STORM WATER REPORT

FOR

412 Chestnut Street, Elmer

LOT 32, BLOCK 3

SEPTEMBER 2018
Rev: MARCH 2020

PREPARED BY
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601 ASBURY AVE
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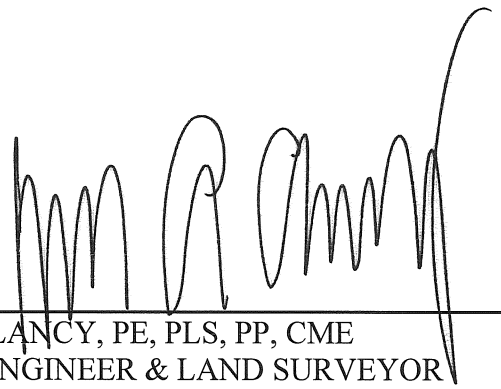

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Summary

EXISTING CONDITIONS:

Block 3, Lot 32 is located on 412 Chestnut Street, Elmer

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The existing condition of the site is currently paving and stone with grass. The soil type located on the site as classified by the NRCS is USGALB. The soils classification as classified by the NRCS and TR-55 manual is Hydrologic Soil Group "B". Using the TR-55 manual a run-off curve number using gravel the run-off curve number used is 61 for grassy pervious area and 98 for impervious paving (all gravel paving shall be considered impervious).

Existing conditions run-off calculations were based on the pre-developed area of the site.

PROPOSED CONDITIONS:

The proposed condition will have the addition of impervious surfaces based on the proposed parking lot area and the rest of the site will remain of grassland. To handle the increase in runoff an infiltration basin is proposed at the rear of the site, which will store stormwater to the 100 year storm and control outflow with a proposed modified type "E" inlet that has a weir wall installed inside with an orifice and overflow at top of wall.

TSS REMOVAL:

The required minimum TSS removal is 80%. The proposed site shall use an infiltration basin which meets the 80% TSS removal rate per NJBMP.

FLOW RATE REDUCTION FOR POST DEVELOPMENT:

Design Storm	Existing Site Discharge "E3"	Post Rate Reduction	Post Development Flow Rate Maximum	Post Discharge Rate "P3"
2 yr.	1.28 cfs	0.5 (50%)	0.64 cfs	0 cfs = OK
10 yr.	2.07 cfs	0.75 (75%)	1.55 cfs	0.11 cfs = OK
100 yr.	3.94 cfs	0.8 (80%)	3.15 cfs	1.01 cfs = OK

WATER QUALITY AND MINIMUM RECHARGE:

Outlet control orifice INV = 111.93
Basin bottom elevation = 111.0
Elevation difference = 0.93 feet (11.16 inches)

* The water quality design storm depth of 1.25 inches is contained within the basin.
* Demonstrate through hydrologic and hydraulic analysis that the increase of stormwater runoff volume from pre-construction to post-construction for the two year storm is infiltrated. Since the basin contains 100% of the 2 year storm with an outflow rate of 0 cfs, the minimum recharge requirements are met.

BASIN DRAIN TIME:

100 yr elevation in basin 113.16 – basin bottom 111 = 2.16 ft depth of water (25.92")
Using **existing soil**: Perc test result = 0.23"/hr
25.92 / 0.23 = 112.7 hours to drain = **FAIL** (> 72 hours)

Using **K4 replacement soil**: using 6"/hr, apply safety factor 2 = 3"/hr
25.92 / 3 = 8.64 hours to drain = **PASS** (<= 72 hours)

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Hydrograph Return Period Recap

Hyd. No.	Hydrograph type (origin)	Inflow Hyd(s)	Peak Outflow (cfs)								Hydrograph description
			1-Yr	2-Yr	3-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr	
1	SCS Runoff	-------	1.07	1.30	-------	-------	2.02	2.51	-------	3.42	E1 impervious
2	SCS Runoff	-------	0.01	0.03	-------	-------	0.10	0.17	-------	0.30	E1 pervious
3	Combine	1, 2	1.07	1.31	-------	-------	2.07	2.61	-------	3.60	E1 combined
4	SCS Runoff	-------	0.53	0.65	-------	-------	1.00	1.25	-------	1.70	E2 impervious
5	SCS Runoff	-------	0.01	0.02	-------	-------	0.08	0.13	-------	0.23	E2 Pervious
6	Combine	4, 5	0.53	0.66	-------	-------	1.08	1.37	-------	1.93	E2 combined to ditch
7	SCS Runoff	-------	1.04	1.27	-------	-------	1.96	2.44	-------	3.32	E3 impervious
8	SCS Runoff	-------	0.08	0.18	-------	-------	0.69	1.15	-------	2.11	E3 pervious
9	Combine	7, 8	1.04	1.28	-------	-------	2.07	2.70	-------	3.94	E3 combined to inlet
10	SCS Runoff	-------	1.01	1.24	-------	-------	1.91	2.38	-------	3.24	P1 impervious
11	SCS Runoff	-------	0.01	0.04	-------	-------	0.17	0.28	-------	0.51	P1 pervious
12	Combine	10, 11	1.02	1.27	-------	-------	2.08	2.66	-------	3.75	P1 combined
13	SCS Runoff	-------	0.52	0.63	-------	-------	0.97	1.22	-------	1.65	P2 impervious
14	SCS Runoff	-------	0.01	0.02	-------	-------	0.07	0.11	-------	0.21	P2 pervious
15	Combine	13, 14	0.52	0.64	-------	-------	1.02	1.30	-------	1.82	P2 combined to ditch
16	SCS Runoff	-------	2.29	2.79	-------	-------	4.30	5.36	-------	7.30	P3 impervious
17	SCS Runoff	-------	0.11	0.27	-------	-------	1.04	1.72	-------	3.15	P3 pervious
18	Combine	16, 17	2.29	2.86	-------	-------	4.93	6.49	-------	9.54	P3 Combined to basin
19	Reservoir	18	0.00	0.00	-------	-------	0.11	0.49	-------	1.01	Routing

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	1.30	1	723	4,357	----	------	------	E1 impervious
2	SCS Runoff	0.03	1	745	192	----	------	------	E1 pervious
3	Combine	1.31	1	723	4,549	1, 2	------	------	E1 combined
4	SCS Runoff	0.65	1	723	2,162	----	------	------	E2 impervious
5	SCS Runoff	0.02	1	725	86	----	------	------	E2 Pervious
6	Combine	0.66	1	723	2,248	4, 5	------	------	E2 combined to ditch
7	SCS Runoff	1.27	1	723	4,237	----	------	------	E3 impervious
8	SCS Runoff	0.18	1	780	2,522	----	------	------	E3 pervious
9	Combine	1.28	1	723	6,759	7, 8	------	------	E3 combined to inlet
10	SCS Runoff	1.24	1	723	4,128	----	------	------	P1 impervious
11	SCS Runoff	0.04	1	725	191	----	------	------	P1 pervious
12	Combine	1.27	1	723	4,319	10, 11	------	------	P1 combined
13	SCS Runoff	0.63	1	723	2,107	----	------	------	P2 impervious
14	SCS Runoff	0.02	1	735	102	----	------	------	P2 pervious
15	Combine	0.64	1	723	2,209	13, 14	------	------	P2 combined to ditch
16	SCS Runoff	2.79	1	723	9,303	----	------	------	P3 impervious
17	SCS Runoff	0.27	1	741	1,785	----	------	------	P3 pervious
18	Combine	2.86	1	723	11,088	16, 17	------	------	P3 Combined to basin
19	Reservoir	0.00	1	0	0	18	112.07	11,088	Routing

Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

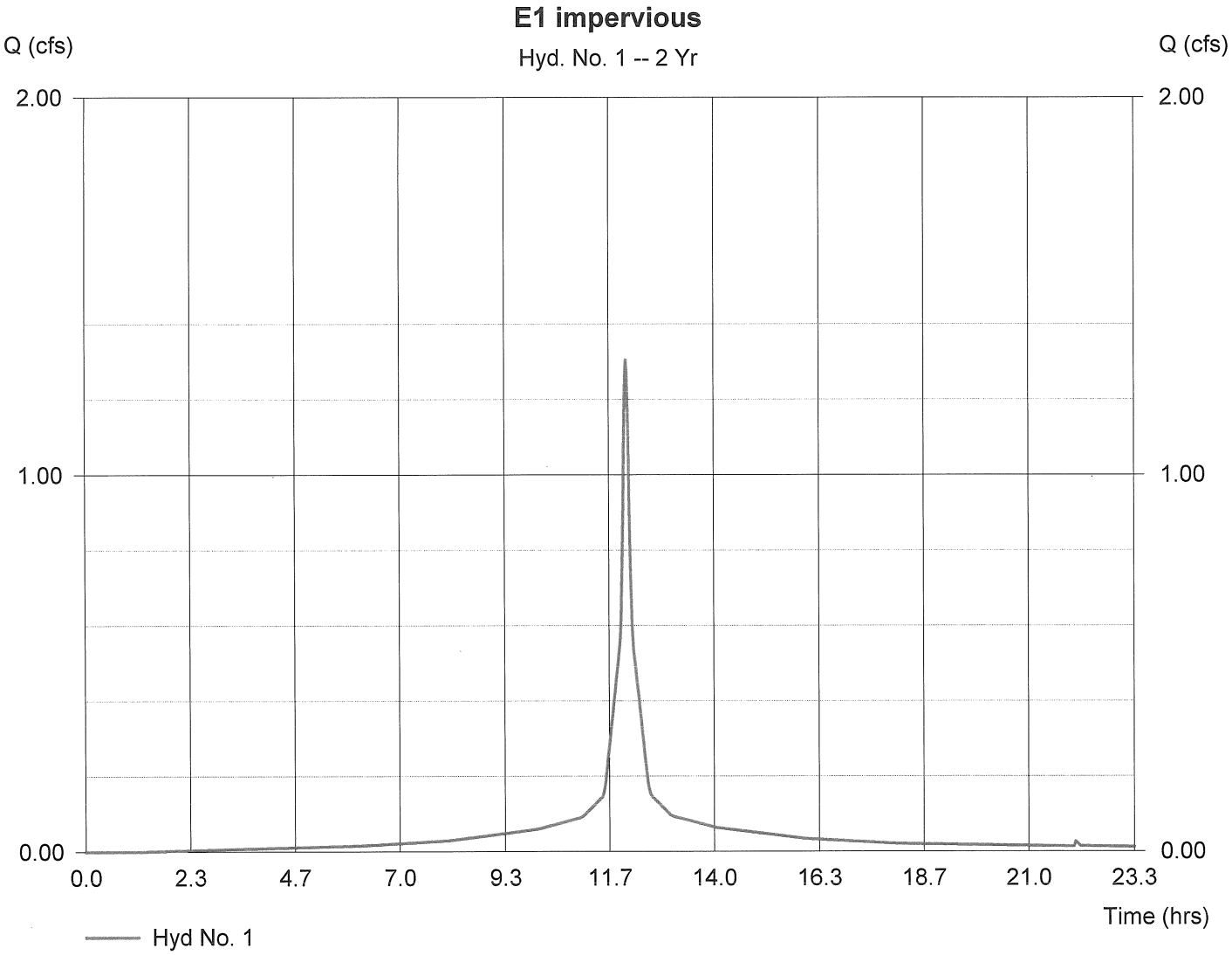
Tuesday, Mar 10 2020, 12:14 PM

Hyd. No. 1

E1 impervious

Hydrograph type	= SCS Runoff	Peak discharge	= 1.30 cfs
Storm frequency	= 2 yrs	Time interval	= 1 min
Drainage area	= 0.399 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 2.20 min
Total precip.	= 3.26 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

Hydrograph Volume = 4,357 cuft



TR55 Tc Worksheet

Hyd. No. 1

E1 impervious

Description	A	B	C	Totals
Sheet Flow				
Manning's n-value	= 0.011	0.011	0.011	
Flow length (ft)	= 113.0	0.0	0.0	
Two-year 24-hr precip. (in)	= 3.26	0.00	0.00	
Land slope (%)	= 0.59	0.00	0.00	
Travel Time (min)	**= 2.16**	**+ 0.00**	**+ 0.00**	**= 2.16**
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	
Travel Time (min)	**= 0.00**	**+ 0.00**	**+ 0.00**	**= 0.00**

Total Travel Time, Tc ..... 2.20 min

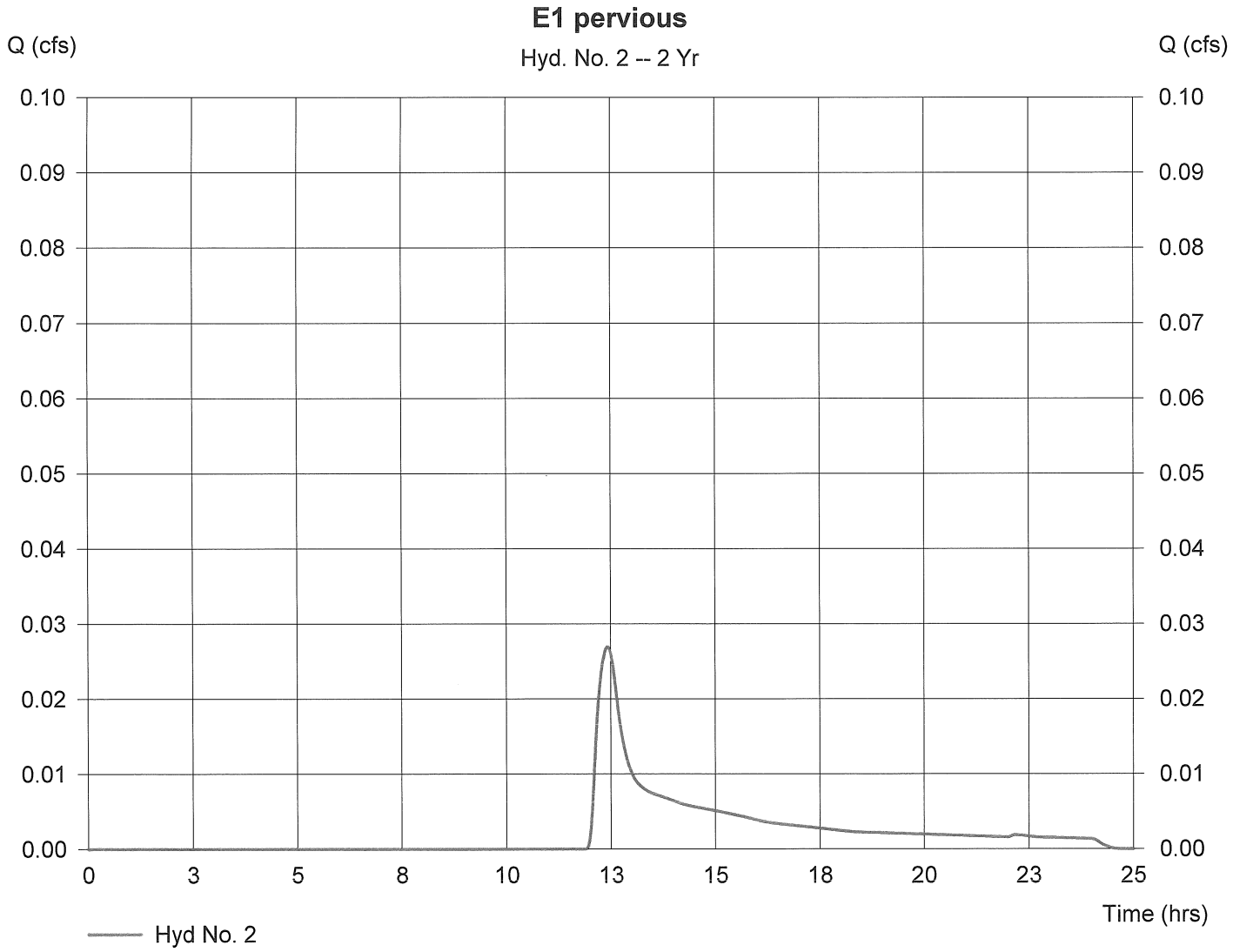
Hydrograph Plot

Hyd. No. 2

E1 pervious

Hydrograph type	= SCS Runoff	Peak discharge	= 0.03 cfs
Storm frequency	= 2 yrs	Time interval	= 1 min
Drainage area	= 0.112 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 14.60 min
Total precip.	= 3.26 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

Hydrograph Volume = 192 cuft



TR55 Tc Worksheet

Hyd. No. 2

E1 pervious

Description	A	B	C	Totals
Sheet Flow				
Manning's n-value	= 0.410	0.011	0.011	
Flow length (ft)	= 32.0	0.0	0.0	
Two-year 24-hr precip. (in)	= 3.26	0.00	0.00	
Land slope (%)	= 0.55	0.00	0.00	
Travel Time (min)	**= 14.62**	**+ 0.00**	**+ 0.00**	**= 14.62**
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	
Travel Time (min)	**= 0.00**	**+ 0.00**	**+ 0.00**	**= 0.00**

Total Travel Time, Tc ..... 14.60 min

Hydrograph Plot

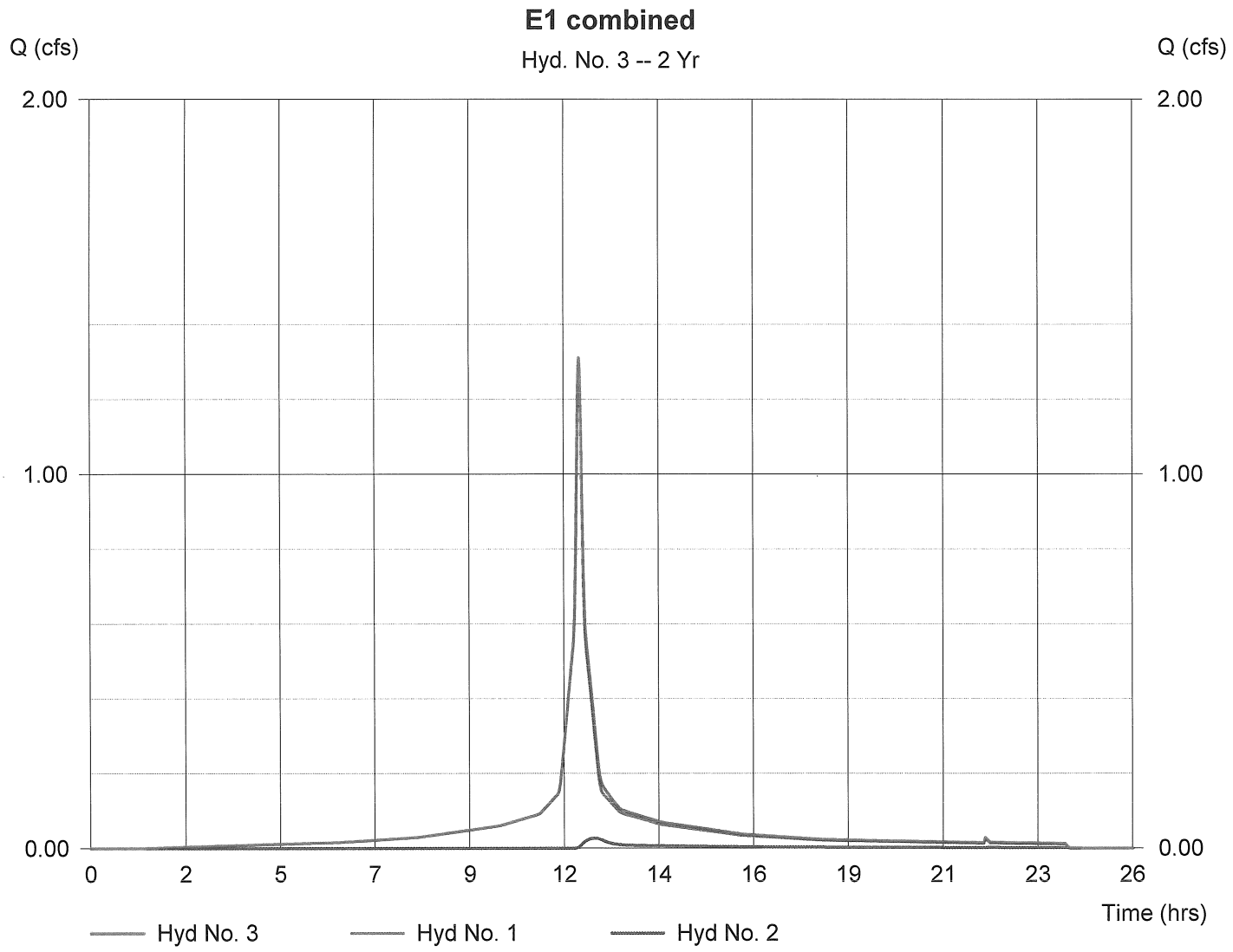
Hydraflow Hydrographs by Intelisolve | Tuesday, Mar 10 2020, 12:14 PM

Hyd. No. 3

E1 combined

Hydrograph type	= Combine	Peak discharge	= 1.31 cfs
Storm frequency	= 2 yrs	Time interval	= 1 min
Inflow hyds.	= 1, 2		

Hydrograph Volume = 4,549 cuft



Hydrograph Plot

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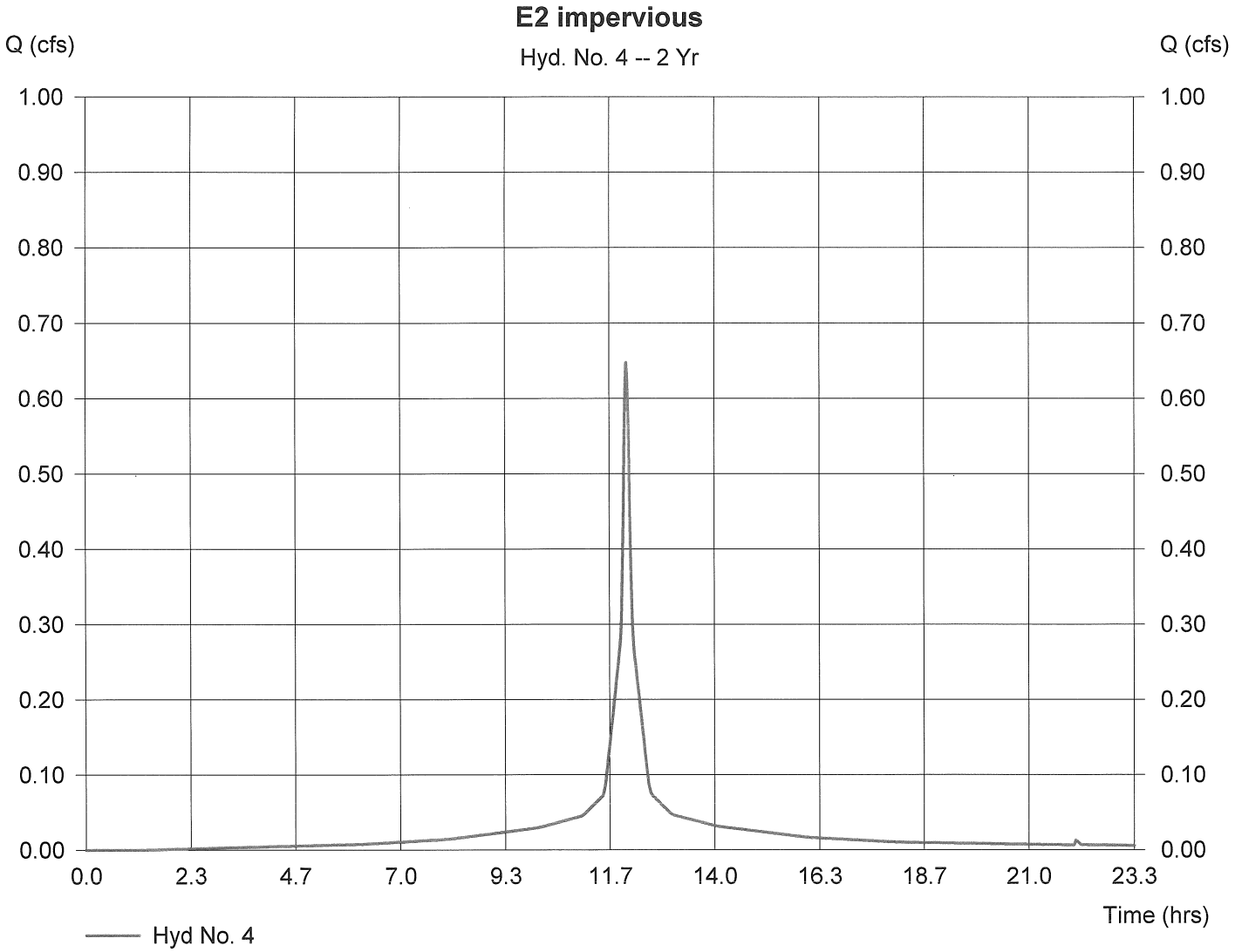
Hyd. No. 4

E2 impervious

Hydrograph type	= SCS Runoff	Peak discharge	= 0.65 cfs
Storm frequency	= 2 yrs	Time interval	= 1 min
Drainage area	= 0.198 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 2.50 min
Total precip.	= 3.26 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

Hydrograph Volume = 2,162 cuft



TR55 Tc Worksheet

Hyd. No. 4

E2 impervious

Description	A	B	C	Totals
Sheet Flow				
Manning's n-value	= 0.011	0.011	0.011	
Flow length (ft)	= 145.0	0.0	0.0	
Two-year 24-hr precip. (in)	= 3.30	0.00	0.00	
Land slope (%)	= 0.88	0.00	0.00	
Travel Time (min)	**= 2.23**	**+ 0.00**	**+ 0.00**	**= 2.23**
Shallow Concentrated Flow				
Flow length (ft)	= 36.00	0.00	0.00	
Watercourse slope (%)	= 1.61	0.00	0.00	
Surface description	= Paved	Paved	Paved	
Average velocity (ft/s)	= 2.58	0.00	0.00	
Travel Time (min)	**= 0.23**	**+ 0.00**	**+ 0.00**	**= 0.23**
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	
Travel Time (min)	**= 0.00**	**+ 0.00**	**+ 0.00**	**= 0.00**

Total Travel Time, Tc ..... 2.50 min

Hydrograph Plot

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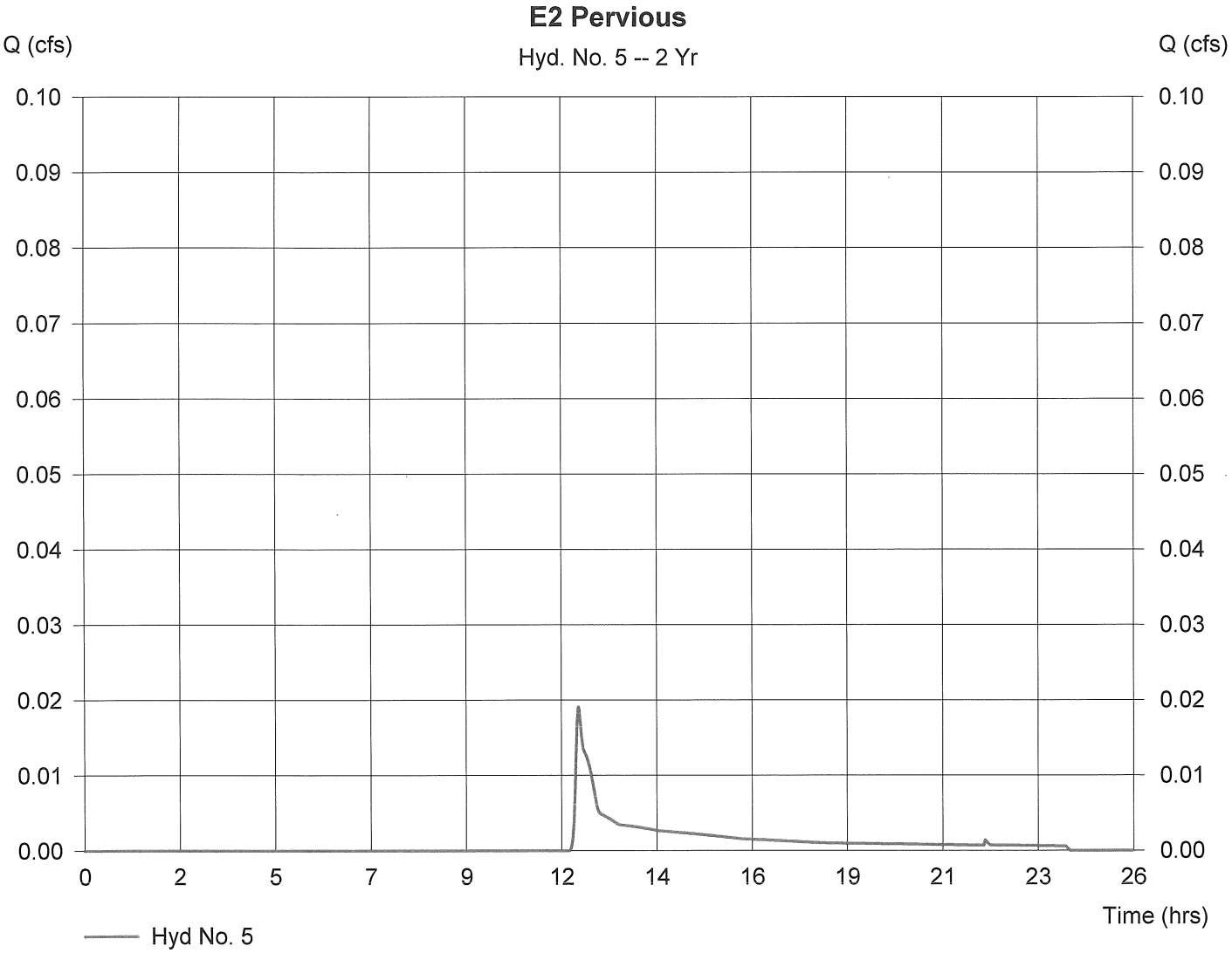
Hyd. No. 5

E2 Pervious

Hydrograph type	= SCS Runoff	Peak discharge	= 0.02 cfs
Storm frequency	= 2 yrs	Time interval	= 1 min
Drainage area	= 0.051 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 2.00 min
Total precip.	= 3.26 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

Hydrograph Volume = 86 cuft



Hydrograph Plot

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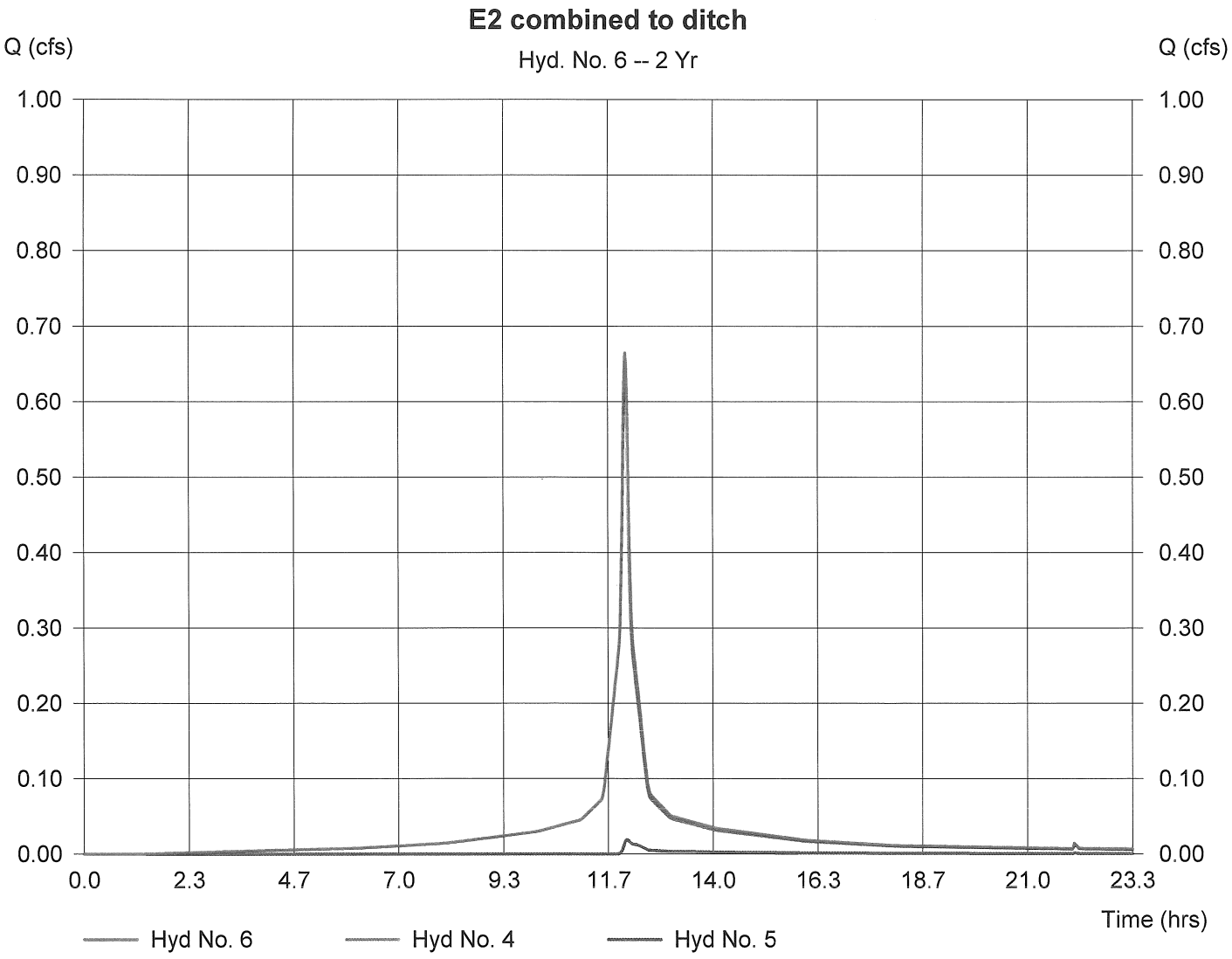
Hyd. No. 6

E2 combined to ditch

Hydrograph type	= Combine	Peak discharge	= 0.66 cfs
Storm frequency	= 2 yrs	Time interval	= 1 min
Inflow hyds.	= 4, 5		

Hydrograph Volume = 2,248 cuft



Hydrograph Plot

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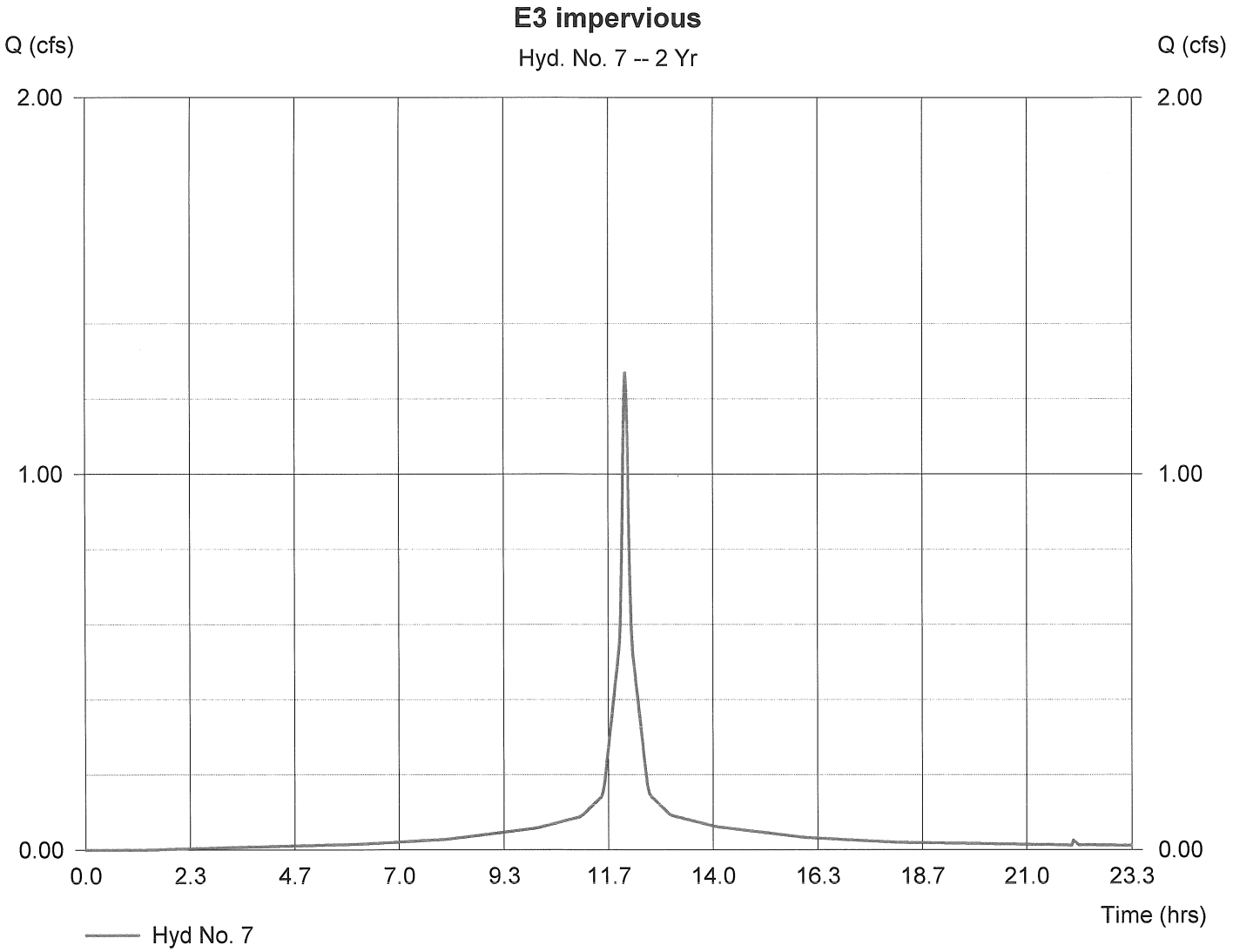
Hyd. No. 7

E3 impervious

Hydrograph type	= SCS Runoff	Peak discharge	= 1.27 cfs
Storm frequency	= 2 yrs	Time interval	= 1 min
Drainage area	= 0.388 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 2.90 min
Total precip.	= 3.26 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

Hydrograph Volume = 4,237 cuft



TR55 Tc Worksheet

Hyd. No. 7

E3 impervious

Description	A	B	C	Totals
Sheet Flow				
Manning's n-value	= 0.011	0.011	0.011	
Flow length (ft)	= 50.0	100.0	0.0	
Two-year 24-hr precip. (in)	= 3.26	3.26	0.00	
Land slope (%)	= 1.36	0.74	0.00	
Travel Time (min)	**= 0.80 +**	**1.79 +**	**0.00 =**	**2.59**
Shallow Concentrated Flow				
Flow length (ft)	= 35.00	0.00	0.00	
Watercourse slope (%)	= 0.74	0.00	0.00	
Surface description	= Paved	Paved	Paved	
Average velocity (ft/s)	= 1.75	0.00	0.00	
Travel Time (min)	**= 0.33 +**	**0.00 +**	**0.00 =**	**0.33**
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	
Travel Time (min)	**= 0.00 +**	**0.00 +**	**0.00 =**	**0.00**

Total Travel Time, Tc ..... 2.90 min

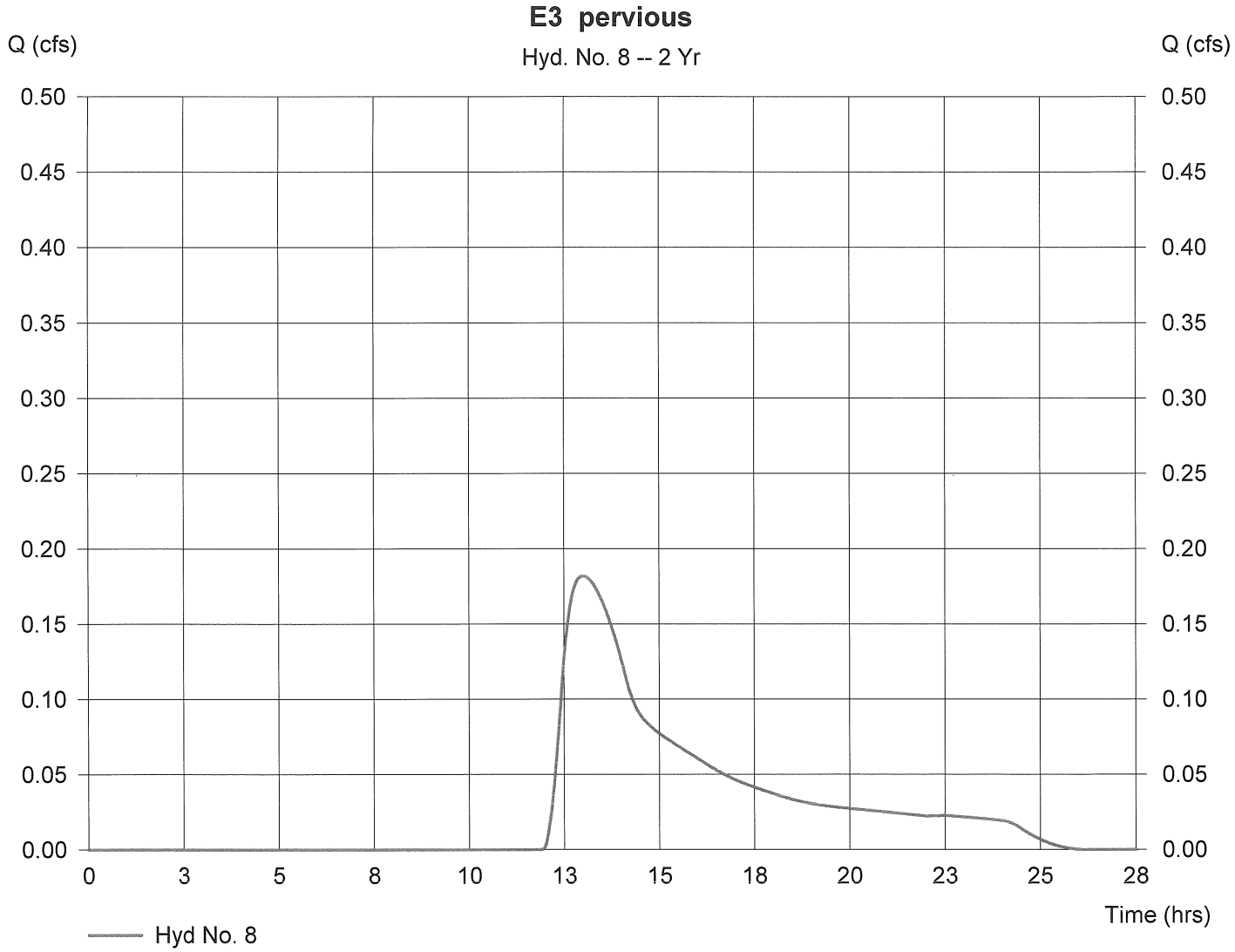
Hydrograph Plot

Hyd. No. 8

E3 pervious

Hydrograph type	= SCS Runoff	Peak discharge	= 0.18 cfs
Storm frequency	= 2 yrs	Time interval	= 1 min
Drainage area	= 1.486 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 48.60 min
Total precip.	= 3.26 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

Hydrograph Volume = 2,522 cuft



TR55 Tc Worksheet

Hyd. No. 8

E3 pervious

Description	A	B	C	Totals
Sheet Flow				
Manning's n-value	= 0.410	0.410	0.011	
Flow length (ft)	= 115.0	35.0	0.0	
Two-year 24-hr precip. (in)	= 3.26	3.26	0.00	
Land slope (%)	= 1.33	0.45	0.00	
Travel Time (min)	**= 28.57**	**+ 17.02**	**+ 0.00**	**= 45.58**
Shallow Concentrated Flow				
Flow length (ft)	= 185.00	32.00	0.00	
Watercourse slope (%)	= 0.45	6.25	0.00	
Surface description	= Unpaved	Unpaved	Paved	
Average velocity (ft/s)	= 1.08	4.03	0.00	
Travel Time (min)	**= 2.85**	**+ 0.13**	**+ 0.00**	**= 2.98**
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	
Travel Time (min)	**= 0.00**	**+ 0.00**	**+ 0.00**	**= 0.00**

Total Travel Time, Tc ..... 48.60 min

Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

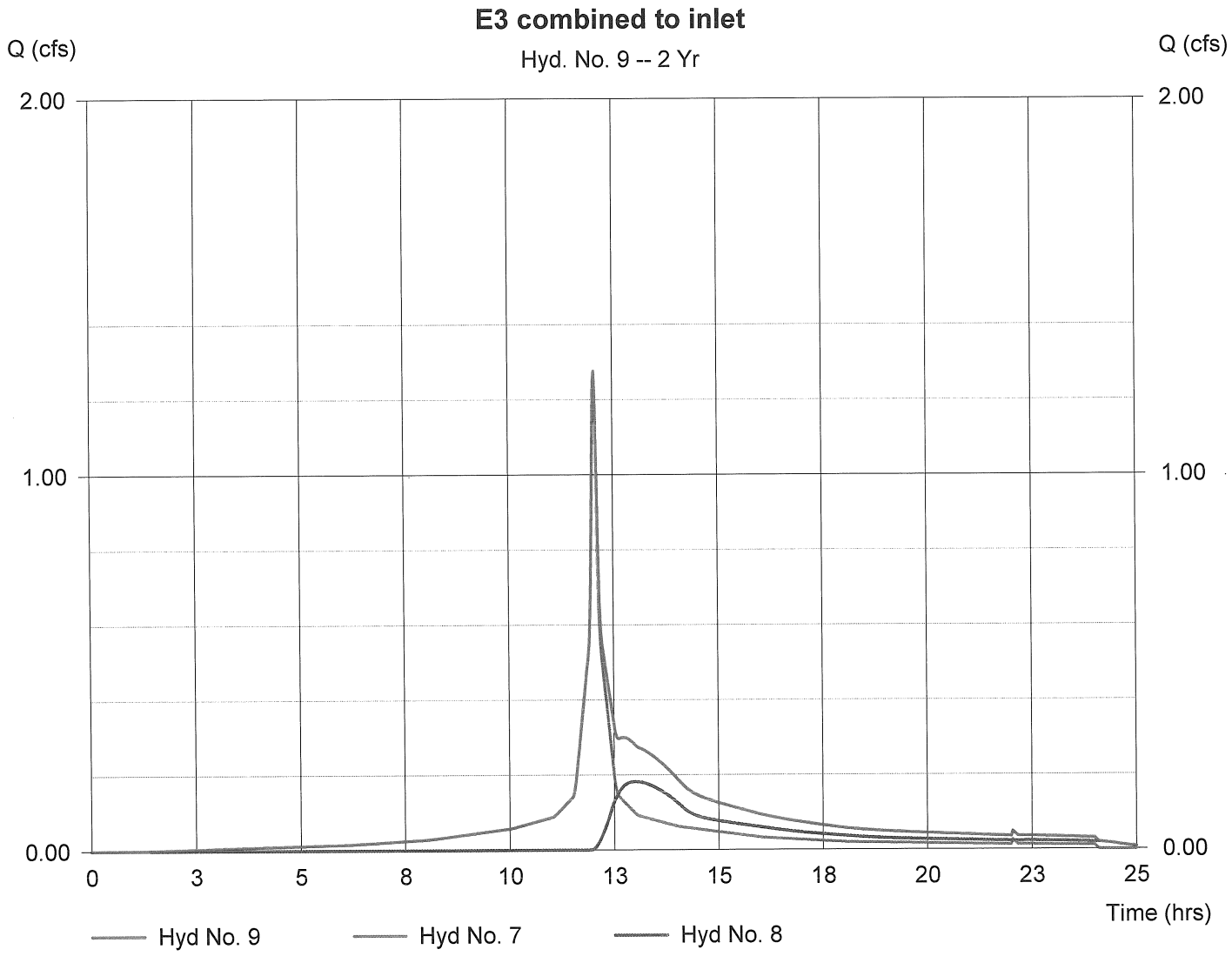
Tuesday, Mar 10 2020, 12:14 PM

Hyd. No. 9

E3 combined to inlet

Hydrograph type	= Combine	Peak discharge	= 1.28 cfs
Storm frequency	= 2 yrs	Time interval	= 1 min
Inflow hyds.	= 7, 8		

Hydrograph Volume = 6,759 cuft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

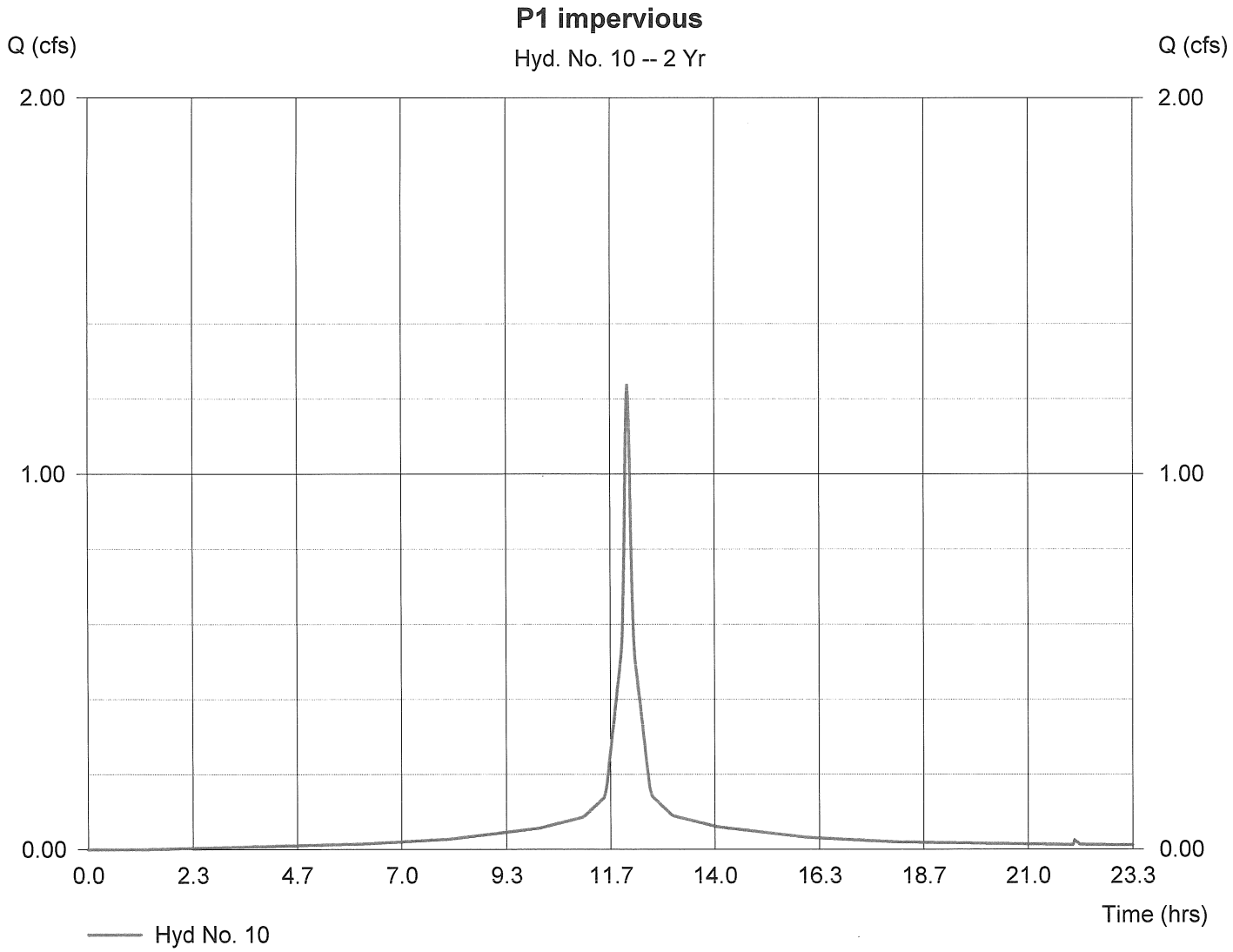
Tuesday, Mar 10 2020, 12:14 PM

Hyd. No. 10

P1 impervious

Hydrograph type	= SCS Runoff	Peak discharge	= 1.24 cfs
Storm frequency	= 2 yrs	Time interval	= 1 min
Drainage area	= 0.378 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 2.40 min
Total precip.	= 3.26 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

Hydrograph Volume = 4,128 cuft



TR55 Tc Worksheet

Hyd. No. 10

P1 impervious

Description	A	B	C	Totals
Sheet Flow				
Manning's n-value	= 0.011	0.011	0.011	
Flow length (ft)	= 123.0	0.0	0.0	
Two-year 24-hr precip. (in)	= 3.26	0.00	0.00	
Land slope (%)	= 0.55	0.00	0.00	
Travel Time (min)	**= 2.37**	**+ 0.00**	**+ 0.00**	**= 2.37**
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	
Travel Time (min)	**= 0.00**	**+ 0.00**	**+ 0.00**	**= 0.00**

Total Travel Time, Tc ..... 2.40 min

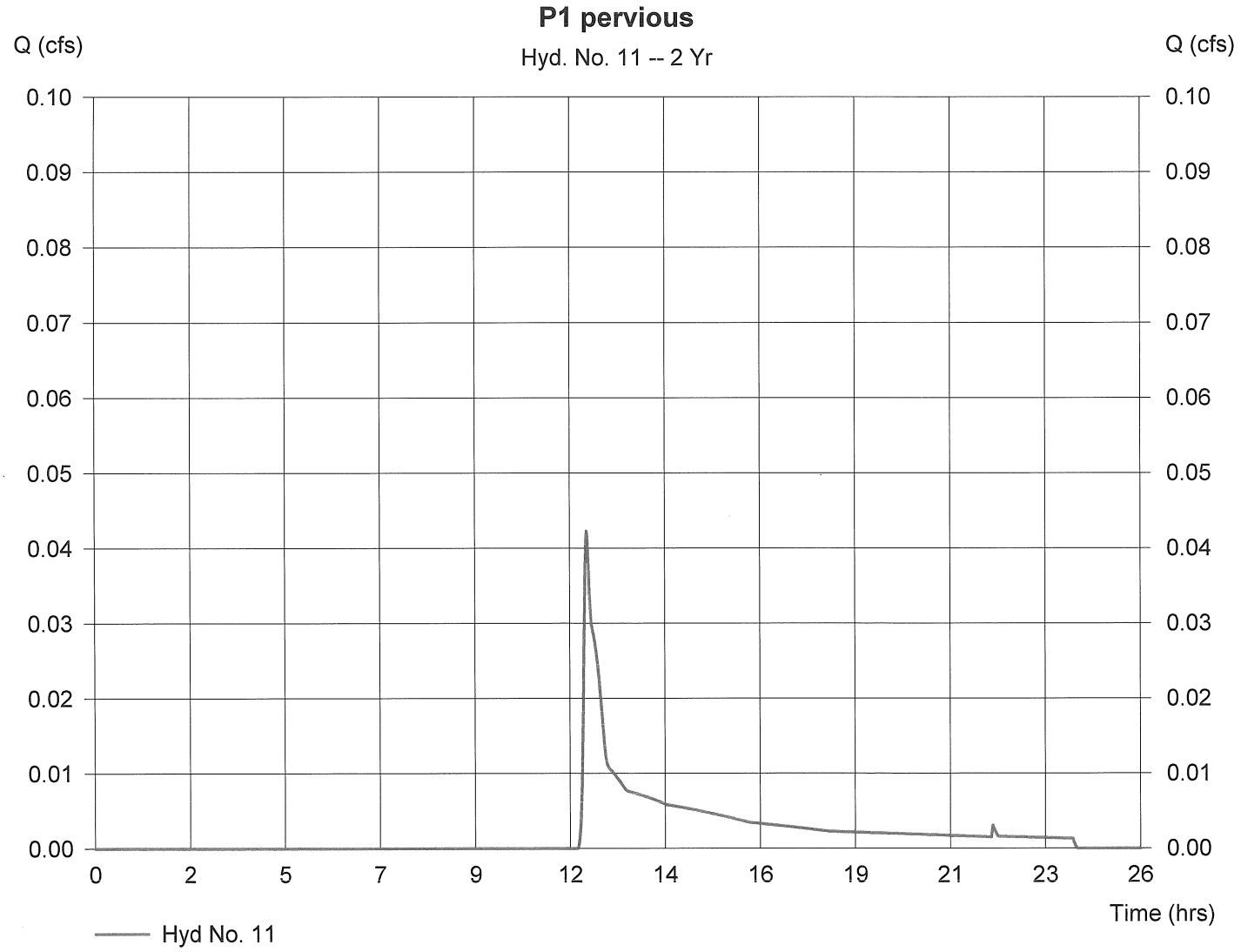
Hydrograph Plot

Hyd. No. 11

P1 pervious

Hydrograph type	= SCS Runoff	Peak discharge	= 0.04 cfs
Storm frequency	= 2 yrs	Time interval	= 1 min
Drainage area	= 0.113 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 2.00 min
Total precip.	= 3.26 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

Hydrograph Volume = 191 cuft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

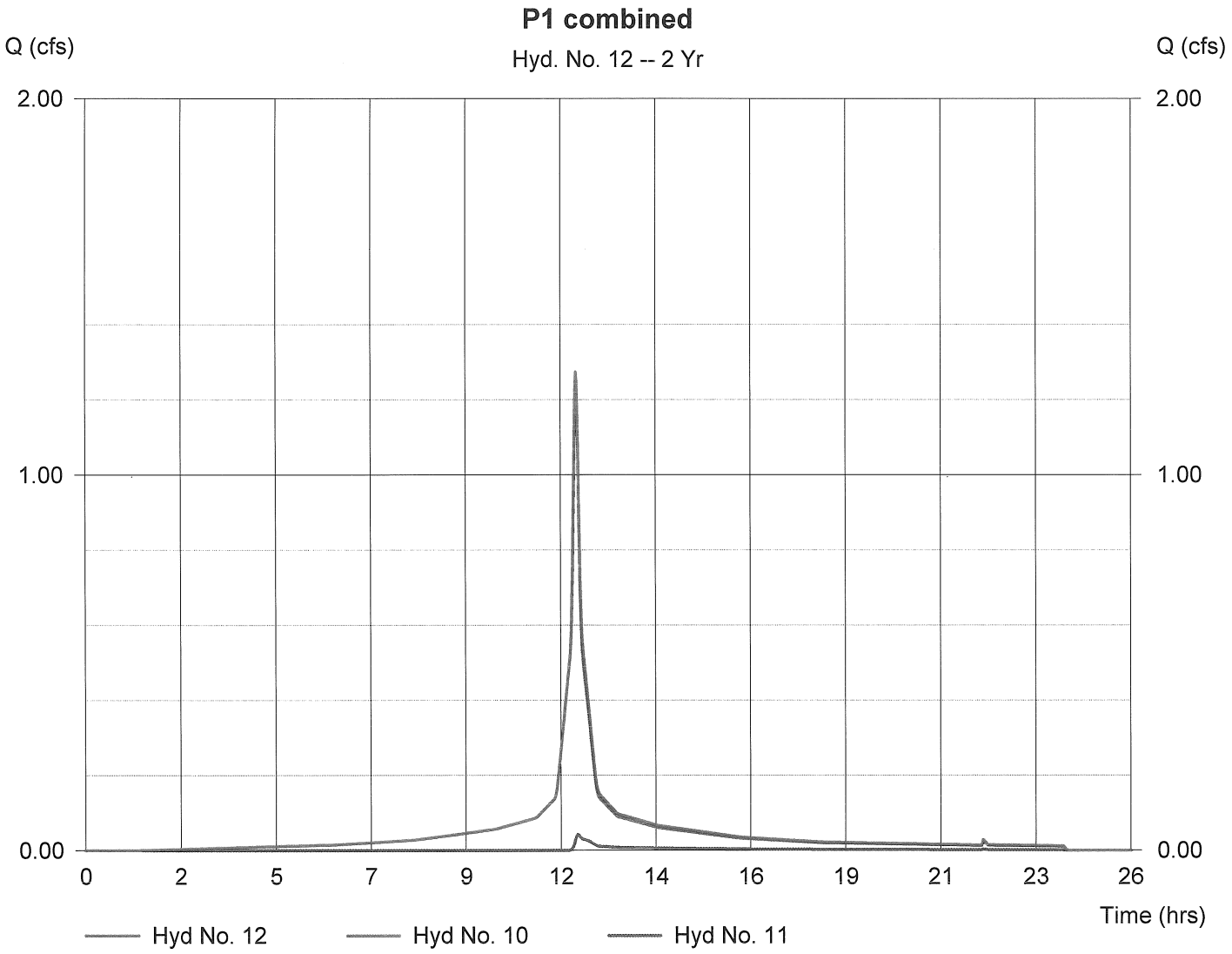
Tuesday, Mar 10 2020, 12:14 PM

Hyd. No. 12

P1 combined

Hydrograph type	= Combine	Peak discharge	= 1.27 cfs
Storm frequency	= 2 yrs	Time interval	= 1 min
Inflow hyds.	= 10, 11		

Hydrograph Volume = 4,319 cuft



Hydrograph Plot

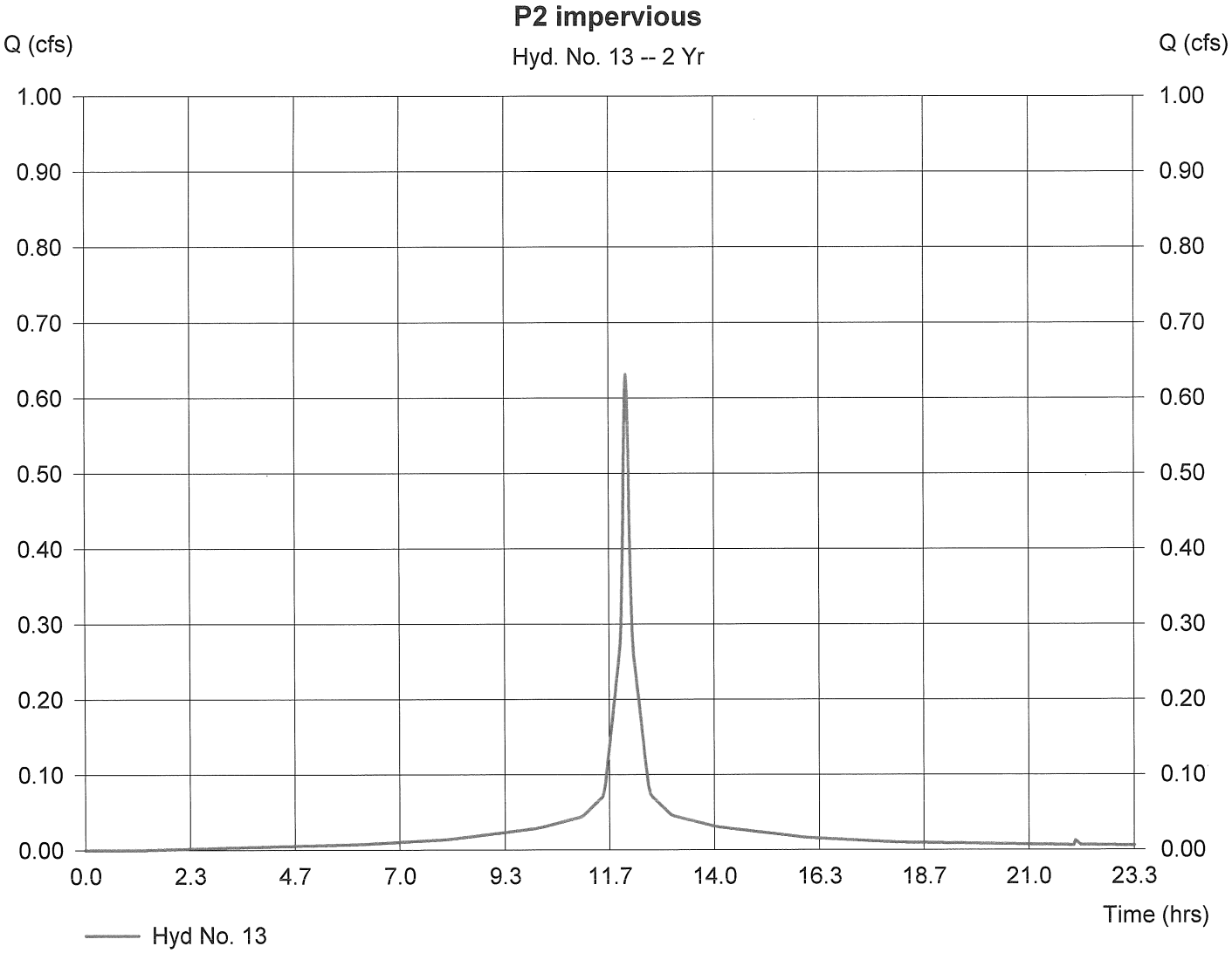
Hydraflow Hydrographs by Intelisolve — Tuesday, Mar 10 2020, 12:14 PM

Hyd. No. 13

P2 impervious

Hydrograph type	= SCS Runoff	Peak discharge	= 0.63 cfs
Storm frequency	= 2 yrs	Time interval	= 1 min
Drainage area	= 0.193 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 2.90 min
Total precip.	= 3.26 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

Hydrograph Volume = 2,107 cuft



TR55 Tc Worksheet

Hyd. No. 13

P2 impervious

Description	A	B	C	Totals
Sheet Flow				
Manning's n-value	= 0.011	0.011	0.011	
Flow length (ft)	= 50.0	95.0	39.0	
Two-year 24-hr precip. (in)	= 3.26	3.26	3.26	
Land slope (%)	= 1.20	1.05	1.67	
Travel Time (min)	**= 0.85**	**+ 1.49**	**+ 0.61**	**= 2.94**
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	
Travel Time (min)	**= 0.00**	**+ 0.00**	**+ 0.00**	**= 0.00**

Total Travel Time, Tc ..... 2.90 min

Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

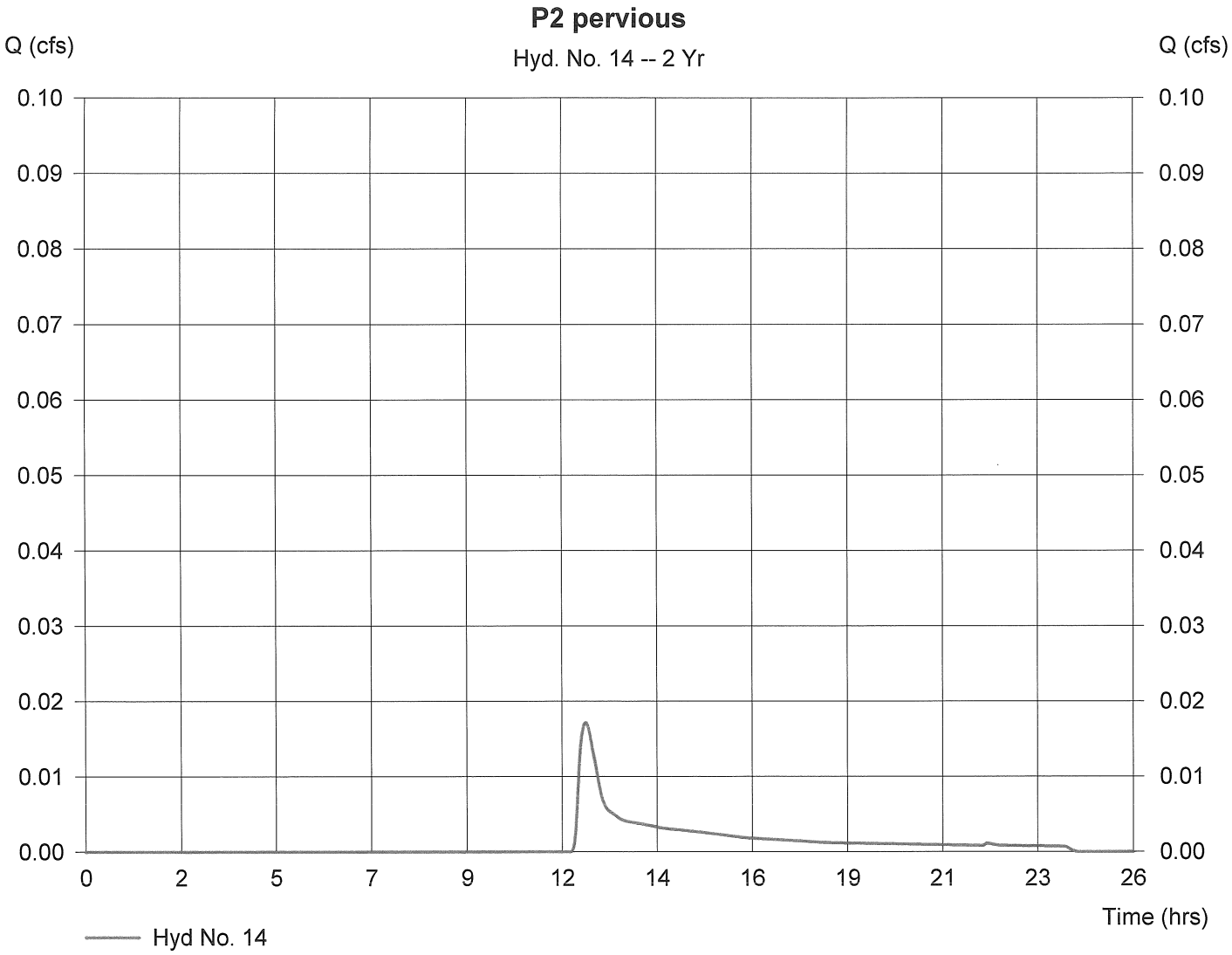
Tuesday, Mar 10 2020, 12:14 PM

Hyd. No. 14

P2 pervious

Hydrograph type	= SCS Runoff	Peak discharge	= 0.02 cfs
Storm frequency	= 2 yrs	Time interval	= 1 min
Drainage area	= 0.059 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 6.70 min
Total precip.	= 3.26 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

Hydrograph Volume = 102 cuft



TR55 Tc Worksheet

Hyd. No. 14

P2 pervious

Description	A	B	C	Totals
Sheet Flow				
Manning's n-value	= 0.410	0.011	0.011	
Flow length (ft)	= 21.0	0.0	0.0	
Two-year 24-hr precip. (in)	= 3.26	0.00	0.00	
Land slope (%)	= 1.67	0.00	0.00	
Travel Time (min)	**= 6.69**	**+ 0.00**	**+ 0.00**	**= 6.69**
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	
Travel Time (min)	**= 0.00**	**+ 0.00**	**+ 0.00**	**= 0.00**

Total Travel Time, Tc ..... 6.70 min

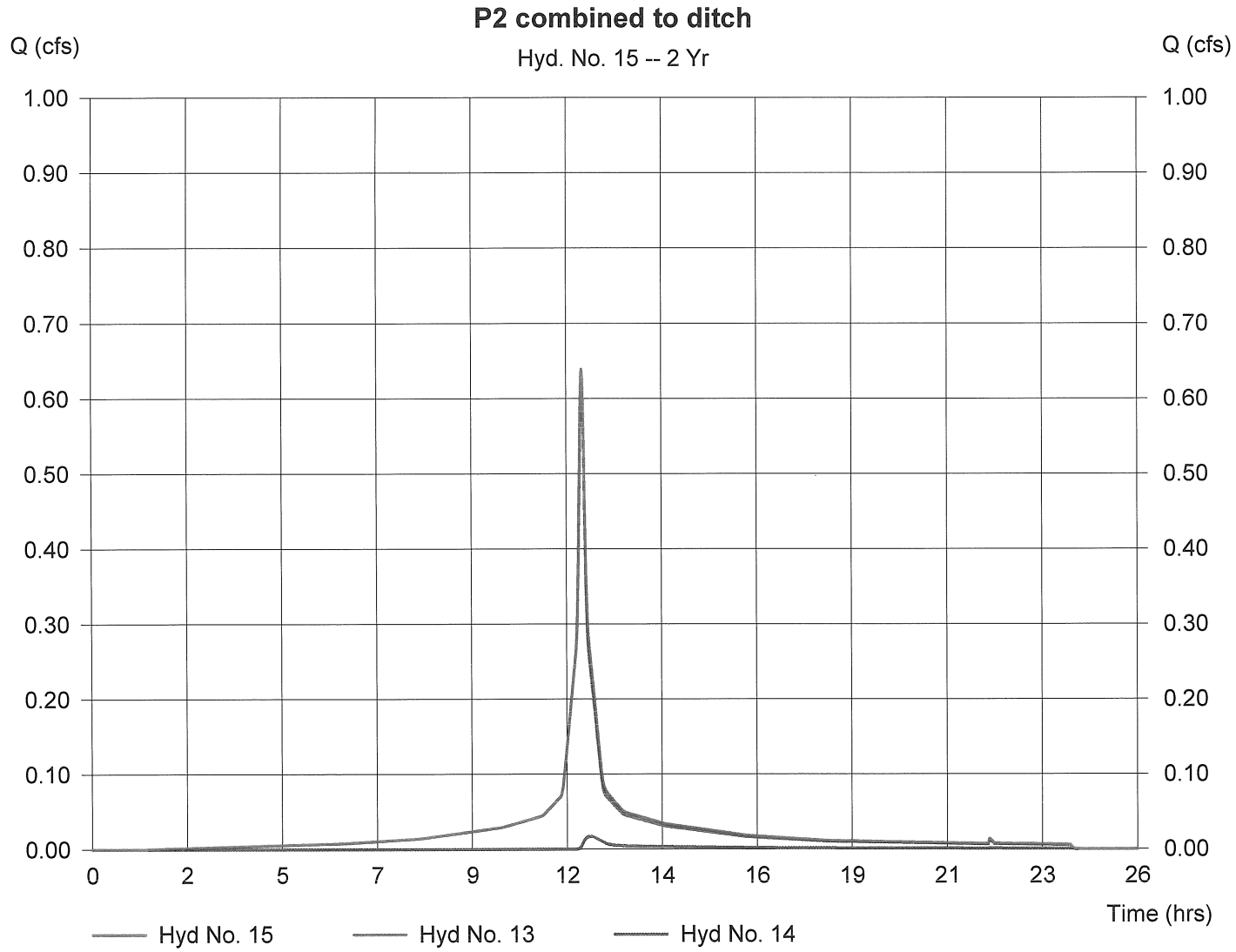
Hydrograph Plot

Hyd. No. 15

P2 combined to ditch

Hydrograph type	= Combine	Peak discharge	= 0.64 cfs
Storm frequency	= 2 yrs	Time interval	= 1 min
Inflow hyds.	= 13, 14		

Hydrograph Volume = 2,209 cuft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

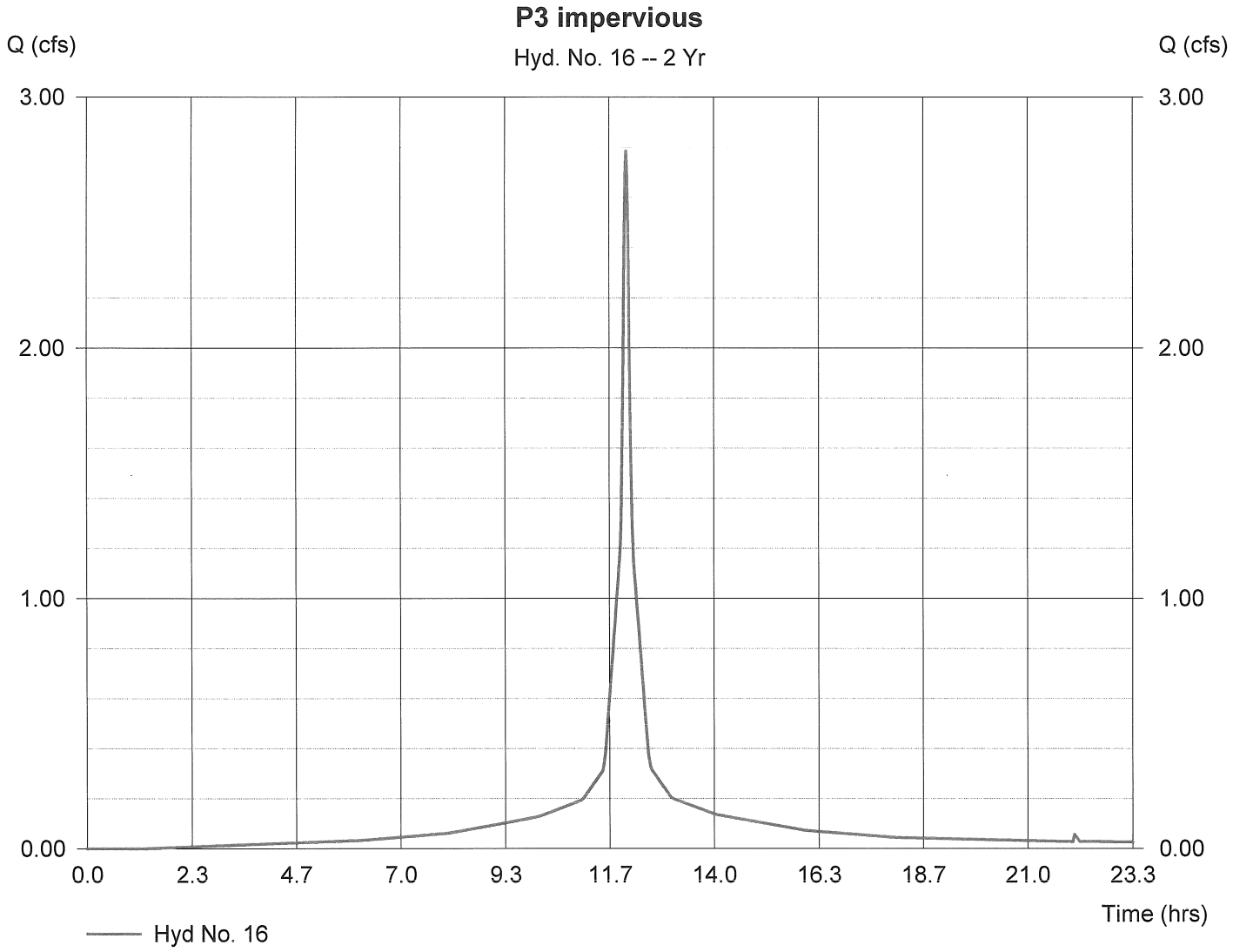
Tuesday, Mar 10 2020, 12:14 PM

Hyd. No. 16

P3 impervious

Hydrograph type	= SCS Runoff	Peak discharge	= 2.79 cfs
Storm frequency	= 2 yrs	Time interval	= 1 min
Drainage area	= 0.852 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 2.50 min
Total precip.	= 3.26 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

Hydrograph Volume = 9,303 cuft



TR55 Tc Worksheet

Hyd. No. 16

P3 impervious

Description	A	B	C	Totals
Sheet Flow				
Manning's n-value	= 0.011	0.011	0.011	
Flow length (ft)	= 147.0	0.0	0.0	
Two-year 24-hr precip. (in)	= 3.26	0.00	0.00	
Land slope (%)	= 0.68	0.00	0.00	
Travel Time (min)	**= 2.52**	**+ 0.00**	**+ 0.00**	**= 2.52**
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	
Travel Time (min)	**= 0.00**	**+ 0.00**	**+ 0.00**	**= 0.00**

Total Travel Time, Tc ..... 2.50 min

Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

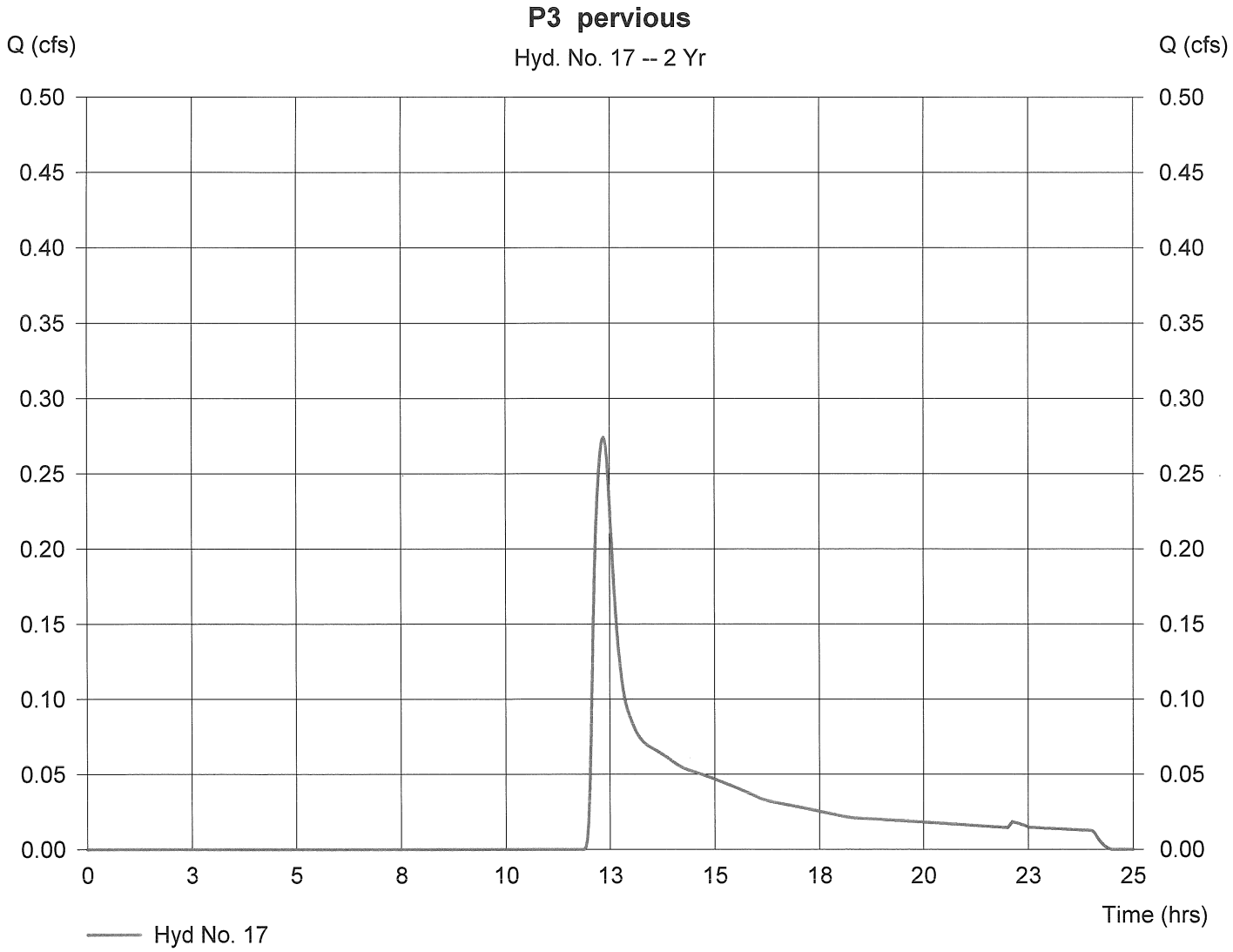
Tuesday, Mar 10 2020, 12:14 PM

Hyd. No. 17

P3 pervious

Hydrograph type	= SCS Runoff	Peak discharge	= 0.27 cfs
Storm frequency	= 2 yrs	Time interval	= 1 min
Drainage area	= 1.039 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 10.40 min
Total precip.	= 3.26 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

Hydrograph Volume = 1,785 cuft



TR55 Tc Worksheet

Hyd. No. 17

P3 pervious

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.410		0.011		0.011		
Flow length (ft)	= 36.0		80.0		0.0		
Two-year 24-hr precip. (in)	= 3.26		3.26		0.00		
Land slope (%)	= 2.22		1.25		0.00		
Travel Time (min)	**= 9.19**	**+**	**1.21**	**+**	**0.00**	**=**	**10.40**
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		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc ..... 10.40 min

Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

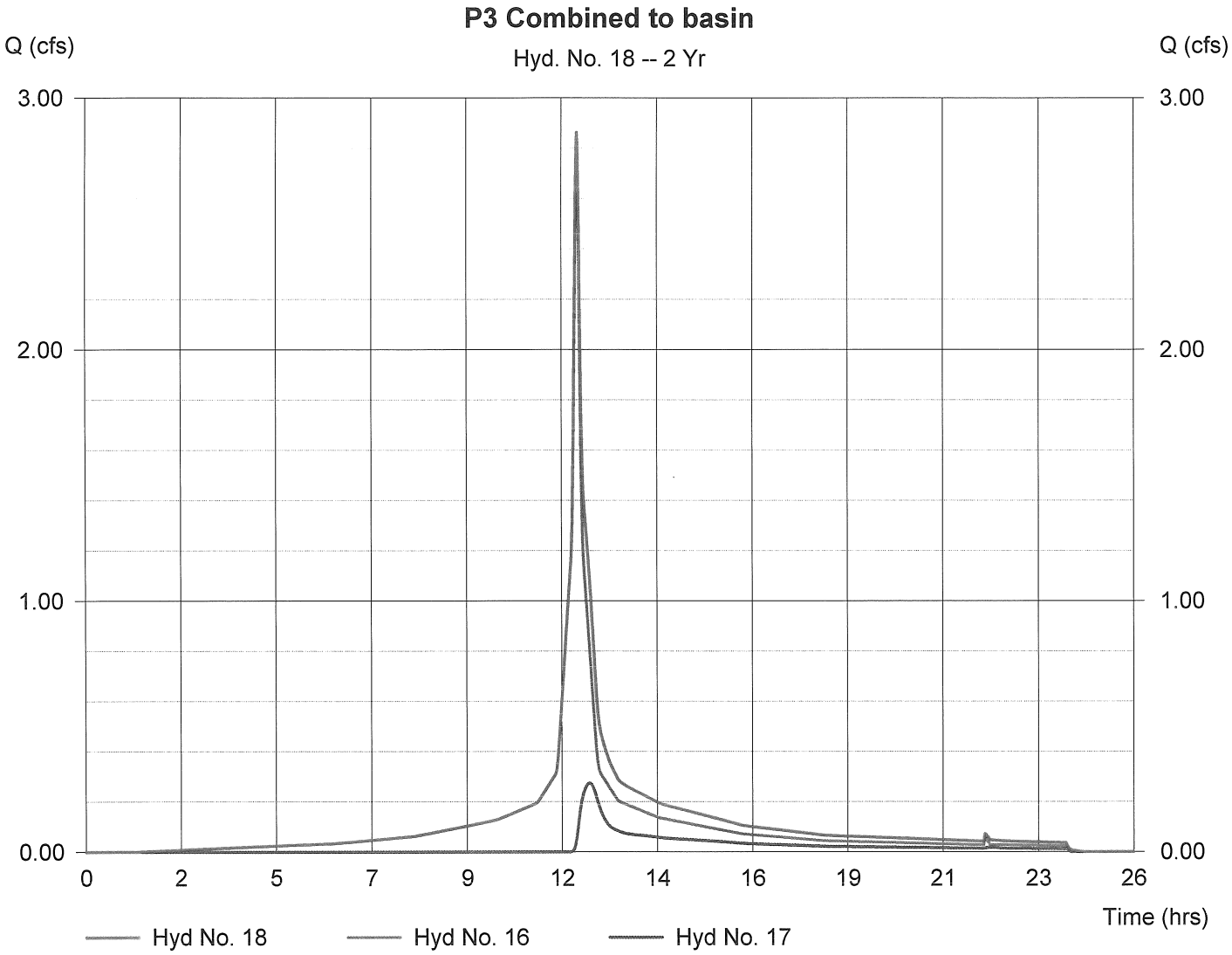
Tuesday, Mar 10 2020, 12:14 PM

Hyd. No. 18

P3 Combined to basin

Hydrograph type	= Combine	Peak discharge	= 2.86 cfs
Storm frequency	= 2 yrs	Time interval	= 1 min
Inflow hyds.	= 16, 17		

Hydrograph Volume = 11,088 cuft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

Tuesday, Mar 10 2020, 12:14 PM

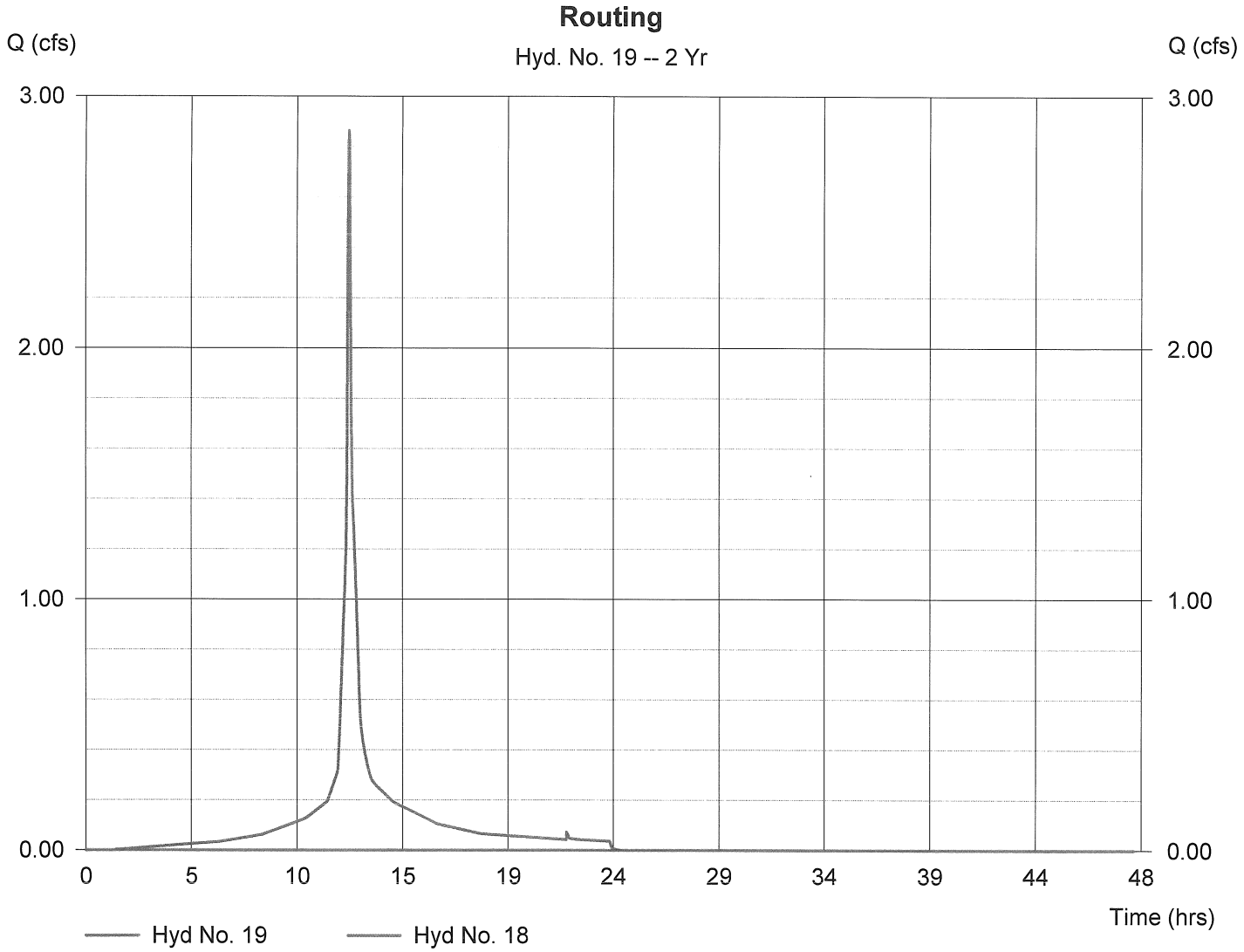
Hyd. No. 19

Routing

Hydrograph type	= Reservoir	Peak discharge	= 0.00 cfs
Storm frequency	= 2 yrs	Time interval	= 1 min
Inflow hyd. No.	= 18	Max. Elevation	= 112.07 ft
Reservoir name	= Pond	Max. Storage	= 11,088 cuft

Storage Indication method used.

Hydrograph Volume = 0 cuft



Pond No. 1 - Pond

Pond Data

Bottom LxW = 160.0 x 60.0 ft Side slope = 3.0:1 Bottom elev. = 111.00 ft Depth = 2.50 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	111.00	9,600	0	0
0.13	111.13	9,766	1,210	1,210
0.25	111.25	9,932	1,231	2,441
0.38	111.38	10,100	1,252	3,693
0.50	111.50	10,269	1,273	4,967
0.63	111.63	10,439	1,294	6,261
0.75	111.75	10,610	1,316	7,576
0.88	111.88	10,783	1,337	8,913
1.00	112.00	10,956	1,359	10,272
1.13	112.13	11,131	1,380	11,652
1.25	112.25	11,306	1,402	13,055
1.38	112.38	11,483	1,424	14,479
1.50	112.50	11,661	1,446	15,926
1.63	112.63	11,840	1,469	17,394
1.75	112.75	12,020	1,491	18,886
1.88	112.88	12,202	1,514	20,399
2.00	113.00	12,384	1,537	21,936
2.13	113.13	12,568	1,559	23,495
2.25	113.25	12,752	1,582	25,078
2.38	113.38	12,938	1,606	26,684
2.50	113.50	13,125	1,629	28,313

Culvert / Orifice Structures

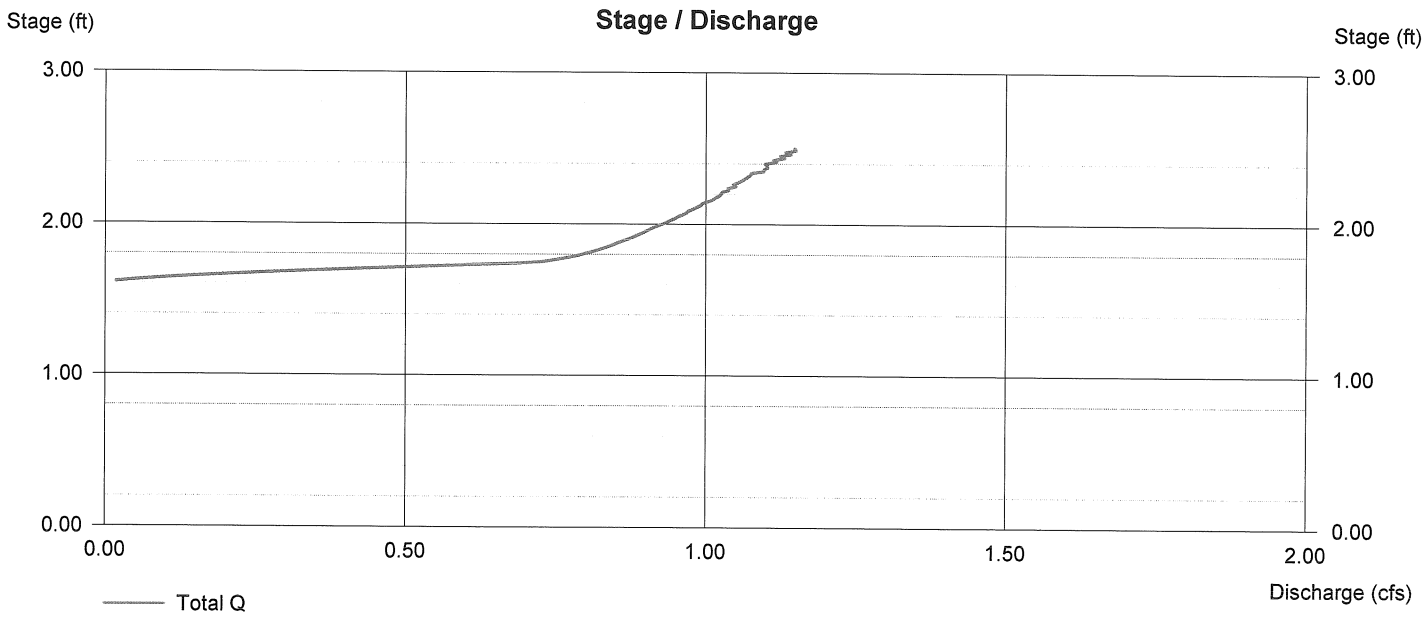
	[A]	[B]	[C]	[D]
Rise (in)	= 8.00	3.00	0.00	0.00
Span (in)	= 8.00	3.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 111.93	111.93	0.00	0.00
Length (ft)	= 125.00	0.00	0.00	0.00
Slope (%)	= 0.40	0.00	0.00	0.00
N-Value	= .013	.013	.000	.000
Orif. Coeff.	= 0.60	0.60	0.00	0.00
Multi-Stage	= n/a	Yes	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 5.00	4.00	0.00	0.00
Crest El. (ft)	= 113.60	112.60	0.00	0.00
Weir Coeff.	= 3.33	3.33	0.00	0.00
Weir Type	= Riser	Rect	---	---
Multi-Stage	= Yes	Yes	No	No

Exfiltration = 0.000 in/hr (Wet area) Tailwater Elev. = 0.00 ft

Note: Culvert/Orifice outflows have been analyzed under inlet and outlet control.



Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	2.02	1	723	6,855	----	------	------	E1 impervious
2	SCS Runoff	0.10	1	739	560	----	------	------	E1 pervious
3	Combine	2.07	1	723	7,415	1, 2	------	------	E1 combined
4	SCS Runoff	1.00	1	723	3,402	----	------	------	E2 impervious
5	SCS Runoff	0.08	1	724	252	----	------	------	E2 Pervious
6	Combine	1.08	1	723	3,654	4, 5	------	------	E2 combined to ditch
7	SCS Runoff	1.96	1	723	6,666	----	------	------	E3 impervious
8	SCS Runoff	0.69	1	769	7,367	----	------	------	E3 pervious
9	Combine	2.07	1	723	14,033	7, 8	------	------	E3 combined to inlet
10	SCS Runoff	1.91	1	723	6,494	----	------	------	P1 impervious
11	SCS Runoff	0.17	1	724	558	----	------	------	P1 pervious
12	Combine	2.08	1	723	7,052	10, 11	------	------	P1 combined
13	SCS Runoff	0.97	1	723	3,316	----	------	------	P2 impervious
14	SCS Runoff	0.07	1	729	298	----	------	------	P2 pervious
15	Combine	1.02	1	723	3,614	13, 14	------	------	P2 combined to ditch
16	SCS Runoff	4.30	1	723	14,638	----	------	------	P3 impervious
17	SCS Runoff	1.04	1	734	5,212	----	------	------	P3 pervious
18	Combine	4.93	1	723	19,851	16, 17	------	------	P3 Combined to basin
19	Reservoir	0.11	1	1125	2,742	18	112.64	17,581	Routing

Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

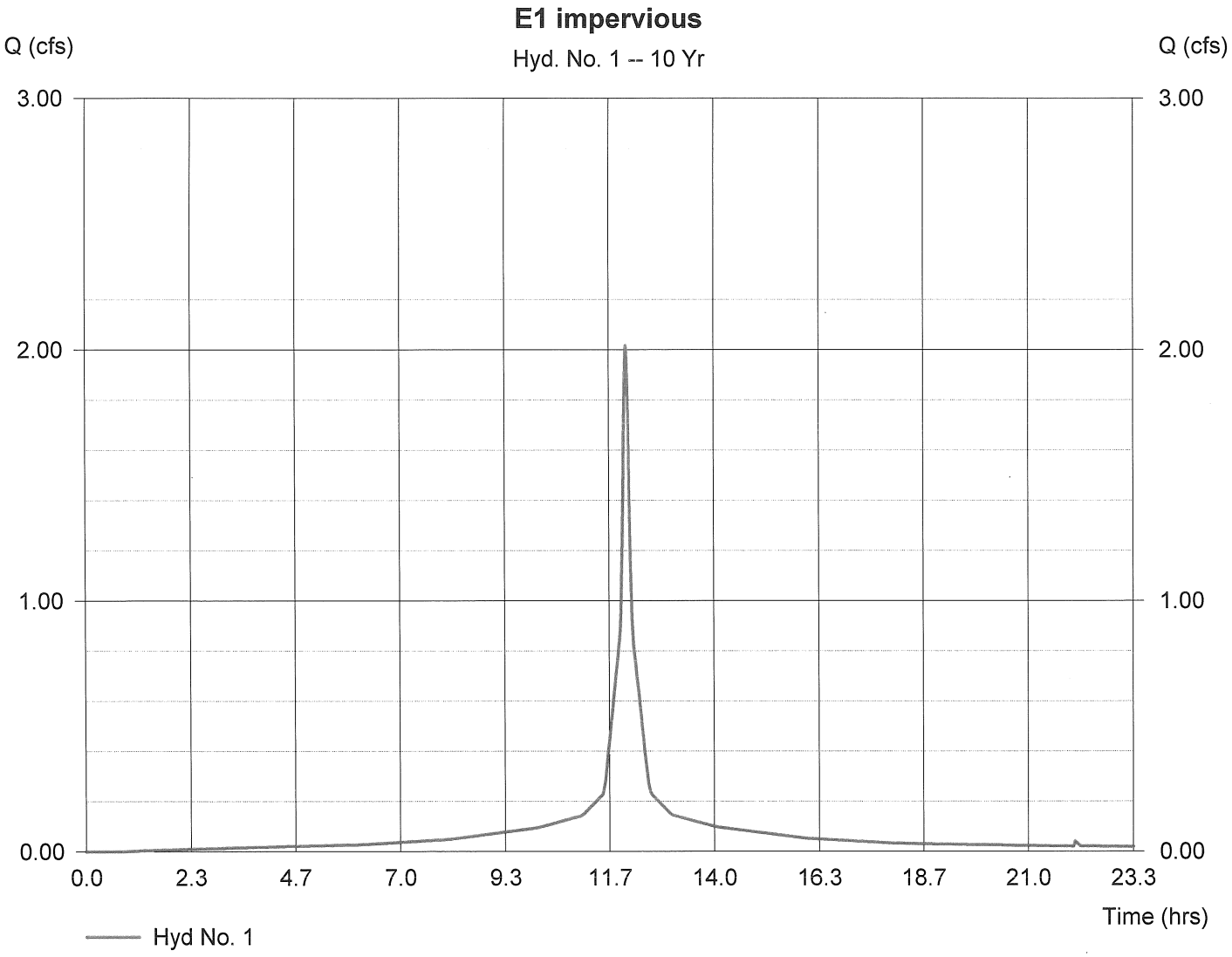
Tuesday, Mar 10 2020, 12:14 PM

Hyd. No. 1

E1 impervious

Hydrograph type	= SCS Runoff	Peak discharge	= 2.02 cfs
Storm frequency	= 10 yrs	Time interval	= 1 min
Drainage area	= 0.399 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 2.20 min
Total precip.	= 5.00 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

Hydrograph Volume = 6,855 cuft



TR55 Tc Worksheet

Hyd. No. 1

E1 impervious

Description	A	B	C	Totals
Sheet Flow				
Manning's n-value	= 0.011	0.011	0.011	
Flow length (ft)	= 113.0	0.0	0.0	
Two-year 24-hr precip. (in)	= 3.26	0.00	0.00	
Land slope (%)	= 0.59	0.00	0.00	
Travel Time (min)	**= 2.16**	**+ 0.00**	**+ 0.00**	**= 2.16**
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	
Travel Time (min)	**= 0.00**	**+ 0.00**	**+ 0.00**	**= 0.00**

Total Travel Time, Tc ..... 2.20 min

Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

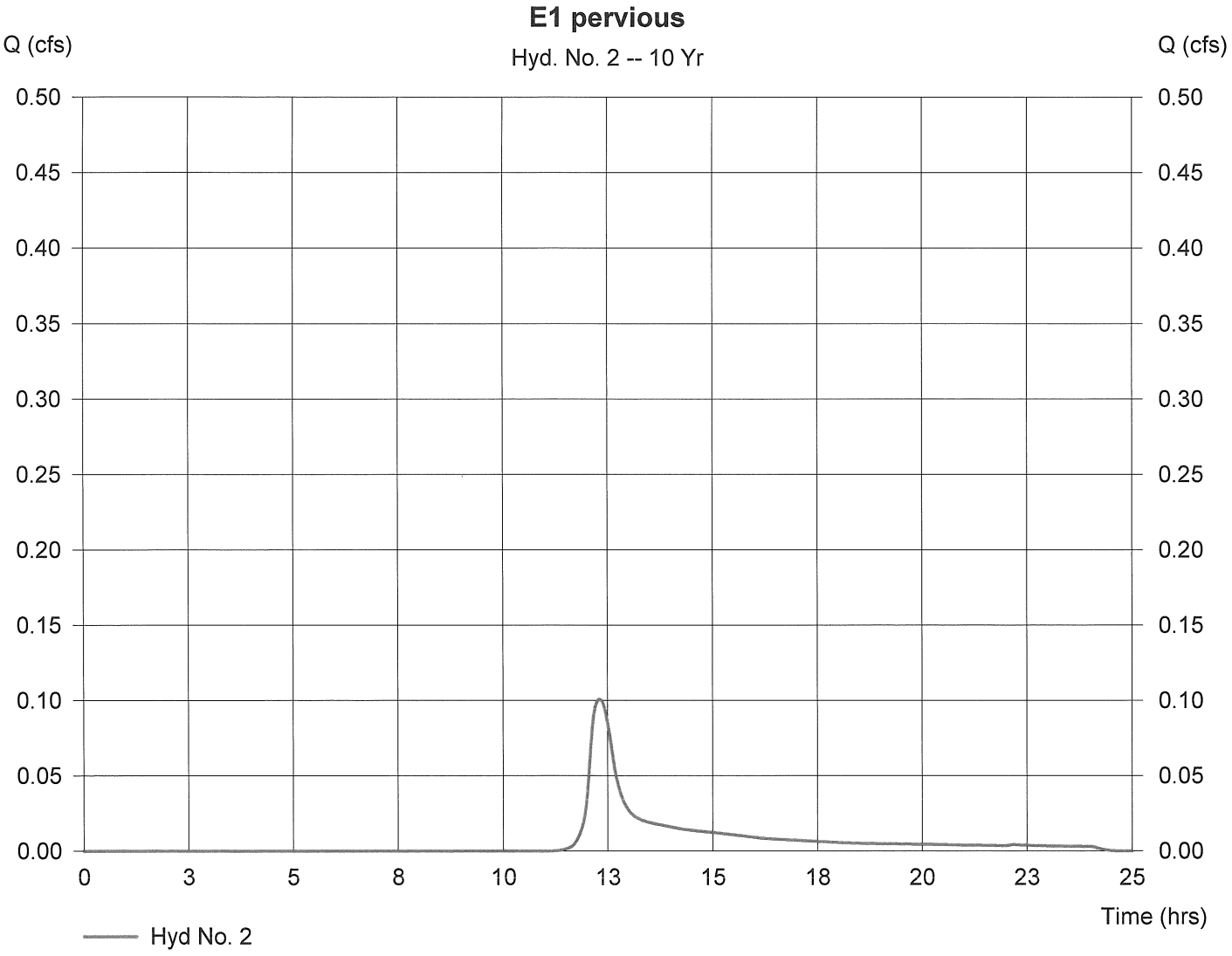
Tuesday, Mar 10 2020, 12:14 PM

Hyd. No. 2

E1 pervious

Hydrograph type	= SCS Runoff	Peak discharge	= 0.10 cfs
Storm frequency	= 10 yrs	Time interval	= 1 min
Drainage area	= 0.112 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 14.60 min
Total precip.	= 5.00 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

Hydrograph Volume = 560 cuft



TR55 Tc Worksheet

Hyd. No. 2

E1 pervious

Description	A	B	C	Totals
Sheet Flow				
Manning's n-value	= 0.410	0.011	0.011	
Flow length (ft)	= 32.0	0.0	0.0	
Two-year 24-hr precip. (in)	= 3.26	0.00	0.00	
Land slope (%)	= 0.55	0.00	0.00	
Travel Time (min)	**= 14.62**	**+ 0.00**	**+ 0.00**	**= 14.62**
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	
Travel Time (min)	**= 0.00**	**+ 0.00**	**+ 0.00**	**= 0.00**

Total Travel Time, Tc ..... 14.60 min

Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

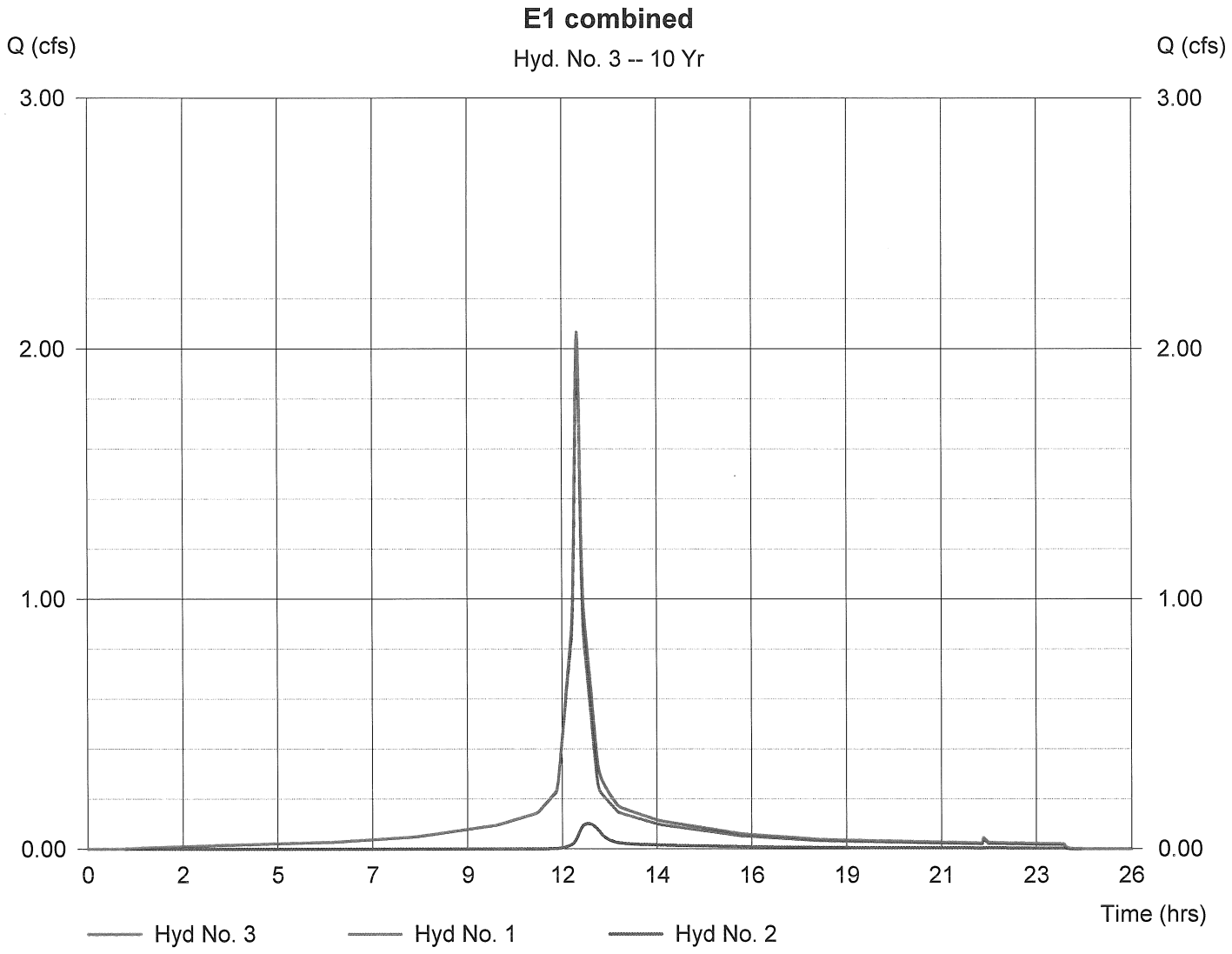
Tuesday, Mar 10 2020, 12:14 PM

Hyd. No. 3

E1 combined

Hydrograph type	= Combine	Peak discharge	= 2.07 cfs
Storm frequency	= 10 yrs	Time interval	= 1 min
Inflow hyds.	= 1, 2		

Hydrograph Volume = 7,415 cuft



Hydrograph Plot

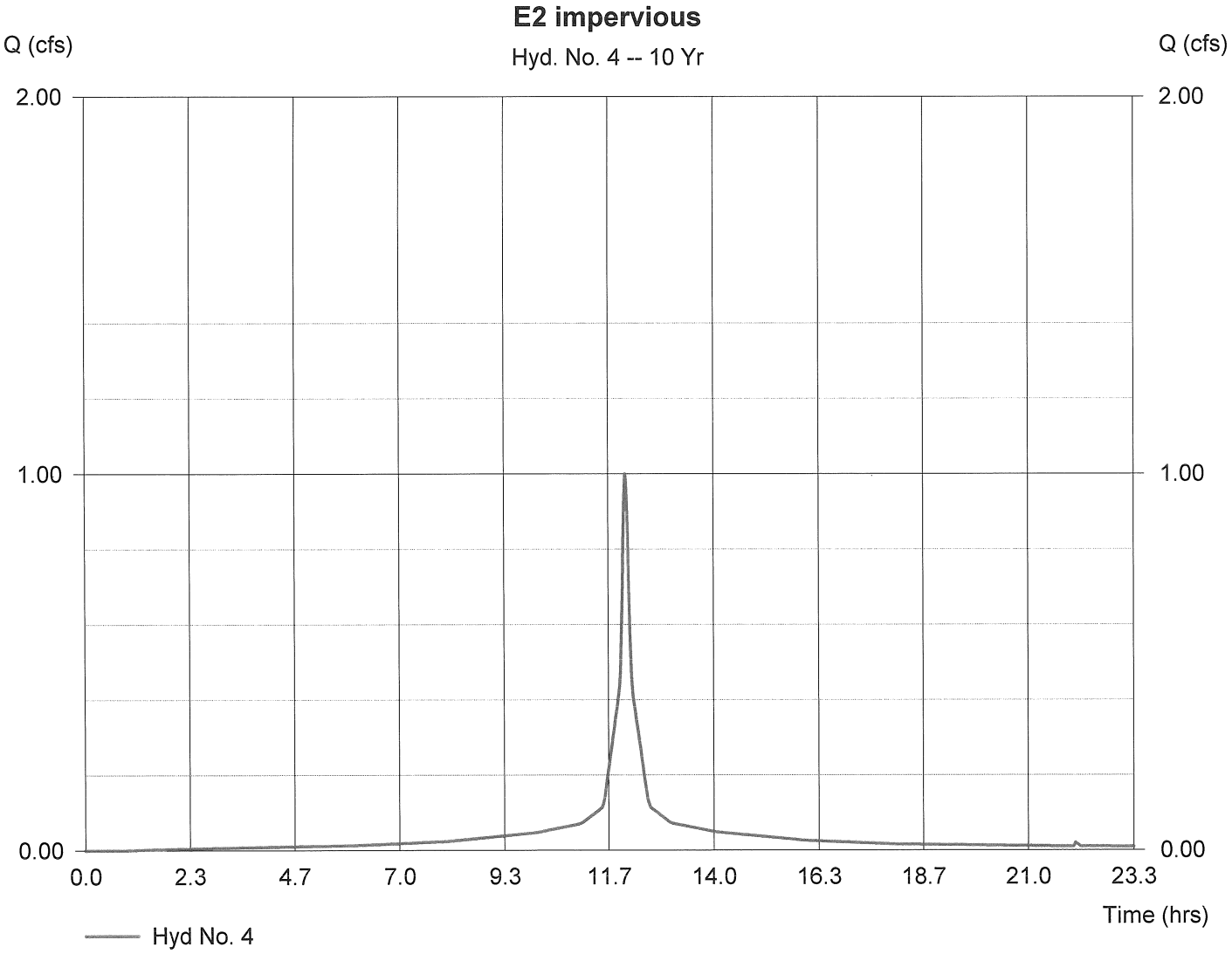
Hydraflow Hydrographs by Intelisolve | Tuesday, Mar 10 2020, 12:14 PM

Hyd. No. 4

E2 impervious

Hydrograph type	= SCS Runoff	Peak discharge	= 1.00 cfs
Storm frequency	= 10 yrs	Time interval	= 1 min
Drainage area	= 0.198 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 2.50 min
Total precip.	= 5.00 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

Hydrograph Volume = 3,402 cuft



TR55 Tc Worksheet

Hyd. No. 4

E2 impervious

Description	A	B	C	Totals
Sheet Flow				
Manning's n-value	= 0.011	0.011	0.011	
Flow length (ft)	= 145.0	0.0	0.0	
Two-year 24-hr precip. (in)	= 3.30	0.00	0.00	
Land slope (%)	= 0.88	0.00	0.00	
Travel Time (min)	**= 2.23**	**+ 0.00**	**+ 0.00**	**= 2.23**
Shallow Concentrated Flow				
Flow length (ft)	= 36.00	0.00	0.00	
Watercourse slope (%)	= 1.61	0.00	0.00	
Surface description	= Paved	Paved	Paved	
Average velocity (ft/s)	= 2.58	0.00	0.00	
Travel Time (min)	**= 0.23**	**+ 0.00**	**+ 0.00**	**= 0.23**
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	
Travel Time (min)	**= 0.00**	**+ 0.00**	**+ 0.00**	**= 0.00**

Total Travel Time, Tc ..... 2.50 min

Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

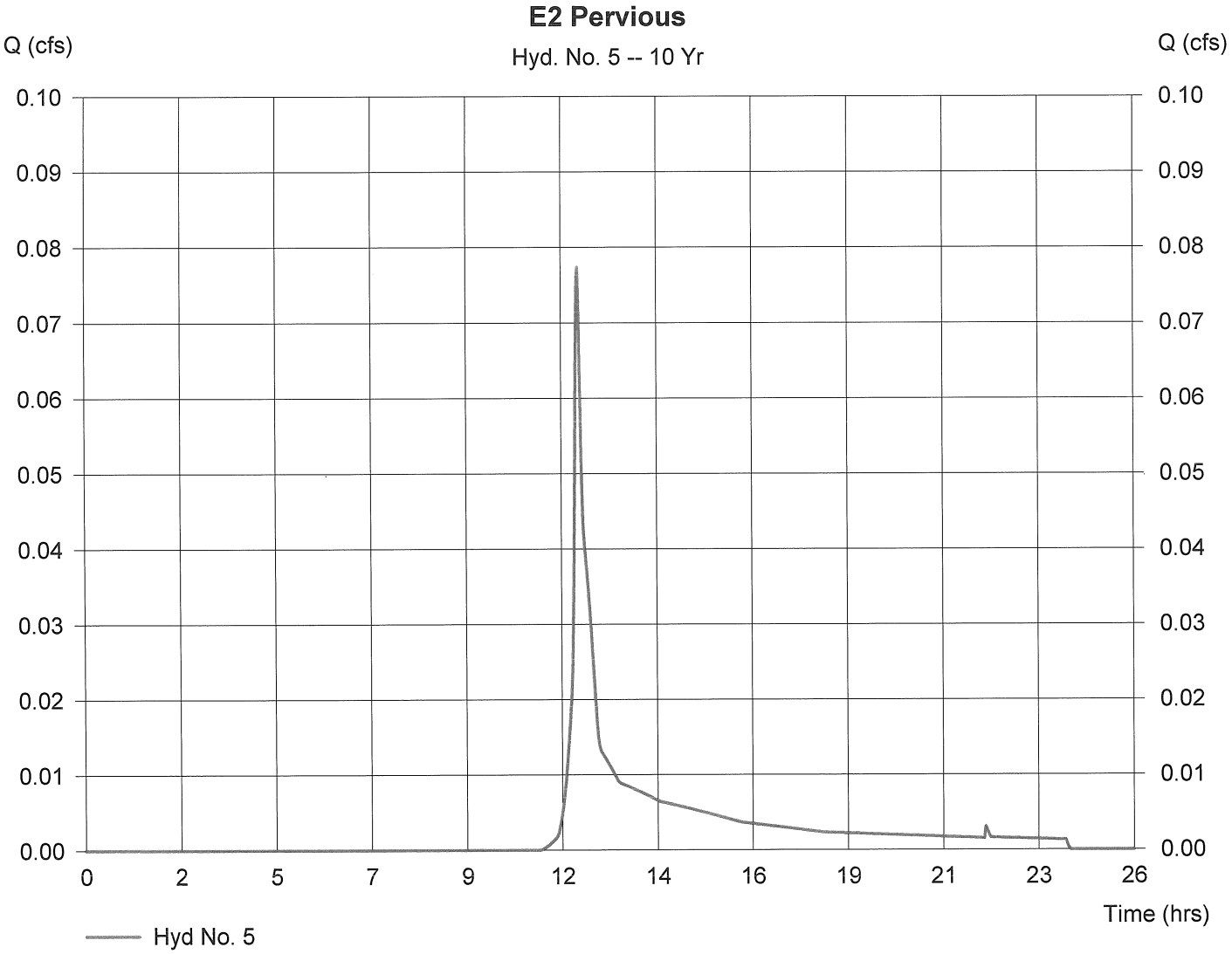
Tuesday, Mar 10 2020, 12:14 PM

Hyd. No. 5

E2 Pervious

Hydrograph type	= SCS Runoff	Peak discharge	= 0.08 cfs
Storm frequency	= 10 yrs	Time interval	= 1 min
Drainage area	= 0.051 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 2.00 min
Total precip.	= 5.00 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

Hydrograph Volume = 252 cuft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

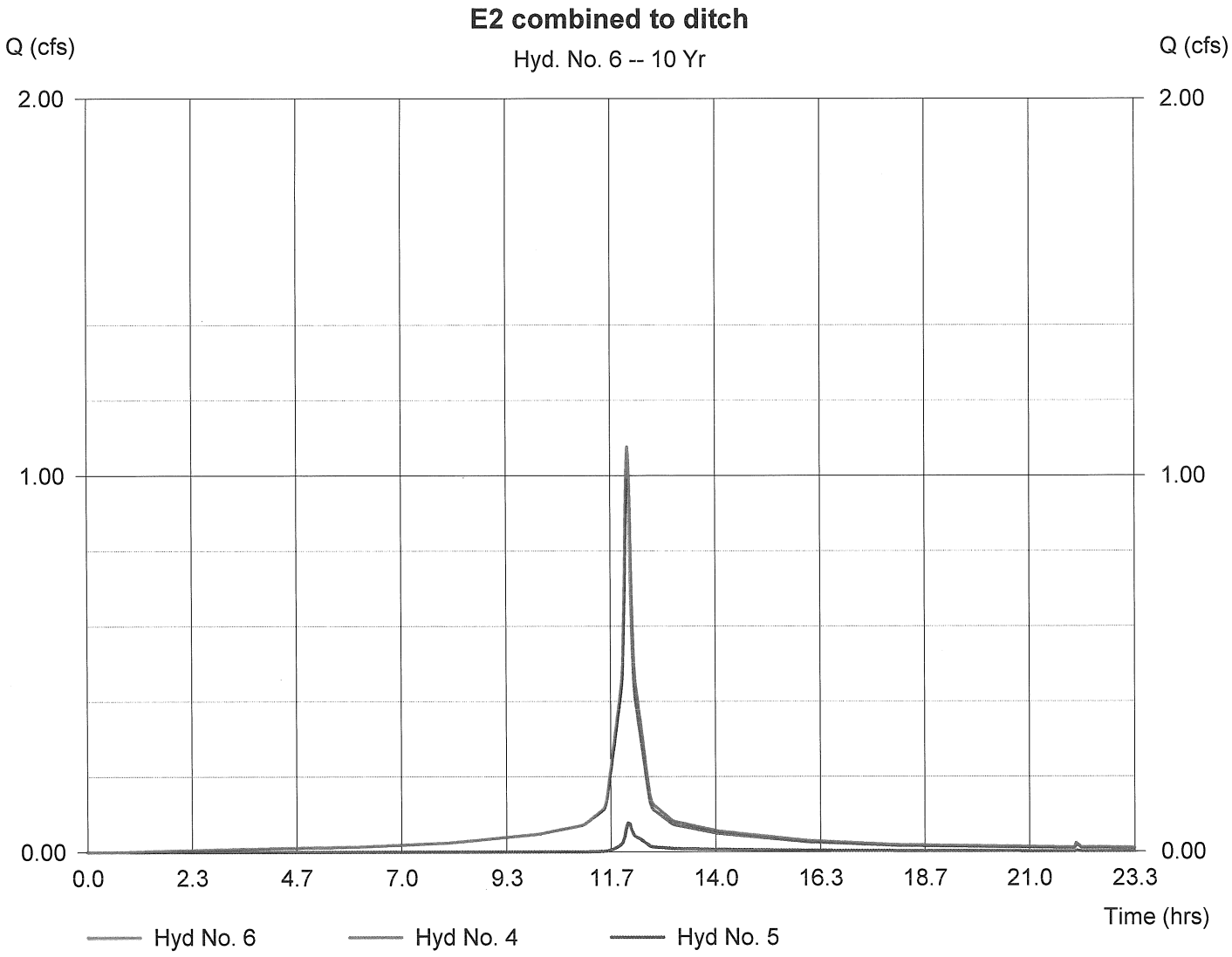
Tuesday, Mar 10 2020, 12:14 PM

Hyd. No. 6

E2 combined to ditch

Hydrograph type	= Combine	Peak discharge	= 1.08 cfs
Storm frequency	= 10 yrs	Time interval	= 1 min
Inflow hyds.	= 4, 5		

Hydrograph Volume = 3,654 cuft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

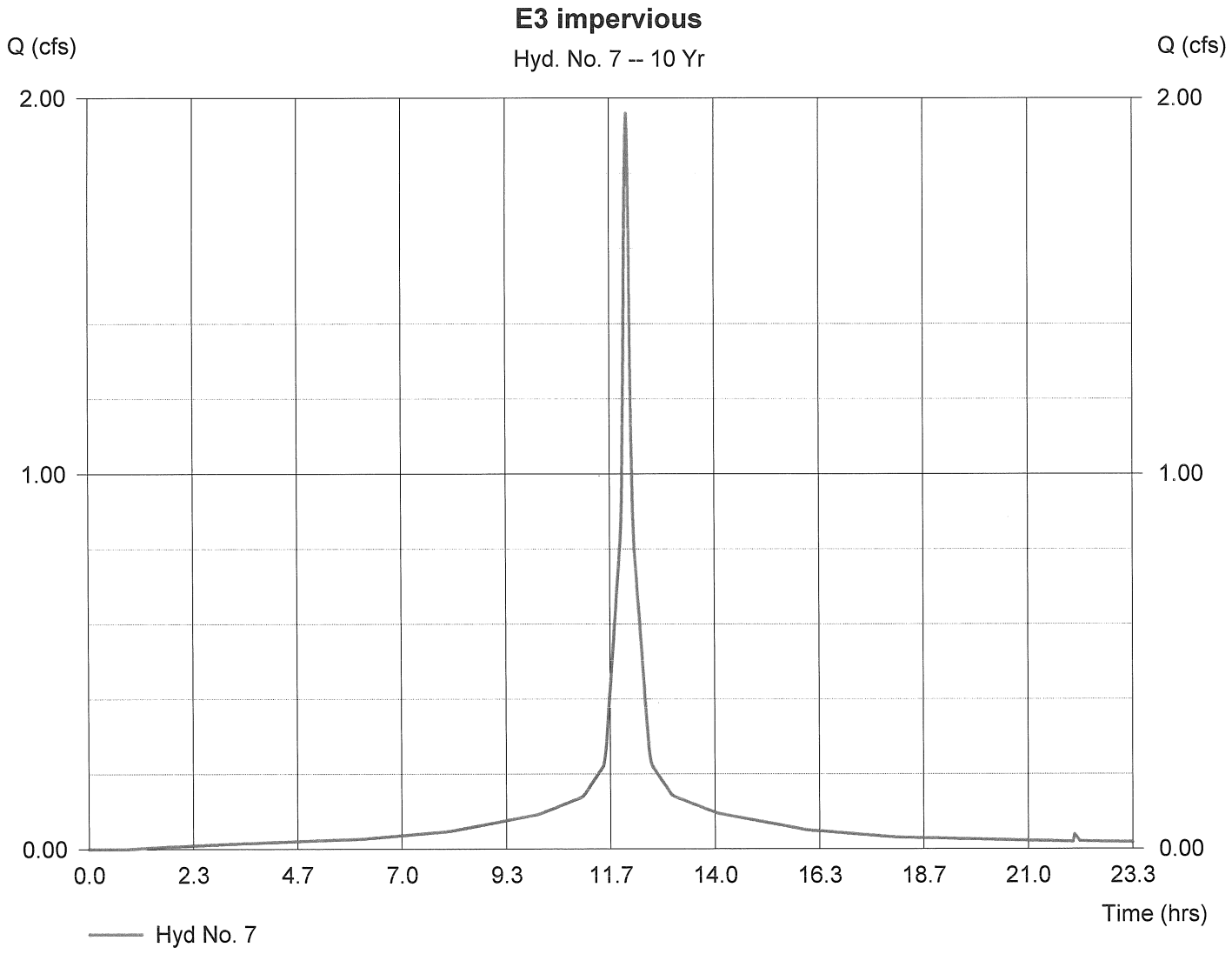
Tuesday, Mar 10 2020, 12:14 PM

Hyd. No. 7

E3 impervious

Hydrograph type	= SCS Runoff	Peak discharge	= 1.96 cfs
Storm frequency	= 10 yrs	Time interval	= 1 min
Drainage area	= 0.388 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 2.90 min
Total precip.	= 5.00 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

Hydrograph Volume = 6,666 cuft



TR55 Tc Worksheet

Hyd. No. 7

E3 impervious

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.011		0.011		0.011		
Flow length (ft)	= 50.0		100.0		0.0		
Two-year 24-hr precip. (in)	= 3.26		3.26		0.00		
Land slope (%)	= 1.36		0.74		0.00		
Travel Time (min)	**= 0.80**	**+**	**1.79**	**+**	**0.00**	**=**	**2.59**
Shallow Concentrated Flow							
Flow length (ft)	= 35.00		0.00		0.00		
Watercourse slope (%)	= 0.74		0.00		0.00		
Surface description	= Paved		Paved		Paved		
Average velocity (ft/s)	= 1.75		0.00		0.00		
Travel Time (min)	**= 0.33**	**+**	**0.00**	**+**	**0.00**	**=**	**0.33**
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		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc ..... 2.90 min

Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

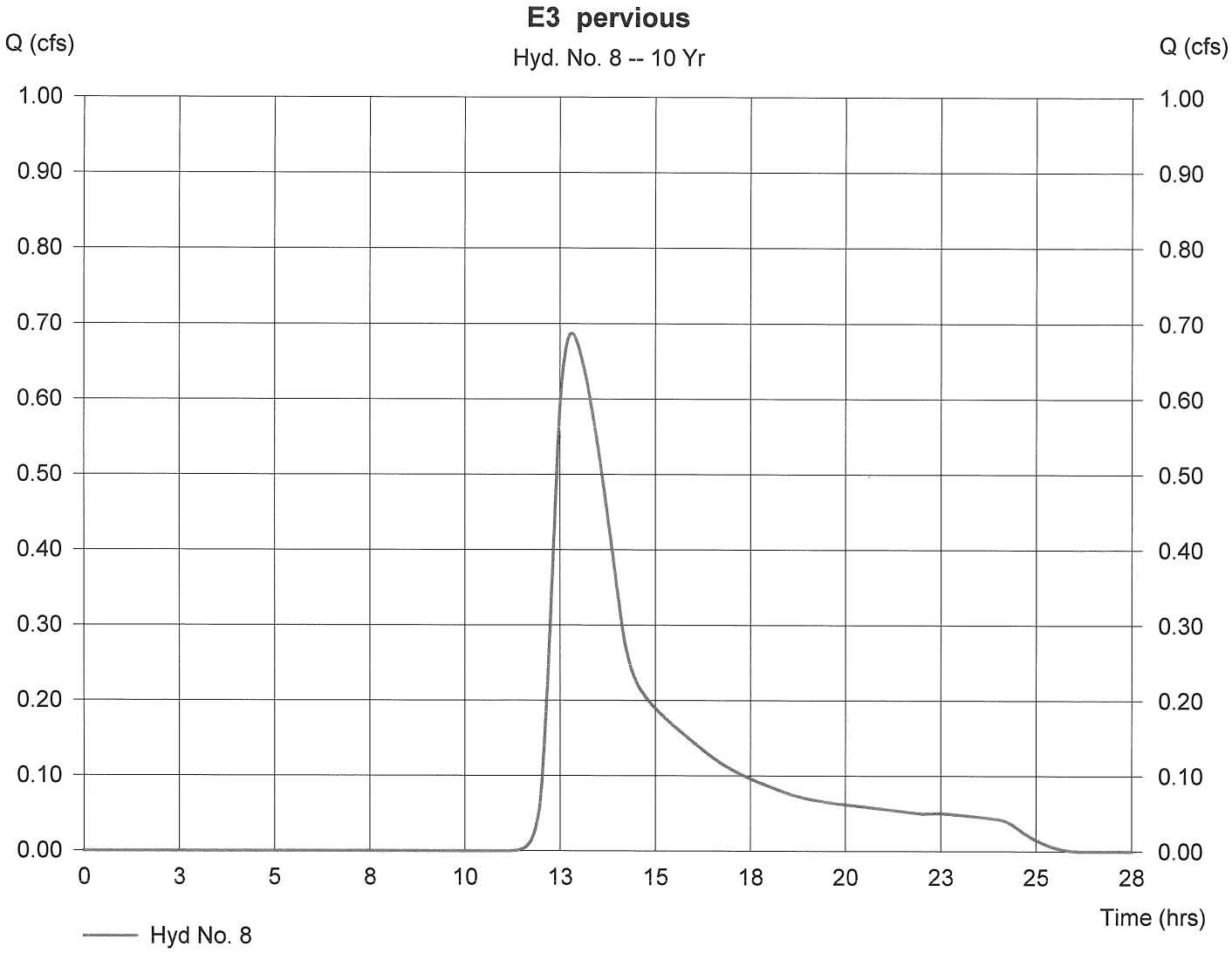
Tuesday, Mar 10 2020, 12:14 PM

Hyd. No. 8

E3 pervious

Hydrograph type	= SCS Runoff	Peak discharge	= 0.69 cfs
Storm frequency	= 10 yrs	Time interval	= 1 min
Drainage area	= 1.486 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 48.60 min
Total precip.	= 5.00 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

Hydrograph Volume = 7,367 cuft



TR55 Tc Worksheet

Hyd. No. 8

E3 pervious

Description	A	B	C	Totals
Sheet Flow				
Manning's n-value	= 0.410	0.410	0.011	
Flow length (ft)	= 115.0	35.0	0.0	
Two-year 24-hr precip. (in)	= 3.26	3.26	0.00	
Land slope (%)	= 1.33	0.45	0.00	
Travel Time (min)	**= 28.57 +**	**17.02 +**	**0.00 =**	**45.58**
Shallow Concentrated Flow				
Flow length (ft)	= 185.00	32.00	0.00	
Watercourse slope (%)	= 0.45	6.25	0.00	
Surface description	= Unpaved	Unpaved	Paved	
Average velocity (ft/s)	= 1.08	4.03	0.00	
Travel Time (min)	**= 2.85 +**	**0.13 +**	**0.00 =**	**2.98**
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	
Travel Time (min)	**= 0.00 +**	**0.00 +**	**0.00 =**	**0.00**

Total Travel Time, Tc ..... 48.60 min

Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

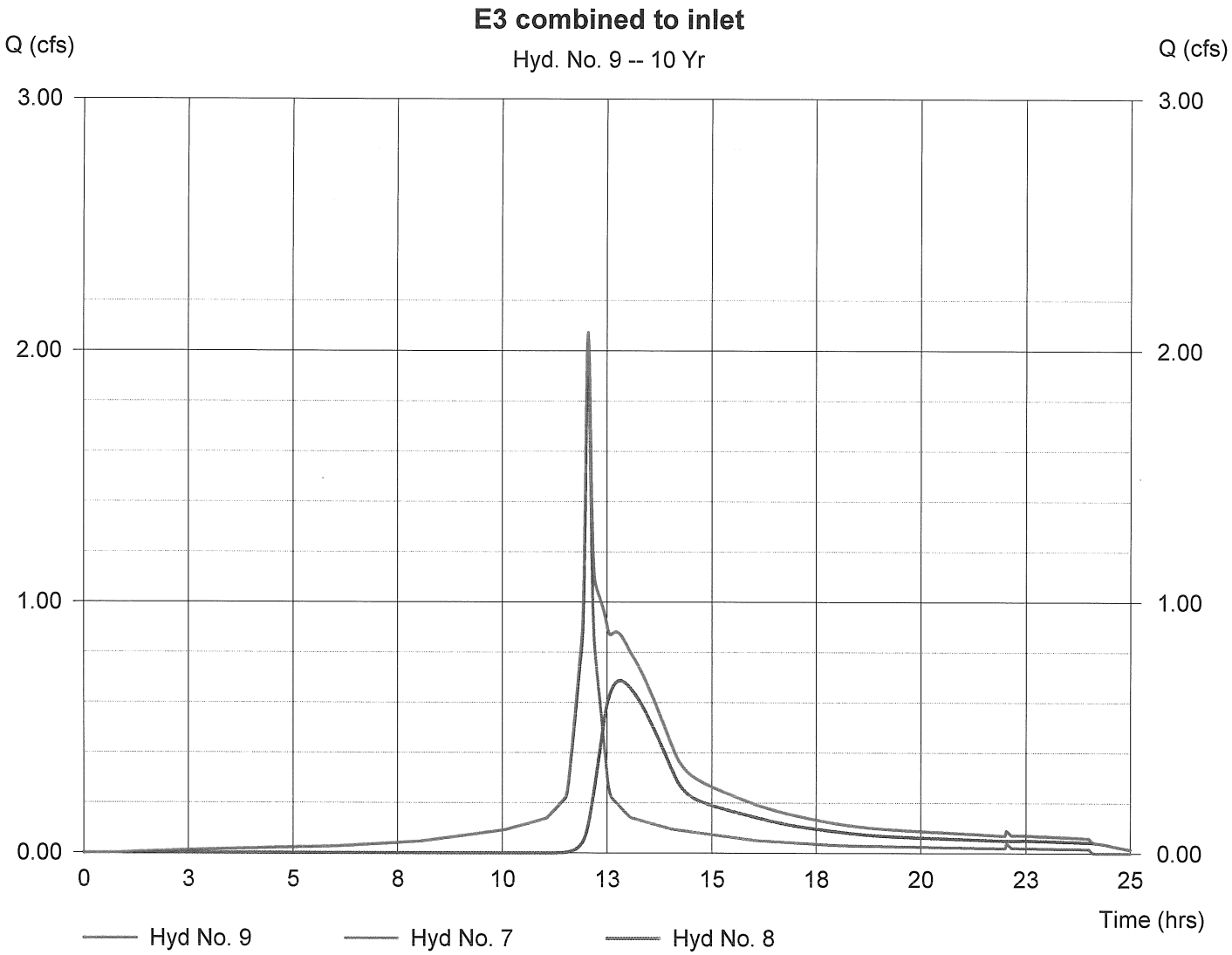
Tuesday, Mar 10 2020, 12:14 PM

Hyd. No. 9

E3 combined to inlet

Hydrograph type	= Combine	Peak discharge	= 2.07 cfs
Storm frequency	= 10 yrs	Time interval	= 1 min
Inflow hyds.	= 7, 8		

Hydrograph Volume = 14,033 cuft



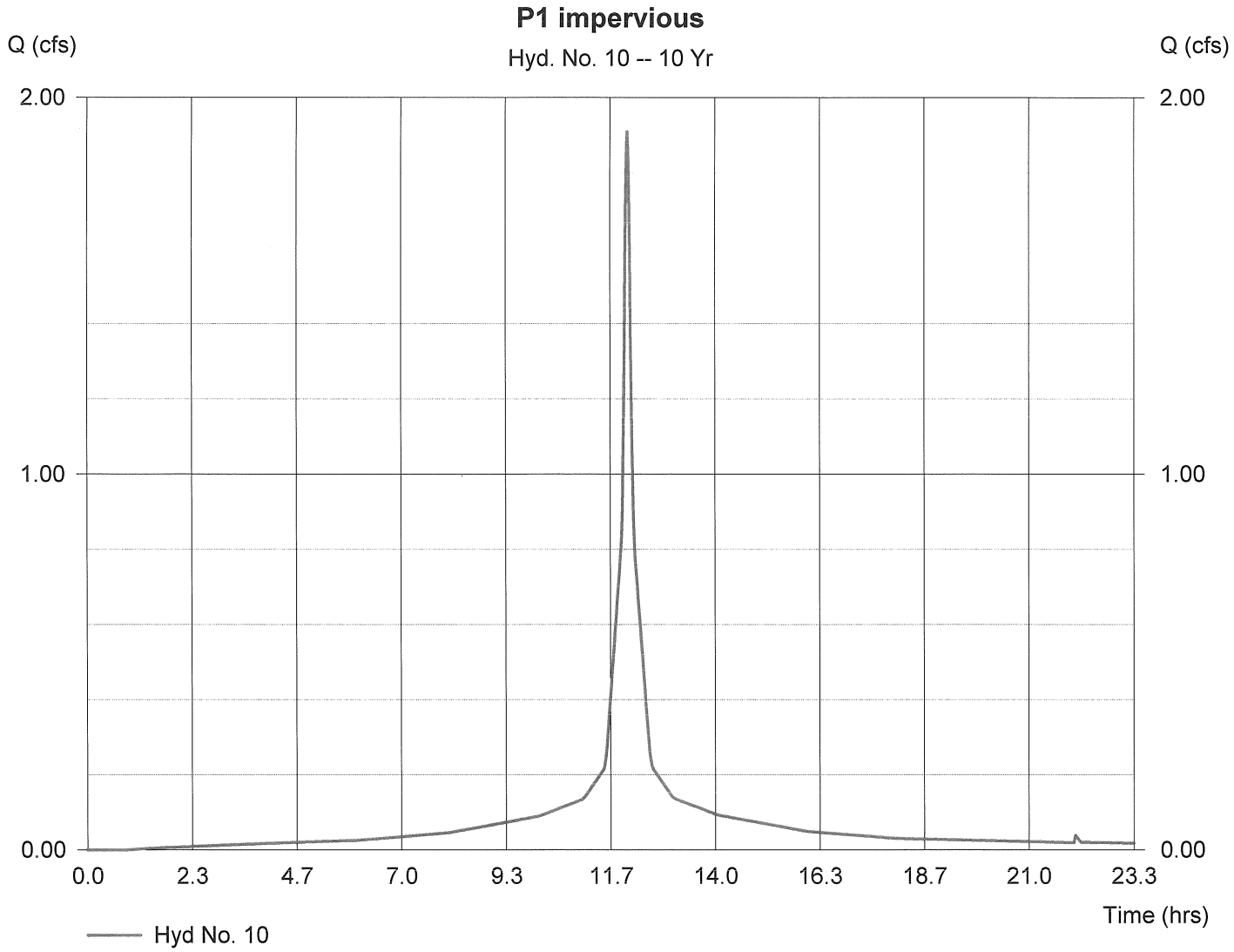
Hydrograph Plot

Hyd. No. 10

P1 impervious

Hydrograph type	= SCS Runoff	Peak discharge	= 1.91 cfs
Storm frequency	= 10 yrs	Time interval	= 1 min
Drainage area	= 0.378 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 2.40 min
Total precip.	= 5.00 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

Hydrograph Volume = 6,494 cuft



TR55 Tc Worksheet

Hyd. No. 10

P1 impervious

Description	A	B	C	Totals
Sheet Flow				
Manning's n-value	= 0.011	0.011	0.011	
Flow length (ft)	= 123.0	0.0	0.0	
Two-year 24-hr precip. (in)	= 3.26	0.00	0.00	
Land slope (%)	= 0.55	0.00	0.00	
Travel Time (min)	**= 2.37**	**+ 0.00**	**+ 0.00**	**= 2.37**
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	
Travel Time (min)	**= 0.00**	**+ 0.00**	**+ 0.00**	**= 0.00**

Total Travel Time, Tc ..... 2.40 min

Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

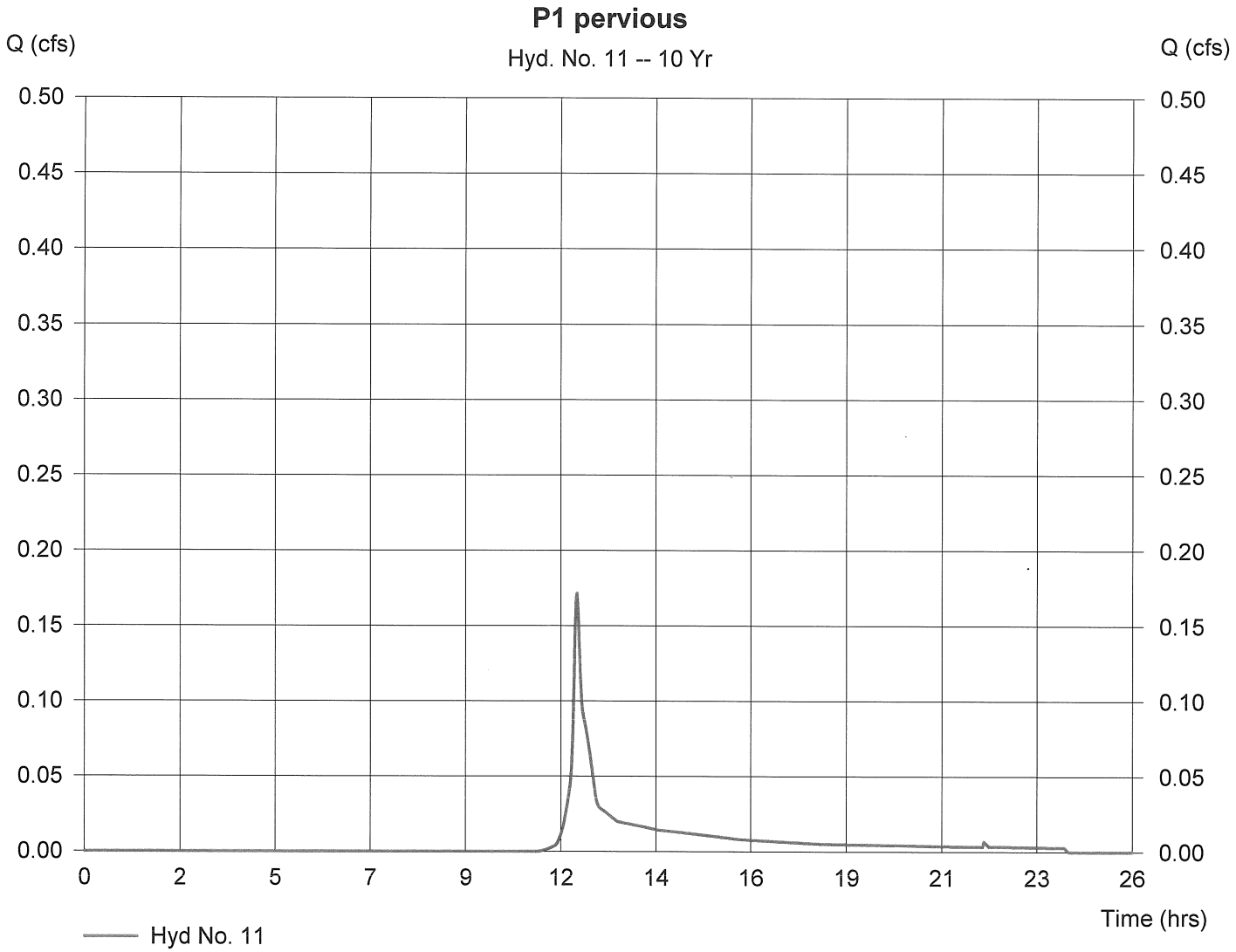
Tuesday, Mar 10 2020, 12:14 PM

Hyd. No. 11

P1 pervious

Hydrograph type	= SCS Runoff	Peak discharge	= 0.17 cfs
Storm frequency	= 10 yrs	Time interval	= 1 min
Drainage area	= 0.113 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 2.00 min
Total precip.	= 5.00 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

Hydrograph Volume = 558 cuft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

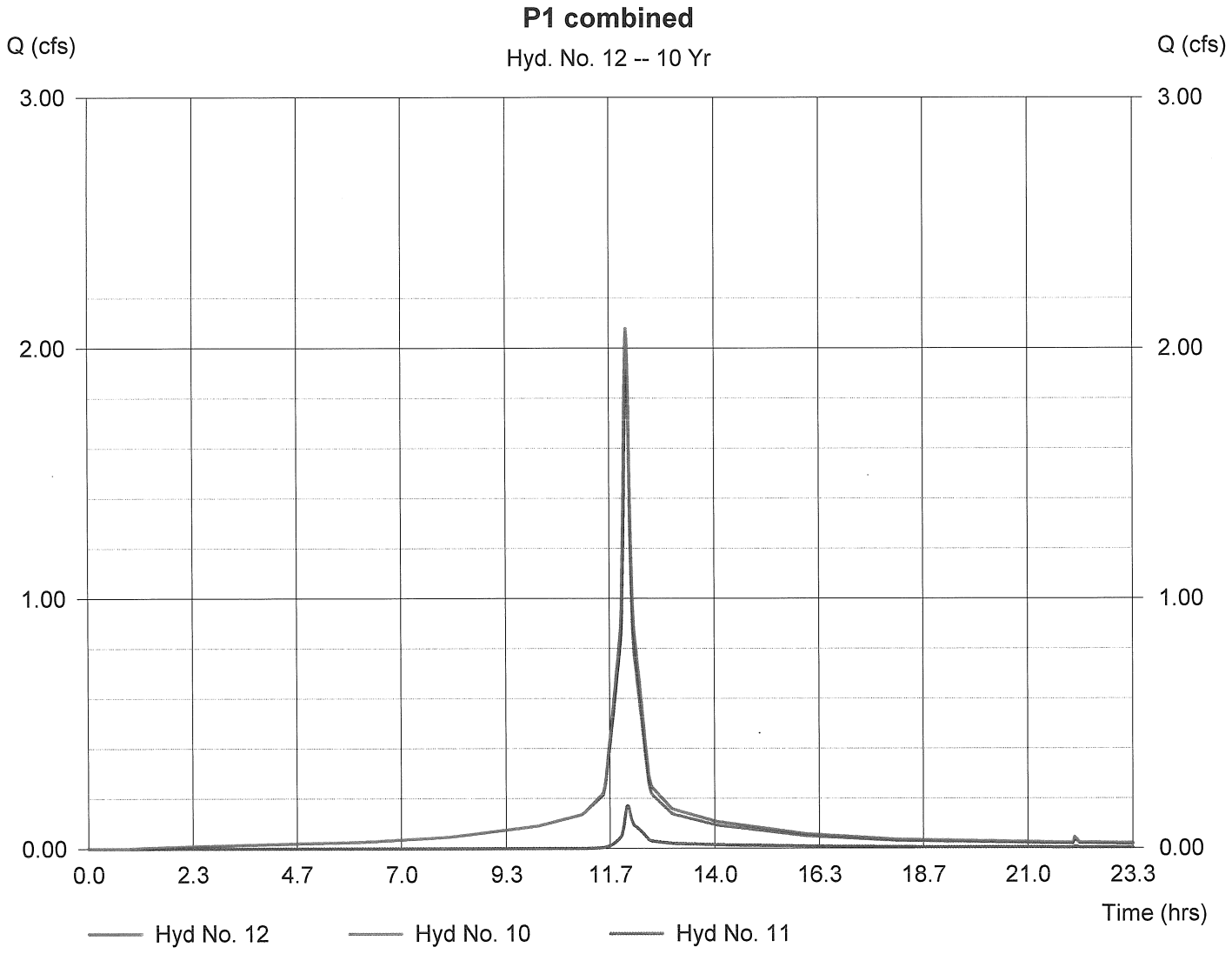
Tuesday, Mar 10 2020, 12:14 PM

Hyd. No. 12

P1 combined

Hydrograph type	= Combine	Peak discharge	= 2.08 cfs
Storm frequency	= 10 yrs	Time interval	= 1 min
Inflow hyds.	= 10, 11		

Hydrograph Volume = 7,052 cuft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

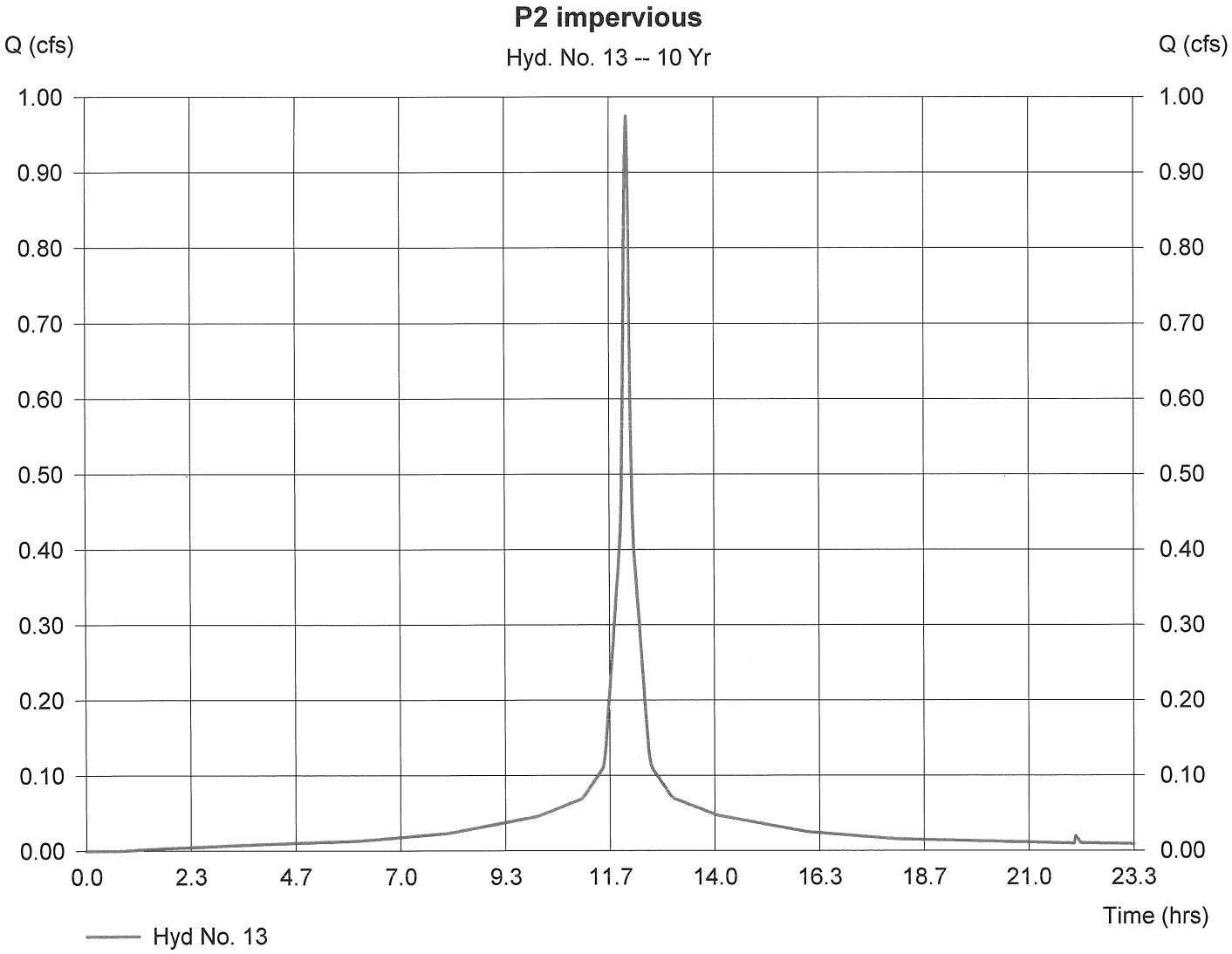
Tuesday, Mar 10 2020, 12:14 PM

Hyd. No. 13

P2 impervious

Hydrograph type	= SCS Runoff	Peak discharge	= 0.97 cfs
Storm frequency	= 10 yrs	Time interval	= 1 min
Drainage area	= 0.193 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 2.90 min
Total precip.	= 5.00 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

Hydrograph Volume = 3,316 cuft



TR55 Tc Worksheet

Hyd. No. 13

P2 impervious

Description	A	B	C	Totals
Sheet Flow				
Manning's n-value	= 0.011	0.011	0.011	
Flow length (ft)	= 50.0	95.0	39.0	
Two-year 24-hr precip. (in)	= 3.26	3.26	3.26	
Land slope (%)	= 1.20	1.05	1.67	
Travel Time (min)	**= 0.85**	**+ 1.49**	**+ 0.61**	**= 2.94**
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	
Travel Time (min)	**= 0.00**	**+ 0.00**	**+ 0.00**	**= 0.00**

Total Travel Time, Tc ..... 2.90 min

Hydrograph Plot

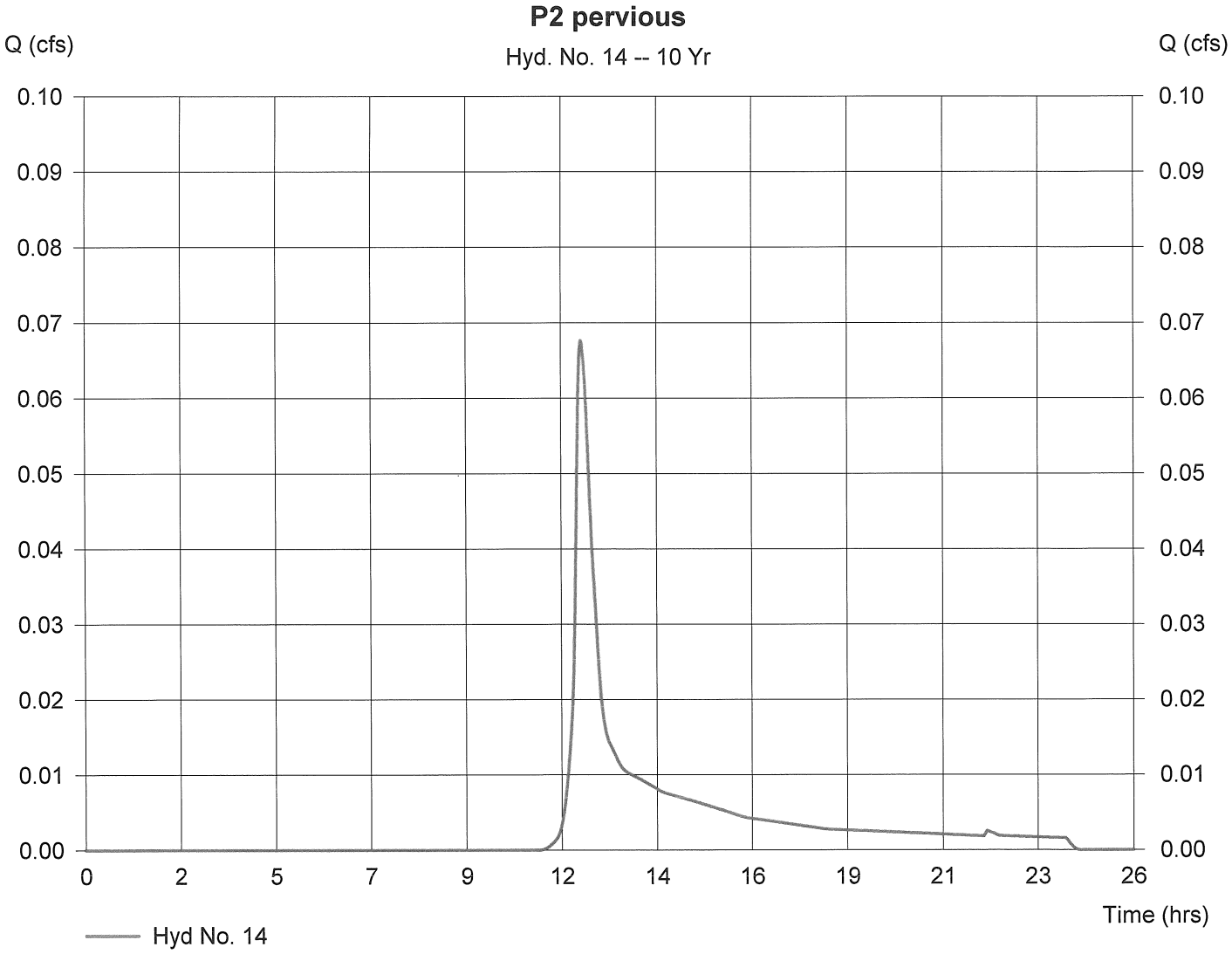
Hydraflow Hydrographs by Intelisolve | Tuesday, Mar 10 2020, 12:14 PM

Hyd. No. 14

P2 pervious

Hydrograph type	= SCS Runoff	Peak discharge	= 0.07 cfs
Storm frequency	= 10 yrs	Time interval	= 1 min
Drainage area	= 0.059 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 6.70 min
Total precip.	= 5.00 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

Hydrograph Volume = 298 cuft



TR55 Tc Worksheet

Hyd. No. 14

P2 pervious

Description	A	B	C	Totals
Sheet Flow				
Manning's n-value	= 0.410	0.011	0.011	
Flow length (ft)	= 21.0	0.0	0.0	
Two-year 24-hr precip. (in)	= 3.26	0.00	0.00	
Land slope (%)	= 1.67	0.00	0.00	
Travel Time (min)	**= 6.69**	**+ 0.00**	**+ 0.00**	**= 6.69**
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	
Travel Time (min)	**= 0.00**	**+ 0.00**	**+ 0.00**	**= 0.00**

Total Travel Time, Tc ..... 6.70 min

Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

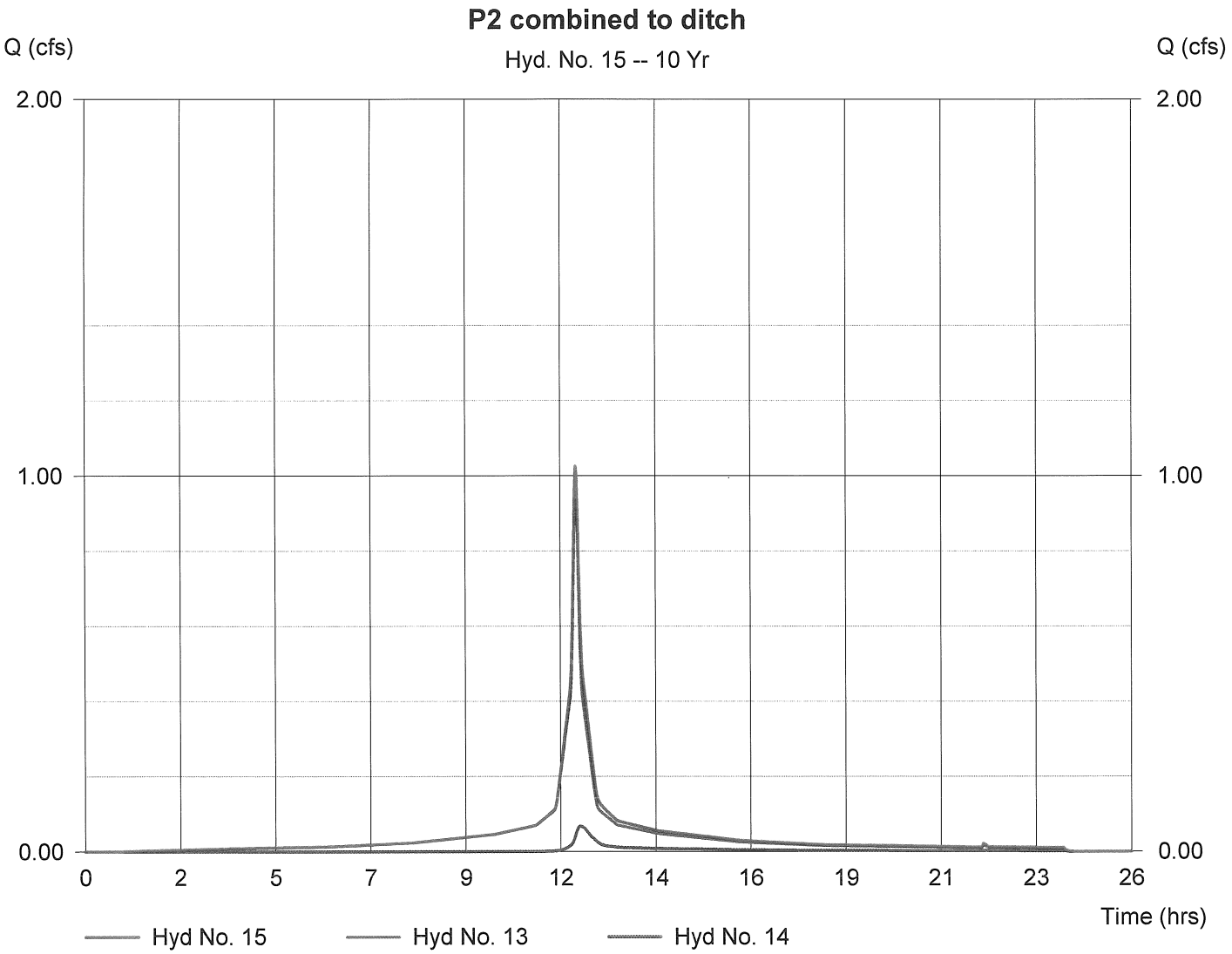
Tuesday, Mar 10 2020, 12:14 PM

Hyd. No. 15

P2 combined to ditch

Hydrograph type	= Combine	Peak discharge	= 1.02 cfs
Storm frequency	= 10 yrs	Time interval	= 1 min
Inflow hyds.	= 13, 14		

Hydrograph Volume = 3,614 cuft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

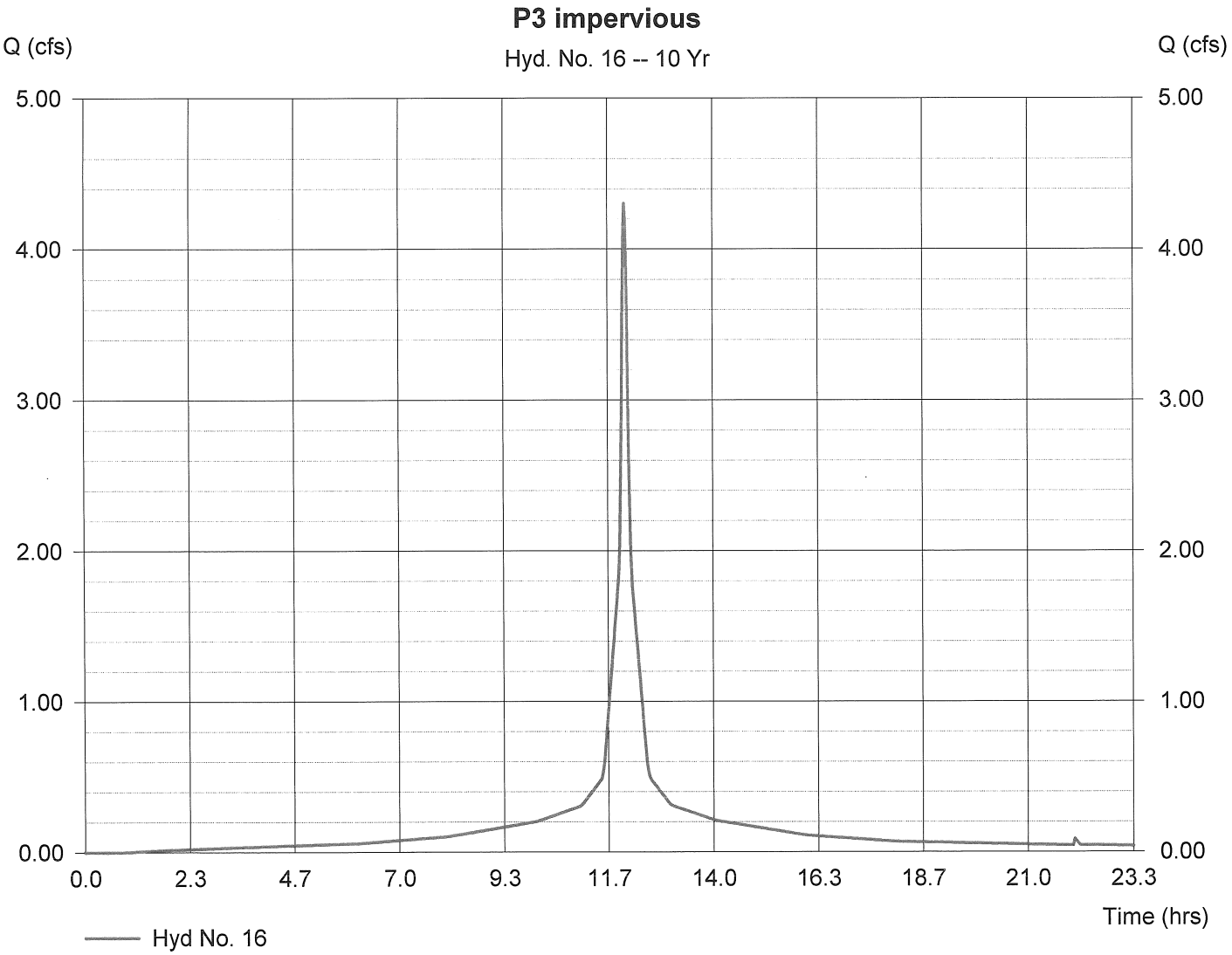
Tuesday, Mar 10 2020, 12:14 PM

Hyd. No. 16

P3 impervious

Hydrograph type	= SCS Runoff	Peak discharge	= 4.30 cfs
Storm frequency	= 10 yrs	Time interval	= 1 min
Drainage area	= 0.852 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 2.50 min
Total precip.	= 5.00 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

Hydrograph Volume = 14,638 cuft



TR55 Tc Worksheet

Hyd. No. 16

P3 impervious

Description	A	B	C	Totals
Sheet Flow				
Manning's n-value	= 0.011	0.011	0.011	
Flow length (ft)	= 147.0	0.0	0.0	
Two-year 24-hr precip. (in)	= 3.26	0.00	0.00	
Land slope (%)	= 0.68	0.00	0.00	
Travel Time (min)	**= 2.52**	**+ 0.00**	**+ 0.00**	**= 2.52**
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	
Travel Time (min)	**= 0.00**	**+ 0.00**	**+ 0.00**	**= 0.00**

Total Travel Time, Tc ..... 2.50 min

Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

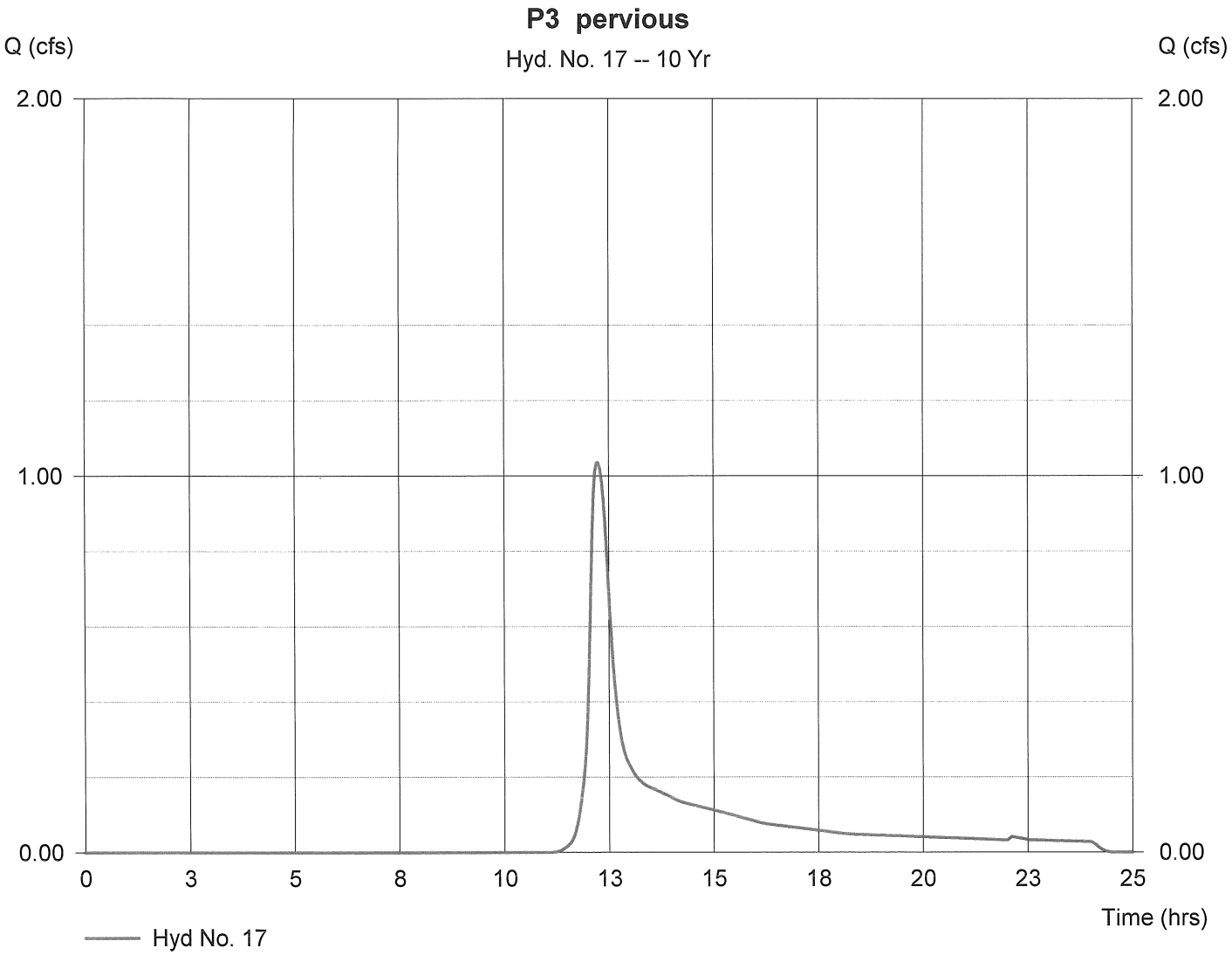
Tuesday, Mar 10 2020, 12:14 PM

Hyd. No. 17

P3 pervious

Hydrograph type	= SCS Runoff	Peak discharge	= 1.04 cfs
Storm frequency	= 10 yrs	Time interval	= 1 min
Drainage area	= 1.039 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 10.40 min
Total precip.	= 5.00 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

Hydrograph Volume = 5,212 cuft



TR55 Tc Worksheet

Hyd. No. 17

P3 pervious

Description	A	B	C	Totals
Sheet Flow				
Manning's n-value	= 0.410	0.011	0.011	
Flow length (ft)	= 36.0	80.0	0.0	
Two-year 24-hr precip. (in)	= 3.26	3.26	0.00	
Land slope (%)	= 2.22	1.25	0.00	
Travel Time (min)	**= 9.19**	**+ 1.21**	**+ 0.00**	**= 10.40**
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	
Travel Time (min)	**= 0.00**	**+ 0.00**	**+ 0.00**	**= 0.00**

Total Travel Time, Tc ..... 10.40 min

Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

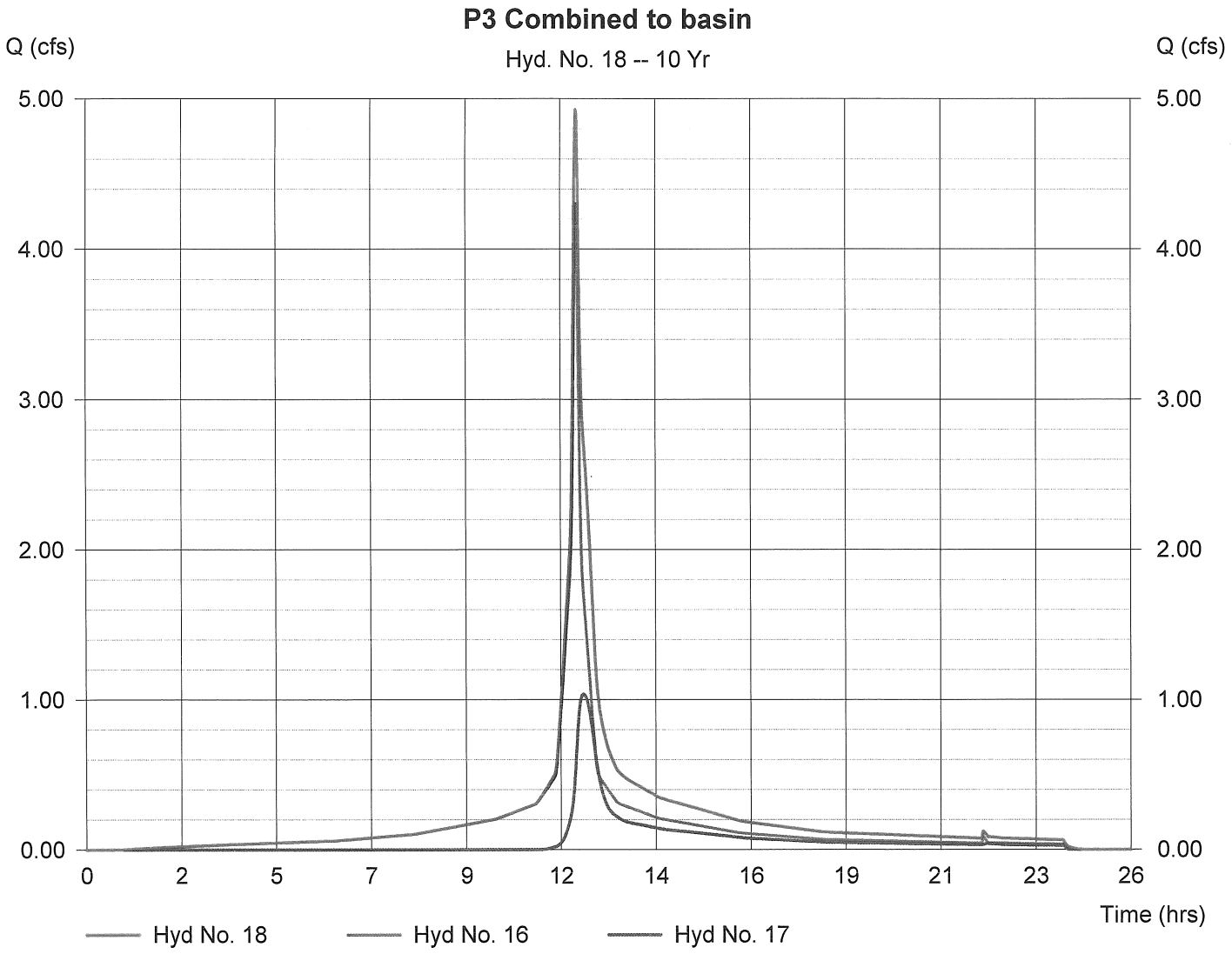
Tuesday, Mar 10 2020, 12:14 PM

Hyd. No. 18

P3 Combined to basin

Hydrograph type	= Combine	Peak discharge	= 4.93 cfs
Storm frequency	= 10 yrs	Time interval	= 1 min
Inflow hyds.	= 16, 17		

Hydrograph Volume = 19,851 cuft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

Tuesday, Mar 10 2020, 12:14 PM

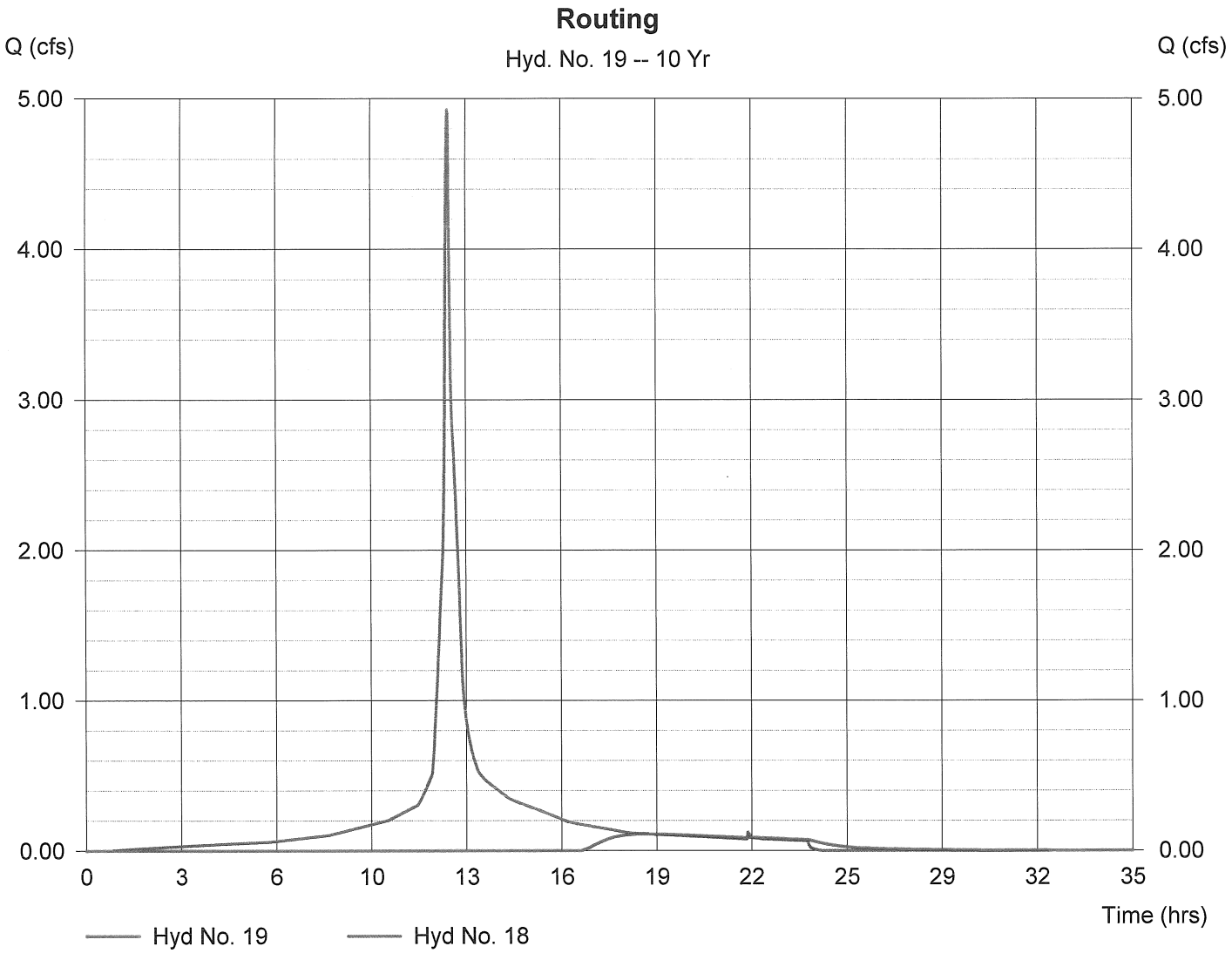
Hyd. No. 19

Routing

Hydrograph type	= Reservoir	Peak discharge	= 0.11 cfs
Storm frequency	= 10 yrs	Time interval	= 1 min
Inflow hyd. No.	= 18	Max. Elevation	= 112.64 ft
Reservoir name	= Pond	Max. Storage	= 17,581 cuft

Storage Indication method used.

Hydrograph Volume = 2,742 cuft



Pond Report

Hydraflow Hydrographs by Intelisolve

Tuesday, Mar 10 2020, 12:14 PM

Pond No. 1 - Pond

Pond Data

Bottom LxW = 160.0 x 60.0 ft Side slope = 3.0:1 Bottom elev. = 111.00 ft Depth = 2.50 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	111.00	9,600	0	0
0.13	111.13	9,766	1,210	1,210
0.25	111.25	9,932	1,231	2,441
0.38	111.38	10,100	1,252	3,693
0.50	111.50	10,269	1,273	4,967
0.63	111.63	10,439	1,294	6,261
0.75	111.75	10,610	1,316	7,576
0.88	111.88	10,783	1,337	8,913
1.00	112.00	10,956	1,359	10,272
1.13	112.13	11,131	1,380	11,652
1.25	112.25	11,306	1,402	13,055
1.38	112.38	11,483	1,424	14,479
1.50	112.50	11,661	1,446	15,926
1.63	112.63	11,840	1,469	17,394
1.75	112.75	12,020	1,491	18,886
1.88	112.88	12,202	1,514	20,399
2.00	113.00	12,384	1,537	21,936
2.13	113.13	12,568	1,559	23,495
2.25	113.25	12,752	1,582	25,078
2.38	113.38	12,938	1,606	26,684
2.50	113.50	13,125	1,629	28,313

Culvert / Orifice Structures

	[A]	[B]	[C]	[D]
Rise (in)	= 8.00	3.00	0.00	0.00
Span (in)	= 8.00	3.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 111.93	111.93	0.00	0.00
Length (ft)	= 125.00	0.00	0.00	0.00
Slope (%)	= 0.40	0.00	0.00	0.00
N-Value	= .013	.013	.000	.000
Orif. Coeff.	= 0.60	0.60	0.00	0.00
Multi-Stage	= n/a	Yes	No	No

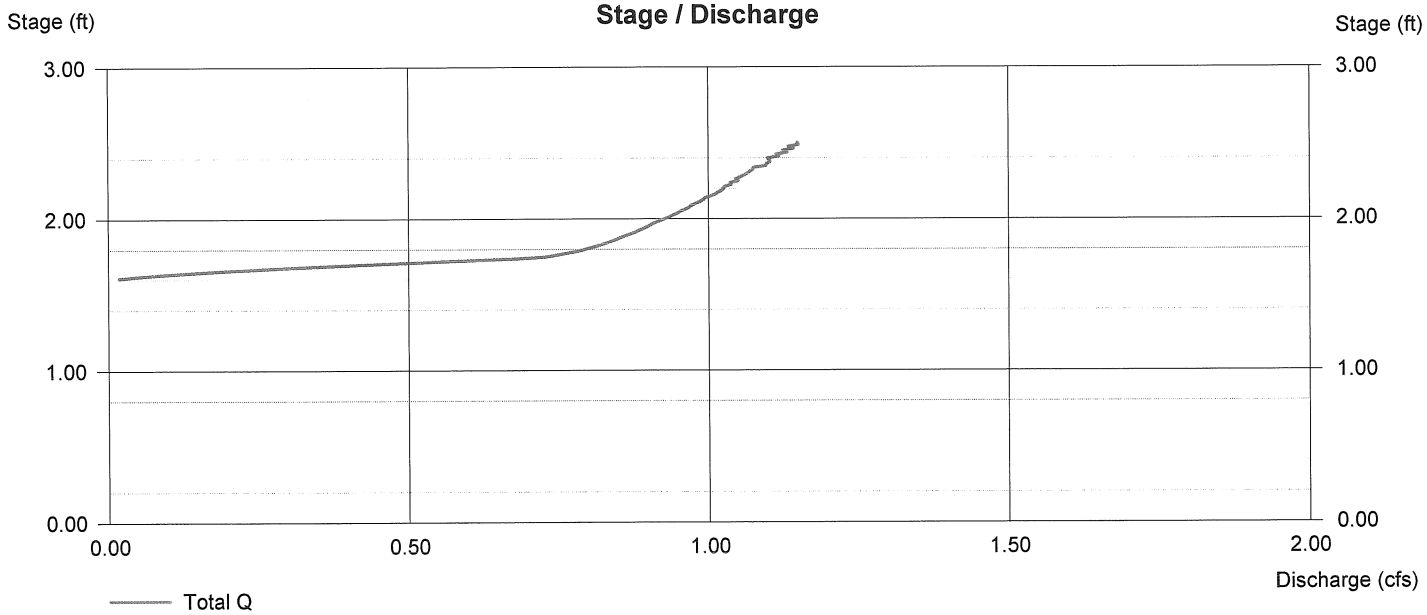
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 5.00	4.00	0.00	0.00
Crest El. (ft)	= 113.60	112.60	0.00	0.00
Weir Coeff.	= 3.33	3.33	0.00	0.00
Weir Type	= Riser	Rect	---	---
Multi-Stage	= Yes	Yes	No	No

Exfiltration = 0.000 in/hr (Wet area) Tailwater Elev. = 0.00 ft

Note: Culvert/Orifice outflows have been analyzed under inlet and outlet control.

Stage / Discharge



Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	3.42	1	723	11,816	----	------	------	E1 impervious
2	SCS Runoff	0.30	1	735	1,551	----	------	------	E1 pervious
3	Combine	3.60	1	723	13,366	1, 2	------	------	E1 combined
4	SCS Runoff	1.70	1	723	5,863	----	------	------	E2 impervious
5	SCS Runoff	0.23	1	723	697	----	------	------	E2 Pervious
6	Combine	1.93	1	723	6,561	4, 5	------	------	E2 combined to ditch
7	SCS Runoff	3.32	1	723	11,490	----	------	------	E3 impervious
8	SCS Runoff	2.11	1	764	20,399	----	------	------	E3 pervious
9	Combine	3.94	1	723	31,889	7, 8	------	------	E3 combined to inlet
10	SCS Runoff	3.24	1	723	11,194	----	------	------	P1 impervious
11	SCS Runoff	0.51	1	723	1,545	----	------	------	P1 pervious
12	Combine	3.75	1	723	12,739	10, 11	------	------	P1 combined
13	SCS Runoff	1.65	1	723	5,715	----	------	------	P2 impervious
14	SCS Runoff	0.21	1	728	825	----	------	------	P2 pervious
15	Combine	1.82	1	723	6,540	13, 14	------	------	P2 combined to ditch
16	SCS Runoff	7.30	1	723	25,231	----	------	------	P3 impervious
17	SCS Runoff	3.15	1	731	14,434	----	------	------	P3 pervious
18	Combine	9.54	1	724	39,665	16, 17	------	------	P3 Combined to basin
19	Reservoir	1.01	1	788	22,556	18	113.16	23,999	Routing

Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

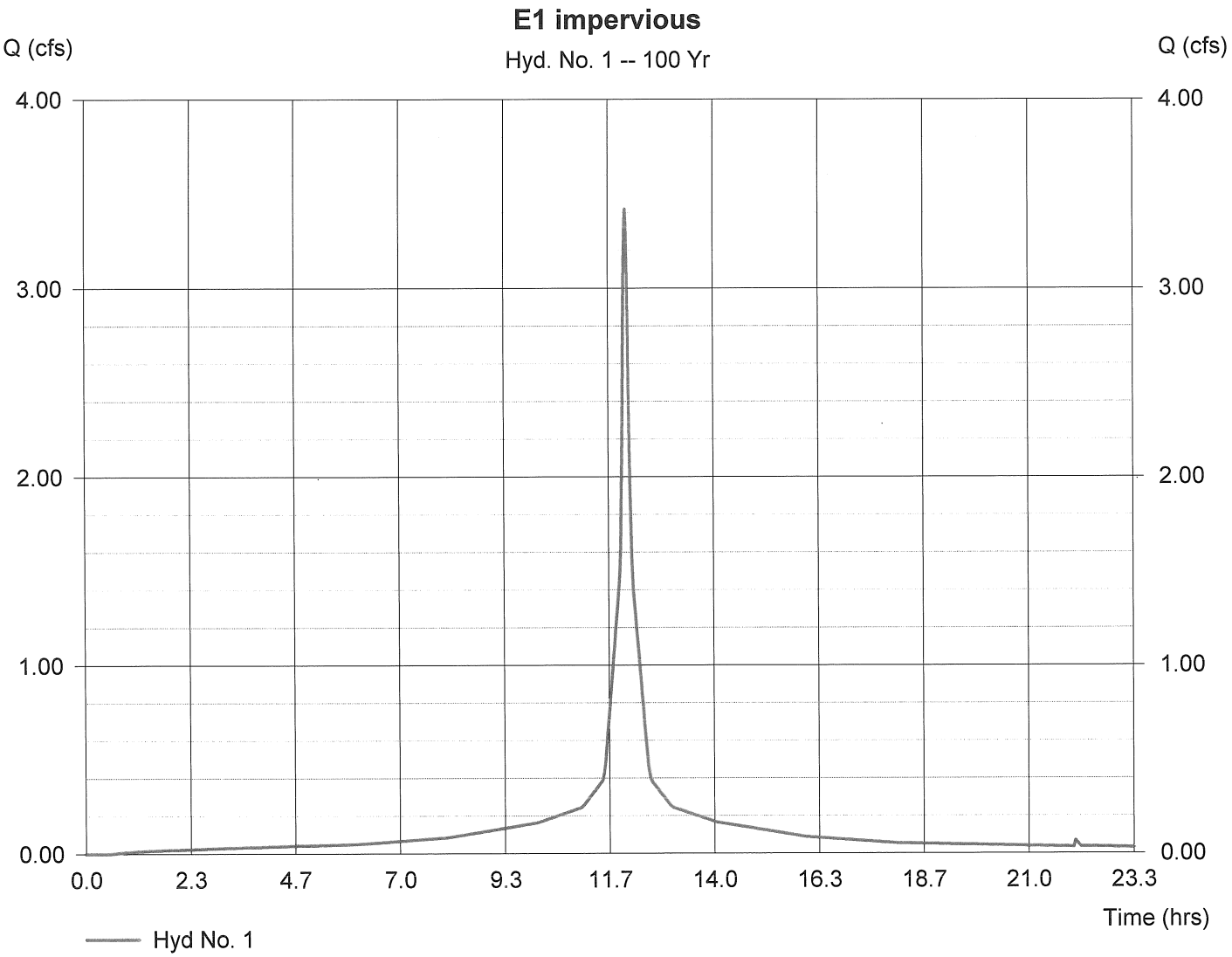
Tuesday, Mar 10 2020, 12:14 PM

Hyd. No. 1

E1 impervious

Hydrograph type	= SCS Runoff	Peak discharge	= 3.42 cfs
Storm frequency	= 100 yrs	Time interval	= 1 min
Drainage area	= 0.399 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 2.20 min
Total precip.	= 8.45 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

Hydrograph Volume = 11,816 cuft



TR55 Tc Worksheet

Hyd. No. 1

E1 impervious

Description	A	B	C	Totals
Sheet Flow				
Manning's n-value	= 0.011	0.011	0.011	
Flow length (ft)	= 113.0	0.0	0.0	
Two-year 24-hr precip. (in)	= 3.26	0.00	0.00	
Land slope (%)	= 0.59	0.00	0.00	
Travel Time (min)	**= 2.16**	**+ 0.00**	**+ 0.00**	**= 2.16**
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	
Travel Time (min)	**= 0.00**	**+ 0.00**	**+ 0.00**	**= 0.00**

Total Travel Time, Tc ..... 2.20 min

Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

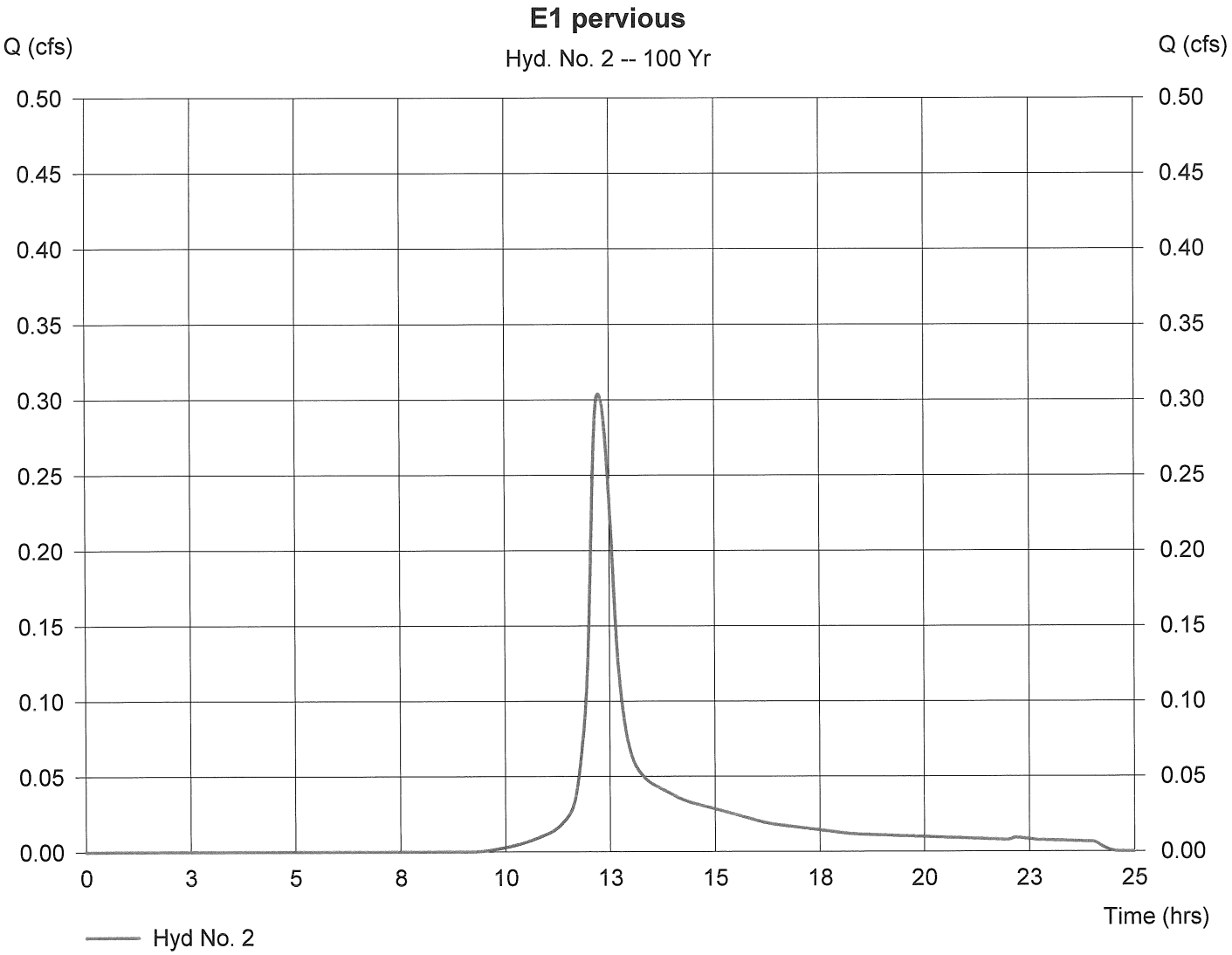
Tuesday, Mar 10 2020, 12:14 PM

Hyd. No. 2

E1 pervious

Hydrograph type	= SCS Runoff	Peak discharge	= 0.30 cfs
Storm frequency	= 100 yrs	Time interval	= 1 min
Drainage area	= 0.112 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 14.60 min
Total precip.	= 8.45 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

Hydrograph Volume = 1,551 cuft



TR55 Tc Worksheet

Hyd. No. 2

E1 pervious

Description	A	B	C	Totals
Sheet Flow				
Manning's n-value	= 0.410	0.011	0.011	
Flow length (ft)	= 32.0	0.0	0.0	
Two-year 24-hr precip. (in)	= 3.26	0.00	0.00	
Land slope (%)	= 0.55	0.00	0.00	
Travel Time (min)	**= 14.62**	**+ 0.00**	**+ 0.00**	**= 14.62**
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	
Travel Time (min)	**= 0.00**	**+ 0.00**	**+ 0.00**	**= 0.00**

Total Travel Time, Tc ..... 14.60 min

Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

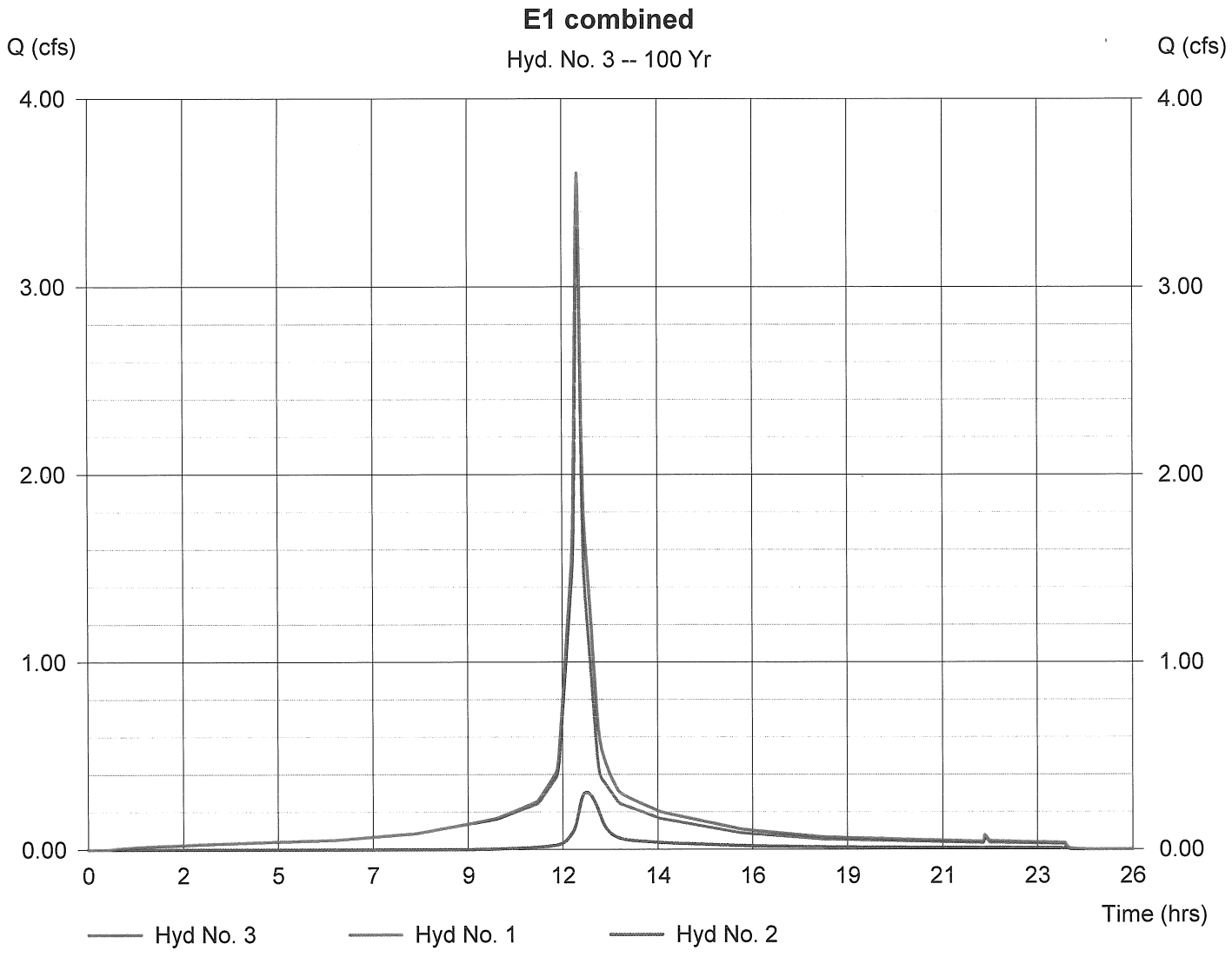
Tuesday, Mar 10 2020, 12:14 PM

Hyd. No. 3

E1 combined

Hydrograph type	= Combine	Peak discharge	= 3.60 cfs
Storm frequency	= 100 yrs	Time interval	= 1 min
Inflow hyds.	= 1, 2		

Hydrograph Volume = 13,366 cuft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

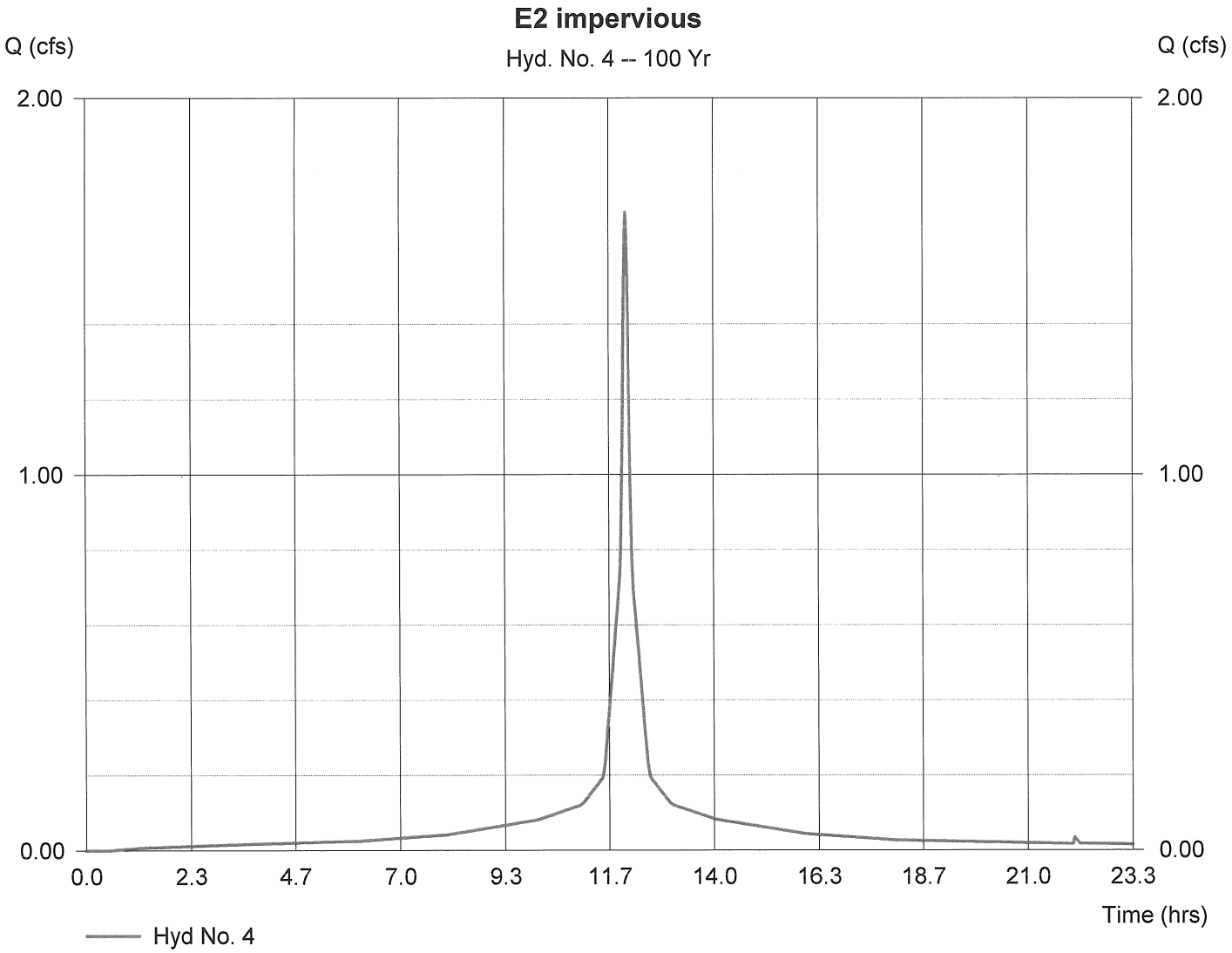
Tuesday, Mar 10 2020, 12:14 PM

Hyd. No. 4

E2 impervious

Hydrograph type	= SCS Runoff	Peak discharge	= 1.70 cfs
Storm frequency	= 100 yrs	Time interval	= 1 min
Drainage area	= 0.198 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 2.50 min
Total precip.	= 8.45 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

Hydrograph Volume = 5,863 cuft



TR55 Tc Worksheet

Hyd. No. 4

E2 impervious

Description	A	B	C	Totals
Sheet Flow				
Manning's n-value	= 0.011	0.011	0.011	
Flow length (ft)	= 145.0	0.0	0.0	
Two-year 24-hr precip. (in)	= 3.30	0.00	0.00	
Land slope (%)	= 0.88	0.00	0.00	
Travel Time (min)	**= 2.23**	**+ 0.00**	**+ 0.00**	**= 2.23**
Shallow Concentrated Flow				
Flow length (ft)	= 36.00	0.00	0.00	
Watercourse slope (%)	= 1.61	0.00	0.00	
Surface description	= Paved	Paved	Paved	
Average velocity (ft/s)	= 2.58	0.00	0.00	
Travel Time (min)	**= 0.23**	**+ 0.00**	**+ 0.00**	**= 0.23**
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	
Travel Time (min)	**= 0.00**	**+ 0.00**	**+ 0.00**	**= 0.00**

Total Travel Time, Tc ..... 2.50 min

Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

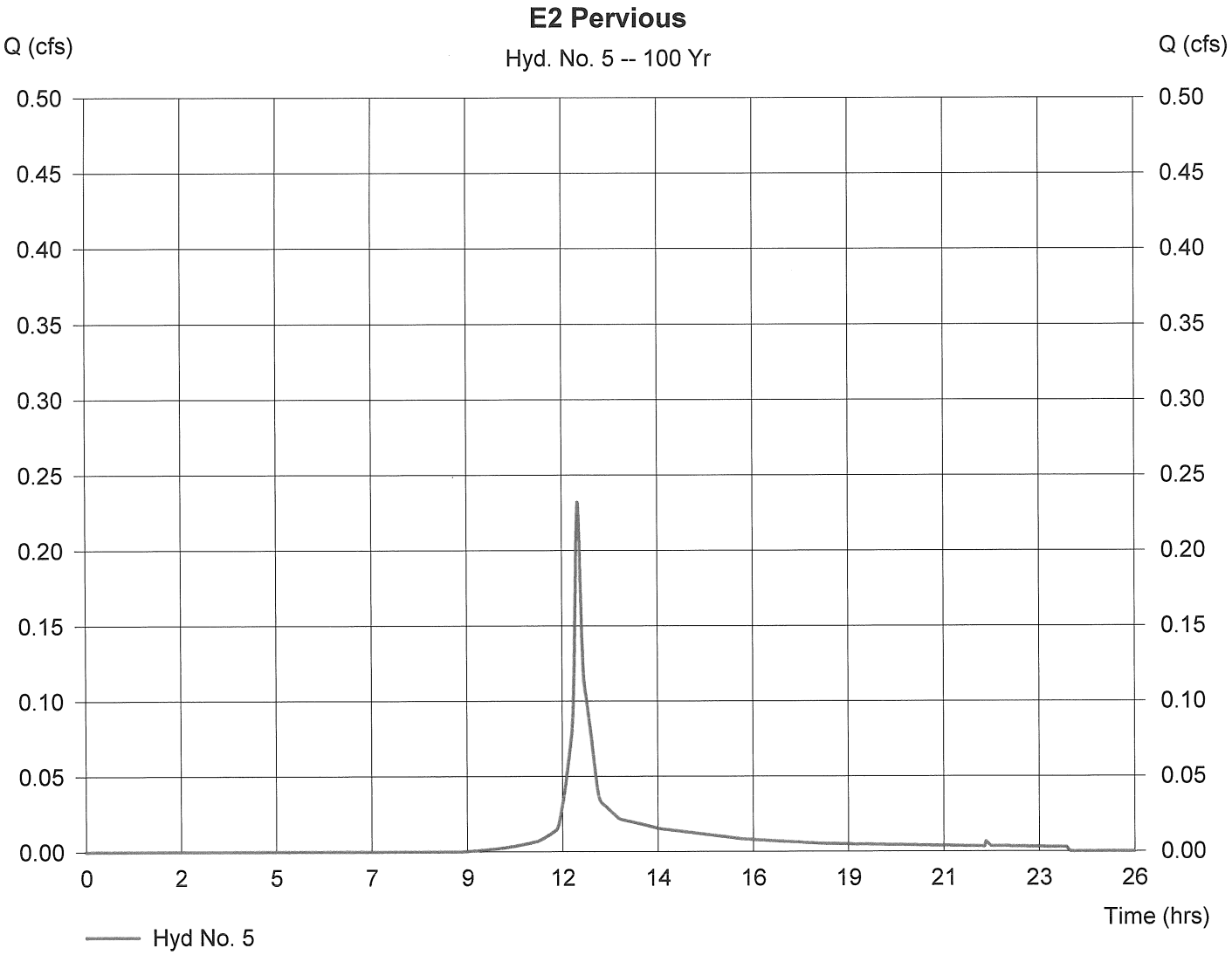
Tuesday, Mar 10 2020, 12:14 PM

Hyd. No. 5

E2 Pervious

Hydrograph type	= SCS Runoff	Peak discharge	= 0.23 cfs
Storm frequency	= 100 yrs	Time interval	= 1 min
Drainage area	= 0.051 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 2.00 min
Total precip.	= 8.45 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

Hydrograph Volume = 697 cuft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

Tuesday, Mar 10 2020, 12:14 PM

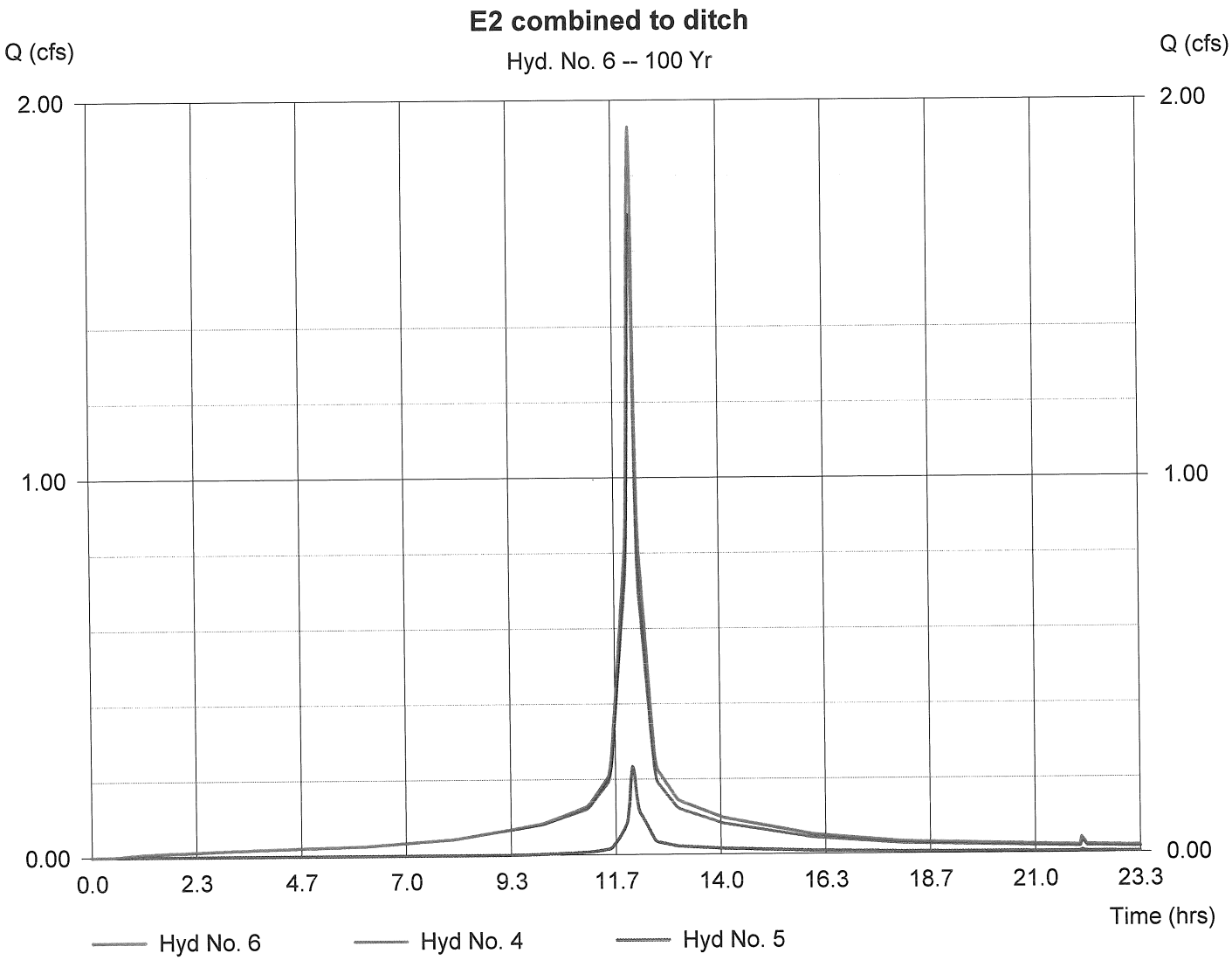
Hyd. No. 6

E2 combined to ditch

Hydrograph type = Combine
Storm frequency = 100 yrs
Inflow hyds. = 4, 5

Peak discharge = 1.93 cfs
Time interval = 1 min

Hydrograph Volume = 6,561 cuft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

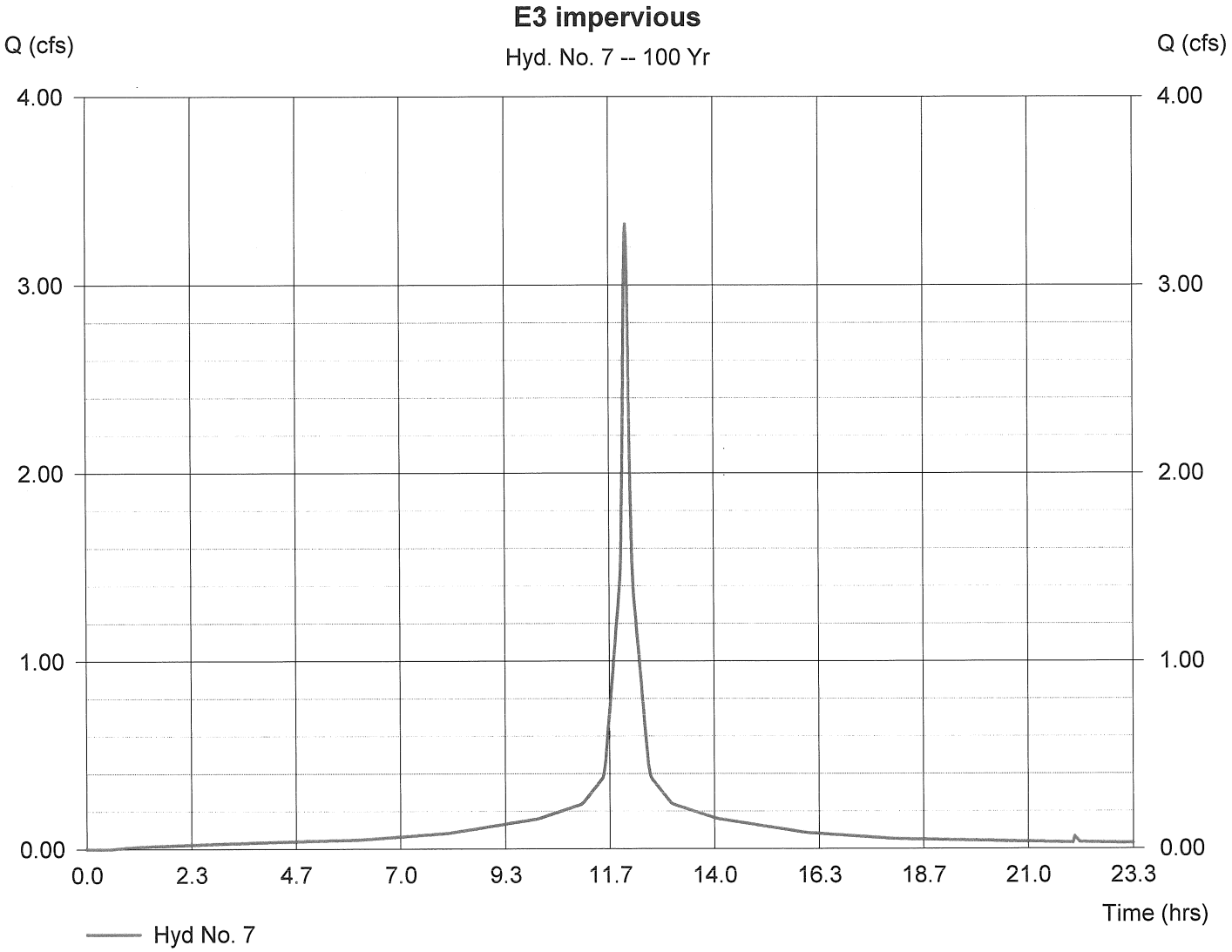
Tuesday, Mar 10 2020, 12:14 PM

Hyd. No. 7

E3 impervious

Hydrograph type	= SCS Runoff	Peak discharge	= 3.32 cfs
Storm frequency	= 100 yrs	Time interval	= 1 min
Drainage area	= 0.388 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 2.90 min
Total precip.	= 8.45 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

Hydrograph Volume = 11,490 cuft



TR55 Tc Worksheet

Hyd. No. 7

E3 impervious

Description	A	B	C	Totals
Sheet Flow				
Manning's n-value	= 0.011	0.011	0.011	
Flow length (ft)	= 50.0	100.0	0.0	
Two-year 24-hr precip. (in)	= 3.26	3.26	0.00	
Land slope (%)	= 1.36	0.74	0.00	
Travel Time (min)	**= 0.80**	**+ 1.79**	**+ 0.00**	**= 2.59**
Shallow Concentrated Flow				
Flow length (ft)	= 35.00	0.00	0.00	
Watercourse slope (%)	= 0.74	0.00	0.00	
Surface description	= Paved	Paved	Paved	
Average velocity (ft/s)	= 1.75	0.00	0.00	
Travel Time (min)	**= 0.33**	**+ 0.00**	**+ 0.00**	**= 0.33**
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	
Travel Time (min)	**= 0.00**	**+ 0.00**	**+ 0.00**	**= 0.00**

Total Travel Time, Tc ..... 2.90 min

Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

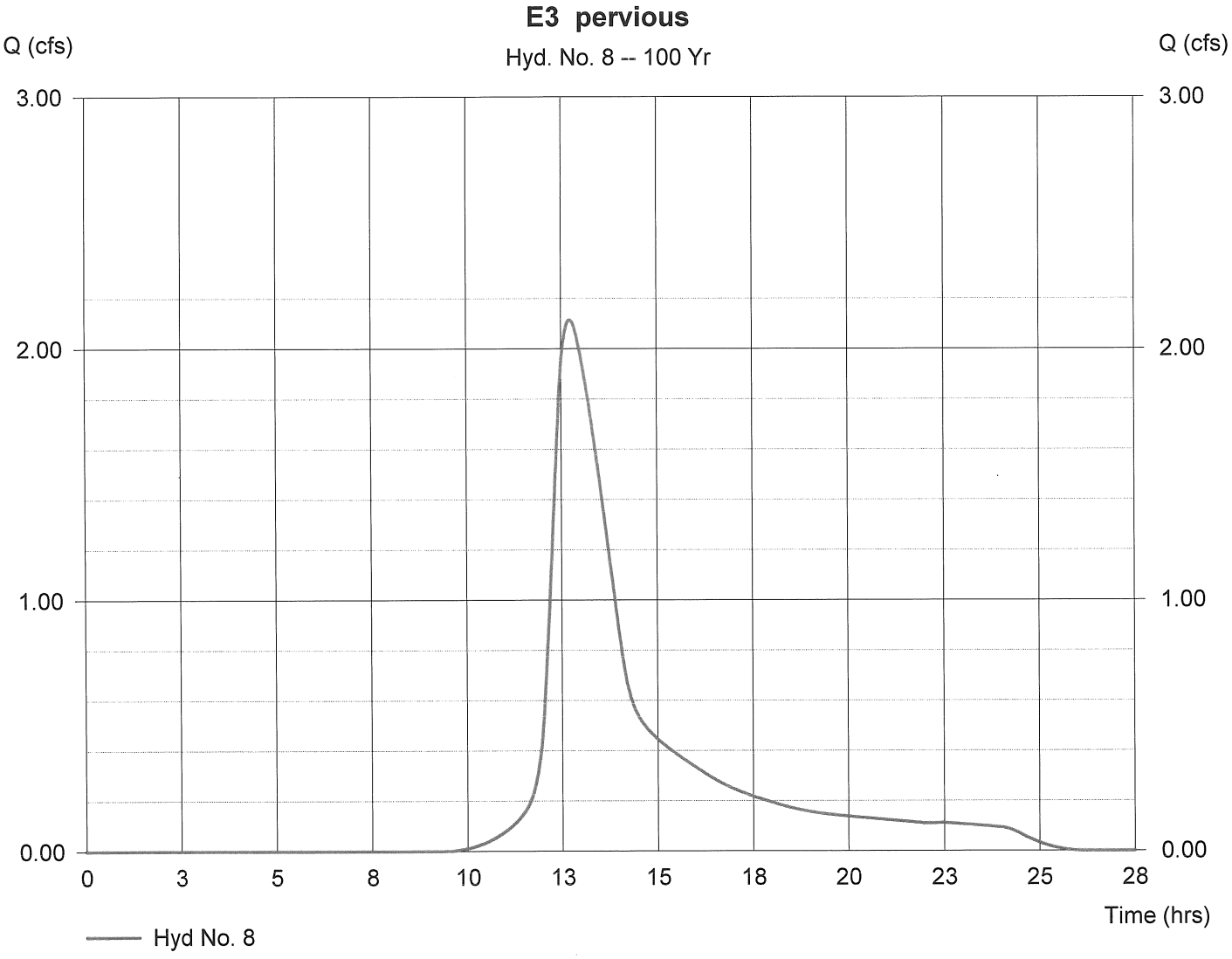
Tuesday, Mar 10 2020, 12:14 PM

Hyd. No. 8

E3 pervious

Hydrograph type	= SCS Runoff	Peak discharge	= 2.11 cfs
Storm frequency	= 100 yrs	Time interval	= 1 min
Drainage area	= 1.486 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 48.60 min
Total precip.	= 8.45 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

Hydrograph Volume = 20,399 cuft



TR55 Tc Worksheet

Hyd. No. 8

E3 pervious

Description	A	B	C	Totals
Sheet Flow				
Manning's n-value	= 0.410	0.410	0.011	
Flow length (ft)	= 115.0	35.0	0.0	
Two-year 24-hr precip. (in)	= 3.26	3.26	0.00	
Land slope (%)	= 1.33	0.45	0.00	
Travel Time (min)	**= 28.57 +**	**17.02 +**	**0.00 =**	**45.58**
Shallow Concentrated Flow				
Flow length (ft)	= 185.00	32.00	0.00	
Watercourse slope (%)	= 0.45	6.25	0.00	
Surface description	= Unpaved	Unpaved	Paved	
Average velocity (ft/s)	= 1.08	4.03	0.00	
Travel Time (min)	**= 2.85 +**	**0.13 +**	**0.00 =**	**2.98**
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	
Travel Time (min)	**= 0.00 +**	**0.00 +**	**0.00 =**	**0.00**

Total Travel Time, Tc ..... 48.60 min

Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

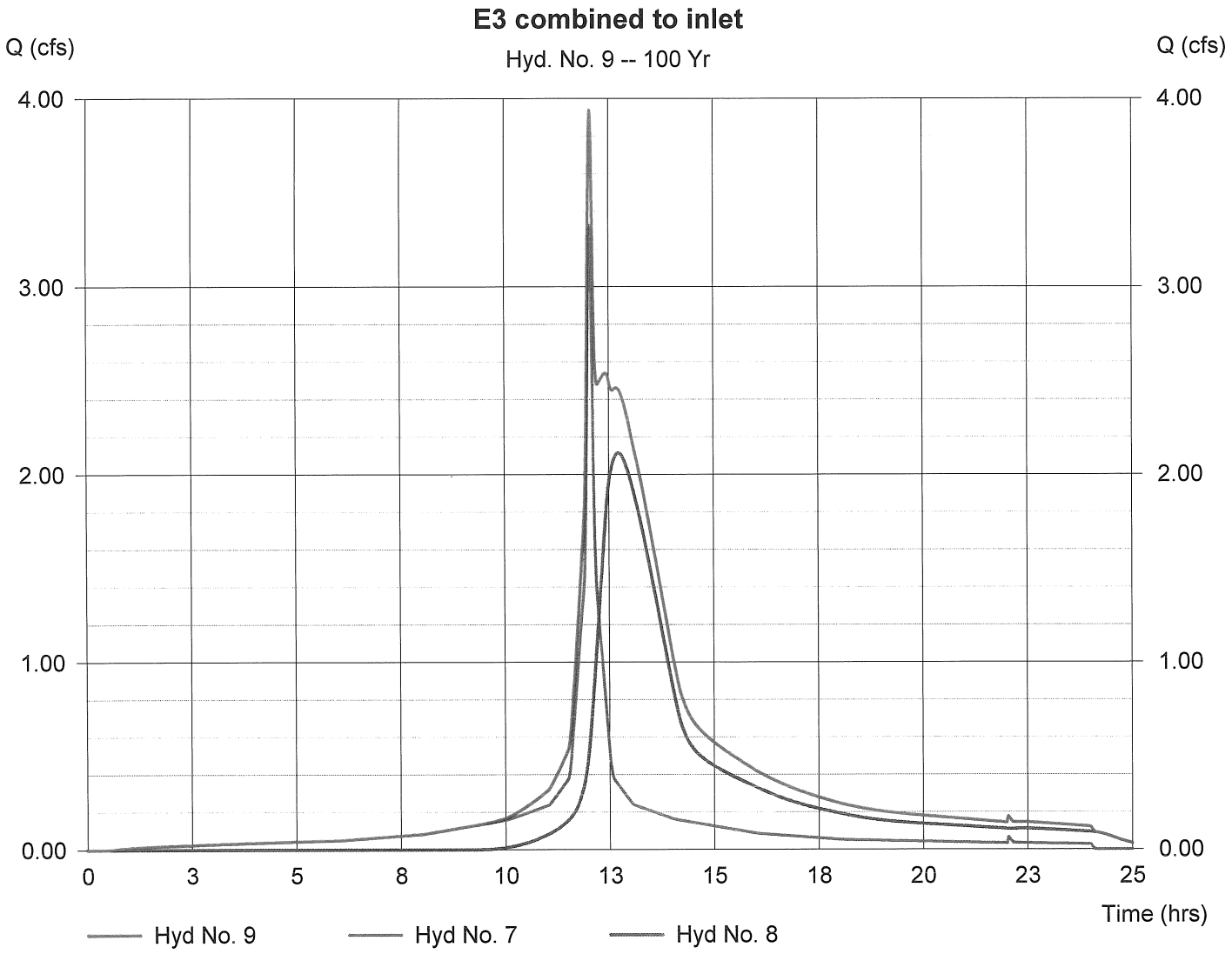
Tuesday, Mar 10 2020, 12:14 PM

Hyd. No. 9

E3 combined to inlet

Hydrograph type	= Combine	Peak discharge	= 3.94 cfs
Storm frequency	= 100 yrs	Time interval	= 1 min
Inflow hyds.	= 7, 8		

Hydrograph Volume = 31,889 cuft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

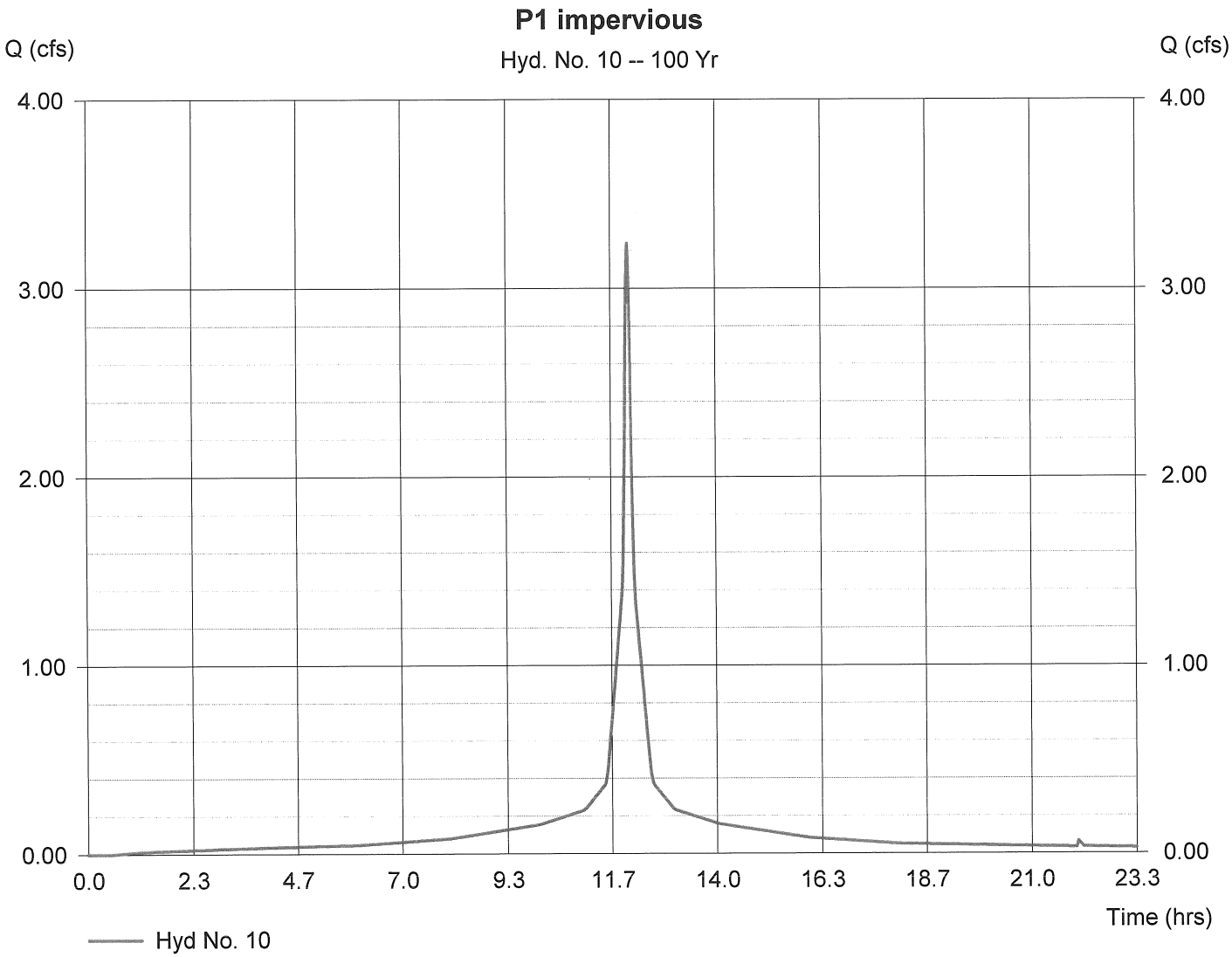
Tuesday, Mar 10 2020, 12:14 PM

Hyd. No. 10

P1 impervious

Hydrograph type	= SCS Runoff	Peak discharge	= 3.24 cfs
Storm frequency	= 100 yrs	Time interval	= 1 min
Drainage area	= 0.378 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 2.40 min
Total precip.	= 8.45 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

Hydrograph Volume = 11,194 cuft



TR55 Tc Worksheet

Hyd. No. 10

P1 impervious

Description	A	B	C	Totals
Sheet Flow				
Manning's n-value	= 0.011	0.011	0.011	
Flow length (ft)	= 123.0	0.0	0.0	
Two-year 24-hr precip. (in)	= 3.26	0.00	0.00	
Land slope (%)	= 0.55	0.00	0.00	
Travel Time (min)	**= 2.37**	**+ 0.00**	**+ 0.00**	**= 2.37**
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	
Travel Time (min)	**= 0.00**	**+ 0.00**	**+ 0.00**	**= 0.00**

Total Travel Time, Tc ..... 2.40 min

Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

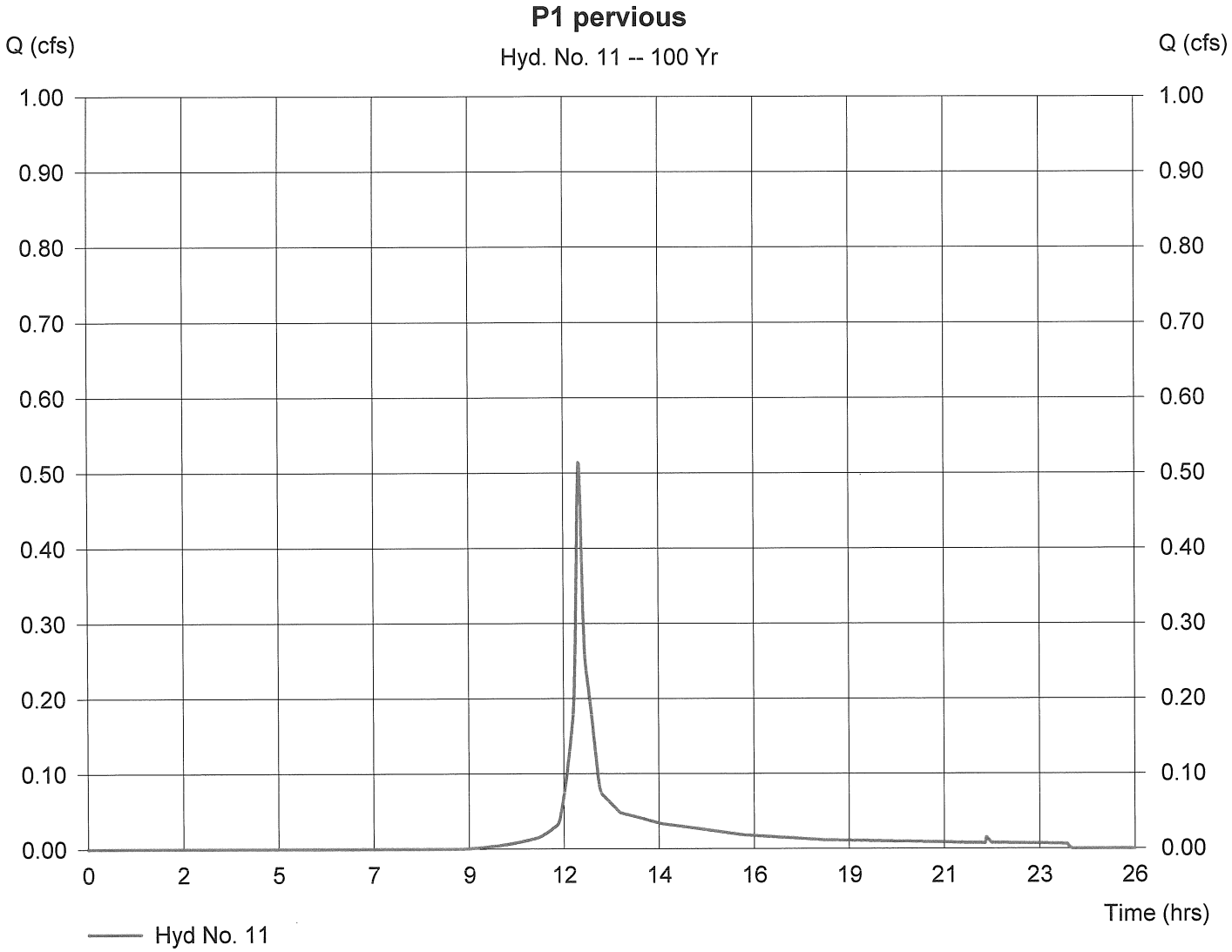
Tuesday, Mar 10 2020, 12:14 PM

Hyd. No. 11

P1 pervious

Hydrograph type	= SCS Runoff	Peak discharge	= 0.51 cfs
Storm frequency	= 100 yrs	Time interval	= 1 min
Drainage area	= 0.113 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 2.00 min
Total precip.	= 8.45 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

Hydrograph Volume = 1,545 cuft



Hydrograph Plot

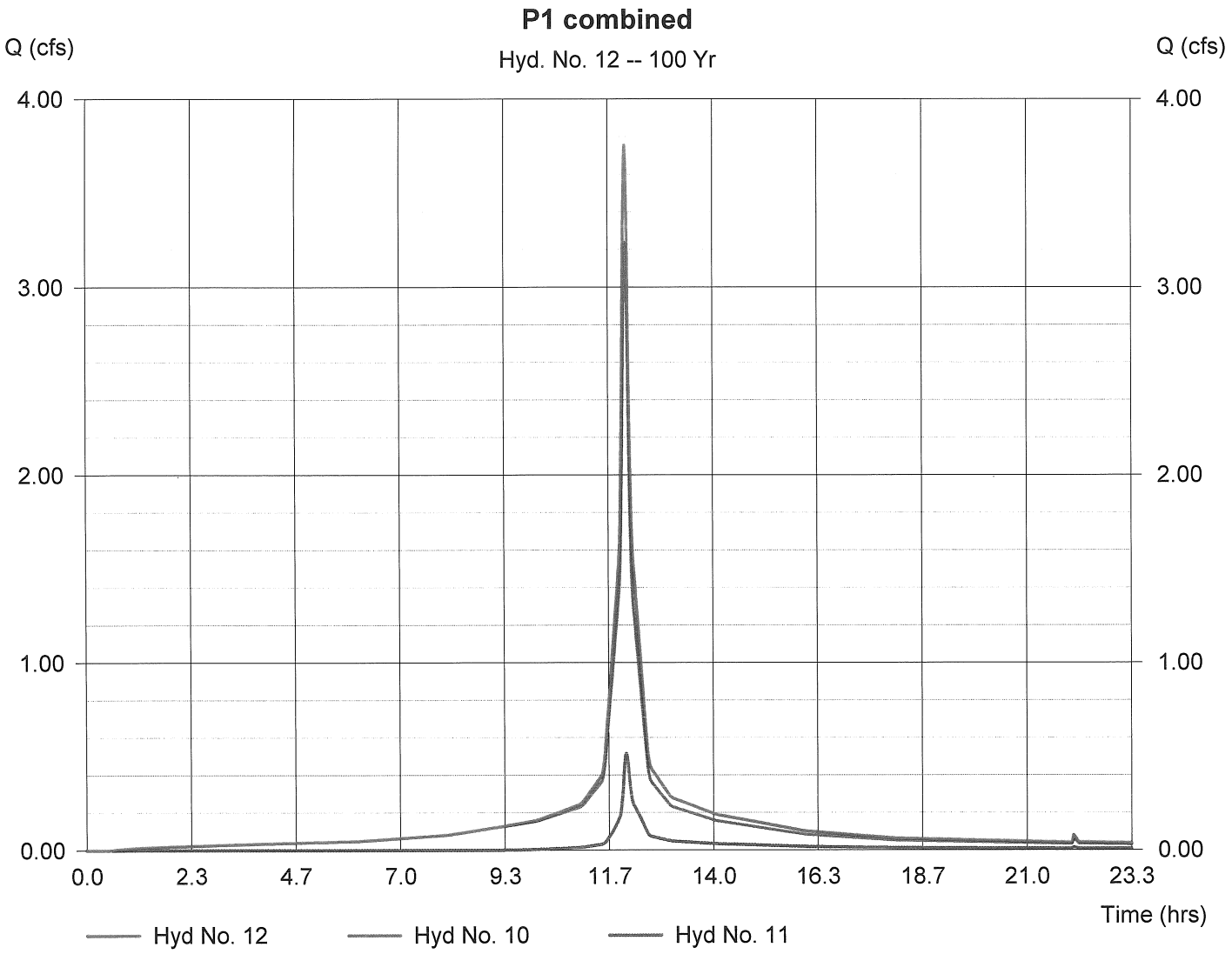
Hydraflow Hydrographs by Intelisolve | Tuesday, Mar 10 2020, 12:14 PM

Hyd. No. 12

P1 combined

Hydrograph type	= Combine	Peak discharge	= 3.75 cfs
Storm frequency	= 100 yrs	Time interval	= 1 min
Inflow hyds.	= 10, 11		

Hydrograph Volume = 12,739 cuft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

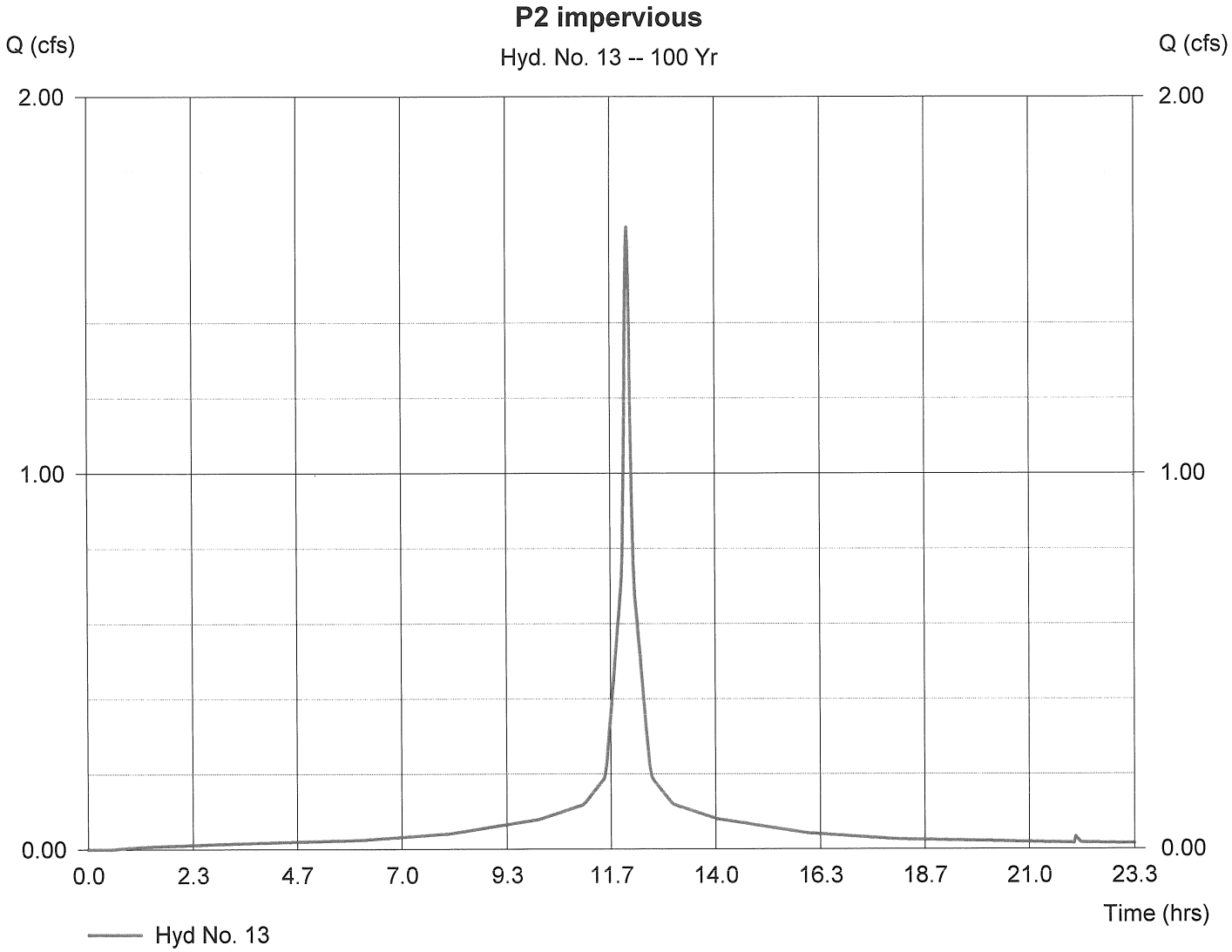
Tuesday, Mar 10 2020, 12:14 PM

Hyd. No. 13

P2 impervious

Hydrograph type	= SCS Runoff	Peak discharge	= 1.65 cfs
Storm frequency	= 100 yrs	Time interval	= 1 min
Drainage area	= 0.193 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 2.90 min
Total precip.	= 8.45 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

Hydrograph Volume = 5,715 cuft



TR55 Tc Worksheet

Hyd. No. 13

P2 impervious

Description	A	B	C	Totals
Sheet Flow				
Manning's n-value	= 0.011	0.011	0.011	
Flow length (ft)	= 50.0	95.0	39.0	
Two-year 24-hr precip. (in)	= 3.26	3.26	3.26	
Land slope (%)	= 1.20	1.05	1.67	
Travel Time (min)	**= 0.85**	**+ 1.49**	**+ 0.61**	**= 2.94**
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	
Travel Time (min)	**= 0.00**	**+ 0.00**	**+ 0.00**	**= 0.00**

Total Travel Time, Tc ..... 2.90 min

Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

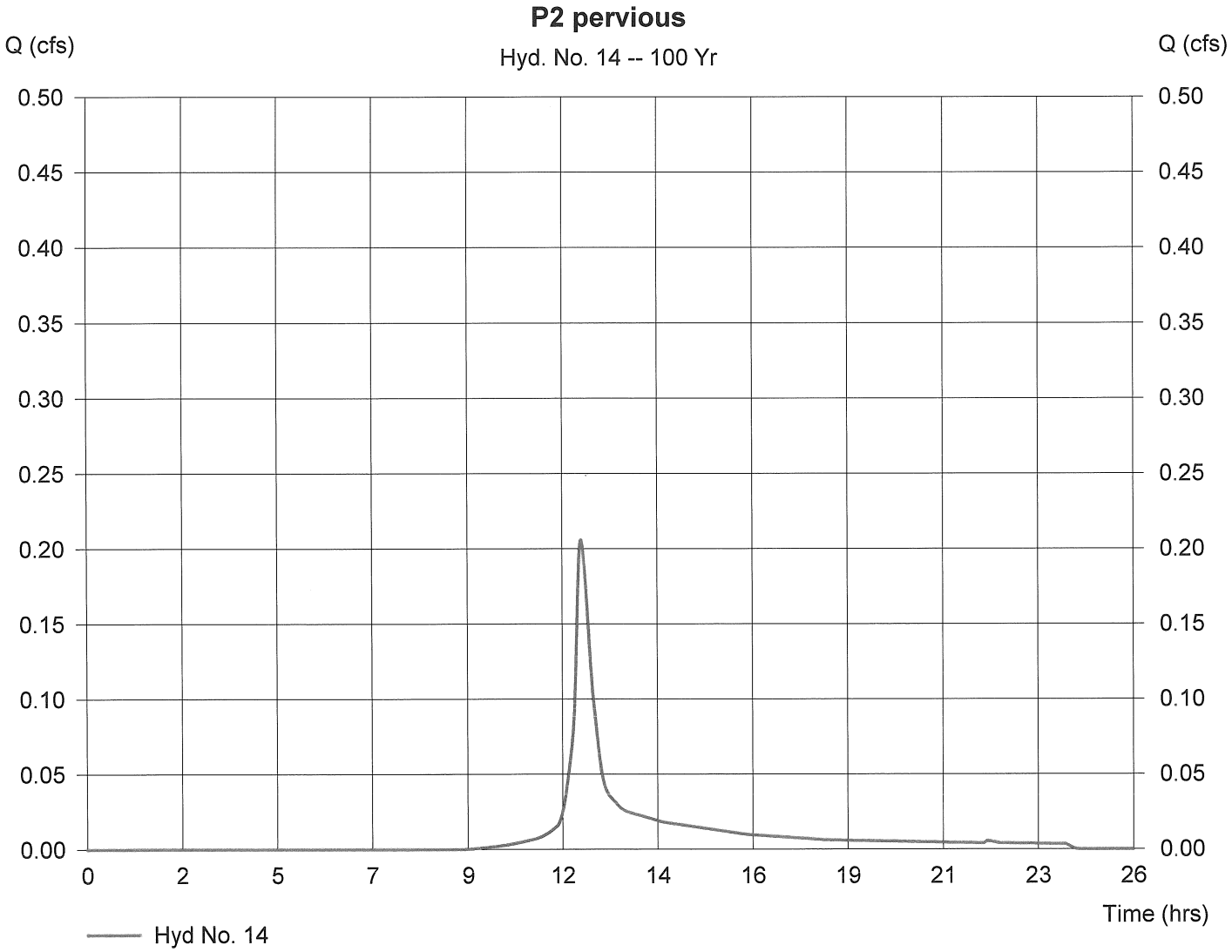
Tuesday, Mar 10 2020, 12:14 PM

Hyd. No. 14

P2 pervious

Hydrograph type	= SCS Runoff	Peak discharge	= 0.21 cfs
Storm frequency	= 100 yrs	Time interval	= 1 min
Drainage area	= 0.059 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 6.70 min
Total precip.	= 8.45 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

Hydrograph Volume = 825 cuft



TR55 Tc Worksheet

Hyd. No. 14

P2 pervious

Description	A	B	C	Totals
Sheet Flow				
Manning's n-value	= 0.410	0.011	0.011	
Flow length (ft)	= 21.0	0.0	0.0	
Two-year 24-hr precip. (in)	= 3.26	0.00	0.00	
Land slope (%)	= 1.67	0.00	0.00	
Travel Time (min)	**= 6.69**	**+ 0.00**	**+ 0.00**	**= 6.69**
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	
Travel Time (min)	**= 0.00**	**+ 0.00**	**+ 0.00**	**= 0.00**

Total Travel Time, Tc ..... 6.70 min

Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

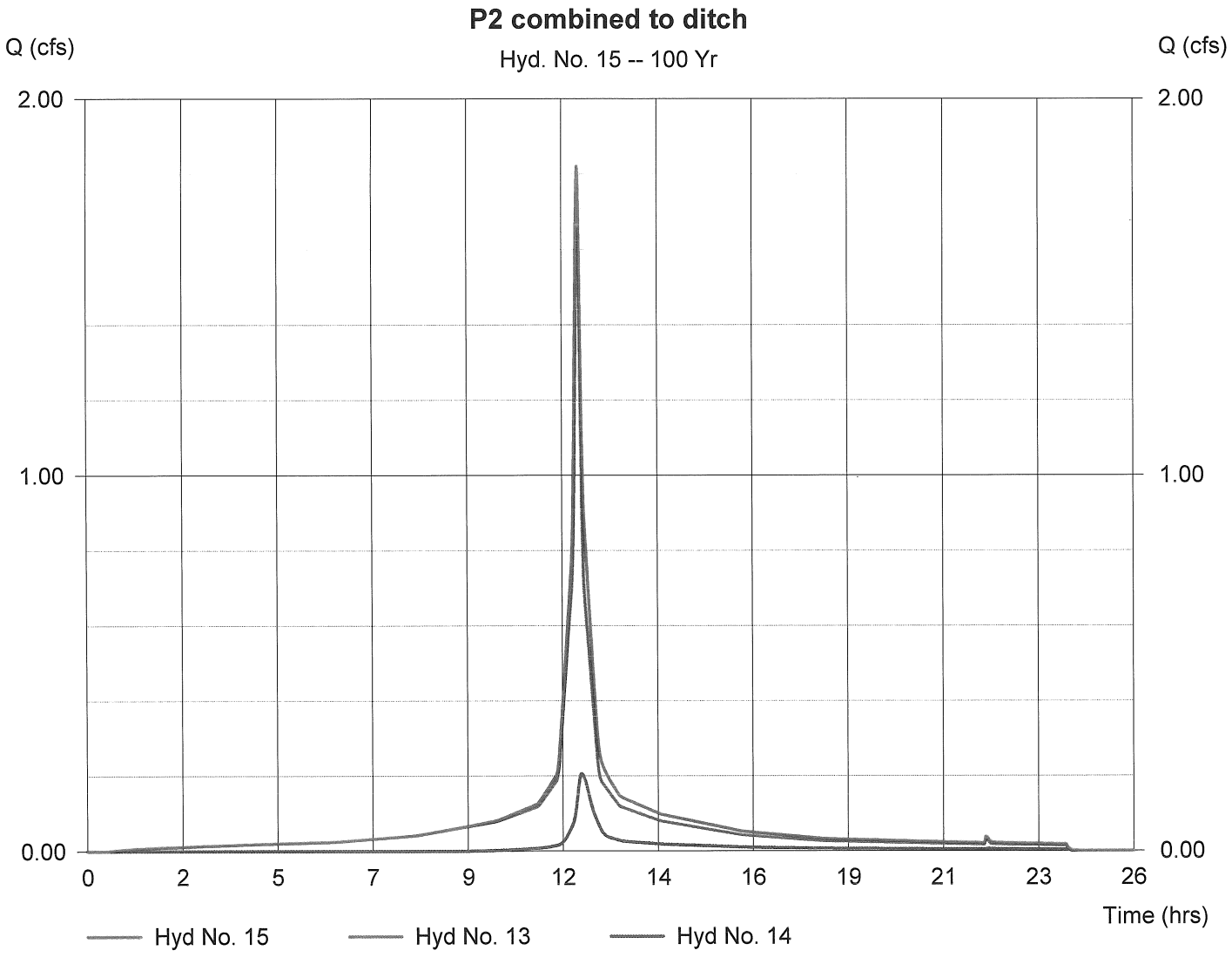
Tuesday, Mar 10 2020, 12:14 PM

Hyd. No. 15

P2 combined to ditch

Hydrograph type	= Combine	Peak discharge	= 1.82 cfs
Storm frequency	= 100 yrs	Time interval	= 1 min
Inflow hyds.	= 13, 14		

Hydrograph Volume = 6,540 cuft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

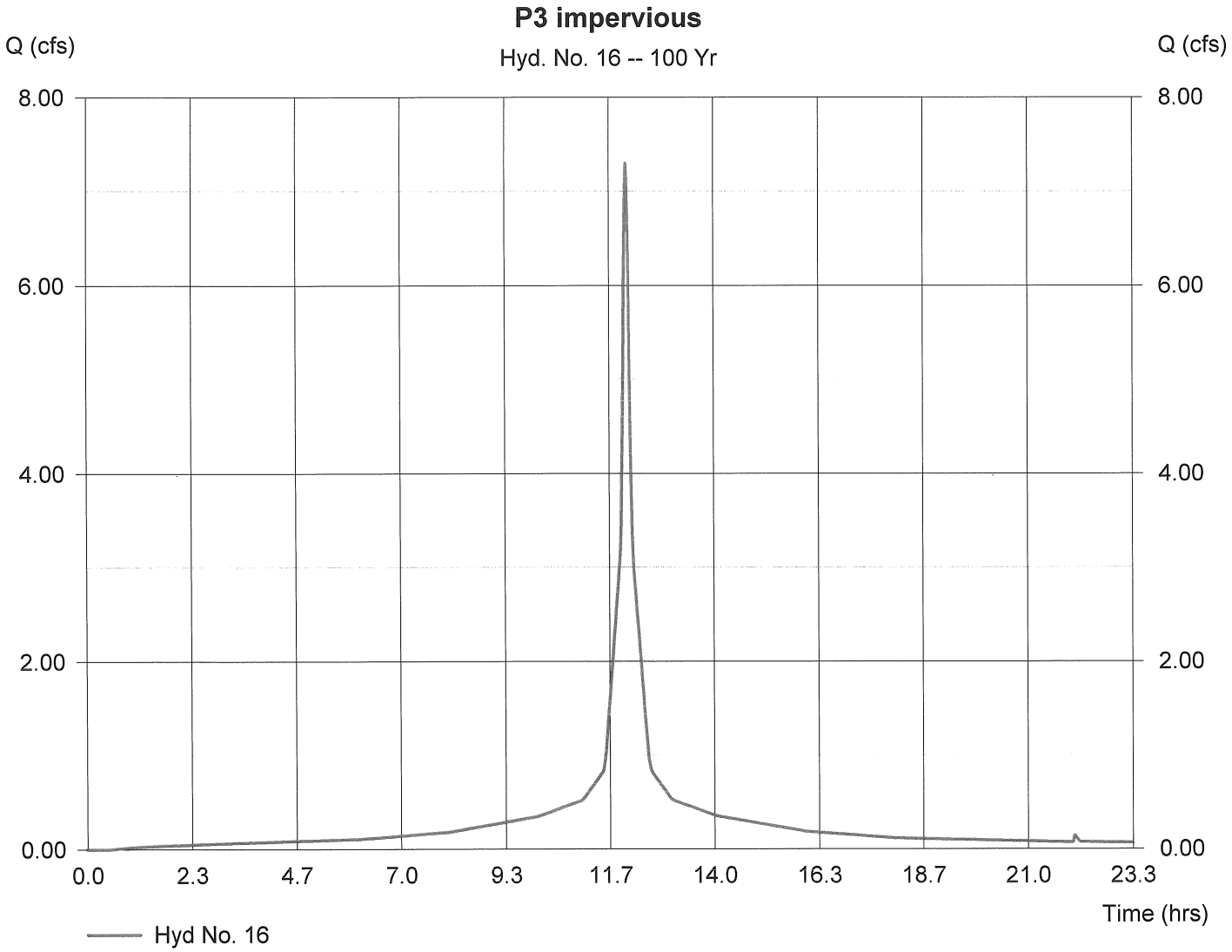
Tuesday, Mar 10 2020, 12:14 PM

Hyd. No. 16

P3 impervious

Hydrograph type	= SCS Runoff	Peak discharge	= 7.30 cfs
Storm frequency	= 100 yrs	Time interval	= 1 min
Drainage area	= 0.852 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 2.50 min
Total precip.	= 8.45 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

Hydrograph Volume = 25,231 cuft



TR55 Tc Worksheet

Hyd. No. 16

P3 impervious

Description	A	B	C	Totals
Sheet Flow				
Manning's n-value	= 0.011	0.011	0.011	
Flow length (ft)	= 147.0	0.0	0.0	
Two-year 24-hr precip. (in)	= 3.26	0.00	0.00	
Land slope (%)	= 0.68	0.00	0.00	
Travel Time (min)	**= 2.52**	**+ 0.00**	**+ 0.00**	**= 2.52**
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	
Travel Time (min)	**= 0.00**	**+ 0.00**	**+ 0.00**	**= 0.00**

Total Travel Time, Tc ..... 2.50 min

Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

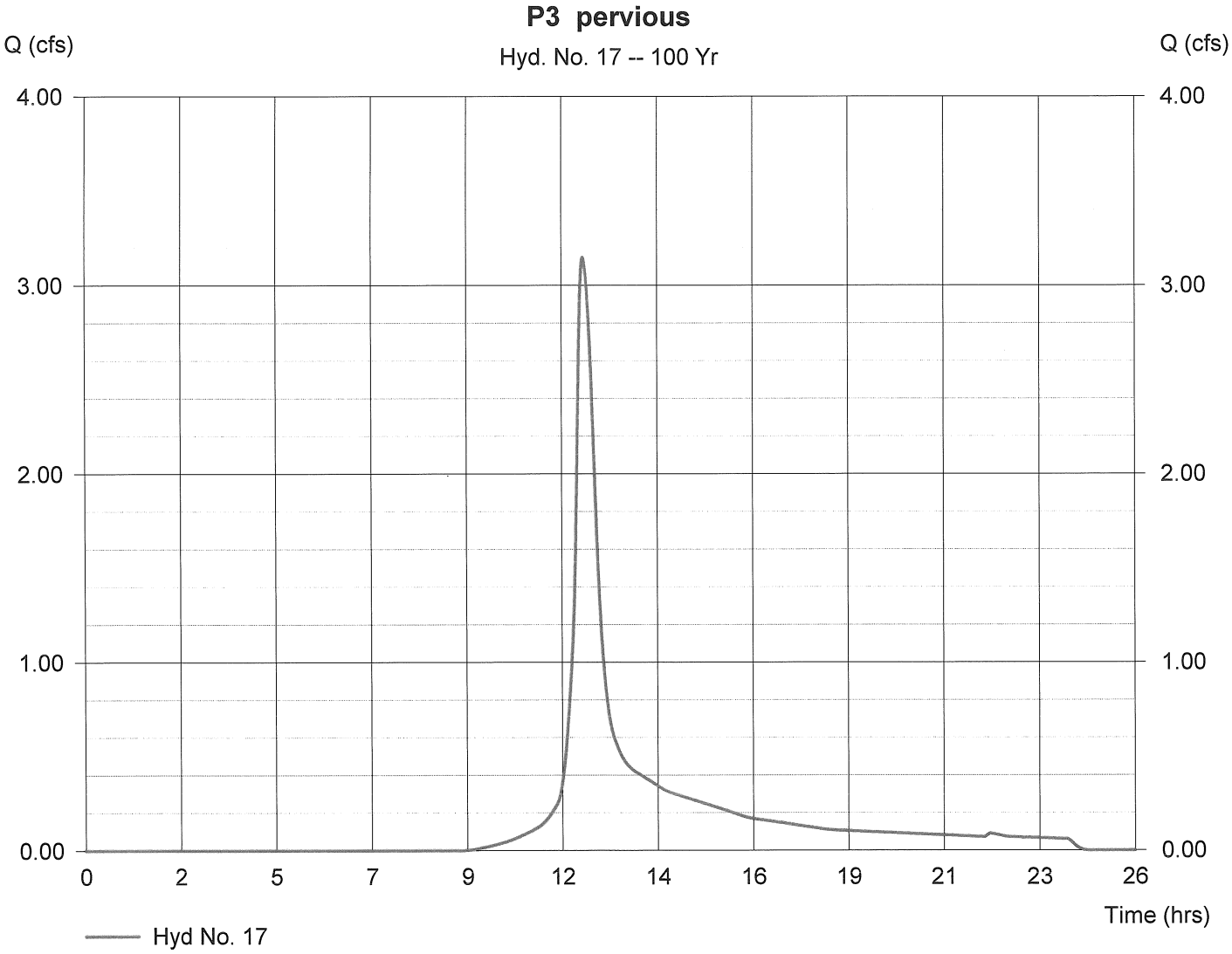
Tuesday, Mar 10 2020, 12:14 PM

Hyd. No. 17

P3 pervious

Hydrograph type	= SCS Runoff	Peak discharge	= 3.15 cfs
Storm frequency	= 100 yrs	Time interval	= 1 min
Drainage area	= 1.039 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 10.40 min
Total precip.	= 8.45 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

Hydrograph Volume = 14,434 cuft



TR55 Tc Worksheet

Hyd. No. 17

P3 pervious

Description	A	B	C	Totals
Sheet Flow				
Manning's n-value	= 0.410	0.011	0.011	
Flow length (ft)	= 36.0	80.0	0.0	
Two-year 24-hr precip. (in)	= 3.26	3.26	0.00	
Land slope (%)	= 2.22	1.25	0.00	
Travel Time (min)	**= 9.19**	**+ 1.21**	**+ 0.00**	**= 10.40**
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	
Travel Time (min)	**= 0.00**	**+ 0.00**	**+ 0.00**	**= 0.00**

Total Travel Time, Tc ..... 10.40 min

Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

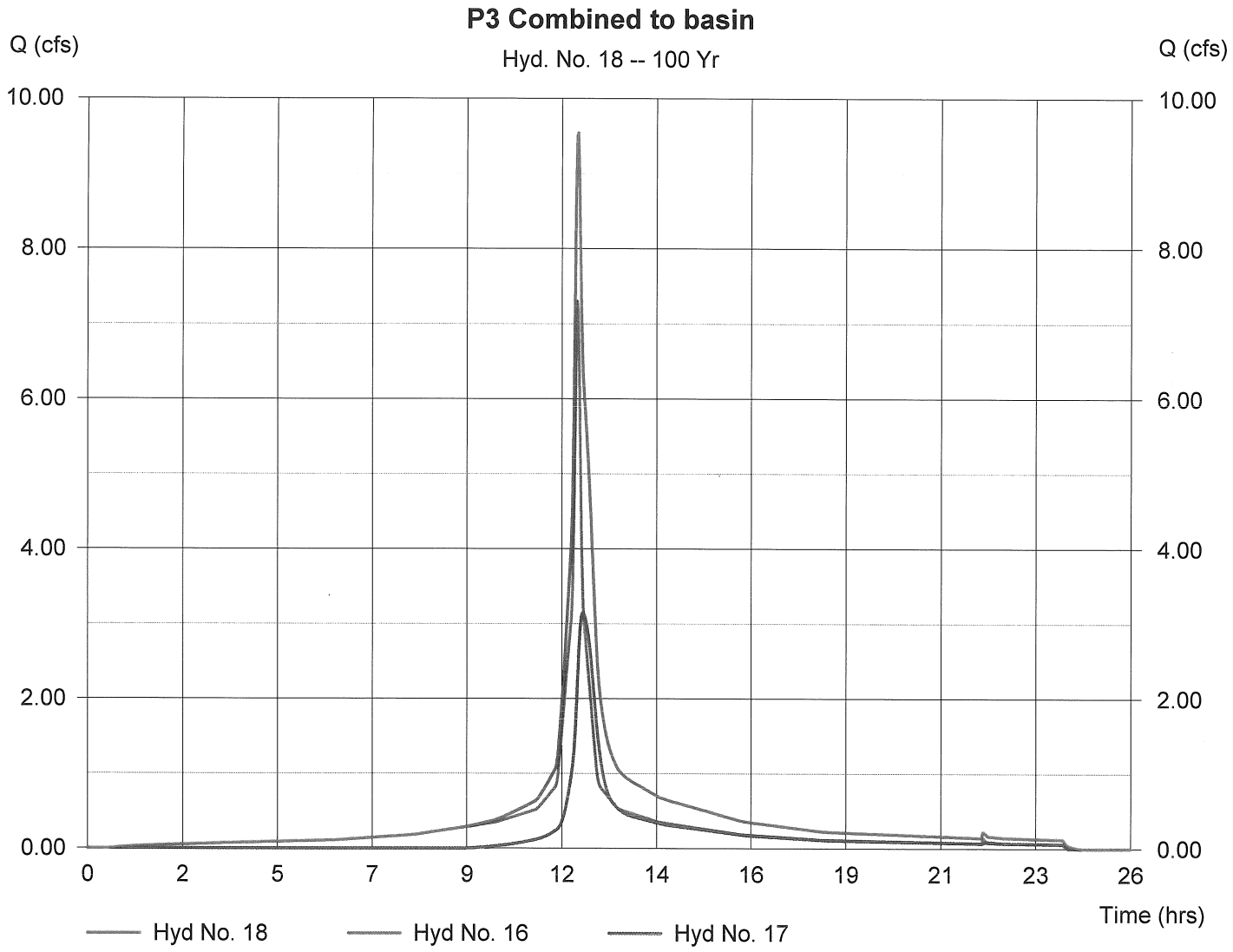
Tuesday, Mar 10 2020, 12:14 PM

Hyd. No. 18

P3 Combined to basin

Hydrograph type	= Combine	Peak discharge	= 9.54 cfs
Storm frequency	= 100 yrs	Time interval	= 1 min
Inflow hyds.	= 16, 17		

Hydrograph Volume = 39,665 cuft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

Tuesday, Mar 10 2020, 12:14 PM

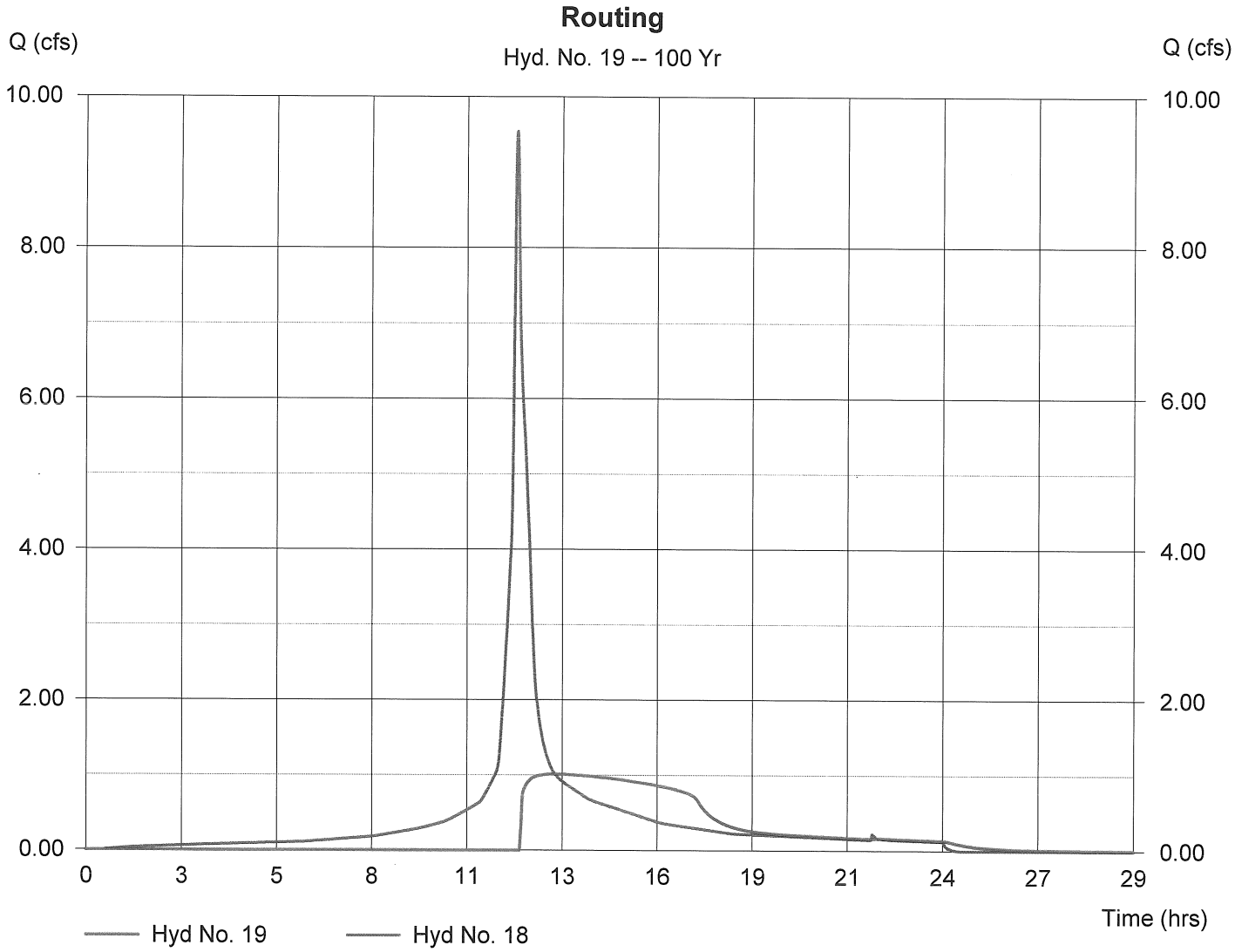
Hyd. No. 19

Routing

Hydrograph type	= Reservoir	Peak discharge	= 1.01 cfs
Storm frequency	= 100 yrs	Time interval	= 1 min
Inflow hyd. No.	= 18	Max. Elevation	= 113.16 ft
Reservoir name	= Pond	Max. Storage	= 23,999 cuft

Storage Indication method used.

Hydrograph Volume = 22,556 cuft



Pond Report

Hydraflow Hydrographs by Intelisolve

Tuesday, Mar 10 2020, 12:14 PM

Pond No. 1 - Pond

Pond Data

Bottom LxW = 160.0 x 60.0 ft Side slope = 3.0:1 Bottom elev. = 111.00 ft Depth = 2.50 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	111.00	9,600	0	0
0.13	111.13	9,766	1,210	1,210
0.25	111.25	9,932	1,231	2,441
0.38	111.38	10,100	1,252	3,693
0.50	111.50	10,269	1,273	4,967
0.63	111.63	10,439	1,294	6,261
0.75	111.75	10,610	1,316	7,576
0.88	111.88	10,783	1,337	8,913
1.00	112.00	10,956	1,359	10,272
1.13	112.13	11,131	1,380	11,652
1.25	112.25	11,306	1,402	13,055
1.38	112.38	11,483	1,424	14,479
1.50	112.50	11,661	1,446	15,926
1.63	112.63	11,840	1,469	17,394
1.75	112.75	12,020	1,491	18,886
1.88	112.88	12,202	1,514	20,399
2.00	113.00	12,384	1,537	21,936
2.13	113.13	12,568	1,559	23,495
2.25	113.25	12,752	1,582	25,078
2.38	113.38	12,938	1,606	26,684
2.50	113.50	13,125	1,629	28,313

Culvert / Orifice Structures

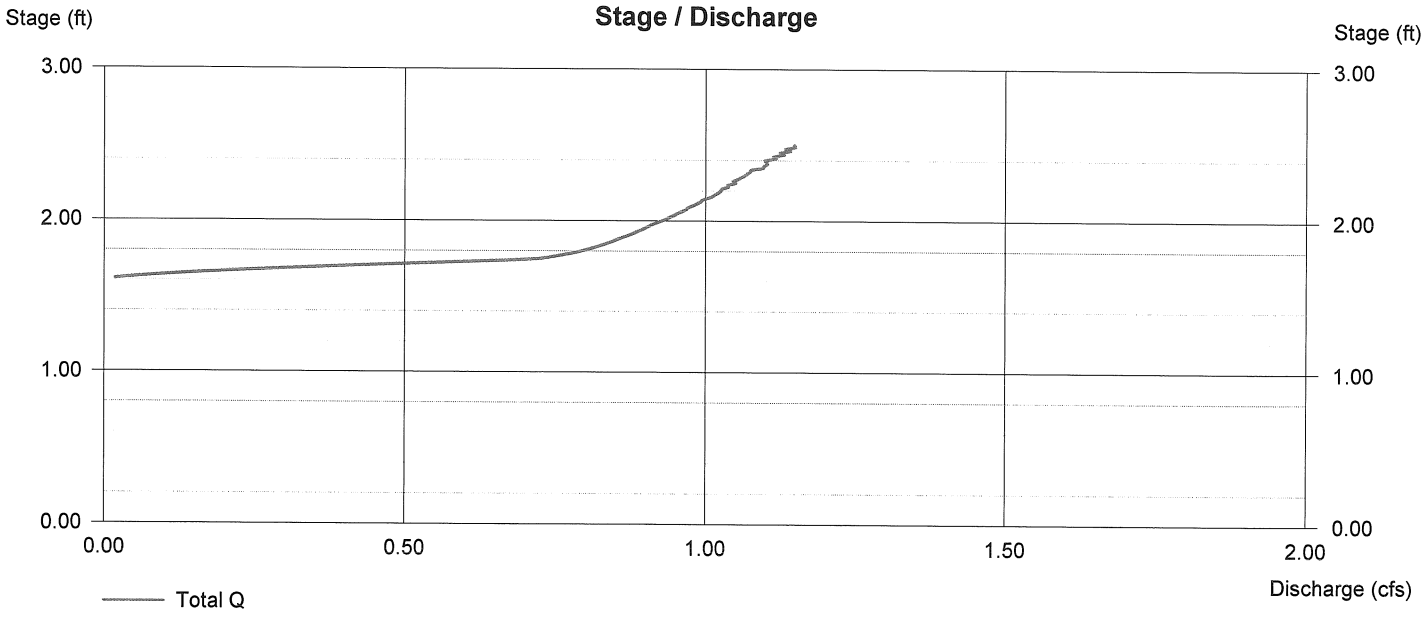
	[A]	[B]	[C]	[D]
Rise (in)	= 8.00	3.00	0.00	0.00
Span (in)	= 8.00	3.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 111.93	111.93	0.00	0.00
Length (ft)	= 125.00	0.00	0.00	0.00
Slope (%)	= 0.40	0.00	0.00	0.00
N-Value	= .013	.013	.000	.000
Orif. Coeff.	= 0.60	0.60	0.00	0.00
Multi-Stage	= n/a	Yes	No	No

Weir Structures

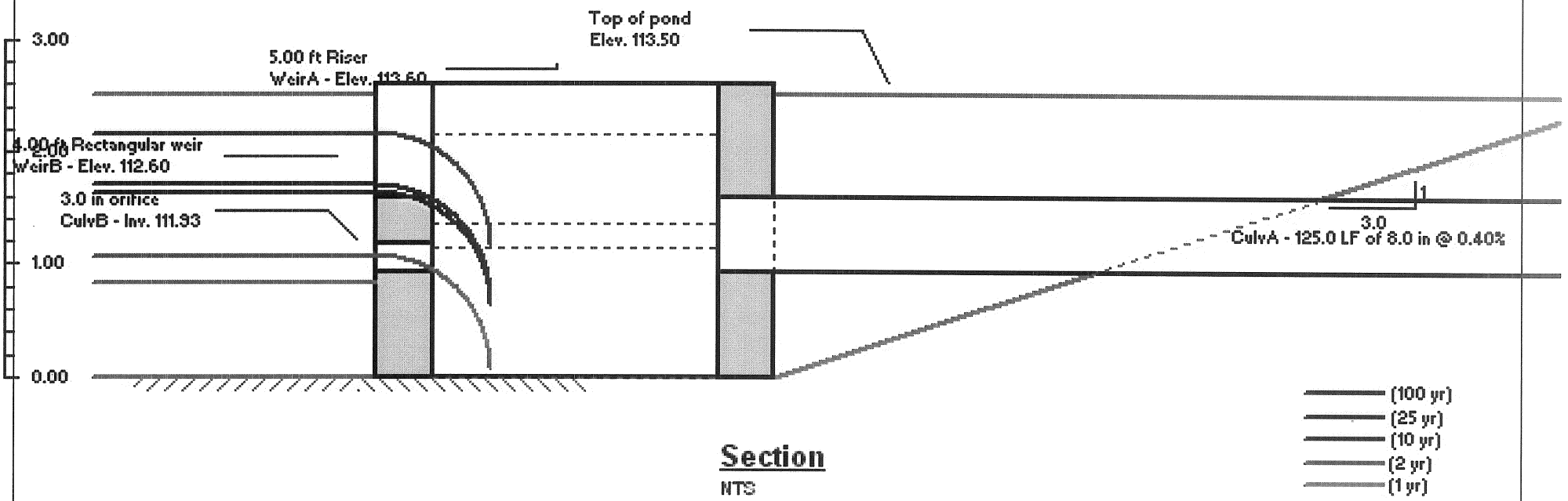
	[A]	[B]	[C]	[D]
Crest Len (ft)	= 5.00	4.00	0.00	0.00
Crest El. (ft)	= 113.60	112.60	0.00	0.00
Weir Coeff.	= 3.33	3.33	0.00	0.00
Weir Type	= Riser	Rect	---	---
Multi-Stage	= Yes	Yes	No	No

Exfiltration = 0.000 in/hr (Wet area) Tailwater Elev. = 0.00 ft

Note: Culvert/Orifice outflows have been analyzed under inlet and outlet control.



Pond



Section

NTS

Schematic only. Not for construction.