DRAINAGE IMPACT ANALYSIS

FOR

SUPERIOR PRESSURE CONTROL

LOCATED AT LOT 35

ST. MARTIN PARISH INDUSTRIAL PARK

Prepared By

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Michael P. Guidry, PE

February 2013

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I. General Information

This property is located in St. Martin Parish, Louisiana, between Petroleum Parkway and Wall Road, and consists of approximately 4.0 acres. The existing property has a small portion that drains north into an existing drainage ditch along Petroleum Parkway. The remainder of the property drains to a swale toward the middle of the property draining in a westerly direction, which also conveys the un-detained post developed flow for the adjacent three industrial sites located to the East. The existing area consists of open grassland. The proposed development will be an industrial development. This drainage report shows accommodations for detention from the pre-developed to the post developed flow condition for this industrial use.

This property is determined to be located in Zone X (Areas determined to be outside of the 0.2% annual chance flood plain) and outside of Zone A (Areas determined to be within the 100 year flood plain with no base flood elevation determined) as said property plots by scale on the Flood Insurance Rate Map for St. Martin Parish, Louisiana and Incorporated Areas Map Number 22099C0350 H effective date, November 4, 2010.

This drainage study is based on methods and data from the Louisiana Department of Transportation and Development 2011 Hydraulics Manual. Hydrographs and runoff values were calculated using Hydra-flow Hydrographs Extension for AutoCAD Civil 3D 2013.

II. Development Information

The proposed development is an industrial development consisting of approximately 4.0 acres.

This development will consist of an approximate 3,900 square foot office building along with an approximate 41,600 square foot warehouse structure. The site will also feature approximately 55,400 square feet of asphalt, concrete, and limestone parking and driveways.

As part of the site development, a detention pond will be added to detain the net post-developed runoff to the pre-developed runoff. This pond is sized with 24,739 cubic feet of total storage.

III. Design Computations (Method = Rational) Ten (10) Year

A. Pre-Development

1. PRE DRAINAGE AREA # 1 - RATIONAL

Drainage Area	Acres=	0.15
Existing Runoff Co-efficient	C=	0.30
Time of Concentration	Min=	8
Hydrograph #		1

Rainstorm	Intensity (in./hr.)	Peak Runoff (cfs)
10-Year	7.39	0.33

2. PRE DRAINAGE AREA # 2 - RATIONAL

Drainage Area	Acres=	3.85
Existing Runoff Co-efficient	C=	0.30
Time of Concentration	Min=	42
Hydrograph #		2

Rainstorm	Intensity (in./hr.)	Peak Runoff (cfs)
10-Year	3.84	4.44

3. PRE DRAINAGE AREA # 3 OFFSITE - RATIONAL

Drainage Area	Acres=	9.91
Existing Runoff Co-efficient	C=	0.47
Time of Concentration	Min=	26
Hydrograph #		3

Rainstorm	Intensity (in./hr.)	Peak Runoff (cfs)
10-Year	4.93	22.96

4. PRE DRAINAGE AREA OFFSITE # 4 - RATIONAL

Drainage Area	Acres=	2.83
Existing Runoff Co-efficient	C=	0.47
Time of Concentration	Min=	10
Hydrograph #		13

Rainstorm	Intensity (in./hr.)	Peak Runoff (cfs)
10-Year	6.99	9.30

5. TOTAL PRE DEVELOPMENT RUNOFF – RATIONAL

Combine Hydrographs #2 & #3
Hydrograph #1
Hydrograph #13

Rainstorm	Peak Runoff (cfs)
10-Year	35.34

B. Post-Developed

1. POST DRAINAGE AREA # 1 - RATIONAL

Drainage Area	Acres=	0.46
Avg. Runoff Co-efficient	C=	0.84
Time of Concentration	Min=	17
Hydrograph #		5

Rainstorm	Intensity (in./hr.)	Peak Runoff (cfs)
10-Year	5.89	2.28

2. POST DRAINAGE AREA # 2 - RATIONAL

Drainage Area	Acres=	0.94
Avg. Runoff Co-efficient	C=	0.72
Time of Concentration	Min=	17
Hydrograph #		6

Rainstorm	Intensity (in./hr.)	Peak Runoff (cfs)
10-Year	5.89	3.99

3. POST DRAINAGE AREA # 3 - RATIONAL

Drainage Area	Acres=	2.60
Avg. Runoff Co-efficient	C=	0.56
Time of Concentration	Min=	10
Hydrograph #		7

Rainstorm	Intensity (in./hr.)	Peak Runoff (cfs)
10-Year	6.99	10.18

4. POST DRAINAGE AREA # 4 OFFSITE– RATIONAL

Drainage Area	Acres=	9.91
Avg. Runoff Co-efficient	C=	0.47
Time of Concentration	Min=	26
Hydrograph #		8

Rainstorm	Intensity (in./hr.)	Peak Runoff (cfs)
10-Year	4.93	22.96

5. POST DRAINAGE AREA # 5 OFFSITE - RATIONAL

Drainage Area	Acres=	2.83
Avg. Runoff Co-efficient	C=	0.47
Time of Concentration	Min=	10
Hydrograph #		13

Rainstorm	Intensity (in./hr.)	Peak Runoff (cfs)
10-Year	6.99	9.30

6. TOTAL POST DEVELOPMENT - RATIONAL

Combine Hydrographs #7 & #8
Hydrograph #5
Hydrograph #6
Hydrograph #13

Rainstorm	Peak Runoff (cfs)
10-Year	40.57

C. Pond Discharge Values

1. Detention Pond

Top Bank Elevation: 27.00' - 26.50'
Bottom Elevation: 22.70'

1 – 24" Discharge Pipe
Hydrograph #19

Rainstorm	Water Surface Elevation (FT)	Free Board (FT)	Total Discharge (CFS)
10-Year	25.67	0.83	19.01

2. TOTAL POST DEVELOPMENT DISCHARGE

Combine Hydrographs #7 & #8
Hydrograph # 5
Hydrograph # 6
Hydrograph # 13

Rainstorm	Peak Runoff (cfs)
10-Year	34.58

IV. Summary

A. Total Pre & Post Discharge Summary

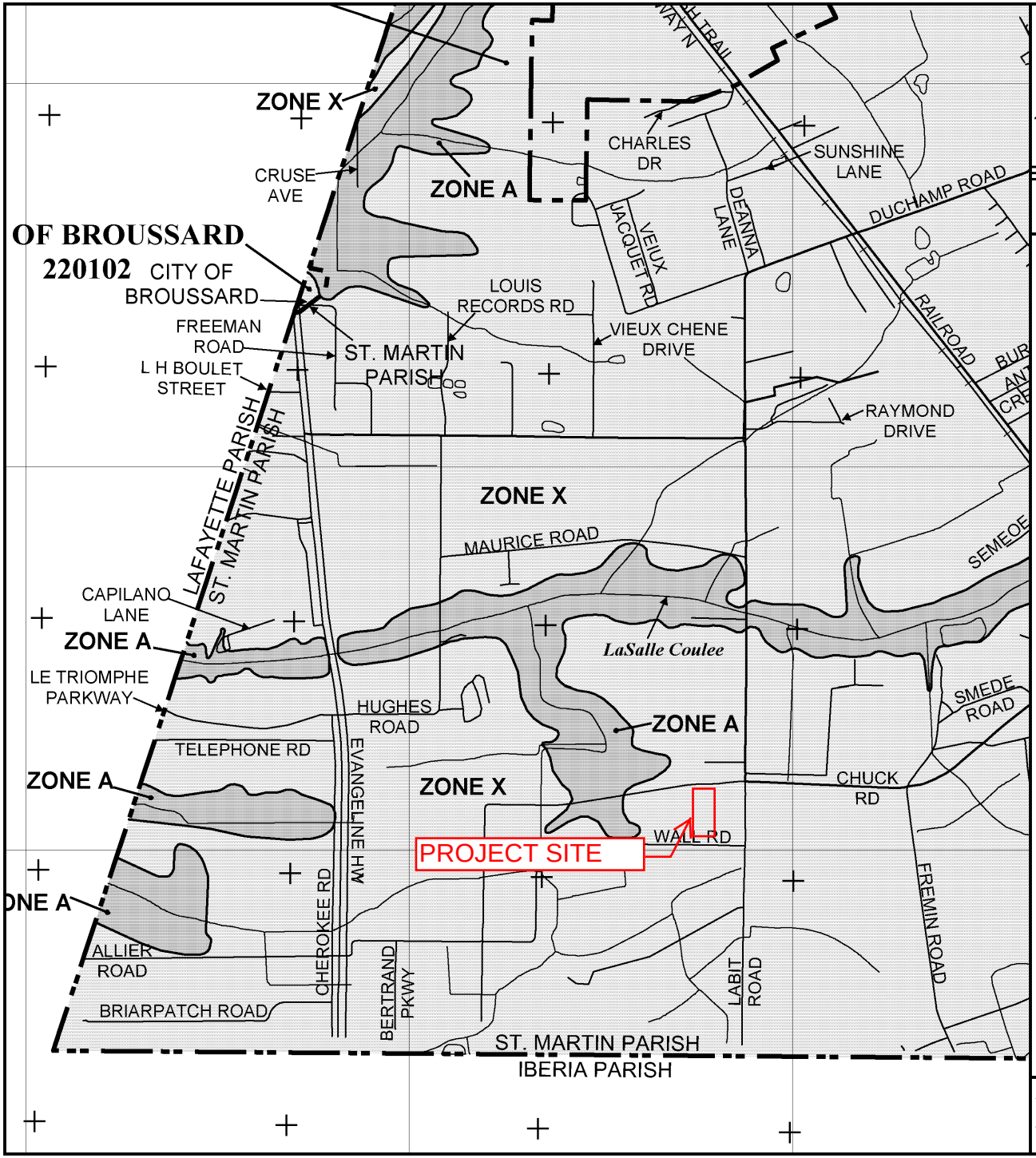
Rainstorm	Total Pre Discharge (CFS)	Total Post Discharge (CFS)	Difference (CFS)
10-Year	35.34	34.58	-0.76

The Superior Pressure Control site located at SMEDA, along Petroleum Parkway, will have no negative effect to adjacent or downstream properties during the 10 year rainstorm events. The development is being designed to adequately accommodate runoff created within its boundaries and to reduce the burden on the existing drainage system to which it will discharge.

Please review the following Exhibits and Calculations for information on the current FIRM for the area, hydrograph runoff calculations, pond cross sections, drainage plan and drainage areas.

Exhibit 1

Current FIRM Panel
For
St. Martin Parish



MAP SCALE 1" = 2000'

1000 0 2000 4000 FEET

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0350H

FIRM

FLOOD INSURANCE RATE MAP

ST. MARTIN PARISH, LOUISIANA
AND INCORPORATED AREAS

PANEL 350 OF 700
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
BROUSSARD, CITY OF	220102	0350	H
ST. MARTIN PARISH	220178	0350	H

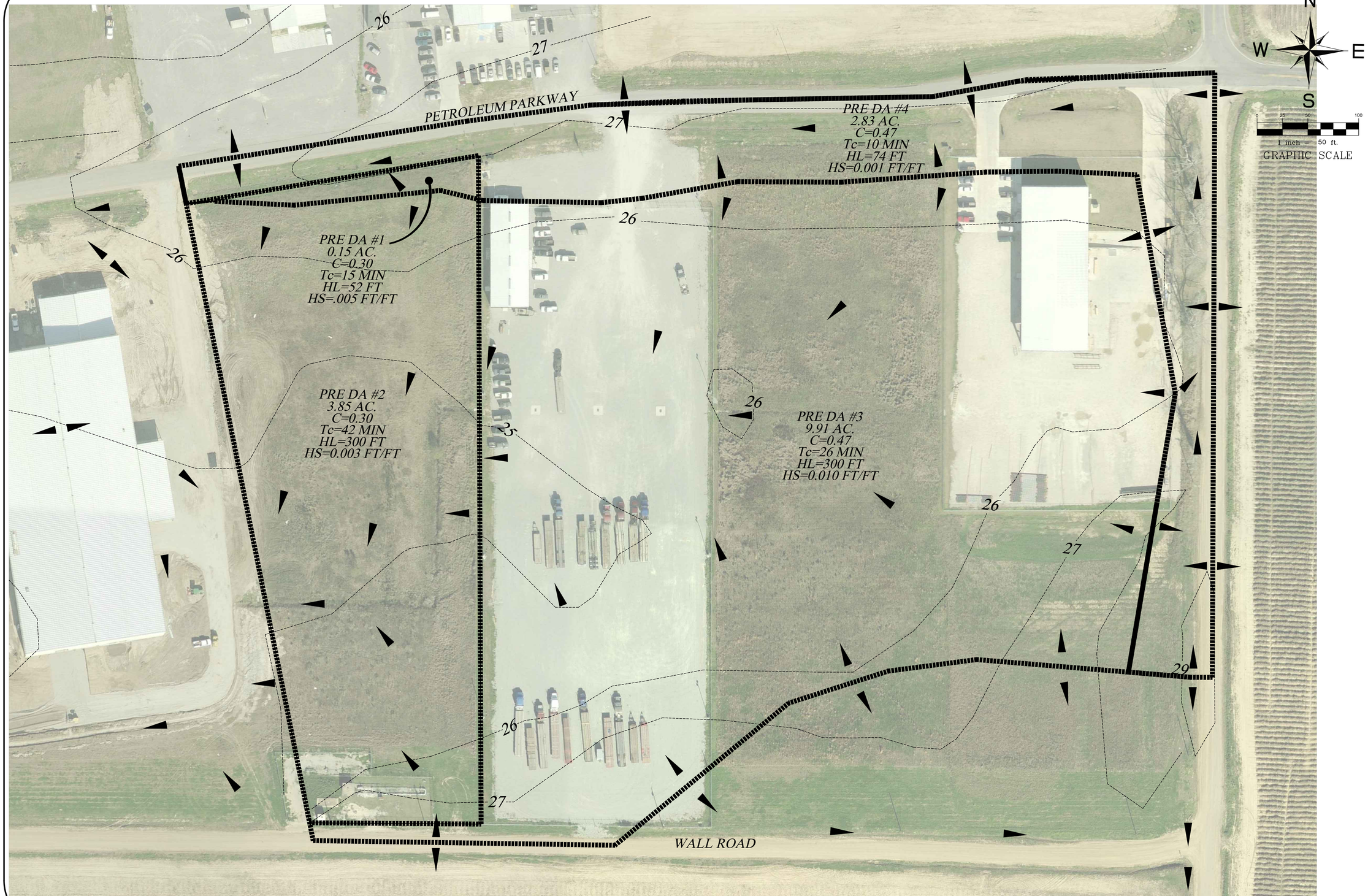
Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
22099C0350H
EFFECTIVE DATE
NOVEMBER 04, 2010

Federal Emergency Management Agency

Exhibit 2

Pre Development
Drainage Area Map



NO.	DATE	REVISION DESCRIPTION	BY

SUPERIOR PRESSURE CONTROL
SMEDA-ST. MARTIN PARISH, LA

PRE-DEVELOPMENT DRAINAGE AREA MAP

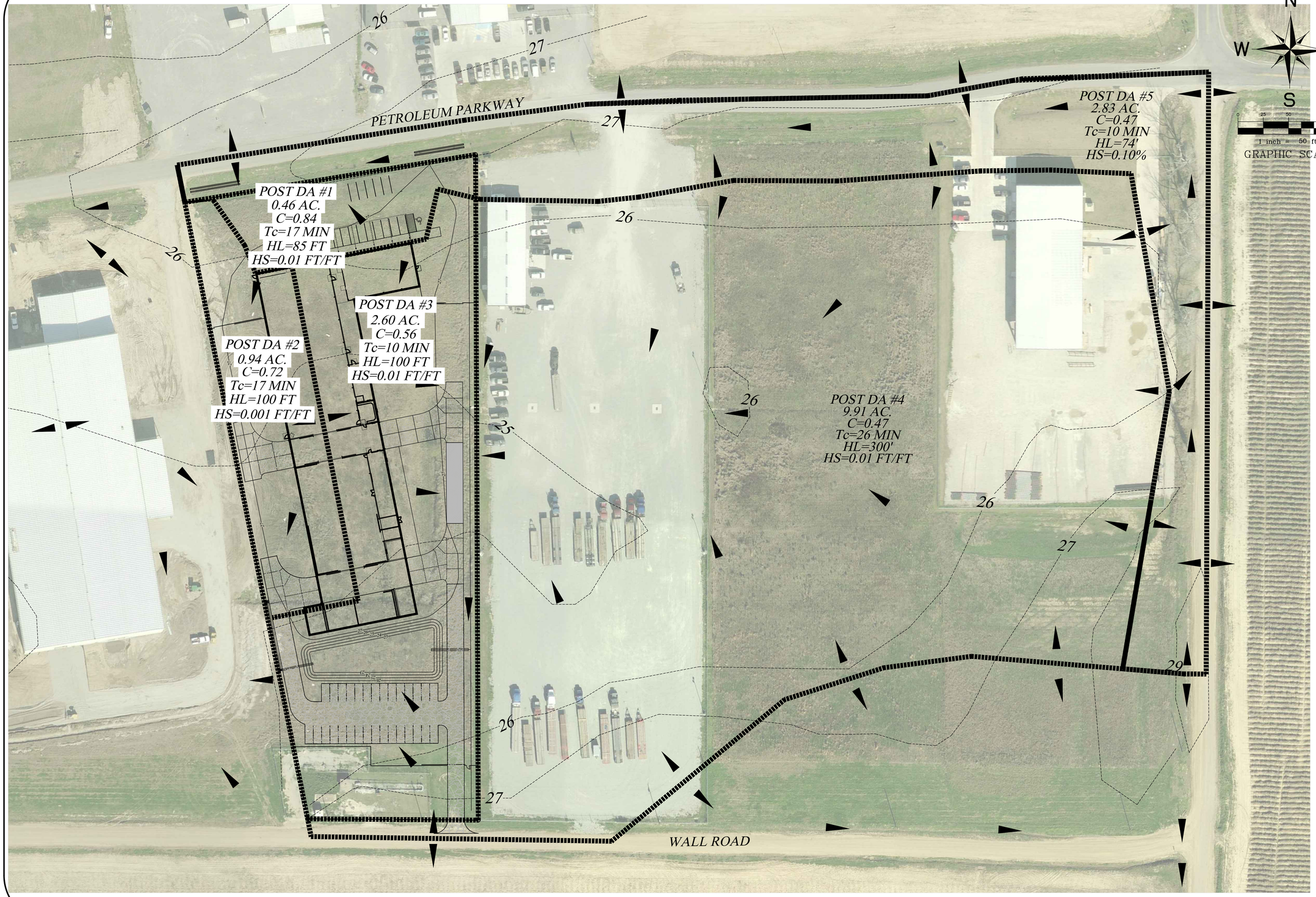
MICHAEL P. GUIDRY, INC.
201 HEYMANN BLVD. #30-E
LAFAYETTE, LA 70503
337-234-7595

SHEET NUMBER
1

DATE
FEBRUARY 2013

Exhibit 3

Post Development Drainage Area Map



NO.	DATE	REVISION DESCRIPTION	BY

SUPERIOR PRESSURE CONTROL
SMEDA-ST. MARTIN PARISH, LA

POST DEVELOPMENT DRAINAGE AREA MAP

MICHAEL P. GUIDRY, INC.
201 HEYMANN BLVD. #30-E
LAFAYETTE, LA 70503
337-234-7595

SHEET NUMBER
2

DATE
FEBRUARY 2013

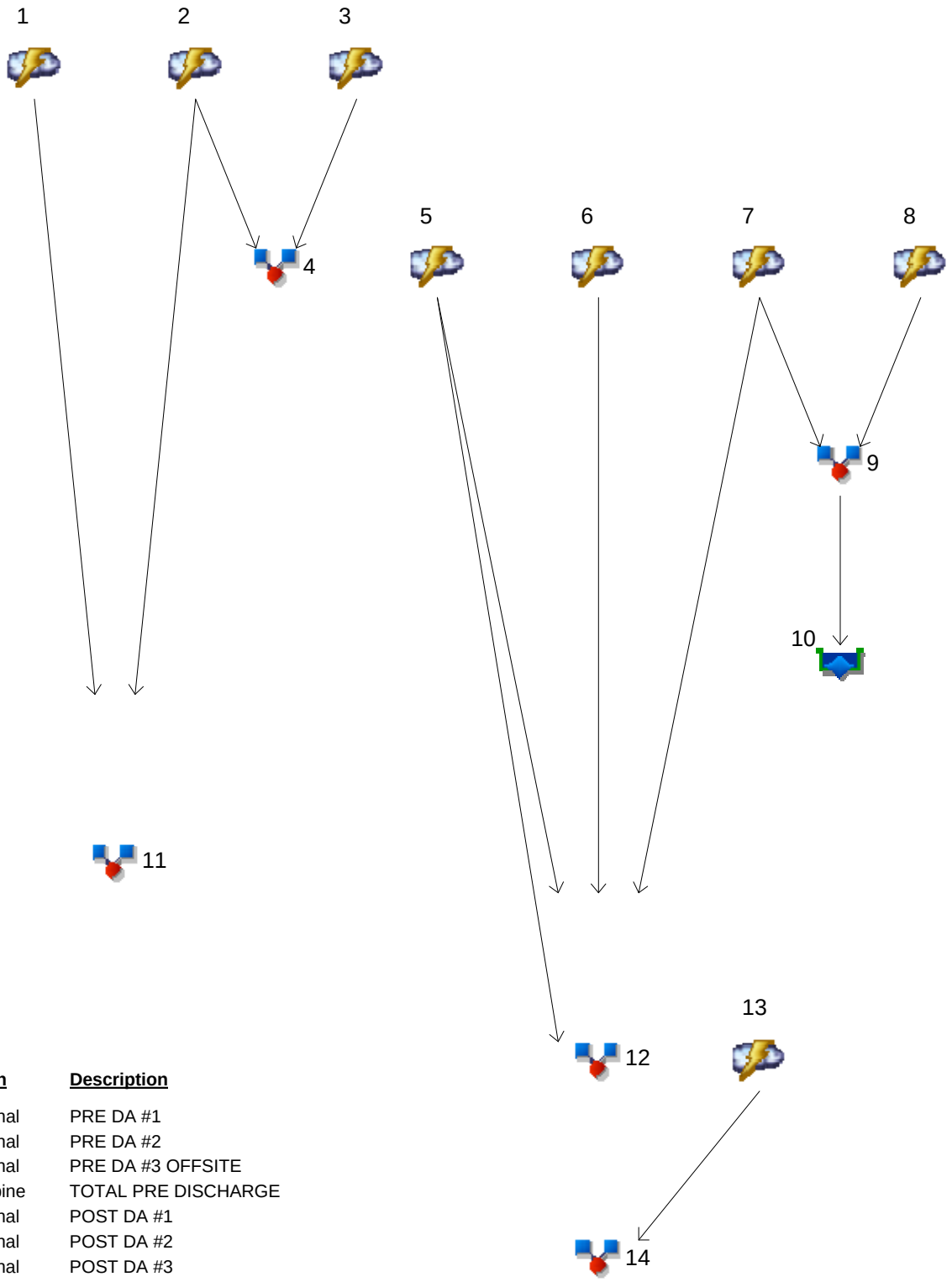
Exhibit 4

Hydra-flow Hydrographs

Exhibit 5

10 YR Rainstorm Event Runoff Calculations

Watershed Model Schematic



Legend

Hyd.	Origin	Description
1	Rational	PRE DA #1
2	Rational	PRE DA #2
3	Rational	PRE DA #3 OFFSITE
4	Combine	TOTAL PRE DISCHARGE
5	Rational	POST DA #1
6	Rational	POST DA #2
7	Rational	POST DA #3
8	Rational	POST DA #4 OFFSITE
9	Combine	TOTAL POST DISCHARGE
10	Reservoir	DISCHARGE INTO POND
11	Combine	TOTAL SITE PRE Q
12	Combine	POST SITE Q
13	Rational	POST DA #5
14	Combine	TOTAL POST Q AT PETRO PKWY

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	Rational	------	-------	-------	-------	0.304	0.333	-------	-------	-------	PRE DA #1
2	Rational	------	-------	-------	-------	3.970	4.439	-------	-------	-------	PRE DA #2
3	Rational	------	-------	-------	-------	20.47	22.96	-------	-------	-------	PRE DA #3 OFFSITE
4	Combine	2, 3	-------	-------	-------	22.93	25.71	-------	-------	-------	TOTAL PRE DISCHARGE
5	Rational	------	-------	-------	-------	2.042	2.279	-------	-------	-------	POST DA #1
6	Rational	------	-------	-------	-------	3.578	3.992	-------	-------	-------	POST DA #2
7	Rational	------	-------	-------	-------	9.248	10.18	-------	-------	-------	POST DA #3
8	Rational	------	-------	-------	-------	20.47	22.96	-------	-------	-------	POST DA #4 OFFSITE
9	Combine	7, 8	-------	-------	-------	22.32	25.00	-------	-------	-------	TOTAL POST DISCHARGE
10	Reservoir	9	-------	-------	-------	17.16	19.01	-------	-------	-------	DISCHARGE INTO POND
11	Combine	1, 2,	-------	-------	-------	3.970	4.439	-------	-------	-------	TOTAL SITE PRE Q
12	Combine	5, 6, 7,	-------	-------	-------	12.55	13.87	-------	-------	-------	POST SITE Q
13	Rational	------	-------	-------	-------	8.448	9.304	-------	-------	-------	POST DA #5
14	Combine	5, 13	-------	-------	-------	9.650	10.64	-------	-------	-------	TOTAL POST Q AT PETRO PKWY

Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2013 by Autodesk, Inc. v10

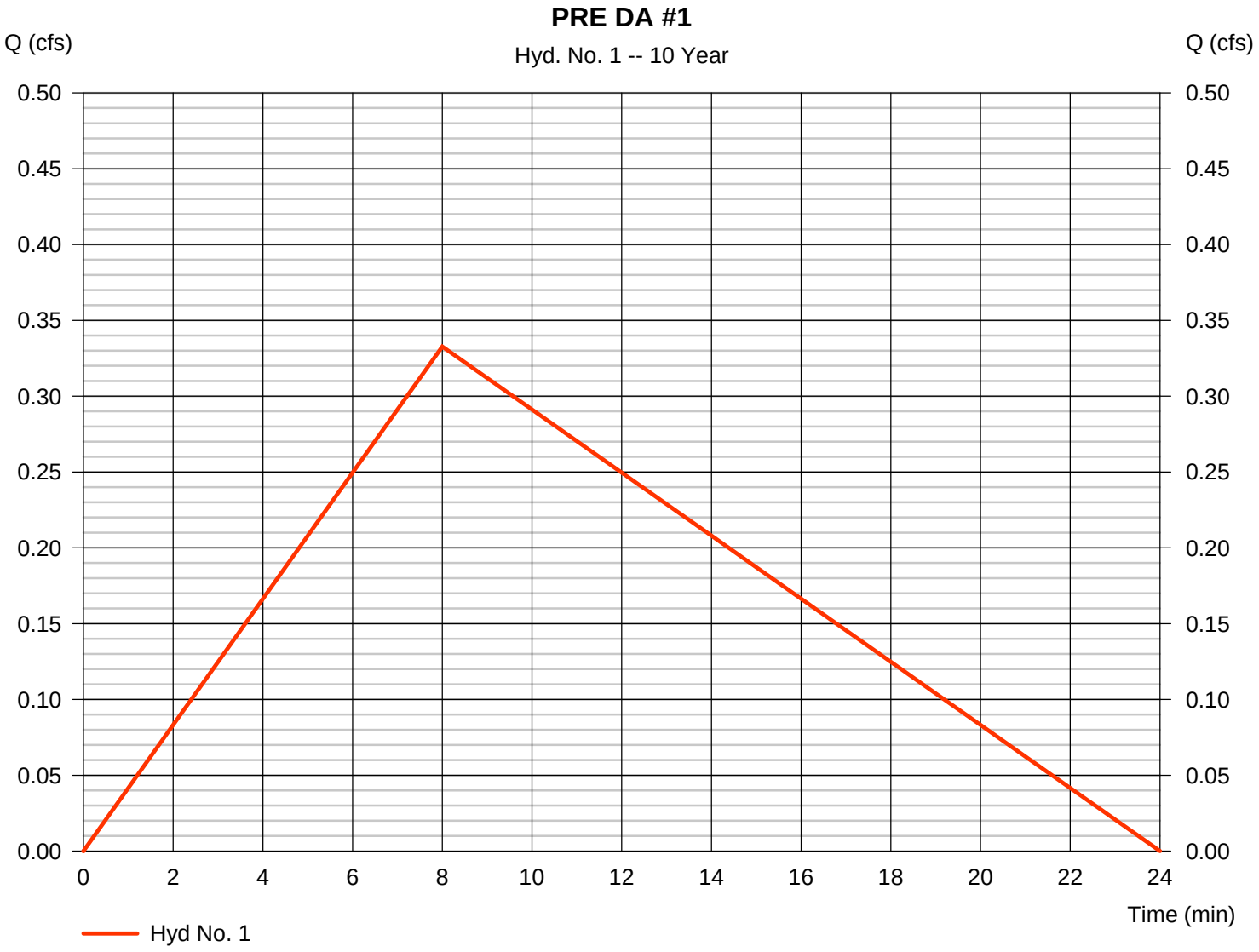
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	Rational	0.333	1	8	240	------	------	------	PRE DA #1
2	Rational	4.439	1	42	11,186	------	------	------	PRE DA #2
3	Rational	22.96	1	26	53,729	------	------	------	PRE DA #3 OFFSITE
4	Combine	25.71	1	26	64,915	2, 3	------	------	TOTAL PRE DISCHARGE
5	Rational	2.279	1	17	3,487	------	------	------	POST DA #1
6	Rational	3.992	1	17	6,108	------	------	------	POST DA #2
7	Rational	10.18	1	10	9,166	------	------	------	POST DA #3
8	Rational	22.96	1	26	53,729	------	------	------	POST DA #4 OFFSITE
9	Combine	25.00	1	26	62,895	7, 8	------	------	TOTAL POST DISCHARGE
10	Reservoir	19.01	1	35	62,842	9	25.67	20,111	DISCHARGE INTO POND
11	Combine	4.439	1	42	11,425	1, 2,	------	------	TOTAL SITE PRE Q
12	Combine	13.87	1	10	18,761	5, 6, 7,	------	------	POST SITE Q
13	Rational	9.304	1	10	8,374	------	------	------	POST DA #5
14	Combine	10.64	1	10	11,861	5, 13	------	------	TOTAL POST Q AT PETRO PKWY

Hydrograph Report

Hyd. No. 1

PRE DA #1

Hydrograph type	=	Rational	Peak discharge	=	0.333 cfs
Storm frequency	=	10 yrs	Time to peak	=	8 min
Time interval	=	1 min	Hyd. volume	=	240 cuft
Drainage area	=	0.150 ac	Runoff coeff.	=	0.3
Intensity	=	7.394 in/hr	Tc by TR55	=	8.00 min
IDF Curve	=	REGION 1.IDF	Asc/Rec limb fact	=	1/2



TR55 Tc Worksheet

Hyd. No. 1

PRE DA #1

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.150		0.011		0.011		
Flow length (ft)	= 52.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 4.80		0.00		0.00		
Land slope (%)	= 0.50		0.00		0.00		
Travel Time (min)	**= 8.25**	**+**	**0.00**	**+**	**0.00**	**=**	**8.25**
Shallow Concentrated Flow							
Flow length (ft)	= 0.00		0.00		0.00		
Watercourse slope (%)	= 0.00		0.00		0.00		
Surface description	= Paved		Paved		Paved		
Average velocity (ft/s)	=0.00		0.00		0.00		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**
Channel Flow							
X sectional flow area (sqft)	= 0.00		0.00		0.00		
Wetted perimeter (ft)	= 0.00		0.00		0.00		
Channel slope (%)	= 0.00		0.00		0.00		
Manning's n-value	= 0.015		0.015		0.015		
Velocity (ft/s)	=0.00						
			0.00				
					0.00		
Flow length (ft)	({0})0.0		0.0		0.0		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

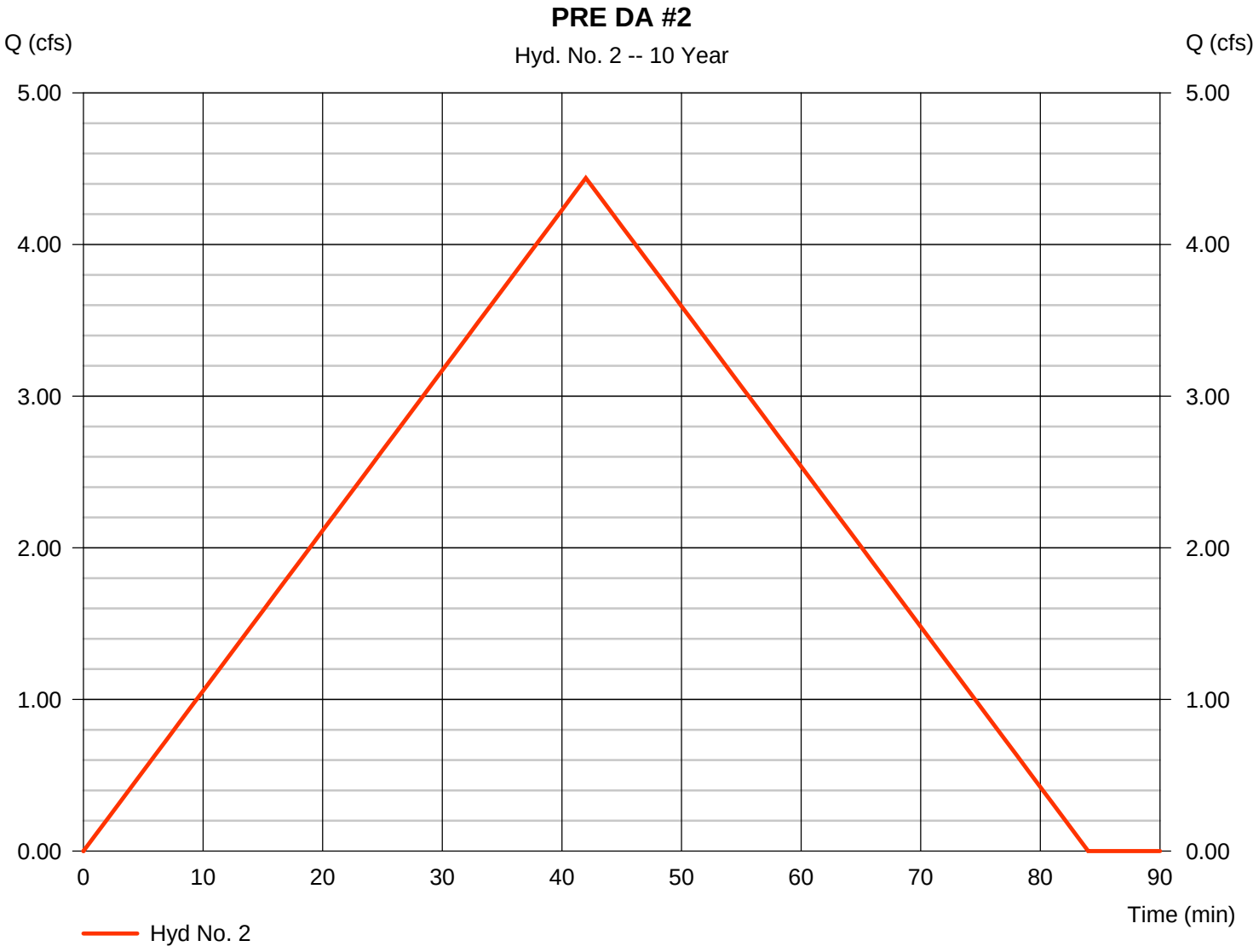
Total Travel Time, Tc ..... 8.00 min

Hydrograph Report

Hyd. No. 2

PRE DA #2

Hydrograph type	=	Rational	Peak discharge	=	4.439 cfs
Storm frequency	=	10 yrs	Time to peak	=	42 min
Time interval	=	1 min	Hyd. volume	=	11,186 cuft
Drainage area	=	3.850 ac	Runoff coeff.	=	0.3
Intensity	=	3.843 in/hr	Tc by TR55	=	42.00 min
IDF Curve	=	REGION 1.IDF	Asc/Rec limb fact	=	1/1



TR55 Tc Worksheet

Hyd. No. 2

PRE DA #2

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.150		0.011		0.011		
Flow length (ft)	= 300.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 4.80		0.00		0.00		
Land slope (%)	= 0.30		0.00		0.00		
Travel Time (min)	**= 41.15**	**+**	**0.00**	**+**	**0.00**	**=**	**41.15**
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)	= 10.00		0.00		0.00		
Wetted perimeter (ft)	= 8.66		0.00		0.00		
Channel slope (%)	= 0.10		0.00		0.00		
Manning's n-value	= 0.025		0.015		0.015		
Velocity (ft/s)	=2.08						
			0.00				
					0.00		
Flow length (ft)	({0})140.0		0.0		0.0		
Travel Time (min)	**= 1.12**	**+**	**0.00**	**+**	**0.00**	**=**	**1.12**

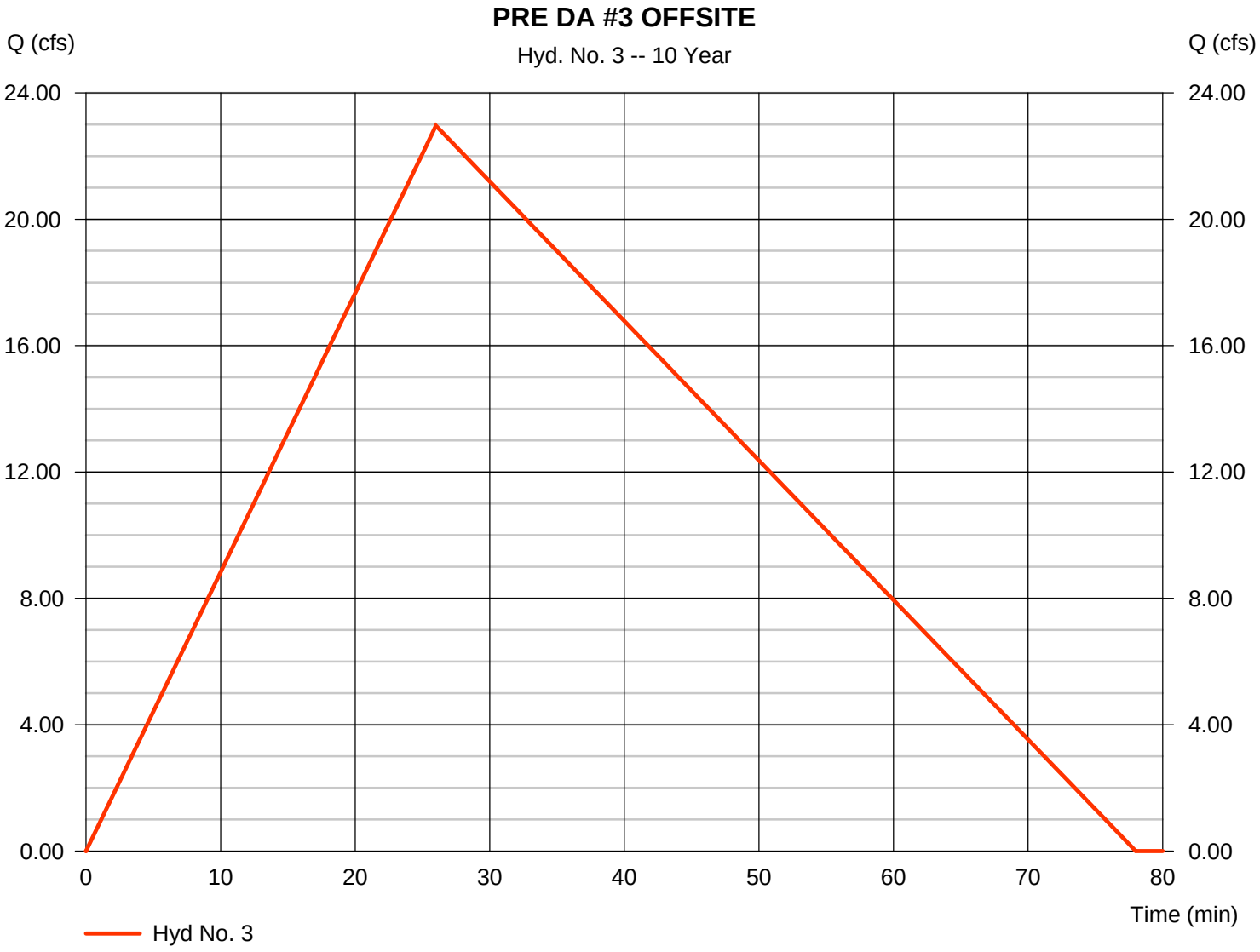
Total Travel Time, Tc ..... 42.00 min

Hydrograph Report

Hyd. No. 3

PRE DA #3 OFFSITE

Hydrograph type	=	Rational	Peak discharge	=	22.96 cfs
Storm frequency	=	10 yrs	Time to peak	=	26 min
Time interval	=	1 min	Hyd. volume	=	53,729 cuft
Drainage area	=	9.910 ac	Runoff coeff.	=	0.47
Intensity	=	4.930 in/hr	Tc by TR55	=	26.00 min
IDF Curve	=	REGION 1.IDF	Asc/Rec limb fact	=	1/2



TR55 Tc Worksheet

Hyd. No. 3

PRE DA #3 OFFSITE

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.130		0.011		0.011		
Flow length (ft)	= 300.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 4.80		0.00		0.00		
Land slope (%)	= 1.00		0.00		0.00		
Travel Time (min)	**= 22.67**	**+**	**0.00**	**+**	**0.00**	**=**	**22.67**
Shallow Concentrated Flow							
Flow length (ft)	= 85.00		0.00		0.00		
Watercourse slope (%)	= 0.30		0.00		0.00		
Surface description	= Unpaved		Paved		Paved		
Average velocity (ft/s)	=0.88		0.00		0.00		
Travel Time (min)	**= 1.60**	**+**	**0.00**	**+**	**0.00**	**=**	**1.60**
Channel Flow							
X sectional flow area (sqft)	= 10.00		0.00		0.00		
Wetted perimeter (ft)	= 8.66		0.00		0.00		
Channel slope (%)	= 0.30		0.00		0.00		
Manning's n-value	= 0.015		0.015		0.015		
Velocity (ft/s)	=5.99						
			0.00				
					0.00		
Flow length (ft)	({0})460.0		0.0		0.0		
Travel Time (min)	**= 1.28**	**+**	**0.00**	**+**	**0.00**	**=**	**1.28**

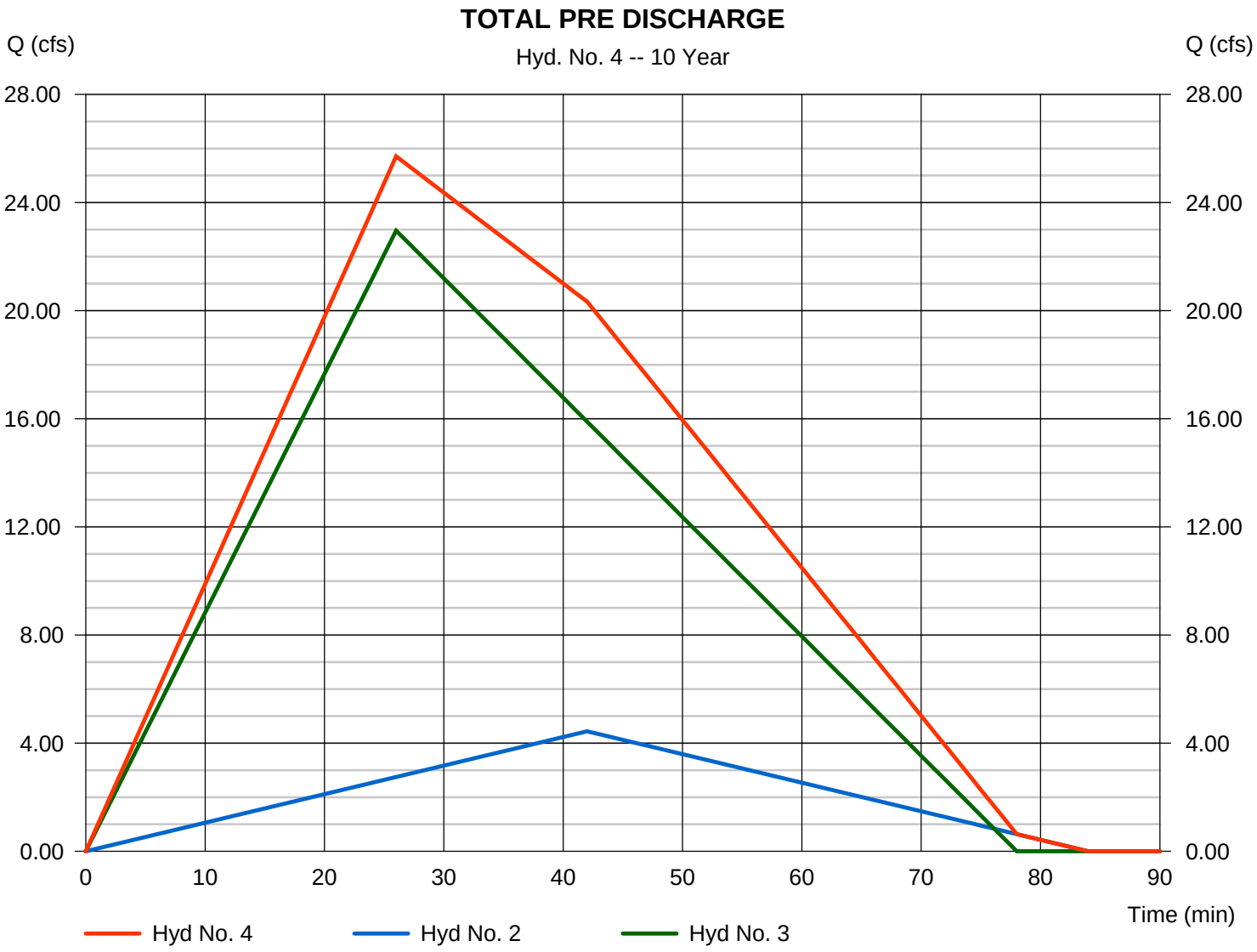
Total Travel Time, Tc ..... 26.00 min

Hydrograph Report

Hyd. No. 4

TOTAL PRE DISCHARGE

Hydrograph type	= Combine	Peak discharge	= 25.71 cfs
Storm frequency	= 10 yrs	Time to peak	= 26 min
Time interval	= 1 min	Hyd. volume	= 64,915 cuft
Inflow hyds.	= 2, 3	Contrib. drain. area	= 13.760 ac

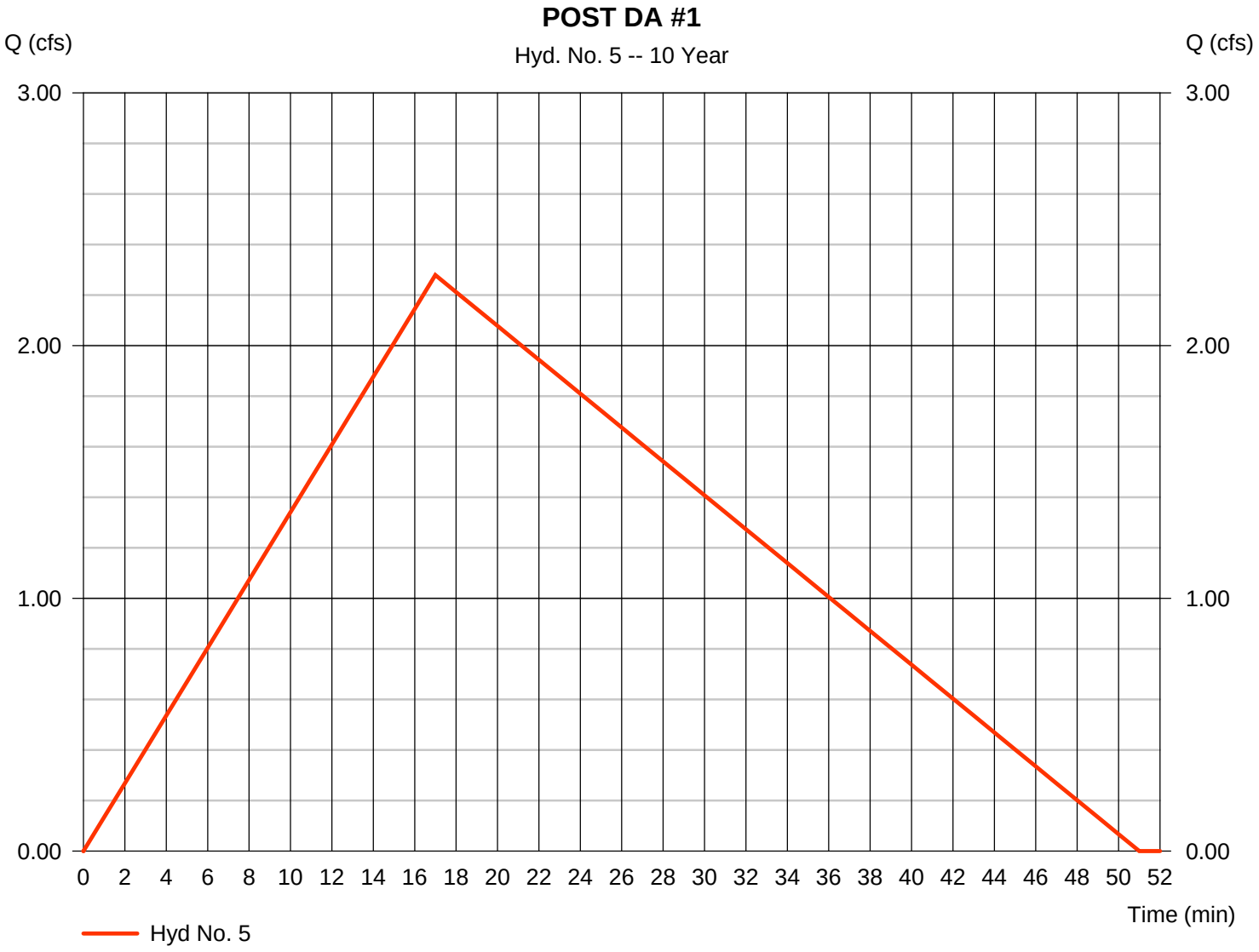


Hydrograph Report

Hyd. No. 5

POST DA #1

Hydrograph type	=	Rational	Peak discharge	=	2.279 cfs
Storm frequency	=	10 yrs	Time to peak	=	17 min
Time interval	=	1 min	Hyd. volume	=	3,487 cuft
Drainage area	=	0.460 ac	Runoff coeff.	=	0.84
Intensity	=	5.898 in/hr	Tc by TR55	=	17.00 min
IDF Curve	=	REGION 1.IDF	Asc/Rec limb fact	=	1/2



TR55 Tc Worksheet

Hyd. No. 5

POST DA #1

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.011		0.011		0.011		
Flow length (ft)	= 85.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 4.80		0.00		0.00		
Land slope (%)	= 1.00		0.00		0.00		
Travel Time (min)	**= 1.15**	**+**	**0.00**	**+**	**0.00**	**=**	**1.15**
Shallow Concentrated Flow							
Flow length (ft)	= 0.00		0.00		0.00		
Watercourse slope (%)	= 0.00		0.00		0.00		
Surface description	= Paved		Paved		Paved		
Average velocity (ft/s)	=0.00		0.00		0.00		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**
Channel Flow							
X sectional flow area (sqft)	= 0.00		0.00		0.00		
Wetted perimeter (ft)	= 0.00		0.00		0.00		
Channel slope (%)	= 0.00		0.00		0.00		
Manning's n-value	= 0.015		0.015		0.015		
Velocity (ft/s)	=0.00						
			0.00				
					0.00		
Flow length (ft)	({0})0.0		0.0		0.0		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc ..... 17.00 min

Hydrograph Report

Hyd. No. 6

POST DA #2

Hydrograph type	=	Rational	Peak discharge	=	3.992 cfs
Storm frequency	=	10 yrs	Time to peak	=	17 min
Time interval	=	1 min	Hyd. volume	=	6,108 cuft
Drainage area	=	0.940 ac	Runoff coeff.	=	0.72
Intensity	=	5.898 in/hr	Tc by TR55	=	17.00 min
IDF Curve	=	REGION 1.IDF	Asc/Rec limb fact	=	1/2

TR55 Tc Worksheet

Hyd. No. 6

POST DA #2

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.020		0.011		0.011		
Flow length (ft)	= 100.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 4.80		0.00		0.00		
Land slope (%)	= 0.10		0.00		0.00		
Travel Time (min)	**= 5.29**	**+**	**0.00**	**+**	**0.00**	**=**	**5.29**
Shallow Concentrated Flow							
Flow length (ft)	= 357.00		0.00		0.00		
Watercourse slope (%)	= 0.10		0.00		0.00		
Surface description	= Unpaved		Paved		Paved		
Average velocity (ft/s)	=0.51		0.00		0.00		
Travel Time (min)	**= 11.66**	**+**	**0.00**	**+**	**0.00**	**=**	**11.66**
Channel Flow							
X sectional flow area (sqft)	= 0.00		0.00		0.00		
Wetted perimeter (ft)	= 0.00		0.00		0.00		
Channel slope (%)	= 0.00		0.00		0.00		
Manning's n-value	= 0.015		0.015		0.015		
Velocity (ft/s)	=0.00						
			0.00				
					0.00		
Flow length (ft)	({0})0.0		0.0		0.0		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

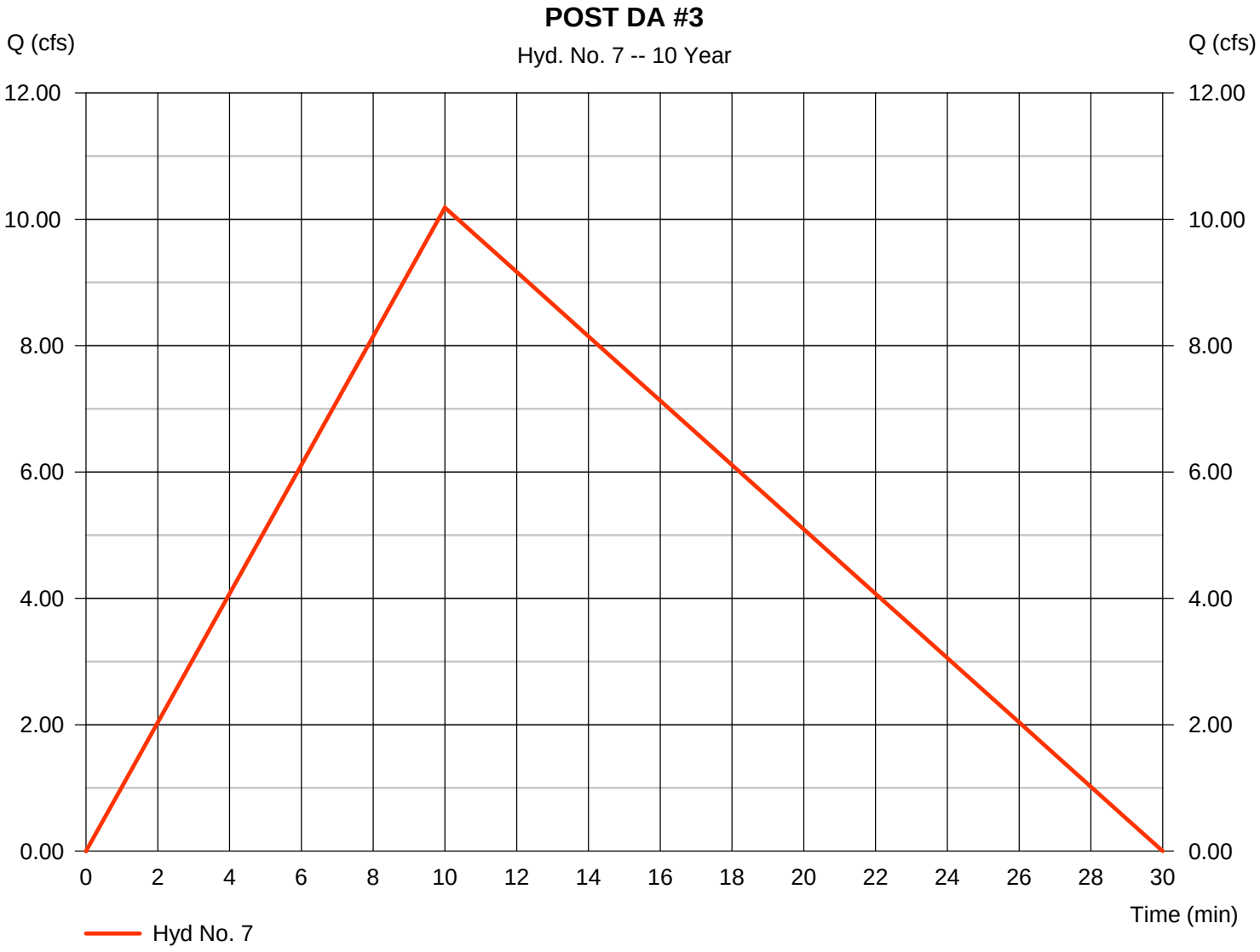
Total Travel Time, Tc ..... 17.00 min

Hydrograph Report

Hyd. No. 7

POST DA #3

Hydrograph type	=	Rational	Peak discharge	=	10.18 cfs
Storm frequency	=	10 yrs	Time to peak	=	10 min
Time interval	=	1 min	Hyd. volume	=	9,166 cuft
Drainage area	=	2.600 ac	Runoff coeff.	=	0.56
Intensity	=	6.995 in/hr	Tc by TR55	=	10.00 min
IDF Curve	=	REGION 1.IDF	Asc/Rec limb fact	=	1/2



TR55 Tc Worksheet

Hyd. No. 7

POST DA #3

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.011		0.011		0.011		
Flow length (ft)	= 100.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 4.80		0.00		0.00		
Land slope (%)	= 1.00		0.00		0.00		
Travel Time (min)	**= 1.31**	**+**	**0.00**	**+**	**0.00**	**=**	**1.31**
Shallow Concentrated Flow							
Flow length (ft)	= 165.00		0.00		0.00		
Watercourse slope (%)	= 0.10		0.00		0.00		
Surface description	= Unpaved		Paved		Paved		
Average velocity (ft/s)	=0.51		0.00		0.00		
Travel Time (min)	**= 5.39**	**+**	**0.00**	**+**	**0.00**	**=**	**5.39**
Channel Flow							
X sectional flow area (sqft)	= 10.00		0.00		0.00		
Wetted perimeter (ft)	= 8.66		0.00		0.00		
Channel slope (%)	= 0.10		0.00		0.00		
Manning's n-value	= 0.020		0.015		0.015		
Velocity (ft/s)	=2.59						
			0.00				
					0.00		
Flow length (ft)	({0})540.0		0.0		0.0		
Travel Time (min)	**= 3.47**	**+**	**0.00**	**+**	**0.00**	**=**	**3.47**

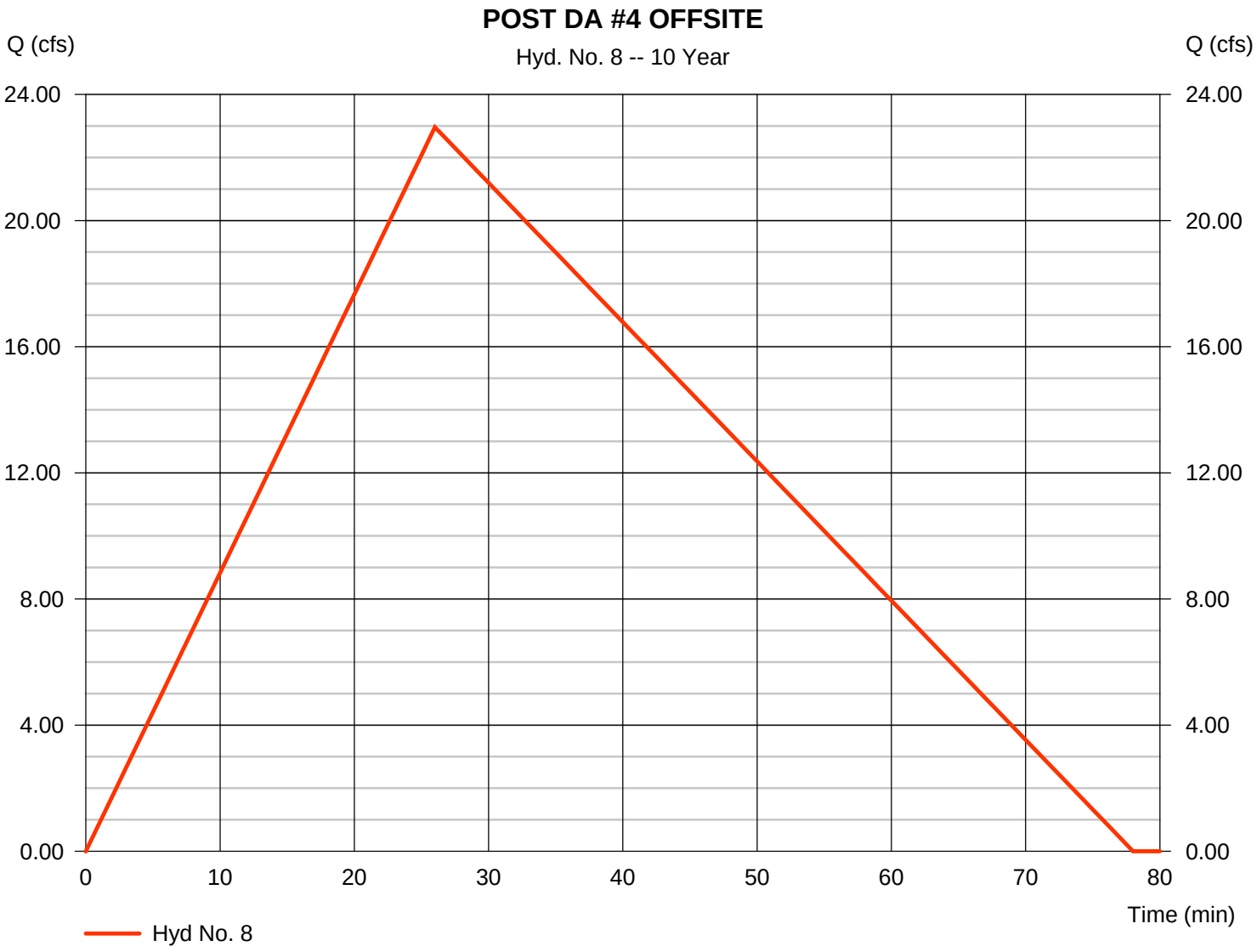
Total Travel Time, Tc ..... 10.00 min

Hydrograph Report

Hyd. No. 8

POST DA #4 OFFSITE

Hydrograph type	=	Rational	Peak discharge	=	22.96 cfs
Storm frequency	=	10 yrs	Time to peak	=	26 min
Time interval	=	1 min	Hyd. volume	=	53,729 cuft
Drainage area	=	9.910 ac	Runoff coeff.	=	0.47
Intensity	=	4.930 in/hr	Tc by TR55	=	26.00 min
IDF Curve	=	REGION 1.IDF	Asc/Rec limb fact	=	1/2



TR55 Tc Worksheet

Hyd. No. 8

POST DA #4 OFFSITE

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.130		0.011		0.011		
Flow length (ft)	= 300.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 4.80		0.00		0.00		
Land slope (%)	= 1.00		0.00		0.00		
Travel Time (min)	**= 22.67**	**+**	**0.00**	**+**	**0.00**	**=**	**22.67**
Shallow Concentrated Flow							
Flow length (ft)	= 85.00		0.00		0.00		
Watercourse slope (%)	= 0.30		0.00		0.00		
Surface description	= Unpaved		Paved		Paved		
Average velocity (ft/s)	=0.88		0.00		0.00		
Travel Time (min)	**= 1.60**	**+**	**0.00**	**+**	**0.00**	**=**	**1.60**
Channel Flow							
X sectional flow area (sqft)	= 10.00		0.00		0.00		
Wetted perimeter (ft)	= 8.66		0.00		0.00		
Channel slope (%)	= 0.30		0.00		0.00		
Manning's n-value	= 0.015		0.015		0.015		
Velocity (ft/s)	=5.99						
			0.00				
					0.00		
Flow length (ft)	({0})460.0		0.0		0.0		
Travel Time (min)	**= 1.28**	**+**	**0.00**	**+**	**0.00**	**=**	**1.28**

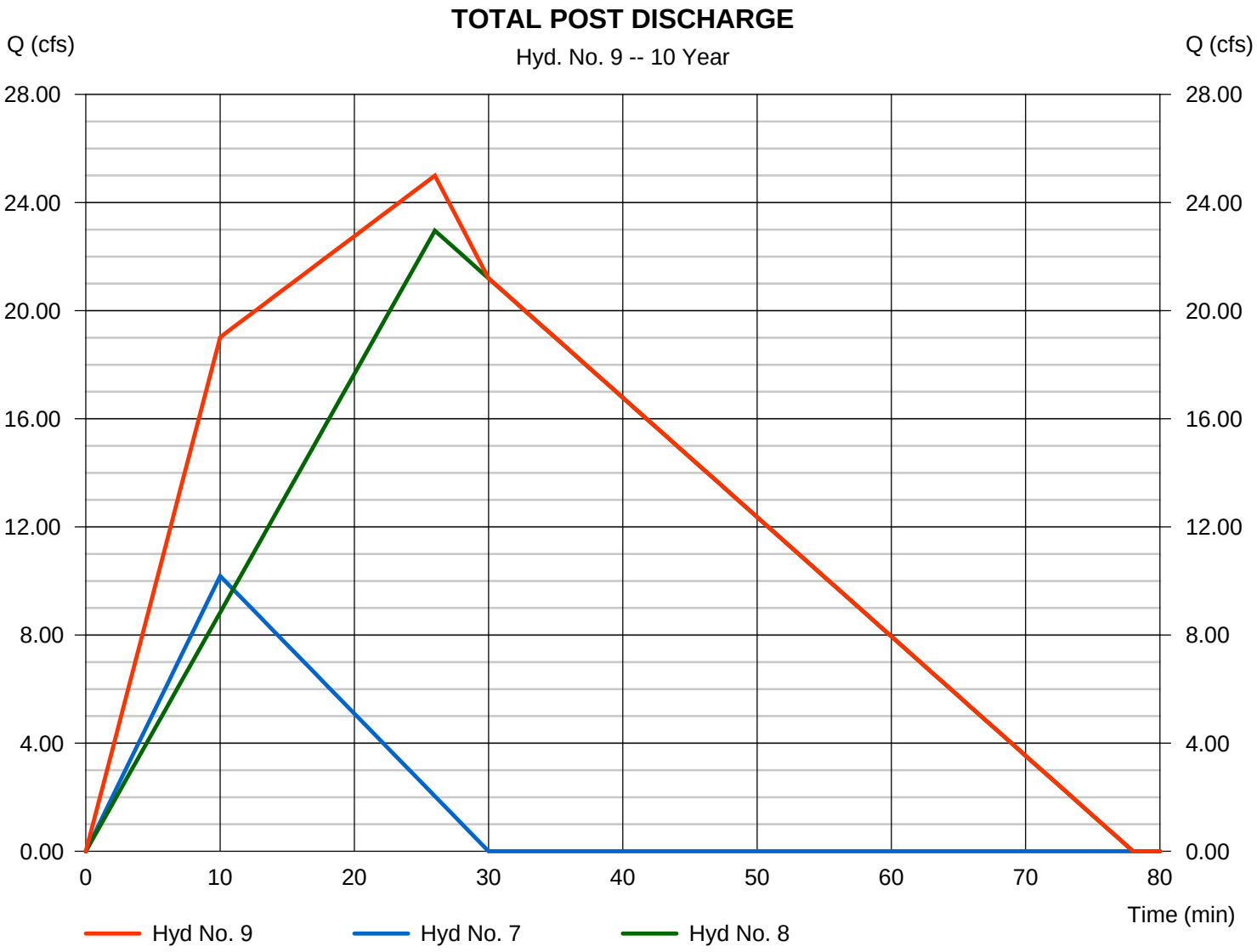
Total Travel Time, Tc ..... 26.00 min

Hydrograph Report

Hyd. No. 9

TOTAL POST DISCHARGE

Hydrograph type	= Combine	Peak discharge	= 25.00 cfs
Storm frequency	= 10 yrs	Time to peak	= 26 min
Time interval	= 1 min	Hyd. volume	= 62,895 cuft
Inflow hyds.	= 7, 8	Contrib. drain. area	= 12.510 ac



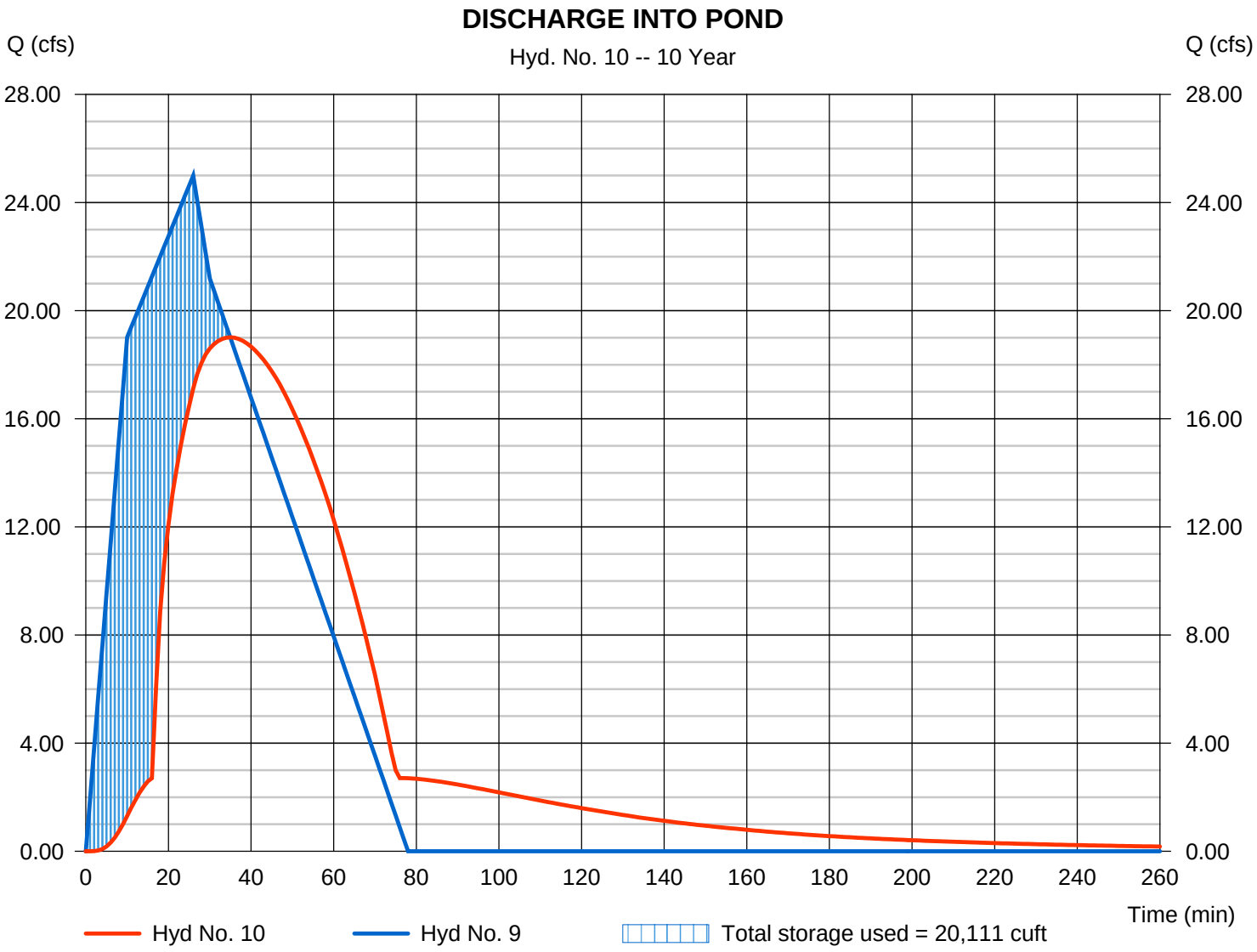
Hydrograph Report

Hyd. No. 10

DISCHARGE INTO POND

Hydrograph type	=	Reservoir	Peak discharge	=	19.01 cfs
Storm frequency	=	10 yrs	Time to peak	=	35 min
Time interval	=	1 min	Hyd. volume	=	62,842 cuft
Inflow hyd. No.	=	9 - TOTAL POST DISCHARGE	Max. Elevation	=	25.67 ft
Reservoir name	=	TOTAL POST INTO POND	Max. Storage	=	20,111 cuft

Storage Indication method used.



Pond No. 1 - TOTAL POST INTO POND

Pond Data

Trapezoid -Bottom L x W = 133.0 x 38.5 ft, Side slope = 3.00:1, Bottom elev. = 22.70 ft, Depth = 3.50 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	22.70	5,121	0	0
0.35	23.05	5,485	1,856	1,856
0.70	23.40	5,858	1,985	3,841
1.05	23.75	6,241	2,117	5,958
1.40	24.10	6,632	2,252	8,210
1.75	24.45	7,032	2,391	10,601
2.10	24.80	7,440	2,532	13,133
2.45	25.15	7,858	2,677	15,810
2.80	25.50	8,284	2,825	18,634
3.15	25.85	8,719	2,975	21,610
3.50	26.20	9,163	3,129	24,739

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 24.00	0.00	0.00	0.00
Span (in)	= 24.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 22.70	0.00	0.00	0.00
Length (ft)	= 20.00	0.00	0.00	0.00
Slope (%)	= 0.10	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

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

Exfil.(in/hr) = 0.000 (by Contour)

TW Elev. (ft) = 0.00

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

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	22.70	0.00	---	---	---	---	---	---	---	---	---	0.000
0.04	186	22.74	0.00 oc	---	---	---	---	---	---	---	---	---	0.003
0.07	371	22.77	0.01 oc	---	---	---	---	---	---	---	---	---	0.015
0.11	557	22.81	0.03 oc	---	---	---	---	---	---	---	---	---	0.032
0.14	742	22.84	0.06 oc	---	---	---	---	---	---	---	---	---	0.056
0.17	928	22.88	0.08 oc	---	---	---	---	---	---	---	---	---	0.084
0.21	1,113	22.91	0.12 oc	---	---	---	---	---	---	---	---	---	0.117
0.24	1,299	22.94	0.15 oc	---	---	---	---	---	---	---	---	---	0.153
0.28	1,485	22.98	0.19 oc	---	---	---	---	---	---	---	---	---	0.193
0.31	1,670	23.01	0.23 oc	---	---	---	---	---	---	---	---	---	0.235
0.35	1,856	23.05	0.28 oc	---	---	---	---	---	---	---	---	---	0.279
0.38	2,054	23.09	0.33 oc	---	---	---	---	---	---	---	---	---	0.327
0.42	2,253	23.12	0.38 oc	---	---	---	---	---	---	---	---	---	0.376
0.45	2,451	23.16	0.43 oc	---	---	---	---	---	---	---	---	---	0.427
0.49	2,650	23.19	0.48 oc	---	---	---	---	---	---	---	---	---	0.479
0.52	2,848	23.23	0.53 oc	---	---	---	---	---	---	---	---	---	0.532
0.56	3,047	23.26	0.59 oc	---	---	---	---	---	---	---	---	---	0.587
0.60	3,245	23.30	0.64 oc	---	---	---	---	---	---	---	---	---	0.644
0.63	3,444	23.33	0.70 oc	---	---	---	---	---	---	---	---	---	0.701
0.67	3,642	23.36	0.76 oc	---	---	---	---	---	---	---	---	---	0.760
0.70	3,841	23.40	0.82 oc	---	---	---	---	---	---	---	---	---	0.821
0.74	4,052	23.44	0.88 oc	---	---	---	---	---	---	---	---	---	0.881
0.77	4,264	23.47	0.94 oc	---	---	---	---	---	---	---	---	---	0.941
0.80	4,476	23.51	1.00 oc	---	---	---	---	---	---	---	---	---	1.003
0.84	4,687	23.54	1.06 oc	---	---	---	---	---	---	---	---	---	1.063
0.87	4,899	23.58	1.13 oc	---	---	---	---	---	---	---	---	---	1.127
0.91	5,111	23.61	1.19 oc	---	---	---	---	---	---	---	---	---	1.188
0.94	5,323	23.65	1.25 oc	---	---	---	---	---	---	---	---	---	1.250
0.98	5,534	23.68	1.32 oc	---	---	---	---	---	---	---	---	---	1.315
1.01	5,746	23.72	1.38 oc	---	---	---	---	---	---	---	---	---	1.377
1.05	5,958	23.75	1.44 oc	---	---	---	---	---	---	---	---	---	1.439
1.08	6,183	23.78	1.50 oc	---	---	---	---	---	---	---	---	---	1.504

Continues on next page...

TOTAL POST INTO POND

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
1.12	6,408	23.82	1.57 oc	---	---	---	---	---	---	---	---	---	1.565
1.15	6,633	23.85	1.63 oc	---	---	---	---	---	---	---	---	---	1.629
1.19	6,859	23.89	1.69 oc	---	---	---	---	---	---	---	---	---	1.689
1.22	7,084	23.92	1.75 oc	---	---	---	---	---	---	---	---	---	1.751
1.26	7,309	23.96	1.81 oc	---	---	---	---	---	---	---	---	---	1.812
1.29	7,534	23.99	1.87 oc	---	---	---	---	---	---	---	---	---	1.872
1.33	7,760	24.03	1.93 oc	---	---	---	---	---	---	---	---	---	1.933
1.36	7,985	24.06	1.99 oc	---	---	---	---	---	---	---	---	---	1.989
1.40	8,210	24.10	2.05 oc	---	---	---	---	---	---	---	---	---	2.047
1.43	8,449	24.14	2.10 oc	---	---	---	---	---	---	---	---	---	2.104
1.47	8,688	24.17	2.16 oc	---	---	---	---	---	---	---	---	---	2.160
1.50	8,927	24.20	2.21 oc	---	---	---	---	---	---	---	---	---	2.215
1.54	9,166	24.24	2.27 oc	---	---	---	---	---	---	---	---	---	2.267
1.57	9,405	24.27	2.32 oc	---	---	---	---	---	---	---	---	---	2.317
1.61	9,645	24.31	2.37 oc	---	---	---	---	---	---	---	---	---	2.367
1.64	9,884	24.34	2.41 oc	---	---	---	---	---	---	---	---	---	2.415
1.68	10,123	24.38	2.46 oc	---	---	---	---	---	---	---	---	---	2.461
1.71	10,362	24.41	2.50 oc	---	---	---	---	---	---	---	---	---	2.504
1.75	10,601	24.45	2.54 oc	---	---	---	---	---	---	---	---	---	2.543
1.78	10,854	24.49	2.58 oc	---	---	---	---	---	---	---	---	---	2.581
1.82	11,107	24.52	2.62 oc	---	---	---	---	---	---	---	---	---	2.616
1.85	11,361	24.56	2.65 oc	---	---	---	---	---	---	---	---	---	2.646
1.89	11,614	24.59	2.67 oc	---	---	---	---	---	---	---	---	---	2.673
1.92	11,867	24.63	2.69 oc	---	---	---	---	---	---	---	---	---	2.693
1.96	12,120	24.66	2.71 oc	---	---	---	---	---	---	---	---	---	2.707
1.99	12,373	24.69	2.71 oc	---	---	---	---	---	---	---	---	---	2.705
2.03	12,627	24.73	4.27 oc	---	---	---	---	---	---	---	---	---	4.265
2.06	12,880	24.76	5.56 oc	---	---	---	---	---	---	---	---	---	5.561
2.10	13,133	24.80	6.61 oc	---	---	---	---	---	---	---	---	---	6.608
2.13	13,401	24.84	7.51 oc	---	---	---	---	---	---	---	---	---	7.510
2.17	13,668	24.87	8.31 oc	---	---	---	---	---	---	---	---	---	8.314
2.21	13,936	24.91	9.05 oc	---	---	---	---	---	---	---	---	---	9.048
2.24	14,204	24.94	9.73 oc	---	---	---	---	---	---	---	---	---	9.726
2.28	14,472	24.98	10.36 oc	---	---	---	---	---	---	---	---	---	10.36
2.31	14,739	25.01	10.96 oc	---	---	---	---	---	---	---	---	---	10.96
2.35	15,007	25.05	11.52 oc	---	---	---	---	---	---	---	---	---	11.52
2.38	15,275	25.08	12.06 oc	---	---	---	---	---	---	---	---	---	12.06
2.42	15,542	25.11	12.58 oc	---	---	---	---	---	---	---	---	---	12.58
2.45	15,810	25.15	13.08 oc	---	---	---	---	---	---	---	---	---	13.08
2.48	16,092	25.19	13.56 oc	---	---	---	---	---	---	---	---	---	13.56
2.52	16,375	25.22	14.02 oc	---	---	---	---	---	---	---	---	---	14.02
2.56	16,657	25.26	14.46 oc	---	---	---	---	---	---	---	---	---	14.46
2.59	16,940	25.29	14.90 oc	---	---	---	---	---	---	---	---	---	14.90
2.63	17,222	25.33	15.32 oc	---	---	---	---	---	---	---	---	---	15.32
2.66	17,505	25.36	15.73 oc	---	---	---	---	---	---	---	---	---	15.73
2.70	17,787	25.40	16.13 oc	---	---	---	---	---	---	---	---	---	16.13
2.73	18,070	25.43	16.52 oc	---	---	---	---	---	---	---	---	---	16.52
2.77	18,352	25.47	16.90 oc	---	---	---	---	---	---	---	---	---	16.90
2.80	18,634	25.50	17.27 oc	---	---	---	---	---	---	---	---	---	17.27
2.83	18,932	25.53	17.64 oc	---	---	---	---	---	---	---	---	---	17.64
2.87	19,230	25.57	18.00 oc	---	---	---	---	---	---	---	---	---	18.00
2.90	19,527	25.60	18.35 oc	---	---	---	---	---	---	---	---	---	18.35
2.94	19,825	25.64	18.69 oc	---	---	---	---	---	---	---	---	---	18.69
2.98	20,122	25.67	19.03 oc	---	---	---	---	---	---	---	---	---	19.03
3.01	20,420	25.71	19.36 oc	---	---	---	---	---	---	---	---	---	19.36
3.05	20,717	25.74	19.68 oc	---	---	---	---	---	---	---	---	---	19.68
3.08	21,015	25.78	20.01 oc	---	---	---	---	---	---	---	---	---	20.01
3.12	21,312	25.81	20.32 oc	---	---	---	---	---	---	---	---	---	20.32
3.15	21,610	25.85	20.63 oc	---	---	---	---	---	---	---	---	---	20.63
3.18	21,923	25.89	20.94 oc	---	---	---	---	---	---	---	---	---	20.94
3.22	22,236	25.92	21.24 oc	---	---	---	---	---	---	---	---	---	21.24
3.25	22,548	25.95	21.54 oc	---	---	---	---	---	---	---	---	---	21.54
3.29	22,861	25.99	21.83 oc	---	---	---	---	---	---	---	---	---	21.83
3.33	23,174	26.02	22.12 oc	---	---	---	---	---	---	---	---	---	22.12
3.36	23,487	26.06	22.41 oc	---	---	---	---	---	---	---	---	---	22.41
3.40	23,800	26.09	22.69 oc	---	---	---	---	---	---	---	---	---	22.69
3.43	24,113	26.13	22.97 oc	---	---	---	---	---	---	---	---	---	22.97
3.47	24,426	26.16	23.24 oc	---	---	---	---	---	---	---	---	---	23.24
3.50	24,739	26.20	23.52 oc	---	---	---	---	---	---	---	---	---	23.52

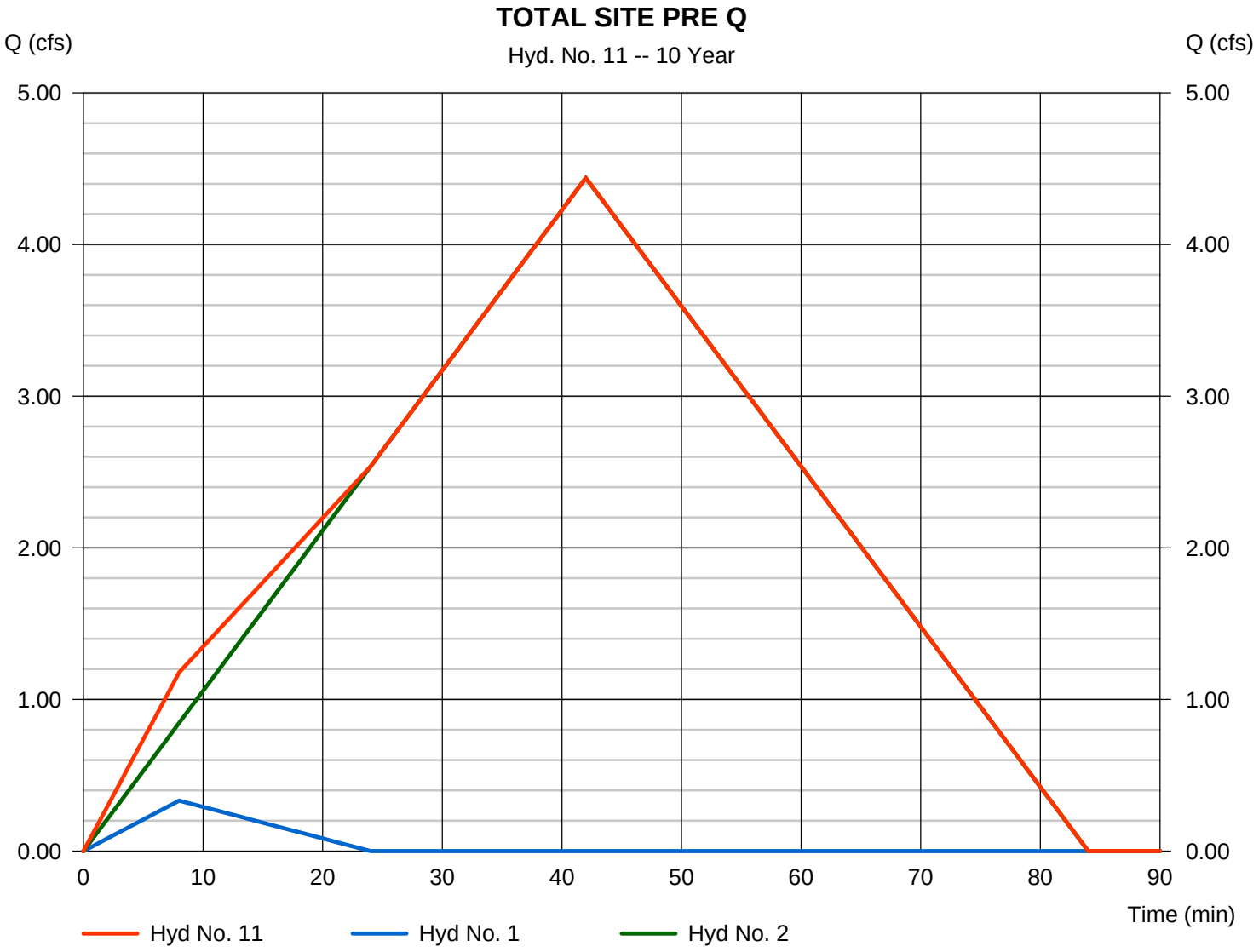
...End

Hydrograph Report

Hyd. No. 11

TOTAL SITE PRE Q

Hydrograph type	= Combine	Peak discharge	= 4.439 cfs
Storm frequency	= 10 yrs	Time to peak	= 42 min
Time interval	= 1 min	Hyd. volume	= 11,425 cuft
Inflow hyds.	= 1, 2	Contrib. drain. area	= 4.000 ac

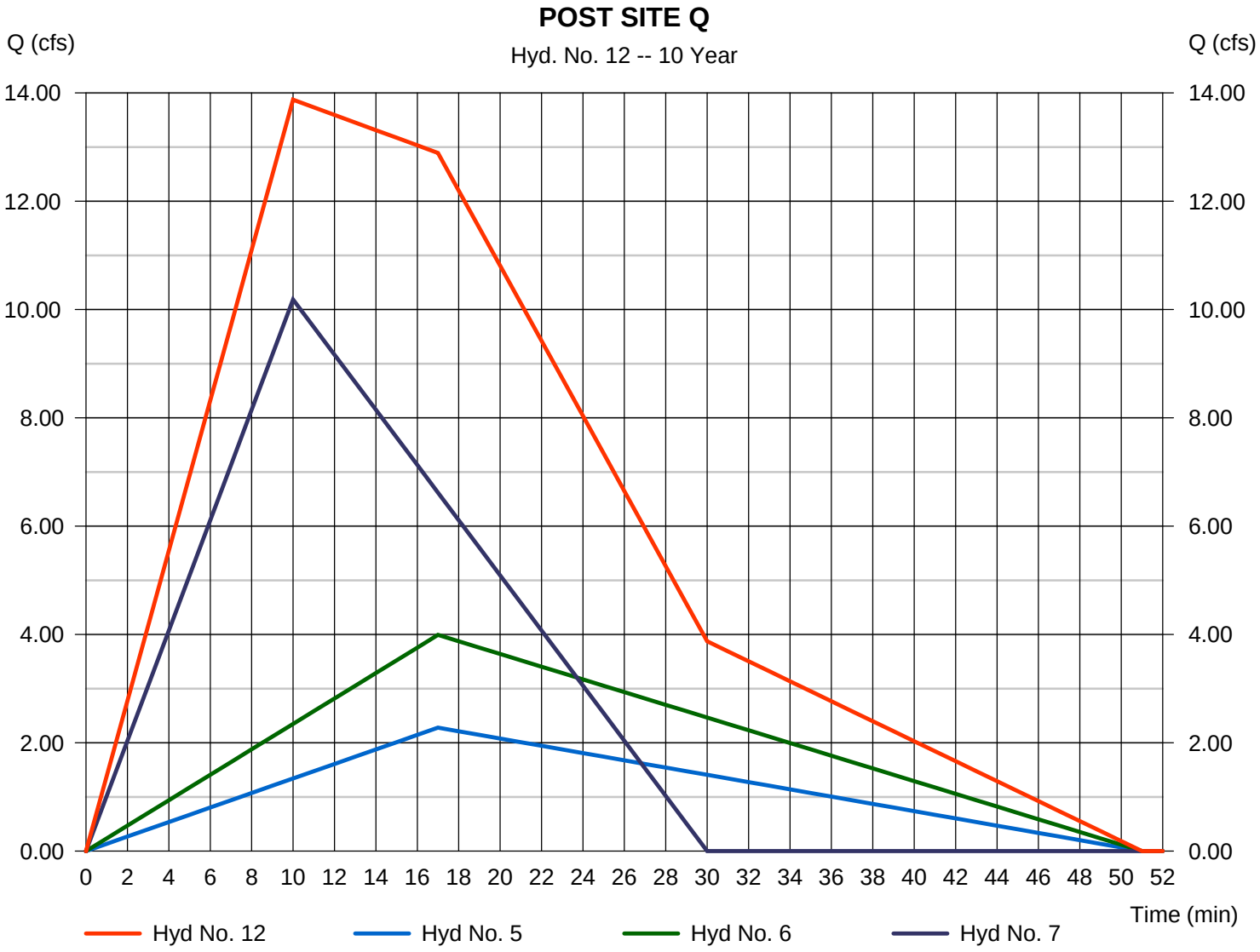


Hydrograph Report

Hyd. No. 12

POST SITE Q

Hydrograph type	= Combine	Peak discharge	= 13.87 cfs
Storm frequency	= 10 yrs	Time to peak	= 10 min
Time interval	= 1 min	Hyd. volume	= 18,761 cuft
Inflow hyds.	= 5, 6, 7	Contrib. drain. area	= 4.000 ac

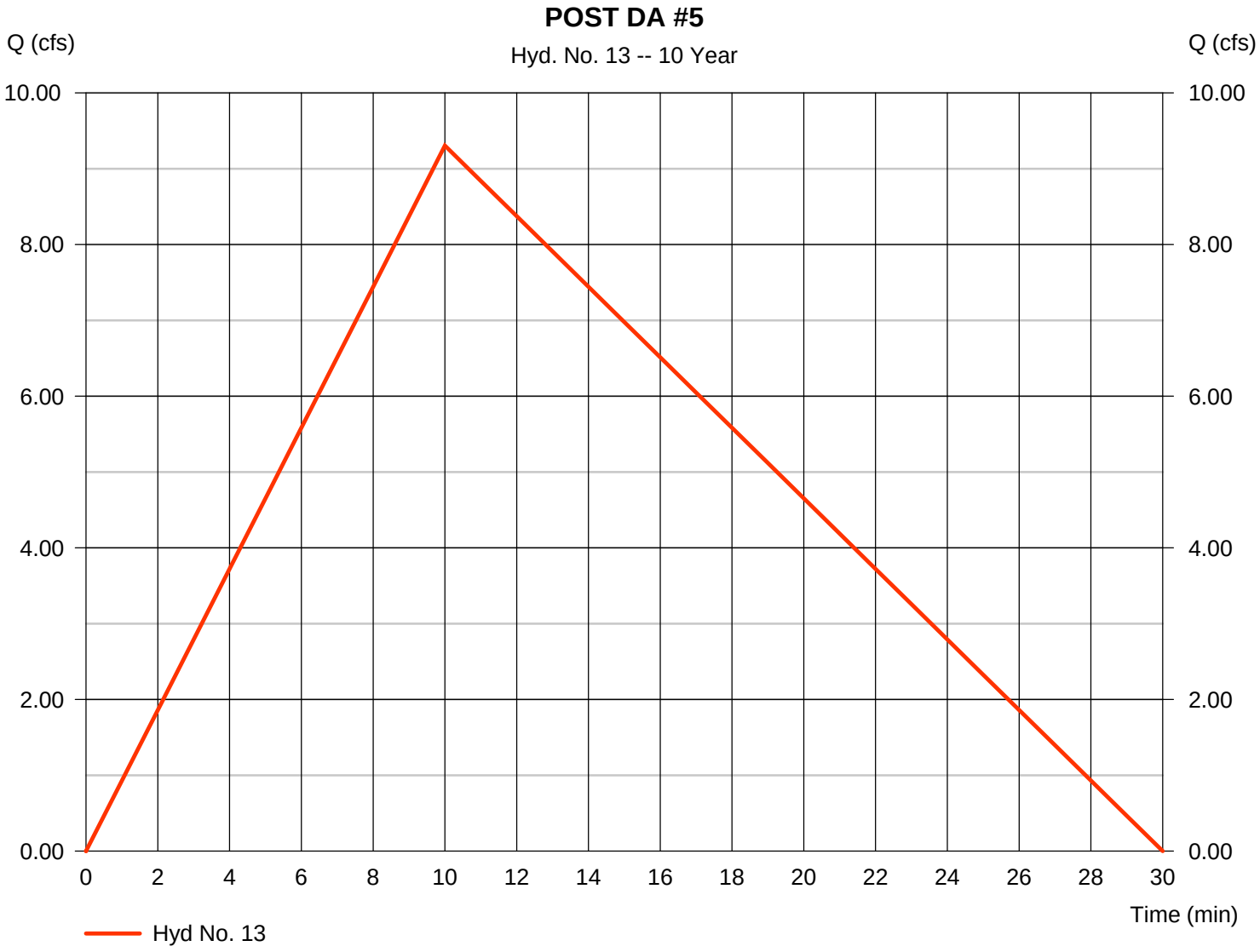


Hydrograph Report

Hyd. No. 13

POST DA #5

Hydrograph type	=	Rational	Peak discharge	=	9.304 cfs
Storm frequency	=	10 yrs	Time to peak	=	10 min
Time interval	=	1 min	Hyd. volume	=	8,374 cuft
Drainage area	=	2.830 ac	Runoff coeff.	=	0.47
Intensity	=	6.995 in/hr	Tc by TR55	=	10.00 min
IDF Curve	=	REGION 1.IDF	Asc/Rec limb fact	=	1/2



TR55 Tc Worksheet

Hyd. No. 13

POST DA #5

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.020		0.011		0.011		
Flow length (ft)	= 74.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 4.80		0.00		0.00		
Land slope (%)	= 0.10		0.00		0.00		
Travel Time (min)	**= 4.16**	**+**	**0.00**	**+**	**0.00**	**=**	**4.16**
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)	= 6.25		18.00		0.00		
Wetted perimeter (ft)	= 7.07		11.48		0.00		
Channel slope (%)	= 0.40		0.10		0.00		
Manning's n-value	= 0.015		0.015		0.015		
Velocity (ft/s)	=5.78						
			4.25				
					0.00		
Flow length (ft)	({0})580.0		1080.0		0.0		
Travel Time (min)	**= 1.67**	**+**	**4.24**	**+**	**0.00**	**=**	**5.91**

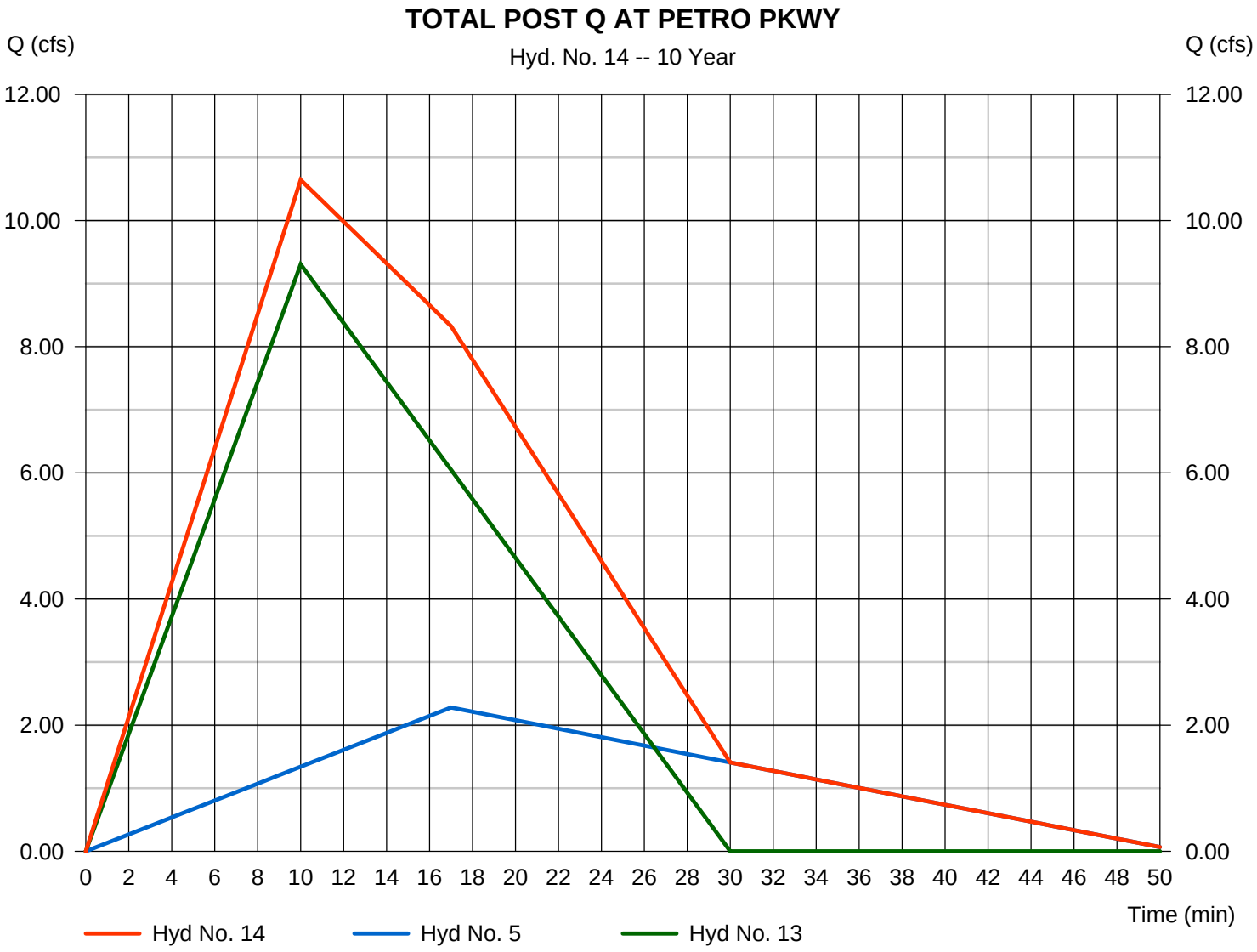
Total Travel Time, Tc ..... 10.00 min

Hydrograph Report

Hyd. No. 14

TOTAL POST Q AT PETRO PKWY

Hydrograph type	= Combine	Peak discharge	= 10.64 cfs
Storm frequency	= 10 yrs	Time to peak	= 10 min
Time interval	= 1 min	Hyd. volume	= 11,861 cuft
Inflow hyds.	= 5, 13	Contrib. drain. area	= 3.290 ac



Hydraflow Rainfall Report

Return Period (Yrs)	Intensity-Duration-Frequency Equation Coefficients (FHA)			
	B	D	E	(N/A)
1	0.0000	0.0000	0.0000	--------
2	68.6649	12.9000	0.7919	--------
3	0.0000	0.0000	0.0000	--------
5	71.2464	15.2000	0.7492	--------
10	145.1131	22.4000	0.8718	--------
25	182.6507	24.7001	0.8846	--------
50	162.8302	23.7001	0.8372	--------
100	124.9848	20.0000	0.7637	--------

File name: REGION 1.IDF

Intensity = B / (Tc + D)^E

Return Period (Yrs)	Intensity Values (in/hr)											
	5 min	10	15	20	25	30	35	40	45	50	55	60
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	6.99	5.75	4.92	4.32	3.86	3.50	3.21	2.96	2.76	2.59	2.43	2.30
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	7.50	6.35	5.55	4.94	4.48	4.10	3.79	3.53	3.31	3.12	2.95	2.80
10	8.10	6.99	6.17	5.53	5.02	4.60	4.25	3.95	3.69	3.47	3.27	3.10
25	9.10	7.93	7.04	6.34	5.77	5.30	4.91	4.57	4.28	4.02	3.80	3.60
50	9.80	8.57	7.63	6.89	6.29	5.80	5.38	5.03	4.72	4.45	4.21	4.00
100	10.70	9.31	8.27	7.47	6.83	6.30	5.86	5.48	5.16	4.87	4.62	4.40

Tc = time in minutes. Values may exceed 60.

Precip. file name: region_1.pcp

Storm Distribution	Rainfall Precipitation Table (in)							
	1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr
SCS 24-hour	0.00	4.80	0.00	6.50	7.80	9.60	11.10	12.60
SCS 6-Hr	0.00	3.50	0.00	4.60	5.50	6.60	7.60	8.60
Huff-1st	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-2nd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-3rd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-4th	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-Indy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Custom	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

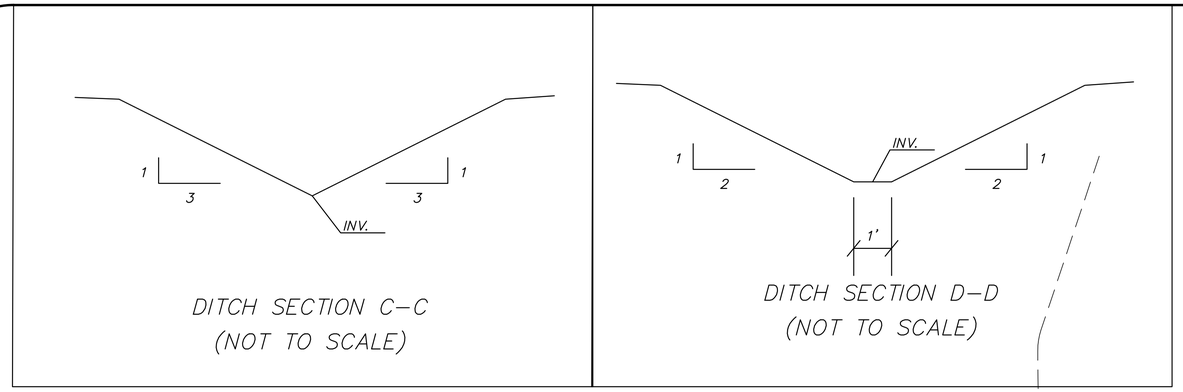
Hydraflow Table of Contents

SMEDA PRE & POST.gpw

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2013 by Autodesk, Inc. v10 Saturday, 02 / 16 / 2013

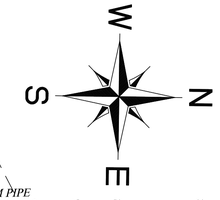
Exhibit 6

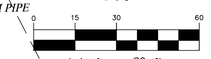
Post Development Drainage Plan



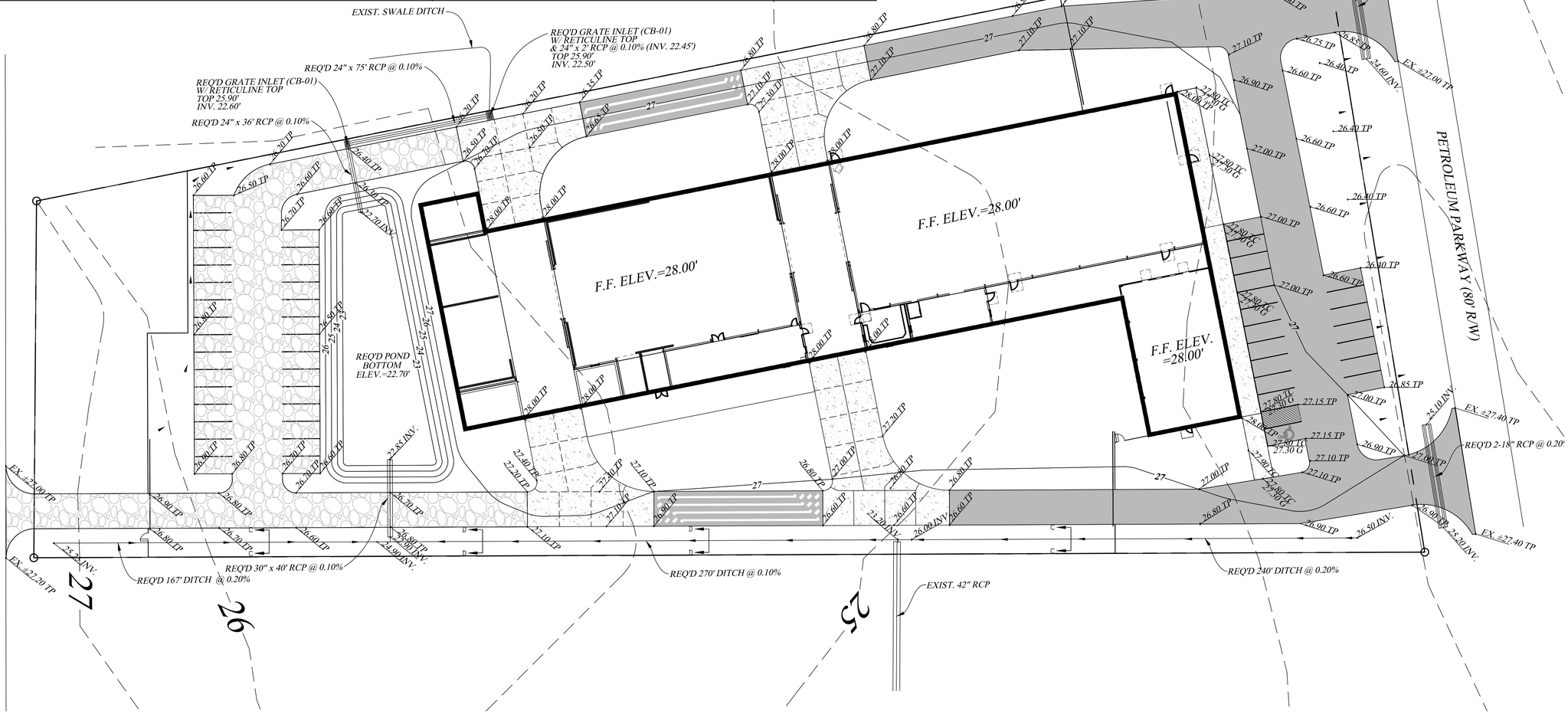
DITCH SECTION C–C
(NOT TO SCALE)

DITCH SECTION D–D
(NOT TO SCALE)





GRAPHIC SCALE



LEGEND:

27.80 TC / 27.30 G	PROP. TOP OF CURB & GUTTER ELEVATION
27.80 TP	PROP. TOP OF PAVEMENT OR FINISHED SURFACE ELEVATION
25.20 INV.	PROP. INVERT ELEVATION
EX. 27.80 TP	EXIST. TOP OF PAVEMENT ELEVATION (CONTRACTOR TO FIELD VERIFY)
25	PROP. CONTOUR
25	EXIST. CONTOUR
	FLOW DIRECTION (GRADE TO DRAIN)

LA One Call
1-800-272-3020
Call before you dig

NOTE:

THE CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING THE EXACT LOCATION, DEPTH, AND SIZE OF ALL UNDERGROUND UTILITIES AND STRUCTURES AND SHALL BE LIABLE FOR ANY DAMAGE CAUSED BY FAILURE TO COMPLY WITH THESE INSTRUCTIONS.

NO.	DATE	REVISION DESCRIPTION	BY

SUPERIOR PRESSURE CONTROL
SMEDA-ST. MARTIN PARISH, LA

GRADING & DRAINAGE PLAN

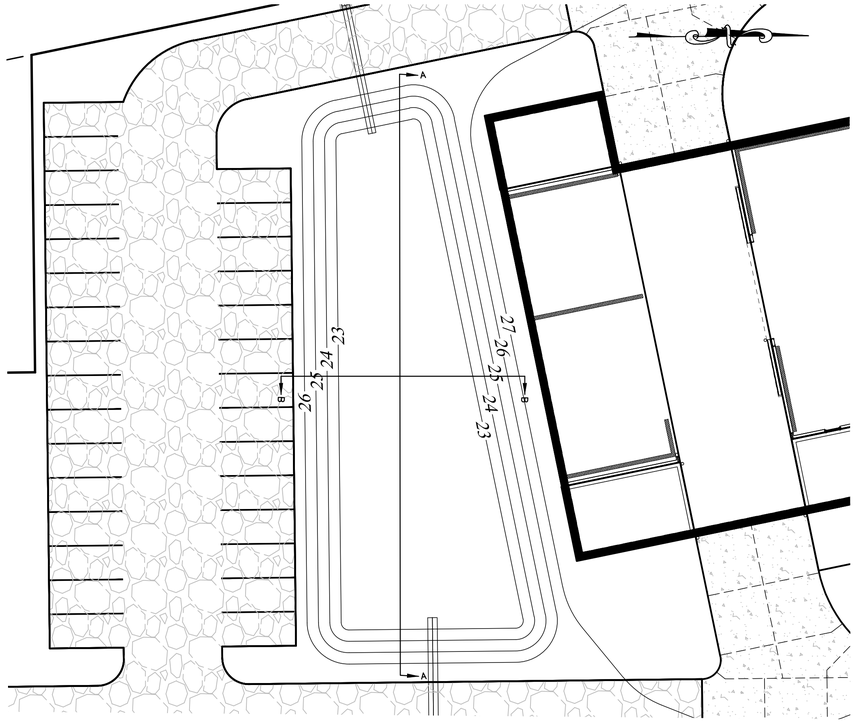
MICHAEL P. GUIDRY, INC.
201 HEYMANN BLVD. #30-E
LAFAYETTE, LA 70503
337-234-7595

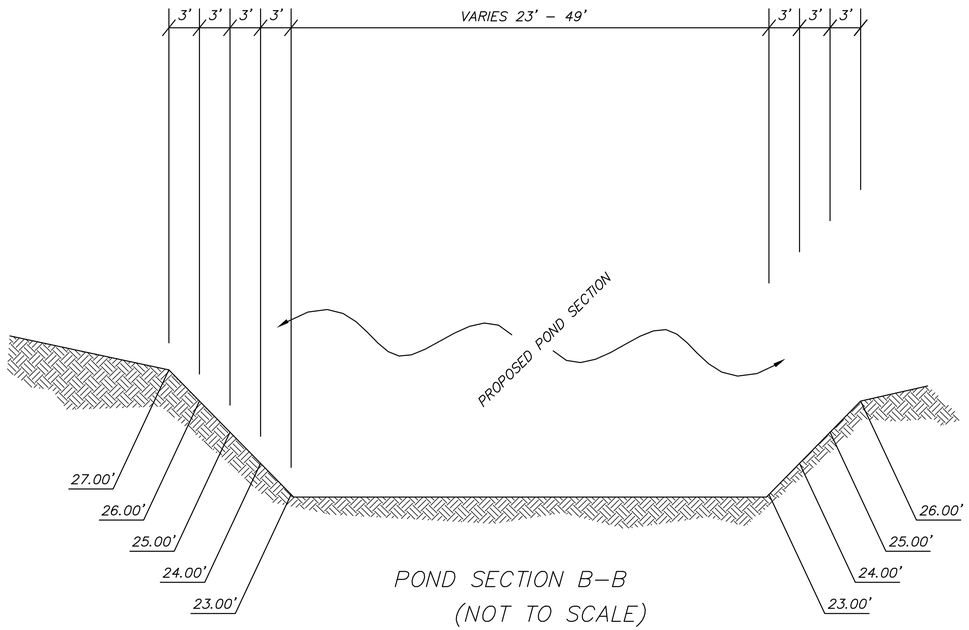
SHEET NUMBER
3

DATE
FEBRUARY 2013

Exhibit 7

Pond Cross Sections





POND SECTION B–B
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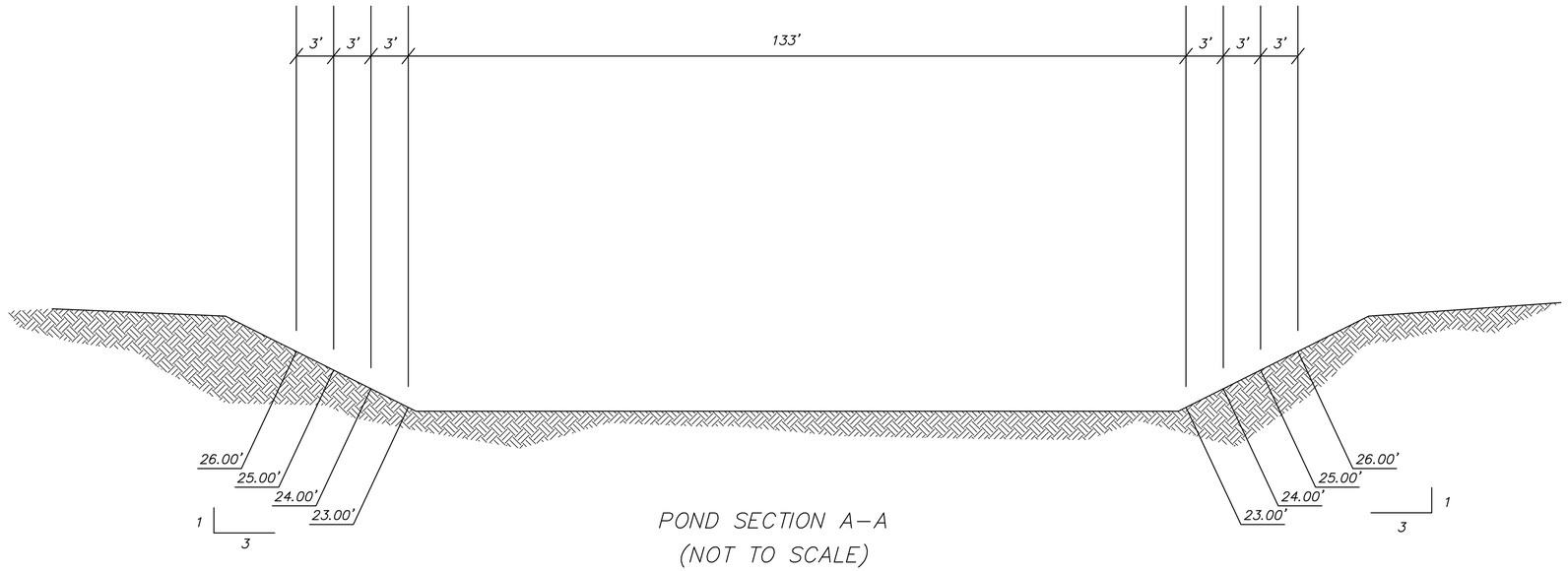

POND SECTION A–A
(NOT TO SCALE)

NO.	DATE	REVISION DESCRIPTION	BY

SUPERIOR PRESSURE CONTROL
SMEDA-ST. MARTIN PARISH, LA

POND CROSS SECTIONS

MICHAEL P. GUIDRY, INC.
201 HEYMANN BLVD. #30-E
LAFAYETTE, LA 70503
337-234-7595

SHEET NUMBER
4

DATE
FEBRUARY 2013