

TOWN OF HARWICH
NOTICE OF PUBLIC HEARING
FEBRUARY 12, 2024

Pursuant to M.G.L. c. 83, §10 and Chapter 295 of the Code of the Town of Harwich, the Select Board, acting as the Town of Harwich Stormwater Authority, will hold a public hearing on Monday, February 12, 2024 no earlier than 6:00 P.M. in the Griffin Room at the Harwich Town Hall, 732 Main Street, Harwich, MA 02645.

Down Cape Engineering, as representative, Christopher Our, as applicant and Mark Giarrusso, as owner seeks a Local Stormwater Permit through application filed pursuant to the Town of Harwich Comprehensive Stormwater and Illicit Discharge Regulations for a proposed seven (7) lot subdivision plan "Wildlife Circle". The property is located off Littlefield Pond Road; Assessors Map 65, Parcel R2-2/0.

All abutters and other interested persons are invited to attend. For further information, please contact the Administration Office at 508-430-7513. Application package available for review at <https://www.harwich-ma.gov/engineering/pages/stormwater-permits>

Select Board

Cape Cod Chronicle
February 12, 2024

DOWN CAPE ENGINEERING, INC.

939 Main Street
Yarmouth Port, MA 02675
508-362-4541

Transmittal

DCE Job # 17-198

Date: December 21, 2023

To: Meggan Eldredge, Assistant Town Administrator
Town of Harwich
732 Main Street
Harwich, MA 02645

From: Daniel A. Ojala, PE, PLS, Down Cape Engineering, Inc.



Subject: Our Definitive Subdivision Stormwater Report

Enclosed are the following for the Stormwater Application for the Definitive Subdivision (Wildlife Circle) off Littlefield Pond Road:

- Stormwater Application
- Abutters within 300 feet
- Our Stormwater Report with following attachments
- Our Stormwater Plan Set (3 Sheets)
- Our Definitive Subdivision Plan of Land "Wildlife Circle" 1-26-22
- Our "Wildlife Circle" Roadway Profile & Detail Sheet 12-27-22
- Our Conservancy Plan of Land 7-16-21
- Check for \$900.00 fee

Please call/email should you have any questions.

DOWN CAPE ENGINEERING, INC.
939 Route 6A, Suite C
Yarmouth Port, MA 02675
telephone: 508-362-4541
downcape@downcape.com
priscilla@downcape.com

Town of Harwich

Comprehensive Stormwater and Illicit Discharge Regulations

Local Stormwater Permit Application

A. General Information

1. Project Location:

Off Littlefield Pond Rd	77 / C20 & C22, 65 / R2 & R3	Bk 29526 PG 215
Street Address	Assessors Map and Parcel(s)	Deed Reference

2. Applicant:

Christopher	Our
a. First Name	b. Last Name
R B Our Co.	
c. Organization	
56 Obed Brooks Rd, Harwich, MA 02645	
d. Legal Mailing Address	
508-432-0530	
h. Phone Number	i. Fax Number
	j. Email Address

3. Property owner (required if different from applicant): ☐ Check if more than one owner

Mark	Giarrusso
a. First Name	b. Last Name
Hybrid Built Homes LLC	
c. Organization	
76 Kilby St, Hingham, MA 02043	
d. Legal Mailing Address	
h. Phone Number	i. Fax Number
	j. Email address

4. Representative (if any):

Daniel A.	Ojala, PE, PLS
a. First Name	b. Last Name
Down Cape Engineering, Inc.	
c. Company	
939 Route 6A, Yarmouth Port, MA 02675	
d. Legal Mailing Address	
508-362-4541	downcape@downcape.com
h. Phone Number	i. Fax Number
	j. Email address

5. Total Fee Paid:

\$900.00

a. Total Fee Paid (per the Local Stormwater Permit fee schedule)

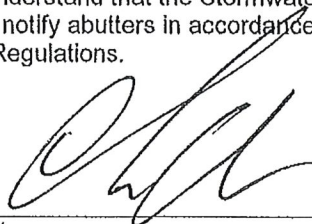
6. General Project Description (include the land disturbance, existing and proposed impervious areas):

Definitive Subdivision "Wildlife Circle" of seven lots Off Littlefield Pond Road. Please see Stormwater Report and Plans for details. Four acres disturbed area in the typical subdivision with dedicated open space.

**Town of Harwich
Comprehensive Stormwater and Illicit Discharge Regulations
Local Stormwater Permit Application**

B. Signatures and Notifications

I hereby certify under the penalties of perjury that the foregoing Stormwater Management Permit Application and accompanying plans, documents, and supporting data are true and complete to the best of my knowledge. I understand that the Stormwater Authority will place notification of this application in a local newspaper and notify abutters in accordance with the Town of Harwich Comprehensive Stormwater and Illicit Discharge Regulations.



Signature of Applicant

Signature of Property Owner (if different)

Signature of Representative (if any)


DANIEL A. OJALA REPS DEC, INC

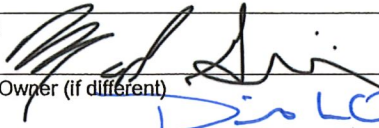
Date 1/20/23

Town of Harwich
Comprehensive Stormwater and Illicit Discharge Regulations
Local Stormwater Permit Application

B. Signatures and Notifications

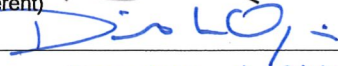
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Signature of Applicant



Mark Giarrusso, mgr HBH

Signature of Property Owner (if different)



Signature of Representative (if any)

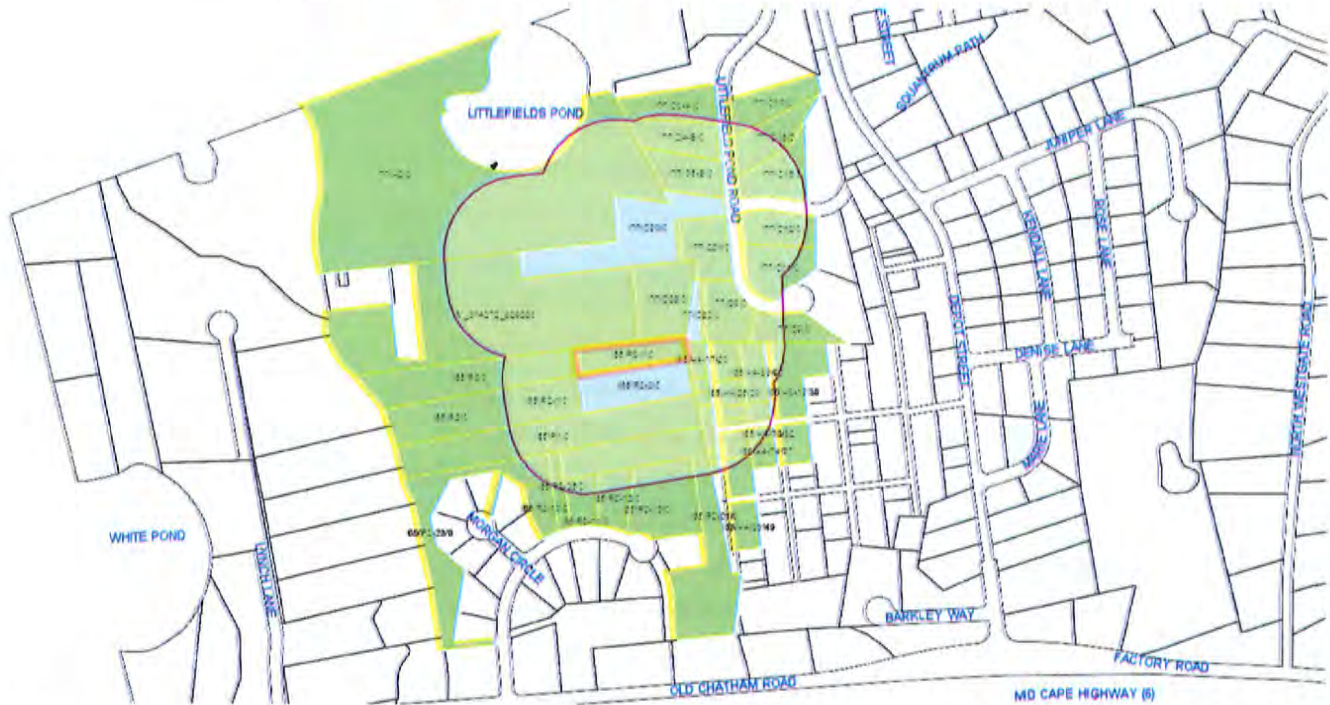
DANIEL A. OJEDA PE PLS DCE, INC.

Date

1/20/23

TOWN OF HARWICH, MA
BOARD OF ASSESSORS
732 Main Street, Harwich, MA 02645

Town of HARWICH Abutters Within 300 feet of Parcel 65/R2-2/0 and others



Key	Parcel ID	Owner	Location	Mailing Street	Mailing City	ST	ZipCd/Country
10797	65-A4-7-12-R	FRATUS ROBERT D JR	0 BELMONT GARDENS	PO BOX 873	BREWSTER	MA	02631
10798	65-A4-13-14-R	FRATUS ROBERT D JR	0 BELMONT GARDENS	PO BOX 873	BREWSTER	MA	02631
10799	65-A4-15-16-R	FRATUS ROBERT D JR	0 BELMONT GARDENS	PO BOX 873	BREWSTER	MA	02631
10800	65-A4-17-20-E	HARWICH TOWN OF - TAX COLLECT	0 BELMONT GARDENS	732 MAIN ST	HARWICH	MA	02645
10801	65-A4-21-24-E	HARWICH TOWN OF - TAX COLLECT	0 BELMONT GARDENS	732 MAIN ST	HARWICH	MA	02645
10802	65-A4-25-28-R	FRATUS ROBERT D JR	0 BELMONT GARDENS	PO BOX 873	BREWSTER	MA	02631
10803	65-A4-29-30-R	FRATUS ROBERT D JR	0 BELMONT GARDENS	PO BOX 873	BREWSTER	MA	02631
10804	65-A4-32-35-E	HARWICH TOWN OF - TAX COLLECT	0 BELMONT GARDENS	732 MAIN ST	HARWICH	MA	02645
10805	65-A4-36-49-E	HARWICH TOWN OF - CONSERVATION	0 BELMONT GARDENS	732 MAIN ST	HARWICH	MA	02645
10811	65-A4-74-77-R	FRATUS ROBERT D JR	0 BELMONT GARDENS	PO BOX 873	BREWSTER	MA	02631
10812	65-A4-78-82-E	HARWICH TOWN OF - CONSERVATION	0 BELMONT GARDENS	732 MAIN ST	HARWICH	MA	02645
10813	65-A4-83-90-E	HARWICH TOWN OF - TAX COLLECT	0 BELMONT GARDENS	732 MAIN ST	HARWICH	MA	02645
10828	66-A3-18-38-E	HARWICH TOWN OF - CONSERVATION	0 BELMONT GARDENS	732 MAIN ST	HARWICH	MA	02645
21404	65-P2-13-0-R	LEBLANC ANDREW D	48 DERBY LN	48 DERBY LN	HARWICH	MA	02645
21421	65-P2-10-0-R	KEATING JAMES M TRS ET AL KEATING SUSAN D TRS	30 DERBY LN	12 EDGEWOOD RD	SHARON	MA	02067
21422	65-P2-11-0-R	STAMATIS DANIEL C	36 DERBY LN	36 DERBY LN	HARWICH	MA	02645
21423	65-P2-12-0-R	STONE JOSEPH A JR & STONE THERESA S	42 DERBY LN	42 DERBY LN	HARWICH	MA	02645
21431	65-P2-21-0-R	LEBEL DOUGLAS W TR HERITAGE ESTATES REALTY TRUST	0 DERBY LN	BOX 170	W HYANNISPORT	MA	02672

Key	Parcel ID	Owner	Location	Mailing Street	Mailing City	ST	ZipCd/Country
21433	65-P2-23-0-R	BENSON PETER TRS ET AL HERITAGE EST HOMEOWN ASSOC TR	0 DERBY LN	PO BOX 623	S DENNIS	MA	02660
21435	65-P2-25-0-R	LEBEL DOUGLAS W TR HERITAGE ESTATES REALTY TRUST	0 DERBY LN	PO BOX 170	W HYANNISPORT	MA	02672
22576	65-R1-0-R	GREY MARGARET	32 DERBY LN	PO BOX 774	S CHATHAM	MA	02659
22631	65-R3-0-R	BLANCHARD BRYAN	105 OLD HARWICH BREWSTER RD	2 SKIPPER SHEA LN	HARWICH	MA	02645
22632	65-R2-0-R	OUR CHRISTOPHER W C/O ALLENBY LEIGHTON T II ET A	103 OLD HARWICH BREWSTER RD	103 OLD HARWICH BREWSTER RD	HARWICH	MA	02645
25334	77-C8-0-R	HALEY MARK T & PARKS SHANNON COLLEEN	15 LITTLEFIELD POND RD	15 LITTLEFIELD POND RD	HARWICH	MA	02645
25335	77-C9-0-R	MARTELL KATHLEEN M ET AL ROUTIER PAULA	17 LITTLEFIELD POND RD	17 LITTLEFIELD POND RD	HARWICH	MA	02645
25337	77-C11-0-R	ONSTAD ALAN D & ONSTAD JULIA A	14 LITTLEFIELD POND RD	14 LITTLEFIELD POND RD	HARWICH	MA	02645
25338	77-C12-0-R	WINSTONE GARRY & C/O TARR ASHLEY L TR	1 FISH & GAME DR	1 FISH & GAME DR	HARWICH	MA	02645
25341	77-C15-0-R	PALUMBO ASHLEY HYOTTE & PALUMBO JOSEPH S	2 FISH & GAME DR	4 ROSS LN	MIDDLETON	MA	01949
25342	77-C16-0-R	LAVALLEY KEITH D C & LAVALLEY REBECCA T	8 LITTLEFIELD POND RD	8 LITTLEFIELD POND RD	HARWICH	MA	02645
25343	77-C17-0-R	FURLONG EILEEN ANTOINETTE TR EILEEN ANTOINETTE FURLONG 2018	6 LITTLEFIELD POND RD	6 LITTLEFIELD POND RD	HARWICH	MA	02645
26008	77-C3-A-0-R	DUPLESSIS PAUL A & DUPLESSIS BETH A	5 LITTLEFIELD POND RD	5 LITTLEFIELD POND RD	HARWICH	MA	02645
26009	77-C4-B-0-R	WHITE CAROLINE M	7 LITTLEFIELD POND RD	PO BOX 631	W HARWICH	MA	02671
26010	77-C5-B-0-R	LAROCCO KEVIN M & LAROCCO COURTNEY L	9 LITTLEFIELD POND RD	9 LITTLEFIELD POND RD	HARWICH	MA	02645
27705	77-C20-0-R	HYBRID BUILT HOME LLC	11 LITTLEFIELD POND RD	76 KILBY ST	HINGHAM	MA	02043
27706	77-C21-0-R	COTE DANIEL J ET AL SMAKOVSKAYA ALINA	13 LITTLEFIELD POND RD	13 LITTLEFIELD POND RD	HARWICH	MA	02645
27707	77-C22-0-R	HYBRID BUILT HOME LLC	0 LITTLEFIELD POND RD	76 KILBY ST	HINGHAM	MA	02043
28946	65-R3-1-0-R	BLANCHARD BRYAN	0 OLD HARWICH BREWSTER RD	2 SKIPPER SHEA LN	HARWICH	MA	02645
28947	65-R2-1-0-R	OUR CHRISTOPHER W	0 OLD HARWICH BREWSTER RD	56 OBED BROOKS RD	HARWICH	MA	02645
28948	65-R2-2-0-R	OUR CHRISTOPHER W	0 OLD HARWICH BREWSTER RD	56 OBED BROOKS RD	HARWICH	MA	02645
28954	77-C23-0-R	OUR SCOTT OWEN	0 LITTLEFIELD POND RD	101 LOVERS LANE	HARWICH	MA	02645
5553	65-A4-5-5-E	HARWICH TOWN OF - SELECTMEN	0 BELMONT GARDENS	732 MAIN ST	HARWICH	MA	02645
5554	65-A4-6-6-R	FRATUS ROBERT D JR	0 BELMONT GARDENS	PO BOX 873	BREWSTER	MA	02631
5562	65-A4-31-31-E	HARWICH TOWN OF - CONSERVATION	0 BELMONT GARDENS	732 MAIN ST	HARWICH	MA	02645
9704	77-A2-0-R	CAPE COD FISH AND GAME ASSOC I C/O KEN JOUDREY PRESIDENT	796 DEPOT ST	PO BOX 119	HARWICH PORT	MA	02646

65-A4-7-12-R	FRATUS ROBERT D JR PO BOX 873 BREWSTER, MA 02631	65-A4-13-14-R	FRATUS ROBERT D JR PO BOX 873 BREWSTER, MA 02631	65-A4-15-16-R	FRATUS ROBERT D JR PO BOX 873 BREWSTER, MA 02631
65-A4-17-20-E	HARWICH TOWN OF - TAX COLLECT 732 MAIN ST HARWICH, MA 02645	65-A4-21-24-E	HARWICH TOWN OF - TAX COLLECT 732 MAIN ST HARWICH, MA 02645	65-A4-25-28-R	FRATUS ROBERT D JR PO BOX 873 BREWSTER, MA 02631
65-A4-29-30-R	FRATUS ROBERT D JR PO BOX 873 BREWSTER, MA 02631	65-A4-32-35-E	HARWICH TOWN OF - TAX COLLECT 732 MAIN ST HARWICH, MA 02645	65-A4-36-49-E	HARWICH TOWN OF - CONSERVATION 732 MAIN ST HARWICH, MA 02645
65-A4-74-77-R	FRATUS ROBERT D JR PO BOX 873 BREWSTER, MA 02631	65-A4-78-82-E	HARWICH TOWN OF - CONSERVATION 732 MAIN ST HARWICH, MA 02645	65-A4-83-90-E	HARWICH TOWN OF - TAX COLLECT 732 MAIN ST HARWICH, MA 02645
66-A3-18-38-E	HARWICH TOWN OF - CONSERVATION 732 MAIN ST HARWICH, MA 02645	65-P2-13-0-R	LEBLANC ANDREW D 48 DERBY LN HARWICH, MA 02645	65-P2-10-0-R	KEATING JAMES M TRS ET AL KEATING SUSAN D TRS 12 EDGEWOOD RD SHARON, MA 02067
65-P2-11-0-R	STAMATIS DANIEL C 36 DERBY LN HARWICH, MA 02645	65-P2-12-0-R	STONE JOSEPH A JR & STONE THERESA S 42 DERBY LN HARWICH, MA 02645	65-P2-21-0-R	LEBEL DOUGLAS W TR HERITAGE ESTATES REALTY TRUST BOX 170 W HYANNISPORT, MA 02672
65-P2-23-0-R	BENSON PETER TRS ET AL HERITAGE EST HOMEOWN ASSOC TR PO BOX 623 S DENNIS, MA 02660	65-P2-25-0-R	LEBEL DOUGLAS W TR HERITAGE ESTATES REALTY TRUST PO BOX 170 W HYANNISPORT, MA 02672	65-R1-0-R	GREY MARGARET PO BOX 774 S CHATHAM, MA 02659
65-R3-0-R	BLANCHARD BRYAN 2 SKIPPER SHEA LN HARWICH, MA 02645	65-R2-0-R	OUR CHRISTOPHER W C/O ALLENBY LEIGHTON T II ET A 103 OLD HARWICH BREWSTER RD HARWICH, MA 02645	77-C8-0-R	HALEY MARK T & PARKS SHANNON COLLEEN 15 LITTLEFIELD POND RD HARWICH, MA 02645
77-C9-0-R	MARTELL KATHLEEN M ET AL ROUTIER PAULA 17 LITTLEFIELD POND RD HARWICH, MA 02645	77-C11-0-R	ONSTAD ALAN D & ONSTAD JULIA A 14 LITTLEFIELD POND RD HARWICH, MA 02645	77-C12-0-R	WINSTONE GARRY & C/O TARR ASHLEY L TR 1 FISH & GAME DR HARWICH, MA 02645
77-C15-0-R	PALUMBO ASHLEY HYOTTE & PALUMBO JOSEPH S 4 ROSS LN MIDDLETON, MA 01949	77-C16-0-R	LAVALLEY KEITH D C & LAVALLEY REBECCA T 8 LITTLEFIELD POND RD HARWICH, MA 02645	77-C17-0-R	FURLONG EILEEN ANTOINETTE TR EILEEN ANTOINETTE FURLONG 2018 6 LITTLEFIELD POND RD HARWICH, MA 02645

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77-C20-0-R	HYBRID BUILT HOME LLC 76 KILBY ST HINGHAM, MA 02043	77-C21-0-R	COTE DANIEL J ET AL SMAKOVSKAYA ALINA 13 LITTLEFIELD POND RD HARWICH, MA 02645	77-C22-0-R	HYBRID BUILT HOME LLC 76 KILBY ST HINGHAM, MA 02043
65-R3-1-0-R	BLANCHARD BRYAN 2 SKIPPER SHEA LN HARWICH, MA 02645	65-R2-1-0-R	OUR CHRISTOPHER W 56 OBED BROOKS RD HARWICH, MA 02645	65-R2-2-0-R	OUR CHRISTOPHER W 56 OBED BROOKS RD HARWICH, MA 02645
77-C23-0-R	OUR SCOTT OWEN 101 LOVERS LANE HARWICH, MA 02645	65-A4-5-5-E	HARWICH TOWN OF - SELECTMEN 732 MAIN ST HARWICH, MA 02645	65-A4-6-6-R	FRATUS ROBERT D JR PO BOX 873 BREWSTER, MA 02631
65-A4-31-31-E	HARWICH TOWN OF - CONSERVATION 732 MAIN ST HARWICH, MA 02645	77-A2-0-R	CAPE COD FISH AND GAME ASSOC I C/O KEN JOUDREY PRESIDENT PO BOX 119 HARWICH PORT, MA 02646		



TOWN OF HARWICH
ASSESSORS OFFICE
732 MAIN STREET
HARWICH, MASSACHUSETTS 02645

Town of Harwich

OCT 11 2023

Assessors Office

OFFICE OF
BOARD OF ASSESSORS

Tel: 508-430-7503

Fax: 508-430-7086

ABUTTERS REQUEST FORM

Board Requesting Action: STORM WATER

Date Submitted: 10/11/2023

Applicant's Name: Down Cape Engineering, Inc.

Assessors Map(s) & Parcel(s): 77-C20.

Property Location: 0 Littlefield Pond Rd, 11 Littlefield Pond Rd,
0 Old Harwich Brewster Rd, 0 Old Harwich Brewster Rd

Owner(s): Hybrid Built Home LLC, Christopher W. Our, Bryan Blanchard

Contact Person: Priscilla Leclerc - Down Cape Engineering, Inc.

E-mail Address: priscilla@downcape.com

Telephone #: 508-362-4541

Type of Petition: STORM WATER, 300' ABUTTERS

I hereby certify that the names and addresses
on the attached or preceding sheet (s) are of
the owners as they appear in the assessing
departments most recent computerized tax list

Assessors Approval By: RB 10/11/23

INVOICE

This cover sheet is also your invoice.

	<u>Amount</u>	<u>Date</u> <u>Paid</u>	<u>Ck #</u>
Up to 25 Abutters	\$50.00	_____	_____
Additional Abutters _____ @ \$2.00 ea	_____	_____	_____
TOTAL	_____	_____	_____

Make checks payable to: Town of Harwich

\\TOWNHALL3\Assessor\ABUTTERS\Abutters Request.doc



TOWN OF HARWICH
ASSESSORS OFFICE
732 MAIN STREET
HARWICH, MASSACHUSETTS 02645

Town of Harwich

OCT 11 2023

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ABUTTERS REQUEST FORM

Board Requesting Action: STORMWATER

Date Submitted: 10/11/2023

Applicant's Name: Down Cape Engineering, Inc.

Assessors Map(s) & Parcel(s): 77-C22

Property Location: 0 Littlefield Pond Rd, 11 Littlefield Pond Rd,
0 Old Harwich Brewster Rd, 0 Old Harwich Brewster Rd

Owner(s): Hybrid Built Home LLC, Christopher W. Our, Bryan Blanchard

Contact Person: Priscilla Leclerc - Down Cape Engineering, Inc.

E-mail Address: priscilla@downcape.com

Telephone #: 508-362-4541

Type of Petition: STORMWATER, 300' ABUTTERS

Assessors Approval By: RR 10/11/23

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Make checks payable to: Town of Harwich

\\TOWNHALL3\Assessor\ABUTTERS\Abutters Request.doc



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ASSESSORS OFFICE
732 MAIN STREET
HARWICH, MASSACHUSETTS 02645

Town of Harwich

OCT 11 2023

Assessors Office

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Tel: 508-430-7503

Fax: 508-430-7086

ABUTTERS REQUEST FORM

Board Requesting Action: STORMWATER

Date Submitted: 10/11/23

Applicant's Name: Down Cape Engineering, Inc.

Assessors Map(s) & Parcel(s): 65-R2, 2

Property Location: 0 Littlefield Pond Rd, 11 Littlefield Pond Rd,
0 Old Harwich Brewster Rd, 0 Old Harwich Brewster Rd

Owner(s): Hybrid Built Home LLC, Christopher W. Our, Bryan Blanchard

Contact Person: Priscilla Leclerc - Down Cape Engineering, Inc.

E-mail Address: priscilla@downcape.com

Telephone #: 508-362-4541

Type of Petition: STORMWATER 300' ABUTTERS

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TOTAL			

Make checks payable to: Town of Harwich

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ASSESSORS OFFICE
732 MAIN STREET
HARWICH, MASSACHUSETTS 02645

Town of Harwich

OCT 11 2023

Assessors Office

OFFICE OF
BOARD OF ASSESSORS
Tel: 508-430-7503
Fax: 508-430-7086

ABUTTERS REQUEST FORM

Board Requesting Action: STORM WATER

Date Submitted: 10/11/2023

Applicant's Name: Down Cape Engineering, Inc.

Assessors Map(s) & Parcel(s): 65-R3-1

Property Location: 0 Littlefield Pond Rd, 11 Littlefield Pond Rd,
0 Old Harwich Brewster Rd, 0 Old Harwich Brewster Rd

Owner(s): Hybrid Built Home LLC, Christopher W. Our, Bryan Blanchard

Contact Person: Priscilla Leclerc - Down Cape Engineering, Inc.

E-mail Address: priscilla@downcape.com

Telephone #: 508-362-4541

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Assessors Approval By: RB 10/11/23

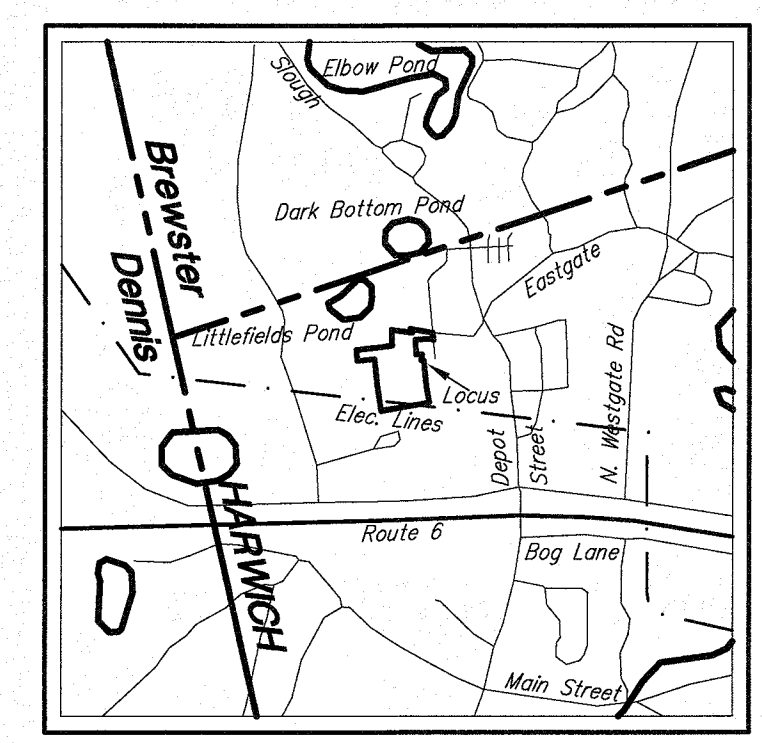
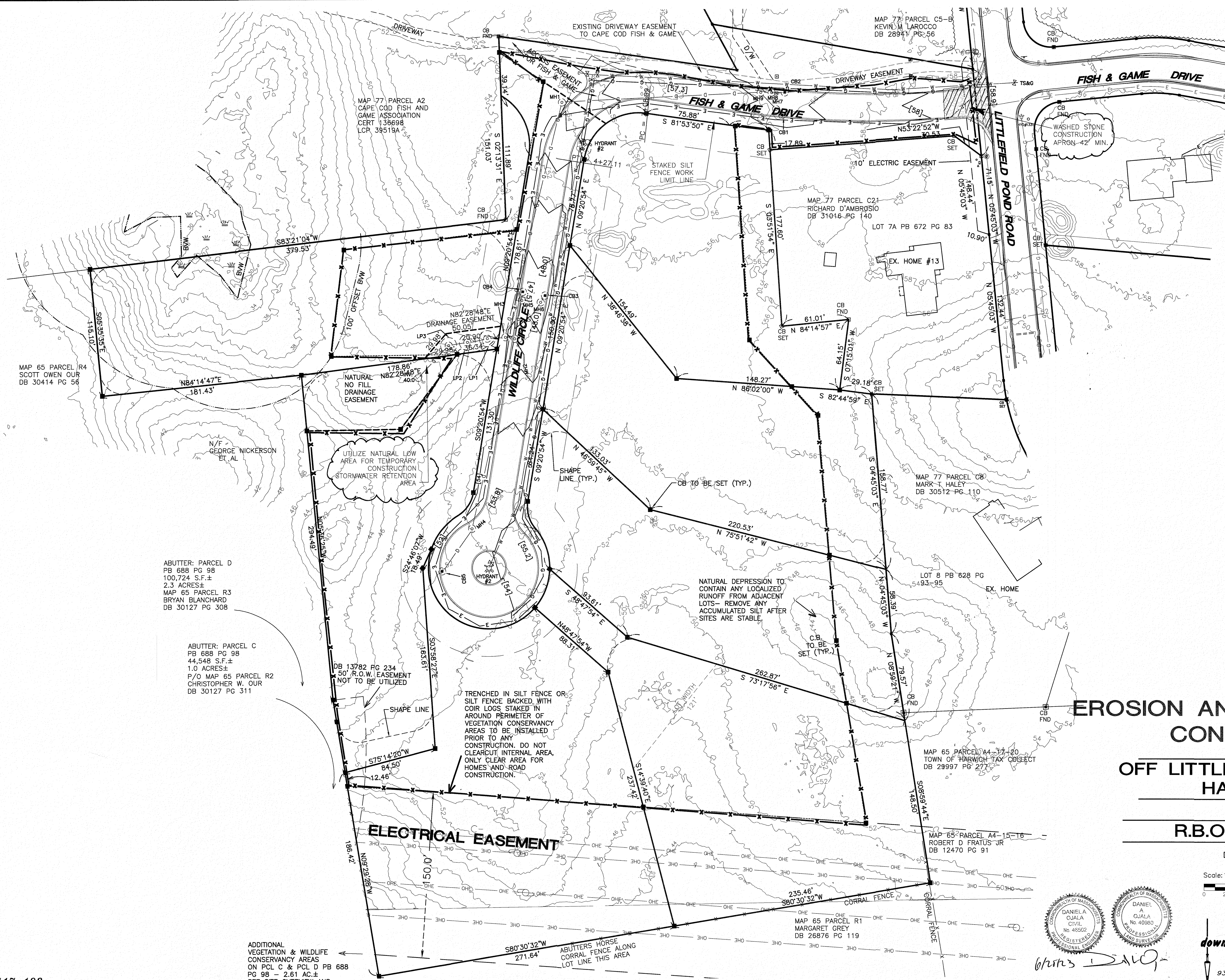
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Additional Abutters _____ @ \$2.00 ea	_____	_____	_____
TOTAL	_____	_____	_____

Make checks payable to: Town of Harwich

\\TOWNHALL3\Assessor\ABUTTERS\Abutters Request.doc



LOCUS MAP
SCALE 1"=2000'
ASSESSORS MAP 77 PARCEL C20, C22
ASSESSORS MAP 65 PARCEL R2, R3
ZONING SUMMARY

ZONING DISTRICT:	RR DISTRICT
REQUIRED:	
MIN. LOT SIZE	40,000 S.F.(0.92 AC.)
MIN. LOT FRONTAGE	150'
MIN. FRONT SETBACK	25'
MIN. SIDE SETBACK	20'
MIN. REAR SETBACK	20'
MAX. BUILDING HEIGHT	30'
MAX. BUILDING COVERAGE	15%
MAX. SITE COVERAGE	25%
LOT WIDTH:	120' AT SETBACK
*35' FRONTAGE AT PANHANDLE	

REFERENCES

DEED BOOK 29526 PAGE 215	
DEED BOOK 30061 PAGE 204	
DEED BOOK 30127 PAGE 308	
DEED BOOK 30127 PAGE 311	
DEED BOOK 31689 PAGE 91	LCP 39519A
PLAN BOOK 558 PAGE 83	PB 637 PG 100
PLAN BOOK 603 PAGE 98	PB 625 PG 94-96
PLAN BOOK 672 PAGE 83	PB 637 PG 100
PLAN BOOK 688 PAGE 98	PB 658 PG 30

OWNER OF RECORD

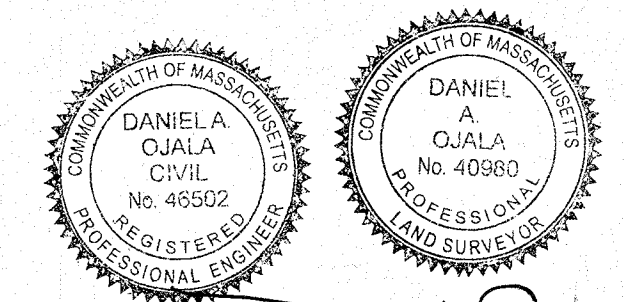
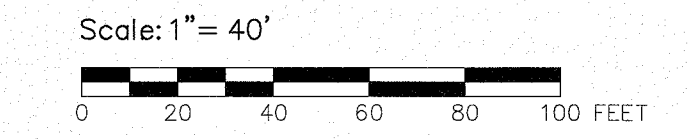
CHRISTOPHER W. OUR	56 OBED BROOKS RD	HARWICH, MA 02645
HYBRID BUILT HOME LLC	76 KILBY ST	HINGHAM, MA 02043
JANET SHEA OUR	56 OBED BROOKS RD	HARWICH, MA 02645
BRYAN BLANCHARD	23 SKIPPER SHEA LN	HARWICH, MA 02645
SCOTT OWEN OUR	101 LOVERS LN	HARWICH, MA 02645

EROSION AND SEDIMENTATION CONTROL PLAN

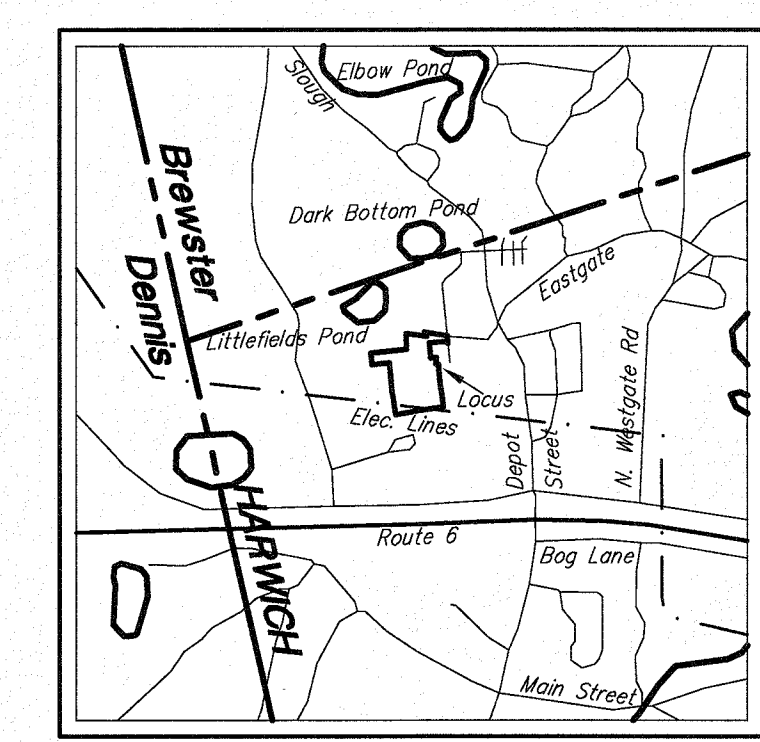
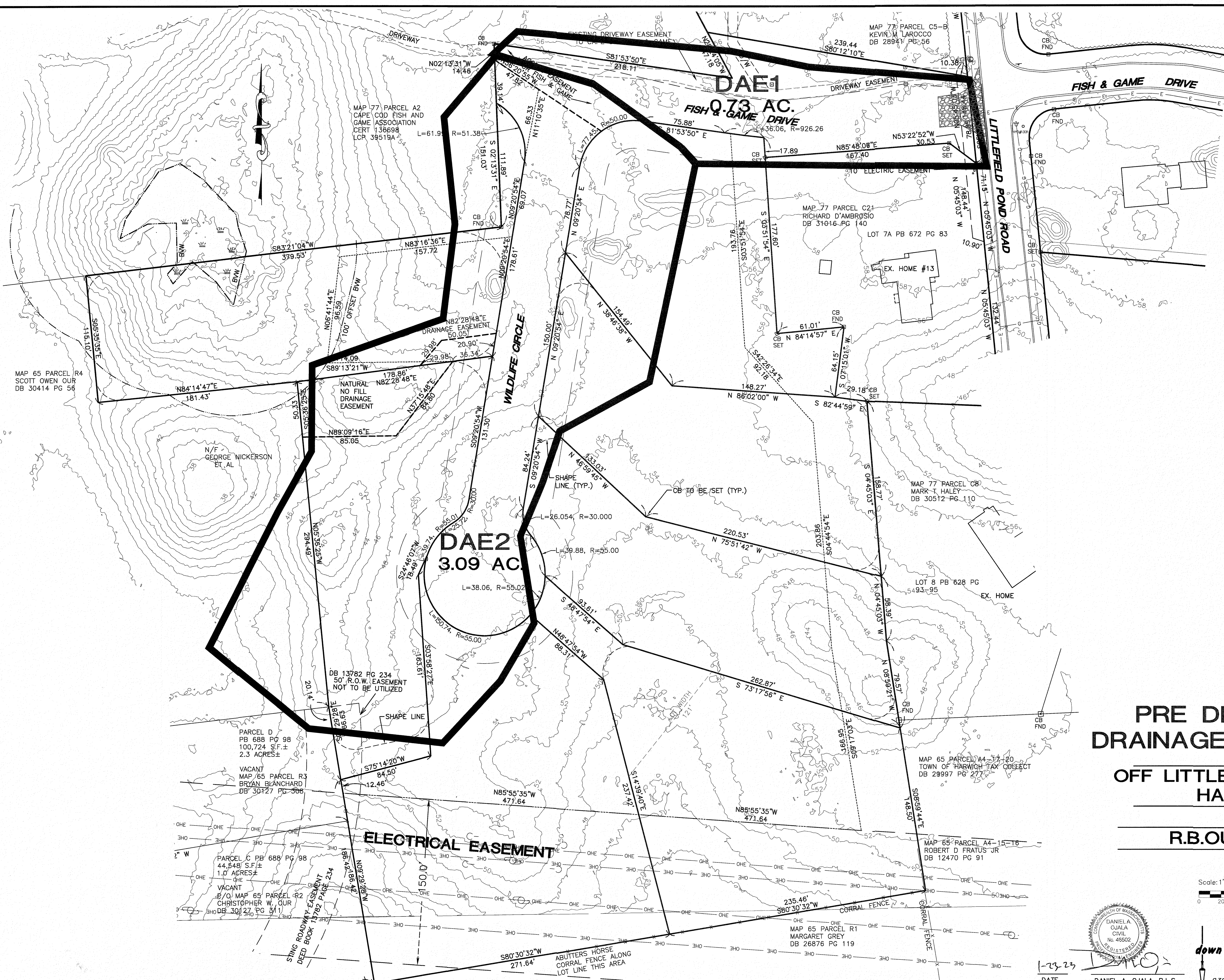
OFF LITTLEFIELD POND ROAD
HARWICH, MA

PREPARED FOR
R.B.OUR Co. ET AL

DATE: JUNE 28, 2023



down cape engineering, inc.
civil engineers
land surveyors
939 Main Street (Rte 6A)
YARMOOUTHPORT MA 02675



LOCUS MAP
 SCALE 1"=2000'±
 ASSESSORS MAP 77 PARCEL C20, C22
 ASSESSORS MAP 65 PARCEL R2, R3

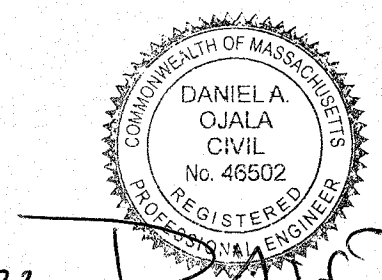
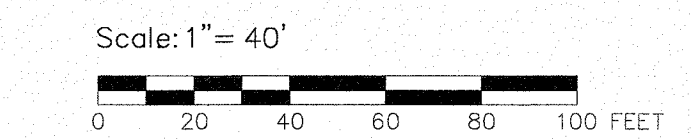
NOTE:
 CEMENT BOUNDS TO BE SET ON
 ALL LOT CORNERS, ROADWAY
 POINTS OF CURVATURE, AND
 CONSERVANCY AREA
 CORNERS/LINES AS INDICATED.

PRE DEVELOPMENT DRAINAGE AREA SKETCH

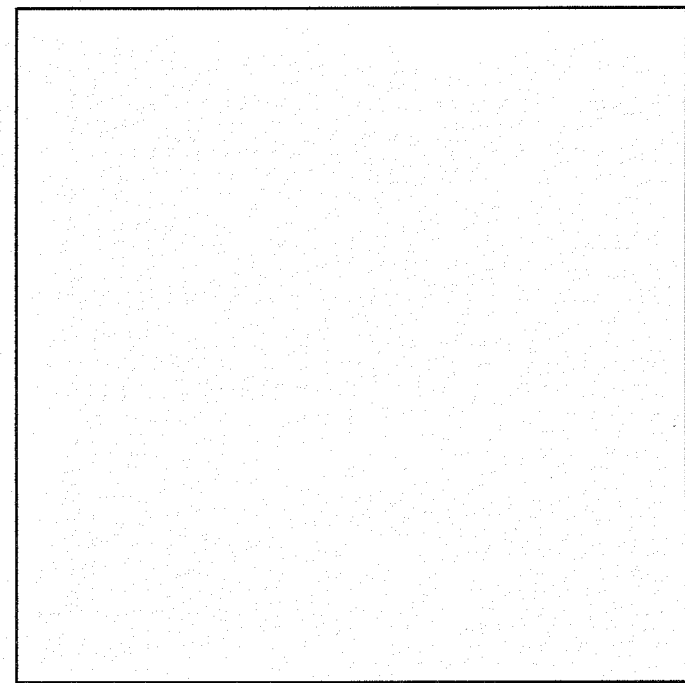
OFF LITTLEFIELD POND ROAD HARWICH, MA

PREPARED FOR
R.B.OUR Co. ET AL

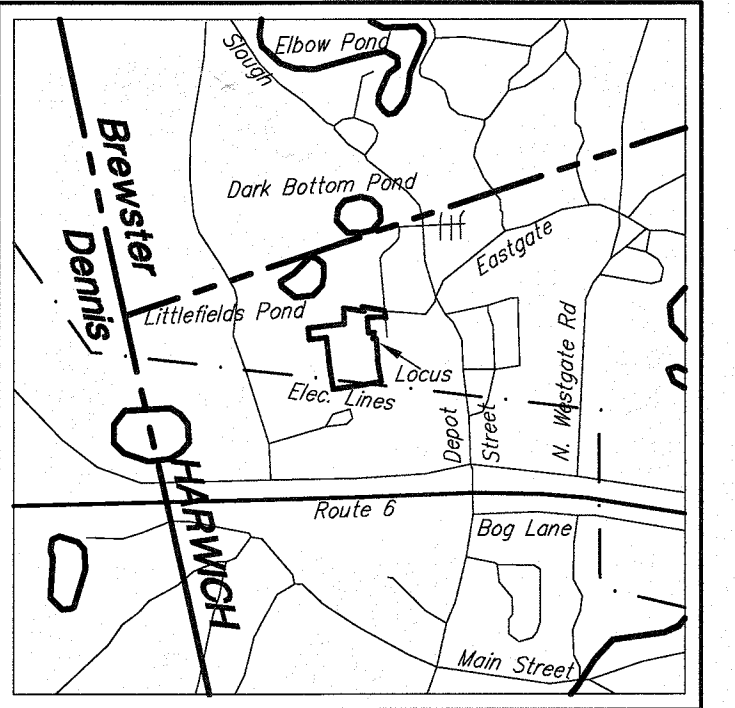
DATE: 1-23-23



down cape engineering, inc.
 civil engineers
 land surveyors
 939 Main Street (Rte 6A)
 YARMOUTHPORT MA 02675



FOR REGISTRY USE



LOCUS MAP

SCALE 1"=2000'±
ASSESSORS MAP 77 PARCEL C20, C22
ASSESSORS MAP 65 PARCEL R2, R3

NOTE:

CEMENT BOUNDS TO BE SET ON
ALL LOT CORNERS, ROADWAY
POINTS OF CURVATURE, AND
CONSERVANCY AREA
CORNERS/LINES AS INDICATED.

DRAINAGE AREA SKETCH OFF LITTLEFIELD POND ROAD HARWICH, MA

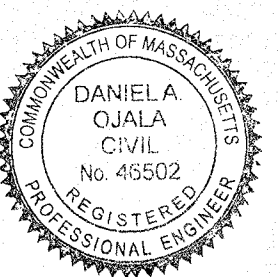
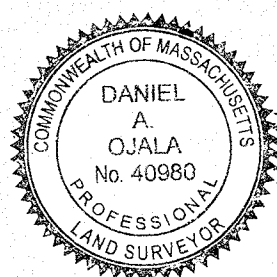
PREPARED FOR

R.B.OUR Co. ET AL

DATE: JANUARY 26, 2022

Scale: 1"=40'

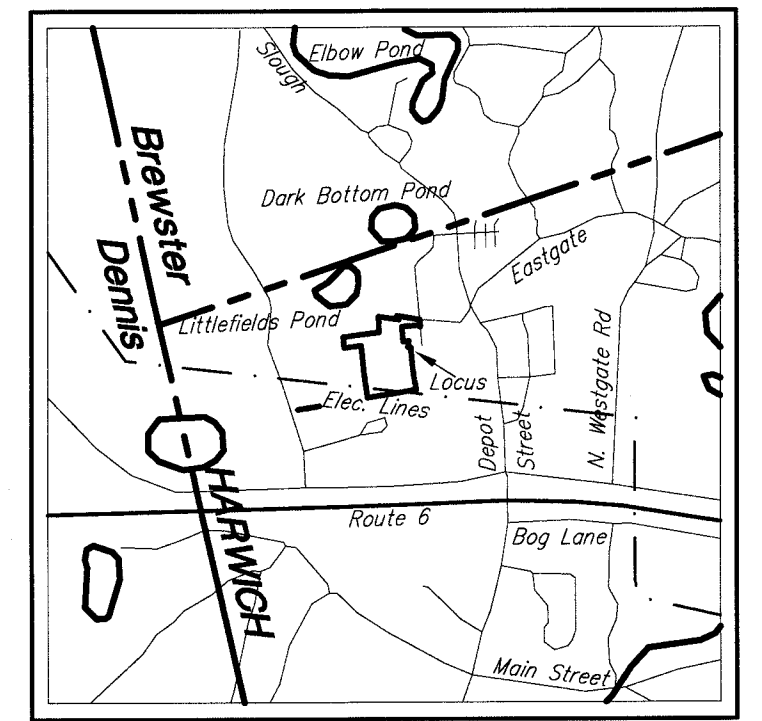
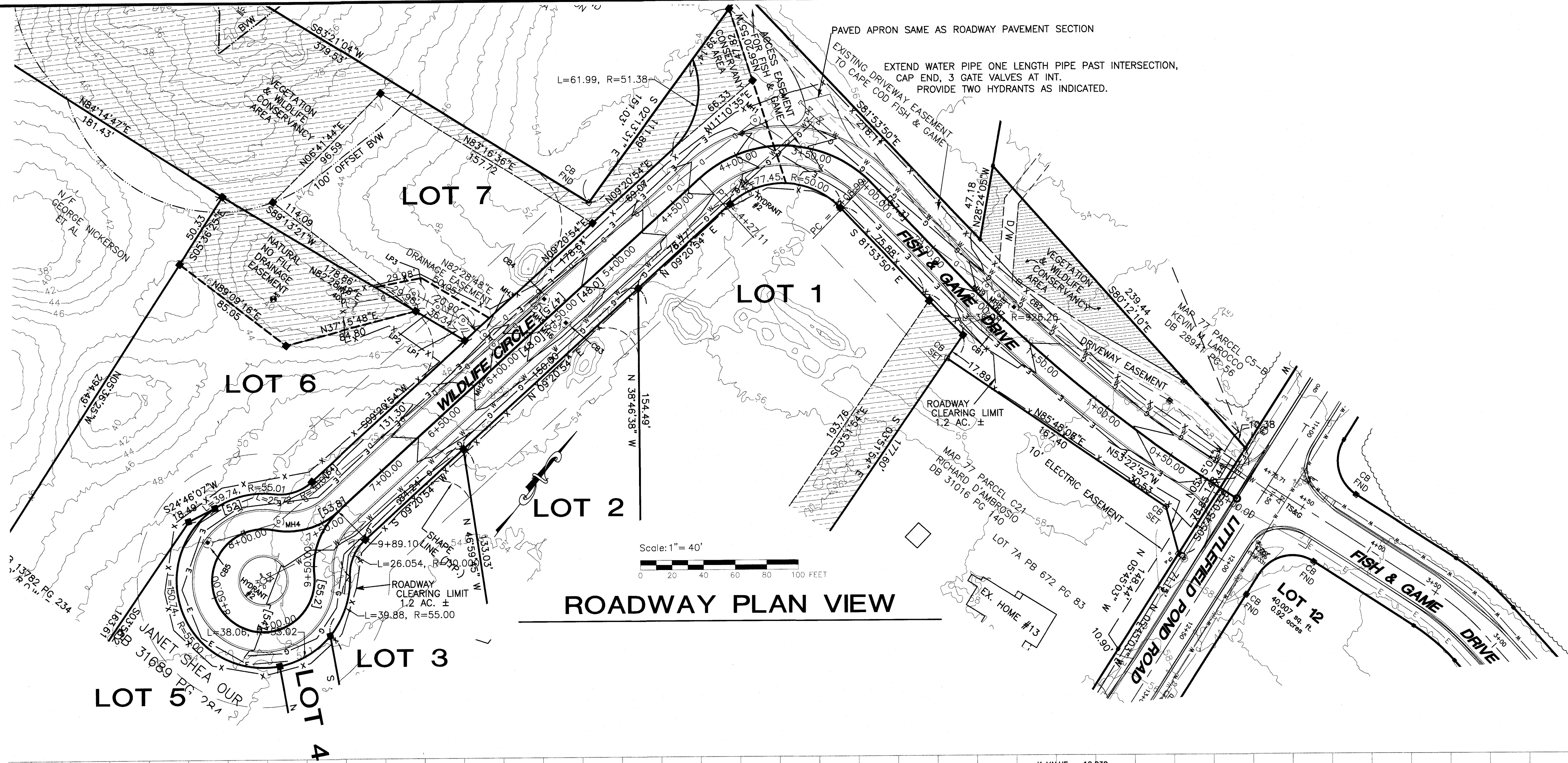
0 20 40 60 80 100 FEET



off 508-362-4541
fax 508-362-9880
downcape.com ©
down cape engineering, inc.
civil engineers
land surveyors
939 Main Street (Rte 6A)
YARMOUTHPORT MA 02675

1-26-22
DATE

DANIEL A. OJALA, P.L.S.



TEST HOLE LOGS

ENGINEER: DANIEL A. OJALA, P.E. P.L.S.
 DATE: 4/20/2021
 PERC. RATE = < 2 MIN/INCH
 CLASS I SOILS

	ELEV.
0"	40'
3"	39.5'
6"	37.5'
30"	29.5'
126"	29.5'

G-W ADJ. DATA:
 WELL: CGW 138
 ZONE: C
 ADJ: 4.4'
 APRIL 2021

GROUNDWATER ENCOUNTERED @ 124" EL. 29.7'
 ADJUSTED HIGH GROUNDWATER = EL. 34.1'

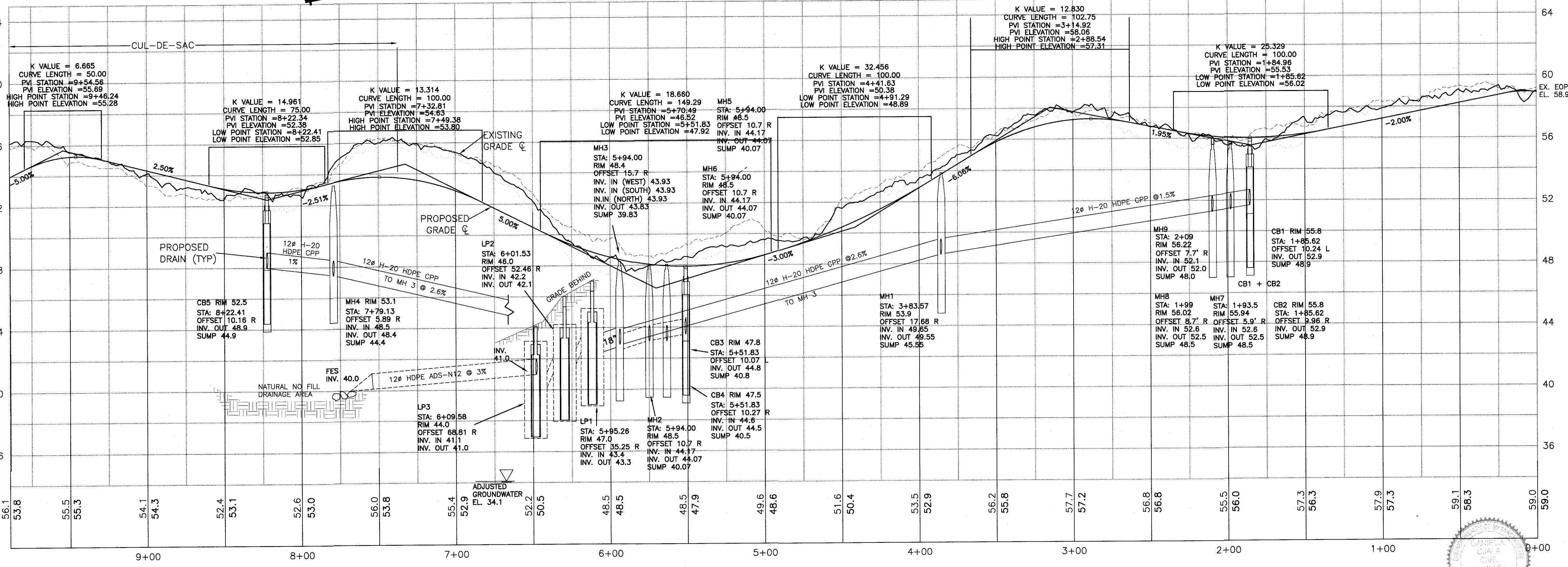
ROADWAY PROFILE TO ACCOMPANY DEFINITIVE SUBDIVISION PLAN OF LAND OFF LITTLEFIELD POND ROAD HARWICH, MA

PREPARED FOR
R.B.OUR Co. ET AL

DATE: JANUARY 26, 2022
 REVISED: DECEMBER 27, 2022 (TOWN COMMENTS)

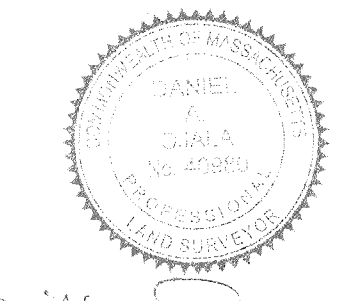
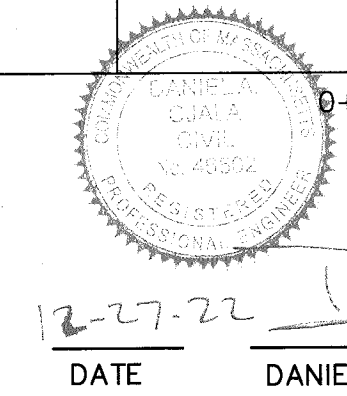
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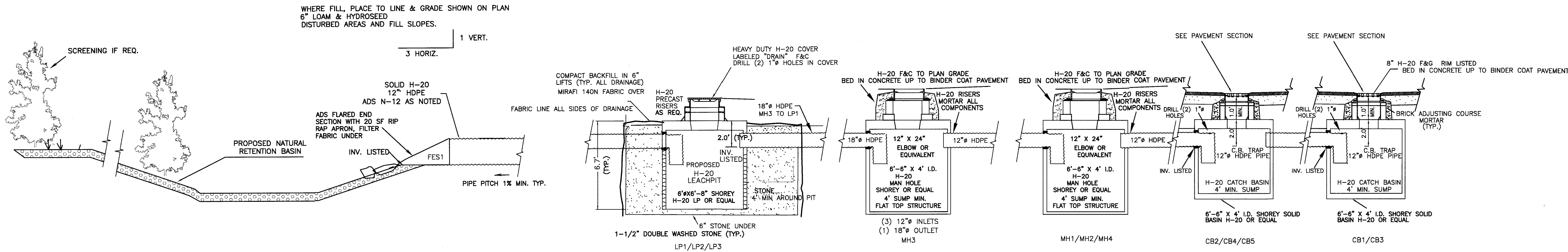
down cape engineering, inc.
 civil engineers
 and surveyors
 939 Main Street (Rte 6A)
 YARMOUTHPORT MA 02675



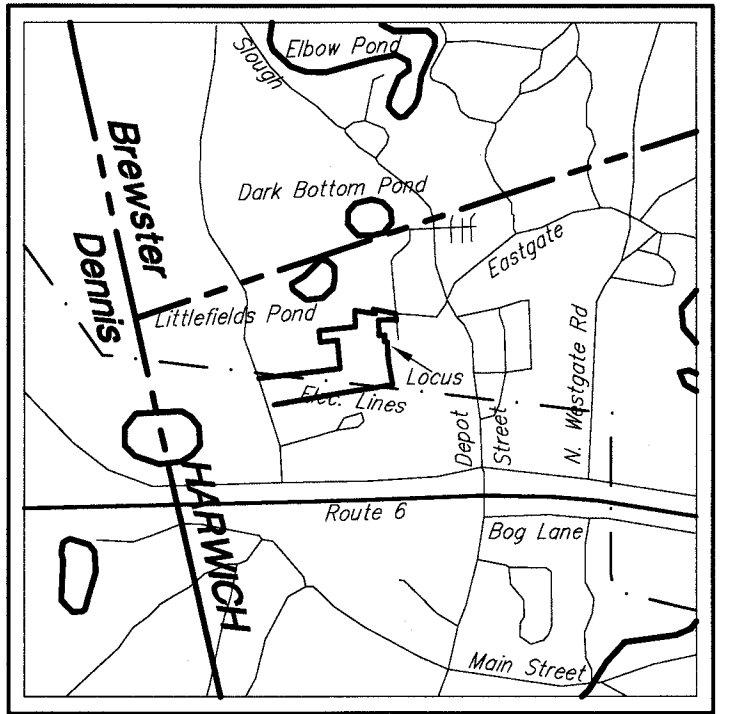
ROADWAY PROFILE

SCALE: HORIZONTAL 1"=40' VERTICAL 1"=4'





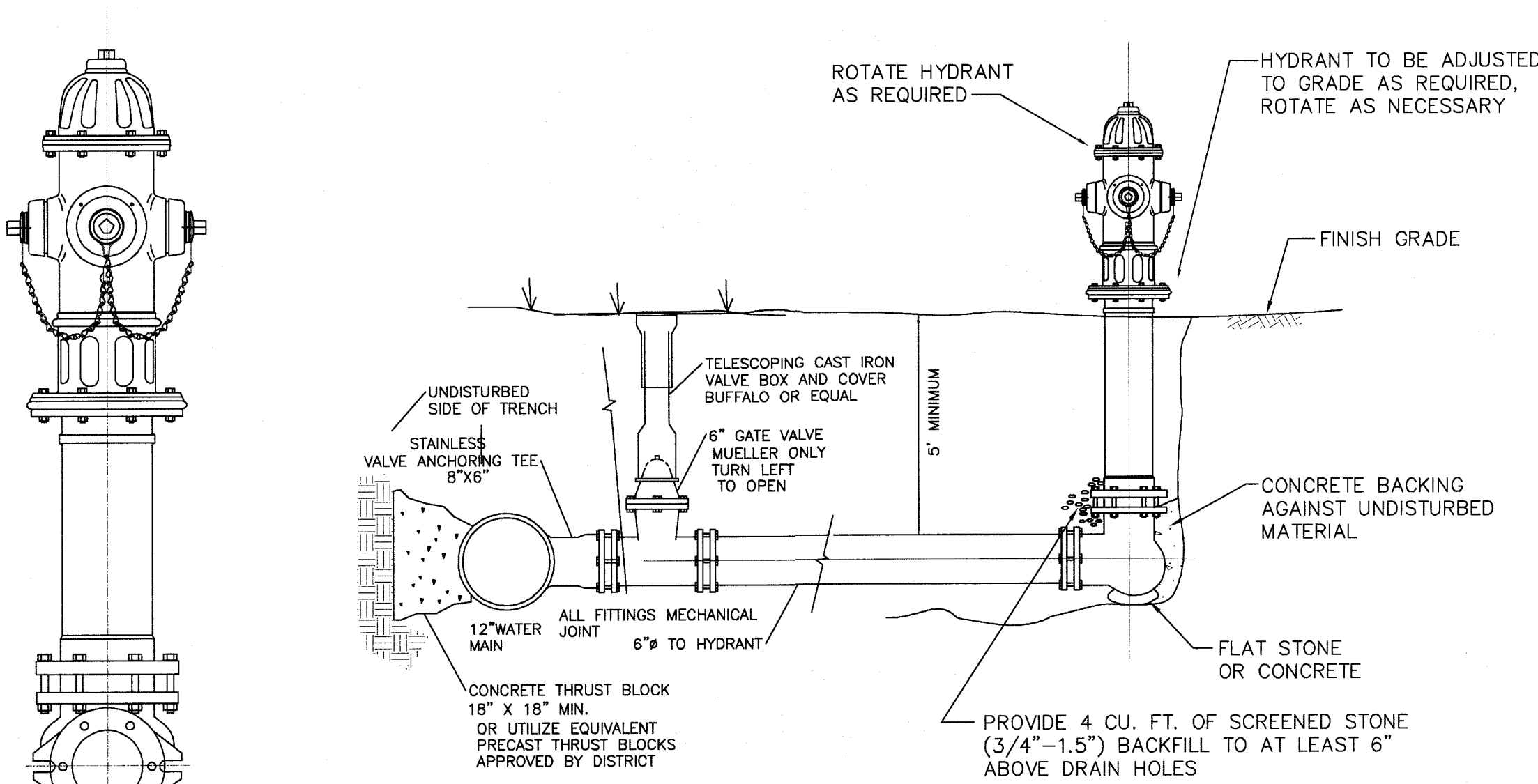
DRAINAGE CROSS SECTION
NOT TO SCALE



LOCUS MAP
SCALE 1"=2000'±
ASSESSORS MAP 77 PARCEL C20, C22
ASSESSORS MAP 65 PARCEL R2, R3

GENERAL NOTES:

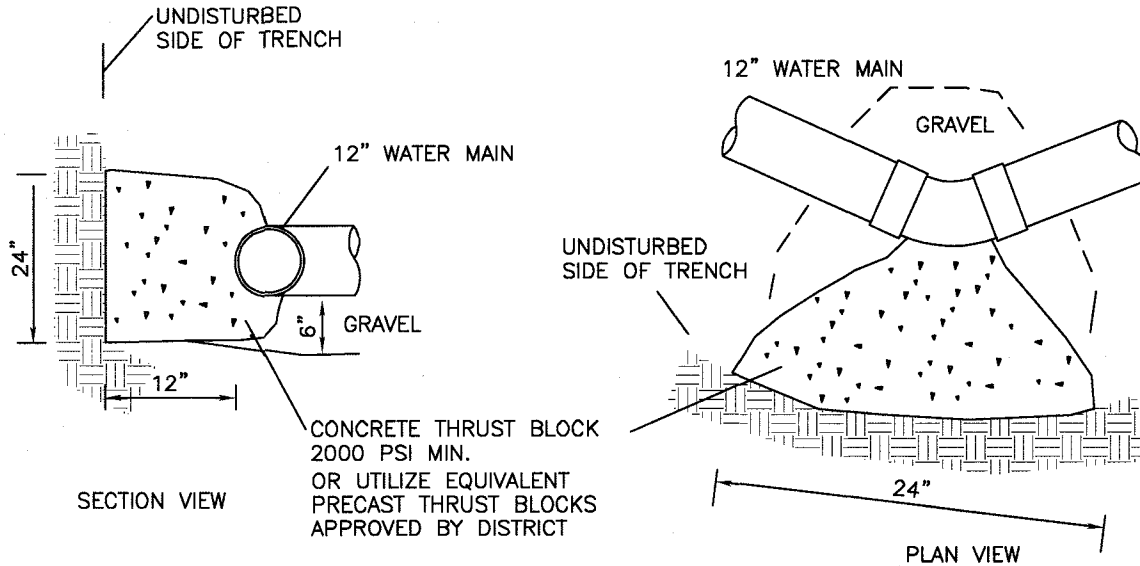
1. THE LOCATION OF EXISTING UNDERGROUND UTILITIES SHOWN ON THIS PLAN IS APPROXIMATE. PRIOR TO ANY EXCAVATION ON THIS SITE, THE EXCAVATING CONTRACTOR SHALL MAKE THE REQUIRED 72 HOUR NOTIFICATION TO DIG SAFE (1-888-344-7233) AND ANY OTHER UTILITIES WHICH MAY HAVE CABLE, PIPE OR EQUIPMENT IN THE CONSTRUCTION AREA FOR VERIFICATION OF LOCATIONS.
2. ALL CONSTRUCTION MATERIALS, COMPONENTS, AND METHODS EMPLOYED ON THIS PROJECT WORK SHALL CONFORM TO THE TOWN OF HARWICH SUBDIVISION REGULATIONS AND/OR THE MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS STANDARD SPECIFICATIONS FOR BRIDGES AND HIGHWAYS AS AMENDED TO PRESENT. ANY SEPTIC WORK AND MATERIALS TO CONFORM TO 310 CMR 15.00 TITLE 5. AND HARWICH HEALTH REGULATIONS.
3. VERTICAL DATUM IS NAVD88
4. TOPOGRAPHY AND DETAIL FROM SURVEYS BY DOWN CAPE ENGINEERING, INC.
5. DESIGN LOADING FOR ALL PRECAST UNITS TO BE AASHTO-H20 UNLESS NOTED.
6. CONTRACTOR TO COORDINATE ALL UTILITY INSTALLATIONS WITH APPROPRIATE VENDORS.
7. NOTIFY OWNERS ENGINEER AND HARWICH ENGINEERING DEPT. FOR INSPECTIONS. ROAD OPENING PERMITS MAY BE REQUIRED. CONTRACTOR RESPONSIBLE FOR ALL PERMITS/SAFETY PRECAUTIONS.



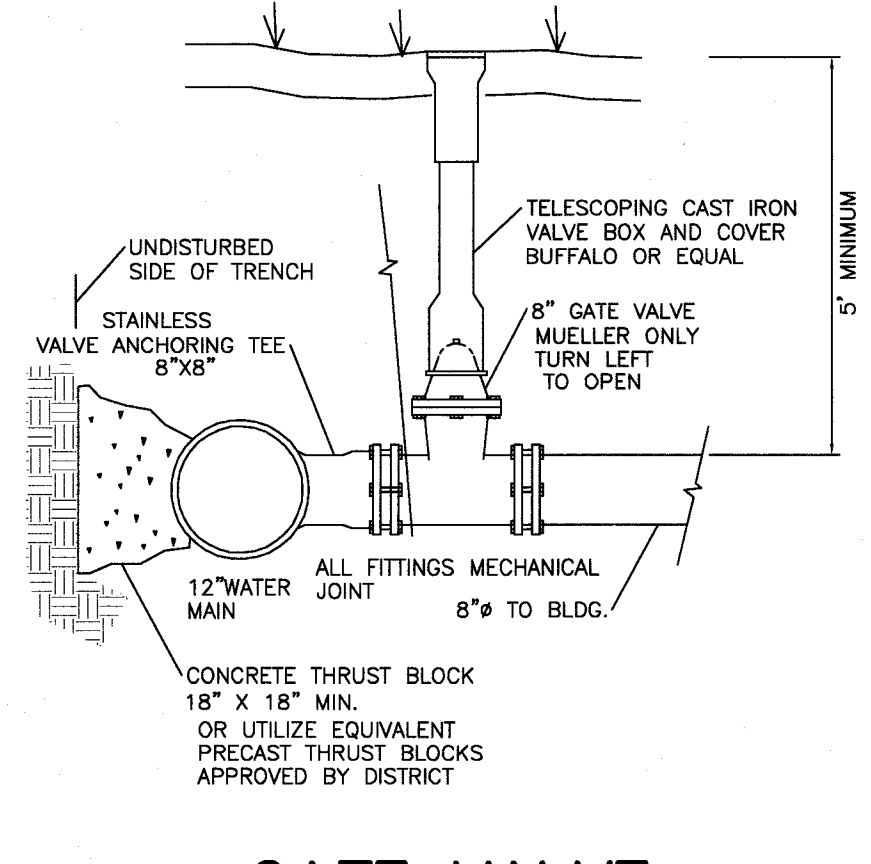
TYPICAL HYDRANT CONNECTION
NOT TO SCALE

WATER LINE NOTES:

1. ALL MATERIALS AND WORKMANSHIP TO CONFORM TO THE RULES, REGULATIONS AND SPECIFICATIONS OF THE HARWICH WATER DEPARTMENT AS AMENDED TO PRESENT. DISTRICT HAS AUTHORITY TO AMEND PLANS.
2. WATER MAIN AND FIRE SERVICE LINE SHALL BE CEMENT LINED DUCTILE IRON PIPE CLASS 52 8" DIA. DOMESTIC SERVICE TO BE 200 PSI CTS PLASTIC LINE TO DISTRICT SPECIFICATIONS.
3. GATE VALVE SHALL BE MUELLER ONLY. IRON BODY, BRONZE MOUNTED, DOUBLE DISC, WITH TWO INCH OPERATING NUT WITH MECHANICAL JOINT HUBS. GATE VALVE SHALL CONFORM IN EVERY RESPECT TO ALL APPLICABLE AWWA STANDARDS. VALVE SHALL BE DESIGNED FOR 200 PSI WORKING AND 300 PSI TEST PRESSURE AND SHALL OPEN LEFT.
4. VALVES SHALL ALSO CONFORM TO THE SPECIFICATIONS OF THE AWWA AS TO SIZE STEM, PITCH OF THREAD, GASKET SEATING AREA SHALL BE FULLY MACHINED TO THE FIXED DIMENSIONS AND TOLERANCES AS PER AWWA SPECIFICATIONS. ALL VALVES SHALL BE PROVIDED WITH "O" RINGS. THE DESIGN OF THE VALVE SHALL BE SUCH THAT THE SEAL PLATE CAN BE FITTED WITH NEW "O" RINGS WHILE THE VALVE IS UNDER PRESSURE IN THE FULLY OPEN POSITION.
5. VALVE BOXES SHALL BE BUFFALO OR PIONEER AND SHALL BE FURNISHED AND INSTALLED FOR ALL VALVES. THEY SHALL BE CAST IRON, TAR COATED, SLIDING TYPE ADJUSTABLE VALVE BOXES TOGETHER WITH CAST IRON COVERS. SEE DISTRICT REGULATIONS.
6. CONCRETE THRUST BLOCKS AS SHOWN, CONCRETE SHALL BE 1 PART CEMENT TO 2 PARTS SAND AND 4 PARTS COARSE AGGREGATE. CONCRETE CLASS "C" WITH A 28 DAY COMPRESSION STRENGTH OF 2000 PSI MINIMUM. MAXIMUM AGGREGATE SIZE OF 1-1/2". THRUST BLOCKS SIZED PER SPECIFICATIONS. ALTERNATELY PRECAST THRUST BLOCKS TO DISTRICT SPECIFICATIONS MAY BE UTILIZED.
7. CARE SHALL BE TAKEN TO ENSURE THAT ALL CONCRETE THRUST BLOCKS BEAR AGAINST UNDISTURBED TRENCH WALLS, AND NOT TO ENCASE FLANGES AND BOLTS ON MECHANICAL JOINT FITTINGS. WHERE UNSUITABLE BEARING MATERIAL IS ENCOUNTERED, EXCAVATE AND PLACE SUFFICIENT CONCRETE BALLAST TO OFFSET THE ANTICIPATED THRUSTS.
8. HARWICH WATER DEPARTMENT APPROVED CONTRACTOR AND INSPECTOR REQUIRED.
9. CONTRACTOR RESPONSIBLE FOR AS-BUILTS AND PLACING SAME ON ENGINEERED DRAWING AND SUBMITTING TO WATER DEPT. FOR THEIR RECORDS.
10. ALL FILL TO BE PLACED IN LIFTS AND ROLLED WITH A 10 TON VIBRATORY ROLLER TO ACHIEVE 95% MAX. DRY DENSITY IN ACCORDANCE WITH ASTM-1557, METHOD "D"



THRUST BLOCK
FOR 45 AND 22.5 DEG BENDS
NOT TO SCALE



GATE VALVE
NOT TO SCALE

INSPECTION OF REQUIRED IMPROVEMENTS

The following inspections of the required improvements will be made by the Town Engineer. (Form 7, Subdivision Road Construction Inspection Form, shall be used during each inspection.) These inspections may be in addition to any other inspection the Board may make or cause to be made. All sampling and testing of materials shall be performed by qualified personnel acceptable to the Town and shall be at the applicant's expense. At the discretion of the Town Engineer or the applicant's Engineer, additional sampling may be required.

1. First Inspection

An inspection will be made of the work upon completion of all clearing, grubbing, and excavation and all work incidental thereto as may be required in Section V, C. No fill shall have been placed at the time of this inspection.

2. Second Inspection

An inspection will be made of the completed drainage system (without backfill) as required herein or on the Definitive Plan. At the same time, or such other time as the work may be available, an inspection will be made of the completed utilities (without backfill) as required on the Definitive Plan. The inspection of the required utilities will be made by the agency responsible for the particular service as well as by the applicant's Engineer. The Town Engineer shall also be notified so that he or she may inspect the utilities prior to backfill. Each agency so involved will notify the Town Engineer of the approval of such work. Backfill of any portion of the drainage system or utilities shall not be made until after receipt of notification of approval or acceptance by the Town Engineer or agency responsible. The inspection of the construction of the ways shall include the inspection of the backfilling and compaction of all utility trenches as may be installed by utility companies and such work shall be performed in the manner as required by these Rules and Regulations. It shall be the applicant's responsibility to insure compliance with these requirements. If, in the opinion of the Planning Board, the backfilling and compaction of utility trenches and the patching of the pavement, if required, has not been performed in accordance with these Rules and Regulations, the Planning Board may not release the bond or covenant applicable until such work has been performed to the satisfaction of the Planning Board.

3. Third Inspection

An inspection will be made of the compacted fill as specified in Section V, G., and as may be required to bring the roadways to their proposed grades. The applicant shall notify the Town and the Town Engineer as to the source of gravel for fill as soon as such information is known, so that samples may be taken and analyzed by the Town and the Town Engineer. The applicant is hereby advised not to proceed with the filling operation until the Town and the Town Engineer notify the applicant that the gravel proposed for the fill is acceptable. If the applicant proceeds with the fill prior to such notice, this act shall be at the applicant's own risk. The applicant shall not use a gravel source other than the one designated without prior notice to the Board and the Town Engineer. The applicant's Engineer or the Town Engineer may also require compaction tests.

4. Fourth Inspection

An inspection will be made of the first layer of compacted roadway foundation (stone dust, gravel, processed stone, or reclaimed asphalt) as specified in Section V, H. A gravel sample or samples may be taken at the option of the Town Engineer, in the same manner as prescribed for the Third Inspection. Compaction tests may also be required by the applicant's Engineer or the Town Engineer.

5. Fifth Inspection

An inspection will be made of the final layer of compacted roadway foundation (processed stone) prior to the application of the concrete penetration as specified in Section V, H. and gravel sample may be taken by the Town Engineer. Compaction tests may also be required by the applicant's Engineer or the Town Engineer.

6. Sixth Inspection

An inspection of the binder course (bituminous concrete) will be made during placement and following completion. If required, samples of the mix shall be taken by the applicant's Engineer or the Town Engineer for the purposes of performing extraction tests, compaction tests, or pavement thickness tests. Core drill samples may be required at the applicant's expense. Certified paving slips indicating bituminous concrete quantities shall be submitted to the applicant's Engineer who will tabulate the quantities, check the correlation with the anticipated quantities, and then forward the slips and a report to the Town Engineer.

7. Seventh Inspection

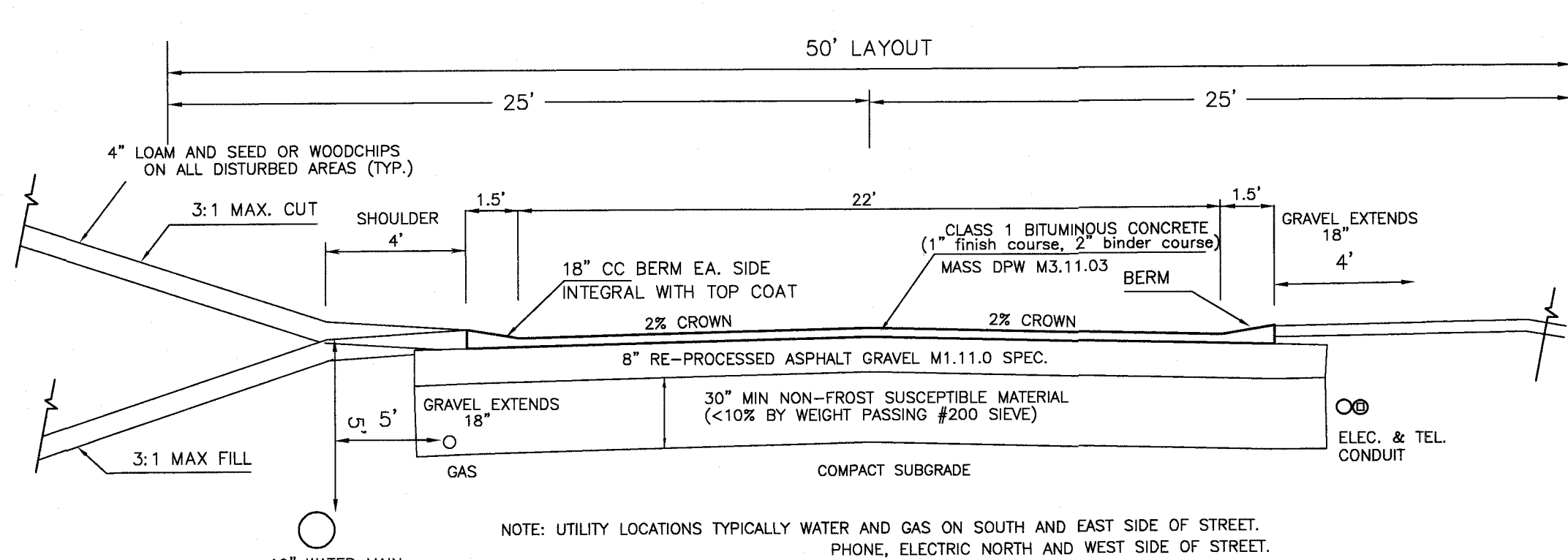
An inspection of the finish course (bituminous concrete) before, during, and following the placement of the mix shall be performed. A tack coat shall be applied to the binder course of mix prior to placement of the top coat where required by the applicant's Engineer or the Town Engineer. The requirements regarding sampling, testing, and quantity slips indicated in paragraph 6 above for binder course shall also apply to the top course.

8. Eighth Inspection

An inspection will be made of all work as required on sidewalks, berms, topsoil, hydroseeding, open space, side slopes, monuments, bounds, and street signs.

9. Ninth Inspection

A final inspection will be made of all subsequent work as required herein or on the Definitive Plan, which shall include the final clean up. An as-built plan shall be filed following this inspection.



TYPICAL SECTION THRU PAVEMENT
NOT TO SCALE

DETAIL SHEET
TO ACCOMPANY
DEFINITIVE
SUBDIVISION PLAN OF LAND
OFF LITTLEFIELD POND ROAD
HARWICH, MA

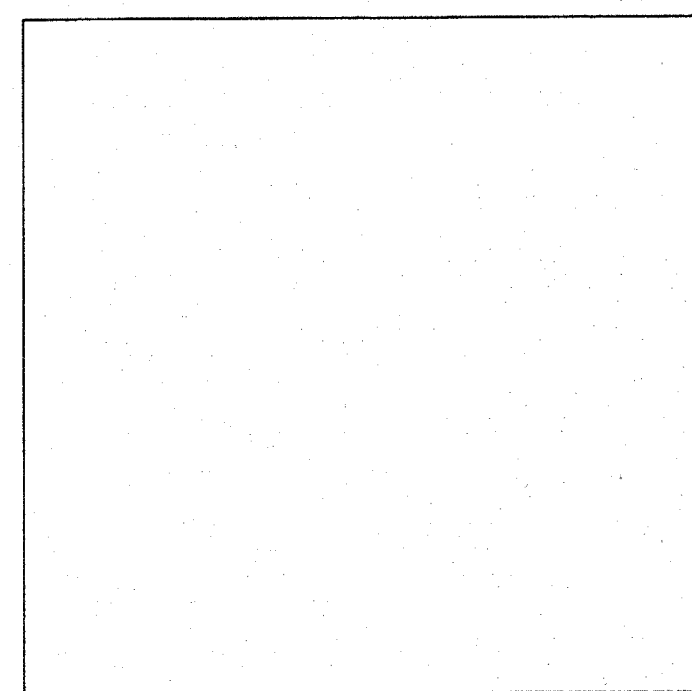
PREPARED FOR
R.B.OUR Co. ET AL

DATE: JANUARY 26, 2022
REVISED: DECEMBER 27, 2022

Scale: 1"= 40'
0 20 40 60 80 100 FEET



down cape engineering, inc.
civil engineers
land surveyors
939 Main Street (Rte 6A)
YARMOUTHPORT MA 02675



FOR REGISTRY USE

HARWICH PLANNING BOARD

APPROVAL UNDER THE SUBDIVISION
CONTROL LAW IS REQUIRED

DATE: 3/28/2023

Ann C. Tucker
Philip J. ...
...

I, Emily Mitchell
CLERK OF THE TOWN OF HARWICH, CERTIFY
THAT THE NOTICE OF APPROVAL OF THIS PLAN
WAS RECEIVED AND RECORDED IN THIS OFFICE
AND THAT NO NOTICE OF APPEAL WAS
RECEIVED DURING THE TWENTY DAYS NEXT
FOLLOWING THE RECEIPT AND RECORDING OF
SAID NOTICE.

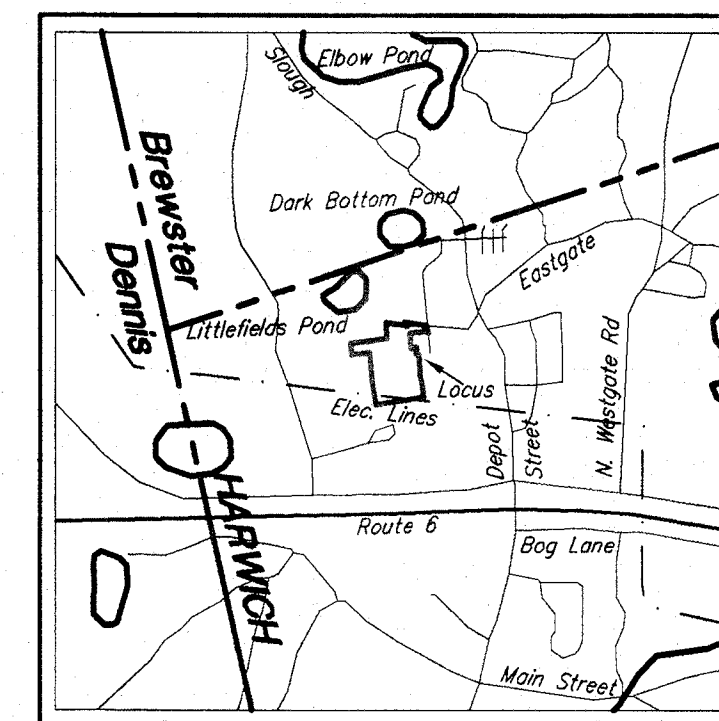
Emily Mitchell
TOWN CLERK

ABUTTER: PARCEL D
PB 688 PG 98
100,724 S.F.±
2.3 ACRES±
MAP 65 PARCEL R3
BRYAN BLANCHARD
DB 30127 PG 308

ABUTTER: PARCEL C
PB 688 PG 98
44,548 S.F.±
1.0 ACRES±
P/O MAP 65 PARCEL R2
CHRISTOPHER W. OUR
DB 30127 PG 311

ADDITIONAL
VEGETATION & WILDLIFE
CONSERVANCY AREAS
ON PCL C & PCL D PB 688
PG 98 - 2.61 AC.±
SEE SITE OVERVIEW AND
SEPARATE PLAN

DCE #17-198



LOCUS MAP

SCALE 1"=2000'±
ASSESSORS MAP 77 PARCEL C20, C22
ASSESSORS MAP 65 PARCEL R2, R3

ZONING SUMMARY

ZONING DISTRICT: RR DISTRICT
REQUIRED:
MIN. LOT SIZE 40,000 S.F.(0.92 AC.)
MIN. LOT FRONTAGE 150'
MIN. FRONT SETBACK 25'
MIN. SIDE SETBACK 20'
MIN. REAR SETBACK 20'
MAX. BUILDING HEIGHT 30'
MAX. BUILDING COVERAGE 15%
MAX. SITE COVERAGE 25%
LOT WIDTH: 120' AT SETBACK
*35' FRONTAGE AT PANHANDLE

REFERENCES

DEED BOOK 29526 PAGE 215
DEED BOOK 30061 PAGE 204
DEED BOOK 30127 PAGE 308
DEED BOOK 30127 PAGE 311
DEED BOOK 31689 PAGE 91 LCP 39519A
PLAN BOOK 558 PAGE 83 PB 637 PG 100
PLAN BOOK 603 PAGE 98 PB 625 PG 94-96
PLAN BOOK 672 PAGE 83 PB 637 PG 100
PLAN BOOK 688 PAGE 98 PB 658 PG 30

OWNER OF RECORD

CHRISTOPHER W OUR
56 OBED BROOKS RD
HARWICH, MA 02645

HYBRID BUILT HOME LLC
76 KILBY ST
HINGHAM, MA 02043

JANET SHEA OUR
56 OBED BROOKS RD
HARWICH, MA 02645

BRYAN BLANCHARD
23 SKIPPER SHEA LN
HARWICH, MA 02645

SCOTT OWEN OUR
101 LOVERS LN
HARWICH, MA 02645

NOTES:

CEMENT BOUNDS TO BE SET ON
ALL LOT CORNERS, ROADWAY
POINTS OF CURVATURE, AND
CONSERVANCY AREA
CORNERS/LINES AS INDICATED.
PLAN SUBJECT TO COVENANT TO BE
FILED HEREWITH.

NOTE:

AREAS OF SUBDIVISION:
ROADWAY: 58,574 SF 1.35 AC.
LOTS: 334,714 SF 7.68 AC.
TOTAL: 393,288 SF 9.03 AC.

AREA DISTURBED FOR ROAD, DRAINAGE,
HOUSES, DRIVES, LAWN, SEPTIC
ESTIMATED TO BE 4.3 ACRES±.

5.5 AC± PROPOSED VEGETATION AND
WILDLIFE CONSERVANCY AREA, INCLUDING
2.61 AC. OFFSITE VEGETATION AND
WILDLIFE CONSERVANCY AREA. (NO
CORRALS ALLOWED IN RESTRICTED
ELECTRICAL EASEMENT AREA, NO
DEVELOPMENT ELSEWHERE IN DEDICATED
CONSERVANCY AREAS. SEE COVENANTS
TO BE RECORDED WITH PLAN AND
DEEDS OUT.

THIS PLAN AND THE ACCOMPANYING
CERTIFICATIONS DO NOT CONSTITUTE A
CERTIFICATION OF TITLE TO THE
PROPERTY DISPLAYED HEREON. THE
OWNERS OF THIS PROPERTY AND OF
ABUTTING PROPERTY ARE SHOWN
ACCORDING TO CURRENT TOWN RECORDS.

LEGEND:

- VEGETATION & WILDLIFE
CONSERVANCY AREAS
(241,776 SF OR 5.55 AC.)
- CONCRETE BOUND FOUND
- STAKE FOUND
- IRON PIPE FOUND
- OVERHEAD ELECTRIC LINES
- CONCRETE BOUND TO BE SET

DEFINITIVE SUBDIVISION PLAN OF LAND OFF LITTLEFIELD POND ROAD HARWICH, MA

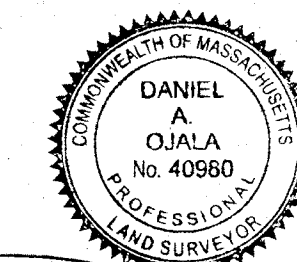
PREPARED FOR

R.B.OUR Co. ET AL

DATE: JANUARY 26, 2022

Scale: 1"= 40'
0 20 40 60 80 100 FEET

I CERTIFY THAT THIS PLAN WAS MADE IN
ACCORDANCE WITH REGISTRY OF DEEDS
REGULATIONS EFFECTIVE JANUARY 1,
1976, AND AS AMENDED JANUARY 7,
1988.



1-26-22
DATE
DANIEL A. OJALA, P.L.S.

off 508-362-4541
fax 508-362-9880
downcape.com
down cape engineering, inc.
civil engineers
land surveyors
939 Main Street (Rte 6A)
YARMOUTHPORT MA 02675



down cape engineering, Inc.

CIVIL ENGINEERS & LAND SURVEYORS

939 MAIN ST / ROUTE 6A YARMOUTHPORT, MA 02675

(508) 362-4541 FAX (508) 362-9880



Stormwater Management Report

Fish & Game Drive and Wildlife Circle
Proposed Subdivision
Harwich, MA

DATE: 12/20/23

PREPARED FOR: Chris Our

Table of contents in Stormwater O&M plan



D. Ojala - 12/20/23

STORMWATER OPERATIONS AND MAINTENANCE PLAN:

Fish & Game Drive and Wildlife Circle, Harwich, MA

DATE: 12-20-23

Prepared by: down cape engineering, inc.

939 Route 6a Yarmouthport, MA 02675

Ph. 1-508-362-4541

Fax 1-508-362-9880

STORMWATER OPERATIONS AND MAINTENANCE PLAN:

Fish & Game Drive and Wildlife Circle, Harwich, MA

TABLE OF CONTENTS

1. Owner of Stormwater System and Responsible Party for Operation and Maintenance
2. Overview of Stormwater Management System
3. Source Control Best Management Practices
4. Schedule of Inspection and Maintenance of System
5. Plan of Stormwater BMPs location for maintenance (see attached Site Plans)
6. Estimated operations and maintenance budget
7. Operations and maintenance Log Form
8. Emergency Spill Contingency Plan
9. Construction Period O&M (also see SWPPP)
10. LTPPP
11. Checklist for Stormwater Report
12. Soil Map
13. eNOI filing for CGP, SWPPP with covenants, Hydrogeologic information
14. Drainage Hydraulic Calculations, HydroCAD output files
15. Full size drainage area and ESCPlans, Design Plans showing drainage system

STORMWATER OPERATIONS AND MAINTENANCE PLAN:

Fish & Game Drive and Wildlife Circle, Harwich, MA

**OWNER OF STORMWATER SYSTEM AND
RESPONSIBLE PARTY FOR OPERATIONS AND
MAINTENANCE:**

OWNER/RESPONSIBLE PARTY:

Chris Our
56 Obed Brooks Road
Harwich, MA
508-432-0530



down cape engineering, inc.

CIVIL ENGINEERS & LAND SURVEYORS

939 MAIN ST / ROUTE 6A YARMOUTHPORT, MA 02675

(508) 362-4541 FAX (508) 362-9880



STORMWATER NARRATIVE:

Fish & Game Drive & Wildlife Circle, Harwich, MA.

Date: 12-19-23 © 2023 down cape engineering, inc.

OVERVIEW OF STORMWATER MANAGEMENT SYSTEM/ NARRATIVE INDICATING STORMWATER STANDARDS COMPLIANCE:

The drainage systems specified for proposed development have been designed in accordance with Town of Harwich Subdivision Rules and Regulations, the Comprehensive Stormwater and Illicit Discharge Regulations of the Town of Harwich, and the State Stormwater Management Guidelines. The project consists of a seven-lot residential subdivision. Full compliance with all Stormwater Standards is met by the design.

The site is within the Residential (RR) zoning district. The site is not a "Land Use with Higher Potential Pollutant Load" per the State Stormwater Management Guidelines, so infiltration after pretreatment is utilized. The underlying material is sand, hydrologic group A under the guidelines. Soils maps indicating the Carver Coarse Sand designation and mapping are included at the end of the report.

During construction, the installation of a silt controls where needed and a stone construction apron will provide full protection of the abutters and roadway. A silt fence for the turtle protection plan will also remain in place for the duration of the construction, a turtle sweep has already been completed. The erosion control fence is to be inspected after every rain event and is to be maintained until the site is stabilized and permission obtained for removal. The stone drive apron will be utilized in the roadway entrance area during the work. There are no wetlands near the work areas, silt fences and a topographical break separate the work from a small wetland to the west of the property. To assist in low impact design, a waiver from sidewalk construction was sought to reduce impervious areas on the site.

The proposed offline deep sump hooded catch basins overflow to secondary deep sump hooded manholes installed prior to the infiltration units, so the design meets the 44% TSS removal prior to infiltration as required by the Standards. A natural drainage overflow area is proposed to help remove nitrogen and phosphorus. The infiltration system is sized per the subdivision guidelines using HydroCAD calculations, which shows a 25 year storm event is contained and infiltrated onsite and provides the required Total Suspended Solids (TSS) removal mandated by the State Stormwater Management Guidelines. The calculations show a reduction in each of the required storms including the 100 year storm event between pre and post development hydrographs. The stormwater for all events is infiltrated on the onsite system and natural overflow areas, so no offsite flow is produced. Since all stormwater is infiltrated onsite, the peak reduction required by the regulations is easily met. The proposed stormwater management system will also therefore provide well in excess of the required one inch of runoff retention from impervious areas on the site. Per Table 3-10 of Appendix F of the Massachusetts MS4 permit this onsite infiltration will mitigate 100% of the total nitrogen and phosphorous load in the stormwater, Table 3-10 is included in the LTPPP section of this report. A Construction General Permit has been filed for the site, as approximately 4 acres of land will be disturbed including the home sites. A SWPPP has been developed, and is attached for reference.

The stormwater owner/operators, description of construction, sequencing, required maps, and list of pollutants, BMP's, waste management, spill prevention, maintenance schedules, etc. are all listed in the SWPPP per the regulations.

Best Management Practices incorporated in the project are as follows:

- Rain Gardens / Bioinfiltration areas (90% TSS Removal)
- Deep Sump Hooded Catch Basins offline (25% TSS Removal)
- Secondary Deep Sump Hooded Manholes (25% TSS Removal)
- Infiltration pits (80% TSS Removal)

Compliance with the 10 State Stormwater Standards (in order in bold with explanation in lighter font following the numbered Standards is as follows:

1. **No new stormwater conveyances (e.g. outfalls) may discharge untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth.**
The project prevents existing stormwater from entering waters of the Commonwealth, and no new outfalls are proposed, so this standard is met and exceeded. The local regulation require a 25 year storm be infiltrated 100% onsite, far exceeding the State requirements.
2. **Stormwater management systems shall be designed so that post-development peak discharge rates do not exceed pre-development peak discharge rates. This Standard may be waived for discharges to land subject to coastal storm flowage as defined in 310 CMR 10.04.**
The sandy soils permit onsite infiltration, the proposed drainage system will infiltrate a 25 year storm event onsite per the attached calculations, so this Standard is easily met by the proposal. Since the majority of a 100 year storm with Type III distribution (high peak) is also infiltrated onsite no greater impact to abutters than existing is assured. A failsafe overflow natural area is utilized.
3. **Loss of annual recharge to groundwater shall be eliminated or minimized through the use of infiltration measures including environmentally sensitive site design, low impact development techniques, stormwater best management practices, and good operation and maintenance. At a minimum, the annual recharge from the post-development site shall approximate the annual recharge from pre-development conditions based on soil type. This Standard is met when the stormwater management system is designed to infiltrate the required recharge volume as determined in accordance with the Massachusetts Stormwater Handbook.**
Local Town of Harwich requirements call for all stormwater to be infiltrated onsite for proposed subdivisions, and the proposed development complies with this standard, so the annual recharge is easily met.
4. **Stormwater management systems shall be designed to remove 80% of the average annual post-construction load of Total Suspended Solids (TSS). This Standard is met when:**
 - a. Suitable practices for source control and pollution prevention are identified in a long-term pollution prevention plan, and thereafter are implemented and maintained;
 - b. Structural stormwater best management practices are sized to capture the required water quality volume determined in accordance with the Massachusetts Stormwater Handbook; and
 - c. Pretreatment is provided in accordance with the Massachusetts Stormwater Handbook.

A long term pollution prevention plan is to be attached, in excess of the correct volumes are captured, and pretreatment is provided per the Handbook, so compliance with #4 is assured.
5. **For land uses with higher potential pollutant loads, source control and pollution prevention shall be implemented in accordance with the Massachusetts Stormwater Handbook to eliminate or reduce the discharge of stormwater runoff from such land uses to the maximum extent practicable. If through source control and/or pollution prevention all land uses with higher potential pollutant loads cannot be completely protected from exposure to rain, snow, snow melt,**

and stormwater runoff, the proponent shall use the specific structural stormwater BMPs determined by the Department to be suitable for such uses as provided in the Massachusetts Stormwater Handbook. Stormwater discharges from land uses with higher potential pollutant loads shall also comply with the requirements of the Massachusetts Clean Waters Act, M.G.L. c.

21, §§ 26-53 and the regulations promulgated thereunder at 314 CMR 3.00, 314 CMR 4.00 and 314 CMR 5.00. The standard residential lots and roadway are not applicable to higher potential pollutant loads per the Handbook, so this standard is "Not Applicable" for this site. (note that 44% TSS removal pretreatment is provided prior to infiltration).

6. Stormwater discharges within the Zone II or Interim Wellhead Protection Area of a public water supply, and stormwater discharges near or to any other critical area, require the use of the specific source control and pollution prevention measures and the specific structural stormwater best management practices determined by the Department to be suitable for managing discharges to such areas, as provided in the Massachusetts Stormwater Handbook. A discharge is near a critical area if there is a strong likelihood of a significant impact occurring to said area, taking into account site-specific factors. Stormwater discharges to Outstanding Resource Waters and Special Resource Waters shall be removed and set back from the receiving water or wetland and receive the highest and best practical method of treatment. A "storm water discharge" as defined in 314 CMR 3.04(2)(a)1 or (b) to an Outstanding Resource Water or Special Resource Water shall comply with 314 CMR 3.00 and 314 CMR 4.00. Stormwater discharges to a Zone I or Zone A are prohibited unless essential to the operation of a public water supply. The site is not within a Zone I, Zone A, the site is partially within a Zone II, and is limited to 1 bedroom per 10,000 sf by the BOH. A Wildlife and Vegetation Conservancy area restricting clearing and brushing is proposed, the perimeter buffer assists in infiltrating and treating stormwater with vegetative uptake of nitrogen and phosphorous, see definitive plan for monumented area limits, and Declaration of Protective Covenants, Permanent Restrictions, Rights and Reservations attached to the stormwater report and on file with the Planning Department.

7. A redevelopment project is required to meet the following Stormwater Management Standards only to the maximum extent practicable: Standard 2, Standard 3, and the pretreatment and structural best management practice requirements of Standards 4, 5, and 6. Existing stormwater discharges shall comply with Standard 1 only to the maximum extent practicable. A redevelopment project shall also comply with all other requirements of the Stormwater Management Standards and improve existing conditions. This project fully complies with the standards.

8. A plan to control construction-related impacts including erosion, sedimentation and other pollutant sources during construction and land disturbance activities (construction period erosion, sedimentation, and pollution prevention plan) shall be developed and implemented. The plans are attached,

9. A long-term operation and maintenance plan shall be developed and implemented to ensure that stormwater management systems function as designed. The plan to be attached.

10. All illicit discharges to the stormwater management system are prohibited. No illicit discharges are allowed or planned related to this site. Additional documentation will be filed per the stormwater instructions. (Illicit Discharge Statement).

As shown above and in the following calculations, the proposed site will be compliant with the State Stormwater Management Guidelines and the Harwich Comprehensive Stormwater regulations.

STORMWATER OPERATIONS AND MAINTENANCE PLAN:

Fish & Game Drive and Wildlife Circle, Harwich, MA

SOURCE CONTROL BEST MANAGEMENT PRACTICES:

1. The pavement should be swept after the last snowfall of the season (sweep on or about April 1st) and when necessary to remove accumulated debris, drywells to be inspected annually.
2. No illicit discharges of any type are allowed into the storm water drainage system or sewer system. Personnel should be instructed in proper disposal of any cleaning materials, paints, chemicals, or other potentially harmful substances utilized on or about the property. Soaps and other deliveries shall be at the loading dock only, to minimize lifting and potential drops of heavier items.

STORMWATER OPERATIONS AND MAINTENANCE PLAN:

Fish & Game Drive and Wildlife Circle, Harwich, MA

SCHEDULE OF INSPECTION AND MAINTENANCE OF STORMWATER MANAGEMENT SYSTEM:

SCHEDULE OF INSPECTION AND MAINTENANCE:

The stormwater management system proposed for the site requires regular inspection and maintenance to ensure proper operation and effectiveness.

1. It is recommended that the stormwater system proposed for the site be inspected annually, and sediment removed from the catch basins as required. The inspection should involve physical inspection of the catch basins and manholes for sediment buildup and inspecting the drywells for solids carryover. If significant solids are found in the basins (more than 2"), basins shall be mechanically cleaned, and the sediment disposed of offsite in compliance with all local, state, and federal regulations. If slow infiltration is noted during storm events, the bottom of the bioretention area should be scarified to restore infiltration, and if required the infiltration pits should be repaired or rebuilt as necessary to restore function.
2. The roadway shall be swept free of sand after the last snowfall of each season, generally on or about April 1st.
3. Repair any damage to paved aprons, overflow spillways, reset/rebuild as required.
4. Operations and maintenance reports are to be maintained by owner for 5 year history

STORMWATER OPERATIONS AND MAINTENANCE PLAN:

**ESTIMATED OPERATIONS AND MAINTENANCE
BUDGET:**

Inspections: Annual inspection of drainage system:

**Visual inspection, probe sediment depth, review for signs of drainage issues, ...Est.
\$150/visit = \$150/year.**

**Maintenance of retention areas- mowing to be part of regular yardwork, removal
of sediment retilling bottom once per 8 years at \$1600 = \$200/yr**

Catch basin cleaning: Est. once every 2 years - \$150/year.

Street Sweeping: Est. \$400/visit.

INSPECTION AND MAINTENANCE LOG FORM-
Long Term Pollution Prevention and Erosion and Sedimentation
Control

Project Name: Our Subdivision

Owner: Chris Our

Contractor:

Date Description of Inspection or Maintenance Person Comments
(Sweep road, apron maintenance, silt fence, etc.)

STORMWATER OPERATIONS AND MAINTENANCE PLAN:

EMERGENCY SPILL CONTINGENCY PLAN:

1. The owner of the facility shall have a designated person with overall responsibility for spill response.
2. A summary of this plan shall be posted in a prominent location in the building. The Summary shall identify the phone numbers of regulatory agencies and individuals to be contacted in the event of a spill.
3. In the event of a spill, the following shall be notified: (emergencies dial 911)
 - a) Harwich Fire Department 1-508-430-7546
(For a gasoline or hazardous materials spill)
 - b) Department of Environmental Protection 1-508-946-2850
Emergency Response
 - c) Harwich Water Department 1-508-432-0304
 - d) Harwich Board of Health 1-508-430-7509
4. Notification of authorities for the cleanup of spills shall be done immediately upon discovery of a spill, except for minor spills inside the building which can be managed by onsite personnel. Any release to the environment must be reported immediately.

**CONSTRUCTION PERIOD POLLUTION
AND EROSION AND SEDIMENTATION
CONTROL PLAN:**

DATE: 10-8-2021

Prepared by: down cape engineering, inc.

939 Route 6a Yarmouthport, MA 02675

Ph. 1-508-362-4541

Fax 1-508-362-9880

**CONSTRUCTION PERIOD POLLUTION AND EROSION AND SEDIMENTATION CONTROL
PLAN:**

Fish & Game Drive and Wildlife Circle, Harwich, MA

TABLE OF CONTENTS

1. Narrative
2. Construction Period Operation and Maintenance Plan
3. Responsible Party for Plan Compliance
4. Erosion and Sedimentation Control Plan Drawings (see separate full-size plans install silt fence at downgradient proposed fenceline)
5. Detail drawings and specifications for erosion control BMP's (see separate sheets)
6. Vegetation Planning (see separate sheets)
7. Site Development Plans (see separate sheets/contract documents)
8. Construction Sequencing Plan
9. Sequencing of Erosion and Sedimentation Controls
10. Schedule of Inspection
11. Schedule of Maintenance
12. Inspection and Maintenance Log Form

*SEE ALSO c NO1 + SWPPP
Construction General Permit*

**CONSTRUCTION PERIOD POLLUTION AND EROSION AND SEDIMENTATION CONTROL
PLAN:**

Fish & Game Drive and Wildlife Circle, Harwich, MA

RESPONSIBLE PARTY FOR PLAN COMPLIANCE:

OWNER/RESPONSIBLE PARTY:

Chris Our
56 Obed Brooks Road
Harwich, MA
508-432-0530

CONSTRUCTION PERIOD POLLUTION AND EROSION AND SEDIMENTATION CONTROL PLAN:

Fish & Game Drive and Wildlife Circle, Harwich, MA

NARRATIVE OF CONSTRUCTION PERIOD POLLUTION AND EROSION AND SEDIMENTATION CONTROL PLAN:

The development proposal for Fish & Game Drive and Wildlife Circle, Harwich consists of a seven-lot residential subdivision and roadway. Erosion control consisting of silt fencing will be utilized to reduce the chance of any storm water pollution resulting from silt washing from the subject property. The underlying base soil material is clean sand, hydrologic group A. The drainage system utilizes deep sump hooded catch basins leading to leaching pits and a natural overflow drainage basin. The proposed work will generate a small potential for construction silt to leave the site. Temporary haybales are to be utilized where required near the daily construction areas, and silt fencing installed on the downgradient edges is to be installed prior to any other work on the site.

During construction, the natural sandy perimeter of the site, natural drainage areas, and the installation of a silt fence near the downgradient borders will provide protection from off site runoff. The rain garden areas will be excavated and utilized for stormwater infiltration during construction. Any construction silt is to be removed from the bottom of the natural drainage areas prior to final construction of the drainage structures. The erosion control fence is to be inspected after every 1/4" rain event and is to be maintained until the site is stabilized and a certificate of compliance obtained. A dedicated stone construction apron is planned.

CONSTRUCTION PERIOD POLLUTION AND EROSION AND SEDIMENTATION CONTROL PLAN:

Fish & Game Drive and Wildlife Circle, Harwich, MA

CONSTRUCTION PERIOD OPERATION AND MAINTENANCE PLAN:

Construction Period Operation and Maintenance shall consist of installation and maintenance of appropriate erosion and sedimentation controls and best management practices such as litter pickup. The Operations and Maintenance will be per the schedule attached to this plan. The sediment barriers will be inspected after every rain event in excess of ¼" of precipitation. The inspection should involve physical inspection the silt fence for sediment buildup or solids carryover. If significant sediments are found against the silt fence the silt shall be mechanically removed. The crushed stone entrance apron shall be maintained, and the paved roadway shall be inspected for vehicle tracking and swept as required to prevent sediment from reaching the street infiltration systems. The proposed natural drainage areas will be utilized for stormwater control during the construction process. If siltation slows the infiltration of the temporary infiltration area, the bottom of the drainage area shall be cleaned of silt such that the infiltration capacity is restored.

CONSTRUCTION PERIOD POLLUTION AND EROSION AND SEDIMENTATION CONTROL PLAN:

Fish & Game Drive and Wildlife Circle, Harwich, MA

Construction Sequencing Plan:

The site will proceed continuously from silt fence installation, stone apron installation, site clearing, to utility and drainage installation, construction roadway base layers, paving, and then final landscaping work.

The silt fence installed at the downgradient proposed work limit line will not be removed until the site is fully stabilized after construction.

SEQUENCING OF EROSION AND SEDIMENTATION CONTROLS:

The erosion and sedimentation controls will be placed per plan as follows:

1. Work limit lines shall be staked in the field under the supervision of a Licensed Professional Land Surveyor to ensure accurate placement.
2. The silt fence line shall be installed as shown on the plans.
3. The washed stone construction apron shall be installed at the entrance of the site
4. The natural drainage areas shall be utilized for stormwater control during the construction process.

CONSTRUCTION PERIOD POLLUTION AND EROSION AND SEDIMENTATION CONTROL PLAN:

SCHEDULE OF INSPECTION AND MAINTENANCE OF STORMWATER MANAGEMENT SYSTEM:

**SCHEDULE OF INSPECTION AND
SCHEDULE OF MAINTENANCE:**

The erosion and sediment control plan proposed for the site requires regular inspection and maintenance to ensure proper operation and effectiveness.

1. The sediment barriers should be inspected after every rain event in excess of one-quarter inch of precipitation.
2. The inspection should involve physical inspection the silt fence for sediment buildup or solids carryover.
3. If significant sediments are found against the silt fence (more than 6" buildup measured from grade) the silt shall be mechanically removed.
4. The natural drainage areas shall be inspected, and any significant buildup of silt shall be removed. The infiltration pits shall not be utilized until the site is paved and stable.
5. The roadway shall be inspected for vehicle tracking and swept as required to prevent sediment from reaching the roadway drainage system, the operator shall monitor weather forecasts regularly to ensure timely sweeping prior to large rain events.

LONG TERM POLLUTION PREVENTION PLAN

Fish & Game Drive and Wildlife Circle, Harwich, MA

DATE: 1/23/2023

Prepared by: down cape engineering, inc.

939 Route 6a Yarmouthport, MA 02675

Ph. 1-508-362-4541

Fax 1-508-362-9880

LONG TERM POLLUTION PREVENTION PLAN:

Fish & Game Drive and Wildlife Circle, Harwich, MA

- 1. Street Sweeping of roadway shall be performed on or about April 1st of every year.**
- 2. Ongoing maintenance of stormwater drainage systems shall be per O&M plan.**
- 3. Spill response plan shall be posted per Stormwater O&M plan.**
- 4. Excessive use of fertilizers, herbicides, and pesticides shall be avoided.**
- 5. Illicit discharges to the stormwater management system or waters of the Commonwealth are prohibited, and personnel shall be instructed that no such discharges are allowed.**

INSPECTION AND MAINTENANCE LOG FORM-
Long Term Pollution Prevention and Erosion and Sedimentation
Control

Project Name: Our Subdivision

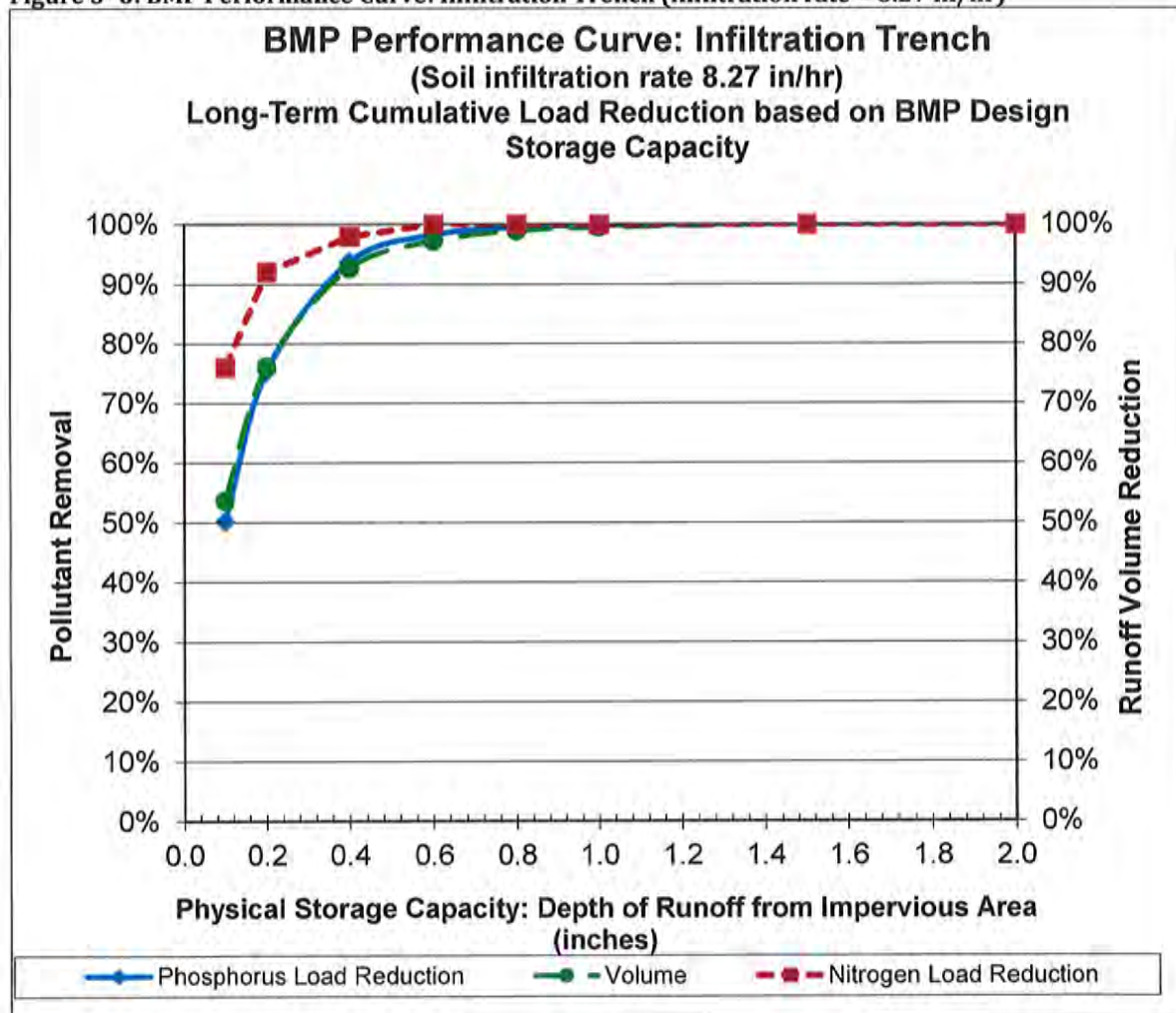
Owner: Chris Our

Contractor:

Date Description of Inspection or Maintenance Person Comments
(Sweep road, apron maintenance, silt fence, etc.)

Table 3- 11: Infiltration Trench (8.27 in/hr) BMP Performance Table

Infiltration Trench (8.27 in/hr) BMP Performance Table: Long-Term Phosphorus & Nitrogen Load Reduction								
BMP Capacity: Depth of Runoff from Impervious Area (inches)	0.1	0.2	0.4	0.6	0.8	1.0	1.5	2.0
Runoff Volume Reduction	53.6%	76.1%	92.6%	97.2%	98.9%	99.5%	100.0%	100.0%
Cumulative Phosphorus Load Reduction	50%	75%	94%	98%	99%	100%	100%	100%
Cumulative Nitrogen Load Reduction	76%	92%	98%	100%	100%	100%	100%	100%

Figure 3- 6: BMP Performance Curve: Infiltration Trench (infiltration rate = 8.27 in/hr)

Illicit Discharge Compliance Statement

I, as Owner/Applicant, certify, that; (1) the property located at:

WILDLIFE CIRCLE

(Street name, route number and station location of proposed stormwater drainage connection)

in, HARWICH, Massachusetts;
(City/Town)

(2) the property does not have any illicit* or unauthorized drainage connections or discharges including, but not limited to, non-stormwater discharges occurring due to spills, dumping and improper connections to the MassDOT drainage system from residential, industrial, commercial or institutional establishments.

(3) that the attached plan/map clearly identifies the following:

- The location of all on-site systems for conveying wastewater, stormwater and/or groundwater.
- The location of any measures taken to prevent the entry of illicit discharges into the MassDOT storm drain system.
- That there are no connections between the wastewater management system and the MassDOT storm drain system; and

NOTE: NO NEARBY STORM DRAINAGE SYSTEMS

(4) that the following actions have been taken to identify and remove illicit discharges for existing and redevelopment projects: N/A NEW PROJECT

- Visual screening/inspection
- Dye or smoke testing
- Water quality sampling
- Removal of illicit discharges (List type and location): _____
- Other method of illicit detection (List method): _____

NOTE: NO ILLICIT DISCHARGES TO STORM DRAINS WILL BE PERMITTED.

Property Owner:

Name: Chris Orr
Address: 56 Obed. Brooks Rd
City/Town: HARWICH, MA

Registered Professional Engineer:

Signature: _____
PRIOR TO START WORK



*An illicit discharge includes direct or indirect discharges to the MassDOT storm drain system that are not composed entirely of storm water, except as exempted in MassDOT's Drainage and Connection Policy, P-06-002, dated, 6/26/2006. Illicit discharges include, without limitation, sewage, process wastewater, or wash water and any connections from indoor drains, sinks, or toilets, regardless of whether said connection was previously allowed, permitted, or approved.

LONG TERM POLLUTION PREVENTION PLAN:

RESPONSIBLE PARTY FOR LTPPP COMPLIANCE:

OWNER:

Chris Our
56 Obed Brooks Road
Harwich, MA
508-432-0530

RESPONSIBLE PARTY:

Chris Our
56 Obed Brooks Road
Harwich, MA
508-432-0530

Note: Responsibility may be transferred using legally binding contract.



Checklist for Stormwater Report

A. Introduction

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



A Stormwater Report must be submitted with the Notice of Intent permit application to document compliance with the Stormwater Management Standards. The following checklist is NOT a substitute for the Stormwater Report (which should provide more substantive and detailed information) but is offered here as a tool to help the applicant organize their Stormwater Management documentation for their Report and for the reviewer to assess this information in a consistent format. As noted in the Checklist, the Stormwater Report must contain the engineering computations and supporting information set forth in Volume 3 of the [Massachusetts Stormwater Handbook](#). The Stormwater Report must be prepared and certified by a Registered Professional Engineer (RPE) licensed in the Commonwealth.

The Stormwater Report must include:

- The Stormwater Checklist completed and stamped by a Registered Professional Engineer (see page 2) that certifies that the Stormwater Report contains all required submittals.¹ This Checklist is to be used as the cover for the completed Stormwater Report.
- Applicant/Project Name
- Project Address
- Name of Firm and Registered Professional Engineer that prepared the Report
- Long-Term Pollution Prevention Plan required by Standards 4-6
- Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan required by Standard 8²
- Operation and Maintenance Plan required by Standard 9

In addition to all plans and supporting information, the Stormwater Report must include a brief narrative describing stormwater management practices, including environmentally sensitive site design and LID techniques, along with a diagram depicting runoff through the proposed BMP treatment train. Plans are required to show existing and proposed conditions, identify all wetland resource areas, NRCS soil types, critical areas, Land Uses with Higher Potential Pollutant Loads (LUHPPL), and any areas on the site where infiltration rate is greater than 2.4 inches per hour. The Plans shall identify the drainage areas for both existing and proposed conditions at a scale that enables verification of supporting calculations.

As noted in the Checklist, the Stormwater Management Report shall document compliance with each of the Stormwater Management Standards as provided in the Massachusetts Stormwater Handbook. The soils evaluation and calculations shall be done using the methodologies set forth in Volume 3 of the Massachusetts Stormwater Handbook.

To ensure that the Stormwater Report is complete, applicants are required to fill in the Stormwater Report Checklist by checking the box to indicate that the specified information has been included in the Stormwater Report. If any of the information specified in the checklist has not been submitted, the applicant must provide an explanation. The completed Stormwater Report Checklist and Certification must be submitted with the Stormwater Report.

¹ The Stormwater Report may also include the Illicit Discharge Compliance Statement required by Standard 10. If not included in the Stormwater Report, the Illicit Discharge Compliance Statement must be submitted prior to the discharge of stormwater runoff to the post-construction best management practices.

² For some complex projects, it may not be possible to include the Construction Period Erosion and Sedimentation Control Plan in the Stormwater Report. In that event, the issuing authority has the discretion to issue an Order of Conditions that approves the project and includes a condition requiring the proponent to submit the Construction Period Erosion and Sedimentation Control Plan before commencing any land disturbance activity on the site.



Checklist for Stormwater Report

B. Stormwater Checklist and Certification

The following checklist is intended to serve as a guide for applicants as to the elements that ordinarily need to be addressed in a complete Stormwater Report. The checklist is also intended to provide conservation commissions and other reviewing authorities with a summary of the components necessary for a comprehensive Stormwater Report that addresses the ten Stormwater Standards.

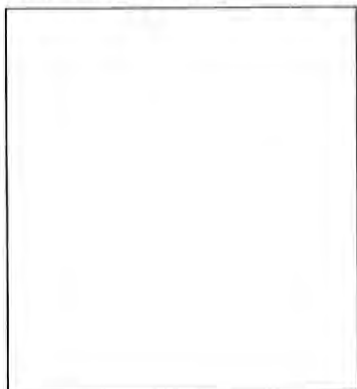
Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the item is not applicable (N.A.) and provide the reasons for that determination.

A complete checklist must include the Certification set forth below signed by the Registered Professional Engineer who prepared the Stormwater Report.

Registered Professional Engineer's Certification

I have reviewed the Stormwater Report, including the soil evaluation, computations, Long-term Pollution Prevention Plan, the Construction Period Erosion and Sedimentation Control Plan (if included), the Long-term Post-Construction Operation and Maintenance Plan, the Illicit Discharge Compliance Statement (if included) and the plans showing the stormwater management system, and have determined that they have been prepared in accordance with the requirements of the Stormwater Management Standards as further elaborated by the Massachusetts Stormwater Handbook. I have also determined that the information presented in the Stormwater Checklist is accurate and that the information presented in the Stormwater Report accurately reflects conditions at the site as of the date of this permit application.

Registered Professional Engineer Block and Signature



D. Ojala 1-23-23

Signature and Date

Checklist

Project Type: Is the application for new development, redevelopment, or a mix of new and redevelopment?

- ☒ New development
☐ Redevelopment
☐ Mix of New Development and Redevelopment



Checklist for Stormwater Report

Checklist (continued)

LID Measures: Stormwater Standards require LID measures to be considered. Document what environmentally sensitive design and LID Techniques were considered during the planning and design of the project:

- ☒ No disturbance to any Wetland Resource Areas
- ☒ Site Design Practices (e.g. clustered development, reduced frontage setbacks)
- ☐ Reduced Impervious Area (Redevelopment Only)
- ☒ Minimizing disturbance to existing trees and shrubs
- ☐ LID Site Design Credit Requested:
 - ☐ Credit 1
 - ☐ Credit 2
 - ☐ Credit 3
- ☐ Use of "country drainage" versus curb and gutter conveyance and pipe
- ☐ Bioretention Cells (includes Rain Gardens)
- ☐ Constructed Stormwater Wetlands (includes Gravel Wetlands designs)
- ☐ Treebox Filter
- ☐ Water Quality Swale
- ☐ Grass Channel
- ☐ Green Roof
- ☐ Other (describe): _____

Standard 1: No New Untreated Discharges

- ☒ No new untreated discharges
- ☒ Outlets have been designed so there is no erosion or scour to wetlands and waters of the Commonwealth
- ☒ Supporting calculations specified in Volume 3 of the Massachusetts Stormwater Handbook included.



Checklist for Stormwater Report

Checklist (continued)

Standard 2: Peak Rate Attenuation

- ☐ Standard 2 waiver requested because the project is located in land subject to coastal storm flowage and stormwater discharge is to a wetland subject to coastal flooding.
- ☒ Evaluation provided to determine whether off-site flooding increases during the 100-year 24-hour storm.
- ☒ Calculations provided to show that post-development peak discharge rates do not exceed pre-development rates for the 2-year and 10-year 24-hour storms. If evaluation shows that off-site flooding increases during the 100-year 24-hour storm, calculations are also provided to show that post-development peak discharge rates do not exceed pre-development rates for the 100-year 24-hour storm.

Standard 3: Recharge

- ☒ Soil Analysis provided.
- ☒ Required Recharge Volume calculation provided.
- ☐ Required Recharge volume reduced through use of the LID site Design Credits.
- ☒ Sizing the infiltration, BMPs is based on the following method: Check the method used.
 - ☐ Static
 - ☒ Simple Dynamic
 - ☐ Dynamic Field¹
- ☒ Runoff from all impervious areas at the site discharging to the infiltration BMP.
- ☐ Runoff from all impervious areas at the site is *not* discharging to the infiltration BMP and calculations are provided showing that the drainage area contributing runoff to the infiltration BMPs is sufficient to generate the required recharge volume.
- ☒ Recharge BMPs have been sized to infiltrate the Required Recharge Volume.
- ☐ Recharge BMPs have been sized to infiltrate the Required Recharge Volume *only* to the maximum extent practicable for the following reason:
 - ☐ Site is comprised solely of C and D soils and/or bedrock at the land surface
 - ☐ M.G.L. c. 21E sites pursuant to 310 CMR 40.0000
 - ☐ Solid Waste Landfill pursuant to 310 CMR 19.000
 - ☐ Project is otherwise subject to Stormwater Management Standards only to the maximum extent practicable.
- ☒ Calculations showing that the infiltration BMPs will drain in 72 hours are provided.
- ☐ Property includes a M.G.L. c. 21E site or a solid waste landfill and a mounding analysis is included.

¹ 80% TSS removal is required prior to discharge to infiltration BMP if Dynamic Field method is used.



Checklist for Stormwater Report

Checklist (continued)

Standard 3: Recharge (continued)

- ☐ The infiltration BMP is used to attenuate peak flows during storms greater than or equal to the 10-year 24-hour storm and separation to seasonal high groundwater is less than 4 feet and a mounding analysis is provided.
- ☒ Documentation is provided showing that infiltration BMPs do not adversely impact nearby wetland resource areas.

Standard 4: Water Quality

The Long-Term Pollution Prevention Plan typically includes the following:

- Good housekeeping practices;
 - Provisions for storing materials and waste products inside or under cover;
 - Vehicle washing controls;
 - Requirements for routine inspections and maintenance of stormwater BMPs;
 - Spill prevention and response plans;
 - Provisions for maintenance of lawns, gardens, and other landscaped areas;
 - Requirements for storage and use of fertilizers, herbicides, and pesticides;
 - Pet waste management provisions;
 - Provisions for operation and management of septic systems;
 - Provisions for solid waste management;
 - Snow disposal and plowing plans relative to Wetland Resource Areas;
 - Winter Road Salt and/or Sand Use and Storage restrictions;
 - Street sweeping schedules;
 - Provisions for prevention of illicit discharges to the stormwater management system;
 - Documentation that Stormwater BMPs are designed to provide for shutdown and containment in the event of a spill or discharges to or near critical areas or from LUHPPL;
 - Training for staff or personnel involved with implementing Long-Term Pollution Prevention Plan;
 - List of Emergency contacts for implementing Long-Term Pollution Prevention Plan.
- ☒ A Long-Term Pollution Prevention Plan is attached to Stormwater Report and is included as an attachment to the Wetlands Notice of Intent.
 - ☒ Treatment BMPs subject to the 44% TSS removal pretreatment requirement and the one inch rule for calculating the water quality volume are included, and discharge:
 - ☒ is within the Zone II or Interim Wellhead Protection Area
 - ☐ is near or to other critical areas
 - ☒ is within soils with a rapid infiltration rate (greater than 2.4 inches per hour)
 - ☐ involves runoff from land uses with higher potential pollutant loads.
 - ☐ The Required Water Quality Volume is reduced through use of the LID site Design Credits.
 - ☒ Calculations documenting that the treatment train meets the 80% TSS removal requirement and, if applicable, the 44% TSS removal pretreatment requirement, are provided.



Checklist for Stormwater Report

Checklist (continued)

Standard 4: Water Quality (continued)

- ☒ The BMP is sized (and calculations provided) based on:
 - ☒ The ½" or 1" Water Quality Volume or
 - ☐ The equivalent flow rate associated with the Water Quality Volume and documentation is provided showing that the BMP treats the required water quality volume.
- ☐ The applicant proposes to use proprietary BMPs, and documentation supporting use of proprietary BMP and proposed TSS removal rate is provided. This documentation may be in the form of the propriety BMP checklist found in Volume 2, Chapter 4 of the Massachusetts Stormwater Handbook and submitting copies of the TARP Report, STEP Report, and/or other third party studies verifying performance of the proprietary BMPs.
- ☐ A TMDL exists that indicates a need to reduce pollutants other than TSS and documentation showing that the BMPs selected are consistent with the TMDL is provided.

Standard 5: Land Uses With Higher Potential Pollutant Loads (LUHPPLs) *N/A*

- ☐ The NPDES Multi-Sector General Permit covers the land use and the Stormwater Pollution Prevention Plan (SWPPP) has been included with the Stormwater Report.
- ☐ The NPDES Multi-Sector General Permit covers the land use and the SWPPP will be submitted **prior to** the discharge of stormwater to the post-construction stormwater BMPs.
- ☐ The NPDES Multi-Sector General Permit does **not** cover the land use.
- ☐ LUHPPLs are located at the site and industry specific source control and pollution prevention measures have been proposed to reduce or eliminate the exposure of LUHPPLs to rain, snow, snow melt and runoff, and been included in the long term Pollution Prevention Plan.
- ☐ All exposure has been eliminated.
- ☐ All exposure has **not** been eliminated and all BMPs selected are on MassDEP LUHPPL list.
- ☐ The LUHPPL has the potential to generate runoff with moderate to higher concentrations of oil and grease (e.g. all parking lots with >1000 vehicle trips per day) and the treatment train includes an oil grit separator, a filtering bioretention area, a sand filter or equivalent.

Standard 6: Critical Areas *N/A*

- ☐ The discharge is near or to a critical area and the treatment train includes only BMPs that MassDEP has approved for stormwater discharges to or near that particular class of critical area.
- ☐ Critical areas and BMPs are identified in the Stormwater Report.



Checklist for Stormwater Report

Checklist (continued)

Standard 7: Redevelopments and Other Projects Subject to the Standards only to the maximum extent practicable *N/A*

- ☐ The project is subject to the Stormwater Management Standards only to the maximum Extent Practicable as a:
 - ☐ Limited Project
 - ☐ Small Residential Projects: 5-9 single family houses or 5-9 units in a multi-family development provided there is no discharge that may potentially affect a critical area.
 - ☐ Small Residential Projects: 2-4 single family houses or 2-4 units in a multi-family development with a discharge to a critical area
 - ☐ Marina and/or boatyard provided the hull painting, service and maintenance areas are protected from exposure to rain, snow, snow melt and runoff
 - ☐ Bike Path and/or Foot Path
 - ☐ Redevelopment Project
 - ☐ Redevelopment portion of mix of new and redevelopment.
- ☐ Certain standards are not fully met (Standard No. 1, 8, 9, and 10 must always be fully met) and an explanation of why these standards are not met is contained in the Stormwater Report.
- ☐ The project involves redevelopment and a description of all measures that have been taken to improve existing conditions is provided in the Stormwater Report. The redevelopment checklist found in Volume 2 Chapter 3 of the Massachusetts Stormwater Handbook may be used to document that the proposed stormwater management system (a) complies with Standards 2, 3 and the pretreatment and structural BMP requirements of Standards 4-6 to the maximum extent practicable and (b) improves existing conditions.

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control

A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan must include the following information:

- Narrative;
 - Construction Period Operation and Maintenance Plan;
 - Names of Persons or Entity Responsible for Plan Compliance;
 - Construction Period Pollution Prevention Measures;
 - Erosion and Sedimentation Control Plan Drawings;
 - Detail drawings and specifications for erosion control BMPs, including sizing calculations;
 - Vegetation Planning;
 - Site Development Plan;
 - Construction Sequencing Plan;
 - Sequencing of Erosion and Sedimentation Controls;
 - Operation and Maintenance of Erosion and Sedimentation Controls;
 - Inspection Schedule;
 - Maintenance Schedule;
 - Inspection and Maintenance Log Form.
- ☒ A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan containing the information set forth above has been included in the Stormwater Report.



Checklist for Stormwater Report

Checklist (continued)

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control (continued)

- ☐ The project is highly complex and information is included in the Stormwater Report that explains why it is not possible to submit the Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan with the application. A Construction Period Pollution Prevention and Erosion and Sedimentation Control has **not** been included in the Stormwater Report but will be submitted **before** land disturbance begins.
- ☐ The project is **not** covered by a NPDES Construction General Permit.
- ☐ The project is covered by a NPDES Construction General Permit and a copy of the SWPPP is in the Stormwater Report.
- ☒ The project is covered by a NPDES Construction General Permit but no SWPPP been submitted. The SWPPP will be submitted BEFORE land disturbance begins.

Standard 9: Operation and Maintenance Plan

- ☒ The Post Construction Operation and Maintenance Plan is included in the Stormwater Report and includes the following information:
 - ☒ Name of the stormwater management system owners;
 - ☒ Party responsible for operation and maintenance;
 - ☒ Schedule for implementation of routine and non-routine maintenance tasks;
 - ☒ Plan showing the location of all stormwater BMPs maintenance access areas;
 - ☒ Description and delineation of public safety features;
 - ☒ Estimated operation and maintenance budget; and
 - ☒ Operation and Maintenance Log Form.
- ☐ The responsible party is **not** the owner of the parcel where the BMP is located and the Stormwater Report includes the following submissions:
 - ☐ A copy of the legal instrument (deed, homeowner's association, utility trust or other legal entity) that establishes the terms of and legal responsibility for the operation and maintenance of the project site stormwater BMPs;
 - ☐ A plan and easement deed that allows site access for the legal entity to operate and maintain BMP functions.

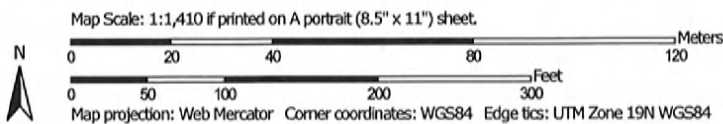
Standard 10: Prohibition of Illicit Discharges

- ☒ The Long-Term Pollution Prevention Plan includes measures to prevent illicit discharges;
- ☐ An Illicit Discharge Compliance Statement is attached;
- ☒ NO Illicit Discharge Compliance Statement is attached but will be submitted **prior to** the discharge of any stormwater to post-construction BMPs. *(Template enclosed)*

Soil Map—Barnstable County, Massachusetts



Soil Map may not be valid at this scale.



Natural Resources
Conservation Service

Web Soil Survey
National Cooperative Soil Survey

1/26/2023
Page 1 of 3

MAP LEGEND

	Area of Interest (AOI)		Soil Area
	Area of Interest (AOI)		Stony Spot
	Soils		Very Stony Spot
	Soil Map Unit Polygons		Wet Spot
	Soil Map Unit Lines		Other
	Soil Map Unit Points		Special Line Features
	Special Point Features		Water Features
	Blowout		Streams and Canals
	Borrow Pit		Transportation
	Clay Spot		Railroads
	Closed Depression		Interstate Highways
	Gravel Pit		US Routes
	Gravelly Spot		Major Roads
	Landfill		Local Roads
	Lava Flow		Background
	Marsh or swamp		Aerial Photography
	Mine or Quarry		
	Miscellaneous Water		
	Perennial Water		
	Rock Outcrop		
	Saline Spot		
	Sandy Spot		
	Severely Eroded Spot		
	Sinkhole		
	Slide or Slip		
	Sodic Spot		

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:25,000.

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: Barnstable County, Massachusetts
Survey Area Data: Version 19, Sep 9, 2022

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

Date(s) aerial images were photographed: Sep 5, 2020—Sep 7, 2020

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
252A	Carver coarse sand, 0 to 3 percent slopes	5.0	50.9%
252C	Carver coarse sand, 8 to 15 percent slopes	3.4	33.8%
252D	Carver coarse sand, 15 to 35 percent slopes	1.5	15.3%
Totals for Area of Interest		9.9	100.0%



This collection of information is approved by OMB under the Paperwork Reduction Act, 44 U.S.C. 3501 et seq. (OMB Control No. 2040-0305). Responses to this collection of information are mandatory in accordance with this permit and EPA NPDES regulations (40 CFR 122.28(b)(2)). An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number. The public reporting and recordkeeping burden for this collection of information are estimated to average 1.1 to 19.6 hours per response. Send comments on the Agency's need for this information, the accuracy of the provided burden estimates and any suggested methods for minimizing respondent burden to the Regulatory Support Division Director, U.S. Environmental Protection Agency (2821T), 1200 Pennsylvania Ave., NW, Washington, D.C. 20460. Include the OMB control number in any correspondence. Do not send the completed form to this address.

Permit Information

This form has not yet been certified.

NPDES ID:

State/Territory to which your project/site is discharging: MA

Is your project/site located on federally recognized Indian Country lands? No

Are you requesting coverage under this NOI as a "Federal Operator" or a "Federal Facility" as defined in Appendix A (<https://www.epa.gov/system/files/documents/2022-01/2022-cgp-final-appendix-a-definitions.pdf>)? No

Have stormwater discharges from your current construction site been covered previously under an NPDES permit? No

Will you use polymers, flocculants, or other treatment chemicals at your construction site? No

Has a Stormwater Pollution Prevention Plan (SWPPP) been prepared in advance of filing this NOI, as required? Yes

Are you able to demonstrate that you meet one of the criteria listed in Appendix D (<https://www.epa.gov/system/files/documents/2022-01/2022-cgp-final-appendix-d-endangered-species-protection.pdf>) with respect to protection of threatened or endangered species listed under the Endangered Species Act (ESA) and federally designated critical habitat?

Yes

Have you completed the screening process in Appendix E (<https://www.epa.gov/system/files/documents/2022-01/2022-cgp-final-appendix-e-historic-properties.pdf>) relating to the protection of historic properties? Yes

Indicating "Yes" below, I confirm that I understand that CGP only authorized the allowable stormwater discharges in Part 1.2.1 and the allowable non-stormwater discharges listed in Part 1.2.2. Any discharges not expressly authorized in this permit cannot become authorized or shielded from liability under CWA section 402(k) by disclosure to EPA, state or local authorities after issuance of this permit via any means, including the Notice of Intent (NOI) to be covered by the permit, the Stormwater Pollution Prevention Plan (SWPPP), during an inspection, etc. If any discharges requiring NPDES permit coverage other than the allowable stormwater and non-stormwater discharges listed in Parts 1.2.1 and 1.2.2 will be discharged, they must be covered under another NPDES permit.

Yes

Operator Information

Operator Information

Operator Name: Christopher Our

Operator Mailing Address:

Address Line 1: 56 Obed Brooks Road

Address Line 2:

City: Harwich

ZIP/Postal Code: 02645

State/Province: MA

County or Similar Division: Barnstable

Country: US

Operator Point of Contact Information

First Name Middle Initial Last Name: Chris Our

Title: Operations Manager

Phone: 508-432-0530

Ext.:

Email: COur@robertbour.com

NOI Preparer Information

☒ This NOI is being prepared by someone other than the certifier.

First Name Middle Initial Last Name: Craig Ferraf

Organization: Down Cape Engineering

Phone: 508-362-4541

Ext.:

Email: craig@downcape.com

Project/Site Information

Project/Site Name: Wildlife Circle

Project/Site Address

Address Line 1: Wildlife Circle

Address Line 2:

City: Harwich

ZIP/Postal Code: 02645

State: MA

County or Similar Division: Barnstable

Latitude/Longitude: 41.705088°N, 70.125301°W

Latitude/Longitude Data Source: Map

Horizontal Reference Datum: WGS 84

Project Start Date: 01/18/2024

Project End Date: 04/15/2025

Estimated Area to be Disturbed: 6

Types of Construction Sites:

- Highway or Road
- Single-Family Residential

Will there be demolition of any structure built or renovated before January 1, 1980? No

Will you be discharging dewatering water from your site? No

Was the pre-development land use used for agriculture? No

Are there other operators that are covered under this permit for the same project site? No

Have earth-disturbing activities commenced on your project/site? No

Is your project/site located on federally recognized Indian Country lands? No

Is your project/site located on a property of religious or cultural significance to an Indian tribe? No

Discharge Information

Does your project/site discharge stormwater into a Municipal Separate Storm Sewer System (MS4)? No

Are there any waters of the U.S. within 50 feet of your project's earth disturbances? No

Are any of the waters of the U.S. to which you discharge designated by the state or tribal authority under its antidegradation policy as a Tier 2 (or Tier 2.5) water (water quality exceeds levels necessary to support propagation of fish, shellfish, and wildlife and recreation in and on the water) or as a Tier 3 water (Outstanding National Resource Water)? See Resources, Tools and Templates (<https://www.epa.gov/npdes/construction-general-permit-resources-tools-and-templates>)

No

001:

Latitude/Longitude: 41.705837°N, 70.125404°W

Tier Designation: N/A

Is this receiving water impaired (on the CWA 303(d) list)? No

Has a TMDL been completed for this receiving waterbody? No

Stormwater Pollution Prevention Plan (SWPPP)

Will all required personnel, including those conducting inspections at your site, meet the training requirements in Part 6 of this permit? Yes

First Name Middle Initial Last Name: Chris Our

Title: Operations Manager

Phone: 508-432-0530

Ext:

Email: COur@robertbour.com

Endangered Species Protection Worksheet: Criterion E

Determine ESA Eligibility Criterion

Are your discharges and discharge-related activities already addressed in another operator's valid certification of eligibility for your "action area" under the current 2022 CGP? No

Has consultation between you, a Federal Agency, and the USFWS and/or the NMFS under section 7 of the Endangered Species Act (ESA) concluded? Yes

➤ The result of the consultation was:

Option 1. A biological opinion currently in effect that determined that the action in question (taking into account the effects of your site's discharges and discharge-related activities) is likely to adversely affect, but is not likely to jeopardize the continued existence of listed species or result in the destruction or adverse modification of critical habitat. The biological opinion must have included the effects of your site's discharges and discharge-related activities on all the listed species and designated critical habitat in your action area under the jurisdiction of each Service, as appropriate. To be eligible under (1), any reasonable and prudent measures specified in the incidental take statement must be implemented;

➤ The consultation does not warrant reinitiation under 50 CFR §402.16; or, if reinitiation of consultation is required (e.g., due to a new species listing, critical habitat designation, or new information), the federal action agency has reinitiated the consultation and the result of the consultation is consistent with the statements above. Include any reinitiation documentation from the Service or consulting federal agency with your NOI.

True

You are eligible under Criterion E.

Identify the federal action agency or agencies involved (i.e. the federal agencies seeking coverage):

NHESP, MA Division of fisheries & Wildlife

Identify the Service(s) field or regional office providing the consultation:

1 Rabbit Hill Rd Westborough, MA

Identify any tracking numbers associated with the consultation (e.g., IPaC number, ECO number):

NHEDP File No. 21-40405

Provide the date the consultation was completed: 2021-08-31

Attach correspondence with USFWS and/or NMFS documenting the Biological Opinion, conference opinion (IPaC or ECO tracking number) or concurrence.

Name	Uploaded Date	Size
 17-198 Our Harwich_21-40405 NHESP Determination.pdf (attachment/1704689)	12/18/2023	237.83 KB

Historic Preservation

Are you installing any stormwater controls as described in Appendix E (<https://www.epa.gov/system/files/documents/2022-01/2022-cgp-final-appendix-e-historic-properties.pdf>) that require subsurface earth disturbances? (Appendix E (<https://www.epa.gov/system/files/documents/2022-01/2022-cgp-final-appendix-e-historic-properties.pdf>), Step 1)

Yes

Have prior surveys or evaluations conducted on the site already determined historic properties do not exist, or that prior disturbances have precluded the existence of historic properties? (Appendix E (<https://www.epa.gov/system/files/documents/2022-01/2022-cgp-final-appendix-e-historic-properties.pdf>), Step 2):

No

Have you determined that your installation of subsurface earth-disturbing stormwater controls will have no effect on historic properties? (Appendix E (<https://www.epa.gov/system/files/documents/2022-01/2022-cgp-final-appendix-e-historic-properties.pdf>), Step 3)

Yes

Certification Information

Form has not been certified yet.

Stormwater Pollution Prevention Plan

For:

Wildlife Circle Subdivision
Off Fish & Game Drive
Harwich, MA

Operator(s):

Chris Our
56 Oben Brooks Road
Harwich, MA 1-508-432-0530

Stormwater Manager and SWPPP Contact(s):

Chris Our
56 Oben Brooks Road
Harwich, MA 1-508-432-0530

SWPPP Preparation Date:

12-19-23

Estimated Project Dates:

Start of Construction: 1-22-2024
Completion of Construction: 1-27-2025

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SECTION 1: SITE EVALUATION, ASSESSMENT, AND PLANNING

1.1 Project/Site Information

Project Information:

Project/Site Name: Wildlife Circle, Harwich, MA

Project Street/Location: Wildlife Circle, off Fish & Game Drive,

City: Harwich State: MA Zip Code: 02645

County or Similar Subdivision: Barnstable County

Latitude/Longitude (Use **one** of three possible formats, and specify method)

Latitude:

1. N (degrees, minutes, seconds)
2. __° __' __" N (degrees, minutes, decimal)
3. 41.705837 ° N (decimal)

Longitude:

1. W (degrees, minutes, seconds)
2. __° __' __" W (degrees, minutes, decimal)
3. 70.125404 ° W (decimal)

Method for determining latitude/longitude:

☐ USGS topographic map (specify scale: __1 ☐ EPA Web site ☐ GPS

☒ Other (please specify): Google Earth/Mass GIS data/RTKGPS

Is the project located in Indian country? ☐ Yes ☒ No

If yes, name of Reservation, or if not part of a Reservation, indicate "not applicable."

Is this project considered a federal facility? ☐ Yes ☒ No

NPDES project or permit tracking number: TBD

(This is the unique identifying number assigned to your project by your permitting authority after you have applied for coverage under the appropriate NPDES construction general permit.)

1.2 Contact Information/Responsible Parties

Instructions:

- List the operator(s), project managers, stormwater manager, and person or organization that prepared the SWPPP. Indicate respective responsibilities, where appropriate.
- Also, list subcontractors expected to work on-site. Notify subcontractors of stormwater requirements applicable to their work.
- See SWPPP Guide, Chapter 2.B. and your construction general permit for the definition of *operator*.

Project Information:

Operator(s):

Chris Our
56 Oben Brooks Road
Harwich, MA 1-508-432-0530

Project Manager(s) or Site Supervisor(s):

Chris Our
56 Oben Brooks Road
Harwich, MA 1-508-432-0530
cwour@robertbour.com

Stormwater Manager and SWPPP Contact(s):

Chris Our
56 Oben Brooks Road
Harwich, MA 1-508-432-0530

This SWPPP Was Prepared By:

Daniel A. Ojala PE, PLS, Craig Ferrari, EIT
down cape engineering, Inc.

939 Main St. (Rt. 6a)

Yarmouthport, MA 02675

1-508-362-4541 fax 508-362-4541

email: downcape@downcape.com copies available by PDF upon request to this email address.

Subcontractor(s):

Chris Our
56 Oben Brooks Road
Harwich, MA 1-508-432-0530
TBD

Emergency 24 hour contact:

Chris Our
56 Oben Brooks Road
Harwich, MA 1-508-432-0530
cwour@robertbour.com

1.3 Nature and Sequence of Construction Activity

Instructions:

- Briefly describe the nature of the construction activity and approximate timeframes (one or more paragraphs, depending on the nature and complexity of the project).

Project Information:

- Describe the general scope of the work for the project, major phases of construction, etc:

Initially silt fence for turtle management plan installed, turtle sweep was performed, next will be installation of any additional silt fence/work limit line, maintain temporary stormwater infiltration area, clear and grub trees, rough grade roadway cuts/fills, construct subsurface drainage, install water main, spread and compact gravel, install cable utilities in shoulder, spread and compact roadway gravel base, install paving binder course, loam and seed shoulders, install topcoat of asphalt, landscape, remove construction silt, final cleanup, home construction to

consist of excavation and backfill of foundation, onsite septic system and utilities. Grade, loam and seed lawn areas, mulch other disturbed areas, remove silt fencing only once site is stable, remove protective filter fabric from between frame and grate to leaching facility once site and landscape stable, do not allow construction silt to enter new drainage system until site stable.

On final cleanup, remove any construction silt from natural lowpoint construction retention areas, allow to naturalize.

What is the function of the construction activity?

☒ Residential ☐ Commercial ☐ Industrial ☒ Road Construction

☐ Linear Utility

☐ Other (please specify): _____

Estimated Project Start Date: 1/22/2024

Estimated Project Completion Date: 1/27/2025

1.4 Soils, Slopes, Vegetation, and Current Drainage Patterns

Project Information:

Soil type(s):

- **Glacial Outwash Plain- Carver Loamy Coarse Sand, excessively drained. See attached soil maps.**

Slopes (describe current slopes and note any changes due to grading or fill activities):

- **1-15%, fairly level site, some rolling wooded topography, sandy soils.**

Drainage Patterns (describe current drainage patterns and note any changes due to grading or fill activities):

- **Site is currently partially cleared, mainly undeveloped pine and oak forest, no observable runoff from site due to pervious nature of soils, drainage systems and level grades, natural sandy lowpoints.**
- **Vegetation: Second growth pitch pine and white oak with scrub understory, mowed shrubs under overhead powerline area.**

Other:

- **Site has very well drained soils due to sandy glacial outwash and grades, vegetation, see erosion and sedimentation control plan for temporary construction period BMPs.**

1.5 Construction Site Estimates

Project Information:

The following are estimates of the construction site:

Construction Site Area to be disturbed	4.3 acres
Total Project Area (includes open space parcels not impacted)	11.2 acres
Percentage impervious area before construction	0.5 %
Runoff coefficient before construction	35
Percentage impervious area after construction	12 %
Runoff coefficient after construction (developed areas only)	45

1.6 Receiving Waters

Project Information:

Description of receiving waters: groundwater, nearby isolated wetland
Description of storm sewer systems: stream ½ mile west not affected, hills.
Description of impaired waters or waters subject to TMDLs: n/a

1.7 Site Features and Sensitive Areas to be Protected

Project Information:

Description of unique features and measures to protect them:

- No wetlands within construction work limits. Site very pervious, silt fence will aid temporary stormwater retention areas during construction, existing lowpoints to be used for infiltration during construction, once site stabilized new onsite subsurface infiltration trenches will be used per local stormwater requirements for recharging 25 year storm onsite. Groundwater will be recharged from onsite precipitation, no discharge offsite from new drainage systems.

1.8 Potential Sources of Pollution

Project Information:

Potentials sources of sediment to stormwater runoff:

- Silt from disturbed topsoil and subsoil, site construction.
- Stockpiled soils, especially topsoil or subsoil, underlying material sand and not subject to forming silt.

1.8 Potential Sources of Pollution (continued)

Potential pollutants and sources, other than sediment, to stormwater runoff:

- Potential fueling or light maintenance of vehicles and construction equipment.
- Concrete and paint washout

1.9 Endangered Species Certification

Project Information:

Are endangered or threatened species and critical habitats on or near the project area?

☒ Yes ☐ No

Describe how this determination was made: [Review of Mass GIS Mapping of Estimated and Priority Habitat for Rare Species under Mass Environmental Protection Act \(MEPA/NHESP\)](#)

If yes, describe the species and/or critical habitat: [Eastern Box Turtle- not threatened but "species of special concern" for habitat loss. Turtle Management Plan submitted and approved.](#)

If yes, describe or refer to documentation which determines the likelihood of an impact on identified species and/or habitat and the steps taken to address that impact. (Note, if species are present on or near your project site, EPA strongly recommends that the site operator work closely with the appropriate field office of the U.S. Fish and Wildlife Service or National Marine Fisheries Service. Please contact a state or tribal official for concerns related to state or tribal listing of species.)
See Turtle Management Plan approved for site, efiled with eNOI.

1.10 Historic Preservation

Project Information:

Are there any historic sites on or near the construction site?

☐ Yes ☒ No

- Describe how this determination was made: Vacant site, [Notified state officials per 2022 CGP instructions, no response back after 15+ days.](#)
- If yes, describe or refer to documentation which determines the likelihood of an impact on this historic site and the steps taken to address that impact.

1.11 Maps

Instructions:

- Attach at least two site maps. The first should show the undeveloped site and its current features. An additional map or maps should be created to show the developed site or the major phases of development, for more complicated sites.

These maps should include: See existing & proposed site plan set

- ☐ Direction(s) of stormwater flow and approximate slopes before and after major grading activities
- ☐ Areas and timing of soil disturbance and areas that will not be disturbed
- ☐ Natural features to be preserved
- ☐ Locations of major structural and non-structural BMPs identified in the SWPPP
- ☐ Locations and timing of stabilization measures
- ☐ Locations of off-site material, waste, borrow, or equipment storage areas
- ☐ Locations of all waters of the U.S., including wetlands
- ☐ Locations where stormwater discharges to a surface water
- ☐ Locations of storm drain inlets
- ☐ Areas where final stabilization has been accomplished
- ☐ For more information, see SWPPP Guide, Chapter 3.C.

Project Information:

- Include the site maps with the SWPPP. SEE ATTACHED MAPS/PLANS

SECTION 2: EROSION AND SEDIMENT CONTROL BMPS

Project Information:

1. Minimize Disturbed Area and Protect Natural Features and Soil:

Describe the areas that will be disturbed with each phase of construction and the methods (signs, fences, etc.) that you will use to protect those areas that should not be disturbed. Describe natural features identified earlier and how each will be protected during construction activity. Also describe how topsoil will be preserved. Include these areas and associated BMPs on your site map(s) also. (See SWPPP Guide, Chapter 4, ESC Principle 1 for more information.)

- Silt fence shall be installed per plan prior to other work on the site. Clear and grub site, utilize natural low dry depressions for stormwater infiltration during construction. Site utilities including drainage, water, gas and electric planned. Site will be stabilized with loam and seed, and vegetation established prior to silt fence removal and project Notice Of Termination filed.
- Phase Construction Activity:

Describe the intended construction sequencing and timing of major activities, including grading activities, road and utility installation, and building phases

- Phase I
 - ☐ Silt fence installation, temporary erosion control basin, fencing.
 - ☐ Signage per DEP/NOI (3 days)
- Phase II
 - ☐ Roadway construction, utilities. Timing: 9 months est.
- Phase III
 - ☐ Home site construction, site will be loamed and seeded, with grass stable, plantings in prior to filing Notice of Termination of coverage. Timing: Up to end plan coverage.

2. *Control Stormwater Flowing Onto and Through the Project:*

Describe structural practices (i.e., diversions, berms, ditches, storage basins) including design specifications and details used to divert flows from exposed soils, retain or detain flows, or otherwise limit runoff and the discharge of pollutants from exposed areas of the site. (See SWPPP Guide, Chapter 4, ESC Principle 3 for more information.)

- Silt fence with coir logs around perimeter, utilizing existing subsurface drainage, plus temporary stormwater retention basins, sandy soils allow high infiltration rates on site.

4. *Stabilize Soils:*

Describe controls (i.e., temporary seeding with native vegetation, hydroseeding, etc.) to stabilize exposed soils where construction activities have temporarily or permanently ceased. Also describe measures to control dust generation. Use of impervious surfaces for stabilization should be avoided whenever possible. (See SWPPP Guide, Chapter 4, ESC Principle 4 for more information.)

- BMP Description: [Loam and Seed, Erosion control netting](#)
☒ Permanent ☐ Temporary
- Installation Schedule: [Prior to project completion](#)
- Maintenance and Inspection: [Ensure grass germination and growth.](#)
- Responsible Staff: [Site Operator/Contractor](#)

- BMP Description: [Stockpile Silt Fence](#)
☐ Permanent ☒ Temporary
- Installation Schedule: [Silt fence around all materials upon creation of pile](#)
- Maintenance and Inspection: [Operator to inspect with regular inspections \(see inspections\)](#)
- Responsible Staff: [Site Operator/Contractor](#)

5. *Protect Slopes:*

Describe controls (i.e., erosion control blankets, tackifiers, etc.) including design specifications and details that will be implemented to protect all slopes. (See SWPPP Guide, Chapter 4, ESC Principle 5 for more information.)

- BMP Description: Silt Fence, Erosion Control netting on all exposed slopes.
- Installation Schedule: After site clearing complete, after loaming for netting.
- Maintenance and Inspection: After any rain event 0.5" or greater.
- Responsible Staff: Site Operator/Contractor

6. *Protect Storm Drain Inlets:*

Describe controls (i.e., inserts, rock-filled bags, or block and gravel, etc.) including design specifications and details that will be implemented to protect all inlets receiving stormwater from the project during the entire duration of the project. (See SWPPP Guide, Chapter 4, ESC Principle 6 for more information.)

- BMP Description: Filter fabric between frame and grate, straw bales around silt sacks.
- Installation Schedule: At start of project, existing basins recharge onsite, will be utilized during construction, no offsite storm water discharge anticipated
- Maintenance and Inspection: After any rain event 0.5" or greater
- Responsible Staff: Site Operator/Contractor

7. *Establish perimeter controls and sediment barriers:*

Describe structural practices (i.e., silt fences or fiber rolls) including design specifications and details to filter and trap sediment before it leaves the construction site. (See SWPPP Guide, Chapter 4, ESC Principle 7 for more information.)

- BMP Description: Silt Fence Installation per plan
 - Installation Schedule: As soon as practical after site work begins.
 - Maintenance and Inspection: Inspect after each rain event in excess of 0.5".
 - Responsible Staff: Site Operator/Contractor
-
- BMP Description: Temporary infiltration basins
 - Installation Schedule: As soon as practical after site work begins
 - Maintenance and Inspection: Inspect after each rain event in excess of 0.5", remove construction silt as required to maintain infiltration capacity.
 - Responsible Staff: Site Operator/Contractor

8. *Retain Sediment On-Site and Control Dewatering Practices:*

Describe sediment control practices (i.e., sediment trap or sediment basin), including design specifications and details (volume, dimensions, outlet structure) that will be implemented at the construction site to retain sediments on-site. Describe dewatering practices that will be implemented if water must be removed from an area so that construction activity can continue. (See SWPPP Guide, Chapter 4, ESC Principle 8 for more information.)

- BMP Description: Sediment Trap/Retention Basin per plan specs.
- Installation Schedule: upon installation of gravel access drive
- Maintenance and Inspection: Inspect after each rain event in excess of 0.5", Remove sediment to prevent standing water, and maintain infiltration capacity.
- Responsible Staff: Site Operator/Contractor

9. Establish Stabilized Construction Exits:

Describe location(s) of vehicle entrance(s) and exit(s), procedures to remove accumulated sediment off-site (i.e., vehicle tracking), and stabilization practices (i.e., stone pads and/or wash racks) to minimize off-site vehicle tracking of sediments and discharges to stormwater. (See SWPPP Guide, Chapter 4, ESC Principle 9 for more information.)

- BMP Description: Washed Stone Construction Aprons, retain paved apron.
- Installation Schedule: Prior to other construction activity on site, coordinate with phases as required.
- Maintenance and Inspection: Inspect after every rain event 0.5" or greater, replenish or replace if aprons clog with silt, sweep apron as required. see plan.
- Responsible Staff: Site Operator/Contractor

-

10. Additional BMPs:

Describe additional BMPs that may not fit into the above categories.

- n/a

SECTION 3: GOOD HOUSEKEEPING BMPS

3.1 *Good Housekeeping BMP*

Project Information:

1. Material Handling and Waste Management:

Describe measures (i.e., trash disposal, sanitary wastes, recycling, and proper material handling) to prevent the discharge of solid materials to waters of the U.S., except as authorized by a permit issued under section 404 of the CWA. (See SWPPP Guide, Chapter 5, P2 Principle 1)

- BMP Description: [Temporary Sanitary Facilities](#)
- Installation Schedule: [Prior to regular construction on site](#)
- Maintenance and Inspection: [Per contract with provider](#)
- Responsible Staff: [Operator/Contractor](#)

- BMP Description: [Street Sweeping](#)
- Installation Schedule: [As required by site conditions.](#)
- Maintenance and Inspection: [visual inspection of tracking](#)
- Responsible Staff: [Operator/contractor](#)

2. *Establish Proper Building Material Staging Areas:*

Describe construction materials expected to be stored on-site and procedures for storage of materials to minimize exposure of the materials to stormwater. (See SWPPP Guide, Chapter 5, P2 Principle 2 for more information.)

- BMP Description: Store any paint etc. under cover of tarps or roof.
- Installation Schedule: as required, constructing one water tower
- Maintenance and Inspection: as required by construction
- Responsible Staff: Operator/Contracor

3. *Designate Washout Areas:*

Describe location(s) and controls to minimize the potential for stormwater pollution from washout areas for concrete mixers, paint, stucco, etc. (See SWPPP Guide, Chapter 5, P2 Principle 3 for more information.)

- BMP Description: Concrete washout Area- utilize premanufactured unit or construct with 10 mil plastic- onsite constructed requires frequent inspection.
 - Installation Schedule: Prior to concrete being poured onsite
 - Maintenance and Inspection: Only one foundation onsite- limited use, maint. as req. per industry standard.
 - Responsible Staff: Operator/Contractor
-
- BMP Description: Paint Washout- utilize premanufactured unit
 - Installation Schedule: Prior to painting onsite
 - Maintenance and Inspection: As required by industry standard
 - Responsible Staff: Operator/Contractor

4. *Establish proper equipment/vehicle fueling and maintenance practices:*

Describe equipment/vehicle fueling and maintenance practices that will be implemented to control pollutants to stormwater (e.g., secondary containment, drip pans, spill kits, etc.) (See SWPPP Guide, Chapter 5, P2 Principle 4 for more information.)

- BMP Description: Fuel over bare ground in designated area, have drip pan available. Spill Kit shall be available.
- Installation Schedule: drip pan and spill kit onsite prior to refueling
- Maintenance and Inspection: inspect refueling area for signs of staining after every rainstorm of 0.5" or greater.
- Responsible Staff: Owner/Contractor

5. *Allowable non-stormwater discharges and control equipment/vehicle washing:*

For the allowable non-stormwater discharge(s) associated with construction industrial activity identified, describe controls and measures that will be implemented at those sites to minimize pollutant discharges. (See SWPPP Guide, Chapter 5, P2 Principle 5 for more information.)

- BMP Description: Vehicle Washing Area- designate on plan, varies with phases.
- Installation Schedule: Wash only if required, avoid detergents.
- Maintenance and Inspection: Inspect area after every rain event of 0.5" or greater
- Responsible Staff: Owner/Contractor (vehicle washing discouraged onsite)

6. *Spill Prevention and Control Plan:*

Describe the spill prevention and control plan to include ways to reduce the chance of spills, stop the source of spills, contain and clean up spills, dispose of materials contaminated by spills, and train personnel responsible for spill prevention and control. (See SWPPP Guide, Chapter 5, P2 Principle 6 for more information.)

- [REFERENCE ATTACHMENT I, SPILL KIT REQ'D.](#)

7. *Any Additional BMPs: N/A*

3.2 *Allowable Non-Stormwater Discharge Management*

Instructions:

- Identify all allowable sources of non-stormwater discharges (except flows from firefighting activities) that are not identified above.
- Identify measures used to eliminate or reduce these discharges and the BMPs used to prevent them from becoming contaminated.
- For more information, see SWPPP Guide, Chapter 3.A. Also, review your permit for exact details.

Project Information:

List allowable non-stormwater discharges and the measures used to eliminate or reduce them and to prevent them from becoming contaminated:

- [N/A](#)

SECTION 4: SELECTING POST-CONSTRUCTION BMPs

Instructions:

- Describe all post-construction stormwater management measures that will be installed during the construction process to control pollutants in stormwater discharges after construction operations have been completed. Examples of post-construction BMPs include:
 - ☐ Biofilters
 - ☐ Detention/retention devices
 - ☐ Earth dikes, drainage swales, and lined ditches
 - ☒ Infiltration Basins
 - ☐ Porous Pavement
 - ☒ Other proprietary permanent structural BMPs
 - ☐ Outlet protection/velocity dissipation devices
 - ☐ Slope protection
 - ☒ Vegetated strips and/or swales
- Identify any applicable federal, state, local, or tribal requirements for design or installation.
- Describe how low impact designs or smart growth considerations have been incorporated into the design.
- Any structural BMPs should have design specifications and details referred to and attached as appendices to the SWPPP.
- For more information on this topic, please refer to your state's stormwater manual.
- You may also want to consult one of the references listed in Appendix D of the SWPPP Guide.
- Visit the post-construction section of EPA's Menu of BMPs at:
www.epa.gov/npes/menuofbmps

Project Information:

- BMP Description: Deep sump hooded catch basins and secondary deep sump hooded catch basins prior to subsurface infiltration of all stormwater required per local requirements. Natural bioinfiltration area for overflow.
- Installation Schedule: subsurface drainage to be installed prior to gravel and pavement on the site.
- Maintenance and Inspection: Per Stormwater Operations and Maintenance Plan for site.
- Responsible Staff: Owner

SECTION 5: INSPECTIONS and MAINTENANCE

5.1 *Inspections*

Project Information:

1. *Inspection Personnel:*

Identify the person(s) who will be responsible for conducting inspections and describe their qualifications.

- Site Operator/Contractor, (Chris Our or designee.) (experienced site contractor) is the responsible person to review all SWPPP documentation. Will conduct review with owners engineer.

2. *Inspection Schedule and Procedures:*

i. Describe the inspection schedules and procedures you have developed for your site (include frequency of inspections for each BMP or group of BMPs, indicate when you will inspect, e.g. before/during/and after rain events, spot inspections, etc.).

- Inspect all BMP's after every rain event in excess of 0.5" during construction period, or every two weeks, whichever occurs sooner. See inspection logs for required information.

ii. Describe the general procedures for correcting problems when they are identified. Include responsible staff and timeframes for making corrections.

- All BMP's will be repaired as required; deficiencies discovered during inspections shall be remedied as soon as possible after discovery.

iii. Attach a copy of the inspection report you will use for your site.

- REFERENCE ATTACHMENT
-

5.2 Maintenance of Controls

Project Information:

- Maintenance Procedures: Site Operator/Contractor will replenish/replace stone aprons and repair silt fence, remove silt from basins and accumulated silt at fence per plan, properly operate washout stations, and repair any deficiencies to original specifications. Operator shall ensure spill kit and drip pan onsite at all times. Document all repairs in corrective actions log see Section 5.3 and document maintenance per inspection reports in 6.1 below.

5.3 Corrective Action Log

Instructions:

Project Information:

Corrective Action Log: *REFERENCE ATTACHMENT*

SECTION 6: Recordkeeping and Training

6.1 Recordkeeping

Instructions:

The following is a list of records you should keep at your project site available for inspectors to review:

- Dates of grading, construction activity, (and stabilization which is covered in Section 7).
- A copy of the construction general permit (attach).
- The signed and certified NOI form or permit application form (attach).
- A copy of the letter from the EPA/State notifying you of their receipt of your complete NOI/application (attach).
- Inspection reports (attach).
- Records relating to endangered species and historic preservation (attach).
- Check your permit for additional details.
- For more on this subject, see SWPPP Guide, Chapter 6.C.

Project Information:

Dates when major grading activities occur:

- [To be noted](#)

Dates when construction activities temporarily or permanently cease on a portion of the site

- [To be noted](#)

6.2 Log of Changes to the SWPPP

Instructions:

Create a log here, or as an attachment, of changes and updates to the SWPPP. You should include additions of new BMPs, replacement of failed BMPs, significant changes in the activities or their timing on the project, changes in personnel, changes in inspection and maintenance procedures, and updates to site maps, etc.

Project Information:

Log of changes and updates to the SWPPP

- [OPERATOR TO UTILIZE ATTACHMENT APP.G](#)

6.3 Training

Instructions:

- Training your staff and subcontractors is an effective BMP. As with the other steps you take to prevent stormwater problems at your site, you should document the training that you conduct for your staff, for those with specific stormwater responsibilities (e.g. installing, inspecting, and maintaining BMPs), and for subcontractors.
- Include dates, number of attendees, subjects covered, and length of training.
- For more on this subject, see SWPPP Guide, Chapter 8.

Project Information:

Describe Training Conducted:

- General stormwater and BMP awareness training for staff and subcontractors
[Reading and familiarization of SWPPP and plans and view of BMP's at site.](#)
- Detailed training for staff and subcontractors with specific stormwater responsibilities
[Operator/Contractor to be familiar with SWPPP and capable of performing maintenance described in 5.2](#)

Individual(s) Responsible for Training:

- [Operator/Contractor- Chris Our....Owners engineer also available 1-508-362-4541 x108 downcape@downcape.com](#) Daniel A. Ojala PE, PLS

SECTION 7: FINAL STABILIZATION

Instructions:

- Describe procedures for final stabilization. If you complete major construction activities on part of your site, you can document your final stabilization efforts for that portion of the site. Many permits will allow you to then discontinue inspection activities in these areas (be sure to check your permit for exact requirements.) You can amend or add to this section as areas of your project are finally stabilized.
- Update your site plans to indicate areas that have achieved final stabilization.
- For more on this topic, see SWPPP Guide, Chapter 9.

Project Information:

- All areas not covered by the building or paving will be loamed and seeded, or stabilized with quality mulch, and the site vegetation established prior to Notice of Termination and silt fence removal. Level site, sandy soils. See plans.

SECTION 8: CERTIFICATION AND NOTIFICATION

Instructions:

- The SWPPP should be signed and certified by the construction operator(s). Attach a copy of the NOI and permit authorization letter received from EPA or the State in Appendix D.

Project Information: Wildlife Circle Subdivision- Off Fish & Game Drive

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name: _____ Title: _____

Signature: _____ Date: _____

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name: _____ Title: _____

Signature: _____ Date: _____

SWPPP APPENDICES

Attach the following documentation to the SWPPP:

App A – Existing Conditions Plan, Soil Maps, Area Maps

App B – Site Plan, Construction Period Erosion Control Plan

App C - Copy of Construction General Permit

App D - Copy of NOI and acknowledgement letter from EPA

App E - Inspection Reports

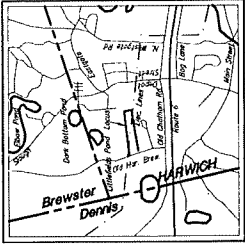
App F - Corrective Action Log

App G - Log of Changes and Updates to SWPPP

App H - Subcontractor Certifications/Agreements

App I- Spill Contingency Plan

REDUCED SEE FULL SIZE



LOCUS MAP

SCALE 1"=2000'

ASSESSORS MAP 65 PARCEL R2, R3

ZONING SUMMARY

ZONING DISTRICT: RR DISTRICT
REQUIRED:
MIN. LOT SIZE 40,000 S.F. (0.92 AC.)
MIN. FRONT SETBACK 25'
MIN. SIDE SETBACK 20'
MIN. REAR SETBACK 20'
MIN. BUILDING SETBACK 15'
MAX. BUILDING COVERAGE 15%
MAX. SITE COVERAGE 25%
LOT WIDTH: 120' AT SETBACK
35' FRONTAGE AT PANHANDLE

REFERENCES

DEED BOOK 30127 PAGE 308
DEED BOOK 30127 PAGE 311
DEED BOOK 30127 PAGE 313
PLAN BOOK 139 PAGE 47 F3
PLAN BOOK 558 PAGE 83
PLAN BOOK 545 PAGE 54
PLAN BOOK 603 PAGE 98
PLAN BOOK 672 PAGE 83

OWNER OF RECORD

CHRISTOPHER W. OUR
DEED BOOK 30127 PAGE 311
HARWICH, MA 02645
BRYAN BLANCHARD
23 SWAMPY SHEA LN
HARWICH, MA 02645

NOTE:

THE PURPOSE OF THIS PLAN IS TO
DEDICATE A VEGETATION AND WILDLIFE
CONSERVANCY AREA OVER PORTIONS OF
PARCELS 103, 105 AND 106 AS SHOWN IN
PLAN BOOK 688 PAGE 98 AS RECORDED IN
THE BARNSTABLE COUNTY REGISTRY OF
DEEDS. ANY PORTION OF THE CONSERVANCY
LINE EASEMENT SEE PB 139 PG 47 F-3.
CONSERVANCY AREA IS TO BE DEDICATED IN
CONFORMANCE WITH MASS. REGS. 801 CMR
SUBCHAPTER 6A.01. ALL DEEDS RELATIVE TO
DEED RESTRICTIONS TO BE RECORDED WITH
THE SUBDIVISION DOCUMENTS.

CONSERVANCY PLAN OF LAND

#103 & 105 OLD HARWICH -
BREWSTER ROAD
HARWICH, MA

PREPARED FOR

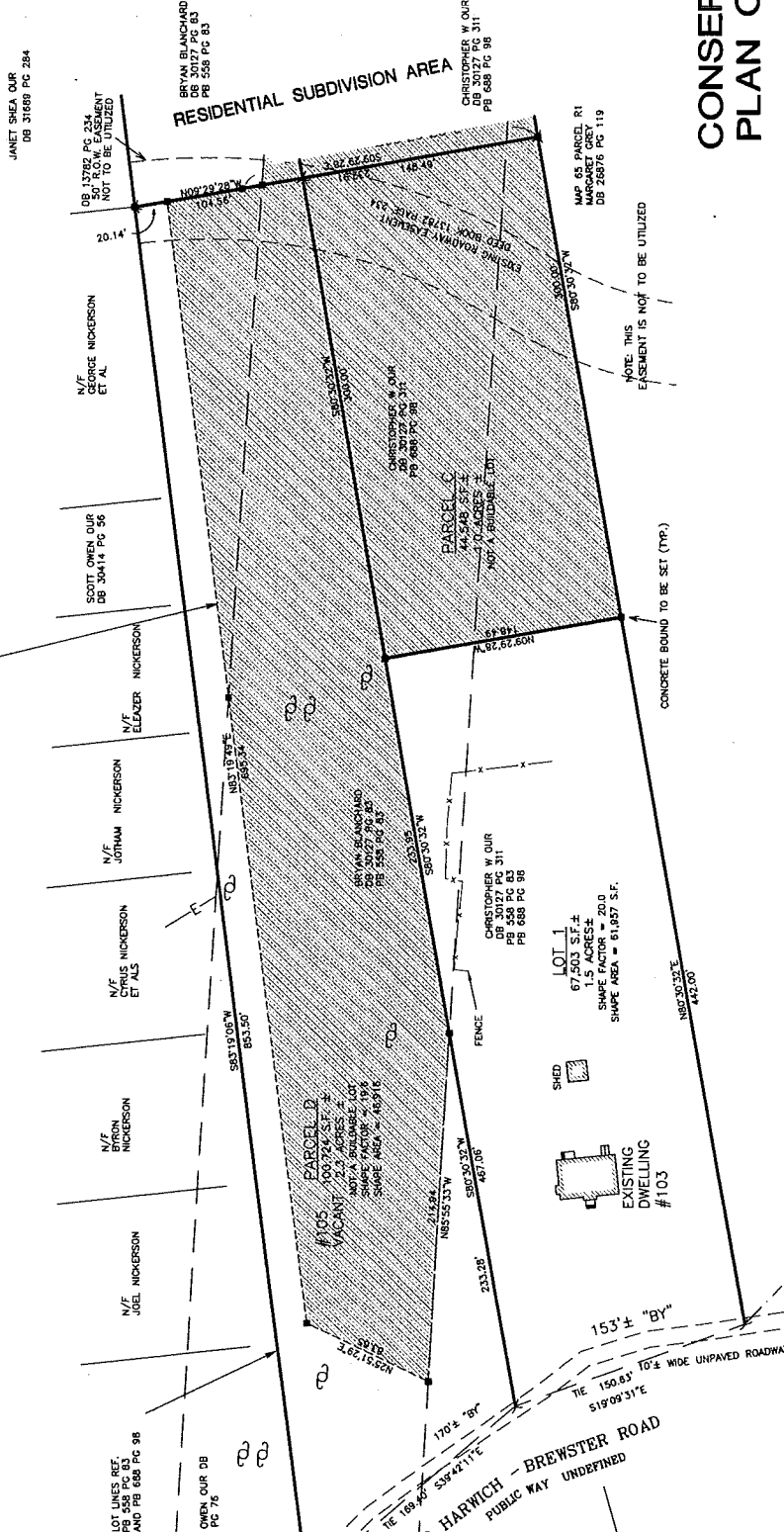
R.B.OUR CO., INC.

DATE: 7-16-2021

Scale: 1"=40'
0 20 40 60 80 100 FEET

down cape engineering, inc.
civil engineers
land surveyors
939 Main Street (Rte 6A)
YARMOUTHPORT MA 02675

VEGETATION AND WILDLIFE
CONSERVANCY AREA:
113,882 SF 2.61 AC.



I HEREBY CERTIFY THAT THE PROPERTY
SHOWN ON THIS PLAN IS THE SAME AS
DIVIDING EXISTING OWNERSHIPS, AND THE
LINES OF THE STREETS AND WAYS SHOWN ARE
THE LINES OF THE STREETS AND WAYS
OR WAYS ALREADY ESTABLISHED, AND THAT
NO NEW LINES FOR DIVISION OF EXISTING
OWNERSHIPS OR STREETS AND WAYS ARE SHOWN.
REF: C-41 2-81-N, M.G.L.

I CERTIFY THAT THIS PLAN WAS MADE IN
ACCORDANCE WITH REGISTRY OF DEEDS
REGS. 801 CMR 6A.01, 6A.02, 6A.03, 6A.04,
1976, AND AS AMENDED JANUARY 7,
1980.

LEGEND:

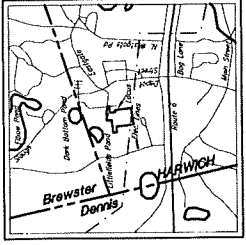
VEGETATION & WILDLIFE
CONSERVANCY AREAS
(113,882 SF OR 2.61 AC.)

CONCRETE BOUND TO BE SET

7-16-21
DATE: DANIEL A. OULA P.L.S.

7-16-21
DATE: DANIEL A. OULA P.L.S.

REDUCED
SEE FULL SIZE



LOCUS MAP
SCALE 1"=2000'

TEST HOLE LOGS

ENGINEER: DANIEL A. OMA, P.E. P.L.S.
DATE: 4/20/2021
PERC. RATE = 2 MIN/INCH
CLASS 1 SOILS

DEPTH	SOILS	ELEV.
0	ORGANIC	40'
3"	A/E	
6"	10TR 4/2	39.5'
	B	
	L5	
30"	10TR 5/6	37.5'
	C	
	M/CS	
120"	10TR 7/4	29.5'

G-W ADL DATA:
WELL COW 138
WELL COW 139
ADL 4.4
APRIL 2021
GROUNDWATER ENCOUNTERED @ 124" EL. 29.7'
ADJUSTED HIGH GROUNDWATER = EL. 34.1'

ROADWAY PROFILE
TO ACCOMPANY
DEFINITIVE
SUBDIVISION PLAN OF LAND
OFF LITTLEFIELD POND ROAD
HARWICH, MA

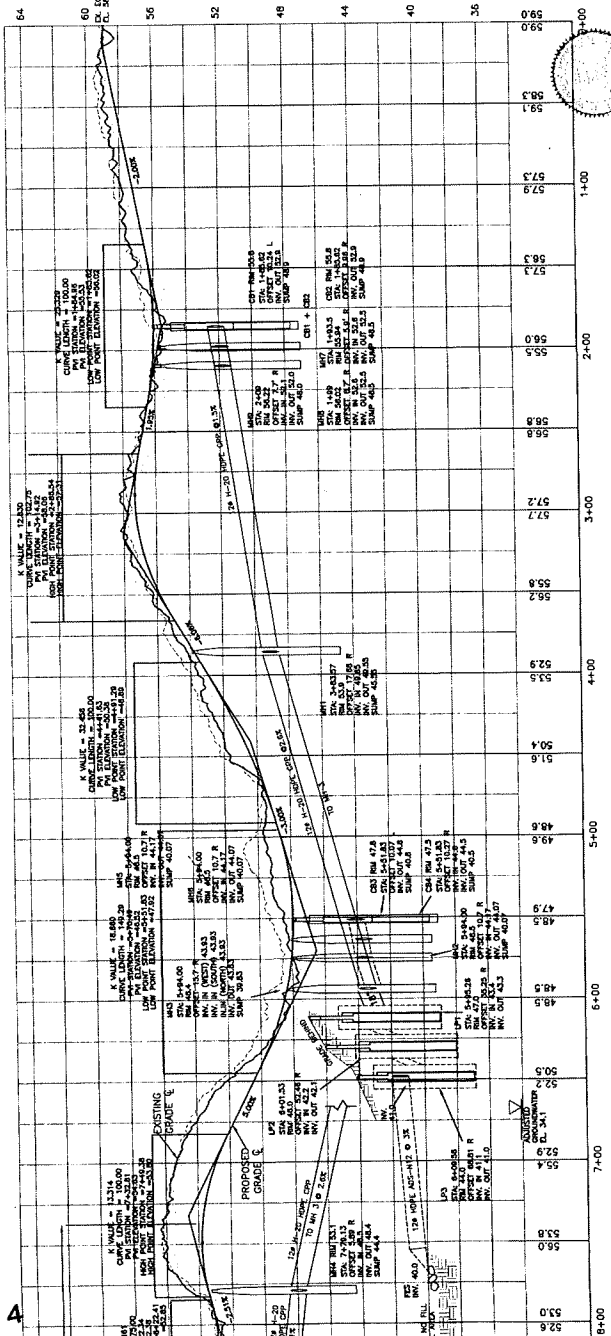
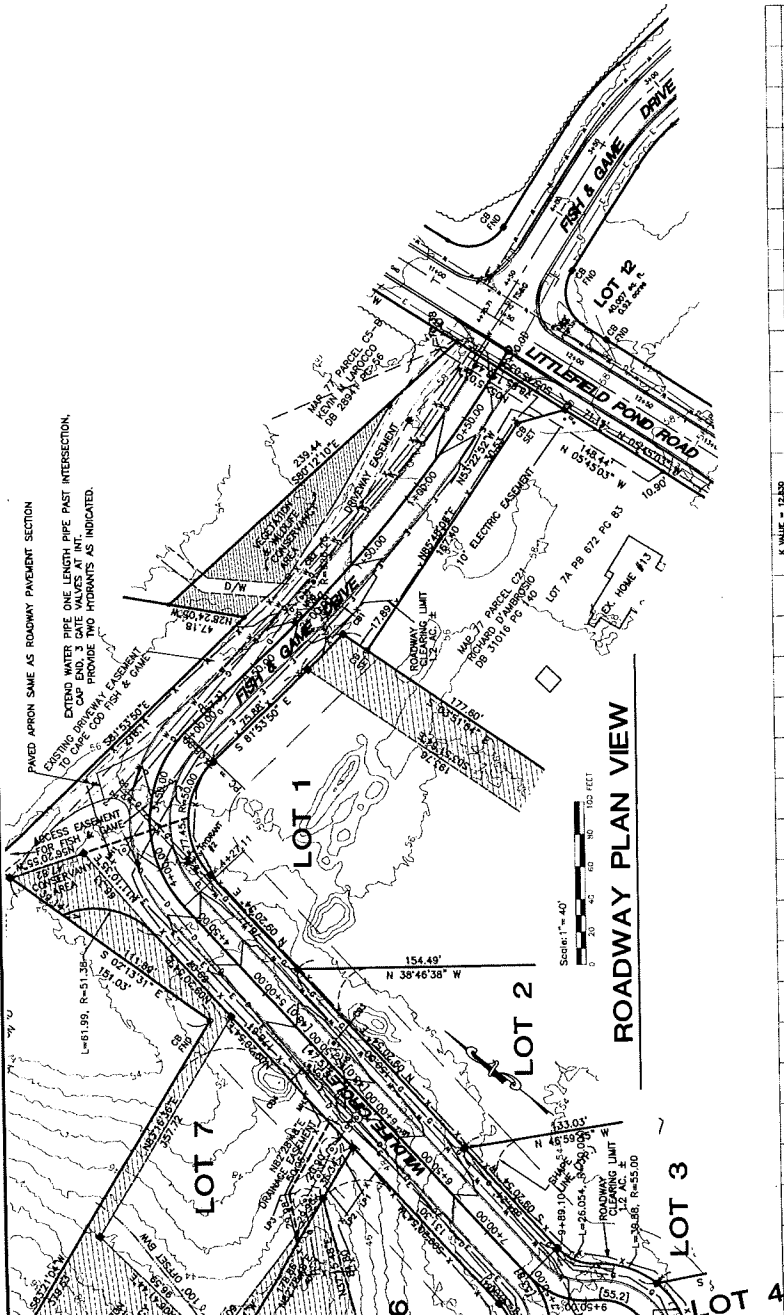
PREPARED FOR
R.B.OUR Co. ET AL

DATE: JANUARY 26, 2022
REVISED: DECEMBER 27, 2022 (TOWN COMMENTS)

Scale 1"=40'

down cap engineering, inc.
1000 Main Street (Rte 6A)
Yarmouthport, MA 02875

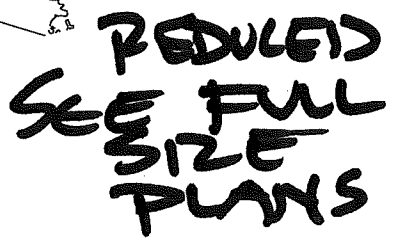
DATE: DANIEL A. OMA, P.L.S.



ROADWAY PROFILE

SCALE: HORIZONTAL 1"=40' VERTICAL 1"=4'

DCB #17-198



APPENDIX E

Stormwater Construction Site Inspection Report

General Information			
Project Name	Wildlife Circle Subdivision		
NPDES Tracking No.		Location	Off Fish & Game Ln, Harwich, MA
Date of Inspection		Start/End Time	
Inspector's Name(s)			
Inspector's Title(s)			
Inspector's Contact Information			
Inspector's Qualifications			
Describe present phase of construction			
Type of Inspection: <input type="checkbox"/> Regular <input type="checkbox"/> Pre-storm event <input type="checkbox"/> During storm event <input type="checkbox"/> Post-storm event			
Weather Information			
Has there been a storm event since the last inspection? <input type="checkbox"/> Yes <input type="checkbox"/> No If yes, provide: Storm Start Date & Time: Storm Duration (hrs): Approximate Amount of Precipitation (in):			
Weather at time of this inspection? <input type="checkbox"/> Clear <input type="checkbox"/> Cloudy <input type="checkbox"/> Rain <input type="checkbox"/> Sleet <input type="checkbox"/> Fog <input type="checkbox"/> Snowing <input type="checkbox"/> High Winds <input type="checkbox"/> Other: Temperature:			
Have any discharges occurred since the last inspection? <input type="checkbox"/> Yes <input type="checkbox"/> No If yes, describe:			
Are there any discharges at the time of inspection? <input type="checkbox"/> Yes <input type="checkbox"/> No If yes, describe:			

Site-specific BMPs

- Number the structural and non-structural BMPs identified in your SWPPP on your site map and list them below (add as many BMPs as necessary). Carry a copy of the numbered site map with you during your inspections. This list will ensure that you are inspecting all required BMPs at your site.
- Describe corrective actions initiated, date completed, and note the person that completed the work in the Corrective Action Log.

	BMP	BMP Installed?	BMP Maintenance Required?	Corrective Action Needed and Notes
1	Silt Fence/Wattles	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
2	Temporary Retention Basin	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
3	Construction Apron	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
4		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
5		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
6		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
7		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
8		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
9		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
10		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
11		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	

	BMP	BMP Installed?	BMP Maintenance Required?	Corrective Action Needed and Notes
12		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
13		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
14		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
15		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
16		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
17		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
18		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
19		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
20		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	

Overall Site Issues

Below are some general site issues that should be assessed during inspections. Customize this list as needed for conditions at your site.

	BMP/activity	Implemented?	Maintenance Required?	Corrective Action Needed and Notes
1	Are all slopes and disturbed areas not actively being worked properly stabilized?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
2	Are natural resource areas (e.g., streams, wetlands, mature trees, etc.) protected with barriers or similar BMPs?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
3	Are perimeter controls and sediment barriers adequately installed (keyed into substrate) and maintained?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
4	Are discharge points and receiving waters free of any sediment deposits?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
5	Are storm drain inlets properly protected?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
6	Is the construction exit preventing sediment from being tracked into the street?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
7	Is trash/litter from work areas collected and placed in covered dumpsters?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
8	Are washout facilities (e.g., paint, stucco, concrete) available, clearly marked, and maintained?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	

	BMP/activity	Implemented?	Maintenance Required?	Corrective Action Needed and Notes
9	Are vehicle and equipment fueling, cleaning, and maintenance areas free of spills, leaks, or any other deleterious material?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
10	Are materials that are potential stormwater contaminants stored inside or under cover?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
11	Are non-stormwater discharges (e.g., wash water, dewatering) properly controlled?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
12	(Other)	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	

Non-Compliance

Describe any incidents of non-compliance not described above:

CERTIFICATION STATEMENT

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Print name and title: _____

Signature: _____ Date: _____

APPENDIX F- CORRECTIVE ACTION LOG

Project Name: Wildlife Circle- Fish & Game Drive, Harwich MA

SWPPP Contact: Chris Our

Daniel Ojala PE

Email: downcape@downcape.com Note: Also note on inspection report.

Corrective action #	Description of Action	Date	By:
---------------------	-----------------------	------	-----

[illegible]

APPENDIX G- LOG OF CHANGES AND UPDATES TO SWPPP

Project Name: Wildlife Circle Subdivision- off Fish&Game Dr. Harwich

SWPPP Contact: Chris Our, cwour@robertbour.com

Daniel Ojala PE downcape@downcape.com

Email:

[illegible]

**DECLARATION OF PROTECTIVE COVENANTS,
PERMANENT RESTRICTIONS, RIGHTS AND RESERVATIONS
FOR: LOTS on Fish & Game Circle and Wildlife Circle, HARWICH, MA**

WHEREAS, the below signed, Christopher W. Our, Trustee of the Wildlife Circle Nominee Trust (hereinafter "Our") is the owner of land in Harwich, Massachusetts, being shown as Lots 1-7 inclusive, which lots have areas designated as "Vegetation and Wildlife Conservancy Areas" on Definitive Subdivision Plan of Land, Off Littlefield Pond Road, Harwich, MA prepared for R.B. Our Co. et al date July 14, 2021 which plan is recorded at the Barnstable County Registry of Deeds in Plan Book _____ Page _____ (hereinafter the "Subdivision Plan").

WHEREAS, said Our is hereinafter referred to as the Declarant; and

WHEREAS, it is the intention of the Declarant to create a residential subdivision in a natural wooded setting for all the land on said plan; and to secure proper and pleasing site development by retaining the maximum natural vegetation and by maintaining natural grade and to assure a high quality of community appearance.

THEREFORE, to protect and preserve the natural beauty and to create and maintain a desirable residential community and to maintain the value of all the homes, the Declarant hereby imposes the following restrictions, conditions, reservations and rights which shall run with said lots and be binding on all parties hereafter having any right, title or interest in said lots.

I. RESTRICTIONS

A. No trade or business, nor any mechanical, manufacturing or mercantile trade or business of any kind, nor practice of any profession shall be carried out upon the granted premises.

B. Tanks or any other storage facility for propane or other types of gas supply, in excess of 5 gallons for grills/firepits and the like, are prohibited. All other tanks maintained on any property shall be buried or confined within the residence.

C. No unregistered automobiles, campers, camping trailers, commercial vehicles, trucks (except light pickups), dump trucks, box trucks, econoline vans with commercial lettering, or moving vans are allowed on the property. No construction equipment or commercial vehicle of

any kind shall be parked in the open overnight, except as required during construction of dwellings, approved facilities, roads, driveways, utilities, or landscaping. Boats and boat trailers are allowed if enclosed and screened with fencing and shrubbery, approved by Declarant, so as to obscure visibility from the street or other abutting properties.

D. No animals of any kind may be kept except household pets. Specifically excluded are chickens, turkeys, geese, ducks, pigs and all other "farm" animals. No pets shall be kept which shall constitute a nuisance or which will be troublesome or objectionable to the occupants of adjoining or nearby premises.

E. No building material of any kind or character shall be placed upon any property except for the immediate purpose of construction of an approved dwelling or accessory structure.

F. No temporary house, trailer or tent shall be placed or erected on any property.

G. No more than three garage bays will be allowed per lot.

H. No clotheslines or drying yards are to be maintained. Receptacles or waste cans for the storage of household rubbish, garbage or refuse shall be stored in suitable containers with tops which can be securely affixed to prevent opening by animals, and if stored outdoors shall be enclosed and screened from the view of adjoining property or street by a fence, hedge or other similar enclosure.

I. No noxious or offensive activity shall be carried out upon any property, nor shall anything be done thereon which may be or become an annoyance or nuisance to the neighborhood.

J. No permanent signs shall be permitted on any lot except for one sign not over one and one-half (1-1/2) square feet in area, indicating the owner's name or identifying the owner's property. This restriction shall not apply to the Declarant, his successors or assigns.

K. No live trees exceeding six (6) inches in diameter at a point two (2) feet above ground level shall be disturbed in their natural growth except as may be necessary for building construction, site development or grading, until prior plan approval and consent shall have first


been obtained in writing from the Declarant, except as hereinafter provided.

L. The exterior of any building erected on any lot and the landscaping and grading in connection therewith shall be finished and completed within ninety days of issuance of a Certificate of Occupancy. No dwelling shall be occupied as a residence until it is completed, and no temporary building shall be so occupied on any lot. All bare or disturbed ground shall be covered with grass, stone, shells, asphalt, woodchips or pine needles. Dirt driveways are prohibited.

M. The structures and grounds on any property shall be maintained in a neat and attractive manner, and the entire property shall be kept free of rubbish, debris or material of any kind, which renders the same unsanitary, unsightly, offensive, or detrimental to any property within the Subdivision.

N. No antennas or aerials shall be placed upon any single-family lot unless completely inside a dwelling.

O. No ham radios, radio transmission equipment (including walkie talkies and CB radios) or microwave transmission equipment shall be operated or permitted without the prior written consent of the Declarant.



P. PERMANENT RESTRICTION with regard to the WILDLIFE CONSERVANCY AREA. No construction or alteration of any kind (exclusive of perimeter fencing, if any, which shall have a height approved as hereinafter set forth), including selective clearing or brushing, shall take place within the areas designated as "Vegetation & Wildlife Conservancy Areas" without the prior written approval of Declarant or the Division of Fisheries and Wildlife, which has determined that this area is within the actual habitat of the Eastern Box Turtle. No structure (fence or otherwise) shall be erected or maintained that impedes the migration of said Eastern Box Turtle. This permanent restriction is designed as a means of protecting said species. Notwithstanding the above restriction, improvements for drainage as shown on the plans submitted to the Town of Harwich Planning Board can be constructed in the

wildlife conservancy areas.

Q. RESTRICTION ON LEASING. A dwelling may not be leased for periods of less than four (4) weeks for more than two (2) times within any twelve (12) month period, i.e. no air b & b or vrbo.

R. NO TIME SHARING. No "Time Sharing Plan" (as hereinafter defined) shall be permitted for any dwelling. A "Time Sharing Plan" means any arrangement, plan, scheme, or similar device, whether by membership, agreement, tenancy in common, sale, lease, deed, rental agreement, license, right-to-use agreement, or by any other means, whereby a purchaser, in exchange for consideration, receives a right to use the dwelling for a specific period of time less than a full year during any given year, but not necessarily for consecutive years, and which extends for a period of more than three (3) years.

II. DEFAULT PROVISIONS

A. In the event of a default in the performance of the provisions as set forth herein and if such default shall not have been cured within fourteen (14) days after written notice thereof, the Declarant, his successors or assigns, shall have the right to enter upon any lot and abate and remove, at the expense of the owner, all weeds, rubbish, debris or materials; to cut the grass and vegetation; to remove dead trees, shrubs and plants or other unsightly objects, vehicles or temporary structures; and to do all things necessary to place the property in a neat and orderly condition without being deemed guilty of any manner of trespass. The cost of any work so required shall become due and payable by the property owner or owners to the Declarant, his successors or assigns, immediately upon the completion thereof.

III. MINIMUM SQUARE FOOTAGE, ARCHITECTURAL GUIDELINES AND RESERVATION OF RIGHT TO AMEND

A. DESIGN. The Declarant shall review designs specifically for conformance to the Guidelines and not to participate in a substantial way in the design process or to suggest alternative designs. We strongly recommend that applicants retain a licensed architect or other

qualified professional architectural designer to design their house.

B. STYLE. The Declarant has created the Architectural Guidelines with a particular architectural style in mind. It is a style rooted in traditional Cape Cod and New England forms with a bias toward larger ranches, Capes and Colonial style homes.

C. SIZE. No one-story dwelling shall be erected that contains less than 2000 square feet exclusive of porches, breezeways or attached garages. With regard to one and a half story dwellings, no Cape or one-half Cape shall be erected that contains less than 1600 square feet exclusive of porches, breezeways or attached garages. No two-story dwelling shall be erected containing less than 1800 square feet exclusive of porches, breezeways or attached garages. All dwellings must have at least a one-car garage. Garages may be "built under" or not attached, in accordance with overall plan and siting approval, if approved by the Declarant. The Declarant specifically reserves the right to amend (lessen) the square footage requirements so long as it owns at least one lot.

D. SCALE/PROPORTION. Houses should be scaled to compliment the lot size, geometry, and the existing landscaping as well as neighboring houses, where applicable. Scale is relative and does not necessarily impact size; a house can be large in area and still made to feel small in scale if properly designed.

The Declarant encourages designs in which separate building elements are in proper proportion to one another and in which the massing, or scale of individual building blocks relative to each other, is appropriate. As an example, a wing off the main house would be expected to be smaller and step forward or back of the plane of the main house. Layering, or creating recesses or elements which project out from the main planes of the building, can be used effectively to break up otherwise long, monotonous wall planes.

E. SIDING. The emphasis should be on muted, monochromatic earth tone color schemes and on natural wood materials rather than on masonry or other siding. Cedar shingles or clapboard with no more than 5" exposure to weather is preferred.

F. ROOF TREATMENTS. A variety of roof planes which result in appropriate proportion, massing, and scale are required. Roof pitches should be a minimum of 8 in 12 except farmer's porch or dormer roofs, where a minimum of 4 in 12 pitches will generally be required. Flat roof pitches are not allowed. Red cedar, white cedar or Architect asphalt roof shingles are required. Approved asphalt roof shingle colors shall be browns, dark grays or slate blend.

G. TRIM. A variety of trim details and colors are acceptable as long as they compliment the overall design. Designers should specify trim sizes and colors clearly on preliminary plans.

H. CHIMNEYS. Chimneys may be masonry or wood framed provided they are finished in brick, stucco or similar traditional finishes. The location, scale, and detailing of chimneys should be carefully planned. Direct vent for fireplaces are allowed but must be screened with landscaping so as to not be visible from the street.

I. SKYLIGHTS. The size and position of skylights on roof planes should compliment the overall design. A variety of manufacturers will be accepted. Bubble skylights will not be allowed.

J. DORMERS. A variety of dormer configurations are acceptable and will be judged on how they compliment the overall design. Dormers, which step in from the plane of the wall below are preferred and shed dormers should start below the ridge wherever possible and have cheeks on each end.

K. WINDOWS/DOORS. A wide variety of window and door treatments and manufacturers will be allowed and will be judged as they relate to the overall design of the house. Colonial style window grills are required.

L. DECKS. Decks should be well integrated into the overall design of the house. Elevated second level decks, which extend too far off the house, tend to look awkward and their supports too spindly and they will not be approved. First level decks are preferred to be low to the ground however where it is appropriate that they are somewhat elevated above grade, lattice may be required below. First floor decks should not be too large in relation to the house and must

be integrated with the design of the house and the landscaping.

M. FOUNDATIONS. Houses and foundations should be designed to fit the natural grade of the lot in such a way that no more than 8" of concrete is exposed above average existing or natural grade. All basement windows must have areaways. In cases of unusual grade conditions where complying with these requirements is not possible, the Declarant will consider landscaping solutions which mitigate the use of exposed foundation.

N. EXTERIOR LIGHTING. Exterior wall mounted light fixtures of a variety of styles and manufacturers are acceptable and will be judged by their relationship to the overall design of the house. Light fixtures shall be of a type, which produce soft levels of illumination, as bright light sources will not be allowed. All exterior lighting must be located or shielded in such a manner as to avoid spillover from the lot in intensities of over one (1) foot candle. Recommended walk and driveway lighting is a fixture with an indirect type light source, garden type, with a height of 2' 6" or less.

IV. OBTAINING APPROVAL

A. BUILDING PLANS. In order to obtain approval the owner must submit to the Declarant two (2) complete sets of building plans that include front, side and rear elevations. The building plans and/or specifications must describe the nature, size, type and color of all exterior building materials, including steps, patios, fences, lights, etc. The applicant must provide samples of all exterior colors to be used on the proposed house.

B. SITE PLANS. Applicants must submit a proposed plot plan showing the house as it relates to the properties lot lines. The proposed septic and well locations, as well as the proposed driveway and what materials will be used in the construction of the driveway. All septic and wells must be installed in accordance with and in the specific areas as shown on plan on record for this subdivision at the Harwich Board of Health.

C. LANDSCAPE PLANS. Applicants must submit a scaled landscape plan indicating the proposed location and grouping of plantings, their sizes and species. The plan shall indicate

the areas to be disturbed by construction and which areas will remain natural. The plan should also indicate areas to be lawn, mulched or stone. Any retaining walls shall also be indicated on the plan. A row of trees along the sides and rear property lines shall remain natural or be transplanted if accidentally disturbed or damaged.

D. PERFORMANCE BOND. The existing owner or contractor shall be responsible for damages to the infrastructure within said subdivision, including the loamed and seeded road shoulders. Each owner or their contractor shall provide a performance bond of \$1,000.00 prior to construction to ensure compliance with the terms and provisions of the documents. Said \$1,000.00 bond shall be returned to owner or contractor upon completion and approval of the house including landscaping, provided that damage has not occurred.

E. APPROVAL BY DECLARANT. The Declarant may decline to approve plans, which in its sole judgment, it deems not suitable or desirable. All approvals or disapprovals of the Declarant shall be in writing and shall be sent to the applicant. Evidence of such approval shall be made by means of a certificate, in recordable form, executed by Declarant. Declarant shall provide approvals or disapprovals within 30 days of submittal.

F. APPROVAL OF CONTRACTORS. All construction on any single family lots must be performed by duly licensed contractors and subcontractors approved by the Declarant in writing prior to performing such construction. All contractors must be properly insured including Workman's Compensation and Liability Insurance. Declarant may request copies of said policies. In the event a contractor or subcontractor performing work on a single family lot fails to comply with any of the terms and provisions of the documents, the Declarant shall have the right, after seven days notice to said contractor or subcontractor of non-compliance, to revoke such written approval and to prohibit such contractor or subcontractor, as the case may be, from entering upon the land. Declarant shall have the right and authority to condition its approval of any contractor upon the experience of said contractor in constructing custom homes.

V. RESERVATIONS

A. The Declarant or his successors, heirs or assigns specifically reserves the fee in the ways and roads as shown on said Plan and the Declarant shall have the right to grant similar rights of way over the roads shown on said plans for the benefit of all lot owners on said plan, and for the benefit of the land of others not shown on said plans, and Declarant reserves the right to grant access over said roads to any person or persons for all purposes in which ways are used in the Town of Harwich. Any purchaser of a lot or lots of land in the Subdivision shall take subject to the rights and reservations created and expressed herein.

B. Each original owner or owners and their successors in title to any lot will have the right to use the ways and roads as shown on said plan in common with others who are now or may hereafter be entitled thereto for all purposes for which public roads are customarily used in the Town of Harwich. This instrument, in addition to creating restrictions, is intended to serve as a dedication of rights of ways for the benefit of each lot owner in the Subdivision.

C. The Declarant may construct and maintain drainage areas on portions of lots designated as drainage easement areas shown on said plans. The original Owner, for itself and its successors in record title, reserves the right to grant easements for utility purposes, cable television, telephone, gas, water and the like, in roads on the subdivision plan and within an area contiguous to, and no more than fifteen (15) feet in depth from said roads, for service boxes, wires, conduits and the necessary attachments for electrical energy, storm water drains, water and gas mains and pipes, and any other method of conducting and performing any utility function along or under the ground.

D. RESALES. Owner shall grant the Declarant or a licensed broker designated by Declarant a six (6) month exclusive brokerage listing for any vacant lot to be sold within the subdivision prior to listing said lot or lot/home package with any other brokerage company. In the event said lot is listed and sold by an outside brokerage company without a written waiver by Declarant, then the owner and/or the outside brokerage company shall pay Declarant an amount equal to no less than three (3) percent of the sales price of a lot/home package or five (5) percent of the sales price of a lot sale only. This provision will terminate five

years from conveyance to the original owner.

This paragraph shall not apply to a bank or lending institution's mortgage or to a foreclosure sale resulting therefrom, but shall apply after said foreclosure sale to any sale by the purchaser thereof other than the foreclosing bank or lending institution which may hold free and clear of said restriction.

E. DEVELOPMENT AND MARKETING ACTIVITIES. Declarant and his nominees reserve the right to enter into and transact on the land any business necessary to consummate the sale, lease, improvement, repair, maintenance or encumbrance of single family lots, residential dwellings or other real property in said subdivision including, but not limited to, the right to maintain models and a sales office, place signs, employ sales personnel, show residential dwellings and single family lots and other portions of the land, and use the portions of the land and residential dwellings and other improvements owned by Declarant or which Declarant or her nominees have the right to use, pursuant to a lease, for purposes set forth above and for storage of construction materials and for assembling construction components on site.

F. SALES AND CONSTRUCTION OFFICES. Declarant shall have the right to use one (1) or more residential dwellings, a trailer located on a portion of the land owned by Declarant, or a portion of any sales office as a construction office. Any such models, sales areas, sales offices, construction offices, signs and any other items pertaining to such sales, construction, maintenance and repair efforts shall not be considered a part of the common elements and shall remain the property of Declarant or its nominees, as the case may be. Declarant for itself and its nominees hereby reserves unto Declarant and its nominees an easement for an office to carry on Declarant's or its nominee's sales and resales business ("Sales Office") on any lots in the Subdivision Plan and easements for access to the Sales Office and for furnishing all required services and utilities to the Sales Office and easements for such other purposes as may be required in connection with the operation of the Sales Office. Declarant further specifically reserves the right in its sole discretion to place the Sales Office upon some other portion of the

land in which event the Sales Office shall remain the property of Declarant. Declarant further reserves the right to use the Sales Office as a sales and business office until Declarant no longer owns any single-family lots.

At such time as Declarant no longer owns any single family lots, or such earlier time as Declarant may determine in its sole discretion, Declarant may remove the Sales Office from the land, in which event the Sales Office shall remain the property of the Declarant. This right of use and transaction of business as set forth herein and any other rights reserved by Declarant in the Documents may be assigned, in writing, by the Declarant in whole or in part.

VI. ENFORCEMENT OF RESTRICTIONS

- A. If in the event the Declarant or any of his successors, heirs or assigns, are obligated to enforce any of the provisions of this Declaration, then and in that event should the Declarant or his successor, heirs or assigns be successful against any lot owner or lot owners in any court of law to cause the lot owner or owners abide by the terms and provisions of this covenant, then in that event the lot owner or owners shall be required to pay to the Declarant, his successors, heirs and assigns any and all attorney's fees and court costs incurred by the Declarant, his successors, heirs and assigns in prosecuting the enforcement of the terms and provisions of this Declaration.
- B. The Division of Fisheries and Wildlife shall have the power to enforce the permanent restriction with regard to the Eastern Box Turtle and shall be allowed to fine any offending owner accordingly for any violation.

VII. AMENDMENT AND ASSIGNMENT OF RESTRICTIONS

- A. The Declarant may delegate or assign any or all of his rights, powers and obligations under these restrictions to any corporation, association or agent, said assignment to be in writing and duly recorded in the Barnstable County Registry of Deeds. **Except for the permanent restriction concerning the Wildlife and Conservancy Areas, the Declarant reserves the**

right to release, modify, amend and waive said covenants, restrictions and conditions at any time.

VIII. RIGHT OF FIRST REFUSAL

A. In the event any vacant lot owner or owners shall receive a bonafide written offer from a third person or persons or any entity to purchase from the lot owner or owners any vacant lot of land shown on the said plan above mentioned; then and in that event before any conveyance shall be made to any such third person or persons or entity, the lot owner or owners shall deliver to the Declarant by certified mail, return receipt requested, a copy of such offer, and the Declarant shall notify the lot owner or owners, by certified mail, return receipt requested within thirty (30) days of receipt of such copy, whether the Declarant will purchase said lot for the net amount of said offer (i.e., without the necessity of either party paying a real estate broker) and if such reply is in the affirmative, the lot owner or owners shall within 60 days convey said real estate to the Declarant for the said net amount. In the event the response of the Declarant is in the negative, the same shall be under seal, acknowledged and in a form acceptable for recording at the Barnstable Registry of Deeds.

Should Declarant not respond within thirty (30) days, the lot owner or owners may execute and record a statement under oath of compliance with the provisions herein contained and such statement shall be conclusive and irrefutable with respect to the facts therein contained. This provision shall not apply to conveyances from the lot owner or owners to any of their children or the spouses of any such children, but shall apply to conveyances from said children or their spouses to any third person, persons or entity.

This provision is personal to the Declarant, shall not be considered running with the granted premises and shall terminate on the earliest occurrence of twenty (20) years after the date of the recording of this Declaration, or the construction of a house on the lot in the Subdivision and obtaining an occupancy permit from the Town of Harwich.

If any banking corporation or lending institution shall become the mortgagee of any of

the lots of land of any of the lot owner or owners, the premises shown on the said plan as mentioned above or any of the portion thereof, then this provision shall not apply to such mortgagee, its successors or assigns or anyone claiming by or through such mortgagee.

IX. HOMEOWNER'S ASSOCIATION

A. All of the lots within the above described plan shall be required to join the WILDLIFE CIRCLE ESTATES HOMEOWNER'S ASSOCIATION and to pay such charges as that association establishes for the maintenance of any open space areas and the like.

For my title reference, see the deeds recorded at Barnstable County Registry of Deeds in Book _____, Pages _____ through _____, inclusive.

WITNESS my hand and seal this ____ day of _____, 2022.

Wildlife Circle Nominee Trust

By Christopher W. Our, Trustee

COMMONWEALTH OF MASSACHUSETTS

Barnstable, ss

July ____, 2022

Then personally appeared before me, the undersigned notary public, the above-named Christopher W. Our, Trustee of the Wildlife Circle Nominee Trust who is known by me and to me known to be, the person whose name is signed on the preceding or attached document, and acknowledged to me that he signed it voluntarily for its stated purpose.

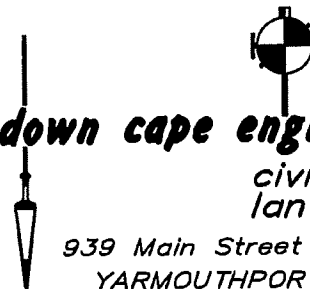
Notary Public
My commission expires:

**HYDRO-GEOLOGIC DATA
PER HARWICH BOH REG. 1.211 FOR
RESIDENTIAL SUBDIVISION
OFF LITTLEFIELD POND ROAD
HARWICH, MA**

PREPARED FOR

R.B.OUR CO. ET. AL.

DATE: 6/25/2019


down cape engineering, inc.
*civil engineers
land surveyors*
939 Main Street (Rte 6A)
YARMOUTHPORT MA 02675

off 508-362-4541
fax 508-362-9880
downcape.com ©



down cape engineering, inc.

CIVIL ENGINEERS & LAND SURVEYORS

939 MAIN ST / ROUTE 6A YARMOUTHPORT, MA 02675

(508) 362-4541 FAX (508) 362-9880

Date: 6-25-19

TO: Town of Harwich Board of Health

FROM: Daniel A. Ojala, PE, PLS down cape engineering, inc.

**RE: R.B.Our Subdivision off Littlefield Pond Road/Fish & Game Drive, Harwich,
MA Hydrogeological Information**

The purpose of this memo is to provide information on the Hydro-Geological conditions for the subdivision filed with the Board of Health and Planning Board for the above referenced site.

The lots are shown as Assessors Map 77 Parcels C20 and C22, and Mape 65 Parcels R2 and R3. The property is West of the Littlefield Pond Road and South of the Cape Cod Fish & Game property.

The proposal is to modify an existing vacant buildable lot, and portions of several other vacant parcels and one developed lot to create seven building lots, for a net gain of six lots. There are two remainder lots West of the division, one with a home and one vacant.

The majority of the site is in a mapped Zone 2 to public wells per the local and DEP mapping, attached. The majority is in the Zone 2 for the Dennis wells west of locus, the northeast corner is in an overlapping zone for a Harwich well as shown on the map. A power line easement runs across the Southern end of the development.

The site is also in the West Reservoir GT10 watershed as mapped by the Mass Estuaries project, as groundwater from the site is mapped travelling in watershed 23 on the attached maps. The area is in a greater than ten year time of travel zone from the West Reservoir, which feeds into the Herring River system.

The site currently consists some cleared areas and typical second growth pine and oak forest, with the cleared power line on the South end. The terrain is rolling, soils

are Carver Coarse sand, and groundwater ranges between around twenty to thirty feet below the ground surface under the roadway areas. The site consists of glacial sand and gravel deposits typical of the area, and the ground elevation is approximately 28.5 feet above mean sea level per the groundwater map and local pond elevations. No wetlands are mapped by DEP on or within 100 feet of the property, the site conditions will be verified during the definitive plan process.

All stormwater from the development will be infiltrated onsite.

The site has been designed to fully comply with the Mass DEP Stormwater Management Guidelines, and is designed per local requirements for infiltrating the entire 25 year design storm onsite. The site's stormwater is run through off line deep sump hooded catch basins and then routed through secondary deep sump hooded manholes to remove the required 44% of TSS prior to onsite infiltration through stormwater leaching pits. Overflow for larger storm events to a natural low area is planned.

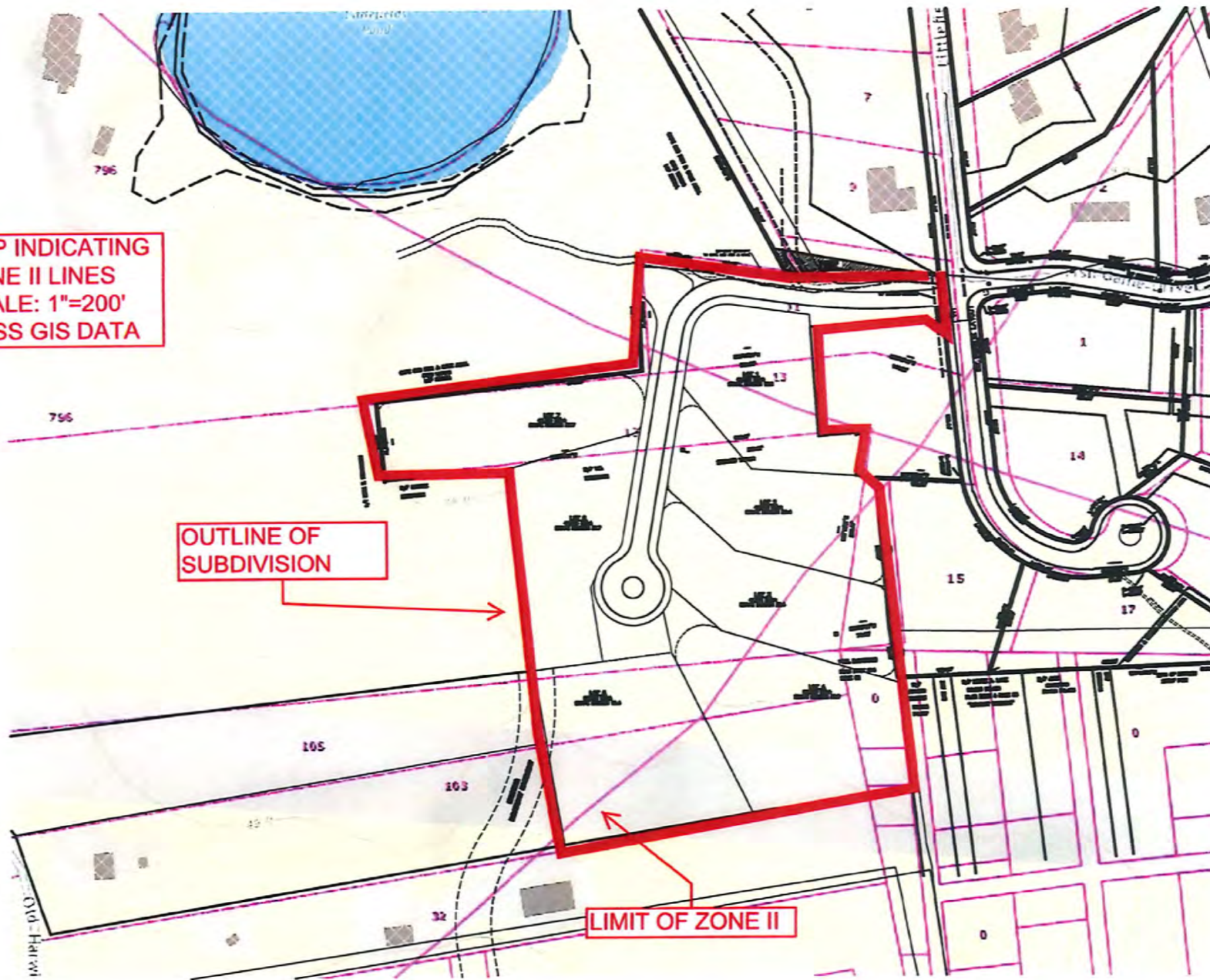
The depth of dry sand beneath the onsite stormwater leaching and the Title 5 septic leaching areas will exceed the depth set by local and state guidelines, helping assure protection of the aquifer.

The direction of groundwater flow is to the South, this is shown on the detailed MassGIS mapping attached.

The area currently utilizes onsite septic systems, as municipal sewer is not available at this time. The homes septic design flow will each be limited to four bedrooms, as the site is within a Nitrogen Sensitive Area, or Zone II, is shown on the attached plans. 310 CMR 15.00 Title 5 limits design flow in a Nitrogen Sensitive Area to 110 gpd/10,000 sf of land area, and each lot is a little over the zoning minimum of 40,000 sf. The Cape Cod Commission formula indicates the development will average 5.31 ppm of nitrogen loading, a reasonable level given the open space around the development and the distance to sensitive receptors. There are no close downgradient lakes which would be sensitive to Phosphorous, so special mitigation is not proposed, the West reservoir is greater than ten years time of travel South of the site.

Encl. groundwater mapping, nitrogen calcs, soil information

MAP INDICATING
ZONE II LINES
SCALE: 1"=200'
MASS GIS DATA



GROUNDWATER
CONTOUR MAP
REF. HARWICH/
BREWSTER MAP
2' CONTOURS
GPR RADAR 1988
NAVD88 DATUM
1"=400' ON 8.5"x11"
PAPER
DATE: 6-25-19
DOWN CAPE
ENGINEERING, INC.

FISH & GAME
CLUB

GROUNDWATER
CONTOUR PER
2' CONTOUR MAP
INTERPOLATED

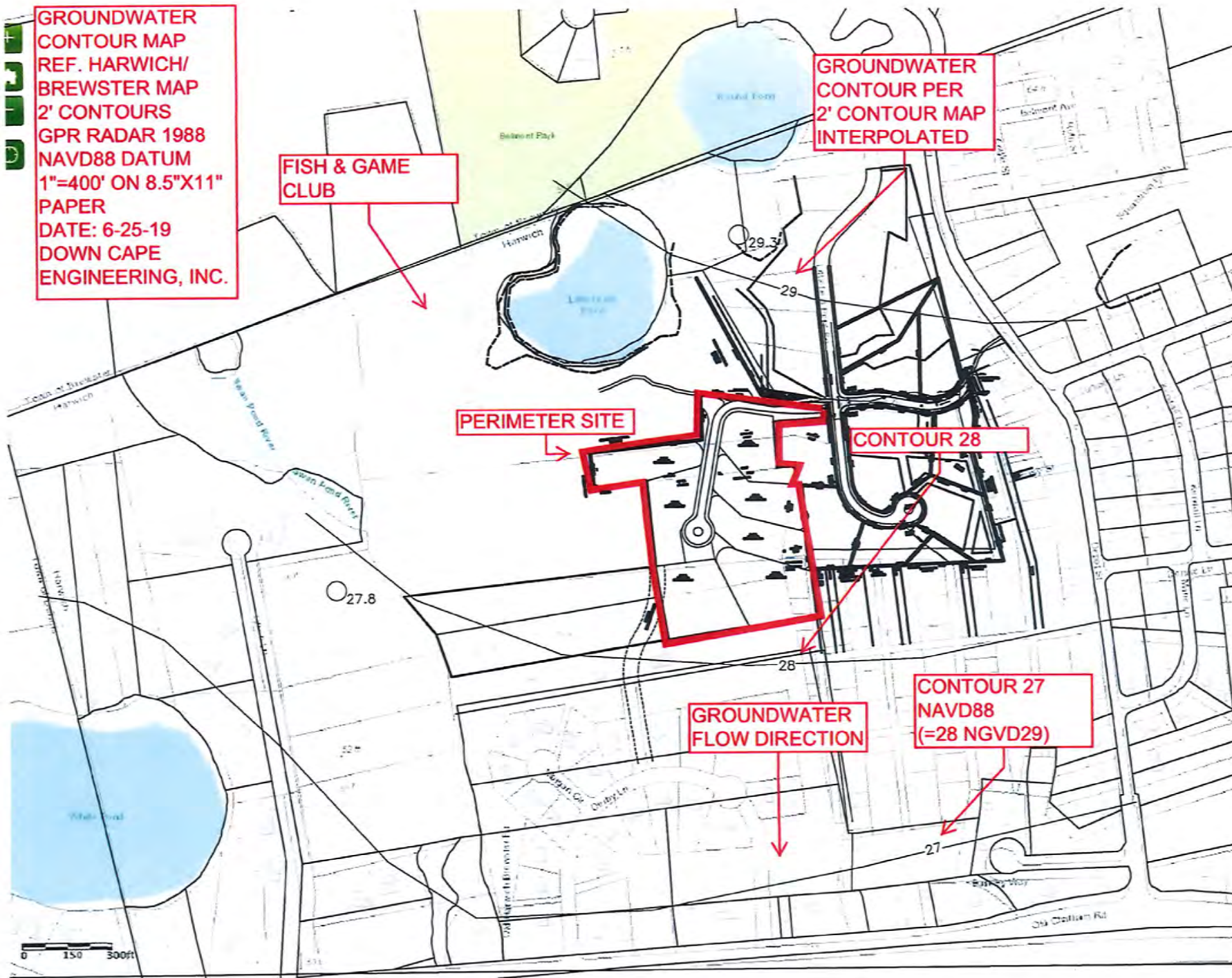
PERIMETER SITE

CONTOUR 28

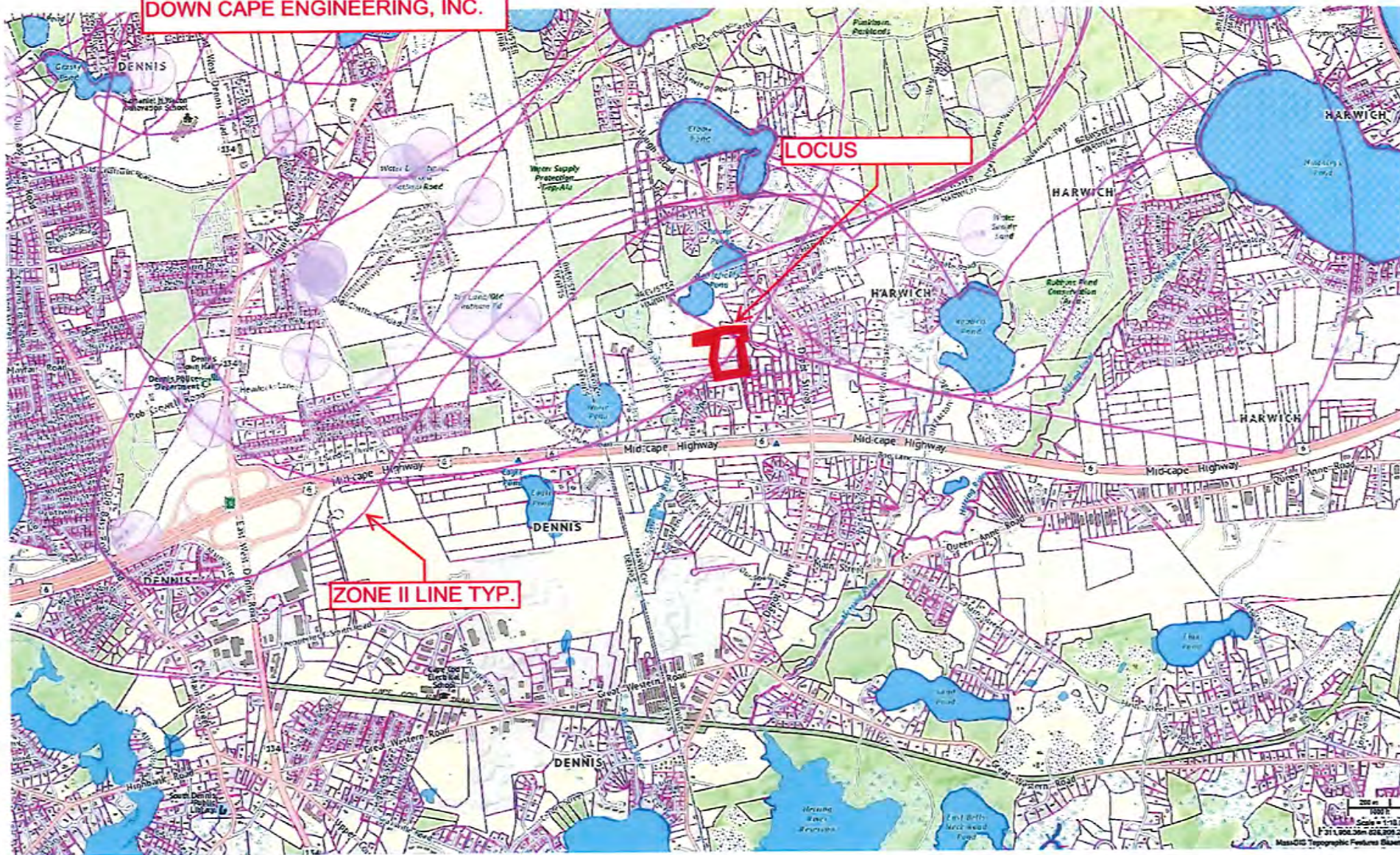
GROUNDWATER
FLOW DIRECTION

CONTOUR 27
NAVD88
(=28 NGVD29)

0 150 300ft



AREA MAP SHOWING ZONE II'S
MASS GIS DATA
6-25-19
DOWN CAPE ENGINEERING, INC.



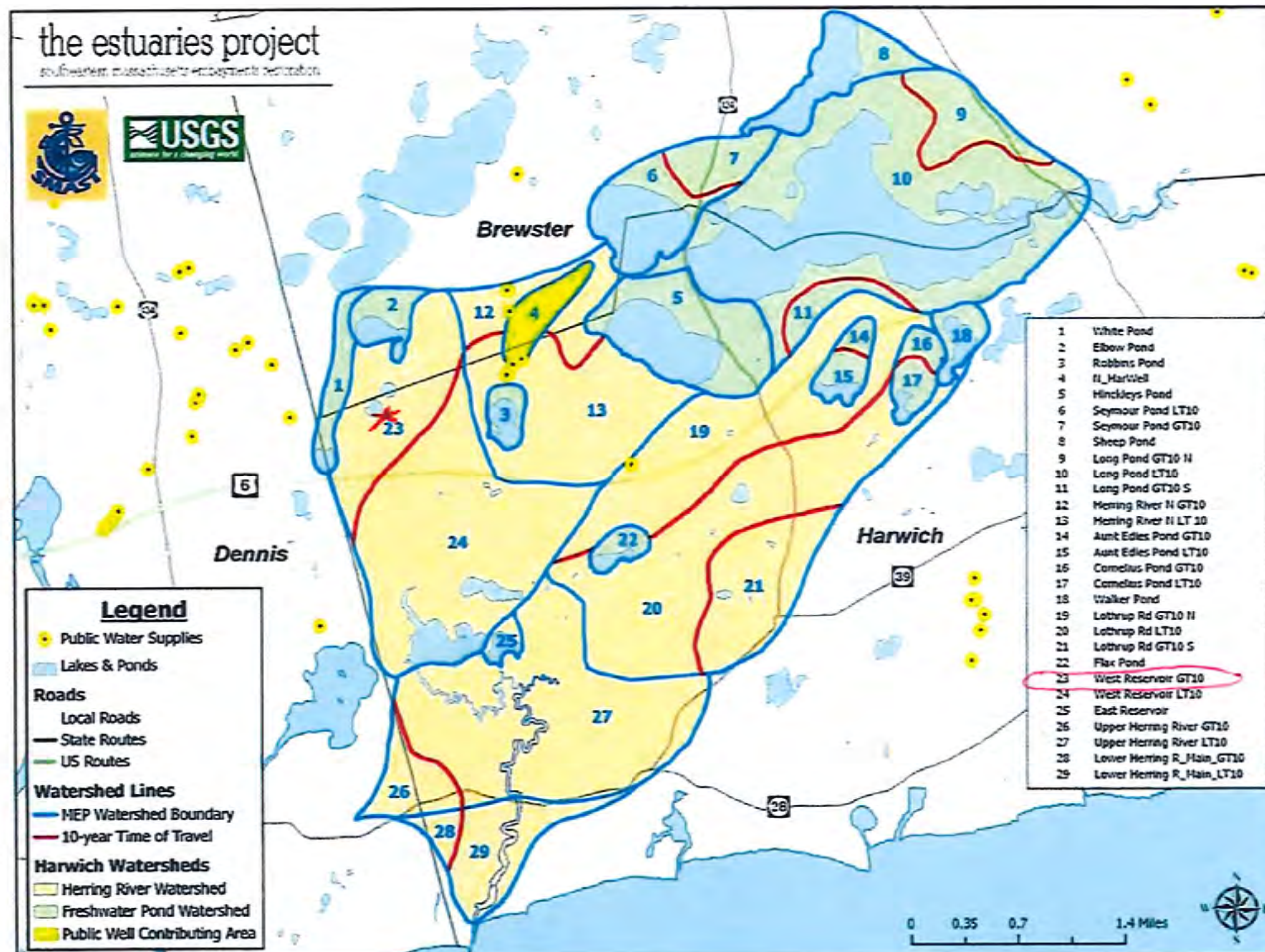


Figure III-1. Watershed delineation for Herring River estuary. Subwatershed delineations are based on USGS groundwater model output with modifications to better address pond and estuary shorelines and MEP stream gauge measurements. Ten-year time-of-travel delineations were produced for quality assurance purposes and are designated with a "10" in the watershed names and are indicated by the red lines (above). Sub-watersheds within the estuary portion of the watershed (e.g., Upper Herring River) were selected based upon functional estuarine sub-units in the water quality model (see Section VI).

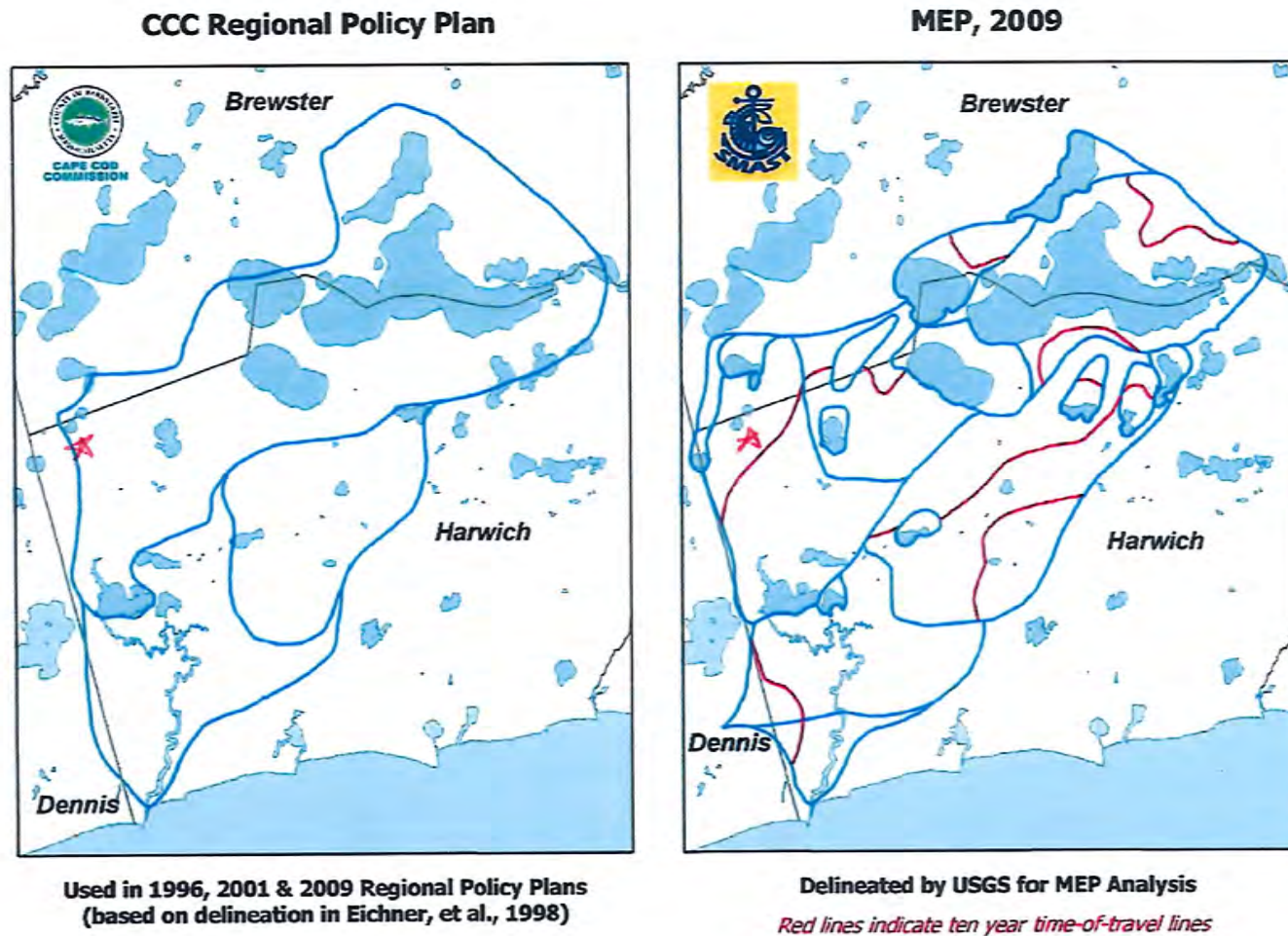


Figure III-2. Comparison of MEP Herring River watershed and subwatershed delineations used in the current assessment and the Cape Cod Commission delineation (Eichner, *et al.*, 1998), which has been used in three Barnstable County Regional Policy Plans (CCC, 1996, 2001, and 2009). Changes relate to the inclusion of new data and refinements included in the USGS analysis, which primarily altered the western boundary.

Table III-1. Daily groundwater discharge from each of the sub-watersheds in the watershed to the Herring River estuary, as determined from the regional USGS groundwater model.

Watershed	#	Watershed Area (acres)	Discharge	
			m ³ /day	ft ³ /day
White Pond	1	106	810	28,613
Elbow Pond	2	97	744	26,268
Robbins Pond	3	57	438	15,464
N HarWell	4	98	755	26,645
Hinckleys Pond	5	435	3,336	117,804
Seymour Pond LT10	6	258	1,979	69,886
Seymour Pond GT10	7	131	1,003	35,418
Sheep Pond	8	214	1,646	58,126
Long Pond GT10 N	9	185	1,418	50,061
Long Pond LT10	10	1,644	12,617	445,555
Long Pond GT10 S	11	85	650	22,952
Herring River N GT10	12	209	1,601	56,554
Herring River N LT 10	13	615	4,722	166,764
Aunt Edies Pond GT10	14	28	216	7,614
Aunt Edies Pond LT10	15	64	491	17,348
Cornelius Pond GT10	16	38	292	10,304
Cornelius Pond LT10	17	62	476	16,792
Walker Pond	18	77	591	20,877
Lothrop Rd GT10 N	19	729	5,596	197,605
Lothrop Rd LT10	20	903	6,927	244,613
Lothrop Rd GT10 S	21	367	2,814	99,373
Flax Pond	22	51	391	13,808
West Reservoir GT10	23	440	3,373	119,109
West Reservoir LT10	24	1,076	8,259	291,662
East Reservoir	25	36	276	9,744
Upper Herring River GT10	26	141	1,083	38,261
Upper Herring River LT10	27	1,085	8,329	294,130
Lower Herring R_Main_GT10	28	46	355	12,554
Lower Herring R_Main_LT10	29	229	1,754	61,942
HERRING RIVER SYSTEM TOTAL			70,509	2,490,001

Notes: 1) discharge volumes are based on 27.25 in of annual recharge over the watershed area; 2) these flows do not include direct precipitation to the surface of the estuary; 3) upgradient ponds often discharge to numerous downgradient subwatersheds including some discharge out of the Herring River system (e.g., Sheep Pond), percentage of outflow is determined by length of downgradient shoreline going to each receiving subwatershed; the sum of these corrections are included in the total system recharge, but not in the recharge for individual subwatersheds.

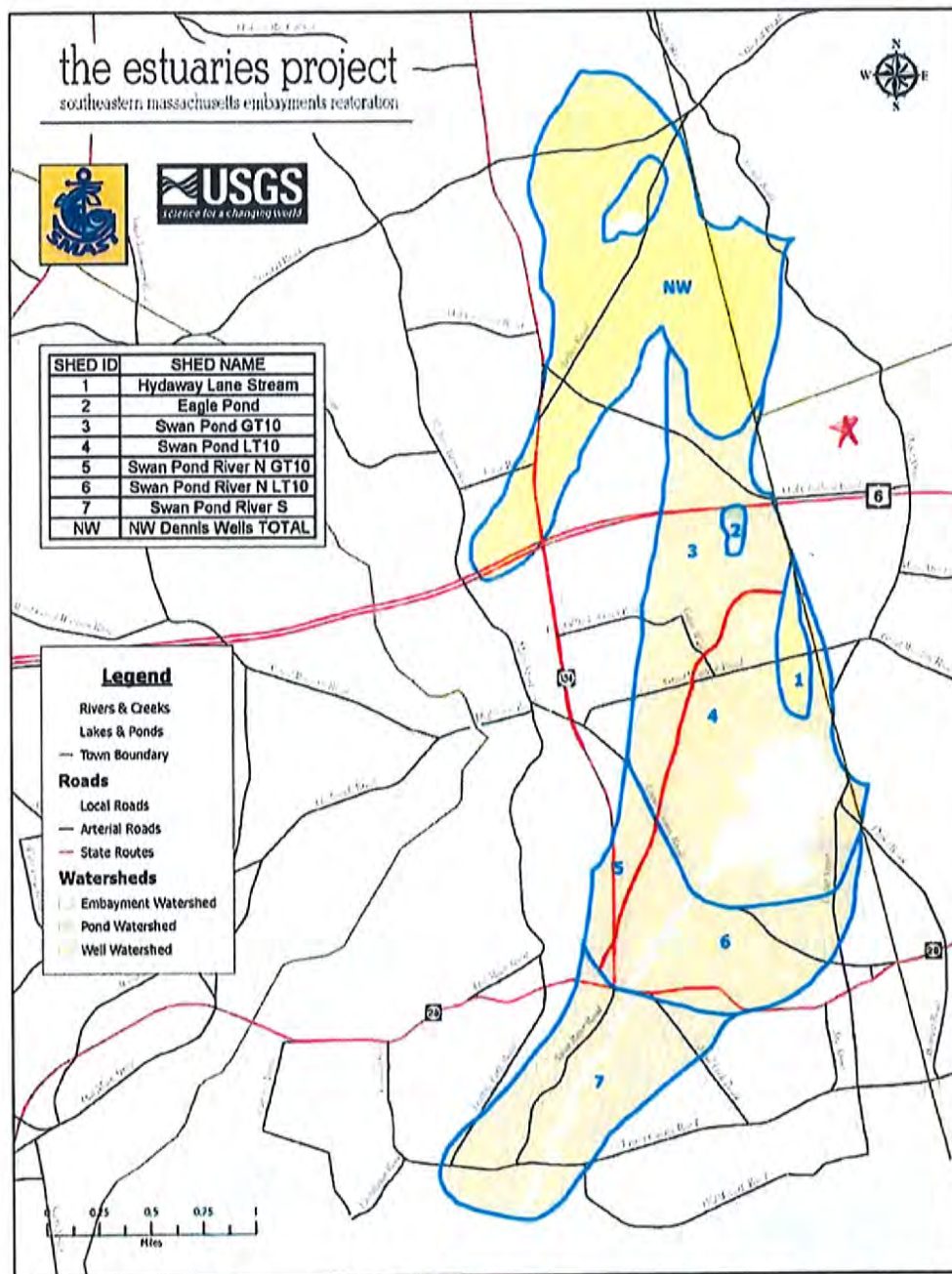


Figure III-1. Watershed delineation for the Swan Pond estuary system. Subwatershed delineations (8) are based on USGS groundwater model output with refinements to better address pond and estuary shorelines and MEP stream gauge measurements. Ten-year time-of-travel delineations were produced for quality assurance purposes and are designated with a "10" in the watershed names (above). Sub-watershed groups (e.g., Swan Pond River N) were selected based upon the functional estuarine sub-units in the water quality model (see Section VI). The watershed to NW Dennis Wells is shared with the Bass River system and is detailed in the Bass River MEP Report (Howes, *et al.*, 2010).

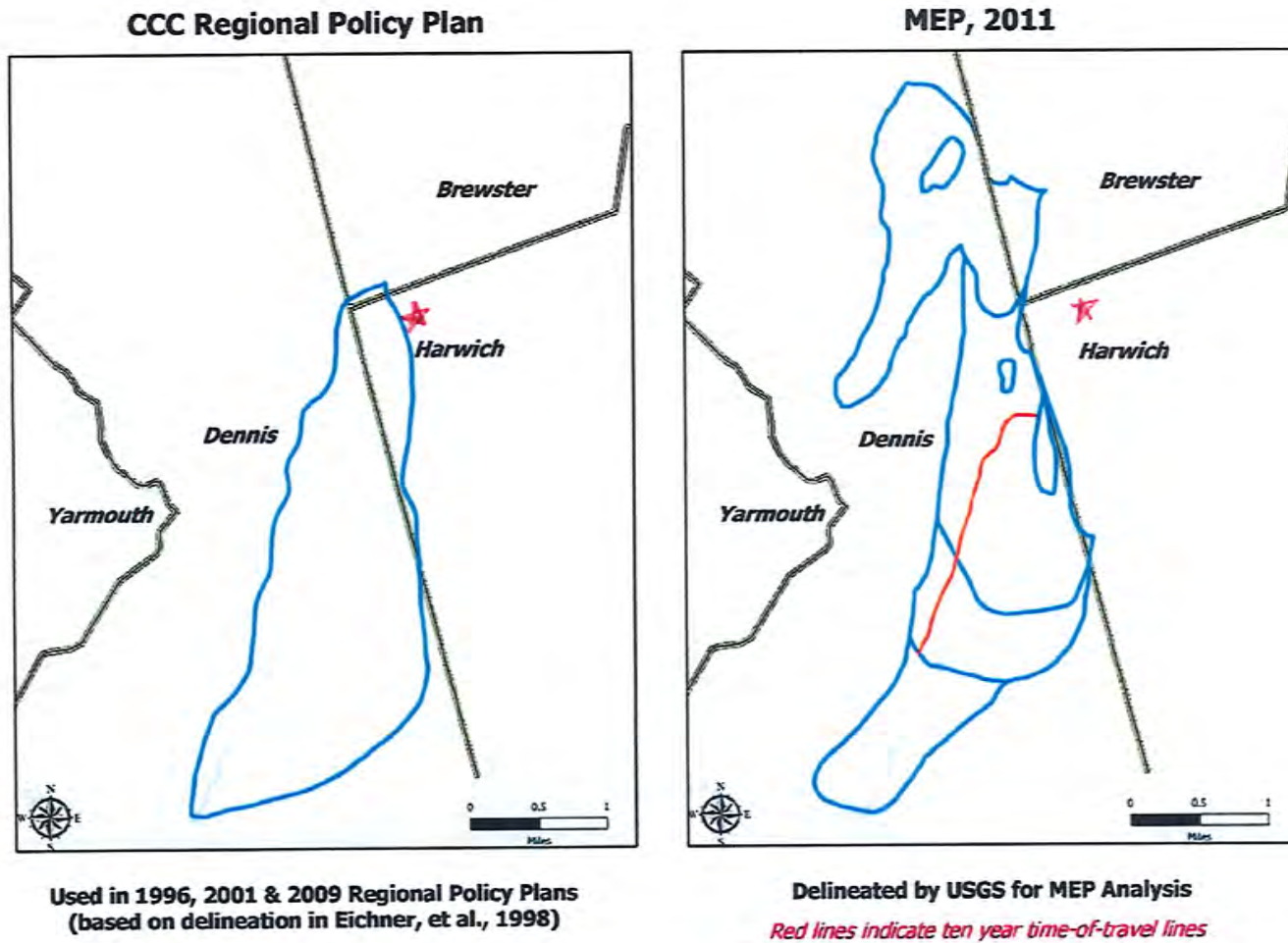


Figure III-2. Comparison of MEP Swan Pond River watershed and sub-watershed delineations used in the current assessment and the Cape Cod Commission watershed delineation (Eichner, *et al.*, 1998), which has been used in three Barnstable County Regional Policy Plans (CCC, 1996, 2001, 2009). Note that while portions of the Towns of Brewster and Harwich are within the watershed, almost all of the watershed area falls within the Town of Dennis.

TEST HOLE LOGS- OFF LITTLEFIELD POND ROAD, HARWICH

ENGINEER: DANIEL E. GONSALVES, SE #13587

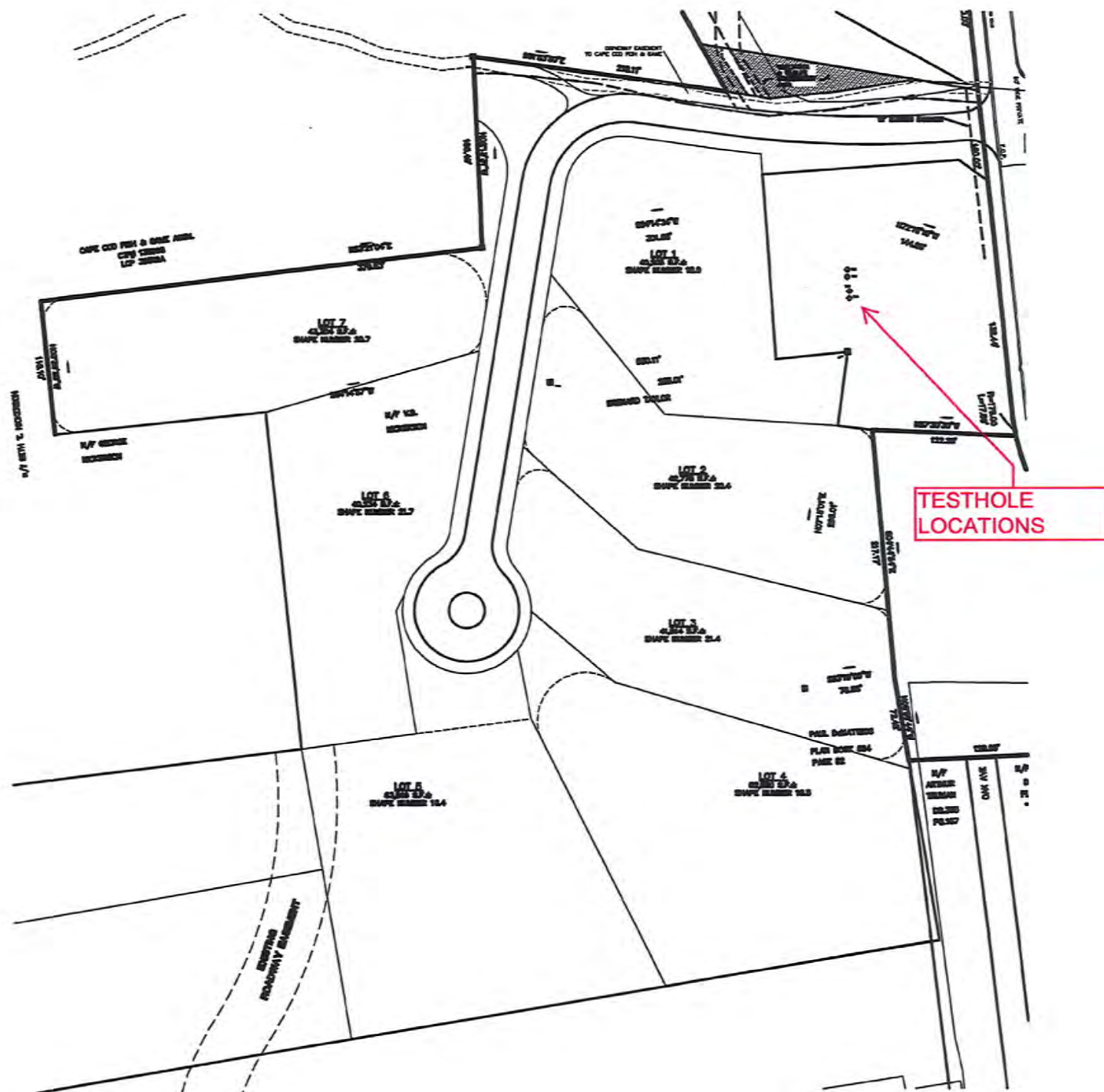
WITNESS: MEGGAN TIERNEY, RS

DATE: 12/14/16

PERC. RATE = < 2 MIN/INCH

CLASS I SOILS

HOLE 1			HOLE 2			HOLE 3			HOLE 4		
		ELEV.			ELEV.			ELEV.			ELEV.
0"	O/A LS 10YR 2/2	57.5'	0"	O/A LS 10YR 2/2	57.5'	0"	O/A LS 10YR 3/2	57.5'	0"	O/A LS 10YR 3/2	57.5'
3"			5"			4"			3"		
	E MS 10YR 6/2	58.9'		E MS 10YR 6/2	56.7'		E MS 2.5Y 5/2	56.7'		E MS 2.5Y 5/2	57.0'
7"			10"			10"			6"		
	B LS 10YR 4/6	54.8'		B LS 10YR 4/6	54.7'		B LS 10YR 5/8	54.7'		B LS 10YR 5/8	55.8'
32"			36"			34"			20"		
	C M/CS 2.5Y 6/6	46.5'		C M/CS 2.5Y 6/6	47.5'		C M/CS 2.5Y 7/4	47.5'		C M/CS 2.5Y 7/4	47.5'
132"			120"			120"			120"		
PERC						PERC					
NO GROUNDWATER ENCOUNTERED			NO GROUNDWATER ENCOUNTERED			NO GROUNDWATER ENCOUNTERED			NO GROUNDWATER ENCOUNTERED		



PROPOSED

RESIDENTIAL NO3-N LOADING

PROJECT:

SUBDIVISION OFF LITTLEFIELD POND ROAD

TOWN Average Occupancy 2.238 ppl/unit
Bedrooms 36
Units 9

Title V Wastewater Flow = 3960.0 gpd
Actual Wastewater Flow = 1107.8 gpd

Total Land Area = 546876 ft2
Paved Area = 3000 ft2
Roof Area = 18000 ft2
Lawn Area = 81000 ft2
Natural Area = 444876 ft2

ASSUMED VALUES

Impervious Recharge Rate = 40 in/yr
Roof Runoff Concentration 0.75 mg/L
Road Runoff Concentration 1.50 mg/L
Lawn Nitrogen Leaching 25 %
Wastewater Concentration = 35 mg/L
Average Lawn Size = 5000 ft2
Recharge Rate = 18 in/yr
Fertilizer Application Rate 3 lbs/1000ft2

CALCULATIONS

Actual Wastewater Loading 146757.13 mg
Title V Wastewater Loading 524601.00 mg
Total Impervious Loading 4655.34 mg
Roof Loading 3491.51 mg
Paved Loading 1163.84 mg
Lawn Loading 75563.01 mg

Actual Wastewater Recharge 4193.06 liters
Title V Wastewater Recharge 14988.60 liters
Roof Recharge 4655.34 liters
Paved Recharge 775.89 liters
Natural Area Recharge 61203.32 liters

Actual Total Loading 226975.49 mg
Title V Total Loading 604819.36 mg

Actual Total Recharge 70827.62 liters
Title V Total Recharge 81623.15 liters

TITLE V NITROGEN LOADING CONCENTRATION = 7.41 ppm
ACTUAL NITROGEN LOADING CONCENTRATION = 3.20 ppm

Mean = 5.31 ppm

Actual loading 82.85 kg/yr
Title 5 loading 220.76 kg/yr

Mean = 151.80 kg/yr



down cape engineering, inc.

CIVIL ENGINEERS & LAND SURVEYORS

939 MAIN ST / ROUTE 6A YARMOUTHPORT, MA 02675

(508) 362-4541 FAX (508) 362-9880

DRAINAGE CALCULATIONS:

Fish & Game Drive and Wildlife Circle
Proposed Subdivision
Harwich, MA

DATE: 9-16-2022

PREPARED FOR: Chris Our



STORMWATER NARRATIVE:

Fish & Game Drive & Wildlife Circle, Harwich, MA.

Date: 12-19-23 © 2023 down cape engineering, inc.

OVERVIEW OF STORMWATER MANAGEMENT SYSTEM/ NARRATIVE INDICATING STORMWATER STANDARDS COMPLIANCE:

The drainage systems specified for proposed development have been designed in accordance with Town of Harwich Subdivision Rules and Regulations, the Comprehensive Stormwater and Illicit Discharge Regulations of the Town of Harwich, and the State Stormwater Management Guidelines. The project consists of a seven-lot residential subdivision. Full compliance with all Stormwater Standards is met by the design. The site is within the Residential (RR) zoning district. The site is not a "Land Use with Higher Potential Pollutant Load" per the State Stormwater Management Guidelines, so infiltration after pretreatment is utilized. The underlying material is sand, hydrologic group A under the guidelines. Soils maps indicating the Carver Coarse Sand designation and mapping are included at the end of the report.

During construction, the installation of a silt controls where needed and a stone construction apron will provide full protection of the abutters and roadway. A silt fence for the turtle protection plan will also remain in place for the duration of the construction, a turtle sweep has already been completed. The erosion control fence is to be inspected after every rain event and is to be maintained until the site is stabilized and permission obtained for removal. The stone drive apron will be utilized in the roadway entrance area during the work. There are no wetlands near the work areas, silt fences and a topographical break separate the work from a small wetland to the west of the property. To assist in low impact design, a waiver from sidewalk construction was sought to reduce impervious areas on the site.

The proposed offline deep sump hooded catch basins overflow to secondary deep sump hooded manholes installed prior to the infiltration units, so the design meets the 44% TSS removal prior to infiltration as required by the Standards. A natural drainage overflow area is proposed to help remove nitrogen and phosphorus. The infiltration system is sized per the subdivision guidelines using HydroCAD calculations, which shows a 25 year storm event is contained and infiltrated onsite and provides the required Total Suspended Solids (TSS) removal mandated by the State Stormwater Management Guidelines. The calculations show a reduction in each of the required storms including the 100 year storm event between pre and post development hydrographs. The stormwater for all events is infiltrated on the onsite system and natural overflow areas, so no offsite flow is produced. Since all stormwater is infiltrated onsite, the peak reduction required by the regulations is easily met. The proposed stormwater management system will also therefore provide well in excess of the required one inch of runoff retention from impervious areas on the site. Per Table 3-10 of Appendix F of the Massachusetts MS4 permit this onsite infiltration will mitigate 100% of the total nitrogen and phosphorous load in the stormwater, Table 3-10 is included in the LTPPP section of this report. A Construction General Permit has been filed for the site, as approximately 4 acres of land will be disturbed including the home sites. A SWPPP has been developed, and is attached for reference.

The stormwater owner/operators, description of construction, sequencing, required maps, and list of pollutants, BMP's, waste management, spill prevention, maintenance schedules, etc. are all listed in the SWPPP per the regulations.

Best Management Practices incorporated in the project are as follows:

- Rain Gardens / Bioinfiltration areas (90% TSS Removal)
- Deep Sump Hooded Catch Basins offline (25% TSS Removal)
- Secondary Deep Sump Hooded Manholes (25% TSS Removal)
- Infiltration pits (80% TSS Removal)

Compliance with the 10 State Stormwater Standards (in order in bold with explanation in lighter font following the numbered Standards is as follows:

- 1. No new stormwater conveyances (e.g. outfalls) may discharge untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth.**
The project prevents existing stormwater from entering waters of the Commonwealth, and no new outfalls are proposed, so this standard is met and exceeded. The local regulation require a 25 year storm be infiltrated 100% onsite, far exceeding the State requirements.
- 2. Stormwater management systems shall be designed so that post-development peak discharge rates do not exceed pre-development peak discharge rates. This Standard may be waived for discharges to land subject to coastal storm flowage as defined in 310 CMR 10.04.**
The sandy soils permit onsite infiltration, the proposed drainage system will infiltrate a 25 year storm event onsite per the attached calculations, so this Standard is easily met by the proposal. Since the majority of a 100 year storm with Type III distribution (high peak) is also infiltrated onsite no greater impact to abutters than existing is assured. A failsafe overflow natural area is utilized.
- 3. Loss of annual recharge to groundwater shall be eliminated or minimized through the use of infiltration measures including environmentally sensitive site design, low impact development techniques, stormwater best management practices, and good operation and maintenance. At a minimum, the annual recharge from the post-development site shall approximate the annual recharge from pre-development conditions based on soil type. This Standard is met when the stormwater management system is designed to infiltrate the required recharge volume as determined in accordance with the Massachusetts Stormwater Handbook.**
Local Town of Harwich requirements call for all stormwater to be infiltrated onsite for proposed subdivisions, and the proposed development complies with this standard, so the annual recharge is easily met.
- 4. Stormwater management systems shall be designed to remove 80% of the average annual post-construction load of Total Suspended Solids (TSS). This Standard is met when:**
 - a. Suitable practices for source control and pollution prevention are identified in a long-term pollution prevention plan, and thereafter are implemented and maintained;
 - b. Structural stormwater best management practices are sized to capture the required water quality volume determined in accordance with the Massachusetts Stormwater Handbook; and
 - c. Pretreatment is provided in accordance with the Massachusetts Stormwater Handbook.

A long term pollution prevention plan is to be attached, in excess of the correct volumes are captured, and pretreatment is provided per the Handbook, so compliance with #4 is assured.
- 5. For land uses with higher potential pollutant loads, source control and pollution prevention shall be implemented in accordance with the Massachusetts Stormwater Handbook to eliminate or reduce the discharge of stormwater runoff from such land uses to the maximum extent practicable. If through source control and/or pollution prevention all land uses with higher potential pollutant loads cannot be completely protected from exposure to rain, snow, snow melt,**

and stormwater runoff, the proponent shall use the specific structural stormwater BMPs determined by the Department to be suitable for such uses as provided in the Massachusetts Stormwater Handbook. Stormwater discharges from land uses with higher potential pollutant loads shall also comply with the requirements of the Massachusetts Clean Waters Act, M.G.L. c.

21, §§ 26-53 and the regulations promulgated thereunder at 314 CMR 3.00, 314 CMR 4.00 and 314 CMR 5.00. The standard residential lots and roadway are not applicable to higher potential pollutant loads per the Handbook, so this standard is "Not Applicable" for this site. (note that 44% TSS removal pretreatment is provided prior to infiltration).

6. Stormwater discharges within the Zone II or Interim Wellhead Protection Area of a public water supply, and stormwater discharges near or to any other critical area, require the use of the specific source control and pollution prevention measures and the specific structural stormwater best management practices determined by the Department to be suitable for managing discharges to such areas, as provided in the Massachusetts Stormwater Handbook. A discharge is near a critical area if there is a strong likelihood of a significant impact occurring to said area, taking into account site-specific factors. Stormwater discharges to Outstanding Resource Waters and Special Resource Waters shall be removed and set back from the receiving water or wetland and receive the highest and best practical method of treatment. A "storm water discharge" as defined in 314 CMR 3.04(2)(a)1 or (b) to an Outstanding Resource Water or Special Resource Water shall comply with 314 CMR 3.00 and 314 CMR 4.00. Stormwater discharges to a Zone I or Zone A are prohibited unless essential to the operation of a public water supply. The site is not within a Zone I, Zone A, the site is partially within a Zone II, and is limited to 1 bedroom per 10,000 sf by the BOH. A Wildlife and Vegetation Conservancy area restricting clearing and brushing is proposed, the perimeter buffer assists in infiltrating and treating stormwater with vegetative uptake of nitrogen and phosphorous, see definitive plan for monumented area limits, and Declaration of Protective Covenants, Permanent Restrictions, Rights and Reservations attached to the stormwater report and on file with the Planning Department.

7. A redevelopment project is required to meet the following Stormwater Management Standards only to the maximum extent practicable: Standard 2, Standard 3, and the pretreatment and structural best management practice requirements of Standards 4, 5, and 6. Existing stormwater discharges shall comply with Standard 1 only to the maximum extent practicable. A redevelopment project shall also comply with all other requirements of the Stormwater Management Standards and improve existing conditions. This project fully complies with the standards.

8. A plan to control construction-related impacts including erosion, sedimentation and other pollutant sources during construction and land disturbance activities (construction period erosion, sedimentation, and pollution prevention plan) shall be developed and implemented. The plans are attached,

9. A long-term operation and maintenance plan shall be developed and implemented to ensure that stormwater management systems function as designed. The plan to be attached.

10. All illicit discharges to the stormwater management system are prohibited. No illicit discharges are allowed or planned related to this site. Additional documentation will be filed per the stormwater instructions. (Illicit Discharge Statement).

As shown above and in the following calculations, the proposed site will be compliant with the State Stormwater Management Guidelines and the Harwich Comprehensive Stormwater regulations.

INSTRUCTIONS:

Version 1, Automated: Mar. 4, 2008

1. In BMP Column, click on Blue Cell to Activate Drop Down Menu
2. Select BMP from Drop Down Menu
3. After BMP is selected, TSS Removal and other Columns are automatically completed.

Location: Wildlife Circle Definitive Subdivision Proposed

TSS Removal
Calculation Worksheet

B	C	D	E	F
BMP ¹	TSS Removal Rate ¹	Starting TSS Load*	Amount Removed (C*D)	Remaining Load (D-E)
Deep Sump and Hooded Catch Basin	0.25	1.00	0.25	0.75
Deep Sump and Hooded Catch Basin	0.25	0.75	0.19	0.56
Infiltration Basin	0.80	0.56	0.45	0.11
	0.00	0.11	0.00	0.11
	0.00	0.11	0.00	0.11

Total TSS Removal =

89%

Separate Form Needs to
be Completed for Each
Outlet or BMP Train

Project: Wildlife Circle

Prepared By: Daniel A. Ojala PE PLS

Date: 10/10/2023

*Equals remaining load from previous BMP (E)
which enters the BMP



Drainage Area DA1



D. Ojala
9-16-22



Drainage Infiltration
Model



Routing Diagram for 17-198 RBOUR SUB DA1

Prepared by down cape engineering, inc.

HydroCAD® 10.10-4b s/n 11505 © 2020 HydroCAD Software Solutions LLC

17-198 RBOUR SUB DA1

Prepared by down cape engineering, inc.

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	Barn Cty 10 Yr	Type III 24-hr		Default	24.00	1	4.95	2
2	Barn Cty 2 Yr	Type III 24-hr		Default	24.00	1	3.39	2
3	Barn Cty 25 Yr	Type III 24-hr		Default	24.00	1	5.92	2
4	Barn Cty 50 yr.	Type III 24-hr		Default	24.00	1	6.65	2

100yr Follows - SEPARATE

17-198 RBOUR SUB DA1

Prepared by down cape engineering, inc.

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
49,364	98	Pavement and front Roof Area (1S)
116,801	32	Woods/grass comb., Good, HSG A (1S)
166,165	52	TOTAL AREA

17-198 RBOUR SUB DA1

Prepared by down cape engineering, inc.

Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
116,801	HSG A	1S
0	HSG B	
0	HSG C	
0	HSG D	
49,364	Other	1S
166,165		TOTAL AREA

17-198 RBOUR SUB DA1

Prepared by down cape engineering, inc.

Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover
0	0	0	0	49,364	49,364	Pavement and front Roof Area
116,801	0	0	0	0	116,801	Woods/grass comb., Good
116,801	0	0	0	49,364	166,165	TOTAL AREA

Time span=1.00-24.00 hrs, dt=0.01 hrs, 2301 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Drainage Area DA1

Runoff Area=166,165 sf 29.71% Impervious Runoff Depth>0.78"

Tc=5.0 min CN=52 Runoff=2.54 cfs 10,797 cf

Pond 1P: Drainage Infiltration Model

Peak Elev=36.20' Storage=912 cf Inflow=2.54 cfs 10,797 cf

Outflow=1.52 cfs 10,751 cf

Total Runoff Area = 166,165 sf Runoff Volume = 10,797 cf Average Runoff Depth = 0.78"

70.29% Pervious = 116,801 sf 29.71% Impervious = 49,364 sf

17-198 RBOUR SUB DA1

Type III 24-hr Barn Cty 10 Yr Rainfall=4.95"

Prepared by down cape engineering, inc.

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Page 7

Summary for Subcatchment 1S: Drainage Area DA1

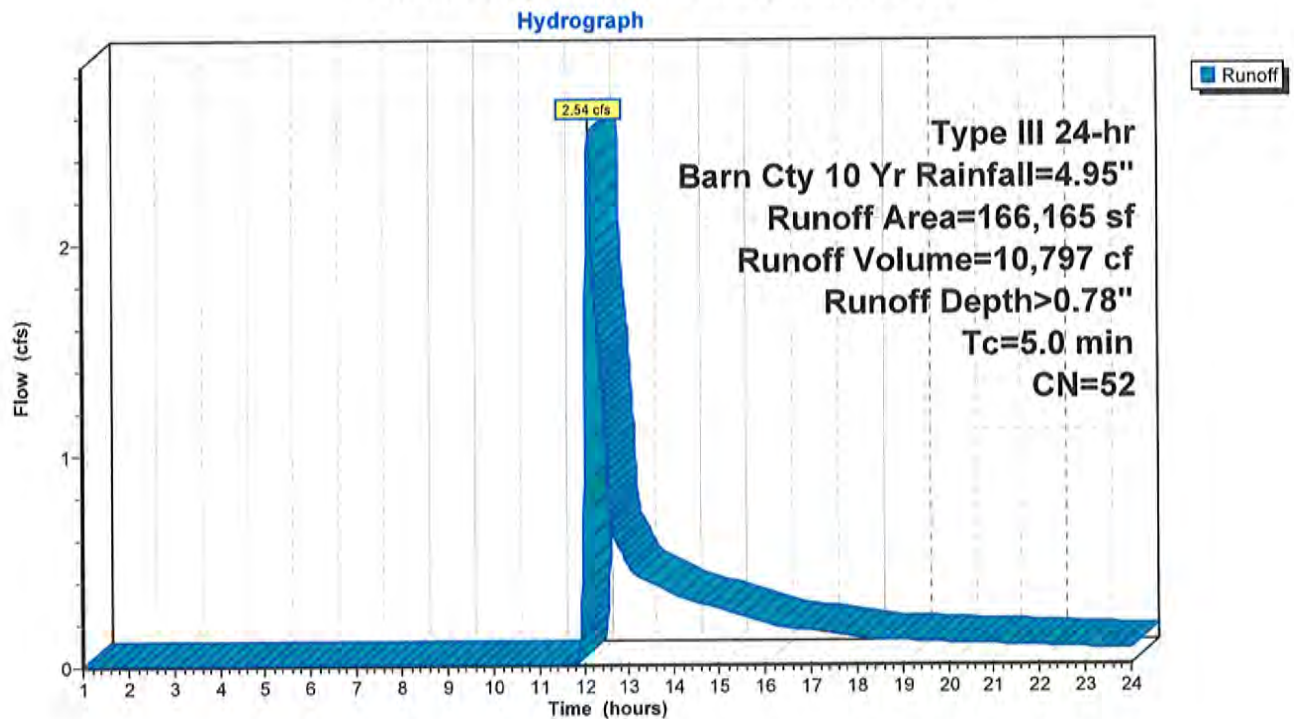
Time of Concentration

Runoff = 2.54 cfs @ 12.10 hrs, Volume= 10,797 cf, Depth> 0.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr Barn Cty 10 Yr Rainfall=4.95"

Area (sf)	CN	Description
116,801	32	Woods/grass comb., Good, HSG A
* 49,364	98	Pavement and front Roof Area
166,165	52	Weighted Average
116,801		70.29% Pervious Area
49,364		29.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, Time Concentration

Subcatchment 1S: Drainage Area DA1

Summary for Pond 1P: Drainage Infiltration Model

3 Leach pits with overflow to low area- Storage/Infiltration Model

[44] Hint: Outlet device #1 is below defined storage

Inflow Area = 166,165 sf, 29.71% Impervious, Inflow Depth > 0.78" for Barn Cty 10 Yr event
 Inflow = 2.54 cfs @ 12.10 hrs, Volume= 10,797 cf
 Outflow = 1.52 cfs @ 12.33 hrs, Volume= 10,751 cf, Atten= 40%, Lag= 13.8 min
 Primary = 1.52 cfs @ 12.33 hrs, Volume= 10,751 cf

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs / 2
 Peak Elev= 36.20' @ 12.33 hrs Storage= 912 cf

Plug-Flow detention time= 9.3 min calculated for 10,746 cf (100% of inflow)
 Center-of-Mass det. time= 7.1 min (911.6 - 904.5)

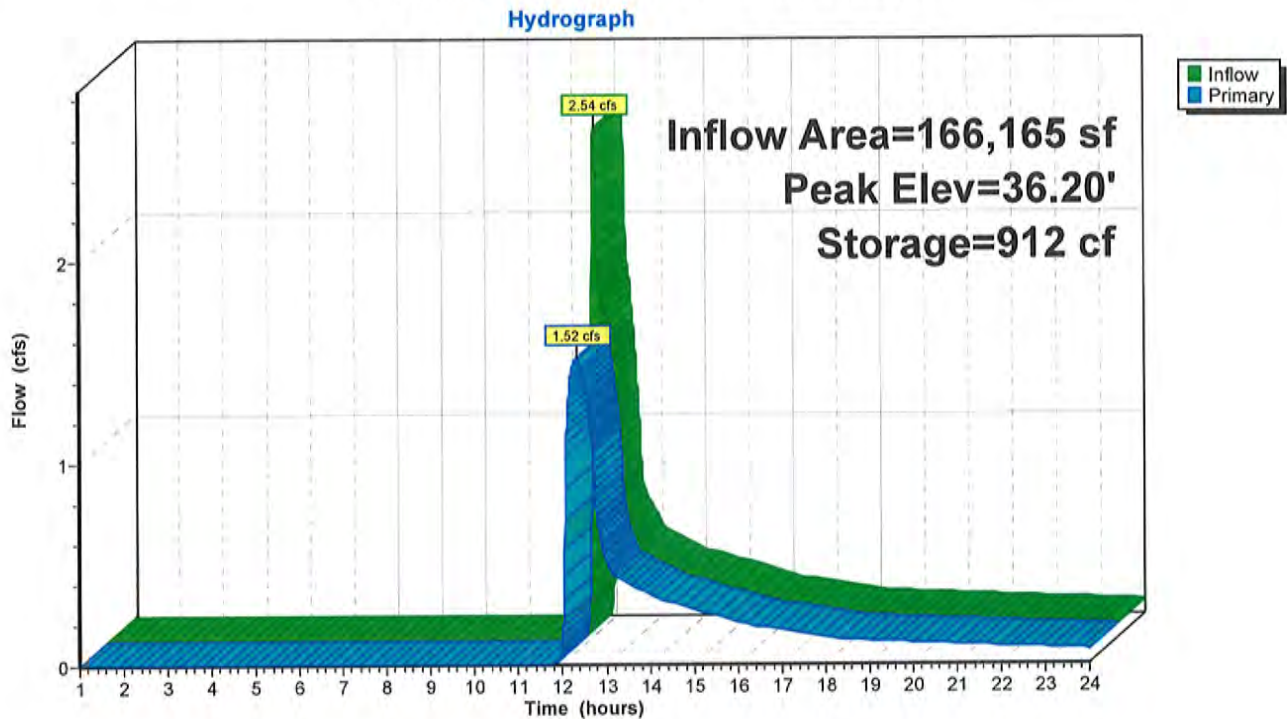
Volume	Invert	Avail.Storage	Storage Description
#1	32.00'	5,894 cf	Infiltration System Storage Model Listed below

Elevation (feet)	Cum.Store (cubic-feet)
32.00	0
33.00	157
34.00	393
35.00	629
36.00	864
37.00	1,100
38.00	1,335
39.00	1,571
40.00	2,742
42.00	5,894

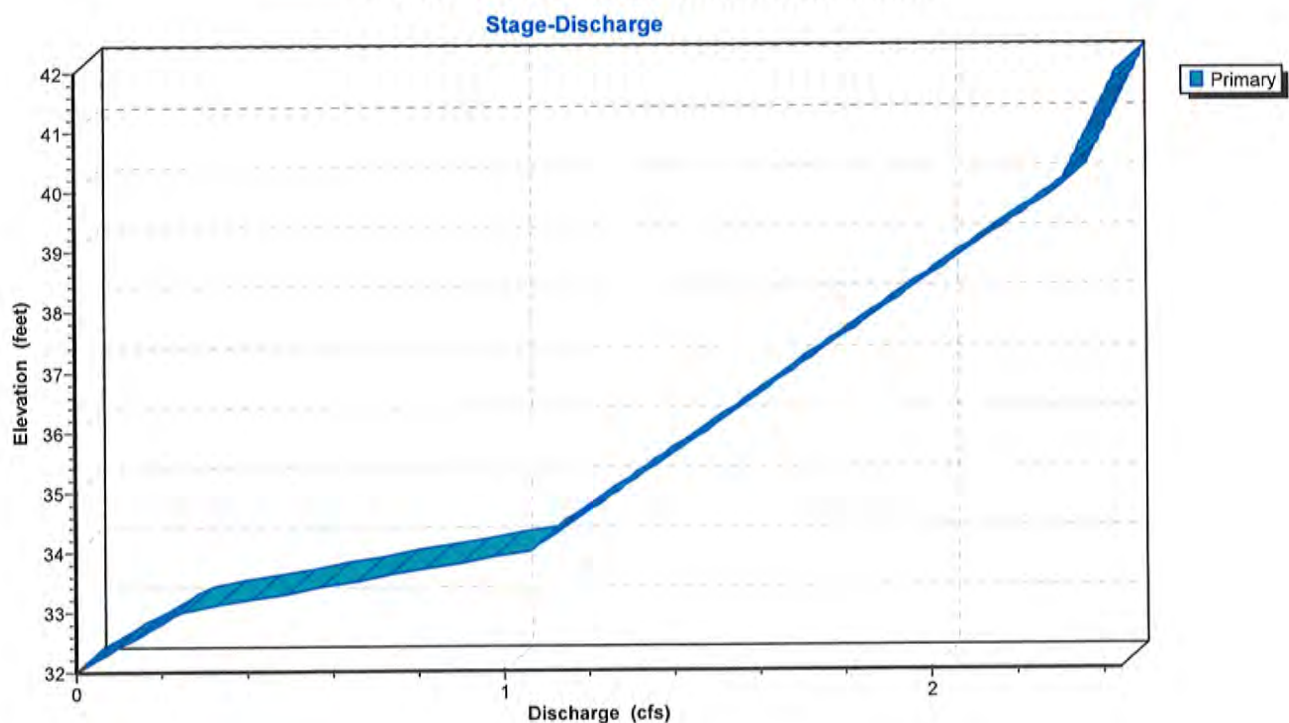
Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	Infiltration Model
			Elev. (feet) 0.00 32.00 33.00 34.00 35.00 36.00 37.00 39.00 40.00 42.00
			Disch. (cfs) 0.000 0.000 0.250 1.060 1.270 1.480 1.680 2.090 2.300 2.440

Primary OutFlow Max=1.52 cfs @ 12.33 hrs HW=36.20' (Free Discharge)
 ↳1=Infiltration Model (Custom Controls 1.52 cfs)

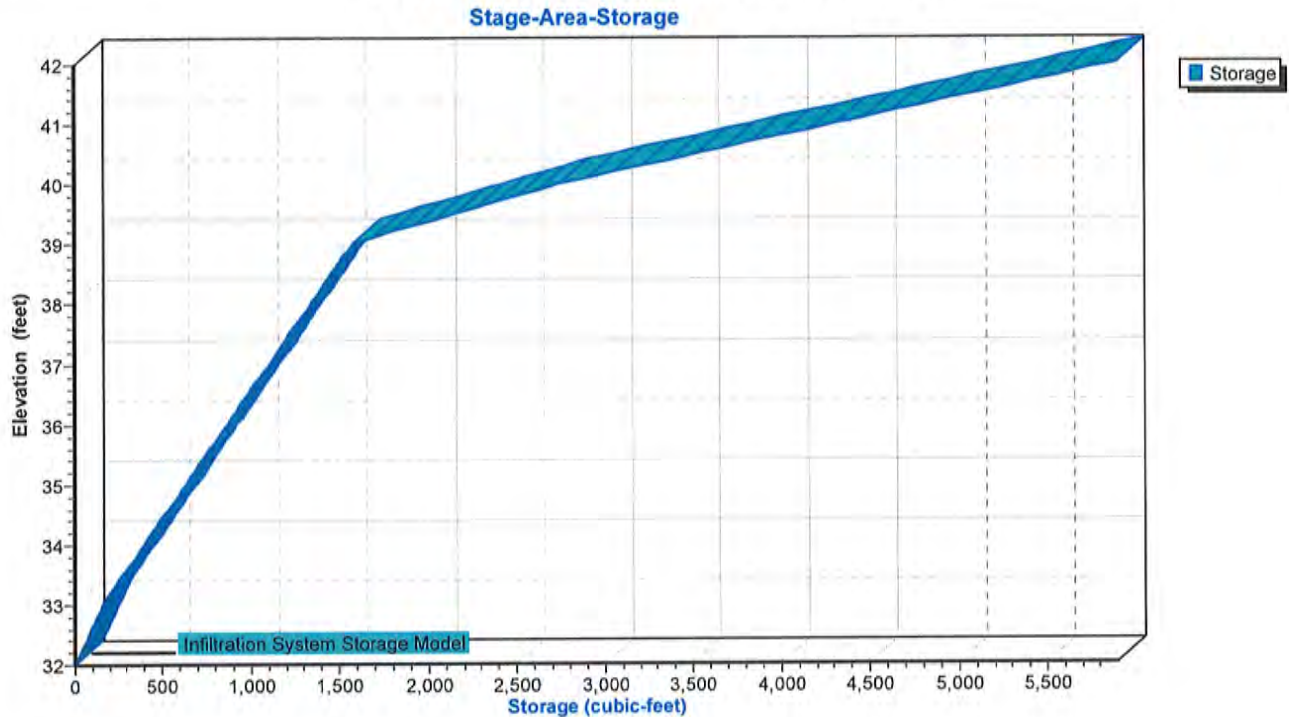
Pond 1P: Drainage Infiltration Model



Pond 1P: Drainage Infiltration Model



Pond 1P: Drainage Infiltration Model



Stage-Discharge for Pond 1P: Drainage Infiltration Model

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
32.00	0.00	37.10	1.70
32.10	0.03	37.20	1.72
32.20	0.05	37.30	1.74
32.30	0.07	37.40	1.76
32.40	0.10	37.50	1.78
32.50	0.13	37.60	1.80
32.60	0.15	37.70	1.82
32.70	0.18	37.80	1.84
32.80	0.20	37.90	1.86
32.90	0.22	38.00	1.88
33.00	0.25	38.10	1.91
33.10	0.33	38.20	1.93
33.20	0.41	38.30	1.95
33.30	0.49	38.40	1.97
33.40	0.57	38.50	1.99
33.50	0.66	38.60	2.01
33.60	0.74	38.70	2.03
33.70	0.82	38.80	2.05
33.80	0.90	38.90	2.07
33.90	0.98	39.00	2.09
34.00	1.06	39.10	2.11
34.10	1.08	39.20	2.13
34.20	1.10	39.30	2.15
34.30	1.12	39.40	2.17
34.40	1.14	39.50	2.20
34.50	1.17	39.60	2.22
34.60	1.19	39.70	2.24
34.70	1.21	39.80	2.26
34.80	1.23	39.90	2.28
34.90	1.25	40.00	2.30
35.00	1.27	40.10	2.31
35.10	1.29	40.20	2.31
35.20	1.31	40.30	2.32
35.30	1.33	40.40	2.33
35.40	1.35	40.50	2.33
35.50	1.38	40.60	2.34
35.60	1.40	40.70	2.35
35.70	1.42	40.80	2.36
35.80	1.44	40.90	2.36
35.90	1.46	41.00	2.37
36.00	1.48	41.10	2.38
36.10	1.50	41.20	2.38
36.20	1.52	41.30	2.39
36.30	1.54	41.40	2.40
36.40	1.56	41.50	2.41
36.50	1.58	41.60	2.41
36.60	1.60	41.70	2.42
36.70	1.62	41.80	2.43
36.80	1.64	41.90	2.43
36.90	1.66	42.00	2.44
37.00	1.68		

Stage-Area-Storage for Pond 1P: Drainage Infiltration Model

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
32.00	0	37.10	1,124
32.10	16	37.20	1,147
32.20	31	37.30	1,170
32.30	47	37.40	1,194
32.40	63	37.50	1,218
32.50	79	37.60	1,241
32.60	94	37.70	1,265
32.70	110	37.80	1,288
32.80	126	37.90	1,311
32.90	141	38.00	1,335
33.00	157	38.10	1,359
33.10	181	38.20	1,382
33.20	204	38.30	1,406
33.30	228	38.40	1,429
33.40	251	38.50	1,453
33.50	275	38.60	1,477
33.60	299	38.70	1,500
33.70	322	38.80	1,524
33.80	346	38.90	1,547
33.90	369	39.00	1,571
34.00	393	39.10	1,688
34.10	417	39.20	1,805
34.20	440	39.30	1,922
34.30	464	39.40	2,039
34.40	487	39.50	2,157
34.50	511	39.60	2,274
34.60	535	39.70	2,391
34.70	558	39.80	2,508
34.80	582	39.90	2,625
34.90	605	40.00	2,742
35.00	629	40.10	2,900
35.10	653	40.20	3,057
35.20	676	40.30	3,215
35.30	699	40.40	3,372
35.40	723	40.50	3,530
35.50	747	40.60	3,688
35.60	770	40.70	3,845
35.70	794	40.80	4,003
35.80	817	40.90	4,160
35.90	840	41.00	4,318
36.00	864	41.10	4,476
36.10	888	41.20	4,633
36.20	911	41.30	4,791
36.30	935	41.40	4,948
36.40	958	41.50	5,106
36.50	982	41.60	5,264
36.60	1,006	41.70	5,421
36.70	1,029	41.80	5,579
36.80	1,053	41.90	5,736
36.90	1,076	42.00	5,894
37.00	1,100		

Time span=1.00-24.00 hrs, dt=0.01 hrs, 2301 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Drainage Area DA1

Runoff Area=166,165 sf 29.71% Impervious Runoff Depth>0.22"

Tc=5.0 min CN=52 Runoff=0.30 cfs 3,055 cf

Pond 1P: Drainage Infiltration Model

Peak Elev=32.95' Storage=150 cf Inflow=0.30 cfs 3,055 cf

Outflow=0.24 cfs 3,036 cf

Total Runoff Area = 166,165 sf Runoff Volume = 3,055 cf Average Runoff Depth = 0.22"

70.29% Pervious = 116,801 sf 29.71% Impervious = 49,364 sf

17-198 RBOUR SUB DA1

Type III 24-hr Barn Cty 2 Yr Rainfall=3.39"

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Summary for Subcatchment 1S: Drainage Area DA1

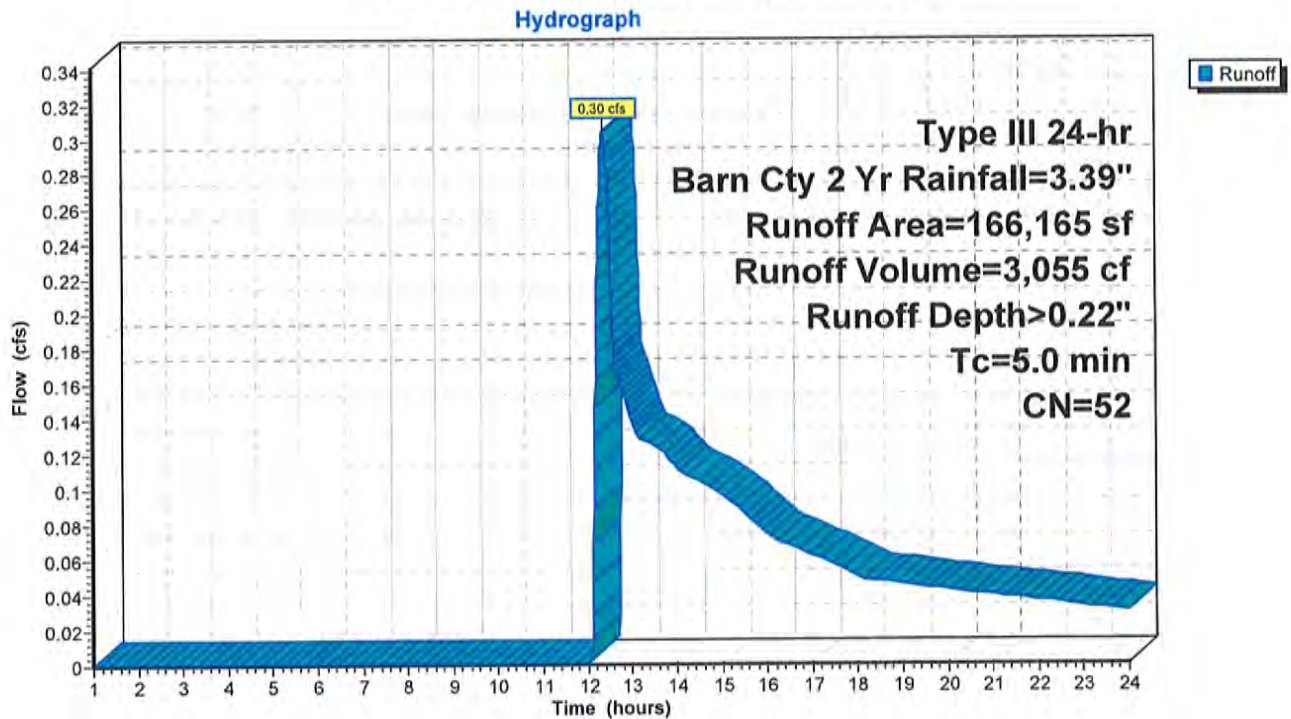
Time of Concentration

Runoff = 0.30 cfs @ 12.35 hrs, Volume= 3,055 cf, Depth> 0.22"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr Barn Cty 2 Yr Rainfall=3.39"

Area (sf)	CN	Description
116,801	32	Woods/grass comb., Good, HSG A
* 49,364	98	Pavement and front Roof Area
166,165	52	Weighted Average
116,801		70.29% Pervious Area
49,364		29.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, Time Concentration

Subcatchment 1S: Drainage Area DA1

Summary for Pond 1P: Drainage Infiltration Model

3 Leach pits with overflow to low area- Storage/Infiltration Model

[44] Hint: Outlet device #1 is below defined storage

Inflow Area = 166,165 sf, 29.71% Impervious, Inflow Depth > 0.22" for Barn Cty 2 Yr event
 Inflow = 0.30 cfs @ 12.35 hrs, Volume= 3,055 cf
 Outflow = 0.24 cfs @ 12.50 hrs, Volume= 3,036 cf, Atten= 22%, Lag= 8.8 min
 Primary = 0.24 cfs @ 12.50 hrs, Volume= 3,036 cf

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs / 2
 Peak Elev= 32.95' @ 12.50 hrs Storage= 150 cf

Plug-Flow detention time= 10.4 min calculated for 3,035 cf (99% of inflow)
 Center-of-Mass det. time= 7.5 min (975.0 - 967.5)

Volume	Invert	Avail.Storage	Storage Description
#1	32.00'	5,894 cf	Infiltration System Storage Model Listed below

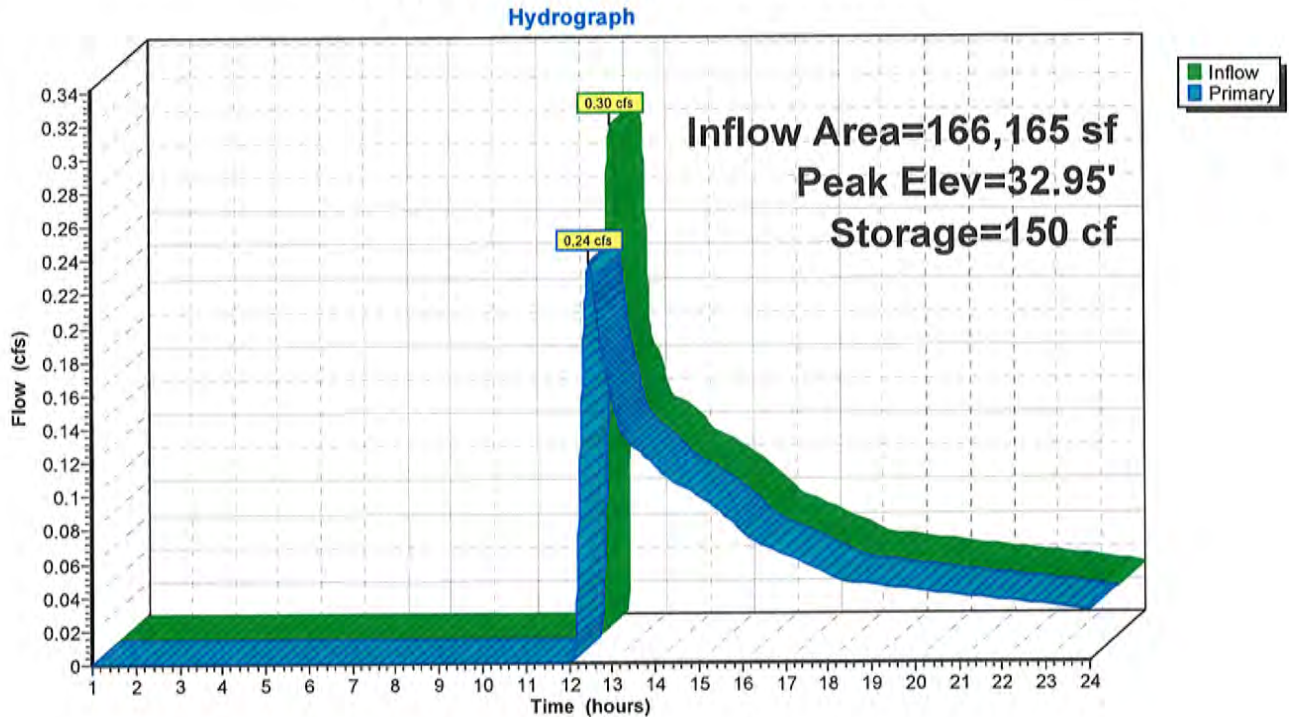
Elevation (feet)	Cum.Store (cubic-feet)
32.00	0
33.00	157
34.00	393
35.00	629
36.00	864
37.00	1,100
38.00	1,335
39.00	1,571
40.00	2,742
42.00	5,894

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	Infiltration Model
			Elev. (feet) 0.00 32.00 33.00 34.00 35.00 36.00 37.00 39.00 40.00 42.00
			Disch. (cfs) 0.000 0.000 0.250 1.060 1.270 1.480 1.680 2.090 2.300 2.440

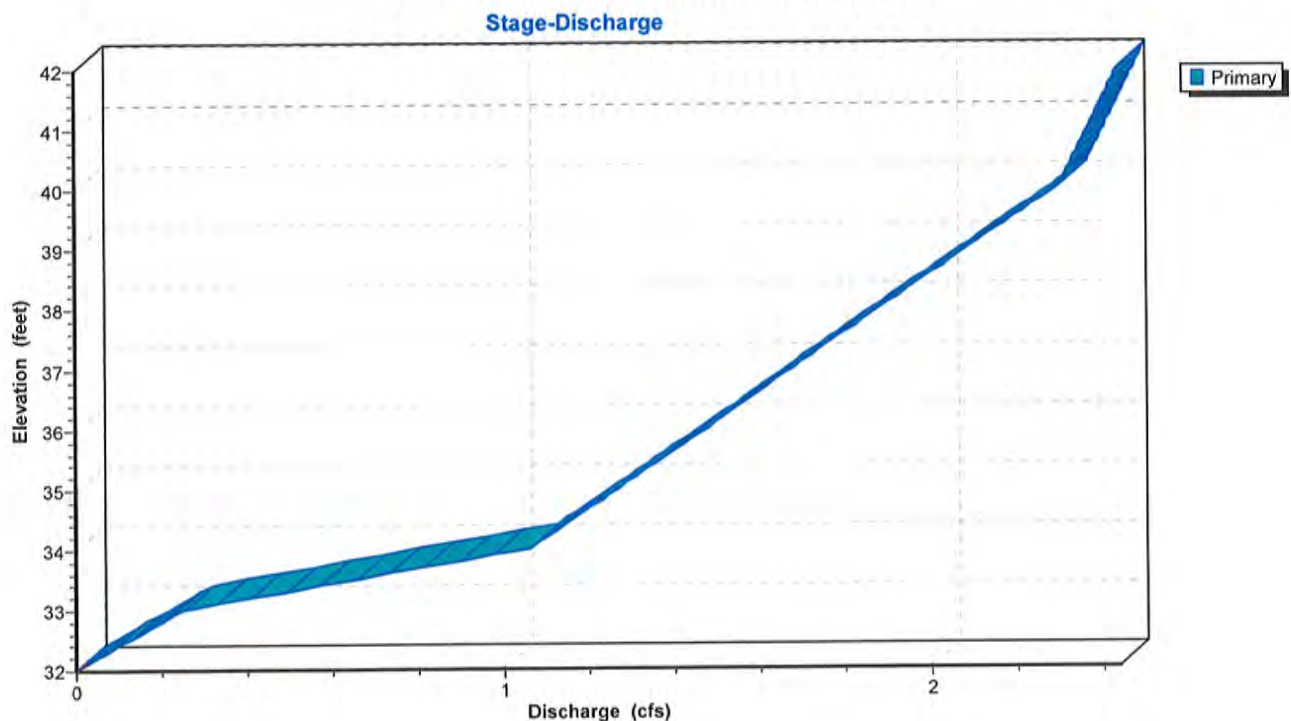
Primary OutFlow Max=0.24 cfs @ 12.50 hrs HW=32.95' (Free Discharge)

↑1=Infiltration Model (Custom Controls 0.24 cfs)

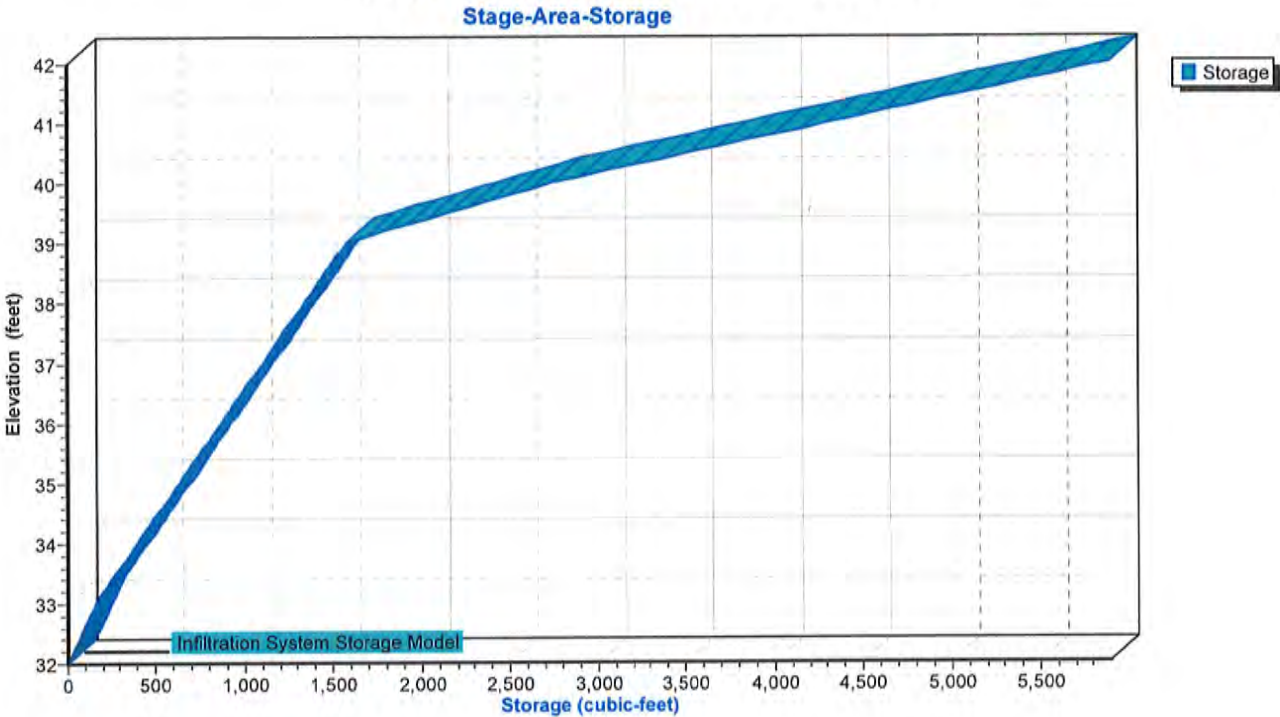
Pond 1P: Drainage Infiltration Model



Pond 1P: Drainage Infiltration Model



Pond 1P: Drainage Infiltration Model



Stage-Discharge for Pond 1P: Drainage Infiltration Model

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
32.00	0.00	37.10	1.70
32.10	0.03	37.20	1.72
32.20	0.05	37.30	1.74
32.30	0.07	37.40	1.76
32.40	0.10	37.50	1.78
32.50	0.13	37.60	1.80
32.60	0.15	37.70	1.82
32.70	0.18	37.80	1.84
32.80	0.20	37.90	1.86
32.90	0.22	38.00	1.88
33.00	0.25	38.10	1.91
33.10	0.33	38.20	1.93
33.20	0.41	38.30	1.95
33.30	0.49	38.40	1.97
33.40	0.57	38.50	1.99
33.50	0.66	38.60	2.01
33.60	0.74	38.70	2.03
33.70	0.82	38.80	2.05
33.80	0.90	38.90	2.07
33.90	0.98	39.00	2.09
34.00	1.06	39.10	2.11
34.10	1.08	39.20	2.13
34.20	1.10	39.30	2.15
34.30	1.12	39.40	2.17
34.40	1.14	39.50	2.20
34.50	1.17	39.60	2.22
34.60	1.19	39.70	2.24
34.70	1.21	39.80	2.26
34.80	1.23	39.90	2.28
34.90	1.25	40.00	2.30
35.00	1.27	40.10	2.31
35.10	1.29	40.20	2.31
35.20	1.31	40.30	2.32
35.30	1.33	40.40	2.33
35.40	1.35	40.50	2.33
35.50	1.38	40.60	2.34
35.60	1.40	40.70	2.35
35.70	1.42	40.80	2.36
35.80	1.44	40.90	2.36
35.90	1.46	41.00	2.37
36.00	1.48	41.10	2.38
36.10	1.50	41.20	2.38
36.20	1.52	41.30	2.39
36.30	1.54	41.40	2.40
36.40	1.56	41.50	2.41
36.50	1.58	41.60	2.41
36.60	1.60	41.70	2.42
36.70	1.62	41.80	2.43
36.80	1.64	41.90	2.43
36.90	1.66	42.00	2.44
37.00	1.68		

17-198 RBOUR SUB DA1*Type III 24-hr Barn Cty 2 Yr Rainfall=3.39"*

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Stage-Area-Storage for Pond 1P: Drainage Infiltration Model

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
32.00	0	37.10	1,124
32.10	16	37.20	1,147
32.20	31	37.30	1,170
32.30	47	37.40	1,194
32.40	63	37.50	1,218
32.50	79	37.60	1,241
32.60	94	37.70	1,265
32.70	110	37.80	1,288
32.80	126	37.90	1,311
32.90	141	38.00	1,335
33.00	157	38.10	1,359
33.10	181	38.20	1,382
33.20	204	38.30	1,406
33.30	228	38.40	1,429
33.40	251	38.50	1,453
33.50	275	38.60	1,477
33.60	299	38.70	1,500
33.70	322	38.80	1,524
33.80	346	38.90	1,547
33.90	369	39.00	1,571
34.00	393	39.10	1,688
34.10	417	39.20	1,805
34.20	440	39.30	1,922
34.30	464	39.40	2,039
34.40	487	39.50	2,157
34.50	511	39.60	2,274
34.60	535	39.70	2,391
34.70	558	39.80	2,508
34.80	582	39.90	2,625
34.90	605	40.00	2,742
35.00	629	40.10	2,900
35.10	653	40.20	3,057
35.20	676	40.30	3,215
35.30	699	40.40	3,372
35.40	723	40.50	3,530
35.50	747	40.60	3,688
35.60	770	40.70	3,845
35.70	794	40.80	4,003
35.80	817	40.90	4,160
35.90	840	41.00	4,318
36.00	864	41.10	4,476
36.10	888	41.20	4,633
36.20	911	41.30	4,791
36.30	935	41.40	4,948
36.40	958	41.50	5,106
36.50	982	41.60	5,264
36.60	1,006	41.70	5,421
36.70	1,029	41.80	5,579
36.80	1,053	41.90	5,736
36.90	1,076	42.00	5,894
37.00	1,100		

Time span=1.00-24.00 hrs, dt=0.01 hrs, 2301 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Drainage Area DA1

Runoff Area=166,165 sf 29.71% Impervious Runoff Depth>1.25"

Tc=5.0 min CN=52 Runoff=4.80 cfs 17,247 cf

Pond 1P: Drainage Infiltration Model

Peak Elev=39.57' Storage=2,236 cf Inflow=4.80 cfs 17,247 cf

Outflow=2.21 cfs 17,182 cf

Total Runoff Area = 166,165 sf Runoff Volume = 17,247 cf Average Runoff Depth = 1.25"

70.29% Pervious = 116,801 sf 29.71% Impervious = 49,364 sf

17-198 RBOUR SUB DA1

Type III 24-hr Barn Cty 25 Yr Rainfall=5.92"

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Summary for Subcatchment 1S: Drainage Area DA1

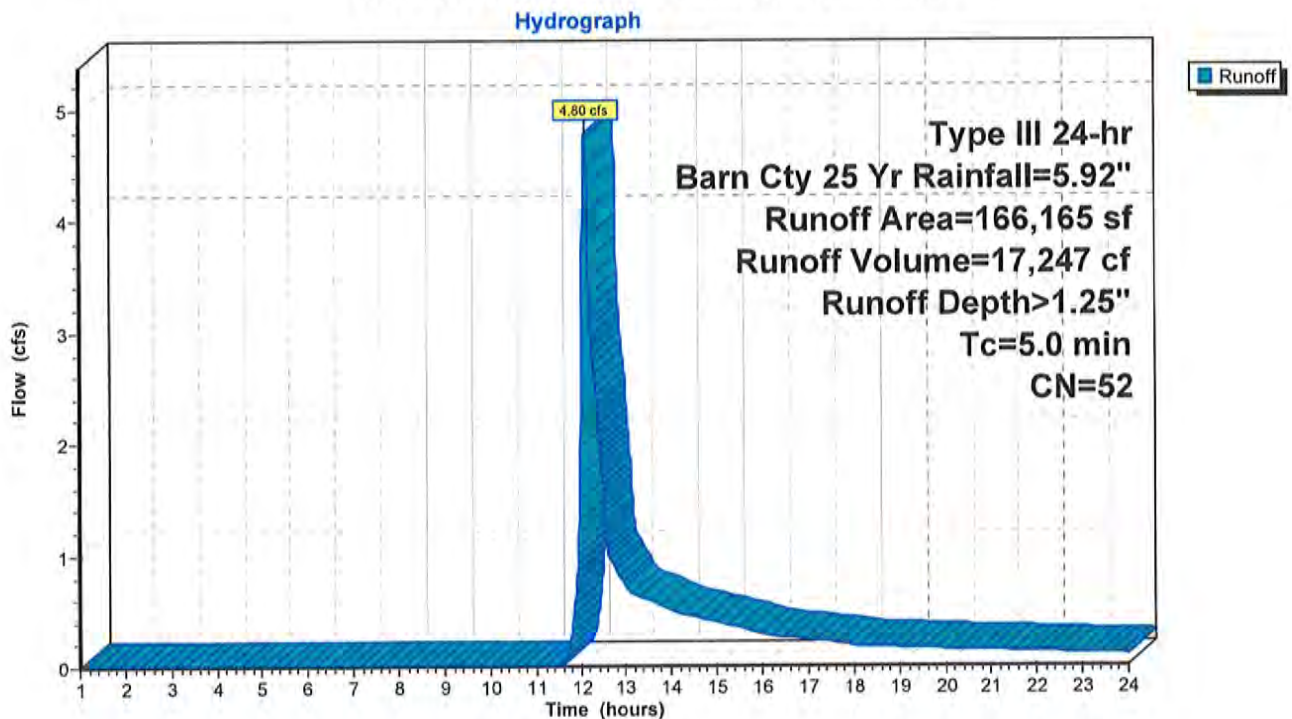
Time of Concentration

Runoff = 4.80 cfs @ 12.09 hrs, Volume= 17,247 cf, Depth> 1.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr Barn Cty 25 Yr Rainfall=5.92"

Area (sf)	CN	Description
116,801	32	Woods/grass comb., Good, HSG A
* 49,364	98	Pavement and front Roof Area
166,165	52	Weighted Average
116,801		70.29% Pervious Area
49,364		29.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, Time Concentration

Subcatchment 1S: Drainage Area DA1

Summary for Pond 1P: Drainage Infiltration Model

3 Leach pits with overflow to low area- Storage/Infiltration Model

[44] Hint: Outlet device #1 is below defined storage

Inflow Area = 166,165 sf, 29.71% Impervious, Inflow Depth > 1.25" for Barn Cty 25 Yr event
 Inflow = 4.80 cfs @ 12.09 hrs, Volume= 17,247 cf
 Outflow = 2.21 cfs @ 12.38 hrs, Volume= 17,182 cf, Atten= 54%, Lag= 17.3 min
 Primary = 2.21 cfs @ 12.38 hrs, Volume= 17,182 cf

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs / 2
 Peak Elev= 39.57' @ 12.38 hrs Storage= 2,236 cf

Plug-Flow detention time= 10.7 min calculated for 17,174 cf (100% of inflow)
 Center-of-Mass det. time= 8.7 min (895.1 - 886.4)

Volume	Invert	Avail.Storage	Storage Description
#1	32.00'	5,894 cf	Infiltration System Storage Model Listed below

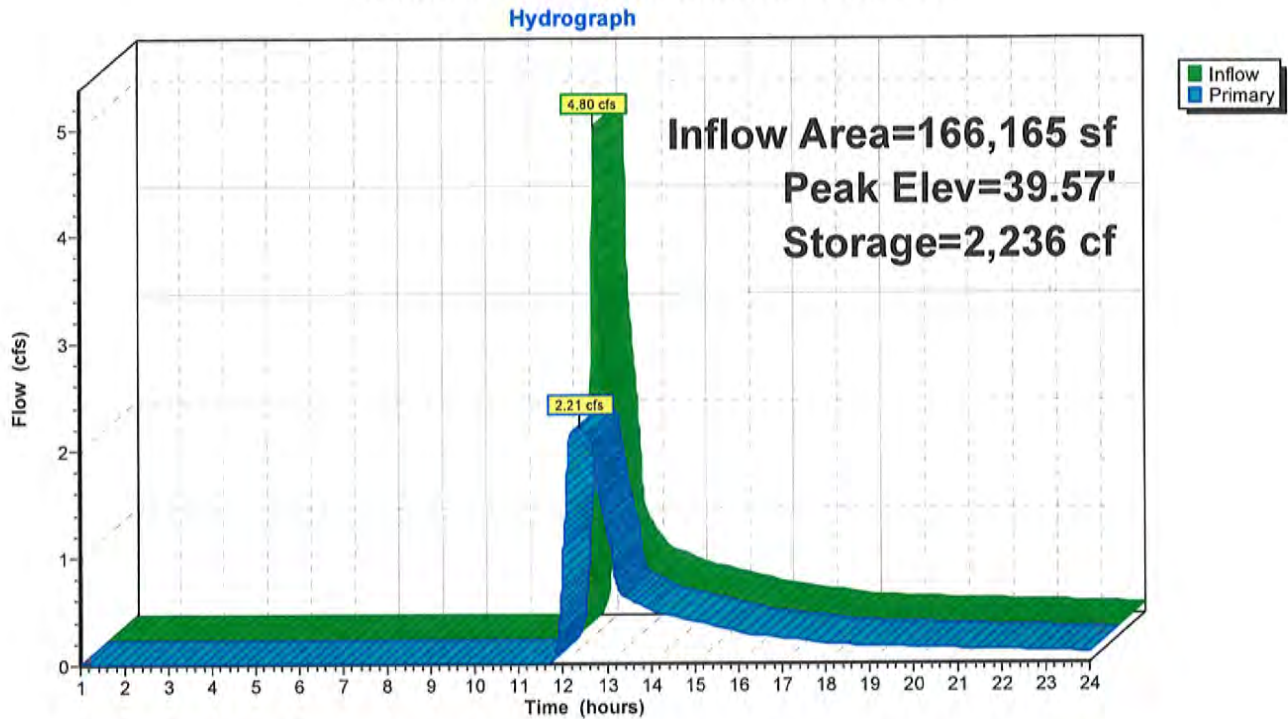
Elevation (feet)	Cum.Store (cubic-feet)
32.00	0
33.00	157
34.00	393
35.00	629
36.00	864
37.00	1,100
38.00	1,335
39.00	1,571
40.00	2,742
42.00	5,894

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	Infiltration Model
			Elev. (feet) 0.00 32.00 33.00 34.00 35.00 36.00 37.00 39.00 40.00 42.00
			Disch. (cfs) 0.000 0.000 0.250 1.060 1.270 1.480 1.680 2.090 2.300 2.440

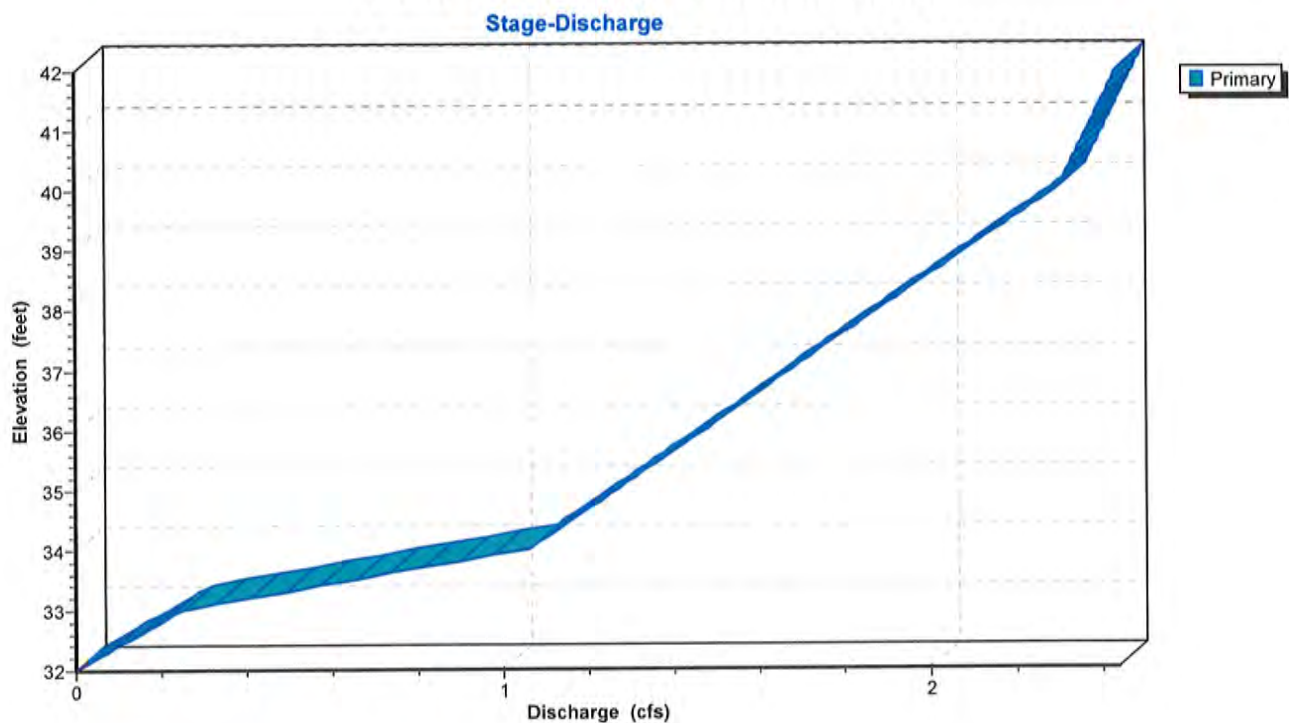
Primary OutFlow Max=2.21 cfs @ 12.38 hrs HW=39.57' (Free Discharge)

↑1=Infiltration Model (Custom Controls 2.21 cfs)

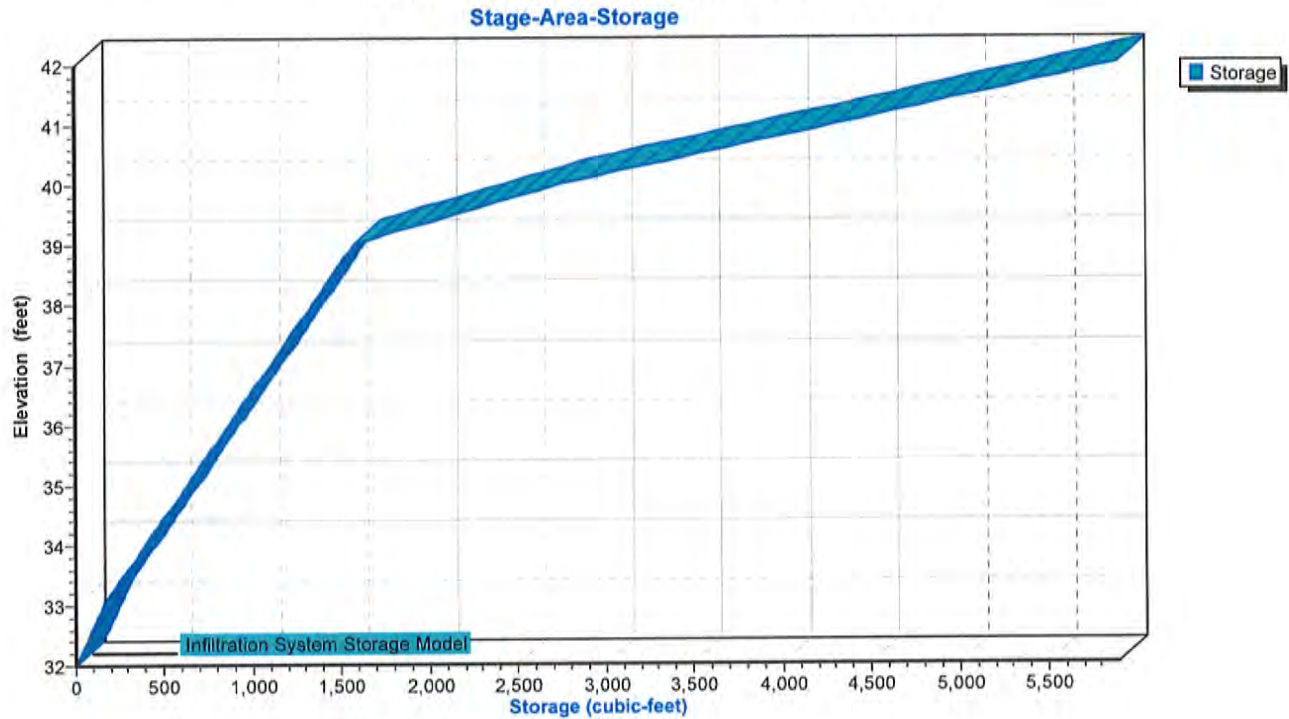
Pond 1P: Drainage Infiltration Model



Pond 1P: Drainage Infiltration Model



Pond 1P: Drainage Infiltration Model



Stage-Discharge for Pond 1P: Drainage Infiltration Model

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
32.00	0.00	37.10	1.70
32.10	0.03	37.20	1.72
32.20	0.05	37.30	1.74
32.30	0.07	37.40	1.76
32.40	0.10	37.50	1.78
32.50	0.13	37.60	1.80
32.60	0.15	37.70	1.82
32.70	0.18	37.80	1.84
32.80	0.20	37.90	1.86
32.90	0.22	38.00	1.88
33.00	0.25	38.10	1.91
33.10	0.33	38.20	1.93
33.20	0.41	38.30	1.95
33.30	0.49	38.40	1.97
33.40	0.57	38.50	1.99
33.50	0.66	38.60	2.01
33.60	0.74	38.70	2.03
33.70	0.82	38.80	2.05
33.80	0.90	38.90	2.07
33.90	0.98	39.00	2.09
34.00	1.06	39.10	2.11
34.10	1.08	39.20	2.13
34.20	1.10	39.30	2.15
34.30	1.12	39.40	2.17
34.40	1.14	39.50	2.20
34.50	1.17	39.60	2.22
34.60	1.19	39.70	2.24
34.70	1.21	39.80	2.26
34.80	1.23	39.90	2.28
34.90	1.25	40.00	2.30
35.00	1.27	40.10	2.31
35.10	1.29	40.20	2.31
35.20	1.31	40.30	2.32
35.30	1.33	40.40	2.33
35.40	1.35	40.50	2.33
35.50	1.38	40.60	2.34
35.60	1.40	40.70	2.35
35.70	1.42	40.80	2.36
35.80	1.44	40.90	2.36
35.90	1.46	41.00	2.37
36.00	1.48	41.10	2.38
36.10	1.50	41.20	2.38
36.20	1.52	41.30	2.39
36.30	1.54	41.40	2.40
36.40	1.56	41.50	2.41
36.50	1.58	41.60	2.41
36.60	1.60	41.70	2.42
36.70	1.62	41.80	2.43
36.80	1.64	41.90	2.43
36.90	1.66	42.00	2.44
37.00	1.68		

Stage-Area-Storage for Pond 1P: Drainage Infiltration Model

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
32.00	0	37.10	1,124
32.10	16	37.20	1,147
32.20	31	37.30	1,170
32.30	47	37.40	1,194
32.40	63	37.50	1,218
32.50	79	37.60	1,241
32.60	94	37.70	1,265
32.70	110	37.80	1,288
32.80	126	37.90	1,311
32.90	141	38.00	1,335
33.00	157	38.10	1,359
33.10	181	38.20	1,382
33.20	204	38.30	1,406
33.30	228	38.40	1,429
33.40	251	38.50	1,453
33.50	275	38.60	1,477
33.60	299	38.70	1,500
33.70	322	38.80	1,524
33.80	346	38.90	1,547
33.90	369	39.00	1,571
34.00	393	39.10	1,688
34.10	417	39.20	1,805
34.20	440	39.30	1,922
34.30	464	39.40	2,039
34.40	487	39.50	2,157
34.50	511	39.60	2,274
34.60	535	39.70	2,391
34.70	558	39.80	2,508
34.80	582	39.90	2,625
34.90	605	40.00	2,742
35.00	629	40.10	2,900
35.10	653	40.20	3,057
35.20	676	40.30	3,215
35.30	699	40.40	3,372
35.40	723	40.50	3,530
35.50	747	40.60	3,688
35.60	770	40.70	3,845
35.70	794	40.80	4,003
35.80	817	40.90	4,160
35.90	840	41.00	4,318
36.00	864	41.10	4,476
36.10	888	41.20	4,633
36.20	911	41.30	4,791
36.30	935	41.40	4,948
36.40	958	41.50	5,106
36.50	982	41.60	5,264
36.60	1,006	41.70	5,421
36.70	1,029	41.80	5,579
36.80	1,053	41.90	5,736
36.90	1,076	42.00	5,894
37.00	1,100		

Time span=1.00-24.00 hrs, dt=0.01 hrs, 2301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Drainage Area DA1 Runoff Area=166,165 sf 29.71% Impervious Runoff Depth>1.64"
Tc=5.0 min CN=52 Runoff=6.73 cfs 22,736 cf

Pond 1P: Drainage Infiltration Model Peak Elev=40.78' Storage=3,969 cf Inflow=6.73 cfs 22,736 cf
Outflow=2.35 cfs 22,657 cf

Total Runoff Area = 166,165 sf Runoff Volume = 22,736 cf Average Runoff Depth = 1.64"
70.29% Pervious = 116,801 sf 29.71% Impervious = 49,364 sf

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Type III 24-hr Barn Cty 50 yr. Rainfall=6.65"

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Summary for Subcatchment 1S: Drainage Area DA1

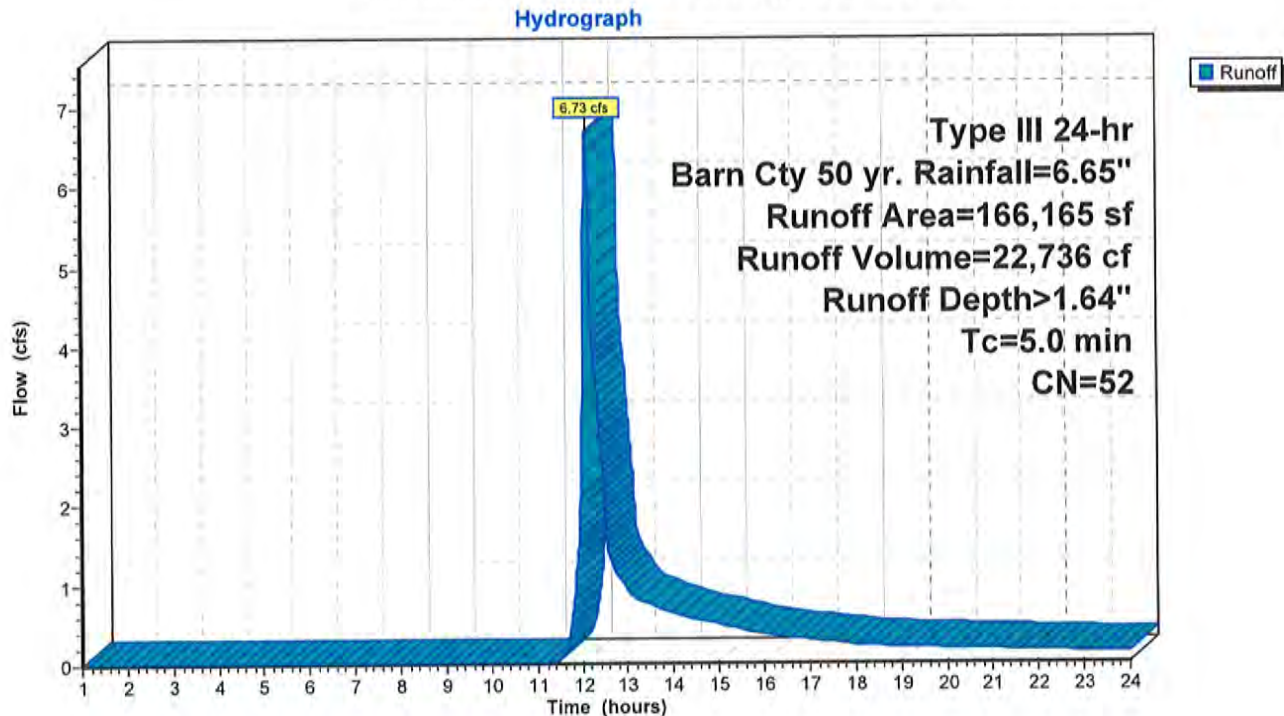
Time of Concentration

Runoff = 6.73 cfs @ 12.09 hrs, Volume= 22,736 cf, Depth> 1.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr Barn Cty 50 yr. Rainfall=6.65"

Area (sf)	CN	Description
116,801	32	Woods/grass comb., Good, HSG A
* 49,364	98	Pavement and front Roof Area
166,165	52	Weighted Average
116,801		70.29% Pervious Area
49,364		29.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, Time Concentration

Subcatchment 1S: Drainage Area DA1

Summary for Pond 1P: Drainage Infiltration Model

3 Leach pits with overflow to low area- Storage/Infiltration Model

[44] Hint: Outlet device #1 is below defined storage

Inflow Area = 166,165 sf, 29.71% Impervious, Inflow Depth > 1.64" for Barn Cty 50 yr. event
 Inflow = 6.73 cfs @ 12.09 hrs, Volume= 22,736 cf
 Outflow = 2.35 cfs @ 12.45 hrs, Volume= 22,657 cf, Atten= 65%, Lag= 21.8 min
 Primary = 2.35 cfs @ 12.45 hrs, Volume= 22,657 cf

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs / 2
 Peak Elev= 40.78' @ 12.45 hrs Storage= 3,969 cf

Plug-Flow detention time= 13.9 min calculated for 22,647 cf (100% of inflow)
 Center-of-Mass det. time= 11.9 min (888.7 - 876.7)

Volume	Invert	Avail.Storage	Storage Description
#1	32.00'	5,894 cf	Infiltration System Storage Model Listed below

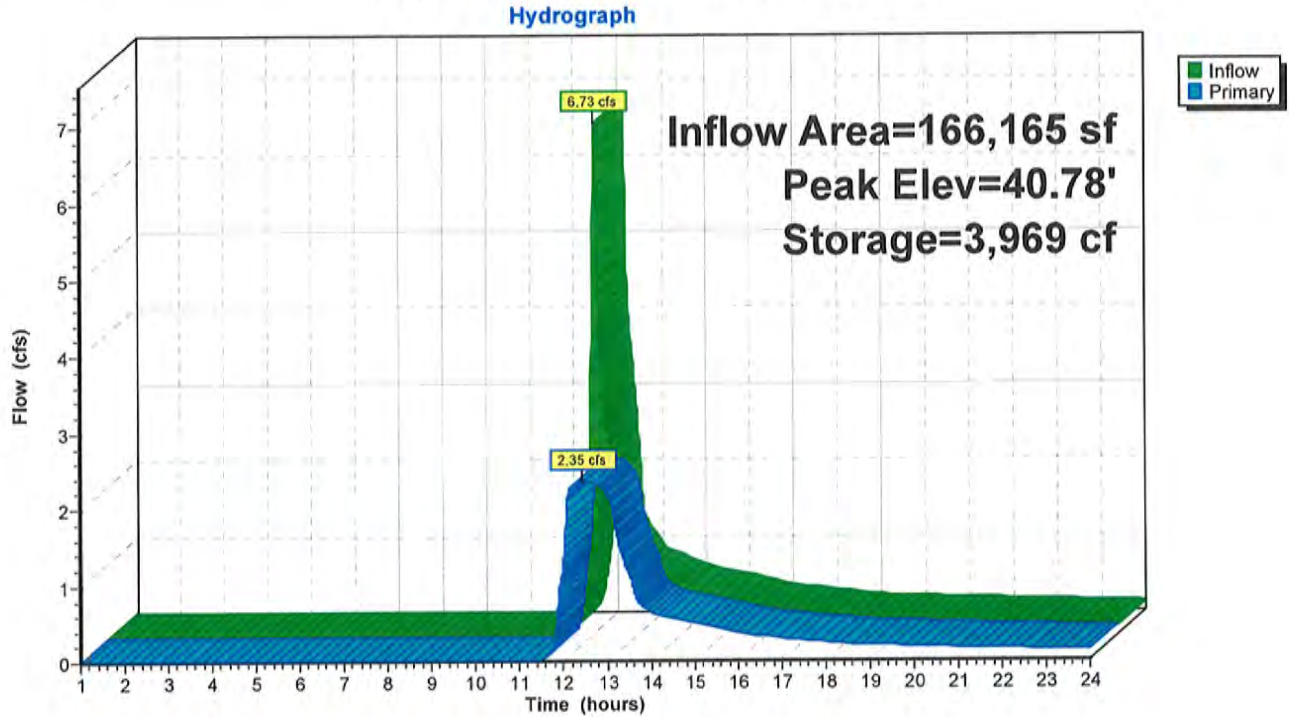
Elevation (feet)	Cum.Store (cubic-feet)
32.00	0
33.00	157
34.00	393
35.00	629
36.00	864
37.00	1,100
38.00	1,335
39.00	1,571
40.00	2,742
42.00	5,894

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	Infiltration Model
			Elev. (feet) 0.00 32.00 33.00 34.00 35.00 36.00 37.00 39.00 40.00 42.00
			Disch. (cfs) 0.000 0.000 0.250 1.060 1.270 1.480 1.680 2.090 2.300 2.440

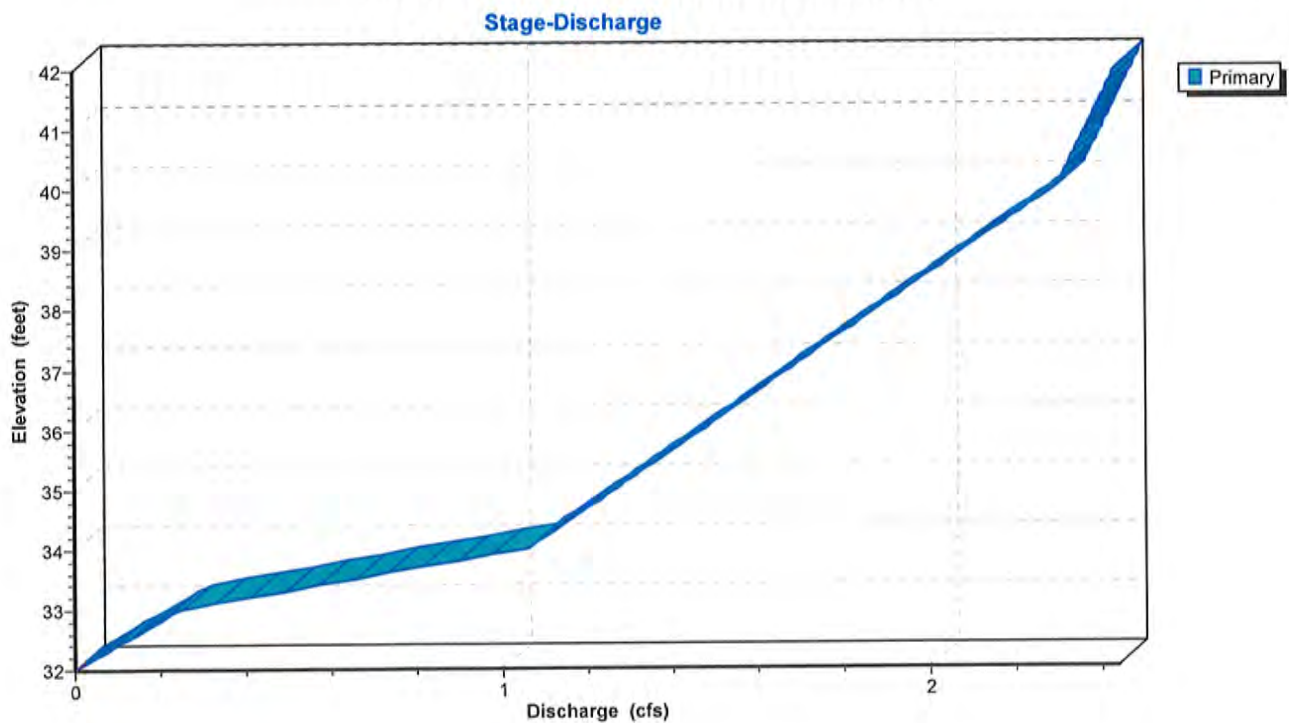
Primary OutFlow Max=2.35 cfs @ 12.45 hrs HW=40.78' (Free Discharge)

↑1=Infiltration Model (Custom Controls 2.35 cfs)

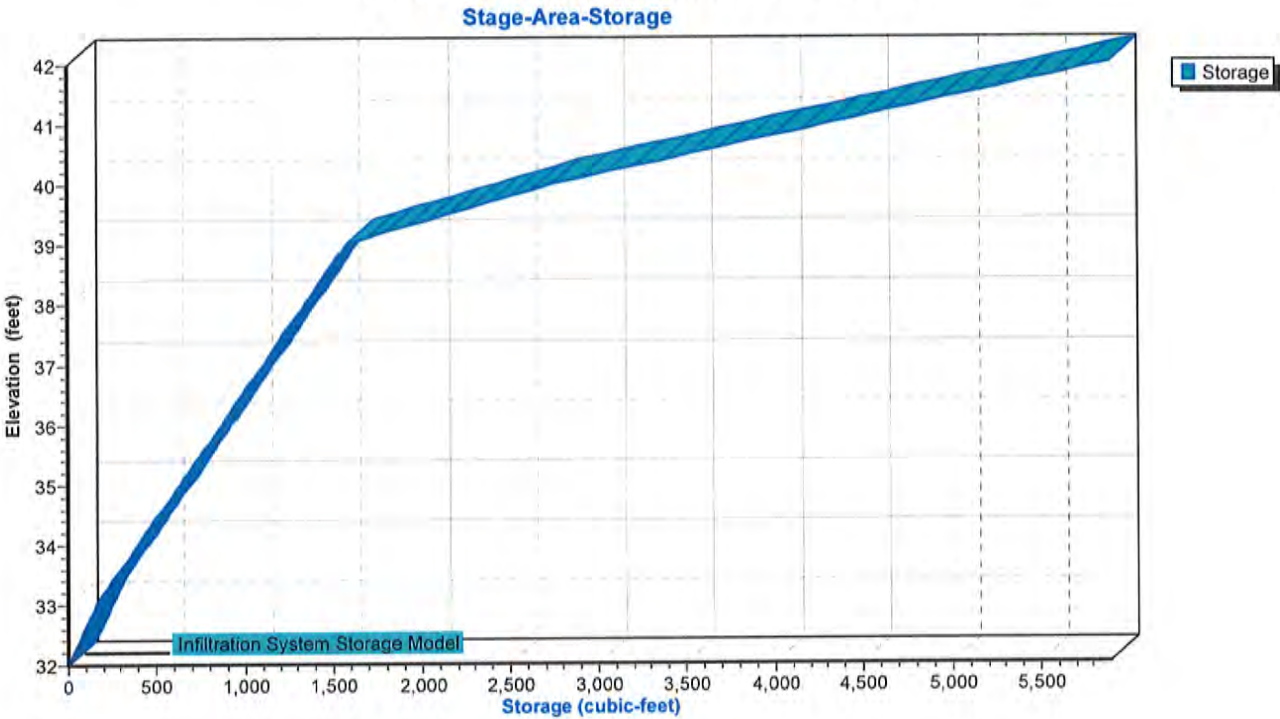
Pond 1P: Drainage Infiltration Model



Pond 1P: Drainage Infiltration Model



Pond 1P: Drainage Infiltration Model



Stage-Discharge for Pond 1P: Drainage Infiltration Model

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
32.00	0.00	37.10	1.70
32.10	0.03	37.20	1.72
32.20	0.05	37.30	1.74
32.30	0.07	37.40	1.76
32.40	0.10	37.50	1.78
32.50	0.13	37.60	1.80
32.60	0.15	37.70	1.82
32.70	0.18	37.80	1.84
32.80	0.20	37.90	1.86
32.90	0.22	38.00	1.88
33.00	0.25	38.10	1.91
33.10	0.33	38.20	1.93
33.20	0.41	38.30	1.95
33.30	0.49	38.40	1.97
33.40	0.57	38.50	1.99
33.50	0.66	38.60	2.01
33.60	0.74	38.70	2.03
33.70	0.82	38.80	2.05
33.80	0.90	38.90	2.07
33.90	0.98	39.00	2.09
34.00	1.06	39.10	2.11
34.10	1.08	39.20	2.13
34.20	1.10	39.30	2.15
34.30	1.12	39.40	2.17
34.40	1.14	39.50	2.20
34.50	1.17	39.60	2.22
34.60	1.19	39.70	2.24
34.70	1.21	39.80	2.26
34.80	1.23	39.90	2.28
34.90	1.25	40.00	2.30
35.00	1.27	40.10	2.31
35.10	1.29	40.20	2.31
35.20	1.31	40.30	2.32
35.30	1.33	40.40	2.33
35.40	1.35	40.50	2.33
35.50	1.38	40.60	2.34
35.60	1.40	40.70	2.35
35.70	1.42	40.80	2.36
35.80	1.44	40.90	2.36
35.90	1.46	41.00	2.37
36.00	1.48	41.10	2.38
36.10	1.50	41.20	2.38
36.20	1.52	41.30	2.39
36.30	1.54	41.40	2.40
36.40	1.56	41.50	2.41
36.50	1.58	41.60	2.41
36.60	1.60	41.70	2.42
36.70	1.62	41.80	2.43
36.80	1.64	41.90	2.43
36.90	1.66	42.00	2.44
37.00	1.68		

Stage-Area-Storage for Pond 1P: Drainage Infiltration Model

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
32.00	0	37.10	1,124
32.10	16	37.20	1,147
32.20	31	37.30	1,170
32.30	47	37.40	1,194
32.40	63	37.50	1,218
32.50	79	37.60	1,241
32.60	94	37.70	1,265
32.70	110	37.80	1,288
32.80	126	37.90	1,311
32.90	141	38.00	1,335
33.00	157	38.10	1,359
33.10	181	38.20	1,382
33.20	204	38.30	1,406
33.30	228	38.40	1,429
33.40	251	38.50	1,453
33.50	275	38.60	1,477
33.60	299	38.70	1,500
33.70	322	38.80	1,524
33.80	346	38.90	1,547
33.90	369	39.00	1,571
34.00	393	39.10	1,688
34.10	417	39.20	1,805
34.20	440	39.30	1,922
34.30	464	39.40	2,039
34.40	487	39.50	2,157
34.50	511	39.60	2,274
34.60	535	39.70	2,391
34.70	558	39.80	2,508
34.80	582	39.90	2,625
34.90	605	40.00	2,742
35.00	629	40.10	2,900
35.10	653	40.20	3,057
35.20	676	40.30	3,215
35.30	699	40.40	3,372
35.40	723	40.50	3,530
35.50	747	40.60	3,688
35.60	770	40.70	3,845
35.70	794	40.80	4,003
35.80	817	40.90	4,160
35.90	840	41.00	4,318
36.00	864	41.10	4,476
36.10	888	41.20	4,633
36.20	911	41.30	4,791
36.30	935	41.40	4,948
36.40	958	41.50	5,106
36.50	982	41.60	5,264
36.60	1,006	41.70	5,421
36.70	1,029	41.80	5,579
36.80	1,053	41.90	5,736
36.90	1,076	42.00	5,894
37.00	1,100		

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- 22 Pond 1P: Drainage Infiltration Model

Barn Cty 50 yr. Event

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- 28 Subcat 1S: Drainage Area DA1
- 29 Pond 1P: Drainage Infiltration Model



Drainage Area DAEX2



Free Discharge model
for Existing Conditions



Routing Diagram for 17-198 RBOUR SUB EXISTING
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Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	Barn Cty 100 yr.	Type III 24-hr		Default	24.00	1	7.80	2

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Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
1	60	Dirt road area/gravel (1S)
1	98	Pavement and front Roof Area (1S)
134,600	32	Woods/grass comb., Good, HSG A (1S)
134,602	32	TOTAL AREA

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Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
134,600	HSG A	1S
0	HSG B	
0	HSG C	
0	HSG D	
2	Other	1S
134,602		TOTAL AREA

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Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover
0	0	0	0	1	1	Dirt road area/gravel
0	0	0	0	1	1	Pavement and front Roof Area
134,600	0	0	0	0	134,600	Woods/grass comb., Good
134,600	0	0	0	2	134,602	TOTAL AREA

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Notes Listing (all nodes)

Line#	Node Number	Notes
1	1S	Time of Concentration
2	1P	Free discharge template to check outflow existitng conditions

Time span=1.00-24.00 hrs, dt=0.01 hrs, 2301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Drainage Area DAEX2 Runoff Area=134,602 sf 0.00% Impervious Runoff Depth>0.51"
Tc=5.0 min CN=32 Runoff=0.57 cfs 5,686 cf

Pond 1P: Free Discharge model for Existing Peak Elev=42.06' Storage=305 cf Inflow=0.57 cfs 5,686 cf
Outflow=0.30 cfs 5,683 cf

Total Runoff Area = 134,602 sf Runoff Volume = 5,686 cf Average Runoff Depth = 0.51"
100.00% Pervious = 134,601 sf 0.00% Impervious = 1 sf

Summary for Subcatchment 1S: Drainage Area DAEX2

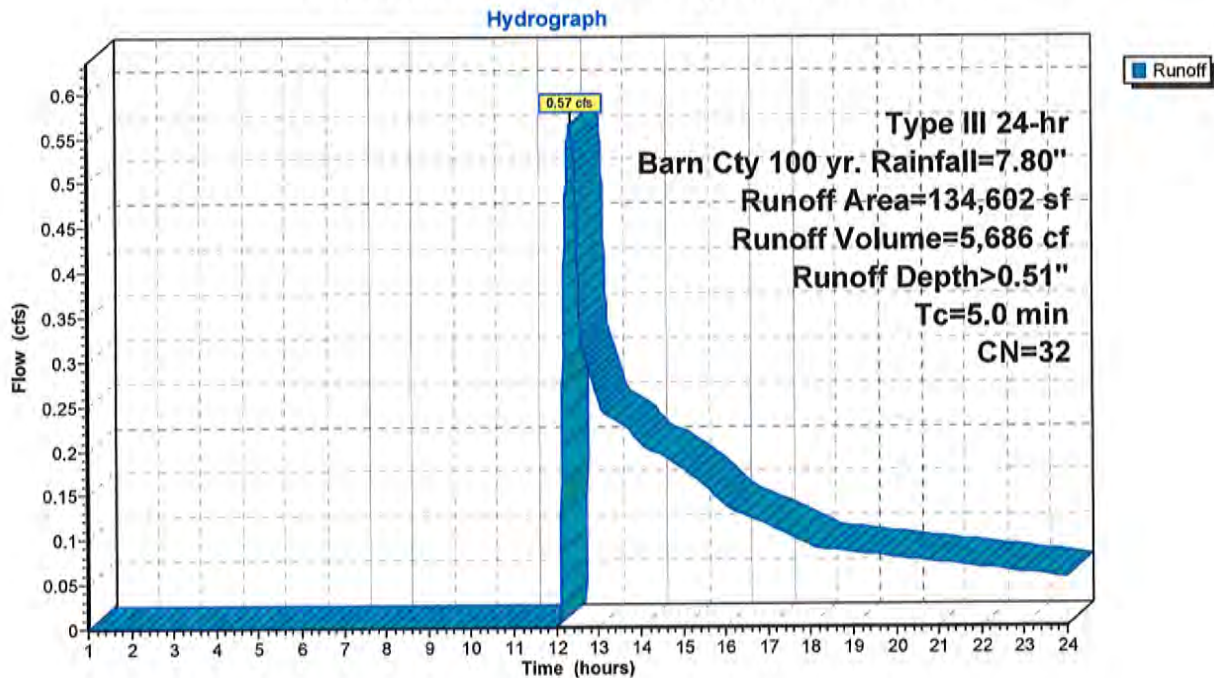
Time of Concentration

Runoff = 0.57 cfs @ 12.35 hrs, Volume= 5,686 cf, Depth> 0.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr Barn Cty 100 yr. Rainfall=7.80"

Area (sf)	CN	Description
134,600	32	Woods/grass comb., Good, HSG A
*	1	98 Pavement and front Roof Area
*	1	60 Dirt road area/gravel
134,602	32	Weighted Average
134,601		100.00% Pervious Area
1		0.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, Time Concentration

Subcatchment 1S: Drainage Area DAEX2

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Type III 24-hr Barn Cty 100 yr. Rainfall=7.80"

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Summary for Pond 1P: Free Discharge model for Existing Conditions

Free discharge template to check outflow existng conditions

Inflow Area = 134,602 sf, 0.00% Impervious, Inflow Depth > 0.51" for Barn Cty 100 yr. event
 Inflow = 0.57 cfs @ 12.35 hrs, Volume= 5,686 cf
 Outflow = 0.30 cfs @ 12.73 hrs, Volume= 5,683 cf, Atten= 48%, Lag= 22.5 min
 Primary = 0.30 cfs @ 12.73 hrs, Volume= 5,683 cf

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs / 2

Peak Elev= 42.06' @ 12.73 hrs Storage= 305 cf

Plug-Flow detention time= 4.6 min calculated for 5,681 cf (100% of inflow)

Center-of-Mass det. time= 4.4 min (972.1 - 967.6)

Volume	Invert	Avail. Storage	Storage Description
#1	41.00'	60,000 cf	Free discharge from existing mode Listed below

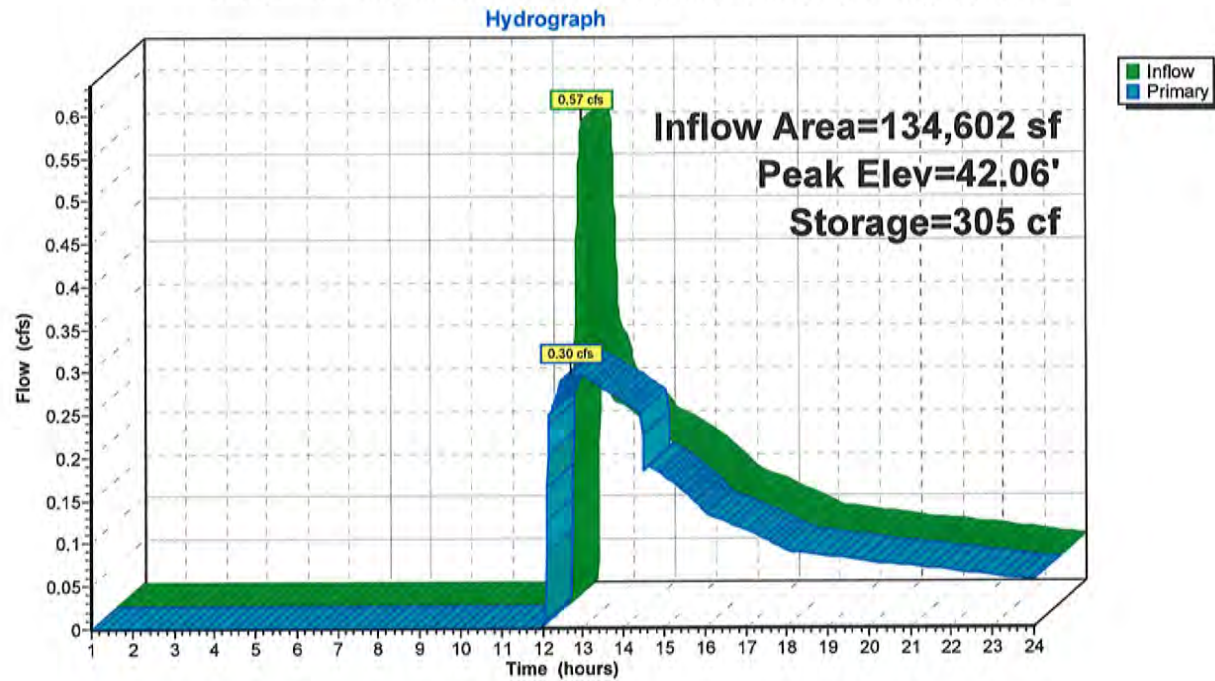
Elevation (feet)	Cum. Store (cubic-feet)
41.00	0
42.00	2
43.00	4,813
44.00	12,030
45.00	18,040
46.00	29,002
47.00	60,000

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	Free discharge model
			Elev. (feet) 0.00 41.90 42.00 43.00 44.00 45.00 46.00
			Disch. (cfs) 0.000 0.000 0.250 1.000 2.000 3.000 4.000

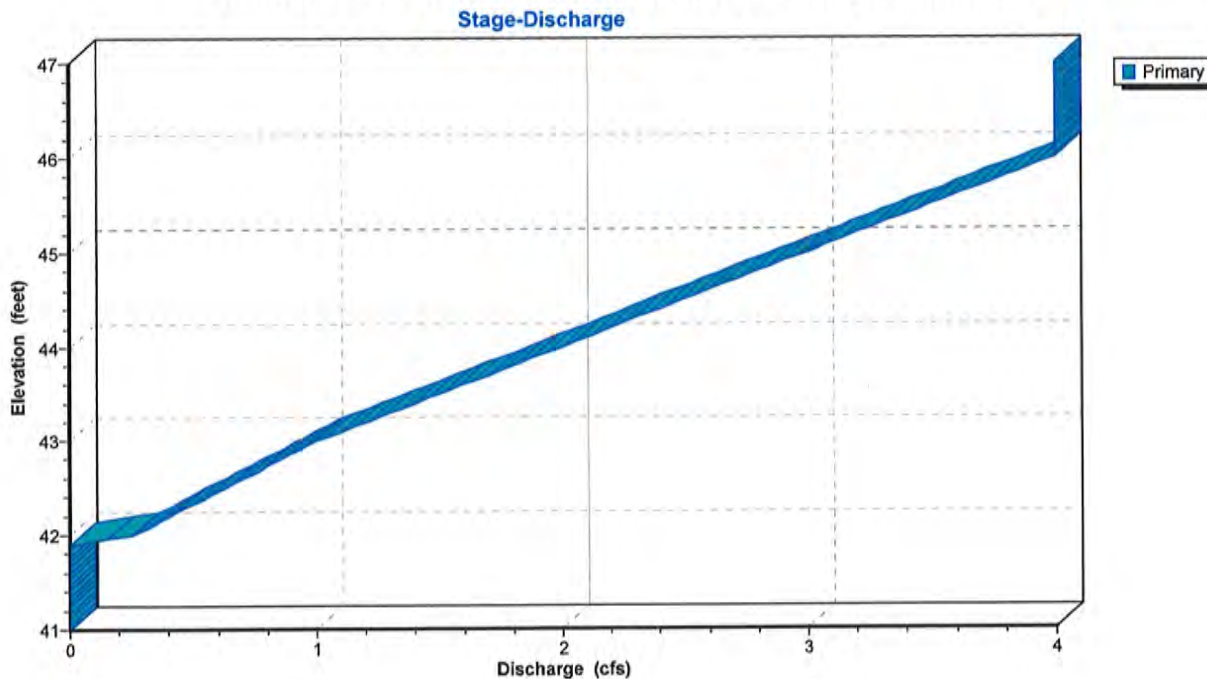
Primary OutFlow Max=0.30 cfs @ 12.73 hrs HW=42.06' (Free Discharge)

↑1=Free discharge model (Custom Controls 0.30 cfs)

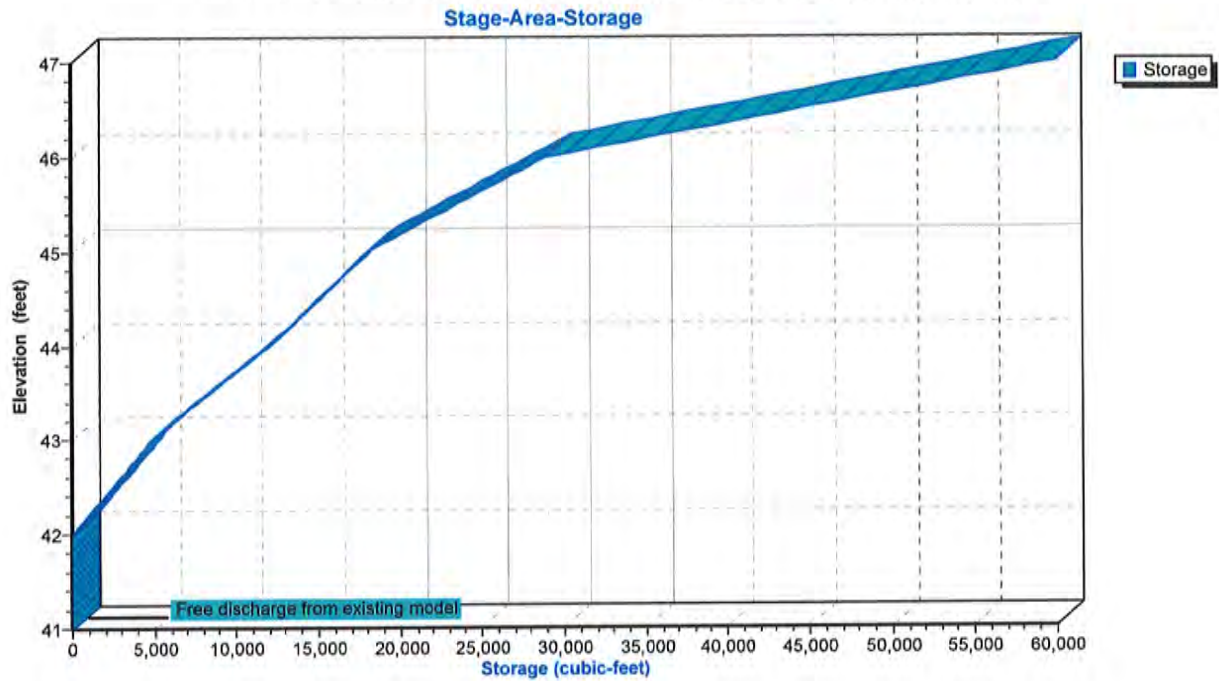
Pond 1P: Free Discharge model for Existing Conditions



Pond 1P: Free Discharge model for Existing Conditions



Pond 1P: Free Discharge model for Existing Conditions



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Barn Cty 100 yr. Event

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Drainage Area DA1



Drainage Infiltration
Model



Routing Diagram for 17-198 RBOUR SUB DA1
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Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	Barn Cty 100 yr.	Type III 24-hr		Default	24.00	1	7.80	2

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Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
33,266	98	Pavement and front Roof Area (1S)
30,304	32	Woods/grass comb., Good, HSG A (1S)
63,570	67	TOTAL AREA

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Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
30,304	HSG A	1S
0	HSG B	
0	HSG C	
0	HSG D	
33,266	Other	1S
63,570		TOTAL AREA

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Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover
0	0	0	0	33,266	33,266	Pavement and front Roof Area
30,304	0	0	0	0	30,304	Woods/grass comb., Good
30,304	0	0	0	33,266	63,570	TOTAL AREA

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Notes Listing (all nodes)

Line#	Node Number	Notes
1	1S	Time of Concentration
2	1P	Rain Garden with overflow Infiltration Model

Time span=1.00-24.00 hrs, dt=0.01 hrs, 2301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Drainage Area DA1

Runoff Area=63,570 sf 52.33% Impervious Runoff Depth>3.95"
Tc=5.0 min CN=67 Runoff=7.01 cfs 20,935 cf

Pond 1P: Drainage Infiltration Model

Peak Elev=43.63' Storage=9,353 cf Inflow=7.01 cfs 20,935 cf
Outflow=0.52 cfs 20,061 cf

Total Runoff Area = 63,570 sf Runoff Volume = 20,935 cf Average Runoff Depth = 3.95"
47.67% Pervious = 30,304 sf 52.33% Impervious = 33,266 sf

Summary for Subcatchment 1S: Drainage Area DA1

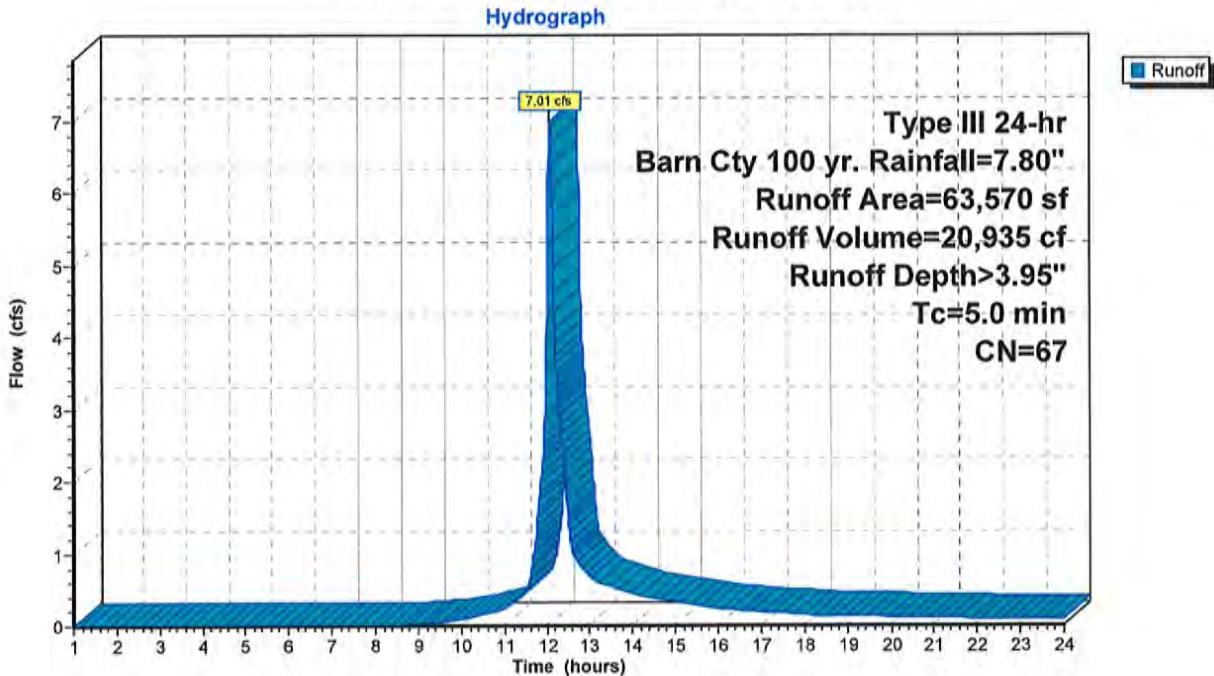
Time of Concentration

Runoff = 7.01 cfs @ 12.08 hrs, Volume= 20,935 cf, Depth> 3.95"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr Barn Cty 100 yr. Rainfall=7.80"

Area (sf)	CN	Description
30,304	32	Woods/grass comb., Good, HSG A
* 33,266	98	Pavement and front Roof Area
63,570	67	Weighted Average
30,304		47.67% Pervious Area
33,266		52.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, Time Concentration

Subcatchment 1S: Drainage Area DA1

Summary for Pond 1P: Drainage Infiltration Model

Rain Garden with overflow Infiltration Model

Inflow Area = 63,570 sf, 52.33% Impervious, Inflow Depth > 3.95" for Barn Cty 100 yr. event
 Inflow = 7.01 cfs @ 12.08 hrs, Volume= 20,935 cf
 Outflow = 0.52 cfs @ 13.66 hrs, Volume= 20,061 cf, Atten= 93%, Lag= 94.8 min
 Primary = 0.52 cfs @ 13.66 hrs, Volume= 20,061 cf

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs / 2

Peak Elev= 43.63' @ 13.66 hrs Storage= 9,353 cf

Plug-Flow detention time= 204.7 min calculated for 20,061 cf (96% of inflow)

Center-of-Mass det. time= 181.7 min (1,012.4 - 830.8)

Volume	Invert	Avail.Storage	Storage Description
#1	41.00'	29,002 cf	Infiltration System Storage Model Listed below

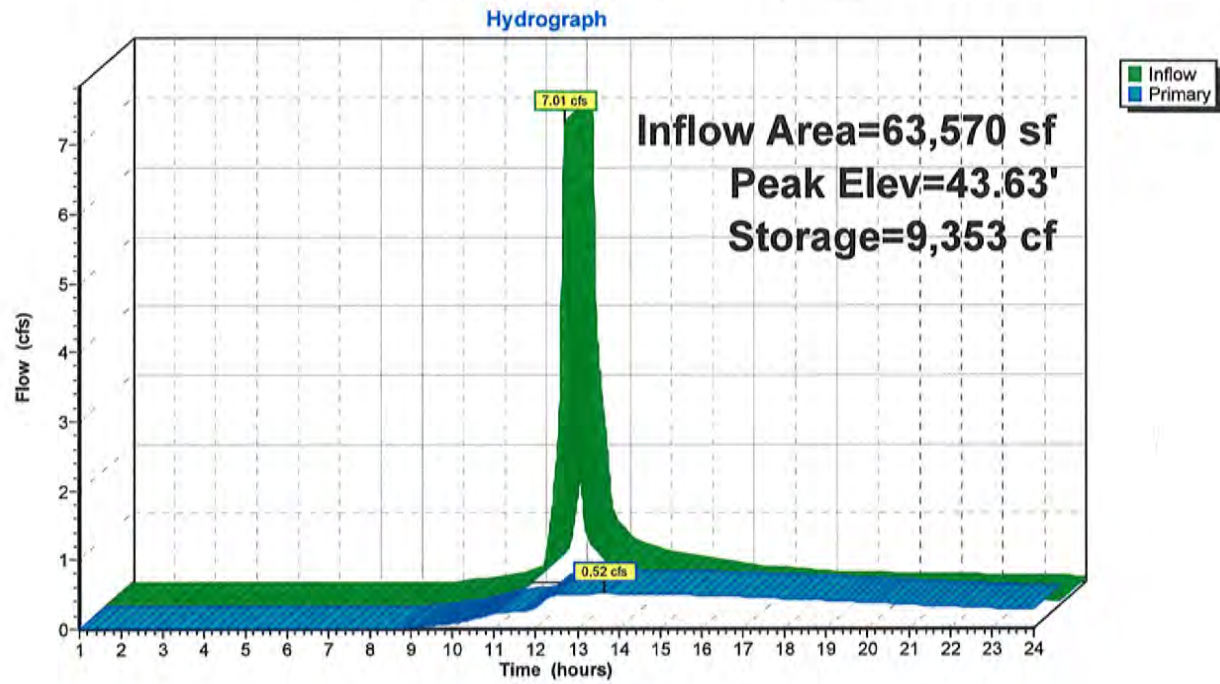
Elevation (feet)	Cum.Store (cubic-feet)
41.00	0
42.00	2
43.00	4,813
44.00	12,030
45.00	18,040
46.00	29,002

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	Infiltration Model
			Elev. (feet) 0.00 41.90 42.00 43.00 44.00 45.00 46.00
			Disch. (cfs) 0.000 0.000 0.250 0.410 0.580 1.250 1.460

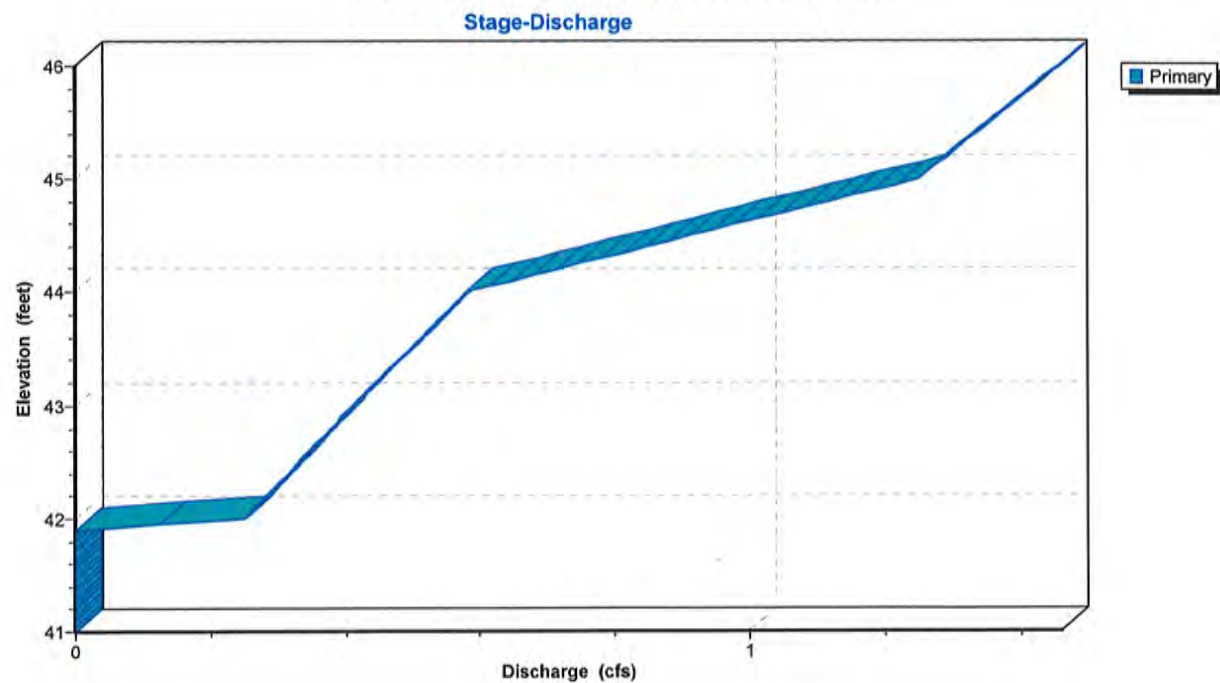
Primary OutFlow Max=0.52 cfs @ 13.66 hrs HW=43.63' (Free Discharge)

↑1=**Infiltration Model** (Custom Controls 0.52 cfs)

Pond 1P: Drainage Infiltration Model



Pond 1P: Drainage Infiltration Model



Pond 1P: Drainage Infiltration Model

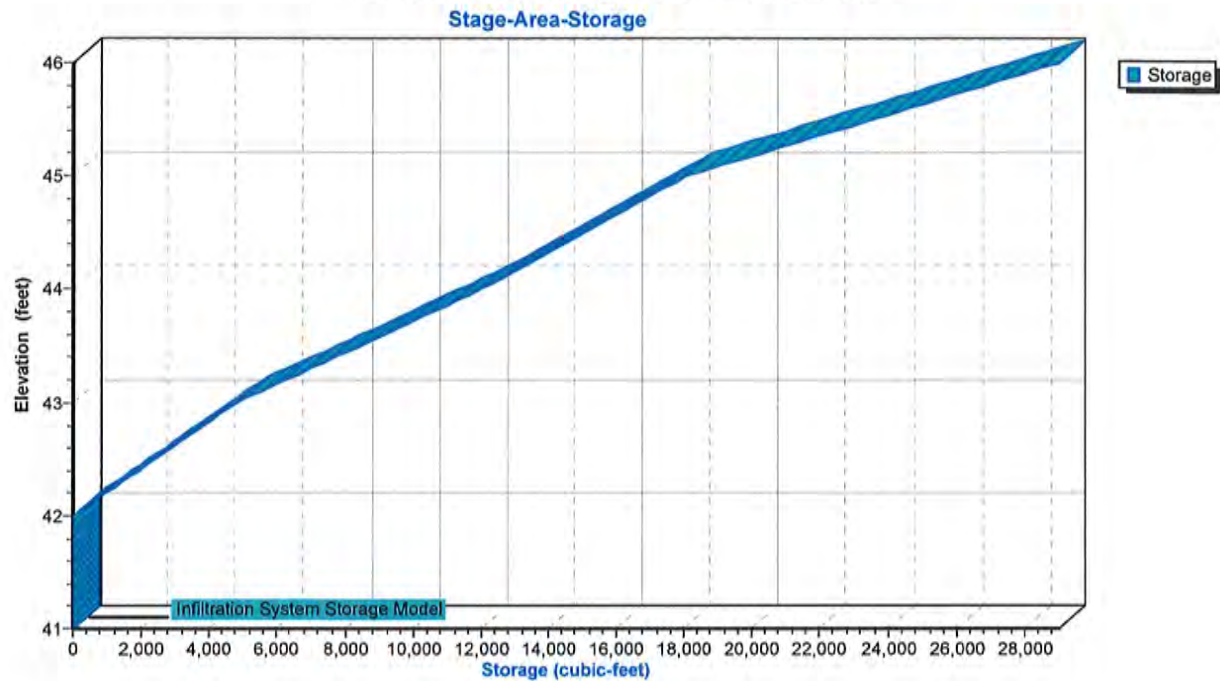


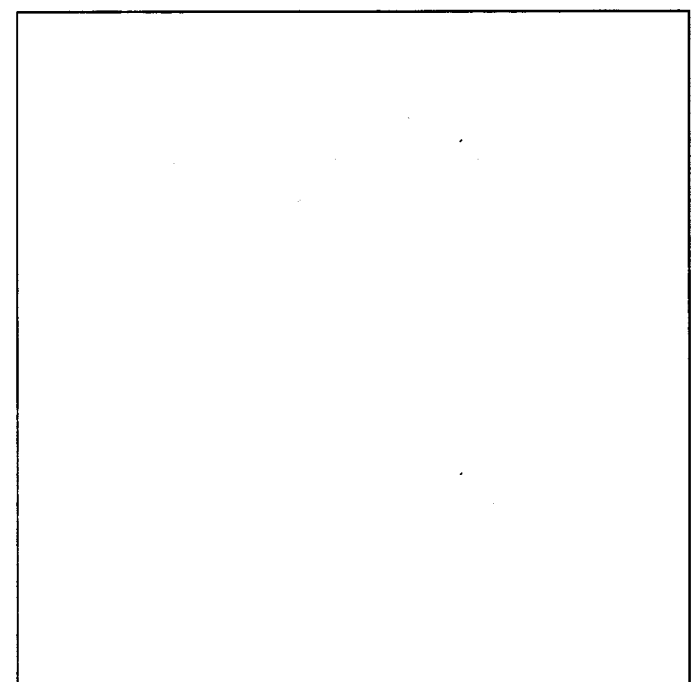
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Project Reports

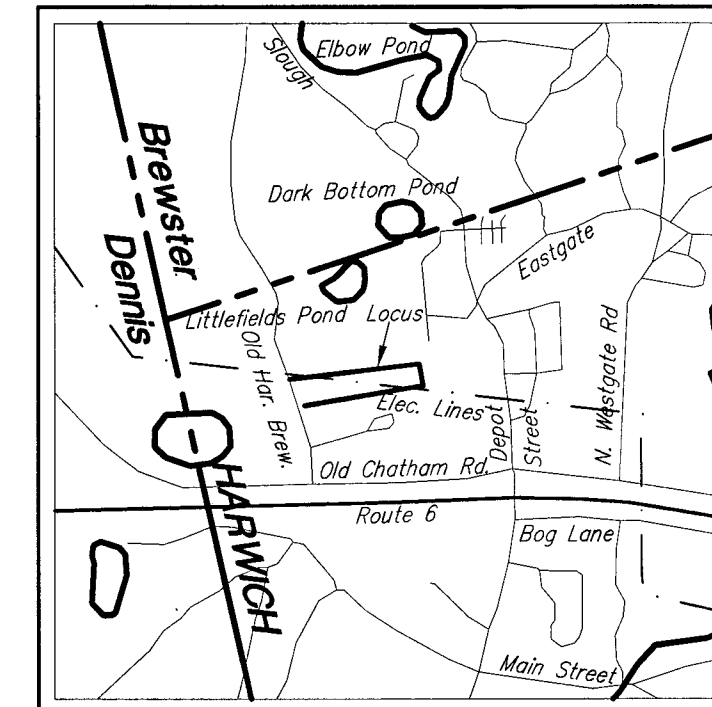
- 1 Routing Diagram
- 2 Rainfall Events Listing (selected events)
- 3 Area Listing (all nodes)
- 4 Soil Listing (all nodes)
- 5 Ground Covers (all nodes)
- 6 Notes Listing (all nodes)

Barn Cty 100 yr. Event

- 7 Node Listing
- 8 Subcat 1S: Drainage Area DA1
- 9 Pond 1P: Drainage Infiltration Model



FOR REGISTRY USE



LOCUS MAP

SCALE 1"=2000'±
ASSESSORS MAP 65 PARCEL R2, R3

ZONING SUMMARY

ZONING DISTRICT: RR DISTRICT
REQUIRED:
MIN. LOT SIZE 40,000 S.F.(0.92 AC.)
MIN. LOT FRONTAGE 150'
MIN. FRONT SETBACK 25'
MIN. SIDE SETBACK 20'
MIN. REAR SETBACK 20'
MAX. BUILDING HEIGHT 30'
MAX. BUILDING COVERAGE 15%
MAX. SITE COVERAGE 25%
LOT WIDTH: 120' AT SETBACK
*35' FRONTAGE AT PANHANDLE

REFERENCES

DEED BOOK 30127 PAGE 308
DEED BOOK 30127 PAGE 311
DEED BOOK 13782 PAGE 234
PLAN BOOK 139 PAGE 47 F3
PLAN BOOK 558 PAGE 83
PLAN BOOK 526 PAGE 94
PLAN BOOK 542 PAGE 52
PLAN BOOK 603 PAGE 98
PLAN BOOK 672 PAGE 83

OWNER OF RECORD

CHRISTOPHER W OUR
56 OBED BROOKS RD
HARWICH, MA 02645

BRYAN BLANCHARD
23 SKIPPER SHEA LN
HARWICH, MA 02645

NOTE:

THE PURPOSE OF THIS PLAN IS TO DELINEATE A VEGETATION AND WILDLIFE CONSERVANCY AREA OVER PORTIONS OF PARCEL C AND PARCEL D AS SHOWN ON PLAN BOOK 688 PAGE 98 RECORDED IN THE BARNSTABLE COUNTY REGISTRY OF DEEDS. PORTIONS OF THE AREA ARE SUBJECT TO AN ELECTRIC TRANSMISSION LINE EASEMENT, SEE PB 139 PG 47 F-3. CONSERVANCY AREA IS TO BE DEDICATED IN SUPPORT OF A SEVEN LOT RESIDENTIAL SUBDIVISION EAST OF LOCUS. REFER TO DEED RESTRICTIONS TO BE RECORDED WITH THE SUBDIVISION DOCUMENTS.

VEGETATION AND WILDLIFE CONSERVANCY AREA: 113,882 SF 2.61 AC.

JANET SHEA OUR
DB 31689 PG 284

RESIDENTIAL SUBDIVISION AREA

CHRISTOPHER W OUR
DB 30127 PG 311
PB 688 PG 98

MAP 65 PARCEL R1
MARGARET GREY
DB 26876 PG 119

N/F GEORGE NICKERSON
ET AL

SCOTT OWEN OUR
DB 30414 PG 56

N/F ELEAZER NICKERSON

N/F JOTHAM NICKERSON

N/F CYRUS NICKERSON
ET ALS

N/F BYRON NICKERSON

N/F JOEL NICKERSON

LOT LINES REF.
PB 558 PG 83
AND PB 688 PG 98

N/F SCOTT OWEN OUR DB
29880 PG 76

150' ELECTRICAL EASEMENT

OLD HARWICH - BREWSTER ROAD
PUBLIC WAY UNDEFINED

MAP 65 PARCEL M1
KELLY SATTMAN
DB 20721 PG 133
PB 594 PG 81

MAP 65 PARCEL M2
MARK E LYNCH JR TRS
ET AL
DB 20721 PG 145
PB 594 PG 82

PARCEL D
#105
100,724 S.F. ±
2.3 ACRES ±
NOT A BUILDABLE LOT
SHAPE FACTOR = 19.6
SHAPE AREA = 46,916

BRYAN BLANCHARD
DB 30127 PG 83
PB 558 PG 83

CHRISTOPHER W OUR
DB 30127 PG 311
PB 688 PG 98

PARCEL C
44,548 S.F. ±
1.0 ACRES ±
NOT A BUILDABLE LOT

CHRISTOPHER W OUR
DB 30127 PG 311
PB 558 PG 83
PB 688 PG 98

LOT 1
67,503 S.F. ±
1.5 ACRES ±
SHAPE FACTOR = 20.0
SHAPE AREA = 61,957 S.F.

EXISTING DWELLING
#103

SHED

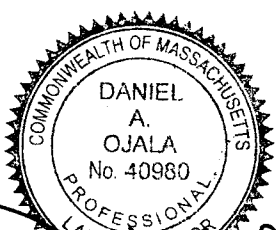
CONCRETE BOUND TO BE SET (TYP.)

NOTE: THIS
EASEMENT IS NOT TO BE UTILIZED

LEGEND:

- VEGETATION & WILDLIFE
CONSERVANCY AREAS
(113,882 SF OR 2.61 AC.±)
- CONCRETE BOUND TO BE SET

I CERTIFY THAT THIS PLAN WAS MADE IN
ACCORDANCE WITH REGISTRY OF DEEDS
REGULATIONS EFFECTIVE JANUARY 1,
1976. AND AS AMENDED JANUARY 7,
1988.



7-16-21
DATE DANIEL A. OJALA, P.L.S.

I HEREBY CERTIFY THAT THE PROPERTY
LINES SHOWN ON THIS PLAN ARE THE LINES
DIVIDING EXISTING OWNERSHIPS, AND THE
LINES OF THE STREETS AND WAYS SHOWN ARE
THOSE OF PUBLIC OR PRIVATE STREETS
OR WAYS ALREADY ESTABLISHED, AND THAT
NO NEW LINES FOR DIVISION OF EXISTING
OWNERSHIP OR FOR NEW WAYS, ARE SHOWN.
REF. C.41 S.81-X, M.G.L.

7-16-21
DATE DANIEL A. OJALA, P.L.S.

CONSERVANCY PLAN OF LAND

#103 & 105 OLD HARWICH -
BREWSTER ROAD
HARWICH, MA

PREPARED FOR

R.B.OUR CO, INC.

DATE: 7-16-2021

Scale: 1"= 40'
0 20 40 60 80 100 FEET

down cape engineering, inc.
civil engineers
land surveyors
939 Main Street (Rte 6A)
YARMOUTHPORT MA 02675