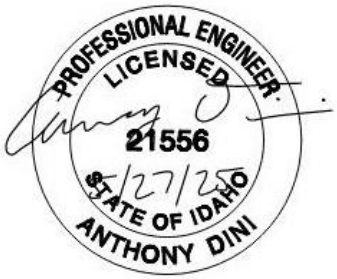
HAWK'S VILLAGE AND RIVER STORAGE
STORMWATER DRAINAGE REPORT

MAY 2025

Prepared for:

Draper Development, LLC
8068 W Woodlark Street
Boise, ID 83709



Crestline Engineers, Inc.
323 Deinhard Lane, Suite C
PO Box 2330
McCall, Idaho 83638
(208) 634-4140

HAWK'S VILLAGE AND RIVER STORAGE

STORMWATER DRAINAGE REPORT

MAY 2025

Crestline Engineers, Inc.
323 Deinhard Lane, Suite C
PO Box 2330
McCall, Idaho 83638
(208) 634-4140

HAWK'S VILLAGE AND RIVER STORAGE

STORMWATER DRAINAGE REPORT

MAY 2025

TABLE OF CONTENTS **PAGE**

SECTION I

REPORT SUMMARY

HAWK'S VILLAGE AND RIVER STORAGE

STORMWATER DRAINAGE REPORT

MAY 2025

SUMMARY:

Included herein is a complete assessment of estimated storm water volume and peak flow generation resulting from the proposed Hawk's Village and River Storage project. All stormwater management improvements have been designed in accordance with Boise County drainage guidelines and the Idaho Catalog of Stormwater Best Management Practices.

The proposed project consists of the construction of eight (8) cabins, two (2) storage buildings with one hundred and two (102) total units, and a gravel driveway/parking area. Construction of the proposed cabins and storage buildings will include two (2) vegetated detention basins, rock check dams, and multiple meandering vegetative swales.

The proposed design will include creating multiple meandering vegetative swales, rock check dams, and two (2) vegetative detention basins. The overall drainage of the site was analyzed using three (3) drainage areas to better analyze the associated stormwater runoff (see Figure 2, Drainage Area Map). Additionally, the Off-Site Drainage Area was analyzed to determine the peak flow being routed through the proposed driveway culvert, as well as the Pathway Culverts Drainage Area to determine the peak flow being routed through the pathway culverts. Drainage Areas Northwest and Northeast will utilize meandering vegetative swales and rock check dams to detain and treat stormwater runoff. Drainage Area South will utilize a combination of meandering vegetative swales, rock check dams, and two (2) vegetated detention basins to detain and treat stormwater runoff. The meandering vegetated swales will be used to route stormwater runoff around the proposed gravel roadway and parking area, cabins, and storage buildings (see Hawk's Village and River Storage Planset for more information).

Estimation of runoff volumes and peak flows was accomplished using the Soil Conservation Society (SCS) Curve Number Method (TR-55) as defined in Appendix D of the IDEQ Catalog of Stormwater Best Management Practices for Idaho Cities and Counties using the Hydraflow Hydrograph extension for AutoCAD Civil 3D.

For on-site drainage, the increase in the 10-year storm runoff volume resulting from the proposed development (see Hawk's Village Stormwater Calculations) will be detained within the proposed vegetated detention basins and rock check dams. The vegetated detention basins and rock check dams have been sized to detain the difference of pre-development and post development 10-year (2.50" 10-year, 24-hour rainfall event)[1] storm events for the proposed development. The proposed driveway culvert was analyzed using the 50-year (3.20" 50-year, 24-hour rainfall event)[1]. The vegetated detention basins and rock check dams have been designed, and will be constructed, to detain the difference of

[1] Rainfall intensity taken from "NOAA ATLAS 2: Precipitation-Frequency Atlas of the Western United State,: Volume V-Idaho"

the 10-year events which happens to include First Flush (1.00” rainfall event 1-year, 95% rainfall intensity) storm event as recommended by the IDEQ Catalog of Stormwater Best Management Practices for Idaho Cities and Counties. The hydrologic behavior of Drainage Area South was evaluated by routing the proportion of the 10-year post development stormwater runoff that is conveyed to the proposed rock check dams and vegetated detention basins. Further analysis was conducted to determine how the stormwater is distributed between Detention Basin No. 1 and Detention Basin No. 2. This included quantifying the respective proportions of runoff directed to each basin. For detailed hydrograph data and modeling results, refer to Hydrograph Reports 9-14 in Section II of this report. Additionally, the Off-site Drainage Area as well as the Pathway Culverts Drainage Area were analyzed to determine peak flows being routed through the proposed culverts (Refer to the Stormwater Calculations in Section II of this report for more information). See Table 1 below for stormwater detention volumes. During an event larger than the 10-year storm event, the water will overflow over the top of the vegetated detention basins, rock check dams, and meandering vegetated swales then flow downhill as it historically has.

Drainage Area	**Pre-Construction Volume (CF)**		**Post-Construction Volume (CF)**		**Required Volume (CF)**		**Available Volume (CF)**
	First Flush	**10-year**	**First Flush**	**10- year**	**First Flush**	**10-year**	
Total Development Area	N/A	12,243	3,438	18,868	3,438	6,625	10,499
Drainage Area Northwest	N/A	1,466	693	2,917	693	1,451	1,838
Drainage Area Northeast	N/A	1,657	711	3,186	711	1,529	3,125
Drainage Area South	N/A	9,120	2,017	12,695	2,017	3,575	5,536

Table 1

- The Total Development Area has a “total available”, detention volume of 10,499 CF, which is more than the required volume of 6,625 CF. Therefore, the detention volume is sufficient.

- Additionally, each development area has more available detention than required for each specific development area.

MODEL ASSUMPTIONS:

- Soil Group B: Although the majority of soils on-site were Group B soils, it was determined that Group C soils would be used for modeling purposes associated

with the project to account for a rain on snow event and to maintain a conservative approach.

- Curve Number (CN) values: The following CN numbers were used to calculate the composite number for each drainage area:
    - Building Roofs: 98
    - Concrete: 98
    - Gravel Road/Walkways: 89
    - Gravel Open Space: 86
    - 1/4 Acre Residential: 85
    - Open Space: 79
    - Pasture: 79

- Manning's N-value: The following numbers were used to calculate the Time of Concentration, Sheet Flow Time, and Shallow Concentrated Flow Time:
    - Grass – Dense Grass: 0.24
    - Smooth Surface – Gravel Driveway: 0.011

- Rainfall Event: The project was modeled using the First Flush event (1.00") and the 10-year event (2.50").

- Off-Site Rainfall Event: The Off-Site Drainage Area was modeled using the 50-year event (3.20").

SECTION II

STORMWATER CALCULATIONS

CRESTLINE ENGINEERS, INC.
CIVIL ENGINEERING CONSULTANTS
323 DEINHARD LANE, SUITE C
PO BOX 2330
McCALL, IDAHO 83638
208.634.4140 · 208.634-4146 FAX

PROJECT: Hawk's Village and River Storage
CLIENT: Draper Developments, LLC
JOB NO.: 24022 **DATE:** May 28, 2025
BY: SMR
REVISION DATE:

RE: Hawk's Village - Stormwater Calculations

Drainage Area Calculations

Drainage Areas:	**(ft^2)**	**(Acres)**
Total Property Area/Boundary	175,550.4	4.03
Drainage Area Northwest	20,699.4	0.48
Drainage Area Northeast	24,020.1	0.55
Drainage Area South	130,830.9	3.00
Drainage Area Off-Site	195,023.6	4.48
Drainage Area Pathway Culverts	9,850.7	0.23

Pre-Development: Drainage Area Northwest:	**(ft^2)**	**(Acres)**	**(%)**
Pasture (CN = 79)	20,699.4	0.48	100.00%
	20,699.4	0.48	100.00%
Total Impervious Surface Area =	**0.0**	**0.00**	**0.00%**

Post Development: Drainage Area Northwest:	**(ft^2)**	**(Acres)**	**(%)**
Building Roofs (CN = 98)	7,800.0	0.18	37.68%
Concrete (CN = 98)	780.0	0.02	3.77%
Gravel Road (CN = 89)	9,401.2	0.22	45.42%
Open Space (CN = 79)	2,718.2	0.06	13.13%
	20,699.4	0.48	100.00%
Total Impervious Surface Area =	**8,580.0**	**0.20**	**41.45%**

Pre-Development: Drainage Area Northeast:	**(ft^2)**	**(Acres)**	**(%)**
Pasture (CN = 79)	24,020.1	0.55	100.00%
	24,020.1	0.55	100.00%
Total Impervious Surface Area =	**0.0**	**0.00**	**0.00%**

Post Development: Drainage Area Northeast:	**(ft^2)**	**(Acres)**	**(%)**
Building Roofs (CN = 98)	6,545.7	0.15	27.25%
Concrete (CN = 98)	844.6	0.02	3.52%
Gravel Road (CN = 89)	13,749.2	0.32	57.24%
Open Space (CN = 79)	2,880.6	0.06	11.99%
	24,020.1	0.55	100.00%
Total Impervious Surface Area =	**7,390.3**	**0.17**	**30.77%**

Pre-Development: Drainage Area South:	**(ft^2)**	**(Acres)**	**(%)**
Pasture (CN = 79)	130,830.9	3.00	100.00%
	130,830.9	3.00	100.00%
Total Impervious Surface Area =	**0.0**	**0.00**	**0.00%**

Post Development: Drainage Area South:	**(ft^2)**	**(Acres)**	**(%)**
Building Roofs (CN = 98)	14,622.7	0.34	11.18%
Concrete (CN = 98)	1,885.3	0.04	1.44%
Gravel Road/Walkways (CN = 89)	52,950.2	1.22	40.47%
Gravel Open Space (CN = 86)	1,382.8	0.03	1.06%
Open Space (CN = 79)	59,989.9	1.37	45.85%
	130,831.0	3.00	100.00%
Total Impervious Surface Area =	**16,508.0**	**0.38**	**12.62%**

Drainage Off-Site Area Surfaces:	**(ft^2)**	**(Acres)**	**(%)**
Asphalt Road (CN = 98)	7,600.6	0.17	3.90%
1/4 Acre Residential (CN = 85)	187,422.9	4.31	96.10%
	195,023.6	4.48	100.00%
Total Impervious Surface Area =	**7,600.6**	**0.17**	**3.90%**

Drainage Area Pathway Culverts Surfaces:	(ft^2)	(Acres)	(%)
Gravel Road/Walkways (CN = 89)	9,850.7	0.23	100.00%
	9,850.7	0.23	100.00%
Total Impervious Surface Area =	**0.0**	**0.00**	**0.00%**

Drainage Area Flow Paths

Pre-Development Flow Path Drainage Area Northwest:	Length (ft)	Elevation Change (ft)	Slope (%)
1. Sheet Flow (n = 0.24, Grass - Dense Grass)	275.00	6.03	2.19%
Total Length/Average Slope =	**275.00**	**6.03**	**2.19%**

Post Development Flow Path Drainage Area Northwest:	Length (ft)	Elevation Change (ft)	Slope (%)
1. Sheet Flow (n = 0.11, Smooth Surface - Gravel)	24.00	0.72	3.00%
2. Sheet Flow (n = 0.24, Grass - Dense Grass)	3.00	1.00	33.33%
3. Channel Flow (n = 0.24, Grass - Dense Grass)	453.78	5.96	1.31%
Total Length/Average Slope =	**480.78**	**7.68**	**1.60%**

Pre-Development Flow Path Drainage Area Northeast:	Length (ft)	Elevation Change (ft)	Slope (%)
1. Sheet Flow (n = 0.24, Grass - Dense Grass)	144.97	4.12	2.84%
Total Length/Average Slope =	**144.97**	**4.12**	**2.84%**

Post Development Flow Path Drainage Area Northeast	Length (ft)	Elevation Change (ft)	Slope (%)
1. Sheet Flow (n = 0.11, Smooth Surface - Gravel)	24.00	0.72	3.00%
2. Sheet Flow (n = 0.24, Grass - Dense Grass)	3.00	1.00	33.33%
2. Channel Flow (n = 0.24, Grass - Dense Grass)	480.10	4.50	0.94%
Total Length/Average Slope =	**507.10**	**6.22**	**1.23%**

Pre-Development Flow Path Drainage Area South:	Length (ft)	Elevation Change (ft)	Slope (%)
1. Sheet Flow (n = 0.24, Grass - Dense Grass)	300.00	6.12	2.04%
2. Shallow Concentrated Flow - Unpaved	369.55	2.70	0.73%
Total Length/Average Slope =	**669.55**	**8.82**	**1.32%**

Post Development Flow Path Drainage Area South:	Length (ft)	Elevation Change (ft)	Slope (%)
1. Sheet Flow (n = 0.011, Smooth Surface - Gravel)	180.67	7.00	3.87%
Total Length/Average Slope =	**180.67**	**7.00**	**3.87%**

Flow Path Drainage Area Off-Site:	Length (ft)	Elevation Change (ft)	Slope (%)
1. Sheet Flow (n = 0.011, Smooth Surface - Asphalt)	17.94	0.36	2.00%
2. Sheet Flow (n = 0.24, Grass - Dense Grass)	282.06	8.00	2.84%
3. Shallow Concentrated Flow - Unpaved)	315.95	8.50	2.69%
Total Length/Average Slope =	**615.95**	**16.86**	**2.74%**

Flow Path Drainage Area Pathway Culverts:	Length (ft)	Elevation Change (ft)	Slope (%)
1. Sheet Flow (n = 0.011, Smooth Surface - Asphalt)	104.70	2.11	2.02%
2. Sheet Flow (n = 0.24, Grass - Dense Grass)	8.00	0.16	2.00%
Total Length/Average Slope =	**112.70**	**2.27**	**2.01%**

CRESTLINE ENGINEERS, INC.
CIVIL ENGINEERING CONSULTANTS
323 DEINHARD LANE, SUITE C
PO BOX 2330
McCALL, IDAHO 83638
208.634.4140 · 208.634.4146 FAX

PROJECT: Hawk's Village
CLIENT: Draper Developments, LLC
JOB NO.: 24005 **DATE:** May 28, 2025
BY: SMR
REVISION DATE:

RE: Hawk's Village - Stormwater Calculations

Stormwater Detention Basin Volume Calculations

Rock Check Dam Detention No. 1 (Northwest)

	Elev. (ft)	Length (ft)	Area (ft^2)	Volume (ft^3)	
Top/Overflow	0.50		8.8		
Bottom	0.00	35.00	0.0	153	
				153	**Per Check Dam**
			Number of Check Dams	**12**	
			Volume Total	**1,838**	

Rock Check Dam Detention No. 2 (Northeast)

	Elev. (ft)	Length (ft)	Area (ft^2)	Volume (ft^3)	
Top/Overflow	0.50		12.5		
Bottom	0.00	50.00	0.0	313	
				313	**Per Check Dam**
			Number of Check Dams =	**10**	
			Volume Total =	**3,125**	

Rock Check Dam Detention No. 3 (South)

	Elev. (ft)	Length (ft)	Area (ft^2)	Volume (ft^3)	
Top/Overflow	0.50		6.3		
Bottom	0.00	25.00	0.0	78	
				78	**Per Check Dam**
			Number of Check Dams =	**15**	
			Volume Total =	**1,172**	

Stormwater Detention Basin No. 1 (South)	Elev. (ft)	Height (ft)	Area (ft^2)	Volume (ft^3)
Top	3135.00		1,489.8	
Overflow	3134.50	0.50	1,262.4	
Bottom	3133.50	1.00	850.0	1,056
				1,056

Stormwater Detention Basin No. 2 (South)	Elev. (ft)	Height (ft)	Area (ft^2)	Volume (ft^3)
Top	3132.00		4,248.6	
Overflow	3131.50	0.50	3,759.5	
Bottom	3130.50	1.00	2,856.7	3,308
				3,308

Total Proposed Detention Volume = 10,499 (ft^3)

Required Water Quality Detention Volume = 6,555 (ft^3)

Proposed stormwater detention is greater than the required water quality detention volume and therefore, storage is adequate.

Notes:

1. The total proposed detention volume shown represents the minimum storage volume of each detention basin and rock check damn. As peak flows are routed through each basin and check dam additional storage will be attained as stormwater flows are restricted by individual overflows should it release/drain to downslope areas.

CRESTLINE ENGINEERS, INC.
CIVIL ENGINEERING CONSULTANTS
323 DEINHARD LANE, SUITE C
PO BOX 2330
McCALL, IDAHO 83638
208.634.4140 · 208.634-4146 FAX

PROJECT: Hawk's Village and River Storage

CLIENT: Draper Developments, LLC

JOB NO.: 24022 **DATE:** May 28, 2025

BY: SMR

REVISION DATE:

RE: Hawk's Village - Stormwater Calculations

Stormwater Detention Storage/Peak Flow Attenuation Summary Tables

Drainage Area	Area (Acres)	Area (ft^2)	Post Dev. 1st Flush Runoff Volume ($V_{1st\text{-}Post}$) (ft^3)	Pre-Dev. 10 Year Runoff Volume ($V_{10\text{-}Pre}$) (ft^3)	Post Dev. 10 Year Runoff Volume ($V_{10\text{-}Post}$) (ft^3)	$V_{10\text{-}Post}$ - $V_{10\text{-}Pre}$ (ft^3)	Required Storage Volume (ft^3)	Proposed Storage (ft^3)
Development Area	4.03	175,550	3,421	12,243	18,798	6,555	6,555	10,499
Drainage Area Northwest	0.48	20,699	693	1,466	2,917	1,451	1,451	1,838
Drainage Area Northwest	0.55	24,020	711	1,657	3,186	1,529	1,529	3,125
Drainage Area South	3.00	130,831	2,017	9,120	12,695	3,575	3,575	5,536

Notes:
1. See Hydrograph Report pages 1 - 31 for runoff calculations.

Drainage Area	Area (Acres)	Area (ft^2)	Pre-Dev. Peak Discharge ($Q_{10\text{-}Pre}$) (ft^3/s)	Post Dev. Peak Discharge ($Q_{10\text{-}Post}$) (ft^3/s)	Post Dev. Peak Discharge with Detention ($Q_{10\text{-}Post}$) (ft^3/s)
Development Area	4.03	175,550	2.235	9.098	0.695
Drainage Area Northwest	0.48	20,699	0.274	0.972	0.120
Drainage Area Northeast	0.55	24,020	0.464	0.935	0.022
Drainage Area South	3.00	130,831	1.497	7.191	0.553

Notes:
1. See Hydrograph Report pages 1 - 31 for runoff calculations.

Culvert Design Table

Drainage Area	Effective Drainage Area (Acres)	24 Hour Design Storm	Required Flow[2,3] (CFS)	Pipe Size, Material, and Min. Slope	Pipe Capacity (CFS)	Hydrograph No.
Pathway Culverts	0.23	10 year	0.63	12" CPP Culvert @ 0.50%	2.44	16
Pathway Culverts	0.23	10 year	0.63	12" CPP Culvert @ 1.00%	2.44	16
Upper Basin Overflow	0.24	10 year	0.74	12" CPP Culvert @ 2.00%	2.44	13
Off-Site	4.48	50 year	5.89	18" CPP Culvert @ 0.50%	6.75	15

1. Refer to Hawk's Village and River Storage planset for all culvert locations.
2. See Culvert Hydrograph, Design Event 24-hour, 50 year, and Culvert Reports (Section II) Maximum value for the Off-Site Drainage Area.
3. See Culvert Hydrograph, Design Event 24-hour, 10 year, and Culvert Reports (Section II) Maximum value for the Pathway Culverts and Upper Basin overflow Dranage Areas.

Hydrograph Report

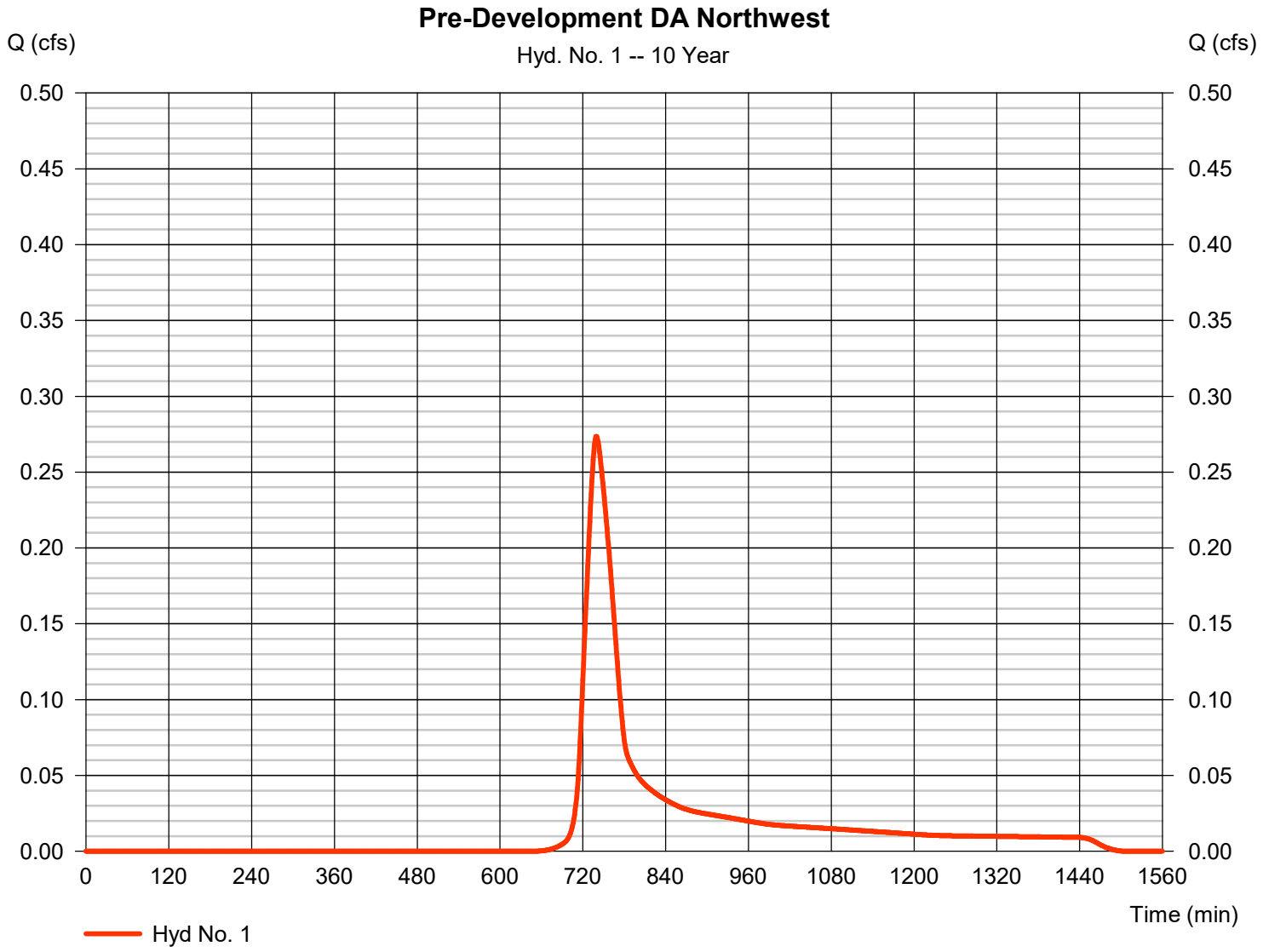
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2025 Thursday, 05 / 22 / 2025

Hyd. No. 1

Pre-Development DA Northwest

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.274 cfs
Storm frequency	=	10 yrs	Time to peak	=	740 min
Time interval	=	1 min	Hyd. volume	=	1,466 cuft
Drainage area	=	0.480 ac	Curve number	=	79*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	41.20 min
Total precip.	=	2.50 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.480 x 79)] / 0.480



TR55 Tc Worksheet

Hyd. No. 1

Pre-Development DA Northwest

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.240		0.011		0.011		
Flow length (ft)	= 275.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 1.80		1.80		0.00		
Land slope (%)	= 2.19		0.00		0.00		
Travel Time (min)	**= 41.22**	**+**	**0.00**	**+**	**0.00**	**=**	**41.22**
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 ..... 41.20 min

Hydrograph Report

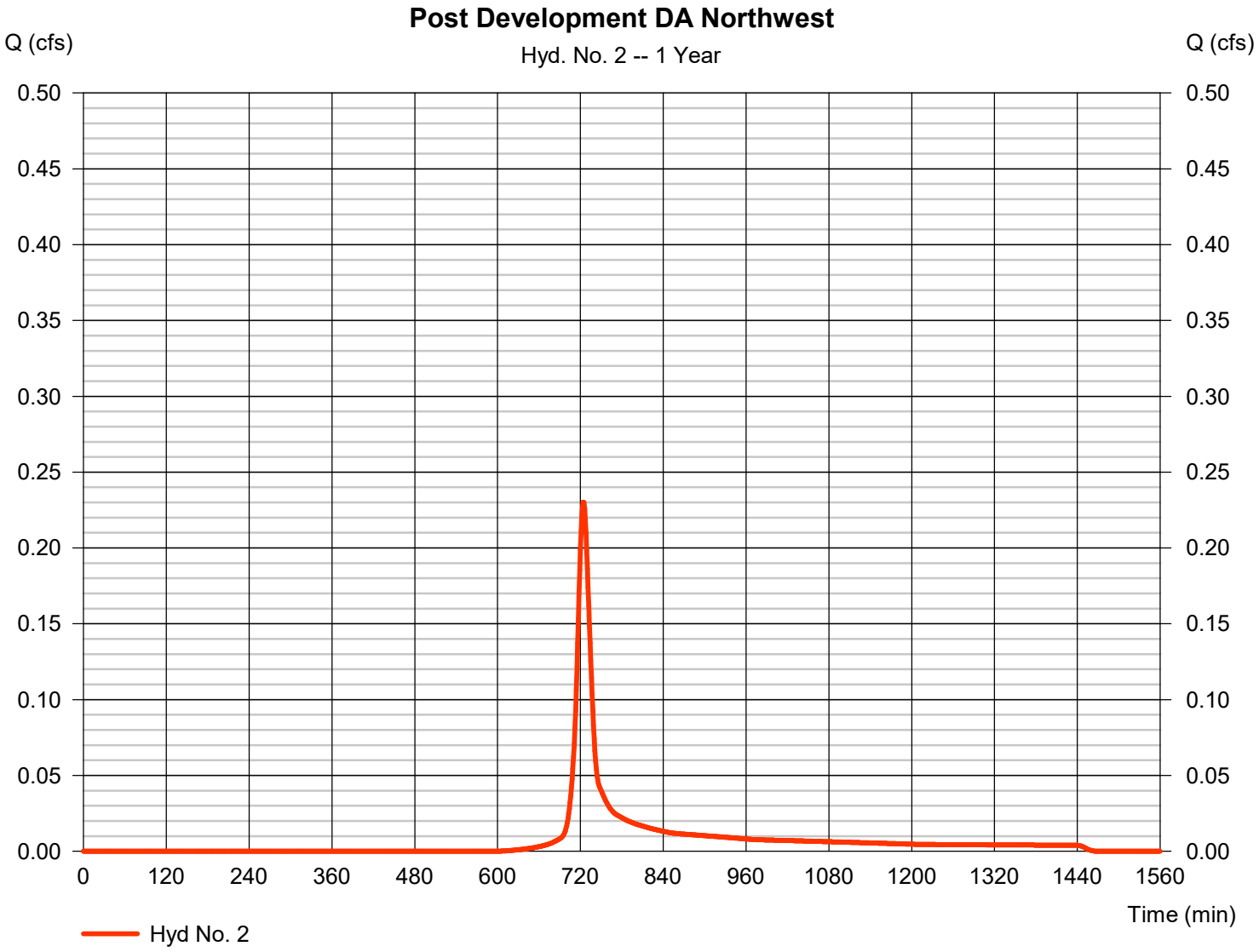
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2025 Tuesday, 05 / 27 / 2025

Hyd. No. 2

Post Development DA Northwest

Hydrograph type	= SCS Runoff	Peak discharge	= 0.230 cfs
Storm frequency	= 1 yrs	Time to peak	= 724 min
Time interval	= 1 min	Hyd. volume	= 693 cuft
Drainage area	= 0.480 ac	Curve number	= 92*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 18.40 min
Total precip.	= 1.00 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.180 x 98) + (0.020 x 98) + (0.220 x 89) + (0.060 x 79)] / 0.480



TR55 Tc Worksheet

Hyd. No. 2

Post Development DA Northwest

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.011		0.240		0.011		
Flow length (ft)	= 24.0		3.0		0.0		
Two-year 24-hr precip. (in)	= 1.80		1.80		1.80		
Land slope (%)	= 3.00		33.33		0.00		
Travel Time (min)	**= 0.44**	**+**	**0.37**	**+**	**0.00**	**=**	**0.81**
Shallow Concentrated Flow							
Flow length (ft)	= 0.00		0.00		0.00		
Watercourse slope (%)	= 0.00		0.00		0.00		
Surface description	= Unpaved		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)	= 3.00		0.00		0.00		
Wetted perimeter (ft)	= 6.32		0.00		0.00		
Channel slope (%)	= 1.31		0.00		0.00		
Manning's n-value	= 0.240		0.015		0.015		
Velocity (ft/s)	=0.43						
			0.00				
					0.00		
Flow length (ft)	({0})453.8		0.0		0.0		
Travel Time (min)	**= 17.54**	**+**	**0.00**	**+**	**0.00**	**=**	**17.54**

Total Travel Time, Tc ..... 18.40 min

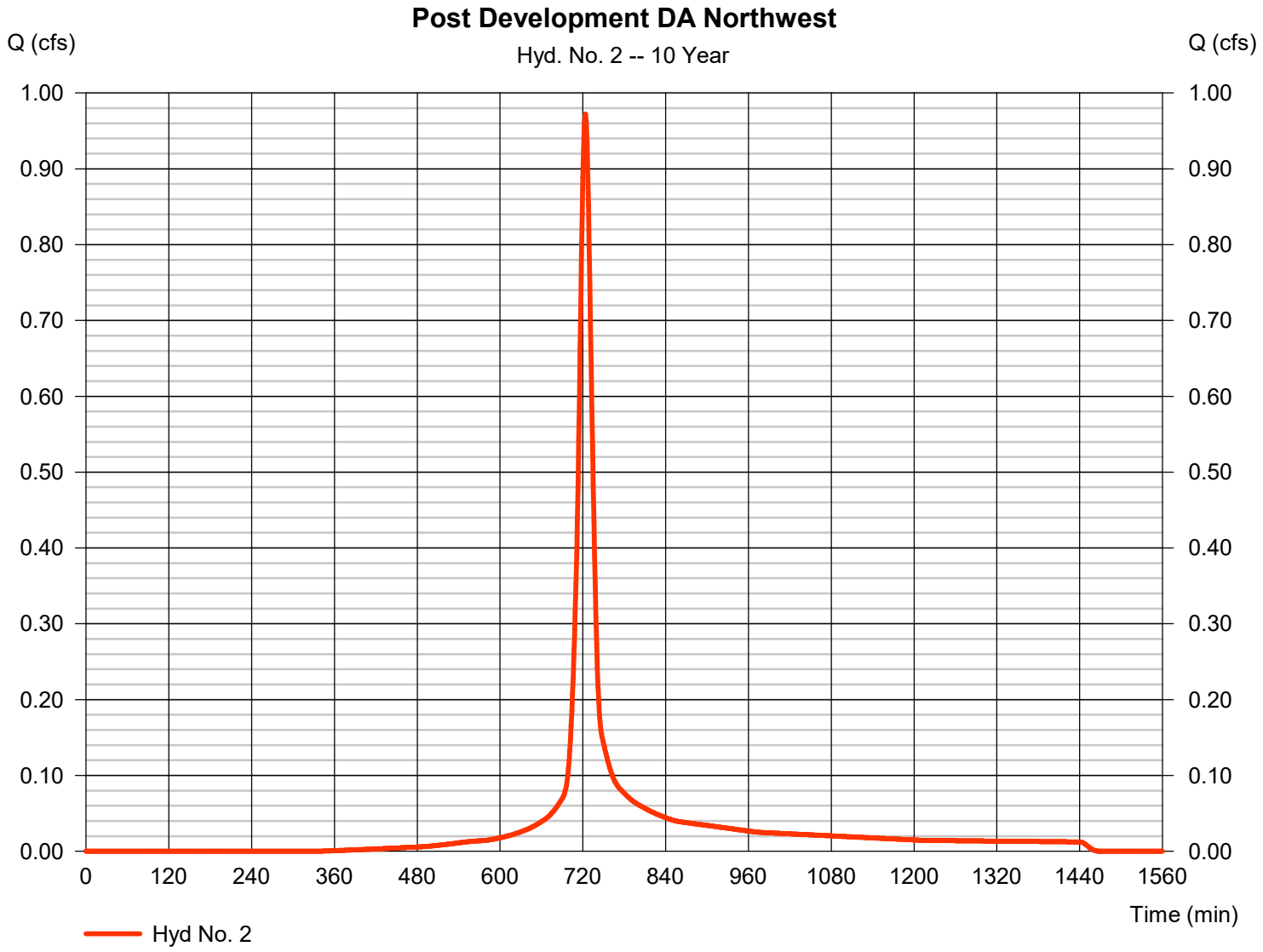
Hydrograph Report

Hyd. No. 2

Post Development DA Northwest

Hydrograph type	= SCS Runoff	Peak discharge	= 0.972 cfs
Storm frequency	= 10 yrs	Time to peak	= 724 min
Time interval	= 1 min	Hyd. volume	= 2,917 cuft
Drainage area	= 0.480 ac	Curve number	= 92*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 18.40 min
Total precip.	= 2.50 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.180 x 98) + (0.020 x 98) + (0.220 x 89) + (0.060 x 79)] / 0.480



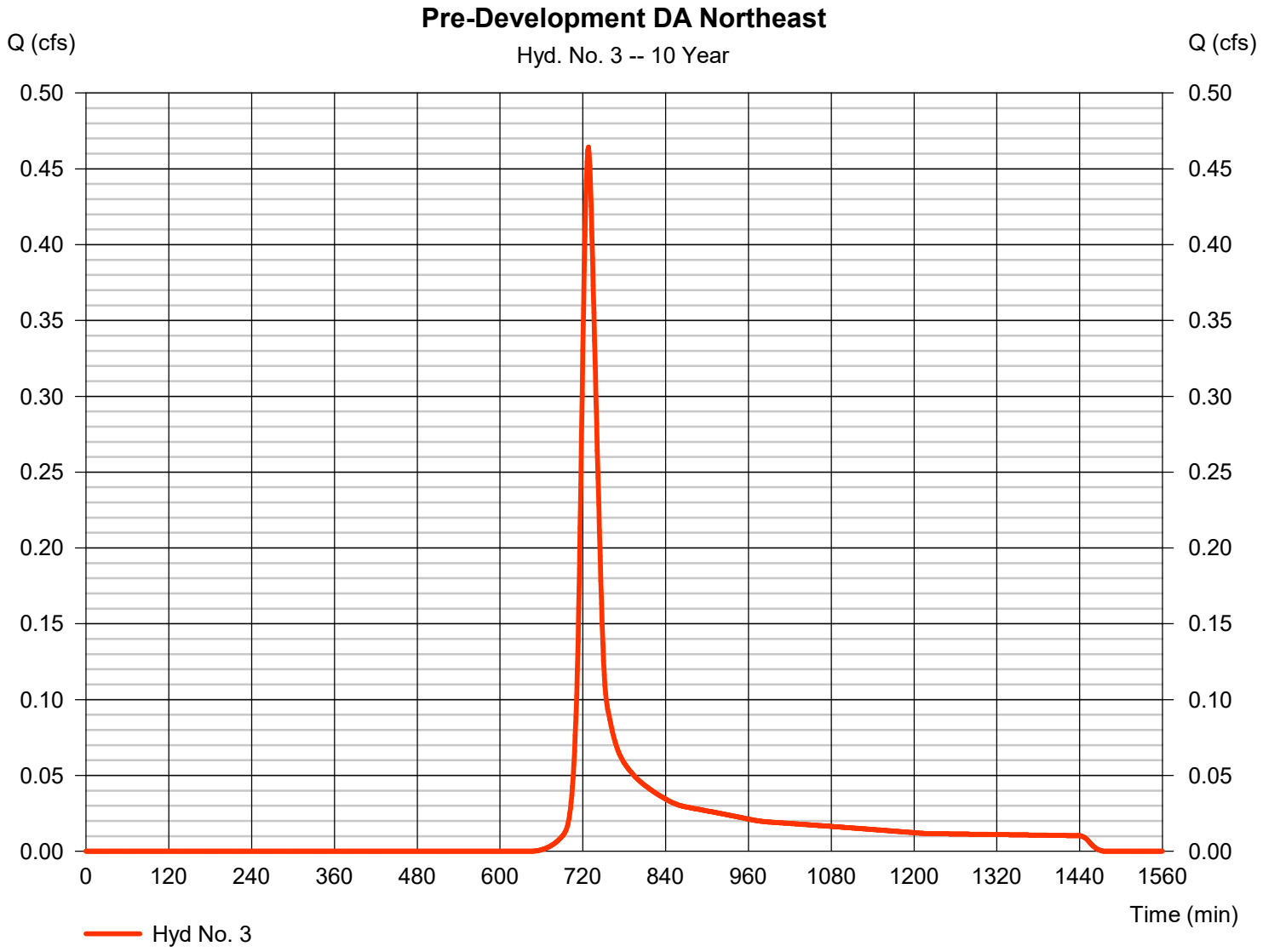
Hydrograph Report

Hyd. No. 3

Pre-Development DA Northeast

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.464 cfs
Storm frequency	=	10 yrs	Time to peak	=	728 min
Time interval	=	1 min	Hyd. volume	=	1,657 cuft
Drainage area	=	0.550 ac	Curve number	=	79*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	22.30 min
Total precip.	=	2.50 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.550 x 79)] / 0.550



TR55 Tc Worksheet

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

Hyd. No. 3

Pre-Development DA Northeast

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.240		0.011		0.011		
Flow length (ft)	= 145.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 1.80		0.00		0.00		
Land slope (%)	= 2.84		0.00		0.00		
Travel Time (min)	**= 22.26**	**+**	**0.00**	**+**	**0.00**	**=**	**22.26**
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 ..... 22.30 min

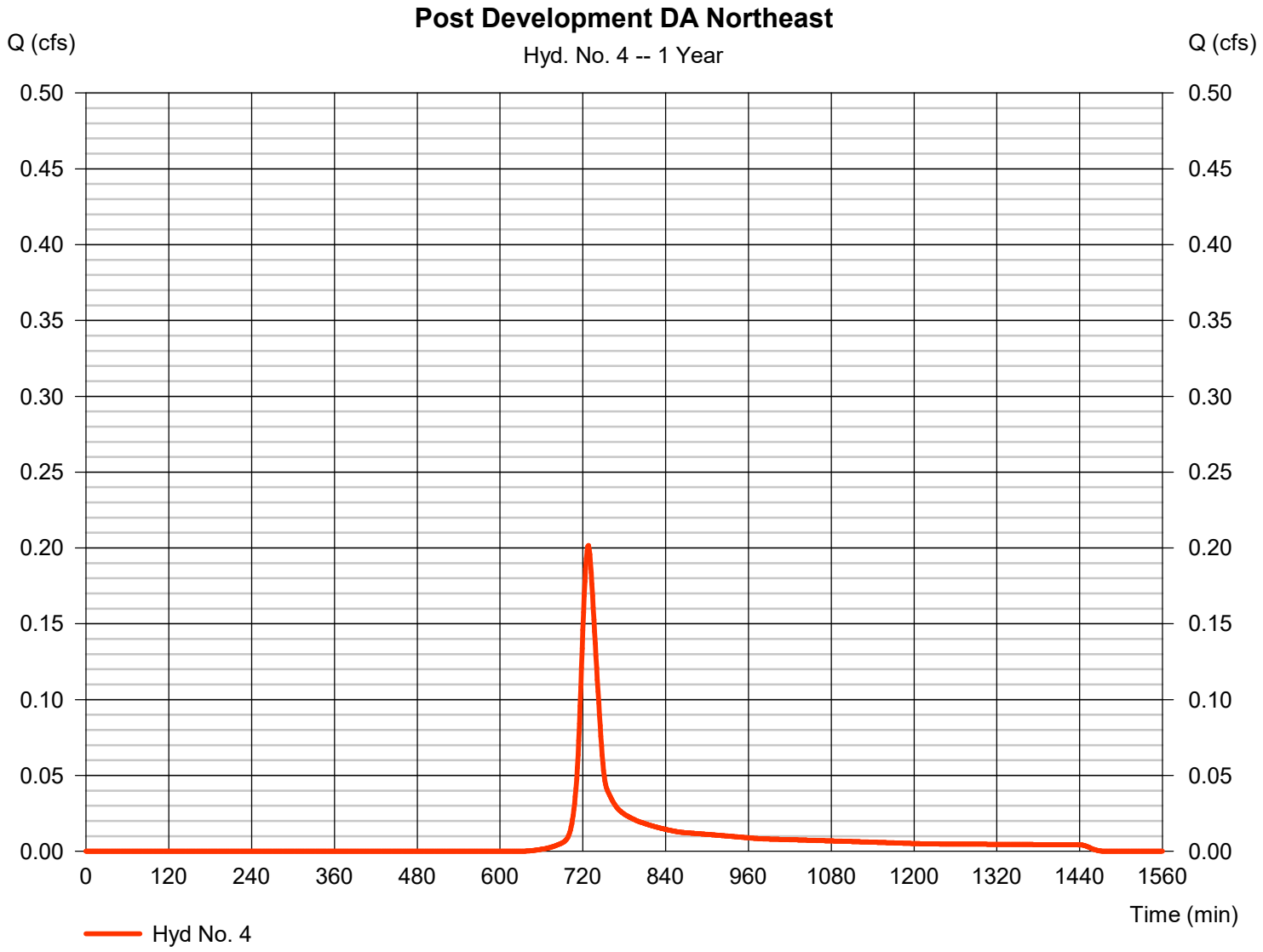
Hydrograph Report

Hyd. No. 4

Post Development DA Northeast

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.202 cfs
Storm frequency	=	1 yrs	Time to peak	=	728 min
Time interval	=	1 min	Hyd. volume	=	711 cuft
Drainage area	=	0.550 ac	Curve number	=	91*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	22.70 min
Total precip.	=	1.00 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.150 x 98) + (0.020 x 98) + (0.320 x 89) + (0.060 x 79)] / 0.550



TR55 Tc Worksheet

Hyd. No. 4

Post Development DA Northeast

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.011		0.240		0.011		
Flow length (ft)	= 24.0		3.0		0.0		
Two-year 24-hr precip. (in)	= 1.80		1.80		0.00		
Land slope (%)	= 3.00		33.33		0.00		
Travel Time (min)	**= 0.44**	**+**	**0.37**	**+**	**0.00**	**=**	**0.81**
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)	= 3.00		0.00		0.00		
Wetted perimeter (ft)	= 6.32		0.00		0.00		
Channel slope (%)	= 0.94		0.00		0.00		
Manning's n-value	= 0.240		0.015		0.015		
Velocity (ft/s)	=0.37						
			0.00				
					0.00		
Flow length (ft)	({0})480.1		0.0		0.0		
Travel Time (min)	**= 21.91**	**+**	**0.00**	**+**	**0.00**	**=**	**21.91**

Total Travel Time, Tc ..... 22.70 min

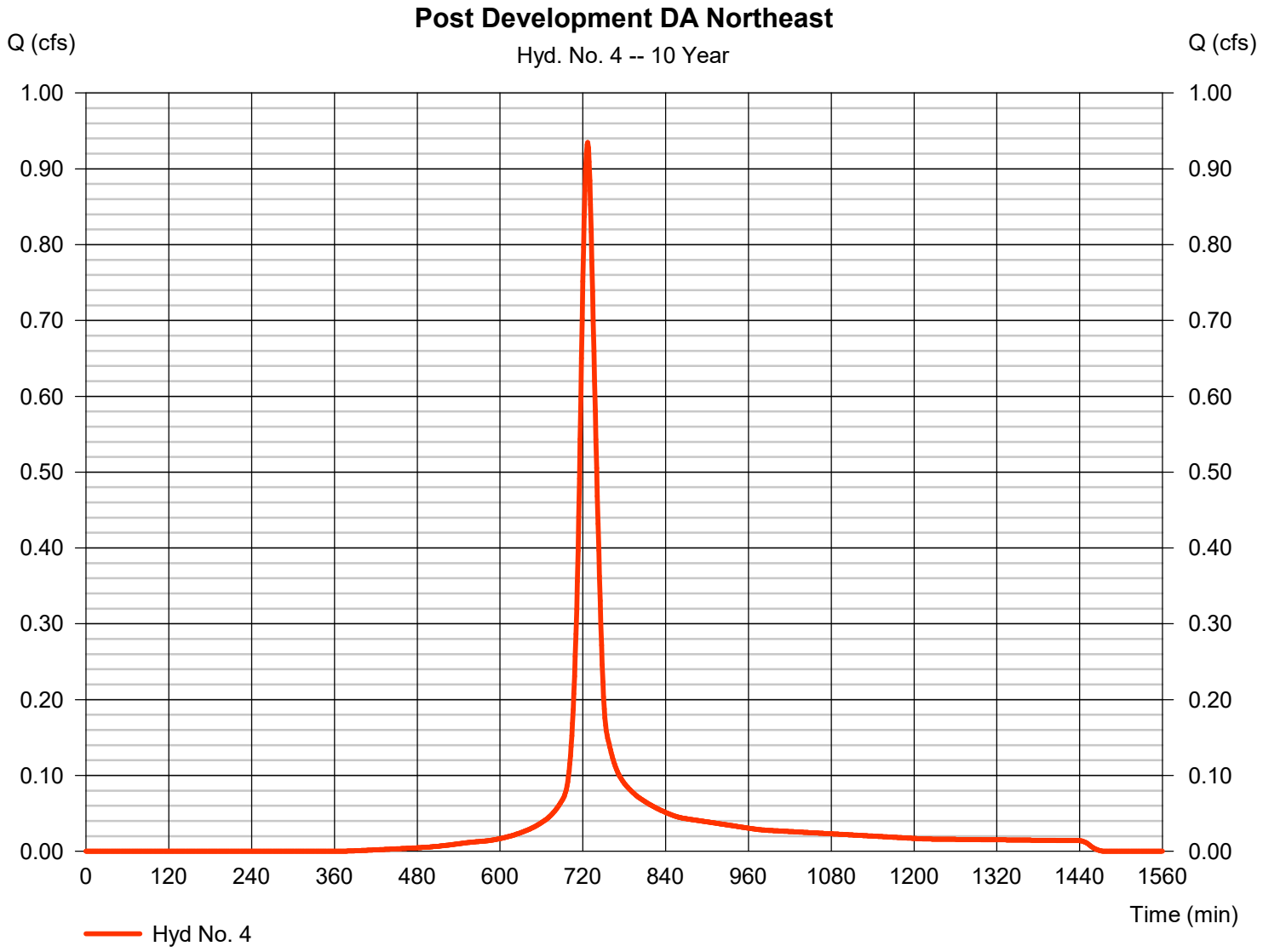
Hydrograph Report

Hyd. No. 4

Post Development DA Northeast

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.935 cfs
Storm frequency	=	10 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	3,186 cuft
Drainage area	=	0.550 ac	Curve number	=	91*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	22.70 min
Total precip.	=	2.50 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.150 x 98) + (0.020 x 98) + (0.320 x 89) + (0.060 x 79)] / 0.550



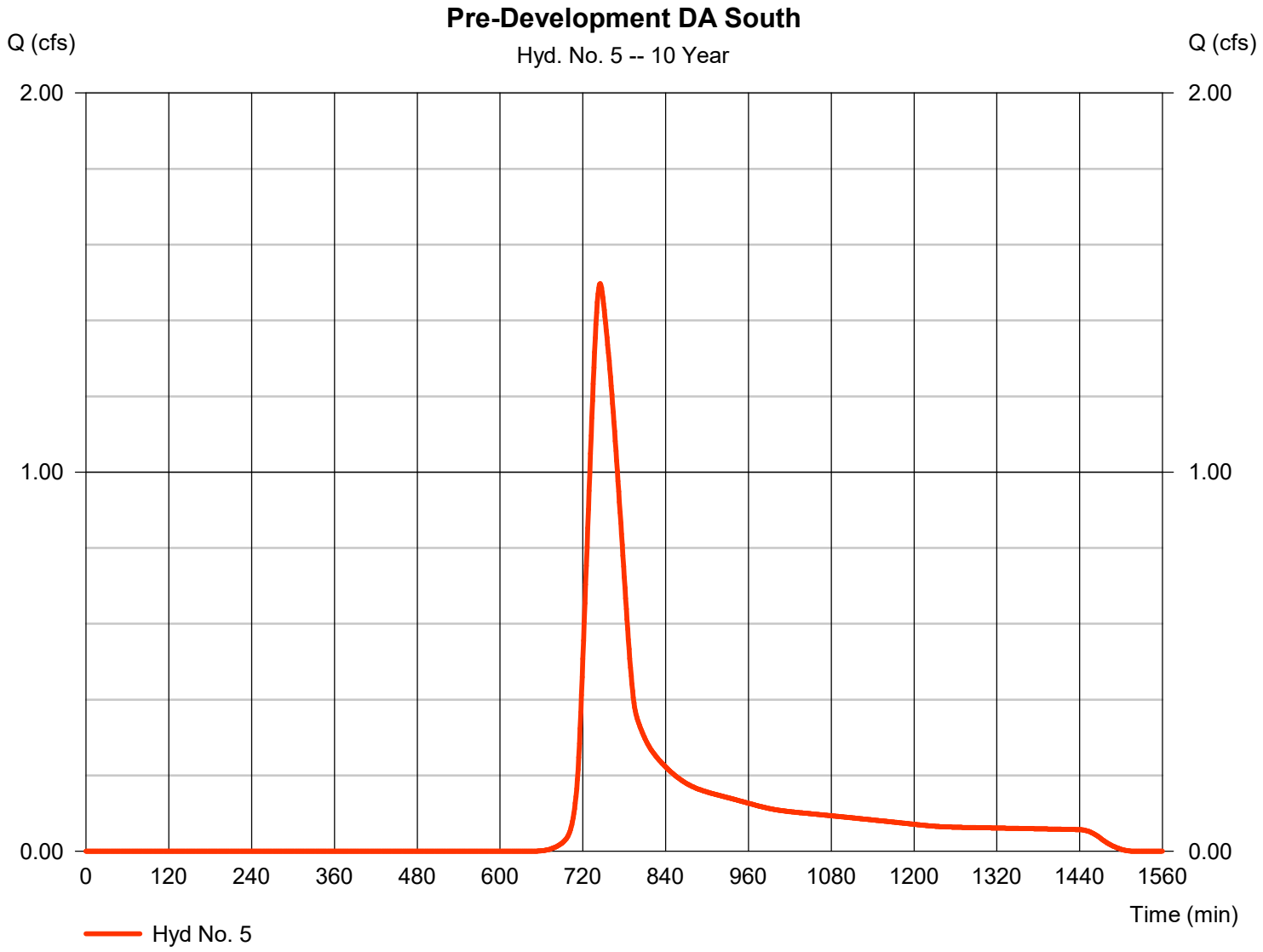
Hydrograph Report

Hyd. No. 5

Pre-Development DA South

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.497 cfs
Storm frequency	=	10 yrs	Time to peak	=	745 min
Time interval	=	1 min	Hyd. volume	=	9,120 cuft
Drainage area	=	3.000 ac	Curve number	=	79*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	49.90 min
Total precip.	=	2.50 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(3.000 x 79)] / 3.000



TR55 Tc Worksheet

Hyd. No. 5

Pre-Development DA South

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.240		0.011		0.011		
Flow length (ft)	= 300.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 1.80		0.00		0.00		
Land slope (%)	= 2.04		0.00		0.00		
Travel Time (min)	**= 45.46**	**+**	**0.00**	**+**	**0.00**	**=**	**45.46**
Shallow Concentrated Flow							
Flow length (ft)	= 369.55		0.00		0.00		
Watercourse slope (%)	= 0.73		0.00		0.00		
Surface description	= Unpaved		Paved		Paved		
Average velocity (ft/s)	=1.38		0.00		0.00		
Travel Time (min)	**= 4.47**	**+**	**0.00**	**+**	**0.00**	**=**	**4.47**
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 ..... 49.90 min

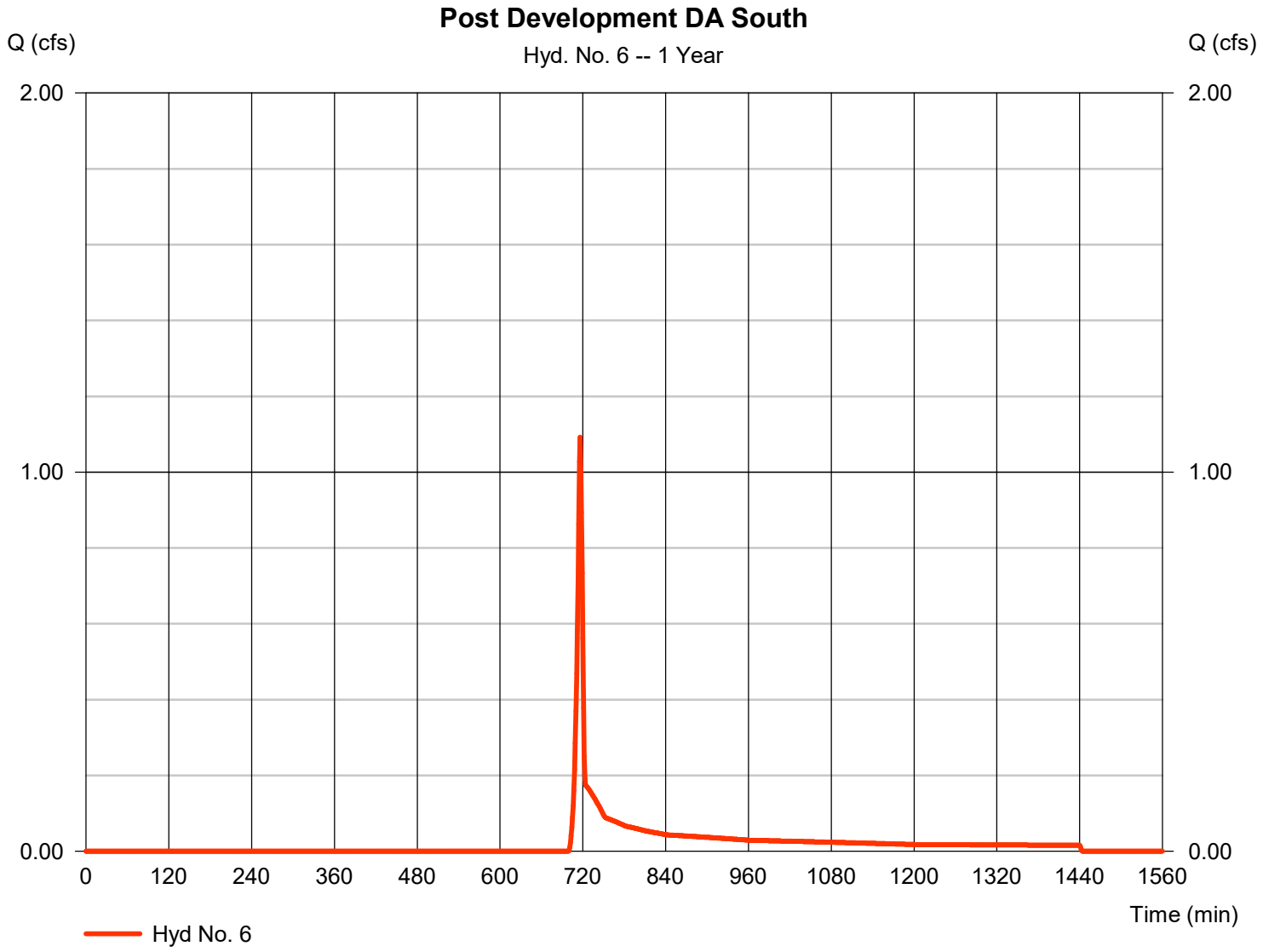
Hydrograph Report

Hyd. No. 6

Post Development DA South

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.092 cfs
Storm frequency	=	1 yrs	Time to peak	=	716 min
Time interval	=	1 min	Hyd. volume	=	2,017 cuft
Drainage area	=	3.000 ac	Curve number	=	86*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	2.00 min
Total precip.	=	1.00 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.340 x 98) + (0.040 x 98) + (1.220 x 89) + (0.030 x 86) + (1.370 x 79)] / 3.000



TR55 Tc Worksheet

Hyd. No. 6

Post Development DA South

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.011		0.011		0.011		
Flow length (ft)	= 180.7		0.0		0.0		
Two-year 24-hr precip. (in)	= 1.80		0.00		0.00		
Land slope (%)	= 3.87		0.00		0.00		
Travel Time (min)	**= 1.99**	**+**	**0.00**	**+**	**0.00**	**=**	**1.99**
Shallow Concentrated Flow							
Flow length (ft)	= 0.00		0.00		0.00		
Watercourse slope (%)	= 0.00		0.00		0.00		
Surface description	= Unpaved		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 ..... 2.00 min

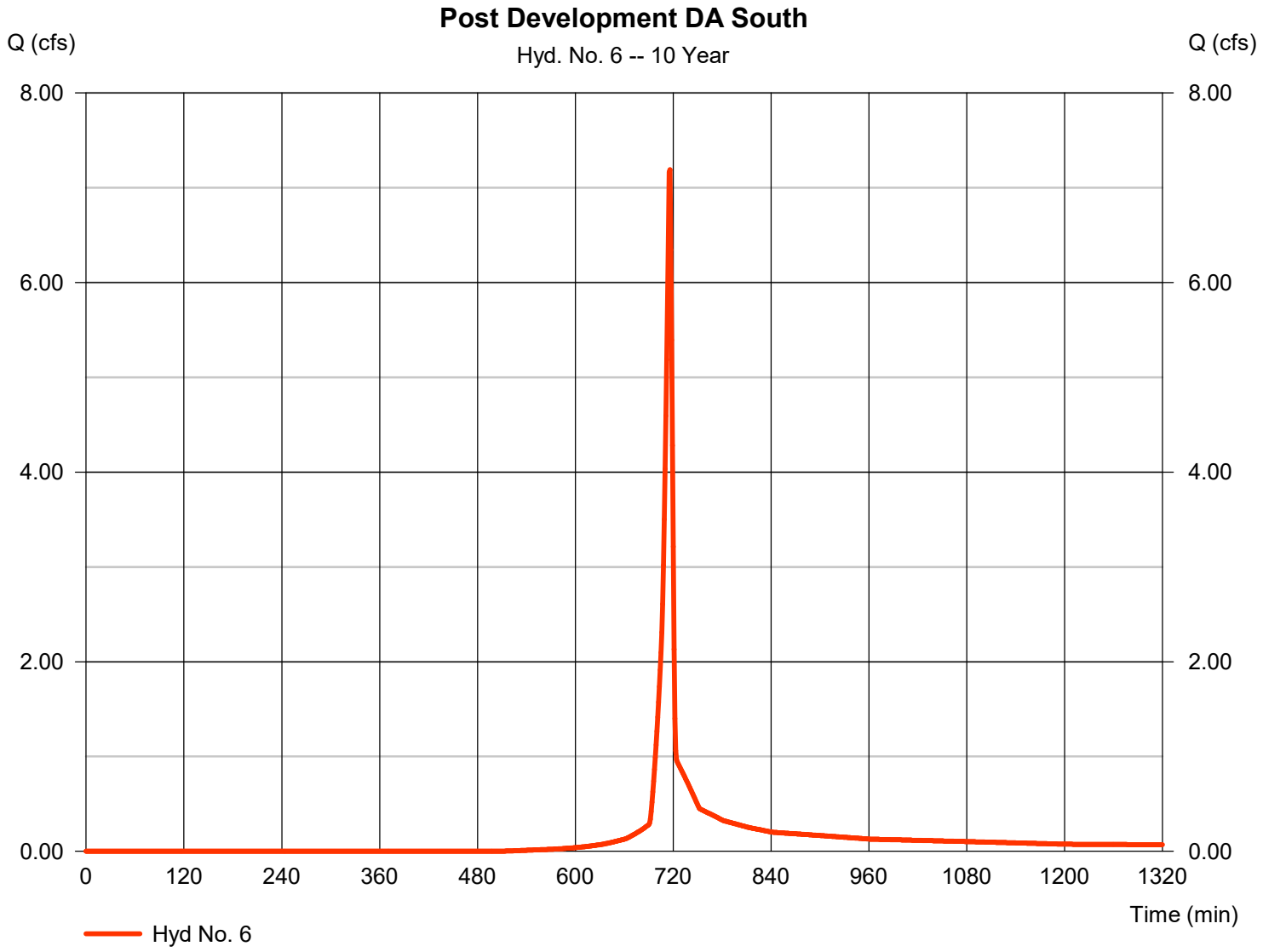
Hydrograph Report

Hyd. No. 6

Post Development DA South

Hydrograph type	=	SCS Runoff	Peak discharge	=	7.191 cfs
Storm frequency	=	10 yrs	Time to peak	=	716 min
Time interval	=	1 min	Hyd. volume	=	12,695 cuft
Drainage area	=	3.000 ac	Curve number	=	86*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	2.00 min
Total precip.	=	2.50 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.340 x 98) + (0.040 x 98) + (1.220 x 89) + (0.030 x 86) + (1.370 x 79)] / 3.000



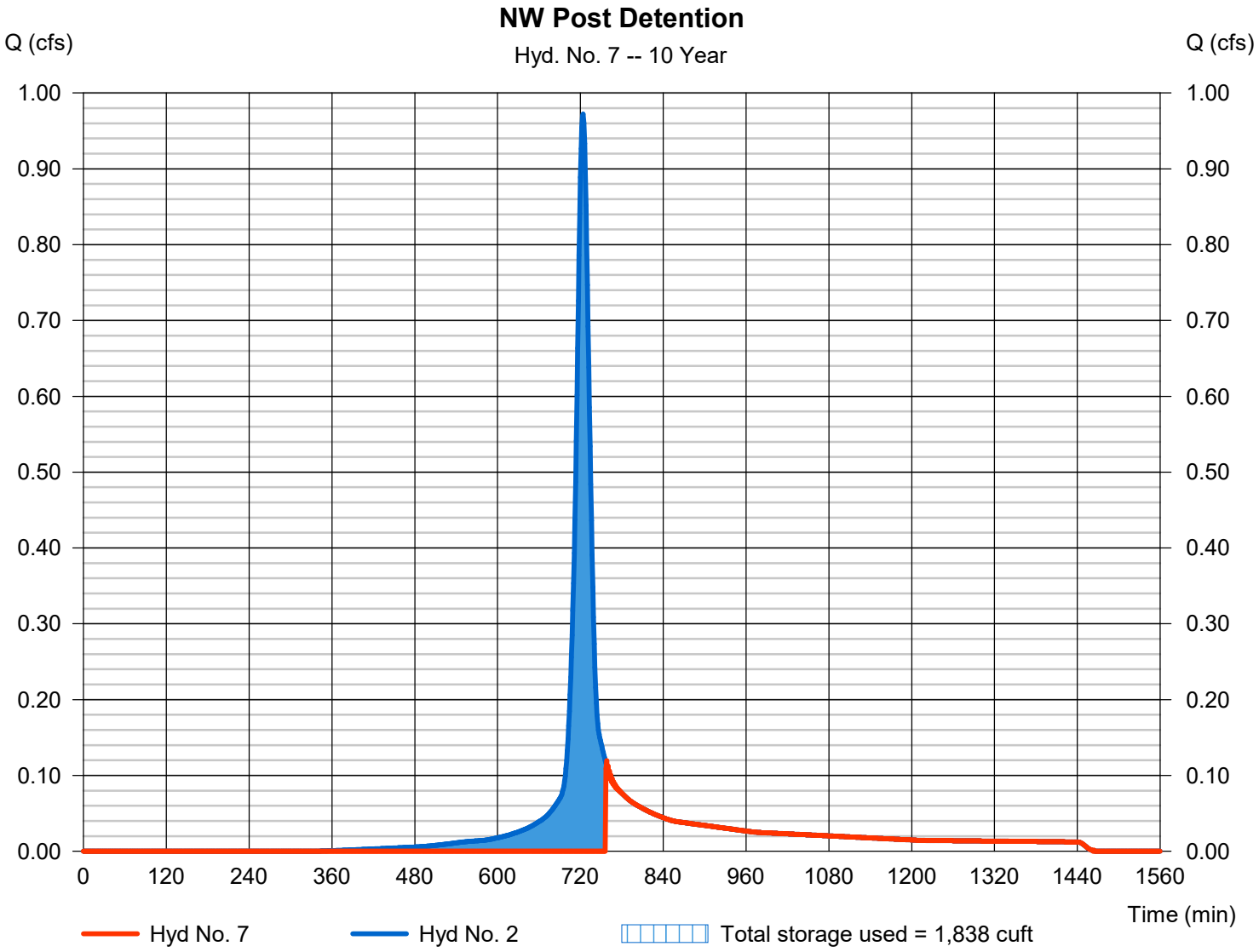
Hydrograph Report

Hyd. No. 7

NW Post Detention

Hydrograph type	=	Reservoir	Peak discharge	=	0.120 cfs
Storm frequency	=	10 yrs	Time to peak	=	758 min
Time interval	=	1 min	Hyd. volume	=	1,079 cuft
Inflow hyd. No.	=	2 - Post Development DA Northwest	Max. Elevation	=	3131.73 ft
Reservoir name	=	Total Detention Northwest	Max. Storage	=	1,838 cuft

Storage Indication method used.



Pond Report

Pond No. 1 - Total Detention Northwest

Pond Data

Pond storage is based on user-defined values.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	3131.00	n/a	0	0
0.50	3131.50	n/a	1,838	1,838
1.00	3132.00	n/a	1	1,839

Culvert / Orifice Structures

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

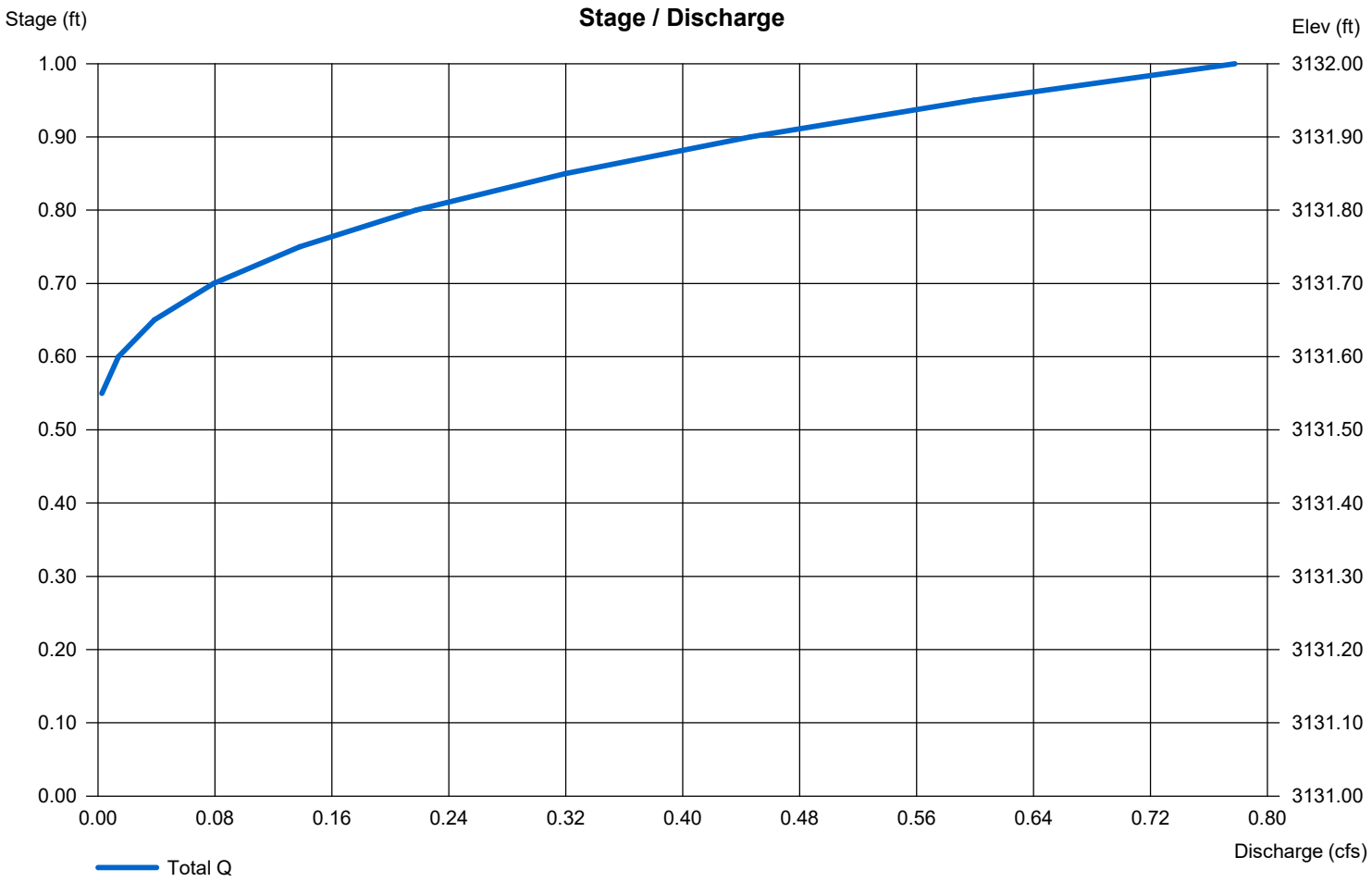
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 0.00	0.00	0.00	0.00
Crest El. (ft)	= 3131.50	0.00	0.00	0.00
Weir Coeff.	= 4.40	3.33	3.33	3.33
Weir Type	= 120 degV	---	---	---
Multi-Stage	= No	No	No	No

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

TW Elev. (ft) = 0.00

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



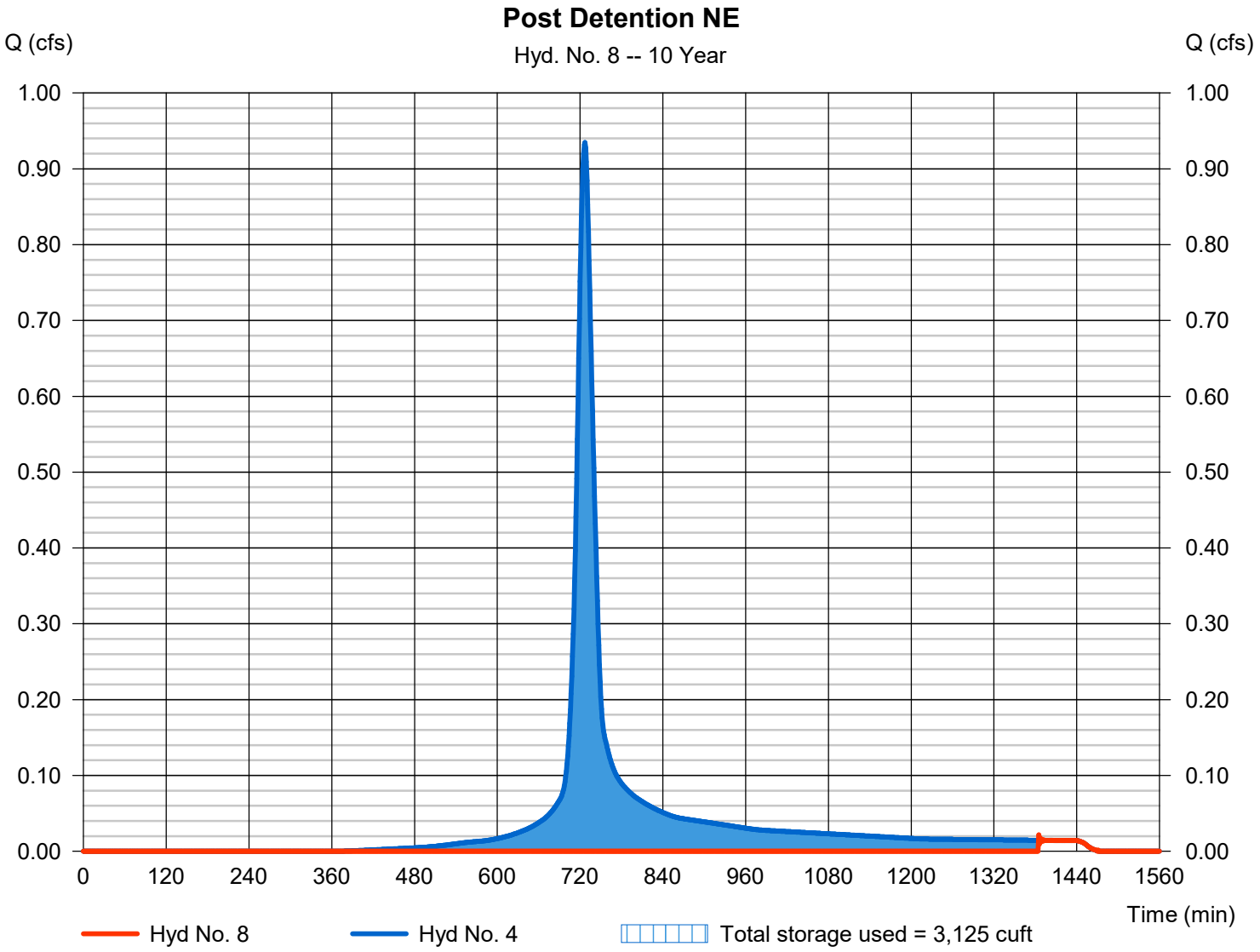
Hydrograph Report

Hyd. No. 8

Post Detention NE

Hydrograph type	=	Reservoir	Peak discharge	=	0.022 cfs
Storm frequency	=	10 yrs	Time to peak	=	1385 min
Time interval	=	1 min	Hyd. volume	=	61 cuft
Inflow hyd. No.	=	4 - Post Development DA Northeast	Max. Elevation	=	3131.62 ft
Reservoir name	=	Total Detention Northeast	Max. Storage	=	3,125 cuft

Storage Indication method used.



Pond Report

Pond No. 2 - Total Detention Northeast

Pond Data

Pond storage is based on user-defined values.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	3131.00	n/a	0	0
0.50	3131.50	n/a	3,125	3,125
1.00	3132.00	n/a	1	3,126

Culvert / Orifice Structures

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

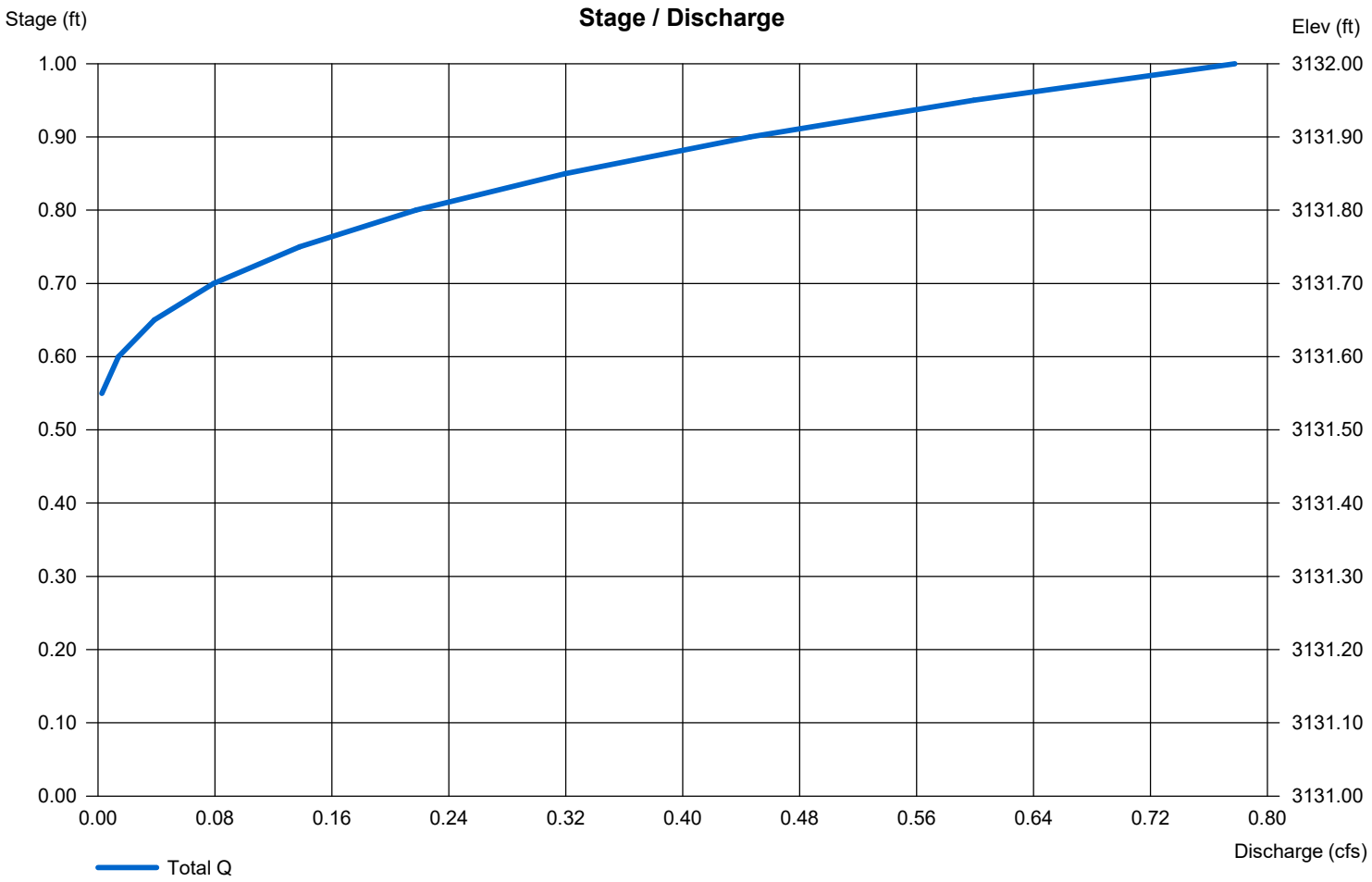
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 0.00	0.00	0.00	0.00
Crest El. (ft)	= 3131.50	0.00	0.00	0.00
Weir Coeff.	= 4.40	3.33	3.33	3.33
Weir Type	= 120 degV	---	---	---
Multi-Stage	= No	No	No	No

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

TW Elev. (ft) = 0.00

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

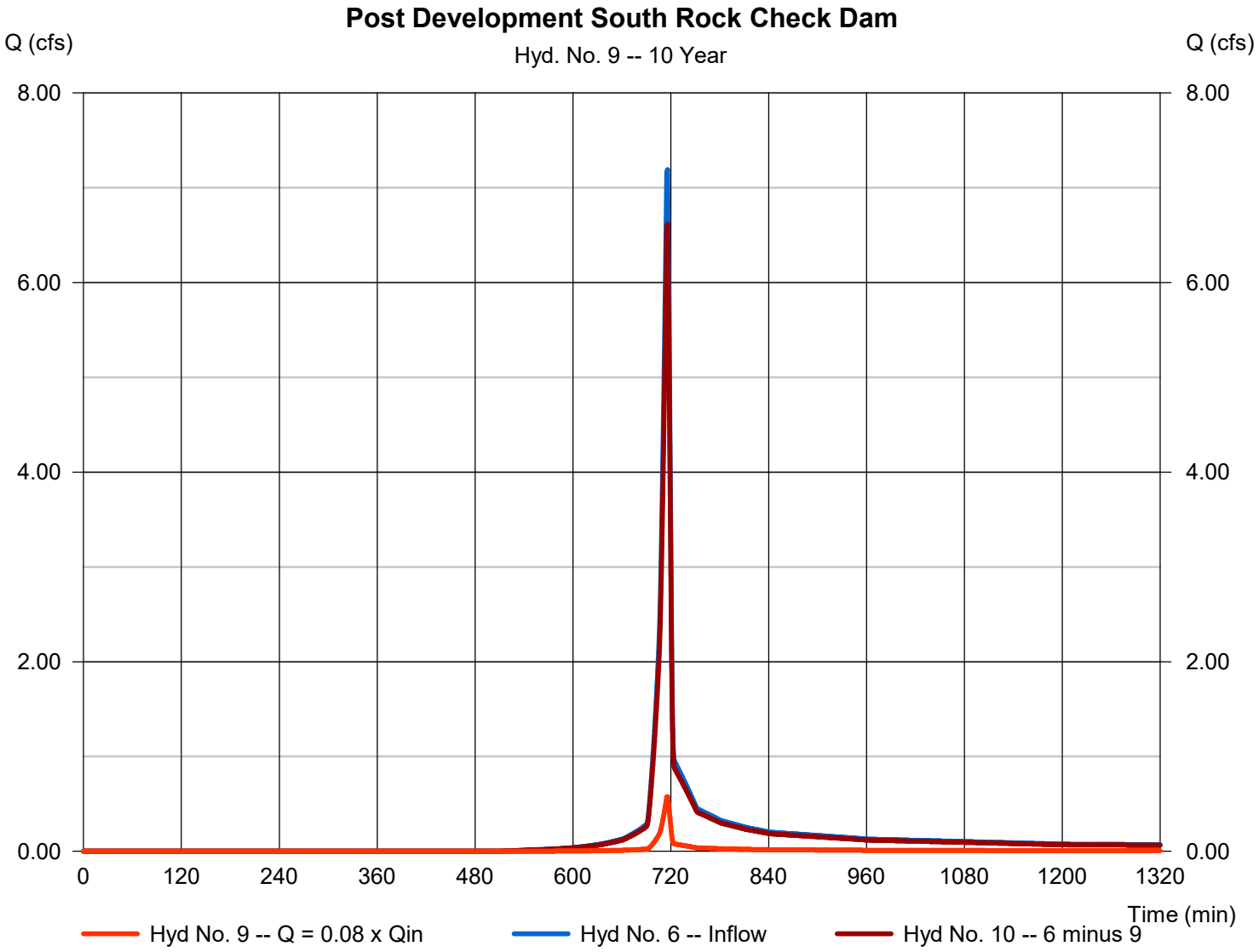


Hydrograph Report

Hyd. No. 9

Post Development South Rock Check Dam

Hydrograph type	= Diversion1	Peak discharge	= 0.575 cfs
Storm frequency	= 10 yrs	Time to peak	= 716 min
Time interval	= 1 min	Hyd. volume	= 1,016 cuft
Inflow hydrograph	= 6 - Post Development DA South	2nd diverted hyd.	= 10
Diversion method	= Flow Ratio	Flow ratio	= 0.08

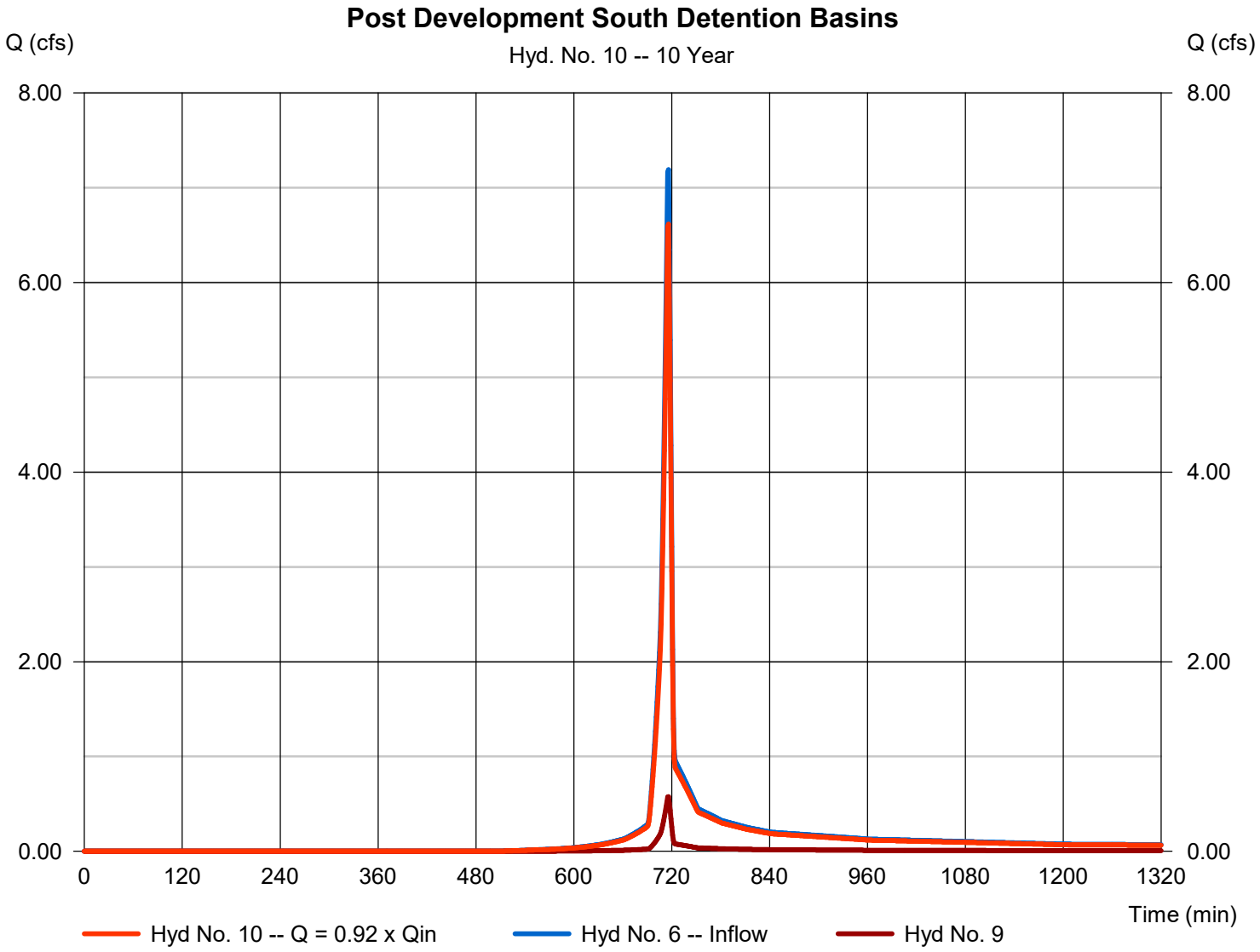


Hydrograph Report

Hyd. No. 10

Post Development South Detention Basins

Hydrograph type	= Diversion2	Peak discharge	= 6.615 cfs
Storm frequency	= 10 yrs	Time to peak	= 716 min
Time interval	= 1 min	Hyd. volume	= 11,679 cuft
Inflow hydrograph	= 6 - Post Development DA South	2nd diverted hyd.	= 9
Diversion method	= Flow Ratio	Flow ratio	= 0.08

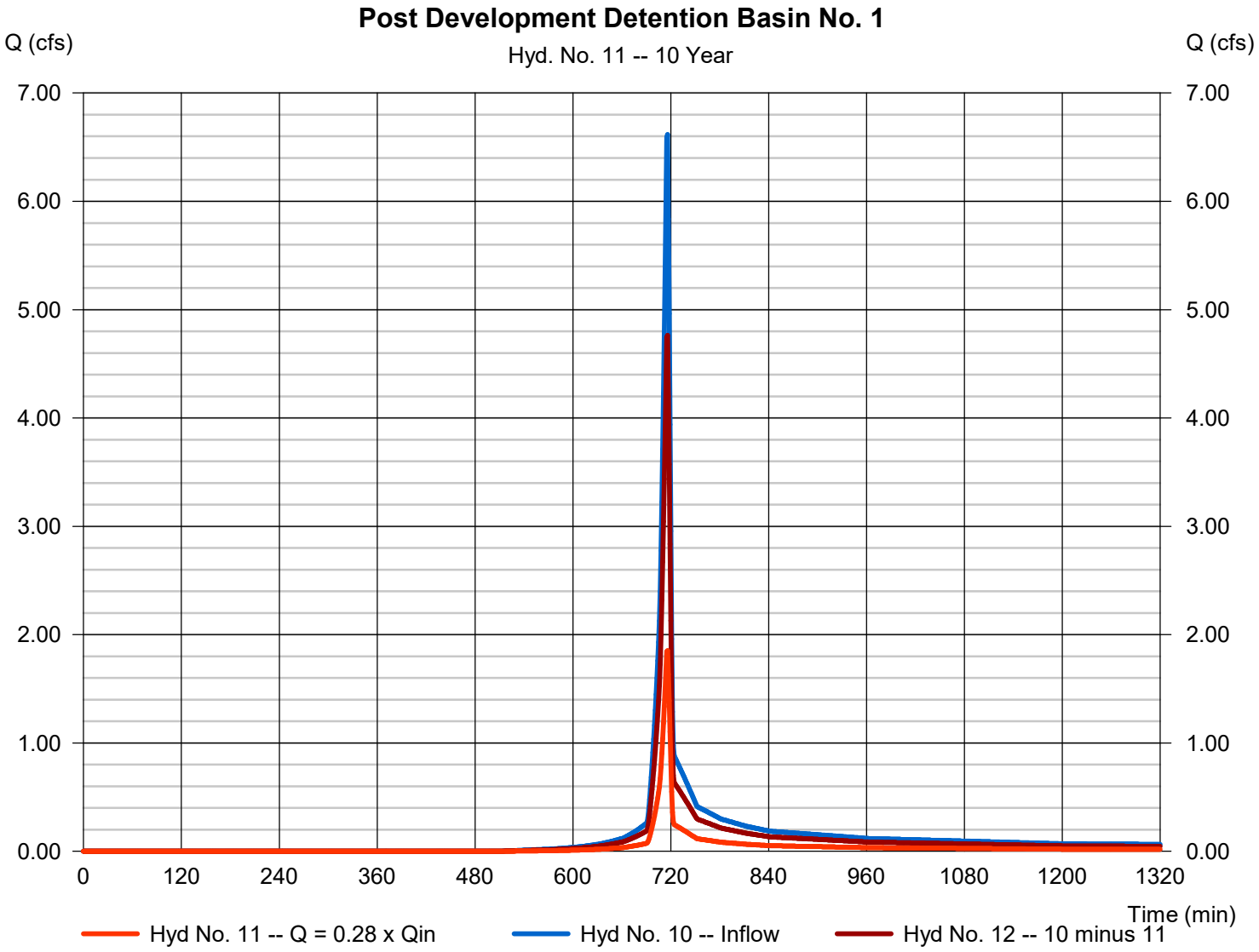


Hydrograph Report

Hyd. No. 11

Post Development Detention Basin No. 1

Hydrograph type	= Diversion1	Peak discharge	= 1.852 cfs
Storm frequency	= 10 yrs	Time to peak	= 716 min
Time interval	= 1 min	Hyd. volume	= 3,270 cuft
Inflow hydrograph	= 10 - Post Development South Detention Basin	Detention Basin	= 12
Diversion method	= Flow Ratio	Flow ratio	= 0.28

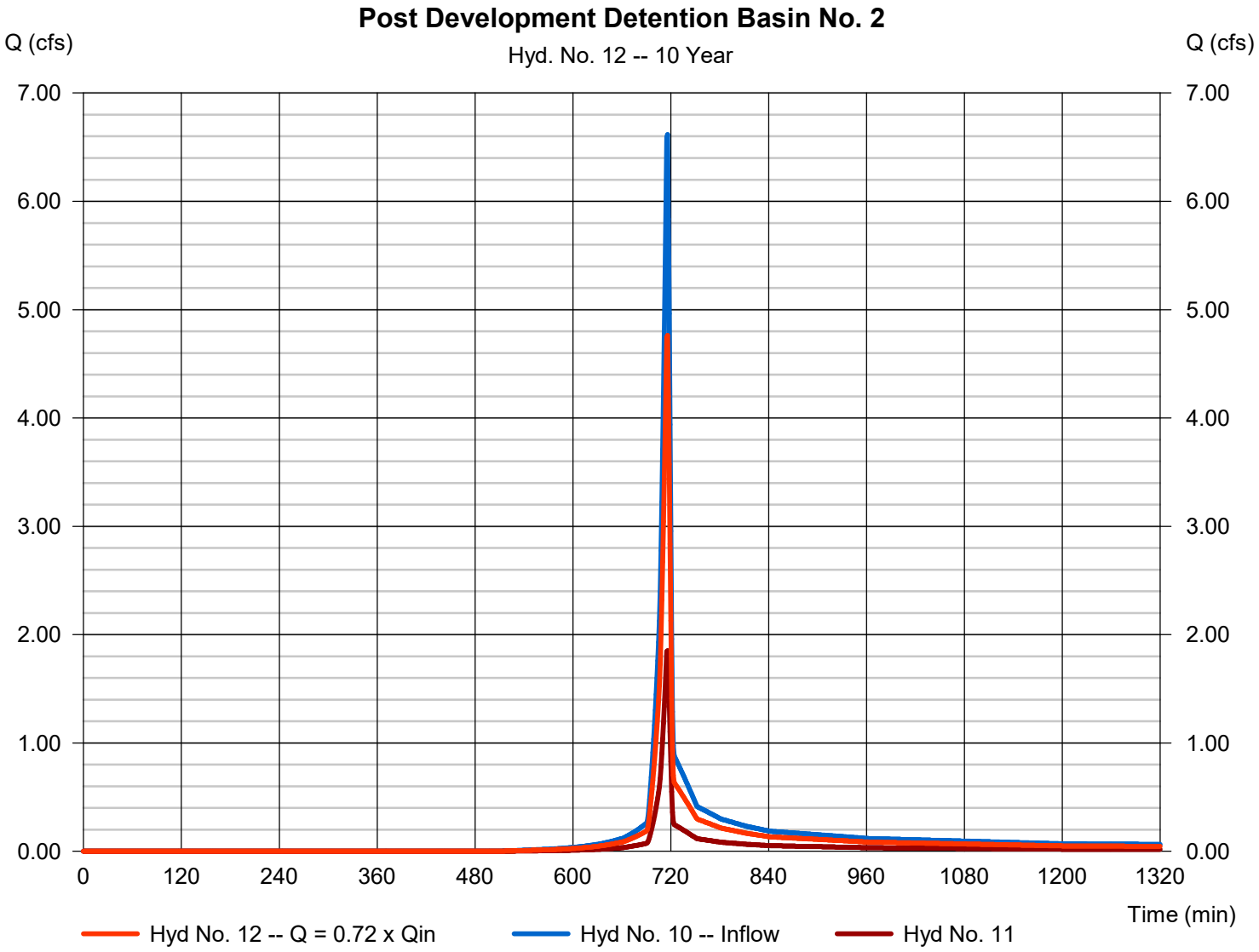


Hydrograph Report

Hyd. No. 12

Post Development Detention Basin No. 2

Hydrograph type	= Diversion2	Peak discharge	= 4.763 cfs
Storm frequency	= 10 yrs	Time to peak	= 716 min
Time interval	= 1 min	Hyd. volume	= 8,409 cuft
Inflow hydrograph	= 10 - Post Development South Detention Basin	Detention Basin Hyd.	= 11
Diversion method	= Flow Ratio	Flow ratio	= 0.28



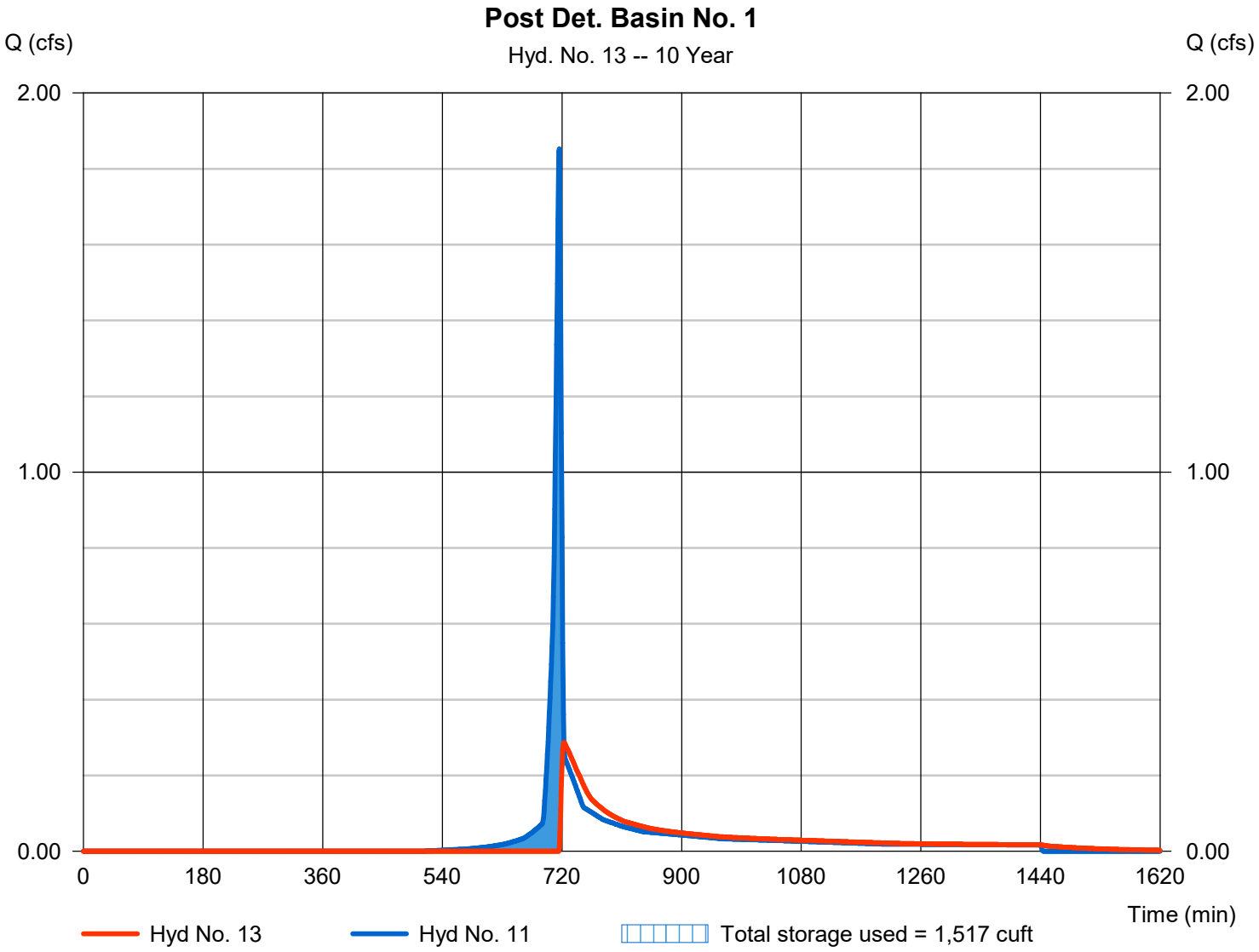
Hydrograph Report

Hyd. No. 13

Post Det. Basin No. 1

Hydrograph type	=	Reservoir	Peak discharge	=	0.287 cfs
Storm frequency	=	10 yrs	Time to peak	=	723 min
Time interval	=	1 min	Hyd. volume	=	2,186 cuft
Inflow hyd. No.	=	11 - Post Development Detention Basin No. 1	Max. Elevation	=	3134.83 ft
Reservoir name	=	Upper Basin South	Max. Storage	=	1,517 cuft

Storage Indication method used.



Pond Report

Pond No. 3 - Upper Basin South

Pond Data

Contours -User-defined contour areas. Average end area method used for volume calculation. Begining Elevation = 3133.50 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	3133.50	850	0	0
1.00	3134.50	1,262	1,056	1,056
1.50	3135.00	1,499	690	1,747

Culvert / Orifice Structures

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

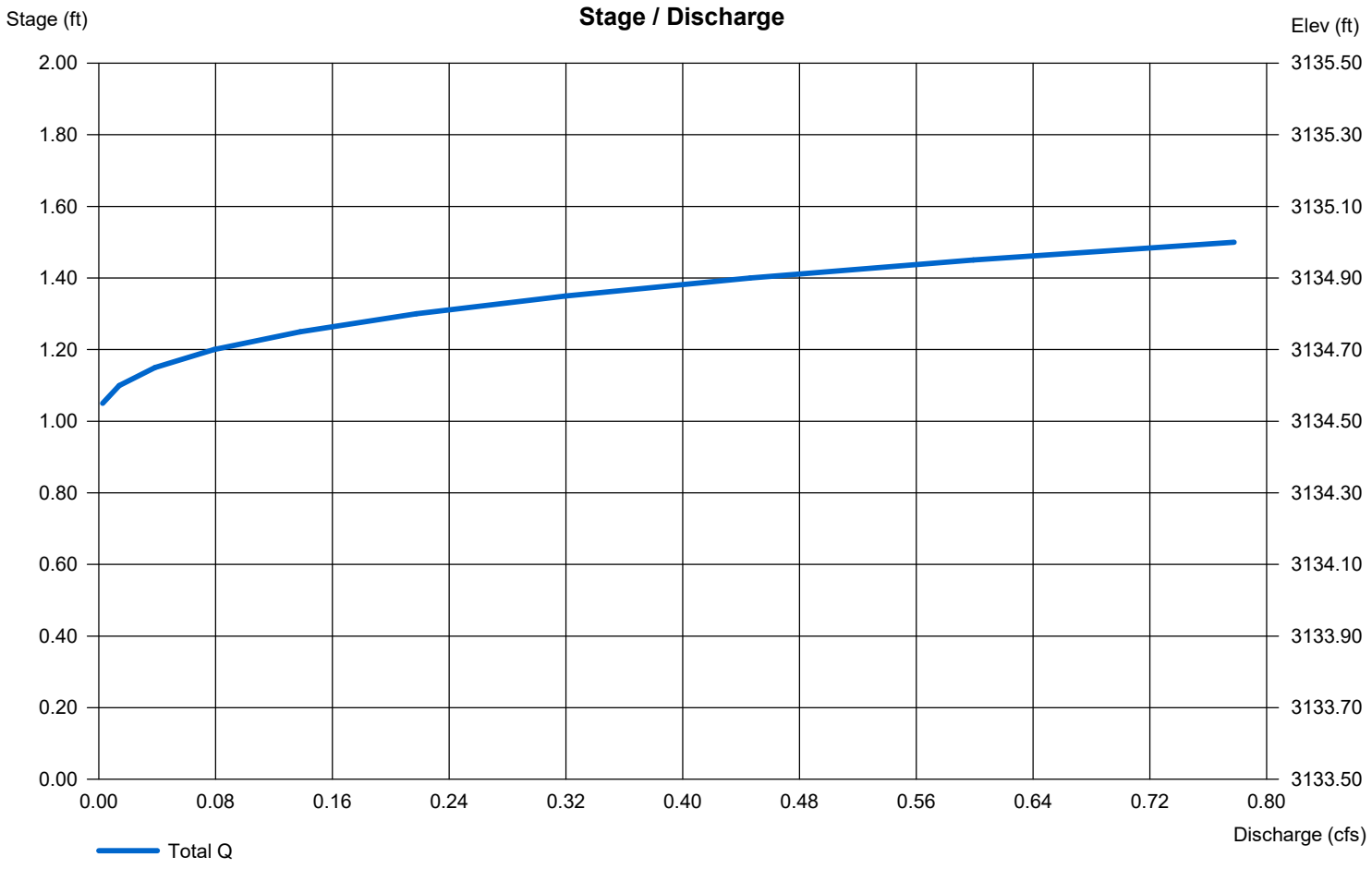
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 0.00	0.00	0.00	0.00
Crest El. (ft)	= 3134.50	0.00	0.00	0.00
Weir Coeff.	= 4.40	3.33	3.33	3.33
Weir Type	= 120 degV	---	---	---
Multi-Stage	= No	No	No	No

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

TW Elev. (ft) = 0.00

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



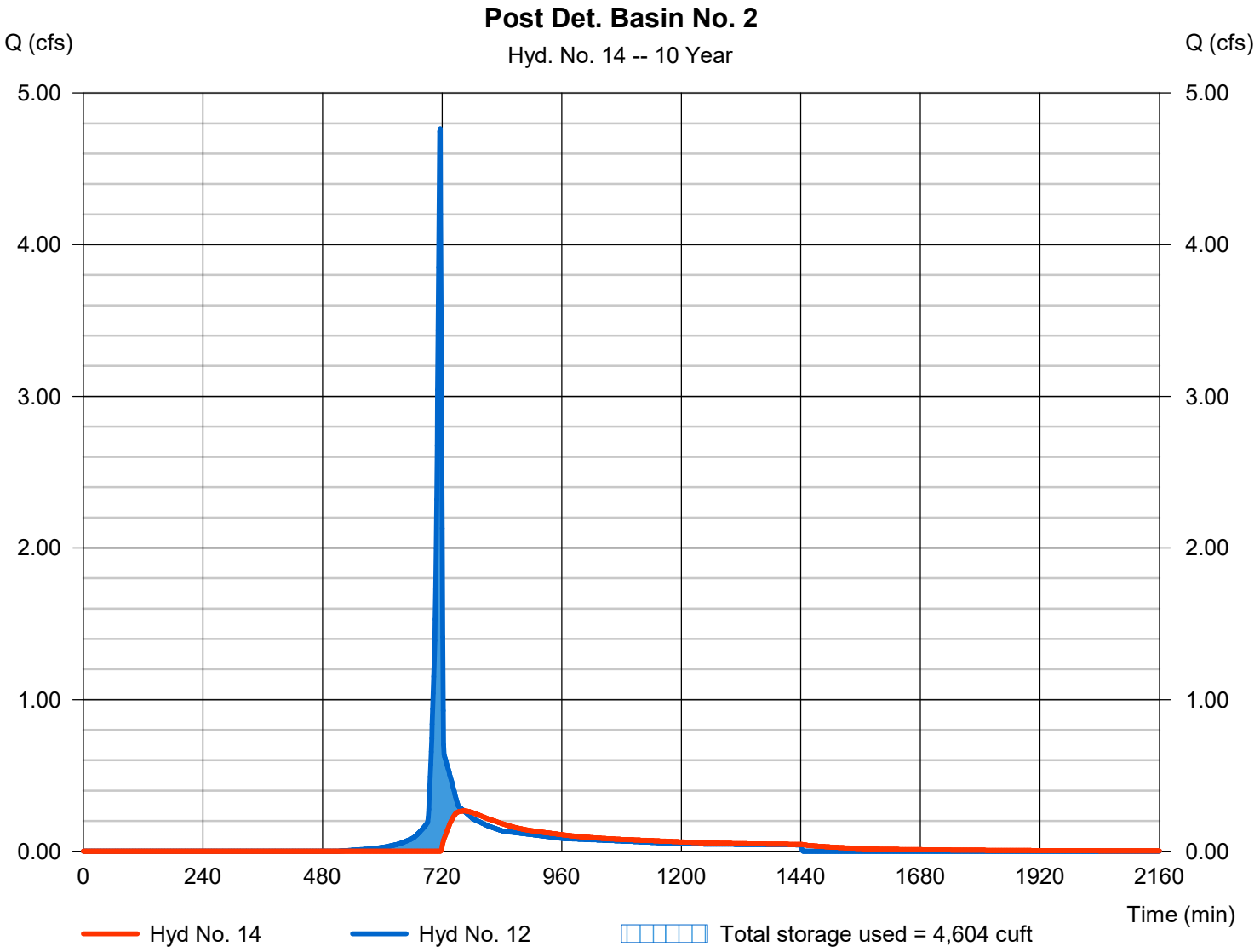
Hydrograph Report

Hyd. No. 14

Post Det. Basin No. 2

Hydrograph type	=	Reservoir	Peak discharge	=	0.266 cfs
Storm frequency	=	10 yrs	Time to peak	=	764 min
Time interval	=	1 min	Hyd. volume	=	4,989 cuft
Inflow hyd. No.	=	12 - Post Development Detention Basin No 2	Max. Elevation	=	3131.82 ft
Reservoir name	=	Lower Basin South	Max. Storage	=	4,604 cuft

Storage Indication method used.



Pond Report

Pond No. 4 - Lower Basin South

Pond Data

Contours -User-defined contour areas. Average end area method used for volume calculation. Begining Elevation = 3130.50 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	3130.50	2,857	0	0
1.00	3131.50	3,760	3,308	3,308
1.50	3132.00	4,249	2,002	5,310

Culvert / Orifice Structures

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

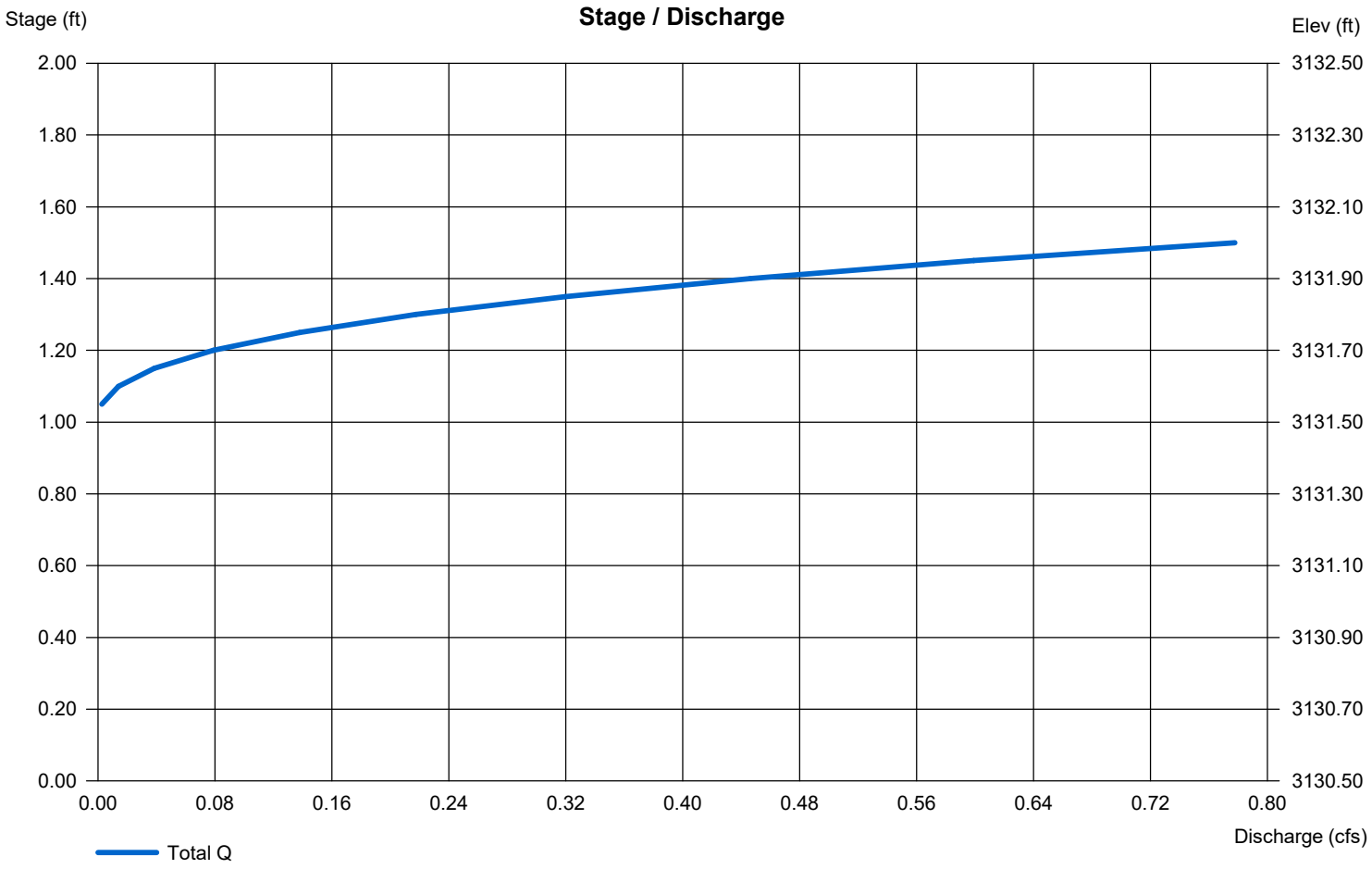
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 0.00	0.00	0.00	0.00
Crest El. (ft)	= 3131.50	0.00	0.00	0.00
Weir Coeff.	= 4.40	3.33	3.33	3.33
Weir Type	= 120 degV	---	---	---
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).



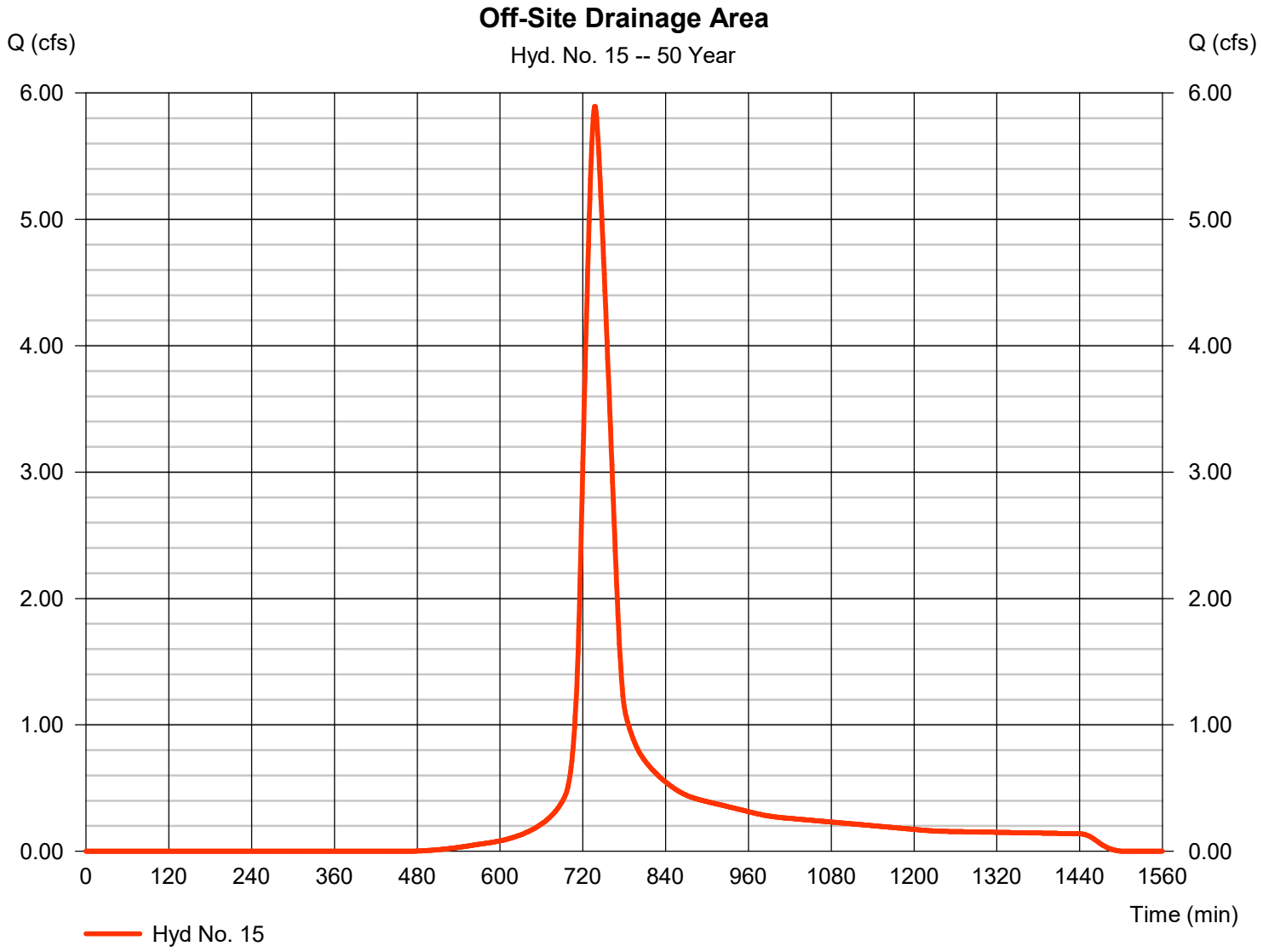
Hydrograph Report

Hyd. No. 15

Off-Site Drainage Area

Hydrograph type	=	SCS Runoff	Peak discharge	=	5.894 cfs
Storm frequency	=	50 yrs	Time to peak	=	738 min
Time interval	=	1 min	Hyd. volume	=	28,583 cuft
Drainage area	=	4.480 ac	Curve number	=	85*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	40.30 min
Total precip.	=	3.20 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.170 x 98) + (4.310 x 85)] / 4.480



TR55 Tc Worksheet

Hyd. No. 15

Off-Site Drainage Area

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.011		0.240		0.011		
Flow length (ft)	= 17.9		282.1		0.0		
Two-year 24-hr precip. (in)	= 1.80		1.80		0.00		
Land slope (%)	= 2.00		2.84		0.00		
Travel Time (min)	**= 0.41**	**+**	**37.91**	**+**	**0.00**	**=**	**38.32**
Shallow Concentrated Flow							
Flow length (ft)	= 315.95		0.00		0.00		
Watercourse slope (%)	= 2.69		0.00		0.00		
Surface description	= Unpaved		Paved		Paved		
Average velocity (ft/s)	=2.65		0.00		0.00		
Travel Time (min)	**= 1.99**	**+**	**0.00**	**+**	**0.00**	**=**	**1.99**
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 ..... 40.30 min

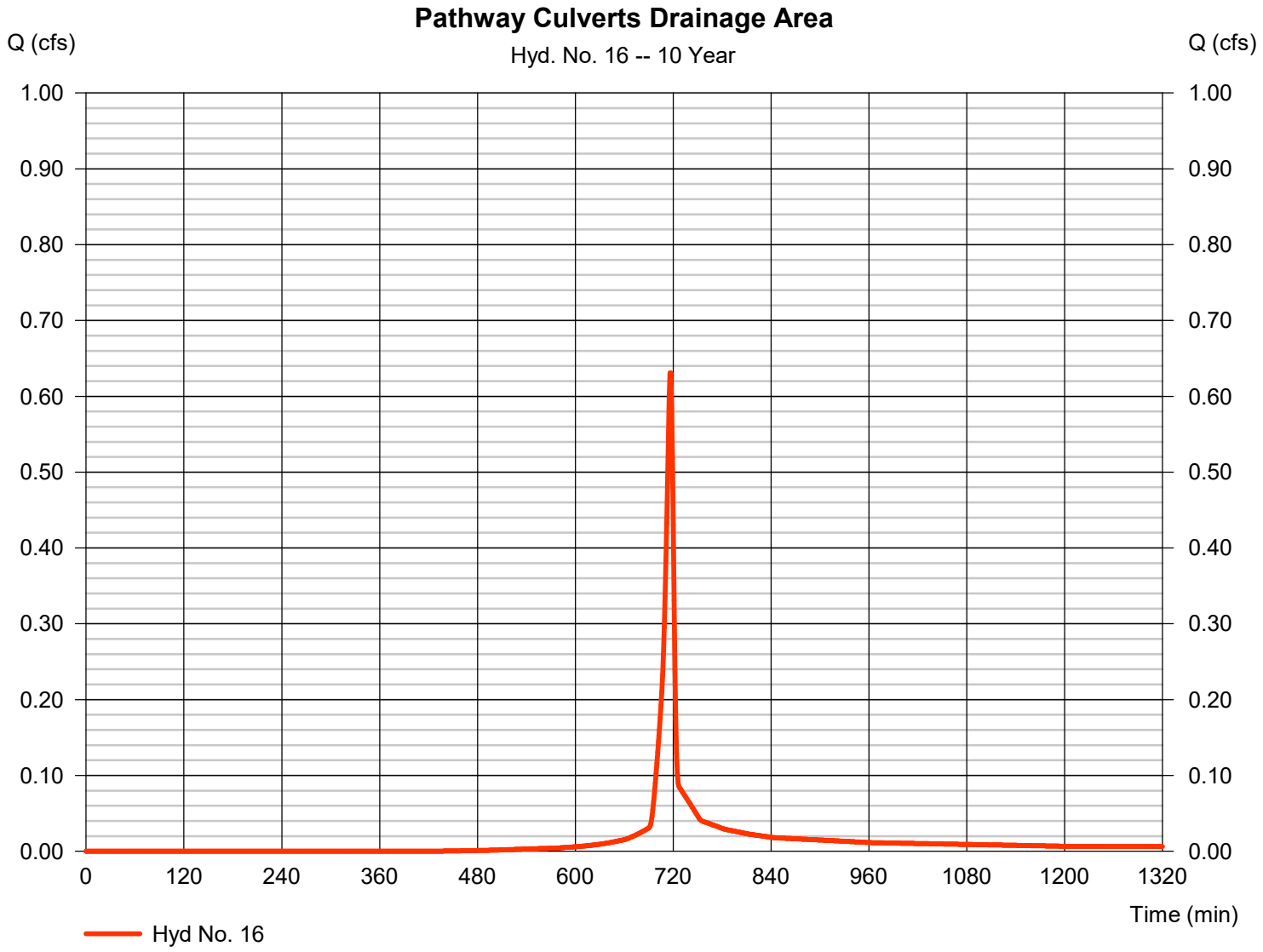
Hydrograph Report

Hyd. No. 16

Pathway Culverts Drainage Area

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.631 cfs
Storm frequency	=	10 yrs	Time to peak	=	717 min
Time interval	=	1 min	Hyd. volume	=	1,215 cuft
Drainage area	=	0.230 ac	Curve number	=	89*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	4.20 min
Total precip.	=	2.50 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.230 x 89)] / 0.230



TR55 Tc Worksheet

Hyd. No. 16

Pathway Culverts Drainage Area

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.011		0.240		0.011		
Flow length (ft)	= 104.7		8.0		0.0		
Two-year 24-hr precip. (in)	= 1.80		1.80		0.00		
Land slope (%)	= 2.00		2.00		0.00		
Travel Time (min)	**= 1.68**	**+**	**2.52**	**+**	**0.00**	**=**	**4.20**
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 ..... 4.20 min

Culvert Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Wednesday, May 28 2025

12-Inch CPP Culvert @ 0.50%

Invert Elev Dn (ft)	=	3131.69
Pipe Length (ft)	=	87.81
Slope (%)	=	0.50
Invert Elev Up (ft)	=	3132.13
Rise (in)	=	12.0
Shape	=	Circular
Span (in)	=	12.0
No. Barrels	=	1
n-Value	=	0.012
Culvert Type	=	Circular Culvert
Culvert Entrance	=	Smooth tapered inlet throat
Coeff. K,M,c,Y,k	=	0.534, 0.555, 0.0196, 0.9, 0.2

Embankment

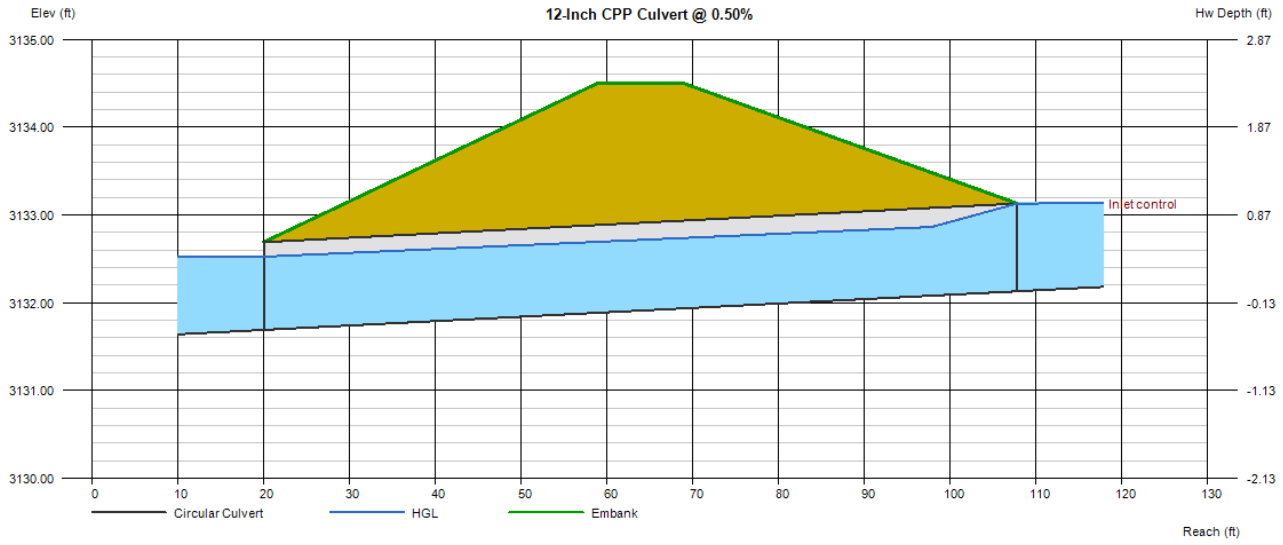
Top Elevation (ft)	=	3134.50
Top Width (ft)	=	10.00
Crest Width (ft)	=	10.00

Calculations

Qmin (cfs)	=	0.63
Qmax (cfs)	=	2.44
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	2.44
Qpipe (cfs)	=	2.44
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	3.49
Veloc Up (ft/s)	=	3.73
HGL Dn (ft)	=	3132.52
HGL Up (ft)	=	3132.91
Hw Elev (ft)	=	3133.13
Hw/D (ft)	=	1.00
Flow Regime	=	Inlet Control



Culvert Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Wednesday, May 28 2025

12-Inch CPP Culvert @ 1.00%

Invert Elev Dn (ft)	=	3131.69
Pipe Length (ft)	=	87.81
Slope (%)	=	1.00
Invert Elev Up (ft)	=	3132.57
Rise (in)	=	12.0
Shape	=	Circular
Span (in)	=	12.0
No. Barrels	=	1
n-Value	=	0.012
Culvert Type	=	Circular Culvert
Culvert Entrance	=	Smooth tapered inlet throat
Coeff. K,M,c,Y,k	=	0.534, 0.555, 0.0196, 0.9, 0.2

Embankment

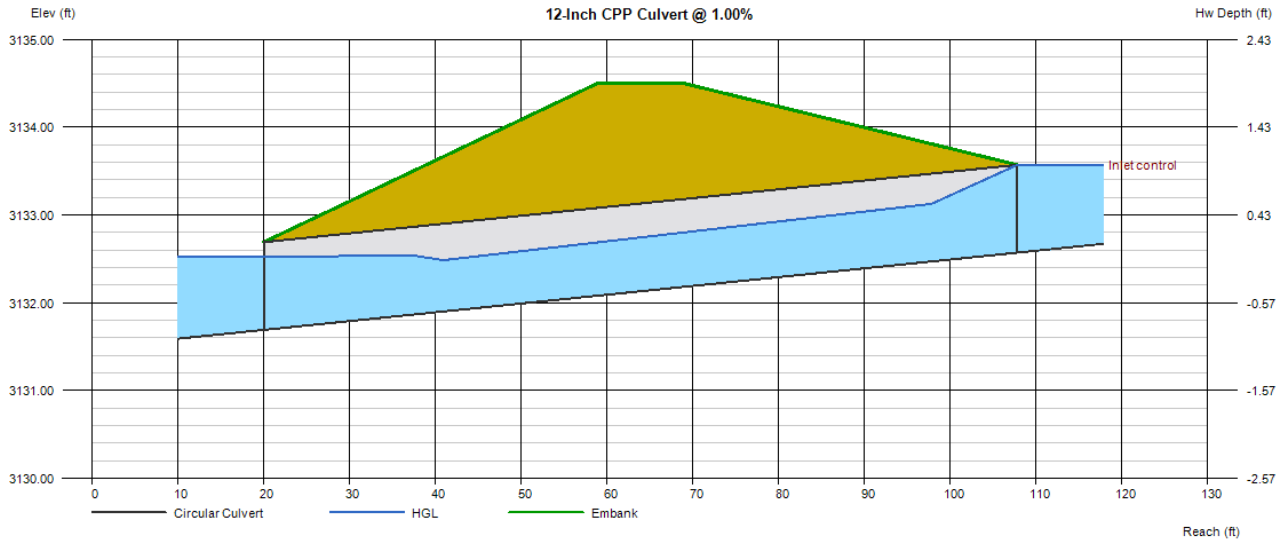
Top Elevation (ft)	=	3134.50
Top Width (ft)	=	10.00
Crest Width (ft)	=	10.00

Calculations

Qmin (cfs)	=	0.63
Qmax (cfs)	=	2.44
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	2.44
Qpipe (cfs)	=	2.44
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	3.49
Veloc Up (ft/s)	=	4.37
HGL Dn (ft)	=	3132.52
HGL Up (ft)	=	3133.24
Hw Elev (ft)	=	3133.57
Hw/D (ft)	=	1.00
Flow Regime	=	Inlet Control



Culvert Report

12-Inch CPP Culvert @ 2.00%

Invert Elev Dn (ft)	=	3131.69
Pipe Length (ft)	=	87.81
Slope (%)	=	2.00
Invert Elev Up (ft)	=	3133.45
Rise (in)	=	12.0
Shape	=	Circular
Span (in)	=	12.0
No. Barrels	=	1
n-Value	=	0.012
Culvert Type	=	Circular Culvert
Culvert Entrance	=	Smooth tapered inlet throat
Coeff. K,M,c,Y,k	=	0.534, 0.555, 0.0196, 0.9, 0.2

Embankment

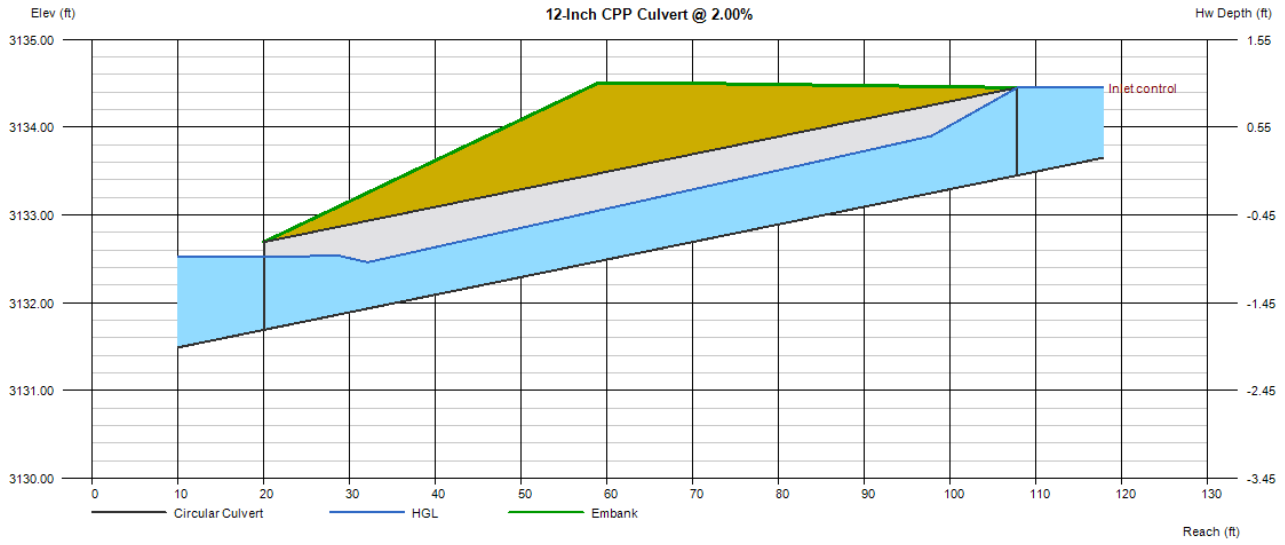
Top Elevation (ft)	=	3134.50
Top Width (ft)	=	10.00
Crest Width (ft)	=	10.00

Calculations

Qmin (cfs)	=	0.74
Qmax (cfs)	=	2.44
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	2.44
Qpipe (cfs)	=	2.44
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	3.49
Veloc Up (ft/s)	=	4.37
HGL Dn (ft)	=	3132.52
HGL Up (ft)	=	3134.12
Hw Elev (ft)	=	3134.45
Hw/D (ft)	=	1.00
Flow Regime	=	Inlet Control



Culvert Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Monday, May 19 2025

18-Inch CPP Culvert @ 0.50%

Invert Elev Dn (ft)	=	3127.66
Pipe Length (ft)	=	167.93
Slope (%)	=	0.50
Invert Elev Up (ft)	=	3128.50
Rise (in)	=	18.0
Shape	=	Circular
Span (in)	=	18.0
No. Barrels	=	1
n-Value	=	0.012
Culvert Type	=	Circular Culvert
Culvert Entrance	=	Smooth tapered inlet throat
Coeff. K,M,c,Y,k	=	0.534, 0.555, 0.0196, 0.9, 0.2

Embankment

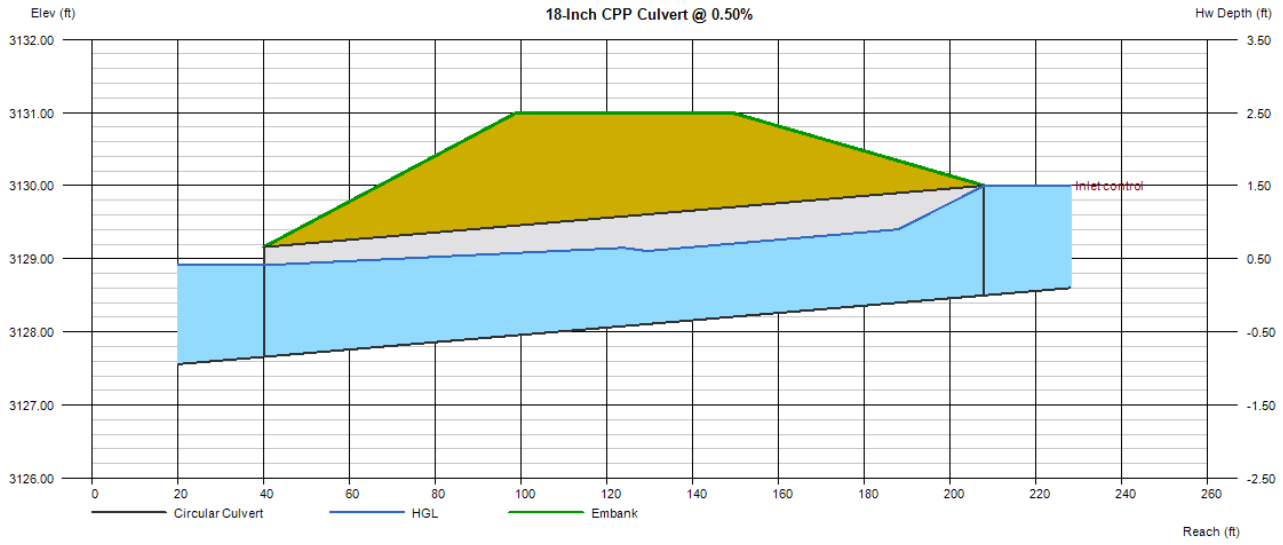
Top Elevation (ft)	=	3131.00
Top Width (ft)	=	50.00
Crest Width (ft)	=	50.00

Calculations

Qmin (cfs)	=	5.89
Qmax (cfs)	=	6.75
Tailwater Elev (ft)	=	(dc+D)/2

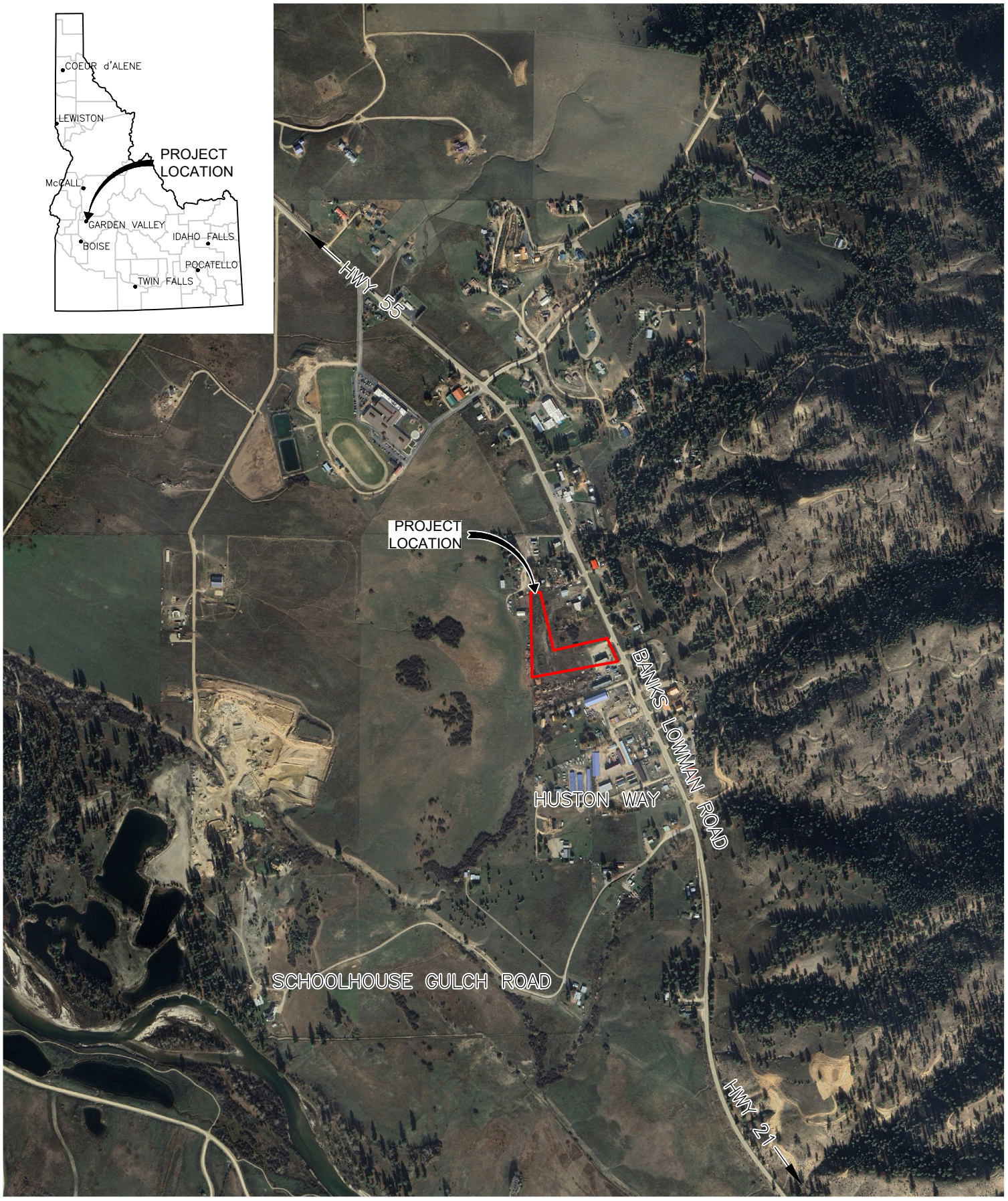
Highlighted

Qtotal (cfs)	=	6.75
Qpipe (cfs)	=	6.75
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	4.28
Veloc Up (ft/s)	=	5.37
HGL Dn (ft)	=	3128.91
HGL Up (ft)	=	3129.50
Hw Elev (ft)	=	3130.01
Hw/D (ft)	=	1.00
Flow Regime	=	Inlet Control



APPENDIX A

FIGURES, DRAWINGS, AND SUPPORTING DOCUMENTS



NORTH
SCALE: 1" = 1,000'

CRESTLINE ENGINEERS
323 DEINHARD LANE, SUITE C · PO BOX 2330
McCALL, IDAHO 83638
208.634.4140 · 208.634.4146 FAX

HAWKS VILLAGE AND RIVER STORAGE

VICINITY MAP

PROJECT	24022	DRAWN	FIGURE NO.
DATE	5/22/2025	TMS	1 OF 2

LEGEND:

- PRE–DEVELOPMENT FLOW PATH
- POST DEVELOPMENT FLOW PATH
- DRAINAGE AREA NORTHWEST
- DRAINAGE AREA NORTHEAST
- DRAINAGE AREA SOUTH
- DRAINAGE AREA OFF–SITE
- DRAINAGE AREA PATHWAY CULVERTS

NORTH

0 30 60 120 180

SCALE: 1" = 60'

NO.	REVISION	BY	DATE

DESIGN	TMS
DRAWN	TMS
CHECKED	SMR
APPROVED	AMD

CRESTLINE ENGINEERS
323 DEINHARD LANE, SUITE C · PO BOX 2330
McCALL, IDAHO 83638
208.634.4140 · 208.634.4146 FAX

811 SAFETY IS IN YOUR HANDS. EVERY DIG. EVERY TIME.

HAWKS VILLAGE AND RIVER STORAGE

BOISE COUNTY, IDAHO

DRAINAGE AREA MAP

VERIFY SCALE
BAR IS ONE INCH ON FULL SIZE DRAWING
0 1"

PROJECT	24022
DATE	5/27/2025
FIGURE NO.	2-2
SHEET NO.	2 OF 2

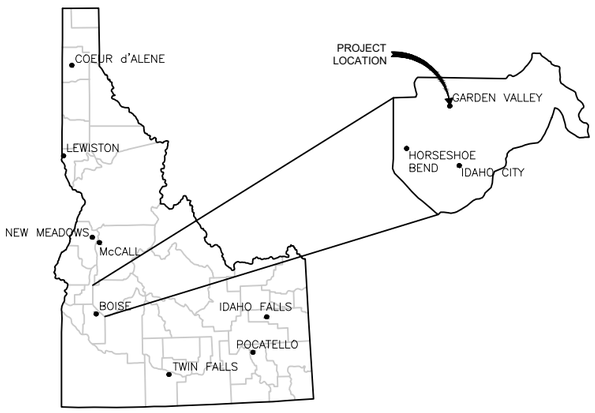
Path: C:\Users\Admin\Crestline Engineers Dropbox\Crestline Engineers Office\CrestlineEngineers\0010\D\DrapperDevelopment\24022\Civil\Dwg\CD\24022_DrainageAreaMap.dwg File Name: 24022_DrainageAreaMap.dwg Plot Date: 5/28/2025 12:58 PM Admin

HAWKS VILLAGE AND RIVER STORAGE

BOISE COUNTY, IDAHO

GRADING, DRAINAGE, AND STORMWATER IMPROVEMENTS
SUMMER/FALL 2025

DRAWING INDEX



LOCATION MAP
NOT TO SCALE

VICINITY MAP
SCALE 1" = 500'

NO.	REVISION	BY	DATE

DESIGN	TMS
DRAWN	TMS
CHECKED	AMD
APPROVED	AMD

PROFESSIONAL ENGINEER LICENSED #21556 5/27/25 STATE OF IDAHO ANTHONY DINI

FOR REVIEW ONLY
NOT FOR CONSTRUCTION

CRESTLINE ENGINEERS
323 DEINHARD LANE, SUITE C · PO BOX 2330
McCALL, IDAHO 83638
208.634.4140 · 208.634.4146 FAX

811 SAFETY IS IN YOUR HANDS. EVERY DIG. EVERY TIME.

HAWKS VILLAGE AND RIVER STORAGE
BOISE COUNTY, IDAHO

GRADING, DRAINAGE, AND STORMWATER IMPROVEMENTS
COVER SHEET

VERIFY SCALE	
BAR IS ONE INCH ON FULL SIZE DRAWING (0 – 1")	
PROJECT	24022
DATE	5/27/2025
DRAWING NO.	SHEET NO.
G-1	1 OF 10

Path: M:\001\D\Draper\Development\24\022\Civil\Dwg\CD\24022_G-1_CoverSheet.dwg File Name: 24022_G-1_CoverSheet.dwg Plot Date: 5/27/2025 2:47 PM Admin

GENERAL NOTES:

1. ALL WORK SHALL CONFORM TO THE PROJECT NOTES, DETAILS, SPECIFICATIONS, AND BOISE COUNTY ROAD STANDARDS. WHERE NOT SPECIFIED, ALL WORK SHALL CONFORM TO THE 2020, OR MOST CURRENT, EDITION OF THE IDAHO STANDARDS FOR PUBLIC WORKS CONSTRUCTION (ISPWC). IN THE EVENT THAT ANY OF THESE STANDARDS CONFLICT, THE MORE STRINGENT SHALL BE THE CONTROLLING STANDARDS OR SPECIFICATIONS.

2. A PRE-CONSTRUCTION MEETING WITH THE CONTRACTOR, PROJECT ENGINEER, AND OWNER (OPTIONAL) SHALL BE HELD ON-SITE A MINIMUM OF ONE (1) WEEK PRIOR TO THE ANTICIPATED START DATE OF PROJECT CONSTRUCTION. IN ADDON, AT THE TIME OF THE PRE-CONSTRUCTION MEETING THE CONTRACTOR SHALL SUBMIT A PROJECT SCHEDULE AND SEQUENCING PLAN TO THE PROJECT ENGINEER AND THE OWNER FOR REVIEW AND APPROVAL.

3. ONLY PLAN SETS STAMPED "APPROVED FOR CONSTRUCTION" SHALL BE USED BY THE PROJECT CONTRACTOR(S). USE OF ANY PLANS ON THE JOB WITHOUT THE "APPROVED FOR CONSTRUCTION" STAMP SHALL BE GROUNDS FOR THE ISSUANCE OF A STOP WORK ORDER.

4. THE CONTRACTOR SHALL KEEP ON-SITE AT ALL TIMES A COPY OF THE APPROVED CONSTRUCTION PLANS. THESE PLANS SHALL BE USED TO RECORD THE ACTUAL LOCATIONS OF THE CONSTRUCTED PIPELINE(S) AND ANY OTHER UTILITIES ENCOUNTERED. THE CONTRACTOR SHALL PROVIDE THESE RECORDED LOCATIONS TO THE PROJECT ENGINEER FOR USE IN THE PRODUCTION OF RECORD DRAWINGS PRIOR TO FINAL PROJECT ACCEPTANCE.

5. EXISTING SITE INFORMATION INCLUDING THE LOCATION OF EXISTING SITE CONDITIONS, SURFACE TOPOGRAPHY, AND PROPERTY BOUNDARY INFORMATION AS SHOWN ON THESE PLANS IS BASED UPON SURVEY DATA AND PROVIDED BY DUNN LAND SURVEYS, INC. THE EXISTING SITE INFORMATION IS PROVIDED FOR THE CONVENIENCE OF THE CONTRACTOR AND SHALL BE FIELD VERIFIED BY THE CONTRACTOR'S CONSTRUCTION SURVEY PRIOR TO THE START OF ANY PROJECT CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ALL CONSTRUCTION STAKING.

6. THE TYPES, LOCATIONS, SIZES AND/OR DEPTHS OF EXISTING UNDERGROUND UTILITIES AS SHOWN ON THESE DRAWINGS WERE OBTAINED FROM SOURCES OF VARYING RELIABILITY. THE CONTRACTOR IS CAUTIONED THAT ONLY ACTUAL EXCAVATION WILL REVEAL THE TYPES, EXTENT, SIZES, LOCATIONS AND DEPTHS OF SUCH UNDERGROUND UTILITIES. THE PROJECT ENGINEER ASSUMES NO RESPONSIBILITY FOR THE COMPLETENESS OR ACCURACY OF THE DELINEATION OF SUCH UNDERGROUND UTILITIES, OR THE EXISTENCE OF OTHER BURIED OBJECTS OR UTILITIES WHICH MAY BE ENCOUNTERED, BUT WHICH ARE NOT SHOWN ON THESE DRAWINGS. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO IDENTIFY EXACT LOCATIONS OF EXISTING UTILITIES PRIOR TO THE START OF ANY PROJECT CONSTRUCTION. ANY LOCATION WHICH MAY POSE A CONFLICT WITH THE PROPOSED CONSTRUCTION MUST BE REPORTED TO THE PROJECT ENGINEER PRIOR TO THE START OF ANY PROJECT CONSTRUCTION.

7. THE CONTRACTOR SHALL CALL DIG LINE (800-342-1585) TO LOCATE ALL EXISTING UTILITIES AT LEAST THREE (3) DAYS PRIOR TO THE START OF CONSTRUCTION.

8. THE CONTRACTOR SHALL NOTIFY BOISE COUNTY ROAD AND BRIDGE DEPARTMENT (BCRB) A MINIMUM OF SEVENTY-TWO (72) HOURS PRIOR TO THE START OF PROJECT CONSTRUCTION.

9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL TRAFFIC CONTROL ASSOCIATED WITH THE PROJECT AND SHALL DEVELOP/SUBMIT A PLAN TO BCRB AND THE PROJECT ENGINEER FOR APPROVAL PRIOR TO THE START OR PROJECT CONSTRUCTION. PLAN TO BE IN ACCORDANCE WITH MUTCD AND PROVIDED AT NO ADDITIONAL COST TO THE OWNER.

10. THE CONTRACTOR SHALL MAINTAIN TRAFFIC ACCESS AT THE END OF EACH DAY AND PROVIDE DETOURS OR ONE-WAY TRAFFIC DURING CONSTRUCTION. WHEN CONSTRUCTION TECHNIQUES ALLOW, CONTRACTOR SHALL PROVIDE FULL TIME ACCESS THROUGH THE CONSTRUCTION ZONE TO PRIVATE PROPERTIES.

11. CONTRACTOR SHALL SECURE A SHORT TERM ACTIVITY EXEMPTION FROM THE IDAHO DEPARTMENT OF ENVIRONMENTAL QUALITY (IDEQ) PRIOR TO THE START OF PROJECT CONSTRUCTION IF WORK IN GROUND WATER IS ANTICIPATED. IN ADDITION TO THE EXEMPTION, CONTRACTOR SHALL SUBMIT A DEWATERING PLAN TO THE PROJECT ENGINEER PRIOR TO COMMENCEMENT OF DEWATERING OPERATIONS.

12. DURING PIPELINE INSTALLATION AND SERVICE CONNECTIONS, GROUNDWATER LEVELS SHALL BE MAINTAINED ONE (1') FOOT OR MORE BELOW PIPE INVERTS PER ISPWC. ONCE DEWATERING OPERATIONS CEASE, CONTRACTOR SHALL CLEAN AND RESTORE TO THEIR ORIGINAL STATE ANY DITCHES OR STORMDRAIN FACILITIES THAT ARE SILTED DUE TO THEIR DEWATERING EFFORTS.

13. THE CONTRACTOR SHALL PROTECT ALL EXISTING MONUMENTS, SURVEY MARKERS, STREET SIGNS, UTILITIES, IRRIGATION LINES, PAVEMENT, TREES, FENCES, AND ANY OTHER IMPORTANT OBJECTS ON/OR ADJACENT TO THE JOB SITE FROM DAMAGE AND REPAIR OR REPLACE DAMAGED FACILITIES AS REQUIRED BY THE OWNER AND THE PROJECT ENGINEER.

14. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS BEFORE STARTING WORK AND SHALL IMMEDIATELY NOTIFY THE PROJECT ENGINEER OF ANY DISCREPANCIES.

15. UNLESS DETAILED, SPECIFIED, OR OTHERWISE INDICATED ON THE PLAN SET, CONSTRUCTION SHALL BE AS INDICATED ON THE APPLICABLE TYPICAL DETAILS AND GENERAL NOTES. TYPICAL DETAILS SHALL APPLY EVEN THOUGH NOT REFERENCED AT SPECIFIC LOCATIONS ON DRAWINGS.

16. WHERE NO CONSTRUCTION DETAILS ARE SHOWN OR NOTED FOR ANY PART OF WORK, DETAILS SHALL BE THE SAME AS FOR OTHER SIMILAR WORK OR IN ACCORDANCE WITH THE ISPWC.

17. CONTRACTOR TO PROVIDE SUBMITTALS FOR ALL PRODUCTS NECESSARY FOR COMPLETING PROJECT PRIOR TO THE START OF CONSTRUCTION.

18. ANY CHANGES TO THE DESIGN AS SHOWN IN THESE CONSTRUCTION DRAWINGS MUST BE REVIEWED AND APPROVED BY THE PROJECT ENGINEER BEFORE CHANGES ARE MADE. THIS INCLUDES CHANGES REQUESTED BY THE OWNER AND SUBCONTRACTORS.

19. CONTRACTOR SHALL PROVIDE THE PROJECT ENGINEER WITH ONE COPY OF REDLINED AS-BUILT DRAWINGS PRIOR TO PROJECT ACCEPTANCE IF DETERMINED NECESSARY.

20. THE CONTRACTOR IS RESPONSIBLE FOR PROTECTING ALL WORK CONSTRUCTED BY THEIR WORK CREWS UNTIL THE WORK IS ACCEPTED BY THE OWNER FOR CONTINUOUS OPERATION AND MAINTENANCE.

21. THE CONTRACTOR IS RESPONSIBLE FOR COMPLIANCE WITH ALL APPLICABLE SAFETY LAWS OF ANY JURISDICTIONAL BODY INCLUDING, BUT NOT LIMITED TO, SAFE WORKING PRACTICES WITHIN AND AROUND THE CONSTRUCTION AREA. IN ADDITION, JURISDICTIONAL AGENCIES, THE OWNER, AND THE PROJECT ENGINEER SHALL NOT BE RESPONSIBLE FOR ENFORCING SAFETY REGULATIONS.

22. THE CONTRACTOR IS TO OBTAIN ALL APPLICABLE PERMITS NOT PROVIDED BY THE OWNER OR PROJECT ENGINEER AT NO ADDITIONAL COST TO THE OWNER. COPIES OF THESE PERMITS SHALL BE PROVIDED TO THE OWNER AND PROJECT ENGINEER.

23. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE REMOVAL AND DISPOSAL OF ANY EXCESS ON-SITE MATERIALS AS NECESSARY TO COMPLETE THE PROJECT.

24. DOMESTIC WATER MAINS AND NON-POTABLE MAINS (SEWER, STORM DRAIN, AND IRRIGATION) SHALL HAVE A MINIMUM HORIZONTAL SEPARATION OF TEN (10') FEET AND A MINIMUM VERTICAL SEPARATION OF EIGHTEEN (18") INCHES. REFER TO ISPWC SD-407 "NON-POTABLE WATER LINE (NPWL) SEPARATION," AND IDAPA 58.01.16.430.02.o FOR ADDITIONAL INFORMATION AS WELL AS SEPARATION REQUIREMENTS FOR POTABLE SERVICE LINES IN RELATION TO NON-POTABLE SERVICE LINES.

25. WHEN MINIMUM VERTICAL SEPARATION IS NOT OBTAINED, NON-POTABLE MAINS SHALL BE ENCASED WITH A SLEEVING MATERIAL ACCEPTABLE TO THE IDEQ FOR A HORIZONTAL DISTANCE OF TEN (10') FEET ON BOTH SIDES OF THE CROSSING. WHEN PRESSURE WASTEWATER MAINS OR OTHER PRESSURIZED MAINS OR LINES CONTAINING NON-POTABLE FLUIDS SHALL BE NO CLOSER VERTICALLY THAN EIGHTEEN (18") INCHES FROM POTABLE MAINS.

26. CONTRACTOR SHALL TAKE EXTRA PRECAUTION WHEN INSTALLING ALL UNDERGROUND UTILITIES AND SERVICE LOCATIONS AS THE PROJECT/SITE DENSITY LIMITS THE POSSIBILITY FOR FIELD ADJUSTMENTS IF NECESSARY.

27. THE CONTRACTOR SHALL NOTIFY THE PROJECT ENGINEER AND BCRB A MINIMUM OF FORTY-EIGHT (48) HOURS PRIOR TO ANY PROJECT TESTING AND THE POURING OF ANY PROJECT CONCRETE.

28. IF ANY ITEMS OF SUSPECTED HISTORICAL OR ARCHAEOLOGICAL VALUE ARE DISCOVERED DURING CONSTRUCTION, THE CONTRACTOR WILL BE REQUIRED TO STOP WORK AND CONTACT THE OWNER, PROJECT ENGINEER, AS WELL AS THE STATE HISTORICAL PRESERVATION OFFICE.

29. CONTRACTOR SHALL CONFORM TO OSHA AND OTHER LOCAL, STATE, AND FEDERAL REQUIREMENTS WHEN REMOVING ASBESTOS CEMENT (AC) PIPE AND MATERIALS.

30. IF DURING CONSTRUCTION OF THE PROJECT, AN UNDERGROUND STORAGE TANK, BURIED DRUM, OTHER CONTAINER, CONTAMINATED SOIL, OR DEBRIS NOT SCHEDULED FOR REMOVAL UNDER THE CONTRACT IS DISCOVERED, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE OWNER AND THE PROJECT ENGINEER. NO ATTEMPT SHALL BE MADE TO EXCAVATE, OPEN, OR REMOVE SUCH MATERIAL WITHOUT WRITTEN APPROVAL.

31. CONTRACTOR IS REQUIRED TO PAY FOR ALL ASPHALT, CONCRETE AND COMPACTION TESTING, INCLUDING ASSOCIATED COSTS IN ACCORDANCE WITH (BCRB) TESTING REQUIREMENTS AS SHOWN ON THIS PAGE.

32. ALL TESTING SHALL BE CONDUCTED BY AN INDEPENDENT THIRD PARTY.

33. CONTRACTOR SHALL ADHERE TO ALL REQUIREMENTS AS IDENTIFIED WITHIN THE PROJECT SWPPP, ASSOCIATED INSPECTIONS AND DOCUMENTATION PROVIDED BY THE OWNER AND/OR REPRESENTATIVE. CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING AND MAINTAINING APPLICABLE EROSION AND SEDIMENT CONTROL MEASURES/BEST MANAGEMENT PRACTICES (BMP'S) FOR THE DURATION OF THE PROJECT AND UNTIL "FINAL STABILIZATION" CRITERIA HAS BEEN MET AS IDENTIFIED IN THE IDEQ CGP.

34. CONTRACTOR SHALL ADHERE TO ALL PERMIT REQUIREMENTS AS SET FORTH BY THE U.S. ARMY CORPS OF ENGINEERS (USACE) WHEN WORKING IN WETLAND AREAS. A COPY OF THE PROJECTS USACE PERMIT AUTHORIZATION/APPROVAL AND ASSOCIATED DRAWINGS SHALL BE KEPT ON-SITE BY THE CONTRACTOR THROUGHOUT THE DURATION OF PROJECT CONSTRUCTION.

EROSION AND SEDIMENT CONTROL NOTES:

1. CONTRACTOR SHALL BE RESPONSIBLE FOR PROPER INSTALLATION AND MAINTENANCE OF ALL EROSION AND SEDIMENT CONTROL BMP'S IN ACCORDANCE WITH LOCAL, STATE AND FEDERAL REQUIREMENTS.

2. STORMWATER MANAGEMENT INCLUDING EROSION AND SEDIMENT CONTROL FOR THE PROJECT WILL BE IMPLEMENTED PER THE CITY OF BOISE COUNTY DRAINAGE GUIDELINES AND THE STATE OF IDAHO, CATALOG OF STORMWATER BEST MANAGEMENT PRACTICES FOR IDAHO CITIES AND COUNTIES.

3. REFER TO THE "STATE OF IDAHO, CATALOG OF STORMWATER BEST MANAGEMENT PRACTICES FOR IDAHO CITIES AND COUNTIES" FOR FURTHER DETAILS ON BMP IMPLEMENTATION AND INSTALLATION.

4. REFER TO THE PROJECTS STORMWATER DRAINAGE REPORT FOR ADDITIONAL INFORMATION PERTAINING TO EROSION AND SEDIMENT CONTROL INSTALLATION AS WELL AD OPERATION AND MAINTENANCE PROCEDURES.

5. THE CONTRACTOR SHALL COMPLY WITH THE PREVISIONS OF THE IDAHO DEPARTMENT OF ENVIRONMENTAL QUALITY'S (IDEQ) IDAHO POLLUTION DISCHARGE ELIMINATION SYSTEM (IPDES) 2022 GENERAL PERMIT FOR DISCHARGES FROM CONSTRUCTION ACTIVITIES (CGP). THE CGP REQUIRES THAT PROJECTS WHICH INTEND TO DISTURB MORE THAN ONE (1) ACRE PREPARE/PROVIDE A STORMWATER POLLUTION PREVENTION PLAN (SWPPP). IF THE CONTRACTOR'S MEANS AND METHODS DISTURB MORE THAN ONE (1) ACRE, THE CONTRACTOR SHALL PREPARE A SWPPP AND OBTAIN COVERAGE UNDER THE IDEQ 2022 CGP.

6. THE INCLUDED PLAN SHEETS ARE NOT INTENDED TO BE A STORMWATER POLLUTION PREVENTION PLAN (SWPPP). CONTRACTOR IS RESPONSIBLE FOR PREPARING A SWPPP AND ASSOCIATED STORMWATER NOTICE OF INTENT (NOI) IN ACCORDANCE WITH THE IDEQ'S CGP.
   TOTAL PROPERTY AREA = 4.03 AC.
   TOTAL ON-SITE/OFF-SITE DISTURBED AREA = ±2.54 AC.

7. ALL EROSION AND SEDIMENT CONTROL BMP'S SHALL BE INSTALLED PRIOR TO THE START OF ANY PROJECT CONSTRUCTION OR EARTH DISTURBING ACTIVITIES AND SHOULD REMAIN IN PLACE UNTIL ALL DISTURBED/EXPOSED AREAS HAVE BEEN STABILIZED AND/OR REVEGETATED.

8. THE IMPLEMENTATION OF THESE EROSION AND SEDIMENT CONTROL MEASURES INCLUDING INSTALLATION, REGULAR INSPECTION, MAINTENANCE, REPLACEMENT, AND UPGRADING OF THESE PLANS IS THE RESPONSIBILITY OF THE CONTRACTOR UNTIL ALL PROJECT CONSTRUCTION IS COMPLETED AND STABILIZATION IS ACHIEVED PER THE CGP.

9. WORK ACTIVITIES SHALL TAKE PLACE WITHIN THE CLEARING LIMITS AS SHOWN ON THESE PLANS. CONTRACTOR SHALL PRESERVE NATURAL VEGETATION OUTSIDE OF CLEARING LIMITS.

10. STABILIZED CONSTRUCTION ENTRANCES SHALL BE PROVIDED AT ALL ENTRANCES/EXITS TO THE SITE AND CONSTRUCTION STAGING AREAS.

11. CONTRACTOR SHALL MINIMIZE THE AMOUNT OF BARE SOIL EXPOSED AT ONE TIME.

12. DURING CONSTRUCTION, CONTRACTOR SHALL WATER ALL DISTURBED AREAS AS NECESSARY FOR DUST ABATEMENT.

13. CONTRACTOR SHALL CONTROL SURFACE DRAINAGE FROM EXCAVATION, BORROW AND WASTE DISPOSAL AREAS AS WELL AS PROVIDE CONTROL STRUCTURES AS NECESSARY TO PREVENT CONTAMINATED RUNOFF FROM LEAVING THE PROJECT SITE.

14. CONTRACTOR SHALL SECURE A SHORT TERM ACTIVITY EXEMPTION FROM IDEQ PRIOR TO THE START OF CONSTRUCTION. IF TRENCH DEWATERING IS REQUIRED, CONTRACTOR SHALL SUBMIT A DEWATERING PLAN TO THE PROJECT ENGINEER PRIOR TO COMMENCEMENT OF DEWATERING OPERATIONS.

15. CONTRACTOR TO PROVIDE TEMPORARY MEASURES SUCH AS BERMS, DIKES, AND DRAINS AS NECESSARY, TO PREVENT RUNOFF FROM FLOWING INTO PIPE TRENCHES DURING CONSTRUCTION.

16. CONTRACTOR SHALL PROVIDE INLET PROTECTION ON ALL STORMWATER DRAIN INLETS (EXISTING AND PROPOSED) UNTIL THE SITE IS STABILIZED AND VEGETATION IS REESTABLISHED.

17. REVEGETATION AND STABILIZATION OF ALL DISTURBED PROJECT AREAS SHALL BE IN ACCORDANCE WITH THE PROJECTS LANDSCAPE DESIGN. IF A LANDSCAPE DESIGN/PLAN IS NOT AVAILABLE, DISTURBED AREAS SHALL BE REVEGETATED WITH A GRASS SEED MIXTURE NATIVE TO THAT AREA.

18. WATTLES MAY BE USED IN PLACE OF SILT FENCE WHERE DETERMINED APPROPRIATE. SILT FENCE HAS BEEN SHOWN ON THE PROPERTY LINES IN SOME AREAS TO PREVENT ENCROACHMENT ONTO NEIGHBORING PROPERTIES.

GRADING AND DRAINAGE NOTES:

1. IN GENERAL, ALL SITE GRADING ADJACENT TO NEW BUILDINGS/STRUCTURES SHALL BE SLOPED TO DRAIN AWAY FROM FOUNDATIONS AT A MINIMUM OF 1.5% IN HARDSCAPE AREAS AND 5% IN LANDSCAPE AREAS. AREAS BETWEEN NEW STRUCTURES AND PROPERTY BOUNDARIES SHALL BE SLOPED TO RETAIN STORMWATER ON-SITE AND RELEASED INTO EXISTING LANDSCAPED AREAS.

2. ALL ACCESSIBLE ROUTE RUNNING SLOPE SHALL NOT BE STEEPER THAT 1:20 (5%). THE CROSS SLOPE ON WALKING SURFACES SHALL NOT BE STEEPER THAN 1:50 (2%).

3. THE CONTRACTOR SHALL MAINTAIN ALL DRAINAGE FACILITIES WITHIN THE CONSTRUCTION AREA UNTIL THE PROPOSED DRAINAGE IMPROVEMENTS ARE IN PLACE, FUNCTIONING, AND APPROVED BY THE PROJECT ENGINEER.

4. ALL DRAINAGE PIPING SHALL MAINTAIN A MINIMUM OF EIGHTEEN (18") INCHES OF COVER IN ALL TRAFFIC AREAS OR A MINIMUM OF TWELVE (12") INCHES OF COVER IN LANDSCAPED AND NON-TRAFFIC AREAS

5. CONTRACTOR TO WORK WITH PROJECT ENGINEER TO EVALUATE SUBSURFACE SOILS WITHIN DETENTION BASIN FOOTPRINT(S). IF SUBSURFACE SOILS ARE NOT FAVORABLE, THE OWNER/ENGINEER WILL WORK WITH CONTRACTOR TO DEVELOP A PLAN TO IMPROVE SUBSURFACE DRAINAGE.

6. REVEGETATION AND STABILIZATION OF ALL DISTURBED PROJECT AREAS SHALL BE IN ACCORDANCE WITH THE PROJECTS LANDSCAPE DESIGN. IF A LANDSCAPE DESIGN/PLAN IS NOT AVAILABLE DISTURBED AREAS SHALL BE REVEGETATED WITH A GRASS SEED MIXTURE NATIVE TO THE PROJECT AREA.

ROAD/STRUCTURAL FILL PLACEMENT NOTES:

1. ALL ROADWAY FILL MATERIAL AND EMBANKMENT SHALL BE IN ACCORDANCE WITH ISPWC SECTION 202.

2. STRUCTURAL FILL PLACEMENT SHALL BE COMPLETED IN ACCORDANCE WITH DIVISIONS 200 AND 800 OF THE ISPWC AND THE PROJECT PLANS.

3. CONTRACTOR TO CONTACT THE PROJECT ENGINEER IMMEDIATELY IN THE EVENT OF ANY UTILITY CONFLICT.

4. ALL BASE/SUBBASE COURSE USED FOR STRUCTURAL/IMPORTED FILL SHALL MEET THE REQUIREMENTS OF ISPWC SECTIONS 801 AND 802, UNCRUSHED AND CRUSHED AGGREGATES. CONTRACTOR SHALL PROVIDE PROJECT ENGINEER WITH RECENT TESTING DATA ON SIEVE ANALYSIS, PROCTOR COMPACTION RESULTS, LIQUID LIMITS, AND PLASTICITY INDEX FROM SOURCE LOCATIONS PRIOR TO PLACEMENT.

5. COMPACTION FOR ALL AGGREGATE BASE/SUBBASE MATERIAL SHALL BE IN ACCORDANCE WITH ISPWC SECTION 802.

6. ALL STRUCTURAL/IMPORTED FILL BASE/SUBBASE PLACEMENT TESTING SHALL BE THIRD PARTY PROVIDED BY THE CONTRACTOR. CONTRACTOR SHALL COORDINATE WITH THE OWNER AND THE PROJECT ENGINEER TO ACCOMMODATE ALL REQUIRED TESTING DURING PLACEMENT OF FILL MATERIALS IN ACCORDANCE WITH ISPWC.

CONCRETE CONSTRUCTION NOTES:

1. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING GROUND ELEVATIONS AND GRADES ON-SITE AND WITHIN THE PUBLIC ROAD/STREET RIGHT-OF-WAY WITH THE PROJECT ENGINEER PRIOR TO THE START OF ANY PROJECT CONSTRUCTION.

2. ALL OTHER CONCRETE (I.E. SIDEWALK, APPROACHES AND RAMPS) TO BE CLASS 4000B WITH 3/4" AGGREGATE IN ACCORDANCE WITH ISPWC SECTION 703, CAST-IN-PLACE CONCRETE, TABLE 1.

3. CONCRETE SUPPLIER/SOURCE AND MIX DESIGN SHALL BE APPROVED BY PROJECT ENGINEER PRIOR TO PLACEMENT.

4. ALL CONCRETE FLATWORK SHALL NOT BE TROWELED, USE SCREED, FLOAT AND BROOM. CONTRACTOR SHALL BE CAREFUL TO NOT OVERWORK CONCRETE DURING PLACEMENT.

5. CONTRACTOR SHALL SEAL ALL CONCRETE WITH CURING AND PROTECTIVE SEALERS. CURING SEALER SHALL BE USED UPON COMPLETION OF CONCRETE PLACEMENT. A SILANE 40 OR APPROVED EQUAL PROTECTIVE SEALER SHALL ALSO BE APPLIED TO ALL FINISHED CONCRETE WITHIN A YEAR OF PLACEMENT. CONTRACTOR TO COORDINATE WITH THE PROJECT ENGINEER TO ENSURE THAT ADEQUATE TIME HAS BEEN ALLOWED FOR THE CURING SEALER TO WEAR OFF AND THE PROTECTIVE SEALER TO CORRECTLY ADHERE TO THE CONCRETE SURFACE.

LEGEND:

	EXISTING	PROPOSED
PROPERTY/RIGHT-OF-WAY LINE		
CENTERLINE		
EASEMENT LINE		
LOT LINES		
CONTOUR	5010	5010
EDGE OF PAVEMENT		
EDGE OF GRAVEL		
FENCE	-x-x-x-	
BUILDING ROOF AREA		
GRAVEL WALKWAY AREA		
GRAVEL DRIVEWAY AREA		
CONCRETE SIDEWALK/PATIO AREA		
FIRE HYDRANT		
DOMESTIC WELL	W	
PRESSURE SEWER LINE	4"PS	4"PS
CULVERT		
DRAINAGE SWALE/FLOW LINE		
SILT FENCE		S
CLEARING LIMITS		CL
SPOT ELEVATION (FG/EG)		(FG)18.84 (EG) 17.1
FINISHED GRADE		FG
EXISTING GRADE		EG
TOP OF CONCRETE		TOC
GRADE BREAK		GB
FLOW LINE		FL
DRAINAGE FLOW DIRECTION ARROW W/SLOPE		2.00%
DETENTION BASIN		
ROCK CHECK DAM		

GENERAL SYMBOLS:

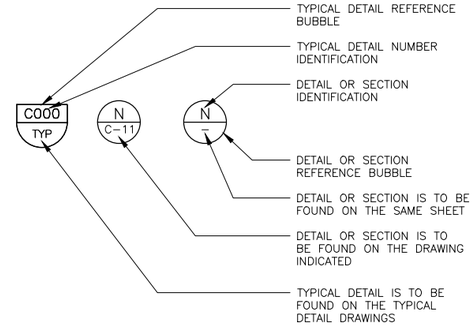
BREAK

DETAIL REFERENCE — A / C-8

SECTION REFERENCE — B / C-11

TYPICAL DETAIL REFERENCE — C100 / TYP

KEYNOTE INDICATOR — 1



NO.	REVISION	BY	DATE

DESIGN: TMS
DRAWN: TMS
CHECKED: AMD
APPROVED: AMD

PROFESSIONAL ENGINEER LICENSED 21556 5/27/25 STATE OF IDAHO ANTHONY DINI

FOR REVIEW ONLY NOT FOR CONSTRUCTION

CRESTLINE ENGINEERS
323 DEINHARD LANE, SUITE C · PO BOX 2330
McCALL, IDAHO 83638
208.634.4140 · 208.634.4146 FAX

811 SAFETY IS IN YOUR HANDS. EVERY DIG. EVERY TIME.

HAWKS VILLAGE AND RIVER STORAGE
BOISE COUNTY, IDAHO

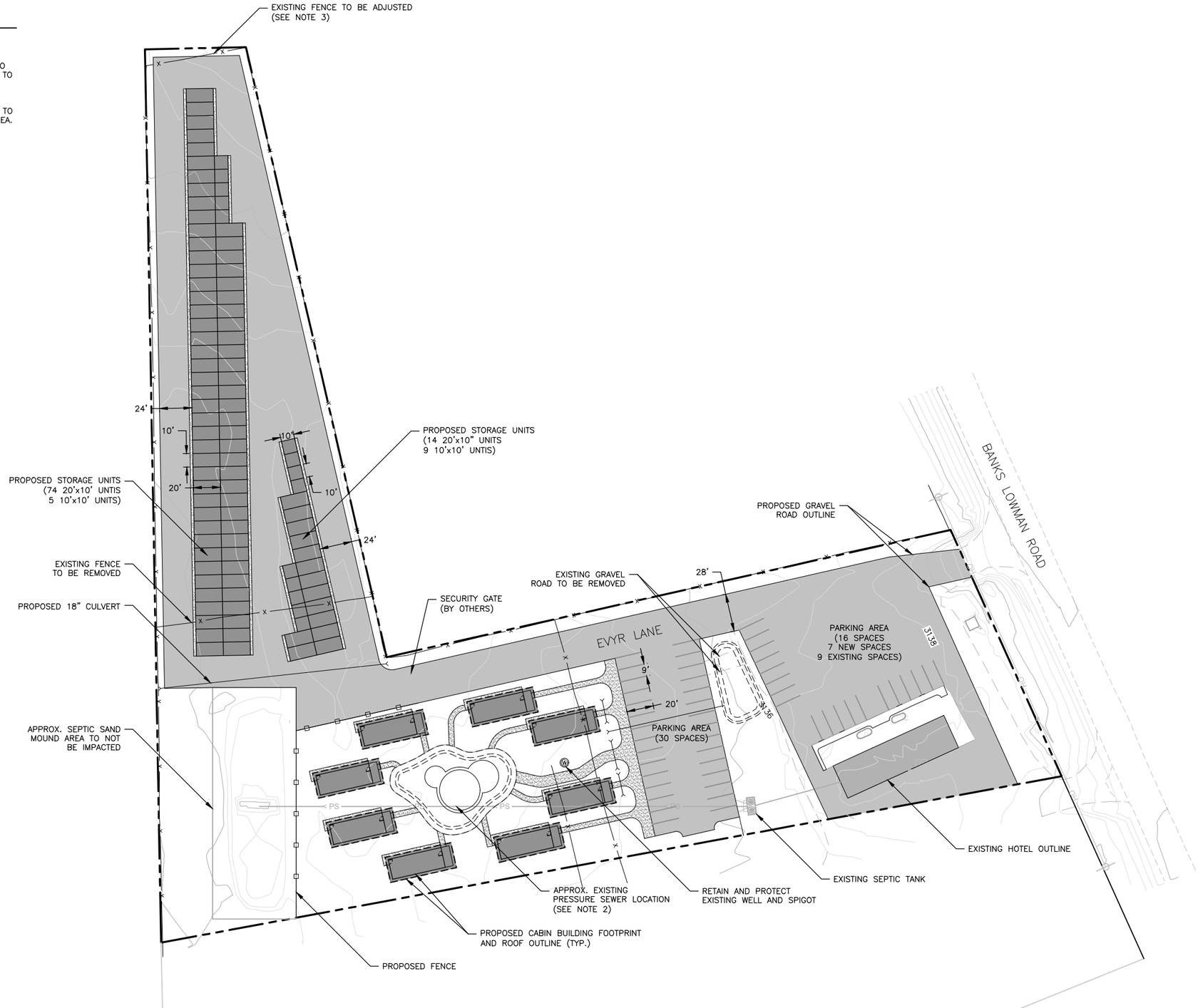
GRADING, DRAINAGE, AND STORMWATER IMPROVEMENTS
GENERAL INFORMATION AND NOTES

VERIFY SCALE
BAR IS ONE INCH ON FULL SIZE DRAWING (0 — 1")

PROJECT	24022
DATE	5/27/2025
DRAWING NO.	G-2
SHEET NO.	2 OF 10

NOTES:

1. REFER TO DRAWING NO. G-2, SHEET 2 FOR PROJECT NOTES, LEGEND AND SYMBOLS.
2. PRIOR TO THE START OF CONSTRUCTION, CONTRACTOR TO VERIFY SEWER LINE LOCATION AND DEPTH. CONTRACTOR TO REPORT ANY CONFLICTS WITH THE SEWER LINE TO THE PROJECT ENGINEER.
3. CONTRACTOR TO ADJUST/REMOVE FENCE AS NECESSARY TO ALLOW FOR CONSTRUCTION OF PARKING LOT/DRIVING AREA. FENCE TO REMAIN INSIDE THE PROPERTY BOUNDARY.



NORTH

0 20 40 80 120

SCALE: 1" = 40'

NO.	REVISION	BY	DATE

DESIGN TMS
DRAWN TMS
CHECKED AMD
APPROVED AMD

PROFESSIONAL ENGINEER LICENSED 21556 5/27/25 STATE OF IDAHO ANTHONY DINI

FOR REVIEW ONLY NOT FOR CONSTRUCTION

CRESTLINE ENGINEERS
323 DEINHARD LANE, SUITE C · PO BOX 2330
McCALL, IDAHO 83638
208.634.4140 · 208.634.4146 FAX

811 SAFETY IS IN YOUR HANDS. DIG SAFE. EVERY TIME.

HAWKS VILLAGE AND RIVER STORAGE
BOISE COUNTY, IDAHO

GRADING, DRAINAGE, AND STORMWATER IMPROVEMENTS
OVERALL LAYOUT AND UTILITY PLAN

VERIFY SCALE
BAR IS ONE INCH ON FULL SIZE DRAWING
0 1"

PROJECT	24022
DATE	5/27/2025
DRAWING NO.	SHEET NO.
C-1	3 OF 10

Path: M:\0010\D\Draper\Development\24022\Civil\Dwg\CD\24022_C-1_OverallLayout.dwg File Name: 24022_C-1_OverallLayout.dwg Plot Date: 5/27/2025 2:54 PM Admin

C1020 GC-2 ROCK CHECK DAM DETENTION SOUTH
INSTALL ROCK CHECK DAMS 25' O.C.
VOLUME PER CHECK DAM ±78 C.F.
VOLUME TOTAL: ±1,172 C.
(TYP. OF 15)

C806 GC-1

EVYR LANE

DRIVEWAY WIDTH AND SLOPE TO MATCH EXISTING

GRADE FROM EDGE OF DRIVEWAY TO EXISTING PARKING LOT AT MAX SLOPE OF 2%

STORMWATER DETENTION NO. 1 SOUTH
1.5' DEEP WITH 3:1 SIDE SLOPE
VOLUME: ±1,056 C.F.
TOP ELEV: 3135.00
OVERFLOW ELEV: 3134.50
BOTTOM ELEV: 3133.50

SEE DRAWING NO. C-3 FOR CONTINUATION

12" N-12 CULVERT
L=±16 L.F. @ 0.50% SLOPE
INV. IN (N): 3132.90
INV. OUT (S): 3132.82

C850 GC-2

12" N-12 STORM PIPE
L=±88 L.F. @ 2.00% SLOPE
INV. IN (E): 3133.54
INV. OUT (W): 3131.78

24"ø W/ GRATED LID C612 GC-1
RIM ELEV: 3134.50
12" INV. OUT (W): 3133.54

12" N-12 CULVERT
L=±20 L.F. @ 1.00% SLOPE
INV. IN (S): 3132.41
INV. OUT (N): 3132.21

12" N-12 CULVERT
L=±15 L.F. @ 1.00% SLOPE
INV. IN (S): 3132.34
INV. OUT (N): 3132.19

64' 20' 24' 20'

3 TYP.

NOTES:

1. REFER TO DRAWING NO. G-2, SHEET 2 FOR PROJECT NOTES, LEGEND, AND SYMBOLS.

KEY NOTES:

1. STABILIZATION OF CONSTRUCTION ENTRANCE/EXIT – EROSION AND SEDIMENT CONTROL BMP 40.
2. SILT FENCE PROTECTION – EROSION AND SEDIMENT CONTROL BMP 65.
3. 4" WIDE SOLID WHITE LINE PAVEMENT MARKINGS PER MUTCD SECTION 3B.19

NORTH

0 5 10 20 30

SCALE: 1" = 10'

NO.	REVISION	BY	DATE

DESIGN AMD
DRAWN AMD
CHECKED GTT
APPROVED AMD

PROFESSIONAL ENGINEER LICENSED 21556 5/27/25 STATE OF IDAHO ANTHONY DINI

FOR REVIEW ONLY NOT FOR CONSTRUCTION

CRESTLINE ENGINEERS
323 DEINHARD LANE, SUITE C · PO BOX 2330
McCALL, IDAHO 83638
208.634.4140 · 208.634.4146 FAX

811 SAFETY IS IN YOUR HANDS. EVERY DIG. EVERY TIME.

HAWKS VILLAGE AND RIVER STORAGE
BOISE COUNTY, IDAHO

GRADING, DRAINAGE, AND STORMWATER IMPROVEMENTS
GRADING, DRAINAGE AND STORMWATER MANAGEMENT PLAN - 1

VERIFY SCALE
BAR IS ONE INCH ON FULL SIZE DRAWING (0 — 1")

PROJECT	24022
DATE	5/27/2025
DRAWING NO.	C-2
SHEET NO.	4 OF 10

SEE DRAWING NO. C-5 FOR CONTINUATION

SEE DRAWING NO. C-6 FOR CONTINUATION

SEE DRAWING NO. C-2 FOR CONTINUATION

KEY NOTES:

1. STABILIZATION OF CONSTRUCTION ENTRANCE/EXIT – EROSION AND SEDIMENT CONTROL BMP 40.
2. SILT FENCE PROTECTION – EROSION AND SEDIMENT CONTROL BMP 65.
3. 4" WIDE SOLID WHITE LINE PAVEMENT MARKINGS PER MUTCD SECTION 3B.19

SECURITY GATE (BY OTHERS)

PROPOSED FENCE

C1020 GC-2 — ROCK CHECK DAM DETENTION SOUTH
INSTALL ROCK CHECK DAMS 25' O.C.
VOLUME PER CHECK DAM ±78 C.F.
VOLUME TOTAL: ±1,172 C.F
(TYP. OF 15)

EVYR LANE

PROPOSED CABIN (FF ELEV: 3133.00)

PROPOSED CABIN (FF ELEV: 3133.30)

PROPOSED CABIN (FF ELEV: 3134.70)

PROPOSED CABIN (FF ELEV: 3133.00)

PROPOSED CABIN (FF ELEV: 3133.50)

PROPOSED CABIN (FF ELEV: 3135.25)

PROPOSED CABIN (FF ELEV: 3134.25)

STORMWATER DETENTION NO. 2 SOUTH
1.5' DEEP WITH 4:1 SIDE SLOPES
VOLUME: ±3,308 C.F.
TOP ELEV: 3132.00
OVERFLOW ELEV: 31.31.50
BOTTOM ELEV: 3130.50

C1014 GC-2

C1401 GC-2

C1401 GC-2

C1401 GC-2

RETAIN AND PROTECT EXISTING WELL AND SPIGOT

12" N-12 CULVERT
L=±16 L.F. @ 0.50% SLOPE
INV. IN (N): 3132.90
INV. OUT (S): 3132.82

C850 GC-2

12" N-12 STORM PIPE
L=±88 L.F. @ 2.00% SLOPE
INV. IN (E): 3133.54
INV. OUT (W): 3131.78

24"ø W/ GRATED LID
RIM ELEV: 3134.50
12" INV. OUT (W): 3133.54

C612 GC-1

12" N-12 CULVERT
L=±20 L.F. @ 1.00% SLOPE
INV. IN (S): 3132.41
INV. OUT (N): 3132.21

C806 GC-1

64'

20' 24' 20'

12" N-12 CULVERT
L=±15 L.F. @ 1.00% SLOPE
INV. IN (S): 3132.34
INV. OUT (N): 3132.19

TYP.

±330 L.F.

R5' R5'

NORTH

0 5 10 20 30

SCALE: 1" = 10'

NOTES:

1. REFER TO DRAWING NO. G-2, SHEET 2 FOR PROJECT NOTES, LEGEND, AND SYMBOLS.

NO.	REVISION	BY	DATE

DESIGN	AMD
DRAWN	AMD
CHECKED	GTT
APPROVED	AMD

PROFESSIONAL ENGINEER LICENSED 21556 5/27/25 STATE OF IDAHO ANTHONY DINI

FOR REVIEW ONLY NOT FOR CONSTRUCTION

CRESTLINE ENGINEERS
323 DEINHARD LANE, SUITE C · PO BOX 2330
McCALL, IDAHO 83638
208.634.4140 · 208.634.4146 FAX

811 SAFETY IS IN YOUR HANDS. EVERY DIG. EVERY TIME.

HAWKS VILLAGE AND RIVER STORAGE

BOISE COUNTY, IDAHO

GRADING, DRAINAGE, AND STORMWATER IMPROVEMENTS
GRADING, DRAINAGE AND STORMWATER MANAGEMENT PLAN - 2

VERIFY SCALE
BAR IS ONE INCH ON FULL SIZE DRAWING
0 1"

PROJECT	24022
DATE	5/27/2025
DRAWING NO.	C-3
SHEET NO.	5 OF 10

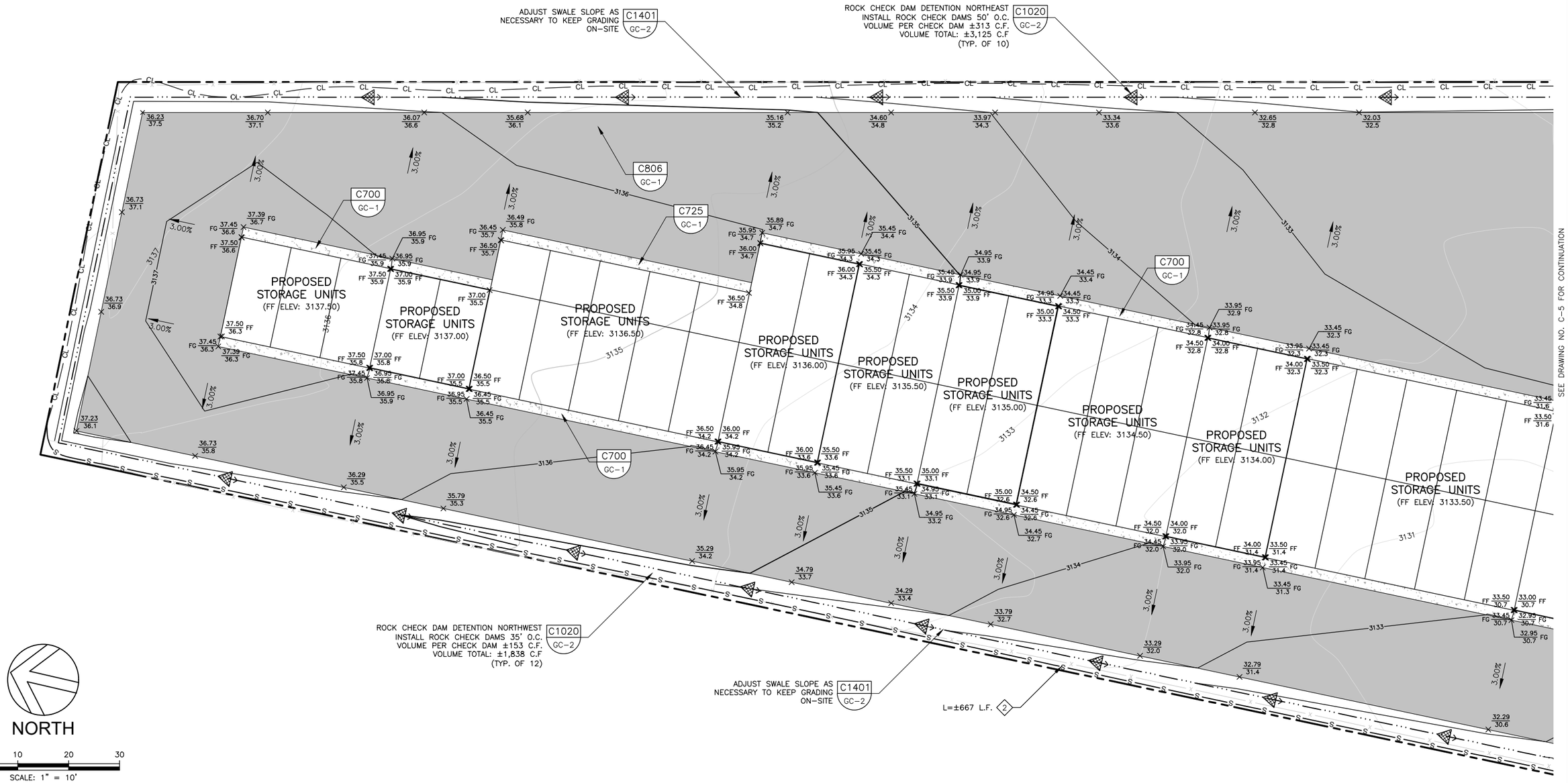
Path: M:\0011D\1Draper Development\24022\Civil\Dwg\CD\24022_C-2-4_Grading.dwg File Name: 24022_C-2-4_Grading.dwg Plot Date: 5/27/2025 3:16 PM Admin

NOTES:

1. REFER TO DRAWING NO. G-2, SHEET 2 FOR PROJECT NOTES, LEGEND, AND SYMBOLS.

KEY NOTES:

1. STABILIZATION OF CONSTRUCTION ENTRANCE/EXIT – EROSION AND SEDIMENT CONTROL BMP 40.
2. SILT FENCE PROTECTION – EROSION AND SEDIMENT CONTROL BMP 65.
3. 4" WIDE SOLID WHITE LINE PAVEMENT MARKINGS PER MUTCD SECTION 3B.19



NO.	REVISION	BY	DATE

DESIGN	AMD
DRAWN	AMD
CHECKED	GTT
APPROVED	AMD

PROFESSIONAL ENGINEER LICENSED 21556 STATE OF IDAHO 5/27/25 ANTHONY DINI

FOR REVIEW ONLY NOT FOR CONSTRUCTION

CRESTLINE ENGINEERS
323 DEINHARD LANE, SUITE C · PO BOX 2330
McCALL, IDAHO 83638
208.634.4140 · 208.634.4146 FAX

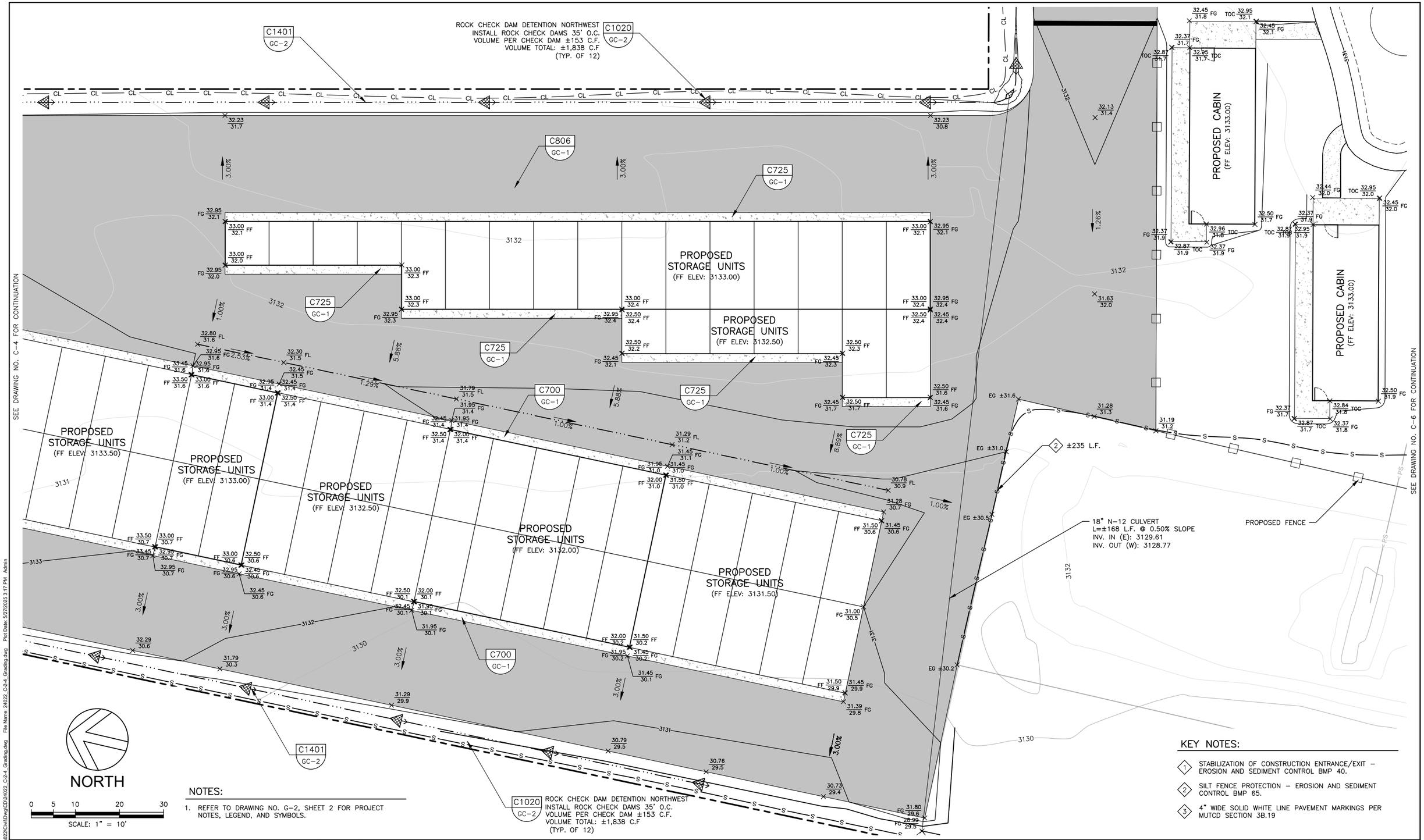
811 SAFETY IS IN YOUR HANDS. EVERY DIG. EVERY TIME.

HAWKS VILLAGE AND RIVER STORAGE
BOISE COUNTY, IDAHO

GRADING, DRAINAGE, AND STORMWATER IMPROVEMENTS
GRADING, DRAINAGE AND STORMWATER MANAGEMENT PLAN - 3

VERIFY SCALE
BAR IS ONE INCH ON FULL SIZE DRAWING
0 1"

PROJECT	24022
DATE	5/27/2025
DRAWING NO.	SHEET NO.
C-4	6 OF 10



NOTES:

1. REFER TO DRAWING NO. G-2, SHEET 2 FOR PROJECT NOTES, LEGEND, AND SYMBOLS.

KEY NOTES:

1. STABILIZATION OF CONSTRUCTION ENTRANCE/EXIT – EROSION AND SEDIMENT CONTROL BMP 40.
2. SILT FENCE PROTECTION – EROSION AND SEDIMENT CONTROL BMP 65.
3. 4" WIDE SOLID WHITE LINE PAVEMENT MARKINGS PER MUTCD SECTION 3B.19

NO.	REVISION	BY	DATE

DESIGN: AMD
DRAWN: AMD
CHECKED: GTT
APPROVED: AMD

PROFESSIONAL ENGINEER LICENSED 21558 5/27/25 STATE OF IDAHO ANTHONY DINI

FOR REVIEW ONLY NOT FOR CONSTRUCTION

CRESTLINE ENGINEERS
323 DEINHARD LANE, SUITE C · PO BOX 2330
McCALL, IDAHO 83638
208.634.4140 · 208.634.4146 FAX

811 SAFETY IS IN YOUR HANDS. EVERY DIG. EVERY TIME.

HAWKS VILLAGE AND RIVER STORAGE
BOISE COUNTY, IDAHO

GRADING, DRAINAGE, AND STORMWATER IMPROVEMENTS
GRADING, DRAINAGE AND STORMWATER MANAGEMENT PLAN - 4

VERIFY SCALE
BAR IS ONE INCH ON FULL SIZE DRAWING
0 1"

PROJECT	24022
DATE	5/27/2025
DRAWING NO.	SHEET NO.
C-5	7 OF 10

Path: M:\0010\Draper\Development\24022\C\civil\Dwg\CD\24022_C-2-4_Grading.dwg Plot Date: 5/27/2025 3:17 PM Admin
File Name: 24022_C-2-4_Grading.dwg

SEE DRAWING NO. C-3 FOR CONTINUATION

SEE DRAWING NO. C-5 FOR CONTINUATION

PROPOSED CABIN
(FF ELEV: 3133.00)

PROPOSED CABIN
(FF ELEV: 3133.00)

C725
GC-1

C1401
GC-2

C1401
GC-2

8.89%

1.00%

3.00%

2 ±235 L.F.

2 ±667 L.F.

18" N-12 CULVERT
L=±168 L.F. @ 0.50% SLOPE
INV. IN (E): 3129.61
INV. OUT (W): 3128.77

PROPOSED FENCE

APPROX. SEPTIC SAND MOUND AREA TO NOT BE IMPACTED

C1401
GC-2
VEGETATIVE SWALE TO PREVENT RUNOFF ONTO NEIGHBORING PROPERTY. SWALE DEPTH TO MATCH PROPOSED CULVERT INVERT ELEVATION.

NORTH

0 5 10 20 30
SCALE: 1" = 10'

NOTES:

1. REFER TO DRAWING NO. G-2, SHEET 2 FOR PROJECT NOTES, LEGEND, AND SYMBOLS.

KEY NOTES:

1. STABILIZATION OF CONSTRUCTION ENTRANCE/EXIT – EROSION AND SEDIMENT CONTROL BMP 40.
2. SILT FENCE PROTECTION – EROSION AND SEDIMENT CONTROL BMP 65.
3. 4" WIDE SOLID WHITE LINE PAVEMENT MARKINGS PER MUTCD SECTION 3B.19

NO.	REVISION	BY	DATE

DESIGN AMD
DRAWN AMD
CHECKED GTT
APPROVED AMD

PROFESSIONAL ENGINEER LICENSED 21556 5/27/25 STATE OF IDAHO ANTHONY DINI

FOR REVIEW ONLY NOT FOR CONSTRUCTION

CRESTLINE ENGINEERS
323 DEINHARD LANE, SUITE C · PO BOX 2330
McCALL, IDAHO 83638
208.634.4140 · 208.634.4146 FAX

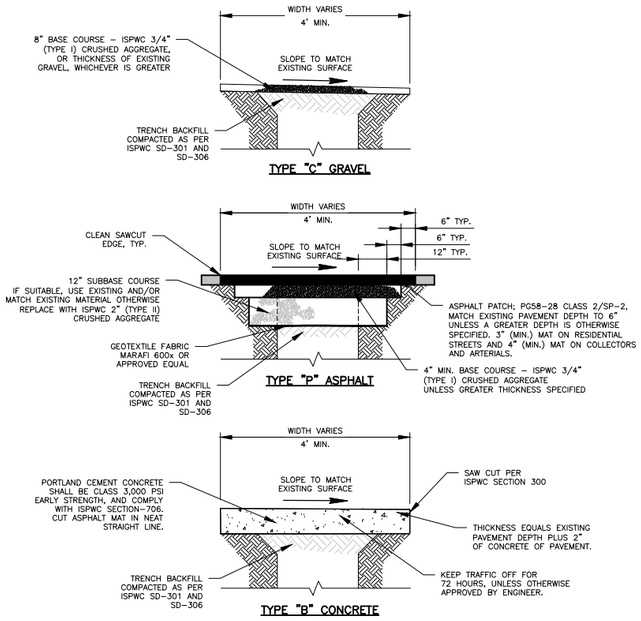
811 SAFETY IS IN YOUR HANDS. EVERY DIG. EVERY TIME.

HAWKS VILLAGE AND RIVER STORAGE
BOISE COUNTY, IDAHO

GRADING, DRAINAGE, AND STORMWATER IMPROVEMENTS
GRADING, DRAINAGE AND STORMWATER MANAGEMENT PLAN - 5

VERIFY SCALE
BAR IS ONE INCH ON FULL SIZE DRAWING
0 1"

PROJECT	24022
DATE	5/27/2025
DRAWING NO.	SHEET NO.
C-6	8 OF 10

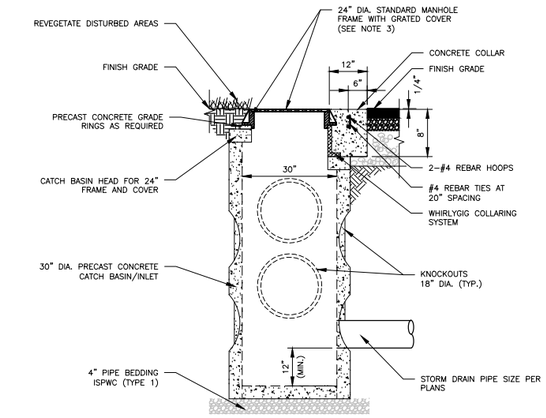


NOTES:

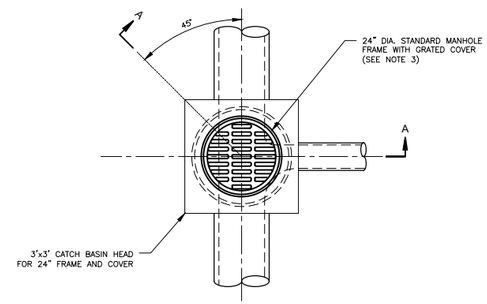
1. REFER TO ISPWC SECTION-307 AND PLRWSD STANDARDS FOR TRENCH MATERIALS AND WORKMANSHIP REQUIREMENTS.
2. ALL STREET CUTS WILL REQUIRE RESURFACING BY A PAVING MACHINE OR SPREADER BOX. PATCH WIDTHS ARE NEVER TO BE LESS THAN 4' IN WIDTH. LOCATE THE MATCH OF THE NEW TO EXISTING PAVEMENT OUT OF THE VEHICLE WHEEL PATH OF THE STREET.
3. WHERE THE STREET SURFACE INCLUDES AN OVERLAY WITH FABRIC, TAKE THE FOLLOWING ADDITIONAL STEPS:

   A. OVERLAY ABOVE FABRIC AN ADDITIONAL 4" ON EACH SIDE TO EXPOSE EXISTING FABRIC.
   B. INSTALL NEW ASPHALT TO GRADE FABRIC.
   C. INSTALL NEW FABRIC FULL WIDTH OF CUT, IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
   D. OVERLAY FABRIC WITH ASPHALT TO FINISH GRADE OF STREET.
4. SAWCUT AND TACK ALL COLD JOINT SURFACES WITH EMULSION PRIOR TO PATCHING.
5. ALL MATERIAL TO BE COMPACTED TO AT LEAST 95% OPTIMUM DENSITY PER AASHTO T99. REFER TO ISPWC SECTION 306 FOR ADDITIONAL INFORMATION.
6. MATERIALS AND CONSTRUCTION OF STRUCTURAL REPAIR SHALL CONFORM TO ISPWC STANDARDS OR PLAN SPECIFICATIONS.
7. CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTENANCE OF STREET REPAIR FOR TWO YEARS AFTER INSTALLATION.
8. COMPLETED PATCH SHALL NOT POND/POOL WATER.
9. COMPLETED PATCH SHALL NOT DEVIATE FROM EXISTING SURFACE MORE THAN 0.03 FT./10 FT. IN STRAIGHT PROFILE OR 0.05 FT./10 FT. IN CROSS SECTION WHEN MEASURED WITH A 10 FT. STRAIGHT EDGE.
10. WHERE 50% OR MORE OF THE SURFACE AREA OF PAVEMENT HAS BEEN REMOVED OR DAMAGED, FULL WIDTH RESTORATION SHALL BE REQUIRED.

C306 TYP — STREET CUTS/SURFACE REPAIR DETAILS
NOT TO SCALE



SECTION A - A
N.T.S.

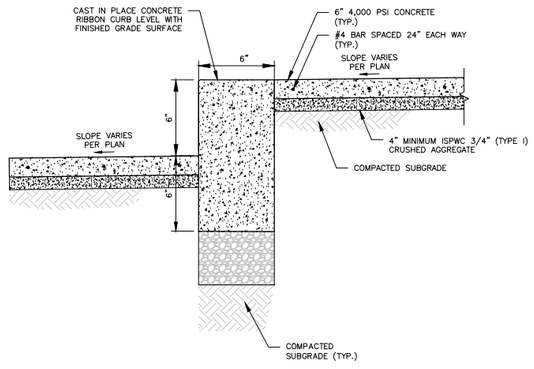


PLAN
N.T.S.

NOTES:

1. CATCH BASIN STRUCTURE, FRAME, AND LID SHALL BE CONSTRUCTED TO SUPPORT H-20 TRAFFIC LOADING.
2. ALL CATCH BASIN JOINTS TO INCLUDE CON-SEAL "CS-320 MASTIC," AND BE GROUTED (INSIDE & OUT) USING QUIKRETE "NON-SHRINK GENERAL PURPOSE GROUT." EXTERIOR MANHOLE JOINTS TO BE COVERED WITH PRESS SEAL "EZ-WRAP" BUTYL ADHESIVE TAPE AFTER GROUTING. PRIME JOINT SURFACE USING A SPRAY ADHESIVE PRIOR TO EZ-WRAP APPLICATION.
3. REFER TO CONSTRUCTION PLANS FOR DETAILS PERTAINING TO GRATED AND/OR SOLID COVER TYPES. SOLID COVERS TO BE STAMPED "STORM DRAIN."

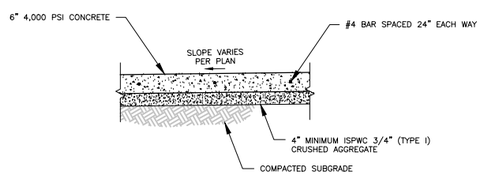
C612 TYP — STANDARD CATCH BASIN
NOT TO SCALE



NOTES:

1. GRADE AND ALIGNMENT TO BE ESTABLISHED BY THE PROJECT ENGINEER AND THE PUBLIC AGENCIES HAVING JURISDICTION.
2. CONTINUOUS PLACEMENT IS PREFERRED. SCORE INTERVALS MINIMUM EIGHT (8') FEET.
3. MATERIAL AND CONSTRUCTION SHALL BE IN COMPLIANCE WITH ISPWC SPECIFICATIONS
4. ROAD SECTION TO BE PER CIVIL TYPICAL DETAIL C806
5. REBAR SHOULD BE PLACED ON A CRISS-CROSS PATTERN AND TIED WITH WIRE. WIRE OR REBAR SHOULD BE SET ON "CHAIRS" SO IT STAYS IN THE MIDDLE OF THE SLAB.
6. EXPANSION JOINTS TO BE PLACED/LOCATED AT A MAXIMUM OF FIVE (5') FEET SPACING. JOINTS TO BE APPROXIMATELY 1/8" WIDE, 3/4" IN DEPTH AND FINISHED/EDGED SMOOTH

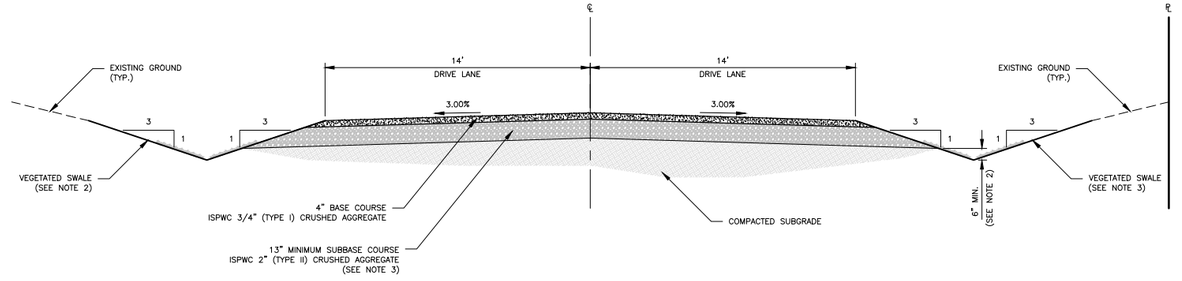
C700 TYP — CONCRETE RIBBON CURB
NOT TO SCALE



NOTES:

1. REBAR SHOULD BE PLACED ON A CRISS-CROSS PATTERN AND TIED WITH WIRE. WIRE OR REBAR SHOULD BE SET ON "CHAIRS" SO IT STAYS IN THE MIDDLE OF THE SLAB.
2. EXPANSION JOINTS TO BE PLACED/LOCATED AT A MAXIMUM OF FIVE (5') FEET SPACING. JOINTS TO BE APPROXIMATELY 1/8" WIDE, 3/4" IN DEPTH AND FINISHED/EDGED SMOOTH

C725 TYP — 2' CONCRETE APPRON
NOT TO SCALE



NOTES:

1. COMPACTION AND TESTING FOR ALL AGGREGATE BASE/SUBBASE MATERIAL SHALL BE IN ACCORDANCE WITH ISPWC SECTION 802.
2. VEGETATED SWALE TO BE A MINIMUM OF 6" BELOW THE BOTTOM SUBBASE. REVEGETATE USING A GRASS MIXTURE NATIVE TO THE PROJECT AREA.
3. UNCRUSHED AGGREGATE MAY BE USED AS A SUBSTITUTE FOR CRUSHED AGGREGATE SHOULD THE PROPOSED SOURCE MATERIAL MEET ISPWC STANDARDS. USE OF ALTERNATIVE MATERIAL IS NOT ALLOWED WITHOUT ADVANCE APPROVAL FROM THE PROJECT ENGINEER AND OWNER.

C806 TYP — ROADWAY TYPICAL SECTION – GRAVEL ROADWAY
NOT TO SCALE

NO.	REVISION	BY	DATE

DESIGN TMS
DRAWN TMS
CHECKED AMD
APPROVED AMD

PROFESSIONAL ENGINEER LICENSED 21556 5/27/25 STATE OF IDAHO ANTHONY DINI

FOR REVIEW ONLY NOT FOR CONSTRUCTION

CRESTLINE ENGINEERS
323 DEINHARD LANE, SUITE C · PO BOX 2330
McCALL, IDAHO 83638
208.634.4140 · 208.634.4146 FAX

811 SAFETY IS IN YOUR HANDS. EVERY DIG. EVERY TIME.

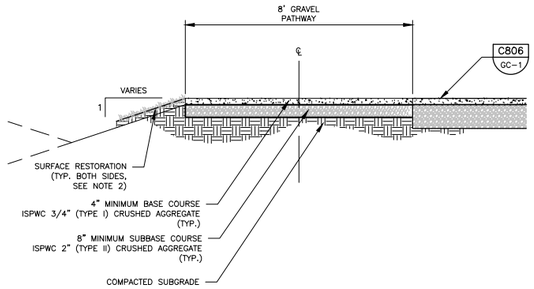
HAWKS VILLAGE AND RIVER STORAGE
BOISE COUNTY, IDAHO

GRADING, DRAINAGE, AND STORMWATER IMPROVEMENTS
CIVIL TYPICAL DETAILS - 1

VERIFY SCALE
BAR IS ONE INCH ON FULL SIZE DRAWING (0 — 1")

PROJECT	24022
DATE	5/27/2025
DRAWING NO.	GC-1
SHEET NO.	9 OF 10

Path: M:\0011D\DraperDevelopment\24022\Civil\Dwg\CD\24022_GC-1-2_CivilTypDetails.dwg File Name: 24022_GC-1-2_CivilTypDetails.dwg Plot Date: 5/27/2025 3:33 P.M. Admin

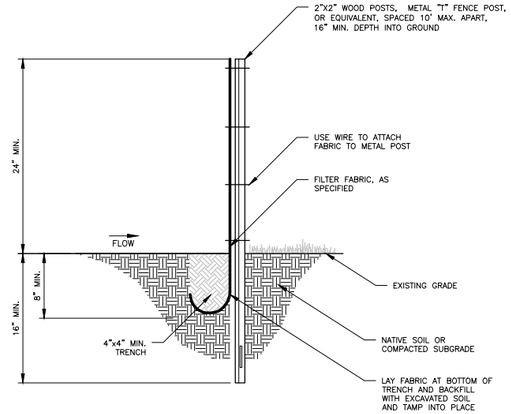


NOTES:

1. COMPACTION AND TESTING FOR ALL AGGREGATE BASE/SUBBASE MATERIAL SHALL BE IN ACCORDANCE WITH ISPWC 802.
2. SURFACE RESTORATION TO BE PER THE PROJECTS LANDSCAPING PLANS. IF LANDSCAPE PLANS HAVE NOT BEEN PROVIDED BY THE OWNER, SURFACE RESTORATION SHALL INCLUDE PLACEMENT OF 2"–3" OF STOCKPILED ON–SITE ORGANICS/TOPSOIL REVEGETATED WITH A NATIVE TO THE PROJECT AREA GRASS SEED MIXTURE.
3. UNCRUSHED AGGREGATE MAY BE USED AS A SUBSTITUTE FOR CRUSHED AGGREGATE SHOULD THE PROPOSED SOURCE MATERIAL MEET BOISE COUNTY PRIVATE ROAD STANDARDS. USE OF ALTERNATIVE MATERIAL IS NOT ALLOWED WITHOUT ADVANCE APPROVAL FROM THE PROJECT ENGINEER AND OWNER.

C850 TYP — GRAVEL PATHWAY
NOT TO SCALE

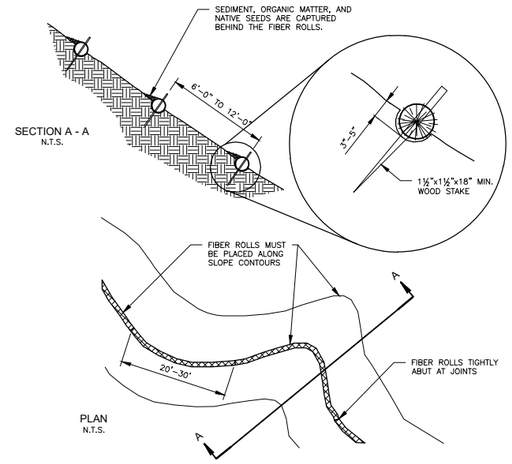
STANDARD SYMBOL
—S—



NOTES:

1. INSTALL SILT FENCE AT TOE OF FILL SLOPES, AS INDICATE ON THE PLANS AND LOCATION WHERE SEDIMENT MAY MOVE OFF SITE.
2. SILT FENCES SHALL REMAIN IN PLACE UNTIL SLOPES HAVE STABILIZED.
3. WOVEN WIRE FENCE TO BE FASTEN SECURELY TO FENCE POSTS WITH WIRE TIES OR STAPLES.
4. FILTER CLOTH TO BE FASTENED SECURELY TO WOVEN WIRE FENCE WITH TIES SPACED EVERY 24 IN. AT TOP AND MID–SECTION.
5. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER, THEY SHALL BE OVERLAPPED BY 6 IN. AND FOLDED.
6. MAINTENANCE SHALL BE PERFORMED AS NEEDED AND MATERIAL REMOVED WHEN BULGES DEVELOP IN THE SILT FENCE.
7. SEE STATE OF IDAHO CATALOG OF STORM WATER BEST MANAGEMENT PRACTICES, BMP 65 FOR ADDITIONAL INFORMATION.

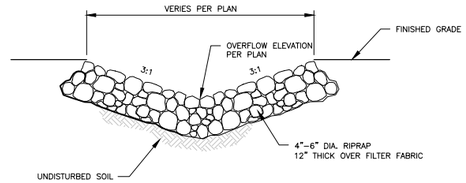
C1000 TYP — SILT FENCE DETAIL
NOT TO SCALE



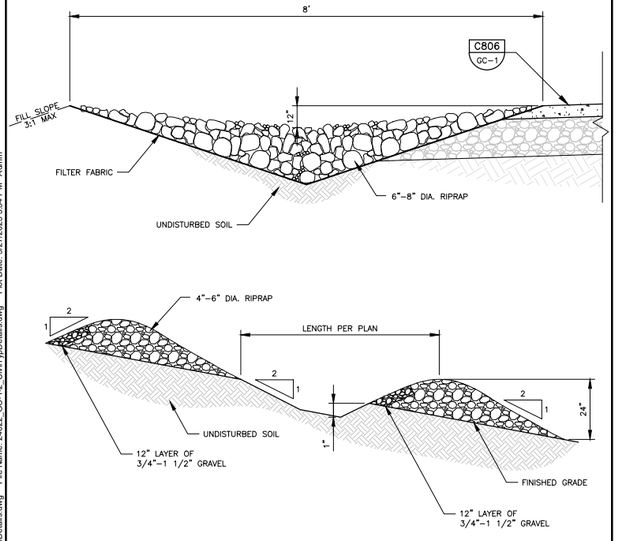
NOTES:

1. A FIBER ROLL (OR WATTLES OR SEDIMENT CONTROL LOG) ARE TUBES MADE FROM STRAW, FLAX, RICE, COCONUT, OR OTHER BIODEGRADABLE MATERIAL WRAPPED IN ULTRAVIOLET DEGRADABLE POLYPROPYLENE NETTING OR A BIODEGRADABLE MATERIAL SUCH AS BURLAP, JUTE, OR COIR. THEY ARE APPROXIMATELY 8"–9" IN DIAMETER AND 20'–30' LONG.
2. FIBER ROLLS TRAP SEDIMENT AND REDUCE SHEET AND RILL EROSION BY REDUCING SLOPE GRADIENT, INCREASING INFILTRATION RATES AND BY PRODUCING A FAVORABLE ENVIRONMENT FOR PLANT ESTABLISHMENT.
3. FIBER ROLL INSTALLATION REQUIRES THE PLACEMENT AND SECURE STAKING OF THE FIBER ROLL IN A TRENCH, 3"–5" DEEP, DUG ON CONTOUR. RUNOFF MUST NOT BE ALLOWED ON RUN UNDER OR AROUND WATTLE.
4. SEE IDAHO CATALOG OF BEST STORMWATER MANAGEMENT PRACTICES, BMP NO. 64 FOR ADDITIONAL INFORMATION.

C1001 TYP — FIBER ROLL DETAIL
NOT TO SCALE



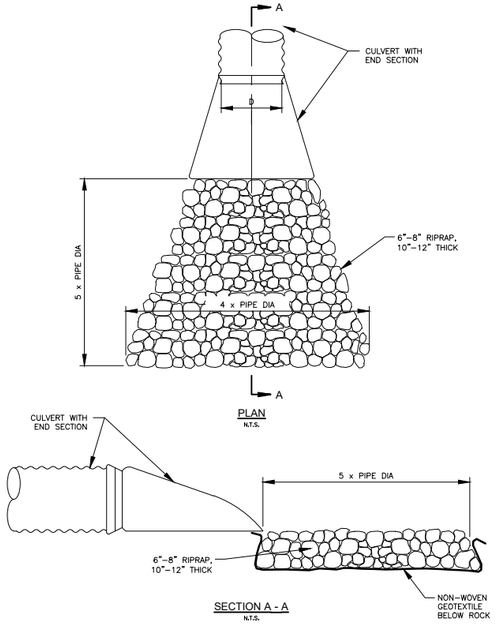
C1014 TYP — WEIR OVERFLOW DETAIL
NOT TO SCALE



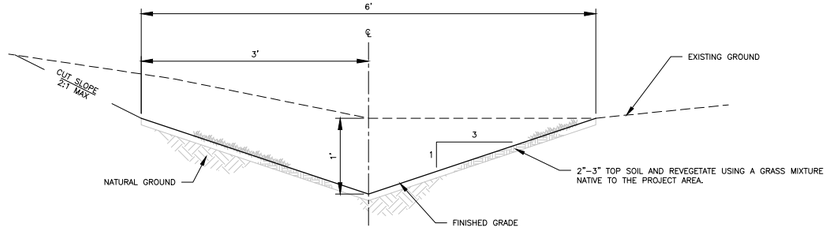
NOTES:

1. REFER TO IDAHO DEPARTMENT OF ENVIORNMENTAL QUALITY'S CATALOG OF STORMWATER BEST MANAGEMENT PRACTICES, VOLUME 4, SECTION 3, BMP 60 FOR MORE INFORMATION.

C1020 TYP — ROCK CHECK DAM DETAIL
NOT TO SCALE



C1230 TYP — OUTLET PROTECTION
NOT TO SCALE



NOTES:

1. REFER TO IDAHO DEPARTMENT OF ENVIRONMENTALLY QUALITY'S CATALOG OF STORMWATER BEST MANAGEMENT PRACTICES, VOLUME 4, SECTION 3, BMP 1 AT WWW.DEQ.IDAHO.GOV/MEDIA/622263–STORMWATER.PDF FOR ADDITIONAL INFORMATION.

C1401 TYP — BIOFILTRATION SWALE (VEGETATED SWALE)
NOT TO SCALE

NO.	REVISION	BY	DATE

DESIGN	SMR
DRAWN	SMR
CHECKED	AMD
APPROVED	AMD

PROFESSIONAL ENGINEER LICENSED 21556 STATE OF IDAHO ANTHONY DINI 5/27/25

FOR REVIEW ONLY NOT FOR CONSTRUCTION

CRESTLINE ENGINEERS
323 DEINHARD LANE, SUITE C · PO BOX 2330
McCALL, IDAHO 83638
208.634.4140 · 208.634.4146 FAX

811 SAFETY IS IN YOUR HANDS. EVERY DIG. EVERY TIME.

HAWKS VILLAGE AND RIVER STORAGE
BOISE COUNTY, IDAHO

GRADING, DRAINAGE, AND STORMWATER IMPROVEMENTS
CIVIL TYPICAL DETAILS - 2

VERIFY SCALE
BAR IS ONE INCH ON FULL SIZE DRAWING
0 1"

PROJECT	24022
DATE	5/27/2025
DRAWING NO.	GC-2
SHEET NO.	10 OF 10

Civil Engineering Consultants
323 Deinhard Lane, Suite C
PO Box 2330
McCall, Idaho 83638
(208) 634-4140