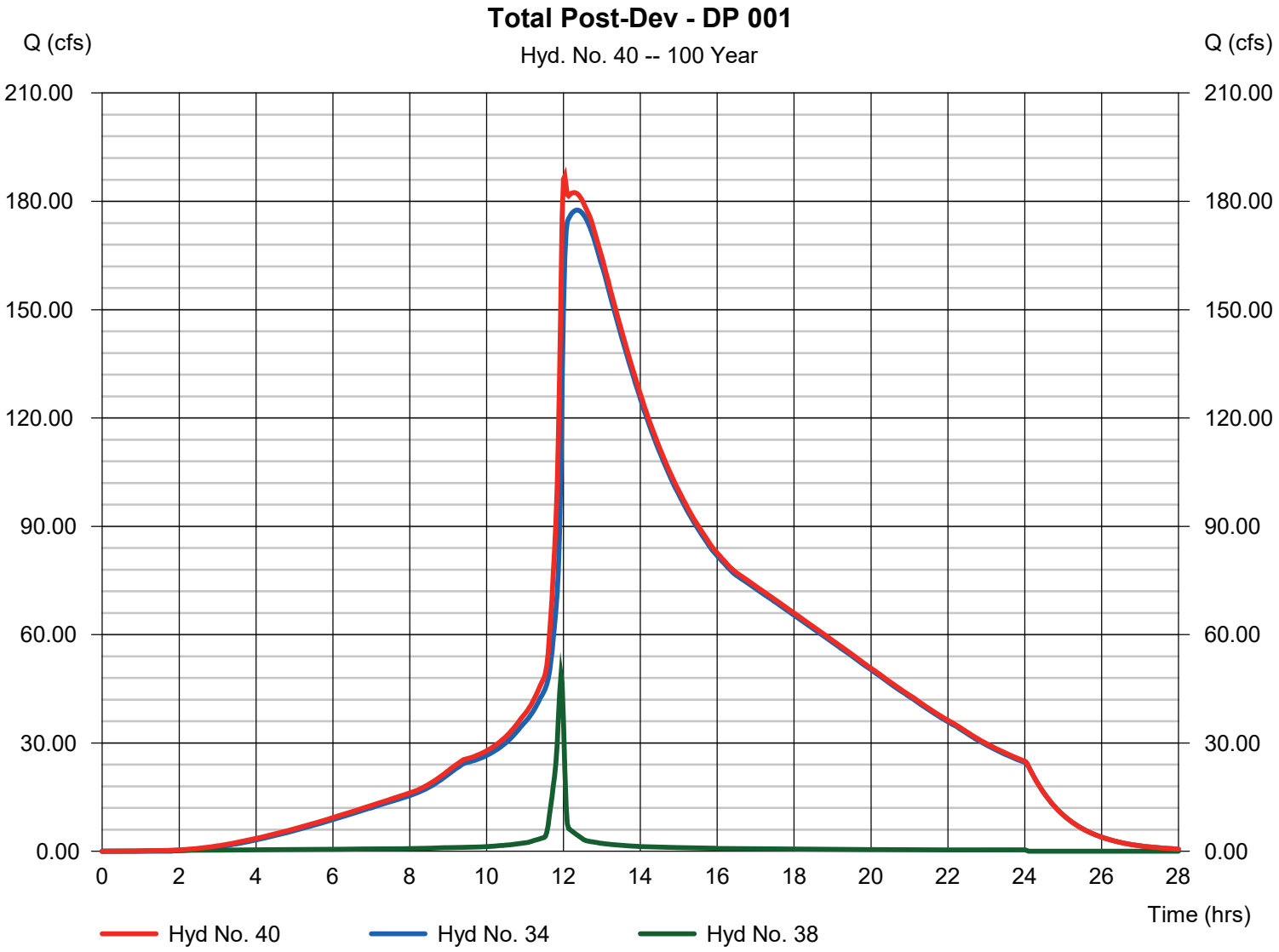
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 09 / 30 / 2024

## Hyd. No. 40

Total Post-Dev - DP 001

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 187.03 cfs |
| Storm frequency | = 100 yrs | Time to peak | = 12.03 hrs |
| Time interval | = 2 min | Hyd. volume | = 4,137,676 cuft |
| Inflow hyds. | = 34, 38 | Contrib. drain. area | = 0.000 ac |



# Pond Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Thursday, 09 / 8 / 2022

## Pond No. 1 - Wet Pond #9 - E.Spill

### Pond Data

**Contours -**User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 14.52 ft

### Stage / Storage Table

| Stage (ft) | Elevation (ft) | Contour area (sqft) | Incr. Storage (cuft) | Total storage (cuft) |
|---|---|---|---|---|
| 0.00 | 14.52 | 109,491 | 0 | 0 |
| 0.48 | 15.00 | 111,447 | 53,019 | 53,019 |
| 1.48 | 16.00 | 115,708 | 113,559 | 166,579 |
| 2.48 | 17.00 | 119,974 | 117,823 | 284,401 |
| 3.48 | 18.00 | 124,969 | 122,451 | 406,852 |

### Culvert / Orifice Structures

| | [A] | [B] | [C] | [PrfRsr] |
|---|---|---|---|---|
| **Rise (in)** | = 48.00 | Inactive | 24.00 | 0.00 |
| **Span (in)** | = 48.00 | 48.00 | 36.00 | 0.00 |
| **No. Barrels** | = 2 | 2 | 2 | 0 |
| **Invert El. (ft)** | = 13.50 | 13.50 | 14.75 | 0.00 |
| **Length (ft)** | = 79.00 | 0.00 | 0.00 | 0.00 |
| **Slope (%)** | = 0.64 | 0.00 | 0.00 | n/a |
| **N-Value** | = .013 | .013 | .013 | n/a |
| **Orifice Coeff.** | = 0.60 | 0.60 | 0.60 | 0.60 |
| **Multi-Stage** | = n/a | Yes | Yes | No |

### Weir Structures

| | [A] | [B] | [C] | [D] |
|---|---|---|---|---|
| **Crest Len (ft)** | = 20.00 | 0.00 | 0.00 | 0.00 |
| **Crest El. (ft)** | = 19.00 | 0.00 | 0.00 | 0.00 |
| **Weir Coeff.** | = 3.33 | 3.33 | 3.33 | 3.33 |
| **Weir Type** | = 1 | Rect | --- | --- |
| **Multi-Stage** | = Yes | No | No | No |

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

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

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

### Stage / Storage / Discharge Table

| Stage ft | Storage cuft | Elevation ft | Clv A cfs | Clv B cfs | Clv C cfs | PrfRsr cfs | Wr A cfs | Wr B cfs | Wr C cfs | Wr D cfs | Exfil cfs | User cfs | Total cfs |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.00 | 0 | 14.52 | 0.00 | 0.00 | 0.00 | --- | 0.00 | --- | --- | --- | --- | --- | 0.000 |
| 0.48 | 53,019 | 15.00 | 17.77 ic | 0.00 | 2.55 ic | --- | 0.00 | --- | --- | --- | --- | --- | 2.554 |
| 1.48 | 166,579 | 16.00 | 29.27 ic | 0.00 | 28.55 ic | --- | 0.00 | --- | --- | --- | --- | --- | 28.55 |
| 2.48 | 284,401 | 17.00 | 63.25 oc | 0.00 | 63.25 ic | --- | 0.00 | --- | --- | --- | --- | --- | 63.25 |
| 3.48 | 406,852 | 18.00 | 77.66 oc | 0.00 | 77.37 ic | --- | 0.00 | --- | --- | --- | --- | --- | 77.37 |

# Pond Report



## Pond No. 3 - Combined Basins - E.Spill

### Pond Data

**Contours -**User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 16.00 ft

### Stage / Storage Table

| Stage (ft) | Elevation (ft) | Contour area (sqft) | Incr. Storage (cuft) | Total storage (cuft) |
|---|---|---|---|---|
| 0.00 | 16.00 | 895,080 | 0 | 0 |
| 1.00 | 17.00 | 958,077 | 926,307 | 926,307 |
| 2.00 | 18.00 | 1,022,280 | 989,906 | 1,916,213 |

### Culvert / Orifice Structures

| | [A] | [B] | [C] | [PrfRsr] |
|---|---|---|---|---|
| **Rise (in)** | = 48.00 | Inactive | 24.00 | 0.00 |
| **Span (in)** | = 48.00 | 24.00 | 48.00 | 0.00 |
| **No. Barrels** | = 2 | 2 | 2 | 0 |
| **Invert El. (ft)** | = 12.00 | 13.40 | 13.40 | 0.00 |
| **Length (ft)** | = 122.00 | 0.00 | 0.00 | 0.00 |
| **Slope (%)** | = 4.92 | 0.00 | 0.00 | n/a |
| **N-Value** | = .013 | .013 | .013 | n/a |
| **Orifice Coeff.** | = 0.60 | 0.60 | 0.60 | 0.60 |
| **Multi-Stage** | = n/a | Yes | Yes | No |

### Weir Structures

| | [A] | [B] | [C] | [D] |
|---|---|---|---|---|
| **Crest Len (ft)** | = 24.00 | 0.00 | 0.00 | 0.00 |
| **Crest El. (ft)** | = 17.00 | 0.00 | 0.00 | 0.00 |
| **Weir Coeff.** | = 3.33 | 3.33 | 3.33 | 3.33 |
| **Weir Type** | = 1 | --- | --- | --- |
| **Multi-Stage** | = Yes | No | No | No |
| **Exfil.(in/hr)** | = 0.000 (by Wet area) | | | |
| **TW Elev. (ft)** | = 0.00 | | | |

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

### Stage / Storage / Discharge Table

| Stage ft | Storage cuft | Elevation ft | Clv A cfs | Clv B cfs | Clv C cfs | PrfRsr cfs | Wr A cfs | Wr B cfs | Wr C cfs | Wr D cfs | Exfil cfs | User cfs | Total cfs |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.00 | 0 | 16.00 | 0.00 | 0.00 | 0.00 | --- | 0.00 | --- | --- | --- | --- | --- | 0.000 |
| 1.00 | 926,307 | 17.00 | 171.12 ic | 0.00 | 77.04 ic | --- | 0.00 | --- | --- | --- | --- | --- | 77.04 |
| 2.00 | 1,916,213 | 18.00 | 181.70 ic | 0.00 | 101.77 ic | --- | 79.92 | --- | --- | --- | --- | --- | 181.69 |

# Inlet Drainage Area Calculations

**Project** NorthPoint - Phase 2 Construction, Building 4 — By: LS
**Location:** Falls Township, Bucks County, PA — Date: 3/23/2022
Chk'd:
Revised: 7/12/2023

| C = | Impervious 0.99 | | Lawn 0.65 | | Wt'd C | Total Area | |
|---|---|---|---|---|---|---|---|
| | (sf) | (ac) | (sf) | (ac) | | (sf) | (ac) |
| INL 1001 | 18,841 | 0.43 | 1,816 | 0.04 | 0.96 | 20,658 | 0.47 |
| INL 1002 | 19,618 | 0.45 | 125 | 0.00 | 0.99 | 19,743 | 0.45 |
| INL 1003 | 19,637 | 0.45 | 3,285 | 0.08 | 0.94 | 22,922 | 0.53 |
| INL 1011 | 20,650 | 0.47 | 177 | 0.00 | 0.99 | 20,827 | 0.48 |
| INL 1012 | 20,904 | 0.48 | 185 | 0.00 | 0.99 | 21,089 | 0.48 |
| INL 1013 | 20,514 | 0.47 | 176 | 0.00 | 0.99 | 20,690 | 0.47 |
| INL 1021 | 20,440 | 0.47 | 176 | 0.00 | 0.99 | 20,615 | 0.47 |
| INL 1022 | 20,519 | 0.47 | 176 | 0.01 | 0.98 | 20,695 | 0.48 |
| INL 1031 | 20,121 | 0.46 | 173 | 0.01 | 0.98 | 20,294 | 0.47 |
| INL 1032 | 21,003 | 0.48 | 180 | 0.01 | 0.98 | 21,183 | 0.49 |
| INL 1033 | 18,925 | 0.43 | 1,839 | 0.05 | 0.96 | 20,764 | 0.48 |
| INL 1041 | 20,551 | 0.47 | 176 | 0.01 | 0.98 | 20,728 | 0.48 |
| INL 1042 | 20,569 | 0.47 | 177 | 0.01 | 0.98 | 20,746 | 0.48 |
| INL 1043 | 19,980 | 0.46 | 174 | 0.00 | 0.99 | 20,154 | 0.46 |
| INL 1051 | 20,574 | 0.47 | 177 | 0.01 | 0.98 | 20,751 | 0.48 |
| INL 1052 | 20,874 | 0.48 | 179 | 0.00 | 0.99 | 21,053 | 0.48 |
| INL 1053 | 20,720 | 0.48 | 716 | 0.01 | 0.98 | 21,436 | 0.49 |
| | | | | | | | |
| INL 1101 | 12,844 | 0.29 | 0 | 0.00 | 0.99 | 12,844 | 0.29 |
| INL 1102 | 18,474 | 0.42 | 1,263 | 0.03 | 0.97 | 19,737 | 0.45 |
| INL 1103 | 5,830 | 0.13 | 3,854 | 0.09 | 0.85 | 9,684 | 0.22 |
| INL 1104 | 6,136 | 0.14 | 383 | 0.01 | 0.97 | 6,519 | 0.15 |
| INL 1111 | 21,123 | 0.48 | 5,317 | 0.13 | 0.92 | 26,440 | 0.61 |
| INL 1112 | 13,933 | 0.32 | 0 | 0.00 | 0.99 | 13,933 | 0.32 |
| INL 1113 | 13,410 | 0.31 | 0 | 0.00 | 0.99 | 13,411 | 0.31 |
| INL 1121 | 5,357 | 0.12 | 2,290 | 0.06 | 0.88 | 7,647 | 0.18 |
| INL 1122 | 21,667 | 0.50 | 2,269 | 0.05 | 0.96 | 23,937 | 0.55 |
| INL 1123 | 21,348 | 0.49 | 0 | 0.00 | 0.99 | 21,348 | 0.49 |
| INL 1124 | 18,898 | 0.43 | 1,662 | 0.04 | 0.96 | 20,560 | 0.47 |
| INL 1125 | 21,416 | 0.49 | 0 | 0.00 | 0.99 | 21,416 | 0.49 |
| INL 1126 | 20,777 | 0.48 | 0 | 0.00 | 0.99 | 20,777 | 0.48 |
| INL 1127 | 20,085 | 0.46 | 2,814 | 0.07 | 0.95 | 22,899 | 0.53 |
| | | | | | | | |
| INL 1201A | 14,407 | 0.33 | 1,579 | 0.04 | 0.96 | 15,986 | 0.37 |
| INL 1211 | 18,302 | 0.42 | 0 | 0.00 | 0.99 | 18,302 | 0.42 |
| INL 1212 | 20,612 | 0.47 | 2,323 | 0.06 | 0.95 | 22,935 | 0.53 |
| INL 1213 | 20,873 | 0.48 | 0 | 0.00 | 0.99 | 20,873 | 0.48 |

## Inlet Drainage Area Calculations

**Project** NorthPoint - Phase 2 Construction, Building 4 — By: LS
**Location:** Falls Township, Bucks County, PA — Date: 3/23/2022
Chk'd:
Revised: 7/12/2023

| C = | Impervious 0.99 | | Lawn 0.65 | | Wt'd C | Total Area | |
|---|---|---|---|---|---|---|---|
| | (sf) | (ac) | (sf) | (ac) | | (sf) | (ac) |
| INL 1214 | 21,062 | 0.48 | 0 | 0.00 | 0.99 | 21,062 | 0.48 |
| INL 1215 | 17,114 | 0.39 | 1,200 | 0.03 | 0.97 | 18,314 | 0.42 |
| INL 1216 | 10,881 | 0.25 | 504 | 0.01 | 0.97 | 11,385 | 0.26 |
| INL 1217 | 13,439 | 0.31 | 505 | 0.01 | 0.98 | 13,944 | 0.32 |
| INL 1218 | 13,564 | 0.31 | 490 | 0.01 | 0.98 | 14,053 | 0.32 |
| INL 1219 | 13,673 | 0.31 | 479 | 0.01 | 0.98 | 14,152 | 0.32 |
| INL 1219A | 13,721 | 0.31 | 608 | 0.02 | 0.97 | 14,329 | 0.33 |
| INL 1231 | 18,525 | 0.43 | 0 | 0.00 | 0.99 | 18,525 | 0.43 |
| INL 1261 | 7,123 | 0.16 | 6,686 | 0.16 | 0.82 | 13,809 | 0.32 |
| INL 1262 | 10,156 | 0.23 | 10,880 | 0.25 | 0.81 | 21,035 | 0.48 |
| INL 1263 | 7,258 | 0.17 | 6,813 | 0.15 | 0.83 | 14,071 | 0.32 |
| INL 1271 | 6,339 | 0.15 | 7,905 | 0.18 | 0.80 | 14,244 | 0.33 |
| INL 1290 | 11,653 | 0.27 | 30 | 0.00 | 0.99 | 11,683 | 0.27 |
| INL 1291 | 10,302 | 0.24 | 0 | 0.00 | 0.99 | 10,302 | 0.24 |
| | | | | | | | |
| INL 1152A | 25,829 | 0.59 | 19,261 | 0.44 | 0.84 | 45,090 | 1.04 |
| INL 1152B | 7,404 | 0.17 | 11,655 | 0.27 | 0.78 | 19,059 | 0.44 |
| | | | | | | | |
| INL 1903 | 1,722 | 0.04 | 25,588 | 0.59 | 0.67 | 27,310 | 0.63 |
| INL 1905 | 15,682 | 0.36 | 12,632 | 0.29 | 0.84 | 28,314 | 0.65 |
| INL 1941 | 8,144 | 0.19 | 4,674 | 0.11 | 0.87 | 12,818 | 0.29 |
| | | | | | | | |
| INL 1902 | 0 | 0.00 | 21,288 | 0.49 | 0.65 | 21,288 | 0.49 |
| INL 1296 | 0 | 0.00 | 8,197 | 0.19 | 0.65 | 8,197 | 0.19 |
| INL 1298 | 0 | 0.00 | 10,271 | 0.24 | 0.65 | 10,271 | 0.24 |
| INL 1299 | 13,097 | 0.30 | 11,958 | 0.27 | 0.83 | 25,055 | 0.58 |

# Inlet Drainage Area Calculations

**Project** NorthPoint - Phase 2 Building 5 Construction
**Location:** Falls Township, Bucks County, PA

By: RCG
Date: 9/28/2021
Chk'd:
Revised: 7/12/2023

| C = | Impervious 0.99 | | Lawn 0.65 | | Wt'd C | Total Area | |
|---|---|---|---|---|---|---|---|
| | (sf) | (ac) | (sf) | (ac) | | (sf) | (ac) |
| INL-1301 | 19,067 | 0.44 | 0 | 0.00 | 0.99 | 19,067 | 0.44 |
| INL-1302 | 12,167 | 0.28 | 1,508 | 0.03 | 0.95 | 13,675 | 0.31 |
| INL-1303 | 19,068 | 0.44 | 0 | 0.00 | 0.99 | 19,068 | 0.44 |
| | | | | | | | |
| | | | | | | | |
| INL-1311 | 19,065 | 0.44 | 0 | 0.00 | 0.99 | 19,065 | 0.44 |
| INL-1312 | 18,573 | 0.43 | 495 | 0.01 | 0.98 | 19,068 | 0.44 |
| INL-1313 | 18,354 | 0.42 | 713 | 0.02 | 0.98 | 19,067 | 0.44 |
| INL-1314 | 19,061 | 0.44 | 0 | 0.00 | 0.99 | 19,061 | 0.44 |
| | | | | | | | |
| INL-1321 | 19,067 | 0.44 | 0 | 0.00 | 0.99 | 19,067 | 0.44 |
| INL-1322 | 19,059 | 0.44 | 0 | 0.00 | 0.99 | 19,059 | 0.44 |
| INL-1323 | 18,938 | 0.43 | 0 | 0.00 | 0.99 | 18,938 | 0.43 |
| INL-1324 | 18,793 | 0.43 | 274 | 0.01 | 0.99 | 19,067 | 0.44 |
| | | | | | | | |
| INL-1331 | 19,067 | 0.44 | 0 | 0.00 | 0.99 | 19,067 | 0.44 |
| INL-1332 | 19,068 | 0.44 | 0 | 0.00 | 0.99 | 19,068 | 0.44 |
| INL-1333 | 18,134 | 0.42 | 935 | 0.02 | 0.97 | 19,069 | 0.44 |
| INL-1334 | 21,328 | 0.49 | 796 | 0.02 | 0.98 | 22,124 | 0.51 |
| INL-1335 | 6,267 | 0.14 | 1,817 | 0.04 | 0.91 | 8,084 | 0.19 |
| | | | | | | | |
| INL-1341 | 13,143 | 0.30 | 1,535 | 0.04 | 0.95 | 14,678 | 0.34 |
| INL-1342 | 19,069 | 0.44 | 0 | 0.00 | 0.99 | 19,069 | 0.44 |
| INL-1343 | 19,069 | 0.44 | 0 | 0.00 | 0.99 | 19,069 | 0.44 |
| INL-1344 | 7,703 | 0.18 | 1,171 | 0.03 | 0.95 | 8,874 | 0.20 |
| | | | | | | | |
| INL-1351 | 19,069 | 0.44 | 0 | 0.00 | 0.99 | 19,069 | 0.44 |
| INL-1352 | 18,572 | 0.43 | 497 | 0.01 | 0.98 | 19,069 | 0.44 |
| INL-1353 | 18,356 | 0.42 | 713 | 0.02 | 0.98 | 19,069 | 0.44 |
| INL-1354 | 19,068 | 0.44 | 0 | 0.00 | 0.99 | 19,068 | 0.44 |
| | | | | | | | |
| INL-1361 | 19,069 | 0.44 | 0 | 0.00 | 0.99 | 19,069 | 0.44 |
| INL-1362 | 19,066 | 0.44 | 0 | 0.00 | 0.99 | 19,066 | 0.44 |
| INL-1363 | 18,946 | 0.43 | 0 | 0.00 | 0.99 | 18,946 | 0.43 |
| INL-1364 | 18,795 | 0.43 | 274 | 0.01 | 0.99 | 19,069 | 0.44 |
| | | | | | | | |

# Inlet Drainage Area Calculations

**Project** NorthPoint - Phase 2 Building 5 Construction
**Location:** Falls Township, Bucks County, PA

By: RCG
Date: 9/28/2021
Chk'd:
Revised: 7/12/2023

| C = | Impervious 0.99 | | Lawn 0.65 | | Wt'd C | Total Area | |
|---|---|---|---|---|---|---|---|
| | (sf) | (ac) | (sf) | (ac) | | (sf) | (ac) |
| INL-1371 | 19,064 | 0.44 | 0 | 0.00 | 0.99 | 19,064 | 0.44 |
| INL-1372 | 19,068 | 0.44 | 0 | 0.00 | 0.99 | 19,068 | 0.44 |
| INL-1373 | 18,134 | 0.42 | 935 | 0.02 | 0.97 | 19,069 | 0.44 |
| INL-1374 | 24,162 | 0.55 | 1,710 | 0.04 | 0.97 | 25,872 | 0.59 |
| INL-1375 | 7,579 | 0.17 | 933 | 0.02 | 0.95 | 8,512 | 0.20 |
| | | | | | | | |
| INL-1461 | 8,675 | 0.20 | 0 | 0.00 | 0.99 | 8,675 | 0.20 |
| INL-1462 | 7,954 | 0.18 | 0 | 0.00 | 0.99 | 7,954 | 0.18 |
| INL-1463 | 19,753 | 0.45 | 2,163 | 0.05 | 0.96 | 21,916 | 0.50 |
| | | | | | | | |
| INL-1471 | 24,084 | 0.55 | 3,395 | 0.08 | 0.95 | 27,479 | 0.63 |
| INL-1472 | 24,051 | 0.55 | 3,428 | 0.08 | 0.95 | 27,479 | 0.63 |
| INL-1473 | 22,682 | 0.52 | 2,210 | 0.05 | 0.96 | 24,892 | 0.57 |
| | | | | | | | |
| INL-1481 | 12,848 | 0.29 | 3,308 | 0.08 | 0.92 | 16,156 | 0.37 |
| | | | | | | | |
| INL-1491 | 7,618 | 0.17 | 919 | 0.02 | 0.95 | 8,537 | 0.20 |
| | | | | | | | |
| INL-1501 | 9,180 | 0.21 | 1,643 | 0.04 | 0.94 | 10,823 | 0.25 |
| | | | | | | | |
| INL-1511 | 9,292 | 0.21 | 1,614 | 0.04 | 0.94 | 10,906 | 0.25 |
| INL-1512 | 6,657 | 0.15 | 9,925 | 0.23 | 0.79 | 16,582 | 0.38 |
| | | | | | | | |
| INL-1521 | 21,194 | 0.49 | 2,888 | 0.07 | 0.95 | 24,082 | 0.55 |
| INL-1522 | 35,266 | 0.81 | 4,519 | 0.10 | 0.95 | 39,785 | 0.91 |
| INL-1523 | 5,661 | 0.13 | 7,437 | 0.17 | 0.80 | 13,098 | 0.30 |
| INL-1524 | 15,670 | 0.36 | 2,274 | 0.05 | 0.95 | 17,944 | 0.41 |
| | | | | | | | |
| INL-1531 | 12,501 | 0.29 | 3,042 | 0.07 | 0.92 | 15,543 | 0.36 |
| INL-1532 | 23,472 | 0.54 | 5,568 | 0.13 | 0.92 | 29,040 | 0.67 |
| INL-1533 | 9,721 | 0.22 | 10,227 | 0.23 | 0.82 | 19,948 | 0.46 |
| | | | | | | | |

## Roof Leader Drainage Area Calculations

| | | | |
|---|---|---|---|
| **Project** | NorthPoint - Phase 2 Building 5 Construction | By: | RCG |
| **Location:** | Falls Township, Bucks County, PA | Date: | 9/28/2021 |
| | | Chk'd: | |
| | | Revised: | 9/7/2022 |

| C = | Impervious 0.99 | | Lawn 0.65 | | Wt'd C | Total Area | |
|---|---|---|---|---|---|---|---|
| | (sf) | (ac) | (sf) | (ac) | | (sf) | (ac) |
| RL - 1 | 18,295 | 0.42 | 0 | 0.00 | 0.99 | 18,295 | 0.42 |
| RL - 2 | 18,295 | 0.42 | 0 | 0.00 | 0.99 | 18,295 | 0.42 |
| RL - 3 | 18,295 | 0.42 | 0 | 0.00 | 0.99 | 18,295 | 0.42 |
| RL - 4 | 16,117 | 0.37 | 0 | 0.00 | 0.99 | 16,117 | 0.37 |
| RL - 5 | 16,553 | 0.38 | 0 | 0.00 | 0.99 | 16,553 | 0.38 |
| RL - 6 | 16,117 | 0.37 | 0 | 0.00 | 0.99 | 16,117 | 0.37 |
| RL - 7 | 16,117 | 0.37 | 0 | 0.00 | 0.99 | 16,117 | 0.37 |
| RL - 8 | 16,117 | 0.37 | 0 | 0.00 | 0.99 | 16,117 | 0.37 |
| RL - 9 | 16,117 | 0.37 | 0 | 0.00 | 0.99 | 16,117 | 0.37 |
| RL - 10 | 16,117 | 0.37 | 0 | 0.00 | 0.99 | 16,117 | 0.37 |
| RL - 11 | 16,117 | 0.37 | 0 | 0.00 | 0.99 | 16,117 | 0.37 |
| RL - 12 | 16,117 | 0.37 | 0 | 0.00 | 0.99 | 16,117 | 0.37 |
| RL - 13 | 16,117 | 0.37 | 0 | 0.00 | 0.99 | 16,117 | 0.37 |
| RL - 14 | 16,117 | 0.37 | 0 | 0.00 | 0.99 | 16,117 | 0.37 |
| RL - 15 | 16,117 | 0.37 | 0 | 0.00 | 0.99 | 16,117 | 0.37 |
| RL - 16 | 16,117 | 0.37 | 0 | 0.00 | 0.99 | 16,117 | 0.37 |
| RL - 17 | 16,117 | 0.37 | 0 | 0.00 | 0.99 | 16,117 | 0.37 |
| RL - 18 | 16,117 | 0.37 | 0 | 0.00 | 0.99 | 16,117 | 0.37 |
| RL - 19 | 16,117 | 0.37 | 0 | 0.00 | 0.99 | 16,117 | 0.37 |
| RL - 20 | 16,117 | 0.37 | 0 | 0.00 | 0.99 | 16,117 | 0.37 |
| RL - 21 | 16,117 | 0.37 | 0 | 0.00 | 0.99 | 16,117 | 0.37 |
| RL - 22 | 16,117 | 0.37 | 0 | 0.00 | 0.99 | 16,117 | 0.37 |
| RL - 23 | 16,117 | 0.37 | 0 | 0.00 | 0.99 | 16,117 | 0.37 |
| RL - 24 | 16,117 | 0.37 | 0 | 0.00 | 0.99 | 16,117 | 0.37 |
| RL - 25 | 16,117 | 0.37 | 0 | 0.00 | 0.99 | 16,117 | 0.37 |
| RL - 26 | 16,117 | 0.37 | 0 | 0.00 | 0.99 | 16,117 | 0.37 |
| RL - 27 | 16,117 | 0.37 | 0 | 0.00 | 0.99 | 16,117 | 0.37 |
| RL - 28 | 16,117 | 0.37 | 0 | 0.00 | 0.99 | 16,117 | 0.37 |
| RL - 29 | 18,295 | 0.42 | 0 | 0.00 | 0.99 | 18,295 | 0.42 |
| RL - 30 | 18,295 | 0.42 | 0 | 0.00 | 0.99 | 18,295 | 0.42 |
| RL - 31 | 18,295 | 0.42 | 0 | 0.00 | 0.99 | 18,295 | 0.42 |

# Roof Leader Drainage Area Calculations

| | | | |
|---|---|---|---|
| **Project** | NorthPoint - Phase 2 Building 5 Construction | By: | RCG |
| **Location:** | Falls Township, Bucks County, PA | Date: | 9/28/2021 |
| | | Chk'd: | |
| | | Revised: | 9/7/2022 |

| C = | Impervious 0.99 | | Lawn 0.65 | | Wt'd C | Total Area | |
|---|---|---|---|---|---|---|---|
| | (sf) | (ac) | (sf) | (ac) | | (sf) | (ac) |
| RL - 32 | 18,295 | 0.42 | 0 | 0.00 | 0.99 | 18,295 | 0.42 |
| RL - 33 | 18,295 | 0.42 | 0 | 0.00 | 0.99 | 18,295 | 0.42 |
| RL - 34 | 18,295 | 0.42 | 0 | 0.00 | 0.99 | 18,295 | 0.42 |
| RL - 35 | 16,117 | 0.37 | 0 | 0.00 | 0.99 | 16,117 | 0.37 |
| RL - 36 | 16,553 | 0.38 | 0 | 0.00 | 0.99 | 16,553 | 0.38 |
| RL - 37 | 16,117 | 0.37 | 0 | 0.00 | 0.99 | 16,117 | 0.37 |
| RL - 38 | 16,117 | 0.37 | 0 | 0.00 | 0.99 | 16,117 | 0.37 |
| RL - 39 | 16,117 | 0.37 | 0 | 0.00 | 0.99 | 16,117 | 0.37 |
| RL - 40 | 16,117 | 0.37 | 0 | 0.00 | 0.99 | 16,117 | 0.37 |
| RL - 41 | 16,117 | 0.37 | 0 | 0.00 | 0.99 | 16,117 | 0.37 |
| RL - 42 | 16,117 | 0.37 | 0 | 0.00 | 0.99 | 16,117 | 0.37 |
| RL - 43 | 16,117 | 0.37 | 0 | 0.00 | 0.99 | 16,117 | 0.37 |
| RL - 44 | 16,117 | 0.37 | 0 | 0.00 | 0.99 | 16,117 | 0.37 |
| RL - 45 | 16,117 | 0.37 | 0 | 0.00 | 0.99 | 16,117 | 0.37 |
| RL - 46 | 16,117 | 0.37 | 0 | 0.00 | 0.99 | 16,117 | 0.37 |
| RL - 47 | 16,117 | 0.37 | 0 | 0.00 | 0.99 | 16,117 | 0.37 |
| RL - 48 | 16,117 | 0.37 | 0 | 0.00 | 0.99 | 16,117 | 0.37 |
| RL - 49 | 16,117 | 0.37 | 0 | 0.00 | 0.99 | 16,117 | 0.37 |
| RL - 50 | 16,117 | 0.37 | 0 | 0.00 | 0.99 | 16,117 | 0.37 |
| RL - 51 | 16,117 | 0.37 | 0 | 0.00 | 0.99 | 16,117 | 0.37 |
| RL - 52 | 16,117 | 0.37 | 0 | 0.00 | 0.99 | 16,117 | 0.37 |
| RL - 53 | 16,117 | 0.37 | 0 | 0.00 | 0.99 | 16,117 | 0.37 |
| RL - 54 | 16,117 | 0.37 | 0 | 0.00 | 0.99 | 16,117 | 0.37 |
| RL - 55 | 16,117 | 0.37 | 0 | 0.00 | 0.99 | 16,117 | 0.37 |
| RL - 56 | 16,117 | 0.37 | 0 | 0.00 | 0.99 | 16,117 | 0.37 |
| RL - 57 | 16,117 | 0.37 | 0 | 0.00 | 0.99 | 16,117 | 0.37 |
| RL - 58 | 16,117 | 0.37 | 0 | 0.00 | 0.99 | 16,117 | 0.37 |
| RL - 59 | 16,117 | 0.37 | 0 | 0.00 | 0.99 | 16,117 | 0.37 |
| RL - 60 | 18,295 | 0.42 | 0 | 0.00 | 0.99 | 18,295 | 0.42 |
| RL -61 | 18,295 | 0.42 | 0 | 0.00 | 0.99 | 18,295 | 0.42 |
| RL - 62 | 18,295 | 0.42 | 0 | 0.00 | 0.99 | 18,295 | 0.42 |

## Inlet Drainage Area Calculations

**Project** NorthPoint - Phase 2 Building 6 Construction
**Location:** Falls Township, Bucks County, PA

By:
Date:
Chk'd:
Revised:

| C = | Impervious 0.99 | | Lawn 0.65 | | Wt'd C | Total Area | |
|---|---|---|---|---|---|---|---|
| | (sf) | (ac) | (sf) | (ac) | | (sf) | (ac) |
| INL-1601 | 19,808 | 0.45 | 10,029 | 0.23 | 0.88 | 29,837 | 0.68 |
| INL-1602 | 18,467 | 0.42 | 1,227 | 0.03 | 0.97 | 19,694 | 0.45 |
| INL-1603 | 18,467 | 0.42 | 1,227 | 0.03 | 0.97 | 19,694 | 0.45 |
| | | | | | | | |
| INL-1606 | 18,468 | 0.42 | 1,228 | 0.03 | 0.97 | 19,696 | 0.45 |
| INL-1607 | 18,467 | 0.42 | 1,228 | 0.03 | 0.97 | 19,695 | 0.45 |
| INL-1608 | 18,467 | 0.42 | 1,227 | 0.03 | 0.97 | 19,694 | 0.45 |
| INL-1609 | 18,319 | 0.42 | 1,377 | 0.03 | 0.97 | 19,696 | 0.45 |
| | | 0.00 | 0 | | | | |
| INL-1611 | 18,468 | 0.42 | 1,230 | 0.03 | 0.97 | 19,698 | 0.45 |
| INL-1612 | 18,320 | 0.42 | 1,378 | 0.03 | 0.97 | 19,698 | 0.45 |
| INL-1613 | 18,345 | 0.42 | 1,228 | 0.03 | 0.97 | 19,573 | 0.45 |
| INL-1614 | 18,468 | 0.42 | 1,230 | 0.03 | 0.97 | 19,698 | 0.45 |
| | | 0.00 | 0 | | | | |
| INL-1616 | 18,468 | 0.42 | 1,232 | 0.03 | 0.97 | 19,700 | 0.45 |
| INL-1617 | 18,468 | 0.42 | 1,231 | 0.03 | 0.97 | 19,699 | 0.45 |
| INL-1618 | 18,468 | 0.42 | 1,232 | 0.03 | 0.97 | 19,700 | 0.45 |
| INL-1619 | 18,843 | 0.43 | 1,257 | 0.03 | 0.97 | 20,100 | 0.46 |
| | | | | | | | |
| INL-1661 | 17,002 | 0.39 | 4,562 | 0.10 | 0.92 | 21,564 | 0.50 |
| | | | | | | | |
| INL-1741 | 14,075 | 0.32 | 2,880 | 0.07 | 0.93 | 16,955 | 0.39 |
| INL-1742 | 9,471 | 0.22 | 1,483 | 0.03 | 0.94 | 10,954 | 0.25 |
| INL-1743 | 14,157 | 0.33 | 2,936 | 0.07 | 0.93 | 17,093 | 0.39 |
| | | | | | | | |
| INL-1751/INL-1751 A | 37,353 | 0.86 | 17,245 | 0.40 | 0.88 | 54,598 | 1.25 |
| INL-1752 | 9,693 | 0.22 | 6,001 | 0.14 | 0.86 | 15,694 | 0.36 |
| | | | | | | | |
| INL-1756 | 7,829 | 0.18 | 27 | 0.00 | 0.99 | 7,856 | 0.18 |
| INL-1757 | 502 | 0.01 | 8,138 | 0.19 | 0.67 | 8,640 | 0.20 |
| INL-1757.1 | 3,760 | 0.09 | 1,180 | 0.03 | 0.91 | 4,940 | 0.11 |
| INL-1758 | 10,241 | 0.24 | 3,687 | 0.08 | 0.90 | 13,928 | 0.32 |
| | | | | | | | |

# Inlet Drainage Area Calculations

**Project** NorthPoint - Phase 2 Building 6 Construction
**Location:** Falls Township, Bucks County, PA

By:
Date:
Chk'd:
Revised:

| C = | Impervious 0.99 | | Lawn 0.65 | | Wt'd C | Total Area | |
|---|---|---|---|---|---|---|---|
| | (sf) | (ac) | (sf) | (ac) | | (sf) | (ac) |
| INL-1766 | 9,693 | 0.22 | 6,001 | 0.14 | 0.86 | 15,694 | 0.36 |
| INL-1767/INL-1767 A | 19,173 | 0.44 | 17,756 | 0.41 | 0.83 | 36,929 | 0.85 |
| | | | | | | | |
| INL-1771 | 10,242 | 0.24 | 1,591 | 0.04 | 0.94 | 11,833 | 0.27 |
| INL-1772 | 3,746 | 0.09 | 537 | 0.01 | 0.95 | 4,283 | 0.10 |
| INL-1773 | 9,757 | 0.22 | 0 | 0.00 | 0.99 | 9,757 | 0.22 |
| | | | | | | | |
| INL 1782 B | 10,856 | 0.25 | 5,804 | 0.13 | 0.87 | 16,660 | 0.38 |
| INL 1782 A | 2,765 | 0.06 | 3,231 | 0.07 | 0.81 | 5,996 | 0.14 |
| INL 1782 C | 17,464 | 0.40 | 4,938 | 0.11 | 0.92 | 22,402 | 0.51 |
| | | | | | | | |
| INL-1821 A | 8,372 | 0.19 | 12,270 | 0.28 | 0.79 | 20,642 | 0.47 |
| | | | | | | | |
| INL-1821 | 14,694 | 0.34 | 977 | 0.02 | 0.97 | 15,671 | 0.36 |
| INL-1822 | 18,067 | 0.41 | 1,003 | 0.02 | 0.97 | 19,070 | 0.44 |
| INL-1823 | 18,066 | 0.41 | 1,003 | 0.02 | 0.97 | 19,069 | 0.44 |
| | | | | | | | |
| INL-1826 | 18,067 | 0.41 | 1,002 | 0.02 | 0.97 | 19,069 | 0.44 |
| INL-1827 | 18,066 | 0.41 | 1,003 | 0.02 | 0.97 | 19,069 | 0.44 |
| INL-1828 | 18,067 | 0.41 | 1,002 | 0.02 | 0.97 | 19,069 | 0.44 |
| INL-1829 | 18,066 | 0.41 | 1,003 | 0.02 | 0.97 | 19,069 | 0.44 |
| | | | | | | | |
| INL-1831 | 18,067 | 0.41 | 1,003 | 0.02 | 0.97 | 19,070 | 0.44 |
| INL-1832 | 18,061 | 0.41 | 1,003 | 0.02 | 0.97 | 19,064 | 0.44 |
| INL-1833 | 17,943 | 0.41 | 1,003 | 0.02 | 0.97 | 18,946 | 0.43 |
| INL-1834 | 18,066 | 0.41 | 1,003 | 0.02 | 0.97 | 19,069 | 0.44 |
| | | | | | | | |
| INL-1836 | 18,066 | 0.41 | 998 | 0.02 | 0.97 | 19,064 | 0.44 |
| INL-1837 | 18,066 | 0.41 | 1,003 | 0.02 | 0.97 | 19,069 | 0.44 |
| INL-1838 | 18,067 | 0.41 | 1,003 | 0.02 | 0.97 | 19,070 | 0.44 |
| | | | | | | | |
| INL-1876 | 18,111 | 0.42 | 3,705 | 0.09 | 0.93 | 21,816 | 0.50 |
| INL-1877 | 2,162 | 0.05 | 667 | 0.02 | 0.91 | 2,829 | 0.06 |
| INL-1878 | 2,387 | 0.05 | 1,111 | 0.03 | 0.88 | 3,498 | 0.08 |
| INL-1879 | 2,560 | 0.06 | 1,564 | 0.04 | 0.86 | 4,124 | 0.09 |
| INL-1880 | 2,534 | 0.06 | 1,529 | 0.04 | 0.86 | 4,063 | 0.09 |
| INL-1881 | 2,534 | 0.06 | 1,527 | 0.04 | 0.86 | 4,061 | 0.09 |

## Inlet Drainage Area Calculations

| | | |
|---|---|---|
| **Project** | NorthPoint - Phase 2 Building 6 Construction | By: |
| **Location:** | Falls Township, Bucks County, PA | Date: |
| | | Chk'd: |
| | | Revised: |

| | **Impervious** | | **Lawn** | | **Wt'd** | **Total Area** | |
|---|---|---|---|---|---|---|---|
| **C =** | **0.99** | | **0.65** | | **C** | | |
| | (sf) | (ac) | (sf) | (ac) | | (sf) | (ac) |
| INL-1882 | 3,171 | 0.07 | 2,158 | 0.05 | 0.85 | 5,329 | 0.12 |

# Storm Sewer Tabulation



| Station | | Len | Drng Area | | Rnoff coeff | Area x C | | Tc | | Rain (I) | Total flow | Cap full | Vel | Pipe | | Invert Elev | | HGL Elev | | Grnd / Rim Elev | | Line ID |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Line | To Line | (ft) | Incr (ac) | Total (ac) | (C) | Incr | Total | Inlet (min) | Syst (min) | (in/hr) | (cfs) | (cfs) | (ft/s) | Size (in) | Slope (%) | Dn (ft) | Up (ft) | Dn (ft) | Up (ft) | Dn (ft) | Up (ft) | |
| 1 | End | 48.968 | 0.00 | 3.30 | 0.00 | 0.00 | 3.27 | 0.0 | 11.7 | 6.7 | 21.78 | 56.32 | 3.08 | 36 | 0.51 | 11.00 | 11.25 | 14.54 | 14.58 | 14.61 | 18.94 | 1241-1240 |
| 2 | 1 | 279.013 | 0.00 | 3.30 | 0.00 | 0.00 | 3.27 | 0.0 | 10.3 | 7.0 | 22.78 | 55.63 | 3.54 | 36 | 0.50 | 11.25 | 12.64 | 14.80 | 14.97 | 18.94 | 18.86 | 1242-1241 |
| 3 | 2 | 279.019 | 0.00 | 3.30 | 0.00 | 0.00 | 3.27 | 0.0 | 9.0 | 7.3 | 23.83 | 55.83 | 5.11 | 36 | 0.50 | 12.64 | 14.04 | 15.09 | 15.61 | 18.86 | 18.77 | 1243-1242 |
| 4 | 3 | 56.000 | 0.00 | 3.30 | 0.00 | 0.00 | 3.27 | 0.0 | 8.7 | 7.4 | 24.06 | 55.73 | 6.40 | 36 | 0.50 | 14.04 | 14.32 | 15.61 | 15.90 | 18.77 | 19.52 | RL23A-1243 |
| 5 | 4 | 20.000 | 0.00 | 2.88 | 0.00 | 0.00 | 2.85 | 0.0 | 8.6 | 7.4 | 21.08 | 55.73 | 5.84 | 36 | 0.50 | 14.32 | 14.42 | 15.90 | 15.89 | 19.52 | 19.75 | 1244-RL23a |
| 6 | 5 | 40.000 | 0.00 | 2.52 | 0.00 | 0.00 | 2.49 | 0.0 | 8.5 | 7.4 | 18.55 | 34.27 | 6.20 | 30 | 0.50 | 14.42 | 14.62 | 15.89 | 16.08 | 19.75 | 19.75 | RL22-1244 |
| 7 | 6 | 38.000 | 0.00 | 2.16 | 0.00 | 0.00 | 2.14 | 0.0 | 8.3 | 7.5 | 16.01 | 34.27 | 5.65 | 30 | 0.50 | 14.62 | 14.81 | 16.08 | 16.16 | 19.75 | 19.75 | RL21-RL22 |
| 8 | 7 | 59.501 | 0.00 | 1.80 | 0.00 | 0.00 | 1.78 | 0.0 | 8.0 | 7.6 | 13.51 | 34.42 | 5.29 | 30 | 0.50 | 14.81 | 15.11 | 16.16 | 16.35 | 19.75 | 19.75 | RL20-RL21 |
| 9 | 8 | 55.513 | 0.00 | 1.44 | 0.00 | 0.00 | 1.43 | 0.0 | 7.6 | 7.7 | 10.97 | 34.42 | 4.88 | 30 | 0.50 | 15.11 | 15.39 | 16.35 | 16.50 | 19.75 | 19.75 | 1245-RL20 |
| 10 | 9 | 49.017 | 0.00 | 1.08 | 0.00 | 0.00 | 1.07 | 0.0 | 7.1 | 7.8 | 8.38 | 37.28 | 4.40 | 30 | 0.59 | 15.39 | 15.68 | 16.50 | 16.64 | 19.75 | 19.75 | RL18-1245 |
| 11 | 10 | 49.500 | 0.00 | 0.72 | 0.00 | 0.00 | 0.71 | 0.0 | 6.4 | 8.1 | 5.74 | 37.10 | 3.80 | 30 | 0.59 | 15.68 | 15.97 | 16.64 | 16.76 | 19.75 | 19.75 | RL17-RL18 |
| 12 | 11 | 23.750 | 0.36 | 0.36 | 0.99 | 0.36 | 0.36 | 5.0 | 5.0 | 8.6 | 3.06 | 5.42 | 4.43 | 15 | 0.51 | 17.13 | 17.25 | 17.80 | 17.95 | 19.75 | 20.00 | RL-17 |
| 13 | 5 | 23.100 | 0.36 | 0.36 | 0.99 | 0.36 | 0.36 | 5.0 | 5.0 | 8.6 | 3.06 | 7.94 | 5.17 | 15 | 1.08 | 17.00 | 17.25 | 17.54 | 17.95 | 19.75 | 20.00 | RL-23 |
| 14 | 9 | 23.144 | 0.36 | 0.36 | 0.99 | 0.36 | 0.36 | 5.0 | 5.0 | 8.6 | 3.06 | 7.93 | 5.17 | 15 | 1.08 | 17.00 | 17.25 | 17.54 | 17.95 | 19.75 | 20.00 | RL-19 |
| 15 | 11 | 47.804 | 0.00 | 0.36 | 0.00 | 0.00 | 0.36 | 0.0 | 5.2 | 8.5 | 3.04 | 37.09 | 2.94 | 30 | 0.59 | 15.97 | 16.25 | 16.76 | 16.82 | 19.75 | 19.75 | 1246-RL17 |
| 16 | 15 | 23.300 | 0.36 | 0.36 | 0.99 | 0.36 | 0.36 | 5.0 | 5.0 | 8.6 | 3.06 | 7.91 | 5.16 | 15 | 1.07 | 17.00 | 17.25 | 17.54 | 17.95 | 19.75 | 20.00 | RL-16 |
| 17 | 10 | 23.750 | 0.36 | 0.36 | 0.99 | 0.36 | 0.36 | 5.0 | 5.0 | 8.6 | 3.06 | 8.86 | 5.43 | 15 | 1.35 | 16.93 | 17.25 | 17.44 | 17.95 | 19.75 | 20.00 | RL-18 |
| 18 | 8 | 23.750 | 0.36 | 0.36 | 0.99 | 0.36 | 0.36 | 5.0 | 5.0 | 8.6 | 3.06 | 14.77 | 6.89 | 15 | 3.75 | 16.36 | 17.25 | 16.75 | 17.95 | 19.75 | 20.00 | RL-20 |
| 19 | 7 | 23.500 | 0.36 | 0.36 | 0.99 | 0.36 | 0.36 | 5.0 | 5.0 | 8.6 | 3.06 | 17.10 | 7.42 | 15 | 5.02 | 16.07 | 17.25 | 16.43 | 17.95 | 19.75 | 20.00 | RL-21 |
| 20 | 4 | 11.670 | 0.42 | 0.42 | 0.99 | 0.42 | 0.42 | 5.0 | 5.0 | 8.6 | 3.57 | 24.27 | 9.35 | 15 | 10.11 | 16.07 | 17.25 | 16.39 | 18.01 | 19.52 | 20.00 | RL-23A |
| 21 | 6 | 23.500 | 0.36 | 0.36 | 0.99 | 0.36 | 0.36 | 5.0 | 5.0 | 8.6 | 3.06 | 18.49 | 7.72 | 15 | 5.87 | 15.87 | 17.25 | 16.21 | 17.95 | 19.75 | 20.00 | RL-22 |
| 22 | End | 187.992 | 0.00 | 2.96 | 0.00 | 0.00 | 2.93 | 0.0 | 6.8 | 7.9 | 23.22 | 46.76 | 5.77 | 30 | 0.93 | 13.00 | 14.75 | 15.93 | 16.39 | 16.10 | 19.75 | 1081-1080 |

Project File: Building 4 Storm.stm | Number of lines: 234 | Run Date: 7/10/2023

NOTES:Intensity = 48.38 / (Inlet time + 9.10) ^ 0.65; Return period =Yrs. 100 ; c = cir e = ellip b = box

# Storm Sewer Tabulation

| Station | | Len | Drng Area | | Rnoff coeff | Area x C | | Tc | | Rain (I) | Total flow | Cap full | Vel | Pipe | | Invert Elev | | HGL Elev | | Grnd / Rim Elev | | Line ID |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Line | To Line | (ft) | Incr (ac) | Total (ac) | (C) | Incr | Total | Inlet (min) | Syst (min) | (in/hr) | (cfs) | (cfs) | (ft/s) | Size (in) | Slope (%) | Dn (ft) | Up (ft) | Dn (ft) | Up (ft) | Dn (ft) | Up (ft) | |
| 23 | 22 | 43.000 | 0.00 | 1.48 | 0.00 | 0.00 | 1.47 | 0.0 | 6.7 | 8.0 | 11.70 | 19.12 | 6.06 | 24 | 0.51 | 15.25 | 15.47 | 16.39 | 16.70 | 19.75 | 19.75 | RL61-1081 |
| 24 | 23 | 51.000 | 0.00 | 1.11 | 0.00 | 0.00 | 1.10 | 0.0 | 6.4 | 8.1 | 8.88 | 19.09 | 4.82 | 24 | 0.51 | 15.47 | 15.73 | 16.70 | 16.79 | 19.75 | 19.75 | RL60-RL61 |
| 25 | 24 | 59.000 | 0.00 | 0.74 | 0.00 | 0.00 | 0.73 | 0.0 | 5.9 | 8.3 | 6.05 | 19.06 | 4.09 | 24 | 0.51 | 15.73 | 16.03 | 16.79 | 16.90 | 19.75 | 19.75 | RL59-RL60 |
| 26 | 25 | 43.000 | 0.00 | 0.37 | 0.00 | 0.00 | 0.37 | 0.0 | 5.1 | 8.5 | 3.12 | 19.12 | 3.09 | 24 | 0.51 | 16.03 | 16.25 | 16.90 | 16.87 | 19.75 | 19.75 | 1082-RL59 |
| 27 | 26 | 22.900 | 0.37 | 0.37 | 0.99 | 0.37 | 0.37 | 5.0 | 5.0 | 8.6 | 3.15 | 7.31 | 5.04 | 15 | 0.92 | 17.04 | 17.25 | 17.61 | 17.96 | 19.75 | 20.00 | RL-58 |
| 28 | 22 | 23.122 | 0.37 | 0.37 | 0.99 | 0.37 | 0.37 | 5.0 | 5.0 | 8.6 | 3.15 | 7.94 | 5.22 | 15 | 1.08 | 17.00 | 17.25 | 17.55 | 17.96 | 19.75 | 20.00 | RL-62 |
| 29 | 22 | 53.000 | 0.00 | 1.11 | 0.00 | 0.00 | 1.10 | 0.0 | 6.1 | 8.2 | 8.97 | 23.80 | 5.06 | 24 | 0.79 | 15.25 | 15.67 | 16.39 | 16.74 | 19.75 | 19.75 | RL63-1081 |
| 30 | 29 | 42.000 | 0.00 | 0.74 | 0.00 | 0.00 | 0.73 | 0.0 | 5.8 | 8.3 | 6.08 | 23.69 | 4.09 | 24 | 0.79 | 15.67 | 16.00 | 16.74 | 16.87 | 19.75 | 19.75 | 1083-RL63 |
| 31 | 30 | 23.098 | 0.37 | 0.37 | 0.99 | 0.37 | 0.37 | 5.0 | 5.0 | 8.6 | 3.15 | 7.94 | 5.22 | 15 | 1.08 | 17.00 | 17.25 | 17.55 | 17.96 | 19.75 | 20.00 | RL-64 |
| 32 | 25 | 24.000 | 0.37 | 0.37 | 0.99 | 0.37 | 0.37 | 5.0 | 5.0 | 8.6 | 3.15 | 10.68 | 5.95 | 15 | 1.96 | 16.78 | 17.25 | 17.25 | 17.96 | 19.75 | 20.00 | RL-59 |
| 33 | 29 | 24.000 | 0.37 | 0.37 | 0.99 | 0.37 | 0.37 | 5.0 | 5.0 | 8.6 | 3.15 | 13.03 | 6.54 | 15 | 2.92 | 16.55 | 17.25 | 16.97 | 17.96 | 19.75 | 20.00 | RL-63 |
| 34 | 24 | 23.900 | 0.37 | 0.37 | 0.99 | 0.37 | 0.37 | 5.0 | 5.0 | 8.6 | 3.15 | 13.70 | 6.70 | 15 | 3.22 | 16.48 | 17.25 | 16.89 | 17.96 | 19.75 | 20.00 | RL-60 |
| 35 | 23 | 23.950 | 0.37 | 0.37 | 0.99 | 0.37 | 0.37 | 5.0 | 5.0 | 8.6 | 3.15 | 15.83 | 5.83 | 15 | 4.30 | 16.22 | 17.25 | 16.70 | 17.96 | 19.75 | 20.00 | RL-61 |
| 36 | 30 | 37.000 | 0.00 | 0.37 | 0.00 | 0.00 | 0.37 | 0.0 | 5.1 | 8.5 | 3.12 | 21.97 | 3.09 | 24 | 0.68 | 16.00 | 16.25 | 16.87 | 16.87 | 19.75 | 19.75 | 1083A-1083 |
| 37 | 36 | 23.000 | 0.37 | 0.37 | 0.99 | 0.37 | 0.37 | 5.0 | 5.0 | 8.6 | 3.15 | 7.96 | 5.22 | 15 | 1.09 | 17.00 | 17.25 | 17.55 | 17.96 | 19.75 | 20.00 | RL 64A-1083A |
| 38 | End | 147.931 | 0.00 | 5.04 | 0.00 | 0.00 | 4.99 | 0.0 | 9.3 | 7.2 | 36.06 | 51.03 | 6.27 | 36 | 0.42 | 13.00 | 13.62 | 15.93 | 15.57 | 16.62 | 21.51 | 1251-1250 |
| 39 | 38 | 38.000 | 0.00 | 4.68 | 0.00 | 0.00 | 4.63 | 0.0 | 9.1 | 7.3 | 33.64 | 51.15 | 7.06 | 36 | 0.42 | 13.62 | 13.78 | 15.57 | 15.66 | 21.51 | 19.75 | RL36-1251 |
| 40 | 39 | 38.250 | 0.00 | 4.32 | 0.00 | 0.00 | 4.28 | 0.0 | 9.0 | 7.3 | 31.21 | 50.98 | 6.84 | 36 | 0.42 | 13.78 | 13.94 | 15.66 | 15.75 | 19.75 | 19.75 | RL35-RL36 |
| 41 | 40 | 42.527 | 0.00 | 3.96 | 0.00 | 0.00 | 3.92 | 0.0 | 8.8 | 7.3 | 28.78 | 51.28 | 6.63 | 36 | 0.42 | 13.94 | 14.12 | 15.75 | 15.85 | 19.75 | 19.75 | 1252-RL35 |
| 42 | 41 | 23.096 | 0.36 | 0.36 | 0.99 | 0.36 | 0.36 | 5.0 | 5.0 | 8.6 | 3.06 | 7.62 | 5.08 | 15 | 1.00 | 17.02 | 17.25 | 17.57 | 17.95 | 19.75 | 20.00 | RL-34 |
| 43 | 41 | 38.500 | 0.00 | 3.60 | 0.00 | 0.00 | 3.56 | 0.0 | 8.7 | 7.4 | 26.32 | 50.81 | 6.40 | 36 | 0.42 | 14.12 | 14.28 | 15.85 | 15.94 | 19.75 | 19.75 | RL33-1252 |
| 44 | 43 | 52.000 | 0.00 | 3.24 | 0.00 | 0.00 | 3.21 | 0.0 | 8.4 | 7.5 | 23.91 | 51.27 | 6.17 | 36 | 0.42 | 14.28 | 14.50 | 15.94 | 16.07 | 19.75 | 19.75 | RL32-RL33 |

Project File: Building 4 Storm.stm | Number of lines: 234 | Run Date: 7/10/2023

NOTES:Intensity = 48.38 / (Inlet time + 9.10) ^ 0.65; Return period =Yrs. 100 ; c = cir e = ellip b = box

# Storm Sewer Tabulation



| Station | | Len | Drng Area | | Rnoff coeff | Area x C | | Tc | | Rain (I) | Total flow | Cap full | Vel | Pipe | | Invert Elev | | HGL Elev | | Grnd / Rim Elev | | Line ID |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Line | To Line | (ft) | Incr (ac) | Total (ac) | (C) | Incr | Total | Inlet (min) | Syst (min) | (in/hr) | (cfs) | (cfs) | (ft/s) | Size (in) | Slope (%) | Dn (ft) | Up (ft) | Dn (ft) | Up (ft) | Dn (ft) | Up (ft) | |
| 45 | 44 | 47.250 | 0.00 | 2.88 | 0.00 | 0.00 | 2.85 | 0.0 | 8.2 | 7.5 | 21.45 | 51.28 | 5.92 | 36 | 0.42 | 14.50 | 14.70 | 16.07 | 16.19 | 19.75 | 19.75 | RL31-RL32 |
| 46 | 45 | 55.000 | 0.00 | 2.52 | 0.00 | 0.00 | 2.49 | 0.0 | 7.8 | 7.6 | 19.01 | 50.97 | 5.67 | 36 | 0.42 | 14.70 | 14.93 | 16.19 | 16.33 | 19.75 | 19.75 | 1253-RL31 |
| 47 | 46 | 38.500 | 0.00 | 2.16 | 0.00 | 0.00 | 2.14 | 0.0 | 7.7 | 7.7 | 16.41 | 31.25 | 5.66 | 30 | 0.42 | 14.83 | 14.99 | 16.33 | 16.36 | 19.75 | 19.75 | RL29-1253 |
| 48 | 47 | 52.000 | 0.00 | 1.80 | 0.00 | 0.00 | 1.78 | 0.0 | 7.4 | 7.8 | 13.83 | 31.53 | 5.33 | 30 | 0.42 | 14.99 | 15.21 | 16.36 | 16.46 | 19.75 | 19.75 | RL28-RL29 |
| 49 | 48 | 47.250 | 0.00 | 1.44 | 0.00 | 0.00 | 1.43 | 0.0 | 7.0 | 7.9 | 11.21 | 31.53 | 4.91 | 30 | 0.42 | 15.21 | 15.41 | 16.46 | 16.53 | 19.75 | 19.75 | RL27-RL28 |
| 50 | 49 | 55.000 | 0.00 | 1.08 | 0.00 | 0.00 | 1.07 | 0.0 | 6.5 | 8.0 | 8.59 | 31.34 | 4.44 | 30 | 0.42 | 15.41 | 15.64 | 16.53 | 16.62 | 19.75 | 19.75 | 1254-RL27 |
| 51 | 50 | 23.098 | 0.36 | 0.36 | 0.99 | 0.36 | 0.36 | 5.0 | 5.0 | 8.6 | 3.06 | 7.62 | 5.08 | 15 | 1.00 | 17.02 | 17.25 | 17.57 | 17.95 | 19.75 | 20.00 | RL-26 |
| 52 | 46 | 23.099 | 0.36 | 0.36 | 0.99 | 0.36 | 0.36 | 5.0 | 5.0 | 8.6 | 3.06 | 7.62 | 5.08 | 15 | 1.00 | 17.02 | 17.25 | 17.57 | 17.95 | 19.75 | 20.00 | RL-30 |
| 53 | 50 | 52.000 | 0.00 | 0.72 | 0.00 | 0.00 | 0.71 | 0.0 | 6.1 | 8.2 | 5.84 | 20.30 | 4.20 | 24 | 0.58 | 15.64 | 15.94 | 16.62 | 16.79 | 19.75 | 19.75 | RL25-1254 |
| 54 | 53 | 53.000 | 0.00 | 0.36 | 0.00 | 0.00 | 0.36 | 0.0 | 5.2 | 8.5 | 3.04 | 20.44 | 3.07 | 24 | 0.58 | 15.94 | 16.25 | 16.79 | 16.86 | 19.75 | 19.75 | 1255-RL25 |
| 55 | 54 | 23.020 | 0.36 | 0.36 | 0.99 | 0.36 | 0.36 | 5.0 | 5.0 | 8.6 | 3.06 | 7.95 | 5.18 | 15 | 1.09 | 17.00 | 17.25 | 17.54 | 17.95 | 19.75 | 20.00 | RL-24 |
| 56 | 38 | 23.000 | 0.36 | 0.36 | 0.99 | 0.36 | 0.36 | 5.0 | 5.0 | 8.6 | 3.06 | 7.96 | 5.18 | 15 | 1.09 | 17.00 | 17.25 | 17.54 | 17.95 | 21.51 | 20.00 | RL-37 |
| 57 | 53 | 24.000 | 0.36 | 0.36 | 0.99 | 0.36 | 0.36 | 5.0 | 5.0 | 8.6 | 3.06 | 11.66 | 6.15 | 15 | 2.33 | 16.69 | 17.25 | 17.13 | 17.95 | 19.75 | 20.00 | RL-25 |
| 58 | 49 | 24.000 | 0.36 | 0.36 | 0.99 | 0.36 | 0.36 | 5.0 | 5.0 | 8.6 | 3.06 | 11.97 | 6.23 | 15 | 2.46 | 16.66 | 17.25 | 17.09 | 17.95 | 19.75 | 20.00 | RL-27 |
| 59 | 48 | 24.000 | 0.36 | 0.36 | 0.99 | 0.36 | 0.36 | 5.0 | 5.0 | 8.6 | 3.06 | 13.85 | 6.68 | 15 | 3.29 | 16.46 | 17.25 | 16.86 | 17.95 | 19.75 | 20.00 | RL-28 |
| 60 | 45 | 23.750 | 0.36 | 0.36 | 0.99 | 0.36 | 0.36 | 5.0 | 5.0 | 8.6 | 3.06 | 14.01 | 6.72 | 15 | 3.37 | 16.45 | 17.25 | 16.85 | 17.95 | 19.75 | 20.00 | RL-31 |
| 61 | 44 | 23.750 | 0.36 | 0.36 | 0.99 | 0.36 | 0.36 | 5.0 | 5.0 | 8.6 | 3.06 | 15.66 | 7.10 | 15 | 4.21 | 16.25 | 17.25 | 16.62 | 17.95 | 19.75 | 20.00 | RL-32 |
| 62 | 47 | 24.000 | 0.36 | 0.36 | 0.99 | 0.36 | 0.36 | 5.0 | 5.0 | 8.6 | 3.06 | 15.66 | 7.10 | 15 | 4.21 | 16.24 | 17.25 | 16.61 | 17.95 | 19.75 | 20.00 | RL-29 |
| 63 | 43 | 23.750 | 0.36 | 0.36 | 0.99 | 0.36 | 0.36 | 5.0 | 5.0 | 8.6 | 3.06 | 17.30 | 7.46 | 15 | 5.14 | 16.03 | 17.25 | 16.39 | 17.95 | 19.75 | 20.00 | RL-33 |
| 64 | 40 | 23.750 | 0.36 | 0.36 | 0.99 | 0.36 | 0.36 | 5.0 | 5.0 | 8.6 | 3.06 | 19.56 | 7.95 | 15 | 6.57 | 15.69 | 17.25 | 16.02 | 17.95 | 19.75 | 20.00 | RL-35 |
| 65 | 39 | 23.750 | 0.36 | 0.36 | 0.99 | 0.36 | 0.36 | 5.0 | 5.0 | 8.6 | 3.06 | 20.54 | 8.15 | 15 | 7.24 | 15.53 | 17.25 | 15.86 | 17.95 | 19.75 | 20.00 | RL-36 |
| 66 | End | 146.557 | 0.00 | 3.70 | 0.00 | 0.00 | 3.66 | 0.0 | 8.0 | 7.6 | 27.68 | 58.23 | 5.32 | 36 | 0.55 | 13.00 | 13.80 | 15.93 | 15.50 | 16.62 | 21.85 | 1281-1280 |

Project File: Building 4 Storm.stm | Number of lines: 234 | Run Date: 7/10/2023

NOTES:Intensity = 48.38 / (Inlet time + 9.10) ^ 0.65; Return period =Yrs. 100 ; c = cir e = ellip b = box

# Storm Sewer Tabulation



| Station | | Len | Drng Area | | Rnoff coeff | Area x C | | Tc | | Rain (I) | Total flow | Cap full | Vel | Pipe | | Invert Elev | | HGL Elev | | Grnd / Rim Elev | | Line ID |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Line | To Line | (ft) | Incr (ac) | Total (ac) | (C) | Incr | Total | Inlet (min) | Syst (min) | (in/hr) | (cfs) | (cfs) | (ft/s) | Size (in) | Slope (%) | Dn (ft) | Up (ft) | Dn (ft) | Up (ft) | Dn (ft) | Up (ft) | |
| 67 | 66 | 41.000 | 0.00 | 3.33 | 0.00 | 0.00 | 3.30 | 0.0 | 7.9 | 7.6 | 25.04 | 34.69 | 7.04 | 30 | 0.51 | 13.80 | 14.01 | 15.50 | 15.71 | 21.85 | 19.75 | RL73-1281 |
| 68 | 67 | 51.000 | 0.00 | 2.96 | 0.00 | 0.00 | 2.93 | 0.0 | 7.7 | 7.6 | 22.41 | 34.61 | 6.50 | 30 | 0.51 | 14.01 | 14.27 | 15.71 | 15.88 | 19.75 | 19.75 | RL72-RL73 |
| 69 | 68 | 43.000 | 0.00 | 2.59 | 0.00 | 0.00 | 2.56 | 0.0 | 7.6 | 7.7 | 19.74 | 34.67 | 6.15 | 30 | 0.51 | 14.27 | 14.49 | 15.88 | 16.00 | 19.75 | 19.75 | 1282-RL72 |
| 70 | 69 | 40.000 | 0.00 | 2.22 | 0.00 | 0.00 | 2.20 | 0.0 | 7.4 | 7.8 | 17.05 | 34.27 | 5.78 | 30 | 0.50 | 14.49 | 14.69 | 16.00 | 16.09 | 19.75 | 19.75 | RL70-1282 |
| 71 | 70 | 52.000 | 0.00 | 1.85 | 0.00 | 0.00 | 1.83 | 0.0 | 7.1 | 7.8 | 14.37 | 34.27 | 5.40 | 30 | 0.50 | 14.69 | 14.95 | 16.09 | 16.23 | 19.75 | 19.75 | RL69-RL70 |
| 72 | 71 | 58.500 | 0.00 | 1.48 | 0.00 | 0.00 | 1.47 | 0.0 | 6.7 | 8.0 | 11.68 | 34.13 | 4.98 | 30 | 0.50 | 14.95 | 15.24 | 16.23 | 16.38 | 19.75 | 19.75 | RL68-RL69 |
| 73 | 72 | 47.860 | 0.00 | 1.11 | 0.00 | 0.00 | 1.10 | 0.0 | 6.3 | 8.1 | 8.92 | 34.32 | 4.49 | 30 | 0.50 | 15.24 | 15.48 | 16.38 | 16.47 | 19.75 | 19.75 | 1283-RL68 |
| 74 | 73 | 23.037 | 0.37 | 0.37 | 0.99 | 0.37 | 0.37 | 5.0 | 5.0 | 8.6 | 3.15 | 7.95 | 5.22 | 15 | 1.09 | 17.00 | 17.25 | 17.55 | 17.96 | 19.75 | 20.00 | RL-67 |
| 75 | 69 | 23.108 | 0.37 | 0.37 | 0.99 | 0.37 | 0.37 | 5.0 | 5.0 | 8.6 | 3.15 | 7.94 | 5.22 | 15 | 1.08 | 17.00 | 17.25 | 17.55 | 17.96 | 19.75 | 20.00 | RL-71 |
| 76 | 66 | 23.019 | 0.37 | 0.37 | 0.99 | 0.37 | 0.37 | 5.0 | 5.0 | 8.6 | 3.15 | 7.95 | 5.22 | 15 | 1.09 | 17.00 | 17.25 | 17.55 | 17.96 | 21.85 | 20.00 | RL-74 |
| 77 | 73 | 46.500 | 0.00 | 0.74 | 0.00 | 0.00 | 0.73 | 0.0 | 5.9 | 8.3 | 6.05 | 24.79 | 4.25 | 24 | 0.86 | 15.48 | 15.88 | 16.47 | 16.75 | 19.75 | 19.75 | RL66-1283 |
| 78 | 77 | 43.061 | 0.00 | 0.37 | 0.00 | 0.00 | 0.37 | 0.0 | 5.2 | 8.5 | 3.12 | 24.78 | 3.09 | 24 | 0.86 | 15.88 | 16.25 | 16.75 | 16.87 | 19.75 | 19.75 | 1284-RL66 |
| 79 | 78 | 23.098 | 0.37 | 0.37 | 0.99 | 0.37 | 0.37 | 5.0 | 5.0 | 8.6 | 3.15 | 7.94 | 5.22 | 15 | 1.08 | 17.00 | 17.25 | 17.55 | 17.96 | 19.75 | 20.00 | RL-65 |
| 80 | 77 | 24.000 | 0.37 | 0.37 | 0.99 | 0.37 | 0.37 | 5.0 | 5.0 | 8.6 | 3.15 | 12.27 | 6.36 | 15 | 2.58 | 16.63 | 17.25 | 17.06 | 17.96 | 19.75 | 20.00 | RL-66 |
| 81 | 72 | 23.750 | 0.37 | 0.37 | 0.99 | 0.37 | 0.37 | 5.0 | 5.0 | 8.6 | 3.15 | 13.56 | 6.67 | 15 | 3.16 | 16.50 | 17.25 | 16.91 | 17.96 | 19.75 | 20.00 | RL-68 |
| 82 | 71 | 23.750 | 0.37 | 0.37 | 0.99 | 0.37 | 0.37 | 5.0 | 5.0 | 8.6 | 3.15 | 15.97 | 7.23 | 15 | 4.38 | 16.21 | 17.25 | 16.59 | 17.96 | 19.75 | 20.00 | RL-69 |
| 83 | 70 | 23.750 | 0.37 | 0.37 | 0.99 | 0.37 | 0.37 | 5.0 | 5.0 | 8.6 | 3.15 | 17.85 | 7.65 | 15 | 5.47 | 15.95 | 17.25 | 16.31 | 17.96 | 19.75 | 20.00 | RL-70 |
| 84 | 68 | 23.750 | 0.37 | 0.37 | 0.99 | 0.37 | 0.37 | 5.0 | 5.0 | 8.6 | 3.15 | 20.60 | 7.57 | 15 | 7.28 | 15.52 | 17.25 | 15.88 | 17.96 | 19.75 | 20.00 | RL-72 |
| 85 | 67 | 23.750 | 0.37 | 0.37 | 0.99 | 0.37 | 0.37 | 5.0 | 5.0 | 8.6 | 3.15 | 22.09 | 6.09 | 15 | 8.38 | 15.26 | 17.25 | 15.71 | 17.96 | 19.75 | 20.00 | RL-73 |
| 86 | End | 187.485 | 0.00 | 4.59 | 0.00 | 0.00 | 4.54 | 0.0 | 7.6 | 7.7 | 34.89 | 55.81 | 6.14 | 36 | 0.50 | 13.00 | 13.94 | 15.93 | 15.86 | 16.62 | 19.75 | 1061-1060 |
| 87 | 86 | 38.000 | 0.00 | 3.11 | 0.00 | 0.00 | 3.08 | 0.0 | 7.5 | 7.7 | 23.76 | 34.27 | 6.38 | 30 | 0.50 | 13.94 | 14.13 | 15.86 | 15.79 | 19.75 | 19.75 | RL45-1061 |
| 88 | 87 | 38.000 | 0.00 | 2.74 | 0.00 | 0.00 | 2.71 | 0.0 | 7.4 | 7.8 | 21.05 | 34.27 | 6.32 | 30 | 0.50 | 14.13 | 14.32 | 15.79 | 15.88 | 19.75 | 19.75 | RL44-RL45 |

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Project File: Building 4 Storm.stm | Number of lines: 234 | Run Date: 7/10/2023

NOTES:Intensity = 48.38 / (Inlet time + 9.10) ^ 0.65; Return period =Yrs. 100 ; c = cir e = ellip b = box

# Storm Sewer Tabulation

| Station | | Len | Drng Area | | Rnoff coeff | Area x C | | Tc | | Rain (I) | Total flow | Cap full | Vel | Pipe | | Invert Elev | | HGL Elev | | Grnd / Rim Elev | | Line ID |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Line | To Line | (ft) | Incr (ac) | Total (ac) | (C) | Incr | Total | Inlet (min) | Syst (min) | (in/hr) | (cfs) | (cfs) | (ft/s) | Size (in) | Slope (%) | Dn (ft) | Up (ft) | Dn (ft) | Up (ft) | Dn (ft) | Up (ft) | |
| 89 | 88 | 52.000 | 0.00 | 2.37 | 0.00 | 0.00 | 2.35 | 0.0 | 7.1 | 7.8 | 18.37 | 34.27 | 5.97 | 30 | 0.50 | 14.32 | 14.58 | 15.88 | 16.03 | 19.75 | 19.75 | RL43-RL44 |
| 90 | 89 | 38.000 | 0.00 | 2.00 | 0.00 | 0.00 | 1.98 | 0.0 | 6.9 | 7.9 | 15.63 | 34.27 | 5.58 | 30 | 0.50 | 14.58 | 14.77 | 16.03 | 16.10 | 19.75 | 19.75 | 1062-RL43 |
| 91 | 90 | 19.722 | 0.39 | 0.39 | 0.99 | 0.39 | 0.39 | 5.0 | 5.0 | 8.6 | 3.32 | 8.59 | 5.49 | 15 | 1.27 | 17.00 | 17.25 | 17.54 | 17.98 | 19.75 | 20.00 | RL-41 |
| 92 | 90 | 29.420 | 0.00 | 1.24 | 0.00 | 0.00 | 1.23 | 0.0 | 6.8 | 7.9 | 9.75 | 19.09 | 5.76 | 24 | 0.51 | 15.27 | 15.42 | 16.28 | 16.54 | 19.75 | 20.29 | 1063 - 1062 |
| 93 | 92 | 41.689 | 0.00 | 1.24 | 0.00 | 0.00 | 1.23 | 0.0 | 6.6 | 8.0 | 9.84 | 18.97 | 5.44 | 24 | 0.50 | 15.42 | 15.63 | 16.54 | 16.75 | 20.29 | 19.70 | RL40-1063 |
| 94 | 93 | 68.402 | 0.00 | 0.82 | 0.00 | 0.00 | 0.81 | 0.0 | 6.0 | 8.2 | 6.65 | 18.85 | 4.22 | 24 | 0.50 | 15.63 | 15.97 | 16.75 | 16.88 | 19.70 | 19.45 | RL39-RL40 |
| 95 | 94 | 55.500 | 0.00 | 0.40 | 0.00 | 0.00 | 0.40 | 0.0 | 5.2 | 8.5 | 3.37 | 18.99 | 3.15 | 24 | 0.50 | 15.97 | 16.25 | 16.88 | 16.89 | 19.45 | 19.70 | 1064-RL39 |
| 96 | 95 | 30.878 | 0.40 | 0.40 | 0.99 | 0.40 | 0.40 | 5.0 | 5.0 | 8.6 | 3.40 | 6.87 | 5.03 | 15 | 0.81 | 17.00 | 17.25 | 17.62 | 17.99 | 19.70 | 20.00 | RL-38 |
| 97 | 90 | 23.007 | 0.37 | 0.37 | 0.99 | 0.37 | 0.37 | 5.0 | 5.0 | 8.6 | 3.15 | 7.96 | 5.22 | 15 | 1.09 | 17.00 | 17.25 | 17.55 | 17.96 | 19.75 | 20.00 | RL-42 |
| 98 | 86 | 23.000 | 0.37 | 0.37 | 0.99 | 0.37 | 0.37 | 5.0 | 5.0 | 8.6 | 3.15 | 7.96 | 5.22 | 15 | 1.09 | 17.00 | 17.25 | 17.55 | 17.96 | 19.75 | 20.00 | RL-46 |
| 99 | 86 | 37.019 | 0.00 | 1.11 | 0.00 | 0.00 | 1.10 | 0.0 | 6.1 | 8.2 | 8.97 | 33.46 | 4.51 | 24 | 1.57 | 14.44 | 15.02 | 15.86 | 16.09 | 19.75 | 19.75 | RL47-1061 |
| 100 | 99 | 38.800 | 0.00 | 0.74 | 0.00 | 0.00 | 0.73 | 0.0 | 5.8 | 8.3 | 6.06 | 33.52 | 4.09 | 24 | 1.57 | 15.02 | 15.63 | 16.09 | 16.50 | 19.75 | 19.75 | RL48-RL47 |
| 101 | 100 | 39.519 | 0.00 | 0.37 | 0.00 | 0.00 | 0.37 | 0.0 | 5.1 | 8.5 | 3.12 | 33.48 | 3.09 | 24 | 1.57 | 15.63 | 16.25 | 16.50 | 16.87 | 19.75 | 19.75 | 1065-RL48 |
| 102 | 101 | 23.028 | 0.37 | 0.37 | 0.99 | 0.37 | 0.37 | 5.0 | 5.0 | 8.6 | 3.15 | 7.95 | 5.22 | 15 | 1.09 | 17.00 | 17.25 | 17.55 | 17.96 | 19.75 | 20.00 | RL-49 |
| 103 | 94 | 6.365 | 0.42 | 0.42 | 0.99 | 0.42 | 0.42 | 5.0 | 5.0 | 8.6 | 3.57 | 21.81 | 8.83 | 15 | 8.17 | 16.73 | 17.25 | 17.07 | 18.01 | 19.45 | 20.00 | RL-39 |
| 104 | 93 | 6.370 | 0.42 | 0.42 | 0.99 | 0.42 | 0.42 | 5.0 | 5.0 | 8.6 | 3.57 | 28.04 | 8.36 | 15 | 13.50 | 16.39 | 17.25 | 16.75 | 18.01 | 19.70 | 20.00 | RL-40 |
| 105 | 100 | 23.890 | 0.37 | 0.37 | 0.99 | 0.37 | 0.37 | 5.0 | 5.0 | 8.6 | 3.15 | 14.65 | 6.92 | 15 | 3.68 | 16.37 | 17.25 | 16.76 | 17.96 | 19.75 | 20.00 | RL-48 |
| 106 | 89 | 23.750 | 0.37 | 0.37 | 0.99 | 0.37 | 0.37 | 5.0 | 5.0 | 8.6 | 3.15 | 18.59 | 7.81 | 15 | 5.94 | 15.84 | 17.25 | 16.19 | 17.96 | 19.75 | 20.00 | RL-43 |
| 107 | 99 | 24.000 | 0.37 | 0.37 | 0.99 | 0.37 | 0.37 | 5.0 | 5.0 | 8.6 | 3.15 | 19.02 | 7.90 | 15 | 6.21 | 15.76 | 17.25 | 16.10 | 17.96 | 19.75 | 20.00 | RL-47 |
| 108 | 88 | 23.750 | 0.37 | 0.37 | 0.99 | 0.37 | 0.37 | 5.0 | 5.0 | 8.6 | 3.15 | 20.24 | 8.16 | 15 | 7.03 | 15.58 | 17.25 | 15.91 | 17.96 | 19.75 | 20.00 | RL-44 |
| 109 | 87 | 23.750 | 0.37 | 0.37 | 0.99 | 0.37 | 0.37 | 5.0 | 5.0 | 8.6 | 3.15 | 21.41 | 6.69 | 15 | 7.87 | 15.38 | 17.25 | 15.79 | 17.96 | 19.75 | 20.00 | RL-45 |
| 110 | End | 187.499 | 0.00 | 3.33 | 0.00 | 0.00 | 3.30 | 0.0 | 7.3 | 7.8 | 25.60 | 35.40 | 5.24 | 30 | 0.53 | 13.00 | 14.00 | 15.93 | 16.41 | 16.10 | 19.75 | 1071-1070 |

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Project File: Building 4 Storm.stm | Number of lines: 234 | Run Date: 7/10/2023

NOTES:Intensity = 48.38 / (Inlet time + 9.10) ^ 0.65; Return period =Yrs. 100 ; c = cir e = ellip b = box

# Storm Sewer Tabulation



| Station | | Len | Drng Area | | Rnoff coeff | Area x C | | Tc | | Rain (I) | Total flow | Cap full | Vel | Pipe | | Invert Elev | | HGL Elev | | Grnd / Rim Elev | | Line ID |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Line | To Line | (ft) | Incr (ac) | Total (ac) | (C) | Incr | Total | Inlet (min) | Syst (min) | (in/hr) | (cfs) | (cfs) | (ft/s) | Size (in) | Slope (%) | Dn (ft) | Up (ft) | Dn (ft) | Up (ft) | Dn (ft) | Up (ft) | |
| 111 | 110 | 55.000 | 0.00 | 2.59 | 0.00 | 0.00 | 2.56 | 0.0 | 7.1 | 7.8 | 20.09 | 34.58 | 4.09 | 30 | 0.51 | 14.00 | 14.28 | 17.38 | 17.48 | 19.75 | 19.75 | RL56-1071 |
| 112 | 111 | 43.000 | 0.00 | 2.22 | 0.00 | 0.00 | 2.20 | 0.0 | 6.9 | 7.9 | 17.35 | 34.67 | 3.54 | 30 | 0.51 | 14.28 | 14.50 | 17.74 | 17.79 | 19.75 | 19.75 | 1072-RL56 |
| 113 | 112 | 52.039 | 0.00 | 1.85 | 0.00 | 0.00 | 1.83 | 0.0 | 6.7 | 8.0 | 14.57 | 19.61 | 4.64 | 24 | 0.54 | 15.00 | 15.28 | 18.08 | 18.24 | 19.75 | 19.75 | RL54-1072 |
| 114 | 113 | 39.001 | 0.00 | 1.48 | 0.00 | 0.00 | 1.47 | 0.0 | 6.6 | 8.0 | 11.74 | 19.61 | 3.74 | 24 | 0.54 | 15.28 | 15.49 | 18.57 | 18.65 | 19.75 | 19.75 | RL53-RL54 |
| 115 | 114 | 33.135 | 0.00 | 1.11 | 0.00 | 0.00 | 1.10 | 0.0 | 6.4 | 8.1 | 8.87 | 19.70 | 2.82 | 24 | 0.54 | 15.49 | 15.67 | 18.87 | 18.90 | 19.75 | 19.75 | 1073-RL53 |
| 116 | 115 | 49.000 | 0.00 | 0.74 | 0.00 | 0.00 | 0.73 | 0.0 | 6.0 | 8.2 | 6.02 | 20.56 | 1.92 | 24 | 0.59 | 15.67 | 15.96 | 19.09 | 19.11 | 19.75 | 19.75 | RL51-1073 |
| 117 | 116 | 49.322 | 0.00 | 0.37 | 0.00 | 0.00 | 0.37 | 0.0 | 5.1 | 8.5 | 3.12 | 20.50 | 0.99 | 24 | 0.59 | 15.96 | 16.25 | 19.17 | 19.18 | 19.75 | 19.75 | 1074-RL51 |
| 118 | 117 | 22.917 | 0.37 | 0.37 | 0.99 | 0.37 | 0.37 | 5.0 | 5.0 | 8.6 | 3.15 | 7.97 | 2.56 | 15 | 1.09 | 17.00 | 17.25 | 19.20 | 19.24 | 19.75 | 20.00 | RL-50 |
| 119 | 110 | 23.100 | 0.37 | 0.37 | 0.99 | 0.37 | 0.37 | 5.0 | 5.0 | 8.6 | 3.15 | 7.94 | 5.22 | 15 | 1.08 | 17.00 | 17.25 | 17.55 | 17.96 | 19.75 | 20.00 | RL-57 |
| 120 | 112 | 23.094 | 0.37 | 0.37 | 0.99 | 0.37 | 0.37 | 5.0 | 5.0 | 8.6 | 3.15 | 7.94 | 3.56 | 15 | 1.08 | 17.00 | 17.25 | 18.08 | 17.96 | 19.75 | 20.00 | RL-55 |
| 121 | 115 | 23.033 | 0.37 | 0.37 | 0.99 | 0.37 | 0.37 | 5.0 | 5.0 | 8.6 | 3.15 | 7.95 | 2.56 | 15 | 1.09 | 17.00 | 17.25 | 19.09 | 19.13 | 19.75 | 20.00 | RL-52 |
| 122 | 116 | 24.000 | 0.37 | 0.37 | 0.99 | 0.37 | 0.37 | 5.0 | 5.0 | 8.6 | 3.15 | 11.45 | 2.56 | 15 | 2.25 | 16.71 | 17.25 | 19.17 | 19.21 | 19.75 | 20.00 | RL-51 |
| 123 | 114 | 24.000 | 0.37 | 0.37 | 0.99 | 0.37 | 0.37 | 5.0 | 5.0 | 8.6 | 3.15 | 15.66 | 2.56 | 15 | 4.21 | 16.24 | 17.25 | 18.87 | 18.91 | 19.75 | 20.00 | RL-53 |
| 124 | 113 | 24.000 | 0.37 | 0.37 | 0.99 | 0.37 | 0.37 | 5.0 | 5.0 | 8.6 | 3.15 | 17.42 | 2.56 | 15 | 5.21 | 16.00 | 17.25 | 18.57 | 18.61 | 19.75 | 20.00 | RL-54 |
| 125 | 111 | 23.750 | 0.37 | 0.37 | 0.99 | 0.37 | 0.37 | 5.0 | 5.0 | 8.6 | 3.15 | 20.54 | 3.45 | 15 | 7.24 | 15.53 | 17.25 | 17.74 | 17.96 | 19.75 | 20.00 | RL-56 |
| 126 | 110 | 50.000 | 0.00 | 0.37 | 0.00 | 0.00 | 0.37 | 0.0 | 5.1 | 8.5 | 3.12 | 18.90 | 2.57 | 24 | 0.50 | 16.00 | 16.25 | 17.38 | 16.87 | 19.75 | 19.75 | 1071A-1071 |
| 127 | 126 | 23.000 | 0.37 | 0.37 | 0.99 | 0.37 | 0.37 | 5.0 | 5.0 | 8.6 | 3.15 | 7.96 | 5.22 | 15 | 1.09 | 17.00 | 17.25 | 17.55 | 17.96 | 19.75 | 20.00 | RL 57A-1071A |
| 128 | End | 91.534 | 0.00 | 5.40 | 0.00 | 0.00 | 5.35 | 0.0 | 9.0 | 7.3 | 38.95 | 50.11 | 6.60 | 36 | 0.40 | 13.00 | 13.37 | 15.93 | 15.40 | 16.62 | 20.97 | 1141-1140 |
| 129 | 128 | 47.112 | 0.00 | 5.40 | 0.00 | 0.00 | 5.35 | 0.0 | 8.9 | 7.3 | 39.15 | 50.06 | 7.68 | 36 | 0.40 | 13.37 | 13.56 | 15.40 | 15.59 | 20.97 | 20.80 | RL1-1141 |
| 130 | 129 | 45.500 | 0.00 | 5.04 | 0.00 | 0.00 | 4.99 | 0.0 | 8.7 | 7.4 | 36.73 | 49.58 | 7.33 | 36 | 0.40 | 13.56 | 13.74 | 15.59 | 15.71 | 20.80 | 19.75 | 1142-RL1 |
| 131 | 130 | 52.013 | 0.00 | 4.68 | 0.00 | 0.00 | 4.63 | 0.0 | 8.6 | 7.4 | 34.33 | 50.08 | 7.12 | 36 | 0.40 | 13.74 | 13.95 | 15.71 | 15.85 | 19.75 | 19.75 | RL3-1142 |
| 132 | 131 | 42.410 | 0.00 | 4.32 | 0.00 | 0.00 | 4.28 | 0.0 | 8.4 | 7.5 | 31.87 | 49.90 | 6.90 | 36 | 0.40 | 13.95 | 14.12 | 15.85 | 15.95 | 19.75 | 19.75 | 1143-RL3 |



Project File: Building 4 Storm.stm | Number of lines: 234 | Run Date: 7/10/2023

NOTES:Intensity = 48.38 / (Inlet time + 9.10) ^ 0.65; Return period =Yrs. 100 ; c = cir e = ellip b = box

# Storm Sewer Tabulation



| Station | | Len | Drng Area | | Rnoff coeff | Area x C | | Tc | | Rain (I) | Total flow | Cap full | Vel | Pipe | | Invert Elev | | HGL Elev | | Grnd / Rim Elev | | Line ID |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Line | To Line | (ft) | Incr (ac) | Total (ac) | (C) | Incr | Total | Inlet (min) | Syst (min) | (in/hr) | (cfs) | (cfs) | (ft/s) | Size (in) | Slope (%) | Dn (ft) | Up (ft) | Dn (ft) | Up (ft) | Dn (ft) | Up (ft) | |
| 133 | 132 | 52.039 | 0.00 | 3.96 | 0.00 | 0.00 | 3.92 | 0.0 | 8.2 | 7.5 | 29.44 | 50.07 | 6.69 | 36 | 0.40 | 14.12 | 14.33 | 15.95 | 16.09 | 19.75 | 19.75 | RL5-1143 |
| 134 | 133 | 47.000 | 0.00 | 3.60 | 0.00 | 0.00 | 3.56 | 0.0 | 8.0 | 7.6 | 26.97 | 50.11 | 6.46 | 36 | 0.40 | 14.33 | 14.52 | 16.09 | 16.20 | 19.75 | 19.75 | RL6-RL5 |
| 135 | 134 | 52.000 | 0.00 | 3.24 | 0.00 | 0.00 | 3.21 | 0.0 | 7.8 | 7.6 | 24.50 | 50.09 | 6.22 | 36 | 0.40 | 14.52 | 14.73 | 16.20 | 16.32 | 19.75 | 19.75 | RL7-RL6 |
| 136 | 135 | 42.521 | 0.00 | 2.88 | 0.00 | 0.00 | 2.85 | 0.0 | 7.5 | 7.7 | 21.97 | 49.84 | 5.97 | 36 | 0.40 | 14.73 | 14.90 | 16.32 | 16.41 | 19.75 | 19.75 | 1144-RL7 |
| 137 | 136 | 52.033 | 0.00 | 2.52 | 0.00 | 0.00 | 2.49 | 0.0 | 7.3 | 7.8 | 19.38 | 30.79 | 6.31 | 30 | 0.40 | 14.90 | 15.11 | 16.41 | 16.60 | 19.75 | 19.75 | RL9-1144 |
| 138 | 137 | 47.000 | 0.00 | 2.16 | 0.00 | 0.00 | 2.14 | 0.0 | 7.1 | 7.8 | 16.76 | 30.82 | 5.75 | 30 | 0.40 | 15.11 | 15.30 | 16.60 | 16.68 | 19.75 | 19.75 | RL10-RL9 |
| 139 | 138 | 37.500 | 0.00 | 1.80 | 0.00 | 0.00 | 1.78 | 0.0 | 6.9 | 7.9 | 14.09 | 30.65 | 5.36 | 30 | 0.40 | 15.30 | 15.45 | 16.68 | 16.71 | 19.75 | 19.75 | RL11-RL10 |
| 140 | 139 | 32.500 | 0.00 | 1.44 | 0.00 | 0.00 | 1.43 | 0.0 | 6.7 | 8.0 | 11.38 | 30.65 | 4.93 | 30 | 0.40 | 15.45 | 15.58 | 16.71 | 16.71 | 19.75 | 19.75 | 1145-RL11 |
| 141 | 140 | 39.017 | 0.00 | 1.08 | 0.00 | 0.00 | 1.07 | 0.0 | 6.4 | 8.1 | 8.61 | 18.65 | 4.95 | 24 | 0.49 | 15.58 | 15.77 | 16.71 | 16.82 | 19.75 | 19.75 | RL13-1145 |
| 142 | 141 | 46.500 | 0.00 | 0.72 | 0.00 | 0.00 | 0.71 | 0.0 | 6.0 | 8.2 | 5.84 | 18.80 | 4.04 | 24 | 0.49 | 15.77 | 16.00 | 16.82 | 16.85 | 19.75 | 19.75 | RL14-RL13 |
| 143 | 142 | 51.500 | 0.00 | 0.36 | 0.00 | 0.00 | 0.36 | 0.0 | 5.2 | 8.5 | 3.04 | 18.62 | 3.07 | 24 | 0.49 | 16.00 | 16.25 | 16.85 | 16.86 | 19.75 | 19.75 | 1146-RL14 |
| 144 | 143 | 23.093 | 0.36 | 0.36 | 0.99 | 0.36 | 0.36 | 5.0 | 5.0 | 8.6 | 3.06 | 7.94 | 5.18 | 15 | 1.08 | 17.00 | 17.25 | 17.54 | 17.95 | 19.75 | 20.00 | RL-15 |
| 145 | 136 | 23.116 | 0.36 | 0.36 | 0.99 | 0.36 | 0.36 | 5.0 | 5.0 | 8.6 | 3.06 | 7.94 | 5.17 | 15 | 1.08 | 17.00 | 17.25 | 17.54 | 17.95 | 19.75 | 20.00 | RL-8 |
| 146 | 140 | 23.092 | 0.36 | 0.36 | 0.99 | 0.36 | 0.36 | 5.0 | 5.0 | 8.6 | 3.06 | 7.94 | 5.18 | 15 | 1.08 | 17.00 | 17.25 | 17.54 | 17.95 | 19.75 | 20.00 | RL-12 |
| 147 | 132 | 23.109 | 0.36 | 0.36 | 0.99 | 0.36 | 0.36 | 5.0 | 5.0 | 8.6 | 3.06 | 7.94 | 5.17 | 15 | 1.08 | 17.00 | 17.25 | 17.54 | 17.95 | 19.75 | 20.00 | RL-4 |
| 148 | 130 | 23.100 | 0.36 | 0.36 | 0.99 | 0.36 | 0.36 | 5.0 | 5.0 | 8.6 | 3.06 | 7.94 | 5.17 | 15 | 1.08 | 17.00 | 17.25 | 17.54 | 17.95 | 19.75 | 20.00 | RL-2 |
| 149 | 142 | 24.000 | 0.36 | 0.36 | 0.99 | 0.36 | 0.36 | 5.0 | 5.0 | 8.6 | 3.06 | 11.02 | 5.99 | 15 | 2.08 | 16.75 | 17.25 | 17.20 | 17.95 | 19.75 | 20.00 | RL-14 |
| 150 | 139 | 23.750 | 0.36 | 0.36 | 0.99 | 0.36 | 0.36 | 5.0 | 5.0 | 8.6 | 3.06 | 11.61 | 6.14 | 15 | 2.32 | 16.70 | 17.25 | 17.14 | 17.95 | 19.75 | 20.00 | RL-11 |
| 151 | 138 | 23.750 | 0.36 | 0.36 | 0.99 | 0.36 | 0.36 | 5.0 | 5.0 | 8.6 | 3.06 | 13.10 | 6.50 | 15 | 2.95 | 16.55 | 17.25 | 16.96 | 17.95 | 19.75 | 20.00 | RL-10 |
| 152 | 141 | 24.000 | 0.36 | 0.36 | 0.99 | 0.36 | 0.36 | 5.0 | 5.0 | 8.6 | 3.06 | 13.40 | 6.57 | 15 | 3.08 | 16.51 | 17.25 | 16.92 | 17.95 | 19.75 | 20.00 | RL-13 |
| 153 | 137 | 23.750 | 0.36 | 0.36 | 0.99 | 0.36 | 0.36 | 5.0 | 5.0 | 8.6 | 3.06 | 14.77 | 6.89 | 15 | 3.75 | 16.36 | 17.25 | 16.75 | 17.95 | 19.75 | 20.00 | RL-9 |
| 154 | 135 | 23.500 | 0.36 | 0.36 | 0.99 | 0.36 | 0.36 | 5.0 | 5.0 | 8.6 | 3.06 | 13.81 | 6.67 | 15 | 3.28 | 16.48 | 17.25 | 16.88 | 17.95 | 19.75 | 20.00 | RL-7 |

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Project File: Building 4 Storm.stm | Number of lines: 234 | Run Date: 7/10/2023

NOTES:Intensity = 48.38 / (Inlet time + 9.10) ^ 0.65; Return period =Yrs. 100 ; c = cir e = ellip b = box

# Storm Sewer Tabulation



| Station | | Len | Drng Area | | Rnoff coeff | Area x C | | Tc | | Rain (I) | Total flow | Cap full | Vel | Pipe | | Invert Elev | | HGL Elev | | Grnd / Rim Elev | | Line ID |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Line | To Line | (ft) | Incr (ac) | Total (ac) | (C) | Incr | Total | Inlet (min) | Syst (min) | (in/hr) | (cfs) | (cfs) | (ft/s) | Size (in) | Slope (%) | Dn (ft) | Up (ft) | Dn (ft) | Up (ft) | Dn (ft) | Up (ft) | |
| 155 | 134 | 23.500 | 0.36 | 0.36 | 0.99 | 0.36 | 0.36 | 5.0 | 5.0 | 8.6 | 3.06 | 15.58 | 7.08 | 15 | 4.17 | 16.27 | 17.25 | 16.65 | 17.95 | 19.75 | 20.00 | RL-6 |
| 156 | 131 | 23.500 | 0.36 | 0.36 | 0.99 | 0.36 | 0.36 | 5.0 | 5.0 | 8.6 | 3.06 | 19.60 | 7.96 | 15 | 6.60 | 15.70 | 17.25 | 16.03 | 17.95 | 19.75 | 20.00 | RL-3 |
| 157 | 133 | 23.500 | 0.36 | 0.36 | 0.99 | 0.36 | 0.36 | 5.0 | 5.0 | 8.6 | 3.06 | 17.03 | 7.40 | 15 | 4.98 | 16.08 | 17.25 | 16.44 | 17.95 | 19.75 | 20.00 | RL-5 |
| 158 | 129 | 23.500 | 0.36 | 0.36 | 0.99 | 0.36 | 0.36 | 5.0 | 5.0 | 8.6 | 3.06 | 21.98 | 8.45 | 15 | 8.30 | 15.30 | 17.25 | 15.62 | 17.95 | 20.80 | 20.00 | RL-1 |
| 159 | End | 227.229 | 0.00 | 1.87 | 0.00 | 0.00 | 1.84 | 0.0 | 10.7 | 6.9 | 12.65 | 34.33 | 2.58 | 30 | 0.50 | 11.00 | 12.14 | 14.54 | 14.69 | 13.64 | 19.50 | 1201-1200 |
| 160 | 159 | 194.074 | 0.00 | 1.50 | 0.00 | 0.00 | 1.49 | 0.0 | 9.8 | 7.1 | 10.52 | 18.90 | 3.35 | 24 | 0.50 | 12.14 | 13.11 | 14.85 | 15.11 | 19.50 | 19.50 | 1202 - 1201 |
| 161 | 160 | 3.550 | 0.50 | 0.50 | 0.99 | 0.50 | 0.50 | 5.0 | 5.0 | 8.6 | 4.25 | 20.25 | 8.97 | 15 | 7.04 | 16.75 | 17.00 | 17.14 | 17.83 | 19.50 | 19.75 | GAR 3 - 1202 |
| 162 | 160 | 254.835 | 0.00 | 1.00 | 0.00 | 0.00 | 0.99 | 0.0 | 8.2 | 7.5 | 7.45 | 18.94 | 3.14 | 24 | 0.50 | 13.11 | 14.39 | 15.37 | 15.56 | 19.50 | 19.50 | 1203 - 1202 |
| 163 | 162 | 3.550 | 0.50 | 0.50 | 0.99 | 0.50 | 0.50 | 5.0 | 5.0 | 8.6 | 4.25 | 20.25 | 8.97 | 15 | 7.04 | 16.75 | 17.00 | 17.14 | 17.83 | 19.50 | 19.75 | GAR 2 - 1203 |
| 164 | 162 | 254.835 | 0.00 | 0.50 | 0.00 | 0.00 | 0.50 | 0.0 | 5.0 | 8.6 | 4.25 | 21.25 | 2.90 | 24 | 0.63 | 14.39 | 16.00 | 15.91 | 16.72 | 19.50 | 19.50 | 1204 - 1203 |
| 165 | 164 | 3.550 | 0.50 | 0.50 | 0.99 | 0.50 | 0.50 | 5.0 | 5.0 | 8.6 | 4.25 | 20.25 | 8.97 | 15 | 7.04 | 16.75 | 17.00 | 17.14 | 17.83 | 19.50 | 19.75 | GAR 1 - 1204 |
| 166 | 159 | 3.520 | 0.37 | 0.37 | 0.96 | 0.36 | 0.36 | 5.0 | 5.0 | 8.6 | 3.05 | 16.20 | 2.93 | 18 | 1.70 | 13.50 | 13.56 | 14.85 | 14.22 | 19.50 | 16.56 | 1201A - 1201 |
| 167 | End | 52.879 | 0.29 | 1.11 | 0.99 | 0.29 | 1.06 | 5.0 | 11.1 | 6.8 | 7.16 | 10.66 | 4.05 | 18 | 0.74 | 13.00 | 13.39 | 15.93 | 16.11 | 15.57 | 18.20 | 1101-1100 |
| 168 | 167 | 96.000 | 0.45 | 0.82 | 0.97 | 0.44 | 0.77 | 5.0 | 10.7 | 6.9 | 5.29 | 8.78 | 3.00 | 18 | 0.50 | 13.59 | 14.07 | 16.33 | 16.50 | 18.20 | 18.20 | 1102-1101 |
| 169 | 168 | 126.605 | 0.22 | 0.37 | 0.85 | 0.19 | 0.33 | 5.0 | 9.3 | 7.2 | 2.40 | 8.75 | 1.36 | 18 | 0.50 | 14.27 | 14.90 | 16.57 | 16.62 | 18.20 | 19.33 | 1103-1102 |
| 170 | 169 | 183.000 | 0.15 | 0.15 | 0.97 | 0.15 | 0.15 | 5.0 | 5.0 | 8.6 | 1.25 | 8.75 | 1.16 | 18 | 0.50 | 15.09 | 16.00 | 16.65 | 16.68 | 19.33 | 19.02 | 1104-1103 |
| 171 | End | 13.992 | 0.43 | 0.43 | 0.99 | 0.43 | 0.43 | 5.0 | 5.0 | 8.6 | 3.66 | 23.46 | 6.97 | 18 | 3.57 | 14.50 | 15.00 | 14.90 | 15.73 | 17.07 | 18.00 | 1231-1230 |
| 172 | End | 25.018 | 0.18 | 3.19 | 0.88 | 0.16 | 3.09 | 5.0 | 8.0 | 7.6 | 23.39 | 29.07 | 4.77 | 30 | 0.36 | 13.00 | 13.09 | 15.93 | 15.99 | 16.60 | 19.01 | 1121-1120 |
| 173 | 172 | 97.849 | 0.55 | 3.01 | 0.96 | 0.53 | 2.93 | 5.0 | 7.6 | 7.7 | 22.50 | 27.72 | 4.58 | 30 | 0.33 | 13.09 | 13.41 | 16.43 | 16.64 | 19.01 | 18.15 | 1122-1121 |
| 174 | 173 | 96.000 | 0.49 | 2.46 | 0.99 | 0.49 | 2.40 | 5.0 | 7.2 | 7.8 | 18.75 | 27.54 | 3.82 | 30 | 0.32 | 13.41 | 13.72 | 16.81 | 16.95 | 18.15 | 18.15 | 1123-1122 |
| 175 | 174 | 96.000 | 0.47 | 1.97 | 0.96 | 0.45 | 1.92 | 5.0 | 6.7 | 8.0 | 15.27 | 27.54 | 3.11 | 30 | 0.32 | 13.72 | 14.03 | 17.06 | 17.16 | 18.15 | 18.15 | 1124-1123 |
| 176 | 175 | 96.000 | 0.49 | 1.50 | 0.99 | 0.49 | 1.46 | 5.0 | 6.3 | 8.1 | 11.88 | 15.19 | 3.78 | 24 | 0.32 | 14.03 | 14.34 | 17.24 | 17.43 | 18.15 | 18.15 | 1125-1124 |

Project File: Building 4 Storm.stm | Number of lines: 234 | Run Date: 7/10/2023

NOTES:Intensity = 48.38 / (Inlet time + 9.10) ^ 0.65; Return period =Yrs. 100 ; c = cir e = ellip b = box

# Storm Sewer Tabulation

| Station | | Len | Drng Area | | Rnoff coeff | Area x C | | Tc | | Rain (I) | Total flow | Cap full | Vel | Pipe | | Invert Elev | | HGL Elev | | Grnd / Rim Elev | | Line ID |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Line | To Line | (ft) | Incr (ac) | Total (ac) | (C) | Incr | Total | Inlet (min) | Syst (min) | (in/hr) | (cfs) | (cfs) | (ft/s) | Size (in) | Slope (%) | Dn (ft) | Up (ft) | Dn (ft) | Up (ft) | Dn (ft) | Up (ft) | |
| 177 | 176 | 96.000 | 0.48 | 1.01 | 0.99 | 0.48 | 0.98 | 5.0 | 5.7 | 8.3 | 8.16 | 15.19 | 2.60 | 24 | 0.32 | 14.34 | 14.65 | 17.54 | 17.63 | 18.15 | 18.15 | 1126-1125 |
| 178 | 177 | 96.000 | 0.53 | 0.53 | 0.95 | 0.50 | 0.50 | 5.0 | 5.0 | 8.6 | 4.32 | 8.96 | 2.45 | 18 | 0.52 | 14.65 | 15.15 | 17.68 | 17.79 | 18.15 | 18.15 | 1127-1126 |
| 179 | End | 20.363 | 0.61 | 1.24 | 0.92 | 0.56 | 1.18 | 5.0 | 6.6 | 8.0 | 9.48 | 43.53 | 3.02 | 24 | 2.65 | 13.00 | 13.54 | 15.93 | 15.96 | 16.10 | 18.20 | 1111-1110 |
| 180 | 179 | 96.000 | 0.32 | 0.63 | 0.99 | 0.32 | 0.62 | 5.0 | 6.1 | 8.2 | 5.11 | 8.78 | 2.89 | 18 | 0.50 | 14.04 | 14.52 | 16.17 | 16.33 | 18.20 | 18.20 | 1112-1111 |
| 181 | 180 | 96.000 | 0.31 | 0.31 | 0.99 | 0.31 | 0.31 | 5.0 | 5.0 | 8.6 | 2.64 | 8.78 | 1.60 | 18 | 0.50 | 14.72 | 15.20 | 16.39 | 16.43 | 18.20 | 18.20 | 1113-1112 |
| 182 | End | 21.000 | 0.42 | 3.88 | 0.99 | 0.42 | 3.79 | 5.0 | 11.1 | 6.8 | 25.73 | 87.70 | 3.64 | 36 | 1.24 | 10.50 | 10.76 | 14.54 | 14.56 | 14.12 | 17.70 | 1211-1210 |
| 183 | 182 | 106.000 | 0.53 | 3.46 | 0.95 | 0.50 | 3.37 | 5.0 | 10.6 | 6.9 | 23.29 | 55.73 | 3.30 | 36 | 0.50 | 10.76 | 11.29 | 14.67 | 14.76 | 17.70 | 17.77 | 1212-1211 |
| 184 | 183 | 100.146 | 0.48 | 2.93 | 0.99 | 0.48 | 2.87 | 5.0 | 10.0 | 7.0 | 20.19 | 55.69 | 2.86 | 36 | 0.50 | 11.29 | 11.79 | 14.86 | 14.93 | 17.77 | 18.16 | 1213-1212 |
| 185 | 184 | 96.000 | 0.48 | 2.45 | 0.99 | 0.48 | 2.40 | 5.0 | 9.6 | 7.1 | 17.11 | 34.27 | 3.49 | 30 | 0.50 | 11.79 | 12.27 | 15.00 | 15.12 | 18.16 | 18.16 | 1214-1213 |
| 186 | 185 | 95.960 | 0.42 | 1.97 | 0.97 | 0.41 | 1.92 | 5.0 | 9.1 | 7.3 | 13.98 | 34.28 | 2.85 | 30 | 0.50 | 12.27 | 12.75 | 15.22 | 15.25 | 18.16 | 18.17 | 1215-1214 |
| 187 | 186 | 96.000 | 0.26 | 1.55 | 0.97 | 0.25 | 1.51 | 5.0 | 8.4 | 7.5 | 11.28 | 34.27 | 2.42 | 30 | 0.50 | 12.75 | 13.23 | 15.31 | 15.34 | 18.17 | 18.17 | 1216-1215 |
| 188 | 187 | 96.000 | 0.32 | 1.29 | 0.98 | 0.31 | 1.26 | 5.0 | 7.6 | 7.7 | 9.68 | 34.27 | 3.58 | 30 | 0.50 | 13.23 | 13.71 | 15.40 | 14.75 | 18.17 | 18.17 | 1217-1216 |
| 189 | 188 | 96.000 | 0.32 | 0.97 | 0.98 | 0.31 | 0.95 | 5.0 | 7.0 | 7.9 | 7.47 | 18.90 | 4.74 | 24 | 0.50 | 13.71 | 14.19 | 14.75 | 15.16 | 18.17 | 18.17 | 1218-1217 |
| 190 | 189 | 96.000 | 0.32 | 0.65 | 0.98 | 0.31 | 0.63 | 5.0 | 6.0 | 8.2 | 5.20 | 18.90 | 3.92 | 24 | 0.50 | 14.19 | 14.67 | 15.16 | 15.47 | 18.17 | 18.17 | 1219-1218 |
| 191 | 190 | 96.000 | 0.33 | 0.33 | 0.97 | 0.32 | 0.32 | 5.0 | 5.0 | 8.6 | 2.75 | 8.96 | 3.38 | 18 | 0.52 | 14.67 | 15.17 | 15.47 | 15.80 | 18.17 | 18.17 | 1219A-1219 |
| 192 | End | 82.241 | 0.32 | 1.12 | 0.82 | 0.26 | 0.92 | 5.0 | 7.4 | 7.7 | 7.10 | 14.74 | 4.02 | 18 | 1.41 | 13.00 | 14.16 | 15.93 | 16.20 | 15.57 | 19.22 | 1261-1260 |
| 193 | 192 | 187.329 | 0.32 | 0.32 | 0.83 | 0.27 | 0.27 | 5.0 | 5.0 | 8.6 | 2.28 | 8.93 | 1.29 | 18 | 0.52 | 14.36 | 15.33 | 16.76 | 16.83 | 19.22 | 19.22 | 1263-1261 |
| 194 | 192 | 194.006 | 0.48 | 0.48 | 0.81 | 0.39 | 0.39 | 5.0 | 5.0 | 8.6 | 3.34 | 8.78 | 1.89 | 18 | 0.50 | 14.36 | 15.33 | 16.76 | 16.90 | 19.22 | 19.22 | 1262-1261 |
| 195 | End | 107.831 | 1.04 | 1.48 | 0.84 | 0.87 | 1.22 | 5.0 | 5.4 | 8.4 | 10.27 | 14.33 | 3.27 | 24 | 0.29 | 13.00 | 13.31 | 15.93 | 16.09 | 19.72 | 18.00 | 1152A-1152 |
| 196 | 195 | 54.002 | 0.44 | 0.44 | 0.78 | 0.34 | 0.34 | 5.0 | 5.0 | 8.6 | 2.95 | 4.53 | 2.40 | 15 | 0.35 | 13.31 | 13.50 | 16.22 | 16.30 | 18.00 | 18.00 | 1152B-1152A |
| 197 | End | 10.939 | 0.37 | 1.43 | 0.99 | 0.37 | 1.42 | 5.0 | 7.5 | 7.7 | 10.92 | 58.28 | 3.48 | 24 | 4.75 | 13.00 | 13.52 | 15.93 | 15.95 | 16.10 | 17.50 | 1011-1010 |
| 198 | 197 | 95.996 | 0.35 | 0.58 | 0.99 | 0.35 | 0.57 | 5.0 | 6.9 | 7.9 | 4.54 | 8.78 | 2.57 | 18 | 0.50 | 14.02 | 14.50 | 16.37 | 16.49 | 17.50 | 17.50 | 1013-1011 |

Project File: Building 4 Storm.stm | Number of lines: 234 | Run Date: 7/10/2023

NOTES:Intensity = 48.38 / (Inlet time + 9.10) ^ 0.65; Return period =Yrs. 100 ; c = cir e = ellip b = box

# Storm Sewer Tabulation



| Station | | Len | Drng Area | | Rnoff coeff | Area x C | | Tc | | Rain (I) | Total flow | Cap full | Vel | Pipe | | Invert Elev | | HGL Elev | | Grnd / Rim Elev | | Line ID |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Line | To Line | (ft) | Incr (ac) | Total (ac) | (C) | Incr | Total | Inlet (min) | Syst (min) | (in/hr) | (cfs) | (cfs) | (ft/s) | Size (in) | Slope (%) | Dn (ft) | Up (ft) | Dn (ft) | Up (ft) | Dn (ft) | Up (ft) | |
| 199 | 197 | 95.998 | 0.48 | 0.48 | 0.99 | 0.48 | 0.48 | 5.0 | 5.0 | 8.6 | 4.08 | 8.78 | 2.31 | 18 | 0.50 | 14.02 | 14.50 | 16.37 | 16.47 | 17.50 | 17.50 | 1012-1011 |
| 200 | 198 | 127.000 | 0.23 | 0.23 | 0.99 | 0.23 | 0.23 | 5.0 | 5.0 | 8.6 | 1.96 | 13.40 | 1.78 | 18 | 1.17 | 14.50 | 15.98 | 16.65 | 16.67 | 17.50 | 19.25 | TR DRAIN-1013 |
| 201 | End | 10.923 | 0.47 | 1.44 | 0.98 | 0.46 | 1.40 | 5.0 | 5.7 | 8.3 | 11.65 | 58.32 | 3.71 | 24 | 4.76 | 13.00 | 13.52 | 15.93 | 15.95 | 15.60 | 17.50 | 1031-1030 |
| 202 | 201 | 96.000 | 0.49 | 0.49 | 0.98 | 0.48 | 0.48 | 5.0 | 5.0 | 8.6 | 4.12 | 8.78 | 2.33 | 18 | 0.50 | 14.02 | 14.50 | 16.27 | 16.37 | 17.50 | 17.50 | 1032-1031 |
| 203 | 201 | 96.000 | 0.48 | 0.48 | 0.96 | 0.46 | 0.46 | 5.0 | 5.0 | 8.6 | 3.96 | 8.78 | 2.24 | 18 | 0.50 | 14.02 | 14.50 | 16.27 | 16.37 | 17.50 | 17.50 | 1033-1031 |
| 204 | End | 10.996 | 0.48 | 1.42 | 0.98 | 0.47 | 1.40 | 5.0 | 5.7 | 8.3 | 11.60 | 58.13 | 3.69 | 24 | 4.73 | 13.00 | 13.52 | 15.93 | 15.95 | 16.10 | 17.50 | 1041-1040 |
| 205 | 204 | 96.000 | 0.46 | 0.46 | 0.99 | 0.46 | 0.46 | 5.0 | 5.0 | 8.6 | 3.91 | 8.78 | 2.21 | 18 | 0.50 | 14.02 | 14.50 | 16.42 | 16.52 | 17.50 | 17.50 | 1043-1041 |
| 206 | 204 | 96.000 | 0.48 | 0.48 | 0.98 | 0.47 | 0.47 | 5.0 | 5.0 | 8.6 | 4.04 | 8.78 | 2.29 | 18 | 0.50 | 14.02 | 14.50 | 16.42 | 16.53 | 17.50 | 17.50 | 1042-1041 |
| 207 | End | 10.954 | 0.47 | 1.45 | 0.96 | 0.45 | 1.39 | 5.0 | 6.3 | 8.1 | 11.31 | 30.22 | 3.60 | 24 | 1.28 | 13.00 | 13.14 | 15.93 | 15.95 | 16.10 | 17.50 | 1001-1000 |
| 208 | 207 | 96.000 | 0.45 | 0.98 | 0.99 | 0.45 | 0.94 | 5.0 | 5.7 | 8.3 | 7.86 | 18.90 | 2.50 | 24 | 0.50 | 13.34 | 13.82 | 16.25 | 16.33 | 17.50 | 17.50 | 1002-1001 |
| 209 | 208 | 95.999 | 0.53 | 0.53 | 0.94 | 0.50 | 0.50 | 5.0 | 5.0 | 8.6 | 4.28 | 8.78 | 2.42 | 18 | 0.50 | 14.02 | 14.50 | 16.38 | 16.49 | 17.50 | 17.50 | 1003-1002 |
| 210 | End | 28.266 | 0.47 | 0.95 | 0.99 | 0.47 | 0.94 | 5.0 | 5.7 | 8.3 | 7.78 | 36.26 | 2.48 | 24 | 1.84 | 13.00 | 13.52 | 15.93 | 15.95 | 16.10 | 17.50 | 1021-1020 |
| 211 | 210 | 95.996 | 0.48 | 0.48 | 0.98 | 0.47 | 0.47 | 5.0 | 5.0 | 8.6 | 4.04 | 8.78 | 2.29 | 18 | 0.50 | 14.02 | 14.50 | 16.06 | 16.17 | 17.50 | 17.50 | 1022-1021 |
| 212 | End | 15.000 | 0.48 | 1.45 | 0.98 | 0.47 | 1.43 | 5.0 | 5.7 | 8.3 | 11.86 | 46.30 | 3.78 | 24 | 3.00 | 13.00 | 13.45 | 15.93 | 15.96 | 16.10 | 17.50 | 1051-1050 |
| 213 | 212 | 97.649 | 0.49 | 0.49 | 0.98 | 0.48 | 0.48 | 5.0 | 5.0 | 8.6 | 4.12 | 9.31 | 2.33 | 18 | 0.56 | 13.95 | 14.50 | 16.43 | 16.54 | 17.50 | 17.50 | 1053-1051 |
| 214 | 212 | 96.000 | 0.48 | 0.48 | 0.99 | 0.48 | 0.48 | 5.0 | 5.0 | 8.6 | 4.08 | 9.39 | 2.31 | 18 | 0.57 | 13.95 | 14.50 | 16.43 | 16.53 | 17.50 | 17.50 | 1052-1051 |
| 215 | End | 90.000 | 0.27 | 0.51 | 0.99 | 0.27 | 0.50 | 5.0 | 6.6 | 8.0 | 4.04 | 12.62 | 5.39 | 18 | 1.03 | 12.47 | 13.40 | 13.05 | 14.17 | 17.99 | 16.65 | 1290-EX MH |
| 216 | 215 | 161.000 | 0.24 | 0.24 | 0.99 | 0.24 | 0.24 | 5.0 | 5.0 | 8.6 | 2.04 | 5.55 | 3.16 | 15 | 0.53 | 13.40 | 14.25 | 14.17 | 14.82 | 16.65 | 17.25 | 1291-1290 |
| 217 | End | 102.750 | 0.33 | 0.33 | 0.80 | 0.26 | 0.26 | 5.0 | 5.0 | 8.6 | 2.27 | 39.55 | 1.62 | 24 | 2.19 | 13.00 | 15.25 | 15.93 | 15.91 | 15.60 | 18.75 | 1271-1270 |
| 218 | End | 20.840 | 0.29 | 0.29 | 0.87 | 0.25 | 0.25 | 5.0 | 5.0 | 8.6 | 2.17 | 30.39 | 1.23 | 18 | 6.00 | 13.00 | 14.25 | 15.93 | 15.94 | 15.07 | 17.25 | 1941-1940 |
| 219 | End | 83.500 | 0.69 | 0.69 | 0.87 | 0.60 | 0.60 | 5.0 | 5.0 | 8.6 | 5.15 | 19.21 | 3.56 | 18 | 2.40 | 13.00 | 15.00 | 15.93 | 15.98 | 15.07 | 18.00 | 1921-1920 |
| 220 | End | 83.501 | 0.70 | 0.70 | 0.87 | 0.61 | 0.61 | 5.0 | 5.0 | 8.6 | 5.23 | 19.21 | 3.60 | 18 | 2.40 | 13.00 | 15.00 | 15.93 | 15.99 | 15.07 | 18.00 | 1931-1930 |

-567-

Project File: Building 4 Storm.stm | Number of lines: 234 | Run Date: 7/10/2023

NOTES:Intensity = 48.38 / (Inlet time + 9.10) ^ 0.65; Return period =Yrs. 100 ; c = cir e = ellip b = box

# Storm Sewer Tabulation

| Station | | Len | Drng Area | | Rnoff coeff | Area x C | | Tc | | Rain (I) | Total flow | Cap full | Vel | Pipe | | Invert Elev | | HGL Elev | | Grnd / Rim Elev | | Line ID |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Line | To Line | (ft) | Incr (ac) | Total (ac) | (C) | Incr | Total | Inlet (min) | Syst (min) | (in/hr) | (cfs) | (cfs) | (ft/s) | Size (in) | Slope (%) | Dn (ft) | Up (ft) | Dn (ft) | Up (ft) | Dn (ft) | Up (ft) | |
| 221 | End | 83.499 | 0.48 | 0.48 | 0.91 | 0.44 | 0.44 | 5.0 | 5.0 | 8.6 | 3.75 | 19.21 | 2.13 | 18 | 2.40 | 13.00 | 15.00 | 16.38 | 16.45 | 15.07 | 18.00 | 1901-1900 |
| 222 | End | 105.376 | 0.69 | 0.69 | 0.87 | 0.60 | 0.60 | 5.0 | 5.0 | 8.6 | 5.15 | 17.10 | 3.42 | 18 | 1.90 | 13.00 | 15.00 | 15.93 | 16.05 | 15.07 | 18.00 | 1911-1910 |
| 223 | End | 31.230 | 0.24 | 0.82 | 0.65 | 0.16 | 0.64 | 5.0 | 6.6 | 8.0 | 5.10 | 19.13 | 1.63 | 24 | 0.51 | 13.00 | 13.16 | 16.38 | 16.39 | 15.81 | 18.00 | 1298-1297 |
| 224 | 223 | 222.720 | 0.58 | 0.58 | 0.83 | 0.48 | 0.48 | 5.0 | 5.0 | 8.6 | 4.13 | 9.63 | 2.34 | 18 | 0.60 | 13.66 | 15.00 | 16.45 | 16.70 | 18.00 | 18.00 | 1299-1298 |
| 225 | End | 142.770 | 0.49 | 0.49 | 0.65 | 0.32 | 0.32 | 5.0 | 5.0 | 8.6 | 23.46 | 51.94 | 4.83 | 36 | 0.43 | 13.00 | 13.62 | 15.93 | 15.18 | 18.00 | 18.00 | 1902-1901 |
| 226 | 225 | 75.580 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.0 | 0.0 | 0.0 | 20.73 | 55.89 | 5.83 | 36 | 0.50 | 13.62 | 14.00 | 15.18 | 15.46 | 18.00 | 18.00 | 103-102 |
| 227 | End | 36.640 | 0.19 | 0.19 | 0.65 | 0.12 | 0.12 | 5.0 | 5.0 | 8.6 | 1.06 | 19.75 | 0.34 | 24 | 0.55 | 13.00 | 13.20 | 16.38 | 16.38 | 15.81 | 18.00 | 1296-1295 |
| 228 | End | 28.830 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.0 | 6.9 | 0.0 | 6.73 | 7.93 | 5.16 | 18 | 0.49 | 10.00 | 10.14 | 11.00 | 11.22 | 12.60 | 18.00 | 1295D-1295E |
| 229 | 228 | 163.790 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.0 | 6.2 | 0.0 | 6.73 | 7.38 | 4.07 | 18 | 0.42 | 10.14 | 10.83 | 11.60 | 12.07 | 18.00 | 18.51 | 1295C-1295D |
| 230 | 229 | 236.140 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 5.0 | 5.2 | 0.0 | 6.73 | 7.40 | 4.01 | 18 | 0.42 | 10.83 | 11.83 | 12.35 | 13.10 | 18.51 | 18.23 | 1295B-1295C |
| 231 | 230 | 40.000 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 5.0 | 5.0 | 0.0 | 6.73 | 7.42 | 3.92 | 18 | 0.43 | 11.83 | 12.00 | 13.26 | 13.37 | 18.23 | 16.50 | 1295A-1295B |
| 232 | End | 202.730 | 0.00 | 0.49 | 0.00 | 0.00 | 0.32 | 0.0 | 5.9 | 8.3 | 19.58 | 0.00 | 2.77 | 36 | 0.00 | 13.00 | 13.00 | 16.38 | 16.53 | 16.62 | 20.00 | 1901-1900 |
| 233 | 232 | 142.770 | 0.49 | 0.49 | 0.65 | 0.32 | 0.32 | 5.0 | 5.0 | 8.6 | 19.68 | 47.61 | 2.79 | 36 | 0.43 | 13.00 | 13.62 | 16.65 | 16.75 | 20.00 | 18.00 | 1902-1901 |
| 234 | 233 | 76.000 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.0 | 0.0 | 0.0 | 16.95 | 51.09 | 2.42 | 36 | 0.50 | 13.62 | 14.00 | 16.81 | 16.85 | 18.00 | 18.00 | 1903-1902 |

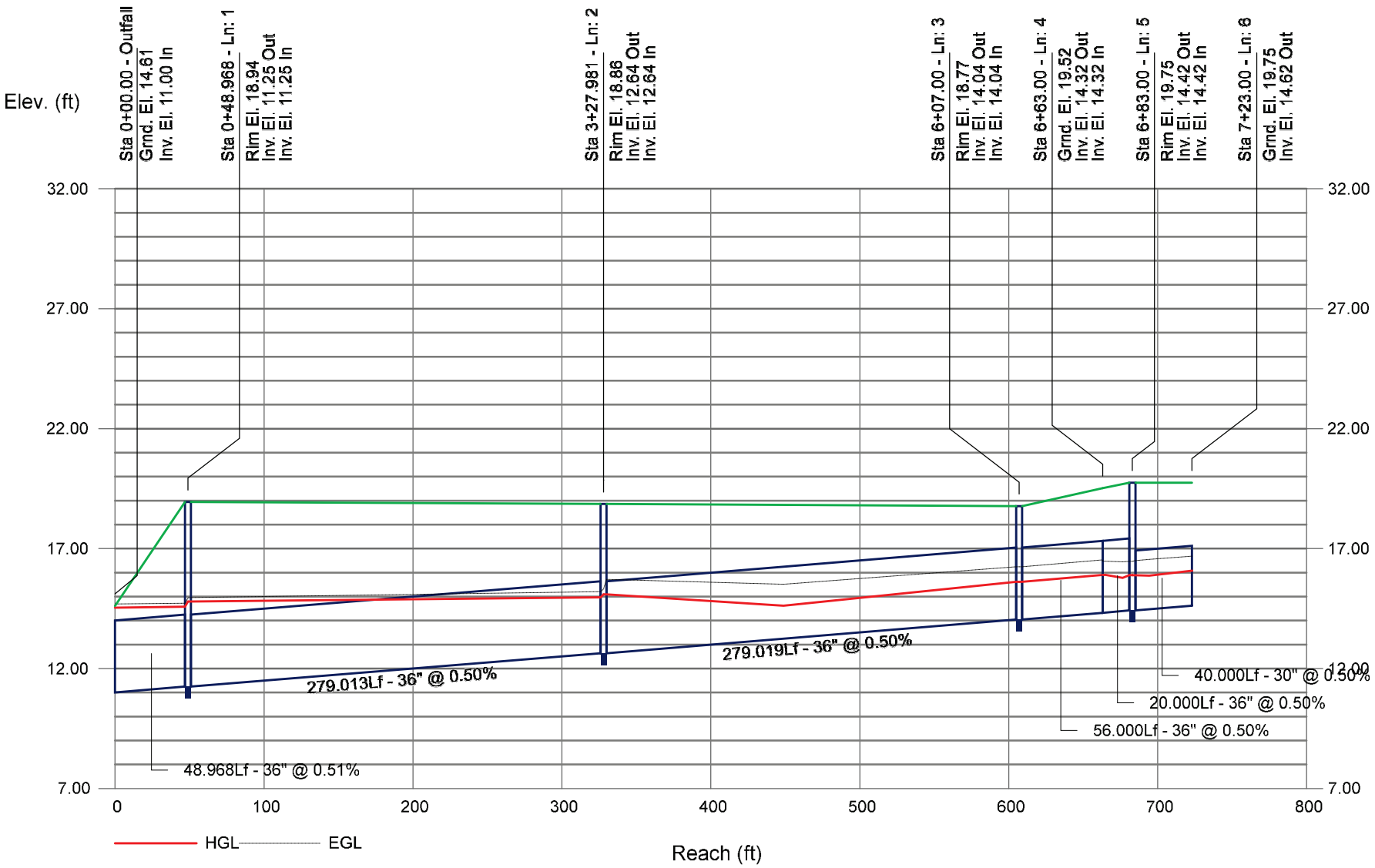
Project File: Building 4 Storm.stm | Number of lines: 234 | Run Date: 7/10/2023

NOTES:Intensity = 48.38 / (Inlet time + 9.10) ^ 0.65; Return period =Yrs. 100 ; c = cir e = ellip b = box

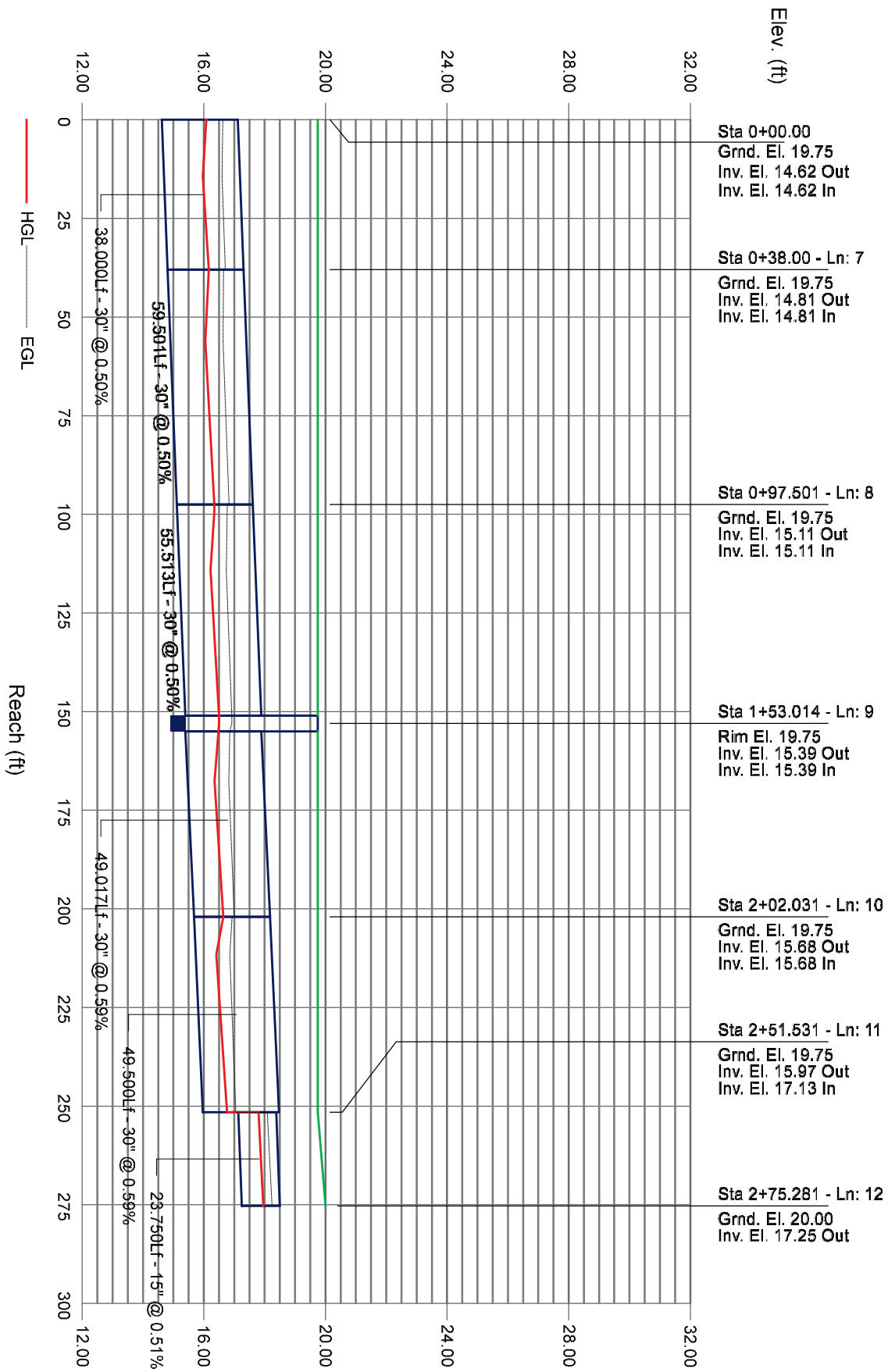
# Storm Sewer Profile

Proj. file: Building 4 Storm.stm





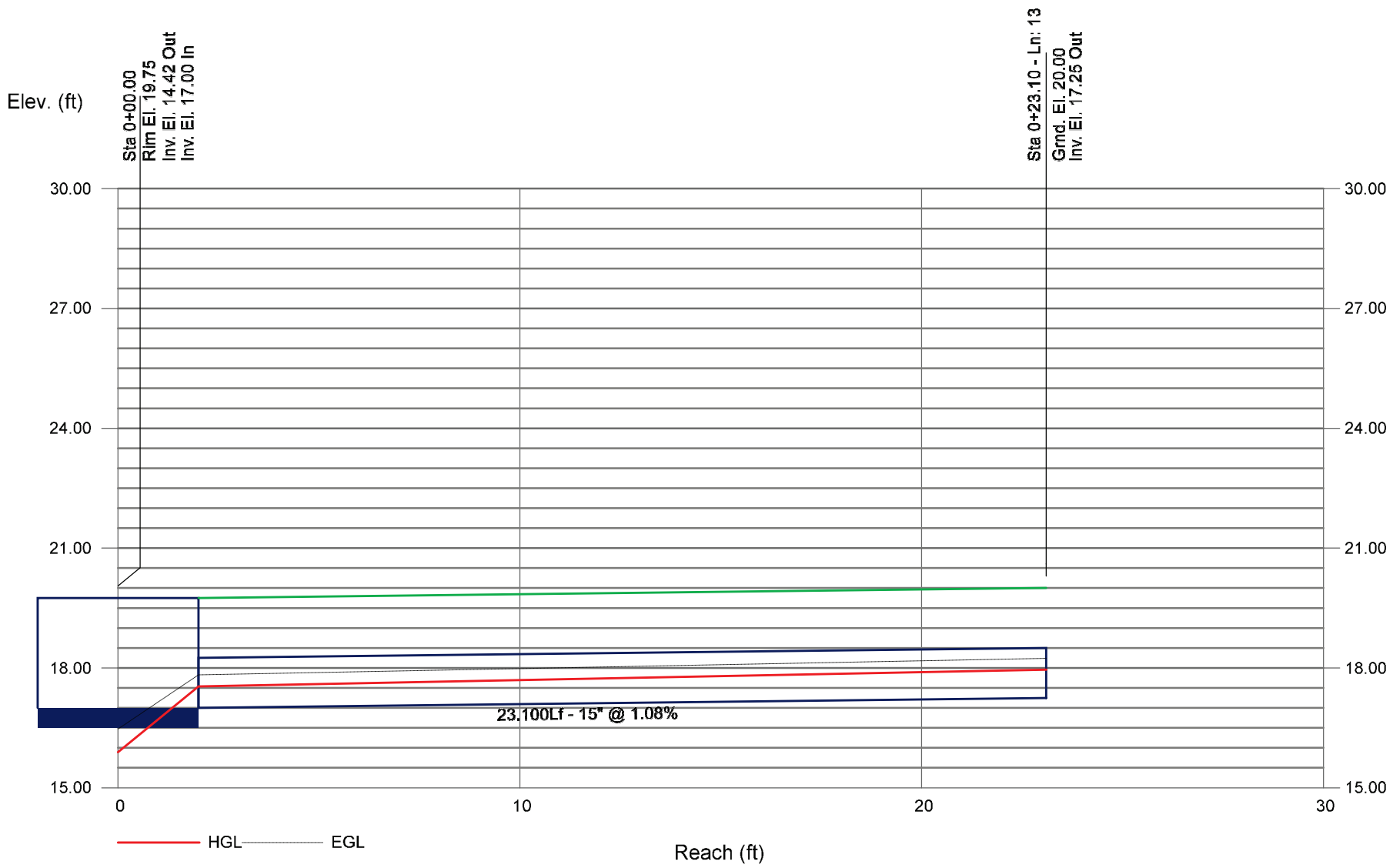
# Storm Sewer Profile



# Storm Sewer Profile

Proj. file: Building 4 Storm.stm

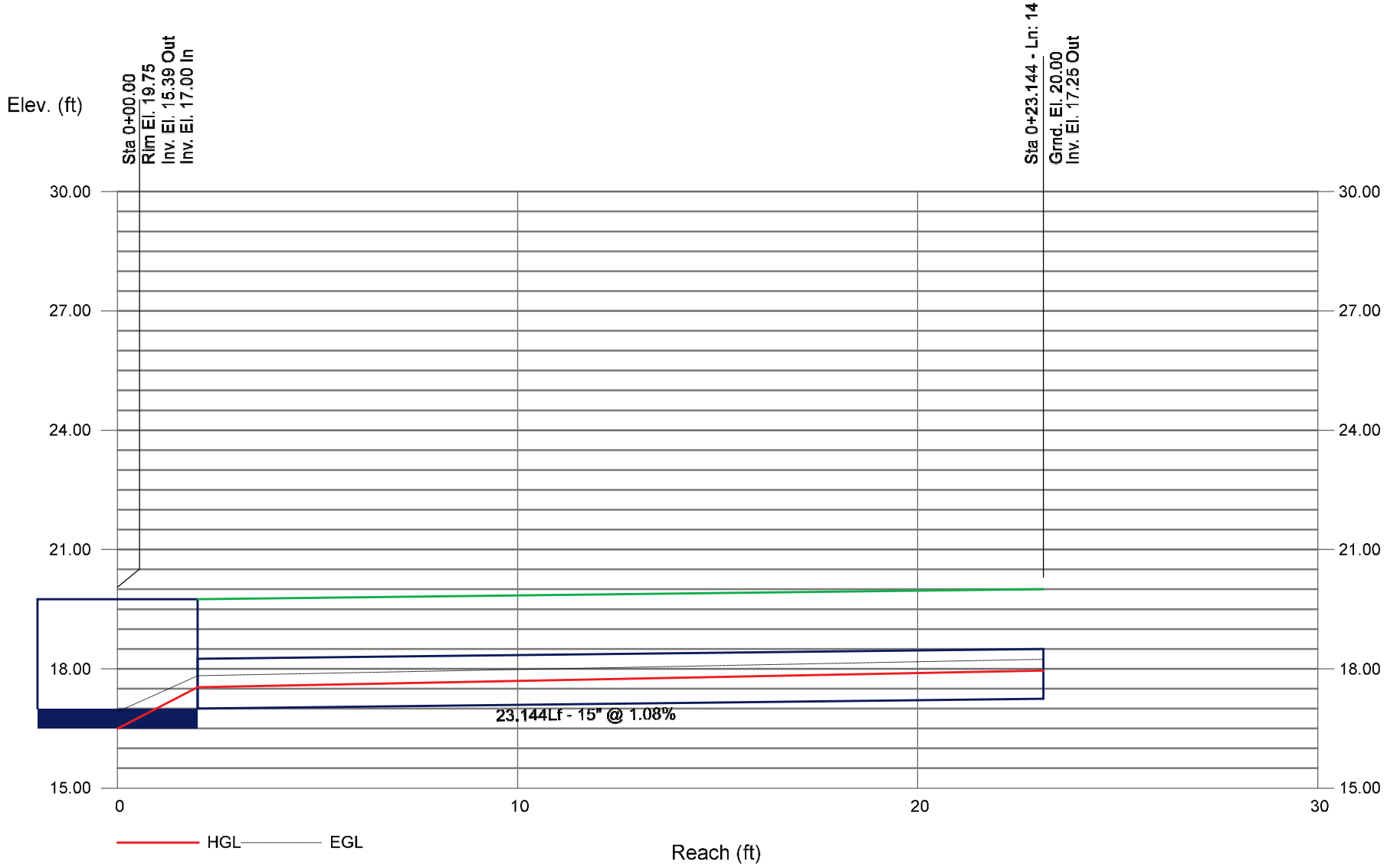




# Storm Sewer Profile

Proj. file: Building 4 Storm.stm

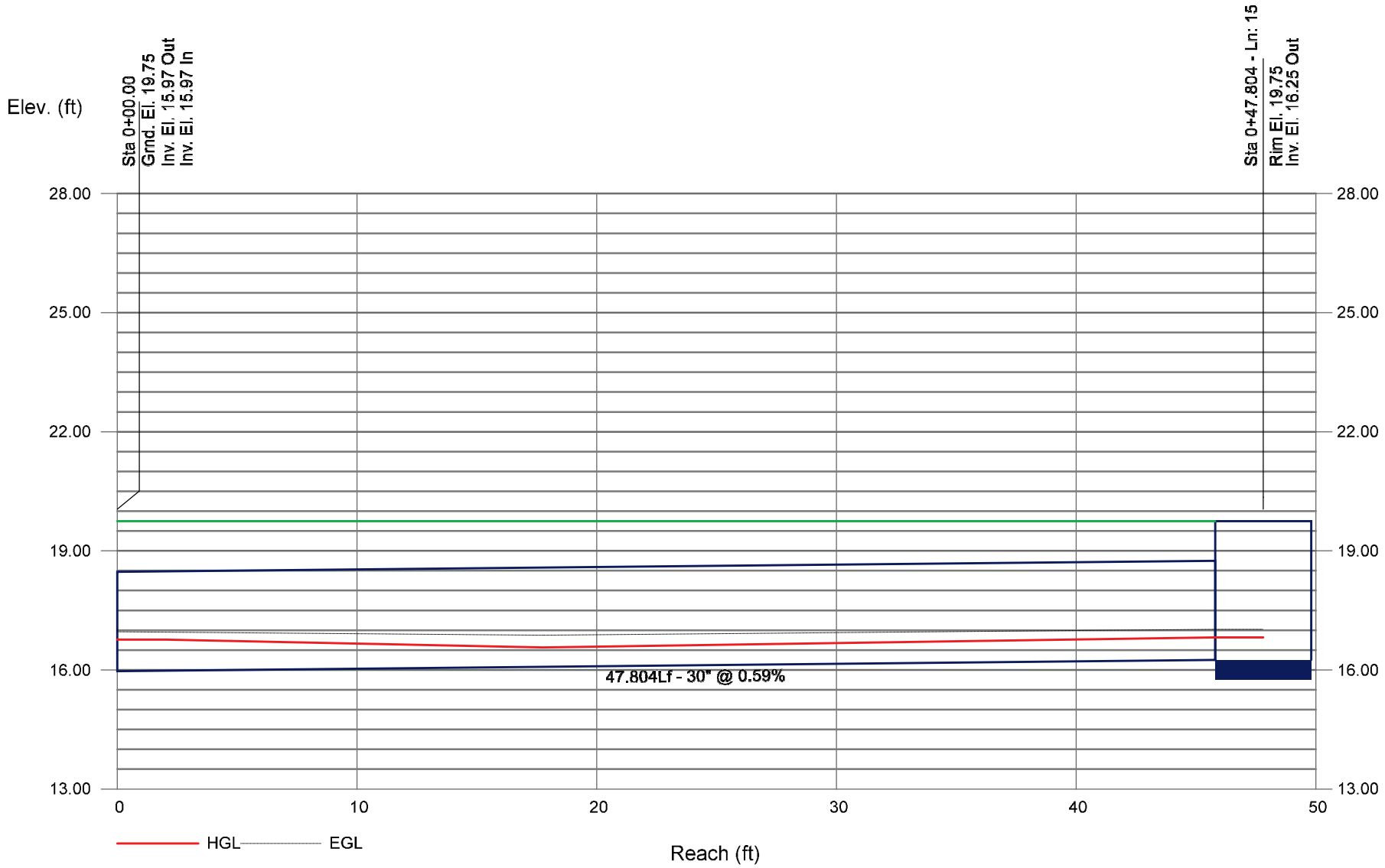




# Storm Sewer Profile

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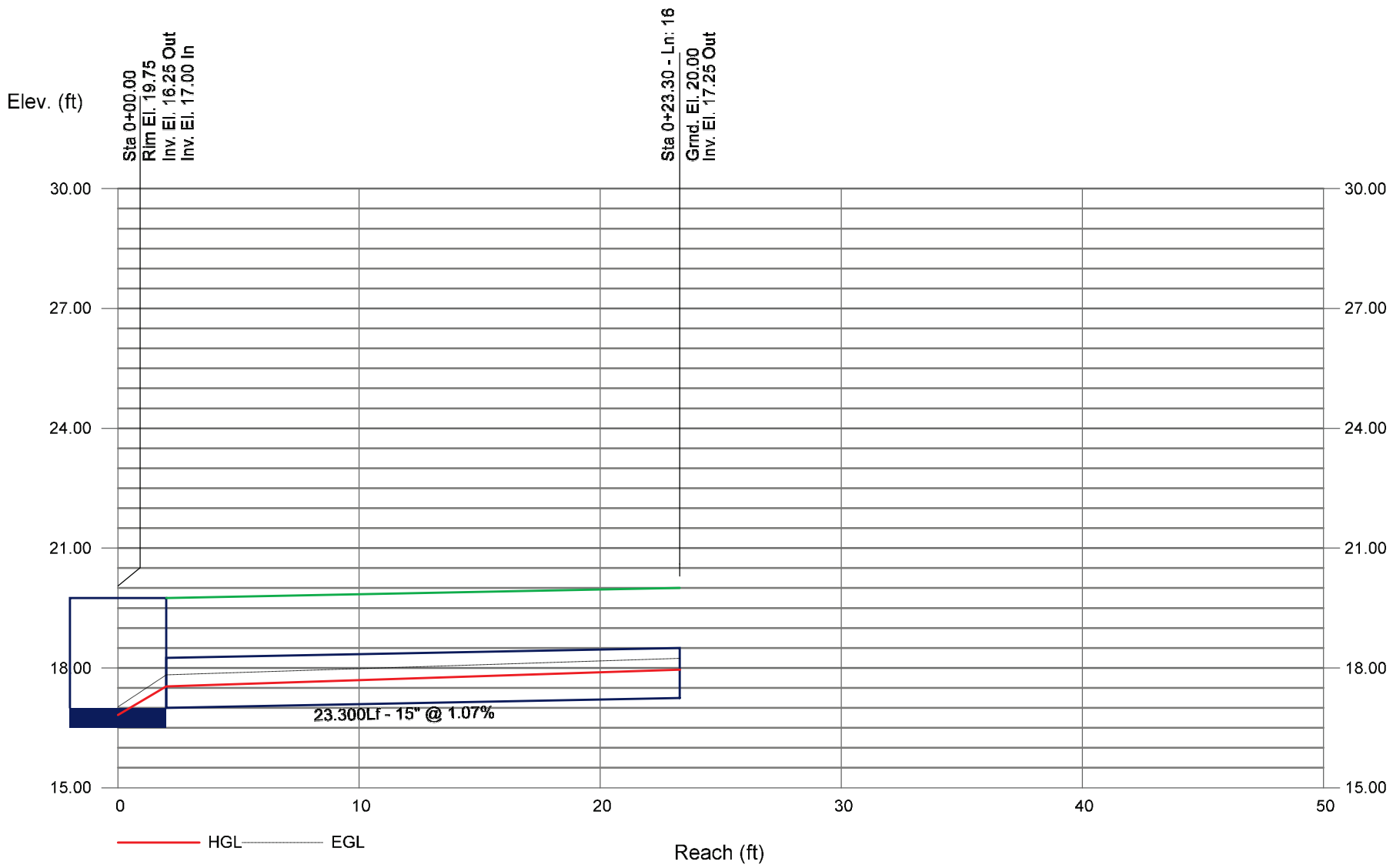




# Storm Sewer Profile

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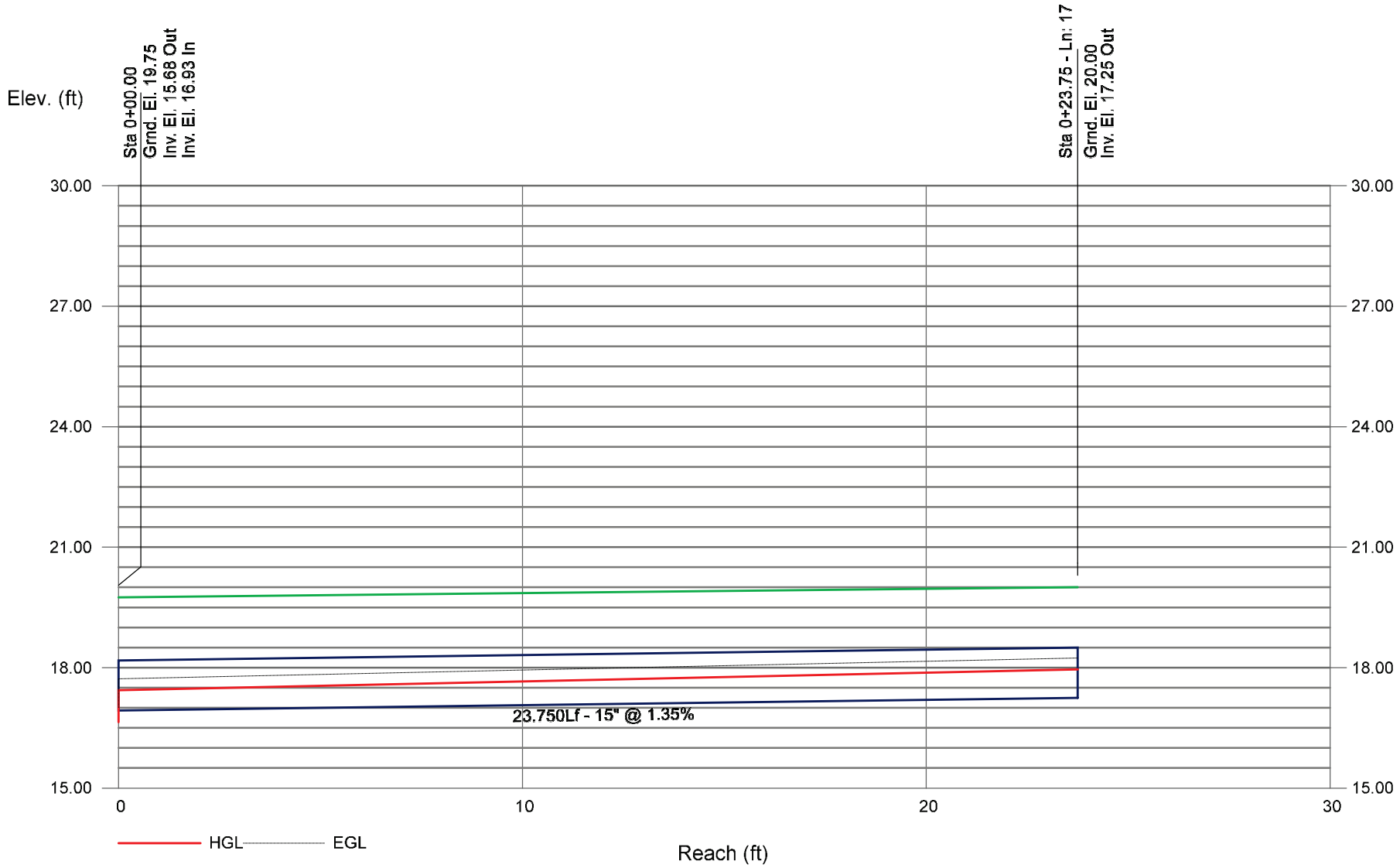




# Storm Sewer Profile

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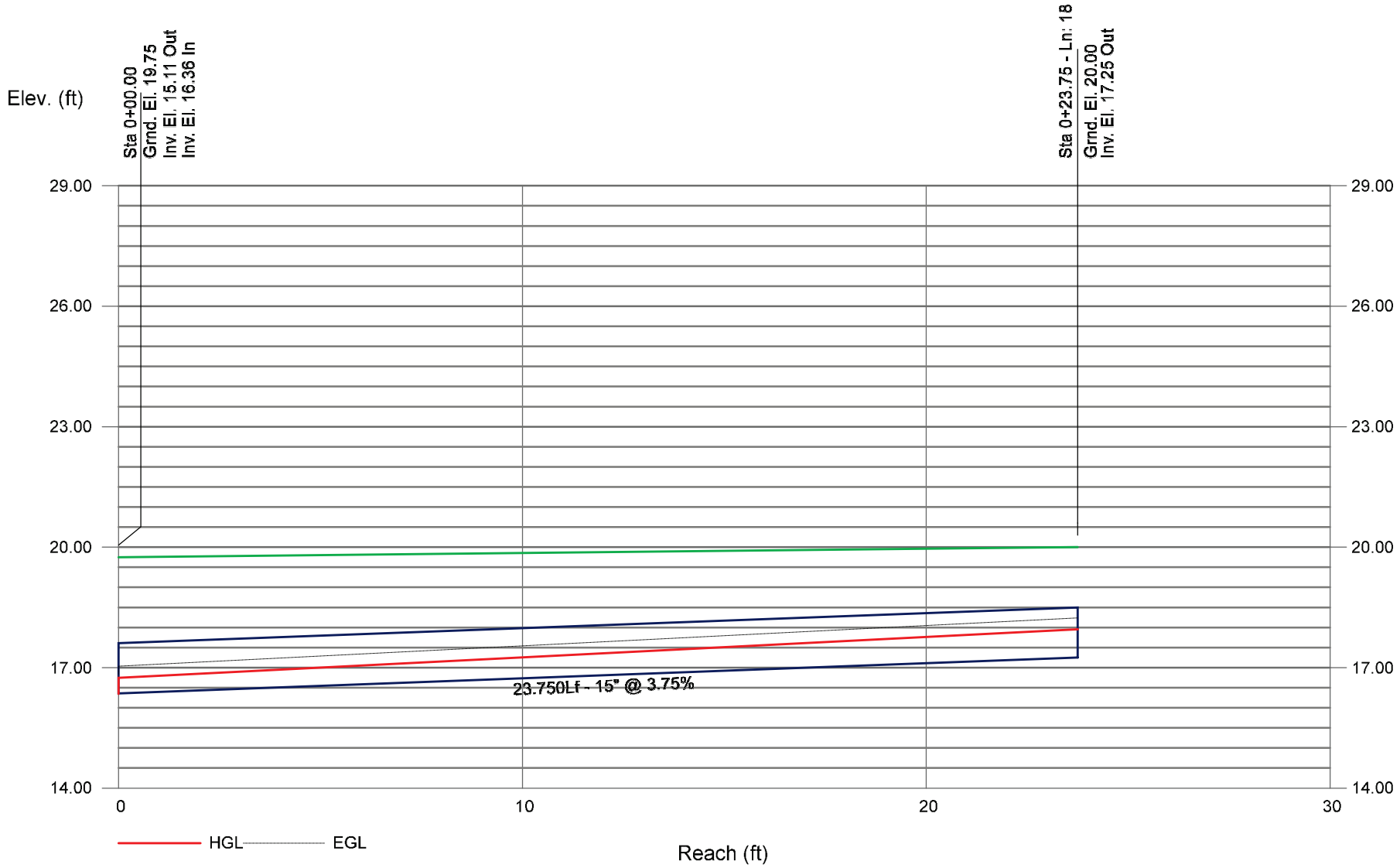




# Storm Sewer Profile

Proj. file: Building 4 Storm.stm

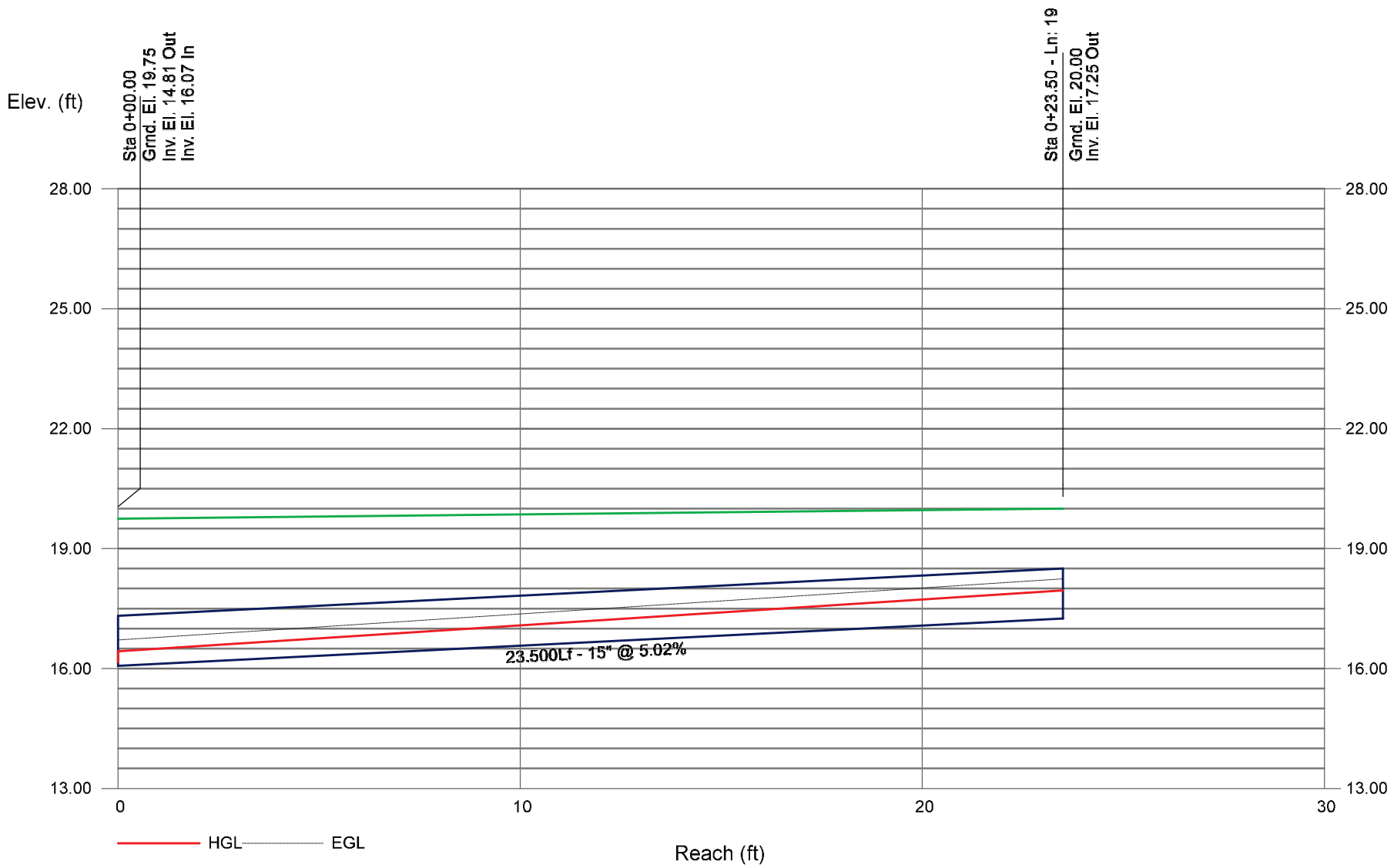




# Storm Sewer Profile



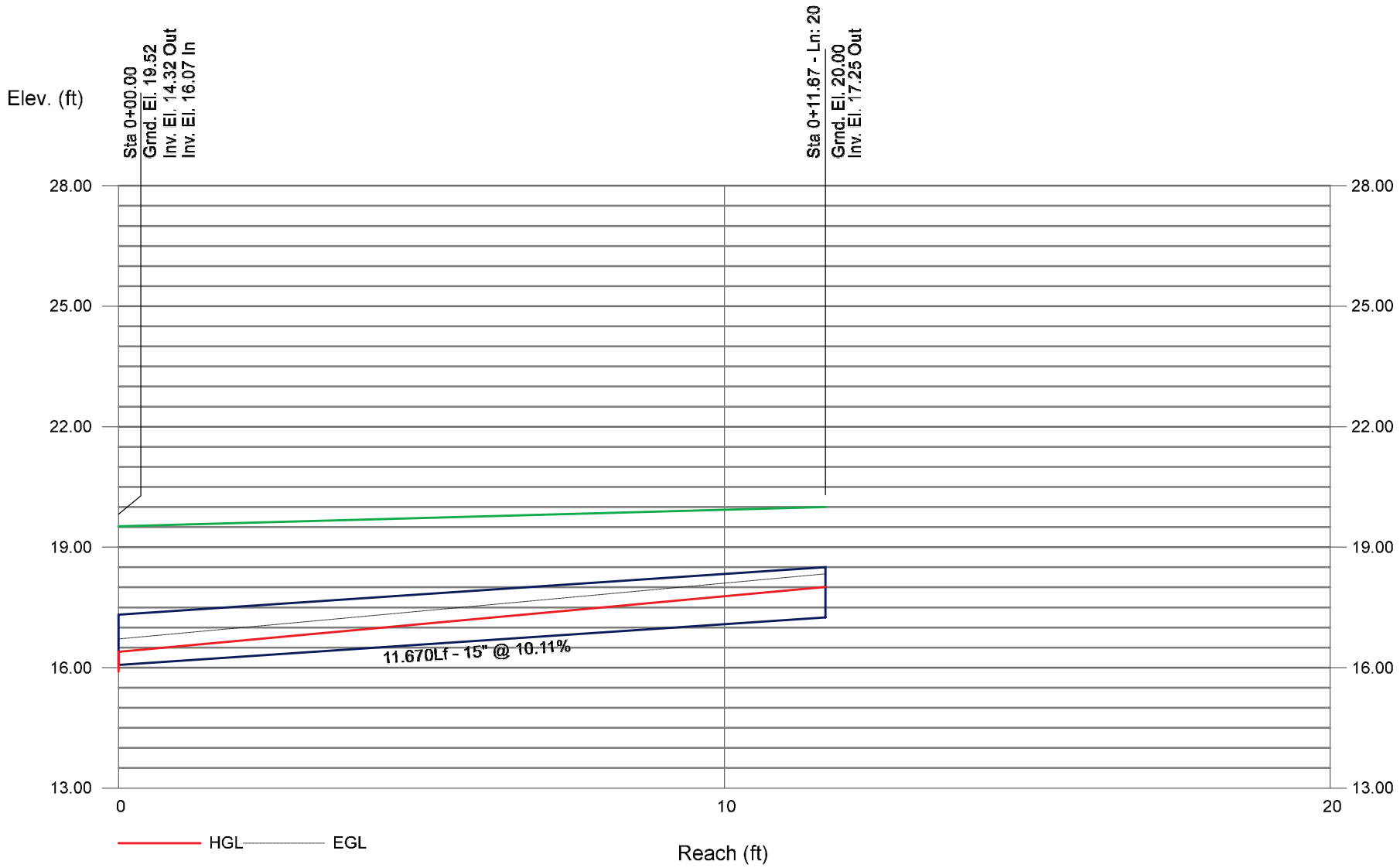




# Storm Sewer Profile

Proj. file: Building 4 Storm.stm

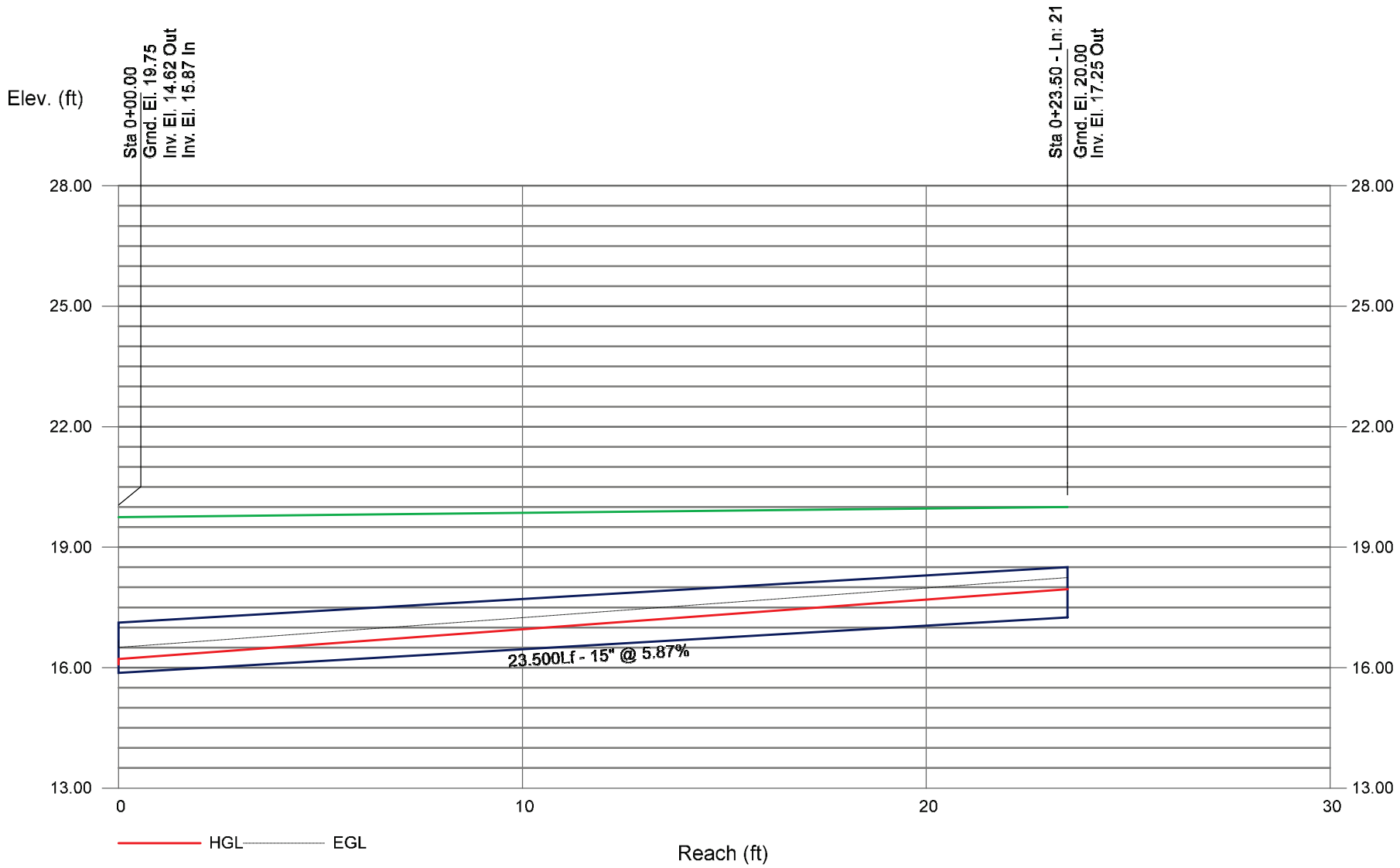




# Storm Sewer Profile

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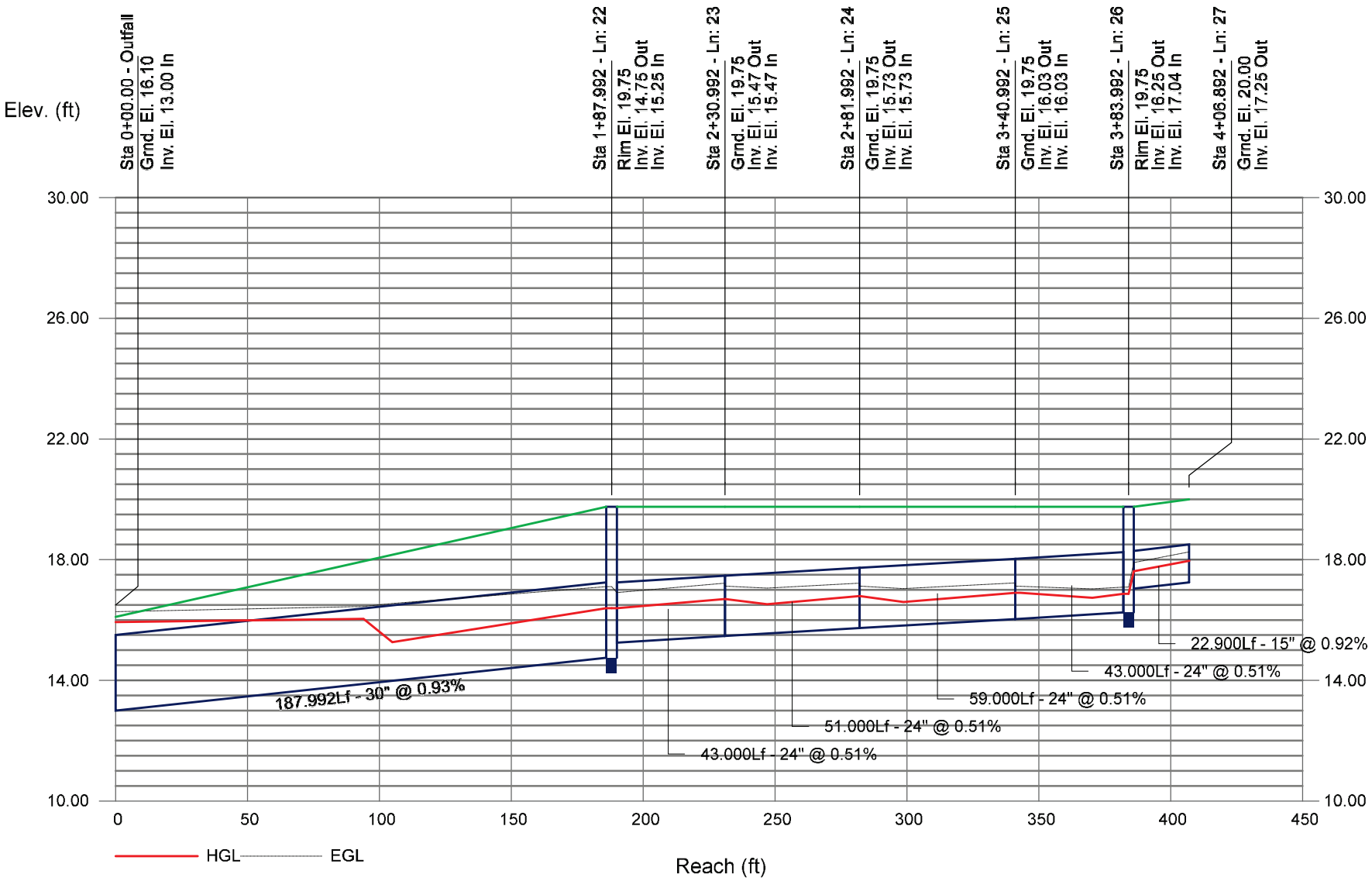




# Storm Sewer Profile

Proj. file: Building 4 Storm.stm

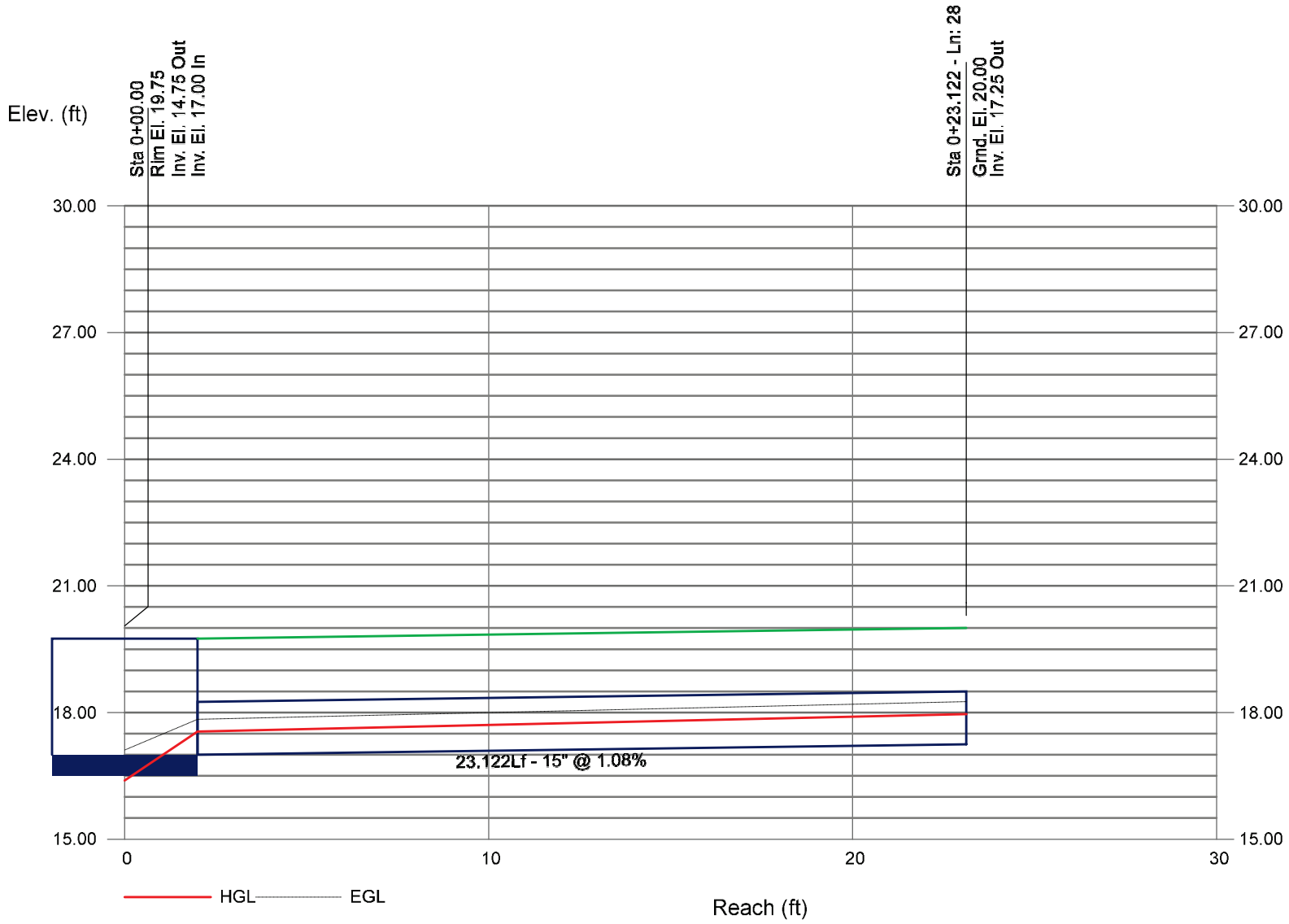




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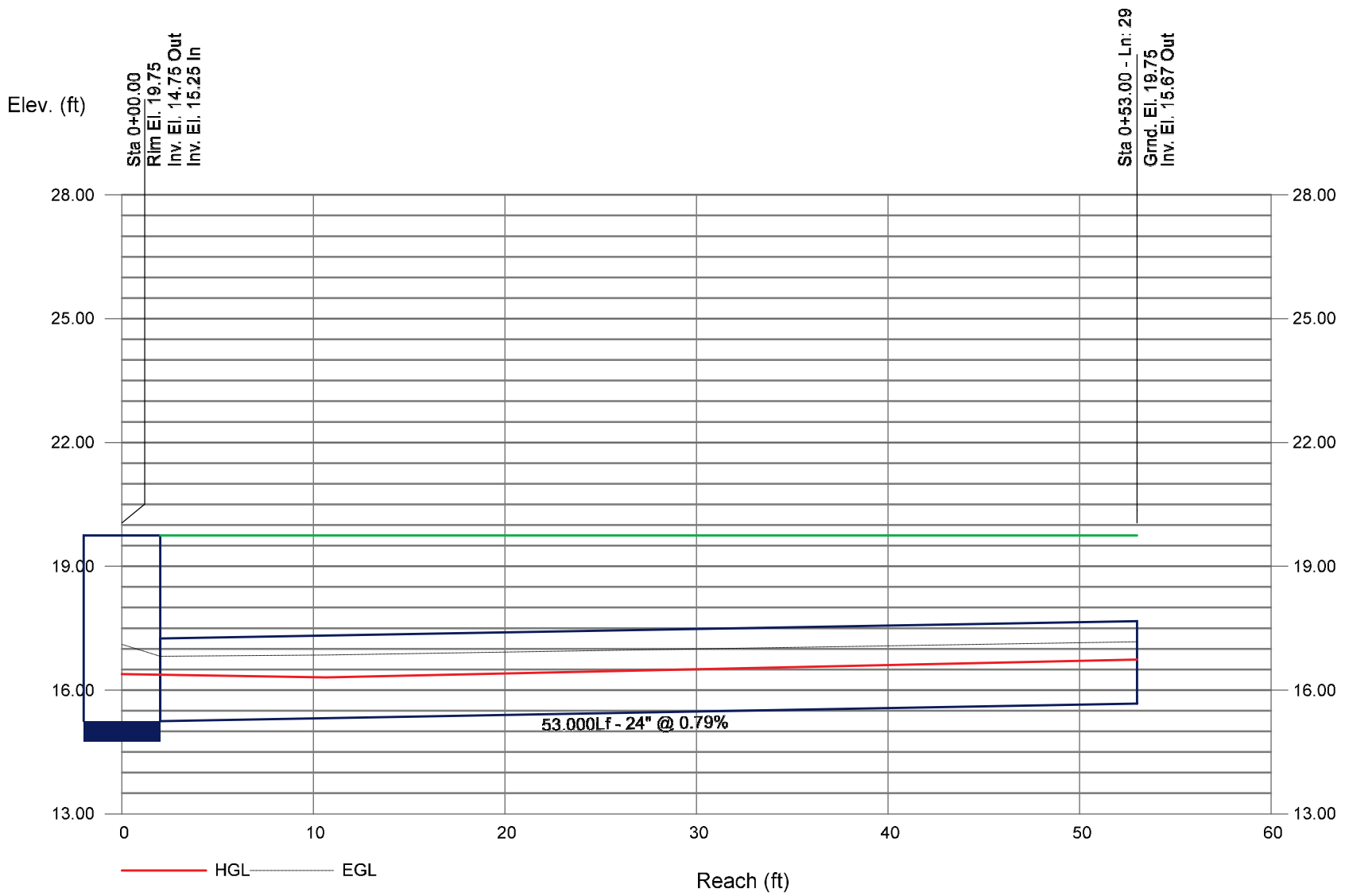




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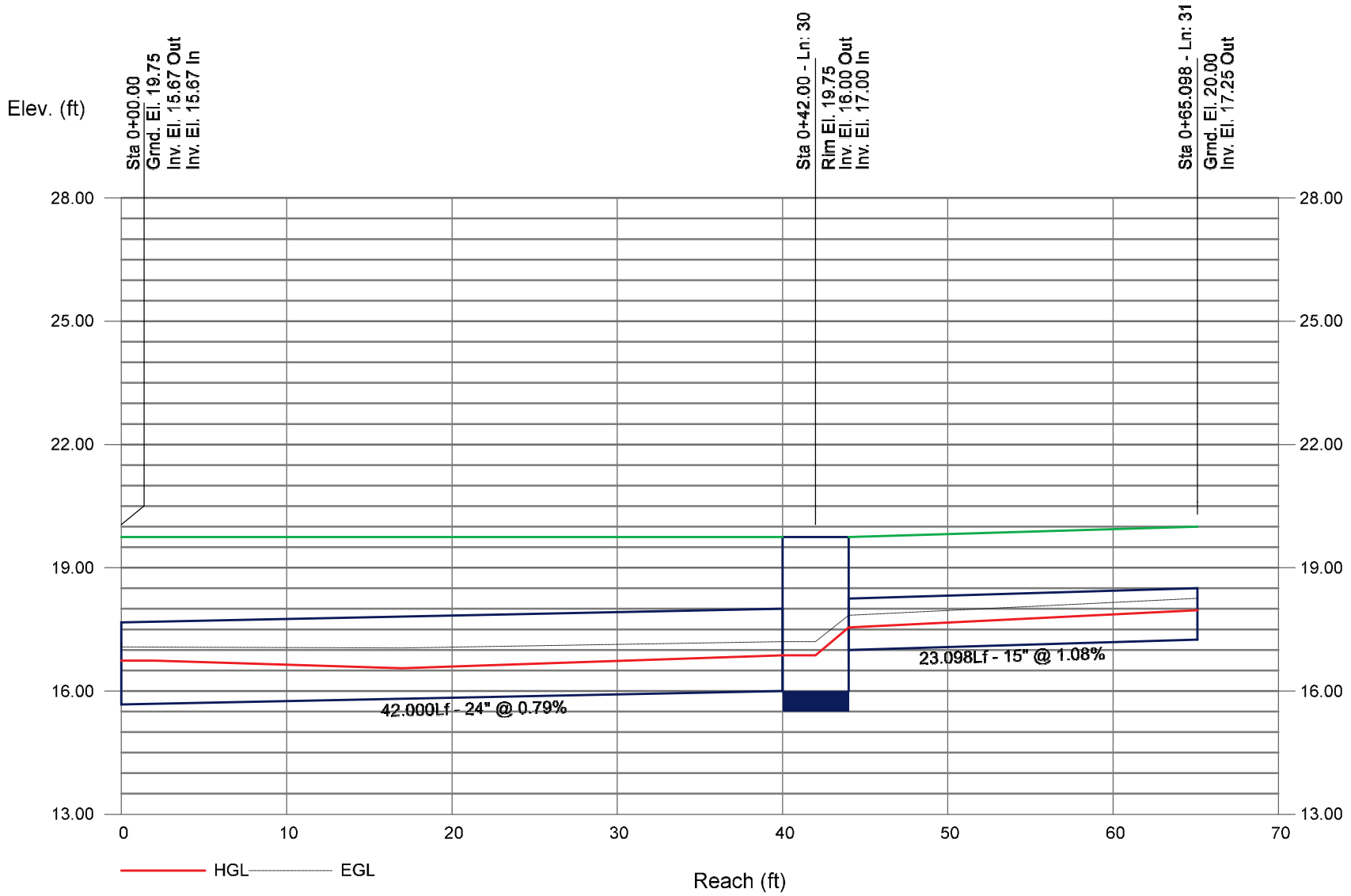




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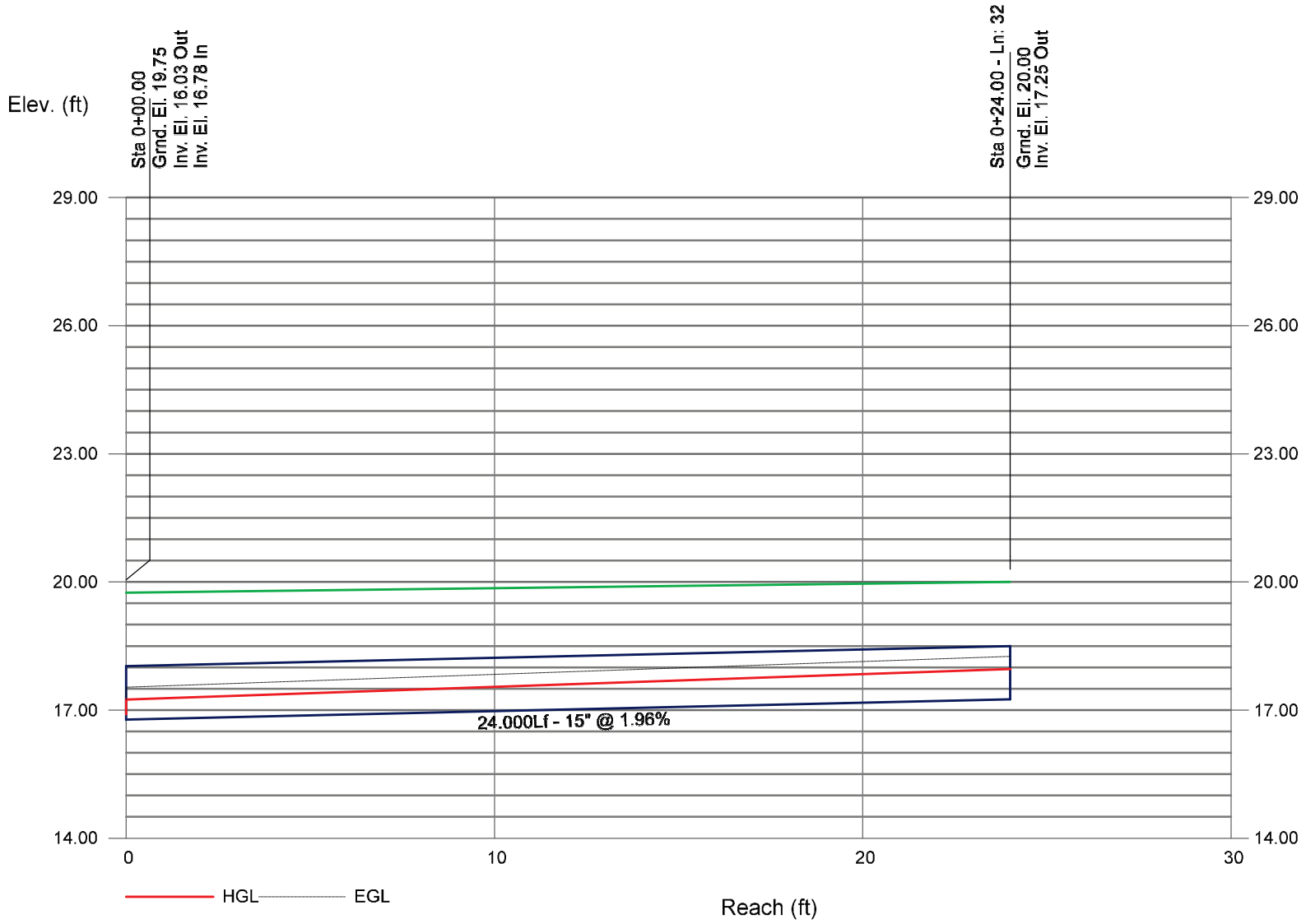




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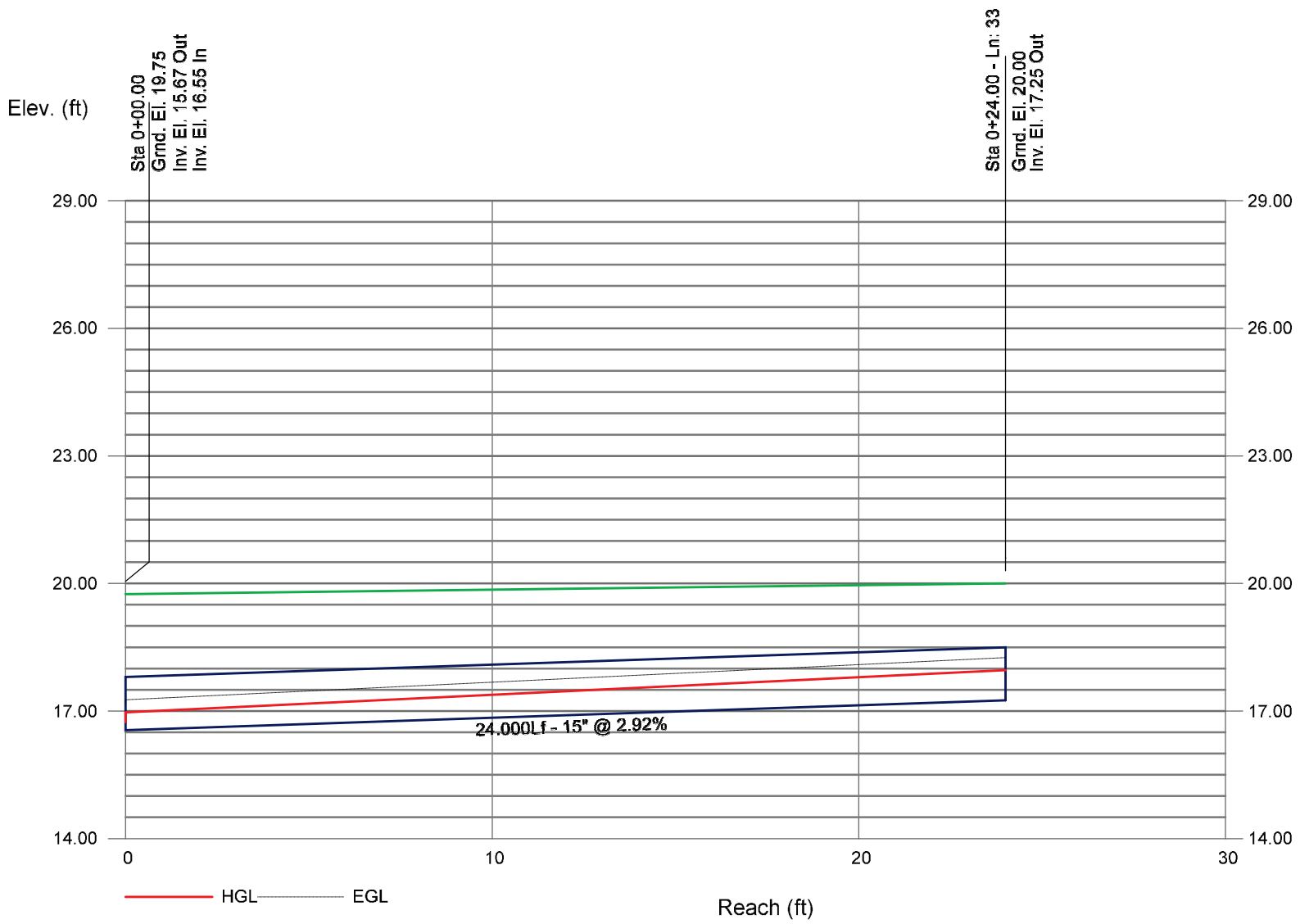




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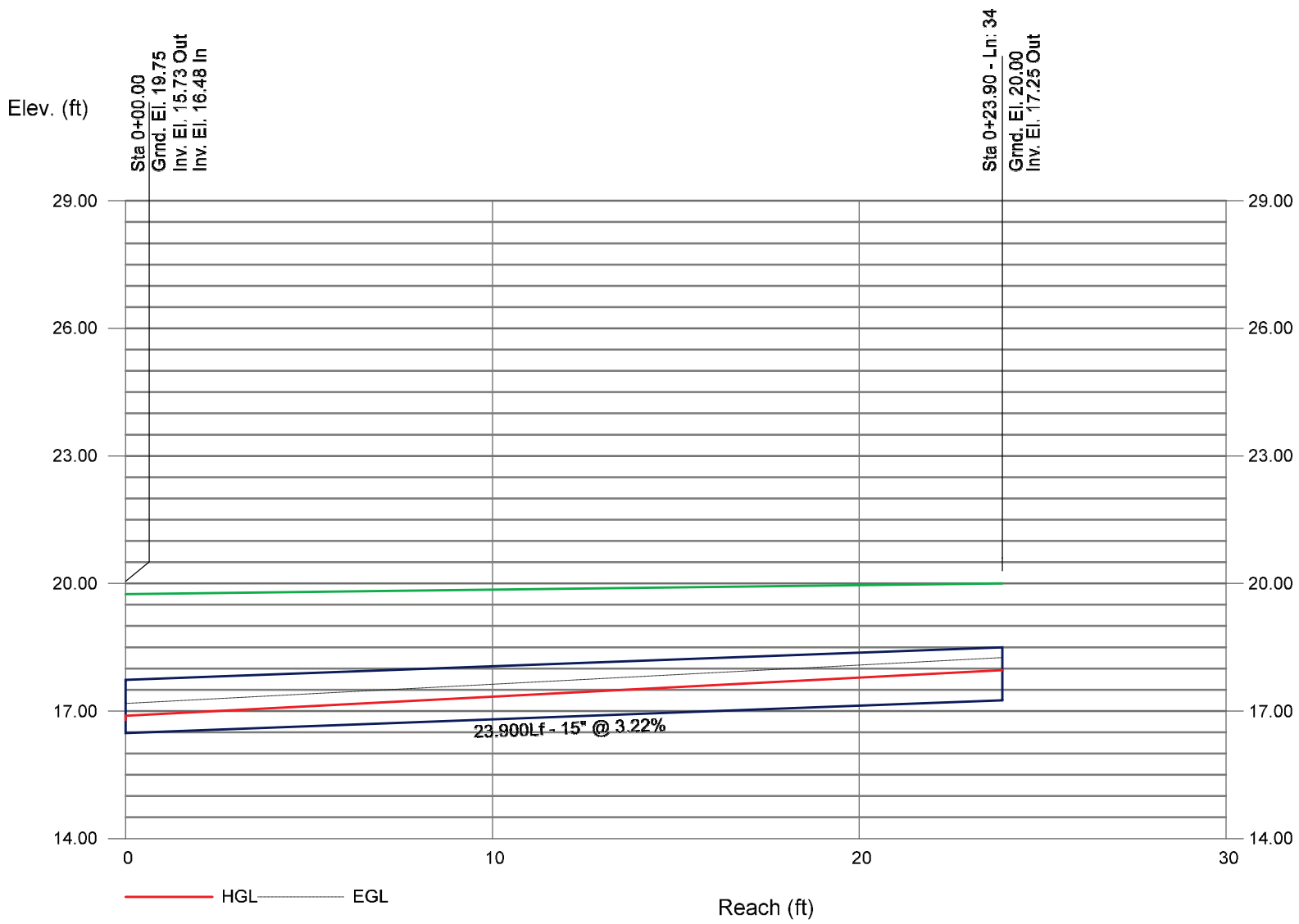




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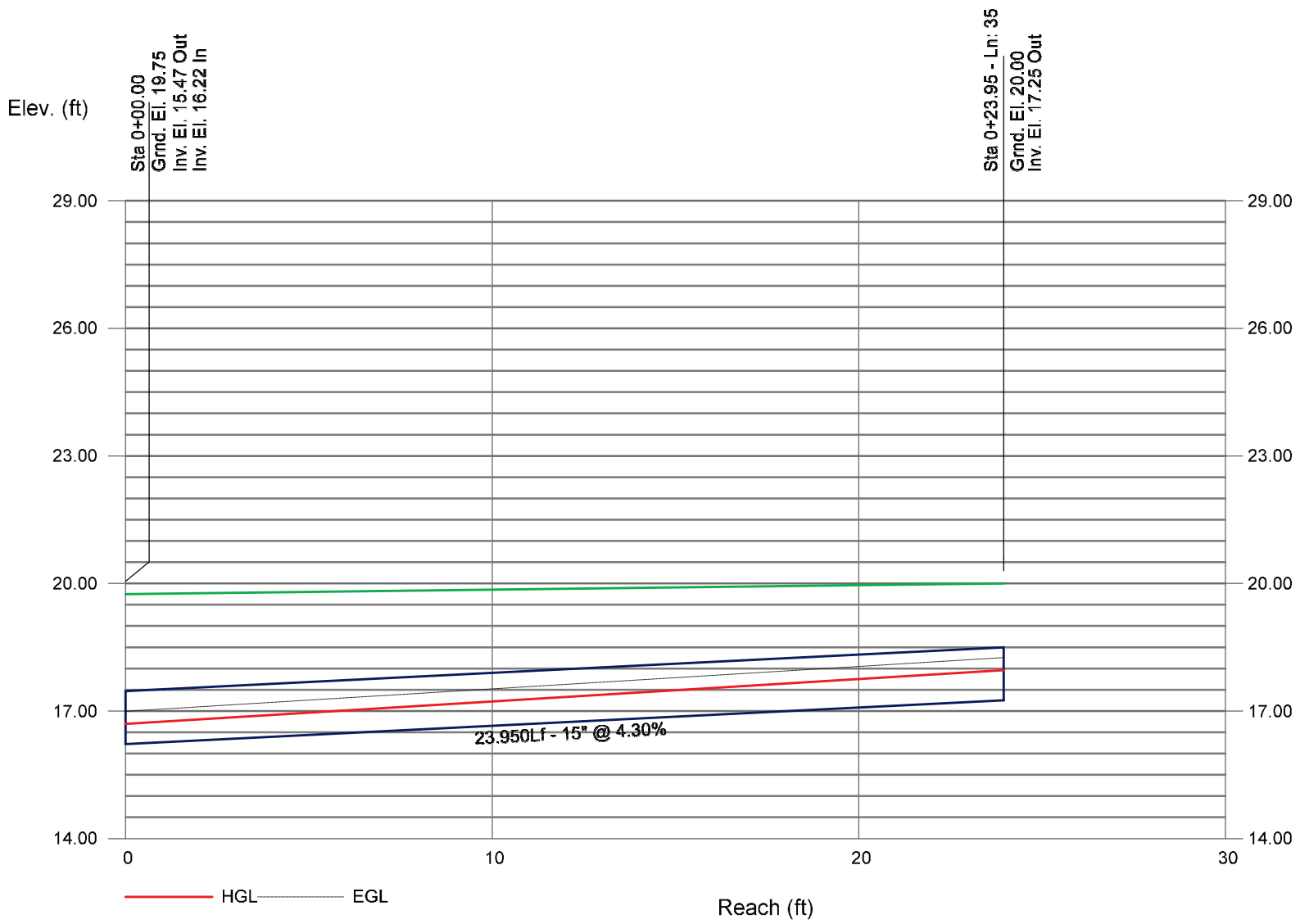




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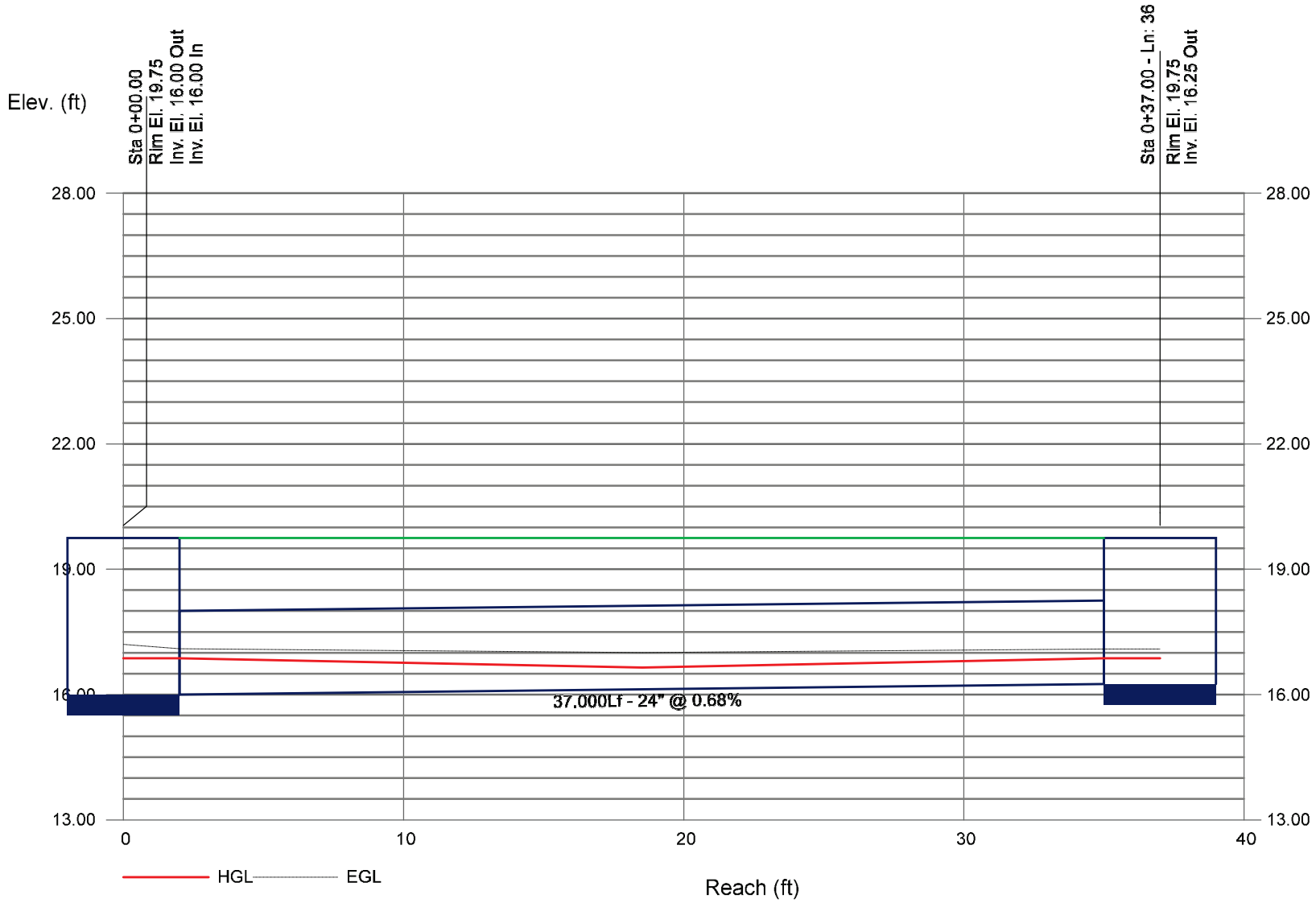




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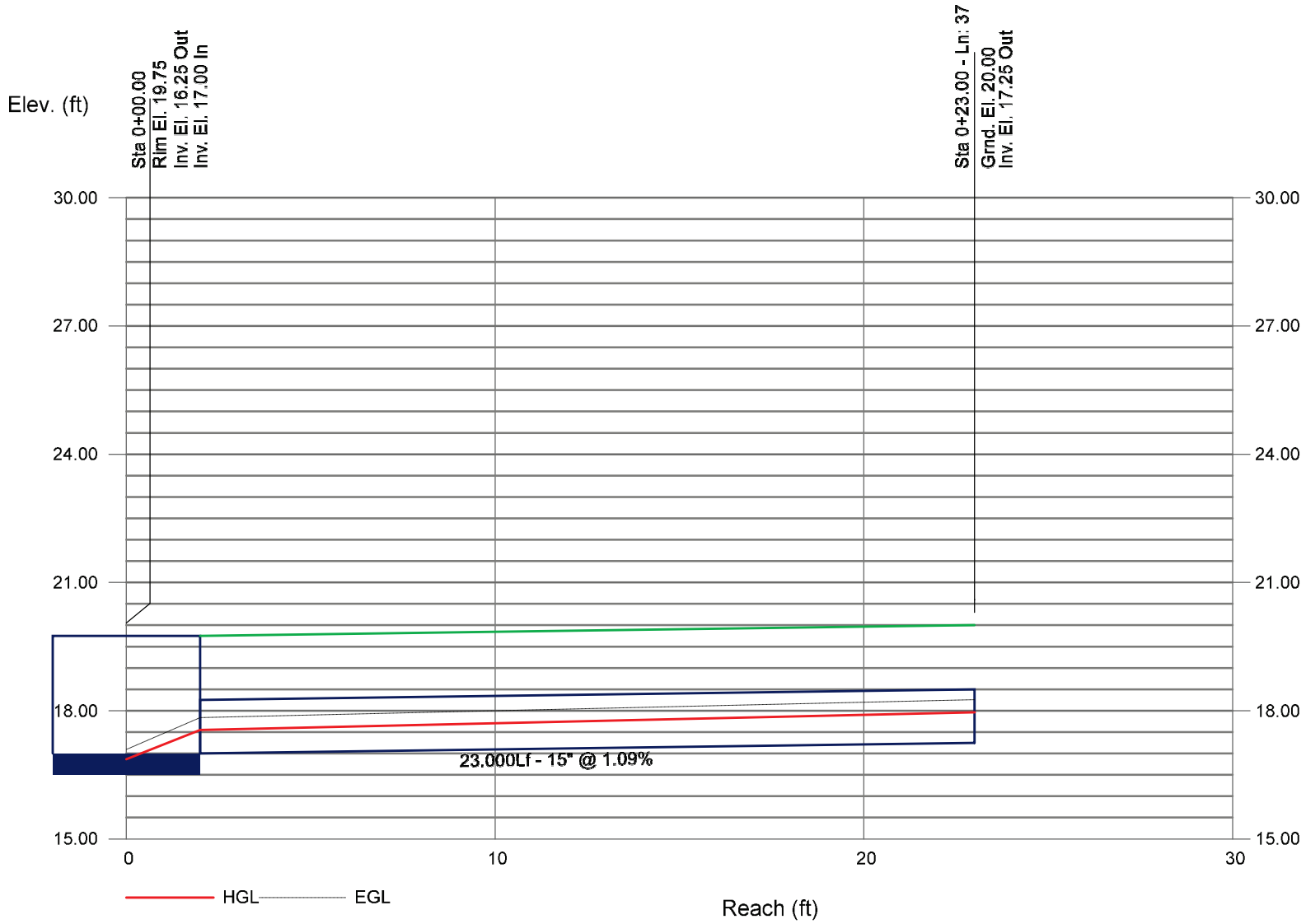




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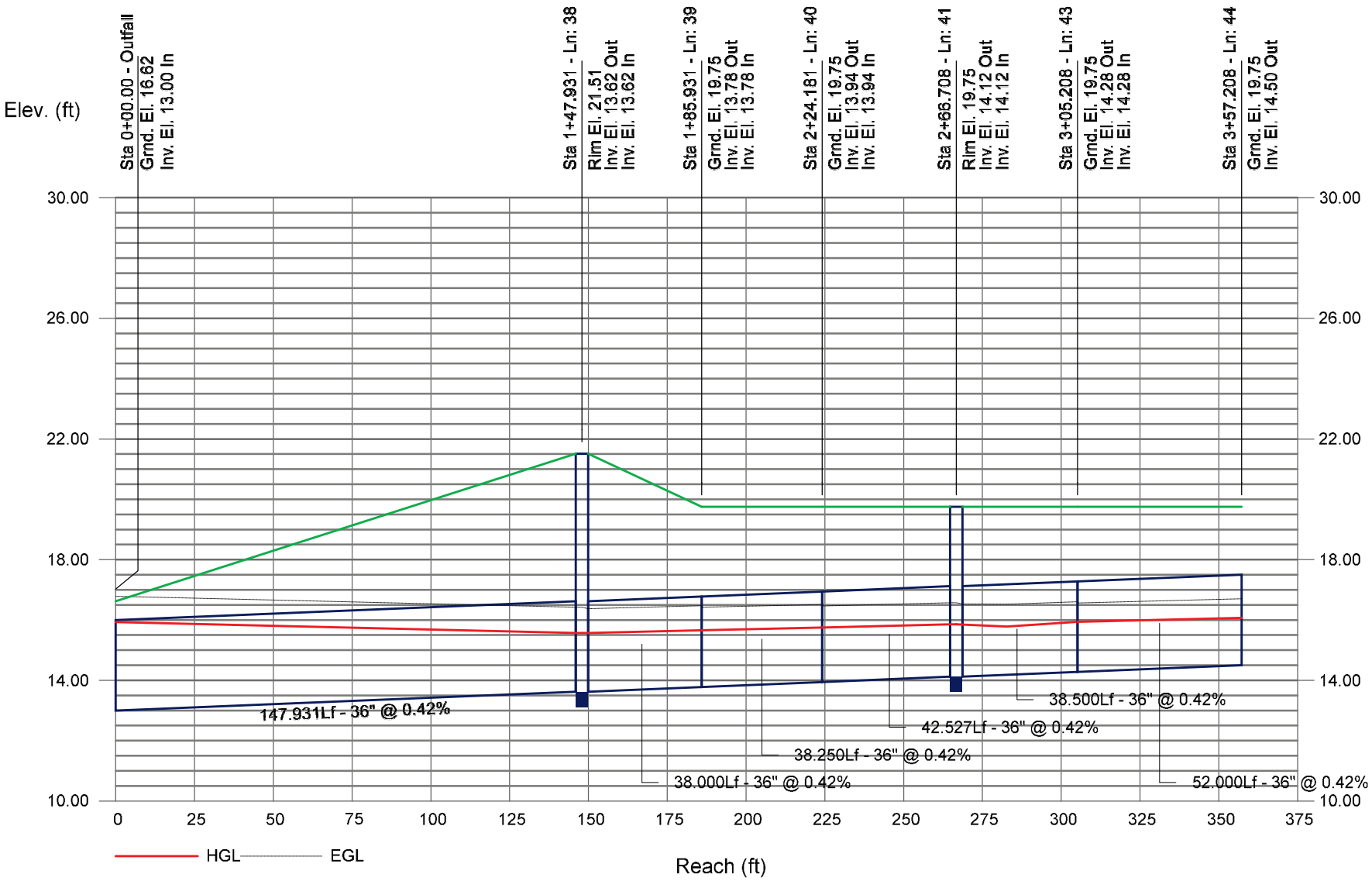




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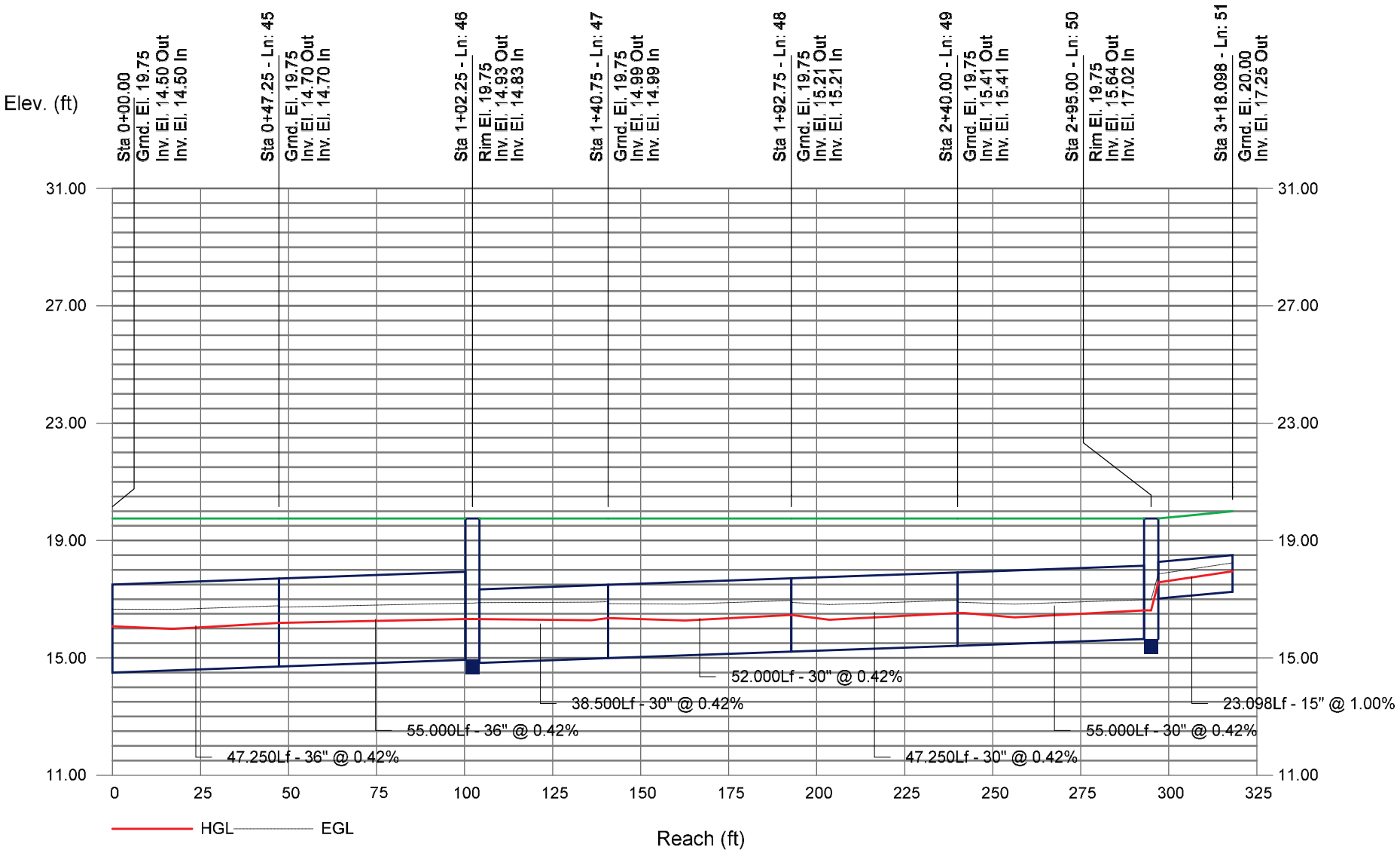




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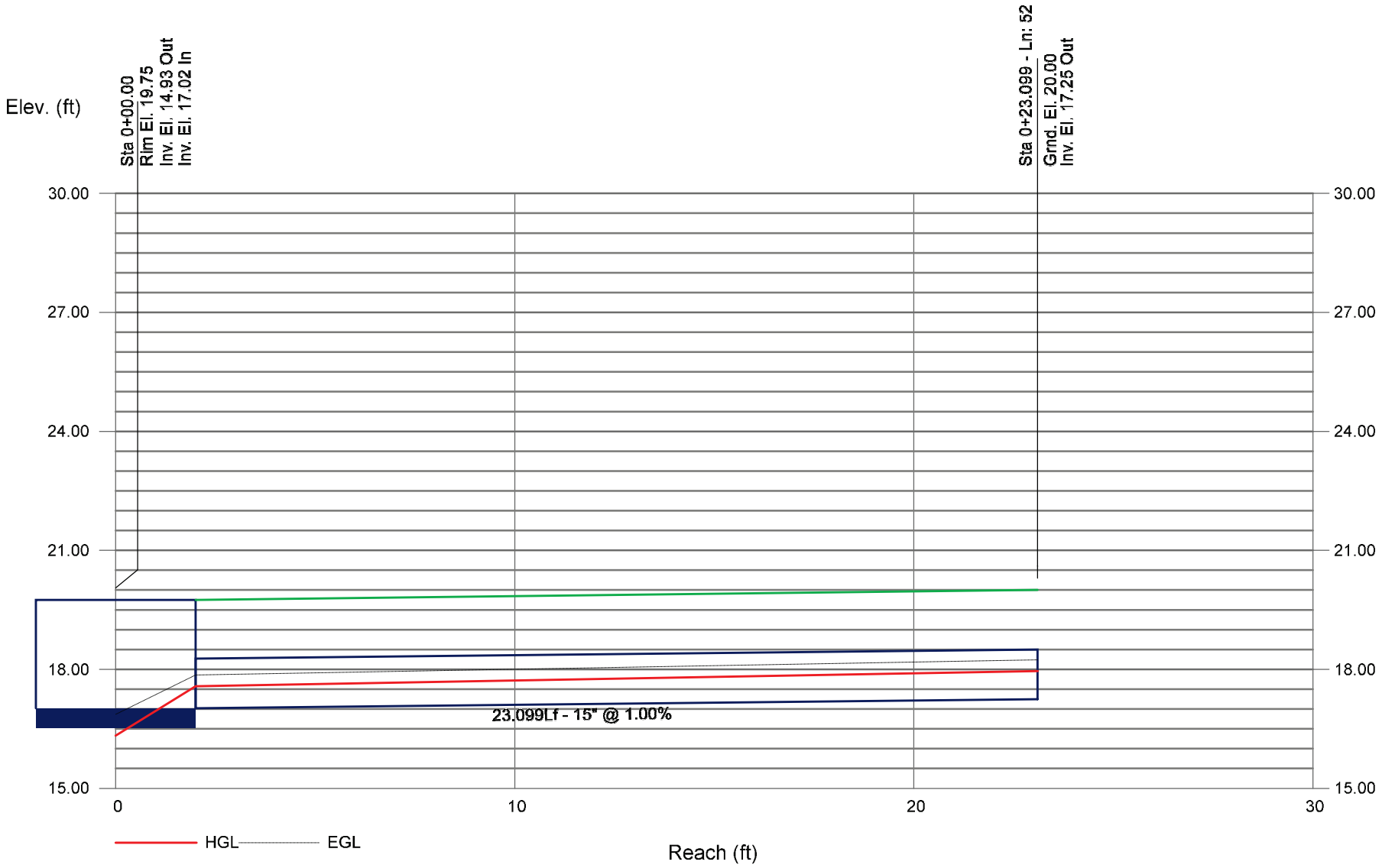




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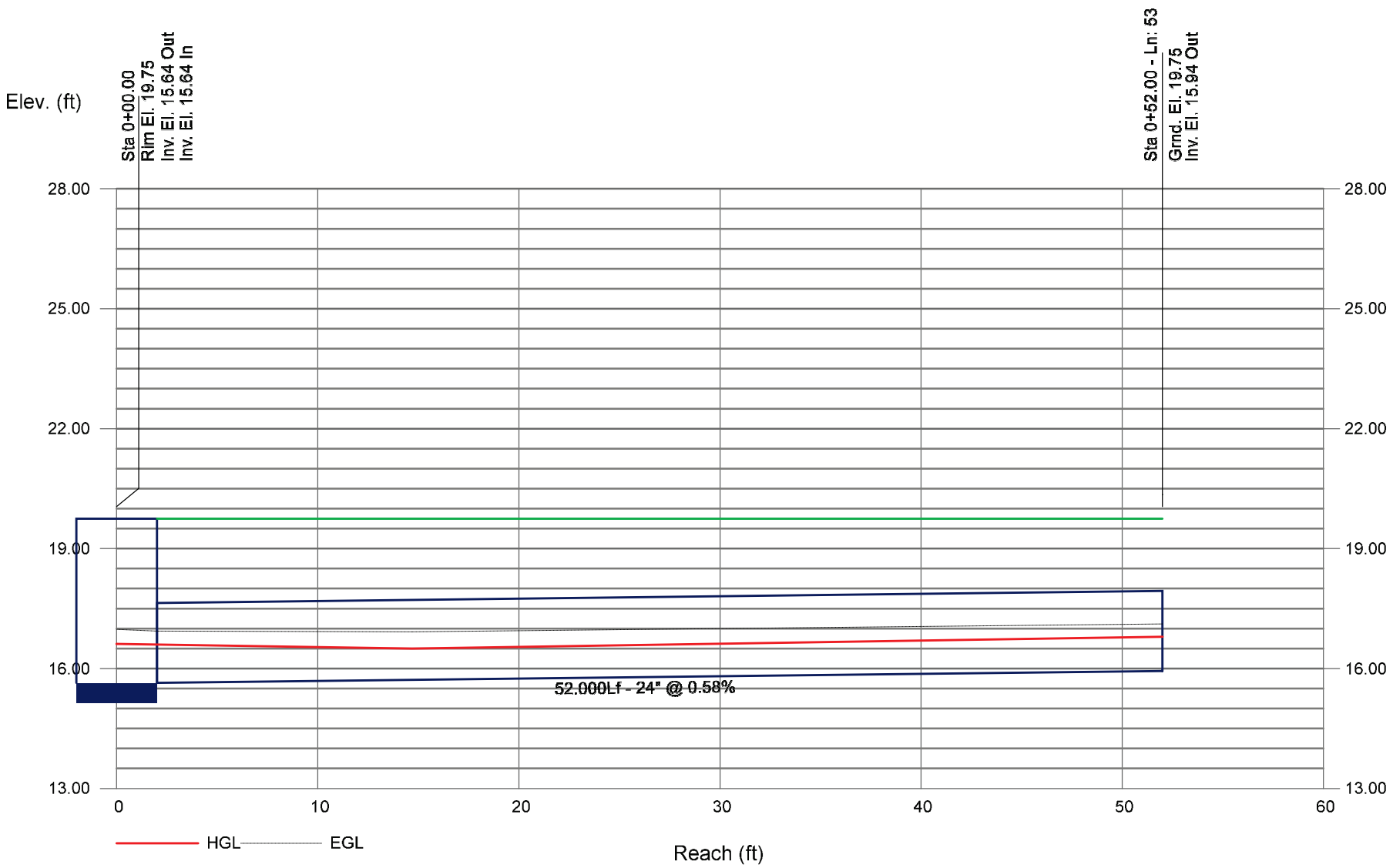




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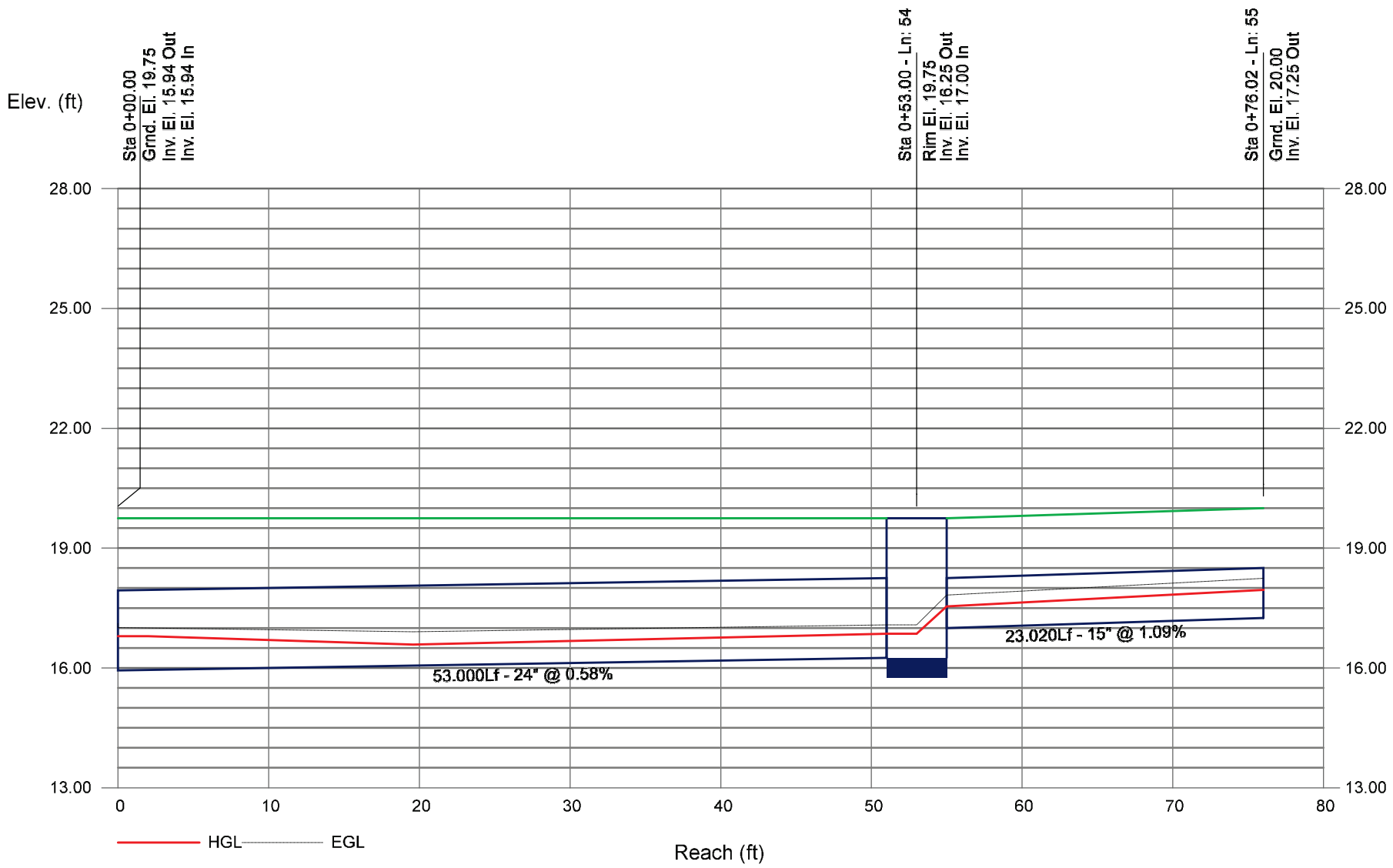




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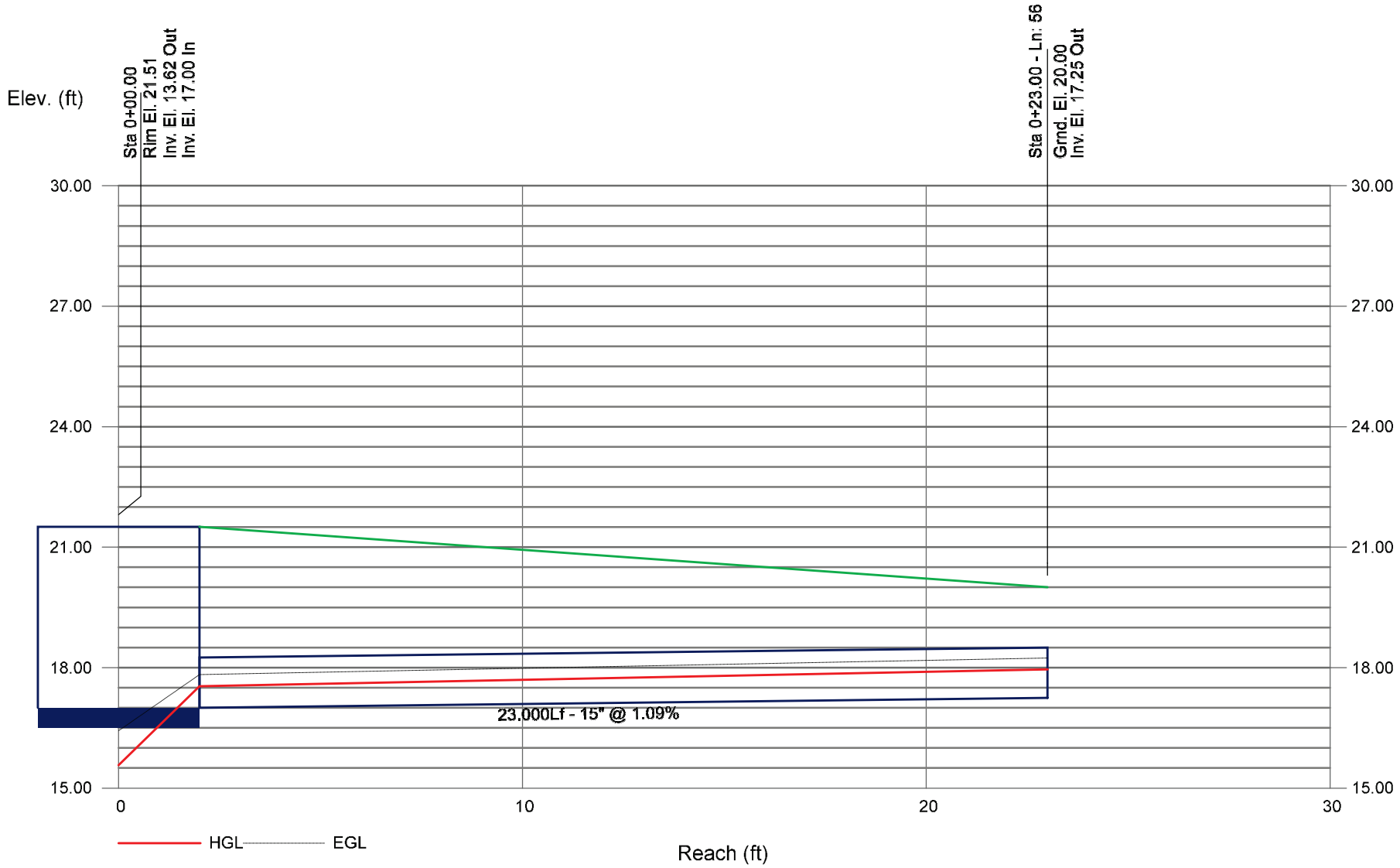




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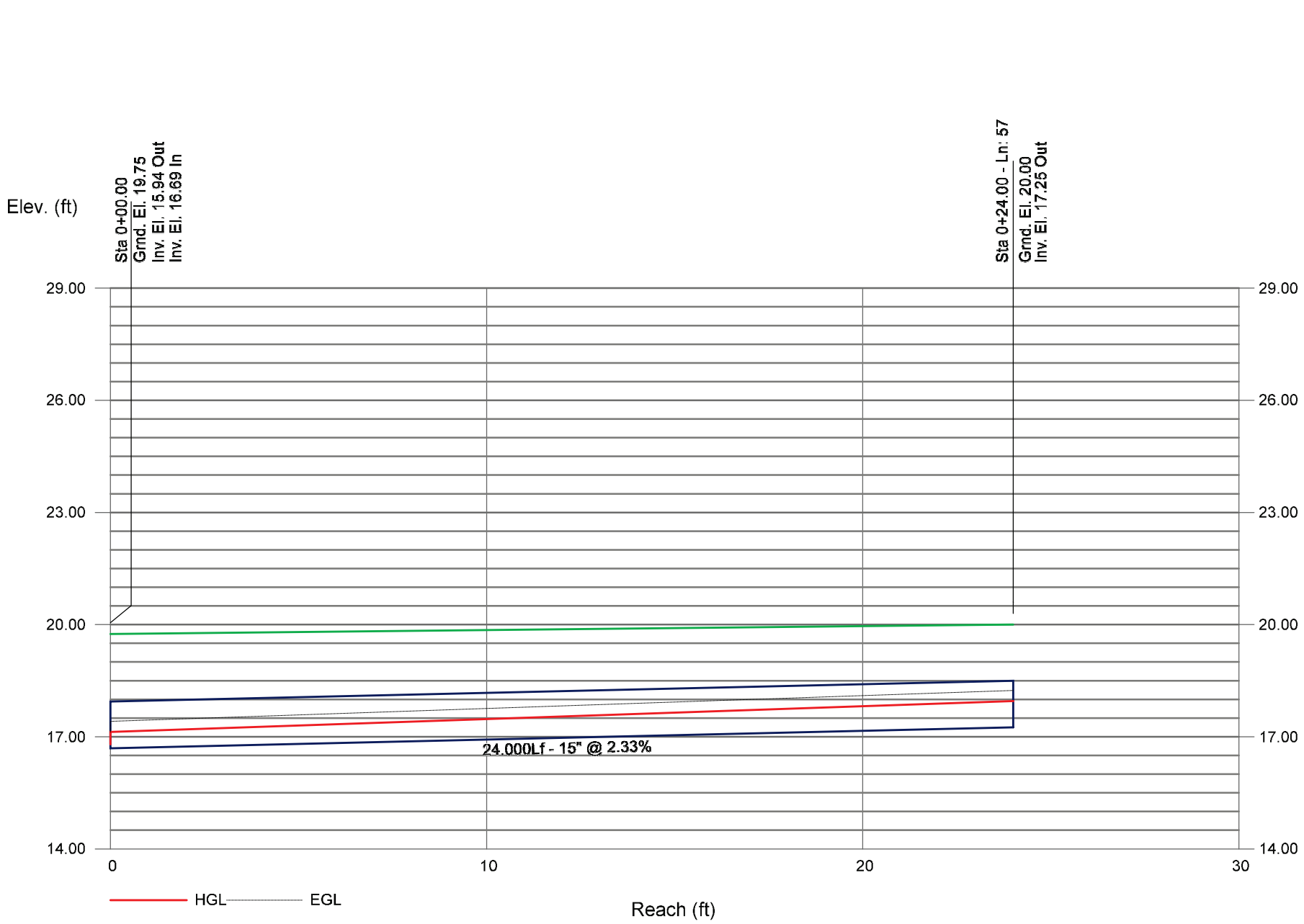
Proj. file: Building 4 Storm.stm





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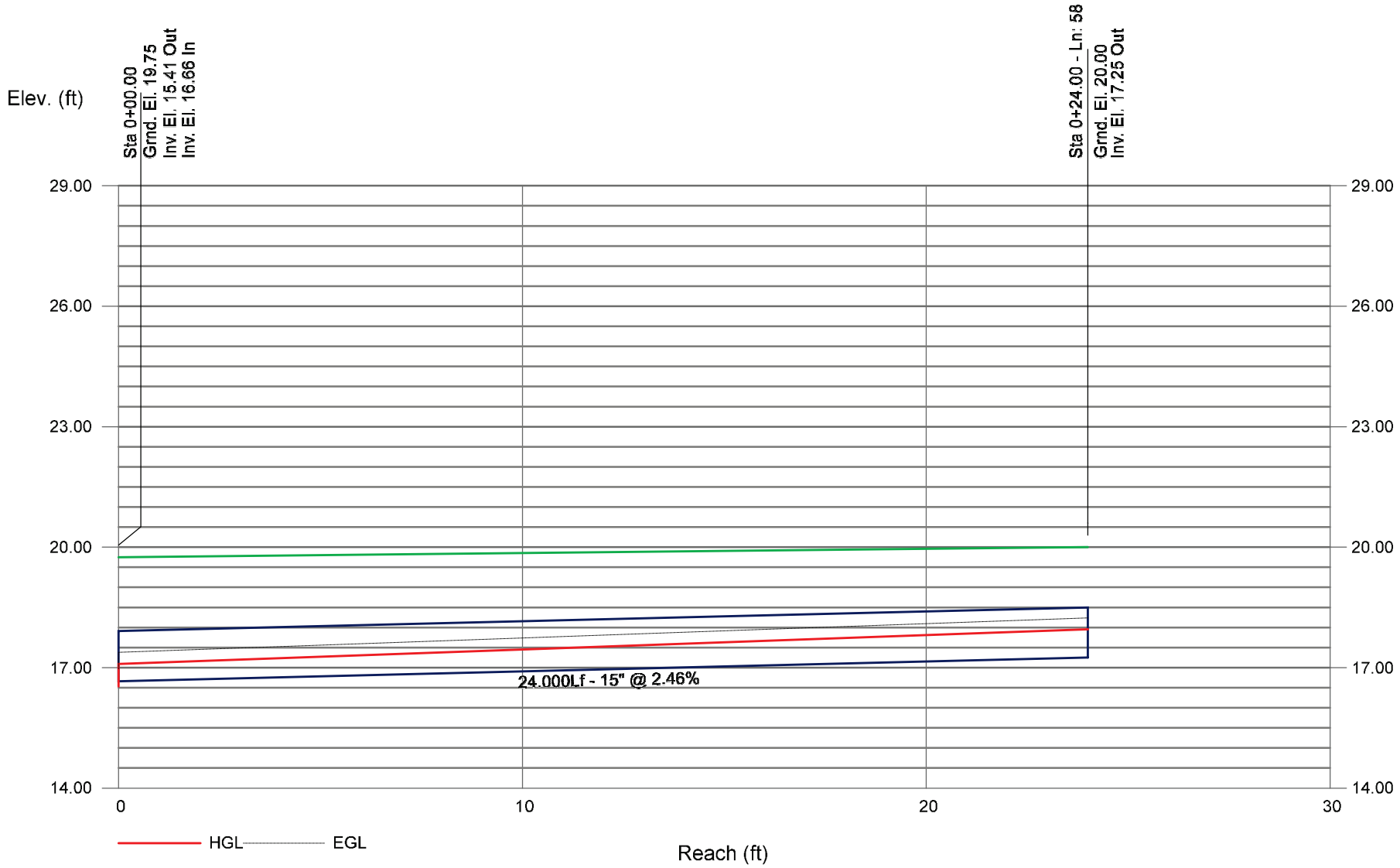
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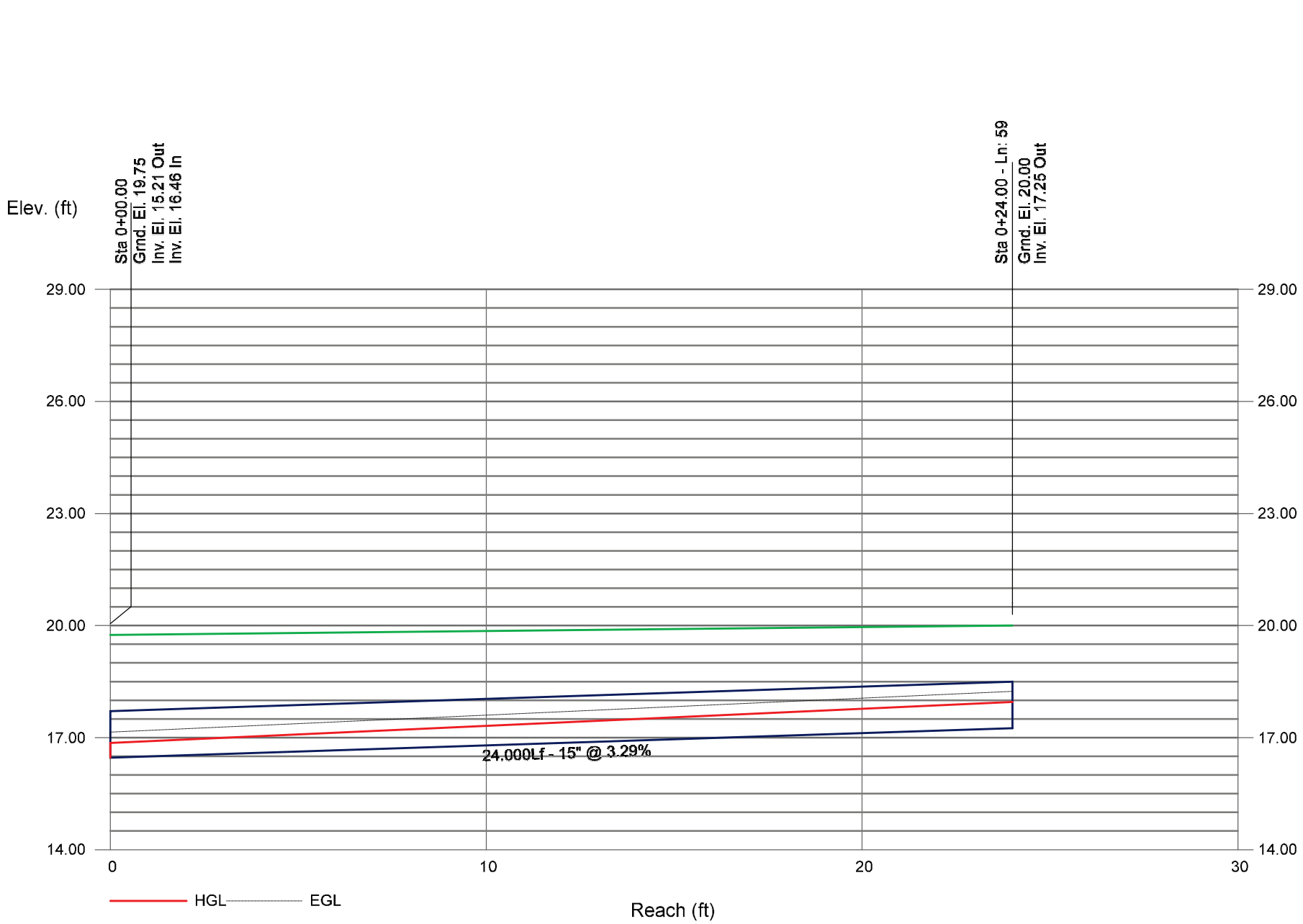
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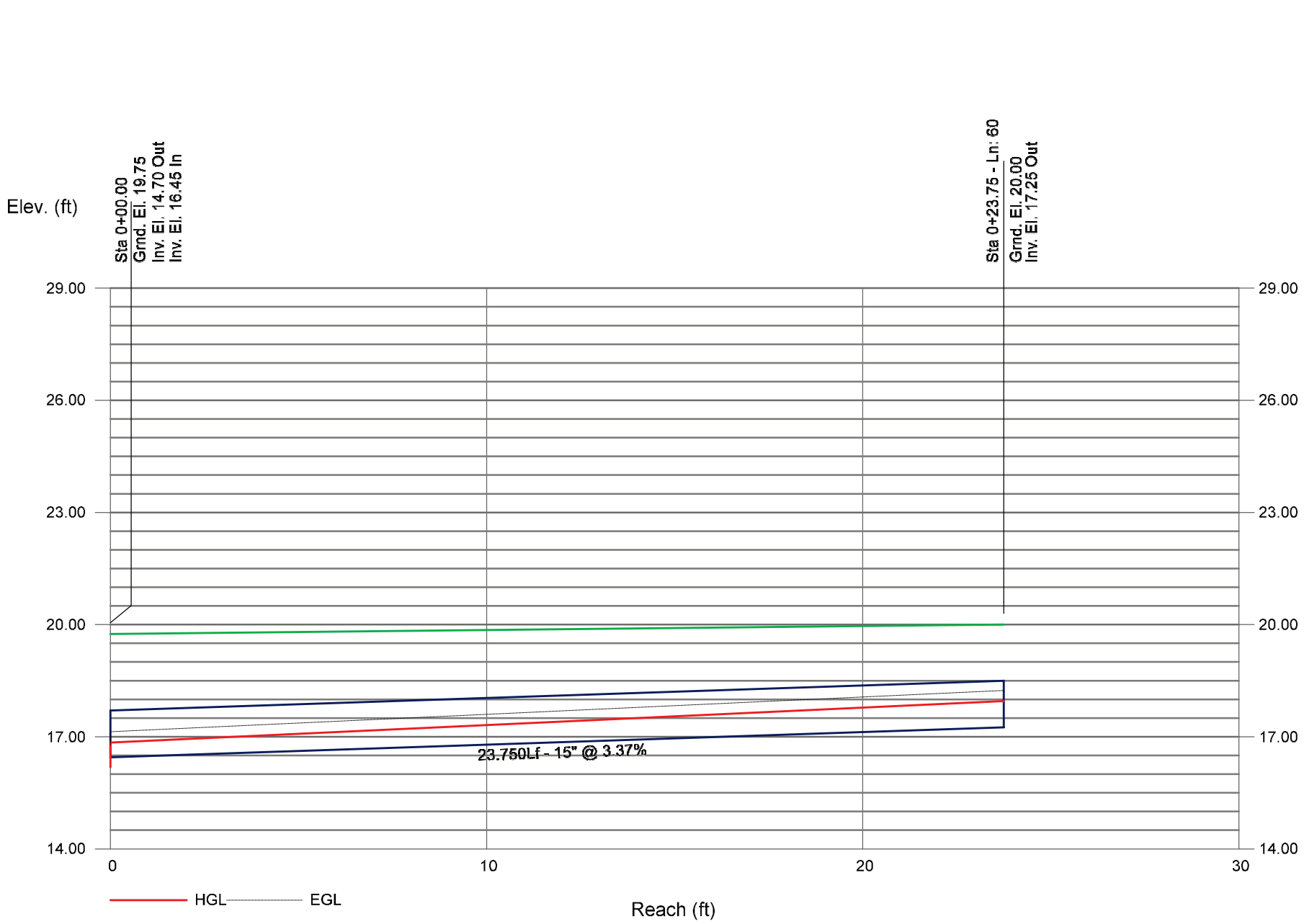
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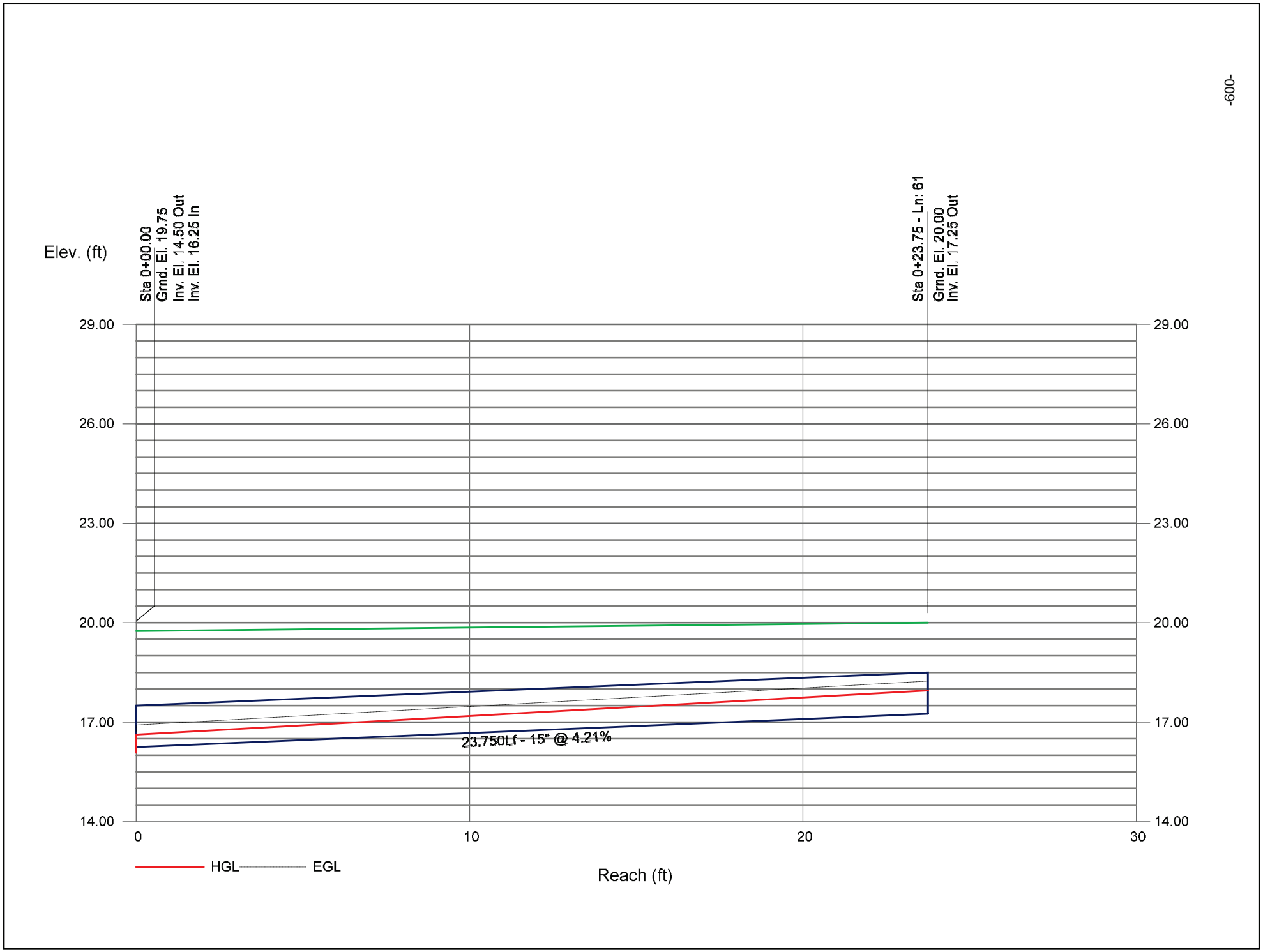
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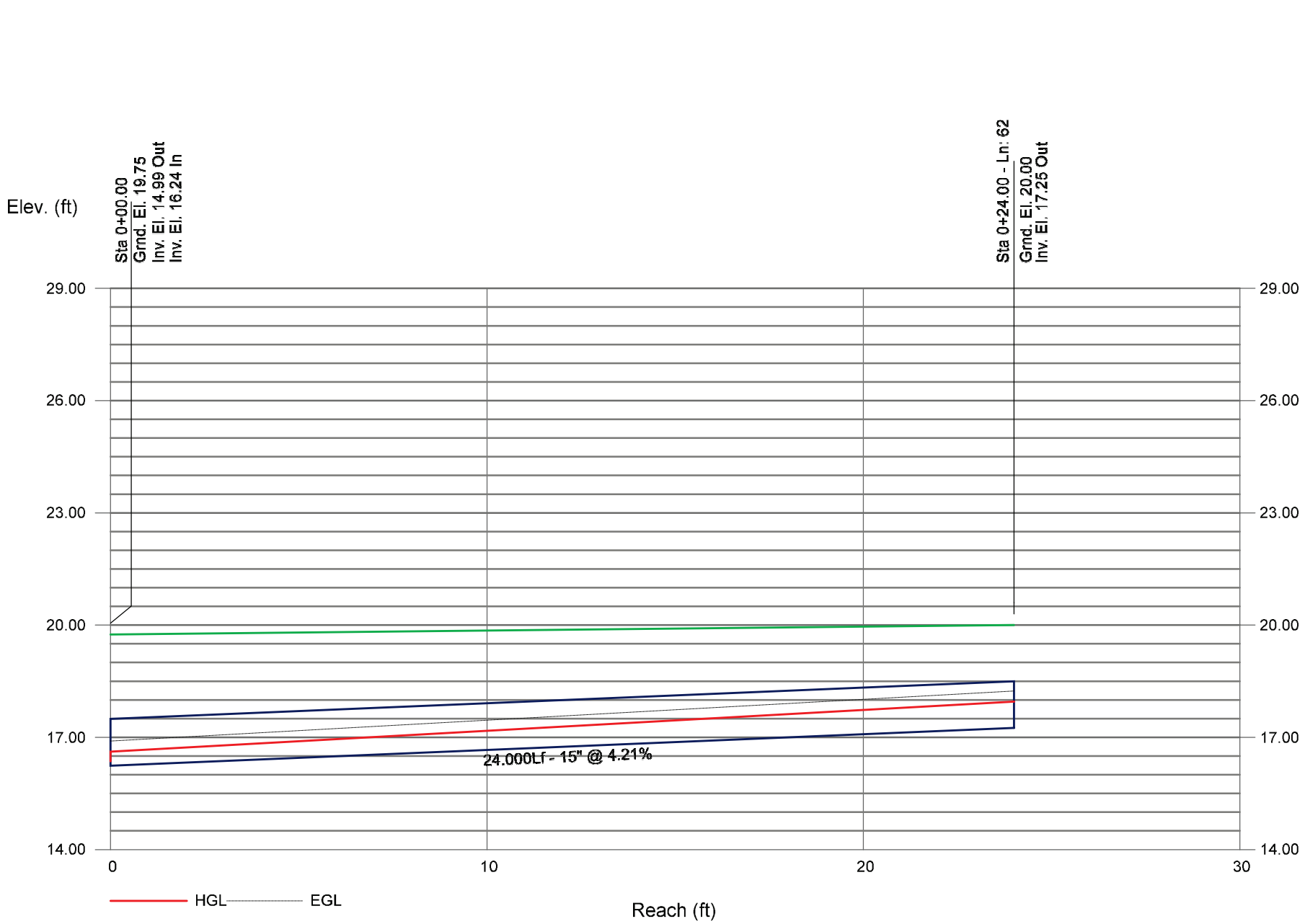
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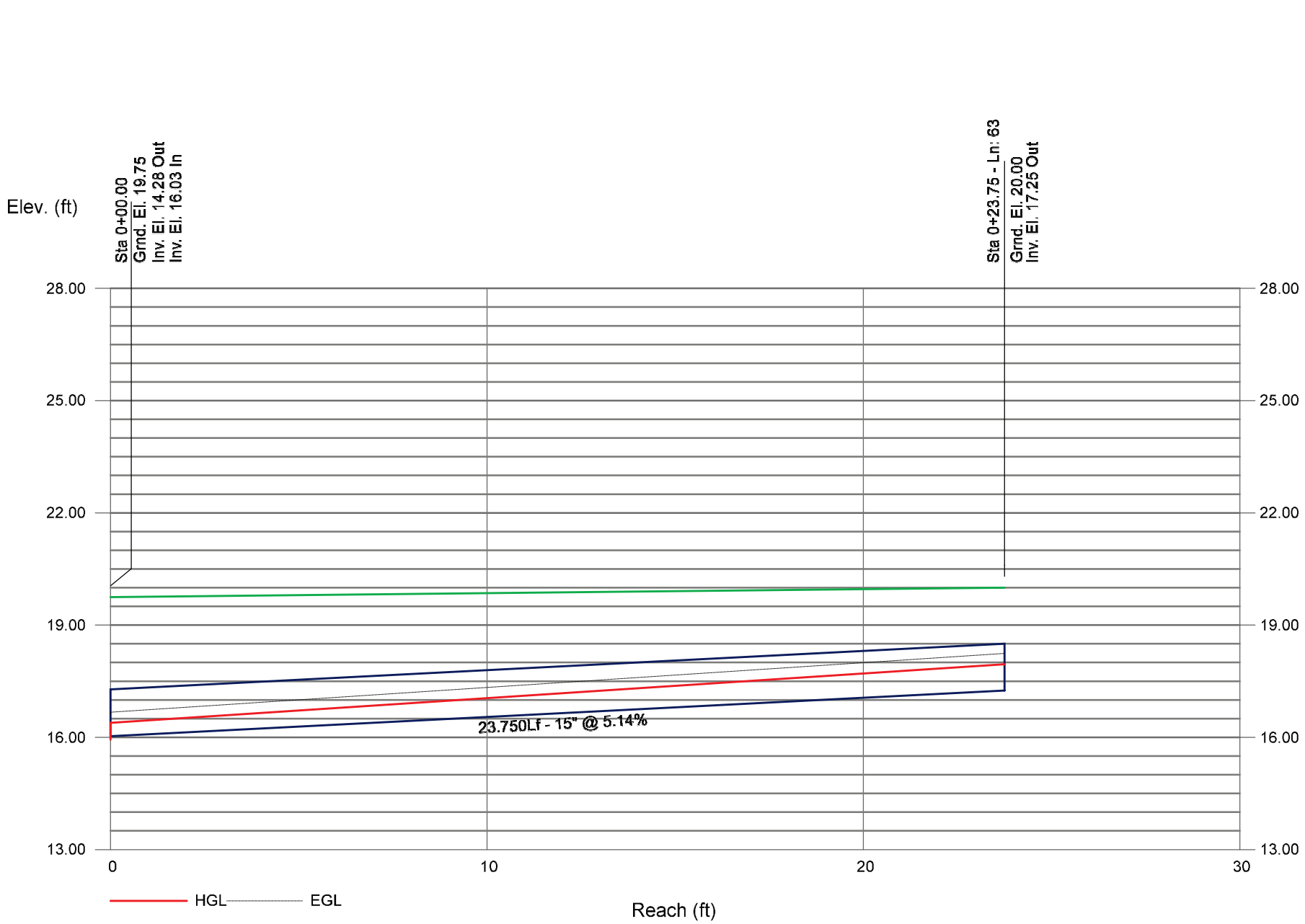
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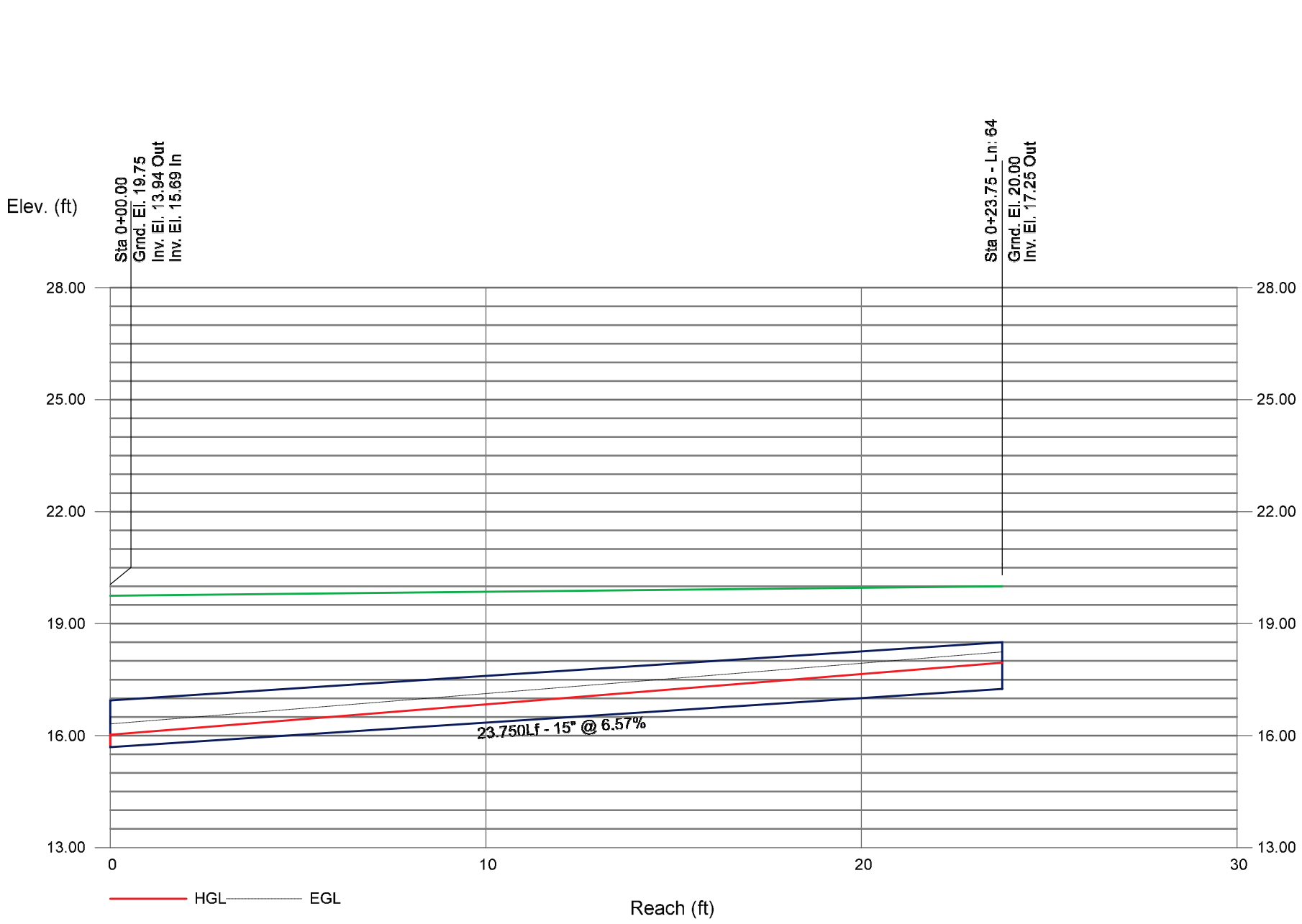
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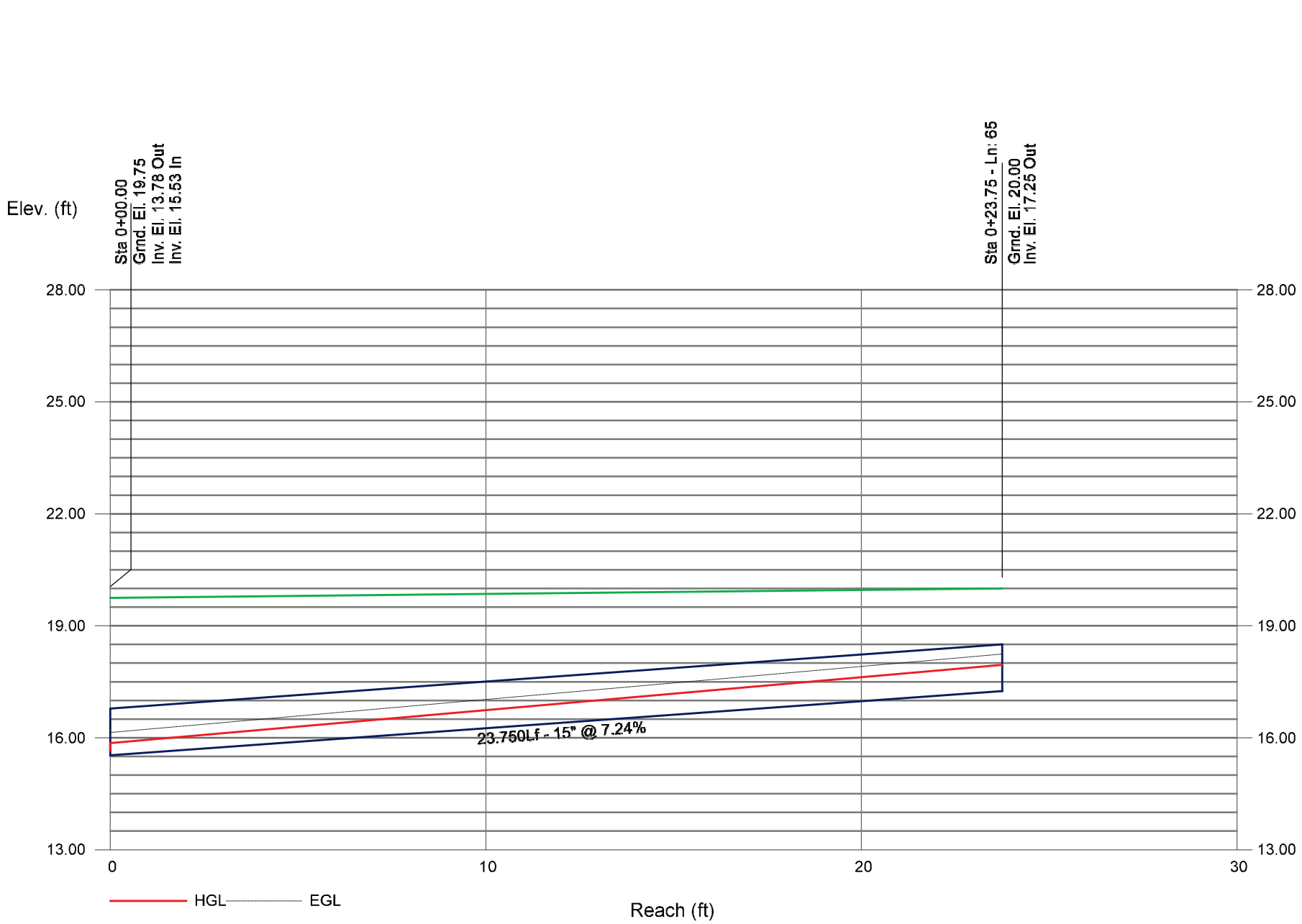
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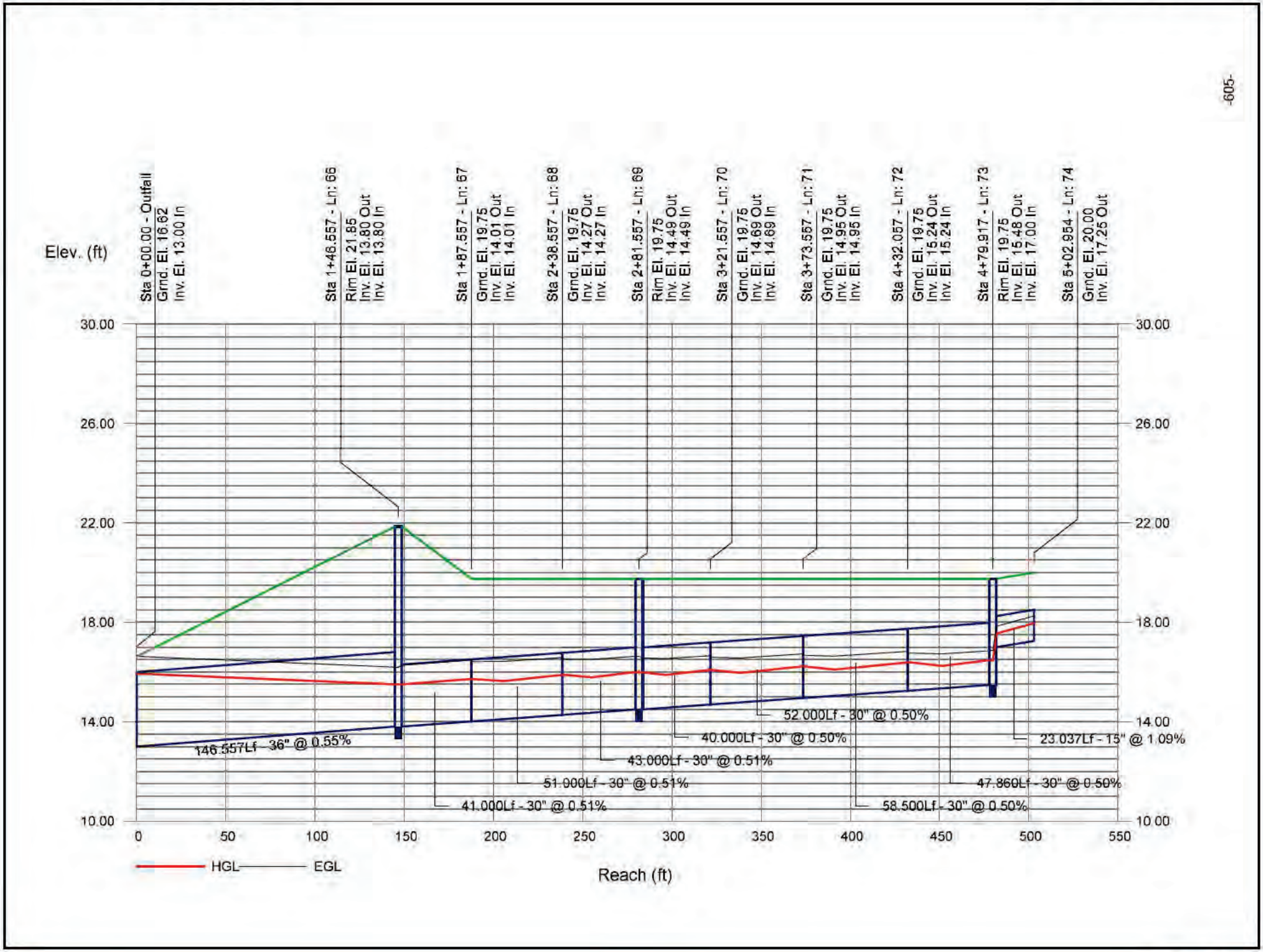
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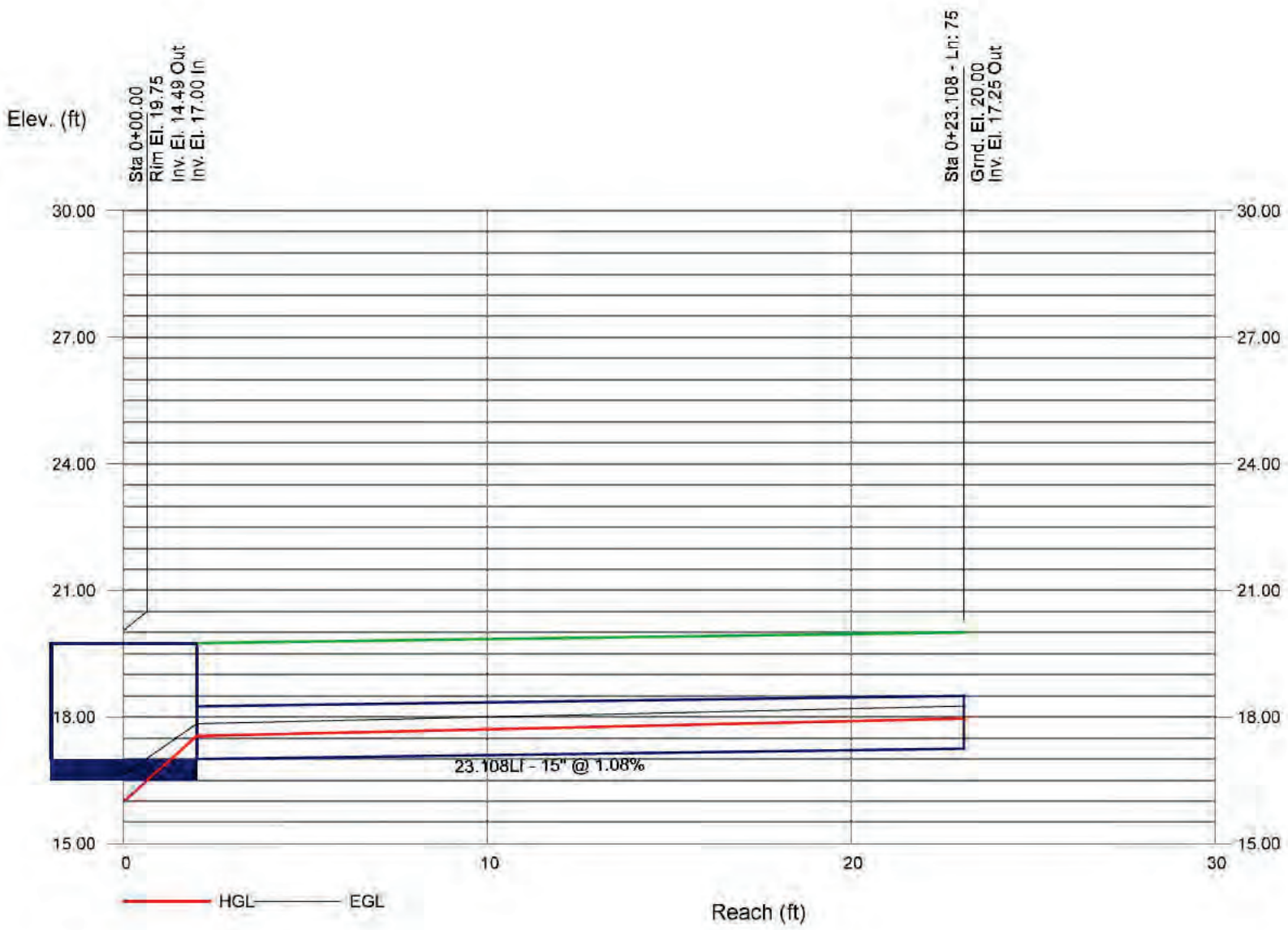
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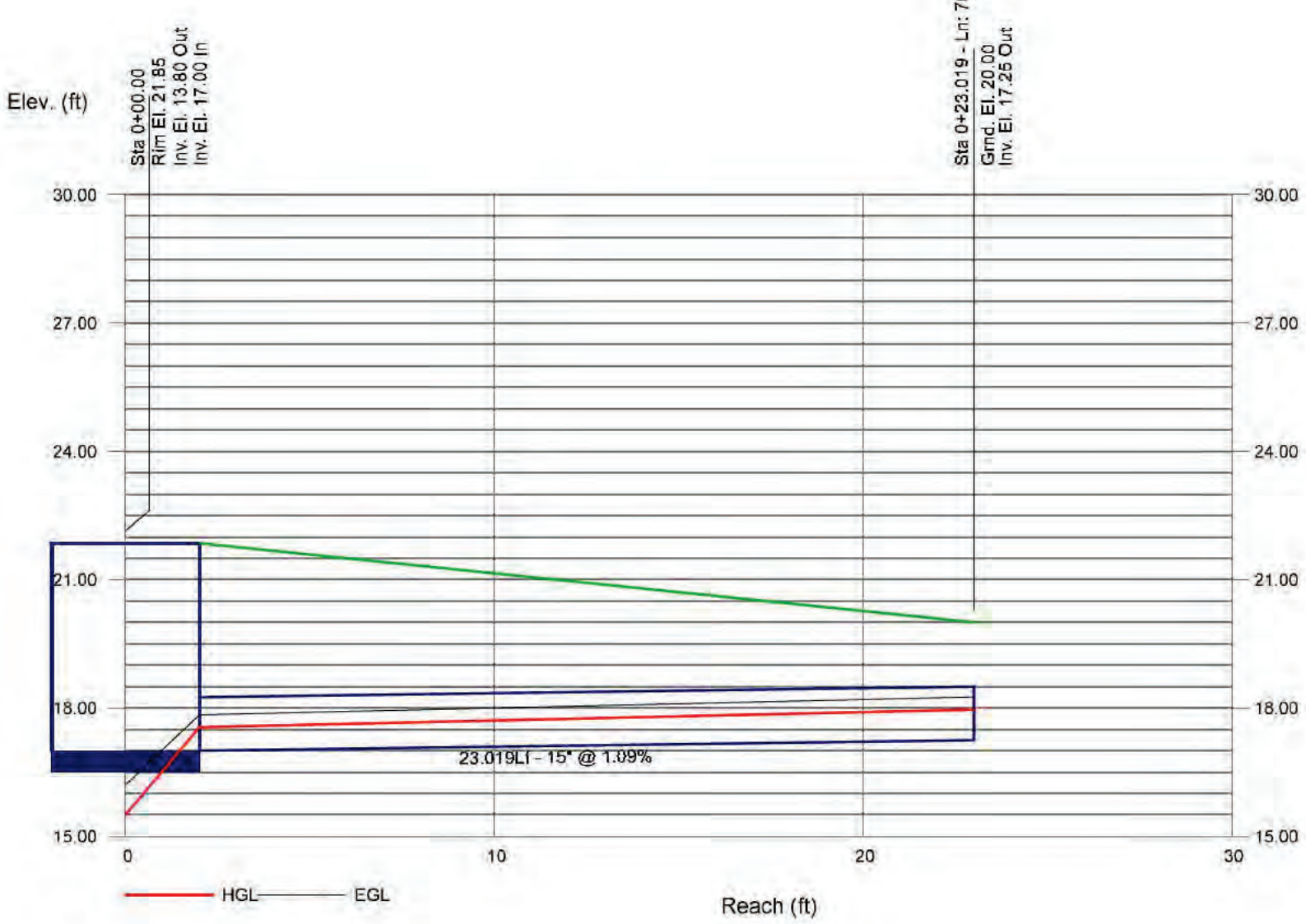
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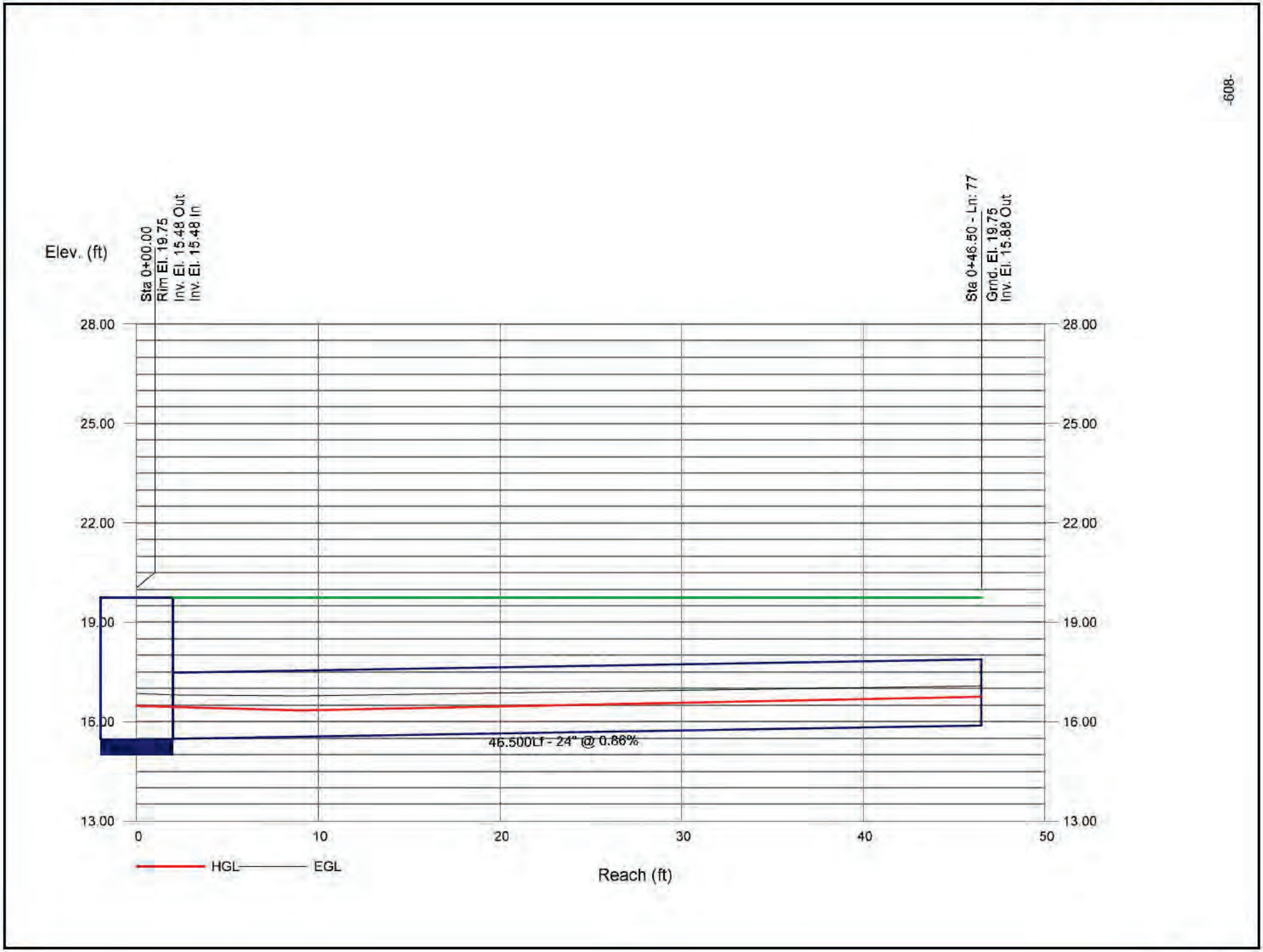
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-607-

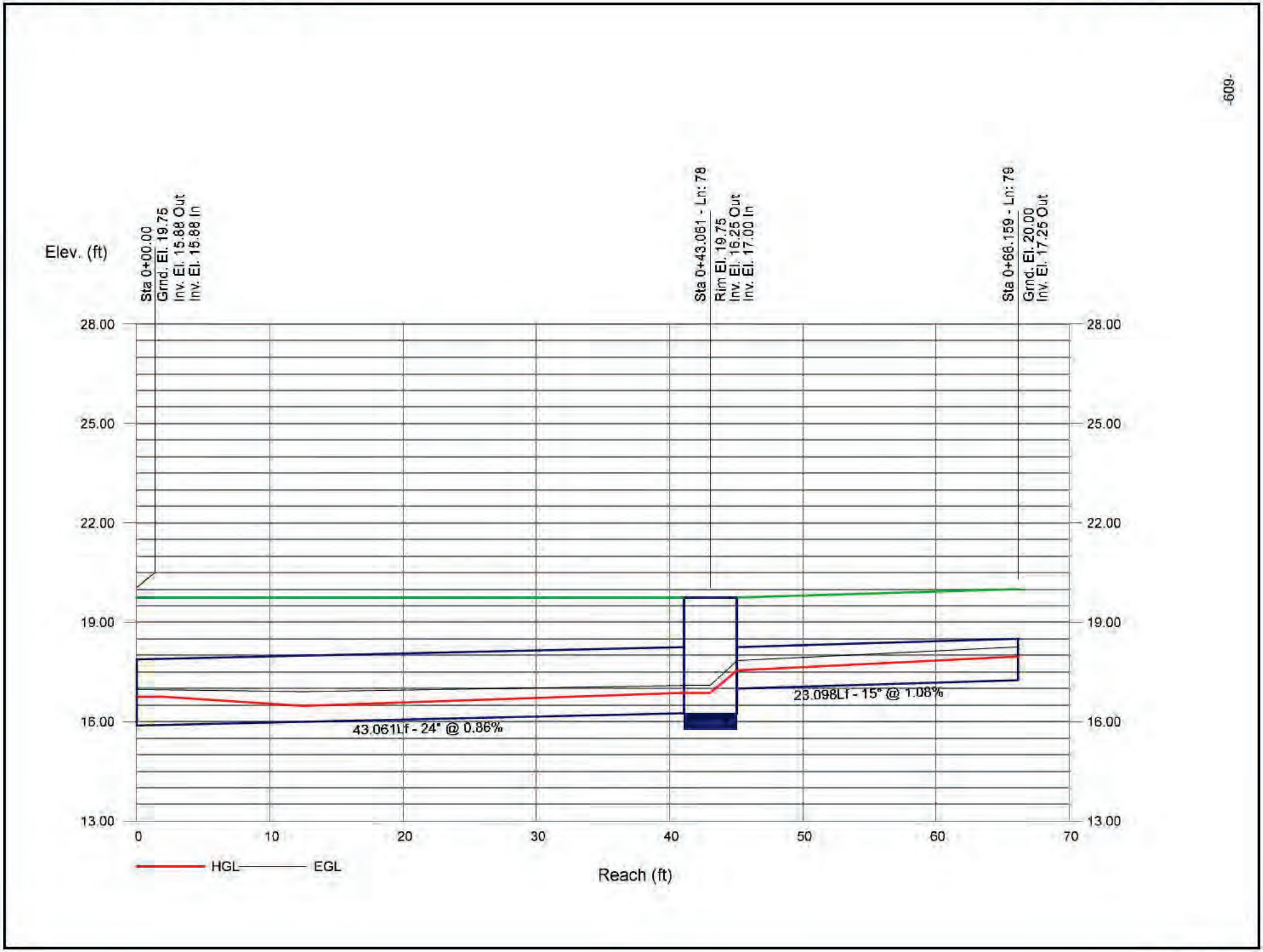
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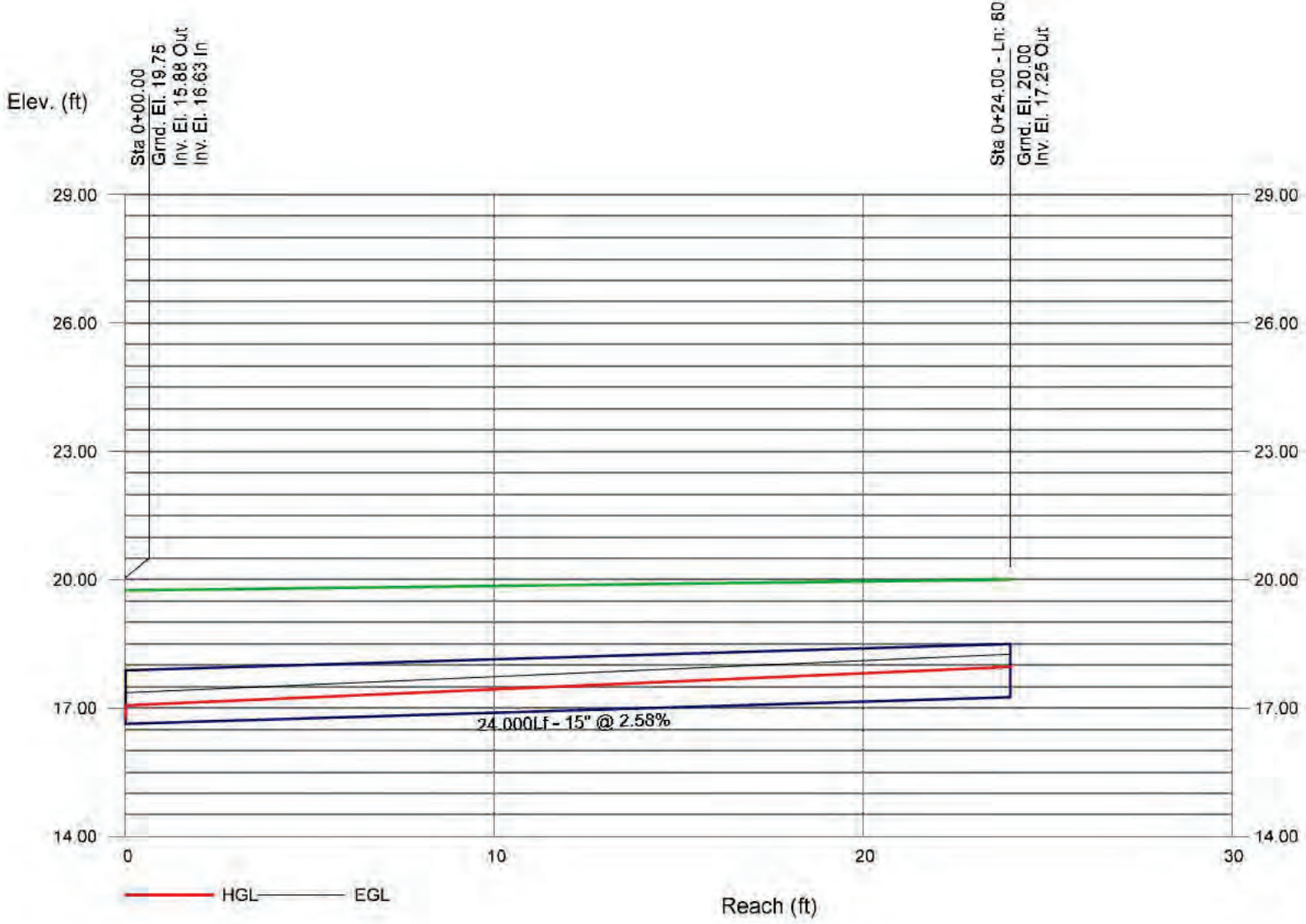
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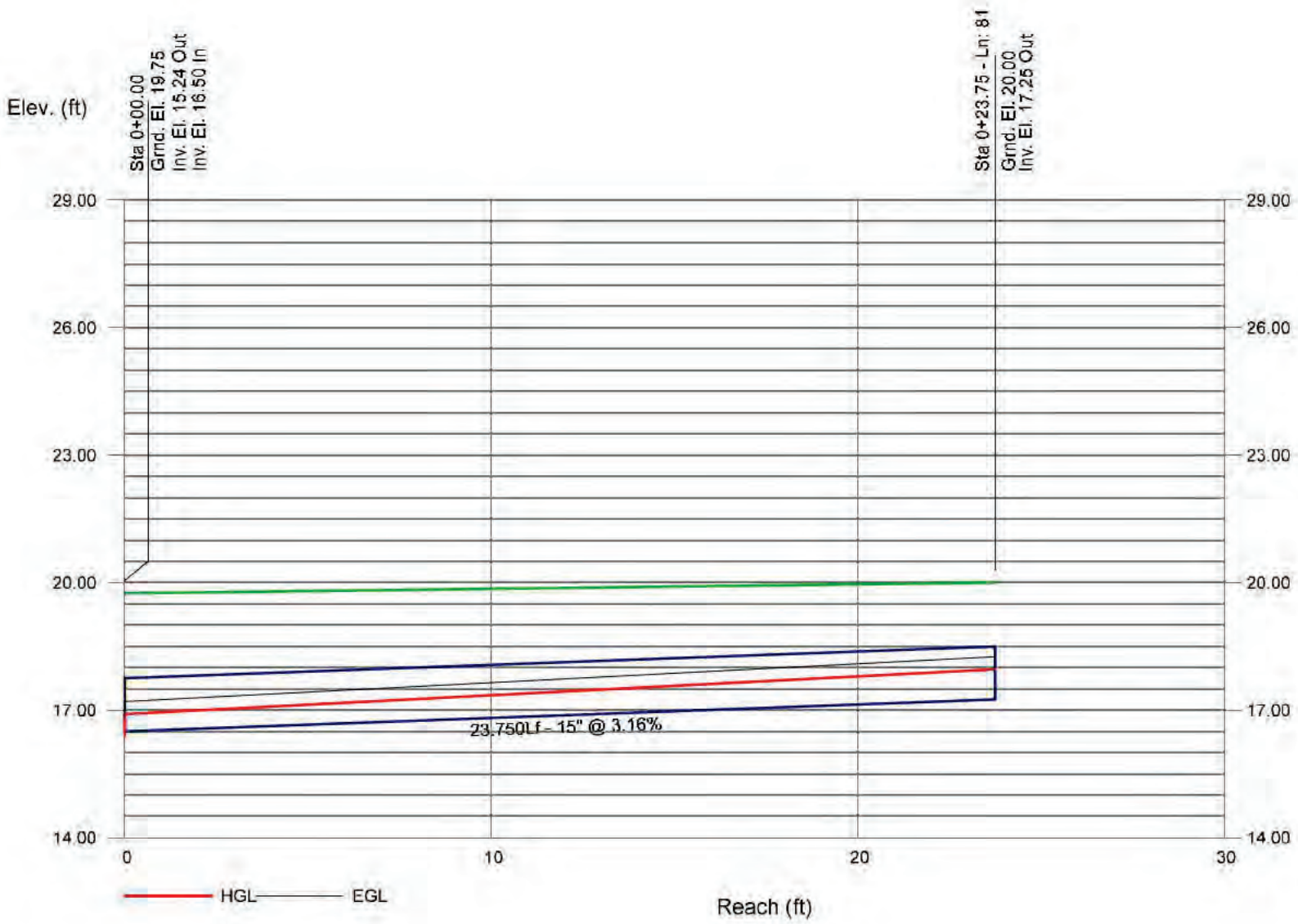
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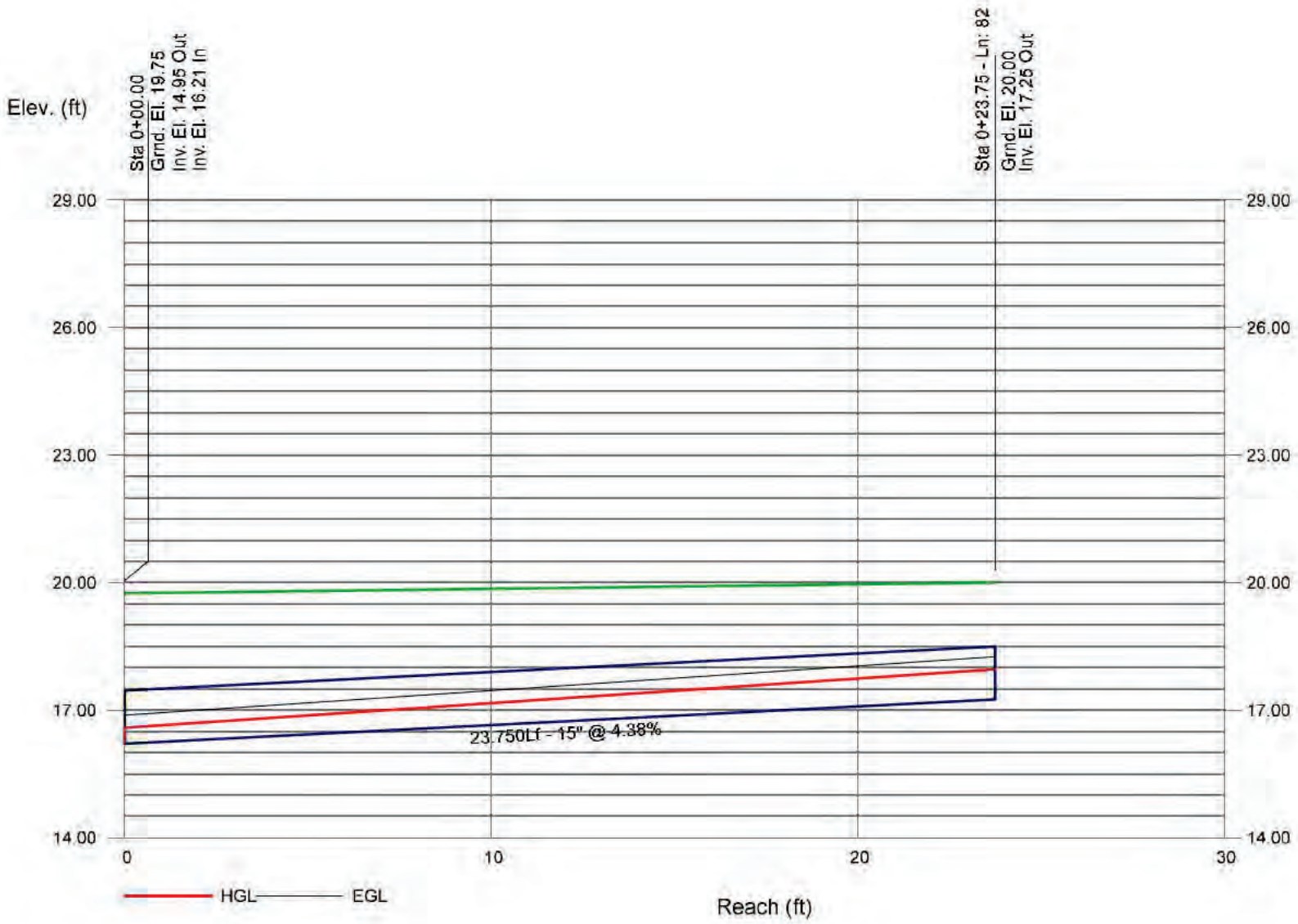




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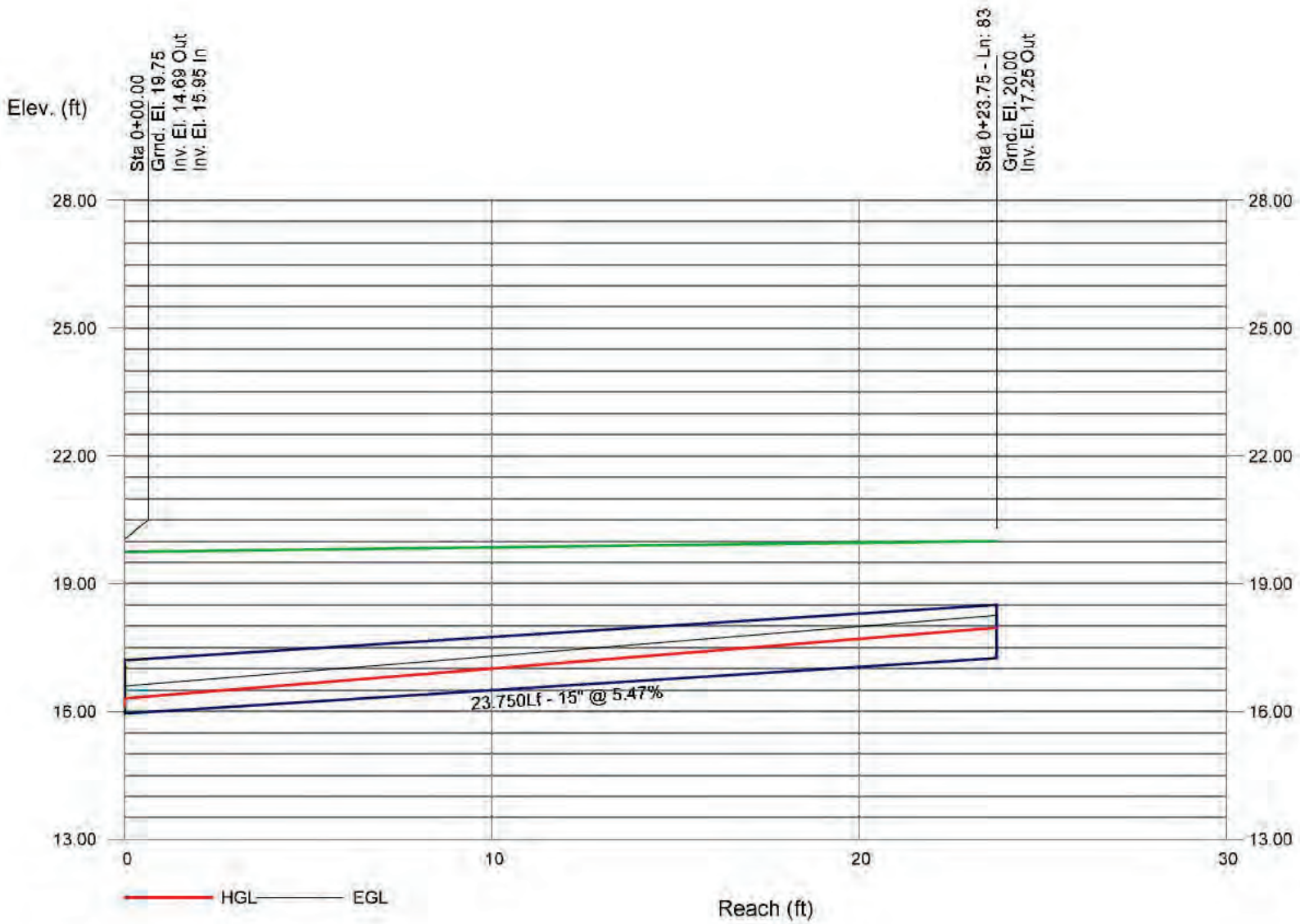




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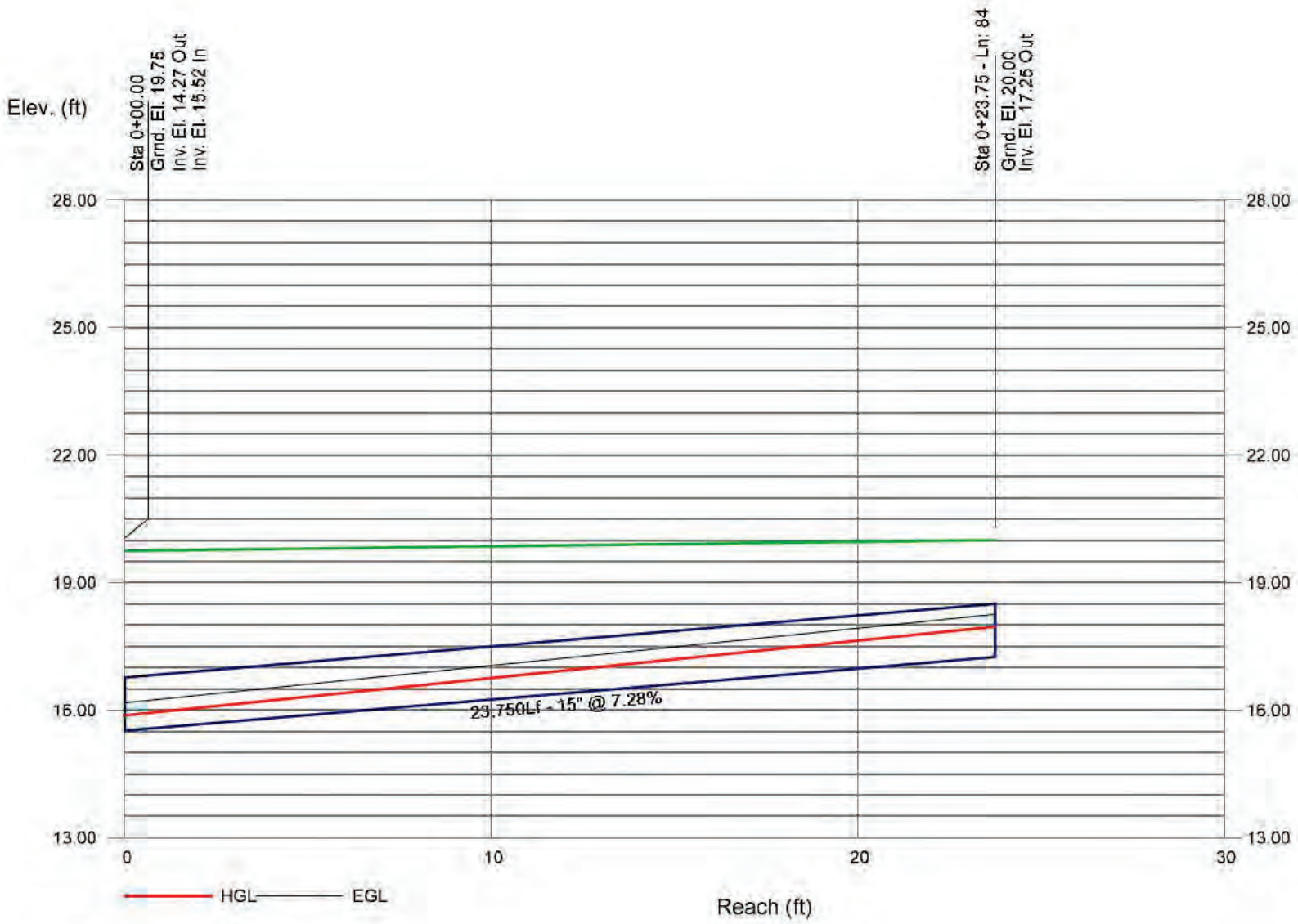




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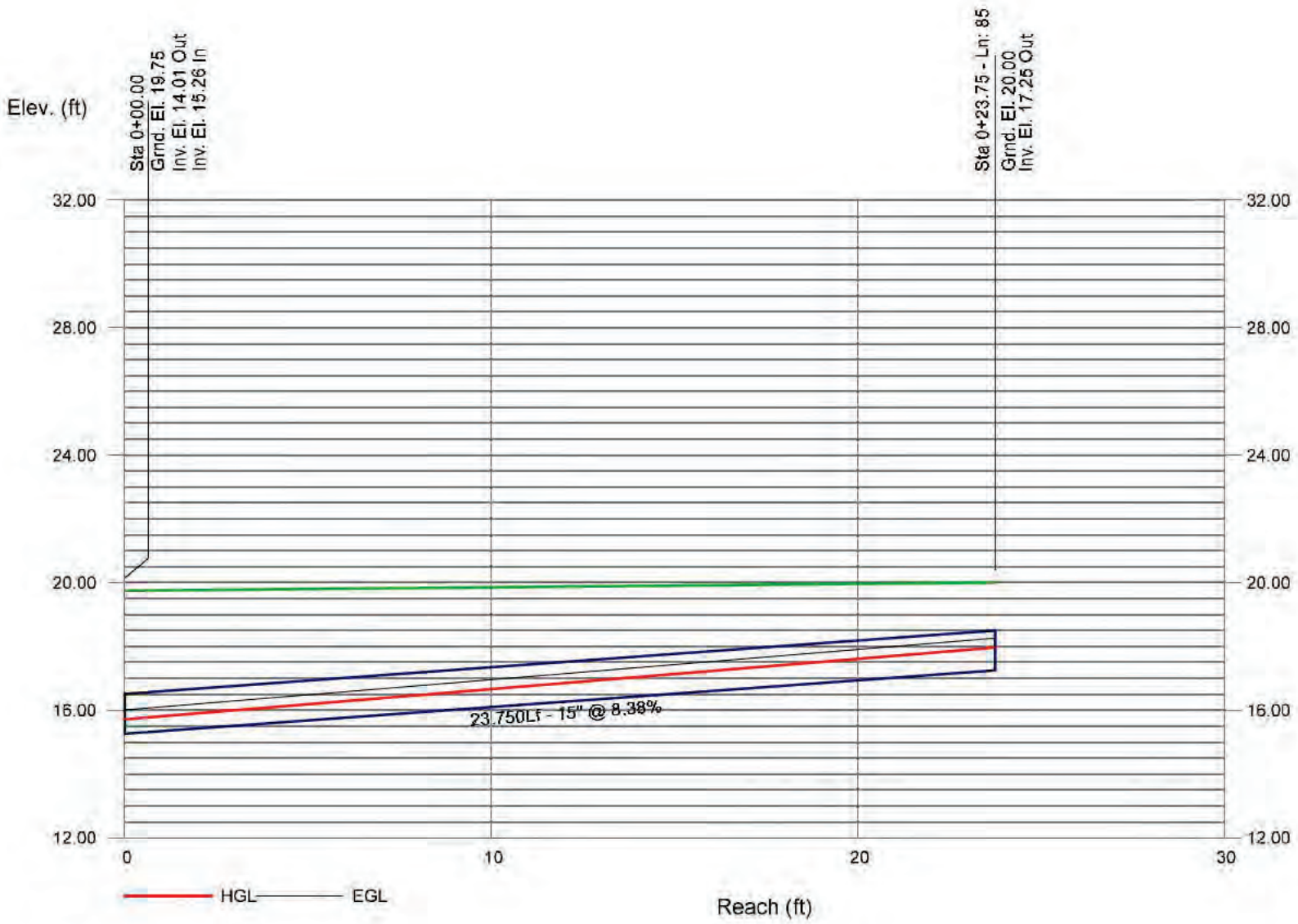




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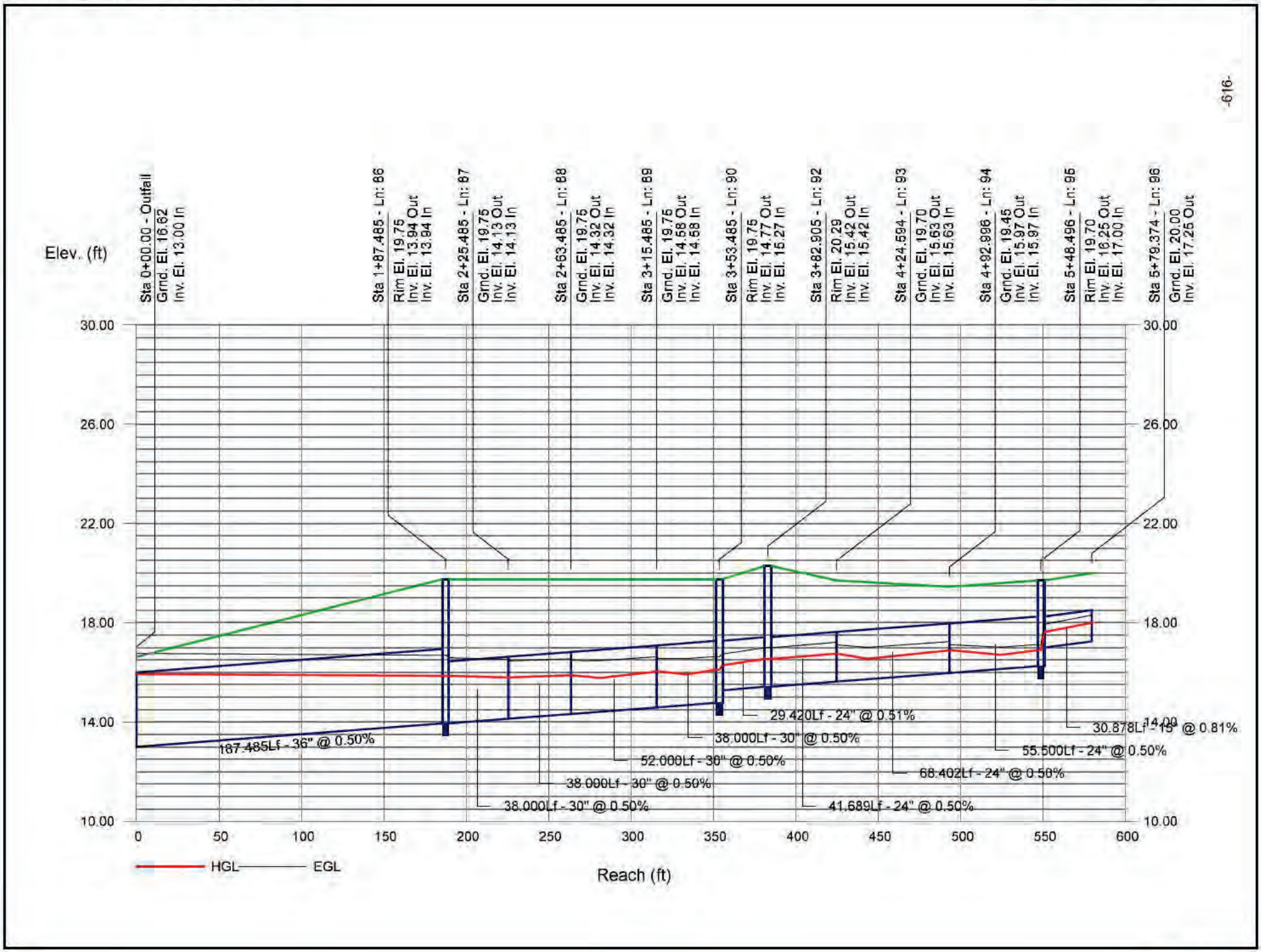
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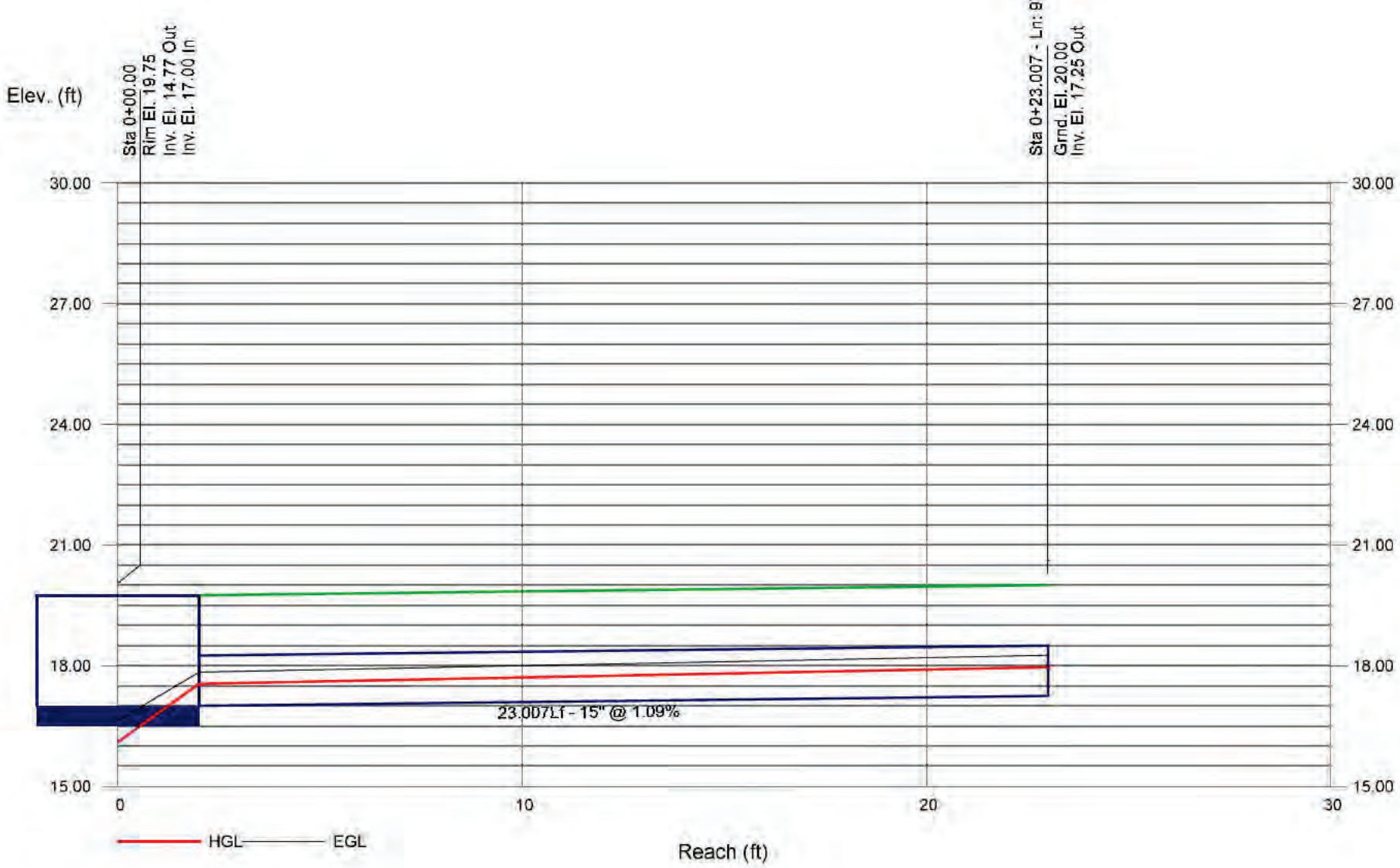
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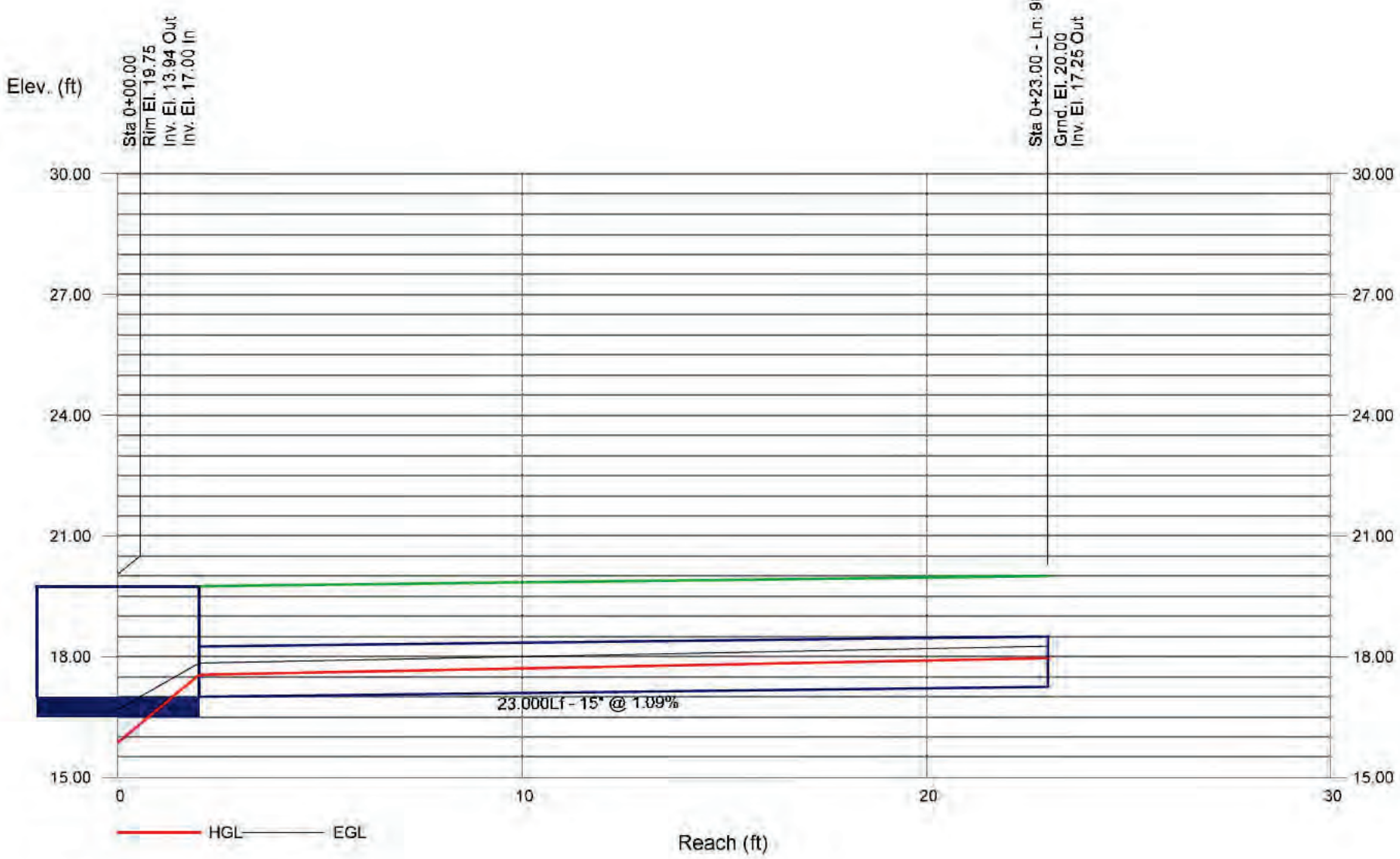
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-617-

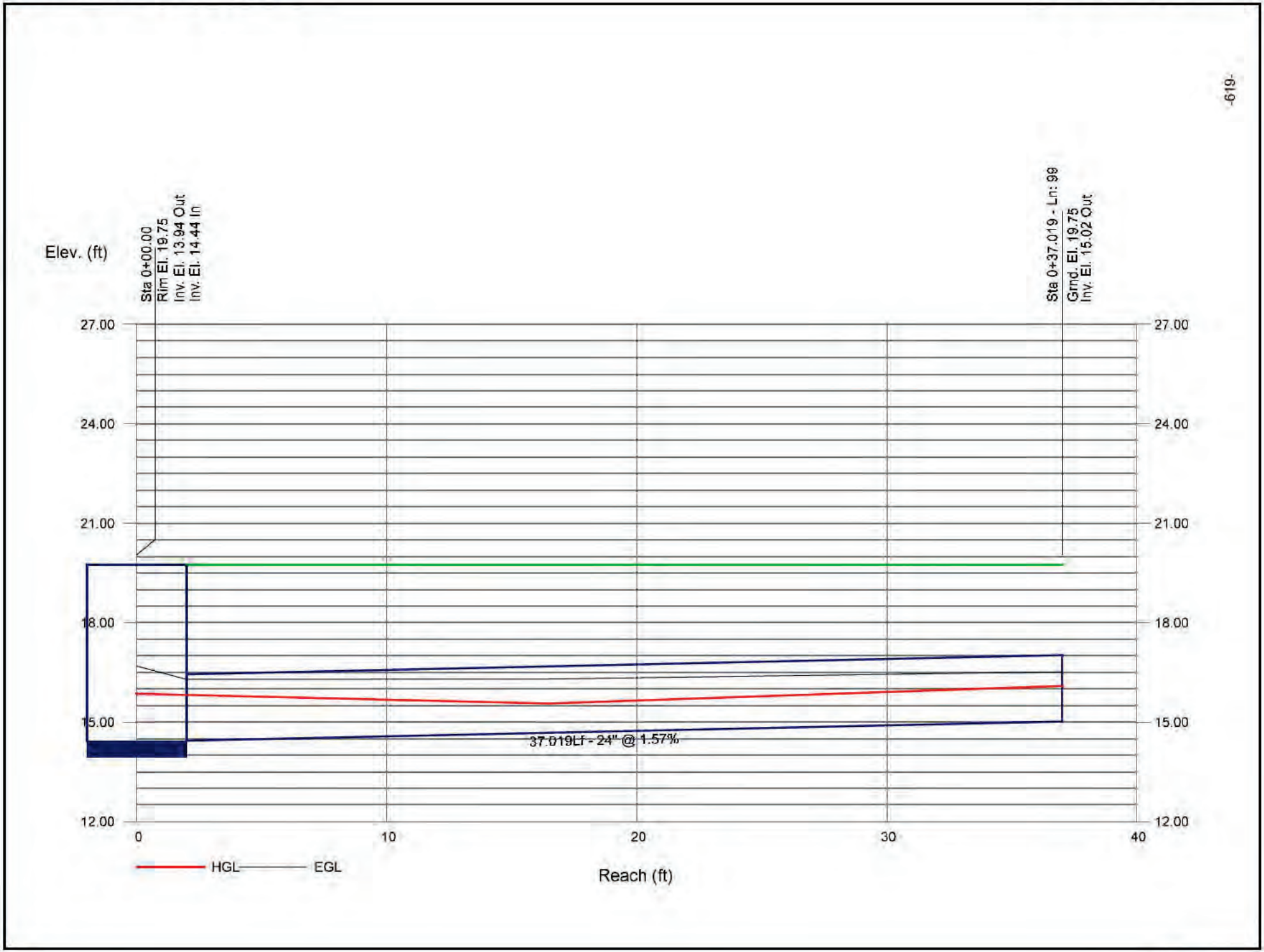
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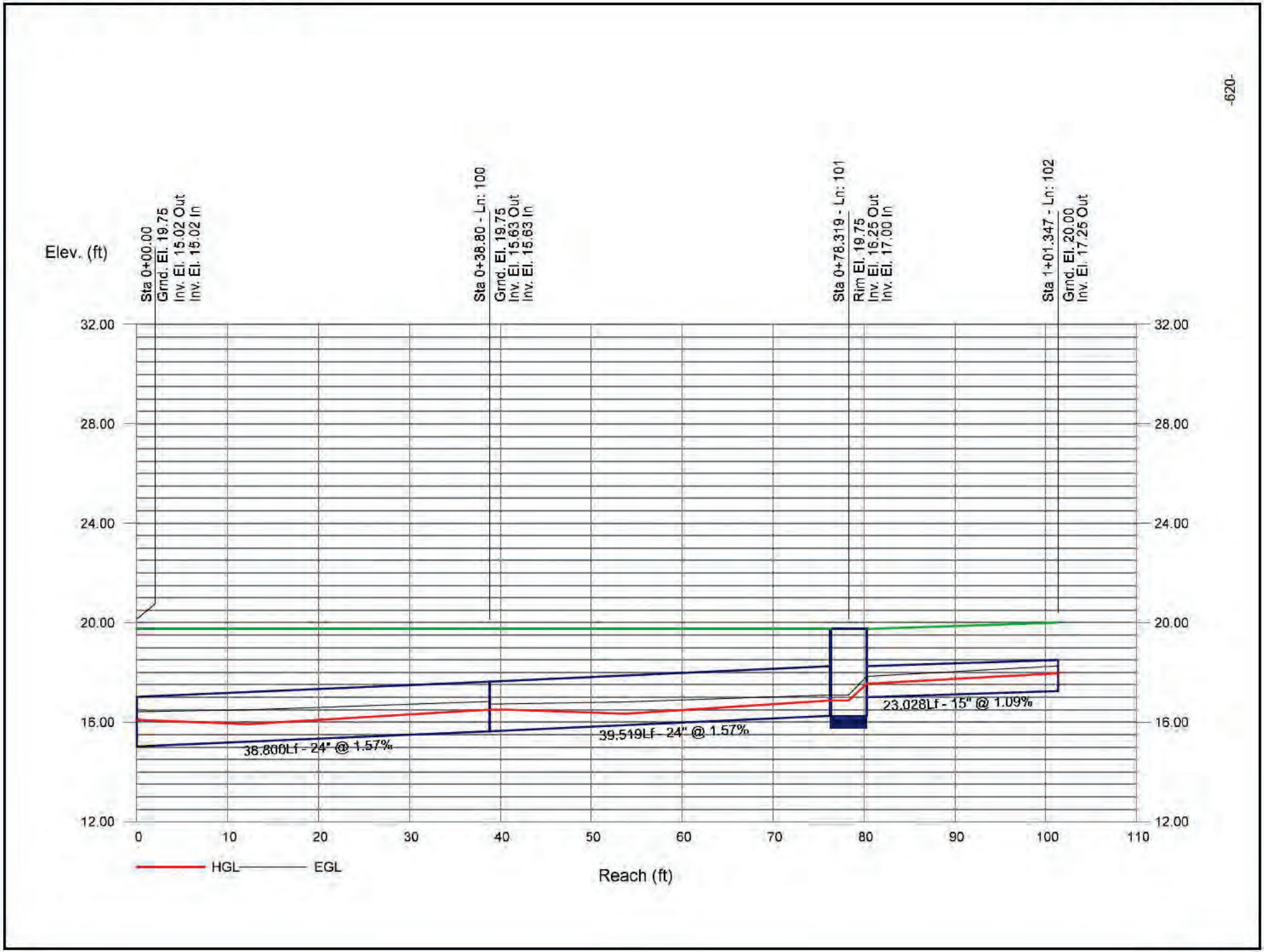
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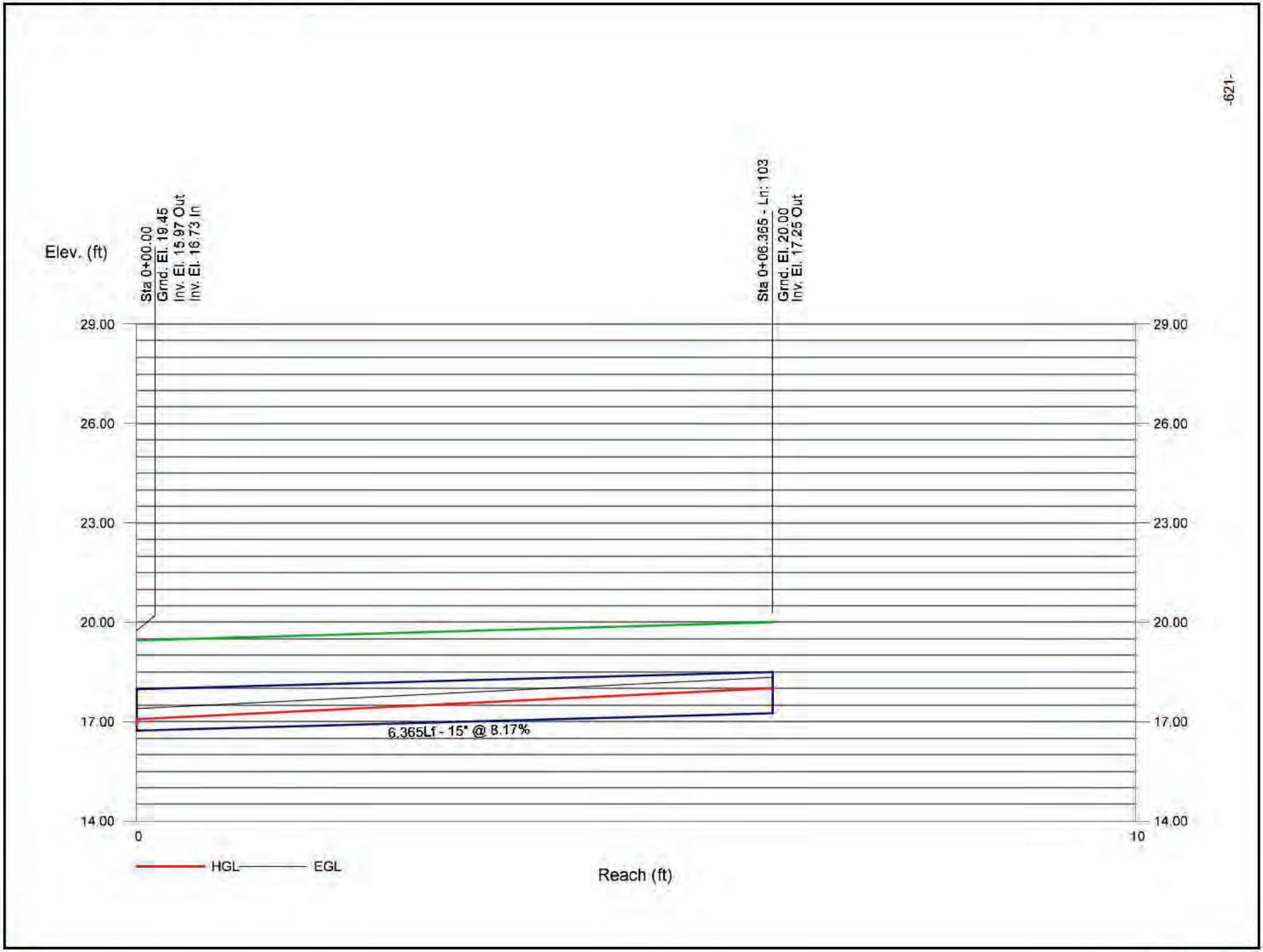
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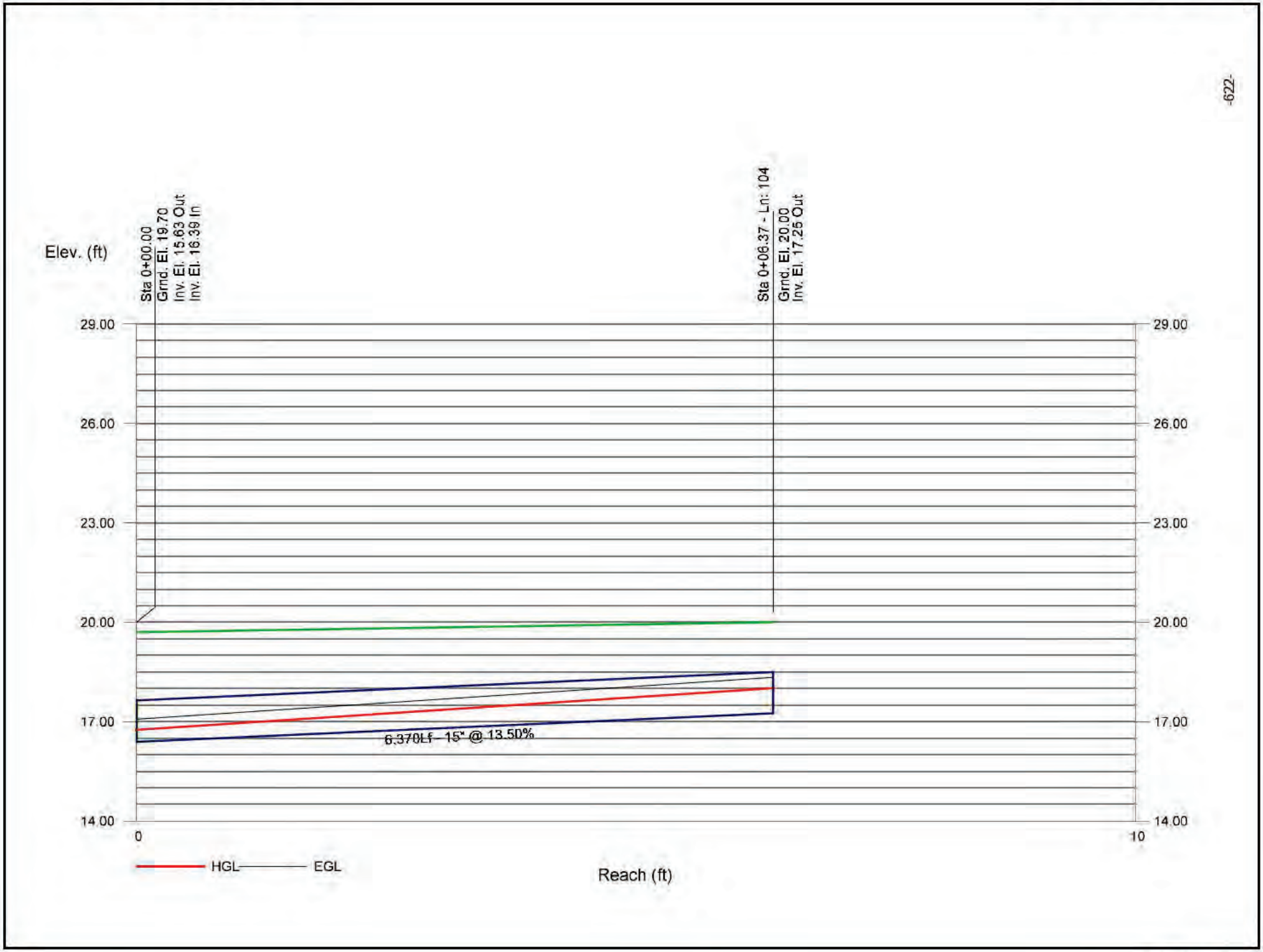
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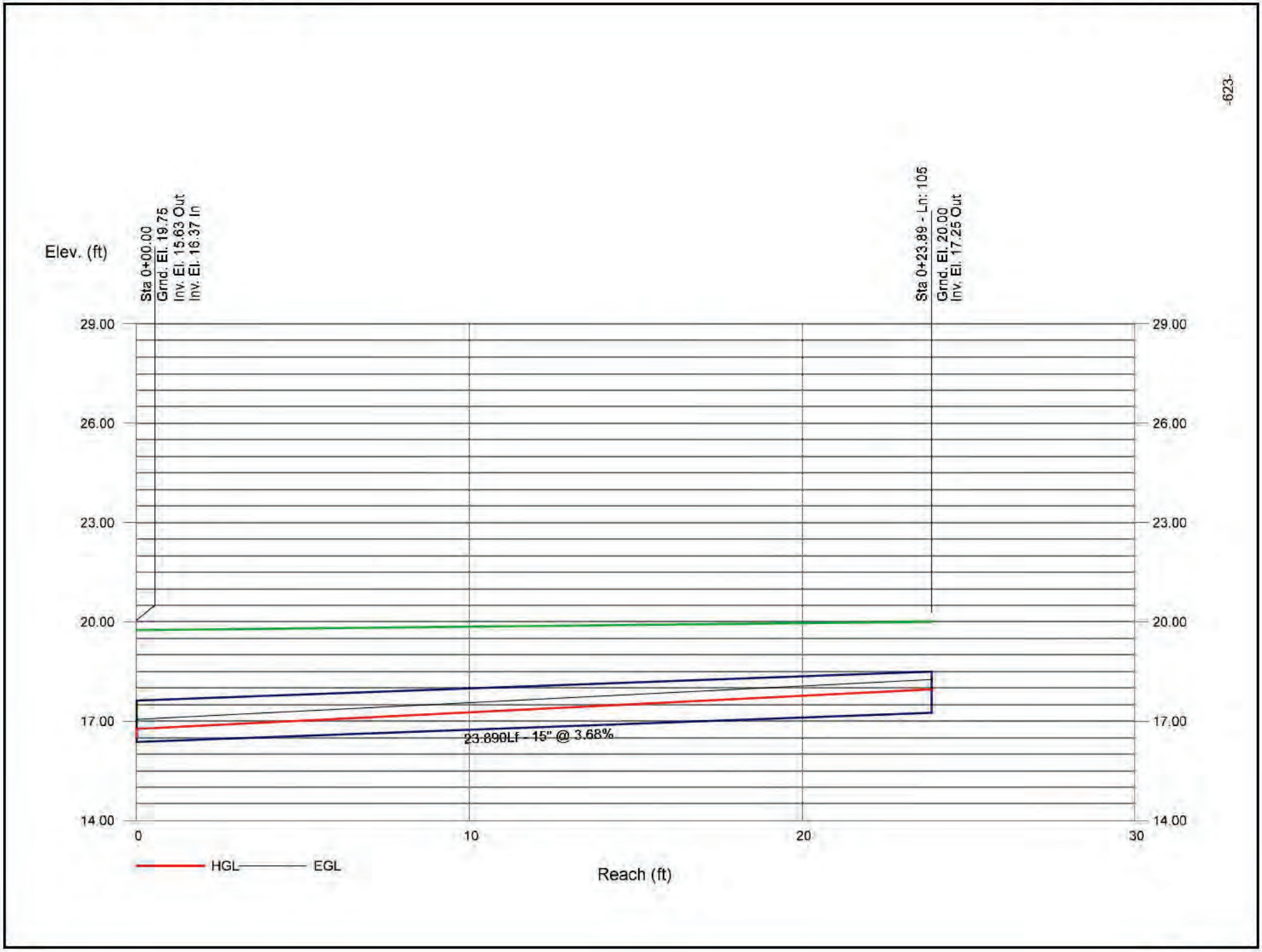
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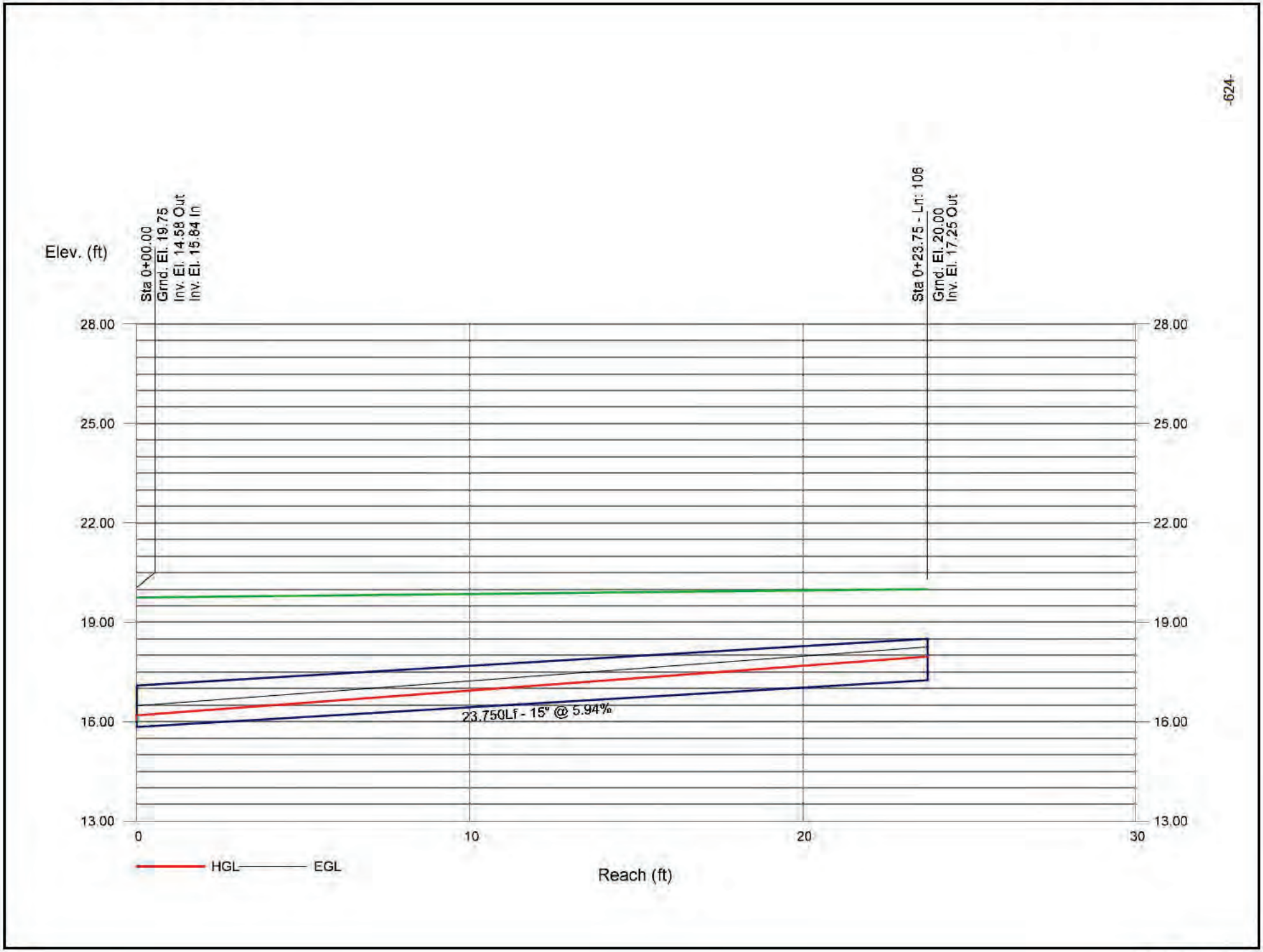
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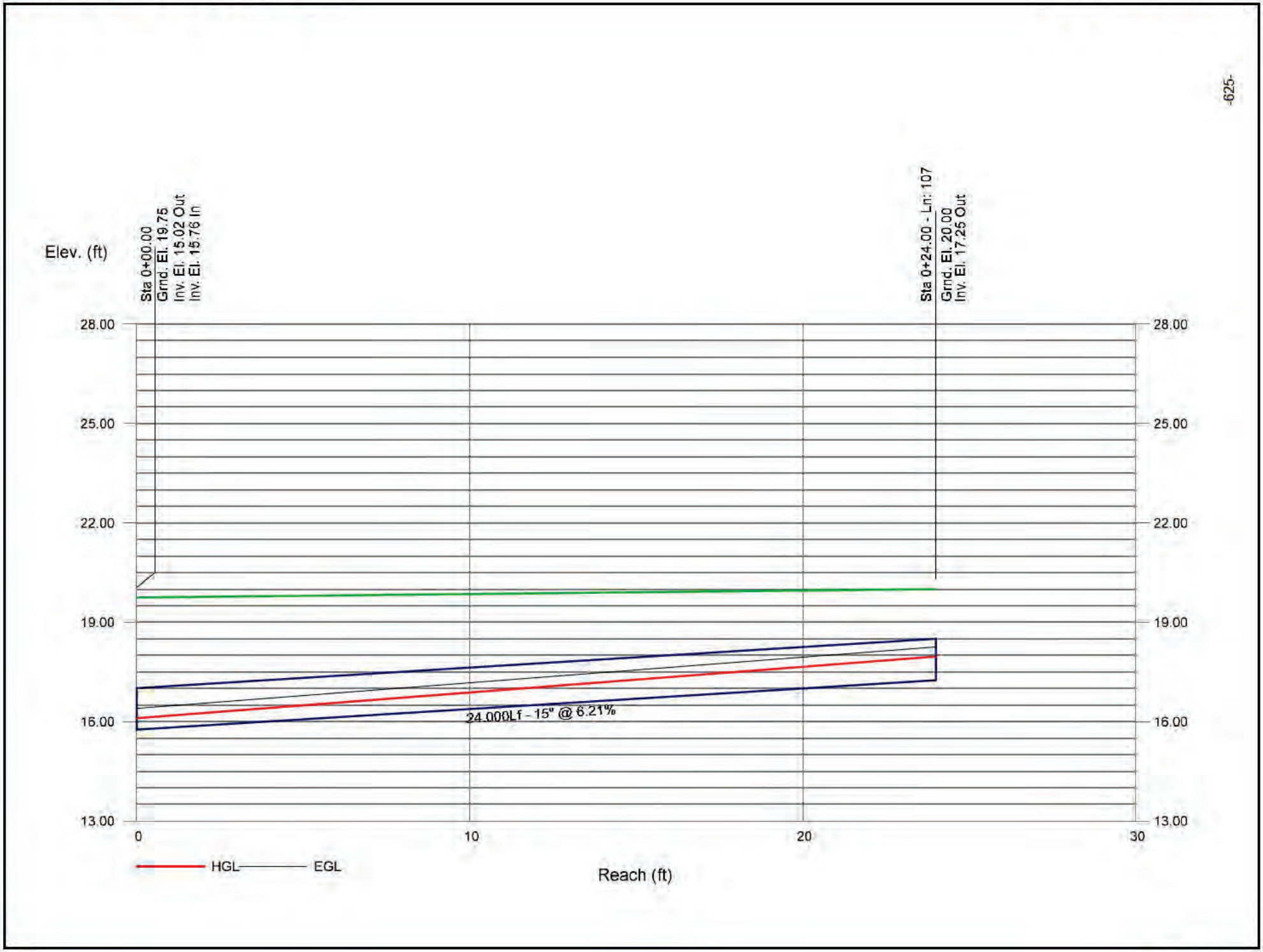
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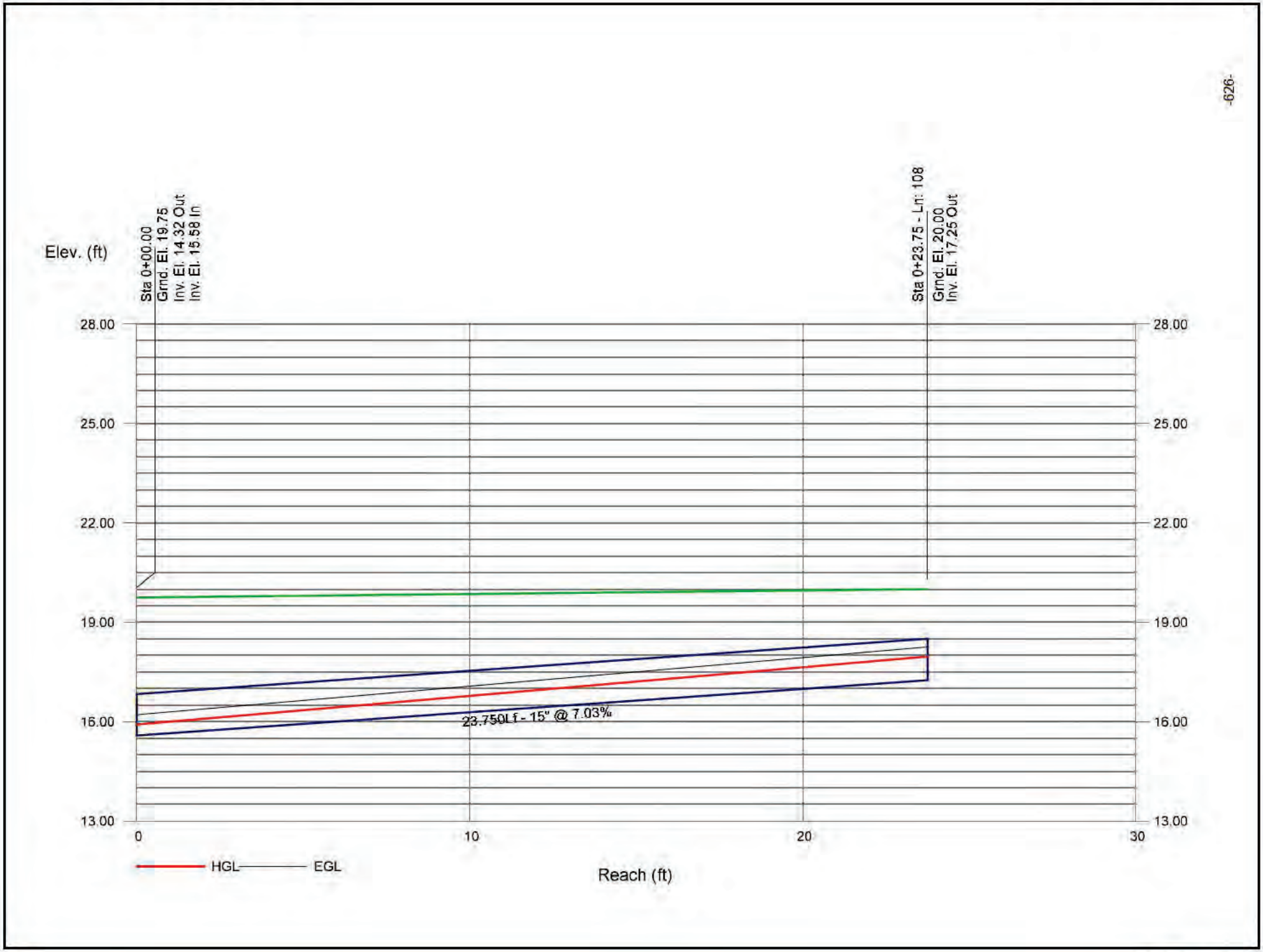
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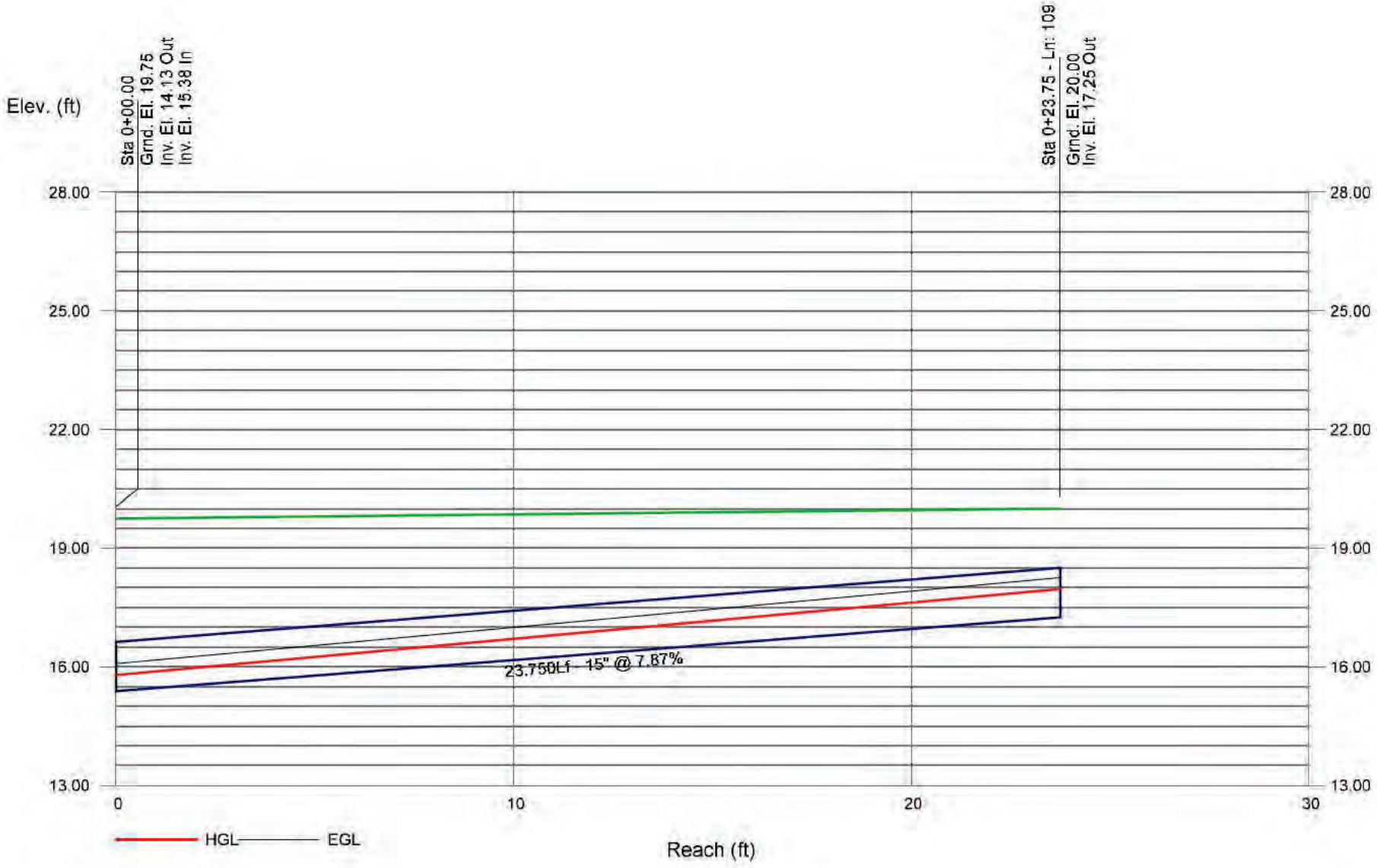




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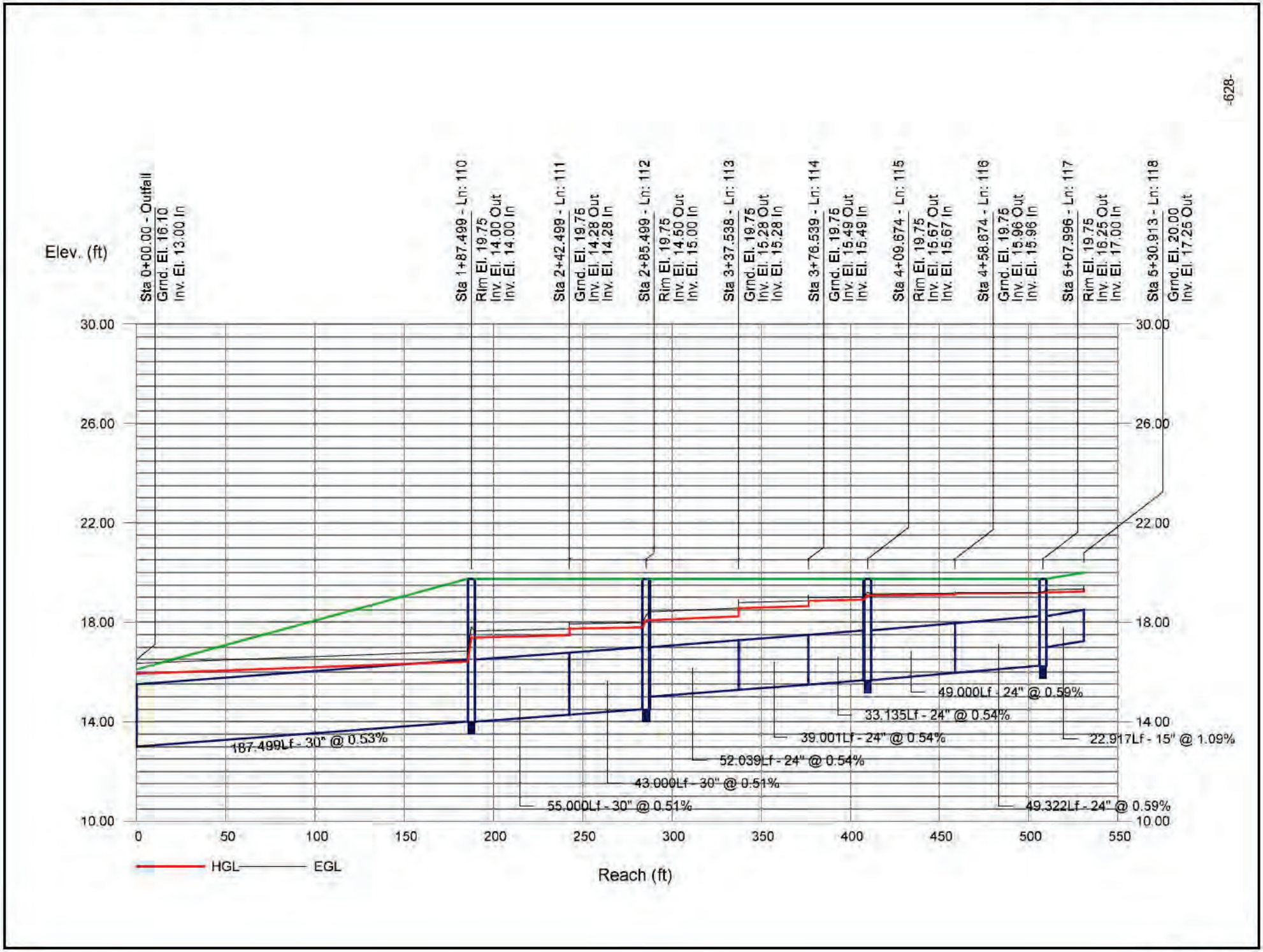
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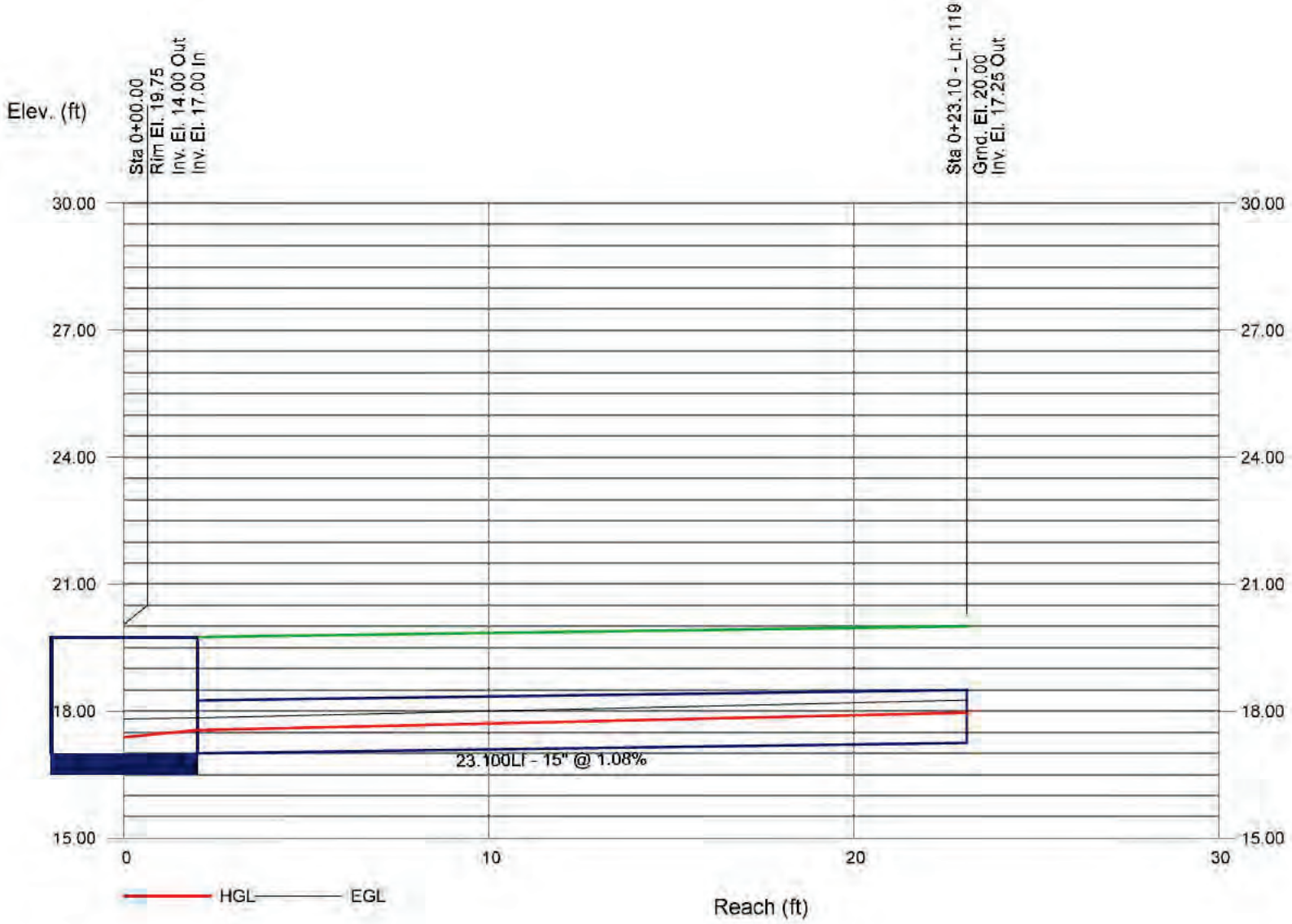
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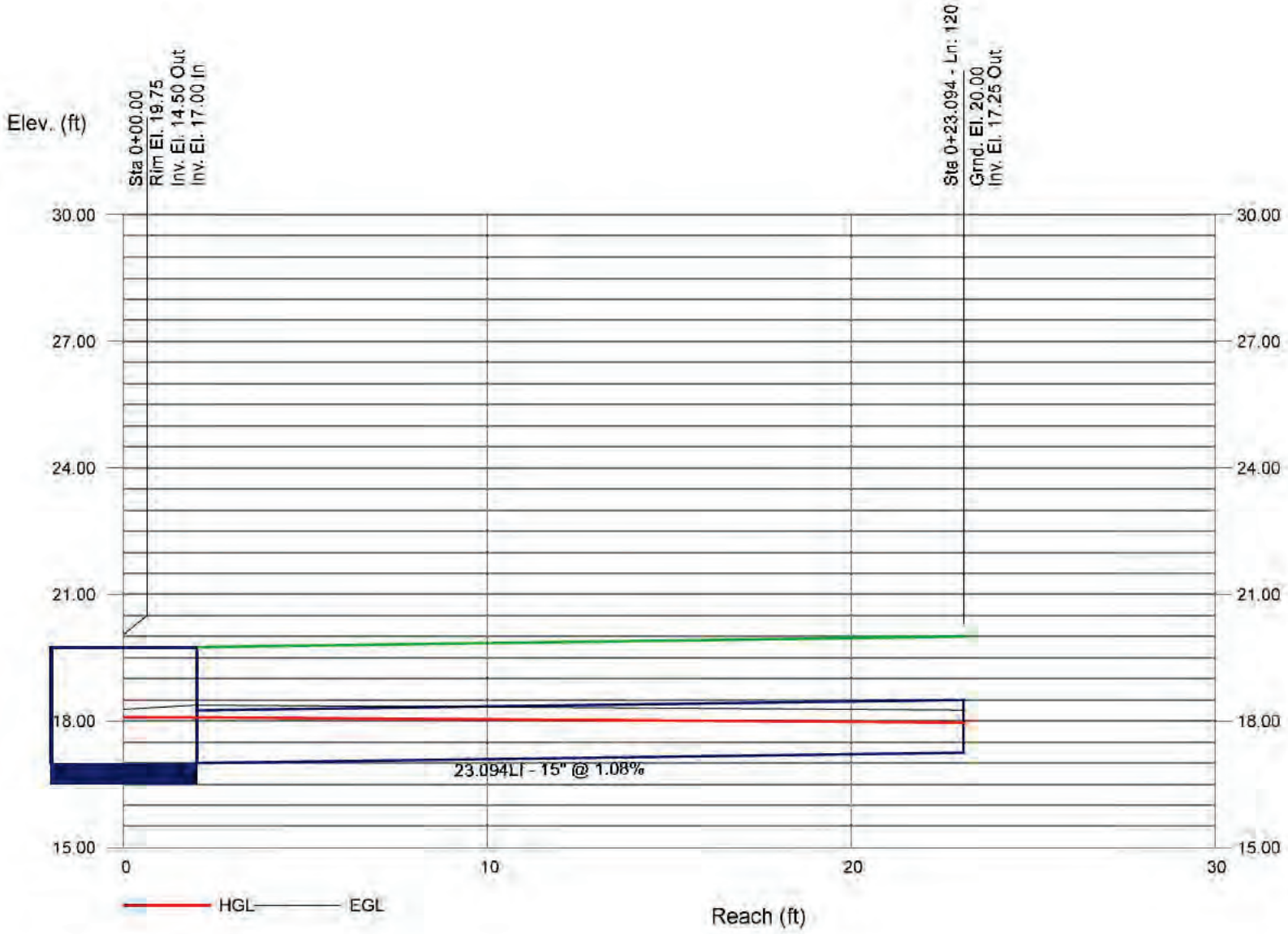
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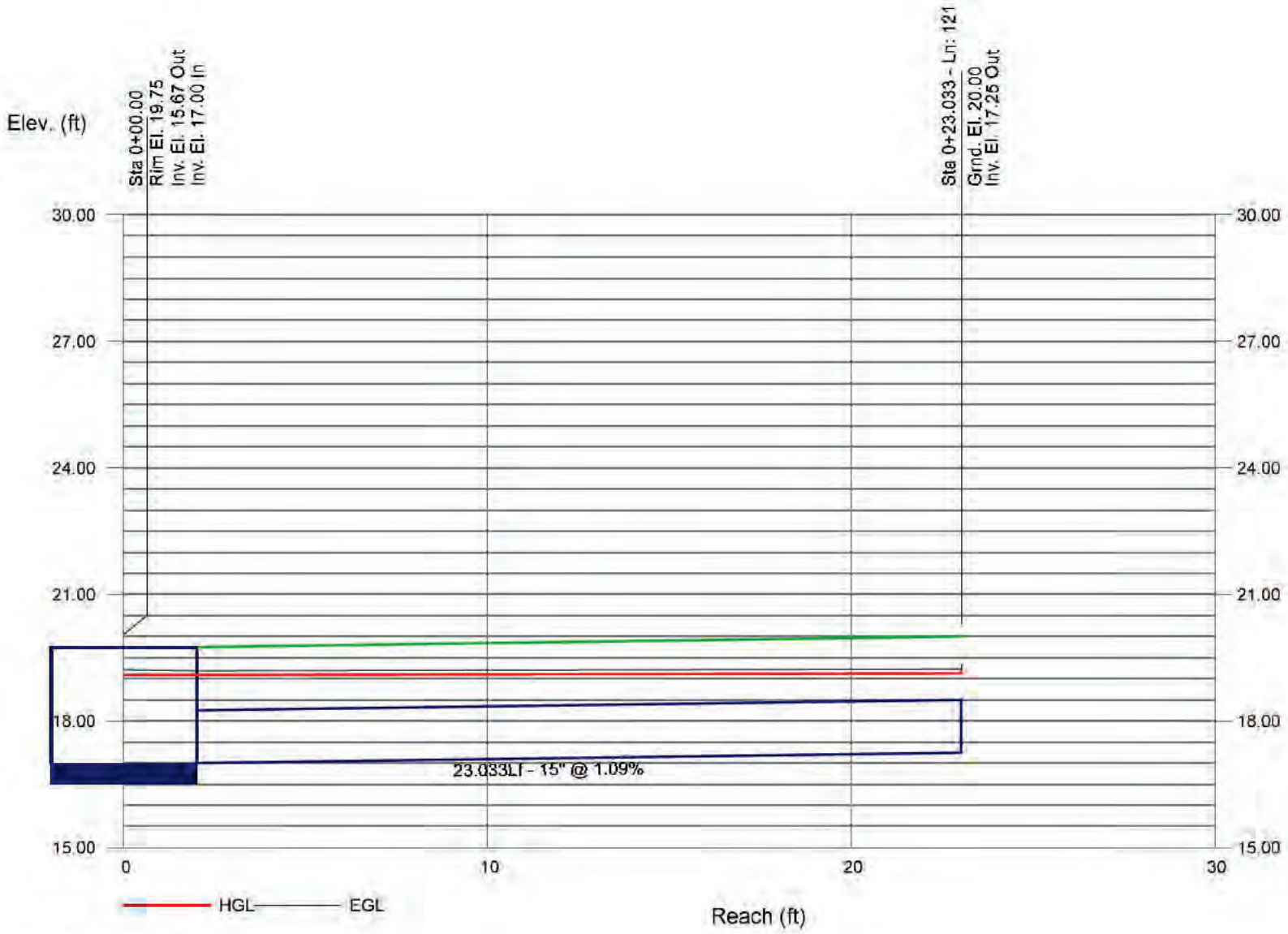
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Proj. file: Building 4 Storm.stm



# Storm Sewer Profile

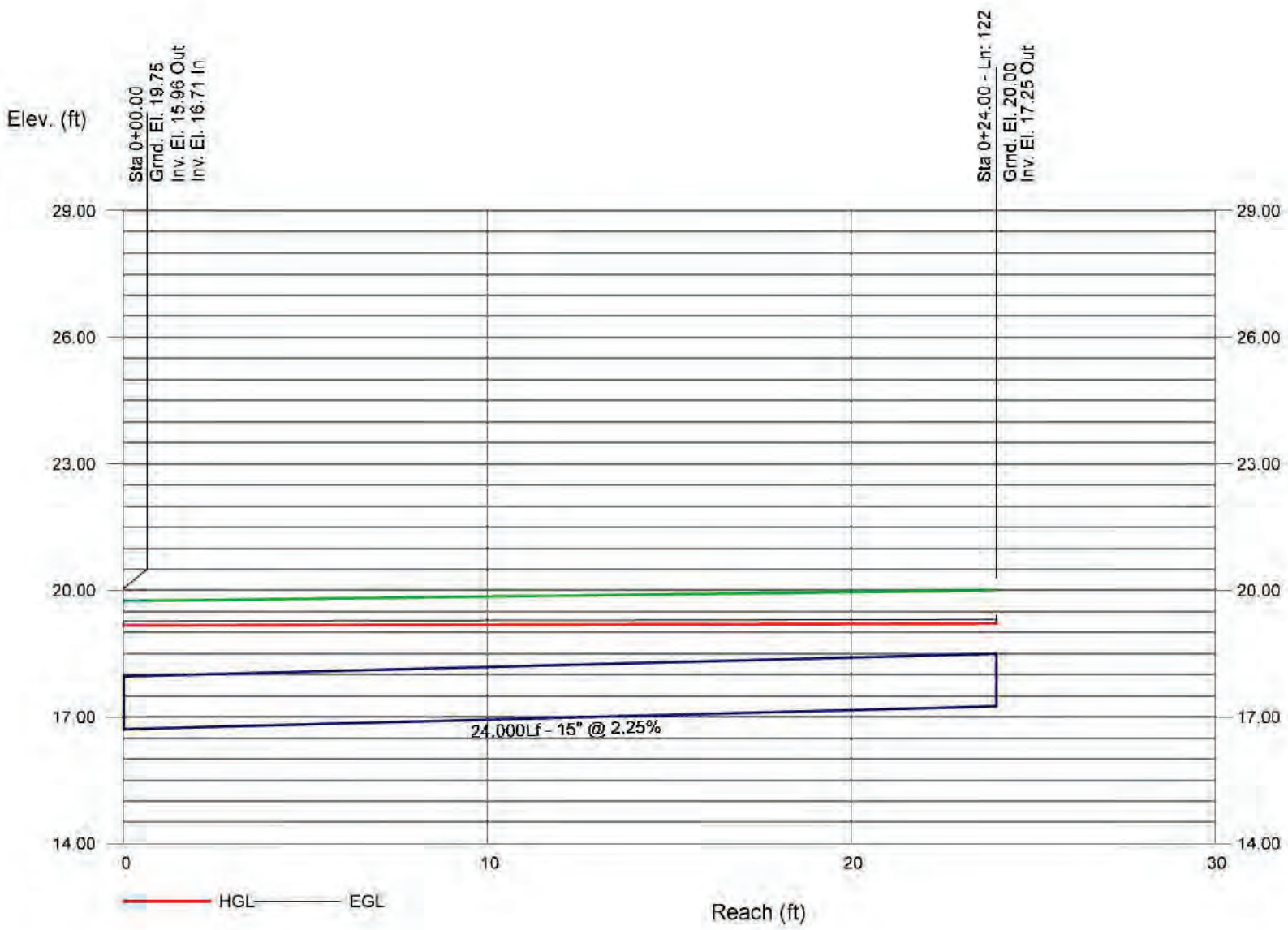
Proj. file: Building 4 Storm.stm




-631-

# Storm Sewer Profile

Proj. file: Building 4 Storm.stm

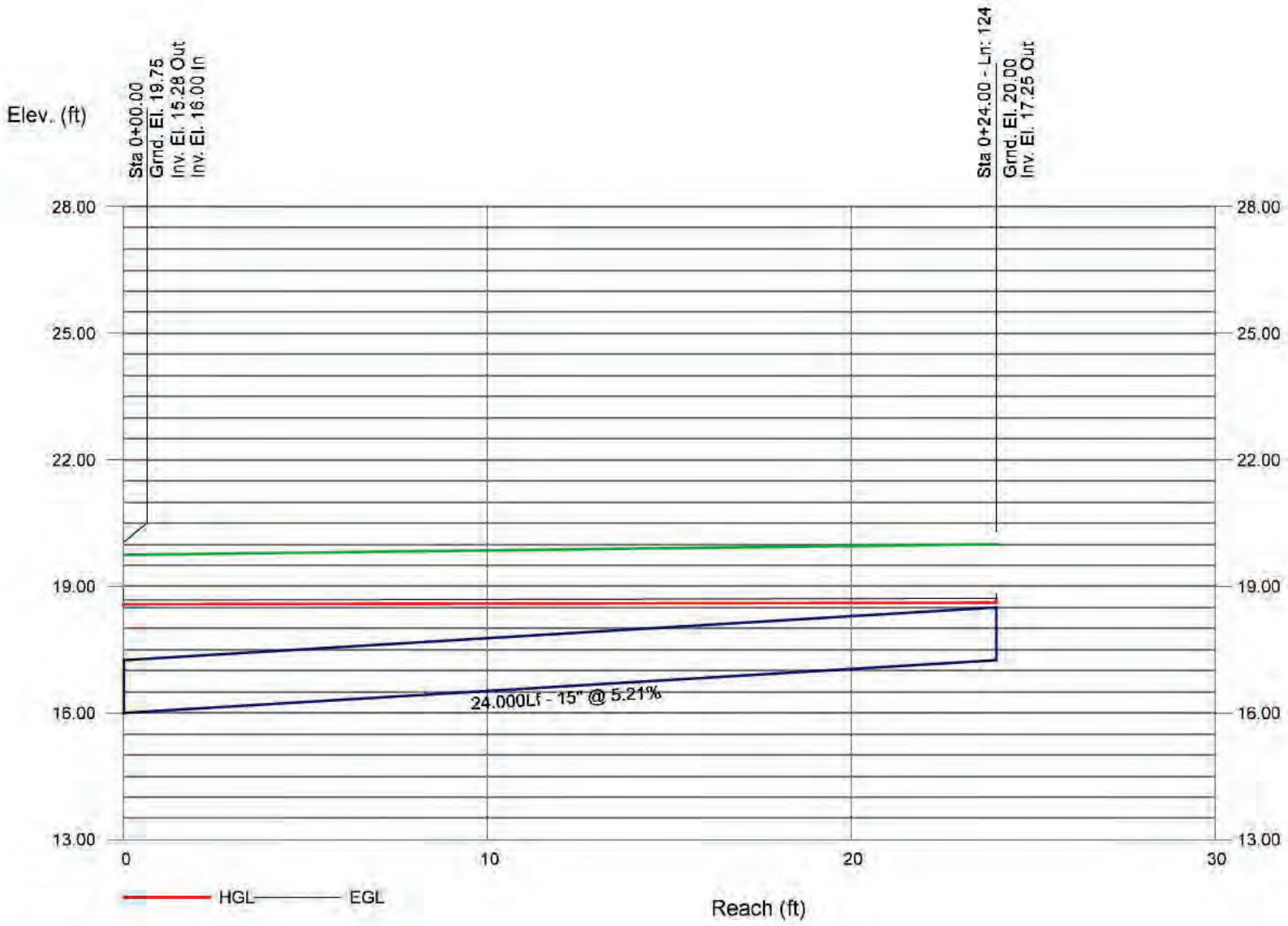



-632-

# Storm Sewer Profile

Proj. file: Building 4 Storm.stm

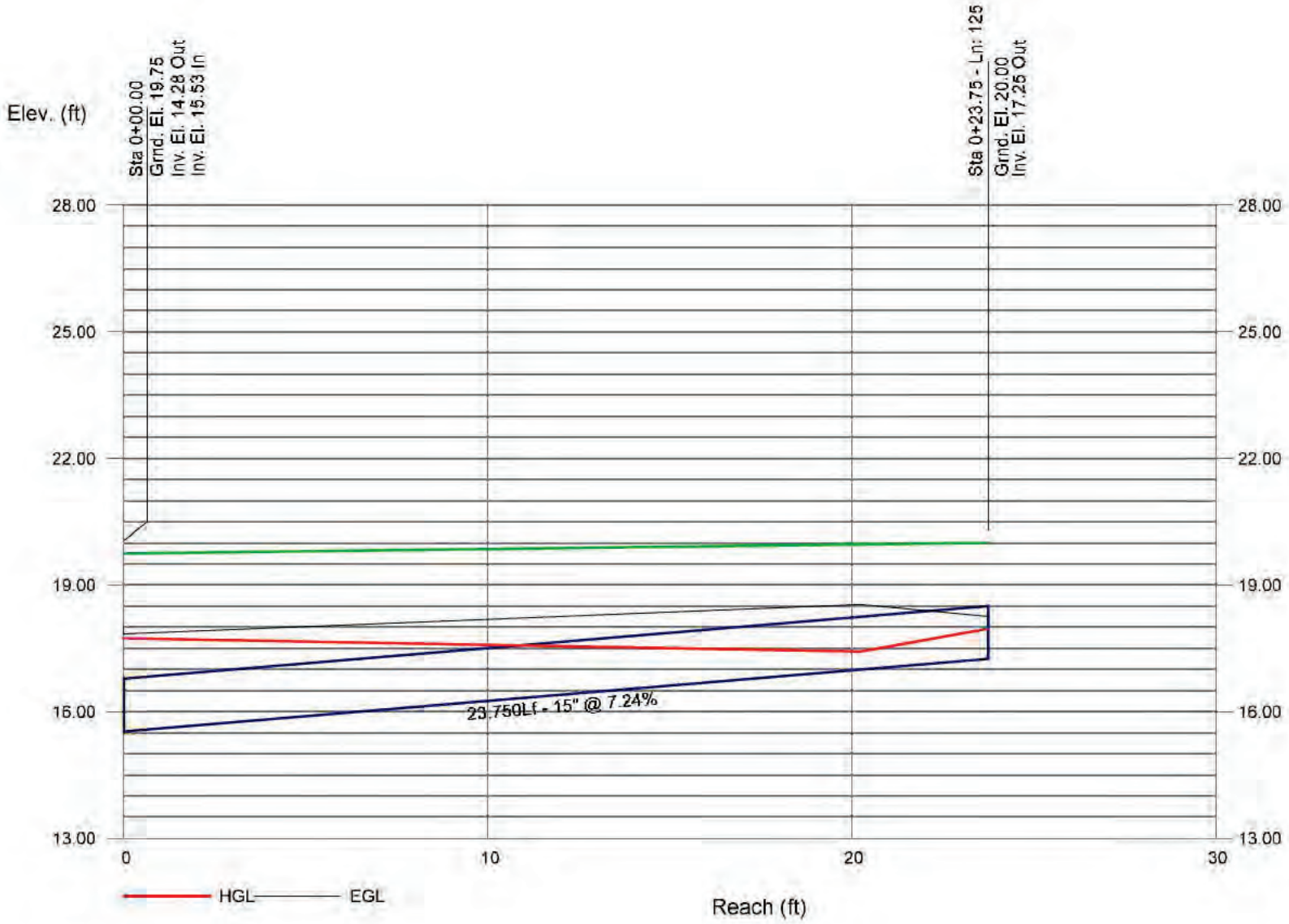
-634-



# Storm Sewer Profile

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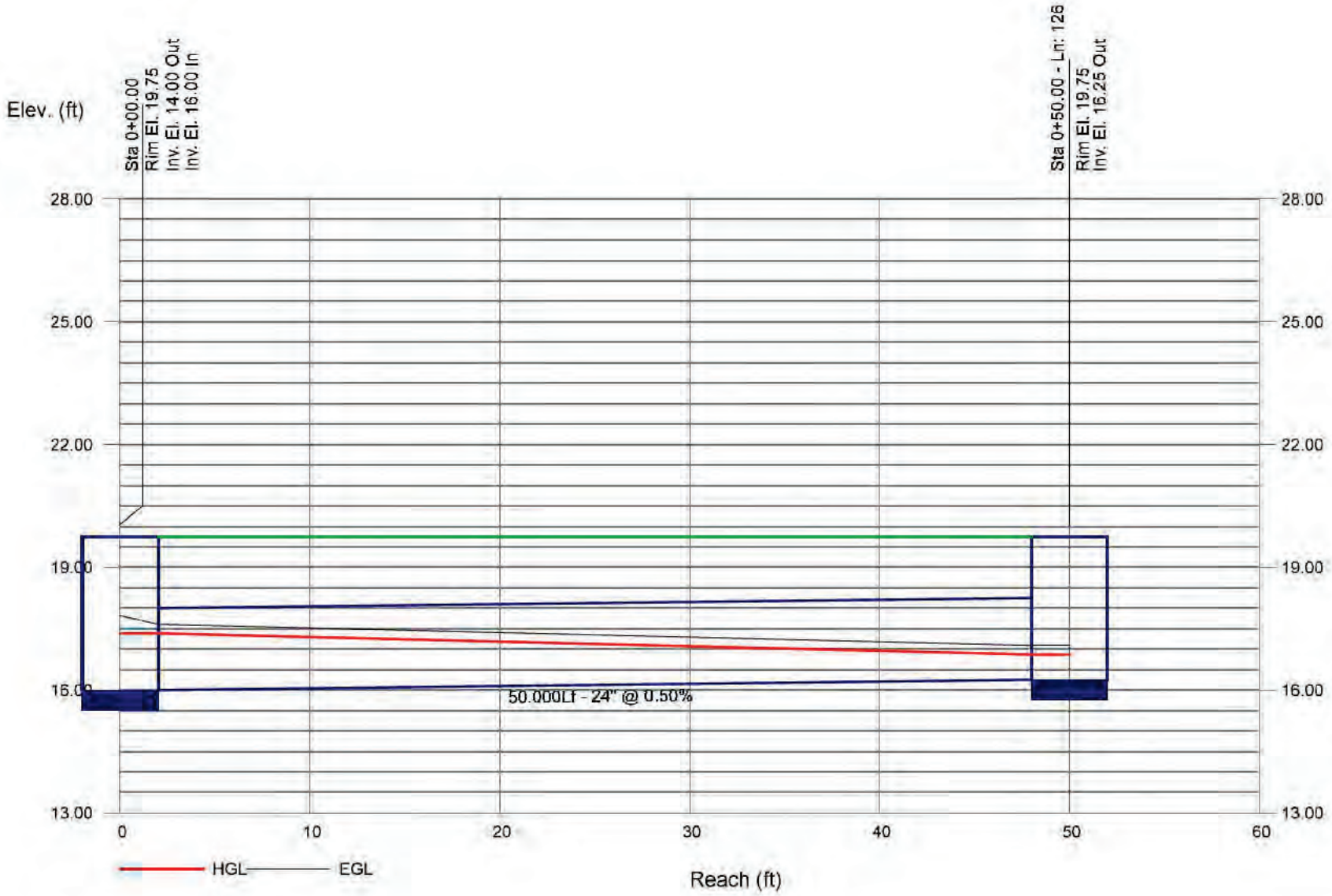




# Storm Sewer Profile

Proj. file: Building 4 Storm.stm

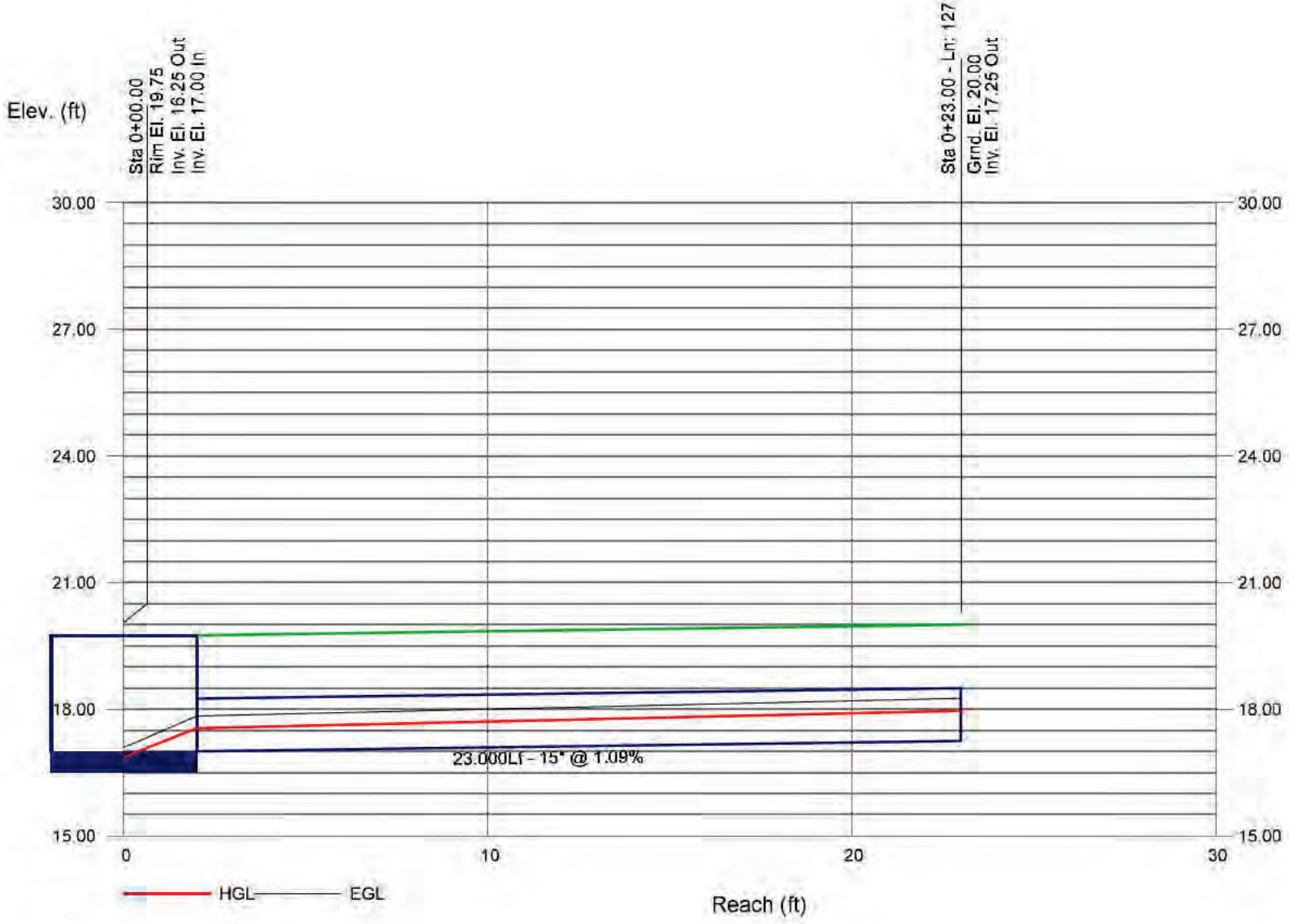




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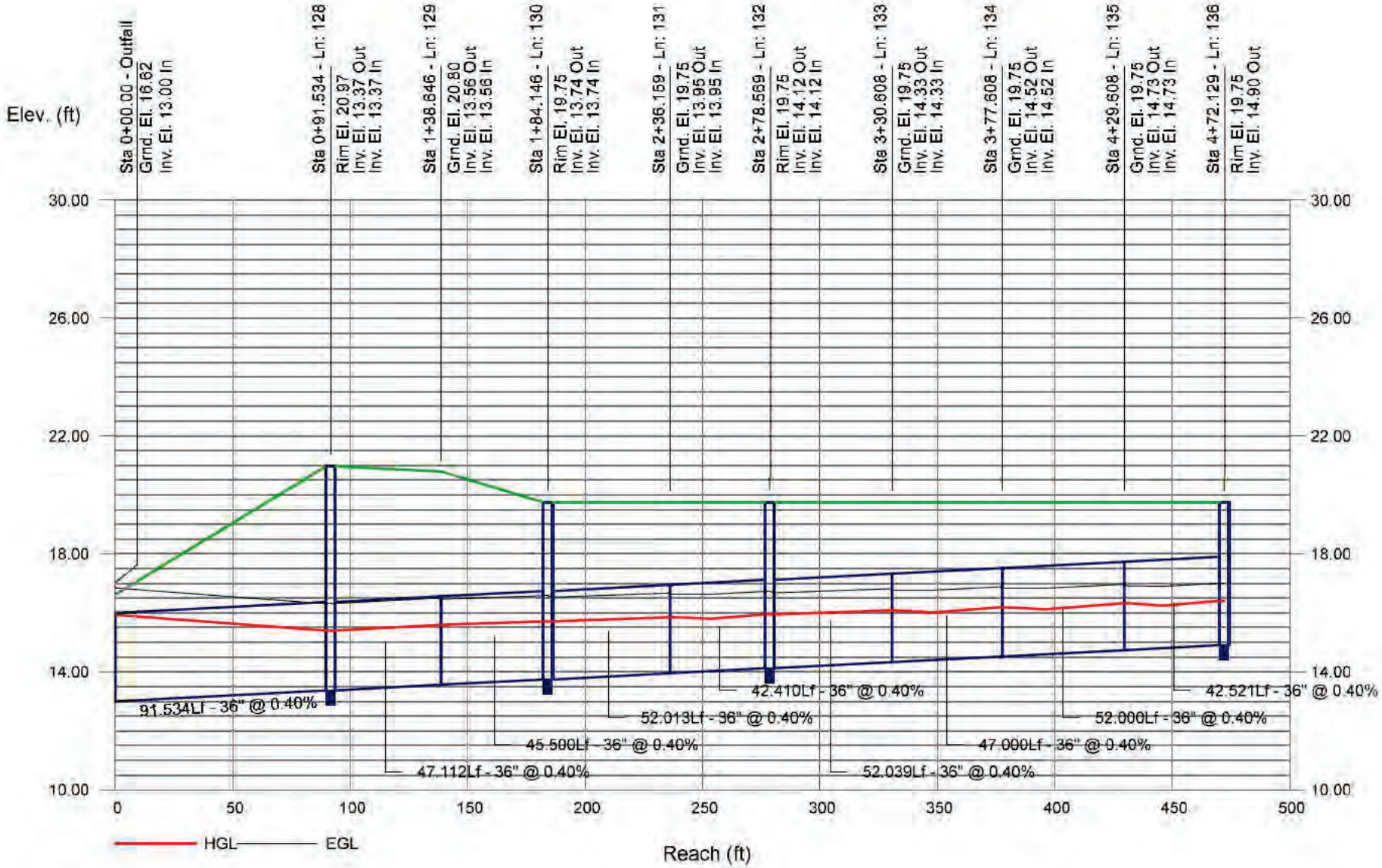
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# Storm Sewer Profile

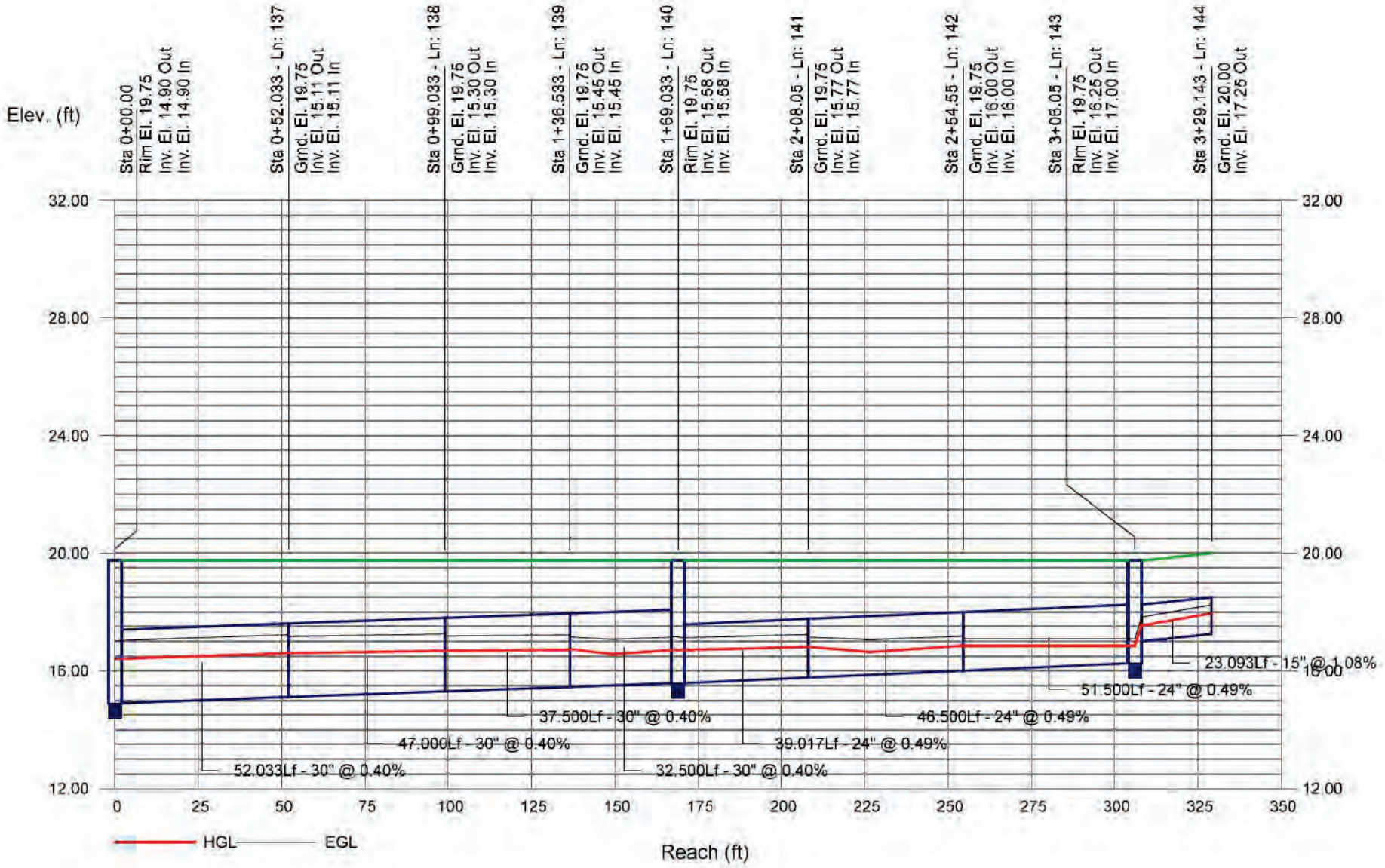
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-638-

# Storm Sewer Profile

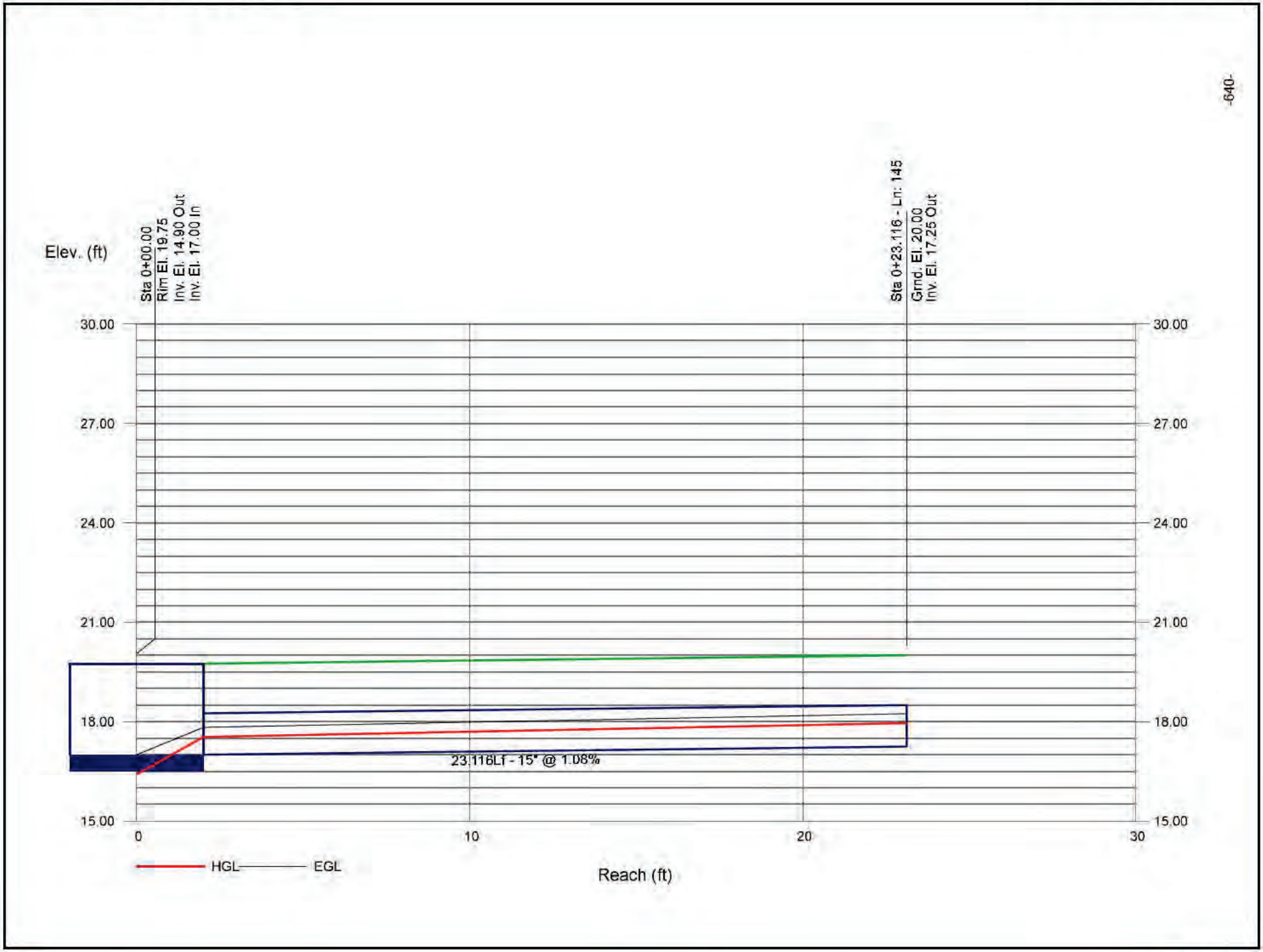
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-639-

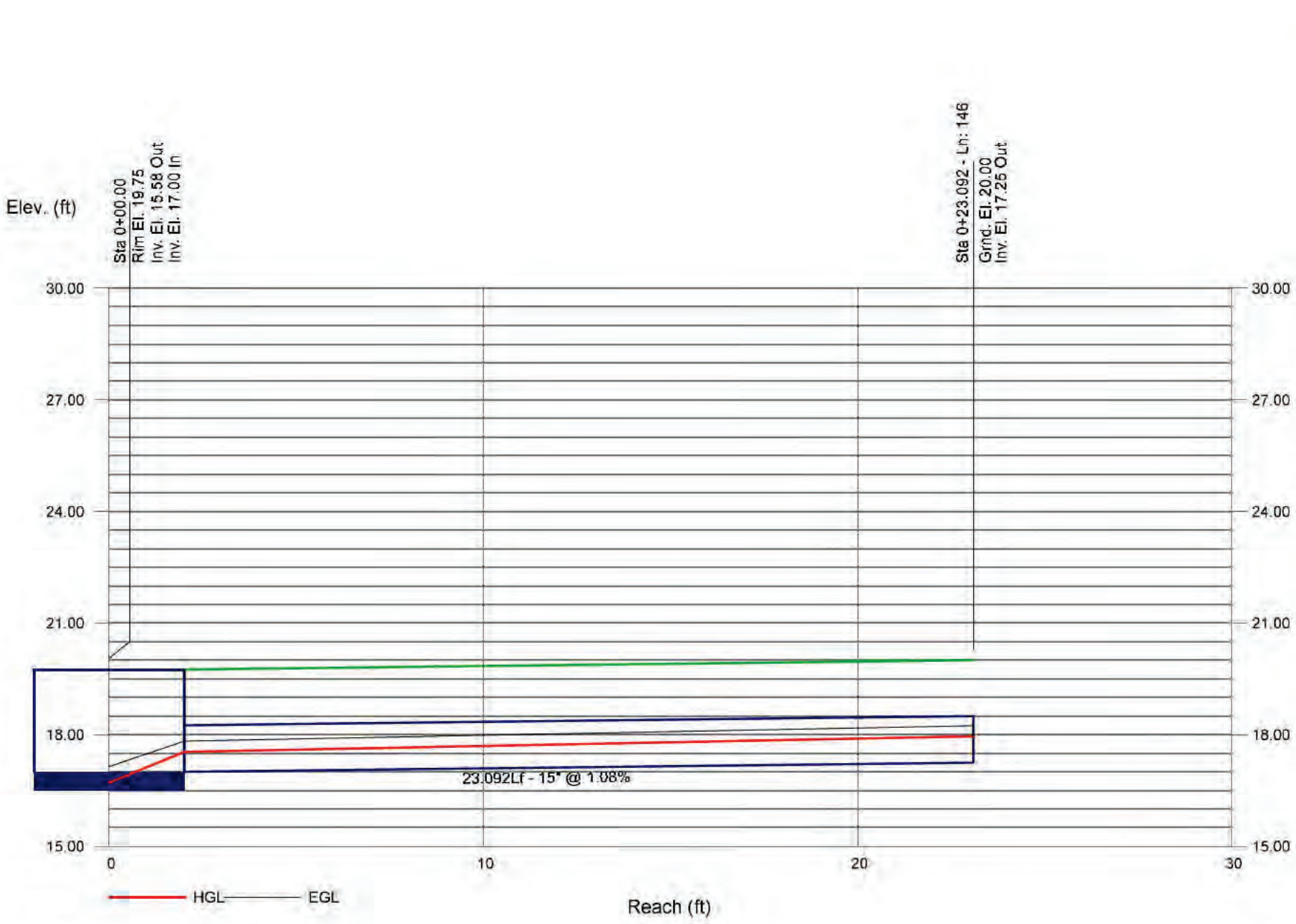
# Storm Sewer Profile

Proj. file: Building 4 Storm.stm



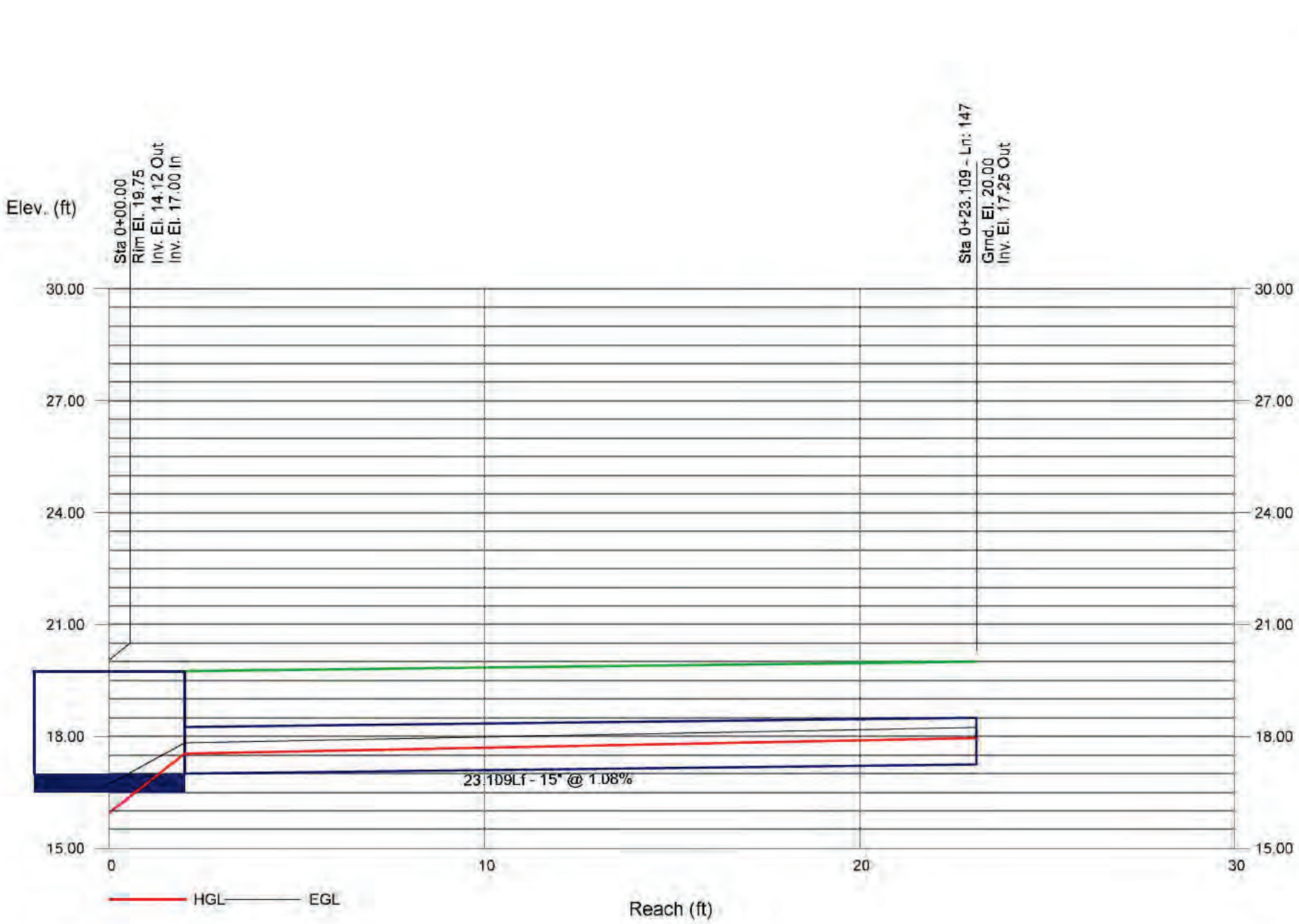
# Storm Sewer Profile

Proj. file: Building 4 Storm.stm



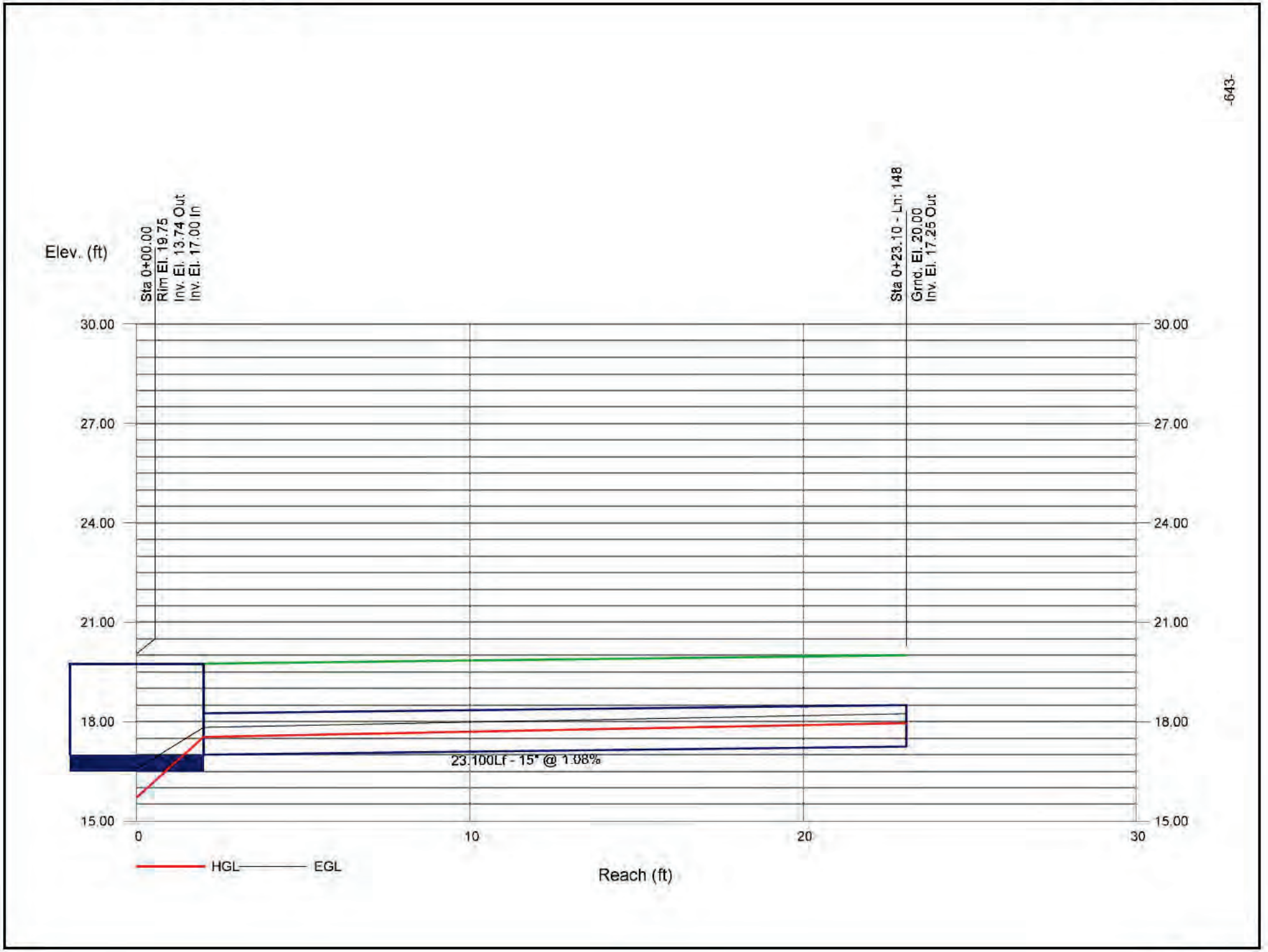
# Storm Sewer Profile

Proj. file: Building 4 Storm.stm



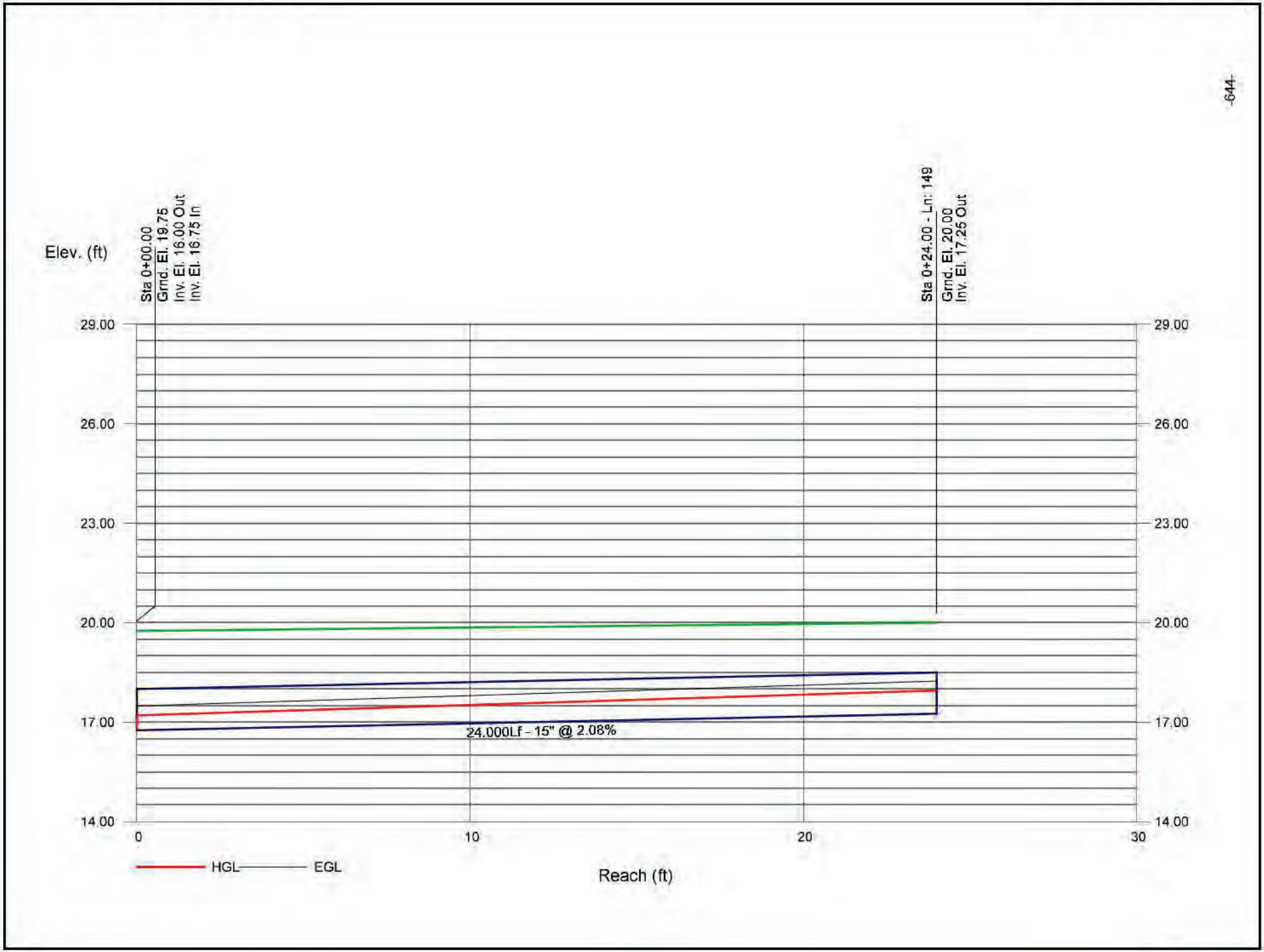
# Storm Sewer Profile

Proj. file: Building 4 Storm.stm



# Storm Sewer Profile

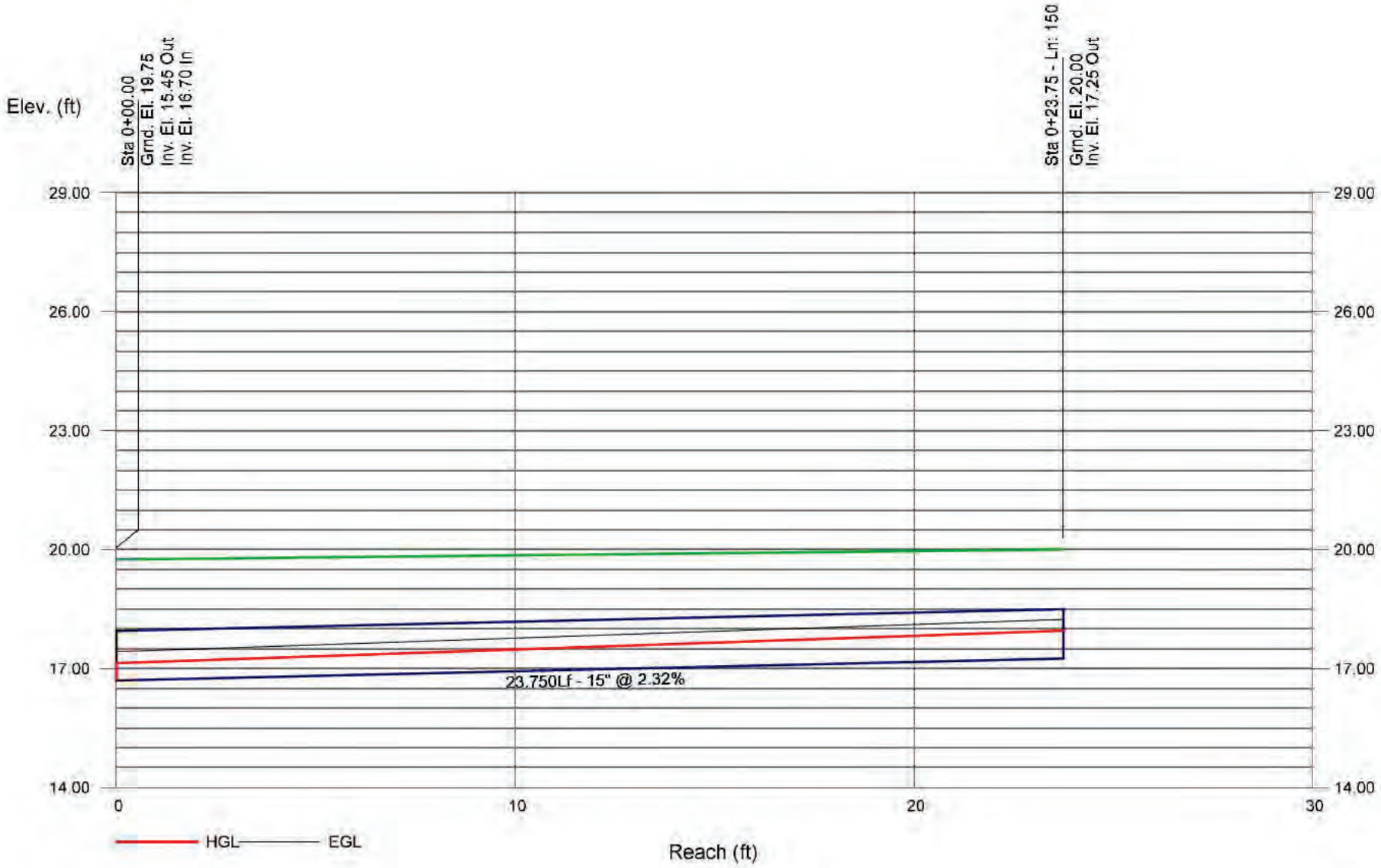
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# Storm Sewer Profile

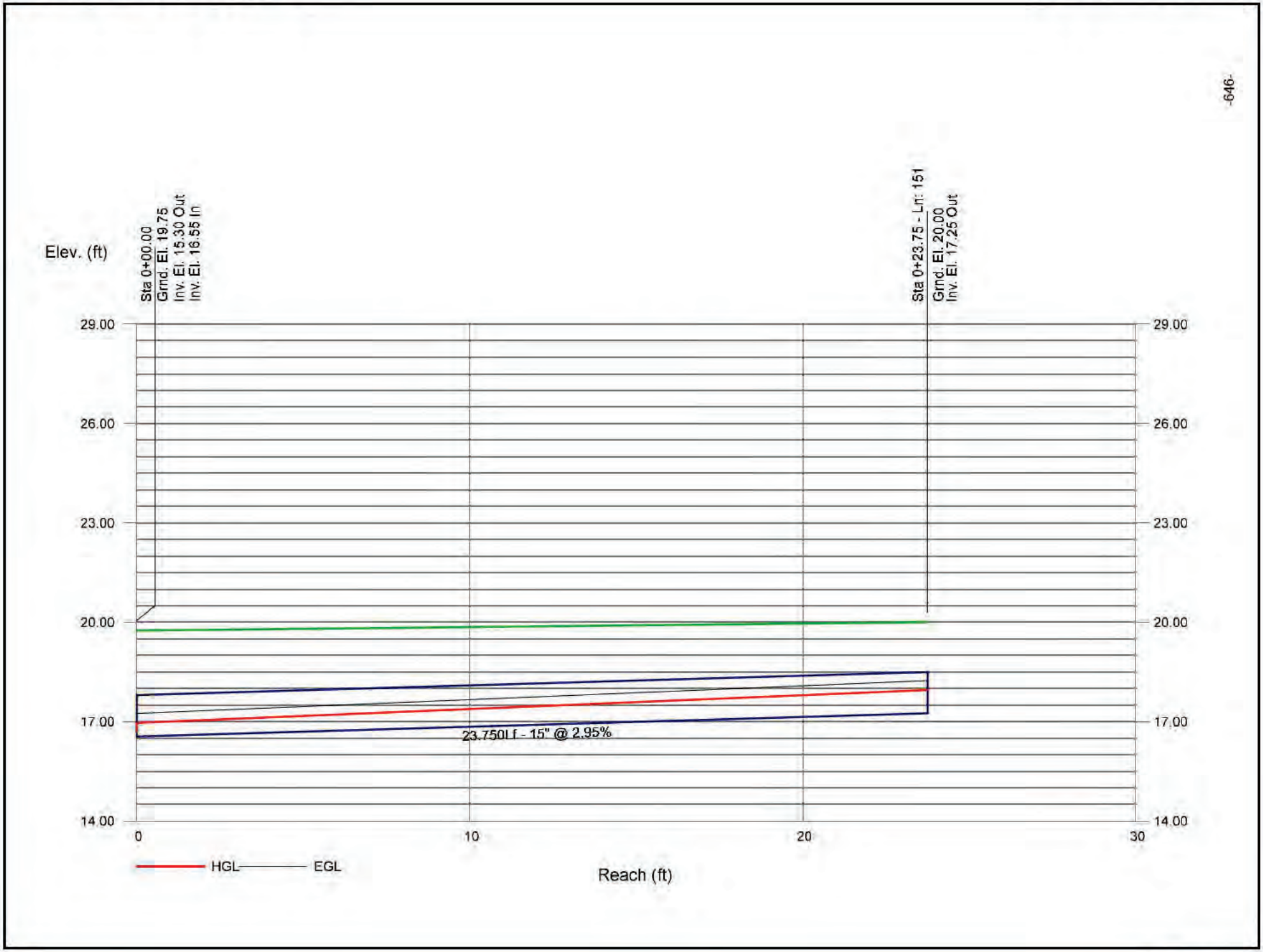
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# Storm Sewer Profile

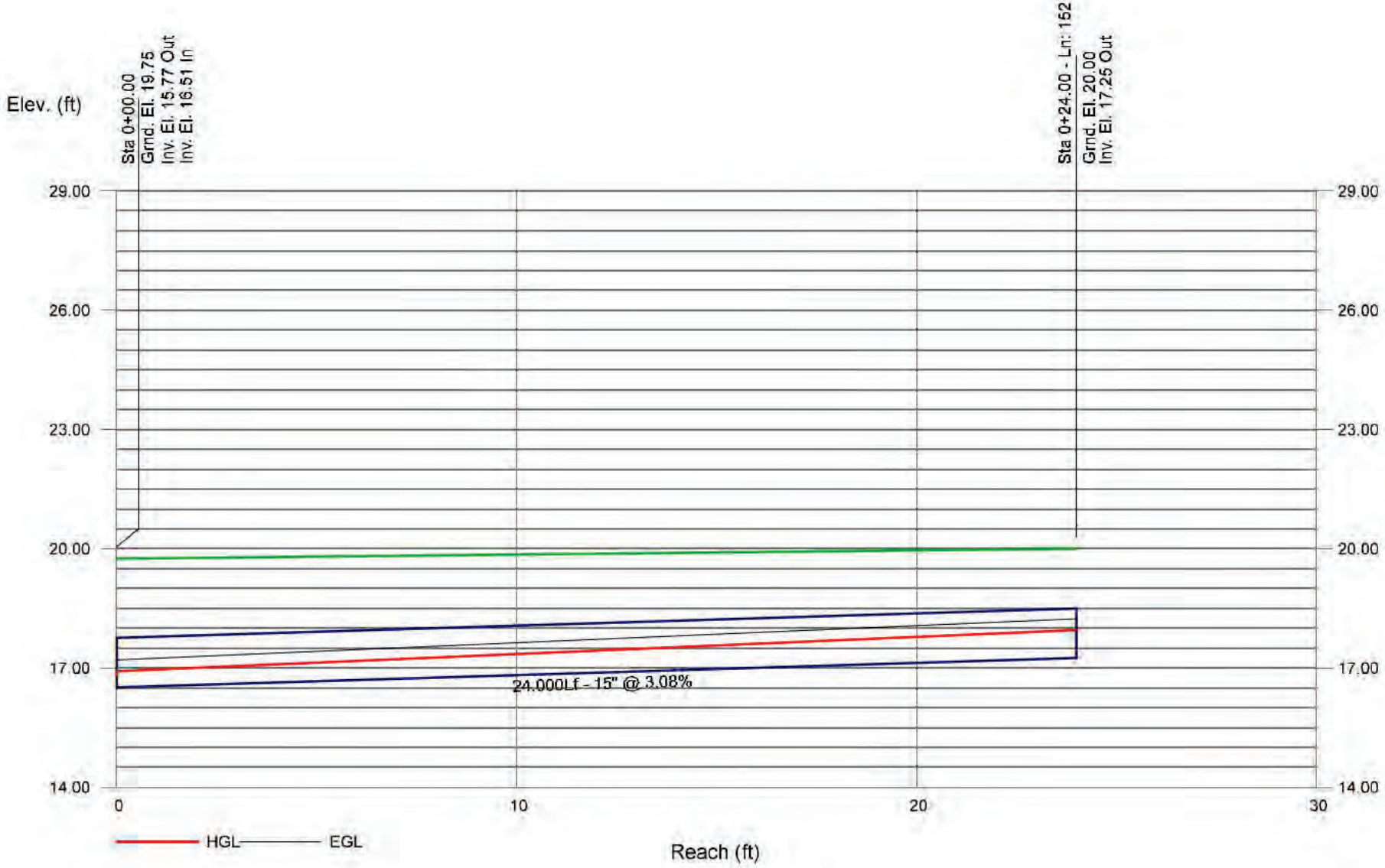
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# Storm Sewer Profile

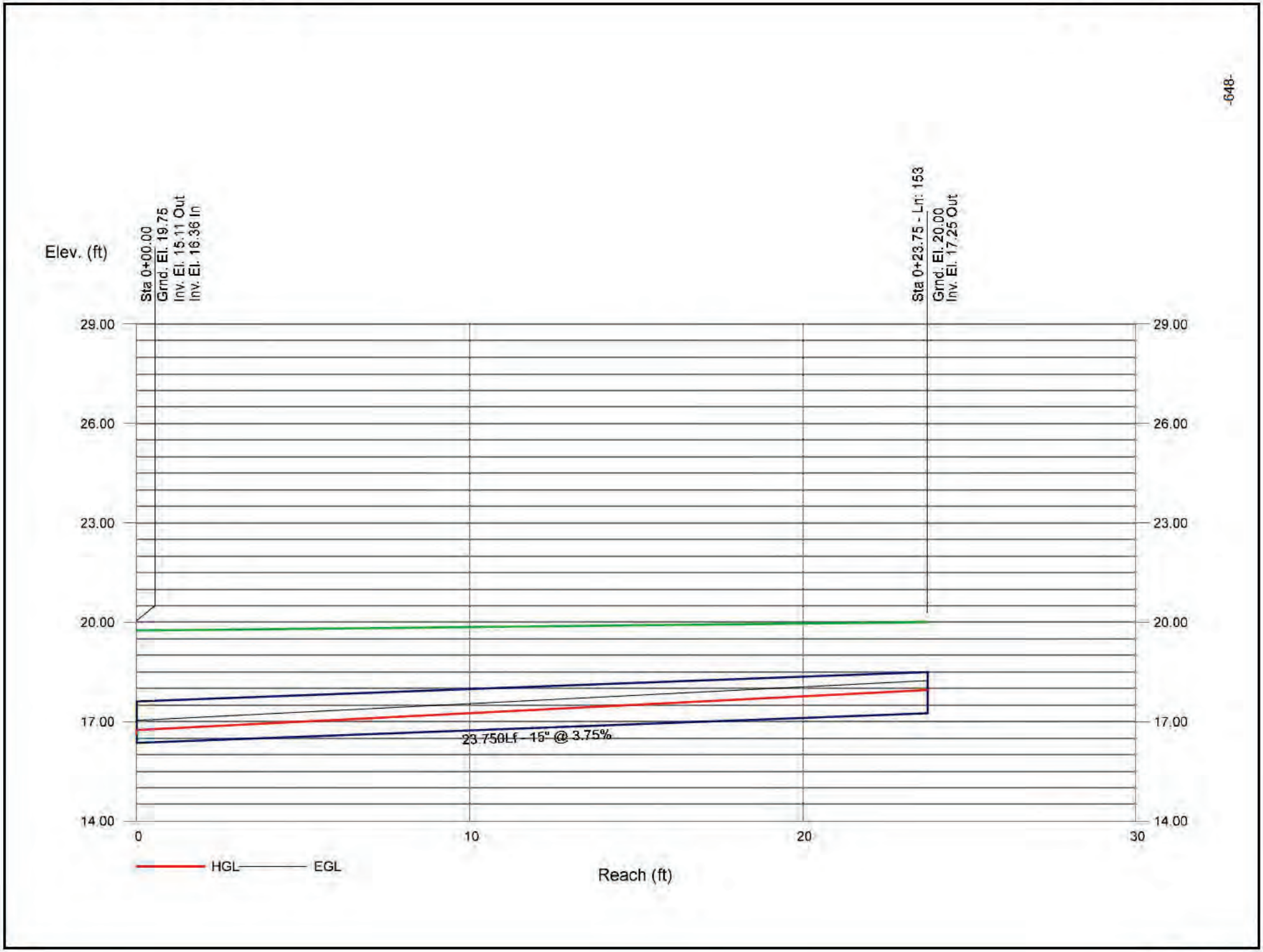
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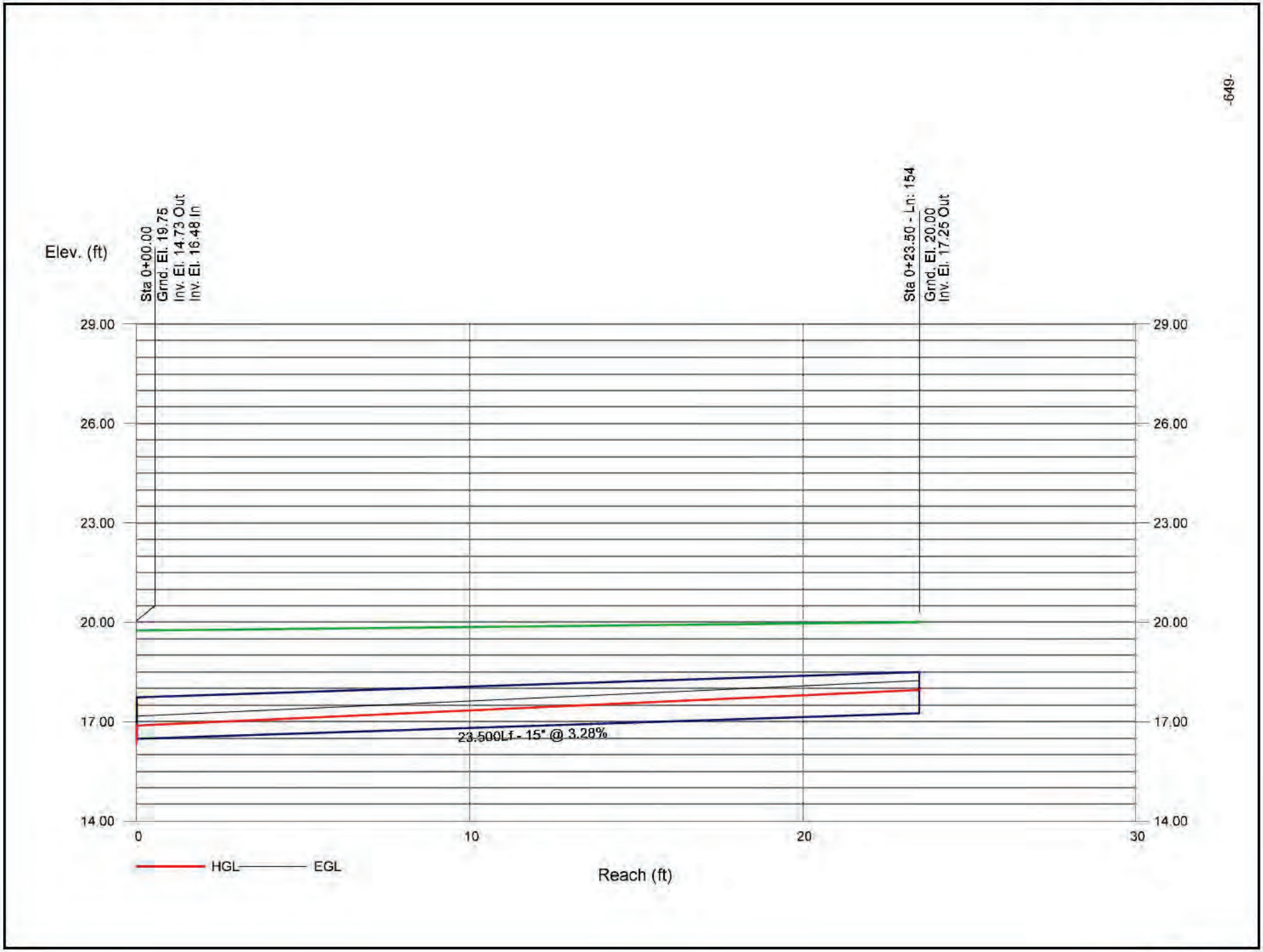
# Storm Sewer Profile

Proj. file: Building 4 Storm.stm



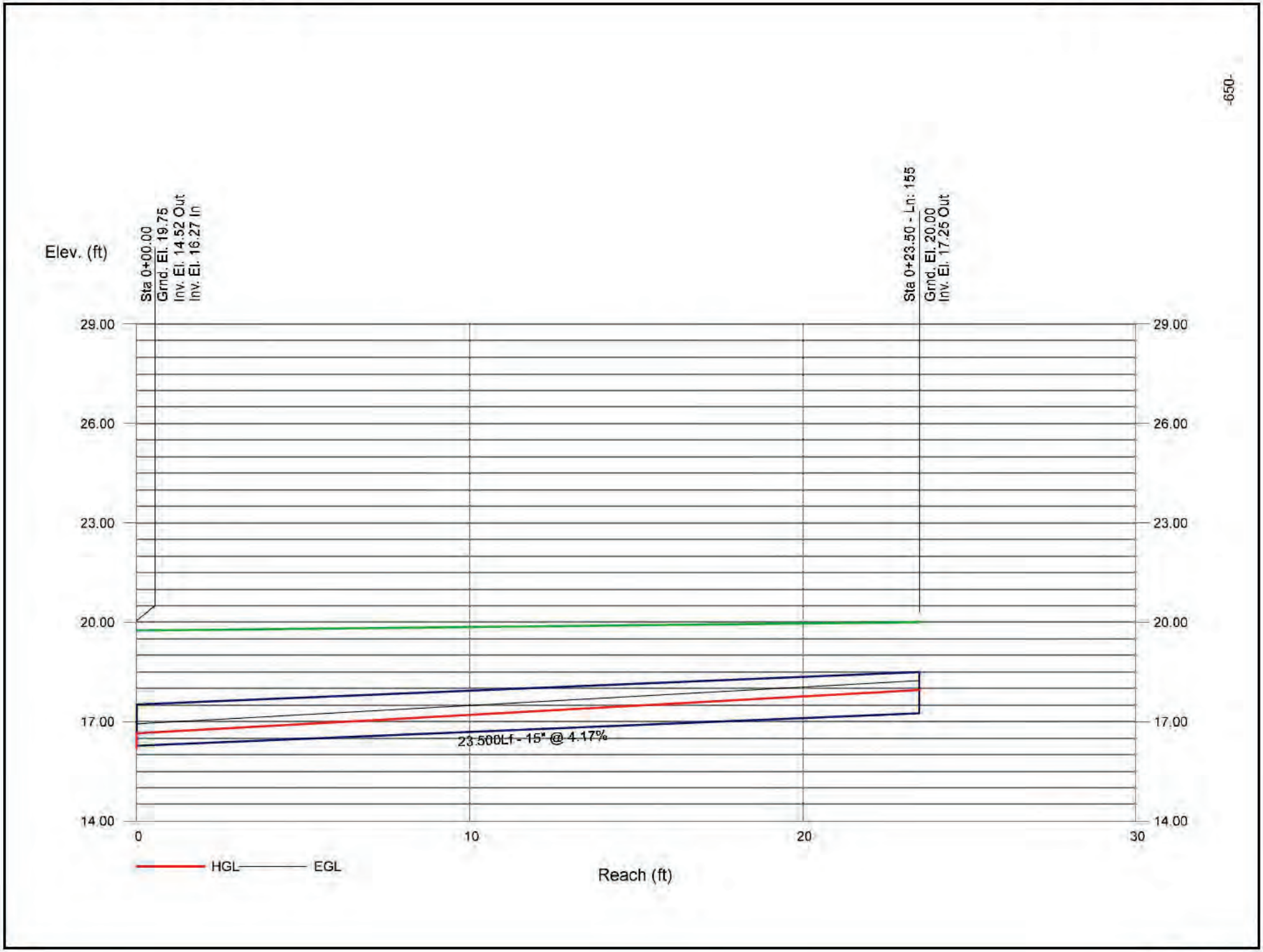
# Storm Sewer Profile

Proj. file: Building 4 Storm.stm



# Storm Sewer Profile

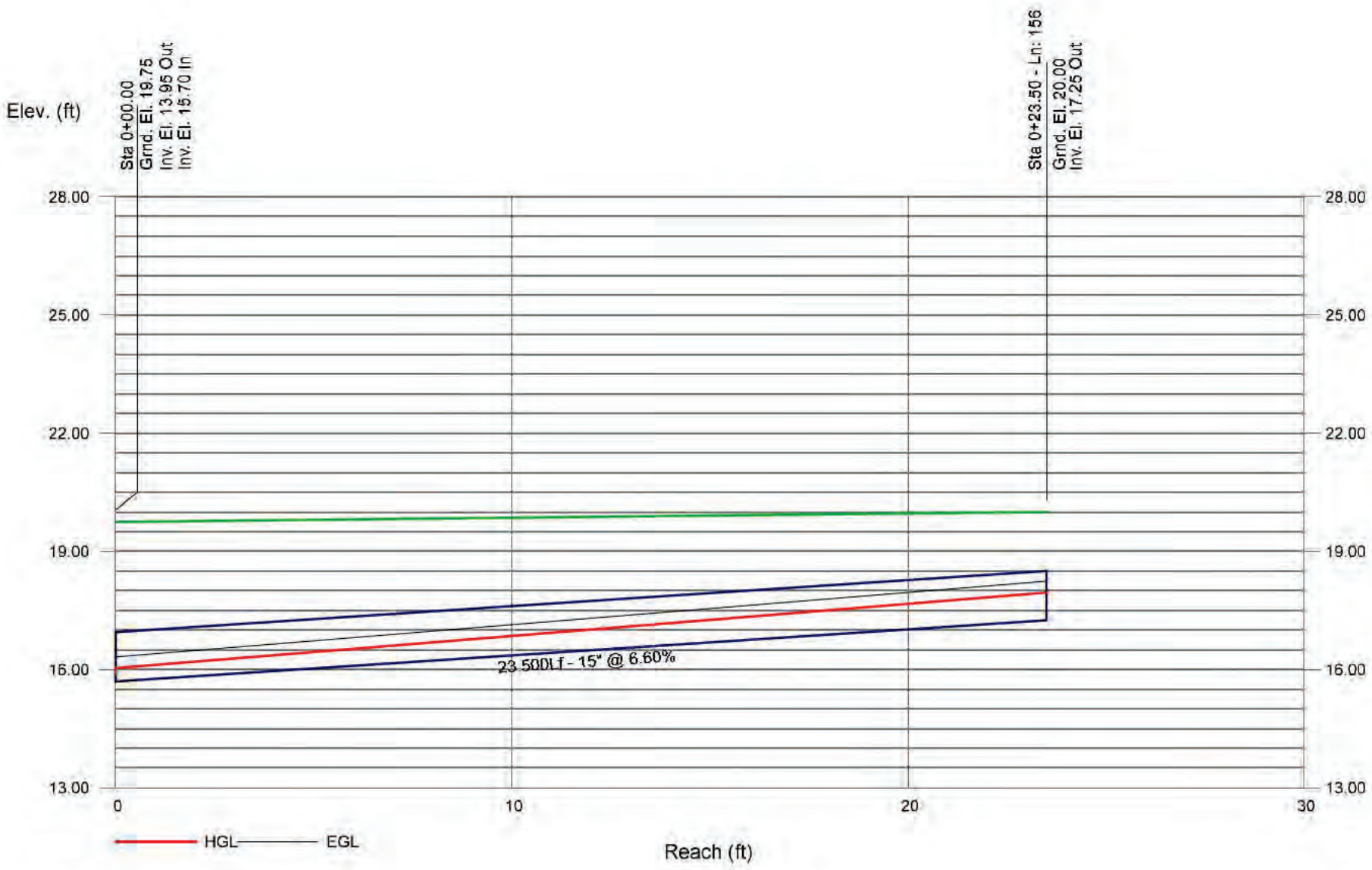
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# Storm Sewer Profile

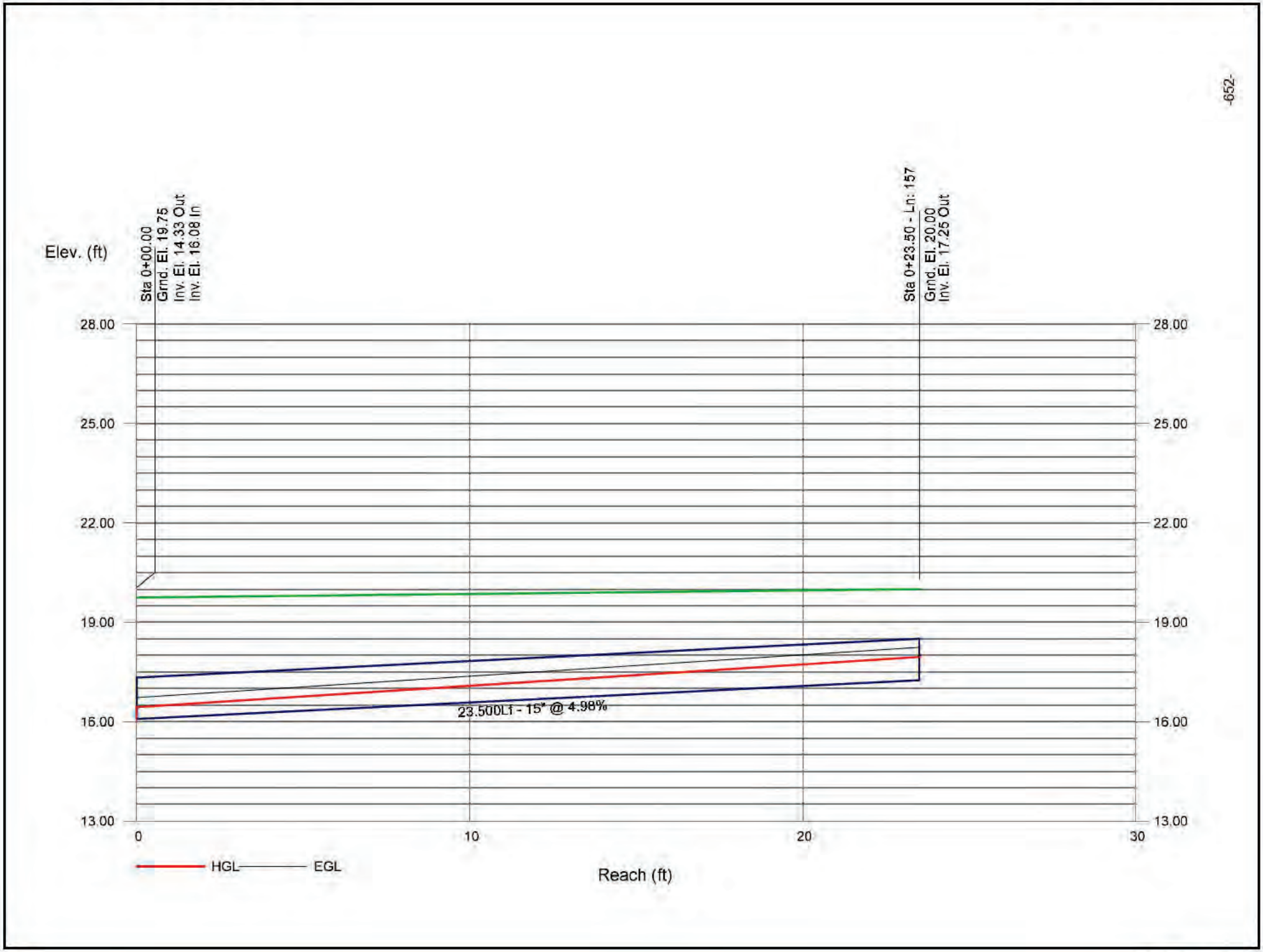
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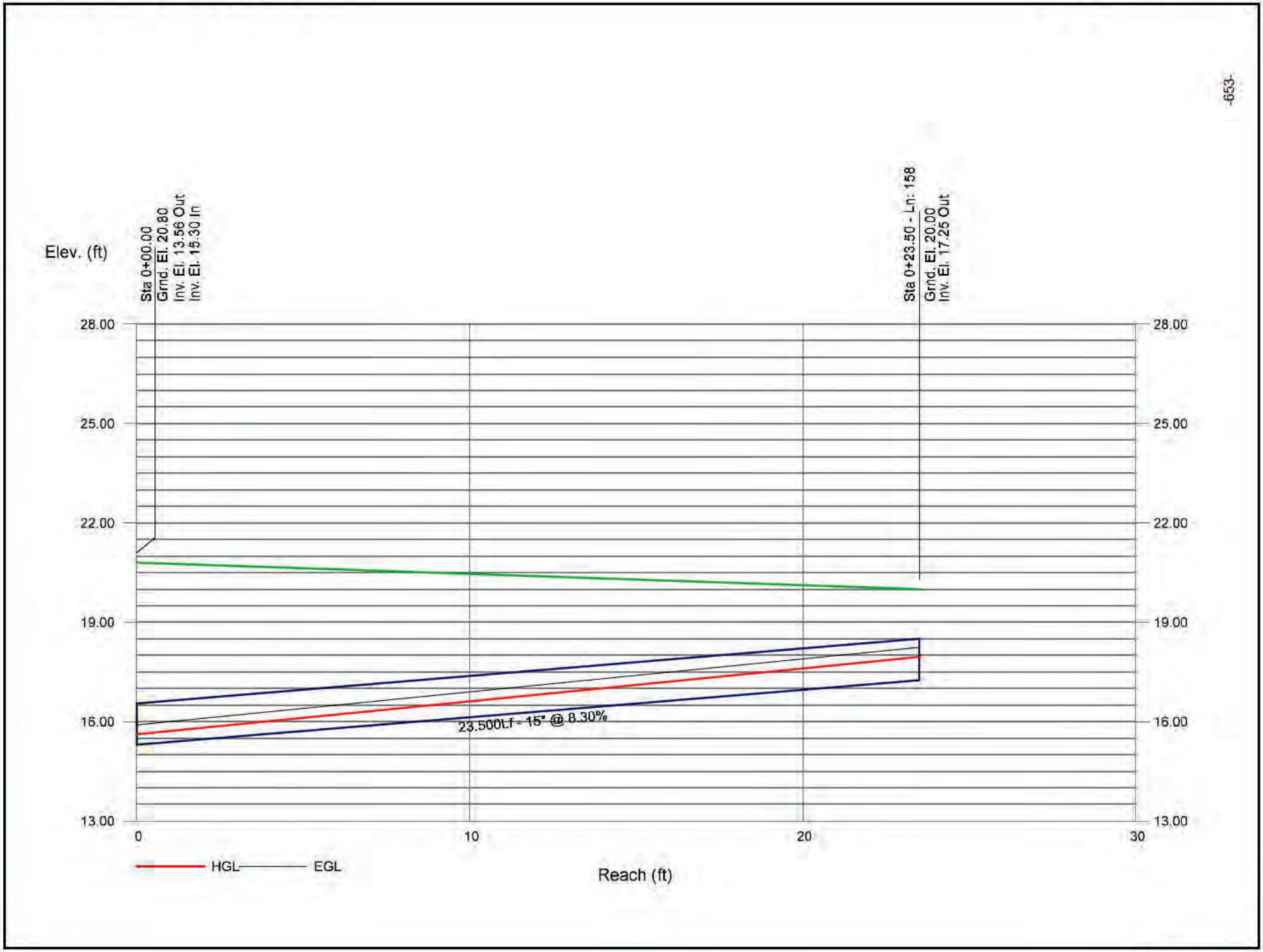
# Storm Sewer Profile

Proj. file: Building 4 Storm.stm



# Storm Sewer Profile

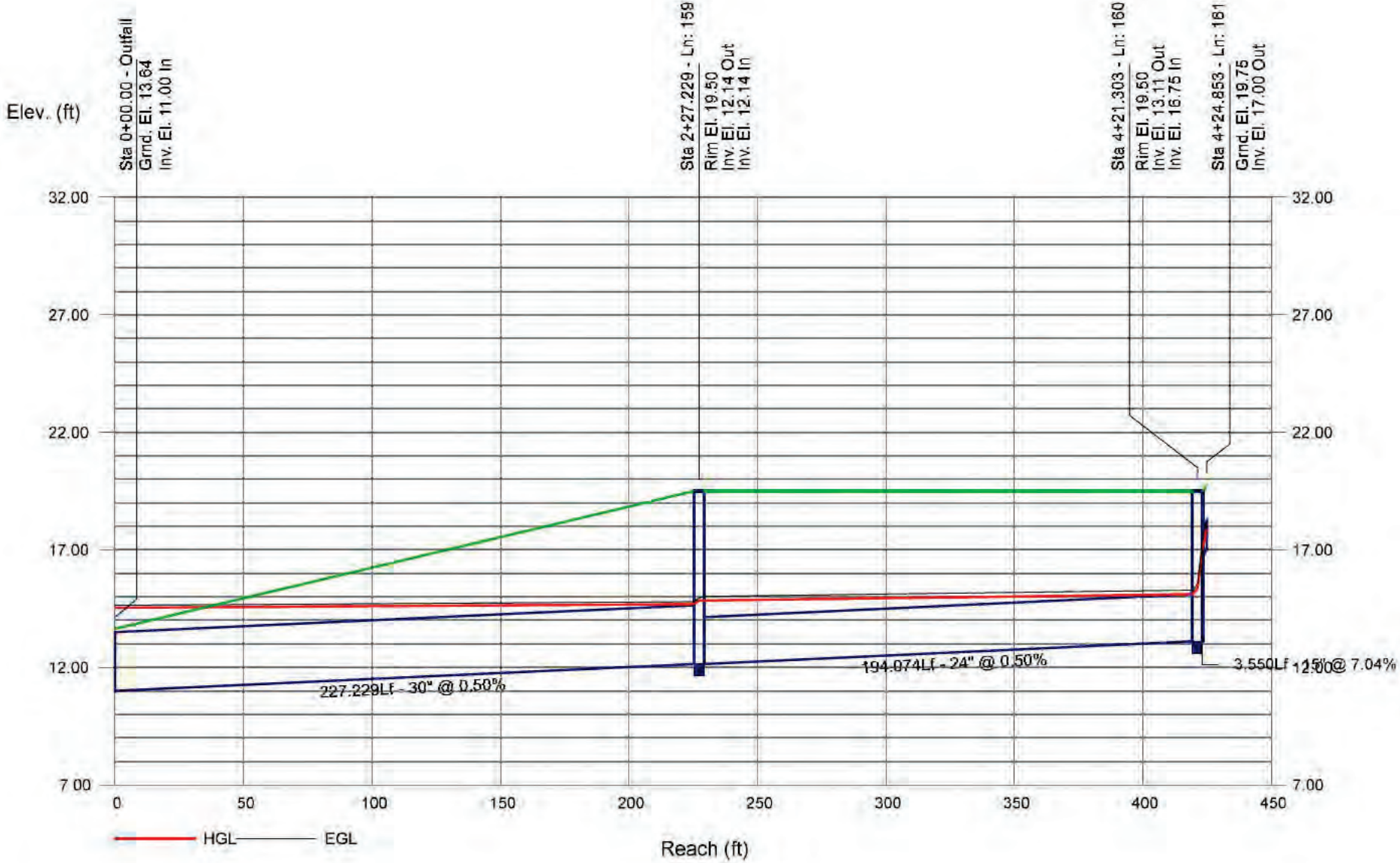
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# Storm Sewer Profile

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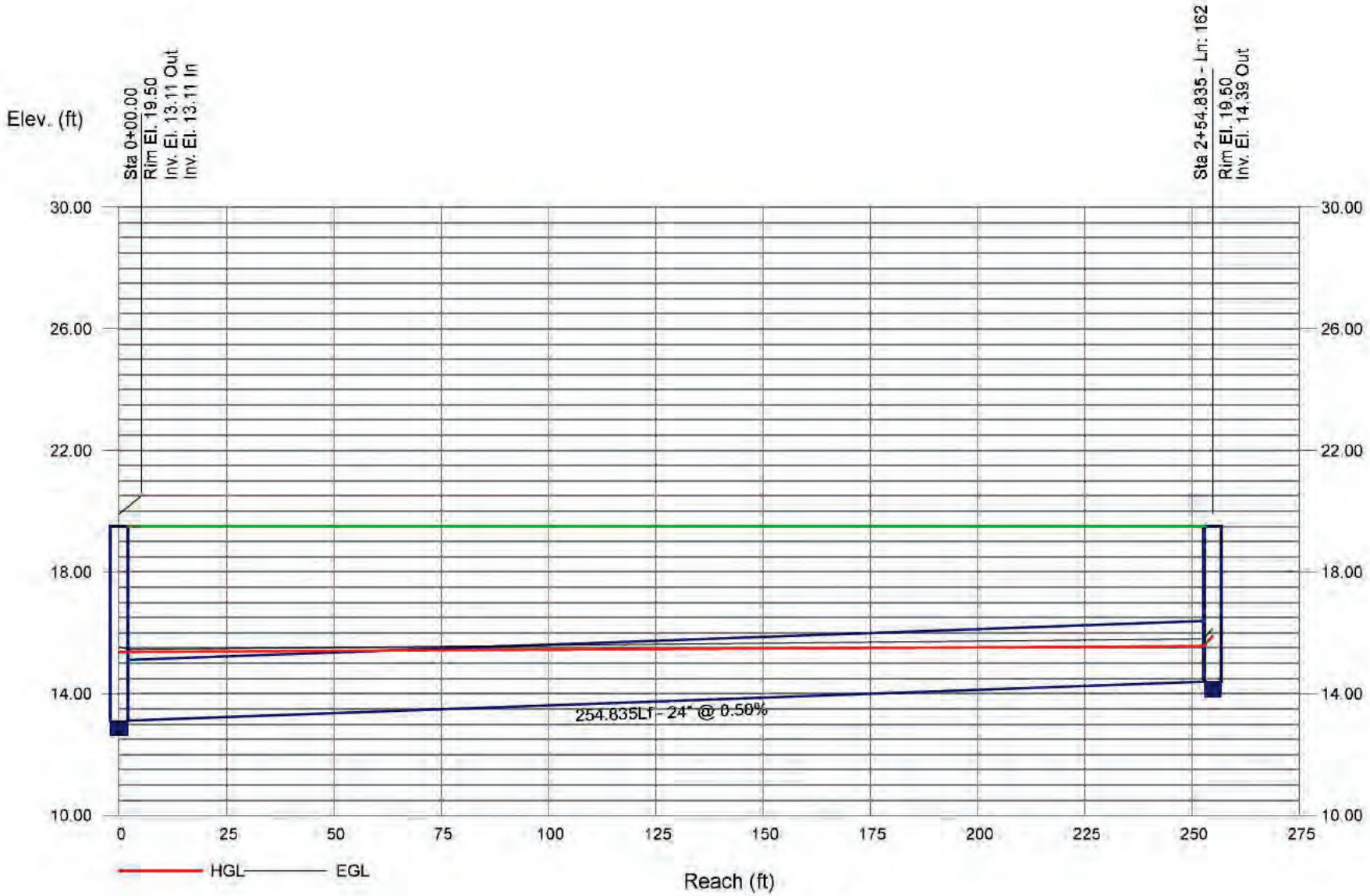




# Storm Sewer Profile

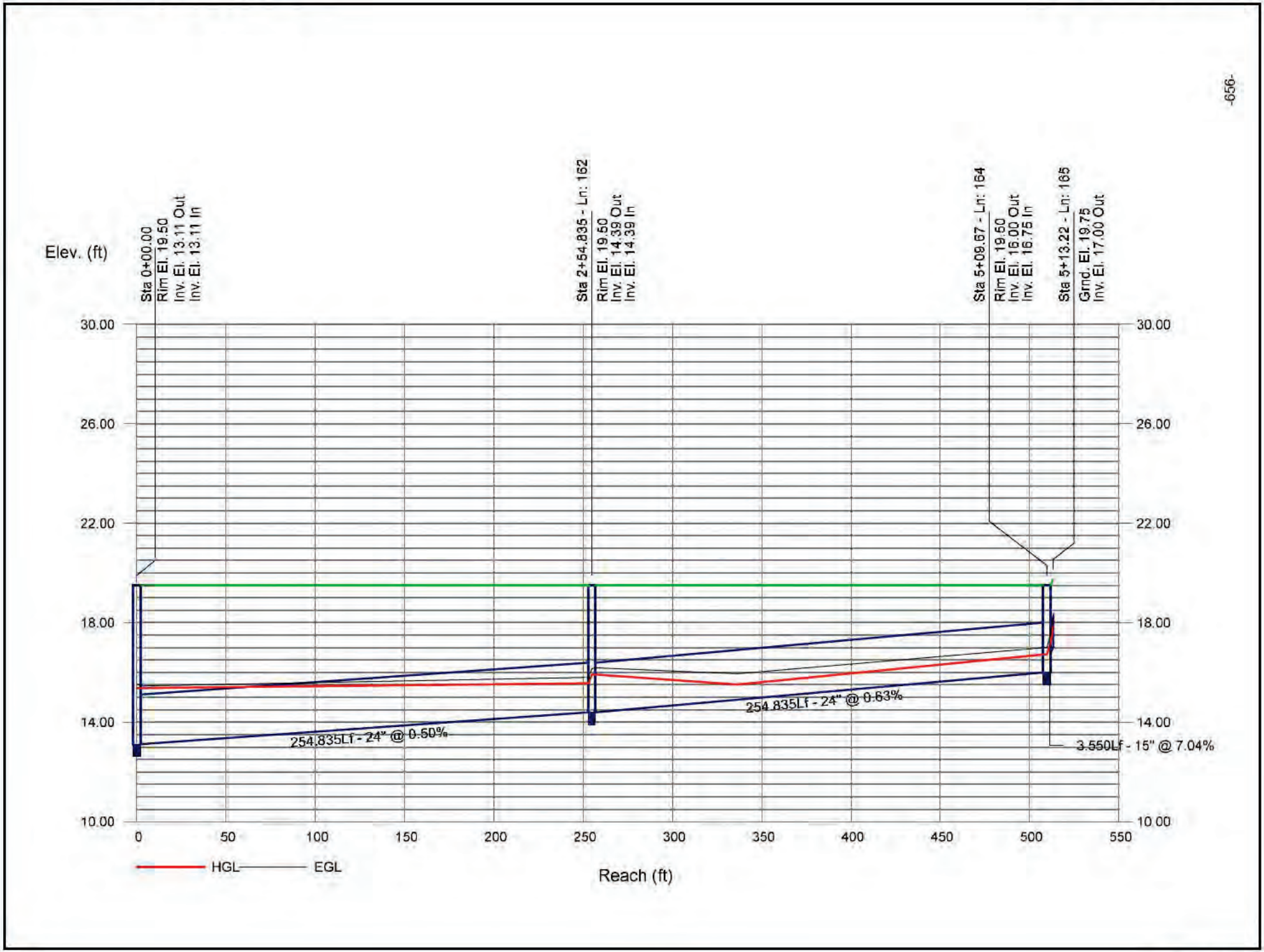
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# Storm Sewer Profile

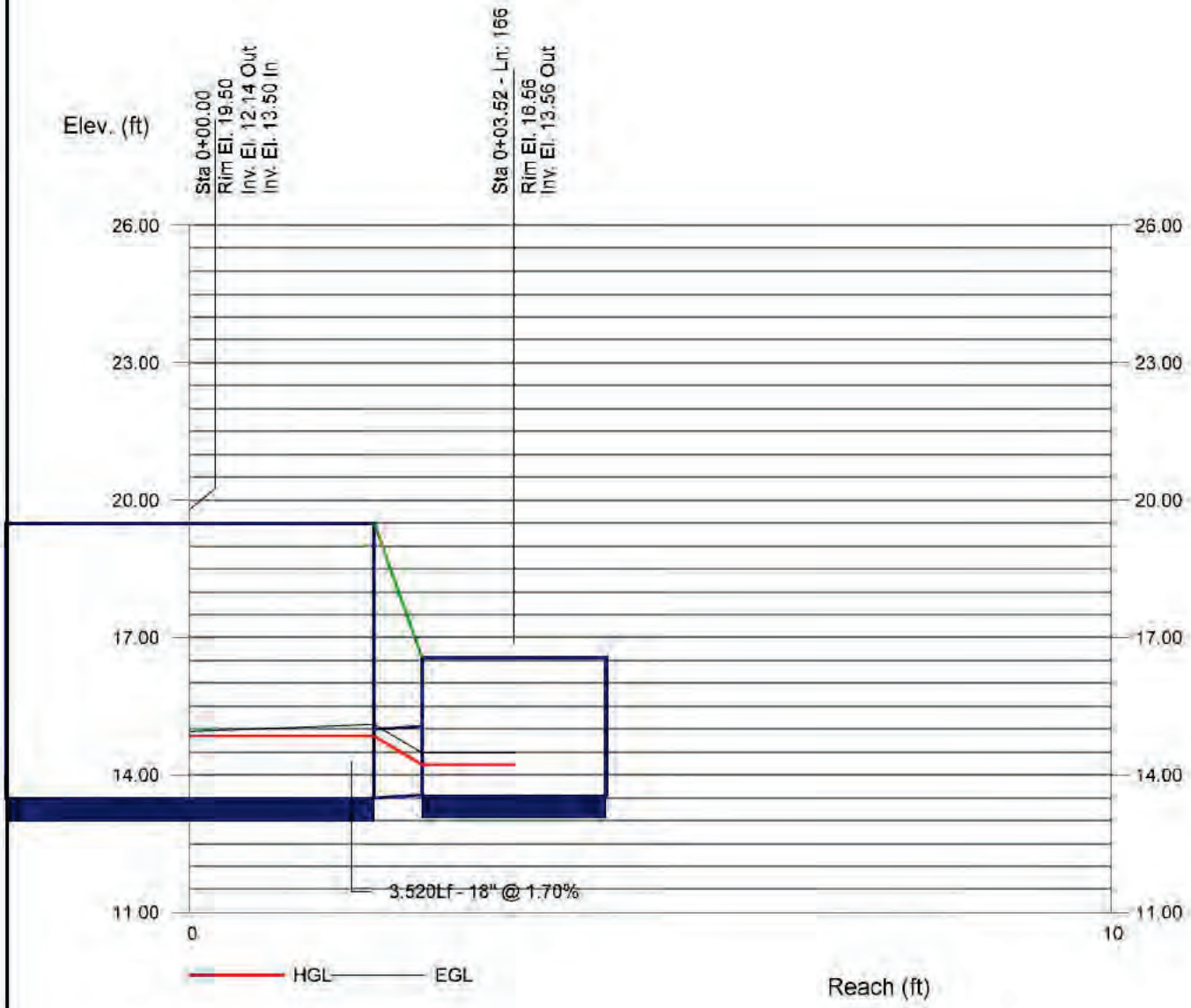
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# Storm Sewer Profile

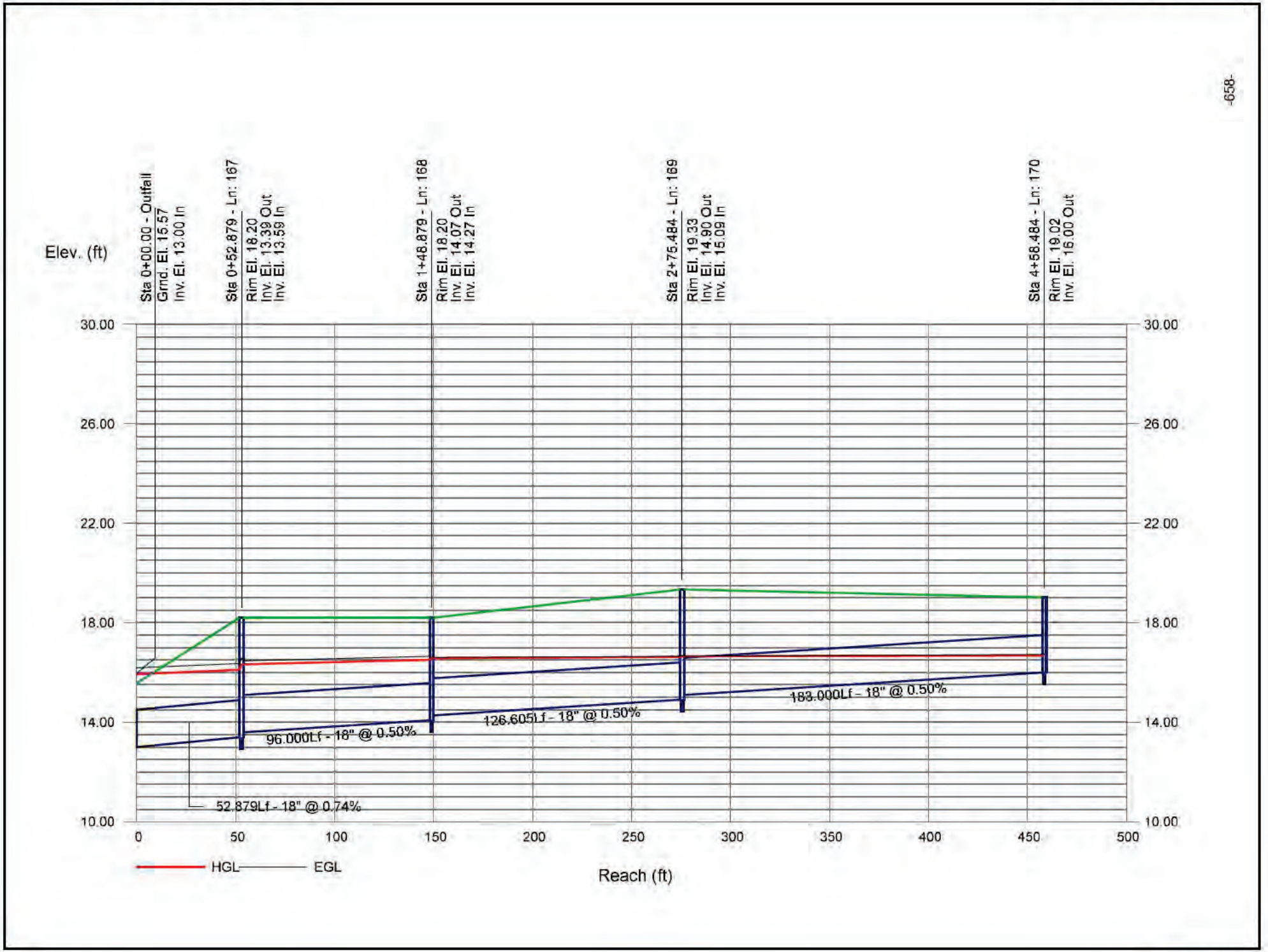
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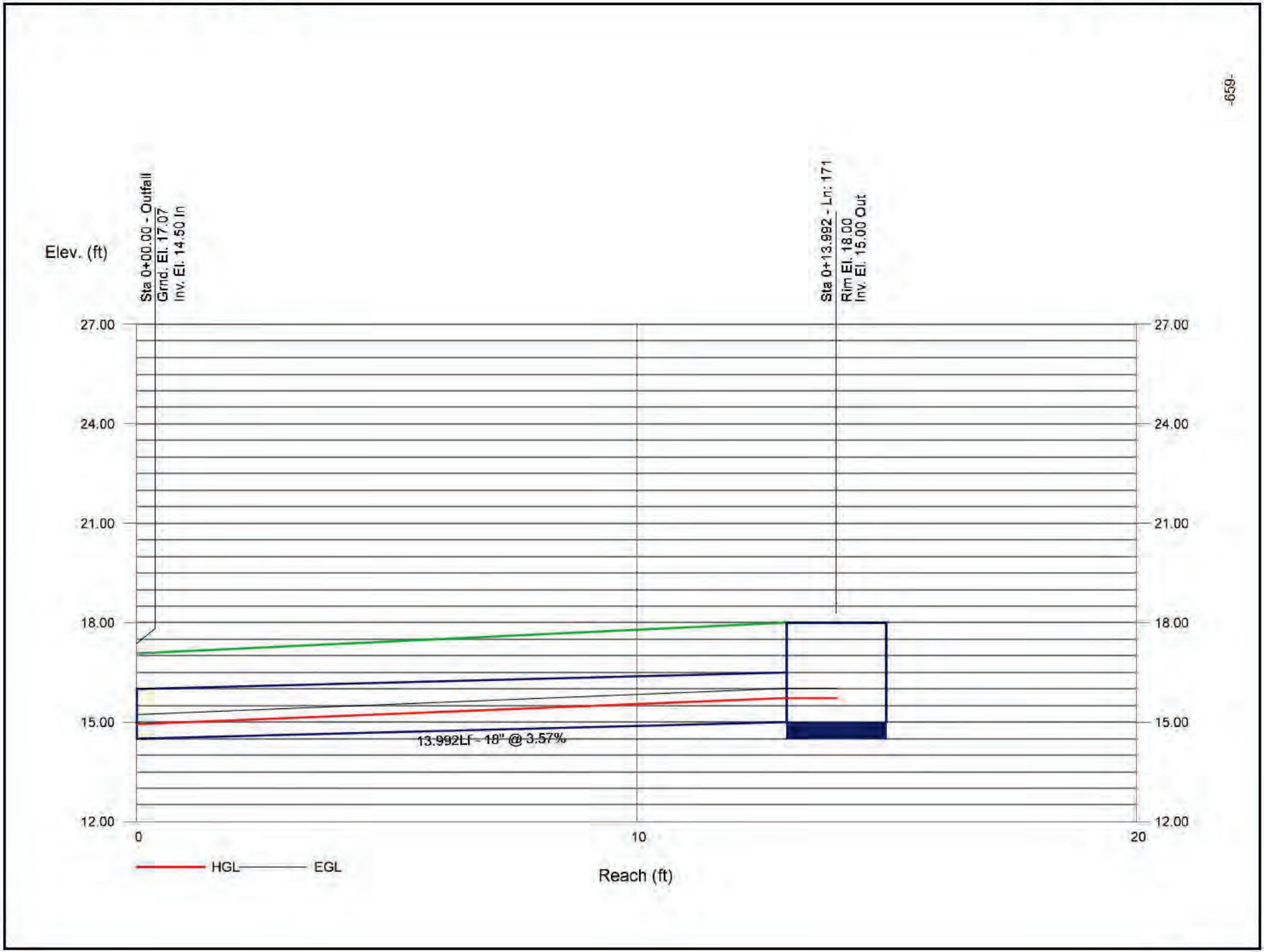
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Proj. file: Building 4 Storm.stm



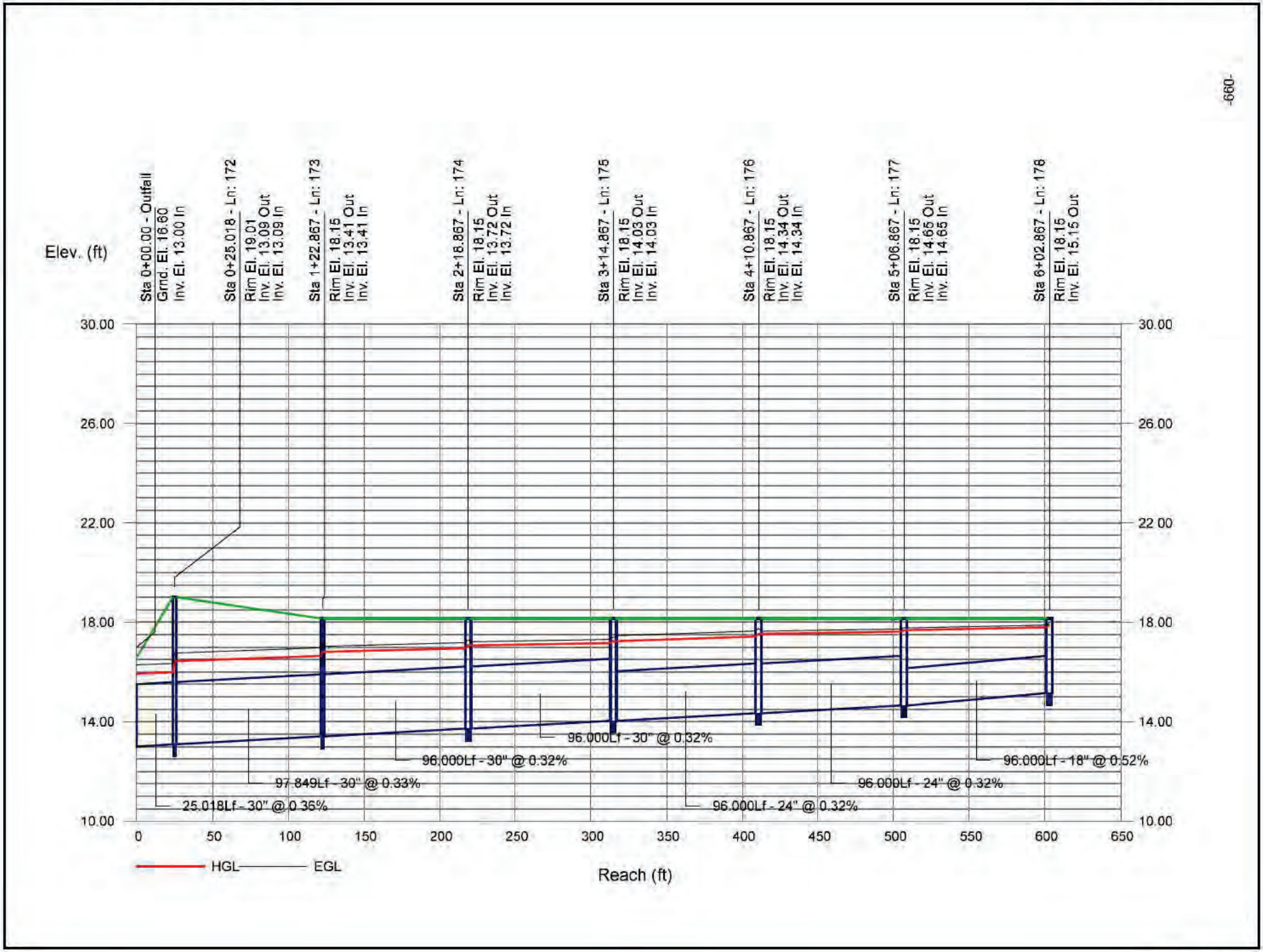
# Storm Sewer Profile

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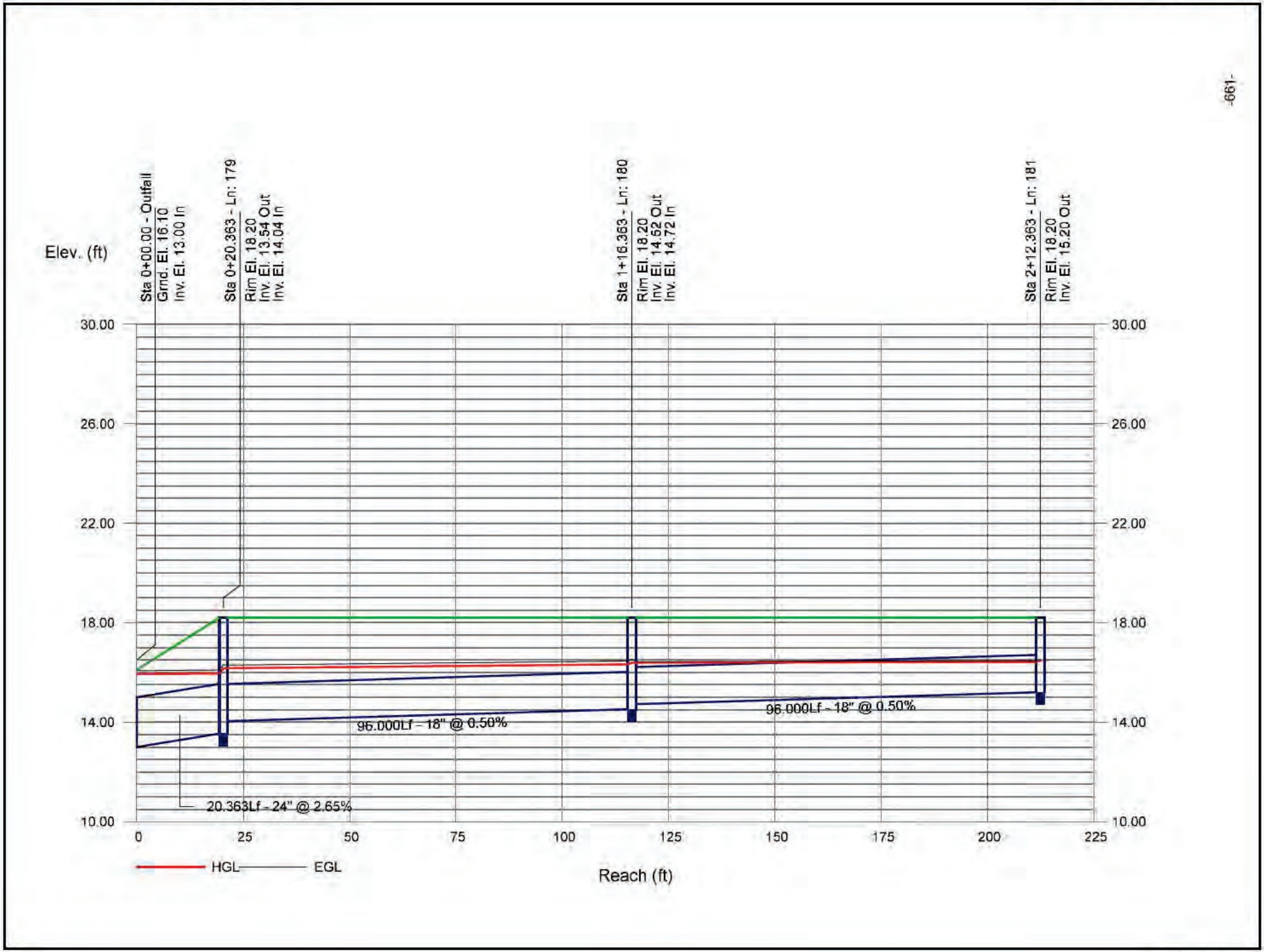
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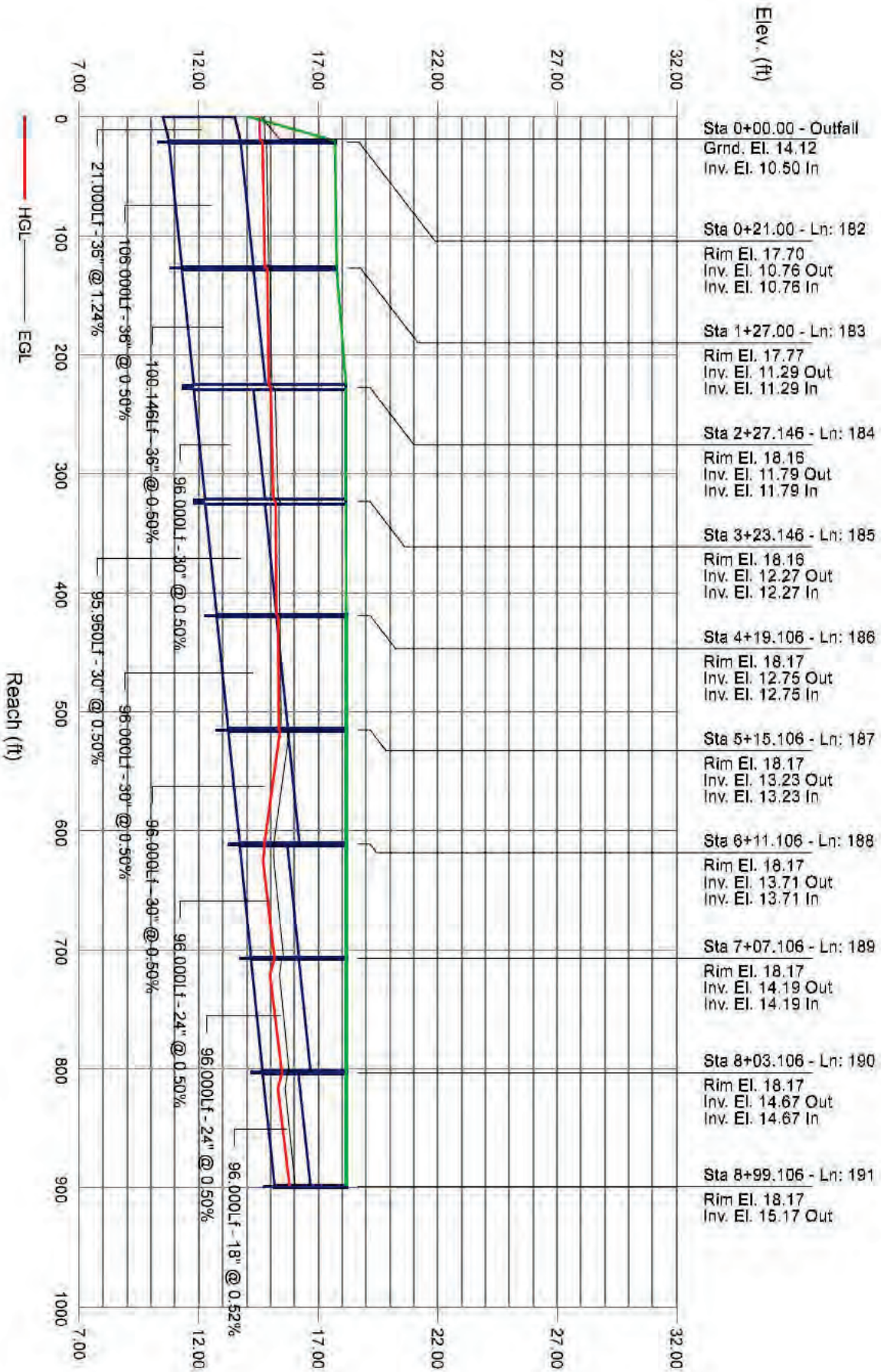


# Storm Sewer Profile

Proj. file: Building 4 Storm.stm



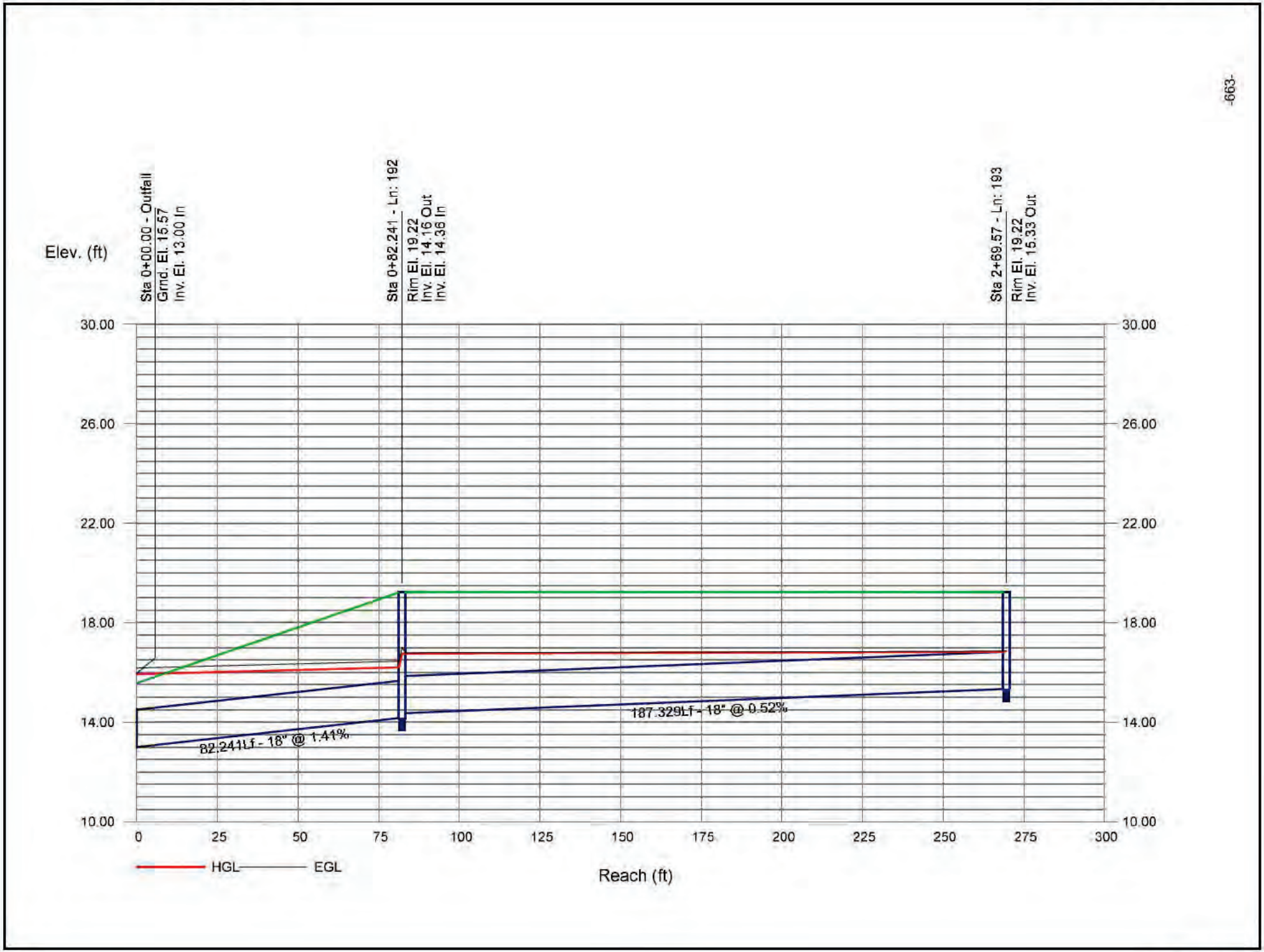
# Storm Sewer Profile




Proj. file: Building 4 Storm.stm

# Storm Sewer Profile

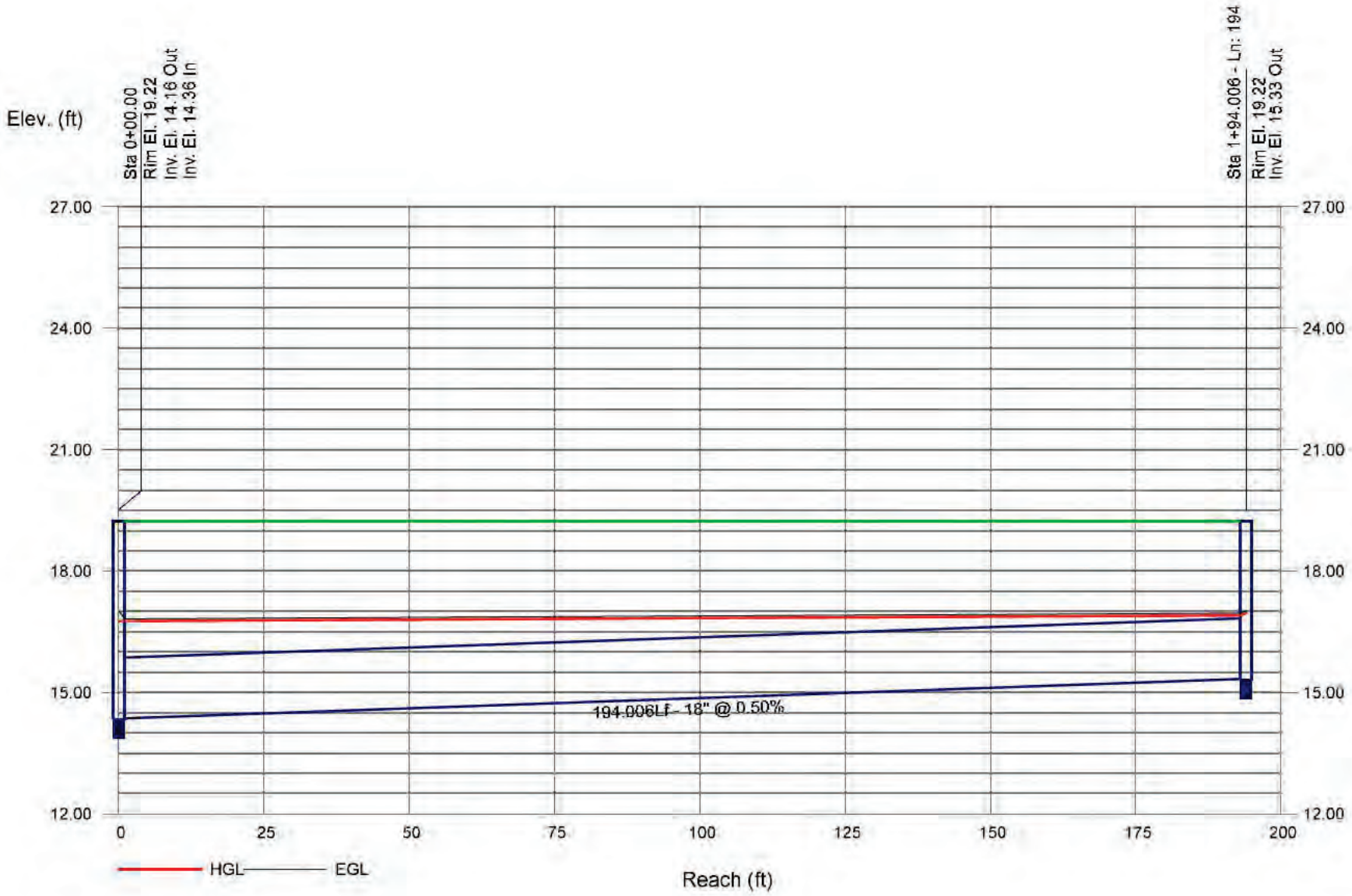
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# Storm Sewer Profile

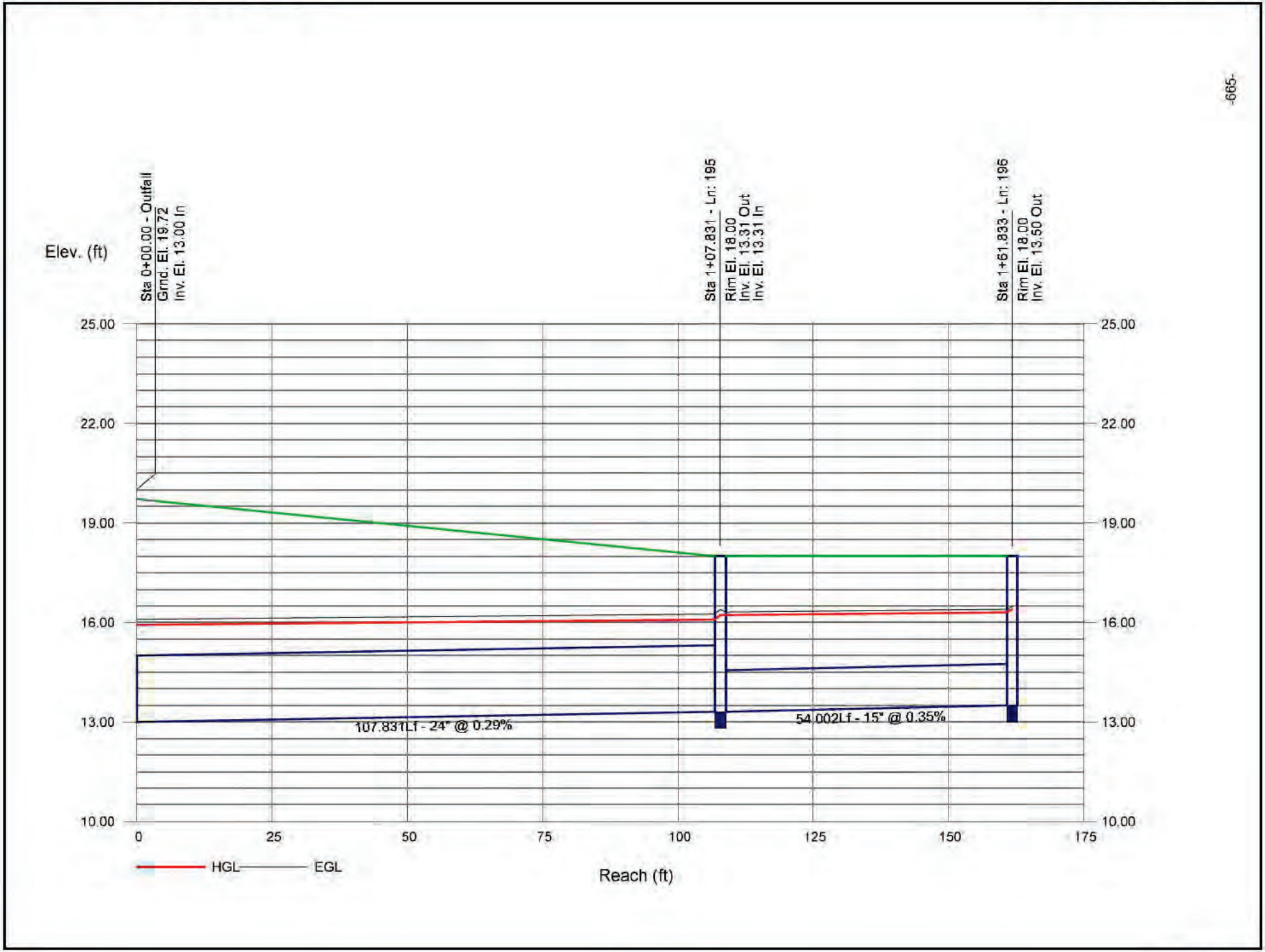
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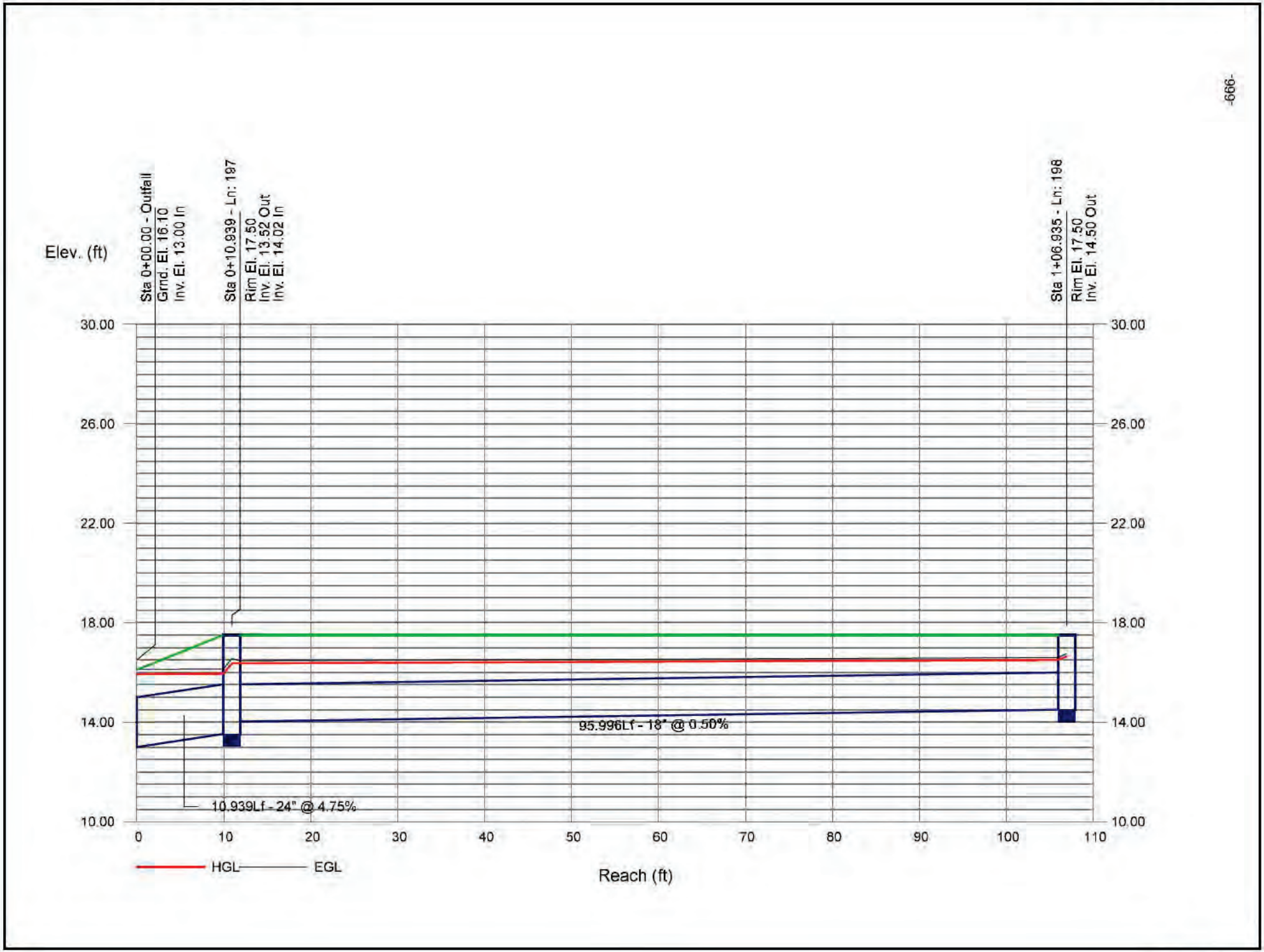
# Storm Sewer Profile

Proj. file: Building 4 Storm.stm



# Storm Sewer Profile

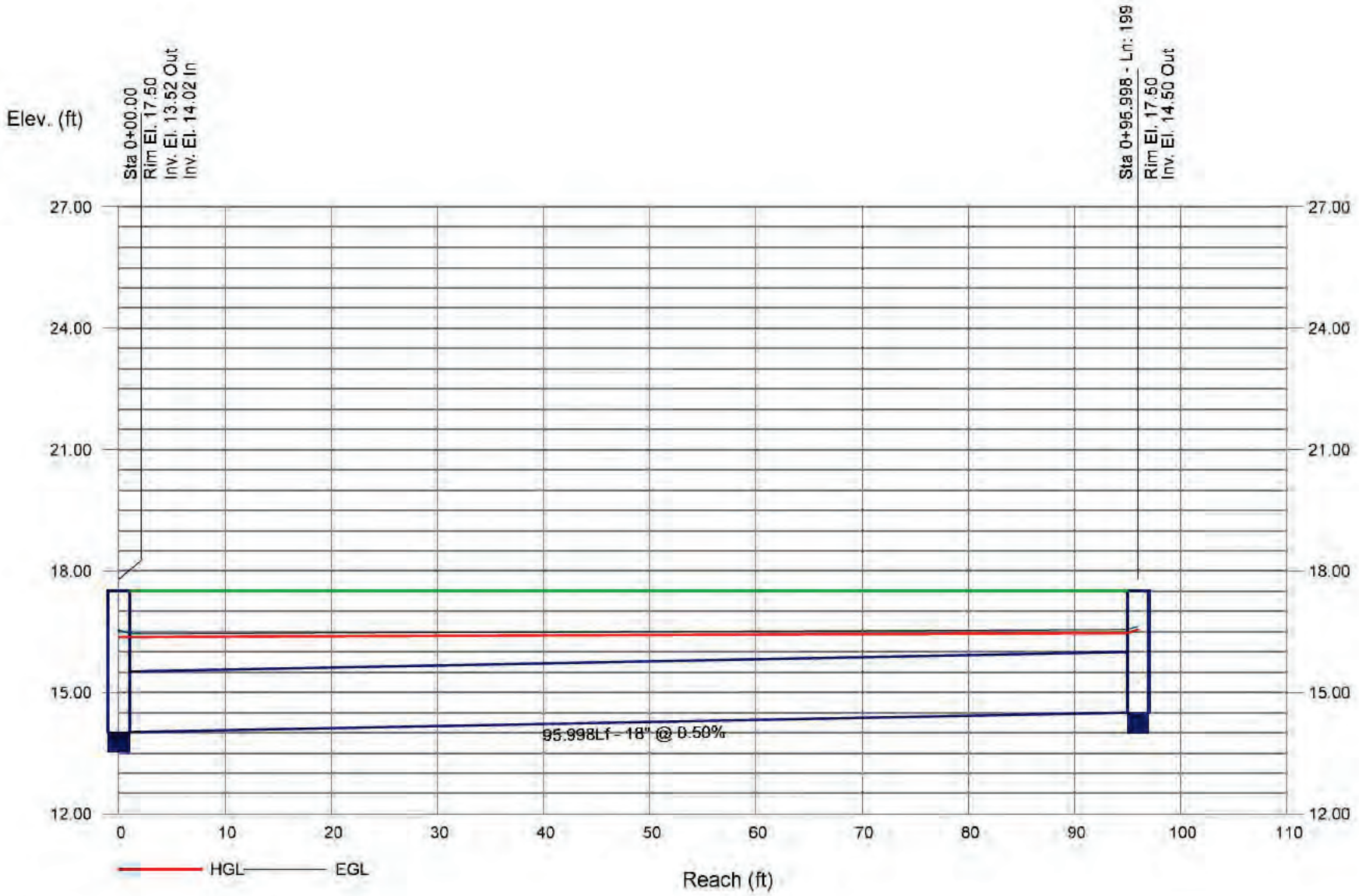
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# Storm Sewer Profile

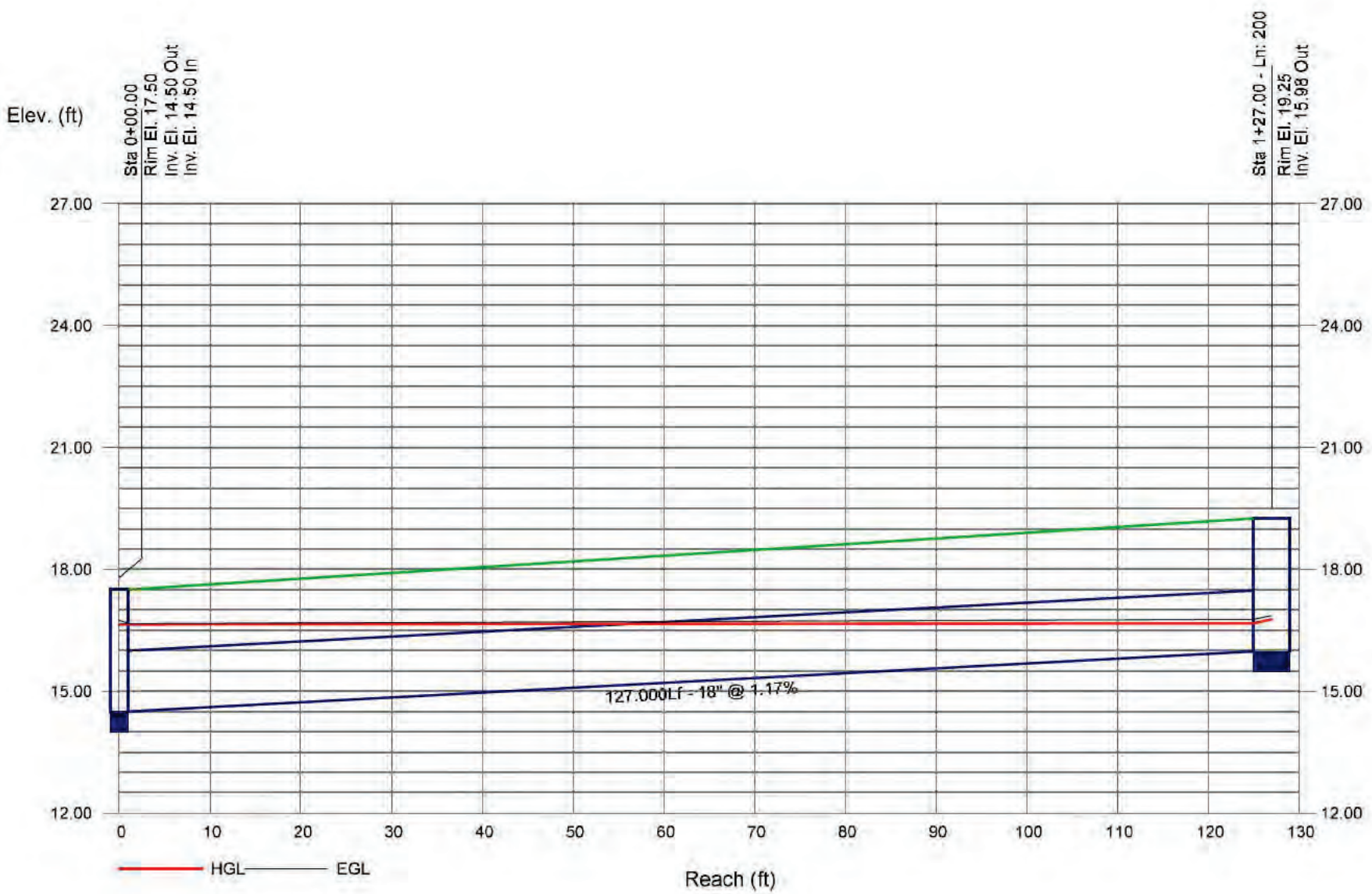
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# Storm Sewer Profile

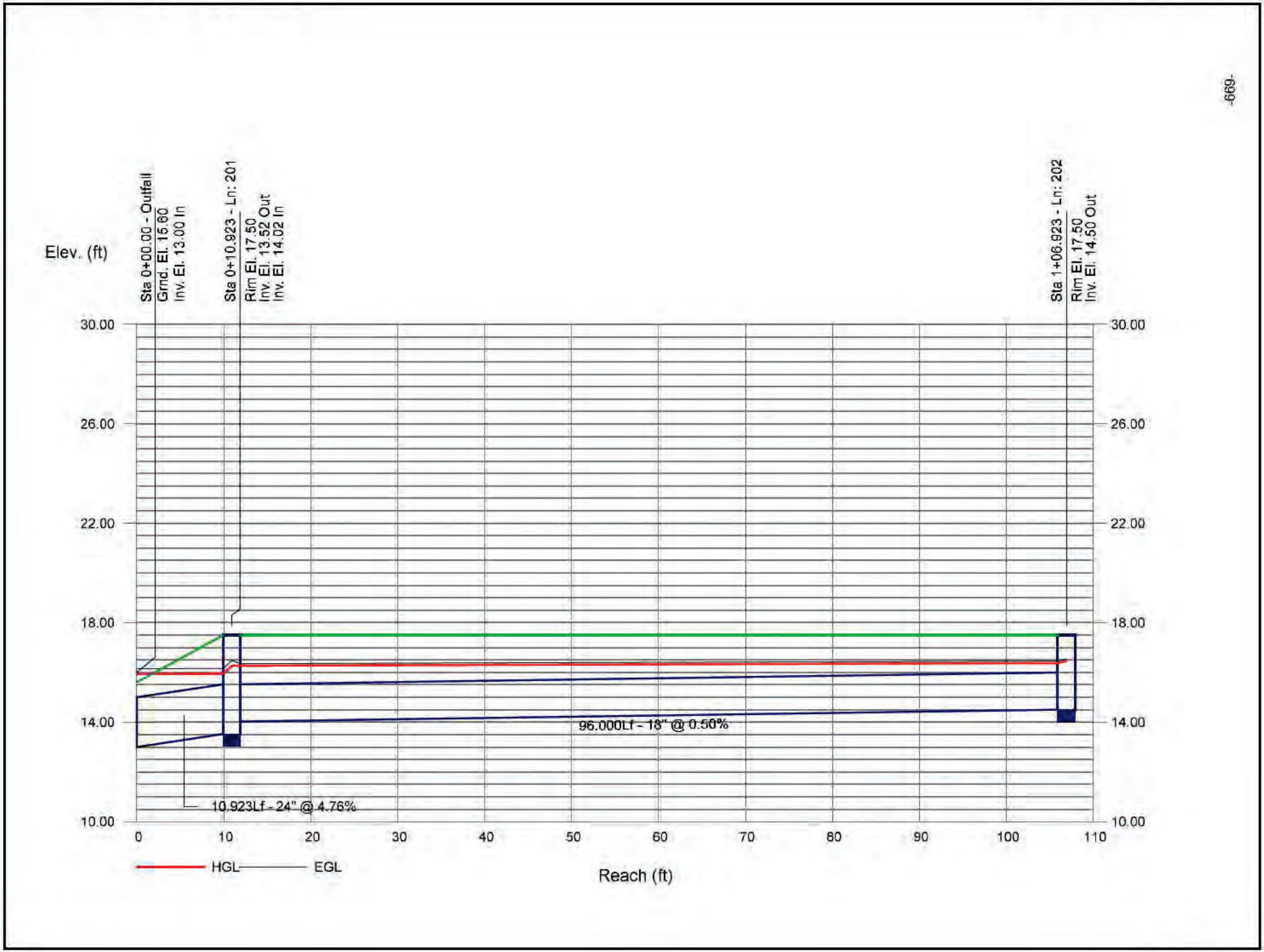
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-668-

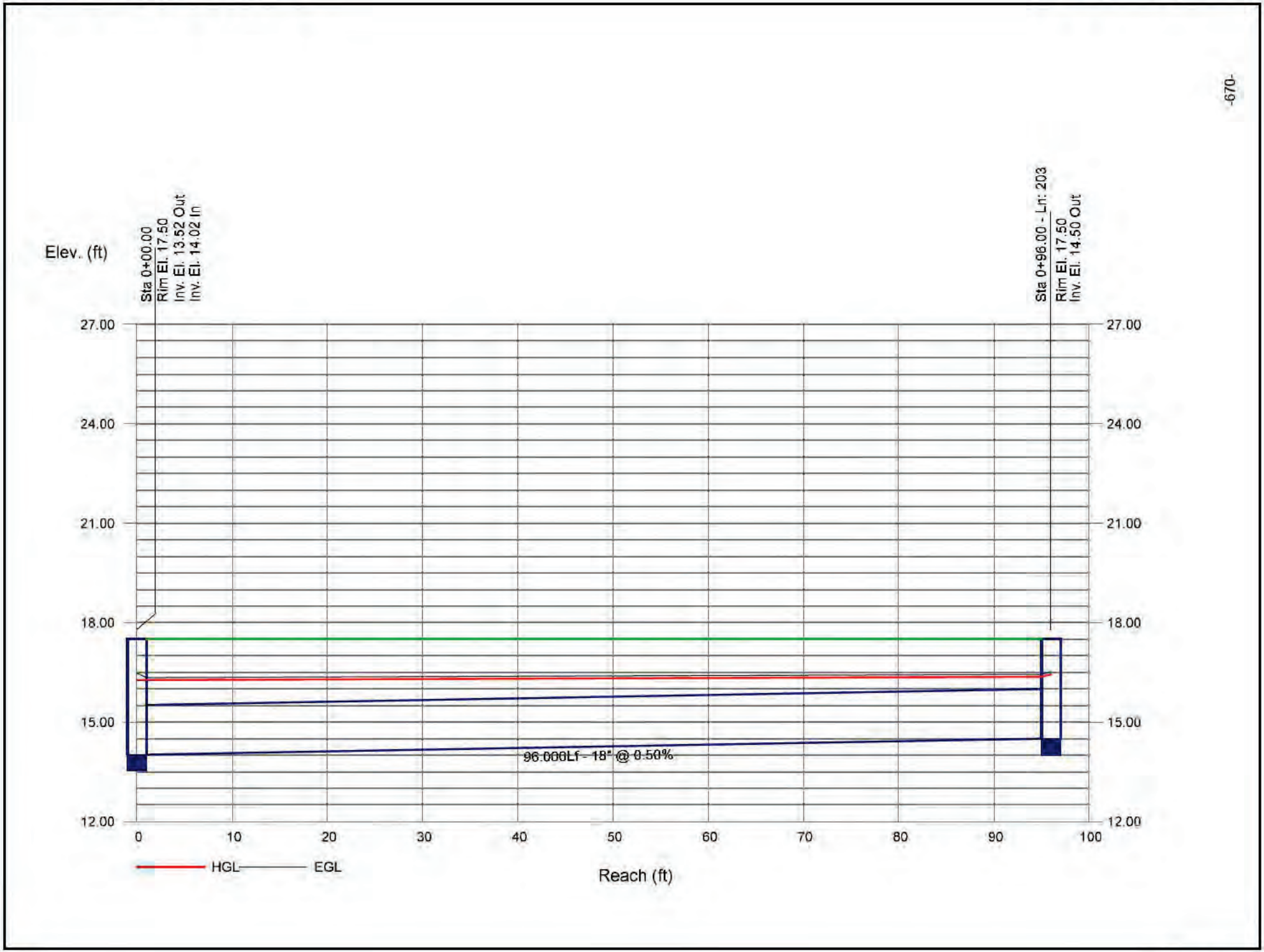
# Storm Sewer Profile

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# Storm Sewer Profile

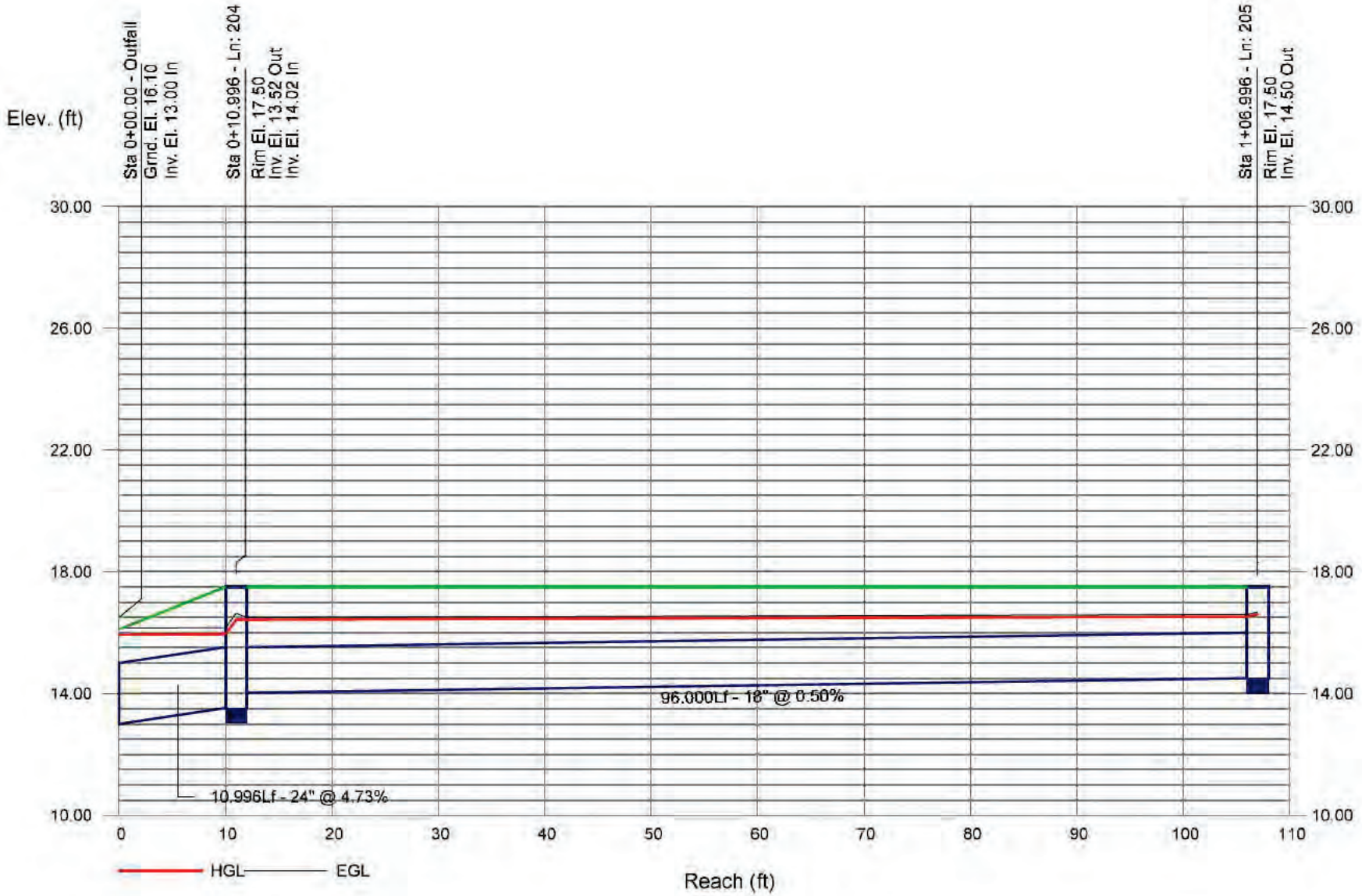
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# Storm Sewer Profile

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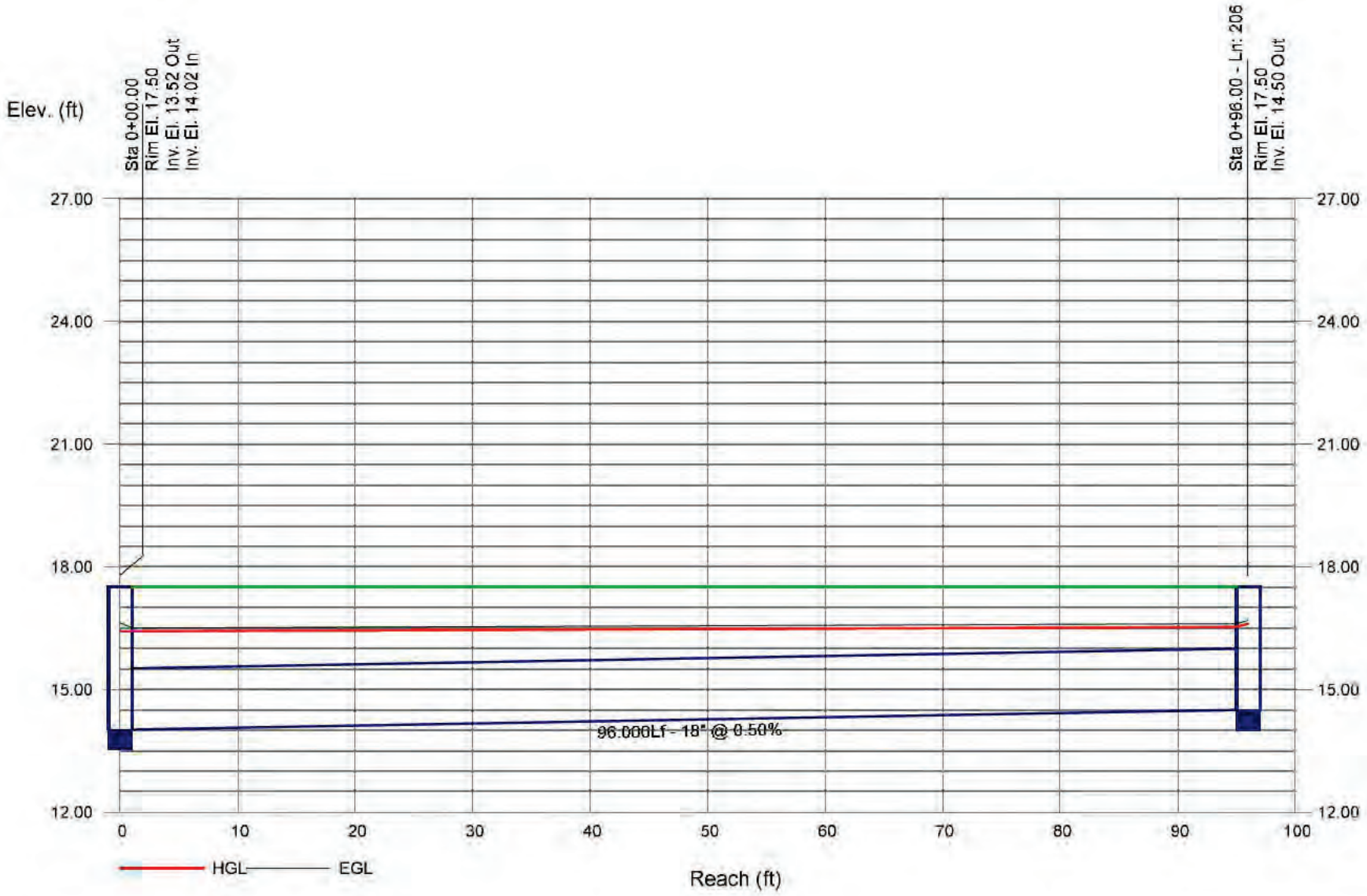




# Storm Sewer Profile

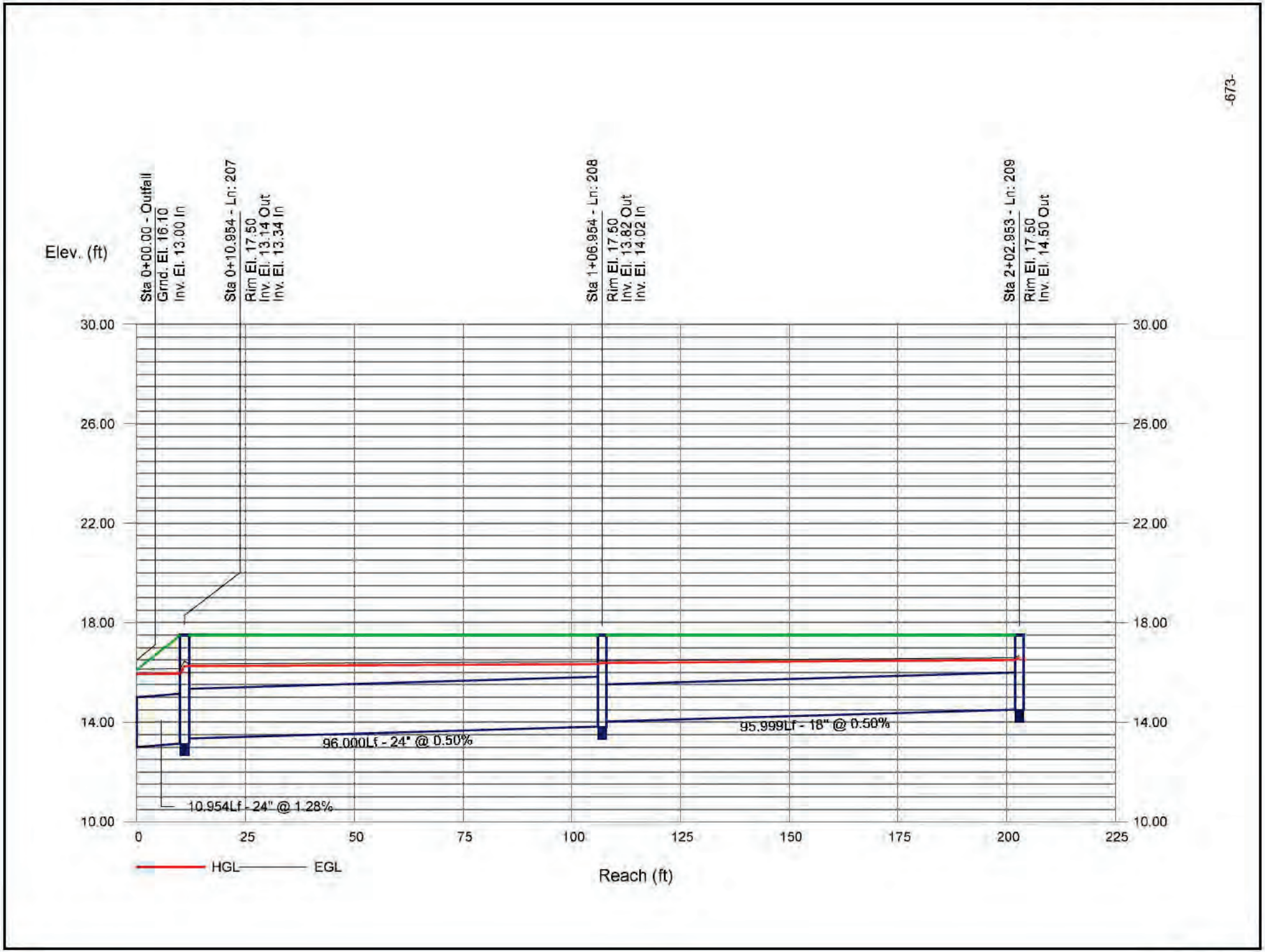
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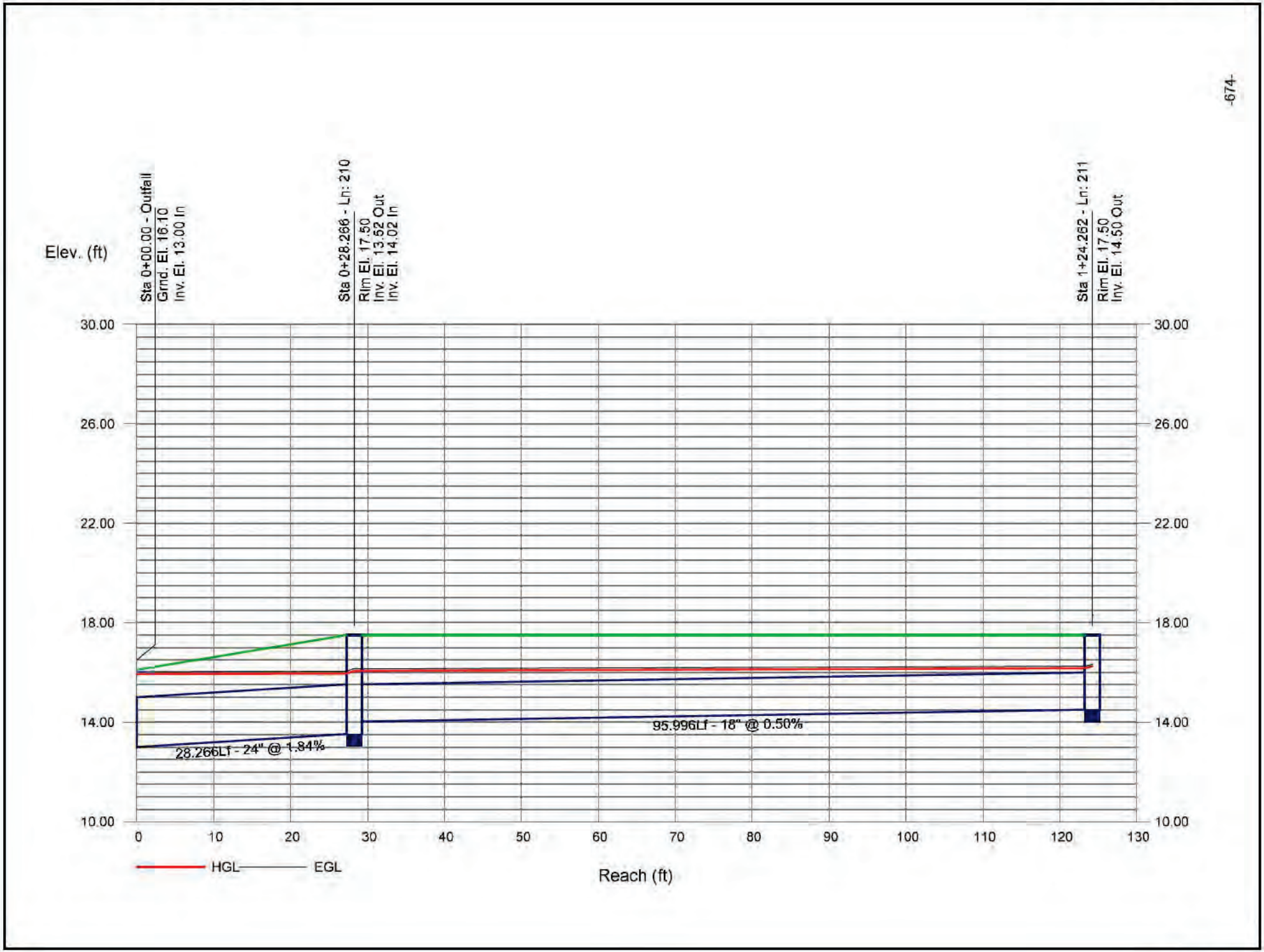
# Storm Sewer Profile

Proj. file: Building 4 Storm.stm



# Storm Sewer Profile

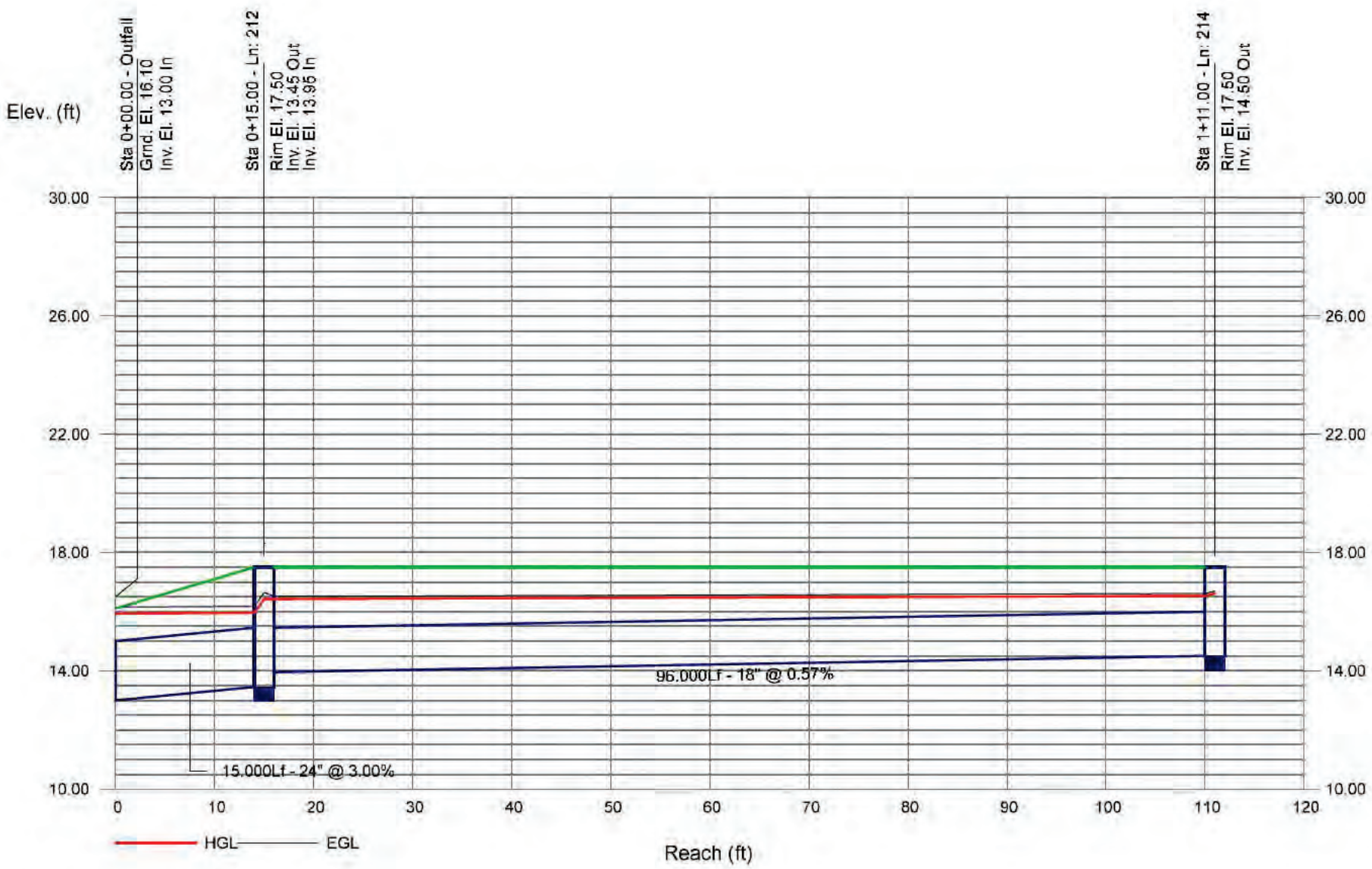
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# Storm Sewer Profile

Proj. file: Building 4 Storm.stm

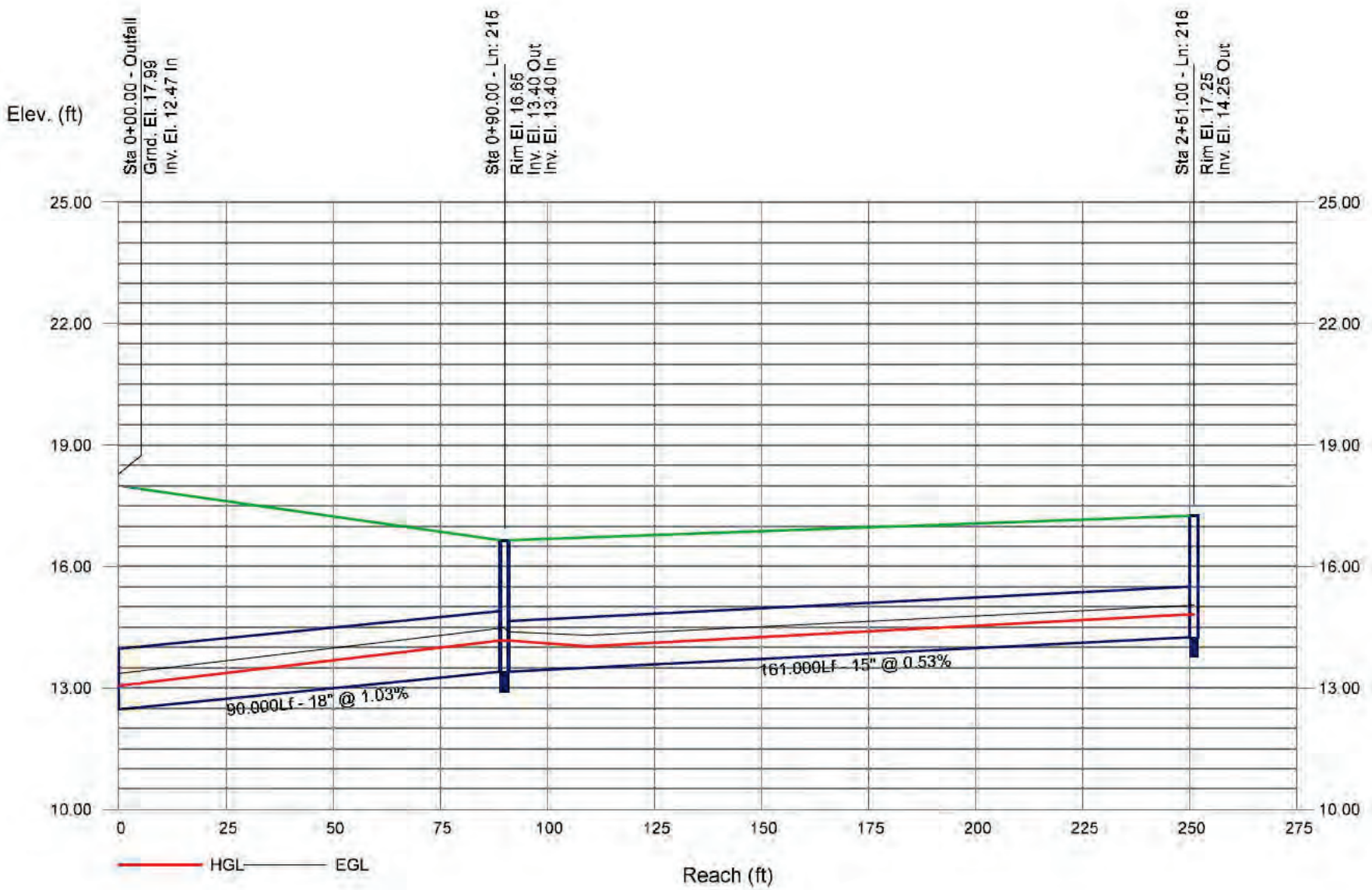




# Storm Sewer Profile

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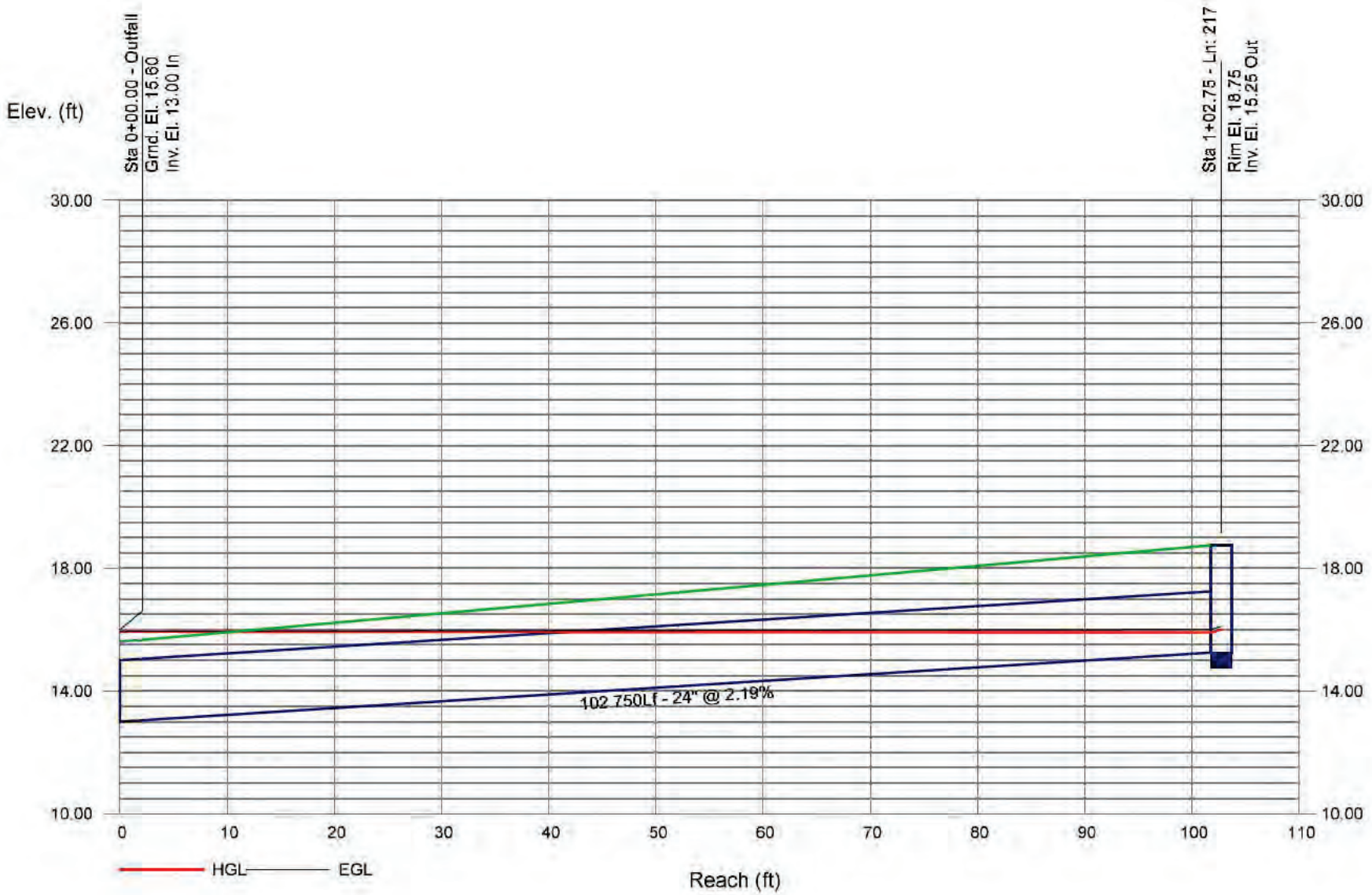




# Storm Sewer Profile

Proj. file: Building 4 Storm.stm

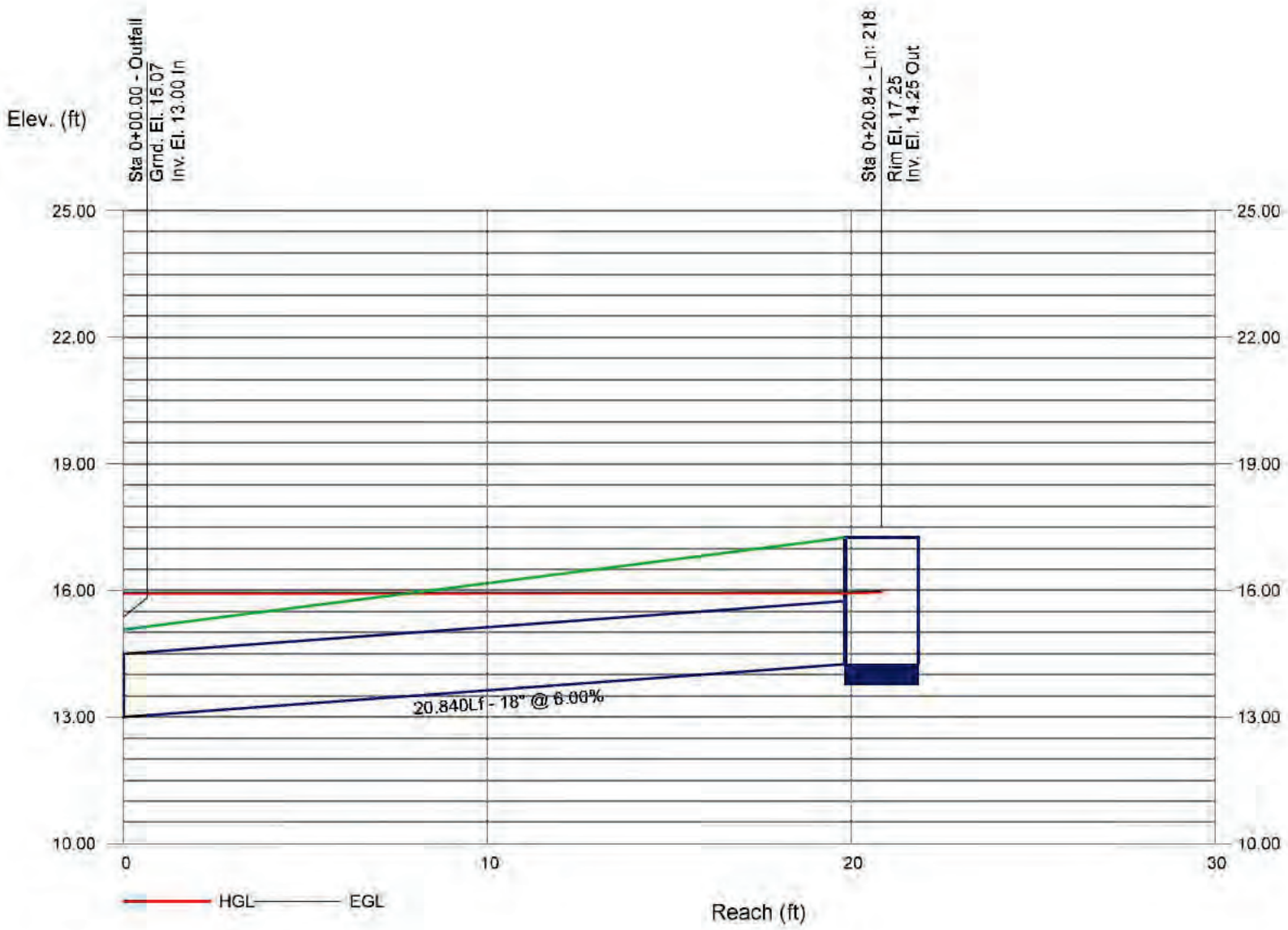




# Storm Sewer Profile

Proj. file: Building 4 Storm.stm

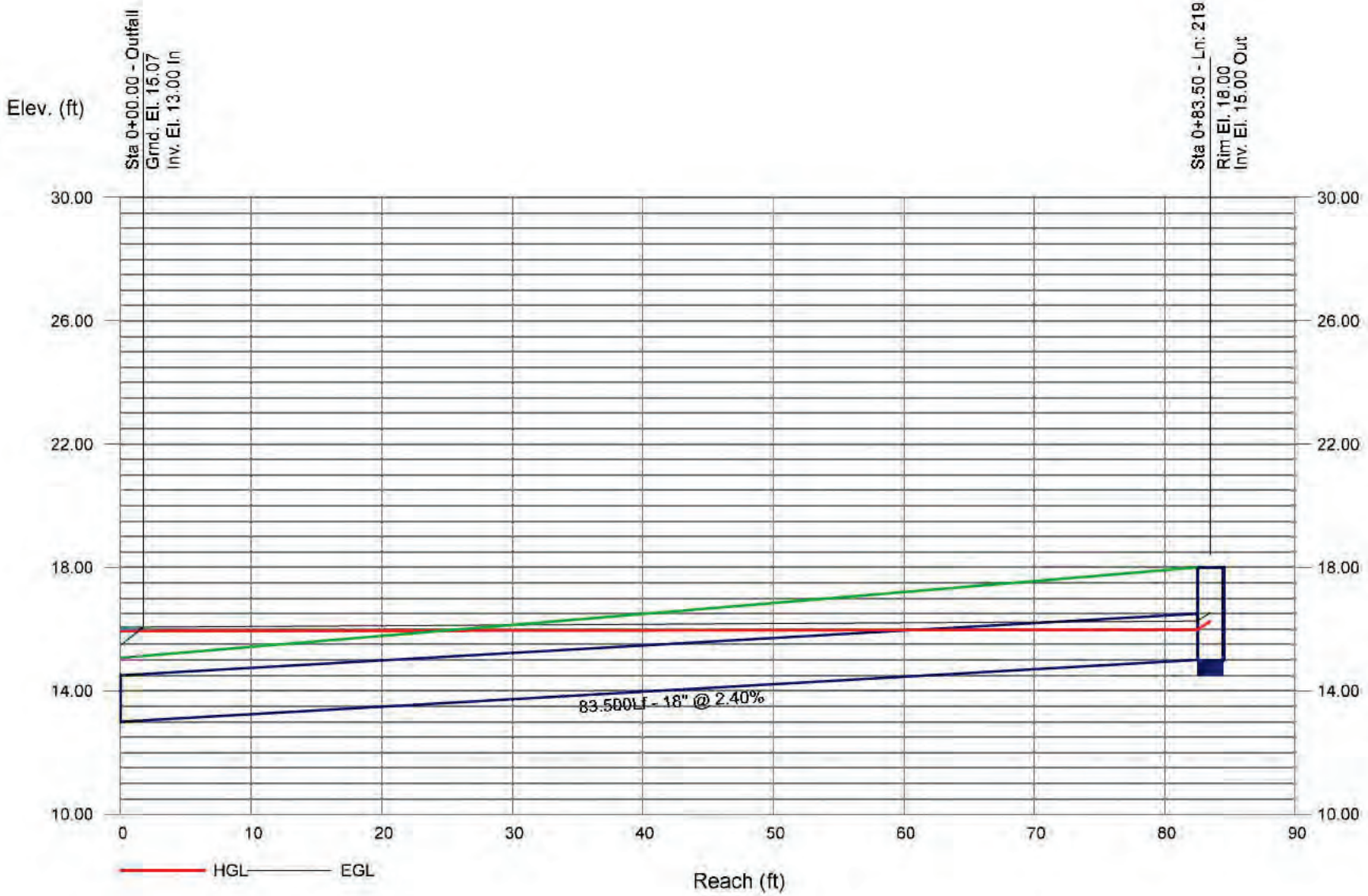




# Storm Sewer Profile

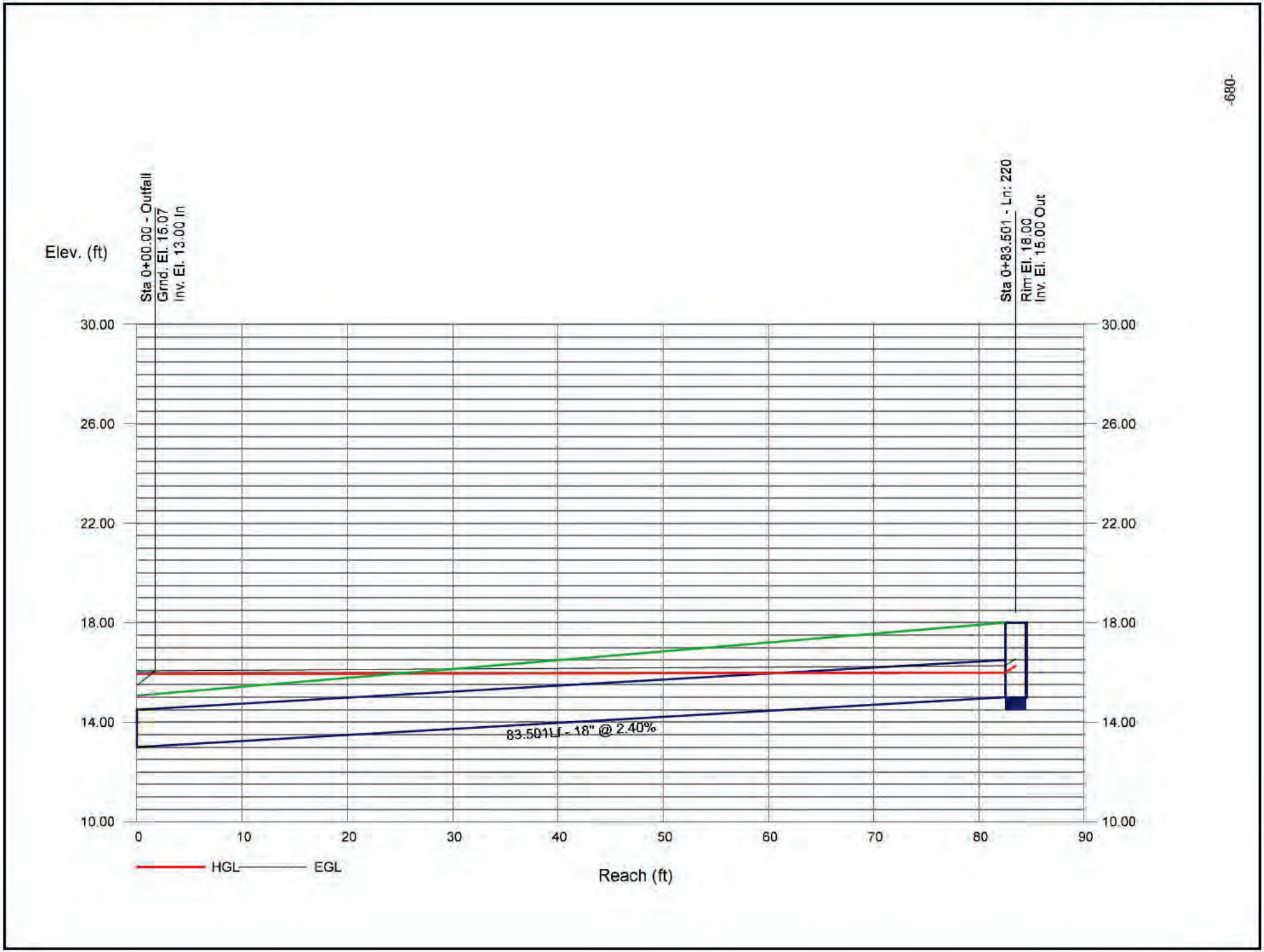
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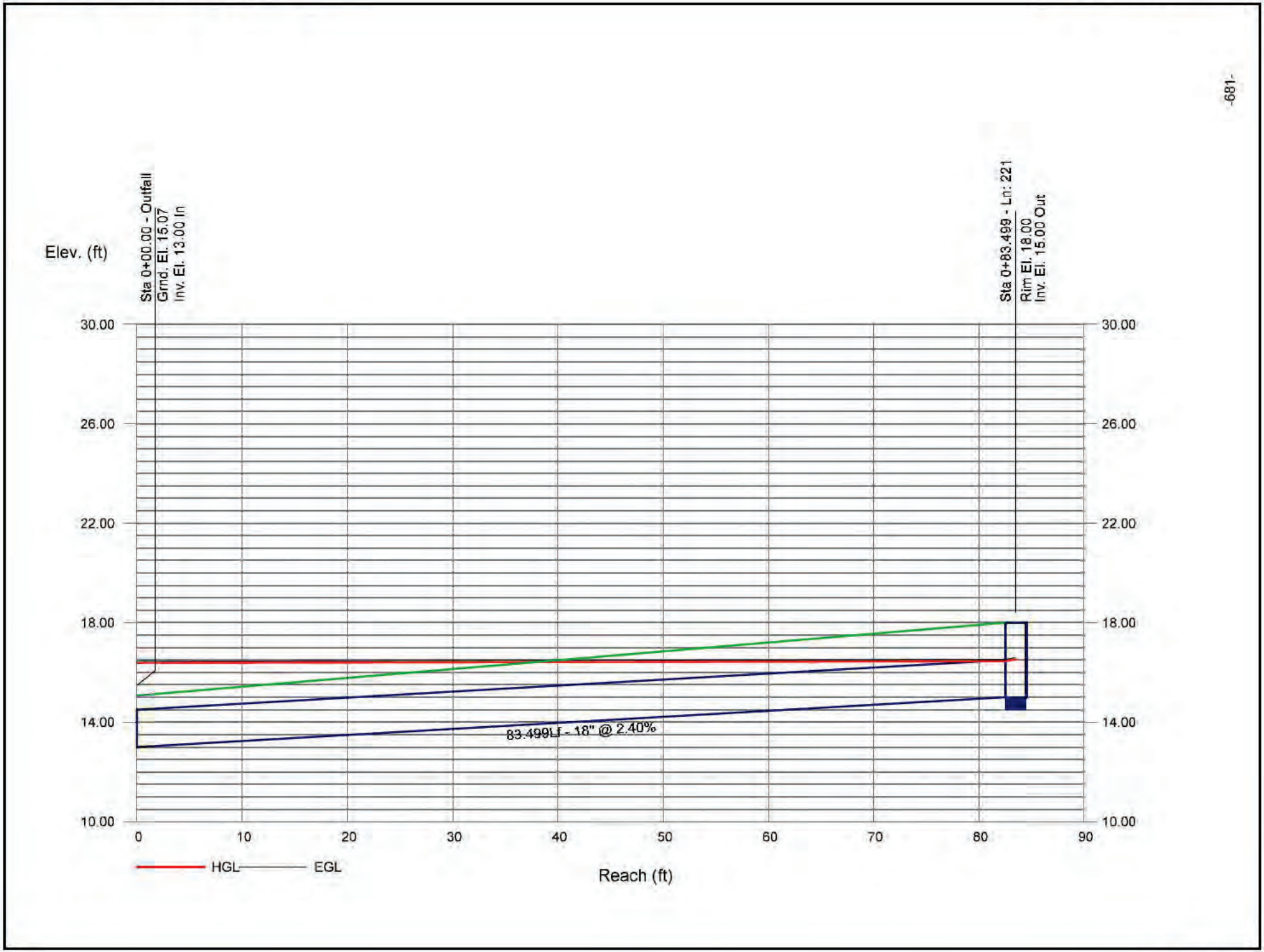
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Proj. file: Building 4 Storm.stm



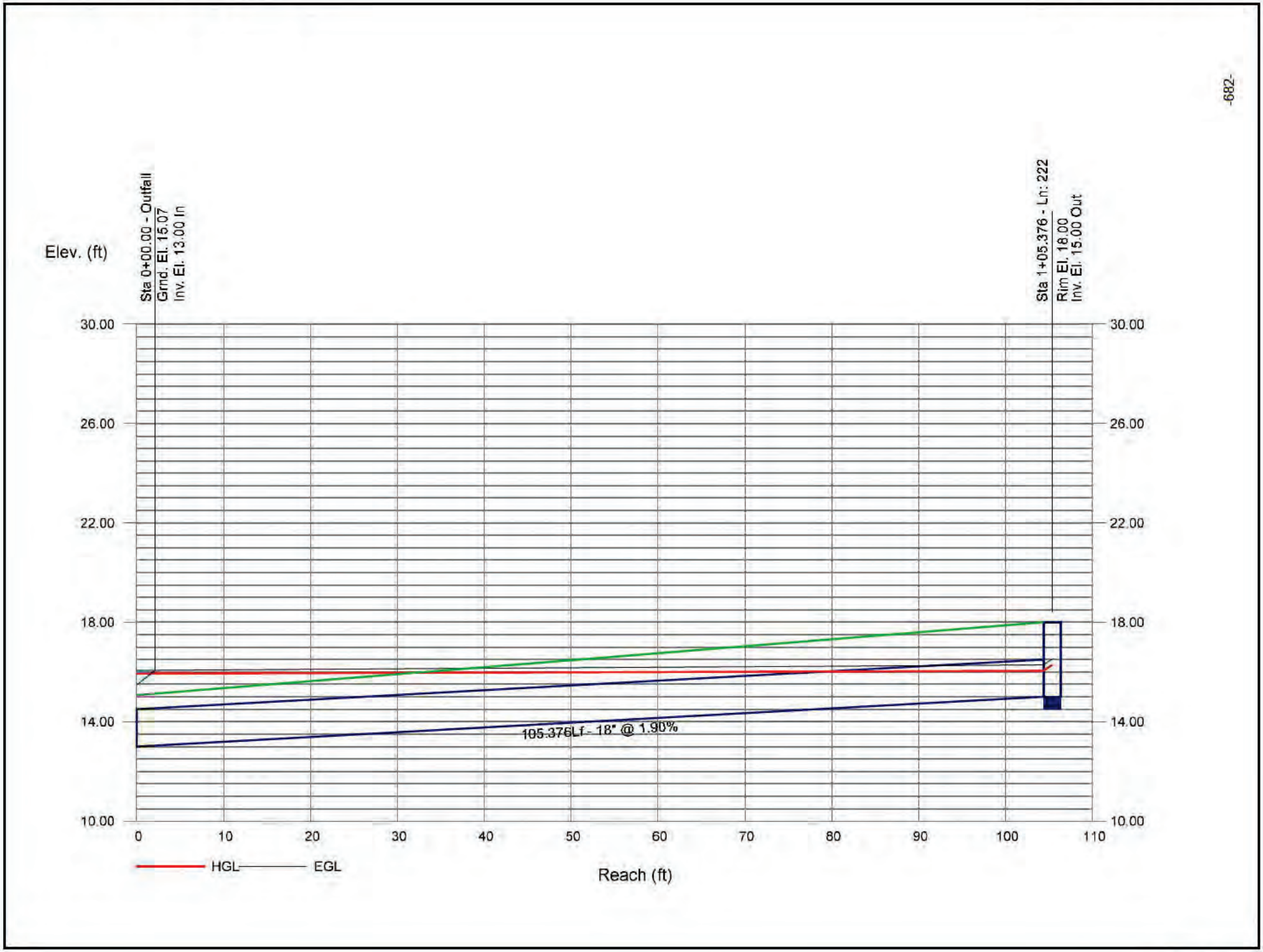
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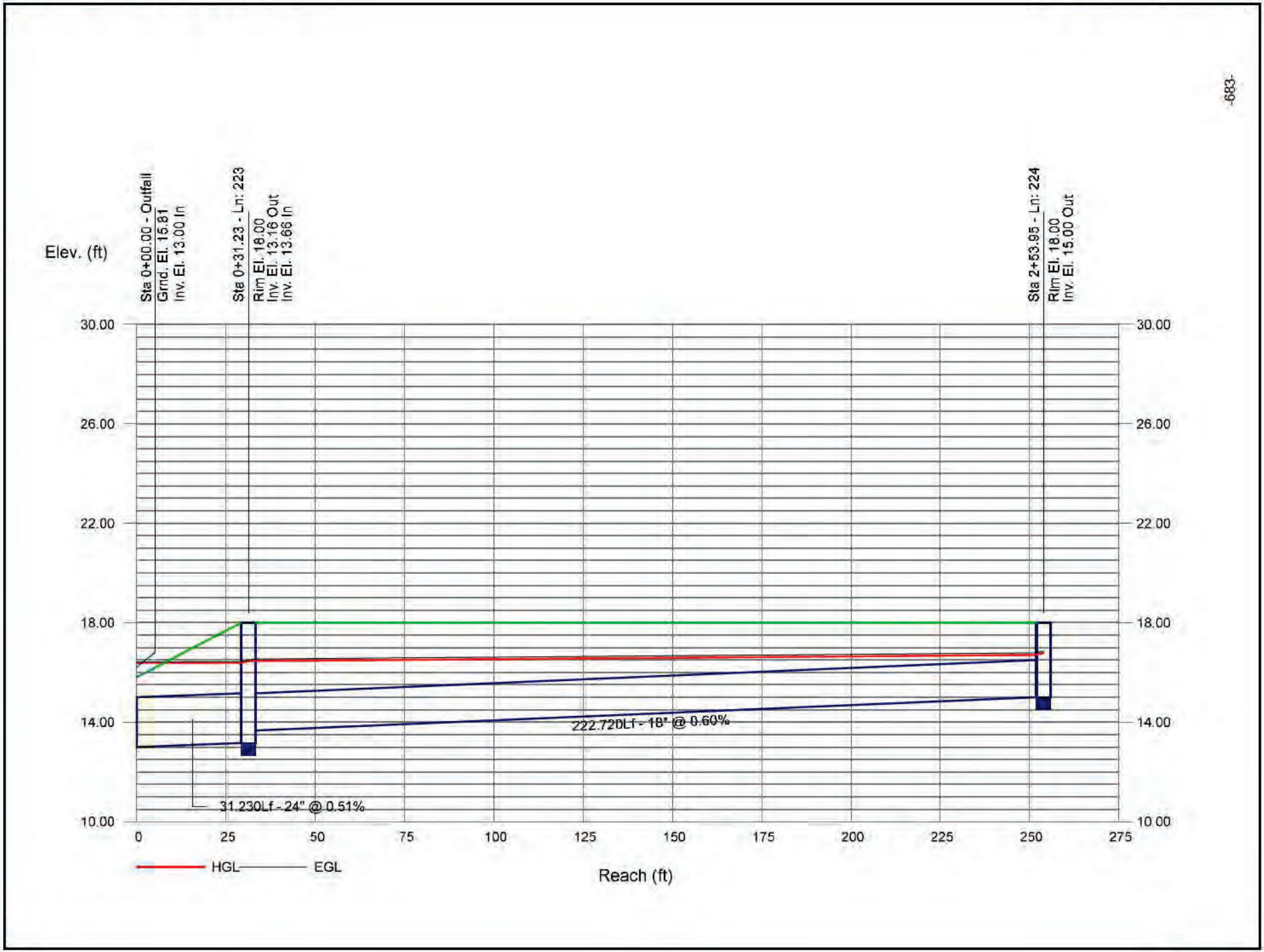
# Storm Sewer Profile

Proj. file: Building 4 Storm.stm



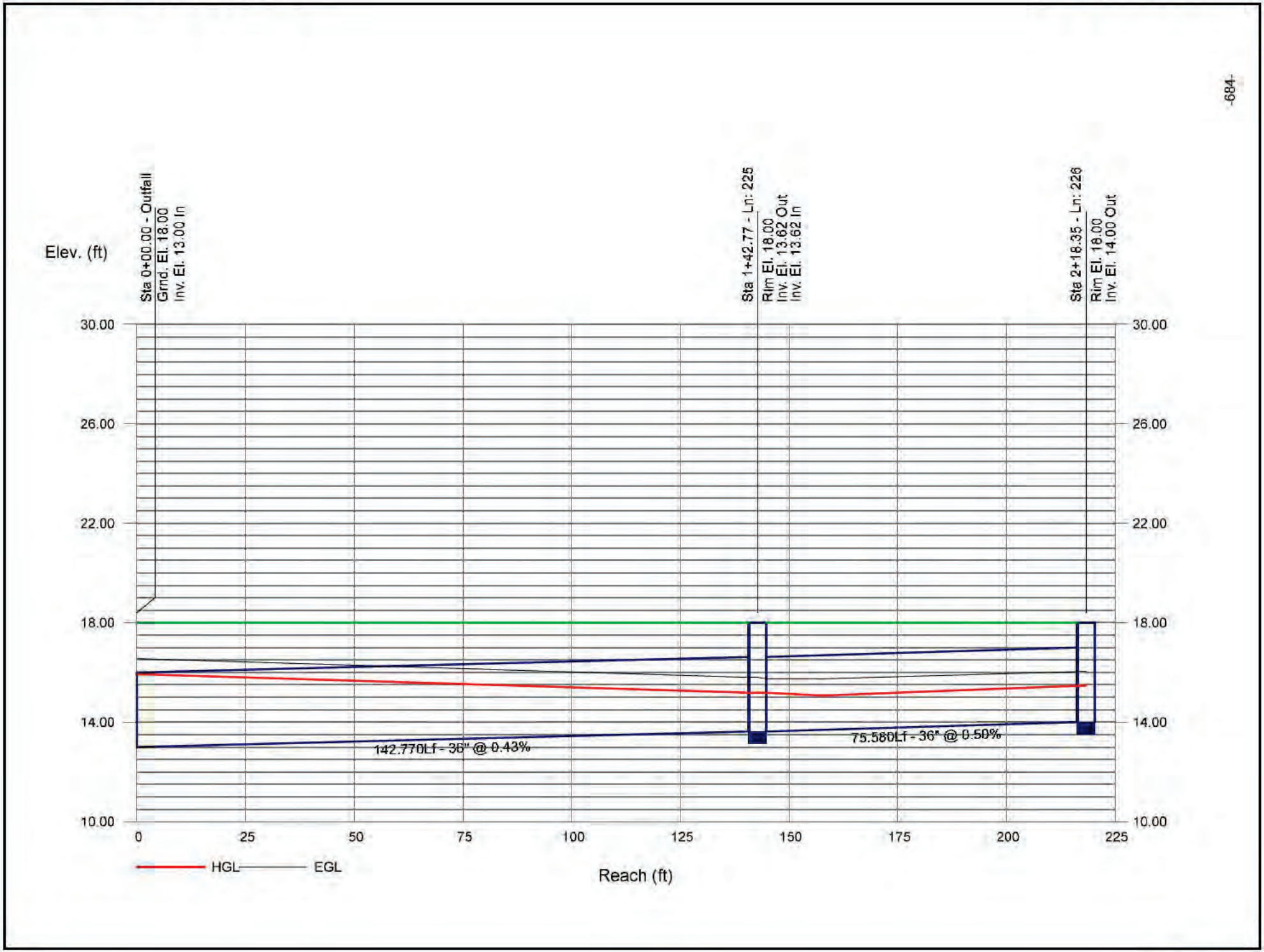
# Storm Sewer Profile

Proj. file: Building 4 Storm.stm



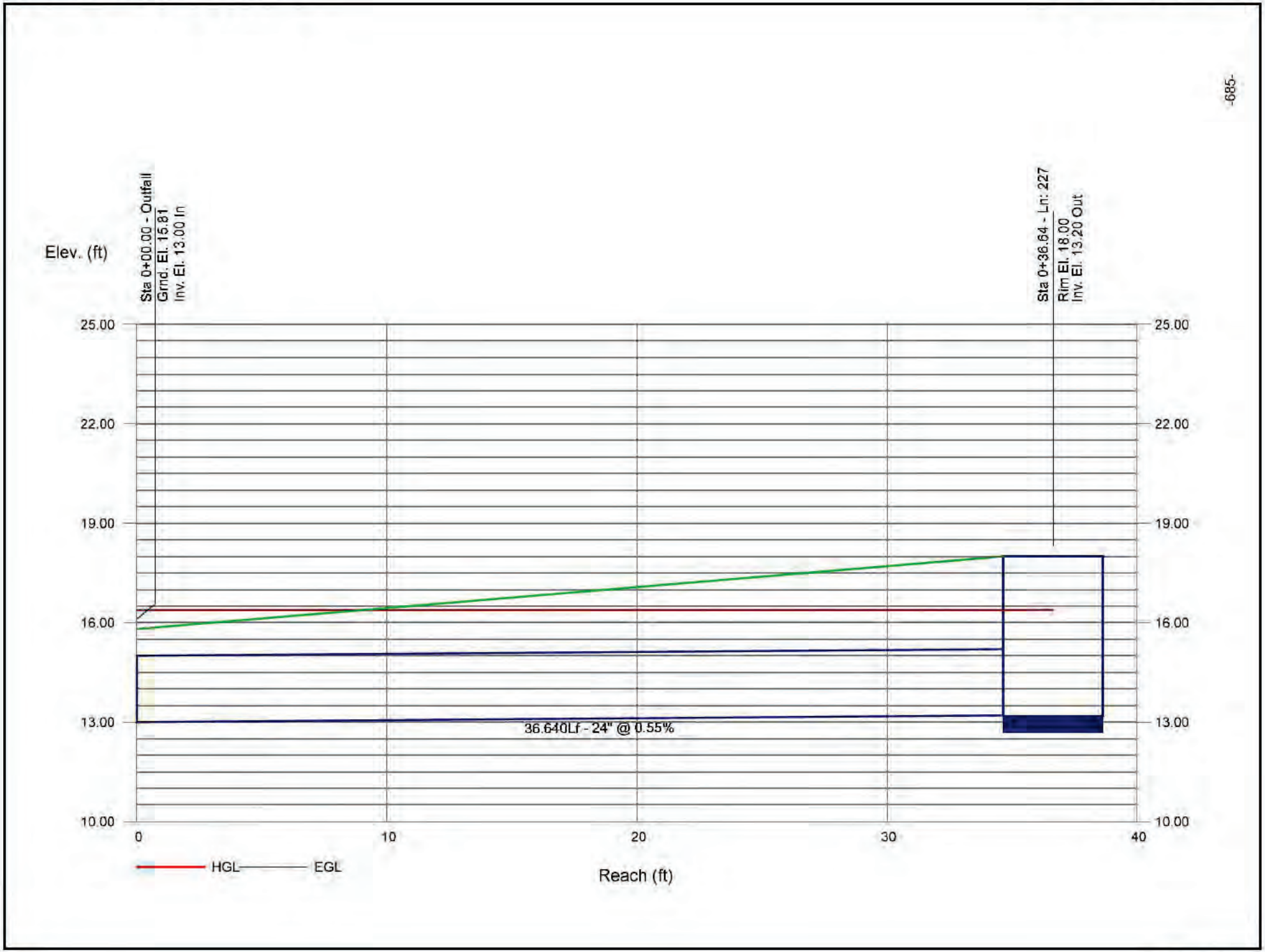
# Storm Sewer Profile

Proj. file: Building 4 Storm.stm



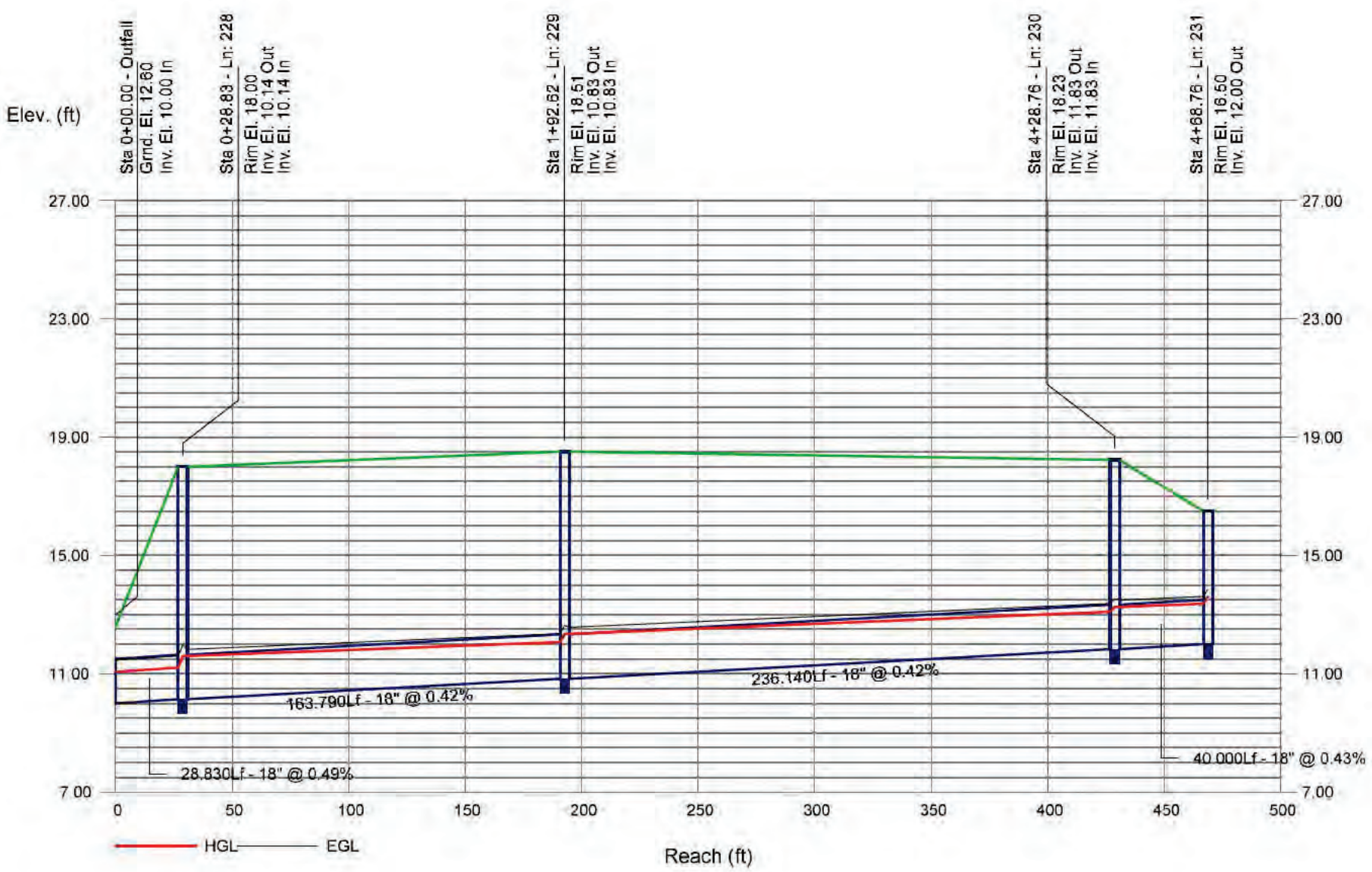
# Storm Sewer Profile

Proj. file: Building 4 Storm.stm



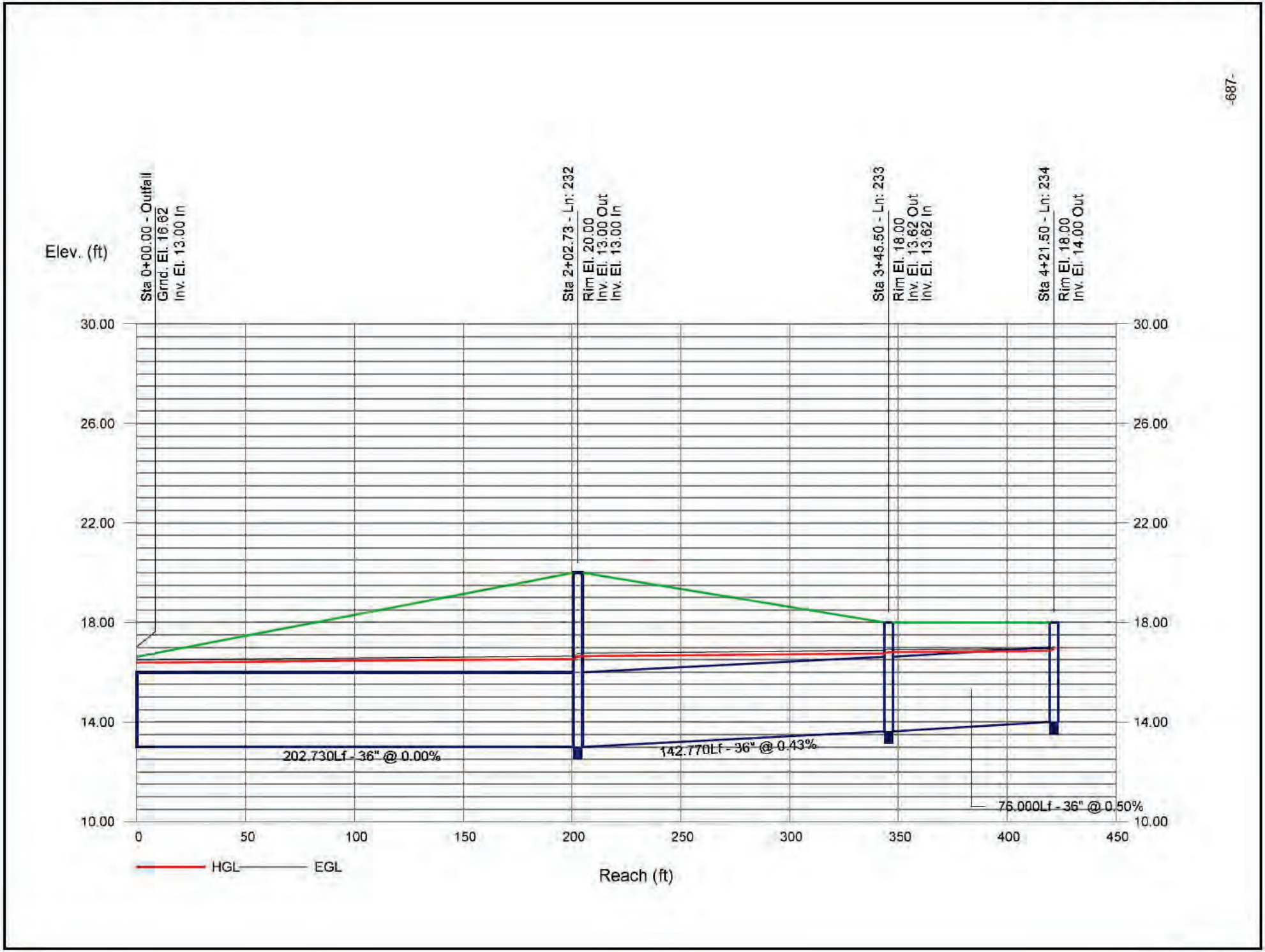
# Storm Sewer Profile

Proj. file: Building 4 Storm.stm



# Storm Sewer Profile

Proj. file: Building 4 Storm.stm



# Storm Sewer Tabulation



| Station | | Len | Drng Area | | Rnoff coeff | Area x C | | Tc | | Rain (I) | Total flow | Cap full | Vel | Pipe | | Invert Elev | | HGL Elev | | Grnd / Rim Elev | | Line ID |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Line | To Line | (ft) | Incr (ac) | Total (ac) | (C) | Incr | Total | Inlet (min) | Syst (min) | (in/hr) | (cfs) | (cfs) | (ft/s) | Size (in) | Slope (%) | Dn (ft) | Up (ft) | Dn (ft) | Up (ft) | Dn (ft) | Up (ft) | |
| 1 | End | 112.568 | 0.00 | 2.37 | 0.00 | 0.00 | 2.35 | 0.0 | 7.2 | 7.8 | 18.36 | 46.25 | 4.98 | 30 | 1.08 | 13.00 | 14.22 | 15.62 | 15.67 | 16.50 | 22.02 | MH 1451-EW 145 |
| 2 | 1 | 18.833 | 0.42 | 0.42 | 0.99 | 0.42 | 0.42 | 5.0 | 5.0 | 8.6 | 3.57 | 8.06 | 5.46 | 15 | 1.33 | 17.00 | 17.25 | 17.58 | 18.01 | 22.02 | 20.00 | RL 5-62 - MH 145 |
| 3 | 1 | 43.688 | 0.00 | 1.95 | 0.00 | 0.00 | 1.93 | 0.0 | 7.0 | 7.9 | 15.19 | 17.39 | 6.24 | 24 | 0.50 | 14.72 | 14.94 | 16.17 | 16.39 | 22.02 | 19.75 | MH 1452-MH 145 |
| 4 | 3 | 70.333 | 0.00 | 1.53 | 0.00 | 0.00 | 1.51 | 0.0 | 6.7 | 8.0 | 12.07 | 17.28 | 3.91 | 24 | 0.50 | 14.94 | 15.29 | 16.99 | 17.13 | 19.75 | 19.75 | MH 1452-MH 145 |
| 5 | 4 | 23.000 | 0.42 | 0.42 | 0.99 | 0.42 | 0.42 | 5.0 | 5.0 | 8.6 | 3.57 | 7.29 | 5.23 | 15 | 1.09 | 17.00 | 17.25 | 17.62 | 18.01 | 19.75 | 20.00 | RL 5-60 - MH 145 |
| 6 | 4 | 50.005 | 0.00 | 1.11 | 0.00 | 0.00 | 1.10 | 0.0 | 6.4 | 8.1 | 8.86 | 17.33 | 4.06 | 24 | 0.50 | 15.49 | 15.74 | 17.38 | 16.80 | 19.75 | 19.75 | MH 1453-MH 145 |
| 7 | 6 | 52.000 | 0.00 | 0.74 | 0.00 | 0.00 | 0.73 | 0.0 | 6.0 | 8.2 | 6.02 | 17.33 | 4.08 | 24 | 0.50 | 15.74 | 16.00 | 16.80 | 16.87 | 19.75 | 19.75 | MH 1453-MH 145 |
| 8 | 7 | 50.000 | 0.00 | 0.37 | 0.00 | 0.00 | 0.37 | 0.0 | 5.1 | 8.5 | 3.12 | 17.33 | 3.09 | 24 | 0.50 | 16.00 | 16.25 | 16.87 | 16.87 | 19.75 | 19.75 | MH 1453-MH 145 |
| 9 | 8 | 23.000 | 0.37 | 0.37 | 0.99 | 0.37 | 0.37 | 5.0 | 5.0 | 8.6 | 3.15 | 7.29 | 5.03 | 15 | 1.09 | 17.00 | 17.25 | 17.57 | 17.96 | 19.75 | 20.00 | RL 5-57 - MH 145 |
| 10 | 7 | 25.000 | 0.37 | 0.37 | 0.99 | 0.37 | 0.37 | 5.0 | 5.0 | 8.6 | 3.15 | 9.89 | 5.75 | 15 | 2.00 | 16.75 | 17.25 | 17.23 | 17.96 | 19.75 | 20.00 | RL 5-58 - TEE |
| 11 | 6 | 25.000 | 0.37 | 0.37 | 0.99 | 0.37 | 0.37 | 5.0 | 5.0 | 8.6 | 3.15 | 12.20 | 6.34 | 15 | 3.04 | 16.49 | 17.25 | 16.92 | 17.96 | 19.75 | 20.00 | RL 5-59 - TEE |
| 12 | 3 | 25.000 | 0.42 | 0.42 | 0.99 | 0.42 | 0.42 | 5.0 | 5.0 | 8.6 | 3.57 | 21.31 | 3.73 | 15 | 9.28 | 14.93 | 17.25 | 16.99 | 18.01 | 19.75 | 20.00 | RL 5-61 - TEE |
| 13 | End | 182.723 | 0.00 | 2.96 | 0.00 | 0.00 | 2.93 | 0.0 | 6.7 | 8.0 | 23.35 | 42.60 | 5.79 | 30 | 0.92 | 13.00 | 14.68 | 15.62 | 16.32 | 16.50 | 19.75 | MH 1401-EW 140 |
| 14 | 13 | 50.026 | 0.00 | 1.11 | 0.00 | 0.00 | 1.10 | 0.0 | 6.4 | 8.1 | 8.86 | 17.32 | 5.39 | 24 | 0.50 | 15.49 | 15.74 | 16.50 | 16.80 | 19.75 | 19.75 | MH 1404-MH 140 |
| 15 | 14 | 52.000 | 0.00 | 0.74 | 0.00 | 0.00 | 0.73 | 0.0 | 6.0 | 8.2 | 6.02 | 17.33 | 4.08 | 24 | 0.50 | 15.74 | 16.00 | 16.80 | 16.87 | 19.75 | 19.75 | MH 1404-MH 140 |
| 16 | 15 | 50.000 | 0.00 | 0.37 | 0.00 | 0.00 | 0.37 | 0.0 | 5.1 | 8.5 | 3.12 | 17.33 | 3.09 | 24 | 0.50 | 16.00 | 16.25 | 16.87 | 16.87 | 19.75 | 19.75 | MH 1404-MH 140 |
| 17 | 16 | 23.000 | 0.37 | 0.37 | 0.99 | 0.37 | 0.37 | 5.0 | 5.0 | 8.6 | 3.15 | 7.29 | 5.03 | 15 | 1.09 | 17.00 | 17.25 | 17.57 | 17.96 | 19.75 | 20.00 | RL 5-25 - MH 140 |
| 18 | 13 | 22.999 | 0.37 | 0.37 | 0.99 | 0.37 | 0.37 | 5.0 | 5.0 | 8.6 | 3.15 | 7.29 | 5.03 | 15 | 1.09 | 17.00 | 17.25 | 17.57 | 17.96 | 19.75 | 20.00 | RL 5-22 - MH 140 |
| 19 | 13 | 50.018 | 0.00 | 1.48 | 0.00 | 0.00 | 1.47 | 0.0 | 6.3 | 8.1 | 11.85 | 17.32 | 5.88 | 24 | 0.50 | 15.18 | 15.43 | 16.39 | 16.67 | 19.75 | 19.75 | MH 1402-MH 140 |
| 20 | 19 | 50.000 | 0.00 | 1.11 | 0.00 | 0.00 | 1.10 | 0.0 | 6.1 | 8.2 | 9.00 | 17.33 | 4.84 | 24 | 0.50 | 15.43 | 15.68 | 16.67 | 16.75 | 19.75 | 19.75 | MH 1402-MH 140 |
| 21 | 20 | 23.000 | 0.37 | 0.37 | 0.99 | 0.37 | 0.37 | 5.0 | 5.0 | 8.6 | 3.15 | 7.29 | 5.03 | 15 | 1.09 | 17.00 | 17.25 | 17.57 | 17.96 | 19.75 | 20.00 | RL 5-20 - MH 140 |
| 22 | 20 | 37.011 | 0.00 | 0.74 | 0.00 | 0.00 | 0.73 | 0.0 | 5.8 | 8.3 | 6.08 | 17.56 | 4.63 | 24 | 0.51 | 15.88 | 16.07 | 16.75 | 16.94 | 19.75 | 19.75 | MH 1403-MH 140 |

Project File: Building 5 Storm.stm | Number of lines: 177 | Run Date: 9/12/2022

NOTES:Intensity = 48.38 / (Inlet time + 9.10) ^ 0.65; Return period =Yrs. 100 ; c = cir e = ellip b = box

# Storm Sewer Tabulation



| Station | | Len | Drng Area | | Rnoff coeff | Area x C | | Tc | | Rain (I) | Total flow | Cap full | Vel | Pipe | | Invert Elev | | HGL Elev | | Grnd / Rim Elev | | Line ID |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Line | To Line | (ft) | Incr (ac) | Total (ac) | (C) | Incr | Total | Inlet (min) | Syst (min) | (in/hr) | (cfs) | (cfs) | (ft/s) | Size (in) | Slope (%) | Dn (ft) | Up (ft) | Dn (ft) | Up (ft) | Dn (ft) | Up (ft) | |
| 23 | 22 | 36.000 | 0.00 | 0.37 | 0.00 | 0.00 | 0.37 | 0.0 | 5.1 | 8.5 | 3.12 | 17.33 | 3.08 | 24 | 0.50 | 16.07 | 16.25 | 16.94 | 16.87 | 19.75 | 19.75 | MH 1403-MH 140 |
| 24 | 23 | 23.000 | 0.37 | 0.37 | 0.99 | 0.37 | 0.37 | 5.0 | 5.0 | 8.6 | 3.15 | 7.29 | 5.03 | 15 | 1.09 | 17.00 | 17.25 | 17.57 | 17.96 | 19.75 | 20.00 | RL 5-18 - MH 140 |
| 25 | 22 | 25.000 | 0.37 | 0.37 | 0.99 | 0.37 | 0.37 | 5.0 | 5.0 | 8.6 | 3.15 | 9.28 | 5.59 | 15 | 1.76 | 16.81 | 17.25 | 17.31 | 17.96 | 19.75 | 20.00 | RI 5-19 - TEE |
| 26 | 15 | 25.000 | 0.37 | 0.37 | 0.99 | 0.37 | 0.37 | 5.0 | 5.0 | 8.6 | 3.15 | 9.89 | 5.75 | 15 | 2.00 | 16.75 | 17.25 | 17.23 | 17.96 | 19.75 | 20.00 | RL 5-24 - TEE |
| 27 | 14 | 25.000 | 0.37 | 0.37 | 0.99 | 0.37 | 0.37 | 5.0 | 5.0 | 8.6 | 3.15 | 12.20 | 6.34 | 15 | 3.04 | 16.49 | 17.25 | 16.92 | 17.96 | 19.75 | 20.00 | RL 5-23 - TEE |
| 28 | 19 | 25.000 | 0.37 | 0.37 | 0.99 | 0.37 | 0.37 | 5.0 | 5.0 | 8.6 | 3.15 | 18.88 | 3.46 | 15 | 7.28 | 15.43 | 17.25 | 16.67 | 17.96 | 19.75 | 20.00 | RL 5-21 - TEE |
| 29 | End | 182.742 | 0.00 | 2.96 | 0.00 | 0.00 | 2.93 | 0.0 | 6.9 | 7.9 | 23.15 | 40.92 | 5.76 | 30 | 0.85 | 13.00 | 14.55 | 15.62 | 16.19 | 16.50 | 19.75 | MH 1391-EW 139 |
| 30 | 29 | 50.044 | 0.00 | 1.48 | 0.00 | 0.00 | 1.47 | 0.0 | 6.7 | 8.0 | 11.68 | 17.32 | 5.85 | 24 | 0.50 | 15.05 | 15.30 | 16.25 | 16.53 | 19.75 | 19.75 | MH 1392-MH 139 |
| 31 | 30 | 50.000 | 0.00 | 1.11 | 0.00 | 0.00 | 1.10 | 0.0 | 6.4 | 8.1 | 8.87 | 17.33 | 4.81 | 24 | 0.50 | 15.30 | 15.55 | 16.53 | 16.61 | 19.75 | 19.75 | MH 1392-MH 139 |
| 32 | 31 | 50.015 | 0.00 | 0.74 | 0.00 | 0.00 | 0.73 | 0.0 | 6.0 | 8.2 | 6.02 | 17.32 | 4.63 | 24 | 0.50 | 15.75 | 16.00 | 16.61 | 16.87 | 19.75 | 19.75 | MH 1393-MH 139 |
| 33 | 32 | 50.000 | 0.00 | 0.37 | 0.00 | 0.00 | 0.37 | 0.0 | 5.1 | 8.5 | 3.12 | 17.33 | 3.09 | 24 | 0.50 | 16.00 | 16.25 | 16.87 | 16.87 | 19.75 | 19.75 | MH 1393-MH 139 |
| 34 | 33 | 23.000 | 0.37 | 0.37 | 0.99 | 0.37 | 0.37 | 5.0 | 5.0 | 8.6 | 3.15 | 7.29 | 5.03 | 15 | 1.09 | 17.00 | 17.25 | 17.57 | 17.96 | 19.75 | 20.00 | RL 5-10 - MH 139 |
| 35 | 29 | 50.016 | 0.00 | 1.11 | 0.00 | 0.00 | 1.10 | 0.0 | 6.4 | 8.1 | 8.86 | 17.32 | 5.39 | 24 | 0.50 | 15.49 | 15.74 | 16.50 | 16.80 | 19.75 | 19.75 | MH 1394-MH 139 |
| 36 | 35 | 52.000 | 0.00 | 0.74 | 0.00 | 0.00 | 0.73 | 0.0 | 6.0 | 8.2 | 6.02 | 17.33 | 4.08 | 24 | 0.50 | 15.74 | 16.00 | 16.80 | 16.87 | 19.75 | 19.75 | MH 1394-MH 139 |
| 37 | 36 | 50.000 | 0.00 | 0.37 | 0.00 | 0.00 | 0.37 | 0.0 | 5.1 | 8.5 | 3.12 | 17.33 | 3.09 | 24 | 0.50 | 16.00 | 16.25 | 16.87 | 16.87 | 19.75 | 19.75 | MH 1394-MH 139 |
| 38 | 37 | 23.000 | 0.37 | 0.37 | 0.99 | 0.37 | 0.37 | 5.0 | 5.0 | 8.6 | 3.15 | 7.29 | 5.03 | 15 | 1.09 | 17.00 | 17.25 | 17.57 | 17.96 | 19.75 | 20.00 | RL 5-17 - MH 139 |
| 39 | 29 | 22.999 | 0.37 | 0.37 | 0.99 | 0.37 | 0.37 | 5.0 | 5.0 | 8.6 | 3.15 | 7.29 | 5.03 | 15 | 1.09 | 17.00 | 17.25 | 17.57 | 17.96 | 19.75 | 20.00 | RL 5-14 - MH 139 |
| 40 | 31 | 23.000 | 0.37 | 0.37 | 0.99 | 0.37 | 0.37 | 5.0 | 5.0 | 8.6 | 3.15 | 7.29 | 5.03 | 15 | 1.09 | 17.00 | 17.25 | 17.57 | 17.96 | 19.75 | 20.00 | RL 5-12 - MH 139 |
| 41 | 32 | 25.000 | 0.37 | 0.37 | 0.99 | 0.37 | 0.37 | 5.0 | 5.0 | 8.6 | 3.15 | 9.89 | 5.75 | 15 | 2.00 | 16.75 | 17.25 | 17.23 | 17.96 | 19.75 | 20.00 | RL 5-11 - TEE |
| 42 | 36 | 24.167 | 0.37 | 0.37 | 0.99 | 0.37 | 0.37 | 5.0 | 5.0 | 8.6 | 3.15 | 10.06 | 5.79 | 15 | 2.07 | 16.75 | 17.25 | 17.23 | 17.96 | 19.75 | 20.00 | RL 5-16 - TEE |
| 43 | 35 | 23.333 | 0.37 | 0.37 | 0.99 | 0.37 | 0.37 | 5.0 | 5.0 | 8.6 | 3.15 | 12.63 | 6.44 | 15 | 3.26 | 16.49 | 17.25 | 16.92 | 17.96 | 19.75 | 20.00 | RL 5-15 - TEE |
| 44 | 30 | 25.000 | 0.37 | 0.37 | 0.99 | 0.37 | 0.37 | 5.0 | 5.0 | 8.6 | 3.15 | 15.33 | 5.84 | 15 | 4.80 | 16.05 | 17.25 | 16.53 | 17.96 | 19.75 | 20.00 | RL 5-13 - TEE |

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Project File: Building 5 Storm.stm | Number of lines: 177 | Run Date: 9/12/2022

NOTES:Intensity = 48.38 / (Inlet time + 9.10) ^ 0.65; Return period =Yrs. 100 ; c = cir e = ellip b = box

# Storm Sewer Tabulation



| Station | | Len | Drng Area | | Rnoff coeff | Area x C | | Tc | | Rain (I) | Total flow | Cap full | Vel | Pipe | | Invert Elev | | HGL Elev | | Grnd / Rim Elev | | Line ID |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Line | To Line | (ft) | Incr (ac) | Total (ac) | (C) | Incr | Total | Inlet (min) | Syst (min) | (in/hr) | (cfs) | (cfs) | (ft/s) | Size (in) | Slope (%) | Dn (ft) | Up (ft) | Dn (ft) | Up (ft) | Dn (ft) | Up (ft) | |
| 45 | End | 112.646 | 0.00 | 2.75 | 0.00 | 0.00 | 2.72 | 0.0 | 7.3 | 7.8 | 21.18 | 41.02 | 5.06 | 30 | 0.85 | 13.00 | 13.96 | 15.62 | 15.70 | 16.50 | 22.02 | MH 1421-EW 142 |
| 46 | 45 | 43.692 | 0.00 | 2.33 | 0.00 | 0.00 | 2.31 | 0.0 | 7.2 | 7.8 | 18.04 | 17.39 | 6.17 | 24 | 0.50 | 14.46 | 14.68 | 16.22 | 16.43 | 22.02 | 19.75 | MH 1422-MH 142 |
| 47 | 46 | 72.334 | 0.00 | 1.91 | 0.00 | 0.00 | 1.89 | 0.0 | 6.9 | 7.9 | 14.93 | 17.29 | 4.75 | 24 | 0.50 | 14.68 | 15.04 | 17.02 | 17.29 | 19.75 | 19.75 | MH 1422-MH 142 |
| 48 | 47 | 50.000 | 0.00 | 1.49 | 0.00 | 0.00 | 1.48 | 0.0 | 6.7 | 8.0 | 11.75 | 17.33 | 3.74 | 24 | 0.50 | 15.04 | 15.29 | 17.64 | 17.76 | 19.75 | 19.75 | MH 1422-MH 142 |
| 49 | 48 | 23.000 | 0.37 | 0.37 | 0.99 | 0.37 | 0.37 | 5.0 | 5.0 | 8.6 | 3.15 | 7.29 | 3.70 | 15 | 1.09 | 17.00 | 17.25 | 17.98 | 17.96 | 19.75 | 20.00 | RL 5-35 - MH 142 |
| 50 | 45 | 18.833 | 0.42 | 0.42 | 0.99 | 0.42 | 0.42 | 5.0 | 5.0 | 8.6 | 3.57 | 8.06 | 5.46 | 15 | 1.33 | 17.00 | 17.25 | 17.58 | 18.01 | 22.02 | 20.00 | RL 5-32 - MH 142 |
| 51 | 48 | 50.009 | 0.00 | 1.12 | 0.00 | 0.00 | 1.11 | 0.0 | 6.4 | 8.1 | 8.94 | 17.32 | 2.85 | 24 | 0.50 | 15.49 | 15.74 | 17.98 | 18.04 | 19.75 | 19.75 | MH 1423-MH 142 |
| 52 | 51 | 52.000 | 0.00 | 0.74 | 0.00 | 0.00 | 0.73 | 0.0 | 6.0 | 8.2 | 6.02 | 17.33 | 1.92 | 24 | 0.50 | 15.74 | 16.00 | 18.17 | 18.20 | 19.75 | 19.75 | MH 1423-MH 142 |
| 53 | 52 | 50.000 | 0.00 | 0.37 | 0.00 | 0.00 | 0.37 | 0.0 | 5.1 | 8.5 | 3.12 | 17.33 | 0.99 | 24 | 0.50 | 16.00 | 16.25 | 18.26 | 18.27 | 19.75 | 19.75 | MH 1423-MH 142 |
| 54 | 53 | 23.000 | 0.37 | 0.37 | 0.99 | 0.37 | 0.37 | 5.0 | 5.0 | 8.6 | 3.15 | 7.29 | 2.71 | 15 | 1.09 | 17.00 | 17.25 | 18.28 | 18.30 | 19.75 | 20.00 | RL 5-38 - MH 142 |
| 55 | 52 | 25.000 | 0.37 | 0.37 | 0.99 | 0.37 | 0.37 | 5.0 | 5.0 | 8.6 | 3.15 | 9.89 | 2.74 | 15 | 2.00 | 16.75 | 17.25 | 18.26 | 18.28 | 19.75 | 20.00 | RL 5-37 - TEE |
| 56 | 51 | 25.000 | 0.38 | 0.38 | 0.99 | 0.38 | 0.38 | 5.0 | 5.0 | 8.6 | 3.23 | 12.20 | 3.00 | 15 | 3.04 | 16.49 | 17.25 | 18.17 | 18.16 | 19.75 | 20.00 | RL 5-36 - TEE |
| 57 | 47 | 25.000 | 0.42 | 0.42 | 0.99 | 0.42 | 0.42 | 5.0 | 5.0 | 8.6 | 3.57 | 20.80 | 3.73 | 15 | 8.84 | 15.04 | 17.25 | 17.64 | 18.01 | 19.75 | 20.00 | RL 5-34 - TEE |
| 58 | 46 | 24.999 | 0.42 | 0.42 | 0.99 | 0.42 | 0.42 | 5.0 | 5.0 | 8.6 | 3.57 | 22.43 | 3.73 | 15 | 10.28 | 14.68 | 17.25 | 17.02 | 18.01 | 19.75 | 20.00 | RL 5-33 - TEE |
| 59 | End | 182.698 | 0.00 | 3.49 | 0.00 | 0.00 | 3.46 | 0.0 | 7.0 | 7.9 | 27.15 | 32.21 | 5.69 | 30 | 0.53 | 13.00 | 13.96 | 15.62 | 16.21 | 16.50 | 19.75 | MH 1381-EW 138 |
| 60 | 59 | 50.006 | 0.00 | 2.38 | 0.00 | 0.00 | 2.36 | 0.0 | 6.9 | 7.9 | 18.62 | 17.32 | 5.93 | 24 | 0.50 | 14.46 | 14.71 | 16.74 | 17.03 | 19.75 | 19.75 | MH 1382-MH 138 |
| 61 | 60 | 52.000 | 0.00 | 2.01 | 0.00 | 0.00 | 1.99 | 0.0 | 6.7 | 8.0 | 15.84 | 17.33 | 5.04 | 24 | 0.50 | 14.71 | 14.97 | 17.57 | 17.79 | 19.75 | 19.75 | MH 1382-MH 138 |
| 62 | 61 | 50.034 | 0.00 | 1.63 | 0.00 | 0.00 | 1.61 | 0.0 | 6.5 | 8.0 | 12.95 | 17.32 | 4.12 | 24 | 0.50 | 14.97 | 15.22 | 18.19 | 18.33 | 19.75 | 19.75 | MH 1382-MH 138 |
| 63 | 62 | 50.030 | 0.00 | 1.26 | 0.00 | 0.00 | 1.25 | 0.0 | 6.3 | 8.1 | 10.12 | 17.32 | 3.22 | 24 | 0.50 | 15.42 | 15.67 | 18.59 | 18.67 | 19.75 | 19.75 | MH 1383-MH 138 |
| 64 | 63 | 72.334 | 0.00 | 0.84 | 0.00 | 0.00 | 0.83 | 0.0 | 5.8 | 8.3 | 6.90 | 17.29 | 2.20 | 24 | 0.50 | 15.67 | 16.03 | 18.84 | 18.89 | 19.75 | 19.75 | MH 1383-MH 138 |
| 65 | 64 | 43.667 | 0.00 | 0.42 | 0.00 | 0.00 | 0.42 | 0.0 | 5.1 | 8.5 | 3.55 | 17.39 | 1.13 | 24 | 0.50 | 16.03 | 16.25 | 18.97 | 18.98 | 19.75 | 22.06 | MH 1383-MH 138 |
| 66 | 65 | 18.833 | 0.42 | 0.42 | 0.99 | 0.42 | 0.42 | 5.0 | 5.0 | 8.6 | 3.57 | 8.06 | 2.91 | 15 | 1.33 | 17.00 | 17.25 | 19.00 | 19.05 | 22.06 | 20.00 | RL 5-1 - MH 1383 |

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Project File: Building 5 Storm.stm | Number of lines: 177 | Run Date: 9/12/2022

NOTES:Intensity = 48.38 / (Inlet time + 9.10) ^ 0.65; Return period =Yrs. 100 ; c = cir e = ellip b = box

# Storm Sewer Tabulation



| Station | | Len | Drng Area | | Rnoff coeff | Area x C | | Tc | | Rain (I) | Total flow | Cap full | Vel | Pipe | | Invert Elev | | HGL Elev | | Grnd / Rim Elev | | Line ID |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Line | To Line | (ft) | Incr (ac) | Total (ac) | (C) | Incr | Total | Inlet (min) | Syst (min) | (in/hr) | (cfs) | (cfs) | (ft/s) | Size (in) | Slope (%) | Dn (ft) | Up (ft) | Dn (ft) | Up (ft) | Dn (ft) | Up (ft) | |
| 67 | 59 | 23.003 | 0.37 | 0.37 | 0.99 | 0.37 | 0.37 | 5.0 | 5.0 | 8.6 | 3.15 | 7.29 | 5.03 | 15 | 1.09 | 17.00 | 17.25 | 17.57 | 17.96 | 19.75 | 20.00 | RL 5-7 - MH 1381 |
| 68 | 59 | 50.032 | 0.00 | 0.74 | 0.00 | 0.00 | 0.73 | 0.0 | 6.0 | 8.2 | 6.02 | 17.32 | 4.25 | 24 | 0.50 | 15.75 | 16.00 | 16.74 | 16.87 | 19.75 | 19.75 | MH 1384-MH 138 |
| 69 | 68 | 50.000 | 0.00 | 0.37 | 0.00 | 0.00 | 0.37 | 0.0 | 5.1 | 8.5 | 3.12 | 17.33 | 3.09 | 24 | 0.50 | 16.00 | 16.25 | 16.87 | 16.87 | 19.75 | 19.75 | MH 1384-MH 138 |
| 70 | 69 | 23.000 | 0.37 | 0.37 | 0.99 | 0.37 | 0.37 | 5.0 | 5.0 | 8.6 | 3.15 | 7.29 | 5.03 | 15 | 1.09 | 17.00 | 17.25 | 17.57 | 17.96 | 19.75 | 20.00 | RL 5-9 - MH 1384 |
| 71 | 62 | 23.000 | 0.37 | 0.37 | 0.99 | 0.37 | 0.37 | 5.0 | 5.0 | 8.6 | 3.15 | 7.29 | 2.56 | 15 | 1.09 | 17.00 | 17.25 | 18.59 | 18.64 | 19.75 | 20.00 | RL 5-4 - MH 1382 |
| 72 | 64 | 25.000 | 0.42 | 0.42 | 0.99 | 0.42 | 0.42 | 5.0 | 5.0 | 8.6 | 3.57 | 9.59 | 2.91 | 15 | 1.88 | 16.78 | 17.25 | 18.97 | 19.03 | 19.75 | 20.00 | RL 5-2 - TEE |
| 73 | 68 | 25.000 | 0.37 | 0.37 | 0.99 | 0.37 | 0.37 | 5.0 | 5.0 | 8.6 | 3.15 | 9.89 | 5.75 | 15 | 2.00 | 16.75 | 17.25 | 17.23 | 17.96 | 19.75 | 20.00 | RL 5-8 - TEE |
| 74 | 63 | 25.000 | 0.42 | 0.42 | 0.99 | 0.42 | 0.42 | 5.0 | 5.0 | 8.6 | 3.57 | 12.75 | 2.91 | 15 | 3.32 | 16.42 | 17.25 | 18.84 | 18.90 | 19.75 | 20.00 | RL 5-3 - TEE |
| 75 | 61 | 25.000 | 0.38 | 0.38 | 0.99 | 0.38 | 0.38 | 5.0 | 5.0 | 8.6 | 3.23 | 17.31 | 2.96 | 15 | 6.12 | 15.72 | 17.25 | 18.19 | 18.18 | 19.75 | 20.00 | RL 5-5 - TEE |
| 76 | 60 | 25.000 | 0.37 | 0.37 | 0.99 | 0.37 | 0.37 | 5.0 | 5.0 | 8.6 | 3.15 | 18.72 | 3.45 | 15 | 7.16 | 15.46 | 17.25 | 17.57 | 17.96 | 19.75 | 20.00 | RL 5-6 - TEE |
| 77 | End | 182.657 | 0.00 | 3.33 | 0.00 | 0.00 | 3.30 | 0.0 | 6.9 | 7.9 | 26.05 | 39.17 | 6.23 | 30 | 0.78 | 13.00 | 14.42 | 15.62 | 16.16 | 16.50 | 19.75 | MH 1441-EW 144 |
| 78 | 77 | 50.020 | 0.00 | 1.11 | 0.00 | 0.00 | 1.10 | 0.0 | 6.4 | 8.1 | 8.86 | 17.32 | 5.39 | 24 | 0.50 | 15.49 | 15.74 | 16.50 | 16.80 | 19.75 | 19.75 | MH 1444-MH 144 |
| 79 | 78 | 52.000 | 0.00 | 0.74 | 0.00 | 0.00 | 0.73 | 0.0 | 6.0 | 8.2 | 6.02 | 17.33 | 4.08 | 24 | 0.50 | 15.74 | 16.00 | 16.80 | 16.87 | 19.75 | 19.75 | MH 1444-MH 144 |
| 80 | 79 | 50.000 | 0.00 | 0.37 | 0.00 | 0.00 | 0.37 | 0.0 | 5.1 | 8.5 | 3.12 | 17.33 | 3.09 | 24 | 0.50 | 16.00 | 16.25 | 16.87 | 16.87 | 19.75 | 19.75 | MH 1444-MH 144 |
| 81 | 80 | 23.000 | 0.37 | 0.37 | 0.99 | 0.37 | 0.37 | 5.0 | 5.0 | 8.6 | 3.15 | 7.29 | 5.03 | 15 | 1.09 | 17.00 | 17.25 | 17.57 | 17.96 | 19.75 | 20.00 | RL 5-56 - MH 144 |
| 82 | 77 | 23.000 | 0.37 | 0.37 | 0.99 | 0.37 | 0.37 | 5.0 | 5.0 | 8.6 | 3.15 | 7.29 | 5.03 | 15 | 1.09 | 17.00 | 17.25 | 17.57 | 17.96 | 19.75 | 20.00 | RL 5-53 - MH 144 |
| 83 | 77 | 50.002 | 0.00 | 1.85 | 0.00 | 0.00 | 1.83 | 0.0 | 6.7 | 8.0 | 14.58 | 17.33 | 6.18 | 24 | 0.50 | 14.92 | 15.17 | 16.33 | 16.58 | 19.75 | 19.75 | MH 1442-MH 144 |
| 84 | 83 | 50.000 | 0.00 | 1.48 | 0.00 | 0.00 | 1.47 | 0.0 | 6.5 | 8.0 | 11.77 | 17.33 | 4.77 | 24 | 0.50 | 15.17 | 15.42 | 17.17 | 16.65 | 19.75 | 19.75 | MH 1442-MH 144 |
| 85 | 84 | 23.000 | 0.37 | 0.37 | 0.99 | 0.37 | 0.37 | 5.0 | 5.0 | 8.6 | 3.15 | 7.29 | 5.03 | 15 | 1.09 | 17.00 | 17.25 | 17.57 | 17.96 | 19.75 | 20.00 | RL 5-51 - TEE |
| 86 | 84 | 37.012 | 0.00 | 1.11 | 0.00 | 0.00 | 1.10 | 0.0 | 6.3 | 8.1 | 8.90 | 17.56 | 5.35 | 24 | 0.51 | 15.62 | 15.81 | 16.65 | 16.87 | 19.75 | 19.75 | MH 1443-MH 144 |
| 87 | 86 | 38.000 | 0.00 | 0.74 | 0.00 | 0.00 | 0.73 | 0.0 | 6.0 | 8.2 | 6.02 | 17.33 | 4.08 | 24 | 0.50 | 15.81 | 16.00 | 16.87 | 16.87 | 19.75 | 19.75 | MH 1443-MH 144 |
| 88 | 87 | 50.000 | 0.00 | 0.37 | 0.00 | 0.00 | 0.37 | 0.0 | 5.1 | 8.5 | 3.12 | 17.33 | 3.09 | 24 | 0.50 | 16.00 | 16.25 | 16.87 | 16.87 | 19.75 | 19.75 | MH 1443-MH 144 |

Project File: Building 5 Storm.stm | Number of lines: 177 | Run Date: 9/12/2022

NOTES:Intensity = 48.38 / (Inlet time + 9.10) ^ 0.65; Return period =Yrs. 100 ; c = cir e = ellip b = box

# Storm Sewer Tabulation



| Station | | Len | Drng Area | | Rnoff coeff | Area x C | | Tc | | Rain (I) | Total flow | Cap full | Vel | Pipe | | Invert Elev | | HGL Elev | | Grnd / Rim Elev | | Line ID |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Line | To Line | (ft) | Incr (ac) | Total (ac) | (C) | Incr | Total | Inlet (min) | Syst (min) | (in/hr) | (cfs) | (cfs) | (ft/s) | Size (in) | Slope (%) | Dn (ft) | Up (ft) | Dn (ft) | Up (ft) | Dn (ft) | Up (ft) | |
| 89 | 88 | 23.000 | 0.37 | 0.37 | 0.99 | 0.37 | 0.37 | 5.0 | 5.0 | 8.6 | 3.15 | 7.29 | 5.03 | 15 | 1.09 | 17.00 | 17.25 | 17.57 | 17.96 | 19.75 | 20.00 | RL 5-48 - MH 144 |
| 90 | 87 | 25.000 | 0.37 | 0.37 | 0.99 | 0.37 | 0.37 | 5.0 | 5.0 | 8.6 | 3.15 | 9.89 | 5.75 | 15 | 2.00 | 16.75 | 17.25 | 17.23 | 17.96 | 19.75 | 20.00 | RL 5-49 - TEE |
| 91 | 79 | 25.000 | 0.37 | 0.37 | 0.99 | 0.37 | 0.37 | 5.0 | 5.0 | 8.6 | 3.15 | 9.89 | 5.75 | 15 | 2.00 | 16.75 | 17.25 | 17.23 | 17.96 | 19.75 | 20.00 | RL 5-55 - TEE |
| 92 | 86 | 25.000 | 0.37 | 0.37 | 0.99 | 0.37 | 0.37 | 5.0 | 5.0 | 8.6 | 3.15 | 11.71 | 6.21 | 15 | 2.80 | 16.55 | 17.25 | 16.99 | 17.96 | 19.75 | 20.00 | RL 5-50 - TEE |
| 93 | 78 | 25.000 | 0.37 | 0.37 | 0.99 | 0.37 | 0.37 | 5.0 | 5.0 | 8.6 | 3.15 | 12.20 | 6.34 | 15 | 3.04 | 16.49 | 17.25 | 16.92 | 17.96 | 19.75 | 20.00 | RL 5-54 - TEE |
| 94 | 83 | 25.000 | 0.37 | 0.37 | 0.99 | 0.37 | 0.37 | 5.0 | 5.0 | 8.6 | 3.15 | 20.18 | 3.45 | 15 | 8.32 | 15.17 | 17.25 | 17.17 | 17.96 | 19.75 | 20.00 | RL 5-52 - TEE |
| 95 | End | 112.539 | 0.00 | 2.37 | 0.00 | 0.00 | 2.35 | 0.0 | 7.2 | 7.8 | 18.36 | 46.26 | 4.98 | 30 | 1.08 | 13.00 | 14.22 | 15.62 | 15.67 | 16.50 | 21.64 | MH 1411-EW 141 |
| 96 | 95 | 18.833 | 0.42 | 0.42 | 0.99 | 0.42 | 0.42 | 5.0 | 5.0 | 8.6 | 3.57 | 8.06 | 5.46 | 15 | 1.33 | 17.00 | 17.25 | 17.58 | 18.01 | 21.64 | 20.00 | RL 5-31 - MH 141 |
| 97 | 95 | 43.678 | 0.00 | 1.95 | 0.00 | 0.00 | 1.93 | 0.0 | 7.0 | 7.9 | 15.19 | 17.39 | 6.24 | 24 | 0.50 | 14.72 | 14.94 | 16.17 | 16.39 | 21.64 | 19.75 | MH 1412-MH 141 |
| 98 | 97 | 70.333 | 0.00 | 1.53 | 0.00 | 0.00 | 1.51 | 0.0 | 6.7 | 8.0 | 12.07 | 17.28 | 3.91 | 24 | 0.50 | 14.94 | 15.29 | 16.99 | 17.13 | 19.75 | 19.75 | MH 1412-MH 141 |
| 99 | 98 | 23.000 | 0.42 | 0.42 | 0.99 | 0.42 | 0.42 | 5.0 | 5.0 | 8.6 | 3.57 | 7.29 | 5.23 | 15 | 1.09 | 17.00 | 17.25 | 17.62 | 18.01 | 19.75 | 20.00 | RL 5-29 - MH 141 |
| 100 | 98 | 50.015 | 0.00 | 1.11 | 0.00 | 0.00 | 1.10 | 0.0 | 6.4 | 8.1 | 8.86 | 17.32 | 4.06 | 24 | 0.50 | 15.49 | 15.74 | 17.38 | 16.80 | 19.75 | 19.75 | MH 1413-MH 141 |
| 101 | 100 | 52.000 | 0.00 | 0.74 | 0.00 | 0.00 | 0.73 | 0.0 | 6.0 | 8.2 | 6.02 | 17.33 | 4.08 | 24 | 0.50 | 15.74 | 16.00 | 16.80 | 16.87 | 19.75 | 19.75 | MH 1413-MH 141 |
| 102 | 101 | 50.000 | 0.00 | 0.37 | 0.00 | 0.00 | 0.37 | 0.0 | 5.1 | 8.5 | 3.12 | 17.33 | 3.09 | 24 | 0.50 | 16.00 | 16.25 | 16.87 | 16.87 | 19.75 | 19.75 | MH 1413-MH 141 |
| 103 | 102 | 23.000 | 0.37 | 0.37 | 0.99 | 0.37 | 0.37 | 5.0 | 5.0 | 8.6 | 3.15 | 7.29 | 5.03 | 15 | 1.09 | 17.00 | 17.25 | 17.57 | 17.96 | 19.75 | 20.00 | RL 5-26 - MH 141 |
| 104 | 101 | 25.000 | 0.37 | 0.37 | 0.99 | 0.37 | 0.37 | 5.0 | 5.0 | 8.6 | 3.15 | 9.89 | 5.75 | 15 | 2.00 | 16.75 | 17.25 | 17.23 | 17.96 | 19.75 | 20.00 | RL 5-27 - TEE |
| 105 | 100 | 25.000 | 0.37 | 0.37 | 0.99 | 0.37 | 0.37 | 5.0 | 5.0 | 8.6 | 3.15 | 12.20 | 6.34 | 15 | 3.04 | 16.49 | 17.25 | 16.92 | 17.96 | 19.75 | 20.00 | RL 5-28 - TEE |
| 106 | 97 | 25.000 | 0.42 | 0.42 | 0.99 | 0.42 | 0.42 | 5.0 | 5.0 | 8.6 | 3.57 | 21.26 | 3.73 | 15 | 9.24 | 14.94 | 17.25 | 16.99 | 18.01 | 19.75 | 20.00 | RL 5-30 - TEE |
| 107 | End | 182.617 | 0.00 | 3.33 | 0.00 | 0.00 | 3.30 | 0.0 | 7.3 | 7.8 | 25.68 | 33.37 | 5.56 | 30 | 0.56 | 13.00 | 14.03 | 15.62 | 16.11 | 16.50 | 19.75 | MH 1431-EW 143 |
| 108 | 107 | 50.010 | 0.00 | 2.22 | 0.00 | 0.00 | 2.20 | 0.0 | 7.1 | 7.8 | 17.23 | 17.32 | 5.48 | 24 | 0.50 | 14.53 | 14.78 | 16.65 | 16.90 | 19.75 | 19.75 | MH 1432-MH 143 |
| 109 | 108 | 52.000 | 0.00 | 1.85 | 0.00 | 0.00 | 1.83 | 0.0 | 6.9 | 7.9 | 14.46 | 17.33 | 4.60 | 24 | 0.50 | 14.78 | 15.04 | 17.36 | 17.54 | 19.75 | 19.75 | MH 1432-MH 143 |
| 110 | 109 | 50.000 | 0.00 | 1.48 | 0.00 | 0.00 | 1.47 | 0.0 | 6.7 | 8.0 | 11.67 | 17.33 | 3.72 | 24 | 0.50 | 15.04 | 15.29 | 17.87 | 17.99 | 19.75 | 19.75 | MH 1432-MH 143 |

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Project File: Building 5 Storm.stm | Number of lines: 177 | Run Date: 9/12/2022

NOTES:Intensity = 48.38 / (Inlet time + 9.10) ^ 0.65; Return period =Yrs. 100 ; c = cir e = ellip b = box

# Storm Sewer Tabulation



| Station | | Len | Drng Area | | Rnoff coeff | Area x C | | Tc | | Rain (I) | Total flow | Cap full | Vel | Pipe | | Invert Elev | | HGL Elev | | Grnd / Rim Elev | | Line ID |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Line | To Line | (ft) | Incr (ac) | Total (ac) | (C) | Incr | Total | Inlet (min) | Syst (min) | (in/hr) | (cfs) | (cfs) | (ft/s) | Size (in) | Slope (%) | Dn (ft) | Up (ft) | Dn (ft) | Up (ft) | Dn (ft) | Up (ft) | |
| 111 | 110 | 50.022 | 0.00 | 1.11 | 0.00 | 0.00 | 1.10 | 0.0 | 6.4 | 8.1 | 8.86 | 17.32 | 2.82 | 24 | 0.50 | 15.49 | 15.74 | 18.20 | 18.27 | 19.75 | 19.75 | MH 1433-MH 143 |
| 112 | 111 | 52.000 | 0.00 | 0.74 | 0.00 | 0.00 | 0.73 | 0.0 | 6.0 | 8.2 | 6.02 | 17.33 | 1.92 | 24 | 0.50 | 15.74 | 16.00 | 18.39 | 18.42 | 19.75 | 19.75 | MH 1433-MH 143 |
| 113 | 112 | 50.000 | 0.00 | 0.37 | 0.00 | 0.00 | 0.37 | 0.0 | 5.1 | 8.5 | 3.12 | 17.33 | 0.99 | 24 | 0.50 | 16.00 | 16.25 | 18.48 | 18.49 | 19.75 | 19.75 | MH 1433-MH 143 |
| 114 | 113 | 23.000 | 0.37 | 0.37 | 0.99 | 0.37 | 0.37 | 5.0 | 5.0 | 8.6 | 3.15 | 7.29 | 2.56 | 15 | 1.09 | 17.00 | 17.25 | 18.50 | 18.55 | 19.75 | 20.00 | RL 5-39 - MH 143 |
| 115 | 107 | 50.015 | 0.00 | 0.74 | 0.00 | 0.00 | 0.73 | 0.0 | 6.0 | 8.2 | 6.02 | 17.32 | 4.51 | 24 | 0.50 | 15.75 | 16.00 | 16.65 | 16.87 | 19.75 | 19.75 | MH 1434-MH 143 |
| 116 | 115 | 50.000 | 0.00 | 0.37 | 0.00 | 0.00 | 0.37 | 0.0 | 5.1 | 8.5 | 3.12 | 17.33 | 3.09 | 24 | 0.50 | 16.00 | 16.25 | 16.87 | 16.87 | 19.75 | 19.75 | MH 1434-MH 143 |
| 117 | 116 | 22.167 | 0.37 | 0.37 | 0.99 | 0.37 | 0.37 | 5.0 | 5.0 | 8.6 | 3.15 | 7.43 | 5.07 | 15 | 1.13 | 17.00 | 17.25 | 17.57 | 17.96 | 19.75 | 20.00 | RL 5-47 - MH 143 |
| 118 | 107 | 22.999 | 0.37 | 0.37 | 0.99 | 0.37 | 0.37 | 5.0 | 5.0 | 8.6 | 3.15 | 7.29 | 5.03 | 15 | 1.09 | 17.00 | 17.25 | 17.57 | 17.96 | 19.75 | 20.00 | RL 5-45 - MH 143 |
| 119 | 110 | 23.000 | 0.37 | 0.37 | 0.99 | 0.37 | 0.37 | 5.0 | 5.0 | 8.6 | 3.15 | 7.29 | 3.47 | 15 | 1.09 | 17.00 | 17.25 | 18.20 | 17.96 | 19.75 | 20.00 | RL 5-42 - MH 143 |
| 120 | 112 | 25.000 | 0.37 | 0.37 | 0.99 | 0.37 | 0.37 | 5.0 | 5.0 | 8.6 | 3.15 | 9.89 | 2.56 | 15 | 2.00 | 16.75 | 17.25 | 18.48 | 18.50 | 19.75 | 20.00 | RL 5-40 - TEE |
| 121 | 115 | 23.333 | 0.37 | 0.37 | 0.99 | 0.37 | 0.37 | 5.0 | 5.0 | 8.6 | 3.15 | 10.24 | 5.84 | 15 | 2.14 | 16.75 | 17.25 | 17.23 | 17.96 | 19.75 | 20.00 | RL 5-46 - TEE |
| 122 | 111 | 25.000 | 0.37 | 0.37 | 0.99 | 0.37 | 0.37 | 5.0 | 5.0 | 8.6 | 3.15 | 12.20 | 2.59 | 15 | 3.04 | 16.49 | 17.25 | 18.39 | 18.43 | 19.75 | 20.00 | RL 5-41 - TEE |
| 123 | 109 | 25.000 | 0.37 | 0.37 | 0.99 | 0.37 | 0.37 | 5.0 | 5.0 | 8.6 | 3.15 | 20.80 | 3.45 | 15 | 8.84 | 15.04 | 17.25 | 17.87 | 17.96 | 19.75 | 20.00 | RL 5-43 - TEE |
| 124 | 108 | 25.000 | 0.37 | 0.37 | 0.99 | 0.37 | 0.37 | 5.0 | 5.0 | 8.6 | 3.15 | 21.99 | 3.45 | 15 | 9.88 | 14.78 | 17.25 | 17.36 | 17.96 | 19.75 | 20.00 | RL 5-44 - TEE |
| 125 | End | 16.672 | 0.25 | 0.25 | 0.94 | 0.24 | 0.24 | 5.0 | 5.0 | 8.6 | 2.02 | 16.48 | 4.76 | 18 | 2.10 | 15.50 | 15.85 | 15.87 | 16.39 | 18.00 | 18.85 | 1501-EW 1500 |
| 126 | End | 20.000 | 0.55 | 2.17 | 0.95 | 0.52 | 2.02 | 5.0 | 7.2 | 7.8 | 15.77 | 17.33 | 5.02 | 24 | 0.50 | 13.00 | 13.10 | 15.62 | 15.70 | 16.00 | 19.00 | 1521-EW 1520 |
| 127 | 126 | 118.534 | 0.41 | 0.41 | 0.95 | 0.39 | 0.39 | 5.0 | 5.0 | 8.6 | 3.34 | 8.03 | 3.64 | 18 | 0.50 | 15.41 | 16.00 | 16.29 | 16.70 | 19.00 | 19.00 | 1524-1521 |
| 128 | 126 | 208.467 | 0.91 | 1.21 | 0.95 | 0.86 | 1.10 | 5.0 | 6.0 | 8.2 | 9.07 | 17.31 | 2.89 | 24 | 0.50 | 13.10 | 14.14 | 16.29 | 16.57 | 19.00 | 19.07 | 1522-1521 |
| 129 | 128 | 70.000 | 0.30 | 0.30 | 0.80 | 0.24 | 0.24 | 5.0 | 5.0 | 8.6 | 2.06 | 8.04 | 1.17 | 18 | 0.50 | 14.14 | 14.49 | 16.72 | 16.74 | 19.07 | 17.63 | 1523-1522 |
| 130 | End | 22.919 | 0.20 | 0.88 | 0.99 | 0.20 | 0.86 | 5.0 | 7.4 | 7.8 | 6.64 | 67.71 | 3.44 | 24 | 7.64 | 13.00 | 14.75 | 15.62 | 15.66 | 16.00 | 19.00 | 1461-EW 1460 |
| 131 | 130 | 151.000 | 0.50 | 0.50 | 0.96 | 0.48 | 0.48 | 5.0 | 5.0 | 8.6 | 4.12 | 8.02 | 4.51 | 18 | 0.50 | 15.25 | 16.00 | 16.01 | 16.78 | 19.00 | 19.00 | 1463-1461 |
| 132 | 130 | 123.000 | 0.18 | 0.18 | 0.99 | 0.18 | 0.18 | 5.0 | 5.0 | 8.6 | 1.53 | 8.88 | 3.52 | 18 | 0.61 | 15.25 | 16.00 | 15.67 | 16.46 | 19.00 | 19.00 | 1462-1461 |

Project File: Building 5 Storm.stm | Number of lines: 177 | Run Date: 9/12/2022

NOTES:Intensity = 48.38 / (Inlet time + 9.10) ^ 0.65; Return period =Yrs. 100 ; c = cir e = ellip b = box

# Storm Sewer Tabulation



| Station | | Len | Drng Area | | Rnoff coeff | Area x C | | Tc | | Rain (I) | Total flow | Cap full | Vel | Pipe | | Invert Elev | | HGL Elev | | Grnd / Rim Elev | | Line ID |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Line | To Line | (ft) | Incr (ac) | Total (ac) | (C) | Incr | Total | Inlet (min) | Syst (min) | (in/hr) | (cfs) | (cfs) | (ft/s) | Size (in) | Slope (%) | Dn (ft) | Up (ft) | Dn (ft) | Up (ft) | Dn (ft) | Up (ft) | |
| 133 | End | 20.000 | 0.36 | 1.49 | 0.92 | 0.33 | 1.32 | 5.0 | 6.6 | 8.0 | 10.59 | 17.33 | 3.37 | 24 | 0.50 | 13.00 | 13.10 | 15.62 | 15.66 | 16.00 | 18.90 | 1531-EW 1530 |
| 134 | 133 | 163.240 | 0.67 | 1.13 | 0.92 | 0.62 | 0.99 | 5.0 | 5.6 | 8.3 | 8.30 | 17.37 | 2.64 | 24 | 0.50 | 13.10 | 13.92 | 15.75 | 15.92 | 18.90 | 19.00 | 1532-1531 |
| 135 | 134 | 68.000 | 0.46 | 0.46 | 0.82 | 0.38 | 0.38 | 5.0 | 5.0 | 8.6 | 3.24 | 8.04 | 1.83 | 18 | 0.50 | 13.92 | 14.26 | 16.08 | 16.14 | 19.00 | 17.41 | 1533-1532 |
| 136 | End | 23.367 | 0.63 | 1.83 | 0.95 | 0.60 | 1.74 | 5.0 | 7.1 | 7.9 | 13.69 | 57.79 | 5.26 | 24 | 5.56 | 13.00 | 14.30 | 15.62 | 15.63 | 16.00 | 19.00 | 1471-EW 1470 |
| 137 | 136 | 186.000 | 0.57 | 0.57 | 0.96 | 0.55 | 0.55 | 5.0 | 5.0 | 8.6 | 4.70 | 17.97 | 3.42 | 24 | 0.54 | 14.50 | 15.50 | 15.63 | 16.26 | 19.00 | 19.00 | 1473-1471 |
| 138 | 136 | 186.000 | 0.63 | 0.63 | 0.95 | 0.60 | 0.60 | 5.0 | 5.0 | 8.6 | 5.14 | 17.97 | 3.60 | 24 | 0.54 | 14.50 | 15.50 | 15.63 | 16.30 | 19.00 | 19.00 | 1472-1471 |
| 139 | End | 19.604 | 0.44 | 2.11 | 0.99 | 0.44 | 2.06 | 5.0 | 7.9 | 7.6 | 15.68 | 27.11 | 4.99 | 24 | 1.22 | 13.00 | 13.24 | 15.62 | 15.70 | 16.00 | 17.60 | 1371-EW 1370 |
| 140 | 139 | 96.000 | 0.59 | 0.79 | 0.97 | 0.57 | 0.76 | 5.0 | 7.4 | 7.7 | 5.90 | 11.38 | 3.34 | 18 | 1.00 | 13.44 | 14.40 | 16.28 | 16.54 | 17.60 | 17.60 | 1374-1371 |
| 141 | 140 | 134.086 | 0.20 | 0.20 | 0.95 | 0.19 | 0.19 | 5.0 | 5.0 | 8.6 | 1.63 | 14.74 | 2.14 | 18 | 1.68 | 14.60 | 16.85 | 16.75 | 17.33 | 17.60 | 19.85 | 1375-1374 |
| 142 | 139 | 96.000 | 0.44 | 0.88 | 0.99 | 0.44 | 0.86 | 5.0 | 5.8 | 8.3 | 7.15 | 8.04 | 4.05 | 18 | 0.50 | 13.44 | 13.92 | 16.28 | 16.66 | 17.60 | 17.60 | 1372-1371 |
| 143 | 142 | 96.000 | 0.44 | 0.44 | 0.97 | 0.43 | 0.43 | 5.0 | 5.0 | 8.6 | 3.66 | 8.04 | 2.07 | 18 | 0.50 | 14.12 | 14.60 | 16.78 | 16.88 | 17.60 | 17.60 | 1373-1372 |
| 144 | End | 18.456 | 0.34 | 1.42 | 0.95 | 0.32 | 1.38 | 5.0 | 7.0 | 7.9 | 10.91 | 28.52 | 3.47 | 24 | 1.35 | 13.00 | 13.25 | 15.62 | 15.66 | 16.00 | 17.60 | 1341-EW 1340 |
| 145 | 144 | 109.685 | 0.20 | 0.20 | 0.95 | 0.19 | 0.19 | 5.0 | 5.0 | 8.6 | 1.63 | 16.29 | 2.17 | 18 | 2.05 | 14.60 | 16.85 | 15.93 | 17.33 | 17.60 | 19.85 | 1344-1341 |
| 146 | 144 | 93.529 | 0.44 | 0.88 | 0.99 | 0.44 | 0.87 | 5.0 | 5.8 | 8.3 | 7.23 | 8.06 | 4.09 | 18 | 0.50 | 13.45 | 13.92 | 15.93 | 16.31 | 17.60 | 17.60 | 1342-1341 |
| 147 | 146 | 96.000 | 0.44 | 0.44 | 0.99 | 0.44 | 0.44 | 5.0 | 5.0 | 8.6 | 3.74 | 8.04 | 2.12 | 18 | 0.50 | 14.12 | 14.60 | 16.44 | 16.54 | 17.60 | 17.60 | 1343-1342 |
| 148 | End | 19.714 | 0.44 | 2.02 | 0.99 | 0.44 | 1.97 | 5.0 | 8.2 | 7.5 | 14.82 | 27.04 | 4.72 | 24 | 1.22 | 13.00 | 13.24 | 15.62 | 15.69 | 16.00 | 17.60 | 1331-EW 1330 |
| 149 | 148 | 96.000 | 0.51 | 0.70 | 0.98 | 0.50 | 0.67 | 5.0 | 7.7 | 7.7 | 5.16 | 8.04 | 2.92 | 18 | 0.50 | 13.92 | 14.40 | 16.21 | 16.41 | 17.60 | 17.60 | 1334-1331 |
| 150 | 149 | 134.156 | 0.19 | 0.19 | 0.91 | 0.17 | 0.17 | 5.0 | 5.0 | 8.6 | 1.48 | 13.54 | 2.05 | 18 | 1.42 | 14.60 | 16.50 | 16.57 | 16.96 | 17.60 | 19.50 | 1335-1334 |
| 151 | 148 | 96.000 | 0.44 | 0.88 | 0.99 | 0.44 | 0.86 | 5.0 | 5.8 | 8.3 | 7.15 | 8.04 | 4.05 | 18 | 0.50 | 13.44 | 13.92 | 16.21 | 16.59 | 17.60 | 17.60 | 1332-1331 |
| 152 | 151 | 96.000 | 0.44 | 0.44 | 0.97 | 0.43 | 0.43 | 5.0 | 5.0 | 8.6 | 3.66 | 8.04 | 2.07 | 18 | 0.50 | 14.12 | 14.60 | 16.71 | 16.81 | 17.60 | 17.60 | 1333-1332 |
| 153 | End | 19.650 | 0.37 | 0.37 | 0.92 | 0.34 | 0.34 | 5.0 | 5.0 | 8.6 | 2.92 | 18.15 | 3.03 | 18 | 2.54 | 14.50 | 15.00 | 15.62 | 15.65 | 17.00 | 18.00 | 1481-EW 1480 |
| 154 | End | 19.704 | 0.44 | 1.75 | 0.99 | 0.44 | 1.73 | 5.0 | 6.2 | 8.2 | 14.12 | 27.04 | 4.50 | 24 | 1.22 | 13.00 | 13.24 | 15.62 | 15.69 | 16.00 | 17.60 | 1321-EW 1320 |

Project File: Building 5 Storm.stm | Number of lines: 177 | Run Date: 9/12/2022

NOTES:Intensity = 48.38 / (Inlet time + 9.10) ^ 0.65; Return period =Yrs. 100 ; c = cir e = ellip b = box

# Storm Sewer Tabulation



| Station | | Len | Drng Area | | Rnoff coeff | Area x C | | Tc | | Rain (I) | Total flow | Cap full | Vel | Pipe | | Invert Elev | | HGL Elev | | Grnd / Rim Elev | | Line ID |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Line | To Line | (ft) | Incr (ac) | Total (ac) | (C) | Incr | Total | Inlet (min) | Syst (min) | (in/hr) | (cfs) | (cfs) | (ft/s) | Size (in) | Slope (%) | Dn (ft) | Up (ft) | Dn (ft) | Up (ft) | Dn (ft) | Up (ft) | |
| 155 | 154 | 96.000 | 0.44 | 0.44 | 0.99 | 0.44 | 0.44 | 5.0 | 5.0 | 8.6 | 3.74 | 8.04 | 2.12 | 18 | 0.50 | 14.12 | 14.60 | 16.39 | 16.49 | 17.60 | 17.60 | 1324-1321 |
| 156 | 154 | 96.000 | 0.44 | 0.87 | 0.99 | 0.44 | 0.86 | 5.0 | 5.8 | 8.3 | 7.14 | 8.04 | 4.04 | 18 | 0.50 | 13.44 | 13.92 | 16.39 | 16.77 | 17.60 | 17.60 | 1322-1321 |
| 157 | 156 | 96.000 | 0.43 | 0.43 | 0.99 | 0.43 | 0.43 | 5.0 | 5.0 | 8.6 | 3.66 | 8.04 | 2.07 | 18 | 0.50 | 14.12 | 14.60 | 16.90 | 16.99 | 17.60 | 17.60 | 1323-1322 |
| 158 | End | 19.606 | 0.44 | 1.76 | 0.99 | 0.44 | 1.73 | 5.0 | 6.2 | 8.2 | 14.14 | 27.11 | 4.50 | 24 | 1.22 | 13.00 | 13.24 | 15.62 | 15.69 | 16.00 | 17.60 | 1351-EW 1350 |
| 159 | 158 | 96.000 | 0.44 | 0.88 | 0.98 | 0.43 | 0.86 | 5.0 | 5.8 | 8.3 | 7.15 | 8.04 | 4.05 | 18 | 0.50 | 13.44 | 13.92 | 16.15 | 16.53 | 17.60 | 17.60 | 1352-1351 |
| 160 | 159 | 96.000 | 0.44 | 0.44 | 0.98 | 0.43 | 0.43 | 5.0 | 5.0 | 8.6 | 3.70 | 8.04 | 2.10 | 18 | 0.50 | 14.12 | 14.60 | 16.66 | 16.76 | 17.60 | 17.60 | 1353-1352 |
| 161 | 158 | 96.000 | 0.44 | 0.44 | 0.99 | 0.44 | 0.44 | 5.0 | 5.0 | 8.6 | 3.74 | 8.04 | 2.12 | 18 | 0.50 | 14.12 | 14.60 | 16.15 | 16.26 | 17.60 | 17.60 | 1354-1351 |
| 162 | End | 19.636 | 0.44 | 1.75 | 0.99 | 0.44 | 1.73 | 5.0 | 6.2 | 8.2 | 14.12 | 27.09 | 4.50 | 24 | 1.22 | 13.00 | 13.24 | 15.62 | 15.69 | 16.00 | 17.60 | 1361-EW 1360 |
| 163 | 162 | 96.000 | 0.44 | 0.87 | 0.99 | 0.44 | 0.86 | 5.0 | 5.8 | 8.3 | 7.14 | 8.04 | 4.04 | 18 | 0.50 | 13.44 | 13.92 | 16.39 | 16.77 | 17.60 | 17.60 | 1362-1361 |
| 164 | 163 | 96.000 | 0.43 | 0.43 | 0.99 | 0.43 | 0.43 | 5.0 | 5.0 | 8.6 | 3.66 | 8.04 | 2.07 | 18 | 0.50 | 14.12 | 14.60 | 16.89 | 16.99 | 17.60 | 17.60 | 1363-1362 |
| 165 | 162 | 96.000 | 0.44 | 0.44 | 0.99 | 0.44 | 0.44 | 5.0 | 5.0 | 8.6 | 3.74 | 8.04 | 2.12 | 18 | 0.50 | 14.12 | 14.60 | 16.39 | 16.49 | 17.60 | 17.60 | 1364-1361 |
| 166 | End | 19.688 | 0.44 | 1.76 | 0.99 | 0.44 | 1.73 | 5.0 | 6.2 | 8.2 | 14.14 | 27.05 | 4.50 | 24 | 1.22 | 13.00 | 13.24 | 15.62 | 15.69 | 16.00 | 17.60 | 1311-EW 1310 |
| 167 | 166 | 96.000 | 0.44 | 0.88 | 0.98 | 0.43 | 0.86 | 5.0 | 5.8 | 8.3 | 7.15 | 8.04 | 4.05 | 18 | 0.50 | 13.44 | 13.92 | 16.39 | 16.77 | 17.60 | 17.60 | 1312-1311 |
| 168 | 167 | 96.000 | 0.44 | 0.44 | 0.98 | 0.43 | 0.43 | 5.0 | 5.0 | 8.6 | 3.70 | 8.04 | 2.10 | 18 | 0.50 | 14.12 | 14.60 | 16.90 | 17.00 | 17.60 | 17.60 | 1313-1312 |
| 169 | 166 | 96.000 | 0.44 | 0.44 | 0.99 | 0.44 | 0.44 | 5.0 | 5.0 | 8.6 | 3.74 | 8.04 | 2.12 | 18 | 0.50 | 14.12 | 14.60 | 16.39 | 16.50 | 17.60 | 17.60 | 1314-1311 |
| 170 | End | 19.674 | 0.44 | 1.19 | 0.99 | 0.44 | 1.17 | 5.0 | 6.1 | 8.2 | 9.54 | 43.50 | 3.04 | 24 | 3.15 | 13.00 | 13.62 | 15.62 | 15.65 | 16.00 | 17.60 | 1301-EW 1300 |
| 171 | 170 | 96.000 | 0.44 | 0.44 | 0.99 | 0.44 | 0.44 | 5.0 | 5.0 | 8.6 | 3.74 | 8.04 | 2.17 | 18 | 0.50 | 14.12 | 14.60 | 15.86 | 15.95 | 17.60 | 17.60 | 1303-1301 |
| 172 | 170 | 93.433 | 0.31 | 0.31 | 0.95 | 0.29 | 0.29 | 5.0 | 5.0 | 8.6 | 2.53 | 8.15 | 1.49 | 18 | 0.51 | 14.12 | 14.60 | 15.86 | 15.90 | 17.60 | 17.60 | 1302-1301 |
| 173 | End | 20.071 | 0.25 | 0.63 | 0.94 | 0.24 | 0.54 | 5.0 | 6.2 | 8.2 | 4.36 | 21.99 | 2.47 | 18 | 3.74 | 13.00 | 13.75 | 15.62 | 15.65 | 15.50 | 18.60 | 1511-EW 1510 |
| 174 | 173 | 101.222 | 0.38 | 0.38 | 0.79 | 0.30 | 0.30 | 5.0 | 5.0 | 8.6 | 2.58 | 10.42 | 1.74 | 18 | 0.84 | 13.95 | 14.80 | 15.78 | 15.81 | 18.60 | 17.80 | 1512-1511 |
| 175 | End | 62.635 | 0.20 | 0.20 | 0.95 | 0.19 | 0.19 | 5.0 | 5.0 | 8.6 | 1.63 | 26.89 | 2.14 | 18 | 5.59 | 13.00 | 16.50 | 15.62 | 16.98 | 15.50 | 19.50 | 1491-EW 1490 |
| 176 | End | 85.000 | 0.82 | 0.82 | 0.87 | 0.71 | 0.71 | 5.0 | 5.0 | 8.6 | 6.13 | 17.45 | 5.14 | 18 | 2.35 | 13.00 | 15.00 | 13.96 | 15.96 | 15.07 | 18.00 | 1951-EW 1950 |

Project File: Building 5 Storm.stm | Number of lines: 177 | Run Date: 9/12/2022

NOTES:Intensity = 48.38 / (Inlet time + 9.10) ^ 0.65; Return period =Yrs. 100 ; c = cir e = ellip b = box

# Storm Sewer Tabulation

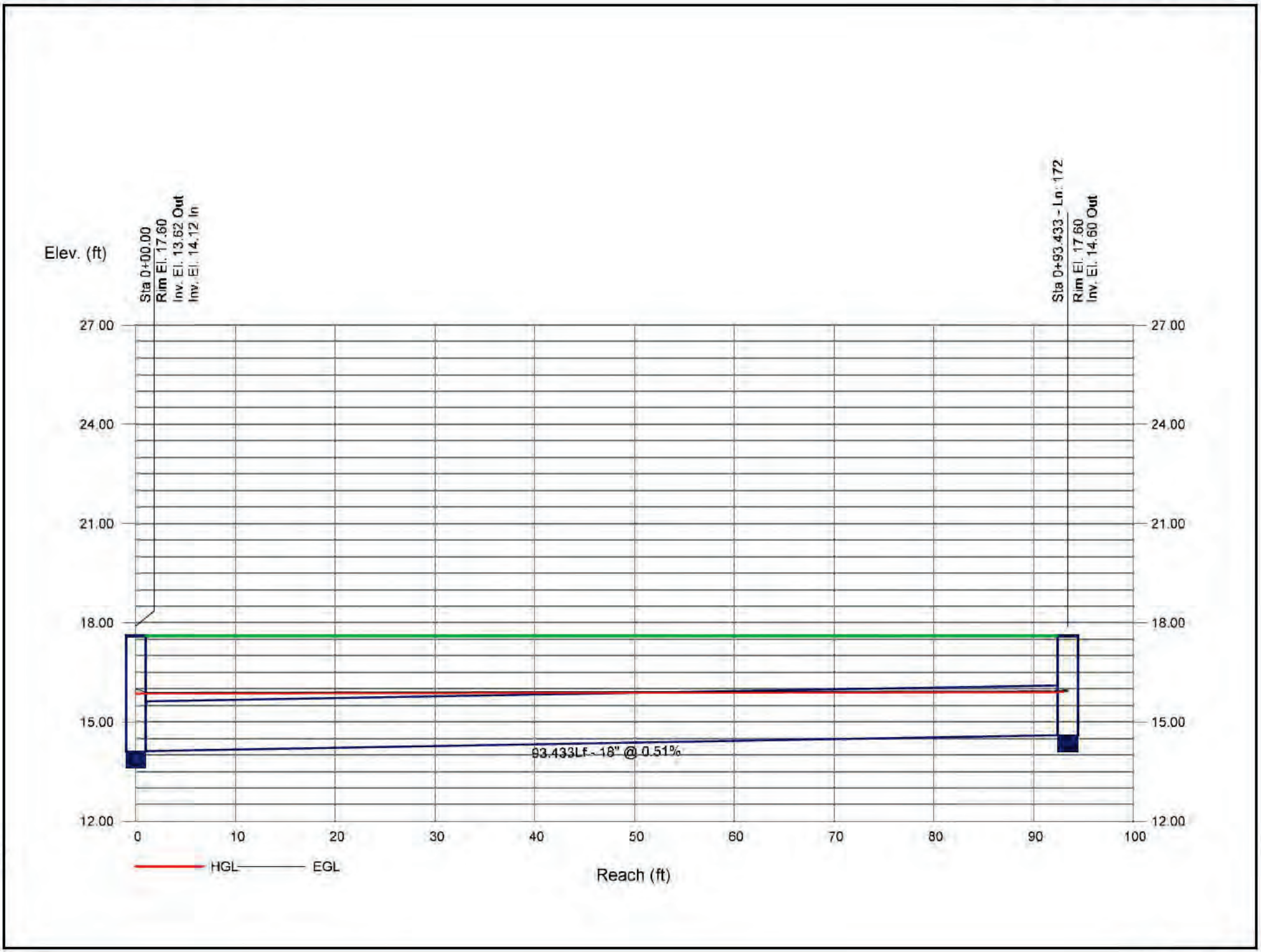
| Station | | Len | Drng Area | | Rnoff coeff | Area x C | | Tc | | Rain (I) | Total flow | Cap full | Vel | Pipe | | Invert Elev | | HGL Elev | | Grnd / Rim Elev | | Line ID |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Line | To Line | (ft) | Incr (ac) | Total (ac) | (C) | Incr | Total | Inlet (min) | Syst (min) | (in/hr) | (cfs) | (cfs) | (ft/s) | Size (in) | Slope (%) | Dn (ft) | Up (ft) | Dn (ft) | Up (ft) | Dn (ft) | Up (ft) | |
| 177 | End | 85.000 | 0.82 | 0.82 | 0.87 | 0.71 | 0.71 | 5.0 | 5.0 | 8.6 | 6.13 | 17.45 | 5.14 | 18 | 2.35 | 13.00 | 15.00 | 13.96 | 15.96 | 15.07 | 18.00 | 1961-EW 1960 |

Project File: Building 5 Storm.stm | Number of lines: 177 | Run Date: 9/12/2022

NOTES:Intensity = 48.38 / (Inlet time + 9.10) ^ 0.65; Return period =Yrs. 100 ; c = cir e = ellip b = box

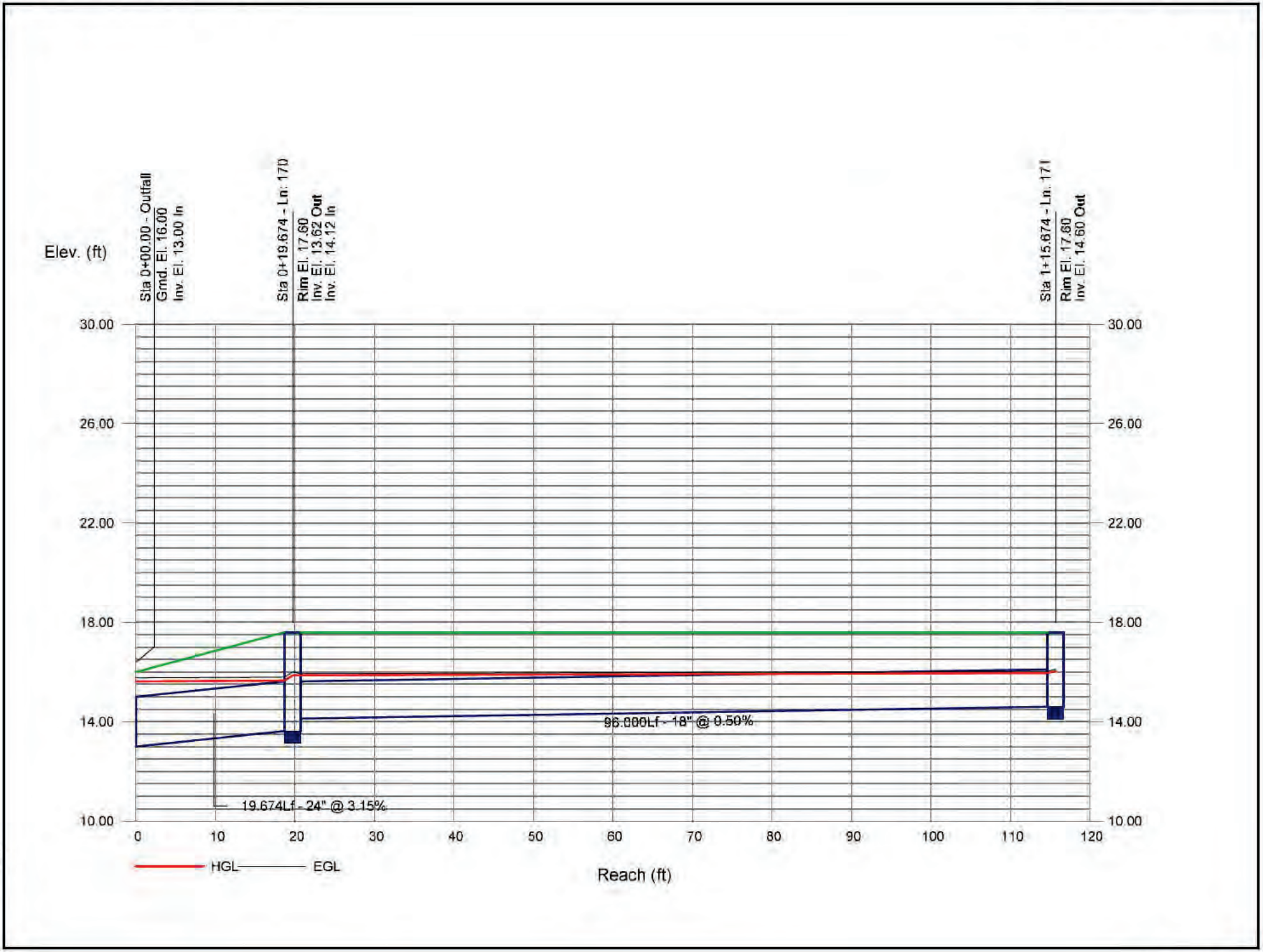
# Storm Sewer Profile

Proj. file: Building 5 Storm.stm



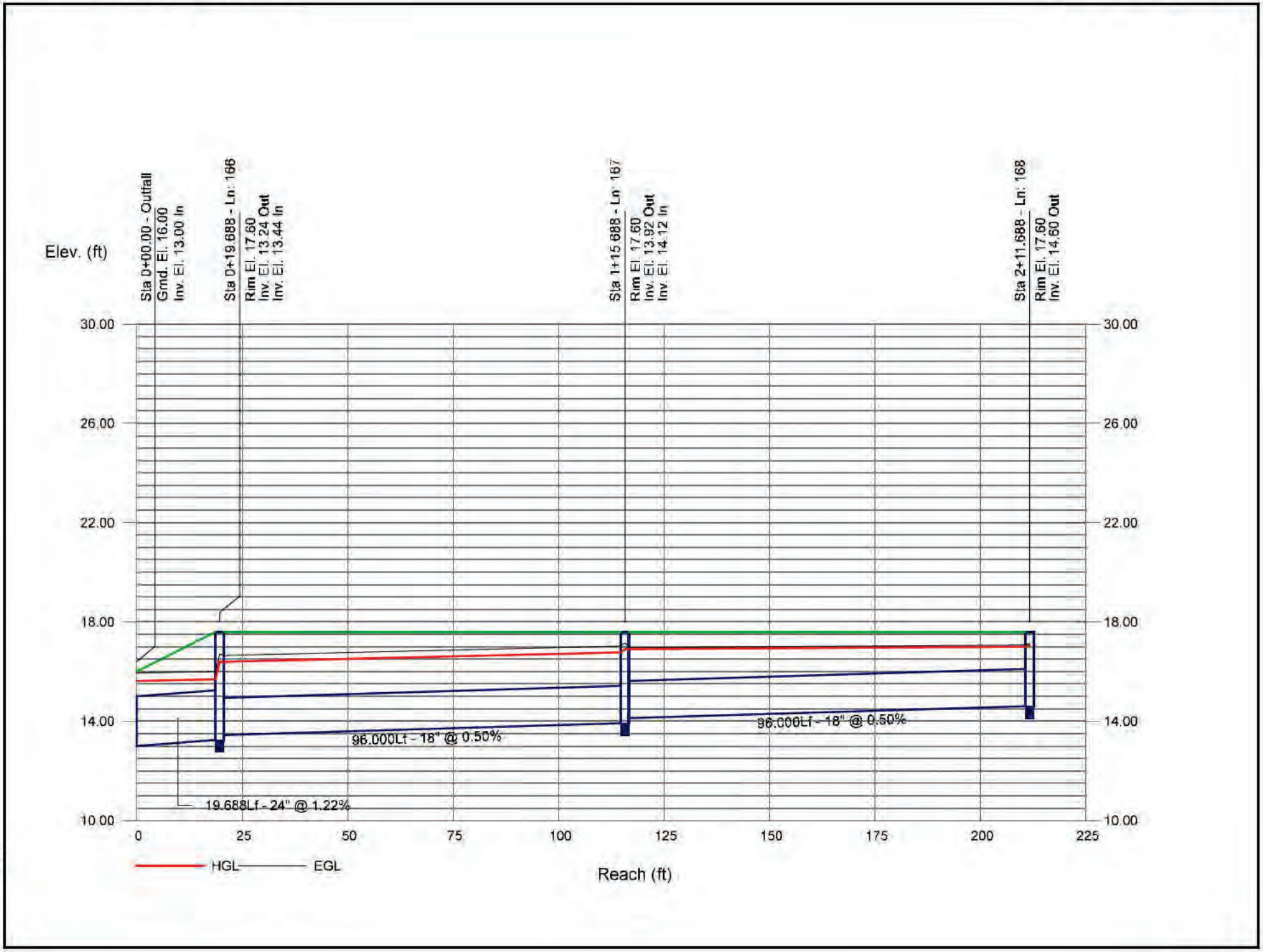
# Storm Sewer Profile

Proj. file: Building 5 Storm.stm



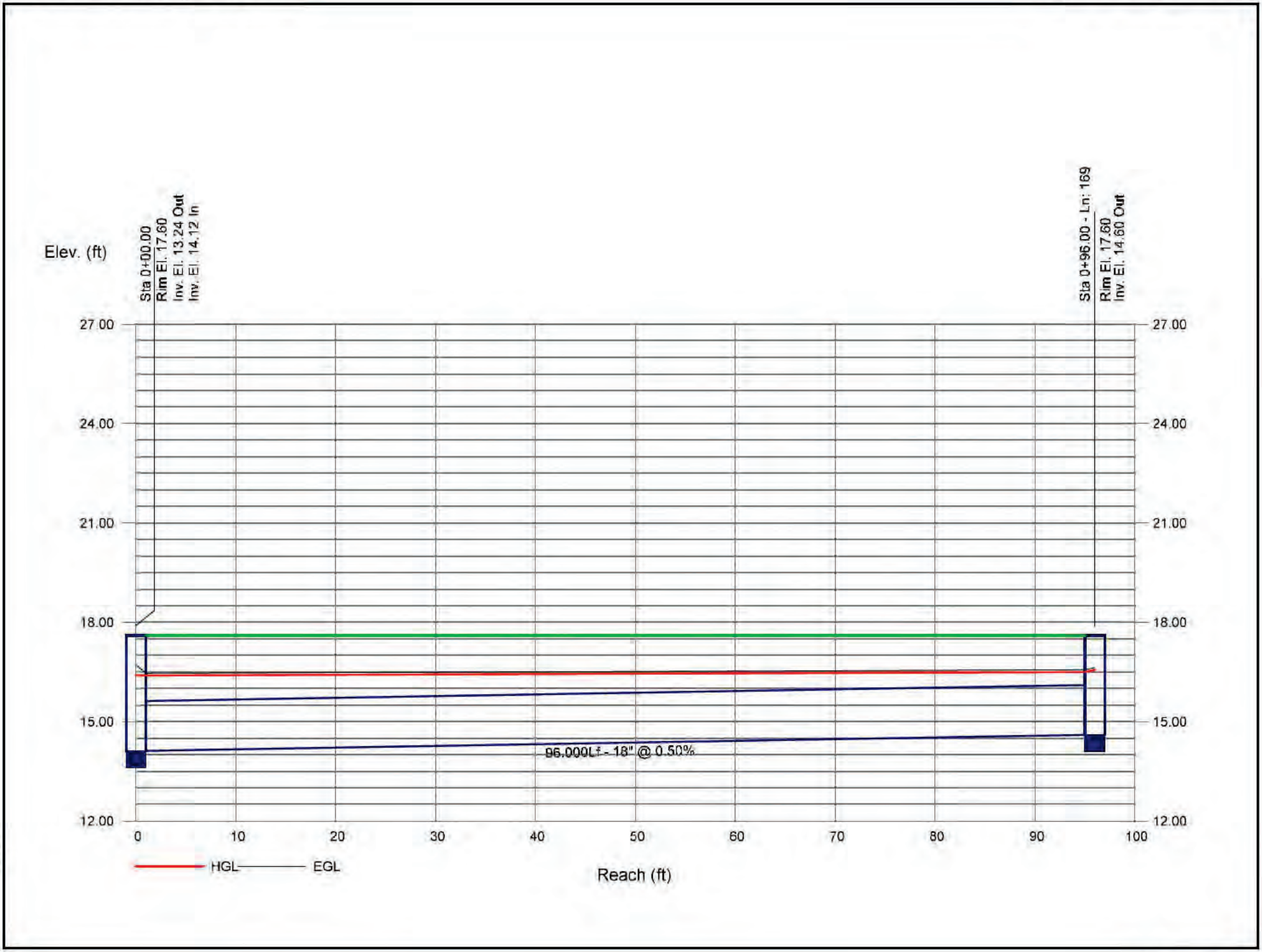
# Storm Sewer Profile

Proj. file: Building 5 Storm.stm



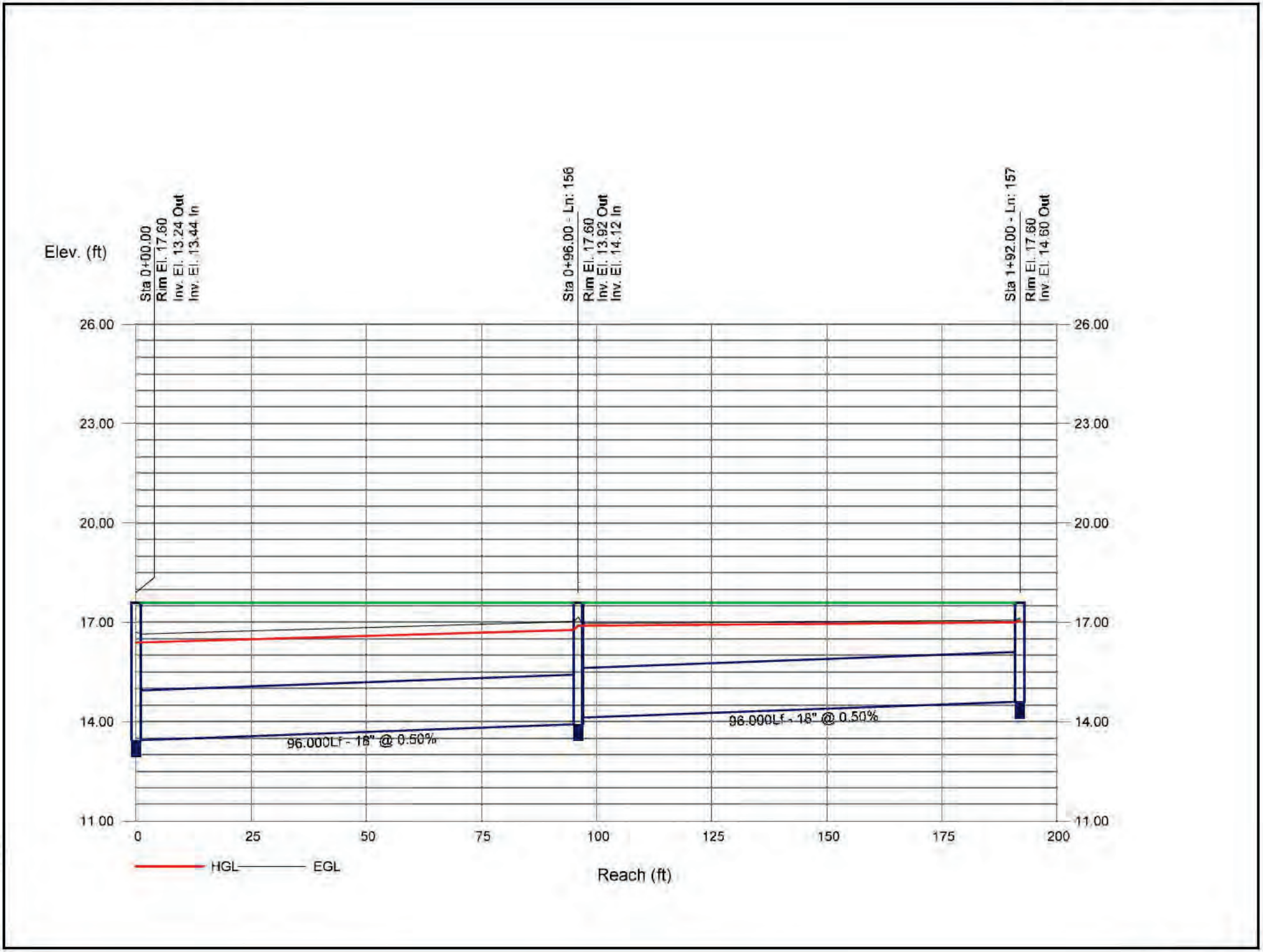
# Storm Sewer Profile

Proj. file: Building 5 Storm.stm



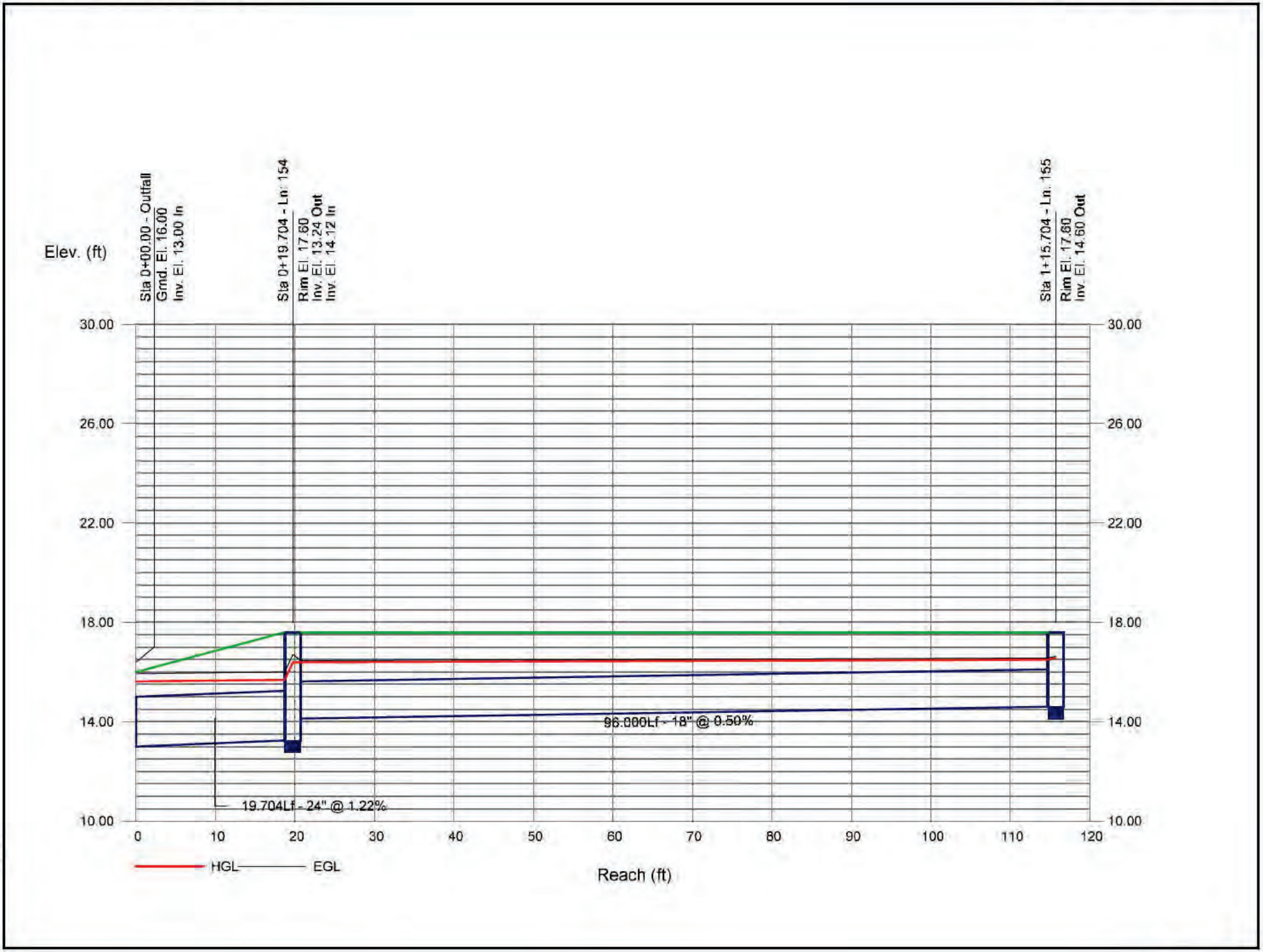
# Storm Sewer Profile

Proj. file: Building 5 Storm.stm



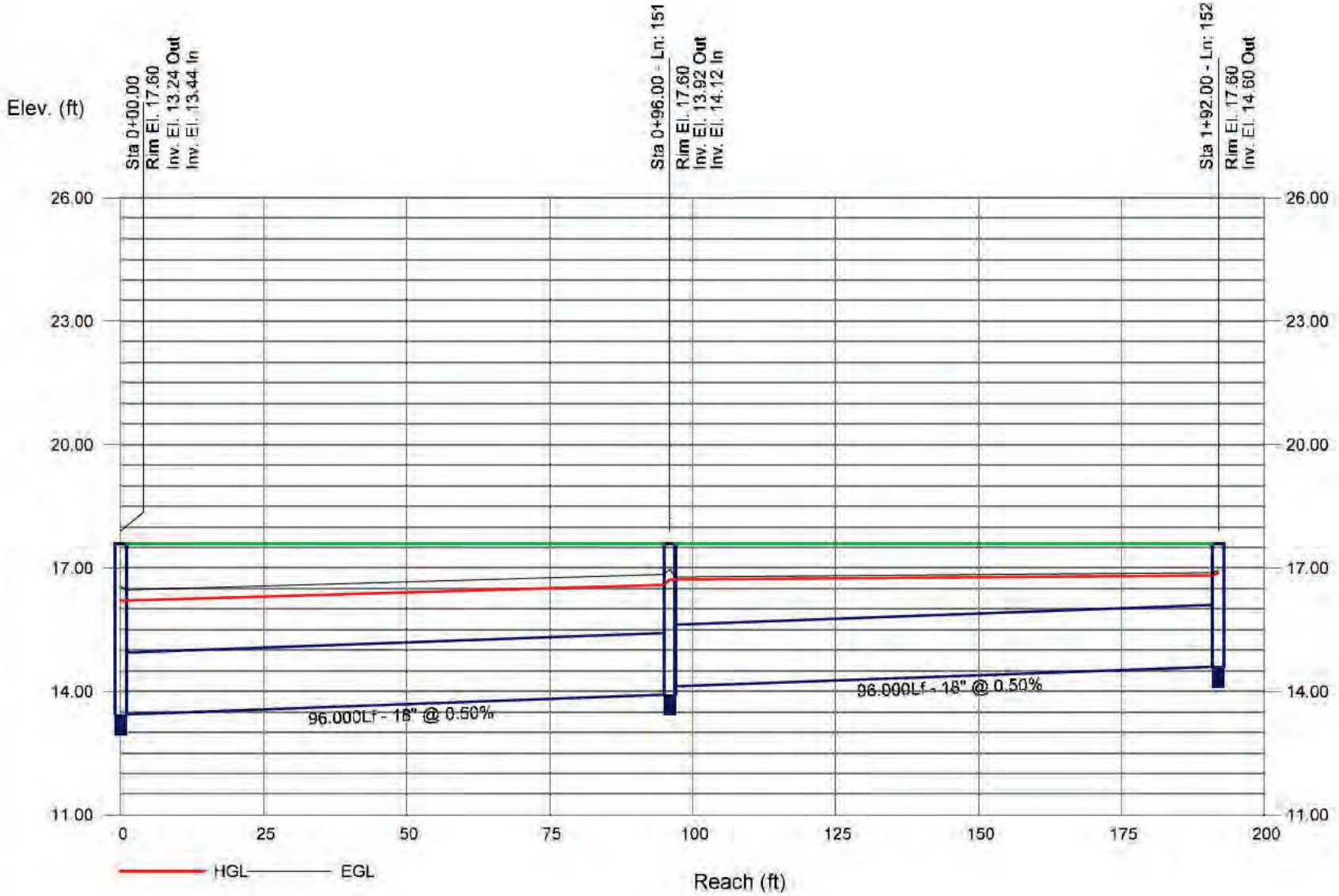
# Storm Sewer Profile

Proj. file: Building 5 Storm.stm



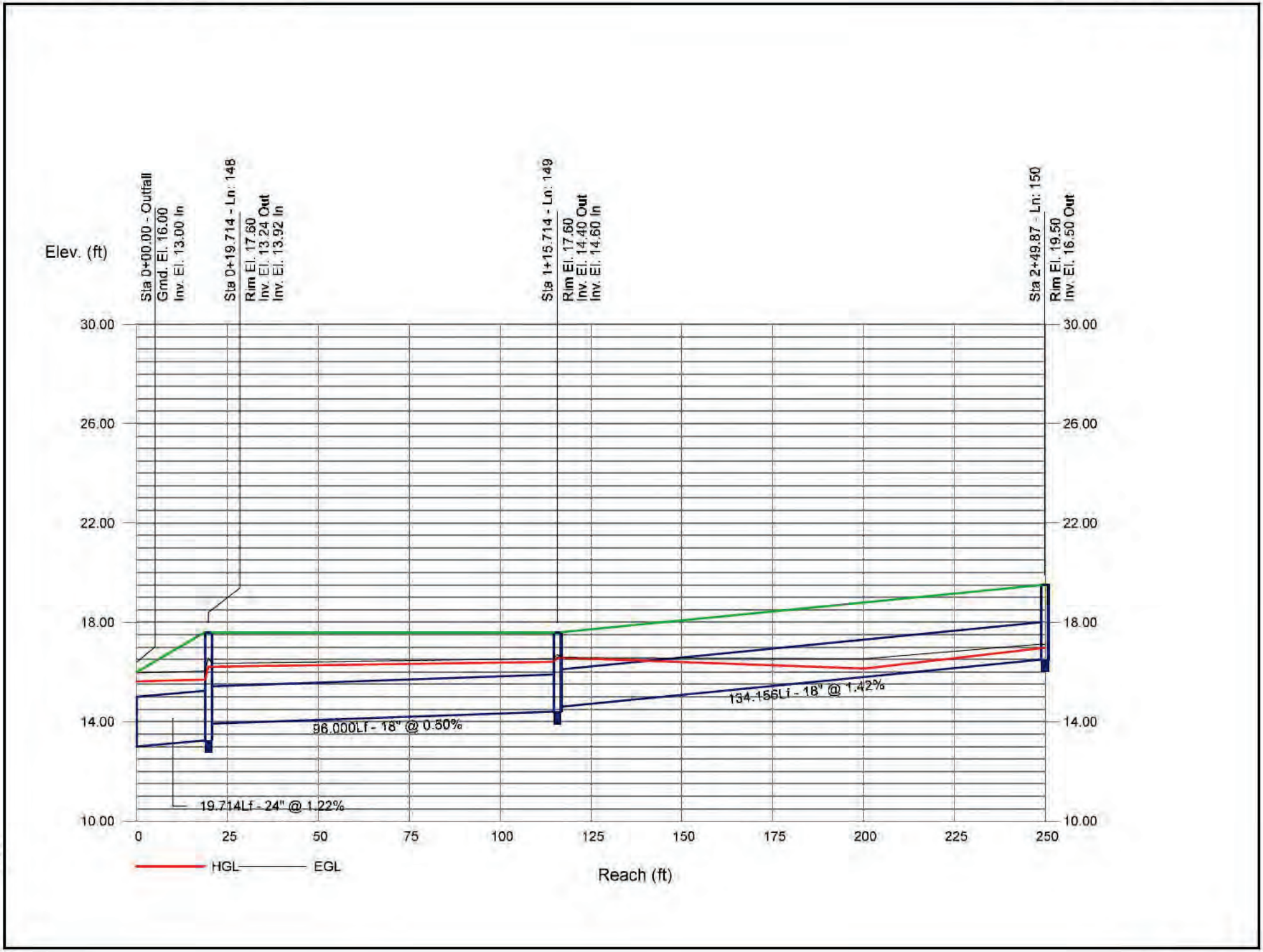
# Storm Sewer Profile

Proj. file: Building 5 Storm.stm



# Storm Sewer Profile

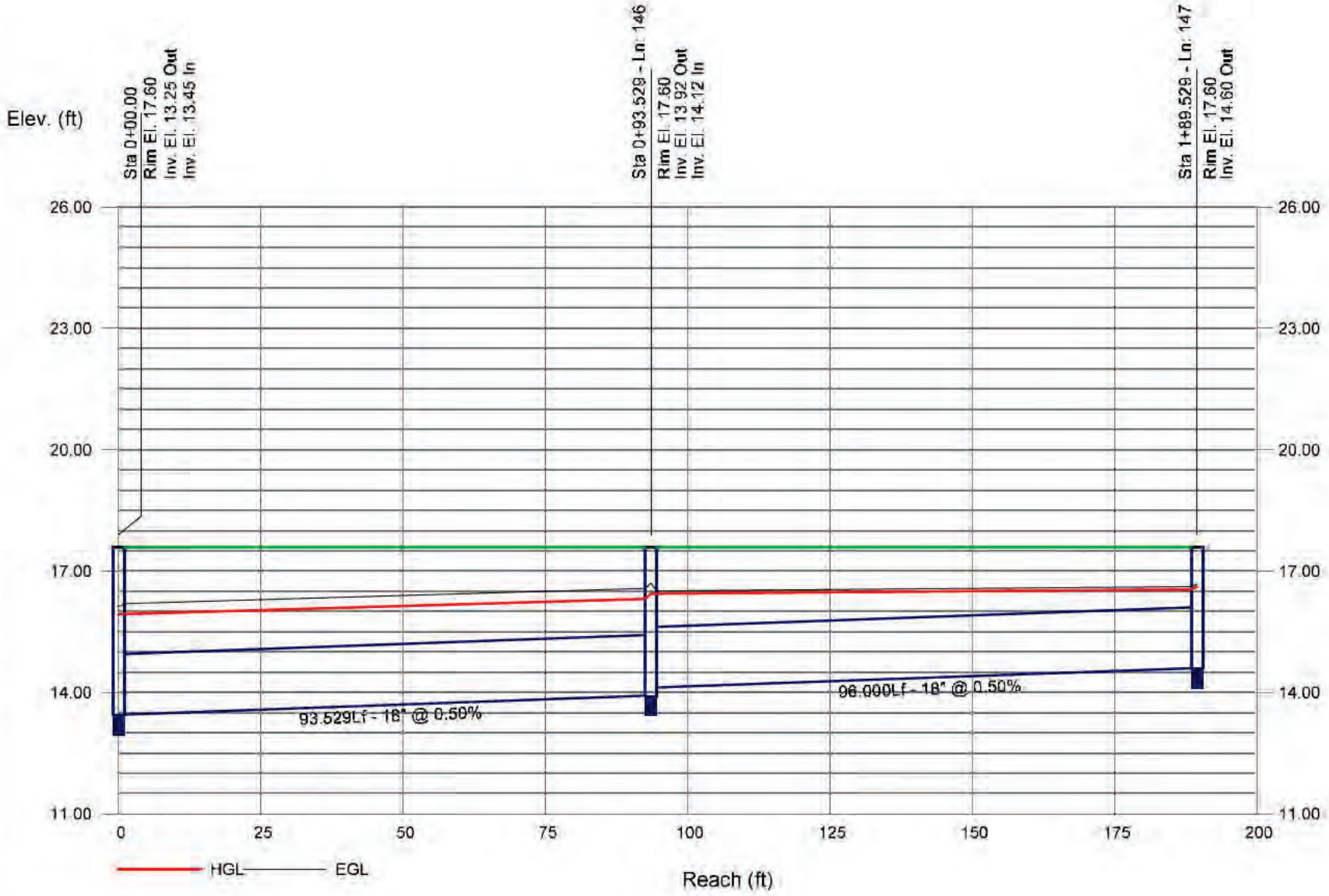
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-704-

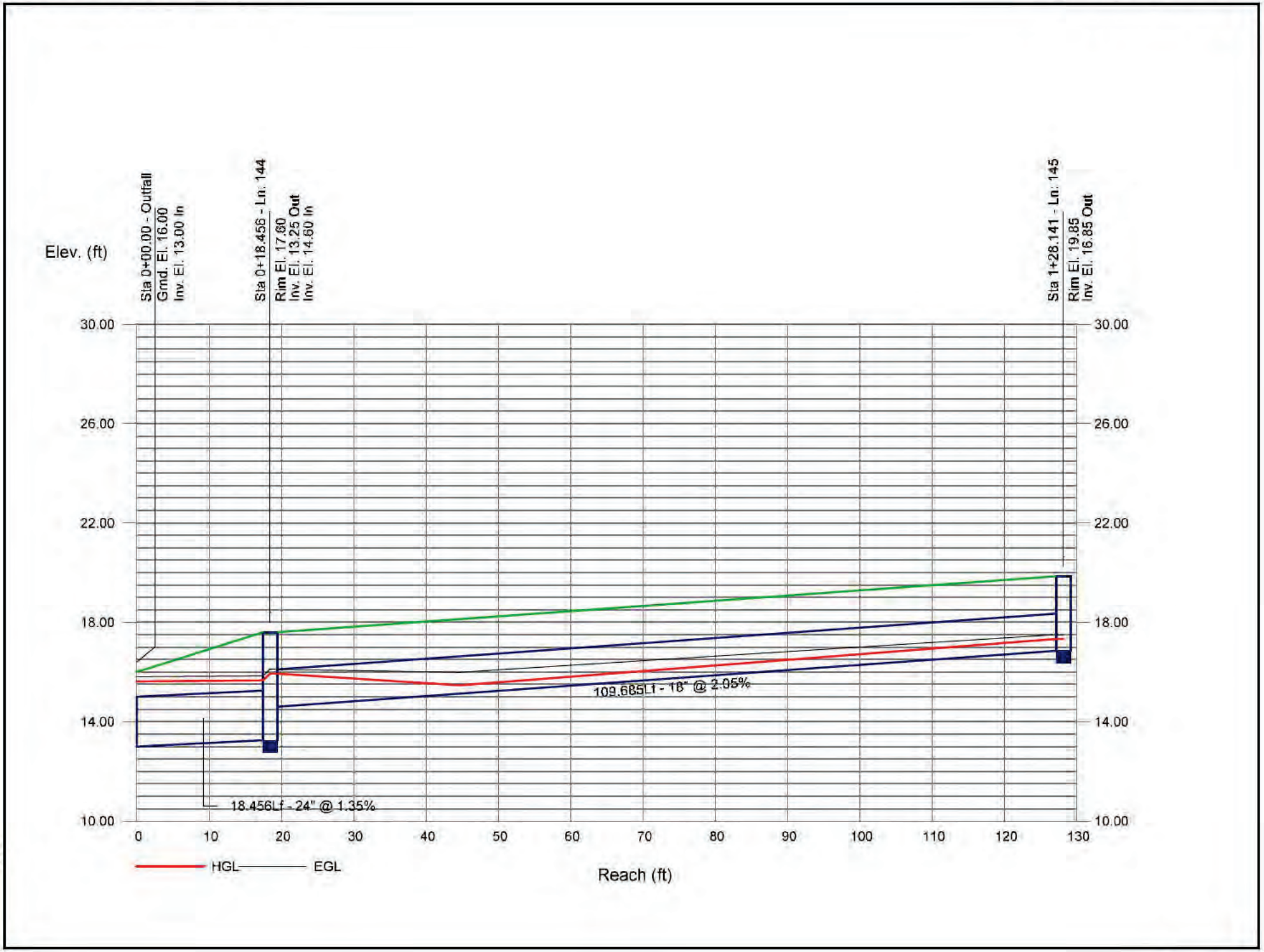
# Storm Sewer Profile

Proj. file: Building 5 Storm.stm



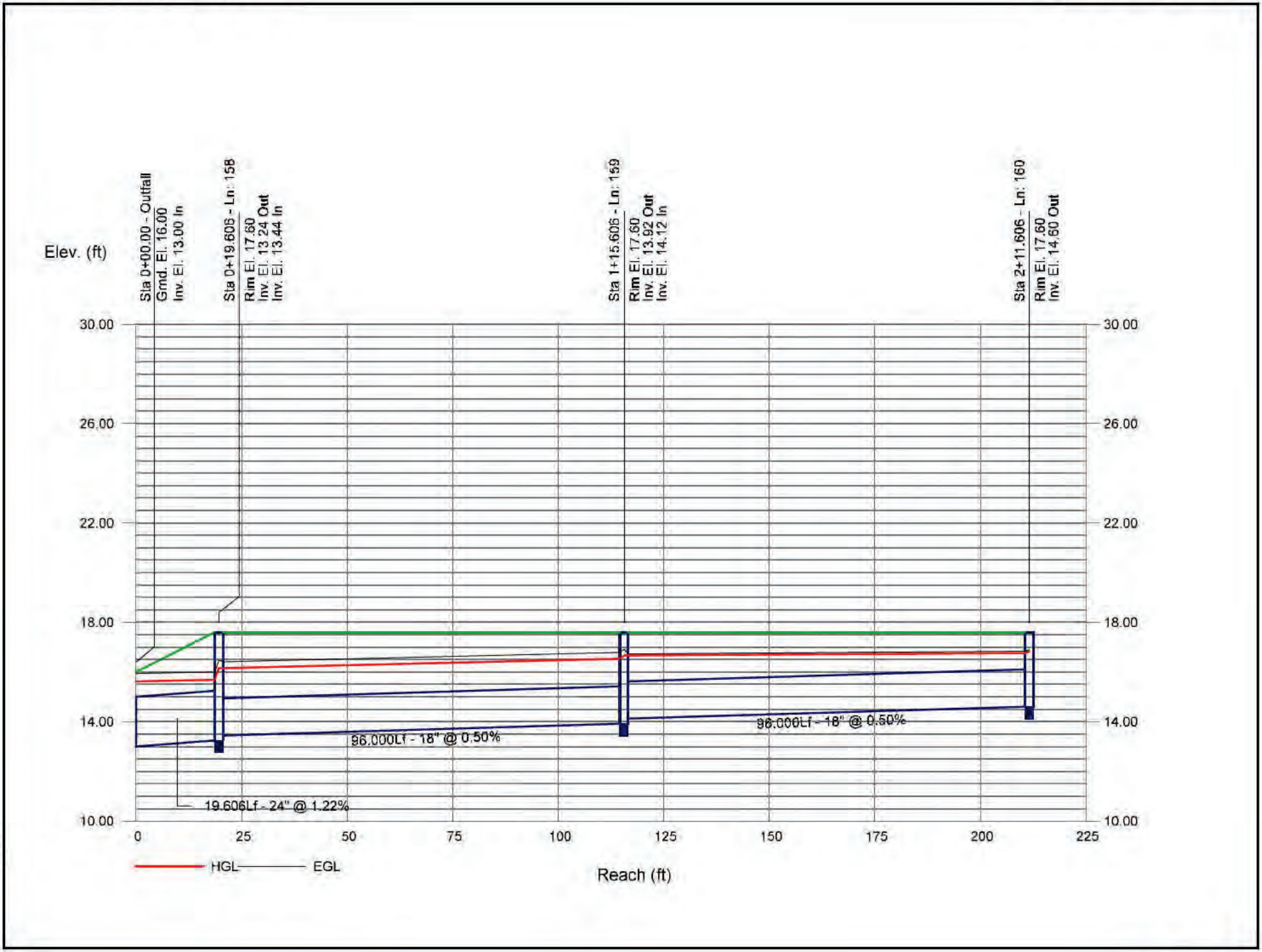
# Storm Sewer Profile

Proj. file: Building 5 Storm.stm



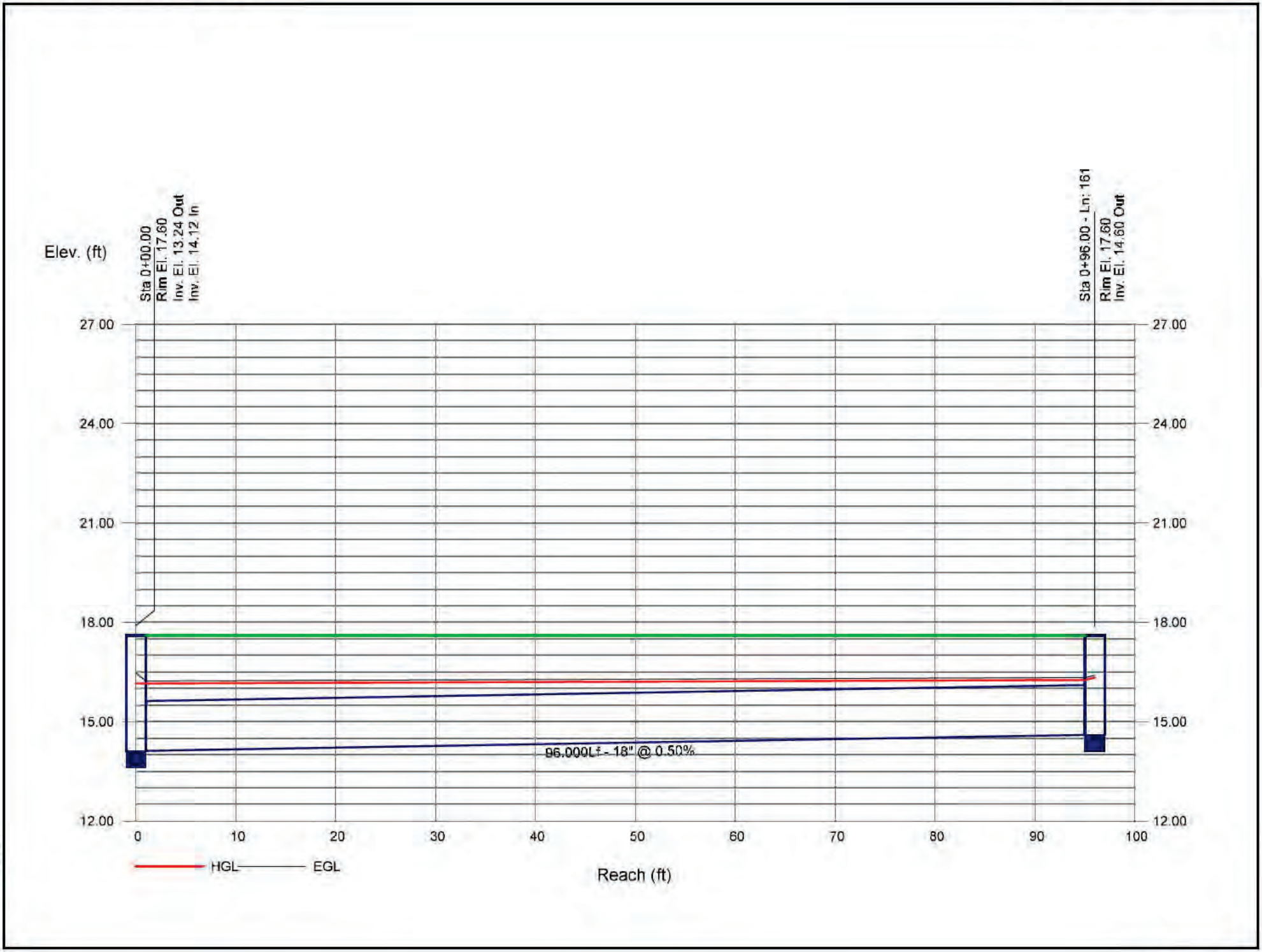
# Storm Sewer Profile

Proj. file: Building 5 Storm.stm



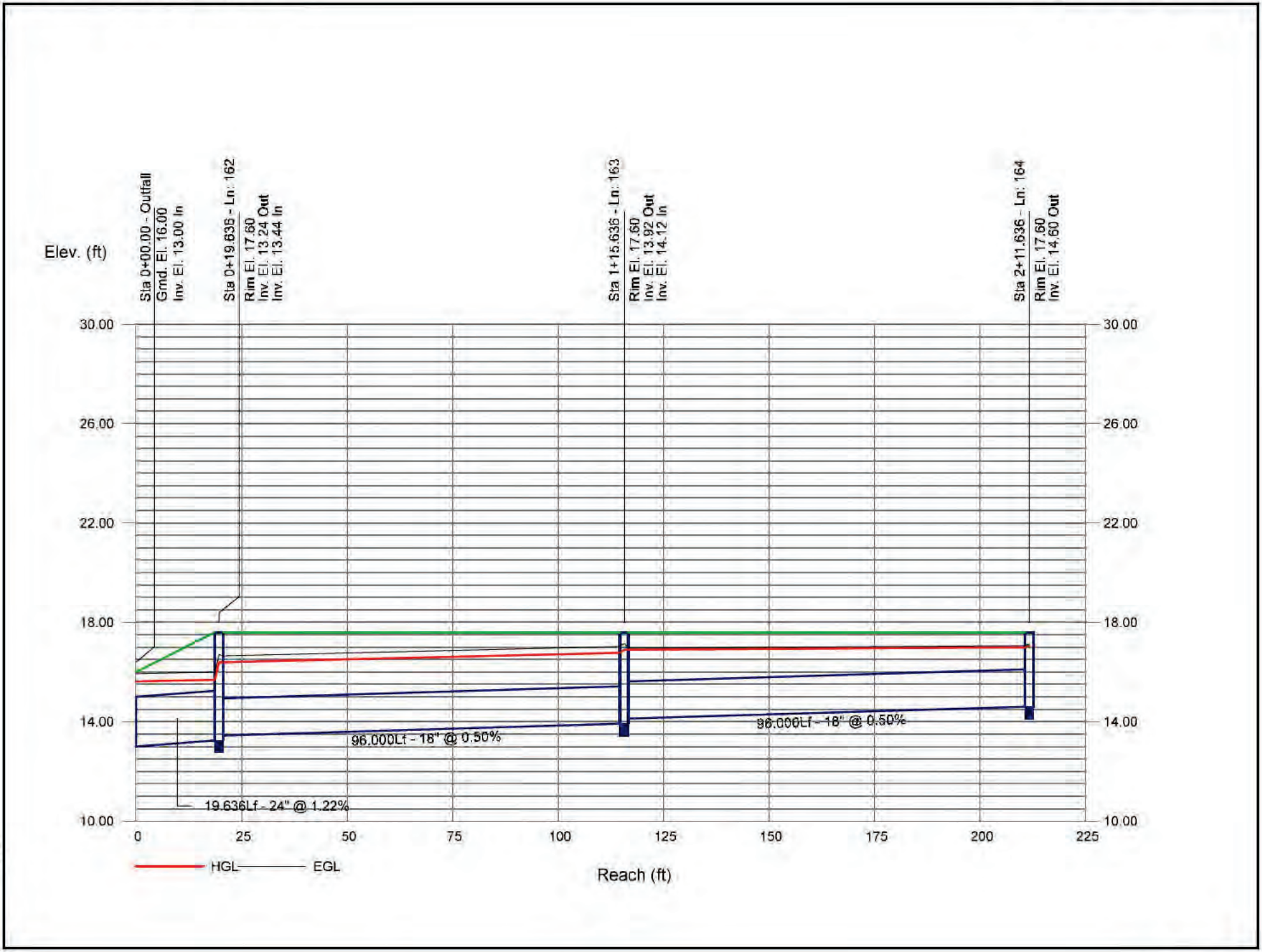
# Storm Sewer Profile

Proj. file: Building 5 Storm.stm



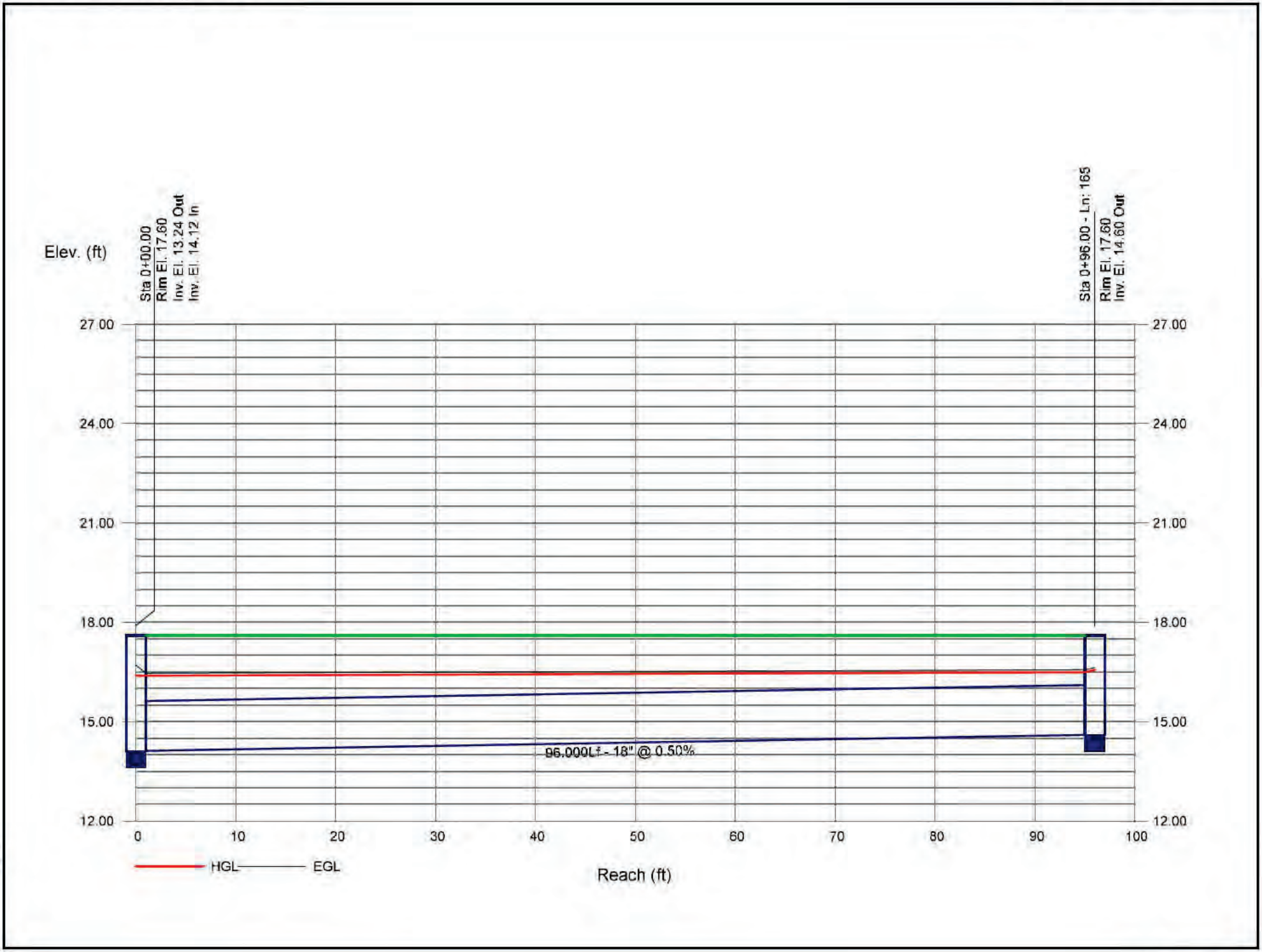
# Storm Sewer Profile

Proj. file: Building 5 Storm.stm



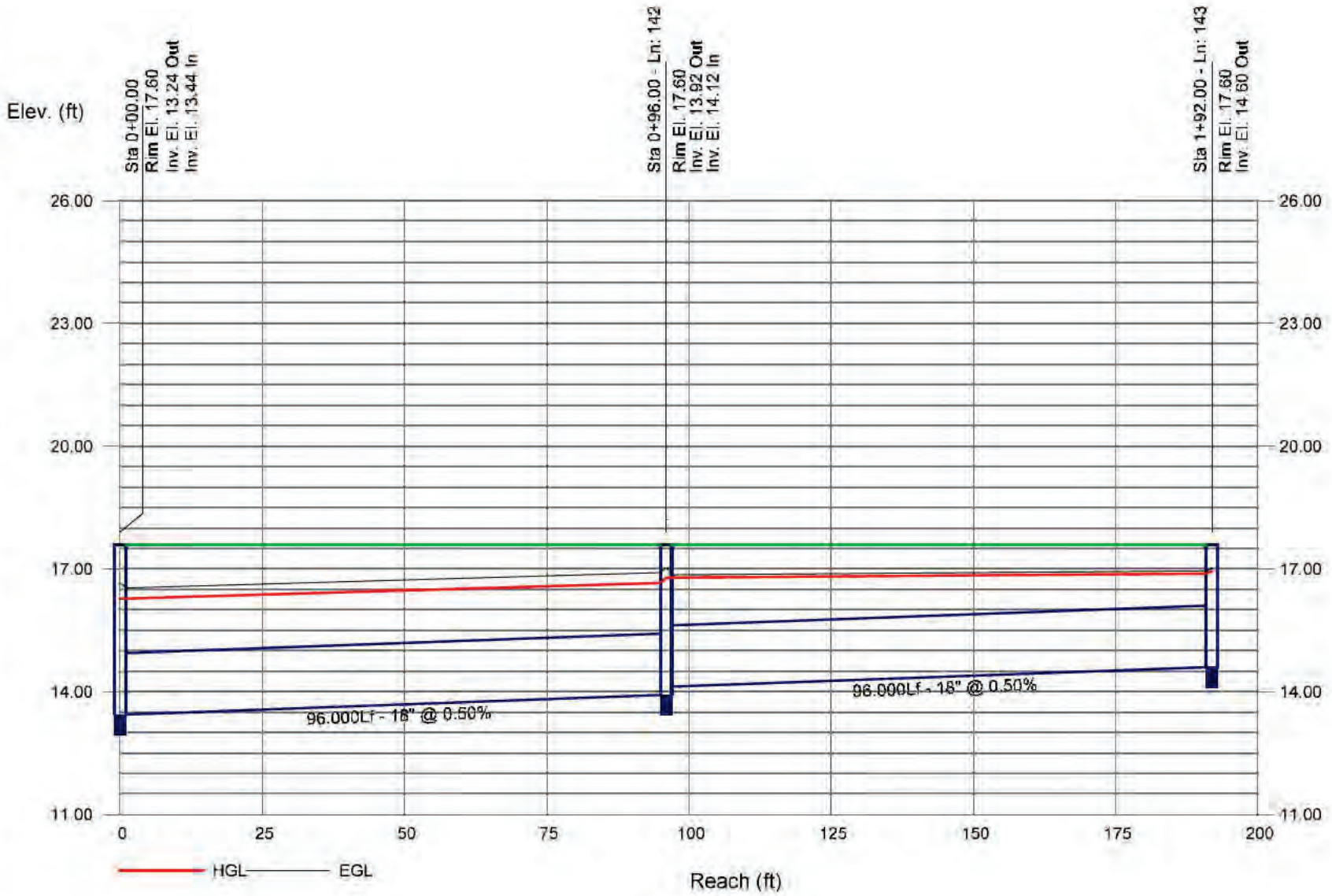
# Storm Sewer Profile

Proj. file: Building 5 Storm.stm



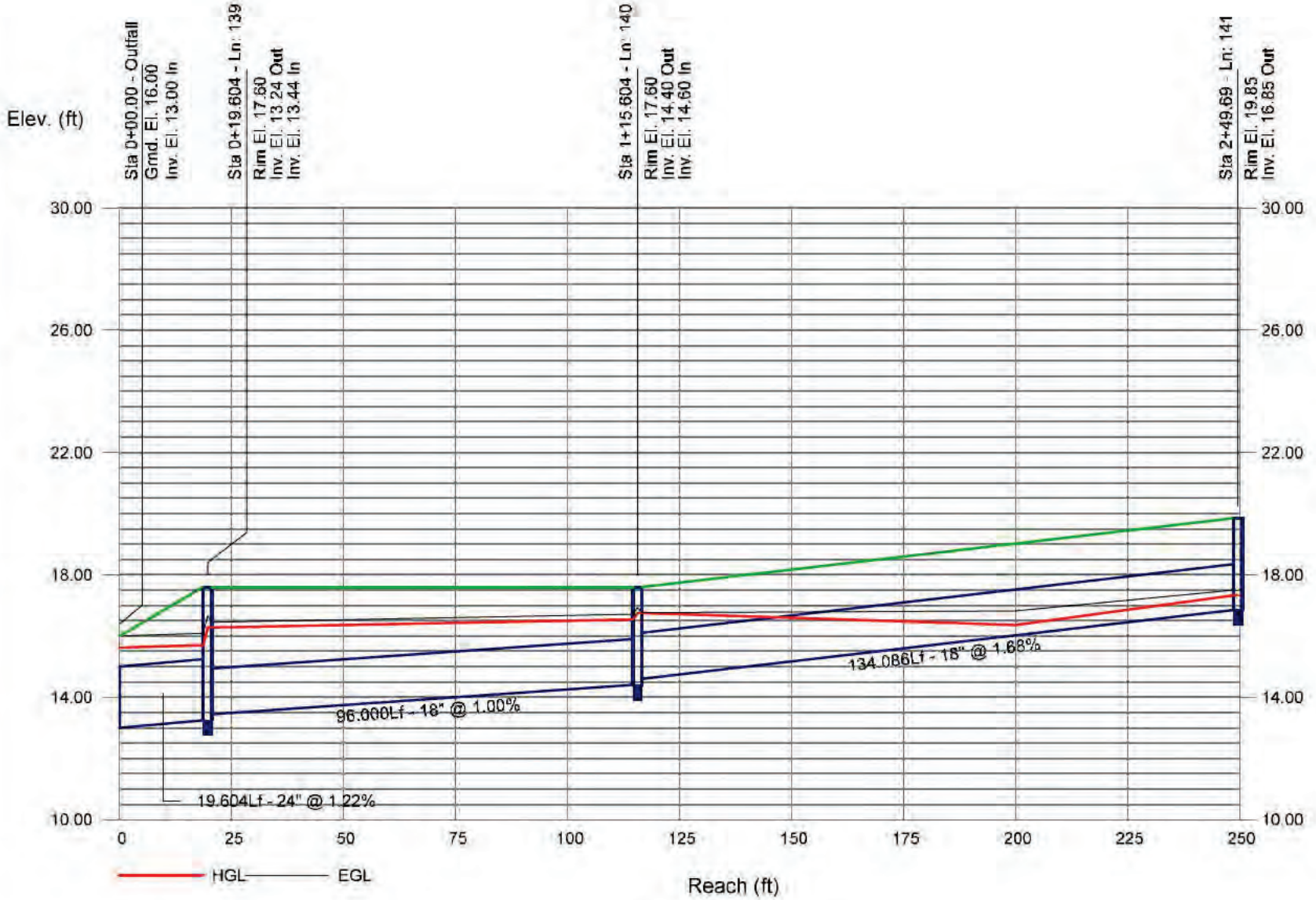
# Storm Sewer Profile

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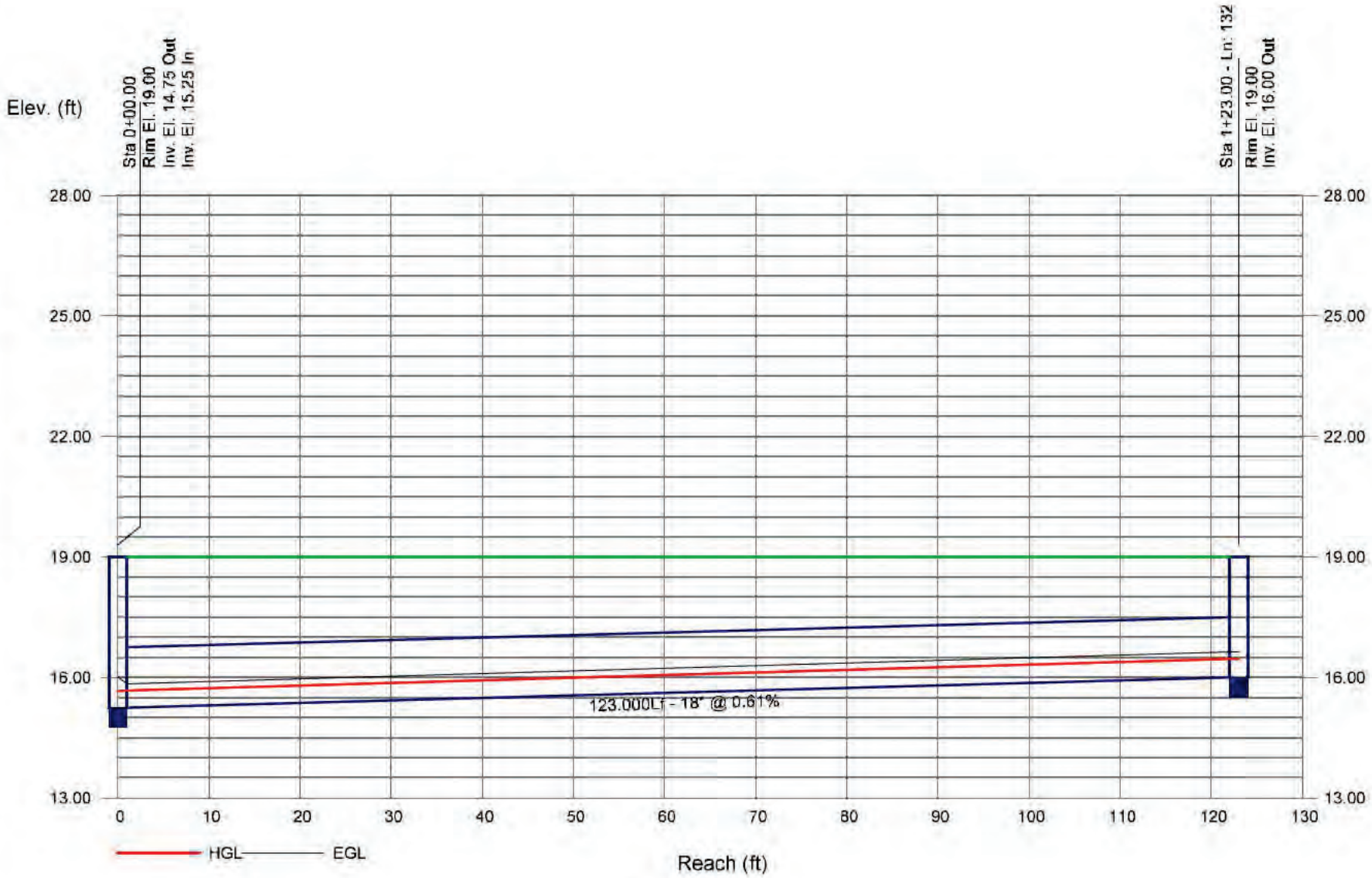
# Storm Sewer Profile

Proj. file: Building 5 Storm.stm



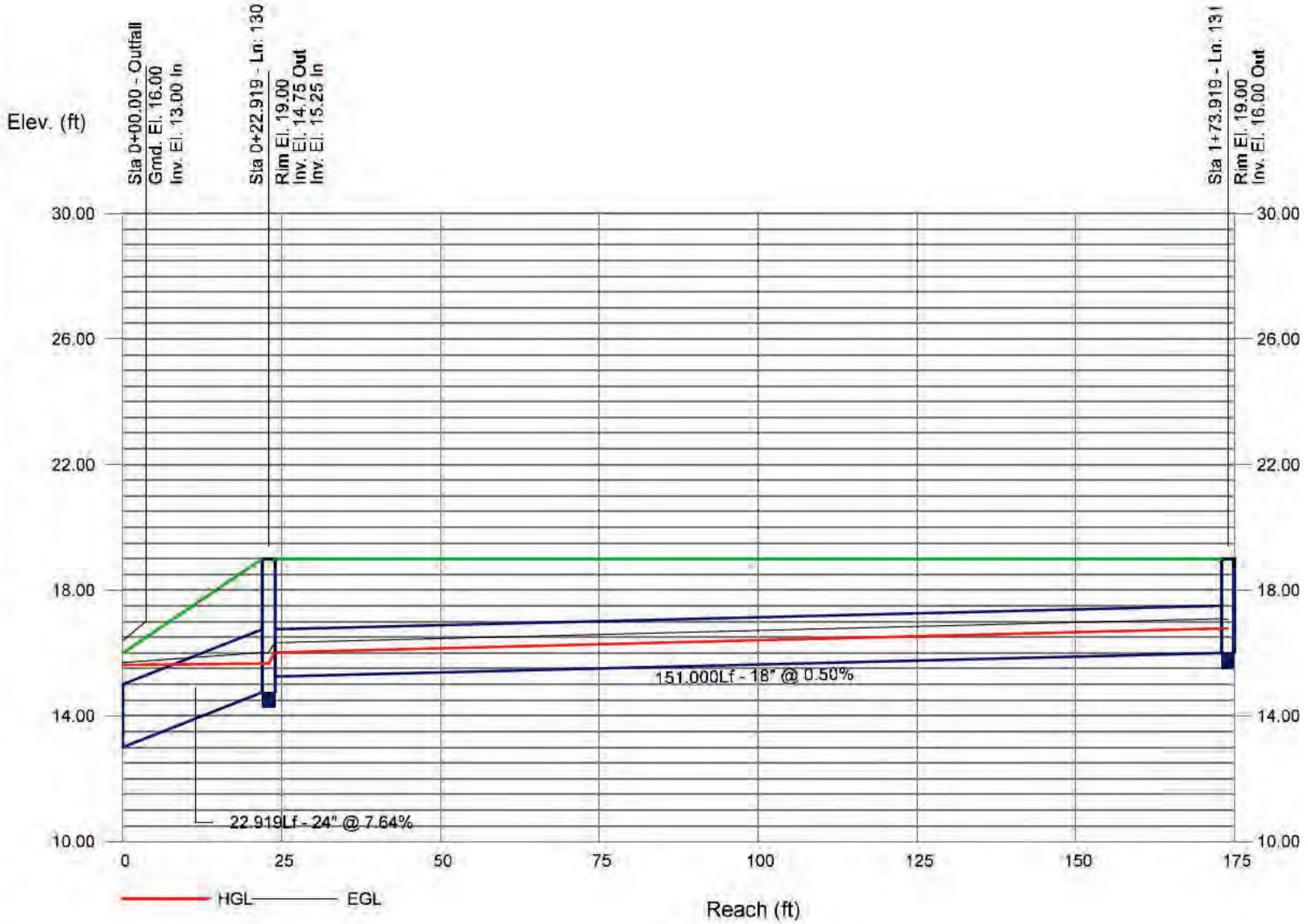
# Storm Sewer Profile

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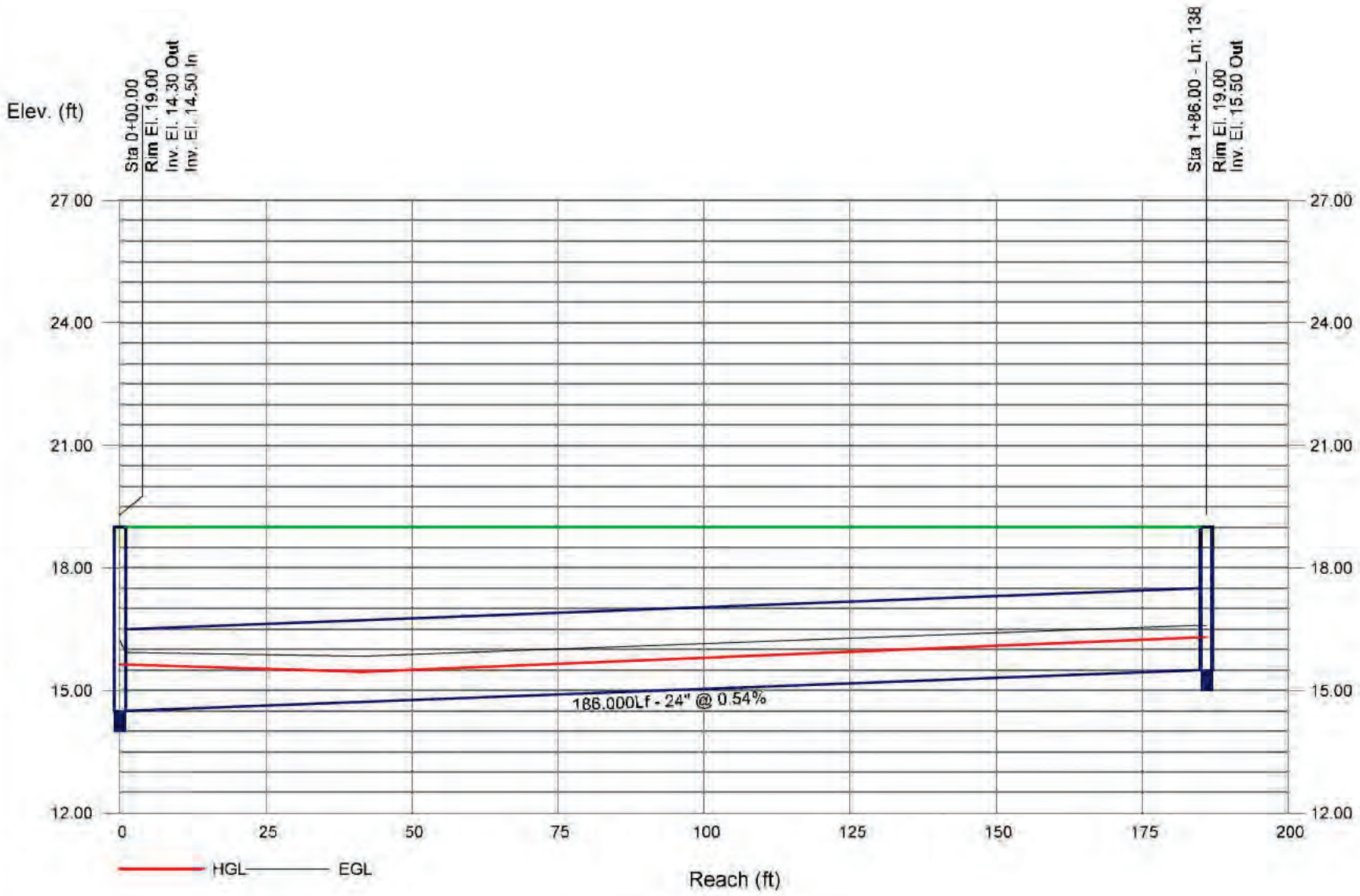
# Storm Sewer Profile

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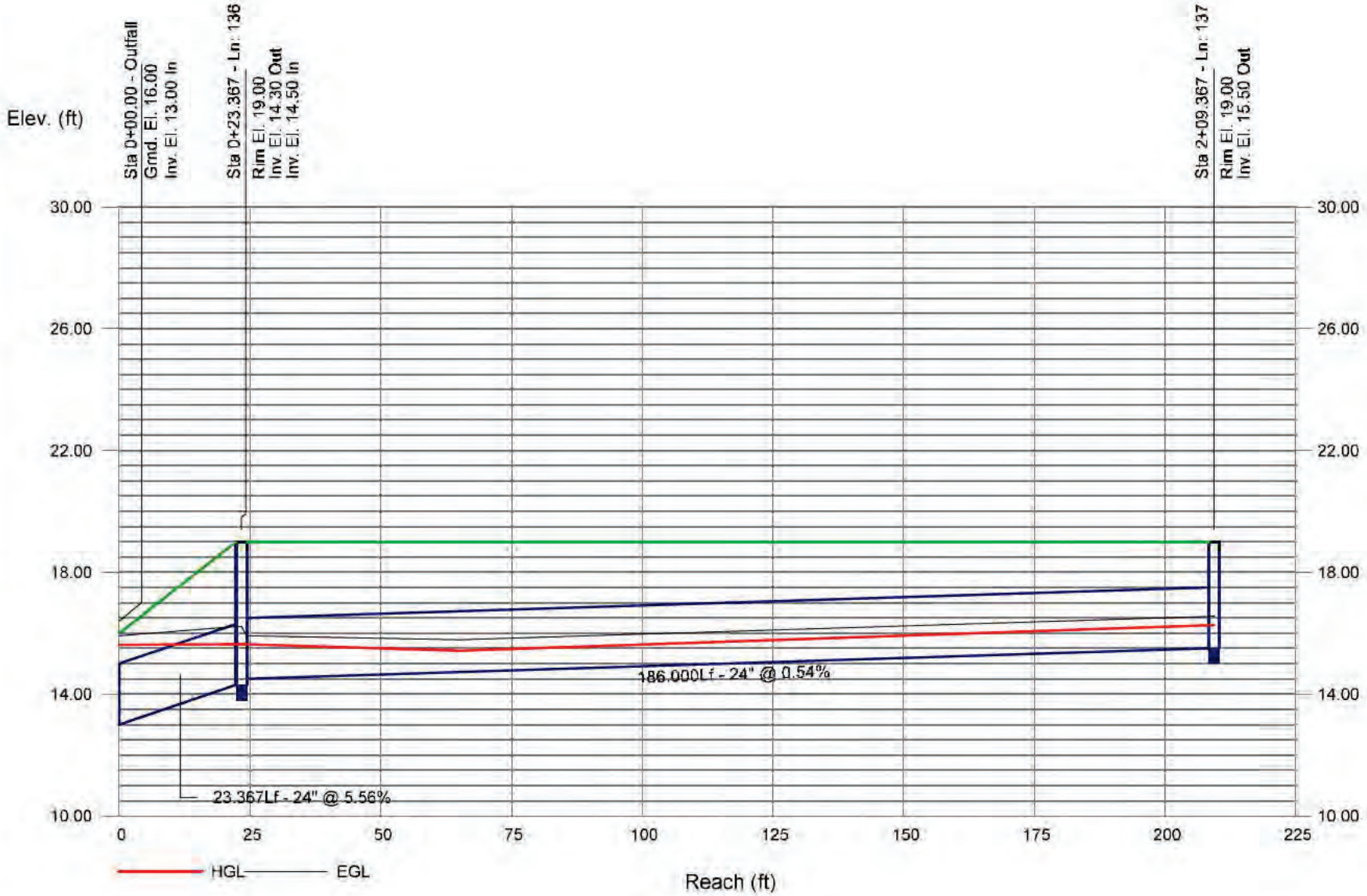
# Storm Sewer Profile

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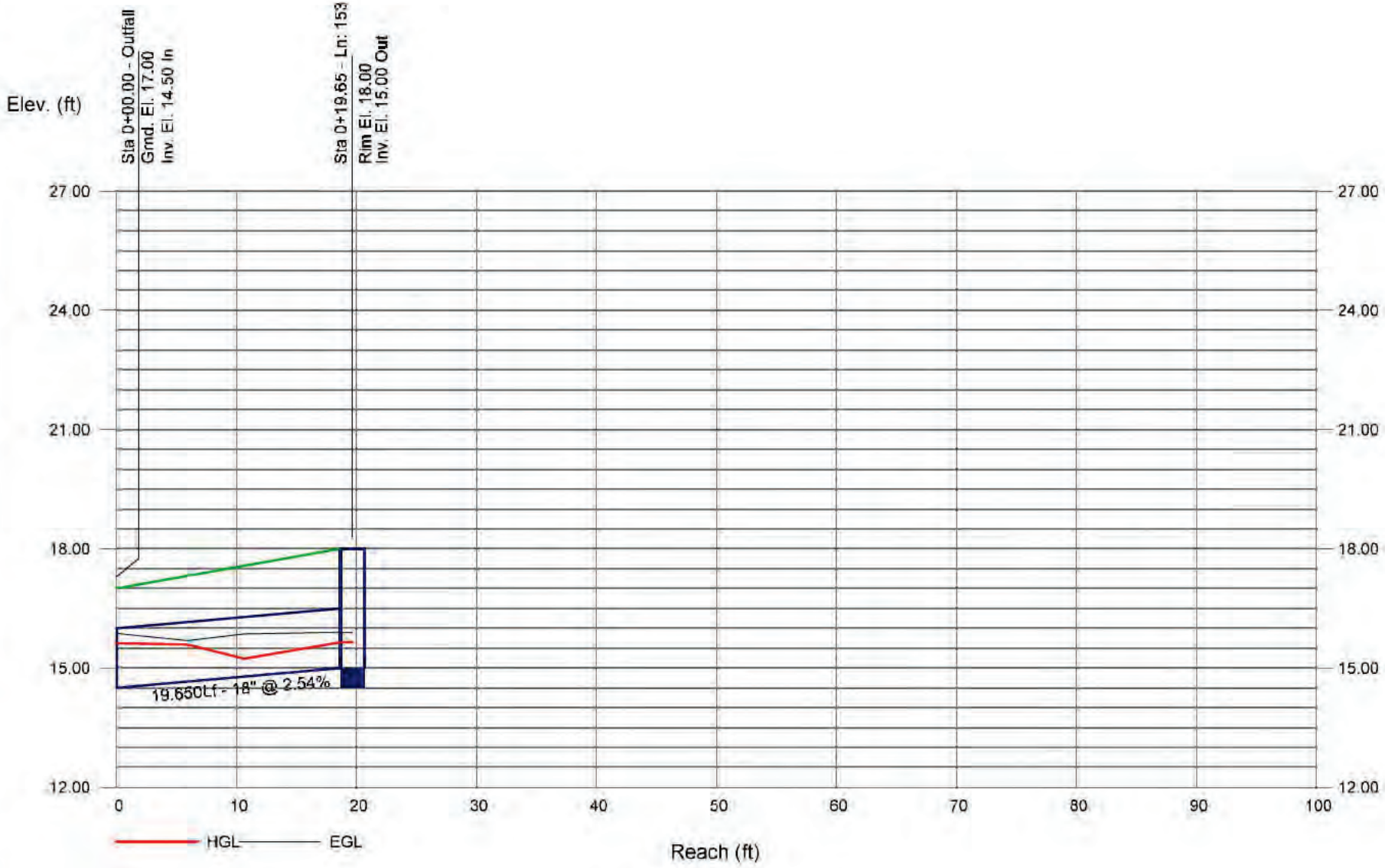
# Storm Sewer Profile

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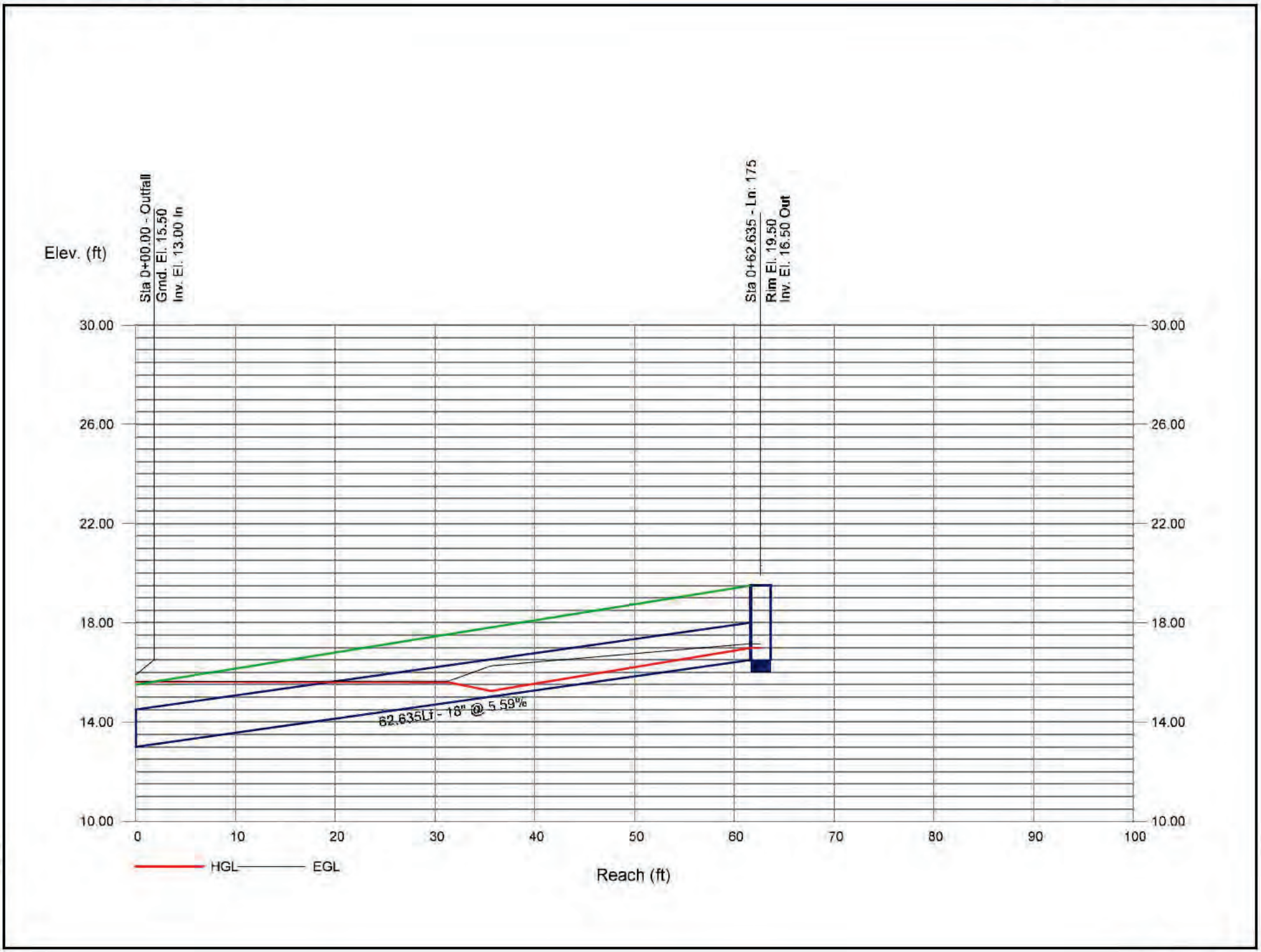
# Storm Sewer Profile

Proj. file: Building 5 Storm.stm



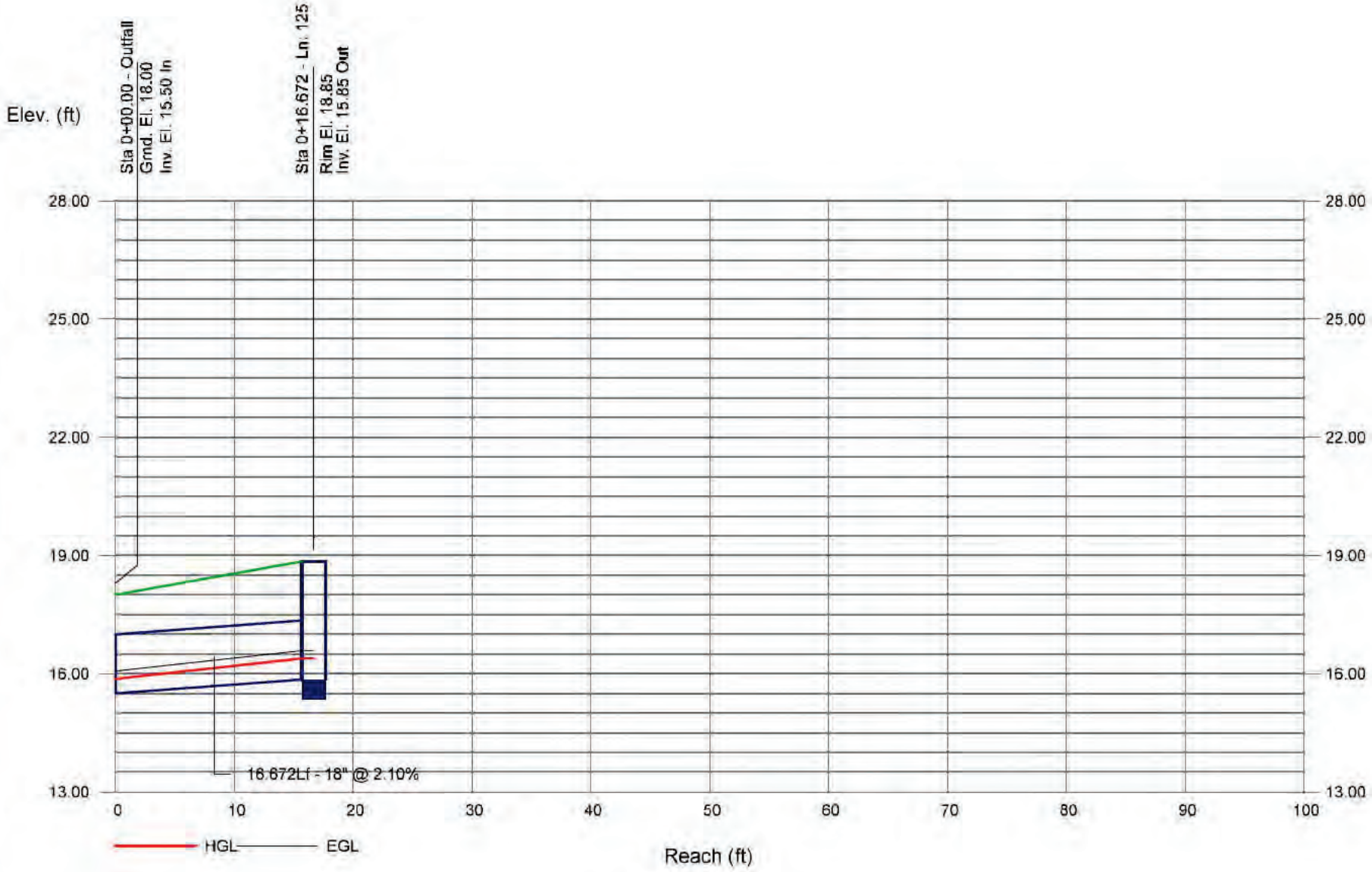
# Storm Sewer Profile

Proj. file: Building 5 Storm.stm



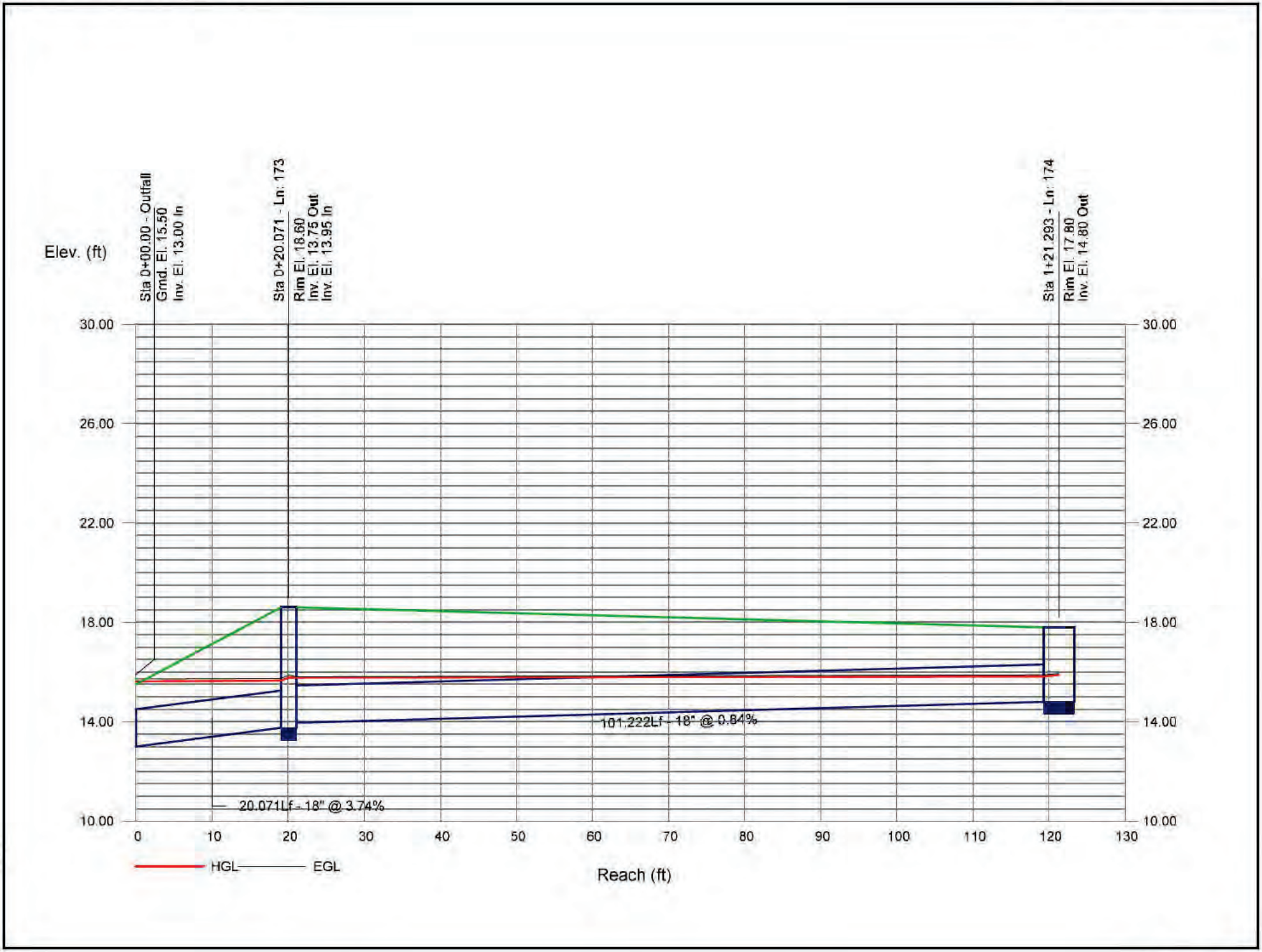
# Storm Sewer Profile

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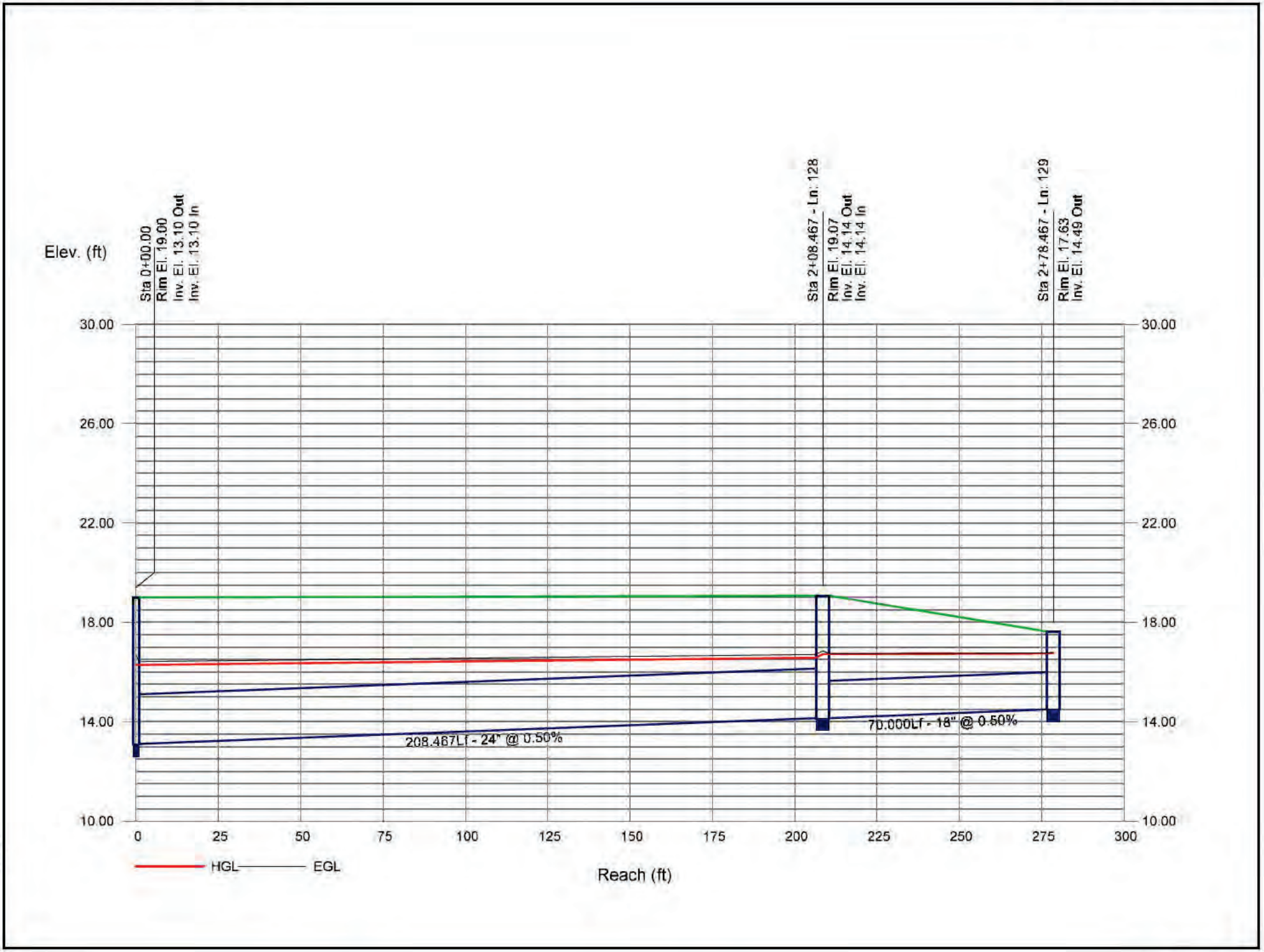
# Storm Sewer Profile

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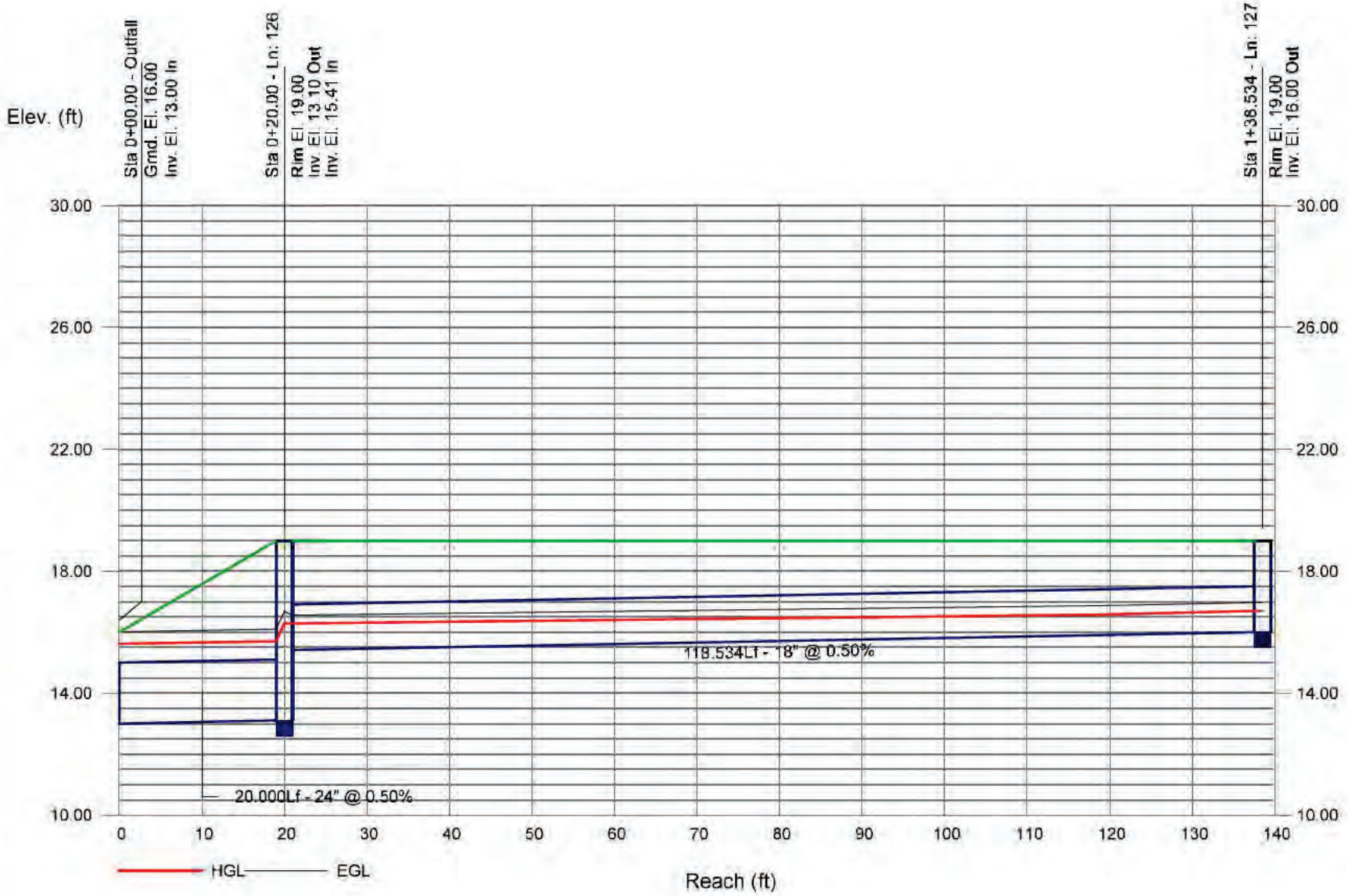
# Storm Sewer Profile

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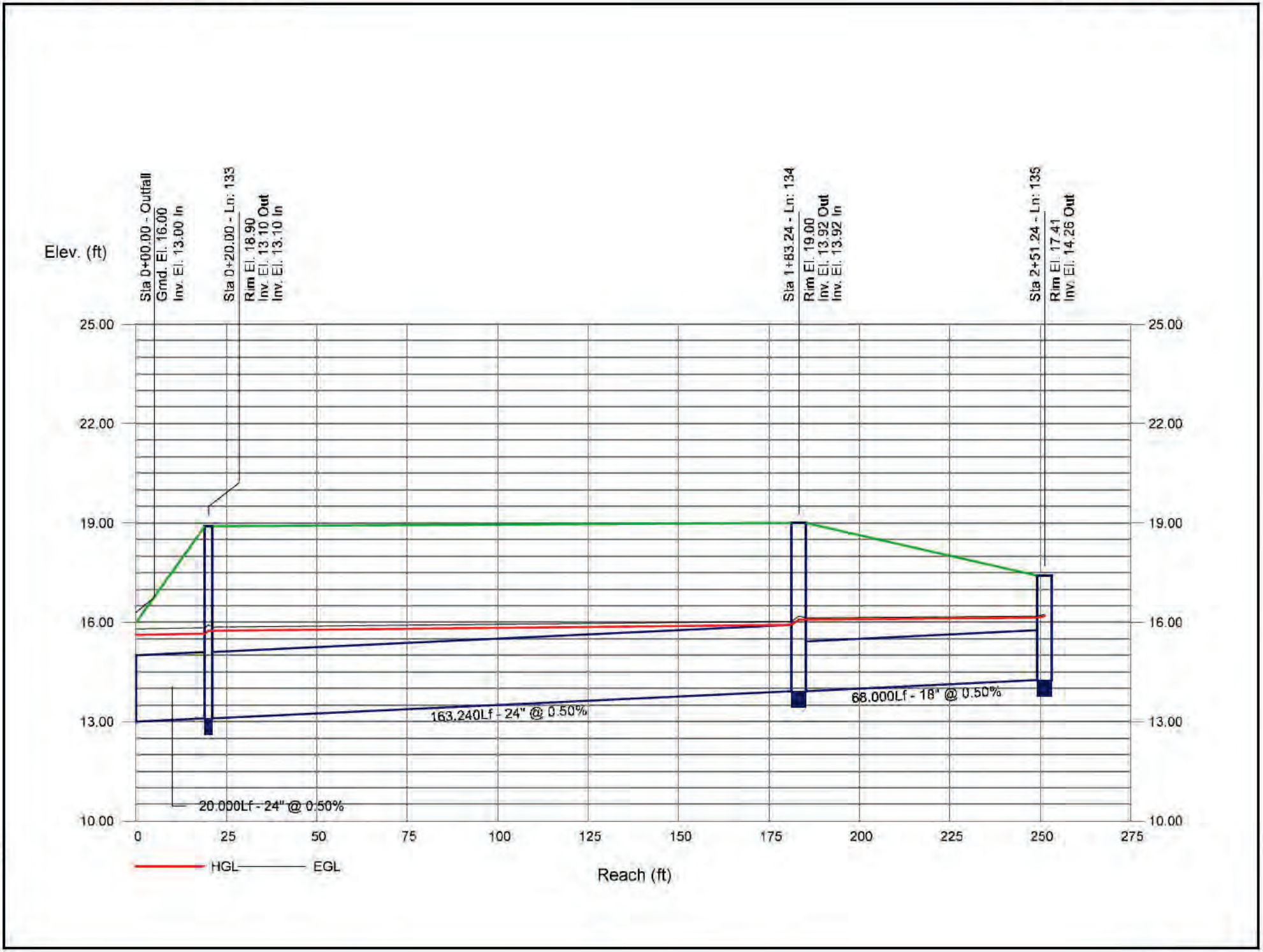
# Storm Sewer Profile

Proj. file: Building 5 Storm.stm



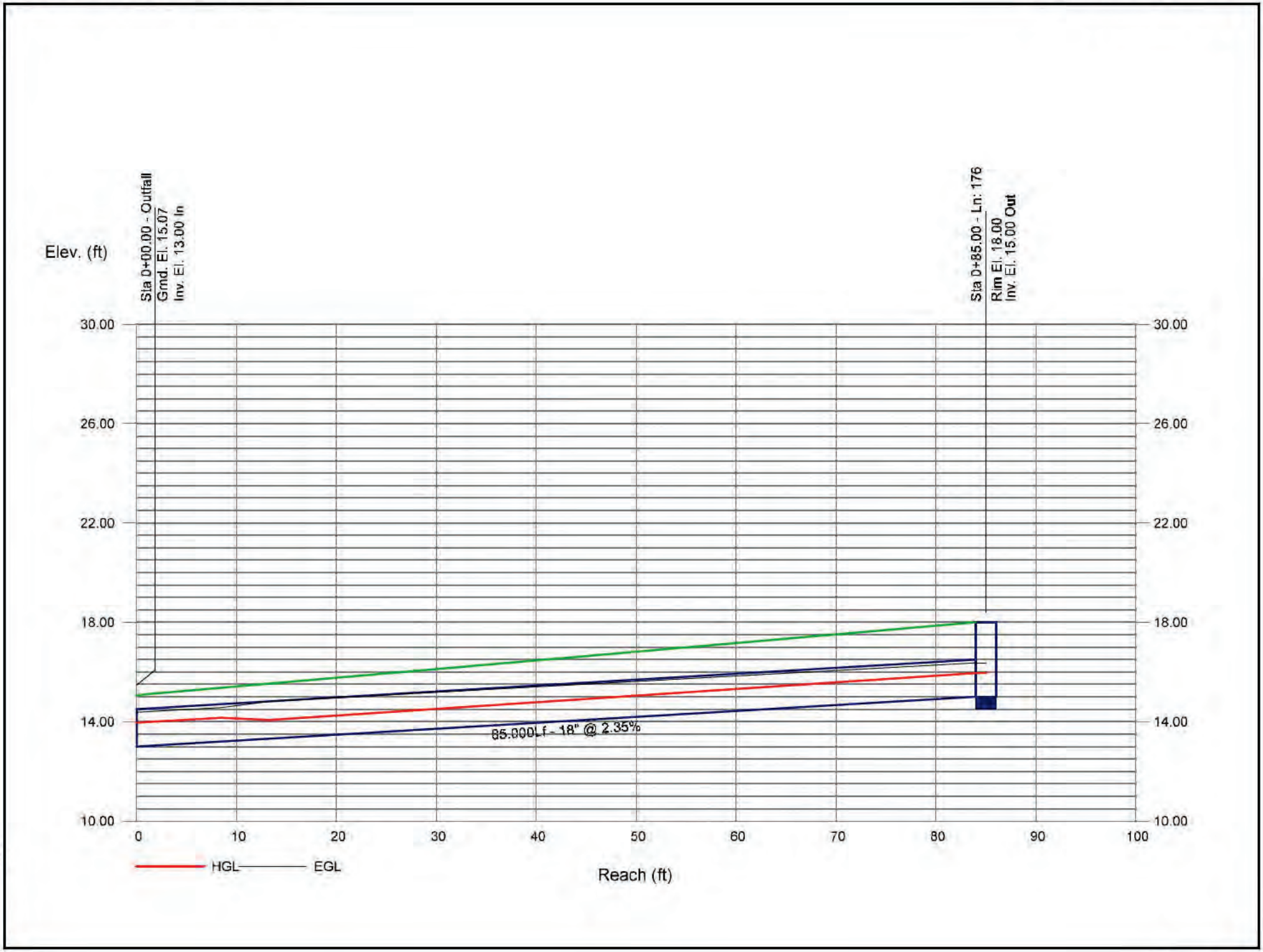
# Storm Sewer Profile

Proj. file: Building 5 Storm.stm



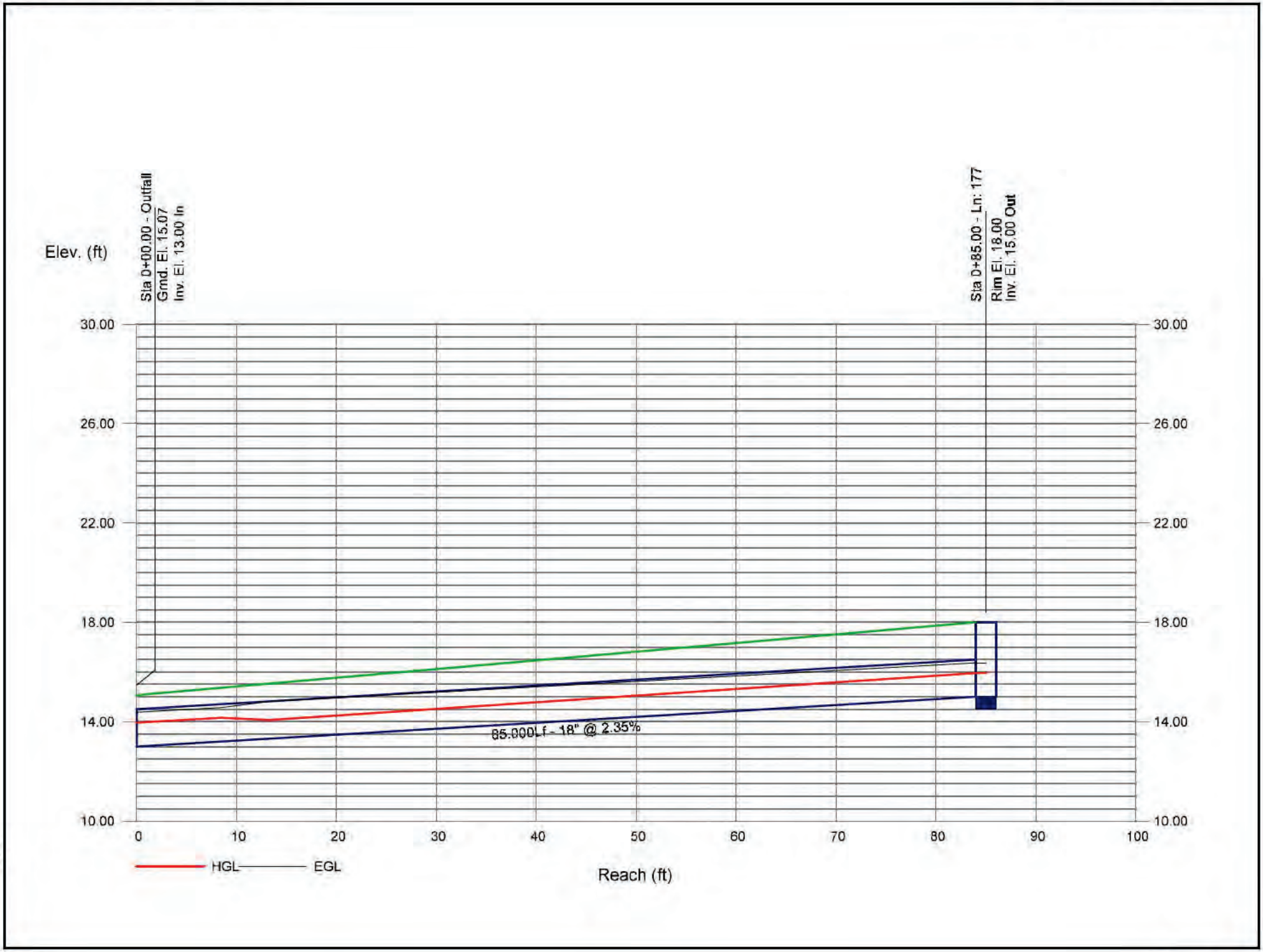
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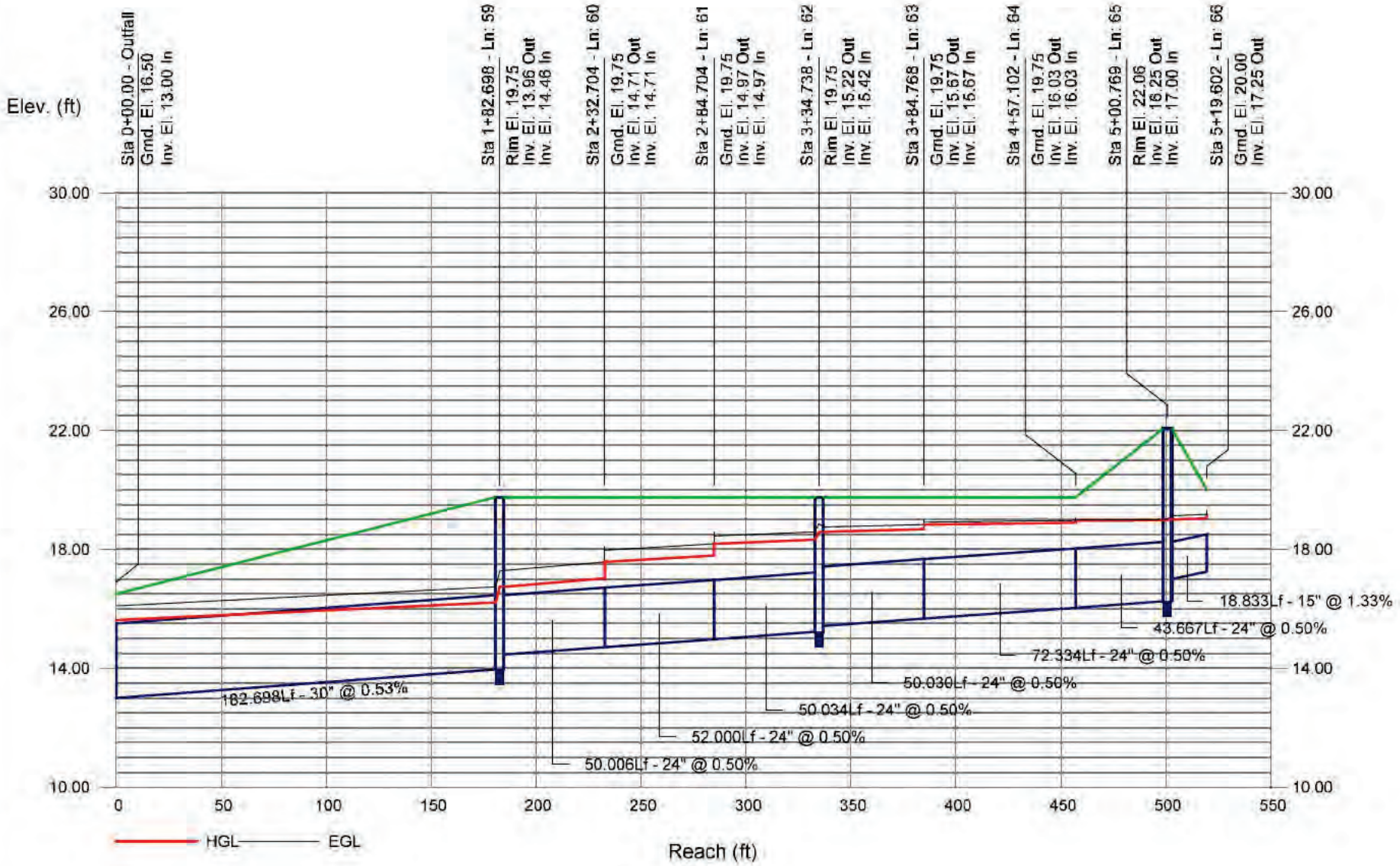
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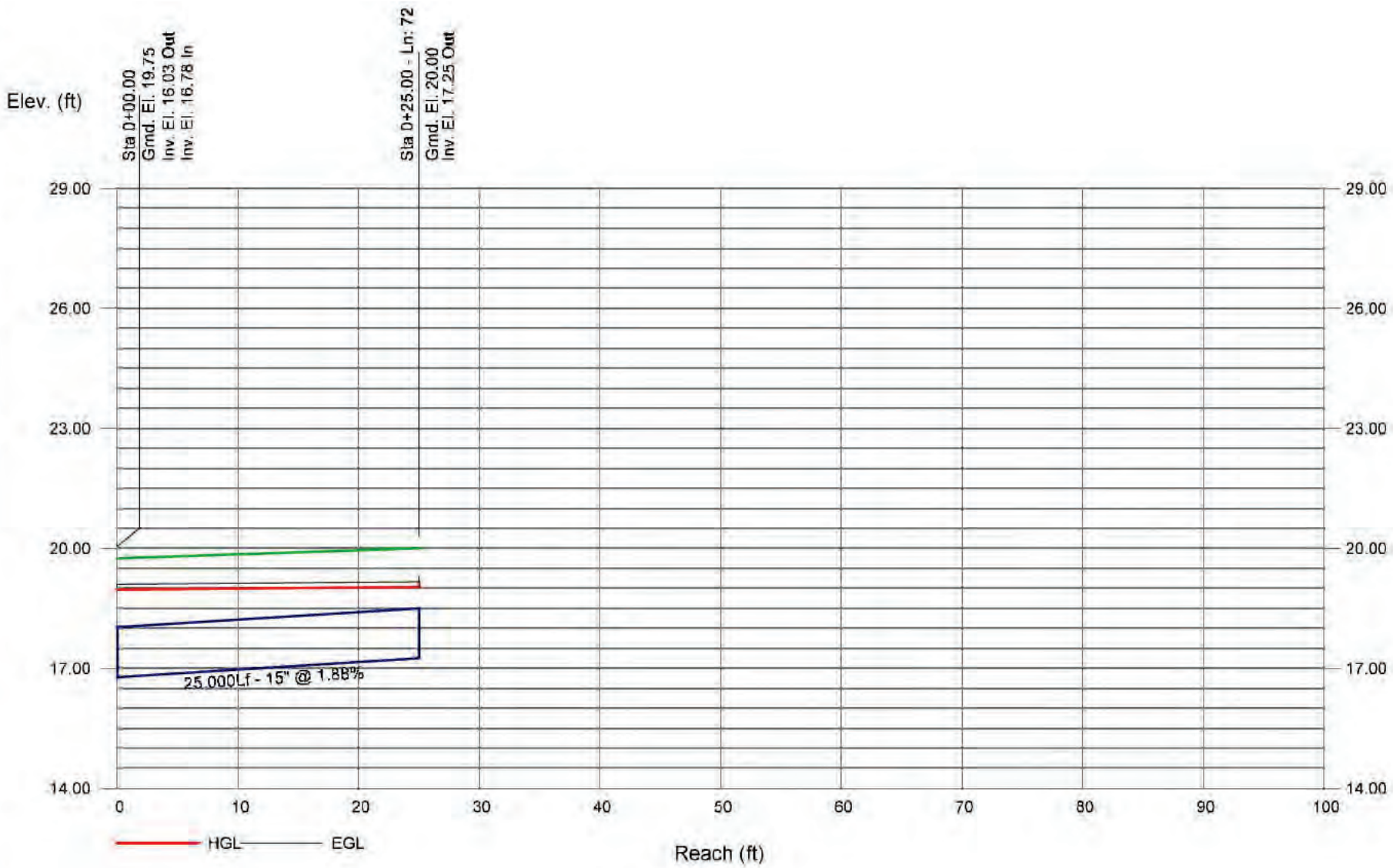
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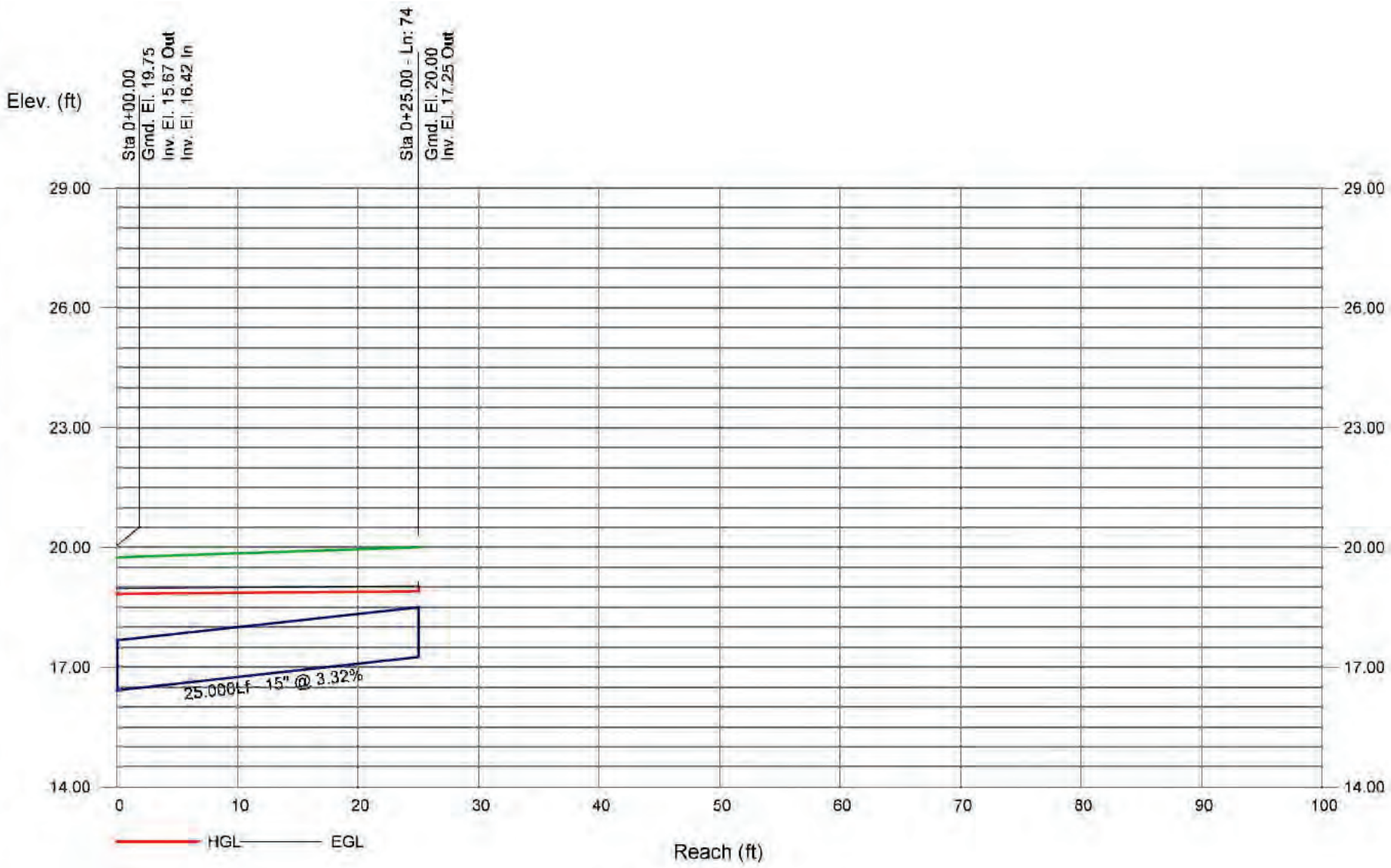
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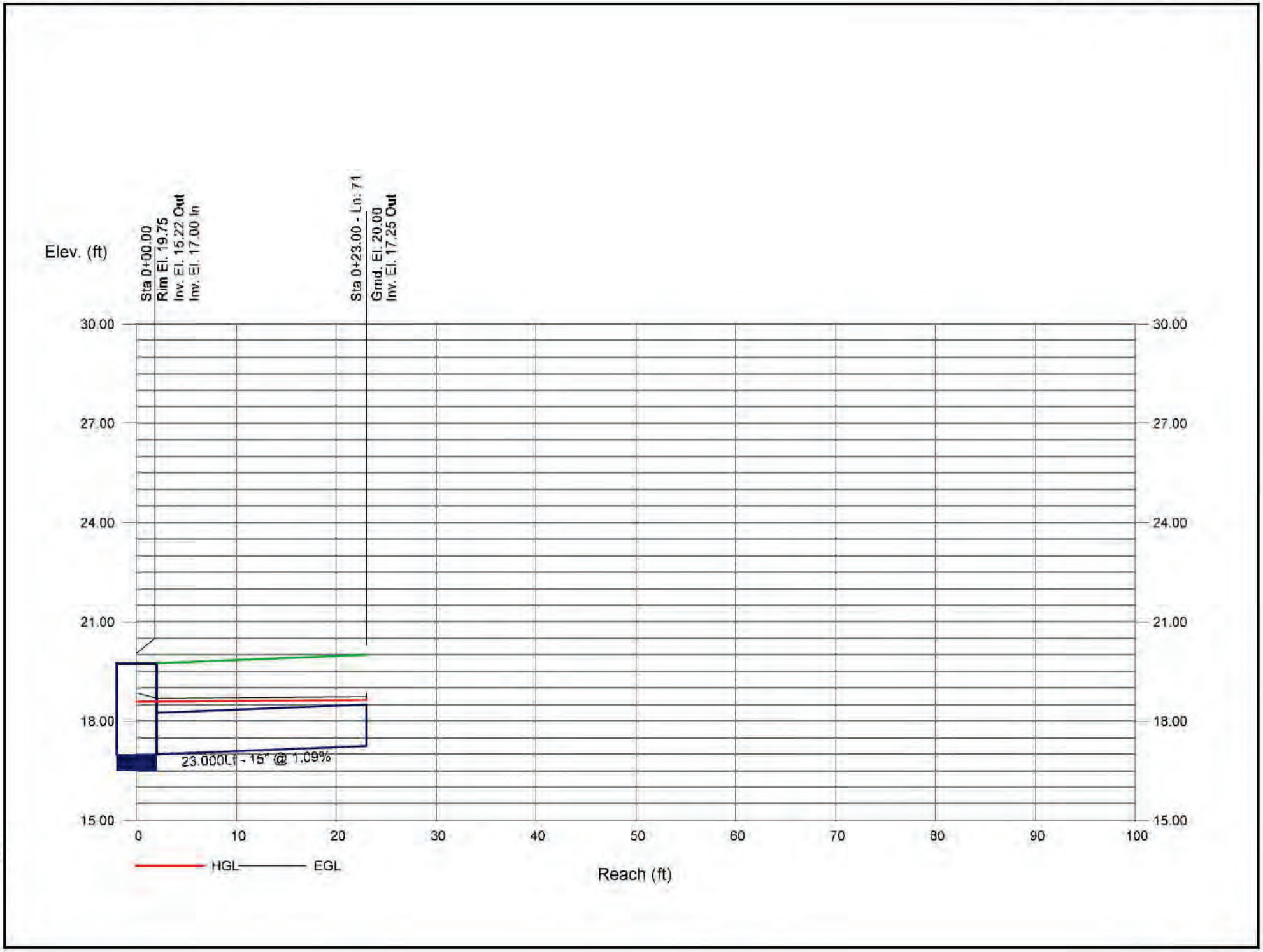
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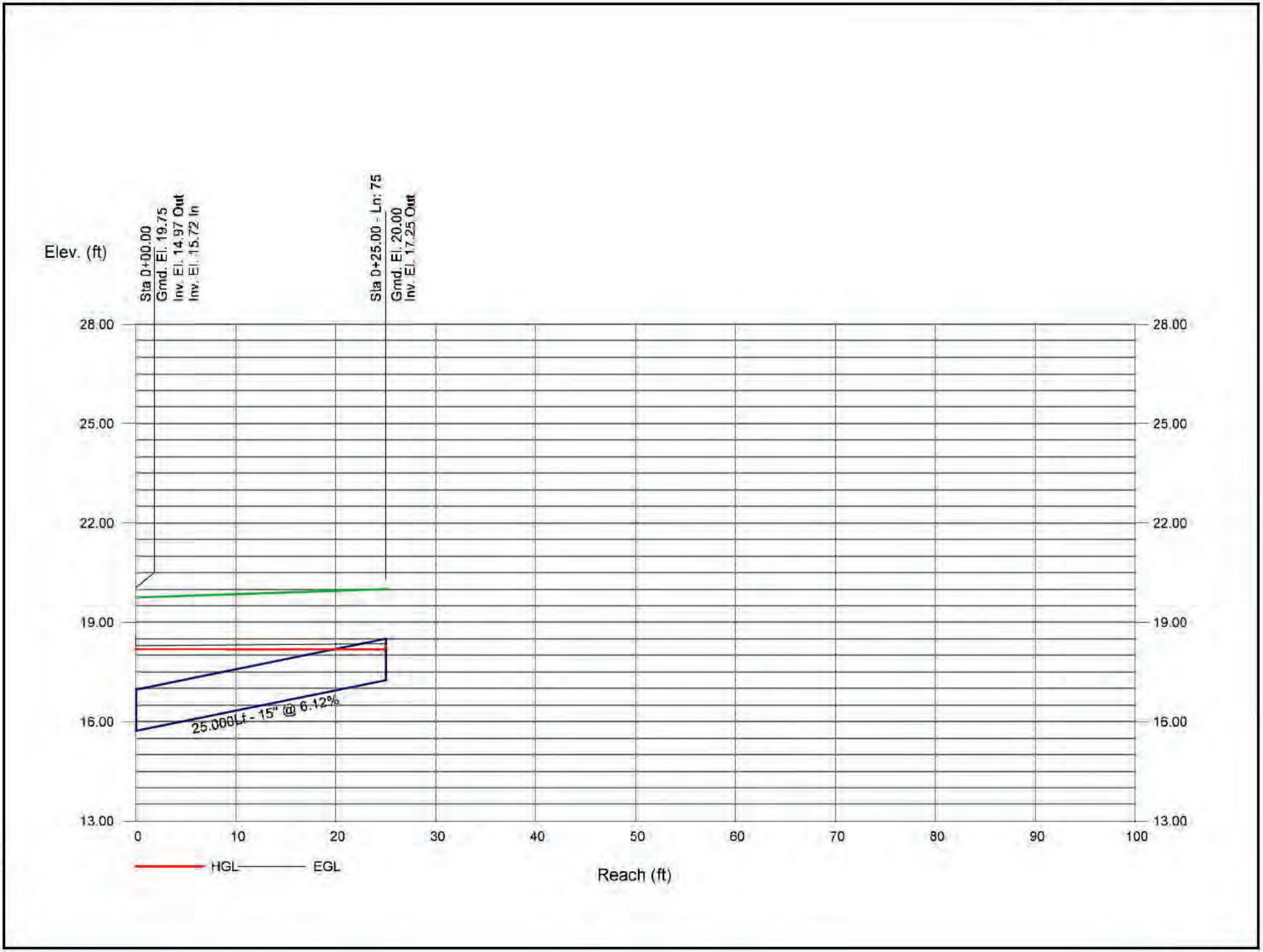
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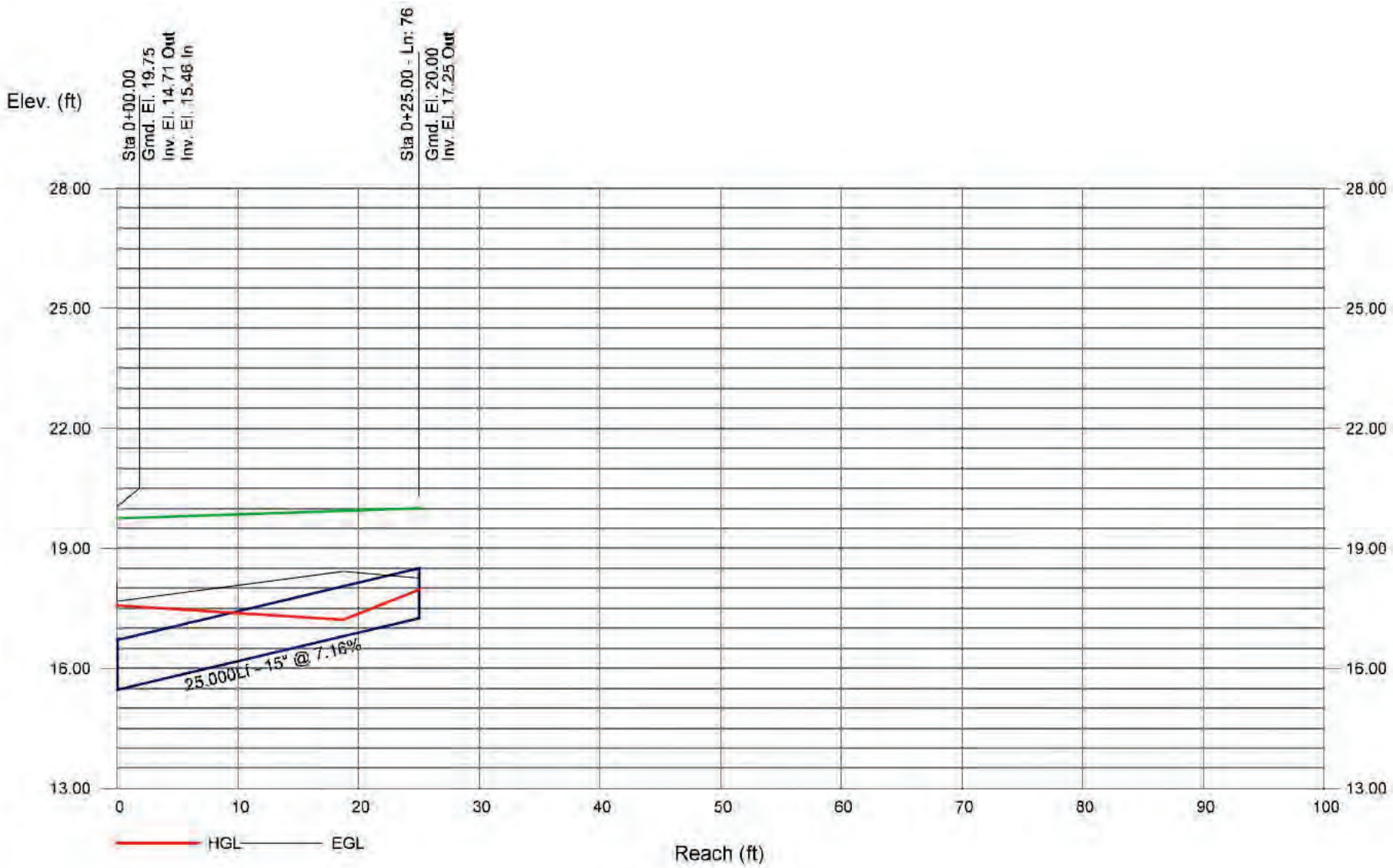
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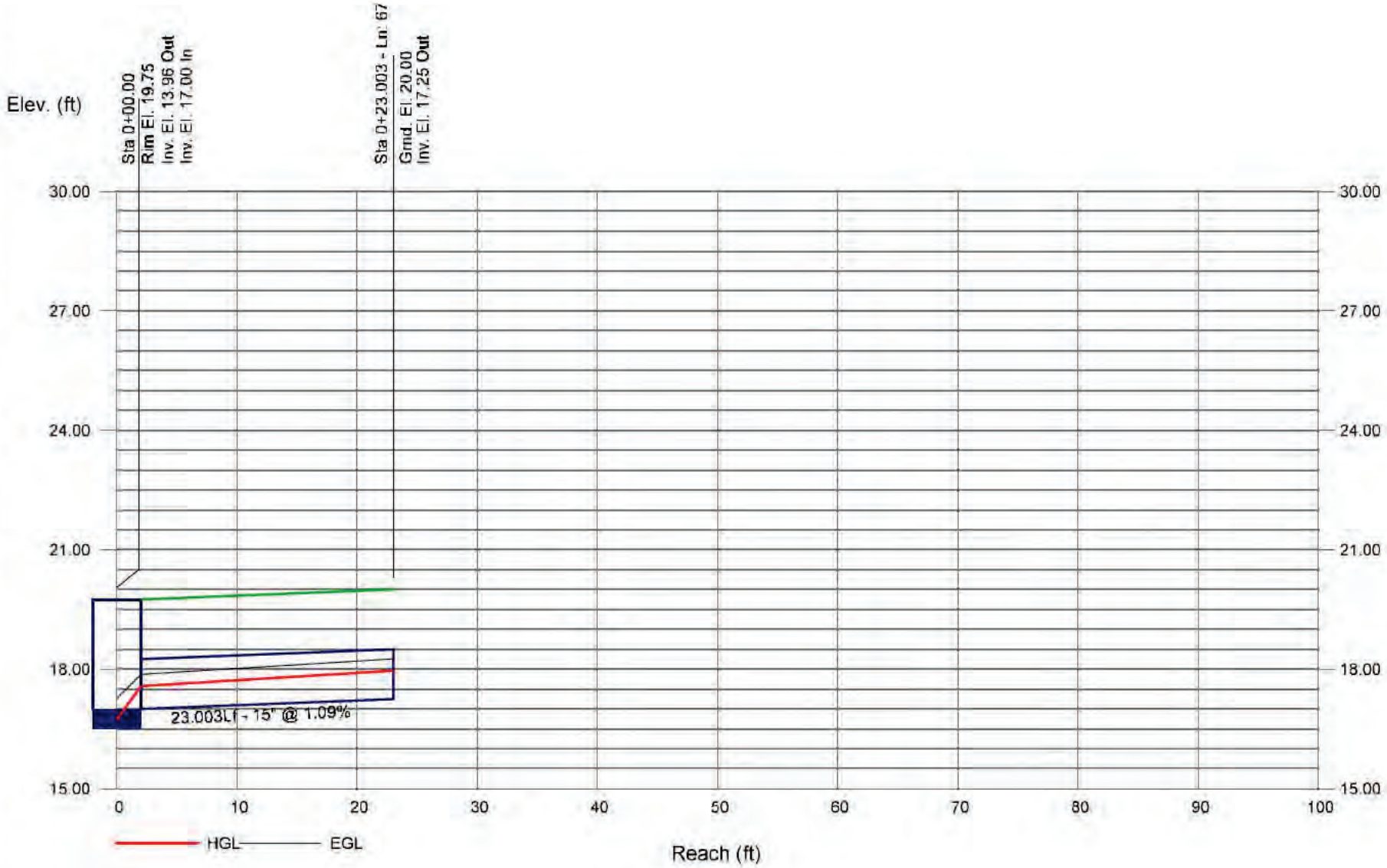
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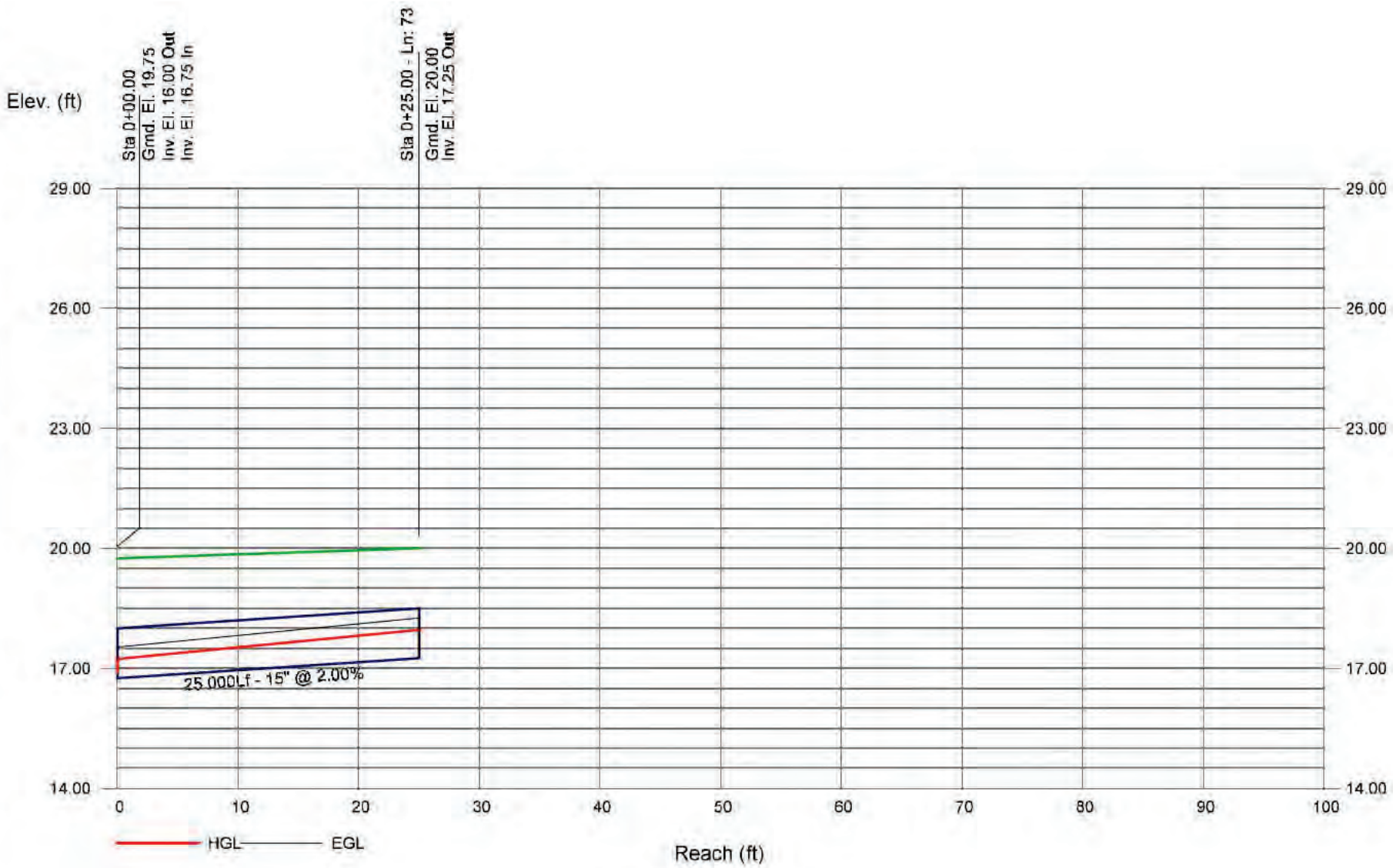
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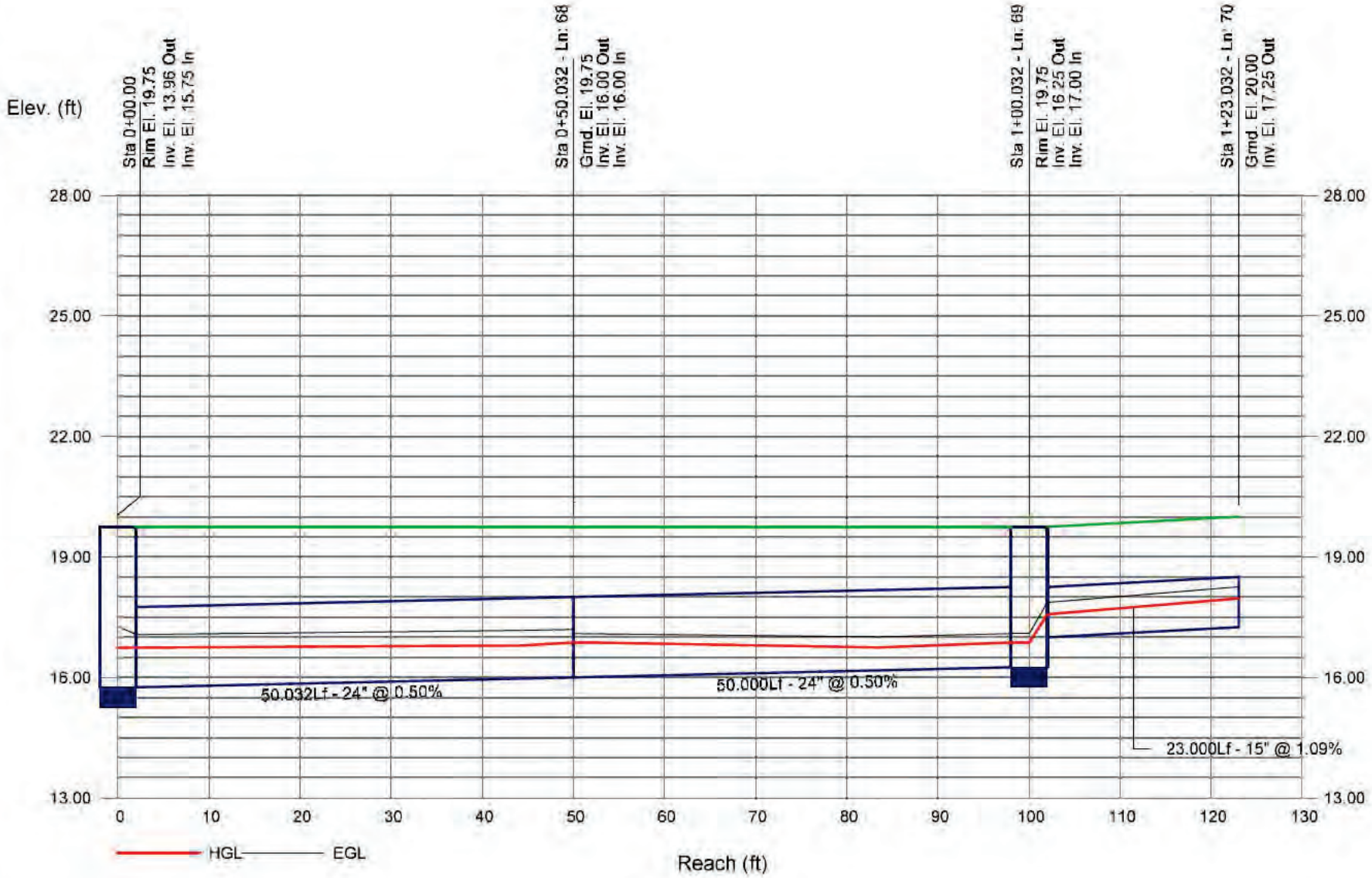
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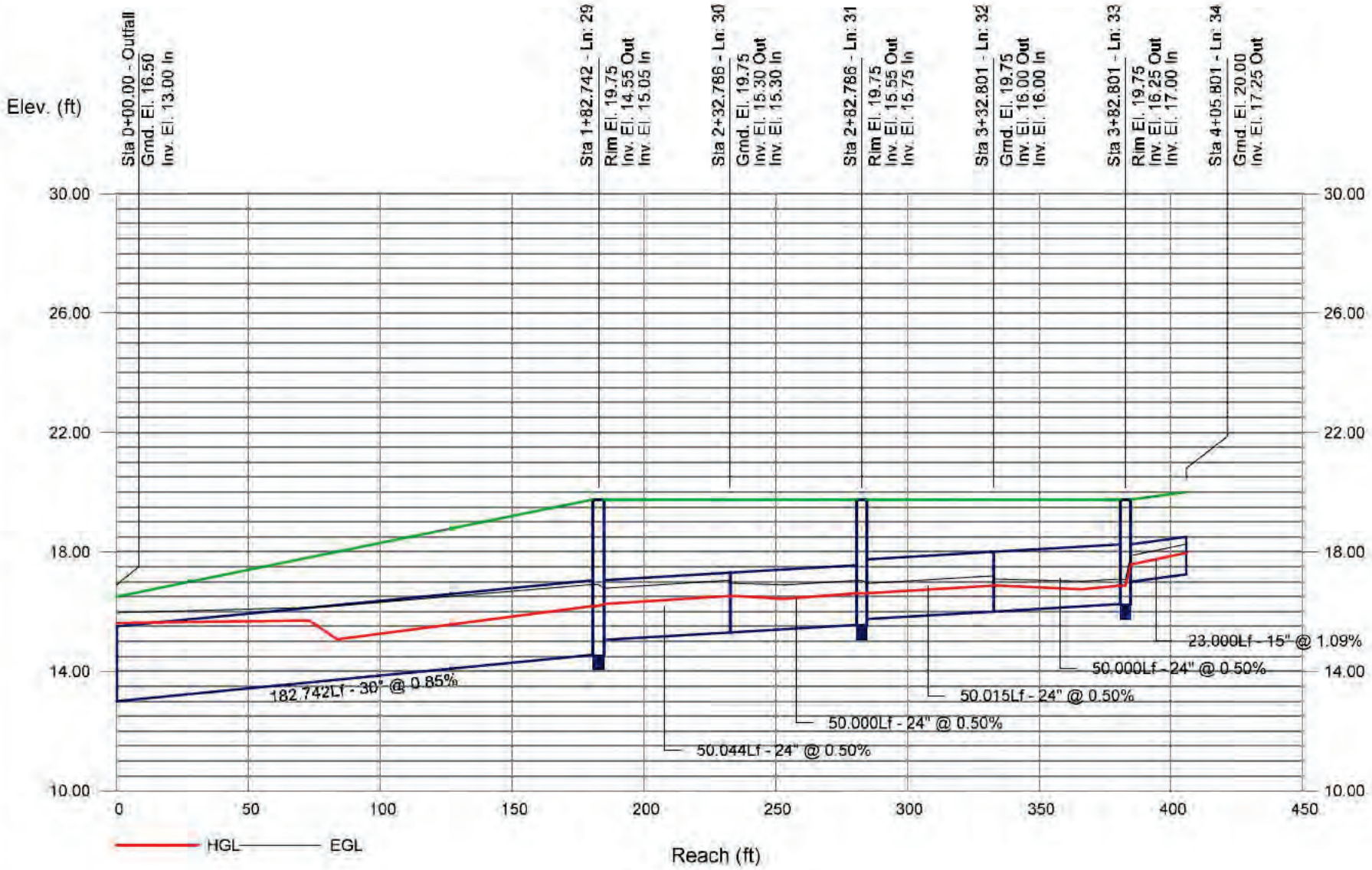
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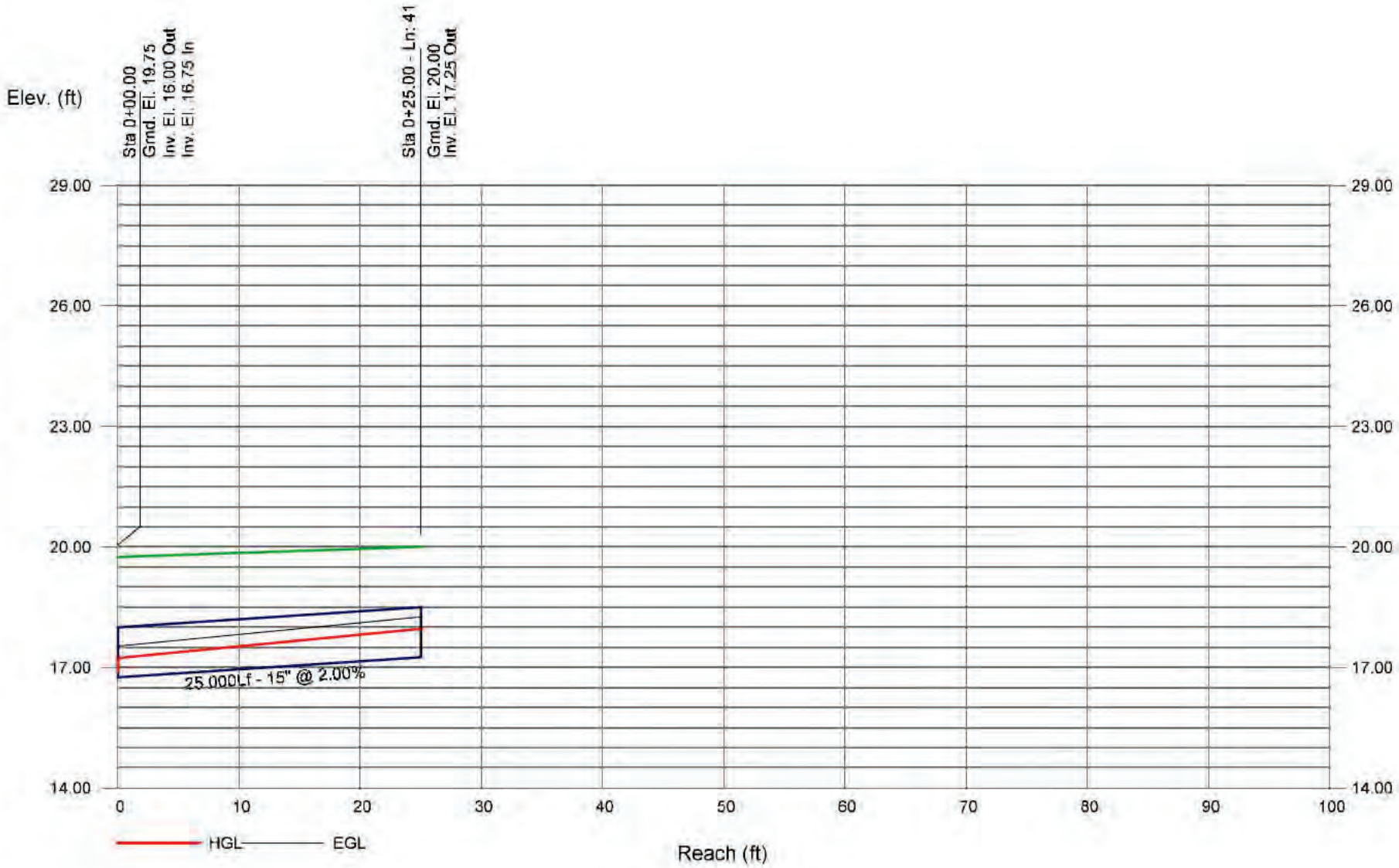
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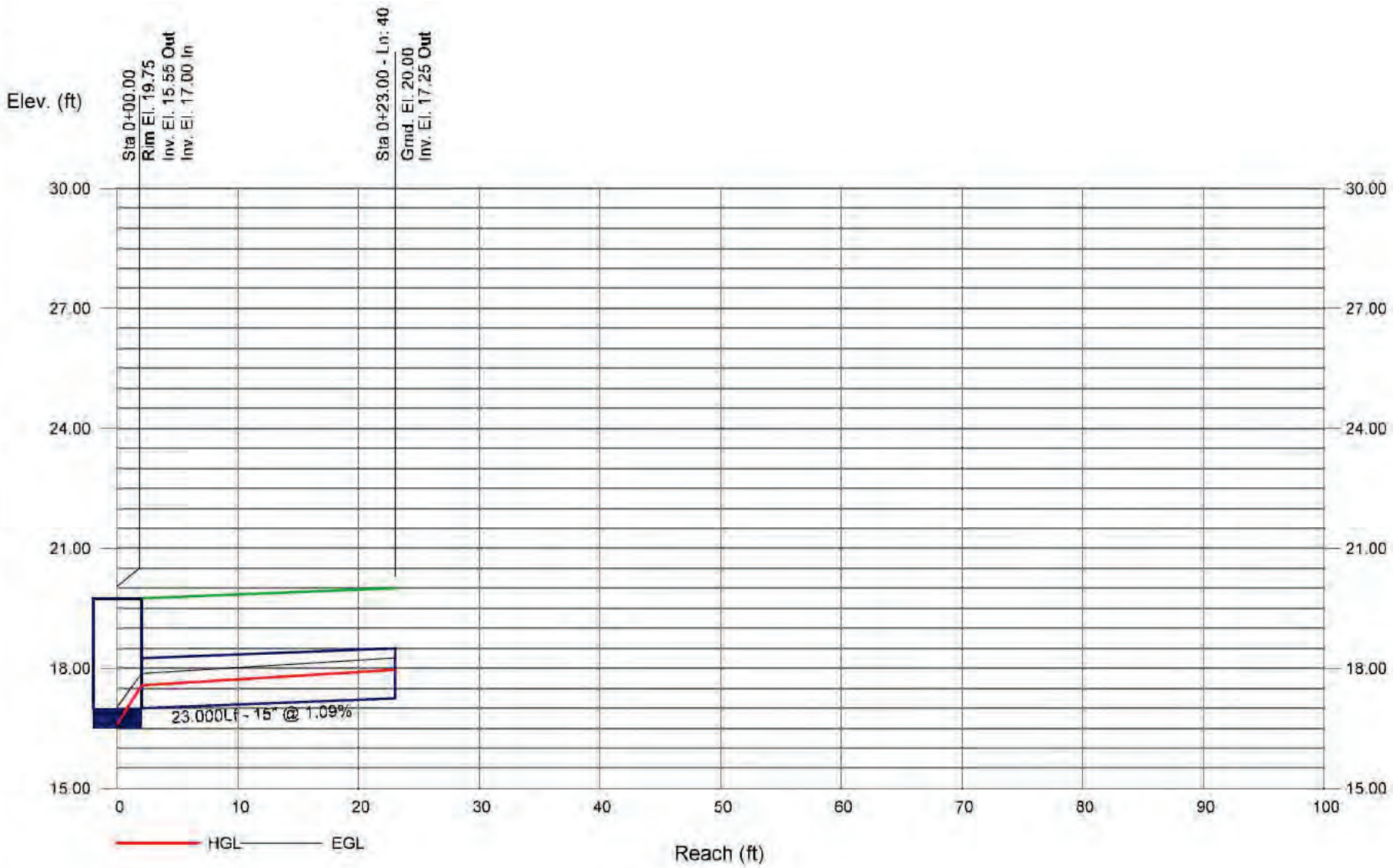
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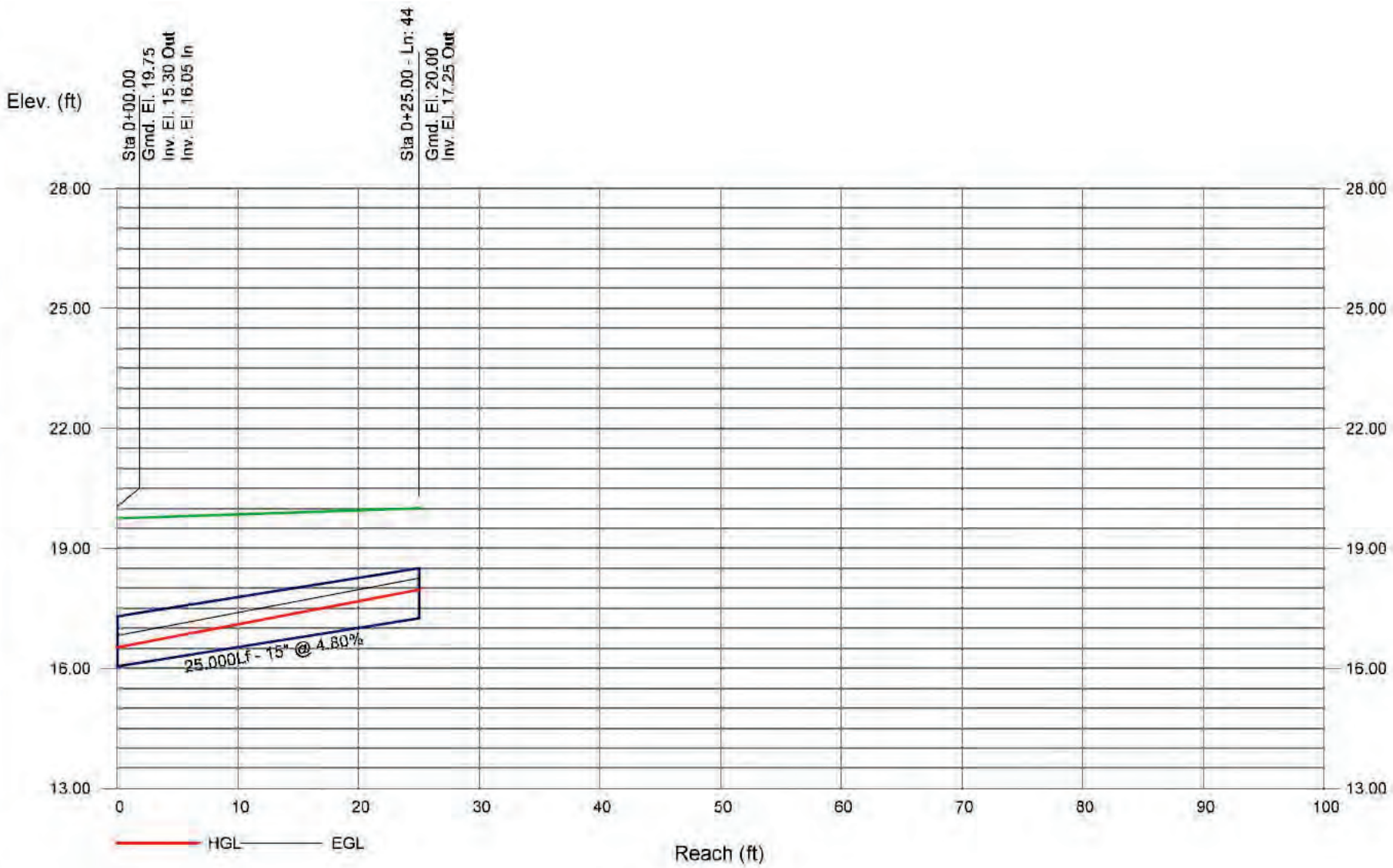
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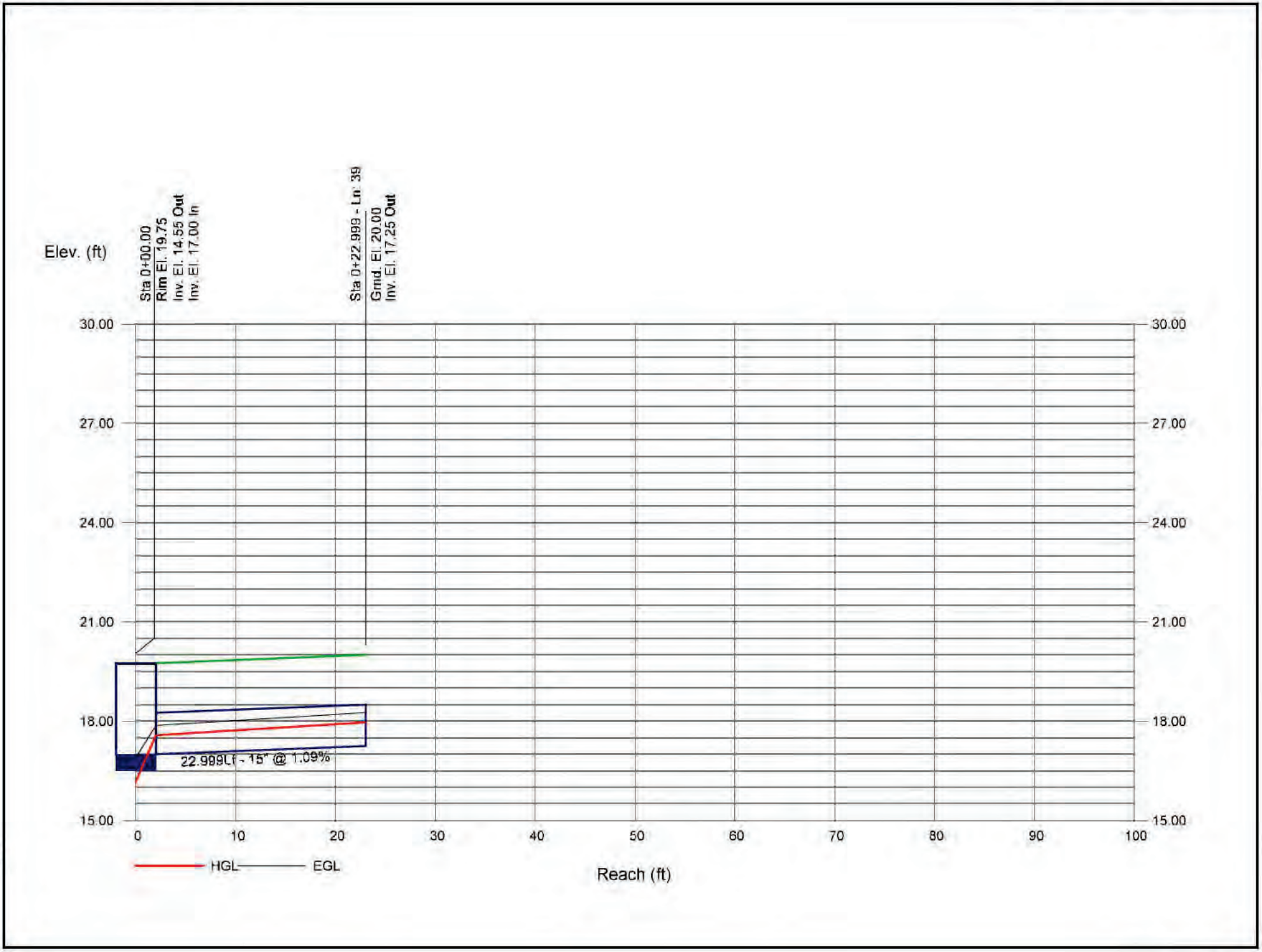
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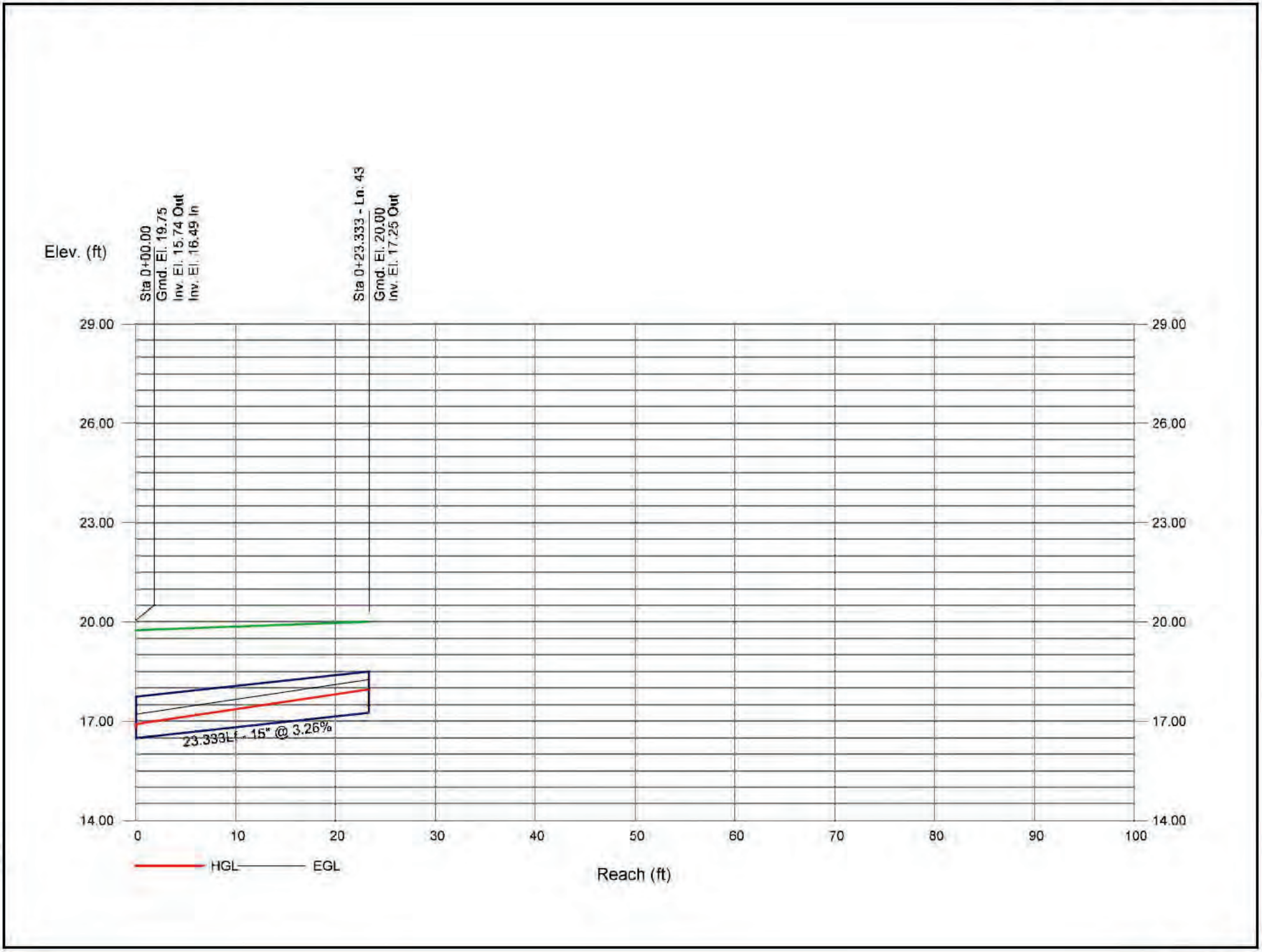
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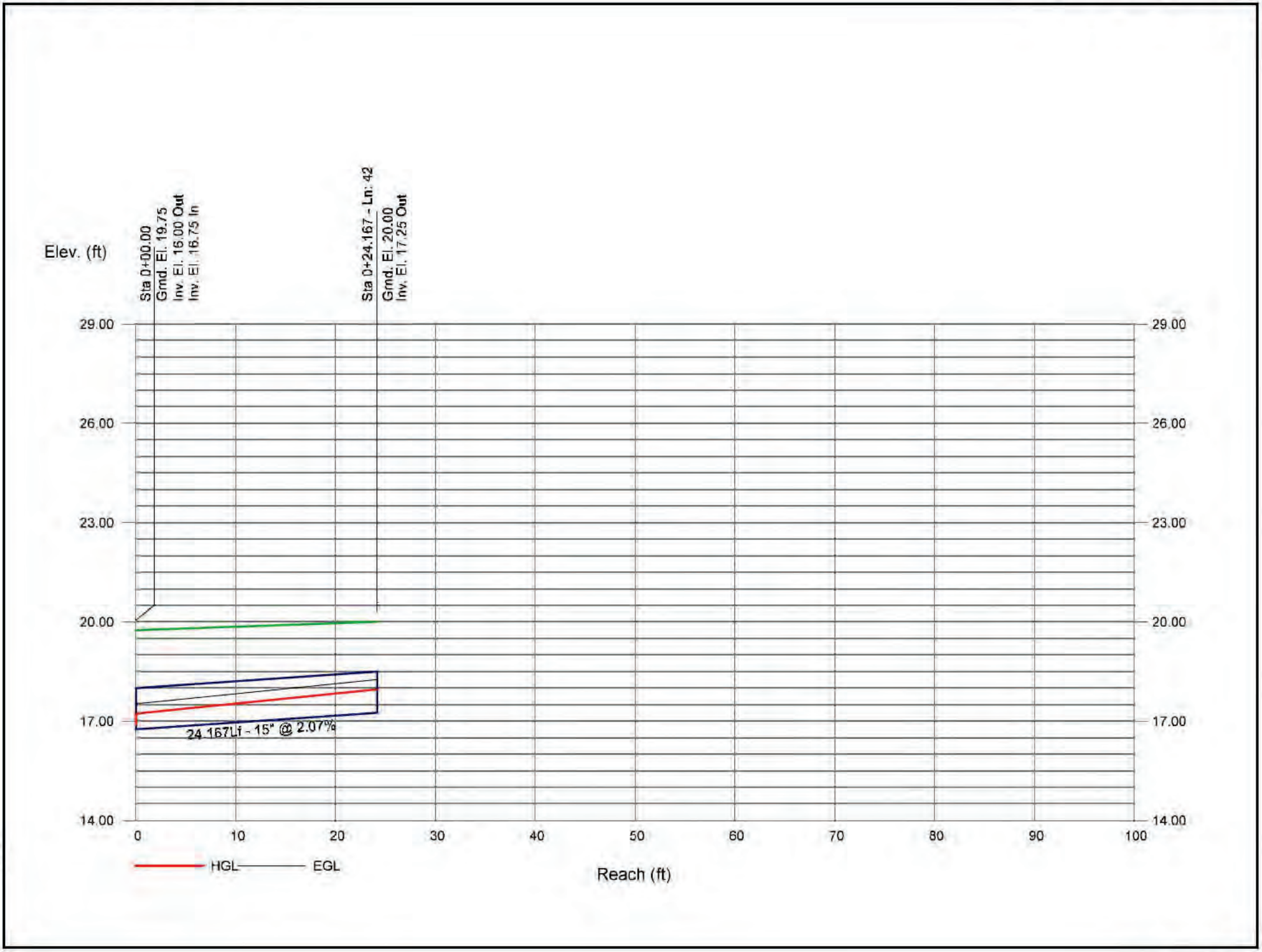
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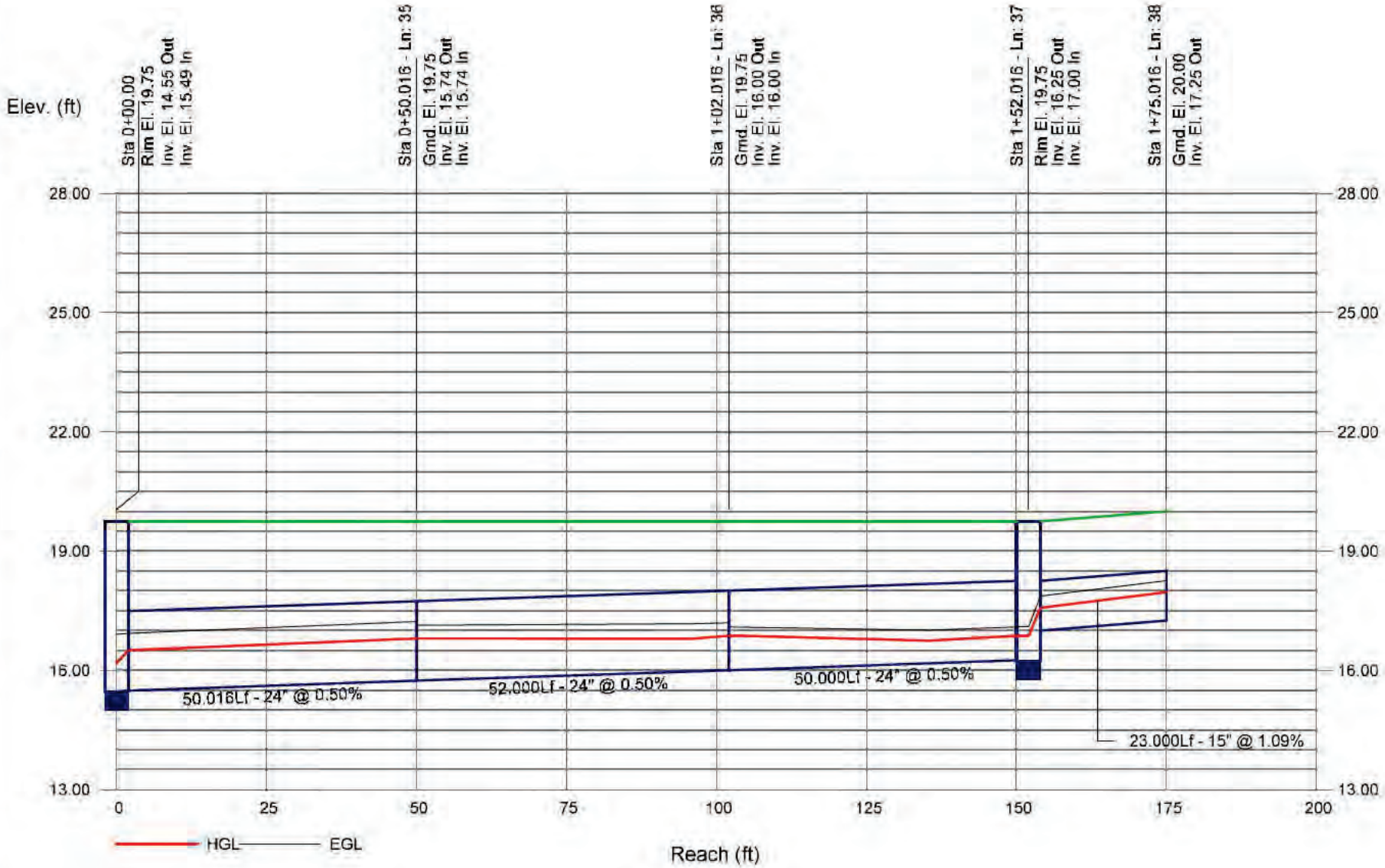
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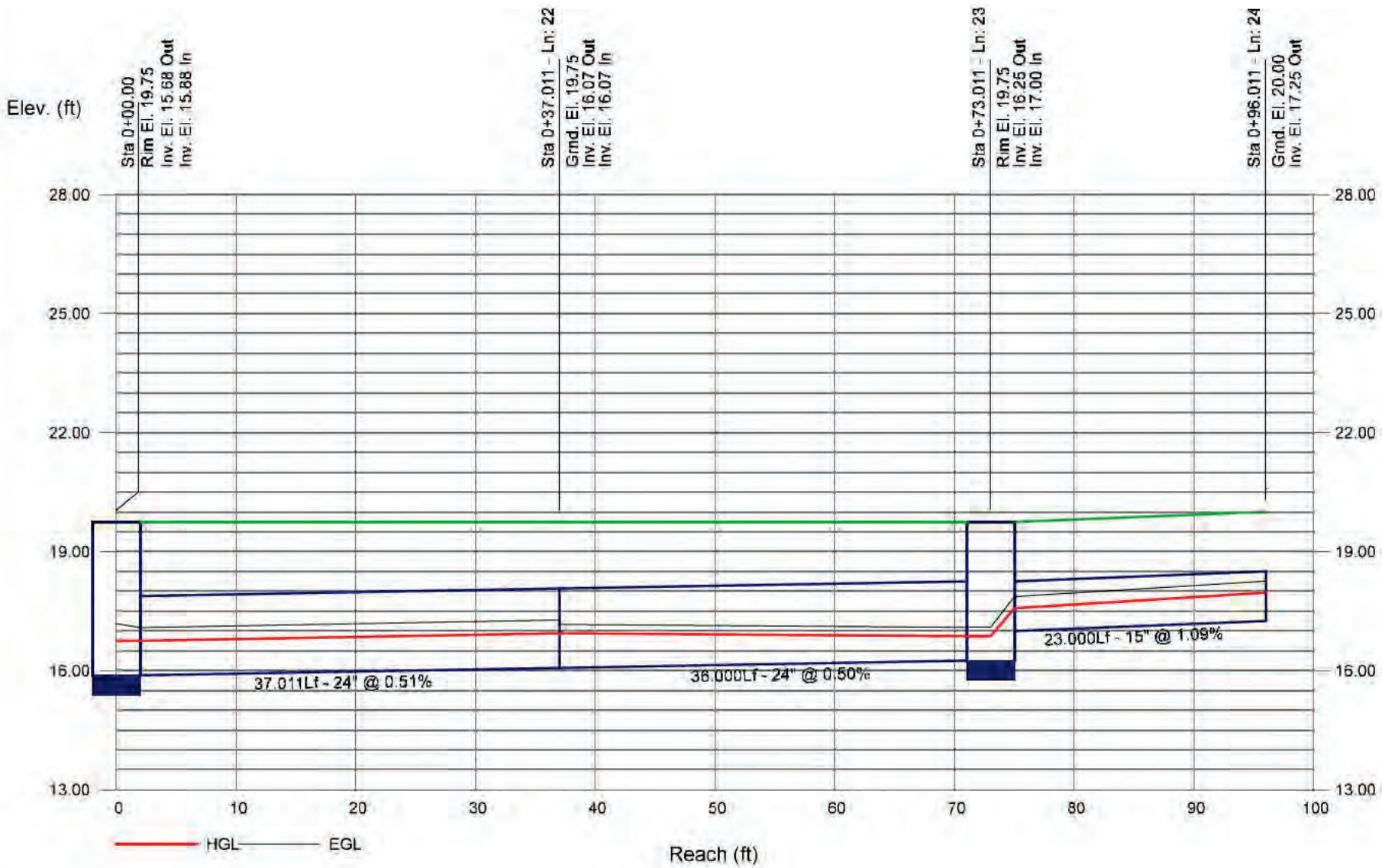
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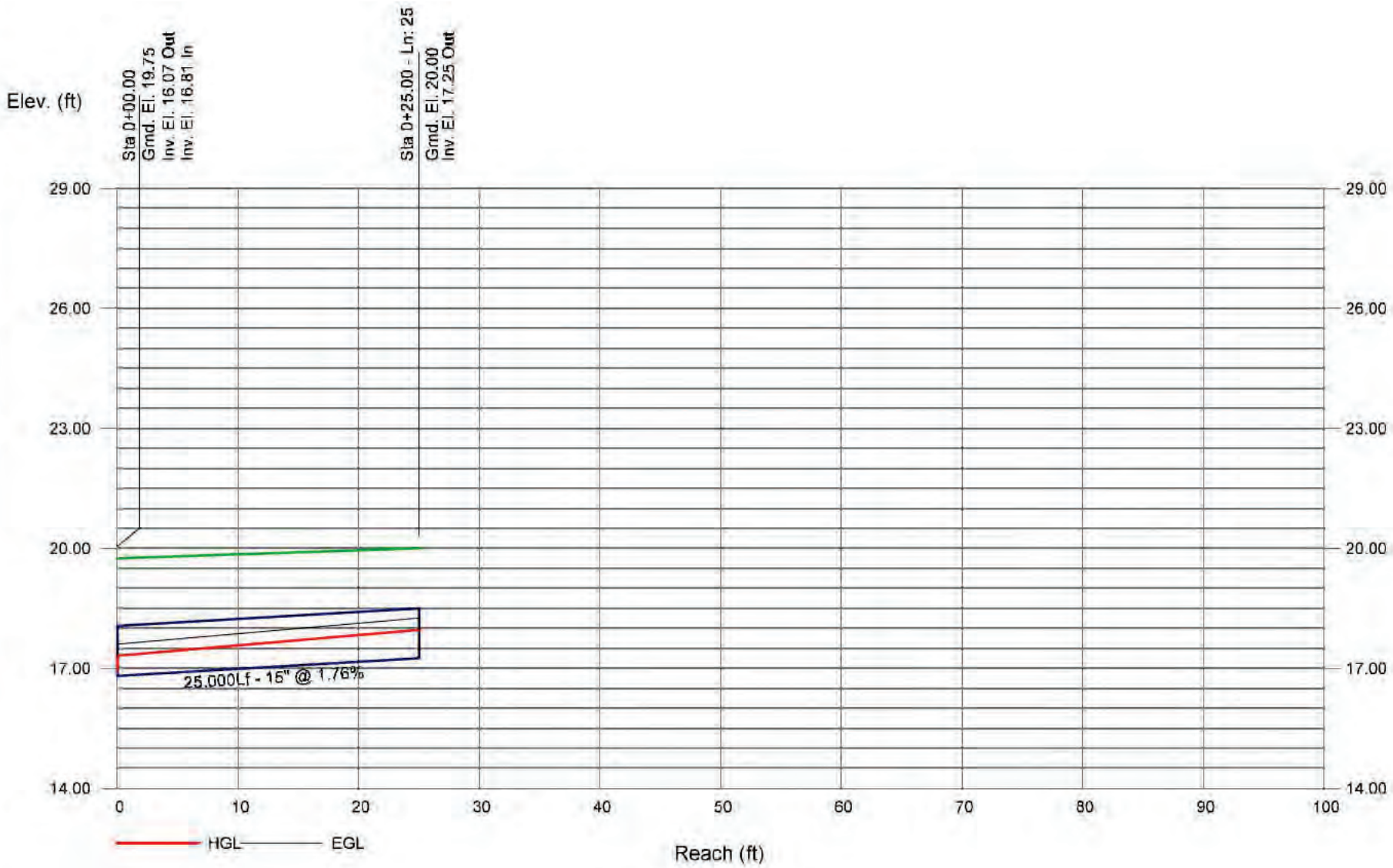
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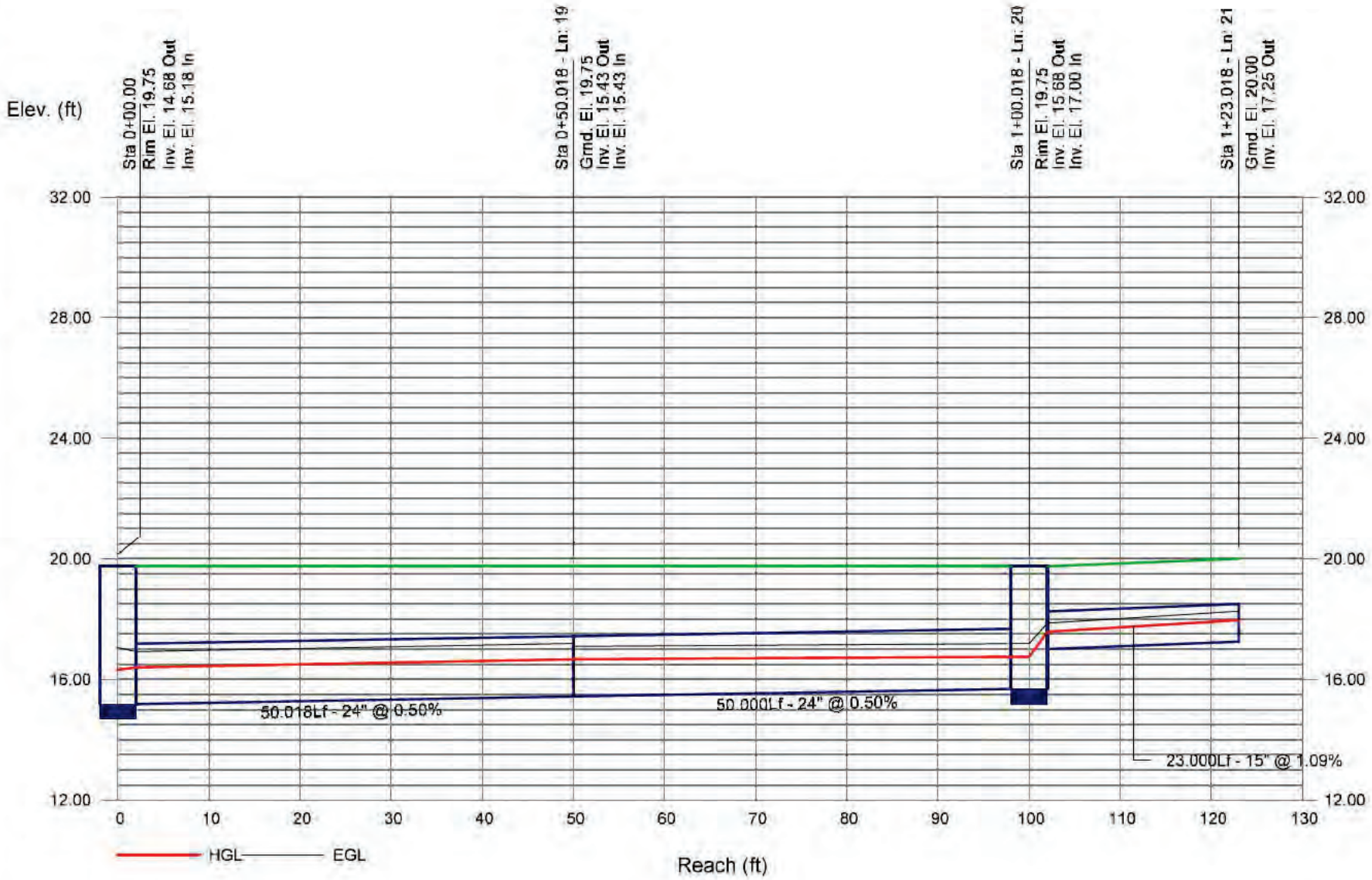
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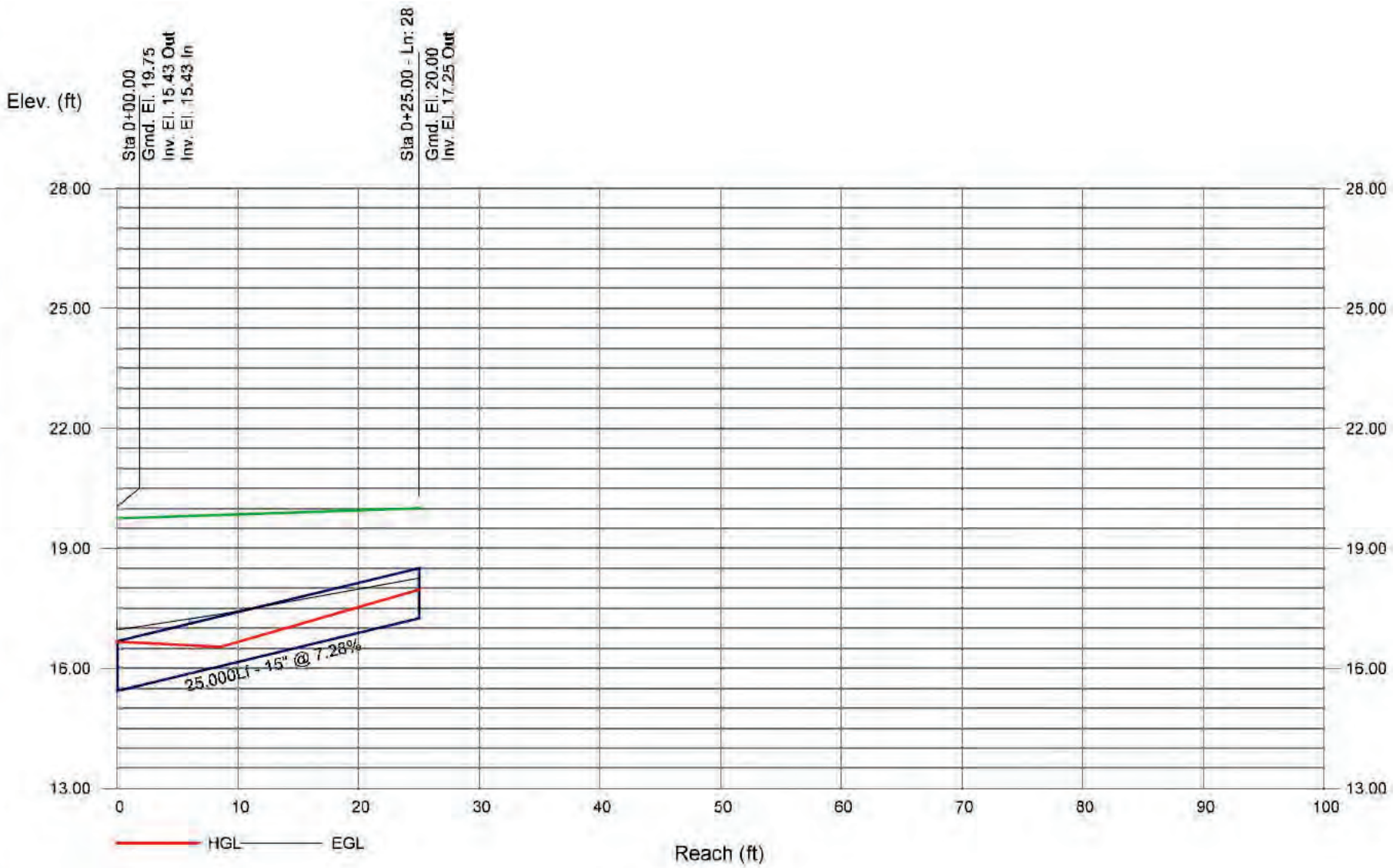
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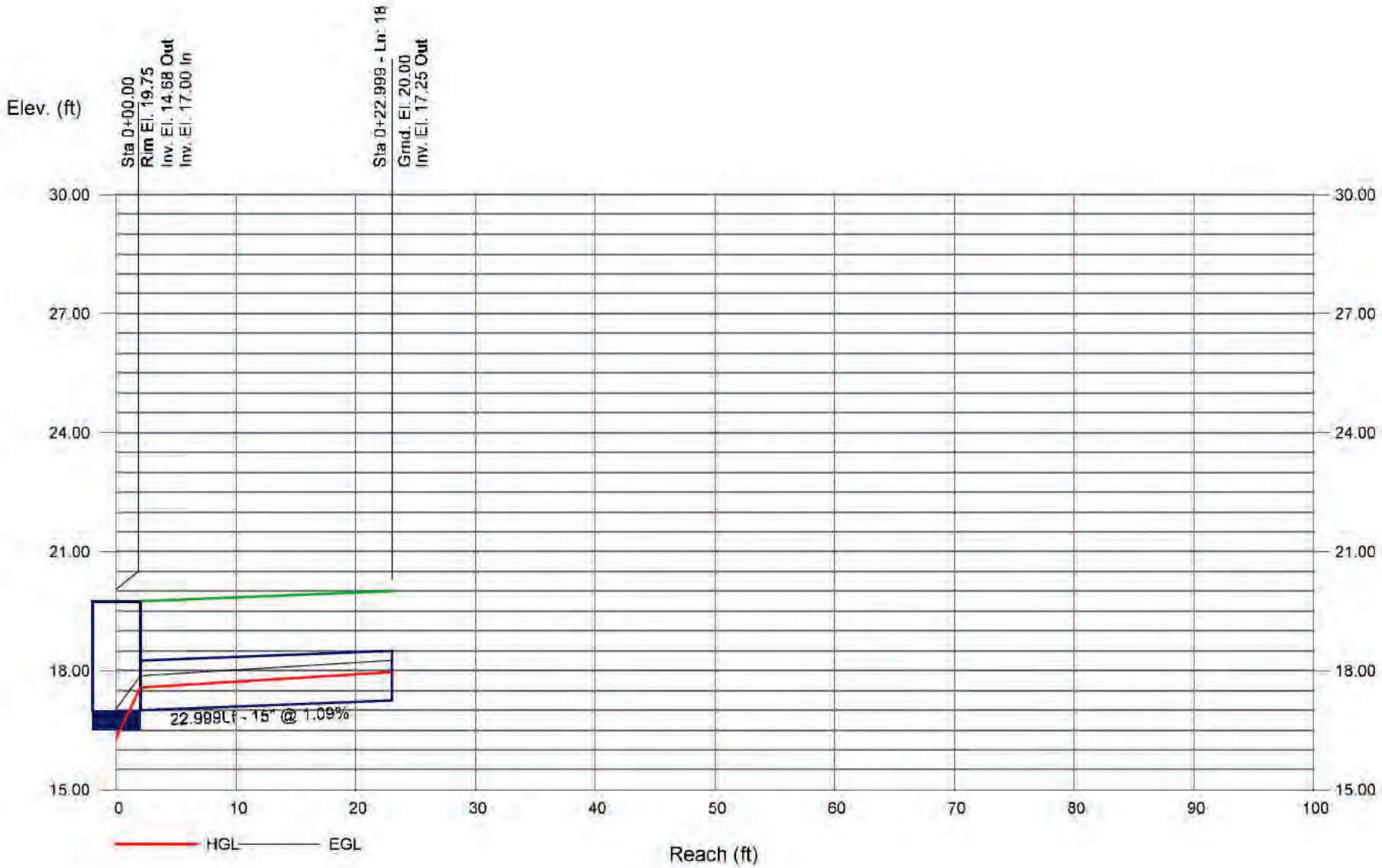
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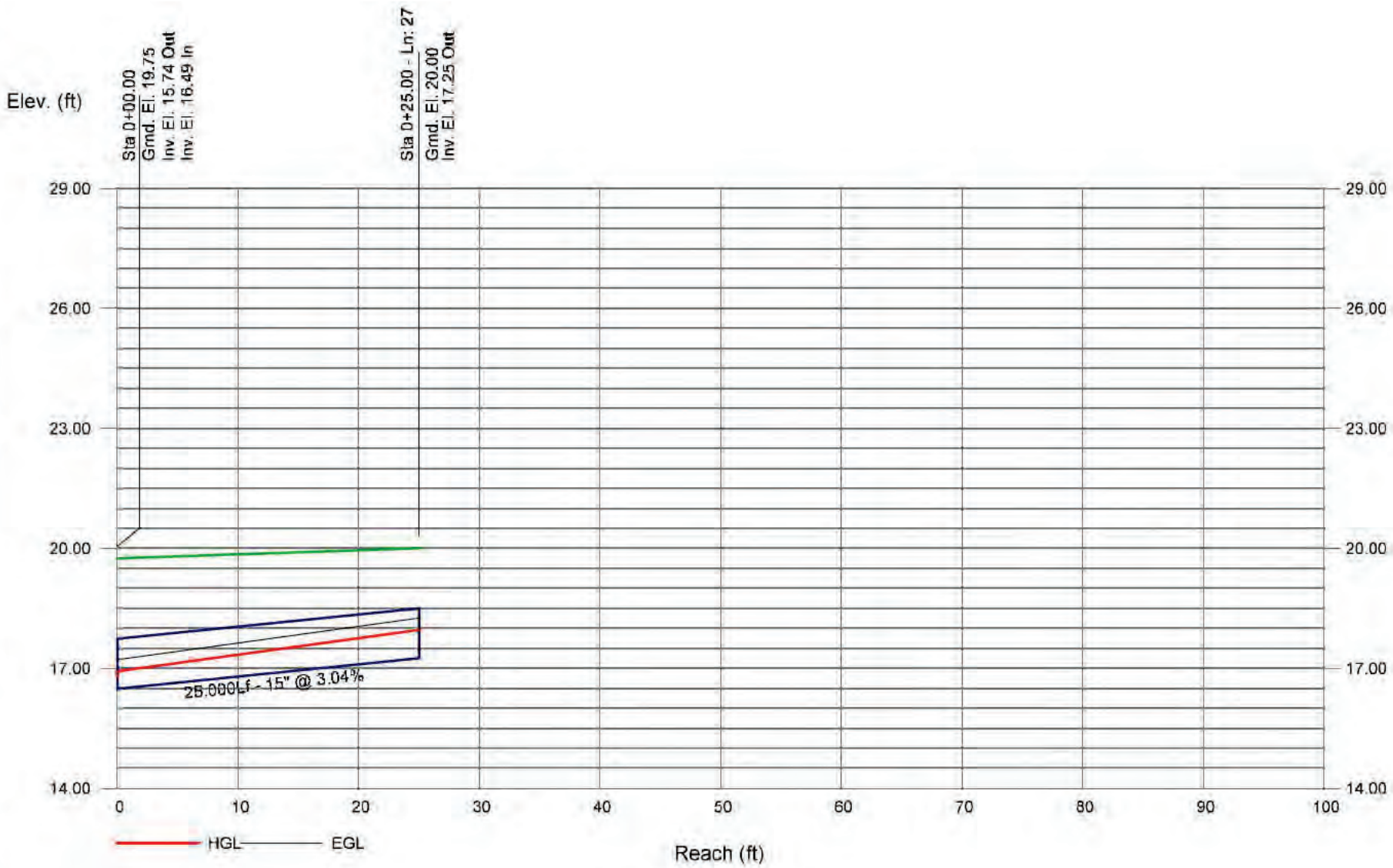
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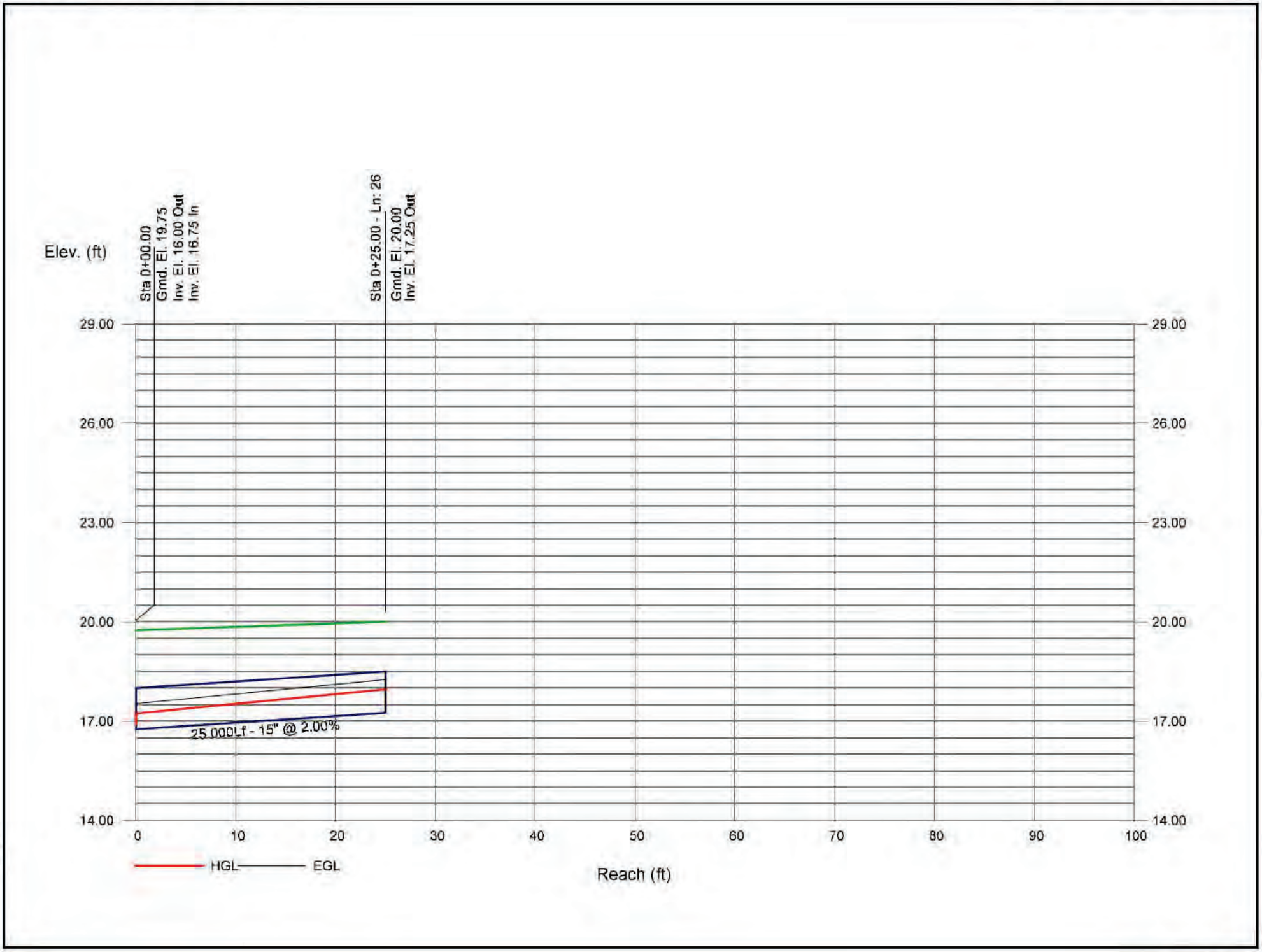
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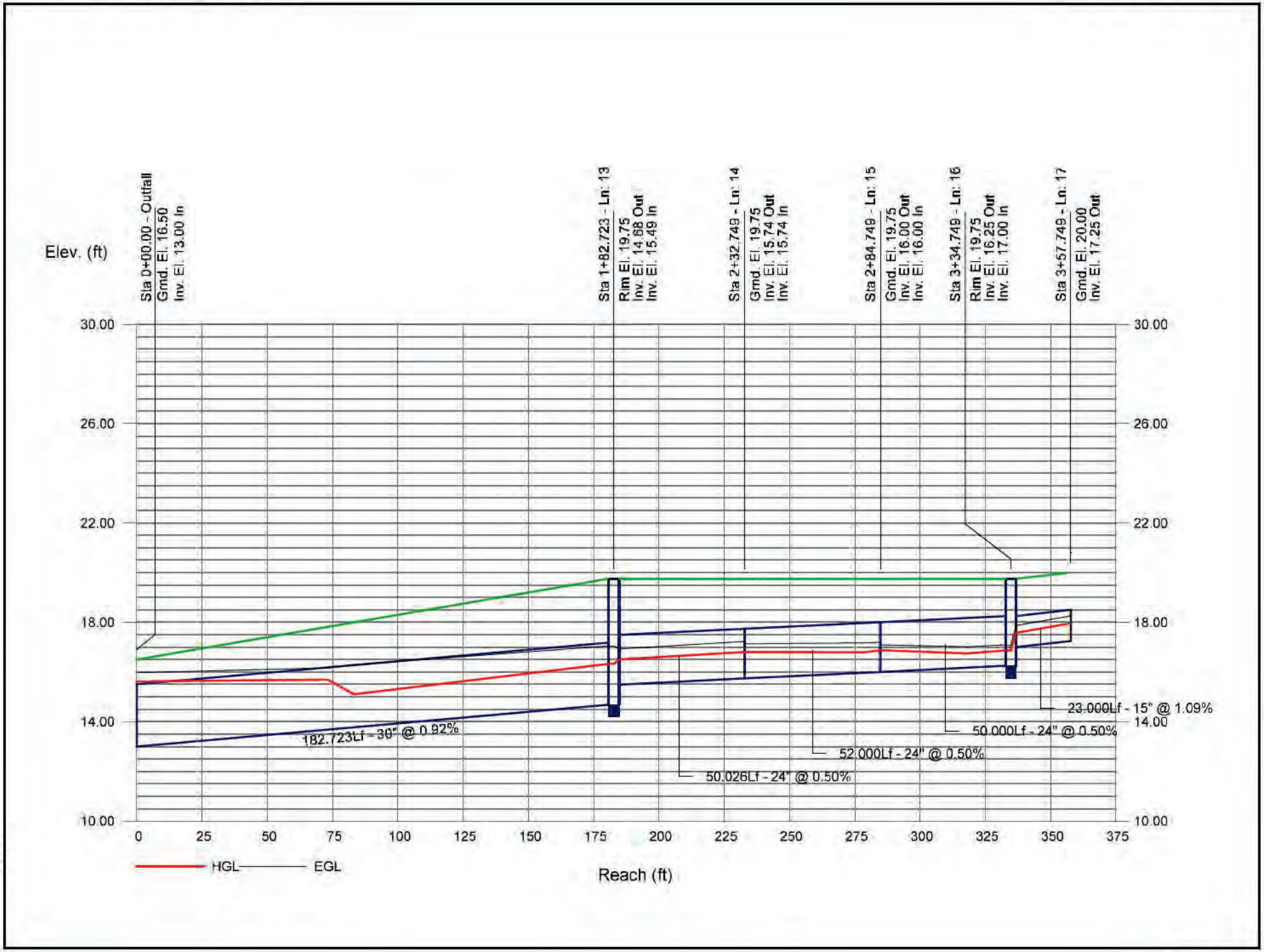
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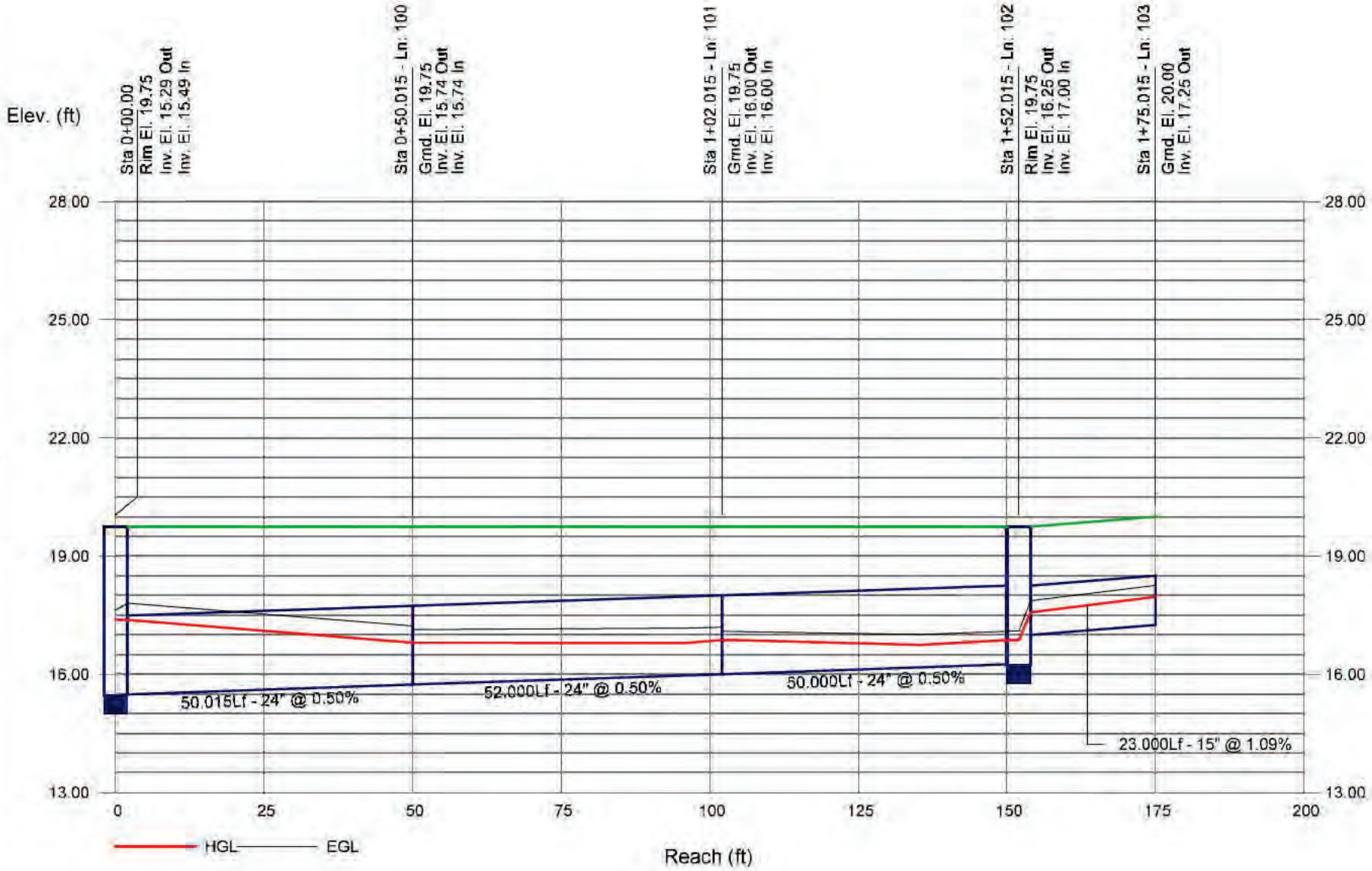
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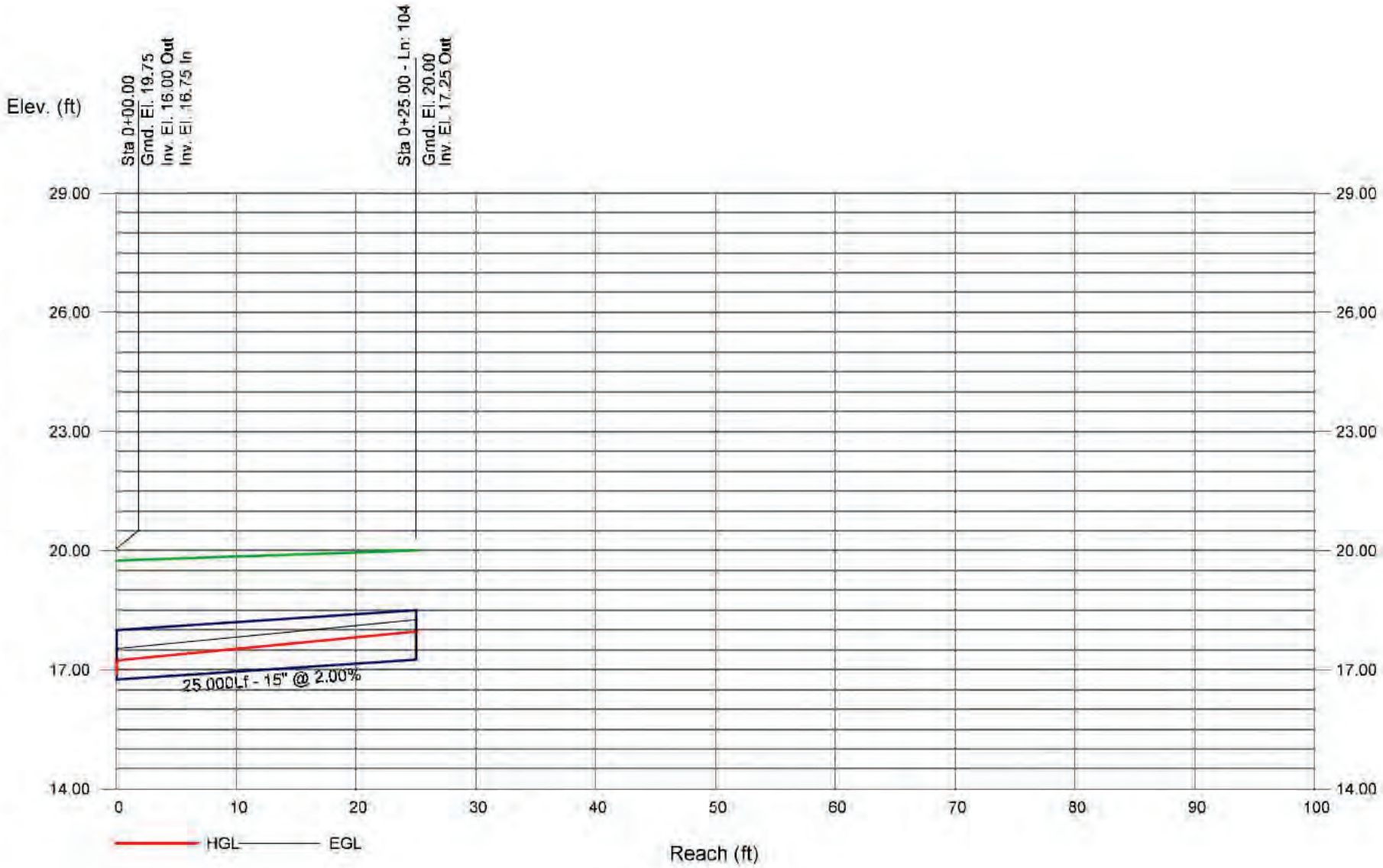
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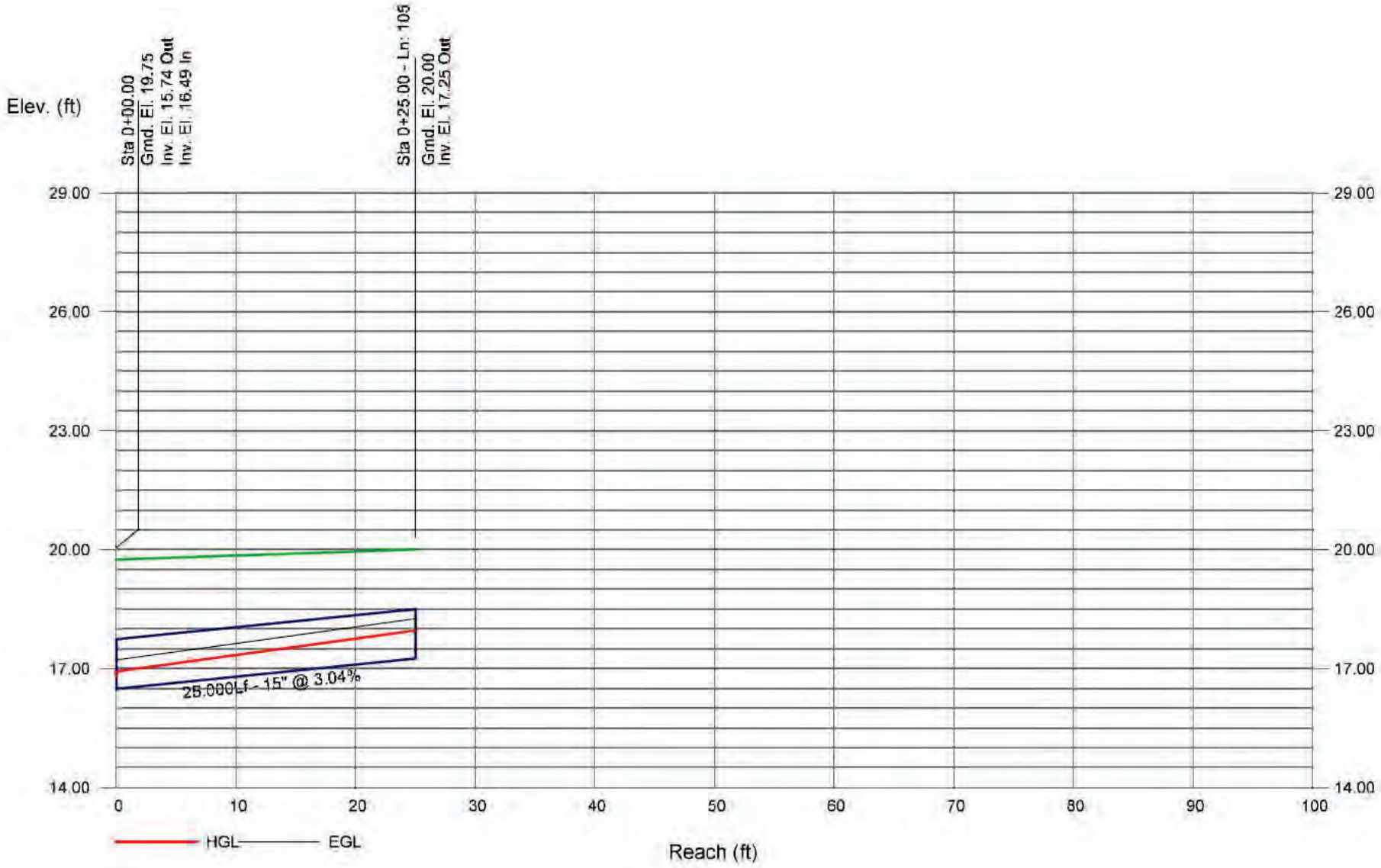
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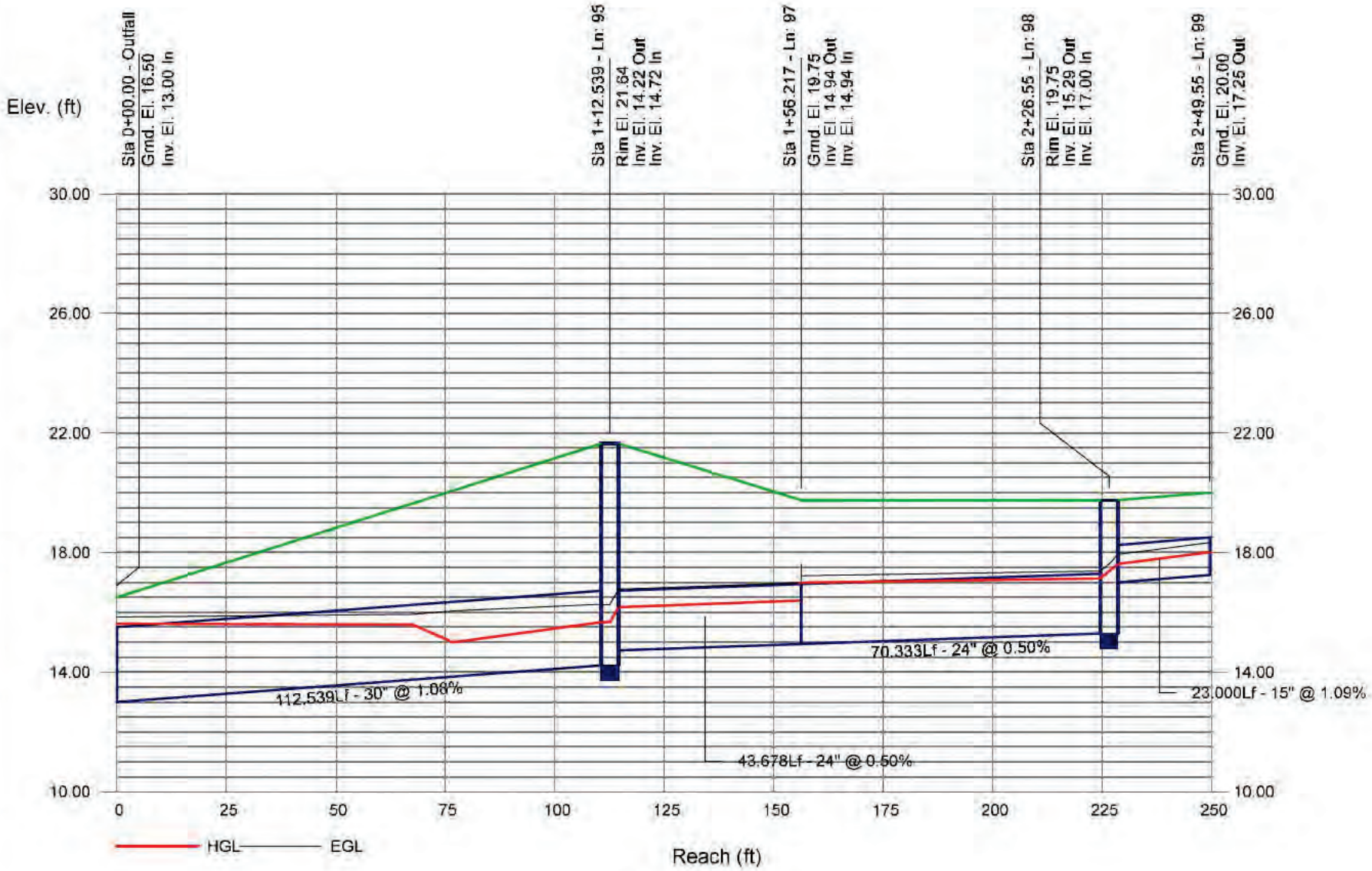
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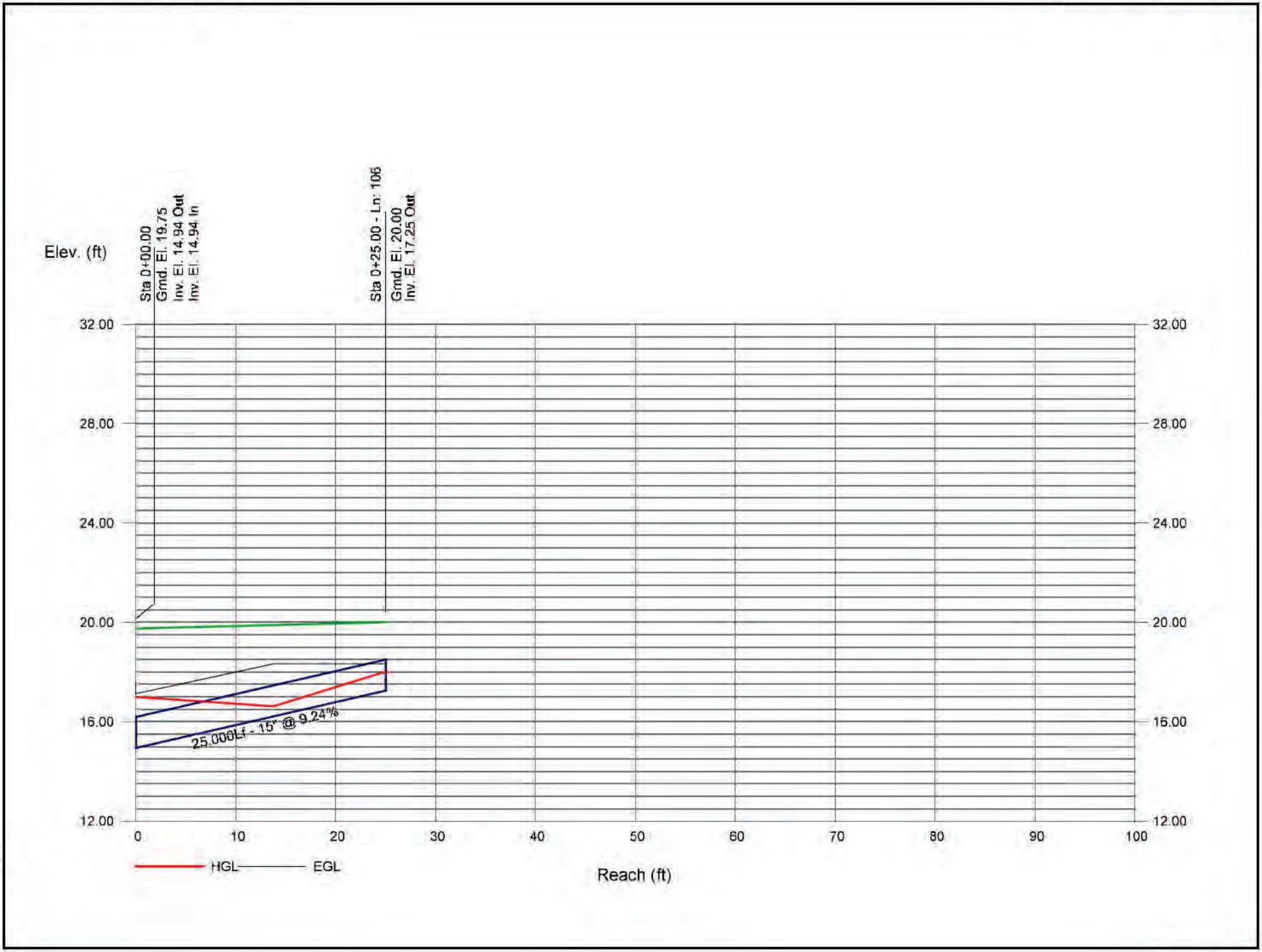
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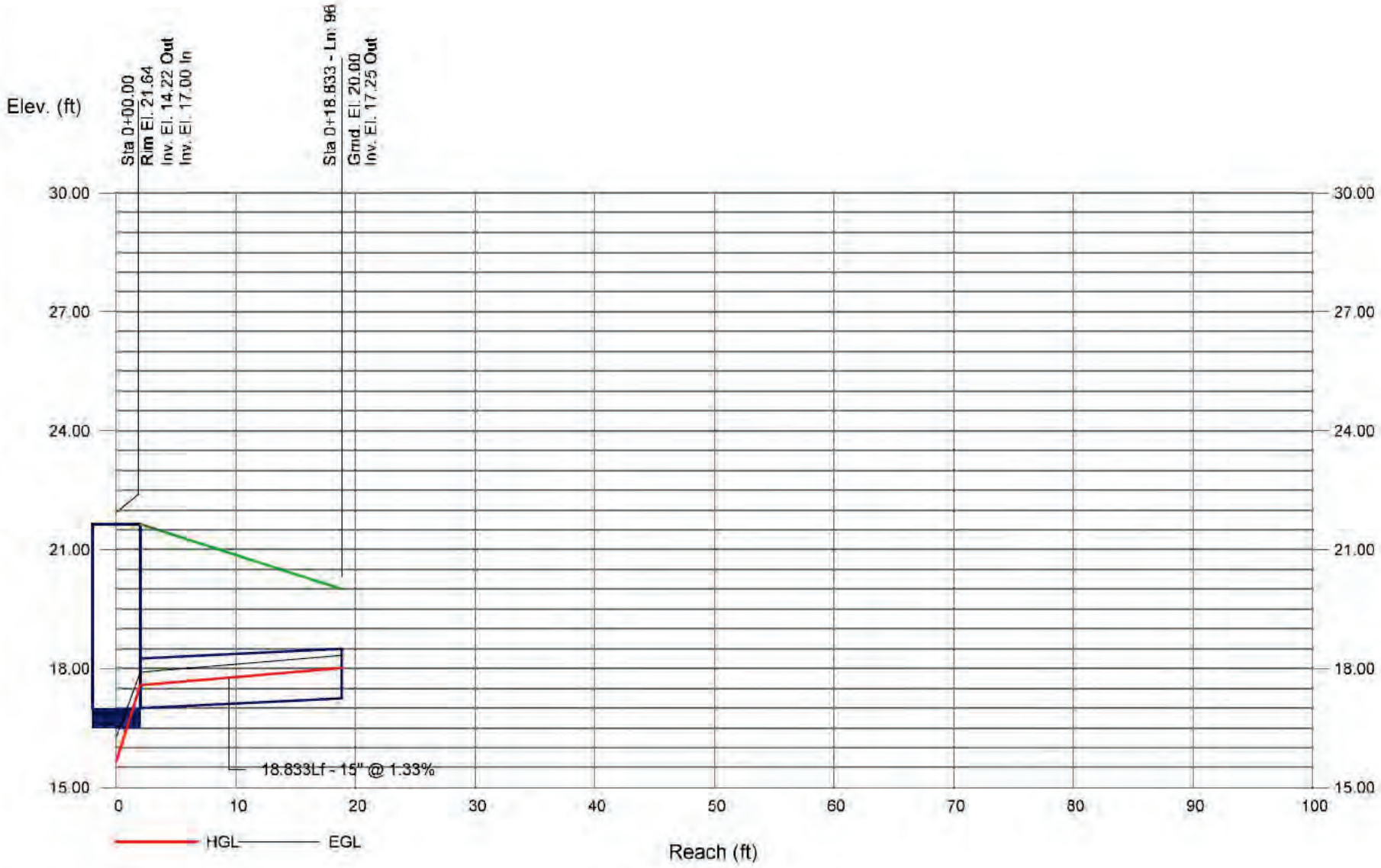
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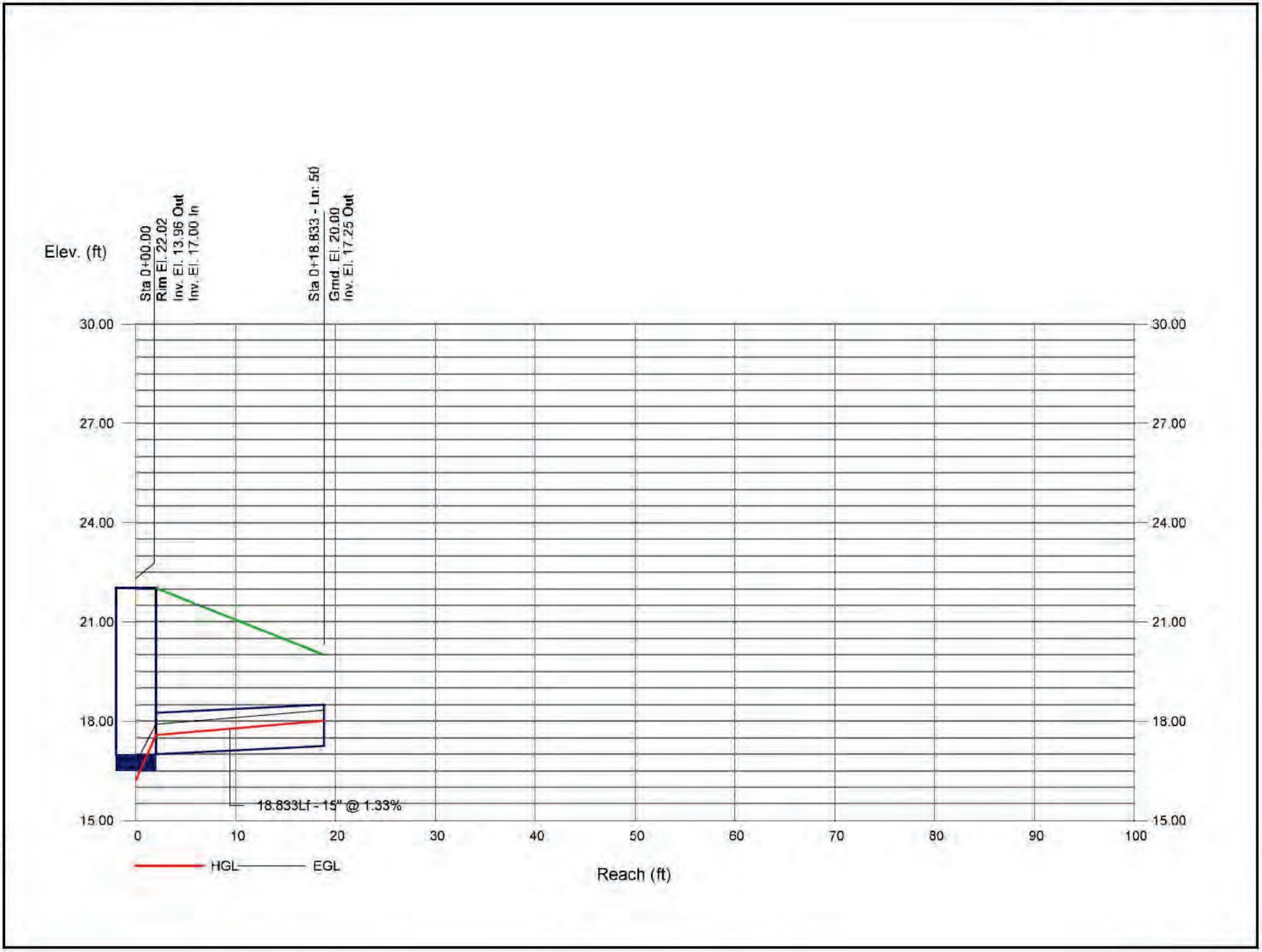
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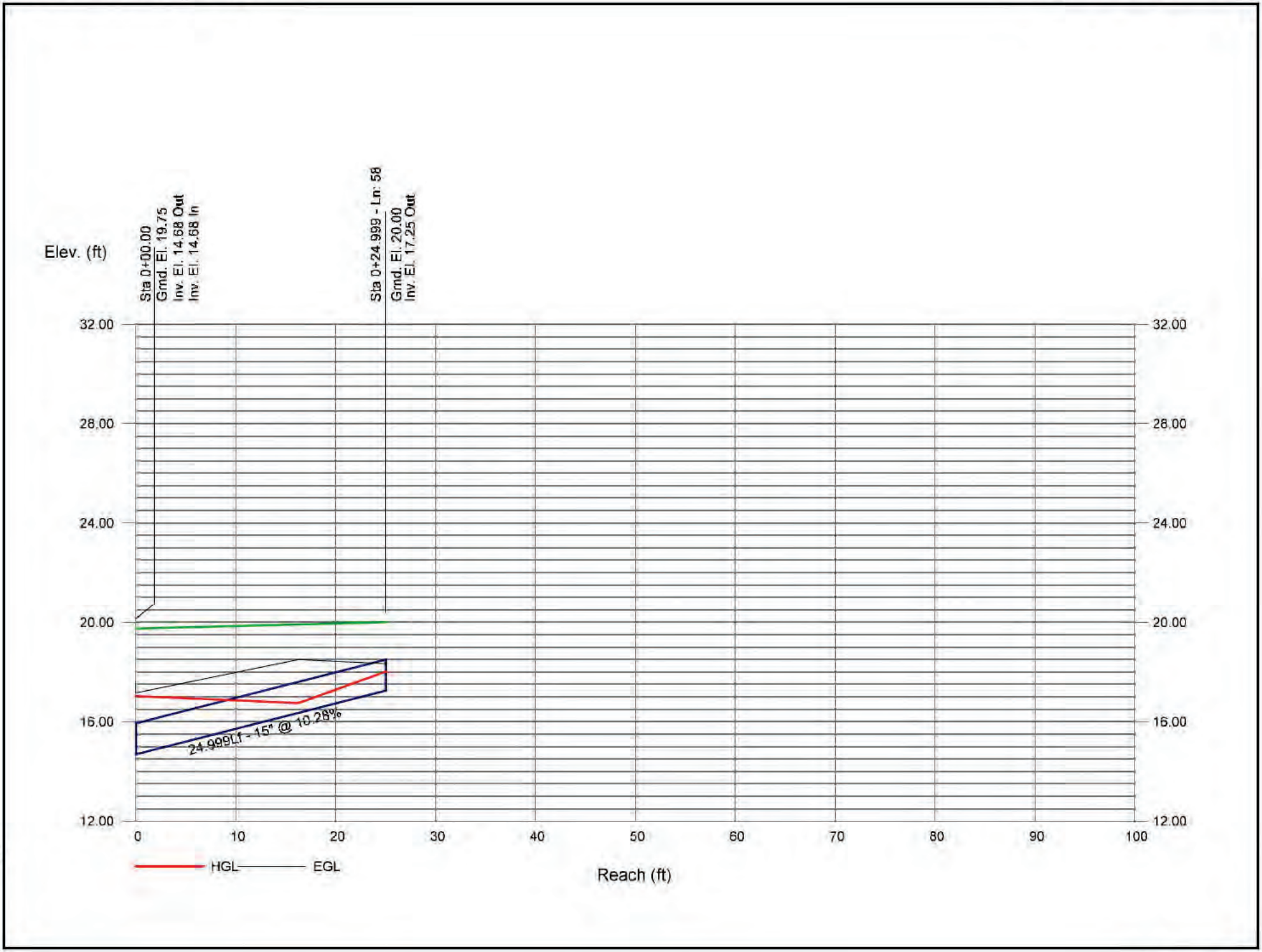
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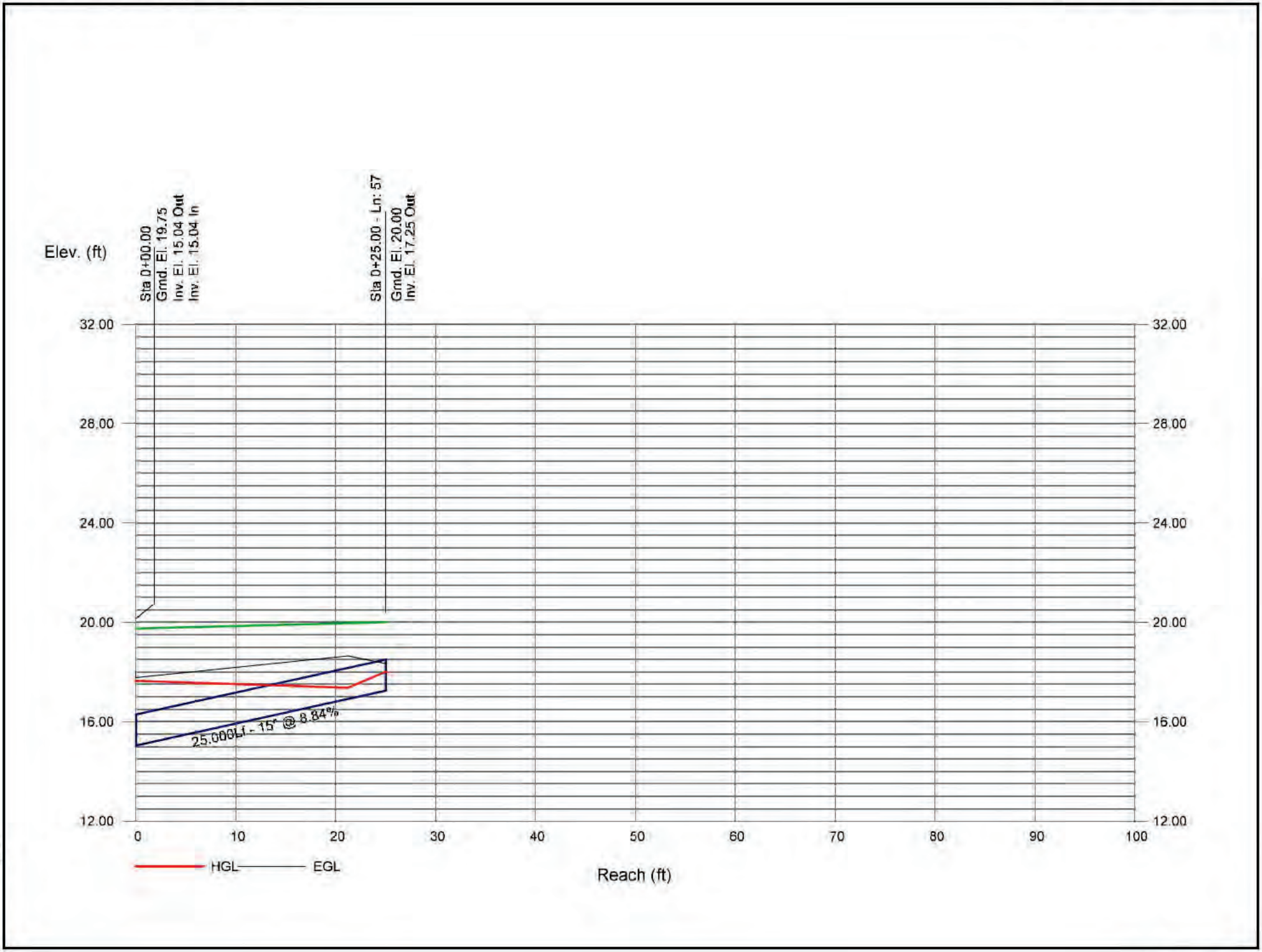
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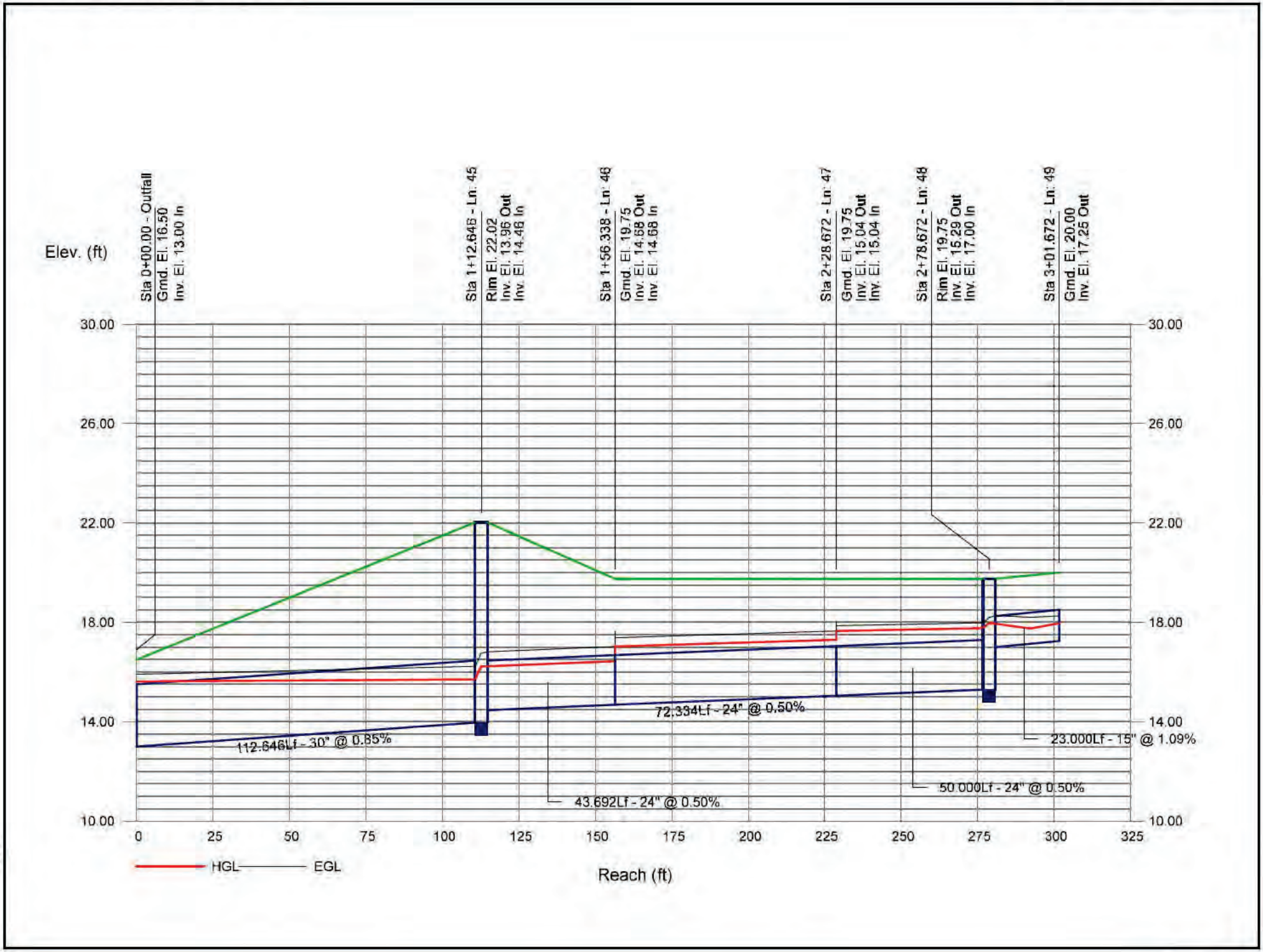
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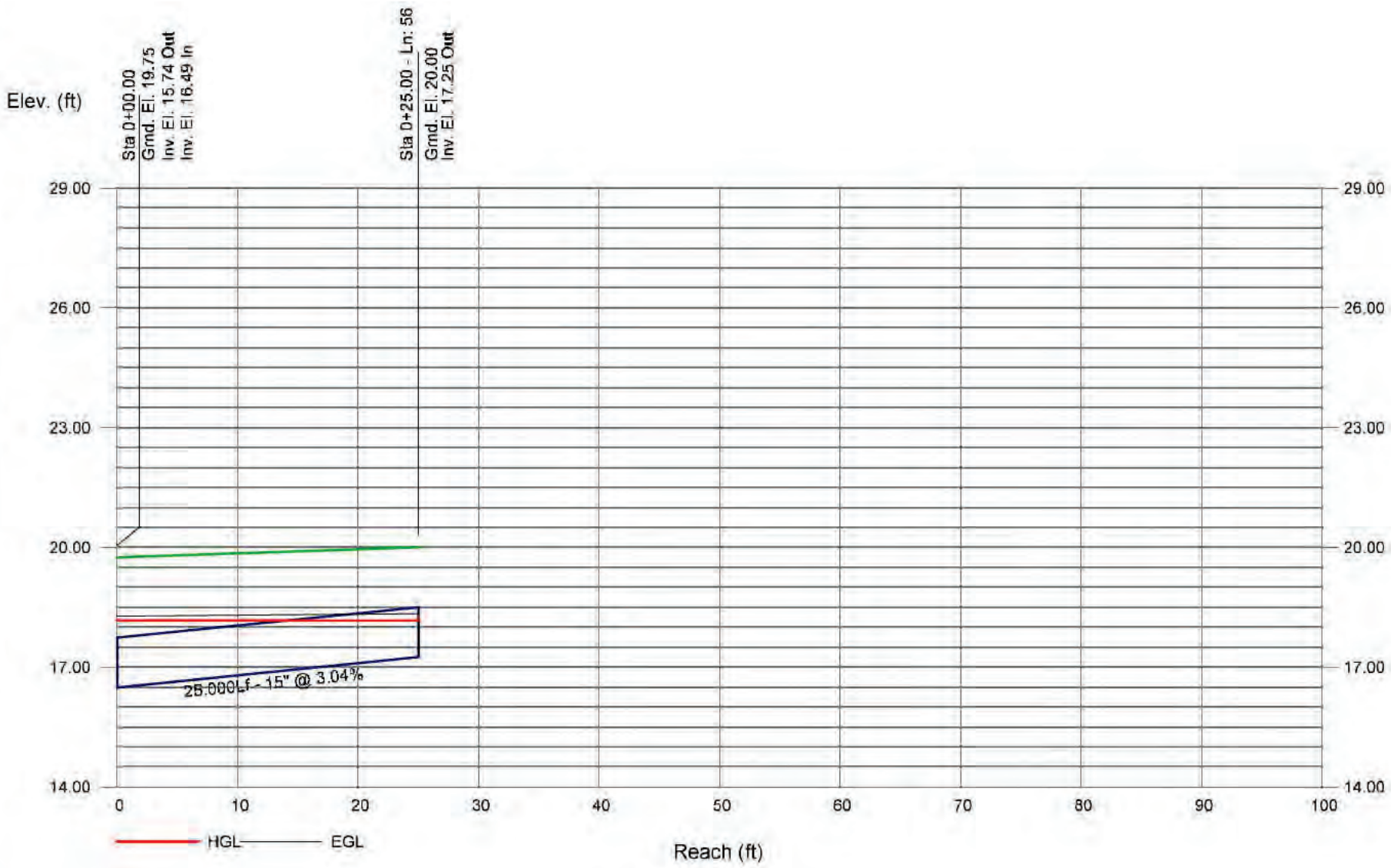
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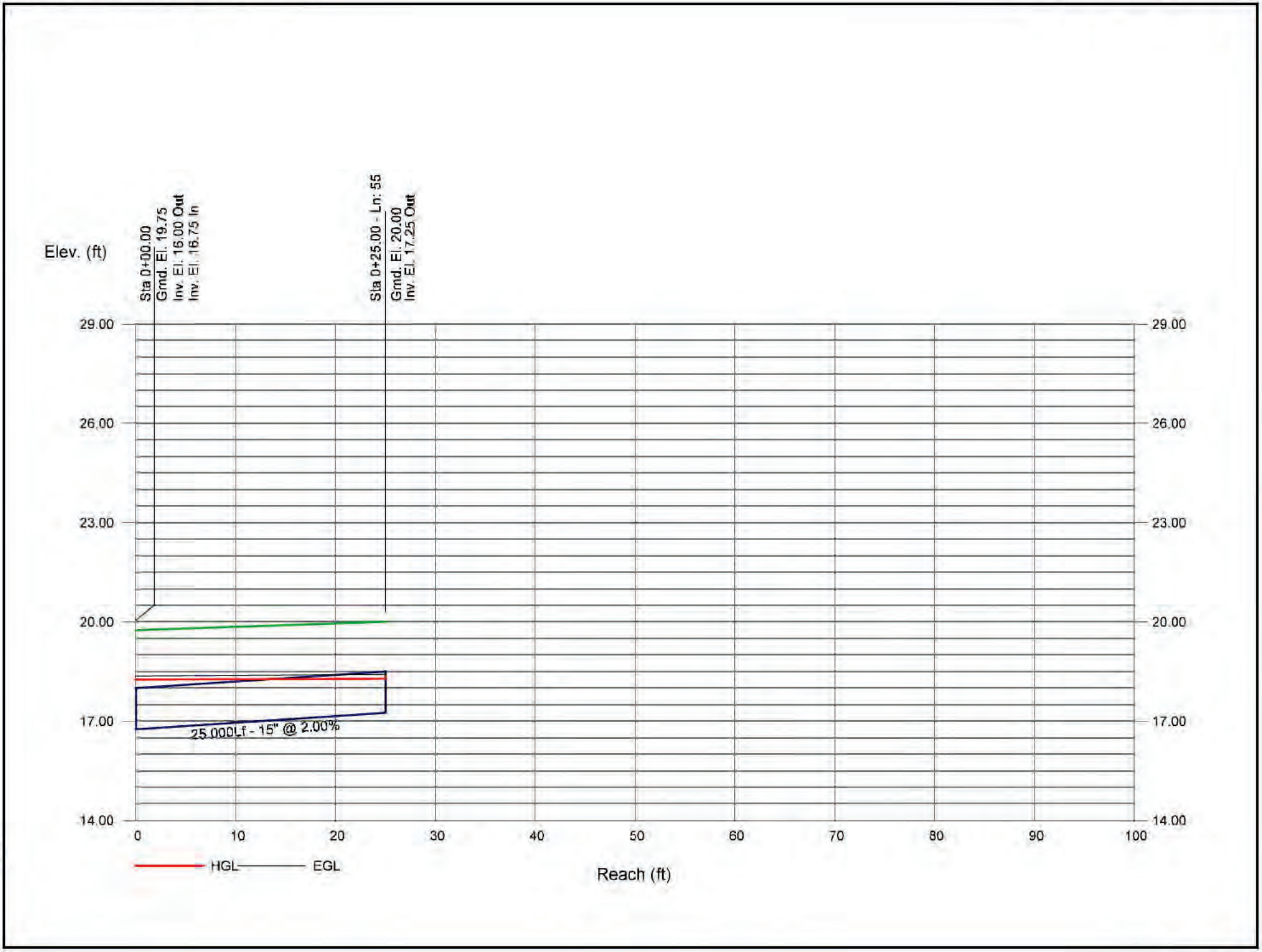
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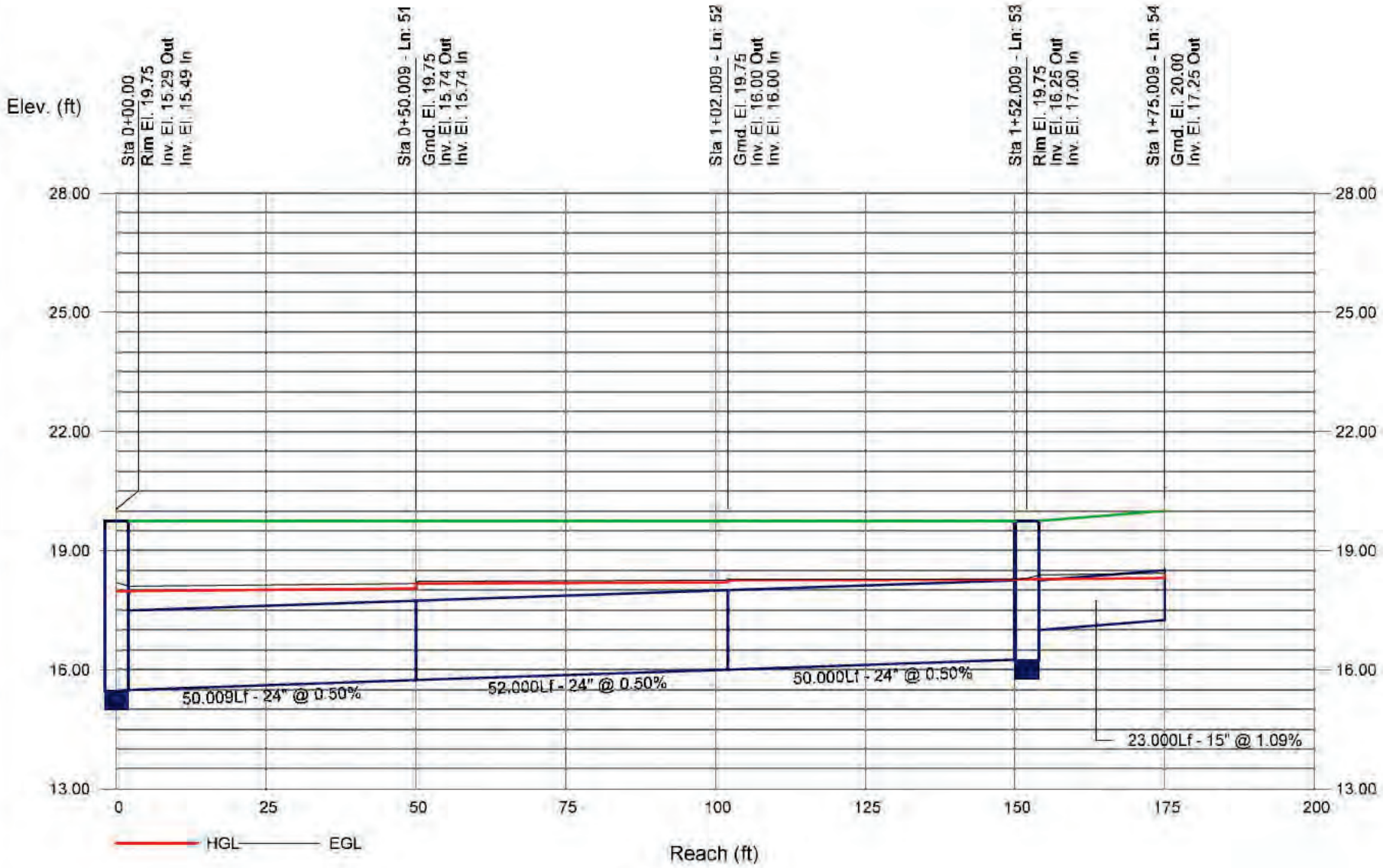
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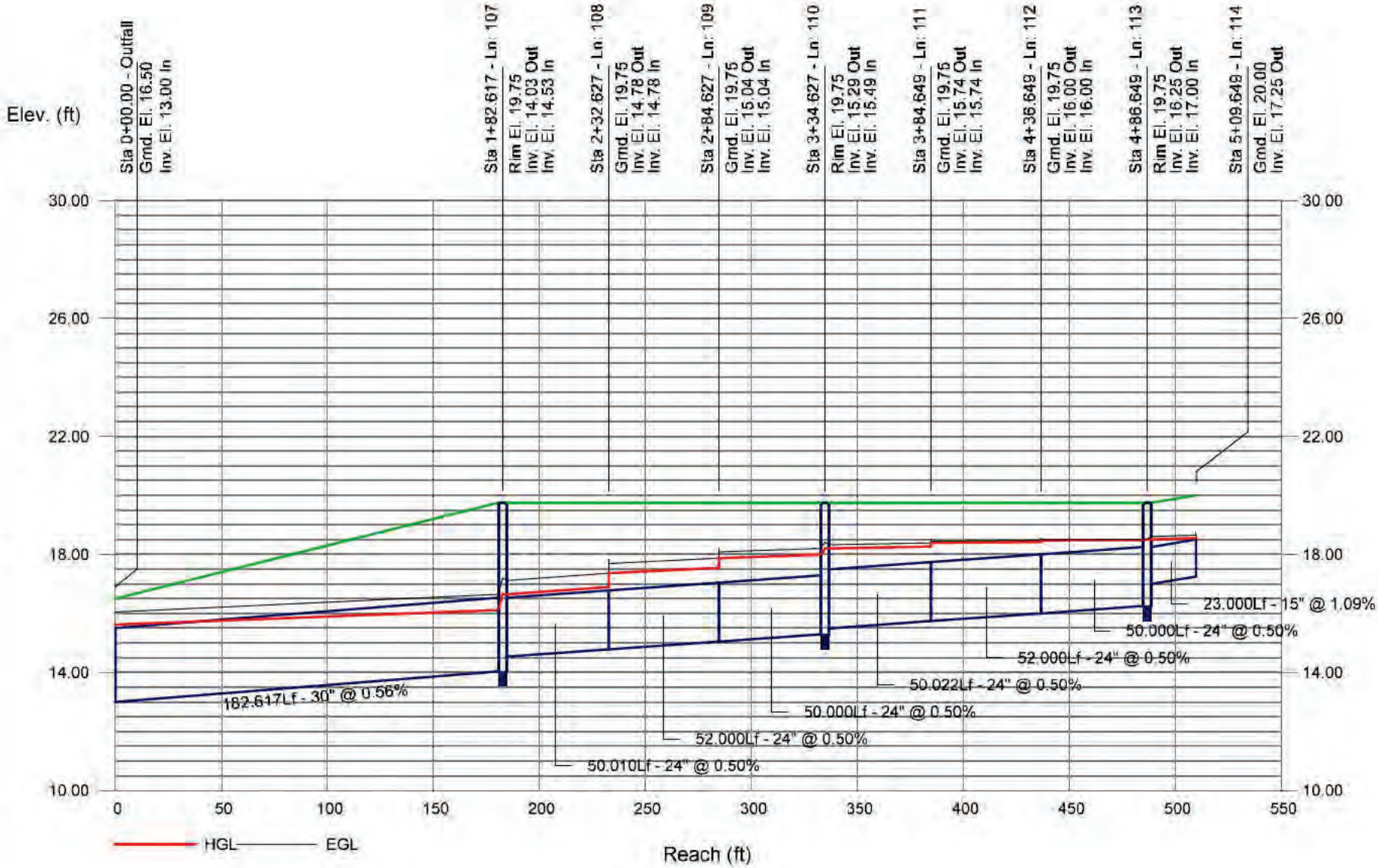
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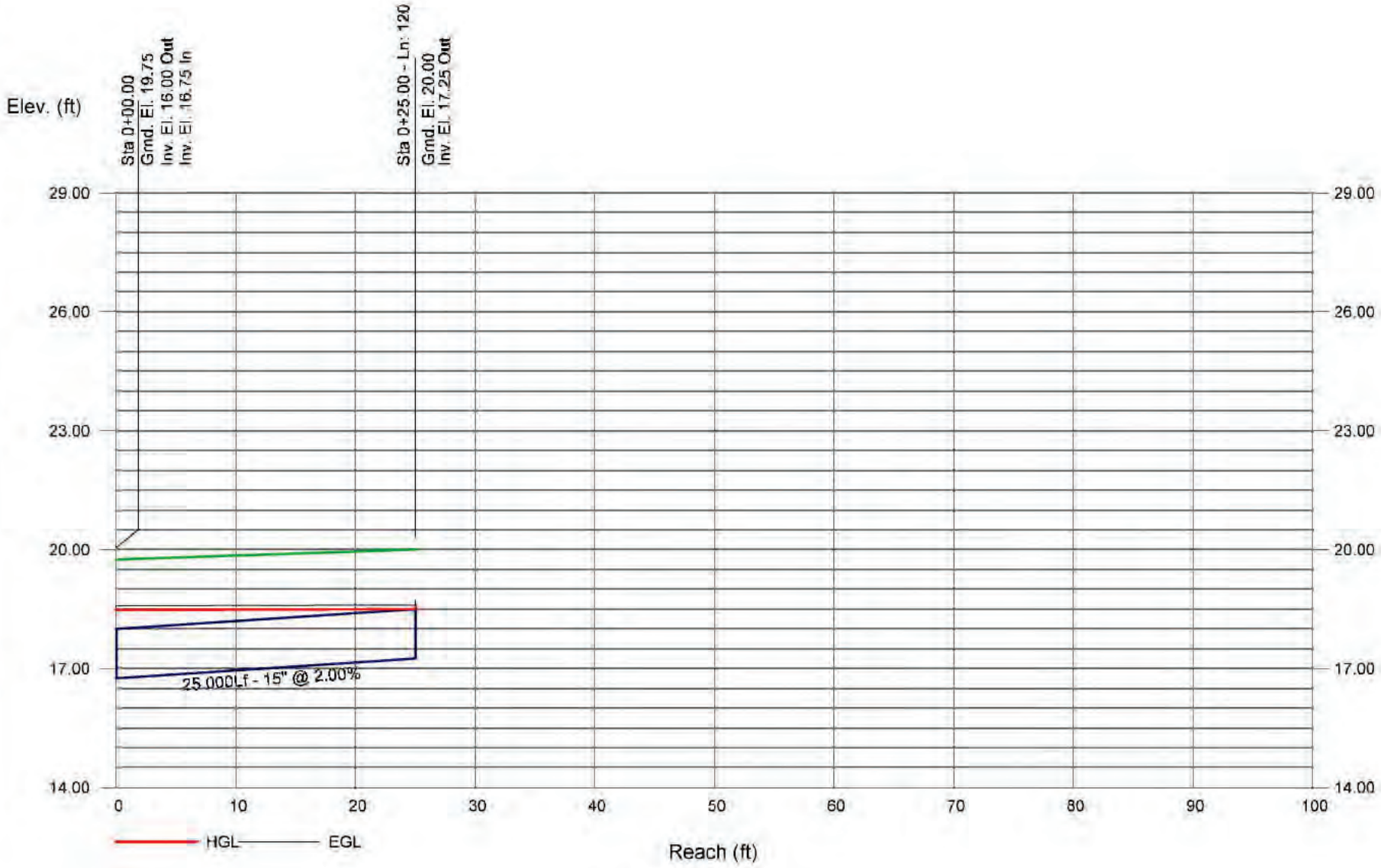
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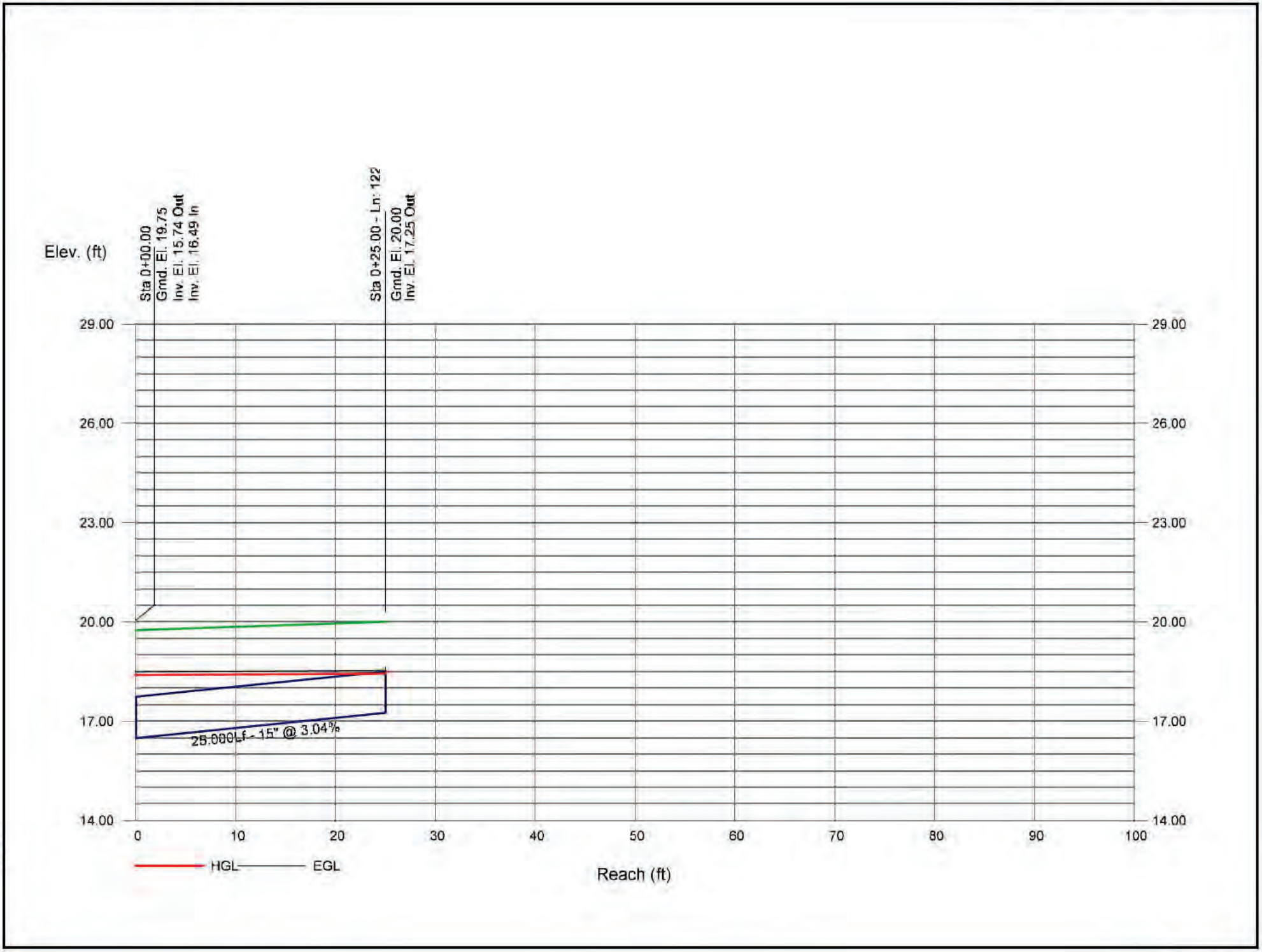
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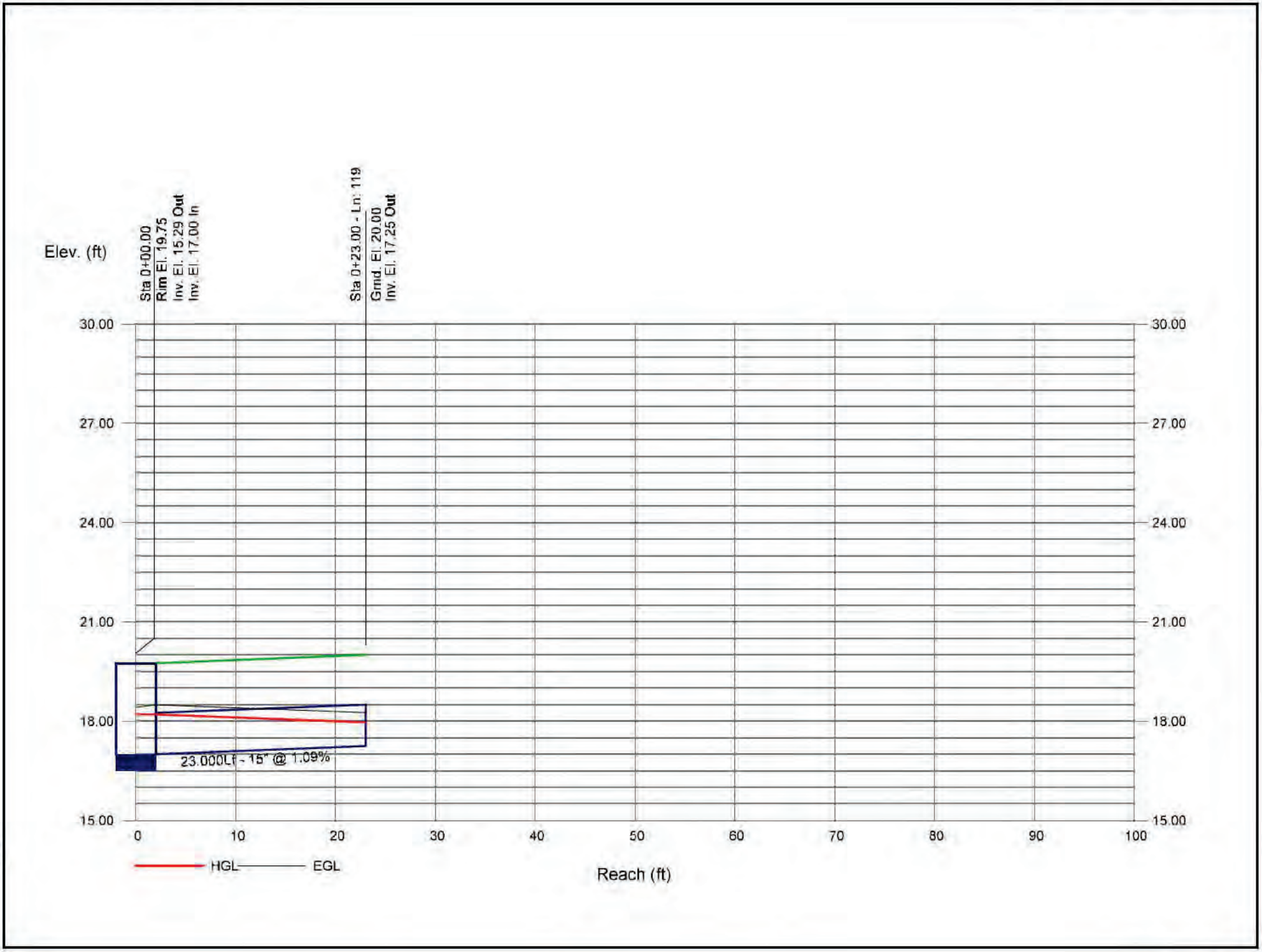
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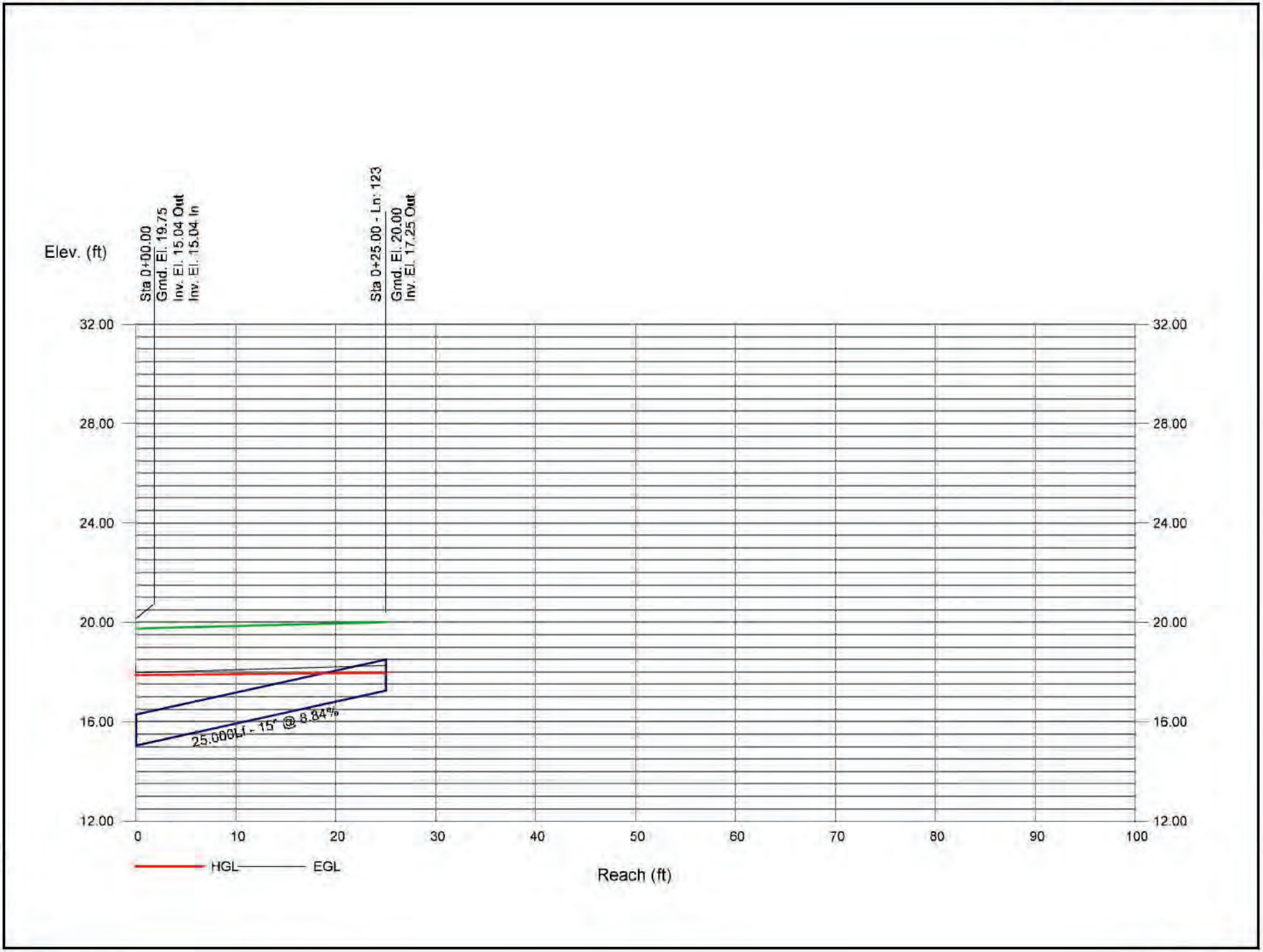
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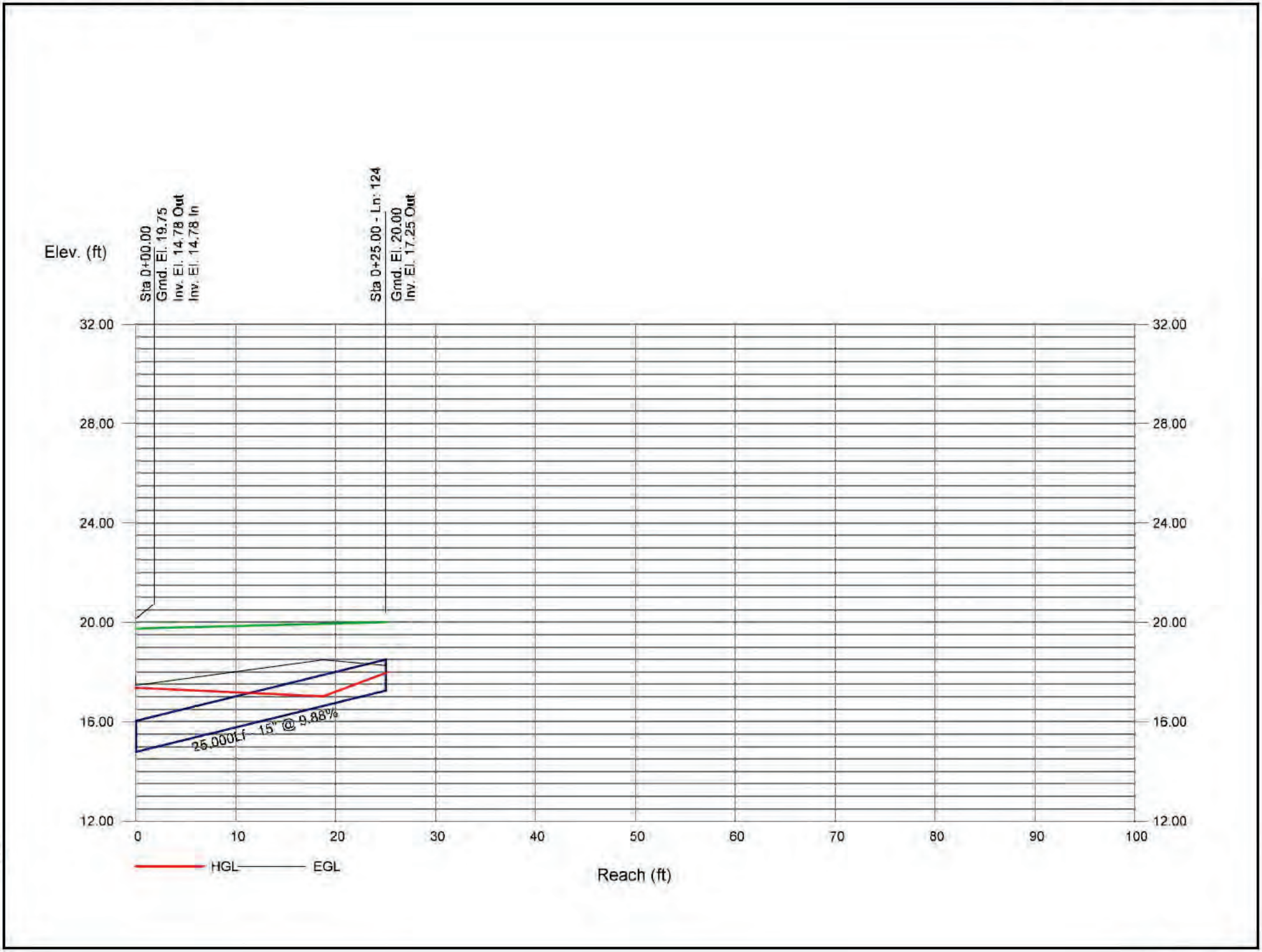
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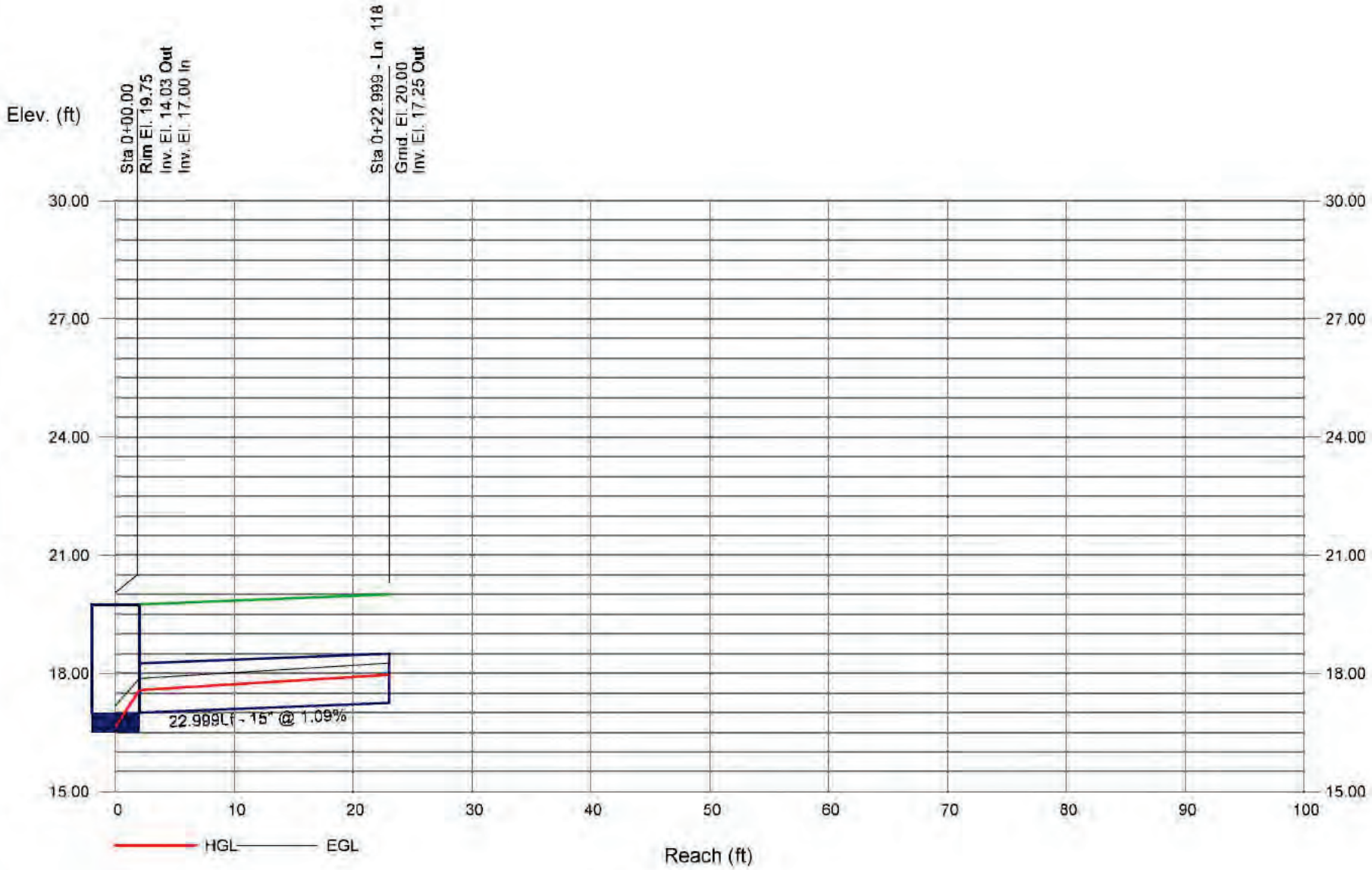
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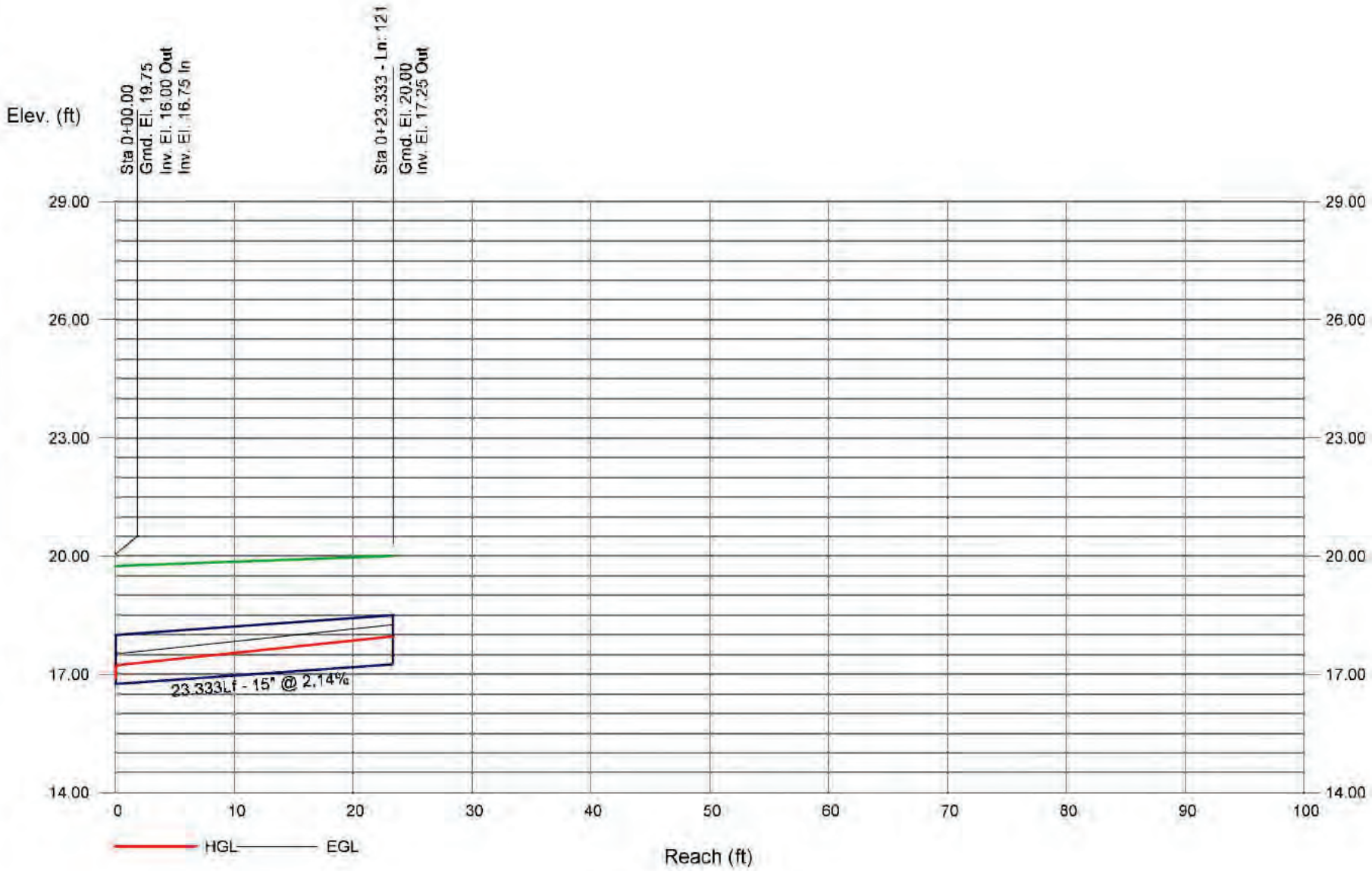
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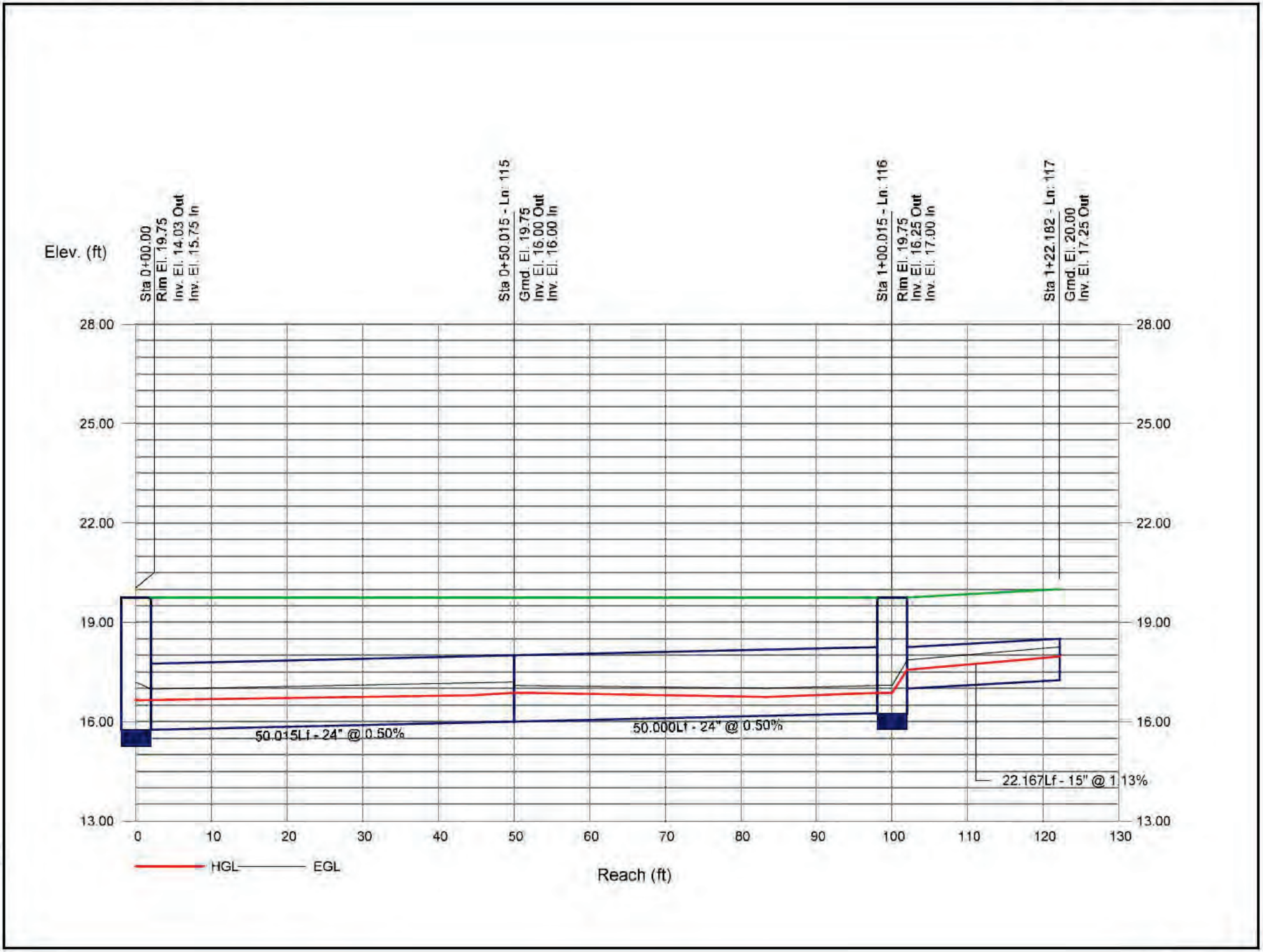
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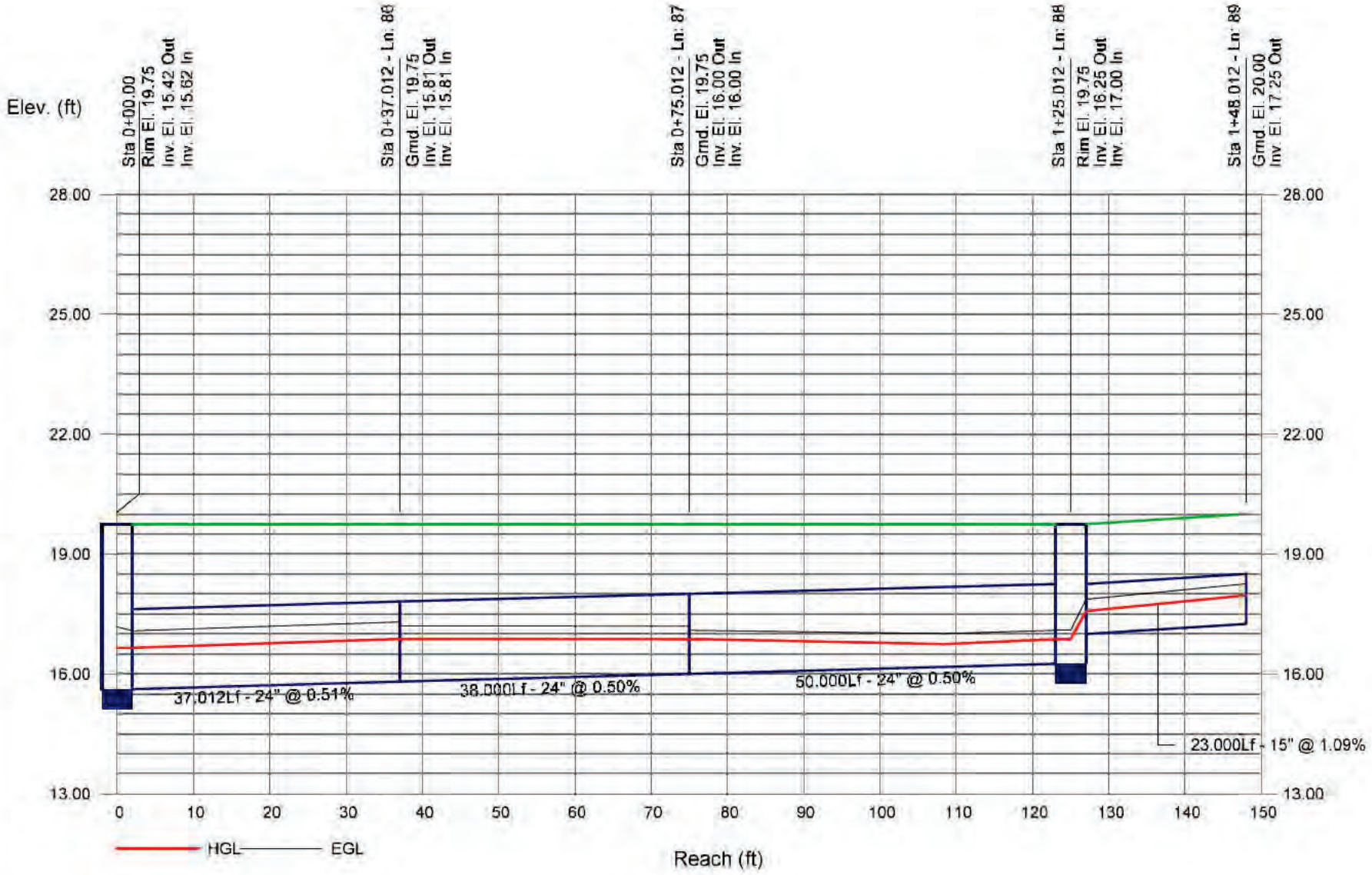
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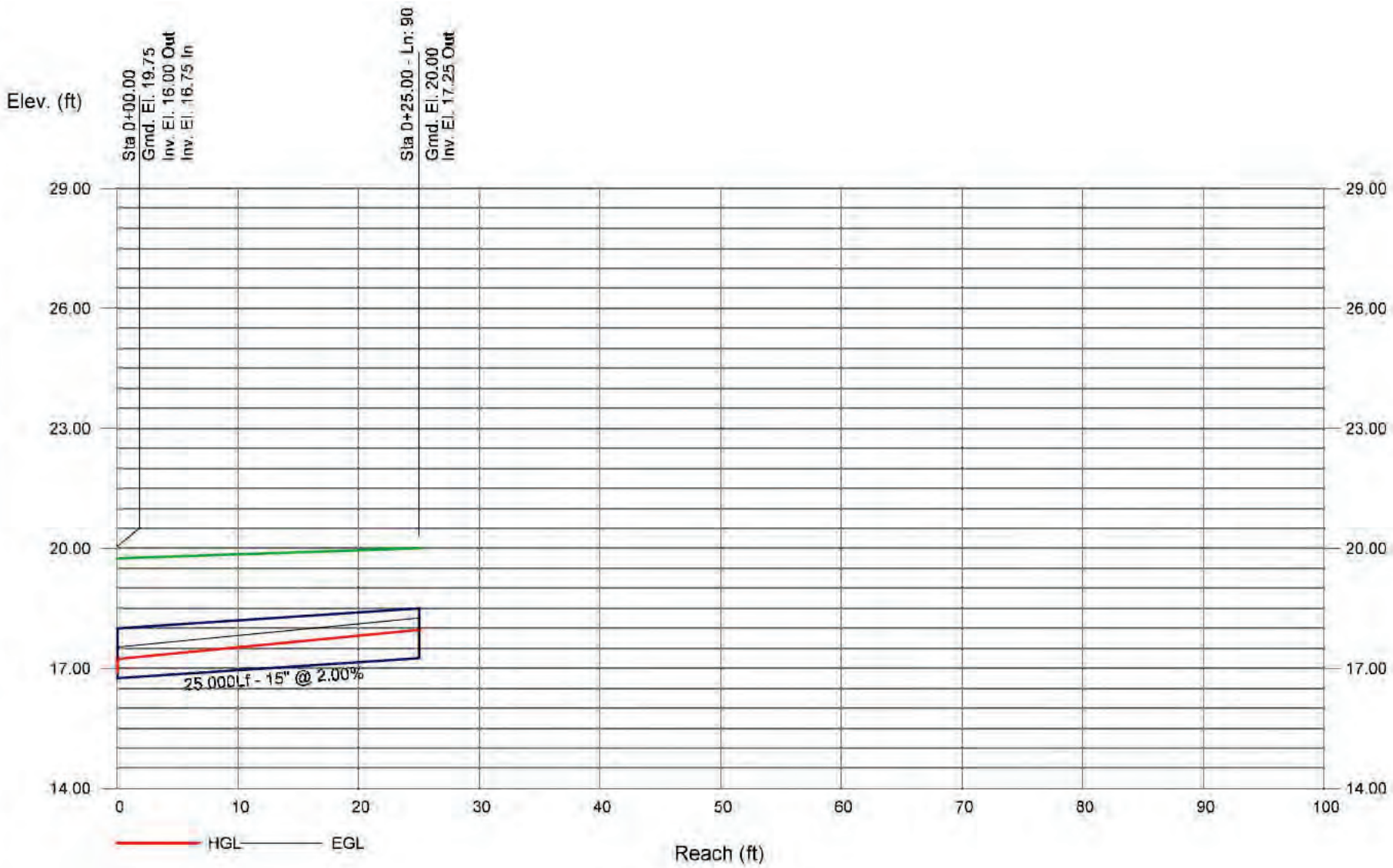
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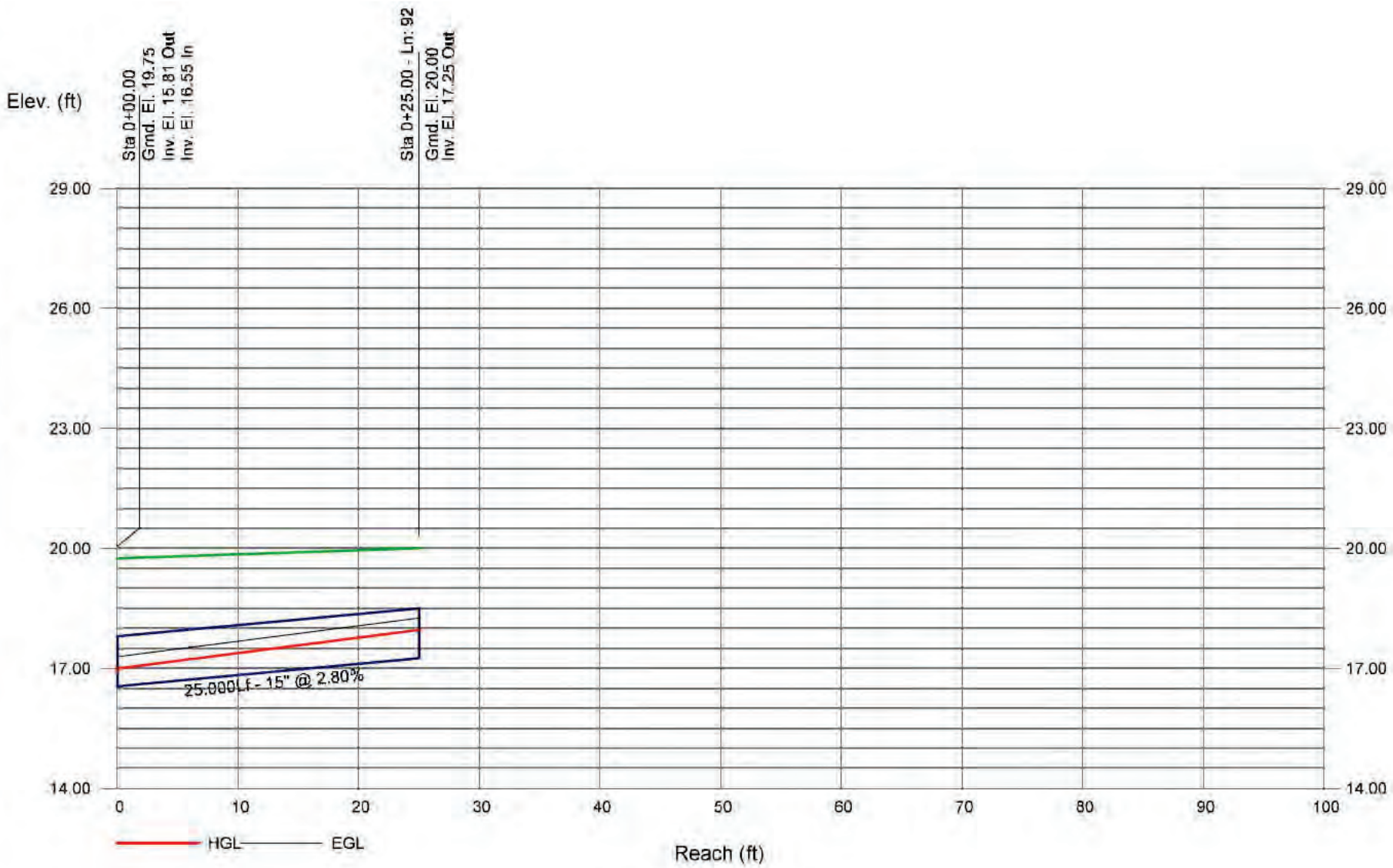
# Storm Sewer Profile

Proj. file: Building 5 Storm.stm



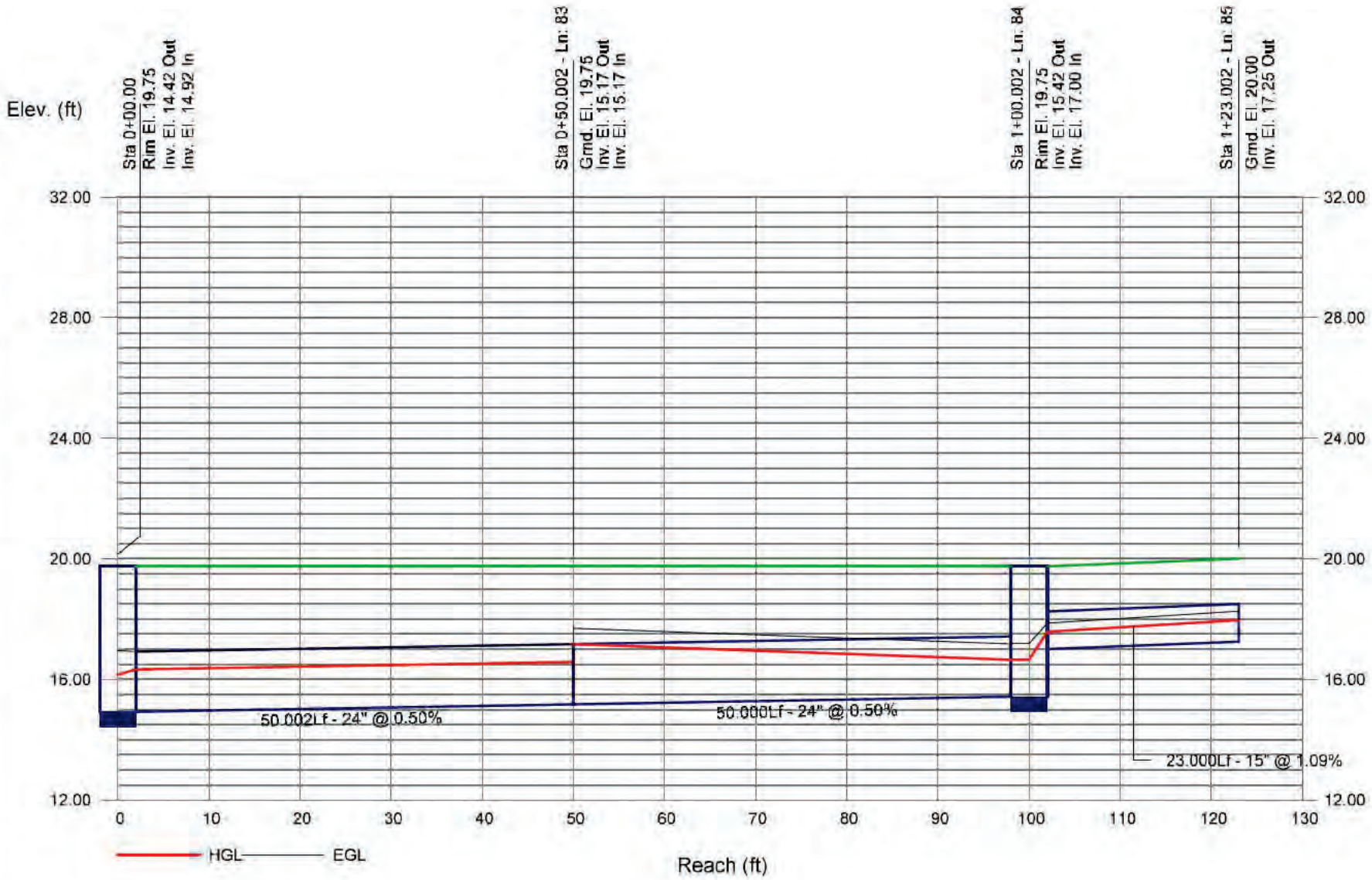
# Storm Sewer Profile

Proj. file: Building 5 Storm.stm



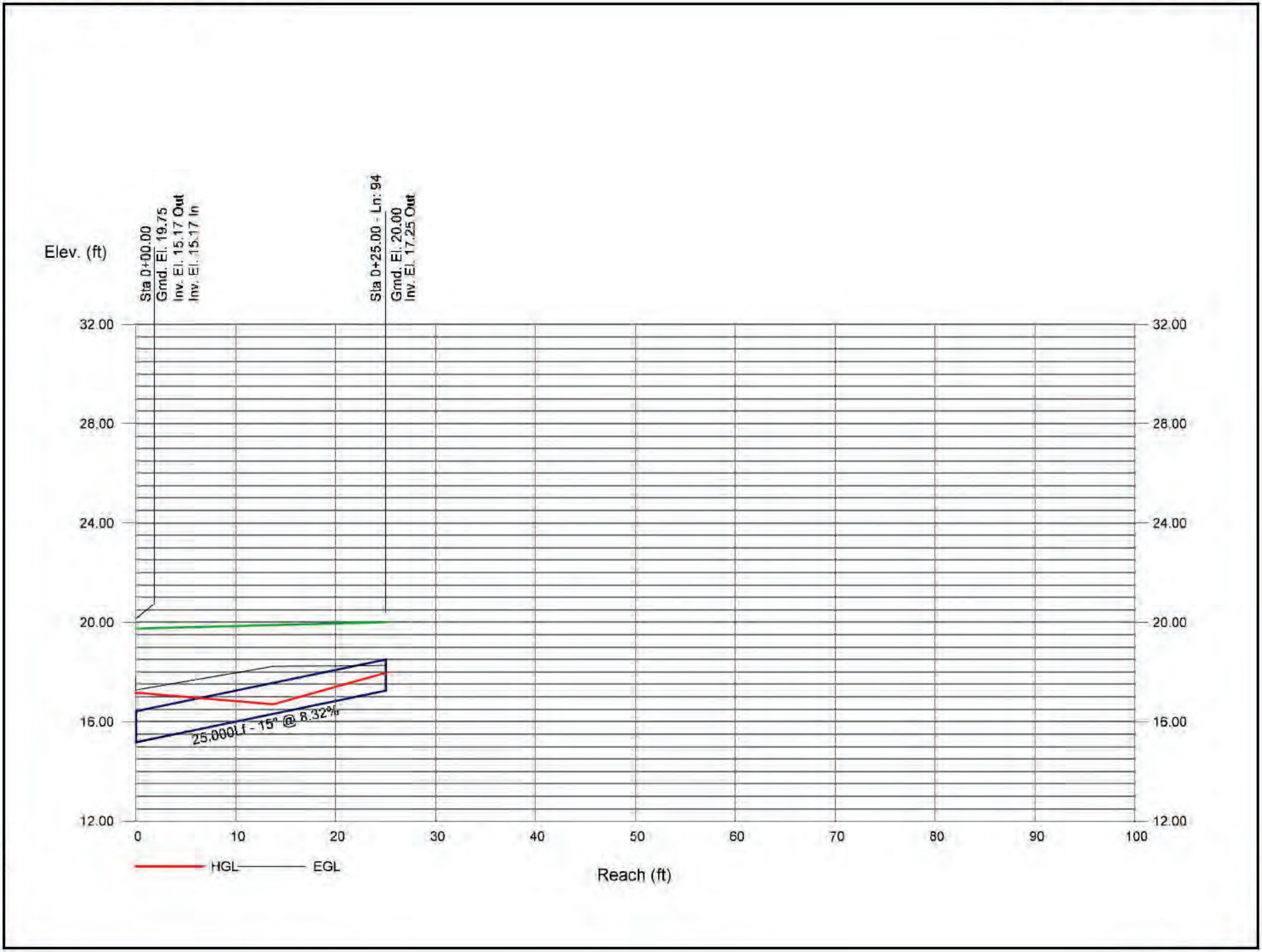
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Proj. file: Building 5 Storm.stm



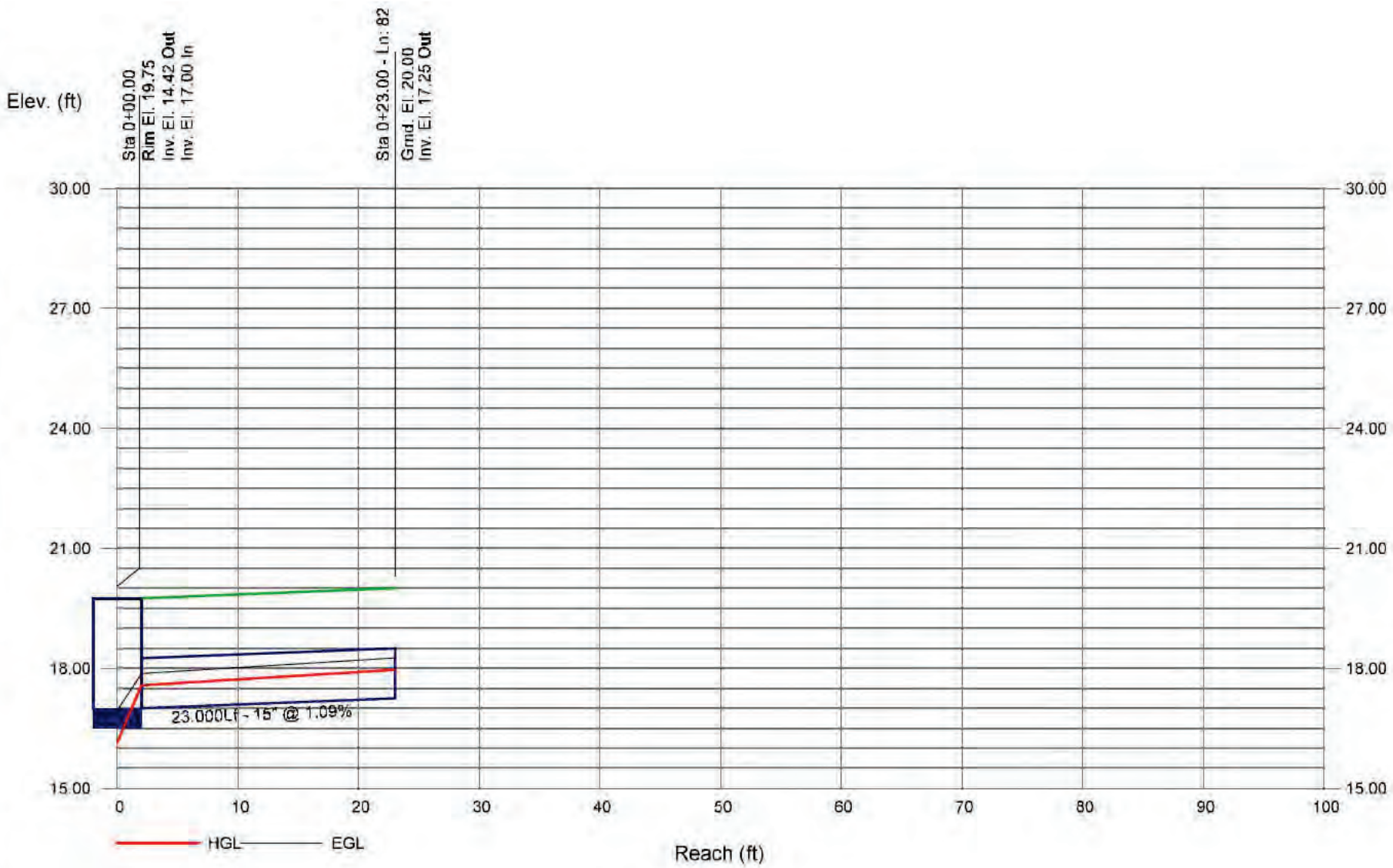
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Proj. file: Building 5 Storm.stm



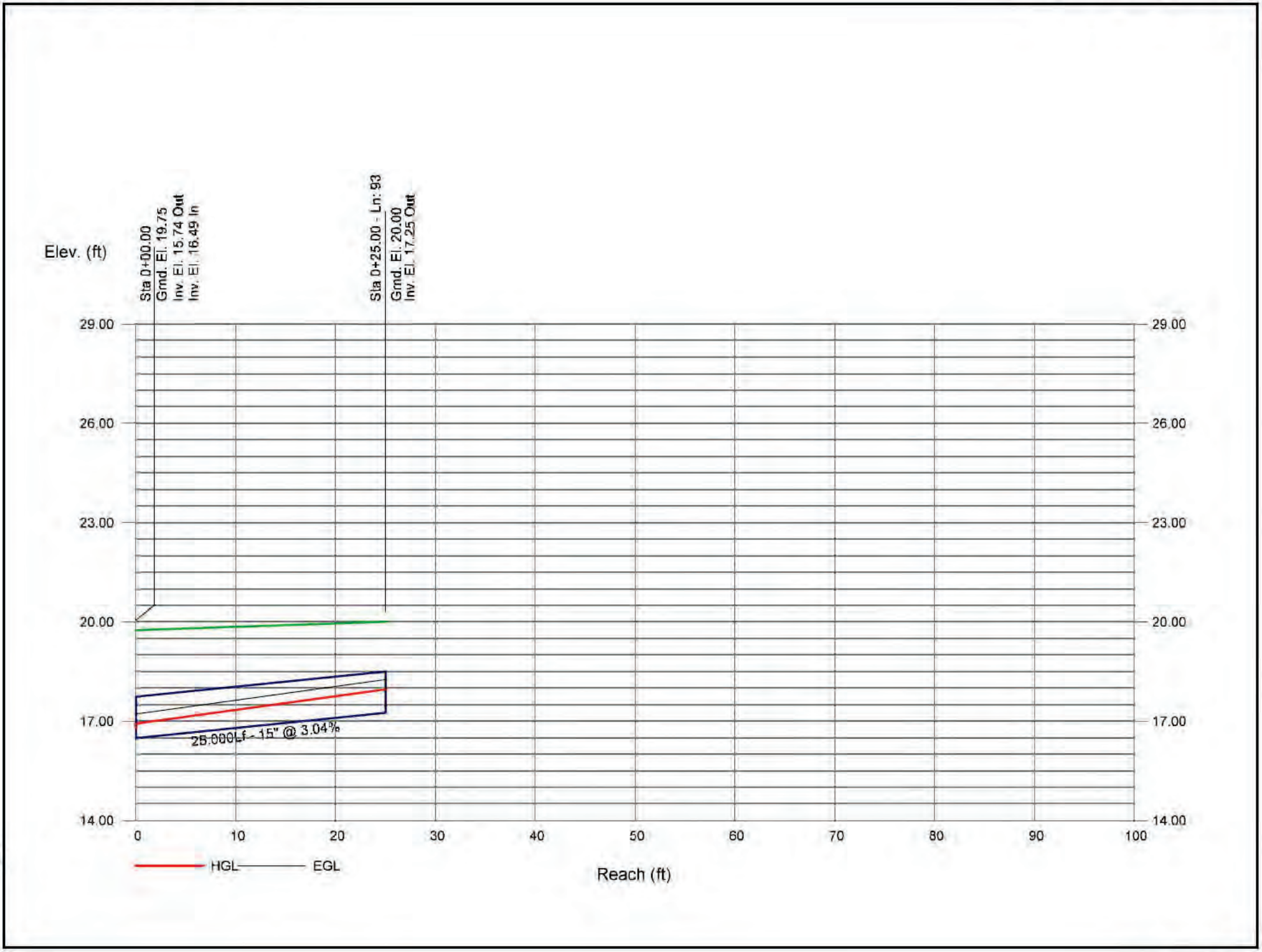
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Proj. file: Building 5 Storm.stm



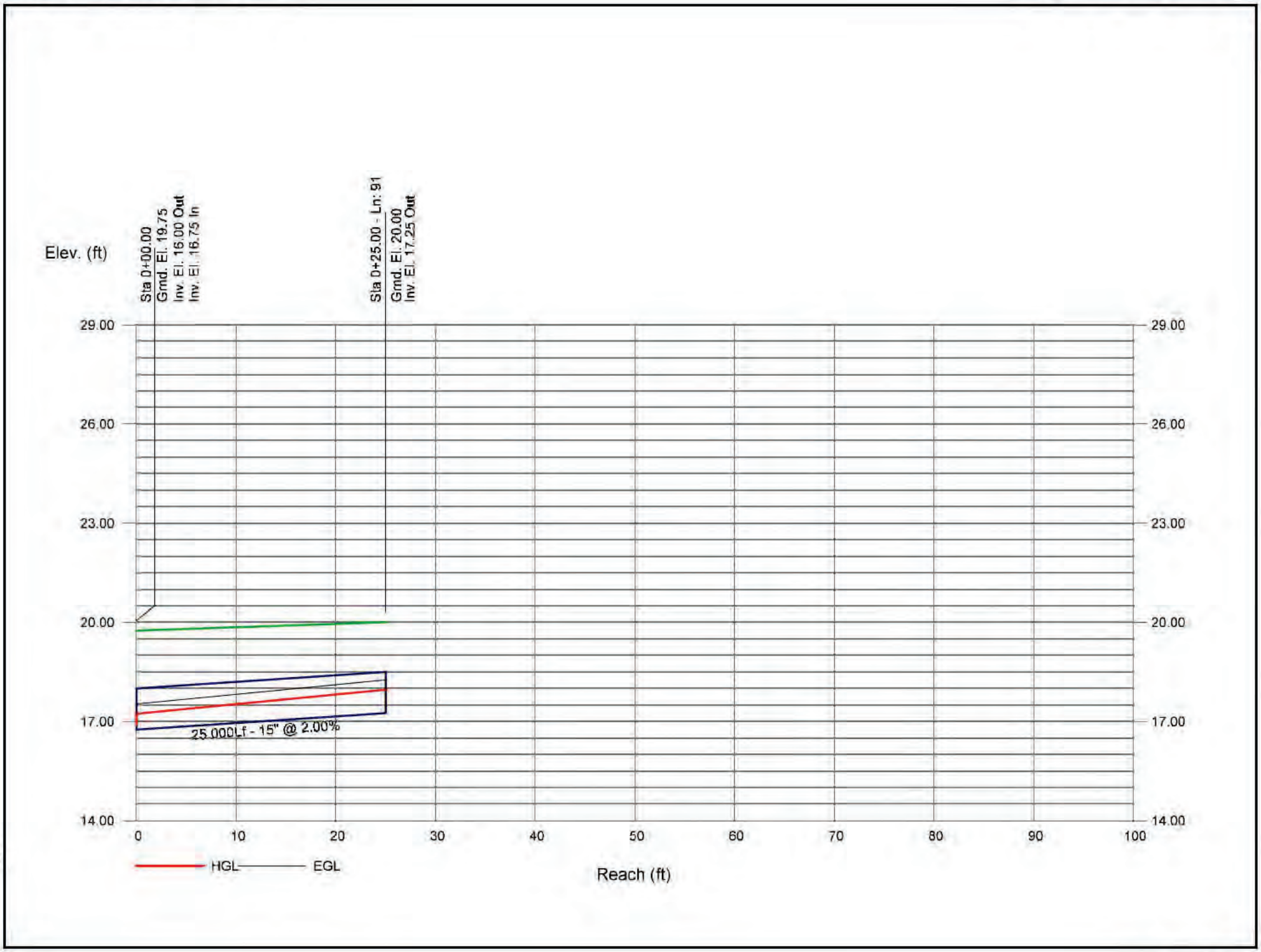
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Proj. file: Building 5 Storm.stm



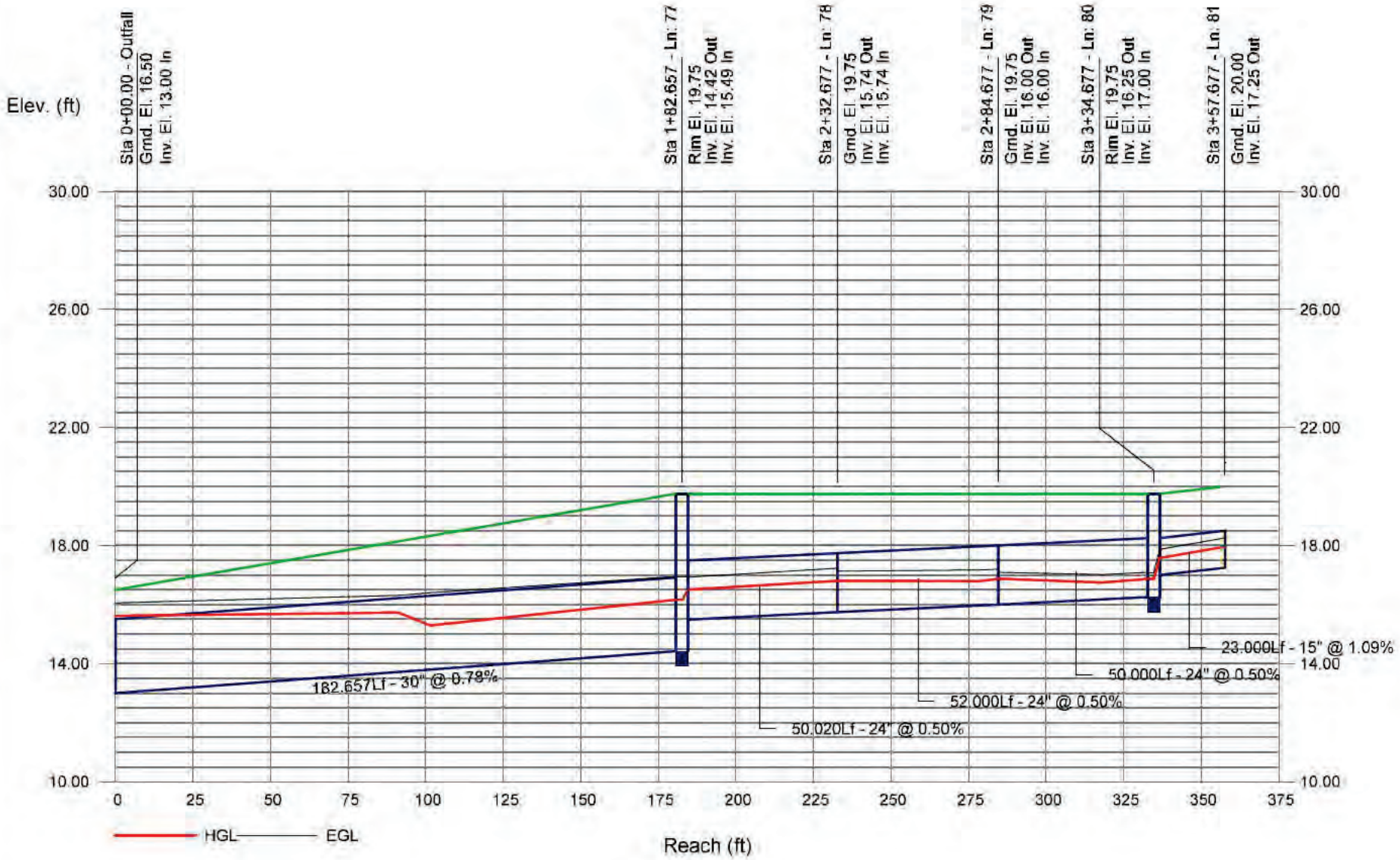
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Proj. file: Building 5 Storm.stm



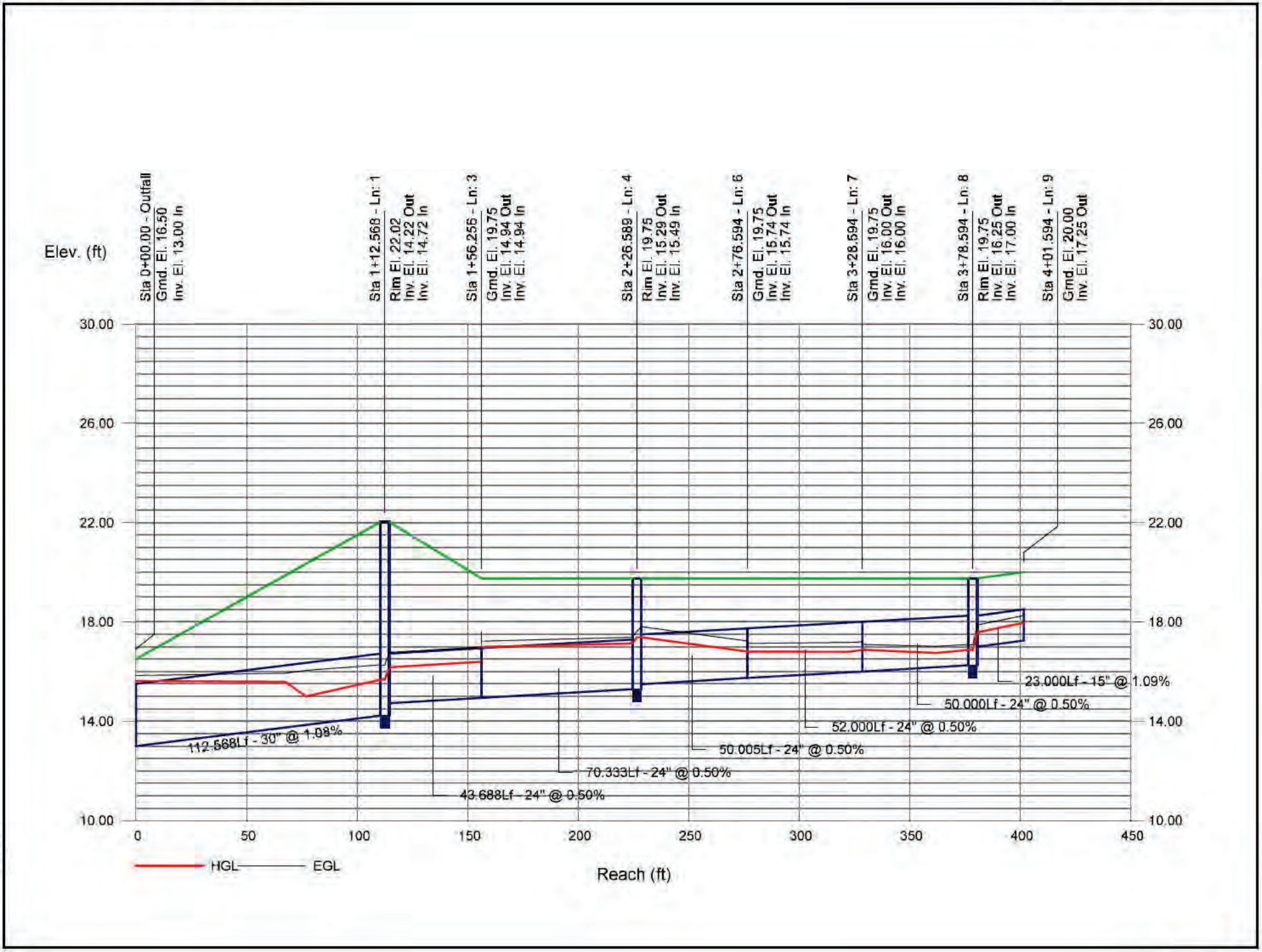
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Proj. file: Building 5 Storm.stm



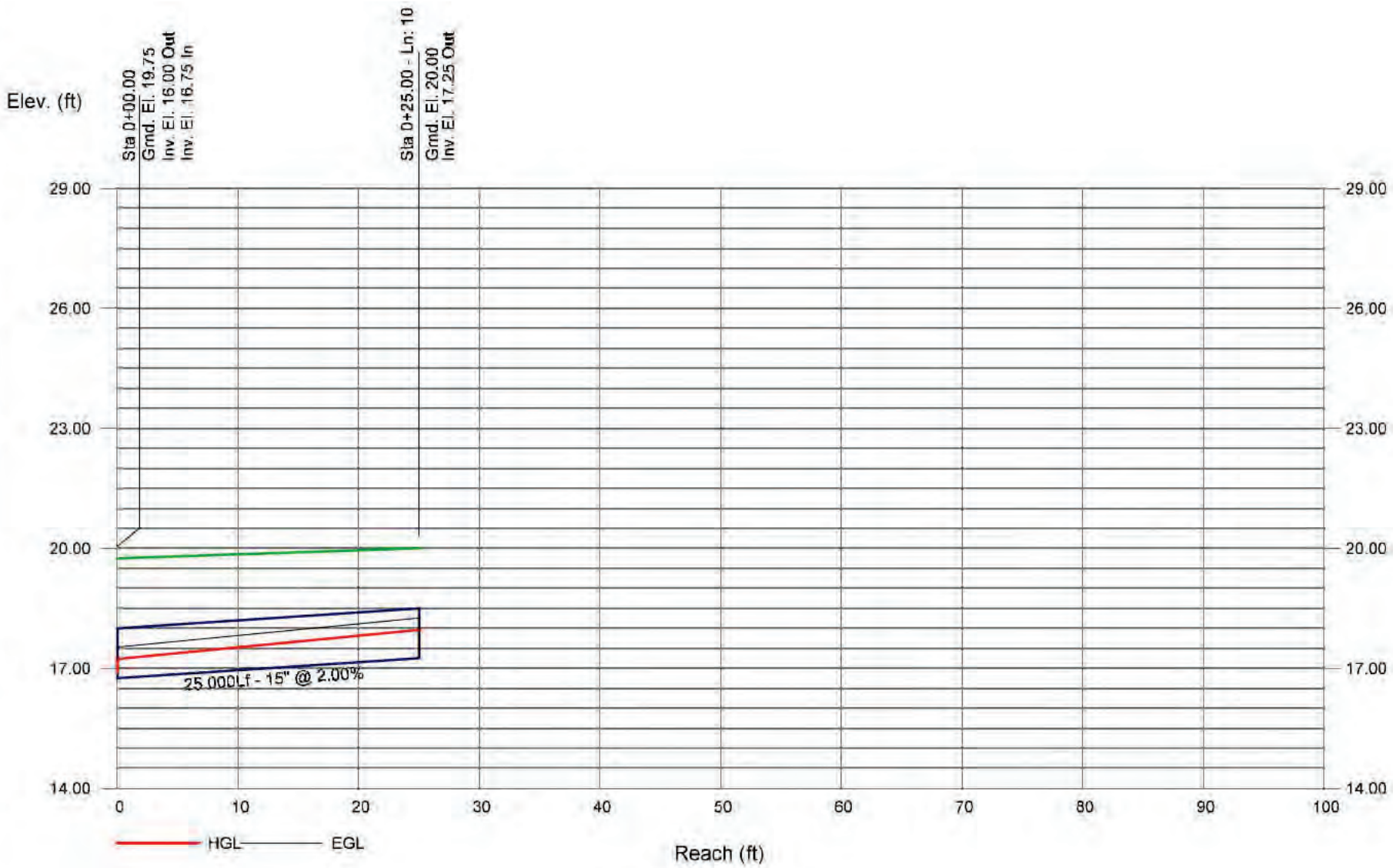
# Storm Sewer Profile

Proj. file: Building 5 Storm.stm



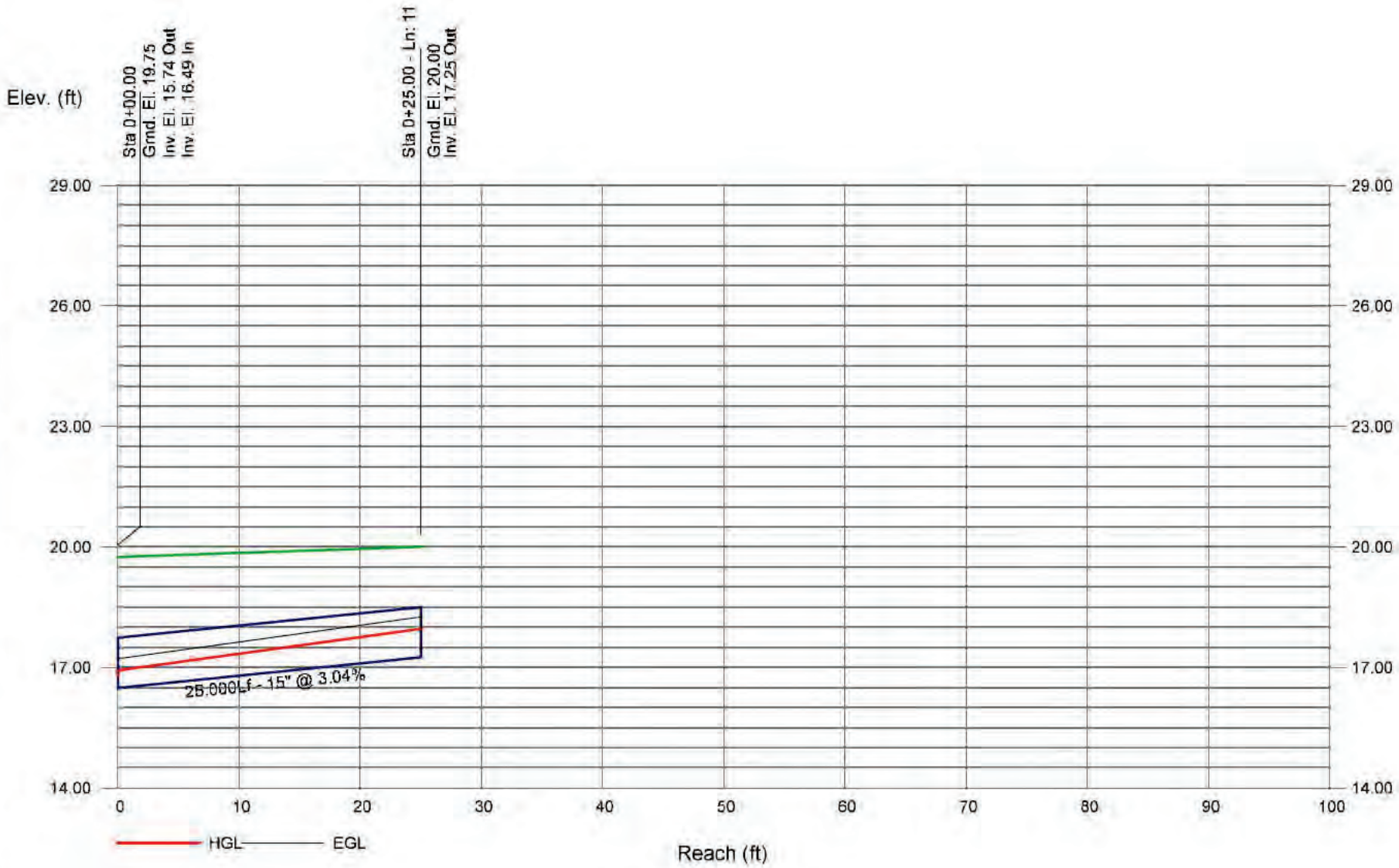
# Storm Sewer Profile

Proj. file: Building 5 Storm.stm



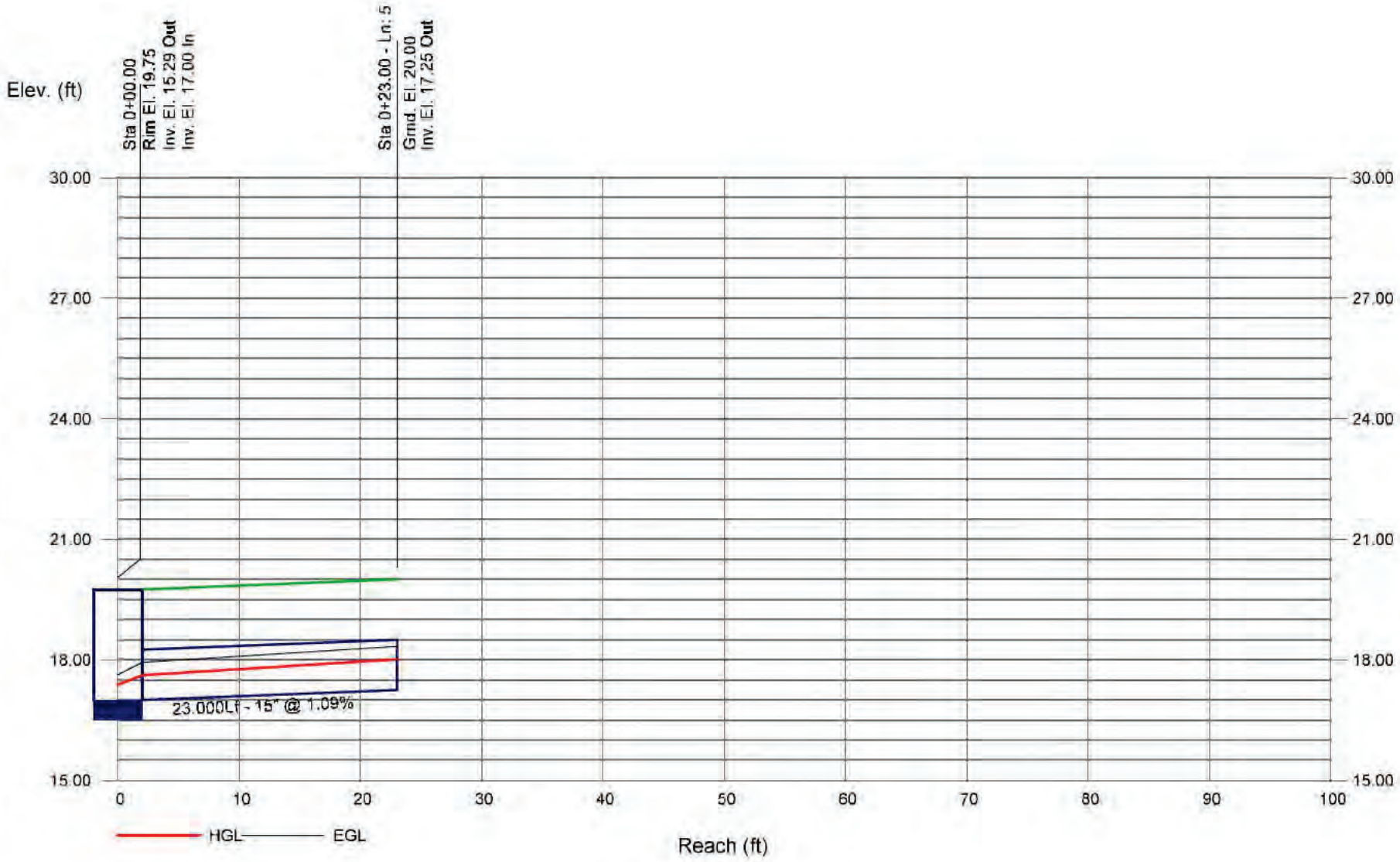
# Storm Sewer Profile

Proj. file: Building 5 Storm.stm



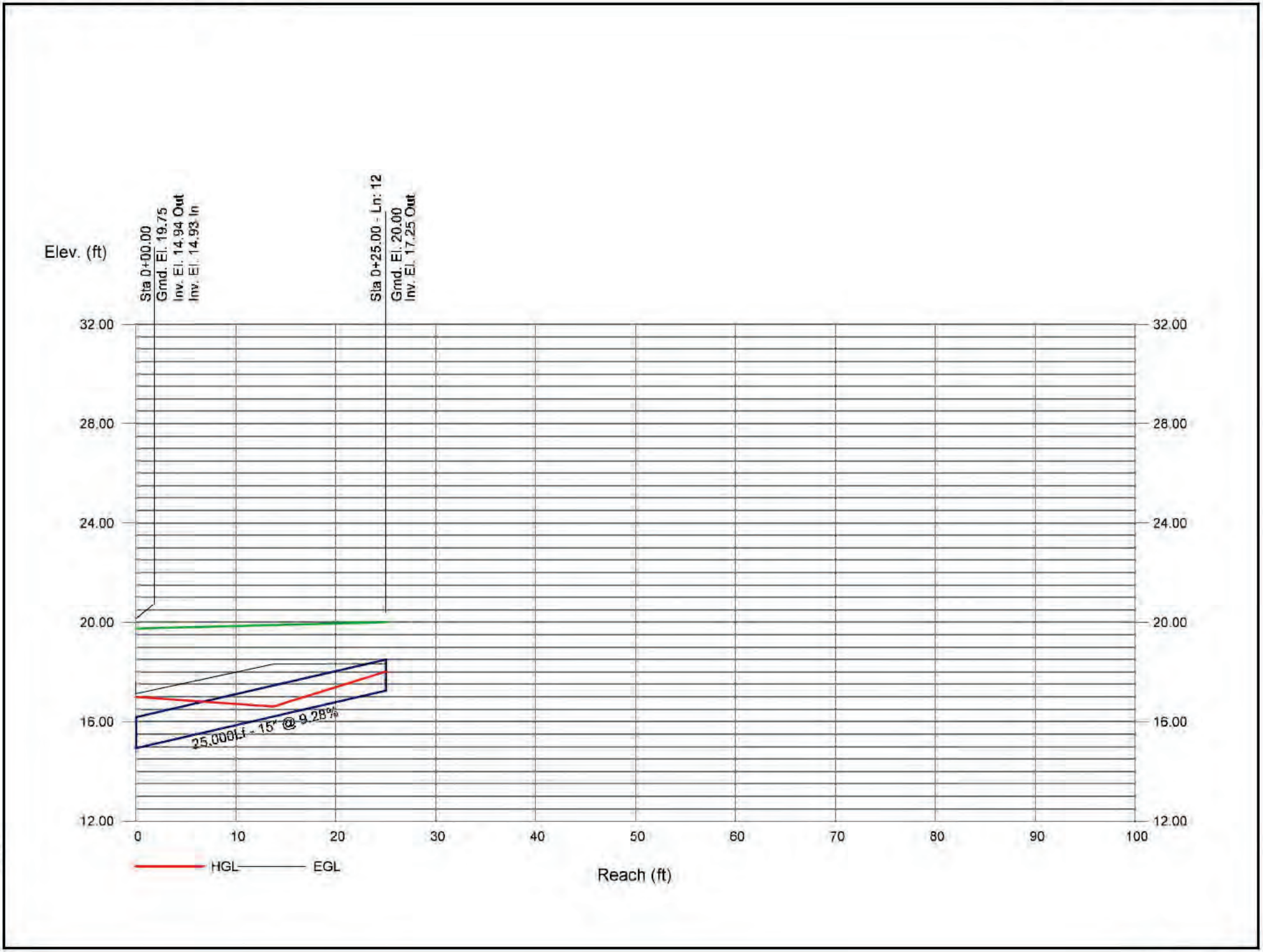
# Storm Sewer Profile

Proj. file: Building 5 Storm.stm



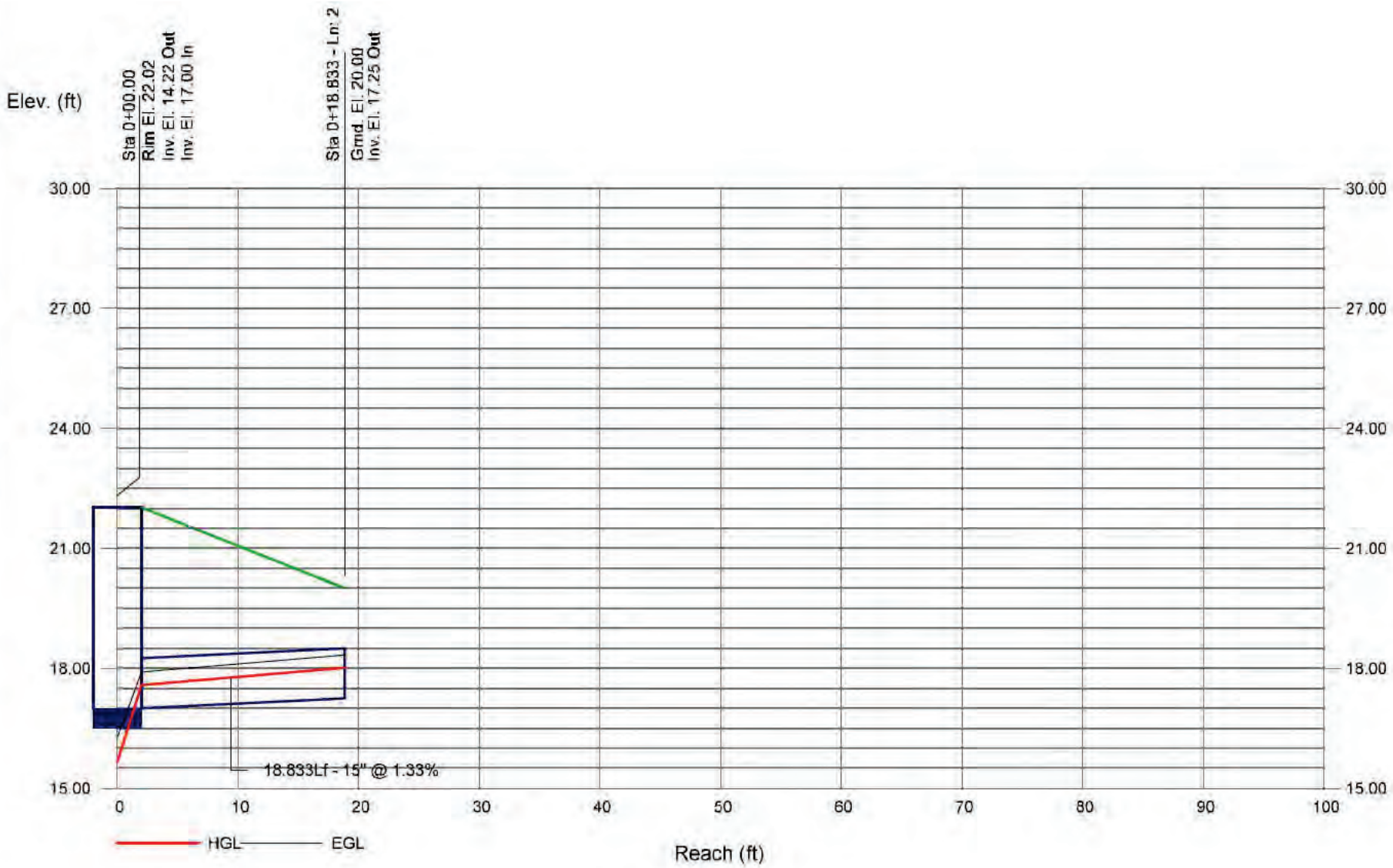
# Storm Sewer Profile

Proj. file: Building 5 Storm.stm



# Storm Sewer Profile

Proj. file: Building 5 Storm.stm



# ulation



| off eff | Area x C | | Tc | | Rain (I) | Total flow | Cap full | Vel | Pipe | | Invert Elev | | HGL Elev | | Grnd / Rim Elev | | Line ID |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Incr | Total | Inlet | Syst | | | | | Size | Slope | Dn | Up | Dn | Up | Dn | Up | |
| ) | | | (min) | (min) | (in/hr) | (cfs) | (cfs) | (ft/s) | (in) | (%) | (ft) | (ft) | (ft) | (ft) | (ft) | (ft) | |
| 91 | 0.05 | 1.15 | 5.0 | 12.6 | 7.8 | 8.97 | 15.23 | 2.85 | 24 | 0.45 | 13.20 | 13.35 | 15.99 | 16.04 | 0.00 | 19.61 | INL 1877-1782 |
| 88 | 0.07 | 0.40 | 5.0 | 11.5 | 8.0 | 3.24 | 8.30 | 2.55 | 18 | 0.62 | 14.68 | 15.50 | 16.19 | 16.32 | 19.61 | 22.46 | INL 1878 - INL 18 |
| 86 | 0.08 | 0.33 | 5.0 | 10.6 | 8.2 | 2.74 | 9.28 | 3.19 | 18 | 0.78 | 15.50 | 16.25 | 16.41 | 16.88 | 22.46 | 22.46 | INL 1879 - INL 18 |
| 86 | 0.08 | 0.26 | 5.0 | 9.5 | 8.5 | 2.18 | 11.49 | 3.38 | 18 | 1.20 | 16.25 | 17.40 | 16.88 | 17.96 | 22.46 | 22.46 | INL 1880 - INL 18 |
| 86 | 0.08 | 0.18 | 5.0 | 7.8 | 8.9 | 1.60 | 10.72 | 3.01 | 18 | 1.04 | 17.40 | 18.40 | 17.96 | 18.88 | 22.46 | 22.46 | INL 1881 - INL 18 |
| 85 | 0.10 | 0.10 | 5.0 | 5.0 | 9.8 | 1.00 | 11.24 | 2.50 | 18 | 1.15 | 18.40 | 19.50 | 18.88 | 19.87 | 22.46 | 22.52 | INL 1882 - INL 18 |
| 90 | 0.29 | 0.69 | 5.0 | 6.6 | 9.3 | 6.46 | 7.76 | 3.66 | 18 | 0.55 | 13.25 | 14.00 | 16.19 | 16.71 | 19.61 | 18.93 | INL 1758 - INL 18 |
| 91 | 0.10 | 0.41 | 5.0 | 6.3 | 9.4 | 3.81 | 19.50 | 2.16 | 18 | 3.45 | 14.00 | 15.06 | 16.81 | 16.85 | 18.93 | 19.08 | INL 1758 - INL 17 |
| 67 | 0.13 | 0.31 | 5.0 | 5.5 | 9.7 | 2.96 | 10.91 | 2.16 | 18 | 1.08 | 15.06 | 16.03 | 16.89 | 16.94 | 19.08 | 18.75 | INL 1751.1 - INL 1 |
| 86 | 0.17 | 0.17 | 5.0 | 5.0 | 9.8 | 1.69 | 13.04 | 2.31 | 18 | 1.54 | 16.00 | 16.40 | 17.09 | 16.89 | 18.75 | 19.40 | INL 1757 - INL 17 |
| 00 | 0.00 | 2.62 | 0.0 | 6.9 | 9.2 | 24.20 | 49.82 | 4.91 | 36 | 0.56 | 13.00 | 14.10 | 15.99 | 15.68 | 16.10 | 21.38 | MH 1691 - EW 16 |
| 00 | 0.00 | 1.27 | 0.0 | 6.7 | 9.3 | 11.75 | 16.40 | 5.67 | 24 | 0.53 | 15.10 | 15.30 | 16.35 | 16.55 | 21.38 | 17.74 | MH 1692 - MH 16 |
| 00 | 0.00 | 0.90 | 0.0 | 6.3 | 9.4 | 8.47 | 16.46 | 4.03 | 24 | 0.53 | 15.30 | 15.65 | 17.05 | 16.69 | 17.74 | 21.38 | MH 1692 - MH 16 |
| 00 | 0.00 | 0.53 | 0.0 | 5.9 | 9.5 | 5.09 | 16.61 | 4.51 | 24 | 0.54 | 16.00 | 16.21 | 16.76 | 17.00 | 21.38 | 18.65 | MH 1693 - MH 16 |
| 00 | 0.00 | 0.26 | 0.0 | 5.2 | 9.8 | 2.52 | 16.43 | 2.87 | 24 | 0.53 | 16.21 | 16.40 | 17.00 | 16.95 | 18.65 | 21.38 | MH 1693 - MH 16 |
| 99 | 0.26 | 0.26 | 5.0 | 5.0 | 9.8 | 2.53 | 5.80 | 4.30 | 15 | 0.81 | 17.10 | 17.25 | 17.68 | 17.89 | 21.38 | 0.00 | RL 6-49 - MH 169 |
| 99 | 0.37 | 0.37 | 5.0 | 5.0 | 9.8 | 3.60 | 7.49 | 5.31 | 15 | 1.35 | 17.00 | 17.25 | 17.61 | 18.02 | 21.38 | 0.00 | RL 6-51 - MH 169 |
| 99 | 0.32 | 0.32 | 5.0 | 5.0 | 9.8 | 3.12 | 7.49 | 5.08 | 15 | 1.35 | 17.00 | 17.25 | 17.56 | 17.96 | 21.38 | 0.00 | RL 6-53 - MH 169 |
| 00 | 0.00 | 1.04 | 0.0 | 6.0 | 9.5 | 9.88 | 16.90 | 5.51 | 24 | 0.56 | 15.49 | 15.78 | 16.59 | 16.90 | 21.38 | 18.22 | MH 1694 - MH 16 |
| 00 | 0.00 | 0.67 | 0.0 | 5.6 | 9.6 | 6.49 | 16.86 | 4.15 | 24 | 0.56 | 15.78 | 16.07 | 16.90 | 16.97 | 18.22 | 18.51 | MH 1694 - MH 16 |
| 00 | 0.00 | 0.38 | 0.0 | 5.1 | 9.8 | 3.69 | 16.82 | 3.33 | 24 | 0.55 | 16.07 | 16.25 | 16.97 | 16.92 | 18.51 | 21.43 | MH 1694 - MH 16 |
| 99 | 0.38 | 0.38 | 5.0 | 5.0 | 9.8 | 3.70 | 8.00 | 5.50 | 15 | 1.54 | 17.00 | 17.25 | 17.60 | 18.03 | 21.43 | 0.00 | RL 6-56 - MH 169 |

Number of lines: 189 | Run Date: 9/26/2024

17.80) ^ 0.82; Return period =Yrs. 100 ; c = cir e = ellip b = box

# ulation



| off eff | Area x C | | Tc | | Rain (I) | Total flow | Cap full | Vel | Pipe | | Invert Elev | | HGL Elev | | Grnd / Rim Elev | | Line ID |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Incr | Total | Inlet | Syst | | | | | Size | Slope | Dn | Up | Dn | Up | Dn | Up | |
| ) | | | (min) | (min) | (in/hr) | (cfs) | (cfs) | (ft/s) | (in) | (%) | (ft) | (ft) | (ft) | (ft) | (ft) | (ft) | |
| 99 | 0.30 | 0.30 | 5.0 | 5.0 | 9.8 | 2.92 | 11.16 | 5.94 | 15 | 2.98 | 16.75 | 17.25 | 17.19 | 17.94 | 18.51 | 0.00 | RL 6-55 - TEE |
| 99 | 0.28 | 0.28 | 5.0 | 5.0 | 9.8 | 2.73 | 10.81 | 5.73 | 15 | 2.80 | 16.73 | 17.25 | 17.16 | 17.91 | 18.65 | 0.00 | RL 6-50 - TEE |
| 99 | 0.37 | 0.37 | 5.0 | 5.0 | 9.8 | 3.60 | 13.13 | 6.85 | 15 | 4.13 | 16.52 | 17.25 | 16.97 | 18.02 | 18.22 | 0.00 | RL 6-54 - TEE |
| 99 | 0.37 | 0.37 | 5.0 | 5.0 | 9.8 | 3.60 | 16.74 | 3.92 | 15 | 6.72 | 16.00 | 17.25 | 17.05 | 18.02 | 17.74 | 0.00 | RL 6-52 TEE |
| 00 | 0.00 | 2.58 | 0.0 | 6.7 | 9.3 | 23.92 | 50.25 | 4.87 | 36 | 0.57 | 13.00 | 14.17 | 15.99 | 15.74 | 16.96 | 21.38 | MH 1806 - EW 18 |
| 00 | 0.00 | 1.48 | 0.0 | 6.5 | 9.3 | 13.77 | 16.11 | 5.76 | 24 | 0.51 | 15.16 | 15.50 | 16.58 | 16.92 | 21.38 | 17.94 | MH 1807 - MH 18 |
| 00 | 0.00 | 1.08 | 0.0 | 6.3 | 9.4 | 10.15 | 15.95 | 3.35 | 24 | 0.50 | 15.50 | 15.72 | 17.44 | 17.50 | 17.94 | 21.38 | MH 1807 - MH 18 |
| 00 | 0.00 | 0.68 | 0.0 | 5.7 | 9.6 | 6.54 | 16.55 | 3.41 | 24 | 0.54 | 15.70 | 16.06 | 17.68 | 16.97 | 21.38 | 18.50 | MH 1808 - MH 18 |
| 00 | 0.00 | 0.32 | 0.0 | 5.1 | 9.8 | 3.10 | 16.24 | 3.02 | 24 | 0.52 | 16.06 | 16.25 | 16.97 | 16.86 | 18.50 | 21.38 | MH 1808 - MH 18 |
| 99 | 0.32 | 0.32 | 5.0 | 5.0 | 9.8 | 3.12 | 7.49 | 5.08 | 15 | 1.35 | 17.00 | 17.25 | 17.56 | 17.96 | 21.38 | 0.00 | RL 6-10 - MH 180 |
| 00 | 0.00 | 0.71 | 0.0 | 5.9 | 9.5 | 6.80 | 16.22 | 4.86 | 24 | 0.51 | 15.75 | 15.98 | 16.65 | 16.90 | 21.38 | 18.43 | MH 1809 - MH 18 |
| 00 | 0.00 | 0.37 | 0.0 | 5.1 | 9.8 | 3.59 | 16.31 | 3.24 | 24 | 0.52 | 15.98 | 16.25 | 16.90 | 16.91 | 18.43 | 21.38 | MH 1809 - MH 18 |
| 99 | 0.37 | 0.37 | 5.0 | 5.0 | 9.8 | 3.60 | 7.66 | 5.36 | 15 | 1.41 | 17.00 | 17.25 | 17.60 | 18.02 | 21.38 | 0.00 | RL 6-16 - MH 180 |
| 99 | 0.40 | 0.40 | 5.0 | 5.0 | 9.8 | 3.89 | 7.49 | 5.44 | 15 | 1.35 | 17.00 | 17.25 | 17.64 | 18.05 | 21.38 | 0.00 | RL 6-14 - MH 180 |
| 99 | 0.40 | 0.40 | 5.0 | 5.0 | 9.8 | 3.89 | 7.49 | 5.19 | 15 | 1.35 | 17.00 | 17.25 | 17.68 | 18.05 | 21.38 | 0.00 | RL 6-12 - MH 180 |
| 99 | 0.37 | 0.37 | 5.0 | 5.0 | 9.8 | 3.60 | 10.05 | 6.04 | 15 | 2.42 | 16.80 | 17.25 | 17.32 | 18.02 | 18.50 | 0.00 | RL 6-11 - TEE |
| 99 | 0.35 | 0.35 | 5.0 | 5.0 | 9.8 | 3.41 | 11.32 | 6.27 | 15 | 3.07 | 16.73 | 17.25 | 17.20 | 17.99 | 18.43 | 0.00 | RL 6-15 - TEE |
| 99 | 0.40 | 0.40 | 5.0 | 5.0 | 9.8 | 3.89 | 15.13 | 3.96 | 15 | 5.49 | 16.23 | 17.25 | 17.44 | 18.05 | 17.94 | 0.00 | RL 6-13 -TEE |
| 00 | 0.00 | 2.99 | 0.0 | 6.7 | 9.3 | 27.72 | 46.79 | 5.31 | 36 | 0.49 | 13.00 | 13.97 | 15.99 | 15.67 | 16.96 | 21.38 | MH 1686 - Ew 16 |
| 00 | 0.00 | 1.47 | 0.0 | 6.6 | 9.3 | 13.65 | 19.23 | 6.40 | 24 | 0.72 | 14.95 | 15.22 | 16.19 | 16.55 | 21.38 | 17.66 | MH 1687 - MH 16 |
| 00 | 0.00 | 1.10 | 0.0 | 6.2 | 9.4 | 10.36 | 19.29 | 5.10 | 24 | 0.73 | 15.22 | 15.72 | 16.55 | 16.87 | 17.66 | 21.38 | MH 1687 - MH 16 |
| 00 | 0.00 | 0.77 | 0.0 | 5.9 | 9.5 | 7.35 | 16.27 | 4.38 | 24 | 0.52 | 15.70 | 15.91 | 16.87 | 16.87 | 21.38 | 18.36 | MH 1688 - MH 16 |

Number of lines: 189 | Run Date: 9/26/2024

17.80) ^ 0.82; Return period =Yrs. 100 ; c = cir e = ellip b = box

# ulation



| off eff | Area x C | | Tc | | Rain (I) | Total flow | Cap full | Vel | Pipe | | Invert Elev | | HGL Elev | | Grnd / Rim Elev | | Line ID |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Incr | Total | Inlet | Syst | | | | | Size | Slope | Dn | Up | Dn | Up | Dn | Up | |
| ) | | | (min) | (min) | (in/hr) | (cfs) | (cfs) | (ft/s) | (in) | (%) | (ft) | (ft) | (ft) | (ft) | (ft) | (ft) | |
| 00 | 0.00 | 0.41 | 0.0 | 5.1 | 9.8 | 3.98 | 16.57 | 3.36 | 24 | 0.54 | 15.91 | 16.25 | 16.87 | 16.95 | 18.36 | 21.38 | MH 1688 - MH 16 |
| 99 | 0.41 | 0.41 | 5.0 | 5.0 | 9.8 | 3.99 | 7.49 | 5.48 | 15 | 1.35 | 17.00 | 17.25 | 17.65 | 18.06 | 21.38 | 0.00 | RL 6-41 - MH 168 |
| 00 | 0.00 | 1.11 | 0.0 | 6.0 | 9.5 | 10.53 | 16.87 | 5.61 | 24 | 0.56 | 15.30 | 15.97 | 16.44 | 17.13 | 21.38 | 18.41 | MH 1689 - MH 16 |
| 00 | 0.00 | 0.31 | 0.0 | 5.1 | 9.8 | 3.00 | 16.86 | 2.67 | 24 | 0.56 | 15.97 | 16.25 | 17.13 | 16.85 | 18.41 | 21.38 | MH 1689 - MH 16 |
| 99 | 0.31 | 0.31 | 5.0 | 5.0 | 9.8 | 3.02 | 7.56 | 5.05 | 15 | 1.37 | 17.00 | 17.25 | 17.55 | 17.95 | 21.38 | 0.00 | RL 6-48 - MH 168 |
| 99 | 0.38 | 0.38 | 5.0 | 5.0 | 9.8 | 3.70 | 11.16 | 6.39 | 15 | 2.99 | 16.70 | 17.23 | 17.20 | 18.01 | 18.41 | 0.00 | RL 6-47 - TEE |
| 99 | 0.37 | 0.37 | 5.0 | 5.0 | 9.8 | 3.60 | 11.70 | 6.48 | 15 | 3.28 | 16.64 | 17.25 | 17.12 | 18.02 | 18.36 | 0.00 | RL 6-42 - TEE |
| 99 | 0.33 | 0.33 | 5.0 | 5.0 | 9.8 | 3.21 | 14.06 | 5.68 | 15 | 4.74 | 16.37 | 17.25 | 16.87 | 17.97 | 21.38 | 0.00 | RL 6-43 - MH 168 |
| 99 | 0.42 | 0.42 | 5.0 | 5.0 | 9.8 | 4.09 | 16.95 | 8.08 | 15 | 6.89 | 15.97 | 17.25 | 16.39 | 18.07 | 21.38 | 0.00 | RL 6-45 - MH 168 |
| 99 | 0.37 | 0.37 | 5.0 | 5.0 | 9.8 | 3.60 | 16.93 | 5.45 | 15 | 6.87 | 15.96 | 17.25 | 16.55 | 18.02 | 17.66 | 0.00 | RL 6-44 - TEE |
| 00 | 0.00 | 3.57 | 0.0 | 6.4 | 9.4 | 33.49 | 47.19 | 5.97 | 36 | 0.50 | 13.00 | 14.04 | 15.99 | 15.92 | 16.96 | 21.38 | MH 1803 - EW 18 |
| 00 | 0.00 | 0.83 | 0.0 | 5.9 | 9.5 | 7.94 | 21.85 | 5.38 | 24 | 0.93 | 15.01 | 15.77 | 15.92 | 16.77 | 21.38 | 18.22 | MH 1804 - MH 18 |
| 00 | 0.00 | 0.37 | 0.0 | 5.1 | 9.8 | 3.59 | 21.91 | 3.11 | 24 | 0.94 | 15.77 | 16.25 | 16.77 | 16.91 | 18.22 | 19.81 | MH 1804 - MH 18 |
| 99 | 0.37 | 0.37 | 5.0 | 5.0 | 9.8 | 3.60 | 7.49 | 5.31 | 15 | 1.35 | 17.00 | 17.25 | 17.61 | 18.02 | 19.81 | 0.00 | RL 6-9 - MH 1804 |
| 00 | 0.00 | 2.35 | 0.0 | 6.3 | 9.4 | 22.04 | 17.36 | 7.02 | 24 | 0.59 | 14.88 | 15.07 | 16.88 | 17.19 | 21.38 | 17.51 | MH 1802 - MH 18 |
| 00 | 0.00 | 1.99 | 0.0 | 6.1 | 9.5 | 18.82 | 16.74 | 5.99 | 24 | 0.55 | 15.07 | 15.46 | 17.95 | 18.45 | 17.51 | 17.91 | MH 1802 - MH 18 |
| 00 | 0.00 | 1.61 | 0.0 | 6.0 | 9.5 | 15.32 | 17.15 | 4.88 | 24 | 0.57 | 15.46 | 15.66 | 19.00 | 19.16 | 17.91 | 18.38 | MH 1802 - MH 18 |
| 00 | 0.00 | 1.35 | 0.0 | 5.8 | 9.5 | 12.86 | 16.98 | 4.09 | 24 | 0.56 | 15.66 | 15.88 | 19.53 | 19.66 | 18.38 | 21.41 | MH 1802 - MH 18 |
| 00 | 0.00 | 0.95 | 0.0 | 5.5 | 9.7 | 9.19 | 16.15 | 2.93 | 24 | 0.51 | 15.87 | 16.21 | 19.92 | 20.03 | 21.41 | 18.66 | MH 1801 - MH 18 |
| 00 | 0.00 | 0.55 | 0.0 | 5.1 | 9.8 | 5.44 | 16.37 | 1.73 | 24 | 0.52 | 16.21 | 16.43 | 20.16 | 20.19 | 18.66 | 23.10 | MH 1801 - MH 18 |
| 99 | 0.55 | 0.55 | 5.0 | 5.0 | 9.8 | 5.45 | 8.72 | 4.44 | 15 | 1.82 | 17.00 | 17.25 | 20.23 | 20.33 | 23.10 | 0.00 | RL 6-1 - MH 1801 |
| 99 | 0.40 | 0.40 | 5.0 | 5.0 | 9.8 | 3.89 | 7.49 | 3.17 | 15 | 1.35 | 17.00 | 17.25 | 19.92 | 19.99 | 21.41 | 0.00 | RL 6-3 - MH 1802 |

Number of lines: 189 | Run Date: 9/26/2024

17.80) ^ 0.82; Return period =Yrs. 100 ; c = cir e = ellip b = box

# ulation



| off eff | Area x C | | Tc | | Rain (I) | Total flow | Cap full | Vel | Pipe | | Invert Elev | | HGL Elev | | Grnd / Rim Elev | | Line ID |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Incr | Total | Inlet | Syst | | | | | Size | Slope | Dn | Up | Dn | Up | Dn | Up | |
| ) | | | (min) | (min) | (in/hr) | (cfs) | (cfs) | (ft/s) | (in) | (%) | (ft) | (ft) | (ft) | (ft) | (ft) | (ft) | |
| 99 | 0.40 | 0.40 | 5.0 | 5.0 | 9.8 | 3.89 | 7.53 | 5.45 | 15 | 1.36 | 17.00 | 17.25 | 17.64 | 18.05 | 21.38 | 0.00 | RL 6-7 - MH 1803 |
| 99 | 0.40 | 0.40 | 5.0 | 5.0 | 9.8 | 3.89 | 8.30 | 3.17 | 15 | 1.65 | 16.94 | 17.25 | 20.16 | 20.23 | 18.66 | 0.00 | RL 6-2 - TEE |
| 99 | 0.27 | 0.27 | 5.0 | 5.0 | 9.8 | 2.63 | 8.49 | 2.14 | 15 | 1.73 | 16.93 | 17.25 | 19.53 | 19.56 | 18.38 | 0.00 | RL 6-4 - TEE |
| 99 | 0.47 | 0.47 | 5.0 | 5.0 | 9.8 | 4.58 | 13.17 | 7.40 | 15 | 4.16 | 16.48 | 17.25 | 16.99 | 18.12 | 18.22 | 0.00 | RL 6-8 - TEE |
| 99 | 0.38 | 0.38 | 5.0 | 5.0 | 9.8 | 3.70 | 15.42 | 3.01 | 15 | 5.71 | 16.20 | 17.25 | 19.00 | 19.06 | 17.91 | 0.00 | RL 6-5 - TEE |
| 99 | 0.36 | 0.36 | 5.0 | 5.0 | 9.8 | 3.50 | 18.10 | 3.69 | 15 | 7.85 | 15.80 | 17.25 | 17.95 | 18.00 | 17.51 | 0.00 | RL 6-6 - TEE |
| 00 | 0.00 | 3.58 | 0.0 | 6.5 | 9.3 | 33.49 | 47.51 | 5.97 | 36 | 0.51 | 13.00 | 14.00 | 15.99 | 15.88 | 16.10 | 21.38 | MH 1683 - EW 16 |
| 00 | 0.00 | 2.20 | 0.0 | 6.3 | 9.4 | 20.67 | 23.27 | 7.96 | 24 | 0.51 | 14.55 | 14.93 | 16.02 | 16.56 | 21.38 | 17.37 | MH 1682 - MH 16 |
| 00 | 0.00 | 1.71 | 0.0 | 6.1 | 9.5 | 16.22 | 23.12 | 6.28 | 24 | 0.50 | 14.93 | 15.24 | 16.56 | 16.69 | 17.37 | 17.68 | MH 1682 - MH 16 |
| 00 | 0.00 | 1.35 | 0.0 | 5.9 | 9.5 | 12.82 | 23.07 | 5.63 | 24 | 0.50 | 15.24 | 15.45 | 16.69 | 16.74 | 17.68 | 21.38 | MH 1682 - MH 16 |
| 99 | 0.40 | 0.40 | 5.0 | 5.0 | 9.8 | 3.89 | 7.49 | 5.44 | 15 | 1.35 | 17.00 | 17.25 | 17.64 | 18.05 | 21.38 | 0.00 | RL 6-34 - MH 168 |
| 00 | 0.00 | 0.99 | 0.0 | 6.2 | 9.4 | 9.34 | 21.92 | 6.01 | 24 | 0.94 | 14.99 | 15.35 | 15.90 | 16.44 | 21.38 | 17.87 | MH 1684 - MH 16 |
| 00 | 0.00 | 0.70 | 0.0 | 5.9 | 9.5 | 6.70 | 22.11 | 4.30 | 24 | 0.96 | 15.35 | 15.76 | 16.44 | 16.68 | 17.87 | 18.20 | MH 1684 - MH 16 |
| 00 | 0.00 | 0.37 | 0.0 | 5.1 | 9.8 | 3.59 | 21.95 | 3.25 | 24 | 0.94 | 15.76 | 16.25 | 16.68 | 16.91 | 18.20 | 21.38 | MH 1684 - MH 16 |
| 99 | 0.37 | 0.37 | 5.0 | 5.0 | 9.8 | 3.60 | 7.49 | 5.31 | 15 | 1.35 | 17.00 | 17.25 | 17.61 | 18.02 | 21.38 | 0.00 | RL 6-40 - MH 168 |
| 00 | 0.00 | 0.95 | 0.0 | 5.5 | 9.7 | 9.18 | 23.35 | 5.28 | 24 | 0.51 | 15.65 | 16.02 | 16.74 | 17.10 | 21.38 | 18.46 | MH 1681 - MH 16 |
| 00 | 0.00 | 0.55 | 0.0 | 5.1 | 9.8 | 5.44 | 23.22 | 3.80 | 24 | 0.51 | 16.02 | 16.25 | 17.10 | 17.07 | 18.46 | 22.52 | MH 1681 - MH 16 |
| 99 | 0.55 | 0.55 | 5.0 | 5.0 | 9.8 | 5.45 | 8.51 | 6.42 | 15 | 1.74 | 17.00 | 17.25 | 17.73 | 18.20 | 22.52 | 0.00 | RL 6-32 - MH 168 |
| 99 | 0.40 | 0.40 | 5.0 | 5.0 | 9.8 | 3.89 | 7.49 | 5.44 | 15 | 1.35 | 17.00 | 17.25 | 17.64 | 18.05 | 21.38 | 0.00 | RL 6-37 - MH 168 |
| 99 | 0.40 | 0.40 | 5.0 | 5.0 | 9.8 | 3.89 | 10.49 | 6.31 | 15 | 2.64 | 16.76 | 17.25 | 17.29 | 18.05 | 18.46 | 0.00 | RL 6-33 - TEE |
| 99 | 0.34 | 0.34 | 5.0 | 5.0 | 9.8 | 3.31 | 11.41 | 6.24 | 15 | 3.12 | 16.67 | 17.25 | 17.13 | 17.98 | 18.20 | 0.00 | RL 6-39 - TEE |
| 99 | 0.29 | 0.29 | 5.0 | 5.0 | 9.8 | 2.82 | 13.57 | 6.46 | 15 | 4.42 | 16.43 | 17.25 | 16.82 | 17.92 | 17.87 | 0.00 | RL 6-38 - TEE |

Number of lines: 189 | Run Date: 9/26/2024

17.80) ^ 0.82; Return period =Yrs. 100 ; c = cir e = ellip b = box

# ulation



| off eff | Area x C | | Tc | | Rain (I) | Total flow | Cap full | Vel | Pipe | | Invert Elev | | HGL Elev | | Grnd / Rim Elev | | Line ID |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Incr | Total | Inlet | Syst | | | | | Size | Slope | Dn | Up | Dn | Up | Dn | Up | |
| ) | | | (min) | (min) | (in/hr) | (cfs) | (cfs) | (ft/s) | (in) | (%) | (ft) | (ft) | (ft) | (ft) | (ft) | (ft) | |
| 99 | 0.37 | 0.37 | 5.0 | 5.0 | 9.8 | 3.60 | 16.35 | 5.19 | 15 | 6.41 | 16.06 | 17.25 | 16.69 | 18.02 | 17.68 | 0.00 | RL 6-35 - TEE |
| 99 | 0.49 | 0.49 | 5.0 | 5.0 | 9.8 | 4.77 | 18.66 | 5.22 | 15 | 8.35 | 15.70 | 17.25 | 16.56 | 18.13 | 17.37 | 0.00 | RL 6-36 - TEE |
| 00 | 0.00 | 2.55 | 0.0 | 7.0 | 9.2 | 23.47 | 47.27 | 4.82 | 36 | 0.50 | 13.00 | 13.99 | 15.99 | 15.55 | 16.96 | 21.99 | MH 1696 - EW 16 |
| 00 | 0.00 | 1.96 | 0.0 | 6.8 | 9.3 | 18.14 | 47.02 | 5.35 | 36 | 0.50 | 13.99 | 14.15 | 15.55 | 15.51 | 21.99 | 17.80 | MH 1697 - MH 16 |
| 00 | 0.00 | 1.60 | 0.0 | 6.2 | 9.4 | 15.11 | 46.79 | 5.16 | 36 | 0.49 | 14.15 | 14.49 | 15.51 | 15.73 | 17.80 | 21.42 | MH 1697 - MH 16 |
| 00 | 0.00 | 1.19 | 0.0 | 6.0 | 9.5 | 11.27 | 16.32 | 5.60 | 24 | 0.52 | 15.48 | 15.72 | 16.70 | 16.94 | 21.42 | 18.16 | MH 1698 - MH 16 |
| 00 | 0.00 | 0.87 | 0.0 | 5.7 | 9.6 | 8.34 | 16.19 | 4.02 | 24 | 0.51 | 15.72 | 15.94 | 17.43 | 16.97 | 18.16 | 18.38 | MH 1698 - MH 16 |
| 00 | 0.00 | 0.49 | 0.0 | 5.1 | 9.8 | 4.76 | 16.17 | 3.61 | 24 | 0.51 | 15.94 | 16.25 | 16.97 | 17.02 | 18.38 | 21.38 | MH 1698 - MH 16 |
| 99 | 0.49 | 0.49 | 5.0 | 5.0 | 9.8 | 4.77 | 7.47 | 5.80 | 15 | 1.34 | 17.00 | 17.25 | 17.73 | 18.13 | 21.38 | 0.00 | RL 6-57 - MH 169 |
| 99 | 0.42 | 0.42 | 5.0 | 5.0 | 9.8 | 4.09 | 7.49 | 5.52 | 15 | 1.35 | 17.00 | 17.25 | 17.66 | 18.07 | 21.42 | 0.00 | RL 6-60 - MH 169 |
| 99 | 0.59 | 0.59 | 5.0 | 5.0 | 9.8 | 5.84 | 8.74 | 6.65 | 15 | 1.83 | 17.00 | 17.25 | 17.75 | 18.23 | 21.99 | 0.00 | RL 6-62 - MH 169 |
| 99 | 0.39 | 0.39 | 5.0 | 5.0 | 9.8 | 3.80 | 11.41 | 6.51 | 15 | 3.12 | 16.67 | 17.25 | 17.17 | 18.04 | 18.38 | 0.00 | RL 6-58 - TEE |
| 99 | 0.32 | 0.32 | 5.0 | 5.0 | 9.8 | 3.12 | 13.48 | 3.66 | 15 | 4.36 | 16.44 | 17.25 | 17.43 | 17.96 | 18.16 | 0.00 | RL 6-59 - TEE |
| 99 | 0.36 | 0.36 | 5.0 | 5.0 | 9.8 | 3.50 | 17.69 | 7.87 | 15 | 7.50 | 15.84 | 17.25 | 16.22 | 18.00 | 17.80 | 0.00 | RL 6-61 - TEE |
| 00 | 0.00 | 3.14 | 0.0 | 6.8 | 9.2 | 28.99 | 48.73 | 5.46 | 36 | 0.53 | 13.00 | 14.10 | 15.99 | 15.84 | 16.96 | 21.37 | MH 1811 - EW 18 |
| 00 | 0.00 | 1.12 | 0.0 | 6.2 | 9.4 | 10.56 | 25.62 | 4.82 | 24 | 1.28 | 14.30 | 14.94 | 15.84 | 16.10 | 21.37 | 17.38 | MH 1814 - MH 18 |
| 00 | 0.00 | 0.75 | 0.0 | 5.8 | 9.6 | 7.19 | 25.65 | 4.34 | 24 | 1.29 | 14.94 | 15.61 | 16.10 | 16.56 | 17.38 | 18.05 | MH 1814 - MH 18 |
| 00 | 0.00 | 0.39 | 0.0 | 5.1 | 9.8 | 3.78 | 25.59 | 3.29 | 24 | 1.28 | 15.61 | 16.25 | 16.56 | 16.93 | 18.05 | 21.33 | MH 1814 - MH 18 |
| 99 | 0.39 | 0.39 | 5.0 | 5.0 | 9.8 | 3.80 | 7.49 | 5.39 | 15 | 1.35 | 17.00 | 17.25 | 17.63 | 18.04 | 21.33 | 0.00 | RL 6-25 - MH 181 |
| 00 | 0.00 | 1.60 | 0.0 | 6.6 | 9.3 | 14.93 | 15.84 | 5.73 | 24 | 0.49 | 15.10 | 15.42 | 16.64 | 16.97 | 21.37 | 17.86 | MH 1812 - MH 18 |
| 00 | 0.00 | 1.24 | 0.0 | 6.4 | 9.4 | 11.58 | 15.84 | 3.70 | 24 | 0.49 | 15.42 | 15.61 | 17.48 | 17.57 | 17.86 | 21.38 | MH 1812 - MH 18 |
| 00 | 0.00 | 0.96 | 0.0 | 6.2 | 9.4 | 9.06 | 15.81 | 2.88 | 24 | 0.49 | 15.60 | 15.79 | 17.78 | 17.85 | 21.38 | 18.24 | MH 1813 - MH 18 |

Number of lines: 189 | Run Date: 9/26/2024

17.80) ^ 0.82; Return period =Yrs. 100 ; c = cir e = ellip b = box

# ulation

| off eff | Area x C | | Tc | | Rain (I) | Total flow | Cap full | Vel | Pipe | | Invert Elev | | HGL Elev | | Grnd / Rim Elev | | Line ID |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ) | Incr | Total | Inlet (min) | Syst (min) | (in/hr) | (cfs) | (cfs) | (ft/s) | Size (in) | Slope (%) | Dn (ft) | Up (ft) | Dn (ft) | Up (ft) | Dn (ft) | Up (ft) | |
| 00 | 0.00 | 0.68 | 0.0 | 5.9 | 9.5 | 6.51 | 16.37 | 2.07 | 24 | 0.52 | 15.79 | 15.98 | 17.98 | 17.98 | 18.24 | 18.42 | MH 1813 - MH 18 |
| 00 | 0.00 | 0.37 | 0.0 | 5.1 | 9.8 | 3.59 | 15.86 | 1.17 | 24 | 0.49 | 15.98 | 16.25 | 18.05 | 18.06 | 18.42 | 21.39 | MH 1813 - MH 18 |
| 99 | 0.37 | 0.37 | 5.0 | 5.0 | 9.8 | 3.60 | 7.49 | 3.88 | 15 | 1.35 | 17.00 | 17.25 | 18.08 | 18.02 | 21.39 | 0.00 | RL 6-17 - MH 181 |
| 99 | 0.42 | 0.42 | 5.0 | 5.0 | 9.8 | 4.09 | 7.49 | 5.52 | 15 | 1.35 | 17.00 | 17.25 | 17.66 | 18.07 | 21.37 | 0.00 | RL 6-22 - MH 181 |
| 99 | 0.28 | 0.28 | 5.0 | 5.0 | 9.8 | 2.73 | 7.49 | 3.75 | 15 | 1.35 | 17.00 | 17.25 | 17.78 | 17.91 | 21.38 | 0.00 | RL 6-20 - MH 181 |
| 99 | 0.32 | 0.32 | 5.0 | 5.0 | 9.8 | 3.12 | 10.70 | 3.42 | 15 | 2.74 | 16.74 | 17.25 | 18.05 | 17.96 | 18.42 | 0.00 | RL 6-18 - TEE |
| 99 | 0.28 | 0.28 | 5.0 | 5.0 | 9.8 | 2.73 | 12.80 | 3.18 | 15 | 3.93 | 16.52 | 17.25 | 17.98 | 17.91 | 18.24 | 0.00 | RL 6-19 - TEE |
| 99 | 0.37 | 0.37 | 5.0 | 5.0 | 9.8 | 3.60 | 14.45 | 7.17 | 15 | 5.01 | 16.32 | 17.25 | 16.75 | 18.02 | 18.05 | 0.00 | RL 6-24 - TEE |
| 99 | 0.37 | 0.37 | 5.0 | 5.0 | 9.8 | 3.60 | 15.85 | 3.75 | 15 | 6.03 | 16.13 | 17.25 | 17.48 | 18.02 | 17.86 | 0.00 | RL 6-21 - TEE |
| 99 | 0.37 | 0.37 | 5.0 | 5.0 | 9.8 | 3.60 | 19.30 | 6.08 | 15 | 8.93 | 15.59 | 17.25 | 16.10 | 18.02 | 17.38 | 0.00 | RL 6- 23 - TEE |
| 00 | 0.00 | 2.50 | 0.0 | 6.8 | 9.2 | 23.13 | 52.75 | 4.78 | 36 | 0.63 | 13.00 | 13.65 | 15.99 | 15.20 | 16.96 | 18.69 | MH 1815 - EW 18 |
| 00 | 0.00 | 2.50 | 0.0 | 6.3 | 9.4 | 23.56 | 47.98 | 6.37 | 36 | 0.52 | 13.65 | 14.23 | 15.20 | 15.79 | 18.69 | 21.38 | MH 1816 - EW 18 |
| 00 | 0.00 | 1.36 | 0.0 | 6.1 | 9.5 | 12.83 | 17.75 | 6.08 | 24 | 0.62 | 15.21 | 15.47 | 16.47 | 16.76 | 21.38 | 17.92 | Mh 1818 - MH 18 |
| 00 | 0.00 | 0.97 | 0.0 | 5.7 | 9.6 | 9.30 | 17.63 | 4.84 | 24 | 0.61 | 15.47 | 15.88 | 16.76 | 16.97 | 17.92 | 18.33 | Mh 1818 - MH 18 |
| 00 | 0.00 | 0.49 | 0.0 | 5.1 | 9.8 | 4.76 | 17.74 | 3.51 | 24 | 0.62 | 15.88 | 16.25 | 16.97 | 17.02 | 18.33 | 23.55 | Mh 1818 - MH 18 |
| 99 | 0.49 | 0.49 | 5.0 | 5.0 | 9.8 | 4.77 | 8.75 | 6.21 | 15 | 1.84 | 17.00 | 17.25 | 17.66 | 18.13 | 23.55 | 0.00 | RL 6-31 - MH 181 |
| 00 | 0.00 | 0.76 | 0.0 | 5.8 | 9.6 | 7.30 | 20.73 | 5.46 | 24 | 0.84 | 15.22 | 15.78 | 16.04 | 16.74 | 21.38 | 18.22 | MH 1817 - MH 18 |
| 00 | 0.00 | 0.37 | 0.0 | 5.1 | 9.8 | 3.59 | 20.72 | 3.18 | 24 | 0.84 | 15.78 | 16.16 | 16.74 | 16.82 | 18.22 | 21.38 | MH 1817 - MH 18 |
| 99 | 0.37 | 0.37 | 5.0 | 5.0 | 9.8 | 3.60 | 7.49 | 5.31 | 15 | 1.35 | 17.00 | 17.25 | 17.61 | 18.02 | 21.38 | 0.00 | RL 6-26 - MH 181 |
| 99 | 0.49 | 0.49 | 5.0 | 5.0 | 9.8 | 4.77 | 11.80 | 7.12 | 15 | 3.34 | 16.63 | 17.25 | 17.18 | 18.13 | 18.33 | 0.00 | RL 6-31 - TEE |
| 99 | 0.40 | 0.40 | 5.0 | 5.0 | 9.8 | 3.89 | 12.80 | 6.93 | 15 | 3.93 | 16.52 | 17.25 | 16.99 | 18.05 | 18.22 | 0.00 | RL 6-27 - TEE |
| 99 | 0.39 | 0.39 | 5.0 | 5.0 | 9.8 | 3.80 | 12.68 | 6.84 | 15 | 3.28 | 16.39 | 17.00 | 16.86 | 17.79 | 21.38 | 0.00 | RL 28 |

Number of lines: 189 | Run Date: 9/26/2024

17.80) ^ 0.82; Return period =Yrs. 100 ; c = cir e = ellip b = box

# ulation



| off eff | Area x C | | Tc | | Rain (I) | Total flow | Cap full | Vel | Pipe | | Invert Elev | | HGL Elev | | Grnd / Rim Elev | | Line ID |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Incr | Total | Inlet | Syst | | | | | Size | Slope | Dn | Up | Dn | Up | Dn | Up | |
| ) | | | (min) | (min) | (in/hr) | (cfs) | (cfs) | (ft/s) | (in) | (%) | (ft) | (ft) | (ft) | (ft) | (ft) | (ft) | |
| 99 | 0.39 | 0.39 | 5.0 | 5.0 | 9.8 | 3.80 | 15.23 | 6.09 | 15 | 5.56 | 16.22 | 17.25 | 16.76 | 18.04 | 17.92 | 0.00 | RL 6-29 - TEE |
| 99 | 0.43 | 0.43 | 5.0 | 5.0 | 9.8 | 4.19 | 14.52 | 5.54 | 15 | 5.05 | 16.46 | 17.25 | 17.13 | 18.08 | 18.41 | 0.00 | RL 6-46 - TEE |
| 00 | 0.00 | 0.56 | 0.0 | 5.3 | 9.7 | 5.42 | 57.35 | 3.07 | 18 | 14.29 | 13.00 | 14.00 | 15.99 | 16.00 | 15.07 | 18.12 | MH 1990A - EW 1 |
| 67 | 0.28 | 0.28 | 5.0 | 5.0 | 9.8 | 2.74 | 0.00 | 4.05 | 12 | 0.00 | 16.00 | 16.00 | 16.71 | 17.07 | 18.12 | 18.00 | INL 1991 - MH 19 |
| 67 | 0.28 | 0.28 | 5.0 | 5.0 | 9.8 | 2.74 | 0.00 | 4.05 | 12 | 0.00 | 16.00 | 16.00 | 16.71 | 17.07 | 18.12 | 18.00 | INL 1991-1990A |
| 00 | 0.00 | 0.55 | 0.0 | 5.3 | 9.7 | 5.39 | 55.18 | 3.05 | 18 | 13.23 | 13.00 | 14.00 | 15.99 | 16.00 | 15.07 | 18.99 | MH 1970 A - EW |
| 68 | 0.28 | 0.28 | 5.0 | 5.0 | 9.8 | 2.73 | 0.00 | 4.03 | 12 | 0.00 | 16.00 | 16.00 | 16.71 | 17.07 | 18.99 | 18.00 | INL1971-MH 1970 |
| 68 | 0.28 | 0.28 | 5.0 | 5.0 | 9.8 | 2.73 | 0.00 | 4.03 | 12 | 0.00 | 16.00 | 16.00 | 16.71 | 17.07 | 18.99 | 18.00 | INL 1971 - MH 19 |
| 00 | 0.00 | 0.55 | 0.0 | 5.3 | 9.7 | 5.32 | 57.34 | 3.01 | 18 | 14.29 | 13.00 | 14.00 | 15.99 | 16.00 | 15.07 | 18.12 | MH 1980A - EW 1 |
| 68 | 0.27 | 0.27 | 5.0 | 5.0 | 9.8 | 2.69 | 0.00 | 4.00 | 12 | 0.00 | 16.00 | 16.00 | 16.70 | 17.06 | 18.12 | 18.00 | INL 1981- MH 198 |
| 68 | 0.27 | 0.27 | 5.0 | 5.0 | 9.8 | 2.69 | 0.00 | 4.00 | 12 | 0.00 | 16.00 | 16.00 | 16.70 | 17.06 | 18.12 | 18.00 | INL 1981 - MH 19 |
| 87 | 0.33 | 0.83 | 5.0 | 5.9 | 9.5 | 7.86 | 9.58 | 4.45 | 18 | 0.83 | 14.00 | 14.50 | 15.99 | 16.33 | 0.00 | 18.00 | INL 1782 B - MH |
| 81 | 0.11 | 0.50 | 5.0 | 5.4 | 9.7 | 4.81 | 7.71 | 2.72 | 18 | 0.54 | 14.50 | 15.00 | 16.79 | 16.98 | 18.00 | 19.78 | INL 1782 A - INL |
| 98 | 0.38 | 0.38 | 5.0 | 5.0 | 9.8 | 3.76 | 15.43 | 2.13 | 18 | 1.03 | 15.00 | 15.50 | 17.12 | 17.15 | 19.78 | 17.50 | 1782C |
| 94 | 0.25 | 0.57 | 5.0 | 8.9 | 8.6 | 4.89 | 20.12 | 1.56 | 24 | 0.79 | 13.00 | 13.30 | 15.99 | 16.01 | 15.60 | 21.13 | INL 1771 - EW 17 |
| 95 | 0.10 | 0.31 | 5.0 | 6.4 | 9.4 | 2.93 | 16.51 | 0.96 | 24 | 0.53 | 13.52 | 14.30 | 16.06 | 16.09 | 21.13 | 20.97 | INL 1772 - INL 17 |
| 99 | 0.22 | 0.22 | 5.0 | 5.0 | 9.8 | 2.14 | 7.02 | 1.66 | 18 | 0.45 | 14.80 | 15.25 | 16.09 | 16.13 | 20.97 | 19.97 | INL 1773 - INL 17 |
| 93 | 0.36 | 0.96 | 5.0 | 8.5 | 8.8 | 8.41 | 42.29 | 2.80 | 24 | 3.50 | 13.00 | 14.30 | 15.99 | 16.02 | 15.60 | 20.91 | INL 1741 - EW 17 |
| 94 | 0.24 | 0.24 | 5.0 | 5.0 | 9.8 | 2.31 | 18.26 | 2.13 | 24 | 0.65 | 14.50 | 15.50 | 16.32 | 16.03 | 20.91 | 21.18 | INL 1742 - INL 17 |
| 93 | 0.36 | 0.36 | 5.0 | 5.0 | 9.8 | 3.57 | 16.58 | 2.56 | 24 | 0.54 | 14.50 | 15.50 | 16.32 | 16.16 | 20.91 | 20.91 | INL 1743 - INL 17 |
| 97 | 0.43 | 1.70 | 5.0 | 6.0 | 9.5 | 16.09 | 18.82 | 5.12 | 24 | 0.69 | 13.00 | 13.24 | 15.99 | 16.17 | 15.60 | 17.60 | INL 1831 - EW 18 |
| 97 | 0.43 | 0.43 | 5.0 | 5.0 | 9.8 | 4.20 | 7.43 | 2.38 | 18 | 0.50 | 14.12 | 14.60 | 17.08 | 17.24 | 17.60 | 17.60 | INL 1834 - INL 18 |

Number of lines: 189 | Run Date: 9/26/2024

17.80) ^ 0.82; Return period =Yrs. 100 ; c = cir e = ellip b = box

# ulation



| off eff | Area x C | | Tc | | Rain (I) | Total flow | Cap full | Vel | Pipe | | Invert Elev | | HGL Elev | | Grnd / Rim Elev | | Line ID |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ) | Incr | Total | Inlet (min) | Syst (min) | (in/hr) | (cfs) | (cfs) | (ft/s) | Size (in) | Slope (%) | Dn (ft) | Up (ft) | Dn (ft) | Up (ft) | Dn (ft) | Up (ft) | |
| 97 | 0.43 | 0.84 | 5.0 | 5.7 | 9.6 | 8.10 | 7.42 | 4.58 | 18 | 0.50 | 13.44 | 13.92 | 17.08 | 17.66 | 17.60 | 17.60 | INL 1832- 1831 |
| 97 | 0.42 | 0.42 | 5.0 | 5.0 | 9.8 | 4.10 | 7.43 | 2.32 | 18 | 0.50 | 14.12 | 14.60 | 17.82 | 17.96 | 17.60 | 17.60 | INL 1833 - INL 18 |
| 97 | 0.44 | 1.75 | 5.0 | 6.0 | 9.5 | 16.58 | 21.87 | 5.28 | 24 | 0.93 | 13.00 | 13.24 | 15.99 | 16.13 | 15.60 | 17.60 | INL 1606 - EW 16 |
| 97 | 0.44 | 0.87 | 5.0 | 5.7 | 9.6 | 8.39 | 7.42 | 4.75 | 18 | 0.50 | 13.44 | 13.92 | 16.78 | 17.39 | 17.60 | 17.60 | INL 1607 - INL 16 |
| 97 | 0.44 | 0.44 | 5.0 | 5.0 | 9.8 | 4.29 | 7.43 | 2.43 | 18 | 0.50 | 14.12 | 14.60 | 17.57 | 17.73 | 17.60 | 17.60 | INL 1608 - INL 16 |
| 97 | 0.44 | 0.44 | 5.0 | 5.0 | 9.8 | 4.29 | 7.43 | 2.43 | 18 | 0.50 | 14.12 | 14.60 | 16.78 | 16.94 | 17.60 | 17.60 | INL 1609 - INL 16 |
| 97 | 0.43 | 1.71 | 5.0 | 6.0 | 9.5 | 16.20 | 18.82 | 5.16 | 24 | 0.69 | 13.00 | 13.24 | 15.99 | 16.17 | 15.60 | 17.60 | INL 1826 - EW 18 |
| 97 | 0.43 | 0.43 | 5.0 | 5.0 | 9.8 | 4.20 | 7.43 | 2.38 | 18 | 0.50 | 14.12 | 14.60 | 16.79 | 16.94 | 17.60 | 17.60 | INL 1829 - INL 18 |
| 97 | 0.43 | 0.85 | 5.0 | 5.7 | 9.6 | 8.20 | 7.43 | 4.64 | 18 | 0.50 | 13.44 | 13.92 | 16.79 | 17.37 | 17.60 | 17.60 | INL 1827 - INL 18 |
| 97 | 0.43 | 0.43 | 5.0 | 5.0 | 9.8 | 4.20 | 7.42 | 2.38 | 18 | 0.50 | 14.12 | 14.60 | 17.54 | 17.69 | 17.60 | 17.60 | INL 1828 - INL 18 |
| 97 | 0.44 | 1.76 | 5.0 | 6.0 | 9.5 | 16.67 | 21.85 | 5.31 | 24 | 0.93 | 13.00 | 13.24 | 15.99 | 16.13 | 16.26 | 17.60 | INL 1616 - EW 16 |
| 97 | 0.45 | 0.45 | 5.0 | 5.0 | 9.8 | 4.39 | 7.43 | 2.48 | 18 | 0.50 | 14.12 | 14.60 | 16.79 | 16.95 | 17.60 | 17.60 | INL 1619 - INL 16 |
| 97 | 0.44 | 0.87 | 5.0 | 5.7 | 9.6 | 8.39 | 7.43 | 4.75 | 18 | 0.50 | 13.44 | 13.92 | 16.79 | 17.40 | 17.60 | 17.60 | INL 1617 - INL 16 |
| 97 | 0.44 | 0.44 | 5.0 | 5.0 | 9.8 | 4.29 | 7.42 | 2.43 | 18 | 0.50 | 14.12 | 14.60 | 17.57 | 17.73 | 17.60 | 17.60 | INL 1618 - INL 16 |
| 97 | 0.35 | 1.20 | 5.0 | 6.0 | 9.5 | 11.42 | 19.21 | 3.63 | 24 | 0.72 | 13.00 | 13.25 | 15.99 | 16.08 | 15.60 | 17.60 | INL 1821 - EW 18 |
| 97 | 0.43 | 0.85 | 5.0 | 5.7 | 9.6 | 8.20 | 7.45 | 4.64 | 18 | 0.50 | 13.45 | 13.92 | 16.39 | 16.96 | 17.60 | 17.60 | INL 1822 - INL 18 |
| 97 | 0.43 | 0.43 | 5.0 | 5.0 | 9.8 | 4.20 | 7.43 | 2.38 | 18 | 0.50 | 14.12 | 14.60 | 17.12 | 17.28 | 17.60 | 17.60 | INL 1823 - INL 18 |
| 97 | 0.44 | 1.76 | 5.0 | 6.0 | 9.5 | 16.67 | 21.86 | 5.31 | 24 | 0.93 | 13.00 | 13.24 | 15.99 | 16.13 | 15.60 | 17.60 | INL 1611 - EW 16 |
| 97 | 0.44 | 0.44 | 5.0 | 5.0 | 9.8 | 4.29 | 7.43 | 2.43 | 18 | 0.50 | 14.12 | 14.60 | 17.11 | 17.27 | 17.60 | 17.60 | INL 1614 - INL 16 |
| 97 | 0.44 | 0.88 | 5.0 | 5.6 | 9.6 | 8.48 | 7.43 | 4.80 | 18 | 0.50 | 13.44 | 13.92 | 17.11 | 17.74 | 17.60 | 17.60 | INL 1612 - INL 16 |
| 99 | 0.45 | 0.45 | 5.0 | 5.0 | 9.8 | 4.38 | 7.43 | 2.48 | 18 | 0.50 | 14.12 | 14.60 | 17.92 | 18.08 | 17.60 | 17.60 | INL 1613 - INL 16 |
| 88 | 0.60 | 1.47 | 5.0 | 6.0 | 9.5 | 13.98 | 20.03 | 4.45 | 24 | 0.78 | 13.00 | 13.20 | 15.99 | 16.09 | 15.60 | 17.60 | INL 1601 - EW 16 |

Number of lines: 189 | Run Date: 9/26/2024

17.80) ^ 0.82; Return period =Yrs. 100 ; c = cir e = ellip b = box

# ulation



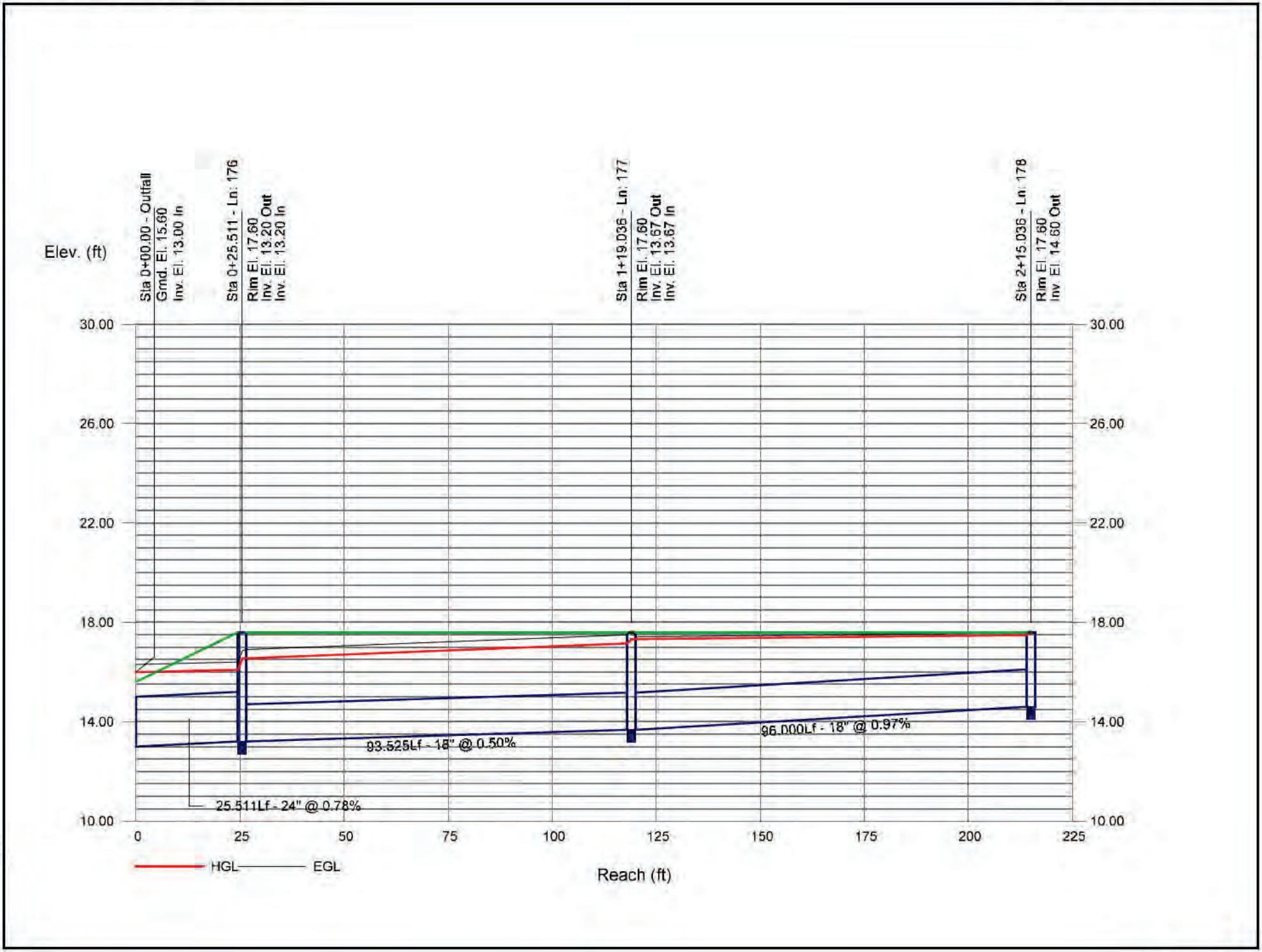
| off eff | Area x C | | Tc | | Rain (I) | Total flow | Cap full | Vel | Pipe | | Invert Elev | | HGL Elev | | Grnd / Rim Elev | | Line ID |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Incr | Total | Inlet | Syst | | | | | Size | Slope | Dn | Up | Dn | Up | Dn | Up | |
| ) | | | (min) | (min) | (in/hr) | (cfs) | (cfs) | (ft/s) | (in) | (%) | (ft) | (ft) | (ft) | (ft) | (ft) | (ft) | |
| 97 | 0.44 | 0.87 | 5.0 | 5.7 | 9.6 | 8.39 | 7.44 | 4.75 | 18 | 0.50 | 13.20 | 13.67 | 16.55 | 17.15 | 17.60 | 17.60 | INL 1602 - INL 16 |
| 97 | 0.44 | 0.44 | 5.0 | 5.0 | 9.8 | 4.29 | 10.34 | 2.43 | 18 | 0.97 | 13.67 | 14.60 | 17.32 | 17.48 | 17.60 | 17.60 | INL 1603 - INL 16 |
| 97 | 0.43 | 1.28 | 5.0 | 5.7 | 9.6 | 12.29 | 22.75 | 3.91 | 24 | 1.01 | 13.00 | 13.34 | 15.99 | 16.09 | 15.81 | 17.60 | INL 1837 - EW 18 |
| 97 | 0.43 | 0.43 | 5.0 | 5.0 | 9.8 | 4.20 | 10.50 | 2.38 | 18 | 1.00 | 13.54 | 14.50 | 16.62 | 16.78 | 17.60 | 17.60 | INL 1838 - INL 18 |
| 97 | 0.43 | 0.43 | 5.0 | 5.0 | 9.8 | 4.20 | 10.50 | 2.38 | 18 | 1.00 | 13.54 | 14.50 | 16.62 | 16.78 | 17.60 | 17.60 | INL 1836 - INL 18 |
| 86 | 0.31 | 1.07 | 5.0 | 5.5 | 9.6 | 10.36 | 21.38 | 3.30 | 24 | 0.89 | 13.00 | 13.50 | 15.99 | 16.11 | 15.60 | 19.13 | INL 1766 - EW 17 |
| 90 | 0.77 | 0.77 | 5.0 | 5.0 | 9.8 | 7.52 | 8.32 | 4.26 | 18 | 0.63 | 13.50 | 14.37 | 16.20 | 16.91 | 19.13 | 17.44 | INL 1767 - INL 17 |
| 00 | 0.00 | 0.47 | 0.0 | 5.3 | 9.7 | 4.52 | 12.23 | 1.44 | 24 | 0.29 | 13.00 | 13.07 | 15.99 | 16.00 | 15.60 | 18.00 | MH 1757 - EW 18 |
| 93 | 0.47 | 0.47 | 5.0 | 5.0 | 9.8 | 4.57 | 11.78 | 1.46 | 24 | 0.27 | 13.07 | 13.15 | 16.02 | 16.04 | 18.00 | 17.60 | INL 1876 - MH 17 |
| 92 | 0.46 | 0.46 | 5.0 | 5.0 | 9.8 | 4.52 | 24.74 | 3.16 | 18 | 5.55 | 13.00 | 15.00 | 15.99 | 15.97 | 15.07 | 17.44 | INL 1661 - EW 16 |
| 79 | 0.37 | 0.37 | 5.0 | 5.0 | 9.8 | 3.65 | 8.82 | 2.07 | 18 | 0.71 | 12.96 | 13.28 | 15.99 | 16.04 | 15.21 | 18.94 | INL 1821 A - EW |
| 00 | 0.00 | 0.00 | 0.0 | 0.0 | 0.0 | 56.50 | 318.4 | 4.50 | 48 | 4.91 | 6.00 | 12.00 | 15.99 | 16.18 | 0.00 | 0.00 | - (208) |
| 00 | 0.00 | 0.00 | 0.0 | 0.0 | 0.0 | 56.50 | 318.6 | 4.50 | 48 | 4.92 | 6.00 | 12.00 | 15.99 | 16.18 | 0.00 | 0.00 | - (207) |

Number of lines: 189 | Run Date: 9/26/2024

17.80) ^ 0.82; Return period =Yrs. 100 ; c = cir e = ellip b = box

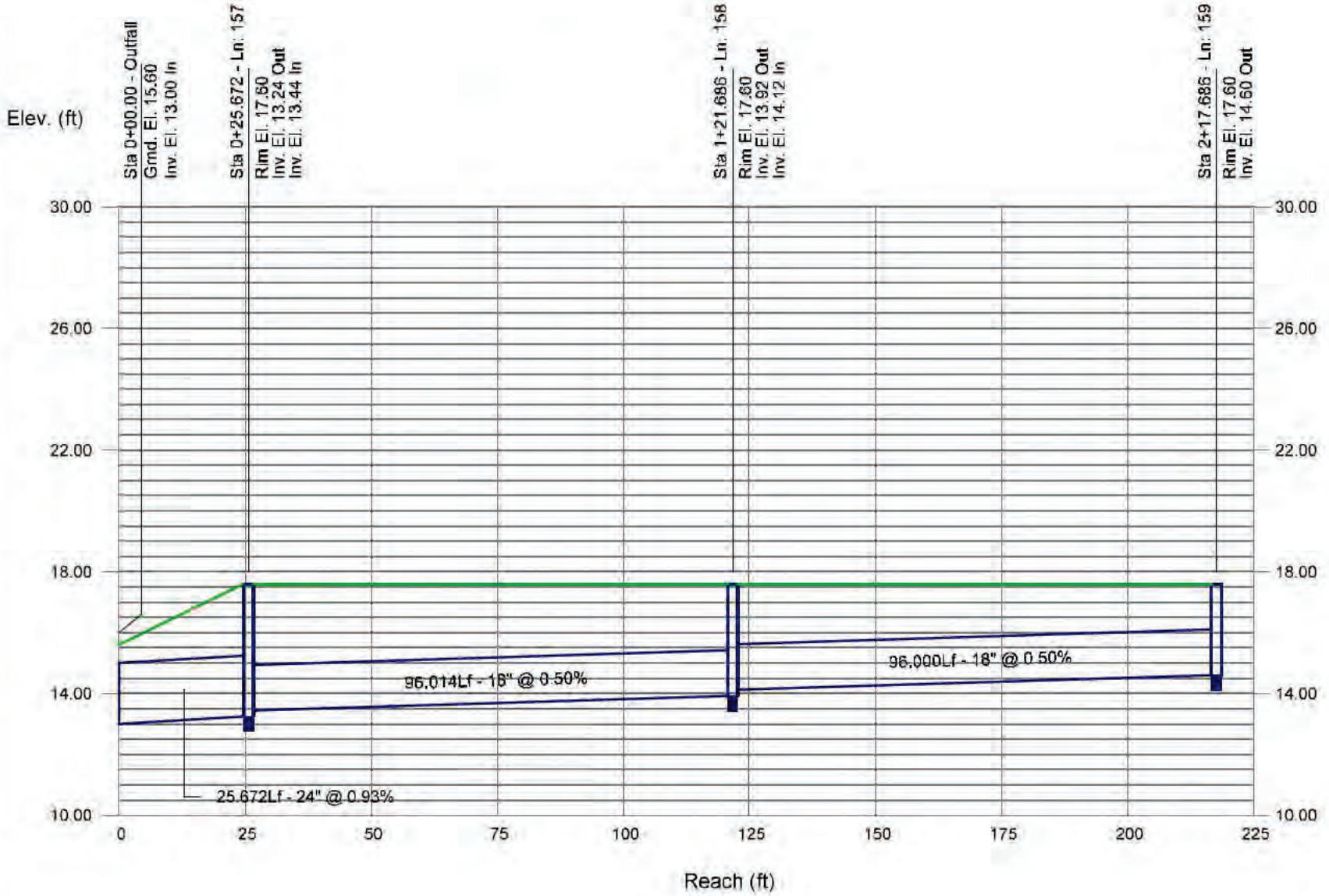
# Storm Sewer Profile

Proj. file: Building 6 Storm.stm



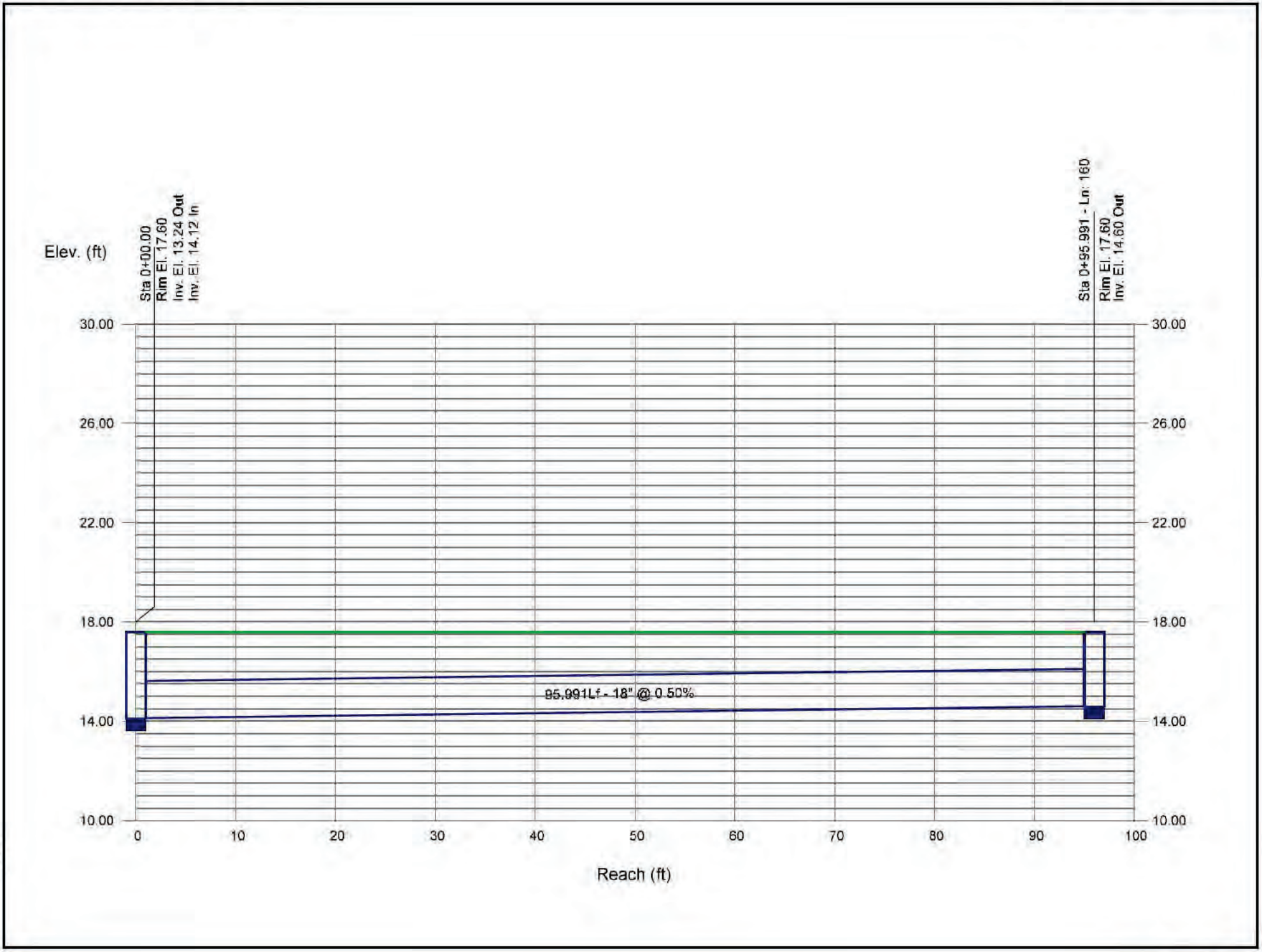
# Storm Sewer Profile

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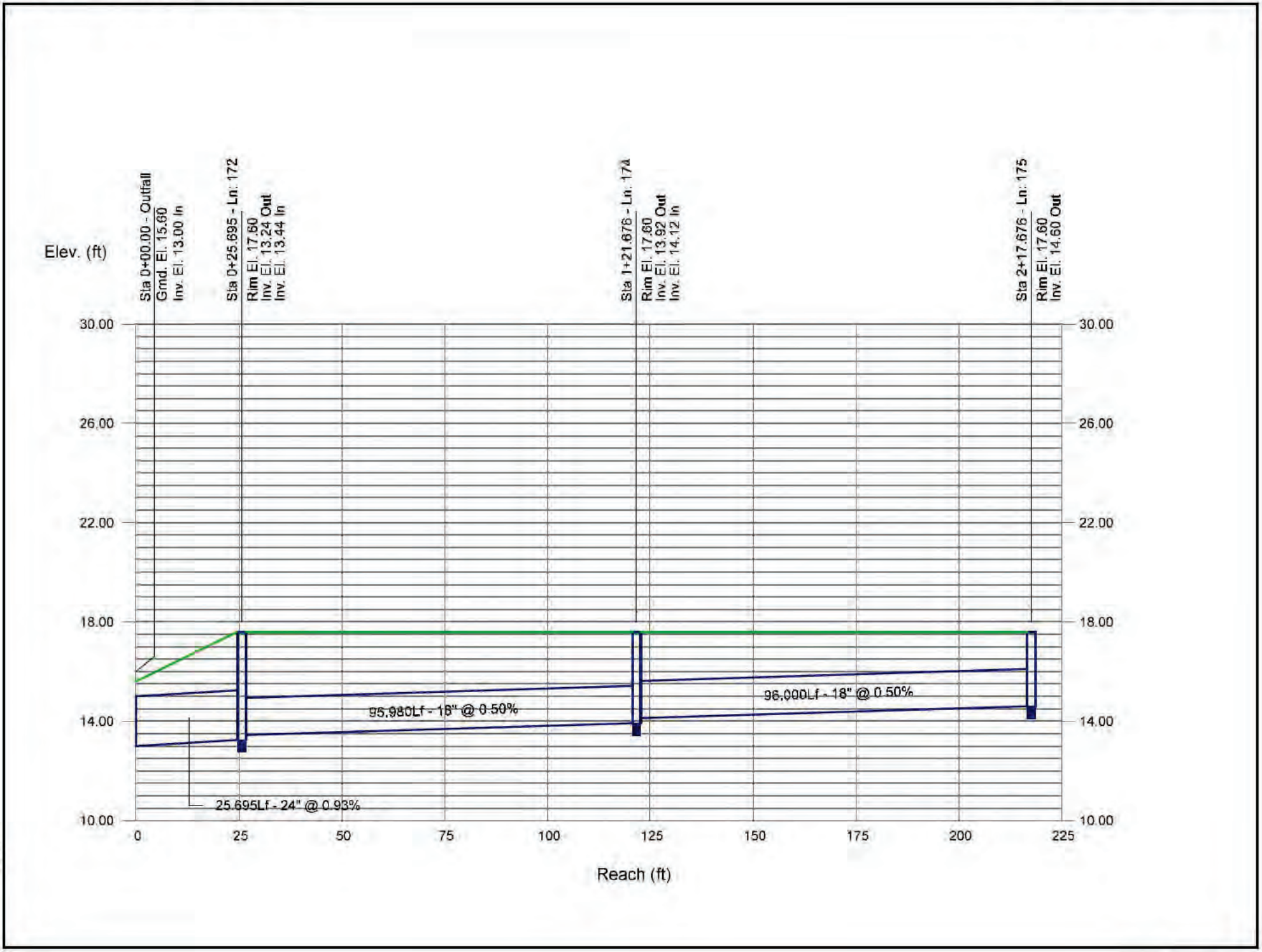
# Storm Sewer Profile

Proj. file: Building 6 Storm.stm



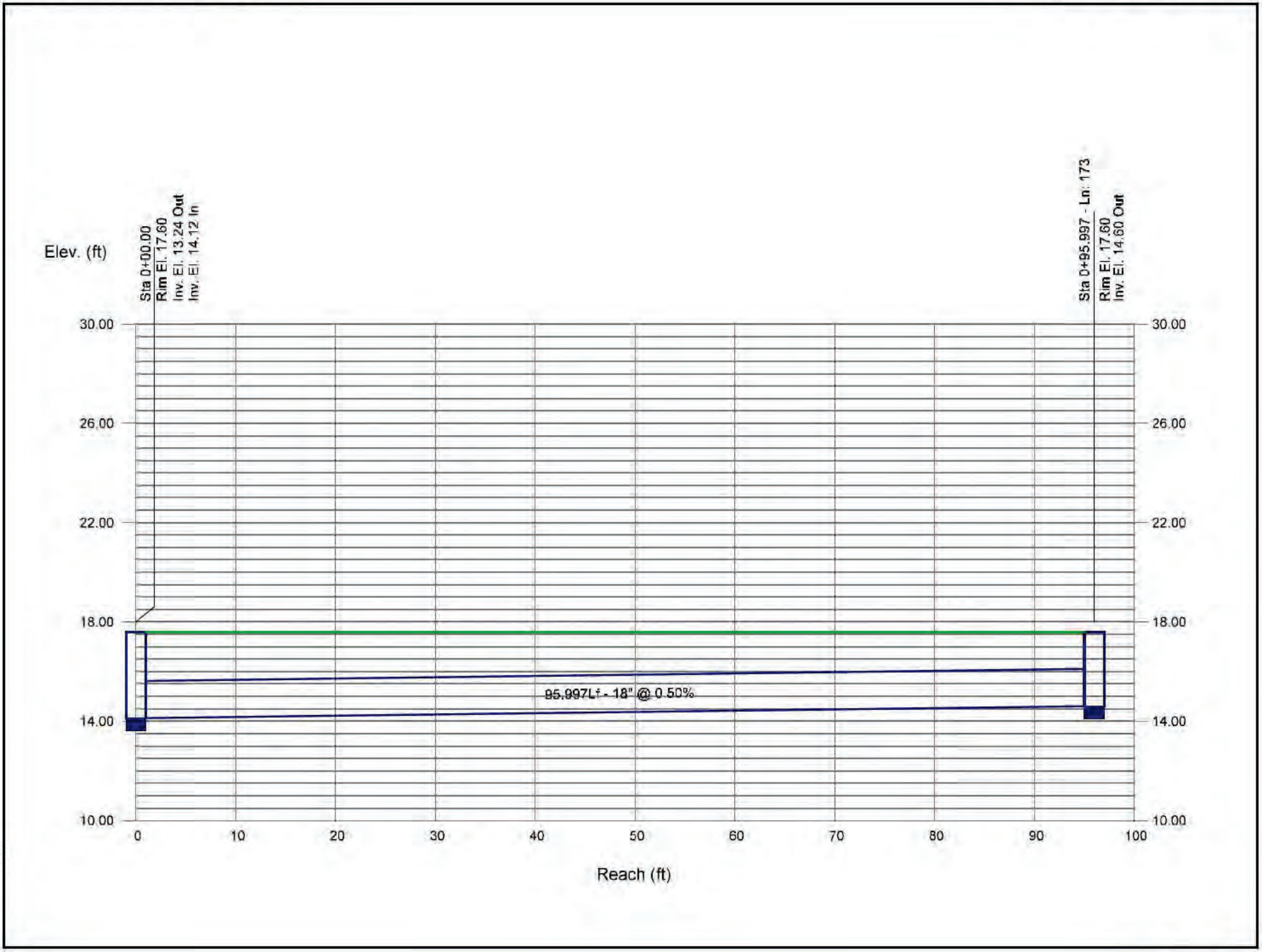
# Storm Sewer Profile

Proj. file: Building 6 Storm.stm



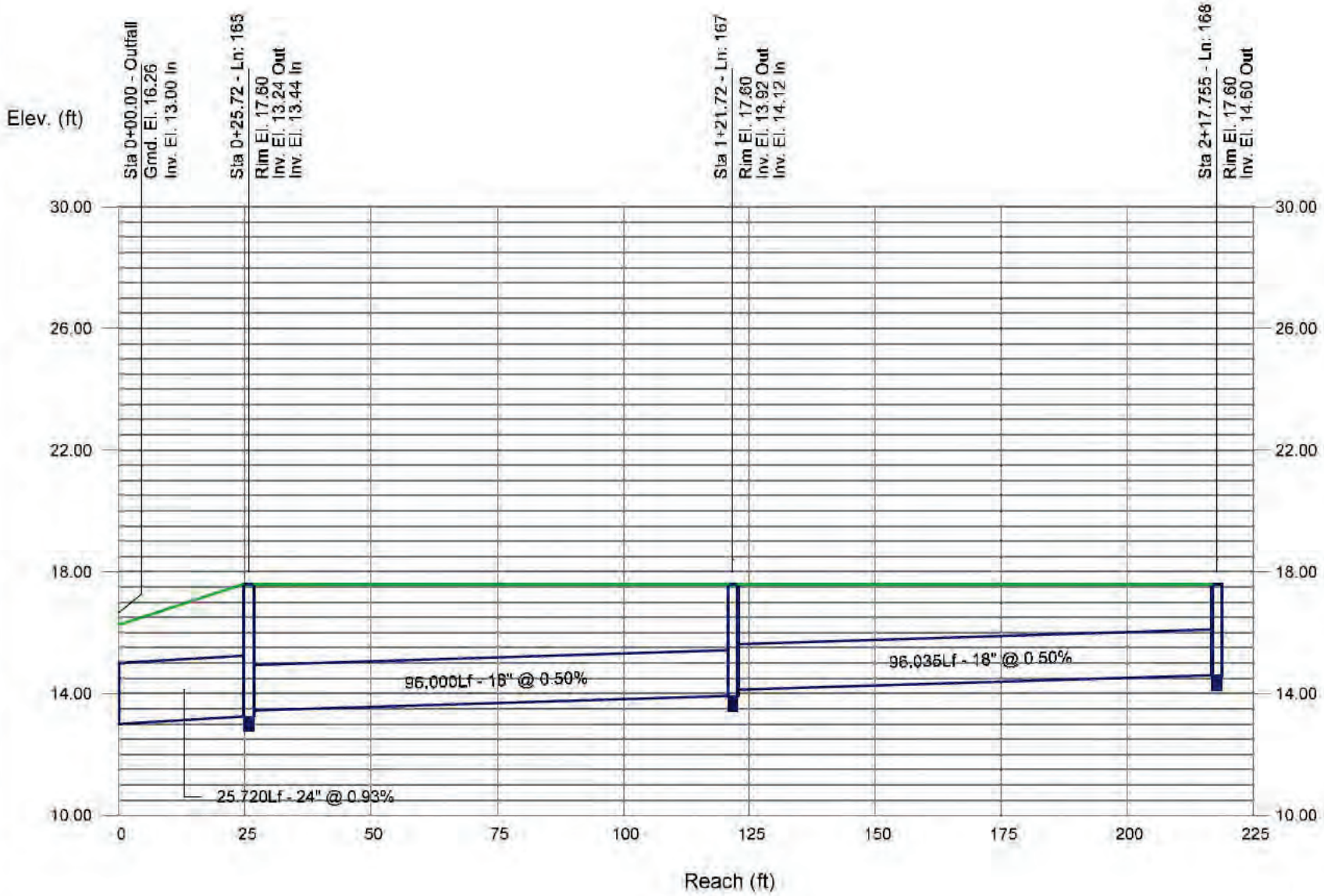
# Storm Sewer Profile

Proj. file: Building 6 Storm.stm



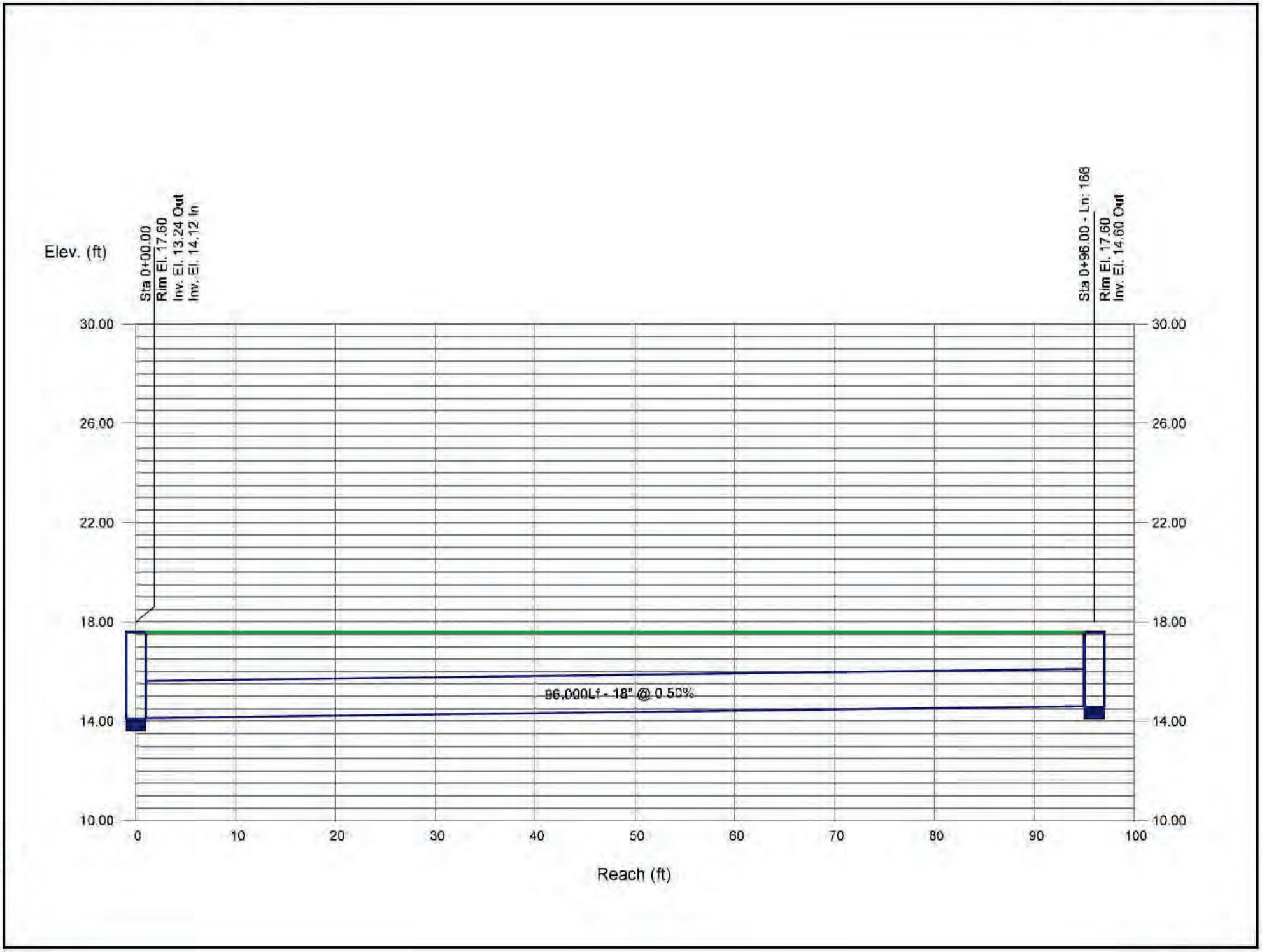
# Storm Sewer Profile

Proj. file: Building 6 Storm.stm



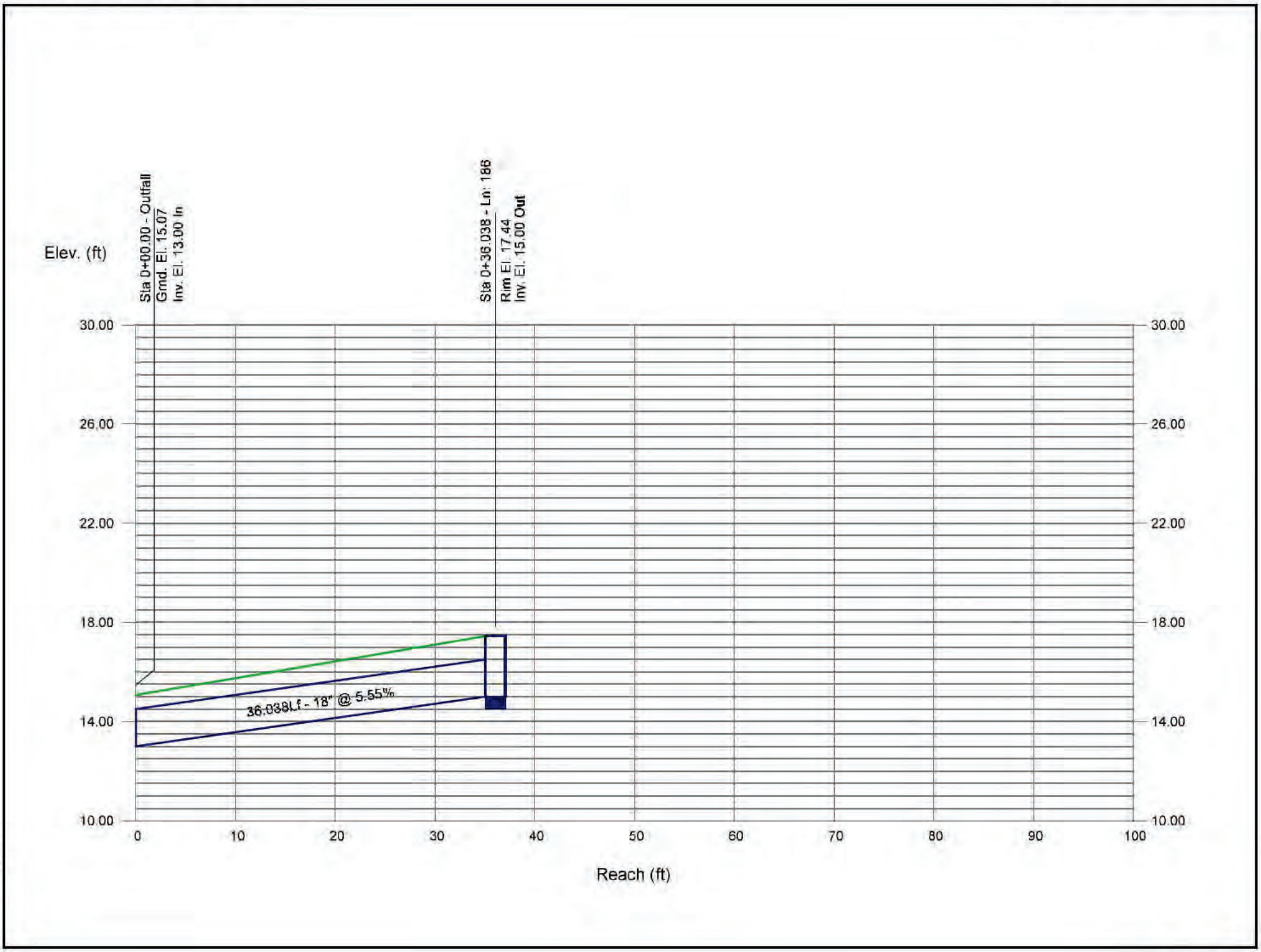
# Storm Sewer Profile

Proj. file: Building 6 Storm.stm



# Storm Sewer Profile

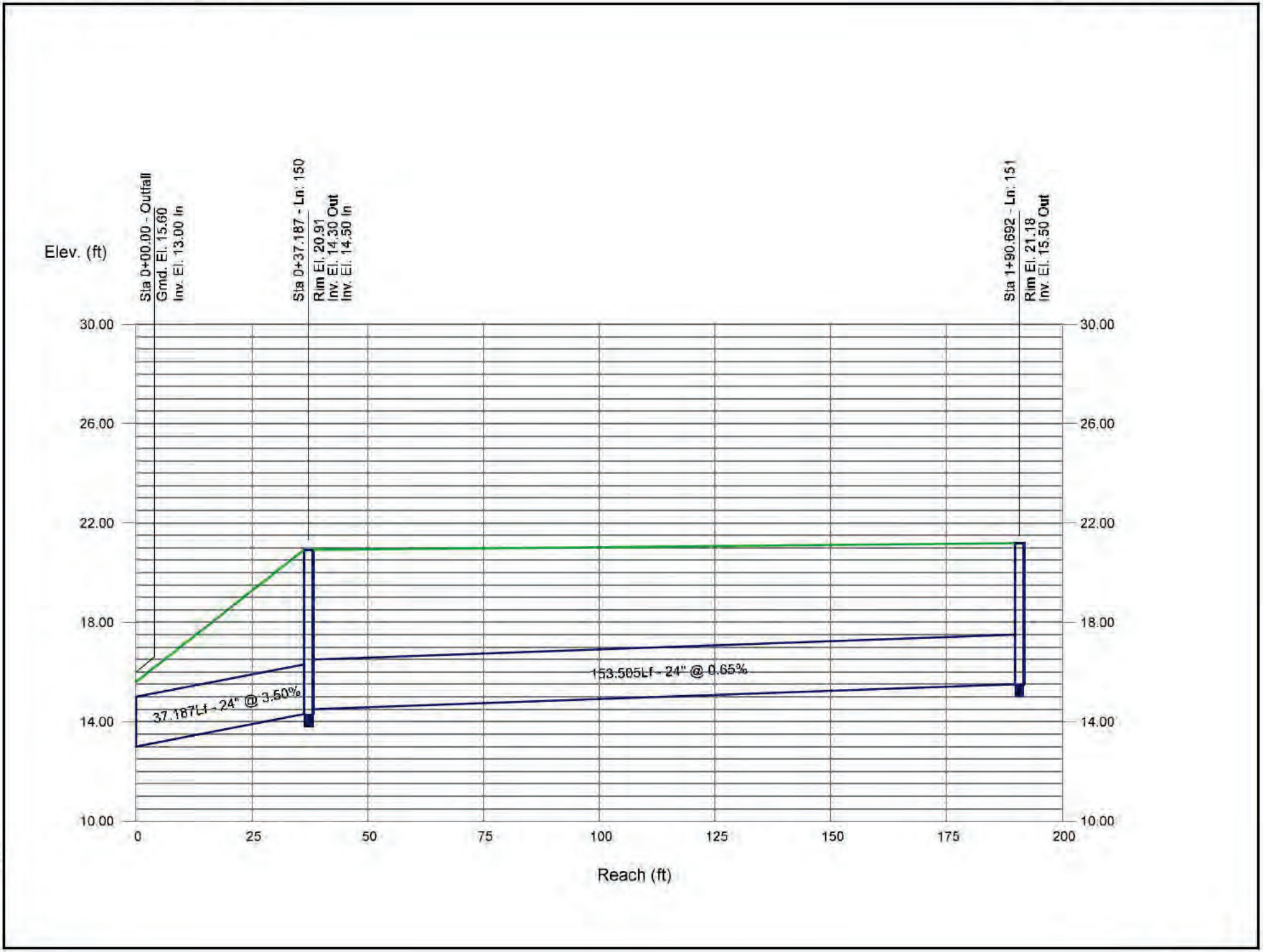
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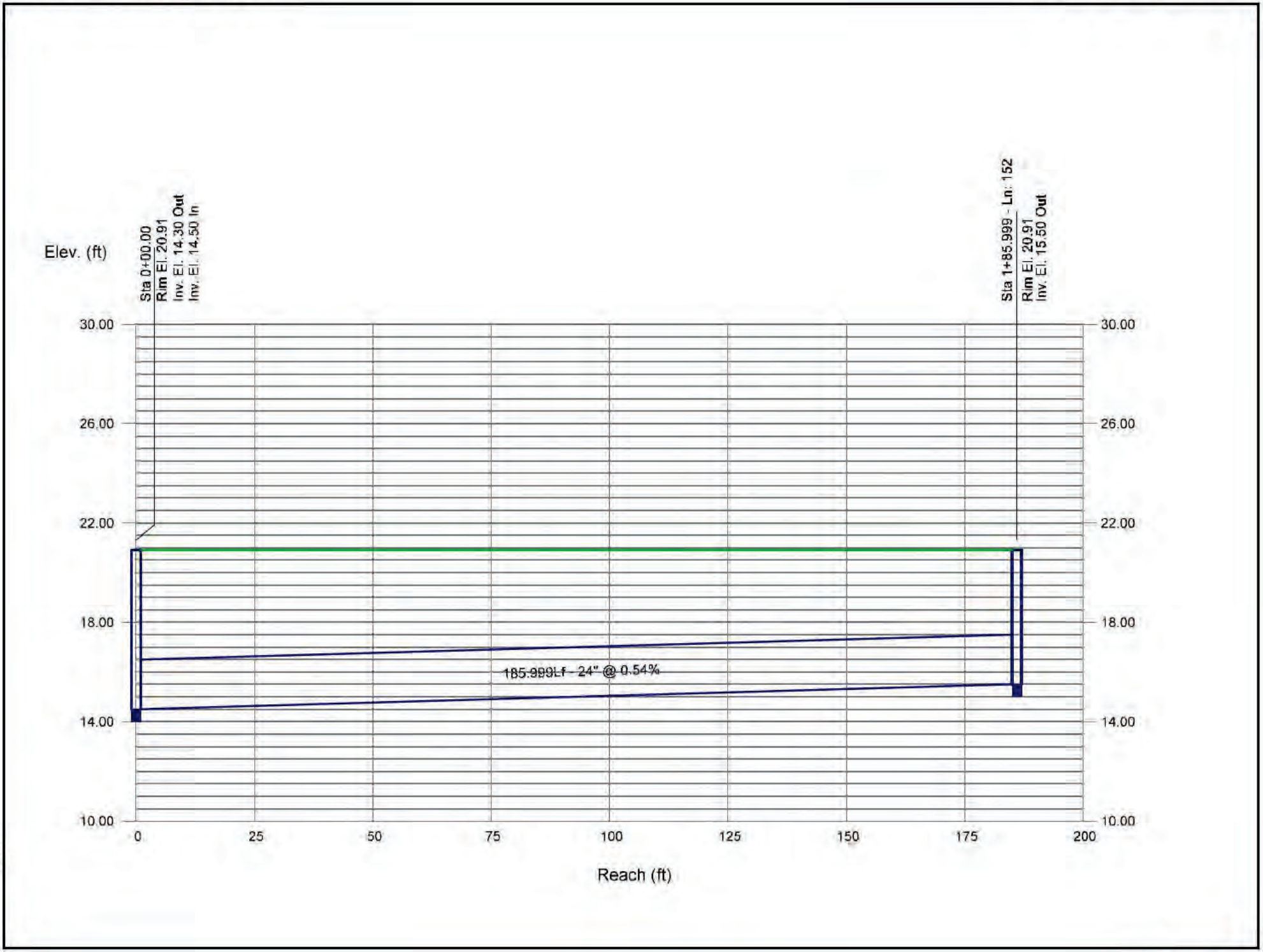
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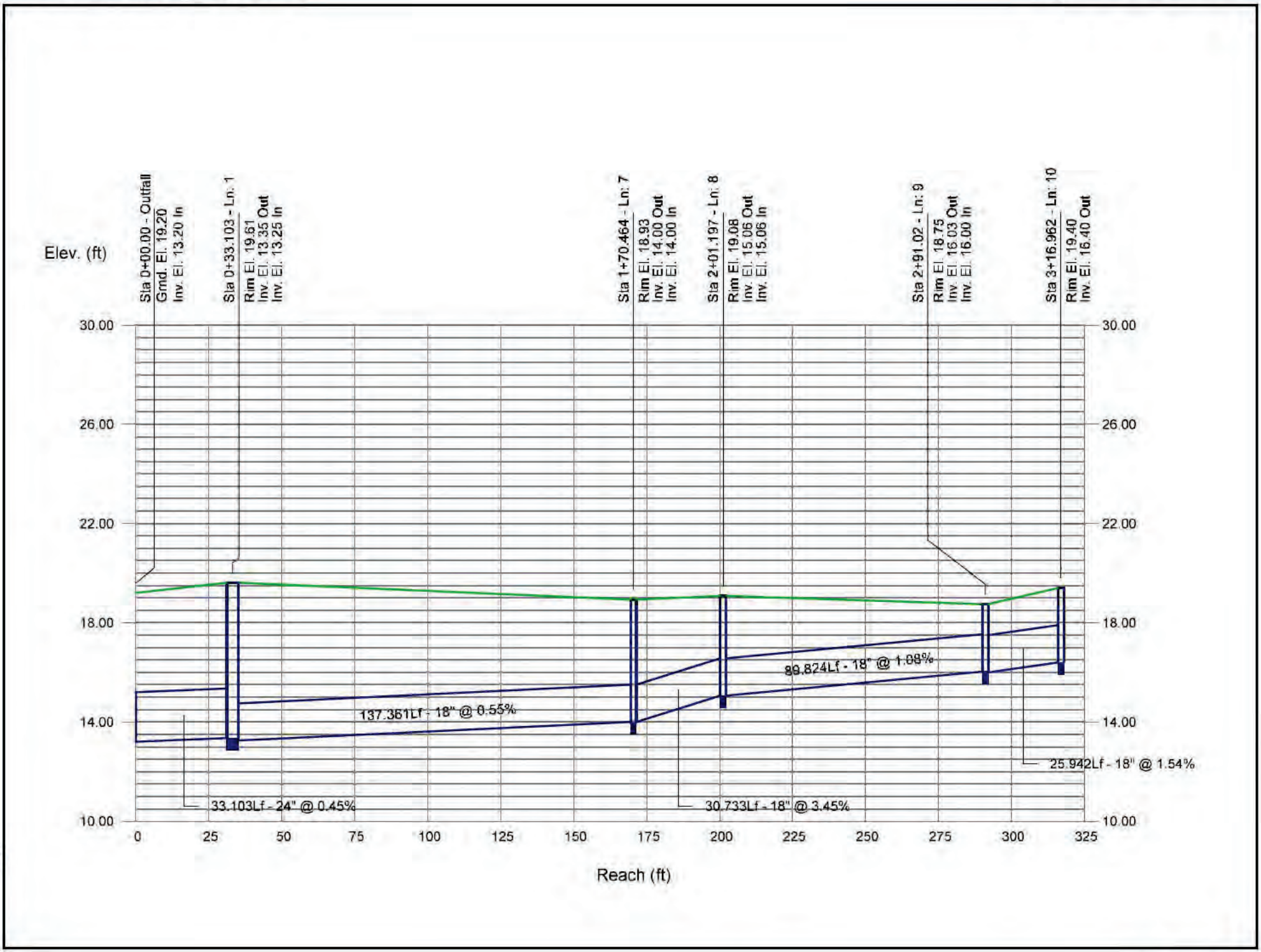
# Storm Sewer Profile

Proj. file: Building 6 Storm.stm



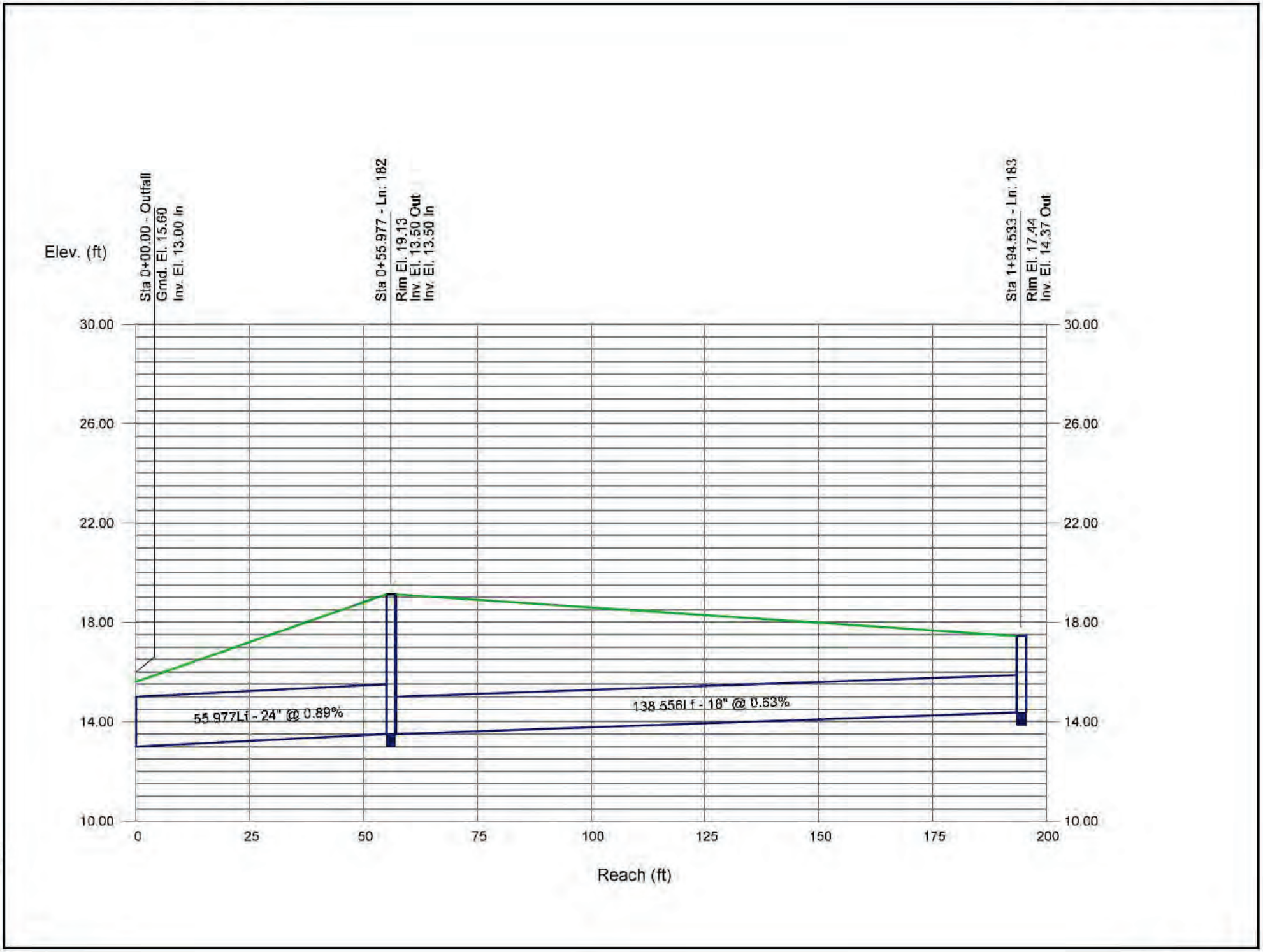
# Storm Sewer Profile

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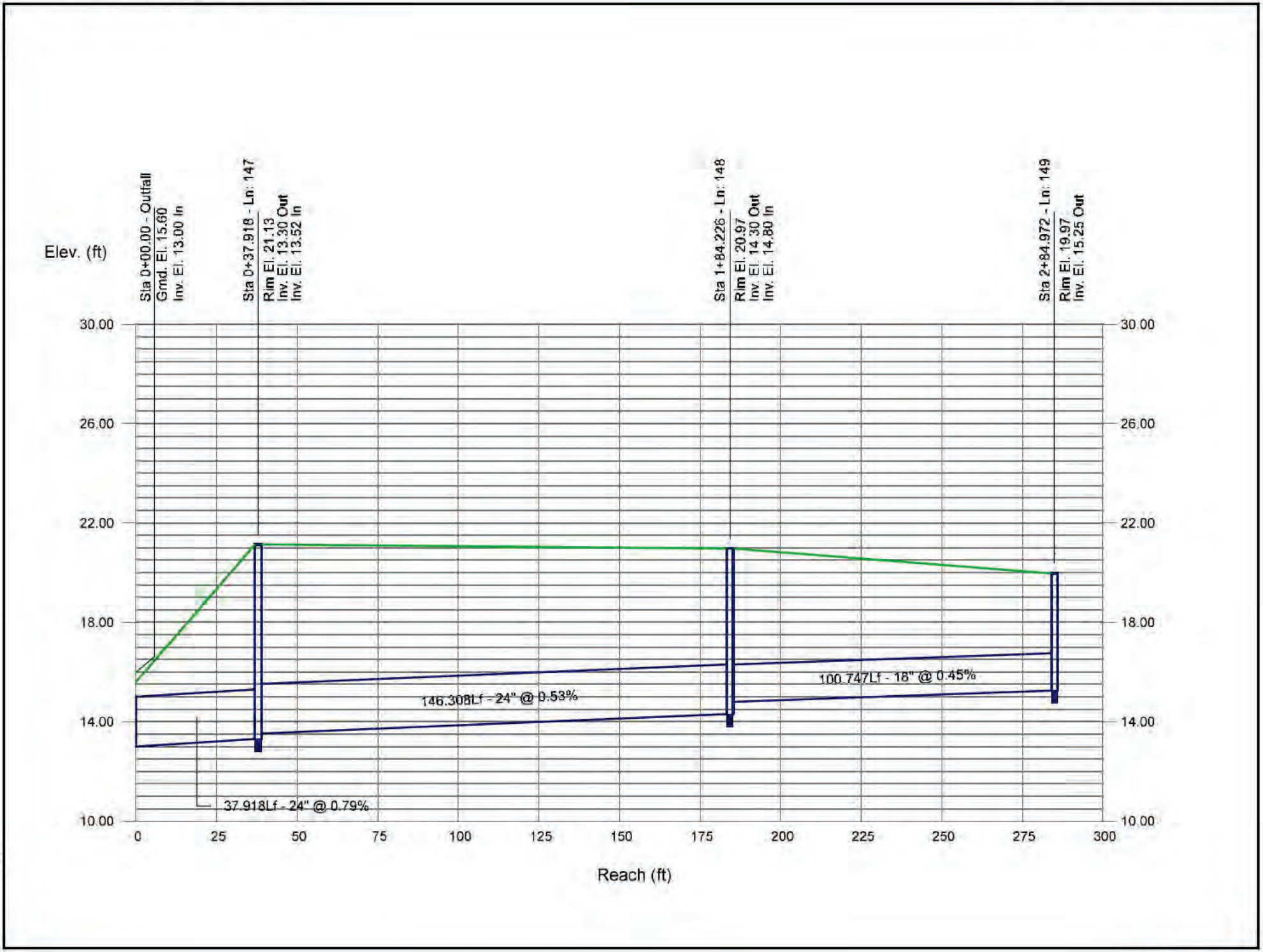
# Storm Sewer Profile

Proj. file: Building 6 Storm.stm



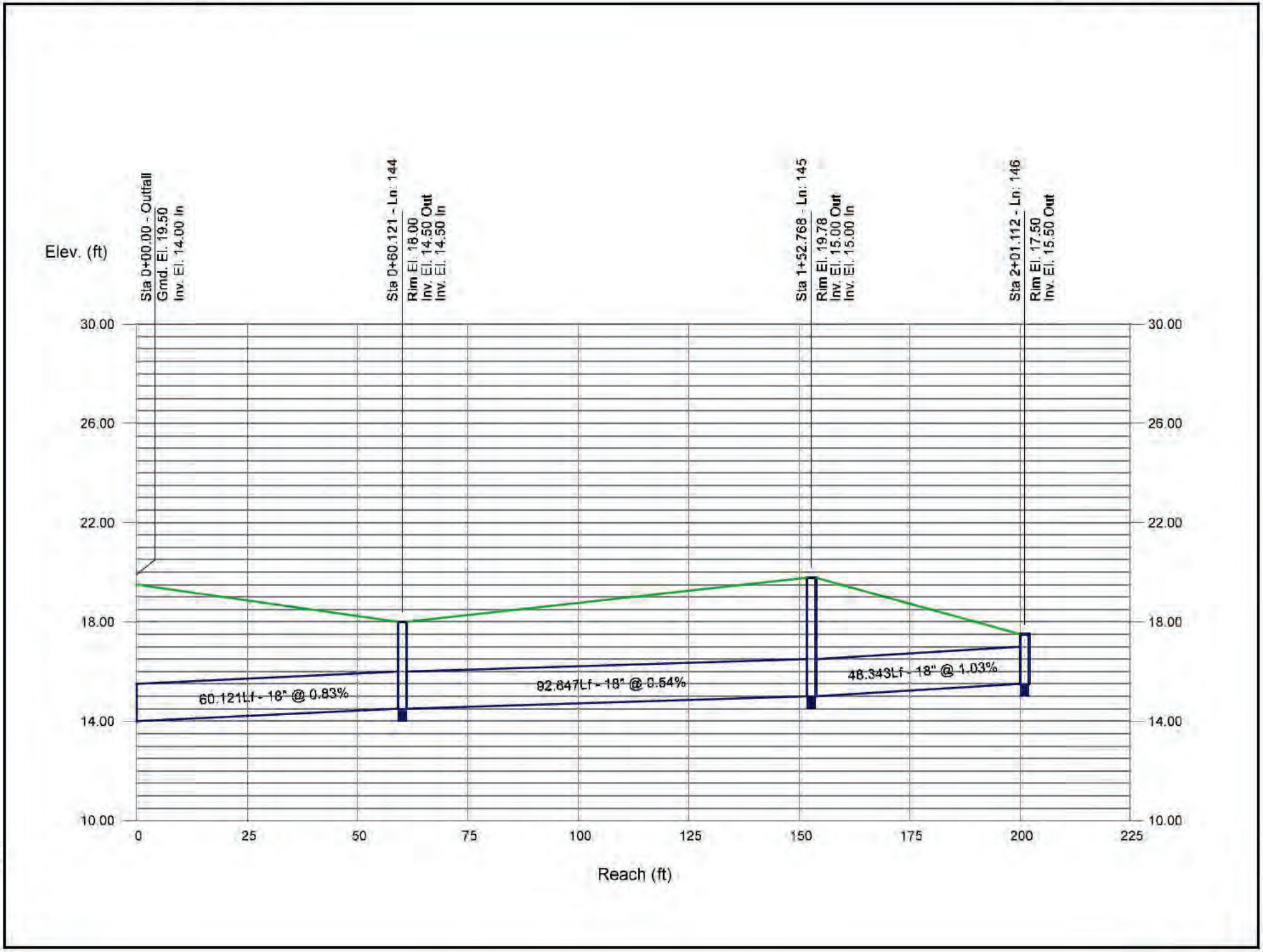
# Storm Sewer Profile

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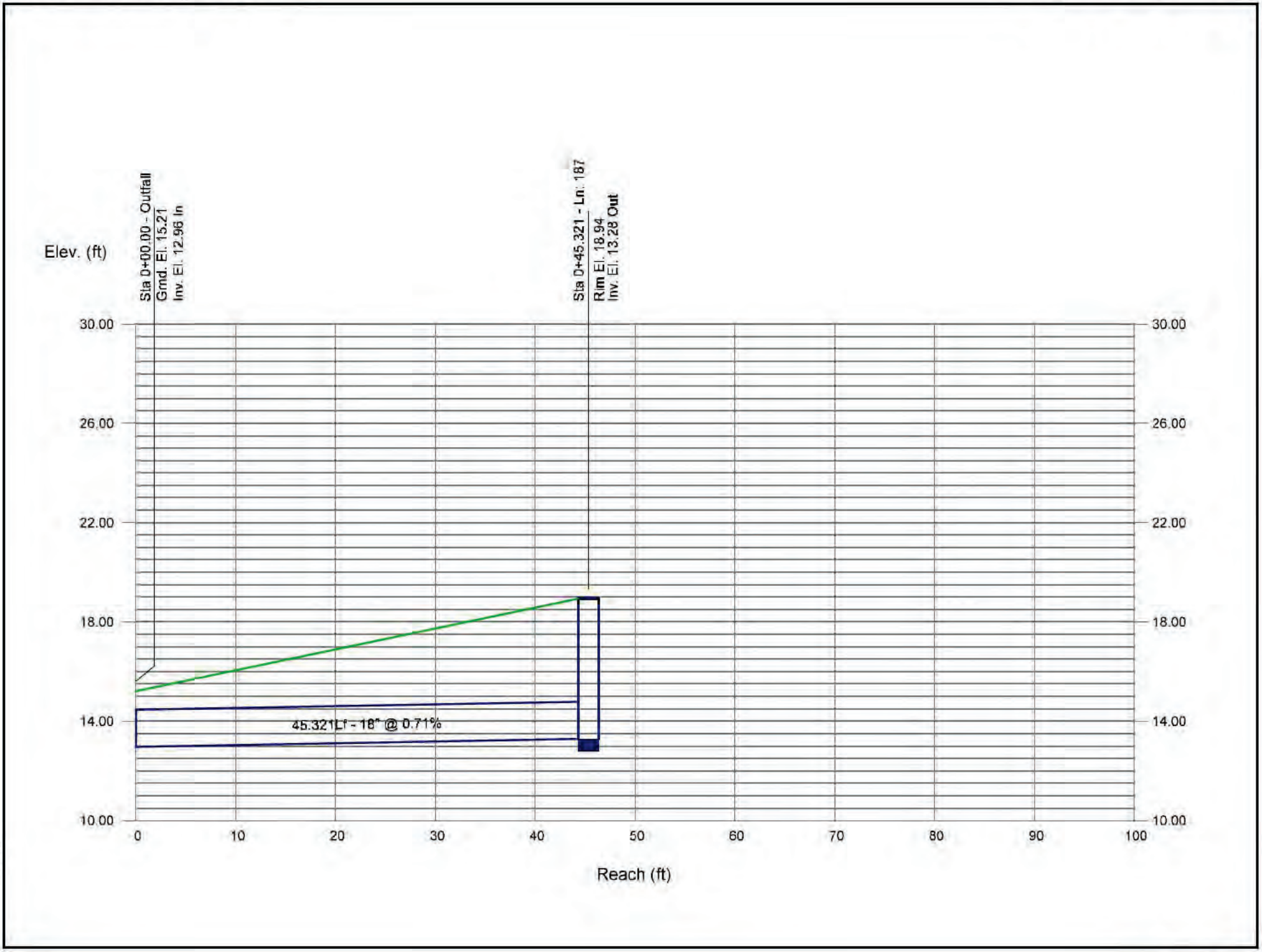
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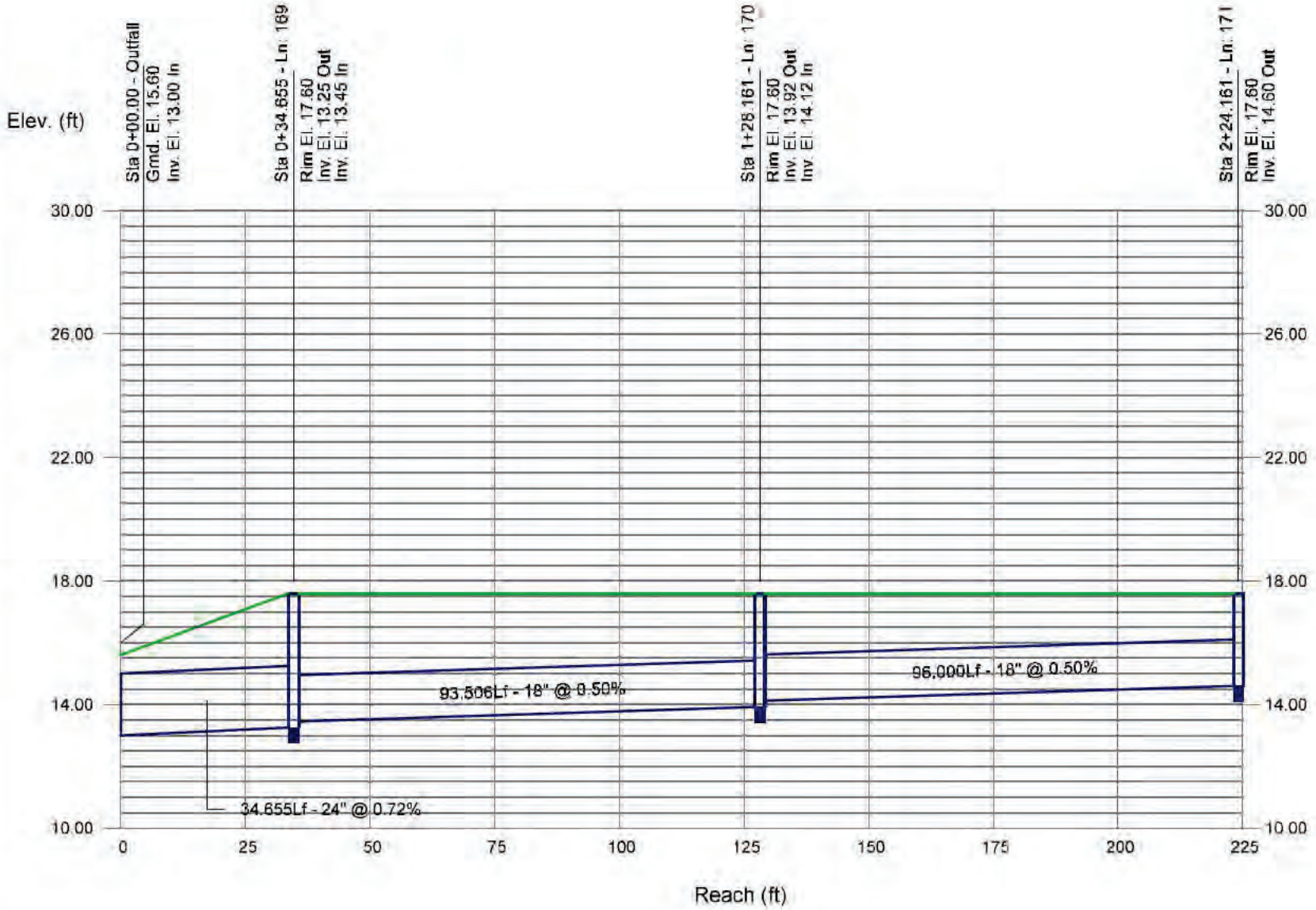
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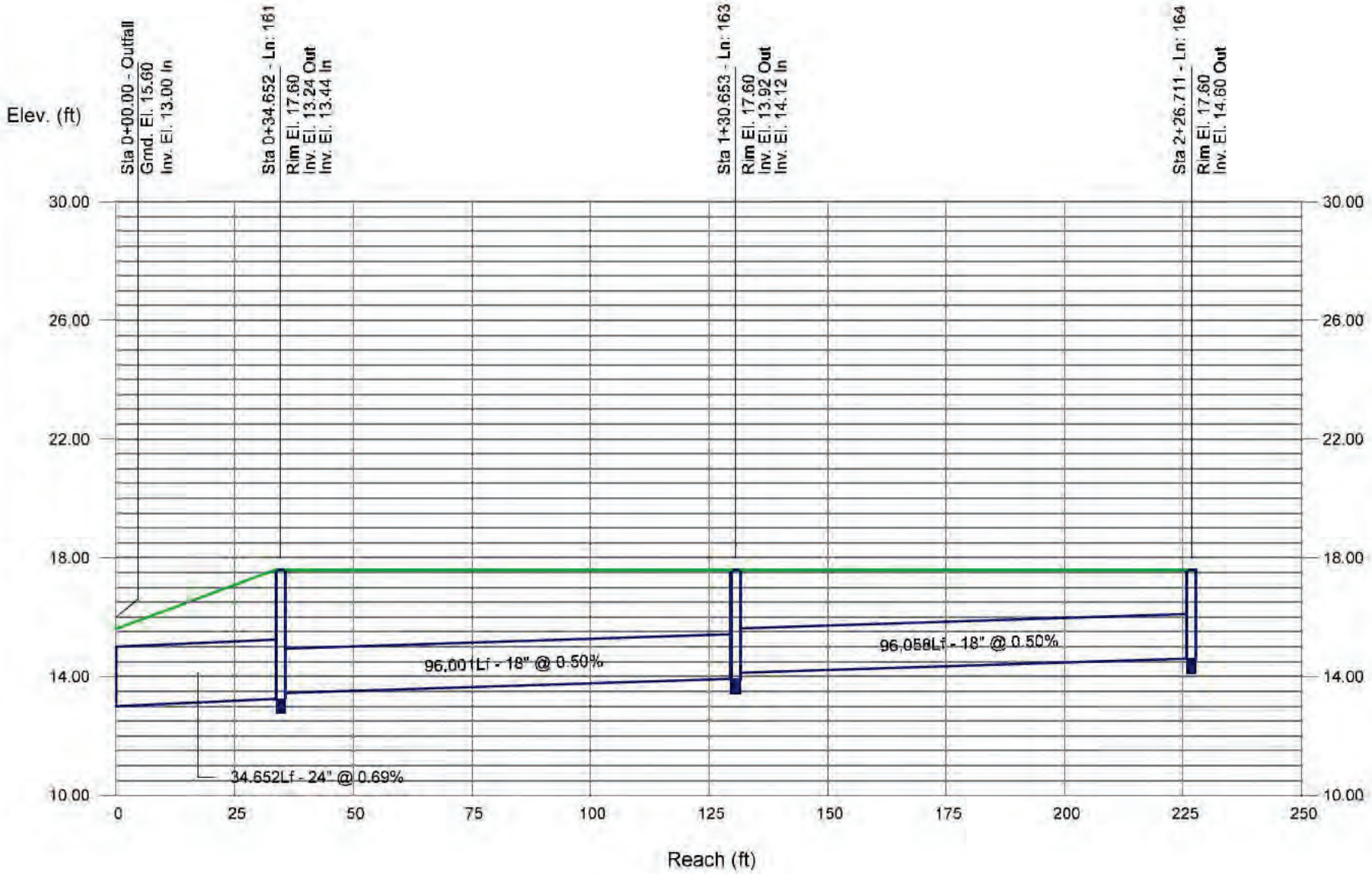
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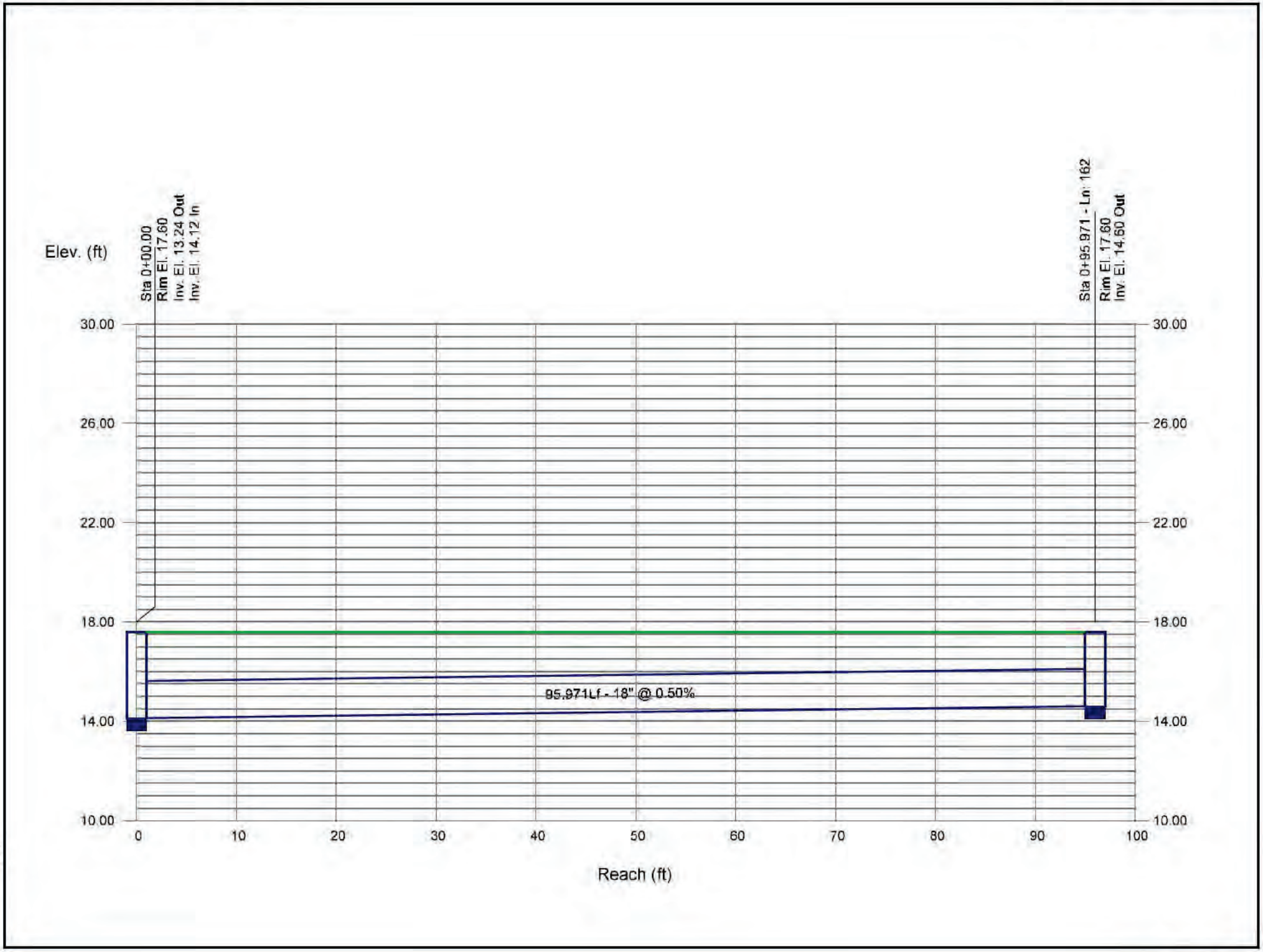
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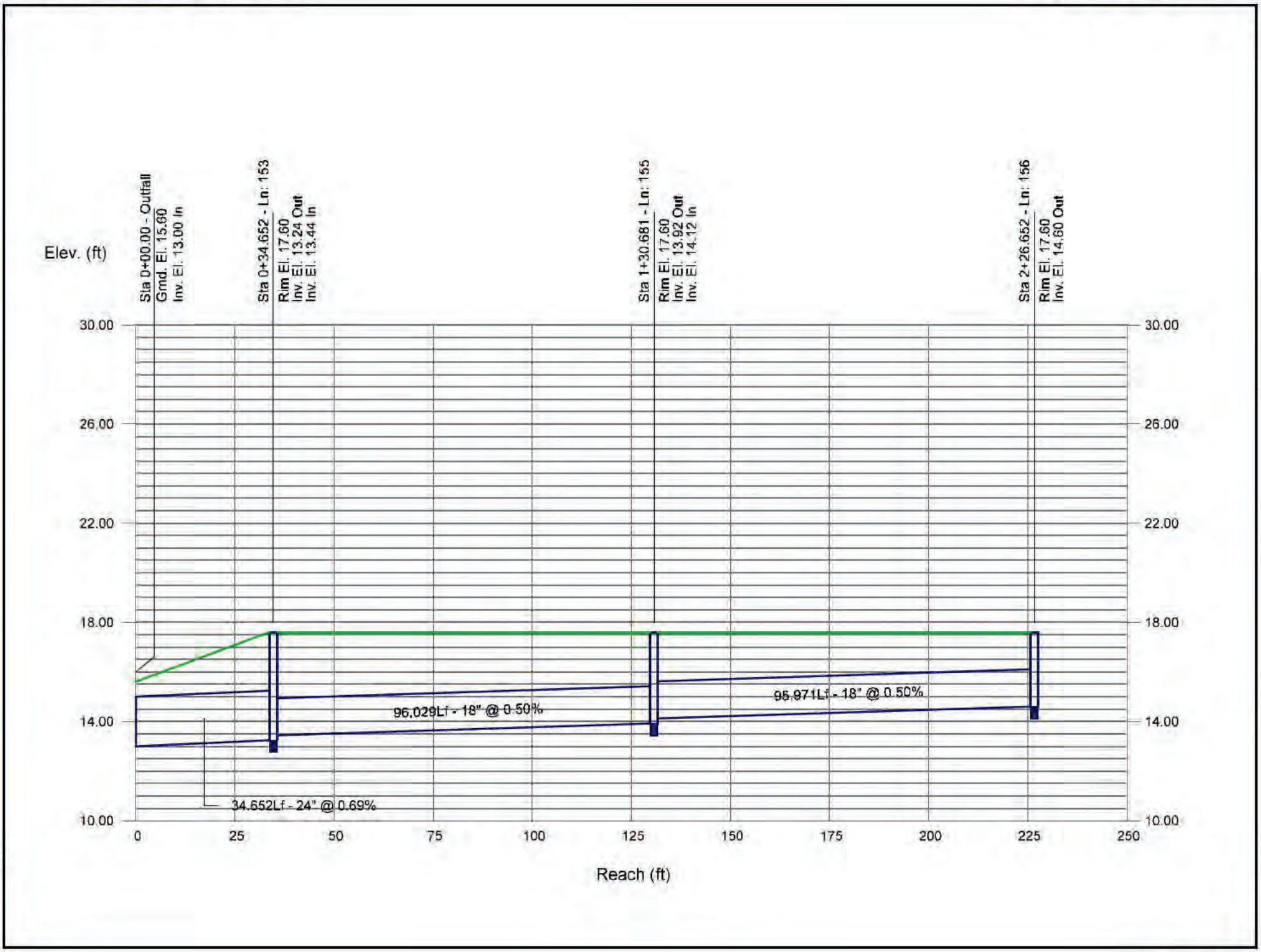
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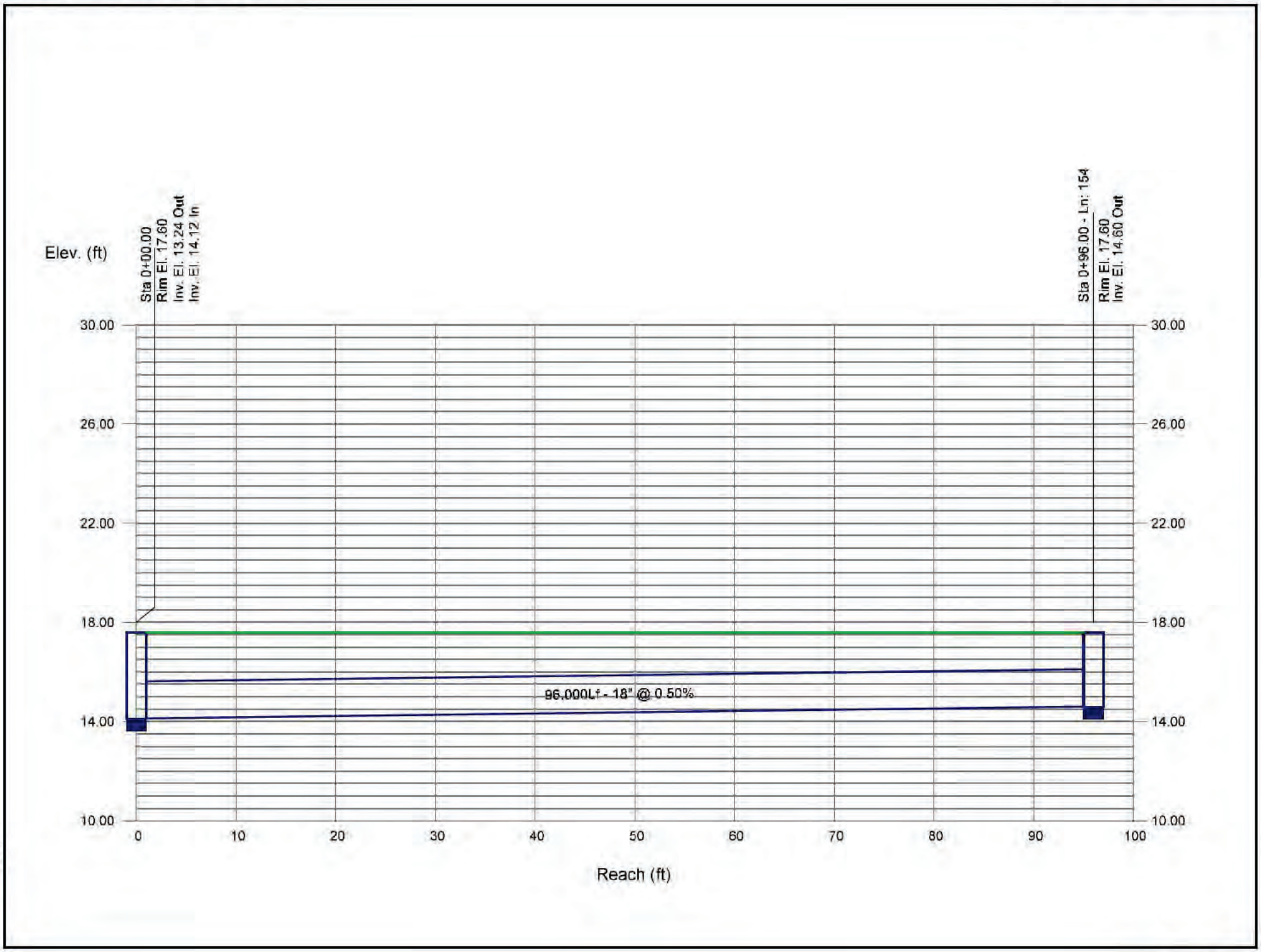
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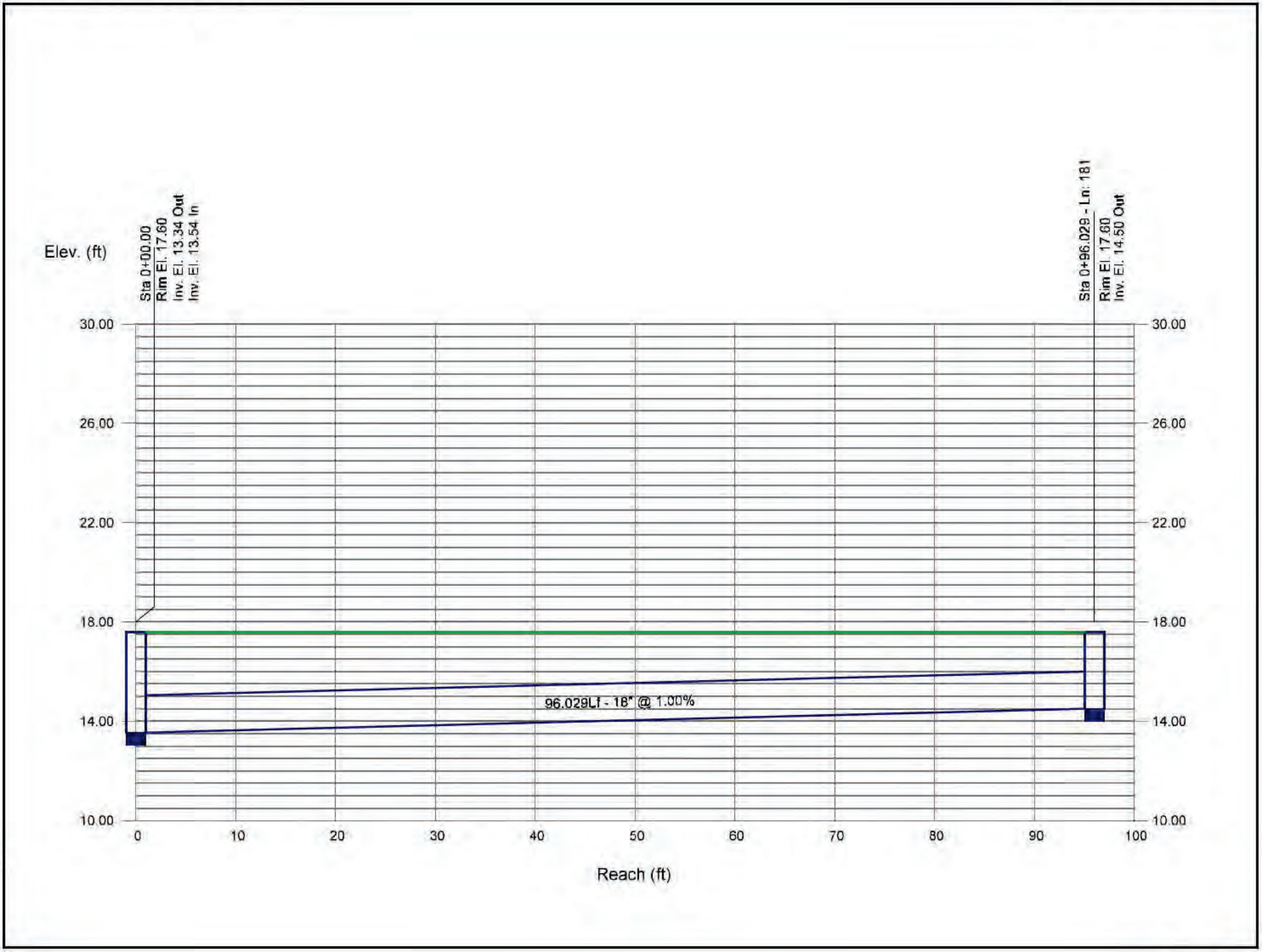
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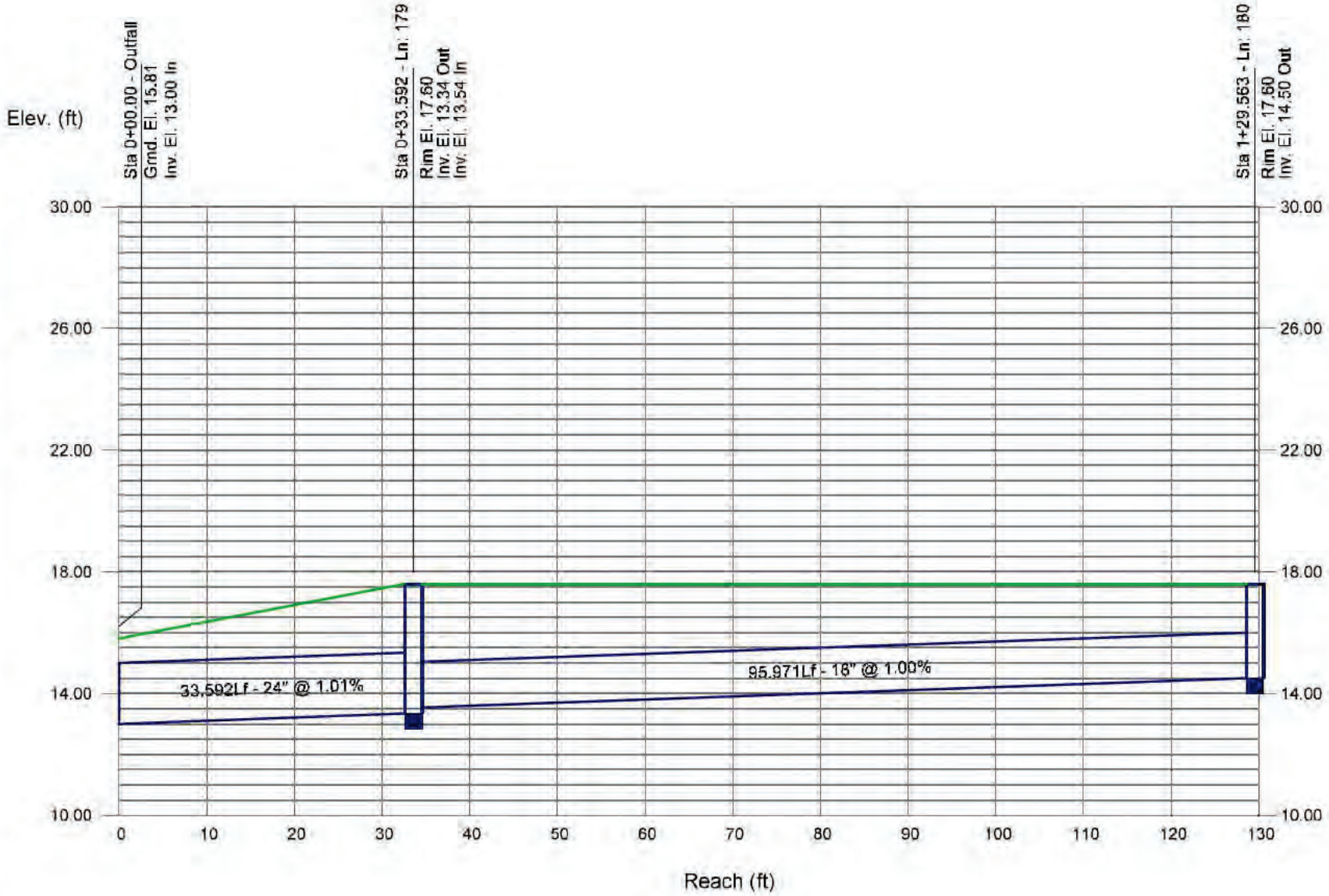
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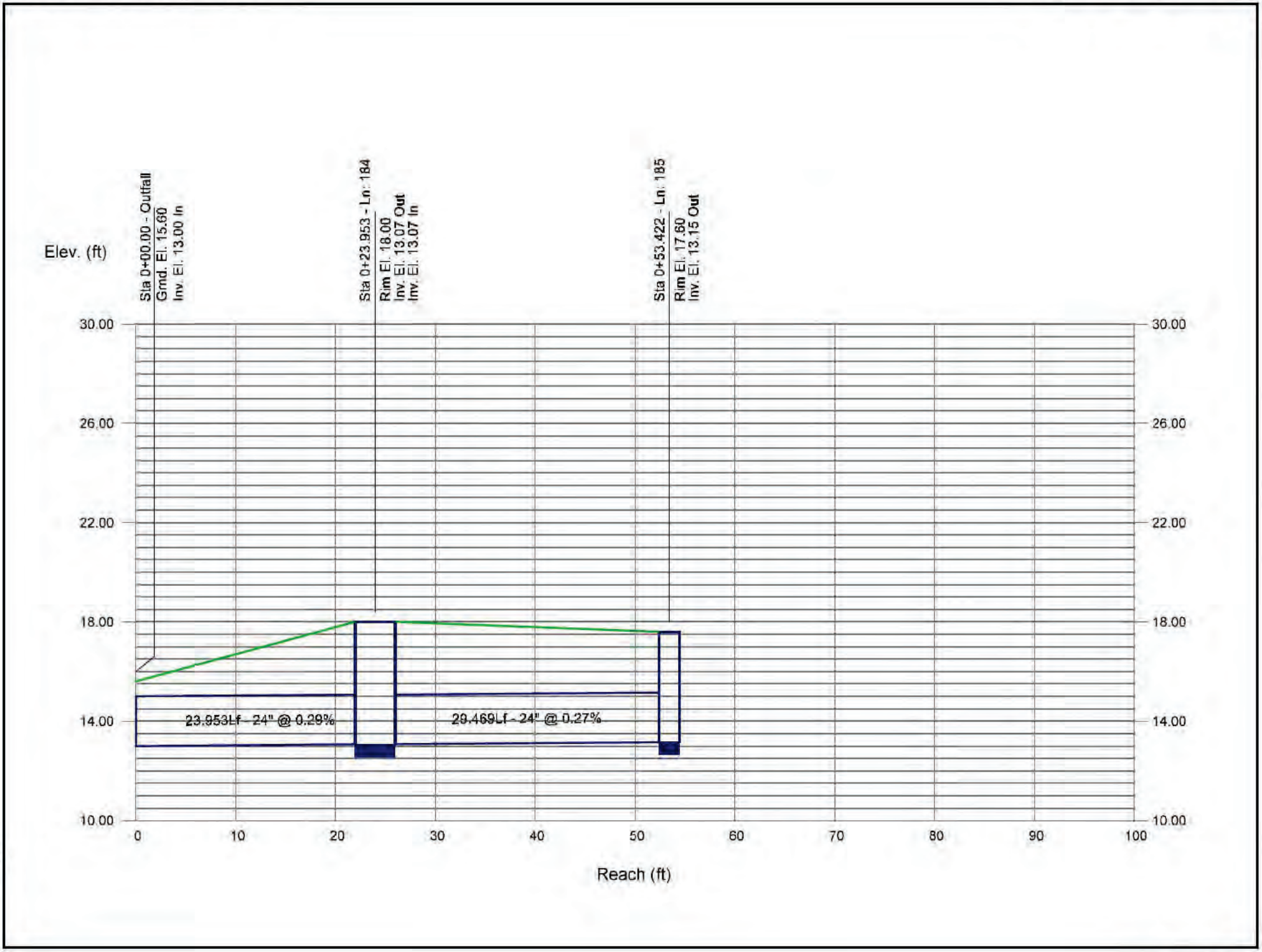
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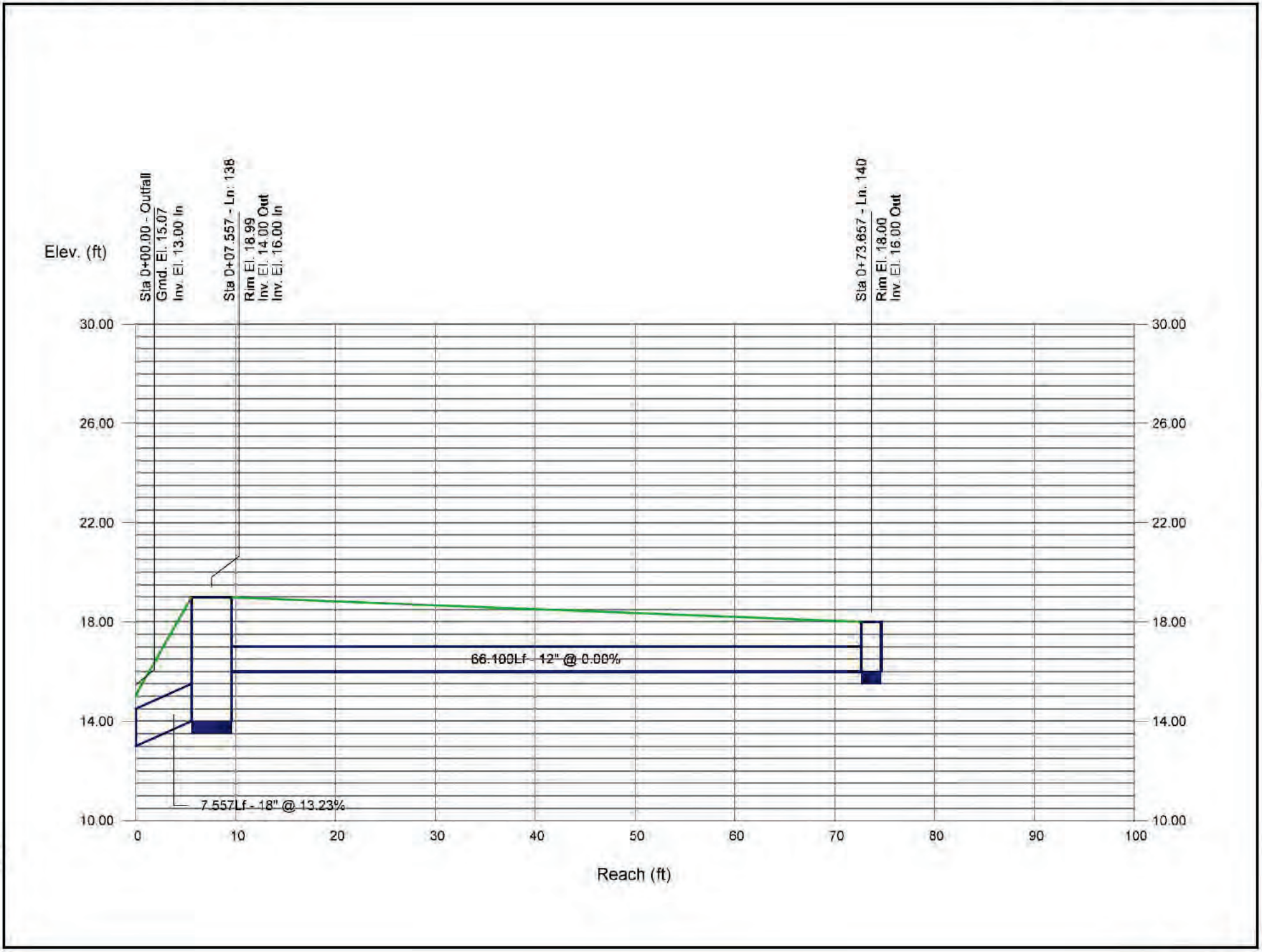
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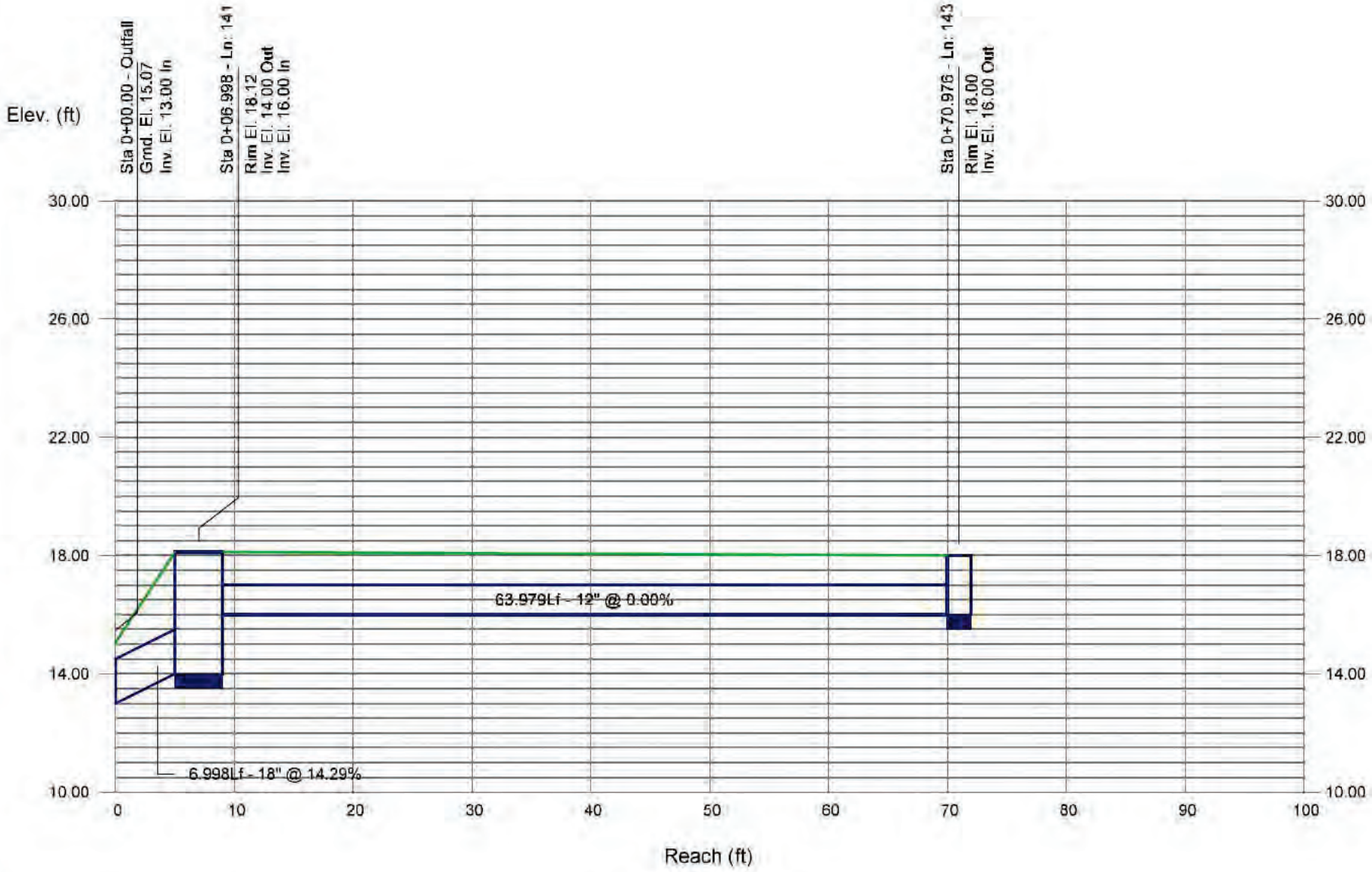
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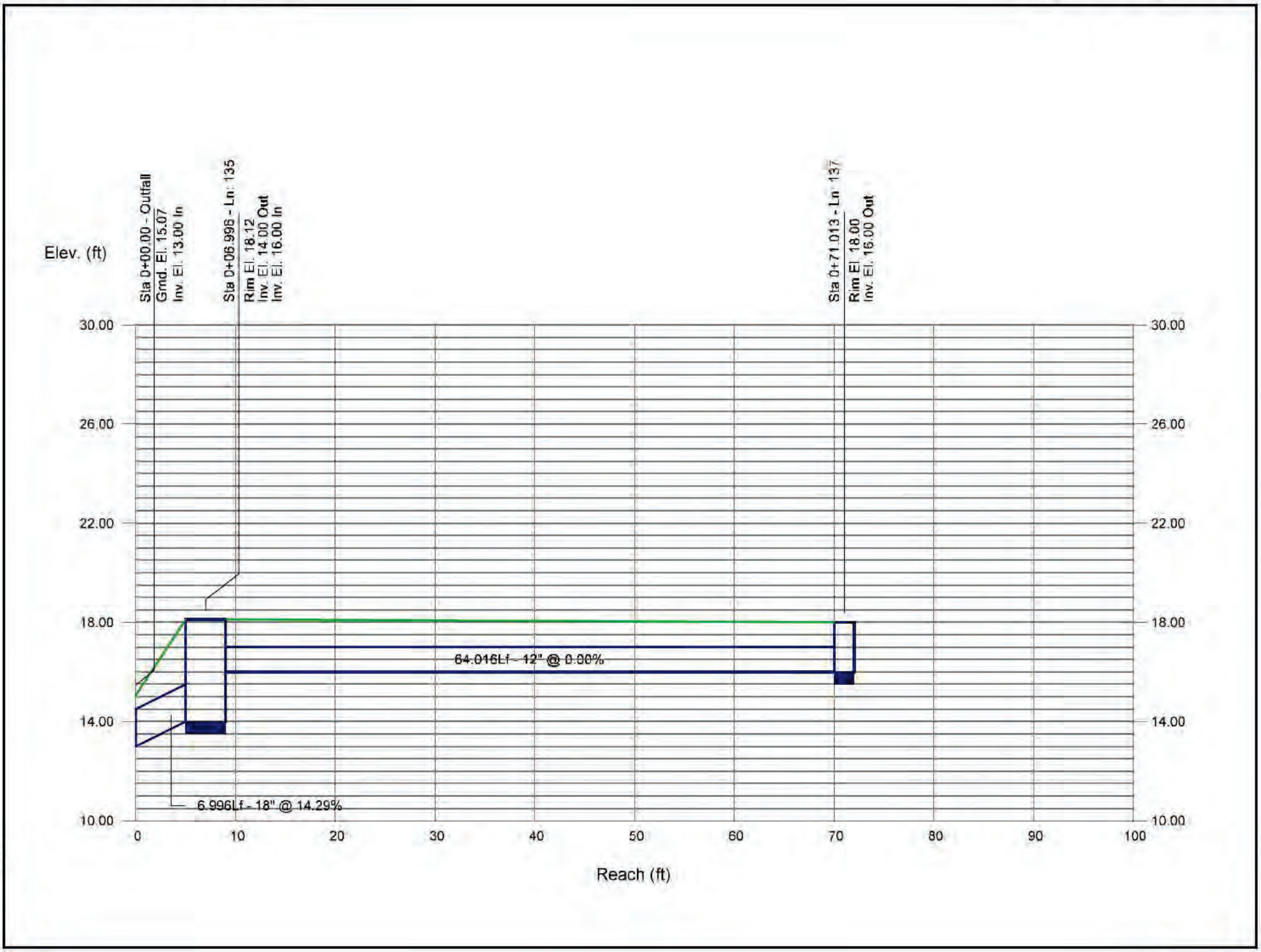
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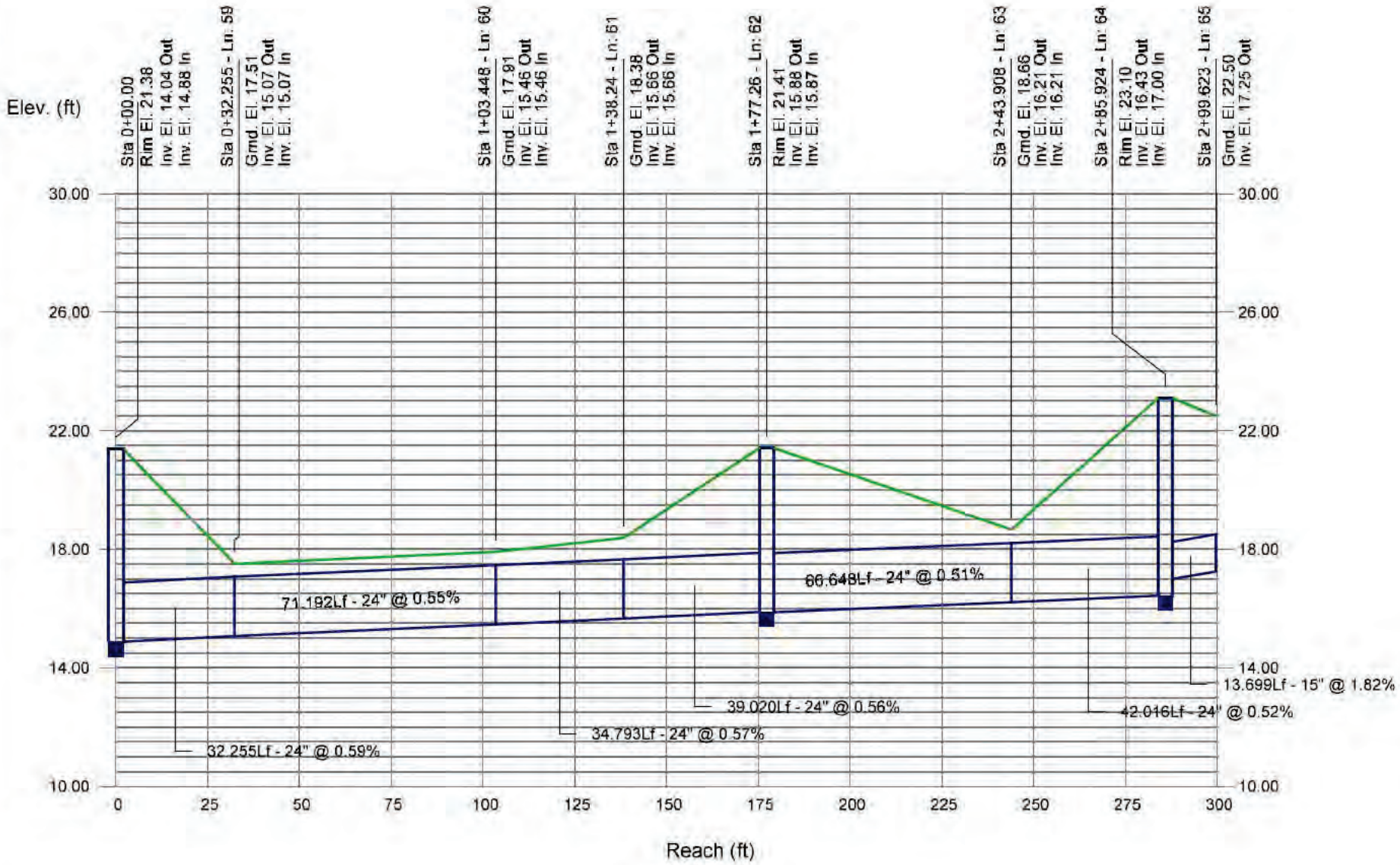
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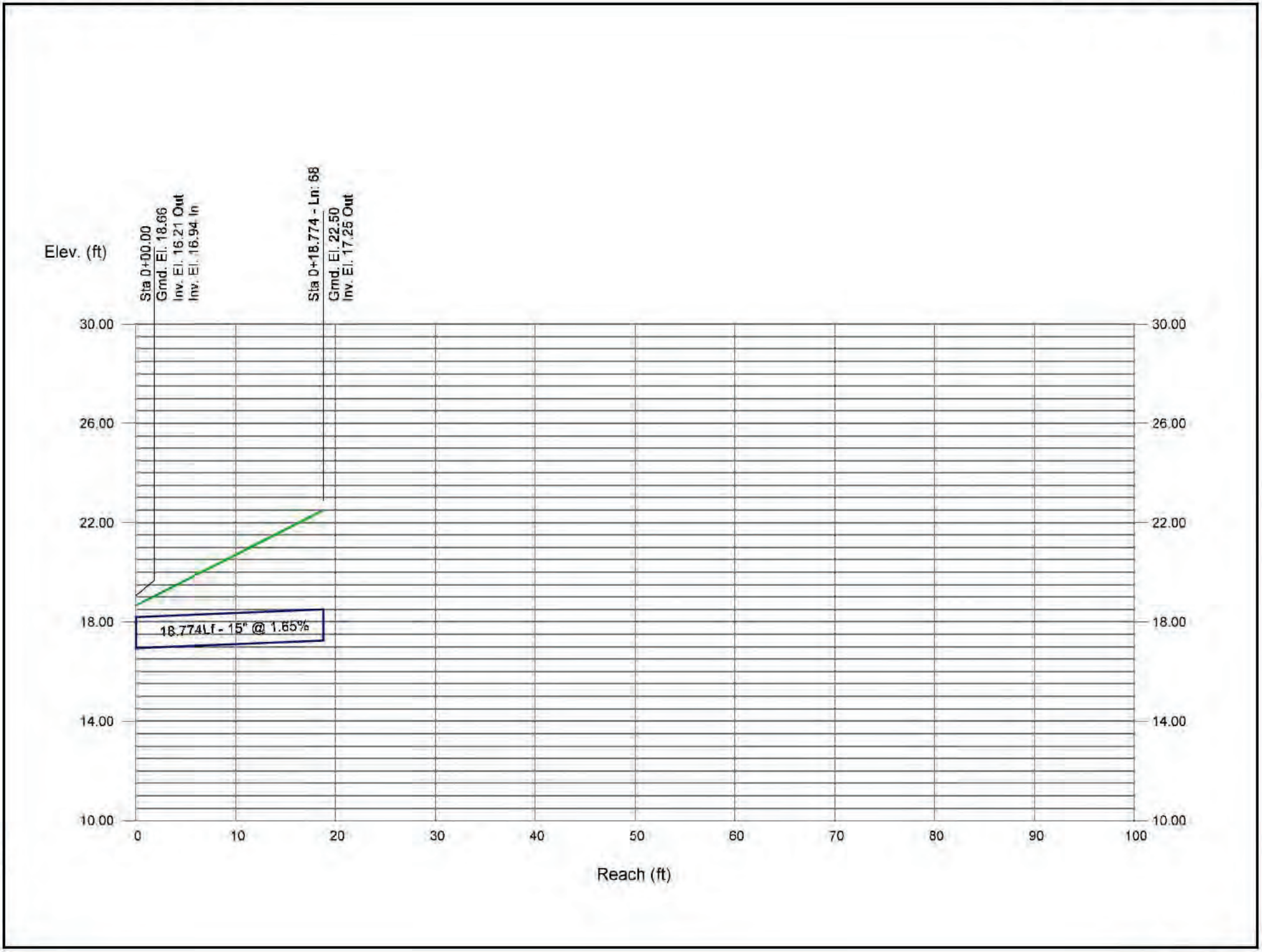
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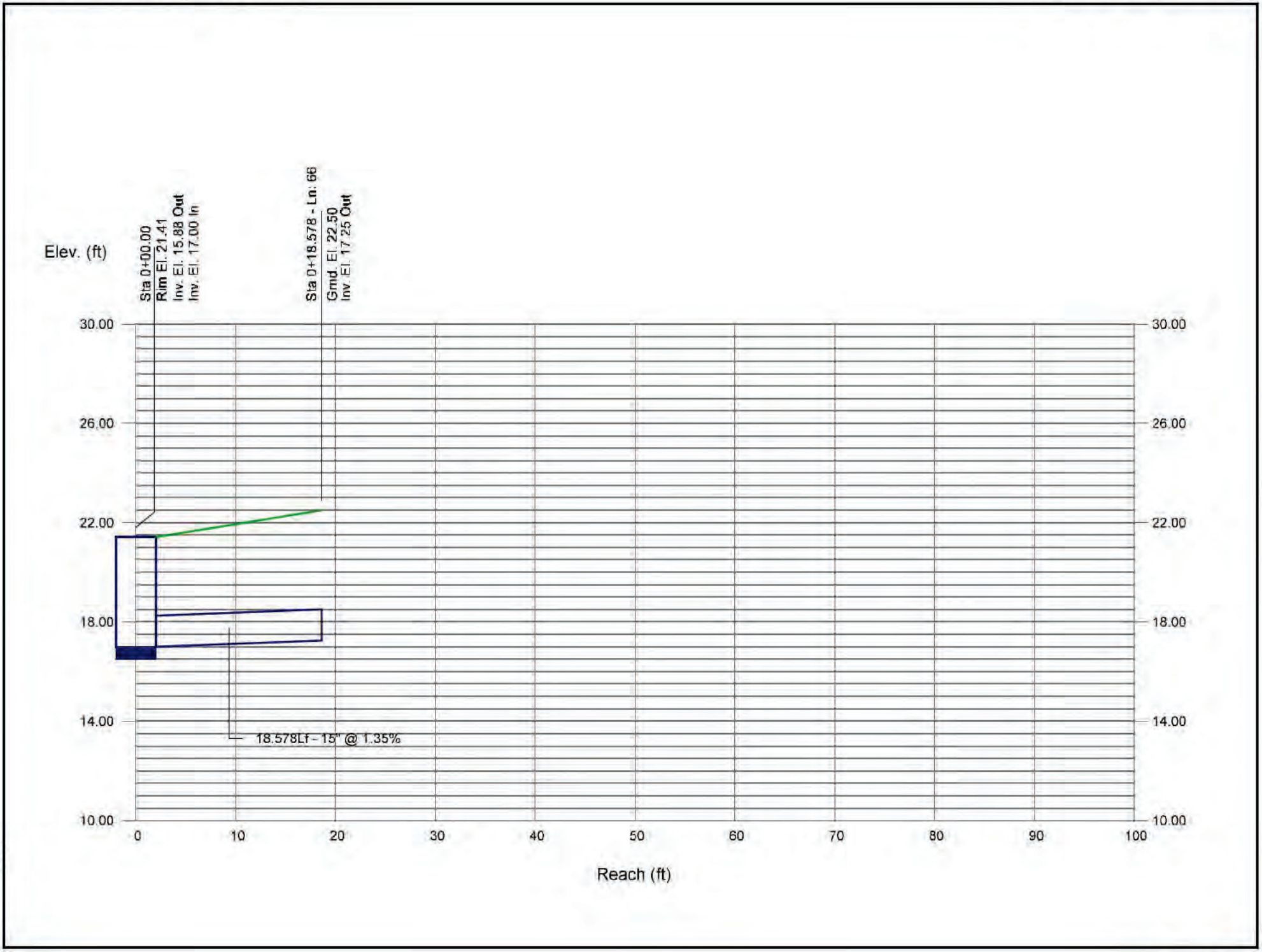
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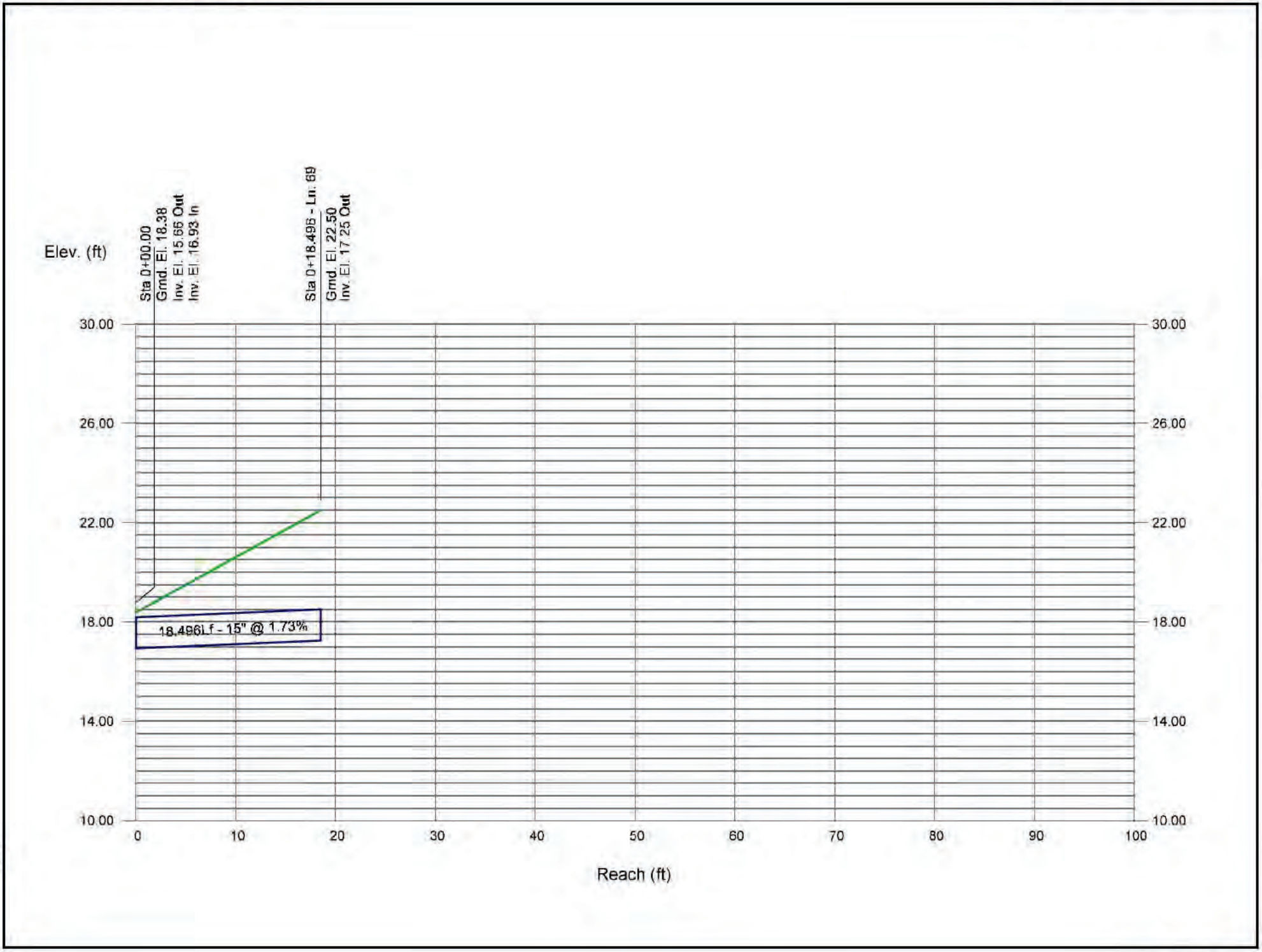
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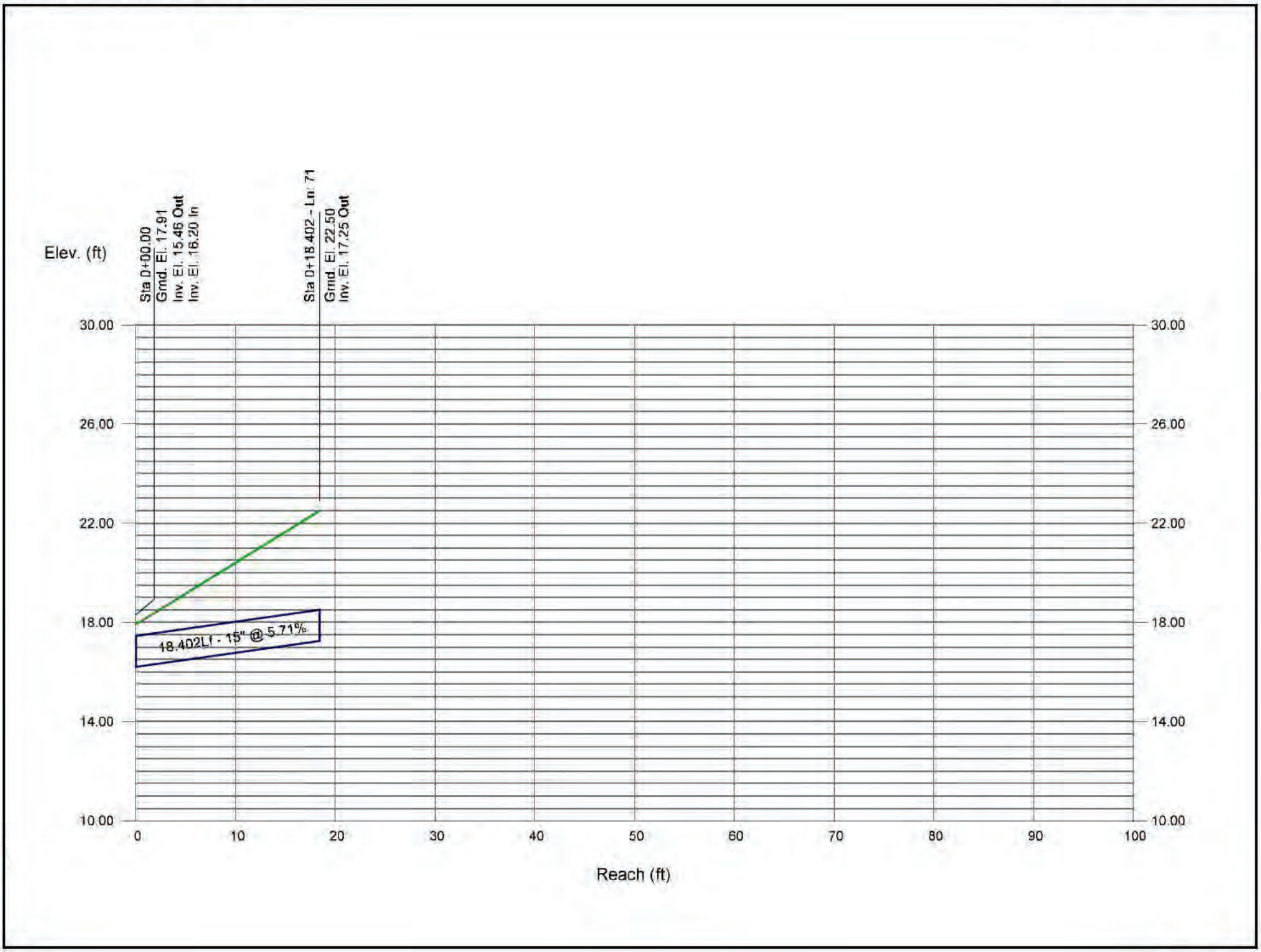
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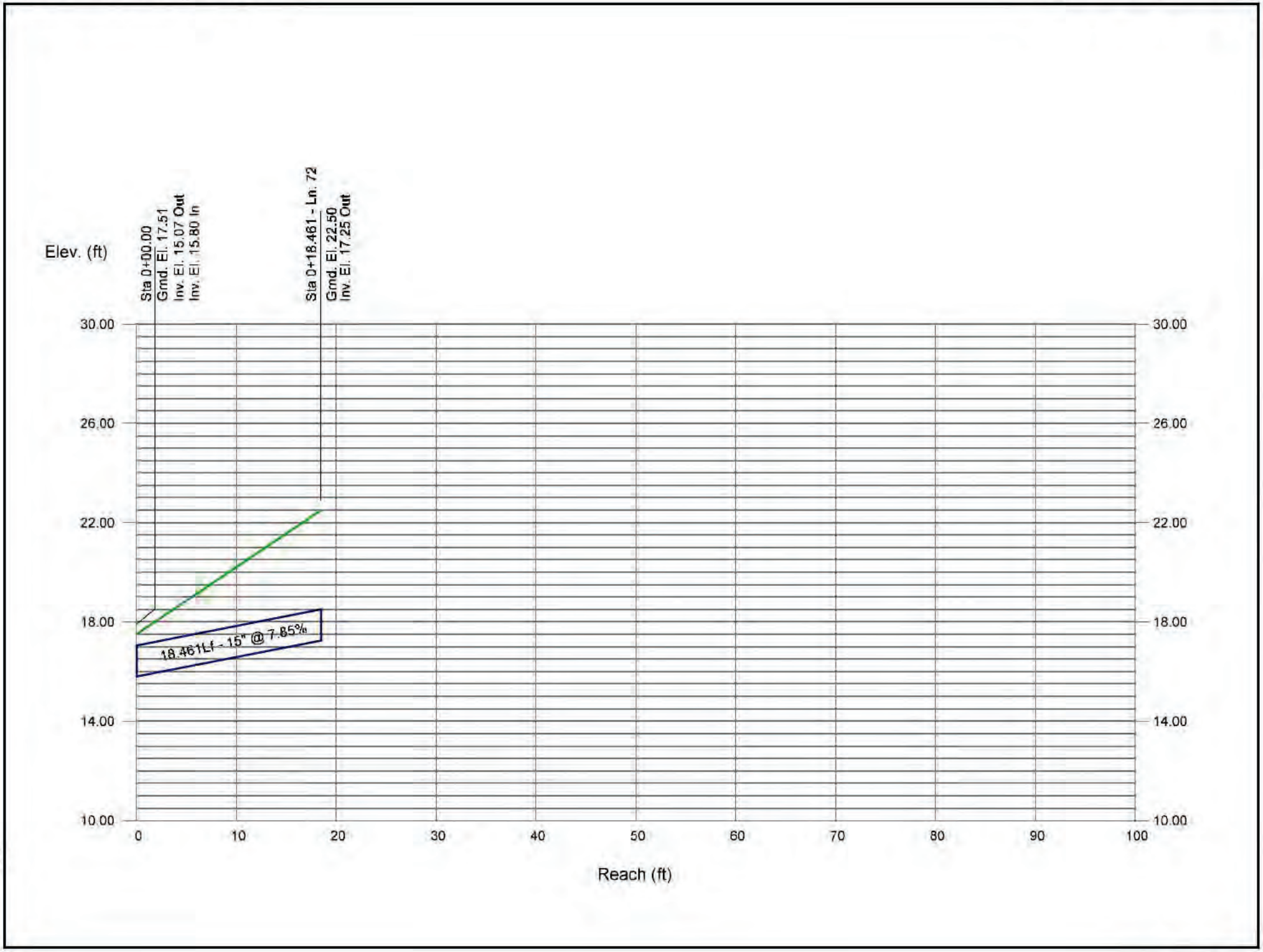
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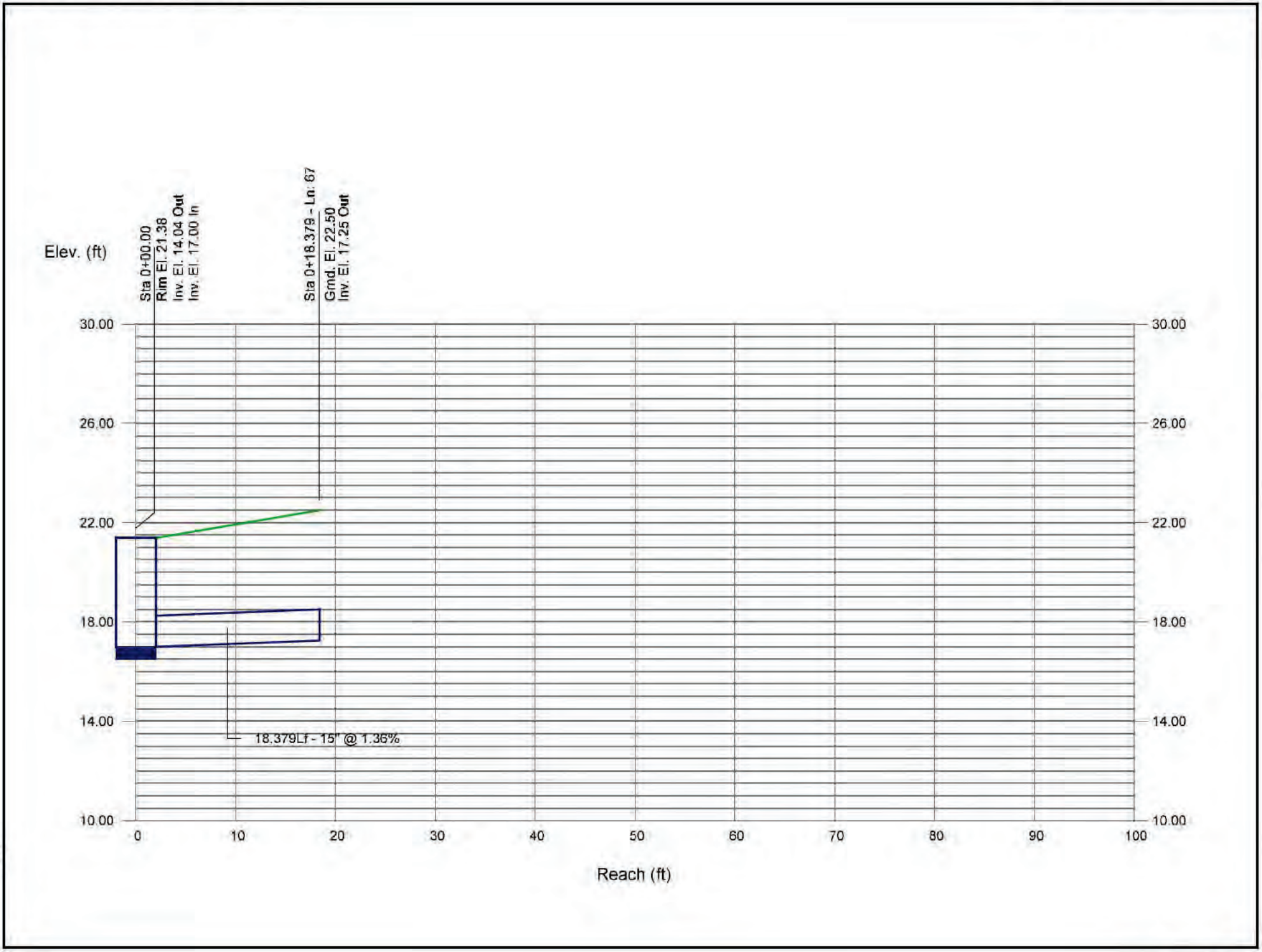
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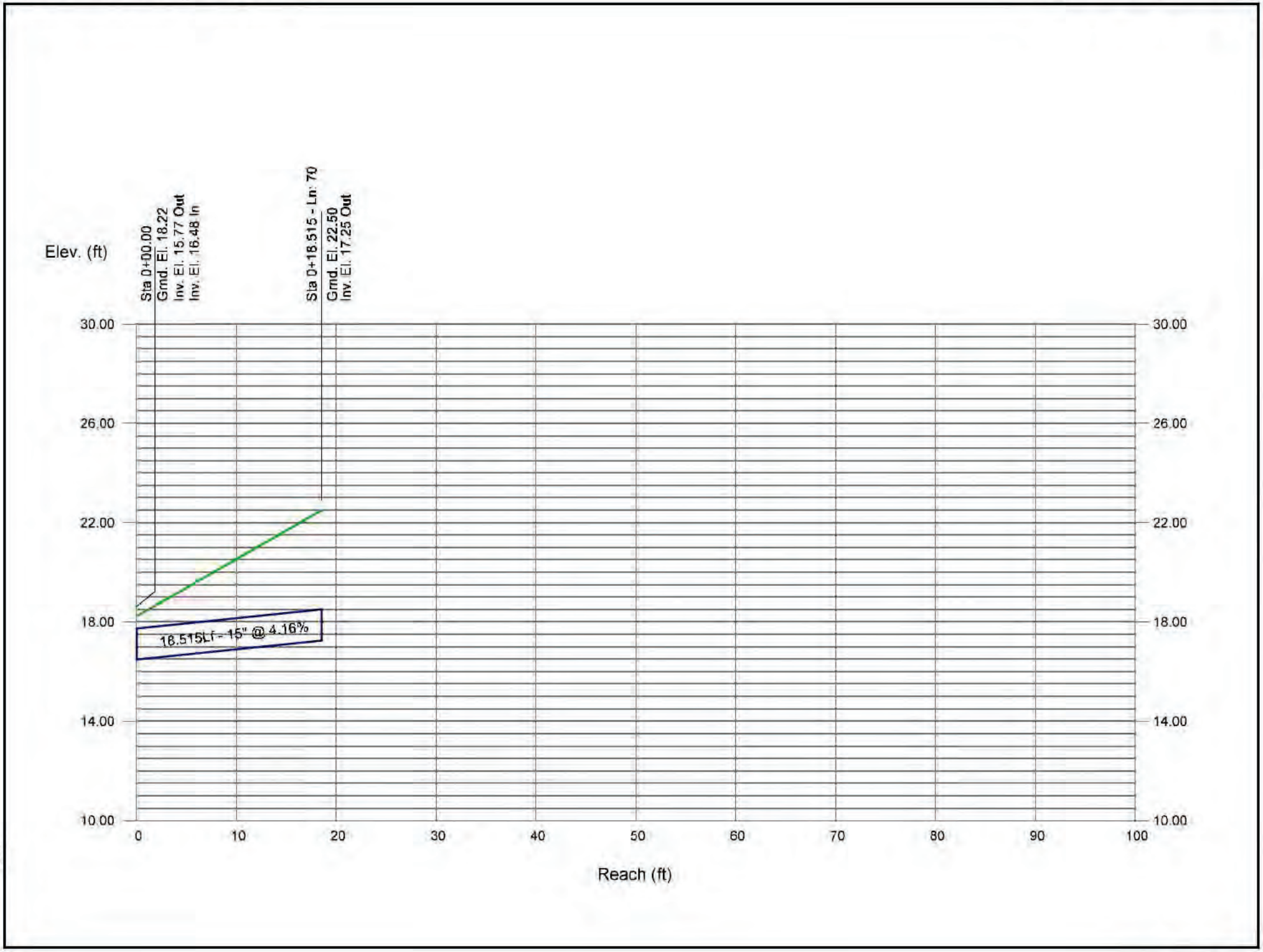
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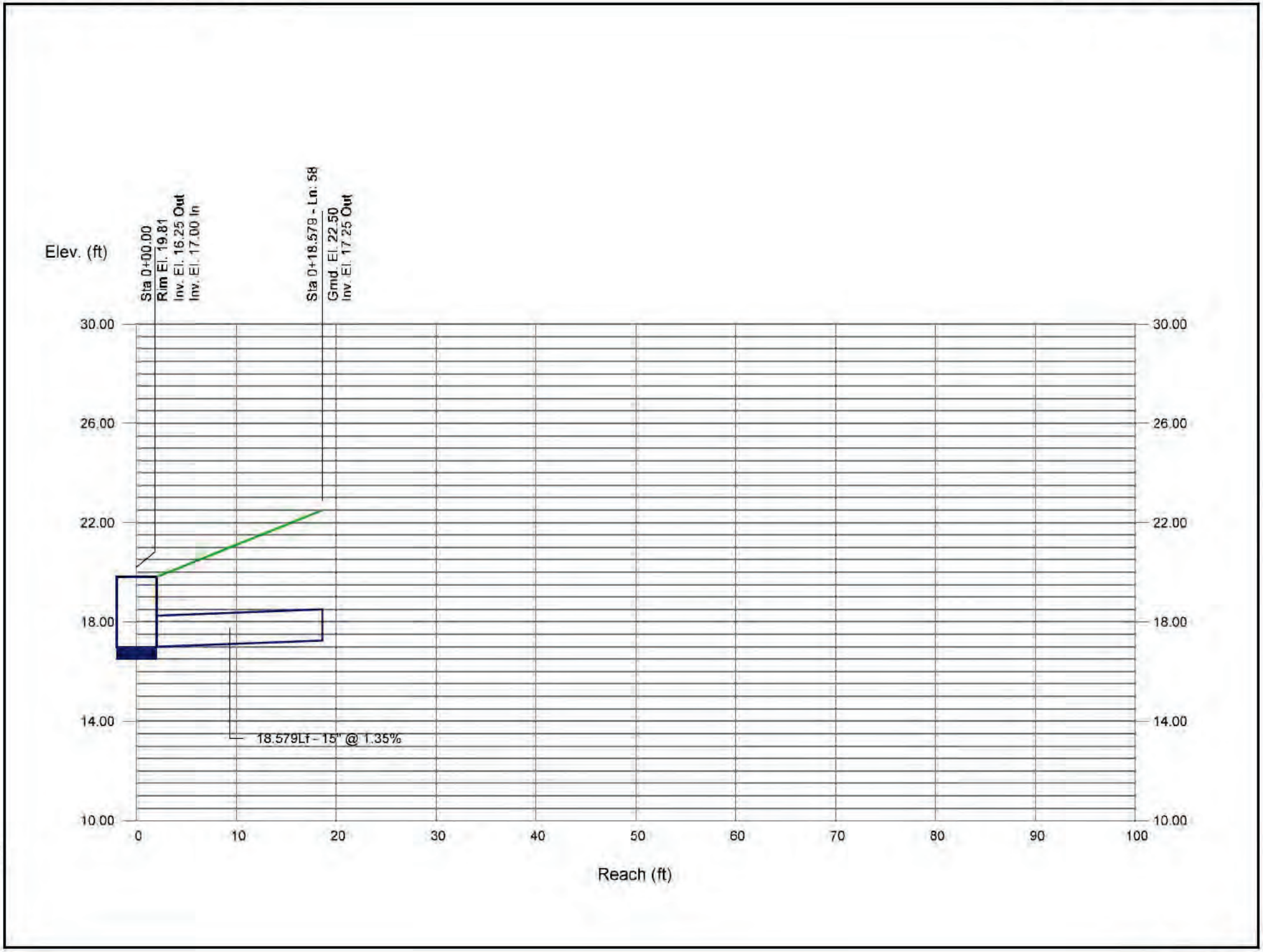
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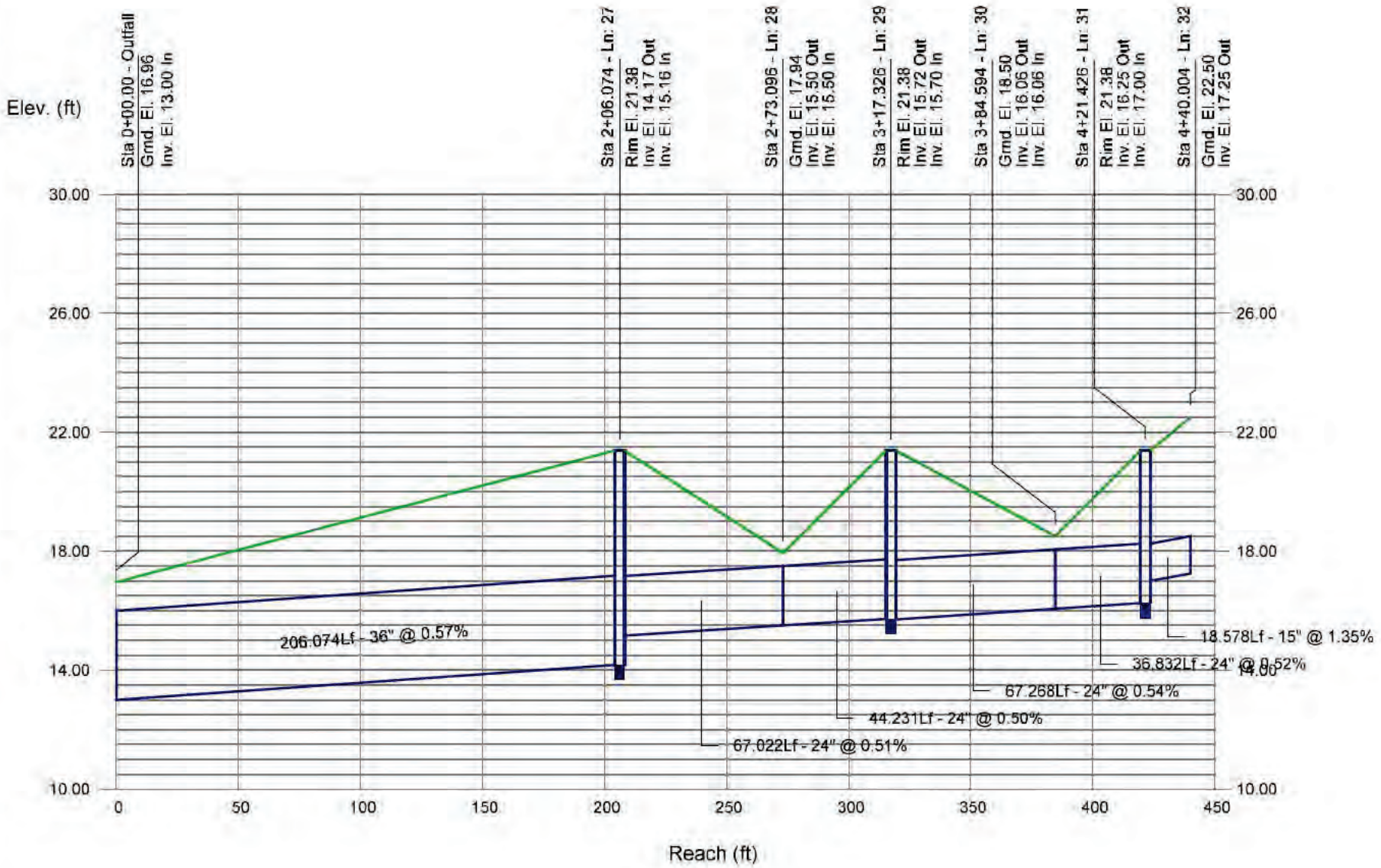
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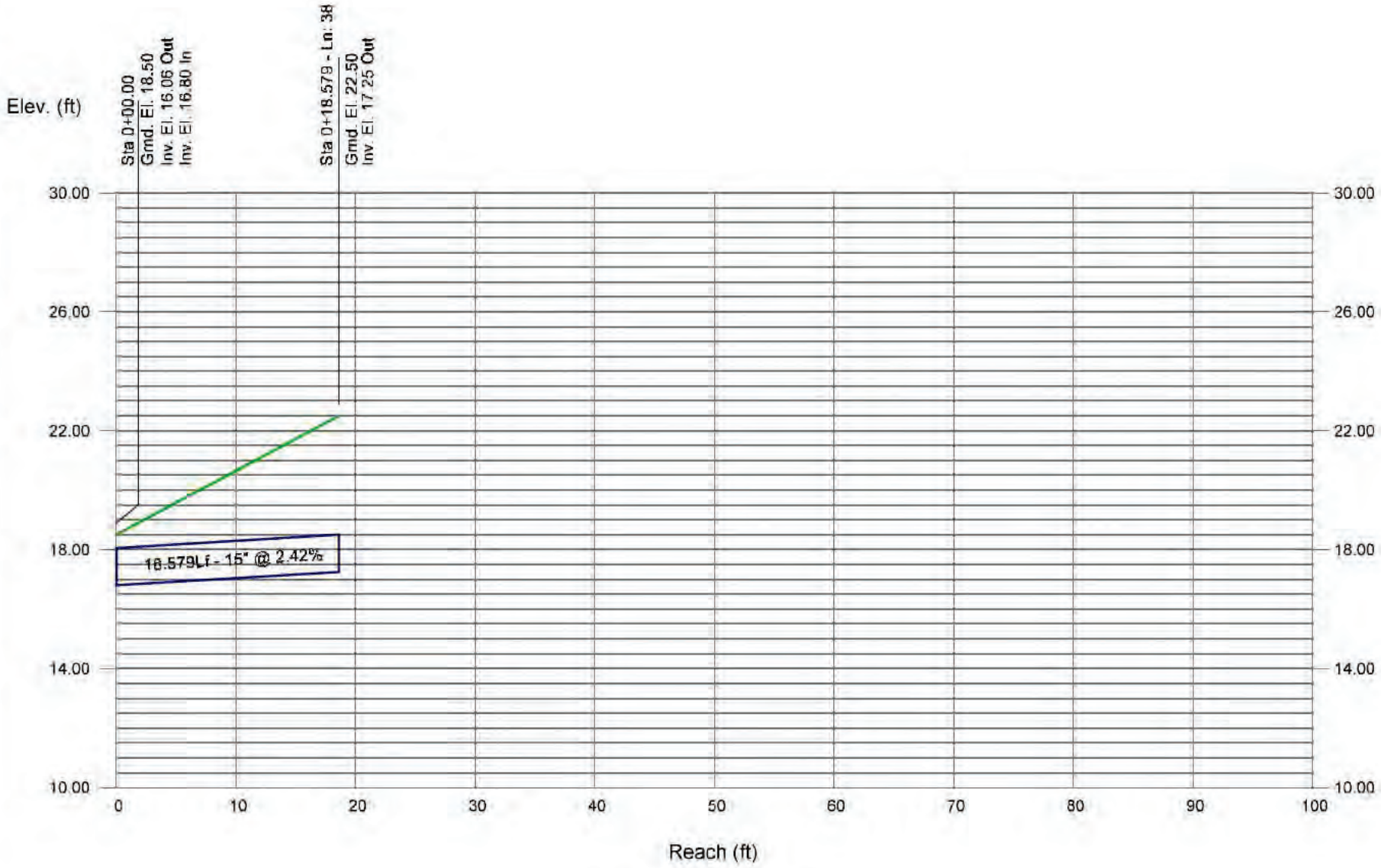
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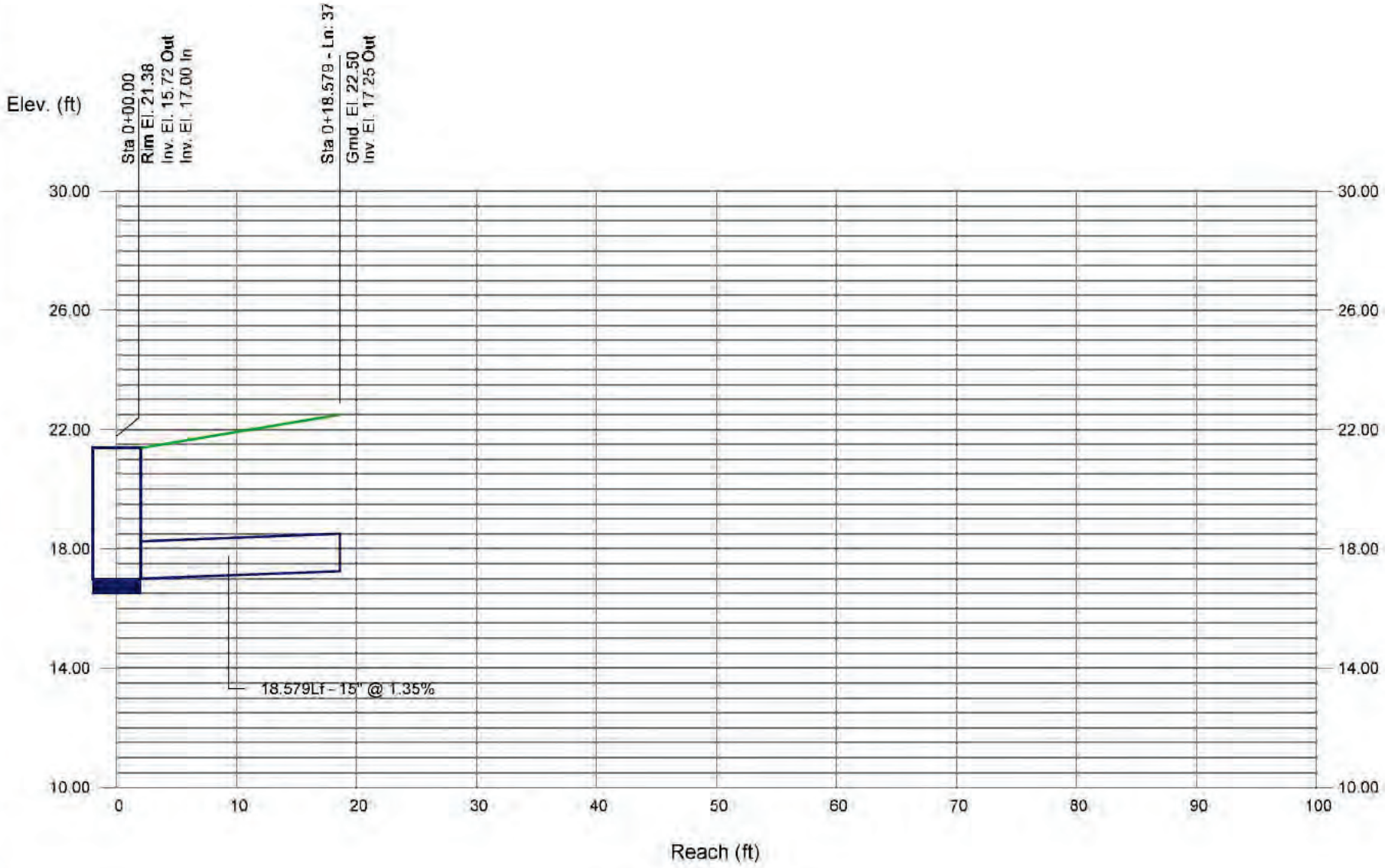
# Storm Sewer Profile

Proj. file: Building 6 Storm.stm



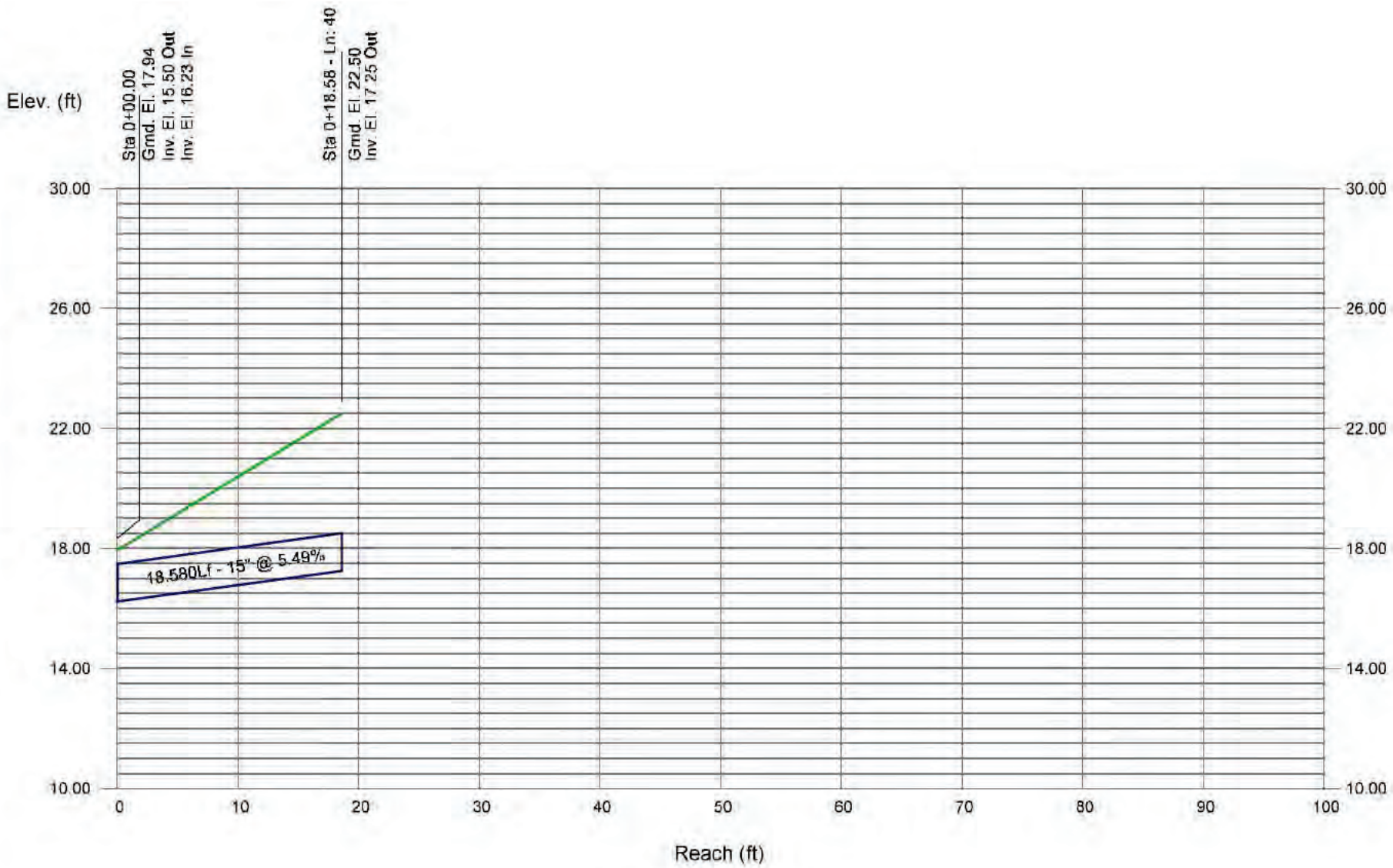
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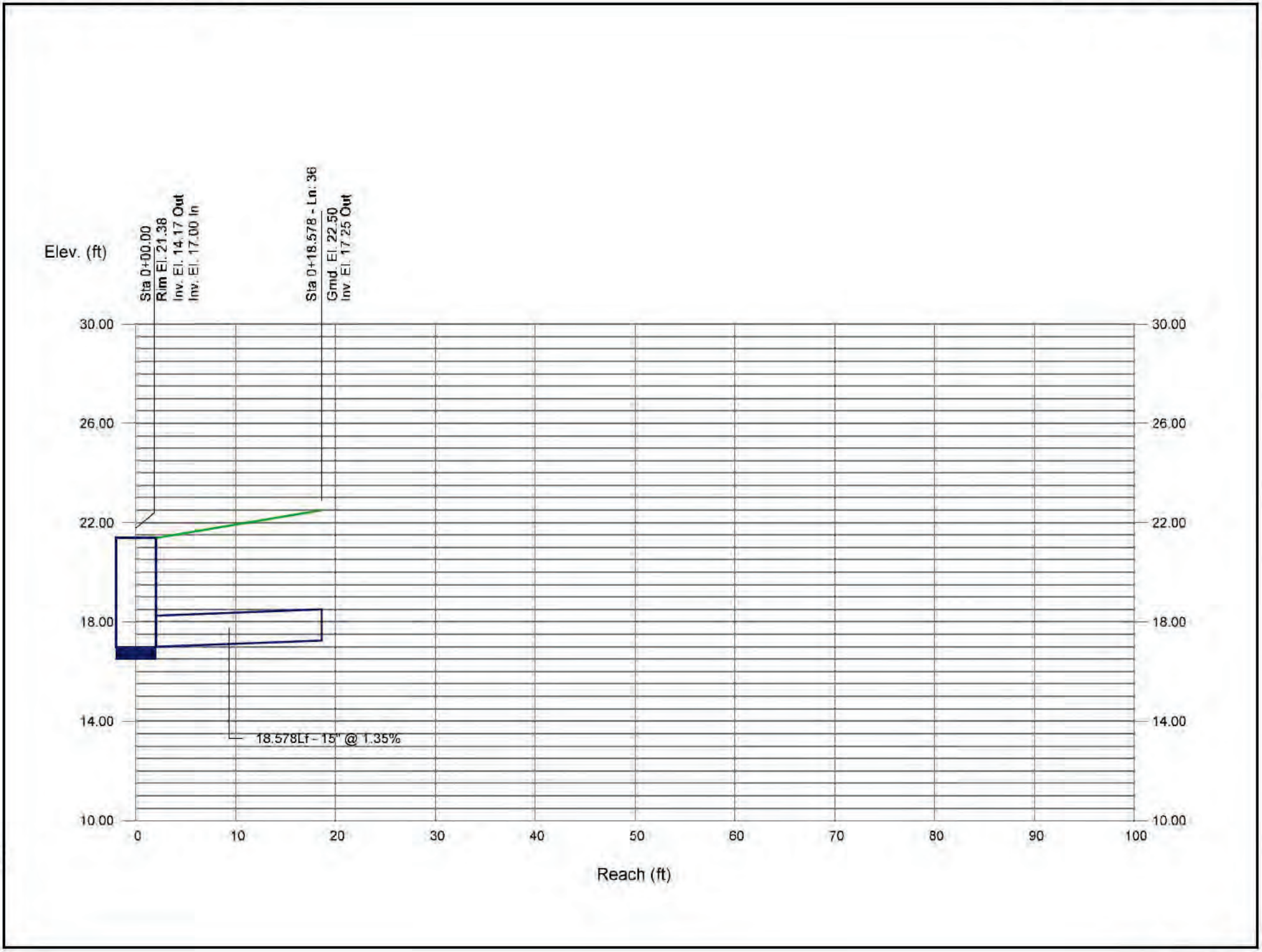
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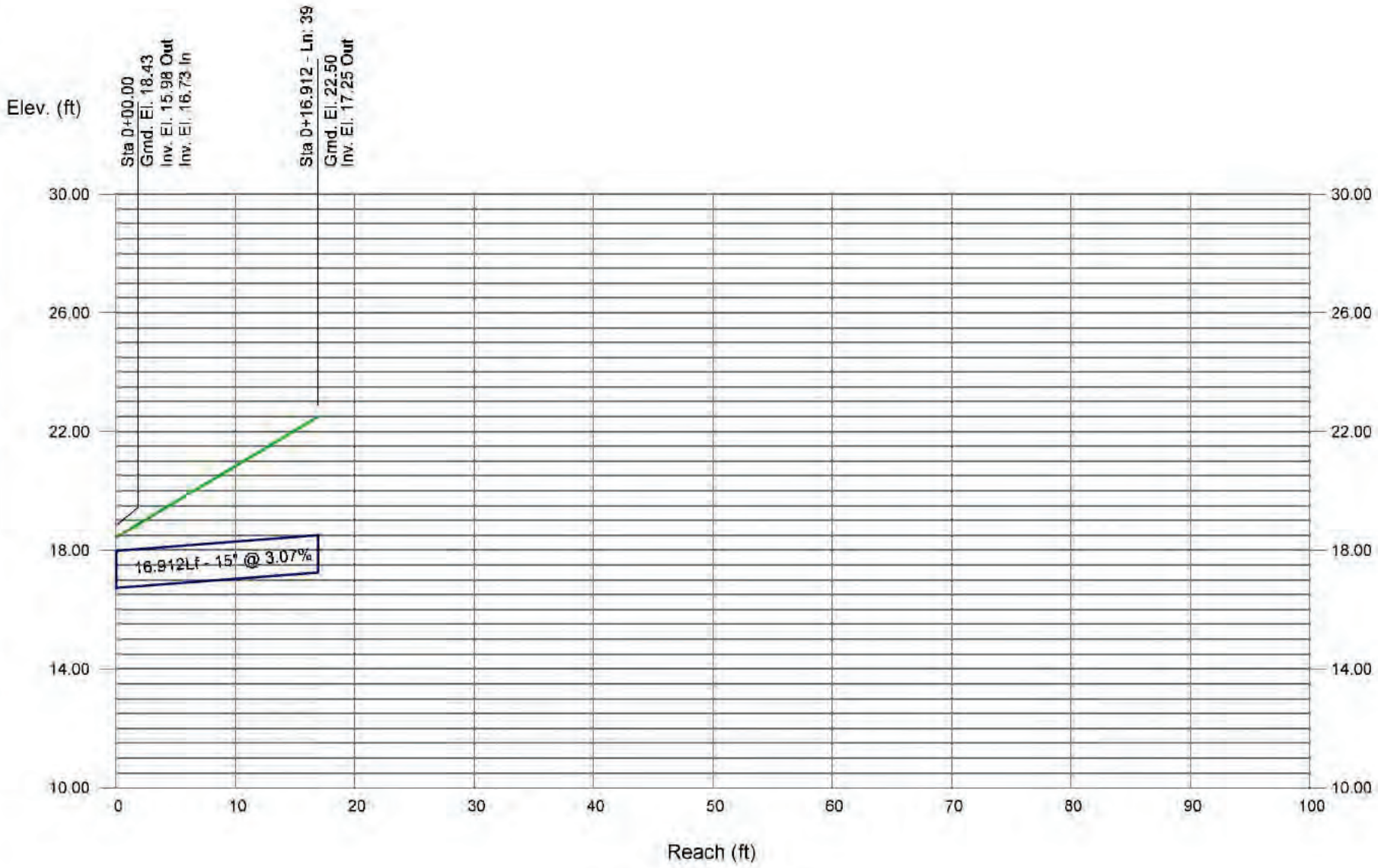
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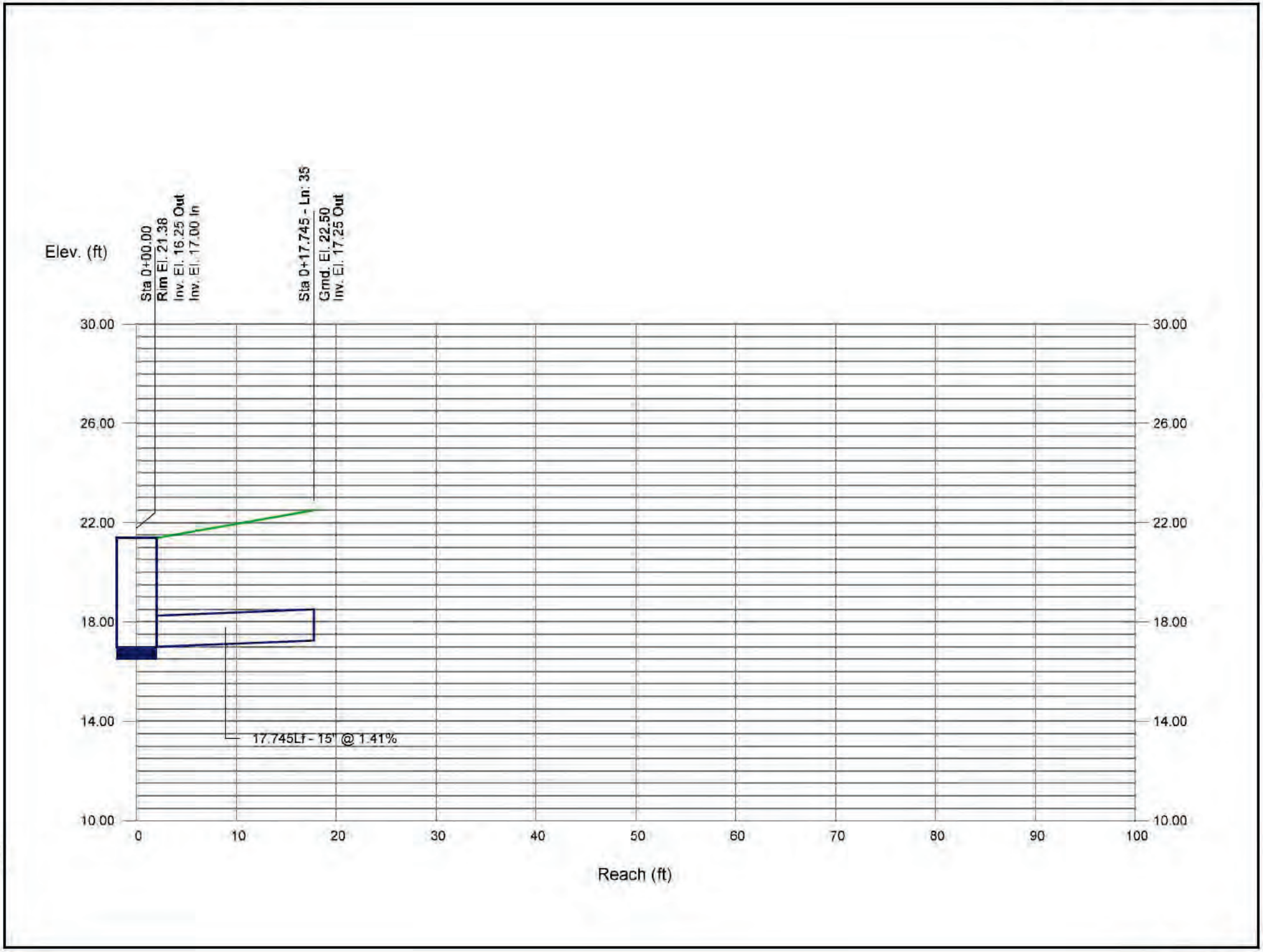
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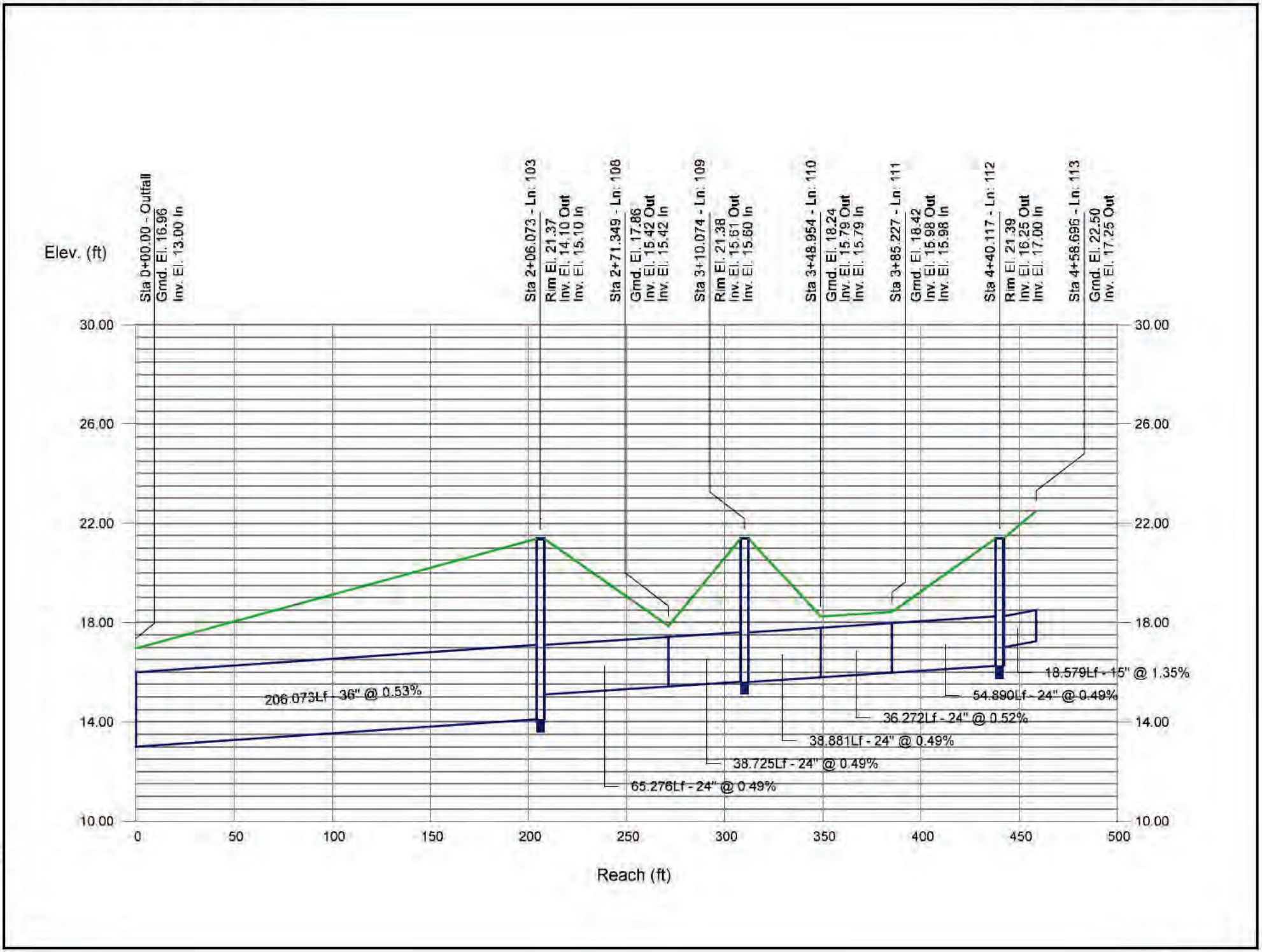
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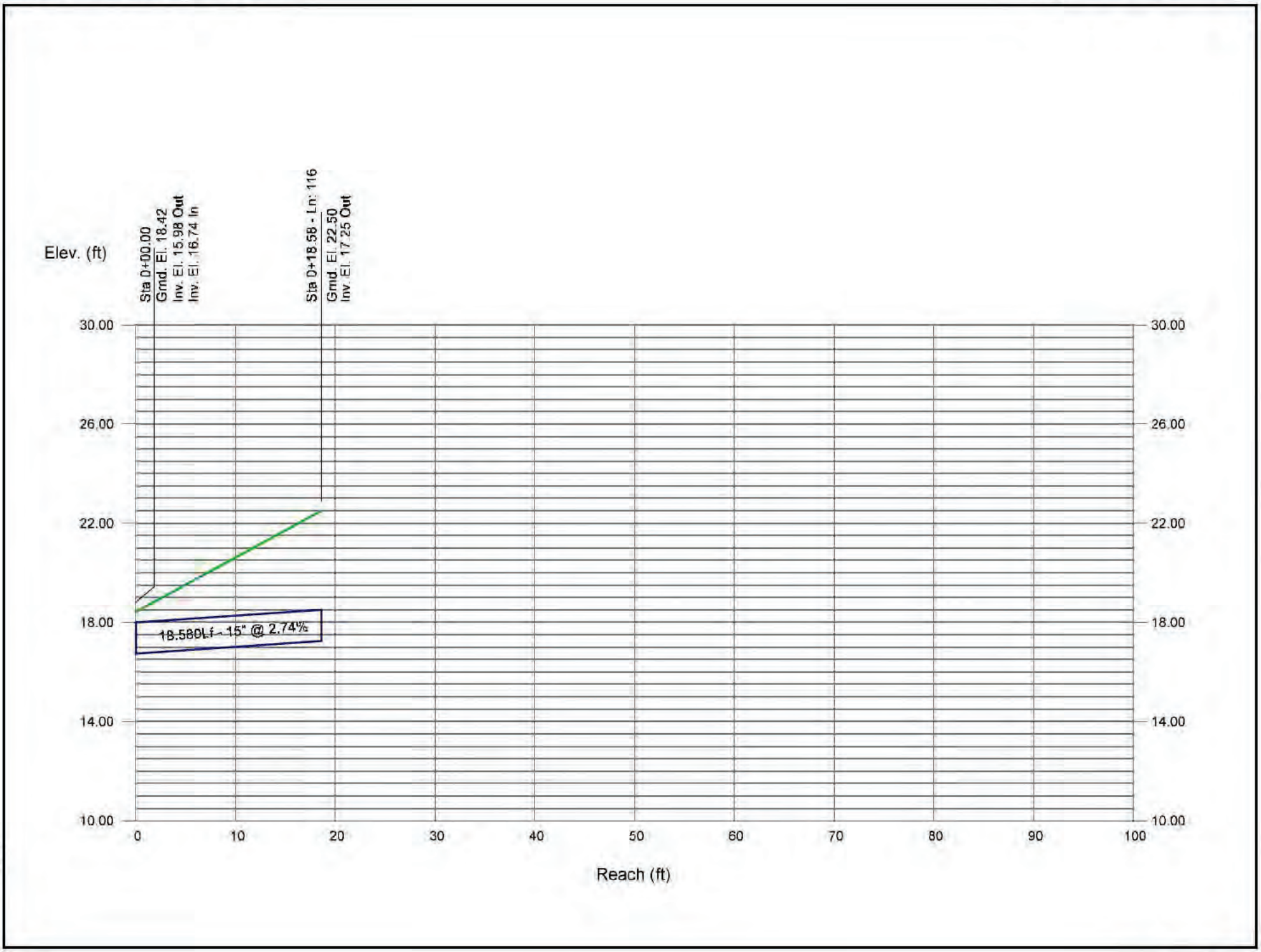
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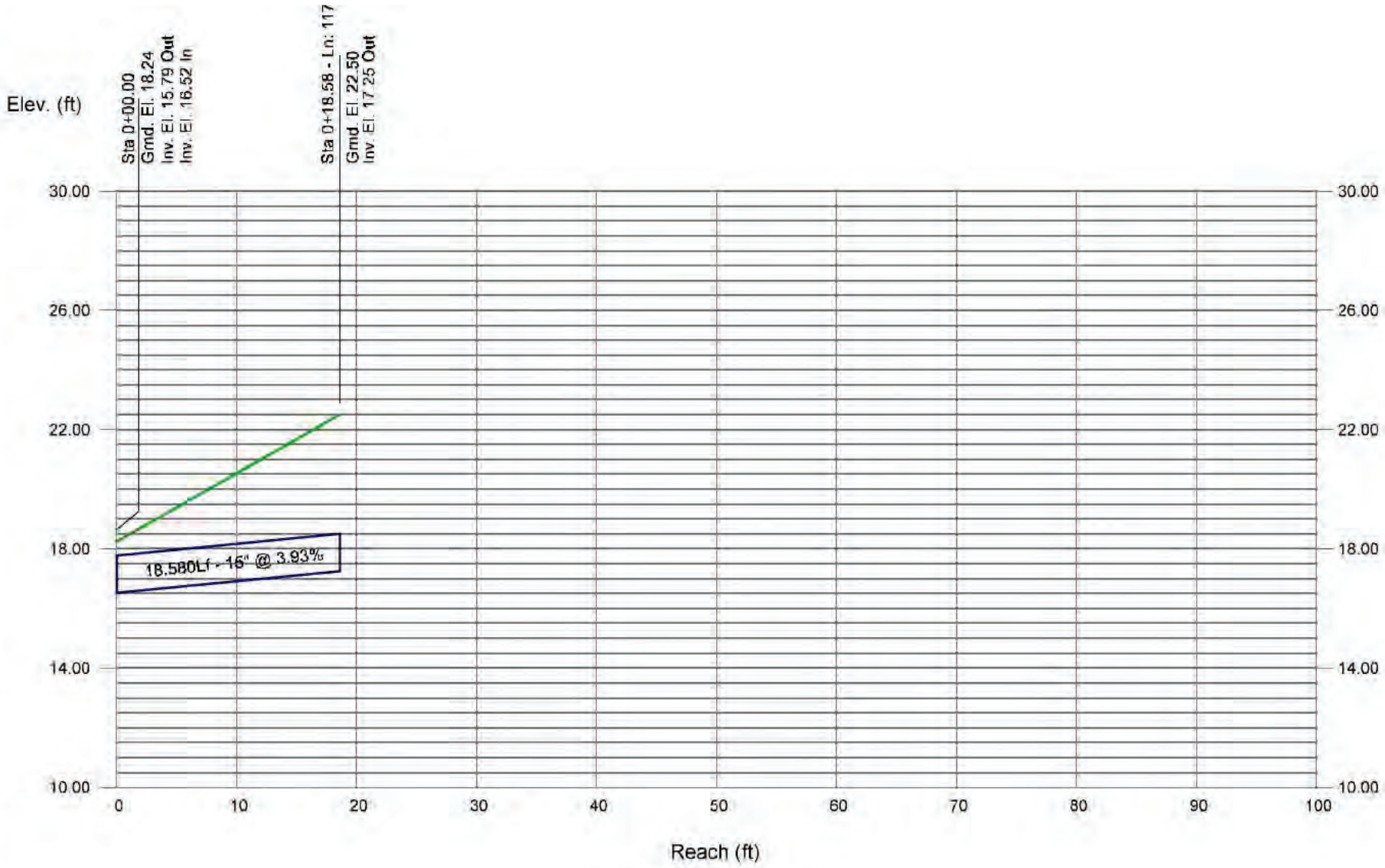
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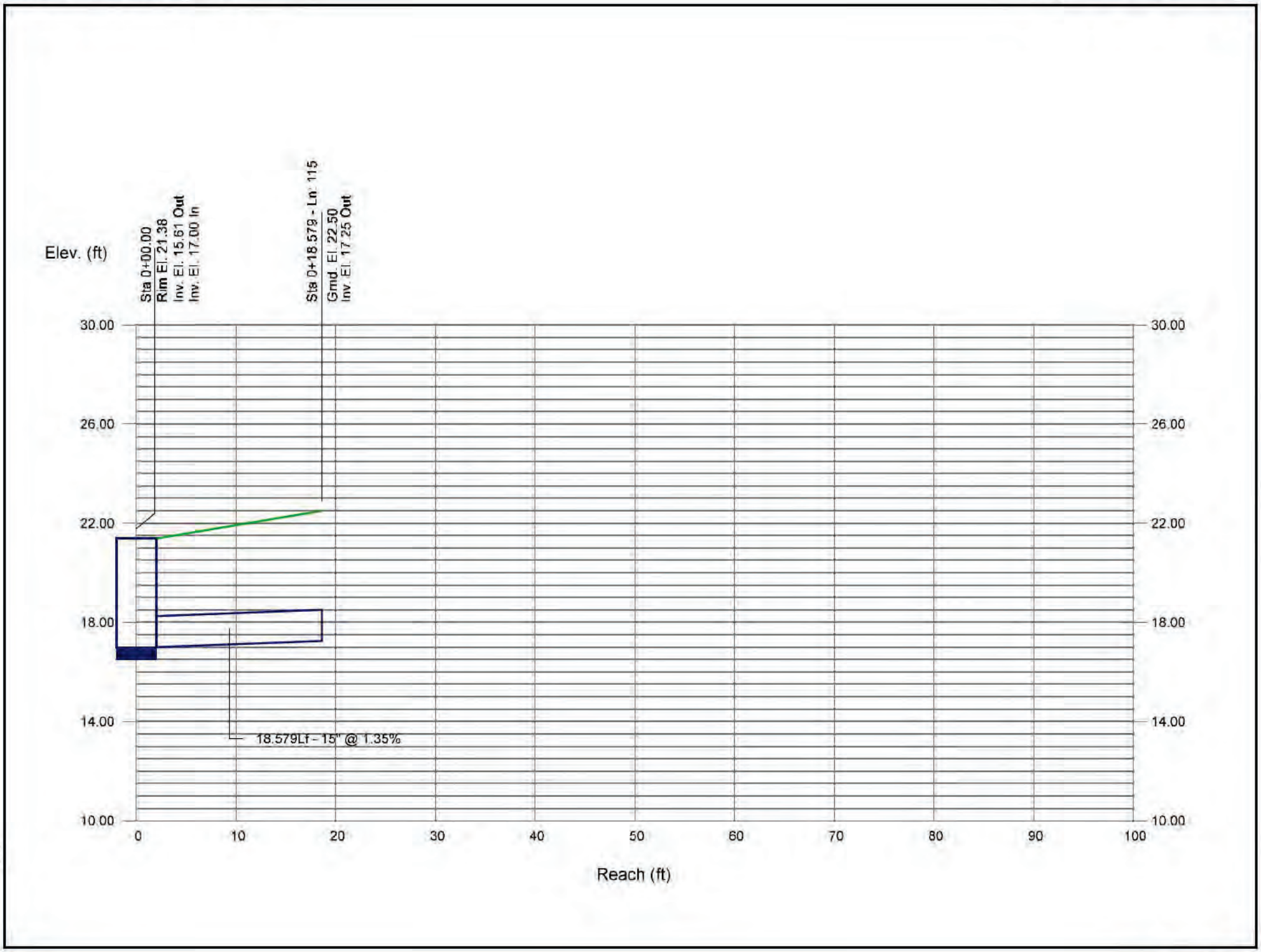
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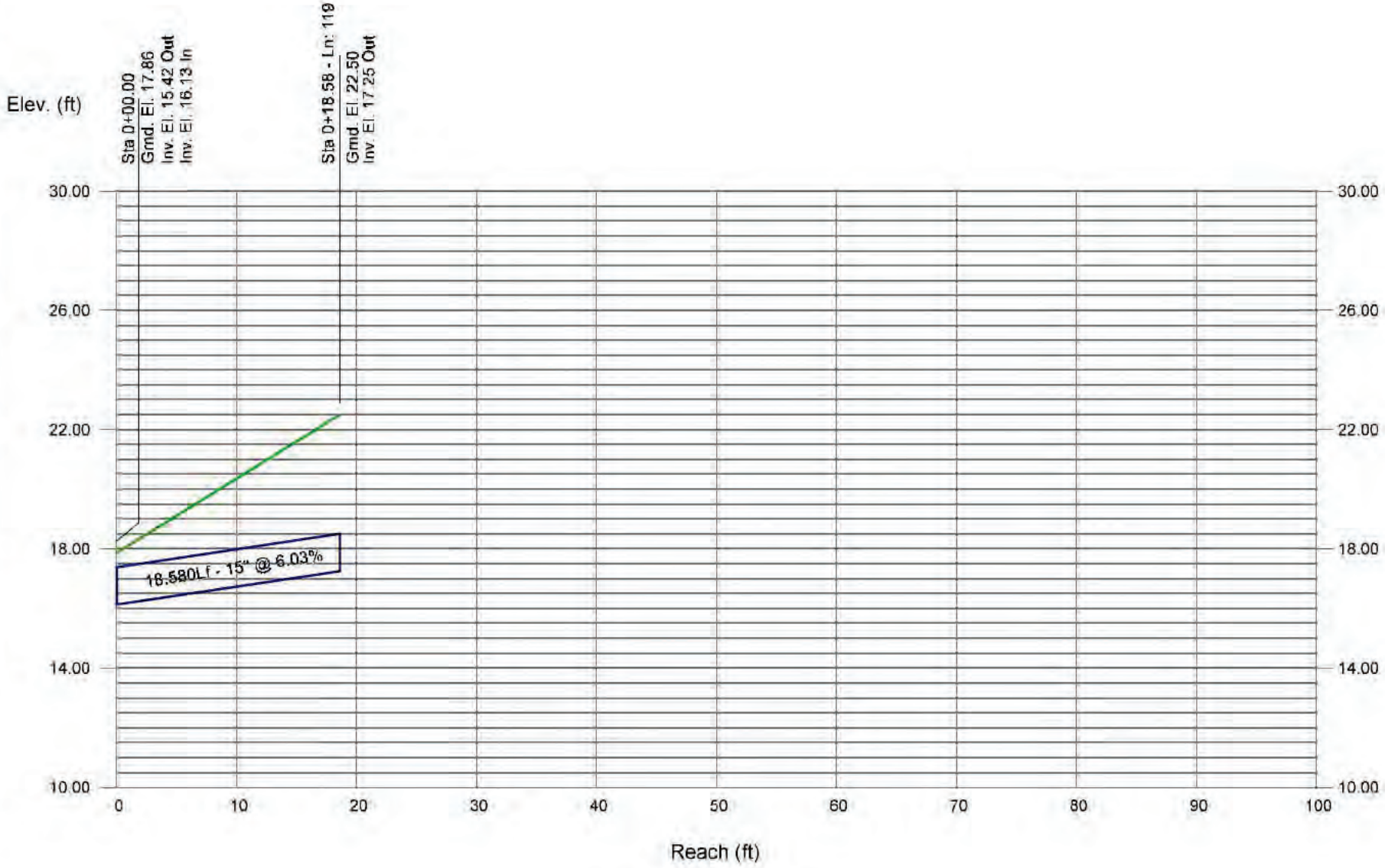
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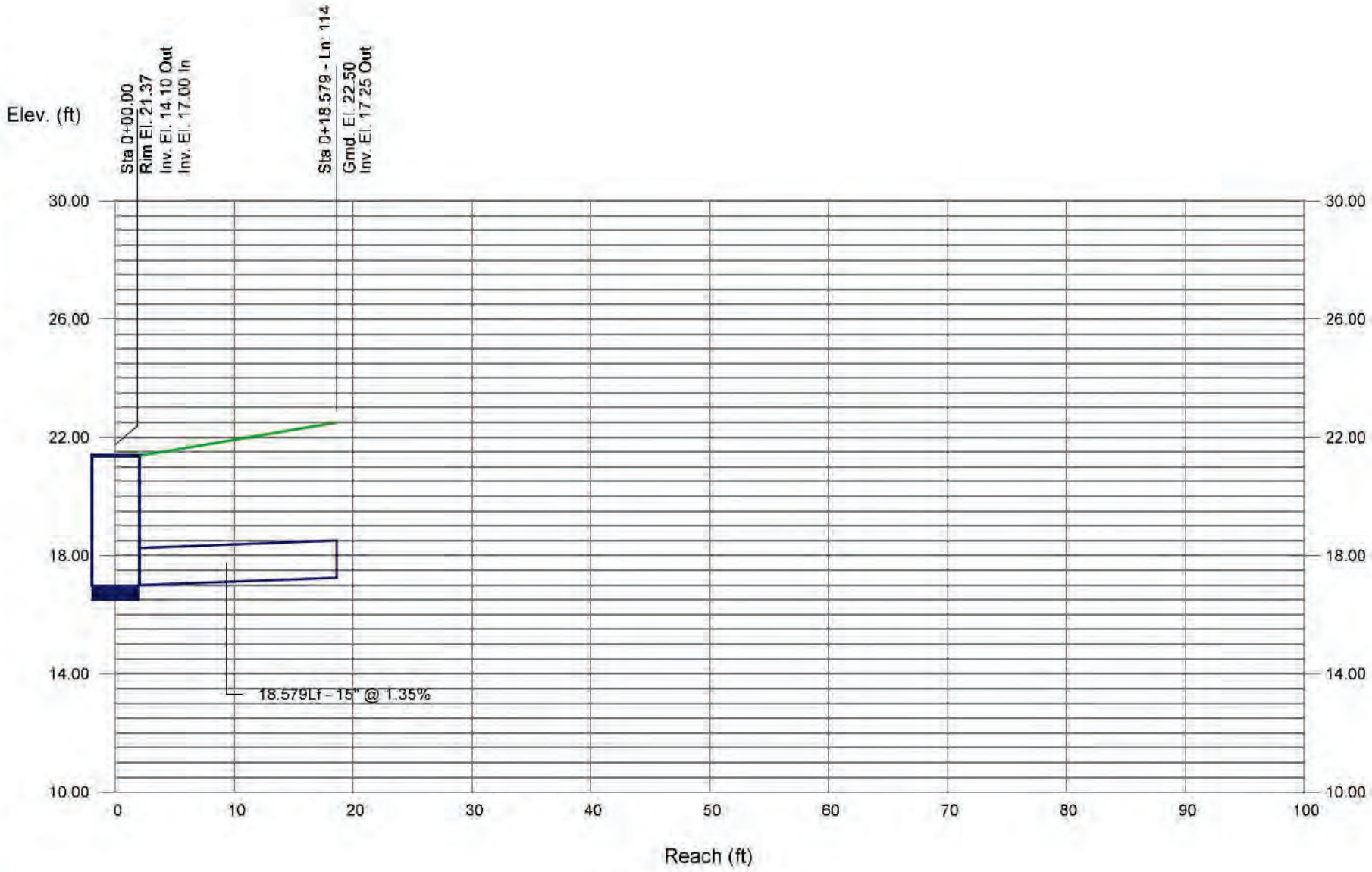
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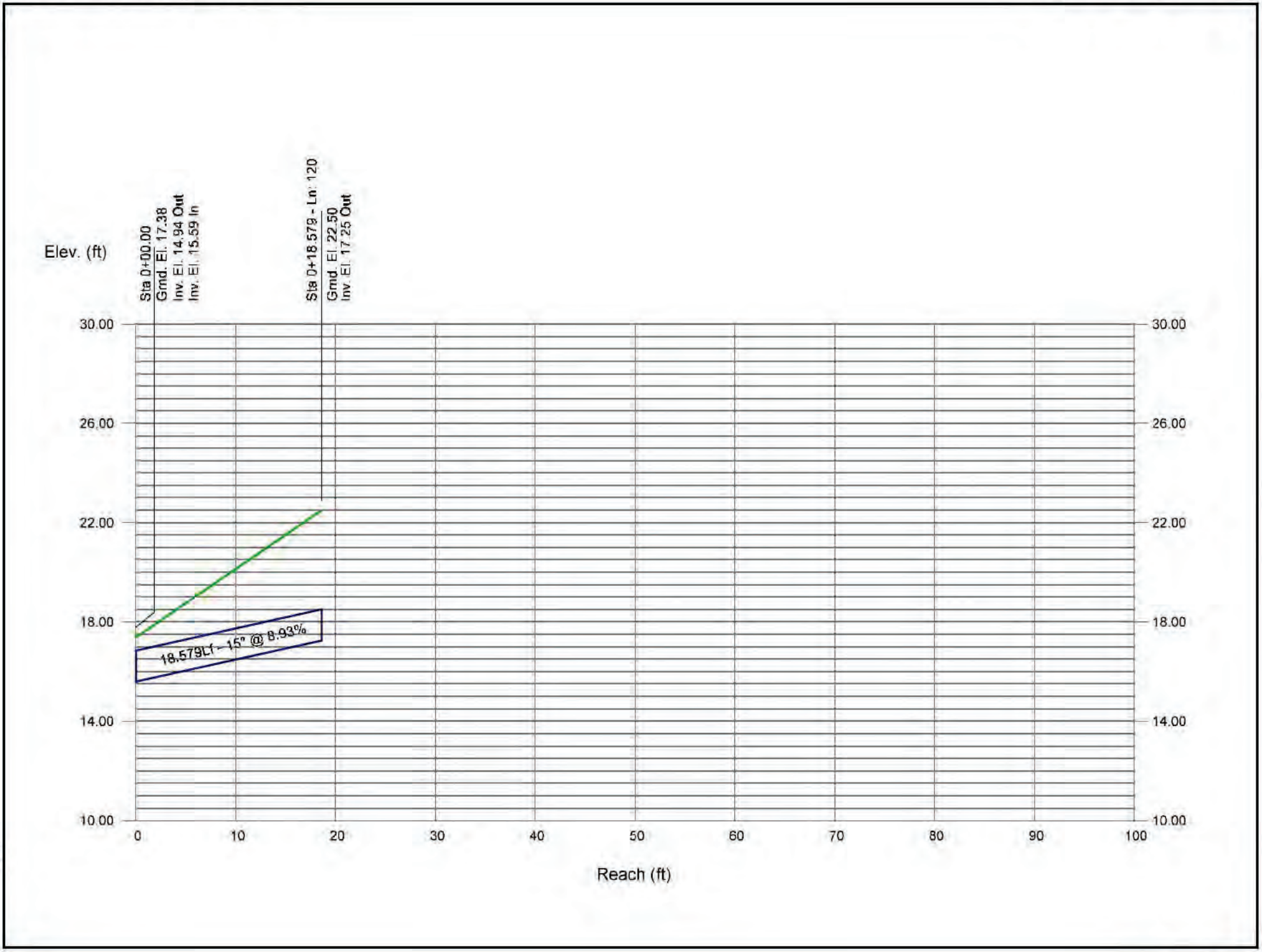
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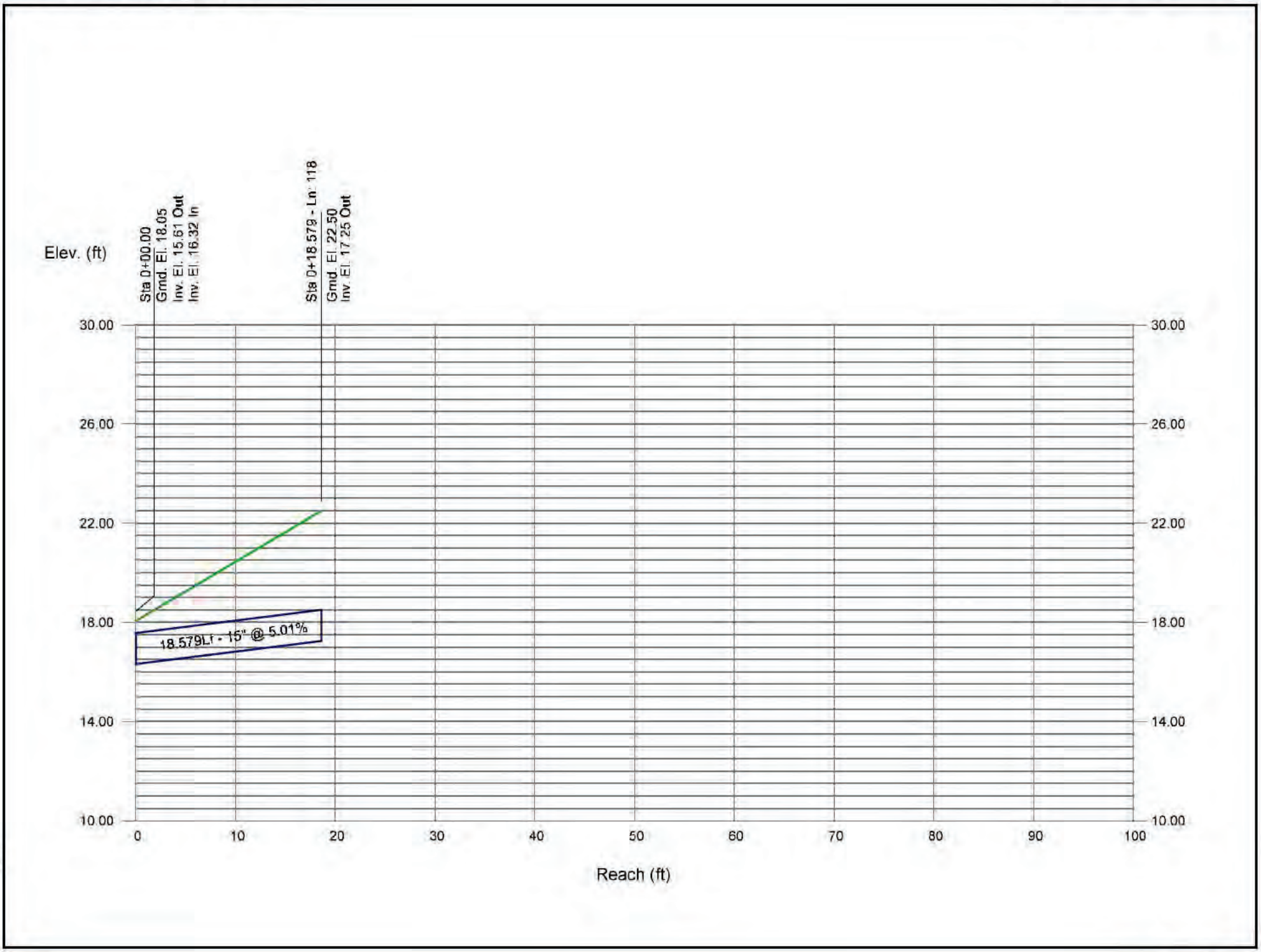
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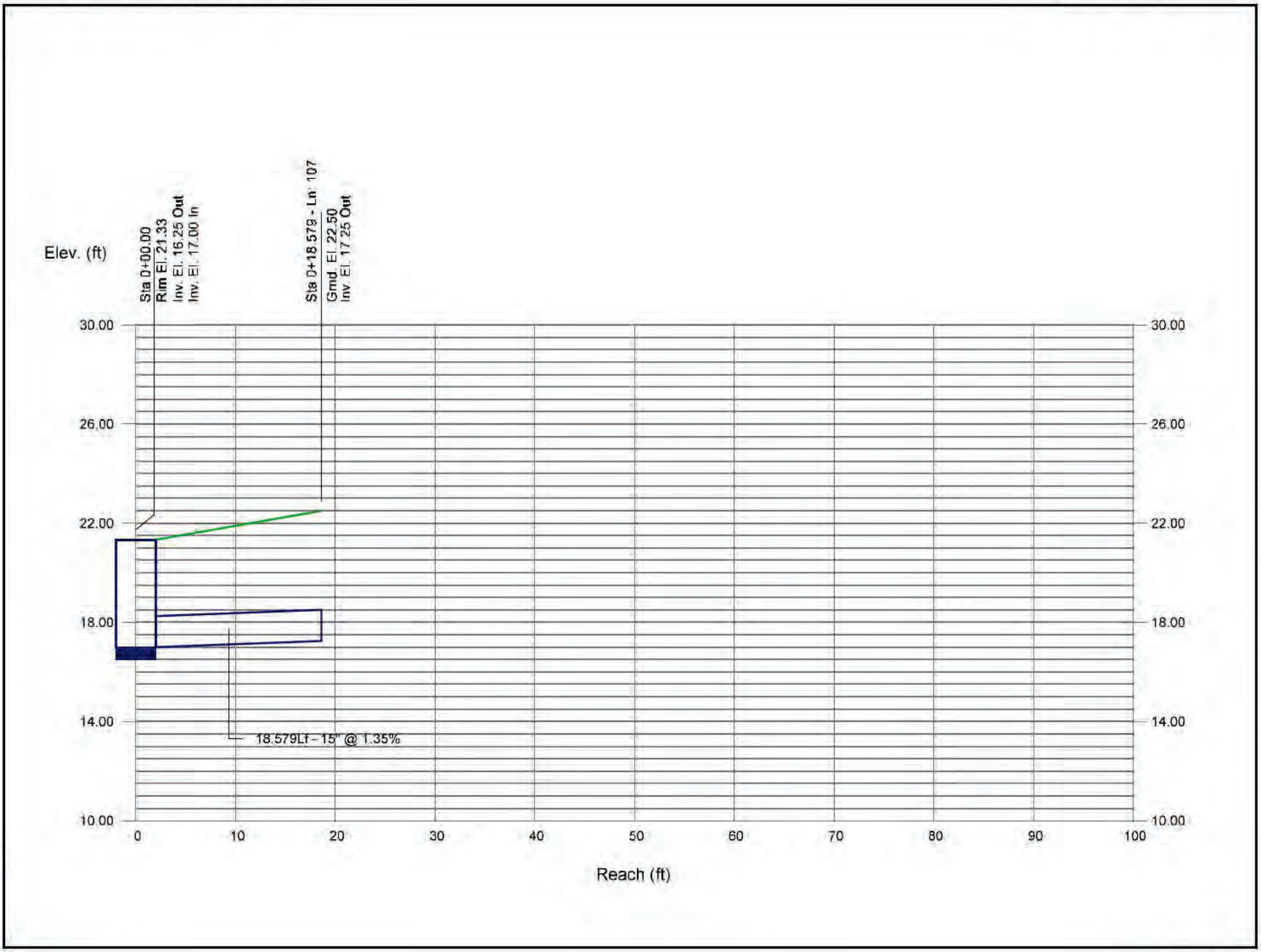
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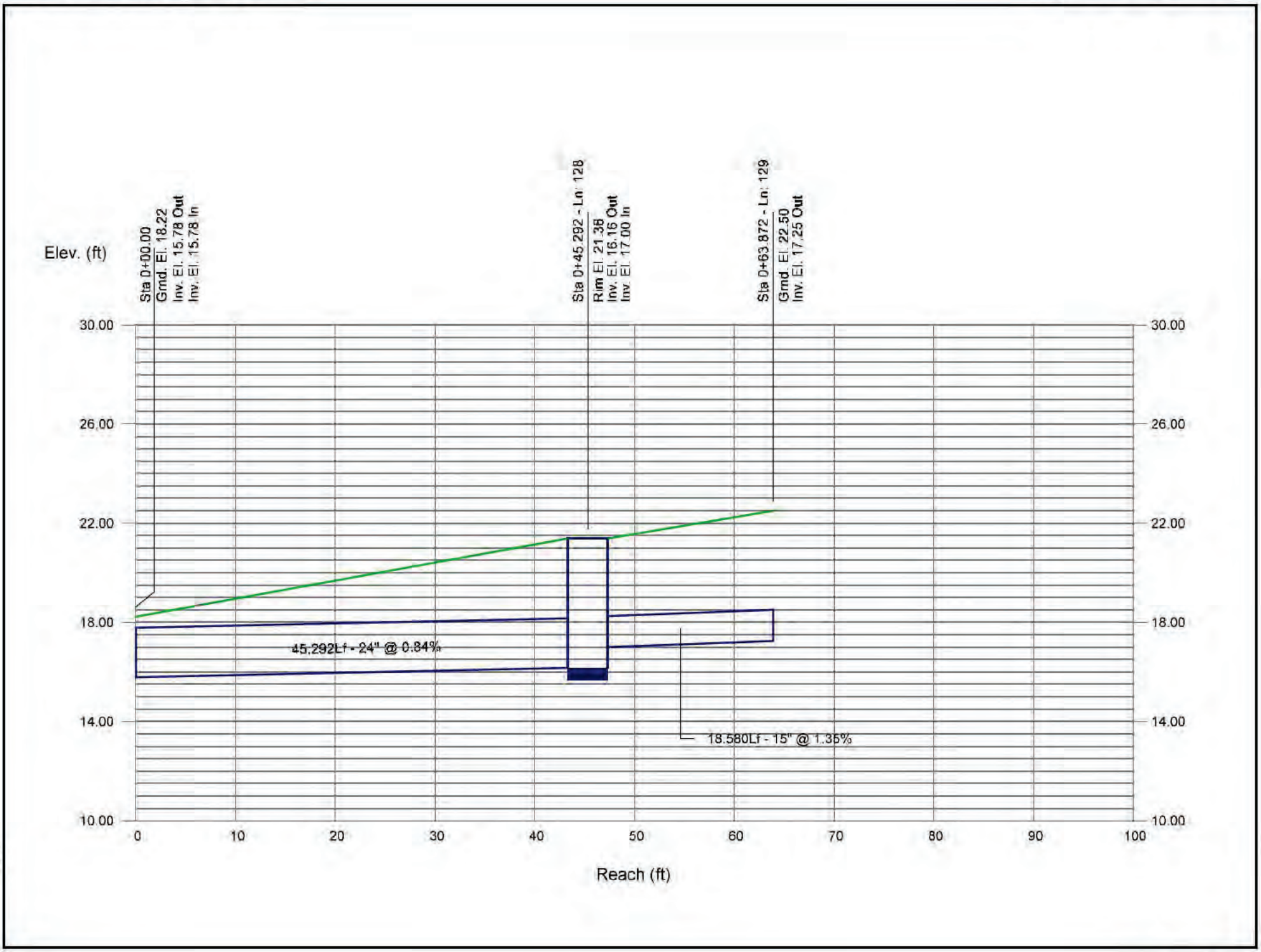
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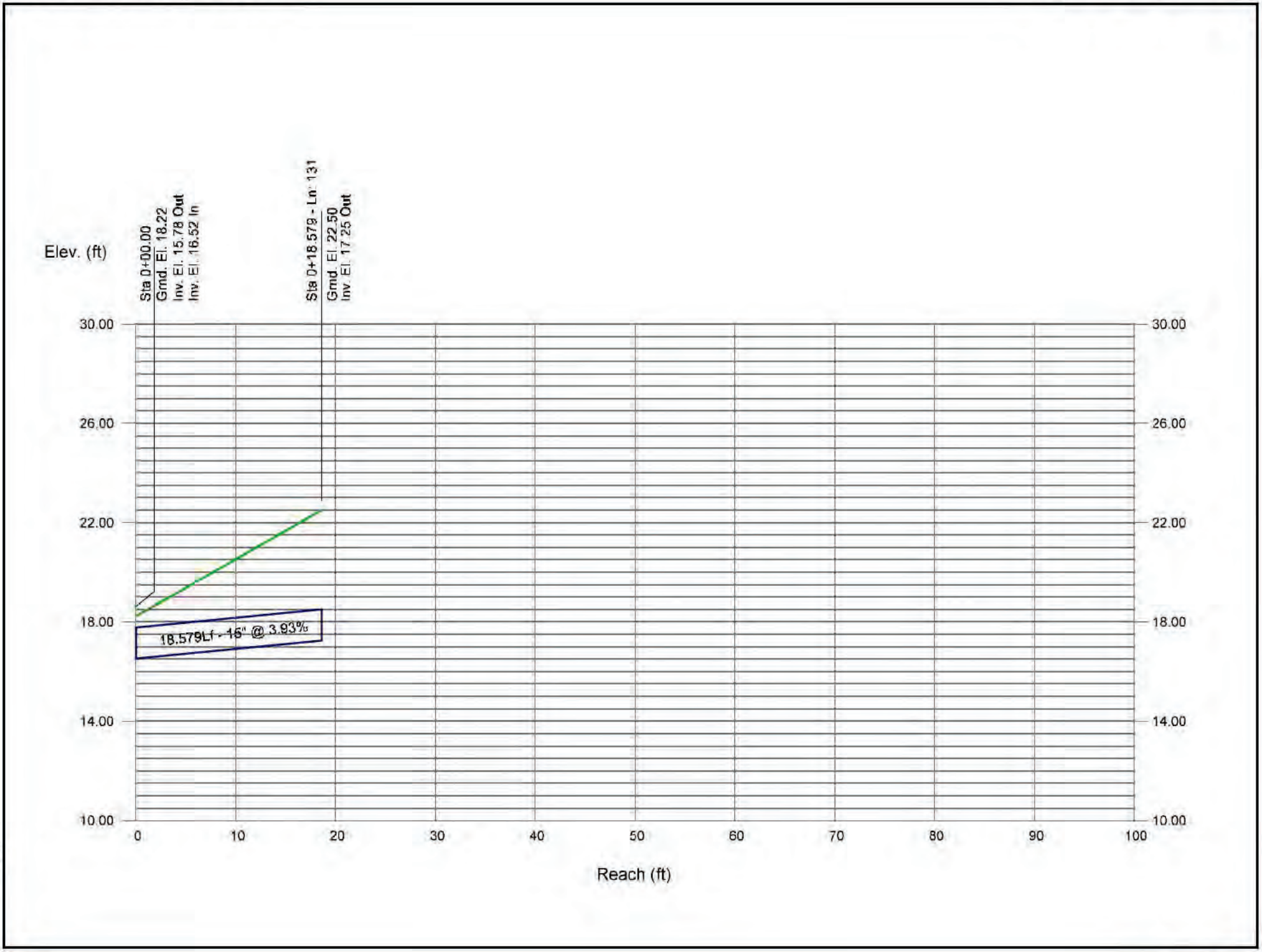
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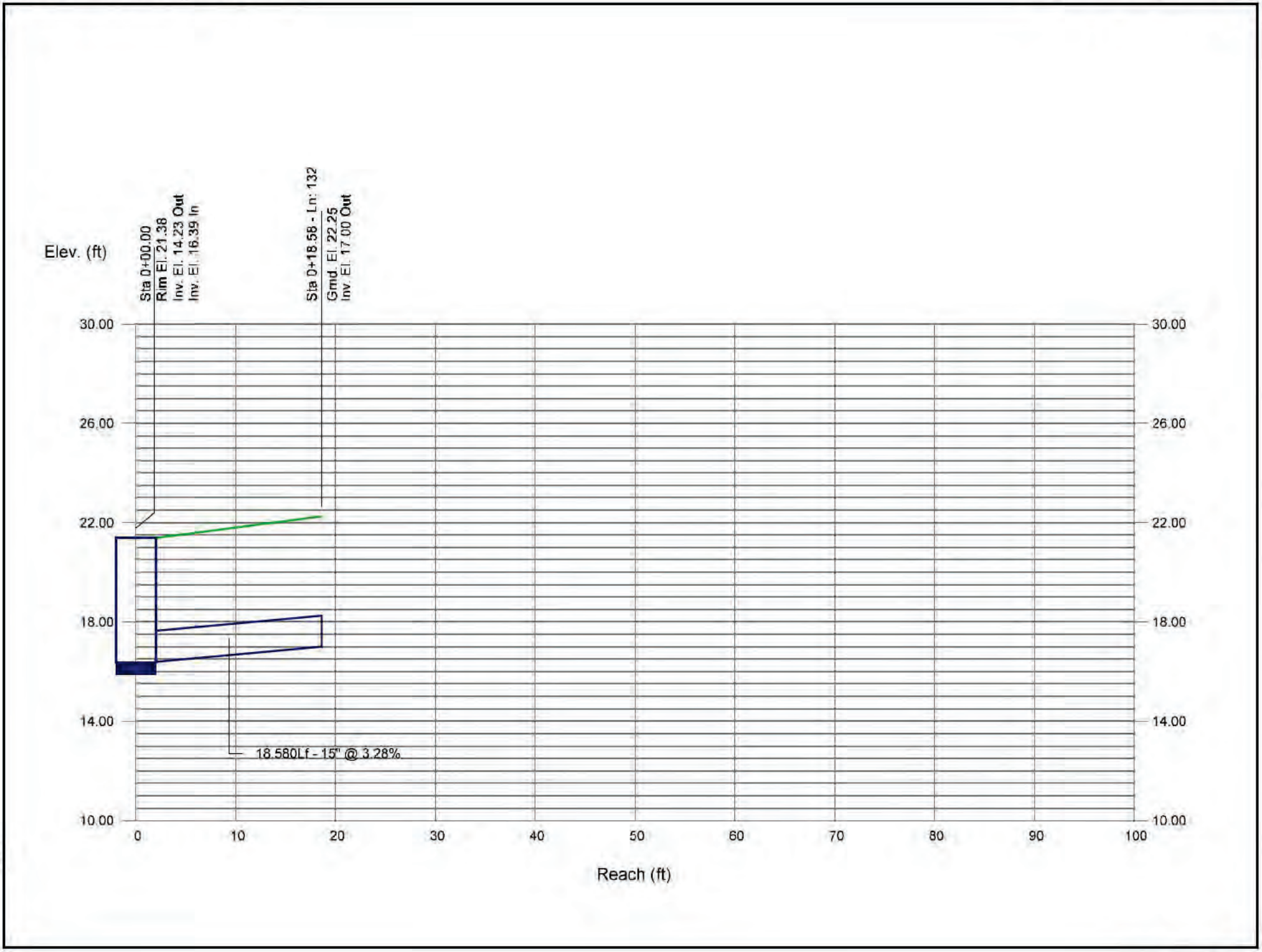
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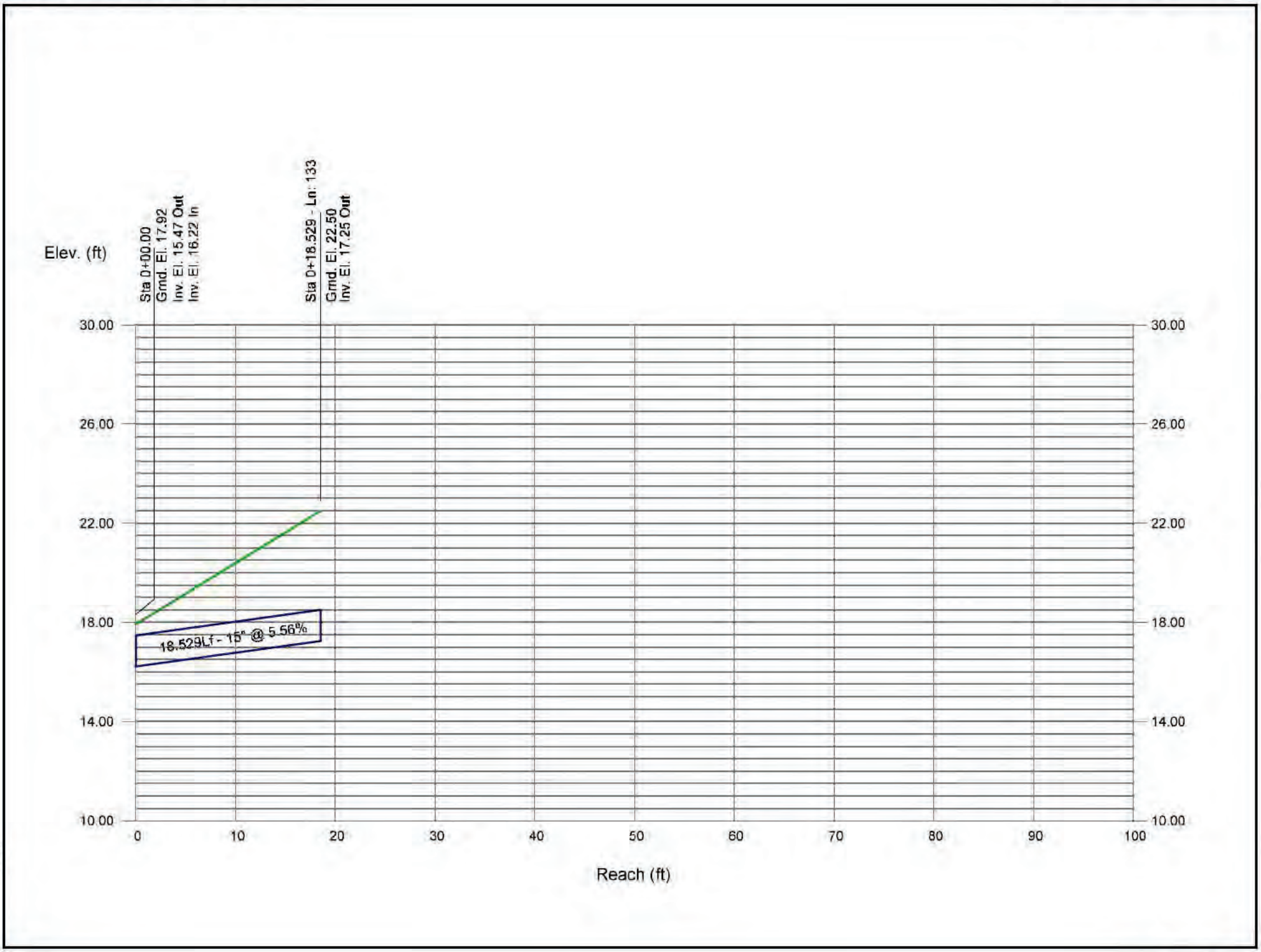
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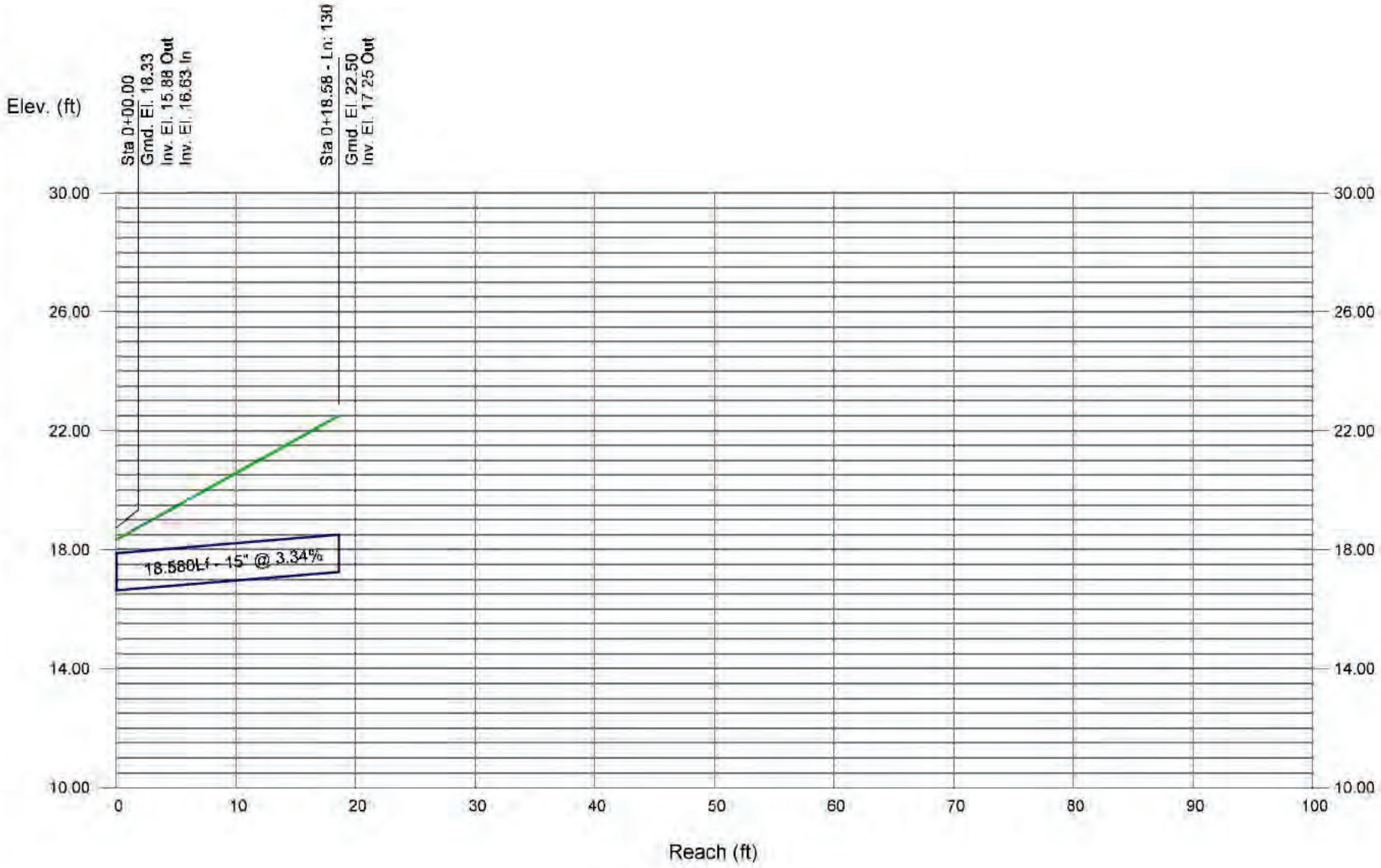
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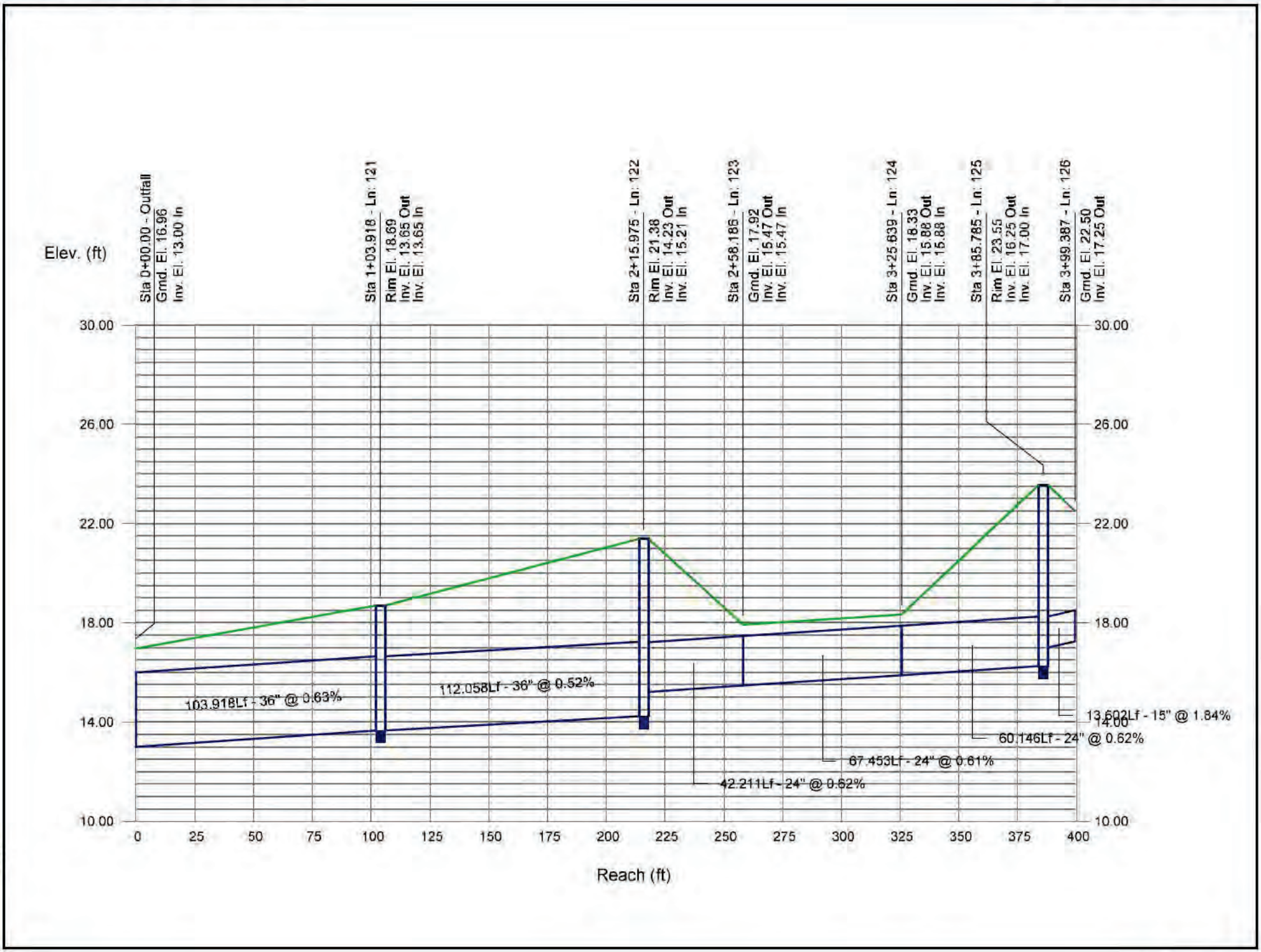
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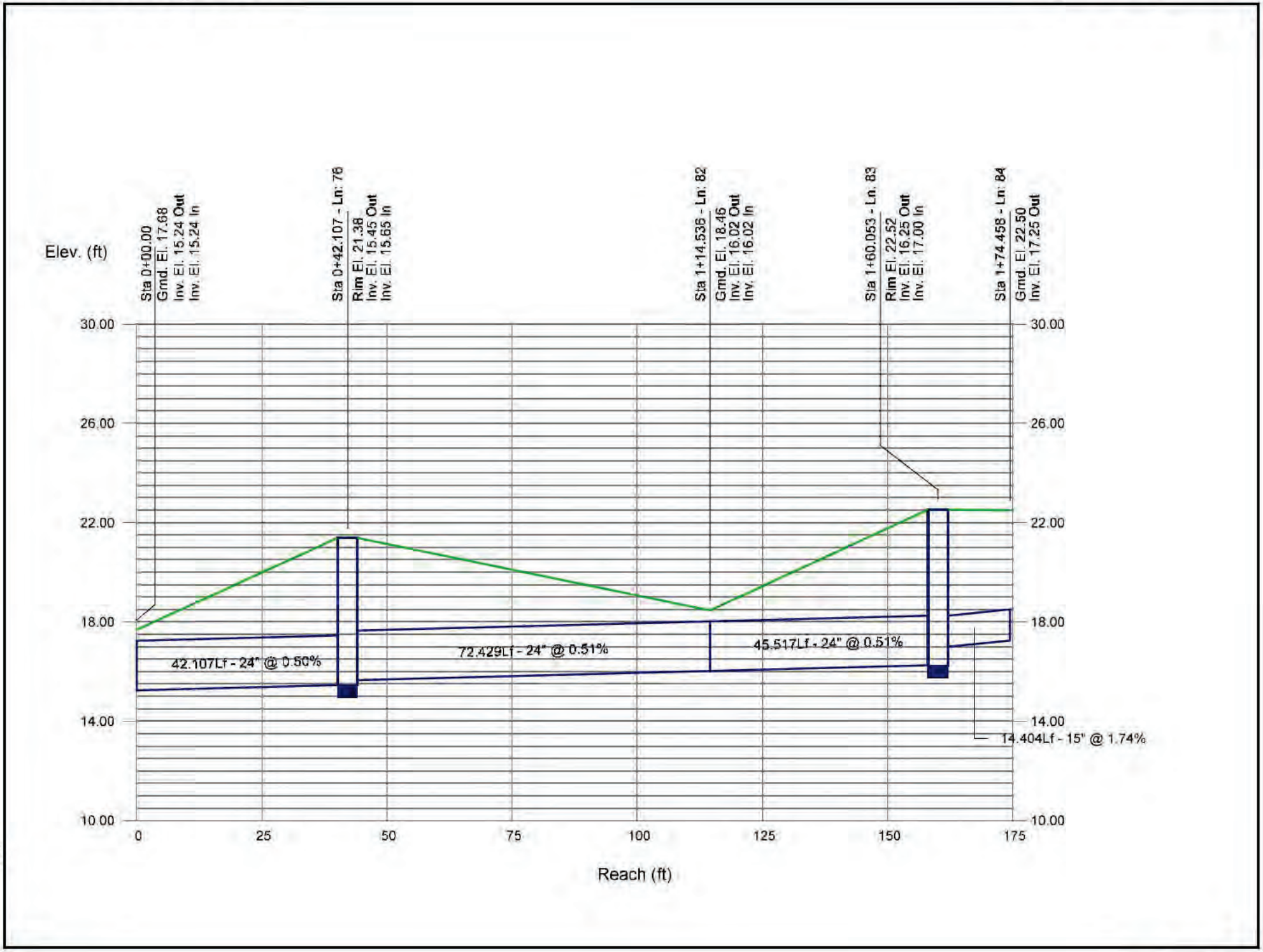
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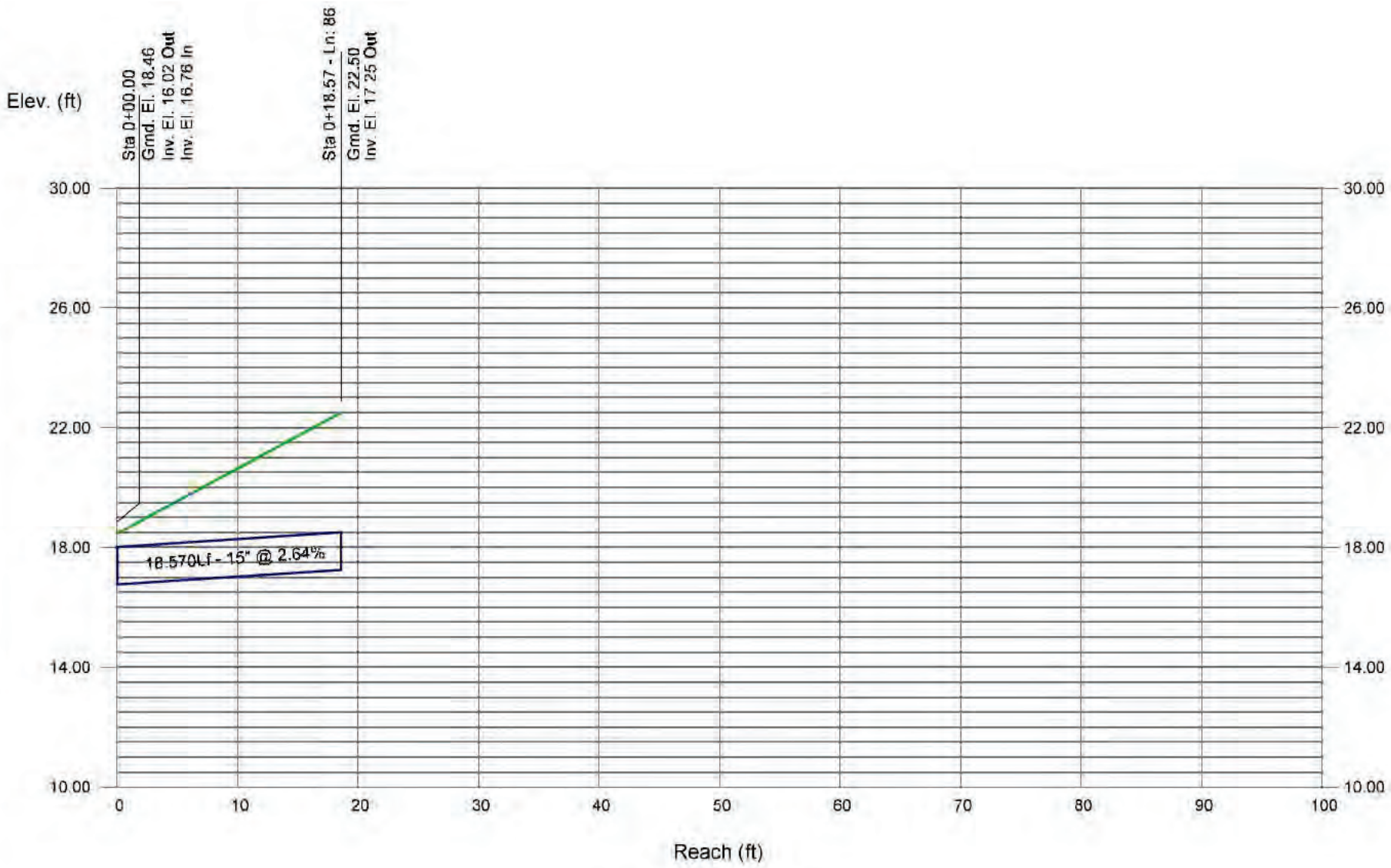
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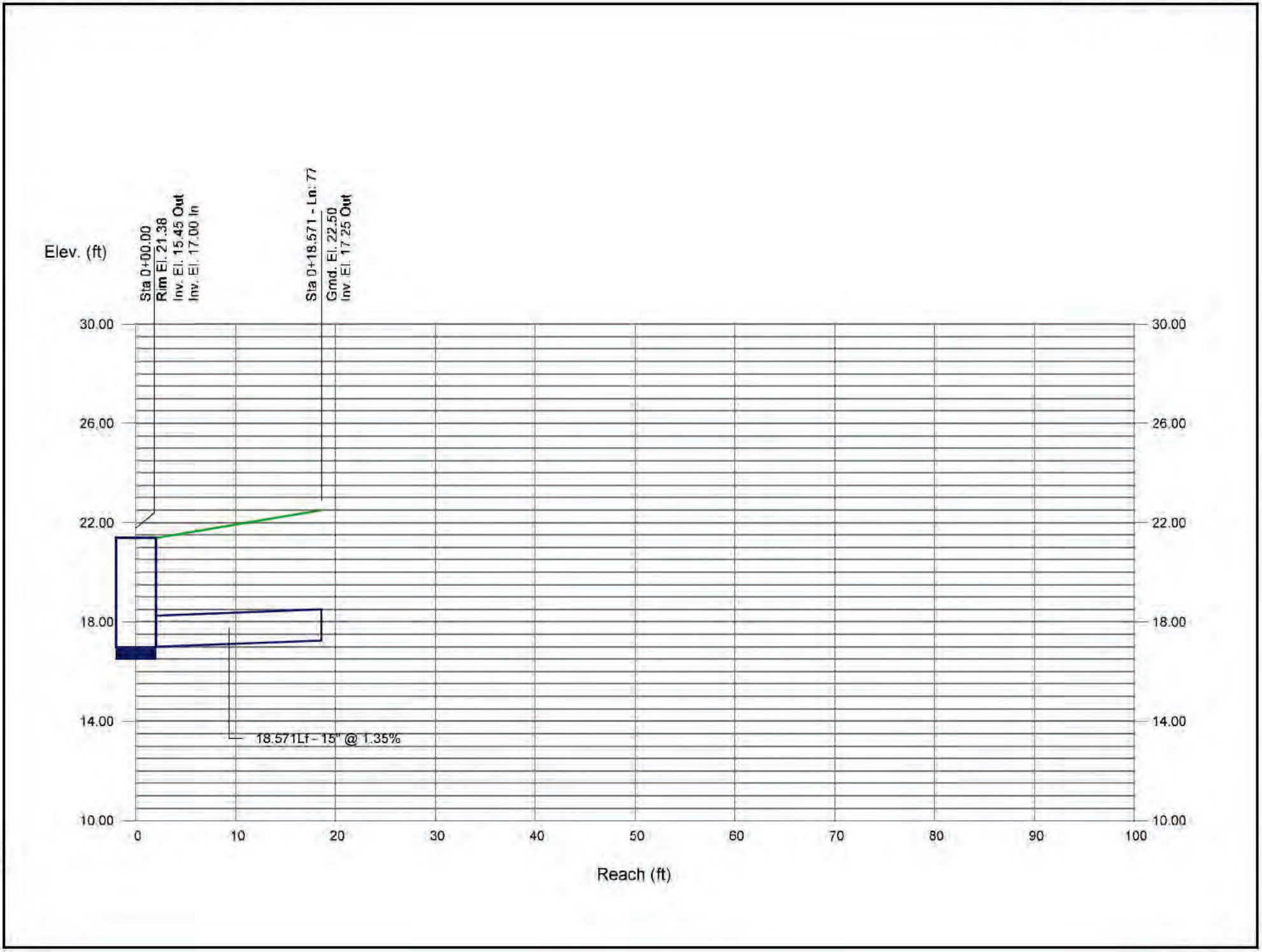
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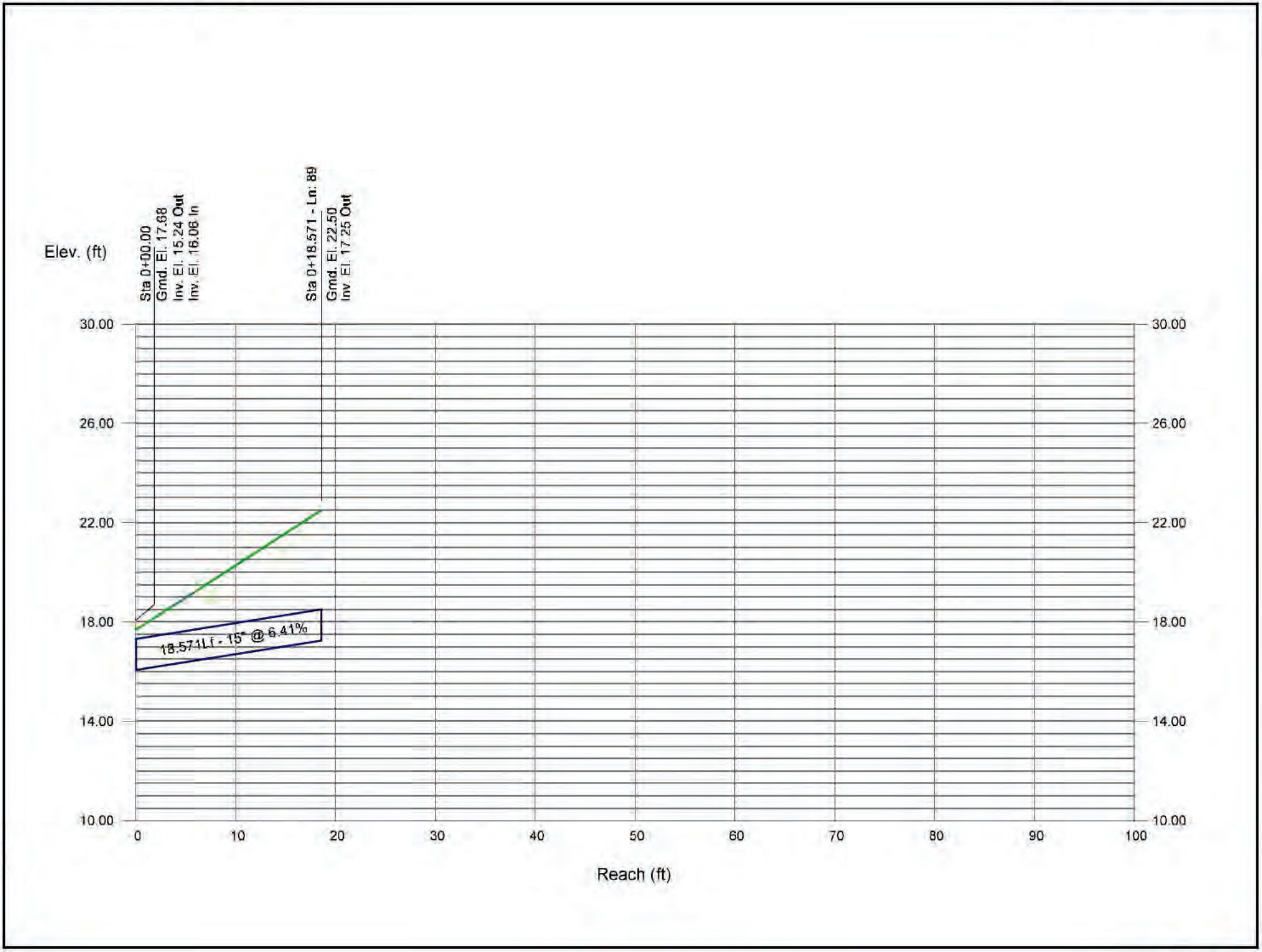
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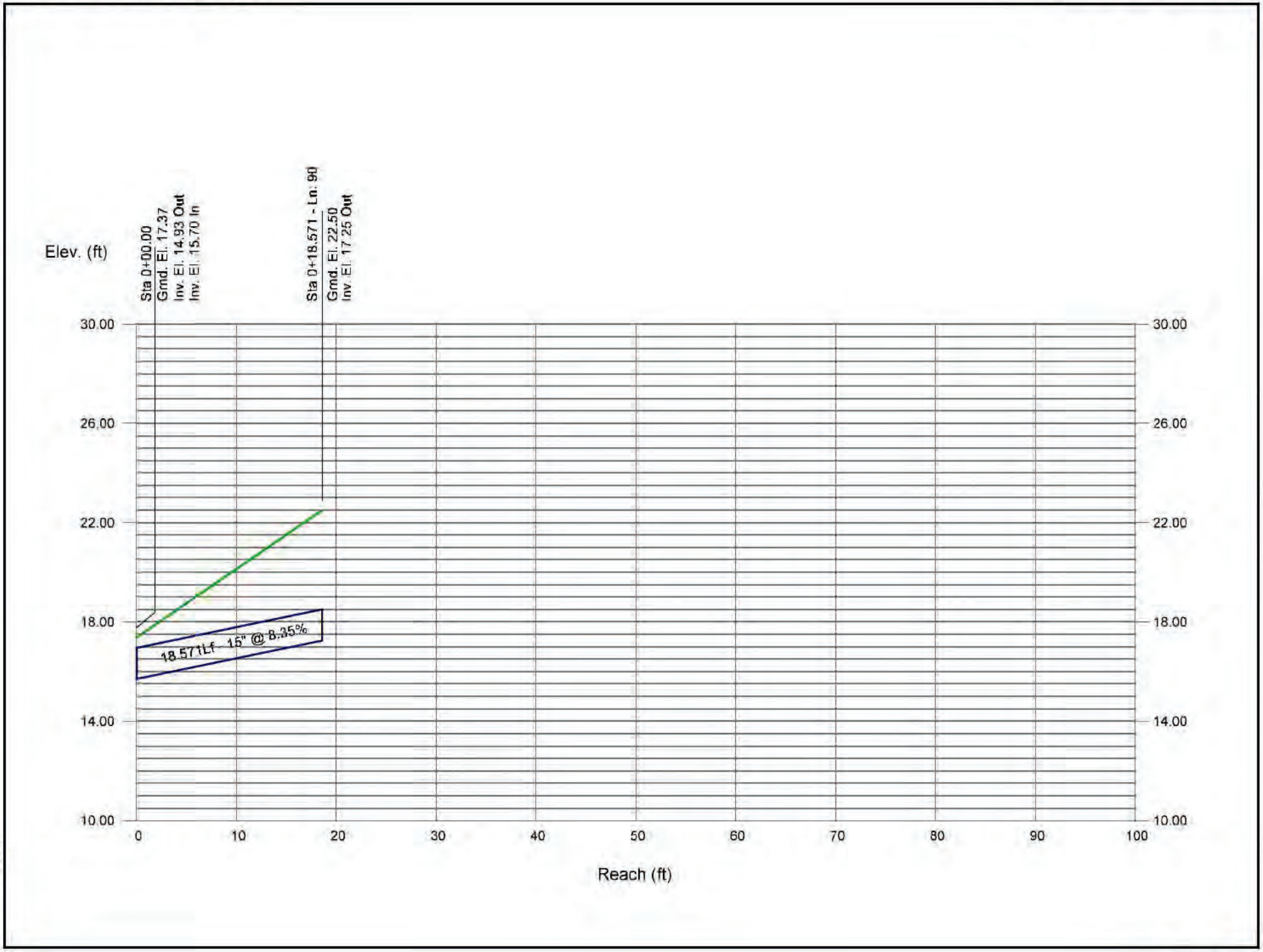
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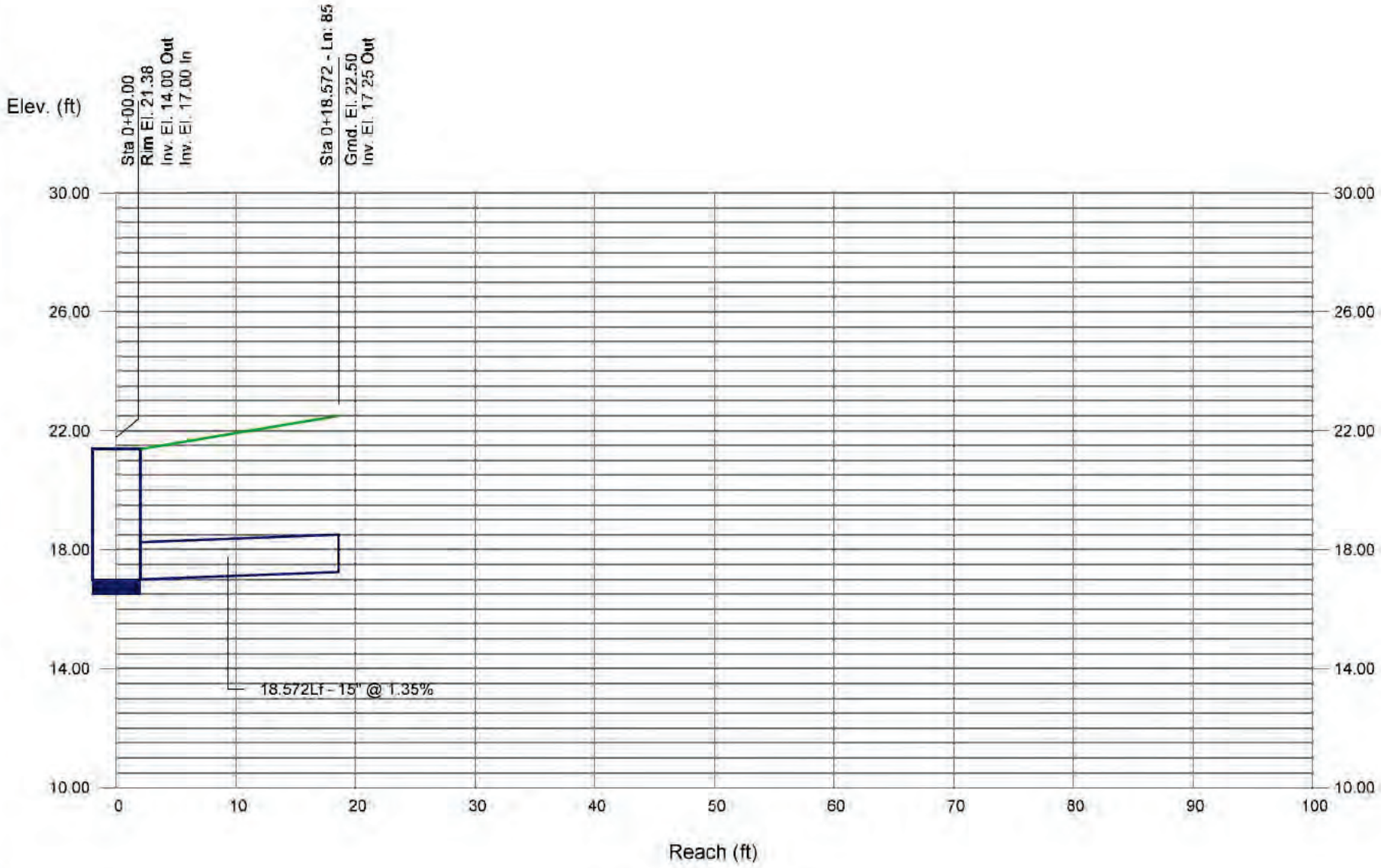
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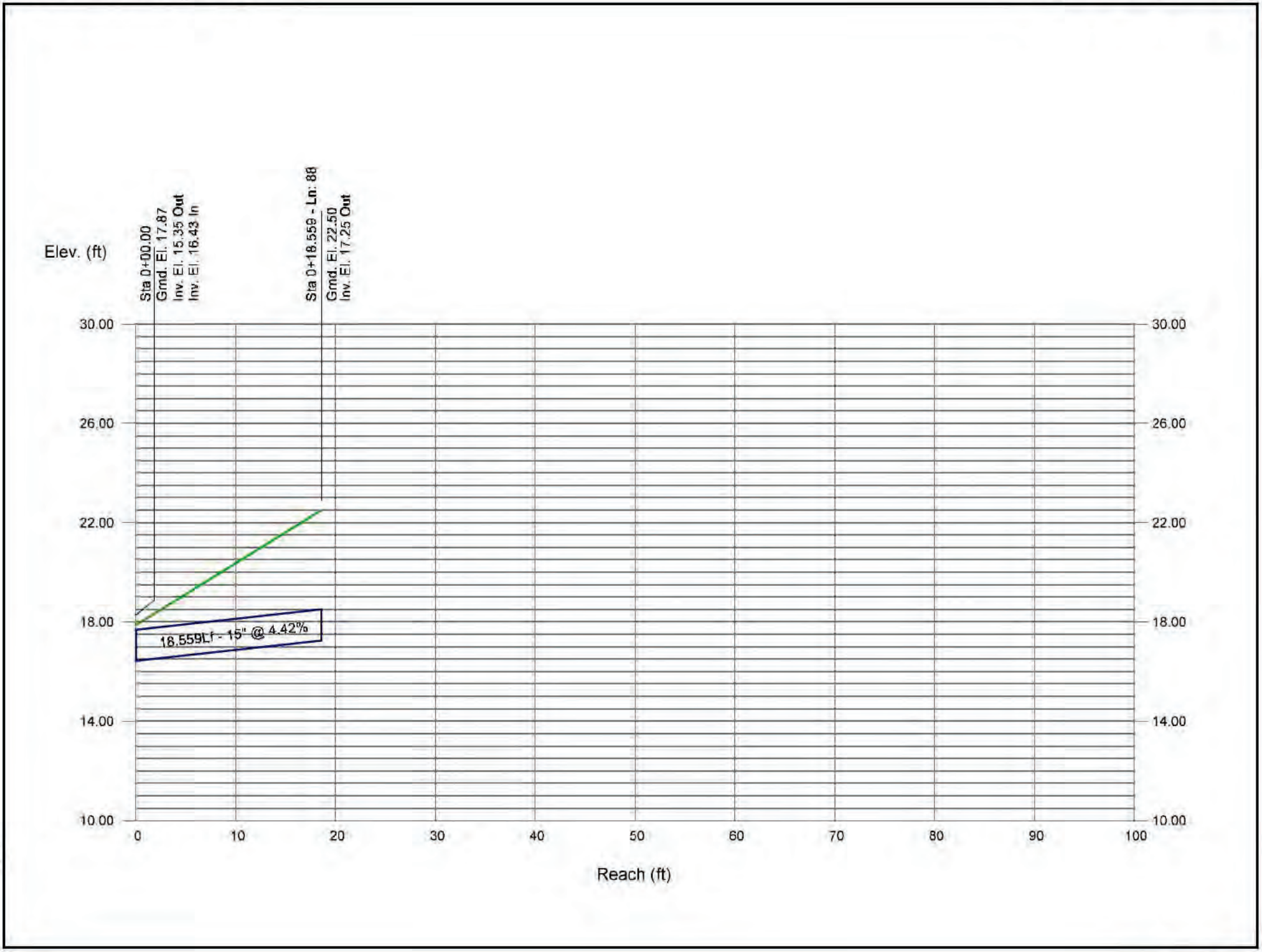
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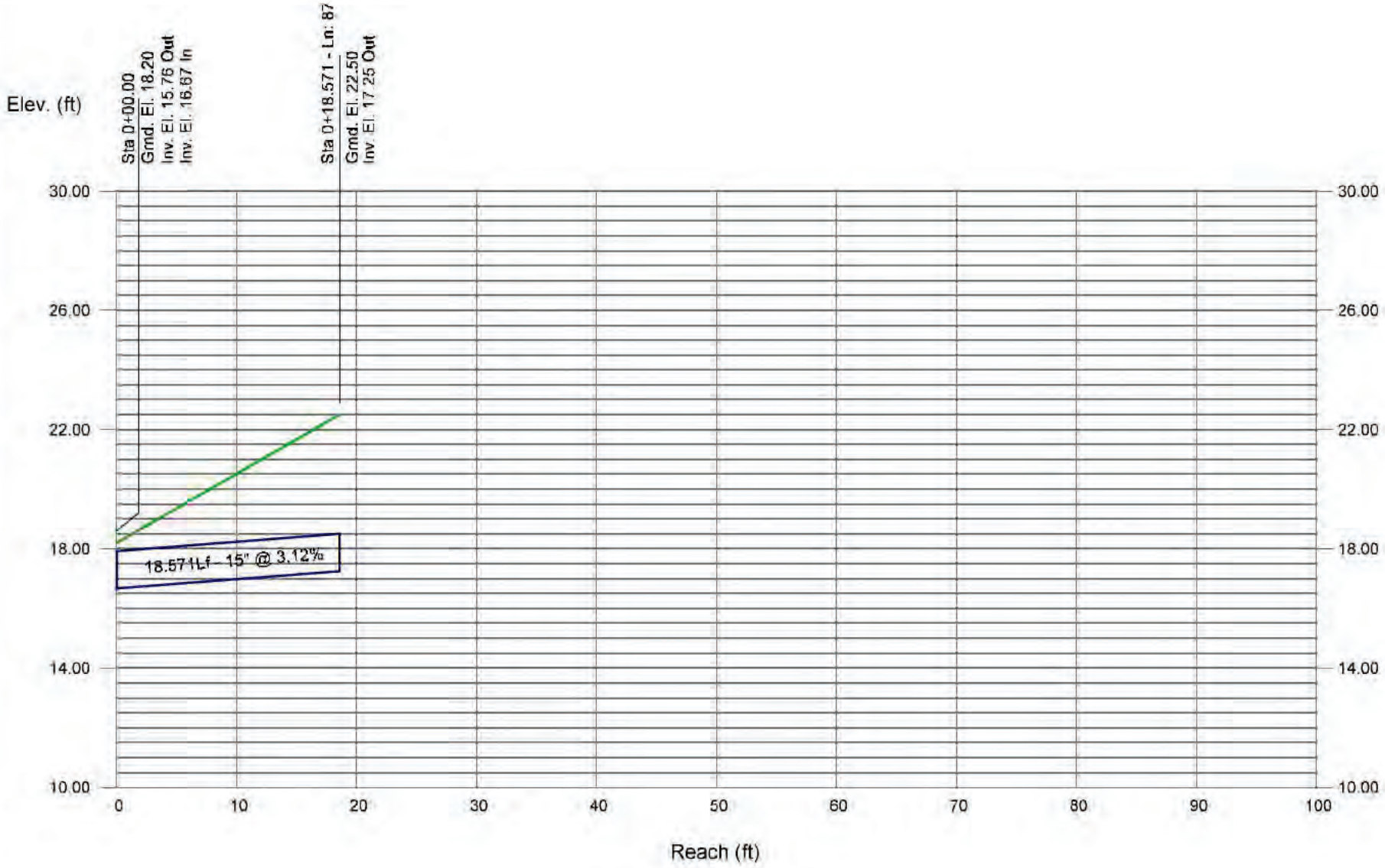
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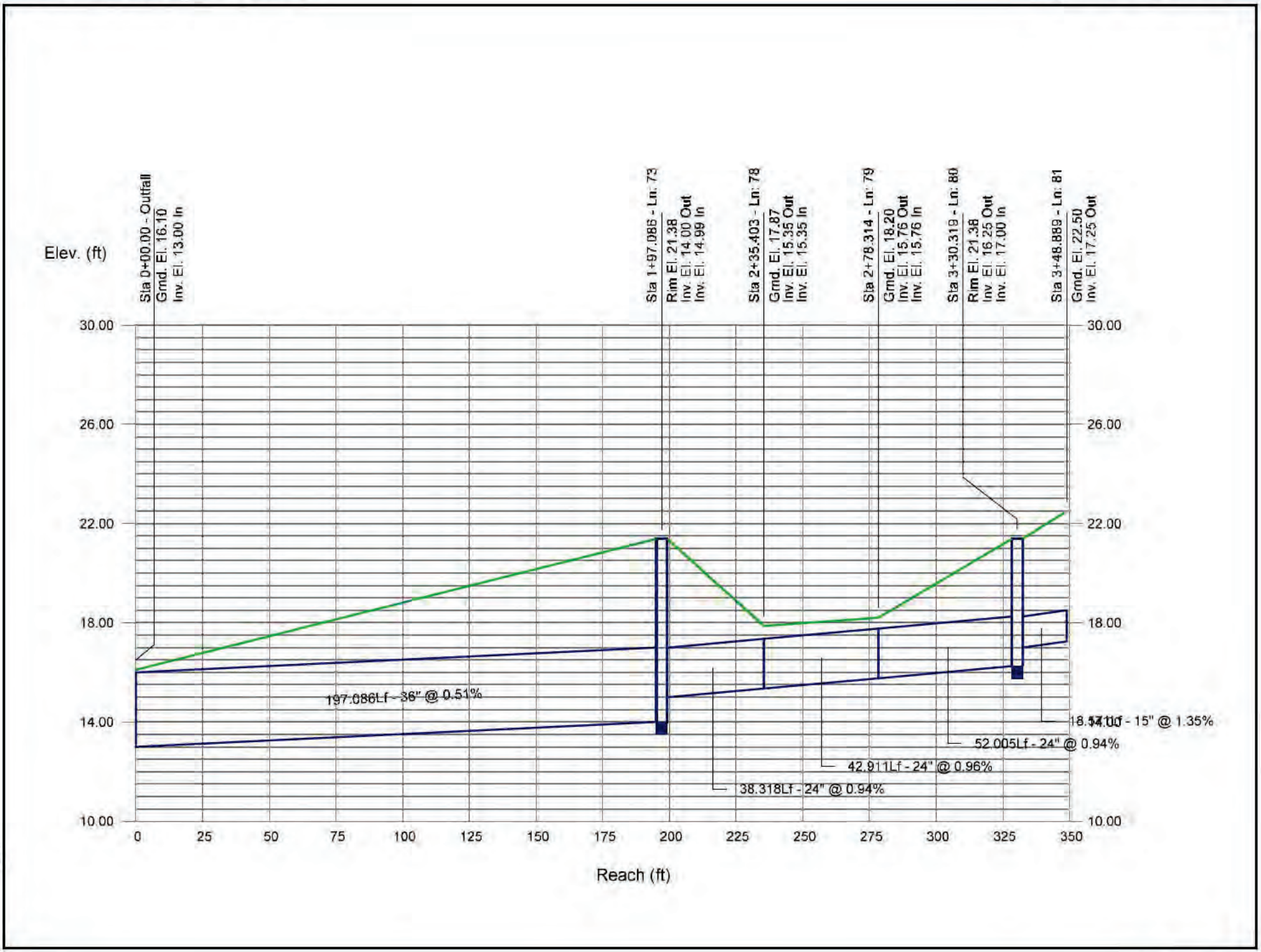
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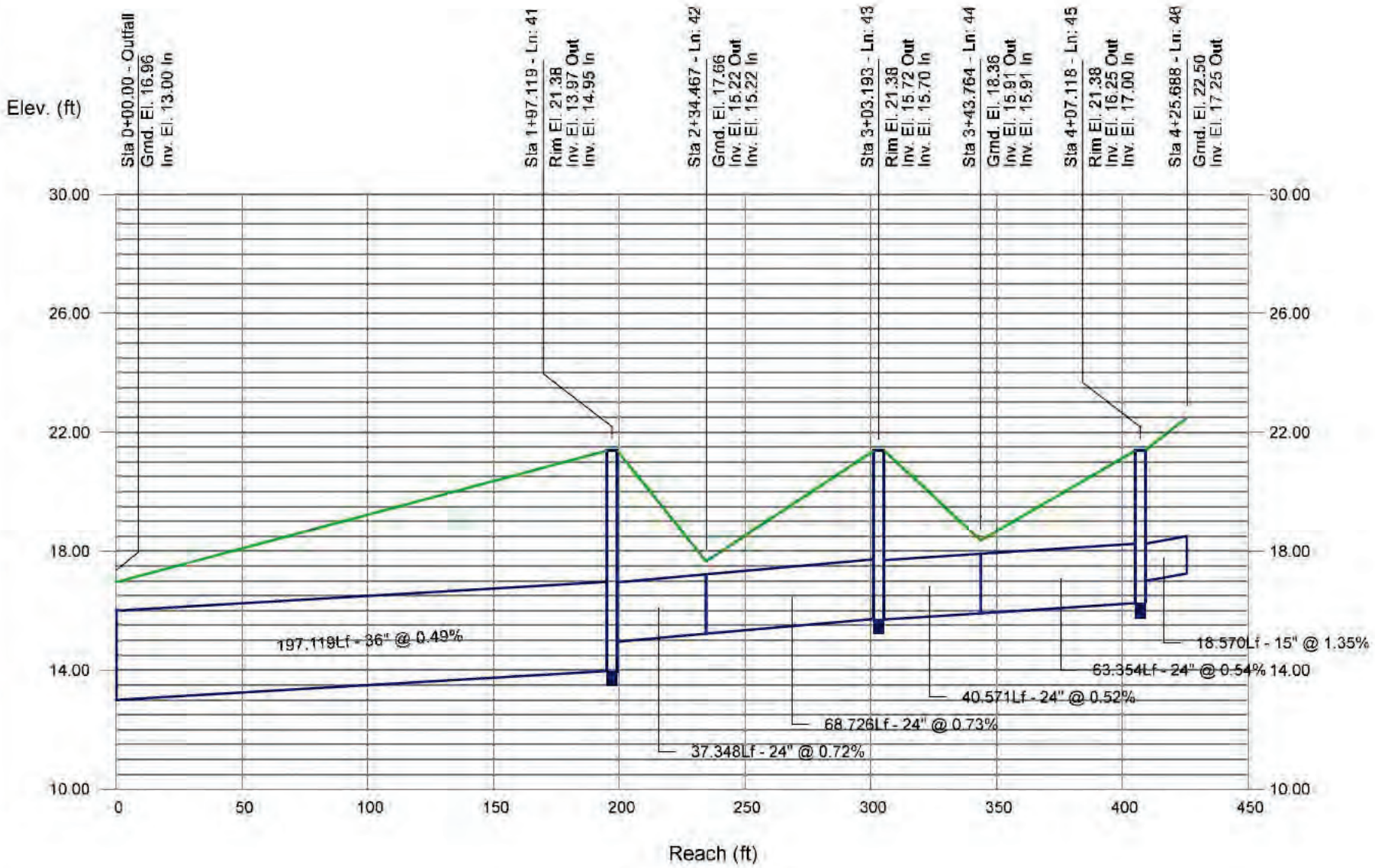
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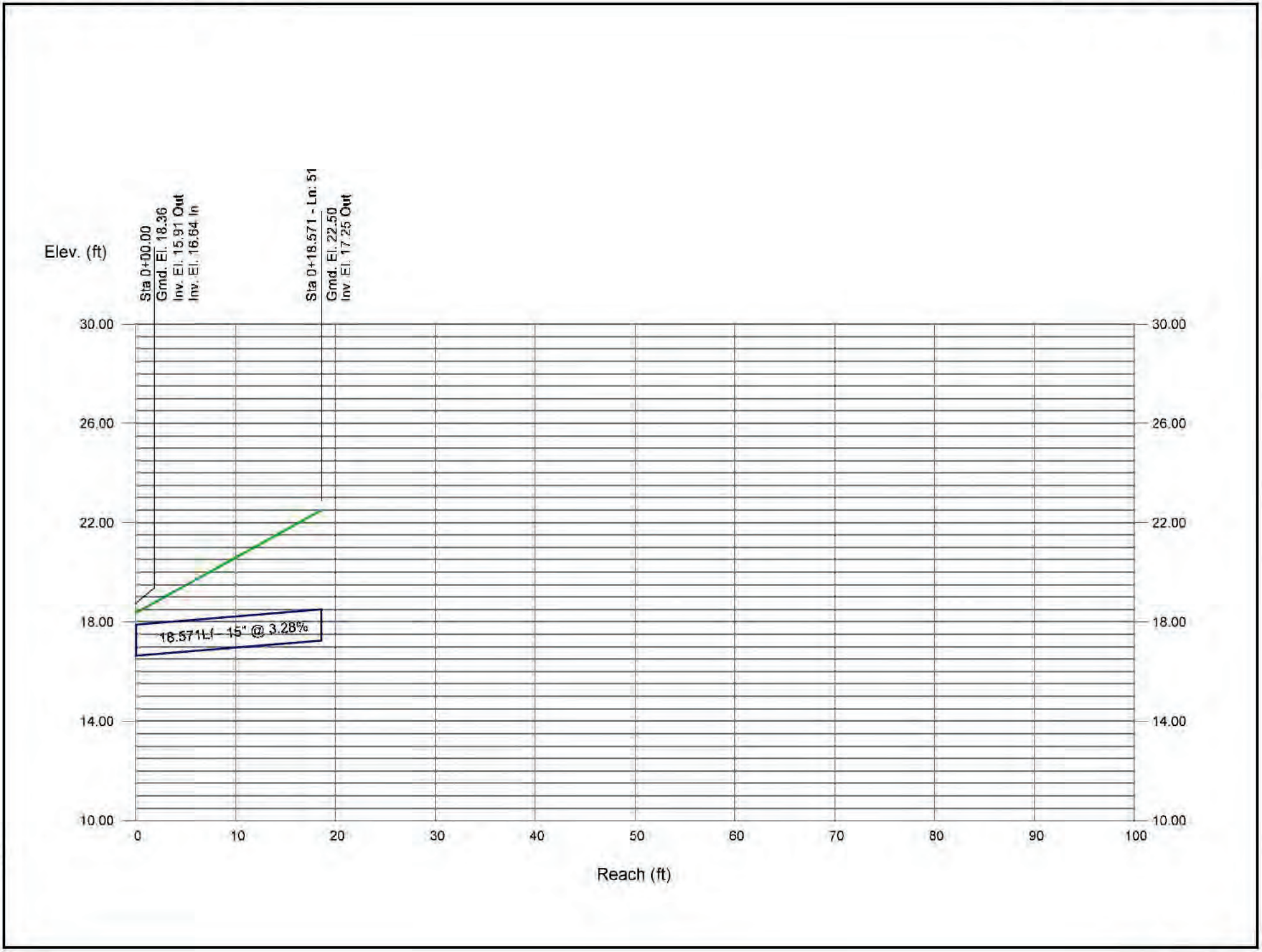
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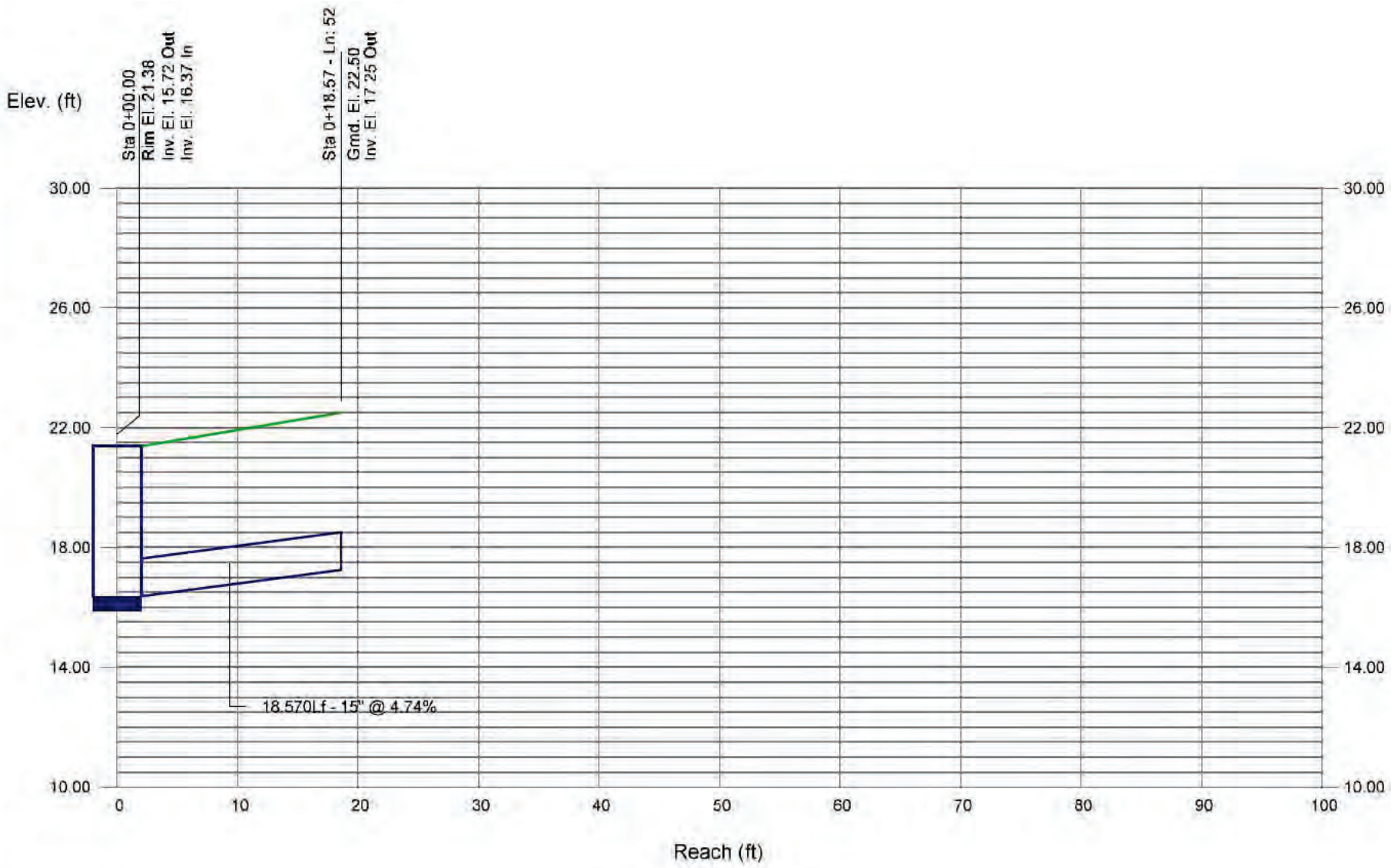
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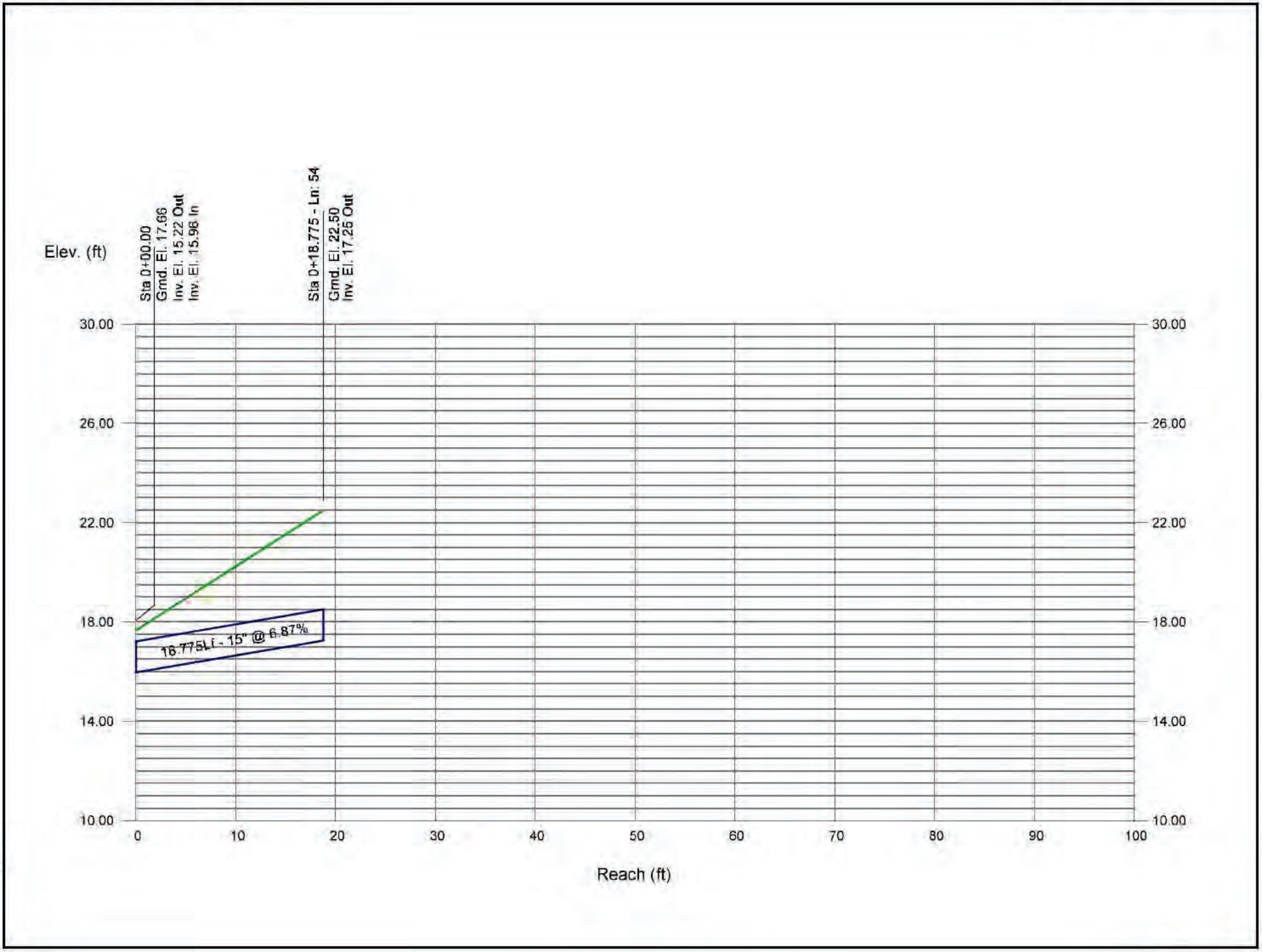
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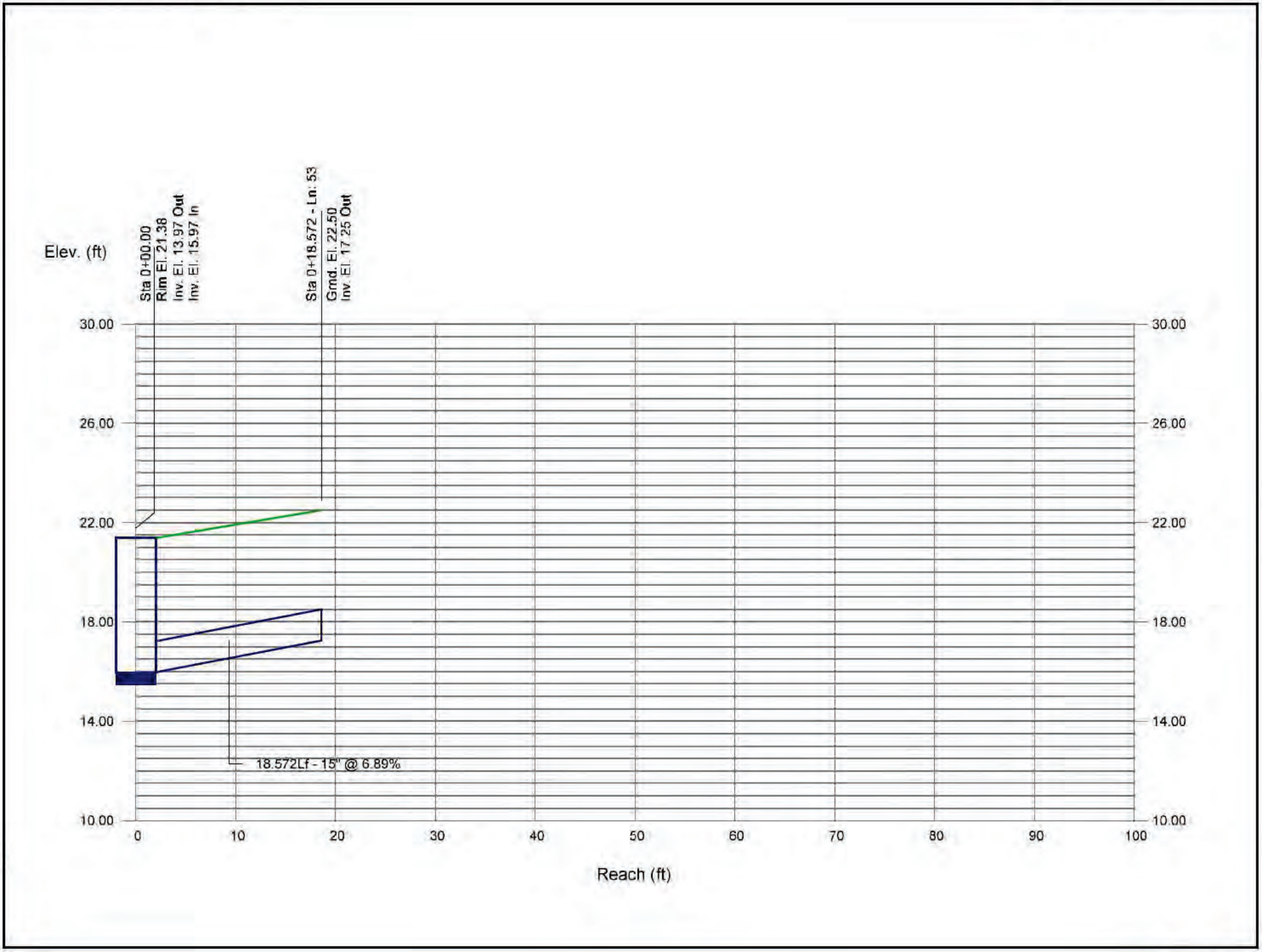
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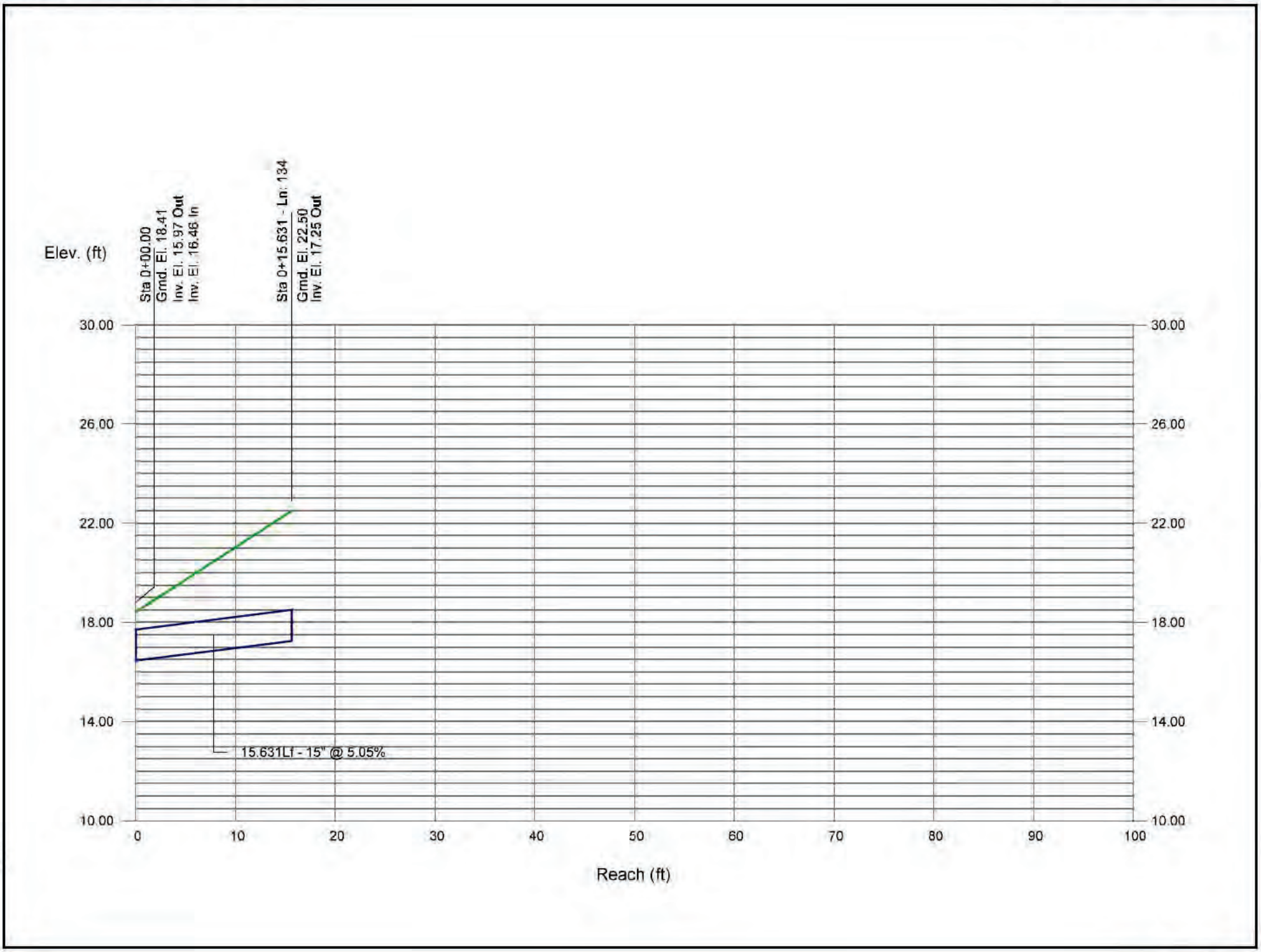
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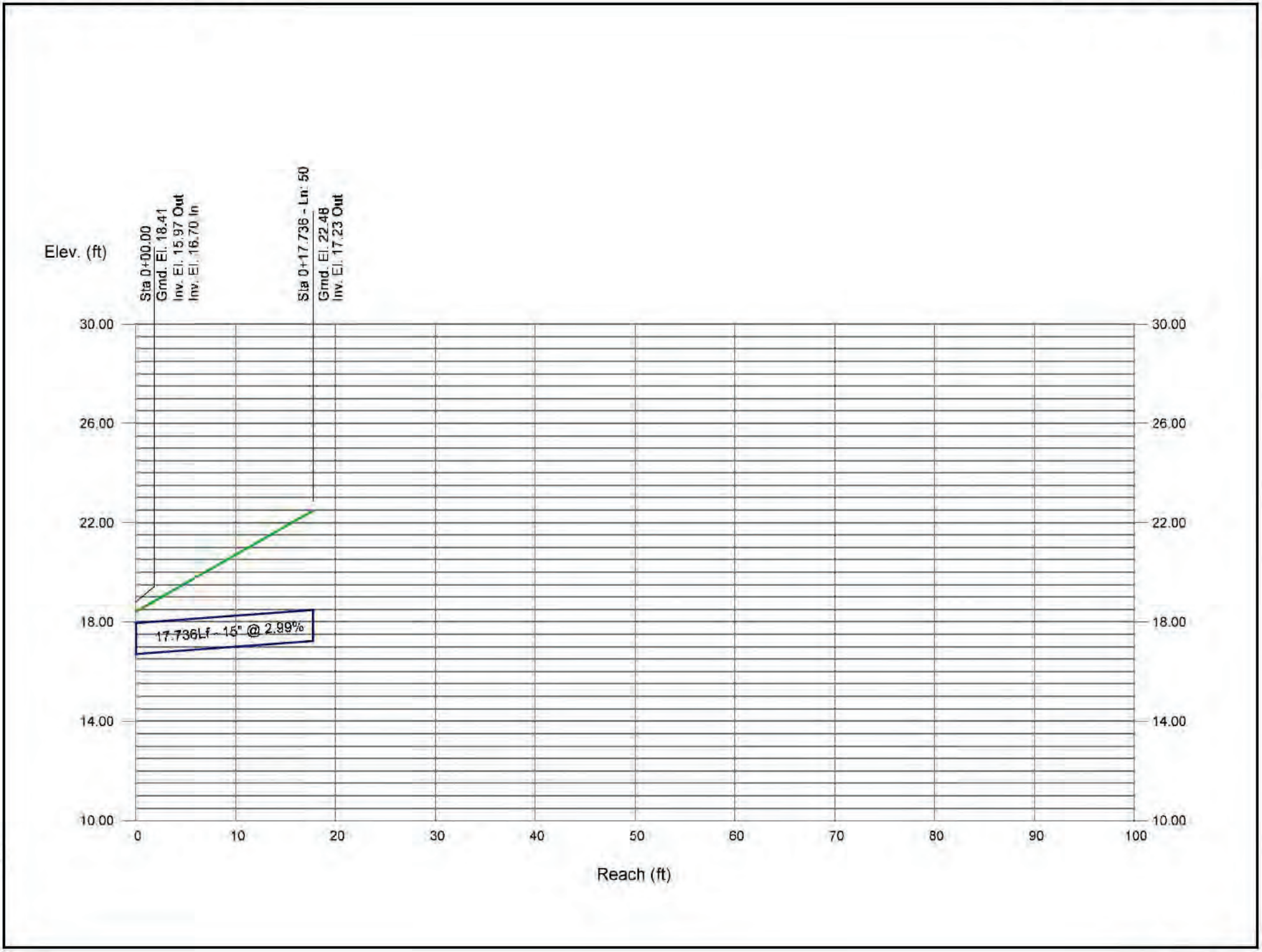
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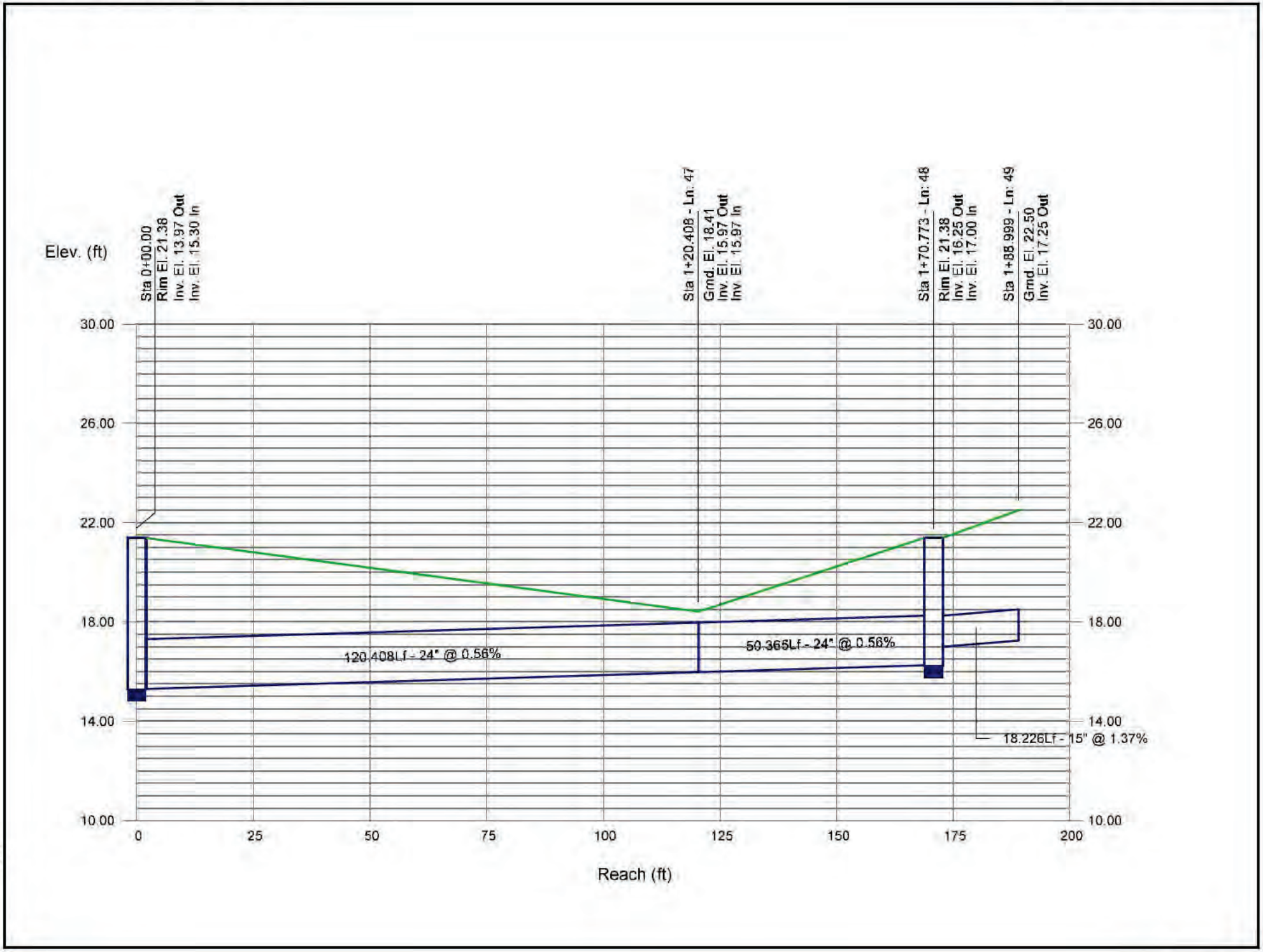
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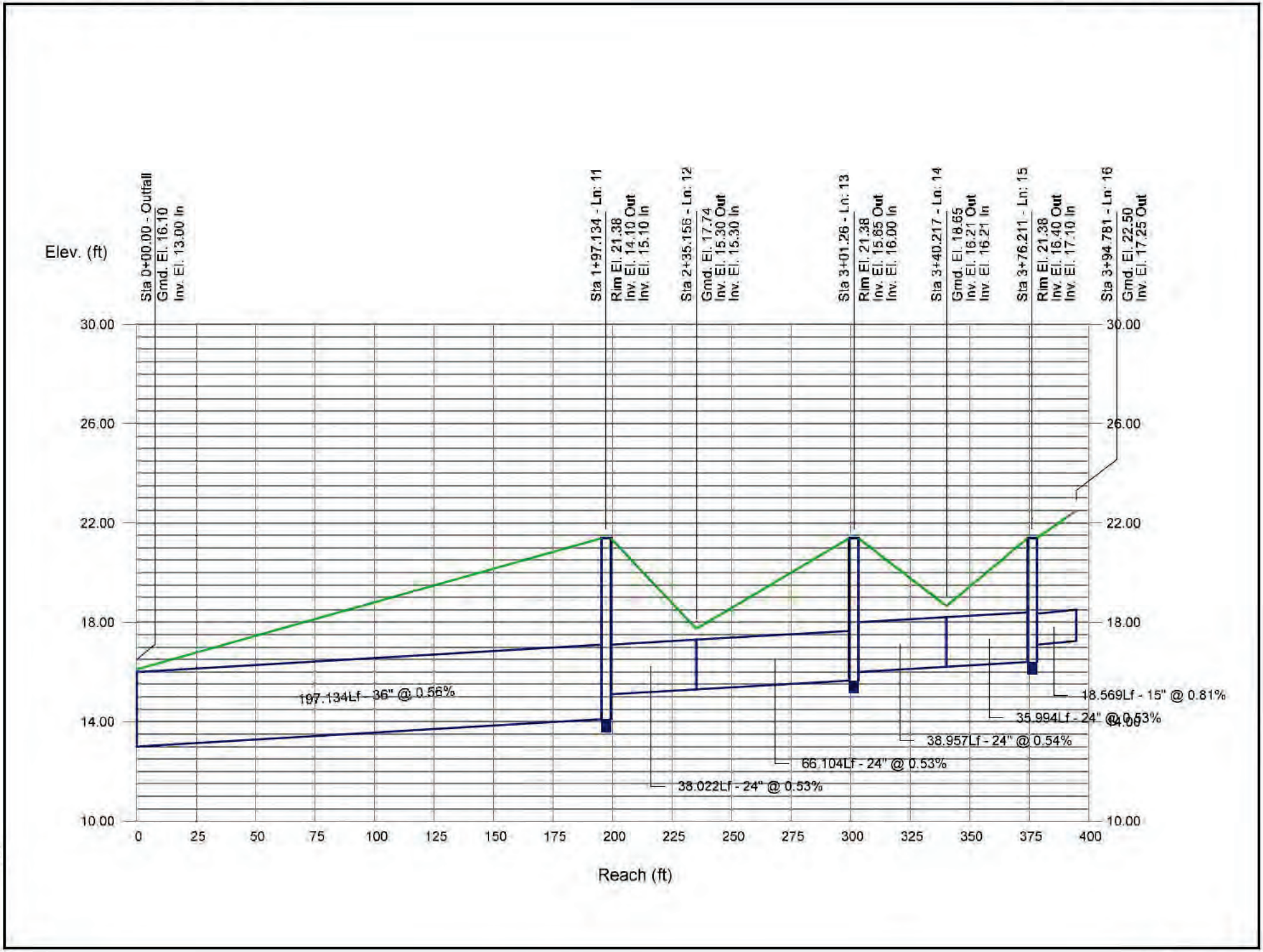
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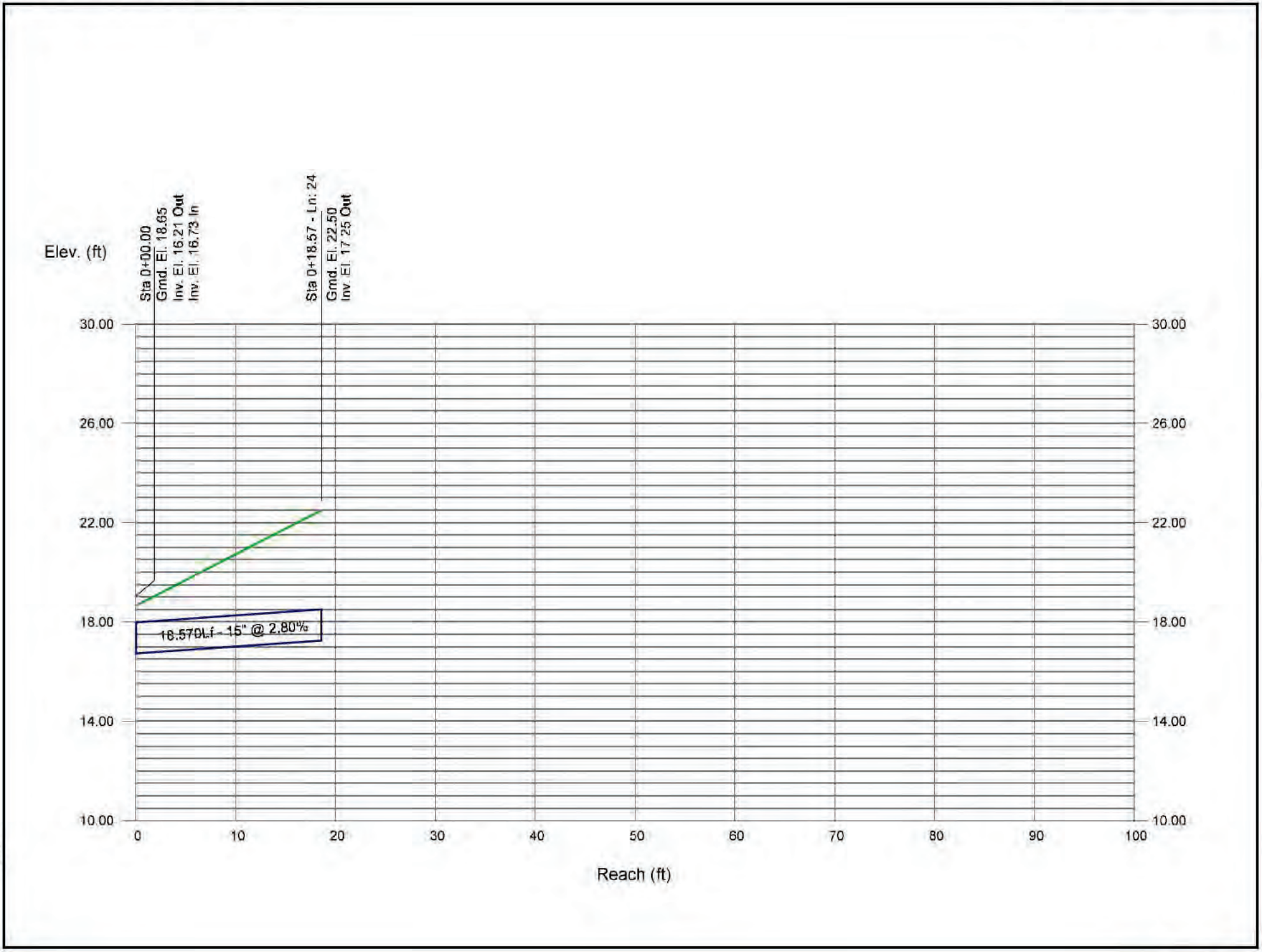
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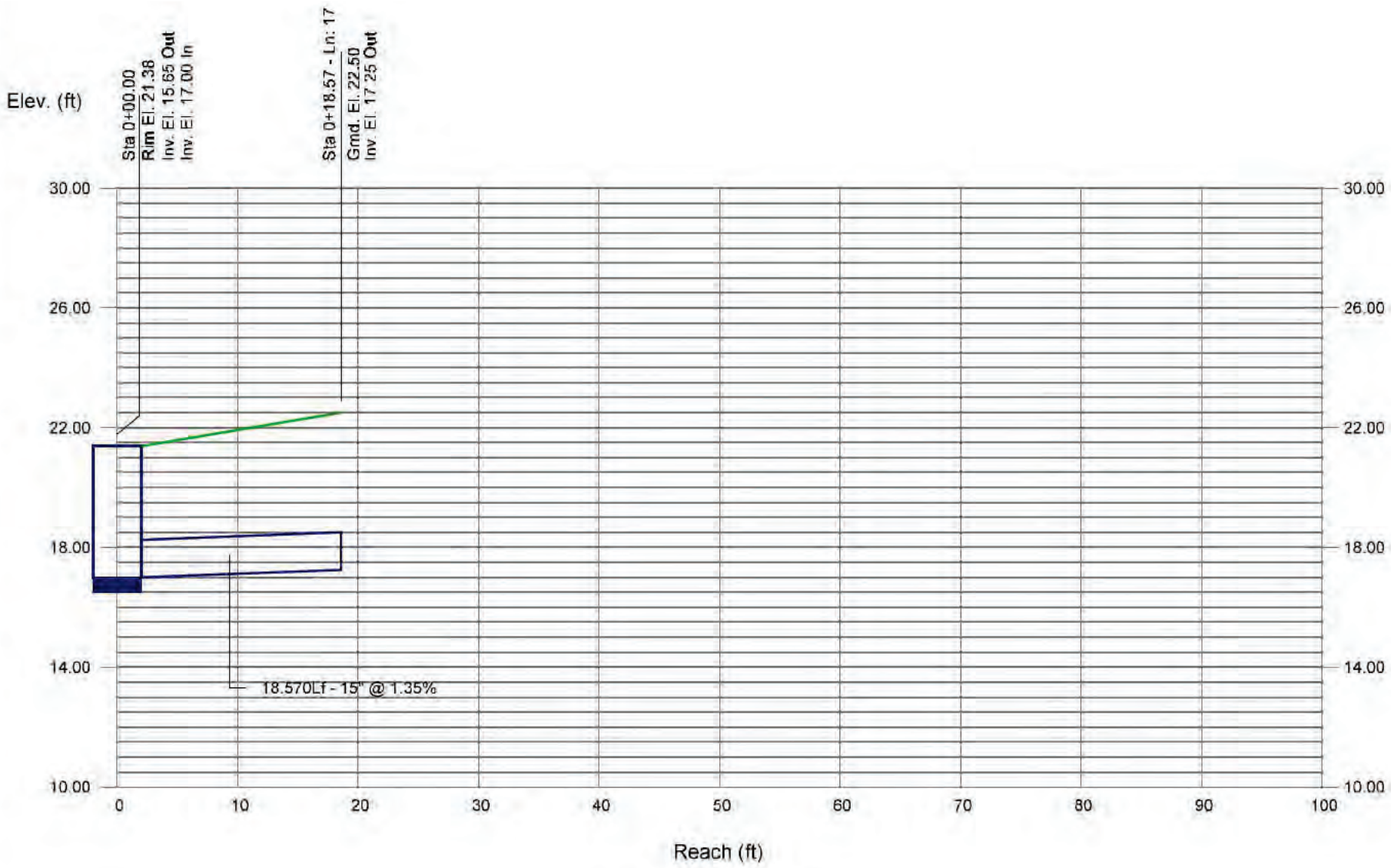
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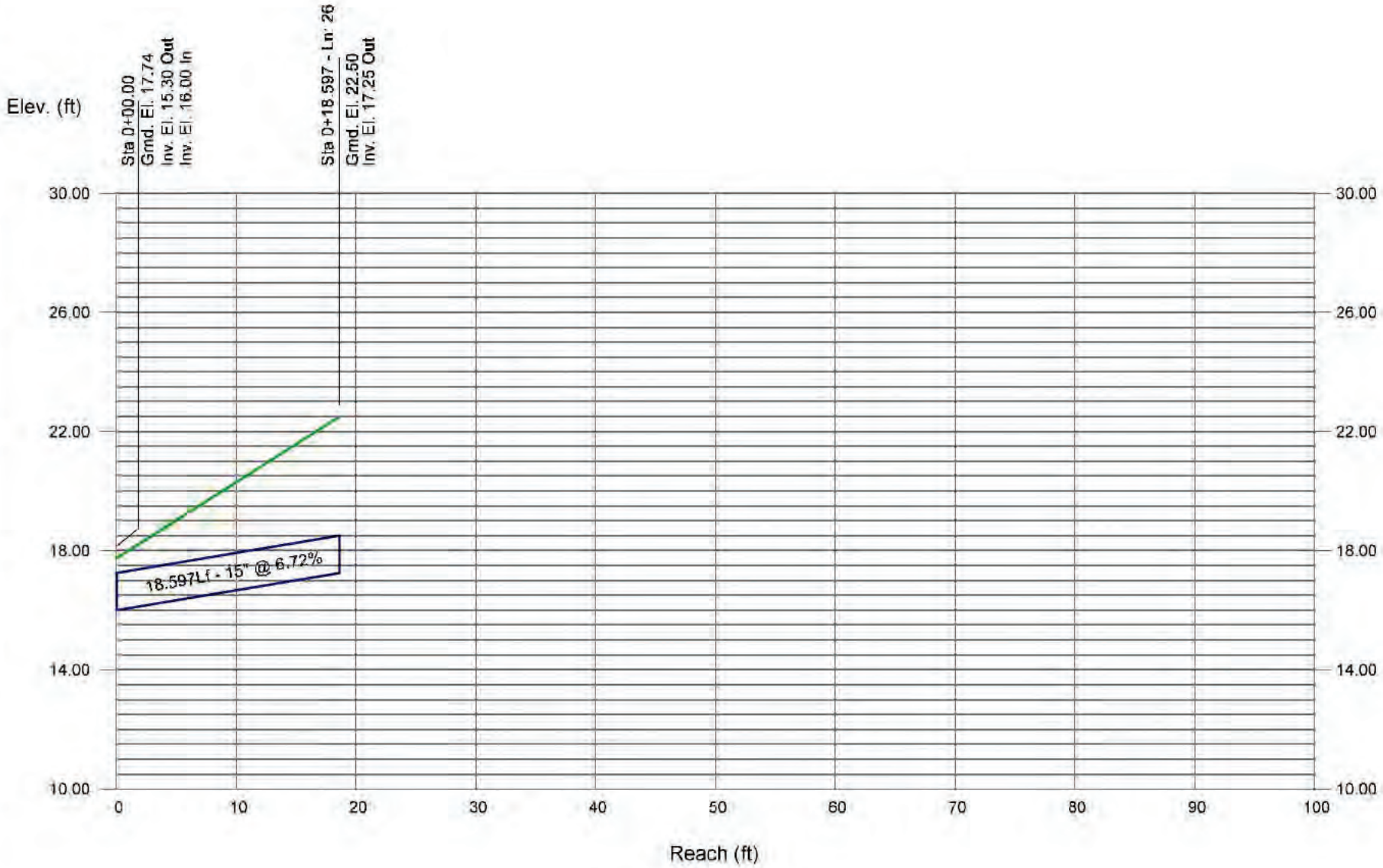
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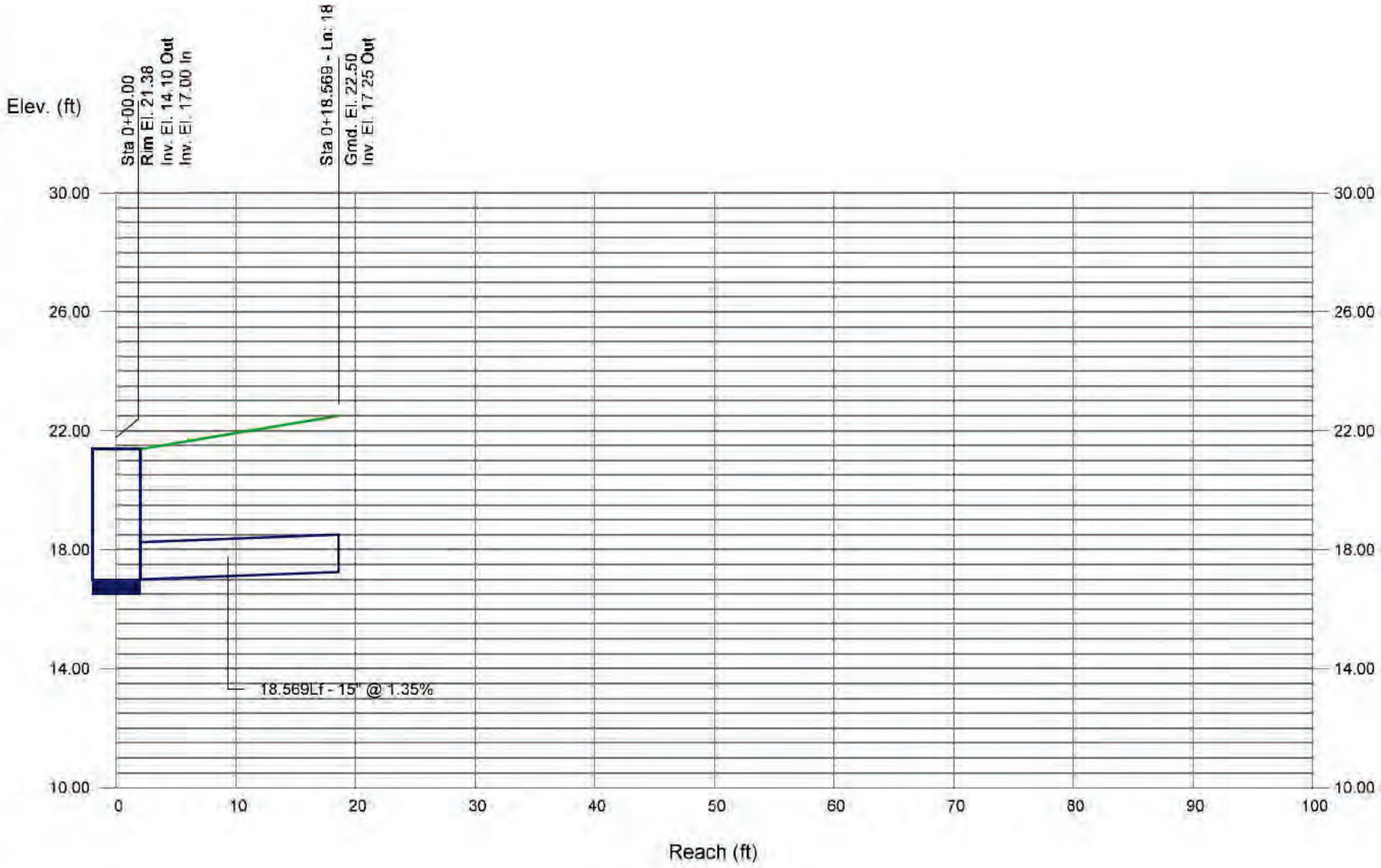
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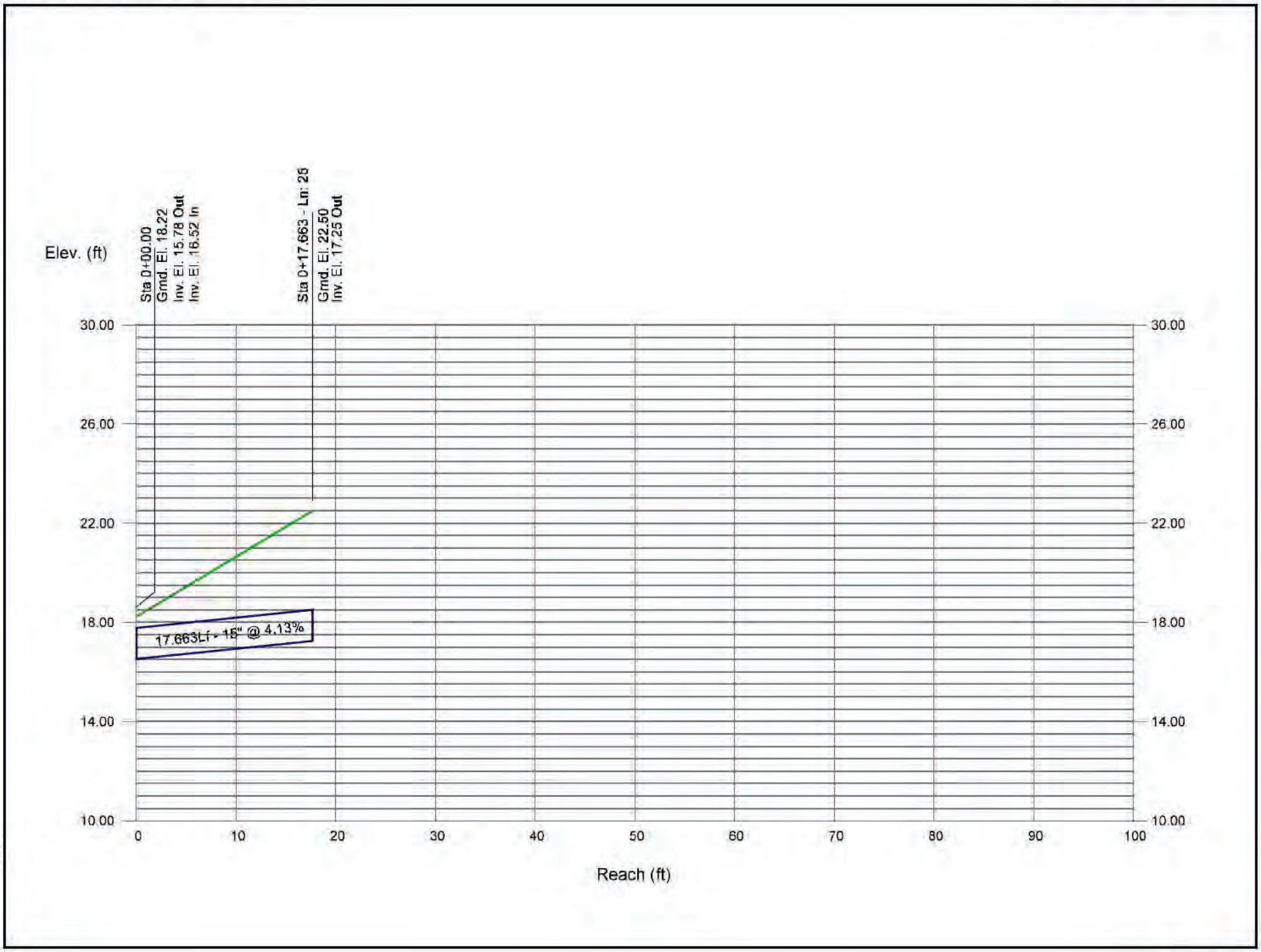
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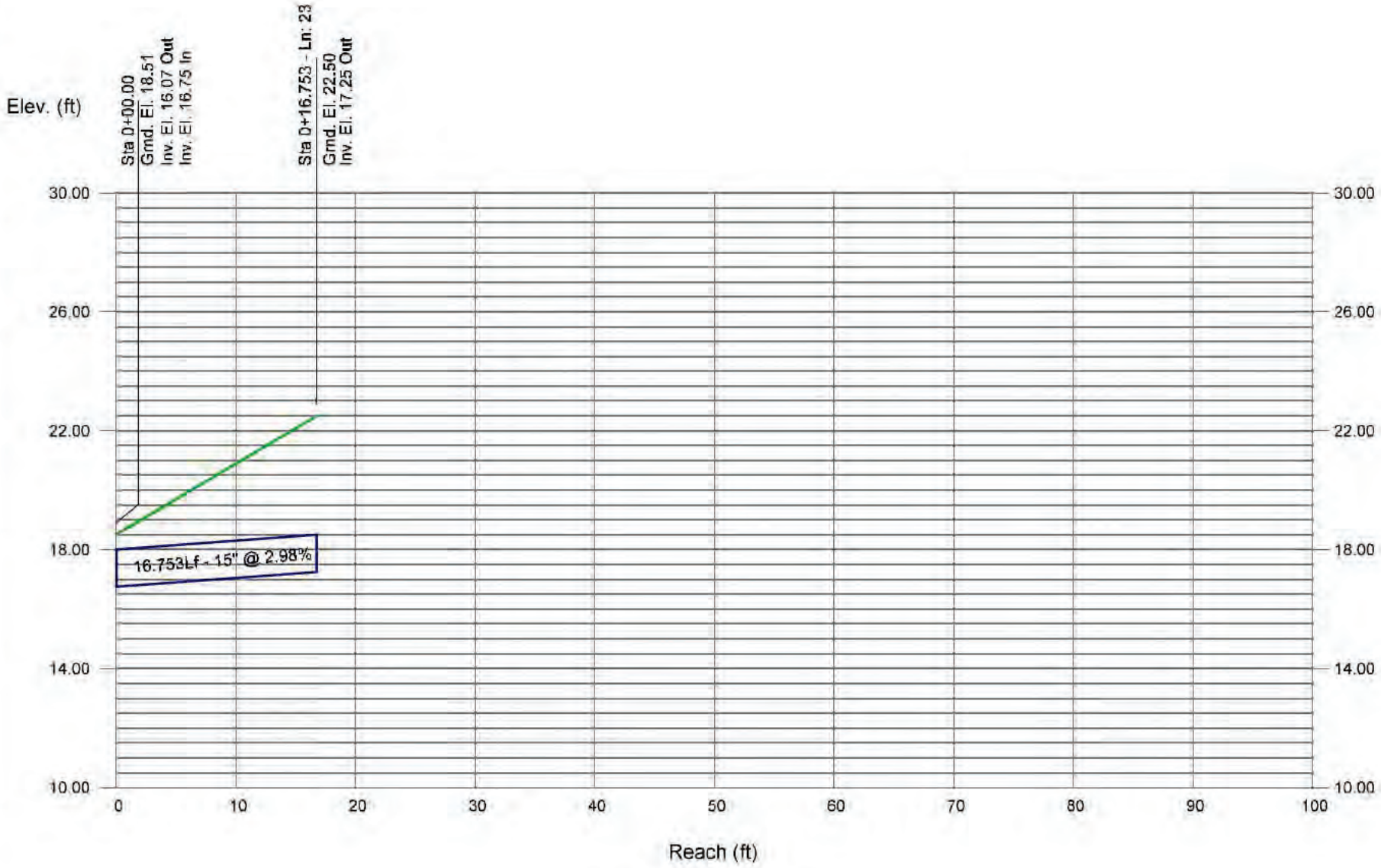
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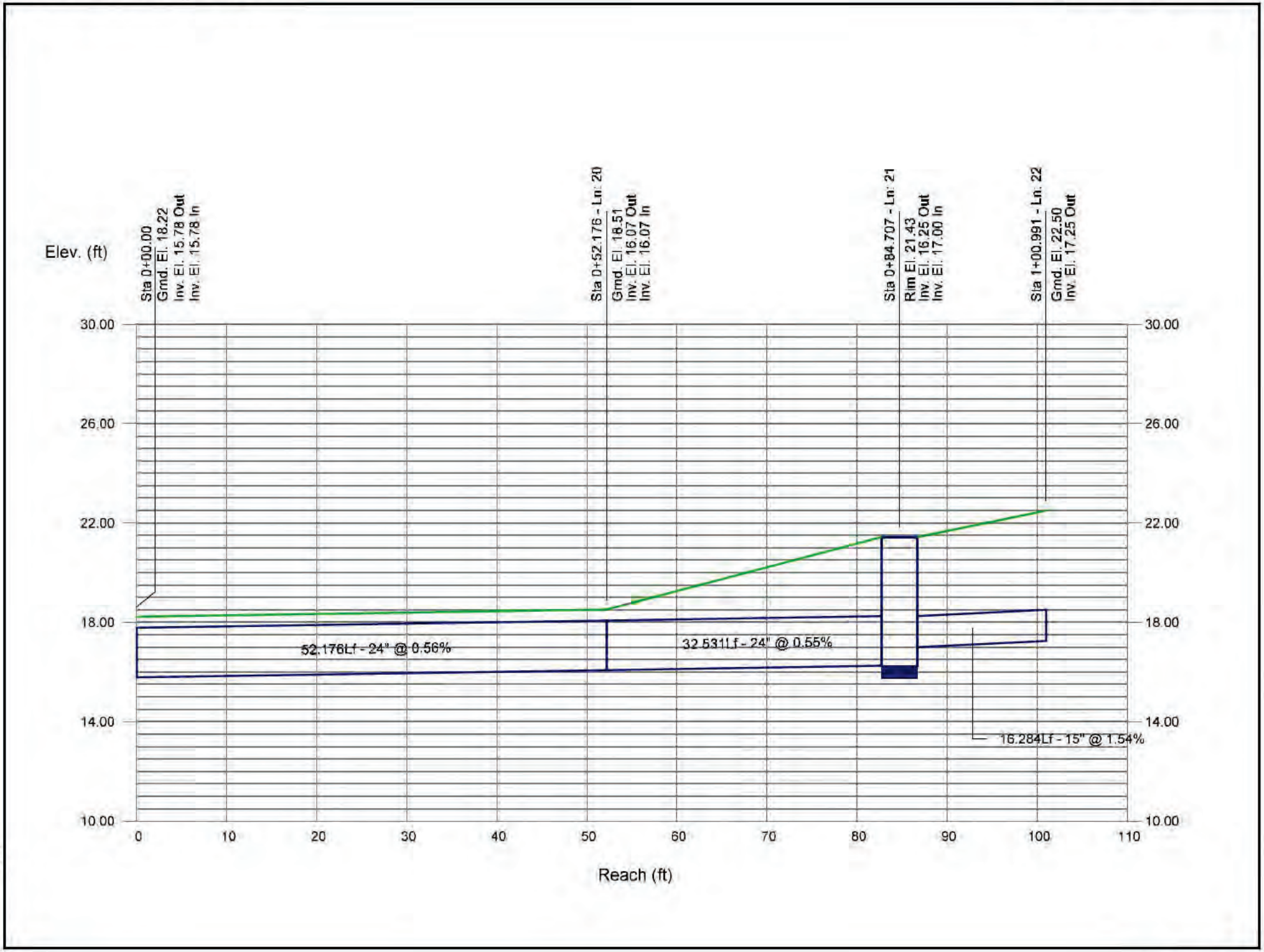
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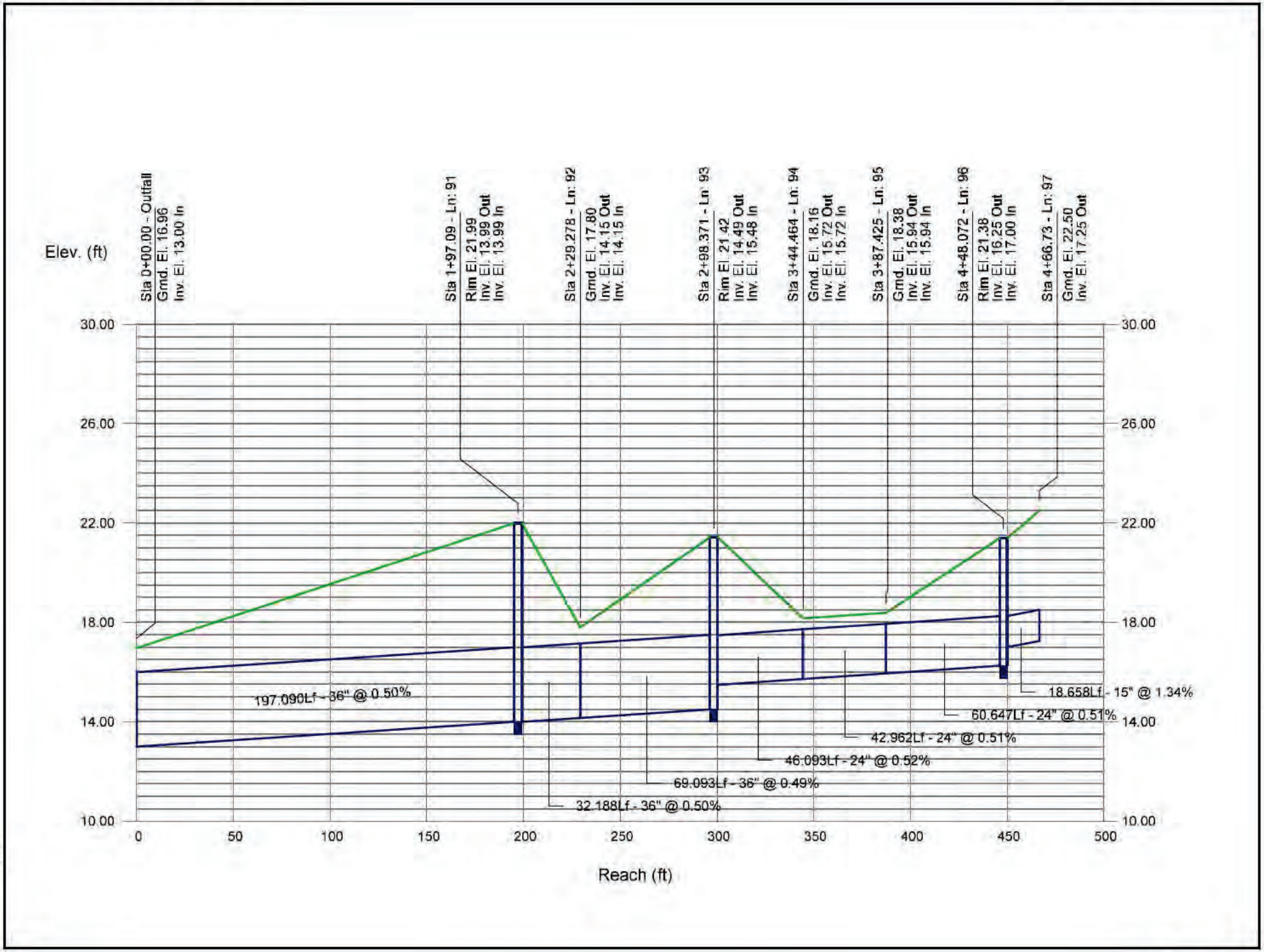
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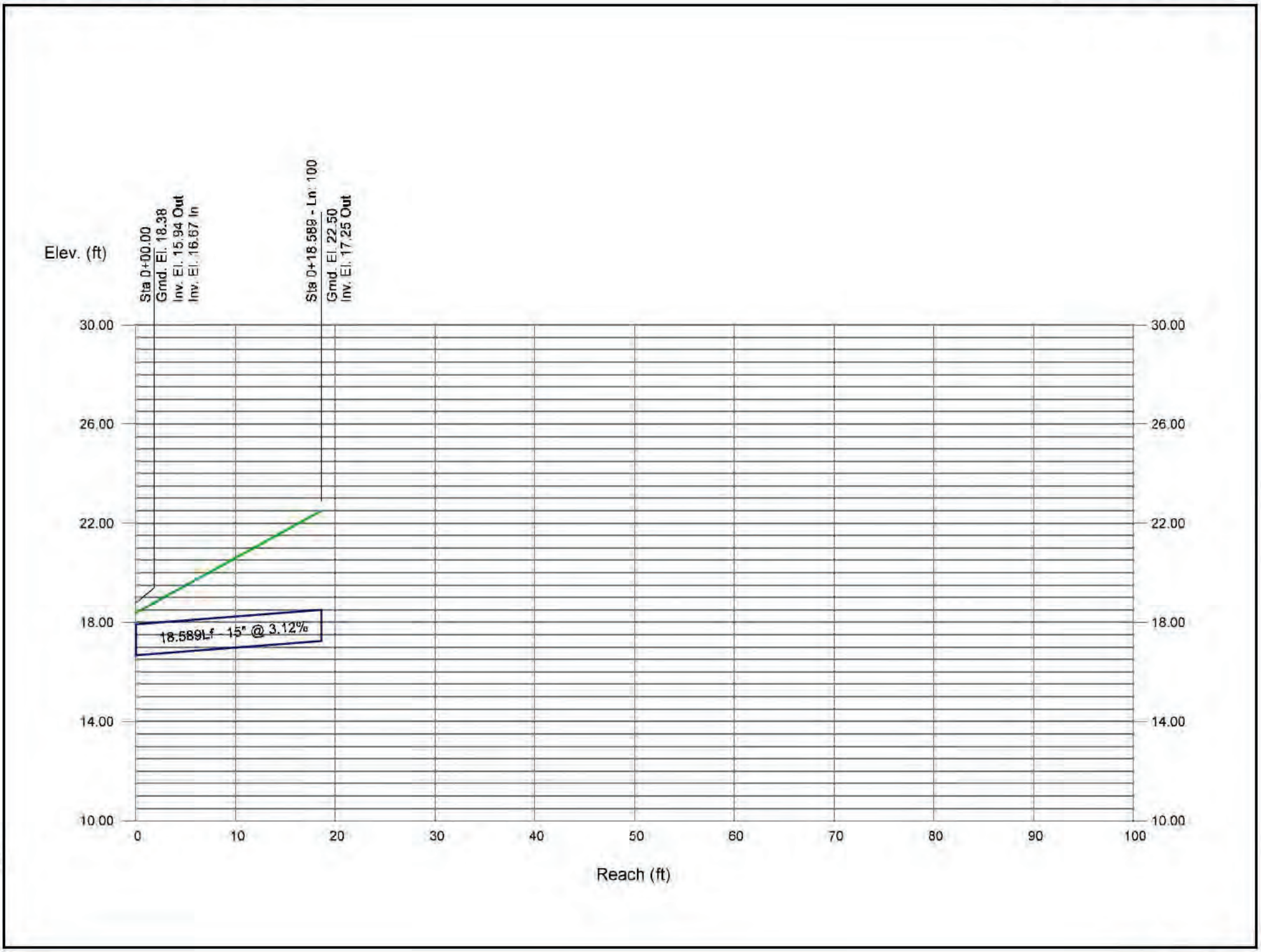
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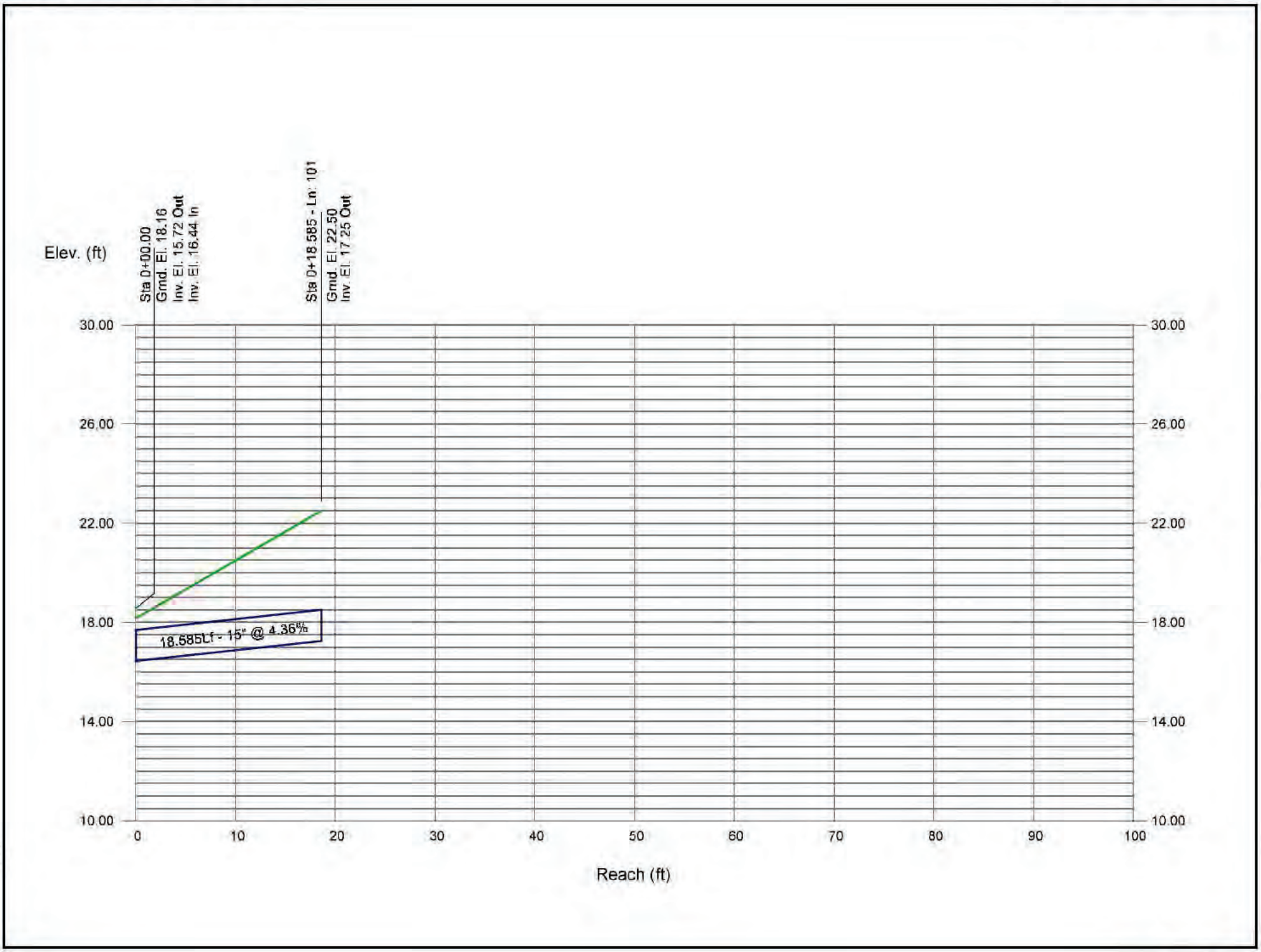
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-880-

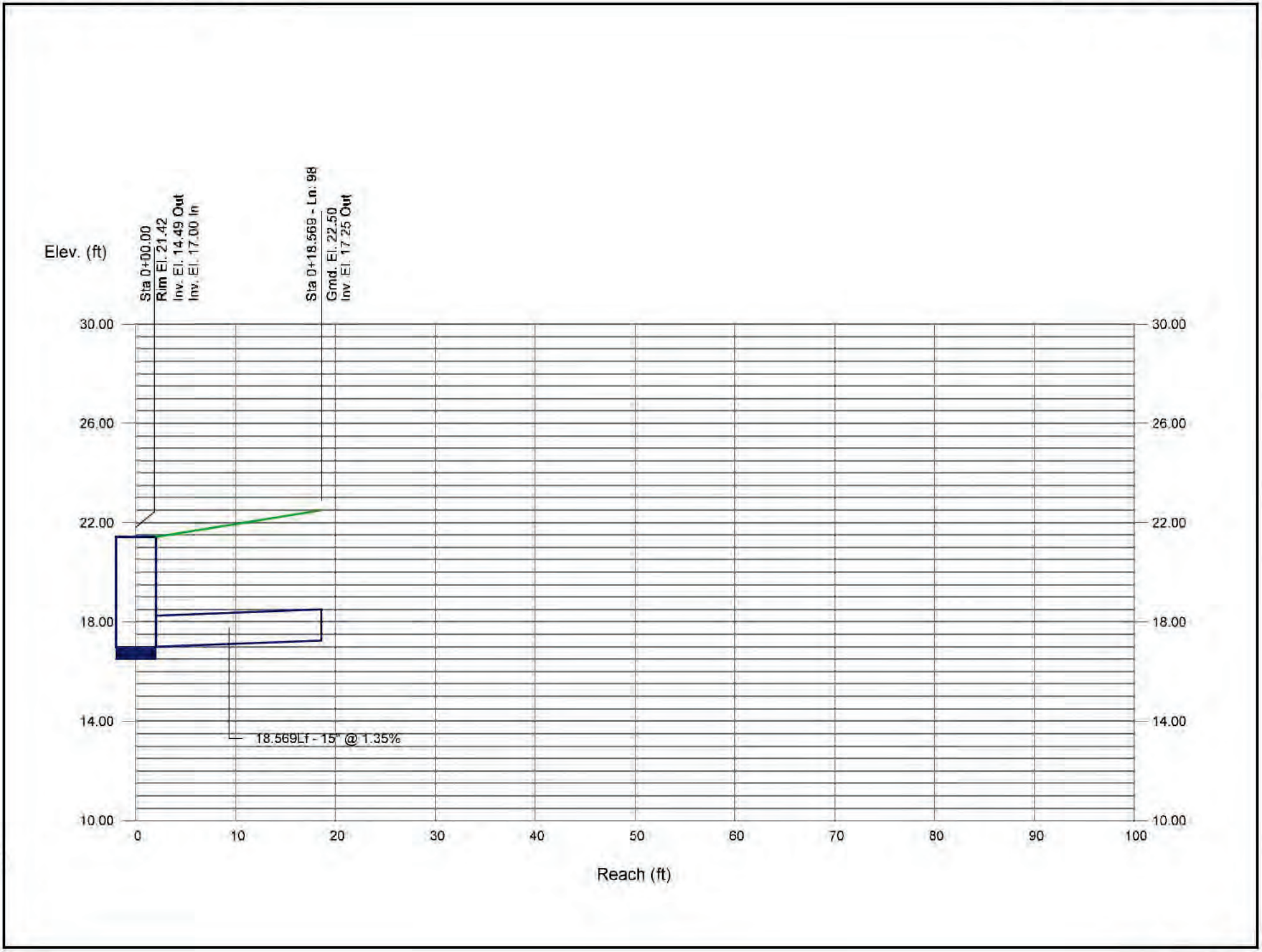
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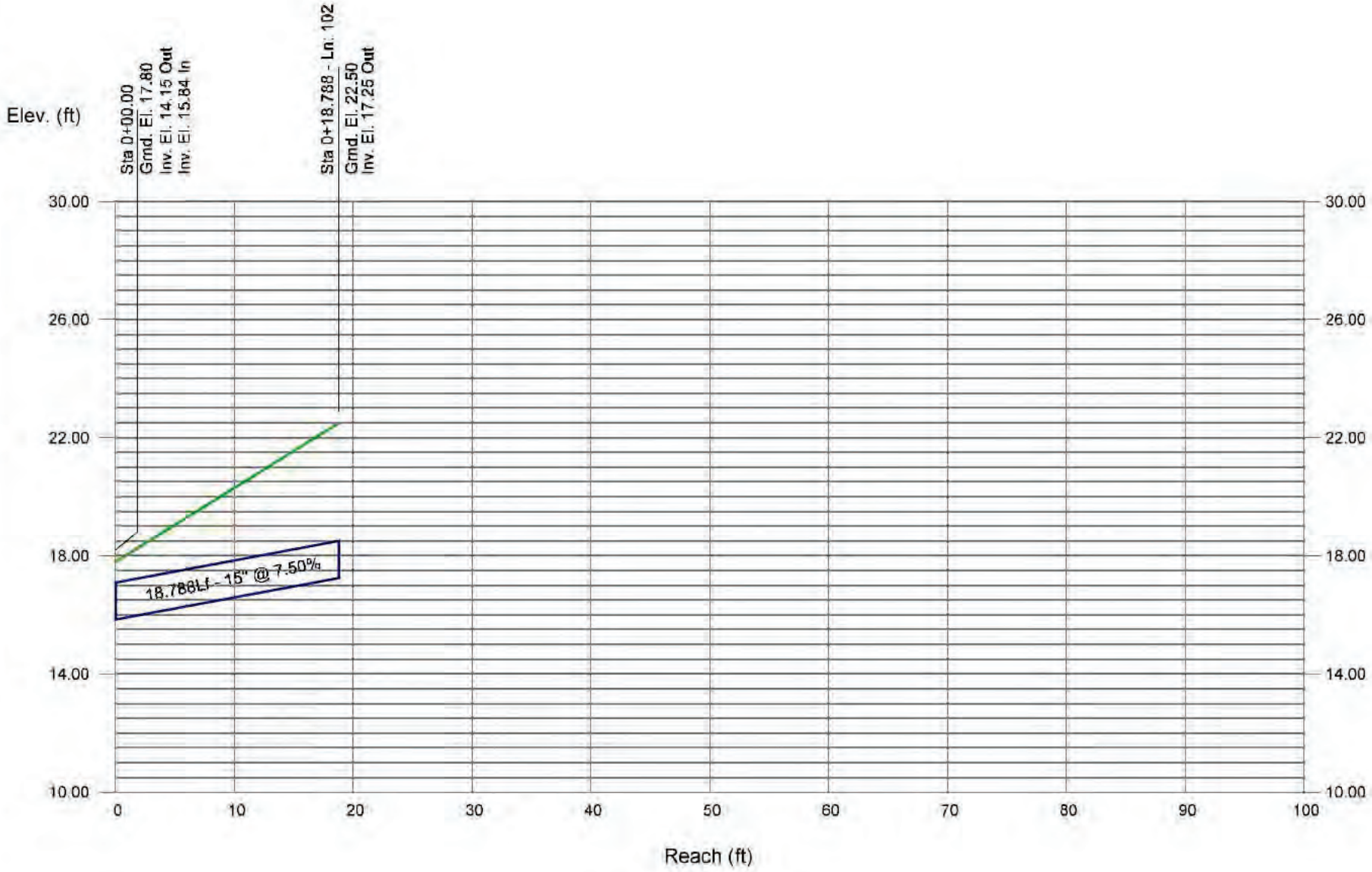
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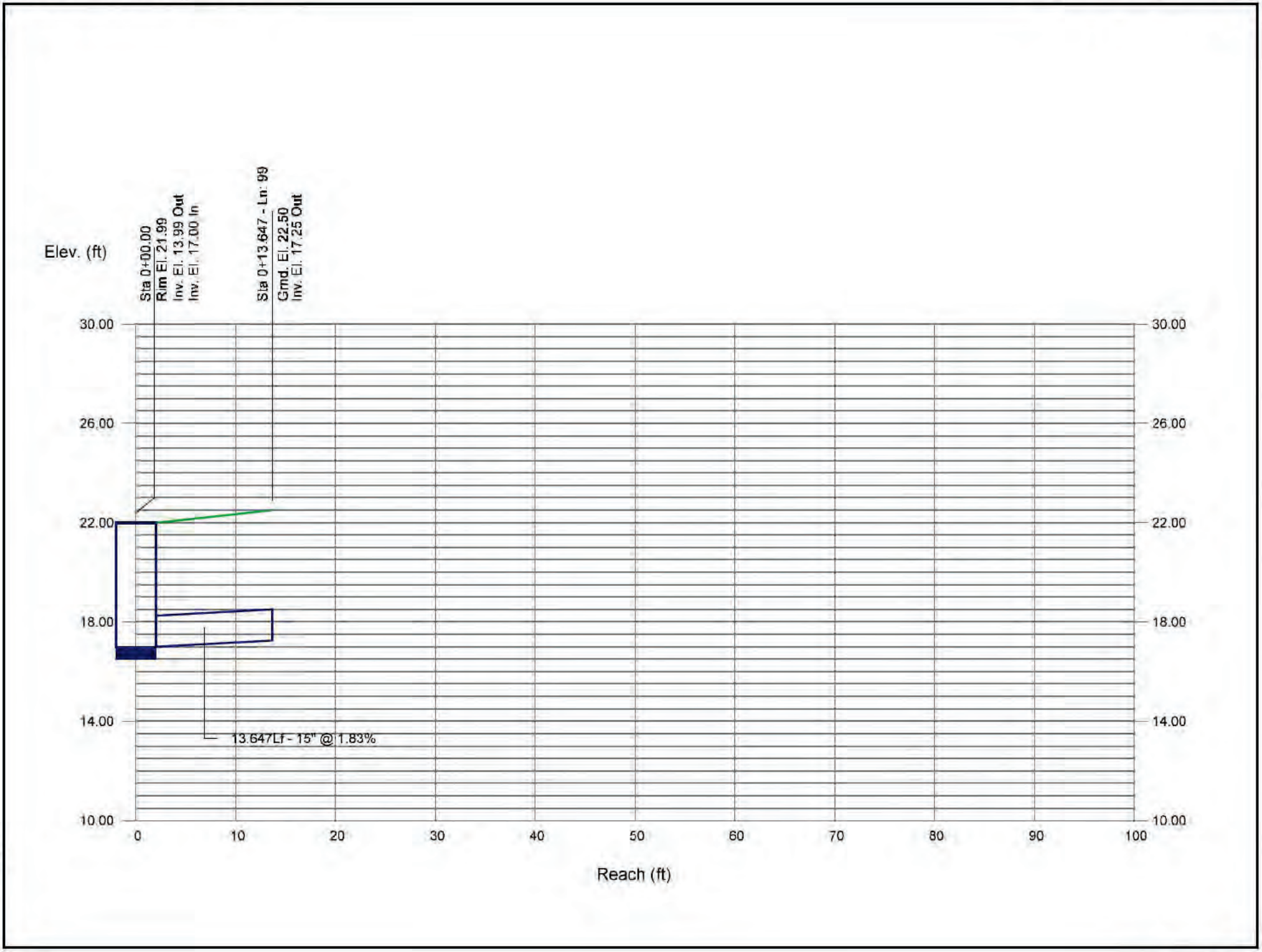
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# Storm Sewer Profile

Proj. file: Building 6 Storm.stm



## OFF-SITE DRAINAGE ANALYSIS: CANAL NO. 2

For the *NorthPoint Phase 2– Buildings 4, 5, and 6* development, eleven (11) proposed stormwater management bio-retention basins are designed with outlet structures that control the outflow of stormwater from the basins for the 1-year through 100-year storm events. Proposed reinforced concrete pipes (RCP) are utilized to convey this outflow to the existing canal located at the south end of the phase 2 project area. This existing canal is known as Canal No. 2 for the drainage scheme for the existing Keystone Trade Center (KTC) site.

The existing canal #2 of the project this phase is draining to is owned and maintained by *NorthPoint Industrial Falls Township, LLC*. Phase 2 makes one connection to existing canal #2 from the basin outlet structure in basin #11F. The connection is located at the southern end of phase #2 improvements. This connection will be achieved by connecting to the canal with proposed twin-48" RCP pipe that outlets from Bio-retention Basin #11F. The canal operates under passive hydraulic conditions (gravity). The canal is in good condition, and no issues should arise when connecting to this conveyance system.

Attached with this report is a drainage and storm sewer capacity analysis for Canal No.2, illustrating that drainage from the post-development sites for Phase 2 – Buildings 4, 5, and 6 can safely convey stormwater through this system and down to the canal. Applying a conservative modeling approach, the starting hydraulic grade line / tailwater condition utilized for analysis was 13.0', which is the regulated base flood elevation of the Delaware River where the canal outfalls to the river, per Fema flood mapping.

The following sheets illustrate the capacity of Canal No. 2 for the flow from the proposed Phase 2 sites (Buildings #4, #5, and #6) and all existing drainage to Canal No. 2 from the KTC site. *Appendix A* also displays drainage area maps corresponding to these calculations. As demonstrated with the following calculations, the existing canal has sufficient capacity to receive and convey the 100-year flow in the post-development condition.

**Canal 2 Analysis**

The proposed Phase 2 development will fill in a portion of the existing Canal 2 that is located north of the existing twin 78" culverts under Middle Drive. The post construction stormwater runoff from the proposed Phase 2 redevelopment will be collected and ultimately conveyed to one (1) discharge point into Canal 2 at Discharge Point #1 (DP 001). The Canal 2 storage volume impacted in Canal No. 2 is being replaced through the Combined Basins freeboard volume.

Using the *Hydraflow Hydrographs™* program and existing topographic information, the storage volume impacted in Canal No.2 as a result of the development is calculated to be 1,369,443 cu.ft. This volume is provided in the Combined Basins above the required storage capacity for the 100-YR storm:

| Row | Stage | Elevation | Contour Area | Incremental Storage | Total Storage |
|---|---|---|---|---|---|
| | (ft) | (ft) | (sqft) | (cuft) | (cuft) |
| 0 | 0.00 | 8.00 | 67,813 | 0.000 | 0.000 |
| 1 | 1.00 | 9.00 | 74,892 | 71,316 | 71,316 |
| 2 | 2.00 | 10.00 | 81,894 | 78,359 | 149,675 |
| 3 | 3.00 | 11.00 | 88,270 | 85,054 | 234,729 |
| 4 | 4.00 | 12.00 | 94,573 | 91,394 | 326,123 |
| 5 | 5.00 | 13.00 | 102,268 | 98,386 | 424,509 |
| 6 | 6.00 | 14.00 | 111,757 | 106,967 | 531,475 |
| 7 | 7.00 | 15.00 | 125,244 | 118,425 | 649,900 |
| 8 | 8.00 | 16.00 | 167,007 | 145,611 | 795,511 |
| 9 | 9.00 | 17.00 | 272,338 | 217,515 | 1,013,026 |
| 10 | 10.00 | 18.00 | 447,802 | 356,417 | 1,369,443 |

The total volume of all the Combined Basins is also calculated below:

**Stage / Storage Table**

| Stage (ft) | Elevation (ft) | Contour area (sqft) | Incr. Storage (cuft) | Total storage (cuft) |
|---|---|---|---|---|
| 0.00 | 13.00 | 710,685 | 0 | 0 |
| 1.00 | 14.00 | 771,758 | 740,938 | 740,938 |
| 2.00 | 15.00 | 832,879 | 802,044 | 1,542,982 |
| 3.00 | 16.00 | 895,080 | 863,706 | 2,406,688 |
| 4.00 | 17.00 | 958,077 | 926,308 | 3,332,996 |
| 5.00 | 18.00 | 1,022,280 | 989,906 | 4,322,902 |

Through the *Hydraflow Hydrographs™* program the calculated maximum water surface elevation for the 100-YR storm will be at elevation 16.00. The storage volume from elevation 16.00 up to elevation 18.0 is calculated to be 1,916,213 cu.ft.:

**Stage / Storage Table**

| Stage (ft) | Elevation (ft) | Contour area (sqft) | Incr. Storage (cuft) | Total storage (cuft) |
|---|---|---|---|---|
| 0.00 | 16.00 | 895,080 | 0 | 0 |
| 1.00 | 17.00 | 958,077 | 926,307 | 926,307 |
| 2.00 | 18.00 | 1,022,280 | 989,906 | 1,916,213 |

Interpolating the storage volumes from elevations 17 and 18, the Combined Basin's water surface elevation for the 100-YR storm and the additional required storage volume from Canal No. 2 is determined to be at elevation 17.37 It is therefore concluded that there is sufficient additional storage volume provided in the combined basins to account for the volume impacted in Canal No. 2 as a result of the Phase 2 development.

# Canal No. 2 - Drainage Analysis

| | | | |
|---|---|---|---|
| **Project** | NorthPoint - Phase 2 | By: | DPB |
| **Location:** | Falls Township, Bucks County, PA | Date: | 9/9/2022 |
| | | Chk'd: | |
| | | Revised: | |

**Impervious C = 0.99**

**Gravel/Compacted areas C = 0.60**

**EXISTING CONDITIONS-DRAINAGE TO CANAL NO. 2**

| Sub-Drainage Area | Total Drainage Area (Ac.) | Existing Impervious (Ac.) | 80% Existing Impervious (Ac.) | Remaining Meadow Area (Ac.) | Composite C |
|---|---|---|---|---|---|
| | | | | | |
| PRE-CANAL 2-1 (WEST) | 9.60 | 3.04 | 0.00 | 6.56 | 0.72 |
| PRE-CANAL 2-2 (WEST) | 5.26 | 2.80 | 0.00 | 2.46 | 0.81 |
| PRE-CANAL 2-3 (WEST) | 24.26 | 5.70 | 0.00 | 18.56 | 0.69 |
| PRE-CANAL 2-4 (WEST) | 55.27 | 24.25 | 0.00 | 31.02 | 0.77 |
| PRE-CANAL 2-5 (WEST) | 13.63 | 12.80 | 0.00 | 0.83 | 0.97 |
| PRE-CANAL 2-6 (WEST) | 92.93 | 59.56 | 0.00 | 33.37 | 0.85 |
| | | | | | |
| PRE-CANAL 2-1 (EAST) | 1.02 | 0.00 | 0.00 | 1.02 | 0.60 |
| PRE-CANAL 2-2 (EAST) | 1.98 | 0.04 | 0.00 | 1.94 | 0.61 |
| PRE-CANAL 2-3 (EAST) | 55.95 | 44.28 | 0.00 | 11.67 | 0.91 |
| PRE-CANAL 2-4 (EAST) | 59.81 | 29.36 | 0.00 | 30.45 | 0.79 |
| PRE-CANAL 2-5 (EAST) | 14.52 | 10.69 | 0.00 | 3.83 | 0.89 |
| PRE-CANAL 2-6 (EAST) | 38.77 | 23.11 | 0.00 | 15.66 | 0.83 |
| | | | | | |
| OFF-FULLER | 7.95 | 5.48 | 0.00 | 2.47 | 0.87 |
| OFF-HIOSSEN | 6.86 | 6.82 | 0.00 | 0.04 | 0.99 |
| OFF-PETRUCCI | 18.12 | 1.48 | 0.00 | 16.64 | 0.63 |
| OFF-FLECK | 8.65 | 4.27 | 0.00 | 4.38 | 0.79 |
| OFF-NORTHERN | 7.81 | 2.77 | 0.00 | 5.04 | 0.74 |
| | | | | | |
| Total Area | **422.39** | **236.45** | **0.00** | **185.94** | |

TOTAL AREA - CANAL NO.1 **422.39** **AC.**

# TR55 Tc Worksheet



## Hyd. No. 10

Pre Canal 2-3 (East)

| Description | A | | B | | C | | Totals |
|---|---|---|---|---|---|---|---|
| **Sheet Flow** | | | | | | | |
| Manning's n-value | = 0.011 | | 0.011 | | 0.011 | | |
| Flow length (ft) | = 150.0 | | 0.0 | | 0.0 | | |
| Two-year 24-hr precip. (in) | = 3.34 | | 0.00 | | 0.00 | | |
| Land slope (%) | = 0.50 | | 0.00 | | 0.00 | | |
| **Travel Time (min)** | **= 2.86** | **+** | **0.00** | **+** | **0.00** | **=** | **2.86** |
| **Shallow Concentrated Flow** | | | | | | | |
| Flow length (ft) | = 903.00 | | 85.00 | | 0.00 | | |
| Watercourse slope (%) | = 0.50 | | 11.78 | | 0.00 | | |
| Surface description | = Paved | | Unpaved | | Paved | | |
| Average velocity (ft/s) | =1.44 | | 5.54 | | 0.00 | | |
| **Travel Time (min)** | **= 10.47** | **+** | **0.26** | **+** | **0.00** | **=** | **10.73** |
| **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 ..... 13.58 min**

# TR55 Tc Worksheet



## Hyd. No. 3

Pre Canal 2-3 (West)

| Description | A | | B | | C | | Totals |
|---|---|---|---|---|---|---|---|
| **Sheet Flow** | | | | | | | |
| Manning's n-value | = 0.050 | | 0.011 | | 0.011 | | |
| Flow length (ft) | = 150.0 | | 0.0 | | 0.0 | | |
| Two-year 24-hr precip. (in) | = 3.34 | | 0.00 | | 0.00 | | |
| Land slope (%) | = 0.50 | | 0.00 | | 0.00 | | |
| **Travel Time (min)** | **= 9.59** | **+** | **0.00** | **+** | **0.00** | **=** | **9.59** |
| **Shallow Concentrated Flow** | | | | | | | |
| Flow length (ft) | = 1090.00 | | 0.00 | | 0.00 | | |
| Watercourse slope (%) | = 0.50 | | 0.00 | | 0.00 | | |
| Surface description | = Unpaved | | Paved | | Paved | | |
| Average velocity (ft/s) | =1.14 | | 0.00 | | 0.00 | | |
| **Travel Time (min)** | **= 15.92** | **+** | **0.00** | **+** | **0.00** | **=** | **15.92** |
| **Channel Flow** | | | | | | | |
| X sectional flow area (sqft) | = 3.14 | | 0.00 | | 0.00 | | |
| Wetted perimeter (ft) | = 6.28 | | 0.00 | | 0.00 | | |
| Channel slope (%) | = 0.50 | | 0.00 | | 0.00 | | |
| Manning's n-value | = 0.023 | | 0.015 | | 0.015 | | |
| Velocity (ft/s) | =2.88 | | | | | | |
| | | | 0.00 | | | | |
| | | | | | 0.00 | | |
| Flow length (ft) | ({0})153.0 | | 0.0 | | 0.0 | | |
| **Travel Time (min)** | **= 0.89** | **+** | **0.00** | **+** | **0.00** | **=** | **0.89** |

**Total Travel Time, Tc ..... 26.40 min**

# TR55 Tc Worksheet



## Hyd. No. 11

Pre Canal 2-4 (East)

| Description | A | | B | | C | | Totals |
|---|---|---|---|---|---|---|---|
| **Sheet Flow** | | | | | | | |
| Manning's n-value | = 0.240 | | 0.011 | | 0.011 | | |
| Flow length (ft) | = 150.0 | | 0.0 | | 0.0 | | |
| Two-year 24-hr precip. (in) | = 3.34 | | 0.00 | | 0.00 | | |
| Land slope (%) | = 0.50 | | 0.00 | | 0.00 | | |
| **Travel Time (min)** | **= 33.64** | **+** | **0.00** | **+** | **0.00** | **=** | **33.64** |
| **Shallow Concentrated Flow** | | | | | | | |
| Flow length (ft) | = 70.00 | | 312.00 | | 726.00 | | |
| Watercourse slope (%) | = 0.50 | | 0.50 | | 1.79 | | |
| Surface description | = Unpaved | | Paved | | Unpaved | | |
| Average velocity (ft/s) | =1.14 | | 1.44 | | 2.16 | | |
| **Travel Time (min)** | **= 1.02** | **+** | **3.62** | **+** | **5.61** | **=** | **10.25** |
| **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 ..... 43.88 min**

# TR55 Tc Worksheet



## Hyd. No. 4

Pre Canal 2-4 (West)

| Description | A | | B | | C | | Totals |
|---|---|---|---|---|---|---|---|
| **Sheet Flow** | | | | | | | |
| Manning's n-value | = 0.240 | | 0.011 | | 0.011 | | |
| Flow length (ft) | = 150.0 | | 0.0 | | 0.0 | | |
| Two-year 24-hr precip. (in) | = 3.34 | | 0.00 | | 0.00 | | |
| Land slope (%) | = 1.00 | | 0.00 | | 0.00 | | |
| **Travel Time (min)** | **= 25.49** | **+** | **0.00** | **+** | **0.00** | **=** | **25.49** |
| **Shallow Concentrated Flow** | | | | | | | |
| Flow length (ft) | = 172.00 | | 0.00 | | 0.00 | | |
| Watercourse slope (%) | = 0.50 | | 0.00 | | 0.00 | | |
| Surface description | = Unpaved | | Paved | | Paved | | |
| Average velocity (ft/s) | =1.14 | | 0.00 | | 0.00 | | |
| **Travel Time (min)** | **= 2.51** | **+** | **0.00** | **+** | **0.00** | **=** | **2.51** |
| **Channel Flow** | | | | | | | |
| X sectional flow area (sqft) | = 0.79 | | 72.00 | | 0.79 | | |
| Wetted perimeter (ft) | = 3.14 | | 26.76 | | 3.14 | | |
| Channel slope (%) | = 0.50 | | 0.50 | | 0.50 | | |
| Manning's n-value | = 0.023 | | 0.026 | | 0.023 | | |
| Velocity (ft/s) | =1.81 | | | | | | |
| | | | 7.86 | | | | |
| | | | | | 1.81 | | |
| Flow length (ft) | ({0})271.0 | | 356.0 | | 207.0 | | |
| **Travel Time (min)** | **= 2.50** | **+** | **0.75** | **+** | **1.91** | **=** | **5.16** |

**Total Travel Time, Tc ..... 33.16 min**

# TR55 Tc Worksheet



## Hyd. No. 12

Pre Canal 2-5 (East)

| Description | A | | B | | C | | Totals |
|---|---|---|---|---|---|---|---|
| **Sheet Flow** | | | | | | | |
| Manning's n-value | = 0.240 | | 0.011 | | 0.011 | | |
| Flow length (ft) | = 150.0 | | 0.0 | | 0.0 | | |
| Two-year 24-hr precip. (in) | = 3.34 | | 0.00 | | 0.00 | | |
| Land slope (%) | = 0.50 | | 0.00 | | 0.00 | | |
| **Travel Time (min)** | **= 33.64** | **+** | **0.00** | **+** | **0.00** | **=** | **33.64** |
| **Shallow Concentrated Flow** | | | | | | | |
| Flow length (ft) | = 192.00 | | 568.00 | | 159.00 | | |
| Watercourse slope (%) | = 0.53 | | 0.50 | | 6.37 | | |
| Surface description | = Unpaved | | Paved | | Unpaved | | |
| Average velocity (ft/s) | =1.17 | | 1.44 | | 4.07 | | |
| **Travel Time (min)** | **= 2.72** | **+** | **6.59** | **+** | **0.65** | **=** | **9.96** |
| **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 ..... 43.60 min**

# TR55 Tc Worksheet



## Hyd. No. 5

Pre Canal 2-5 (West)

| Description | A | | B | | C | | Totals |
|---|---|---|---|---|---|---|---|
| **Sheet Flow** | | | | | | | |
| Manning's n-value | = 0.050 | | 0.011 | | 0.011 | | |
| Flow length (ft) | = 150.0 | | 0.0 | | 0.0 | | |
| Two-year 24-hr precip. (in) | = 3.34 | | 0.00 | | 0.00 | | |
| Land slope (%) | = 0.50 | | 0.00 | | 0.00 | | |
| **Travel Time (min)** | **= 9.59** | **+** | **0.00** | **+** | **0.00** | **=** | **9.59** |
| **Shallow Concentrated Flow** | | | | | | | |
| Flow length (ft) | = 650.00 | | 50.00 | | 0.00 | | |
| Watercourse slope (%) | = 0.50 | | 24.00 | | 0.00 | | |
| Surface description | = Paved | | Unpaved | | Paved | | |
| Average velocity (ft/s) | =1.44 | | 7.90 | | 0.00 | | |
| **Travel Time (min)** | **= 7.54** | **+** | **0.11** | **+** | **0.00** | **=** | **7.64** |
| **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 ..... 17.23 min**

# TR55 Tc Worksheet



## Hyd. No. 13

Pre Canal 2-6 (East)

| Description | A | | B | | C | | Totals |
|---|---|---|---|---|---|---|---|
| **Sheet Flow** | | | | | | | |
| Manning's n-value | = 0.240 | | 0.011 | | 0.011 | | |
| Flow length (ft) | = 150.0 | | 0.0 | | 0.0 | | |
| Two-year 24-hr precip. (in) | = 3.34 | | 0.00 | | 0.00 | | |
| Land slope (%) | = 0.50 | | 0.00 | | 0.00 | | |
| **Travel Time (min)** | **= 33.64** | **+** | **0.00** | **+** | **0.00** | **=** | **33.64** |
| **Shallow Concentrated Flow** | | | | | | | |
| Flow length (ft) | = 770.00 | | 175.00 | | 0.00 | | |
| Watercourse slope (%) | = 0.50 | | 4.07 | | 0.00 | | |
| Surface description | = Paved | | Unpaved | | Paved | | |
| Average velocity (ft/s) | =1.44 | | 3.26 | | 0.00 | | |
| **Travel Time (min)** | **= 8.93** | **+** | **0.90** | **+** | **0.00** | **=** | **9.82** |
| **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 ..... 43.46 min**

# TR55 Tc Worksheet



## Hyd. No. 6

Pre Canal 2-6 (West)

| Description | A | | B | | C | | Totals |
|---|---|---|---|---|---|---|---|
| **Sheet Flow** | | | | | | | |
| Manning's n-value | = 0.240 | | 0.011 | | 0.011 | | |
| Flow length (ft) | = 150.0 | | 0.0 | | 0.0 | | |
| Two-year 24-hr precip. (in) | = 3.34 | | 0.00 | | 0.00 | | |
| Land slope (%) | = 0.68 | | 0.00 | | 0.00 | | |
| **Travel Time (min)** | **= 29.75** | **+** | **0.00** | **+** | **0.00** | **=** | **29.75** |
| **Shallow Concentrated Flow** | | | | | | | |
| Flow length (ft) | = 861.00 | | 0.00 | | 0.00 | | |
| Watercourse slope (%) | = 0.50 | | 0.00 | | 0.00 | | |
| Surface description | = Unpaved | | Paved | | Paved | | |
| Average velocity (ft/s) | =1.14 | | 0.00 | | 0.00 | | |
| **Travel Time (min)** | **= 12.58** | **+** | **0.00** | **+** | **0.00** | **=** | **12.58** |
| **Channel Flow** | | | | | | | |
| X sectional flow area (sqft) | = 15.90 | | 47.52 | | 56.54 | | |
| Wetted perimeter (ft) | = 14.14 | | 34.56 | | 37.70 | | |
| Channel slope (%) | = 0.50 | | 0.50 | | 0.50 | | |
| Manning's n-value | = 0.023 | | 0.023 | | 0.023 | | |
| Velocity (ft/s) | =4.96 | | | | | | |
| | | | 5.67 | | | | |
| | | | | | 6.01 | | |
| Flow length (ft) | ({0})273.0 | | 891.0 | | 319.0 | | |
| **Travel Time (min)** | **= 0.92** | **+** | **2.62** | **+** | **0.88** | **=** | **4.42** |

**Total Travel Time, Tc ..... 46.74 min**

# TR55 Tc Worksheet



## Hyd. No. 18

Off-Site Fleck

| Description | A | | B | | C | | Totals |
|---|---|---|---|---|---|---|---|
| **Sheet Flow** | | | | | | | |
| Manning's n-value | = 0.240 | | 0.011 | | 0.011 | | |
| Flow length (ft) | = 150.0 | | 0.0 | | 0.0 | | |
| Two-year 24-hr precip. (in) | = 3.30 | | 0.00 | | 0.00 | | |
| Land slope (%) | = 1.00 | | 0.00 | | 0.00 | | |
| **Travel Time (min)** | **= 25.65** | **+** | **0.00** | **+** | **0.00** | **=** | **25.65** |
| **Shallow Concentrated Flow** | | | | | | | |
| Flow length (ft) | = 335.00 | | 0.00 | | 0.00 | | |
| Watercourse slope (%) | = 2.00 | | 0.00 | | 0.00 | | |
| Surface description | = Unpaved | | Paved | | Paved | | |
| Average velocity (ft/s) | =2.28 | | 0.00 | | 0.00 | | |
| **Travel Time (min)** | **= 2.45** | **+** | **0.00** | **+** | **0.00** | **=** | **2.45** |
| **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 ..... 28.09 min**

# TR55 Tc Worksheet



## Hyd. No. 16

Off-Site Hiossen

| Description | A | | B | | C | | Totals |
|---|---|---|---|---|---|---|---|
| **Sheet Flow** | | | | | | | |
| Manning's n-value | = 0.050 | | 0.011 | | 0.011 | | |
| Flow length (ft) | = 150.0 | | 0.0 | | 0.0 | | |
| Two-year 24-hr precip. (in) | = 3.30 | | 0.00 | | 0.00 | | |
| Land slope (%) | = 1.00 | | 0.00 | | 0.00 | | |
| **Travel Time (min)** | **= 7.31** | **+** | **0.00** | **+** | **0.00** | **=** | **7.31** |
| **Shallow Concentrated Flow** | | | | | | | |
| Flow length (ft) | = 303.00 | | 82.00 | | 0.00 | | |
| Watercourse slope (%) | = 1.00 | | 1.00 | | 0.00 | | |
| Surface description | = Paved | | Paved | | Paved | | |
| Average velocity (ft/s) | =2.03 | | 2.03 | | 0.00 | | |
| **Travel Time (min)** | **= 2.48** | **+** | **0.67** | **+** | **0.00** | **=** | **3.16** |
| **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 ..... 10.47 min**

# TR55 Tc Worksheet



## Hyd. No. 19

Off-Site Northern DA

| Description | A | | B | | C | | Totals |
|---|---|---|---|---|---|---|---|
| **Sheet Flow** | | | | | | | |
| Manning's n-value | = 0.240 | | 0.011 | | 0.011 | | |
| Flow length (ft) | = 150.0 | | 0.0 | | 0.0 | | |
| Two-year 24-hr precip. (in) | = 3.30 | | 0.00 | | 0.00 | | |
| Land slope (%) | = 1.00 | | 0.00 | | 0.00 | | |
| **Travel Time (min)** | **= 25.65** | **+** | **0.00** | **+** | **0.00** | **=** | **25.65** |
| **Shallow Concentrated Flow** | | | | | | | |
| Flow length (ft) | = 618.00 | | 240.00 | | 0.00 | | |
| Watercourse slope (%) | = 1.00 | | 1.00 | | 0.00 | | |
| Surface description | = Unpaved | | Paved | | Paved | | |
| Average velocity (ft/s) | =1.61 | | 2.03 | | 0.00 | | |
| **Travel Time (min)** | **= 6.38** | **+** | **1.97** | **+** | **0.00** | **=** | **8.35** |
| **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 ..... 34.00 min**

# TR55 Tc Worksheet



## Hyd. No. 17

Off-Site Petrucci

| Description | A | | B | | C | | Totals |
|---|---|---|---|---|---|---|---|
| **Sheet Flow** | | | | | | | |
| Manning's n-value | = 0.240 | | 0.011 | | 0.011 | | |
| Flow length (ft) | = 150.0 | | 0.0 | | 0.0 | | |
| Two-year 24-hr precip. (in) | = 3.30 | | 0.00 | | 0.00 | | |
| Land slope (%) | = 1.00 | | 0.00 | | 0.00 | | |
| **Travel Time (min)** | **= 25.65** | **+** | **0.00** | **+** | **0.00** | **=** | **25.65** |
| **Shallow Concentrated Flow** | | | | | | | |
| Flow length (ft) | = 1108.00 | | 49.00 | | 0.00 | | |
| Watercourse slope (%) | = 1.00 | | 2.00 | | 0.00 | | |
| Surface description | = Unpaved | | Paved | | Paved | | |
| Average velocity (ft/s) | =1.61 | | 2.87 | | 0.00 | | |
| **Travel Time (min)** | **= 11.45** | **+** | **0.28** | **+** | **0.00** | **=** | **11.73** |
| **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 ..... 37.38 min**

# Hydrograph Summary Report

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

| Hyd. No. | Hydrograph type (origin) | Peak flow (cfs) | Time interval (min) | Time to Peak (min) | Hyd. volume (cuft) | Inflow hyd(s) | Maximum elevation (ft) | Total strge used (cuft) | Hydrograph Description |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Rational | 67.96 | 1 | 5 | 20,389 | ------ | ------ | ------ | Pre Canal 2-1 (West) |
| 2 | Rational | 41.89 | 1 | 5 | 12,568 | ------ | ------ | ------ | Pre Canal 2-2 (West) |
| 3 | Rational | 96.45 | 1 | 26 | 150,461 | ------ | ------ | ------ | Pre Canal 2-3 (West) |
| 4 | Rational | 217.18 | 1 | 33 | 430,024 | ------ | ------ | ------ | Pre Canal 2-4 (West) |
| 5 | Rational | 91.96 | 1 | 17 | 93,801 | ------ | ------ | ------ | Pre Canal 2-5 (West) |
| 6 | Rational | 330.28 | 1 | 47 | 931,388 | ------ | ------ | ------ | Pre Canal 2-6 (West) |
| 8 | Rational | 6.018 | 1 | 5 | 1,805 | ------ | ------ | ------ | Pre Canal 2-1 (East) |
| 9 | Rational | 11.88 | 1 | 5 | 3,563 | ------ | ------ | ------ | Pre Canal 2-2 (East) |
| 10 | Rational | 381.27 | 1 | 14 | 320,266 | ------ | ------ | ------ | Pre Canal 2-3 (East) |
| 11 | Rational | 205.38 | 1 | 44 | 542,206 | ------ | ------ | ------ | Pre Canal 2-4 (East) |
| 12 | Rational | 56.17 | 1 | 44 | 148,293 | ------ | ------ | ------ | Pre Canal 2-5 (East) |
| 13 | Rational | 141.75 | 1 | 43 | 365,724 | ------ | ------ | ------ | Pre Canal 2-6 (East) |
| 15 | Rational | 64.93 | 1 | 5 | 19,479 | ------ | ------ | ------ | Off-Site Fuller |
| 16 | Rational | 56.77 | 1 | 10 | 34,064 | ------ | ------ | ------ | Off-Site Hiossen |
| 17 | Rational | 54.75 | 1 | 37 | 121,549 | ------ | ------ | ------ | Off-Site Petrucci |
| 18 | Rational | 37.96 | 1 | 28 | 63,773 | ------ | ------ | ------ | Off-Site Fleck |
| 19 | Rational | 29.03 | 1 | 34 | 59,215 | ------ | ------ | ------ | Off-Site Northern DA |
| 21 | Combine | 73.98 | 1 | 5 | 22,195 | 1, 8, | ------ | ------ | To Sta 0+85 |
| 22 | Combine | 53.77 | 1 | 5 | 16,131 | 2, 9, | ------ | ------ | To Sta 7+37 |
| 23 | Combine | 433.20 | 1 | 14 | 470,727 | 3, 10, | ------ | ------ | To Sta 16+54 |
| 24 | Combine | 371.22 | 1 | 33 | 972,230 | 4, 11, | ------ | ------ | To Sta 41+23 |
| 25 | Combine | 511.19 | 1 | 47 | 1,539,206 | 5, 6, 12, | ------ | ------ | To Sta 63.+24 |
| 26 | Combine | 111.76 | 1 | 5 | 298,079 | 13, 15, 16, 17, 18, 19, | ------ | ------ | To 78+24 |
| 28 | Reach | 107.53 | 1 | 37 | 301,974 | 26 | ------ | ------ | To 63+24 |
| 29 | Combine | 595.17 | 1 | 44 | 1,841,180 | 5, 6, 12, | ------ | ------ | Total to 63+24 |
| 30 | Reach | 590.85 | 1 | 48 | 1,847,394 | 13, 28 29 | ------ | ------ | To 41+23 |
| 31 | Combine | 929.16 | 1 | 44 | 2,819,624 | 4, 11, 30 | ------ | ------ | Total to 41+23 |
| 32 | Reach | 919.72 | 1 | 46 | 2,827,490 | 31 | ------ | ------ | To 16+54 |
| 33 | Combine | 942.96 | 1 | 45 | 3,298,217 | 3, 10, 32 | ------ | ------ | Total to 16+54 |
| 34 | Reach | 941.95 | 1 | 47 | 3,304,446 | 33 | ------ | ------ | To 7+37 |
| 35 | Combine | 941.95 | 1 | 47 | 3,320,577 | 2, 9, 34 | ------ | ------ | Total to 7+37 |
| 36 | Reach | 941.94 | 1 | 48 | 3,326,392 | 35 | ------ | ------ | To 0+85 |

# Hydrograph Summary Report

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

| Hyd. No. | Hydrograph type (origin) | Peak flow (cfs) | Time interval (min) | Time to Peak (min) | Hyd. volume (cuft) | Inflow hyd(s) | Maximum elevation (ft) | Total strge used (cuft) | Hydrograph Description |
|---|---|---|---|---|---|---|---|---|---|
| 37 | Combine | 941.94 | 1 | 48 | 3,348,586 | 1, 8, 36 | ------ | ------ | Total to 0+85 |

Plan: Plan 02  Canal 2  Canal 2 Centerli  RS: 7824.29  Profile: PF 1

| E.G. Elev (ft) | 20.15 | Element | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| Vel Head (ft) | 0.00 | Wt. n-Val. | 0.040 | 0.070 | 0.040 |
| W.S. Elev (ft) | 20.15 | Reach Len. (ft) | 298.00 | 300.00 | 301.00 |
| Crit W.S. (ft) | | Flow Area (sq ft) | 404.70 | 1089.21 | 62.33 |
| E.G. Slope (ft/ft) | 0.000001 | Area (sq ft) | 404.70 | 1089.21 | 62.33 |
| Q Total (cfs) | 111.76 | Flow (cfs) | 23.46 | 85.22 | 3.08 |
| Top Width (ft) | 361.22 | Top Width (ft) | 188.43 | 136.83 | 35.96 |
| Vel Total (ft/s) | 0.07 | Avg. Vel. (ft/s) | 0.06 | 0.08 | 0.05 |
| Max Chl Dpth (ft) | 14.15 | Hydr. Depth (ft) | 2.15 | 7.96 | 1.73 |
| Conv. Total (cfs) | 118342.4 | Conv. (cfs) | 24837.3 | 90243.2 | 3261.9 |
| Length Wtd. (ft) | 299.75 | Wetted Per. (ft) | 190.58 | 141.26 | 37.28 |
| Min Ch El (ft) | 6.00 | Shear (lb/sq ft) | 0.00 | 0.00 | 0.00 |
| Alpha | 1.05 | Stream Power (lb/ft s) | 0.00 | 0.00 | 0.00 |
| Frctn Loss (ft) | 0.00 | Cum Volume (acre-ft) | 69.70 | 142.06 | 12.31 |
| C & E Loss (ft) | 0.00 | Cum SA (acres) | 35.36 | 16.93 | 11.61 |

Plan: Plan 02  Canal 2  Canal 2 Centerli  RS: 7524.44  Profile: PF 1

| E.G. Elev (ft) | 20.15 | Element | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| Vel Head (ft) | 0.00 | Wt. n-Val. | 0.040 | 0.070 | 0.040 |
| W.S. Elev (ft) | 20.15 | Reach Len. (ft) | 300.00 | 302.00 | 302.00 |
| Crit W.S. (ft) | | Flow Area (sq ft) | 173.93 | 988.34 | 114.67 |
| E.G. Slope (ft/ft) | 0.000001 | Area (sq ft) | 173.93 | 988.34 | 114.67 |
| Q Total (cfs) | 111.76 | Flow (cfs) | 9.87 | 94.99 | 6.91 |
| Top Width (ft) | 277.17 | Top Width (ft) | 103.85 | 111.69 | 61.63 |
| Vel Total (ft/s) | 0.09 | Avg. Vel. (ft/s) | 0.06 | 0.10 | 0.06 |
| Max Chl Dpth (ft) | 14.15 | Hydr. Depth (ft) | 1.67 | 8.85 | 1.86 |
| Conv. Total (cfs) | 102568.7 | Conv. (cfs) | 9053.8 | 87174.3 | 6340.5 |
| Length Wtd. (ft) | 301.89 | Wetted Per. (ft) | 104.86 | 116.69 | 63.15 |
| Min Ch El (ft) | 6.00 | Shear (lb/sq ft) | 0.00 | 0.00 | 0.00 |
| Alpha | 1.09 | Stream Power (lb/ft s) | 0.00 | 0.00 | 0.00 |
| Frctn Loss (ft) | 0.00 | Cum Volume (acre-ft) | 67.72 | 134.91 | 11.70 |
| C & E Loss (ft) | 0.00 | Cum SA (acres) | 34.37 | 16.08 | 11.27 |

Plan: Plan 02  Canal 2  Canal 2 Centerli  RS: 7224.11  Profile: PF 1

| E.G. Elev (ft) | 20.15 | Element | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| Vel Head (ft) | 0.00 | Wt. n-Val. | 0.040 | 0.070 | 0.040 |
| W.S. Elev (ft) | 20.15 | Reach Len. (ft) | 200.00 | 200.00 | 200.00 |
| Crit W.S. (ft) | | Flow Area (sq ft) | 63.25 | 662.01 | 15.19 |
| E.G. Slope (ft/ft) | 0.000004 | Area (sq ft) | 63.25 | 662.01 | 15.19 |
| Q Total (cfs) | 111.76 | Flow (cfs) | 2.48 | 108.99 | 0.29 |
| Top Width (ft) | 325.94 | Top Width (ft) | 150.15 | 72.12 | 103.67 |
| Vel Total (ft/s) | 0.15 | Avg. Vel. (ft/s) | 0.04 | 0.16 | 0.02 |
| Max Chl Dpth (ft) | 14.15 | Hydr. Depth (ft) | 0.42 | 9.18 | 0.15 |
| Conv. Total (cfs) | 59469.5 | Conv. (cfs) | 1319.1 | 57993.8 | 156.6 |
| Length Wtd. (ft) | 200.00 | Wetted Per. (ft) | 150.38 | 78.96 | 103.82 |
| Min Ch El (ft) | 6.00 | Shear (lb/sq ft) | 0.00 | 0.00 | 0.00 |
| Alpha | 1.16 | Stream Power (lb/ft s) | 0.00 | 0.00 | 0.00 |
| Frctn Loss (ft) | 0.00 | Cum Volume (acre-ft) | 66.90 | 129.19 | 11.25 |
| C & E Loss (ft) | 0.00 | Cum SA (acres) | 33.49 | 15.44 | 10.70 |

Plan: Plan 02  Canal 2  Canal 2 Centerli  RS: 7024  Profile: PF 1

| E.G. Elev (ft) | 20.15 | Element | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| Vel Head (ft) | 0.00 | Wt. n-Val. | 0.040 | 0.070 | 0.040 |
| W.S. Elev (ft) | 20.15 | Reach Len. (ft) | 200.00 | 202.00 | 203.00 |
| Crit W.S. (ft) | | Flow Area (sq ft) | 191.94 | 776.18 | 158.16 |
| E.G. Slope (ft/ft) | 0.000001 | Area (sq ft) | 191.94 | 776.18 | 158.16 |
| Q Total (cfs) | 111.76 | Flow (cfs) | 10.50 | 92.19 | 9.07 |
| Top Width (ft) | 329.81 | Top Width (ft) | 145.10 | 73.74 | 110.97 |
| Vel Total (ft/s) | 0.10 | Avg. Vel. (ft/s) | 0.05 | 0.12 | 0.06 |
| Max Chl Dpth (ft) | 14.15 | Hydr. Depth (ft) | 1.32 | 10.53 | 1.43 |
| Conv. Total (cfs) | 91284.4 | Conv. (cfs) | 8579.1 | 75299.8 | 7405.5 |
| Length Wtd. (ft) | 201.89 | Wetted Per. (ft) | 145.43 | 79.44 | 111.76 |
| Min Ch El (ft) | 6.00 | Shear (lb/sq ft) | 0.00 | 0.00 | 0.00 |
| Alpha | 1.24 | Stream Power (lb/ft s) | 0.00 | 0.00 | 0.00 |
| Frctn Loss (ft) | 0.00 | Cum Volume (acre-ft) | 66.32 | 125.89 | 10.85 |
| C & E Loss (ft) | 0.00 | Cum SA (acres) | 32.81 | 15.11 | 10.21 |

Plan: Plan 02  Canal 2  Canal 2 Centerli  RS: 6823.66  Profile: PF 1

| E.G. Elev (ft) | 20.15 | Element | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| Vel Head (ft) | 0.00 | Wt. n-Val. | 0.040 | 0.070 | 0.040 |
| W.S. Elev (ft) | 20.15 | Reach Len. (ft) | 6301.00 | 300.00 | 298.00 |
| Crit W.S. (ft) | | Flow Area (sq ft) | 210.87 | 888.35 | 174.05 |
| E.G. Slope (ft/ft) | 0.000001 | Area (sq ft) | 210.87 | 888.35 | 174.05 |
| Q Total (cfs) | 111.76 | Flow (cfs) | 11.45 | 90.71 | 9.60 |
| Top Width (ft) | 319.33 | Top Width (ft) | 129.15 | 86.33 | 103.85 |
| Vel Total (ft/s) | 0.09 | Avg. Vel. (ft/s) | 0.05 | 0.10 | 0.06 |
| Max Chl Dpth (ft) | 14.15 | Hydr. Depth (ft) | 1.63 | 10.29 | 1.68 |
| Conv. Total (cfs) | 105399.9 | Conv. (cfs) | 10800.3 | 85546.8 | 9052.8 |
| Length Wtd. (ft) | 866.87 | Wetted Per. (ft) | 130.25 | 91.94 | 105.05 |
| Min Ch El (ft) | 6.00 | Shear (lb/sq ft) | 0.00 | 0.00 | 0.00 |
| Alpha | 1.17 | Stream Power (lb/ft s) | 0.00 | 0.00 | 0.00 |
| Frctn Loss (ft) | 0.00 | Cum Volume (acre-ft) | 65.39 | 122.03 | 10.08 |
| C & E Loss (ft) | 0.00 | Cum SA (acres) | 32.18 | 14.74 | 9.71 |

Plan: Plan 02  Canal 2  Canal 2 Centerli  RS: 6524.2  Profile: PF 1

| E.G. Elev (ft) | 20.15 | Element | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| Vel Head (ft) | 0.00 | Wt. n-Val. | 0.040 | 0.070 | 0.040 |
| W.S. Elev (ft) | 20.14 | Reach Len. (ft) | 200.00 | 200.00 | 200.00 |
| Crit W.S. (ft) | | Flow Area (sq ft) | 201.23 | 921.84 | 21.83 |
| E.G. Slope (ft/ft) | 0.000001 | Area (sq ft) | 201.23 | 921.84 | 21.83 |
| Q Total (cfs) | 111.76 | Flow (cfs) | 9.67 | 101.79 | 0.31 |
| Top Width (ft) | 368.57 | Top Width (ft) | 165.44 | 87.73 | 115.40 |
| Vel Total (ft/s) | 0.10 | Avg. Vel. (ft/s) | 0.05 | 0.11 | 0.01 |
| Max Chl Dpth (ft) | 14.14 | Hydr. Depth (ft) | 1.22 | 10.51 | 0.19 |
| Conv. Total (cfs) | 97611.1 | Conv. (cfs) | 8442.0 | 88902.2 | 266.9 |
| Length Wtd. (ft) | 200.00 | Wetted Per. (ft) | 167.68 | 95.20 | 115.59 |
| Min Ch El (ft) | 6.00 | Shear (lb/sq ft) | 0.00 | 0.00 | 0.00 |
| Alpha | 1.19 | Stream Power (lb/ft s) | 0.00 | 0.00 | 0.00 |
| Frctn Loss (ft) | 0.00 | Cum Volume (acre-ft) | 35.59 | 115.79 | 9.41 |
| C & E Loss (ft) | 0.00 | Cum SA (acres) | 10.88 | 14.14 | 8.96 |

Plan: Plan 02  Canal 2  Canal 2 Centerli  RS: 6324.18  Profile: PF 1

| E.G. Elev (ft) | 20.14 | Element | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| Vel Head (ft) | 0.00 | Wt. n-Val. | 0.040 | 0.070 | 0.040 |
| W.S. Elev (ft) | 20.14 | Reach Len. (ft) | 200.00 | 200.00 | 200.00 |
| Crit W.S. (ft) | 8.08 | Flow Area (sq ft) | 222.02 | 873.28 | 128.82 |
| E.G. Slope (ft/ft) | 0.000028 | Area (sq ft) | 222.02 | 873.28 | 128.82 |
| Q Total (cfs) | 511.19 | Flow (cfs) | 57.47 | 421.60 | 32.12 |
| Top Width (ft) | 324.29 | Top Width (ft) | 143.11 | 92.54 | 88.64 |
| Vel Total (ft/s) | 0.42 | Avg. Vel. (ft/s) | 0.26 | 0.48 | 0.25 |
| Max Chl Dpth (ft) | 14.14 | Hydr. Depth (ft) | 1.55 | 9.44 | 1.45 |
| Conv. Total (cfs) | 97259.3 | Conv. (cfs) | 10934.8 | 80214.2 | 6110.3 |
| Length Wtd. (ft) | 200.00 | Wetted Per. (ft) | 145.44 | 97.02 | 89.27 |
| Min Ch El (ft) | 6.00 | Shear (lb/sq ft) | 0.00 | 0.02 | 0.00 |
| Alpha | 1.17 | Stream Power (lb/ft s) | 0.00 | 0.01 | 0.00 |
| Frctn Loss (ft) | | Cum Volume (acre-ft) | 34.61 | 111.67 | 9.06 |
| C & E Loss (ft) | | Cum SA (acres) | 10.17 | 13.72 | 8.49 |

Plan: Plan 02  Canal 2  Canal 2 Centerli  RS: 6122.84  Profile: PF 1

| E.G. Elev (ft) | 19.30 | Element | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| Vel Head (ft) | 0.01 | Wt. n-Val. | 0.040 | 0.070 | 0.040 |
| W.S. Elev (ft) | 19.29 | Reach Len. (ft) | 302.00 | 300.00 | 298.00 |
| Crit W.S. (ft) | | Flow Area (sq ft) | 15.27 | 615.83 | 60.98 |
| E.G. Slope (ft/ft) | 0.000091 | Area (sq ft) | 15.27 | 615.83 | 60.98 |
| Q Total (cfs) | 511.19 | Flow (cfs) | 3.64 | 490.58 | 16.97 |
| Top Width (ft) | 192.74 | Top Width (ft) | 31.88 | 73.58 | 87.28 |
| Vel Total (ft/s) | 0.74 | Avg. Vel. (ft/s) | 0.24 | 0.80 | 0.28 |
| Max Chl Dpth (ft) | 13.29 | Hydr. Depth (ft) | 0.48 | 8.37 | 0.70 |
| Conv. Total (cfs) | 53685.8 | Conv. (cfs) | 382.2 | 51521.7 | 1781.9 |
| Length Wtd. (ft) | 300.76 | Wetted Per. (ft) | 32.44 | 78.71 | 87.39 |
| Min Ch El (ft) | 6.00 | Shear (lb/sq ft) | 0.00 | 0.04 | 0.00 |
| Alpha | 1.12 | Stream Power (lb/ft s) | 0.00 | 0.04 | 0.00 |
| Frctn Loss (ft) | 0.00 | Cum Volume (acre-ft) | 34.61 | 110.57 | 9.06 |
| C & E Loss (ft) | 0.00 | Cum SA (acres) | 9.77 | 13.34 | 8.08 |

Plan: Plan 02  Canal 2  Canal 2 Centerli  RS: 5823.42  Profile: PF 1

| E.G. Elev (ft) | 19.30 | Element | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| Vel Head (ft) | 0.00 | Wt. n-Val. | 0.040 | 0.070 | 0.040 |
| W.S. Elev (ft) | 19.30 | Reach Len. (ft) | 301.00 | 300.00 | 299.00 |
| Crit W.S. (ft) | | Flow Area (sq ft) | 1577.22 | 597.67 | 152.78 |
| E.G. Slope (ft/ft) | 0.000002 | Area (sq ft) | 1577.22 | 597.67 | 152.78 |
| Q Total (cfs) | 511.19 | Flow (cfs) | 410.80 | 88.98 | 11.41 |
| Top Width (ft) | 303.03 | Top Width (ft) | 147.02 | 56.84 | 99.17 |
| Vel Total (ft/s) | 0.22 | Avg. Vel. (ft/s) | 0.26 | 0.15 | 0.07 |
| Max Chl Dpth (ft) | 13.30 | Hydr. Depth (ft) | 10.73 | 10.51 | 1.54 |
| Conv. Total (cfs) | 334848.0 | Conv. (cfs) | 269088.2 | 58285.0 | 7474.8 |
| Length Wtd. (ft) | 300.59 | Wetted Per. (ft) | 160.25 | 60.70 | 101.09 |
| Min Ch El (ft) | 6.00 | Shear (lb/sq ft) | 0.00 | 0.00 | 0.00 |
| Alpha | 1.21 | Stream Power (lb/ft s) | 0.00 | 0.00 | 0.00 |
| Frctn Loss (ft) | 0.00 | Cum Volume (acre-ft) | 29.09 | 106.39 | 8.33 |
| C & E Loss (ft) | 0.00 | Cum SA (acres) | 9.15 | 12.89 | 7.45 |

Plan: Plan 02  Canal 2  Canal 2 Centerli  RS: 5523.12  Profile: PF 1

| E.G. Elev (ft) | 19.30 | Element | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| Vel Head (ft) | 0.00 | Wt. n-Val. | 0.040 | 0.070 | 0.040 |
| W.S. Elev (ft) | 19.30 | Reach Len. (ft) | 300.00 | 300.00 | 300.00 |
| Crit W.S. (ft) | | Flow Area (sq ft) | 556.93 | 626.65 | 151.91 |
| E.G. Slope (ft/ft) | 0.000016 | Area (sq ft) | 556.93 | 626.65 | 151.91 |
| Q Total (cfs) | 511.19 | Flow (cfs) | 235.82 | 246.68 | 28.68 |
| Top Width (ft) | 281.54 | Top Width (ft) | 115.43 | 60.39 | 105.72 |
| Vel Total (ft/s) | 0.38 | Avg. Vel. (ft/s) | 0.42 | 0.39 | 0.19 |
| Max Chl Dpth (ft) | 13.30 | Hydr. Depth (ft) | 4.82 | 10.38 | 1.44 |
| Conv. Total (cfs) | 126408.7 | Conv. (cfs) | 58315.0 | 61000.5 | 7093.2 |
| Length Wtd. (ft) | 300.00 | Wetted Per. (ft) | 117.69 | 63.81 | 107.80 |
| Min Ch El (ft) | 6.00 | Shear (lb/sq ft) | 0.00 | 0.01 | 0.00 |
| Alpha | 1.09 | Stream Power (lb/ft s) | 0.00 | 0.00 | 0.00 |
| Frctn Loss (ft) | 0.01 | Cum Volume (acre-ft) | 21.72 | 102.18 | 7.29 |
| C & E Loss (ft) | 0.00 | Cum SA (acres) | 8.24 | 12.49 | 6.74 |

Plan: Plan 02  Canal 2  Canal 2 Centerli  RS: 5223.34  Profile: PF 1

| E.G. Elev (ft) | 19.29 | Element | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| Vel Head (ft) | 0.00 | Wt. n-Val. | 0.040 | 0.070 | 0.040 |
| W.S. Elev (ft) | 19.29 | Reach Len. (ft) | 303.00 | 301.00 | 300.00 |
| Crit W.S. (ft) | | Flow Area (sq ft) | 607.36 | 528.39 | 133.84 |
| E.G. Slope (ft/ft) | 0.000018 | Area (sq ft) | 607.36 | 528.39 | 133.84 |
| Q Total (cfs) | 511.19 | Flow (cfs) | 276.59 | 208.77 | 25.83 |
| Top Width (ft) | 269.85 | Top Width (ft) | 119.10 | 52.75 | 98.00 |
| Vel Total (ft/s) | 0.40 | Avg. Vel. (ft/s) | 0.46 | 0.40 | 0.19 |
| Max Chl Dpth (ft) | 13.29 | Hydr. Depth (ft) | 5.10 | 10.02 | 1.37 |
| Conv. Total (cfs) | 119849.2 | Conv. (cfs) | 64846.8 | 48945.8 | 6056.5 |
| Length Wtd. (ft) | 301.81 | Wetted Per. (ft) | 124.65 | 57.96 | 99.55 |
| Min Ch El (ft) | 6.00 | Shear (lb/sq ft) | 0.01 | 0.01 | 0.00 |
| Alpha | 1.10 | Stream Power (lb/ft s) | 0.00 | 0.00 | 0.00 |
| Frctn Loss (ft) | 0.01 | Cum Volume (acre-ft) | 17.71 | 98.20 | 6.30 |
| C & E Loss (ft) | 0.00 | Cum SA (acres) | 7.43 | 12.10 | 6.04 |

Plan: Plan 02  Canal 2  Canal 2 Centerli  RS: 4922.72  Profile: PF 1

| E.G. Elev (ft) | 19.28 | Element | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| Vel Head (ft) | 0.00 | Wt. n-Val. | 0.040 | 0.070 | 0.040 |
| W.S. Elev (ft) | 19.28 | Reach Len. (ft) | 300.00 | 300.00 | 300.00 |
| Crit W.S. (ft) | | Flow Area (sq ft) | 278.88 | 545.68 | 119.72 |
| E.G. Slope (ft/ft) | 0.000044 | Area (sq ft) | 278.88 | 545.68 | 119.72 |
| Q Total (cfs) | 511.19 | Flow (cfs) | 167.31 | 309.58 | 34.31 |
| Top Width (ft) | 220.71 | Top Width (ft) | 66.72 | 60.39 | 93.60 |
| Vel Total (ft/s) | 0.54 | Avg. Vel. (ft/s) | 0.60 | 0.57 | 0.29 |
| Max Chl Dpth (ft) | 13.28 | Hydr. Depth (ft) | 4.18 | 9.04 | 1.28 |
| Conv. Total (cfs) | 77380.2 | Conv. (cfs) | 25325.7 | 46861.5 | 5193.0 |
| Length Wtd. (ft) | 300.00 | Wetted Per. (ft) | 72.97 | 67.06 | 94.88 |
| Min Ch El (ft) | 6.00 | Shear (lb/sq ft) | 0.01 | 0.02 | 0.00 |
| Alpha | 1.09 | Stream Power (lb/ft s) | 0.01 | 0.01 | 0.00 |
| Frctn Loss (ft) | 0.01 | Cum Volume (acre-ft) | 14.63 | 94.49 | 5.43 |
| C & E Loss (ft) | 0.00 | Cum SA (acres) | 6.79 | 11.71 | 5.38 |

Plan: Plan 02  Canal 2  Canal 2 Centerli  RS: 4623.05  Profile: PF 1

| E.G. Elev (ft) | 19.27 | Element | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| Vel Head (ft) | 0.00 | Wt. n-Val. | 0.040 | 0.070 | 0.040 |
| W.S. Elev (ft) | 19.27 | Reach Len. (ft) | 299.00 | 300.00 | 301.00 |
| Crit W.S. (ft) | | Flow Area (sq ft) | 370.13 | 610.06 | 115.49 |
| E.G. Slope (ft/ft) | 0.000036 | Area (sq ft) | 370.13 | 610.06 | 115.49 |
| Q Total (cfs) | 511.19 | Flow (cfs) | 167.87 | 313.29 | 30.03 |
| Top Width (ft) | 285.76 | Top Width (ft) | 125.52 | 69.16 | 91.08 |
| Vel Total (ft/s) | 0.47 | Avg. Vel. (ft/s) | 0.45 | 0.51 | 0.26 |
| Max Chl Dpth (ft) | 13.27 | Hydr. Depth (ft) | 2.95 | 8.82 | 1.27 |
| Conv. Total (cfs) | 84770.2 | Conv. (cfs) | 27837.3 | 51952.8 | 4980.1 |
| Length Wtd. (ft) | 299.75 | Wetted Per. (ft) | 128.48 | 75.92 | 92.35 |
| Min Ch El (ft) | 6.00 | Shear (lb/sq ft) | 0.01 | 0.02 | 0.00 |
| Alpha | 1.07 | Stream Power (lb/ft s) | 0.00 | 0.01 | 0.00 |
| Frctn Loss (ft) | 0.01 | Cum Volume (acre-ft) | 12.39 | 90.51 | 4.62 |
| C & E Loss (ft) | 0.00 | Cum SA (acres) | 6.12 | 11.26 | 4.74 |

Plan: Plan 02  Canal 2  Canal 2 Centerli  RS: 4322.55  Profile: PF 1

| E.G. Elev (ft) | 19.26 | Element | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| Vel Head (ft) | 0.00 | Wt. n-Val. | 0.040 | 0.070 | |
| W.S. Elev (ft) | 19.25 | Reach Len. (ft) | 200.00 | 200.00 | 200.00 |
| Crit W.S. (ft) | | Flow Area (sq ft) | 232.54 | 712.59 | |
| E.G. Slope (ft/ft) | 0.000046 | Area (sq ft) | 232.54 | 712.59 | |
| Q Total (cfs) | 511.19 | Flow (cfs) | 117.47 | 393.72 | |
| Top Width (ft) | 166.21 | Top Width (ft) | 78.07 | 88.14 | |
| Vel Total (ft/s) | 0.54 | Avg. Vel. (ft/s) | 0.51 | 0.55 | |
| Max Chl Dpth (ft) | 13.25 | Hydr. Depth (ft) | 2.98 | 8.08 | |
| Conv. Total (cfs) | 75445.8 | Conv. (cfs) | 17337.4 | 58108.4 | |
| Length Wtd. (ft) | 200.00 | Wetted Per. (ft) | 81.78 | 94.64 | |
| Min Ch El (ft) | 6.00 | Shear (lb/sq ft) | 0.01 | 0.02 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | 0.00 | 0.01 | |
| Frctn Loss (ft) | 0.01 | Cum Volume (acre-ft) | 10.33 | 85.96 | 4.22 |
| C & E Loss (ft) | 0.00 | Cum SA (acres) | 5.43 | 10.72 | 4.43 |

Plan: Plan 02  Canal 2  Canal 2 Centerli  RS: 4122.9  Profile: PF 1

| E.G. Elev (ft) | 19.25 | Element | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| Vel Head (ft) | 0.00 | Wt. n-Val. | 0.040 | 0.070 | 0.040 |
| W.S. Elev (ft) | 19.25 | Reach Len. (ft) | 199.00 | 201.00 | 202.00 |
| Crit W.S. (ft) | 8.27 | Flow Area (sq ft) | 400.68 | 610.25 | 42.73 |
| E.G. Slope (ft/ft) | 0.000020 | Area (sq ft) | 400.68 | 610.25 | 42.73 |
| Q Total (cfs) | 371.22 | Flow (cfs) | 142.96 | 222.80 | 5.47 |
| Top Width (ft) | 264.75 | Top Width (ft) | 124.76 | 76.54 | 63.45 |
| Vel Total (ft/s) | 0.35 | Avg. Vel. (ft/s) | 0.36 | 0.37 | 0.13 |
| Max Chl Dpth (ft) | 13.25 | Hydr. Depth (ft) | 3.21 | 7.97 | 0.67 |
| Conv. Total (cfs) | 82614.4 | Conv. (cfs) | 31814.7 | 49582.7 | 1217.0 |
| Length Wtd. (ft) | 201.00 | Wetted Per. (ft) | 128.22 | 81.49 | 63.65 |
| Min Ch El (ft) | 6.00 | Shear (lb/sq ft) | 0.00 | 0.01 | 0.00 |
| Alpha | 1.04 | Stream Power (lb/ft s) | 0.00 | 0.00 | 0.00 |
| Frctn Loss (ft) | | Cum Volume (acre-ft) | 8.87 | 82.92 | 4.12 |
| C & E Loss (ft) | | Cum SA (acres) | 4.96 | 10.34 | 4.28 |

Plan: Plan 02  Canal 2  Canal 2 Centerli  RS: 3922.64  Profile: PF 1

| E.G. Elev (ft) | 19.24 | Element | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| Vel Head (ft) | 0.00 | Wt. n-Val. | 0.040 | 0.070 | 0.040 |
| W.S. Elev (ft) | 19.24 | Reach Len. (ft) | 300.00 | 300.00 | 300.00 |
| Crit W.S. (ft) | | Flow Area (sq ft) | 170.91 | 670.87 | 70.24 |
| E.G. Slope (ft/ft) | 0.000025 | Area (sq ft) | 170.91 | 670.87 | 70.24 |
| Q Total (cfs) | 371.22 | Flow (cfs) | 56.67 | 302.75 | 11.80 |
| Top Width (ft) | 223.04 | Top Width (ft) | 69.44 | 71.48 | 82.12 |
| Vel Total (ft/s) | 0.41 | Avg. Vel. (ft/s) | 0.33 | 0.45 | 0.17 |
| Max Chl Dpth (ft) | 13.24 | Hydr. Depth (ft) | 2.46 | 9.39 | 0.86 |
| Conv. Total (cfs) | 73711.6 | Conv. (cfs) | 11252.7 | 60116.7 | 2342.2 |
| Length Wtd. (ft) | 300.00 | Wetted Per. (ft) | 72.43 | 77.35 | 82.58 |
| Min Ch El (ft) | 6.00 | Shear (lb/sq ft) | 0.00 | 0.01 | 0.00 |
| Alpha | 1.11 | Stream Power (lb/ft s) | 0.00 | 0.01 | 0.00 |
| Frctn Loss (ft) | 0.01 | Cum Volume (acre-ft) | 8.87 | 81.31 | 4.12 |
| C & E Loss (ft) | 0.00 | Cum SA (acres) | 4.52 | 10.00 | 3.95 |

Plan: Plan 02  Canal 2  Canal 2 Centerli  RS: 3622.17  Profile: PF 1

| E.G. Elev (ft) | 19.24 | Element | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| Vel Head (ft) | 0.00 | Wt. n-Val. | 0.040 | 0.070 | 0.040 |
| W.S. Elev (ft) | 19.24 | Reach Len. (ft) | 302.00 | 301.00 | 298.00 |
| Crit W.S. (ft) | | Flow Area (sq ft) | 332.89 | 874.68 | 103.26 |
| E.G. Slope (ft/ft) | 0.000012 | Area (sq ft) | 332.89 | 874.68 | 103.26 |
| Q Total (cfs) | 371.22 | Flow (cfs) | 86.18 | 269.84 | 15.20 |
| Top Width (ft) | 293.48 | Top Width (ft) | 115.07 | 94.94 | 83.47 |
| Vel Total (ft/s) | 0.28 | Avg. Vel. (ft/s) | 0.26 | 0.31 | 0.15 |
| Max Chl Dpth (ft) | 13.24 | Hydr. Depth (ft) | 2.89 | 9.21 | 1.24 |
| Conv. Total (cfs) | 106895.4 | Conv. (cfs) | 24816.4 | 77701.9 | 4377.2 |
| Length Wtd. (ft) | 301.00 | Wetted Per. (ft) | 118.90 | 102.17 | 84.71 |
| Min Ch El (ft) | 6.00 | Shear (lb/sq ft) | 0.00 | 0.01 | 0.00 |
| Alpha | 1.07 | Stream Power (lb/ft s) | 0.00 | 0.00 | 0.00 |
| Frctn Loss (ft) | 0.00 | Cum Volume (acre-ft) | 7.14 | 75.99 | 3.53 |
| C & E Loss (ft) | 0.00 | Cum SA (acres) | 3.88 | 9.43 | 3.38 |

Plan: Plan 02  Canal 2  Canal 2 Centerli  RS: 3322.23  Profile: PF 1

| E.G. Elev (ft) | 19.23 | Element | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| Vel Head (ft) | 0.00 | Wt. n-Val. | 0.040 | 0.070 | 0.040 |
| W.S. Elev (ft) | 19.23 | Reach Len. (ft) | 298.00 | 299.00 | 300.00 |
| Crit W.S. (ft) | | Flow Area (sq ft) | 74.49 | 946.93 | 104.21 |
| E.G. Slope (ft/ft) | 0.000015 | Area (sq ft) | 74.49 | 946.93 | 104.21 |
| Q Total (cfs) | 371.22 | Flow (cfs) | 12.54 | 341.40 | 17.27 |
| Top Width (ft) | 241.61 | Top Width (ft) | 58.65 | 98.40 | 84.56 |
| Vel Total (ft/s) | 0.33 | Avg. Vel. (ft/s) | 0.17 | 0.36 | 0.17 |
| Max Chl Dpth (ft) | 13.23 | Hydr. Depth (ft) | 1.27 | 9.62 | 1.23 |
| Conv. Total (cfs) | 94714.2 | Conv. (cfs) | 3200.2 | 87107.0 | 4407.0 |
| Length Wtd. (ft) | 298.99 | Wetted Per. (ft) | 59.90 | 104.97 | 85.79 |
| Min Ch El (ft) | 6.00 | Shear (lb/sq ft) | 0.00 | 0.01 | 0.00 |
| Alpha | 1.12 | Stream Power (lb/ft s) | 0.00 | 0.00 | 0.00 |
| Frctn Loss (ft) | 0.01 | Cum Volume (acre-ft) | 5.72 | 69.69 | 2.82 |
| C & E Loss (ft) | 0.00 | Cum SA (acres) | 3.28 | 8.76 | 2.80 |

Plan: Plan 02  Canal 2  Canal 2 Centerli  RS: 3022.7  Profile: PF 1

| E.G. Elev (ft) | 19.23 | Element | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| Vel Head (ft) | 0.00 | Wt. n-Val. | 0.040 | 0.070 | 0.040 |
| W.S. Elev (ft) | 19.22 | Reach Len. (ft) | 307.00 | 302.00 | 295.00 |
| Crit W.S. (ft) | | Flow Area (sq ft) | 74.77 | 751.73 | 29.92 |
| E.G. Slope (ft/ft) | 0.000028 | Area (sq ft) | 74.77 | 751.73 | 29.92 |
| Q Total (cfs) | 371.22 | Flow (cfs) | 16.30 | 350.73 | 4.19 |
| Top Width (ft) | 197.11 | Top Width (ft) | 63.21 | 83.87 | 50.03 |
| Vel Total (ft/s) | 0.43 | Avg. Vel. (ft/s) | 0.22 | 0.47 | 0.14 |
| Max Chl Dpth (ft) | 13.22 | Hydr. Depth (ft) | 1.18 | 8.96 | 0.60 |
| Conv. Total (cfs) | 69814.6 | Conv. (cfs) | 3065.5 | 65960.4 | 788.7 |
| Length Wtd. (ft) | 302.05 | Wetted Per. (ft) | 65.11 | 89.45 | 50.05 |
| Min Ch El (ft) | 6.00 | Shear (lb/sq ft) | 0.00 | 0.01 | 0.00 |
| Alpha | 1.11 | Stream Power (lb/ft s) | 0.00 | 0.01 | 0.00 |
| Frctn Loss (ft) | 0.01 | Cum Volume (acre-ft) | 5.21 | 63.86 | 2.35 |
| C & E Loss (ft) | 0.00 | Cum SA (acres) | 2.86 | 8.13 | 2.34 |

Plan: Plan 02  Canal 2  Canal 2 Centerli  RS: 2720.33  Profile: PF 1

| E.G. Elev (ft) | 19.22 | Element | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| Vel Head (ft) | 0.00 | Wt. n-Val. | 0.040 | 0.070 | 0.040 |
| W.S. Elev (ft) | 19.22 | Reach Len. (ft) | 293.00 | 300.00 | 303.00 |
| Crit W.S. (ft) | | Flow Area (sq ft) | 91.77 | 897.05 | 78.88 |
| E.G. Slope (ft/ft) | 0.000018 | Area (sq ft) | 91.77 | 897.05 | 78.88 |
| Q Total (cfs) | 371.22 | Flow (cfs) | 15.70 | 341.67 | 13.85 |
| Top Width (ft) | 239.43 | Top Width (ft) | 78.72 | 96.00 | 64.71 |
| Vel Total (ft/s) | 0.35 | Avg. Vel. (ft/s) | 0.17 | 0.38 | 0.18 |
| Max Chl Dpth (ft) | 13.22 | Hydr. Depth (ft) | 1.17 | 9.34 | 1.22 |
| Conv. Total (cfs) | 88527.1 | Conv. (cfs) | 3744.7 | 81480.1 | 3302.3 |
| Length Wtd. (ft) | 299.83 | Wetted Per. (ft) | 80.39 | 101.35 | 65.93 |
| Min Ch El (ft) | 6.00 | Shear (lb/sq ft) | 0.00 | 0.01 | 0.00 |
| Alpha | 1.12 | Stream Power (lb/ft s) | 0.00 | 0.00 | 0.00 |
| Frctn Loss (ft) | 0.01 | Cum Volume (acre-ft) | 4.63 | 58.15 | 1.99 |
| C & E Loss (ft) | 0.00 | Cum SA (acres) | 2.36 | 7.51 | 1.95 |

Plan: Plan 02  Canal 2  Canal 2 Centerli  RS: 2419.37  Profile: PF 1

| E.G. Elev (ft) | 19.22 | Element | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| Vel Head (ft) | 0.00 | Wt. n-Val. | 0.040 | 0.070 | 0.040 |
| W.S. Elev (ft) | 19.21 | Reach Len. (ft) | 295.00 | 300.00 | 305.00 |
| Crit W.S. (ft) | | Flow Area (sq ft) | 100.47 | 874.30 | 105.64 |
| E.G. Slope (ft/ft) | 0.000016 | Area (sq ft) | 100.47 | 874.30 | 105.64 |
| Q Total (cfs) | 371.22 | Flow (cfs) | 16.45 | 336.92 | 17.85 |
| Top Width (ft) | 258.99 | Top Width (ft) | 86.93 | 85.03 | 87.03 |
| Vel Total (ft/s) | 0.34 | Avg. Vel. (ft/s) | 0.16 | 0.39 | 0.17 |
| Max Chl Dpth (ft) | 14.21 | Hydr. Depth (ft) | 1.16 | 10.28 | 1.21 |
| Conv. Total (cfs) | 92029.7 | Conv. (cfs) | 4077.9 | 83527.1 | 4424.6 |
| Length Wtd. (ft) | 300.02 | Wetted Per. (ft) | 88.60 | 91.57 | 88.24 |
| Min Ch El (ft) | 5.00 | Shear (lb/sq ft) | 0.00 | 0.01 | 0.00 |
| Alpha | 1.16 | Stream Power (lb/ft s) | 0.00 | 0.00 | 0.00 |
| Frctn Loss (ft) | 0.00 | Cum Volume (acre-ft) | 3.98 | 52.05 | 1.34 |
| C & E Loss (ft) | 0.00 | Cum SA (acres) | 1.80 | 6.89 | 1.42 |

Plan: Plan 02  Canal 2  Canal 2 Centerli  RS: 2117.71  Profile: PF 1

| E.G. Elev (ft) | 19.21 | Element | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| Vel Head (ft) | 0.00 | Wt. n-Val. | 0.040 | 0.070 | 0.040 |
| W.S. Elev (ft) | 19.21 | Reach Len. (ft) | 277.00 | 308.00 | 343.00 |
| Crit W.S. (ft) | | Flow Area (sq ft) | 83.94 | 966.93 | 90.98 |
| E.G. Slope (ft/ft) | 0.000014 | Area (sq ft) | 83.94 | 966.93 | 90.98 |
| Q Total (cfs) | 371.22 | Flow (cfs) | 12.38 | 344.54 | 14.30 |
| Top Width (ft) | 248.95 | Top Width (ft) | 77.11 | 96.62 | 75.22 |
| Vel Total (ft/s) | 0.33 | Avg. Vel. (ft/s) | 0.15 | 0.36 | 0.16 |
| Max Chl Dpth (ft) | 14.21 | Hydr. Depth (ft) | 1.09 | 10.01 | 1.21 |
| Conv. Total (cfs) | 98548.7 | Conv. (cfs) | 3286.2 | 91466.5 | 3796.0 |
| Length Wtd. (ft) | 307.98 | Wetted Per. (ft) | 78.57 | 102.79 | 76.43 |
| Min Ch El (ft) | 5.00 | Shear (lb/sq ft) | 0.00 | 0.01 | 0.00 |
| Alpha | 1.13 | Stream Power (lb/ft s) | 0.00 | 0.00 | 0.00 |
| Frctn Loss (ft) | 0.00 | Cum Volume (acre-ft) | 3.36 | 45.71 | 0.66 |
| C & E Loss (ft) | 0.00 | Cum SA (acres) | 1.25 | 6.26 | 0.85 |

Plan: Plan 02  Canal 2  Canal 2 Centerli  RS: 1807.45  Profile: PF 1

| E.G. Elev (ft) | 19.21 | Element | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| Vel Head (ft) | 0.00 | Wt. n-Val. | 0.040 | 0.070 | 0.040 |
| W.S. Elev (ft) | 19.21 | Reach Len. (ft) | 166.00 | 155.00 | 130.00 |
| Crit W.S. (ft) | | Flow Area (sq ft) | 101.85 | 2452.13 | 35.11 |
| E.G. Slope (ft/ft) | 0.000002 | Area (sq ft) | 101.85 | 2452.13 | 35.11 |
| Q Total (cfs) | 371.22 | Flow (cfs) | 5.84 | 363.92 | 1.46 |
| Top Width (ft) | 339.89 | Top Width (ft) | 84.50 | 207.90 | 47.49 |
| Vel Total (ft/s) | 0.14 | Avg. Vel. (ft/s) | 0.06 | 0.15 | 0.04 |
| Max Chl Dpth (ft) | 15.21 | Hydr. Depth (ft) | 1.21 | 11.79 | 0.74 |
| Conv. Total (cfs) | 269908.6 | Conv. (cfs) | 4245.7 | 264600.7 | 1062.2 |
| Length Wtd. (ft) | 154.96 | Wetted Per. (ft) | 85.68 | 213.95 | 47.77 |
| Min Ch El (ft) | 4.00 | Shear (lb/sq ft) | 0.00 | 0.00 | 0.00 |
| Alpha | 1.05 | Stream Power (lb/ft s) | 0.00 | 0.00 | 0.00 |
| Frctn Loss (ft) | 0.00 | Cum Volume (acre-ft) | 2.77 | 33.62 | 0.16 |
| C & E Loss (ft) | 0.00 | Cum SA (acres) | 0.73 | 5.18 | 0.37 |

Plan: Plan 02  Canal 2  Canal 2 Centerli  RS: 1654.95  Profile: PF 1

| E.G. Elev (ft) | 19.21 | Element | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| Vel Head (ft) | 0.00 | Wt. n-Val. | 0.040 | 0.070 | 0.040 |
| W.S. Elev (ft) | 19.21 | Reach Len. (ft) | 395.00 | 398.00 | 398.00 |
| Crit W.S. (ft) | 3.96 | Flow Area (sq ft) | 43.58 | 2667.80 | 56.35 |
| E.G. Slope (ft/ft) | 0.000002 | Area (sq ft) | 43.58 | 2667.80 | 56.35 |
| Q Total (cfs) | 433.20 | Flow (cfs) | 2.54 | 427.23 | 3.43 |
| Top Width (ft) | 311.98 | Top Width (ft) | 39.60 | 225.37 | 47.01 |
| Vel Total (ft/s) | 0.16 | Avg. Vel. (ft/s) | 0.06 | 0.16 | 0.06 |
| Max Chl Dpth (ft) | 17.21 | Hydr. Depth (ft) | 1.10 | 11.84 | 1.20 |
| Conv. Total (cfs) | 293603.7 | Conv. (cfs) | 1722.1 | 289558.5 | 2323.0 |
| Length Wtd. (ft) | 398.00 | Wetted Per. (ft) | 39.71 | 230.74 | 48.20 |
| Min Ch El (ft) | 2.00 | Shear (lb/sq ft) | 0.00 | 0.00 | 0.00 |
| Alpha | 1.03 | Stream Power (lb/ft s) | 0.00 | 0.00 | 0.00 |
| Frctn Loss (ft) | | Cum Volume (acre-ft) | 2.49 | 24.51 | 0.02 |
| C & E Loss (ft) | | Cum SA (acres) | 0.50 | 4.41 | 0.23 |

Plan: Plan 02  Canal 2  Canal 2 Centerli  RS: 1253.38  Profile: PF 1

| E.G. Elev (ft) | 13.11 | Element | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| Vel Head (ft) | 0.01 | Wt. n-Val. | | 0.070 | |
| W.S. Elev (ft) | 13.10 | Reach Len. (ft) | 296.00 | 296.00 | 296.00 |
| Crit W.S. (ft) | | Flow Area (sq ft) | | 715.06 | |
| E.G. Slope (ft/ft) | 0.000061 | Area (sq ft) | | 715.06 | |
| Q Total (cfs) | 433.20 | Flow (cfs) | | 433.20 | |
| Top Width (ft) | 98.97 | Top Width (ft) | | 98.97 | |
| Vel Total (ft/s) | 0.61 | Avg. Vel. (ft/s) | | 0.61 | |
| Max Chl Dpth (ft) | 9.10 | Hydr. Depth (ft) | | 7.22 | |
| Conv. Total (cfs) | 55293.1 | Conv. (cfs) | | 55293.1 | |
| Length Wtd. (ft) | 296.00 | Wetted Per. (ft) | | 102.85 | |
| Min Ch El (ft) | 4.00 | Shear (lb/sq ft) | | 0.03 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 0.02 | |
| Frctn Loss (ft) | 0.01 | Cum Volume (acre-ft) | 2.49 | 20.87 | 0.02 |
| C & E Loss (ft) | 0.00 | Cum SA (acres) | 0.32 | 2.93 | 0.02 |

Plan: Plan 02  Canal 2  Canal 2 Centerli  RS: 953.68  Profile: PF 1

| E.G. Elev (ft) | 13.10 | Element | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| Vel Head (ft) | 0.00 | Wt. n-Val. | | 0.070 | |
| W.S. Elev (ft) | 13.09 | Reach Len. (ft) | 222.00 | 216.00 | 218.00 |
| Crit W.S. (ft) | | Flow Area (sq ft) | | 968.39 | |
| E.G. Slope (ft/ft) | 0.000038 | Area (sq ft) | | 968.39 | |
| Q Total (cfs) | 433.20 | Flow (cfs) | | 433.20 | |
| Top Width (ft) | 149.67 | Top Width (ft) | | 149.67 | |
| Vel Total (ft/s) | 0.45 | Avg. Vel. (ft/s) | | 0.45 | |
| Max Chl Dpth (ft) | 10.09 | Hydr. Depth (ft) | | 6.47 | |
| Conv. Total (cfs) | 70369.5 | Conv. (cfs) | | 70369.5 | |
| Length Wtd. (ft) | 216.00 | Wetted Per. (ft) | | 152.89 | |
| Min Ch El (ft) | 3.00 | Shear (lb/sq ft) | | 0.01 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 0.01 | |
| Frctn Loss (ft) | 0.01 | Cum Volume (acre-ft) | 2.49 | 15.15 | 0.02 |
| C & E Loss (ft) | 0.00 | Cum SA (acres) | 0.32 | 2.09 | 0.02 |

Plan: Plan 02  Canal 2  Canal 2 Centerli  RS: 737.13  Profile: PF 1

| E.G. Elev (ft) | 13.09 | Element | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| Vel Head (ft) | 0.00 | Wt. n-Val. | | 0.070 | |
| W.S. Elev (ft) | 13.09 | Reach Len. (ft) | 148.00 | 150.00 | 154.00 |
| Crit W.S. (ft) | 1.91 | Flow Area (sq ft) | | 423.29 | |
| E.G. Slope (ft/ft) | 0.000004 | Area (sq ft) | | 423.29 | |
| Q Total (cfs) | 53.77 | Flow (cfs) | | 53.77 | |
| Top Width (ft) | 76.67 | Top Width (ft) | | 76.67 | |
| Vel Total (ft/s) | 0.13 | Avg. Vel. (ft/s) | | 0.13 | |
| Max Chl Dpth (ft) | 12.09 | Hydr. Depth (ft) | | 5.52 | |
| Conv. Total (cfs) | 26694.7 | Conv. (cfs) | | 26694.7 | |
| Length Wtd. (ft) | 150.00 | Wetted Per. (ft) | | 82.66 | |
| Min Ch El (ft) | 1.00 | Shear (lb/sq ft) | | 0.00 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 0.00 | |
| Frctn Loss (ft) | | Cum Volume (acre-ft) | 2.49 | 11.70 | 0.02 |
| C & E Loss (ft) | | Cum SA (acres) | 0.32 | 1.53 | 0.02 |

Plan: Plan 02  Canal 2  Canal 2 Centerli  RS: 585.52  Profile: PF 1

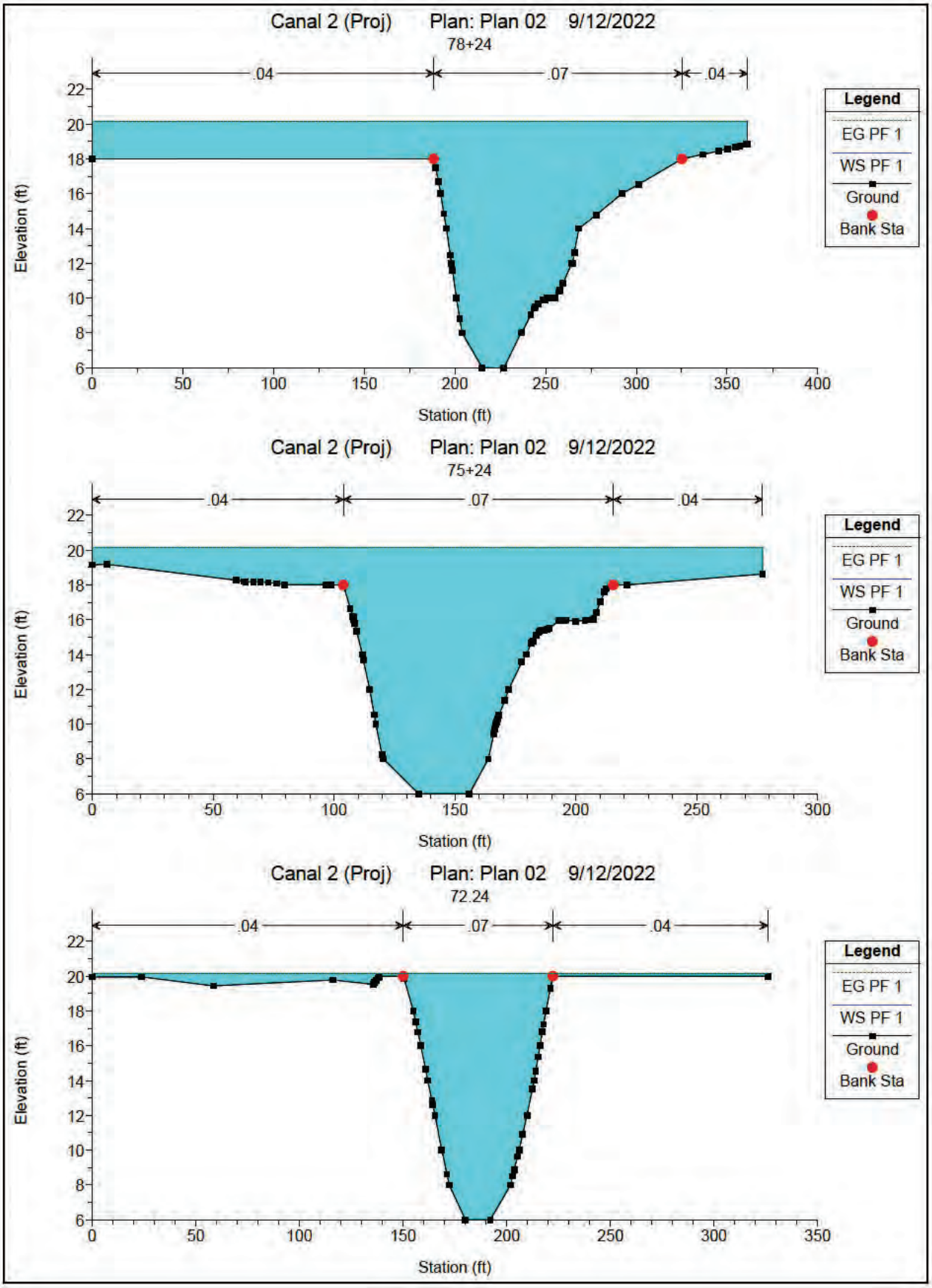
| E.G. Elev (ft) | 13.00 | Element | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| Vel Head (ft) | 0.00 | Wt. n-Val. | | 0.070 | |
| W.S. Elev (ft) | 13.00 | Reach Len. (ft) | 306.00 | 300.00 | 298.00 |
| Crit W.S. (ft) | | Flow Area (sq ft) | | 1025.78 | |
| E.G. Slope (ft/ft) | 0.000000 | Area (sq ft) | | 1025.78 | |
| Q Total (cfs) | 53.77 | Flow (cfs) | | 53.77 | |
| Top Width (ft) | 103.10 | Top Width (ft) | | 103.10 | |
| Vel Total (ft/s) | 0.05 | Avg. Vel. (ft/s) | | 0.05 | |
| Max Chl Dpth (ft) | 13.00 | Hydr. Depth (ft) | | 9.95 | |
| Conv. Total (cfs) | 96834.7 | Conv. (cfs) | | 96834.7 | |
| Length Wtd. (ft) | 300.00 | Wetted Per. (ft) | | 109.38 | |
| Min Ch El (ft) | 0.00 | Shear (lb/sq ft) | | 0.00 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 0.00 | |
| Frctn Loss (ft) | 0.00 | Cum Volume (acre-ft) | 2.49 | 11.32 | 0.02 |
| C & E Loss (ft) | 0.00 | Cum SA (acres) | 0.32 | 1.22 | 0.02 |

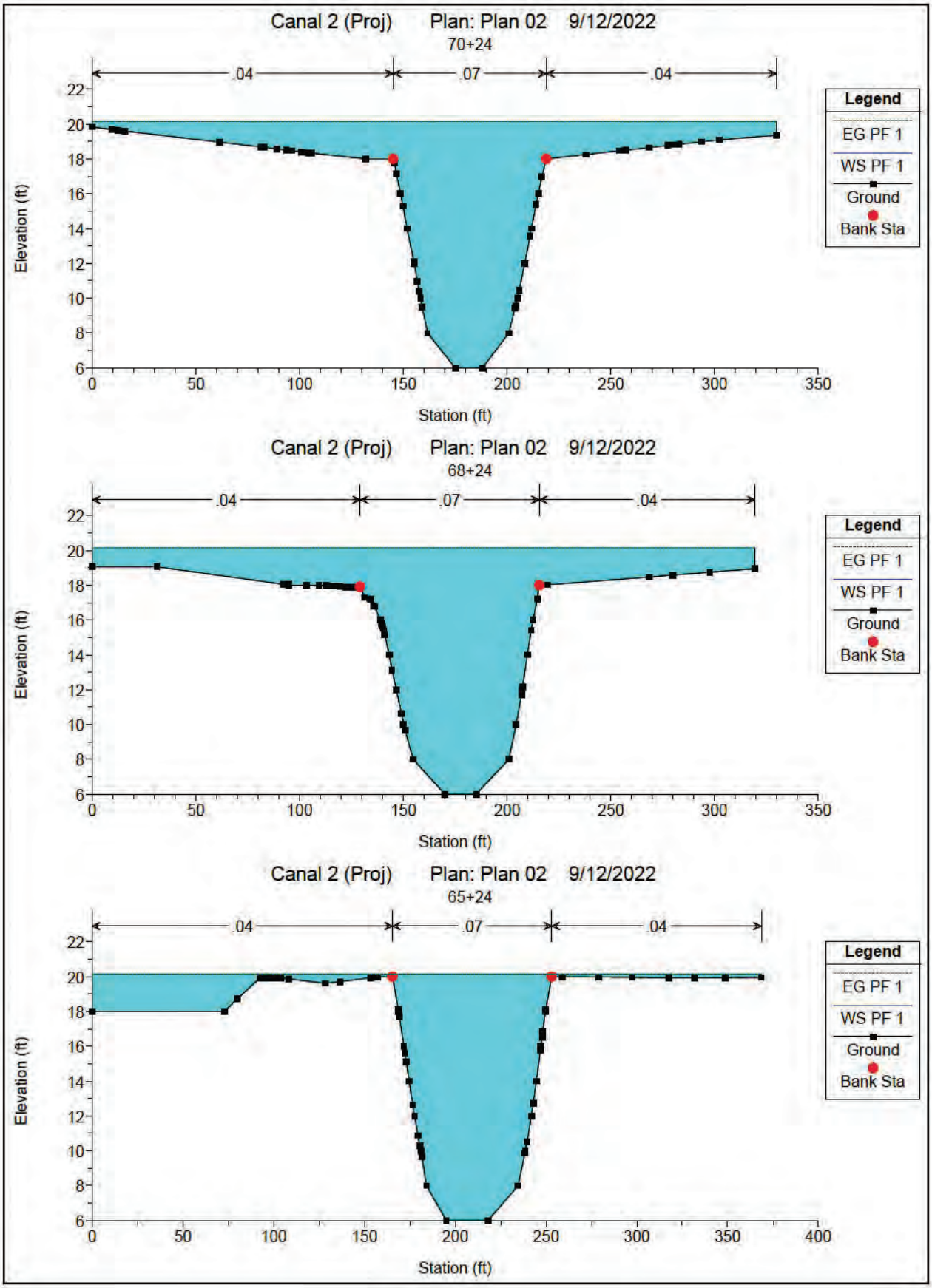
Plan: Plan 02  Canal 2  Canal 2 Centerli  RS: 285.01  Profile: PF 1

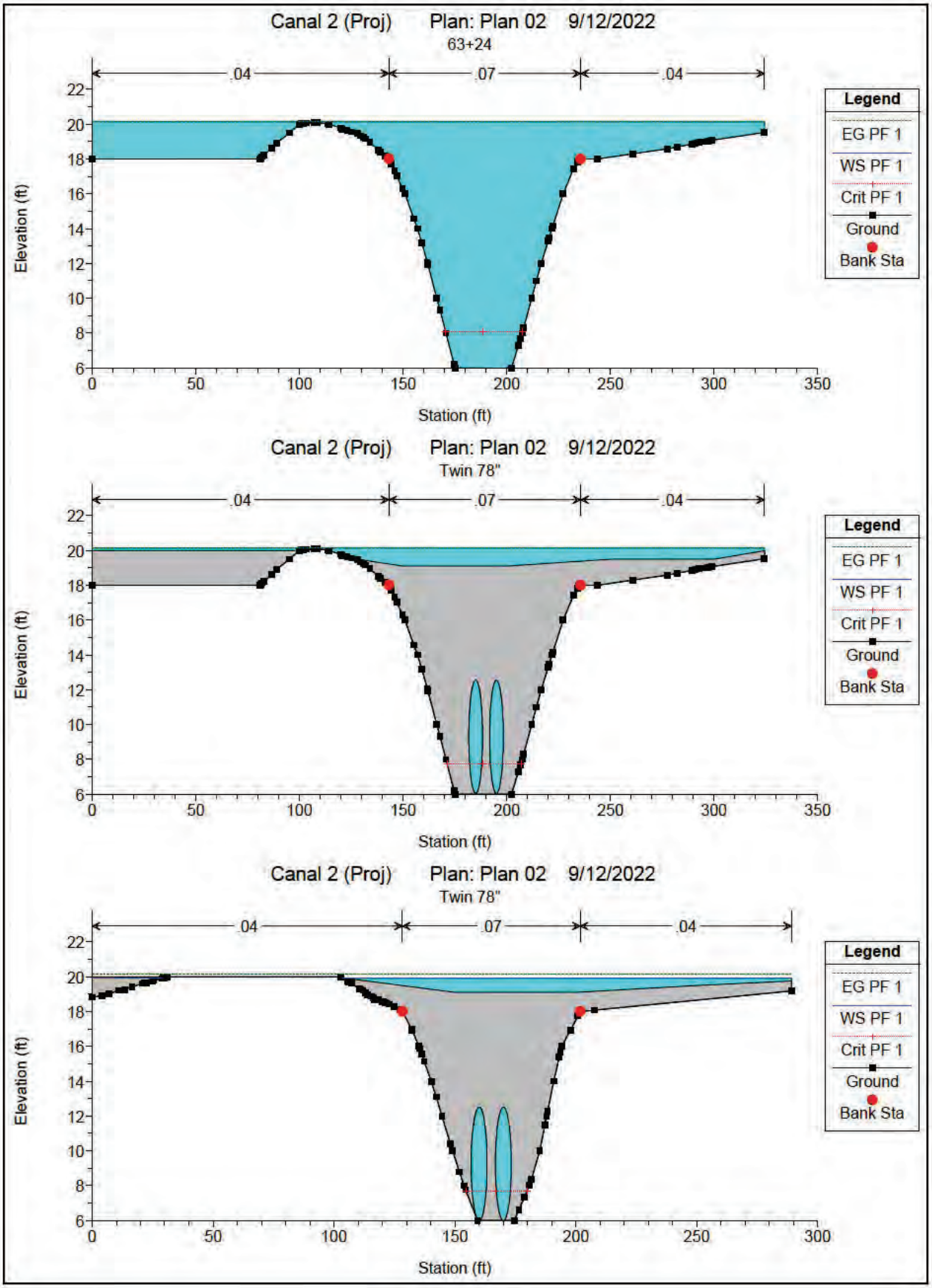
| E.G. Elev (ft) | 13.00 | Element | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| Vel Head (ft) | 0.00 | Wt. n-Val. | 0.040 | 0.070 | |
| W.S. Elev (ft) | 13.00 | Reach Len. (ft) | 198.00 | 204.00 | 204.00 |
| Crit W.S. (ft) | | Flow Area (sq ft) | 0.00 | 1029.82 | |
| E.G. Slope (ft/ft) | 0.000000 | Area (sq ft) | 0.00 | 1029.82 | |
| Q Total (cfs) | 53.77 | Flow (cfs) | 0.00 | 53.77 | |
| Top Width (ft) | 105.71 | Top Width (ft) | 0.32 | 105.40 | |
| Vel Total (ft/s) | 0.05 | Avg. Vel. (ft/s) | 0.00 | 0.05 | |
| Max Chl Dpth (ft) | 13.00 | Hydr. Depth (ft) | 0.02 | 9.77 | |
| Conv. Total (cfs) | 95863.0 | Conv. (cfs) | 0.0 | 95863.0 | |
| Length Wtd. (ft) | 201.50 | Wetted Per. (ft) | 0.35 | 112.14 | |
| Min Ch El (ft) | 0.00 | Shear (lb/sq ft) | 0.00 | 0.00 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | 0.00 | 0.00 | |
| Frctn Loss (ft) | 0.00 | Cum Volume (acre-ft) | 2.49 | 4.24 | 0.02 |
| C & E Loss (ft) | 0.00 | Cum SA (acres) | 0.32 | 0.50 | 0.02 |

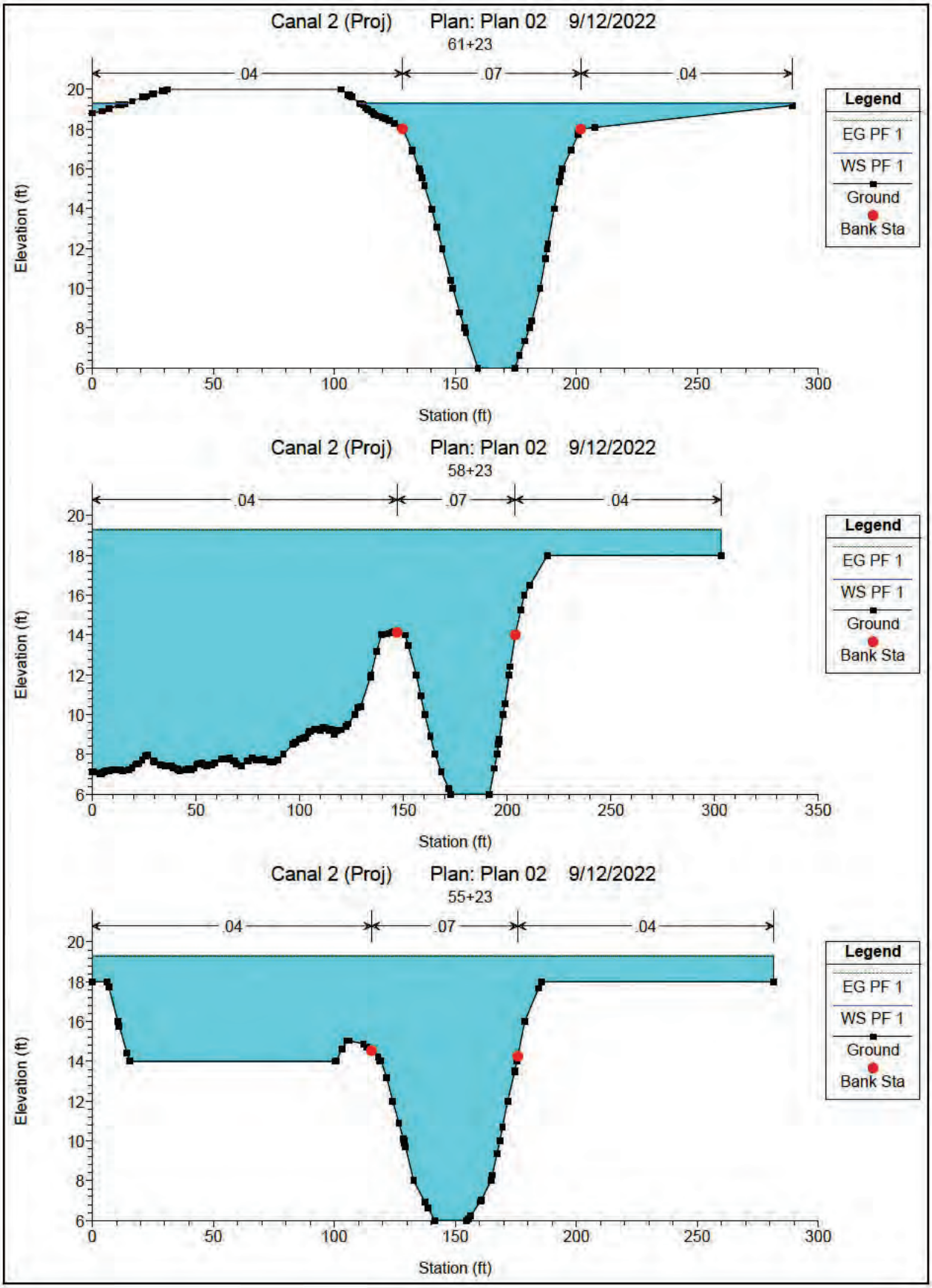
Plan: Plan 02  Canal 2  Canal 2 Centerli  RS: 85.14  Profile: PF 1

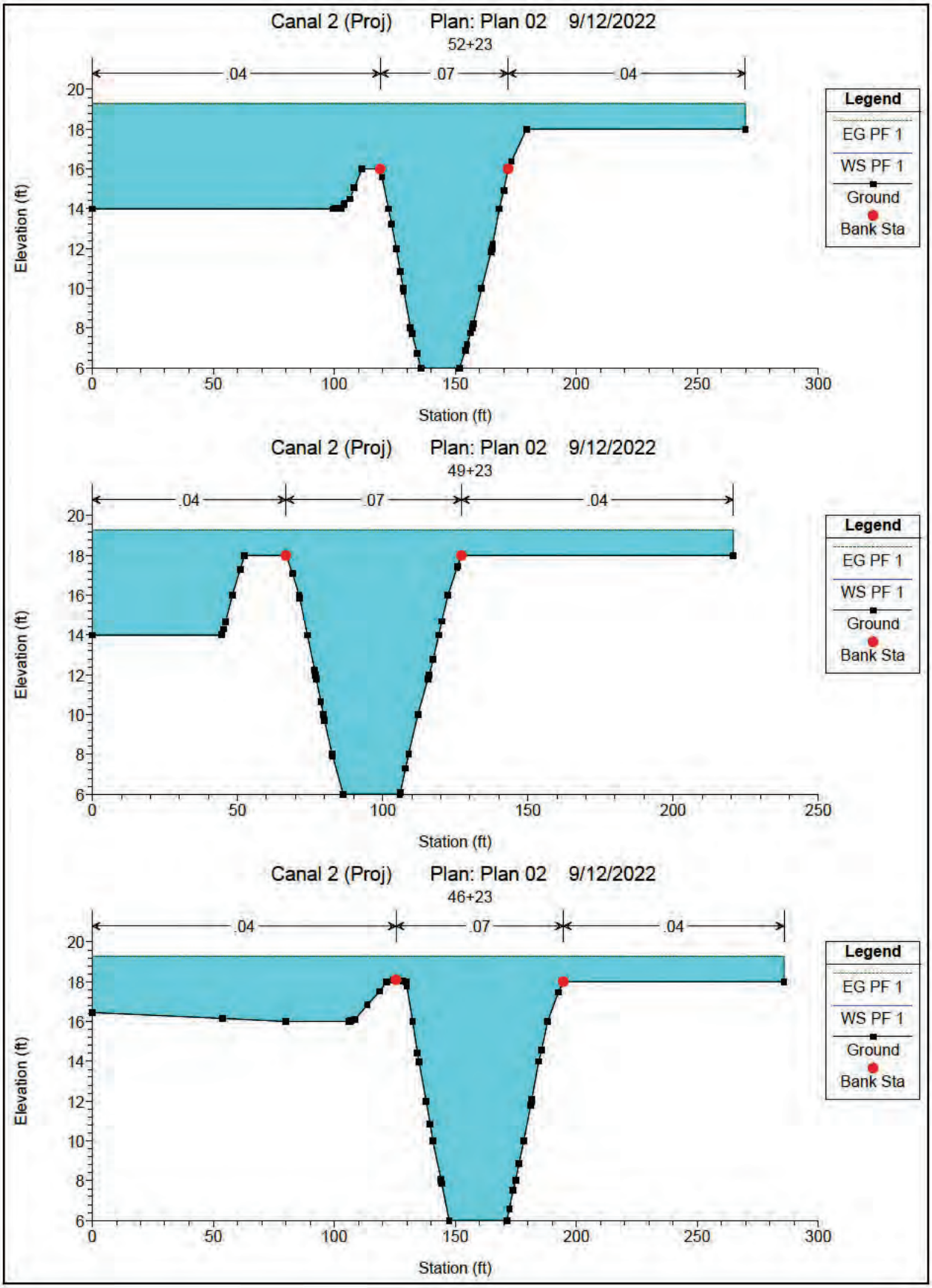
| E.G. Elev (ft) | 13.00 | Element | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| Vel Head (ft) | 0.00 | Wt. n-Val. | 0.040 | 0.070 | 0.040 |
| W.S. Elev (ft) | 13.00 | Reach Len. (ft) | | | |
| Crit W.S. (ft) | 1.43 | Flow Area (sq ft) | 1094.81 | 780.80 | 9.67 |
| E.G. Slope (ft/ft) | 0.000000 | Area (sq ft) | 1094.81 | 780.80 | 9.67 |
| Q Total (cfs) | 73.98 | Flow (cfs) | 53.14 | 20.69 | 0.15 |
| Top Width (ft) | 253.36 | Top Width (ft) | 139.56 | 107.33 | 6.47 |
| Vel Total (ft/s) | 0.04 | Avg. Vel. (ft/s) | 0.05 | 0.03 | 0.02 |
| Max Chl Dpth (ft) | 13.00 | Hydr. Depth (ft) | 7.84 | 7.27 | 1.49 |
| Conv. Total (cfs) | 212174.6 | Conv. (cfs) | 152404.7 | 59329.8 | 440.0 |
| Length Wtd. (ft) | | Wetted Per. (ft) | 150.92 | 115.29 | 7.14 |
| Min Ch El (ft) | 0.00 | Shear (lb/sq ft) | 0.00 | 0.00 | 0.00 |
| Alpha | 1.23 | Stream Power (lb/ft s) | 0.00 | 0.00 | 0.00 |
| Frctn Loss (ft) | | Cum Volume (acre-ft) | | | |
| C & E Loss (ft) | | Cum SA (acres) | | | |

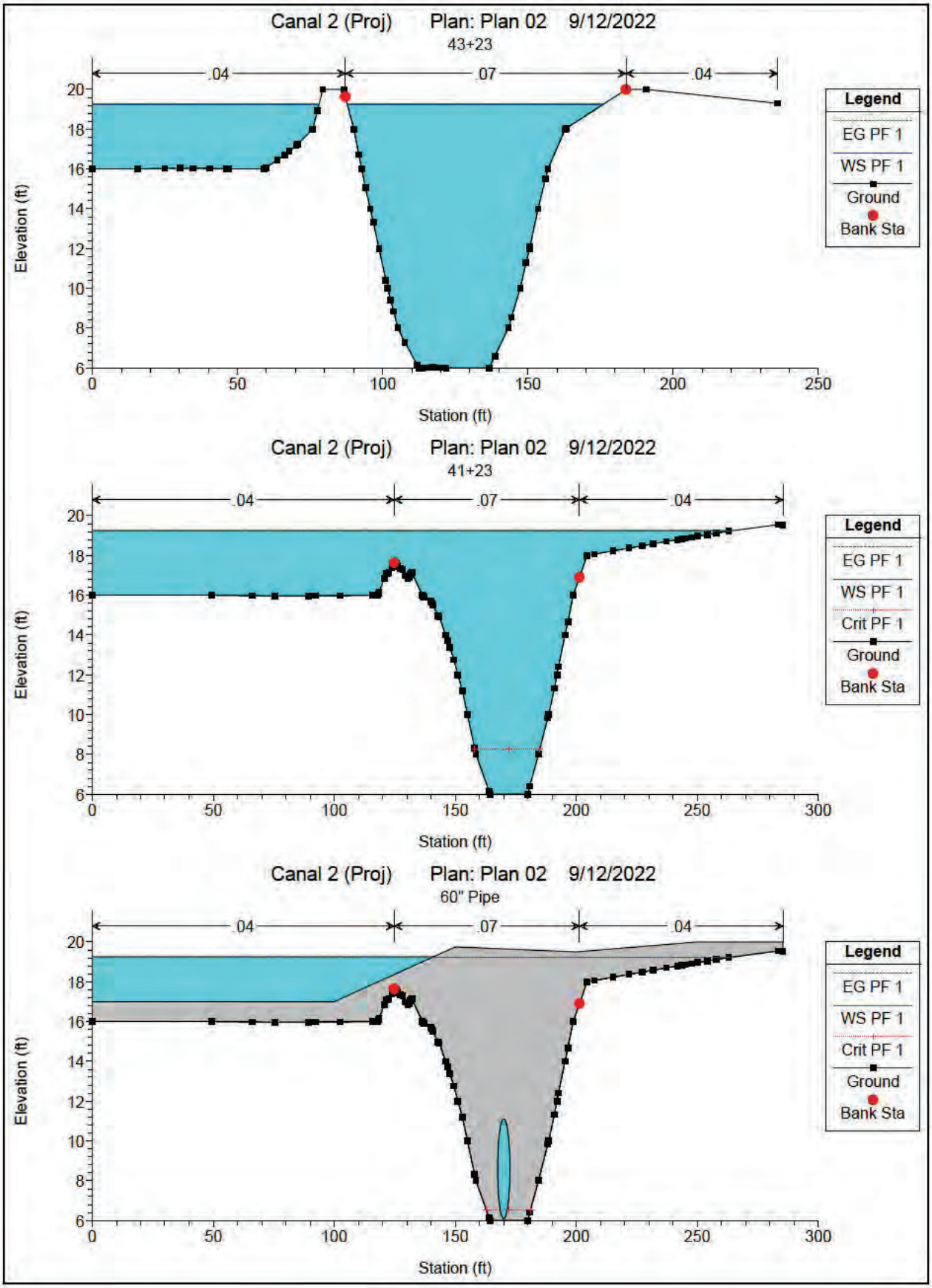

Canal 2 (Proj) Plan: Plan 02 9/12/2022
78+24
.04
.07
.04
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
Canal 2 (Proj) Plan: Plan 02 9/12/2022
75+24
.04
.07
.04
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
Canal 2 (Proj) Plan: Plan 02 9/12/2022
72.24
.04
.07
.04
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

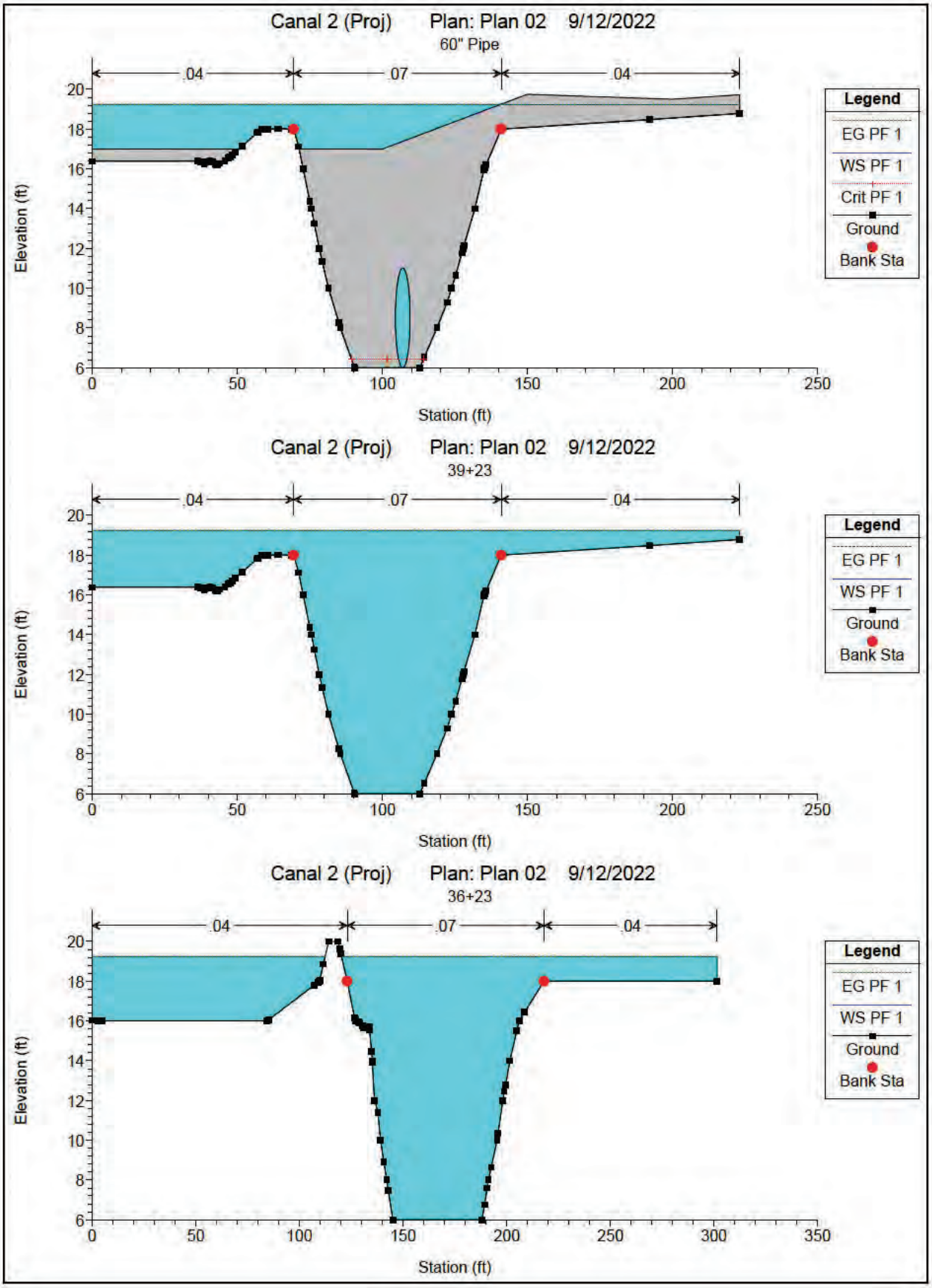

Canal 2 (Proj) Plan: Plan 02 9/12/2022
70+24
.04
.07
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Canal 2 (Proj) Plan: Plan 02 9/12/2022
68+24
.04
.07
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Canal 2 (Proj) Plan: Plan 02 9/12/2022
65+24
.04
.07
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta

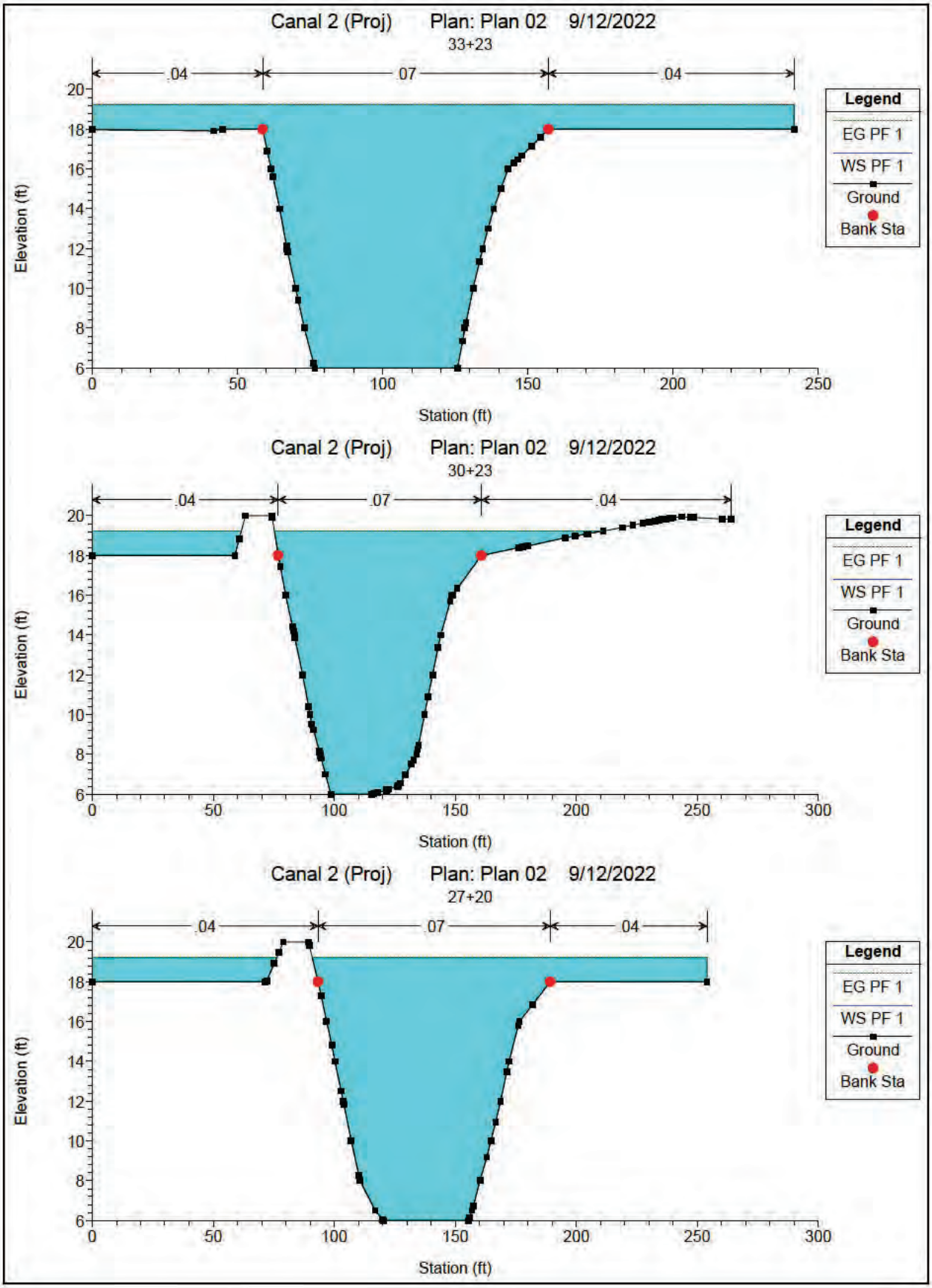

Canal 2 (Proj) Plan: Plan 02 9/12/2022
63+24
.04
.07
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Canal 2 (Proj) Plan: Plan 02 9/12/2022
Twin 78"
.04
.07
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Canal 2 (Proj) Plan: Plan 02 9/12/2022
Twin 78"
.04
.07
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta

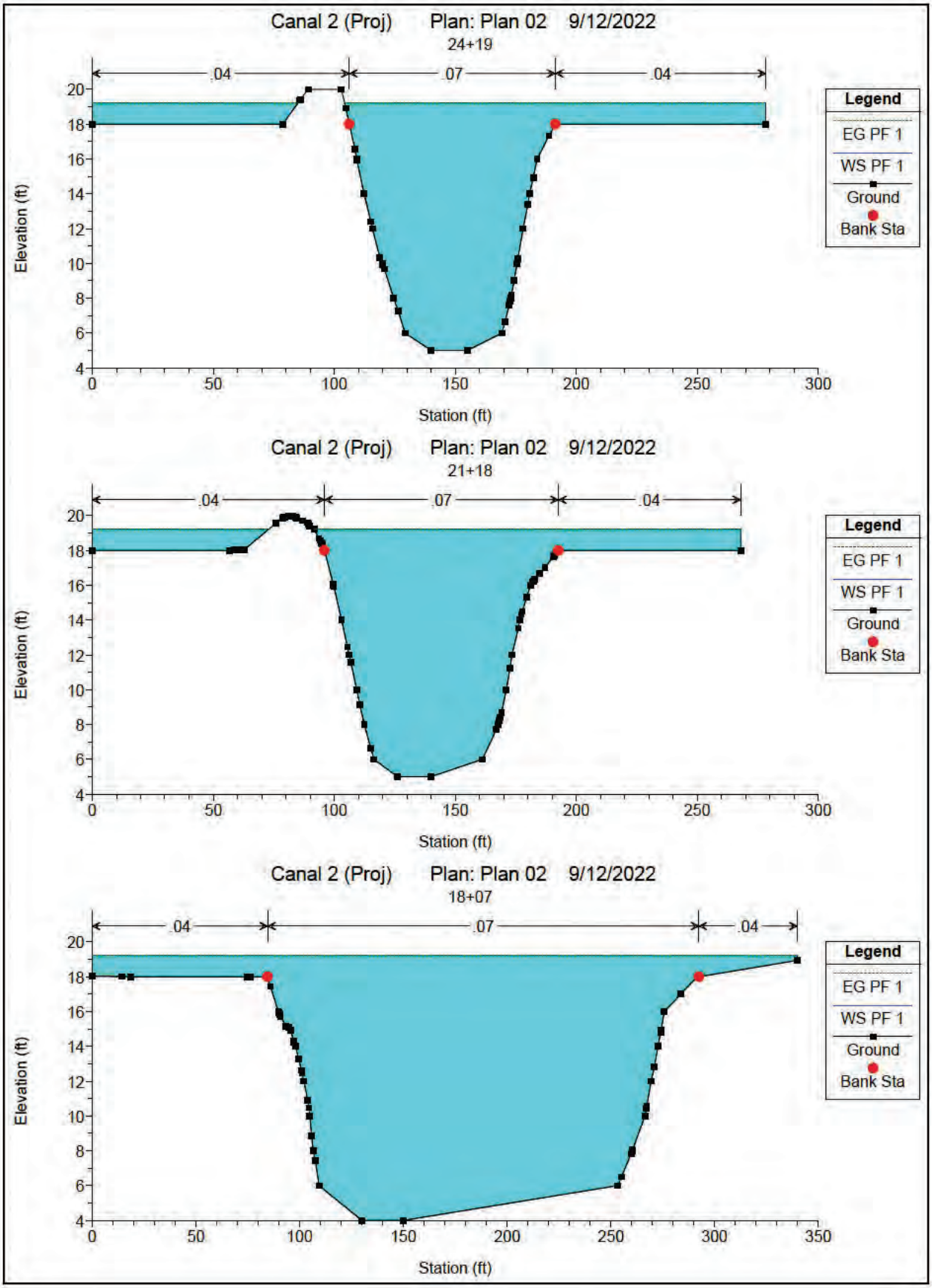

Canal 2 (Proj) Plan: Plan 02 9/12/2022
61+23
.04
.07
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Canal 2 (Proj) Plan: Plan 02 9/12/2022
58+23
.04
.07
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Canal 2 (Proj) Plan: Plan 02 9/12/2022
55+23
.04
.07
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta

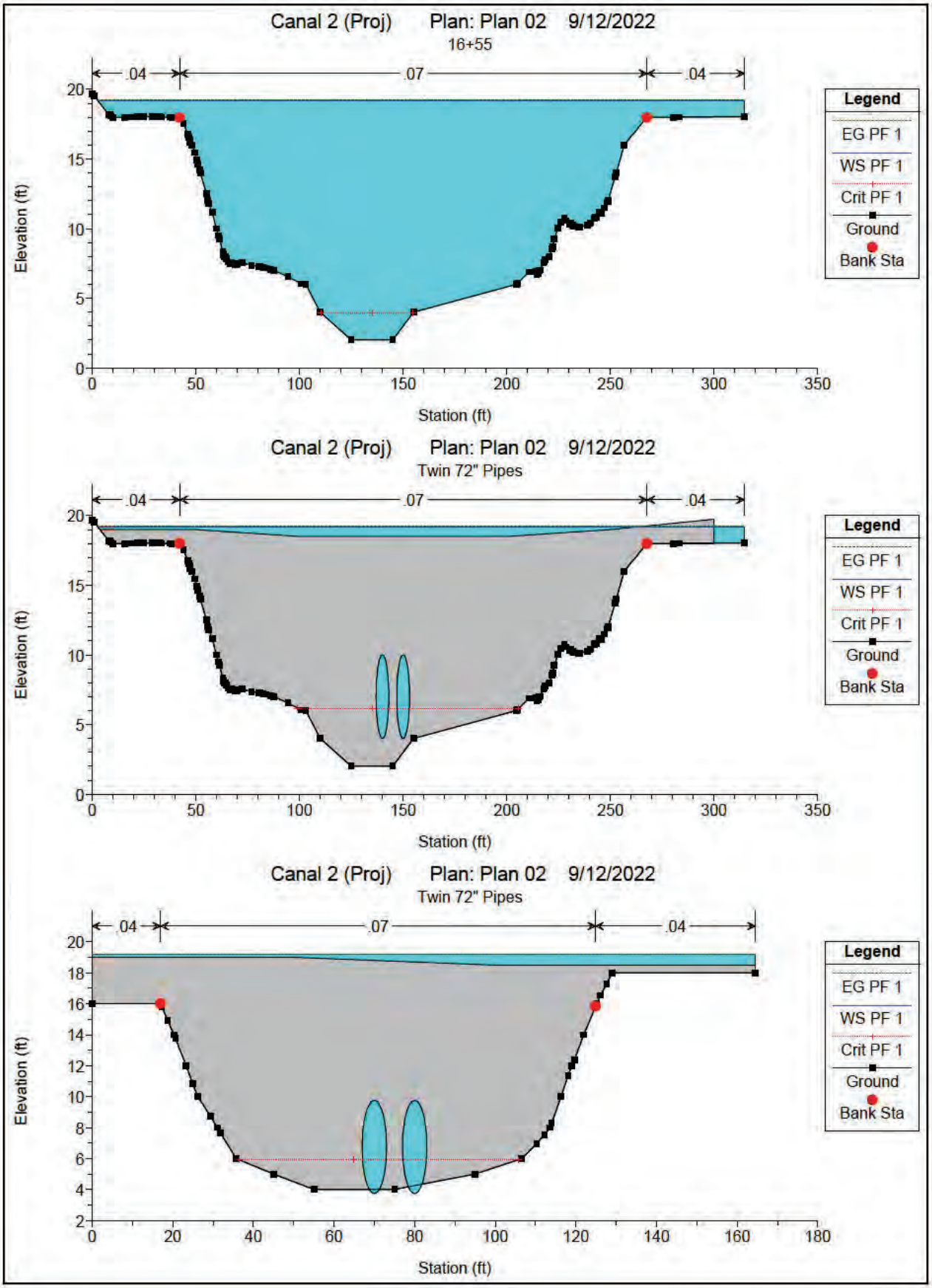

Canal 2 (Proj) Plan: Plan 02 9/12/2022
52+23
.04
.07
.04
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
Canal 2 (Proj) Plan: Plan 02 9/12/2022
49+23
.04
.07
.04
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
Canal 2 (Proj) Plan: Plan 02 9/12/2022
46+23
.04
.07
.04
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

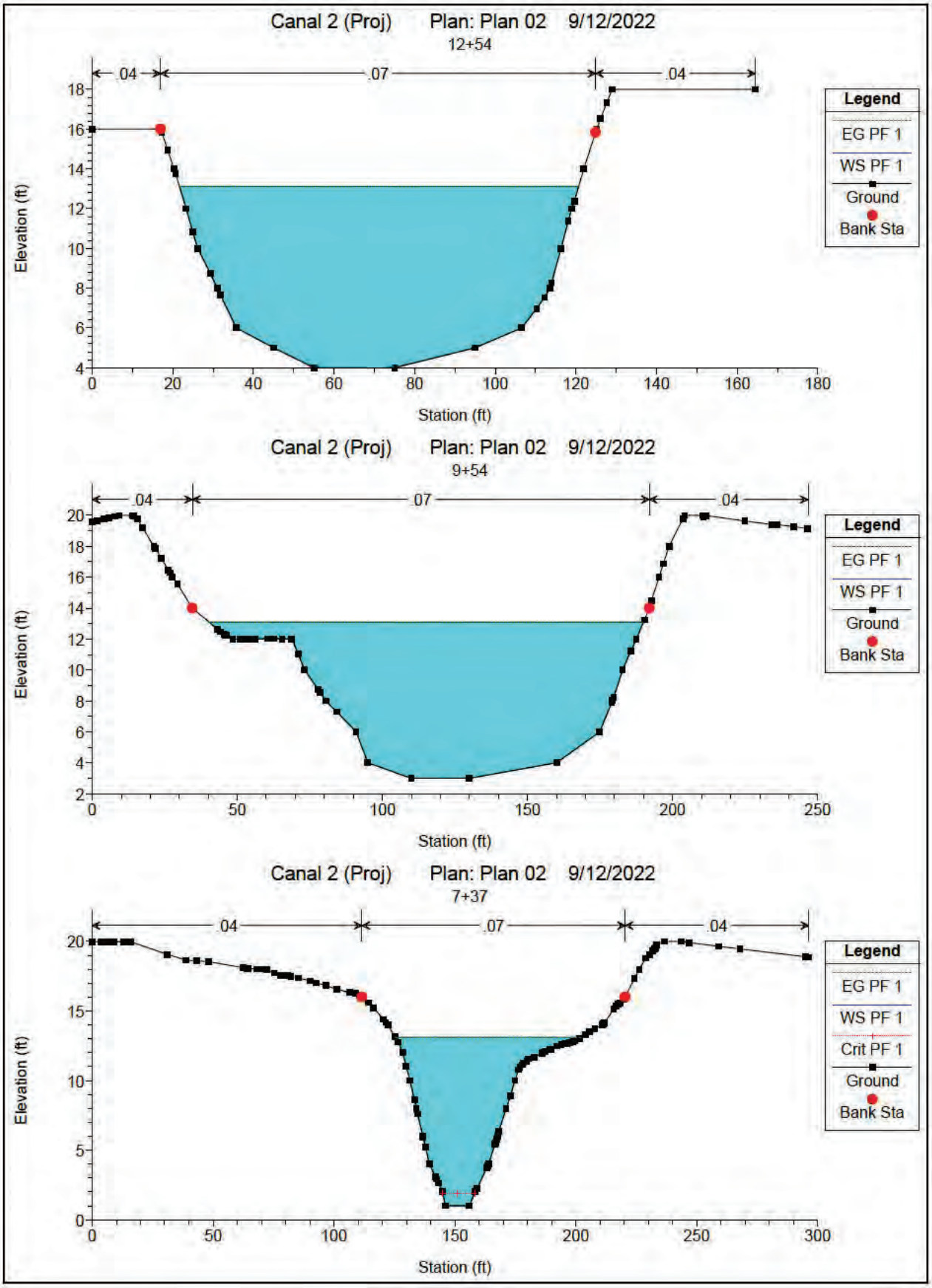

Canal 2 (Proj) Plan: Plan 02 9/12/2022
43+23
.04
.07
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Canal 2 (Proj) Plan: Plan 02 9/12/2022
41+23
.04
.07
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Canal 2 (Proj) Plan: Plan 02 9/12/2022
60" Pipe
.04
.07
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta

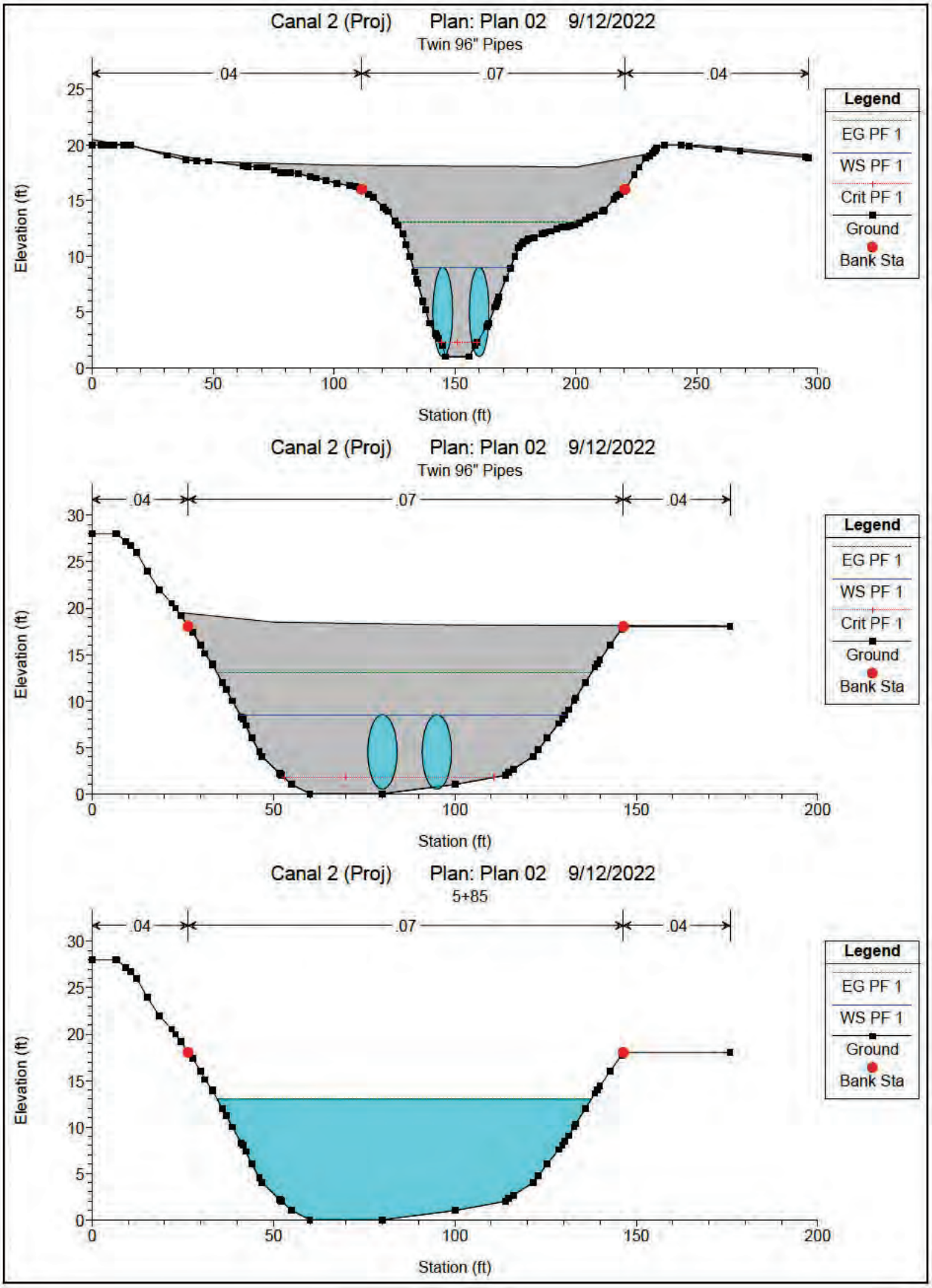

Canal 2 (Proj) Plan: Plan 02 9/12/2022
60" Pipe
.04
.07
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Canal 2 (Proj) Plan: Plan 02 9/12/2022
39+23
.04
.07
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Canal 2 (Proj) Plan: Plan 02 9/12/2022
36+23
.04
.07
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta

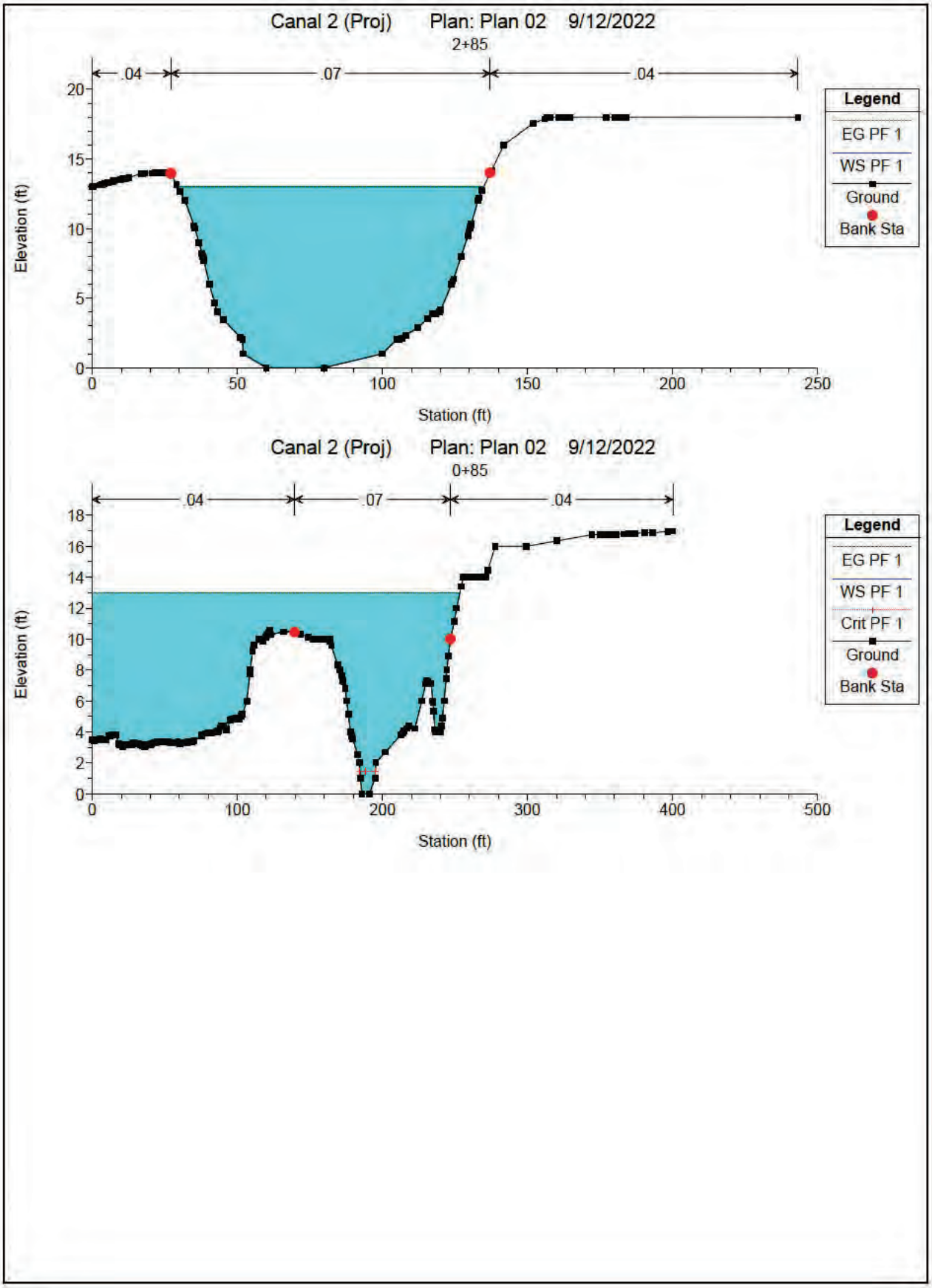

Canal 2 (Proj) Plan: Plan 02 9/12/2022
33+23
.04
.07
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Canal 2 (Proj) Plan: Plan 02 9/12/2022
30+23
.04
.07
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Canal 2 (Proj) Plan: Plan 02 9/12/2022
27+20
.04
.07
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta


Canal 2 (Proj) Plan: Plan 02 9/12/2022
24+19
.04
.07
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Canal 2 (Proj) Plan: Plan 02 9/12/2022
21+18
.04
.07
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Canal 2 (Proj) Plan: Plan 02 9/12/2022
18+07
.04
.07
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta


Canal 2 (Proj) Plan: Plan 02 9/12/2022
16+55
.04
.07
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Canal 2 (Proj) Plan: Plan 02 9/12/2022
Twin 72" Pipes
.04
.07
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Canal 2 (Proj) Plan: Plan 02 9/12/2022
Twin 72" Pipes
.04
.07
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta


Canal 2 (Proj) Plan: Plan 02 9/12/2022
12+54
.04
.07
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Canal 2 (Proj) Plan: Plan 02 9/12/2022
9+54
.04
.07
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Canal 2 (Proj) Plan: Plan 02 9/12/2022
7+37
.04
.07
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta


Canal 2 (Proj) Plan: Plan 02 9/12/2022
Twin 96" Pipes
.04
.07
.04
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
Canal 2 (Proj) Plan: Plan 02 9/12/2022
Twin 96" Pipes
.04
.07
.04
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
Canal 2 (Proj) Plan: Plan 02 9/12/2022
5+85
.04
.07
.04
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


Canal 2 (Proj) Plan: Plan 02 9/12/2022
2+85
.04
.07
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Canal 2 (Proj) Plan: Plan 02 9/12/2022
0+85
.04
.07
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta

HEC-RAS Plan: Plan 02 River: Canal 2 Reach: Canal 2 Centerli Profile: PF 1

| Reach | River Sta | Profile | Q Total | Min Ch El | W.S. Elev | Crit W.S. | E.G. Elev | E.G. Slope | Vel Chnl | Flow Area | Top Width | Froude # Chl |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | (cfs) | (ft) | (ft) | (ft) | (ft) | (ft/ft) | (ft/s) | (sq ft) | (ft) | |
| Canal 2 Centerli | 7824.29 | PF 1 | 111.76 | 6.00 | 20.15 | | 20.15 | 0.000001 | 0.08 | 1556.24 | 361.22 | 0.00 |
| Canal 2 Centerli | 7524.44 | PF 1 | 111.76 | 6.00 | 20.15 | | 20.15 | 0.000001 | 0.10 | 1276.94 | 277.17 | 0.01 |
| Canal 2 Centerli | 7224.11 | PF 1 | 111.76 | 6.00 | 20.15 | | 20.15 | 0.000004 | 0.16 | 740.45 | 325.94 | 0.01 |
| Canal 2 Centerli | 7024 | PF 1 | 111.76 | 6.00 | 20.15 | | 20.15 | 0.000001 | 0.12 | 1126.28 | 329.81 | 0.01 |
| Canal 2 Centerli | 6823.66 | PF 1 | 111.76 | 6.00 | 20.15 | | 20.15 | 0.000001 | 0.10 | 1273.26 | 319.33 | 0.01 |
| Canal 2 Centerli | 6524.2 | PF 1 | 111.76 | 6.00 | 20.14 | | 20.15 | 0.000001 | 0.11 | 1144.90 | 368.57 | 0.01 |
| Canal 2 Centerli | 6324.18 | PF 1 | 511.19 | 6.00 | 20.14 | 8.08 | 20.14 | 0.000028 | 0.48 | 1224.12 | 324.29 | 0.03 |
| Canal 2 Centerli | 6169 | | Culvert | | | | | | | | | |
| Canal 2 Centerli | 6122.84 | PF 1 | 511.19 | 6.00 | 19.29 | | 19.30 | 0.000091 | 0.80 | 692.07 | 192.74 | 0.05 |
| Canal 2 Centerli | 5823.42 | PF 1 | 511.19 | 6.00 | 19.30 | | 19.30 | 0.000002 | 0.15 | 2327.67 | 303.03 | 0.01 |
| Canal 2 Centerli | 5523.12 | PF 1 | 511.19 | 6.00 | 19.30 | | 19.30 | 0.000016 | 0.39 | 1335.49 | 281.54 | 0.02 |
| Canal 2 Centerli | 5223.34 | PF 1 | 511.19 | 6.00 | 19.29 | | 19.29 | 0.000018 | 0.40 | 1269.59 | 269.85 | 0.02 |
| Canal 2 Centerli | 4922.72 | PF 1 | 511.19 | 6.00 | 19.28 | | 19.28 | 0.000044 | 0.57 | 944.29 | 220.71 | 0.03 |
| Canal 2 Centerli | 4623.05 | PF 1 | 511.19 | 6.00 | 19.27 | | 19.27 | 0.000036 | 0.51 | 1095.68 | 285.76 | 0.03 |
| Canal 2 Centerli | 4322.55 | PF 1 | 511.19 | 6.00 | 19.25 | | 19.26 | 0.000046 | 0.55 | 945.13 | 166.21 | 0.03 |
| Canal 2 Centerli | 4122.9 | PF 1 | 371.22 | 6.00 | 19.25 | 8.27 | 19.25 | 0.000020 | 0.37 | 1053.67 | 264.75 | 0.02 |
| Canal 2 Centerli | 3994 | | Culvert | | | | | | | | | |
| Canal 2 Centerli | 3922.64 | PF 1 | 371.22 | 6.00 | 19.24 | | 19.24 | 0.000025 | 0.45 | 912.01 | 223.04 | 0.03 |
| Canal 2 Centerli | 3622.17 | PF 1 | 371.22 | 6.00 | 19.24 | | 19.24 | 0.000012 | 0.31 | 1310.82 | 293.48 | 0.02 |
| Canal 2 Centerli | 3322.23 | PF 1 | 371.22 | 6.00 | 19.23 | | 19.23 | 0.000015 | 0.36 | 1125.63 | 241.61 | 0.02 |
| Canal 2 Centerli | 3022.7 | PF 1 | 371.22 | 6.00 | 19.22 | | 19.23 | 0.000028 | 0.47 | 856.42 | 197.11 | 0.03 |
| Canal 2 Centerli | 2720.33 | PF 1 | 371.22 | 6.00 | 19.22 | | 19.22 | 0.000018 | 0.38 | 1067.70 | 239.43 | 0.02 |
| Canal 2 Centerli | 2419.37 | PF 1 | 371.22 | 5.00 | 19.21 | | 19.22 | 0.000016 | 0.39 | 1080.41 | 258.99 | 0.02 |
| Canal 2 Centerli | 2117.71 | PF 1 | 371.22 | 5.00 | 19.21 | | 19.21 | 0.000014 | 0.36 | 1141.85 | 248.95 | 0.02 |
| Canal 2 Centerli | 1807.45 | PF 1 | 371.22 | 4.00 | 19.21 | | 19.21 | 0.000002 | 0.15 | 2589.09 | 339.89 | 0.01 |
| Canal 2 Centerli | 1654.95 | PF 1 | 433.20 | 2.00 | 19.21 | 3.96 | 19.21 | 0.000002 | 0.16 | 2767.72 | 311.98 | 0.01 |
| Canal 2 Centerli | 1359 | | Culvert | | | | | | | | | |
| Canal 2 Centerli | 1253.38 | PF 1 | 433.20 | 4.00 | 13.10 | | 13.11 | 0.000061 | 0.61 | 715.06 | 98.97 | 0.04 |
| Canal 2 Centerli | 953.68 | PF 1 | 433.20 | 3.00 | 13.09 | | 13.10 | 0.000038 | 0.45 | 968.39 | 149.67 | 0.03 |
| Canal 2 Centerli | 737.13 | PF 1 | 53.77 | 1.00 | 13.09 | 1.91 | 13.09 | 0.000004 | 0.13 | 423.29 | 76.67 | 0.01 |
| Canal 2 Centerli | 600 | | Culvert | | | | | | | | | |
| Canal 2 Centerli | 585.52 | PF 1 | 53.77 | 0.00 | 13.00 | | 13.00 | 0.000000 | 0.05 | 1025.78 | 103.10 | 0.00 |
| Canal 2 Centerli | 285.01 | PF 1 | 53.77 | 0.00 | 13.00 | | 13.00 | 0.000000 | 0.05 | 1029.82 | 105.71 | 0.00 |
| Canal 2 Centerli | 85.14 | PF 1 | 73.98 | 0.00 | 13.00 | 1.43 | 13.00 | 0.000000 | 0.03 | 1885.28 | 253.36 | 0.00 |

# Hydrograph Summary Report

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

| Hyd. No. | Hydrograph type (origin) | Peak flow (cfs) | Time interval (min) | Time to Peak (min) | Hyd. volume (cuft) | Inflow hyd(s) | Maximum elevation (ft) | Total strge used (cuft) | Hydrograph Description |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Rational | 67.96 | 1 | 5 | 20,389 | ------ | ------ | ------ | Pre Canal 2-1 (West) |
| 2 | Rational | 41.89 | 1 | 5 | 12,568 | ------ | ------ | ------ | Pre Canal 2-2 (West) |
| 3 | Rational | 95.74 | 1 | 26 | 151,641 | ------ | ------ | ------ | Pre Canal 2-3 (West) |
| 4 | Rational | 216.62 | 1 | 33 | 431,013 | ------ | ------ | ------ | Pre Canal 2-4 (West) |
| 6 | Rational | 6.018 | 1 | 5 | 1,805 | ------ | ------ | ------ | Pre Canal 2-1 (East) |
| 7 | Rational | 11.88 | 1 | 5 | 3,563 | ------ | ------ | ------ | Pre Canal 2-2 (East) |
| 8 | Rational | 385.42 | 1 | 14 | 314,089 | ------ | ------ | ------ | Pre Canal 2-3 (East) |
| 9 | Rational | 205.70 | 1 | 44 | 541,607 | ------ | ------ | ------ | Pre Canal 2-4 (East) |
| 11 | Rational | 64.93 | 1 | 5 | 19,479 | ------ | ------ | ------ | Off-Site Fuller |
| 12 | Rational | 56.00 | 1 | 10 | 35,176 | ------ | ------ | ------ | Off-Site Hiossen |
| 13 | Rational | 54.45 | 1 | 37 | 122,099 | ------ | ------ | ------ | Off-Site Petrucci |
| 14 | Rational | 37.90 | 1 | 28 | 63,880 | ------ | ------ | ------ | Off-Site Fleck |
| 15 | Rational | 29.03 | 1 | 34 | 59,213 | ------ | ------ | ------ | Off-Site Northern DA |
| 17 | Rational | 112.37 | 1 | 5 | 33,710 | ------ | ------ | ------ | Post Flow to 61+23 |
| 19 | Combine | 73.98 | 1 | 5 | 22,195 | 1, 6, | ------ | ------ | To Sta 0+85 |
| 20 | Combine | 53.77 | 1 | 5 | 16,131 | 2, 7, | ------ | ------ | To Sta 7+37 |
| 21 | Combine | 436.97 | 1 | 14 | 449,975 | 3, 8, | ------ | ------ | To Sta 16+54 |
| 22 | Combine | 369.69 | 1 | 33 | 959,603 | 4, 9, | ------ | ------ | To Sta 41+23 |
| 24 | Reach | 71.92 | 1 | 7 | 39,148 | 17 | ------ | ------ | To 41+23 |
| 25 | Combine | 369.77 | 1 | 33 | 998,751 | 4, 9, 24 | ------ | ------ | Total to 41+23 |
| 26 | Reach | 360.13 | 1 | 39 | 1,004,429 | 25 | ------ | ------ | To 16+54 |
| 27 | Combine | 593.36 | 1 | 14 | 1,454,404 | 3, 8, 26 | ------ | ------ | Total to 16+54 |
| 28 | Reach | 578.69 | 1 | 15 | 1,457,131 | 27 | ------ | ------ | To 7+37 |
| 29 | Combine | 578.69 | 1 | 15 | 1,473,262 | 2, 7, 28 | ------ | ------ | Total to 7+37 |
| 30 | Reach | 573.82 | 1 | 17 | 1,476,227 | 29 | ------ | ------ | To 0+85 |
| 31 | Combine | 573.82 | 1 | 17 | 1,498,421 | 1, 6, 30 | ------ | ------ | Total to 0+85 |

Plan: Plan 02  Canal 2  Canal 2 Centerli  RS: 6122.84  Profile: PF 1

| E.G. Elev (ft) | 18.89 | Element | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| Vel Head (ft) | 0.00 | Wt. n-Val. | 0.040 | 0.070 | 0.040 |
| W.S. Elev (ft) | 18.89 | Reach Len. (ft) | 302.00 | 300.00 | 298.00 |
| Crit W.S. (ft) | | Flow Area (sq ft) | 5.66 | 585.93 | 28.86 |
| E.G. Slope (ft/ft) | 0.000005 | Area (sq ft) | 5.66 | 585.93 | 28.86 |
| Q Total (cfs) | 112.37 | Flow (cfs) | 0.27 | 110.64 | 1.45 |
| Top Width (ft) | 154.66 | Top Width (ft) | 15.98 | 73.58 | 65.10 |
| Vel Total (ft/s) | 0.18 | Avg. Vel. (ft/s) | 0.05 | 0.19 | 0.05 |
| Max Chl Dpth (ft) | 12.89 | Hydr. Depth (ft) | 0.35 | 7.96 | 0.44 |
| Conv. Total (cfs) | 48161.1 | Conv. (cfs) | 117.7 | 47420.2 | 623.2 |
| Length Wtd. (ft) | 300.79 | Wetted Per. (ft) | 16.10 | 78.71 | 65.10 |
| Min Ch El (ft) | 6.00 | Shear (lb/sq ft) | 0.00 | 0.00 | 0.00 |
| Alpha | 1.07 | Stream Power (lb/ft s) | 0.00 | 0.00 | 0.00 |
| Frctn Loss (ft) | 0.00 | Cum Volume (acre-ft) | 31.28 | 106.41 | 6.23 |
| C & E Loss (ft) | 0.00 | Cum SA (acres) | 9.62 | 13.31 | 7.78 |

Plan: Plan 02  Canal 2  Canal 2 Centerli  RS: 5823.42  Profile: PF 1

| E.G. Elev (ft) | 18.89 | Element | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| Vel Head (ft) | 0.00 | Wt. n-Val. | 0.040 | 0.070 | 0.040 |
| W.S. Elev (ft) | 18.89 | Reach Len. (ft) | 301.00 | 300.00 | 299.00 |
| Crit W.S. (ft) | | Flow Area (sq ft) | 1516.93 | 574.36 | 112.12 |
| E.G. Slope (ft/ft) | 0.000000 | Area (sq ft) | 1516.93 | 574.36 | 112.12 |
| Q Total (cfs) | 112.37 | Flow (cfs) | 91.09 | 19.67 | 1.61 |
| Top Width (ft) | 303.03 | Top Width (ft) | 147.02 | 56.84 | 99.17 |
| Vel Total (ft/s) | 0.05 | Avg. Vel. (ft/s) | 0.06 | 0.03 | 0.01 |
| Max Chl Dpth (ft) | 12.89 | Hydr. Depth (ft) | 10.32 | 10.10 | 1.13 |
| Conv. Total (cfs) | 311616.0 | Conv. (cfs) | 252595.4 | 54546.0 | 4474.6 |
| Length Wtd. (ft) | 300.61 | Wetted Per. (ft) | 159.84 | 60.70 | 100.68 |
| Min Ch El (ft) | 6.00 | Shear (lb/sq ft) | 0.00 | 0.00 | 0.00 |
| Alpha | 1.20 | Stream Power (lb/ft s) | 0.00 | 0.00 | 0.00 |
| Frctn Loss (ft) | 0.00 | Cum Volume (acre-ft) | 26.00 | 102.41 | 5.75 |
| C & E Loss (ft) | 0.00 | Cum SA (acres) | 9.05 | 12.86 | 7.22 |

Plan: Plan 02  Canal 2  Canal 2 Centerli  RS: 5523.12  Profile: PF 1

| E.G. Elev (ft) | 18.89 | Element | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| Vel Head (ft) | 0.00 | Wt. n-Val. | 0.040 | 0.070 | 0.040 |
| W.S. Elev (ft) | 18.89 | Reach Len. (ft) | 300.00 | 300.00 | 300.00 |
| Crit W.S. (ft) | | Flow Area (sq ft) | 509.94 | 602.07 | 108.87 |
| E.G. Slope (ft/ft) | 0.000001 | Area (sq ft) | 509.94 | 602.07 | 108.87 |
| Q Total (cfs) | 112.37 | Flow (cfs) | 50.81 | 57.45 | 4.11 |
| Top Width (ft) | 281.54 | Top Width (ft) | 115.43 | 60.39 | 105.72 |
| Vel Total (ft/s) | 0.09 | Avg. Vel. (ft/s) | 0.10 | 0.10 | 0.04 |
| Max Chl Dpth (ft) | 12.89 | Hydr. Depth (ft) | 4.42 | 9.97 | 1.03 |
| Conv. Total (cfs) | 111610.7 | Conv. (cfs) | 50464.4 | 57064.6 | 4081.7 |
| Length Wtd. (ft) | 300.00 | Wetted Per. (ft) | 117.28 | 63.81 | 107.39 |
| Min Ch El (ft) | 6.00 | Shear (lb/sq ft) | 0.00 | 0.00 | 0.00 |
| Alpha | 1.09 | Stream Power (lb/ft s) | 0.00 | 0.00 | 0.00 |
| Frctn Loss (ft) | 0.00 | Cum Volume (acre-ft) | 19.00 | 98.36 | 4.99 |
| C & E Loss (ft) | 0.00 | Cum SA (acres) | 8.14 | 12.46 | 6.52 |

Plan: Plan 02  Canal 2  Canal 2 Centerli  RS: 5223.34  Profile: PF 1

| E.G. Elev (ft) | 18.89 | Element | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| Vel Head (ft) | 0.00 | Wt. n-Val. | 0.040 | 0.070 | 0.040 |
| W.S. Elev (ft) | 18.89 | Reach Len. (ft) | 303.00 | 301.00 | 300.00 |
| Crit W.S. (ft) | | Flow Area (sq ft) | 559.50 | 507.19 | 94.45 |
| E.G. Slope (ft/ft) | 0.000001 | Area (sq ft) | 559.50 | 507.19 | 94.45 |
| Q Total (cfs) | 112.37 | Flow (cfs) | 60.20 | 48.56 | 3.61 |
| Top Width (ft) | 269.85 | Top Width (ft) | 119.10 | 52.75 | 98.00 |
| Vel Total (ft/s) | 0.10 | Avg. Vel. (ft/s) | 0.11 | 0.10 | 0.04 |
| Max Chl Dpth (ft) | 12.89 | Hydr. Depth (ft) | 4.70 | 9.61 | 0.96 |
| Conv. Total (cfs) | 105790.2 | Conv. (cfs) | 56676.5 | 45716.6 | 3397.1 |
| Length Wtd. (ft) | 301.82 | Wetted Per. (ft) | 124.25 | 57.96 | 99.15 |
| Min Ch El (ft) | 6.00 | Shear (lb/sq ft) | 0.00 | 0.00 | 0.00 |
| Alpha | 1.09 | Stream Power (lb/ft s) | 0.00 | 0.00 | 0.00 |
| Frctn Loss (ft) | 0.00 | Cum Volume (acre-ft) | 15.31 | 94.54 | 4.29 |
| C & E Loss (ft) | 0.00 | Cum SA (acres) | 7.34 | 12.07 | 5.82 |

Plan: Plan 02  Canal 2  Canal 2 Centerli  RS: 4922.72  Profile: PF 1

| E.G. Elev (ft) | 18.89 | Element | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| Vel Head (ft) | 0.00 | Wt. n-Val. | 0.040 | 0.070 | 0.040 |
| W.S. Elev (ft) | 18.89 | Reach Len. (ft) | 300.00 | 300.00 | 300.00 |
| Crit W.S. (ft) | | Flow Area (sq ft) | 252.73 | 522.01 | 83.02 |
| E.G. Slope (ft/ft) | 0.000003 | Area (sq ft) | 252.73 | 522.01 | 83.02 |
| Q Total (cfs) | 112.37 | Flow (cfs) | 35.68 | 72.00 | 4.68 |
| Top Width (ft) | 220.71 | Top Width (ft) | 66.72 | 60.39 | 93.60 |
| Vel Total (ft/s) | 0.13 | Avg. Vel. (ft/s) | 0.14 | 0.14 | 0.06 |
| Max Chl Dpth (ft) | 12.89 | Hydr. Depth (ft) | 3.79 | 8.64 | 0.89 |
| Conv. Total (cfs) | 67920.2 | Conv. (cfs) | 21569.0 | 43522.0 | 2829.2 |
| Length Wtd. (ft) | 300.00 | Wetted Per. (ft) | 72.57 | 67.06 | 94.49 |
| Min Ch El (ft) | 6.00 | Shear (lb/sq ft) | 0.00 | 0.00 | 0.00 |
| Alpha | 1.09 | Stream Power (lb/ft s) | 0.00 | 0.00 | 0.00 |
| Frctn Loss (ft) | 0.00 | Cum Volume (acre-ft) | 12.49 | 90.98 | 3.68 |
| C & E Loss (ft) | 0.00 | Cum SA (acres) | 6.69 | 11.68 | 5.16 |

Plan: Plan 02  Canal 2  Canal 2 Centerli  RS: 4623.05  Profile: PF 1

| E.G. Elev (ft) | 18.89 | Element | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| Vel Head (ft) | 0.00 | Wt. n-Val. | 0.040 | 0.070 | 0.040 |
| W.S. Elev (ft) | 18.89 | Reach Len. (ft) | 299.00 | 300.00 | 301.00 |
| Crit W.S. (ft) | | Flow Area (sq ft) | 322.21 | 583.66 | 80.72 |
| E.G. Slope (ft/ft) | 0.000002 | Area (sq ft) | 322.21 | 583.66 | 80.72 |
| Q Total (cfs) | 112.37 | Flow (cfs) | 34.01 | 74.14 | 4.22 |
| Top Width (ft) | 285.76 | Top Width (ft) | 125.52 | 69.16 | 91.08 |
| Vel Total (ft/s) | 0.11 | Avg. Vel. (ft/s) | 0.11 | 0.13 | 0.05 |
| Max Chl Dpth (ft) | 12.89 | Hydr. Depth (ft) | 2.57 | 8.44 | 0.89 |
| Conv. Total (cfs) | 73146.0 | Conv. (cfs) | 22137.5 | 48259.6 | 2748.9 |
| Length Wtd. (ft) | 299.77 | Wetted Per. (ft) | 128.10 | 75.92 | 91.97 |
| Min Ch El (ft) | 6.00 | Shear (lb/sq ft) | 0.00 | 0.00 | 0.00 |
| Alpha | 1.09 | Stream Power (lb/ft s) | 0.00 | 0.00 | 0.00 |
| Frctn Loss (ft) | 0.00 | Cum Volume (acre-ft) | 10.51 | 87.18 | 3.12 |
| C & E Loss (ft) | 0.00 | Cum SA (acres) | 6.03 | 11.23 | 4.52 |

Plan: Plan 02  Canal 2  Canal 2 Centerli  RS: 4322.55  Profile: PF 1

| E.G. Elev (ft) | 18.89 | Element | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| Vel Head (ft) | 0.00 | Wt. n-Val. | 0.040 | 0.070 | |
| W.S. Elev (ft) | 18.89 | Reach Len. (ft) | 200.00 | 200.00 | 200.00 |
| Crit W.S. (ft) | | Flow Area (sq ft) | 203.83 | 680.88 | |
| E.G. Slope (ft/ft) | 0.000003 | Area (sq ft) | 203.83 | 680.88 | |
| Q Total (cfs) | 112.37 | Flow (cfs) | 22.63 | 89.74 | |
| Top Width (ft) | 161.02 | Top Width (ft) | 77.42 | 83.60 | |
| Vel Total (ft/s) | 0.13 | Avg. Vel. (ft/s) | 0.11 | 0.13 | |
| Max Chl Dpth (ft) | 12.89 | Hydr. Depth (ft) | 2.63 | 8.14 | |
| Conv. Total (cfs) | 69752.3 | Conv. (cfs) | 14046.4 | 55705.9 | |
| Length Wtd. (ft) | 200.00 | Wetted Per. (ft) | 80.67 | 89.98 | |
| Min Ch El (ft) | 6.00 | Shear (lb/sq ft) | 0.00 | 0.00 | |
| Alpha | 1.01 | Stream Power (lb/ft s) | 0.00 | 0.00 | |
| Frctn Loss (ft) | 0.00 | Cum Volume (acre-ft) | 8.70 | 82.82 | 2.84 |
| C & E Loss (ft) | 0.00 | Cum SA (acres) | 5.33 | 10.71 | 4.21 |

Plan: Plan 02  Canal 2  Canal 2 Centerli  RS: 4122.9  Profile: PF 1

| E.G. Elev (ft) | 18.88 | Element | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| Vel Head (ft) | 0.00 | Wt. n-Val. | 0.040 | 0.070 | 0.040 |
| W.S. Elev (ft) | 18.88 | Reach Len. (ft) | 199.00 | 201.00 | 202.00 |
| Crit W.S. (ft) | 7.83 | Flow Area (sq ft) | 354.87 | 582.15 | 22.93 |
| E.G. Slope (ft/ft) | 0.000013 | Area (sq ft) | 354.87 | 582.15 | 22.93 |
| Q Total (cfs) | 257.40 | Flow (cfs) | 92.55 | 162.93 | 1.93 |
| Top Width (ft) | 246.23 | Top Width (ft) | 124.76 | 76.54 | 44.93 |
| Vel Total (ft/s) | 0.27 | Avg. Vel. (ft/s) | 0.26 | 0.28 | 0.08 |
| Max Chl Dpth (ft) | 12.88 | Hydr. Depth (ft) | 2.84 | 7.61 | 0.51 |
| Conv. Total (cfs) | 72413.9 | Conv. (cfs) | 26036.0 | 45835.5 | 542.4 |
| Length Wtd. (ft) | 201.00 | Wetted Per. (ft) | 127.86 | 81.49 | 45.13 |
| Min Ch El (ft) | 6.00 | Shear (lb/sq ft) | 0.00 | 0.01 | 0.00 |
| Alpha | 1.03 | Stream Power (lb/ft s) | 0.00 | 0.00 | 0.00 |
| Frctn Loss (ft) | | Cum Volume (acre-ft) | 7.42 | 79.92 | 2.79 |
| C & E Loss (ft) | | Cum SA (acres) | 4.87 | 10.34 | 4.10 |

Plan: Plan 02  Canal 2  Canal 2 Centerli  RS: 3922.64  Profile: PF 1

| E.G. Elev (ft) | 18.87 | Element | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| Vel Head (ft) | 0.00 | Wt. n-Val. | 0.040 | 0.070 | 0.040 |
| W.S. Elev (ft) | 18.87 | Reach Len. (ft) | 300.00 | 300.00 | 300.00 |
| Crit W.S. (ft) | | Flow Area (sq ft) | 145.03 | 644.23 | 39.63 |
| E.G. Slope (ft/ft) | 0.000015 | Area (sq ft) | 145.03 | 644.23 | 39.63 |
| Q Total (cfs) | 257.40 | Flow (cfs) | 33.65 | 220.20 | 3.55 |
| Top Width (ft) | 223.04 | Top Width (ft) | 69.44 | 71.48 | 82.12 |
| Vel Total (ft/s) | 0.31 | Avg. Vel. (ft/s) | 0.23 | 0.34 | 0.09 |
| Max Chl Dpth (ft) | 12.87 | Hydr. Depth (ft) | 2.09 | 9.01 | 0.48 |
| Conv. Total (cfs) | 65684.3 | Conv. (cfs) | 8588.2 | 56190.9 | 905.2 |
| Length Wtd. (ft) | 300.00 | Wetted Per. (ft) | 72.06 | 77.35 | 82.21 |
| Min Ch El (ft) | 6.00 | Shear (lb/sq ft) | 0.00 | 0.01 | 0.00 |
| Alpha | 1.11 | Stream Power (lb/ft s) | 0.00 | 0.00 | 0.00 |
| Frctn Loss (ft) | 0.00 | Cum Volume (acre-ft) | 7.42 | 78.53 | 2.79 |
| C & E Loss (ft) | 0.00 | Cum SA (acres) | 4.42 | 10.00 | 3.81 |

Plan: Plan 02  Canal 2  Canal 2 Centerli  RS: 3622.17  Profile: PF 1

| E.G. Elev (ft) | 18.87 | Element | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| Vel Head (ft) | 0.00 | Wt. n-Val. | 0.040 | 0.070 | 0.040 |
| W.S. Elev (ft) | 18.87 | Reach Len. (ft) | 302.00 | 301.00 | 298.00 |
| Crit W.S. (ft) | | Flow Area (sq ft) | 290.49 | 839.44 | 72.28 |
| E.G. Slope (ft/ft) | 0.000007 | Area (sq ft) | 290.49 | 839.44 | 72.28 |
| Q Total (cfs) | 257.40 | Flow (cfs) | 54.16 | 196.67 | 6.57 |
| Top Width (ft) | 291.82 | Top Width (ft) | 113.41 | 94.94 | 83.47 |
| Vel Total (ft/s) | 0.21 | Avg. Vel. (ft/s) | 0.19 | 0.23 | 0.09 |
| Max Chl Dpth (ft) | 12.87 | Hydr. Depth (ft) | 2.56 | 8.84 | 0.87 |
| Conv. Total (cfs) | 94957.5 | Conv. (cfs) | 19979.7 | 72555.3 | 2422.6 |
| Length Wtd. (ft) | 301.03 | Wetted Per. (ft) | 116.72 | 102.17 | 84.34 |
| Min Ch El (ft) | 6.00 | Shear (lb/sq ft) | 0.00 | 0.00 | 0.00 |
| Alpha | 1.08 | Stream Power (lb/ft s) | 0.00 | 0.00 | 0.00 |
| Frctn Loss (ft) | 0.00 | Cum Volume (acre-ft) | 5.92 | 73.42 | 2.40 |
| C & E Loss (ft) | 0.00 | Cum SA (acres) | 3.79 | 9.43 | 3.24 |

Plan: Plan 02  Canal 2  Canal 2 Centerli  RS: 3322.23  Profile: PF 1

| E.G. Elev (ft) | 18.86 | Element | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| Vel Head (ft) | 0.00 | Wt. n-Val. | 0.040 | 0.070 | 0.040 |
| W.S. Elev (ft) | 18.86 | Reach Len. (ft) | 298.00 | 299.00 | 300.00 |
| Crit W.S. (ft) | | Flow Area (sq ft) | 52.84 | 910.60 | 72.99 |
| E.G. Slope (ft/ft) | 0.000009 | Area (sq ft) | 52.84 | 910.60 | 72.99 |
| Q Total (cfs) | 257.40 | Flow (cfs) | 5.43 | 244.65 | 7.32 |
| Top Width (ft) | 241.61 | Top Width (ft) | 58.65 | 98.40 | 84.56 |
| Vel Total (ft/s) | 0.25 | Avg. Vel. (ft/s) | 0.10 | 0.27 | 0.10 |
| Max Chl Dpth (ft) | 12.86 | Hydr. Depth (ft) | 0.90 | 9.25 | 0.86 |
| Conv. Total (cfs) | 85862.8 | Conv. (cfs) | 1812.8 | 81608.5 | 2441.4 |
| Length Wtd. (ft) | 298.99 | Wetted Per. (ft) | 59.53 | 104.97 | 85.42 |
| Min Ch El (ft) | 6.00 | Shear (lb/sq ft) | 0.00 | 0.00 | 0.00 |
| Alpha | 1.12 | Stream Power (lb/ft s) | 0.00 | 0.00 | 0.00 |
| Frctn Loss (ft) | 0.00 | Cum Volume (acre-ft) | 4.73 | 67.37 | 1.90 |
| C & E Loss (ft) | 0.00 | Cum SA (acres) | 3.20 | 8.76 | 2.66 |

Plan: Plan 02  Canal 2  Canal 2 Centerli  RS: 3022.7  Profile: PF 1

| E.G. Elev (ft) | 18.86 | Element | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| Vel Head (ft) | 0.00 | Wt. n-Val. | 0.040 | 0.070 | 0.040 |
| W.S. Elev (ft) | 18.86 | Reach Len. (ft) | 307.00 | 302.00 | 295.00 |
| Crit W.S. (ft) | | Flow Area (sq ft) | 51.88 | 721.03 | 14.64 |
| E.G. Slope (ft/ft) | 0.000016 | Area (sq ft) | 51.88 | 721.03 | 14.64 |
| Q Total (cfs) | 257.40 | Flow (cfs) | 6.87 | 249.26 | 1.27 |
| Top Width (ft) | 179.34 | Top Width (ft) | 61.90 | 83.87 | 33.57 |
| Vel Total (ft/s) | 0.33 | Avg. Vel. (ft/s) | 0.13 | 0.35 | 0.09 |
| Max Chl Dpth (ft) | 12.86 | Hydr. Depth (ft) | 0.84 | 8.60 | 0.44 |
| Conv. Total (cfs) | 63542.0 | Conv. (cfs) | 1696.7 | 61532.6 | 312.7 |
| Length Wtd. (ft) | 302.03 | Wetted Per. (ft) | 63.24 | 89.45 | 33.58 |
| Min Ch El (ft) | 6.00 | Shear (lb/sq ft) | 0.00 | 0.01 | 0.00 |
| Alpha | 1.09 | Stream Power (lb/ft s) | 0.00 | 0.00 | 0.00 |
| Frctn Loss (ft) | 0.00 | Cum Volume (acre-ft) | 4.37 | 61.77 | 1.60 |
| C & E Loss (ft) | 0.00 | Cum SA (acres) | 2.78 | 8.13 | 2.26 |

Plan: Plan 02  Canal 2  Canal 2 Centerli  RS: 1807.45  Profile: PF 1

| E.G. Elev (ft) | 18.85 | Element | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| Vel Head (ft) | 0.00 | Wt. n-Val. | 0.040 | 0.070 | 0.040 |
| W.S. Elev (ft) | 18.85 | Reach Len. (ft) | 166.00 | 155.00 | 130.00 |
| Crit W.S. (ft) | | Flow Area (sq ft) | 71.47 | 2377.37 | 18.24 |
| E.G. Slope (ft/ft) | 0.000001 | Area (sq ft) | 71.47 | 2377.37 | 18.24 |
| Q Total (cfs) | 257.40 | Flow (cfs) | 2.39 | 254.62 | 0.39 |
| Top Width (ft) | 335.33 | Top Width (ft) | 84.50 | 207.90 | 42.93 |
| Vel Total (ft/s) | 0.10 | Avg. Vel. (ft/s) | 0.03 | 0.11 | 0.02 |
| Max Chl Dpth (ft) | 14.85 | Hydr. Depth (ft) | 0.85 | 11.44 | 0.42 |
| Conv. Total (cfs) | 254035.6 | Conv. (cfs) | 2359.0 | 251293.7 | 382.9 |
| Length Wtd. (ft) | 155.00 | Wetted Per. (ft) | 85.32 | 213.95 | 42.94 |
| Min Ch El (ft) | 4.00 | Shear (lb/sq ft) | 0.00 | 0.00 | 0.00 |
| Alpha | 1.04 | Stream Power (lb/ft s) | 0.00 | 0.00 | 0.00 |
| Frctn Loss (ft) | 0.00 | Cum Volume (acre-ft) | 2.68 | 32.60 | 0.11 |
| C & E Loss (ft) | 0.00 | Cum SA (acres) | 0.72 | 5.18 | 0.36 |

Plan: Plan 02  Canal 2  Canal 2 Centerli  RS: 1654.95  Profile: PF 1

| E.G. Elev (ft) | 18.85 | Element | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| Vel Head (ft) | 0.00 | Wt. n-Val. | 0.040 | 0.070 | 0.040 |
| W.S. Elev (ft) | 18.85 | Reach Len. (ft) | 395.00 | 398.00 | 398.00 |
| Crit W.S. (ft) | 3.35 | Flow Area (sq ft) | 29.69 | 2586.83 | 39.46 |
| E.G. Slope (ft/ft) | 0.000001 | Area (sq ft) | 29.69 | 2586.83 | 39.46 |
| Q Total (cfs) | 223.59 | Flow (cfs) | 0.76 | 221.79 | 1.04 |
| Top Width (ft) | 310.10 | Top Width (ft) | 37.72 | 225.37 | 47.01 |
| Vel Total (ft/s) | 0.08 | Avg. Vel. (ft/s) | 0.03 | 0.09 | 0.03 |
| Max Chl Dpth (ft) | 16.85 | Hydr. Depth (ft) | 0.79 | 11.48 | 0.84 |
| Conv. Total (cfs) | 277288.3 | Conv. (cfs) | 938.9 | 275060.3 | 1289.2 |
| Length Wtd. (ft) | 398.00 | Wetted Per. (ft) | 37.79 | 230.74 | 47.84 |
| Min Ch El (ft) | 2.00 | Shear (lb/sq ft) | 0.00 | 0.00 | 0.00 |
| Alpha | 1.03 | Stream Power (lb/ft s) | 0.00 | 0.00 | 0.00 |
| Frctn Loss (ft) | | Cum Volume (acre-ft) | 2.49 | 23.77 | 0.02 |
| C & E Loss (ft) | | Cum SA (acres) | 0.49 | 4.41 | 0.23 |

Plan: Plan 02  Canal 2  Canal 2 Centerli  RS: 1253.38  Profile: PF 1

| E.G. Elev (ft) | 13.10 | Element | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| Vel Head (ft) | 0.00 | Wt. n-Val. | | 0.070 | |
| W.S. Elev (ft) | 13.09 | Reach Len. (ft) | 296.00 | 296.00 | 296.00 |
| Crit W.S. (ft) | | Flow Area (sq ft) | | 713.97 | |
| E.G. Slope (ft/ft) | 0.000016 | Area (sq ft) | | 713.97 | |
| Q Total (cfs) | 223.59 | Flow (cfs) | | 223.59 | |
| Top Width (ft) | 98.94 | Top Width (ft) | | 98.94 | |
| Vel Total (ft/s) | 0.31 | Avg. Vel. (ft/s) | | 0.31 | |
| Max Chl Dpth (ft) | 9.09 | Hydr. Depth (ft) | | 7.22 | |
| Conv. Total (cfs) | 55166.2 | Conv. (cfs) | | 55166.2 | |
| Length Wtd. (ft) | 296.00 | Wetted Per. (ft) | | 102.81 | |
| Min Ch El (ft) | 4.00 | Shear (lb/sq ft) | | 0.01 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 0.00 | |
| Frctn Loss (ft) | 0.00 | Cum Volume (acre-ft) | 2.49 | 20.86 | 0.02 |
| C & E Loss (ft) | 0.00 | Cum SA (acres) | 0.32 | 2.93 | 0.02 |

Plan: Plan 02  Canal 2  Canal 2 Centerli  RS: 953.68  Profile: PF 1

| E.G. Elev (ft) | 13.09 | Element | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| Vel Head (ft) | 0.00 | Wt. n-Val. | | 0.070 | |
| W.S. Elev (ft) | 13.09 | Reach Len. (ft) | 222.00 | 216.00 | 218.00 |
| Crit W.S. (ft) | | Flow Area (sq ft) | | 968.08 | |
| E.G. Slope (ft/ft) | 0.000010 | Area (sq ft) | | 968.08 | |
| Q Total (cfs) | 223.59 | Flow (cfs) | | 223.59 | |
| Top Width (ft) | 149.65 | Top Width (ft) | | 149.65 | |
| Vel Total (ft/s) | 0.23 | Avg. Vel. (ft/s) | | 0.23 | |
| Max Chl Dpth (ft) | 10.09 | Hydr. Depth (ft) | | 6.47 | |
| Conv. Total (cfs) | 70337.5 | Conv. (cfs) | | 70337.5 | |
| Length Wtd. (ft) | 216.00 | Wetted Per. (ft) | | 152.88 | |
| Min Ch El (ft) | 3.00 | Shear (lb/sq ft) | | 0.00 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 0.00 | |
| Frctn Loss (ft) | 0.00 | Cum Volume (acre-ft) | 2.49 | 15.15 | 0.02 |
| C & E Loss (ft) | 0.00 | Cum SA (acres) | 0.32 | 2.09 | 0.02 |

Plan: Plan 02  Canal 2  Canal 2 Centerli  RS: 737.13  Profile: PF 1

| E.G. Elev (ft) | 13.09 | Element | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| Vel Head (ft) | 0.00 | Wt. n-Val. | | 0.070 | |
| W.S. Elev (ft) | 13.09 | Reach Len. (ft) | 148.00 | 150.00 | 154.00 |
| Crit W.S. (ft) | 1.91 | Flow Area (sq ft) | | 423.29 | |
| E.G. Slope (ft/ft) | 0.000004 | Area (sq ft) | | 423.29 | |
| Q Total (cfs) | 53.77 | Flow (cfs) | | 53.77 | |
| Top Width (ft) | 76.67 | Top Width (ft) | | 76.67 | |
| Vel Total (ft/s) | 0.13 | Avg. Vel. (ft/s) | | 0.13 | |
| Max Chl Dpth (ft) | 12.09 | Hydr. Depth (ft) | | 5.52 | |
| Conv. Total (cfs) | 26694.7 | Conv. (cfs) | | 26694.7 | |
| Length Wtd. (ft) | 150.00 | Wetted Per. (ft) | | 82.66 | |
| Min Ch El (ft) | 1.00 | Shear (lb/sq ft) | | 0.00 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 0.00 | |
| Frctn Loss (ft) | | Cum Volume (acre-ft) | 2.49 | 11.70 | 0.02 |
| C & E Loss (ft) | | Cum SA (acres) | 0.32 | 1.53 | 0.02 |

Plan: Plan 02  Canal 2  Canal 2 Centerli  RS: 585.52  Profile: PF 1

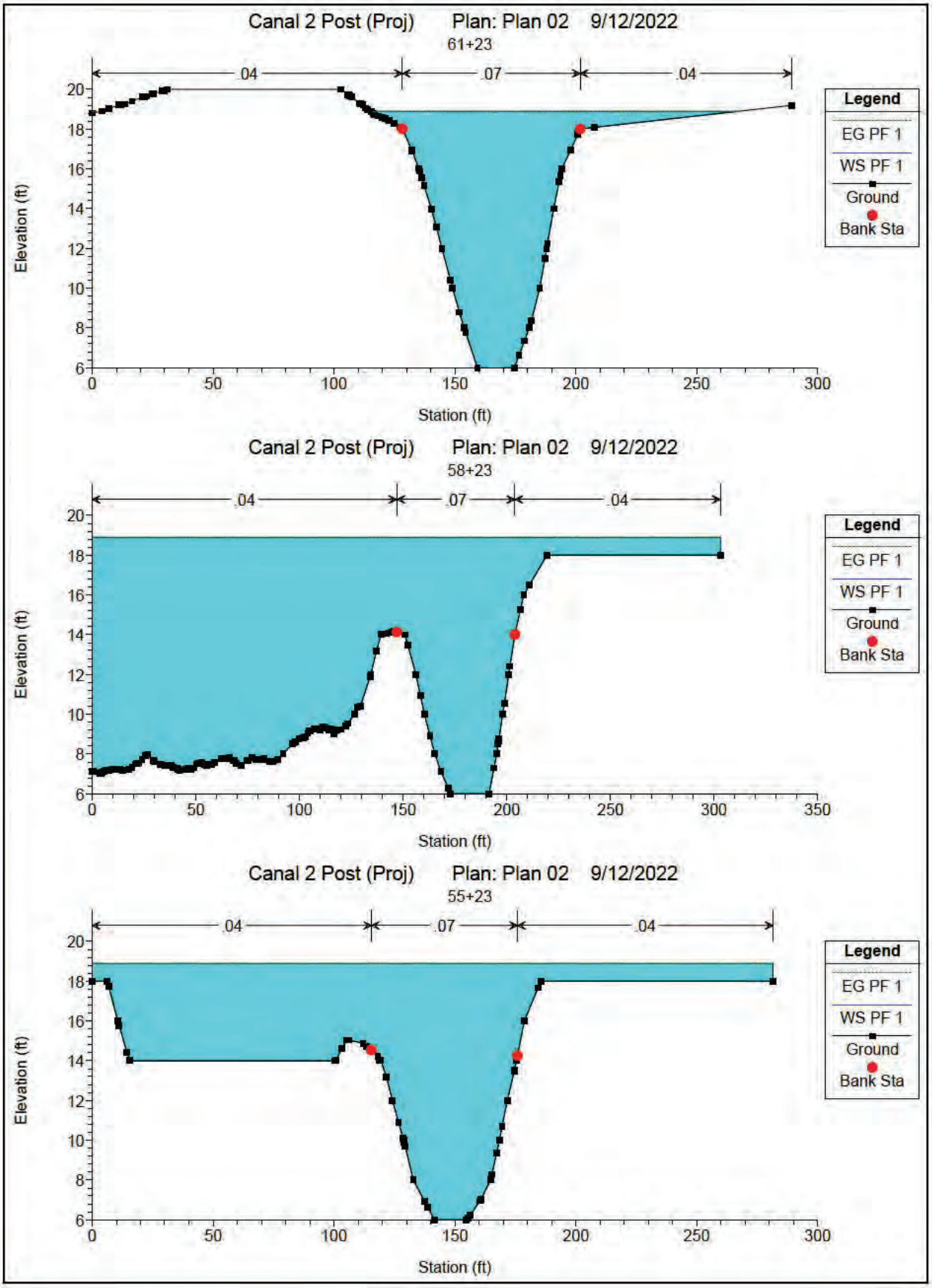
| E.G. Elev (ft) | 13.00 | Element | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| Vel Head (ft) | 0.00 | Wt. n-Val. | | 0.070 | |
| W.S. Elev (ft) | 13.00 | Reach Len. (ft) | 306.00 | 300.00 | 298.00 |
| Crit W.S. (ft) | | Flow Area (sq ft) | | 1025.78 | |
| E.G. Slope (ft/ft) | 0.000000 | Area (sq ft) | | 1025.78 | |
| Q Total (cfs) | 53.77 | Flow (cfs) | | 53.77 | |
| Top Width (ft) | 103.10 | Top Width (ft) | | 103.10 | |
| Vel Total (ft/s) | 0.05 | Avg. Vel. (ft/s) | | 0.05 | |
| Max Chl Dpth (ft) | 13.00 | Hydr. Depth (ft) | | 9.95 | |
| Conv. Total (cfs) | 96834.7 | Conv. (cfs) | | 96834.7 | |
| Length Wtd. (ft) | 300.00 | Wetted Per. (ft) | | 109.38 | |
| Min Ch El (ft) | 0.00 | Shear (lb/sq ft) | | 0.00 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 0.00 | |
| Frctn Loss (ft) | 0.00 | Cum Volume (acre-ft) | 2.49 | 11.32 | 0.02 |
| C & E Loss (ft) | 0.00 | Cum SA (acres) | 0.32 | 1.22 | 0.02 |

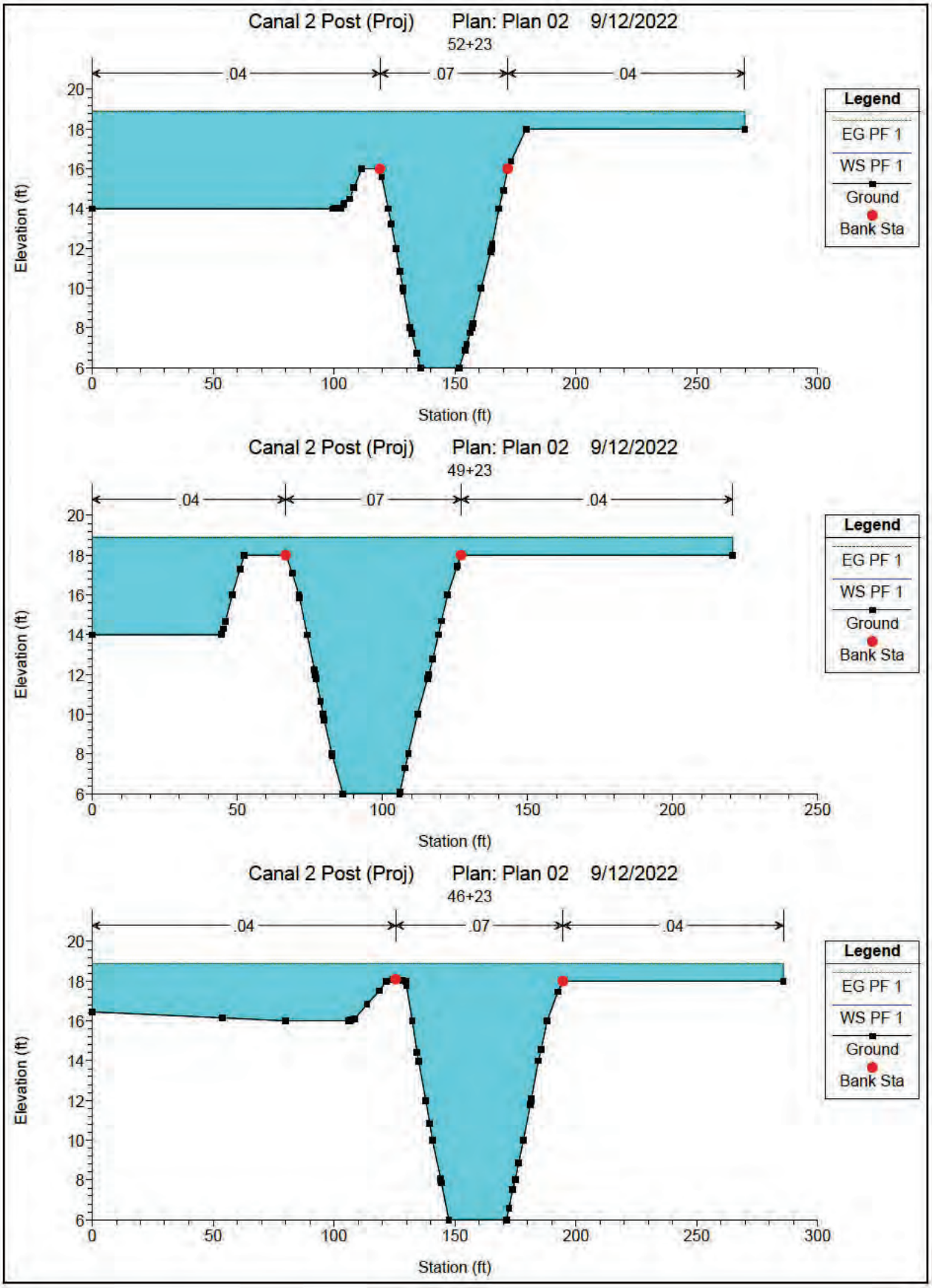
Plan: Plan 02  Canal 2  Canal 2 Centerli  RS: 285.01  Profile: PF 1

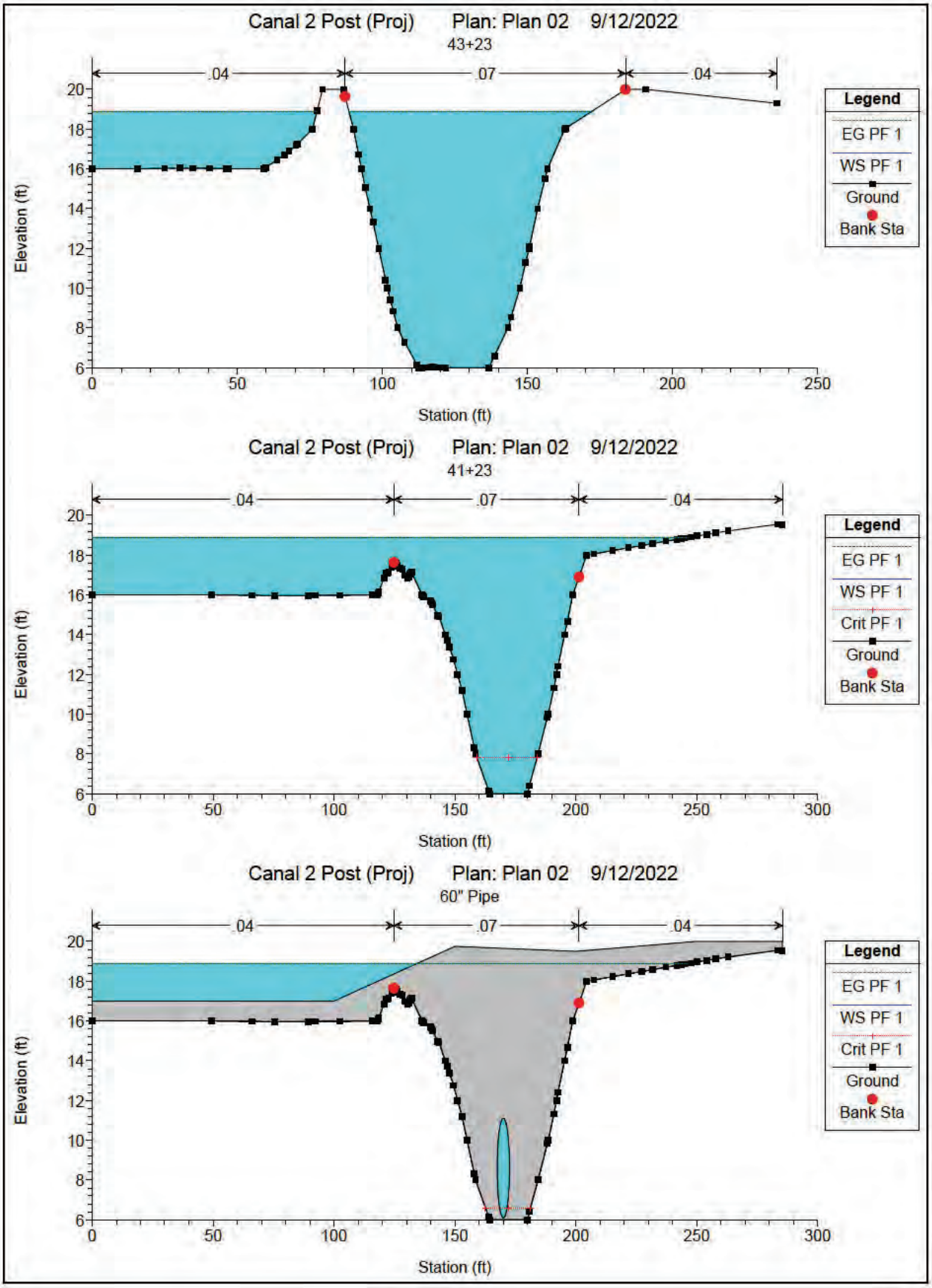
| E.G. Elev (ft) | 13.00 | Element | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| Vel Head (ft) | 0.00 | Wt. n-Val. | 0.040 | 0.070 | |
| W.S. Elev (ft) | 13.00 | Reach Len. (ft) | 198.00 | 204.00 | 204.00 |
| Crit W.S. (ft) | | Flow Area (sq ft) | 0.00 | 1029.82 | |
| E.G. Slope (ft/ft) | 0.000000 | Area (sq ft) | 0.00 | 1029.82 | |
| Q Total (cfs) | 53.77 | Flow (cfs) | 0.00 | 53.77 | |
| Top Width (ft) | 105.71 | Top Width (ft) | 0.32 | 105.40 | |
| Vel Total (ft/s) | 0.05 | Avg. Vel. (ft/s) | 0.00 | 0.05 | |
| Max Chl Dpth (ft) | 13.00 | Hydr. Depth (ft) | 0.02 | 9.77 | |
| Conv. Total (cfs) | 95863.0 | Conv. (cfs) | 0.0 | 95863.0 | |
| Length Wtd. (ft) | 201.50 | Wetted Per. (ft) | 0.35 | 112.14 | |
| Min Ch El (ft) | 0.00 | Shear (lb/sq ft) | 0.00 | 0.00 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | 0.00 | 0.00 | |
| Frctn Loss (ft) | 0.00 | Cum Volume (acre-ft) | 2.49 | 4.24 | 0.02 |
| C & E Loss (ft) | 0.00 | Cum SA (acres) | 0.32 | 0.50 | 0.02 |

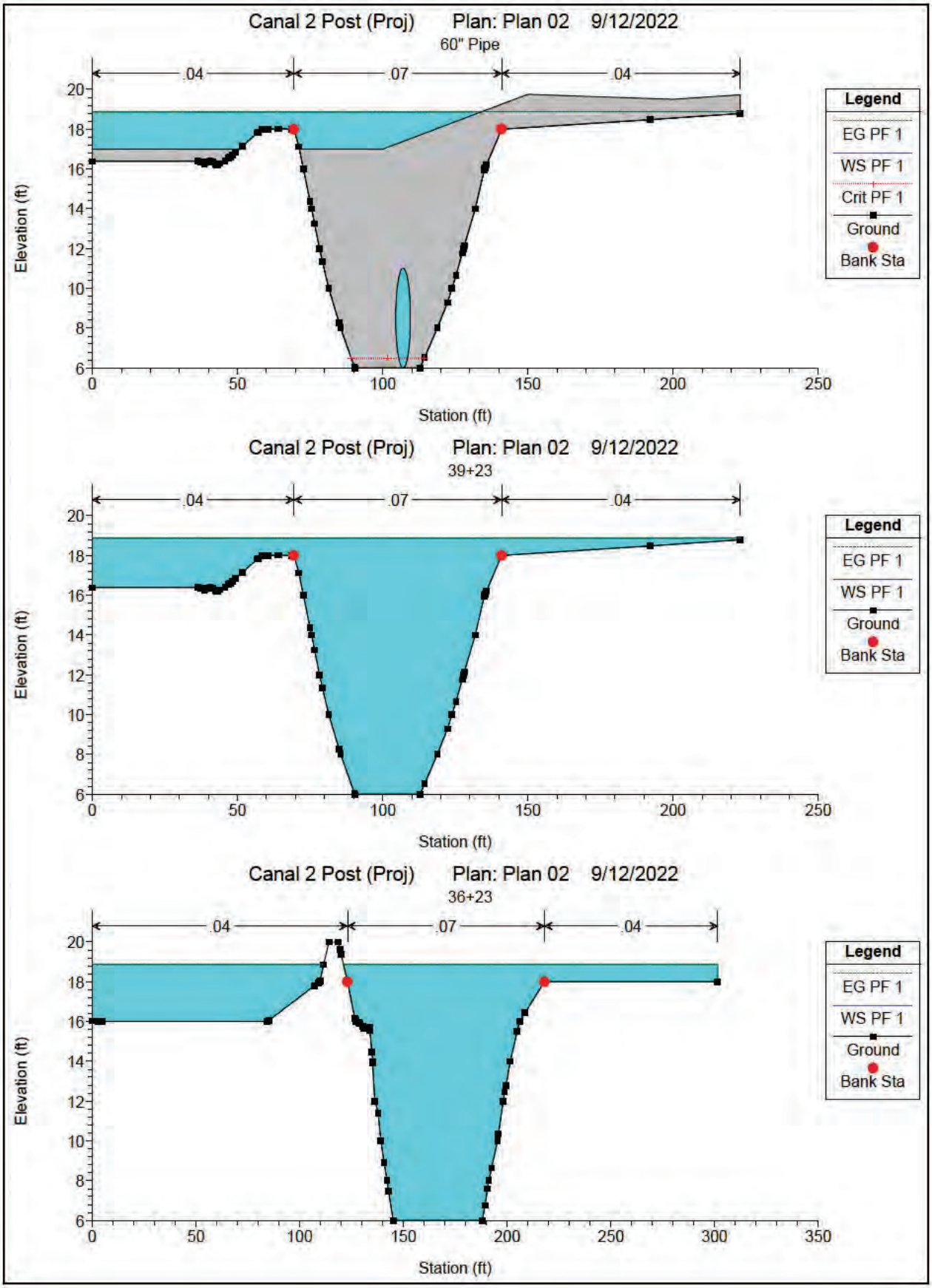
Plan: Plan 02  Canal 2  Canal 2 Centerli  RS: 85.14  Profile: PF 1

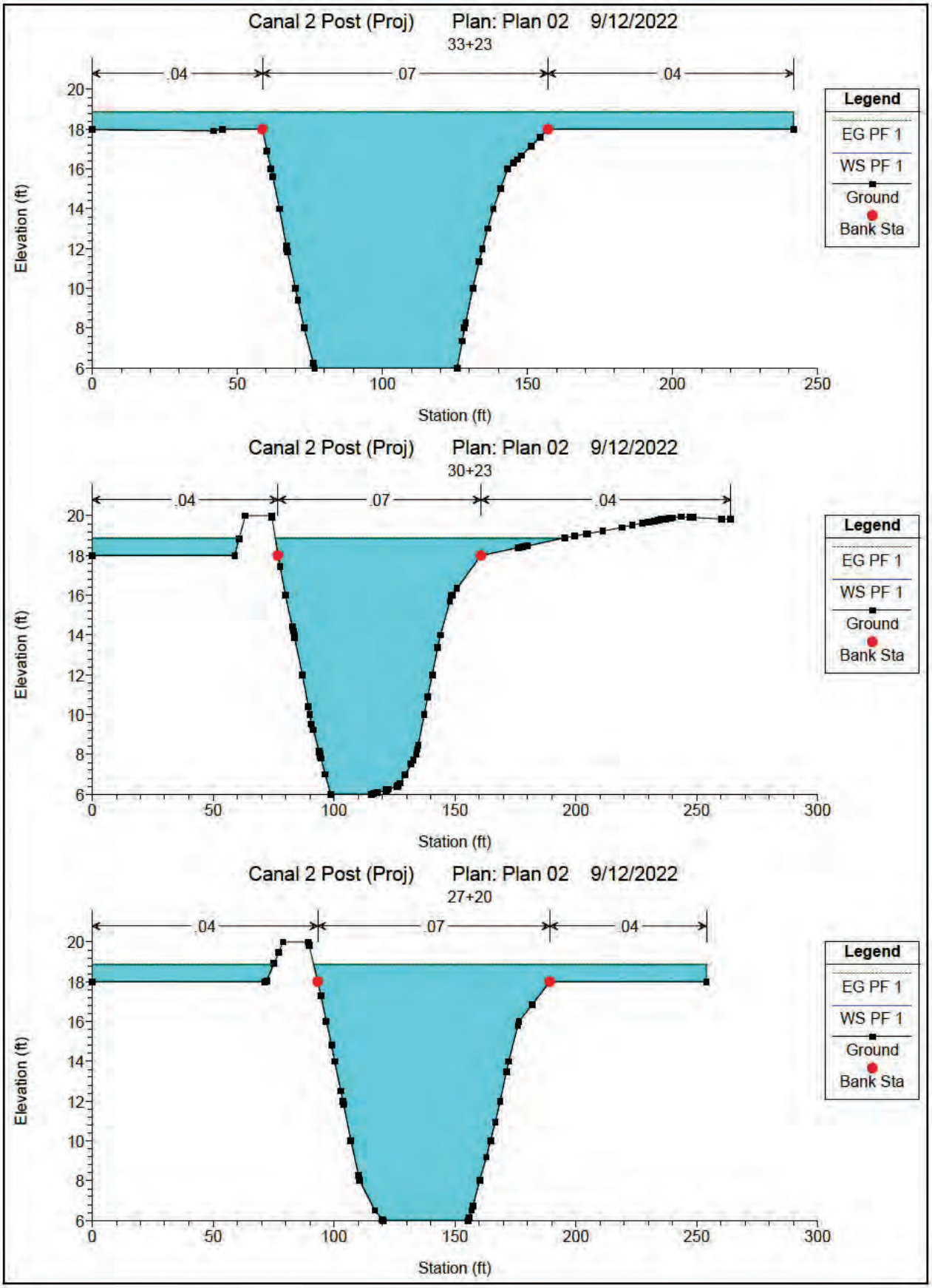
| E.G. Elev (ft) | 13.00 | Element | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| Vel Head (ft) | 0.00 | Wt. n-Val. | 0.040 | 0.070 | 0.040 |
| W.S. Elev (ft) | 13.00 | Reach Len. (ft) | | | |
| Crit W.S. (ft) | 1.43 | Flow Area (sq ft) | 1094.81 | 780.80 | 9.67 |
| E.G. Slope (ft/ft) | 0.000000 | Area (sq ft) | 1094.81 | 780.80 | 9.67 |
| Q Total (cfs) | 73.98 | Flow (cfs) | 53.14 | 20.69 | 0.15 |
| Top Width (ft) | 253.36 | Top Width (ft) | 139.56 | 107.33 | 6.47 |
| Vel Total (ft/s) | 0.04 | Avg. Vel. (ft/s) | 0.05 | 0.03 | 0.02 |
| Max Chl Dpth (ft) | 13.00 | Hydr. Depth (ft) | 7.84 | 7.27 | 1.49 |
| Conv. Total (cfs) | 212174.6 | Conv. (cfs) | 152404.7 | 59329.8 | 440.0 |
| Length Wtd. (ft) | | Wetted Per. (ft) | 150.92 | 115.29 | 7.14 |
| Min Ch El (ft) | 0.00 | Shear (lb/sq ft) | 0.00 | 0.00 | 0.00 |
| Alpha | 1.23 | Stream Power (lb/ft s) | 0.00 | 0.00 | 0.00 |
| Frctn Loss (ft) | | Cum Volume (acre-ft) | | | |
| C & E Loss (ft) | | Cum SA (acres) | | | |

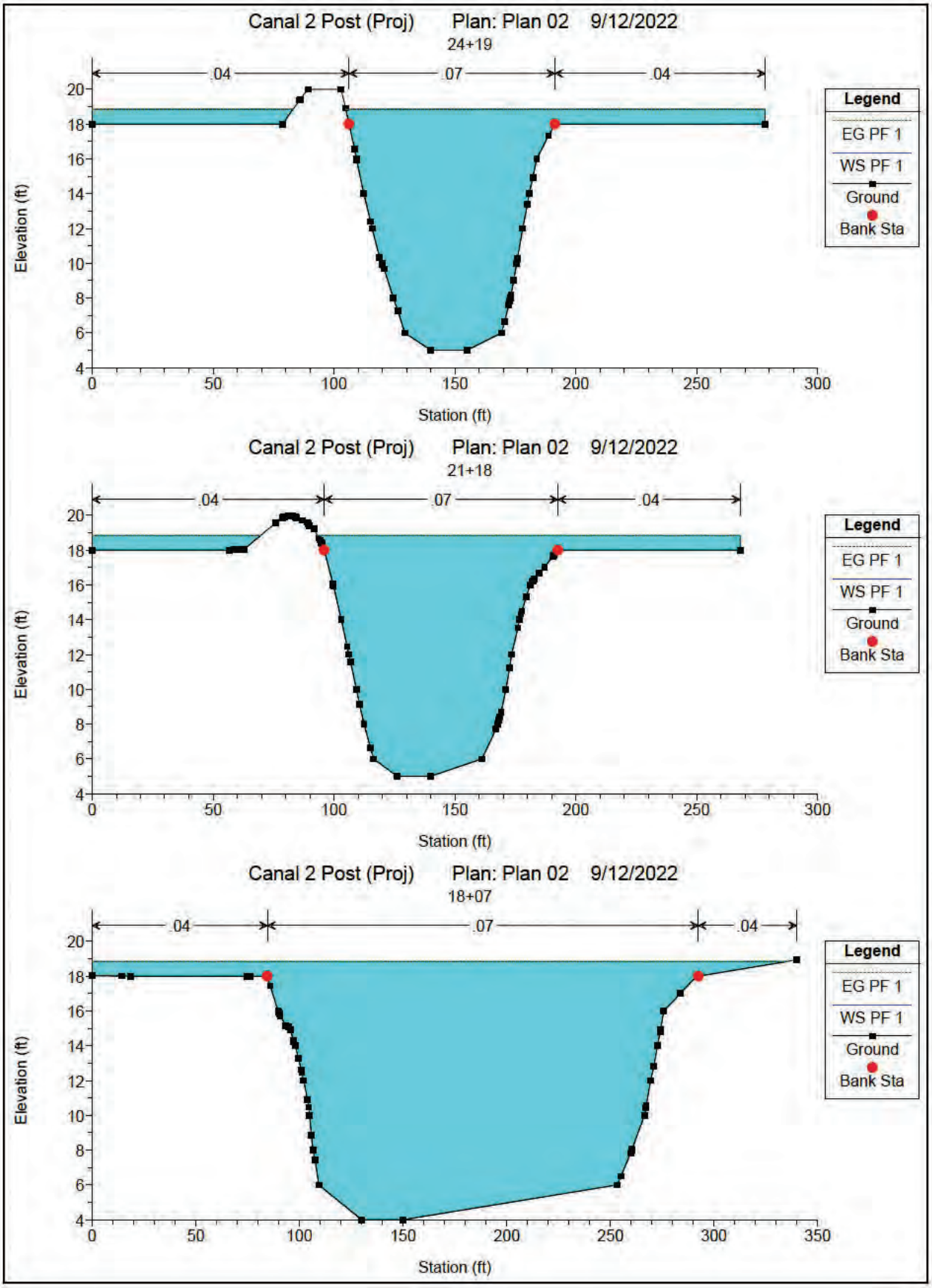

Canal 2 Post (Proj) Plan: Plan 02 9/12/2022
61+23
.04
.07
.04
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
Canal 2 Post (Proj) Plan: Plan 02 9/12/2022
58+23
.04
.07
.04
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
Canal 2 Post (Proj) Plan: Plan 02 9/12/2022
55+23
.04
.07
.04
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

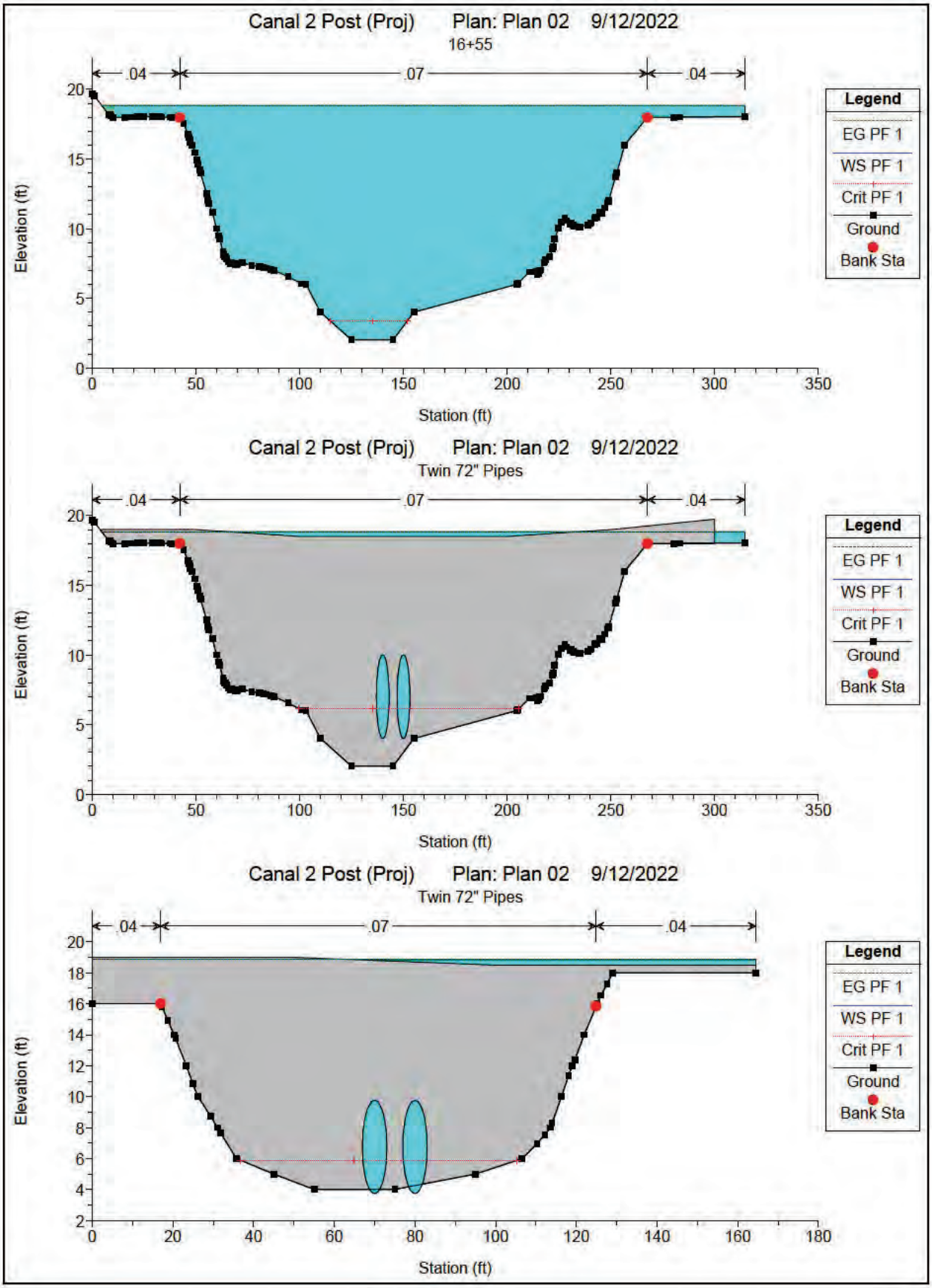

Canal 2 Post (Proj) Plan: Plan 02 9/12/2022
52+23
.04
.07
.04
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
Canal 2 Post (Proj) Plan: Plan 02 9/12/2022
49+23
.04
.07
.04
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
Canal 2 Post (Proj) Plan: Plan 02 9/12/2022
46+23
.04
.07
.04
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

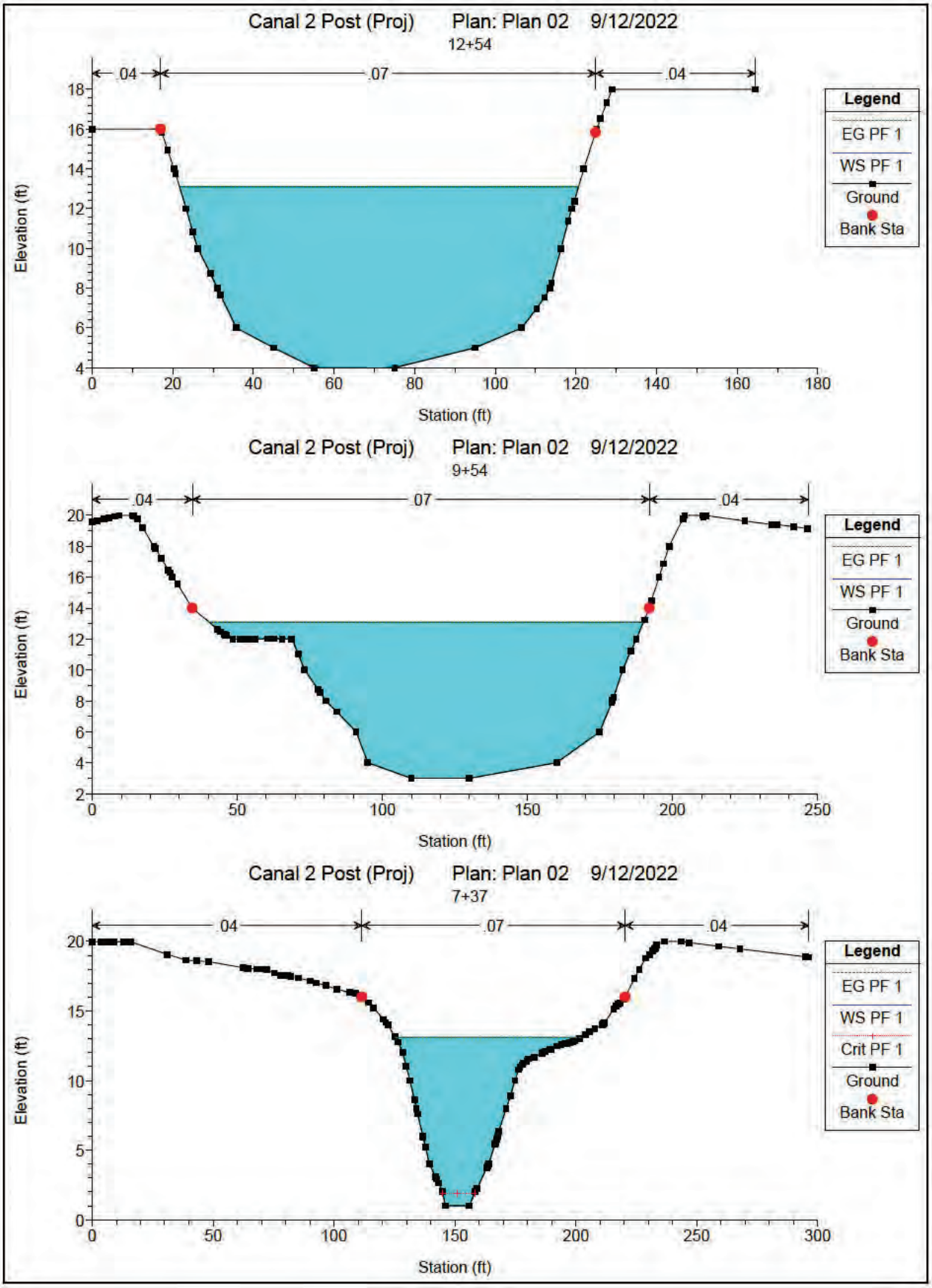

Canal 2 Post (Proj) Plan: Plan 02 9/12/2022
43+23
.04
.07
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Canal 2 Post (Proj) Plan: Plan 02 9/12/2022
41+23
.04
.07
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Canal 2 Post (Proj) Plan: Plan 02 9/12/2022
60" Pipe
.04
.07
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta

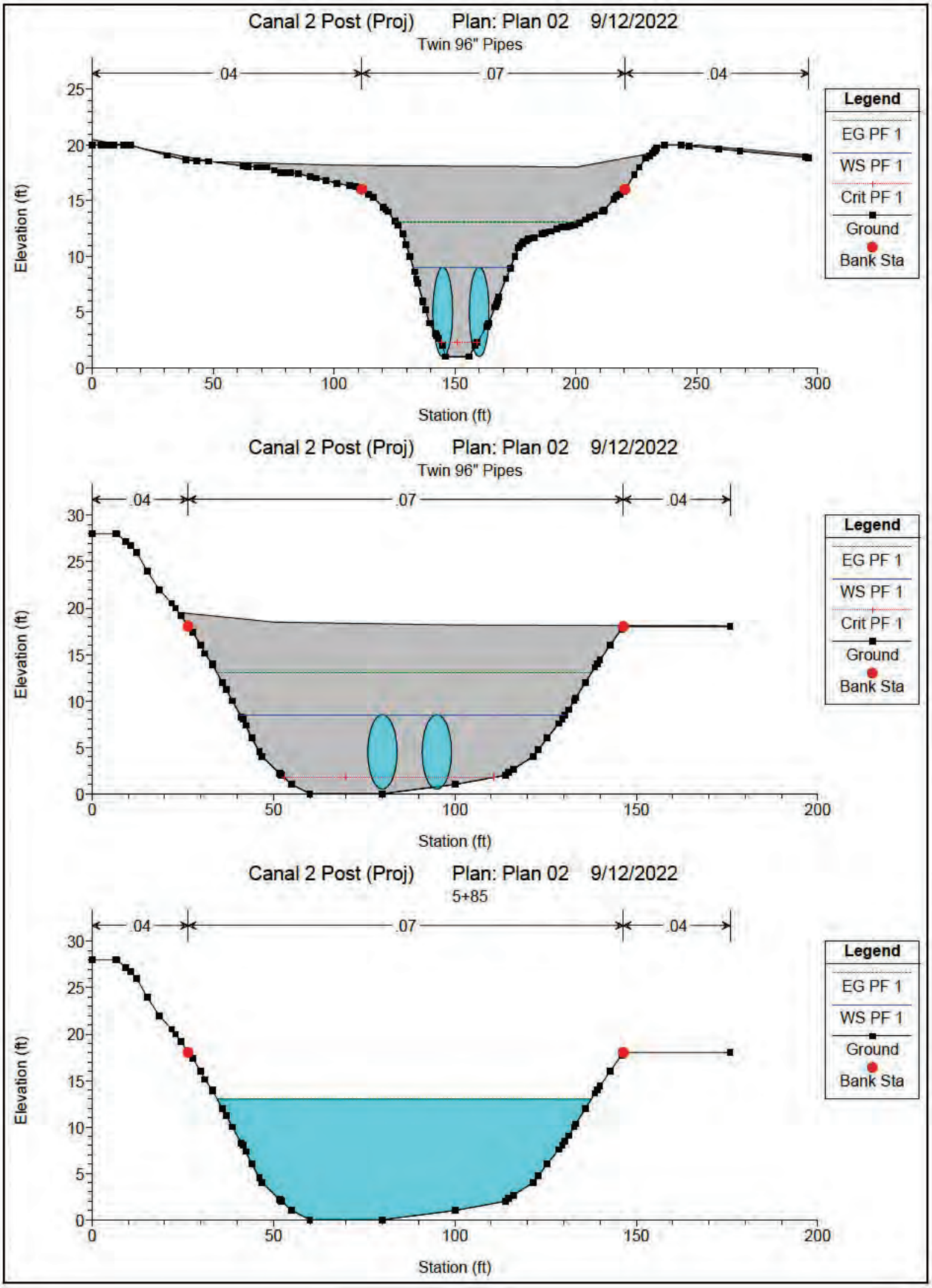

Canal 2 Post (Proj) Plan: Plan 02 9/12/2022
60" Pipe
.04
.07
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Canal 2 Post (Proj) Plan: Plan 02 9/12/2022
39+23
.04
.07
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Canal 2 Post (Proj) Plan: Plan 02 9/12/2022
36+23
.04
.07
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta

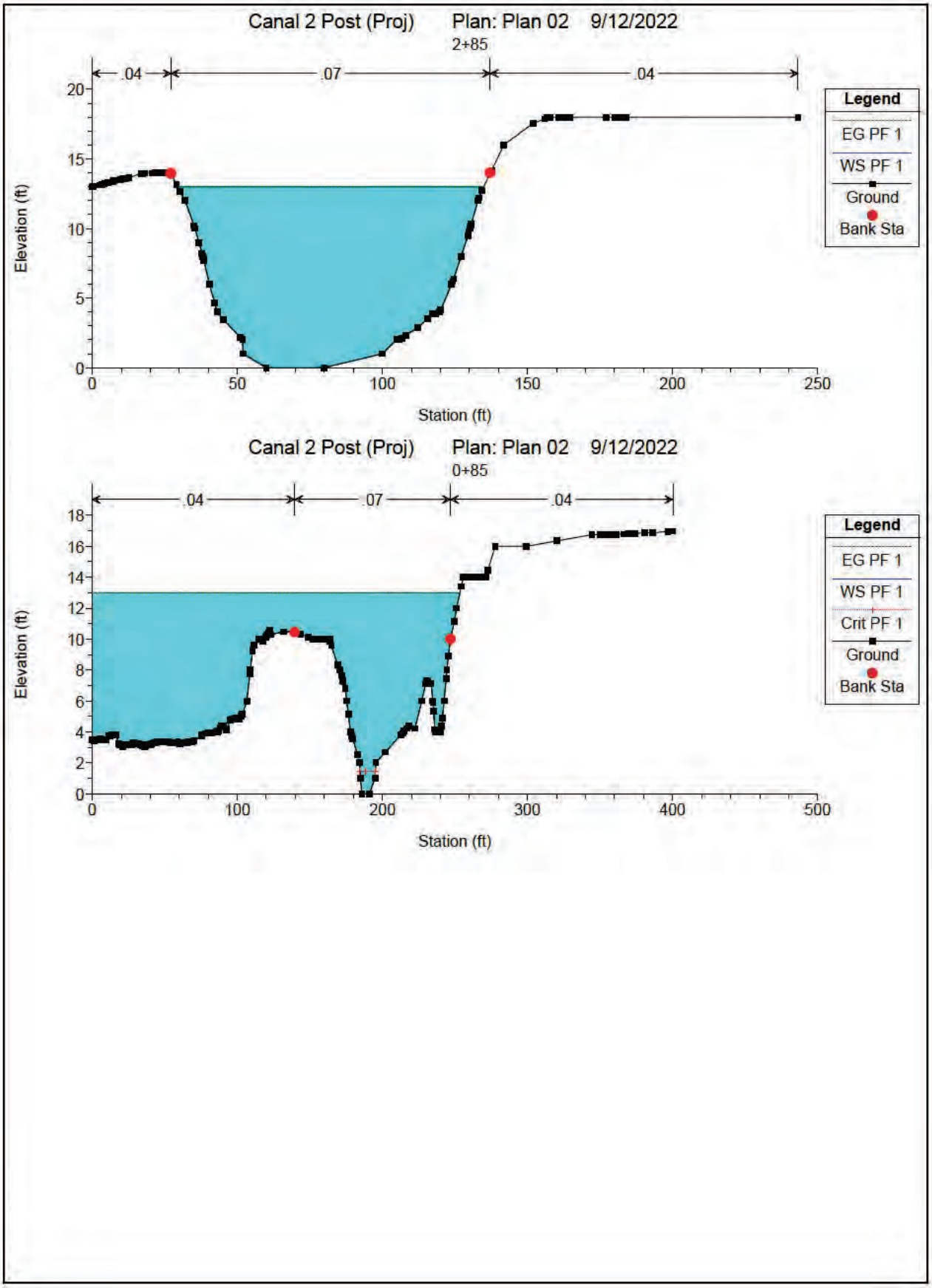

Canal 2 Post (Proj) Plan: Plan 02 9/12/2022
33+23
.04
.07
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Canal 2 Post (Proj) Plan: Plan 02 9/12/2022
30+23
.04
.07
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Canal 2 Post (Proj) Plan: Plan 02 9/12/2022
27+20
.04
.07
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta


Canal 2 Post (Proj) Plan: Plan 02 9/12/2022
24+19
.04
.07
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Canal 2 Post (Proj) Plan: Plan 02 9/12/2022
21+18
.04
.07
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Canal 2 Post (Proj) Plan: Plan 02 9/12/2022
18+07
.04
.07
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta


Canal 2 Post (Proj) Plan: Plan 02 9/12/2022
16+55
.04
.07
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Canal 2 Post (Proj) Plan: Plan 02 9/12/2022
Twin 72" Pipes
.04
.07
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Canal 2 Post (Proj) Plan: Plan 02 9/12/2022
Twin 72" Pipes
.04
.07
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta


Canal 2 Post (Proj) Plan: Plan 02 9/12/2022
12+54
.04
.07
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Canal 2 Post (Proj) Plan: Plan 02 9/12/2022
9+54
.04
.07
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Canal 2 Post (Proj) Plan: Plan 02 9/12/2022
7+37
.04
.07
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta


Canal 2 Post (Proj) Plan: Plan 02 9/12/2022
Twin 96" Pipes
.04
.07
.04
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
Canal 2 Post (Proj) Plan: Plan 02 9/12/2022
Twin 96" Pipes
.04
.07
.04
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
Canal 2 Post (Proj) Plan: Plan 02 9/12/2022
5+85
.04
.07
.04
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


Canal 2 Post (Proj) Plan: Plan 02 9/12/2022
2+85
.04
.07
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Canal 2 Post (Proj) Plan: Plan 02 9/12/2022
0+85
.04
.07
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta

HEC-RAS Plan: Plan 02 River: Canal 2 Reach: Canal 2 Centerli Profile: PF 1

| Reach | River Sta | Profile | Q Total | Min Ch El | W.S. Elev | Crit W.S. | E.G. Elev | E.G. Slope | Vel Chnl | Flow Area | Top Width | Froude # Chl |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | (cfs) | (ft) | (ft) | (ft) | (ft) | (ft/ft) | (ft/s) | (sq ft) | (ft) | |
| Canal 2 Centerli | 6122.84 | PF 1 | 112.37 | 6.00 | 18.89 | | 18.89 | 0.000005 | 0.19 | 620.45 | 154.66 | 0.01 |
| Canal 2 Centerli | 5823.42 | PF 1 | 112.37 | 6.00 | 18.89 | | 18.89 | 0.000000 | 0.03 | 2203.40 | 303.03 | 0.00 |
| Canal 2 Centerli | 5523.12 | PF 1 | 112.37 | 6.00 | 18.89 | | 18.89 | 0.000001 | 0.10 | 1220.89 | 281.54 | 0.01 |
| Canal 2 Centerli | 5223.34 | PF 1 | 112.37 | 6.00 | 18.89 | | 18.89 | 0.000001 | 0.10 | 1161.14 | 269.85 | 0.01 |
| Canal 2 Centerli | 4922.72 | PF 1 | 112.37 | 6.00 | 18.89 | | 18.89 | 0.000003 | 0.14 | 857.75 | 220.71 | 0.01 |
| Canal 2 Centerli | 4623.05 | PF 1 | 112.37 | 6.00 | 18.89 | | 18.89 | 0.000002 | 0.13 | 986.59 | 285.76 | 0.01 |
| Canal 2 Centerli | 4322.55 | PF 1 | 112.37 | 6.00 | 18.89 | | 18.89 | 0.000003 | 0.13 | 884.71 | 161.02 | 0.01 |
| Canal 2 Centerli | 4122.9 | PF 1 | 257.40 | 6.00 | 18.88 | 7.83 | 18.88 | 0.000013 | 0.28 | 959.95 | 246.23 | 0.02 |
| Canal 2 Centerli | 3994 | | Culvert | | | | | | | | | |
| Canal 2 Centerli | 3922.64 | PF 1 | 257.40 | 6.00 | 18.87 | | 18.87 | 0.000015 | 0.34 | 828.89 | 223.04 | 0.02 |
| Canal 2 Centerli | 3622.17 | PF 1 | 257.40 | 6.00 | 18.87 | | 18.87 | 0.000007 | 0.23 | 1202.21 | 291.82 | 0.01 |
| Canal 2 Centerli | 3322.23 | PF 1 | 257.40 | 6.00 | 18.86 | | 18.86 | 0.000009 | 0.27 | 1036.42 | 241.61 | 0.02 |
| Canal 2 Centerli | 3022.7 | PF 1 | 257.40 | 6.00 | 18.86 | | 18.86 | 0.000016 | 0.35 | 787.55 | 179.34 | 0.02 |
| Canal 2 Centerli | 2720.33 | PF 1 | 257.40 | 6.00 | 18.86 | | 18.86 | 0.000010 | 0.28 | 981.02 | 237.36 | 0.02 |
| Canal 2 Centerli | 2419.37 | PF 1 | 257.40 | 5.00 | 18.85 | | 18.85 | 0.000010 | 0.29 | 987.23 | 256.50 | 0.02 |
| Canal 2 Centerli | 2117.71 | PF 1 | 257.40 | 5.00 | 18.85 | | 18.85 | 0.000008 | 0.26 | 1053.10 | 244.56 | 0.01 |
| Canal 2 Centerli | 1807.45 | PF 1 | 257.40 | 4.00 | 18.85 | | 18.85 | 0.000001 | 0.11 | 2467.08 | 335.33 | 0.01 |
| Canal 2 Centerli | 1654.95 | PF 1 | 223.59 | 2.00 | 18.85 | 3.35 | 18.85 | 0.000001 | 0.09 | 2655.98 | 310.10 | 0.00 |
| Canal 2 Centerli | 1359 | | Culvert | | | | | | | | | |
| Canal 2 Centerli | 1253.38 | PF 1 | 223.59 | 4.00 | 13.09 | | 13.10 | 0.000016 | 0.31 | 713.97 | 98.94 | 0.02 |
| Canal 2 Centerli | 953.68 | PF 1 | 223.59 | 3.00 | 13.09 | | 13.09 | 0.000010 | 0.23 | 968.08 | 149.65 | 0.02 |
| Canal 2 Centerli | 737.13 | PF 1 | 53.77 | 1.00 | 13.09 | 1.91 | 13.09 | 0.000004 | 0.13 | 423.29 | 76.67 | 0.01 |
| Canal 2 Centerli | 600 | | Culvert | | | | | | | | | |
| Canal 2 Centerli | 585.52 | PF 1 | 53.77 | 0.00 | 13.00 | | 13.00 | 0.000000 | 0.05 | 1025.78 | 103.10 | 0.00 |
| Canal 2 Centerli | 285.01 | PF 1 | 53.77 | 0.00 | 13.00 | | 13.00 | 0.000000 | 0.05 | 1029.82 | 105.71 | 0.00 |
| Canal 2 Centerli | 85.14 | PF 1 | 73.98 | 0.00 | 13.00 | 1.43 | 13.00 | 0.000000 | 0.03 | 1885.28 | 253.36 | 0.00 |

**Off-Site Discharge Analysis for Discharge Point #2 (DP 002)**

Discharge Point #2 (DP 002) in the Post Construction Stormwater Analysis is located at the northwestern portion of the disturbance area. The discharge point is a proposed level spreader at the outfall point of MRC Basin A. Discharge from MRC Basin A is slowly and safely conveyed over the level spreader and into the roadside stormwater swale north of Old Bordentown Road. Stormwater then flows to the nearby existing wetlands and conveys downstream toward Biles Creek/Delaware River. Outflows from this level spreader are on the subject property owned by the applicant NP Falls Township Industrial, LLC. The design of the level spreader ensures that flow will not reconcentrate and cause erosion to the downstream wetlands or soils. All post-development flow rates are reduced to below the corresponding pre-development storm event peak rates. The flow from this discharge point is considered off-site discharge of stormwater to an area that is not a surface water.

The flow path from DP 002 outlets to the adjacent property owned by NP Falls Township Industrial, LLC, eventually ending up in the existing drainage swale to the northwest of the subject parcel. Flow is ultimately conveyed to the Biles Creek/Delaware River approximately 5,000 ft north of the project site. The flow path winds through the existing wetlands and drainage swales to an existing channel that confluences with Biles Creek, discharging to the Delaware River. The flow path is shown in this report. The design of the level spreader ensures that flow will not reconcentrate and cause erosion to the downstream wetlands or soils. The stormwater flows over soil types that do not have erodibility factors that are of concern. The flow path vegetation cover varies from wetlands, to woodlands, to meadow channels, eventually conveying to the Delaware River.

For purposes of stormwater management analysis, pre- and post-development peak rates were analyzed to determine the effects of the off-site discharge for DP 002. For all storm events, the post development stormwater rates were reduced below the corresponding pre-development rates. Since the flows are being reduced, all downstream channels and areas will be stabled in the post-development condition. The design of the level spreader ensures that flow will not reconcentrate and cause erosion to the downstream wetlands or soils.

The *DP 002 - Peak Rate Control Table* below illustrates that peak rates for all design storms are reduced beyond the requirements of Stormwater Runoff Rate District C of the Delaware River Watershed. These analyses for peak rate reveal that for the stormwater discharge to DP 002, and the off-site flow path beyond DP 001 to the Delaware River, accelerated erosion or sedimentation will not occur due to these reduced peak rates. This analysis is consistent with the Erosion and Sediment Pollution Control Manual (363-2134-008) and the Pennsylvania Stormwater Best Management Practices Manual (363-0300-002).

Increased stormwater discharges for peak rate have been avoided through the implementation of an MRC Basin on-site, retaining stormwater in larger storm events to the extent practical, and discharging to areas that are not susceptible to soil erosion. These methods in the post-development condition, along with the design of the level spreader, effectively prevent accelerated erosion or damage downslope of DP 002 and the existing flow path to the Delaware River.

The project site is located within Stormwater Runoff Rate District C and is subject to the following peak rate control criteria:

| **Post-Development** | | **Pre-Development** |
|---|---|---|
| 2-Year | Reduced to | 1-Year |
| 5-Year | Reduced to | 2-Year |
| 100-Year | Reduced to | 50% of the 100-Year |

In accordance with the above table, the table below displays compliance with the Peak Rate Control requirements for DP 002, Off-site Discharge Analysis:

**Summary of Peak Runoff Rate Control – DP 002**

| | DP 001 - Peak Flow (cfs) - SCS Method | | | | | | |
|---|---|---|---|---|---|---|---|
| **Design Storm** | **1-Year** | **2-Year** | **5-Year** | **10-Year** | **25-Year** | **50-Year** | **100-Year** |
| **Pre-Development** | **3.146** | **4.657** | **7.116** | **9.403** | **11.74** | **13.52** | **15.91** |
| **Maximum Allowable Post-Development** | --- | 3.146 | 4.657 | --- | --- | --- | 7.955 |
| **Post-Development** | **0.326** | **0.414** | **1.515** | **3.736** | **5.244** | **6.204** | **7.231*** |

* 7.231 cfs / 15.91 cfs = 45.45%

(Post-Dev 100-year reduced to 45.45% of Pre-Dev 100-year peak rate)

# 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 | ------ | 87.05 | 134.95 | 0.000 | 213.63 | 287.94 | 364.87 | 424.09 | 504.08 | Pre-Dev DA #1 - DP 001 |
| 2 | SCS Runoff | ------ | 0.402 | 1.427 | 0.000 | 4.033 | 7.105 | 10.69 | 13.59 | 17.70 | Pre-Dev DA #4 - DP 001 |
| 3 | SCS Runoff | ------ | 1.120 | 3.743 | 0.000 | 9.186 | 14.84 | 21.08 | 26.05 | 33.00 | Off-site (Fleck) - DP 001 |
| 4 | SCS Runoff | ------ | 0.000 | 0.004 | 0.000 | 0.093 | 0.426 | 3.277 | 8.087 | 16.12 | Off-site (Petrucci) - DP 001 |
| 5 | SCS Runoff | ------ | 24.87 | 31.80 | 0.000 | 42.15 | 51.27 | 60.34 | 67.12 | 76.11 | Off-site (Hiossen) - DP 001 |
| 6 | SCS Runoff | ------ | 0.900 | 1.591 | 0.000 | 2.777 | 3.934 | 5.157 | 6.105 | 7.422 | Off-site (HB Fuller-North) - DP 001 |
| 7 | SCS Runoff | ------ | 10.26 | 13.37 | 0.000 | 18.03 | 22.15 | 26.26 | 29.32 | 33.39 | Off-site (HB Fuller-Middle) - DP 001 |
| 8 | SCS Runoff | ------ | 5.655 | 7.284 | 0.000 | 9.717 | 11.87 | 14.00 | 15.60 | 17.71 | Off-site (HB Fuller-South) - DP 001 |
| 9 | SCS Runoff | ------ | 5.152 | 8.768 | 0.000 | 14.90 | 20.84 | 27.08 | 31.90 | 38.69 | Off-site (Eastern DA) - DP 001 |
| 10 | Combine | 2, 3, 4, 5, 6, | 26.71 | 37.42 | 0.000 | 55.35 | 72.80 | 93.53 | 112.80 | 141.51 | Off-site (2-6) - DP 001 |
| 11 | Combine | 7, 8, 9, 10 | 47.40 | 66.23 | 0.000 | 97.05 | 126.41 | 159.31 | 187.82 | 228.97 | Total Off-site (Pre-Dev) - DP 001 |
| 12 | Combine | 1, 2, | 87.42 | 136.36 | 0.000 | 217.45 | 294.50 | 375.02 | 436.91 | 520.66 | Total On-site (Pre-Dev) - DP 001 |
| 13 | Combine | 11, 12 | 94.03 | 146.22 | 0.000 | 233.20 | 317.42 | 405.89 | 473.93 | 566.24 | Total Pre-Dev - DP 001 |
| 15 | SCS Runoff | ------ | 106.68 | 137.02 | 0.000 | 182.35 | 222.37 | 262.15 | 291.86 | 331.32 | Pre-Dev DA #2 (Remains On-Site) |
| 16 | SCS Runoff | ------ | 0.052 | 0.272 | 0.000 | 1.989 | 5.335 | 10.07 | 14.32 | 20.80 | Pre-Dev DA #3 (Remains On-Site) |
| 18 | SCS Runoff | ------ | 39.23 | 53.40 | 0.000 | 75.12 | 94.59 | 114.08 | 128.68 | 148.09 | Post-Dev DA #1 - DP 001 |
| 19 | Combine | 11, 18 | 86.40 | 118.86 | 0.000 | 170.47 | 218.41 | 269.88 | 312.28 | 371.90 | Total To Pond #9 - DP 001 |
| 20 | Reservoir | 19 | 0.000 | 0.000 | 0.000 | 0.000 | 0.004 | 3.311 | 5.982 | 11.36 | Route Pond #9 |
| 22 | SCS Runoff | ------ | 4.044 | 5.403 | 0.000 | 7.465 | 9.302 | 11.13 | 12.50 | 14.32 | Stormwater Trench 2+3 - DP 001 |
| 23 | Reservoir | 22 | 3.635 | 4.730 | 0.000 | 6.463 | 7.992 | 9.591 | 10.75 | 12.29 | Route ST-2+3 |
| 24 | SCS Runoff | ------ | 2.095 | 2.796 | 0.000 | 3.860 | 4.807 | 5.752 | 6.459 | 7.397 | Stormwater Trench 4 - DP 001 |
| 25 | Reservoir | 24 | 1.846 | 2.509 | 0.000 | 3.493 | 4.367 | 5.162 | 5.679 | 6.421 | Route ST-4 |
| 26 | SCS Runoff | ------ | 2.069 | 2.762 | 0.000 | 3.813 | 4.749 | 5.682 | 6.380 | 7.307 | Stormwater Trench 5 - DP 001 |
| 27 | Reservoir | 26 | 1.822 | 2.477 | 0.000 | 3.451 | 4.315 | 5.111 | 5.618 | 6.352 | Route ST-5 |
| 28 | SCS Runoff | ------ | 2.082 | 2.790 | 0.000 | 3.865 | 4.824 | 5.782 | 6.497 | 7.448 | Stormwater Trench 6 - DP 001 |
| 29 | Reservoir | 28 | 1.827 | 2.486 | 0.000 | 3.479 | 4.360 | 5.162 | 5.681 | 6.426 | Route ST-6 |
| 30 | Combine | 23, 25, 27, 29 | 9.099 | 12.20 | 0.000 | 16.87 | 21.01 | 25.02 | 27.72 | 31.49 | Total Stormwater Trench Outflow - D |
| 32 | SCS Runoff | ------ | 39.87 | 53.63 | 0.000 | 74.58 | 93.29 | 111.97 | 125.94 | 144.51 | Post-Dev DA #2A - DP 001 |
| 33 | SCS Runoff | ------ | 81.53 | 105.29 | 0.000 | 140.82 | 172.20 | 203.40 | 226.69 | 257.61 | Post-Dev DA #2B - DP 001 |
| 34 | SCS Runoff | ------ | 0.234 | 0.965 | 0.000 | 3.061 | 5.626 | 8.717 | 11.25 | 14.85 | Post-Dev DA #2C - DP 001 |
| 35 | SCS Runoff | ------ | 7.734 | 10.52 | 0.000 | 14.78 | 18.60 | 22.43 | 25.29 | 29.10 | Post-Dev DA #3 - DP 001 |
| 36 | SCS Runoff | ------ | 110.72 | 143.11 | 0.000 | 191.56 | 234.36 | 276.90 | 308.67 | 350.84 | Post-Dev DA #4 - DP 001 |

# 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 | |
| 37 | SCS Runoff | ------ | 19.90 | 25.76 | 0.000 | 34.54 | 42.30 | 50.01 | 55.77 | 63.42 | Post-Dev DA #5 - DP 001 |
| 38 | SCS Runoff | ------ | 24.61 | 31.67 | 0.000 | 42.21 | 51.53 | 60.78 | 67.69 | 76.86 | Post-Dev DA #6 - DP 001 |
| 39 | SCS Runoff | ------ | 158.71 | 199.27 | 0.000 | 259.59 | 312.83 | 365.79 | 405.38 | 458.02 | Post-Dev DA #7 - DP 001 |
| 40 | SCS Runoff | ------ | 20.00 | 25.95 | 0.000 | 34.85 | 42.71 | 50.54 | 56.38 | 64.13 | Post-Dev DA #8 - DP 001 |
| 41 | SCS Runoff | ------ | 85.85 | 107.88 | 0.000 | 140.63 | 169.54 | 198.29 | 219.78 | 248.36 | Post-Dev DA #9 - DP 001 |
| 42 | Combine | 32, 33, 34, 35, 36, | 239.85 | 312.63 | 0.000 | 422.28 | 519.87 | 617.44 | 690.52 | 787.76 | Subtotal - Post DA (2A-4) |
| 43 | Combine | 37, 38, 39, 40, 41, | 309.06 | 390.52 | 0.000 | 511.83 | 618.90 | 725.41 | 804.99 | 910.79 | Subtotal - Post DA (5-9) |
| 44 | Combine | 20, 30, 42, 43 | 556.83 | 714.02 | 0.000 | 949.19 | 1157.70 | 1365.52 | 1520.82 | 1727.11 | Total to Combined Basins |
| 45 | Reservoir | 44 | 17.66 | 30.05 | 0.000 | 53.25 | 75.08 | 91.88 | 100.98 | 111.07 | Route Combined Basins |
| 47 | SCS Runoff | ------ | 10.48 | 13.04 | 0.000 | 16.84 | 20.20 | 23.55 | 26.06 | 29.39 | Post-Dev Bypass #1 - DP 001 |
| 48 | SCS Runoff | ------ | 12.01 | 16.81 | 0.000 | 24.44 | 31.38 | 38.38 | 43.65 | 50.68 | Post-Dev Bypass #2 - DP 001 |
| 49 | SCS Runoff | ------ | 1.306 | 1.604 | 0.000 | 2.051 | 2.446 | 2.841 | 3.138 | 3.532 | Post-Dev Bypass #3 - DP 001 |
| 50 | Combine | 47, 48, 49 | 23.71 | 31.45 | 0.000 | 43.33 | 54.03 | 64.78 | 72.84 | 83.60 | Total Bypass Area - DP 001 |
| 52 | Combine | 45, 50, | 28.72 | 44.72 | 0.000 | 73.04 | 101.59 | 131.85 | 150.91 | 174.57 | Total Post-Dev - DP 001 |
| 54 | SCS Runoff | ------ | 3.146 | 4.657 | 0.000 | 7.116 | 9.403 | 11.74 | 13.52 | 15.91 | Pre-Dev DA #5 - DP 002 |
| 56 | SCS Runoff | ------ | 5.260 | 7.383 | 0.000 | 10.79 | 13.90 | 17.04 | 19.40 | 22.56 | Stormwater Trench ST-1 - DP 002 |
| 57 | Reservoir | 56 | 4.340 | 5.864 | 0.000 | 8.417 | 10.78 | 12.80 | 14.25 | 16.58 | Route ST-1 |
| 58 | SCS Runoff | ------ | 3.287 | 5.314 | 0.000 | 8.694 | 11.92 | 15.30 | 17.97 | 21.60 | Post-Dev Basin A - DP 002 |
| 59 | Combine | 57, 58 | 7.466 | 10.87 | 0.000 | 16.66 | 22.11 | 27.58 | 31.44 | 36.97 | Total to Basin A |
| 60 | Reservoir | 59 | 0.067 | 0.316 | 0.000 | 1.483 | 3.673 | 5.168 | 6.120 | 7.137 | Route Basin A |
| 62 | SCS Runoff | ------ | 0.326 | 0.401 | 0.000 | 0.513 | 0.612 | 0.710 | 0.784 | 0.883 | Post-Dev Bypass #5 - DP 002 |
| 64 | Combine | 60, 62, | 0.326 | 0.414 | 0.000 | 1.515 | 3.736 | 5.244 | 6.204 | 7.231 | Total Post-Dev - DP 002 |
| 66 | SCS Runoff | ------ | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | Comb Basins (MRC - Lawn A) |
| 67 | SCS Runoff | ------ | 0.000 | 0.000 | 6.935 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | Comb Basins (MRC - Lawn D) |
| 68 | SCS Runoff | ------ | 0.000 | 0.000 | 85.43 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | Comb Basins (MRC - Imp) |
| 69 | Combine | 66, 67, 68 | 0.000 | 0.000 | 92.37 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | Total Comb Basins (MRC) |
| 70 | Reservoir | 69 | 0.000 | 0.000 | 1.005 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | Route MRC Basins |
| 72 | SCS Runoff | ------ | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | Basin A (MRC - Lawn A) |
| 73 | SCS Runoff | ------ | 0.000 | 0.000 | 0.576 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | Basin A (MRC - Lawn D) |
| 74 | SCS Runoff | ------ | 0.000 | 0.000 | 0.122 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | Basin A (MRC - Gravel A) |

# 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 | |
| 75 | SCS Runoff | ------ | 0.000 | 0.000 | 0.592 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | Basin A (MRC - Gravel D) |
| 76 | SCS Runoff | ------ | 0.000 | 0.000 | 0.280 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | Basin A (MRC - Impervious) |
| 77 | Combine | 72, 73, 74, 75, 76 | 0.000 | 0.000 | 1.570 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | Total Basin A (MRC) |
| 78 | Reservoir | 77 | 0.000 | 0.000 | 0.014 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | Route MRC Basin A |

# Soil Information for All Uses

## Soil Properties and Qualities

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

## Soil Erosion Factors

Soil Erosion Factors are soil properties and interpretations used in evaluating the soil for potential erosion. Example soil erosion factors can include K factor for the whole soil or on a rock free basis, T factor, wind erodibility group and wind erodibility index.

### K Factor, Rock Free

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) and the Revised Universal Soil Loss Equation (RUSLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter and on soil structure and saturated hydraulic conductivity (Ksat). Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

"Erosion factor Kf (rock free)" indicates the erodibility of the fine-earth fraction, or the material less than 2 millimeters in size.

Factor K does not apply to organic horizons and is not reported for those layers.



## MAP LEGEND

**Area of Interest (AOI)**
- Area of Interest (AOI)

**Soils**

**Soil Rating Polygons**
- .02
- .05
- .10
- .15
- .17
- .20
- .24
- .28
- .32
- .37
- .43
- .49
- .55
- .64
- Not rated or not available

**Soil Rating Lines**
- .02
- .05
- .10
- .15
- .17
- .20
- .24
- .28
- .32
- .37
- .43
- .49
- .55
- .64
- Not rated or not available

**Soil Rating Points**
- .02
- .05
- .10
- .15
- .17
- .20
- .24
- .28
- .32
- .37
- .43
- .49
- .55
- .64
- 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 1:24,000.

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: Bucks County, Pennsylvania
Survey Area Data: Version 20, Sep 4, 2023

Soil Survey Area: Mercer County, New Jersey
Survey Area Data: Version 19, Aug 29, 2023

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

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

Date(s) aerial images were photographed: Jun 4, 2022—Jul 22, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

-953-

## MAP LEGEND

## MAP INFORMATION

imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

## Table—K Factor, Rock Free

| Map unit symbol | Map unit name | Rating | Acres in AOI | Percent of AOI |
|---|---|---|---|---|
| AlA | Alton gravelly loam, 0 to 3 percent slopes | .32 | 127.2 | 8.9% |
| DaA | Delaware fine sandy loam, 0 to 3 percent slopes | .24 | 113.4 | 8.0% |
| Na | Nanticoke-Hatboro silt loams | .43 | 72.7 | 5.1% |
| Ot | Othello silt loams, 0 to 2 percent slopes, northern coastal plain | .43 | 146.1 | 10.3% |
| Pr | Pits, quarry | | 5.5 | 0.4% |
| Ps | Psamments, dredged river material | .02 | 133.1 | 9.4% |
| Ua | Udorthents, gravelly | .02 | 168.2 | 11.8% |
| UcB | Udorthents, sandy | .02 | 73.2 | 5.1% |
| UfuB | Urban land, 0 to 8 percent slopes | | 404.6 | 28.4% |
| UzbB | Urban land-Udorthents, sandy complex, 0 to 8 percent slopes | | 23.6 | 1.7% |
| W | Water | | 130.1 | 9.1% |
| **Subtotals for Soil Survey Area** | | | **1,397.7** | **98.2%** |
| **Totals for Area of Interest** | | | **1,423.1** | **100.0%** |

| Map unit symbol | Map unit name | Rating | Acres in AOI | Percent of AOI |
|---|---|---|---|---|
| UddcB | Udorthents, dredged coarse materials, 0 to 8 percent slopes | .32 | 0.0 | 0.0% |
| WATER | Water | | 25.4 | 1.8% |
| **Subtotals for Soil Survey Area** | | | **25.4** | **1.8%** |
| **Totals for Area of Interest** | | | **1,423.1** | **100.0%** |

## Rating Options—K Factor, Rock Free

*Aggregation Method:* Dominant Condition

Aggregation is the process by which a set of component attribute values is reduced to a single value that represents the map unit as a whole.

A map unit is typically composed of one or more "components". A component is either some type of soil or some nonsoil entity, e.g., rock outcrop. For the attribute being aggregated, the first step of the aggregation process is to derive one attribute value for each of a map unit's components. From this set of component attributes,

the next step of the aggregation process derives a single value that represents the map unit as a whole. Once a single value for each map unit is derived, a thematic map for soil map units can be rendered. Aggregation must be done because, on any soil map, map units are delineated but components are not.

For each of a map unit's components, a corresponding percent composition is recorded. A percent composition of 60 indicates that the corresponding component typically makes up approximately 60% of the map unit. Percent composition is a critical factor in some, but not all, aggregation methods.

The aggregation method "Dominant Condition" first groups like attribute values for the components in a map unit. For each group, percent composition is set to the sum of the percent composition of all components participating in that group. These groups now represent "conditions" rather than components. The attribute value associated with the group with the highest cumulative percent composition is returned. If more than one group shares the highest cumulative percent composition, the corresponding "tie-break" rule determines which value should be returned. The "tie-break" rule indicates whether the lower or higher group value should be returned in the case of a percent composition tie. The result returned by this aggregation method represents the dominant condition throughout the map unit only when no tie has occurred.

*Component Percent Cutoff: None Specified*

Components whose percent composition is below the cutoff value will not be considered. If no cutoff value is specified, all components in the database will be considered. The data for some contrasting soils of minor extent may not be in the database, and therefore are not considered.

*Tie-break Rule:* Higher

The tie-break rule indicates which value should be selected from a set of multiple candidate values, or which value should be selected in the event of a percent composition tie.

*Layer Options (Horizon Aggregation Method):* Surface Layer (Not applicable)

For an attribute of a soil horizon, a depth qualification must be specified. In most cases it is probably most appropriate to specify a fixed depth range, either in centimeters or inches. The Bottom Depth must be greater than the Top Depth, and the Top Depth can be greater than zero. The choice of "inches" or "centimeters" only applies to the depth of soil to be evaluated. It has no influence on the units of measure the data are presented in.

When "Surface Layer" is specified as the depth qualifier, only the surface layer or horizon is considered when deriving a value for a component, but keep in mind that the thickness of the surface layer varies from component to component.

When "All Layers" is specified as the depth qualifier, all layers recorded for a component are considered when deriving the value for that component.

Whenever more than one layer or horizon is considered when deriving a value for a component, and the attribute being aggregated is a numeric attribute, a weighted average value is returned, where the weighting factor is the layer or horizon thickness.




OFF-SITE DISCHARGE ANALYSIS MAP

# *KEYSTONE TRADE CENTER - PHASE 2 (DP 002)*

FALLS TOWNSHIP, BUCKS COUNTY, PENNSYLVANIA


**GILMORE & ASSOCIATES, INC.**

ENGINEERING & CONSULTING SERVICES

65 EAST BUTLER AVENUE, SUITE 100, NEW BRITAIN, PA 18901-5106 • (215) 345-4330

www.gilmore-assoc.com


| JOB NO.: | DATE: | SCALE: |
|---|---|---|
| 2020-07083-16 | 01/31/2024 | 1"=1,000' |


Q:\landdev\2020\2007083_USS_Fairless_Hills_Master_Plan\2007083-15 - Building 4 Land Development\DESIGN\CAD\Sheet Set\200708316_Location Map_1000_Off-Site.dwg Layout: Location Map-ODA Plotted By: bhadler, on Mon Jan 29, 2024 at 9:32am

**APPENDIX A – GEOTECHNICAL ENGINEERING STUDY: PHASE 2**

HILLIS-CARNES
ENGINEERING ASSOCIATES
30 S. Keystone Ave.
Emmaus, PA 18049
Phone 484-519-9650
www.hcea.com

September 30, 2021

Mr. Jeremy Michael
Director of Development
NorthPoint Development
4825 NW 41st St
Riverside, MO 64150

Re: **Keystone Trade Center Building 4**
Falls Township, Bucks County, PA
HCEA Project No. L21049

Dear Mr. Michael,

Hillis-Carnes Engineering Associates, Inc. (HCEA) is pleased to submit this summary concerning the subsurface exploration and subsequent geotechnical engineering study for the construction of a proposed 1,032,000 square feet industrial warehouse at the Keystone Trade Center facility in the Fairless Hills area of Bucks County, PA.

The project site has been mapped by the Pennsylvania Geological Survey on the Geologic Map of Pennsylvania (1980) as being located within the physiographic province known as the Atlantic Coastal Plain. Specifically, the site lies within the Trenton Gravel Formation of the Quaternary Age, consisting of gray to pale-reddish-brown, very gravelly sand and interbedded cross bedded sand and clay-silt layers.

Materials specifically identified as man-placed fill materials were encountered at majority of the advanced boring locations, to depths ranging from 2 feet to 20 feet below existing site grades. The man-placed fill materials consisted of both coarse and fine-grained materials containing slag, boulders and coal. The more fine-grained materials consisted of SILT with varying amounts of Sand and Gravel and exhibited very stiff consistency. The more coarse-grained materials consisted of SAND and GRAVEL with varying amounts of Silt, slag, coal and boulders and exhibited relative densities in the loose to very dense range. Based on our understanding of the planned grading for the site, these materials will likely be encountered within the limits of the site excavations and may require the use of special equipment to excavate these very dense or hard materials.

Review of the existing borrow pit plan, shows a small portion of the property within BP-4. These areas may have varying compositions of fill with depths ranging from 2 feet to 20 feet below the existing ground surface. It should be anticipated that man-placed fill materials may be encountered at other locations and to different depths across the site

due to the previous construction and earth work that has occurred on and around the project site.

The natural soils encountered at the site generally reflect the description of the materials in the geologic references, consisting of interbedded coarse and fine-grained soils. The coarse-grained natural soils were observed to generally consist of SAND (SP, SP-SM, SM, SC) and GRAVEL/cobbles (GP-GM, GP, GM) with lesser amounts of Silt and Clay. The SPT N-values recorded in the coarse-grained materials generally indicate very loose to very dense relative densities. The fine-grained natural soils generally consist of SILT (ML) and CLAY (CL, CL-ML) with varying amounts of Sand, Gravel and cobbles. The SPT N-values recorded in fine-grained materials generally indicate very soft to very stiff consistencies.

Groundwater was monitored in the boreholes during drilling operations and at completion of drilling operations. Groundwater was observed at each of the building borings that reached planned depths, at depths ranging from approximately 10 to 15 feet below existing grades.

Our findings anticipate that the site can be developed for the proposed structures utilizing conventional spread and wall footings supported on the existing man-placed fill materials or on new engineering fill placed in accordance with the recommendations of the geotechnical report. However, due to the potential for variability in undocumented existing fill material, footings and floor slabs should not be constructed on or over any existing fill materials unless they are specifically approved for use by the Geotechnical Engineer or his designated representative in the field during construction. Special consideration should be given to the proper monitoring of fill operations, footing excavations, and concrete placement in all structural areas.

All existing structures (including all above and below ground construction) within the areas to be developed should be reviewed prior to the initiation of new construction in order to determine their impact on the planned construction. These structures should include all underground pipes, utilities, tanks and underground structures that might interfere with the new construction. If abandoned underground utilities are to be removed prior to the initiation of construction, provisions should be made in the construction specifications and budget to restore the subgrade to a stable condition. Restoration should include backfilling and compaction of the excavation areas. All existing topsoil and overgrown areas of the site should be stripped or removed from the site prior to the start of construction.

With the proper implementation of the site preparations recommended below that include proofrolling of the building pad and roadway areas, and the excavation of test pits, it is our professional opinion that in some instances, it may be acceptable to leave the historical, abandoned, below-grade construction elements in-place. Prior to the commencement of site earthwork operations, this office should be contacted to review existing site conditions. If below-grade structures are to remain in place, HCEA recommends at a minimum that holes be punched through any relatively impervious

material (i.e., concrete or asphalt) that covers an area equal to or greater than 500 square feet to prevent the perching of surface water infiltration on the relatively impervious surface. Holes should generally be a minimum of 4 inches in diameter and punched at a maximum center to center spacing of 10 feet. Additionally, any below-grade structure that will remain in-place should maintain a minimum 1 foot between any new structural element to prevent support on a local “hard spot” that could pose differential settlement issues. This may require the partial or complete removal of buried features and replacement with controlled fill. These general recommendations are provided so budgets and allowances can be created for addressing the existing below-grade constructions. The geotechnical engineer or their designated representative should be consulted on a case by case scenario to determine if additional measures may be necessary.

Prior to the start of earthwork operations, HCEA recommends that test pits be excavated throughout the site between 50 and 100 feet on centers in order to verify the suitability of the man-placed fill materials. In general, the man-placed fill materials encountered throughout our exploration are generally considered suitable for the support of the proposed site improvements; however, several test borings were observed to contain man-placed fill materials with deleterious components such as organics, construction debris and/or relatively soft or loose consistencies and relative densities. The purpose of the test pits would be to better determine the quality of the man-placed fill materials and identify any pockets of deleterious materials that will need to be undercut and replaced. The Geotechnical Engineer or their designated representative should witness the test pitting operations and should determine which areas may need further exploration.

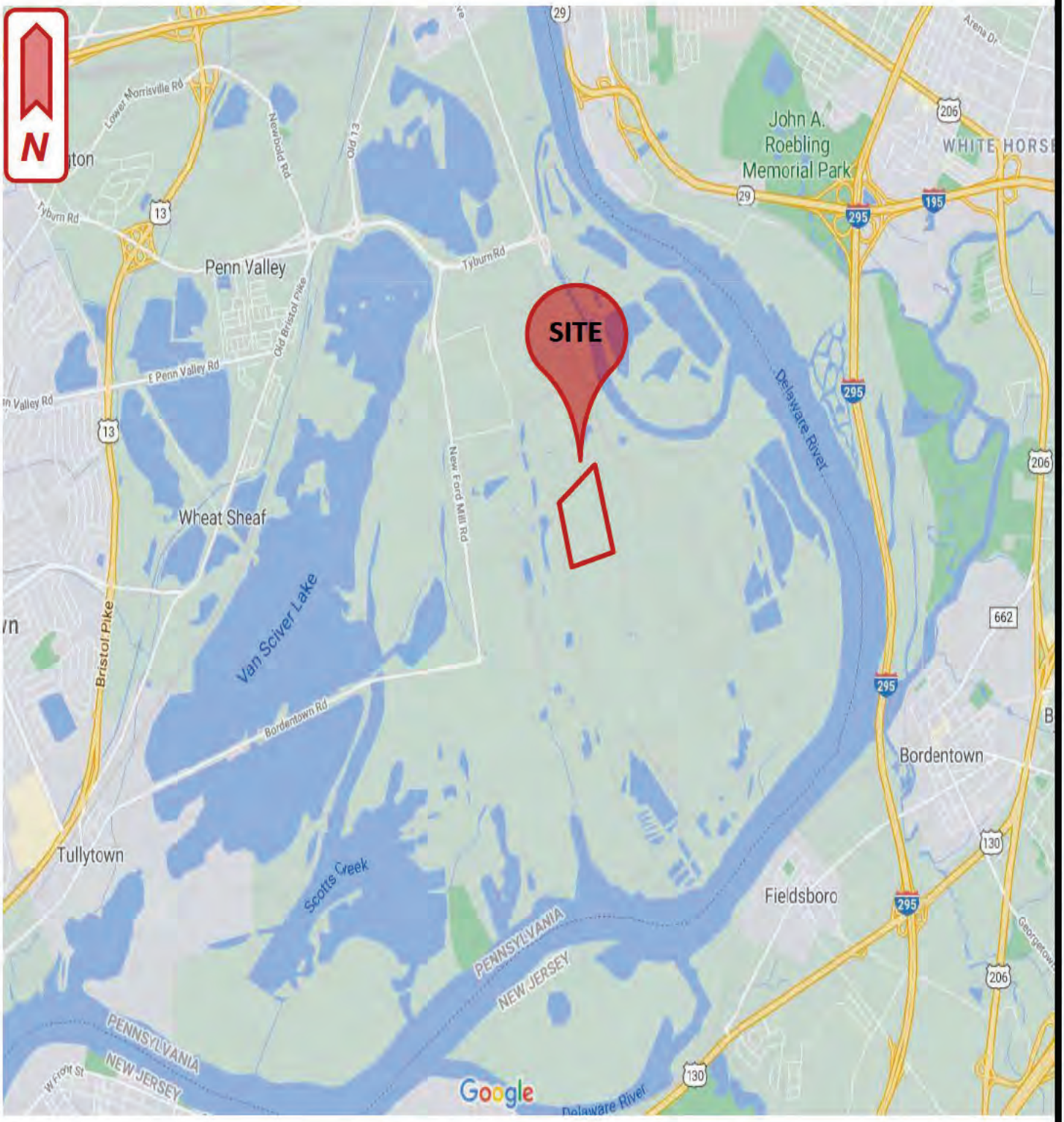
Based on the assumed maximum structural loads, the maximum allowable settlement, and the general soil conditions which were encountered, it is recommended that a design allowable soil bearing pressure of 3,000 lbs/sq ft be used for proportioning footings in firm, approved ground. All footing excavations should be examined by the Geotechnical Engineer or their designated representative prior to the placement of concrete.

No other conclusions should be drawn other than those specifically stated. Contact the undersigned should you have any further questions.

Sincerely,
**HILLIS-CARNES ENGINEERING ASSOCIATES, INC.**



Arjan Kloet
Branch Manager
akloet@hcea.com




This sketch was developed using Google Maps

HILLIS-CARNES
ENGINEERING ASSOCIATES

30 S. Keystone Ave., Suite 1
Emmaus, PA 18049

Phone: 484-519-9650

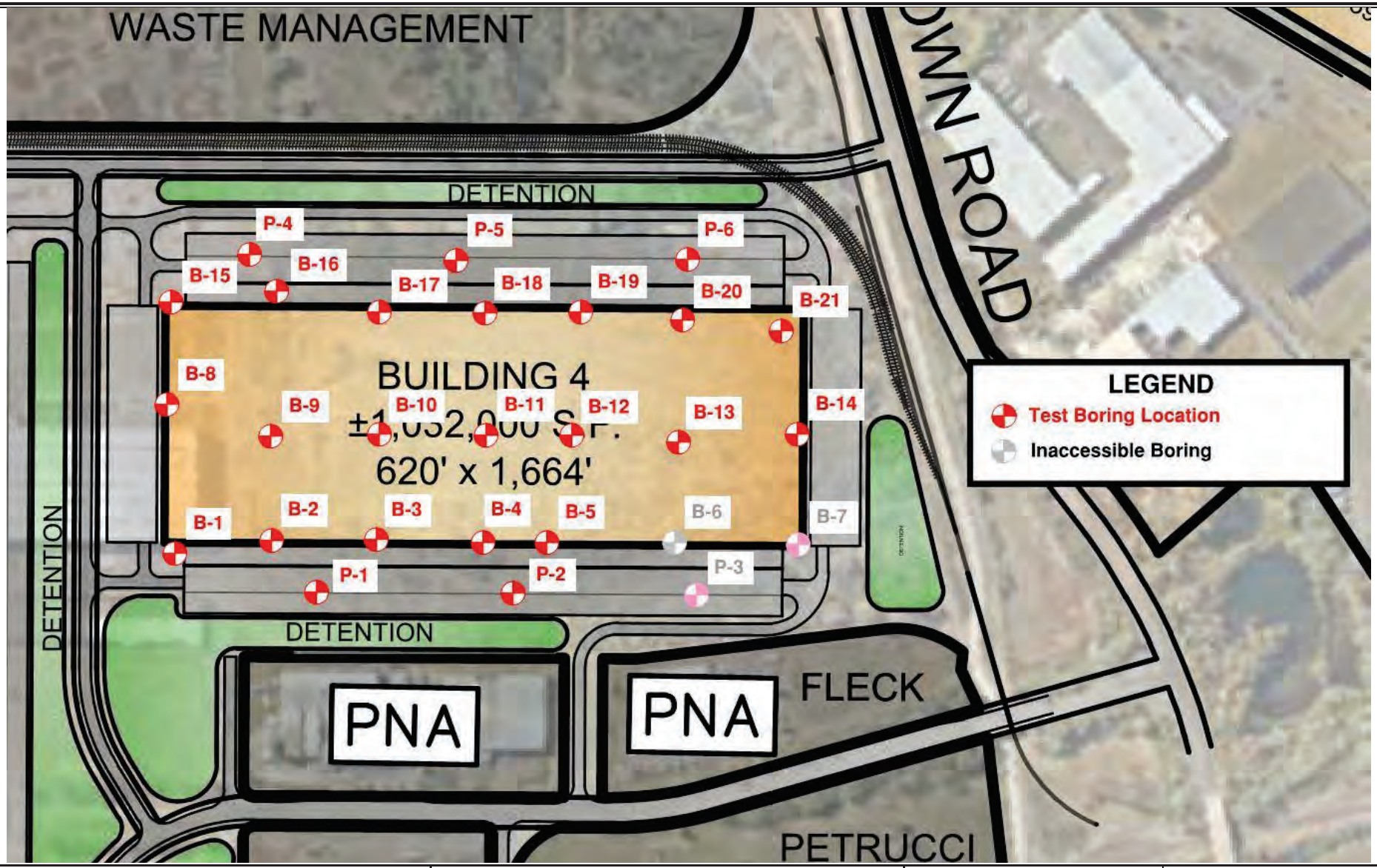
**SITE LOCATION SKETCH**

**FIGURE 1**

KTC Building 4

Falls Township, Pennsylvania

| | | | |
|---|---|---|---|
| **JOB NO:** | L21049 | **DRAWN BY:** | MJD |
| **DATE:** | 09/27/2021 | **CHECKED BY:** | ASK |
| **SCALE:** | NTS | | |
| **PAGE:** | 1 | | |




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|---|---|---|---|---|---|
| HILLIS-CARNES ENGINEERING ASSOCIATES<br>30 S. Keystone Ave., Suite 1<br>Emmaus, PA 18049<br>Phone: 484-519-9650 | **BORING LOCATION PLAN**<br>**FIGURE 2**<br>KTC Building 4<br>Falls Township, Pennsylvania | **JOB NO:** | L21049 | **DRAWN BY:** | MJD |
| | | **DATE:** | 09/27/2021 | **CHECKED BY:** | ASK |
| | | **SCALE:** | NTS | | |
| | | **PAGE:** | 1 | | |

**Source: Concept Site Plan D6, dated 6/01/2021*

HILLIS-CARNES
ENGINEERING ASSOCIATES
30 S. Keystone Ave.
Emmaus, PA 18049
Phone 484-519-9650
www.hcea.com

September 30, 2021

Mr. Jeremy Michael
Director of Development
NorthPoint Development
4825 NW 41st St
Riverside, MO 64150

Re: **Keystone Trade Center Building 5**
Falls Township, Bucks County, PA
HCEA Project No. L21050

Dear Mr. Michael,

Hillis-Carnes Engineering Associates, Inc. (HCEA) is pleased to submit this summary concerning the subsurface exploration and subsequent geotechnical engineering study for the construction of a proposed 1,096,000 square feet industrial warehouse at the Keystone Trade Center facility in the Fairless Hills area of Bucks County, PA.

The project site has been mapped by the Pennsylvania Geological Survey on the Geologic Map of Pennsylvania (1980) as being located within the physiographic province known as the Atlantic Coastal Plain. Specifically, the site lies within the Trenton Gravel Formation of the Quaternary Age, consisting of gray to pale-reddish-brown, very gravelly sand and interbedded cross bedded sand and clay-silt layers.

Materials specifically identified as man-placed fill materials were encountered at majority of the advanced boring locations, to depths ranging from 4 feet to 20 feet below existing site grades. The man-placed fill materials consisted of both coarse and fine-grained materials containing slag, boulders and coal. The more fine-grained materials consisted of SILT with varying amounts of Sand and Gravel and exhibited very stiff consistency. The more coarse-grained materials consisted of SAND and GRAVEL with varying amounts of Silt, slag, coal and boulders and exhibited relative densities in the loose to very dense range. Based on our understanding of the planned grading for the site, these materials will likely be encountered within the limits of the site excavations and may require the use of special equipment to excavate these very dense or hard materials.

Review of the existing borrow pit plan, shows a portion of the property within BP-2 and BP-4. These areas may have varying compositions of fill with depths ranging from 4 feet to 20 feet below the existing ground surface. It should be anticipated that man-placed fill materials may be encountered at other locations and to different depths across the site

due to the previous construction and earth work that has occurred on and around the project site.

The natural soils encountered at the site generally reflect the description of the materials in the geologic references, consisting of interbedded coarse and fine-grained soils. The coarse-grained natural soils were observed to generally consist of SAND (SP, SP-SM, SM, SC) and GRAVEL/cobbles (GP-GM, GP, GM) with lesser amounts of Silt and Clay. The SPT N-values recorded in the coarse-grained materials generally indicate very loose to very dense relative densities. The fine-grained natural soils generally consist of SILT (ML) and CLAY (CL, CL-ML) with varying amounts of Sand, Gravel and cobbles. The SPT N-values recorded in fine-grained materials generally indicate very soft to very stiff consistencies.

Groundwater was monitored in the boreholes during drilling operations and at completion of drilling operations. Groundwater was observed at each of the building borings that reached planned depths, at depths ranging from approximately 11 to 14 feet below existing grades.

Our findings anticipate that the site can be developed for the proposed structures utilizing conventional spread and wall footings supported on the existing man-placed fill materials or on new engineering fill placed in accordance with the recommendations of the geotechnical report. However, due to the potential for variability in undocumented existing fill material, footings and floor slabs should not be constructed on or over any existing fill materials unless they are specifically approved for use by the Geotechnical Engineer or his designated representative in the field during construction. Special consideration should be given to the proper monitoring of fill operations, footing excavations, and concrete placement in all structural areas.

All existing structures (including all above and below ground construction) within the areas to be developed should be reviewed prior to the initiation of new construction in order to determine their impact on the planned construction. These structures should include all underground pipes, utilities, tanks and underground structures that might interfere with the new construction. If abandoned underground utilities are to be removed prior to the initiation of construction, provisions should be made in the construction specifications and budget to restore the subgrade to a stable condition. Restoration should include backfilling and compaction of the excavation areas. All existing topsoil and overgrown areas of the site should be stripped or removed from the site prior to the start of construction.

With the proper implementation of the site preparations recommended below that include proofrolling of the building pad and roadway areas, and the excavation of test pits, it is our professional opinion that in some instances, it may be acceptable to leave the historical, abandoned, below-grade construction elements in-place. Prior to the commencement of site earthwork operations, this office should be contacted to review existing site conditions. If below-grade structures are to remain in place, HCEA recommends at a minimum that holes be punched through any relatively impervious

material (i.e., concrete or asphalt) that covers an area equal to or greater than 500 square feet to prevent the perching of surface water infiltration on the relatively impervious surface. Holes should generally be a minimum of 4 inches in diameter and punched at a maximum center to center spacing of 10 feet. Additionally, any below-grade structure that will remain in-place should maintain a minimum 1 foot between any new structural element to prevent support on a local “hard spot” that could pose differential settlement issues. This may require the partial or complete removal of buried features and replacement with controlled fill. These general recommendations are provided so budgets and allowances can be created for addressing the existing below-grade constructions. The geotechnical engineer or their designated representative should be consulted on a case by case scenario to determine if additional measures may be necessary.

Prior to the start of earthwork operations, HCEA recommends that test pits be excavated throughout the site between 50 and 100 feet on centers in order to verify the suitability of the man-placed fill materials. In general, the man-placed fill materials encountered throughout our exploration are generally considered suitable for the support of the proposed site improvements; however, several test borings were observed to contain man-placed fill materials with deleterious components such as organics, construction debris and/or relatively soft or loose consistencies and relative densities. The purpose of the test pits would be to better determine the quality of the man-placed fill materials and identify any pockets of deleterious materials that will need to be undercut and replaced. The Geotechnical Engineer or their designated representative should witness the test pitting operations and should determine which areas may need further exploration.

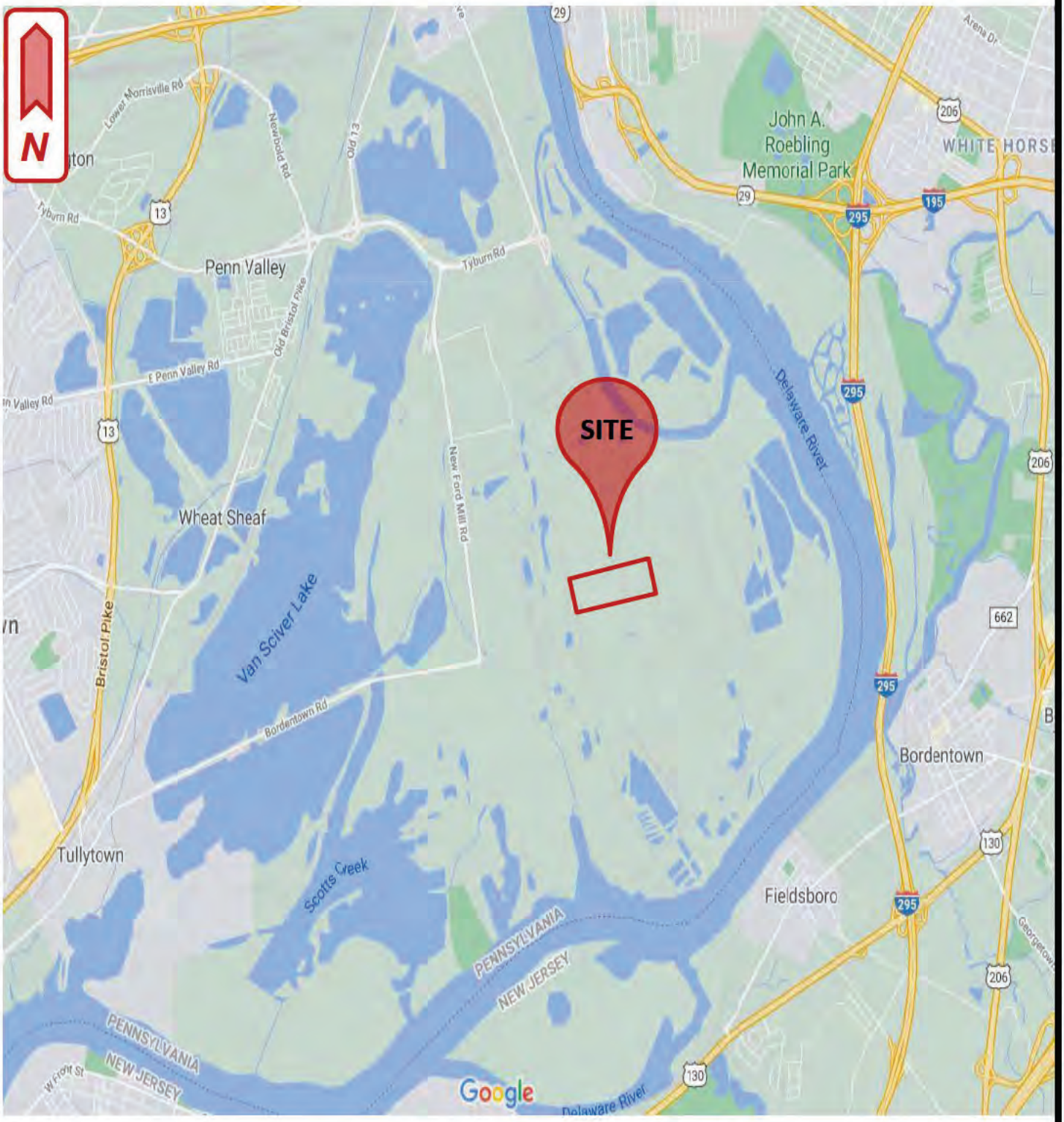
Based on the assumed maximum structural loads, the maximum allowable settlement, and the general soil conditions which were encountered, it is recommended that a design allowable soil bearing pressure of 3,000 lbs/sq ft be used for proportioning footings in firm, approved ground. All footing excavations should be examined by the Geotechnical Engineer or their designated representative prior to the placement of concrete.

No other conclusions should be drawn other than those specifically stated. Contact the undersigned should you have any further questions.

Sincerely,
**HILLIS-CARNES ENGINEERING ASSOCIATES, INC.**



Arjan Kloet
Branch Manager
akloet@hcea.com




This sketch was developed using Google Maps


HILLIS-CARNES
ENGINEERING ASSOCIATES

30 S. Keystone Ave., Suite 1
Emmaus, PA 18049

Phone: 484-519-9650

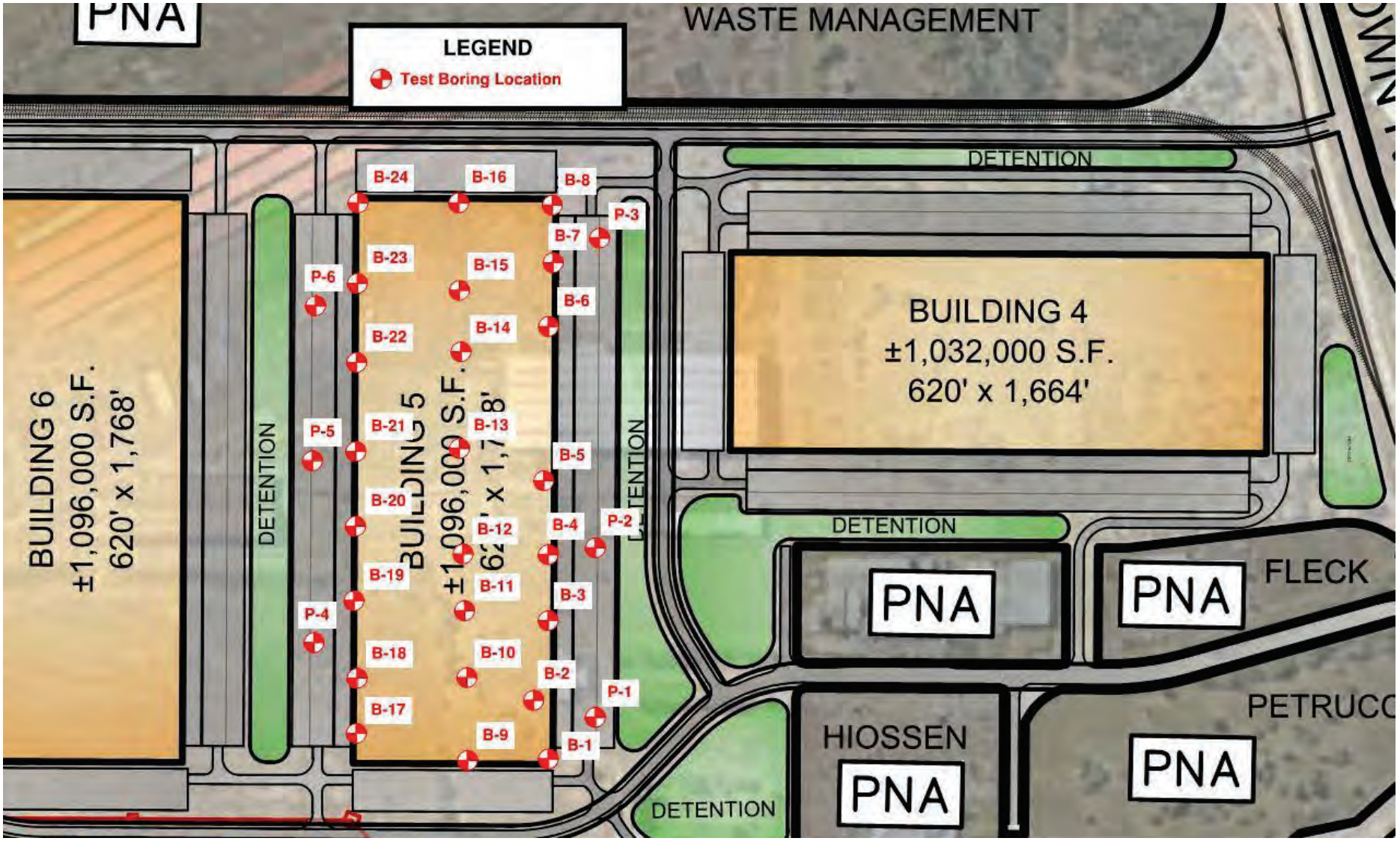

**SITE LOCATION SKETCH**

**FIGURE 1**

KTC Building 5

Falls Township, Pennsylvania

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| **JOB NO:** | L21050 | **DRAWN BY:** | MJD |
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| **HILLIS-CARNES ENGINEERING ASSOCIATES**<br>30 S. Keystone Ave., Suite 1<br>Emmaus, PA 18049<br>Phone: 484-519-9650 | **BORING LOCATION PLAN**<br>**FIGURE 2**<br>KTC Building 5<br>Falls Township, Pennsylvania | **JOB NO:** | L21050 | **DRAWN BY:** | MJD |
| | | **DATE:** | 09/27/2021 | **CHECKED BY:** | ASK |
| | | **SCALE:** | NTS | | |
| | | **PAGE:** | 1 | | |

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**Source: Concept Site Plan D6, dated 6/01/2021*

HILLIS-CARNES
ENGINEERING ASSOCIATES
30 S. Keystone Ave.
Emmaus, PA 18049
Phone 484-519-9650
www.hcea.com

September 30, 2021

Mr. Jeremy Michael
Director of Development
NorthPoint Development
4825 NW 41st St
Riverside, MO 64150

Re: **Keystone Trade Center Building 6**
Falls Township, Bucks County, PA
HCEA Project No. L21051

Dear Mr. Michael,

Hillis-Carnes Engineering Associates, Inc. (HCEA) is pleased to submit this summary concerning the subsurface exploration and subsequent geotechnical engineering study for the construction of a proposed 1,096,000 square feet industrial warehouse at the Keystone Trade Center facility in the Fairless Hills area of Bucks County, PA.

The project site has been mapped by the Pennsylvania Geological Survey on the Geologic Map of Pennsylvania (1980) as being located within the physiographic province known as the Atlantic Coastal Plain. Specifically, the site lies within the Trenton Gravel Formation of the Quaternary Age, consisting of gray to pale-reddish-brown, very gravelly sand and interbedded cross bedded sand and clay-silt layers.

Materials specifically identified as man-placed fill materials were encountered at majority of the advanced boring locations, to depths ranging from 2 feet to 21 feet below existing site grades. The man-placed fill materials consisted of both coarse and fine-grained materials containing slag, boulders and coal. The more fine-grained materials consisted of SILT with varying amounts of Sand and Gravel and exhibited very stiff consistency. The more coarse-grained materials consisted of SAND and GRAVEL with varying amounts of Silt, slag, coal and boulders and exhibited relative densities in the loose to very dense range. Based on our understanding of the planned grading for the site, these materials will likely be encountered within the limits of the site excavations and may require the use of special equipment to excavate these very dense or hard materials.

Review of the existing borrow pit plan, shows a large portion of the property within BP-2 and BP-4. These areas may have varying compositions of fill with depths ranging from 2 feet to 21 feet below the existing ground surface. It should be anticipated that man-placed fill materials may be encountered at other locations and to different depths across the site

due to the previous construction and earth work that has occurred on and around the project site.

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Groundwater was monitored in the boreholes during drilling operations and at completion of drilling operations. Groundwater was observed at each of the building borings that reached planned depths, at depths ranging from approximately 11 to 14 feet below existing grades.

Our findings anticipate that the site can be developed for the proposed structures utilizing conventional spread and wall footings supported on the existing man-placed fill materials or on new engineering fill placed in accordance with the recommendations of the geotechnical report. However, due to the potential for variability in undocumented existing fill material, footings and floor slabs should not be constructed on or over any existing fill materials unless they are specifically approved for use by the Geotechnical Engineer or his designated representative in the field during construction. Special consideration should be given to the proper monitoring of fill operations, footing excavations, and concrete placement in all structural areas.

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With the proper implementation of the site preparations recommended below that include proofrolling of the building pad and roadway areas, and the excavation of test pits, it is our professional opinion that in some instances, it may be acceptable to leave the historical, abandoned, below-grade construction elements in-place. Prior to the commencement of site earthwork operations, this office should be contacted to review existing site conditions. If below-grade structures are to remain in place, HCEA recommends at a minimum that holes be punched through any relatively impervious

material (i.e., concrete or asphalt) that covers an area equal to or greater than 500 square feet to prevent the perching of surface water infiltration on the relatively impervious surface. Holes should generally be a minimum of 4 inches in diameter and punched at a maximum center to center spacing of 10 feet. Additionally, any below-grade structure that will remain in-place should maintain a minimum 1 foot between any new structural element to prevent support on a local “hard spot” that could pose differential settlement issues. This may require the partial or complete removal of buried features and replacement with controlled fill. These general recommendations are provided so budgets and allowances can be created for addressing the existing below-grade constructions. The geotechnical engineer or their designated representative should be consulted on a case by case scenario to determine if additional measures may be necessary.

Prior to the start of earthwork operations, HCEA recommends that test pits be excavated throughout the site between 50 and 100 feet on centers in order to verify the suitability of the man-placed fill materials. In general, the man-placed fill materials encountered throughout our exploration are generally considered suitable for the support of the proposed site improvements; however, several test borings were observed to contain man-placed fill materials with deleterious components such as organics, construction debris and/or relatively soft or loose consistencies and relative densities. The purpose of the test pits would be to better determine the quality of the man-placed fill materials and identify any pockets of deleterious materials that will need to be undercut and replaced. The Geotechnical Engineer or their designated representative should witness the test pitting operations and should determine which areas may need further exploration.

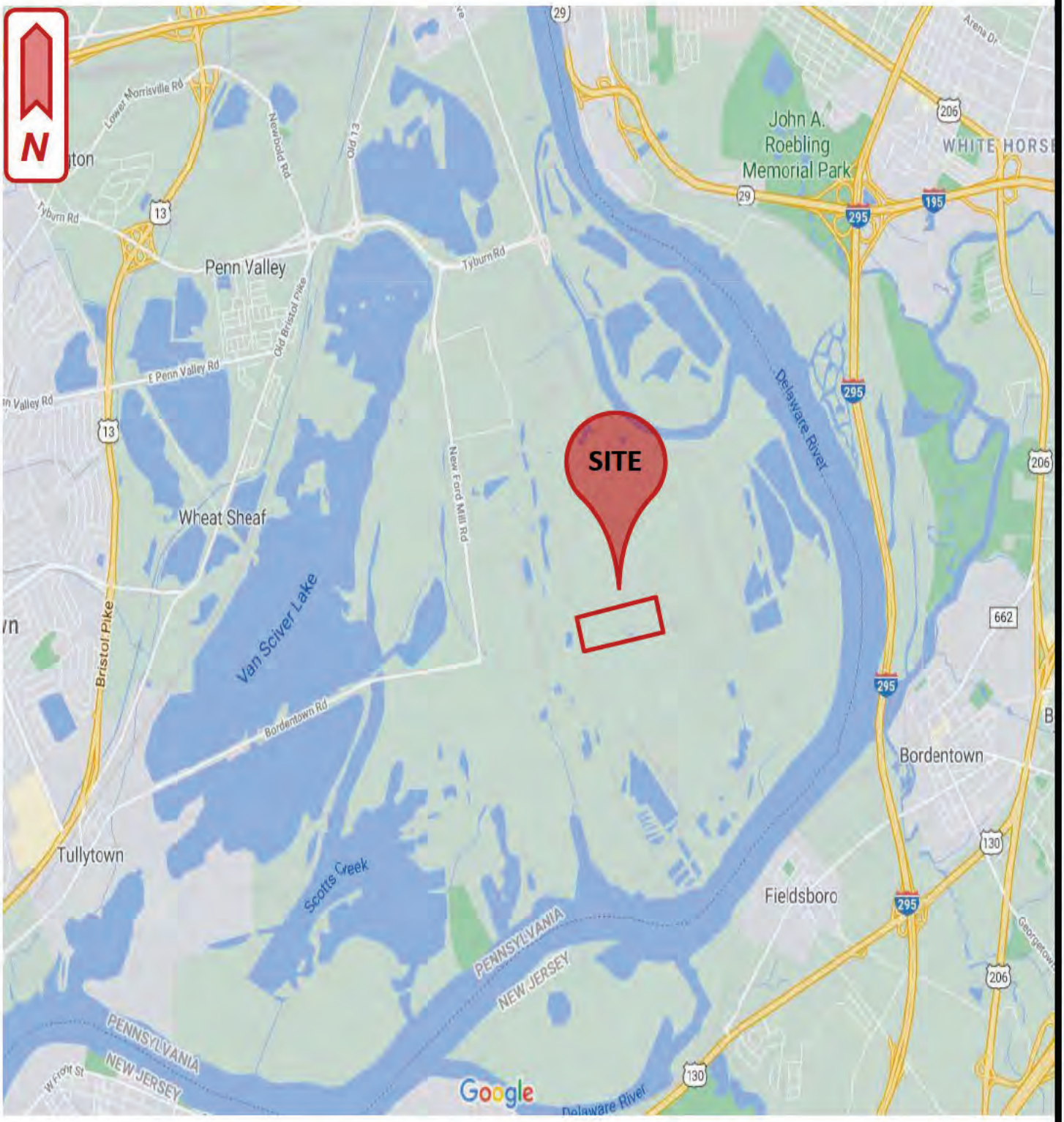
Based on the assumed maximum structural loads, the maximum allowable settlement, and the general soil conditions which were encountered, it is recommended that a design allowable soil bearing pressure of 3,000 lbs/sq ft be used for proportioning footings in firm, approved ground. All footing excavations should be examined by the Geotechnical Engineer or their designated representative prior to the placement of concrete.

No other conclusions should be drawn other than those specifically stated. Contact the undersigned should you have any further questions.

Sincerely,
**HILLIS-CARNES ENGINEERING ASSOCIATES, INC.**



Arjan Kloet
Branch Manager
akloet@hcea.com




This sketch was developed using Google Maps

HILLIS-CARNES
ENGINEERING ASSOCIATES

30 S. Keystone Ave., Suite 1
Emmaus, PA 18049

Phone: 484-519-9650

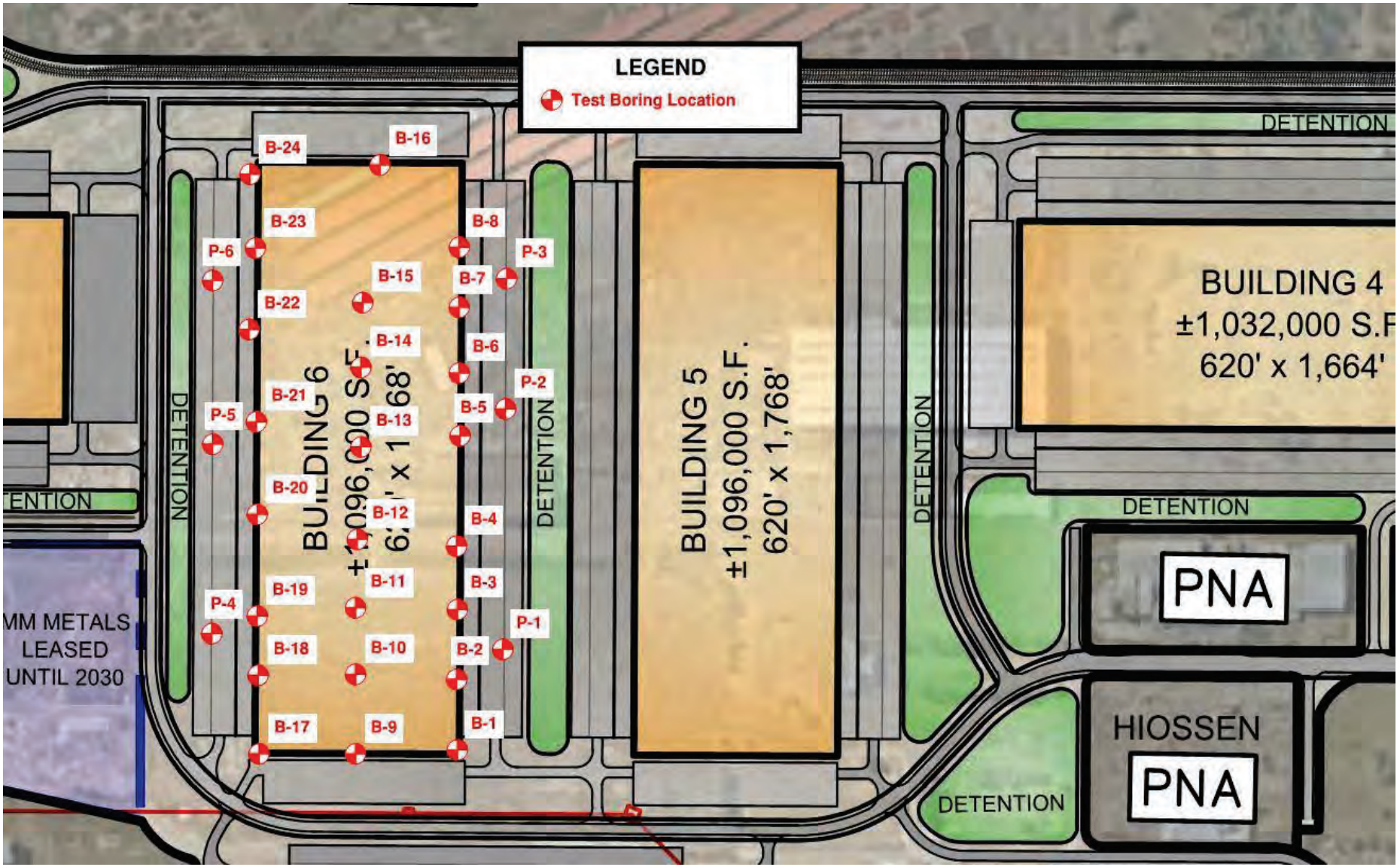
**SITE LOCATION SKETCH**

**FIGURE 1**

KTC Building 6

Falls Township, Pennsylvania

| | | | |
|---|---|---|---|
| **JOB NO:** | L21051 | **DRAWN BY:** | MJD |
| **DATE:** | 09/27/2021 | **CHECKED BY:** | ASK |
| **SCALE:** | NTS | | |
| **PAGE:** | 1 | | |




| | | | | | |
|---|---|---|---|---|---|
| **HILLIS-CARNES ENGINEERING ASSOCIATES**<br>30 S. Keystone Ave., Suite 1<br>Emmaus, PA 18049<br>Phone: 484-519-9650 | **BORING LOCATION PLAN**<br>**FIGURE 2**<br>KTC Building 6<br>Falls Township, Pennsylvania | **JOB NO:** | L21051 | **DRAWN BY:** | MJD |
| | | **DATE:** | 09/27/2021 | **CHECKED BY:** | ASK |
| | | **SCALE:** | NTS | | |
| | | **PAGE:** | 1 | | |



**Source: Concept Site Plan D6, dated 6/01/2021*

# HILLIS - CARNES
# ENGINEERING ASSOCIATES, INC.

## TEST BORING LOGS

Project Name: **Keystone Trade Center Building 4** Boring No. B-1

Location: Falls Township, PA Job # L21049

**SAMPLER**

Datum ____ Hammer Wt. 140 lbs. Hole Diameter 3.25 inch I.D. Foreman Jay (Allied)

Surf. Elev. ____ Ft. Hammer Drop 30 in. Rock Core Diameter N/A Inspector M. Delluso

Date Started 9/14/2021 Pipe Size 2 O.D. in. Boring Method Hollow Stem Auger Date Completed 9/14/2021

| Elevation/ Depth | SOIL SYMBOLS/ SAMPLE CONDITIONS | Description | Boring and Sampling Notes | Rec. | NM% | SPT Blows | SPT Blows/Foot N | SPT Blows/Foot Curve |
|---|---|---|---|---|---|---|---|---|
| 0 | | 6" asphalt and 12" subbase | | | | | | |
| | I | Very dense grey GRAVEL with Sand [GP] to brown Silty SAND with Gravel [SM] | Fill from 0.5 to 6 feet | 16" | | 32-34-30 | 64 | 64 |
| 2.5 | I | Very dense brown Silty SAND with Gravel [SM] | | 14" | | 27-40-31-23 | 71 | 71 |
| | I | Very dense brown to grey Silty GRAVEL with Sand [GM] | | 17" | | 9-30-50/5" | 80/11" | 80/11" |
| 5 | I | | | | | | | |
| | | Augered to 8 feet (cobbles/ boulders) | Stratum I from 6 to 48 feet | | | | | |
| 7.5 | I | Very loose brown Silty SAND [SM] (moist) | | 16" | | 2-3-2-3 | 5 | |
| 10 | I | | | | | | | |
| 12.5 | I | Loose brown Silty SAND [SM] (wet) | | 18" | | 2-2-4-5 | 6 | |
| 15 | | | | | | | | |

10 30 50

**SAMPLER TYPE**
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

**SAMPLE CONDITIONS**
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

| | GROUND WATER | CAVE IN DEPTH |
|---|---|---|
| AT COMPLETION | 14 ft. | ____ ft. |
| AFTER 24 HRS. | ____ ft. | ____ ft. |
| AFTER ___ HRS. | ____ ft. | ____ ft. |

**BORING METHOD**
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING



STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

# HILLIS - CARNES
# ENGINEERING ASSOCIATES, INC.

## TEST BORING LOGS

Project Name: **Keystone Trade Center Building 4** | Boring No.: B-1

Location: Falls Township, PA | Job #: L21049

**SAMPLER**

Datum: | Hammer Wt.: 140 lbs. | Hole Diameter: 3.25 inch I.D. | Foreman: Jay (Allied)

Surf. Elev.: Ft. | Hammer Drop: 30 in. | Rock Core Diameter: N/A | Inspector: M. Delluso

Date Started: 9/14/2021 | Pipe Size: 2 O.D. in. | Boring Method: Hollow Stem Auger | Date Completed: 9/14/2021

| Elevation/ Depth | SOIL SYMBOLS/ SAMPLE CONDITIONS | Description | Boring and Sampling Notes | Rec. | NM% | SPT Blows | SPT Blows/Foot N | SPT Blows/Foot Curve (10 30 50) |
|---|---|---|---|---|---|---|---|---|
| 17.5 | | Loose brown Silty SAND [SM] | | 18" | | 7-6-3-4 | 9 | |
| 20 | | | | | | | | |
| 22.5 | | Very loose brown SAND with Silt [SP-SM] | | 20" | | 3-2-1-3 | 3 | |
| 25 | | | | | | | | |
| 27.5 | | Medium dense brown SAND with Silt [SP-SM] | | 22" | | 6-9-8-8 | 17 | |
| 30 | | | | | | | | |

**SAMPLER TYPE**
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

**SAMPLE CONDITIONS**
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

| | GROUND WATER | CAVE IN DEPTH |
|---|---|---|
| AT COMPLETION | 14 ft. | ft. |
| AFTER 24 HRS. | ft. | ft. |
| AFTER ___ HRS. | ft. | ft. |

**BORING METHOD**
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING



STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

# HILLIS - CARNES
# ENGINEERING ASSOCIATES, INC.

## TEST BORING LOGS

Project Name: **Keystone Trade Center Building 4** Boring No.: B-1

Location: Falls Township, PA Job #: L21049

**SAMPLER**

Datum: ____ Hammer Wt.: 140 lbs. Hole Diameter: 3.25 inch I.D. Foreman: Jay (Allied)

Surf. Elev.: ____ Ft. Hammer Drop: 30 in. Rock Core Diameter: N/A Inspector: M. Delluso

Date Started: 9/14/2021 Pipe Size: 2 O.D. in. Boring Method: Hollow Stem Auger Date Completed: 9/14/2021

| Elevation/ Depth | SOIL SYMBOLS/ SAMPLE CONDITIONS | Description | Boring and Sampling Notes | Rec. | NM% | SPT Blows | SPT Blows/Foot N | SPT Blows/Foot Curve (10 30 50) |
|---|---|---|---|---|---|---|---|---|
| 32.5 | | Medium dense brown SAND [SP] | | 24" | | 7-10-8-10 | 18 | |
| 35 | | | | | | | | |
| 37.5 | | Medium dense beige Clayey SAND [SC] | | 18" | | 10-12-11-8 | 23 | |
| 40 | | | | | | | | |
| 42.5 | | Medium dense beige Clayey SAND [SC] | | 22" | | 9-12-13-9 | 25 | |
| 45 | | | | | | | | |

**SAMPLER TYPE**
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

**SAMPLE CONDITIONS**
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

| | GROUND WATER | CAVE IN DEPTH |
|---|---|---|
| AT COMPLETION | 14 ft. | ____ ft. |
| AFTER 24 HRS. | ____ ft. | ____ ft. |
| AFTER ___ HRS. | ____ ft. | ____ ft. |

**BORING METHOD**
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING



STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

# HILLIS - CARNES
# ENGINEERING ASSOCIATES, INC.

## TEST BORING LOGS

Project Name: **Keystone Trade Center Building 4** Boring No.: B-1

Location: Falls Township, PA Job #: L21049

**SAMPLER**

Datum: _____ Hammer Wt.: 140 lbs. Hole Diameter: 3.25 inch I.D. Foreman: Jay (Allied)

Surf. Elev.: _____ Ft. Hammer Drop: 30 in. Rock Core Diameter: N/A Inspector: M. Delluso

Date Started: 9/14/2021 Pipe Size: 2 O.D. in. Boring Method: Hollow Stem Auger Date Completed: 9/14/2021

| Elevation/ Depth | SOIL SYMBOLS/ SAMPLE CONDITIONS | Description | Boring and Sampling Notes | Rec. | NM% | SPT Blows | SPT Blows/Foot N | SPT Blows/Foot Curve (10 30 50) |
|---|---|---|---|---|---|---|---|---|
| 47.5 | | Very stiff light grey to tan CLAY [CL] | Stratum III from 48 to 50 feet | 20" | | 10-9-15-11 | 24 | |
| 50 | I | -Boring terminated at 50 feet- | | | | | | |
| 52.5 | | | | | | | | |
| 55 | | | | | | | | |
| 57.5 | | | | | | | | |
| 60 | | | | | | | | |
| 62.5 | | | | | | | | |

**SAMPLER TYPE**
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

**SAMPLE CONDITIONS**
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

| | GROUND WATER | CAVE IN DEPTH |
|---|---|---|
| AT COMPLETION | 14 ft. | _____ ft. |
| AFTER 24 HRS. | _____ ft. | _____ ft. |
| AFTER ___ HRS. | _____ ft. | _____ ft. |

**BORING METHOD**
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING



STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

# HILLIS - CARNES
# ENGINEERING ASSOCIATES, INC.

## TEST BORING LOGS

Project Name: **Keystone Trade Center Building 4** Boring No.: B-2

Location: Falls Township, PA Job #: L21049

**SAMPLER**

Datum: ____ Hammer Wt.: 140 lbs. Hole Diameter: 3.25 inch I.D. Foreman: Jay (Allied)

Surf. Elev.: ____ Ft. Hammer Drop: 30 in. Rock Core Diameter: N/A Inspector: M. Delluso

Date Started: 9/16/2021 Pipe Size: 2 O.D. in. Boring Method: Hollow Stem Auger Date Completed: 9/16/2021

| Elevation/ Depth | SOIL SYMBOLS/ SAMPLE CONDITIONS | Description | Boring and Sampling Notes | Rec. | NM% | SPT Blows | SPT Blows/Foot N | SPT Blows/Foot Curve |
|---|---|---|---|---|---|---|---|---|
| 0 | | Dense brown to grey SAND with slag [SP] | Fill from 0 to 2 feet | 18" | | 17-21-26-21 | 47 | |
| 2.5 | | Very stiff brown to greyish brown Sandy SILT [ML] | Stratum II from 2 to 4 feet | 22" | | 18-13-14-7 | 27 | |
| 5 | | Medium dense brown Silty SAND with Gravel [SM] | Stratum I from 4 to 13 feet | 14" | | 5-7-7-6 | 14 | |
| | | Loose brown Silty SAND [SM] | | 20" | | 9-6-2-3 | 8 | |
| 7.5 | | Loose brown Silty SAND [SM] | | 12" | | 4-4-4-8 | 8 | |
| 10 | | | | | | | | |
| 12.5 | | Stiff brown Sandy SILT with Gravel [ML] (wet) | Stratum II from 13 to 18 feet | 6" | | 6-8-4-6 | 12 | |
| 15 | | | | | | | | |

10 30 50

**SAMPLER TYPE**
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

**SAMPLE CONDITIONS**
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

| | GROUND WATER | CAVE IN DEPTH |
|---|---|---|
| AT COMPLETION | 12.5 ft. | ____ ft. |
| AFTER 24 HRS. | ____ ft. | ____ ft. |
| AFTER ___ HRS. | ____ ft. | ____ ft. |

**BORING METHOD**
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING



STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

# HILLIS - CARNES
# ENGINEERING ASSOCIATES, INC.

## TEST BORING LOGS

Project Name: **Keystone Trade Center Building 4** Boring No. B-2

Location: Falls Township, PA Job # L21049

**SAMPLER**

Datum ____ Hammer Wt. 140 lbs. Hole Diameter 3.25 inch I.D. Foreman Jay (Allied)

Surf. Elev. ____ Ft. Hammer Drop 30 in. Rock Core Diameter N/A Inspector M. Delluso

Date Started 9/16/2021 Pipe Size 2 O.D. in. Boring Method Hollow Stem Auger Date Completed 9/16/2021

| Elevation/ Depth | SOIL SYMBOLS/ SAMPLE CONDITIONS | Description | Boring and Sampling Notes | Rec. | NM% | SPT Blows | SPT Blows/Foot N | SPT Blows/Foot Curve (10 30 50) |
|---|---|---|---|---|---|---|---|---|
| 17.5 | I | Loose brown SAND with Gravel [SP] | Stratum I from 18 to 38 feet | 8" | | 21-6-4-6 | 10 | |
| 20 | | | | | | | | |
| 22.5 | I | Very dense brown to grey GRAVEL with Sand [GP] | | 3" | | 50/3" | 50/3" | |
| 25 | | | | | | | | |
| 27.5 | I | Very dense brown SAND with Gravel [SP] | | 10" | | 19-50/4" | 50/4" | |
| 30 | | | | | | | | |

**SAMPLER TYPE**
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

**SAMPLE CONDITIONS**
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

| | GROUND WATER | CAVE IN DEPTH |
|---|---|---|
| AT COMPLETION | 12.5 ft. | ____ ft. |
| AFTER 24 HRS. | ____ ft. | ____ ft. |
| AFTER ___ HRS. | ____ ft. | ____ ft. |

**BORING METHOD**
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING



STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

# HILLIS - CARNES
# ENGINEERING ASSOCIATES, INC.

## TEST BORING LOGS

Project Name: **Keystone Trade Center Building 4** Boring No. B-2

Location: Falls Township, PA Job # L21049

**SAMPLER**

Datum ____ Hammer Wt. 140 lbs. Hole Diameter 3.25 inch I.D. Foreman Jay (Allied)

Surf. Elev. ____ Ft. Hammer Drop 30 in. Rock Core Diameter N/A Inspector M. Delluso

Date Started 9/16/2021 Pipe Size 2 O.D. in. Boring Method Hollow Stem Auger Date Completed 9/16/2021

| Elevation/ Depth | SOIL SYMBOLS/ SAMPLE CONDITIONS | Description | Boring and Sampling Notes | Rec. | NM% | SPT Blows | SPT Blows/Foot N | SPT Blows/Foot Curve (10 30 50) |
|---|---|---|---|---|---|---|---|---|
| 32.5 | | Dense brown SAND [SP] | | 10" | | 16-14-18-27 | 32 | |
| 35 | | | | | | | | |
| 37.5 | | Very stiff beige to orange Sandy CLAY [CL] | Stratum III from 38 to 43 feet | 24" | | 12-10-8-13 | 18 | |
| 40 | | | | | | | | |
| 42.5 | | Dense beige SAND [SP] | Stratum I from 43 to 50 feet | 22" | | 20-21-19-12 | 40 | |
| 45 | | | | | | | | |

**SAMPLER TYPE**
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

**SAMPLE CONDITIONS**
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

| | GROUND WATER | CAVE IN DEPTH |
|---|---|---|
| AT COMPLETION | 12.5 ft. | ____ ft. |
| AFTER 24 HRS. | ____ ft. | ____ ft. |
| AFTER ___ HRS. | ____ ft. | ____ ft. |

**BORING METHOD**
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

# HILLIS - CARNES
# ENGINEERING ASSOCIATES, INC.

## TEST BORING LOGS

Project Name: **Keystone Trade Center Building 4** Boring No.: B-2

Location: Falls Township, PA Job #: L21049

**SAMPLER**

Datum: ____ Hammer Wt.: 140 lbs. Hole Diameter: 3.25 inch I.D. Foreman: Jay (Allied)

Surf. Elev.: ____ Ft. Hammer Drop: 30 in. Rock Core Diameter: N/A Inspector: M. Delluso

Date Started: 9/16/2021 Pipe Size: 2 O.D. in. Boring Method: Hollow Stem Auger Date Completed: 9/16/2021

| Elevation/ Depth | SOIL SYMBOLS/ SAMPLE CONDITIONS | Description | Boring and Sampling Notes | Rec. | NM% | SPT Blows | SPT Blows/Foot N | SPT Blows/Foot Curve (10 30 50) |
|---|---|---|---|---|---|---|---|---|
| 47.5 | I | Medium dense beige SAND [SP] | | 18" | | 10-13-15-13 | 28 | |
| 50 | | -Boring terminated at 50 feet- | | | | | | |
| 52.5 | | | | | | | | |
| 55 | | | | | | | | |
| 57.5 | | | | | | | | |
| 60 | | | | | | | | |
| 62.5 | | | | | | | | |

**SAMPLER TYPE**
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

**SAMPLE CONDITIONS**
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

| | GROUND WATER | CAVE IN DEPTH |
|---|---|---|
| AT COMPLETION | 12.5 ft. | ____ ft. |
| AFTER 24 HRS. | ____ ft. | ____ ft. |
| AFTER ___ HRS. | ____ ft. | ____ ft. |

**BORING METHOD**
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING



STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

# HILLIS - CARNES
# ENGINEERING ASSOCIATES, INC.

## TEST BORING LOGS

Project Name: **Keystone Trade Center Building 4** Boring No. B-3

Location: Falls Township, PA Job # L21049

**SAMPLER**

Datum ____ Hammer Wt. 140 lbs. Hole Diameter 3.25 inch I.D. Foreman Jay (Allied)

Surf. Elev. ____ Ft. Hammer Drop 30 in. Rock Core Diameter N/A Inspector M. Delluso

Date Started 9/17/2021 Pipe Size 2 O.D. in. Boring Method Hollow Stem Auger Date Completed 9/17/2021

| Elevation/ Depth | SOIL SYMBOLS/ SAMPLE CONDITIONS | Description | Boring and Sampling Notes | Rec. | NM% | SPT Blows | SPT Blows/Foot N | SPT Blows/Foot Curve |
|---|---|---|---|---|---|---|---|---|
| 0 | | 6" organic soil | | 16" | | 4-4-4-3 | 8 | |
| | | Loose brown Silty SAND [SM] | Stratum I from 0.5 to 4 feet | | | | | |
| 2.5 | | Medium dense brown Silty SAND [SM] | | 14" | | 6-7-6-8 | 13 | |
| | | Stiff brown Sandy SILT [ML] | Stratum II from 4 to 8 feet | 18" | | 11-7-7-4 | 14 | |
| 5 | | Stiff brown Sandy SILT [ML] | | 18" | | 8-8-5-12 | 13 | |
| 7.5 | | Dense brown Silty SAND [SM] | Stratum I from 8 to 13 feet | 24" | | 13-14-17-16 | 31 | |
| 10 | | | | | | | | |
| 12.5 | | Very stiff brown Sandy SILT, trace organics [ML] (wet) | Stratum II from 13 to 18 feet | 22" | | 7-8-8-6 | 16 | |
| 15 | | | | | | | | |

SPT Blows/Foot Curve: 10 30 50

**SAMPLER TYPE**
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

**SAMPLE CONDITIONS**
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

| | GROUND WATER | CAVE IN DEPTH |
|---|---|---|
| AT COMPLETION | 12 ft. | ____ ft. |
| AFTER 24 HRS. | ____ ft. | ____ ft. |
| AFTER ____ HRS. | ____ ft. | ____ ft. |

**BORING METHOD**
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING



STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

# HILLIS - CARNES
# ENGINEERING ASSOCIATES, INC.

## TEST BORING LOGS

Project Name: **Keystone Trade Center Building 4** Boring No.: B-3

Location: Falls Township, PA Job #: L21049

**SAMPLER**

Datum: ____ Hammer Wt.: 140 lbs. Hole Diameter: 3.25 inch I.D. Foreman: Jay (Allied)

Surf. Elev.: ____ Ft. Hammer Drop: 30 in. Rock Core Diameter: N/A Inspector: M. Delluso

Date Started: 9/17/2021 Pipe Size: 2 O.D. in. Boring Method: Hollow Stem Auger Date Completed: 9/17/2021

| Elevation/ Depth | SOIL SYMBOLS/ SAMPLE CONDITIONS | Description | Boring and Sampling Notes | Rec. | NM% | SPT Blows | SPT Blows/Foot N | SPT Blows/Foot Curve (10 30 50) |
|---|---|---|---|---|---|---|---|---|
| 17.5 | | Medium dense greyish brown Clayey SAND [SC] | Stratum I from 18 to 50 feet | 20" | | 16-18-9-10 | 27 | |
| 20 | | | | | | | | |
| 22.5 | | Very dense brown SAND with Silt [SP-SM] | | 20" | | 20-25-31-27 | 56 | |
| 25 | | | | | | | | |
| 27.5 | | Medium dense brown SAND with Silt [SP-SM] | | 16" | | 5-9-14-25 | 23 | |
| 30 | | | | | | | | |

**SAMPLER TYPE**
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

**SAMPLE CONDITIONS**
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

| | GROUND WATER | CAVE IN DEPTH |
|---|---|---|
| AT COMPLETION | 12 ft. | ____ ft. |
| AFTER 24 HRS. | ____ ft. | ____ ft. |
| AFTER ___ HRS. | ____ ft. | ____ ft. |

**BORING METHOD**
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING



STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

# HILLIS - CARNES
# ENGINEERING ASSOCIATES, INC.

## TEST BORING LOGS

Project Name: **Keystone Trade Center Building 4** Boring No.: B-3

Location: Falls Township, PA Job #: L21049

**SAMPLER**

Datum: ____ Hammer Wt.: 140 lbs. Hole Diameter: 3.25 inch I.D. Foreman: Jay (Allied)

Surf. Elev.: ____ Ft. Hammer Drop: 30 in. Rock Core Diameter: N/A Inspector: M. Delluso

Date Started: 9/17/2021 Pipe Size: 2 O.D. in. Boring Method: Hollow Stem Auger Date Completed: 9/17/2021

| Elevation/ Depth | SOIL SYMBOLS/ SAMPLE CONDITIONS | Description | Boring and Sampling Notes | Rec. | NM% | SPT Blows | SPT Blows/Foot N | SPT Blows/Foot Curve (10 30 50) |
|---|---|---|---|---|---|---|---|---|
| 32.5 | | Medium dense beige Clayey SAND [SC] | | 17" | | 7-12-17-16 | 29 | |
| 35 | | | | | | | | |
| 37.5 | | Dense beige Clayey SAND [SC] | | 12" | | 23-14-22-24 | 36 | |
| 40 | | | | | | | | |
| 42.5 | | Dense beige Clayey SAND [SC] | | 20" | | 12-19-25-32 | 44 | |
| 45 | | | | | | | | |

**SAMPLER TYPE**
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

**SAMPLE CONDITIONS**
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

| | GROUND WATER | CAVE IN DEPTH |
|---|---|---|
| AT COMPLETION | 12 ft. | ____ ft. |
| AFTER 24 HRS. | ____ ft. | ____ ft. |
| AFTER ___ HRS. | ____ ft. | ____ ft. |

**BORING METHOD**
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING



STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

# HILLIS - CARNES
# ENGINEERING ASSOCIATES, INC.

## TEST BORING LOGS

Project Name: **Keystone Trade Center Building 4** Boring No.: B-3

Location: Falls Township, PA Job #: L21049

**SAMPLER**

Datum: _____ Hammer Wt.: 140 lbs. Hole Diameter: 3.25 inch I.D. Foreman: Jay (Allied)

Surf. Elev.: _____ Ft. Hammer Drop: 30 in. Rock Core Diameter: N/A Inspector: M. Delluso

Date Started: 9/17/2021 Pipe Size: 2 O.D. in. Boring Method: Hollow Stem Auger Date Completed: 9/17/2021

| Elevation/ Depth | SOIL SYMBOLS/ SAMPLE CONDITIONS | Description | Boring and Sampling Notes | Rec. | NM% | SPT Blows | SPT Blows/Foot N | SPT Blows/Foot Curve (10 30 50) |
|---|---|---|---|---|---|---|---|---|
| 47.5 | | Dense beige Clayey SAND [SC] | | 18" | | 15-20-18-26 | 38 | |
| 50 | | -Boring terminated at 50 feet- | | | | | | |
| 52.5 | | | | | | | | |
| 55 | | | | | | | | |
| 57.5 | | | | | | | | |
| 60 | | | | | | | | |
| 62.5 | | | | | | | | |

**SAMPLER TYPE**
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

**SAMPLE CONDITIONS**
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

| | GROUND WATER | CAVE IN DEPTH |
|---|---|---|
| AT COMPLETION | 12 ft. | _____ ft. |
| AFTER 24 HRS. | _____ ft. | _____ ft. |
| AFTER ___ HRS. | _____ ft. | _____ ft. |

**BORING METHOD**
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING



STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

# HILLIS - CARNES
# ENGINEERING ASSOCIATES, INC.

## TEST BORING LOGS

Project Name: **Keystone Trade Center Building 4** Boring No. B-4

Location: Falls Township, PA Job # L21049

**SAMPLER**

Datum ____ Hammer Wt. 140 lbs. Hole Diameter 3.25 inch I.D. Foreman Jay (Allied)

Surf. Elev. ____ Ft. Hammer Drop 30 in. Rock Core Diameter N/A Inspector M. Delluso

Date Started 9/16/2021 Pipe Size 2 O.D. in. Boring Method Hollow Stem Auger Date Completed 9/16/2021

| Elevation/ Depth | SOIL SYMBOLS/ SAMPLE CONDITIONS | Description | Boring and Sampling Notes | Rec. | NM% | SPT Blows | SPT Blows/Foot N | SPT Blows/Foot Curve |
|---|---|---|---|---|---|---|---|---|
| 0 | | 5" organic soil | | | | | | 10 30 50 |
| | | Very stiff brown Sandy SILT [ML] | Stratum II from 0.4 to 4 feet | 20" | | 7-9-8-11 | 17 | |
| 2.5 | | Stiff brown Sandy SILT [ML] | | 18" | | 6-6-7-8 | 13 | |
| | | Loose brown Silty SAND [SM] | Stratum I from 4 to 8 feet | 24" | | 9-5-5-7 | 10 | |
| 5 | | Medium dense brown Silty SAND [SM] | | 22" | | 9-11-9-12 | 20 | |
| 7.5 | | Very stiff brown Sandy SILT with organics [ML] (moist) | Stratum II from 8 to 13 feet | 8" | | 5-4-7-7 | 11 | |
| 10 | | | | | | | | |
| 12.5 | | Loose brown SAND with Silt and Gravel [SP-SM] (wet) | Stratum I from 13 to 50 feet | 4" | | 6-4-6-5 | 10 | |
| 15 | | | | | | | | |

**SAMPLER TYPE**
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

**SAMPLE CONDITIONS**
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

| | GROUND WATER | CAVE IN DEPTH |
|---|---|---|
| AT COMPLETION | 10 ft. | ____ ft. |
| AFTER 24 HRS. | ____ ft. | ____ ft. |
| AFTER ___ HRS. | ____ ft. | ____ ft. |

**BORING METHOD**
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING



STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

# HILLIS - CARNES
# ENGINEERING ASSOCIATES, INC.

## TEST BORING LOGS

Project Name: **Keystone Trade Center Building 4** Boring No.: B-4

Location: Falls Township, PA Job #: L21049

**SAMPLER**

Datum: ____ Hammer Wt.: 140 lbs. Hole Diameter: 3.25 inch I.D. Foreman: Jay (Allied)

Surf. Elev.: ____ Ft. Hammer Drop: 30 in. Rock Core Diameter: N/A Inspector: M. Delluso

Date Started: 9/16/2021 Pipe Size: 2 O.D. in. Boring Method: Hollow Stem Auger Date Completed: 9/16/2021

| Elevation/ Depth | SOIL SYMBOLS/ SAMPLE CONDITIONS | Description | Boring and Sampling Notes | Rec. | NM% | SPT Blows | SPT Blows/Foot N | SPT Blows/Foot Curve (10 30 50) |
|---|---|---|---|---|---|---|---|---|
| 17.5 | | Medium dense brown SAND with Gravel [SP] | | 11" | | 22-14-9-8 | 23 | |
| 20 | | | | | | | | |
| 22.5 | | Very dense brown SAND with Gravel [SP] | | 8" | | 14-27-30-11 | 57 | |
| 25 | | | | | | | | |
| 27.5 | | Medium dense brown SAND with Gravel [SP] | | 10" | | 37-12-10-17 | 22 | |
| 30 | | | | | | | | |

**SAMPLER TYPE**
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

**SAMPLE CONDITIONS**
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

| | GROUND WATER | CAVE IN DEPTH |
|---|---|---|
| AT COMPLETION | 10 ft. | ____ ft. |
| AFTER 24 HRS. | ____ ft. | ____ ft. |
| AFTER ___ HRS. | ____ ft. | ____ ft. |

**BORING METHOD**
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING



STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

# HILLIS - CARNES
# ENGINEERING ASSOCIATES, INC.

## TEST BORING LOGS

Project Name: **Keystone Trade Center Building 4** Boring No. B-4

Location: Falls Township, PA Job # L21049

**SAMPLER**

Datum ____ Hammer Wt. 140 lbs. Hole Diameter 3.25 inch I.D. Foreman Jay (Allied)

Surf. Elev. ____ Ft. Hammer Drop 30 in. Rock Core Diameter N/A Inspector M. Delluso

Date Started 9/16/2021 Pipe Size 2 O.D. in. Boring Method Hollow Stem Auger Date Completed 9/16/2021

| Elevation/ Depth | SOIL SYMBOLS/ SAMPLE CONDITIONS | Description | Boring and Sampling Notes | Rec. | NM% | SPT Blows | SPT Blows/Foot N | SPT Blows/Foot Curve (10 30 50) |
|---|---|---|---|---|---|---|---|---|
| 32.5 | I | Very dense brown GRAVEL with Sand [GP] | | 5" | | 50/5" | 50/5" | |
| 35 | | | | | | | | |
| 37.5 | I | Very dense brown SAND [SP] | | 4" | | 14-38-31-47 | 69 | 69 |
| 40 | | | | | | | | |
| 42.5 | I | Very dense brown SAND with Gravel [SP] | | 22" | | 9-25-31-38 | 56 | |
| 45 | | | | | | | | |

**SAMPLER TYPE**
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

**SAMPLE CONDITIONS**
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

| | GROUND WATER | CAVE IN DEPTH |
|---|---|---|
| AT COMPLETION | 10 ft. | ____ ft. |
| AFTER 24 HRS. | ____ ft. | ____ ft. |
| AFTER ___ HRS. | ____ ft. | ____ ft. |

**BORING METHOD**
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING



STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

# HILLIS - CARNES
# ENGINEERING ASSOCIATES, INC.

## TEST BORING LOGS

Project Name: **Keystone Trade Center Building 4** Boring No.: B-4

Location: Falls Township, PA Job #: L21049

**SAMPLER**

Datum: ____ Hammer Wt.: 140 lbs. Hole Diameter: 3.25 inch I.D. Foreman: Jay (Allied)

Surf. Elev.: ____ Ft. Hammer Drop: 30 in. Rock Core Diameter: N/A Inspector: M. Delluso

Date Started: 9/16/2021 Pipe Size: 2 O.D. in. Boring Method: Hollow Stem Auger Date Completed: 9/16/2021

| Elevation/ Depth | SOIL SYMBOLS/ SAMPLE CONDITIONS | Description | Boring and Sampling Notes | Rec. | NM% | SPT Blows | SPT Blows/Foot N | SPT Blows/Foot Curve (10 30 50) |
|---|---|---|---|---|---|---|---|---|
| 47.5 | | Dense brown SAND with Gravel [SP] | | 18" | | 7-11-36-50 | 47 | |
| 50 | | -Boring terminated at 50 feet- | | | | | | |
| 52.5 | | | | | | | | |
| 55 | | | | | | | | |
| 57.5 | | | | | | | | |
| 60 | | | | | | | | |
| 62.5 | | | | | | | | |

**SAMPLER TYPE**
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

**SAMPLE CONDITIONS**
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

| | GROUND WATER | CAVE IN DEPTH |
|---|---|---|
| AT COMPLETION | 10 ft. | ____ ft. |
| AFTER 24 HRS. | ____ ft. | ____ ft. |
| AFTER ___ HRS. | ____ ft. | ____ ft. |

**BORING METHOD**
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING



STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

# HILLIS - CARNES
# ENGINEERING ASSOCIATES, INC.

## TEST BORING LOGS

Project Name: **Keystone Trade Center Building 4** Boring No. B-5

Location: Falls Township, PA Job # L21049

**SAMPLER**

Datum ____ Hammer Wt. 140 lbs. Hole Diameter 3.25 inch I.D. Foreman Kevin (FM&W)

Surf. Elev. ____ Ft. Hammer Drop 30 in. Rock Core Diameter N/A Inspector M. Delluso

Date Started 9/16/2021 Pipe Size 2 O.D. in. Boring Method Hollow Stem Auger Date Completed 9/16/2021

| Elevation/ Depth | SOIL SYMBOLS/ SAMPLE CONDITIONS | Description | Boring and Sampling Notes | Rec. | NM% | SPT Blows | SPT Blows/Foot N | SPT Blows/Foot Curve |
|---|---|---|---|---|---|---|---|---|
| 0 | | 9" organic soil | | 14" | | 3-8-12-14 | 20 | |
| | | Medium dense brown Silty SAND with Gravel [SM] | Stratum I from 0.8 to 8 feet | | | | | |
| 2.5 | | Dense brown Silty SAND with Gravel [SM] | | 4" | | 27-22-13-7 | 35 | |
| | | Medium dense brown Silty SAND with Gravel [SM] | | 2" | | 23-18-9-7 | 27 | |
| 5 | | Medium dense brown to grey GRAVEL with Sand [GP] | | 10" | | 12-15-10-10 | 25 | |
| 7.5 | | Medium stiff brown Sandy SILT with Gravel [ML] (moist) | Stratum II from 8 to 14 feet | 14" | | 11-6-3-3 | 9 | |
| 10 | | | | | | | | |
| 12.5 | | Loose brown to grey GRAVEL with Sand [GP] (wet) | Stratum I from 14 to 50 feet | 12" | | 2-3-6-5 | 9 | |
| 15 | | | | | | | | |

**SAMPLER TYPE**
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

**SAMPLE CONDITIONS**
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

| | GROUND WATER | CAVE IN DEPTH |
|---|---|---|
| AT COMPLETION | 10 ft. | ____ ft. |
| AFTER 24 HRS. | ____ ft. | ____ ft. |
| AFTER ___ HRS. | ____ ft. | ____ ft. |

**BORING METHOD**
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING



STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

# HILLIS - CARNES
# ENGINEERING ASSOCIATES, INC.

## TEST BORING LOGS

Project Name: **Keystone Trade Center Building 4** Boring No. B-5

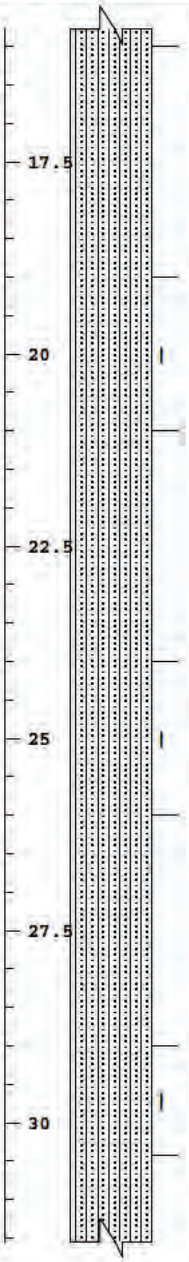
Location: Falls Township, PA Job # L21049

**SAMPLER**

Datum ____ Hammer Wt. 140 lbs. Hole Diameter 3.25 inch I.D. Foreman Kevin (FM&W)

Surf. Elev. ____ Ft. Hammer Drop 30 in. Rock Core Diameter N/A Inspector M. Delluso

Date Started 9/16/2021 Pipe Size 2 O.D. in. Boring Method Hollow Stem Auger Date Completed 9/16/2021




| Elevation/ Depth | SOIL SYMBOLS/ SAMPLE CONDITIONS | Description | Boring and Sampling Notes | Rec. | NM% | SPT Blows | SPT Blows/Foot N | SPT Blows/Foot Curve |
|---|---|---|---|---|---|---|---|---|
| | | Very loose grey GRAVEL [GP] | | 6" | | 5-2-1-2 | 3 | |
| | | Medium dense brown to grey GRAVEL with Sand [GP] | | 18" | | 15-13-10-9 | 23 | |
| | | Very dense tan SAND with Gravel [SP] | | 16" | | 36-38-50/5" | 88/11" | 88/11" |

Curve: 10 30 50

**SAMPLER TYPE**
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

**SAMPLE CONDITIONS**
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

| | GROUND WATER | CAVE IN DEPTH |
|---|---|---|
| AT COMPLETION | 10 ft. | ____ ft. |
| AFTER 24 HRS. | ____ ft. | ____ ft. |
| AFTER ___ HRS. | ____ ft. | ____ ft. |

**BORING METHOD**
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING



STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

# HILLIS - CARNES
# ENGINEERING ASSOCIATES, INC.

## TEST BORING LOGS

Project Name: **Keystone Trade Center Building 4** Boring No. B-5

Location: Falls Township, PA Job # L21049

**SAMPLER**

Datum ____ Hammer Wt. 140 lbs. Hole Diameter 3.25 inch I.D. Foreman Kevin (FM&W)

Surf. Elev. ____ Ft. Hammer Drop 30 in. Rock Core Diameter N/A Inspector M. Delluso

Date Started 9/16/2021 Pipe Size 2 O.D. in. Boring Method Hollow Stem Auger Date Completed 9/16/2021

| Elevation/ Depth | SOIL SYMBOLS/ SAMPLE CONDITIONS | Description | Boring and Sampling Notes | Rec. | NM% | SPT Blows | SPT Blows/Foot N | SPT Blows/Foot Curve (10 30 50) |
|---|---|---|---|---|---|---|---|---|
| 32.5 | | | | | | | | |
| | | Very dense tan SAND [SP] | | 12" | | 19-32-50/5" | 82/11" | 82/11" |
| 35 | | | | | | | | |
| 37.5 | | | | | | | | |
| | | Dense beige SAND [SP] | | 20" | | 17-24-26-33 | 50 | |
| 40 | | | | | | | | |
| 42.5 | | | | | | | | |
| | | Very dense beige SAND [SP] | | 12" | | 28-38-50/5" | 88/11" | 88/11" |
| 45 | | | | | | | | |

**SAMPLER TYPE**
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

**SAMPLE CONDITIONS**
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

| | GROUND WATER | CAVE IN DEPTH |
|---|---|---|
| AT COMPLETION | 10 ft. | ____ ft. |
| AFTER 24 HRS. | ____ ft. | ____ ft. |
| AFTER ___ HRS. | ____ ft. | ____ ft. |

**BORING METHOD**
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

# HILLIS - CARNES
# ENGINEERING ASSOCIATES, INC.

## TEST BORING LOGS

Project Name: **Keystone Trade Center Building 4** Boring No.: B-5

Location: Falls Township, PA Job #: L21049

**SAMPLER**

Datum: _____ Hammer Wt.: 140 lbs. Hole Diameter: 3.25 inch I.D. Foreman: Kevin (FM&W)

Surf. Elev.: _____ Ft. Hammer Drop: 30 in. Rock Core Diameter: N/A Inspector: M. Delluso

Date Started: 9/16/2021 Pipe Size: 2 O.D. in. Boring Method: Hollow Stem Auger Date Completed: 9/16/2021

| Elevation/ Depth | SOIL SYMBOLS/ SAMPLE CONDITIONS | Description | Boring and Sampling Notes | Rec. | NM% | SPT Blows | SPT Blows/Foot N | SPT Blows/Foot Curve (10 30 50) |
|---|---|---|---|---|---|---|---|---|
| 47.5 | I | Very dense grey to beige Clayey SAND [SC] | | 14" | | 21-37-50/5" | 87/11" | 87/11" |
| 50 | | -Boring terminated at 50 feet- | | | | | | |
| 52.5 | | | | | | | | |
| 55 | | | | | | | | |
| 57.5 | | | | | | | | |
| 60 | | | | | | | | |
| 62.5 | | | | | | | | |

**SAMPLER TYPE**
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

**SAMPLE CONDITIONS**
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

| | GROUND WATER | CAVE IN DEPTH |
|---|---|---|
| AT COMPLETION | 10 ft. | _____ ft. |
| AFTER 24 HRS. | _____ ft. | _____ ft. |
| AFTER ___ HRS. | _____ ft. | _____ ft. |

**BORING METHOD**
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING



STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

# HILLIS - CARNES
# ENGINEERING ASSOCIATES, INC.

## TEST BORING LOGS

Project Name **Keystone Trade Center Building 4** Boring No. B-6

Location Falls Township, PA Job # L21049

**SAMPLER**

Datum _____ Hammer Wt. _____ lbs. Hole Diameter _____ Foreman _____

Surf. Elev. _____ Ft. Hammer Drop _____ in. Rock Core Diameter _____ Inspector M. Delluso

Date Started _____ Pipe Size _____ in. Boring Method _____ Date Completed _____

| Elevation/ Depth | SOIL SYMBOLS/ SAMPLE CONDITIONS | Description | Boring and Sampling Notes | Rec. | NM% | SPT Blows | SPT Blows/Foot N | SPT Blows/Foot Curve 10 30 50 |
|---|---|---|---|---|---|---|---|---|
| 0 | | Inaccessible boring | | | | | | |
| 2.5 | | | | | | | | |
| 5 | | | | | | | | |
| 7.5 | | | | | | | | |
| 10 | | | | | | | | |
| 12.5 | | | | | | | | |
| 15 | | | | | | | | |

**SAMPLER TYPE**
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

**SAMPLE CONDITIONS**
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

| | GROUND WATER | CAVE IN DEPTH |
|---|---|---|
| AT COMPLETION | _____ ft. | _____ ft. |
| AFTER 24 HRS. | _____ ft. | _____ ft. |
| AFTER ___ HRS. | _____ ft. | _____ ft. |

**BORING METHOD**
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING



STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

# HILLIS - CARNES
# ENGINEERING ASSOCIATES, INC.

## TEST BORING LOGS

Project Name **Keystone Trade Center Building 4** Boring No. B-7

Location Falls Township, PA Job # L21049

**SAMPLER**

Datum _____ Hammer Wt. _____ lbs. Hole Diameter _____ Foreman _____

Surf. Elev. _____ Ft. Hammer Drop _____ in. Rock Core Diameter _____ Inspector M. Delluso

Date Started _____ Pipe Size _____ in. Boring Method _____ Date Completed _____

| Elevation/ Depth | SOIL SYMBOLS/ SAMPLE CONDITIONS | Description | Boring and Sampling Notes | Rec. | NM% | SPT Blows | SPT Blows/Foot N | SPT Blows/Foot Curve 10 30 50 |
|---|---|---|---|---|---|---|---|---|
| 0 | | Inaccessible boring | | | | | | |
| 2.5 | | | | | | | | |
| 5 | | | | | | | | |
| 7.5 | | | | | | | | |
| 10 | | | | | | | | |
| 12.5 | | | | | | | | |
| 15 | | | | | | | | |

**SAMPLER TYPE**
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

**SAMPLE CONDITIONS**
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

| | GROUND WATER | CAVE IN DEPTH |
|---|---|---|
| AT COMPLETION | _____ ft. | _____ ft. |
| AFTER 24 HRS. | _____ ft. | _____ ft. |
| AFTER ___ HRS. | _____ ft. | _____ ft. |

**BORING METHOD**
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING



STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

# HILLIS - CARNES
# ENGINEERING ASSOCIATES, INC.

## TEST BORING LOGS

Project Name: **Keystone Trade Center Building 4** Boring No.: B-8

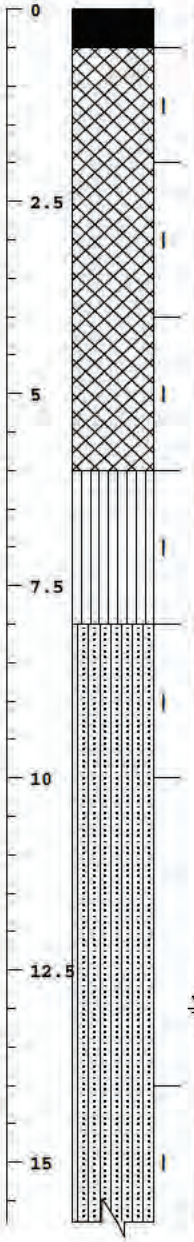
Location: Falls Township, PA Job #: L21049

**SAMPLER**

Datum: _____ Hammer Wt.: 140 lbs. Hole Diameter: 3.25 inch I.D. Foreman: Kevin (FM&W)

Surf. Elev.: _____ Ft. Hammer Drop: 30 in. Rock Core Diameter: N/A Inspector: M. Delluso

Date Started: 9/14/2021 Pipe Size: 2 O.D. in. Boring Method: Hollow Stem Auger Date Completed: 9/14/2021




| Elevation/ Depth | SOIL SYMBOLS/ SAMPLE CONDITIONS | Description | Boring and Sampling Notes | Rec. | NM% | SPT Blows | SPT Blows/Foot N | SPT Blows/Foot Curve |
|---|---|---|---|---|---|---|---|---|
| 0 | | 4" asphalt and 6" subbase | | | | | | 10 30 50 |
| | | Dense greyish brown to brown Silty SAND with Gravel [SM] | Fill from 0.3 to 6 feet | 12" | | 12-22-24 | 46 | |
| 2.5 | | Very dense brown to grey GRAVEL with Sand [GP] | | | | 31-44-41-44 | 85 | 85 → |
| 5 | | Dense brown to grey Silty GRAVEL with Sand [GM] | | | | 25-26-18-12 | 44 | |
| 7.5 | | Very stiff brown SILT with Sand [ML] | Stratum II from 6 to 8 feet | | | 7-9-7-7 | 16 | |
| | | Loose brown SAND with Silt [SP] | Stratum I from 8 to 44 feet | | | 5-5-5-6 | 10 | |
| 10 | | | | | | | | |
| 12.5 | | | | | | | | |
| | | Medium dense brown to grey GRAVEL with Sand [GP] (wet) | | | | 6-6-5-4 | 11 | |
| 15 | | | | | | | | |

**SAMPLER TYPE**
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

**SAMPLE CONDITIONS**
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

| | GROUND WATER | CAVE IN DEPTH |
|---|---|---|
| AT COMPLETION | 13 ft. | _____ ft. |
| AFTER 24 HRS. | _____ ft. | _____ ft. |
| AFTER ___ HRS. | _____ ft. | _____ ft. |

**BORING METHOD**
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING



STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

# HILLIS - CARNES
# ENGINEERING ASSOCIATES, INC.

## TEST BORING LOGS

Project Name: **Keystone Trade Center Building 4** Boring No.: B-8

Location: Falls Township, PA Job #: L21049

**SAMPLER**

Datum: ____ Hammer Wt.: 140 lbs. Hole Diameter: 3.25 inch I.D. Foreman: Kevin (FM&W)

Surf. Elev.: ____ Ft. Hammer Drop: 30 in. Rock Core Diameter: N/A Inspector: M. Delluso

Date Started: 9/14/2021 Pipe Size: 2 O.D. in. Boring Method: Hollow Stem Auger Date Completed: 9/14/2021

| Elevation/ Depth | SOIL SYMBOLS/ SAMPLE CONDITIONS | Description | Boring and Sampling Notes | Rec. | NM% | SPT Blows | SPT Blows/Foot N | SPT Blows/Foot Curve (10 30 50) |
|---|---|---|---|---|---|---|---|---|
| 17.5 | | | | | | | | |
| 20 | | Medium dense brown to grey GRAVEL with Sand [GP] | | 2" | | 6-6-10-12 | 16 | |
| 22.5 | | | | | | | | |
| 25 | | Medium dense brown to grey Silty GRAVEL with Sand [GP] | | | | 7-9-9-9 | 18 | |
| 27.5 | | | | | | | | |
| 30 | | Medium dense brown SAND with Silt [SP-SM] | | | | 11-7-8-7 | 15 | |

**SAMPLER TYPE**
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

**SAMPLE CONDITIONS**
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

| | GROUND WATER | CAVE IN DEPTH |
|---|---|---|
| AT COMPLETION | 13 ft. | ____ ft. |
| AFTER 24 HRS. | ____ ft. | ____ ft. |
| AFTER ___ HRS. | ____ ft. | ____ ft. |

**BORING METHOD**
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING



STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

# HILLIS - CARNES
# ENGINEERING ASSOCIATES, INC.

## TEST BORING LOGS

Project Name: **Keystone Trade Center Building 4** Boring No. B-8

Location: Falls Township, PA Job # L21049

**SAMPLER**

Datum ____ Hammer Wt. 140 lbs. Hole Diameter 3.25 inch I.D. Foreman Kevin (FM&W)

Surf. Elev. ____ Ft. Hammer Drop 30 in. Rock Core Diameter N/A Inspector M. Delluso

Date Started 9/14/2021 Pipe Size 2 O.D. in. Boring Method Hollow Stem Auger Date Completed 9/14/2021

| Elevation/ Depth | SOIL SYMBOLS/ SAMPLE CONDITIONS | Description | Boring and Sampling Notes | Rec. | NM% | SPT Blows | SPT Blows/Foot N | SPT Blows/Foot Curve (10 30 50) |
|---|---|---|---|---|---|---|---|---|
| 32.5 | | | | | | | | |
| | | Medium dense brown SAND with Silt [SP-SM] | | 20" | | 12-13-13-12 | 26 | |
| 35 | | | | | | | | |
| 37.5 | | | | | | | | |
| | | Medium dense light brown Clayey SAND [SC] | | 18" | | 6-7-10-11 | 17 | |
| 40 | | | | | | | | |
| 42.5 | | | | | | | | |
| | | Very stiff tan to reddish grey CLAY [CL] | Stratum III from 44 to 50 feet | 22" | | 11-12-14-14 | 26 | |
| 45 | | | | | | | | |

**SAMPLER TYPE**
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

**SAMPLE CONDITIONS**
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

| | GROUND WATER | CAVE IN DEPTH |
|---|---|---|
| AT COMPLETION | 13 ft. | ____ ft. |
| AFTER 24 HRS. | ____ ft. | ____ ft. |
| AFTER ___ HRS. | ____ ft. | ____ ft. |

**BORING METHOD**
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING



STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

# HILLIS - CARNES
# ENGINEERING ASSOCIATES, INC.

## TEST BORING LOGS

Project Name: **Keystone Trade Center Building 4** Boring No.: B-8

Location: Falls Township, PA Job #: L21049

**SAMPLER**

Datum: ____ Hammer Wt.: 140 lbs. Hole Diameter: 3.25 inch I.D. Foreman: Kevin (FM&W)

Surf. Elev.: ____ Ft. Hammer Drop: 30 in. Rock Core Diameter: N/A Inspector: M. Delluso

Date Started: 9/14/2021 Pipe Size: 2 O.D. in. Boring Method: Hollow Stem Auger Date Completed: 9/14/2021

| Elevation/ Depth | SOIL SYMBOLS/ SAMPLE CONDITIONS | Description | Boring and Sampling Notes | Rec. | NM% | SPT Blows | SPT Blows/Foot N | SPT Blows/Foot Curve (10 30 50) |
|---|---|---|---|---|---|---|---|---|
| 47.5 | I | Very stiff reddish grey CLAY [CL] | | 22" | | 15-18-12-16 | 30 | |
| 50 | | -Boring terminated at 50 feet- | | | | | | |
| 52.5 | | | | | | | | |
| 55 | | | | | | | | |
| 57.5 | | | | | | | | |
| 60 | | | | | | | | |
| 62.5 | | | | | | | | |

**SAMPLER TYPE**
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

**SAMPLE CONDITIONS**
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

| | GROUND WATER | CAVE IN DEPTH |
|---|---|---|
| AT COMPLETION | 13 ft. | ____ ft. |
| AFTER 24 HRS. | ____ ft. | ____ ft. |
| AFTER ___ HRS. | ____ ft. | ____ ft. |

**BORING METHOD**
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING



STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

# HILLIS - CARNES
# ENGINEERING ASSOCIATES, INC.

## TEST BORING LOGS

Project Name: **Keystone Trade Center Building 4** Boring No.: B-9

Location: Falls Township, PA Job #: L21049

**SAMPLER**

Datum: _____ Hammer Wt.: 140 lbs. Hole Diameter: 3.25 inch I.D. Foreman: Rick (Allied)

Surf. Elev.: _____ Ft. Hammer Drop: 30 in. Rock Core Diameter: N/A Inspector: M. Delluso

Date Started: 9/17/2021 Pipe Size: 2 O.D. in. Boring Method: Hollow Stem Auger Date Completed: 9/17/2021

| Elevation/ Depth | SOIL SYMBOLS/ SAMPLE CONDITIONS | Description | Boring and Sampling Notes | Rec. | NM% | SPT Blows | SPT Blows/Foot N | SPT Blows/Foot Curve |
|---|---|---|---|---|---|---|---|---|
| 0 | | Medium dense grey slag with Sand [GP] | Fill from 0 to 2 feet | 2" | | 8-5-6-7 | 11 | |
| 2.5 | | Medium dense red-brown Silty SAND with Gravel [SM] | Stratum I from 2 to 4 feet | 14" | | 8-12-18-28 | 30 | |
| 5 | | Very stiff red-brown Sandy SILT [ML] | Stratum II from 4 to 6 feet | 15" | | 6-12-9-7 | 21 | |
| 7.5 | | Medium dense red-brown Silty SAND [SM] | Stratum I from 6 to 50 feet | 15" | | 7-7-6-5 | 13 | |
| 10 | | Loose red-brown Silty SAND [SM] | | 18" | | 4-3-5-7 | 8 | |
| 12.5 | | Loose brown SAND with Silt and Gravel [SP-SM] (wet) | | 8" | | 4-6-2-4 | 8 | |
| 15 | | | | | | | | |

SPT Blows/Foot Curve: 10 30 50

**SAMPLER TYPE**
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

**SAMPLE CONDITIONS**
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

| | GROUND WATER | CAVE IN DEPTH |
|---|---|---|
| AT COMPLETION | 13 ft. | _____ ft. |
| AFTER 24 HRS. | _____ ft. | _____ ft. |
| AFTER ___ HRS. | _____ ft. | _____ ft. |

**BORING METHOD**
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

# HILLIS - CARNES
# ENGINEERING ASSOCIATES, INC.

## TEST BORING LOGS

Project Name: **Keystone Trade Center Building 4** Boring No.: B-9

Location: Falls Township, PA Job #: L21049

**SAMPLER**

Datum: ____ Hammer Wt.: 140 lbs. Hole Diameter: 3.25 inch I.D. Foreman: Rick (Allied)

Surf. Elev.: ____ Ft. Hammer Drop: 30 in. Rock Core Diameter: N/A Inspector: M. Delluso

Date Started: 9/17/2021 Pipe Size: 2 O.D. in. Boring Method: Hollow Stem Auger Date Completed: 9/17/2021

| Elevation/ Depth | SOIL SYMBOLS/ SAMPLE CONDITIONS | Description | Boring and Sampling Notes | Rec. | NM% | SPT Blows | SPT Blows/Foot N | SPT Blows/Foot Curve (10 30 50) |
|---|---|---|---|---|---|---|---|---|
| 17.5 | | Loose brown to grey Silty GRAVEL with Sand [GM] | | 8" | | 4-6-4-3 | 10 | |
| 20 | | | | | | | | |
| 22.5 | | Medium dense brown SAND with Silt and Gravel [SP-SM] | | 18" | | 22-7-6-6 | 13 | |
| 25 | | | | | | | | |
| 27.5 | | Medium dense brown SAND to white Clayey SAND [SP,SC] | | 24" | | 3-5-9-16 | 14 | |
| 30 | | | | | | | | |

**SAMPLER TYPE**
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

**SAMPLE CONDITIONS**
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

| | GROUND WATER | CAVE IN DEPTH |
|---|---|---|
| AT COMPLETION | 13 ft. | ____ ft. |
| AFTER 24 HRS. | ____ ft. | ____ ft. |
| AFTER ___ HRS. | ____ ft. | ____ ft. |

**BORING METHOD**
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

# HILLIS - CARNES
# ENGINEERING ASSOCIATES, INC.

## TEST BORING LOGS

Project Name: **Keystone Trade Center Building 4** | Boring No.: B-9

Location: Falls Township, PA | Job #: L21049

**SAMPLER**

Datum | Hammer Wt.: 140 lbs. | Hole Diameter: 3.25 inch I.D. | Foreman: Rick (Allied)

Surf. Elev. Ft. | Hammer Drop: 30 in. | Rock Core Diameter: N/A | Inspector: M. Delluso

Date Started: 9/17/2021 | Pipe Size: 2 O.D. in. | Boring Method: Hollow Stem Auger | Date Completed: 9/17/2021

| Elevation/ Depth | SOIL SYMBOLS/ SAMPLE CONDITIONS | Description | Boring and Sampling Notes | Rec. | NM% | SPT Blows | SPT Blows/Foot N | SPT Blows/Foot Curve (10 30 50) |
|---|---|---|---|---|---|---|---|---|
| 32.5 | | Dense brown to white SAND [SP] | | 24" | | 15-21-20-21 | 41 | |
| 35 | | | | | | | | |
| 37.5 | | Medium dense brown to white SAND [SP] | | 20" | | 16-16-12-13 | 28 | |
| 40 | | | | | | | | |
| 42.5 | | Dense beige SAND [SP] | | 18" | | 18-22-15-20 | 37 | |
| 45 | | | | | | | | |

**SAMPLER TYPE**
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

**SAMPLE CONDITIONS**
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

| | GROUND WATER | CAVE IN DEPTH |
|---|---|---|
| AT COMPLETION | 13 ft. | ft. |
| AFTER 24 HRS. | ft. | ft. |
| AFTER ___ HRS. | ft. | ft. |

**BORING METHOD**
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

-1002-

STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

# HILLIS - CARNES
# ENGINEERING ASSOCIATES, INC.

## TEST BORING LOGS

Project Name: **Keystone Trade Center Building 4** Boring No.: B-9

Location: Falls Township, PA Job #: L21049

**SAMPLER**

Datum: ____ Hammer Wt.: 140 lbs. Hole Diameter: 3.25 inch I.D. Foreman: Rick (Allied)

Surf. Elev.: ____ Ft. Hammer Drop: 30 in. Rock Core Diameter: N/A Inspector: M. Delluso

Date Started: 9/17/2021 Pipe Size: 2 O.D. in. Boring Method: Hollow Stem Auger Date Completed: 9/17/2021

| Elevation/ Depth | SOIL SYMBOLS/ SAMPLE CONDITIONS | Description | Boring and Sampling Notes | Rec. | NM% | SPT Blows | SPT Blows/Foot N | SPT Blows/Foot Curve (10 30 50) |
|---|---|---|---|---|---|---|---|---|
| 47.5 | | Medium dense beige SAND [SP] | | 18" | | 15-17-13-19 | 30 | |
| 50 | | -Boring terminated at 50 feet- | | | | | | |
| 52.5 | | | | | | | | |
| 55 | | | | | | | | |
| 57.5 | | | | | | | | |
| 60 | | | | | | | | |
| 62.5 | | | | | | | | |

**SAMPLER TYPE**
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

**SAMPLE CONDITIONS**
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

| | GROUND WATER | CAVE IN DEPTH |
|---|---|---|
| AT COMPLETION | 13 ft. | ____ ft. |
| AFTER 24 HRS. | ____ ft. | ____ ft. |
| AFTER ___ HRS. | ____ ft. | ____ ft. |

**BORING METHOD**
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING



STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

# HILLIS - CARNES
# ENGINEERING ASSOCIATES, INC.

## TEST BORING LOGS

Project Name: **Keystone Trade Center Building 4** Boring No. B-10

Location: Falls Township, PA Job # L21049

**SAMPLER**

Datum ____ Hammer Wt. 140 lbs. Hole Diameter 3.25 inch I.D. Foreman Rick (Allied)

Surf. Elev. ____ Ft. Hammer Drop 30 in. Rock Core Diameter N/A Inspector M. Delluso

Date Started 9/16/2021 Pipe Size 2 O.D. in. Boring Method Hollow Stem Auger Date Completed 9/16/2021

| Elevation/ Depth | SOIL SYMBOLS/ SAMPLE CONDITIONS | Description | Boring and Sampling Notes | Rec. | NM% | SPT Blows | SPT Blows/Foot N | SPT Blows/Foot Curve |
|---|---|---|---|---|---|---|---|---|
| 0 | | 4" organic soil | | | | | | |
| | | Very stiff brown Sandy SILT with Gravel [ML] | Stratum II from 0.3 to 4 feet | 12" | | 6-9-12-7 | 21 | |
| 2.5 | | Stiff brown Sandy SILT [ML] | | 10" | | 8-5-7-8 | 12 | |
| | | Loose brown SAND with Silt [SP-SM] | Stratum I from 4 to 13 feet | 16" | | 4-4-6-6 | 10 | |
| 5 | | Loose brown Silty SAND [SM] | | 20" | | 8-5-4-9 | 9 | |
| 7.5 | | Medium dense brown SAND with Silt and Gravel [SP-SM] | | 8" | | 7-5-6-11 | 11 | |
| 10 | | | | | | | | |
| 12.5 | | Very stiff brown to light grey CLAY [CL] | Stratum III from 13 to 18 feet | 10" | | 5-9-8-9 | 17 | |
| 15 | | | | | | | | |

SPT Blows/Foot Curve: 10 30 50

**SAMPLER TYPE**
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

**SAMPLE CONDITIONS**
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

| | GROUND WATER | CAVE IN DEPTH |
|---|---|---|
| AT COMPLETION | 10 ft. | ____ ft. |
| AFTER 24 HRS. | ____ ft. | ____ ft. |
| AFTER ___ HRS. | ____ ft. | ____ ft. |

**BORING METHOD**
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING



STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

# HILLIS - CARNES
# ENGINEERING ASSOCIATES, INC.

## TEST BORING LOGS

Project Name: **Keystone Trade Center Building 4** Boring No.: B-10

Location: Falls Township, PA Job #: L21049

**SAMPLER**

Datum: _____ Hammer Wt.: 140 lbs. Hole Diameter: 3.25 inch I.D. Foreman: Rick (Allied)

Surf. Elev.: _____ Ft. Hammer Drop: 30 in. Rock Core Diameter: N/A Inspector: M. Delluso

Date Started: 9/16/2021 Pipe Size: 2 O.D. in. Boring Method: Hollow Stem Auger Date Completed: 9/16/2021

| Elevation/ Depth | SOIL SYMBOLS/ SAMPLE CONDITIONS | Description | Boring and Sampling Notes | Rec. | NM% | SPT Blows | SPT Blows/Foot N | SPT Blows/Foot Curve (10 30 50) |
|---|---|---|---|---|---|---|---|---|
| 17.5 | | Medium dense brown Clayey to Silty SAND [SC, SM] | Stratum I from 18 to 34 feet | 8" | | 4-11-6-4 | 17 | |
| 20 | I | | | | | | | |
| 22.5 | | Loose brown SAND with Silt and Gravel [SP-SM] | | 12" | | 4-5-5-11 | 10 | |
| 25 | I | | | | | | | |
| 27.5 | | Medium dense brown SAND with Silt [SP-SM] | | 12" | | 6-5-10-13 | 15 | |
| 30 | I | | | | | | | |

**SAMPLER TYPE**
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

**SAMPLE CONDITIONS**
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

| | GROUND WATER | CAVE IN DEPTH |
|---|---|---|
| AT COMPLETION | 10 ft. | _____ ft. |
| AFTER 24 HRS. | _____ ft. | _____ ft. |
| AFTER ___ HRS. | _____ ft. | _____ ft. |

**BORING METHOD**
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

-1005-

STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

# HILLIS - CARNES
# ENGINEERING ASSOCIATES, INC.

## TEST BORING LOGS

Project Name: **Keystone Trade Center Building 4** | Boring No.: B-10

Location: Falls Township, PA | Job #: L21049

**SAMPLER**

Datum: | Hammer Wt.: 140 lbs. | Hole Diameter: 3.25 inch I.D. | Foreman: Rick (Allied)

Surf. Elev.: Ft. | Hammer Drop: 30 in. | Rock Core Diameter: N/A | Inspector: M. Delluso

Date Started: 9/16/2021 | Pipe Size: 2 O.D. in. | Boring Method: Hollow Stem Auger | Date Completed: 9/16/2021

| Elevation/ Depth | SOIL SYMBOLS/ SAMPLE CONDITIONS | Description | Boring and Sampling Notes | Rec. | NM% | SPT Blows | SPT Blows/Foot N | SPT Blows/Foot Curve (10 30 50) |
|---|---|---|---|---|---|---|---|---|
| 32.5 | I | Loose brown SAND [SP] to medium stiff light grey Sandy CLAY [CL] | Stratum III from 34 to 38 feet | 12" | | 3-2-7-10 | 9 | |
| 35 | | | | | | | | |
| 37.5 | I | Very loose brown to tan SAND [SP] | Stratum I from 38 to 43 feet | 14" | | WOH-1-4-11 | 5 | |
| 40 | | | | | | | | |
| 42.5 | I | Medium stiff beige to orange Sandy CLAY [CL] | Stratum III from 43 to 50 feet | 16" | | 2-1-7-11 | 8 | |
| 45 | | | | | | | | |

**SAMPLER TYPE**

DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

**SAMPLE CONDITIONS**

D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

| | GROUND WATER | CAVE IN DEPTH |
|---|---|---|
| AT COMPLETION | 10 ft. | ft. |
| AFTER 24 HRS. | ft. | ft. |
| AFTER ___ HRS. | ft. | ft. |

**BORING METHOD**

HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

-1006-

STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

# HILLIS - CARNES
# ENGINEERING ASSOCIATES, INC.

## TEST BORING LOGS

Project Name: **Keystone Trade Center Building 4** Boring No. B-10

Location: Falls Township, PA Job # L21049

**SAMPLER**

Datum ____ Hammer Wt. 140 lbs. Hole Diameter 3.25 inch I.D. Foreman Rick (Allied)

Surf. Elev. ____ Ft. Hammer Drop 30 in. Rock Core Diameter N/A Inspector M. Delluso

Date Started 9/16/2021 Pipe Size 2 O.D. in. Boring Method Hollow Stem Auger Date Completed 9/16/2021

| Elevation/ Depth | SOIL SYMBOLS/ SAMPLE CONDITIONS | Description | Boring and Sampling Notes | Rec. | NM% | SPT Blows | SPT Blows/Foot N | SPT Blows/Foot Curve (10 30 50) |
|---|---|---|---|---|---|---|---|---|
| 47.5 | I | Very stiff light grey CLAY [CL] | | 18" | | 9-17-22-26 | 39 | |
| 50 | | -Boring terminated at 50 feet- | | | | | | |
| 52.5 | | | | | | | | |
| 55 | | | | | | | | |
| 57.5 | | | | | | | | |
| 60 | | | | | | | | |
| 62.5 | | | | | | | | |

**SAMPLER TYPE**
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

**SAMPLE CONDITIONS**
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

| | GROUND WATER | CAVE IN DEPTH |
|---|---|---|
| AT COMPLETION | 10 ft. | ____ ft. |
| AFTER 24 HRS. | ____ ft. | ____ ft. |
| AFTER ___ HRS. | ____ ft. | ____ ft. |

**BORING METHOD**
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

-1007-

STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

# HILLIS - CARNES
# ENGINEERING ASSOCIATES, INC.

## TEST BORING LOGS

Project Name: **Keystone Trade Center Building 4** Boring No. B-11

Location: Falls Township, PA Job # L21049

**SAMPLER**

Datum _____ Hammer Wt. 140 lbs. Hole Diameter 3.25 inch I.D. Foreman Rick (Allied)

Surf. Elev. _____ Ft. Hammer Drop 30 in. Rock Core Diameter N/A Inspector M. Delluso

Date Started 9/16/2021 Pipe Size 2 O.D. in. Boring Method Hollow Stem Auger Date Completed 9/16/2021

| Elevation/ Depth | SOIL SYMBOLS/ SAMPLE CONDITIONS | Description | Boring and Sampling Notes | Rec. | NM% | SPT Blows | SPT Blows/Foot N | SPT Blows/Foot Curve |
|---|---|---|---|---|---|---|---|---|
| 0 | | 10" organic soil with cobbles | | 2" | | 10-10-19-18 | 29 | |
| | | Very stiff light brown Sandy SILT [ML] | Stratum II from 0.8 to 4 feet | | | | | |
| 2.5 | | Very stiff light brown Sandy SILT [ML] | | 22" | | 14-15-12-9 | 27 | |
| | | Very loose brown Silty SAND [SM] | Stratum I from 4 to 33 feet | 18" | | 1-1-2-2 | 3 | |
| 5 | | | | | | | | |
| | | Loose brown Silty SAND [SM] (moist) | | 12" | | 2-3-7-11 | 10 | |
| 7.5 | | | | | | | | |
| | | Medium dense brown to grey GRAVEL with Sand [GP] | | 8" | | 7-10-7-6 | 17 | |
| 10 | | | | | | | | |
| 12.5 | | No recovery (wet) | | 0" | | 3-4-1-1 | 5 | |
| 15 | | | | | | | | |

Curve: 10 30 50

**SAMPLER TYPE**
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

**SAMPLE CONDITIONS**
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

| | GROUND WATER | CAVE IN DEPTH |
|---|---|---|
| AT COMPLETION | 12 ft. | _____ ft. |
| AFTER 24 HRS. | _____ ft. | _____ ft. |
| AFTER ___ HRS. | _____ ft. | _____ ft. |

**BORING METHOD**
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

-1008-

STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

# HILLIS - CARNES
# ENGINEERING ASSOCIATES, INC.

## TEST BORING LOGS

Project Name: **Keystone Trade Center Building 4** Boring No. B-11

Location: Falls Township, PA Job # L21049

**SAMPLER**

Datum ____ Hammer Wt. 140 lbs. Hole Diameter 3.25 inch I.D. Foreman Rick (Allied)

Surf. Elev. ____ Ft. Hammer Drop 30 in. Rock Core Diameter N/A Inspector M. Delluso

Date Started 9/16/2021 Pipe Size 2 O.D. in. Boring Method Hollow Stem Auger Date Completed 9/16/2021

| Elevation/ Depth | SOIL SYMBOLS/ SAMPLE CONDITIONS | Description | Boring and Sampling Notes | Rec. | NM% | SPT Blows | SPT Blows/Foot N | SPT Blows/Foot Curve (10 30 50) |
|---|---|---|---|---|---|---|---|---|
| 17.5 | | Loose brown SAND with Gravel [SP] | | 8" | | 7-7-3-3 | 10 | |
| 20 | | | | | | | | |
| 22.5 | | Loose brown SAND [SP] | | 5" | | 3-3-4-7 | 7 | |
| 25 | | | | | | | | |
| 27.5 | | Loose tan to light grey Clayey SAND [SC] | | 10" | | WOH-5-5-7 | 10 | |
| 30 | | | | | | | | |

**SAMPLER TYPE**
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

**SAMPLE CONDITIONS**
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

| | GROUND WATER | CAVE IN DEPTH |
|---|---|---|
| AT COMPLETION | 12 ft. | ____ ft. |
| AFTER 24 HRS. | ____ ft. | ____ ft. |
| AFTER ___ HRS. | ____ ft. | ____ ft. |

**BORING METHOD**
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

-1009-

STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

# HILLIS - CARNES
# ENGINEERING ASSOCIATES, INC.

## TEST BORING LOGS

Project Name: **Keystone Trade Center Building 4** Boring No. B-11

Location: Falls Township, PA Job # L21049

**SAMPLER**

Datum ____ Hammer Wt. 140 lbs. Hole Diameter 3.25 inch I.D. Foreman Rick (Allied)

Surf. Elev. ____ Ft. Hammer Drop 30 in. Rock Core Diameter N/A Inspector M. Delluso

Date Started 9/16/2021 Pipe Size 2 O.D. in. Boring Method Hollow Stem Auger Date Completed 9/16/2021

| Elevation/ Depth | SOIL SYMBOLS/ SAMPLE CONDITIONS | Description | Boring and Sampling Notes | Rec. | NM% | SPT Blows | SPT Blows/Foot N | SPT Blows/Foot Curve (10 30 50) |
|---|---|---|---|---|---|---|---|---|
| 32.5 | | Stiff light grey CLAY with Sand [CL] | Stratum III from 33 to 50 feet | 20" | | 3-6-9-11 | 15 | |
| 35 | I | | | | | | | |
| 37.5 | | Stiff light grey CLAY with Sand [CL] | | 22" | | 2-4-8-13 | 12 | |
| 40 | I | | | | | | | |
| 42.5 | | Very stiff light grey CLAY with Sand [CL] | | 20" | | WOH-8-10-13 | 18 | |
| 45 | I | | | | | | | |

**SAMPLER TYPE**
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

**SAMPLE CONDITIONS**
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

| | GROUND WATER | CAVE IN DEPTH |
|---|---|---|
| AT COMPLETION | 12 ft. | ____ ft. |
| AFTER 24 HRS. | ____ ft. | ____ ft. |
| AFTER ___ HRS. | ____ ft. | ____ ft. |

**BORING METHOD**
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING



STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

# HILLIS - CARNES
# ENGINEERING ASSOCIATES, INC.

## TEST BORING LOGS

Project Name: **Keystone Trade Center Building 4** Boring No.: B-11

Location: Falls Township, PA Job #: L21049

**SAMPLER**

Datum: _____ Hammer Wt.: 140 lbs. Hole Diameter: 3.25 inch I.D. Foreman: Rick (Allied)

Surf. Elev.: _____ Ft. Hammer Drop: 30 in. Rock Core Diameter: N/A Inspector: M. Delluso

Date Started: 9/16/2021 Pipe Size: 2 O.D. in. Boring Method: Hollow Stem Auger Date Completed: 9/16/2021

| Elevation/ Depth | SOIL SYMBOLS/ SAMPLE CONDITIONS | Description | Boring and Sampling Notes | Rec. | NM% | SPT Blows | SPT Blows/Foot N | SPT Blows/Foot Curve (10 30 50) |
|---|---|---|---|---|---|---|---|---|
| 47.5 | I | Stiff light grey CLAY with Sand to beige CLAY [CL] | | 18" | | 4-6-9-11 | 15 | |
| 50 | | -Boring terminated at 50 feet- | | | | | | |
| 52.5 | | | | | | | | |
| 55 | | | | | | | | |
| 57.5 | | | | | | | | |
| 60 | | | | | | | | |
| 62.5 | | | | | | | | |

**SAMPLER TYPE**
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

**SAMPLE CONDITIONS**
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

| | GROUND WATER | CAVE IN DEPTH |
|---|---|---|
| AT COMPLETION | 12 ft. | _____ ft. |
| AFTER 24 HRS. | _____ ft. | _____ ft. |
| AFTER ___ HRS. | _____ ft. | _____ ft. |

**BORING METHOD**
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING



STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

# HILLIS - CARNES
# ENGINEERING ASSOCIATES, INC.

## TEST BORING LOGS

Project Name: **Keystone Trade Center Building 4** Boring No.: B-12

Location: Falls Township, PA Job #: L21049

**SAMPLER**

Datum: _____ Hammer Wt.: 140 lbs. Hole Diameter: 3.25 inch I.D. Foreman: Rick (Allied)

Surf. Elev.: _____ Ft. Hammer Drop: 30 in. Rock Core Diameter: N/A Inspector: M. Delluso

Date Started: 9/15/2021 Pipe Size: 2 O.D. in. Boring Method: Hollow Stem Auger Date Completed: 9/15/2021

| Elevation/ Depth | SOIL SYMBOLS/ SAMPLE CONDITIONS | Description | Boring and Sampling Notes | Rec. | NM% | SPT Blows | SPT Blows/Foot N | SPT Blows/Foot Curve (10 30 50) |
|---|---|---|---|---|---|---|---|---|
| 0 | | 8" organic soil | | 12" | | 3-6-8-6 | 14 | |
| | | Medium dense dark brown to brown Silty SAND with organic debris [SM] | Stratum I from 0.7 to 49 feet | | | | | |
| 2.5 | | Very loose dark brown to brown Silty SAND with organic debris [SM] | | 16" | | 5-2-2-4 | 4 | |
| | | No recovery | | 0" | | 3-2-2-4 | 4 | |
| 5 | | Loose brown Silty SAND [SM] | | 10" | | 1-3-4-2 | 7 | |
| 7.5 | | Loose brown Silty SAND [SM] | | 18" | | 3-2-4-3 | 6 | |
| 10 | | | | | | | | |
| 12.5 | | Medium dense brown to grey GRAVEL with Sand [GP] (wet) | | 4" | | 9-9-3-4 | 12 | |
| 15 | | | | | | | | |

**SAMPLER TYPE**
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

**SAMPLE CONDITIONS**
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

| | GROUND WATER | CAVE IN DEPTH |
|---|---|---|
| AT COMPLETION | 14 ft. | _____ ft. |
| AFTER 24 HRS. | _____ ft. | _____ ft. |
| AFTER ___ HRS. | _____ ft. | _____ ft. |

**BORING METHOD**
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING



STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

# HILLIS - CARNES
# ENGINEERING ASSOCIATES, INC.

## TEST BORING LOGS

Project Name: **Keystone Trade Center Building 4** Boring No.: B-12

Location: Falls Township, PA Job #: L21049

**SAMPLER**

Datum: ____ Hammer Wt.: 140 lbs. Hole Diameter: 3.25 inch I.D. Foreman: Rick (Allied)

Surf. Elev.: ____ Ft. Hammer Drop: 30 in. Rock Core Diameter: N/A Inspector: M. Delluso

Date Started: 9/15/2021 Pipe Size: 2 O.D. in. Boring Method: Hollow Stem Auger Date Completed: 9/15/2021

| Elevation/ Depth | SOIL SYMBOLS/ SAMPLE CONDITIONS | Description | Boring and Sampling Notes | Rec. | NM% | SPT Blows | SPT Blows/Foot N | SPT Blows/Foot Curve (10 30 50) |
|---|---|---|---|---|---|---|---|---|
| 17.5 | | Medium dense brown to grey SAND with Silt and Gravel [SP-SM] | | 6" | | 9-9-4-4 | 13 | |
| 20 | | | | | | | | |
| 22.5 | | No recovery | | 0" | | 4-2-2-2 | 4 | |
| 25 | | | | | | | | |
| 27.5 | | Loose brown to tan SAND with Gravel [SM] | Clayey SAND in shoe | 18" | | 5-3-3-5 | 6 | |
| 30 | | | | | | | | |

**SAMPLER TYPE**
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

**SAMPLE CONDITIONS**
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

| | GROUND WATER | CAVE IN DEPTH |
|---|---|---|
| AT COMPLETION | 14 ft. | ____ ft. |
| AFTER 24 HRS. | ____ ft. | ____ ft. |
| AFTER ___ HRS. | ____ ft. | ____ ft. |

**BORING METHOD**
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING



STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

# HILLIS - CARNES
# ENGINEERING ASSOCIATES, INC.

## TEST BORING LOGS

Project Name: **Keystone Trade Center Building 4** Boring No. B-12

Location: Falls Township, PA Job # L21049

**SAMPLER**

Datum ____ Hammer Wt. 140 lbs. Hole Diameter 3.25 inch I.D. Foreman Rick (Allied)

Surf. Elev. ____ Ft. Hammer Drop 30 in. Rock Core Diameter N/A Inspector M. Delluso

Date Started 9/15/2021 Pipe Size 2 O.D. in. Boring Method Hollow Stem Auger Date Completed 9/15/2021

| Elevation/ Depth | SOIL SYMBOLS/ SAMPLE CONDITIONS | Description | Boring and Sampling Notes | Rec. | NM% | SPT Blows | SPT Blows/Foot N | SPT Blows/Foot Curve (10 30 50) |
|---|---|---|---|---|---|---|---|---|
| 32.5 | | Very loose brown SAND with Gravel to tan SAND [SP] | | 12" | | 3-2-2-2 | 4 | |
| 35 | | | | | | | | |
| 37.5 | | Very loose tan SAND with Silt and Gravel [SP-SM] | | 10" | | WOH/12"-5-8 | 5 | |
| 40 | | | | | | | | |
| 42.5 | | Loose tan to white SAND with Silt [SP-SM] | | 22" | | 2-1-5-4 | 6 | |
| 45 | | | | | | | | |

**SAMPLER TYPE**
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

**SAMPLE CONDITIONS**
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

| | GROUND WATER | CAVE IN DEPTH |
|---|---|---|
| AT COMPLETION | 14 ft. | ____ ft. |
| AFTER 24 HRS. | ____ ft. | ____ ft. |
| AFTER ___ HRS. | ____ ft. | ____ ft. |

**BORING METHOD**
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING



STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

# HILLIS - CARNES
# ENGINEERING ASSOCIATES, INC.

## TEST BORING LOGS

Project Name: **Keystone Trade Center Building 4** Boring No.: B-12

Location: Falls Township, PA Job #: L21049

**SAMPLER**

Datum: _____ Hammer Wt.: 140 lbs. Hole Diameter: 3.25 inch I.D. Foreman: Rick (Allied)

Surf. Elev.: _____ Ft. Hammer Drop: 30 in. Rock Core Diameter: N/A Inspector: M. Delluso

Date Started: 9/15/2021 Pipe Size: 2 O.D. in. Boring Method: Hollow Stem Auger Date Completed: 9/15/2021

| Elevation/ Depth | SOIL SYMBOLS/ SAMPLE CONDITIONS | Description | Boring and Sampling Notes | Rec. | NM% | SPT Blows | SPT Blows/Foot N | SPT Blows/Foot Curve (10 30 50) |
|---|---|---|---|---|---|---|---|---|
| 47.5 | | Very loose tan SAND [SP] to very soft white CLAY with Sand [CL] | Stratum III from 49 to 50 feet | 6" | | 2-WOH/12"-1-6 | 1 | |
| 50 | | -Boring terminated at 50 feet- | | | | | | |
| 52.5 | | | | | | | | |
| 55 | | | | | | | | |
| 57.5 | | | | | | | | |
| 60 | | | | | | | | |
| 62.5 | | | | | | | | |

**SAMPLER TYPE**
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

**SAMPLE CONDITIONS**
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

| | GROUND WATER | CAVE IN DEPTH |
|---|---|---|
| AT COMPLETION | 14 ft. | _____ ft. |
| AFTER 24 HRS. | _____ ft. | _____ ft. |
| AFTER ___ HRS. | _____ ft. | _____ ft. |

**BORING METHOD**
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING



STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

# HILLIS - CARNES
# ENGINEERING ASSOCIATES, INC.

## TEST BORING LOGS

Project Name: **Keystone Trade Center Building 4** Boring No. B-13

Location: Falls Township, PA Job # L21049

**SAMPLER**

Datum ____ Hammer Wt. 140 lbs. Hole Diameter 3.25 inch I.D. Foreman Rick (Allied)

Surf. Elev. ____ Ft. Hammer Drop 30 in. Rock Core Diameter N/A Inspector M. Delluso

Date Started 9/20/2021 Pipe Size 2 O.D. in. Boring Method Hollow Stem Auger Date Completed 9/20/2021

| Elevation/ Depth | SOIL SYMBOLS/ SAMPLE CONDITIONS | Description | Boring and Sampling Notes | Rec. | NM% | SPT Blows | SPT Blows/Foot N | SPT Blows/Foot Curve |
|---|---|---|---|---|---|---|---|---|
| 0 | | 8" organic soil with Gravel | | 20" | | 5-5-9-11 | 14 | |
| | | Medium dense brown Silty SAND [SM] | Stratum I from 0.7 to 2 feet | | | | | |
| 2.5 | | Very stiff grey Sandy SILT [ML] | Stratum II from 2 to 4 feet | 18" | | 10-11-12-12 | 23 | |
| | | Loose brown Silty SAND [SM] | Stratum I from 4 to 13 feet | 16" | | 3-3-4-2 | 7 | |
| 5 | | Loose brown Silty SAND [SM] | | 16" | | 2-4-3-6 | 7 | |
| 7.5 | | Dense brown SAND with Silt and Gravel [SP-SM] | | 10" | | 12-25-13-17 | 38 | |
| 10 | | | | | | | | |
| 12.5 | | Medium stiff brown to dark brown Sandy SILT with Gravel and organic debris [ML] (wet) | Stratum II from 13 to 18 feet | 10" | | 9-7-2-3 | 9 | |
| 15 | | | | | | | | |

10 30 50

**SAMPLER TYPE**
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

**SAMPLE CONDITIONS**
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

| | GROUND WATER | CAVE IN DEPTH |
|---|---|---|
| AT COMPLETION | 13 ft. | ____ ft. |
| AFTER 24 HRS. | ____ ft. | ____ ft. |
| AFTER ___ HRS. | ____ ft. | ____ ft. |

**BORING METHOD**
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING



STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

# HILLIS - CARNES
# ENGINEERING ASSOCIATES, INC.

## TEST BORING LOGS

Project Name: **Keystone Trade Center Building 4** Boring No.: B-13

Location: Falls Township, PA Job #: L21049

**SAMPLER**

Datum: _____ Hammer Wt.: 140 lbs. Hole Diameter: 3.25 inch I.D. Foreman: Rick (Allied)

Surf. Elev.: _____ Ft. Hammer Drop: 30 in. Rock Core Diameter: N/A Inspector: M. Delluso

Date Started: 9/20/2021 Pipe Size: 2 O.D. in. Boring Method: Hollow Stem Auger Date Completed: 9/20/2021

| Elevation/ Depth | SOIL SYMBOLS/ SAMPLE CONDITIONS | Description | Boring and Sampling Notes | Rec. | NM% | SPT Blows | SPT Blows/Foot N | SPT Blows/Foot Curve (10 30 50) |
|---|---|---|---|---|---|---|---|---|
| 17.5 | | Loose brown to grey Silty GRAVEL with Sand [GM] | Stratum I from 18 to 50 feet | 8" | | 3-2-4-7 | 6 | |
| 20 | | | | | | | | |
| 22.5 | | Dense brown to grey GRAVEL with Sand [GM] to beige SAND with Silt [SP-SM] | | 15" | | 22-27-19-25 | 46 | |
| 25 | | | | | | | | |
| 27.5 | | Medium dense orange to white SAND with Silt [SP-SM], trace Clay | | 18" | | 1-5-6-19 | 11 | |
| 30 | | | | | | | | |

**SAMPLER TYPE**
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

**SAMPLE CONDITIONS**
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

| | GROUND WATER | CAVE IN DEPTH |
|---|---|---|
| AT COMPLETION | 13 ft. | _____ ft. |
| AFTER 24 HRS. | _____ ft. | _____ ft. |
| AFTER ___ HRS. | _____ ft. | _____ ft. |

**BORING METHOD**
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING



STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

# HILLIS - CARNES
# ENGINEERING ASSOCIATES, INC.

## TEST BORING LOGS

Project Name: **Keystone Trade Center Building 4** Boring No.: B-13

Location: Falls Township, PA Job #: L21049

**SAMPLER**

Datum: _____ Hammer Wt.: 140 lbs. Hole Diameter: 3.25 inch I.D. Foreman: Rick (Allied)

Surf. Elev.: _____ Ft. Hammer Drop: 30 in. Rock Core Diameter: N/A Inspector: M. Delluso

Date Started: 9/20/2021 Pipe Size: 2 O.D. in. Boring Method: Hollow Stem Auger Date Completed: 9/20/2021

| Elevation/ Depth | SOIL SYMBOLS/ SAMPLE CONDITIONS | Description | Boring and Sampling Notes | Rec. | NM% | SPT Blows | SPT Blows/Foot N | SPT Blows/Foot Curve (10 30 50) |
|---|---|---|---|---|---|---|---|---|
| 32.5 | | Dense tan SAND with Silty Clay [SP-SC] | | 20" | | 9-14-25-20 | 39 | |
| 35 | | | | | | | | |
| 37.5 | | Medium dense tan SAND with Silty Clay [SP-SC] | | 24" | | 9-12-11-15 | 23 | |
| 40 | | | | | | | | |
| 42.5 | | Medium dense tan SAND with Silt [SP-SM] | | 22" | | 8-8-8-6 | 16 | |
| 45 | | | | | | | | |

**SAMPLER TYPE**
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

**SAMPLE CONDITIONS**
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

| | GROUND WATER | CAVE IN DEPTH |
|---|---|---|
| AT COMPLETION | 13 ft. | _____ ft. |
| AFTER 24 HRS. | _____ ft. | _____ ft. |
| AFTER ___ HRS. | _____ ft. | _____ ft. |

**BORING METHOD**
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

-1018-

STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

# HILLIS - CARNES
# ENGINEERING ASSOCIATES, INC.

## TEST BORING LOGS

Project Name: **Keystone Trade Center Building 4** Boring No. B-13

Location: Falls Township, PA Job # L21049

**SAMPLER**

Datum ____ Hammer Wt. 140 lbs. Hole Diameter 3.25 inch I.D. Foreman Rick (Allied)

Surf. Elev. ____ Ft. Hammer Drop 30 in. Rock Core Diameter N/A Inspector M. Delluso

Date Started 9/20/2021 Pipe Size 2 O.D. in. Boring Method Hollow Stem Auger Date Completed 9/20/2021

| Elevation/ Depth | SOIL SYMBOLS/ SAMPLE CONDITIONS | Description | Boring and Sampling Notes | Rec. | NM% | SPT Blows | SPT Blows/Foot N | SPT Blows/Foot Curve (10 30 50) |
|---|---|---|---|---|---|---|---|---|
| 47.5 | I | Medium dense tan SAND with Silty Clay [SP-SC] | White CLAY in shoe | 20" | | 6-4-8-17 | 12 | |
| 50 | | -Boring terminated at 50 feet- | | | | | | |
| 52.5 | | | | | | | | |
| 55 | | | | | | | | |
| 57.5 | | | | | | | | |
| 60 | | | | | | | | |
| 62.5 | | | | | | | | |

**SAMPLER TYPE**
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

**SAMPLE CONDITIONS**
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

| | GROUND WATER | CAVE IN DEPTH |
|---|---|---|
| AT COMPLETION | 13 ft. | ____ ft. |
| AFTER 24 HRS. | ____ ft. | ____ ft. |
| AFTER ___ HRS. | ____ ft. | ____ ft. |

**BORING METHOD**
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING



STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

# HILLIS - CARNES
# ENGINEERING ASSOCIATES, INC.

## TEST BORING LOGS

Project Name: **Keystone Trade Center Building 4** | Boring No.: B-14

Location: Falls Township, PA | Job #: L21049

**SAMPLER**

Datum | Hammer Wt.: 140 lbs. | Hole Diameter: 3.25 inch I.D. | Foreman: Rick (Allied)

Surf. Elev. Ft. | Hammer Drop: 30 in. | Rock Core Diameter: N/A | Inspector: M. Delluso

Date Started: 9/20/2021 | Pipe Size: 2 O.D. in. | Boring Method: Hollow Stem Auger | Date Completed: 9/24/2021

| Elevation/ Depth | SOIL SYMBOLS/ SAMPLE CONDITIONS | Description | Boring and Sampling Notes | Rec. | NM% | SPT Blows | SPT Blows/Foot N | SPT Blows/Foot Curve |
|---|---|---|---|---|---|---|---|---|
| 0 | | 3" organic soil | | | | | | 10 30 50 |
| | | Dense brown to dark grey SAND with Silt, Gravel and slag [SP-SM] | Fill from 0.3 to 3 feet | 20" | | 10-24-25-21 | 49 | |
| 2.5 | | Dense dark grey SAND with Gravel [SP] to brown Silty SAND [SM] | | 18" | | 12-23-21-15 | 44 | |
| | | Medium dense brown Silty SAND [SM] | Stratum I from 3 to 6 feet | 6" | | 10-16-9-7 | 25 | |
| 5 | | | | | | | | |
| | | Soft brown Sandy SILT [ML] | Stratum II from 6 to 8 feet | 18" | | 4-1-3-2 | 4 | |
| 7.5 | | Very loose brown Silty SAND, trace organic debris [SM] | Stratum I from 8 to 50 feet | 16" | | 2-1-2-2 | 3 | |
| 10 | | | | | | | | |
| 12.5 | | Loose brown Silty GRAVEL with Sand [GM] (wet) | | 4" | | 3-6-4-4 | 10 | |
| 15 | | | | | | | | |

**SAMPLER TYPE**
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

**SAMPLE CONDITIONS**
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

| | GROUND WATER | CAVE IN DEPTH |
|---|---|---|
| AT COMPLETION | 14 ft. | ft. |
| AFTER 24 HRS. | ft. | ft. |
| AFTER ___ HRS. | ft. | ft. |

**BORING METHOD**
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING



STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

# HILLIS - CARNES
# ENGINEERING ASSOCIATES, INC.

## TEST BORING LOGS

Project Name: **Keystone Trade Center Building 4** Boring No.: B-14

Location: Falls Township, PA Job #: L21049

**SAMPLER**

Datum: ____ Hammer Wt.: 140 lbs. Hole Diameter: 3.25 inch I.D. Foreman: Rick (Allied)

Surf. Elev.: ____ Ft. Hammer Drop: 30 in. Rock Core Diameter: N/A Inspector: M. Delluso

Date Started: 9/20/2021 Pipe Size: 2 O.D. in. Boring Method: Hollow Stem Auger Date Completed: 9/24/2021

| Elevation/ Depth | SOIL SYMBOLS/ SAMPLE CONDITIONS | Description | Boring and Sampling Notes | Rec. | NM% | SPT Blows | SPT Blows/Foot N | SPT Blows/Foot Curve (10 30 50) |
|---|---|---|---|---|---|---|---|---|
| 17.5 | | Very loose brown to grey Silty GRAVEL with Sand [GM] | | 10" | | 2-1-3-4 | 4 | |
| 20 | | | | | | | | |
| 22.5 | | Loose brown SAND with Gravel [SP] | | 12" | | 2-3-3-3 | 6 | |
| 25 | | | | | | | | |
| 27.5 | | Dense brown to grey GRAVEL with Sand [GP] | | 14" | | 13-23-10-6 | 33 | |
| 30 | | | | | | | | |

**SAMPLER TYPE**
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

**SAMPLE CONDITIONS**
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

| | GROUND WATER | CAVE IN DEPTH |
|---|---|---|
| AT COMPLETION | 14 ft. | ____ ft. |
| AFTER 24 HRS. | ____ ft. | ____ ft. |
| AFTER ___ HRS. | ____ ft. | ____ ft. |

**BORING METHOD**
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING



STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

# HILLIS - CARNES
# ENGINEERING ASSOCIATES, INC.

## TEST BORING LOGS

Project Name: **Keystone Trade Center Building 4** Boring No. B-14

Location: Falls Township, PA Job # L21049

**SAMPLER**

Datum ____ Hammer Wt. 140 lbs. Hole Diameter 3.25 inch I.D. Foreman Rick (Allied)

Surf. Elev. ____ Ft. Hammer Drop 30 in. Rock Core Diameter N/A Inspector M. Delluso

Date Started 9/20/2021 Pipe Size 2 O.D. in. Boring Method Hollow Stem Auger Date Completed 9/24/2021

| Elevation/ Depth | SOIL SYMBOLS/ SAMPLE CONDITIONS | Description | Boring and Sampling Notes | Rec. | NM% | SPT Blows | SPT Blows/Foot N | SPT Blows/Foot Curve (10 30 50) |
|---|---|---|---|---|---|---|---|---|
| 32.5 | | Dense brown to orange SAND [SP] | | 22" | | 23-18-26-33 | 44 | |
| 35 | | | | | | | | |
| 37.5 | | Dense tan SAND [SP] | | 18" | | 2-8-29-50/4" | 37 | |
| 40 | | | | | | | | |
| 42.5 | | Very dense beige SAND with Gravel [SP] | | 12" | | 8-12-50/5" | 62/11" | 62/11" |
| 45 | | | | | | | | |

**SAMPLER TYPE**
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

**SAMPLE CONDITIONS**
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

| | GROUND WATER | CAVE IN DEPTH |
|---|---|---|
| AT COMPLETION | 14 ft. | ____ ft. |
| AFTER 24 HRS. | ____ ft. | ____ ft. |
| AFTER ___ HRS. | ____ ft. | ____ ft. |

**BORING METHOD**
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING



STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

# HILLIS - CARNES
# ENGINEERING ASSOCIATES, INC.

## TEST BORING LOGS

Project Name: **Keystone Trade Center Building 4** Boring No.: B-14

Location: Falls Township, PA Job #: L21049

**SAMPLER**

Datum: _____ Hammer Wt.: 140 lbs. Hole Diameter: 3.25 inch I.D. Foreman: Rick (Allied)

Surf. Elev.: _____ Ft. Hammer Drop: 30 in. Rock Core Diameter: N/A Inspector: M. Delluso

Date Started: 9/20/2021 Pipe Size: 2 O.D. in. Boring Method: Hollow Stem Auger Date Completed: 9/24/2021

| Elevation/ Depth | SOIL SYMBOLS/ SAMPLE CONDITIONS | Description | Boring and Sampling Notes | Rec. | NM% | SPT Blows | SPT Blows/Foot N | SPT Blows/Foot Curve (10 30 50) |
|---|---|---|---|---|---|---|---|---|
| 47.5 | | Very dense beige SAND with Gravel [SP] | | 12" | | 10-22-50/2" | 72/8" | 72/8" |
| 50 | | -Boring terminated at 50 feet- | | | | | | |
| 52.5 | | | | | | | | |
| 55 | | | | | | | | |
| 57.5 | | | | | | | | |
| 60 | | | | | | | | |
| 62.5 | | | | | | | | |

**SAMPLER TYPE**
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

**SAMPLE CONDITIONS**
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

| | GROUND WATER | CAVE IN DEPTH |
|---|---|---|
| AT COMPLETION | 14 ft. | _____ ft. |
| AFTER 24 HRS. | _____ ft. | _____ ft. |
| AFTER ___ HRS. | _____ ft. | _____ ft. |

**BORING METHOD**
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING



STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

# HILLIS - CARNES
# ENGINEERING ASSOCIATES, INC.

## TEST BORING LOGS

Project Name: **Keystone Trade Center Building 4** Boring No. B-15

Location: Falls Township, PA Job # L21049

**SAMPLER**

Datum ____ Hammer Wt. 140 lbs. Hole Diameter 3.25 inch I.D. Foreman Kevin (FM&W)

Surf. Elev. ____ Ft. Hammer Drop 30 in. Rock Core Diameter N/A Inspector M. Delluso

Date Started 9/14/2021 Pipe Size 2 O.D. in. Boring Method Hollow Stem Auger Date Completed 9/14/2021

| Elevation/ Depth | SOIL SYMBOLS/ SAMPLE CONDITIONS | Description | Boring and Sampling Notes | Rec. | NM% | SPT Blows | SPT Blows/Foot N | SPT Blows/Foot Curve |
|---|---|---|---|---|---|---|---|---|
| 0 | | Dense dark grey SAND with slag [SP] | Fill from 0 to 20 feet | | | 11-22-16-16 | 38 | |
| 2.5 | | Medium dense dark grey SAND with slag and brick [SP] | | | | 17-14-7-6 | 21 | |
| | | Medium dense dark grey SAND with slag [SP] | | | | 6-6-5-5 | 11 | |
| 5 | | Medium dense dark grey to tan slag and brick with Sand [GP] | | | | 5-4-20-22 | 24 | |
| 7.5 | | Very dense dark grey slag with Sand [GP] | | | | 28-26-25-19 | 51 | |
| 10 | | | | | | | | |
| 12.5 | | | | | | | | |
| | | Medium dense dark grey slag with Sand [GP] (wet) | | | | 9-6-9-13 | 15 | |
| 15 | | | | | | | | |

10 30 50

**SAMPLER TYPE**
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

**SAMPLE CONDITIONS**
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

| | GROUND WATER | CAVE IN DEPTH |
|---|---|---|
| AT COMPLETION | 14 ft. | ____ ft. |
| AFTER 24 HRS. | ____ ft. | ____ ft. |
| AFTER ___ HRS. | ____ ft. | ____ ft. |

**BORING METHOD**
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING



STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

# HILLIS - CARNES
# ENGINEERING ASSOCIATES, INC.

## TEST BORING LOGS

Project Name: **Keystone Trade Center Building 4** Boring No.: B-15

Location: Falls Township, PA Job #: L21049

**SAMPLER**

Datum: _____ Hammer Wt.: 140 lbs. Hole Diameter: 3.25 inch I.D. Foreman: Kevin (FM&W)

Surf. Elev.: _____ Ft. Hammer Drop: 30 in. Rock Core Diameter: N/A Inspector: M. Delluso

Date Started: 9/14/2021 Pipe Size: 2 O.D. in. Boring Method: Hollow Stem Auger Date Completed: 9/14/2021

| Elevation/ Depth | SOIL SYMBOLS/ SAMPLE CONDITIONS | Description | Boring and Sampling Notes | Rec. | NM% | SPT Blows | SPT Blows/Foot N | SPT Blows/Foot Curve (10 30 50) |
|---|---|---|---|---|---|---|---|---|
| 17.5 | | | | | | | | |
| | I | Very dense brown to grey GRAVEL with slag [GP] | | 2" | | 50/2" | 50/2" | |
| 20 | | | Stratum I from 20 to 26 feet | | | | | |
| 22.5 | | | | | | | | |
| | I | Very dense greyish brown Silty GRAVEL with Sand [GM] | | | | 50/5" | 50/5" | |
| 25 | | -Auger refusal at 26 feet- -Boring terminated at 26 feet- | | | | | | |
| 27.5 | | | | | | | | |
| 30 | | | | | | | | |

**SAMPLER TYPE**
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

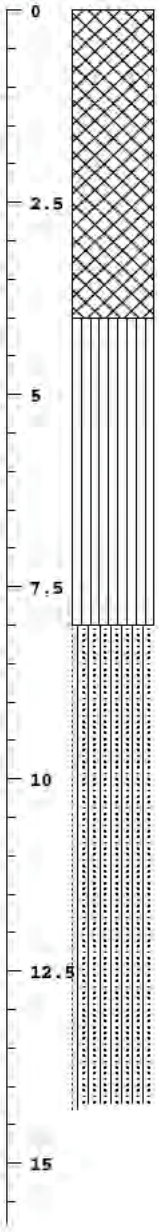
**SAMPLE CONDITIONS**
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

| | GROUND WATER | CAVE IN DEPTH |
|---|---|---|
| AT COMPLETION | 14 ft. | _____ ft. |
| AFTER 24 HRS. | _____ ft. | _____ ft. |
| AFTER ___ HRS. | _____ ft. | _____ ft. |

**BORING METHOD**
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

-1025-

STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.


0
2.5
5
7.5
10
12.5
15

# HILLIS - CARNES
# ENGINEERING ASSOCIATES, INC.

## TEST BORING LOGS

Project Name: **Keystone Trade Center Building 4** | Boring No.: B-16

Location: Falls Township, PA | Job #: L21049

**SAMPLER**

Datum: | Hammer Wt.: 140 lbs. | Hole Diameter: 3.25 inch I.D. | Foreman: Jay (Allied)

Surf. Elev.: Ft. | Hammer Drop: 30 in. | Rock Core Diameter: N/A | Inspector: M. Delluso

Date Started: 9/15/2021 | Pipe Size: 2 O.D. in. | Boring Method: Hollow Stem Auger | Date Completed: 9/15/2021

| Elevation/ Depth | SOIL SYMBOLS/ SAMPLE CONDITIONS | Description | Boring and Sampling Notes | Rec. | NM% | SPT Blows | SPT Blows/Foot N | SPT Blows/Foot Curve (10 30 50) |
|---|---|---|---|---|---|---|---|---|
| 17.5 | I | Medium dense brown SAND with Silt [SP-SM] | | 18" | | 14-9-5-4 | 14 | |
| 20 | | | | | | | | |
| 22.5 | I | Very dense brown SAND with Gravel [SP] | | 24" | | 26-39-42-50 | 81 | 81 |
| 25 | | | | | | | | |
| 27.5 | I | Very dense brown Silty GRAVEL with Sand [GM] | | 22" | | 29-24-31-30 | 55 | |
| 30 | | | | | | | | |

**SAMPLER TYPE**
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

**SAMPLE CONDITIONS**
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

| | GROUND WATER | CAVE IN DEPTH |
|---|---|---|
| AT COMPLETION | 12 ft. | ft. |
| AFTER 24 HRS. | ft. | ft. |
| AFTER ___ HRS. | ft. | ft. |

**BORING METHOD**
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

-1027-

STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

# HILLIS - CARNES
# ENGINEERING ASSOCIATES, INC.

## TEST BORING LOGS

Project Name: **Keystone Trade Center Building 4** Boring No. B-16

Location: Falls Township, PA Job # L21049

**SAMPLER**

Datum ____ Hammer Wt. 140 lbs. Hole Diameter 3.25 inch I.D. Foreman Jay (Allied)

Surf. Elev. ____ Ft. Hammer Drop 30 in. Rock Core Diameter N/A Inspector M. Delluso

Date Started 9/15/2021 Pipe Size 2 O.D. in. Boring Method Hollow Stem Auger Date Completed 9/15/2021

| Elevation/ Depth | SOIL SYMBOLS/ SAMPLE CONDITIONS | Description | Boring and Sampling Notes | Rec. | NM% | SPT Blows | SPT Blows/Foot N | SPT Blows/Foot Curve |
|---|---|---|---|---|---|---|---|---|
| 32.5 | | Very dense brown GRAVEL with Sand [GP] | | 5" | | 50/5" | 50/5" | |
| 35 | | | | | | | | |
| 37.5 | | Very dense brown SAND [SP] | | 12" | | 15-36-37-47 | 73 | 73 |
| 40 | | | | | | | | |
| 42.5 | | Dense brown SAND [SP] | | 10" | | 17-11-21-9 | 32 | |
| 45 | | | | | | | | |

10 30 50

**SAMPLER TYPE**
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

**SAMPLE CONDITIONS**
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

| | GROUND WATER | CAVE IN DEPTH |
|---|---|---|
| AT COMPLETION | 12 ft. | ____ ft. |
| AFTER 24 HRS. | ____ ft. | ____ ft. |
| AFTER ___ HRS. | ____ ft. | ____ ft. |

**BORING METHOD**
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING



STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

# HILLIS - CARNES
# ENGINEERING ASSOCIATES, INC.

## TEST BORING LOGS

Project Name: **Keystone Trade Center Building 4** Boring No.: B-16

Location: Falls Township, PA Job #: L21049

**SAMPLER**

Datum: ____ Hammer Wt.: 140 lbs. Hole Diameter: 3.25 inch I.D. Foreman: Jay (Allied)

Surf. Elev.: ____ Ft. Hammer Drop: 30 in. Rock Core Diameter: N/A Inspector: M. Delluso

Date Started: 9/15/2021 Pipe Size: 2 O.D. in. Boring Method: Hollow Stem Auger Date Completed: 9/15/2021

| Elevation/ Depth | SOIL SYMBOLS/ SAMPLE CONDITIONS | Description | Boring and Sampling Notes | Rec. | NM% | SPT Blows | SPT Blows/Foot N | SPT Blows/Foot Curve (10 30 50) |
|---|---|---|---|---|---|---|---|---|
| 47.5 | I | Medium dense brown SAND with Gravel [SP] | | 8" | | 12-7-19-10 | 26 | |
| 50 | | -Boring terminated at 50 feet- | | | | | | |
| 52.5 | | | | | | | | |
| 55 | | | | | | | | |
| 57.5 | | | | | | | | |
| 60 | | | | | | | | |
| 62.5 | | | | | | | | |

**SAMPLER TYPE**
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

**SAMPLE CONDITIONS**
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

| | GROUND WATER | CAVE IN DEPTH |
|---|---|---|
| AT COMPLETION | 12 ft. | ____ ft. |
| AFTER 24 HRS. | ____ ft. | ____ ft. |
| AFTER ___ HRS. | ____ ft. | ____ ft. |

**BORING METHOD**
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING



STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

# HILLIS - CARNES
# ENGINEERING ASSOCIATES, INC.

## TEST BORING LOGS

Project Name: **Keystone Trade Center Building 4** Boring No.: B-17

Location: Falls Township, PA Job #: L21049

**SAMPLER**

Datum: ____ Hammer Wt.: 140 lbs. Hole Diameter: 3.25 inch I.D. Foreman: Rick (Allied)

Surf. Elev.: ____ Ft. Hammer Drop: 30 in. Rock Core Diameter: N/A Inspector: M. Delluso

Date Started: 9/14/2021 Pipe Size: 2 O.D. in. Boring Method: Hollow Stem Auger Date Completed: 9/15/2021

| Elevation/ Depth | SOIL SYMBOLS/ SAMPLE CONDITIONS | Description | Boring and Sampling Notes | Rec. | NM% | SPT Blows | SPT Blows/Foot N | SPT Blows/Foot Curve |
|---|---|---|---|---|---|---|---|---|
| 0 | | Medium dense dark grey SAND with Gravel and slag [SP] | Fill from 0 to 2 feet | 10" | | 7-9-12-12 | 21 | |
| 2.5 | | Dense brown Silty SAND [SM] | Stratum I from 2 to 4 feet | 14" | | 14-16-18-16 | 34 | |
| 5 | | Very stiff greyish brown Sandy SILT [ML] | Stratum II from 4 to 8 feet | 18" | | 13-13-10-13 | 23 | |
| | | Very stiff brown Sandy SILT [ML] | | 18" | | 14-9-7-6 | 16 | |
| 7.5 | | Loose brown Silty SAND [SM] | Stratum I from 8 to 50 feet | 20" | | 5-5-4-4 | 9 | |
| 10 | | | | | | | | |
| 12.5 | | No recovery (wet) | | 0" | | 4-3-2-3 | 5 | |
| 15 | | | | | | | | |

10 30 50

**SAMPLER TYPE**
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

**SAMPLE CONDITIONS**
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

| | GROUND WATER | CAVE IN DEPTH |
|---|---|---|
| AT COMPLETION | 13 ft. | ____ ft. |
| AFTER 24 HRS. | ____ ft. | ____ ft. |
| AFTER ___ HRS. | ____ ft. | ____ ft. |

**BORING METHOD**
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING



STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

# HILLIS - CARNES
# ENGINEERING ASSOCIATES, INC.

## TEST BORING LOGS

Project Name: **Keystone Trade Center Building 4** Boring No.: B-17

Location: Falls Township, PA Job #: L21049

**SAMPLER**

Datum: _____ Hammer Wt.: 140 lbs. Hole Diameter: 3.25 inch I.D. Foreman: Rick (Allied)

Surf. Elev.: _____ Ft. Hammer Drop: 30 in. Rock Core Diameter: N/A Inspector: M. Delluso

Date Started: 9/14/2021 Pipe Size: 2 O.D. in. Boring Method: Hollow Stem Auger Date Completed: 9/15/2021

| Elevation/ Depth | SOIL SYMBOLS/ SAMPLE CONDITIONS | Description | Boring and Sampling Notes | Rec. | NM% | SPT Blows | SPT Blows/Foot N | SPT Blows/Foot Curve (10 30 50) |
|---|---|---|---|---|---|---|---|---|
| 17.5 | | | | | | | | |
| 20 | I | Loose brown SAND with Silt [SP-SM] | | 18" | | 4-3-3-3 | 6 | |
| 22.5 | | | | | | | | |
| 25 | I | Medium dense brown to grey GRAVEL with Sand [GP] | | 10" | | 17-18-12-12 | 30 | |
| 27.5 | | | | | | | | |
| 30 | I | Medium dense brown Silty SAND [SM] | | 18" | | 8-9-11-13 | 20 | |

**SAMPLER TYPE**
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

**SAMPLE CONDITIONS**
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

| | GROUND WATER | CAVE IN DEPTH |
|---|---|---|
| AT COMPLETION | 13 ft. | _____ ft. |
| AFTER 24 HRS. | _____ ft. | _____ ft. |
| AFTER ___ HRS. | _____ ft. | _____ ft. |

**BORING METHOD**
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING



STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

# HILLIS - CARNES
# ENGINEERING ASSOCIATES, INC.

## TEST BORING LOGS

Project Name: **Keystone Trade Center Building 4** Boring No. B-17

Location: Falls Township, PA Job # L21049

**SAMPLER**

Datum ____ Hammer Wt. 140 lbs. Hole Diameter 3.25 inch I.D. Foreman Rick (Allied)

Surf. Elev. ____ Ft. Hammer Drop 30 in. Rock Core Diameter N/A Inspector M. Delluso

Date Started 9/14/2021 Pipe Size 2 O.D. in. Boring Method Hollow Stem Auger Date Completed 9/15/2021

| Elevation/ Depth | SOIL SYMBOLS/ SAMPLE CONDITIONS | Description | Boring and Sampling Notes | Rec. | NM% | SPT Blows | SPT Blows/Foot N | SPT Blows/Foot Curve (10 30 50) |
|---|---|---|---|---|---|---|---|---|
| 32.5 | | | | | | | | |
| 35 | | Medium dense brown GRAVEL with Sand [SP] | | 8" | | 8-11-11-13 | 22 | |
| 37.5 | | | | | | | | |
| 40 | | Very dense grey GRAVEL [GP] | | 6" | | 49-50/3" | 50/3" | |
| 42.5 | | | | | | | | |
| 45 | | Very dense beige SAND with Gravel [SP] | | 4" | | 47-50/3" | 50/3" | |

**SAMPLER TYPE**
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

**SAMPLE CONDITIONS**
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

| | GROUND WATER | CAVE IN DEPTH |
|---|---|---|
| AT COMPLETION | 13 ft. | ____ ft. |
| AFTER 24 HRS. | ____ ft. | ____ ft. |
| AFTER ___ HRS. | ____ ft. | ____ ft. |

**BORING METHOD**
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING



STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

# HILLIS - CARNES
# ENGINEERING ASSOCIATES, INC.

## TEST BORING LOGS

Project Name: **Keystone Trade Center Building 4** Boring No.: B-17

Location: Falls Township, PA Job #: L21049

**SAMPLER**

Datum: ____ Hammer Wt.: 140 lbs. Hole Diameter: 3.25 inch I.D. Foreman: Rick (Allied)

Surf. Elev.: ____ Ft. Hammer Drop: 30 in. Rock Core Diameter: N/A Inspector: M. Delluso

Date Started: 9/14/2021 Pipe Size: 2 O.D. in. Boring Method: Hollow Stem Auger Date Completed: 9/15/2021

| Elevation/ Depth | SOIL SYMBOLS/ SAMPLE CONDITIONS | Description | Boring and Sampling Notes | Rec. | NM% | SPT Blows | SPT Blows/Foot N | SPT Blows/Foot Curve (10 30 50) |
|---|---|---|---|---|---|---|---|---|
| 47.5 | | Very dense beige SAND with Gravel [SP] | | 18" | | 15-20-38-50/5" | 58 | |
| 50 | | -Boring terminated at 50 feet- | | | | | | |
| 52.5 | | | | | | | | |
| 55 | | | | | | | | |
| 57.5 | | | | | | | | |
| 60 | | | | | | | | |
| 62.5 | | | | | | | | |

**SAMPLER TYPE**
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

**SAMPLE CONDITIONS**
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

| | GROUND WATER | CAVE IN DEPTH |
|---|---|---|
| AT COMPLETION | 13 ft. | ____ ft. |
| AFTER 24 HRS. | ____ ft. | ____ ft. |
| AFTER ___ HRS. | ____ ft. | ____ ft. |

**BORING METHOD**
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING



STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

# HILLIS - CARNES
# ENGINEERING ASSOCIATES, INC.

## TEST BORING LOGS

Project Name: **Keystone Trade Center Building 4** | Boring No.: B-18

Location: Falls Township, PA | Job #: L21049

**SAMPLER**

Datum: | Hammer Wt.: 140 lbs. | Hole Diameter: 3.25 inch I.D. | Foreman: Kevin (FM&W)

Surf. Elev.: Ft. | Hammer Drop: 30 in. | Rock Core Diameter: N/A | Inspector: M. Delluso

Date Started: 9/15/2021 | Pipe Size: 2 O.D. in. | Boring Method: Hollow Stem Auger | Date Completed: 9/16/2021

| Elevation/ Depth | SOIL SYMBOLS/ SAMPLE CONDITIONS | Description | Boring and Sampling Notes | Rec. | NM% | SPT Blows | SPT Blows/Foot N | SPT Blows/Foot Curve |
|---|---|---|---|---|---|---|---|---|
| 0 | | Dense brown to grey SAND with Gravel, trace slag and organics [SP] | Fill from 0 to 2 feet | | | 4-17-18-10 | 35 | |
| 2.5 | | Very stiff brown Sandy SILT with Gravel [ML] | Stratum II from 2 to 8 feet | | | 14-13-15-15 | 28 | |
| | | Very stiff brown Sandy SILT [ML] | | | | 13-12-9-7 | 21 | |
| 5 | | Medium stiff brown Sandy SILT [ML] | | | | 5-5-4-4 | 9 | |
| 7.5 | | Loose brown Silty SAND [SM] | Stratum I from 8 to 50 feet | | | 3-3-3-4 | 6 | |
| 10 | | | | | | | | |
| 12.5 | | Very loose brown to grey GRAVEL with Sand [GP] (wet) | | | | 3-2-2-1 | 4 | |
| 15 | | | | | | | | |

10 30 50

**SAMPLER TYPE**
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

**SAMPLE CONDITIONS**
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

| | GROUND WATER | CAVE IN DEPTH |
|---|---|---|
| AT COMPLETION | 13 ft. | ft. |
| AFTER 24 HRS. | ft. | ft. |
| AFTER ___ HRS. | ft. | ft. |

**BORING METHOD**
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING



STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

# HILLIS - CARNES
# ENGINEERING ASSOCIATES, INC.

## TEST BORING LOGS

Project Name: **Keystone Trade Center Building 4** Boring No.: B-18

Location: Falls Township, PA Job #: L21049

**SAMPLER**

Datum: _____ Hammer Wt.: 140 lbs. Hole Diameter: 3.25 inch I.D. Foreman: Kevin (FM&W)

Surf. Elev.: _____ Ft. Hammer Drop: 30 in. Rock Core Diameter: N/A Inspector: M. Delluso

Date Started: 9/15/2021 Pipe Size: 2 O.D. in. Boring Method: Hollow Stem Auger Date Completed: 9/16/2021

| Elevation/ Depth | SOIL SYMBOLS/ SAMPLE CONDITIONS | Description | Boring and Sampling Notes | Rec. | NM% | SPT Blows | SPT Blows/Foot N | SPT Blows/Foot Curve (10 30 50) |
|---|---|---|---|---|---|---|---|---|
| 17.5 | | | | | | | | |
| 20 | I | Medium dense brown to grey GRAVEL with Sand [GP] | | | | 9-9-9-8 | 18 | |
| 22.5 | | | | | | | | |
| 25 | I | Medium dense brown to grey GRAVEL with Sand [GP] | | | | 13-10-13-20 | 23 | |
| 27.5 | | | | | | | | |
| 30 | I | Medium dense brown to grey GRAVEL with Sand [GP] | | | | 11-12-13-16 | 25 | |

**SAMPLER TYPE**
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

**SAMPLE CONDITIONS**
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

| | GROUND WATER | CAVE IN DEPTH |
|---|---|---|
| AT COMPLETION | 13 ft. | _____ ft. |
| AFTER 24 HRS. | _____ ft. | _____ ft. |
| AFTER ___ HRS. | _____ ft. | _____ ft. |

**BORING METHOD**
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING



STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

# HILLIS - CARNES
# ENGINEERING ASSOCIATES, INC.

## TEST BORING LOGS

Project Name: **Keystone Trade Center Building 4** Boring No.: B-18

Location: Falls Township, PA Job #: L21049

**SAMPLER**

Datum: ____ Hammer Wt.: 140 lbs. Hole Diameter: 3.25 inch I.D. Foreman: Kevin (FM&W)

Surf. Elev.: ____ Ft. Hammer Drop: 30 in. Rock Core Diameter: N/A Inspector: M. Delluso

Date Started: 9/15/2021 Pipe Size: 2 O.D. in. Boring Method: Hollow Stem Auger Date Completed: 9/16/2021

| Elevation/ Depth | SOIL SYMBOLS/ SAMPLE CONDITIONS | Description | Boring and Sampling Notes | Rec. | NM% | SPT Blows | SPT Blows/Foot N | SPT Blows/Foot Curve (10 30 50) |
|---|---|---|---|---|---|---|---|---|
| 32.5 | | | | | | | | |
| 35 | | Medium dense brown to grey GRAVEL with Sand [GP] | | | | 3-4-19-9 | 23 | |
| 37.5 | | | | | | | | |
| 40 | | Very dense beige SAND with Gravel [SP] | | | | 32-50/3" | 50/3" | |
| 42.5 | | | | | | | | |
| 45 | | Very dense orange SAND with Gravel [SP] | | | | 18-36-50/5" | 86/11" | 86/11" |

**SAMPLER TYPE**
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

**SAMPLE CONDITIONS**
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

| | GROUND WATER | CAVE IN DEPTH |
|---|---|---|
| AT COMPLETION | 13 ft. | ____ ft. |
| AFTER 24 HRS. | ____ ft. | ____ ft. |
| AFTER ___ HRS. | ____ ft. | ____ ft. |

**BORING METHOD**
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING



STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

# HILLIS - CARNES
# ENGINEERING ASSOCIATES, INC.

## TEST BORING LOGS

Project Name: **Keystone Trade Center Building 4** Boring No.: B-18

Location: Falls Township, PA Job #: L21049

**SAMPLER**

Datum: _____ Hammer Wt.: 140 lbs. Hole Diameter: 3.25 inch I.D. Foreman: Kevin (FM&W)

Surf. Elev.: _____ Ft. Hammer Drop: 30 in. Rock Core Diameter: N/A Inspector: M. Delluso

Date Started: 9/15/2021 Pipe Size: 2 O.D. in. Boring Method: Hollow Stem Auger Date Completed: 9/16/2021

| Elevation/ Depth | SOIL SYMBOLS/ SAMPLE CONDITIONS | Description | Boring and Sampling Notes | Rec. | NM% | SPT Blows | SPT Blows/Foot N | SPT Blows/Foot Curve (10 30 50) |
|---|---|---|---|---|---|---|---|---|
| 47.5 | I | Very dense beige SAND with Gravel [SP] | | | | 22-34-50/5" | 84/11" | 84/11" |
| 50 | | -Boring terminated at 50 feet- | | | | | | |
| 52.5 | | | | | | | | |
| 55 | | | | | | | | |
| 57.5 | | | | | | | | |
| 60 | | | | | | | | |
| 62.5 | | | | | | | | |

**SAMPLER TYPE**
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

**SAMPLE CONDITIONS**
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

| | GROUND WATER | CAVE IN DEPTH |
|---|---|---|
| AT COMPLETION | 13 ft. | _____ ft. |
| AFTER 24 HRS. | _____ ft. | _____ ft. |
| AFTER ___ HRS. | _____ ft. | _____ ft. |

**BORING METHOD**
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING



STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

# HILLIS - CARNES
# ENGINEERING ASSOCIATES, INC.

## TEST BORING LOGS

Project Name: **Keystone Trade Center Building 4** Boring No. B-19

Location: Falls Township, PA Job # L21049

**SAMPLER**

Datum ____ Hammer Wt. 140 lbs. Hole Diameter 3.25 inch I.D. Foreman Rick (Allied)

Surf. Elev. ____ Ft. Hammer Drop 30 in. Rock Core Diameter N/A Inspector M. Delluso

Date Started 9/15/2021 Pipe Size 2 O.D. in. Boring Method Hollow Stem Auger Date Completed 9/15/2021

| Elevation/ Depth | SOIL SYMBOLS/ SAMPLE CONDITIONS | Description | Boring and Sampling Notes | Rec. | NM% | SPT Blows | SPT Blows/Foot N | SPT Blows/Foot Curve |
|---|---|---|---|---|---|---|---|---|
| 0 | | Very stiff greyish brown Sandy SILT with organic debris [ML] | Stratum II from 0 to 4 feet | 15" | | 11-17-12-14 | 29 | |
| 2.5 | | Very stiff brown Sandy SILT [ML] | | 18" | | 15-16-14-14 | 30 | |
| 5 | | Medium dense brown Silty SAND [SM] (wet) | Stratum I from 4 to 48 feet<br>Perched water at 4 feet | 20" | | 6-7-5-4 | 12 | |
| 7.5 | | Loose brown Silty SAND [SM] (wet) | | 6" | | 3-3-3-3 | 6 | |
| 10 | | Loose brown Silty SAND [SM] (wet) | | 4" | | 5-3-5-5 | 8 | |
| 12.5 | | Loose brown Silty SAND [SM] (wet) | | 10" | | 5-4-3-2 | 7 | |
| 15 | | | | | | | | |

SPT Blows/Foot Curve: 10 30 50

**SAMPLER TYPE**
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

**SAMPLE CONDITIONS**
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

| | GROUND WATER | CAVE IN DEPTH |
|---|---|---|
| AT COMPLETION | 13 ft. | ____ ft. |
| AFTER 24 HRS. | ____ ft. | ____ ft. |
| AFTER ___ HRS. | ____ ft. | ____ ft. |

**BORING METHOD**
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING



STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

# HILLIS - CARNES
# ENGINEERING ASSOCIATES, INC.

## TEST BORING LOGS

Project Name: **Keystone Trade Center Building 4** Boring No.: B-19

Location: Falls Township, PA Job #: L21049

**SAMPLER**

Datum: ____ Hammer Wt.: 140 lbs. Hole Diameter: 3.25 inch I.D. Foreman: Rick (Allied)

Surf. Elev.: ____ Ft. Hammer Drop: 30 in. Rock Core Diameter: N/A Inspector: M. Delluso

Date Started: 9/15/2021 Pipe Size: 2 O.D. in. Boring Method: Hollow Stem Auger Date Completed: 9/15/2021

| Elevation/ Depth | SOIL SYMBOLS/ SAMPLE CONDITIONS | Description | Boring and Sampling Notes | Rec. | NM% | SPT Blows | SPT Blows/Foot N | SPT Blows/Foot Curve (10 30 50) |
|---|---|---|---|---|---|---|---|---|
| 17.5 | | Medium dense brown SAND with Gravel [SP] | | 10" | | 2-5-7-12 | 12 | |
| 20 | | | | | | | | |
| 22.5 | | Medium dense brown SAND with Silt [SP-SM] | | 6" | | 3-8-6-15 | 14 | |
| 25 | | | | | | | | |
| 27.5 | | Medium dense brown to grey GRAVEL with Sand [GP] | | 4" | | 18-12-10-9 | 22 | |
| 30 | | | | | | | | |

**SAMPLER TYPE**
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

**SAMPLE CONDITIONS**
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

| | GROUND WATER | CAVE IN DEPTH |
|---|---|---|
| AT COMPLETION | 13 ft. | ____ ft. |
| AFTER 24 HRS. | ____ ft. | ____ ft. |
| AFTER ___ HRS. | ____ ft. | ____ ft. |

**BORING METHOD**
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

-1039-

STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

# HILLIS - CARNES
# ENGINEERING ASSOCIATES, INC.

## TEST BORING LOGS

Project Name: **Keystone Trade Center Building 4** Boring No.: B-19

Location: Falls Township, PA Job #: L21049

**SAMPLER**

Datum: ____ Hammer Wt.: 140 lbs. Hole Diameter: 3.25 inch I.D. Foreman: Rick (Allied)

Surf. Elev.: ____ Ft. Hammer Drop: 30 in. Rock Core Diameter: N/A Inspector: M. Delluso

Date Started: 9/15/2021 Pipe Size: 2 O.D. in. Boring Method: Hollow Stem Auger Date Completed: 9/15/2021

| Elevation/ Depth | SOIL SYMBOLS/ SAMPLE CONDITIONS | Description | Boring and Sampling Notes | Rec. | NM% | SPT Blows | SPT Blows/Foot N | SPT Blows/Foot Curve |
|---|---|---|---|---|---|---|---|---|
| 32.5 | | Dense brown SAND with Silt and Gravel [SP-SM] | | 6" | | 10-16-15-6 | 31 | |
| 35 | | | | | | | | |
| 37.5 | | Medium dense brown SAND with Silt and Gravel [SP-SM] | | 6" | | 20-16-7-5 | 23 | |
| 40 | | | | | | | | |
| 42.5 | | Loose brown SAND with Silt [SP-SM] | | 8" | | 6-4-2-3 | 6 | |
| 45 | | | | | | | | |

SPT Blows/Foot Curve: 10 30 50

**SAMPLER TYPE**
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

**SAMPLE CONDITIONS**
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

| | GROUND WATER | CAVE IN DEPTH |
|---|---|---|
| AT COMPLETION | 13 ft. | ____ ft. |
| AFTER 24 HRS. | ____ ft. | ____ ft. |
| AFTER ___ HRS. | ____ ft. | ____ ft. |

**BORING METHOD**
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING



STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

# HILLIS - CARNES
# ENGINEERING ASSOCIATES, INC.

## TEST BORING LOGS

Project Name: **Keystone Trade Center Building 4** Boring No.: B-19

Location: Falls Township, PA Job #: L21049

**SAMPLER**

Datum: ____ Hammer Wt.: 140 lbs. Hole Diameter: 3.25 inch I.D. Foreman: Rick (Allied)

Surf. Elev.: ____ Ft. Hammer Drop: 30 in. Rock Core Diameter: N/A Inspector: M. Delluso

Date Started: 9/15/2021 Pipe Size: 2 O.D. in. Boring Method: Hollow Stem Auger Date Completed: 9/15/2021

| Elevation/ Depth | SOIL SYMBOLS/ SAMPLE CONDITIONS | Description | Boring and Sampling Notes | Rec. | NM% | SPT Blows | SPT Blows/Foot N | SPT Blows/Foot Curve (10 30 50) |
|---|---|---|---|---|---|---|---|---|
| 47.5 | | Very stiff orange to light grey CLAY [CL] | Stratum III from 48 to 50 feet | 8" | | 7-4-12-10 | 16 | |
| 50 | I | -Boring terminated at 50 feet- | | | | | | |
| 52.5 | | | | | | | | |
| 55 | | | | | | | | |
| 57.5 | | | | | | | | |
| 60 | | | | | | | | |
| 62.5 | | | | | | | | |

**SAMPLER TYPE**
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

**SAMPLE CONDITIONS**
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

| | GROUND WATER | CAVE IN DEPTH |
|---|---|---|
| AT COMPLETION | 13 ft. | ____ ft. |
| AFTER 24 HRS. | ____ ft. | ____ ft. |
| AFTER ___ HRS. | ____ ft. | ____ ft. |

**BORING METHOD**
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING



STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

# HILLIS - CARNES
# ENGINEERING ASSOCIATES, INC.

## TEST BORING LOGS

Project Name: **Keystone Trade Center Building 4** Boring No. B-20

Location: Falls Township, PA Job # L21049

**SAMPLER**

Datum ____ Hammer Wt. 140 lbs. Hole Diameter 3.25 inch I.D. Foreman Rick (Allied)

Surf. Elev. ____ Ft. Hammer Drop 30 in. Rock Core Diameter N/A Inspector M. Delluso

Date Started 9/24/2021 Pipe Size 2 O.D. in. Boring Method Hollow Stem Auger Date Completed 9/24/2021

| Elevation/ Depth | SOIL SYMBOLS/ SAMPLE CONDITIONS | Description | Boring and Sampling Notes | Rec. | NM% | SPT Blows | SPT Blows/Foot N | SPT Blows/Foot Curve |
|---|---|---|---|---|---|---|---|---|
| 0 | | 4" organic soil | | | | | | 10 30 50 |
| | | Dense brown Silty SAND with Gravel and slag [SM] | Fill from 0.3 to 3 feet | 16" | | 12-19-20-17 | 39 | |
| 2.5 | | Dense brown Silty SAND with Gravel and slag to brown Silty SAND [SM] | | 24" | | 16-17-17-22 | 34 | |
| | | Medium dense brown Silty SAND [SM] | Stratum I from 3 to 6 feet | 12" | | 3-12-16-12 | 28 | |
| 5 | | Very stiff greyish brown Sandy SILT with organic debris [ML] | Stratum II from 6 to 8 feet | 24" | | 10-13-13-11 | 26 | |
| 7.5 | | Loose greyish brown Silty SAND [SM] | Stratum I from 8 to 13 feet | 20" | | 9-6-4-3 | 10 | |
| 10 | | | | | | | | |
| 12.5 | | Stiff greyish brown Sandy SILT [ML] (wet) | Stratum II from 13 to 18 feet | 6" | | 4-6-9-9 | 15 | |
| 15 | | | | | | | | |

**SAMPLER TYPE**
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

**SAMPLE CONDITIONS**
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

| | GROUND WATER | CAVE IN DEPTH |
|---|---|---|
| AT COMPLETION | 13 ft. | ____ ft. |
| AFTER 24 HRS. | ____ ft. | ____ ft. |
| AFTER ___ HRS. | ____ ft. | ____ ft. |

**BORING METHOD**
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING



STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

# HILLIS - CARNES
# ENGINEERING ASSOCIATES, INC.

## TEST BORING LOGS

Project Name: **Keystone Trade Center Building 4** Boring No.: B-20

Location: Falls Township, PA Job #: L21049

**SAMPLER**

Datum: ____ Hammer Wt.: 140 lbs. Hole Diameter: 3.25 inch I.D. Foreman: Rick (Allied)

Surf. Elev.: ____ Ft. Hammer Drop: 30 in. Rock Core Diameter: N/A Inspector: M. Delluso

Date Started: 9/24/2021 Pipe Size: 2 O.D. in. Boring Method: Hollow Stem Auger Date Completed: 9/24/2021

| Elevation/ Depth | SOIL SYMBOLS/ SAMPLE CONDITIONS | Description | Boring and Sampling Notes | Rec. | NM% | SPT Blows | SPT Blows/Foot N | SPT Blows/Foot Curve (10 30 50) |
|---|---|---|---|---|---|---|---|---|
| 17.5 | | Loose brown SAND with Silt and Gravel [SP-SM] | Stratum I from 18 to 50 feet | 6" | | 10-3-3-2 | 6 | |
| 20 | I | | | | | | | |
| 22.5 | I | Very dense brown to grey GRAVEL with Sand [GP] | | 4" | | 50/4" | 50/4" | |
| 25 | | | | | | | | |
| 27.5 | | Very dense brown to grey Silty GRAVEL with Sand [GM] | | 16" | | 38-46-38-15 | 84 | 84 |
| 30 | I | | | | | | | |

**SAMPLER TYPE**
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

**SAMPLE CONDITIONS**
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

| | GROUND WATER | CAVE IN DEPTH |
|---|---|---|
| AT COMPLETION | 13 ft. | ____ ft. |
| AFTER 24 HRS. | ____ ft. | ____ ft. |
| AFTER ___ HRS. | ____ ft. | ____ ft. |

**BORING METHOD**
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING



STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

# HILLIS - CARNES
# ENGINEERING ASSOCIATES, INC.

## TEST BORING LOGS

Project Name: **Keystone Trade Center Building 4** Boring No.: B-20

Location: Falls Township, PA Job #: L21049

**SAMPLER**

Datum: ____ Hammer Wt.: 140 lbs. Hole Diameter: 3.25 inch I.D. Foreman: Rick (Allied)

Surf. Elev.: ____ Ft. Hammer Drop: 30 in. Rock Core Diameter: N/A Inspector: M. Delluso

Date Started: 9/24/2021 Pipe Size: 2 O.D. in. Boring Method: Hollow Stem Auger Date Completed: 9/24/2021

| Elevation/ Depth | SOIL SYMBOLS/ SAMPLE CONDITIONS | Description | Boring and Sampling Notes | Rec. | NM% | SPT Blows | SPT Blows/Foot N | SPT Blows/Foot Curve (10 30 50) |
|---|---|---|---|---|---|---|---|---|
| 32.5 | | Medium dense brown to beige SAND with Silt and Gravel [SP-SM] | | 24" | | 15-17-13-22 | 30 | |
| 35 | | | | | | | | |
| 37.5 | | Dense beige SAND [SP] | | 24" | | 12-16-18-19 | 34 | |
| 40 | | | | | | | | |
| 42.5 | | Dense brown SAND with Silt [SP-SM] | | 18" | | 4-12-22-30 | 34 | |
| 45 | | | | | | | | |

**SAMPLER TYPE**
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

**SAMPLE CONDITIONS**
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

| | GROUND WATER | CAVE IN DEPTH |
|---|---|---|
| AT COMPLETION | 13 ft. | ____ ft. |
| AFTER 24 HRS. | ____ ft. | ____ ft. |
| AFTER ___ HRS. | ____ ft. | ____ ft. |

**BORING METHOD**
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING



STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

# HILLIS - CARNES
# ENGINEERING ASSOCIATES, INC.

## TEST BORING LOGS

Project Name: **Keystone Trade Center Building 4** Boring No.: B-20

Location: Falls Township, PA Job #: L21049

**SAMPLER**

Datum: ____ Hammer Wt.: 140 lbs. Hole Diameter: 3.25 inch I.D. Foreman: Rick (Allied)

Surf. Elev.: ____ Ft. Hammer Drop: 30 in. Rock Core Diameter: N/A Inspector: M. Delluso

Date Started: 9/24/2021 Pipe Size: 2 O.D. in. Boring Method: Hollow Stem Auger Date Completed: 9/24/2021

| Elevation/ Depth | SOIL SYMBOLS/ SAMPLE CONDITIONS | Description | Boring and Sampling Notes | Rec. | NM% | SPT Blows | SPT Blows/Foot N | SPT Blows/Foot Curve (10 30 50) |
|---|---|---|---|---|---|---|---|---|
| 47.5 | I | Dense brown to orange SAND [SP] | | 20" | | 16-11-30-25 | 41 | |
| 50 | | -Boring terminated at 50 feet- | | | | | | |
| 52.5 | | | | | | | | |
| 55 | | | | | | | | |
| 57.5 | | | | | | | | |
| 60 | | | | | | | | |
| 62.5 | | | | | | | | |

**SAMPLER TYPE**
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

**SAMPLE CONDITIONS**
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

| | GROUND WATER | CAVE IN DEPTH |
|---|---|---|
| AT COMPLETION | 13 ft. | ____ ft. |
| AFTER 24 HRS. | ____ ft. | ____ ft. |
| AFTER ___ HRS. | ____ ft. | ____ ft. |

**BORING METHOD**
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING



STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

# HILLIS - CARNES
# ENGINEERING ASSOCIATES, INC.

## TEST BORING LOGS

Project Name: **Keystone Trade Center Building 4** Boring No. B-21

Location: Falls Township, PA Job # L21049

**SAMPLER**

Datum ____ Hammer Wt. 140 lbs. Hole Diameter 3.25 inch I.D. Foreman Rick (Allied)

Surf. Elev. ____ Ft. Hammer Drop 30 in. Rock Core Diameter N/A Inspector M. Delluso

Date Started 9/27/2021 Pipe Size 2 O.D. in. Boring Method Hollow Stem Auger Date Completed 9/27/2021

| Elevation/ Depth | SOIL SYMBOLS/ SAMPLE CONDITIONS | Description | Boring and Sampling Notes | Rec. | NM% | SPT Blows | SPT Blows/Foot N | SPT Blows/Foot Curve |
|---|---|---|---|---|---|---|---|---|
| 0 | | 6" organic soil | | 20" | | 12-13-15-15 | 28 | |
| | | Medium dense brown Silty SAND [SM] | Stratum I from 0.5 to 2 feet | | | | | |
| 2.5 | | Very stiff brown Sandy SILT [ML] | Stratum II from 2 to 8 feet | 24" | | 10-7-12-14 | 19 | |
| | | Stiff brown Sandy SILT [ML] | | 22" | | 9-7-8-9 | 15 | |
| 5 | | | | | | | | |
| | | Medium stiff brownish grey Sandy SILT, trace organics [ML] | | 24" | | 7-5-4-3 | 9 | |
| 7.5 | | | | | | | | |
| | | Very loose brown Silty SAND [SM] | Stratum I from 8 to 13 feet | 22" | | 3-2-2-2 | 4 | |
| 10 | | | | | | | | |
| 12.5 | | | | | | | | |
| | | Medium stiff greyish brown Sandy SILT with Gravel [ML] (wet) | Stratum II from 13 to 18 feet | 20" | | 6-4-4-4 | 8 | |
| 15 | | | | | | | | |

Curve: 10 30 50

**SAMPLER TYPE**
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

**SAMPLE CONDITIONS**
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

| | GROUND WATER | CAVE IN DEPTH |
|---|---|---|
| AT COMPLETION | 14 ft. | ____ ft. |
| AFTER 24 HRS. | ____ ft. | ____ ft. |
| AFTER ___ HRS. | ____ ft. | ____ ft. |

**BORING METHOD**
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING



STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

# HILLIS - CARNES
# ENGINEERING ASSOCIATES, INC.

## TEST BORING LOGS

Project Name: **Keystone Trade Center Building 4** | Boring No.: B-21

Location: Falls Township, PA | Job #: L21049

**SAMPLER**

Datum: | Hammer Wt.: 140 lbs. | Hole Diameter: 3.25 inch I.D. | Foreman: Rick (Allied)

Surf. Elev.: Ft. | Hammer Drop: 30 in. | Rock Core Diameter: N/A | Inspector: M. Delluso

Date Started: 9/27/2021 | Pipe Size: 2 O.D. in. | Boring Method: Hollow Stem Auger | Date Completed: 9/27/2021

| Elevation/ Depth | SOIL SYMBOLS/ SAMPLE CONDITIONS | Description | Boring and Sampling Notes | Rec. | NM% | SPT Blows | SPT Blows/Foot N | SPT Blows/Foot Curve (10 30 50) |
|---|---|---|---|---|---|---|---|---|
| 17.5 | | Medium dense brown to grey GRAVEL with Sand [GP] | Stratum I from 18 to 50 feet | 6" | | 4-6-6-5 | 12 | |
| 20 | | | | | | | | |
| 22.5 | | Loose brown SAND with Gravel [SP] | | 20" | | 5-4-4-8 | 8 | |
| 25 | | | | | | | | |
| 27.5 | | Loose brown SAND with Silt [SP] | | 24" | | 3-3-3-4 | 6 | |
| 30 | | | | | | | | |

**SAMPLER TYPE**
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

**SAMPLE CONDITIONS**
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

| | GROUND WATER | CAVE IN DEPTH |
|---|---|---|
| AT COMPLETION | 14 ft. | ft. |
| AFTER 24 HRS. | ft. | ft. |
| AFTER ___ HRS. | ft. | ft. |

**BORING METHOD**
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING



STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

# HILLIS - CARNES
# ENGINEERING ASSOCIATES, INC.

## TEST BORING LOGS

Project Name: **Keystone Trade Center Building 4** | Boring No.: B-21

Location: Falls Township, PA | Job #: L21049

**SAMPLER**

Datum: | Hammer Wt.: 140 lbs. | Hole Diameter: 3.25 inch I.D. | Foreman: Rick (Allied)

Surf. Elev.: Ft. | Hammer Drop: 30 in. | Rock Core Diameter: N/A | Inspector: M. Delluso

Date Started: 9/27/2021 | Pipe Size: 2 O.D. in. | Boring Method: Hollow Stem Auger | Date Completed: 9/27/2021

| Elevation/ Depth | SOIL SYMBOLS/ SAMPLE CONDITIONS | Description | Boring and Sampling Notes | Rec. | NM% | SPT Blows | SPT Blows/Foot N | SPT Blows/Foot Curve (10 30 50) |
|---|---|---|---|---|---|---|---|---|
| 32.5 | I | Very dense white SAND [SP] | | 20" | | 15-27-37-43 | 64 | 64 |
| 35 | | | | | | | | |
| 37.5 | I | Dense white Clayey SAND [SC] | | 24" | | 16-21-23-14 | 44 | |
| 40 | | | | | | | | |
| 42.5 | I | Very dense white to beige SAND [SP] | | 16" | | 4-14-40-50/2" | 54 | |
| 45 | | | | | | | | |

**SAMPLER TYPE**
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

**SAMPLE CONDITIONS**
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

| | GROUND WATER | CAVE IN DEPTH |
|---|---|---|
| AT COMPLETION | 14 ft. | ft. |
| AFTER 24 HRS. | ft. | ft. |
| AFTER ___ HRS. | ft. | ft. |

**BORING METHOD**
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING



STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

# HILLIS - CARNES
# ENGINEERING ASSOCIATES, INC.

## TEST BORING LOGS

Project Name: **Keystone Trade Center Building 4** Boring No.: B-21

Location: Falls Township, PA Job #: L21049

**SAMPLER**

Datum: _____ Hammer Wt.: 140 lbs. Hole Diameter: 3.25 inch I.D. Foreman: Rick (Allied)

Surf. Elev.: _____ Ft. Hammer Drop: 30 in. Rock Core Diameter: N/A Inspector: M. Delluso

Date Started: 9/27/2021 Pipe Size: 2 O.D. in. Boring Method: Hollow Stem Auger Date Completed: 9/27/2021

| Elevation/ Depth | SOIL SYMBOLS/ SAMPLE CONDITIONS | Description | Boring and Sampling Notes | Rec. | NM% | SPT Blows | SPT Blows/Foot N | SPT Blows/Foot Curve (10 30 50) |
|---|---|---|---|---|---|---|---|---|
| 47.5 | | Medium dense beige SAND [SP] | | 14" | | 4-4-22-50/3" | 26 | |
| 50 | | -Boring terminated at 50 feet- | | | | | | |
| 52.5 | | | | | | | | |
| 55 | | | | | | | | |
| 57.5 | | | | | | | | |
| 60 | | | | | | | | |
| 62.5 | | | | | | | | |

**SAMPLER TYPE**
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

**SAMPLE CONDITIONS**
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

| | GROUND WATER | CAVE IN DEPTH |
|---|---|---|
| AT COMPLETION | 14 ft. | _____ ft. |
| AFTER 24 HRS. | _____ ft. | _____ ft. |
| AFTER ___ HRS. | _____ ft. | _____ ft. |

**BORING METHOD**
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING



STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

# HILLIS - CARNES
# ENGINEERING ASSOCIATES, INC.

## TEST BORING LOGS

Project Name: **Keystone Trade Center Building 4** Boring No. P-1

Location: Falls Township, PA Job # L21049

**SAMPLER**

Datum ____ Hammer Wt. 140 lbs. Hole Diameter 3.25 inch I.D. Foreman Jay (Allied)

Surf. Elev. ____ Ft. Hammer Drop 30 in. Rock Core Diameter N/A Inspector M. Delluso

Date Started 9/17/2021 Pipe Size 2 O.D. in. Boring Method Hollow Stem Auger Date Completed 9/17/2021

| Elevation/ Depth | SOIL SYMBOLS/ SAMPLE CONDITIONS | Description | Boring and Sampling Notes | Rec. | NM% | SPT Blows | SPT Blows/Foot N | SPT Blows/Foot Curve |
|---|---|---|---|---|---|---|---|---|
| 0 | | Loose brown SAND with slag and organics [SP] | Fill from 0 to 4 feet | 12" | | 4-3-7-12 | 10 | |
| 2.5 | | Medium dense brown SAND with Gravel and slag [SP] | | 18" | | 9-11-14-7 | 25 | |
| | | Medium dense brown SAND [SP] | Stratum I from 4 to 20 feet | 16" | | 4-4-7-6 | 11 | |
| 5 | | Medium dense brown SAND with Silt [SP-SM] (moist) | | 8" | | 5-6-7-7 | 13 | |
| 7.5 | | Medium dense brown SAND with Silt [SP-SM] (moist) | | 16" | | 8-9-9-7 | 18 | |
| 10 | | | | | | | | |
| 12.5 | | Medium dense brown Clayey SAND, trace organics [SC] (wet) | | 4" | | 8-11-7-9 | 18 | |
| 15 | | | | | | | | |

Curve: 10 30 50

**SAMPLER TYPE**
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

**SAMPLE CONDITIONS**
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

| | GROUND WATER | CAVE IN DEPTH |
|---|---|---|
| AT COMPLETION | 10 ft. | ____ ft. |
| AFTER 24 HRS. | ____ ft. | ____ ft. |
| AFTER ___ HRS. | ____ ft. | ____ ft. |

**BORING METHOD**
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING



STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

# HILLIS - CARNES
# ENGINEERING ASSOCIATES, INC.

## TEST BORING LOGS

Project Name: **Keystone Trade Center Building 4** Boring No. P-1

Location: Falls Township, PA Job # L21049

**SAMPLER**

Datum ____ Hammer Wt. 140 lbs. Hole Diameter 3.25 inch I.D. Foreman Jay (Allied)

Surf. Elev. ____ Ft. Hammer Drop 30 in. Rock Core Diameter N/A Inspector M. Delluso

Date Started 9/17/2021 Pipe Size 2 O.D. in. Boring Method Hollow Stem Auger Date Completed 9/17/2021

| Elevation/ Depth | SOIL SYMBOLS/ SAMPLE CONDITIONS | Description | Boring and Sampling Notes | Rec. | NM% | SPT Blows | SPT Blows/Foot N | SPT Blows/Foot Curve (10 30 50) |
|---|---|---|---|---|---|---|---|---|
| 17.5 | | Medium dense brown Clayey SAND with Gravel [SC] | | 16" | | 12-8-4-4 | 12 | |
| 20 | | -Boring terminated at 20 feet- | | | | | | |
| 22.5 | | | | | | | | |
| 25 | | | | | | | | |
| 27.5 | | | | | | | | |
| 30 | | | | | | | | |

**SAMPLER TYPE**
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

**SAMPLE CONDITIONS**
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

| | GROUND WATER | CAVE IN DEPTH |
|---|---|---|
| AT COMPLETION | 10 ft. | ____ ft. |
| AFTER 24 HRS. | ____ ft. | ____ ft. |
| AFTER ___ HRS. | ____ ft. | ____ ft. |

**BORING METHOD**
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING



STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

# HILLIS - CARNES
# ENGINEERING ASSOCIATES, INC.

## TEST BORING LOGS

Project Name: **Keystone Trade Center Building 4** Boring No. P-2

Location: Falls Township, PA Job # L21049

**SAMPLER**

Datum ____ Hammer Wt. 140 lbs. Hole Diameter 3.25 inch I.D. Foreman Rick (Allied)

Surf. Elev. ____ Ft. Hammer Drop 30 in. Rock Core Diameter N/A Inspector M. Delluso

Date Started 9/17/2021 Pipe Size 2 O.D. in. Boring Method Hollow Stem Auger Date Completed 9/17/2021

| Elevation/ Depth | SOIL SYMBOLS/ SAMPLE CONDITIONS | Description | Boring and Sampling Notes | Rec. | NM% | SPT Blows | SPT Blows/Foot N | SPT Blows/Foot Curve |
|---|---|---|---|---|---|---|---|---|
| 0 | | 4" organic soil | | | | | | 10 30 50 |
| | | Medium dense brown Silty SAND [SM] | Stratum I from 0.3 to 2 feet | 18" | | 4-8-12-14 | 20 | |
| 2.5 | | Very stiff brown to grey Sandy SILT [ML] | Stratum II from 2 to 4 feet | 20" | | 15-13-11-8 | 24 | |
| | | Loose brown Silty SAND [SM] | Stratum I from 4 to 20 feet | 10" | | 6-4-2-3 | 6 | |
| 5 | | Medium dense brown Silty SAND with Gravel [SM] | | 12" | | 2-5-7-11 | 12 | |
| 7.5 | | Medium dense brown to grey GRAVEL with Silt and Sand [GP-GM] | | 6" | | 6-7-5-6 | 12 | |
| 10 | | | | | | | | |
| 12.5 | | Medium dense brown to grey GRAVEL with Sand [GP] | | 6" | | 6-5-6-6 | 11 | |
| 15 | | | | | | | | |

**SAMPLER TYPE**
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

**SAMPLE CONDITIONS**
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

| | GROUND WATER | CAVE IN DEPTH |
|---|---|---|
| AT COMPLETION | 10 ft. | ____ ft. |
| AFTER 24 HRS. | ____ ft. | ____ ft. |
| AFTER ___ HRS. | ____ ft. | ____ ft. |

**BORING METHOD**
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING



STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

# HILLIS - CARNES
# ENGINEERING ASSOCIATES, INC.

## TEST BORING LOGS

Project Name: **Keystone Trade Center Building 4** Boring No.: P-2

Location: Falls Township, PA Job #: L21049

**SAMPLER**

Datum: _____ Hammer Wt.: 140 lbs. Hole Diameter: 3.25 inch I.D. Foreman: Rick (Allied)

Surf. Elev.: _____ Ft. Hammer Drop: 30 in. Rock Core Diameter: N/A Inspector: M. Delluso

Date Started: 9/17/2021 Pipe Size: 2 O.D. in. Boring Method: Hollow Stem Auger Date Completed: 9/17/2021

| Elevation/ Depth | SOIL SYMBOLS/ SAMPLE CONDITIONS | Description | Boring and Sampling Notes | Rec. | NM% | SPT Blows | SPT Blows/Foot N | SPT Blows/Foot Curve (10 30 50) |
|---|---|---|---|---|---|---|---|---|
| 17.5 | | Medium dense brown SAND with Gravel [SP] | | 12" | | 9-7-6-4 | 13 | |
| 20 | | -Boring terminated at 20 feet- | | | | | | |
| 22.5 | | | | | | | | |
| 25 | | | | | | | | |
| 27.5 | | | | | | | | |
| 30 | | | | | | | | |

**SAMPLER TYPE**
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

**SAMPLE CONDITIONS**
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

| | GROUND WATER | CAVE IN DEPTH |
|---|---|---|
| AT COMPLETION | 10 ft. | _____ ft. |
| AFTER 24 HRS. | _____ ft. | _____ ft. |
| AFTER ___ HRS. | _____ ft. | _____ ft. |

**BORING METHOD**
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING



STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

# HILLIS - CARNES
# ENGINEERING ASSOCIATES, INC.

## TEST BORING LOGS

Project Name **Keystone Trade Center Building 4** Boring No. P-3

Location Falls Township, PA Job # L21049

**SAMPLER**

Datum _____ Hammer Wt. _____ lbs. Hole Diameter _____ Foreman _____

Surf. Elev. _____ Ft. Hammer Drop _____ in. Rock Core Diameter _____ Inspector M. Delluso

Date Started _____ Pipe Size _____ in. Boring Method _____ Date Completed _____

| Elevation/ Depth | SOIL SYMBOLS/ SAMPLE CONDITIONS | Description | Boring and Sampling Notes | Rec. | NM% | SPT Blows | SPT Blows/Foot N | SPT Blows/Foot Curve 10 30 50 |
|---|---|---|---|---|---|---|---|---|
| 0 | | Inaccessible boring | | | | | | |
| 2.5 | | | | | | | | |
| 5 | | | | | | | | |
| 7.5 | | | | | | | | |
| 10 | | | | | | | | |
| 12.5 | | | | | | | | |
| 15 | | | | | | | | |

**SAMPLER TYPE**
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

**SAMPLE CONDITIONS**
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

| | GROUND WATER | CAVE IN DEPTH |
|---|---|---|
| AT COMPLETION | _____ ft. | _____ ft. |
| AFTER 24 HRS. | _____ ft. | _____ ft. |
| AFTER ___ HRS. | _____ ft. | _____ ft. |

**BORING METHOD**
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING



STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

# HILLIS - CARNES
# ENGINEERING ASSOCIATES, INC.

## TEST BORING LOGS

Project Name: **Keystone Trade Center Building 4** Boring No. P-4

Location: Falls Township, PA Job # L21049

**SAMPLER**

Datum ____ Hammer Wt. 140 lbs. Hole Diameter 3.25 inch I.D. Foreman Jay (Allied)

Surf. Elev. ____ Ft. Hammer Drop 30 in. Rock Core Diameter N/A Inspector M. Delluso

Date Started 9/15/2021 Pipe Size 2 O.D. in. Boring Method Hollow Stem Auger Date Completed 9/15/2021

| Elevation/ Depth | SOIL SYMBOLS/ SAMPLE CONDITIONS | Description | Boring and Sampling Notes | Rec. | NM% | SPT Blows | SPT Blows/Foot N | SPT Blows/Foot Curve |
|---|---|---|---|---|---|---|---|---|
| 0 | | 8" organic soil | | 17" | | 9-4-6-7 | 10 | |
| | | Loose brown Silty SAND, trace organics [SM] | Stratum I from 0.7 to 6 feet | | | | | |
| 2.5 | | Dense brown Silty SAND with Gravel [SM] | | 10" | | 15-17-19-27 | 36 | |
| 5 | | Medium dense brown Silty SAND [SM] (moist) | | 20" | | 16-8-6-7 | 14 | |
| | | Very stiff brown Sandy Silty CLAY [CL-ML] | Stratum II from 6 to 13 feet | 24" | | 17-20-23-31 | 43 | |
| 7.5 | | Very stiff greyish brown Sandy Silty CLAY [CL-ML] (moist) | | 18" | | 15-17-11-8 | 28 | |
| 10 | | | | | | | | |
| 12.5 | | Loose brown SAND with Gravel [SP] (wet) | Stratum I from 13 to 18 feet | 12" | | 4-6-4-5 | 10 | |
| 15 | | | | | | | | |

SPT Blows/Foot Curve: 10 30 50

**SAMPLER TYPE**
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

**SAMPLE CONDITIONS**
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

| | GROUND WATER | CAVE IN DEPTH |
|---|---|---|
| AT COMPLETION | 12 ft. | ____ ft. |
| AFTER 24 HRS. | ____ ft. | ____ ft. |
| AFTER ____ HRS. | ____ ft. | ____ ft. |

**BORING METHOD**
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

-1055-

STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

# HILLIS - CARNES
# ENGINEERING ASSOCIATES, INC.

## TEST BORING LOGS

Project Name: **Keystone Trade Center Building 4** Boring No. P-4

Location: Falls Township, PA Job # L21049

**SAMPLER**

Datum ____ Hammer Wt. 140 lbs. Hole Diameter 3.25 inch I.D. Foreman Jay (Allied)

Surf. Elev. ____ Ft. Hammer Drop 30 in. Rock Core Diameter N/A Inspector M. Delluso

Date Started 9/15/2021 Pipe Size 2 O.D. in. Boring Method Hollow Stem Auger Date Completed 9/15/2021

| Elevation/ Depth | SOIL SYMBOLS/ SAMPLE CONDITIONS | Description | Boring and Sampling Notes | Rec. | NM% | SPT Blows | SPT Blows/Foot N | SPT Blows/Foot Curve |
|---|---|---|---|---|---|---|---|---|
| 17.5 | I | Stiff brown Sandy Silty CLAY with Gravel [CL-ML] | Stratum II from 18 to 20 feet | 8" | | 5-5-7-12 | 12 | |
| 20 | | -Boring terminated at 20 feet- | | | | | | |
| 22.5 | | | | | | | | |
| 25 | | | | | | | | |
| 27.5 | | | | | | | | |
| 30 | | | | | | | | |

10 30 50

**SAMPLER TYPE**
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

**SAMPLE CONDITIONS**
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

| | GROUND WATER | CAVE IN DEPTH |
|---|---|---|
| AT COMPLETION | 12 ft. | ____ ft. |
| AFTER 24 HRS. | ____ ft. | ____ ft. |
| AFTER ___ HRS. | ____ ft. | ____ ft. |

**BORING METHOD**
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING



STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

# HILLIS - CARNES
# ENGINEERING ASSOCIATES, INC.

## TEST BORING LOGS

Project Name: **Keystone Trade Center Building 4** Boring No. P-5

Location: Falls Township, PA Job # L21049

**SAMPLER**

Datum ____ Hammer Wt. 140 lbs. Hole Diameter 3.25 inch I.D. Foreman Jay (Allied)

Surf. Elev. ____ Ft. Hammer Drop 30 in. Rock Core Diameter N/A Inspector M. Delluso

Date Started 9/15/2021 Pipe Size 2 O.D. in. Boring Method Hollow Stem Auger Date Completed 9/15/2021

| Elevation/ Depth | SOIL SYMBOLS/ SAMPLE CONDITIONS | Description | Boring and Sampling Notes | Rec. | NM% | SPT Blows | SPT Blows/Foot N | SPT Blows/Foot Curve |
|---|---|---|---|---|---|---|---|---|
| 0 | | Dense dark grey SAND with slag [SP] | Fill from 0 to 4 feet | 12" | | 7-12-31-30 | 43 | |
| 2.5 | | Medium dense dark grey to brown SAND with slag and Gravel, trace organics [SP] | | 14" | | 5-13-9-11 | 22 | |
| 5 | | Very stiff brown Sandy SILT [ML] | Stratum II from 4 to 13 feet | 17" | | 11-10-6-7 | 16 | |
| 7.5 | | Very stiff brown Sandy SILT [ML] | | 20" | | 6-6-10-7 | 16 | |
| 10 | | Very stiff brown Sandy SILT [ML] | | 18" | | 9-11-12-14 | 23 | |
| 12.5 | | Medium dense brown Silty SAND with Gravel [SM] (wet) | Stratum I from 13 to 20 feet | 10" | | 4-6-7-2 | 13 | |
| 15 | | | | | | | | |

10 30 50

**SAMPLER TYPE**
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

**SAMPLE CONDITIONS**
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

| | GROUND WATER | CAVE IN DEPTH |
|---|---|---|
| AT COMPLETION | 12 ft. | ____ ft. |
| AFTER 24 HRS. | ____ ft. | ____ ft. |
| AFTER ___ HRS. | ____ ft. | ____ ft. |

**BORING METHOD**
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING



STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

# HILLIS - CARNES
# ENGINEERING ASSOCIATES, INC.

## TEST BORING LOGS

Project Name: **Keystone Trade Center Building 4** Boring No. P-5

Location: Falls Township, PA Job # L21049

**SAMPLER**

Datum ____ Hammer Wt. 140 lbs. Hole Diameter 3.25 inch I.D. Foreman Jay (Allied)

Surf. Elev. ____ Ft. Hammer Drop 30 in. Rock Core Diameter N/A Inspector M. Delluso

Date Started 9/15/2021 Pipe Size 2 O.D. in. Boring Method Hollow Stem Auger Date Completed 9/15/2021

| Elevation/ Depth | SOIL SYMBOLS/ SAMPLE CONDITIONS | Description | Boring and Sampling Notes | Rec. | NM% | SPT Blows | SPT Blows/Foot N | SPT Blows/Foot Curve (10 30 50) |
|---|---|---|---|---|---|---|---|---|
| 17.5 | | Very loose brown to grey GRAVEL with Sand [GP] | | 10" | | 3-3-2-1 | 5 | |
| 20 | | -Boring terminated at 20 feet- | | | | | | |
| 22.5 | | | | | | | | |
| 25 | | | | | | | | |
| 27.5 | | | | | | | | |
| 30 | | | | | | | | |

**SAMPLER TYPE**
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

**SAMPLE CONDITIONS**
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

| | GROUND WATER | CAVE IN DEPTH |
|---|---|---|
| AT COMPLETION | 12 ft. | ____ ft. |
| AFTER 24 HRS. | ____ ft. | ____ ft. |
| AFTER ___ HRS. | ____ ft. | ____ ft. |

**BORING METHOD**
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING



STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

# HILLIS - CARNES
# ENGINEERING ASSOCIATES, INC.

## TEST BORING LOGS

Project Name: **Keystone Trade Center Building 4** Boring No. P-6

Location: Falls Township, PA Job # L21049

**SAMPLER**

Datum ____ Hammer Wt. 140 lbs. Hole Diameter 3.25 inch I.D. Foreman Rick (Allied)

Surf. Elev. ____ Ft. Hammer Drop 30 in. Rock Core Diameter N/A Inspector M. Delluso

Date Started 9/24/2021 Pipe Size 2 O.D. in. Boring Method Hollow Stem Auger Date Completed 9/24/2021

| Elevation/ Depth | SOIL SYMBOLS/ SAMPLE CONDITIONS | Description | Boring and Sampling Notes | Rec. | NM% | SPT Blows | SPT Blows/Foot N | SPT Blows/Foot Curve |
|---|---|---|---|---|---|---|---|---|
| 0 | | 5" organic soil | | | | | | 10 30 50 |
| | | Dense brown Silty SAND [SM] | Stratum I from 0.4 to 2 feet | 20" | | 12-20-16-23 | 36 | |
| 2.5 | | Very stiff brown Sandy SILT [ML] | Stratum II from 2 to 8 feet | 24" | | 24-32-23-20 | 55 | |
| | | Medium stiff brown Sandy SILT [ML] | | 18" | | 8-6-3-2 | 9 | |
| 5 | | Soft brown Sandy SILT [ML] | | 18" | | 3-2-3-3 | 5 | |
| 7.5 | | Loose brown Silty SAND [SM] | Stratum I from 8 to 13 feet | 24" | | 3-3-4-3 | 7 | |
| 10 | | | | | | | | |
| 12.5 | | Very stiff brown Sandy SILT with Gravel [ML] (moist) | Stratum II from 13 to 18 feet | 16" | | 11-11-8-11 | 19 | |
| 15 | | | | | | | | |

**SAMPLER TYPE**
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

**SAMPLE CONDITIONS**
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

| | GROUND WATER | CAVE IN DEPTH |
|---|---|---|
| AT COMPLETION | 15 ft. | ____ ft. |
| AFTER 24 HRS. | ____ ft. | ____ ft. |
| AFTER ___ HRS. | ____ ft. | ____ ft. |

**BORING METHOD**
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING



STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

# HILLIS - CARNES
# ENGINEERING ASSOCIATES, INC.

## TEST BORING LOGS

Project Name: **Keystone Trade Center Building 4** Boring No. P-6

Location: Falls Township, PA Job # L21049

**SAMPLER**

Datum ____ Hammer Wt. 140 lbs. Hole Diameter 3.25 inch I.D. Foreman Rick (Allied)

Surf. Elev. ____ Ft. Hammer Drop 30 in. Rock Core Diameter N/A Inspector M. Delluso

Date Started 9/24/2021 Pipe Size 2 O.D. in. Boring Method Hollow Stem Auger Date Completed 9/24/2021

| Elevation/ Depth | SOIL SYMBOLS/ SAMPLE CONDITIONS | Description | Boring and Sampling Notes | Rec. | NM% | SPT Blows | SPT Blows/Foot N | SPT Blows/Foot Curve (10 30 50) |
|---|---|---|---|---|---|---|---|---|
| 17.5 | I | Loose brown to grey GRAVEL with Sand (wet) [GP] | Stratum I from 18 to 20 feet | 12" | | 3-5-5-5 | 10 | |
| 20 | | -Boring terminated at 20 feet- | | | | | | |
| 22.5 | | | | | | | | |
| 25 | | | | | | | | |
| 27.5 | | | | | | | | |
| 30 | | | | | | | | |

**SAMPLER TYPE**
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

**SAMPLE CONDITIONS**
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

| | GROUND WATER | CAVE IN DEPTH |
|---|---|---|
| AT COMPLETION | 15 ft. | ____ ft. |
| AFTER 24 HRS. | ____ ft. | ____ ft. |
| AFTER ___ HRS. | ____ ft. | ____ ft. |

**BORING METHOD**
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING



STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

## APPENDIX B – DRAINAGE AREA PLANS: PHASE 2 DEVELOPMENT

**APPENDIX C – CANAL NO. 2: DRAINAGE ANALYSIS**

**Canal 2 Analysis**

The proposed Phase 2 development will fill in a portion of the existing Canal 2 that is located north of the existing twin 78" culverts under Middle Drive. The post construction stormwater runoff from the proposed Phase 2 redevelopment will be collected and ultimately conveyed to one (1) discharge point into Canal 2 at Discharge Point #1 (DP 001). The Canal 2 storage volume impacted in Canal No. 2 is being replaced by installing additional aboveground canal area and volume south of Ben Fairless Drive. Three (3) Canal No. 2 extension areas are proposed that will be connected with 60"-diameter equalizer pipes at 0.00% slope with invert elevation at 8.0'.

Using the *Hydraflow Hydrographs™* program and existing topographic information, the storage volume impacted in Canal No. 2 from elevation 8.0'-13.0' as a result of the development is calculated to be 424,509 CF, as seen in *Figure A* below. Half of this volume totals 212,255 CF, which is the volume the proposed canal extension areas will be required to provide. *Figure B* below shows the proposed volume provided in each of the canal extension areas as well as the total volume provided. The total canal extension volume equals 217,830 CF, which exceeds the required volume of 212,255 CF:

Figure A:

**Pond Data**

**Contours -**User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 8.00 ft

**Stage / Storage Table**

| Stage (ft) | Elevation (ft) | Contour area (sqft) | Incr. Storage (cuft) | Total storage (cuft) |
|---|---|---|---|---|
| 0.00 | 8.00 | 67,813 | 0 | 0 |
| 1.00 | 9.00 | 74,892 | 71,316 | 71,316 |
| 2.00 | 10.00 | 81,894 | 78,359 | 149,675 |
| 3.00 | 11.00 | 88,270 | 85,054 | 234,729 |
| 4.00 | 12.00 | 94,573 | 91,394 | 326,123 |
| 5.00 | 13.00 | 102,268 | 98,386 | 424,509 |
| 6.00 | 14.00 | 111,757 | 106,967 | 531,475 |
| 7.00 | 15.00 | 125,244 | 118,425 | 649,900 |
| 8.00 | 16.00 | 167,007 | 145,611 | 795,511 |
| 9.00 | 17.00 | 272,338 | 217,515 | 1,013,026 |
| 10.00 | 18.00 | 447,802 | 356,417 | 1,369,443 |

Figure B:

(Canal 2 Extension Area 1)

**Pond Data**

**Contours -**User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 8.00 ft

**Stage / Storage Table**

| Stage (ft) | Elevation (ft) | Contour area (sqft) | Incr. Storage (cuft) | Total storage (cuft) |
|---|---|---|---|---|
| 0.00 | 8.00 | 8,937 | 0 | 0 |
| 1.00 | 9.00 | 10,041 | 9,483 | 9,483 |
| 2.00 | 10.00 | 11,199 | 10,614 | 20,096 |
| 3.00 | 11.00 | 12,411 | 11,799 | 31,895 |
| 4.00 | 12.00 | 13,678 | 13,038 | 44,933 |
| 5.00 | 13.00 | 14,999 | 14,332 | 59,265 |

(Canal 2 Extension Area 2)

**Pond Data**

**Contours -**User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 8.00 ft

**Stage / Storage Table**

| Stage (ft) | Elevation (ft) | Contour area (sqft) | Incr. Storage (cuft) | Total storage (cuft) |
|---|---|---|---|---|
| 0.00 | 8.00 | 13,921 | 0 | 0 |
| 1.00 | 9.00 | 15,437 | 14,671 | 14,671 |
| 2.00 | 10.00 | 17,009 | 16,215 | 30,886 |
| 3.00 | 11.00 | 18,637 | 17,815 | 48,701 |
| 4.00 | 12.00 | 20,323 | 19,472 | 68,173 |
| 5.00 | 13.00 | 22,065 | 21,186 | 89,359 |

(Canal 2 Extension Area 3)

**Pond Data**

**Contours -**User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 8.00 ft

**Stage / Storage Table**

| Stage (ft) | Elevation (ft) | Contour area (sqft) | Incr. Storage (cuft) | Total storage (cuft) |
|---|---|---|---|---|
| 0.00 | 8.00 | 10,683 | 0 | 0 |
| 1.00 | 9.00 | 11,882 | 11,276 | 11,276 |
| 2.00 | 10.00 | 13,136 | 12,503 | 23,779 |
| 3.00 | 11.00 | 14,447 | 13,785 | 37,563 |
| 4.00 | 12.00 | 15,814 | 15,124 | 52,687 |
| 5.00 | 13.00 | 17,237 | 16,519 | 69,206 |

(Total Canal 2 Extension Volume)

59,266 CF + 89,359CF + 69,206 CF = **217,830 CF (Provided)**

212,255 CF (Required)