December 4, 2025

To: John Neumeier, P.E.

From: Robert Mach, P.E.

Re: Peters Concrete (former Griesbach) Stormwater Management

Peters Concrete Stormwater Plan Revisions

The existing stormwater pond at the Peters Concrete site located at 380 Farmland Ct. was analyzed for compliance with the City ordinance for the proposed project. It was determined that the pond and outlet require slight modifications to achieve compliance. We believe the previous analysis in the report titled "Stormwater Management Plan Griesbach Ready-Mix" dated September 22, 2020 was incorrect in the modelling of the outlet characteristics for peak flow reduction. The attached modelling properly accounts for when the 18" pipe controls the flow in an outlet control condition. The proposed solution is modifying the outlet structure by cutting the rim/overflow down and patching the remaining 8" orifices. The 4" water quality outlet that regulates small events will remain unchanged. Approximately 500 square feet of surface area will be added to the pond to provide the required storage. The table below summarizes the previously approved plan flow rates and the proposed flow rates.

	1 YEAR	2 YEAR	10 YEAR	100 YEAR
EXISTING	1.21 CFS	1.86 CFS	4.56 CFS	10.73 CFS
TOTAL OFF-SITE DEVELOPED (2020)	0.80 CFS	1.41 CFS	4.02 CFS	9.04 CFS
WATER ELEVATION (2020)	685.81	685.93	686.30	686.88
TOTAL OFF-SITE DEVELOPED (2025)	0.49 CFS	1.18 CFS	4.20 CFS	10.95
WATER ELEVATION (2025)	685.97	686.05	686.33	686.97

The proposed peak flows are reduced slightly below the previously approved (2020) values for the 1 and 2 year events and increase slightly for the 10 and 100 year events. Water quality modelling was not analyzed since the water quality outlet will remain unchanged.

Revised modelling and the original report are attached to this memo.

Hydrograph Return Period Recap

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

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	------	0.209	0.282	-------	-------	0.561	-------	-------	1.189	AREA DRAINING OFF SITE
2	SCS Runoff	------	3.579	4.578	-------	-------	8.252	-------	-------	16.03	AREA DRAINING TO POND
4	Reservoir	2	0.461	1.131	-------	-------	4.040	-------	-------	10.54	Pond Routed Discharge
5	Combine	1, 4	0.486	1.183	-------	-------	4.199	-------	-------	10.95	Total Proposed Discharge

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

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	0.209	2	732	637	------	------	------	AREA DRAINING OFF SITE
2	SCS Runoff	3.579	2	736	12,569	------	------	------	AREA DRAINING TO POND
4	Reservoir	0.461	2	804	12,508	2	685.97	6,741	Pond Routed Discharge
5	Combine	0.486	2	802	13,145	1, 4	------	------	Total Proposed Discharge

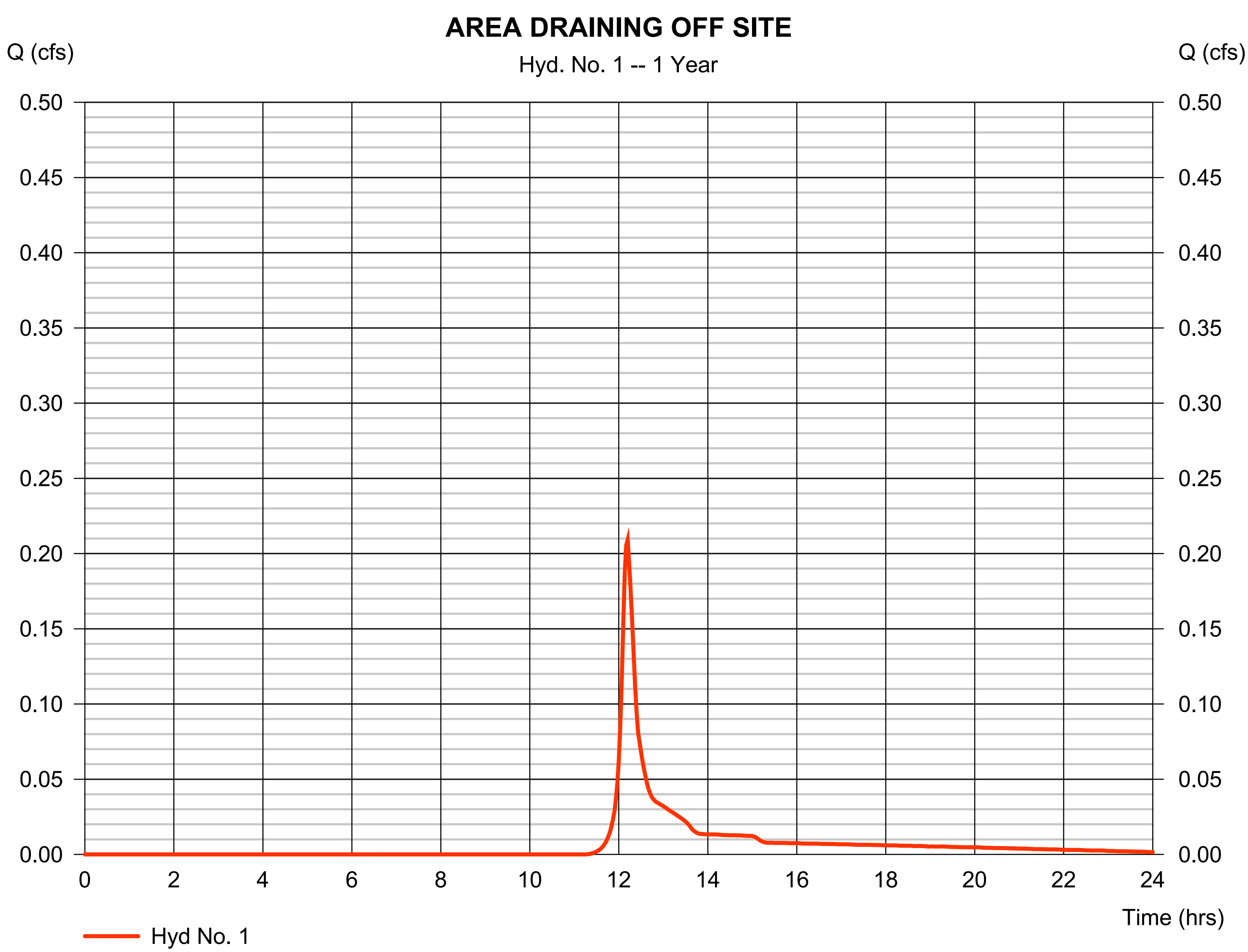
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2 Thursday, 12 / 4 / 2025

Hyd. No. 1

AREA DRAINING OFF SITE

Hydrograph type	= SCS Runoff	Peak discharge	= 0.209 cfs
Storm frequency	= 1 yrs	Time to peak	= 12.20 hrs
Time interval	= 2 min	Hyd. volume	= 637 cuft
Drainage area	= 0.270 ac	Curve number	= 80
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 11.20 min
Total precip.	= 2.11 in	Distribution	= Custom
Storm duration	= R:\Blocks\Hydraflow Rain Files\MSE4 2min.cds	Shape factor	= 484



TR55 Tc Worksheet

Hyd. No. 1

AREA DRAINING OFF SITE

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.240		0.011		0.011		
Flow length (ft)	= 92.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 2.60		0.00		0.00		
Land slope (%)	= 4.00		0.00		0.00		
Travel Time (min)	**= 11.22**	**+**	**0.00**	**+**	**0.00**	**=**	**11.22**
Shallow Concentrated Flow							
Flow length (ft)	= 0.00		0.00		0.00		
Watercourse slope (%)	= 0.00		0.00		0.00		
Surface description	= Paved		Paved		Paved		
Average velocity (ft/s)	=0.00		0.00		0.00		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**
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 ..... 11.20 min

Hydrograph Report

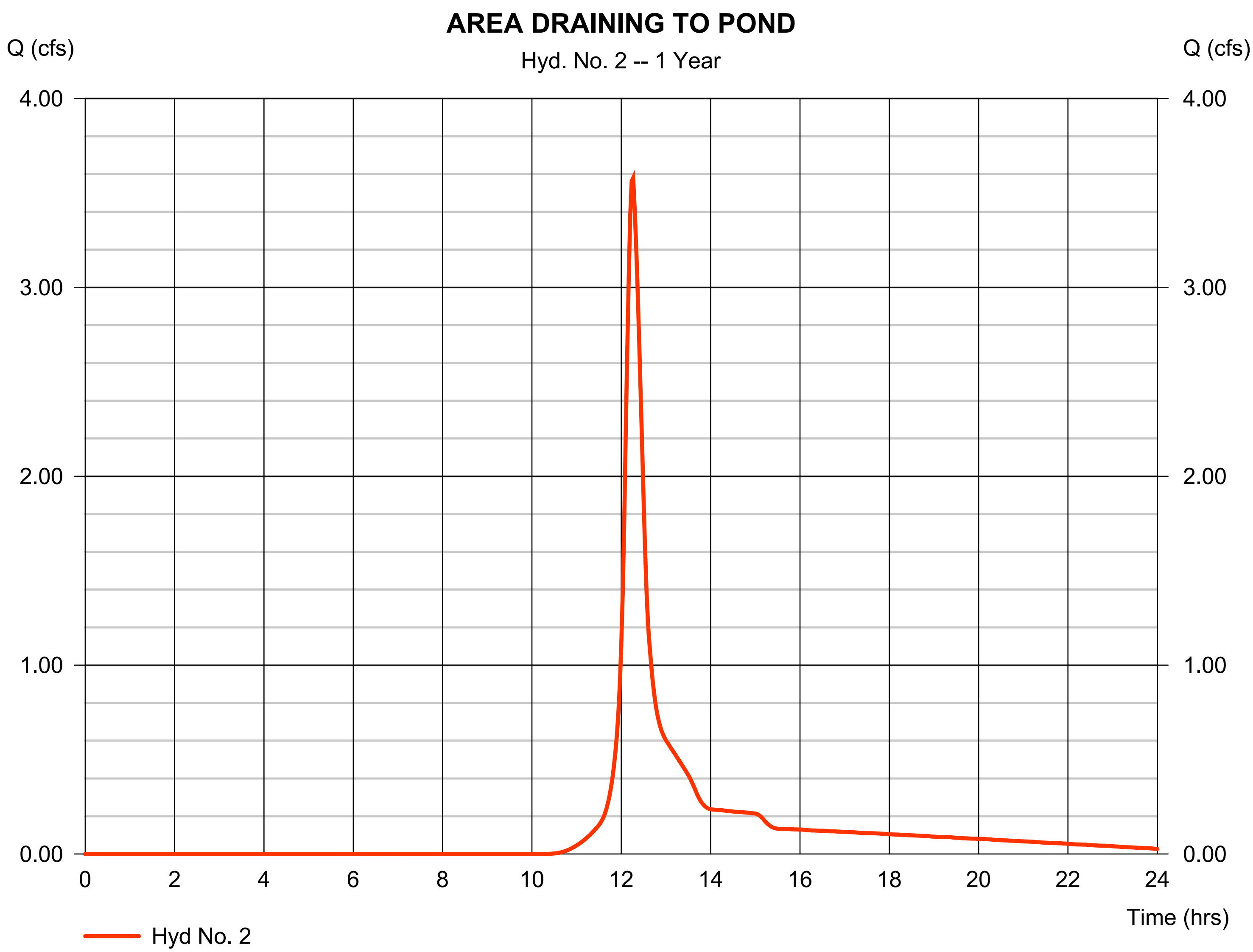
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2 — Thursday, 12 / 4 / 2025

Hyd. No. 2

AREA DRAINING TO POND

Hydrograph type	= SCS Runoff	Peak discharge	= 3.579 cfs
Storm frequency	= 1 yrs	Time to peak	= 12.27 hrs
Time interval	= 2 min	Hyd. volume	= 12,569 cuft
Drainage area	= 3.950 ac	Curve number	= 85*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 18.90 min
Total precip.	= 2.11 in	Distribution	= Custom
Storm duration	= R:\Blocks\Hydraflow Rain Files\MSE4 24hr.cds	Shape factor	= 484

* Composite (Area/CN) = [(0.320 x 98) + (1.940 x 85) + (0.210 x 98) + (0.280 x 60) + (0.920 x 80) + (0.280 x 98)] / 3.950



TR55 Tc Worksheet

Hyd. No. 2

AREA DRAINING TO POND

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.400		0.013		0.011		
Flow length (ft)	= 107.0		93.0		0.0		
Two-year 24-hr precip. (in)	= 2.60		4.60		0.00		
Land slope (%)	= 6.50		2.50		0.00		
Travel Time (min)	**= 15.69**	**+**	**1.00**	**+**	**0.00**	**=**	**16.69**
Shallow Concentrated Flow							
Flow length (ft)	= 215.00		0.00		0.00		
Watercourse slope (%)	= 1.60		0.00		0.00		
Surface description	= Paved		Paved		Paved		
Average velocity (ft/s)	=2.57		0.00		0.00		
Travel Time (min)	**= 1.39**	**+**	**0.00**	**+**	**0.00**	**=**	**1.39**
Channel Flow							
X sectional flow area (sqft)	= 2.41		0.00		0.00		
Wetted perimeter (ft)	= 4.48		0.00		0.00		
Channel slope (%)	= 0.52		0.00		0.00		
Manning's n-value	= 0.015		0.015		0.015		
Velocity (ft/s)	=4.73						
			0.00				
					0.00		
Flow length (ft)	({0})217.0		0.0		0.0		
Travel Time (min)	**= 0.76**	**+**	**0.00**	**+**	**0.00**	**=**	**0.76**

Total Travel Time, Tc ..... 18.90 min

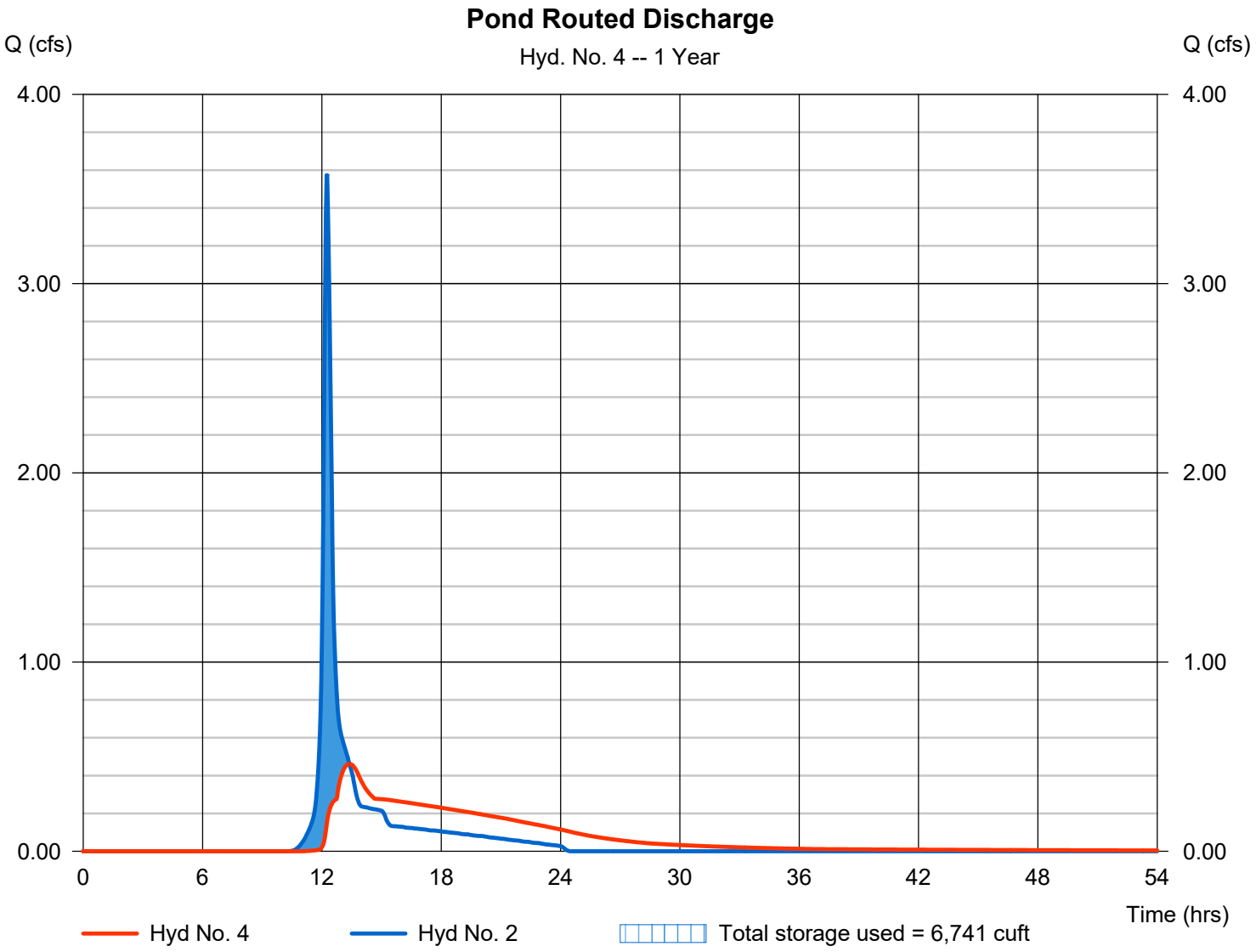
Hydrograph Report

Hyd. No. 4

Pond Routed Discharge

Hydrograph type	= Reservoir	Peak discharge	= 0.461 cfs
Storm frequency	= 1 yrs	Time to peak	= 13.40 hrs
Time interval	= 2 min	Hyd. volume	= 12,508 cuft
Inflow hyd. No.	= 2 - AREA DRAINING TO POND	Max. Elevation	= 685.97 ft
Reservoir name	= Existing Pond	Max. Storage	= 6,741 cuft

Storage Indication method used.



Pond Report

Pond No. 1 - Existing Pond

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 685.33 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	685.33	9,700	0	0
0.67	686.00	11,300	7,027	7,027
1.67	687.00	13,800	12,528	19,555
2.67	688.00	25,400	19,305	38,861

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 18.00	4.00	0.00	0.00
Span (in)	= 18.00	4.00	0.00	0.00
No. Barrels	= 1	1	1	1
Invert El. (ft)	= 685.17	685.33	0.00	0.00
Length (ft)	= 81.00	0.50	0.00	0.00
Slope (%)	= 0.40	1.00	0.00	n/a
N-Value	= .011	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	Yes	No

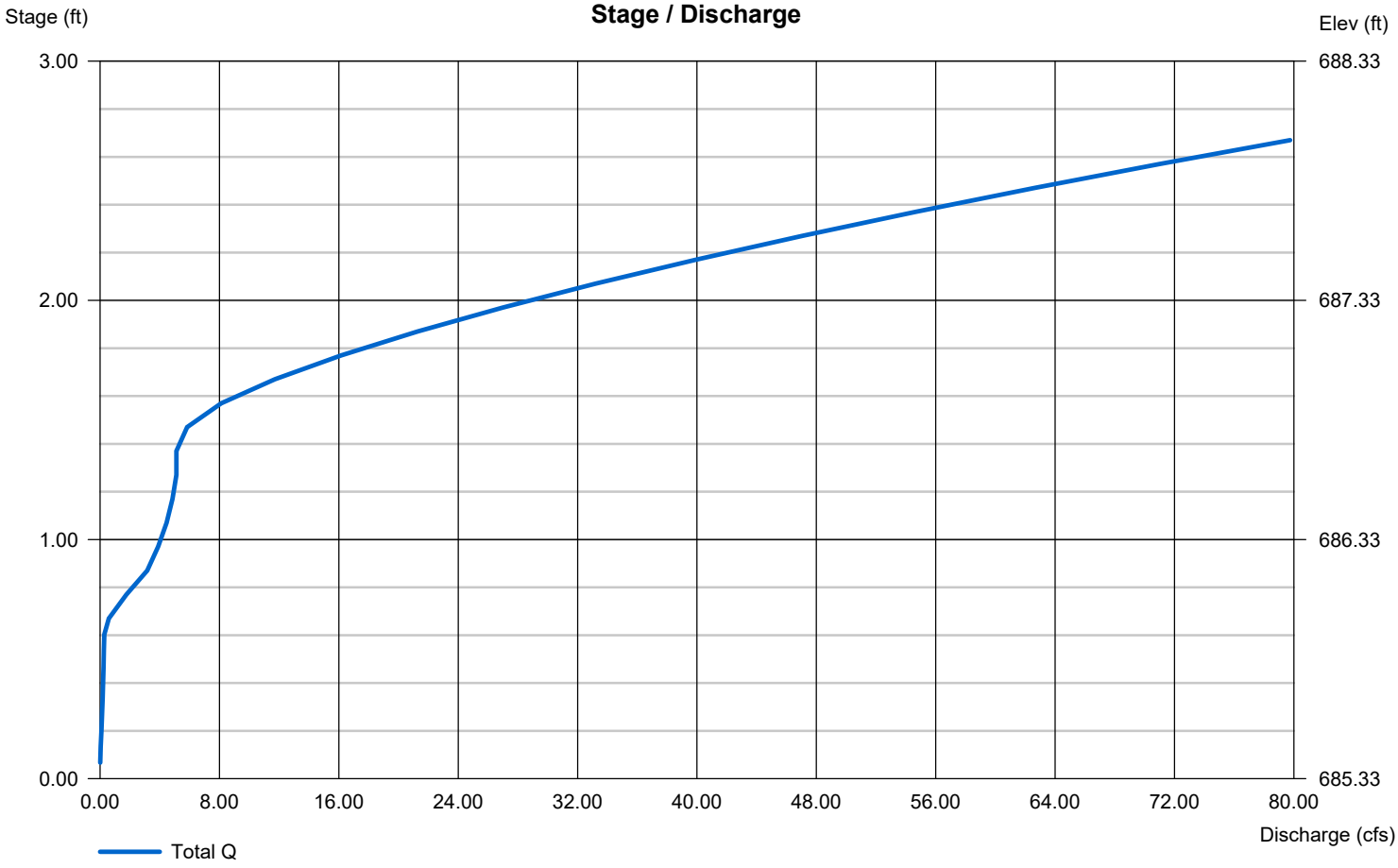
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 20.00	7.85	0.00	0.00
Crest El. (ft)	= 686.80	685.95	0.00	0.00
Weir Coeff.	= 2.60	3.33	3.33	3.33
Weir Type	= Broad	Rect	---	---
Multi-Stage	= No	Yes	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).

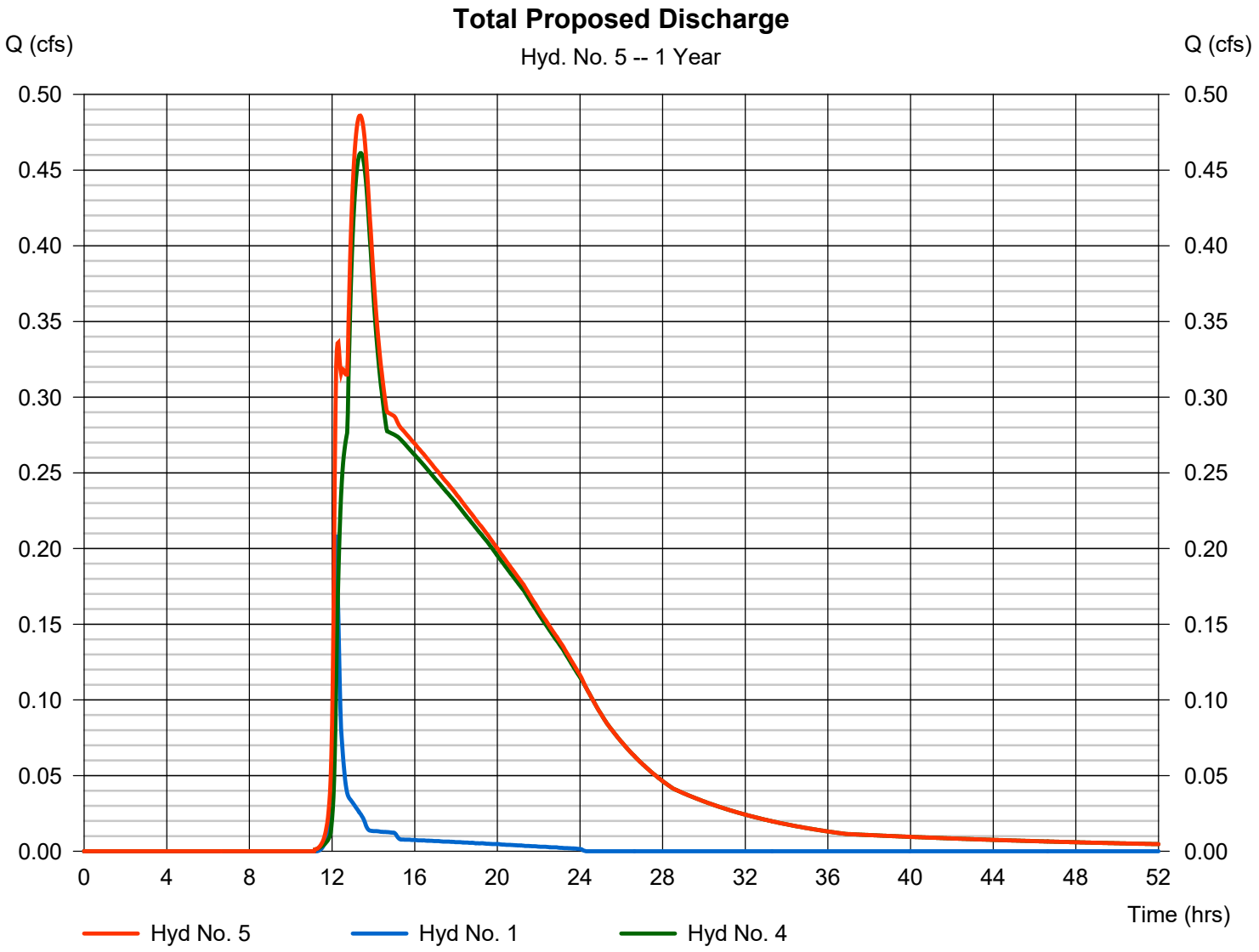


Hydrograph Report

Hyd. No. 5

Total Proposed Discharge

Hydrograph type	=	Combine	Peak discharge	=	0.486 cfs
Storm frequency	=	1 yrs	Time to peak	=	13.37 hrs
Time interval	=	2 min	Hyd. volume	=	13,145 cuft
Inflow hyds.	=	1, 4	Contrib. drain. area	=	0.270 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

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	0.282	2	732	843	------	------	------	AREA DRAINING OFF SITE
2	SCS Runoff	4.578	2	736	15,989	------	------	------	AREA DRAINING TO POND
4	Reservoir	1.131	2	762	15,927	2	686.05	7,608	Pond Routed Discharge
5	Combine	1.183	2	762	16,770	1, 4	------	------	Total Proposed Discharge

Hydrograph Report

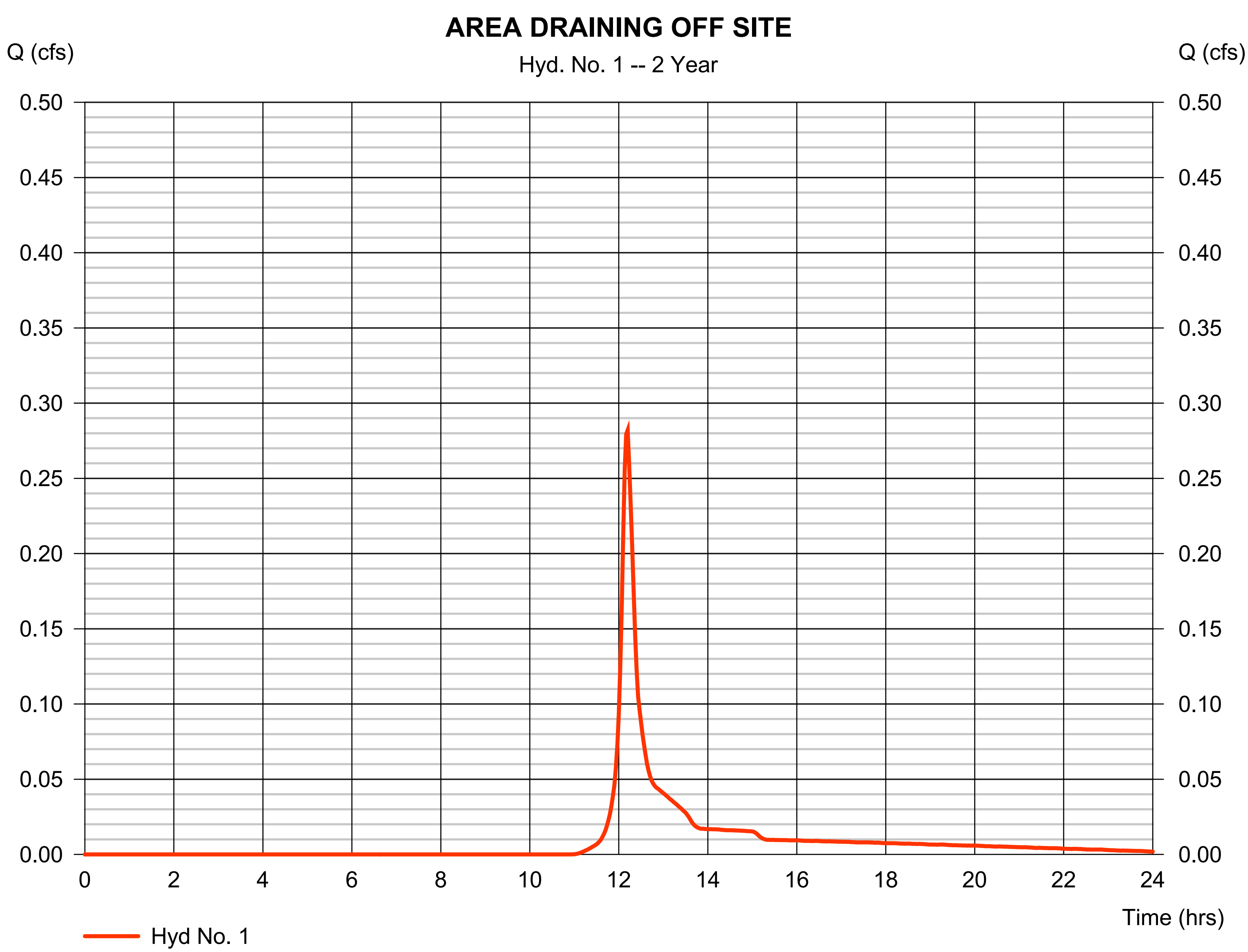
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

Thursday, 12 / 4 / 2025

Hyd. No. 1

AREA DRAINING OFF SITE

Hydrograph type	= SCS Runoff	Peak discharge	= 0.282 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.20 hrs
Time interval	= 2 min	Hyd. volume	= 843 cuft
Drainage area	= 0.270 ac	Curve number	= 80
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 11.20 min
Total precip.	= 2.42 in	Distribution	= Custom
Storm duration	= R:\Blocks\Hydraflow Rain Files\MSE4 2min.cds	Shape factor	= 484



Hydrograph Report

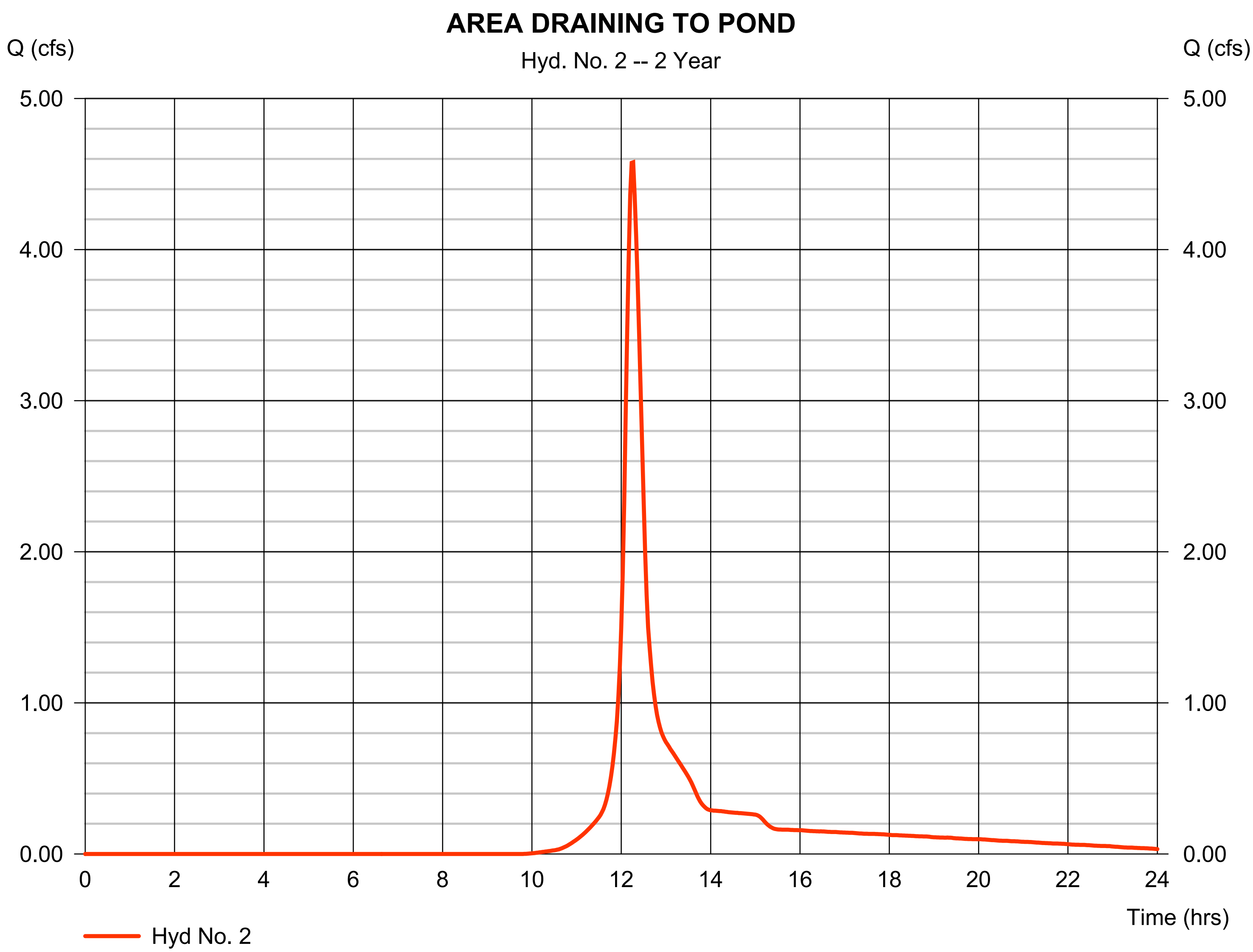
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2 Thursday, 12 / 4 / 2025

Hyd. No. 2

AREA DRAINING TO POND

Hydrograph type	= SCS Runoff	Peak discharge	= 4.578 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.27 hrs
Time interval	= 2 min	Hyd. volume	= 15,989 cuft
Drainage area	= 3.950 ac	Curve number	= 85*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 18.90 min
Total precip.	= 2.42 in	Distribution	= Custom
Storm duration	= R:\Blocks\Hydraflow Rain Files\MSE4 2in.cds	Shape factor	= 484

* Composite (Area/CN) = [(0.320 x 98) + (1.940 x 85) + (0.210 x 98) + (0.280 x 60) + (0.920 x 80) + (0.280 x 98)] / 3.950



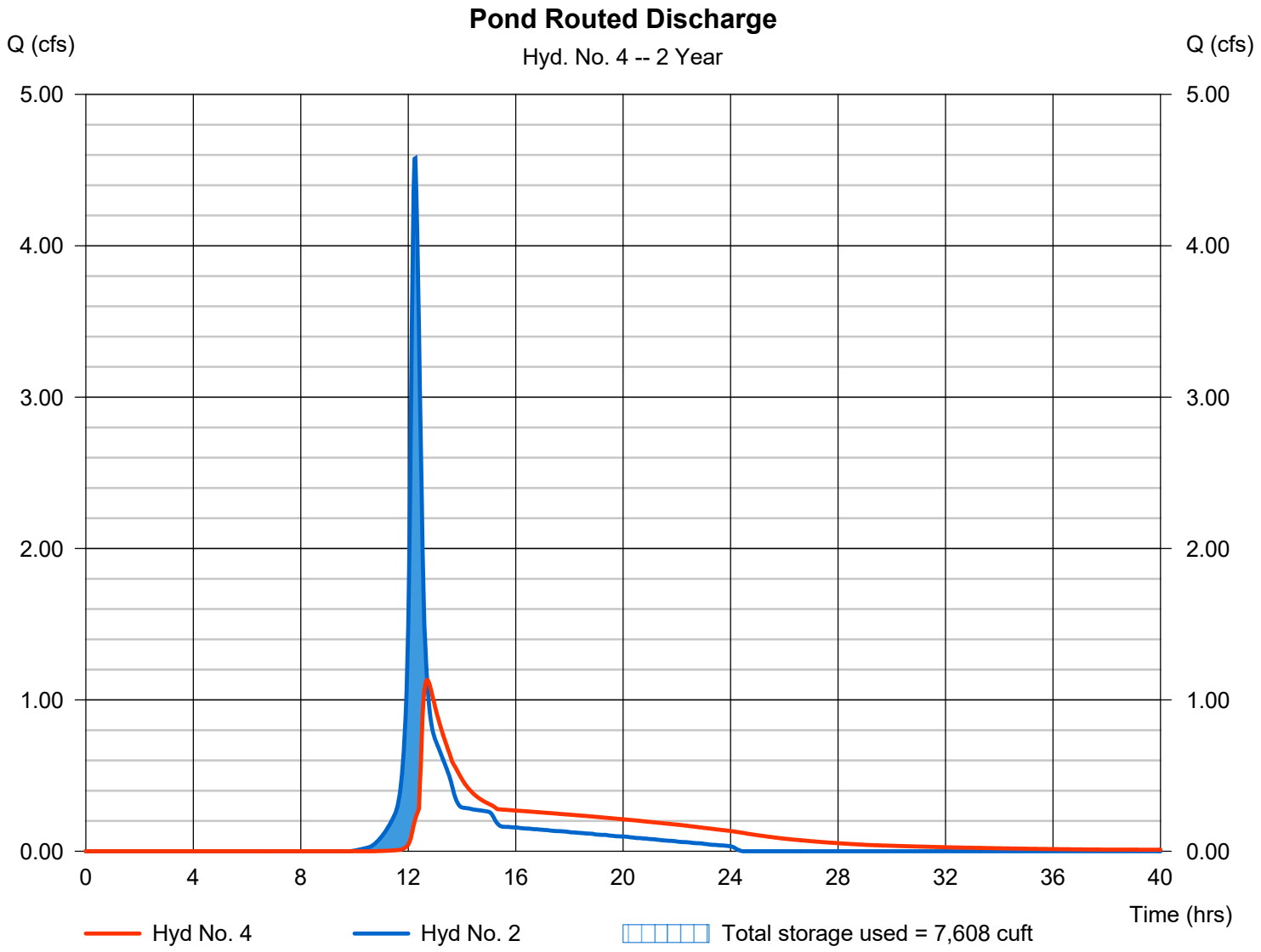
Hydrograph Report

Hyd. No. 4

Pond Routed Discharge

Hydrograph type	=	Reservoir	Peak discharge	=	1.131 cfs
Storm frequency	=	2 yrs	Time to peak	=	12.70 hrs
Time interval	=	2 min	Hyd. volume	=	15,927 cuft
Inflow hyd. No.	=	2 - AREA DRAINING TO POND	Max. Elevation	=	686.05 ft
Reservoir name	=	Existing Pond	Max. Storage	=	7,608 cuft

Storage Indication method used.

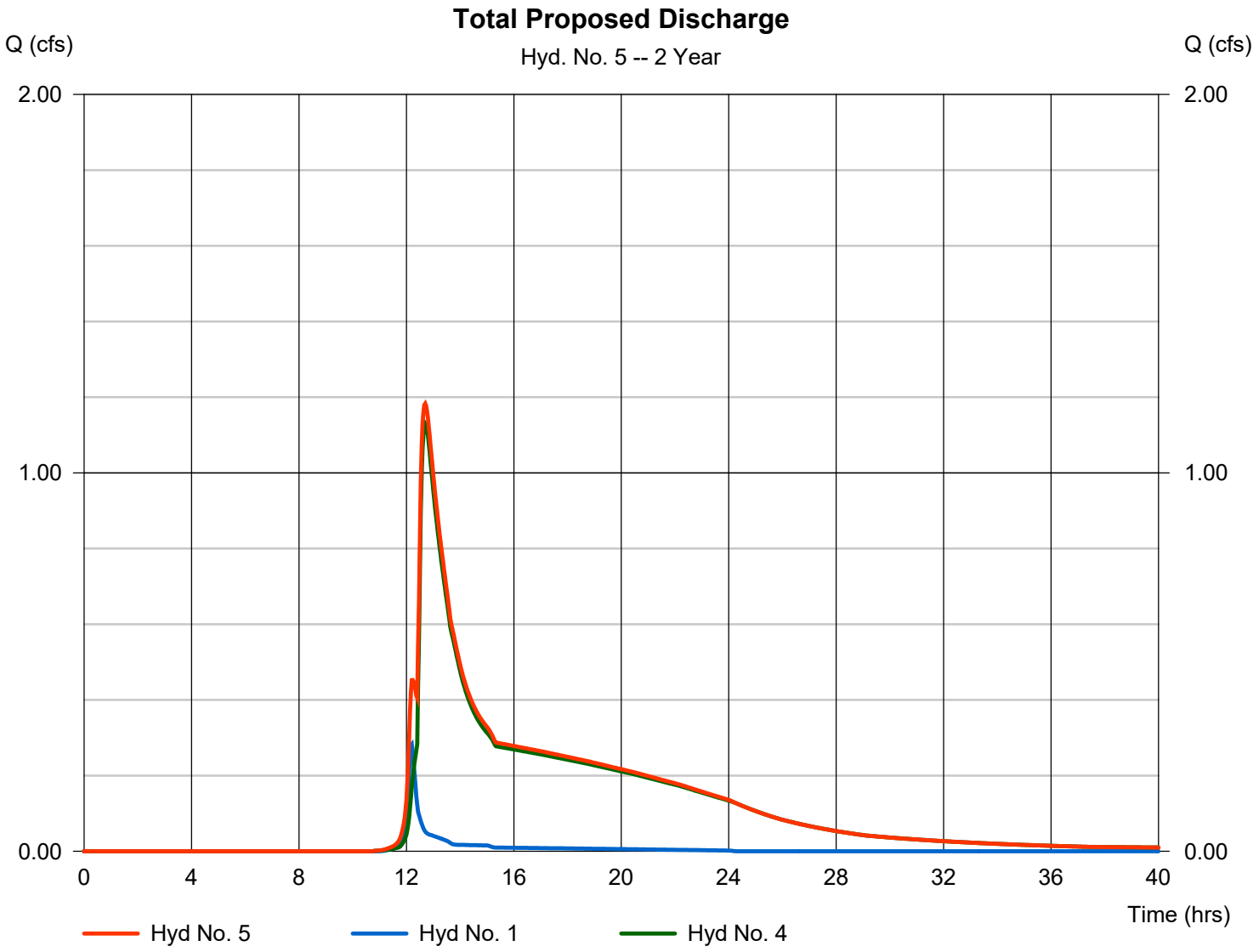


Hydrograph Report

Hyd. No. 5

Total Proposed Discharge

Hydrograph type	=	Combine	Peak discharge	=	1.183 cfs
Storm frequency	=	2 yrs	Time to peak	=	12.70 hrs
Time interval	=	2 min	Hyd. volume	=	16,770 cuft
Inflow hyds.	=	1, 4	Contrib. drain. area	=	0.270 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

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	0.561	2	730	1,638	------	------	------	AREA DRAINING OFF SITE
2	SCS Runoff	8.252	2	734	28,662	------	------	------	AREA DRAINING TO POND
4	Reservoir	4.040	2	750	28,601	2	686.33	11,120	Pond Routed Discharge
5	Combine	4.199	2	750	30,239	1, 4	------	------	Total Proposed Discharge

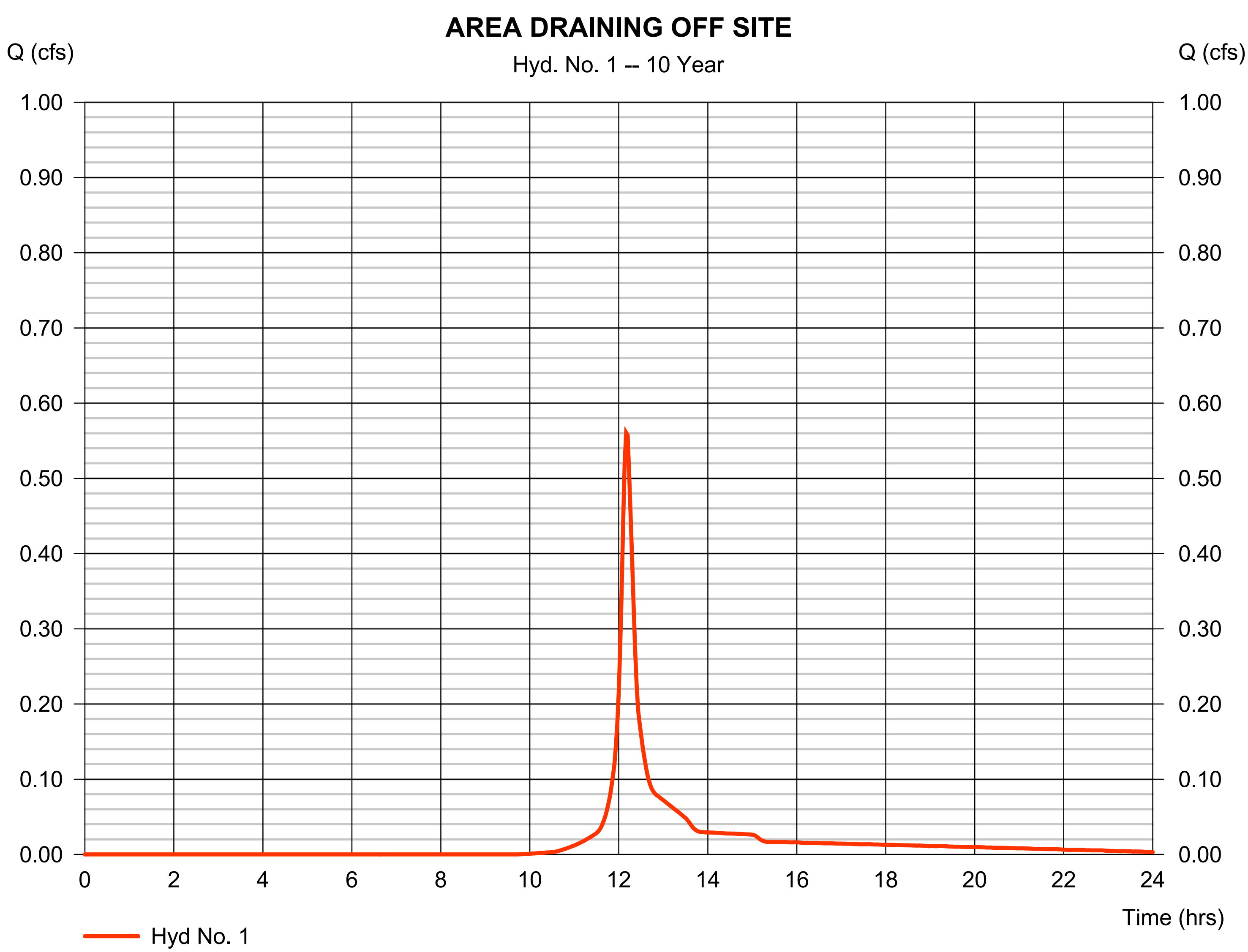
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2 Thursday, 12 / 4 / 2025

Hyd. No. 1

AREA DRAINING OFF SITE

Hydrograph type	= SCS Runoff	Peak discharge	= 0.561 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.17 hrs
Time interval	= 2 min	Hyd. volume	= 1,638 cuft
Drainage area	= 0.270 ac	Curve number	= 80
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 11.20 min
Total precip.	= 3.48 in	Distribution	= Custom
Storm duration	= R:\Blocks\Hydraflow Rain Files\MSE4 2[illegible].cds	Shape factor	= 484



Hydrograph Report

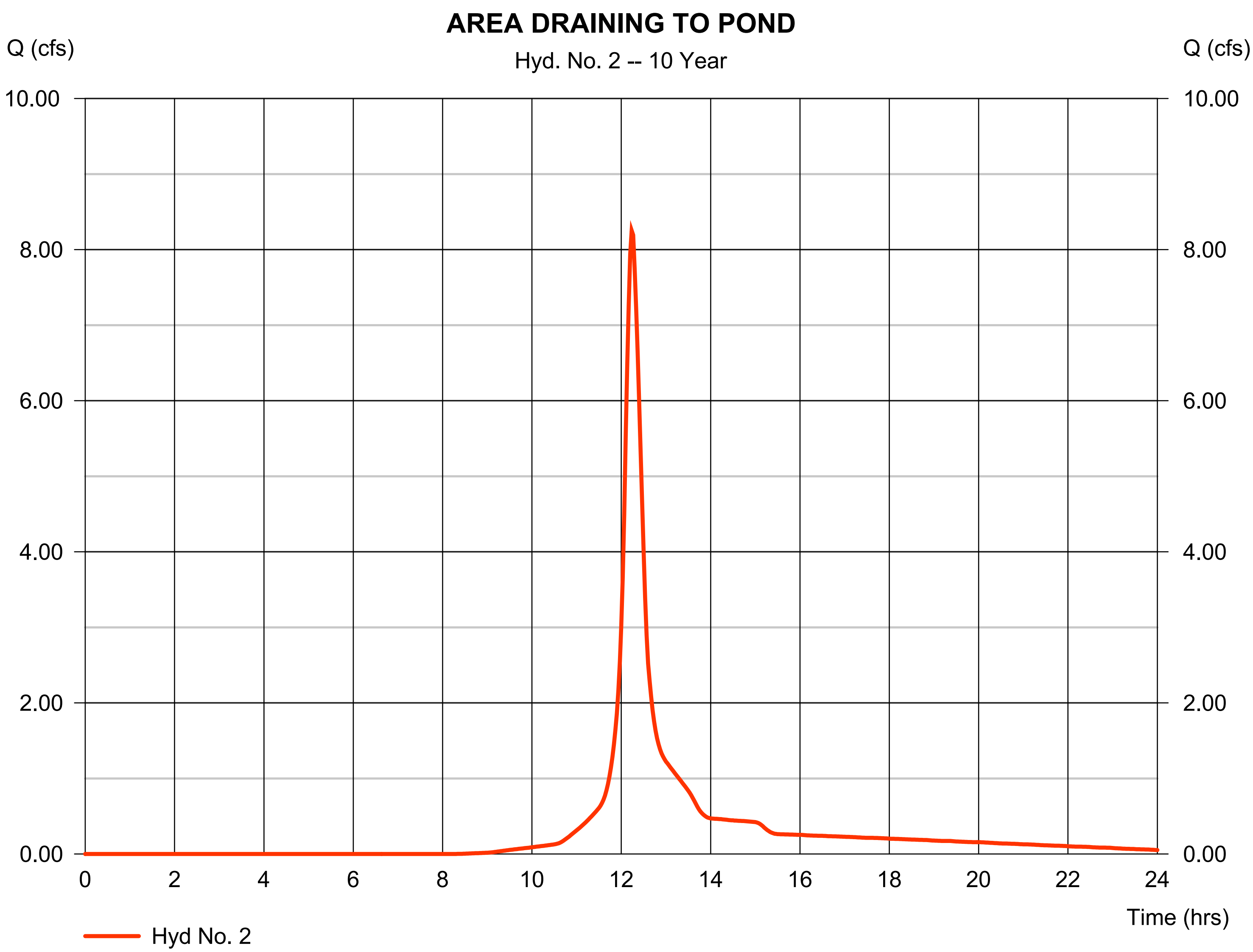
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2 — Thursday, 12 / 4 / 2025

Hyd. No. 2

AREA DRAINING TO POND

Hydrograph type	= SCS Runoff	Peak discharge	= 8.252 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.23 hrs
Time interval	= 2 min	Hyd. volume	= 28,662 cuft
Drainage area	= 3.950 ac	Curve number	= 85*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 18.90 min
Total precip.	= 3.48 in	Distribution	= Custom
Storm duration	= R:\Blocks\Hydraflow Rain Files\MSE4 2[illegible].cds	Shape factor	= 484

* Composite (Area/CN) = [(0.320 x 98) + (1.940 x 85) + (0.210 x 98) + (0.280 x 60) + (0.920 x 80) + (0.280 x 98)] / 3.950



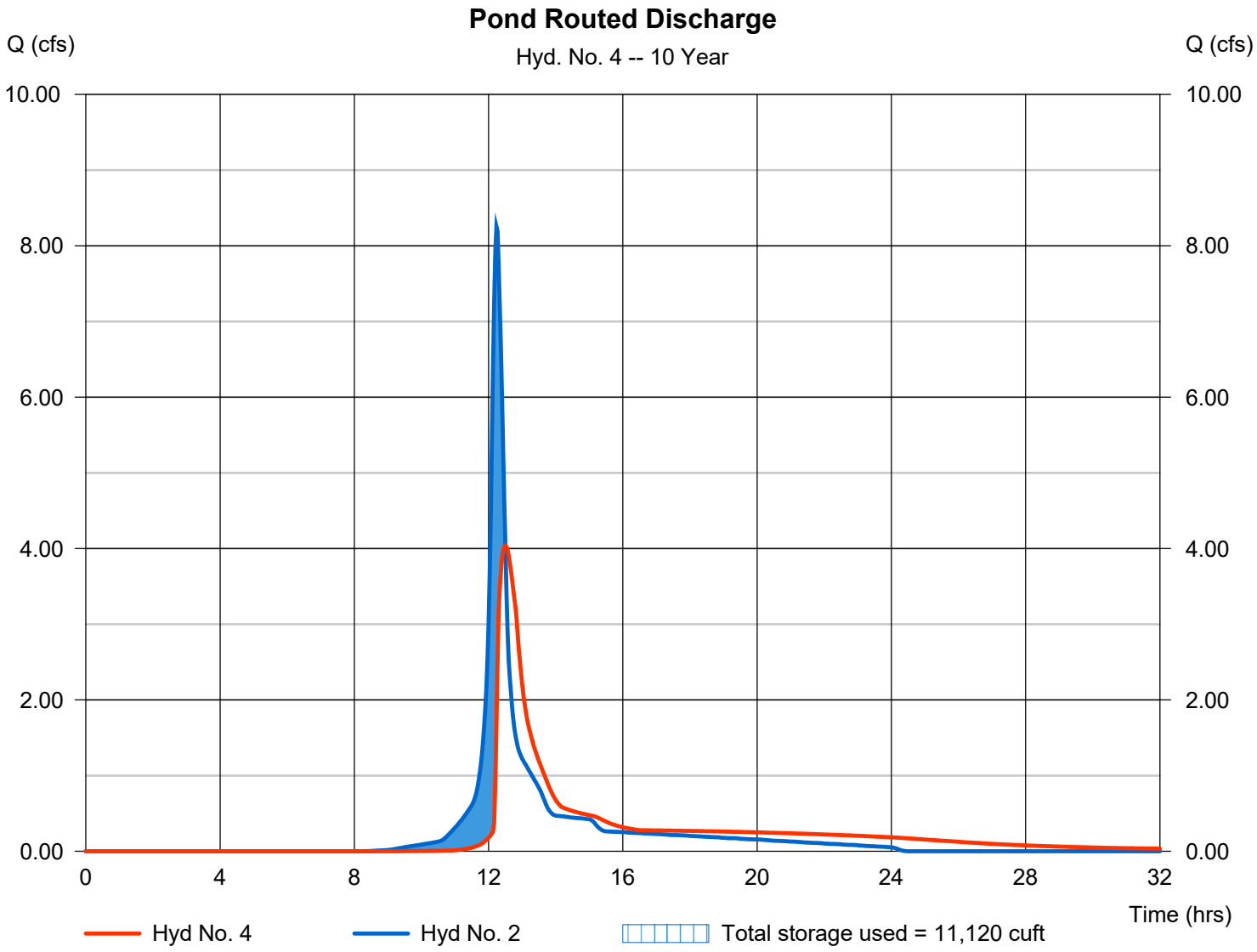
Hydrograph Report

Hyd. No. 4

Pond Routed Discharge

Hydrograph type	=	Reservoir	Peak discharge	=	4.040 cfs
Storm frequency	=	10 yrs	Time to peak	=	12.50 hrs
Time interval	=	2 min	Hyd. volume	=	28,601 cuft
Inflow hyd. No.	=	2 - AREA DRAINING TO POND	Max. Elevation	=	686.33 ft
Reservoir name	=	Existing Pond	Max. Storage	=	11,120 cuft

Storage Indication method used.

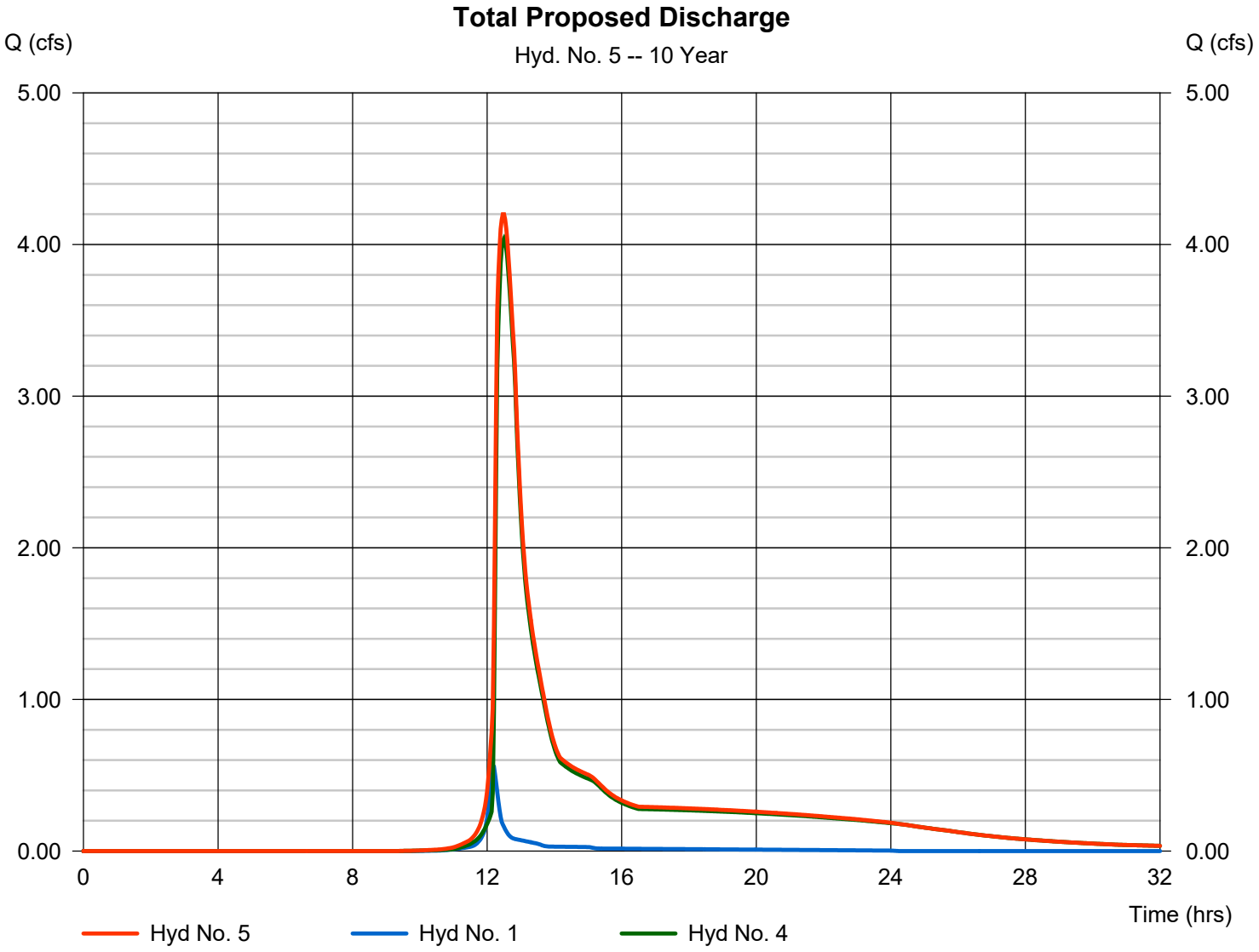


Hydrograph Report

Hyd. No. 5

Total Proposed Discharge

Hydrograph type	= Combine	Peak discharge	= 4.199 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.50 hrs
Time interval	= 2 min	Hyd. volume	= 30,239 cuft
Inflow hyds.	= 1, 4	Contrib. drain. area	= 0.270 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

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	1.189	2	730	3,477	------	------	------	AREA DRAINING OFF SITE
2	SCS Runoff	16.03	2	734	56,569	------	------	------	AREA DRAINING TO POND
4	Reservoir	10.54	2	746	56,507	2	686.97	19,145	Pond Routed Discharge
5	Combine	10.95	2	744	59,984	1, 4	------	------	Total Proposed Discharge

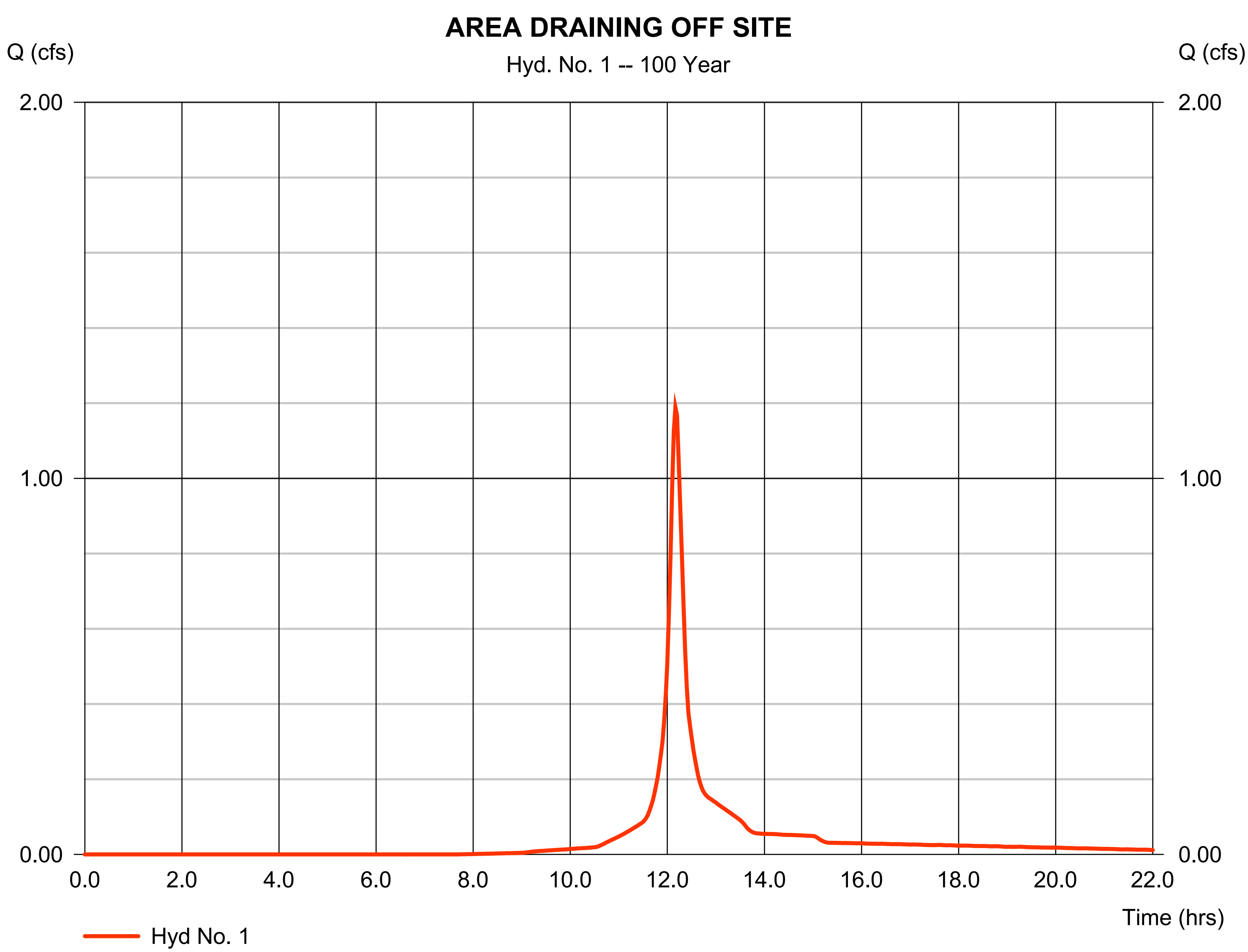
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2 — Thursday, 12 / 4 / 2025

Hyd. No. 1

AREA DRAINING OFF SITE

Hydrograph type	= SCS Runoff	Peak discharge	= 1.189 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.17 hrs
Time interval	= 2 min	Hyd. volume	= 3,477 cuft
Drainage area	= 0.270 ac	Curve number	= 80
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 11.20 min
Total precip.	= 5.62 in	Distribution	= Custom
Storm duration	= R:\Blocks\Hydraflow Rain Files\MSE4 24hr.cds	Shape factor	= 484



Hydrograph Report

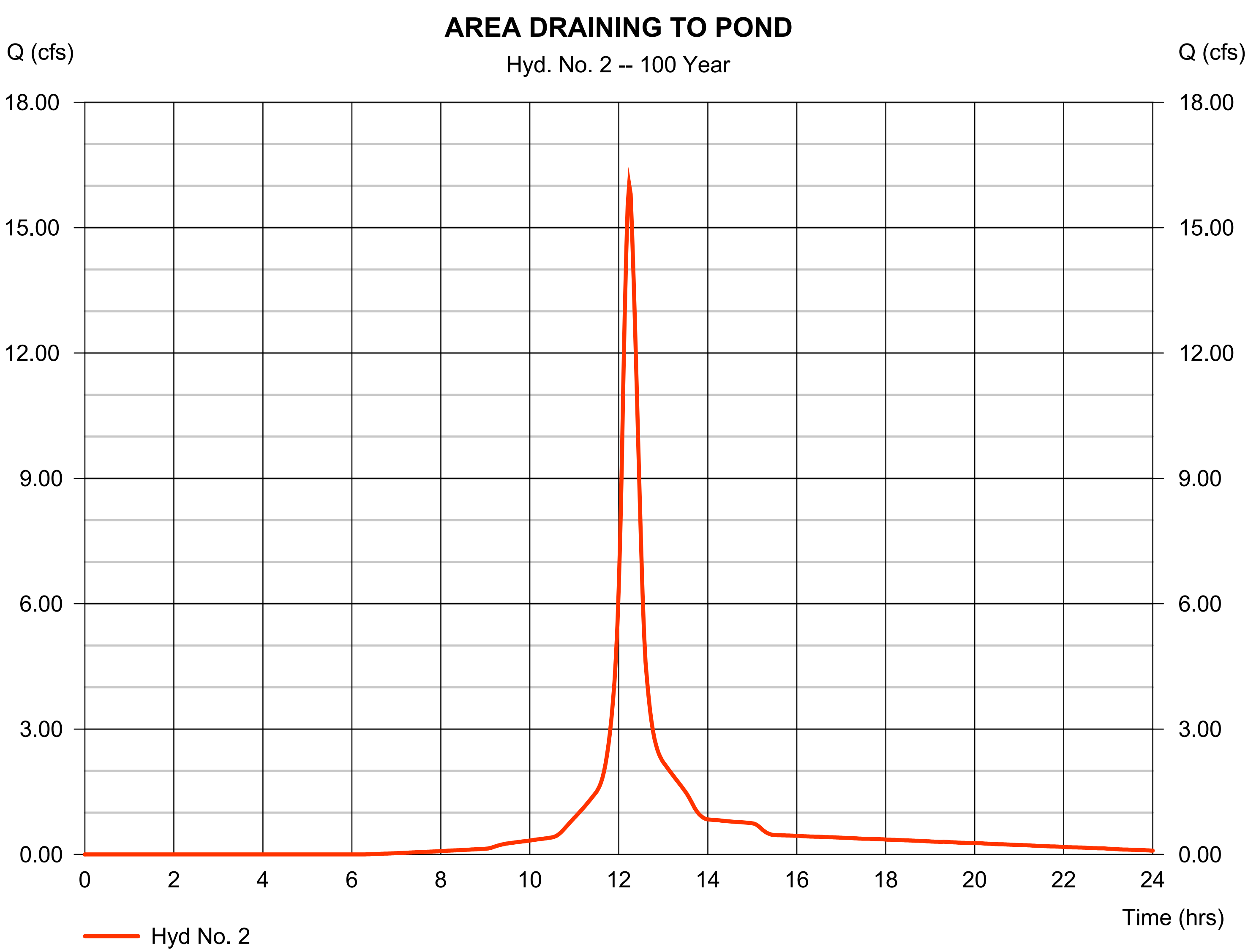
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2 Thursday, 12 / 4 / 2025

Hyd. No. 2

AREA DRAINING TO POND

Hydrograph type	=	SCS Runoff	Peak discharge	=	16.03 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.23 hrs
Time interval	=	2 min	Hyd. volume	=	56,569 cuft
Drainage area	=	3.950 ac	Curve number	=	85*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	18.90 min
Total precip.	=	5.62 in	Distribution	=	Custom
Storm duration	=	R:\Blocks\Hydraflow Rain Files\MSE4 24hr.cds	Shape factor	=	484

* Composite (Area/CN) = [(0.320 x 98) + (1.940 x 85) + (0.210 x 98) + (0.280 x 60) + (0.920 x 80) + (0.280 x 98)] / 3.950



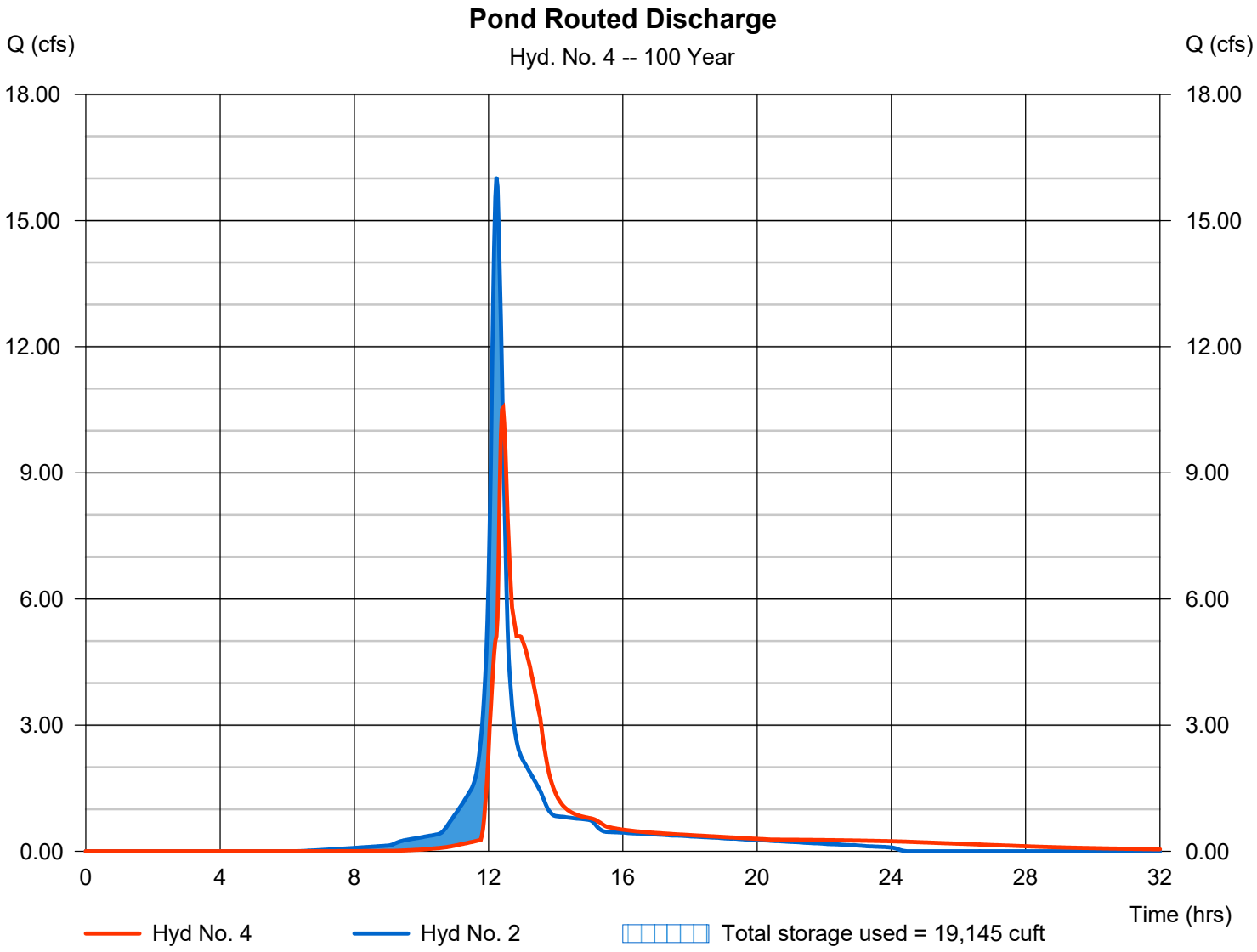
Hydrograph Report

Hyd. No. 4

Pond Routed Discharge

Hydrograph type	=	Reservoir	Peak discharge	=	10.54 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.43 hrs
Time interval	=	2 min	Hyd. volume	=	56,507 cuft
Inflow hyd. No.	=	2 - AREA DRAINING TO POND	Max. Elevation	=	686.97 ft
Reservoir name	=	Existing Pond	Max. Storage	=	19,145 cuft

Storage Indication method used.

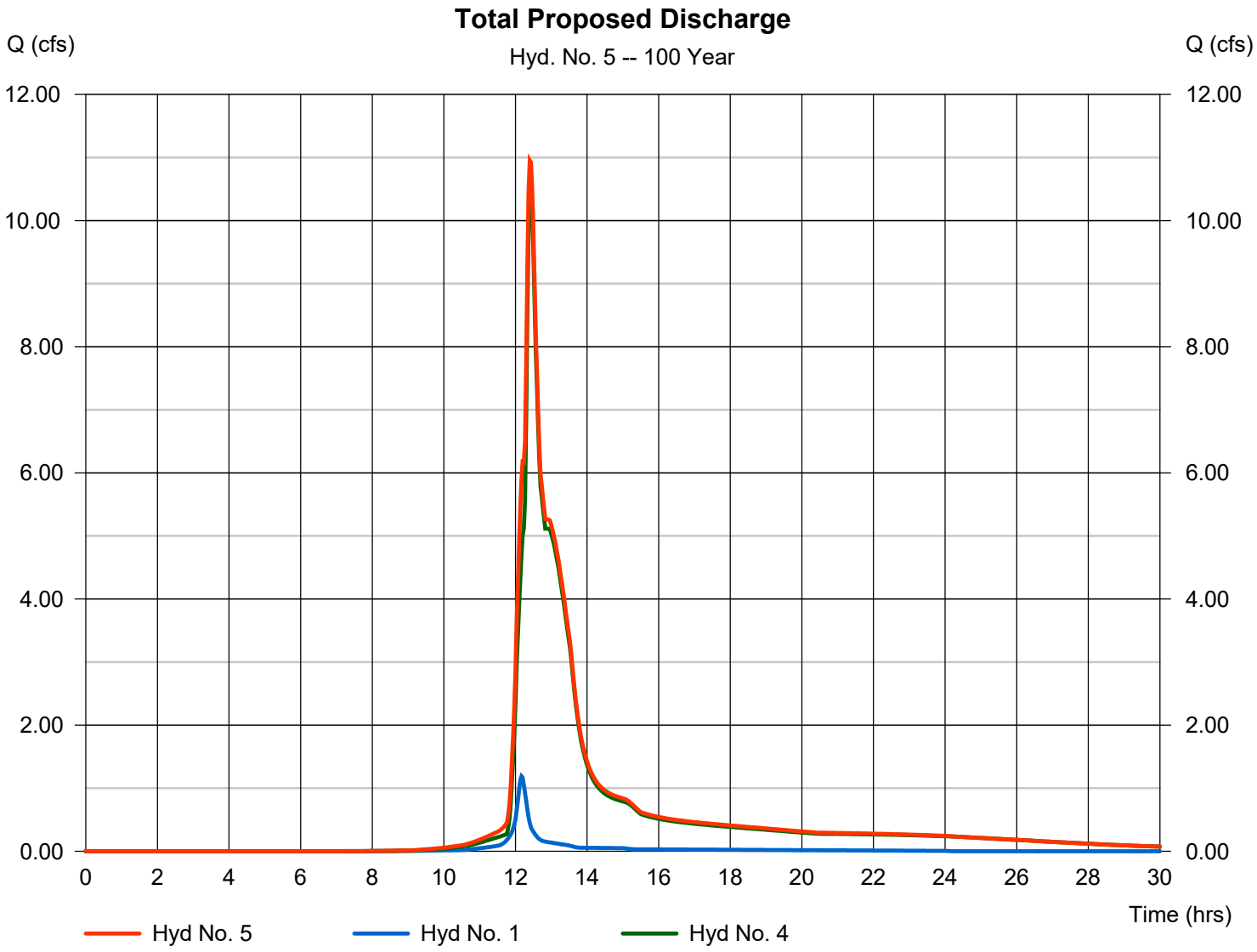


Hydrograph Report

Hyd. No. 5

Total Proposed Discharge

Hydrograph type	=	Combine	Peak discharge	=	10.95 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.40 hrs
Time interval	=	2 min	Hyd. volume	=	59,984 cuft
Inflow hyds.	=	1, 4	Contrib. drain. area	=	0.270 ac



STORMWATER MANAGEMENT PLAN
GRIESBACH READY-MIX
CITY OF KAUKAUNA
September 22, 2020

9-22-20

TABLÆ OF CONTENTS

STORMWATER/EROSION CONTROL NARRATIVE

INTRODUCTION

The Griesbach Ready-Mix property is Lot 1 of Certified Survey Map No. 5711 located in the southeast ¼ of the southwest ¼, Section 7, T21N, R19E, City of Kaukauna, Outagamie County, Wisconsin.

The site is on the northeast side of the cul-de-sac for Farmland Drive.

The proposed project includes a proposed 11,760 square feet building and wet detention area.

EXISTING SITE CONDITIONS

The soils are Manawa silty clay loam and Manistee fine sandy loam.

The existing site has three buildings, gravel area, concrete piles and a wooded area on the south side.

STORMWATER MANAGEMENT

The proposed detention area is located on the north side of the site and discharges to the existing ditch located at the northeast corner of the property.

The Hydrocad method is used for the stormwater calculations. Meadow is used as the existing condition for the entire site.

The developed runoff rates are lower than the existing runoff rates for the 1-year, 2-year, 10-year and 100-year storms.

The wet detention area removes 80% of the total suspended solids and 67.88% of the total phosphous for the entire developed site.

See Appendix A for Stormwater Calculations

See Appendix B for Winslamm Results

See Appendix C for Operations and Maintenance Manual

The owner is responsible for the operation and maintenance of detention area.

EROSION CONTROL

Silt fence will be installed at the toe of the slope of the disturbed areas. Erosion matting will be installed at the ditch bottoms and slopes steeper than 5%. The disturbed areas will be seeded and mulched in a timely manner. The Best Management Practices are designed in accordance with The WDNR Technical Standards.

The estimated disturbed area is 0.97 acres.

CONSTRUCTION SEQUENCE

a. Install silt fence at the toe of slopes of the disturbed areas
b. Remove and stockpile topsoil
c. Construct detention area and ditches
d. Construct new building
e. Seed and mulch all disturbed areas
f. Remove erosion control measures, after stabilization of the disturbed areas

SUMMARY OF RESULTS

PEAK RUNOFF RATEES

	1 YEAR	2 YEAR	10 YEAR	100 YEAR
EXISTING	1.21 C.F.S.	1.86 C.F.S.	4.56 C.F.S.	10.73 C.F.S.
TOTAL OFF-SITE - DEVELOPED	0.80 C.F.S.	1.41 C.F.S.	4.02 C.F.S.	9.04 C.F.S.
WATER ELEVATION	EL 685.81	EL 685.93	EL 686.30	EL 686.88

WINSLAMM MODEL: Total Suspended Solids Removal – over 80% of Total Solids removed for new development. Over 67.88% of total phosphorus removed.

APPENDIX A

Stormwater Calculations

HARRIS & ASSOCIATES, INC. 2718 N. MEADE STREET, APPLETON, WISCONSIN 54911
ENGINEERS & SURVEYORS (920) 733-8377, FAX (920) 733-4731

BY CLT DATE 6-15-20 SUBJECT Morton Buildings SHEET NO. 1 OF 3
CK. ____ DATE ____ Griesbach Ready-Mix - Kaukauna JOB NO. ____

STORMWATER CALCULATIONS

Calculate existing and developed runoff rates for the 1 year, 2 year, 10 year and 100 year storms and design detention. Use meadow condition as existing. Use Hydrocad Model.

EXISTING

Area = 183,785 Sq.Ft. ÷ 43560 = 4.22 Acres

Soil Types:		HYDROLOGIC GROUP	
	Manawa, Silty Clay Loam, McA	"D"	75%
	Manistee, Fine Sandy Loam, MfB	"B"	25%

Land Use: Meadow "B" Area = 4.22 × 0.25 = 1.06 Ac
"D" Area = 4.22 × 0.75 = 3.16 Ac

TIME OF CONCENTRATION

Sheet, 100', $s = \frac{703 - 693}{220} = 0.045$, Woods-Light Underbrush

Shallow Concentrated, 120', s = 0.045, Unpaved

Shallow Concentrated, 430', $s = \frac{693 - 686.67}{430} = 0.015$, Unpaved

T_c = 21.8 min.

DISCHARGE

1YR	2YR	10YR	100YR
1.21 c.f.s.	1.86 c.f.s.	4.56 c.f.s.	10.73 c.f.s.

HARRIS & ASSOCIATES, INC. 2718 N. MEADE STREET, APPLETON, WISCONSIN 54911
ENGINEERS & SURVEYORS (920) 733-8377, FAX (920) 733-4731

BY CLT DATE 6-25-20 SUBJECT Morton Buildings SHEET NO. 2 OF 3
CK. ____ DATE ____ Griesbach Ready-Mix - Kaukauna JOB NO. ____

Area Draining Directly Off-site

Area = 10,640 Sq.Ft. ÷ 43560 = 0.24 Acres

Soil Type: Manawa silty clay loam, McA — Hydrologic Group "D"

Land Use: Open - Good RCN = 80

TIME OF CONCENTRATION

Sheet, 62', $s = \frac{688.04 - 686.41}{62} = 0.026$, Grass - short

T_c =

7-13-20

Area Draining to Detention Area

Area = 4.22 Ac - 0.24 Ac = 3.98 Acres

		Hydrologic Group
Roof Area	11760 + 558 + 1065 + 208 = 13591 Sq.Ft. ÷ 43560 = 0.31 Ac	"D"
Paved Area	86160 - 558 - 1065 - 208 = 84330 Sq.Ft. ÷ 43560 = 1.94 Ac	"D"
Water Surface	= 0.21 Ac	"D"
Wooded Area	= 30,280 Sq.Ft. ÷ 43560 = 0.70 Ac	"B"
Grass Area	= 3.98 - 0.31 - 1.94 - 0.21 - 0.70 = 0.82 Ac	"D"

TIME OF CONCENTRATION

Sheet, 100', $s = \frac{703 - 694}{210} = 0.043$, Woods - Light Under brush

Shallow Concentrated, 110', s = 0.043, Unpaved

Shallow Concentrated, 277', $s = \frac{694 - 689}{277} = 0.018$, Paved

Shallow Concentrated, 100', $s = \frac{689 - 688}{100} = 0.01$, Unpaved

HARRIS & ASSOCIATES, INC. 2718 N. MEADE STREET, APPLETON, WISCONSIN 54911
ENGINEERS & SURVEYORS (920) 733-8377, FAX (920) 733-4731

BY CLT DATE 7-13-20 SUBJECT Morton Buildings SHEET NO. 3 OF 3
CK. ____ DATE ____ Greisbach Ready-Mix- Kaukauna JOB NO. ____

OUTLETS

18" Culvert Inv. EL. 685.00
1- 4" Orifice Inv. EL. 685.00
3- 8" Orifice Inv. EL. 685.60
3- 8" Orifice Inv. EL. 686.10
1- 36" Stand Pipe EL. 687.00

Summary

	1YR	2YR	10YR	100YR
Existing	1.21 cfs.	1.86 cfs	4.56 cfs	10.73 cfs.
Total Off-site-Developed	0.80 cfs	1.41 cfs	4.02 cfs.	9.04 cfs
Water Elevation	El. 685.81	El. 685.93	El. 686.30	El. 686.88

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
McA	Manawa silty clay loam, 0 to 3 percent slopes	D	2.8	75.4%
MfB	Manistee fine sandy loam, 2 to 6 percent slopes	B	0.9	24.6%
Totals for Area of Interest			**3.6**	**100.0%**

Description

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

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

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

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

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

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

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

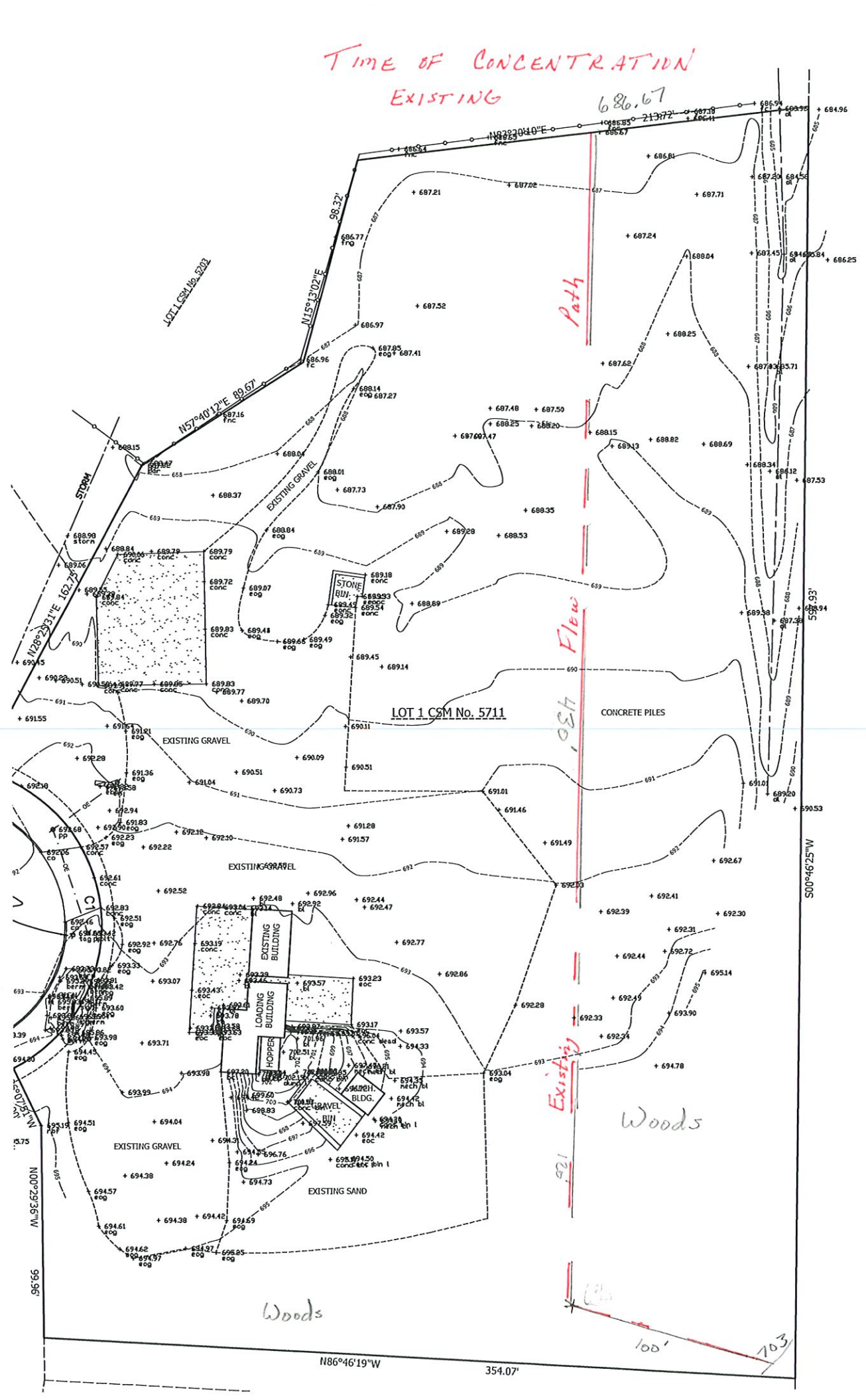
Map Scale: 1:1,050 if printed on A portrait (8.5" x 11") sheet.

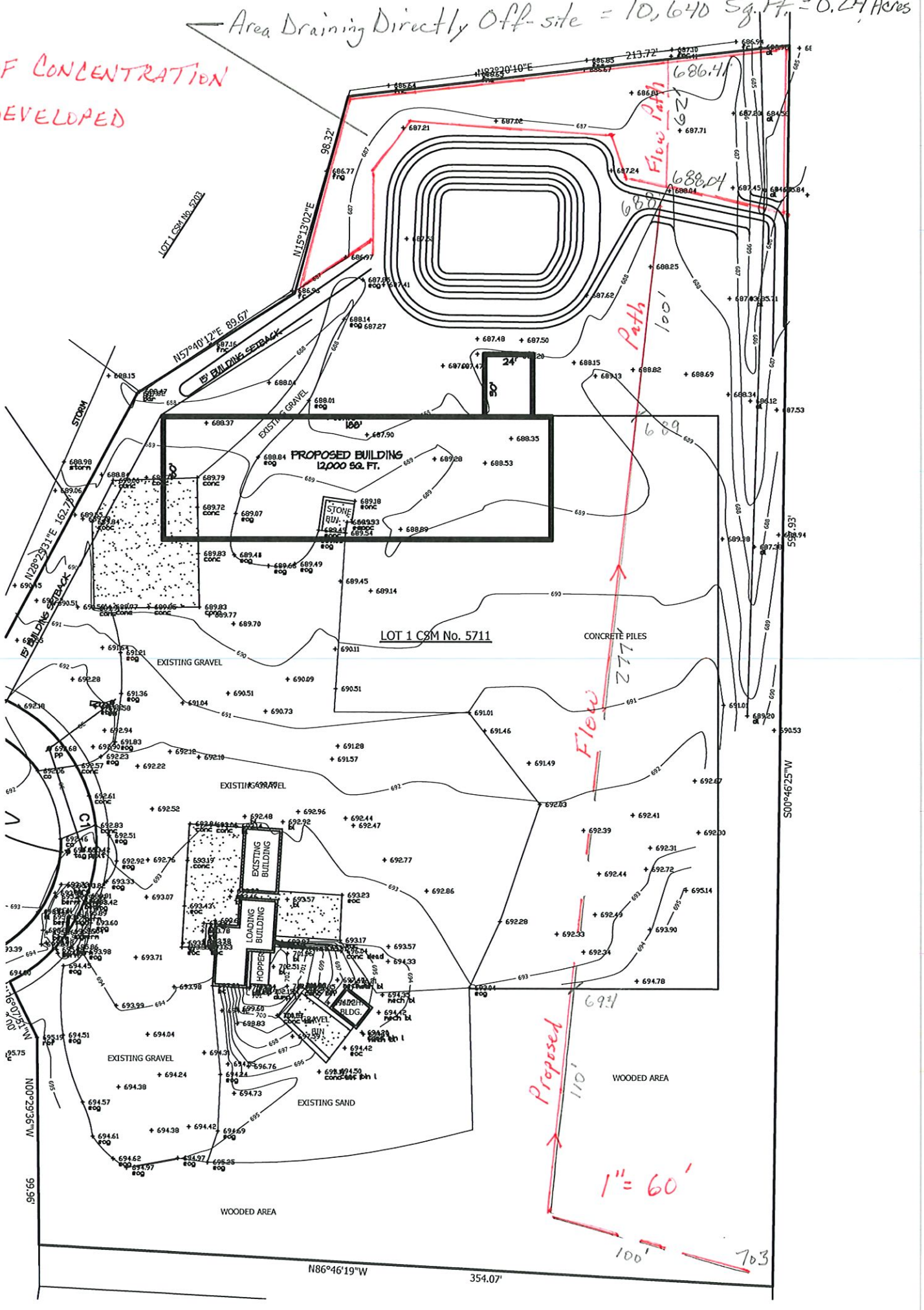
N

Meters: 0 15 30 60 90

Feet: 0 50 100 200 300

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 16N WGS84


TIME OF CONCENTRATION
EXISTING
686.67
213.72'
N03°20'10"E
98.32'
N15°13'02"E
LOT 1 CSM No. 5702
N57°40'12"E 89.67'
N28°23'31"E 162.72'
STORM
EXISTING GRAVEL
Path
Flow
LOT 1 CSM No. 5711
CONCRETE PILES
EXISTING GRAVEL
EXISTING BUILDING
LOADING BUILDING
HOPPER
STONE BIN
BLDG.
GRAVEL BIN
EXISTING GRAVEL
EXISTING SAND
EXISTING GRAVEL
Existing
Woods
Woods
S00°46'25"W
N00°29'36"W
N86°46'19"W
354.07'
99.96'
100'
1"=60'


Area Draining Directly Off-site = 10,640 Sq. Ft. = 0.24 Acres
TIME OF CONCENTRATION
DEVELOPED
Flow Path
686.41'
688.04'
688.
689
Flow Path
100'
Flow
277'
Proposed
110'
1" = 60'
PROPOSED BUILDING
12,000 SQ. FT.
LOT 1 CSM No. 5711
LOT 1 CSM No. 5203
EXISTING GRAVEL
EXISTING BUILDING
LOADING
HOPPER
BUILDING
SCALE
BLDG.
STONE
RUN.
CONCRETE PILES
EXISTING SAND
WOODED AREA
STORM
24'
90'
100'
213.72'
98.32'
N15°13'02"E
N57°40'12"E 89.67'
N28°29'31"E 162.71'
N00°29'36"W 99.96'
S00°46'25"W 593'
N86°46'19"W 354.07'
B/ BUILDING SETBACK
703

Subcat Reach Pond Link

Routing Diagram for GRIESBACHREDIMIX
Prepared by HP Inc., Printed 7/13/2020

Summary for Subcatchment 3S: EXISTING

Runoff = 1.21 cfs @ 12.38 hrs, Volume= 0.135 af, Depth> 0.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
MSE 24-hr 4 1-year Rainfall=2.14"

Area (ac)	CN	Description
1.060	58	Meadow, non-grazed, HSG B
3.160	78	Meadow, non-grazed, HSG D
4.220	73	Weighted Average
4.220		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.6	100	0.0450	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.50"
0.6	120	0.0450	3.42		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
3.6	430	0.0150	1.97		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
21.8	650	Total			

Summary for Subcatchment 3S: EXISTING

Runoff = 1.86 cfs @ 12.36 hrs, Volume= 0.190 af, Depth> 0.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
MSE 24-hr 4 2-year Rainfall=2.45"

Area (ac)	CN	Description
1.060	58	Meadow, non-grazed, HSG B
3.160	78	Meadow, non-grazed, HSG D
4.220	73	Weighted Average
4.220		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.6	100	0.0450	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.50"
0.6	120	0.0450	3.42		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
3.6	430	0.0150	1.97		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
21.8	650	Total			

Summary for Subcatchment 3S: EXISTING

Runoff = 4.56 cfs @ 12.34 hrs, Volume= 0.416 af, Depth> 1.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
MSE 24-hr 4 10-year Rainfall=3.51"

Area (ac)	CN	Description
1.060	58	Meadow, non-grazed, HSG B
3.160	78	Meadow, non-grazed, HSG D
4.220	73	Weighted Average
4.220		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.6	100	0.0450	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.50"
0.6	120	0.0450	3.42		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
3.6	430	0.0150	1.97		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
21.8	650	Total			

Summary for Subcatchment 3S: EXISTING

Runoff = 10.73 cfs @ 12.32 hrs, Volume= 0.940 af, Depth> 2.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
MSE 24-hr 4 100-year Rainfall=5.50"

Area (ac)	CN	Description
1.060	58	Meadow, non-grazed, HSG B
3.160	78	Meadow, non-grazed, HSG D
4.220	73	Weighted Average
4.220		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.6	100	0.0450	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.50"
0.6	120	0.0450	3.42		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
3.6	430	0.0150	1.97		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
21.8	650	Total			

Summary for Subcatchment 1S: GREISBACH DEVELOPED

Runoff = 4.16 cfs @ 12.31 hrs, Volume= 0.357 af, Depth> 1.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
MSE 24-hr 4 1-year Rainfall=2.14"

Area (ac)	CN	Description
0.310	98	Roofs, HSG D
1.940	98	Paved parking, HSG D
0.820	80	>75% Grass cover, Good, HSG D
0.210	98	Water Surface, HSG D
0.700	60	Woods, Fair, HSG B
3.980	88	Weighted Average
1.520		38.19% Pervious Area
2.460		61.81% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.9	100	0.0430	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.50"
0.5	110	0.0430	3.34		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.7	277	0.0180	2.72		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.0	100	0.0100	1.61		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
21.1	587	Total			

Summary for Subcatchment 1S: GREISBACH DEVELOPED

Runoff = 5.17 cfs @ 12.31 hrs, Volume= 0.443 af, Depth> 1.34"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
MSE 24-hr 4 2-year Rainfall=2.45"

Area (ac)	CN	Description
0.310	98	Roofs, HSG D
1.940	98	Paved parking, HSG D
0.820	80	>75% Grass cover, Good, HSG D
0.210	98	Water Surface, HSG D
0.700	60	Woods, Fair, HSG B
3.980	88	Weighted Average
1.520		38.19% Pervious Area
2.460		61.81% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.9	100	0.0430	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.50"
0.5	110	0.0430	3.34		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.7	277	0.0180	2.72		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.0	100	0.0100	1.61		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
21.1	587	Total			

Summary for Subcatchment 1S: GREISBACH DEVELOPED

Runoff = 8.74 cfs @ 12.31 hrs, Volume= 0.754 af, Depth> 2.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
MSE 24-hr 4 10-year Rainfall=3.51"

Area (ac)	CN	Description
0.310	98	Roofs, HSG D
1.940	98	Paved parking, HSG D
0.820	80	>75% Grass cover, Good, HSG D
0.210	98	Water Surface, HSG D
0.700	60	Woods, Fair, HSG B
3.980	88	Weighted Average
1.520		38.19% Pervious Area
2.460		61.81% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.9	100	0.0430	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.50"
0.5	110	0.0430	3.34		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.7	277	0.0180	2.72		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.0	100	0.0100	1.61		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
21.1	587	Total			

Summary for Subcatchment 1S: GREISBACH DEVELOPED

Runoff = 15.58 cfs @ 12.30 hrs, Volume= 1.373 af, Depth> 4.14"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
MSE 24-hr 4 100-year Rainfall=5.50"

Area (ac)	CN	Description
0.310	98	Roofs, HSG D
1.940	98	Paved parking, HSG D
0.820	80	>75% Grass cover, Good, HSG D
0.210	98	Water Surface, HSG D
0.700	60	Woods, Fair, HSG B
3.980	88	Weighted Average
1.520		38.19% Pervious Area
2.460		61.81% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.9	100	0.0430	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.50"
0.5	110	0.0430	3.34		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.7	277	0.0180	2.72		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.0	100	0.0100	1.61		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
21.1	587	Total			

Summary for Subcatchment 4S: AREA DIRECTLY OFFSITE

Runoff = 0.23 cfs @ 12.15 hrs, Volume= 0.013 af, Depth> 0.65"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
MSE 24-hr 4 1-year Rainfall=2.14"

Area (ac)	CN	Description
0.240	80	>75% Grass cover, Good, HSG D
0.240		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	62	0.0260	0.15		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.50"

Summary for Subcatchment 4S: AREA DIRECTLY OFFSITE

Runoff = 0.31 cfs @ 12.15 hrs, Volume= 0.017 af, Depth> 0.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
MSE 24-hr 4 2-year Rainfall=2.45"

Area (ac)	CN	Description
0.240	80	>75% Grass cover, Good, HSG D
0.240		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	62	0.0260	0.15		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.50"

Summary for Subcatchment 4S: AREA DIRECTLY OFFSITE

Runoff = 0.61 cfs @ 12.14 hrs, Volume= 0.033 af, Depth> 1.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
MSE 24-hr 4 10-year Rainfall=3.51"

Area (ac)	CN	Description
0.240	80	>75% Grass cover, Good, HSG D
0.240		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	62	0.0260	0.15		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.50"

Summary for Subcatchment 4S: AREA DIRECTLY OFFSITE

Runoff = 1.21 cfs @ 12.14 hrs, Volume= 0.067 af, Depth> 3.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
MSE 24-hr 4 100-year Rainfall=5.50"

Area (ac)	CN	Description
0.240	80	>75% Grass cover, Good, HSG D
0.240		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	62	0.0260	0.15		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.50"

Summary for Pond 2P: DETENTION AREA

Inflow Area = 3.980 ac, 61.81% Impervious, Inflow Depth > 1.08" for 1-year event
Inflow = 4.16 cfs @ 12.31 hrs, Volume= 0.357 af
Outflow = 0.78 cfs @ 13.06 hrs, Volume= 0.300 af, Atten= 81%, Lag= 44.9 min
Primary = 0.78 cfs @ 13.06 hrs, Volume= 0.300 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 685.81' @ 13.06 hrs Surf.Area= 0.242 ac Storage= 0.183 af

Plug-Flow detention time= 226.5 min calculated for 0.300 af (84% of inflow)
Center-of-Mass det. time= 164.1 min (995.3 - 831.2)

Volume	Invert	Avail.Storage	Storage Description
#1	685.00'	0.660 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
685.00	0.210	0.000	0.000
686.00	0.250	0.230	0.230
687.00	0.300	0.275	0.505
687.50	0.320	0.155	0.660

Device	Routing	Invert	Outlet Devices
#1	Primary	685.00'	**18.0" Round Culvert** L= 80.0' Ke= 0.500 Inlet / Outlet Invert= 685.00' / 684.60' S= 0.0050 '/' Cc= 0.900 n= 0.009, Flow Area= 1.77 sf
#2	Device 1	685.00'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	685.60'	**8.0" Vert. Orifice/Grate X 3.00** C= 0.600 Limited to weir flow at low heads
#4	Device 1	686.10'	**8.0" Vert. Orifice/Grate X 3.00** C= 0.600 Limited to weir flow at low heads
#5	Device 1	687.00'	**36.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.78 cfs @ 13.06 hrs HW=685.81' (Free Discharge)
└─**1=Culvert** (Passes 0.78 cfs of 2.72 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.34 cfs @ 3.86 fps)
  ├─**3=Orifice/Grate** (Orifice Controls 0.44 cfs @ 1.56 fps)
  ├─**4=Orifice/Grate** (Controls 0.00 cfs)
  └─**5=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond 2P: DETENTION AREA

Inflow Area = 3.980 ac, 61.81% Impervious, Inflow Depth > 1.34" for 2-year event
Inflow = 5.17 cfs @ 12.31 hrs, Volume= 0.443 af
Outflow = 1.37 cfs @ 12.83 hrs, Volume= 0.379 af, Atten= 73%, Lag= 30.9 min
Primary = 1.37 cfs @ 12.83 hrs, Volume= 0.379 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 685.93' @ 12.83 hrs Surf.Area= 0.247 ac Storage= 0.212 af

Plug-Flow detention time= 196.9 min calculated for 0.379 af (86% of inflow)
Center-of-Mass det. time= 139.1 min (965.2 - 826.1)

Volume	Invert	Avail.Storage	Storage Description
#1	685.00'	0.660 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
685.00	0.210	0.000	0.000
686.00	0.250	0.230	0.230
687.00	0.300	0.275	0.505
687.50	0.320	0.155	0.660

Device	Routing	Invert	Outlet Devices
#1	Primary	685.00'	**18.0" Round Culvert** L= 80.0' Ke= 0.500 Inlet / Outlet Invert= 685.00' / 684.60' S= 0.0050 '/' Cc= 0.900 n= 0.009, Flow Area= 1.77 sf
#2	Device 1	685.00'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	685.60'	**8.0" Vert. Orifice/Grate X 3.00** C= 0.600 Limited to weir flow at low heads
#4	Device 1	686.10'	**8.0" Vert. Orifice/Grate X 3.00** C= 0.600 Limited to weir flow at low heads
#5	Device 1	687.00'	**36.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.37 cfs @ 12.83 hrs HW=685.93' (Free Discharge)
└**1=Culvert** (Passes 1.37 cfs of 3.42 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 0.37 cfs @ 4.20 fps)
  ├**3=Orifice/Grate** (Orifice Controls 1.01 cfs @ 1.95 fps)
  ├**4=Orifice/Grate** (Controls 0.00 cfs)
  └**5=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond 2P: DETENTION AREA

Inflow Area = 3.980 ac, 61.81% Impervious, Inflow Depth > 2.27" for 10-year event
Inflow = 8.74 cfs @ 12.31 hrs, Volume= 0.754 af
Outflow = 3.93 cfs @ 12.62 hrs, Volume= 0.669 af, Atten= 55%, Lag= 18.9 min
Primary = 3.93 cfs @ 12.62 hrs, Volume= 0.669 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 686.30' @ 12.62 hrs Surf.Area= 0.265 ac Storage= 0.308 af

Plug-Flow detention time= 138.8 min calculated for 0.667 af (88% of inflow)
Center-of-Mass det. time= 91.0 min (904.6 - 813.6)

Volume	Invert	Avail.Storage	Storage Description
#1	685.00'	0.660 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
685.00	0.210	0.000	0.000
686.00	0.250	0.230	0.230
687.00	0.300	0.275	0.505
687.50	0.320	0.155	0.660

Device	Routing	Invert	Outlet Devices
#1	Primary	685.00'	**18.0" Round Culvert** L= 80.0' Ke= 0.500 Inlet / Outlet Invert= 685.00' / 684.60' S= 0.0050 '/' Cc= 0.900 n= 0.009, Flow Area= 1.77 sf
#2	Device 1	685.00'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	685.60'	**8.0" Vert. Orifice/Grate X 3.00** C= 0.600 Limited to weir flow at low heads
#4	Device 1	686.10'	**8.0" Vert. Orifice/Grate X 3.00** C= 0.600 Limited to weir flow at low heads
#5	Device 1	687.00'	**36.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=3.92 cfs @ 12.62 hrs HW=686.30' (Free Discharge)
└**1=Culvert** (Passes 3.92 cfs of 5.77 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 0.45 cfs @ 5.13 fps)
  ├**3=Orifice/Grate** (Orifice Controls 3.06 cfs @ 2.92 fps)
  ├**4=Orifice/Grate** (Orifice Controls 0.41 cfs @ 1.53 fps)
  └**5=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond 2P: DETENTION AREA

Inflow Area = 3.980 ac, 61.81% Impervious, Inflow Depth > 4.14" for 100-year event
Inflow = 15.58 cfs @ 12.30 hrs, Volume= 1.373 af
Outflow = 8.83 cfs @ 12.54 hrs, Volume= 1.258 af, Atten= 43%, Lag= 14.1 min
Primary = 8.83 cfs @ 12.54 hrs, Volume= 1.258 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 686.88' @ 12.54 hrs Surf.Area= 0.294 ac Storage= 0.470 af

Plug-Flow detention time= 97.6 min calculated for 1.256 af (91% of inflow)
Center-of-Mass det. time= 59.7 min (859.3 - 799.6)

Volume	Invert	Avail.Storage	Storage Description
#1	685.00'	0.660 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
685.00	0.210	0.000	0.000
686.00	0.250	0.230	0.230
687.00	0.300	0.275	0.505
687.50	0.320	0.155	0.660

Device	Routing	Invert	Outlet Devices
#1	Primary	685.00'	**18.0" Round Culvert** L= 80.0' Ke= 0.500 Inlet / Outlet Invert= 685.00' / 684.60' S= 0.0050 '/' Cc= 0.900 n= 0.009, Flow Area= 1.77 sf
#2	Device 1	685.00'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	685.60'	**8.0" Vert. Orifice/Grate X 3.00** C= 0.600 Limited to weir flow at low heads
#4	Device 1	686.10'	**8.0" Vert. Orifice/Grate X 3.00** C= 0.600 Limited to weir flow at low heads
#5	Device 1	687.00'	**36.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=8.82 cfs @ 12.54 hrs HW=686.88' (Free Discharge)
└**1=Culvert** (Passes 8.82 cfs of 8.95 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 0.55 cfs @ 6.30 fps)
  ├**3=Orifice/Grate** (Orifice Controls 4.90 cfs @ 4.68 fps)
  ├**4=Orifice/Grate** (Orifice Controls 3.37 cfs @ 3.21 fps)
  └**5=Orifice/Grate** (Controls 0.00 cfs)

Summary for Link 3L: TOTAL FLOW OFF-SITE

Inflow Area = 4.220 ac, 58.29% Impervious, Inflow Depth > 0.89" for 1-year event
Inflow = 0.80 cfs @ 13.05 hrs, Volume= 0.313 af
Primary = 0.80 cfs @ 13.05 hrs, Volume= 0.313 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs

Summary for Link 3L: TOTAL FLOW OFF-SITE

Inflow Area = 4.220 ac, 58.29% Impervious, Inflow Depth > 1.13" for 2-year event
Inflow = 1.41 cfs @ 12.82 hrs, Volume= 0.396 af
Primary = 1.41 cfs @ 12.82 hrs, Volume= 0.396 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs

Summary for Link 3L: TOTAL FLOW OFF-SITE

Inflow Area = 4.220 ac, 58.29% Impervious, Inflow Depth > 2.00" for 10-year event
Inflow = 4.02 cfs @ 12.62 hrs, Volume= 0.702 af
Primary = 4.02 cfs @ 12.62 hrs, Volume= 0.702 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs

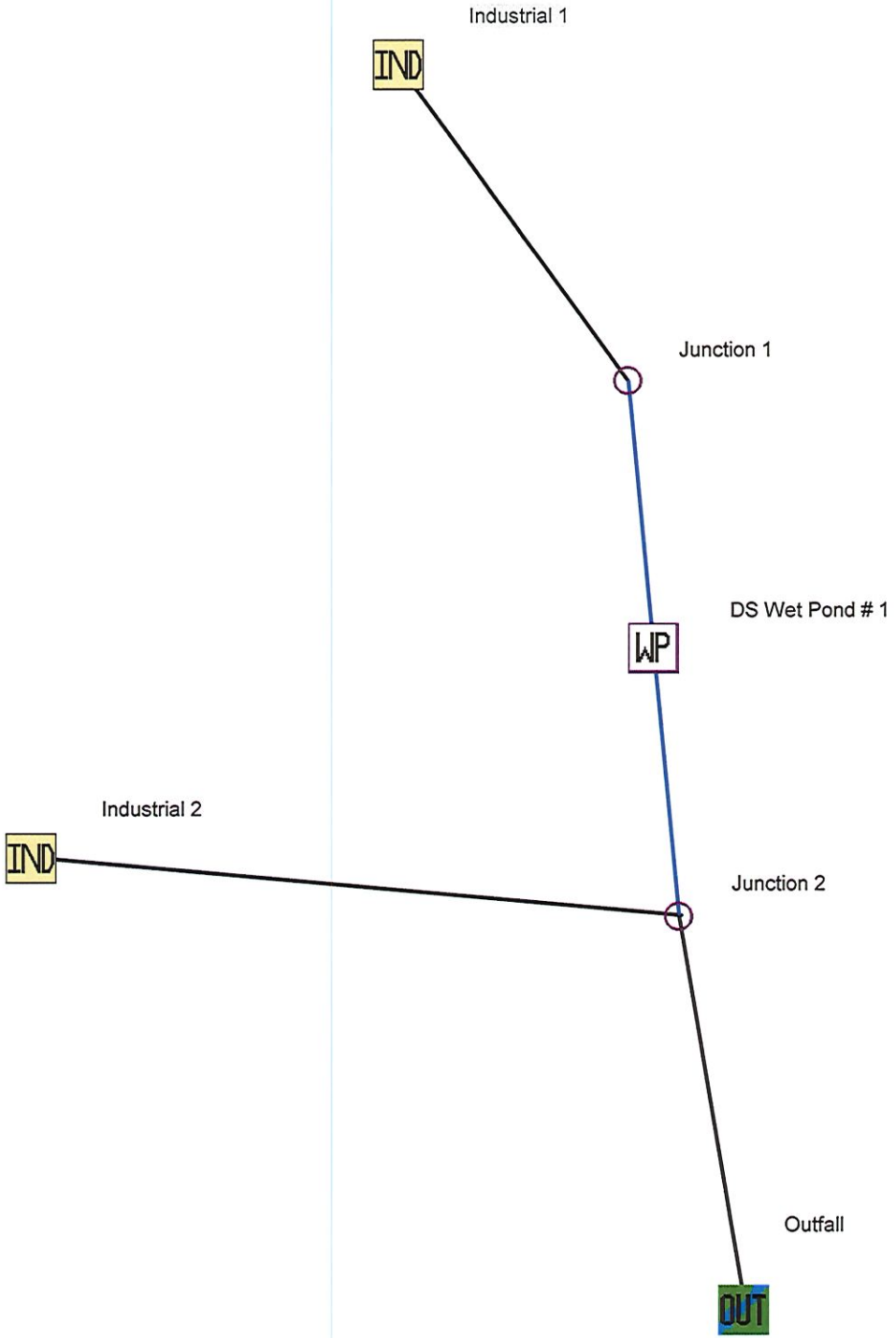
Summary for Link 3L: TOTAL FLOW OFF-SITE

Inflow Area = 4.220 ac, 58.29% Impervious, Inflow Depth > 3.77" for 100-year event
Inflow = 9.04 cfs @ 12.53 hrs, Volume= 1.325 af
Primary = 9.04 cfs @ 12.53 hrs, Volume= 1.325 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs

APPENDIX B

Winslamm Output


Industrial 1
IND
Junction 1
DS Wet Pond # 1
WP
Industrial 2
IND
Junction 2
Outfall
OUT

SLAMM for Windows Version 10.4.1

Data file name: C:\Program Files (x86)\WinSLAMM v10\WinSlamm files\griesbachreadymix.mdb
WinSLAMM Version 10.4.1
Rain file name: C:\WinSLAMM Files\Rain Files\WI Green Bay 69.RAN
Particulate Solids Concentration file name: C:\WinSLAMM Files\v10.1 WI_AVG01.pscx
Runoff Coefficient file name: C:\WinSLAMM Files\WI_SL06 Dec06.rsvx
Pollutant Relative Concentration file name: C:\WinSLAMM Files\WI_GEO03.ppdx
Residential Street Delivery file name: C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std
Institutional Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Commercial Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Industrial Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Other Urban Street Delivery file name: C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std
Freeway Street Delivery file name: C:\WinSLAMM Files\Freeway Dec06.std
Apply Street Delivery Files to Adjust the After Event Load Street Dirt Mass Balance: False
Source Area PSD and Peak to Average Flow Ratio File: C:\WinSLAMM Files\NURP Source Area PSD Files.csv
Cost Data file name:
Seed for random number generator: -42
Study period starting date: 01/02/69 Study period ending date: 12/28/69
Start of Winter Season: 11/25 End of Winter Season: 03/29
Model Run Start Date: 01/02/69 Model Run End Date: 12/28/69
Date of run: 09-22-2020 Time of run: 09:17:42
Total Area Modeled (acres): 4.220
Years in Model Run: 0.99

	Runoff Volume (cu ft)	Percent Runoff Volume Reduction	Particulate Solids Conc. (mg/L)	Particulate Solids Yield (lbs)	Percent Particulate Solids Reduction
Total of all Land Uses without Controls:	156318	-	189.2	1847	-
Outfall Total with Controls:	156583	-0.17%	32.07	313.5	83.03%
Annualized Total After Outfall Controls:	158758			317.9	

Pollutant	Conc. No Controls	Conc. With Controls	Conc. Units	Pollutant Yield No Controls	Pollutant Yield With Controls	Pol. Yield Units	Percent Reduction
Particulate Solids	189.2	32.07	mg/L	1847	313.5	lbs	83.03 %
Total Phosphorus	0.2630	0.08431	mg/L	2.566	0.8243	lbs	67.88 %

Data file name: C:\Program Files (x86)\WinSLAMM v10\WinSlamm files\griesbachreadymix.mdb
WinSLAMM Version 10.4.1
Rain file name: C:\WinSLAMM Files\Rain Files\WI Green Bay 69.RAN
Particulate Solids Concentration file name: C:\WinSLAMM Files\v10.1 WI_AVG01.pscx
Runoff Coefficient file name: C:\WinSLAMM Files\WI_SL06 Dec06.rsvx
Residential Street Delivery file name: C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std
Institutional Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Commercial Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Industrial Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Other Urban Street Delivery file name: C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std
Freeway Street Delivery file name: C:\WinSLAMM Files\Freeway Dec06.std
Apply Street Delivery Files to Adjust the After Event Load Street Dirt Mass Balance: False
Pollutant Relative Concentration file name: C:\WinSLAMM Files\WI_GEO03.ppdx
Source Area PSD and Peak to Average Flow Ratio File: C:\WinSLAMM Files\NURP Source Area PSD Files.csv
Cost Data file name:
Seed for random number generator: -42
Study period starting date: 01/02/69 Study period ending date: 12/28/69
Start of Winter Season: 11/25 End of Winter Season: 03/29
Date: 09-22-2020 Time: 09:18:01
Site information: GRIESBACH READY MIX

LU# 1 - Industrial: Industrial 1 Total area (ac): 3.980
1 - Roofs 1: 0.310 ac. Pitched Connected PSD File: C:\WinSLAMM Files\NURP.cpz
13 - Paved Parking 1: 1.940 ac. Connected PSD File: C:\WinSLAMM Files\NURP.cpz
51 - Small Landscaped Areas 1: 0.820 ac. Normal Silty PSD File: C:\WinSLAMM Files\NURP.cpz
52 - Small Landscaped Areas 2: 0.700 ac. Normal Sandy PSD File: C:\WinSLAMM Files\NURP.cpz
70 - Water Body Areas: 0.210 ac. PSD File:

LU# 2 - Industrial: Industrial 2 Total area (ac): 0.240
51 - Small Landscaped Areas 1: 0.240 ac. Normal Silty PSD File: C:\WinSLAMM Files\NURP.cpz

Control Practice 1: Wet Detention Pond CP# 1 (DS) - DS Wet Pond # 1
Particle Size Distribution file name: Not needed - calculated by program
Initial stage elevation (ft): 5
Peak to Average Flow Ratio: 3.8
Maximum flow allowed into pond (cfs): No maximum value entered
Outlet Characteristics:
Outlet type: Orifice 1
1. Orifice diameter (ft): 0.33
2. Number of orifices: 1
3. Invert elevation above datum (ft): 5
Outlet type: Orifice 2
1. Orifice diameter (ft): 0.67
2. Number of orifices: 3
3. Invert elevation above datum (ft): 5.6
Outlet type: Orifice 3
1. Orifice diameter (ft): 0.67
2. Number of orifices: 3
3. Invert elevation above datum (ft): 6.1
Outlet type: Broad Crested Weir
1. Weir crest length (ft): 25
2. Weir crest width (ft): 10
3. Height from datum to bottom of weir opening: 7
Outlet type: Vertical Stand Pipe
1. Stand pipe diameter (ft): 3
2. Stand pipe height above datum (ft): 7
Pond stage and surface area

Entry Number	Stage (ft)	Pond Area (acres)	Natural Seepage (in/hr)	Other Outflow (cfs)
0	0.00	0.0000	0.00	0.00
1	0.10	0.0490	0.00	0.00
2	1.00	0.0630	0.00	0.00
3	2.00	0.0780	0.00	0.00
4	3.00	0.1100	0.00	0.00
5	4.00	0.1300	0.00	0.00
6	5.00	0.2100	0.00	0.00
7	6.00	0.2500	0.00	0.00
8	7.00	0.3000	0.00	0.00

APPENDIX C

Operations and Maintenance Manual

OPERATIONS AND MAINTENANCE MANUAL

GRIESBACH READY-MIX
DETENTION BASIN

Table of Contents

OPERATIONS AND MAINTENANCE MANUAL

INTRODUCTION

The wet detention area is located on the north side of the site. Ditches and grades direct the runoff to the detention area.

The soil types are Manawa silty clay loam and Manistee fine sandy loam.

The owner of the site is responsible for inspection and maintenance.

WET DETENTION BASIN

The detention area restricts the developed runoff rates to the existing runoff rates for the 1-year, 2-year, 10-year and 100-year storms. The permanent pool removes over 80% of the Total Suspended Solids per the Winslamm model.

SEDIMENT REMOVAL

Sediment at the outlet pipe shall be removed when the sediment impedes flow to the pipe. The pond should be inspected annually to determine if removal is necessary. Sediment disposal shall be conducted in accordance with NR526.

The dredged material can be hauled in watertight trucks or stockpiled and hauled after the water drains out. The work area should be restored after the removal process.

During construction, inspect the basin weekly and remove sediment when necessary.

INSPECTION

Inspect the pond annually for sediment build-up and obstruction of the overflow areas. When necessary, repair the basin and outlet pipe.

After each major storm, debris and litter should be removed from the pond and overflow areas.

UNDESIRABLE PLANT CONTROL

Mowing of the grass should control weeds, trees and shrubs. If lawn type turf is used then mow the basin area as frequently as the adjacent lawn area. If native vegetation is used then maintain per recommended standards.

OUTLET STRUCTURE MAINTENANCE

Remove debris and sediment from the outlet pipe. Repair as needed. Inspect the pipe after each storm and in the spring.

EROSION CONTROL

Vegetation should be established and maintained to prevent erosion by overland flow. If erosion occurs, then re-seed and mulch area. Re-grade areas to disperse concentrated flow. Erosion control mats may be needed to protect bare soil until vegetation is established.

Erosion inspections should be made after major storms and in the spring. General observations should be made during mowing and site visits.

During construction, weekly inspections should be made for erosion. Repair eroded areas immediately.

CHECKSLIST

Inspect and Record for:

Erosion/Settling – Repair area immediately and re-vegetate.

Sediment Accumulation at Wet Detention Area – Visual and measure depth of water to determine sediment buildup.

Sediment Accumulation on Surface – Remove sediments when visible.

Clogged Storm Sewer Pipes – Remove and dispose of any debris blocking flow.

Debris/Litter – Remove and dispose of immediately.

Tree Growth – Remove any unwanted tree growth.

Grass Health – If lawn type turf is used then mow a minimum of twice a year. Re-seed areas as needed to maintain dense cover.

State of Wisconsin
Department of Natural Resources (DNR)
PO Box 7921, Madison WI 53707-7921
dnr.wi.gov

CONSTRUCTION SITE INSPECTION REPORT

Form 3400-187 (R 11/16)

Notice: This form was developed in accordance with s. NR 216.48 Wis. Adm. Code for WPDES permittees' convenience; however, use of this specific form is voluntary. Multiple copies of this form may be made to compile the inspection report. Inspections of the construction site and implemented erosion and sediment control best management practices (BMPs) must be performed weekly and within 24 hours after a rainfall event 0.5 inches or greater.

Construction Site Name and Location (Project, Municipality, and County):	**Site/Facility ID No. (FIN):**
Onsite Contact/Contractor:	**Onsite Phone/Cell:**

Note: Inspection reports, along with erosion control and storm water management plans, are required to be maintained on site in accordance with s. NR 216.48 (4) and made available upon request. PLEASE PRINT LEGIBLY.

Date of inspection:	**Time of inspection:** **Start:** _____ ◯ am ◯ pm **End:** _____ ◯ am ◯ pm	**Type of inspection:** ◯ **Weekly** ◯ **Precipitation Event** ◯ **Other (specify)**

Weather/Site Conditions:		**Describe current phase of construction:**
Temp. _____ **°F** **Antecedent Soil Moisture**	◯ **Dry** ◯ **Frozen or snow covered** ◯ **Variable** ◯ **Frozen (Thaw predicted in next week)** ◯ **Wet** ◯ **Melting Snow/slush**	Scheduled Final Stabilization Date for Universal Soil Loss Equation (USLE) [1] :
Last Rainfall Depth: _____ **inches**		
Last Rainfall Date: _____		**Project on Schedule[2]?** ◯ **Yes** ◯ **No**
Name(s) of individual(s) performing inspection:		**Inspector Phone/Cell:**

I certify that the information contained on this form is an accurate assessment of site conditions at the time of inspection:

Inspector Signature _____ **Date:** _____

Inspection Questions:	**Yes**	**No (Identify Actions Required):**	**Location/Comments:**	**Actions Completed by Date & Initials**
1. Is the erosion control plan accessible to operators?	☐	☐ Provide onsite copy		
2. Is the permit certificate posted where visible?	☐	☐ Post certificate		
3. Is the current phase of construction on sequence with the site-specific erosion and sediment control plan, including installation/stabilization of ponds and ditches?	☐	☐ Add sediment control ☐ Install missing ditch/pipe/pond ☐ Stabilize bare soil		
4. Are all erosion and sediment control BMPs shown on plan properly installed and in functional condition?	☐	☐ Repair ☐ Modify ☐ Install/Replace		
5. Is inlet protection properly installed and functioning in all inlets likely to receive runoff from the site?	☐	☐ Clean ☐ Replace ☐ Install		
6. Is the air free of fugitive dust resulting from construction activity and bare soil exposure?	☐	☐ Apply water ☐ Apply dust control product		

[1] The Universal Soil Loss Equation (USLE) model and the Construction Site Soil Loss and Sediment Discharge Guidance are available at: http://dnr.wi.gov/topic/stormwater/standards/const_standards.html

[2] If the project is not on schedule then the soil loss summary for the project should be reviewed and schedule, plan or practices modified accordingly.

CONSTRUCTION SITE INSPECTION REPORT

Inspection Questions:	Yes	No (Identify Actions Required):	Location/Comments:	Actions Completed by Date & Initials
7. Is the public right of way curb line free of tracked soil and accumulation?	☐	☐ Install tracking pad ☐ Widen/lengthen pad ☐ Amend stone/Add geotextile ☐ Install wheel washing station ☐ Close entrance/exit ☐ Limit traffic across disturbed areas ☐ Sweep road and curb line		
8. Are wetlands, lakes, streams, ditches, or storm sewers downstream of the site free of sedimentation and turbid water leaving the site?[3]	☐	☐ Repair/Replace erosion control ☐ Add sediment controls ☐ Modify operations ☐ Contact DNR to verify extent of cleanup required		
9. Is dewatering and/or vehicle and equipment washing being done in a manner that prevents erosion and sediment discharge?	☐	☐ Install treatment train ☐ Install energy dissipation ☐ Modify discharge location ☐ Modify intake to reduce sediment		
10. Are soil stockpiles existing for more than 7 days covered and stabilized?	☐	☐ Seed ☐ Install mat/mulch/polymer ☐ Cover with tarp/plastic sheeting		
11. Are downstream channels and other downhill areas protected from scour and erosion?	☐	☐ Install energy dissipation at outfall ☐ Install ditch checks ☐ Install slope interruption ☐ Install onsite detention		
12. Are good housekeeping practices or treatment controls in place to prevent the discharge of chemicals, cement, trash, and other materials into wetlands, waterways, storm sewers, ditches, or drainage-ways?[4]	☐	☐ Properly dispose of trash ☐ Provide concrete washout station ☐ Contact DNR to verify extent of cleanup required		
13. Is the plan reflective of current site operations and does it address all erosion and sediment control issues identified during the inspection?	☐	☐ Revise sequence ☐ Revise sediment control BMP ☐ Revise erosion control BMP ☐ Revise post-construction storm water BMP		
14. Are all areas where construction has temporarily ceased (and will not resume for more than 2 weeks) temporarily stabilized?	☐	☐ Topsoil & seed ☐ Install mat/mulch/polymer ☐ Cover with tarp/plastic sheeting		
15. Are all areas at final grade permanently vegetated or stabilized with other treatments?	☐	☐ Topsoil & seed ☐ Install mat/mulch/polymer ☐ Sod ☐ Install stone base		
16. Have temporary sediment controls been removed in areas of the site that meet the permit definition of 'final stabilization'?	☐	☐ Water to establish vegetation ☐ Repair or reseed areas ☐ Remove temporary practices		

3 If sediment discharge enters a wetland or waterbody, the permittee should consult with DNR staff to determine if sediment cleanup and/or additional control measures are required.

4 The permittee shall notify the DNR immediately via the spills hotline at (800)943-0003 of any release or spill of a hazardous substance to the environment in accordance with s. 292.11, Wis. Stats., and ch. NR 706, Wis. Adm. Code.

State of Wisconsin
Department of Natural Resources
dnr.wi.gov

Construction Site Inspection Corrective Action Photos

Form 3400-187A (R 11/16)

Corrective Action Photo Documentation Pages (Attach as many as needed):

Notice: Use of this specific form is voluntary, and is provided as an optional attachment to Form 3400-187 for use in documenting erosion and sediment control maintenance actions. This form is provided for the convenience of the permittee to meet the requirements of s. NR 216.48(4), Wis. Adm. Code.

Construction Site Name (Project):	Site/Facility ID No. (FIN):
Photo Location:	

BEFORE CONDITION:

	Photo #:
	Date/Time of Photo:
	Photo By:
	Photo Description:

AFTER CONDITION:

	Photo #:
	Date/Time of Photo:
	Photo By:
	Photo Description:

Construction Site Inspection Corrective Action Photos

Form 3400-187A (R 11/16)

Construction Site Name (Project):	Site/Facility ID No. (FIN):
Photo Location:	

BEFORE CONDITION:

	Photo #:
	Date/Time of Photo:
	Photo By:
	Photo Description:

AFTER CONDITION:

	Photo #:
	Date/Time of Photo:
	Photo By:
	Photo Description: