# JCREMC – 752 INTERATIONAL DRIVE

**Franklin, Johnson County, Indiana**

# Drainage Report

**June 5, 2024**

**Prepared By:**

**Andrew Barkocy, P.L.S.**

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# JCREMC – 752 INTERNATIONAL DRIVE

Commercial Site Plan

**Franklin, Johnson County, Indiana**

## "Final Drainage Study"

PROFESSIONAL CERTIFICATION

The following report and accompanying computations have been completed by me or under my direct supervision.

Andrew Barkocy
Professional Land Surveyor
Registration Number: 21800016
Barkocy Surveying, Inc.

# JCREMC – 752 INTERNATIONAL DRIVE

## Industrial Development

**Franklin, Johnson County, Indiana**

## DRAINAGE STUDY

JCREMC – 752 International Drive is an existing site with a building, parking, and asphalt trail that was previously used as a daycare site. The site is 1.31 acres and is zoned Industrial General. The existing stormwater flows from West to East into a roadside swale on the West side of International Drive. This roadside swale flows South into a storm sewer that flows South under International Drive into another swale. This swale flows South and then East eventually outleting into Canary Ditch.

The proposed site is to demolish and remove everything from the site except for the asphalt drive onto International Drive. It is being proposed to then install a 1.04 acre gravel storage area. This will put the site at 80% impervious surface coverage which is the maximum allowed. The proposed site is designed to sheet flow from the West to East as it does now into a new swale which will flow south into another existing swale that flows east into the roadside swale along International Drive. The proposed gravel for the site is an increase in impervious surface from the existing site and therefore an increase in runoff. To maximize the gravel area on the site, there is a proposed offsite dry detention area in a grass area south of the site. This parcel is also owned by JCREMC. The dry detention is designed to collect runoff from this area and reduce the runoff to the same roadside swale where the site flows to and therefore reducing the runoff downstream. JCREMC is planning on possibly having a storage building on this site as well, therefore included in the post development of the site is the inclusion of a 5400 square foot building. Included in the report are the pre and post runoff conditions for the site and the dry detention area.

Pre onsite + Pre Detention Area vs Post Onsite + Post Detention Area

2yr Storm

1.58cfs + 3.44cfs > 2.42cfs + 1.17cfs

5.02cfs > 3.59 cfs

10yr Storm

2.19cfs + 5.62cfs > 3.36cfs + 1.95cfs

7.81cfs > 5.31cfs

100yr Storm

3.08cfs + 7.78cfs > 4.72cfs + 2.83cfs

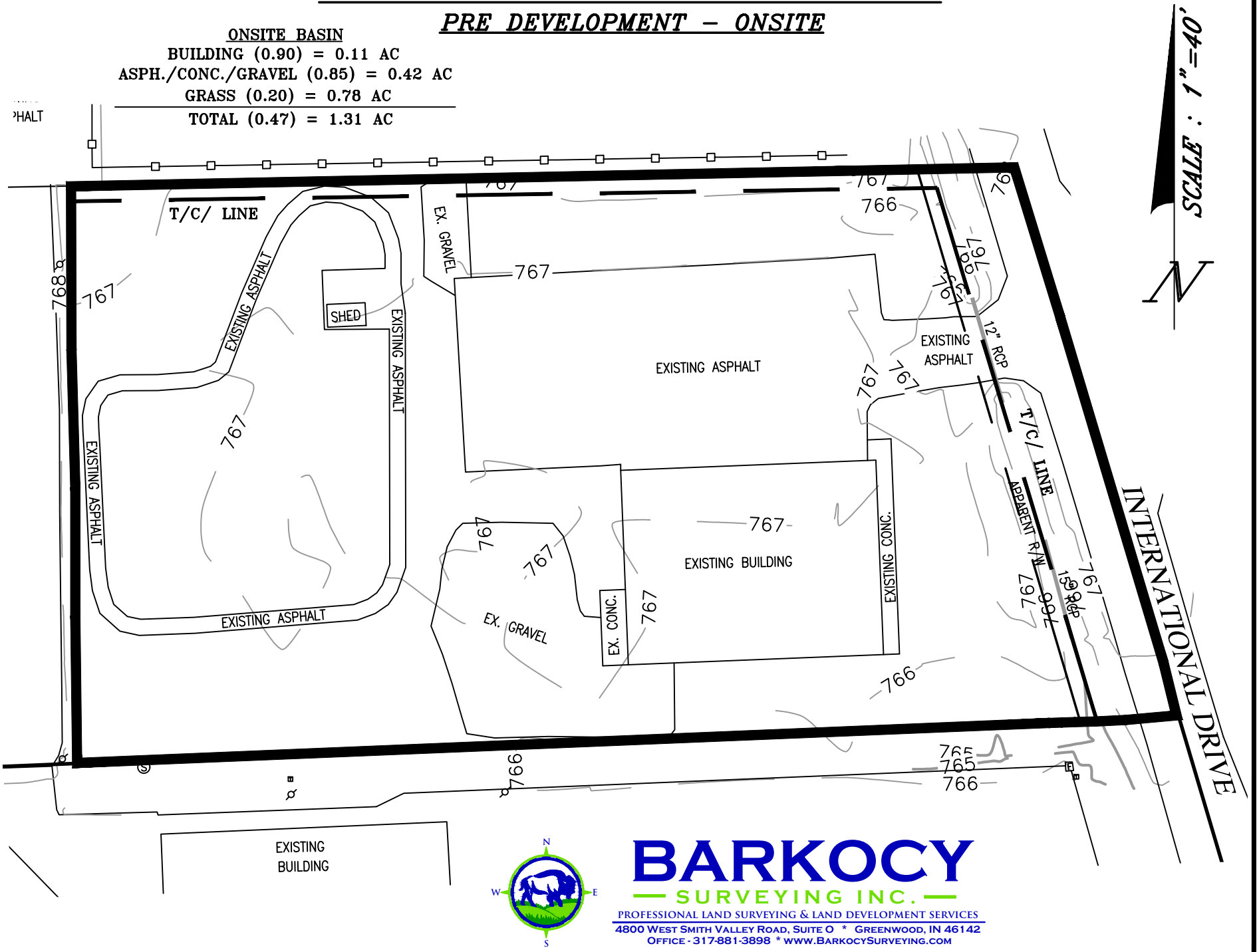
10.86cfs > 7.55 cfs

As the results show, the offsite dry detention area will greatly reduce the runoff to this watershed for each of the storms. It is just short of meeting the 10-year post versus the 2-year pre and it does meet the 100-year post being less than the 10-year pre. These results are acquired by having a 1% slope in the dry detention area and a 12” pipe outlet. Also included are spillway calculations.

# JCREMC – 752 INTERNATIONAL DRIVE

## PRE DEVELOPMENT – ONSITE

**ONSITE BASIN**
BUILDING (0.90) = 0.11 AC
ASPH./CONC./GRAVEL (0.85) = 0.42 AC
GRASS (0.20) = 0.78 AC
TOTAL (0.47) = 1.31 AC





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# TR55 Tc Worksheet



## Hyd. No. 1

PRE BASIIN

| Description | A | | B | | C | | Totals |
|---|---|---|---|---|---|---|---|
| **Sheet Flow** | | | | | | | |
| Manning's n-value | = 0.240 | | 0.011 | | 0.011 | | |
| Flow length (ft) | = 100.0 | | 0.0 | | 0.0 | | |
| Two-year 24-hr precip. (in) | = 2.90 | | 0.00 | | 0.00 | | |
| Land slope (%) | = 1.00 | | 0.00 | | 0.00 | | |
| **Travel Time (min)** | **= 19.78** | **+** | **0.00** | **+** | **0.00** | **=** | **19.78** |
| **Shallow Concentrated Flow** | | | | | | | |
| Flow length (ft) | = 345.00 | | 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)** | **= 5.04** | **+** | **0.00** | **+** | **0.00** | **=** | **5.04** |
| **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 ..... 24.82 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 | 1.577 | 1 | 25 | 2,365 | ------ | ------ | ------ | PRE BASIIN |
| 3 | Rational | 2.416 | 1 | 25 | 3,624 | ------ | ------ | ------ | POST BASIN |

# Hydrograph Report



## Hyd. No. 1

PRE BASIIN

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | Rational | Peak discharge | = | 1.577 cfs |
| Storm frequency | = | 2 yrs | Time to peak | = | 0.42 hrs |
| Time interval | = | 1 min | Hyd. volume | = | 2,365 cuft |
| Drainage area | = | 1.310 ac | Runoff coeff. | = | 0.47* |
| Intensity | = | 2.561 in/hr | Tc by TR55 | = | 25.00 min |
| IDF Curve | = | Greenwood-IN-15.IDF | Asc/Rec limb fact | = | 1/1 |

* Composite (Area/C) = [(0.110 x 0.90) + (0.420 x 0.85) + (0.780 x 0.20)] / 1.310

# 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 | 2.191 | 1 | 25 | 3,286 | ------ | ------ | ------ | PRE BASIIN |
| 3 | Rational | 3.356 | 1 | 25 | 5,034 | ------ | ------ | ------ | POST BASIN |

# Hydrograph Report

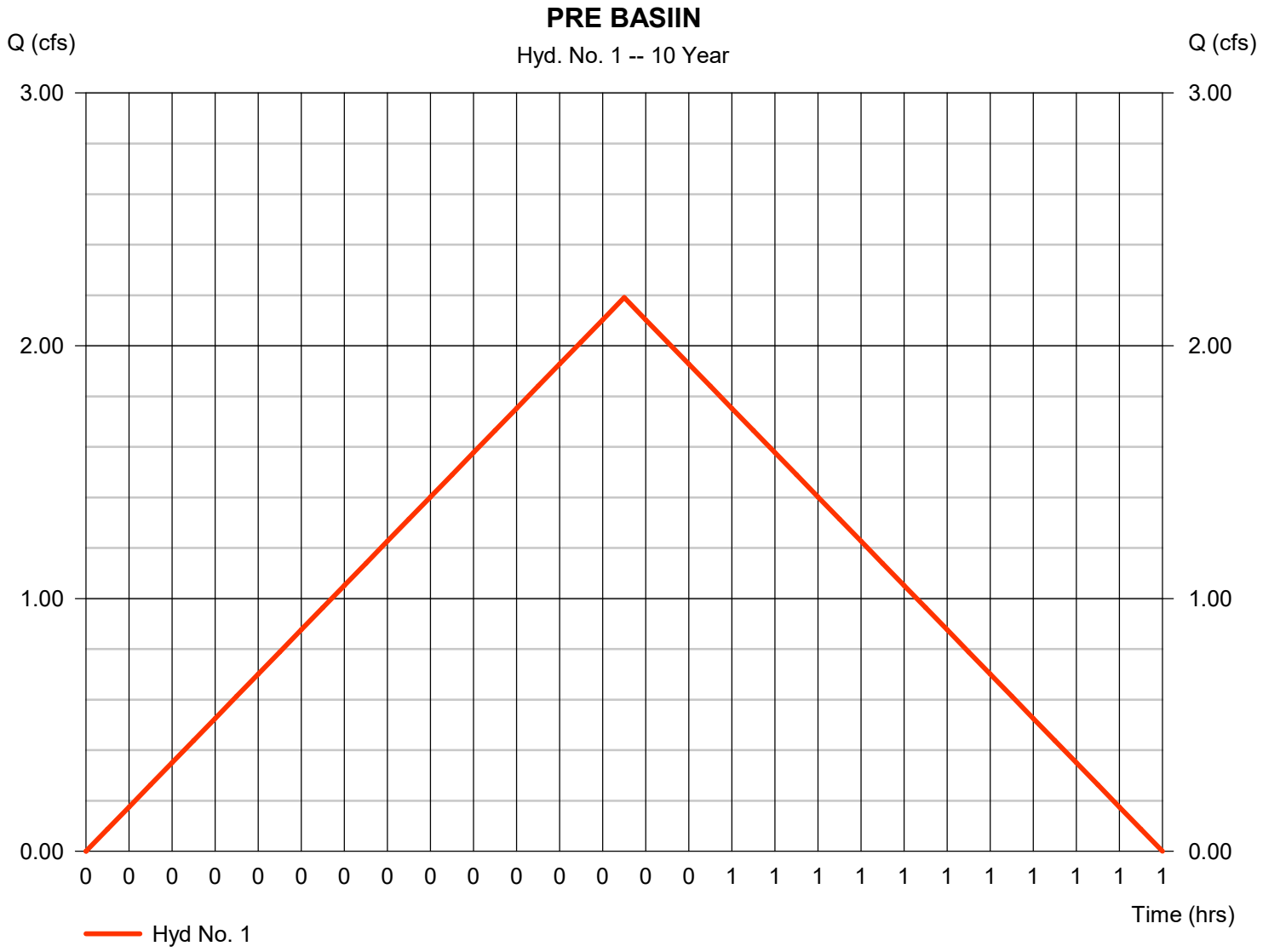


## Hyd. No. 1

PRE BASIIN

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | Rational | Peak discharge | = | 2.191 cfs |
| Storm frequency | = | 10 yrs | Time to peak | = | 0.42 hrs |
| Time interval | = | 1 min | Hyd. volume | = | 3,286 cuft |
| Drainage area | = | 1.310 ac | Runoff coeff. | = | 0.47* |
| Intensity | = | 3.558 in/hr | Tc by TR55 | = | 25.00 min |
| IDF Curve | = | Greenwood-IN-15.IDF | Asc/Rec limb fact | = | 1/1 |

* Composite (Area/C) = [(0.110 x 0.90) + (0.420 x 0.85) + (0.780 x 0.20)] / 1.310



# 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 | 3.081 | 1 | 25 | 4,622 | ------ | ------ | ------ | PRE BASIIN |
| 3 | Rational | 4.721 | 1 | 25 | 7,081 | ------ | ------ | ------ | POST BASIN |

# Hydrograph Report

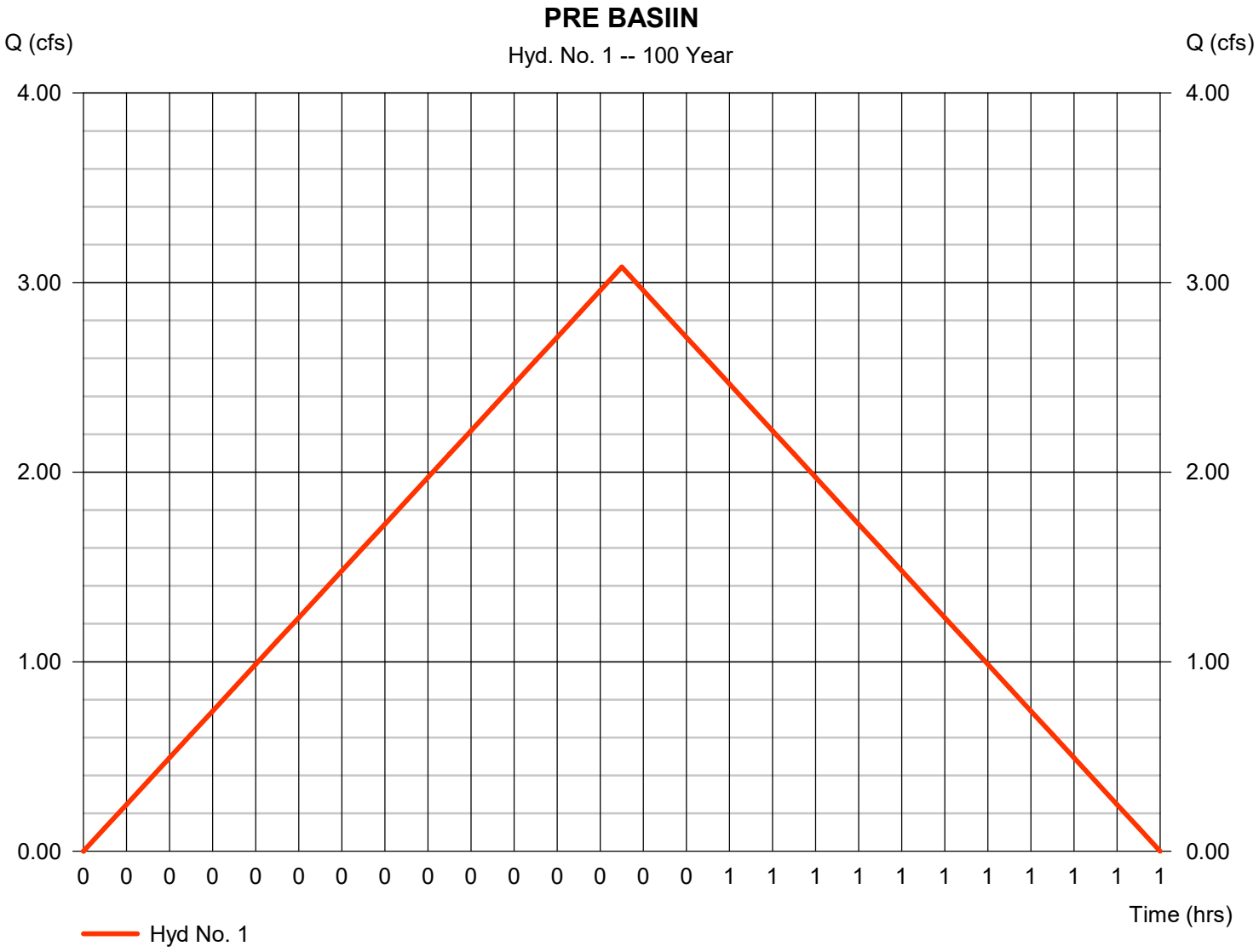


## Hyd. No. 1

PRE BASIIN

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | Rational | Peak discharge | = | 3.081 cfs |
| Storm frequency | = | 100 yrs | Time to peak | = | 0.42 hrs |
| Time interval | = | 1 min | Hyd. volume | = | 4,622 cuft |
| Drainage area | = | 1.310 ac | Runoff coeff. | = | 0.47* |
| Intensity | = | 5.005 in/hr | Tc by TR55 | = | 25.00 min |
| IDF Curve | = | Greenwood-IN-15.IDF | Asc/Rec limb fact | = | 1/1 |

* Composite (Area/C) = [(0.110 x 0.90) + (0.420 x 0.85) + (0.780 x 0.20)] / 1.310



# JCREMC – 752 INTERNATIONAL DRIVE

## POST DEVELOPMENT – ONSITE

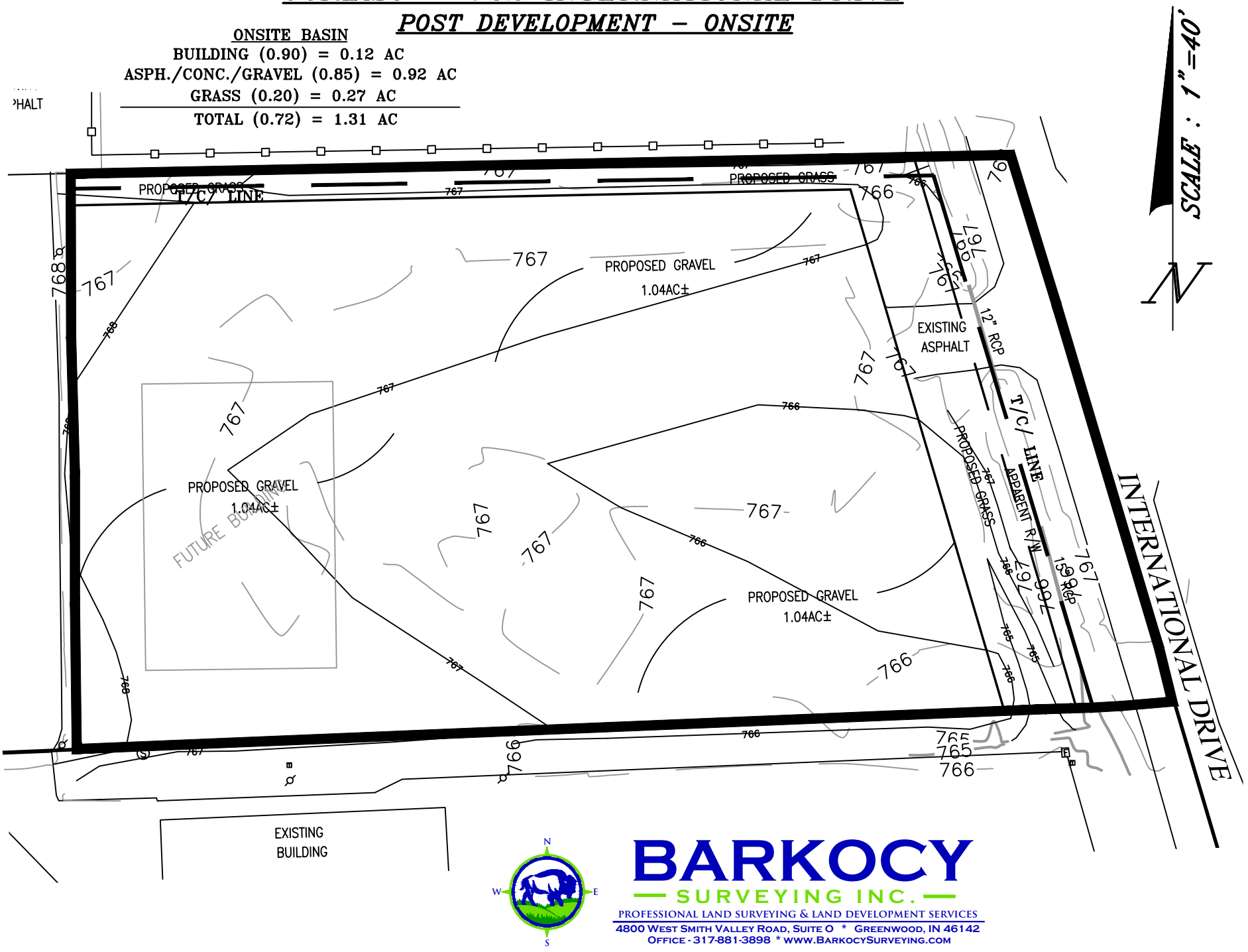
**ONSITE BASIN**

BUILDING (0.90) = 0.12 AC

ASPH./CONC./GRAVEL (0.85) = 0.92 AC

GRASS (0.20) = 0.27 AC

TOTAL (0.72) = 1.31 AC





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# TR55 Tc Worksheet



## Hyd. No. 3

POST BASIN

| Description | A | | B | | C | | Totals |
|---|---|---|---|---|---|---|---|
| **Sheet Flow** | | | | | | | |
| Manning's n-value | = 0.240 | | 0.011 | | 0.011 | | |
| Flow length (ft) | = 100.0 | | 0.0 | | 0.0 | | |
| Two-year 24-hr precip. (in) | = 2.90 | | 0.00 | | 0.00 | | |
| Land slope (%) | = 1.00 | | 0.00 | | 0.00 | | |
| **Travel Time (min)** | **= 19.78** | **+** | **0.00** | **+** | **0.00** | **=** | **19.78** |
| **Shallow Concentrated Flow** | | | | | | | |
| Flow length (ft) | = 345.00 | | 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)** | **= 5.04** | **+** | **0.00** | **+** | **0.00** | **=** | **5.04** |
| **Channel Flow** | | | | | | | |
| X sectional flow area (sqft) | = 0.00 | | 0.00 | | 0.00 | | |
| Wetted perimeter (ft) | = 0.00 | | 0.00 | | 0.00 | | |
| Channel slope (%) | = 0.00 | | 0.00 | | 0.00 | | |
| Manning's n-value | = 0.015 | | 0.015 | | 0.015 | | |
| Velocity (ft/s) | =0.00 | | | | | | |
| | | | 0.00 | | | | |
| | | | | | 0.00 | | |
| Flow length (ft) | ({0})0.0 | | 0.0 | | 0.0 | | |
| **Travel Time (min)** | **= 0.00** | **+** | **0.00** | **+** | **0.00** | **=** | **0.00** |

**Total Travel Time, Tc ..... 25.00 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 | 1.577 | 1 | 25 | 2,365 | ------ | ------ | ------ | PRE BASIIN |
| 3 | Rational | 2.416 | 1 | 25 | 3,624 | ------ | ------ | ------ | POST BASIN |

# Hydrograph Report

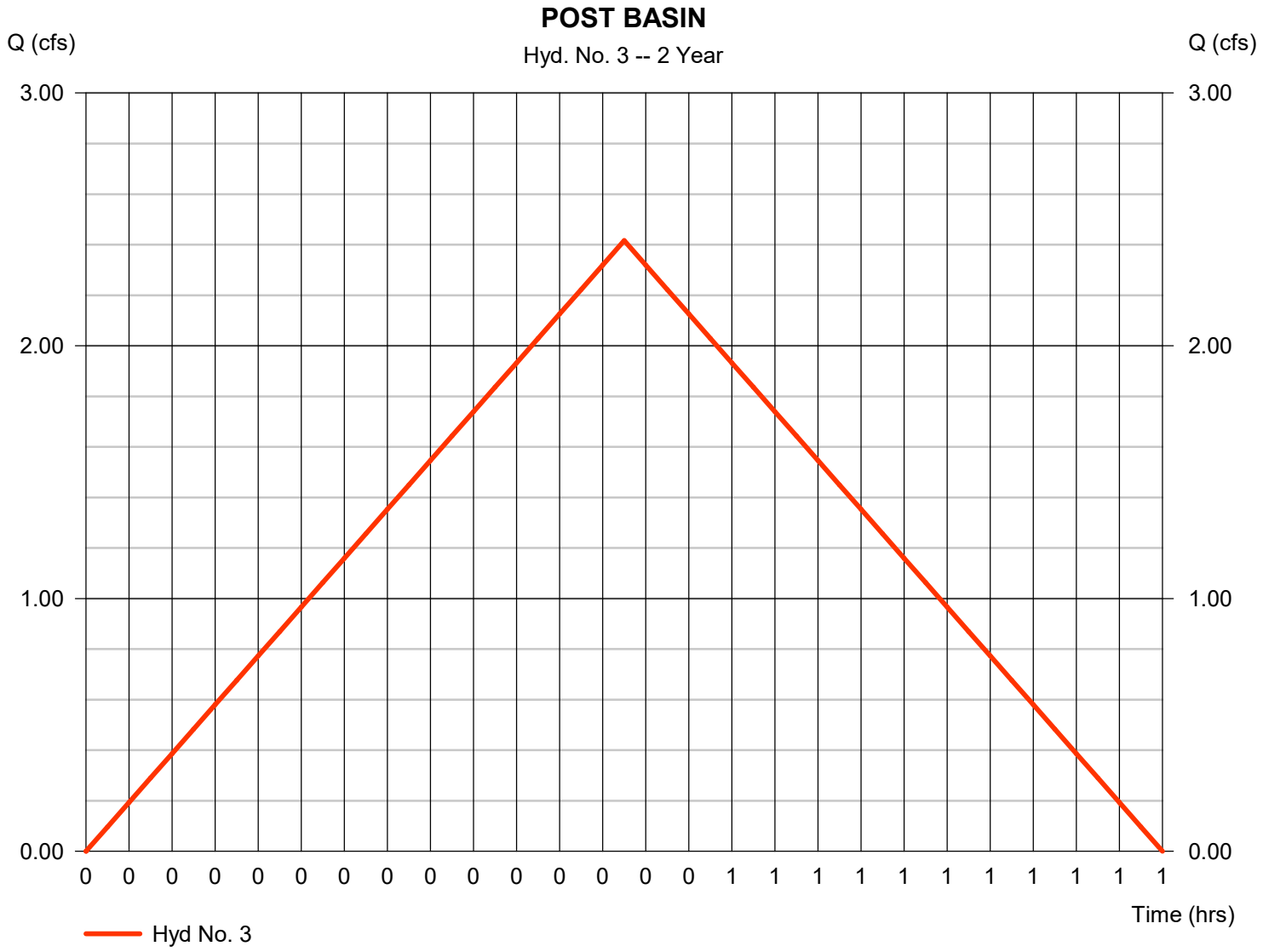


## Hyd. No. 3

POST BASIN

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | Rational | Peak discharge | = | 2.416 cfs |
| Storm frequency | = | 2 yrs | Time to peak | = | 0.42 hrs |
| Time interval | = | 1 min | Hyd. volume | = | 3,624 cuft |
| Drainage area | = | 1.310 ac | Runoff coeff. | = | 0.72* |
| Intensity | = | 2.561 in/hr | Tc by TR55 | = | 25.00 min |
| IDF Curve | = | Greenwood-IN-15.IDF | Asc/Rec limb fact | = | 1/1 |

* Composite (Area/C) = [(0.120 x 0.90) + (0.920 x 0.85) + (0.270 x 0.20)] / 1.310



# 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 | 2.191 | 1 | 25 | 3,286 | ------ | ------ | ------ | PRE BASIIN |
| 3 | Rational | 3.356 | 1 | 25 | 5,034 | ------ | ------ | ------ | POST BASIN |

# Hydrograph Report

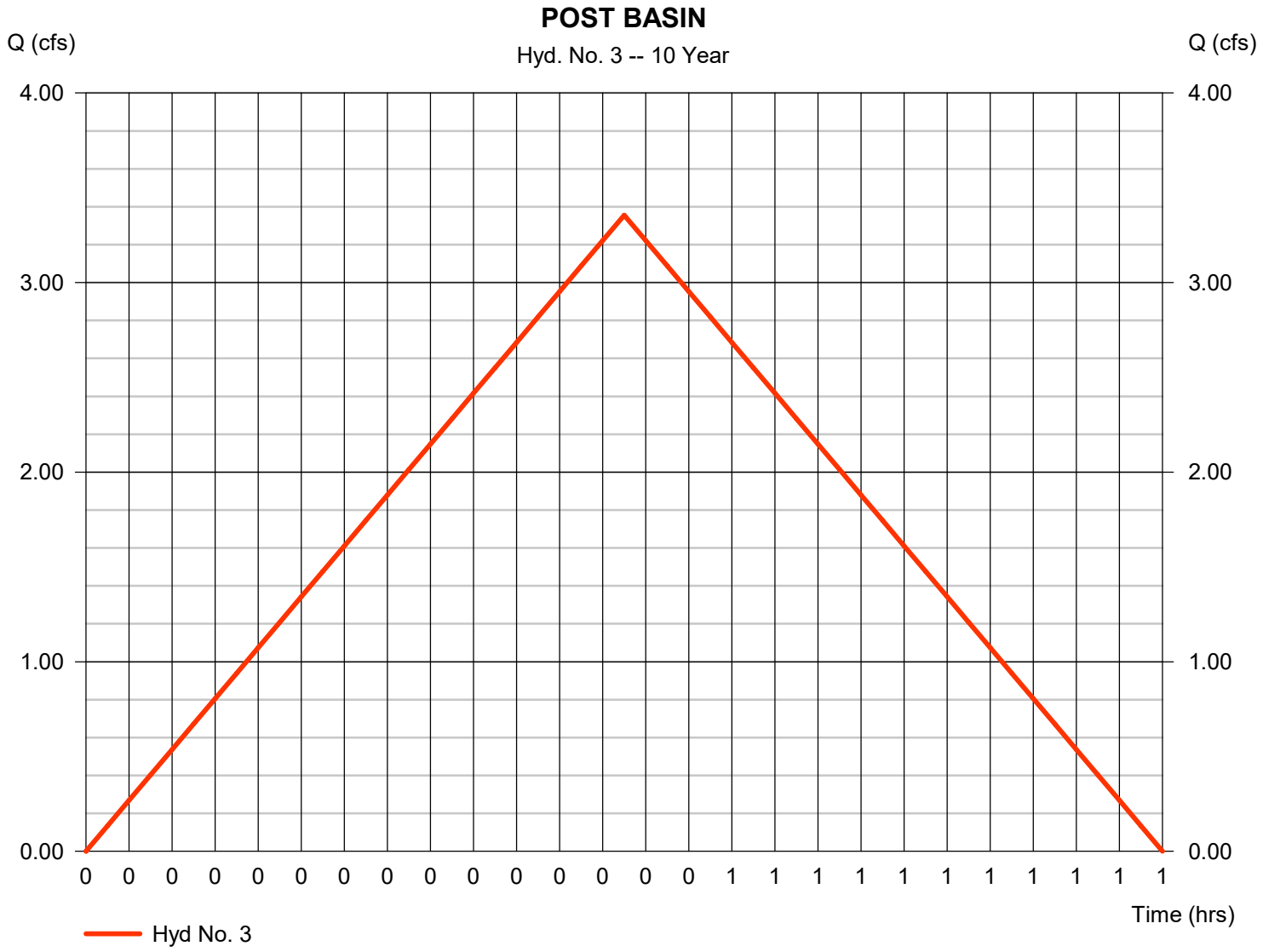


## Hyd. No. 3

POST BASIN

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | Rational | Peak discharge | = | 3.356 cfs |
| Storm frequency | = | 10 yrs | Time to peak | = | 0.42 hrs |
| Time interval | = | 1 min | Hyd. volume | = | 5,034 cuft |
| Drainage area | = | 1.310 ac | Runoff coeff. | = | 0.72* |
| Intensity | = | 3.558 in/hr | Tc by TR55 | = | 25.00 min |
| IDF Curve | = | Greenwood-IN-15.IDF | Asc/Rec limb fact | = | 1/1 |

* Composite (Area/C) = [(0.120 x 0.90) + (0.920 x 0.85) + (0.270 x 0.20)] / 1.310



# 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 | 3.081 | 1 | 25 | 4,622 | ------ | ------ | ------ | PRE BASIIN |
| 3 | Rational | 4.721 | 1 | 25 | 7,081 | ------ | ------ | ------ | POST BASIN |

# Hydrograph Report

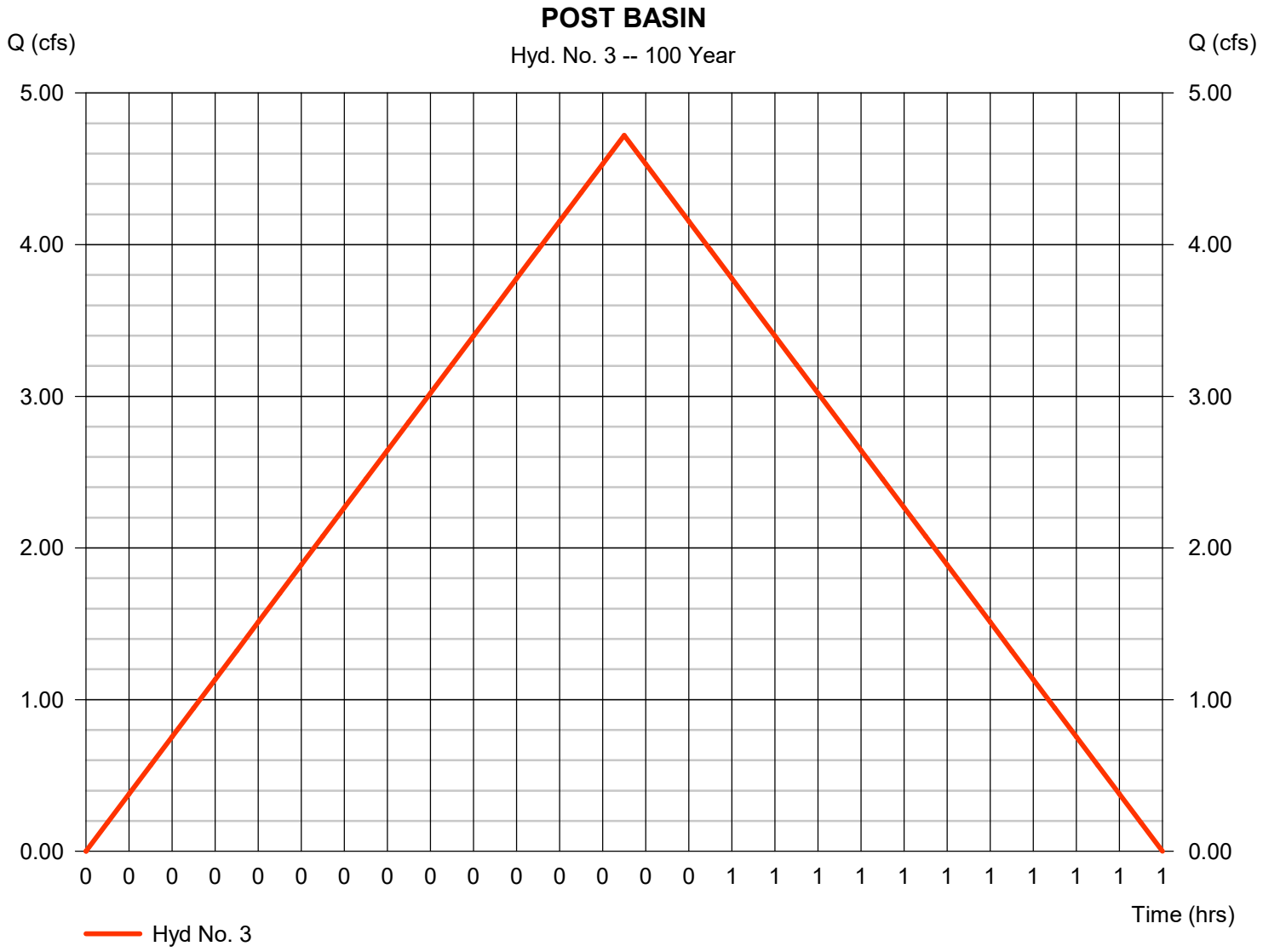


## Hyd. No. 3

POST BASIN

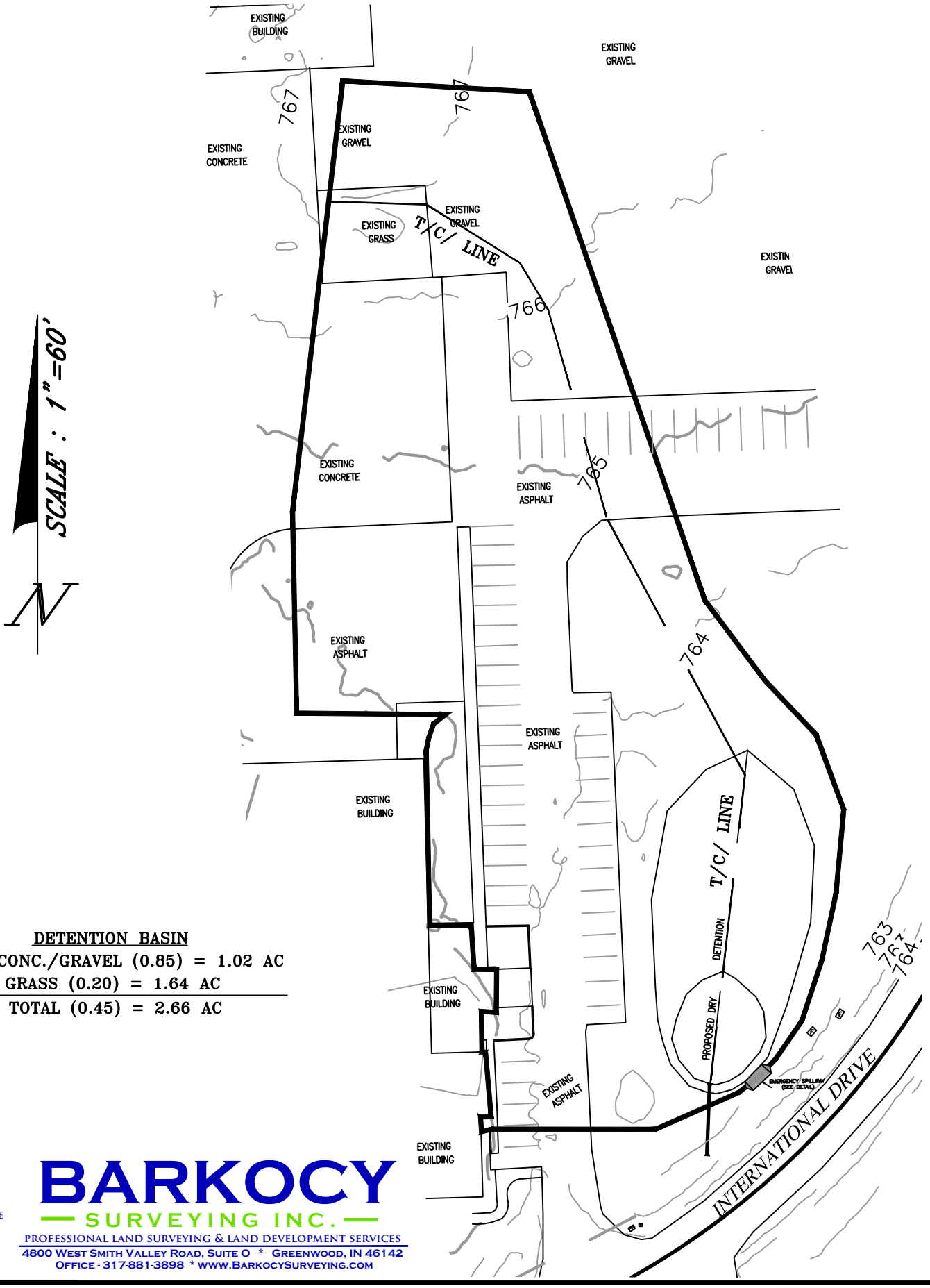
| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | Rational | Peak discharge | = | 4.721 cfs |
| Storm frequency | = | 100 yrs | Time to peak | = | 0.42 hrs |
| Time interval | = | 1 min | Hyd. volume | = | 7,081 cuft |
| Drainage area | = | 1.310 ac | Runoff coeff. | = | 0.72* |
| Intensity | = | 5.005 in/hr | Tc by TR55 | = | 25.00 min |
| IDF Curve | = | Greenwood-IN-15.IDF | Asc/Rec limb fact | = | 1/1 |

* Composite (Area/C) = [(0.120 x 0.90) + (0.920 x 0.85) + (0.270 x 0.20)] / 1.310



# JCREMC – 752 INTERNATIONAL DRIVE

## DETENTION BASIN




**DETENTION BASIN**

ASPH./CONC./GRAVEL (0.85) = 1.02 AC

GRASS (0.20) = 1.64 AC

TOTAL (0.45) = 2.66 AC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# TR55 Tc Worksheet



## Hyd. No. 1

PRE BASIN

| Description | A | | B | | C | | Totals |
|---|---|---|---|---|---|---|---|
| **Sheet Flow** | | | | | | | |
| Manning's n-value | = 0.240 | | 0.011 | | 0.011 | | |
| Flow length (ft) | = 45.0 | | 55.0 | | 0.0 | | |
| Two-year 24-hr precip. (in) | = 2.90 | | 2.90 | | 0.00 | | |
| Land slope (%) | = 0.90 | | 0.70 | | 0.00 | | |
| **Travel Time (min)** | **= 10.89** | **+** | **1.20** | **+** | **0.00** | **=** | **12.09** |
| **Shallow Concentrated Flow** | | | | | | | |
| Flow length (ft) | = 210.00 | | 115.00 | | 0.00 | | |
| Watercourse slope (%) | = 0.70 | | 1.40 | | 0.00 | | |
| Surface description | = Unpaved | | Paved | | Paved | | |
| Average velocity (ft/s) | =1.35 | | 2.41 | | 0.00 | | |
| **Travel Time (min)** | **= 2.59** | **+** | **0.80** | **+** | **0.00** | **=** | **3.39** |
| **Channel Flow** | | | | | | | |
| X sectional flow area (sqft) | = 0.00 | | 0.00 | | 0.00 | | |
| Wetted perimeter (ft) | = 0.00 | | 0.00 | | 0.00 | | |
| Channel slope (%) | = 0.00 | | 0.00 | | 0.00 | | |
| Manning's n-value | = 0.015 | | 0.015 | | 0.015 | | |
| Velocity (ft/s) | =0.00 | | | | | | |
| | | | 0.00 | | | | |
| | | | | | 0.00 | | |
| Flow length (ft) | ({0})0.0 | | 0.0 | | 0.0 | | |
| **Travel Time (min)** | **= 0.00** | **+** | **0.00** | **+** | **0.00** | **=** | **0.00** |

**Total Travel Time, Tc ..... 15.00 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 | 4.109 | 1 | 15 | 3,698 | ------ | ------ | ------ | PRE BASIN |
| 3 | Reservoir | 1.243 | 1 | 25 | 3,695 | 1 | 762.44 | 2,303 | ROUTED |

# Hydrograph Report



## Hyd. No. 1

PRE BASIN

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | Rational | Peak discharge | = | 4.109 cfs |
| Storm frequency | = | 2 yrs | Time to peak | = | 15 min |
| Time interval | = | 1 min | Hyd. volume | = | 3,698 cuft |
| Drainage area | = | 2.660 ac | Runoff coeff. | = | 0.45* |
| Intensity | = | 3.432 in/hr | Tc by TR55 | = | 15.00 min |
| IDF Curve | = | Greenwood-IN-15 W 1YR.IDF | Asc/Rec limb fact | = | 1/1 |

* Composite (Area/C) = [(1.020 x 0.85) + (1.640 x 0.20)] / 2.660

# 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 | 5.624 | 1 | 15 | 5,062 | ------ | ------ | ------ | PRE BASIN |
| 3 | Reservoir | 1.950 | 1 | 25 | 5,059 | 1 | 762.65 | 3,253 | ROUTED |

# Hydrograph Report

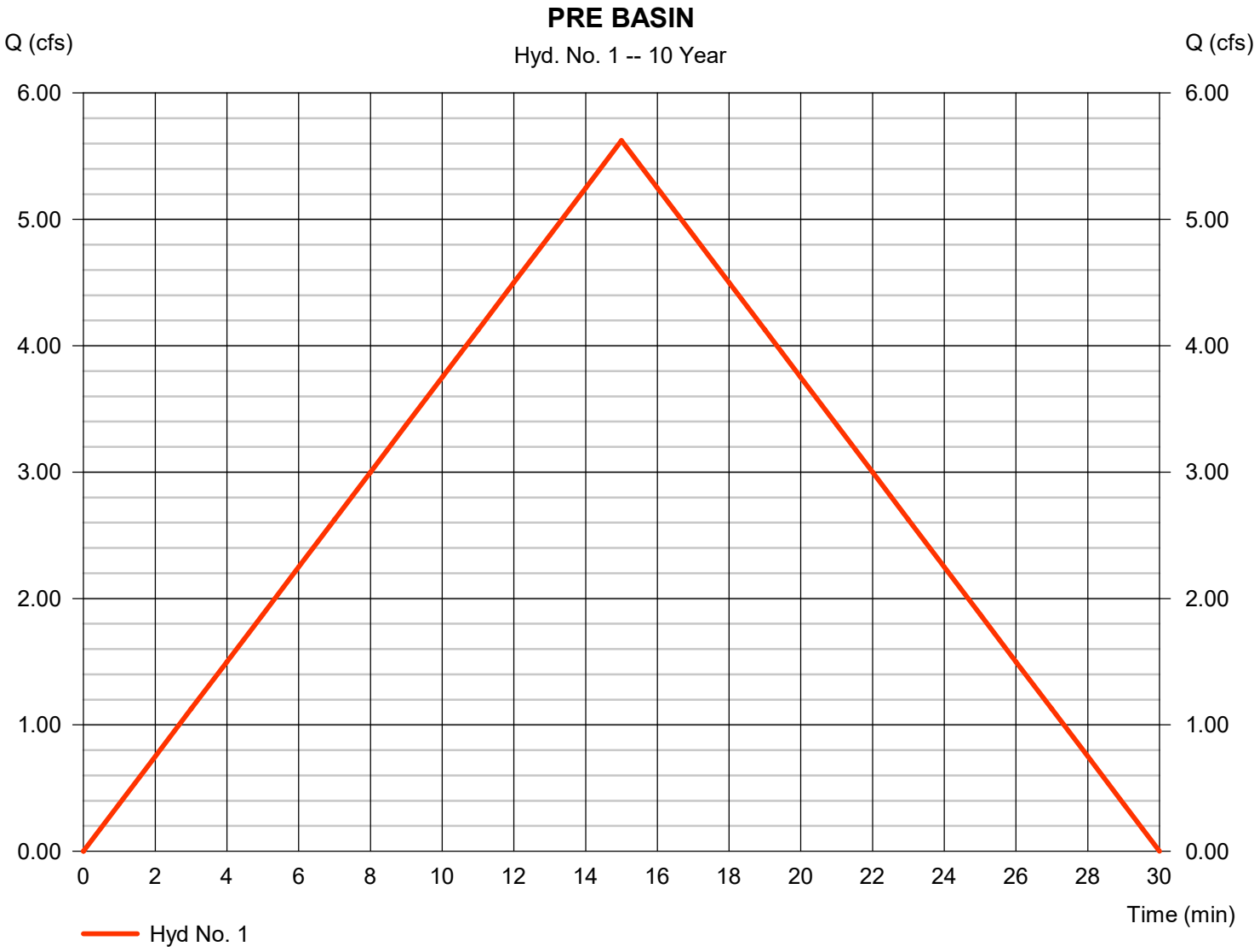


## Hyd. No. 1

PRE BASIN

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | Rational | Peak discharge | = | 5.624 cfs |
| Storm frequency | = | 10 yrs | Time to peak | = | 15 min |
| Time interval | = | 1 min | Hyd. volume | = | 5,062 cuft |
| Drainage area | = | 2.660 ac | Runoff coeff. | = | 0.45* |
| Intensity | = | 4.699 in/hr | Tc by TR55 | = | 15.00 min |
| IDF Curve | = | Greenwood-IN-15 W 1YR.IDF | Asc/Rec limb fact | = | 1/1 |

* Composite (Area/C) = [(1.020 x 0.85) + (1.640 x 0.20)] / 2.660



# 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 | 7.776 | 1 | 15 | 6,999 | ------ | ------ | ------ | PRE BASIN |
| 3 | Reservoir | 2.825 | 1 | 25 | 6,996 | 1 | 762.91 | 4,465 | ROUTED |

# Hydrograph Report

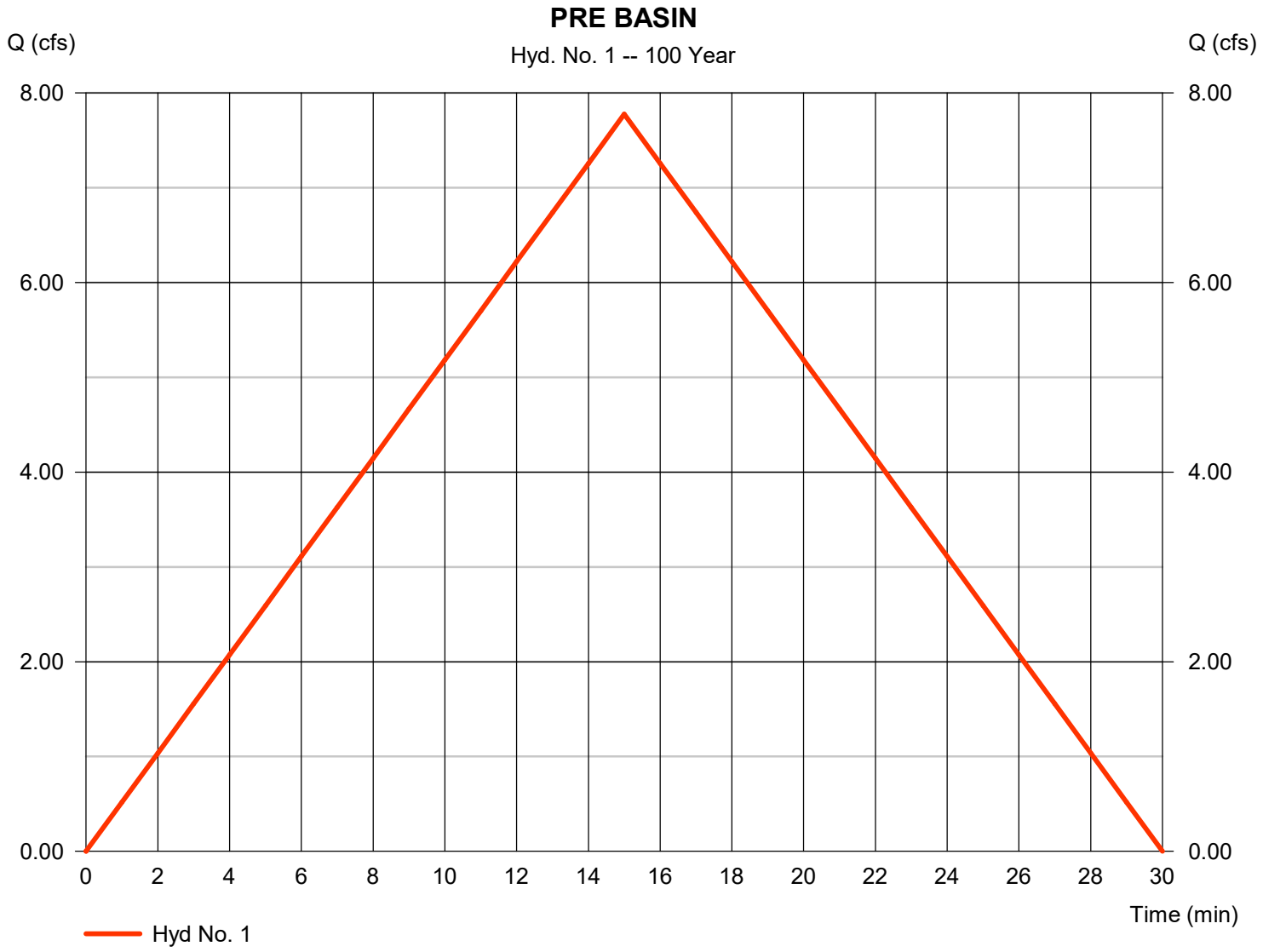


## Hyd. No. 1

PRE BASIN

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | Rational | Peak discharge | = | 7.776 cfs |
| Storm frequency | = | 100 yrs | Time to peak | = | 15 min |
| Time interval | = | 1 min | Hyd. volume | = | 6,999 cuft |
| Drainage area | = | 2.660 ac | Runoff coeff. | = | 0.45* |
| Intensity | = | 6.496 in/hr | Tc by TR55 | = | 15.00 min |
| IDF Curve | = | Greenwood-IN-15 W 1YR.IDF | Asc/Rec limb fact | = | 1/1 |

* Composite (Area/C) = [(1.020 x 0.85) + (1.640 x 0.20)] / 2.660



# Pond Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Thursday, 06 / 6 / 2024

## Pond No. 1 - <New Pond>

### Pond Data

**Contours -**User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 761.50 ft

### Stage / Storage Table

| Stage (ft) | Elevation (ft) | Contour area (sqft) | Incr. Storage (cuft) | Total storage (cuft) |
|---|---|---|---|---|
| 0.00 | 761.50 | 10 | 0 | 0 |
| 0.50 | 762.00 | 1,555 | 282 | 282 |
| 1.50 | 763.00 | 8,604 | 4,605 | 4,887 |

### Culvert / Orifice Structures

| | [A] | [B] | [C] | [PrfRsr] |
|---|---|---|---|---|
| **Rise (in)** | = 12.00 | 0.00 | 0.00 | 0.00 |
| **Span (in)** | = 12.00 | 0.00 | 0.00 | 0.00 |
| **No. Barrels** | = 1 | 0 | 0 | 0 |
| **Invert El. (ft)** | = 761.50 | 0.00 | 0.00 | 0.00 |
| **Length (ft)** | = 33.00 | 0.00 | 0.00 | 0.00 |
| **Slope (%)** | = 0.30 | 0.00 | 0.00 | n/a |
| **N-Value** | = .013 | .013 | .013 | n/a |
| **Orifice Coeff.** | = 0.60 | 0.60 | 0.60 | 0.60 |
| **Multi-Stage** | = n/a | No | No | No |

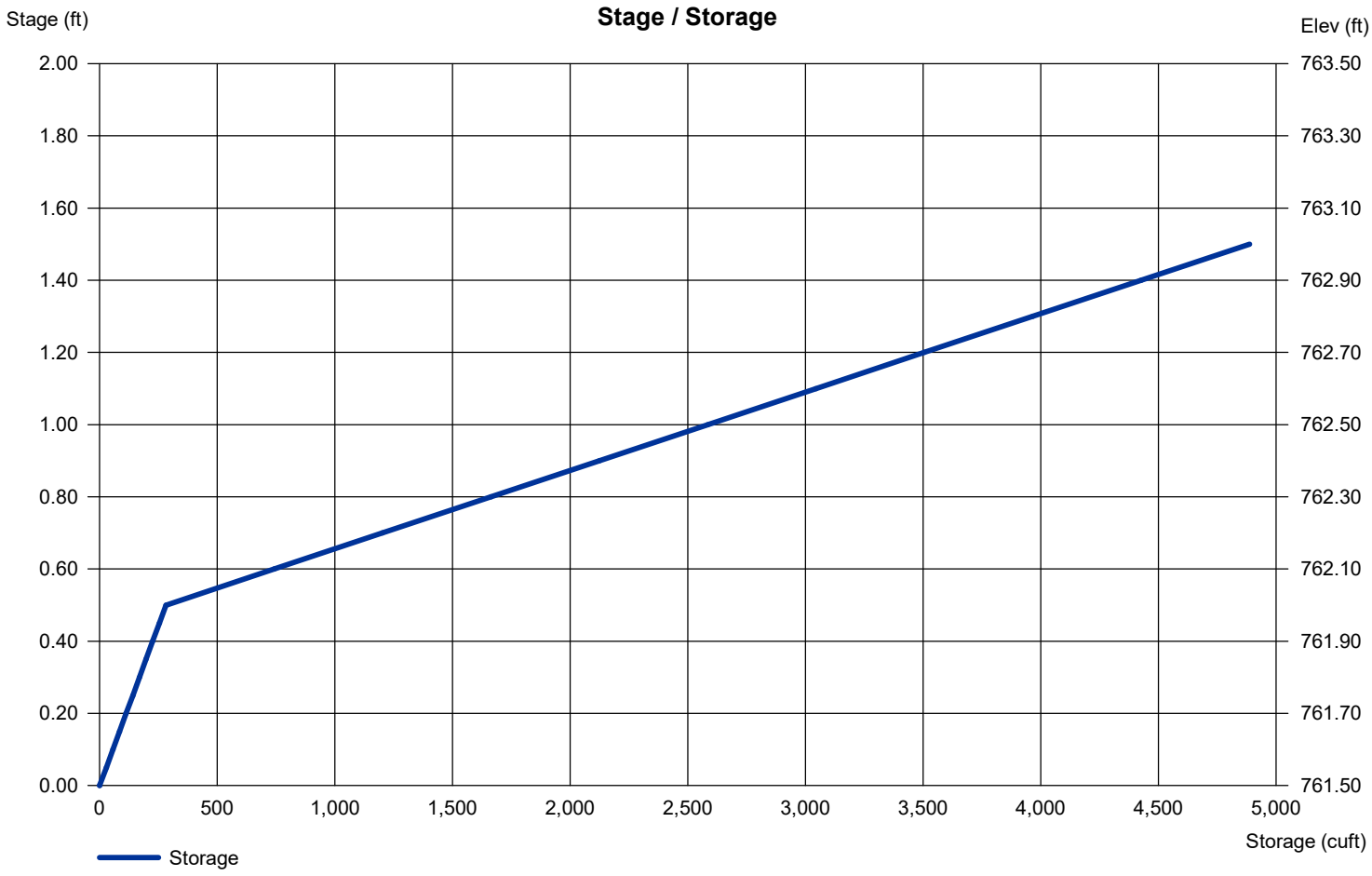
### Weir Structures

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

**Exfil.(in/hr)** = 0.000 (by Contour)

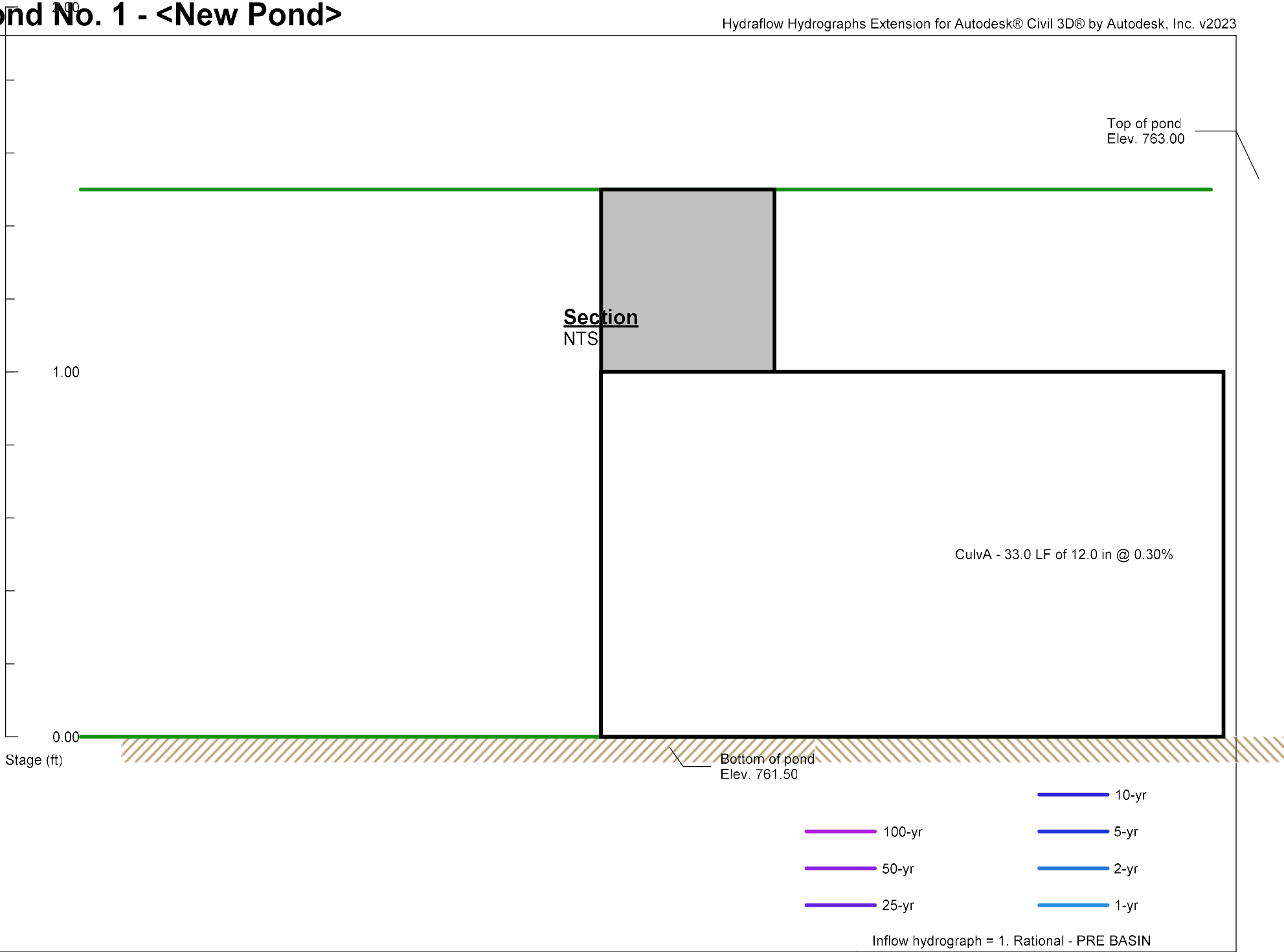
**TW Elev. (ft)** = 0.00

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



# Pond No. 1 - <New Pond>






Inflow hydrograph = 1. Rational - PRE BASIN

**JCREMC – 752 INTERNATIONAL DRIVE**

# Emergency Spillway
# Weir Calculation
# For Detention Pond

MAX. 100 YR. STORM = Q = 1.38 CFS

$1.25 \times Q = (C_d)\ (L)\ (H)^{1.5}$

$1.25 \times 7.78 = (2.7)\ (L)\ (0.5)^{1.5}$

$9.725 = (2.7)\ (L)\ (0.354)$

$9.725 = (0.956)\ (L)$

$10.17' = (L)$

10.5' = (L) = LENGTH OF WEIR

# 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 | 4.109 | 1 | 15 | 3,698 | ------ | ------ | ------ | PRE BASIN |
| 3 | Reservoir | 1.243 | 1 | 25 | 3,695 | 1 | 762.44 | 2,303 | ROUTED |

# Hydrograph Report

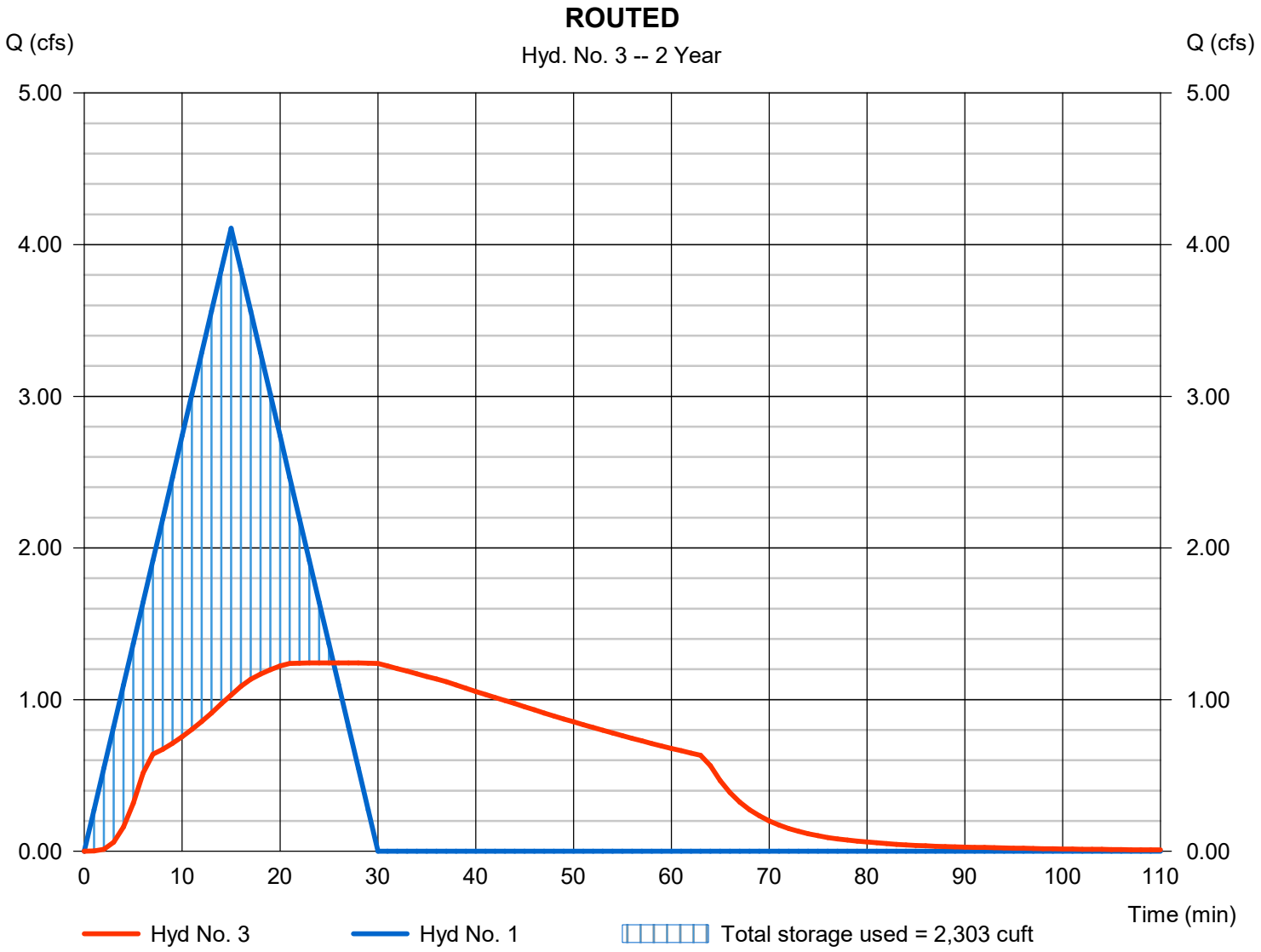


## Hyd. No. 3

ROUTED

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | Reservoir | Peak discharge | = | 1.243 cfs |
| Storm frequency | = | 2 yrs | Time to peak | = | 25 min |
| Time interval | = | 1 min | Hyd. volume | = | 3,695 cuft |
| Inflow hyd. No. | = | 1 - PRE BASIN | Max. Elevation | = | 762.44 ft |
| Reservoir name | = | <New Pond> | Max. Storage | = | 2,303 cuft |

Storage Indication method used.



# 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 | 5.624 | 1 | 15 | 5,062 | ------ | ------ | ------ | PRE BASIN |
| 3 | Reservoir | 1.950 | 1 | 25 | 5,059 | 1 | 762.65 | 3,253 | ROUTED |

# Hydrograph Report

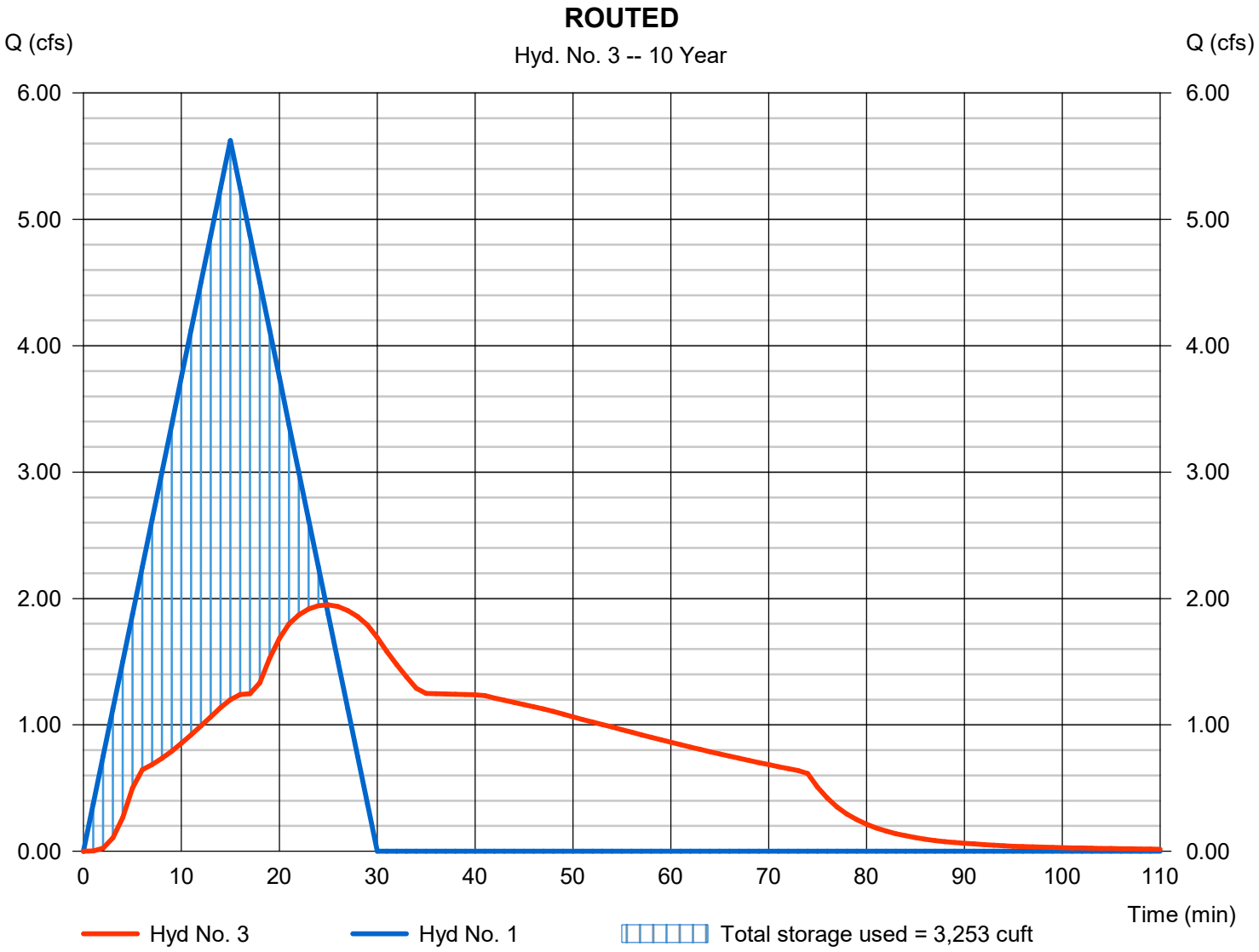


## Hyd. No. 3

ROUTED

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | Reservoir | Peak discharge | = | 1.950 cfs |
| Storm frequency | = | 10 yrs | Time to peak | = | 25 min |
| Time interval | = | 1 min | Hyd. volume | = | 5,059 cuft |
| Inflow hyd. No. | = | 1 - PRE BASIN | Max. Elevation | = | 762.65 ft |
| Reservoir name | = | <New Pond> | Max. Storage | = | 3,253 cuft |

Storage Indication method used.



# 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 | 7.776 | 1 | 15 | 6,999 | ------ | ------ | ------ | PRE BASIN |
| 3 | Reservoir | 2.825 | 1 | 25 | 6,996 | 1 | 762.91 | 4,465 | ROUTED |

# Hydrograph Report



## Hyd. No. 3

ROUTED

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | Reservoir | Peak discharge | = | 2.825 cfs |
| Storm frequency | = | 100 yrs | Time to peak | = | 25 min |
| Time interval | = | 1 min | Hyd. volume | = | 6,996 cuft |
| Inflow hyd. No. | = | 1 - PRE BASIN | Max. Elevation | = | 762.91 ft |
| Reservoir name | = | <New Pond> | Max. Storage | = | 4,465 cuft |

Storage Indication method used.