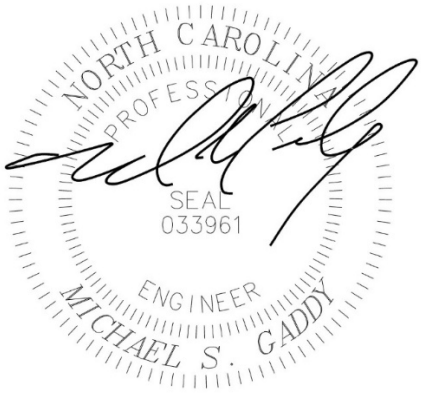
STORMWATER ANALYSIS

Currituck Way Subdivision
Currituck County, NC

October 13, 2026



Gaddy Engineering Services, LLC
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1 EXISTING SITE REVIEW

1.1 EXISTING SITE CONDITIONS

The proposed project is located at the northeast corner of the intersection of Caratoke Highway and Foster Forbes Road in Currituck County, North Carolina.

The project proposes constructing a twenty lot residential subdivision on the old farm land known as the 'Gallop Tract' as recorded on Plat Book A, Page 278. The parcel area is approximately 20 acres and fronts along Foster Forbes Road and Caratoke Highway. Vehicular access to the parcel will be from the north side Foster Forbes Way, a public right of way. The parcel is zoned Conditional MXR.

The site is bordered by Caratoke Highway to the west, single family residences to the north; single family residences to the east; and Foster Forbes Road to the south.



Figure 1.1: Existing Site

1.3 EXISTING DRAINAGE PATTERNS

The site is relatively flat, having existing elevations ranging from 6 feet to 14 feet. The site drains to an existing ditch system that bisects the parcel and drains upstream flow from offsite areas. The outfall point is the existing 12-inch CMP (corrugated metal pipe) that crosses Foster Forbes Road, denoted as 'OF-1' (Outfall 1). The CMP pipe outfalls to a ditch system on the

south side of Foster Forbes Road then flows across Caratoke Highway to the West, ultimately flowing to the Albemarle Sound. The existing site is currently fallow farm land with no impervious areas.

1.4 Soil Classification

Based on the NRCS soil report, the site has Type B soil; CnA, Conetoe loamy sand, Ds, Dragston loamy fine sand, and No, Nimmo loamy sand.

1.5 Groundwater

Based on the soil boring report, completed by McCallum, PC, and dated May 29, 2026, existing groundwater was encountered at depths of approximately 5.3 feet below grade at the location of the proposed stormwater wet pond. Based on the soil morphology, these depths are expected to the be seasonal high groundwater elevations. Per the survey, existing topographic elevations at the location of the borings are elevation 9.8 feet (NAVD88). Therefore the seasonal high groundwater elevation (SHGW) is expected to be at elevation 4.5 feet (NAVD88). Due to the outfall elevation the pond outfall will be set to elevation 5.95. The normal pool elevation of the pond is set to this elevation.

2 Proposed Site Analysis

2.1 Proposed Stormwater Design

The site is designed to route runoff to the roadside swales and culverts, which will outfall to the proposed wet pond on-site. Small areas onsite may bypass the pond as shown on the drainage area maps. The wet pond will outfall to a new storm sewer system that will cross Foster Forbes Road, replacing the old 12-inch CMP culvert.

2.1.1 Stormwater Analysis Software

The Hydraflow Storm Sewer software is used in stormwater analysis for all rainfall event models. The analysis uses the TR-55 Method.

2.1.2 Rainfall

24-hour rainfall estimates were taken from NOAA Atlas 14, Currituck County, NC:

1-year. =	3.27 in.
2-year. =	3.98 in.
5-year =	5.14 in.
10-year. =	6.11 in.
100-year =	10.2 in.

2.1.3 Tailwater

The starting tailwater elevation at the outfall (12-inch CMP) is estimated at 0.8D:

TW = 5.53’ + (0.8)(1.0’) = 6.33’

2.2 EXISTING AND PROPOSED HYDROLOGY

The project proposes to construct twenty (20) residential lots, along with a new public roadway and sidewalks. The proposed drainage pattern for the property routes stormwater runoff to the on-site swales and pipe systems, which outfalls to a new wet pond onsite. The existing and proposed site hydrology is as follows:

Existing Hydrology Conditions:

DA OFFSITE 1: Total Area = 16.22 ac.
Impervious Area = 2.53 ac. @ Cn=98
Woods Area = 3.70 ac. @ Cn=55
Pervious Area (Lawn) = 9.99 ac. @ Cn=69
Weigthed Cn (CnW) = 70.33

DA OFFSITE 2: Total Area = 26.62 ac.
Impervious Area = 2.85 ac. @ Cn=98
Woods Area = 10.7 ac. @ Cn=55
Pervious Area (Lawn) = 13.07 ac. @ Cn=69
Weigthed Cn (CnW) = 66.48

EX DA 1: Total Area = 14.23 ac.
Impervious Area = 0.28 ac. @ Cn=98
Woods Area = 1.62 ac. @ Cn=55
Pervious Area (Lawn) = 12.33 ac. @ Cn=69
Weigthed Cn (CnW) = 67.98; 2-Yr Wooded Cn = 55.85

EX DA 2: Total Area = 5.35 ac.
Impervious Area = 0.14 ac. @ Cn=98
Woods Area = 0.35 ac. @ Cn=55
Pervious Area (Lawn) = 4.86 ac. @ Cn=69
Weigthed Cn (CnW) = 68.84; 2-Yr. Wooded Cn = 56.13

EX DA OPEN SPACE: Total Area = 2.40 ac.
Impervious Area = 0.11 ac. @ Cn=98
Woods Area = 2.09 ac. @ Cn=55
Pervious Area (Lawn) = 0.20 ac. @ Cn=69
Weigthed Cn (CnW) = 58.14; 2-Yr Wooded Cn = 55

Pre-development Drainage Area Hydrology: (Refer to Existing Drainage Area Map)

Drainage Area	**Area (ac.)**	**C(n)W**	**T(c)min.**	**q_p (cfs) (2-Yr)**
DA OFFSITE 1	16.22	52.31	70.84	9.85
DA OFFSITE 2	26.62	46.61	66.48	13.39
EX DA 1	14.23	55.85	35.39	4.09
EX DA 2	5.35	56.13	56.42	1.16
EX DA OPEN SPACE	2.40	56.97	40.46	0.72
Routed Flow to OF- 1 (inlet of culvert at Foster Forbes Road) Node A4 in model	**64.82**			**5.19 (Routed)**

Proposed Hydrology Conditions:

DA OFFSITE 1: Total Area = 16.22 ac.
Impervious Area = 2.53 ac. @ Cn=98
Woods Area = 3.70 ac. @ Cn=55
Pervious Area (Lawn) = 9.99 ac. @ Cn=69
Weigthed Cn (CnW) = 70.330

DA OFFSITE 2: Total Area = 26.62 ac.
Impervious Area = 2.85 ac. @ Cn=98
Woods Area = 10.7 ac. @ Cn=55
Pervious Area (Lawn) = 13.07 ac. @ Cn=69
Weigthed Cn (CnW) = 66.48

DA BMP: Total Area = 2.62 ac.
Impervious Area = 1.30 ac. @ Cn=98
Woods Area = 0.0 ac. @ Cn=55
Pervious Area (Lawn) = 1.32 ac. @ Cn=69
Weigthed Cn (CnW) = 83.39

DA A5: Total Area = 1.66 ac.
Impervious Area = 0.33 ac. @ Cn=98
Woods Area = 0.00 ac. @ Cn=55
Pervious Area (Lawn) = 1.33 ac. @ Cn=69
Weigthed Cn (CnW) = 74.77

DA A6: Total Area = 1.33 ac.
Impervious Area = 0.14 ac. @ Cn=98
Woods Area = 0.00 ac. @ Cn=55
Pervious Area (Lawn) = 1.19 ac. @ Cn=69
Weigthed Cn (CnW) = 72.05

DA B1: Total Area = 4.96 ac.
Impervious Area = 1.81 ac. @ Cn=98
Woods Area = 0.00 ac. @ Cn=55
Pervious Area (Lawn) = 3.15 ac. @ Cn=69
Weigthed Cn (CnW) = 79.58

DA B3: Total Area = 2.66 ac.
Impervious Area = 1.12 ac. @ Cn=98
Woods Area = 0.00 ac. @ Cn=55
Pervious Area (Lawn) = 1.54 ac. @ Cn=69
Weigthed Cn (CnW) = 81.21

DA B5: Total Area = 1.34 ac.
Impervious Area = 0.52 ac. @ Cn=98
Woods Area = 0.00 ac. @ Cn=55
Pervious Area (Lawn) = 0.82 ac. @ Cn=69
Weigthed Cn (CnW) = 80.25

DA B6: Total Area = 0.95 ac.
Impervious Area = 0.28 ac. @ Cn=98
Woods Area = 0.00 ac. @ Cn=55
Pervious Area (Lawn) = 0.67 ac. @ Cn=69
Weigthed Cn (CnW) = 77.55

DA C1: Total Area = 1.83 ac.
Impervious Area = 0.55 ac. @ Cn=98
Woods Area = 0.00 ac. @ Cn=55
Pervious Area (Lawn) = 1.28 ac. @ Cn=69
Weigthed Cn (CnW) = 77.72

DA C2: Total Area = 1.18 ac.
Impervious Area = 0.45 ac. @ Cn=98
Woods Area = 0.00 ac. @ Cn=55
Pervious Area (Lawn) = 0.73 ac. @ Cn=69
Weigthed Cn (CnW) = 80.06

DA C3: Total Area = 0.79 ac.
Impervious Area = 0.22 ac. @ Cn=98
Woods Area = 0.00 ac. @ Cn=55
Pervious Area (Lawn) = 0.57 ac. @ Cn=69
Weigthed Cn (CnW) = 77.08

DA C4: Total Area = 0.44 ac.
Impervious Area = 0.10 ac. @ Cn=98
Woods Area = 0.00 ac. @ Cn=55
Pervious Area (Lawn) = 0.34 ac. @ Cn=69
Weigthed Cn (CnW) = 75.59

DA OPEN SPACE: Total Area = 2.21 ac.
Impervious Area = 0.11 ac. @ Cn=98
Woods Area = 2.10 ac. @ Cn=55
Pervious Area (Lawn) = 0.00 ac. @ Cn=69
Weigthed Cn (CnW) = 57.14

Post-development Drainage Area Hydrology: (Refer to Post Drainage Area Map)

Drainage Area	**Area (ac.)**	**C(n)W**	**T(c)min.**	q_p **(cfs) (10-Yr)**
DA OFFSITE 1	16.22	70.33	70.84	7.57
DA OFFSITE 2	26.62	66.48	66.48	7.95
DA BMP	2.62	83.39	11.06	11.40
DA B1	4.96	79.58	30.29	11.10
DA B3	2.66	81.21	24.50	7.50
DA B5	1.34	80.25	21.33	3.83
DA B6	0.95	77.55	26.41	2.00
DA C1	1.83	77.72	27.99	3.77
DA C2	1.18	80.06	23.27	3.18
DA C3	0.79	77.08	24.22	1.69
DA C4	0.44	75.59	23.06	0.86
DA OPEN SPACE	2.21	57.14	40.46	0.06
Routed Thru BMP	**61.82**			**5.53 (Routed)**
DA A5	1.66	58.74	43.95	3.84
DA A6	1.33	54.16	45.39	2.75
To OF-1	**64.81**			**5.13 (Routed)**

Requirement of post development 10 Year Peak Flow is attenuated to the 2 year (wooded condition) pre-developed peak flow at the point of analysis 'OF-1' (5.13 cfs < 5.19 cfs)

2.5 Storm Pipe Design (10-Year Hydraulic Grade Line)

The proposed stormwater pipes associated with this development are analyzed for the 10-year storm event. All hydraulic grade line elevations are below the rim elevations of the proposed storm sewer structures or are contained within the swale system. See Appendix B for hydraulic grade line computations.

Structure Name	Rim Elev. Or Top of Swale	10 Year HGL Elev.
A1 (BMP outfall)	9.5	8.81
A2	8.6	8.53
A3	9.35	7.48
A4	8.27	6.99
A5	8.0	7.24
A6	8.0	7.13
B1	9.2	9.13
B2	9.2	8.82
B3	9.1	8.82
B4	9.1	8.82
B5	9.1	8.82
B6	9.8	8.82
C1	9.5	9.34
C2	9.5	9.42
C3	9.5	9.02
C4	9.5	8.84
BMP (wet pond)	9.0	8.82

2.6 STAGE-STORAGE CURVE FOR WET POND

Stage – Storage Data for Wet Pond

Contour Elevation	Contour Area (sq. ft)	Depth (ft)	Cumulative Volume (cu.ft.)
0.0	16756	N/A	N/A
0.5	18353	0.5	8777.25
1.5	23547	1	29727.25
2.5	29891	1	56446.25
3.5	35354	1	89068.75
4.5	40931	1	127211.25
5.5	48066	0.5	171709.75
6	56201	1	197776.50
7	61214	1	256484.00
8	66328	1	320255.00
9	71542	0.5	389190.00
9.5	74187		425622.25

Normal Pool Elev = 5.95

APPENDIX A DRAINAGE AREA MAP

NORTH CAROLINA STATE PLANE COORDINATE SYSTEM (NSRS HARN)

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 033961 10.13.2026 MICHAEL S. GADDY

GADDY
ENGINEERING SERVICES, LLC

GADDY ENGINEERING SERVICES, LLC
508 N. BIRDNECK RD. SUITE D
VIRGINIA BEACH, VIRGINIA 23451
CONTACT:
MICHAEL S. GADDY, PE, LS
757-289-5933

DA OFFSITE 1
AREA = 16.22 AC.
110,167 S.F. OR 2.53 AC. (Cn=98)
WOODS = 3.70 AC. (Cn=30)
LAWN = 9.99 AC. (Cn=49)

DA OFFSITE 2
AREA = 26.62 AC.
123,991 S.F. OR 2.85 AC. (Cn=98)
WOODS = 10.7 AC. (Cn=30)
LAWN = 13.07 AC. (Cn=49)

200' OVERLAND FLOW @ 1%
525' SHAL CONCENTRATED FLOW @ 1%
125' SHAL CONCENTRATED FLOW @ 1%
390' CHANNEL FLOW @ 0.5%
240' OVERLAND FLOW @ 1%
325' SHALLOW CONCENTRATED FLOW @ 0.5%
305' SHALLOW CONCENTRATED FLOW @ 0.5%
270' SHALLOW CONCENTRATED FLOW @ 0.5%
100' OVERLAND FLOW @ 1%
395' SHALLOW CONC. FLOW @ 0.5%
240' OVERLAND FLOW @ 1.8%

MATCHLINE

DITCH NODE D-4
DITCH NODE D-3
DITCH NODE D-2
DITCH NODE D-1
OFFSITE POND

N59°23'45"E 2123.23'
N24°16'15"W 272.75'
S65°52'12"W 359.18'
S8°21'36"E 144.37'
C1

REVISION	DESCRIPTION
REV. NO. 1	07/

PRE-DEVELOPMENT DRAINAGE AREA MAP
FOR
CURRITUCK WAY SUBDIVISION
POPLAR BRANCH TOWNSHIP
CURRITUCK COUNTY
NORTH CAROLINA

PRE-DA

1 of 4 Sheets

SCALE: 1" = 80'

0 80 160 240

MATCHLINE

DITCH NODE D-4

DITCH NODE D-3

DITCH NODE D-2

DITCH NODE D-1

OFFSITE POND

390' CHANNEL FLOW @ 0.5%

100' OVERLAND FLOW @ 1%

395' SHALLOW CONC. FLOW @ 0.5%

EX DA 2

200' OVERLAND FLOW @ 1.5%

665' CHANNEL FLOW @ 0.05% N = 0.05

EX DA 1

EX DA OPEN SPACE

240' OVERLAND FLOW @ 1.8%

N59°23'45"E 2123.23'

S18°21'36"E 144.37'

S65°52'12"W 359.18'

S29°10'23"W 351.39'

S29°57'52"W 60.31'

S72°37'25"W 196.18'

N24°15'15"W 272.75'

N21°41'35"W 151.55'

N62°41'53"E 188.26'

N24°15'15"W 160.43'

S60°12'45"W 89.95'

S56°41'45"W 201.87'

N26°20'03"W 193.41'

S49°53'16"W 140.08'

DITCH NODE D-5

OF-1

CARATOKE HIGHWAY (NC HIGHWAY 3 & NC HIGHWAY 615) (P.C.A. PG. 288)

FOSTER FORBES ROAD (50' RIGHT-OF-WAY) (D.B. 435, PG. 81), (D.B. 435, PG. 85), (D.B. 435, PG. 80), (D.B. 435, PG. 87), (D.B. 435, PG. 88) (P.C.A. PG. 278)

1-STORY BRICK CHURCH BUILDING

NORTH CAROLINA STATE PLANE COORDINATE SYSTEM (NSRS 1983 (NAD83))

0 80 160 240

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 033961 10.13.2026 MICHAEL S. GADDY

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REV. NO.	REV. BY	REVISION	DESCRIPTION

PRE-DEVELOPMENT DRAINAGE AREA MAP
FOR
CURRITUCK WAY SUBDIVISION
POPLAR BRANCH TOWNSHIP
CURRITUCK COUNTY
NORTH CAROLINA

PRE-DA

2 of 4 Sheets

SCALE: 1" = 80'

NORTH CAROLINA PROFESSIONAL SEAL 033961 10.13.2026 ENGINEER MICHAEL S. GADDY

NORTH CAROLINA STATE PLANE COORDINATE SYSTEM (NAD 1983 (HARN))

GADDY ENGINEERING SERVICES, LLC

GADDY ENGINEERING SERVICES, LLC
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CONTACT:
MICHAEL S. GADDY, PE, LS
757-289-5933

REV. NO.	REV. BY	REVISION	DESCRIPTION	REVISION DATE

DA OFFSITE-1

DA OFFSITE-2

DA C1

DA C2

DA C3

DA C4

DA OPEN SPACE

325' OVERLAND FLOW @ 1%

200' OVERLAND FLOW @ 1%

525' SHAL CONCENTRATED FLOW @ 1%

125' SHAL CONCENTRATED FLOW @ 1%

240' OVERLAND FLOW @ 8%

305' SHALLOW CONCENTRATED FLOW @ 0.5%

270' SHALLOW CONCENTRATED FLOW @ 0.5%

390' CHANNEL FLOW @ 0.5%

TRENOR LANE

MATCHLINE

50' OVERLAND FLOW @ 2%

PROPOSED 10' SIDEWALK EASEMENT

150' CHANNEL FLOW @ 0.5%

130' CHANNEL FLOW @ 0.5%

65' OVERLAND FLOW @ 2%

150' CHANNEL FLOW @ 0.5%

100' OVERLAND FLOW @ 2%

60' OVERLAND FLOW @ 2%

240' OVERLAND FLOW @ 1.8%

N24°15'15"W 272.75'

N59°29'45"E 2123.23'

S65°52'12"W 359.18'

S16°21'36"E 144.37'

INV=6.40

FOSTER FORBES ROAD

0 80 160 240

PRE-DEVELOPMENT DRAINAGE AREA MAP
FOR
CURRITUCK WAY SUBDIVISION
POPLAR BRANCH TOWNSHIP
CURRITUCK COUNTY
NORTH CAROLINA

POST-DA

3 of 4 Sheets

SCALE: 1" = 80'

MATCHLINE

DA C3

DA C1

DA C4

DA C2

DA B3

DA OPEN SPACE

DA BMP-1

DA B6

DA B5

DA B1

DA A5

DA A6

POINT OF ANALYSIS
OF-1

50' OVERLAND
FLOW @ 2%

PROPOSED 10'
SIDEWALK EASEMENT

FOREBAY

WET POND

150' CHANNEL
FLOW @ 0.5%

130' CHANNEL
FLOW @ 0.5%

65' OVERLAND
FLOW @ 2%

60' OVERLAND
FLOW @ 2%

175' CHANNEL
FLOW @ 0.5%

100' OVERLAND
FLOW @ 2%

750' CHANNEL
FLOW @ 0.5%

850' CHANNEL
FLOW @ 0.5%

1,200' CHANNEL
FLOW @ 0.5%

240' OVERLAND
FLOW @ 1.8%

50' OVERLAND
FLOW @ 1%

200' CHANNEL
FLOW @ 0.5%

200' OVERLAND
FLOW @ 2%

75' OVERLAND
FLOW @ 2%

150' CHANNEL
FLOW @ 0.5%

PROPOSED NEW ELECTRIC ALIGNMENT
TO BE VERIFIED AND COORDINATE WITH COMPANY

CARATOKE HIGHWAY

FOSTER FORBES ROAD

150' RIGHT-OF-WAY (D.B. 435, PG. 85).
(D.B. 435, PG. 80) (D.B. 435, PG. 87) (D.B. 435, PG. 88)
(P.C. A, PG. 278)

1-STORY BRICK
CHURCH BUILDING

CBU MAILBOX
(ADA COMPLIANT)

STREETLIGHT
(TYP.)
(OPTIONAL)

N59°23'45"E 2123.23'

S65°52'12"W 359.18'

S16°21'36"E 144.37'

S29°10'24"W 354.38'

S49°53'16"W 140.08'

S60°12'45"W 52.95'

S56°41'43"W 201.87'

N24°15'15"W 272.75'

N24°15'15"W 160.43'

N62°41'35"W 175.75'

N62°41'35"W 175.75'

N28°23'W 193.41'

INV=3.16(in)NE

INV=6.40

NORTH CAROLINA STATE PLANE
COORDINATE SYSTEM (1983 (NAD83))

0 80 160 240

SCALE: 1" = 80'

NORTH CAROLINA
PROFESSIONAL ENGINEER
SEAL
033961
10.13.2026
ENGINEER
MICHAEL S. GADDY

GADDY
ENGINEERING SERVICES, LLC

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REV. NO.	REV. BY	REVISION DESCRIPTION	REVISION DATE

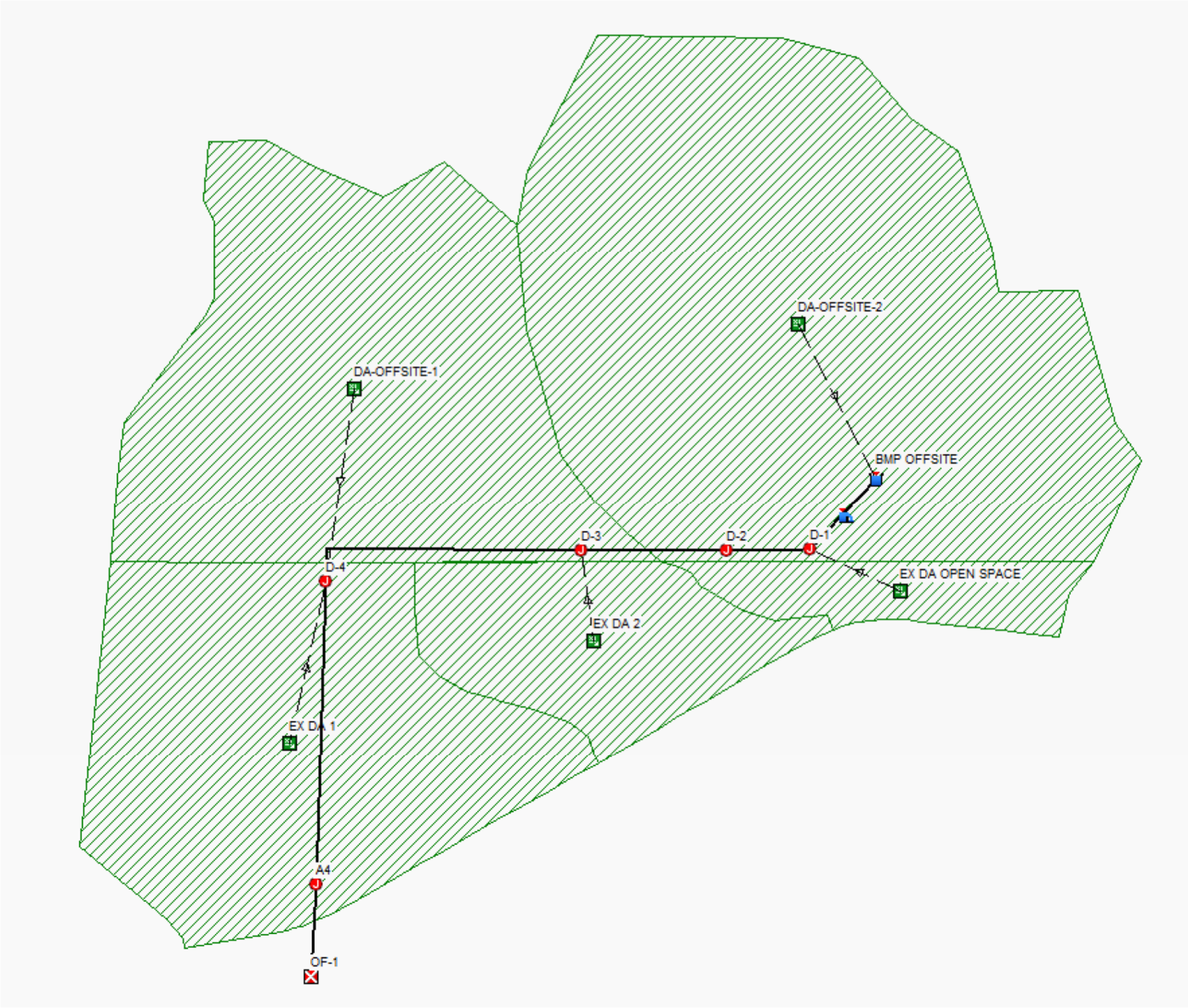
POST-DEVELOPMENT DRAINAGE AREA MAP
FOR
CURRITUCK WAY SUBDIVISION
POPLAR BRANCH TOWNSHIP
CURRITUCK COUNTY
NORTH CAROLINA

POST-DA

4 of 4 Sheets

APPENDIX B 2-YEAR EXISTING ROUTING & 10-YEAR PROPOSED ROUTING

2-YEAR EXISTING ROUTING SCHEMATIC (WOODED CONDITION)



Project Description

File Name	Existing 2 Year Model (Wooded).SPF

Project Options

Flow Units	CFS
Elevation Type	Elevation
Hydrology Method	SCS TR-55
Time of Concentration (TOC) Method	SCS TR-55
Link Routing Method	Hydrodynamic
Enable Overflow Ponding at Nodes	YES
Skip Steady State Analysis Time Periods	YES

Analysis Options

Start Analysis On	00:00:00	0:00:00
End Analysis On	00:00:00	0:00:00
Start Reporting On	00:00:00	0:00:00
Antecedent Dry Days	0	days
Runoff (Dry Weather) Time Step	0 01:00:00	days hh:mm:ss
Runoff (Wet Weather) Time Step	0 00:05:00	days hh:mm:ss
Reporting Time Step	0 00:01:00	days hh:mm:ss
Routing Time Step	5	seconds

Number of Elements

	Qty
Rain Gages	1
Subbasins	5
Nodes	7
Junctions	5
Outfalls	1
Flow Diversions	0
Inlets	0
Storage Nodes	1
Links	6
Channels	3
Pipes	2
Pumps	0
Orifices	0
Weirs	1
Outlets	0
Pollutants	0
Land Uses	0

Rainfall Details

SN	Rain Gage ID	Data Source	Data Source ID	Rainfall Type	Rain Units	State	County	Return Period (years)	Rainfall Depth (inches)	Rainfall Distribution
1	2YR	Time Series	2 YR	Cumulative	inches	North Carolina	Currituck	2.00	3.98	SCS Type II 24-hr

Subbasin Summary

SN	Subbasin ID	Area (ac)	Peak Rate Factor	Weighted Curve Number	Total Rainfall (in)	Total Runoff (in)	Total Runoff Volume (ac-in)	Peak Runoff (cfs)	Time of Concentration (days hh:mm:ss)
1	DA-OFFSITE-1	16.22	484.00	70.33	3.98	1.34	21.69	9.85	0 01:10:50
2	DA-OFFSITE-2	26.62	484.00	66.48	3.98	1.10	29.34	13.39	0 01:05:19
3	EX DA 1	14.23	484.00	55.85	3.98	0.56	7.95	4.09	0 00:35:23
4	EX DA 2	5.35	484.00	56.13	3.98	0.57	3.05	1.16	0 00:56:25
5	EX DA OPEN SPACE	2.40	484.00	56.97	3.98	0.61	1.46	0.72	0 00:40:27

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Surcharge Elevation (ft)	Ponded Area (ft^2)	Peak Inflow (cfs)	Max HGL Elevation Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)	Time of Peak Flooding Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
1	A4	Junction	5.94	8.34	6.33	0.00	0.00	8.07	8.15	0.00	0.55	0 00:00	0.00	0.00
2	D-1	Junction	6.80	8.30	0.00	0.00	0.00	5.23	8.24	0.00	1.06	0 00:00	0.00	0.00
3	D-2	Junction	6.28	10.10	0.00	0.00	0.00	3.24	8.24	0.00	1.86	0 00:00	0.00	0.00
4	D-3	Junction	6.32	10.00	0.00	0.00	0.00	3.98	8.19	0.00	2.01	0 00:00	0.00	0.00
5	D-4	Junction	6.30	8.00	0.00	0.00	0.00	12.67	8.21	0.00	1.89	0 00:00	0.00	0.00
6	OF-1	Outfall	5.53					5.19	6.45					
7	BMP OFFSITE	Storage Node	6.00	9.00	0.00		0.00	16.80	8.24				0.00	0.00

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length	Inlet Invert Elevation	Outlet Invert Elevation	Average Slope	Diameter or Height	Manning's Roughness	Peak Design Flow	Design Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Peak Flow Depth	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged	Reported Condition
					(ft)	(ft)	(ft)	(%)	(in)		(cfs)	(cfs)		(ft/sec)	(ft)		(min)	
1	A4 TO OF-1	Pipe	A4	OF-1	40.00	5.29	5.25	0.1000	12.000	0.0150	5.19	3.13	1.66	6.69	0.96	0.96	0.00	> CAPACITY
2	Ex-18-inch-Culvert	Pipe	D-2	D-3	333.00	6.28	6.32	-0.0100	18.000	0.0170	3.24	0.88	3.68	1.86	1.50	1.00	275.00	SURCHARGED
3	Ex-Ditch-1	Channel	D-1	D-2	250.00	6.80	6.28	0.2100	18.000	0.0320	3.20	15.42	0.21	0.87	1.47	0.98	0.00	
4	Ex-Ditch-2	Channel	D-3	D-4	600.00	6.40	6.30	0.0200	45.600	0.0320	2.94	33.41	0.09	0.75	1.85	0.49	0.00	
5	Ex-Ditch-3	Channel	D-4	A4	665.00	6.30	6.00	0.0500	32.400	0.0320	8.07	39.21	0.21	0.76	2.03	0.75	0.00	
6	Weir-OFFSITE BMP	Weir	BMP OFFSITE	D-1		6.00	6.80				5.13							

Subbasin Hydrology

Subbasin : DA-OFFSITE-1

Input Data

Area (ac)	16.22
Peak Rate Factor	484
Weighted Curve Number	70.33
Rain Gage ID	2YR

Composite Curve Number

32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Paved roads with curbs & sewers	2.53	B	98
50 - 75% grass cover, Fair	9.99	B	69
Woods, Good	3.7	B	55
Composite Area & Weighted CN	16.22		70.33

Time of Concentration

TOC Method : SCS TR-55

Sheet Flow Equation :

Tc = (0.007 * ((n * Lf)^0.8)) / ((P^0.5) * (Sf^0.4))

Where :

Tc = Time of Concentration (hr)
n = Manning's roughness
Lf = Flow Length (ft)
P = 2 yr, 24 hr Rainfall (inches)
Sf = Slope (ft/ft)

Shallow Concentrated Flow Equation :

V = 16.1345 * (Sf^0.5) (unpaved surface)
V = 20.3282 * (Sf^0.5) (paved surface)
V = 15.0 * (Sf^0.5) (grassed waterway surface)
V = 10.0 * (Sf^0.5) (nearly bare & untilled surface)
V = 9.0 * (Sf^0.5) (cultivated straight rows surface)
V = 7.0 * (Sf^0.5) (short grass pasture surface)
V = 5.0 * (Sf^0.5) (woodland surface)
V = 2.5 * (Sf^0.5) (forest w/heavy litter surface)
Tc = (Lf / V) / (3600 sec/hr)

Where:

Tc = Time of Concentration (hr)
Lf = Flow Length (ft)
V = Velocity (ft/sec)
Sf = Slope (ft/ft)

Channel Flow Equation :

V = (1.49 * (R^(2/3)) * (Sf^0.5)) / n
R = Aq / Wp
Tc = (Lf / V) / (3600 sec/hr)

Where :

Tc = Time of Concentration (hr)
Lf = Flow Length (ft)
R = Hydraulic Radius (ft)
Aq = Flow Area (ft^2)
Wp = Wetted Perimeter (ft)
V = Velocity (ft/sec)
Sf = Slope (ft/ft)
n = Manning's roughness

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.4	0	0
Flow Length (ft) :	200	0	0
Slope (%) :	1	0	0
2 yr, 24 hr Rainfall (in) :	3.98	0	0
Velocity (ft/sec) :	0.08	0	0
Computed Flow Time (min) :	44.24	0	0

Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	650	0	0
Slope (%) :	1	0	0
Surface Type :	Woodland	Unpaved	Unpaved
Velocity (ft/sec) :	0.5	0	0
Computed Flow Time (min) :	21.67	0	0

Channel Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.08	0	0
Flow Length (ft) :	390	0	0
Channel Slope (%) :	0.5	0	0
Cross Section Area (ft^2) :	6	0	0
Wetted Perimeter (ft) :	6	0	0
Velocity (ft/sec) :	1.32	0	0
Computed Flow Time (min) :	4.94	0	0

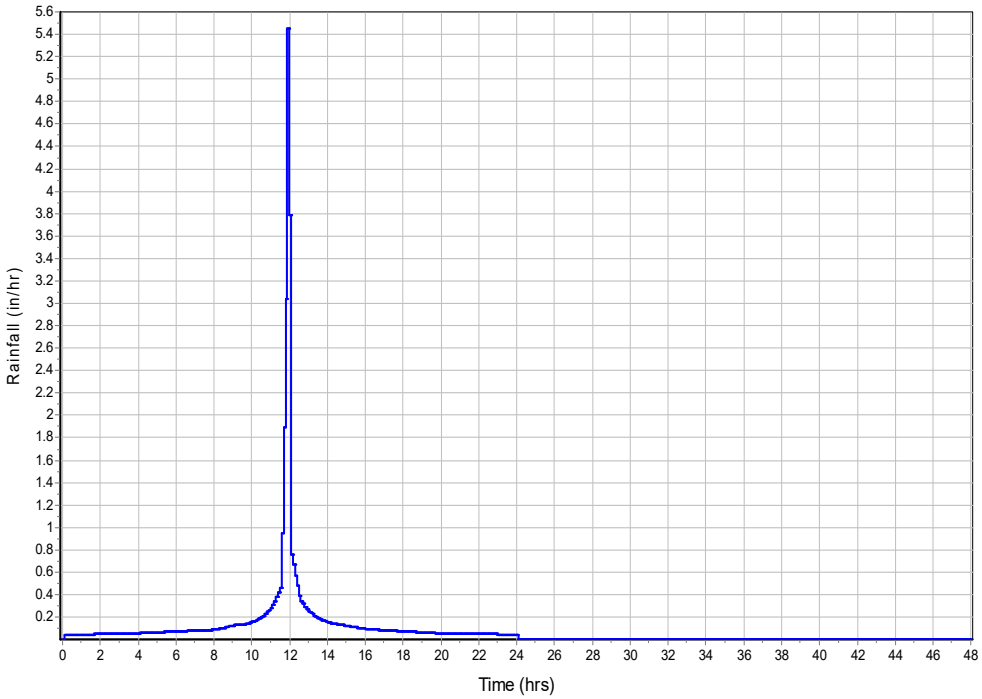
Total TOC (min) 70.84

Subbasin Runoff Results

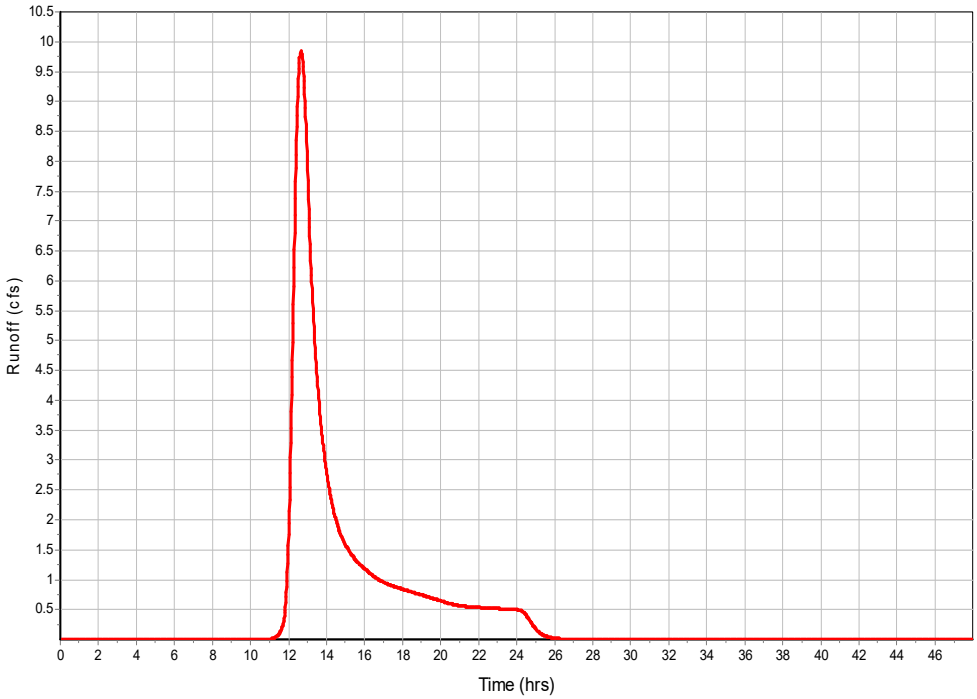
Total Rainfall (in)	3.98
Total Runoff (in)	1.34
Peak Runoff (cfs)	9.85
Weighted Curve Number	70.33
Time of Concentration (days hh:mm:ss)	0 01:10:50

Subbasin : DA-OFFSITE-1

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : DA-OFFSITE-2

Input Data

Area (ac)	26.62
Peak Rate Factor	484
Weighted Curve Number	66.48
Rain Gage ID	2YR

Composite Curve Number

32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Paved parking & roofs	2.85	B	98
50 - 75% grass cover, Fair	13.07	B	69
Woods, Good	10.7	B	55
Composite Area & Weighted CN	26.62		66.48

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.4	0	0
Flow Length (ft) :	240	0	0
Slope (%) :	1	0	0
2 yr, 24 hr Rainfall (in) :	3.98	0	0
Velocity (ft/sec) :	0.08	0	0
Computed Flow Time (min) :	51.18	0	0

Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	325	305	270
Slope (%) :	0.5	0.5	0.5
Surface Type :	Grassed waterway	sed wate	sed waterway
Velocity (ft/sec) :	1.06	1.06	1.06
Computed Flow Time (min) :	5.11	4.8	4.25

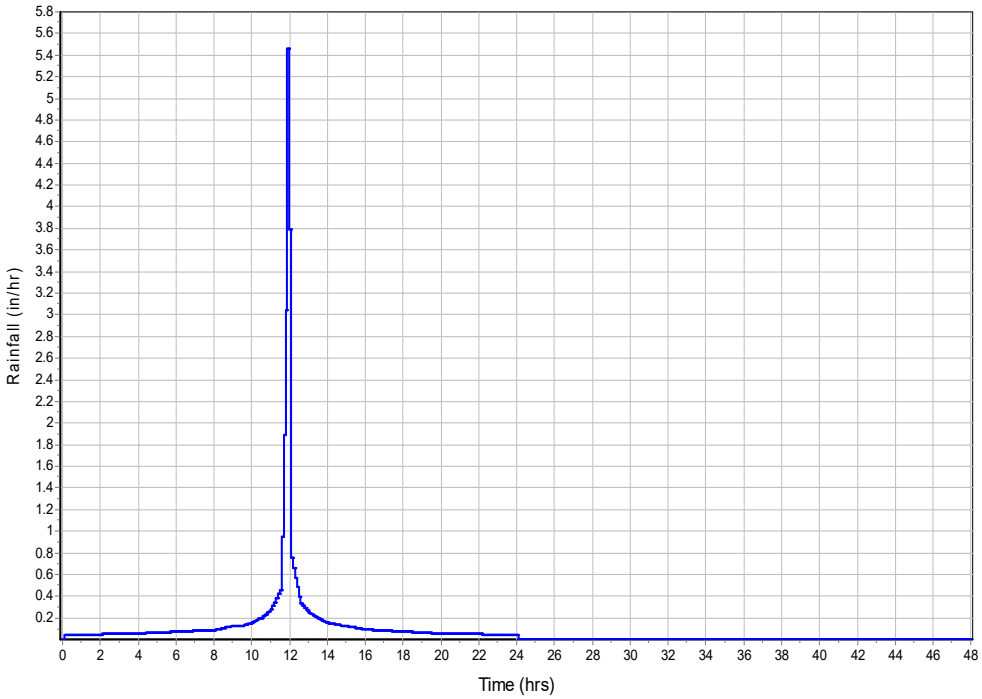
Total TOC (min) 65.33

Subbasin Runoff Results

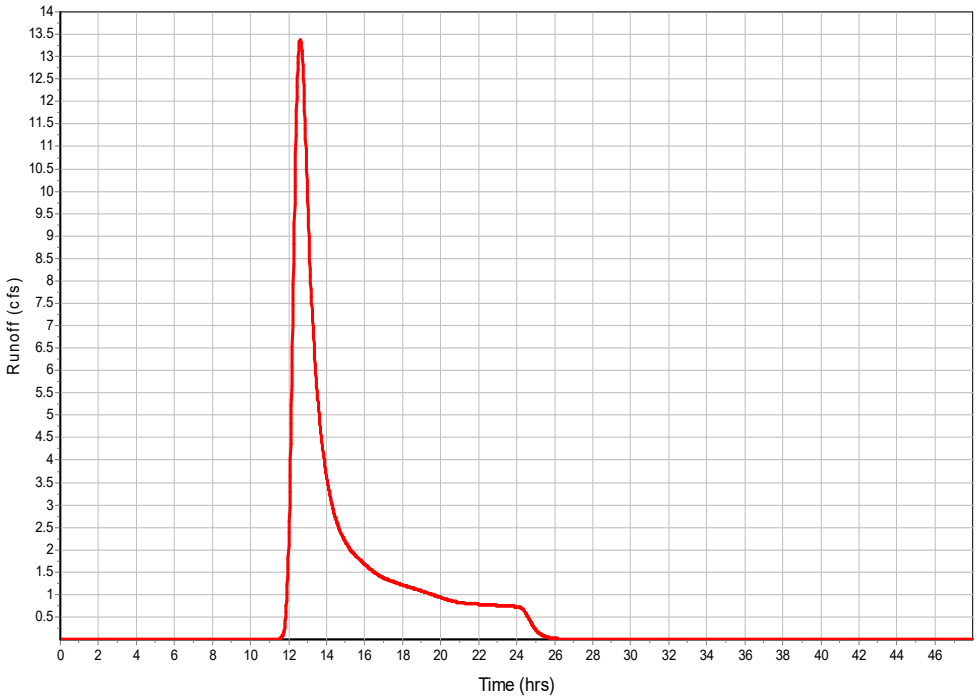
Total Rainfall (in)	3.98
Total Runoff (in)	1.1
Peak Runoff (cfs)	13.39
Weighted Curve Number	66.48
Time of Concentration (days hh:mm:ss)	0 01:05:20

Subbasin : DA-OFFSITE-2

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : EX DA 1

Input Data

Area (ac)	14.23
Peak Rate Factor	484
Weighted Curve Number	55.85
Rain Gage ID	2YR

Composite Curve Number

32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Woods, Good	13.95	B	55
Paved parking & roofs	0.28	B	98
Composite Area & Weighted CN	14.23		55.85

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.4	0	0
Flow Length (ft) :	100	0	0
Slope (%) :	1	0	0
2 yr, 24 hr Rainfall (in) :	3.98	0	0
Velocity (ft/sec) :	0.07	0	0
Computed Flow Time (min) :	25.41	0	0

Channel Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.03	0	0
Flow Length (ft) :	665	0	0
Channel Slope (%) :	0.05	0	0
Cross Section Area (ft^2) :	6	0	0
Wetted Perimeter (ft) :	6	0	0
Velocity (ft/sec) :	1.11	0	0
Computed Flow Time (min) :	9.98	0	0

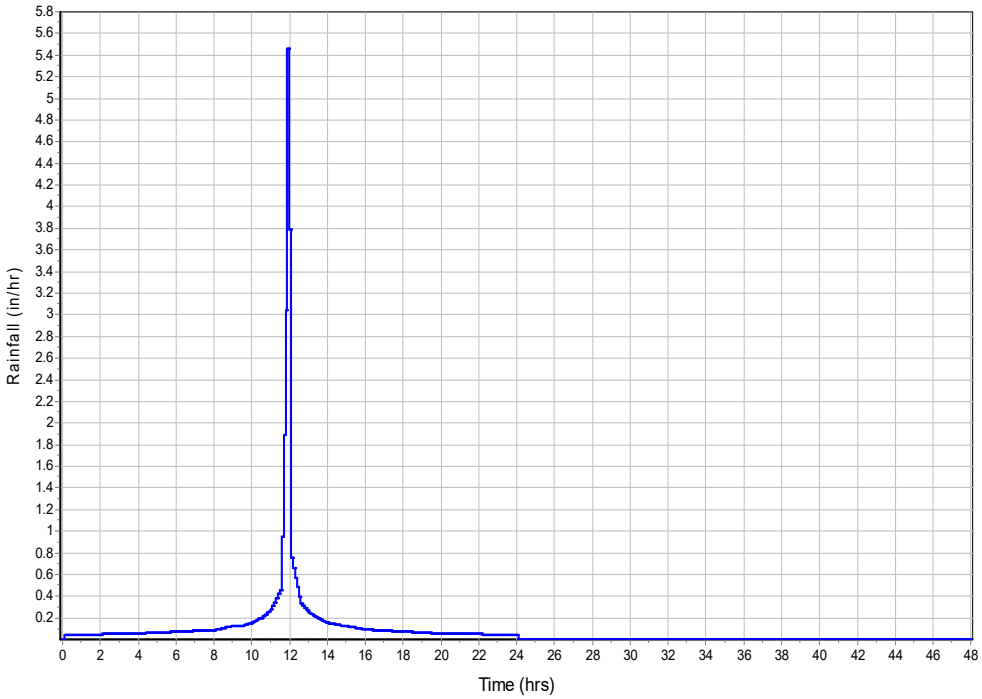
Total TOC (min) 35.39

Subbasin Runoff Results

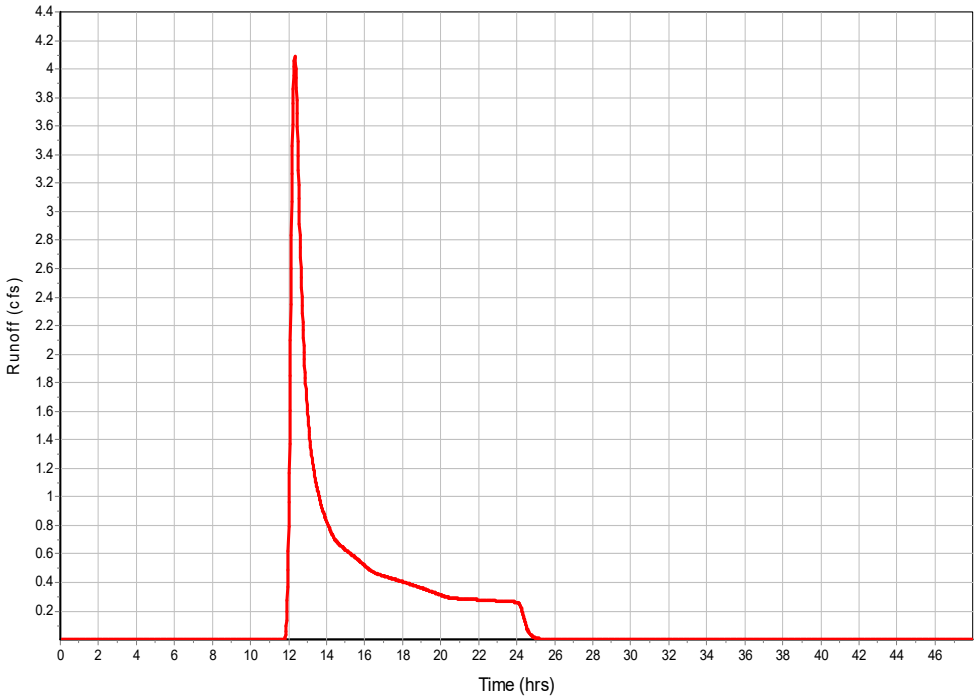
Total Rainfall (in)	3.98
Total Runoff (in)	0.56
Peak Runoff (cfs)	4.09
Weighted Curve Number	55.85
Time of Concentration (days hh:mm:ss)	0 00:35:23

Subbasin : EX DA 1

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : EX DA 2

Input Data

Area (ac)	5.35
Peak Rate Factor	484
Weighted Curve Number	56.13
Rain Gage ID	2YR

Composite Curve Number

32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Woods, Good	5.21	B	55
Paved parking & roofs	0.14	B	98
Composite Area & Weighted CN	5.35		56.13

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.4	0	0
Flow Length (ft) :	200	0	0
Slope (%) :	1.5	0	0
2 yr, 24 hr Rainfall (in) :	3.98	0	0
Velocity (ft/sec) :	0.09	0	0
Computed Flow Time (min) :	37.61	0	0

Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	395	0	0
Slope (%) :	0.5	0	0
Surface Type :	Woodland	Unpaved	Unpaved
Velocity (ft/sec) :	0.35	0	0
Computed Flow Time (min) :	18.81	0	0

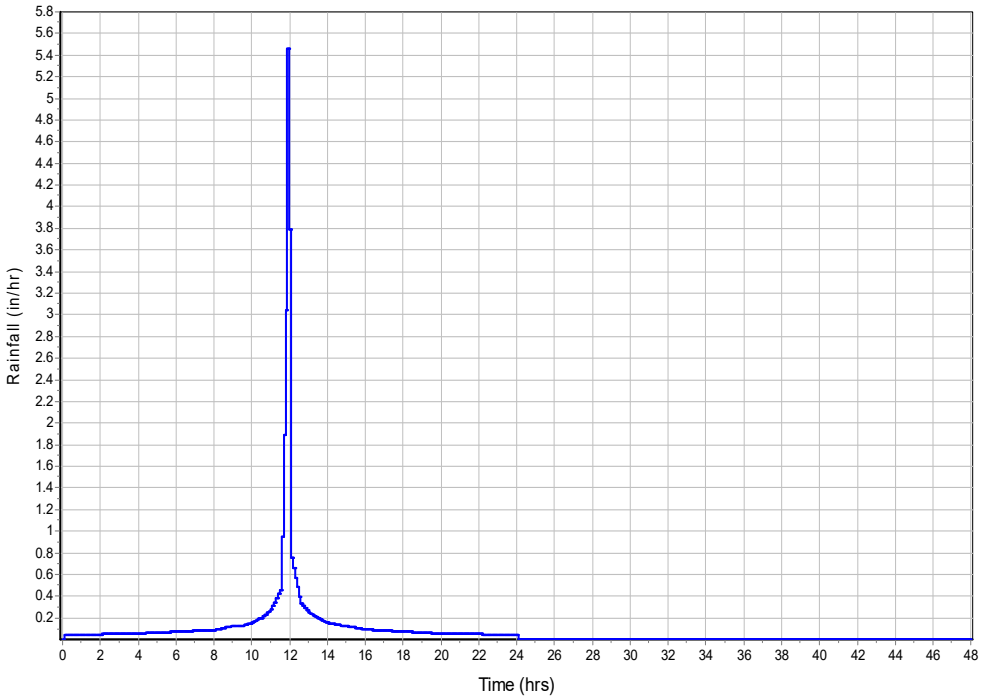
Total TOC (min) 56.42

Subbasin Runoff Results

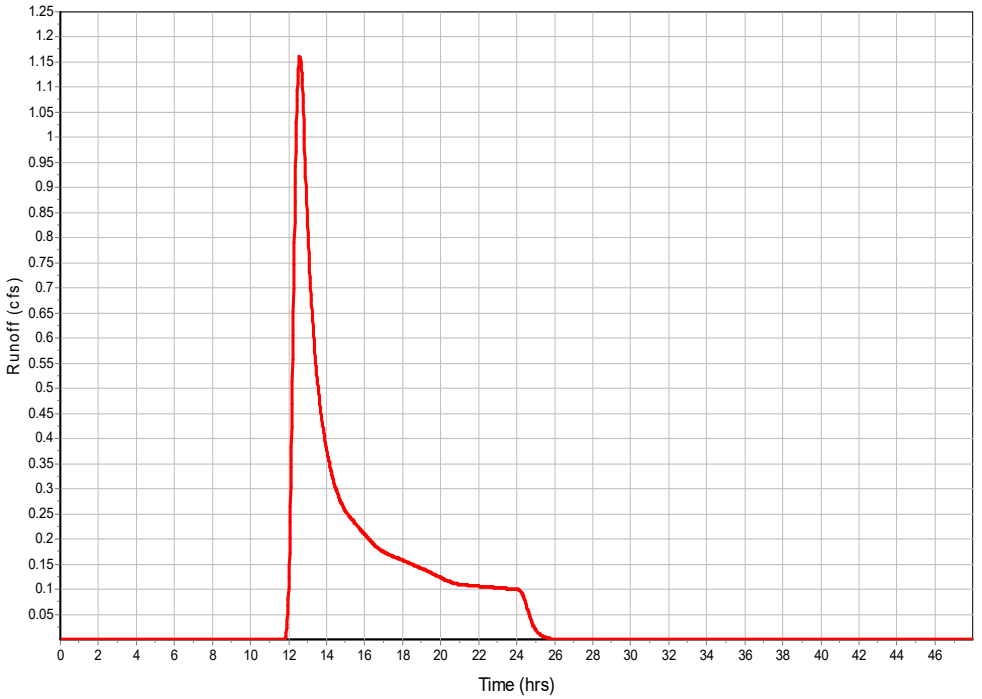
Total Rainfall (in)	3.98
Total Runoff (in)	0.57
Peak Runoff (cfs)	1.16
Weighted Curve Number	56.13
Time of Concentration (days hh:mm:ss)	0 00:56:25

Subbasin : EX DA 2

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : EX DA OPEN SPACE

Input Data

Area (ac)	2.4
Peak Rate Factor	484
Weighted Curve Number	56.97
Rain Gage ID	2YR

Composite Curve Number

32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Woods, Good	2.29	B	55
Paved parking & roofs	0.11	B	98
Composite Area & Weighted CN	2.4		56.97

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.4	0	0
Flow Length (ft) :	240	0	0
Slope (%) :	1.8	0	0
2 yr, 24 hr Rainfall (in) :	3.98	0	0
Velocity (ft/sec) :	0.1	0	0
Computed Flow Time (min) :	40.46	0	0

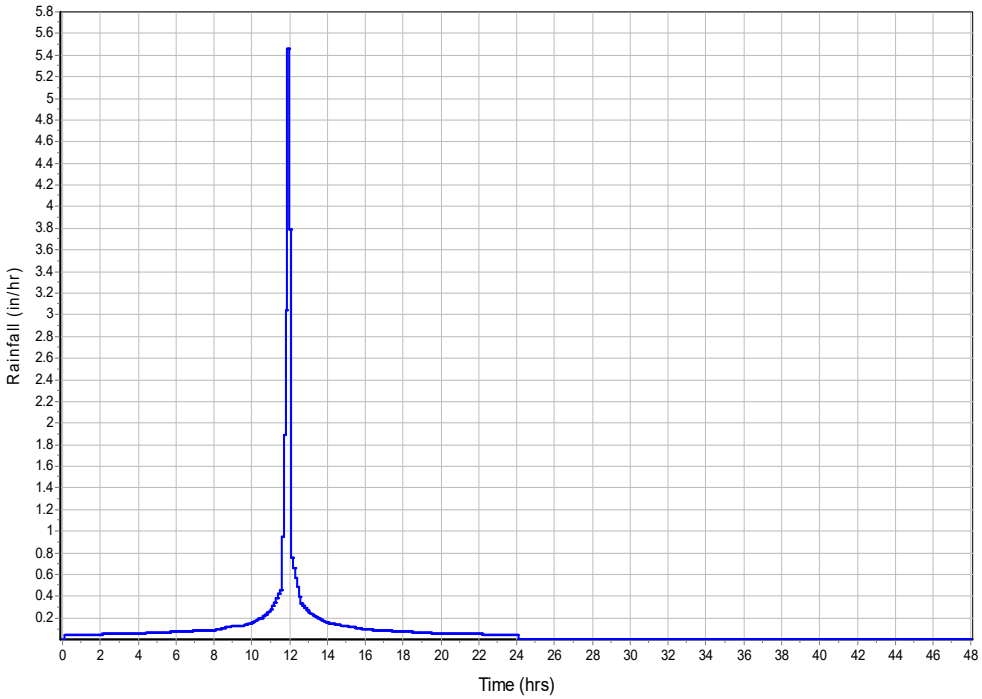
Total TOC (min) 40.46

Subbasin Runoff Results

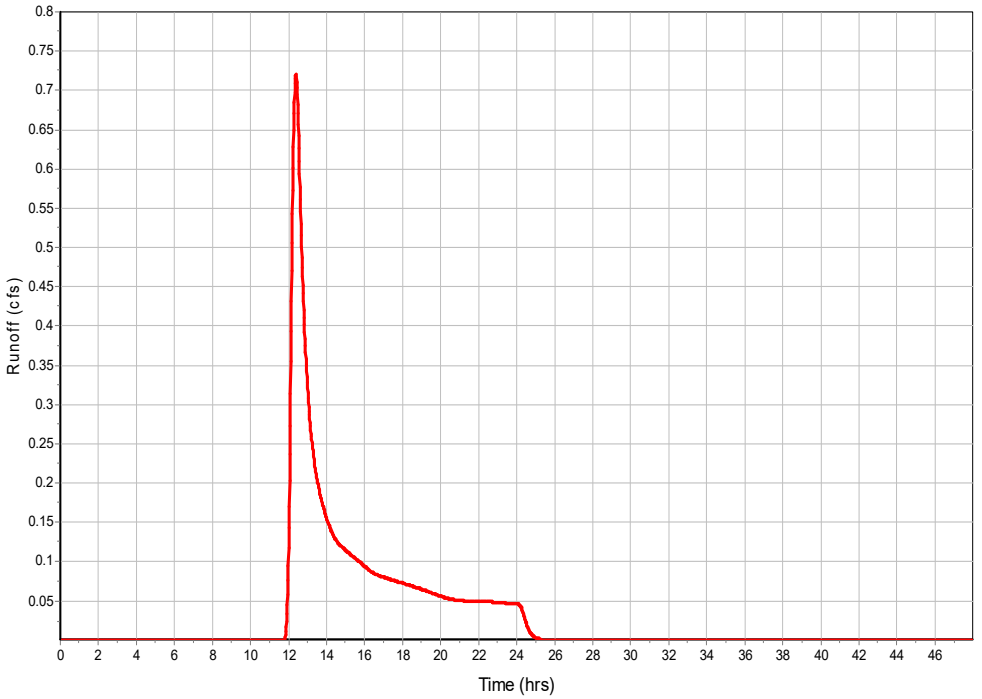
Total Rainfall (in)	3.98
Total Runoff (in)	0.61
Peak Runoff (cfs)	0.72
Weighted Curve Number	56.97
Time of Concentration (days hh:mm:ss)	0 00:40:28

Subbasin : EX DA OPEN SPACE

Rainfall Intensity Graph



Runoff Hydrograph



Junction Input

SN	Element ID	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Ground/Rim (Max) Offset (ft)	Initial Water Elevation (ft)	Initial Water Depth (ft)	Surcharge Elevation (ft)	Surcharge Depth (ft)	Ponded Area (ft^2)	Minimum Pipe Cover (in)
1	A4	5.94	8.34	2.40	6.33	0.39	0.00	-8.34	0.00	0.00
2	D-1	6.80	8.30	1.50	0.00	-6.80	0.00	-8.30	0.00	0.00
3	D-2	6.28	10.10	3.82	0.00	-6.28	0.00	-10.10	0.00	0.00
4	D-3	6.32	10.00	3.68	0.00	-6.32	0.00	-10.00	0.00	0.00
5	D-4	6.30	8.00	1.70	0.00	-6.30	0.00	-8.00	0.00	0.00

Junction Results

SN	Element ID	Peak Inflow (cfs)	Peak Lateral Inflow (cfs)	Max HGL Elevation Attained (ft)	Max HGL Depth Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)	Average HGL Elevation Attained (ft)	Average HGL Depth Attained (ft)	Time of Max HGL Occurrence (days hh:mm)	Time of Peak Flooding Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
1	A4	8.07	0.00	8.15	2.21	0.00	0.55	6.81	0.87	0 13:15	0 00:00	0.00	0.00
2	D-1	5.23	0.72	8.24	1.44	0.00	1.06	7.39	0.59	0 15:34	0 00:00	0.00	0.00
3	D-2	3.24	0.00	8.24	1.96	0.00	1.86	7.24	0.96	0 15:29	0 00:00	0.00	0.00
4	D-3	3.98	1.16	8.19	1.87	0.00	2.01	7.20	0.88	0 13:07	0 00:00	0.00	0.00
5	D-4	12.67	12.67	8.21	1.91	0.00	1.89	7.03	0.73	0 13:06	0 00:00	0.00	0.00

Channel Input

SN	Element ID	Length	Inlet Invert Elevation	Inlet Invert Offset	Outlet Invert Elevation	Outlet Invert Offset	Total Drop	Average Slope	Shape	Height	Width	Manning's Roughness	Entrance Losses	Exit/Bend Losses	Additional Losses	Initial Flow	Flap Gate
		(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(%)		(ft)	(ft)					(cfs)	
1	Ex-Ditch-1	250.00	6.80	0.00	6.28	0.00	0.52	0.2100	Triangular	1.500	12.000	0.0320	0.0000	0.0000	0.0000	0.00	No
2	Ex-Ditch-2	600.00	6.40	0.08	6.30	0.00	0.10	0.0200	Triangular	3.800	20.000	0.0320	0.0000	0.0000	0.0000	0.00	No
3	Ex-Ditch-3	665.00	6.30	0.00	6.00	0.06	0.30	0.0500	User-Defined	2.700	84.000	0.0320	0.0000	0.0000	0.0000	0.00	No

Channel Results

SN	Element ID	Peak Flow	Time of Peak Flow Occurrence	Design Flow Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Travel Time	Peak Flow Depth	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged	Froude Number	Reported Condition
		(cfs)	(days hh:mm)	(cfs)		(ft/sec)	(min)	(ft)		(min)		
1	Ex-Ditch-1	3.20	0 12:56	15.42	0.21	0.87	4.79	1.47	0.98	0.00		
2	Ex-Ditch-2	2.94	0 12:26	33.41	0.09	0.75	13.33	1.85	0.49	0.00		
3	Ex-Ditch-3	8.07	0 12:45	39.21	0.21	0.76	14.58	2.03	0.75	0.00		

Pipe Input

SN	Element ID	Length (ft)	Inlet Invert Elevation (ft)	Inlet Invert Offset (ft)	Outlet Invert Elevation (ft)	Outlet Invert Offset (ft)	Total Drop (ft)	Average Slope (%)	Pipe Shape	Pipe Diameter or Height (in)	Pipe Width (in)	Manning's Roughness	Entrance Losses	Exit/Bend Losses	Additional Losses	Initial Flow (cfs)	Flap Gate	No. of Barrels
1	A4 TO OF-1	40.00	5.29	-0.65	5.25	-0.28	0.04	0.1000	CIRCULAR	12.000	12.000	0.0150	0.3500	0.5000	0.0000	0.00	No	1
2	Ex-18-inch-Culvert	333.00	6.28	0.00	6.32	0.00	-0.04	-0.0100	CIRCULAR	18.000	18.000	0.0170	0.5000	0.5000	0.0000	0.00	No	1

Pipe Results

SN	Element ID	Peak Flow (cfs)	Time of Peak Flow Occurrence (days hh:mm)	Design Flow Capacity (cfs)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)	Travel Time (min)	Peak Flow Depth (ft)	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged (min)	Froude Number	Reported Condition
1	A4 TO OF-1	5.19	0 13:15	3.13	1.66	6.69	0.10	0.96	0.96	0.00		> CAPACITY
2	Ex-18-inch-Culvert	3.24	0 12:58	0.88	3.68	1.86	2.98	1.50	1.00	275.00		SURCHARGED

Storage Nodes

Storage Node : BMP OFFSITE

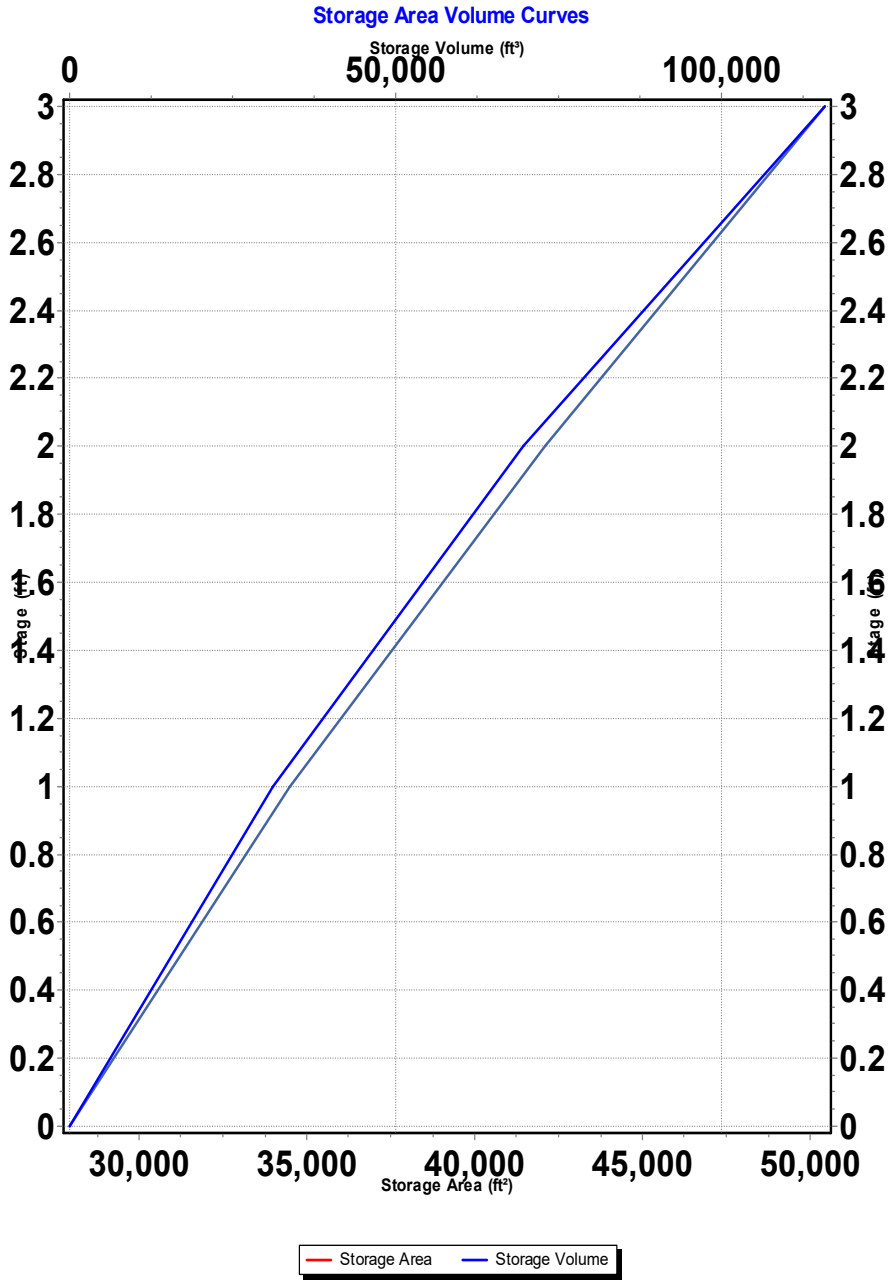
Input Data

Invert Elevation (ft)	6.00
Max (Rim) Elevation (ft)	9.00
Max (Rim) Offset (ft)	3.00
Initial Water Elevation (ft)	0.00
Initial Water Depth (ft)	-6.00
Ponded Area (ft^2)	0.00
Evaporation Loss	0.00

Storage Area Volume Curves

Storage Curve : BMP-OFFSITE

Stage (ft)	Storage Area (ft^2)	Storage Volume (ft^3)
0	27950	0
1	34500	31225
2	42120	69535
3	50450	115820


Storage Area Volume Curves
Storage Volume (ft³)
0
50,000
100,000
3
2.8
2.6
2.4
2.2
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
Storage (ft)
30,000
35,000
40,000
45,000
50,000
Storage Area (ft²)
Storage Area
Storage Volume

Storage Node : BMP OFFSITE (continued)

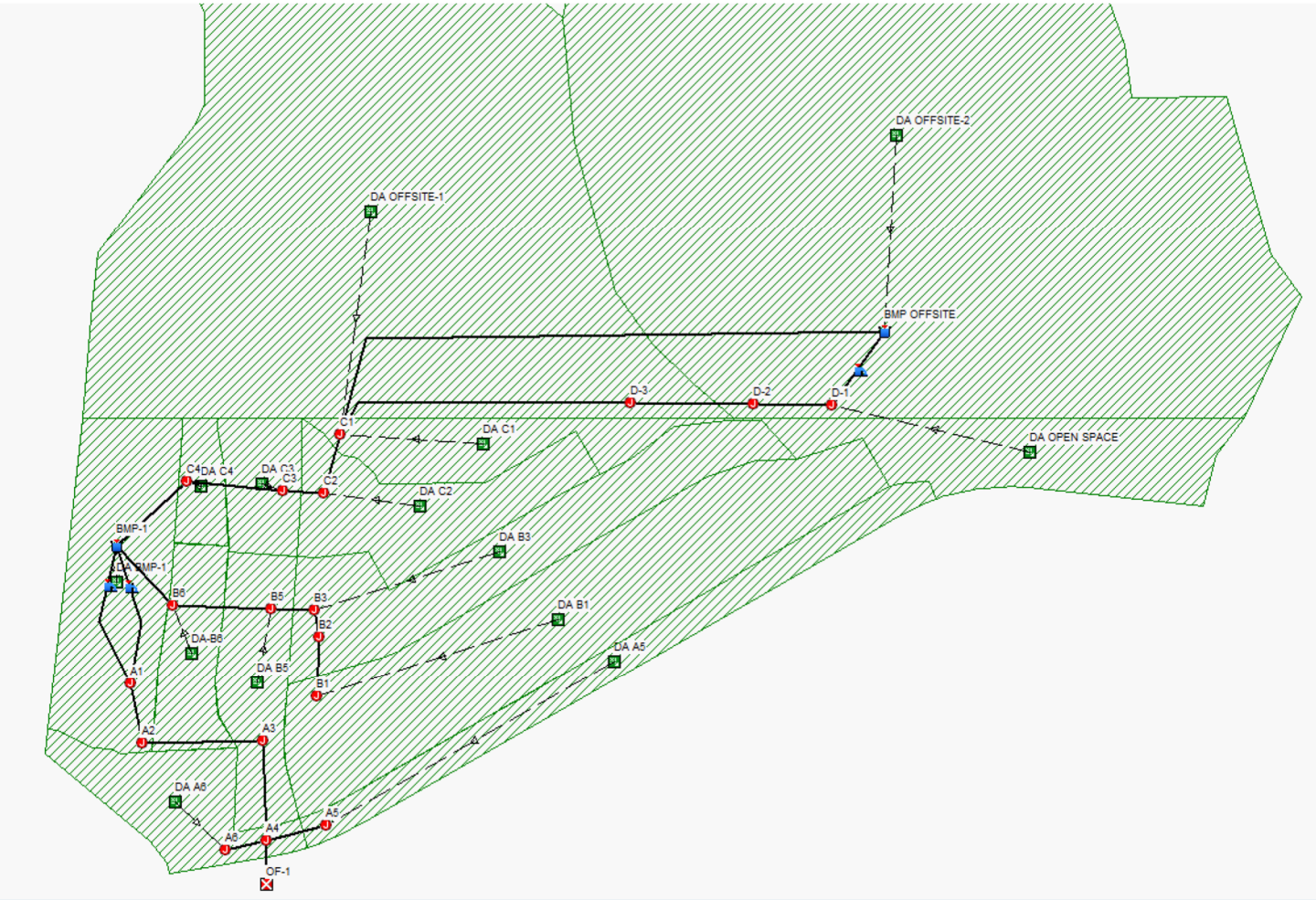
Outflow Weirs

SN	Element ID	Weir Type	Flap Gate	Crest Elevation (ft)	Crest Offset (ft)	Length (ft)	Weir Total Height (ft)	Discharge Coefficient
1	Weir-OFFSITE BMP	V-Notch	No	6.80	0.80	24.00	1.70	2.40

Output Summary Results

Peak Inflow (cfs)	16.8
Peak Lateral Inflow (cfs)	13.39
Peak Outflow (cfs)	5.13
Peak Exfiltration Flow Rate (cfm)	0
Max HGL Elevation Attained (ft)	8.24
Max HGL Depth Attained (ft)	2.24
Average HGL Elevation Attained (ft)	7.21
Average HGL Depth Attained (ft)	1.21
Time of Max HGL Occurrence (days hh:mm)	0 15:34
Total Exfiltration Volume (1000-ft^3)	0
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0

10-YEAR PROPOSED ROUTING SCHEMATIC (DEVELOPED CONDITION)



Project Description

File Name	Proposed 10 Year Model.SPF

Project Options

Flow Units	CFS
Elevation Type	Elevation
Hydrology Method	SCS TR-55
Time of Concentration (TOC) Method	SCS TR-55
Link Routing Method	Hydrodynamic
Enable Overflow Ponding at Nodes	YES
Skip Steady State Analysis Time Periods	YES

Analysis Options

Start Analysis On	00:00:00	0:00:00
End Analysis On	00:00:00	0:00:00
Start Reporting On	00:00:00	0:00:00
Antecedent Dry Days	0	days
Runoff (Dry Weather) Time Step	0 01:00:00	days hh:mm:ss
Runoff (Wet Weather) Time Step	0 00:05:00	days hh:mm:ss
Reporting Time Step	0 00:01:00	days hh:mm:ss
Routing Time Step	1	seconds

Number of Elements

	Qty
Rain Gages	1
Subbasins	14
Nodes	21
Junctions	18
Outfalls	1
Flow Diversions	0
Inlets	0
Storage Nodes	2
Links	22
Channels	4
Pipes	15
Pumps	0
Orifices	1
Weirs	2
Outlets	0
Pollutants	0
Land Uses	0

Rainfall Details

SN	Rain Gage ID	Data Source	Data Source ID	Rainfall Type	Rain Units	State	County	Return Period (years)	Rainfall Depth (inches)	Rainfall Distribution
1	10YR	Time Series	10 YR	Cumulative	inches	North Carolina	Currituck	10.00	6.11	SCS Type II 24-hr

Subbasin Summary

SN	Subbasin ID	Area (ac)	Peak Rate Factor	Weighted Curve Number	Total Rainfall (in)	Total Runoff (in)	Total Runoff Volume (ac-in)	Peak Runoff (cfs)	Time of Concentration (days hh:mm:ss)
1	DA A5	1.66	484.00	74.77	6.11	3.35	5.57	3.84	0 00:43:57
2	DA A6	1.33	484.00	72.05	6.11	3.09	4.11	2.75	0 00:45:23
3	DA B1	4.96	484.00	79.58	6.11	3.84	19.03	16.72	0 00:30:17
4	DA B3	2.66	484.00	81.21	6.11	4.01	10.66	10.55	0 00:24:30
5	DA B5	1.34	484.00	80.25	6.11	3.91	5.23	5.55	0 00:21:19
6	DA BMP-1	2.62	484.00	83.39	6.11	4.24	11.10	14.72	0 00:11:03
7	DA C1	1.83	484.00	77.72	6.11	3.65	6.68	6.15	0 00:27:59
8	DA C2	1.18	484.00	80.06	6.11	3.89	4.59	4.65	0 00:23:16
9	DA C3	0.79	484.00	77.08	6.11	3.58	2.83	2.81	0 00:24:13
10	DA C4	0.44	484.00	75.59	6.11	3.43	1.51	1.55	0 00:23:03
11	DA OFFSITE-1	16.22	484.00	70.33	6.11	2.92	47.43	22.89	0 01:10:50
12	DA OFFSITE-2	26.62	484.00	66.48	6.11	2.57	68.31	34.45	0 01:05:19
13	DA OPEN SPACE	2.21	484.00	57.14	6.11	1.76	3.88	2.53	0 00:40:27
14	DA-B6	0.95	484.00	77.55	6.11	3.63	3.45	3.27	0 00:26:24

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Surcharge Elevation (ft)	Ponded Area (ft^2)	Peak Inflow (cfs)	Max HGL Elevation Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)	Time of Peak Flooding Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
1	A1	Junction	5.95	9.42	0.00	0.00	0.00	5.53	8.81	0.00	6.64	0 00:00	0.00	0.00
2	A2	Junction	5.83	9.22	0.00	0.00	0.00	3.49	8.52	0.00	0.70	0 00:00	0.00	0.00
3	A3	Junction	5.53	9.44	0.00	0.00	0.00	3.49	7.48	0.00	1.96	0 00:00	0.00	0.00
4	A4	Junction	5.94	7.94	6.33	0.00	0.00	6.57	6.99	0.00	0.95	0 00:00	0.00	0.00
5	A5	Junction	6.00	8.20	6.33	0.00	0.00	3.83	7.24	0.00	0.96	0 00:00	0.00	0.00
6	A6	Junction	6.00	7.80	6.33	0.00	0.00	2.75	7.13	0.00	0.67	0 00:00	0.00	0.00
7	B1	Junction	6.80	10.00	0.00	0.00	0.00	16.71	9.13	0.00	0.87	0 00:00	0.00	0.00
8	B2	Junction	6.60	10.00	0.00	0.00	0.00	16.71	8.82	0.00	1.18	0 00:00	0.00	0.00
9	B3	Junction	6.30	10.00	0.00	0.00	0.00	26.96	8.82	0.00	1.18	0 00:00	0.00	0.00
10	B5	Junction	6.00	9.41	1.83	0.00	0.00	32.17	8.82	0.00	0.59	0 00:00	0.00	0.00
11	B6	Junction	4.35	9.21	5.95	0.00	0.00	35.43	8.82	0.00	0.39	0 00:00	0.00	0.00
12	C1	Junction	6.00	9.50	0.00	0.00	0.00	24.87	9.34	0.00	0.56	0 00:00	0.00	0.00
13	C2	Junction	5.80	9.50	5.95	0.00	0.00	17.35	9.07	0.00	0.43	0 00:00	0.00	0.00
14	C3	Junction	5.31	9.40	5.95	0.00	0.00	18.21	8.88	0.00	0.52	0 00:00	0.00	0.00
15	C4	Junction	3.35	9.50	5.95	0.00	0.00	18.86	8.84	0.00	0.66	0 00:00	0.00	0.00
16	D-1	Junction	6.80	10.00	0.00	0.00	0.00	6.58	9.70	0.00	0.30	0 00:00	0.00	0.00
17	D-2	Junction	6.28	10.10	0.00	0.00	0.00	3.94	9.70	0.00	0.40	0 00:00	0.00	0.00
18	D-3	Junction	6.32	10.00	0.00	0.00	0.00	6.45	9.35	0.00	0.77	0 00:00	0.00	0.00
19	OF-1	Outfall	5.53					5.14	6.36					
20	BMP OFFSITE	Storage Node	6.00	10.00	0.00		0.00	38.98	9.71				0.00	0.00
21	BMP-1	Storage Node	0.00	9.50	5.95		0.00	62.37	8.82				0.00	0.00

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length	Inlet Invert Elevation	Outlet Invert Elevation	Average Slope	Diameter or Height	Manning's Roughness	Peak Design Flow	Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Peak Flow Depth	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged	Reported Condition
					(ft)	(ft)	(ft)	(%)	(in)		(cfs)	(cfs)		(ft/sec)	(ft)		(min)	
1	A1 TO A2	Pipe	A1	A2	74.00	5.95	5.88	0.0900	15.000	0.0130	3.49	1.99	1.76	2.84	1.25	1.00	1009.00	SURCHARGED
2	A2 TO A3	Pipe	A2	A3	250.00	5.83	5.58	0.1000	15.000	0.0150	3.49	1.77	1.97	2.84	1.25	1.00	1010.00	SURCHARGED
3	A3 TO A4	Pipe	A3	A4	176.00	5.53	5.35	0.1000	15.000	0.0130	3.49	3.12	1.12	3.16	1.15	0.92	0.00	> CAPACITY
4	A4 TO OF-1	Pipe	A4	OF-1	40.00	5.29	5.25	0.1000	15.000	0.0130	5.14	6.54	0.79	5.18	0.94	0.75	0.00	Calculated
5	A5 TO A4	Pipe	A5	A4	32.00	6.00	5.40	1.8700	15.000	0.0130	3.83	2.80	1.37	3.26	1.14	0.92	0.00	> CAPACITY
6	A6 TO A4	Pipe	A6	A4	40.00	6.00	5.40	1.5000	15.000	0.0130	2.75	2.50	1.10	2.42	1.09	0.87	0.00	> CAPACITY
7	B1 TO B2	Pipe	B1	B2	54.00	6.80	6.50	0.5600	18.000	0.0120	16.71	13.85	1.21	4.73	1.50	1.00	676.00	SURCHARGED
8	B10 TO B11	Pipe	C1	C2	35.00	6.00	5.90	0.2900	24.000	0.0130	16.56	12.09	1.37	5.27	2.00	1.00	921.00	SURCHARGED
9	B11 TO B12	Pipe	C2	C3	130.00	5.80	5.41	0.3000	24.000	0.0120	17.35	13.42	1.29	5.52	2.00	1.00	972.00	SURCHARGED
10	B13 TO BMP-1	Pipe	C4	BMP-1	56.00	3.34	3.16	0.3200	30.000	0.0130	18.80	23.89	0.79	3.83	2.50	1.00	1707.00	SURCHARGED
11	B5 TO B8	Pipe	B3	B5	50.00	6.30	6.10	0.4000	24.000	0.0120	26.96	31.00	0.87	4.30	2.00	1.00	662.00	SURCHARGED
12	B7 TO B8	Pipe	B6	BMP-1	57.00	4.35	3.97	0.6700	36.000	0.0130	35.43	54.46	0.65	7.37	3.00	1.00	1110.00	SURCHARGED
13	C3 TO C4	Pipe	C3	C4	155.00	5.31	4.84	0.3000	30.000	0.0120	18.14	24.47	0.74	5.46	2.50	1.00	943.00	SURCHARGED
14	Link-69	Pipe	D-2	D-3	333.00	6.28	6.32	-0.0100	18.000	0.0170	3.94	0.88	4.47	2.23	1.50	1.00	999.00	SURCHARGED
15	Link-70	Pipe	B5	B6	185.00	6.00	4.45	0.8400	30.000	0.0120	32.16	40.67	0.79	7.52	2.50	1.00	527.00	SURCHARGED
16	Link-62	Channel	D-1	D-2	250.00	6.80	6.28	0.2100	24.000	0.0350	3.62	22.43	0.16	0.89	2.00	1.00	774.00	
17	Link-68	Channel	D-3	C1	600.00	6.32	6.00	0.0500	45.600	0.0350	6.45	54.64	0.12	0.81	3.18	0.84	0.00	
18	Link-72	Channel	B2	B3	68.00	6.65	6.30	0.5100	18.000	0.0320	16.71	38.94	0.43	1.47	1.50	1.00	750.00	
19	Overflow OFFSITE BMP	Channel	BMP OFFSITE	C1	50.00	9.50	9.40	0.2000	6.000	0.0320	4.98	39.83	0.13	0.58	0.14	0.27	0.00	
20	Orifice-02	Orifice	BMP-1	A1		0.00	5.95		3.000		1.64							
21	Overflow Weir	Weir	BMP-1	A1		0.00	5.95				5.36							
22	Weir-OFFSITE BMP	Weir	BMP OFFSITE	D-1		6.00	6.80				6.58							

Subbasin Hydrology

Subbasin : DA A5

Input Data

Area (ac)	1.66
Peak Rate Factor	484
Weighted Curve Number	74.77
Rain Gage ID	10YR

Composite Curve Number

32

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Paved parking & roofs	0.33	B	98
50 - 75% grass cover, Fair	1.33	B	69
Woods, Good	0	B	55
Composite Area & Weighted CN	1.66		74.77

Time of Concentration

TOC Method : SCS TR-55

Sheet Flow Equation :

Tc = (0.007 * ((n * Lf)^0.8)) / ((P^0.5) * (Sf^0.4))

Where :

Tc = Time of Concentration (hr)
n = Manning's roughness
Lf = Flow Length (ft)
P = 2 yr, 24 hr Rainfall (inches)
Sf = Slope (ft/ft)

Shallow Concentrated Flow Equation :

V = 16.1345 * (Sf^0.5) (unpaved surface)
V = 20.3282 * (Sf^0.5) (paved surface)
V = 15.0 * (Sf^0.5) (grassed waterway surface)
V = 10.0 * (Sf^0.5) (nearly bare & untilled surface)
V = 9.0 * (Sf^0.5) (cultivated straight rows surface)
V = 7.0 * (Sf^0.5) (short grass pasture surface)
V = 5.0 * (Sf^0.5) (woodland surface)
V = 2.5 * (Sf^0.5) (forest w/heavy litter surface)
Tc = (Lf / V) / (3600 sec/hr)

Where:

Tc = Time of Concentration (hr)
Lf = Flow Length (ft)
V = Velocity (ft/sec)
Sf = Slope (ft/ft)

Channel Flow Equation :

V = (1.49 * (R^(2/3)) * (Sf^0.5)) / n
R = Aq / Wp
Tc = (Lf / V) / (3600 sec/hr)

Where :

Tc = Time of Concentration (hr)
Lf = Flow Length (ft)
R = Hydraulic Radius (ft)
Aq = Flow Area (ft^2)
Wp = Wetted Perimeter (ft)
V = Velocity (ft/sec)
Sf = Slope (ft/ft)
n = Manning's roughness

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.6	0	0
Flow Length (ft) :	100	0	0
Slope (%) :	1	0	0
2 yr, 24 hr Rainfall (in) :	3.98	0	0
Velocity (ft/sec) :	0.05	0	0
Computed Flow Time (min) :	35.14	0	0

Channel Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.04	0	0
Flow Length (ft) :	1200	0	0
Channel Slope (%) :	0.5	0	0
Cross Section Area (ft^2) :	8	0	0
Wetted Perimeter (ft) :	10	0	0
Velocity (ft/sec) :	2.27	0	0
Computed Flow Time (min) :	8.81	0	0

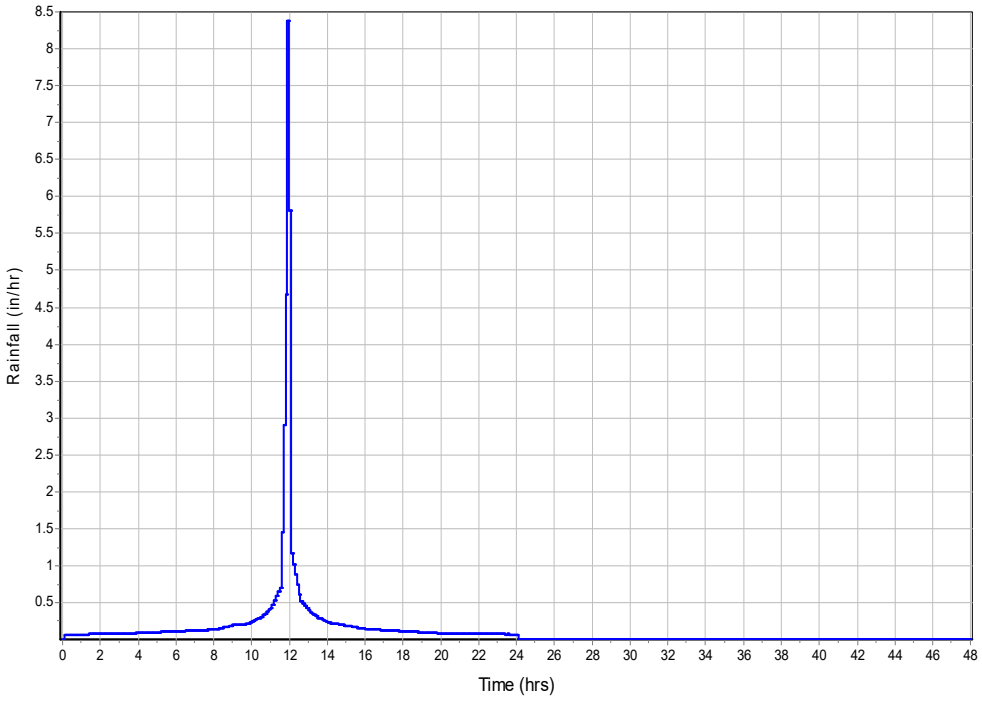
Total TOC (min) 43.95

Subbasin Runoff Results

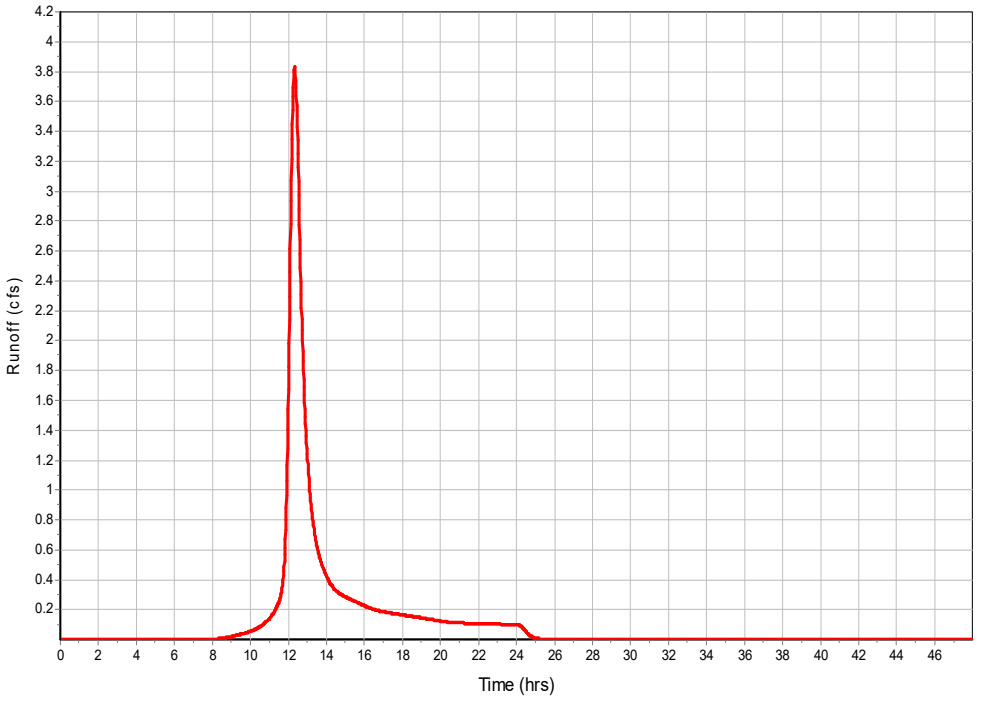
Total Rainfall (in)	6.11
Total Runoff (in)	3.35
Peak Runoff (cfs)	3.84
Weighted Curve Number	74.77
Time of Concentration (days hh:mm:ss)	0 00:43:57

Subbasin : DA A5

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : DA A6

Input Data

Area (ac)	1.33
Peak Rate Factor	484
Weighted Curve Number	72.05
Rain Gage ID	10YR

Composite Curve Number

32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Paved parking & roofs	0.14	B	98
50 - 75% grass cover, Fair	1.19	B	69
Woods, Good	0	B	55
Composite Area & Weighted CN	1.33		72.05

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.4	0	0
Flow Length (ft) :	200	0	0
Slope (%) :	1	0	0
2 yr, 24 hr Rainfall (in) :	3.98	0	0
Velocity (ft/sec) :	0.08	0	0
Computed Flow Time (min) :	44.24	0	0

Channel Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.04	0	0
Flow Length (ft) :	150	0	0
Channel Slope (%) :	0.5	0	0
Cross Section Area (ft^2) :	7.5	0	0
Wetted Perimeter (ft) :	10	0	0
Velocity (ft/sec) :	2.17	0	0
Computed Flow Time (min) :	1.15	0	0

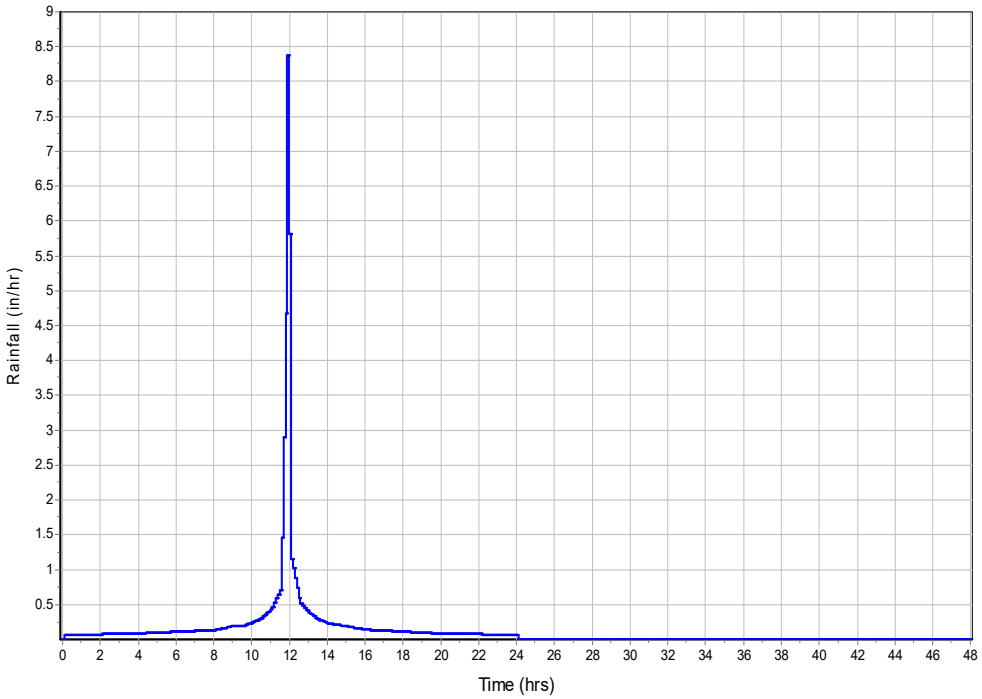
Total TOC (min) 45.39

Subbasin Runoff Results

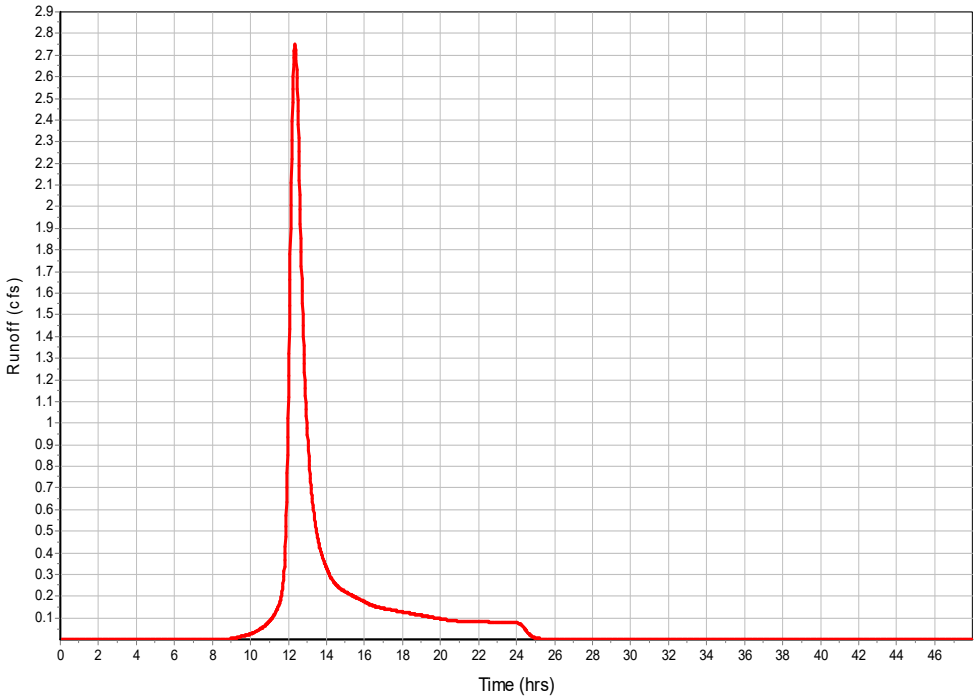
Total Rainfall (in)	6.11
Total Runoff (in)	3.09
Peak Runoff (cfs)	2.75
Weighted Curve Number	72.05
Time of Concentration (days hh:mm:ss)	0 00:45:23

Subbasin : DA A6

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : DA B1

Input Data

Area (ac)	4.96
Peak Rate Factor	484
Weighted Curve Number	79.58
Rain Gage ID	10YR

Composite Curve Number

32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Paved parking & roofs	1.81	B	98
50 - 75% grass cover, Fair	3.15	B	69
Woods, Good	0	B	55
Composite Area & Weighted CN	4.96		79.58

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.4	0	0
Flow Length (ft) :	100	0	0
Slope (%) :	1	0	0
2 yr, 24 hr Rainfall (in) :	3.98	0	0
Velocity (ft/sec) :	0.07	0	0
Computed Flow Time (min) :	25.41	0	0

Channel Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.03	0	0
Flow Length (ft) :	850	0	0
Channel Slope (%) :	0.5	0	0
Cross Section Area (ft^2) :	7.5	0	0
Wetted Perimeter (ft) :	10	0	0
Velocity (ft/sec) :	2.9	0	0
Computed Flow Time (min) :	4.89	0	0

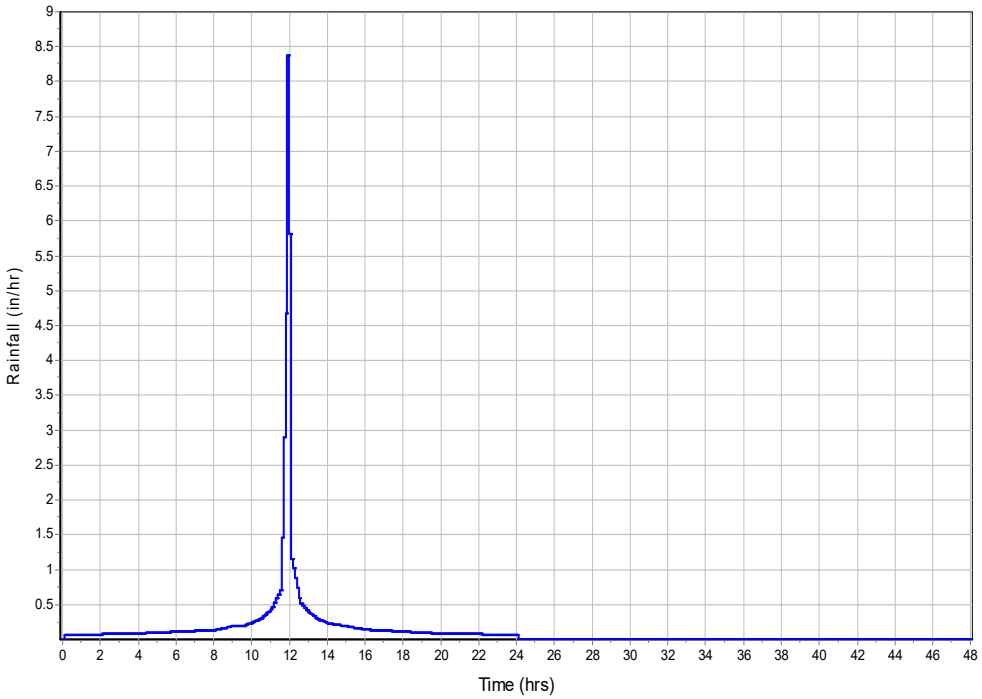
Total TOC (min) 30.29

Subbasin Runoff Results

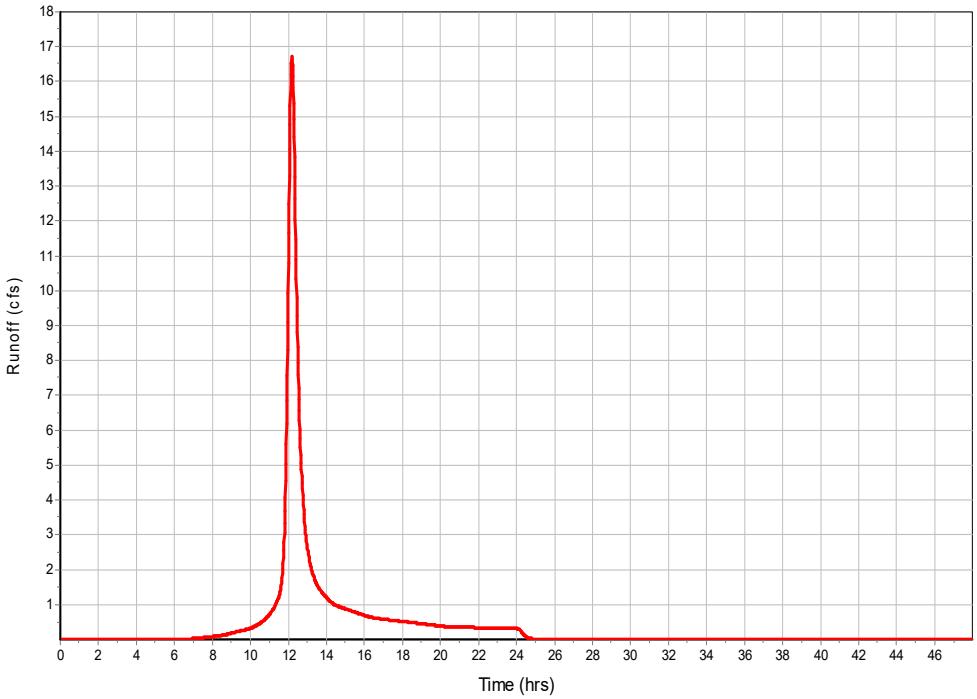
Total Rainfall (in)	6.11
Total Runoff (in)	3.84
Peak Runoff (cfs)	16.72
Weighted Curve Number	79.58
Time of Concentration (days hh:mm:ss)	0 00:30:17

Subbasin : DA B1

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : DA B3

Input Data

Area (ac)	2.66
Peak Rate Factor	484
Weighted Curve Number	81.21
Rain Gage ID	10YR

Composite Curve Number

32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Paved parking & roofs	1.12	B	98
50 - 75% grass cover, Fair	1.54	B	69
Woods, Good	0	B	55
Composite Area & Weighted CN	2.66		81.21

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.4	0	0
Flow Length (ft) :	75	0	0
Slope (%) :	1	0	0
2 yr, 24 hr Rainfall (in) :	3.98	0	0
Velocity (ft/sec) :	0.06	0	0
Computed Flow Time (min) :	20.18	0	0

Channel Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.03	0	0
Flow Length (ft) :	750	0	0
Channel Slope (%) :	0.5	0	0
Cross Section Area (ft^2) :	7.5	0	0
Wetted Perimeter (ft) :	10	0	0
Velocity (ft/sec) :	2.9	0	0
Computed Flow Time (min) :	4.31	0	0

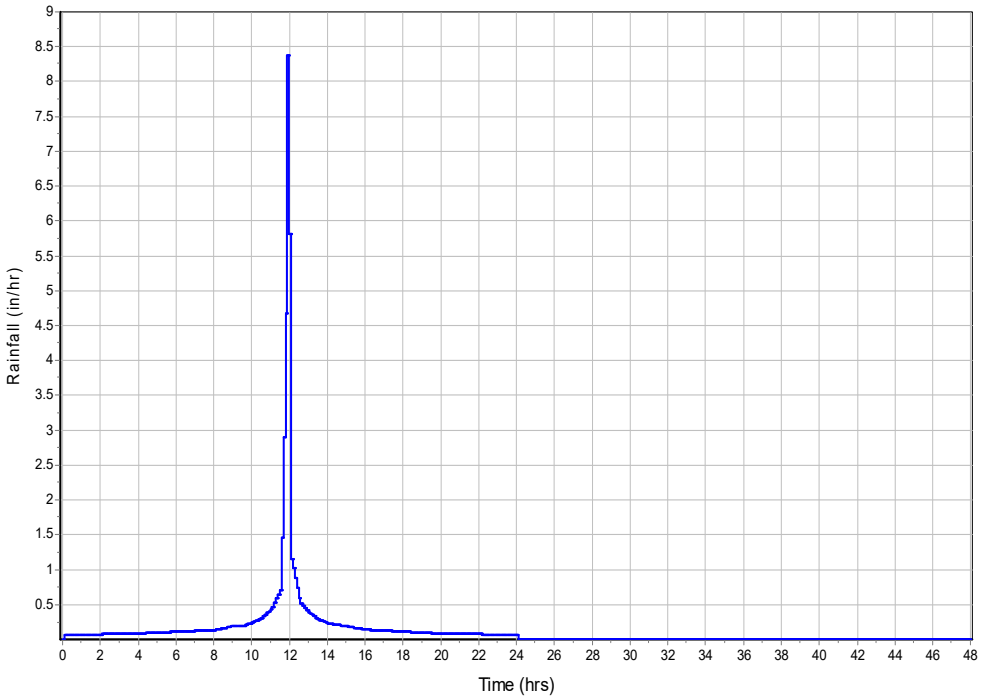
Total TOC (min) 24.50

Subbasin Runoff Results

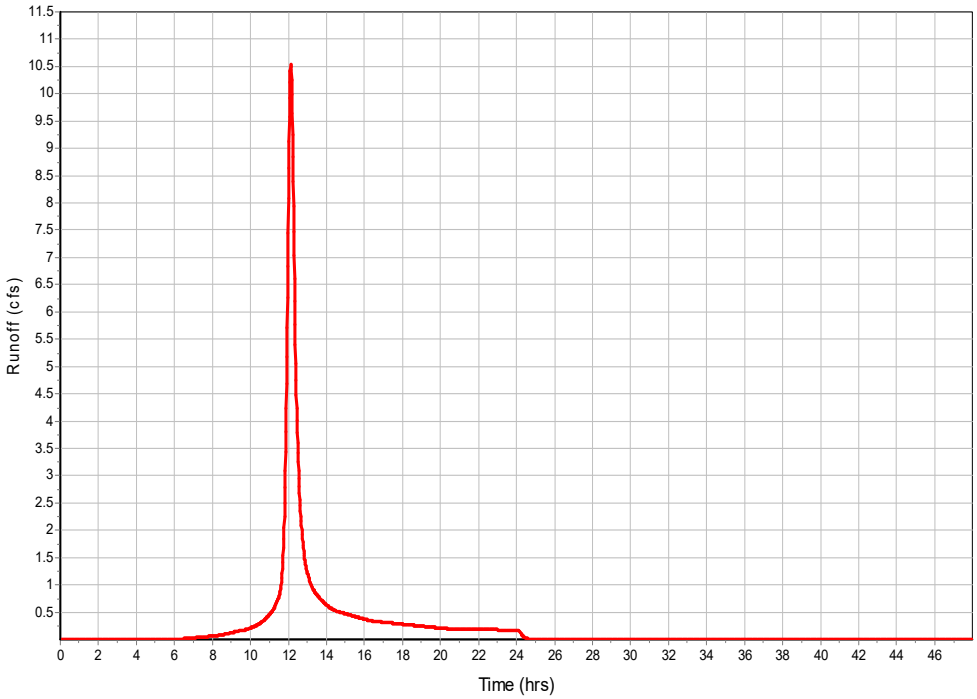
Total Rainfall (in)	6.11
Total Runoff (in)	4.01
Peak Runoff (cfs)	10.55
Weighted Curve Number	81.21
Time of Concentration (days hh:mm:ss)	0 00:24:30

Subbasin : DA B3

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : DA B5

Input Data

Area (ac)	1.34
Peak Rate Factor	484
Weighted Curve Number	80.25
Rain Gage ID	10YR

Composite Curve Number

32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Paved parking & roofs	0.52	B	98
50 - 75% grass cover, Fair	0.82	B	69
Woods, Good	0	B	55
Composite Area & Weighted CN	1.34		80.25

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.4	0	0
Flow Length (ft) :	75	0	0
Slope (%) :	1	0	0
2 yr, 24 hr Rainfall (in) :	3.98	0	0
Velocity (ft/sec) :	0.06	0	0
Computed Flow Time (min) :	20.18	0	0

Channel Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.03	0	0
Flow Length (ft) :	200	0	0
Channel Slope (%) :	0.5	0	0
Cross Section Area (ft^2) :	7.5	0	0
Wetted Perimeter (ft) :	10	0	0
Velocity (ft/sec) :	2.9	0	0
Computed Flow Time (min) :	1.15	0	0

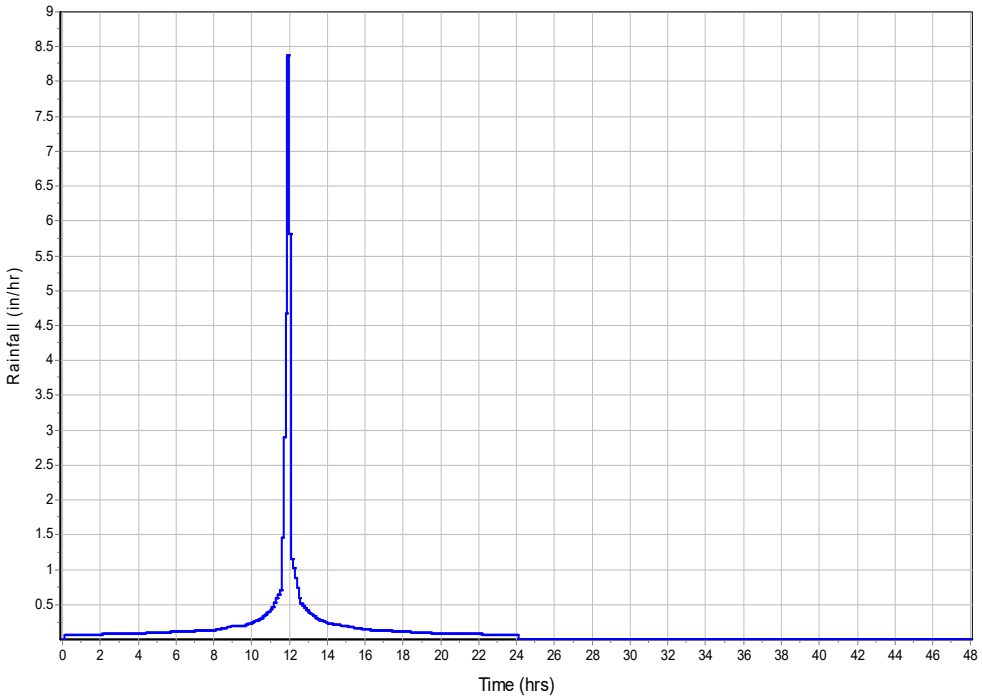
Total TOC (min) 21.33

Subbasin Runoff Results

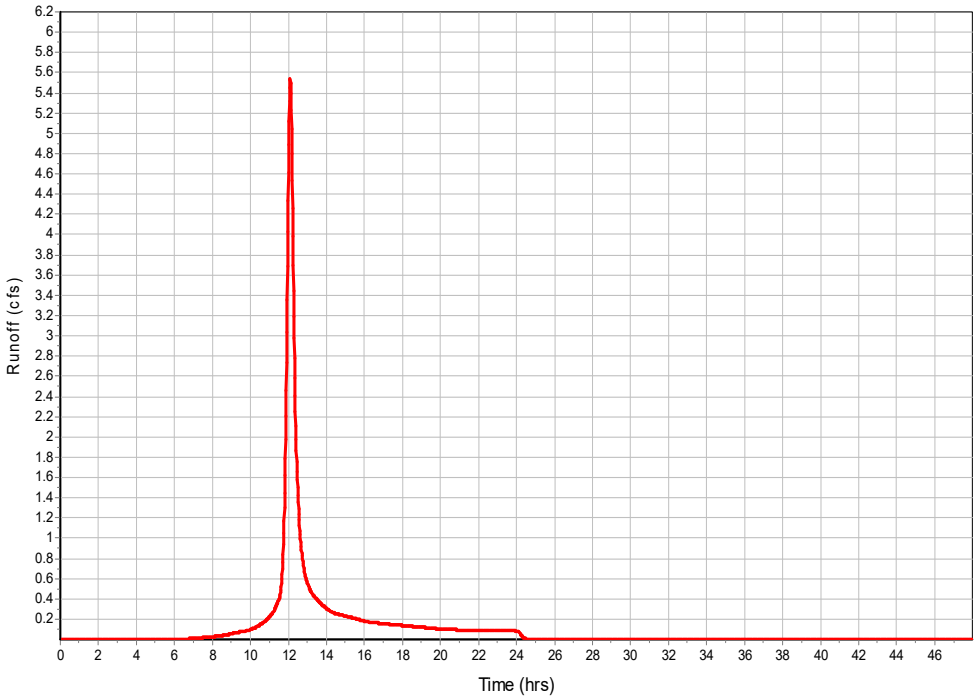
Total Rainfall (in)	6.11
Total Runoff (in)	3.91
Peak Runoff (cfs)	5.55
Weighted Curve Number	80.25
Time of Concentration (days hh:mm:ss)	0 00:21:20

Subbasin : DA B5

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : DA BMP-1

Input Data

Area (ac)	2.62
Peak Rate Factor	484
Weighted Curve Number	83.39
Rain Gage ID	10YR

Composite Curve Number

32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Paved parking & roofs	1.3	B	98
50 - 75% grass cover, Fair	1.32	B	69
Woods, Good	0	B	55
Composite Area & Weighted CN	2.62		83.39

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.4	0	0
Flow Length (ft) :	50	0	0
Slope (%) :	2	0	0
2 yr, 24 hr Rainfall (in) :	3.98	0	0
Velocity (ft/sec) :	0.08	0	0
Computed Flow Time (min) :	11.06	0	0

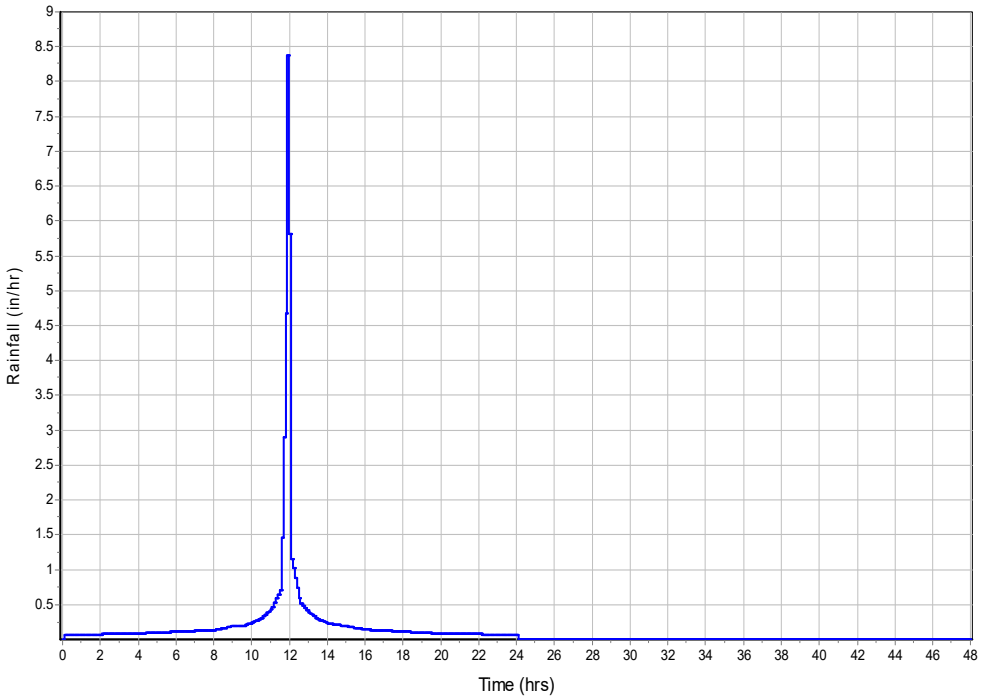
Total TOC (min) 11.06

Subbasin Runoff Results

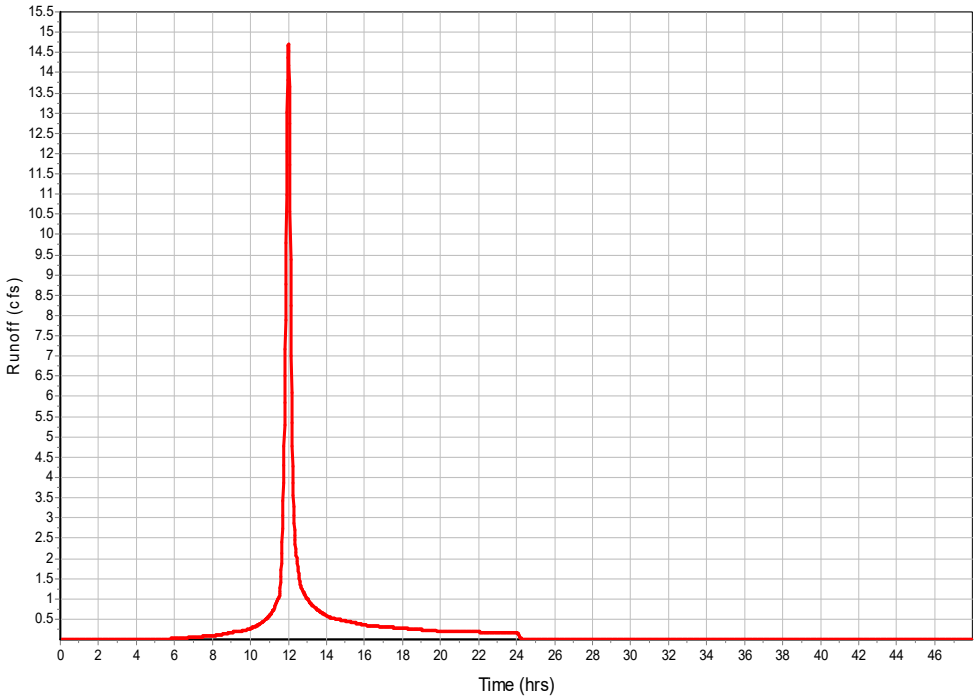
Total Rainfall (in)	6.11
Total Runoff (in)	4.24
Peak Runoff (cfs)	14.72
Weighted Curve Number	83.39
Time of Concentration (days hh:mm:ss)	0 00:11:04

Subbasin : DA BMP-1

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : DA C1

Input Data

Area (ac)	1.83
Peak Rate Factor	484
Weighted Curve Number	77.72
Rain Gage ID	10YR

Composite Curve Number

32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Paved roads with curbs & sewers	0.55	B	98
50 - 75% grass cover, Fair	1.28	B	69
Woods, Good	0	B	55
Composite Area & Weighted CN	1.83		77.72

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.4	0	0
Flow Length (ft) :	100	0	0
Slope (%) :	1	0	0
2 yr, 24 hr Rainfall (in) :	3.98	0	0
Velocity (ft/sec) :	0.07	0	0
Computed Flow Time (min) :	25.41	0	0

Channel Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.03	0	0
Flow Length (ft) :	450	0	0
Channel Slope (%) :	0.5	0	0
Cross Section Area (ft^2) :	7.5	0	0
Wetted Perimeter (ft) :	10	0	0
Velocity (ft/sec) :	2.9	0	0
Computed Flow Time (min) :	2.59	0	0

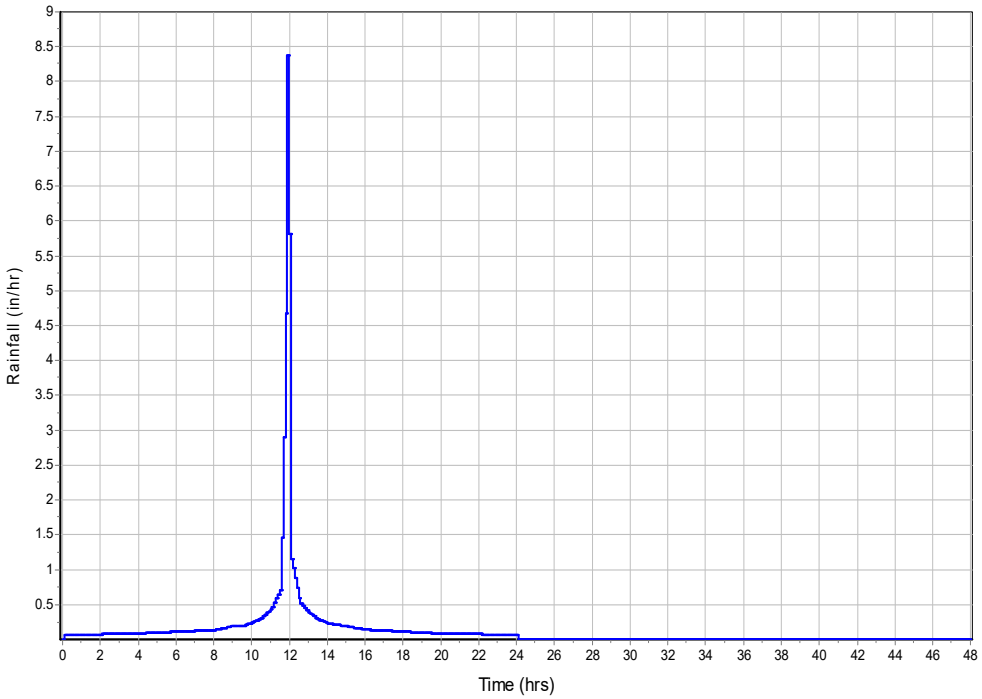
Total TOC (min) 27.99

Subbasin Runoff Results

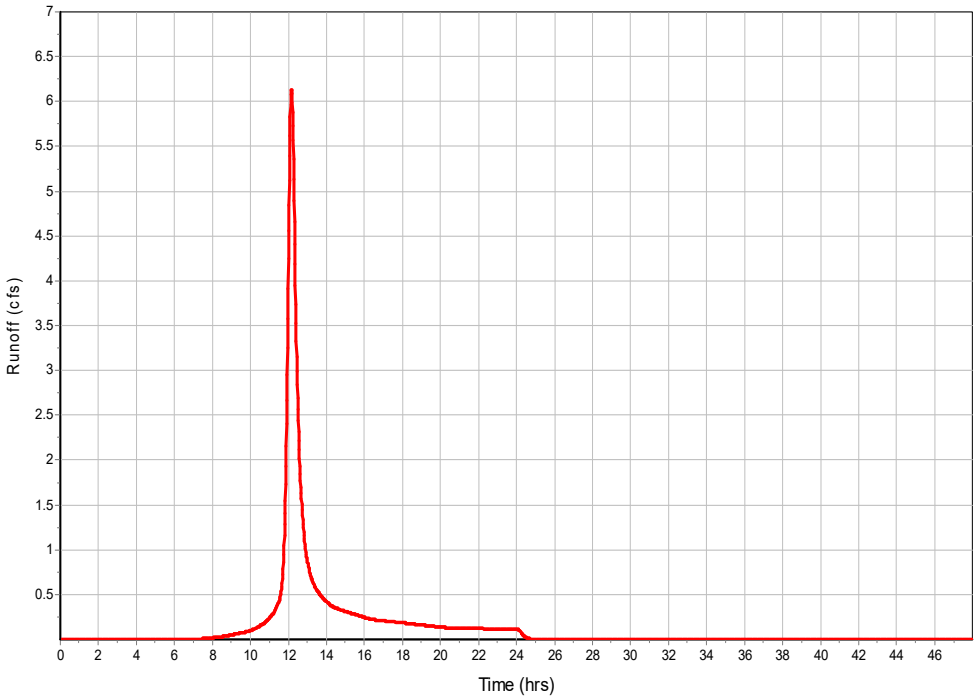
Total Rainfall (in)	6.11
Total Runoff (in)	3.65
Peak Runoff (cfs)	6.15
Weighted Curve Number	77.72
Time of Concentration (days hh:mm:ss)	0 00:27:59

Subbasin : DA C1

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : DA C2

Input Data

Area (ac)	1.18
Peak Rate Factor	484
Weighted Curve Number	80.06
Rain Gage ID	10YR

Composite Curve Number

32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Paved parking & roofs	0.45	B	98
50 - 75% grass cover, Fair	0.73	B	69
Composite Area & Weighted CN	1.18		80.06

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.4	0	0
Flow Length (ft) :	80	0	0
Slope (%) :	1	0	0
2 yr, 24 hr Rainfall (in) :	3.98	0	0
Velocity (ft/sec) :	0.06	0	0
Computed Flow Time (min) :	21.25	0	0

Channel Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.03	0	0
Flow Length (ft) :	350	0	0
Channel Slope (%) :	0.5	0	0
Cross Section Area (ft^2) :	7.5	0	0
Wetted Perimeter (ft) :	10	0	0
Velocity (ft/sec) :	2.9	0	0
Computed Flow Time (min) :	2.01	0	0

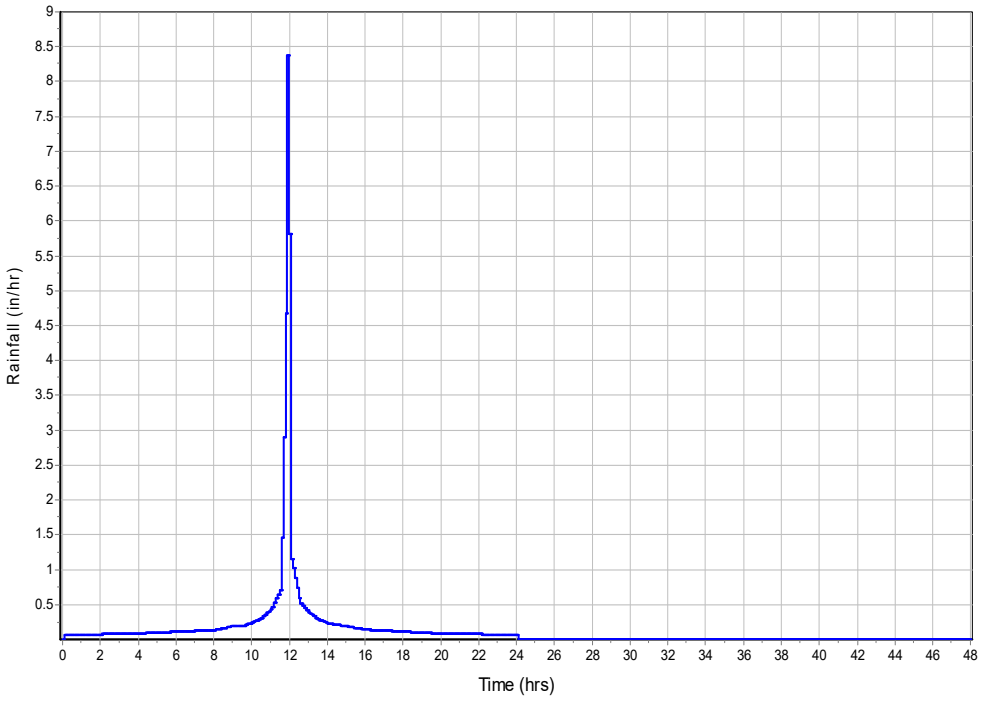
Total TOC (min) 23.27

Subbasin Runoff Results

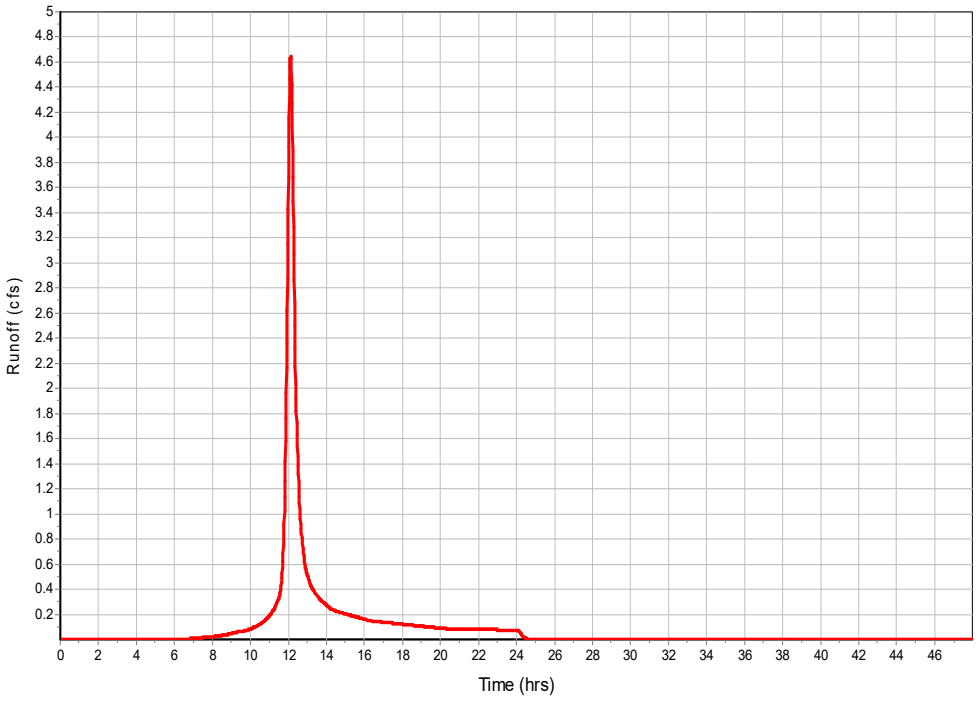
Total Rainfall (in)	6.11
Total Runoff (in)	3.89
Peak Runoff (cfs)	4.65
Weighted Curve Number	80.06
Time of Concentration (days hh:mm:ss)	0 00:23:16

Subbasin : DA C2

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : DA C3

Input Data

Area (ac)	0.79
Peak Rate Factor	484
Weighted Curve Number	77.08
Rain Gage ID	10YR

Composite Curve Number

32	Area	Soil	Curve
Soil/Surface Description	(acres)	Group	Number
Paved parking & roofs	0.22	B	98
50 - 75% grass cover, Fair	0.57	B	69
Woods, Good	0	B	55
Composite Area & Weighted CN	0.79		77.08

Time of Concentration

	Subarea	Subarea	Subarea
Sheet Flow Computations	A	B	C
Manning's Roughness :	0.4	0	0
Flow Length (ft) :	90	0	0
Slope (%) :	1	0	0
2 yr, 24 hr Rainfall (in) :	3.98	0	0
Velocity (ft/sec) :	0.06	0	0
Computed Flow Time (min) :	23.35	0	0

	Subarea	Subarea	Subarea
Channel Flow Computations	A	B	C
Manning's Roughness :	0.03	0	0
Flow Length (ft) :	150	0	0
Channel Slope (%) :	0.5	0	0
Cross Section Area (ft^2) :	7.5	0	0
Wetted Perimeter (ft) :	10	0	0
Velocity (ft/sec) :	2.9	0	0
Computed Flow Time (min) :	0.86	0	0

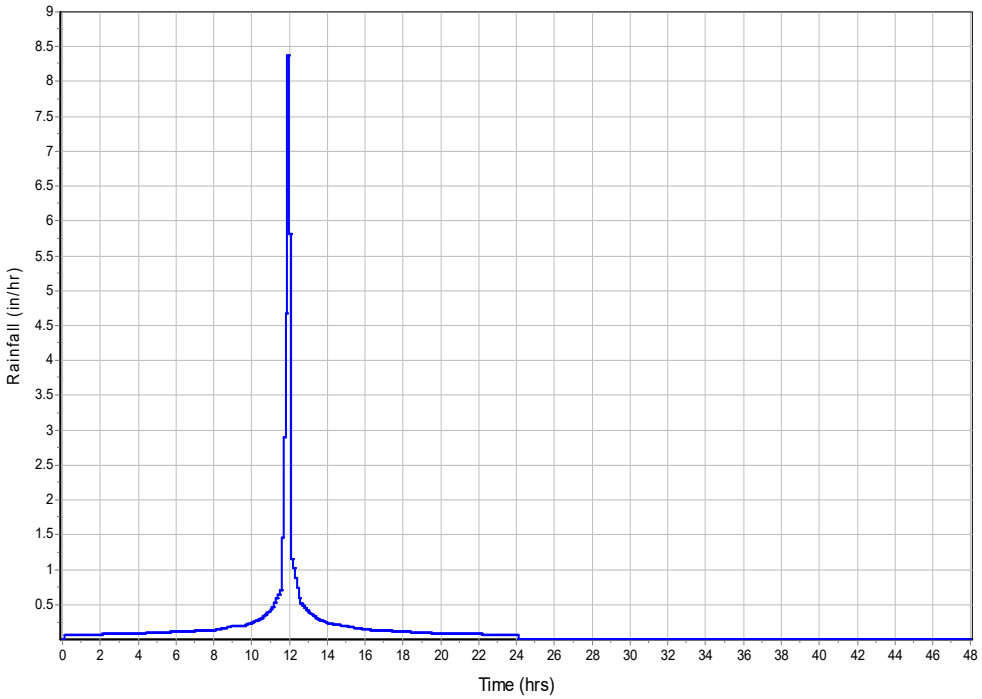
Total TOC (min) 24.22

Subbasin Runoff Results

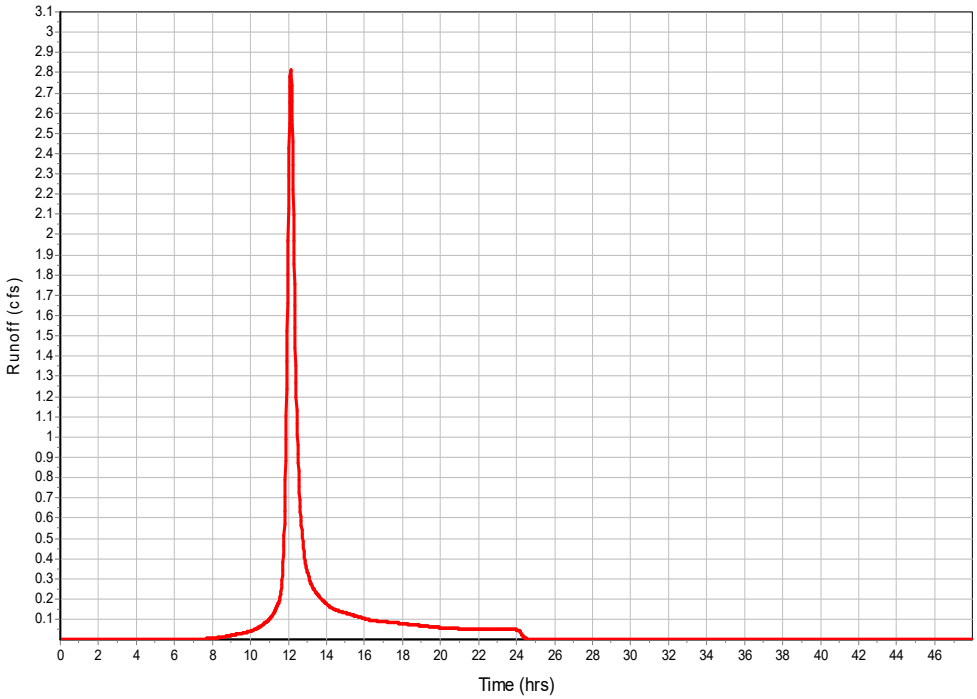
Total Rainfall (in)	6.11
Total Runoff (in)	3.58
Peak Runoff (cfs)	2.81
Weighted Curve Number	77.08
Time of Concentration (days hh:mm:ss)	0 00:24:13

Subbasin : DA C3

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : DA C4

Input Data

Area (ac)	0.44
Peak Rate Factor	484
Weighted Curve Number	75.59
Rain Gage ID	10YR

Composite Curve Number

32	Area	Soil	Curve
Soil/Surface Description	(acres)	Group	Number
Paved parking & roofs	0.1	B	98
50 - 75% grass cover, Fair	0.34	B	69
Woods, Good	0	B	55
Composite Area & Weighted CN	0.44		75.59

Time of Concentration

	Subarea	Subarea	Subarea
Sheet Flow Computations	A	B	C
Manning's Roughness :	0.4	0	0
Flow Length (ft) :	85	0	0
Slope (%) :	1	0	0
2 yr, 24 hr Rainfall (in) :	3.98	0	0
Velocity (ft/sec) :	0.06	0	0
Computed Flow Time (min) :	22.31	0	0

	Subarea	Subarea	Subarea
Channel Flow Computations	A	B	C
Manning's Roughness :	0.03	0	0
Flow Length (ft) :	130	0	0
Channel Slope (%) :	0.5	0	0
Cross Section Area (ft^2) :	7.5	0	0
Wetted Perimeter (ft) :	10	0	0
Velocity (ft/sec) :	2.9	0	0
Computed Flow Time (min) :	0.75	0	0

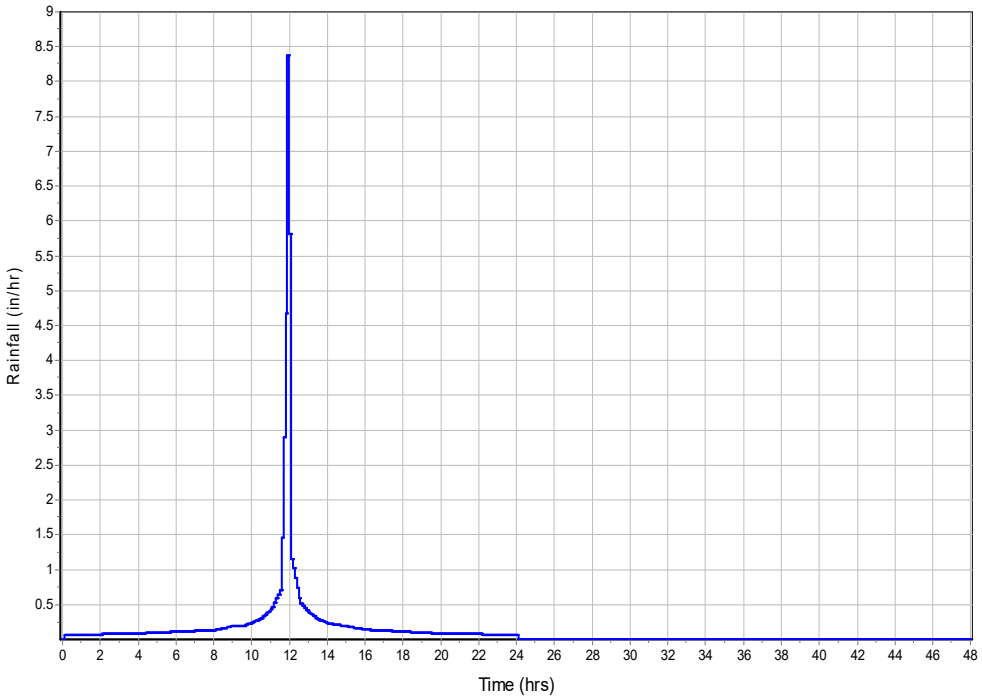
Total TOC (min) 23.06

Subbasin Runoff Results

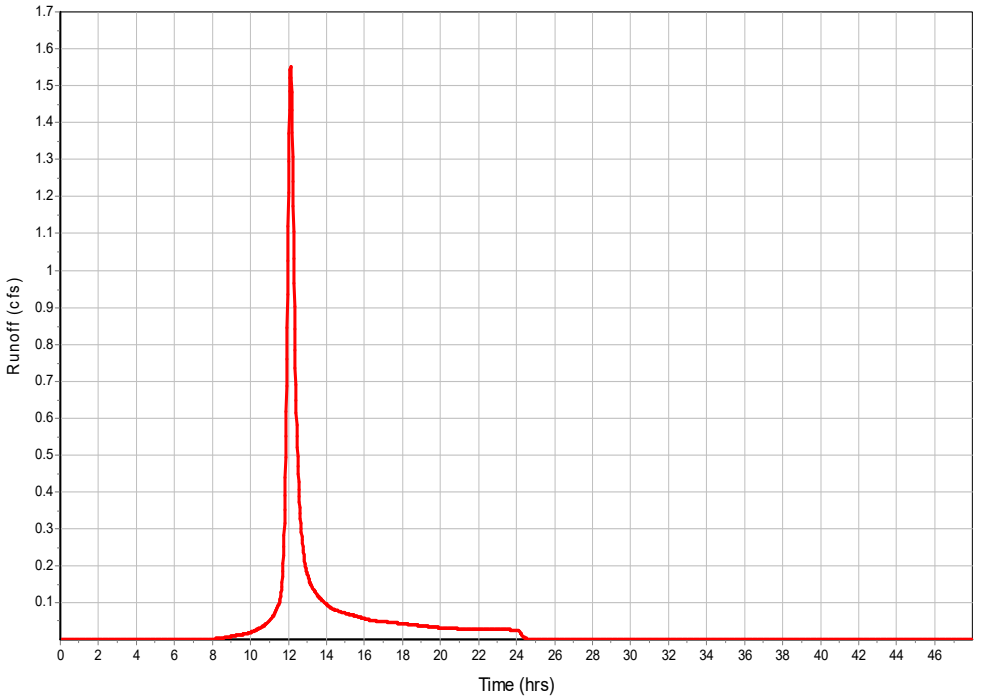
Total Rainfall (in)	6.11
Total Runoff (in)	3.43
Peak Runoff (cfs)	1.55
Weighted Curve Number	75.59
Time of Concentration (days hh:mm:ss)	0 00:23:04

Subbasin : DA C4

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : DA OFFSITE-1

Input Data

Area (ac)	16.22
Peak Rate Factor	484
Weighted Curve Number	70.33
Rain Gage ID	10YR

Composite Curve Number

32

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Paved parking & roofs	2.53	B	98
50 - 75% grass cover, Fair	9.99	B	69
Woods, Good	3.7	B	55
Composite Area & Weighted CN	16.22		70.33

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.4	0	0
Flow Length (ft) :	200	0	0
Slope (%) :	1	0	0
2 yr, 24 hr Rainfall (in) :	3.98	0	0
Velocity (ft/sec) :	0.08	0	0
Computed Flow Time (min) :	44.24	0	0

Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	650	0	0
Slope (%) :	1	0	0
Surface Type :	Woodland	Unpaved	Unpaved
Velocity (ft/sec) :	0.5	0	0
Computed Flow Time (min) :	21.67	0	0

Channel Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.08	0	0
Flow Length (ft) :	390	0	0
Channel Slope (%) :	0.5	0	0
Cross Section Area (ft^2) :	6	0	0
Wetted Perimeter (ft) :	6	0	0
Velocity (ft/sec) :	1.32	0	0
Computed Flow Time (min) :	4.94	0	0

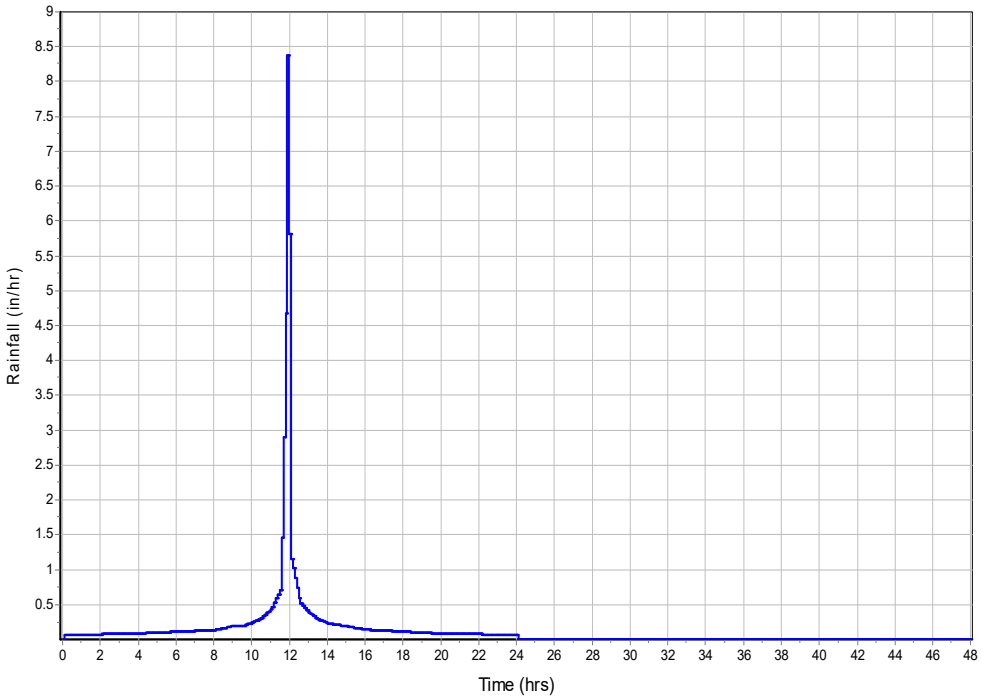
Total TOC (min) 70.84

Subbasin Runoff Results

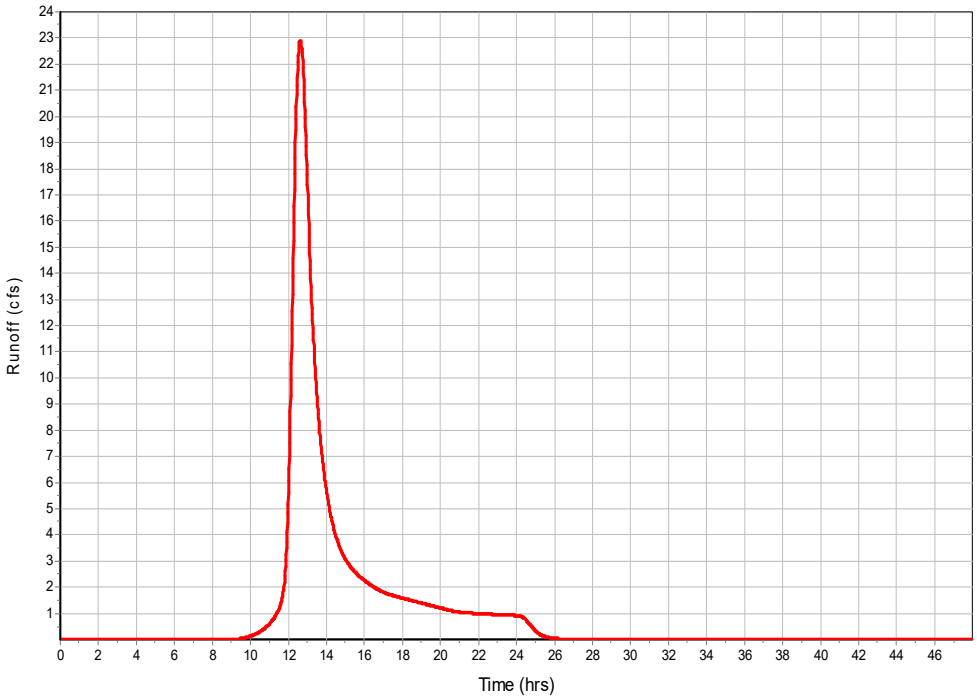
Total Rainfall (in)	6.11
Total Runoff (in)	2.92
Peak Runoff (cfs)	22.89
Weighted Curve Number	70.33
Time of Concentration (days hh:mm:ss)	0 01:10:50

Subbasin : DA OFFSITE-1

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : DA OFFSITE-2

Input Data

Area (ac)	26.62
Peak Rate Factor	484
Weighted Curve Number	66.48
Rain Gage ID	10YR

Composite Curve Number

32

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Paved parking & roofs	2.85	B	98
Woods, Good	10.7	B	55
50 - 75% grass cover, Fair	13.07	B	69
Composite Area & Weighted CN	26.62		66.48

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.4	0	0
Flow Length (ft) :	240	0	0
Slope (%) :	1	0	0
2 yr, 24 hr Rainfall (in) :	3.98	0	0
Velocity (ft/sec) :	0.08	0	0
Computed Flow Time (min) :	51.18	0	0

Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	325	305	270
Slope (%) :	0.5	0.5	0.5
Surface Type :	Grassed waterway	Grassed waterway	Grassed waterway
Velocity (ft/sec) :	1.06	1.06	1.06
Computed Flow Time (min) :	5.11	4.8	4.25

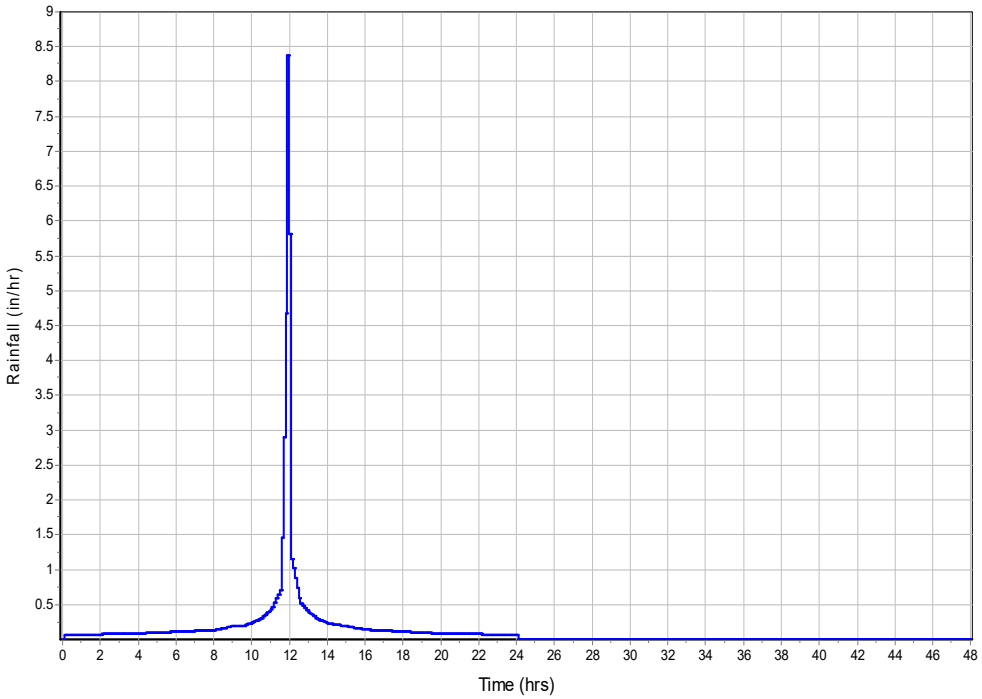
Total TOC (min) 65.33

Subbasin Runoff Results

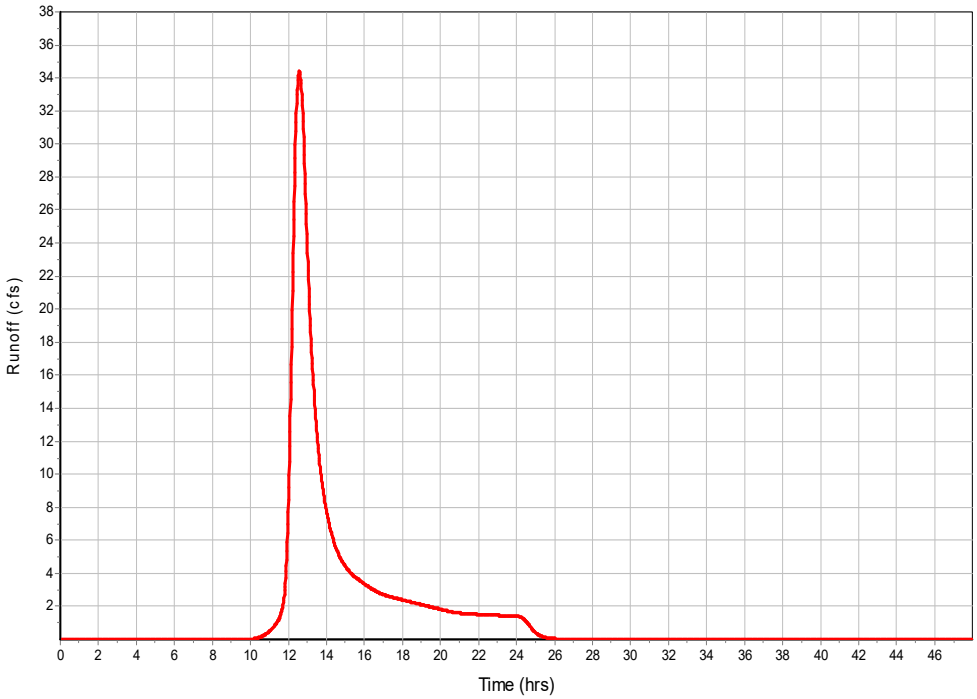
Total Rainfall (in)	6.11
Total Runoff (in)	2.57
Peak Runoff (cfs)	34.45
Weighted Curve Number	66.48
Time of Concentration (days hh:mm:ss)	0 01:05:20

Subbasin : DA OFFSITE-2

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : DA OPEN SPACE

Input Data

Area (ac)	2.21
Peak Rate Factor	484
Weighted Curve Number	57.14
Rain Gage ID	10YR

Composite Curve Number

32	Area	Soil	Curve
Soil/Surface Description	(acres)	Group	Number
Paved parking & roofs	0.11	B	98
50 - 75% grass cover, Fair	0	B	69
Woods, Good	2.1	B	55
Composite Area & Weighted CN	2.21		57.14

Time of Concentration

	Subarea	Subarea	Subarea
Sheet Flow Computations	A	B	C
Manning's Roughness :	0.4	0	0
Flow Length (ft) :	240	0	0
Slope (%) :	1.8	0	0
2 yr, 24 hr Rainfall (in) :	3.98	0	0
Velocity (ft/sec) :	0.1	0	0
Computed Flow Time (min) :	40.46	0	0

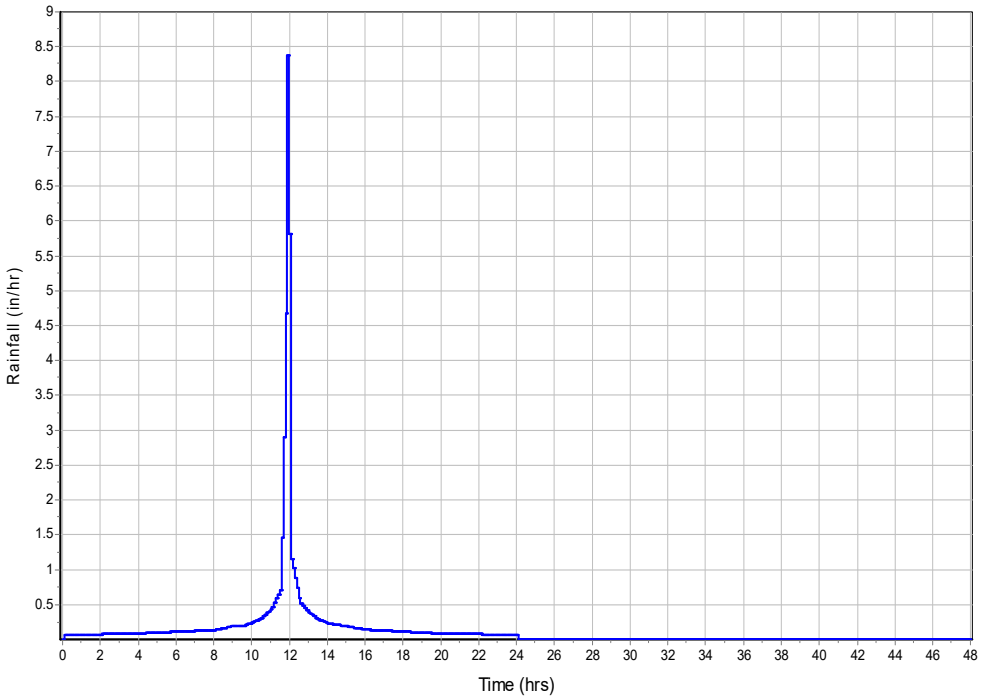
Total TOC (min) 40.46

Subbasin Runoff Results

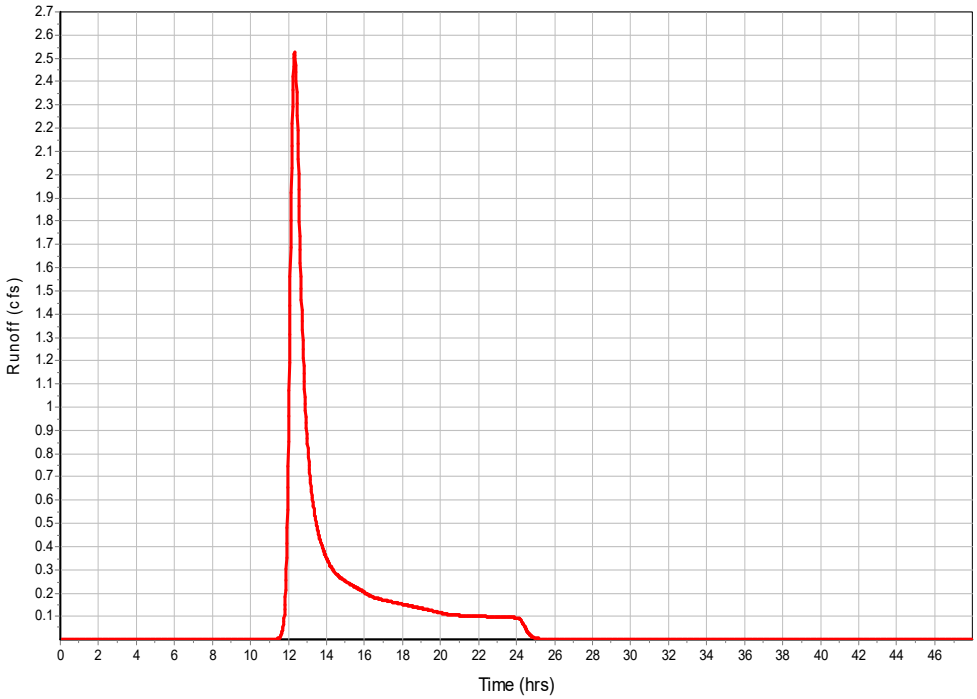
Total Rainfall (in)	6.11
Total Runoff (in)	1.76
Peak Runoff (cfs)	2.53
Weighted Curve Number	57.14
Time of Concentration (days hh:mm:ss)	0 00:40:28

Subbasin : DA OPEN SPACE

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : DA-B6

Input Data

Area (ac)	0.95
Peak Rate Factor	484
Weighted Curve Number	77.55
Rain Gage ID	10YR

Composite Curve Number

32	Area	Soil	Curve
Soil/Surface Description	(acres)	Group	Number
Paved parking & roofs	0.28	B	98
50 - 75% grass cover, Fair	0.67	B	69
Woods, Good	0	B	55
Composite Area & Weighted CN	0.95		77.55

Time of Concentration

	Subarea	Subarea	Subarea
Sheet Flow Computations	A	B	C
Manning's Roughness :	0.4	0	0
Flow Length (ft) :	100	0	0
Slope (%) :	1	0	0
2 yr, 24 hr Rainfall (in) :	3.98	0	0
Velocity (ft/sec) :	0.07	0	0
Computed Flow Time (min) :	25.41	0	0

	Subarea	Subarea	Subarea
Channel Flow Computations	A	B	C
Manning's Roughness :	0.03	0	0
Flow Length (ft) :	175	0	0
Channel Slope (%) :	0.5	0	0
Cross Section Area (ft^2) :	7.5	0	0
Wetted Perimeter (ft) :	10	0	0
Velocity (ft/sec) :	2.9	0	0
Computed Flow Time (min) :	1.01	0	0

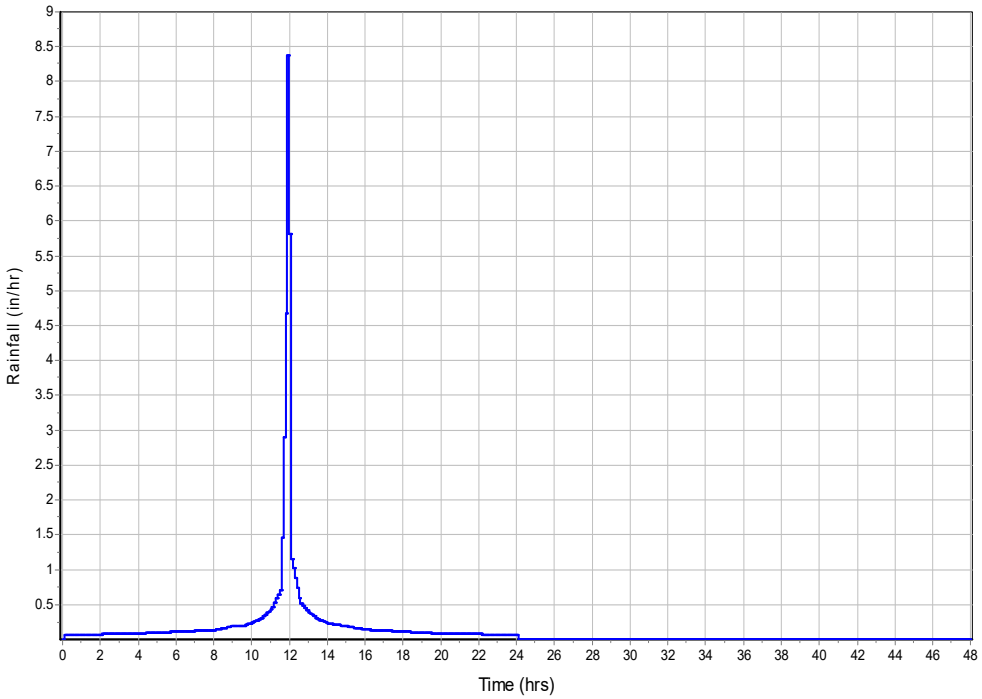
Total TOC (min) 26.41

Subbasin Runoff Results

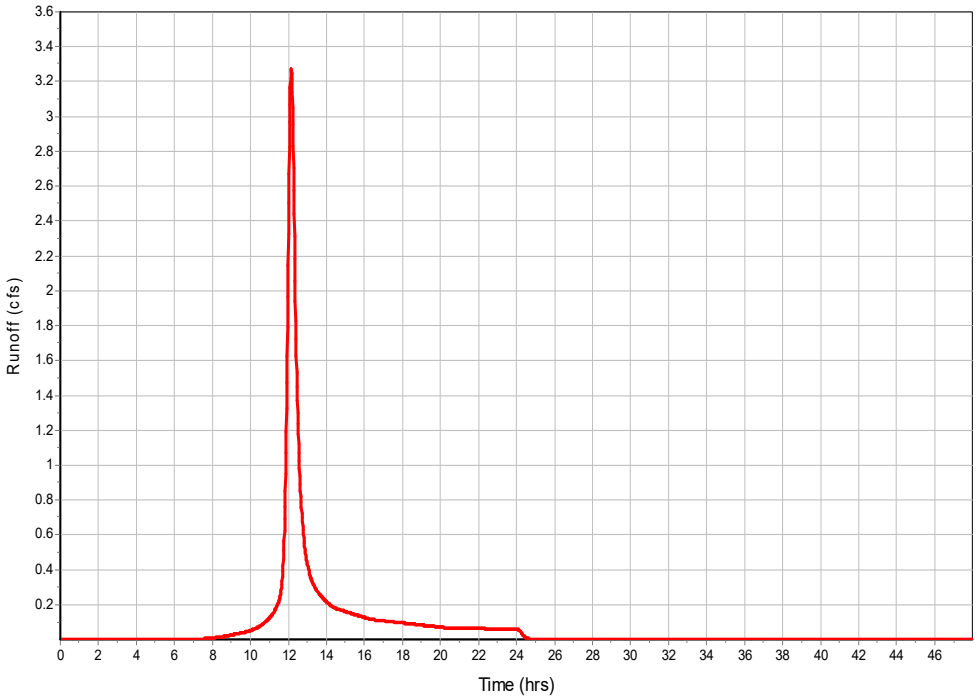
Total Rainfall (in)	6.11
Total Runoff (in)	3.63
Peak Runoff (cfs)	3.27
Weighted Curve Number	77.55
Time of Concentration (days hh:mm:ss)	0 00:26:25

Subbasin : DA-B6

Rainfall Intensity Graph



Runoff Hydrograph



Junction Input

SN	Element ID	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Ground/Rim (Max) Offset (ft)	Initial Water Elevation (ft)	Initial Water Depth (ft)	Surcharge Elevation (ft)	Surcharge Depth (ft)	Ponded Area (ft^2)	Minimum Pipe Cover (in)
1	A1	5.95	9.42	3.47	0.00	-5.95	0.00	-9.42	0.00	0.00
2	A2	5.83	9.22	3.39	0.00	-5.83	0.00	-9.22	0.00	0.00
3	A3	5.53	9.44	3.91	0.00	-5.53	0.00	-9.44	0.00	0.00
4	A4	5.94	7.94	2.00	6.33	0.39	0.00	-7.94	0.00	0.00
5	A5	6.00	8.20	2.20	6.33	0.33	0.00	-8.20	0.00	0.00
6	A6	6.00	7.80	1.80	6.33	0.33	0.00	-7.80	0.00	0.00
7	B1	6.80	10.00	3.20	0.00	-6.80	0.00	-10.00	0.00	0.00
8	B2	6.60	10.00	3.40	0.00	-6.60	0.00	-10.00	0.00	0.00
9	B3	6.30	10.00	3.70	0.00	-6.30	0.00	-10.00	0.00	0.00
10	B5	6.00	9.41	3.41	1.83	-4.17	0.00	-9.41	0.00	0.00
11	B6	4.35	9.21	4.86	5.95	1.60	0.00	-9.21	0.00	0.00
12	C1	6.00	9.50	3.50	0.00	-6.00	0.00	-9.50	0.00	0.00
13	C2	5.80	9.50	3.70	5.95	0.15	0.00	-9.50	0.00	0.00
14	C3	5.31	9.40	4.09	5.95	0.64	0.00	-9.40	0.00	0.00
15	C4	3.35	9.50	6.15	5.95	2.60	0.00	-9.50	0.00	0.00
16	D-1	6.80	10.00	3.20	0.00	-6.80	0.00	-10.00	0.00	0.00
17	D-2	6.28	10.10	3.82	0.00	-6.28	0.00	-10.10	0.00	0.00
18	D-3	6.32	10.00	3.68	0.00	-6.32	0.00	-10.00	0.00	0.00

Junction Results

SN	Element ID	Peak Inflow (cfs)	Peak Lateral Inflow (cfs)	Max HGL Elevation Attained (ft)	Max HGL Depth Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)	Average HGL Elevation Attained (ft)	Average HGL Depth Attained (ft)	Time of Max HGL Occurrence (days hh:mm)	Time of Peak Flooding Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
1	A1	5.53	0.00	8.81	2.86	0.00	6.64	7.00	1.05	0 17:42	0 00:00	0.00	0.00
2	A2	3.49	0.00	8.52	2.69	0.00	0.70	7.01	1.18	0 17:42	0 00:00	0.00	0.00
3	A3	3.49	0.00	7.48	1.95	0.00	1.96	6.72	1.19	0 17:38	0 00:00	0.00	0.00
4	A4	6.57	0.00	6.99	1.05	0.00	0.95	6.49	0.55	0 12:23	0 00:00	0.00	0.00
5	A5	3.83	3.83	7.24	1.24	0.00	0.96	6.49	0.49	0 12:21	0 00:00	0.00	0.00
6	A6	2.75	2.75	7.13	1.13	0.00	0.67	6.49	0.49	0 12:23	0 00:00	0.00	0.00
7	B1	16.71	16.71	9.13	2.33	0.00	0.87	7.45	0.65	0 12:10	0 00:00	0.00	0.00
8	B2	16.71	0.00	8.82	2.22	0.00	1.18	7.36	0.76	0 17:42	0 00:00	0.00	0.00
9	B3	26.96	10.53	8.82	2.52	0.00	1.18	7.19	0.89	0 17:42	0 00:00	0.00	0.00
10	B5	32.17	5.54	8.82	2.82	0.00	0.59	7.06	1.06	0 17:42	0 00:00	0.00	0.00
11	B6	35.43	3.27	8.82	4.47	0.00	0.39	6.62	2.27	0 17:42	0 00:00	0.00	0.00
12	C1	24.87	24.87	9.34	3.34	0.00	0.56	7.21	1.21	0 14:16	0 00:00	0.00	0.00
13	C2	17.35	4.64	9.07	3.27	0.00	0.43	7.09	1.29	0 14:29	0 00:00	0.00	0.00
14	C3	18.21	2.81	8.88	3.57	0.00	0.52	6.85	1.54	0 17:18	0 00:00	0.00	0.00
15	C4	18.86	1.55	8.84	5.49	0.00	0.66	6.60	3.25	0 17:33	0 00:00	0.00	0.00
16	D-1	6.58	2.53	9.70	2.90	0.00	0.30	7.83	1.03	0 14:06	0 00:00	0.00	0.00
17	D-2	3.94	0.00	9.70	3.42	0.00	0.40	7.63	1.35	0 14:07	0 00:00	0.00	0.00
18	D-3	6.45	0.00	9.35	3.03	0.00	0.77	7.48	1.16	0 14:17	0 00:00	0.00	0.00

Channel Input

SN	Element ID	Length	Inlet Invert Elevation	Inlet Invert Offset	Outlet Invert Elevation	Outlet Invert Offset	Total Drop	Average Slope	Shape	Height	Width	Manning's Roughness	Entrance Losses	Exit/Bend Losses	Additional Losses	Initial Flow	Flap Gate
		(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(%)		(ft)	(ft)					(cfs)	
1	Link-62	250.00	6.80	0.00	6.28	0.00	0.52	0.2100	Triangular	2.000	12.000	0.0350	0.0000	0.0000	0.0000	0.00	No
2	Link-68	600.00	6.32	0.00	6.00	0.00	0.32	0.0500	Triangular	3.800	20.000	0.0350	0.0000	0.0000	0.0000	0.00	No
3	Link-72	68.00	6.65	0.05	6.30	0.00	0.35	0.5100	Parabolic	1.500	12.000	0.0320	0.0000	0.0000	0.0000	0.00	No
4	Overflow OFFSITE BMF	50.00	9.50	3.50	9.40	3.40	0.10	0.2000	User-Defined	0.500	150.000	0.0320	0.0000	0.0000	0.0000	0.00	No

Channel Results

SN	Element ID	Peak Flow (cfs)	Time of Peak Flow Occurrence (days hh:mm)	Design Flow Capacity (cfs)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)	Travel Time (min)	Peak Flow Depth (ft)	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged (min)	Froude Number	Reported Condition
1	Link-62	3.62	0 12:43	22.43	0.16	0.89	4.68	2.00	1.00	774.00		
2	Link-68	6.45	0 12:33	54.64	0.12	0.81	12.35	3.18	0.84	0.00		
3	Link-72	16.71	0 12:12	38.94	0.43	1.47	0.77	1.50	1.00	750.00		
4	Overflow OFFSITE BMF	4.98	0 14:06	39.83	0.13	0.58	1.44	0.14	0.27	0.00		

Pipe Input

SN	Element ID	Length (ft)	Inlet Invert Elevation (ft)	Inlet Invert Offset (ft)	Outlet Invert Elevation (ft)	Outlet Invert Offset (ft)	Total Drop (ft)	Average Slope (%)	Pipe Shape	Pipe Diameter or Height (in)	Pipe Width (in)	Manning's Roughness	Entrance Losses	Exit/Bend Losses	Additional Losses	Initial Flow (cfs)	Flap Gate	No. of Barrels
1	A1 TO A2	74.00	5.95	0.00	5.88	0.05	0.07	0.0900	CIRCULAR	15.000	15.000	0.0130	0.3500	0.2500	0.0000	0.00	No	1
2	A2 TO A3	250.00	5.83	0.00	5.58	0.05	0.25	0.1000	CIRCULAR	15.000	15.000	0.0150	0.3500	0.2500	0.0000	0.00	No	1
3	A3 TO A4	176.00	5.53	0.00	5.35	-0.59	0.18	0.1000	CIRCULAR	15.000	15.000	0.0130	0.3500	0.2500	0.0000	0.00	No	1
4	A4 TO OF-1	40.00	5.29	-0.65	5.25	-0.28	0.04	0.1000	CIRCULAR	15.000	15.000	0.0130	0.3500	0.5000	0.0000	0.00	No	1
5	A5 TO A4	32.00	6.00	0.00	5.40	-0.54	0.60	1.8700	CIRCULAR	15.000	15.000	0.0130	0.5000	0.2500	0.0000	0.00	No	1
6	A6 TO A4	40.00	6.00	0.00	5.40	-0.54	0.60	1.5000	CIRCULAR	15.000	15.000	0.0130	0.5000	0.2500	0.0000	0.00	No	1
7	B1 TO B2	54.00	6.80	0.00	6.50	-0.10	0.30	0.5600	CIRCULAR	18.000	18.000	0.0120	0.5000	0.5000	0.0000	0.00	No	2
8	B10 TO B11	35.00	6.00	0.00	5.90	0.10	0.10	0.2900	CIRCULAR	24.000	24.000	0.0130	0.5000	0.2500	0.0000	0.00	No	1
9	B11 TO B12	130.00	5.80	0.00	5.41	0.10	0.39	0.3000	CIRCULAR	24.000	24.000	0.0120	0.3500	0.2500	0.0000	0.00	No	1
10	B13 TO BMP-1	56.00	3.34	-0.01	3.16	3.16	0.18	0.3200	CIRCULAR	30.000	30.000	0.0130	0.3500	0.5000	0.0000	0.00	No	1
11	B5 TO B8	50.00	6.30	0.00	6.10	0.10	0.20	0.4000	CIRCULAR	24.000	24.000	0.0120	0.5000	0.2500	0.0000	0.00	No	2
12	B7 TO B8	57.00	4.35	0.00	3.97	3.97	0.38	0.6700	CIRCULAR	36.000	36.000	0.0130	0.3500	0.2500	0.0000	0.00	No	1
13	C3 TO C4	155.00	5.31	0.00	4.84	1.49	0.47	0.3000	CIRCULAR	30.000	30.000	0.0120	0.3500	0.2500	0.0000	0.00	No	1
14	Link-69	333.00	6.28	0.00	6.32	0.00	-0.04	-0.0100	CIRCULAR	18.000	18.000	0.0170	0.5000	0.5000	0.0000	0.00	No	1
15	Link-70	185.00	6.00	0.00	4.45	0.10	1.55	0.8400	CIRCULAR	30.000	30.000	0.0120	0.5000	0.2500	0.0000	0.00	No	1

Pipe Results

SN	Element ID	Peak Flow	Time of Peak Flow Occurrence	Design Flow Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Travel Time	Peak Flow Depth	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged	Froude Number	Reported Condition
		(cfs)	(days hh:mm)	(cfs)		(ft/sec)	(min)	(ft)		(min)		
1	A1 TO A2	3.49	0 17:44	1.99	1.76	2.84	0.43	1.25	1.00	1009.00		SURCHARGED
2	A2 TO A3	3.49	0 17:44	1.77	1.97	2.84	1.47	1.25	1.00	1010.00		SURCHARGED
3	A3 TO A4	3.49	0 17:44	3.12	1.12	3.16	0.93	1.15	0.92	0.00		> CAPACITY
4	A4 TO OF-1	5.14	0 12:23	6.54	0.79	5.18	0.13	0.94	0.75	0.00		Calculated
5	A5 TO A4	3.83	0 12:20	2.80	1.37	3.26	0.16	1.14	0.92	0.00		> CAPACITY
6	A6 TO A4	2.75	0 12:22	2.50	1.10	2.42	0.28	1.09	0.87	0.00		> CAPACITY
7	B1 TO B2	16.71	0 12:12	13.85	1.21	4.73	0.19	1.50	1.00	676.00		SURCHARGED
8	B10 TO B11	16.56	0 12:45	12.09	1.37	5.27	0.11	2.00	1.00	921.00		SURCHARGED
9	B11 TO B12	17.35	0 12:41	13.42	1.29	5.52	0.39	2.00	1.00	972.00		SURCHARGED
10	B13 TO BMP-1	18.80	0 12:14	23.89	0.79	3.83	0.24	2.50	1.00	1707.00		SURCHARGED
11	B5 TO B8	26.96	0 12:10	31.00	0.87	4.30	0.19	2.00	1.00	662.00		SURCHARGED
12	B7 TO B8	35.43	0 12:10	54.46	0.65	7.37	0.13	3.00	1.00	1110.00		SURCHARGED
13	C3 TO C4	18.14	0 12:29	24.47	0.74	5.46	0.47	2.50	1.00	943.00		SURCHARGED
14	Link-69	3.94	0 12:35	0.88	4.47	2.23	2.49	1.50	1.00	999.00		SURCHARGED
15	Link-70	32.16	0 12:10	40.67	0.79	7.52	0.41	2.50	1.00	527.00		SURCHARGED

Storage Nodes

Storage Node : BMP OFFSITE

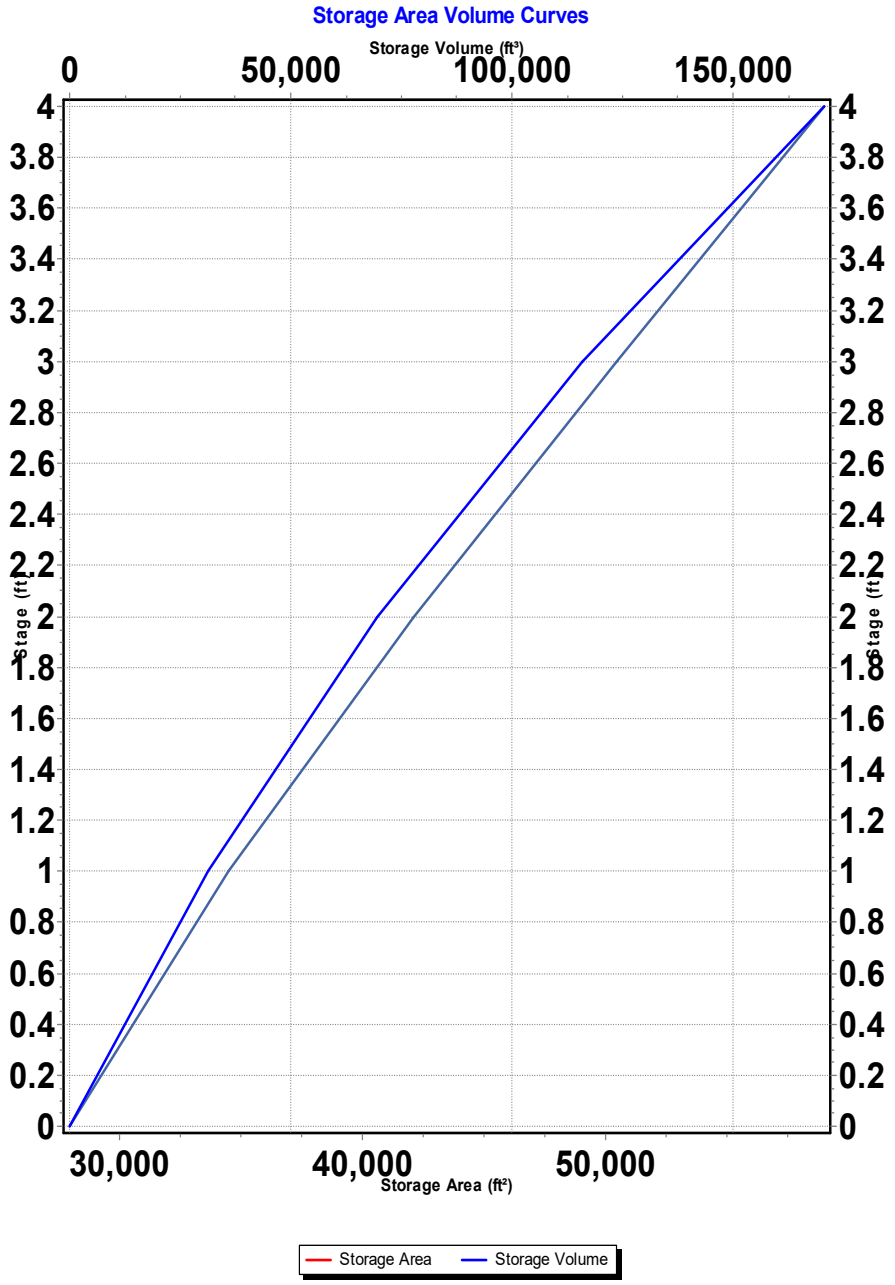
Input Data

Invert Elevation (ft)	6.00
Max (Rim) Elevation (ft)	10.00
Max (Rim) Offset (ft)	4.00
Initial Water Elevation (ft)	0.00
Initial Water Depth (ft)	-6.00
Ponded Area (ft^2)	0.00
Evaporation Loss	0.00

Storage Area Volume Curves

Storage Curve : BMP-OFFSITE

Stage (ft)	Storage Area (ft^2)	Storage Volume (ft^3)
0	27950	0
1	34500	31225
2	42120	69535
3	50450	115820
4	59000	170545


Storage Area Volume Curves
Storage Volume (ft³)
0
50,000
100,000
150,000
4
3.8
3.6
3.4
3.2
3
2.8
2.6
2.4
2.2
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
Stage (ft)
30,000
40,000
50,000
Storage Area (ft²)
Storage Area
Storage Volume

Storage Node : BMP OFFSITE (continued)

Outflow Weirs

SN	Element ID	Weir Type	Flap Gate	Crest Elevation (ft)	Crest Offset (ft)	Length (ft)	Weir Total Height (ft)	Discharge Coefficient
1	Weir-OFFSITE BMP	V-Notch	No	6.80	0.80	24.00	1.70	2.40

Output Summary Results

Peak Inflow (cfs)	38.98
Peak Lateral Inflow (cfs)	34.43
Peak Outflow (cfs)	7.21
Peak Exfiltration Flow Rate (cfm)	0
Max HGL Elevation Attained (ft)	9.71
Max HGL Depth Attained (ft)	3.71
Average HGL Elevation Attained (ft)	7.62
Average HGL Depth Attained (ft)	1.62
Time of Max HGL Occurrence (days hh:mm)	0 14:06
Total Exfiltration Volume (1000-ft^3)	0
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0

Storage Node : BMP-1

Input Data

Invert Elevation (ft)	0.00
Max (Rim) Elevation (ft)	9.50
Max (Rim) Offset (ft)	9.50
Initial Water Elevation (ft)	5.95
Initial Water Depth (ft)	5.95
Ponded Area (ft^2)	0.00
Evaporation Loss	0.00

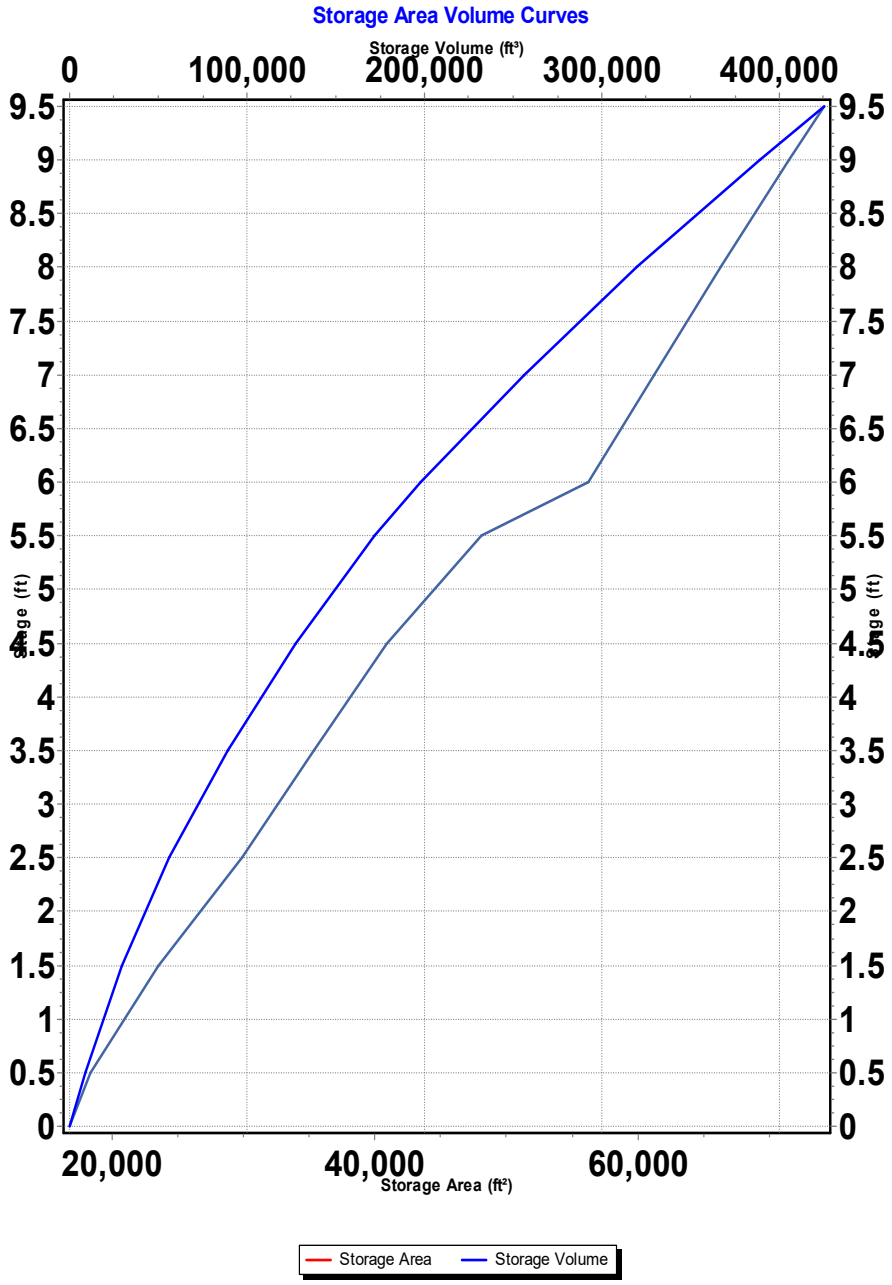
Infiltration/Exfiltration

Exfiltration Rate (in/hr)	2

Storage Area Volume Curves

Storage Curve : BMP-1

Stage (ft)	Storage Area (ft^2)	Storage Volume (ft^3)
0	16756	0
0.5	18353	8777.25
1.5	23547	29727.25
2.5	29891	56446.25
3.5	35354	89068.75
4.5	40931	127211.25
5.5	48066	171709.75
6	56201	197776.5
7	61214	256484
8	66328	320255
9	71542	389190
9.5	74187	425622.25


Storage Area Volume Curves
Storage Volume (ft³)
0
100,000
200,000
300,000
400,000
9.5
9
8.5
8
7.5
7
6.5
6
5.5
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
Stage (ft)
20,000
40,000
60,000
Storage Area (ft²)
Storage Area
Storage Volume

Storage Node : BMP-1 (continued)

Outflow Weirs

SN	Element ID	Weir Type	Flap Gate	Crest Elevation (ft)	Crest Offset (ft)	Length (ft)	Weir Total Height (ft)	Discharge Coefficient
1	Overflow Weir	Rectangular	No	7.50	7.50	8.00	2.00	3.33

Outflow Orifices

SN	Element ID	Orifice Type	Orifice Shape	Flap Gate	Circular Orifice Diameter (in)	Rectangular Orifice Height (in)	Rectangular Orifice Width (in)	Orifice Invert Elevation (ft)	Orifice Coefficient
1	Orifice-02	Side	Rectangular	No		3.00	24.00	5.95	0.59

Output Summary Results

Peak Inflow (cfs)	62.37
Peak Lateral Inflow (cfs)	14.69
Peak Outflow (cfs)	5.53
Peak Exfiltration Flow Rate (cfm)	196.06
Max HGL Elevation Attained (ft)	8.82
Max HGL Depth Attained (ft)	8.82
Average HGL Elevation Attained (ft)	6.58
Average HGL Depth Attained (ft)	6.58
Time of Max HGL Occurrence (days hh:mm)	0 17:42
Total Exfiltration Volume (1000-ft^3)	530.871
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0

APPENDIX C GEOTECHNICAL DATA

McCALLUM, P.C.

Geotechnical Engineering, Materials Testing & Environmental Services

May 29, 2026

Kirbor Development, LLC
1521 Taylor Farm Road
Virginia Beach, VA 23453

Attention: **Robert Wadsworth**

Subject: **Field and Laboratory Testing**
Proposed Currituck Way Subdivision
Foster Forbes Road
Powells Point, North Carolina
MTL Project 264427 NC

Dear **Mr. Wadsworth**:

McCallum, P.C. is pleased to present this report of field and laboratory testing performed for the above referenced project. Included in this report are:

1) A BMP, CBR and Test Boring Location Plan;
2) A Subsurface Profile;
3) Test Boring Records;
4) Stabilized Groundwater Levels;
5) A Summary of Laboratory Test Results;
6) The Results of California Bearing Ratio Tests and Soil Analyses; and
7) Moisture Density Test Curves.

The stabilized groundwater level measurements indicate the water levels to be approximately 5.3 ft. below ground surface. Soil morphology shows no evidence of redoximorphic features above these levels. Therefore, we believe that these measurements represent the seasonal high groundwater levels at the time of testing.

Should you have any questions concerning this report, please contact this office at your earliest convenience.

Very truly yours,

McCALLUM, P.C.

Alexander Kinloch
Staff Engineer

NORTH CAROLINA PROFESSIONAL SEAL 028731 ENGINEER John W. Ebbert
John W. Ebbert
Chief Engineer

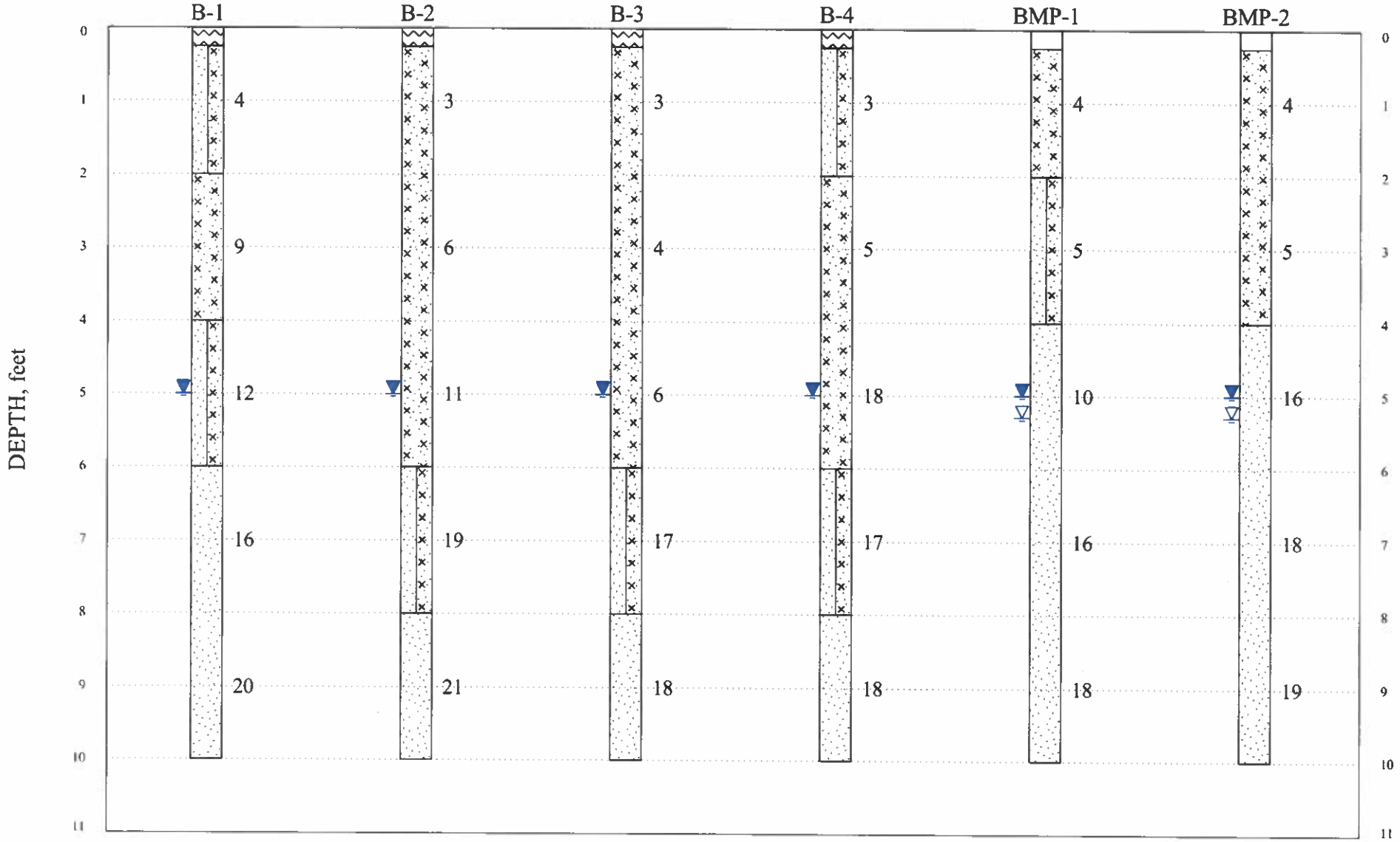
1808 HAYWARD AVENUE, CHESAPEAKE, VA. 23320 • P. O. BOX 13337, CHESAPEAKE, VA. 23325-0337
PHONE (757) 420-2520 • FAX (757) 424-2874

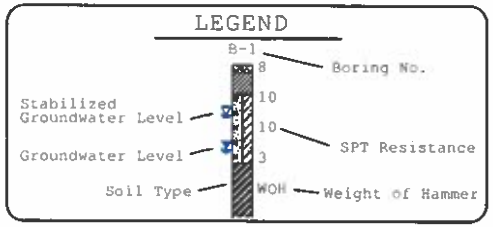


McCALLUM, P.C.

1808 Hayward Avenue
Chesapeake, Virginia 23325-0337

Scale:	---	Approved By:	Jon W. Ebbert, P.E.	Date:	5/8/05
Project:	Proposed Currituck Way Subdivision Foster Forbes Road Powells Point, North Carolina				
Drawing Title:	BMP, CBR and Test Boring Location Plan			Drawing Number:	1





Subsurface Profile

Drawing 2

PROJECT Proposed Currituck Way Subdivision

PROJECT NO. 26-4427 NC

McCALLUM, P.C.

McCALLUM, P.C.

Geotechnical Engineering, Materials Testing & Environmental Services

Unified Soil Classification System
ASTM Designation D 2487

Coarse Grained Soils (More than 50% of material retained on the No. 200 Sieve)	Gravels (more than 50% retained the No. 4 Sieve)	GW	Well graded gravels, gravel-sand mixtures, little or no fines
		GP	Poorly graded gravels, gravel-sand mixtures, little or no fines
		GM	Silty gravels, gravel-sand-silt mixtures
		GC	Clayey gravels, gravel-sand-clay mixtures
	Sands (more than 50% passing the No. 4 Sieve)	SW	Well graded sands, gravelly sands, little or no fines
		SP	Poorly graded sands, gravelly sands, little or no fines
		SM	Silty sands, sand-silt mixtures
		SC	Clayey sands, sand-clay mixtures
Fine Grained Soils (More than 50% of material passes on the No. 200 Sieve)	Silts & Clays (LL less than 50)	ML	Inorganic silts, very fine sands, silty or clayey fine sands or clayey silts with slight plasticity
		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays
		OL	Organic silts and organic silty clays of low plasticity
	Silts & Clays (LL greater than 50)	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, plastic silts
		CH	Inorganic clays of high plasticity, fat clays
		OH	Organic clays of medium to high plasticity
	Highly Organic Soil	PEAT	Peat and other highly organic soils

Standard Penetration Test (SPT) Resistance Correlations

Coarse Grained Soils

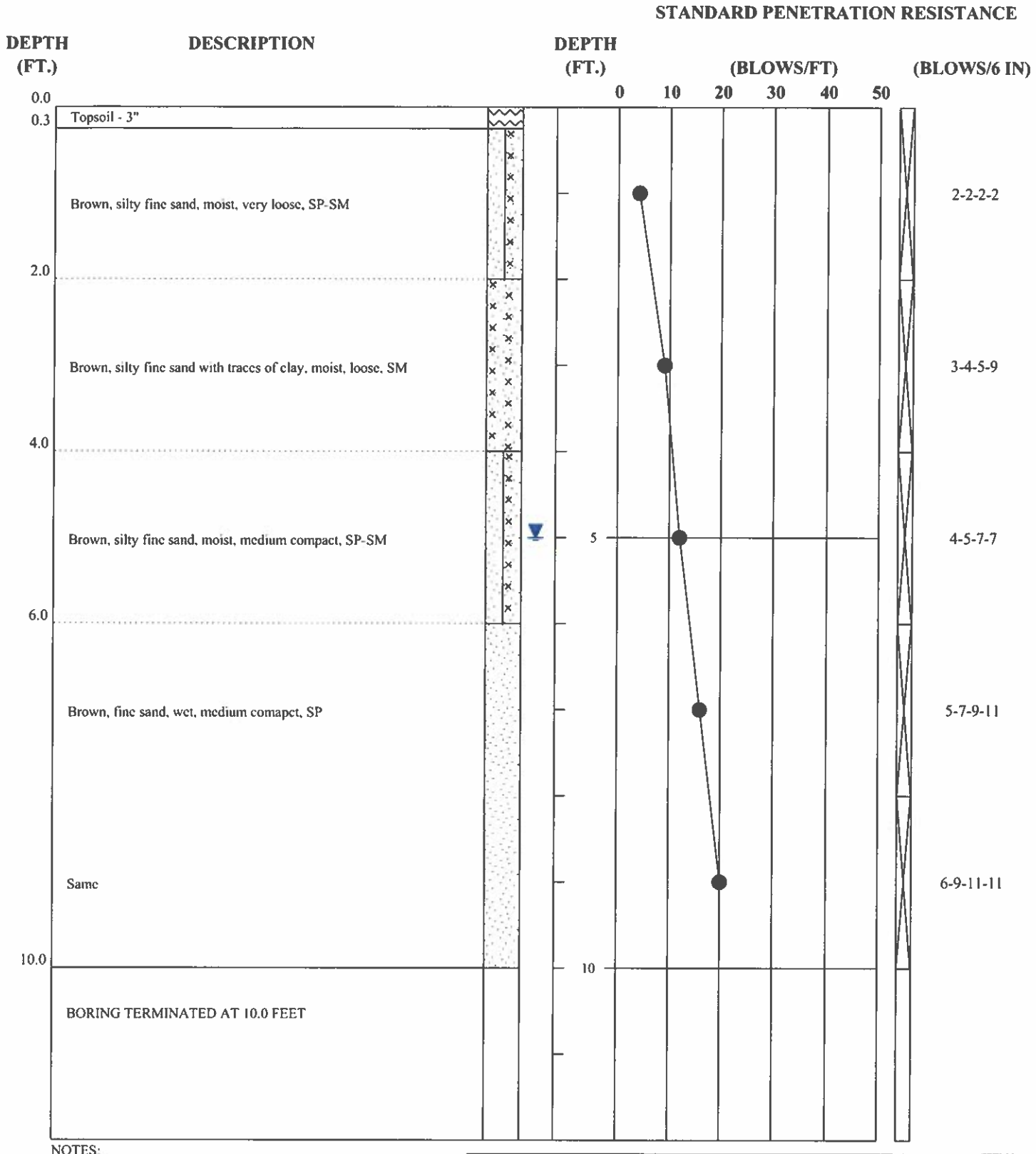
SPT
vs.
Relative Density

Blows/Ft	Relative Density
0 - 4	Very Loose
5 - 10	Loose
11 - 30	Medium Compact
31 - 50	Compact
Over 50	Very Compact

Fine Grained Soils

SPT
vs.
Consistency

Blows/Ft	Consistency
0 - 2	Very Soft
3 - 4	Soft
5 - 8	Medium Stiff
9 - 15	Stiff
16 - 30	Very Stiff
31 - 50	Hard
Over 50	Very Hard



NOTES:

- ..... - Gradual Stratum Change
- – – – - Approximate Stratum Change
- ● - Penetration Resistance (N - value)
- ▮ - Standard Penetration Test
- ▮ - Undisturbed Sample
- ▼ - Groundwater Level at Time of Boring
- ▽ - Stabilized Groundwater Level Reading

TEST BORING RECORD

BORING NUMBER	B-1
DATE DRILLED	May 8, 2026
PROJECT NUMBER	26-4427 NC
PROJECT	Proposed Currituck Way Subdivision
LOCATION	Foster Forbes Road, Powells Point, NC

McCALLUM, P.C.

STANDARD PENETRATION RESISTANCE

DEPTH (FT.)	DESCRIPTION	(BLOWS/FT) 0 10 20 30 40 50	(BLOWS/6 IN)
0.0			
0.3	Topsoil - 3"		
	Brown, silty fine sand with traces of clay, moist, very loose, SM		2-1-2-2
	Same - loose		2-3-3-4
	Same - wet, medium compact	5	5-5-6-7
6.0			
	Brown, silty fine sand, wet, medium compact, SP-SM		6-8-11-11
8.0			
	Brown, fine sand, wet, medium comapct, SP		8-9-12-11
10.0		10	
	BORING TERMINATED AT 10.0 FEET		

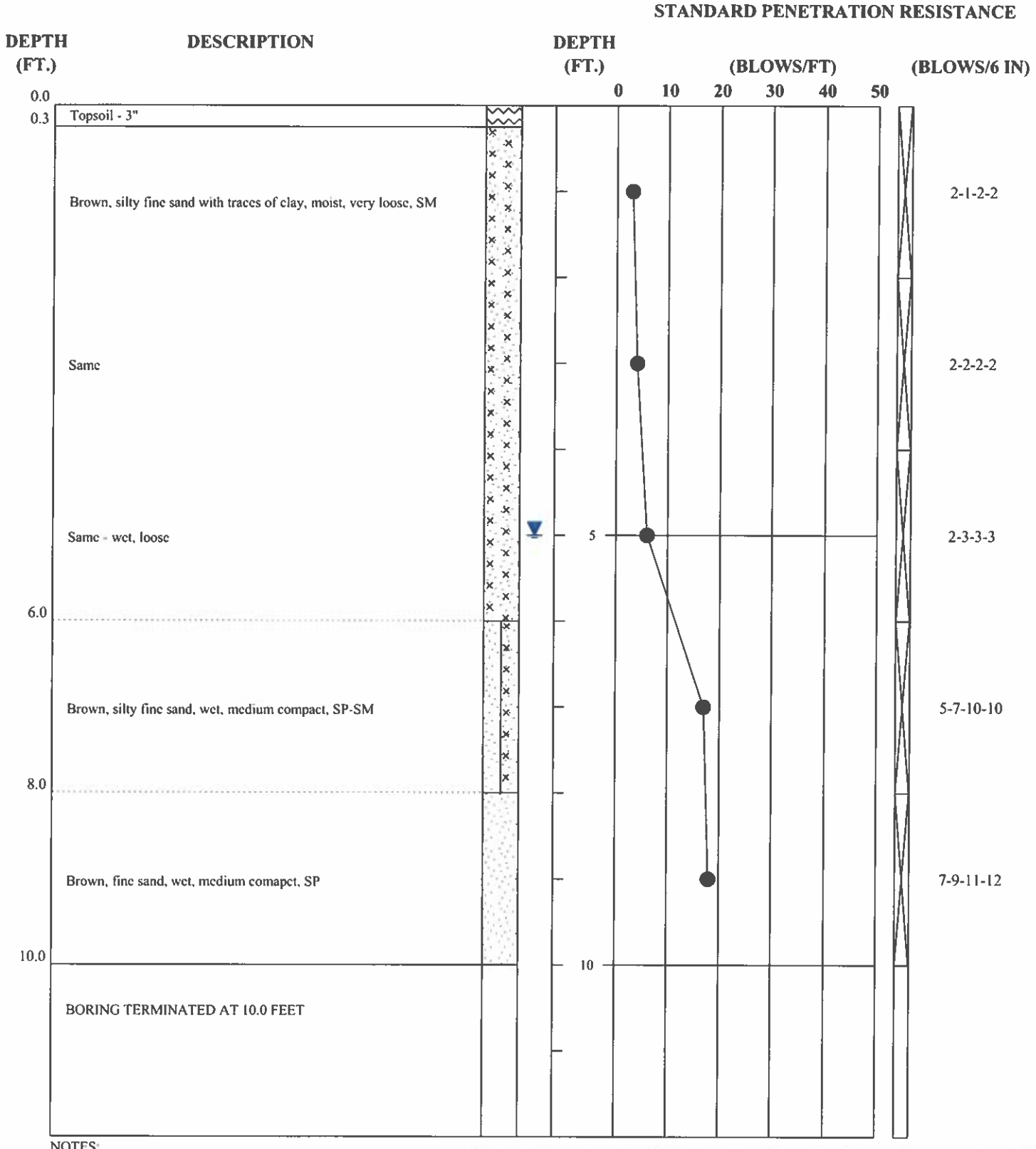
NOTES:

- ..... - Gradual Stratum Change
- – – – - Approximate Stratum Change
- ● - Penetration Resistance (N - value)
- SPT - Standard Penetration Test
- ▮ - Undisturbed Sample
- ▼ - Groundwater Level at Time of Boring
- ▽ - Stabilized Groundwater Level Reading

TEST BORING RECORD

BORING NUMBER	B-2
DATE DRILLED	May 8, 2026
PROJECT NUMBER	26-4427 NC
PROJECT	Proposed Currituck Way Subdivision
LOCATION	Foster Forbes Road, Powells Point, NC

McCALLUM, P.C.



NOTES:

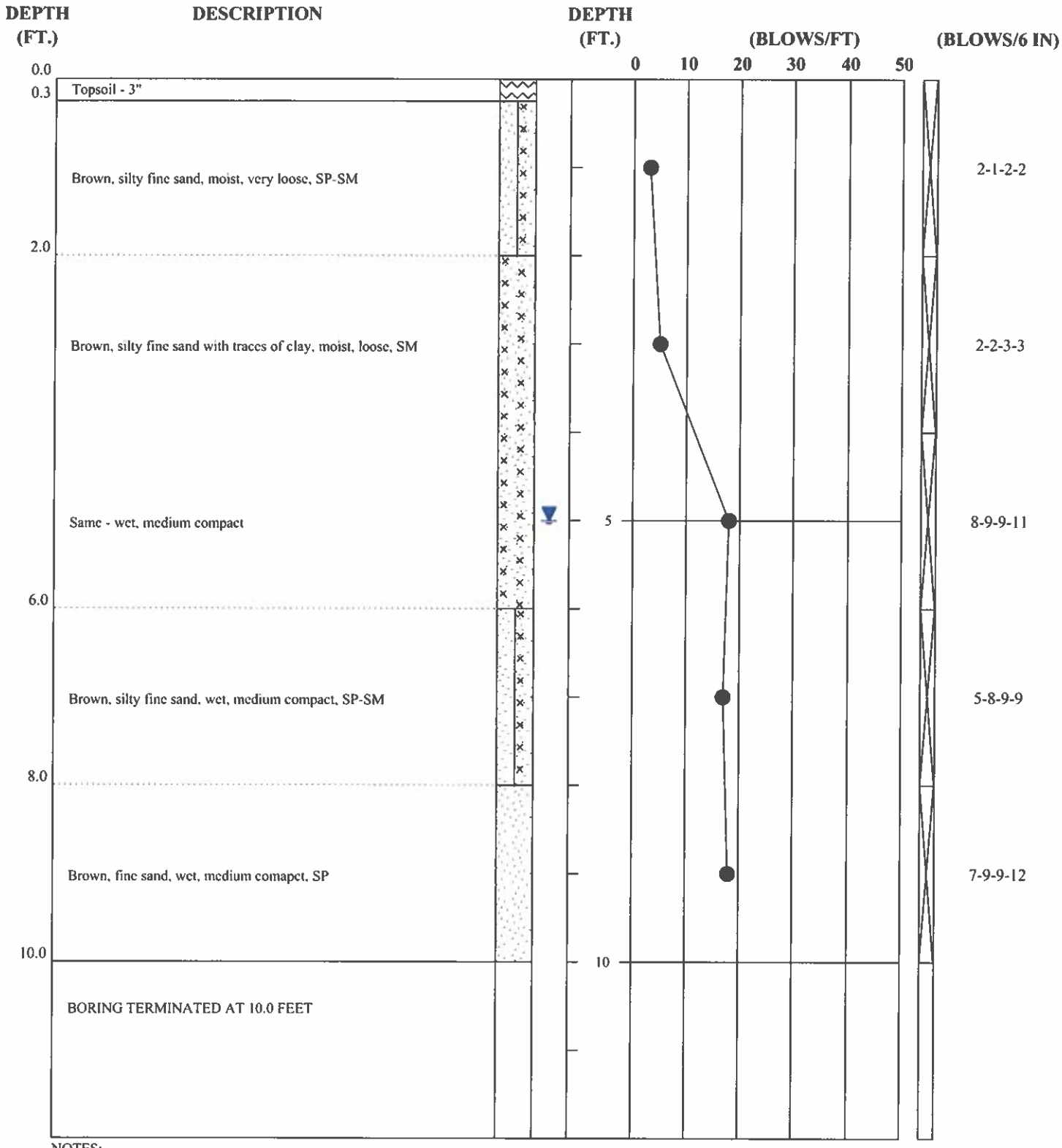
- Gradual Stratum Change
- Approximate Stratum Change
- Penetration Resistance (N - value)
- Standard Penetration Test
- Undisturbed Sample
- Groundwater Level at Time of Boring
- Stabilized Groundwater Level Reading

TEST BORING RECORD

BORING NUMBER	B-3
DATE DRILLED	May 8, 2026
PROJECT NUMBER	26-4427 NC
PROJECT	Proposed Currituck Way Subdivision
LOCATION	Foster Forbes Road, Powells Point, NC

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STANDARD PENETRATION RESISTANCE



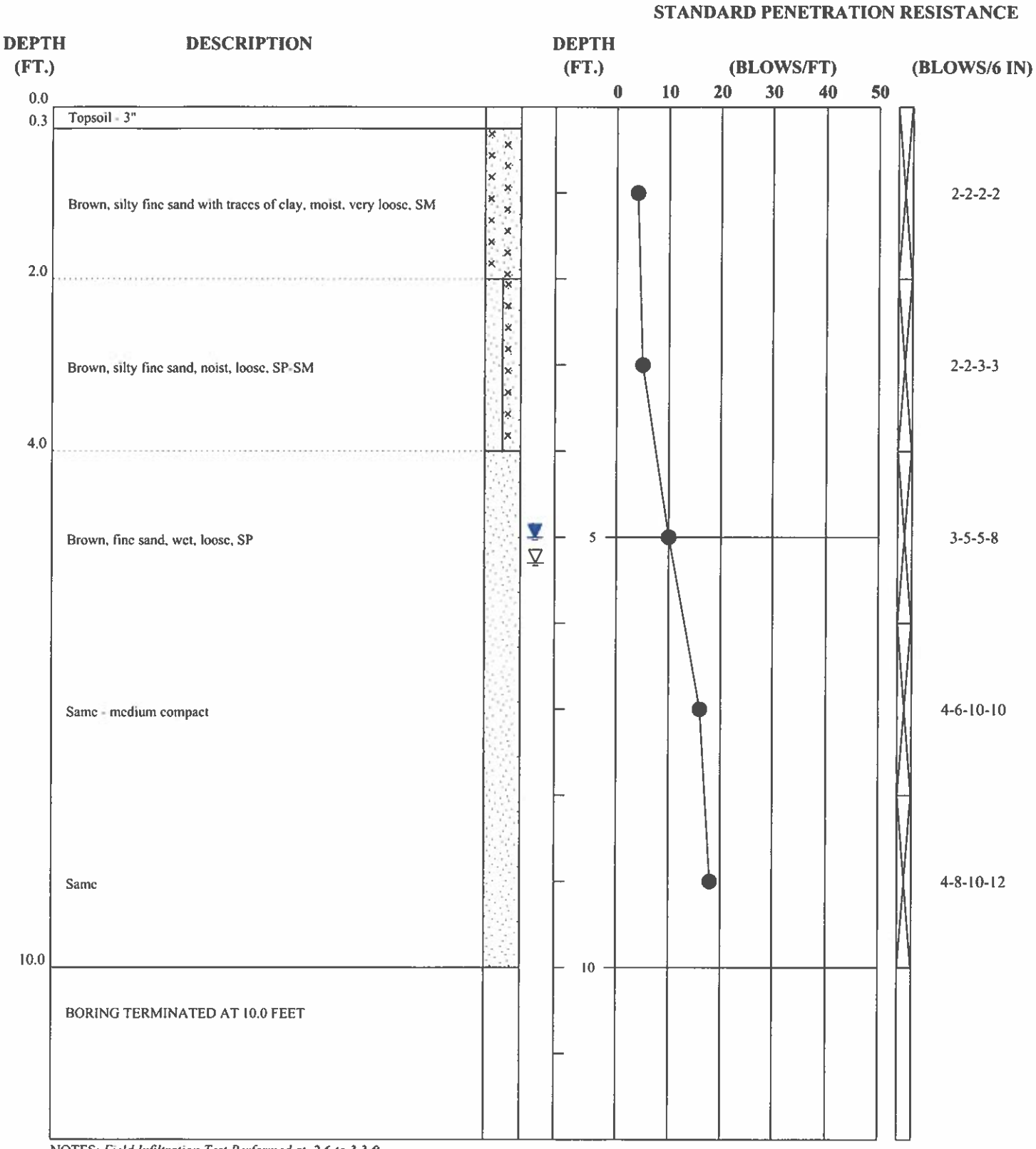
NOTES:

- ····· - Gradual Stratum Change
- – – – - Approximate Stratum Change
- ● - Penetration Resistance (N - value)
- ▮ - Standard Penetration Test
- ▮ - Undisturbed Sample
- ▼ - Groundwater Level at Time of Boring
- ▽ - Stabilized Groundwater Level Reading

TEST BORING RECORD

BORING NUMBER	B-4
DATE DRILLED	May 8, 2026
PROJECT NUMBER	26-4427 NC
PROJECT	Proposed Currituck Way Subdivision
LOCATION	Foster Forbes Road, Powells Point, NC

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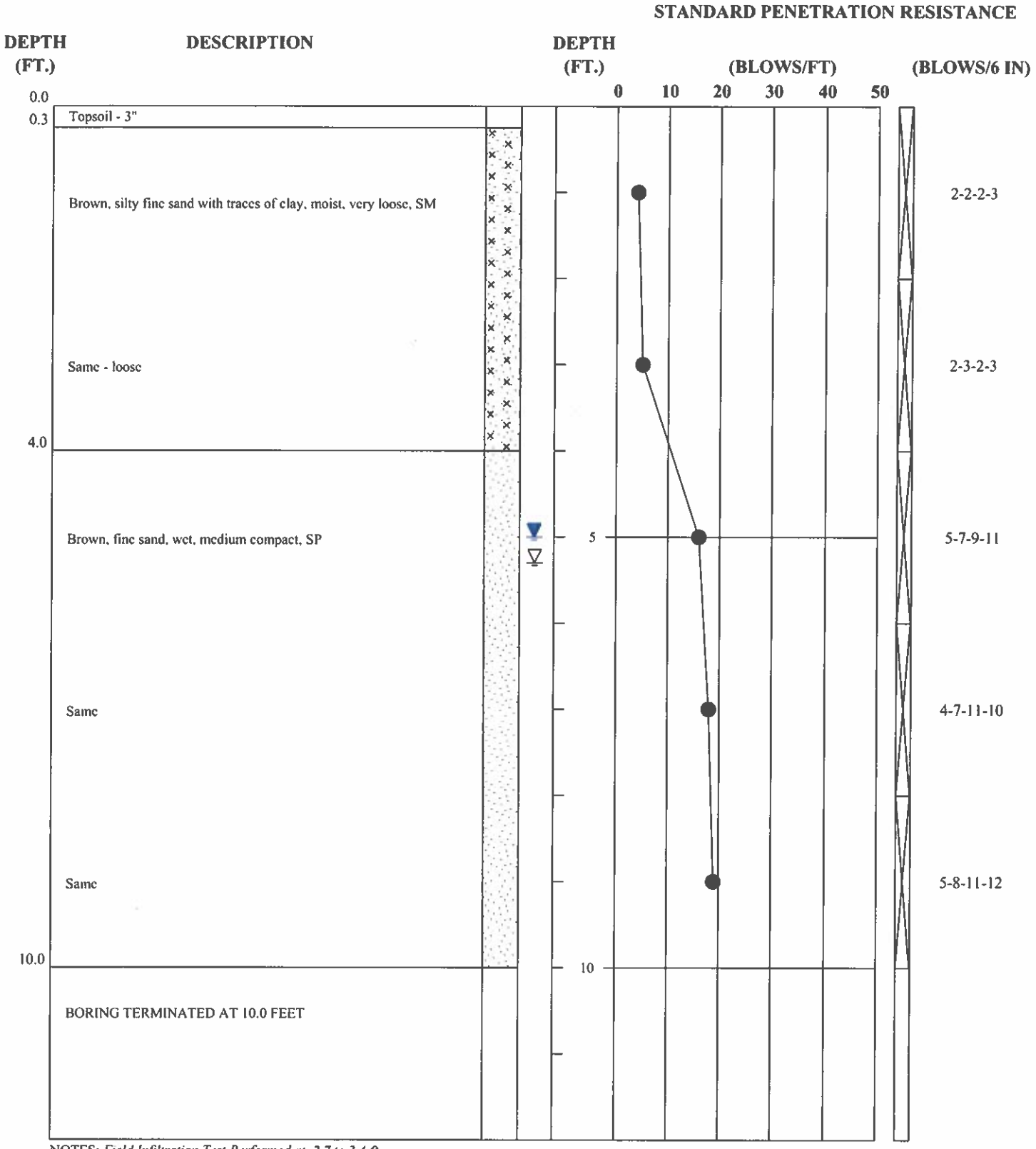
NOTES: *Field Infiltration Test Performed at 2.6 to 3.3 ft.*
Infiltration Rate = 5.6 in/hr

- ..... - Gradual Stratum Change
- – – – - Approximate Stratum Change
- ● - Penetration Resistance (N - value)
- ▮ - Standard Penetration Test
- ▮ - Undisturbed Sample
- ▼ - Groundwater Level at Time of Boring
- ▽ - Stabilized Groundwater Level Reading

TEST BORING RECORD

BORING NUMBER	BMP-1
DATE DRILLED	May 8, 2026
PROJECT NUMBER	26-4427 NC
PROJECT	Proposed Currituck Way Subdivision
LOCATION	Foster Forbes Road, Powells Point, NC

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NOTES: *Field Infiltration Test Performed at 2.7 to 3.4 ft.*
Infiltration Rate = 9.8 in/hr

- Gradual Stratum Change
- Approximate Stratum Change
- Penetration Resistance (N - value)
- Standard Penetration Test
- Undisturbed Sample
- Groundwater Level at Time of Boring
- Stabilized Groundwater Level Reading

TEST BORING RECORD

BORING NUMBER	BMP-2
DATE DRILLED	May 8, 2026
PROJECT NUMBER	26-4427 NC
PROJECT	Proposed Currituck Way Subdivision
LOCATION	Foster Forbes Road, Powells Point, NC

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1808 Hayward Avenue • Chesapeake, VA 23320

DATE: 5/8/2026

CLIENT: Kirbor Development, LLC
1521 Taylor Farm Road
Virginia Beach, VA 23453

PROJECT: Proposed Currituck Way Subdivision
Foster Forbes Road
Powells Point, North Carolina
MTL Project 264427 NC

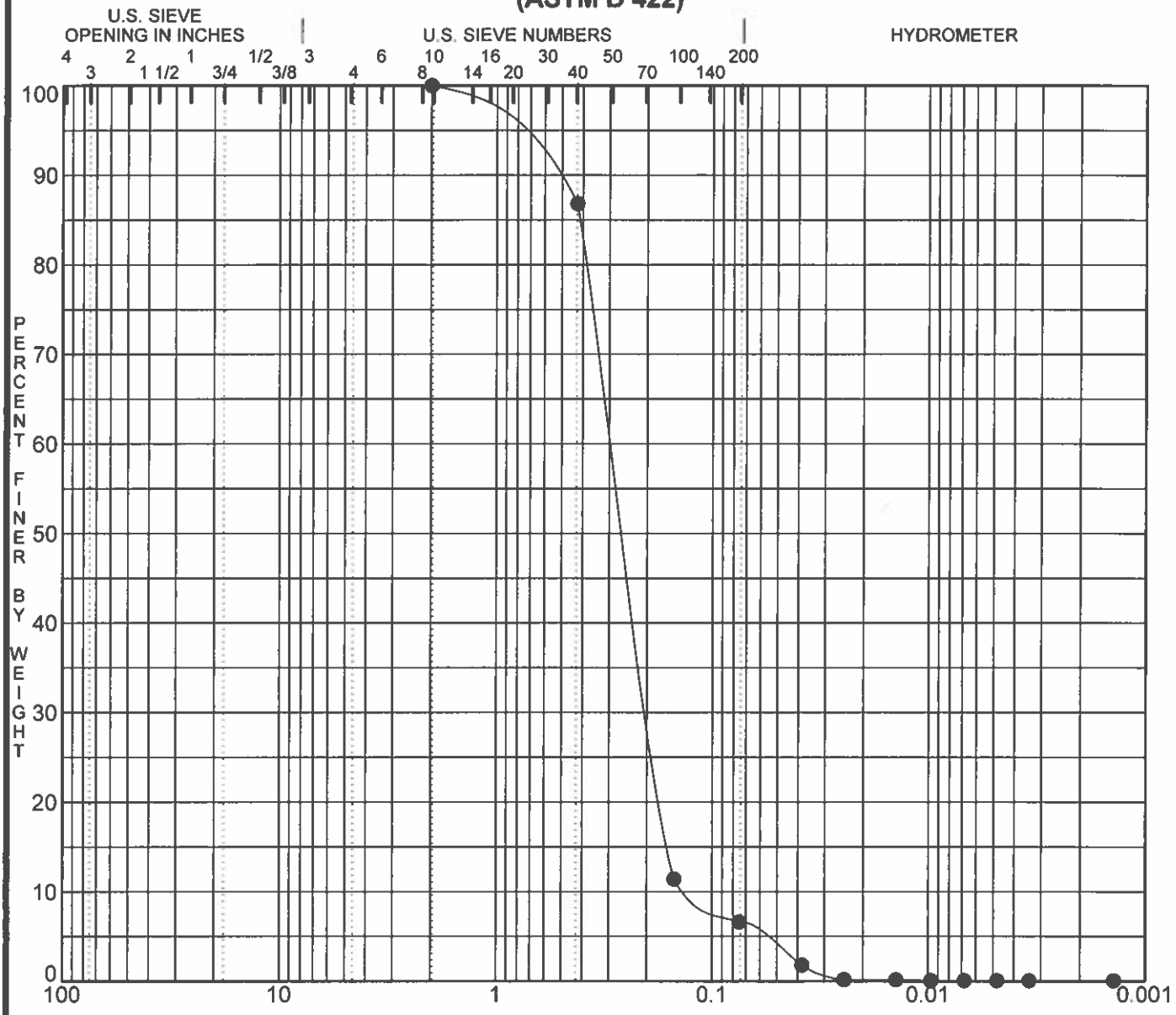
LABORATORY TEST RESULTS

SAMPLE NUMBER	CBR-1	CBR-2	CBR-3	CBR-4		
BORING NUMBER	(B-1)	(B-2)	(B-3)	(B-4)		
SAMPLE DEPTH	1.0 to 2.0 ft.	1.0 to 2.0 ft.	1.0 to 2.0 ft.	1.0 to 2.0 ft.		
NATURAL MOISTURE CONTENT, % (ASTM D 2216)						
MOISTURE CONTENT, %	11.7	8.7	6.1	4.6		
SPECIFIC GRAVITY OF SOILS TEST (ASTM D 854)						
SPECIFIC GRAVITY	2.6	2.66	2.68	2.67		
PARTICLE SIZE ANALYSIS OF SOILS TEST (ASTM D 422)						
SIEVE SIZES	PERCENT PASSING					
#4 (4.75 mm)	---	---	---	---		
#10 (2.00 mm)	100	100	100	100		
#40 (0.425 mm)	86.8	82.8	71.1	61.7		
#100 (0.150 mm)	11.4	19.7	14.8	12.1		
#200 (0.075 mm)	6.6	15.3	12.2	8.0		
HYDROMETER TEST (ASTM D 422)						
SILT CONTENT, % (0.075 - 0.005 mm)	6.5	11.1	9.6	7.1		
CLAY CONTENT, % (<0.005 mm)	0.1	4.2	2.6	0.9		
ATTERBERG LIMITS (ASTM D 4318)						
LIQUID LIMIT	16	17	17	16		
PLASTIC LIMIT	NP	NP	NP	NP		
PLASTICITY INDEX	NP	NP	NP	NP		
SOIL CLASSIFICATION (ASTM D 2487)						
UNIFIED SOIL CLASSIFICATION	SP-SM	SM	SM	SP-SM		
AASHTO CLASSIFICATION	A-3	A-2-4	A-2-4	A-3		
MOISTURE DENSITY TEST (ASTM D 698)						
MAXIMUM DRY DENSITY (PCF)	103.7	105.3	107	106.4		
OPTIMUM MOISTURE CONTENT (%)	13.0	12.8	13.1	12.8		
CALIFORNIA BEARING RATIO TEST (ASTM D 1883)						
SOAKED C.B.R. VALUE	21.0	18.8	19.3	20.1		
SWELL (%)	+0.017	+0.033	+0.017	+0.017		

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PARTICLE SIZE ANALYSIS
(ASTM D 422)



GRAVEL		SAND			SILT OR CLAY
coarse	fine	coarse	medium	fine	

Specimen Identification		Classification	MC%	LL	PL	PI	Cc	Cu
●	CBR-1 (B-1)	Brown, silty fine to medium sand, SP-SM	11.7	16	NP	NP	1.05	2.4

Specimen Identification		D_{100}	D_{60}	D_{50}	D_{30}	D_{10}	%Gravel	%Sand	%Silt	%Clay
●	CBR-1 (B-1)	2.00	0.29	0.26	0.194	0.1225	0.0	93.4	6.5	0.1

PROJECT **Proposed Currituck Way Subdivision - Foster Forbes Road, Powells Point, NC**

JOB NO. **26-4427 NC**

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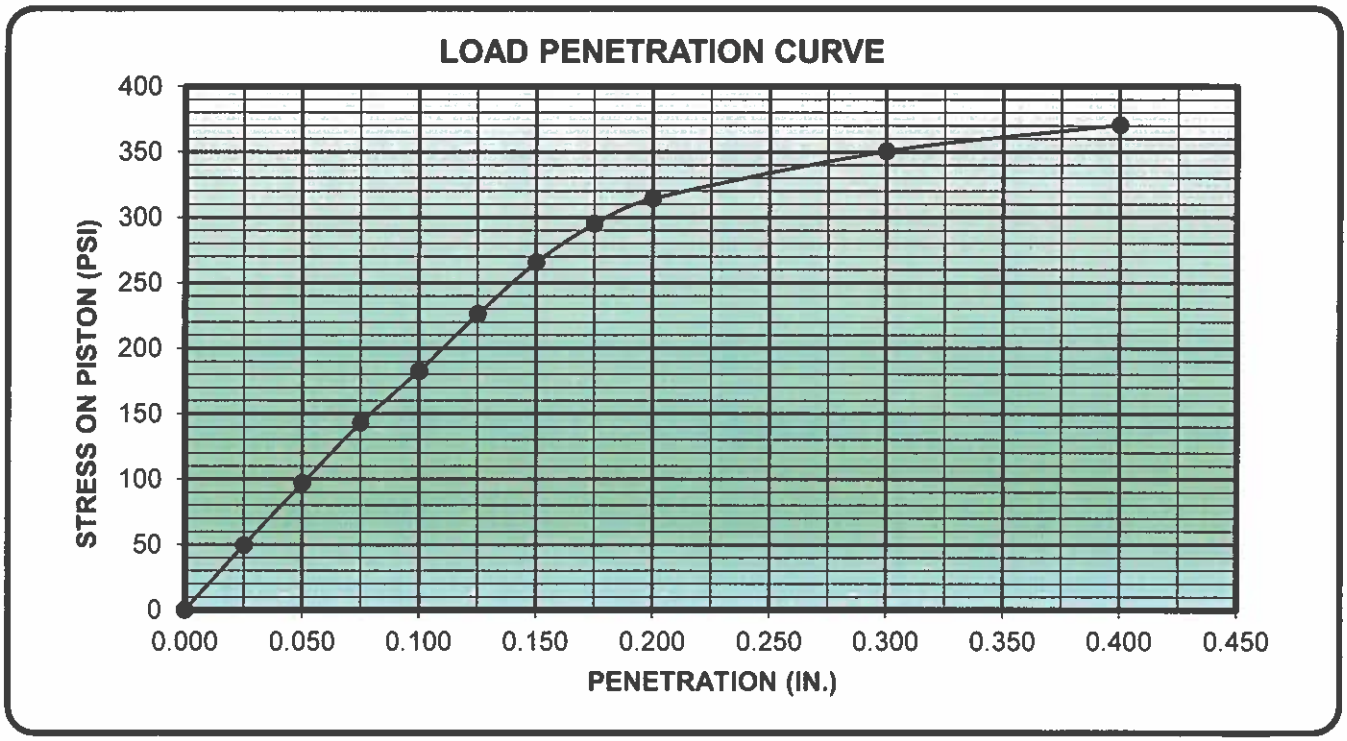
DATE: 5/8/2026

CLIENT: Kirbor Development, LLC
1521 Taylor Farm Road
Virginia Beach, VA 23453

PROJECT: Proposed Currituck Way Subdivision
Foster Forbes Road
Powells Point, North Carolina
MTL Project 264427 NC

LABORATORY CALIFORNIA BEARING RATIO TEST (ASTM D 1883)

SAMPLE IDENTIFICATION	**CBR-1 (B-1)**	
SAMPLE OF	Subgrade Material	
SOURCE	1.0 to 2.0 ft.	
PROPOSED USE	Pavement Subgrade/General Fill	
MAXIMUM DRY DENSITY (ASTM D 698)	103.7 pcf	1661.2 kg/m^3
DRY DENSITY BEFORE SOAKING	101.6 pcf	1627.3 kg/m^3
DRY DENSITY AFTER SOAKING	101.6 pcf	1627.3 kg/m^3
COMPACTION BEFORE SOAKING	97.9 %	
COMPACTION AFTER SOAKING	97.9 %	
OPTIMUM MOISTURE (ASTM D 698)	13.0 %	
MOISTURE CONTENT BEFORE SOAKING	12.5 %	
MOISTURE CONTENT AFTER SOAKING	14.8 %	
SWELL	+0.017 %	
CBR VALUE - SOAKED	21.0 %	



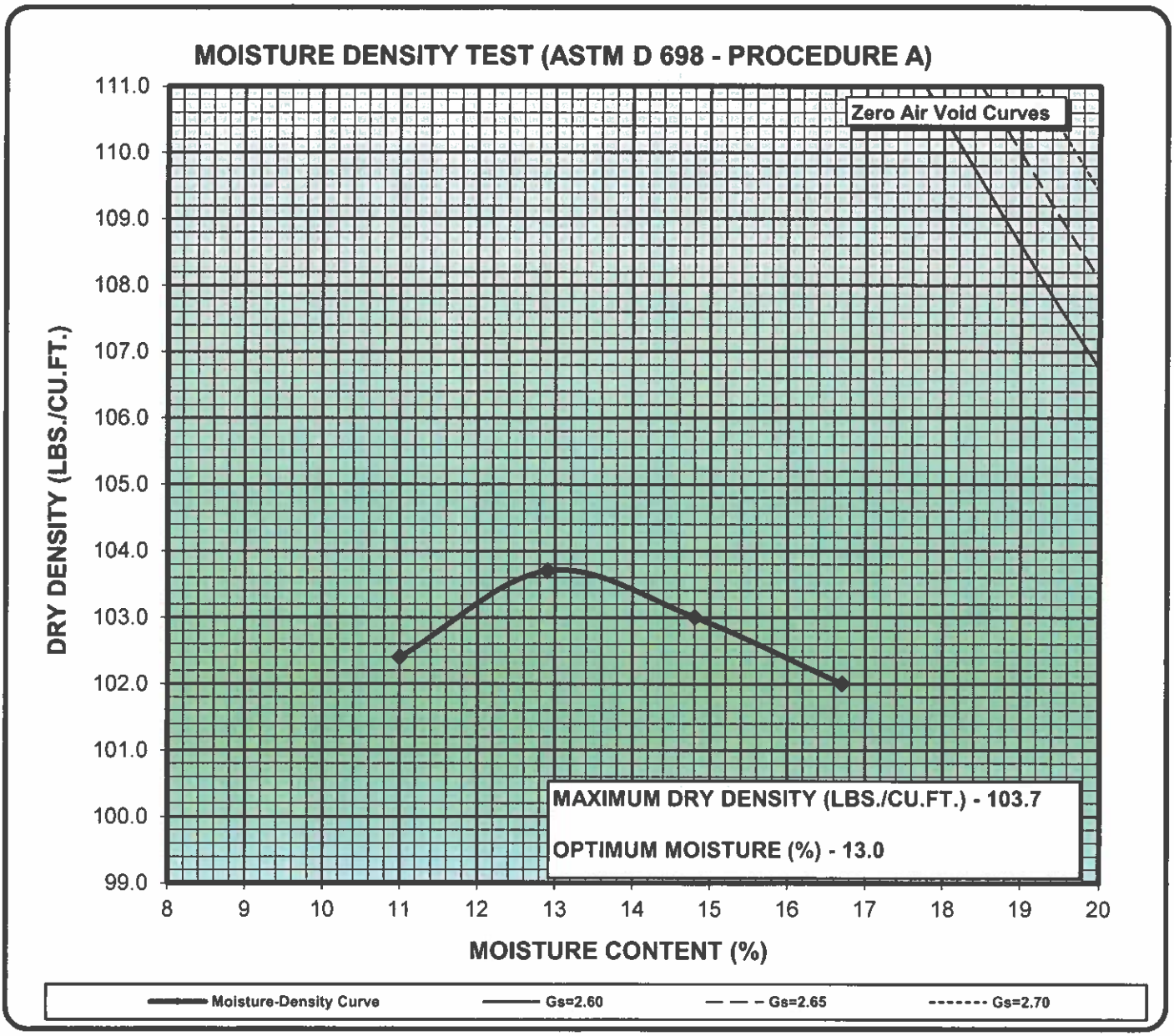
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LABORATORY TEST RESULTS

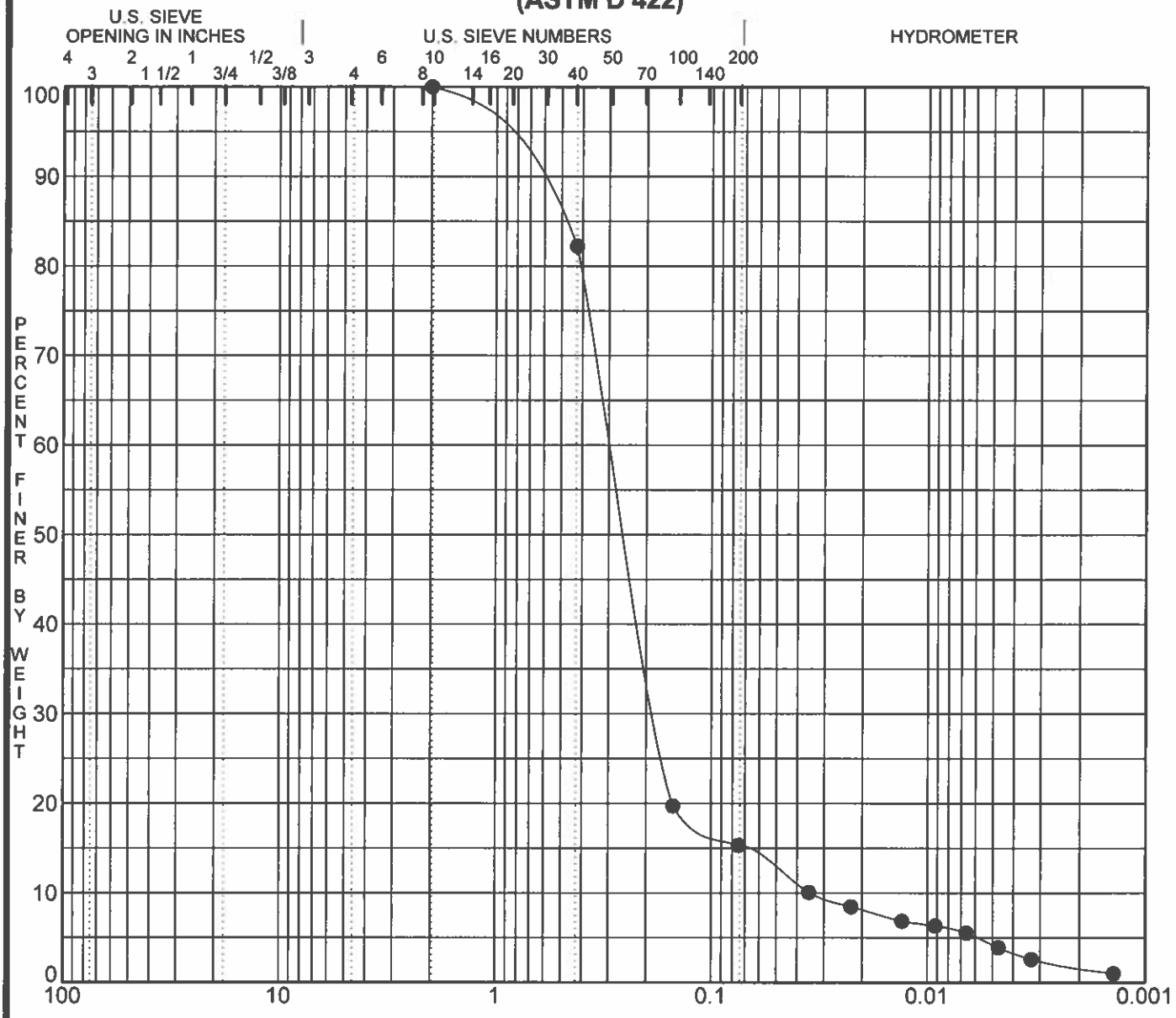
SAMPLE NO.	SOURCE	DATE RECEIVED	VISUAL DESCRIPTION
CBR-1 (B-1)	Subgrade Material 1.0 to 2.0 ft.	5/8/2026	Brown, silty fine to medium sand, SP-SM



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PARTICLE SIZE ANALYSIS
(ASTM D 422)



GRAVEL		SAND			SILT OR CLAY
coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	MC%	LL	PL	PI	Cc	Cu
● CBR-2 (B-2)	Brown, silty fine to medium sand with traces of clay, SM	8.8	17	NP	NP	3.11	8.4

Specimen Identification	D_{100}	D_{60}	D_{50}	D_{30}	D_{10}	%Gravel	%Sand	%Silt	%Clay
● CBR-2 (B-2)	2.00	0.29	0.25	0.178	0.0348	0.0	84.7	11.1	4.2

PROJECT: Proposed Currituck Way Subdivision - Foster Forbes Road, Powells Point, NC

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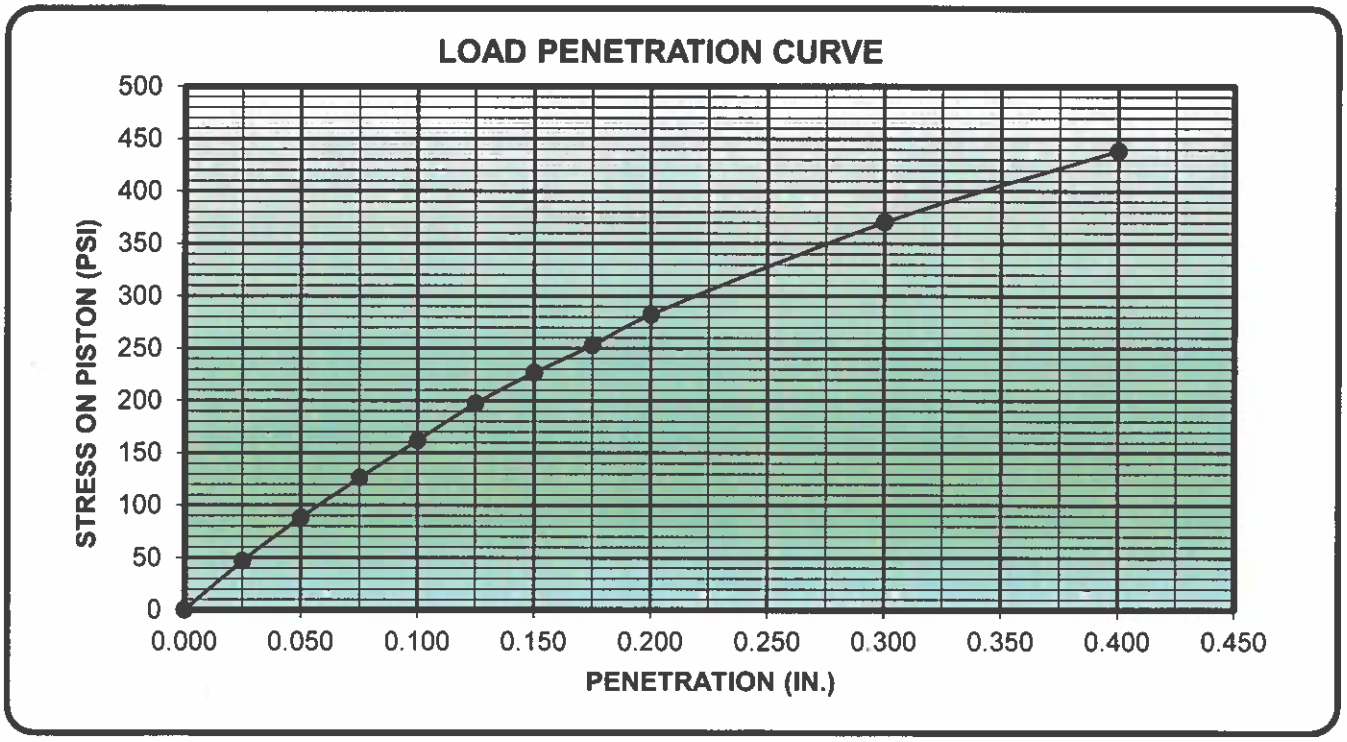
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LABORATORY CALIFORNIA BEARING RATIO TEST (ASTM D 1883)

SAMPLE IDENTIFICATION	**CBR-2 (B-2)**	
SAMPLE OF	Subgrade Material	
SOURCE	1.0 to 2.0 ft.	
PROPOSED USE	Pavement Subgrade/General Fill	
MAXIMUM DRY DENSITY (ASTM D 698)	105.3 pcf	1686.8 kg/m^3
DRY DENSITY BEFORE SOAKING	105.0 pcf	1681.3 kg/m^3
DRY DENSITY AFTER SOAKING	105.0 pcf	1682.0 kg/m^3
COMPACTION BEFORE SOAKING	99.7 %	
COMPACTION AFTER SOAKING	99.7 %	
OPTIMUM MOISTURE (ASTM D 698)	12.8 %	
MOISTURE CONTENT BEFORE SOAKING	12.5 %	
MOISTURE CONTENT AFTER SOAKING	14.4 %	
SWELL	+0.033 %	
CBR VALUE - SOAKED	18.8 %	



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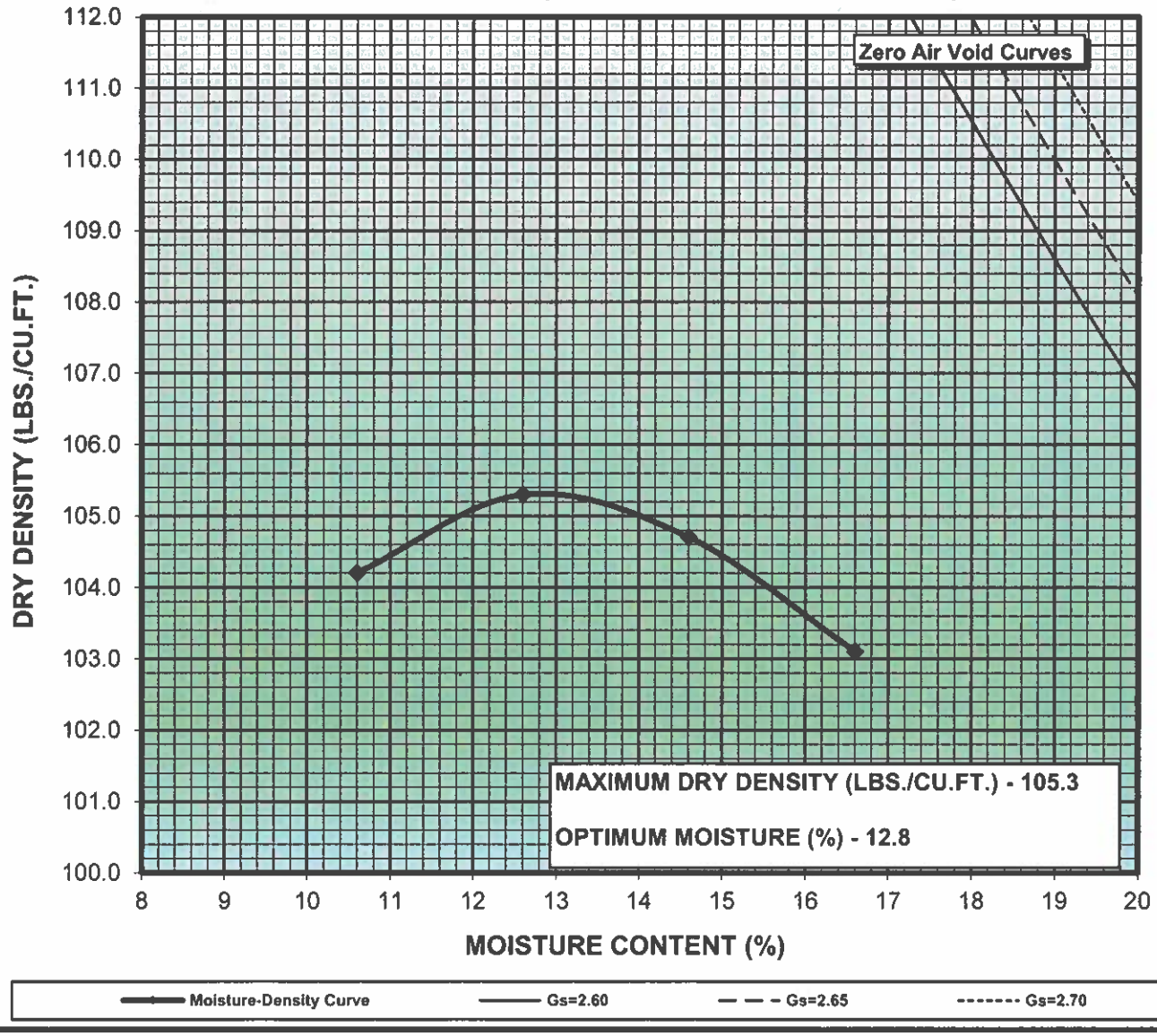
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Powells Point, North Carolina
MTL Project 264427 NC

LABORATORY TEST RESULTS

SAMPLE NO.	SOURCE	DATE RECEIVED	VISUAL DESCRIPTION
CBR-2 (B-2)	Subgrade Material 1.0 to 2.0 ft.	5/8/2026	Brown, silty fine to medium sand with traces of clay, SM

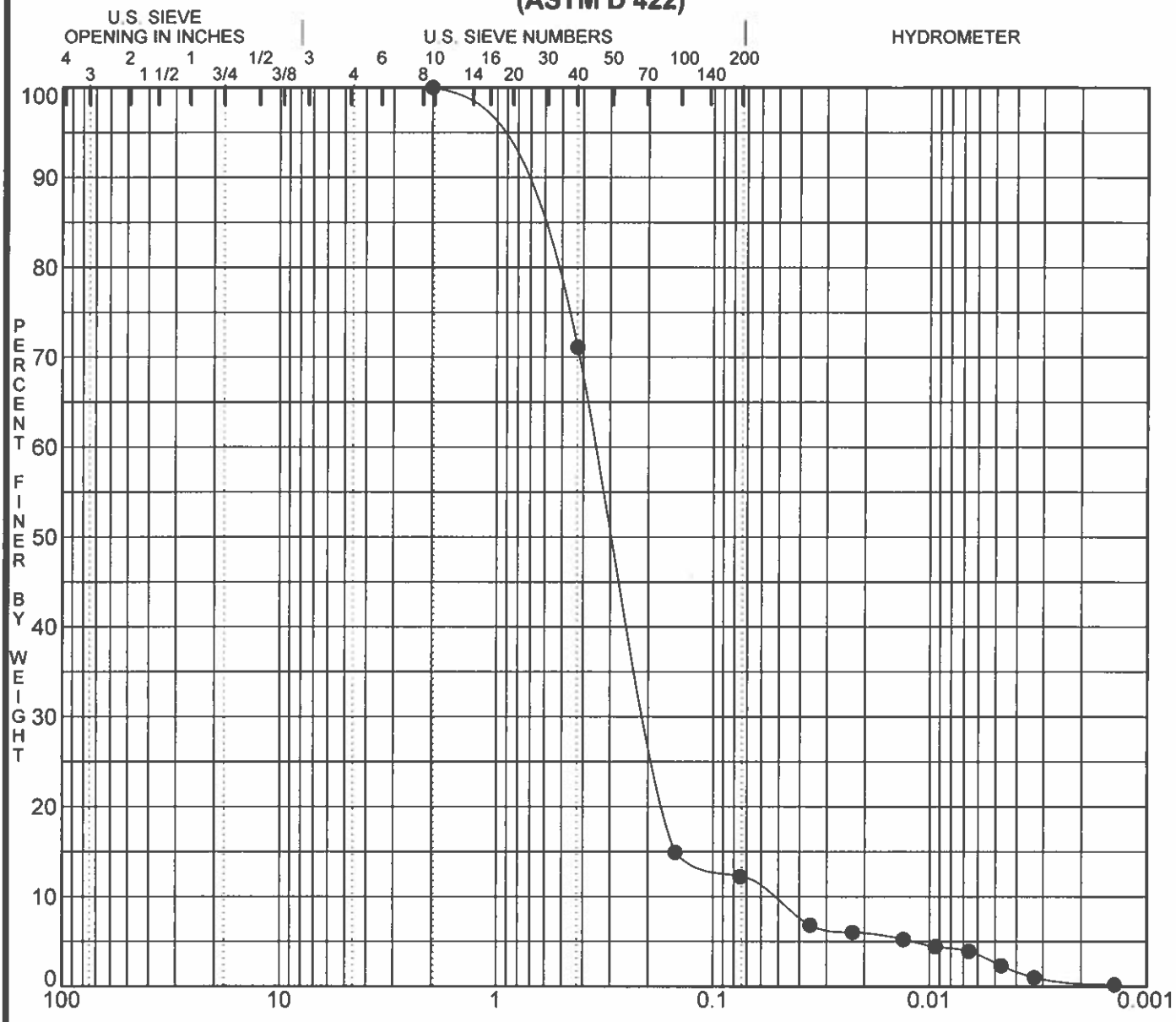
MOISTURE DENSITY TEST (ASTM D 698 - PROCEDURE A)



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PARTICLE SIZE ANALYSIS
(ASTM D 422)



GRAVEL		SAND			SILT OR CLAY
coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	MC%	LL	PL	PI	Cc	Cu
● CBR-3 (B-3)	Brown, silty fine to medium sand with traces of clay, SM	6.1	17	NP	NP	2.05	6.2

Specimen Identification	D_{100}	D_{60}	D_{50}	D_{30}	D_{10}	%Gravel	%Sand	%Silt	%Clay
● CBR-3 (B-3)	2.00	0.35	0.29	0.198	0.0554	0.0	87.8	9.6	2.6

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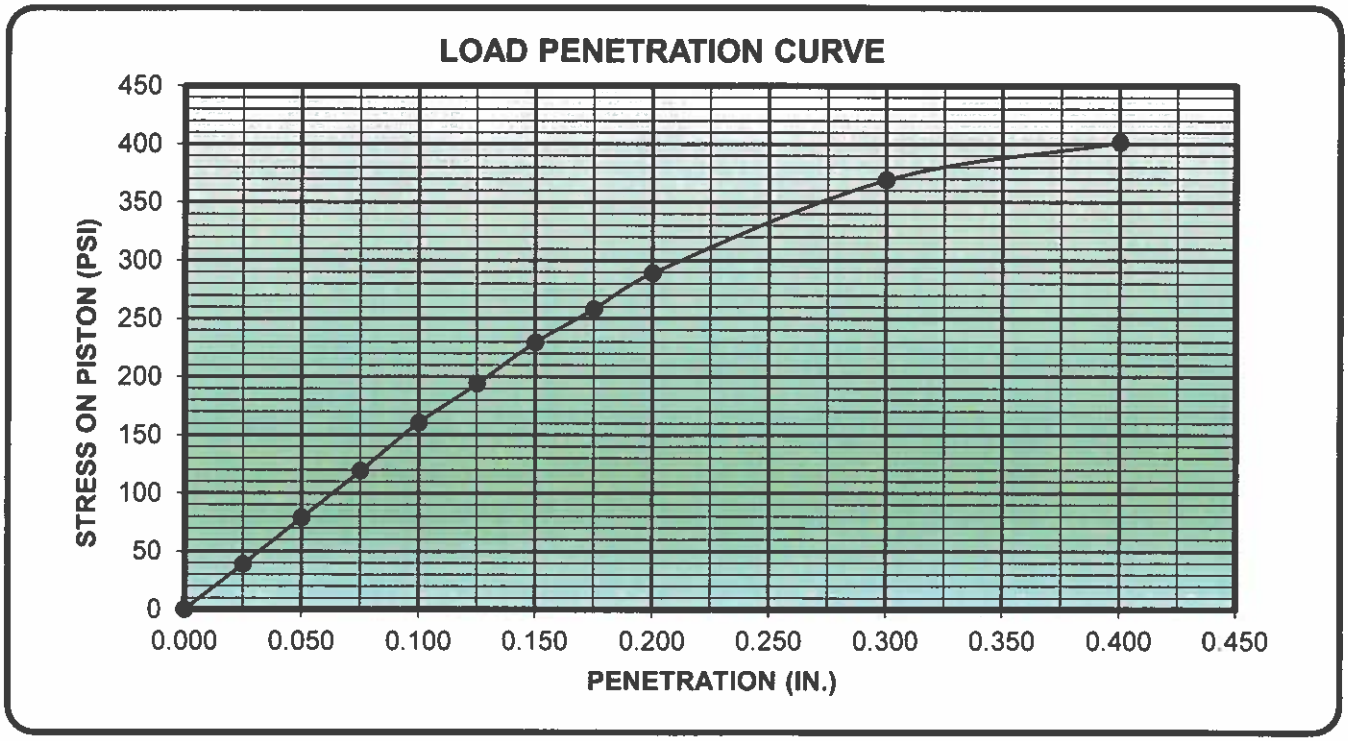
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LABORATORY CALIFORNIA BEARING RATIO TEST (ASTM D 1883)

SAMPLE IDENTIFICATION	**CBR-3 (B-3)**	
SAMPLE OF	Subgrade Material	
SOURCE	1.0 to 2.0 ft.	
PROPOSED USE	Pavement Subgrade/General Fill	
MAXIMUM DRY DENSITY (ASTM D 698)	107.0 pcf	1714.0 kg/m^3
DRY DENSITY BEFORE SOAKING	106.3 pcf	1702.7 kg/m^3
DRY DENSITY AFTER SOAKING	106.3 pcf	1702.4 kg/m^3
COMPACTION BEFORE SOAKING	99.3 %	
COMPACTION AFTER SOAKING	99.3 %	
OPTIMUM MOISTURE (ASTM D 698)	13.1 %	
MOISTURE CONTENT BEFORE SOAKING	11.0 %	
MOISTURE CONTENT AFTER SOAKING	12.8 %	
SWELL	+0.017 %	
CBR VALUE - SOAKED	19.3 %	



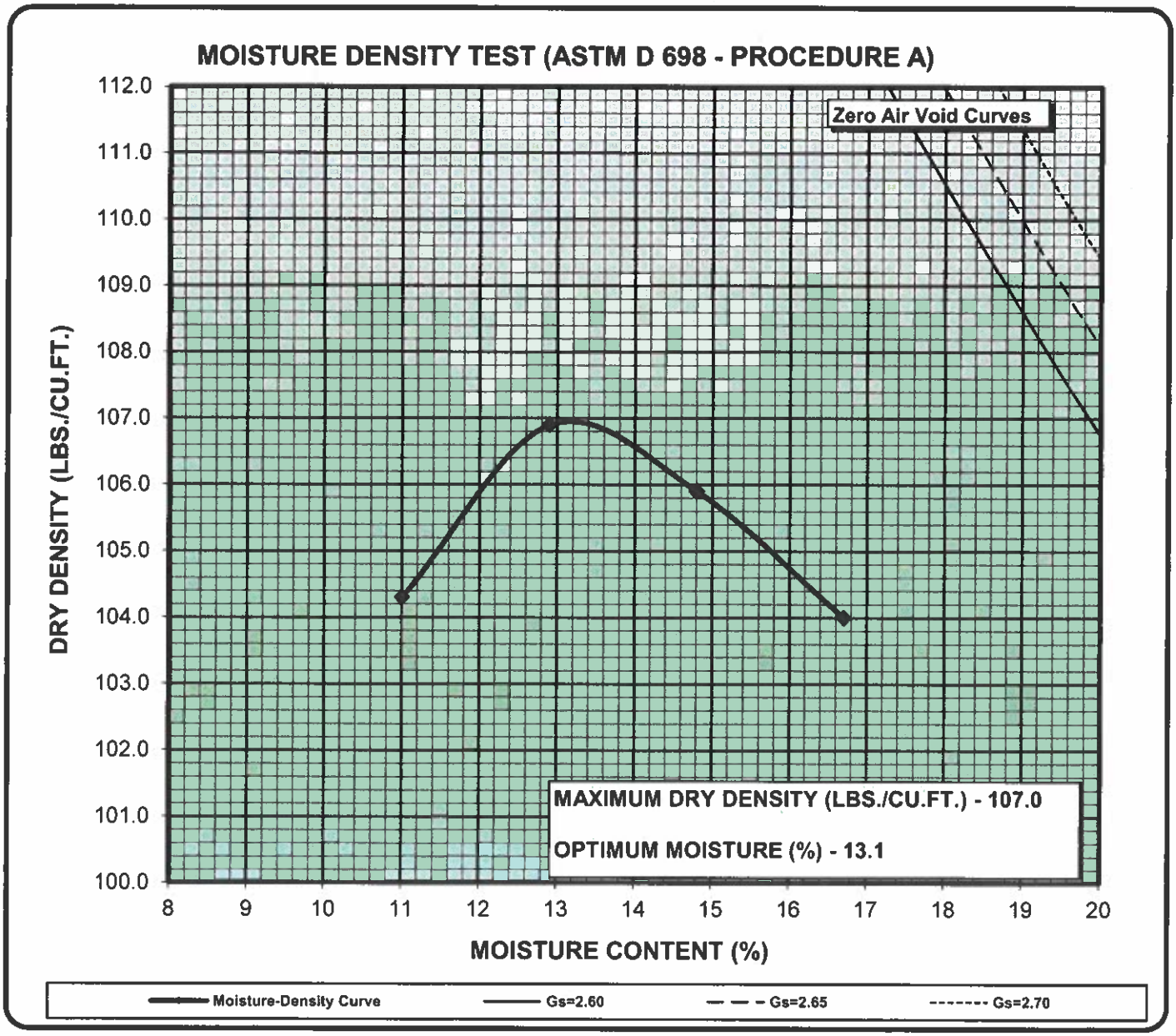
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PROJECT: Proposed Currituck Way Subdivision
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LABORATORY TEST RESULTS

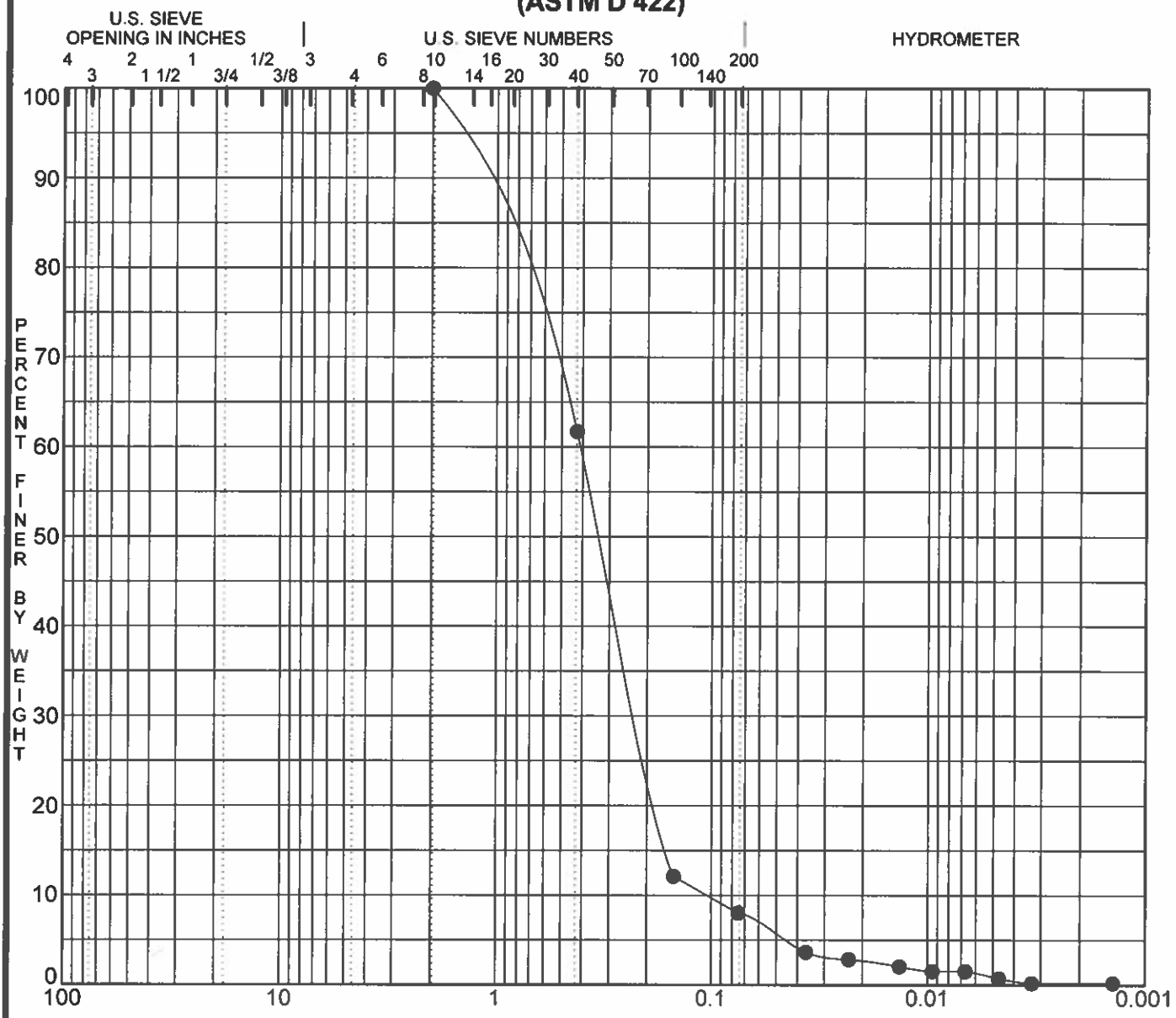
SAMPLE NO.	SOURCE	DATE RECEIVED	VISUAL DESCRIPTION
CBR-3 (B-3)	Subgrade Material 1.0 to 2.0 ft.	5/8/2026	Brown, silty fine to medium sand with traces of clay, SM



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PARTICLE SIZE ANALYSIS
(ASTM D 422)



GRAVEL		SAND			SILT OR CLAY
coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	MC%	LL	PL	PI	Cc	Cu
● CBR-4 (B-4)	Brown, silty fine to medium sand, SP-SM	4.6	16	NP	NP	1.11	3.9

Specimen Identification	D_{100}	D_{60}	D_{50}	D_{30}	D_{10}	%Gravel	%Sand	%Silt	%Clay
● CBR-4 (B-4)	2.00	0.41	0.33	0.218	0.1052	0.0	92.0	7.1	0.9

PROJECT **Proposed Currituck Way Subdivision - Foster Forbes Road, Powells Point, NC**

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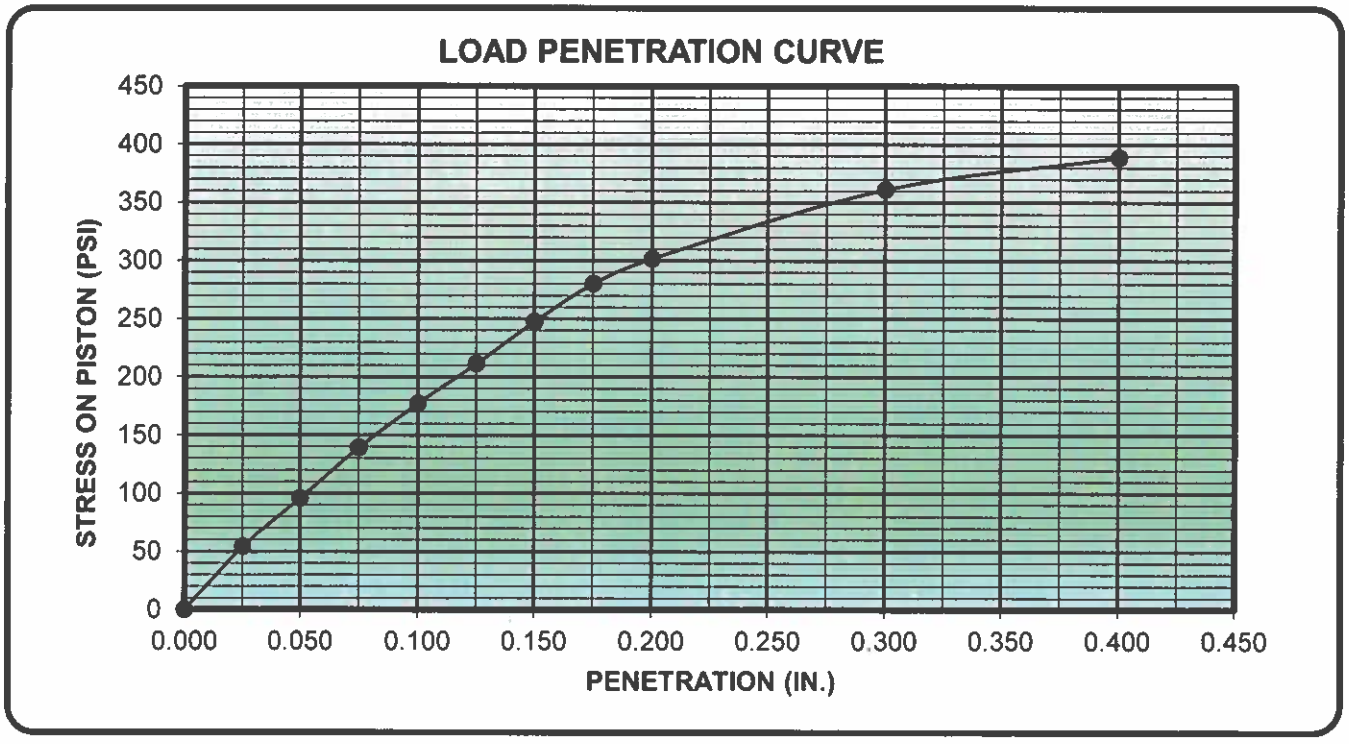
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LABORATORY CALIFORNIA BEARING RATIO TEST (ASTM D 1883)

SAMPLE IDENTIFICATION	**CBR-4 (B-4)**	
SAMPLE OF	Subgrade Material	
SOURCE	1.0 to 2.0 ft.	
PROPOSED USE	Pavement Subgrade/General Fill	
MAXIMUM DRY DENSITY (ASTM D 698)	106.4 pcf	1704.4 kg/m^3
DRY DENSITY BEFORE SOAKING	106.3 pcf	1703.3 kg/m^3
DRY DENSITY AFTER SOAKING	106.3 pcf	1703.0 kg/m^3
COMPACTION BEFORE SOAKING	99.9 %	
COMPACTION AFTER SOAKING	99.9 %	
OPTIMUM MOISTURE (ASTM D 698)	12.8 %	
MOISTURE CONTENT BEFORE SOAKING	12.4 %	
MOISTURE CONTENT AFTER SOAKING	14.2 %	
SWELL	+0.017 %	
CBR VALUE - SOAKED	20.1 %	



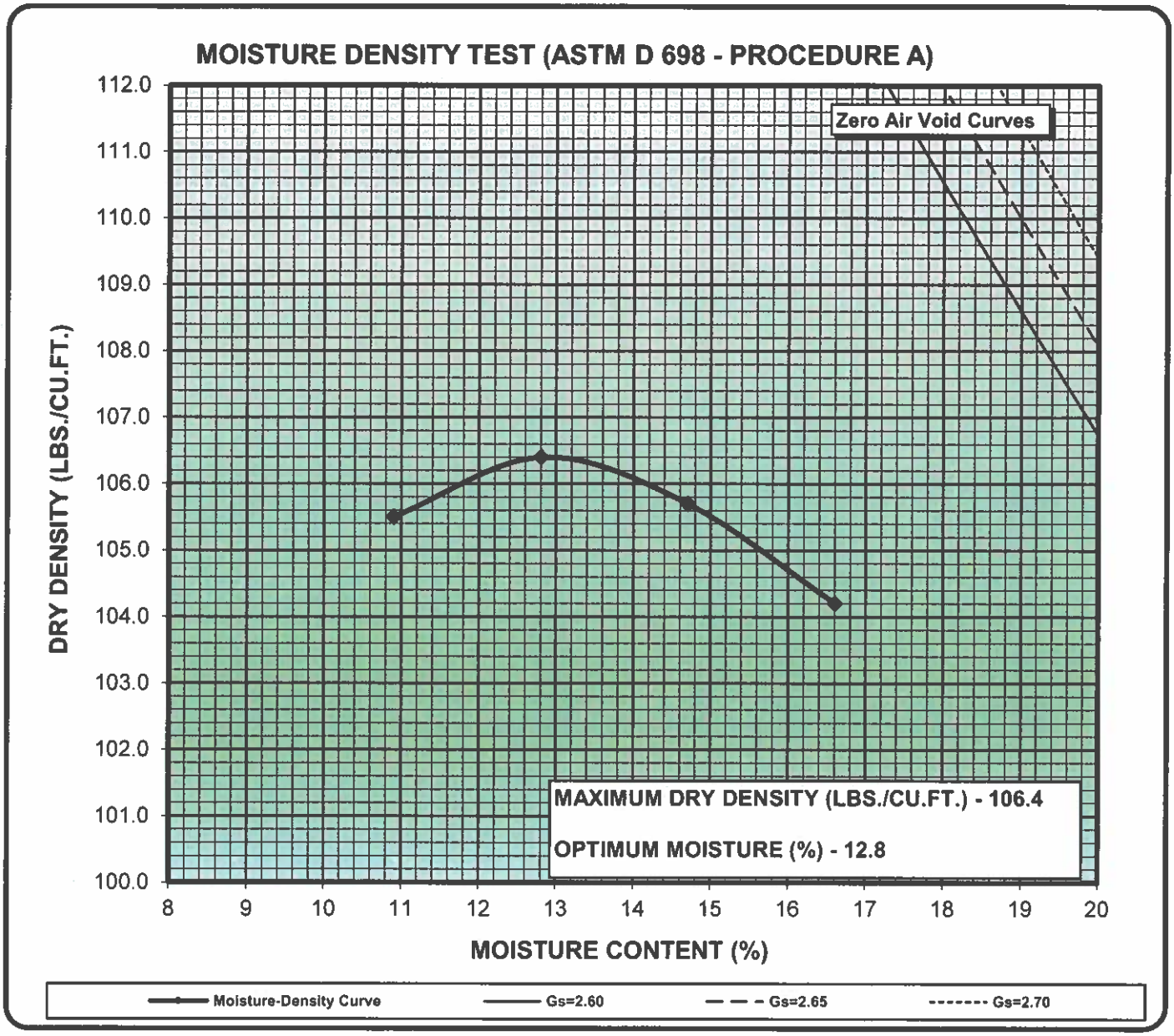
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LABORATORY TEST RESULTS

SAMPLE NO.	SOURCE	DATE RECEIVED	VISUAL DESCRIPTION
CBR-4 (B-4)	Subgrade Material 1.0 to 2.0 ft.	5/8/2026	Brown, silty fine to medium sand, SP-SM



United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Currituck County, North Carolina



April 21, 2026

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map



Map Scale: 1:4,290 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 50 100 200 300

Feet
0 200 400 800 1200

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Currituck County, North Carolina
Survey Area Data: Version 25, Sep 2, 2025

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: May 18, 2022—May 31, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
CnA	Conetoe loamy sand, 0 to 3 percent slopes	12.5	62.2%
Ds	Dragston loamy fine sand	5.7	28.3%
No	Nimmo loamy sand	1.8	8.8%
Pt	Portsmouth fine sandy loam	0.1	0.7%
Totals for Area of Interest		**20.1**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The

delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Currituck County, North Carolina

CnA—Conetoe loamy sand, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 3rnf
Landscape: Coastal plains
Elevation: 0 to 20 feet
Mean annual precipitation: 42 to 58 inches
Mean annual air temperature: 61 to 64 degrees F
Frost-free period: 190 to 270 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Conetoe and similar soils: 85 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Conetoe

Setting

Landscape: Coastal plains
Landform: Low ridges on stream terraces, Low ridges on marine terraces
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Crest
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Sandy and loamy fluviomarine deposits and/or marine deposits

Typical profile

Ap - 0 to 8 inches: loamy sand
E - 8 to 22 inches: loamy sand
Bt - 22 to 40 inches: sandy loam
BC - 40 to 46 inches: loamy sand
C - 46 to 80 inches: sand

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 5.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: A
Ecological site: F153AY030NC - Dry Loamy Rises and Flats, F153BY030NC - Dry Loamy Rises and Flats
Hydric soil rating: No

Minor Components

Leon

Percent of map unit: 5 percent
Landscape: Coastal plains
Landform: Flats on marine terraces
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: F153AY070NC - Wet Spodosol Flats and Depressions, F153BY070NC - Wet Spodosol Flats and Depressions
Hydric soil rating: Yes

Ds—Dragston loamy fine sand

Map Unit Setting

National map unit symbol: 3rnm
Landscape: Coastal plains
Elevation: 0 to 20 feet
Mean annual precipitation: 42 to 58 inches
Mean annual air temperature: 61 to 64 degrees F
Frost-free period: 190 to 270 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Dragston, drained, and similar soils: 45 percent
Dragston, undrained, and similar soils: 40 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Dragston, Drained

Setting

Landscape: Coastal plains
Landform: Marine terraces
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy and loamy fluviomarine deposits and/or marine deposits

Typical profile

A - 0 to 6 inches: loamy fine sand
E - 6 to 10 inches: loamy fine sand
Bt - 10 to 42 inches: sandy loam
2Cg - 42 to 80 inches: loamy sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Runoff class: Very low

Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: About 12 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 6.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: A/D
Ecological site: F153AY040NC - Moist Loamy Rises and Flats, F153BY040NC - Moist Loamy Rises and Flats, F133AY410NC - Summits, Loamy and Clayey, Seasonally Wet
Hydric soil rating: No

Description of Dragston, Undrained

Setting

Landscape: Coastal plains
Landform: Marine terraces
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy and loamy fluviomarine deposits and/or marine deposits

Typical profile

A - 0 to 6 inches: loamy fine sand
E - 6 to 10 inches: loamy fine sand
Bt - 10 to 42 inches: sandy loam
2Cg - 42 to 80 inches: loamy sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: About 12 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 6.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: A/D
Ecological site: F153AY040NC - Moist Loamy Rises and Flats, F153BY040NC - Moist Loamy Rises and Flats, F133AY410NC - Summits, Loamy and Clayey, Seasonally Wet
Hydric soil rating: No

Minor Components

Portsmouth, undrained

Percent of map unit: 3 percent
Landscape: Coastal plains

Landform: Depressions on marine terraces, Flats on marine terraces
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F153AY060NC - Wet Loamy Flats and Depressions, F153BY060NC - Wet Loamy Flats and Depressions, F133AY320NC - Upland Depressions, Flats, and Carolina Bays
Hydric soil rating: Yes

Nimmo, undrained

Percent of map unit: 2 percent
Landscape: Coastal plains
Landform: Flats on marine terraces, Depressions on marine terraces
Down-slope shape: Concave
Across-slope shape: Linear
Ecological site: F153AY060NC - Wet Loamy Flats and Depressions, F153BY060NC - Wet Loamy Flats and Depressions, F133AY320NC - Upland Depressions, Flats, and Carolina Bays
Hydric soil rating: Yes

No—Nimmo loamy sand

Map Unit Setting

National map unit symbol: 3rnv
Landscape: Coastal plains
Elevation: 0 to 20 feet
Mean annual precipitation: 42 to 58 inches
Mean annual air temperature: 61 to 64 degrees F
Frost-free period: 190 to 270 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Nimmo, drained, and similar soils: 80 percent
Nimmo, undrained, and similar soils: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Nimmo, Drained

Setting

Landscape: Coastal plains
Landform: Flats on marine terraces, Depressions on marine terraces
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Sandy and loamy fluviomarine deposits and/or marine deposits

Typical profile

Ap - 0 to 6 inches: loamy fine sand
Btg - 6 to 25 inches: fine sandy loam
Cg - 25 to 80 inches: sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 5.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: A/D
Ecological site: F153AY060NC - Wet Loamy Flats and Depressions, F153BY060NC - Wet Loamy Flats and Depressions
Hydric soil rating: Yes

Description of Nimmo, Undrained

Setting

Landscape: Coastal plains
Landform: Flats on marine terraces, Depressions on marine terraces
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Sandy and loamy fluviomarine deposits and/or marine deposits

Typical profile

Ap - 0 to 6 inches: loamy fine sand
Btg - 6 to 25 inches: fine sandy loam
Cg - 25 to 80 inches: sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 5.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: A/D
Ecological site: F153AY060NC - Wet Loamy Flats and Depressions, F153BY060NC - Wet Loamy Flats and Depressions
Hydric soil rating: Yes

Pt—Portsmouth fine sandy loam

Map Unit Setting

National map unit symbol: 3rp0
Landscape: Coastal plains
Elevation: 0 to 30 feet
Mean annual precipitation: 42 to 58 inches
Mean annual air temperature: 61 to 64 degrees F
Frost-free period: 190 to 270 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Portsmouth, drained, and similar soils: 75 percent
Portsmouth, undrained, and similar soils: 10 percent
Minor components: 7 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Portsmouth, Drained

Setting

Landscape: Coastal plains
Landform: Flats on marine terraces, Depressions on marine terraces
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loamy fluviomarine deposits over sandy fluviomarine deposits

Typical profile

Ap - 0 to 12 inches: fine sandy loam
Eg - 12 to 19 inches: fine sandy loam
Btg - 19 to 35 inches: sandy clay loam
BCg - 35 to 38 inches: sandy loam
2Cg - 38 to 80 inches: loamy sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: 20 to 40 inches to strongly contrasting textural stratification
Drainage class: Very poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 5.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: B/D

Ecological site: F153BY060NC - Wet Loamy Flats and Depressions
Hydric soil rating: Yes

Description of Portsmouth, Undrained

Setting

Landscape: Coastal plains
Landform: Depressions on marine terraces, Flats on marine terraces
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loamy fluviomarine deposits over sandy fluviomarine deposits

Typical profile

A - 0 to 12 inches: fine sandy loam
Eg - 12 to 19 inches: fine sandy loam
Btg - 19 to 35 inches: sandy clay loam
BCg - 35 to 38 inches: sandy loam
2Cg - 38 to 80 inches: loamy sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: 20 to 40 inches to strongly contrasting textural stratification
Drainage class: Very poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 5.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6w
Hydrologic Soil Group: B/D
Ecological site: F153BY060NC - Wet Loamy Flats and Depressions
Hydric soil rating: Yes

Minor Components

Cape lookout, undrained

Percent of map unit: 4 percent
Landscape: Coastal plains
Landform: Flats, Depressions, Pocosins
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: F153BY065NC - Wet Clay Flats and Depressions
Hydric soil rating: Yes

Portsmouth, undrained

Percent of map unit: 3 percent
Landscape: Coastal plains
Landform: Depressions on marine terraces, Flats on marine terraces
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F153BY060NC - Wet Loamy Flats and Depressions

Hydric soil rating: Yes

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APPENDIX D WET POND DESIGN FORM

Please complete the yellow shaded items.

STORMWATER MANAGEMENT PERMIT APPLICATION FORM

WET DETENTION BASIN

This form must be completely filled out, printed, initialed, and submitted.

I. PROJECT INFORMATION

Project name	Currituck Way Subdivision
Contact person	Michael S. Gaddy, PE, LS
Phone number	757-289-5933
Date	10.13.2026
Drainage area number (for projects with multiple drainage areas, as labeled on plans)	

II. DESIGN INFORMATION

Site Characteristics

Drainage area (Include both on- and off-site areas that flow to the wet pond)	2,692,879	ft^2	
Impervious surface area (Include both on- and off-site areas that flow to the wet pond)	515,750	ft^2	
% impervious	19.2	%	
Project within 0.5 miles & draining to SA Waters	Yes		

Peak Flow Calculations

Peak flow from the **wooded** 2-year, 24-hour storm	5	ft^3/sec	
Peak flow from the post-development 10-yr storm	5	ft^3/sec	
Pre/Post peak flow control	-0.05	ft^3/sec	Please provide routing calculations

Storage Volume

Minimum volume required (1.5" Rainfall Water Quality Volume)	74,852	ft^3	
Volume provided (Temporary pool volume)	98,845	ft^3	OK

Elevations

Temporary pool elevation (Refer to figure on next tab for reference)	7.50	fmsl	
Permanent pool elevation (Elevation at bottom of orifice)	5.95	fmsl	OK
SHWT elevation (approx. at the perm. pool elevation)	4.50	fmsl	
Top of 10ft vegetated shelf elevation	6.00	fmsl	
Bottom of 10ft vegetated shelf elevation	5.50	fmsl	
Sediment cleanout, top elevation (bottom of pond)	1.00	fmsl	
Sediment cleanout, bottom elevation	0.00	fmsl	
Sediment storage provided	1.00	ft	OK

SA/DA Table Data

Design TSS removal	85.0	%	OK
Depth between the bottom of the vegetated shelf and sediment storage	4.50	ft	
Average depth (used in SA/DA table) (Round to nearest 0.5ft)	3.50		
SA/DA ratio (Refer to the *Currituck County Stormwater Manual Table IV-2)*	1.25	(unitless)	

Surface Areas

Area, temporary pool	63,771	ft^2	
Area REQUIRED, permanent pool	33,661	ft^2	
SA/DA ratio (Refer to the *Currituck County Stormwater Manual Table IV-2)*	1.25	(unitless)	
Area PROVIDED, permanent pool, A_{perm_pool}	56,201	ft^2	OK
Area, bottom of 10ft vegetated shelf, A_{bot_shelf} (Surface area at the bottom of the 10-foot vegetated shelf; includes main pond and forebay(s))	48,066	ft^2	
Area, sediment cleanout, top elevation (bottom of pond), A_{bot_pond} (Surface area at the bottom of pond excluding sediment storage; do not include forebay(s))	19,966	ft^2	

Volumes

Volume, temporary pool	98,845	ft^3	OK
Volume, permanent pool, V_{perm_pool}	278,195	ft^3	
Volume, forebay (sum of forebays if more than one forebay)	55,989	ft^3	

Forebay % of permanent pool volume	20.1	%	OK

Drawdown Calculations **(Refer to figure on next tab for reference)**

Drawdown through orifice?	Yes		
Diameter of orifice (if circular)		in	
Area of orifice (if-non-circular) (Only fill out if non-circular orifice is used)	72.00	in^2	
Coefficient of discharge (C_D) (Refer to reference table on next tab)	0.59	(unitless)	
Driving head (H_o)	0.15	ft	
Drawdown through weir?	Yes		
Weir type	Sharp-crested		
If V-notch: Weir orientation		degrees	
Coefficient of discharge (C_v)		(unitless)	
Coefficient of discharge (C_w) (Non V-notch weirs)	3.33		
Length of weir (L)	7.5	ft	
Driving head (H)	0.66	ft	
Peak flow from the **wooded** 2-year, 24-hour storm	5.19	ft^3/sec	
Peak flow from the post-development 10-yr storm	5.14	ft^3/sec	
Pre/Post peak flow control	-0.05	ft^3/sec	
Storage volume discharge rate (through discharge orifice or weir)	10.82	ft^3/sec	
Storage volume drawdown time	2.54	days	OK

Additional Information

Vegetated side slopes	4	:1	OK
Vegetated shelf slope	12	:1	OK
Vegetated shelf width	10.0	ft	OK
Length of flowpath to width ratio	5	:1	OK
Length to width ratio	5.0	:1	OK
Trash rack for overflow & orifice?	Yes		OK

Freeboard provided	1.0	ft	OK
Vegetated filter strip provided?	Yes		Please provide LS-VFS form
Recorded drainage easement provided?	Yes		OK
Capures all runoff at ultimate build-out?	Yes		OK
Drain mechanism for maintenance or emergencies is:	Temporary Emergency Pump		

III. REQUIRED ITEMS CHECKLIST

EDIT Please indicate the page or plan sheet numbers where the supporting documentation can be found.

Requried Item:	Initials	Page or plan sheet number and any notes:
1. Plans (1" - 50' or larger) of the entire site showing: - Design at ultimate build-out, - Off-site drainage (if applicable), - Delineated drainage basins (include Rational C or Curve Number, CN per basin), - Basin dimensions, - Forebay, - High flow bypass system, - Overflow device, - Maintenance access, - Proposed drainage easement and public right of way (ROW), and - Boundaries of drainage easement.	MG	Design is for ultimate build out. Offsite drainage from the north is routed to bmp. Drainage basins are delineated and shown on the Drainage Area Maps in the Drainage Manual. Basin and forebay are shown on C7.1. Bypass emergency spillway is shown on C7.1. Drainage easements will be shown on the plat.
2. Plan details (1" = 30' or larger) for the wet pond showing: - Forebay and main treatment area, - High flow bypass system, - Outlet structure with trash rack, - Permanent pool dimensions, - Emergency spillway, and - VFS	MG	Items for poind design are shown on C7.1. Aquattic bench filter strip shonwn on Landscape Plan.

3. Section view of the wet pond (1" = 20' or larger) showing: - Basin cross section, - Side slopes, 3:1 or lower, - Pretreatment and treatment areas, and - Inlet and outlet structures.	MG	Profile section view shown on C7.1
4. Table of elevations, areas, incremental volumes, and accumulated volumes for overall pond and forebay, to verify volume provided	MG	Tables are shown in the Drainage Manual
5. A construction sequence that shows how the wet pond will be protected from sediment until the entire drainage area is stabilized.	MG	Construction sequence shown on E&S Phase I and Phase II plans
6. A detailed planting plan for the vegetated shelf.	MG	See landsape plan
7. The supporting calculations.	MG	See Drainage Manual
8. A soils report based on actual field investigations, soil borings, and infiltration tests. County soil maps are not acceptable.	MG	Soils Report located in Drainage Manual
9. A detailed description for the operation and maintenance of the wet pond. Refer to the *Currituck County Stormwater Manual Appendix B - Sample Maintenance Plan*	MG	Maintenance and inspection requirements are shown on C7.1

APPENDIX E NOAA ATLAS 14 RAINFALL DATA

NOAA Atlas 14, Volume 2, Version 3
Location name: Powells Point, North Carolina, USA*
Latitude: 36.1362°, Longitude: -75.8367°
Elevation: 10 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

G.M. Bonnin, D. Martin, B. Lin, T. Parzybok, M.Yekta, and D. Riley

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.448** (0.408-0.494)	**0.524** (0.477-0.576)	**0.595** (0.543-0.655)	**0.680** (0.618-0.747)	**0.767** (0.693-0.840)	**0.843** (0.759-0.923)	**0.913** (0.819-1.00)	**0.981** (0.875-1.08)	**1.06** (0.942-1.17)	**1.14** (1.00-1.26)
10-min	**0.716** (0.651-0.789)	**0.838** (0.763-0.921)	**0.953** (0.870-1.05)	**1.09** (0.988-1.20)	**1.22** (1.10-1.34)	**1.34** (1.21-1.47)	**1.45** (1.30-1.59)	**1.56** (1.39-1.70)	**1.68** (1.49-1.85)	**1.80** (1.58-1.98)
15-min	**0.895** (0.814-0.986)	**1.05** (0.959-1.16)	**1.21** (1.10-1.33)	**1.38** (1.25-1.51)	**1.55** (1.40-1.70)	**1.70** (1.53-1.86)	**1.83** (1.64-2.01)	**1.96** (1.75-2.15)	**2.12** (1.88-2.33)	**2.26** (1.99-2.49)
30-min	**1.23** (1.12-1.35)	**1.46** (1.32-1.60)	**1.71** (1.56-1.88)	**1.99** (1.81-2.19)	**2.29** (2.07-2.51)	**2.56** (2.30-2.80)	**2.81** (2.52-3.08)	**3.06** (2.72-3.35)	**3.38** (2.99-3.71)	**3.67** (3.22-4.03)
60-min	**1.53** (1.39-1.68)	**1.82** (1.66-2.01)	**2.20** (2.00-2.42)	**2.60** (2.36-2.85)	**3.06** (2.76-3.35)	**3.47** (3.12-3.80)	**3.87** (3.47-4.24)	**4.28** (3.82-4.70)	**4.84** (4.28-5.32)	**5.35** (4.70-5.89)
2-hr	**1.76** (1.59-1.95)	**2.11** (1.91-2.33)	**2.59** (2.35-2.86)	**3.12** (2.82-3.44)	**3.75** (3.37-4.12)	**4.34** (3.88-4.76)	**4.92** (4.37-5.40)	**5.54** (4.90-6.08)	**6.38** (5.59-7.01)	**7.15** (6.22-7.86)
3-hr	**1.92** (1.73-2.13)	**2.29** (2.07-2.55)	**2.83** (2.56-3.14)	**3.43** (3.09-3.80)	**4.17** (3.73-4.61)	**4.87** (4.34-5.37)	**5.59** (4.95-6.15)	**6.36** (5.59-7.00)	**7.44** (6.47-8.19)	**8.46** (7.28-9.31)
6-hr	**2.32** (2.10-2.58)	**2.77** (2.51-3.08)	**3.43** (3.09-3.81)	**4.16** (3.73-4.61)	**5.07** (4.53-5.61)	**5.94** (5.28-6.55)	**6.84** (6.03-7.52)	**7.82** (6.84-8.59)	**9.19** (7.94-10.1)	**10.5** (8.97-11.6)
12-hr	**2.74** (2.47-3.08)	**3.28** (2.95-3.68)	**4.07** (3.66-4.56)	**4.96** (4.44-5.54)	**6.10** (5.42-6.79)	**7.20** (6.36-7.99)	**8.34** (7.30-9.25)	**9.61** (8.32-10.6)	**11.4** (9.73-12.6)	**13.1** (11.1-14.5)
24-hr	**3.27** (3.01-3.57)	**3.98** (3.66-4.34)	**5.14** (4.72-5.60)	**6.11** (5.60-6.65)	**7.55** (6.87-8.20)	**8.80** (7.93-9.54)	**10.2** (9.07-11.0)	**11.7** (10.3-12.7)	**13.9** (12.1-15.2)	**15.8** (13.5-17.3)
2-day	**3.79** (3.48-4.15)	**4.59** (4.22-5.03)	**5.89** (5.41-6.44)	**7.01** (6.41-7.65)	**8.69** (7.88-9.47)	**10.1** (9.12-11.0)	**11.8** (10.5-12.8)	**13.6** (11.9-14.8)	**16.3** (14.1-17.9)	**18.7** (15.8-20.6)
3-day	**4.03** (3.71-4.40)	**4.88** (4.50-5.33)	**6.23** (5.74-6.80)	**7.37** (6.77-8.04)	**9.06** (8.25-9.86)	**10.5** (9.48-11.4)	**12.1** (10.8-13.2)	**13.8** (12.2-15.1)	**16.5** (14.3-18.1)	**18.9** (16.1-20.8)
4-day	**4.27** (3.95-4.65)	**5.17** (4.78-5.64)	**6.57** (6.07-7.16)	**7.74** (7.12-8.42)	**9.43** (8.61-10.3)	**10.9** (9.85-11.8)	**12.4** (11.1-13.5)	**14.1** (12.5-15.3)	**16.7** (14.6-18.3)	**19.0** (16.4-21.0)
7-day	**4.94** (4.57-5.37)	**5.95** (5.51-6.48)	**7.48** (6.91-8.13)	**8.74** (8.04-9.48)	**10.6** (9.65-11.4)	**12.1** (11.0-13.1)	**13.7** (12.3-14.8)	**15.4** (13.7-16.8)	**18.0** (15.7-19.6)	**20.0** (17.4-22.0)
10-day	**5.56** (5.19-6.00)	**6.67** (6.22-7.19)	**8.27** (7.69-8.90)	**9.58** (8.89-10.3)	**11.5** (10.6-12.3)	**13.0** (11.9-14.0)	**14.7** (13.4-15.8)	**16.5** (14.8-17.8)	**19.1** (16.9-20.7)	**21.2** (18.5-23.1)
20-day	**7.48** (7.01-7.99)	**8.91** (8.36-9.52)	**10.8** (10.2-11.6)	**12.4** (11.6-13.3)	**14.7** (13.6-15.7)	**16.5** (15.2-17.6)	**18.4** (16.9-19.7)	**20.4** (18.6-21.9)	**23.3** (20.9-25.1)	**25.6** (22.7-27.8)
30-day	**9.20** (8.66-9.79)	**10.9** (10.3-11.6)	**13.2** (12.4-14.0)	**14.9** (14.0-15.9)	**17.4** (16.2-18.5)	**19.3** (18.0-20.6)	**21.3** (19.7-22.8)	**23.4** (21.5-25.0)	**26.2** (23.8-28.2)	**28.4** (25.6-30.7)
45-day	**11.4** (10.7-12.1)	**13.5** (12.7-14.3)	**16.1** (15.1-17.1)	**18.3** (17.1-19.4)	**21.3** (19.9-22.7)	**23.8** (22.1-25.3)	**26.4** (24.4-28.1)	**29.1** (26.7-31.0)	**32.8** (29.8-35.2)	**35.9** (32.2-38.6)
60-day	**13.6** (12.8-14.4)	**16.0** (15.2-17.0)	**19.0** (17.9-20.1)	**21.3** (20.1-22.5)	**24.5** (23.0-25.9)	**27.0** (25.3-28.6)	**29.6** (27.5-31.4)	**32.2** (29.8-34.2)	**35.7** (32.7-38.2)	**38.4** (34.9-41.3)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

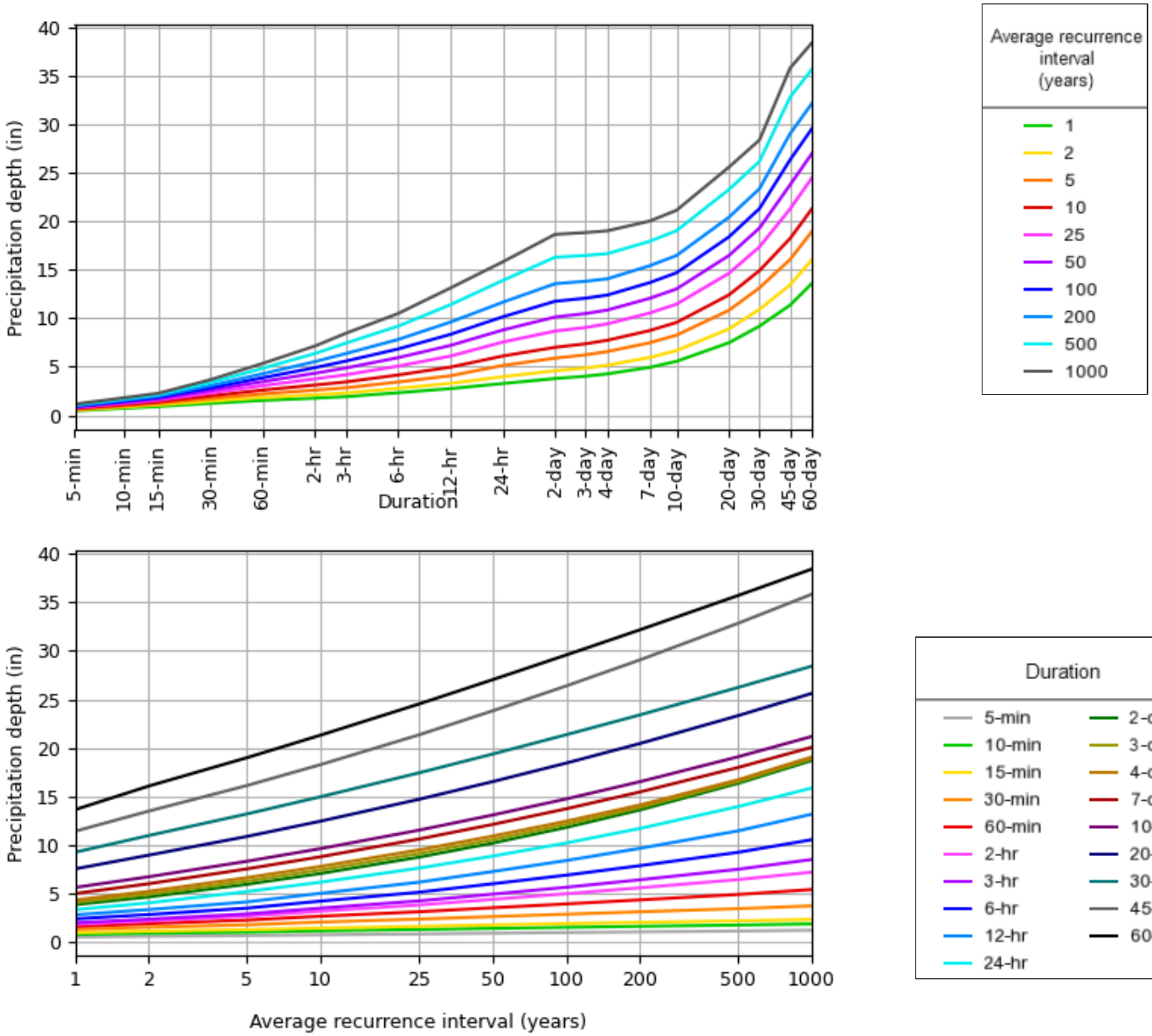
Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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PF graphical

PDS-based depth-duration-frequency (DDF) curves
Latitude: 36.1362°, Longitude: -75.8367°



NOAA Atlas 14, Volume 2, Version 3

Created (GMT): Wed Jul 29 21:10:17 2026

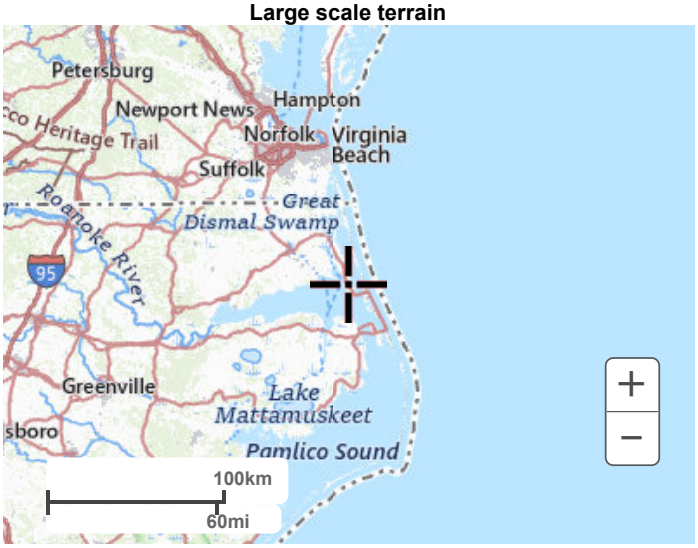
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Maps & aerials

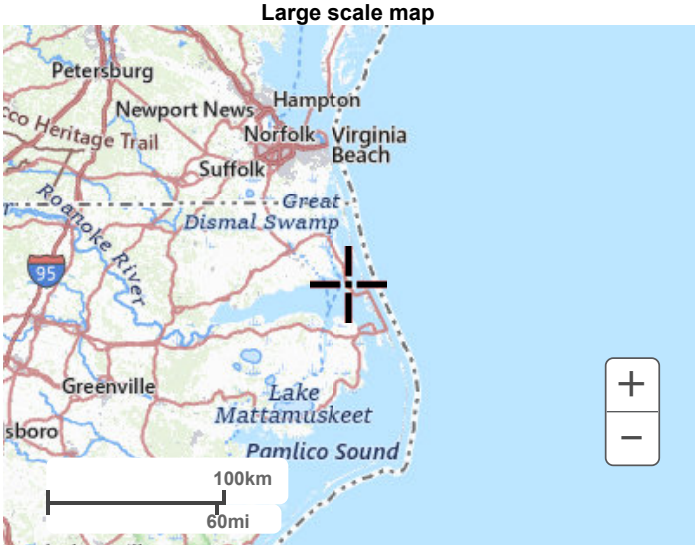
Small scale terrain



Large scale terrain



Large scale map



Large scale aerial



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US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Disclaimer

EXISTING

NRCS Method Peak Flow
Form SW-004

DA OFFSITE 1

Project Information

Project Location: CARATOKE HWY & FOSTER FORBES RD.

Parcel Identification Number(s): 0123000095000 & 012300009SA0000

Check One: ☑ Pre-Development ☑ Post-Development

Calculations

Runoff Curve Number and Runoff

1. Runoff Curve Number (CN)

Soil Type	Cover Description	CN (Table 2-6)	Area (acres)	CN*A
B	IMPERVIOUS	98	2.53	247.94
B	GRASS (LAWN)	69	9.99	689.31
B	WOODS	55	3.70	203.50
		Totals	16.22	1140.75

$CN_{Weighted} = \frac{SCN*A}{SA} = \frac{1140.75}{16.22}$ Use CN = 70.33

2. Runoff

	Storm #1	Storm #2	Storm #3
Frequency..... Yr	2		
Rainfall, P (24-hour) (Use Table 2-7)..... In	3.98		
Runoff, Q..... In	1.337		

Time of Concentration (Tc)

NOTES: Space for as many as two segments per flow type can be used for each worksheet.

Include a map, schematic, or description of flow segments

Sheet flow	**(Applicable to T_c only)**						
	Segment ID		Pre		Post		
1.	Surface description		WOODS				
2.	Manning's roughness coeff., n (Table 2-9)		0.4				
3.	Flow Length, L (total L<= 300 ft)	ft	200				
4.	24-hr rainfall, P	in	4.0		6.0		
5.	Land Slope, s	ft / ft	.01				
6.	$T_t = 0.42(nL)^{0.8} / P_2^{0.5} s^{0.4}$	min	44.24	+		=	44.24
Shallow concentrated flow							
	Segment ID						
7.	Surface Description: paved (P) or unpaved (U)?		U				
8.	Flow Length, L	ft	650				
9.	Watercourse slope, s	ft / ft	.01				
10.	Average velocity, V (Table 2-8)	ft / sec	0.5				
11.	$T_t = L / V$	min	21.67	+		=	21.67
Channel flow							
	Segment ID						
	Pipe (P) or Channel (C)?		C				
	If pipe, enter D (in):		N/A				
	If channel, enter bottom width:		0				
	If channel, enter side slopes (_:1):		3:1				
12.	Cross sectional flow area, a	sq ft	6				
13.	Wetted perimeter, w_p	ft	6				
14.	Hydraulic radius, $r = a / w_p$	ft	1				
15.	Channel slope, s	ft / ft	.005				
16.	Manning's roughness coeff., n		0.04				
17.	$V = 1.49\ r^{0.67} s^{0.5} / n$	ft / sec	1.32				
18.	Flow length, L	ft	340				
19.	$T_t = L / 60V$	min	4.94	+		=	4.94
20.	Watershed or subarea T_c or T_t (add T_t in steps 6, 11, 19)					min	70.84

Graphical Peak Discharge

1. Data:

Drainage Area, Am	=	0.025	sq mi (acres/640)
Runoff Curve Number, CN	=	70.33	(From Runoff Curve Number Worksheet)
Time of Concentration, Tc	=	1.181	hr (From Time of Concentration Worksheet)
Rainfall Distribution	=	Type III	
Pond and swamp areas spread throughout watershed	=	0	% of A_m (_____ acres covered)

			Storm #1	Storm #2	Storm #3
2.	Frequency	yr	2		
3.	Rainfall, P (24-hour)	in	3.98		
4.	Initial abstraction, I_a (Use CN)	in	0.84		
5.	Compute I_a/P		0.212		
6.	Unit peak discharge, q_u (use T_c and I_a/P with Figure 2-9)	csm/in	296		
7.	Runoff, Q (From Runoff Curve Number Worksheet)	in	1.337		
8.	Pond and swamp adjustment factor, F_p (Use Table 2-10)		1		
9.	Peak discharge, Q_p (Where $Q_p = q_u A_m Q F_p$)	cfs	9.85		

MICHAEL S. GADDY, PE LS
Applicant

10.13.26
Date

NRCS Method Peak Flow
Form SW-004

DA OFFSITE 2

Project Information

Project Location: _____

Parcel Identification Number(s): _____

Check One: ☐ ~~Pre-Development~~ 1/3 ☑ ~~Post-Development~~

Calculations

Runoff Curve Number and Runoff

1. Runoff Curve Number (CN)

Soil Type	Cover Description	CN (Table 2-6)	Area (acres)	CN*A
B	IMPERVIOUS AREA	98	2.85	279.30
B	GRASS (LAWN) AREA	69	13.07	901.83
B	WOODS AREA	55	10.70	588.50
		Totals	26.62	1769.63

$CN_{Weighted} = \frac{SCN*A}{SA} = \frac{1769.63}{26.62}$ **Use CN =** 66.48

2. Runoff

	Storm #1	Storm #2	Storm #3
Frequency..... Yr	2		
Rainfall, P (24-hour) (Use Table 2-7)..... In	3.98		
Runoff, Q..... In	1.102		

Time of Concentration (Tc)

NOTES: Space for as many as two segments per flow type can be used for each worksheet.

Include a map, schematic, or description of flow segments

Sheet flow	**(Applicable to T_c only)**						
	Segment ID		Pre		Post		
1.	Surface description		Woods				
2.	Manning's roughness coeff., n (Table 2-9)		0.4				
3.	Flow Length, L (total L<= 300 ft)	ft	240				
4.	24-hr rainfall, P	in	4.0		6.0		
5.	Land Slope, s	ft / ft	.01				
6.	$T_t = 0.42(nL)^{0.8} / P_2^{0.5} s^{0.4}$	min	57.18	+		=	57.18
Shallow concentrated flow							
	Segment ID						
7.	Surface Description: paved (P) or unpaved (U)?		U				
8.	Flow Length, L	ft	900				
9.	Watercourse slope, s	ft / ft	.005				
10.	Average velocity, V (Table 2-8)	ft / sec	1.06				
11.	$T_t = L / V$	min	14.16	+		=	14.16
Channel flow							
	Segment ID						
	Pipe (P) or Channel (C)?						
	If pipe, enter D (in):						
	If channel, enter bottom width:						
	If channel, enter side slopes (_:1):						
12.	Cross sectional flow area, a	sq ft					
13.	Wetted perimeter, w_p	ft					
14.	Hydraulic radius, $r = a / w_p$	ft					
15.	Channel slope, s	ft / ft					
16.	Manning's roughness coeff., n						
17.	$V = 1.49\ r^{0.67}\ s^{0.5} / n$	ft / sec					
18.	Flow length, L	ft					
19.	$T_t = L / 60V$	min		+		=	
20.	Watershed or subarea T_c or T_t (add T_t in steps 6, 11, 19)					min	65.33

Graphical Peak Discharge

1. Data:

Drainage Area, Am = 0.042 sq mi (acres/640)

Runoff Curve Number, CN = 66.48 (From Runoff Curve Number Worksheet)

Time of Concentration, Tc = 1.089 hr (From Time of Concentration Worksheet)

Rainfall Distribution = Type III

Pond and swamp areas spread throughout watershed = 0 % of Am (_____ acres covered)

			Storm #1	Storm #2	Storm #3
2.	Frequency	yr	2		
3.	Rainfall, P (24-hour)	in	3.98		
4.	Initial abstraction, I_a (Use CN)	in	1.008		
5.	Compute I_a/P		0.253		
6.	Unit peak discharge, q_u (use T_c and I_a/P with Figure 2-9)	csm/in	284		
7.	Runoff, Q (From Runoff Curve Number Worksheet)	in	1.102		
8.	Pond and swamp adjustment factor, F_p (Use Table 2-10)		1		
9.	Peak discharge, Q_p (Where $Q_p = q_u A_m Q F_p$)	cfs	13.36		

MICHAEL S. GROOT, PE, LS

Applicant

10.13.26

Date

NRCS Method Peak Flow
Form SW-004

EX-DA-1

Project Information

Project Location: _____

Parcel Identification Number(s): _____

Check One: ☑ Pre-Development ☐ Post-Development

Calculations

Runoff Curve Number and Runoff

1. Runoff Curve Number (CN)

Soil Type	Cover Description	CN (Table 2-6)	Area (acres)	CN*A
B	IMPERVIOUS	98	0.28	27.44
B	WOODS	55	13.95	767.25
		Totals	14.23	794.69

$CN_{Weighted} = \frac{SCN*A}{SA} = \frac{794.69}{14.23}$ **Use CN =** 55.85

2. Runoff

	Storm #1	Storm #2	Storm #3
Frequency..... Yr	2		
Rainfall, P (24-hour) (Use Table 2-7)..... In	3.98		
Runoff, Q..... In	0.559		

Time of Concentration (Tc)

NOTES: Space for as many as two segments per flow type can be used for each worksheet.

Include a map, schematic, or description of flow segments

Sheet flow	**(Applicable to T_c only)**							
	Segment ID		Pre		Post		
1.	Surface description		WOODS				
2.	Manning's roughness coeff., n (Table 2-9)		0.4				
3.	Flow Length, L (total L<= 300 ft)	ft	100				
4.	24-hr rainfall, P	in	4.0		6.0		
5.	Land Slope, s	ft / ft	.01				
6.	$T_t = 0.42(nL)^{0.8} / P_2^{0.5} s^{0.4}$	min	25.41	+		=	25.41
Shallow concentrated flow							
	Segment ID						
7.	Surface Description: paved (P) or unpaved (U)?						
8.	Flow Length, L	ft					
9.	Watercourse slope, s	ft / ft					
10.	Average velocity, V (Table 2-8)	ft / sec					
11.	$T_t = L / V$	min		+		=	
Channel flow							
	Segment ID						
	Pipe (P) or Channel (C)?		C				
	If pipe, enter D (in):		N/A				
	If channel, enter bottom width:		0				
	If channel, enter side slopes (_:1):		3:1				
12.	Cross sectional flow area, a	sq ft	6				
13.	Wetted perimeter, w_p	ft	6				
14.	Hydraulic radius, $r = a / w_p$	ft	1				
15.	Channel slope, s	ft / ft	.0005				
16.	Manning's roughness coeff., n		.03				
17.	$V = 1.49\ r^{0.67} s^{0.5} / n$	ft / sec	1.11				
18.	Flow length, L	ft	665				
19.	$T_t = L / 60V$	min	9.98	+		=	9.98
20.	Watershed or subarea T_c or T_t (add T_t in steps 6, 11, 19)					min	35.39

Graphical Peak Discharge

1. Data:

Drainage Area, Am	=	0.022	sq mi (acres/640)
Runoff Curve Number, CN	=	55.85	(From Runoff Curve Number Worksheet)
Time of Concentration, Tc	=	0.59	hr (From Time of Concentration Worksheet)
Rainfall Distribution	=	Type III	

Pond and swamp areas spread throughout watershed = 0 % of A_m (_____ acres covered)

			Storm #1	Storm #2	Storm #3
2.	Frequency	yr	2		
3.	Rainfall, P (24-hour)	in	3.98		
4.	Initial abstraction, I_a (Use CN)	in	1.581		
5.	Compute I_a/P		0.397		
6.	Unit peak discharge, q_u (use T_c and I_a/P with Figure 2-9)	csm/in	332		
7.	Runoff, Q (From Runoff Curve Number Worksheet)	in	0.559		
8.	Pond and swamp adjustment factor, F_p (Use Table 2-10)		1		
9.	Peak discharge, Q_p (Where $Q_p = q_u A_m Q F_p$)	cfs	4.09		

MICHAEL S. GADM, PE, LS
Applicant

10.13.26
Date

NRCS Method Peak Flow
Form SW-004

EX DA 2

Project Information

Project Location: _____

Parcel Identification Number(s): _____

Check One: ☑ Pre-Development ☐ Post-Development

Calculations

Runoff Curve Number and Runoff

1. Runoff Curve Number (CN)

Soil Type	Cover Description	CN (Table 2-6)	Area (acres)	CN*A
B	IMPERVIOUS	98	0.14	13.72
B	WOODS	55	5.21	286.55
		Totals	5.35	300.27

$CN_{Weighted} = \frac{SCN*A}{SA} = \frac{300.27}{5.35}$ **Use CN =** 56.13

2. Runoff

	Storm #1	Storm #2	Storm #3
Frequency..... Yr	2		
Rainfall, P (24-hour) (Use Table 2-7)..... In	3.98		
Runoff, Q..... In	0.571		

Time of Concentration (Tc)

NOTES: Space for as many as two segments per flow type can be used for each worksheet.

Include a map, schematic, or description of flow segments

Sheet flow	**(Applicable to T_c only)**						
	Segment ID		Pre		Post		
1.	Surface description		Woods				
2.	Manning's roughness coeff., n (Table 2-9)		0.4				
3.	Flow Length, L (total L<= 300 ft)	ft	200				
4.	24-hr rainfall, P	in	4.0		6.0		
5.	Land Slope, s	ft / ft	.015				
6.	$T_t = 0.42(nL)^{0.8} / P_2^{0.5} s^{0.4}$	min	37.61	+		=	37.61
Shallow concentrated flow							
	Segment ID						
7.	Surface Description: paved (P) or unpaved (U)?		U				
8.	Flow Length, L	ft	395				
9.	Watercourse slope, s	ft / ft	.005				
10.	Average velocity, V (Table 2-8)	ft / sec	0.35				
11.	$T_t = L / V$	min	18.81	+		=	18.81
Channel flow							
	Segment ID						
	Pipe (P) or Channel (C)?						
	If pipe, enter D (in):						
	If channel, enter bottom width:						
	If channel, enter side slopes (_:1):						
12.	Cross sectional flow area, a	sq ft					
13.	Wetted perimeter, w_p	ft					
14.	Hydraulic radius, $r = a / w_p$	ft					
15.	Channel slope, s	ft / ft					
16.	Manning's roughness coeff., n						
17.	$V = 1.49\ r^{0.67}\ s^{0.5} / n$	ft / sec					
18.	Flow length, L	ft					
19.	$T_t = L / 60V$	min		+		=	
20.	Watershed or subarea T_c or T_t (add T_t in steps 6, 11, 19)					min	56.42

Graphical Peak Discharge

1. Data:

Drainage Area, Am = 0.008 sq mi (acres/640)

Runoff Curve Number, CN = 56.13 (From Runoff Curve Number Worksheet)

Time of Concentration, Tc = 0.94 hr (From Time of Concentration Worksheet)

Rainfall Distribution = Type III

Pond and swamp areas spread throughout watershed = 0 % of A_m (_____ acres covered)

			Storm #1	Storm #2	Storm #3
2.	Frequency	yr	2		
3.	Rainfall, P (24-hour)	in	3.98		
4.	Initial abstraction, I_a (Use CN)	in	1.563		
5.	Compute I_a/P		0.393		
6.	Unit peak discharge, q_u (use T_c and I_a/P with Figure 2-9)	csm/in	254		
7.	Runoff, Q (From Runoff Curve Number Worksheet)	in	0.571		
8.	Pond and swamp adjustment factor, F_p (Use Table 2-10)		1		
9.	Peak discharge, Q_p (Where $Q_p = q_u A_m Q F_p$)	cfs	1.16		

Michael S. Good, PE, LS

Applicant

10.13.26

Date

NRCS Method Peak Flow
Form SW-004

1 EX DA OPEN SPACE

Project Information

Project Location: _____

Parcel Identification Number(s): _____

Check One: ☑ Pre-Development ☐ Post-Development

Calculations

Runoff Curve Number and Runoff

1. Runoff Curve Number (CN)

Soil Type	Cover Description	CN (Table 2-6)	Area (acres)	CN*A
B	IMPERVIOUS	98	0.11	10.78
B	WOODS	55	2.29	125.95
		Totals	2.40	136.73

$CN_{Weighted} = \frac{SCN*A}{SA} = \frac{136.73}{2.40}$ **Use CN =** 56.97

2. Runoff

	Storm #1	Storm #2	Storm #3
Frequency..... Yr	2		
Rainfall, P (24-hour) (Use Table 2-7)..... In	3.98		
Runoff, Q..... In	0.608		

Time of Concentration (Tc)

NOTES: Space for as many as two segments per flow type can be used for each worksheet.

Include a map, schematic, or description of flow segments

Sheet flow	**(Applicable to T_c only)**							
	Segment ID		Pre		Post		
1.	Surface description		Woods				
2.	Manning's roughness coeff., n (Table 2-9)		0.4				
3.	Flow Length, L (total L<= 300 ft)	ft	240				
4.	24-hr rainfall, P	in	4.0		6.0		
5.	Land Slope, s	ft / ft	.018				
6.	$T_t = 0.42(nL)^{0.8} / P_2^{0.5} s^{0.4}$	min	40.96	+		=	40.96
Shallow concentrated flow							
	Segment ID						
7.	Surface Description: paved (P) or unpaved (U)?						
8.	Flow Length, L	ft					
9.	Watercourse slope, s	ft / ft					
10.	Average velocity, V (Table 2-8)	ft / sec					
11.	$T_t = L / V$	min		+		=	
Channel flow							
	Segment ID						
	Pipe (P) or Channel (C)?						
	If pipe, enter D (in):						
	If channel, enter bottom width:						
	If channel, enter side slopes (_:1):						
12.	Cross sectional flow area, a	sq ft					
13.	Wetted perimeter, w_p	ft					
14.	Hydraulic radius, $r = a / w_p$	ft					
15.	Channel slope, s	ft / ft					
16.	Manning's roughness coeff., n						
17.	$V = 1.49\ r^{0.67} s^{0.5} / n$	ft / sec					
18.	Flow length, L	ft					
19.	$T_t = L / 60V$	min		+		=	
20.	Watershed or subarea T_c or T_t (add T_t in steps 6, 11, 19)						min 40.96

Graphical Peak Discharge

1. Data:

Drainage Area, Am	=	0.004	sq mi (acres/640)
Runoff Curve Number, CN	=	56.97	(From Runoff Curve Number Worksheet)
Time of Concentration, Tc	=	0.674	hr (From Time of Concentration Worksheet)
Rainfall Distribution	=	Type III	

Pond and swamp areas spread throughout watershed = 0 % of A_m (_____ acres covered)

			Storm #1	Storm #2	Storm #3
2.	Frequency	yr	2		
3.	Rainfall, P (24-hour)	in	3.98		
4.	Initial abstraction, I_a (Use CN)	in	1.511		
5.	Compute I_a/P		0.038		
6.	Unit peak discharge, q_u (use T_c and I_a/P with Figure 2-9)	csm/in	296		
7.	Runoff, Q (From Runoff Curve Number Worksheet)	in	0.608		
8.	Pond and swamp adjustment factor, F_p (Use Table 2-10)		1		
9.	Peak discharge, Q_p (Where $Q_p = q_u A_m Q F_p$)	cfs	0.72		

MICHAEL S. GADDY, PE, LS
Applicant

10.13.26
Date

PROPOSED

NRCS Method Peak Flow
Form SW-004

DA OFFSITE 1

Project Information

Project Location: CARATOKE HWY & FOSTER FORBES RD.

Parcel Identification Number(s): 0123000095000 & 012300009SA0000

Check One: ☑ Pre-Development ☑ Post-Development

Calculations

Runoff Curve Number and Runoff

1. Runoff Curve Number (CN)

Soil Type	Cover Description	CN (Table 2-6)	Area (acres)	CN*A
B	IMPERVIOUS	98	2.53	247.94
B	GRASS (LAWN)	69	9.99	689.31
B	WOODS	55	3.70	203.50
		Totals	16.22	1140.75

$CN_{Weighted} = \frac{SCN*A}{SA} = \frac{1140.75}{16.22}$ Use CN = 70.33

2. Runoff

	Storm #1	Storm #2	Storm #3
Frequency..... Yr	2		
Rainfall, P (24-hour) (Use Table 2-7)..... In	3.98		
Runoff, Q..... In	1.337		

Time of Concentration (Tc)

NOTES: Space for as many as two segments per flow type can be used for each worksheet.

Include a map, schematic, or description of flow segments

Sheet flow	**(Applicable to T_c only)**						
	Segment ID		Pre		Post		
1.	Surface description		Woods				
2.	Manning's roughness coeff., n (Table 2-9)		0.4				
3.	Flow Length, L (total L<= 300 ft)	ft	200				
4.	24-hr rainfall, P	in	4.0		6.0		
5.	Land Slope, s	ft / ft	.01				
6.	$T_t = 0.42(nL)^{0.8} / P_2^{0.5} s^{0.4}$	min	44.24	+		=	44.24
Shallow concentrated flow							
	Segment ID						
7.	Surface Description: paved (P) or unpaved (U)?		U				
8.	Flow Length, L	ft	650				
9.	Watercourse slope, s	ft / ft	.01				
10.	Average velocity, V (Table 2-8)	ft / sec	0.5				
11.	$T_t = L / V$	min	21.67	+		=	21.67
Channel flow							
	Segment ID						
	Pipe (P) or Channel (C)?		C				
	If pipe, enter D (in):		N/A				
	If channel, enter bottom width:		0				
	If channel, enter side slopes (_:1):		3:1				
12.	Cross sectional flow area, a	sq ft	6				
13.	Wetted perimeter, w_p	ft	6				
14.	Hydraulic radius, $r = a / w_p$	ft	1				
15.	Channel slope, s	ft / ft	.005				
16.	Manning's roughness coeff., n		0.08				
17.	$V = 1.49\ r^{0.67} s^{0.5} / n$	ft / sec	1.32				
18.	Flow length, L	ft	340				
19.	$T_t = L / 60V$	min	4.29	+		=	4.29
20.	Watershed or subarea T_c or T_t (add T_t in steps 6, 11, 19)					min	70.29

Graphical Peak Discharge

1. Data:

Drainage Area, Am = 0.1025 sq mi (acres/640)

Runoff Curve Number, CN = 70.35 (From Runoff Curve Number Worksheet)

Time of Concentration, Tc = 1.181 hr (From Time of Concentration Worksheet)

Rainfall Distribution = Type III

Pond and swamp areas spread throughout watershed = 0 % of A_m (_____ acres covered)

			Storm #1	Storm #2	Storm #3
2.	Frequency	yr	2		
3.	Rainfall, P (24-hour)	in	3.98		
4.	Initial abstraction, I_a (Use CN)	in	0.84		
5.	Compute I_a/P		0.212		
6.	Unit peak discharge, q_u (use T_c and I_a/P with Figure 2-9)	csm/in	295		
7.	Runoff, Q (From Runoff Curve Number Worksheet)	in	1.337		
8.	Pond and swamp adjustment factor, F_p (Use Table 2-10)		1		
9.	Peak discharge, Q_p (Where $Q_p = q_u A_m Q F_p$)	cfs	9.85		

MICHAEL S. GRAY, PE, LS

Applicant

10.13.26

Date

NRCS Method Peak Flow
Form SW-004

DA OFFSITE 2

Project Information

Project Location: _____

Parcel Identification Number(s): _____

Check One: ☐ Pre-Development ☑ Post-Development

Calculations

Runoff Curve Number and Runoff

1. Runoff Curve Number (CN)

Soil Type	Cover Description	CN (Table 2-6)	Area (acres)	CN*A
B	IMPERVIOUS AREA	98	2.85	279.30
B	GRASS (LAWN) AREA	69	13.07	901.83
B	WOODS AREA	55	10.70	588.50
		Totals	26.62	1769.63

$CN_{Weighted} = \frac{SCN*A}{SA} = \frac{1769.63}{26.62}$ **Use CN =** 66.48

2. Runoff

	Storm #1	Storm #2	Storm #3
Frequency..... Yr	2		
Rainfall, P (24-hour) (Use Table 2-7)..... In	3.98		
Runoff, Q..... In	1.102		

Time of Concentration (Tc)

NOTES: Space for as many as two segments per flow type can be used for each worksheet.

Include a map, schematic, or description of flow segments

Sheet flow	**(Applicable to T_c only)**							
	Segment ID		Pre		Post		
1.	Surface description		Woods				
2.	Manning's roughness coeff., n (Table 2-9)		0.4				
3.	Flow Length, L (total L<= 300 ft)	ft	240				
4.	24-hr rainfall, P	in	4.0		6.0		
5.	Land Slope, s	ft / ft	.01				
6.	$T_t = 0.42(nL)^{0.8} / P_2^{0.5} s^{0.4}$	min	51.18	+		=	51.18
Shallow concentrated flow							
	Segment ID						
7.	Surface Description: paved (P) or unpaved (U)?		U				
8.	Flow Length, L	ft	900				
9.	Watercourse slope, s	ft / ft	.005				
10.	Average velocity, V (Table 2-8)	ft / sec	1.06				
11.	$T_t = L / V$	min	14.16	+		=	14.16
Channel flow							
	Segment ID						
	Pipe (P) or Channel (C)?						
	If pipe, enter D (in):						
	If channel, enter bottom width:						
	If channel, enter side slopes (_:1):						
12.	Cross sectional flow area, a	sq ft					
13.	Wetted perimeter, w_p	ft					
14.	Hydraulic radius, $r = a / w_p$	ft					
15.	Channel slope, s	ft / ft					
16.	Manning's roughness coeff., n						
17.	$V = 1.49\ r^{0.67} s^{0.5} / n$	ft / sec					
18.	Flow length, L	ft					
19.	$T_t = L / 60V$	min		+		=	
20.	Watershed or subarea T_c or T_t (add T_t in steps 6, 11, 19)					min	65.33

Graphical Peak Discharge

1. Data:

Drainage Area, Am	=	0.042	sq mi (acres/640)
Runoff Curve Number, CN	=	66.48	(From Runoff Curve Number Worksheet)
Time of Concentration, Tc	=	1.089	hr (From Time of Concentration Worksheet)
Rainfall Distribution	=	Type III	

Pond and swamp areas spread throughout watershed = 0 % of A_m (_____ acres covered)

			Storm #1	Storm #2	Storm #3
2.	Frequency	yr	2		
3.	Rainfall, P (24-hour)	in	3.98		
4.	Initial abstraction, I_a (Use CN)	in	1.008		
5.	Compute I_a/P		0.253		
6.	Unit peak discharge, q_u (use T_c and I_a/P with Figure 2-9)	csm/in	284		
7.	Runoff, Q (From Runoff Curve Number Worksheet)	in	1.102		
8.	Pond and swamp adjustment factor, F_p (Use Table 2-10)		1		
9.	Peak discharge, Q_p (Where $Q_p = q_u A_m Q F_p$)	cfs	13.36		

MICHAEL S. GROOT P.E., LS

Applicant

10.13.26

Date

PROPOSED

NRCS Method Peak Flow
Form SW-004

1 DA - A5

Project Information

Project Location: _____

Parcel Identification Number(s): _____

Check One: ☐ Pre-Development ☑ Post-Development

Calculations

Runoff Curve Number and Runoff

1. Runoff Curve Number (CN)

Soil Type	Cover Description	CN (Table 2-6)	Area (acres)	CN*A
B	IMPERVIOUS	98	0.33	32.34
B	GRASS (LAWN)	69	1.33	91.77
B	WOODS	55	0	0
		Totals	1.66	124.11

$CN_{Weighted} = \frac{SCN*A}{SA} = \frac{124.11}{1.66}$ **Use CN =** 74.77

2. Runoff

	Storm #1	Storm #2	Storm #3
Frequency..... Yr	10		
Rainfall, P (24-hour) (Use Table 2-7)..... In	6.11		
Runoff, Q..... In	3.353		

Time of Concentration (Tc)

NOTES: Space for as many as two segments per flow type can be used for each worksheet.

Include a map, schematic, or description of flow segments

Sheet flow	**(Applicable to T_c only)**							
	Segment ID		Pre		Post			
1.	Surface description				DENSE LANDSCAPING			
2.	Manning's roughness coeff., n (Table 2-9)				0.6			
3.	Flow Length, L (total L<= 300 ft)	ft			100			
4.	24-hr rainfall, P	in	4.0		6.0			
5.	Land Slope, s	ft / ft			.01			
6.	$T_t = 0.42(nL)^{0.8} / P_2^{0.5} s^{0.4}$	min		+	35.14	=	35.14	
Shallow concentrated flow								
	Segment ID							
7.	Surface Description: paved (P) or unpaved (U)?							
8.	Flow Length, L	ft						
9.	Watercourse slope, s	ft / ft						
10.	Average velocity, V (Table 2-8)	ft / sec						
11.	$T_t = L / V$	min		+		=	—	
Channel flow								
	Segment ID							
	Pipe (P) or Channel (C)?				C			
	If pipe, enter D (in):				N/A			
	If channel, enter bottom width:				8			
	If channel, enter side slopes (_:1):				4:1			
12.	Cross sectional flow area, a	sq ft			8			
13.	Wetted perimeter, w_p	ft			10			
14.	Hydraulic radius, $r = a / w_p$	ft			.8			
15.	Channel slope, s	ft / ft			.005			
16.	Manning's roughness coeff., n				.04			
17.	$V = 1.49\ r^{0.67}\ s^{0.5} / n$	ft / sec			2.27			
18.	Flow length, L	ft			1200			
19.	$T_t = L / 60V$	min		+	8.81	=	8.81	
20.	Watershed or subarea T_c or T_t (add T_t in steps 6, 11, 19)						min	43.95

Graphical Peak Discharge

1. Data:

Drainage Area, Am	=	0.003	sq mi (acres/640)
Runoff Curve Number, CN	=	74.77	(From Runoff Curve Number Worksheet)
Time of Concentration, Tc	=	0.733	hr (From Time of Concentration Worksheet)
Rainfall Distribution	=	Type III	
Pond and swamp areas spread throughout watershed	=	0	% of A_m (_____ acres covered)

			Storm #1	Storm #2	Storm #3
2.	Frequency	yr	10		
3.	Rainfall, P (24-hour)	in	6.11		
4.	Initial abstraction, I_a (Use CN)	in	0.1675		
5.	Compute I_a/P		0.11		
6.	Unit peak discharge, q_u (use T_c and I_a/P with Figure 2-9)	csm/in	382		
7.	Runoff, Q (From Runoff Curve Number Worksheet)	in	3.353		
8.	Pond and swamp adjustment factor, F_p (Use Table 2-10)		1		
9.	Peak discharge, Q_p (Where $Q_p = q_u A_m Q F_p$)	cfs	3.84		

MICHAEL S. GADDY, PE, LS

Applicant

10.13.26

Date

NRCS Method Peak Flow
Form SW-004

IDA A6

Project Information

Project Location: _____

Parcel Identification Number(s): _____

Check One: ☐ Pre-Development ☐ Post-Development

Calculations

Runoff Curve Number and Runoff

1. Runoff Curve Number (CN)

Soil Type	Cover Description	CN (Table 2-6)	Area (acres)	CN*A
B	IMPERVIOUS	98	0.14	13.72
B	GRASS (LAWN)	69	1.19	82.11
B	WOODS	55	0	0
		Totals	1.33	95.83

$CN_{Weighted} = \frac{SCN*A}{SA} = \frac{95.83}{1.33}$

Use CN = 72.05

2. Runoff

	Storm #1	Storm #2	Storm #3
Frequency..... Yr	10		
Rainfall, P (24-hour) (Use Table 2-7)..... In	6.11		
Runoff, Q..... In	3.088		

Time of Concentration (Tc)

NOTES: Space for as many as two segments per flow type can be used for each worksheet.

Include a map, schematic, or description of flow segments

Sheet flow	**(Applicable to T_c only)**						
	Segment ID		Pre		Post		
1.	Surface description				Woods		
2.	Manning's roughness coeff., n (Table 2-9)				0.4		
3.	Flow Length, L (total L<= 300 ft)	ft			200		
4.	24-hr rainfall, P	in	4.0		6.0		
5.	Land Slope, s	ft / ft			.101		
6.	$T_t = 0.42(nL)^{0.8} / P_2^{0.5} s^{0.4}$	min		+	44.24	=	44.24
Shallow concentrated flow							
	Segment ID						
7.	Surface Description: paved (P) or unpaved (U)?						
8.	Flow Length, L	ft					
9.	Watercourse slope, s	ft / ft					
10.	Average velocity, V (Table 2-8)	ft / sec					
11.	$T_t = L / V$	min		+		=	—
Channel flow							
	Segment ID						
	Pipe (P) or Channel (C)?				C		
	If pipe, enter D (in):				N/A		
	If channel, enter bottom width:				0		
	If channel, enter side slopes (_:1):				4:1		
12.	Cross sectional flow area, a	sq ft			7.5		
13.	Wetted perimeter, w_p	ft			10		
14.	Hydraulic radius, $r = a / w_p$	ft			.75		
15.	Channel slope, s	ft / ft			.005		
16.	Manning's roughness coeff., n				0.04		
17.	$V = 1.49\ r^{0.67}\ s^{0.5} / n$	ft / sec			2.17		
18.	Flow length, L	ft			150		
19.	$T_t = L / 60V$	min		+	1.15	=	1.15
20.	Watershed or subarea T_c or T_t (add T_t in steps 6, 11, 19)					min	45.39

Graphical Peak Discharge

1. Data:

Drainage Area, Am = 0.002 sq mi (acres/640)

Runoff Curve Number, CN = 72.05 (From Runoff Curve Number Worksheet)

Time of Concentration, Tc = 0.757 hr (From Time of Concentration Worksheet)

Rainfall Distribution = Type III

Pond and swamp areas spread throughout watershed = 0 % of A_m (_____ acres covered)

			Storm #1	Storm #2	Storm #3
2.	Frequency	yr	10		
3.	Rainfall, P (24-hour)	in	6.11		
4.	Initial abstraction, I_a (Use CN)	in	0.776		
5.	Compute I_a/P		0.127		
6.	Unit peak discharge, q_u (use T_c and I_a/P with Figure 2-9)	csm/in	445		
7.	Runoff, Q (From Runoff Curve Number Worksheet)	in	3.088		
8.	Pond and swamp adjustment factor, F_p (Use Table 2-10)		1		
9.	Peak discharge, Q_p (Where $Q_p = q_u A_m Q F_p$)	cfs	2.75		

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10.13.26

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NRCS Method Peak Flow
Form SW-004

DA B1

Project Information

Project Location: _____

Parcel Identification Number(s): _____

Check One: ☐ Pre-Development ☑ Post-Development

Calculations

Runoff Curve Number and Runoff

1. Runoff Curve Number (CN)

Soil Type	Cover Description	CN (Table 2-6)	Area (acres)	CN*A
B	IMPERVIOUS	98	1.81	177.38
B	GRASS (LAWN)	69	3.15	217.35
B	WOODS	55	0	0
		Totals	4.96	394.73

$CN_{Weighted} = \frac{SCN*A}{SA} = \frac{394.73}{4.96}$

Use CN = 79.58

2. Runoff

	Storm #1	Storm #2	Storm #3
Frequency..... Yr	10		
Rainfall, P (24-hour) (Use Table 2-7)..... In	6.11		
Runoff, Q..... In	3.837		

Time of Concentration (Tc)

NOTES: Space for as many as two segments per flow type can be used for each worksheet.

Include a map, schematic, or description of flow segments

Sheet flow	**(Applicable to T_c only)**							
	Segment ID		Pre			Post		
1.	Surface description					DENSE TURF		
2.	Manning's roughness coeff., n (Table 2-9)					0.4		
3.	Flow Length, L (total L<= 300 ft)	ft				100		
4.	24-hr rainfall, P	in	4.0			6.0		
5.	Land Slope, s	ft / ft				.01		
6.	$T_t = 0.42(nL)^{0.8} / P_2^{0.5} s^{0.4}$	min		+		25.41	=	25.41
Shallow concentrated flow								
	Segment ID							
7.	Surface Description: paved (P) or unpaved (U)?							
8.	Flow Length, L	ft						
9.	Watercourse slope, s	ft / ft						
10.	Average velocity, V (Table 2-8)	ft / sec						
11.	$T_t = L / V$	min		+			=	—
Channel flow								
	Segment ID							
	Pipe (P) or Channel (C)?					C		
	If pipe, enter D (in):					N/A		
	If channel, enter bottom width:					0		
	If channel, enter side slopes (_:1):					4:1		
12.	Cross sectional flow area, a	sq ft				7.5		
13.	Wetted perimeter, w_p	ft				10		
14.	Hydraulic radius, $r = a / w_p$	ft				0.75		
15.	Channel slope, s	ft / ft				.005		
16.	Manning's roughness coeff., n					0.03		
17.	$V = 1.49\ r^{0.67} s^{0.5} / n$	ft / sec				2.90		
18.	Flow length, L	ft				850		
19.	$T_t = L / 60V$	min		+		4.89	=	4.89
20.	Watershed or subarea T_c or T_t (add T_t in steps 6, 11, 19)						min	30.29

Graphical Peak Discharge

1. Data:

Drainage Area, Am = 0.008 sq mi (acres/640)

Runoff Curve Number, CN = 79.58 (From Runoff Curve Number Worksheet)

Time of Concentration, Tc = 0.505 hr (From Time of Concentration Worksheet)

Rainfall Distribution = Type III

Pond and swamp areas spread throughout watershed = 0 % of A_m (_____ acres covered)

			Storm #1	Storm #2	Storm #3
2.	Frequency	yr	10		
3.	Rainfall, P (24-hour)	in	6.11		
4.	Initial abstraction, I_a (Use CN)	in	0.513		
5.	Compute I_a/P		0.084		
6.	Unit peak discharge, q_u (use T_c and I_a/P with Figure 2-9)	csm/in	544		
7.	Runoff, Q (From Runoff Curve Number Worksheet)	in	3.837		
8.	Pond and swamp adjustment factor, F_p (Use Table 2-10)		1		
9.	Peak discharge, Q_p (Where $Q_p = q_u A_m Q F_p$)	cfs	16.72		

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NRCS Method Peak Flow
Form SW-004

DA B3 1

Project Information

Project Location: _____

Parcel Identification Number(s): _____

Check One: ☐ Pre-Development ☑ Post-Development

Calculations

Runoff Curve Number and Runoff

1. Runoff Curve Number (CN)

Soil Type	Cover Description	CN (Table 2-6)	Area (acres)	CN*A
B	IMPERVIOUS	98	1.12	109.76
B	GRASS (LAWN)	69	1.54	106.26
B	WOODS	55	0	0
		Totals	2.66	216.02

$CN_{Weighted} = \frac{SCN*A}{SA} = \frac{216.02}{2.66}$ **Use CN =** 81.21

2. Runoff

	Storm #1	Storm #2	Storm #3
Frequency..... Yr	10		
Rainfall, P (24-hour) (Use Table 2-7)..... In	6.11		
Runoff, Q..... In	4.006		

Time of Concentration (Tc)

NOTES: Space for as many as two segments per flow type can be used for each worksheet.

Include a map, schematic, or description of flow segments

Sheet flow	**(Applicable to T_c only)**							
	Segment ID		Pre			Post		
1.	Surface description					DENSE TURF		
2.	Manning's roughness coeff., n (Table 2-9)					0.4		
3.	Flow Length, L (total L<= 300 ft)	ft				75		
4.	24-hr rainfall, P	in	4.0			6.0		
5.	Land Slope, s	ft / ft				.01		
6.	$T_t = 0.42(nL)^{0.8} / P_2^{0.5} s^{0.4}$	min		+		20.18	=	20.18
Shallow concentrated flow								
	Segment ID							
7.	Surface Description: paved (P) or unpaved (U)?							
8.	Flow Length, L	ft						
9.	Watercourse slope, s	ft / ft						
10.	Average velocity, V (Table 2-8)	ft / sec						
11.	$T_t = L / V$	min		+			=	
Channel flow								
	Segment ID							
	Pipe (P) or Channel (C)?					C		
	If pipe, enter D (in):					N/A		
	If channel, enter bottom width:					0		
	If channel, enter side slopes (_:1):					4:1		
12.	Cross sectional flow area, a	sq ft				7.5		
13.	Wetted perimeter, w_p	ft				10		
14.	Hydraulic radius, $r = a / w_p$	ft				.75		
15.	Channel slope, s	ft / ft				.005		
16.	Manning's roughness coeff., n					0.03		
17.	$V = 1.49\ r^{0.67} s^{0.5} / n$	ft / sec				2.90		
18.	Flow length, L	ft				750		
19.	$T_t = L / 60V$	min		+		4.31	=	4.31
20.	Watershed or subarea T_c or T_t (add T_t in steps 6, 11, 19)						min	24.50

Graphical Peak Discharge

1. Data:

Drainage Area, Am	=	0.004	sq mi (acres/640)
Runoff Curve Number, CN	=	81.21	(From Runoff Curve Number Worksheet)
Time of Concentration, Tc	=	0.408	hr (From Time of Concentration Worksheet)
Rainfall Distribution	=	Type III	

Pond and swamp areas spread throughout watershed = 0 % of A_m (_____ acres covered)

			Storm #1	Storm #2	Storm #3
2.	Frequency	yr	10		
3.	Rainfall, P (24-hour)	in	6.11		
4.	Initial abstraction, I_a (Use CN)	in	0.963		
5.	Compute I_a/P		0.096		
6.	Unit peak discharge, q_u (use T_c and I_a/P with Figure 2-9)	csm/in	658		
7.	Runoff, Q (From Runoff Curve Number Worksheet)	in	4.006		
8.	Pond and swamp adjustment factor, F_p (Use Table 2-10)		1		
9.	Peak discharge, Q_p (Where $Q_p = q_u A_m Q F_p$)	cfs	10.55		

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10.13.26
Date

NRCS Method Peak Flow
Form SW-004

DA B5

Project Information

Project Location: _____

Parcel Identification Number(s): _____

Check One: ☐ Pre-Development ☑ Post-Development

Calculations

Runoff Curve Number and Runoff

1. Runoff Curve Number (CN)

Soil Type	Cover Description	CN (Table 2-6)	Area (acres)	CN*A
B	IMPERVIOUS	98	0.52	50.96
B	GRASS (LAWN)	69	0.82	56.58
B	WOODS	55	0	0
		Totals	1.34	107.54

$CN_{Weighted} = \frac{SCN*A}{SA} = \frac{107.54}{1.34}$

Use CN = 80.25

2. Runoff

	Storm #1	Storm #2	Storm #3
Frequency..... Yr	10		
Rainfall, P (24-hour) (Use Table 2-7)..... In	6.11		
Runoff, Q..... In	3.906		

Time of Concentration (Tc)

NOTES: Space for as many as two segments per flow type can be used for each worksheet.

Include a map, schematic, or description of flow segments

Sheet flow	**(Applicable to T_c only)**						
	Segment ID		Pre		Post		
1.	Surface description				DENSE TURF		
2.	Manning's roughness coeff., n (Table 2-9)				0.4		
3.	Flow Length, L (total L<= 300 ft)	ft			75		
4.	24-hr rainfall, P	in	4.0		6.0		
5.	Land Slope, s	ft / ft			.01		
6.	$T_t = 0.42(nL)^{0.8} / P_2^{0.5} s^{0.4}$	min		+	20.18	=	20.18
Shallow concentrated flow							
	Segment ID						
7.	Surface Description: paved (P) or unpaved (U)?						
8.	Flow Length, L	ft					
9.	Watercourse slope, s	ft / ft					
10.	Average velocity, V (Table 2-8)	ft / sec					
11.	$T_t = L / V$	min		+		=	—
Channel flow							
	Segment ID						
	Pipe (P) or Channel (C)?				C		
	If pipe, enter D (in):				N/A		
	If channel, enter bottom width:				0		
	If channel, enter side slopes (_:1):				4:1		
12.	Cross sectional flow area, a	sq ft			7.5		
13.	Wetted perimeter, w_p	ft			10		
14.	Hydraulic radius, $r = a / w_p$	ft			.75		
15.	Channel slope, s	ft / ft			.005		
16.	Manning's roughness coeff., n				0.03		
17.	$V = 1.49\ r^{0.67} s^{0.5} / n$	ft / sec			2.90		
18.	Flow length, L	ft			200		
19.	$T_t = L / 60V$	min		+	1.15	=	1.15
20.	Watershed or subarea T_c or T_t (add T_t in steps 6, 11, 19)					min	21.33

Graphical Peak Discharge

1. Data:

Drainage Area, Am	=	0.0027	sq mi (acres/640)
Runoff Curve Number, CN	=	80.125	(From Runoff Curve Number Worksheet)
Time of Concentration, Tc	=	0.356	hr (From Time of Concentration Worksheet)
Rainfall Distribution	=	Type III	
Pond and swamp areas spread throughout watershed	=	0	% of A_m (acres covered)

			Storm #1	Storm #2	Storm #3
2.	Frequency	yr	10		
3.	Rainfall, P (24-hour)	in	6.11		
4.	Initial abstraction, I_a (Use CN)	in	0.992		
5.	Compute I_a/P		0.081		
6.	Unit peak discharge, q_u (use T_c and I_a/P with Figure 2-9)	csm/in	710		
7.	Runoff, Q (From Runoff Curve Number Worksheet)	in	3.906		
8.	Pond and swamp adjustment factor, F_p (Use Table 2-10)		1		
9.	Peak discharge, Q_p (Where $Q_p = q_u A_m Q F_p$)	cfs	5.55		

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Date

NRCS Method Peak Flow
Form SW-004

DA-B6

Project Information

Project Location: _____

Parcel Identification Number(s): _____

Check One: ☐ Pre-Development ☑ Post-Development

Calculations

Runoff Curve Number and Runoff

1. Runoff Curve Number (CN)

Soil Type	Cover Description	CN (Table 2-6)	Area (acres)	CN*A
B	IMPERVIOUS	98	0.28	27.44
B	GRASS (LAWN)	69	0.67	46.23
B	WOODS	55	0	0
		Totals	0.95	73.67

$CN_{Weighted} = \frac{SCN*A}{SA} = \frac{73.67}{0.95}$

Use CN = 77.55

2. Runoff

	Storm #1	Storm #2	Storm #3
Frequency..... Yr	10		
Rainfall, P (24-hour) (Use Table 2-7)..... In	6.11		
Runoff, Q..... In	3.63		

Time of Concentration (Tc)

NOTES: Space for as many as two segments per flow type can be used for each worksheet.

Include a map, schematic, or description of flow segments

Sheet flow	**(Applicable to T_c only)**							
	Segment ID		Pre			Post		
1.	Surface description					DENSE TURF		
2.	Manning's roughness coeff., n (Table 2-9)					0.4		
3.	Flow Length, L (total L<= 300 ft)	ft				100		
4.	24-hr rainfall, P	in	4.0			6.0		
5.	Land Slope, s	ft / ft				.01		
6.	$T_t = 0.42(nL)^{0.8} / P_2^{0.5} s^{0.4}$	min		+		25.41	=	25.41
Shallow concentrated flow								
	Segment ID							
7.	Surface Description: paved (P) or unpaved (U)?							
8.	Flow Length, L	ft						
9.	Watercourse slope, s	ft / ft						
10.	Average velocity, V (Table 2-8)	ft / sec						
11.	$T_t = L / V$	min		+			=	—
Channel flow								
	Segment ID							
	Pipe (P) or Channel (C)?					C		
	If pipe, enter D (in):					N/A		
	If channel, enter bottom width:					0		
	If channel, enter side slopes (_:1):					4:1		
12.	Cross sectional flow area, a	sq ft				7.5		
13.	Wetted perimeter, w_p	ft				10		
14.	Hydraulic radius, $r = a / w_p$	ft				.75		
15.	Channel slope, s	ft / ft				.005		
16.	Manning's roughness coeff., n					0.03		
17.	$V = 1.49\ r^{0.67} s^{0.5} / n$	ft / sec				2.90		
18.	Flow length, L	ft				175		
19.	$T_t = L / 60V$	min		+		1.01	=	1.01
20.	Watershed or subarea T_c or T_t (add T_t in steps 6, 11, 19)						min	26.42

Graphical Peak Discharge

1. Data:

Drainage Area, Am = 0.001 sq mi (acres/640)

Runoff Curve Number, CN = 77.55 (From Runoff Curve Number Worksheet)

Time of Concentration, Tc = 0.44 hr (From Time of Concentration Worksheet)

Rainfall Distribution = Type III

Pond and swamp areas spread throughout watershed = 0 % of A_m (_____ acres covered)

			Storm #1	Storm #2	Storm #3
2.	Frequency	yr	10		
3.	Rainfall, P (24-hour)	in	6.11		
4.	Initial abstraction, I_a (Use CN)	in	0.579		
5.	Compute I_a/P		0.095		
6.	Unit peak discharge, q_u (use T_c and I_a/P with Figure 2-9)	csm/in	900		
7.	Runoff, Q (From Runoff Curve Number Worksheet)	in	3.63		
8.	Pond and swamp adjustment factor, F_p (Use Table 2-10)		1		
9.	Peak discharge, Q_p (Where $Q_p = q_u A_m Q F_p$)	cfs	3.27		

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10.13.26

Date

NRCS Method Peak Flow
Form SW-004

DA C1

Project Information

Project Location: _____

Parcel Identification Number(s): _____

Check One: ☐ Pre-Development ☑ Post-Development

Calculations

Runoff Curve Number and Runoff

1. Runoff Curve Number (CN)

Soil Type	Cover Description	CN (Table 2-6)	Area (acres)	CN*A
B	IMPERVIOUS	98	0.55	53.90
B	GRASS (LAWN)	69	1.28	88.32
B	WOODS	55	0	0
		Totals	1.83	142.22

$CN_{Weighted} = \frac{SCN*A}{SA} = \frac{142.22}{1.83}$ **Use CN =** 77.72

2. Runoff

	Storm #1	Storm #2	Storm #3
Frequency..... Yr	10		
Rainfall, P (24-hour) (Use Table 2-7)..... In	6.11		
Runoff, Q..... In	3.648		

Time of Concentration (Tc)

NOTES: Space for as many as two segments per flow type can be used for each worksheet.

Include a map, schematic, or description of flow segments

Sheet flow	**(Applicable to T_c only)**							
	Segment ID		Pre		Post			
1.	Surface description				DENSE TURF			
2.	Manning's roughness coeff., n (Table 2-9)				0.24			
3.	Flow Length, L (total L<= 300 ft)	ft			100			
4.	24-hr rainfall, P	in	4.0		6.0			
5.	Land Slope, s	ft / ft			.01			
6.	$T_t = 0.42(nL)^{0.8} / P_2^{0.5} s^{0.4}$	min		+	26.91	=	25.9	
Shallow concentrated flow								
	Segment ID							
7.	Surface Description: paved (P) or unpaved (U)?							
8.	Flow Length, L	ft						
9.	Watercourse slope, s	ft / ft						
10.	Average velocity, V (Table 2-8)	ft / sec						
11.	$T_t = L / V$	min		+		=		
Channel flow								
	Segment ID							
	Pipe (P) or Channel (C)?				C			
	If pipe, enter D (in):				N/A			
	If channel, enter bottom width:				0			
	If channel, enter side slopes (_:1):				4:1			
12.	Cross sectional flow area, a	sq ft			7.5			
13.	Wetted perimeter, w_p	ft			10			
14.	Hydraulic radius, $r = a / w_p$	ft			.75			
15.	Channel slope, s	ft / ft			.005			
16.	Manning's roughness coeff., n				0.03			
17.	$V = 1.49\ r^{0.67} s^{0.5} / n$	ft / sec			2.90			
18.	Flow length, L	ft			150			
19.	$T_t = L / 60V$	min		+	2.59	=	2.59	
20.	Watershed or subarea T_c or T_t (add T_t in steps 6, 11, 19)						min	28.0

Graphical Peak Discharge

1. Data:

Drainage Area, Am	=	0.003	sq mi (acres/640)
Runoff Curve Number, CN	=	77.72	(From Runoff Curve Number Worksheet)
Time of Concentration, Tc	=	0.167	hr (From Time of Concentration Worksheet)
Rainfall Distribution	=	Type III	
Pond and swamp areas spread throughout watershed	=	0	% of A_m (_____ acres covered)

			Storm #1	Storm #2	Storm #3
2.	Frequency	yr	10		
3.	Rainfall, P (24-hour)	in	6.11		
4.	Initial abstraction, I_a (Use CN)	in	0.573		
5.	Compute I_a/P		0.094		
6.	Unit peak discharge, q_u (use T_c and I_a/P with Figure 2-9)	csm/in	562		
7.	Runoff, Q (From Runoff Curve Number Worksheet)	in	3.698		
8.	Pond and swamp adjustment factor, F_p (Use Table 2-10)		1		
9.	Peak discharge, Q_p (Where $Q_p = q_u A_m Q F_p$)	cfs	6.15		

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10.13.20
Date

NRCS Method Peak Flow
Form SW-004

DA-C2

Project Information

Project Location: _____

Parcel Identification Number(s): _____

Check One: ☐ Pre-Development ☑ Post-Development

Calculations

Runoff Curve Number and Runoff

1. Runoff Curve Number (CN)

Soil Type	Cover Description	CN (Table 2-6)	Area (acres)	CN*A
B	IMPERVIOUS	98	0.45	44.10
B	GRASS (LAWN)	69	0.73	50.37
B	WOODS	55	0	0
		Totals	1.18	94.47

$CN_{Weighted} = \frac{SCN*A}{SA} = \frac{94.47}{1.18}$

Use CN = 80.06

2. Runoff

	Storm #1	Storm #2	Storm #3
Frequency..... Yr	10		
Rainfall, P (24-hour) (Use Table 2-7)..... In	6.11		
Runoff, Q..... In	3.884		

Time of Concentration (Tc)

NOTES: Space for as many as two segments per flow type can be used for each worksheet.

Include a map, schematic, or description of flow segments

Sheet flow	**(Applicable to T_c only)**						
	Segment ID		Pre		Post		
1.	Surface description				DENSE TURF		
2.	Manning's roughness coeff., n (Table 2-9)				0.4		
3.	Flow Length, L (total L<= 300 ft)	ft			80		
4.	24-hr rainfall, P	in	4.0		6.0		
5.	Land Slope, s	ft / ft			.01		
6.	$T_t = 0.42(nL)^{0.8} / P_2^{0.5} s^{0.4}$	min		+	21.25	=	21.25
Shallow concentrated flow							
	Segment ID						
7.	Surface Description: paved (P) or unpaved (U)?						
8.	Flow Length, L	ft					
9.	Watercourse slope, s	ft / ft					
10.	Average velocity, V (Table 2-8)	ft / sec					
11.	$T_t = L / V$	min		+		=	
Channel flow							
	Segment ID						
	Pipe (P) or Channel (C)?				C		
	If pipe, enter D (in):				N/A		
	If channel, enter bottom width:				0		
	If channel, enter side slopes (_:1):				4:1		
12.	Cross sectional flow area, a	sq ft			7.5		
13.	Wetted perimeter, w_p	ft			10		
14.	Hydraulic radius, $r = a / w_p$	ft			.75		
15.	Channel slope, s	ft / ft			.005		
16.	Manning's roughness coeff., n				0.03		
17.	$V = 1.49\ r^{0.67} s^{0.5} / n$	ft / sec			2.70		
18.	Flow length, L	ft			350		
19.	$T_t = L / 60V$	min		+	2.01	=	2.01
20.	Watershed or subarea T_c or T_t (add T_t in steps 6, 11, 19)					min	23.26

Graphical Peak Discharge

1. Data:

Drainage Area, Am	=	0.002	sq mi (acres/640)
Runoff Curve Number, CN	=	80.06	(From Runoff Curve Number Worksheet)
Time of Concentration, Tc	=	0.328	hr (From Time of Concentration Worksheet)
Rainfall Distribution	=	Type III	
Pond and swamp areas spread throughout watershed	=	0	% of A_m (acres covered)

			Storm #1	Storm #2	Storm #3
2.	Frequency	yr	10		
3.	Rainfall, P (24-hour)	in	6.11		
4.	Initial abstraction, I_a (Use CN)	in	0.498		
5.	Compute I_a/P		0.082		
6.	Unit peak discharge, q_u (use T_c and I_a/P with Figure 2-9)	csm/in	598		
7.	Runoff, Q (From Runoff Curve Number Worksheet)	in	3.887		
8.	Pond and swamp adjustment factor, F_p (Use Table 2-10)		1		
9.	Peak discharge, Q_p (Where $Q_p = q_u A_m Q F_p$)	cfs	7.65		

MICHAEL S. GATTO, PE, LS
Applicant

10.13.26
Date

NRCS Method Peak Flow
Form SW-004

IDA C3

Project Information

Project Location: _____

Parcel Identification Number(s): _____

Check One: ☐ Pre-Development ☑ Post-Development

Calculations

Runoff Curve Number and Runoff

1. Runoff Curve Number (CN)

Soil Type	Cover Description	CN (Table 2-6)	Area (acres)	CN*A
B	IMPERVIOUS	98	0.22	21.56
B	GRASS (LAWN)	69	0.57	39.33
B	WOODS	55	0	0
		Totals	0.79	60.89

$CN_{Weighted} = \frac{SCN*A}{SA} = \frac{60.89}{0.79}$

Use CN = 77.08

2. Runoff

	Storm #1	Storm #2	Storm #3
Frequency..... Yr	10		
Rainfall, P (24-hour) (Use Table 2-7)..... In	6.11		
Runoff, Q..... In	3.583		

Time of Concentration (Tc)

NOTES: Space for as many as two segments per flow type can be used for each worksheet.

Include a map, schematic, or description of flow segments

Sheet flow	**(Applicable to T_c only)**							
	Segment ID		Pre		Post			
1.	Surface description				DENSE TURF			
2.	Manning's roughness coeff., n (Table 2-9)				0.4			
3.	Flow Length, L (total L<= 300 ft)	ft			90			
4.	24-hr rainfall, P	in	4.0		6.0			
5.	Land Slope, s	ft / ft			.01			
6.	$T_t = 0.42(nL)^{0.8} / P_2^{0.5} s^{0.4}$	min		+	23.35	=	23.35	
Shallow concentrated flow								
	Segment ID							
7.	Surface Description: paved (P) or unpaved (U)?							
8.	Flow Length, L	ft						
9.	Watercourse slope, s	ft / ft						
10.	Average velocity, V (Table 2-8)	ft / sec						
11.	$T_t = L / V$	min		+		=		
Channel flow								
	Segment ID							
	Pipe (P) or Channel (C)?				C			
	If pipe, enter D (in):				N/A			
	If channel, enter bottom width:				6			
	If channel, enter side slopes (_:1):				4:1			
12.	Cross sectional flow area, a	sq ft			7.5			
13.	Wetted perimeter, w_p	ft			10			
14.	Hydraulic radius, $r = a / w_p$	ft			.75			
15.	Channel slope, s	ft / ft			.005			
16.	Manning's roughness coeff., n				.03			
17.	$V = 1.49\ r^{0.67} s^{0.5} / n$	ft / sec			2.90			
18.	Flow length, L	ft			150			
19.	$T_t = L / 60V$	min		+	0.86	=	0.86	
20.	Watershed or subarea T_c or T_t (add T_t in steps 6, 11, 19)						24.2	min

Graphical Peak Discharge

1. Data:

Drainage Area, Am	=	0.0001	sq mi (acres/640)
Runoff Curve Number, CN	=	77.05	(From Runoff Curve Number Worksheet)
Time of Concentration, Tc	=	0.404	hr (From Time of Concentration Worksheet)
Rainfall Distribution	=	Type III	
Pond and swamp areas spread throughout watershed	=	0	% of A_m (_____ acres covered)

			Storm #1	Storm #2	Storm #3
2.	Frequency	yr	10		
3.	Rainfall, P (24-hour)	in	6.11		
4.	Initial abstraction, I_a (Use CN)	in	0.595		
5.	Compute I_a/P		0.097		
6.	Unit peak discharge, q_u (use T_c and I_a/P with Figure 2-9)	csm/in	784		
7.	Runoff, Q (From Runoff Curve Number Worksheet)	in	3.583		
8.	Pond and swamp adjustment factor, F_p (Use Table 2-10)		1		
9.	Peak discharge, Q_p (Where $Q_p = q_u A_m Q F_p$)	cfs	2.181		

MICHAEL S. GADDY PE, LS
Applicant

10.13.26
Date

NRCS Method Peak Flow
Form SW-004

1 DA CA

Project Information

Project Location: _____

Parcel Identification Number(s): _____

Check One: ☐ Pre-Development ☑ Post-Development

Calculations

Runoff Curve Number and Runoff

1. Runoff Curve Number (CN)

Soil Type	Cover Description	CN (Table 2-6)	Area (acres)	CN*A
B	IMPERVIOUS	98	0.10	9.8
B	GRASS (LAWN)	69	0.34	23.46
B	WOODS	55	0	0
		Totals	0.44	33.26

$CN_{Weighted} = \frac{SCN*A}{SA} = \frac{33.26}{0.44}$ **Use CN =** 75.59

2. Runoff

	Storm #1	Storm #2	Storm #3
Frequency..... Yr	10		
Rainfall, P (24-hour) (Use Table 2-7)..... In	6.11		
Runoff, Q..... In	3.434		

Time of Concentration (Tc)

NOTES: Space for as many as two segments per flow type can be used for each worksheet.

Include a map, schematic, or description of flow segments

Sheet flow	**(Applicable to T_c only)**							
	Segment ID		Pre		Post			
1.	Surface description				DENSE TURF			
2.	Manning's roughness coeff., n (Table 2-9)				0.14			
3.	Flow Length, L (total L<= 300 ft)	ft			85			
4.	24-hr rainfall, P	in	4.0		6.0			
5.	Land Slope, s	ft / ft			.01			
6.	$T_t = 0.42(nL)^{0.8} / P_2^{0.5} s^{0.4}$	min		+	22.31	=	22.31	
Shallow concentrated flow								
	Segment ID							
7.	Surface Description: paved (P) or unpaved (U)?							
8.	Flow Length, L	ft						
9.	Watercourse slope, s	ft / ft						
10.	Average velocity, V (Table 2-8)	ft / sec						
11.	$T_t = L / V$	min		+		=		
Channel flow								
	Segment ID							
	Pipe (P) or Channel (C)?				C			
	If pipe, enter D (in):				N/A			
	If channel, enter bottom width:				0			
	If channel, enter side slopes (_:1):				4:1			
12.	Cross sectional flow area, a	sq ft			7.5			
13.	Wetted perimeter, w_p	ft			10			
14.	Hydraulic radius, $r = a / w_p$	ft			0.75			
15.	Channel slope, s	ft / ft			.005			
16.	Manning's roughness coeff., n				0.03			
17.	$V = 1.49\ r^{0.67} s^{0.5} / n$	ft / sec			2.90			
18.	Flow length, L	ft			130			
19.	$T_t = L / 60V$	min		+	0.75	=	0.75	
20.	Watershed or subarea T_c or T_t (add T_t in steps 6, 11, 19)						min	23.06

Graphical Peak Discharge

1. Data:

Drainage Area, Am	=	0.001	sq mi (acres/640)
Runoff Curve Number, CN	=	75.59	(From Runoff Curve Number Worksheet)
Time of Concentration, Tc	=	0.384	hr (From Time of Concentration Worksheet)
Rainfall Distribution	=	Type III	

Pond and swamp areas spread throughout watershed = 0 % of A_m (_____ acres covered)

			Storm #1	Storm #2	Storm #3
2.	Frequency	yr	10		
3.	Rainfall, P (24-hour)	in	6.11		
4.	Initial abstraction, I_a (Use CN)	in	0.1646		
5.	Compute I_a/P		0.106		
6.	Unit peak discharge, q_u (use T_c and I_a/P with Figure 2-9)	csm/in	46		
7.	Runoff, Q (From Runoff Curve Number Worksheet)	in	3.934		
8.	Pond and swamp adjustment factor, F_p (Use Table 2-10)		1		
9.	Peak discharge, Q_p (Where $Q_p = q_u A_m Q F_p$)	cfs	1.55		

MICHAEL S. GADDY, PE, LS
Applicant

10.13.26
Date

NRCS Method Peak Flow
Form SW-004

DA - BMP

Project Information

Project Location: _____

Parcel Identification Number(s): _____

Check One: ☐ Pre-Development ☑ Post-Development

Calculations

Runoff Curve Number and Runoff

1. Runoff Curve Number (CN)

Soil Type	Cover Description	CN (Table 2-6)	Area (acres)	CN*A
B	IMPERVIOUS	98	1.30	127.40
B	GRASS (LAWN)	69	1.32	91.08
B	WOODS	55		
		Totals	2.62	218.48

$CN_{Weighted} = \frac{SCN*A}{SA} = \frac{218.48}{2.62}$ **Use CN =** 83.39

2. Runoff

	Storm #1	Storm #2	Storm #3
Frequency..... Yr	10		
Rainfall, P (24-hour) (Use Table 2-7)..... In	6.11		
Runoff, Q..... In	4.235		

Time of Concentration (Tc)

NOTES: Space for as many as two segments per flow type can be used for each worksheet.

Include a map, schematic, or description of flow segments

Sheet flow	**(Applicable to T_c only)**						
	Segment ID		Pre		Post		
1.	Surface description				DENSE TURF		
2.	Manning's roughness coeff., n (Table 2-9)				0.4		
3.	Flow Length, L (total L<= 300 ft)	ft			50		
4.	24-hr rainfall, P	in	4.0		6.0		
5.	Land Slope, s	ft / ft			.02		
6.	$T_t = 0.42(nL)^{0.8} / P_2^{0.5} s^{0.4}$	min		+	11.06	=	11.06
Shallow concentrated flow							
	Segment ID						
7.	Surface Description: paved (P) or unpaved (U)?						
8.	Flow Length, L	ft					
9.	Watercourse slope, s	ft / ft					
10.	Average velocity, V (Table 2-8)	ft / sec					
11.	$T_t = L / V$	min		+		=	
Channel flow							
	Segment ID						
	Pipe (P) or Channel (C)?						
	If pipe, enter D (in):						
	If channel, enter bottom width:						
	If channel, enter side slopes (_:1):						
12.	Cross sectional flow area, a	sq ft					
13.	Wetted perimeter, w_p	ft					
14.	Hydraulic radius, $r = a / w_p$	ft					
15.	Channel slope, s	ft / ft					
16.	Manning's roughness coeff., n						
17.	$V = 1.49\ r^{0.67} s^{0.5} / n$	ft / sec					
18.	Flow length, L	ft					
19.	$T_t = L / 60V$	min		+		=	
20.	Watershed or subarea T_c or T_t (add T_t in steps 6, 11, 19)					min	11.06

Graphical Peak Discharge

1. Data:

Drainage Area, Am	=	0.004	sq mi (acres/640)
Runoff Curve Number, CN	=	83.39	(From Runoff Curve Number Worksheet)
Time of Concentration, Tc	=	0.184	hr (From Time of Concentration Worksheet)
Rainfall Distribution	=	Type III	

Pond and swamp areas spread throughout watershed = 0 % of A_m (_____ acres covered)

			Storm #1	Storm #2	Storm #3
2.	Frequency	yr	10		
3.	Rainfall, P (24-hour)	in	6.11		
4.	Initial abstraction, I_a (Use CN)	in	0.398		
5.	Compute I_a/P		0.065		
6.	Unit peak discharge, q_u (use T_c and I_a/P with Figure 2-9)	csm/in	869		
7.	Runoff, Q (From Runoff Curve Number Worksheet)	in	4.235		
8.	Pond and swamp adjustment factor, F_p (Use Table 2-10)		1		
9.	Peak discharge, Q_p (Where $Q_p = q_u A_m Q F_p$)	cfs	14.72		

Michael S. Gaddy, PE, LS
Applicant

10.13.26
Date

NRCS Method Peak Flow
Form SW-004

1 DA OPEN SPACE

Project Information

Project Location: _____

Parcel Identification Number(s): _____

Check One: ☐ Pre-Development ☑ Post-Development

Calculations

Runoff Curve Number and Runoff

1. Runoff Curve Number (CN)

Soil Type	Cover Description	CN (Table 2-6)	Area (acres)	CN*A
B	IMPERVIOUS	98	0.11	10.78
B	GRASS (LAWN)	69	0	0
B	WOODS	55	2.10	115.50
		Totals	2.21	126.28

$CN_{Weighted} = \frac{SCN*A}{SA} = \frac{126.28}{2.21}$ **Use CN =** 57.14

2. Runoff

	Storm #1	Storm #2	Storm #3
Frequency..... Yr	10		
Rainfall, P (24-hour) (Use Table 2-7)..... In	6.11		
Runoff, Q..... In	1.755		

Time of Concentration (Tc)

NOTES: Space for as many as two segments per flow type can be used for each worksheet.

Include a map, schematic, or description of flow segments

Sheet flow	**(Applicable to T_c only)**						
	Segment ID		Pre		Post		
1.	Surface description				Woods		
2.	Manning's roughness coeff., n (Table 2-9)				0.4		
3.	Flow Length, L (total L<= 300 ft)	ft			240		
4.	24-hr rainfall, P	in	4.0		6.0		
5.	Land Slope, s	ft / ft			.018		
6.	$T_t = 0.42(nL)^{0.8} / P_2^{0.5} s^{0.4}$	min		+	10 Adj	=	10.4
Shallow concentrated flow							
	Segment ID						
7.	Surface Description: paved (P) or unpaved (U)?						
8.	Flow Length, L	ft					
9.	Watercourse slope, s	ft / ft					
10.	Average velocity, V (Table 2-8)	ft / sec					
11.	$T_t = L / V$	min		+		=	—
Channel flow							
	Segment ID						
	Pipe (P) or Channel (C)?						
	If pipe, enter D (in):						
	If channel, enter bottom width:						
	If channel, enter side slopes (_:1):						
12.	Cross sectional flow area, a	sq ft					
13.	Wetted perimeter, w_p	ft					
14.	Hydraulic radius, $r = a / w_p$	ft					
15.	Channel slope, s	ft / ft					
16.	Manning's roughness coeff., n						
17.	$V = 1.49\ r^{0.67}\ s^{0.5} / n$	ft / sec					
18.	Flow length, L	ft					
19.	$T_t = L / 60V$	min		+		=	—
20.	Watershed or subarea T_c or T_t (add T_t in steps 6, 11, 19)					min	10.4

Graphical Peak Discharge

1. Data:

Drainage Area, Am	=	0.003	sq mi (acres/640)
Runoff Curve Number, CN	=	57.14	(From Runoff Curve Number Worksheet)
Time of Concentration, Tc	=	0.674	hr (From Time of Concentration Worksheet)
Rainfall Distribution	=	Type III	
Pond and swamp areas spread throughout watershed	=	_____	% of A_m (_____ acres covered)

			Storm #1	Storm #2	Storm #3
2.	Frequency	yr	10		
3.	Rainfall, P (24-hour)	in	6.11		
4.	Initial abstraction, I_a (Use CN)	in	1.5		
5.	Compute I_a/P		0.246		
6.	Unit peak discharge, q_u (use T_c and I_a/P with Figure 2-9)	csm/in	480		
7.	Runoff, Q (From Runoff Curve Number Worksheet)	in	1.755		
8.	Pond and swamp adjustment factor, F_p (Use Table 2-10)		1		
9.	Peak discharge, Q_p (Where $Q_p = q_u A_m Q F_p$)	cfs	2.53		

MICHAEL S. GADD, PE, LS
Applicant

10.13.26
Date

ALBEMARLE REGIONAL HEALTH SERVICES

475693

Improvement Permit

Applicant:
Kirbor NC Properties LLC
1521 Taylor Farm Rd
Virginia Beach, VA 23453

Owner:
Currituck Way LLC
353 Soundview Dr
Kill Devil Hills, NC 27948

Site Location:
Lot 1 Foster Forbes Rd
Powells Point, VA 27966

GPD:	480	**LTAR:**	0.500	**Classification:**	Suitable

The site will require the following modification(s):

* Fill Area 100 ft. by 50 ft. with 12 in. of Sand

To obtain an Authorization to Construct:

* Submit a plat or scale drawing of the lot, showing location and dimensions of all property lines, proposed structures and driveways
* Pay permit fee of $463

Comments:

Fill septic area and call for inspection

EHS: Carver, Kevin

Date: 07/31/2026

THIS APPROVAL WILL BECOME VOID AFTER 12 MONTHS AND A NEW APPLICATION WILL BE NECESSARY.

ALBEMARLE REGIONAL HEALTH SERVICES

475694

Improvement Permit

Applicant:
Kirbor NC Properties LLC
1521 Taylor Farm Rd
Virginia Beach, VA 23453

Owner:
Currituck Way LLC
353 Soundview Dr
Kill Devil Hills, NC 27948

Site Location:
Lot 2 Foster Forbes Rd
Powells Point, VA 27966

GPD:	480	**LTAR:**	0.400	**Classification:**	Suitable

The site will require the following modification(s):

* Fill Area 100 ft. by 60 ft. with 12 in. of Sand

To obtain an Authorization to Construct:

* Submit a plat or scale drawing of the lot, showing location and dimensions of all property lines, proposed structures and driveways
* Pay permit fee of $463

Comments:

Fill septic area and call for inspection

EHS: Carver, Kevin

Date: 07/31/2026

THIS APPROVAL WILL BECOME VOID AFTER 12 MONTHS AND A NEW APPLICATION WILL BE NECESSARY.

475695

ALBEMARLE REGIONAL HEALTH SERVICES
Improvement Permit

Applicant:
Kirbor NC Properties LLC
1521 Taylor Farm Rd
Virginia Beach, VA 23453

Owner:
Currituck Way LLC
353 Soundview Dr
Kill Devil Hills, 27948

Site Location:
Lot 3 Foster Forbes Rd
Powells Point, VA 27966

GPD:	480	**LTAR:**	0.400	**Classification:**	Suitable

The site will require the following modification(s):

* Fill Area 100 ft. by 60 ft. with 14 in. of Sand

To obtain an Authorization to Construct:

* Submit a plat or scale drawing of the lot, showing location and dimensions of all property lines, proposed structures and driveways
* Pay permit fee of $463

Comments:

Fill septic area and call for inspection

EHS: Carver, Kevin

Date: 07/31/2026

THIS APPROVAL WILL BECOME VOID AFTER 12 MONTHS AND A NEW APPLICATION WILL BE NECESSARY.

ALBEMARLE REGIONAL HEALTH SERVICES

475696

Improvement Permit

Applicant:
Kirbor NC Properties LLC
1521 Taylor Farm Rd
Virginia Beach, VA 23453

Owner:
Currituck Way LLC
353 Soundview Dr
Kill Devil Hills, 27948

Site Location:
Lot 4 Foster Forbes Rd
Powells Point, VA 27966

GPD:	480	**LTAR:**	0.400	**Classification:**	Suitable

The site will require the following modification(s):

* Fill Area 100 ft. by 60 ft. with 14 in. of Sand

To obtain an Authorization to Construct:

* Submit a plat or scale drawing of the lot, showing location and dimensions of all property lines, proposed structures and driveways
* Pay permit fee of $463

Comments:

Fill septic area and call for inspection

EHS: Carver, Kevin

Date: 07/31/2026

THIS APPROVAL WILL BECOME VOID AFTER 12 MONTHS AND A NEW APPLICATION WILL BE NECESSARY.

ALBEMARLE REGIONAL HEALTH SERVICES

475697

Improvement Permit

Applicant:
Kirbor NC Properties LLC
1521 Taylor Farm Rd
Virginia Beach, VA 23453

Owner:
Currituck Way LLC
353 Soundview Dr
Kill Devil Hills, 27948

Site Location:
Lot 5 Foster Forbes Rd
Powells Point, VA 27966

GPD:	480	**LTAR:**	0.400	**Classification:**	Suitable

The site will require the following modification(s):

* Fill Area 100 ft. by 60 ft. with 14 in. of Sand

To obtain an Authorization to Construct:

* Submit a plat or scale drawing of the lot, showing location and dimensions of all property lines, proposed structures and driveways
* Pay permit fee of $463

Comments:

Fill septic area and call for inspection

EHS: 

Carver, Kevin

Date: 07/31/2026

THIS APPROVAL WILL BECOME VOID AFTER 12 MONTHS AND A NEW APPLICATION WILL BE NECESSARY.

ALBEMARLE REGIONAL HEALTH SERVICES

475698

Improvement Permit

Applicant:
Kirbor NC Properties LLC
1521 Taylor Farm Rd
Virginia Beach, VA 23453

Owner:
Currituck Way LLC
353 Soundview Dr
Kill Devil Hills, 27948

Site Location:
Lot 6 Foster Forbes Rd
Powells Point, VA 27966

GPD:	480	**LTAR:**	0.300	**Classification:**	Suitable

The site will require the following modification(s):

* Fill Area 109 ft. by 68 ft. with 14 in. of Sand

To obtain an Authorization to Construct:

* Submit a plat or scale drawing of the lot, showing location and dimensions of all property lines, proposed structures and driveways
* Pay permit fee of $463

Comments:

Fill septic area and call for inspection
Septic and repair area to stay out of existing field ditch area

EHS: Carver, Kevin

Date: 07/31/2026

THIS APPROVAL WILL BECOME VOID AFTER 12 MONTHS AND A NEW APPLICATION WILL BE NECESSARY.

475699

ALBEMARLE REGIONAL HEALTH SERVICES
Improvement Permit

Applicant:
Kirbor NC Properties LLC
1521 Taylor Farm Rd
Virginia Beach, VA 23453

Owner:
Currituck Way LLC
353 Soundview Dr
Kill Devil Hills, 27948

Site Location:
Lot 7 Foster Forbes Rd
Powells Point, VA 27966

GPD: 480	**LTAR:** 0.400	**Classification:** Suitable

The site will require the following modification(s):

* Fill Area 100 ft. by 60 ft. with 14 in. of Sand

To obtain an Authorization to Construct:

* Submit a plat or scale drawing of the lot, showing location and dimensions of all property lines, proposed structures and driveways
* Pay permit fee of $463

Comments:

Fill septic area and call for inspection
Septic and repair area to stay out of existing field ditch area

EHS:  **Date:** 07/31/2026

Carver, Kevin

THIS APPROVAL WILL BECOME VOID AFTER 12 MONTHS AND A NEW APPLICATION WILL BE NECESSARY.

ALBEMARLE REGIONAL HEALTH SERVICES

475700

Improvement Permit

Applicant:
Kirbor NC Properties LLC
1521 Taylor Farm Rd
Virginia Beach, VA 23453

Owner:
Currituck Way LLC
353 Soundview Dr
Kill Devil Hills, 27948

Site Location:
Lot 8 Foster Forbes Rd
Powells Point, VA 27966

GPD: 480	**LTAR:** 0.300	**Classification:** Suitable

The site will require the following modification(s):

* Fill Area 109 ft. by 68 ft. with 14 in. of Sand

To obtain an Authorization to Construct:

* Submit a plat or scale drawing of the lot, showing location and dimensions of all property lines, proposed structures and driveways
* Pay permit fee of $463

Comments:

Fill septic area and call for inspection

EHS: Carver, Kevin

Date: 07/31/2026

THIS APPROVAL WILL BECOME VOID AFTER 12 MONTHS AND A NEW APPLICATION WILL BE NECESSARY.

ALBEMARLE REGIONAL HEALTH SERVICES

475702

Improvement Permit

Applicant:
Kirbor NC Properties LLC
1521 Taylor Farm Rd
Virginia Beach, VA 23453

Owner:
Currituck Way LLC
353 Soundview Dr
Kill Devil Hills, 27948

Site Location:
Lot 9 Foster Forbes Rd
Powells Point, VA 27966

GPD:	480	**LTAR:**	0.500	**Classification:**	Suitable

The site will require the following modification(s):

To obtain an Authorization to Construct:

* Submit a plat or scale drawing of the lot, showing location and dimensions of all property lines, proposed structures and driveways
* Pay permit fee of $463

Comments:
Level septic area and call for inspection

EHS: _____ **Date:** 07/31/2026
Carver, Kevin

THIS APPROVAL WILL BECOME VOID AFTER 12 MONTHS AND A NEW APPLICATION WILL BE NECESSARY.

ALBEMARLE REGIONAL HEALTH SERVICES

475703

Improvement Permit

Applicant:
Kirbor NC Properties LLC
1521 Taylor Farm Rd
Virginia Beach, VA 23453

Owner:
Currituck Way LLC
353 Soundview Dr
Kill Devil Hills, 27948

Site Location:
Lot 10 Foster Forbes Rd
Powells Point, VA 27966

GPD:	480	**LTAR:**	0.300	**Classification:**	Suitable

The site will require the following modification(s):

* Fill Area 109 ft. by 68 ft. with 24 in. of Sand

To obtain an Authorization to Construct:

* Submit a plat or scale drawing of the lot, showing location and dimensions of all property lines, proposed structures and driveways
* Pay permit fee of $463

Comments:

Fill septic area and call for inspection
crown lot to promote positive drainage

EHS: Carver, Kevin

Date: 07/31/2026

THIS APPROVAL WILL BECOME VOID AFTER 12 MONTHS AND A NEW APPLICATION WILL BE NECESSARY.

ALBEMARLE REGIONAL HEALTH SERVICES

475704

Improvement Permit

Applicant:
Kirbor NC Properties LLC
1521 Taylor Farm Rd
Virginia Beach, VA 23453

Owner:
Currituck Way LLC
353 Soundview Dr
Kill Devil Hills, 27948

Site Location:
Lot 11 Foster Forbes Rd
Powells Point, VA 27966

GPD: 480	**LTAR:** 0.400	**Classification:** Suitable

The site will require the following modification(s):

* Fill Area 120 ft. by 50 ft. with 24 in. of Sand

To obtain an Authorization to Construct:

* Submit a plat or scale drawing of the lot, showing location and dimensions of all property lines, proposed structures and driveways
* Pay permit fee of $463

Comments:

Fill septic area and call for inspection
crown lot to promote positive drainage

EHS: 

Carver, Kevin

Date: 07/31/2026

THIS APPROVAL WILL BECOME VOID AFTER 12 MONTHS AND A NEW APPLICATION WILL BE NECESSARY.

ALBEMARLE REGIONAL HEALTH SERVICES

475705

Improvement Permit

Applicant:
Kirbor NC Properties LLC
1521 Taylor Farm Rd
Virginia Beach, VA 23453

Owner:
Currituck Way LLC
353 Soundview Dr
Kill Devil Hills, 27948

Site Location:
Lot 12 Foster Forbes Rd
Powells Point, VA 27966

GPD:	480	**LTAR:**	0.500	**Classification:**	Suitable

The site will require the following modification(s):

To obtain an Authorization to Construct:

* Submit a plat or scale drawing of the lot, showing location and dimensions of all property lines, proposed structures and driveways
* Pay permit fee of $463

Comments:
Level septic area and call for inspection

EHS: 

Carver, Kevin

Date: 07/31/2026

THIS APPROVAL WILL BECOME VOID AFTER 12 MONTHS AND A NEW APPLICATION WILL BE NECESSARY.

ALBEMARLE REGIONAL HEALTH SERVICES

475706

Improvement Permit

Applicant:
Kirbor NC Properties LLC
1521 Taylor Farm Rd
Virginia Beach, VA 23453

Owner:
Currituck Way LLC
353 Soundview Dr
Kill Devil Hills, 27948

Site Location:
Lot 13 Foster Forbes Rd
Powells Point, VA 27966

GPD:	480	**LTAR:**	0.500	**Classification:**	Suitable

The site will require the following modification(s):

To obtain an Authorization to Construct:

* Submit a plat or scale drawing of the lot, showing location and dimensions of all property lines, proposed structures and driveways
* Pay permit fee of $463

Comments:
Level septic area and call for inspection

EHS: Carver, Kevin

Date: 07/31/2026

THIS APPROVAL WILL BECOME VOID AFTER 12 MONTHS AND A NEW APPLICATION WILL BE NECESSARY.

ALBEMARLE REGIONAL HEALTH SERVICES

475707

Improvement Permit

Applicant:
Kirbor NC Properties LLC
1521 Taylor Farm Rd
Virginia Beach, VA 23453

Owner:
Currituck Way LLC
353 Soundview Dr
Kill Devil Hills, 27948

Site Location:
Lot 14 Foster Forbes Rd
Powells Point, VA 27966

GPD: 480	**LTAR:** 0.500	**Classification:** Suitable

The site will require the following modification(s):

* Fill Area 100 ft. by 50 ft. with 12 in. of Sand

To obtain an Authorization to Construct:

* Submit a plat or scale drawing of the lot, showing location and dimensions of all property lines, proposed structures and driveways
* Pay permit fee of $463

Comments:

Fill septic area and call for inspection

EHS: 

Carver, Kevin

Date: 07/31/2026

THIS APPROVAL WILL BECOME VOID AFTER 12 MONTHS AND A NEW APPLICATION WILL BE NECESSARY.

475708

ALBEMARLE REGIONAL HEALTH SERVICES
Improvement Permit

Applicant:
Kirbor NC Properties LLC
1521 Taylor Farm Rd
Virginia Beach, VA 23453

Owner:
Currituck Way LLC
353 Soundview Dr
Kill Devil Hills, 27948

Site Location:
Lot 15 Foster Forbes Rd
Powells Point, VA 27966

GPD:	480	**LTAR:**	0.300	**Classification:**	Suitable

The site will require the following modification(s):

* Fill Area 109 ft. by 68 ft. with 12 in. of Sand

To obtain an Authorization to Construct:

* Submit a plat or scale drawing of the lot, showing location and dimensions of all property lines, proposed structures and driveways
* Pay permit fee of $463

Comments:

Fill septic area and call for inspection
crown lot to promote positive drainage

EHS: 

Carver, Kevin

Date: 07/31/2026

THIS APPROVAL WILL BECOME VOID AFTER 12 MONTHS AND A NEW APPLICATION WILL BE NECESSARY.

ALBEMARLE REGIONAL HEALTH SERVICES

475709

Improvement Permit

Applicant:
Kirbor NC Properties LLC
1521 Taylor Farm Rd
Virginia Beach, VA 23453

Owner:
Currituck Way LLC
353 Soundview Dr
Kill Devil Hills, 27948

Site Location:
Lot 16 Foster Forbes Rd
Powells Point, VA 27966

GPD:	480	**LTAR:**	0.500	**Classification:**	Suitable

The site will require the following modification(s):

To obtain an Authorization to Construct:

* Submit a plat or scale drawing of the lot, showing location and dimensions of all property lines, proposed structures and driveways
* Pay permit fee of $463

Comments:
Level septic area and call for inspection

EHS: _____ **Date:** 07/31/2026
Carver, Kevin

THIS APPROVAL WILL BECOME VOID AFTER 12 MONTHS AND A NEW APPLICATION WILL BE NECESSARY.

ALBEMARLE REGIONAL HEALTH SERVICES

475710

Improvement Permit

Applicant:
Kirbor NC Properties LLC
1521 Taylor Farm Rd
Virginia Beach, VA 23453

Owner:
Currituck Way LLC
353 Soundview Dr
Kill Devil Hills, 27948

Site Location:
Lot 17 Foster Forbes Rd
Powells Point, VA 27966

GPD: 480	**LTAR:** 0.300	**Classification:** Suitable

The site will require the following modification(s):

* Fill Area 109 ft. by 68 ft. with 14 in. of Sand

To obtain an Authorization to Construct:

* Submit a plat or scale drawing of the lot, showing location and dimensions of all property lines, proposed structures and driveways
* Pay permit fee of $463

Comments:

Fill septic area and call for inspection
crown lot to promote positive drainage

EHS: 

Carver, Kevin

Date: 07/31/2026

THIS APPROVAL WILL BECOME VOID AFTER 12 MONTHS AND A NEW APPLICATION WILL BE NECESSARY.

ALBEMARLE REGIONAL HEALTH SERVICES

475711

Improvement Permit

Applicant:
Kirbor NC Properties LLC
1521 Taylor Farm Rd
Virginia Beach, VA 23453

Owner:
Currituck Way LLC
353 Soundview Dr
Kill Devil Hills, 27948

Site Location:
Lot 18 Foster Forbes Rd
Powells Point, VA 27966

GPD: 480	**LTAR:** 0.300	**Classification:** Suitable

The site will require the following modification(s):

* Fill Area 109 ft. by 68 ft. with 22 in. of Sand

To obtain an Authorization to Construct:

* Submit a plat or scale drawing of the lot, showing location and dimensions of all property lines, proposed structures and driveways
* Pay permit fee of $463

Comments:

Fill septic area and call for inspection
crown lot to promote positive drainage

EHS: 

Carver, Kevin

Date: 07/31/2026

THIS APPROVAL WILL BECOME VOID AFTER 12 MONTHS AND A NEW APPLICATION WILL BE NECESSARY.

ALBEMARLE REGIONAL HEALTH SERVICES

475712

Improvement Permit

Applicant:
Kirbor NC Properties LLC
1521 Taylor Farm Rd
Virginia Beach, VA 23453

Owner:
Currituck Way LLC
353 Soundview Dr
Kill Devil Hills, 27948

Site Location:
Lot 19 Foster Forbes Rd
Powells Point, VA 27966

GPD:	480	**LTAR:**	0.300	**Classification:**	Suitable

The site will require the following modification(s):

* Fill Area 109 ft. by 68 ft. with 22 in. of Sand

To obtain an Authorization to Construct:

* Submit a plat or scale drawing of the lot, showing location and dimensions of all property lines, proposed structures and driveways
* Pay permit fee of $463

Comments:

Fill septic area and call for inspection
crown lot to promote positive drainage

EHS: 

Carver, Kevin

Date: 07/31/2026

THIS APPROVAL WILL BECOME VOID AFTER 12 MONTHS AND A NEW APPLICATION WILL BE NECESSARY.

ALBEMARLE REGIONAL HEALTH SERVICES

475714

Improvement Permit

Applicant:
Kirbor NC Properties LLC
1521 Taylor Farm Rd
Virginia Beach, VA 23453

Owner:
Currituck Way LLC
353 Soundview Dr
Kill Devil Hills, NC 27948

Site Location:
Lot 20 Foster Forbes Rd
Powells Point, NC 27966

GPD: 480	**LTAR:** 0.300	**Classification:** Suitable

The site will require the following modification(s):

* Fill Area 109 ft. by 68 ft. with 19 in. of Sand

To obtain an Authorization to Construct:

* Submit a plat or scale drawing of the lot, showing location and dimensions of all property lines, proposed structures and driveways
* Pay permit fee of $463

Comments:

Fill septic area and call for inspection
crown lot to promote positive drainage

EHS: 

Carver, Kevin

Date: 07/31/2026

THIS APPROVAL WILL BECOME VOID AFTER 12 MONTHS AND A NEW APPLICATION WILL BE NECESSARY.

Jovita Hood

From: Daniel Constanza
Sent: Tuesday, October 27, 2026 4:07 PM
To: Jennie Turner
Cc: mike.gaddy@gmail.com; Jovita Hood
Subject: Re: [EXTERNAL] Re: Currituck Way Preliminary Plat and CD Permit# 202602565

Hi Jennie,

Turnstone Drive and Dunlin Court are both approved street names for use at Currituck Way.

Thanks,

Daniel Constanza
GIS Coordinator
Currituck County Government
Phone: (252) 232-2034
Email: Daniel.Constanza@currituckcountync.gov

GIS Data Viewer:
https://maps.currituckcountync.gov/gis/

From: Jennie Turner <Jennie.Turner@CurrituckCountyNC.gov>
Sent: Tuesday, October 27, 2026 1:38 PM
To: Daniel Constanza <Daniel.Constanza@currituckcountync.gov>
Cc: mike.gaddy@gmail.com <mike.gaddy@gmail.com>; Jovita Hood <Jovita.Hood@CurrituckCountyNC.gov>
Subject: FW: [EXTERNAL] Re: Currituck Way Preliminary Plat and CD Permit# 202602565

Hi Dan,
Trying to help the developer on this one, can you review the attached form and provide approval if appropriate?

Respectfully,

Jennie Turner
Planning & Inspections Director
County of Currituck
Phone: 252-232-6031
Email: jennie.turner@currituckcountync.gov
Website: www.currituckgovernment.com

From: Mike Gaddy <mike.gaddy@gmail.com>
Sent: Tuesday, October 27, 2026 1:29 PM

To: Jovita Hood <Jovita.Hood@CurrituckCountyNC.gov>; Anne- Renee'Livingston <annerenee@kirborhomes.com>; jimobx@aol.com; ccole@slnusbaum.com
Cc: Jennie Turner <Jennie.Turner@CurrituckCountyNC.gov>; Jason Litteral <Jason.Litteral@CurrituckCountyNC.gov>; Millicent Ott <Millicent.Ott@CurrituckCountync.gov>
Subject: [EXTERNAL] Re: Currituck Way Preliminary Plat and CD Permit# 202602565

[CAUTION]: This email originated from outside of Currituck County's system. Do not click links or open attachments unless you verify that the attachment and contents are safe. Please report any suspicious emails or attachments to support.

Hi Jovita, regarding the preliminary plat, please find attached the street name application and the SW-002 attached. I'm sorry but I cannot upload any attachments to the self citizen portal (for some reason?). So I'm hoping this can be uploaded on your end. Also, I am working to get you the necessary water availability form from Will Rumley. I will send that shortly when I receive it. Thank you

Mike Gaddy, PE, LS
Gaddy Engineering Services, LLC
508 N. Birdneck Rd., Suite D
Virginia Beach, VA 23451
757-289-5933

CERTIFIED SWaM Small, Women and Minority-Owned
Supplier Diversity Strengthens the Commonwealth
by the Virginia Department of Small Business & Supplier Diversity

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From: Jovita Hood <Jovita.Hood@CurrituckCountyNC.gov>
Sent: Wednesday, October 21, 2026 11:49 AM
To: Anne- Renee'Livingston <annerenee@kirborhomes.com>; jimobx@aol.com <jimobx@aol.com>; ccole@slnusbaum.com <ccole@slnusbaum.com>; Mike.gaddy@gmail.com <Mike.gaddy@gmail.com>
Cc: Jennie Turner <Jennie.Turner@CurrituckCountyNC.gov>; Jason Litteral <Jason.Litteral@CurrituckCountyNC.gov>; Millicent Ott <Millicent.Ott@CurrituckCountync.gov>
Subject: Currituck Way Preliminary Plat and CD Permit# 202602565

Good morning All,

Thank you for submitting applications for a Preliminary Plat and Construction Drawings for Currituck Way at 8149 Caratoke Hwy.

The submittal is incomplete. Please provide the following documents to complete the application package:

Preliminary Plat

1. Street name approval
2. Letter of commitment from water provider
3. SW-002, signed by property owner

Construction Drawings

1. NCDEQ waterline extension permit
2. NCDEQ stormwater permit including application, plan, and narrative with calculations
3. NCDEQ soil erosion and sedimentation control permit
4. NCDOT driveway permit and encroachment agreement

Please feel free to contact me should you have any questions.

Thank you,

Jovita Hood
Planner I
County of Currituck
Planning & Inspections
Phone: 252-232-3055
Direct Line: 252-232-6019
Jovita.Hood@CurrituckCountyNC.Gov
www.CurrituckCountyNC.Gov

Major Stormwater Plan Form SW-002

Review Process

Contact Information

Currituck County
Planning and Inspections Department
153 Courthouse Road, Suite 110
Currituck, NC 27929

Phone: 252-232-3055

Website: http://www.currituckcountync.gov/planning-zoning/

Email: ccpz@currituckcountync.gov

General

Major stormwater plan approval is required for:

- Major subdivisions.
- Major site plans - development or expansion on a nonresidential, multi-family, or mixed use lot by 5,000 square feet or more of impervious coverage or resulting in 10% or more total impervious coverage.

Step 1: Application Submittal

The applicant must submit a complete application packet consisting of the following:

Submitted on a USB flash drive or a compact disc (CD):

- ompleted Currituck County Major Stormwater Plan Form SW-002.
- Completed Rational Method Form SW-003 or NRCS Method Form SW-004.
- Stormwater management plan drawn to scale. The plan shall include the items listed in the major stormwater plan design standards checklist.
- Alternative stormwater runoff storage analysis and/or downstream drainage capacity analysis, if applicable.
- NCDENR permit applications, if applicable.
- Stormwater Review Fee (see fee schedule)

On receiving an application, staff shall determine whether the application is complete or incomplete. A complete application contains all the information and materials listed above and is in sufficient detail to evaluate and determine whether it complies with appropriate review standards. An application for major stormwater plan must be submitted and approved prior altering an existing drainage system, performing any land disturbing activity or, before construction documents are approved.

Step 2: Staff Review and Action

Once an application is determined complete staff shall approve, approve subject to conditions or disapprove the application.

Major Stormwater Plan
Form SW-002

OFFICIAL USE ONLY:
Permit Number: _____
Date Filed: _____
Date Approved: _____

Contact Information

APPLICANT:
Name: Kirbor Homes
Address: 1521 Taylor Farm Road
Virginia Beach, VA 23453
Telephone: 757-734-4509
E-Mail Address: annerenee@robwadsworth.com

PROPERTY OWNER:
Name: Currituck Way, LLC
Address: 353 Soundview Drive
Kill Devil Hills, NC 27948
Telephone: 252-202-1292
E-Mail Address: jimobx@aol.com

Property Information

Physical Street Address: 8149 Caratoke Highway
Parcel Identification Number(s): 0123000095A0000 & 0123000095A0000
FEMA Flood Zone Designation: X

Request

Project Description: 20 Residential Lots - Subdivision
Total land disturbance activity: 754,803 sf
Calculated volume of BMPs: 425,622 c.f. sf
Maximum lot coverage: 153,118 sf
Proposed lot coverage: 153,118 sf

TYPE OF REQUEST

- ■ Major subdivision (10-year, 24-hour rate)
- □ Major site plan (5-year, 24-hour rate)

METHOD USED TO CALCULATE PEAK DISCHARGE

- □ Rational Method
- ■ NRCS Method (TR-55 and TR-20)
- □ Simple volume calculation for small sites (less than 10 acres)
- □ Alternative stormwater runoff storage analysis
- □ Downstream drainage capacity analysis

I hereby authorize county officials to enter my property for the purpose of determining compliance. All information submitted and required as part of this process shall become public record.

Applicant _____ , III — Date 10-22-2026

Property Owner(s) _____ — Date 10-23-2026

*NOTE: Form must be signed by the owner(s) of record, contract purchaser(s), or other person(s) having a recognized property interest. If there are multiple property owners/applicants a signature is required for each.

The table below depicts the design standards of the major stormwater plan application. Please make sure to include all applicable listed items to ensure all appropriate standards are reviewed.

Major Stormwater Plan

Design Standards Checklist

Date Received: _____

Project Name: _____

Applicant/Property Owner: _____

	Minor Stormwater Plan Design Standards Checklist	
	General	
1	Property owner name and address.	✓
2	Site address and parcel identification number.	✓
3	North arrow and scale to be 1" = 100' or larger.	✓
	Site Features	
4	Scaled drawing showing existing and proposed site features: Property lines with dimensions, acreage, streets, easements, structures (dimensions and square footage), fences, bulkheads, septic area (active and repair), utilities, vehicular use areas, driveways, and sidewalks.	✓
5	Approximate location of all designated Areas of Environmental Concern (AEC) or other such areas which are environmentally sensitive on the property, such as Maritime Forest, CAMA, 404, or 401 wetlands as defined by the appropriate agency.	✓
6	Existing and proposed ground elevations shown in one foot intervals. All elevation changes within the past six months shall be shown on the plan.	✓
8	Limits of all proposed fill, including the toe of fill slope and purpose of fill.	✓
9	Square footage of all existing and proposed impervious areas (structures, sidewalks, walkways, vehicular use areas regardless of surface material), including a description of surface materials.	✓
10	Existing and proposed drainage patterns, including direction of flow.	✓
11	Location, capacity, design plans (detention, retention, infiltration), and design discharge of existing and proposed stormwater management features.	✓
12	Elevation of the seasonal high water level as determined by a licensed soil scientist.	✓
13	Plant selection.	✓
	Permits and Other Documentation	
14	NCDENR stormwater permit application (if 10,000sf or more of built upon area).	✓
15	NCDENR erosion and sedimentation control permit application (if one acre or more of land disturbance).	✓
16	NCDENR coastal area management act permit application, if applicable.	
17	Stormwater management narrative with supporting calculations.	✓
18	Rational Method Form SW-003 or NRCS Method Form SW-004	✓
19	Alternative stormwater runoff storage analysis and/or downstream drainage capacity analysis, if applicable	
20	Design spreadsheets for all BMPs (*Appendix F – Currituck County Stormwater Manual*).	✓
21	Detailed maintenance plan for all proposed BMPs.	✓

	Certificate	
22	The major stormwater plan shall contain the following certificate: I, _____, owner/agent hereby certify the information included on this and attached pages is true and correct to the best of my knowledge. On the plan entitled _____, stormwater drainage improvements shall be installed according to these plans and specifications and approved by Currituck County. Yearly inspections are required as part of the stormwater plan. The owner is responsible for all maintenance required. Currituck County assumes no responsibility for the design, maintenance, or performance of the stormwater improvements. Date:_____ Owner/Agent:_____	✓

Major Stormwater Plan Submittal Checklist

Staff will use the following checklist to determine the completeness of your application. Please make sure all the listed items are included. Staff shall not process an application for further review until it is determined to be complete.

Major Stormwater Plan Form SW-002

Submittal Checklist

Date Received: _____

Project Name: _____

Applicant/Property Owner: _____

	Major Stormwater Plan Form SW-002 Submittal Checklist – Documents provided on USB flash drive or CD	
1	Completed Major Stormwater Plan Form SW-002	✓
2	Completed Rational Method Form SW-003 or NRCS Method Form SW-004	✓
3	Stormwater plan	✓
4	NCDENR permit applications, if applicable	✓

Comments

_____

_____

_____

Currituck County Mainland Water
Capacity Availability Form

County Contact Information

Will Rumsey, Utilities Director
444 Maple Road
Maple, NC 27956

Phone: 252.232.2769
Fax: 252.453.3721

Website: https://co.currituck.nc.us/departments/water/

Request

This request is for:

- ☐ Single Family Residence
- ☑ Residential Development
- ☐ Non-residential

Owner Information

Name(s): CURRITUCK WAY, LLC

Mailing Address: 353 SOUNDVIEW DRIVE, KILL DEVIL HILLS, NC 27948

E-Mail Address: jimobx@aol.com

Phone Number: 252-202-1297

Applicant Information (if different from Owner)

Name(s): KIRBOR [redacted] NC, LLC

Mailing Address: 1621 TAYLOR FARM RD. VA. BEACH, VA 23453

E-Mail Address: annerenee@rdowadsworth.com

Phone Number: 757-734-1509

Parcel Information

PIN(s): 0123000095A0000 & 0123000095B000

Street Address: 8149 CARATOKE HWY

Project Information

Name of Project: CURRITUCK WAY SUBDIVISION

Number of Units: 20

Projected Daily Project Demand (gpd): 8,000

Anticipated Water Access Date: 1/1/27

TYP. UNIT @ 400GPD/UNIT
400 x 20 = 8,000

Applicant's Signature

I declare, that to the best of my knowledge, the information provided herein is true, correct, and complete.

Property Owner/Applicant Signature

10-28-2026
Date

Note: Water connection and/or developmental fees are due at building permit application. See the Currituck County Master Fee Schedule for rates.
https://co.currituck.nc.us/master-fee-schedule/

For Office Use Only

☒ Water capacity is available for this project.

☐ Water capacity is not available for this project.

Utilities Director — 10-30-26 Date

County Manager — 10/30/2026 Date

This capacity availability is good for one year