

# **DRAINAGE REPORT**

## **Orlando Excavations, LLC**

95 Rescue Lane  
Bloomfield, CT

April 11, 2025



PREPARED BY:

### **BORGHESI BUILDING & ENGINEERING CO.**

2155 EAST MAIN STREET  
TORRINGTON, CT 06790  
(860) 482-7613

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missing from report

Include CT soil  
survey info with  
hydrologic soil groups  
(HSG) of site soils

include dimension of  
yard and material  
composition

## **SUMMARY**

The applicant proposes to construct a 900 sf storage building and an outdoor material stockpile yard at their 95 Rescue Lane Bloomfield property. Minor grading and considerable land clearing is required for construction. The proposed drainage system is designed with detention basins to reduce post -development flows to pre-development levels for the 2-yr, 10-yr, 25-yr, 50-yr, and 100-year storms.

The proposed site grading will direct sheetflow runoff from the proposed stock yard area into a detention basin. The detention basin reduces the post-development flows to pre-development levels prior to being piped to on-site wetlands. A summary of the watershed analysis is found on the next page. Hydraflow Hydrographs software is used to evaluate the pre- and post- development conditions.

Dead storage in the detention basin stores the stormwater quality volume, see Appendix C for calculations.

A Stormwater Operations & Maintenance Plan is found in Appendix D.

The amount of  
grading appears  
significant due to size  
of site

**BORGHESI BUILDING & ENGINEERING CO.**

2155 EAST MAIN ST., TORRINGTON, CT

**Orlando Excavations, LLC**

95 Rescue Lane, Bloomfield, CT

**SUMMARY OF DISCHARGES**

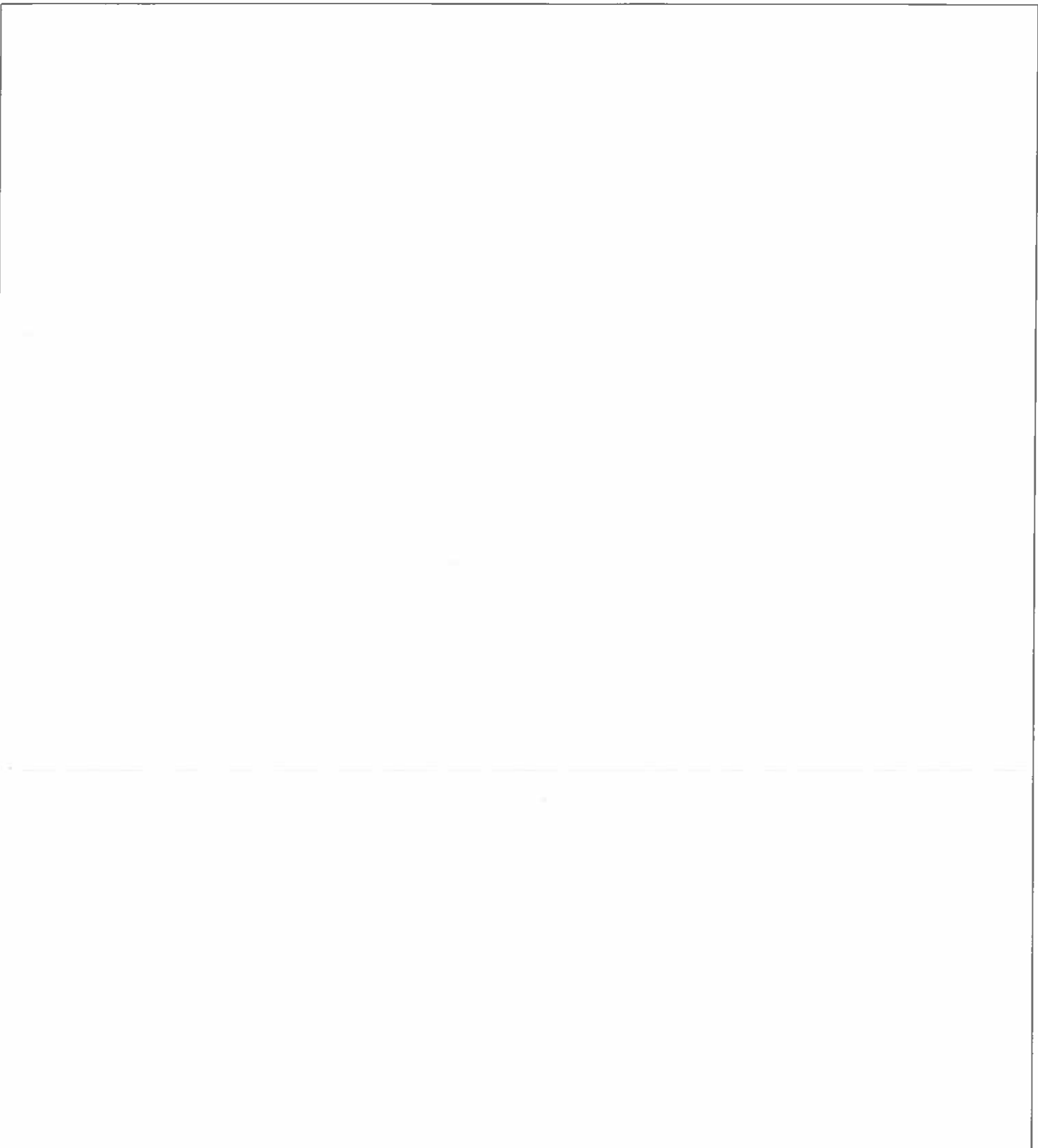
<b>STORM (YEAR)</b>	<b>EXISTING (CFS)</b>	<b>PROPOSED (CFS)</b>	<b>CHANGE (CFS)</b>
2	6.09	2.74	-3.35
10	13.40	4.20	-9.20
25	18.20	5.91	-12.29
50	21.98	8.66	-13.32
100	25.73	10.28	-15.45

**APPENDIX A:**

**HYDROLOGIC CALCULATIONS: EXISTING CONDITIONS**

# Watershed Model Schematic

Hydraflow Hydrographs by Intelisolve v9.1



**Legend**

<u>Hyd. Origin</u>	<u>Description</u>
1	SCS Runoff Existing Conditions



# Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.1

Friday, Apr 11, 2025

## Hyd. No. 1

### Existing Conditions

Hydrograph type = SCS Runoff  
 Storm frequency = 2 yrs  
 Time interval = 2 min  
 Drainage area = 3.600 ac  
 Basin Slope = 0.0 %  
 Tc method = USER  
 Total precip. = 3.60 in  
 Storm duration = 24 hrs

Tc seems very low  
 for 3.6 acres; provide  
 Tc path on watershed  
 mapping

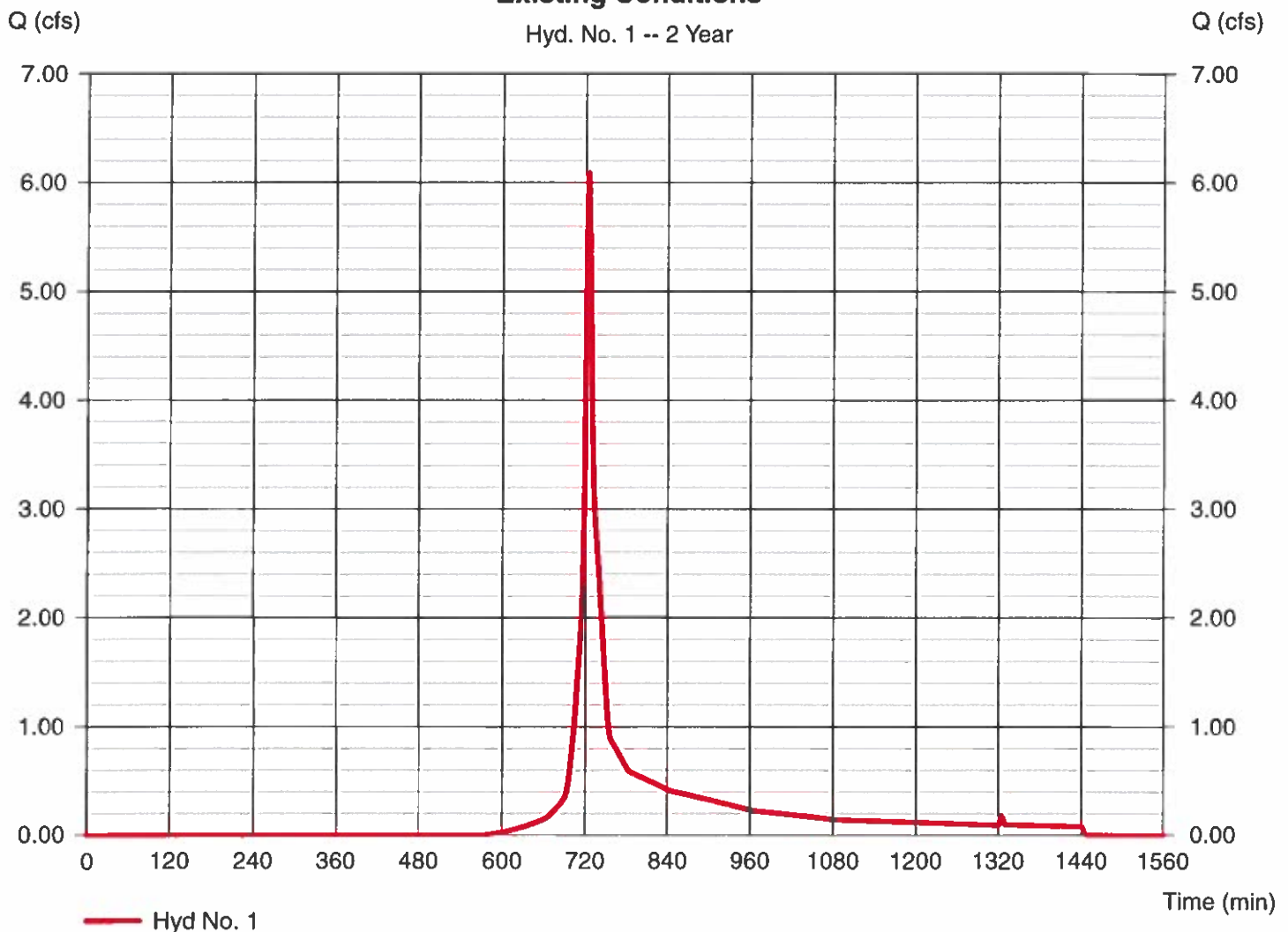
provide backup data for  
 value used

Peak discharge = 6.088 cfs  
 Time to peak = 724 min  
 Hyd. volume = 18,441 cuft  
 Curve number = 77  
 Hydraulic length = 0 ft  
 Time of conc. (Tc) = 5.00 min  
 Distribution = Type III  
 Shape factor = 484

precipitation values should be  
 based on Atlas 14 Volume 10  
 values for site location; this  
 comment applies for other storms  
 also 10 yr through 100 yr

### Existing Conditions

Hyd. No. 1 -- 2 Year





# Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.1

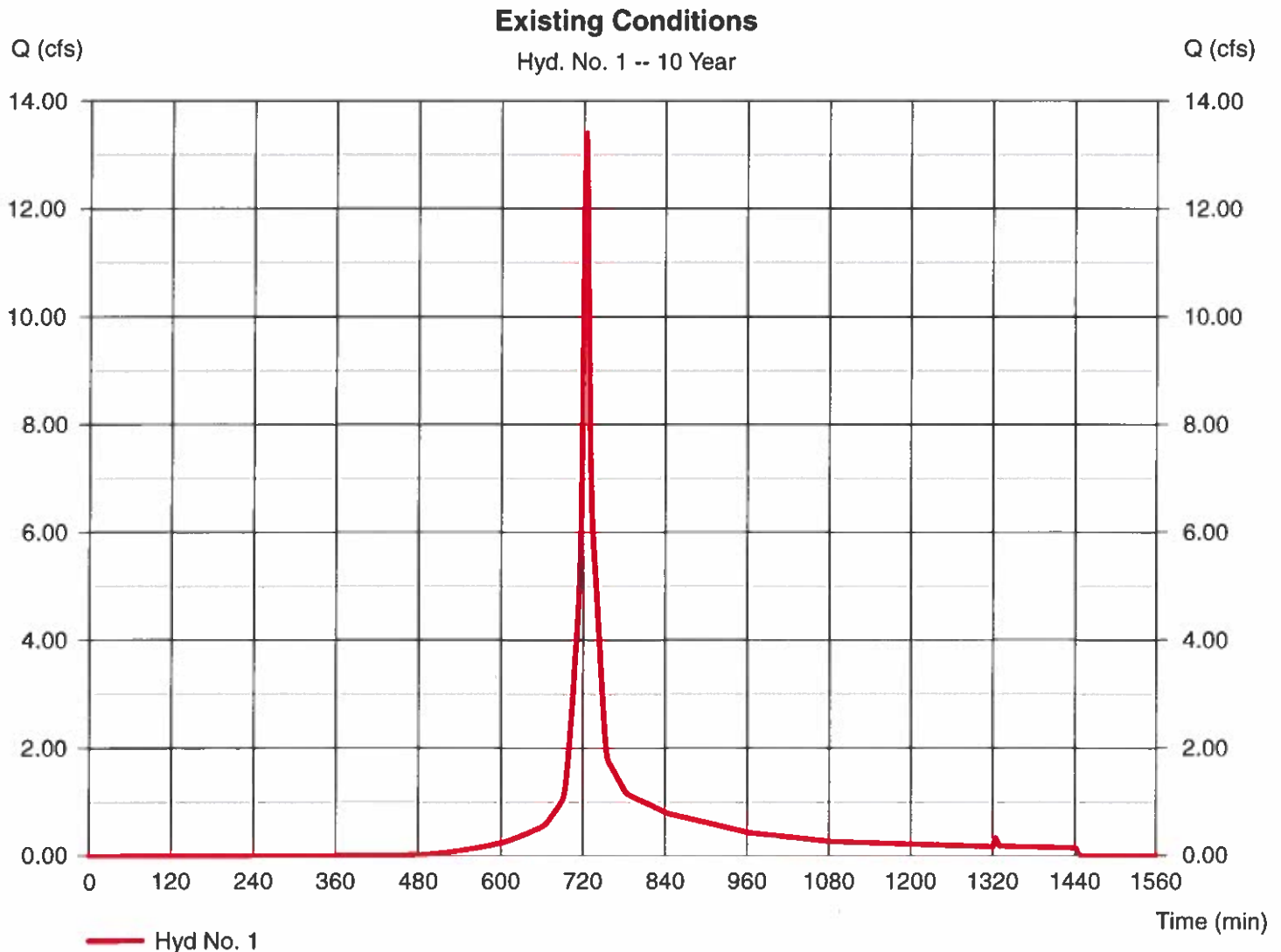
Friday, Apr 11, 2025

## Hyd. No. 1

### Existing Conditions

Hydrograph type = SCS Runoff  
 Storm frequency = 10 yrs  
 Time interval = 2 min  
 Drainage area = 3.600 ac  
 Basin Slope = 0.0 %  
 Tc method = USER  
 Total precip. = 5.76 in  
 Storm duration = 24 hrs

Peak discharge = 13.40 cfs  
 Time to peak = 724 min  
 Hyd. volume = 40,066 cuft  
 Curve number = 77  
 Hydraulic length = 0 ft  
 Time of conc. (Tc) = 5.00 min  
 Distribution = Type III  
 Shape factor = 484

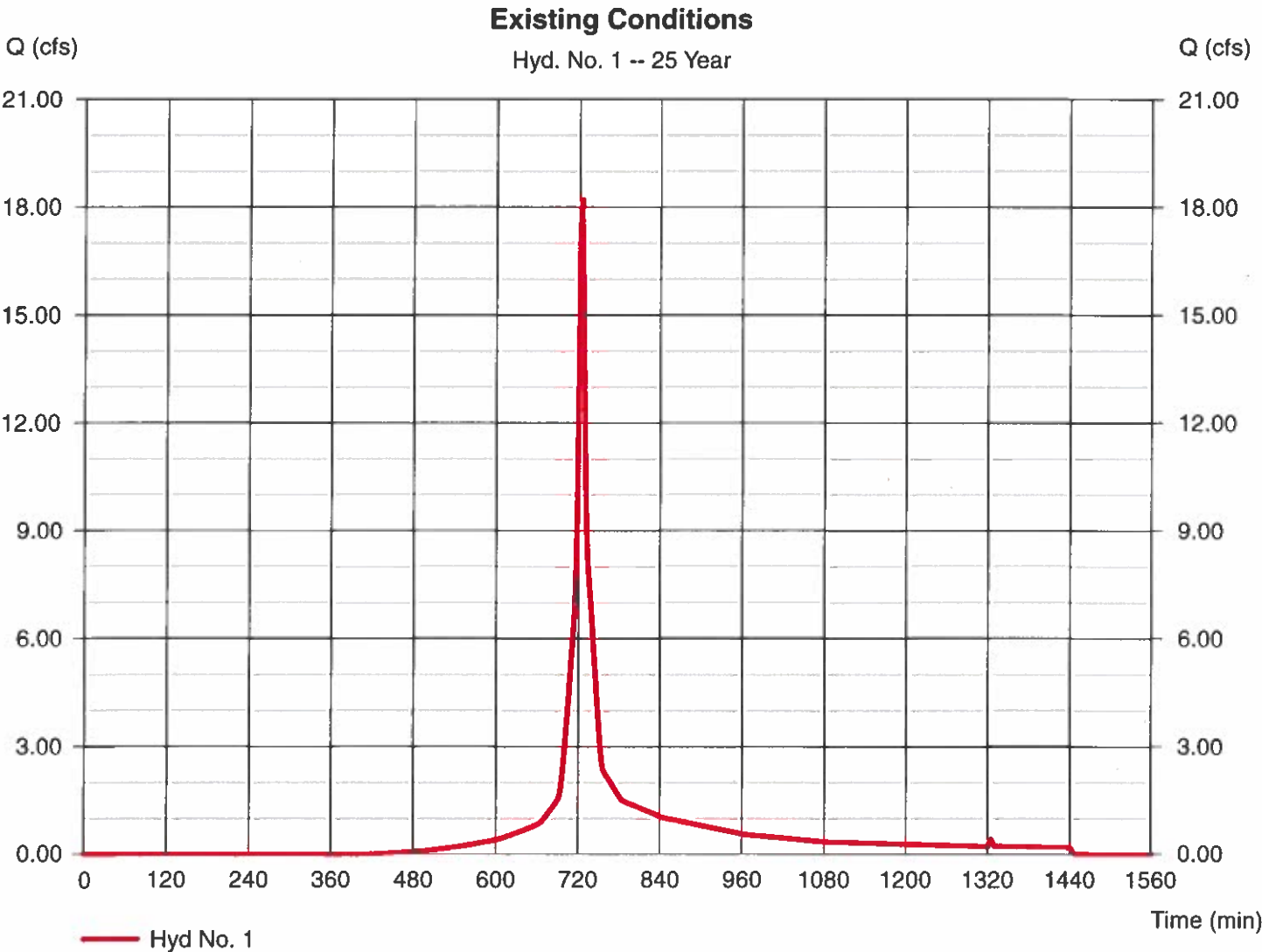


# Hydrograph Report

## Hyd. No. 1

### Existing Conditions

Hydrograph type	=	SCS Runoff	Peak discharge	=	18.20 cfs
Storm frequency	=	25 yrs	Time to peak	=	724 min
Time interval	=	2 min	Hyd. volume	=	54,700 cuft
Drainage area	=	3.600 ac	Curve number	=	77
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	5.00 min
Total precip.	=	7.11 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484



# Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.1

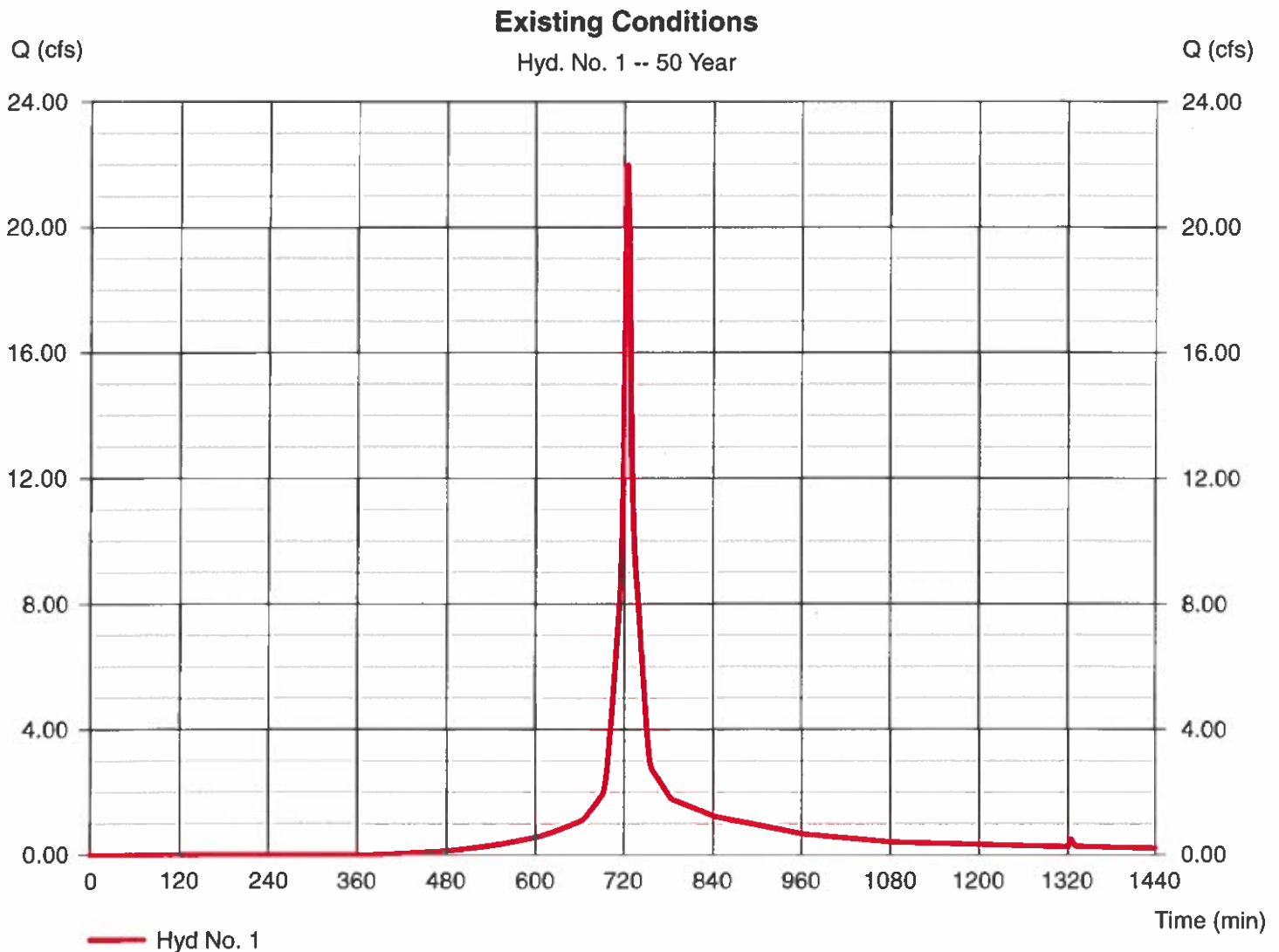
Friday, Apr 11, 2025

## Hyd. No. 1

### Existing Conditions

Hydrograph type = SCS Runoff  
 Storm frequency = 50 yrs  
 Time interval = 2 min  
 Drainage area = 3.600 ac  
 Basin Slope = 0.0 %  
 Tc method = USER  
 Total precip. = 8.16 in  
 Storm duration = 24 hrs

Peak discharge = 21.98 cfs  
 Time to peak = 724 min  
 Hyd. volume = 66,418 cuft  
 Curve number = 77  
 Hydraulic length = 0 ft  
 Time of conc. (Tc) = 5.00 min  
 Distribution = Type III  
 Shape factor = 484



# Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.1

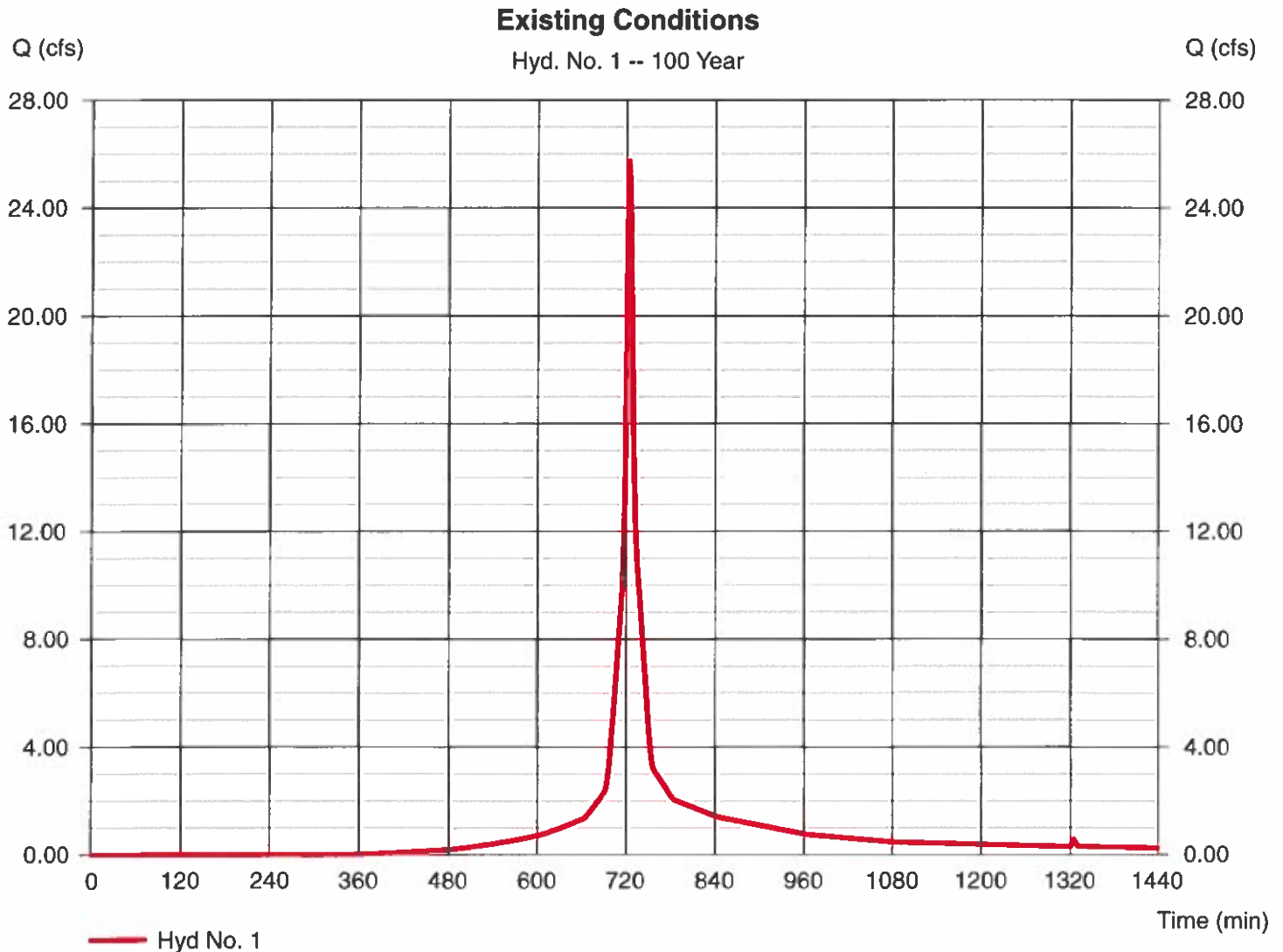
Friday, Apr 11, 2025

## Hyd. No. 1

### Existing Conditions

Hydrograph type = SCS Runoff  
 Storm frequency = 100 yrs  
 Time interval = 2 min  
 Drainage area = 3.600 ac  
 Basin Slope = 0.0 %  
 Tc method = USER  
 Total precip. = 9.20 in  
 Storm duration = 24 hrs

Peak discharge = 25.73 cfs  
 Time to peak = 724 min  
 Hyd. volume = 78,229 cuft  
 Curve number = 77  
 Hydraulic length = 0 ft  
 Time of conc. (Tc) = 5.00 min  
 Distribution = Type III  
 Shape factor = 484

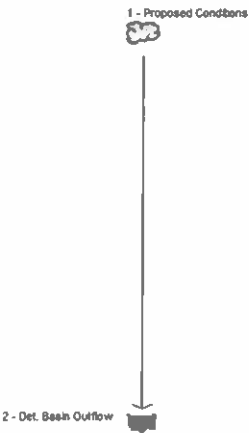


**APPENDIX B:**

**HYDROLOGIC CALCULATIONS: PROPOSED CONDITIONS**

# Watershed Model Schematic

Hydraflow Hydrographs by Intelisolve v9.1



**Legend**

Hyd. Origin	Description
1	SCS Runoff Proposed Conditions
2	Reservoir Det. Basin Outflow



# Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.1

Friday, Apr 11, 2025

## Hyd. No. 1

### Proposed Conditions

Hydrograph type = SCS Runoff  
 Storm frequency = 2 yrs  
 Time interval = 2 min  
 Drainage area = 3.600 ac  
 Basin Slope = 0.0 %  
 Tc method = USER  
 Total precip. = 3.60 in  
 Storm duration = 24 hrs

Peak discharge = 9.582 cfs  
 Time to peak = 12.07 hrs  
 Hyd. volume = 28,913 cuft  
 Curve number = 88\*  
 Hydraulic length = 0 ft  
 Time of conc. (Tc) = 5.00 min  
 Distribution = Type III  
 Shape factor = 484

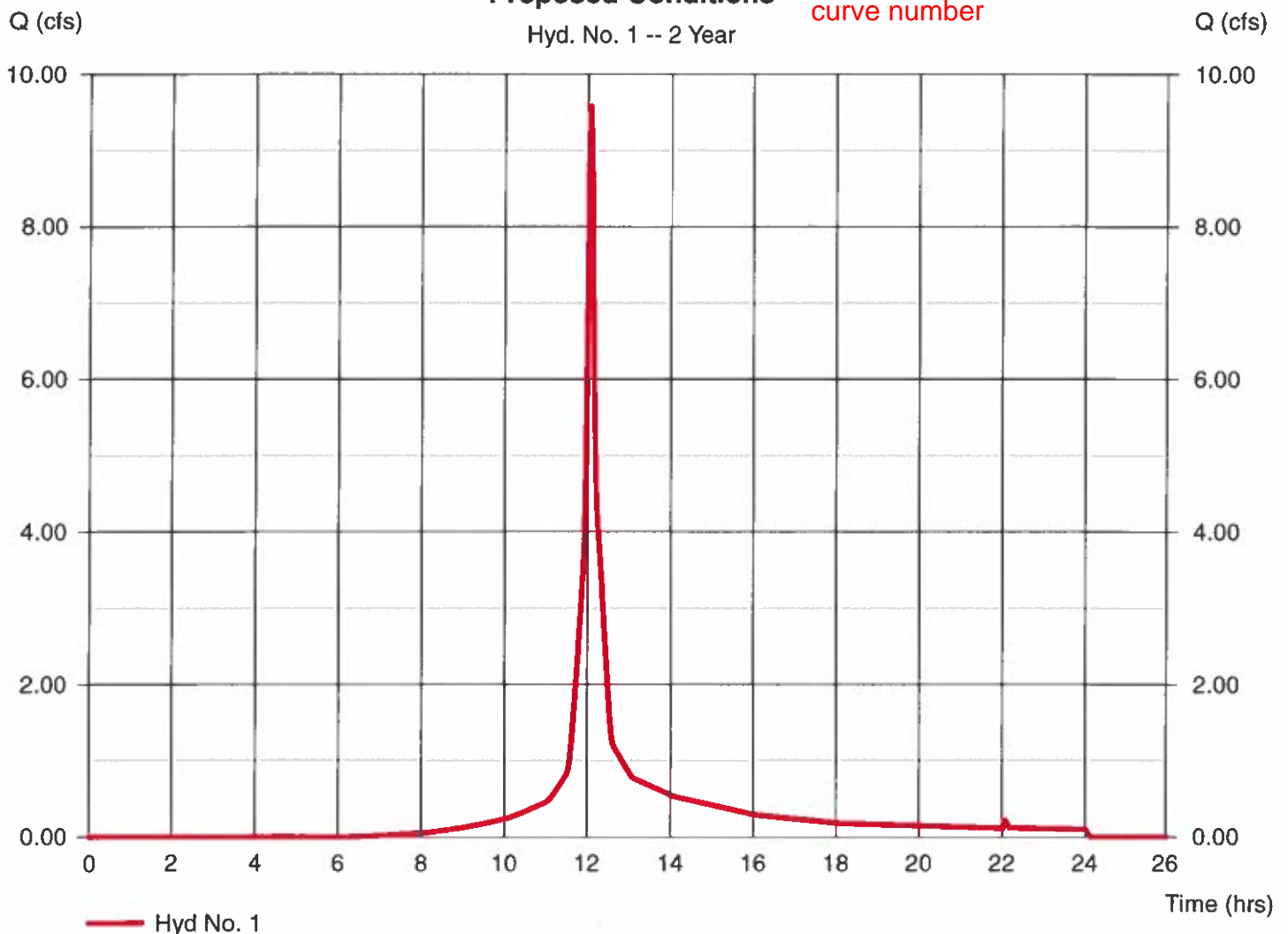
Provide calculation

\* Composite (Area/CN) =  $[(0.020 \times 98) + (2.430 \times 91) + (1.150 \times 80)] / 3.600$

Provide backup data  
including description  
of land use  
associated with each  
curve number

### Proposed Conditions

Hyd. No. 1 -- 2 Year





# Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.1

Friday, Apr 11, 2025

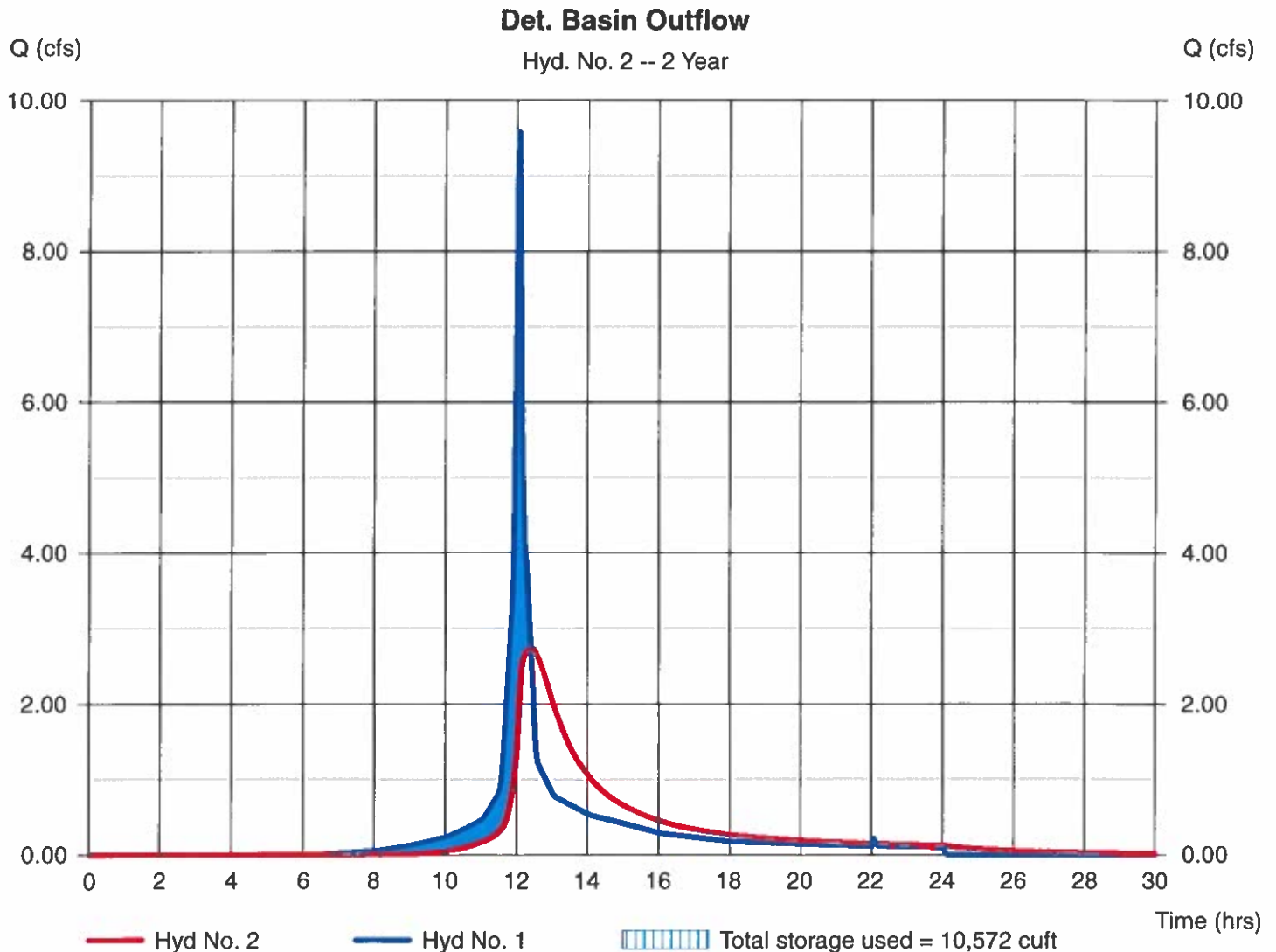
## Hyd. No. 2

### Det. Basin Outflow

Hydrograph type = Reservoir  
 Storm frequency = 2 yrs  
 Time interval = 2 min  
 Inflow hyd. No. = 1 - Proposed Conditions  
 Reservoir name = <New Pond>

Peak discharge = 2.744 cfs  
 Time to peak = 12.40 hrs  
 Hyd. volume = 28,872 cuft  
 Max. Elevation = 117.03 ft  
 Max. Storage = 10,572 cuft

Storage Indication method used.



# Pond Report

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Hydraflow Hydrographs by Intelisolve v9.1

Friday, Apr 11, 2025

**Pond No. 1 - <New Pond>**

## Pond Data

**Contours** - User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 116.00 ft

## Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	116.00	9,000	0	0
0.50	116.50	10,250	4,809	4,809
1.00	117.00	11,500	5,434	10,243
1.50	117.50	13,000	6,121	16,363
2.00	118.00	14,500	6,871	23,234
2.50	118.50	16,000	7,621	30,855
3.00	119.00	17,500	8,371	39,227

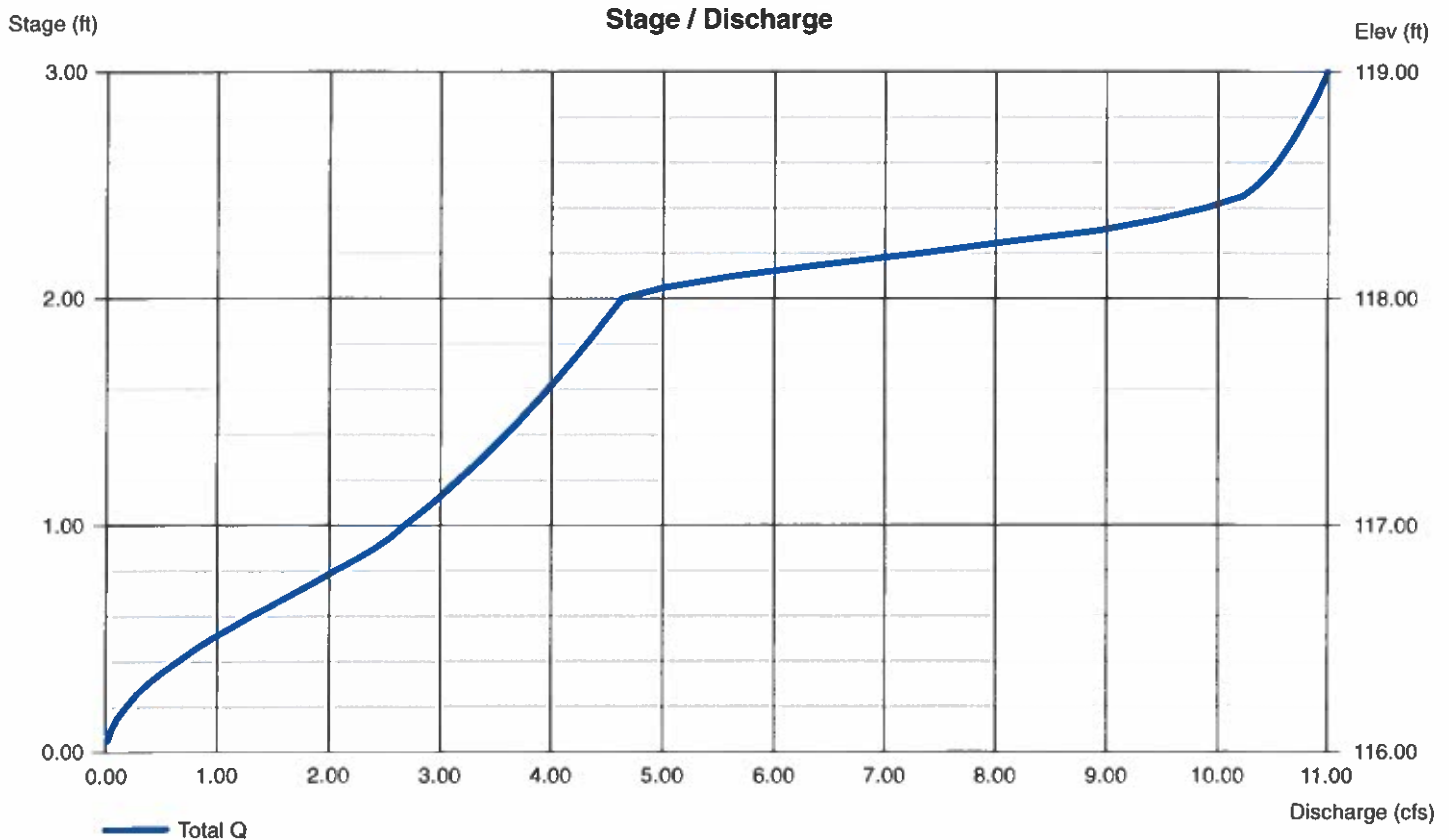
## Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 18.00	12.00	0.00	0.00
Span (in)	= 18.00	12.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 115.00	116.00	0.00	0.00
Length (ft)	= 600.00	1.00	0.00	0.00
Slope (%)	= 0.67	1.00	0.00	n/a
N-Value	= .012	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	No	No

## Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 8.00	0.00	0.00	0.00
Crest El. (ft)	= 118.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Rect	---	---	---
Multi-Stage	= Yes	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

Hydraflow Hydrographs by Intelisolve v9.1

Friday, Apr 11, 2025

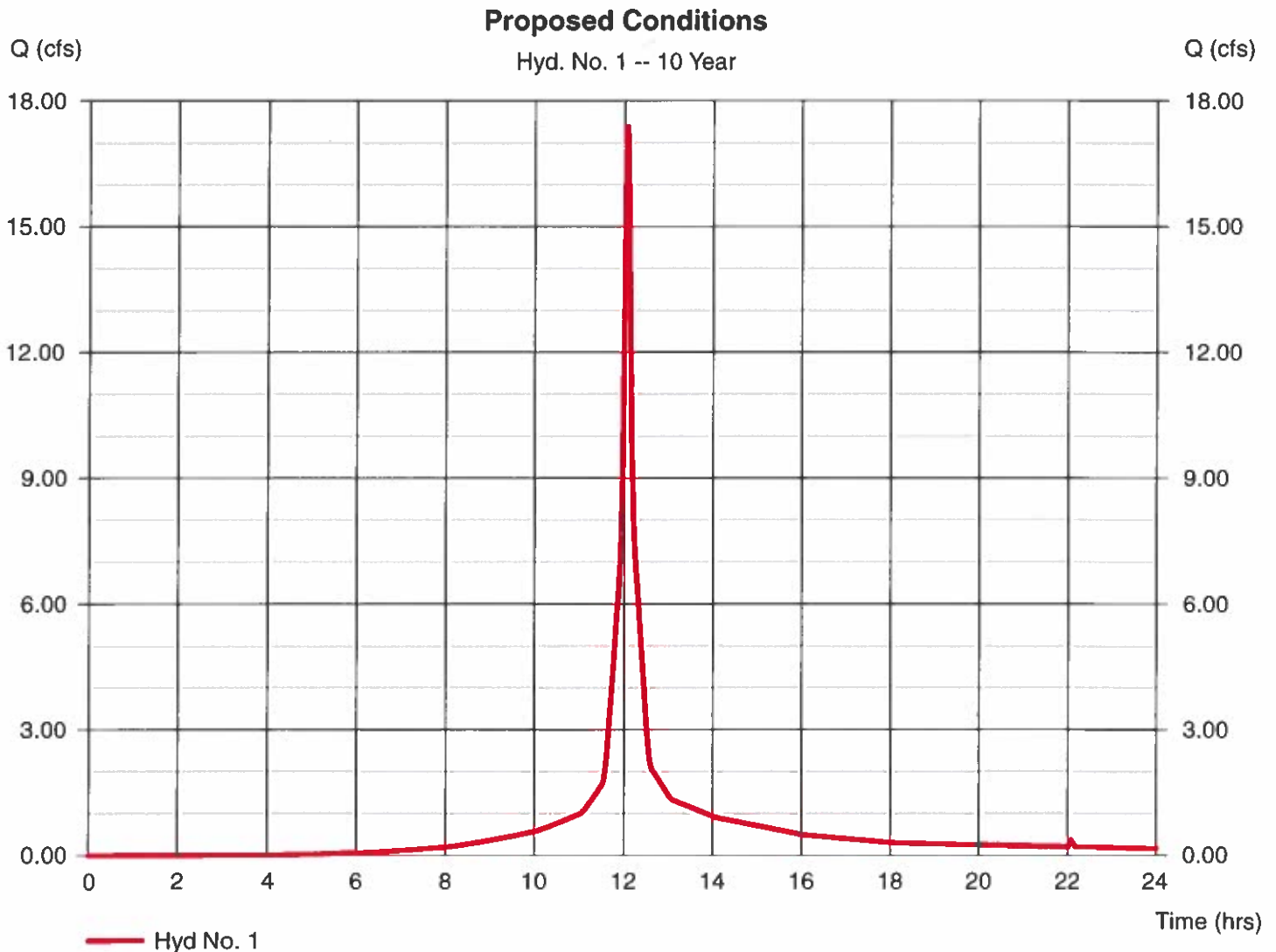
## Hyd. No. 1

### Proposed Conditions

Hydrograph type = SCS Runoff  
 Storm frequency = 10 yrs  
 Time interval = 2 min  
 Drainage area = 3.600 ac  
 Basin Slope = 0.0 %  
 Tc method = USER  
 Total precip. = 5.76 in  
 Storm duration = 24 hrs

Peak discharge = 17.37 cfs  
 Time to peak = 12.07 hrs  
 Hyd. volume = 53,845 cuft  
 Curve number = 88\*  
 Hydraulic length = 0 ft  
 Time of conc. (Tc) = 5.00 min  
 Distribution = Type III  
 Shape factor = 484

\* Composite (Area/CN) =  $[(0.020 \times 98) + (2.430 \times 91) + (1.150 \times 80)] / 3.600$



# Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.1

Friday, Apr 11, 2025

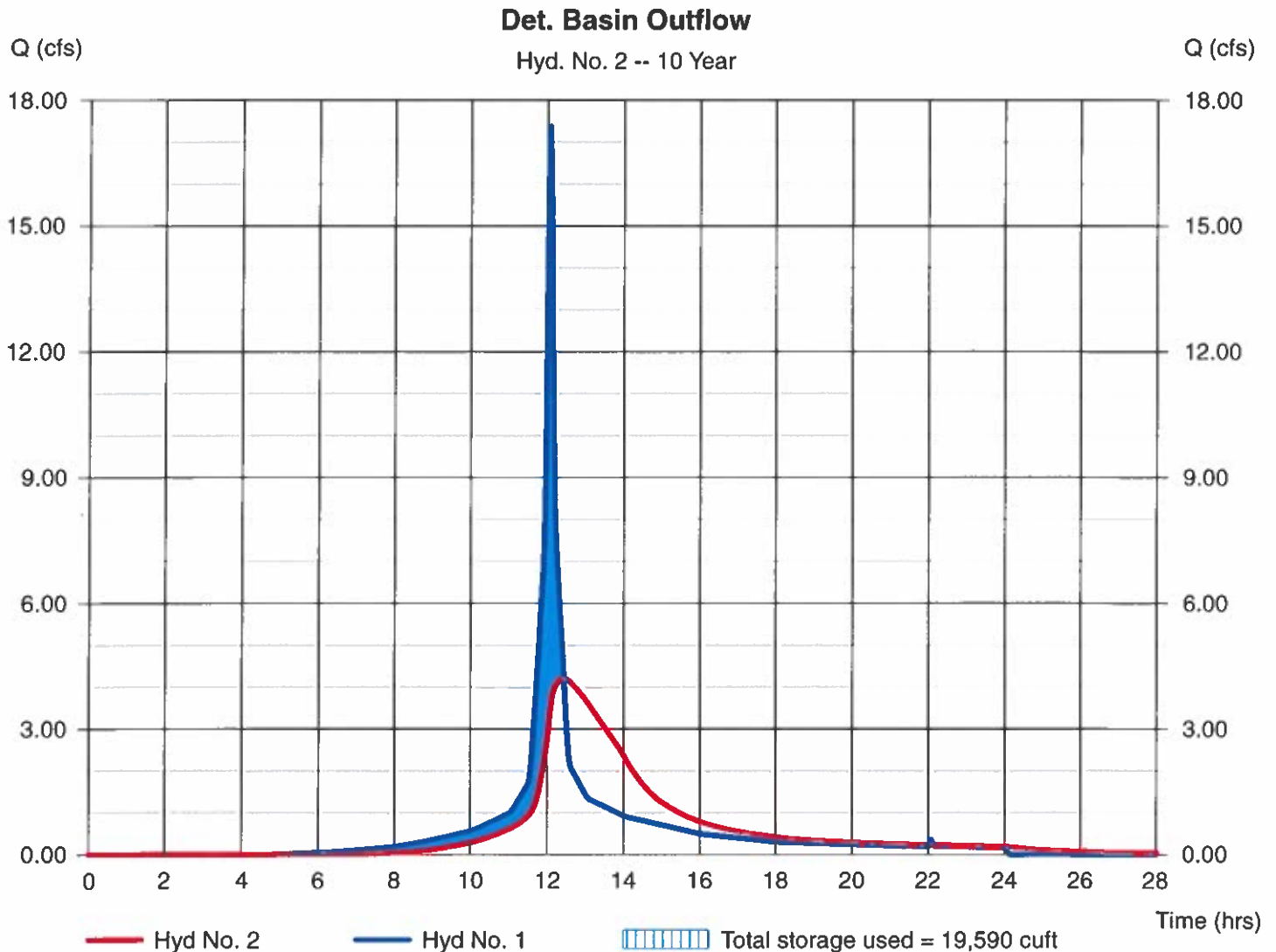
## Hyd. No. 2

Det. Basin Outflow

Hydrograph type = Reservoir  
 Storm frequency = 10 yrs  
 Time interval = 2 min  
 Inflow hyd. No. = 1 - Proposed Conditions  
 Reservoir name = <New Pond>

Peak discharge = 4.202 cfs  
 Time to peak = 12.43 hrs  
 Hyd. volume = 53,803 cuft  
 Max. Elevation = 117.73 ft  
 Max. Storage = 19,590 cuft

Storage Indication method used.



# Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.1

Friday, Apr 11, 2025

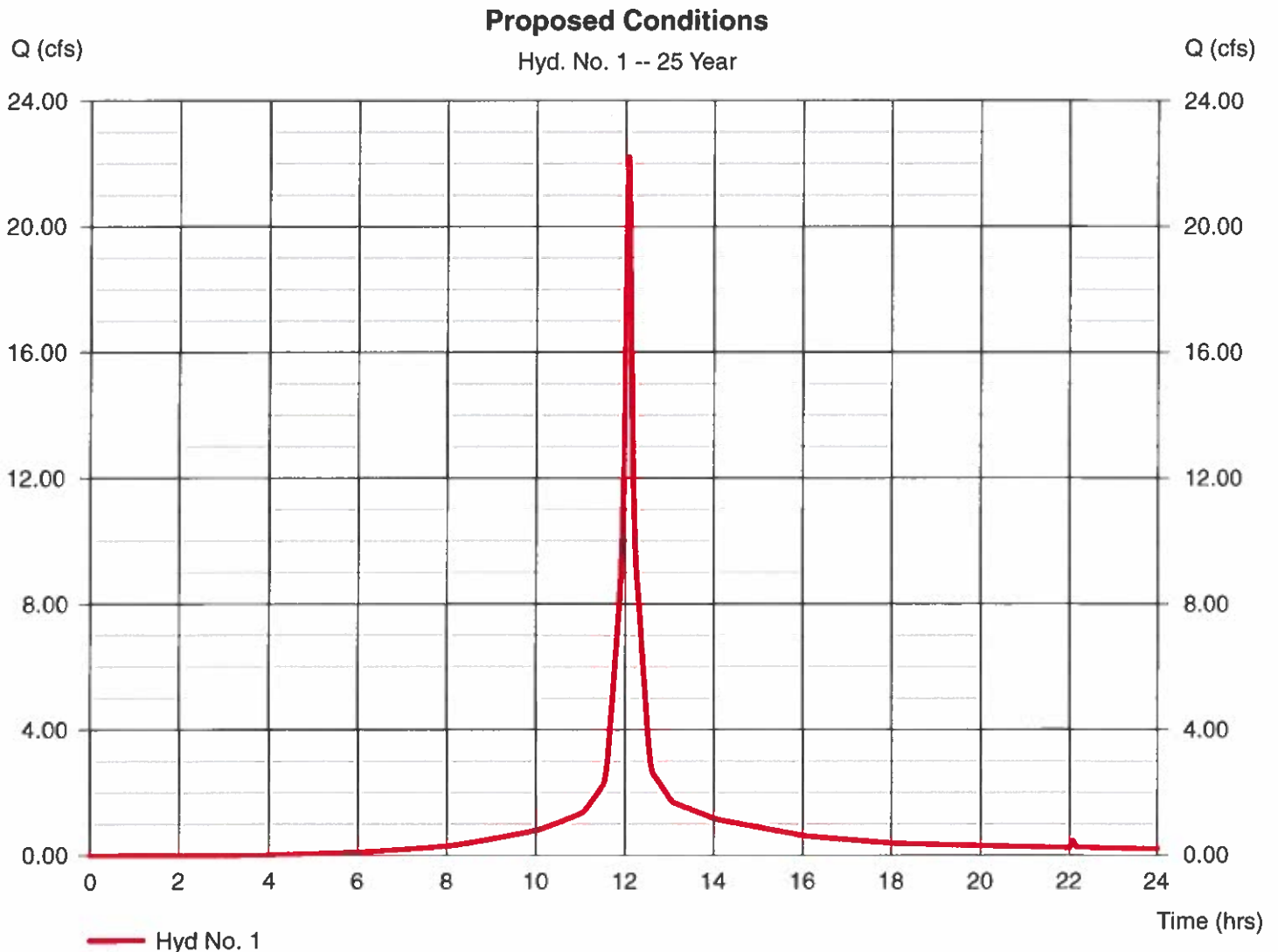
## Hyd. No. 1

### Proposed Conditions

Hydrograph type = SCS Runoff  
 Storm frequency = 25 yrs  
 Time interval = 2 min  
 Drainage area = 3.600 ac  
 Basin Slope = 0.0 %  
 Tc method = USER  
 Total precip. = 7.11 in  
 Storm duration = 24 hrs

Peak discharge = 22.21 cfs  
 Time to peak = 12.07 hrs  
 Hyd. volume = 69,837 cuft  
 Curve number = 88\*  
 Hydraulic length = 0 ft  
 Time of conc. (Tc) = 5.00 min  
 Distribution = Type III  
 Shape factor = 484

\* Composite (Area/CN) =  $[(0.020 \times 98) + (2.430 \times 91) + (1.150 \times 80)] / 3.600$



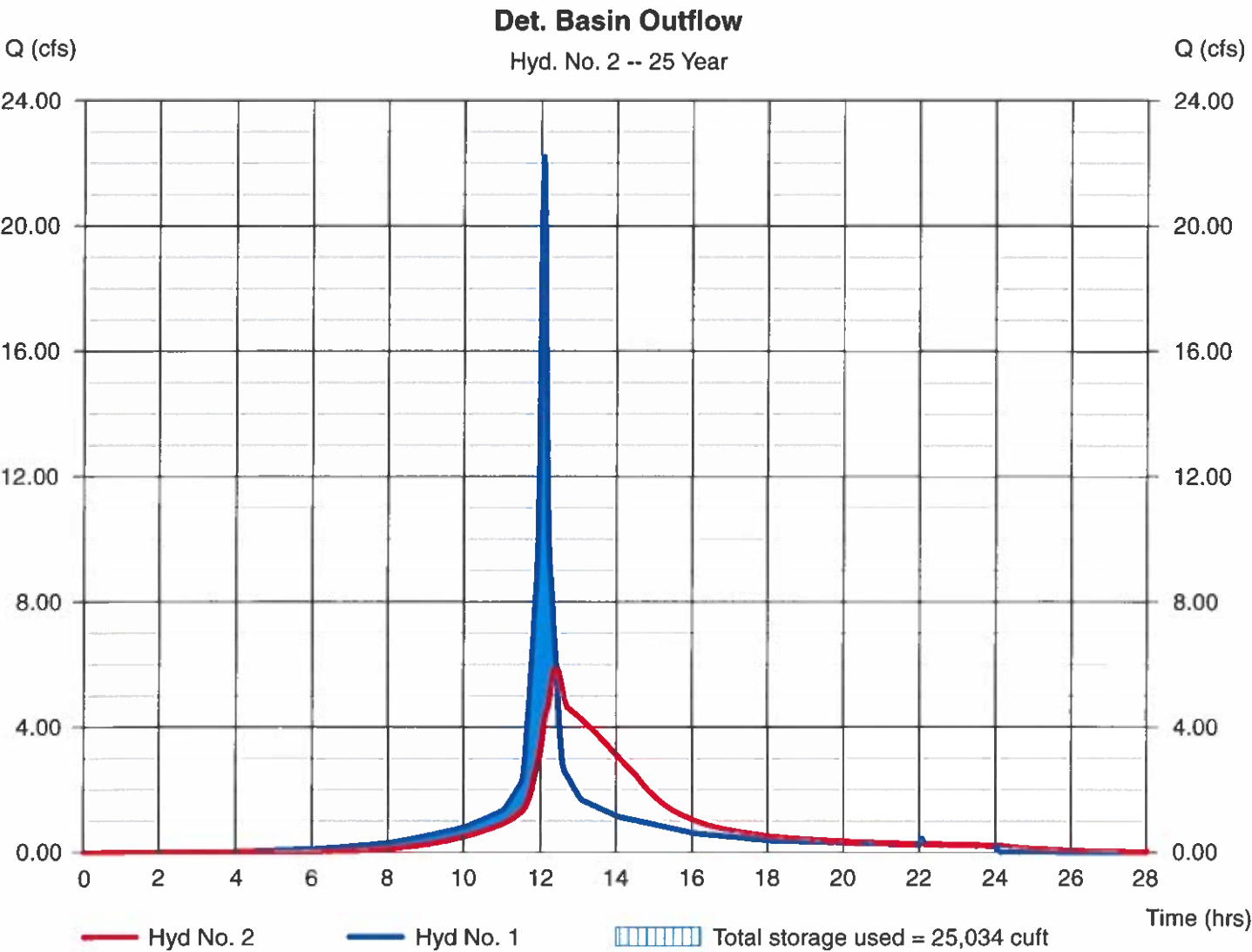
# Hydrograph Report

## Hyd. No. 2

### Det. Basin Outflow

Hydrograph type	= Reservoir	Peak discharge	= 5.908 cfs
Storm frequency	= 25 yrs	Time to peak	= 12.40 hrs
Time interval	= 2 min	Hyd. volume	= 69,795 cuft
Inflow hyd. No.	= 1 - Proposed Conditions	Max. Elevation	= 118.12 ft
Reservoir name	= <New Pond>	Max. Storage	= 25,034 cuft

Storage Indication method used.



# Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.1

Friday, Apr 11, 2025

## Hyd. No. 1

### Proposed Conditions

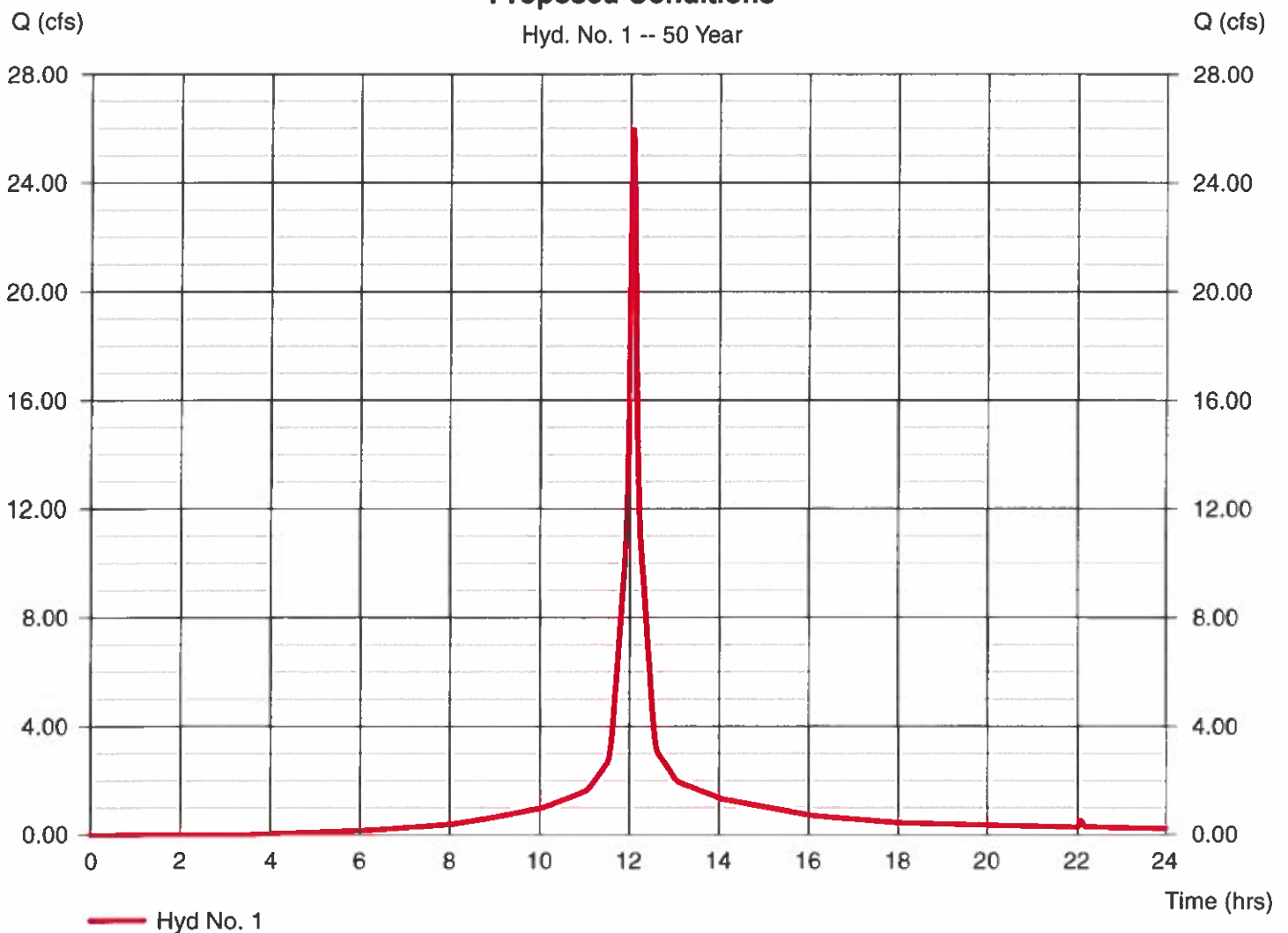
Hydrograph type = SCS Runoff  
 Storm frequency = 50 yrs  
 Time interval = 2 min  
 Drainage area = 3.600 ac  
 Basin Slope = 0.0 %  
 Tc method = USER  
 Total precip. = 8.16 in  
 Storm duration = 24 hrs

Peak discharge = 25.95 cfs  
 Time to peak = 12.07 hrs  
 Hyd. volume = 82,385 cuft  
 Curve number = 88\*  
 Hydraulic length = 0 ft  
 Time of conc. (Tc) = 5.00 min  
 Distribution = Type III  
 Shape factor = 484

\* Composite (Area/CN) =  $[(0.020 \times 98) + (2.430 \times 91) + (1.150 \times 80)] / 3.600$

### Proposed Conditions

Hyd. No. 1 -- 50 Year



# Hydrograph Report

Hydrflow Hydrographs by Intelisolve v9.1

Friday, Apr 11, 2025

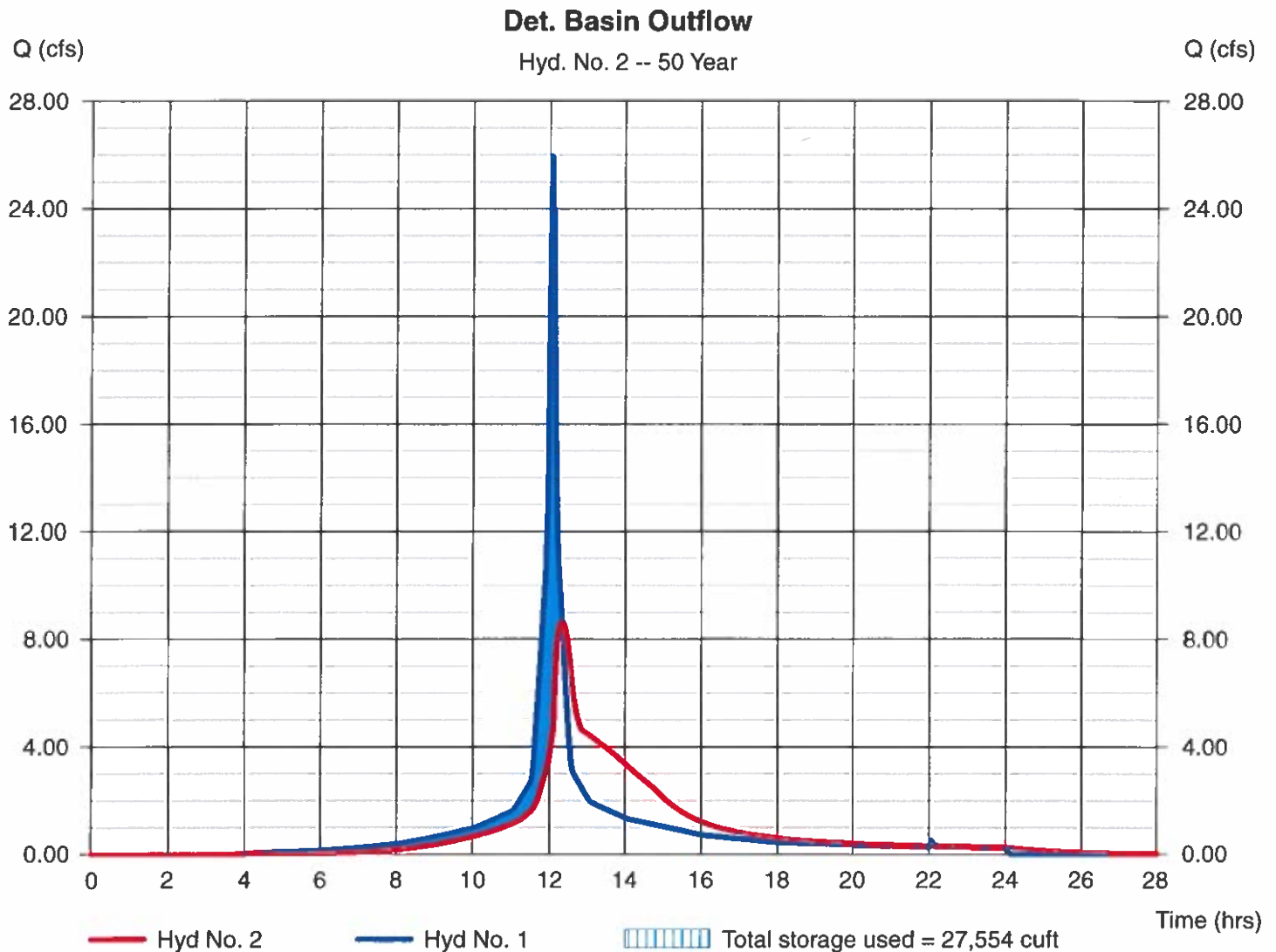
## Hyd. No. 2

Det. Basin Outflow

Hydrograph type = Reservoir  
 Storm frequency = 50 yrs  
 Time interval = 2 min  
 Inflow hyd. No. = 1 - Proposed Conditions  
 Reservoir name = <New Pond>

Peak discharge = 8.655 cfs  
 Time to peak = 12.33 hrs  
 Hyd. volume = 82,344 cuft  
 Max. Elevation = 118.28 ft  
 Max. Storage = 27,554 cuft

Storage Indication method used.





# Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.1

Friday, Apr 11, 2025

## Hyd. No. 1

### Proposed Conditions

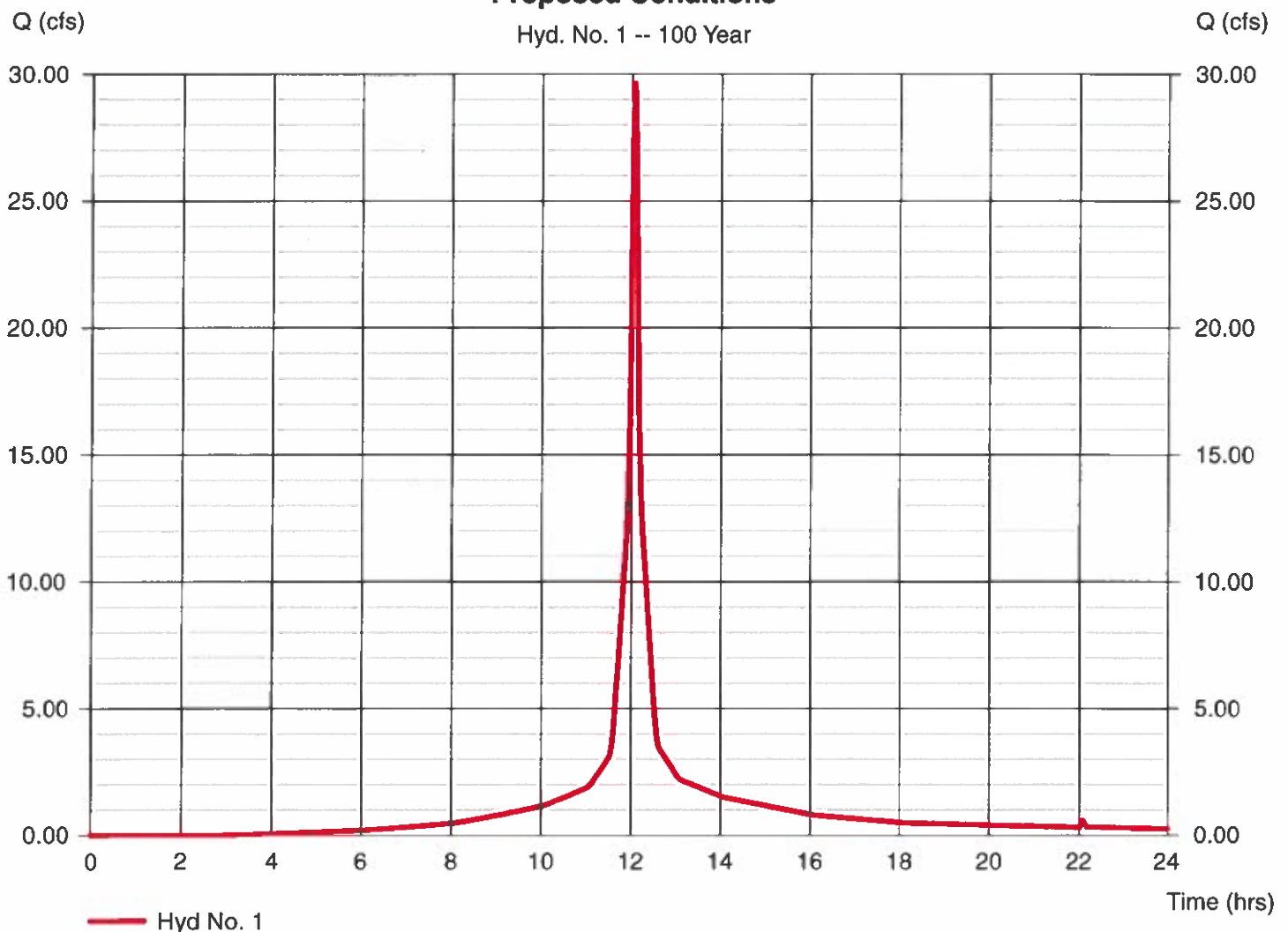
Hydrograph type = SCS Runoff  
 Storm frequency = 100 yrs  
 Time interval = 2 min  
 Drainage area = 3.600 ac  
 Basin Slope = 0.0 %  
 Tc method = USER  
 Total precip. = 9.20 in  
 Storm duration = 24 hrs

Peak discharge = 29.63 cfs  
 Time to peak = 12.07 hrs  
 Hyd. volume = 94,878 cuft  
 Curve number = 88\*  
 Hydraulic length = 0 ft  
 Time of conc. (Tc) = 5.00 min  
 Distribution = Type III  
 Shape factor = 484

\* Composite (Area/CN) =  $[(0.020 \times 98) + (2.430 \times 91) + (1.150 \times 80)] / 3.600$

### Proposed Conditions

Hyd. No. 1 -- 100 Year



# Hydrograph Report

13

Hydraflow Hydrographs by Intelisolve v9.1

Friday, Apr 11, 2025

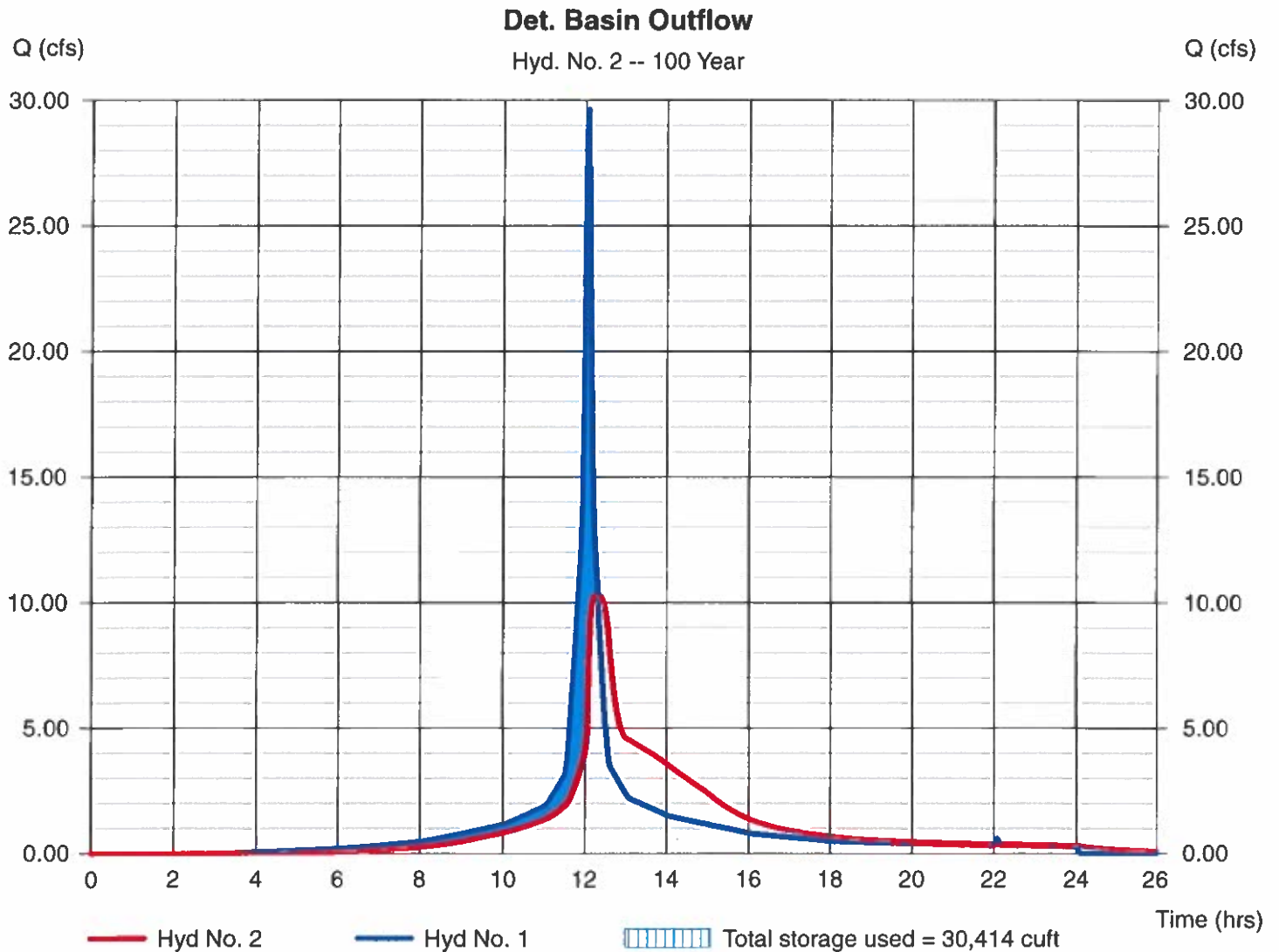
## Hyd. No. 2

Det. Basin Outflow

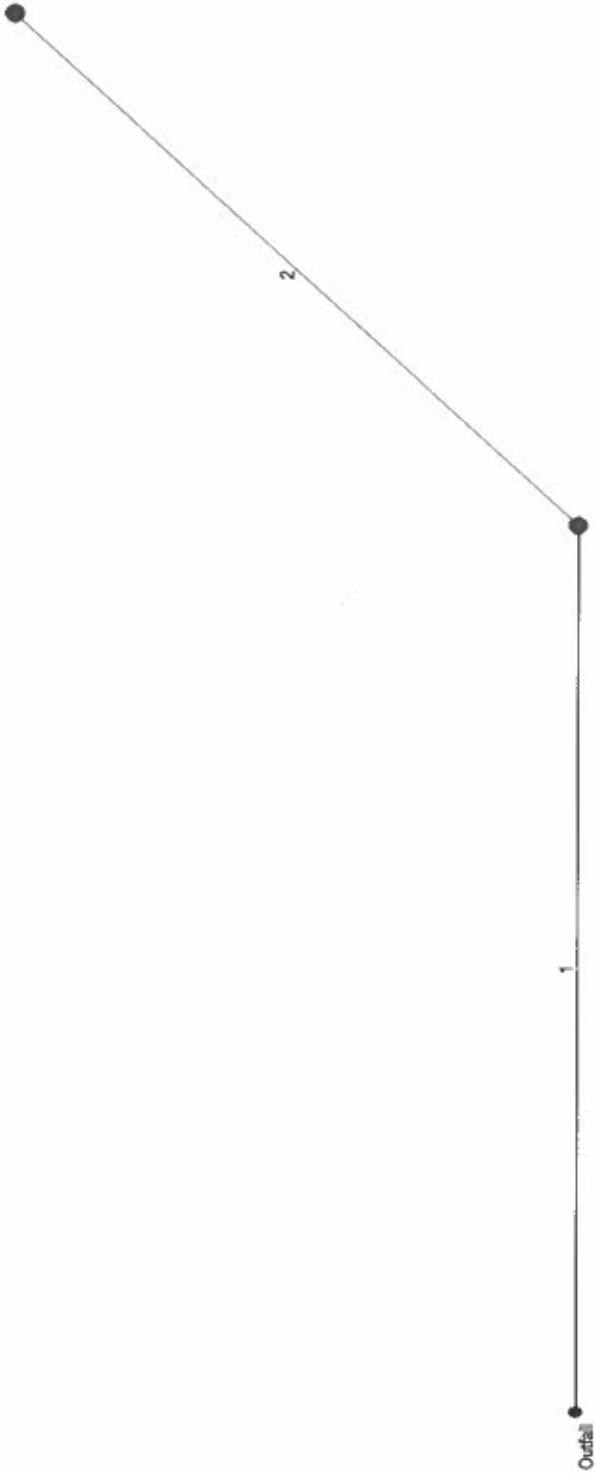
Hydrograph type = Reservoir  
Storm frequency = 100 yrs  
Time interval = 2 min  
Inflow hyd. No. = 1 - Proposed Conditions  
Reservoir name = <New Pond>

Peak discharge = 10.28 cfs  
Time to peak = 12.30 hrs  
Hyd. volume = 94,836 cuft  
Max. Elevation = 118.47 ft  
Max. Storage = 30,414 cuft

Storage Indication method used.



Hydraflow Plan View



Project File: New.stm	No. Lines: 2	04-11-2025
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# Storm Sewer Tabulation

Station		Len (ft)	Drng Area		Rnoff coeff (C)	Area x C		Tc		Rain (l) (in/hr)	Total flow (cfs)	Cap full (cfs)	Vel (ft/s)	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID			
Line	To Line		Incr (ac)	Total (ac)		Incr	Total	Inlet (min)	Syst (min)					Size (in)	Slope (%)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)				
1	End	325.0	0.00	0.00	0.00	0.00	0.0	0.8	0.0	0.0	10.30	10.18	6.56	18	0.80	113.60	111.00	114.85	112.25	116.00	115.00	Outlet			
2	1	265.0	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	10.30	8.27	5.83	18	0.53	115.00	113.60	117.66	115.49	119.70	116.00	DB out			
Project File: New.stm														Number of lines: 2										Run Date: 04-11-2025	
NOTES: Intensity = 106.59 / (Inlet time + 17.00) ^ 0.85; Return period = 100 Yrs.																									

## **APPENDIX C: WATER QUALITY CALCULATIONS**

**BORGHESI BUILDING & ENGINEERING CO.**

2155 EAST MAIN ST., TORRINGTON, CT

**Orlando Excavations, LLC**

95 Rescue Lane, Bloomfield, CT

**WATER QUALITY BASIN VOLUME CALCULATIONS-1.3"****VOLUME**

ELEV. (FT)	AREA (SF)	AVE. AREA (SF)	ΔZ (FT)	ΔV (CF)	ΣV (CF)
114.4	5,400	7,200	1.60	11,520	0
116.0	9,000				11,520
VOLUME PROVIDED					11,520

**RUNOFF CURVE NUMBERS**

	AREA DESCRIPTION	AREA (ACRE)	C	CA	
	PAVED/BLDG	0.02	98	2	
	LAWN/GRASS	1.15	80	92	
	GRAVEL	2.43	91	221	
	TOTAL	3.60	87.5	315	

WATERSHED AREA: 3.60 ACRES

WATER QUALITY VOLUME, WQV=  $(1.3)(R)(A)/12$   $R=.05+.009(I)=$  0.663  
 $I = \text{PERCENT IMPERVIOUS} =$  68.06 %  
WQV= 1.3 0.663 3.60 / 12 =  
VOLUME REQUIRED 0.26 AC-FT = 11,255 CF

VOLUME PROVIDED IN WATER QUALITY BASIN IS GREATER THAN REQUIRED WQV, THEREFORE OK

## **APPENDIX D: STORMWATER OPERATIONS & MAINTENANCE PLAN**

Stormwater Operations & Maintenance Plan  
Orlando Excavations  
95 Rescue Lane  
Bloomfield, CT

The applicant proposes to construct a 900 sf storage building and an outdoor material stockpile yard at their 95 Rescue Lane Bloomfield property. Minor grading and considerable land clearing is required for construction. The proposed drainage system is designed with detention basins to reduce post -development flows to pre-development levels for the 2-yr, 10-yr, 25-yr, 50-yr, and 100-year storms.

The detention basin is designed with dead storage to provide for the water quality volume. A Drainage Report is included with the project documents which details the drainage analysis and design. The proposed site grading will direct sheetflow runoff from the proposed stock yard area into a detention basin. The detention basin reduces the post-development flows to pre-development levels prior to being piped to on-site wetlands.

Silt fence will be installed at the toe of all grading fill slopes. A construction entrance is proposed to minimize the transport of sediment from the site during construction. A riprap is located at the drain pipe outlet to reduce the energy from the pipe discharge. Upon completion of grading and gravelling operations all non-graveled areas disturbed during construction will be covered with topsoil, seeded and mulched to establish a durable grass surface. All erosion control measures will be maintained until a grass surface is established.

The plan implements the best management practices described below and on Site Plans and details.

A sediment and erosion plan is included on the project construction drawings which details measures necessary during construction. This Stormwater Operations & Maintenance Plan is prepared to address long term maintenance of the site facilities to enhance stormwater quality.

The following annual inspections and maintenance shall be performed. The inspection and maintenance shall be performed in the spring of each year. Additional inspections shall be made after any large rainfall event (three inches of rain or more within a 24 hour period). The Owner of the property shall be responsible for the implementation of this plan.

1. Clean gravel lot. Sweep lot of any accumulated sand from the winter maintenance operations.
2. The stone filter strip shall be inspected. Any missing stone shall be replaced. Any accumulated sand/debris shall be removed.
3. Inspect riprap. Inspect the riprap at the outlets, remove any debris and accumulated sediment. Any displaced or missing riprap shall be replaced.



4. Inspect the detention basin. Remove any accumulated debris; inspect for any bare soil areas and any dead or dying vegetation. Sediment shall be removed from the basin once there is approximately six inches of accumulated sediment in the bottom of the basin. Inspect the outlet structure and remove any accumulated debris or sediment. If any of the concrete is spalled or damaged it shall be repaired.
5. Clear vegetative growth in basins and swales.

Routine site maintenance shall be performed as follows to limit pollutant loads into the stormwater system.

1. Daily debris and litter removal from the site will eliminate entry into the stormwater system.
2. During winter snow removal and deicing operations the use of salts shall be minimized, and used only in icy locations.

## **APPENDIX E: WATERSHED MAP**