LOT#4B & 5 UPPER METRO PLACE
PRELIMINARY DETENTION REPORT
03/11/2024

INTRODUCTION

The remainder of proposed Lot #4B and all of Lot #5 are being considered for development as a Multi-Family residential and commercial site. A portion of the parking for the site will be located on Lot 4B. See the drainage map for details.

Currently, The City of Dublin's detention regulations require detention to be based on a critical year storm method. The allowable release rates are governed by the city-wide allowable release rate factor provided by the City.

CRITICAL YEAR STORM & ALLOWABLE RELEASE RATE CALCULATIONS

The critical year storm is determined from the percentage change (PC) from the 1 yr Pre-Developed runoff volume and the 1 yr Post-Developed runoff volume. The Pre-Developed 1 yr. Pre-Developed runoff volume is (6,242 CF) and the 1yr Post Developed runoff volume is (16,616 CF). The PC for this area is a 166% increase in runoff volume. Per City of Dublin Detention Regulations this PC equates to a 25-year critical storm. Meaning that a 25-year post-developed storm runoff rate must be no more than the pre-developed 1-year runoff rate and all storms of higher intensity will not exceed their matching pre-developed runoff rates. See table below for pre-developed allowable release rates.

PRE-DEVELOPED RELEASE RATES DUBLIN MASTER PLAN MONTERREY CREEK SUB BASIN 330	
STORM RATE (CFS/AC)	**PRE-SITE RELEASE RATE 2.25 Acres X RATE)**
1 YR (0.6 CFS/AC)	1.35 cfs
2 YR (0.7 CFS/AC)	1.58 cfs
5 YR (0.9 CFS/AC)	2.03 cfs
10 YR (1.1 CFS/AC)	2.48 cfs
25 YR (1.4 CFS/AC)	3.15 cfs
50 YR (1.9 CFS/AC)	4.28 cfs
100 YR (2.4 CFS/AC)	5.40 cfs

Since the critical year storm is the 25 year, in the table below are the post developed allowable release rates and storage elevation numbers.

POST DEVELOPED ALLOWABLE RELEASE RATES	
STORM	**ALLOWABLE RELEASE RATE**
1 YEAR	1.35 cfs
2 YEAR	1.35 cfs
5 YEAR	1.35 cfs
10 YEAR	1.35 cfs
25 YEAR	1.35 cfs
50 YEAR	4.28 cfs
100 YEAR	5.40 cfs

INPUT DATA

The site was evaluated using the SCS runoff/hydrograph routing with rainfall depths per table 2-4 of the Dublin Stormwater Management Design Manual. See the attached data sheets and maps for the data.

Detention and Water Quality will be provided in an underground storage facility comprised of sets of connected chambers. Isolation chambers will provide Water quality volume. The isolation chambers outlet through the fabric under the stone bed to a 6" underdrain. The outlet manhole will provide water quality and detention controls. Based on 18% of site area the underground detention facility will need to provide approximately 17,642 Cubic Feet of volume. We feel we have ample area to provide such volume to meet The City of Dublin's stormwater regulations.

Watershed Model Schematic

Legend

Hyd.	Origin	Description
1	SCS Runoff	PRE-DEVELOPMENT
2	SCS Runoff	POST DEVELOPMENT

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	------	2.157	3.068	-------	4.451	5.632	7.331	8.762	10.28	PRE-DEVELOPMENT
2	SCS Runoff	------	5.802	6.987	-------	8.660	10.03	11.94	13.52	15.18	POST DEVELOPMENT

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	2.157	2	724	6,242	------	------	------	PRE-DEVELOPMENT
2	SCS Runoff	5.802	2	720	16,616	------	------	------	POST DEVELOPMENT

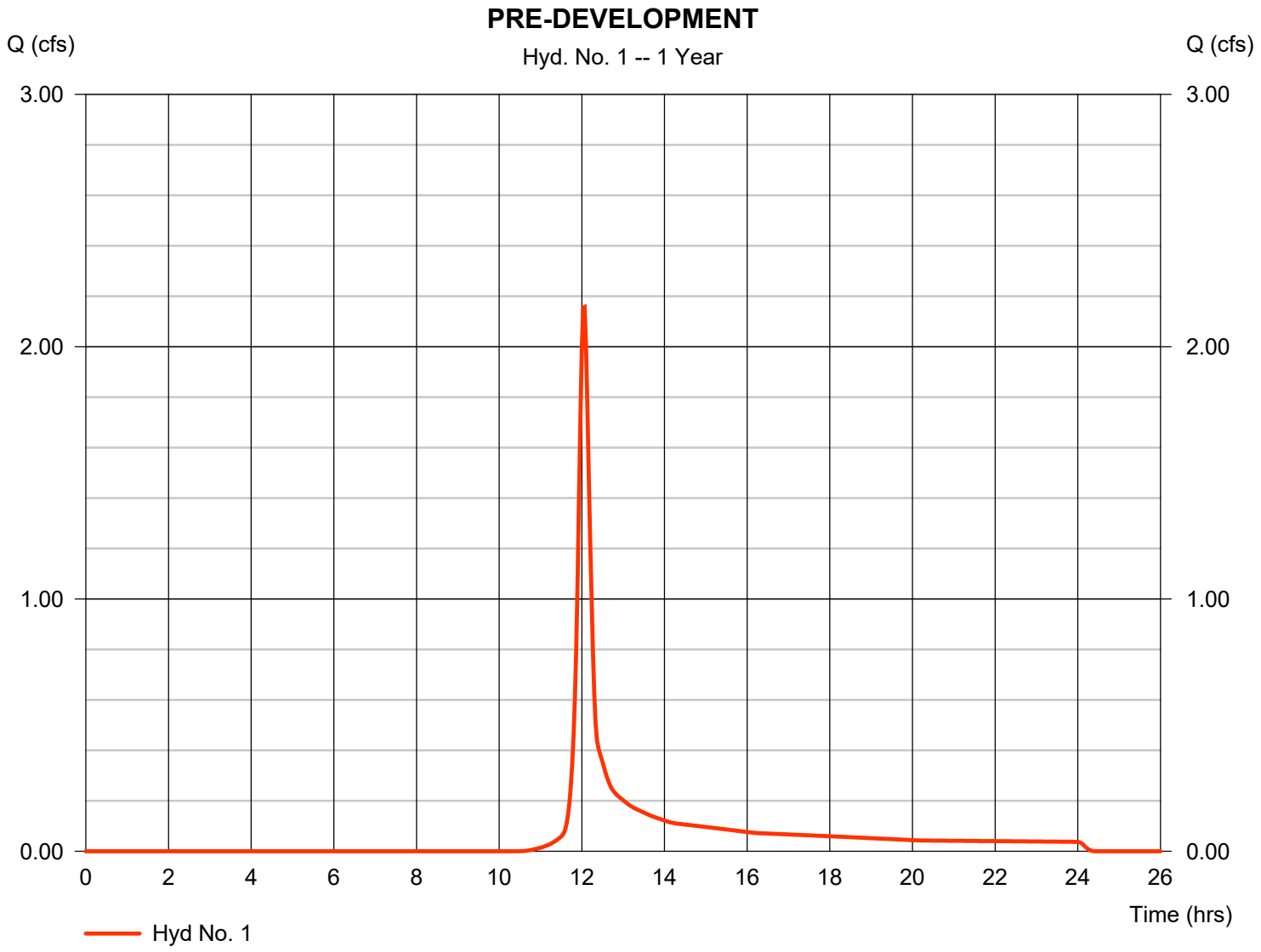
Hydrograph Report

Hyd. No. 1

PRE-DEVELOPMENT

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.157 cfs
Storm frequency	=	1 yrs	Time to peak	=	12.07 hrs
Time interval	=	2 min	Hyd. volume	=	6,242 cuft
Drainage area	=	2.250 ac	Curve number	=	82*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	16.50 min
Total precip.	=	2.20 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(1.220 x 89) + (1.030 x 74)] / 2.250



TR55 Tc Worksheet

Hyd. No. 1

PRE-DEVELOPMENT

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.240		0.011		0.011		
Flow length (ft)	= 15.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 2.63		0.00		0.00		
Land slope (%)	= 0.10		0.00		0.00		
Travel Time (min)	**= 11.44**	**+**	**0.00**	**+**	**0.00**	**=**	**11.44**
Shallow Concentrated Flow							
Flow length (ft)	= 283.00		0.00		0.00		
Watercourse slope (%)	= 0.34		0.00		0.00		
Surface description	= Unpaved		Paved		Paved		
Average velocity (ft/s)	=0.94		0.00		0.00		
Travel Time (min)	**= 5.01**	**+**	**0.00**	**+**	**0.00**	**=**	**5.01**
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 ..... 16.50 min

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	3.068	2	722	8,715	------	------	------	PRE-DEVELOPMENT
2	SCS Runoff	6.987	2	720	20,215	------	------	------	POST DEVELOPMENT

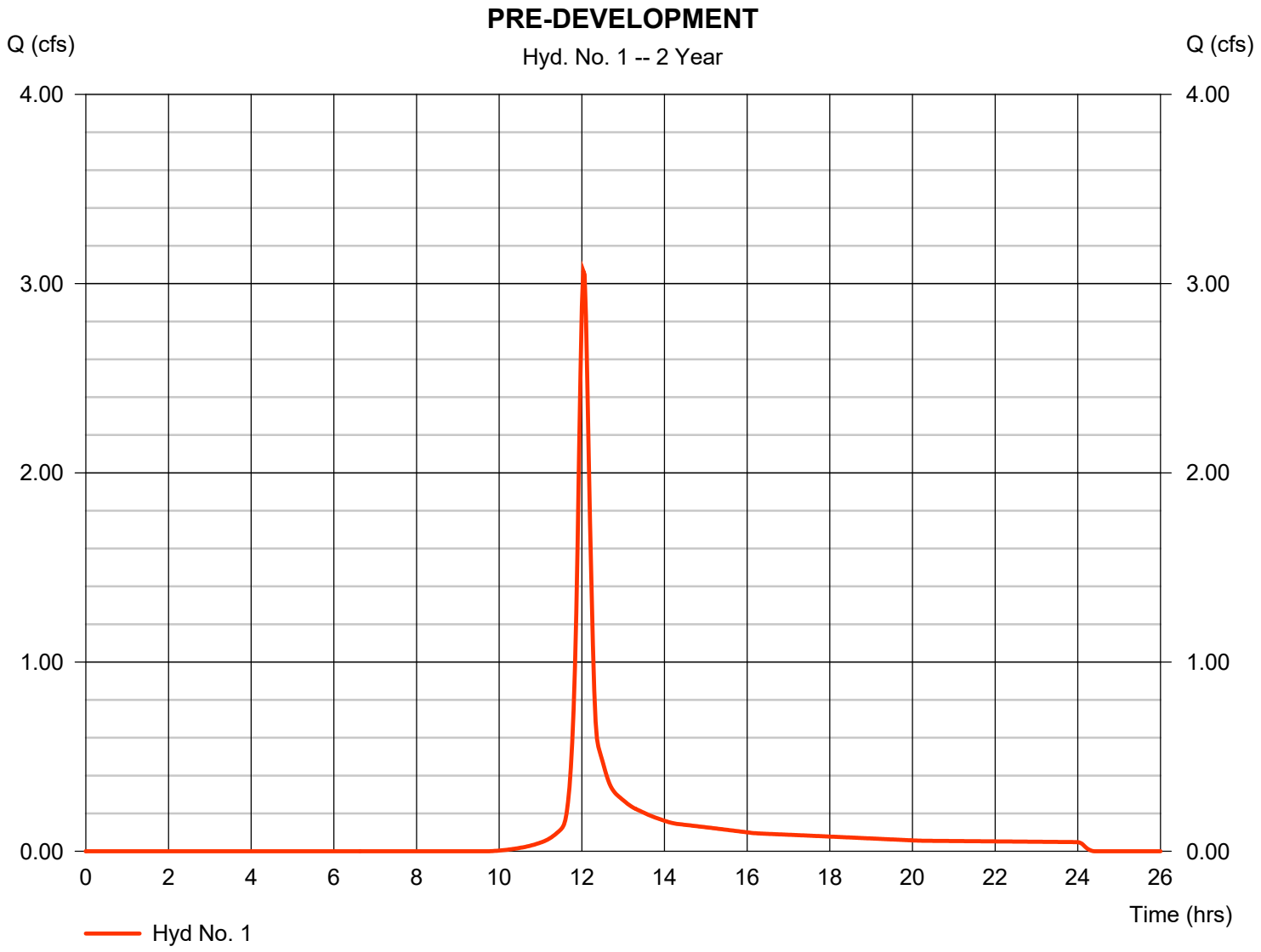
Hydrograph Report

Hyd. No. 1

PRE-DEVELOPMENT

Hydrograph type	=	SCS Runoff	Peak discharge	=	3.068 cfs
Storm frequency	=	2 yrs	Time to peak	=	12.03 hrs
Time interval	=	2 min	Hyd. volume	=	8,715 cuft
Drainage area	=	2.250 ac	Curve number	=	82*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	16.50 min
Total precip.	=	2.63 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(1.220 x 89) + (1.030 x 74)] / 2.250



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022

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	4.451	2	722	12,505	------	------	------	PRE-DEVELOPMENT
2	SCS Runoff	8.660	2	720	25,330	------	------	------	POST DEVELOPMENT

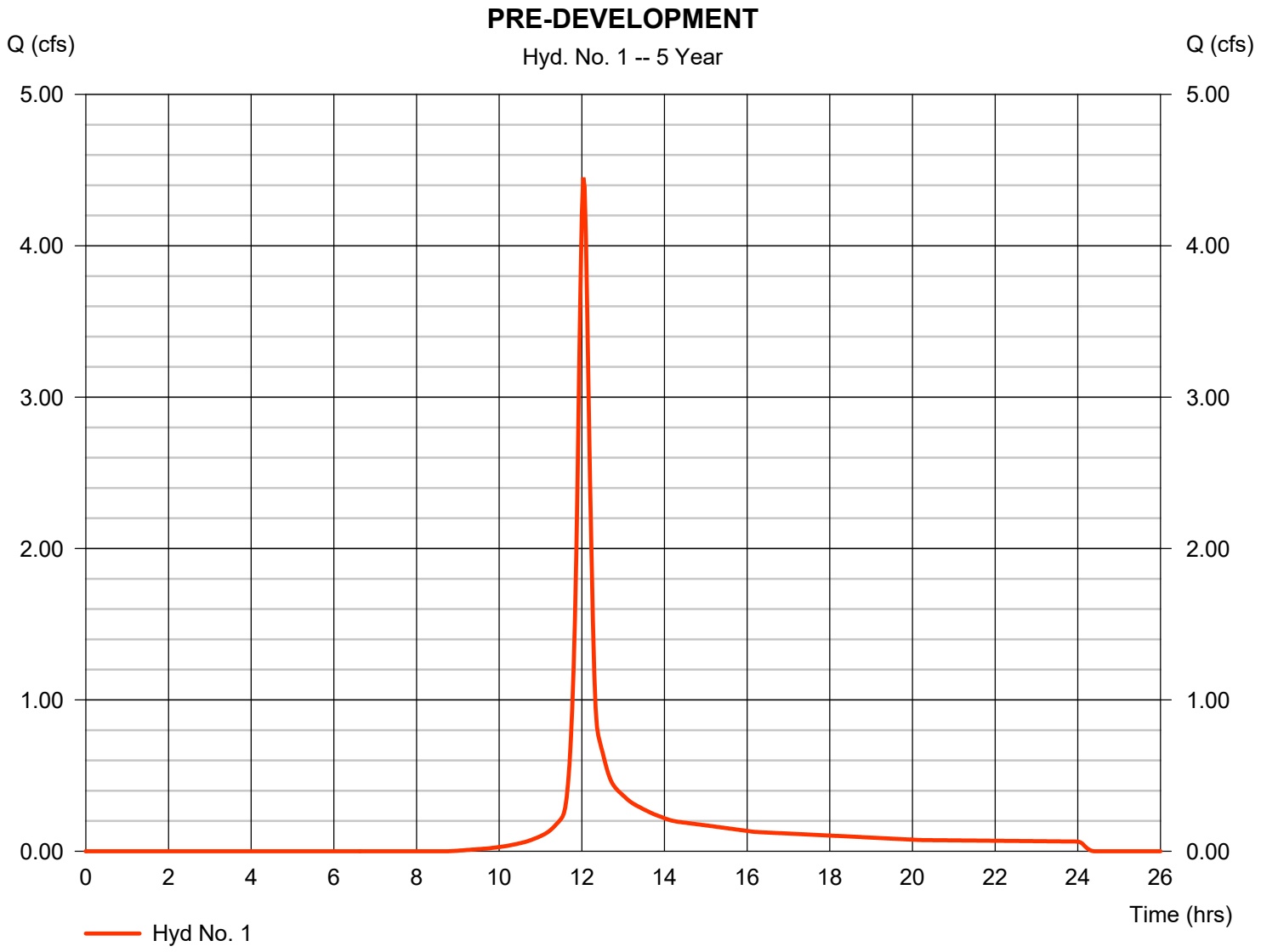
Hydrograph Report

Hyd. No. 1

PRE-DEVELOPMENT

Hydrograph type	=	SCS Runoff	Peak discharge	=	4.451 cfs
Storm frequency	=	5 yrs	Time to peak	=	12.03 hrs
Time interval	=	2 min	Hyd. volume	=	12,505 cuft
Drainage area	=	2.250 ac	Curve number	=	82*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	16.50 min
Total precip.	=	3.24 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(1.220 x 89) + (1.030 x 74)] / 2.250



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	5.632	2	722	15,788	------	------	------	PRE-DEVELOPMENT
2	SCS Runoff	10.03	2	720	29,528	------	------	------	POST DEVELOPMENT

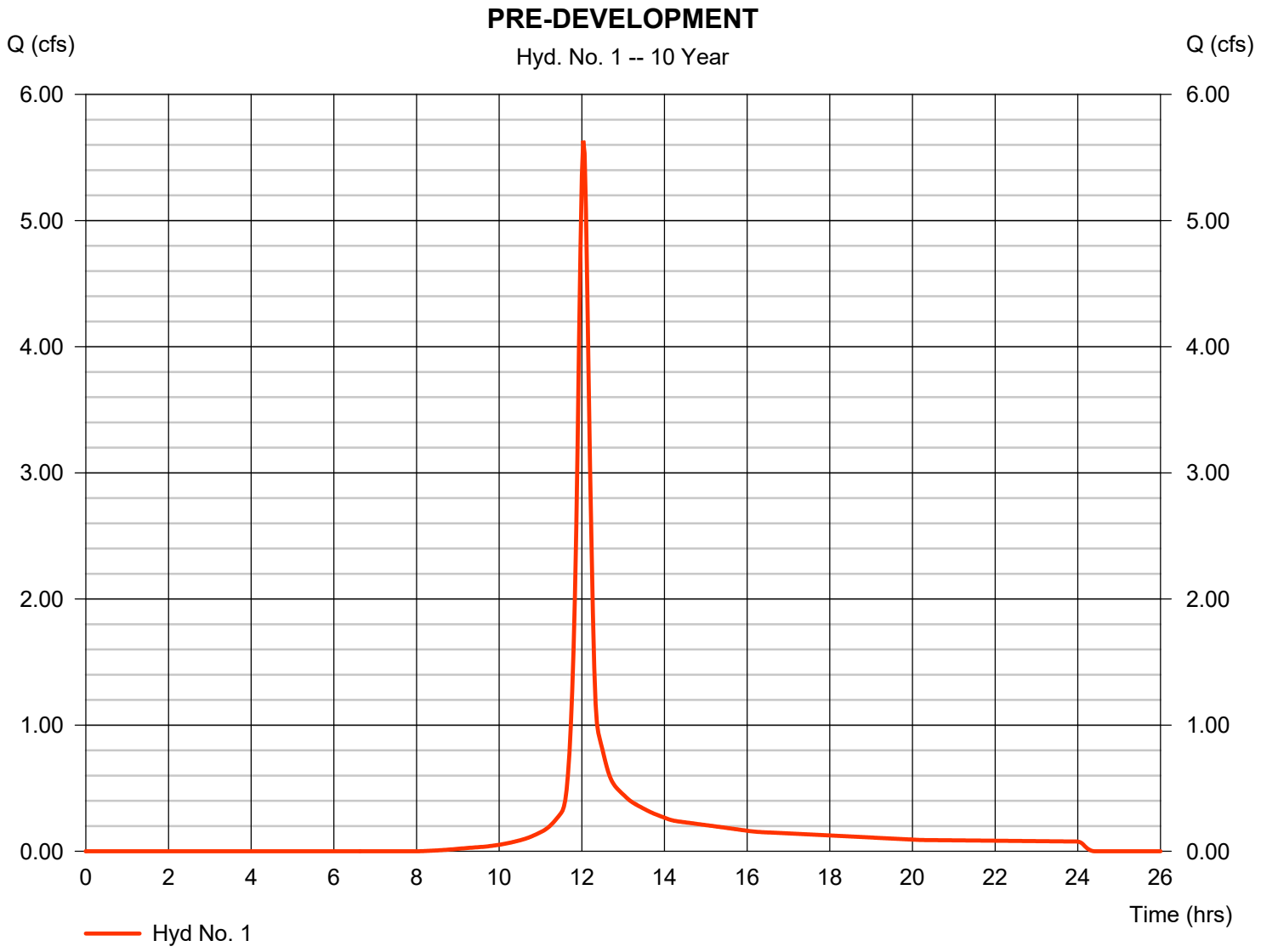
Hydrograph Report

Hyd. No. 1

PRE-DEVELOPMENT

Hydrograph type	=	SCS Runoff	Peak discharge	=	5.632 cfs
Storm frequency	=	10 yrs	Time to peak	=	12.03 hrs
Time interval	=	2 min	Hyd. volume	=	15,788 cuft
Drainage area	=	2.250 ac	Curve number	=	82*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	16.50 min
Total precip.	=	3.74 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(1.220 x 89) + (1.030 x 74)] / 2.250



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022

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	7.331	2	722	20,573	------	------	------	PRE-DEVELOPMENT
2	SCS Runoff	11.94	2	720	35,410	------	------	------	POST DEVELOPMENT

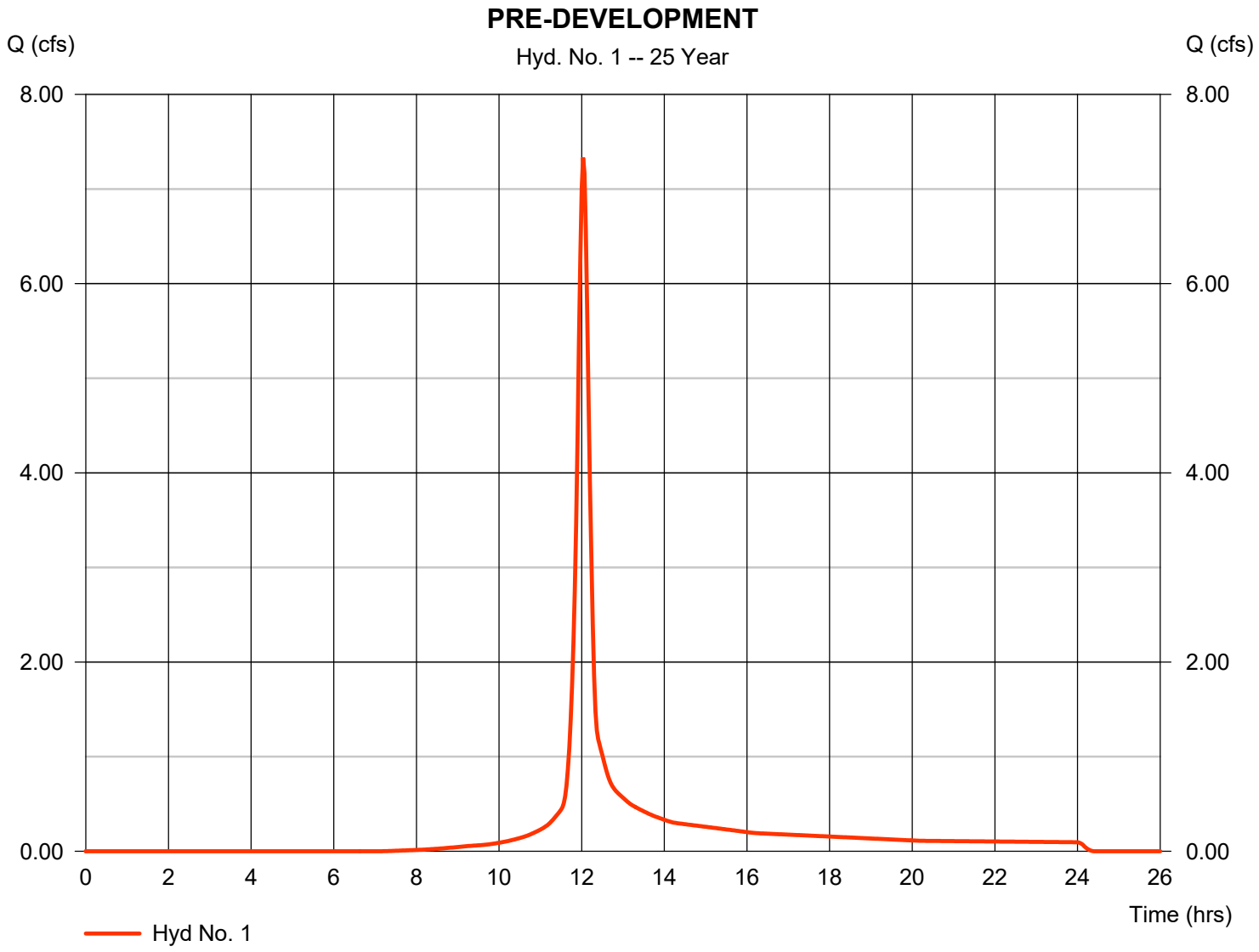
Hydrograph Report

Hyd. No. 1

PRE-DEVELOPMENT

Hydrograph type	=	SCS Runoff	Peak discharge	=	7.331 cfs
Storm frequency	=	25 yrs	Time to peak	=	12.03 hrs
Time interval	=	2 min	Hyd. volume	=	20,573 cuft
Drainage area	=	2.250 ac	Curve number	=	82*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	16.50 min
Total precip.	=	4.44 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(1.220 x 89) + (1.030 x 74)] / 2.250



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022

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	8.762	2	722	24,662	------	------	------	PRE-DEVELOPMENT
2	SCS Runoff	13.52	2	720	40,287	------	------	------	POST DEVELOPMENT

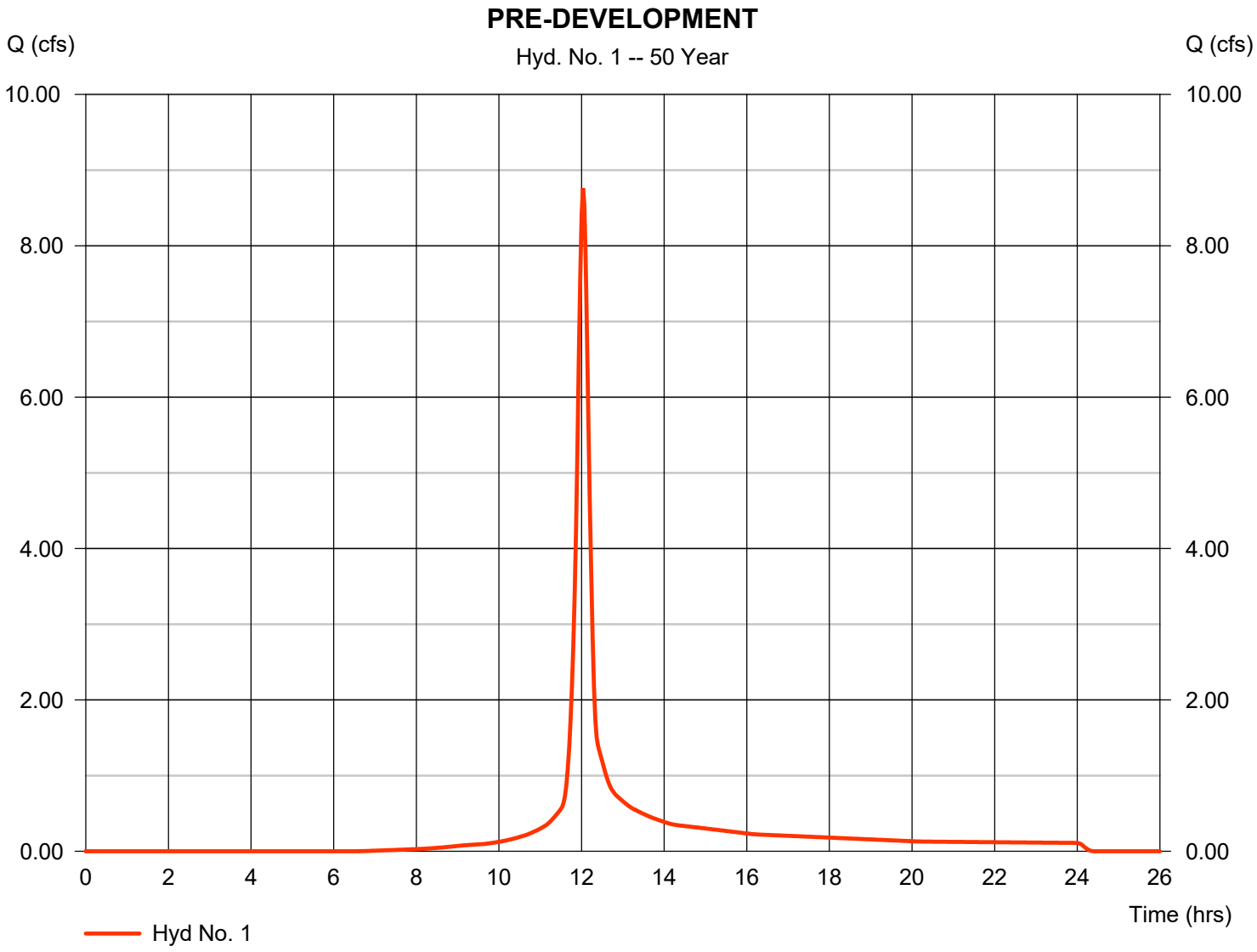
Hydrograph Report

Hyd. No. 1

PRE-DEVELOPMENT

Hydrograph type	=	SCS Runoff	Peak discharge	=	8.762 cfs
Storm frequency	=	50 yrs	Time to peak	=	12.03 hrs
Time interval	=	2 min	Hyd. volume	=	24,662 cuft
Drainage area	=	2.250 ac	Curve number	=	82*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	16.50 min
Total precip.	=	5.02 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(1.220 x 89) + (1.030 x 74)] / 2.250



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022

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	10.28	2	722	29,052	------	------	------	PRE-DEVELOPMENT
2	SCS Runoff	15.18	2	720	45,418	------	------	------	POST DEVELOPMENT

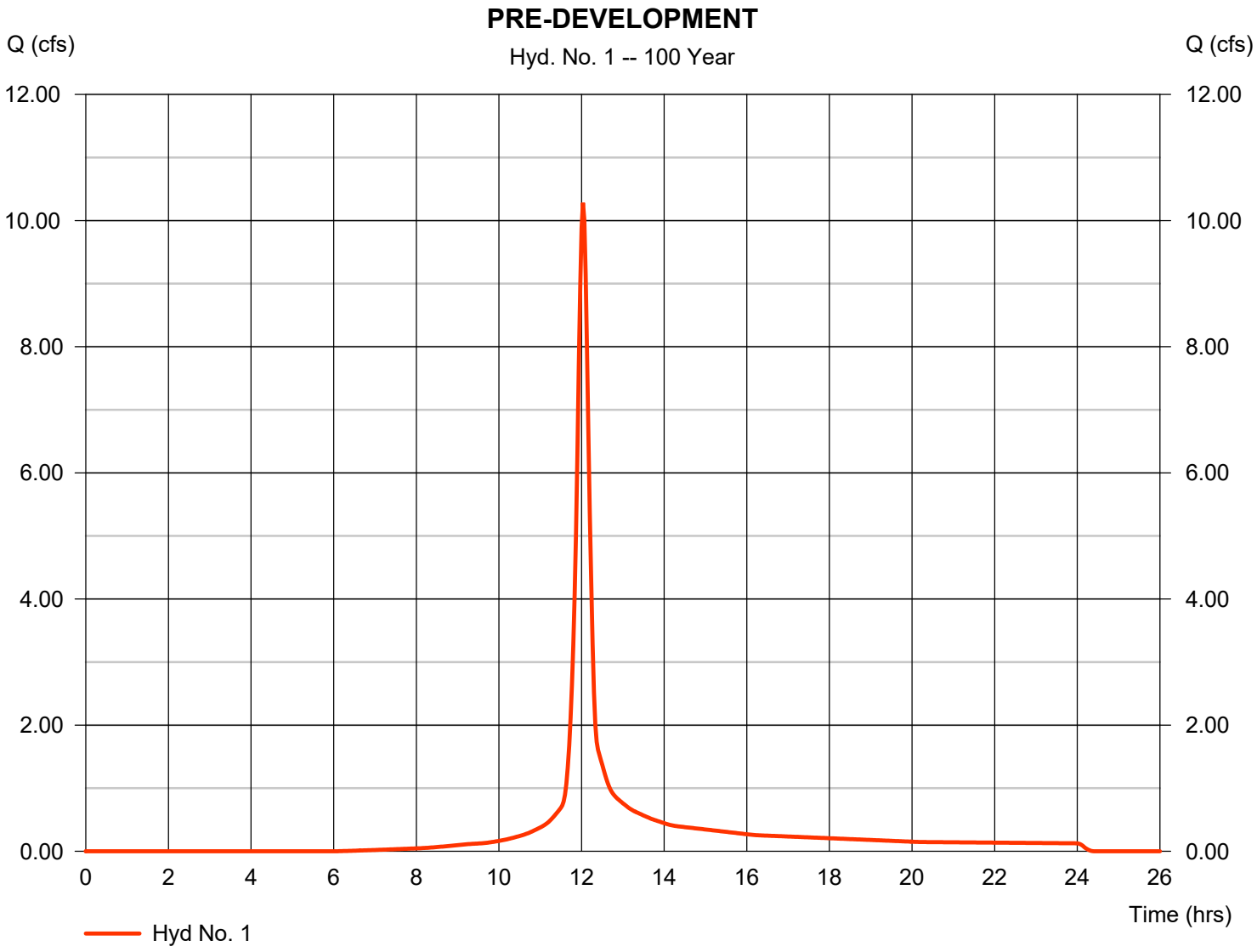
Hydrograph Report

Hyd. No. 1

PRE-DEVELOPMENT

Hydrograph type	=	SCS Runoff	Peak discharge	=	10.28 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.03 hrs
Time interval	=	2 min	Hyd. volume	=	29,052 cuft
Drainage area	=	2.250 ac	Curve number	=	82*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	16.50 min
Total precip.	=	5.63 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(1.220 x 89) + (1.030 x 74)] / 2.250



Hydraflow Rainfall Report

Return Period (Yrs)	Intensity-Duration-Frequency Equation Coefficients (FHA)			
	B	D	E	(N/A)
1	43.2760	9.5000	0.8680	--------
2	58.8730	10.7000	0.8918	--------
3	0.0000	0.0000	0.0000	--------
5	52.7607	9.2000	0.8164	--------
10	55.4107	8.9000	0.7956	--------
25	51.2475	7.6000	0.7408	--------
50	45.9728	6.3000	0.6905	--------
100	44.8155	5.7000	0.6609	--------

File name: City of Dublin-Ohio-idf.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	4.25	3.28	2.69	2.29	2.00	1.78	1.61	1.46	1.35	1.25	1.16	1.09
2	5.05	3.95	3.25	2.78	2.43	2.16	1.95	1.78	1.63	1.51	1.41	1.32
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	6.05	4.73	3.91	3.36	2.95	2.64	2.39	2.19	2.03	1.89	1.76	1.66
10	6.83	5.35	4.43	3.81	3.36	3.01	2.73	2.51	2.32	2.16	2.03	1.91
25	7.84	6.12	5.09	4.39	3.88	3.49	3.18	2.93	2.72	2.54	2.39	2.26
50	8.62	6.69	5.56	4.81	4.26	3.85	3.52	3.25	3.03	2.84	2.68	2.54
100	9.36	7.26	6.05	5.24	4.66	4.22	3.87	3.58	3.35	3.15	2.97	2.82

Tc = time in minutes. Values may exceed 60.

Precip. file name: R:\RESOURCES\Design tools\CITY OF DUBLIN OHIO-PRECIP.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	2.20	2.63	0.00	3.24	3.74	4.44	5.02	5.63
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	0.00	0.00	0.00	0.00	0.00	0.00

Hydraflow Table of Contents

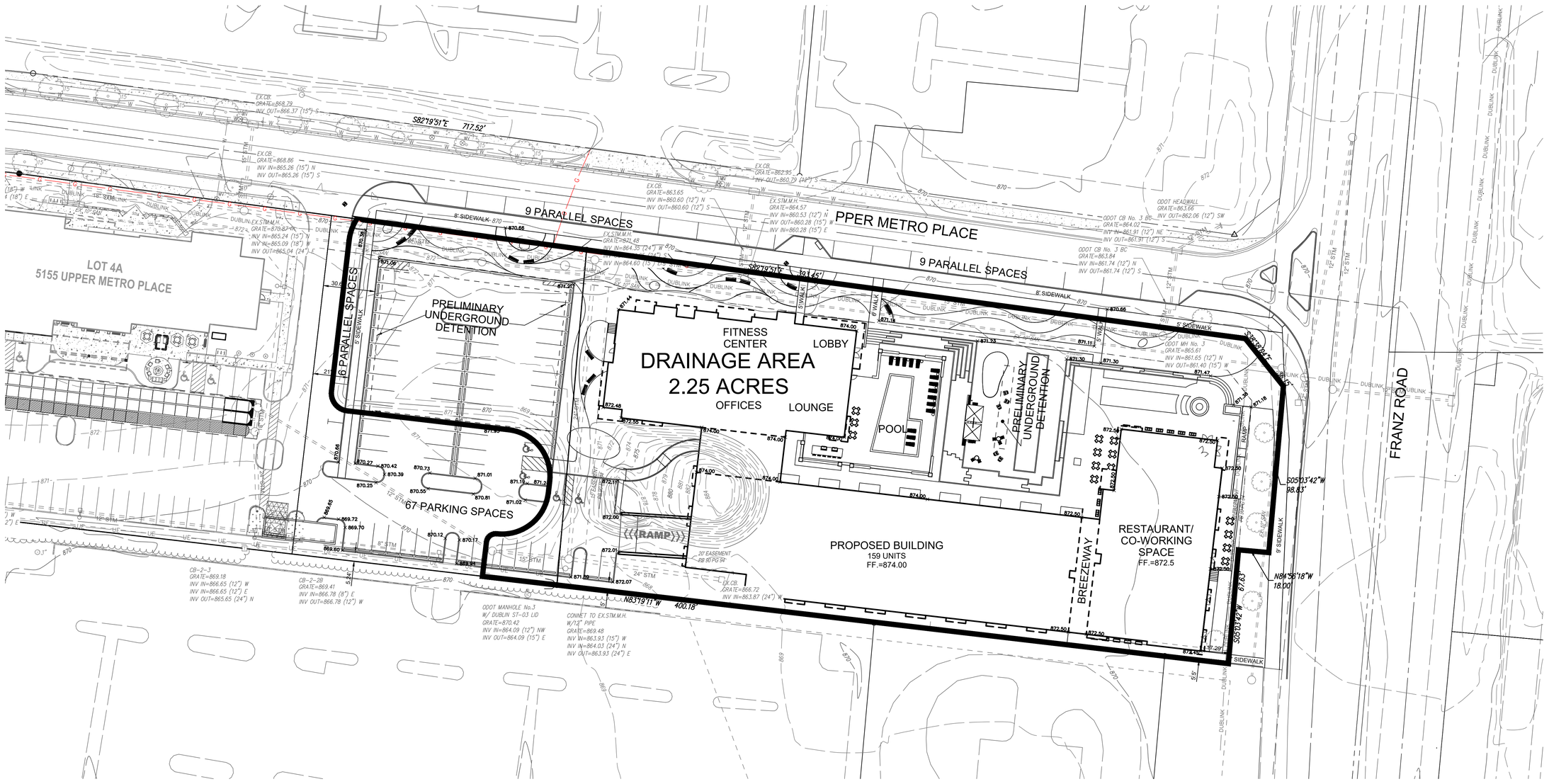
DETENTION.gpw

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022

Monday, 03 / 11 / 2024

PRELIMINARY DRAINAGE PLAN
DUBLIN UPPER METRO APARTMENTS

UPPER METRO PLACE, LOTS 4B & 5
5565 UPPER METRO PLACE
CITY OF DUBLIN, FRANKLIN COUNTY, OHIO
SCALE: 1"=30' MARCH 8, 2024



REVISIONS

SCALE:	1"=30'
DATE:	MARCH 8, 2024
DRAWN:	SAD
DESIGNED:	SAD
CHECKED:	RVP
XREF:	
JOB NO.:	21032

DUBLIN UPPER METRO APARTMENTS