TOWN OF DIGHTON

PLANNING BOARD
979 SOMERSET AVENUE
DIGHTON, MA 02715

PETITIONER: Zero Elm Street, LLC
NAME:
ADDRESS: 9 Jessie Lane Berkley, MA 02779
0 Elm St Map 84 Lot 4

LOCATION (from Assessors' Office)
PLAT AND
LOT NOS. 20-84-4

PRESENT ZONING Industrial	First Record Date Planning Board Use Only
DATE OF THIS DOCUMENT	FILE: TITLE:

APPLICATION FOR SITE PLAN REVIEW

File two (2) completed copies of this application with the Planning Board and within three (3) days thereafter submit a copy to the Board of Health, Board of Appeals, Building Commissioner, Town Engineer and Conservation Commission in accordance with the Zoning Bylaws. The filing fee as calculated by the Fee Schedule, made payable to the Town of Dighton.

To the Dighton Planning Board:

TITLE OF PLAN: Storage Facility Site Plan Elm Street Dighton, Massachusetts

PLAN DATED: June 9, 2023

SUBJECT PROPERTY ADDRESS: 0 Elm Street

ASSESSOR'S MAP/LOT(s): Map 84 Lot 4

ALL APPLICABLE ZONING DISTRICTS: Industrial

PROPOSED USES FOR THIS PROPERTY:

Storage Building

TOTAL LOT AREA: 1,211,859 S.F. (27.8acre) TOTAL FRONTAGE: 820.64'

EXISTING STRUTURE(s) — S.F.

PROPOSED STRUCTURE(s) 7,200 S.F

TOTAL # OF PARKING SPACED REQUIRED:

TOTAL # OF PARKING SPACES PROPSED: 4

ATTACH A LIST OF VARIANCES REQUESTED, IF ANY. (Variances may require relief from the Zoning Board of Appeals)

SPECIAL PERMIT APPLICATION/FEES PURSUANT TO THE FEE SCHEDULE, IF APPLICABLE, SHALL BE SUBMITTED IN CONJUNCTION WITH THIS SITE PLAN REVIEW APPLICATION.

I HAVE READ SECTION 5400, SITE PLAN REVIEW OF THE DIGHTON ZONING BYLAWS, AND I AM SUBMITTING THIS APPLICATION WITH ACCOMPANYING PLANS AS REQUIRED. EXCEPT FOR THE ATTACHED LIST OF VARIANCES (IF ANY), IT IS MY BELIEF THAT THE PLANS COMPLY WITH SECTION 5400. I HAVE NOTFIED TENANTS AND PARTIES (IF ANY) WHO HAVE AN INTEREST IN OR ARE AFFECTED BY THE PROPOSED PLAN.

Received by the Planning Board:
Date: RECEIVED
Time:
Signature: OCT 10 2023

By: Dighton Planning Board

RECEIVED
Received by the Town Clerk: Town Clerk-Dighton, MA
Date: OCT 19 2023
Time: 12:10 PM
Signature: By: RW

Applicant's Name: Zero Elm Street, LLC
Applicant's Address: 9 Jessie Lane, Berkley, MA 02779
Applicant's Phone #:
Signature:

Owner's name, address and signature for authorization (if other than applicant)
Owner's Name: Donald J. Emond
Owner's Address: 9 Jessie Lane, Berkley, MA 02779
Owner's Phone#: 508-880-0580 x120
Signature:

Checklist of items to be submitted with application.

1. ✓ Application Form (x2)
2. ✓ Application Fee (please refer to Fee Schedule) Need check.
3. ✓ Project Review Fee (please refer to Fee Schedule) & Completed W-9
4. ✓ Tax Status Application Form
5. ✓ Plans (See applicable Zoning Bylaws for Specific Requirements)
6. ✓ Completed Receipt for Special Permit Application/Site Plan Review (within 3 working days of the submittal date)

TOWN OF DIGHTON

PLANNING BOARD
979 SOMERSET AVENUE
DIGHTON, MA 02715

PETITIONER: Zero Elm Street, LLC
NAME:
ADDRESS: 9 Jessie Lane Berkley, MA

LOCATION (from Assessors' Office)
PLAT AND
LOT NOS. 20-84-4

PRESENT ZONING: Industrial

First Record Date
Planning Board Use Only

DATE OF THIS DOCUMENT: 10-19-23

File:
Title:

FORM R
WAIVER REQUEST

Nature of Waiver: To allow a basin that is greater than 3' deep.

Subdivision Rules and Regulation Reference: 4324

Reason the waiver is requested: To reduce the footprint of the proposed basin.

Alternatives to granting the waiver: Larger basin with more site disturbance including tree clearing.

Impact of waiver denial on the project: Increased site disturbance including tree clearing.

Reasons this waiver is in the best interests of the town and consistent with the intent and purpose of the Subdivision Control Law: The waiver reduces land disturbance. The development is non-residential and the basin top slope has a guardrail proposed so there is no inherent safety concern with a deeper basin.

Prepared by: Zenith Consulting Engineers, LLC Date: 10-19-23

Subdivision: Storage Facility on Elm Street

Signed: _____

Rev. 8/2021

TOWN OF DIGHTON

PLANNING BOARD
979 SOMERSET AVENUE
DIGHTON, MA 02715

PETITIONER: Zero Elm Street, LLC
NAME:
ADDRESS: 9 Jessie Lane Berkley, MA

LOCATION (from Assessors' Office)
PLAT AND
LOT NOS. 20-84-4

PRESENT ZONING: Industrial

First Record Date
Planning Board Use Only

DATE OF THIS DOCUMENT: 10-19-23

File:
Title:

FORM R
WAIVER REQUEST

Nature of Waiver: To allow 3:1 slopes inside the proposed stormwater basin rather than 5:1.

Subdivision Rules and Regulation Reference: 4327

Reason the waiver is requested: To reduce the footprint of the proposed basin.

Alternatives to granting the waiver: Larger basin with more site disturbance including tree clearing.

Impact of waiver denial on the project: Increased site disturbance including tree clearing.

Reasons this waiver is in the best interests of the town and consistent with the intent and purpose of the Subdivision Control Law: The intent of the regulation is to provide safe traversable slopes within the basin. 3:1 slopes are standard for stormwater basins and is considered safe & traversable.

Prepared by: Zenith Consulting Engineers, LLC Date: 10-19-23

Subdivision: Storage Facility on Elm Street

Signed: _____

Rev. 8/2021

TOWN OF DIGHTON

PLANNING BOARD
979 SOMERSET AVENUE
DIGHTON, MA 02715

PETITIONER: Zero Elm Street, LLC
NAME:
ADDRESS: 9 Jessie Lane Berkley, MA

LOCATION (from Assessors' Office)	
PLAT AND LOT NOS. 20-84-4	
PRESENT ZONING Industrial	First Record Date Planning Board Use Only
DATE OF THIS DOCUMENT 10-19-23	File: Title:

FORM R
WAIVER REQUEST

Nature of Waiver: To allow drainage pipes to be installed with less than 3' of cover.

Subdivision Rules and Regulation Reference: 4340

Reason the waiver is requested: Reduce fill required on the site.

Alternatives to granting the waiver: Raising elevations across the proposed improvements.

Impact of waiver denial on the project: Raising elevations across the proposed improvements.

Reasons this waiver is in the best interests of the town and consistent with the intent and purpose of the Subdivision Control Law: The intent of this regulation is to provide proper cover over pipes to meet an H-20 loading rate. The proposed ADS N-12 HDPE pipe only requires 1' of cover to meet H-20 loading.

Prepared by: Zenith Consulting Engineers, LLC Date: 10-19-23

Subdivision: Storage Facility on Elm Street

Signed: _____

Rev. 8/2021

TOWN OF DIGHTON

PLANNING BOARD
979 SOMERSET AVENUE
DIGHTON, MA 02715

PETITIONER: Zero Elm Street, LLC
NAME:
ADDRESS: 9 Jessie Lane Berkley, MA

LOCATION (from Assessors' Office)
PLAT AND
LOT NOS. 20-84-4

PRESENT ZONING: Industrial

First Record Date
Planning Board Use Only

DATE OF THIS DOCUMENT: 10-19-23

File:
Title:

FORM R
WAIVER REQUEST

Nature of Waiver: To allow an open drainage basin.

Subdivision Rules and Regulation Reference: 4320

Reason the waiver is requested: An open basin lowers constructions cost and allows for easier long term maintenance.

Alternatives to granting the waiver: Subsurface drainage field.

Impact of waiver denial on the project: Subsurface drain field would require a proprietary water quality unit to obtain proper runoff treatment and would be much more difficult to maintain in the long term.

Reasons this waiver is in the best interests of the town and consistent with the intent and purpose of the Subdivision Control Law: An open basin is prefered to subsurface drain fields by the state because of their treatment capabilities and ease of maintenance.

Prepared by: Zenith Consulting Engineers, LLC Date: 10-19-23

Subdivision: Storage Facilty on Elm Street

Signed: _____

STORAGE FACILITY SITE PLAN

ELM STREET

DIGHTON, MASSACHUSETTS

SITE NOTES:

1. THE SITE IS LISTED ON THE TOWN OF DIGHTON ASSESSORS PROPERTY RECORD CARDS AS PARCEL ID 20-84-4.
2. PROPERTY LINE AND EXISTING CONDITIONS INFORMATION WAS TAKEN FROM A FIELD SURVEY BY ZENITH LAND SURVEYORS, LLC.
3. BRISTOL COUNTY REGISTRY OF DEEDS:
   DEED REFERENCE: BOOK 27854 PAGE 97
   PLAN REFERENCE: BOOK 451 PAGE 22
4. THE SITE IS LOCATED WITHIN THE TOWN OF DIGHTON'S INDUSTRIAL ZONE AND INDUSTRIAL OVERLAY DISTRICT.
5. THE SUBJECT PROPERTY IS LOCATED IN ZONE X, AS SHOWN ON THE FLOOD INSURANCE RATE MAP (F.I.R.M.) NUMBER 25005C0242G & 25005C0261G, MAPS REVISED 7-16-14.
6. THE SITE IS NOT LOCATED IN A PRIORITY HABITAT AND ESTIMATED HABITAT AS SHOWN ON THE MASSACHUSETTS NATURAL HERITAGE ATLAS 14TH EDITION EFFECTIVE DATE AUGUST, 2017.
7. AN ORDER OF RESOURCE AREA DELINEATION (ORAD) WAS ISSUED ON 1-5-23 BY THE DIGHTON CONSERVATION COMMISSION. DEP FILE NUMBER SE017-0473 RECORDED IN BRISTOL COUNTY REGISTRY OF DEEDS BOOK 28272 PAGE 337.
8. THE PROJECT IS NOT LOCATED WITHIN AN AREA OF CRITICAL ENVIRONMENTAL CONCERN (ACEC).
9. THE SITE IS NOT LOCATED IN A ZONE II TO A PUBLIC WATER SUPPLY WELL.
10. THE SITE IS NOT IN A ZONE A TO A SURFACE WATER SUPPLY AREA.
11. THE SITE IS NOT LOCATED IN AN OUTSTANDING RESOURCE WATER AREA (ORW).

CONSTRUCTION NOTES:

1. A NPDES PERMIT MUST BE OBTAINED FOR THIS PROJECT PRIOR TO CONSTRUCTION.
2. CONTRACTOR TO VERIFY BENCHMARKS FOR CONSISTENCY PRIOR TO CONSTRUCTION AND SHALL NOTIFY ZENITH CONSULTING ENGINEERS, LLC. OF ANY DISCREPANCIES.
3. CONTRACTOR SHALL VERIFY WATER TABLE ELEVATIONS AND NOTIFY THE DESIGN ENGINEER OF ANY DISCREPANCIES FROM THE PLAN.
4. IT IS THE CONTRACTORS' RESPONSIBILITY TO CONTACT DIG SAFE (1-888-DIG SAFE) PRIOR TO THE COMMENCEMENT OF WORK AND ALL UNDERGROUND UTILITY COMPANIES TO CONFIRM LOCATIONS AND ELEVATIONS.
5. ALL PAVEMENT MARKING AND SIGNAGE SHALL CONFORM TO MUTCD STANDARDS.
6. PROPOSED UTILITIES AND CONSTRUCTION METHODS UNDER AREAS SUBJECT TO TRAFFIC LOADING SHALL BE INSTALLED TO WITHSTAND H-20 LOADING TRAFFIC STANDARDS. CONTRACTOR SHALL VERIFY THAT ALL STRUCTURES COMPLY TO THIS STANDARD.
7. WHERE ALL CONCRETE STRUCTURES INTERCEPT THE SEASONAL HIGH GROUNDWATER TABLE, THE CONTRACTOR SHALL SEAL THE ENTIRE STRUCTURE WITH WATERPROOF SEALER.
8. IF APPLICABLE, ANY RETAINING WALLS SHALL BE DESIGNED BY A MASSACHUSETTS REGISTERED PROFESSIONAL STRUCTURAL ENGINEER.
9. ALL WORK SHALL CONFORM TO THE TOWN OF DIGHTON RULES AND REGULATIONS AND THE MASSACHUSETTS DEPARTMENT OF TRANSPORTATION SPECIFICATIONS FOR HIGHWAY AND BRIDGES, MOST CURRENT VERSION OF PLAN SET.

WAIVER REQUESTS:

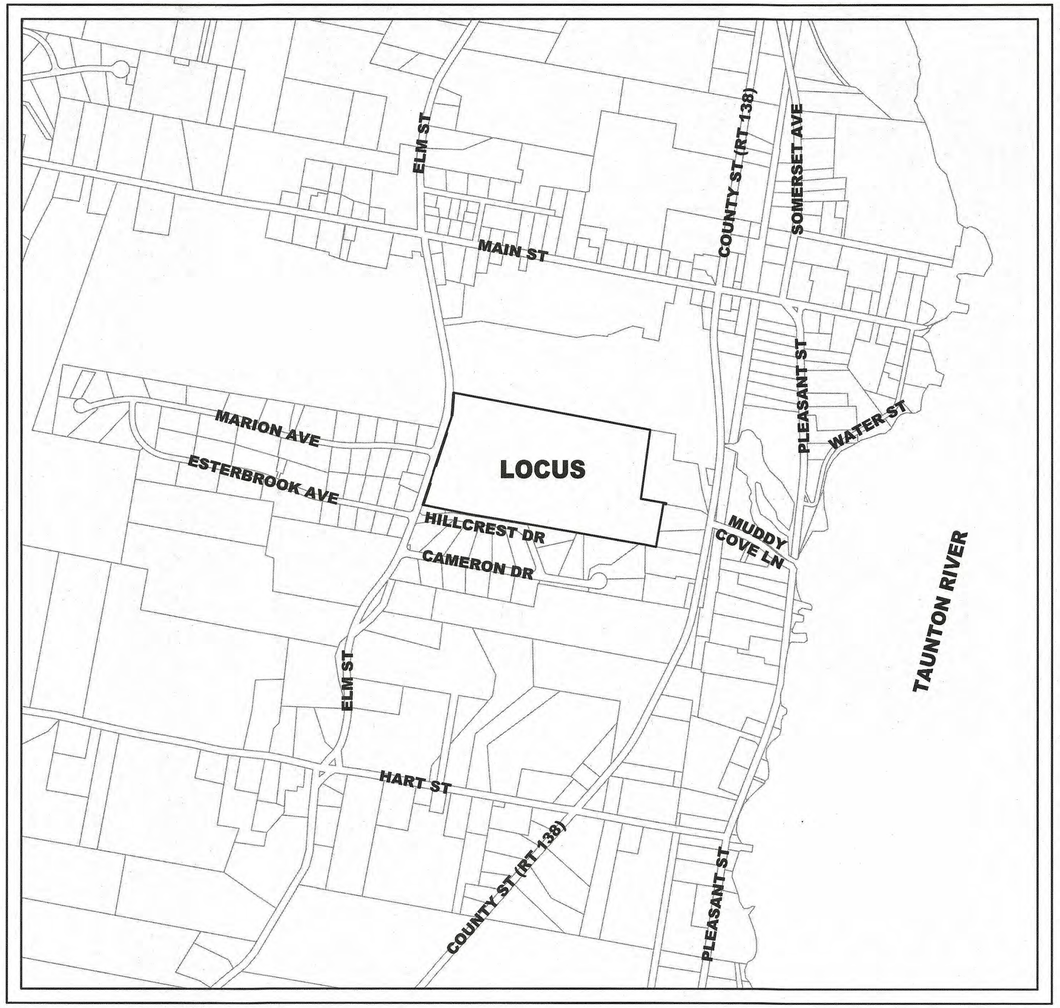
THE FOLLOWING WAIVERS ARE REQUESTED FROM THE TOWN OF DIGHTON SUBDIVISION RULES AND REGULATIONS:

1. FROM SECTION 4320 TO ALLOW AN OPEN STORMWATER BASIN.
2. FROM SECTION 4324 TO ALLOW A DEPTH GREATER THAN 3' IN THE PROPOSED STORMWATER BASIN.
3. FROM SECTION 4327 TO ALLOW 3:1 SLOPES INSIDE THE STORMWATER BASIN RATHER THAN 5:1.
4. FROM SECTION 4340 TO ALLOW DRAIN PIPES TO BE INSTALLED WITH LESS THAN 3' OF COVER. THE ADS N-12 HDPE PIPE PROPOSED REQUIRES ONLY 1' OF COVER TO MEET AN H-20 LOADING RATE.

ZONING SUMMARY AND COMPLIANCE TABLE (INDUSTRIAL)		
CRITERIA	REQUIRED	PROPOSED
LOT AREA	60,000 S.F.	1,211,859± S.F.
FRONTAGE	250'	820.64'
FRONT BUILDING SETBACK	100'*	116'±
SIDE BUILDING SETBACK	100'	100.7'
REAR BUILDING SETBACK	75'	> 75'
BUILDING HEIGHT	65'	< 65'
BUILDING COVERAGE	35%	0.6% (7,200 S.F.)

*FRONT SETBACK MEASURED FROM CENTER OF PUBLIC WAY

SCHEDULE OF DRAWINGS		
SHEET ID	PLAN TITLE	LATEST REVISION DATE
C	COVER SHEET	-
X	EXISTING CONDITIONS PLAN	-
L	LAYOUT PLAN	-
G	GRADING AND DRAINAGE PLAN	-
E	EROSION CONTROL PLAN	-
D	SITE DETAILS	-



LOCUS PLAN
SCALE: 1"=500'

LEGEND		
EXISTING	DESCRIPTION	PROPOSED
	BUILDING	
-99- / -100-	CONTOUR	100
100X0	SPOT GRADE	100X0
	SILT SOCK	
	CHAINLINK FENCE	
	STOCKADE FENCE	
X	WIRE FENCE	X
	GUARDRAIL	
	SIGN	
	TEST PIT	
D D	DRAINAGE PIPE	D D
RD RD	ROOF DRAIN PIPE	RD RD
	CATCH BASIN	
	DOUBLE GRATE CATCH BASIN	
	DRAIN MANHOLE	
	FLARED END	
G G	GAS MAIN	G G
GS GS	GAS SERVICE	GS GS
G	GAS MANHOLE	G
	GAS GATE/VALVE	
ETC	ELEC/TELE/CABLE	ETC
OHW	OVERHEAD WIRES	OHW
UE UE	UNDERGROUND ELECTRIC	UE UE
T	TRANSFORMER	T
	UTILITY POLE	
	GUY POLE	
	GUY WIRE	
	LIGHT POLE	
	FLOOD LIGHT	
S S	GRAVITY SEWER MAIN	S S
FSM	FORCE SEWER MAIN	FSM
SS SS	SEWER SERVICE	SS SS
S	SEWER MANHOLE	S
	SEWER VALVE	
W W	WATER MAIN	W W
WS WS	WATER SERVICE	WS WS
	HYDRANT	
	WATER GATE/VALVE	
	WATER SHUTOFF	
	TREELINE	
	STONEWALL	
	WETLAND LINE	
25'B	25' BUFFER	
50'B	50' BUFFER	
100'B	100' BUFFER	
WF10	WETLAND FLAG	
	DRILLHOLE	
	CONCRETE BOUND	
	REBAR	

OWNER/APPLICANT
ZERO ELM STREET, LLC
9 JESSIE LANE
BERKLEY, MA 02779

COMMONWEALTH OF MASSACHUSETTS
JONATHAN J. PINK
NO. 41787
REGISTERED PROFESSIONAL LAND SURVEYOR
9-29-23

SEPTEMBER 25, 2023

COMMONWEALTH OF MASSACHUSETTS
KYLES C. ZENITH
CIVIL
No. 49117
REGISTERED PROFESSIONAL ENGINEER
P.E. STAMP

ZCE
ZENITH CONSULTING ENGINEERS, LLC
3 MAIN STREET LAKEVILLE, MA 02347
PHONE: (508) 947-4208

REV.	DATE	DESCRIPTION	BY	APP.

DRAWN BY: RMF/TEM
DESIGNED BY: RMF
CHECKED BY: NCZ
APPROVED BY: NCZ
DATE: 9-25-23
PROJECT NUMBER: 0945-01-01
DRAWING SCALE: 1" = 500'
SHEET ID: C

SHEET NAME: **STORAGE FACILITY SITE PLAN COVER SHEET**
PROJECT SITE: **ELM STREET DIGHTON, MASSACHUSETTS**
OWNER INFO: **ZERO ELM STREET, LLC 9 JESSIE LANE BERKLEY, MA 02779**

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SITE NOTES:

1. THE SITE IS LISTED ON THE TOWN OF DIGHTON ASSESSORS PROPERTY RECORD CARDS AS PARCEL ID 20-84-4.
2. PROPERTY LINE AND EXISTING CONDITIONS INFORMATION WAS TAKEN FROM A FIELD SURVEY BY ZENITH LAND SURVEYORS, LLC.
3. BRISTOL COUNTY REGISTRY OF DEEDS:
   DEED REFERENCE: BOOK 27854 PAGE 97
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5. THE SUBJECT PROPERTY IS LOCATED IN ZONE X, AS SHOWN ON THE FLOOD INSURANCE RATE MAP (F.I.R.M.) NUMBER 25005C0242G & 25005C0261G, MAPS REVISED 7-16-14.
6. THE SITE IS NOT LOCATED IN A PRIORITY HABITAT AND ESTIMATED HABITAT AS SHOWN ON THE MASSACHUSETTS NATURAL HERITAGE ATLAS 15TH EDITION EFFECTIVE DATE AUGUST, 2021.
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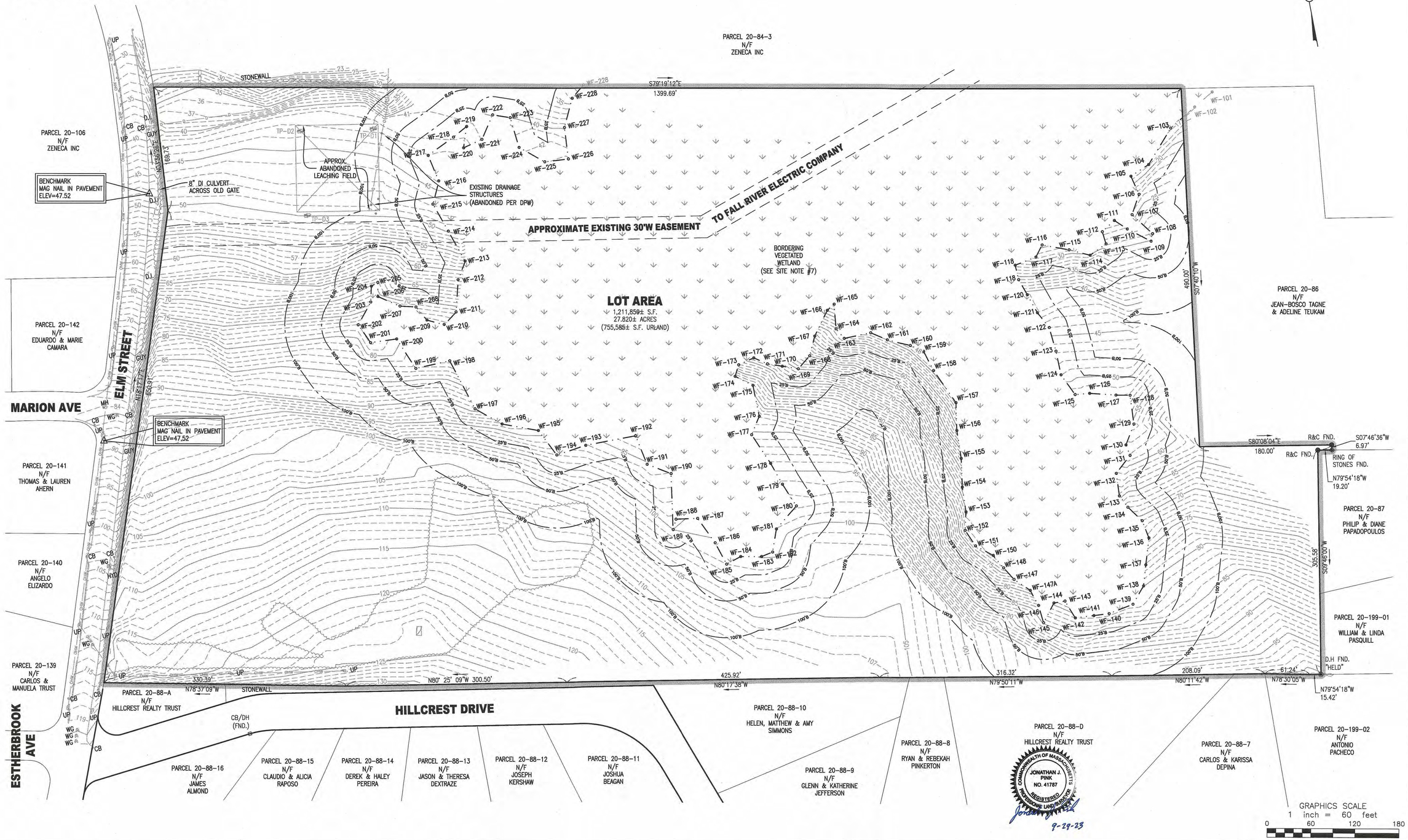

COMMONWEALTH OF MASSACHUSETTS
NYLES C. ZAGIER
CIVIL
No. 49717
REGISTERED PROFESSIONAL ENGINEER
9-29-23
P.E. STAMP

ZCE
ZENITH CONSULTING ENGINEERS, LLC
3 MAIN STREET LAKEVILLE, MA 02347
PHONE: (508) 947-4208

REV.	DATE	DESCRIPTION	BY	APP.

DATE: 9-25-23
PROJECT NUMBER 0945-01-01
DRAWING SCALE 1" = 60'
SHEET ID X

DRAWN BY: RMF/TEM
DESIGNED BY: RMF
CHECKED BY: NCZ
APPROVED BY NCZ

SHEET NAME: **STORAGE FACILITY SITE PLAN**
EXISTING CONDITIONS PLAN

PROJECT SITE:
ELM STREET
DIGHTON, MASSACHUSETTS

OWNER INFO:
ZERO ELM STREET, LLC
9 JESSIE LANE
BERKLEY, MA 02779

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PARCEL 20-84-3
N/F
ZENECA INC

STONEWALL

EXISTING VEGETATION TO REMAIN TO THE MAXIMUM EXTENT PRACTICABLE

PARCEL 20-106
N/F
ZENECA INC

ELM STREET

10'W LANDSCAPE BUFFER

100.7'

157'

136'

LIGHTING TO BE MOUNTED TO BUILDING. MUST BE DOWNWARD FACING AND SHALL NOT ILLUMINATE BEYOND THE SITE BOUNDARY.

PROPOSED STORMWATER BASIN

BOLLARDS AT BUILDING CORNERS (TYP)

PROPOSED
60' X 120'
STORAGE BUILDING
7,200 S.F.
SLAB=50.5

(4) 9' X 19' SPACES

30' (TYP)

109'±
TO CENTER OF WAY

77.5'

24'

R=10'

R=20'

R=30'

TP-D1

TP-D2

TP-D3

APPROX. EX. 30'W
EASEMENT TO FALL RIVER
ELECTRIC COMPANY

BORDERING
VEGETATED
WETLAND
(SEE SITE NOTE #7)

LOT AREA
1,211,859± S.F.
27.820± ACRES
(755,585± S.F. UPLAND)

WF-202
WF-203
WF-204
WF-205
WF-206
WF-207
WF-208
WF-209
WF-210
WF-211
WF-212
WF-213
WF-214
WF-215
WF-216
WF-217
WF-218
WF-219
WF-220
WF-221
WF-222

GRAPHICS SCALE
1 inch = 20 feet
0 20 40 60

JONATHAN J. PINK
NO. 41787
REGISTERED PROFESSIONAL LAND SURVEYOR
COMMONWEALTH OF MASSACHUSETTS
9-29-23

KYLES C. TAYLOR
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3 MAIN STREET LAKEVILLE, MA 02347
PHONE: (508) 947-4208

REV.	DATE	DESCRIPTION

DRAWN BY: RMF/TCM
DESIGNED BY: RMF
CHECKED BY: NCZ
APPROVED BY: NCZ
DATE: 9-25-23
PROJECT NUMBER: 0945-01
DRAWING SCALE: 1" = 20'
SHEET ID: L

SHEET NAME: **STORAGE FACILITY SITE PLAN LAYOUT PLAN**

PROJECT SITE: **ELM STREET**
DIGHTON, MASSACHUSETTS

OWNER INFO: **ZERO ELM STREET, LLC**
9 JESSIE LANE
BERKLEY, MA 02779

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DRAIN PIPE NOTE
ALL HDPE PIPE SHALL BE ADS N-12 OR APPROVED EQUAL.

PARCEL 20-84-3
N/F
ZENECA INC

STONEWALL

STORMWATER BASIN
TOP=48.0
POOL=44.0
(SEE DETAIL)

PARCEL 20-106
N/F
ZENECA INC

ELM STREET

CB-3
RIM=49.20
INV=46.20

167' - 12" HDPE

CB-4
RIM=49.20
INV=46.40

12' 17" HDPE

29'
12" HDPE

8" HDPE
ROOF DRAIN
(TYP)

BOLLARDS
AT BUILDING
CORNERS
(TYP)

PROPOSED
60' X 120'
STORAGE BUILDING
7,200 S.F.
SLAB=50.5

(3) CULTEC 330XLHD
CHAMBERS (TYP OF 2)
(SEE DETAIL)

195' - 12" HDPE

CB-1
RIM=48.90
INV=46.10

DMH-1
RIM=49.20
INV IN=44.50
INV OUT=44.40

31'
12" HDPE

18'
12" HDPE

CB-2
RIM=48.95
INV=44.80

TP-D1
INV=47.0

TP-D2

TP-D3

36'
6" HDPE

INV=43.0

DMH-2
RIM=49.60
INV IN=44.50
INV OUT=44.40

OVERFLOW SPILLWAY
EL=47.0

FE-2
INV=44.0

SEDIMENT
FOREBAY

FE-1
INV=44.0

GRASS SWALE

GRASS SWALE

APPROX. EX. 30'W
EASEMENT TO FALL RIVER
ELECTRIC COMPANY

BORDERING
VEGETATED
WETLAND
(SEE SITE NOTE #7)

LOT AREA
1,211,859± S.F.
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(755,585± S.F. UPLAND)

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WF-213
WF-214
WF-215
WF-216
WF-217
WF-218
WF-219
WF-220
WF-221
WF-222

GRAPHICS SCALE
1 inch = 20 feet
0 20 40 60

NYLAS C. ZUKERT CIVIL No. 48717 REGISTERED PROFESSIONAL ENGINEER COMMONWEALTH OF MASSACHUSETTS
P.E. STAMP

ZCE
ZENITH CONSULTING ENGINEERS, LLC
3 MAIN STREET LAKEVILLE, MA 02347
PHONE: (508) 947-4208

REV:	DATE	DESCRIPTION
BY		
APP.		

DATE: 9-25-23
PROJECT NUMBER 0945-01-01
DRAWING SCALE 1" = 20'
SHEET ID G

DRAWN BY: RMF/TEM
DESIGNED BY: RMF
CHECKED BY: NCZ
APPROVED BY NCZ

SHEET NAME: **STORAGE FACILITY SITE PLAN GRADING & DRAINAGE PLAN**

PROJECT SITE: **ELM STREET DIGHTON, MASSACHUSETTS**

OWNER INFO: **ZERO ELM STREET, LLC 9 JESSIE LANE BERKLEY, MA 02779**

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STORMWATER MANAGEMENT SYSTEMS LONG-TERM OPERATION AND MAINTENANCE PLAN:

1.0 INTRODUCTION
THE ELM STREET SITE PLAN HAS BEEN DESIGNED TO ENSURE STORMWATER QUALITY. IN ORDER FOR THIS TO CONTINUE IN THE LONG TERM, IT IS NECESSARY TO IMPLEMENT THE FOLLOWING LONG TERM OPERATION AND MAINTENANCE PROGRAM.

2.0 RESPONSIBLE PARTY
OWNER:
ZERO ELM STREET, LLC
9 JESSIE LANE
BERKLEY, MA 02779

RESPONSIBLE FOR OPERATION AND MAINTENANCE:
SAME AS ABOVE

UPON COMPLETION OF THE DEVELOPMENT, THE PROPERTY OWNER SHALL TAKE OVER AS THE RESPONSIBLE PARTY FOR OPERATION AND MAINTENANCE OF THE PAVED AREA AND DRAINAGE FEATURES.

3.0 MAINTENANCE OF STORMWATER MANAGEMENT FACILITIES
THE STORMWATER MANAGEMENT FACILITIES WERE DESIGNED TO REQUIRE LITTLE OR NO INTERVENTION IN THE OPERATION AND TO REQUIRE LITTLE OR NO MAINTENANCE ONCE THE PROJECT IS BUILT AND STABLE VEGETATIVE COVER IS ESTABLISHED. HOWEVER, THE DRAINAGE IMPROVEMENTS SHALL BE SUBJECT TO THE FOLLOWING MAINTENANCE SCHEDULE.

A. ROUTINE MAINTENANCE

1. DEBRIS: ALL DEBRIS AND LITTER ARE TO BE REMOVED FROM ALL CATCH BASINS, DRAINS AND SURROUNDING AREAS AT LEAST TWICE PER YEAR.

2. RE-SEEDING: EMBANKMENTS THAT HAVE EXCESSIVE EROSION OR SLUMPING ARE TO BE RE-GRADED AND SEEDED (WITH CANARY GRASS OR TALL FESCUE GRASS) DURING THE SPRING OR FALL GROWING SEASONS AS NEEDED.

3. INSPECT: POCKET WETLAND BASIN SHALL BE INSPECTED FOR THE FOLLOWING TWICE PER YEAR (ONCE IN THE GROWING SEASON AND ONCE IN THE NON-GROWING SEASON);
- 3.1. THE TYPES AND DISTRIBUTION OF THE DOMINANT WETLAND PLANTS IN THE MARSH,
- 3.2. THE PRESENCE AND DISTRIBUTION OF PLANTED WETLAND SPECIES AND INVASIVE WETLAND SPECIES (INVASIVES MUST BE REMOVED).
- 3.3. INDICATIONS THAT OTHER SPECIES ARE REPLACING THE PLANTED WETLAND SPECIES,
- 3.4. PERCENTAGE OF STANDING WATER THAT IS UNVEGETATED (EXCLUDING THE FOREBAY AND MICROPOOL WHICH ARE NOT SUITABLE FOR EMERGENT PLANT GROWTH),
- 3.5. IF THE DESIGN ELEVATION OF THE NORMAL POOL IS BEING MAINTAINED,
- 3.6. STABILITY OF THE ORIGINAL DEPTH ZONES AND THE MICROTOPOGRAPHY FEATURES,
- 3.7. ACCUMULATION OF SEDIMENT IN THE FOREBAY AND MICROPOOL AND SURVIVAL RATE OF PLANTS (CELLS WITH DEAD PLANTS MUST BE REPLACED.

4. MOWING: ALL LAWN AREAS SHALL BE MOWED AT LEAST TWICE PER YEAR.

B. PERIODIC MAINTENANCE

1. ALL CATCH BASIN SUMPS SHALL BE INSPECTED, AT A MINIMUM, FOUR TIMES PER YEAR AND SEDIMENT FOREBAY, AT A MINIMUM, ONE TIME PER YEAR. THESE STRUCTURES SHALL BE CLEANED WHENEVER THE DEPTH OF DEPOSITS IS GREATER THAN OR EQUAL TO ONE HALF THE DEPTH FROM THE BOTTOM OF THE UNIT TO THE INVERT OF THE LOWEST PIPE IN THE CATCH BASIN. WITH THE FOUR-FOOT SUMPS THAT ARE SPECIFIED, THIS DEPTH EQUALS TWO FEET. WITH THE FOREBAY, ANY ACCUMULATION OF SEDIMENT OVER 2 INCHES IN DEPTH SHALL BE REMOVED. IN THIS CLEANING, THE ENTIRE CONTENTS OF THE SUMPS AND FOREBAY SHALL BE REMOVED.

C. NON-ROUTINE MAINTENANCE

1. STRUCTURAL: ALL CATCH BASINS, PIPES, FOREBAY AND BASIN SHALL BE INSPECTED ONCE EVERY FOUR (4) YEARS FOR PROPER FUNCTION, CLOGGING, SIGNS OF DETERIORATION AND STRUCTURAL INADEQUACY. ANY ADVERSE SITUATIONS ARE TO BE REPAIRED AS NEEDED.

D. NON-PERIODIC INSPECTION

1. THE STORM WATER MANAGEMENT SYSTEM SHALL BE INSPECTED AFTER TWO YEARS OF FULL OPERATION BY A REGISTERED PROFESSIONAL CIVIL ENGINEER TO CONFIRM ITS ADEQUACY. THE INSPECTION SHALL INCLUDE AN EXAMINATION OF ALL COMPONENTS OF THE SYSTEM INCLUDING CATCH BASINS AND POCKET WETLAND.

E. ANNUAL BUDGET

1. THE ESTIMATED ANNUAL BUDGET FOR THE O & M IS $1,000.

EROSION & SEDIMENT CONTROL NOTES:

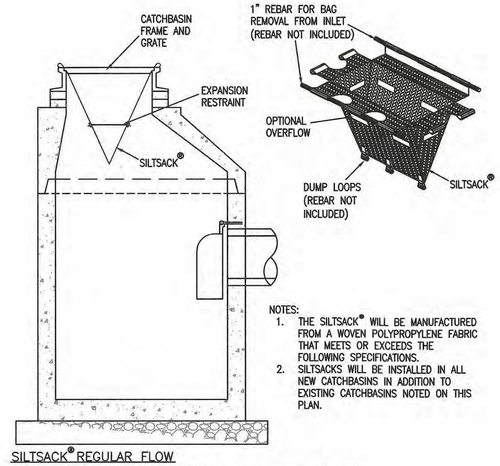
IT IS THE CONTRACTOR'S RESPONSIBILITY TO CONTROL EROSION AND PREVENT SEDIMENTATION TOWARD WETLANDS OR OFFSITE PROPERTIES. IT IS INTENDED THAT THE IMPLEMENTATION OF THE FOLLOWING MEASURES WILL MEET THIS GOAL. WHEN IT IS CLEAR TO THE DESIGNER THAT EROSION AND SEDIMENTATION HAVE BEEN ADEQUATELY CONTROLLED WITHOUT THE IMPLEMENTATION OF EVERY MEASURE, ADDITIONAL MEASURES NEED NOT BE IMPLEMENTED. ALTERNATIVELY, IF ALL OF THE FOLLOWING MEASURES HAVE BEEN IMPLEMENTED AND THE CONTROL OF EROSION AND SEDIMENTATION IS INADEQUATE, THE CONTRACTOR MUST EMPLOY SUFFICIENT SUPPLEMENTAL MEASURES BEYOND THE SCOPE OF THIS PLAN.

1. EROSION AND SEDIMENT CONTROL MEASURES WILL BE INSTALLED PRIOR TO STUMP REMOVAL AND CONSTRUCTION. STABILIZATION OF ALL REGRADED AND SOIL STOCKPILE AREAS WILL BE INITIATED AND MAINTAINED DURING ALL PHASES OF CONSTRUCTION.
2. ALL EROSION AND SEDIMENT CONTROL MEASURES WILL BE CONSTRUCTED IN ACCORDANCE WITH LOCAL MUNICIPAL REGULATIONS. ALL EROSION CONTROL MEASURES ARE TO BE MAINTAINED AND UPGRADED AS REQUIRED TO ACHIEVE PROPER SEDIMENT CONTROL DURING CONSTRUCTION. A STAKED FILTER SOCK DAM SHALL BE INSTALLED DOWN GRADIENT OF ALL DRAINAGE OUTFALLS.
3. ADDITIONAL CONTROL MEASURES WILL BE INSTALLED DURING THE CONSTRUCTION PERIOD, IF DEEMED NECESSARY BY THE OWNER OR AGENTS OF THE OWNER.
4. CATCH BASINS WILL BE PROTECTED WITH FILTER SOCKS THROUGHOUT THE CONSTRUCTION PERIOD UNTIL ALL DISTURBED AREAS ARE THOROUGHLY STABILIZED. SILT SOCKS SHOULD BE INSTALLED UNDER GRATE OPENING UNTIL PAVEMENT IS IN PLACE AND GROUND SURFACE IS STABILIZED.
5. SEEDING MIXTURE FOR FINISHED GRASSED AREAS WILL BE AS FOLLOWS:
   KENTUCKY BLUE GRASS 45%
   CREEPING RED FESCUE 45%
   PERENNIAL RYEGRASS 10%
   SEED TO BE APPLIED AT A RATE OF 4 LBS./1000 SQ. FT.
   PLANTING SEASONS SHALL BE APRIL 1 TO JUNE 1 AND AUGUST 1 TO OCTOBER 15. AFTER OCTOBER 15, AREAS WILL BE STABILIZED WITH HAYBALE CHECK, FILTER FABRIC, OR WOODCHIP MULCH, AS REQUIRED, TO CONTROL EROSION.
6. AREAS THAT ARE NOT THE LOCATION OF ACTIVE CONSTRUCTION WHICH ARE TO BE LEFT BARE FOR OVER ONE MONTH BEFORE FINISHED GRADING AND SEEDING IS ACHIEVED, SHALL BE MULCHED OR RECEIVE TEMPORARY STABILIZATION SUCH AS JUTE NETTING OR SHALL RECEIVE A TEMPORARY SEEDING OF PERENNIAL RYEGRASS APPLIED TO A RATE OF 2 LBS./1,000 SQ. FT. LIMESTONE (EQUIVALENT TO BE 50 PERCENT CALCIUM PLUS MAGNESIUM OXIDE) SHALL BE APPLIED AS SEEDBED PREPARATION AT A RATE OF 90 LBS./1,000 SQ. FT. PLANTING SEASONS SHALL BE APRIL 1 TO JUNE 1 AND AUGUST 1 TO OCTOBER 1. AREAS TO BE LEFT BARE BEFORE FINISH GRADING AND SEEDING OUTSIDE OF PLANTING SEASONS SHALL RECEIVE AN AIR-DRIED WOOD CHIP MULCH, FREE OF COARSE MATTER.
7. AT ALL PROPOSED FILL AREAS WHICH ARE NOT CURRENTLY SHOWN ON THESE PLANS, THE CONTRACTOR SHALL ESTABLISH AN EROSION CONTROL LINE (HAYBALE CHECK OR FILTER FABRIC) ABOUT TEN (10') FEET FROM TOE TO SLOPE OF PROPOSED FILL AREAS PRIOR TO BEGINNING FILL INSTALLATION. STABILIZATION OF SLOPES IN FILL AREAS (USING MULCH OR GRASS) SHALL BE INITIATED WITHIN THIRTY (30) DAYS OF COMMENCEMENT OF FILL INSTALLATION.
8. STABILIZATION OF SLOPES IN CUT AREAS (USING MULCH OR GRASS) AND THE INSTALLATION OF CONTROL LINE (HAYBALE CHECK OR FILTER FABRIC) AT THE TOE OF SLOPE SHALL BE INITIATED WITHIN THIRTY (30) DAYS OF COMPLETION.
9. SEDIMENT REMOVED FROM CONTROL STRUCTURES WILL BE DISPOSED IN A MANNER WHICH IS CONSISTENT WITH THE INTENT OF THE PLAN. ALL HAYBALES OR SILT FENCE RETAINING SEDIMENT OVER 1/2 THEIR HEIGHT SHALL HAVE THE SEDIMENT REMOVED AND ALL DAMAGED EROSION CONTROLS SHALL BE REPAIRED OR REPLACED.
10. CONTRACTOR WILL BE ASSIGNED THE RESPONSIBILITY FOR IMPLEMENTING THIS EROSION AND SEDIMENT CONTROL PLAN. THIS RESPONSIBILITY INCLUDES THE INSTALLATION AND MAINTENANCE OF EROSION CONTROL MEASURES, INFORMING ALL PARTIES ENGAGED ON THE CONSTRUCTION SITE OF THE REQUIREMENTS AND OBJECTIVES OF THE PLAN, AND NOTIFYING THE PLANNING BOARD OF ANY TRANSFER OF THIS RESPONSIBILITY. THE OWNER SHALL BE RESPONSIBLE FOR CONVEYING A COPY OF THE EROSION AND SEDIMENT CONTROL PLAN IF THE TITLE TO THE LAND IS TRANSFERRED.
11. THE CONTRACTOR SHALL SECURE THE SERVICES OF A PROFESSIONAL ENGINEER, WHO SHALL VERIFY IN THE FIELD THAT THE CONTROLS REQUIRED BY THIS PLAN ARE PROPERLY INSTALLED, SHALL MAKE INSPECTION OF SUCH FACILITIES NOT LESS FREQUENTLY THAN EVERY 14 DAYS OR AFTER A RAINFALL IN EXCESS OF 1/2 INCH, WHICHEVER OCCURS FIRST. THE INSPECTION REPORTS SHALL BE SUBMITTED TO THE PLANNING DEPARTMENT AND CONSERVATION COMMISSION OFFICE ON A MONTHLY BASIS.
12. STOCKPILES OF SOIL SHALL BE SURROUNDED BY A SEDIMENT BARRIER. SOIL STOCKPILES TO BE LEFT BARE FOR MORE THAN THIRTY (30) DAYS SHALL BE STABILIZED WITH TEMPORARY VEGETATION OR MULCH. IF SOIL STOCKPILES ARE TO REMAIN FOR MORE THAN SIXTY (60) DAYS, FILTER FABRIC SHALL BE USED IN PLACE OF HAYBALES. SIDE SLOPES SHALL NOT EXCEED 2:1.
13. THE CONTRACTOR SHALL BE RESPONSIBLE TO CONTROL DUST AND WIND EROSION THROUGHOUT THE LIFE OF THE CONTRACT. DUST CONTROL SHALL INCLUDE, BUT IS NOT LIMITED TO SPRINKLING OF WATER ON EXPOSED SOILS AND HAUL ROADS. CONTRACTOR SHALL CONTROL DUST TO PREVENT A HAZARD TO TRAFFIC AND ABUTTING PROPERTIES.
14. IF FINAL GRADING IS TO BE DELAYED FOR MORE THAN THIRTY (30) DAYS AFTER LAND DISTURBANCES CEASE, TEMPORARY VEGETATION OR MULCH SHALL BE USED TO STABILIZE SOILS.
15. FILTER SOCK SHALL BE USED ONLY AS A TEMPORARY MEASURE. WHERE CONTROL MEASURES WILL BE REQUIRED FOR LONGER THAN SIXTY (60) DAYS, FILTER FABRIC SHALL BE USED.
16. WHERE DEWATERING IS NECESSARY, THERE SHALL NOT BE A DISCHARGE DIRECTLY INTO WETLANDS OR WATERCOURSES. PROPER METHODS AND DEVICES SHALL BE UTILIZED TO THE EXTENT PERMITTED BY LAW, SUCH AS PUMPING WATER INTO A TEMPORARY SEDIMENTATION BOWL, PROVIDING SURGE PROTECTION AT THE INLET AND THE OUTLET OF PUMPS, OR FLOATING THE INTAKE OF THE PUMP, OR OTHER METHODS TO MINIMIZE AND RETAIN THE SUSPENDED SOLIDS. IF A PUMPING OPERATION IS CAUSING TURBIDITY PROBLEMS, SAID OPERATION SHALL CEASE UNTIL SUCH TIME AS FEASIBLE MEANS OF CONTROLLING TURBIDITY ARE DETERMINED AND IMPLEMENTED. SAID DISCHARGE POINTS SHALL BE LOCATED OVER 100 FEET FROM THE DELINEATED WETLANDS AS INDICATED ON THIS PLAN.
17. EROSION CONTROL MEASURES SHOWN ON THIS PLAN SHALL BE FOLLOWED BY THE GENERAL CONTRACTOR AND AND ANY/ALL SUB-CONTRACTORS.
18. ANY SLOPE GREATER THAN 3:1 SHALL BE STABILIZED WITH STUMP GRINDINGS (OR EQUIVALENT) AND INSPECTED ON A WEEKLY BASIS THROUGHOUT THE CONSTRUCTION PERIOD. ANY EROSION OR SLUMPING DISCOVERED SHALL BE REPAIRED AND STABILIZED IMMEDIATELY. INSPECTIONS SHALL CONTINUE UNTIL THE SLOPE IS CONSIDERED FULLY STABILIZED.

CONSTRUCTION OPERATION AND MAINTENANCE SCHEDULE

THE OPERATION AND MAINTENANCE (O&M) SCHEDULE DURING THE CONSTRUCTION PHASE IS THE RESPONSIBILITY OF THE DEVELOPER AND/OR SITE CONTRACTOR. THE OUTLINE BELOW SHALL BE ADHERED TO AS CLOSELY AS POSSIBLE TO ENSURE THE PROPER CONSTRUCTION AND FUNCTION OF THE DRAINAGE SYSTEM.

1. PRIOR TO CONSTRUCTION, SILT SOCK SHALL BE INSTALLED PER THE APPROVED PLANS. THE EROSION CONTROL SHALL BE INSPECTED PRIOR TO A LARGE STORM EVENT TO ENSURE THAT THE EROSION CONTROL WILL FUNCTION AS REQUIRED AND FOLLOWING A STORM TO INSPECT FOR DAMAGE TO THE EROSION CONTROL ELEMENTS. ANY DAMAGE OR IMPROPER INSTALLATION THAT IS NOTICED PRIOR TO OR FOLLOWING A STORM EVENT SHALL BE PROMPTLY REPLACED OR REPAIRED IN A SATISFACTORY MANNER SO AS TO PREVENT SEDIMENT FROM BYPASSING THE EROSION CONTROL BARRIER.
2. THE LIMIT OF CLEARING SHOWN ON THE APPROVED PLAN SHALL BE STRICTLY ADHERED TO. IT SHALL BE THE CONTRACTORS RESPONSIBILITY TO DETERMINE THE LEVEL OF SAFETY OF STANDING TREES.
3. IN CONJUNCTION WITH THE PAVED AREA CONSTRUCTION, ALL DRAINAGE STRUCTURES, INCLUDING THE POCKET WETLAND BASIN, SHALL BE CONSTRUCTED AND STABILIZED AS SOON AS POSSIBLE. METHODS OF STABILIZATION INCLUDE, BUT ARE NOT LIMITED TO, HYDROSEED, LOAM AND SEED, STRAW MULCH, EROSION CONTROL BLANKETS, ETC.
4. THE CATCH BASINS SHALL BE INSPECTED WEEKLY DURING CONSTRUCTION. ANY SEDIMENT BUILDUP OF EIGHT (8) INCH DEPTH IN THE STRUCTURES SHALL BE PROMPTLY REMOVED BY HAND OR MECHANICAL METHODS AND ALL DEBRIS REMOVED IN ACCORDANCE WITH ALL LOCAL, STATE, AND FEDERAL REGULATIONS.
5. THE POCKET WETLAND BASIN SHALL BE INSPECTED WEEKLY OR AFTER ALL RAINFALL EVENTS GREATER THAN 1/2 INCH, WHICHEVER OCCURS SOONER. ANY EROSION WITHIN THE BASINS SHALL BE FILLED AND RE-STABILIZED IN A MANNER TO PREVENT FUTURE EROSION. IN ADDITION, THE OUTER PORTIONS OF THE BASINS SHALL BE INSPECTED IN A SIMILAR MANNER.
6. THE ANTI-TRACKING PAD SHALL BE INSPECTED DAILY. THE STONE AND SEDIMENT MUST BE REMOVED AND REPLACED AS NECESSARY TO PREVENT EXCESSIVE SEDIMENT FROM ENTERING BEDFORD STREET. DAILY SWEEPING SHALL BE PERFORMED AS NEEDED TO REMOVE ANY SEDIMENT IN ELM STREET.
7. THIS SCHEDULE MUST BE ADHERED TO BY THE OWNER AND/OR CONTRACTOR.

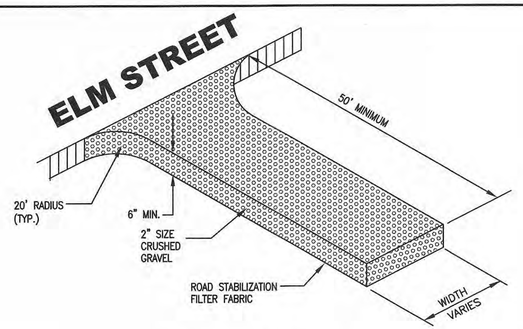


NOTES:
1. THE SILTSACK® WILL BE MANUFACTURED FROM A WOVEN POLYPROPYLENE FABRIC THAT MEETS OR EXCEEDS THE FOLLOWING SPECIFICATIONS.
2. SILTSACKS WILL BE INSTALLED IN ALL NEW CATCHBASINS IN ADDITION TO EXISTING CATCHBASINS NOTED ON THIS PLAN.

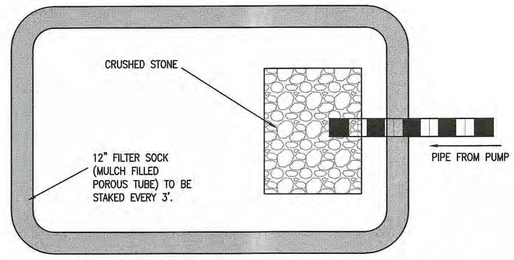
SILTSACK® REGULAR FLOW

PROPERTIES	TEST METHOD	UNITS	TEST RESULTS
GRAB TENSILE	ASTM D-4632	LBS	167.5X300
GRAB ELONGATION	ASTM D-4632	%	10X15
PUNCTURE STRENGTH	ASTM D-4533	LBS.	900
TRAPEZOID TEAR	ASTM D-4533	LBS,	65X90
UV RESISTANCE (@500 HRS)	ASTM D-4355	%	96
AOS	ASTM D-4751	US SIEVE	30
FLOW RATE	ASTM D-4491	GAL/MIN/FT²	66
PERMITTIVITY	ASTM D-4491	SEC-1	0.862

INLET SEDIMENT CONTROL DEVICE "SILT SACK" DETAIL
NOT TO SCALE

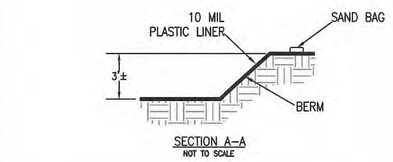


ANTI-TRACKING PAD DETAIL
NOT TO SCALE



* TO BE USED IF NECESSARY, LOCATION TO BE DETERMINED AT TIME OF CONSTRUCTION

DEWATERING BASIN DETAIL
NOT TO SCALE



SECTION A-A
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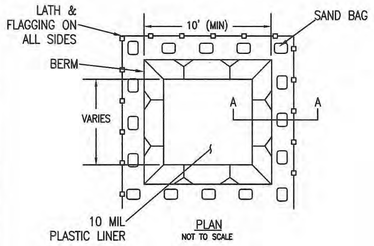
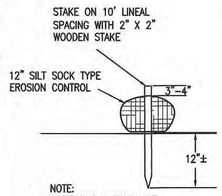


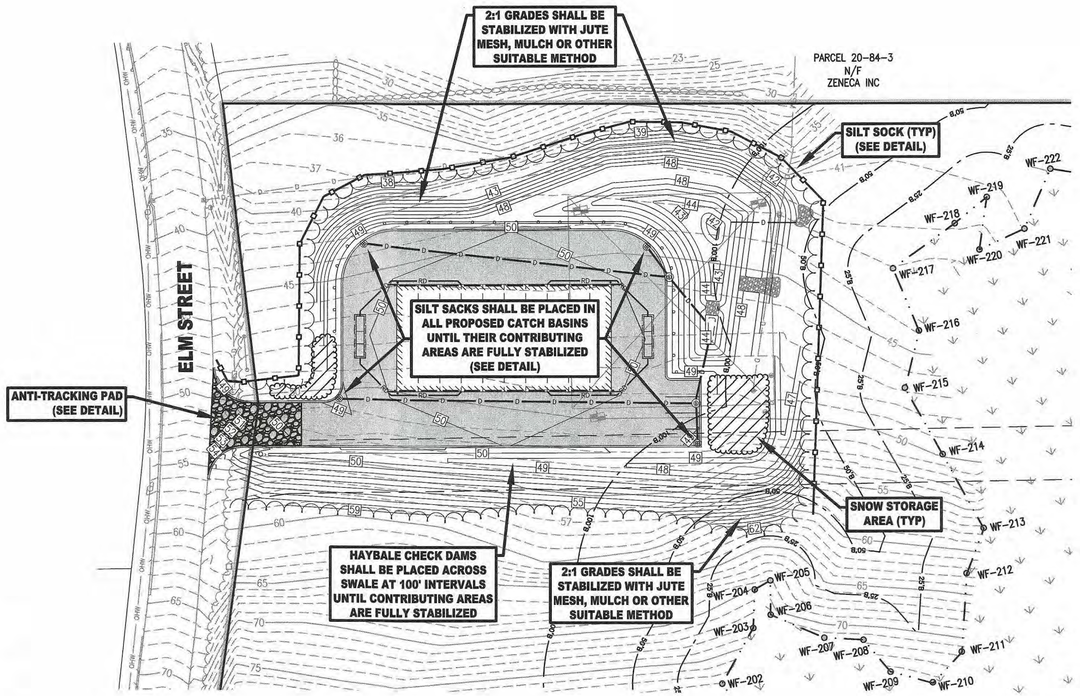
PLAN
NOT TO SCALE

CONCRETE WASHOUT PIT DETAIL
NOT TO SCALE



NOTE:
SILT SOCK ONLY TO BE PLACED AS SHOWN ON THE "EROSION CONTROL PLAN".

SILT SOCK DETAIL
NOT TO SCALE



GRAPHICS SCALE
1 inch = 20 feet
0 20 40 60

P.E. STAMP

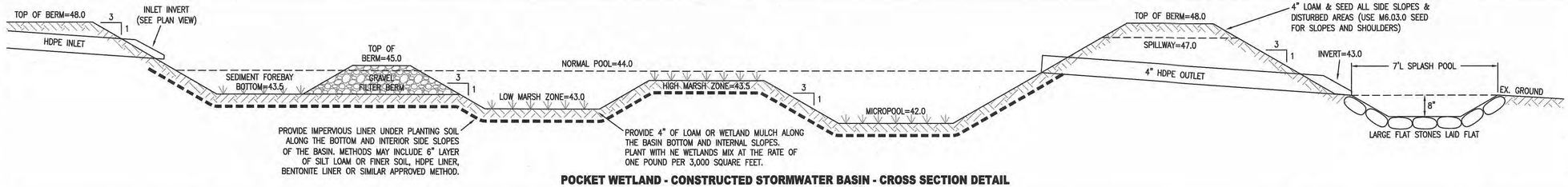
ZCE
ZENITH CONSULTING ENGINEERS, LLC
3 MAIN STREET LAKEVILLE, MA 02347
PHONE: (508) 947-4208

REV.	DATE	DESCRIPTION	BY	APP.

DATE: 9-25-23
PROJECT NUMBER 0945-01-01
DRAWING SCALE 1" = 20'
SHEET ID E
DRAWN BY: RMF/TEM
DESIGNED BY: RMF
CHECKED BY: NCZ
APPROVED BY NCZ

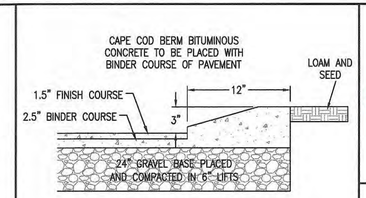
SHEET NAME: STORAGE FACILITY SITE PLAN
EROSION CONTROL PLAN
PROJECT SITE: ELM STREET
DIGHTON, MASSACHUSETTS
OWNER INFO: ZERO ELM STREET, LLC
9 JESSIE LANE
BERKLEY, MA 02779

C:\Users\mcorin\AppData\Local\Temp\AcPublish_11912\Site Plan - Elm St - Dighton.dwg



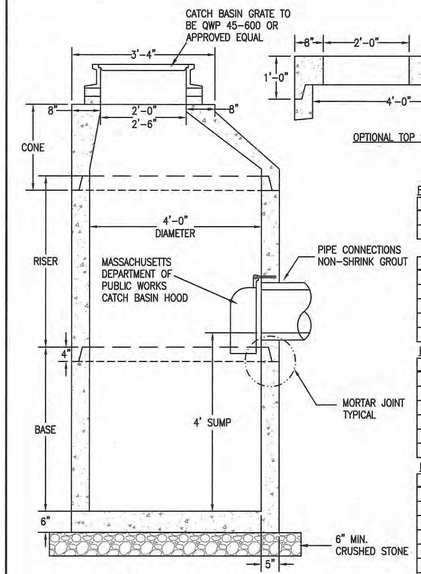
POCKET WETLAND - CONSTRUCTED STORMWATER BASIN - CROSS SECTION DETAIL

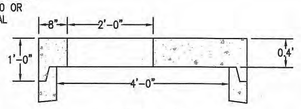
NOT TO SCALE



PAVEMENT & CAPE COD BERM DETAIL

NOT TO SCALE





OPTIONAL TOP SLAB

FLAT TOP	
	ITEM NO
1 HOLE	MH4-FT4ID
2 HOLE	MH4-FT4ID2H

ECCENTRIC CONE	
HEIGHT	ITEM NO
1'-6"	MH4-18C4ID
2'-0"	MH4-24C4ID
2'-6"	MH4-30C4ID
3'-0"	MH4-36C4ID
4'-0"	MH4-48C4ID

RISER SECTION	
HEIGHT	ITEM NO
1'-0"	MH4-12CS4ID
2'-0"	MH4-24CS4ID
2'-6"	MH4-30CS4ID
3'-0"	MH4-36CS4ID
4'-0"	MH4-48CS4ID
5'-0"	MH4-60CS4ID

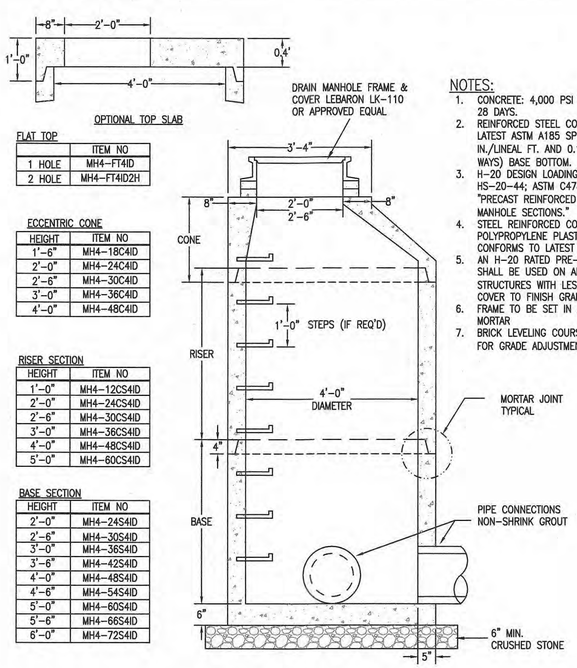
BASE SECTION	
HEIGHT	ITEM NO
2'-0"	MH4-24S4ID
2'-6"	MH4-30S4ID
3'-0"	MH4-36S4ID
3'-6"	MH4-42S4ID
4'-0"	MH4-48S4ID
4'-6"	MH4-54S4ID
5'-0"	MH4-60S4ID
5'-6"	MH4-66S4ID
6'-0"	MH4-72S4ID

NOTES:

1. CONCRETE: 4,000 PSI MINIMUM AFTER 28 DAYS.
2. REINFORCED STEEL: ASTM A185 SPEC. 0.12 SQ. IN./LINEAL FT. AND 0.12 SQ. IN. (BOTH WAYS) BASE BOTTOM.
3. H-20 DESIGN LOADING PER AASHTO HS-20-44; ASTM C478 SPEC FOR "PRECAST REINFORCED CONCRETE MANHOLE SECTIONS."
4. H-20 RATED PRE-CAST FLAT TOP SHALL BE USED ON DRAINAGE STRUCTURES WITH LESS THAN 3' OF COVER TO FINISH GRADE.
5. FRAME TO BE SET IN A FULL BED OF MORTAR
6. BRICK LEVELING COURSE AS REQUIRED FOR GRADE ADJUSTMENTS (5 MAXIMUM)
7. MASSACHUSETTS STANDARD CATCH BASIN HOOD SHALL BE INSTALLED ON OUTLET PIPE.

PRECAST CONCRETE CATCH BASIN

NOT TO SCALE



OPTIONAL TOP SLAB

FLAT TOP	
	ITEM NO
1 HOLE	MH4-FT4ID
2 HOLE	MH4-FT4ID2H

ECCENTRIC CONE	
HEIGHT	ITEM NO
1'-6"	MH4-18C4ID
2'-0"	MH4-24C4ID
2'-6"	MH4-30C4ID
3'-0"	MH4-36C4ID
4'-0"	MH4-48C4ID

RISER SECTION	
HEIGHT	ITEM NO
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2'-0"	MH4-24CS4ID
2'-6"	MH4-30CS4ID
3'-0"	MH4-36CS4ID
4'-0"	MH4-48CS4ID
5'-0"	MH4-60CS4ID

BASE SECTION	
HEIGHT	ITEM NO
2'-0"	MH4-24S4ID
2'-6"	MH4-30S4ID
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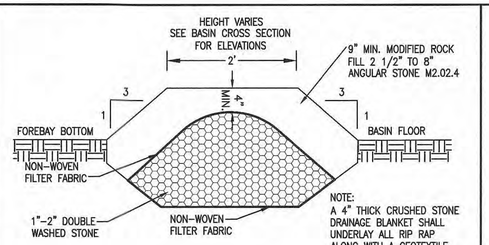
3'-6"	MH4-42S4ID
4'-0"	MH4-48S4ID
4'-6"	MH4-54S4ID
5'-0"	MH4-60S4ID
5'-6"	MH4-66S4ID
6'-0"	MH4-72S4ID

NOTES:

1. CONCRETE: 4,000 PSI MINIMUM AFTER 28 DAYS.
2. REINFORCED STEEL CONFORMS TO LATEST ASTM A185 SPEC. 0.12 SQ. IN./LINEAL FT. AND 0.12 SQ. IN. (BOTH WAYS) BASE BOTTOM.
3. H-20 DESIGN LOADING PER AASHTO HS-20-44; ASTM C478 SPEC FOR "PRECAST REINFORCED CONCRETE MANHOLE SECTIONS."
4. STEEL REINFORCED COPOLYMER POLYPROPYLENE PLASTIC STEP CONFORMS TO LATEST ASTM C478 SPEC.
5. AN H-20 RATED PRE-CAST FLAT TOP SHALL BE USED ON ALL DRAINAGE STRUCTURES WITH LESS THAN 3' OF COVER TO FINISH GRADE.
6. FRAME TO BE SET IN A FULL BED OF MORTAR
7. BRICK LEVELING COURSE AS REQUIRED FOR GRADE ADJUSTMENTS (5 MAXIMUM)

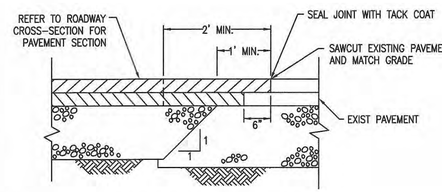
PRECAST CONCRETE DRAIN MANHOLE

NOT TO SCALE



FOREBAY GRAVEL FILTER

NOT TO SCALE



PAVEMENT MATCHING DETAIL

NOT TO SCALE

SOIL LOGS

DATE: 3-23-23

PERFORMED BY: NYLES ZAGER, P.E./S.E., ZENITH CONSULTING ENGINEERS

DEPTH (IN)	TP-D1	ELEV (FT)
0	FILL	42.7
36	STONE	39.7
62	SAND	37.5
120	C SANDY LOAM	32.7
144		30.7

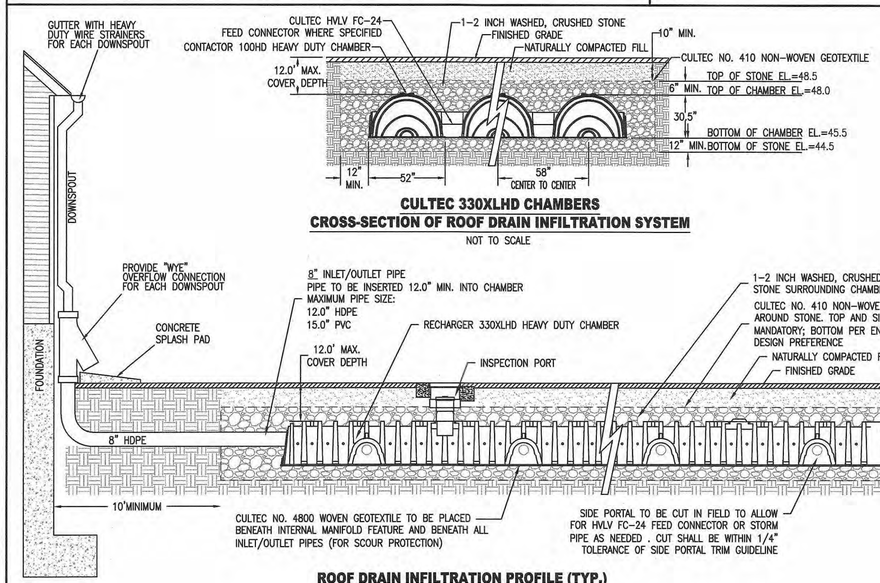
MOTTLES @ 120"
WEEPING @ NONE
ESHW EL = 32.7

DEPTH (IN)	TP-D2	ELEV (FT)
0	FILL	43.6
24	STONE	41.6
48	SAND	39.6
132	C SANDY LOAM	32.6
156		30.6

MOTTLES @ 132"
WEEPING @ NONE
ESHW EL = 32.6

DEPTH (IN)	TP-D3	ELEV (FT)
0	FILL	50.0
20	Ab SANDY LOAM	48.3
30	B SANDY LOAM	47.5
48	C SANDY LOAM	46.0
126		39.5

MOTTLES @ 48"
WEEPING @ NONE
ESHW EL = 46.0



CULTEC 330XLHD CHAMBERS
CROSS-SECTION OF ROOF DRAIN INFILTRATION SYSTEM

NOT TO SCALE

ROOF DRAIN INFILTRATION PROFILE (TYP.)

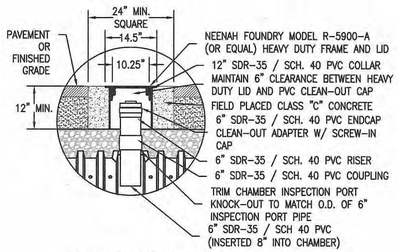
NOT TO SCALE

INFILTRATION SYSTEM CONSTRUCTION NOTES:

1. TOPSOIL AND SUBSOIL SHALL BE REMOVED BENEATH CHAMBER SYSTEMS AND REPLACED WITH TITLE 5 SAND UP TO THE ELEVATION AT THE BOTTOM OF THE CHAMBERS.
2. HEAVY DUTY WIRE STRAINERS ARE TO BE INSTALLED AT ALL DOWN SPOUTS. THIS IS TO PREVENT LEAVES AND OTHER DEBRIS FROM CLOGGING DOWN SPOUT.

OPERATION AND MAINTENANCE FOR ROOF INFILTRATION SYSTEM:

1. THE INSPECTION OF THE GUTTER SYSTEM AND HEAVY DUTY WIRE STRAINERS ARE TO BE CONDUCTED A MINIMUM OF 4 TIMES PER YEAR. DURING THAT TIME LEAVES AND DEBRIS SHALL BE CLEANED FROM GUTTERS AND STRAINERS.
2. THE INFILTRATION CHAMBERS SHALL BE INSPECTED A MINIMUM OF 1 TIME PER YEAR. THE INSTALLATION OF AN INSPECTION PORT TO GRADE WILL ALLOW EASY ACCESS FOR INSPECTION. AS PART OF THE INSPECTION ALL DEBRIS AND LEAVES ARE TO BE REMOVED FROM THE CHAMBERS.



INSPECTION PORT DETAIL

NOT TO SCALE

P.E. STAMP

ZCE
ZENITH CONSULTING ENGINEERS, LLC
3 MAIN STREET LAKEVILLE, MA 02347
PHONE: (508) 947-4208

REV.	DATE	DESCRIPTION

DRAWN BY:	DATE:
RMF/TEM	9-25-23
DESIGNED BY:	PROJECT NUMBER
RMF	0945-01-01
CHECKED BY:	DRAWING SCALE
NCZ	N.T.S.
APPROVED BY	SHEET ID
NCZ	D

SHEET NAME: **STORAGE FACILITY SITE PLAN**
SITE DETAILS

PROJECT SITE: **ELM STREET**
DIGHTON, MASSACHUSETTS

OWNER INFO: **ZERO ELM STREET, LLC**
9 JESSIE LANE
BERKLEY, MA 02779

C:\Users\mzenis\AppData\Local\Temp\AcPublish_11912\Site Plan - Elm St. - Dighton.dwg

Map 20 Lot 84-4

Town of Dighton, MA

1 inch = 752 Feet

0 752 1504 2256

May 17, 2023

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Precision Mapping Geospatial Solutions
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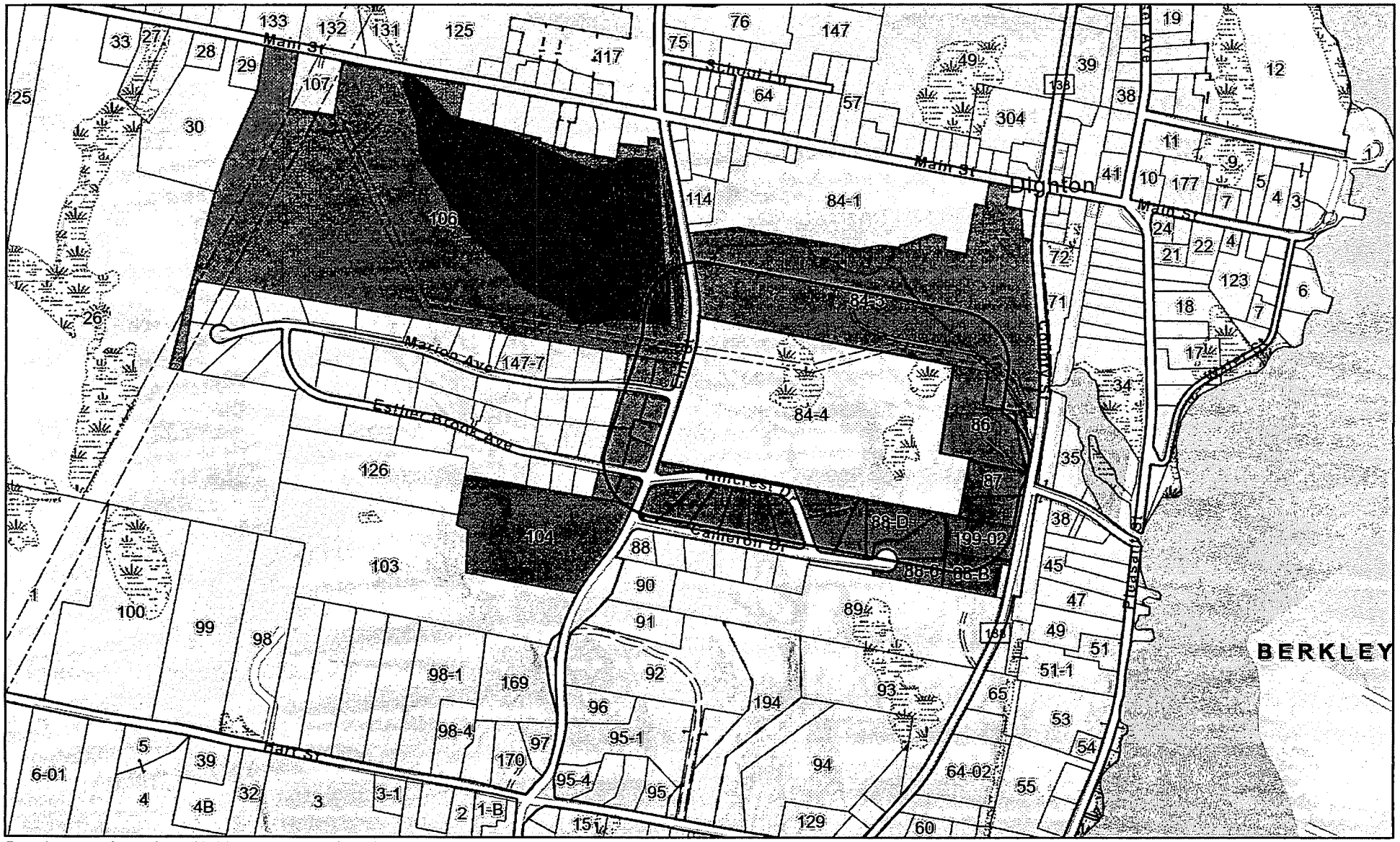

Data shown on this map is provided for planning and informational purposes only. The municipality and CAI Technologies are not responsible for any use for other purposes or misuse or misrepresentation of this map.

Stormwater Management Report

Site Plan – Storage Units

Elm Street

Dighton, Massachusetts

May 4, 2023

Prepared for:

Zero Elm Street, LLC

9 Jessie Lane

Berkley, MA 02779

Prepared by:

Zenith Consulting Engineers, LLC

3 Main Street

Lakeville, MA 02347

ZCE

Zenith Consulting Engineers, LLC

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NARRATIVE

STORMWATER NARRATIVE
Storage Bays Site Plan – Elm Street, Dighton, Massachusetts

The existing site is a vacant wooded lot. There is an existing drainage outlet located on the site from the Elm Street drainage system. Additionally, there is an abandoned leaching field on the property. The proposed project is to construct a storage bay building with access drives around the building and 4 parking spaces. The upland soils are classified by online mapping as hydrologic soil groups C and D which is consistent with soil conditions witnessed in test pits performed on-site (see soil report attached and soil logs on plan set), except in the location of the sandy fill materials brought to the site for the leaching field.

The proposed project includes the construction of a storage bay building with access drives around the building and 4 parking spaces. The building will not contain an office so there will be no water service or onsite sewage disposal facilities. The facility will be served by an electric service.

The storm drainage system at the proposed facility has been designed to meet the Massachusetts Stormwater Standards as outlined below. The stormwater collection and treatment systems for the proposed improvements will be in the form of deep sump catch basins, sediment forebays and a constructed stormwater wetland detention basin. Upgradient of the proposed facility, a large, undeveloped wooded area sheds runoff in the direction of the building. A swale is proposed just upgradient of the paved area around the proposed building to divert this significant portion of runoff around the project and away from the proposed drainage controls.

1.0 STORM WATER COLLECTION SYSTEM

Runoff from the proposed facility will through a treatment train on the site. Runoff will be collected from the impervious area in precast concrete, deep sump catch basins. This runoff will then be routed to a sediment forebay and a detention basin that is designed as a constructed pocket wetland.

All catch basins will have a four-foot-deep sump for sediment settlement and will be equipped with a hood on the outlet to prevent discharge of floating debris and other substances. The collected runoff will be conveyed through smooth interior walled HDPE piping with corrugated exterior walls. The corrugated exterior of the piping provides for exceptional strength and bearing capacity. The smooth interior walls of the piping provide a smoothness that exceeds that of concrete pipe, thus providing increased hydraulic capacity. The piping is designed to provide self cleansing velocities in large storm events to remain essentially maintenance free throughout its life.

The proposed treatment train will provide removal of Total Suspended Solids (TSS) prior to the drainage basin designed to infiltrate a portion of the runoff and safely discharge downgradient of the facility. Roof runoff, which is considered clean by the Stormwater Management Standards, will be directed into subsurface infiltration chambers designed under the pavement. The drainage system has been designed to meet the requirement for recharge and to handle more than the 100-year design storm event.

2.0 STORM WATER MANAGEMENT FACILITIES

Current Department of Environmental Protection Policies require that the peak runoff rate after development is not more than peak runoff rate prior to development for the 2 and 10 year 24-hour storm events. Additionally, it is required that the storm water management system be evaluated for the 100-year storm projections.

Hydrologic modeling has been conducted for the design of the drainage system to determine appropriate sizing and infiltration characteristics. HydroCAD Version 10.00 was utilized to perform this hydrologic and hydraulic modeling. The 2, 10, and 100-year design storms were evaluated. The drainage summary provided with this document tabulates the projected runoff rates when the site is subjected to the design storm events. The complete hydrologic and hydraulic computational output is presented in this document.

2.1 LOW IMPACT DEVELOPMENT (LID) CONSIDERATIONS

The Massachusetts Stormwater Handbook encourages the use of Low Impact Development (LID) techniques by offering design credits for their implementation. No credits are sought or required for this project and, therefore, no LID techniques are required. Nevertheless, the project design incorporates LID techniques by proposing no impacts to wetlands and the minimum amount of pavement required to provide safe vehicular access to and around the site for all vehicle types.

3.0 WATER QUALITY CONSIDERATIONS

On November 18, 1996, The Massachusetts Department of Environmental Protection (MADEP) issued the Storm Water Management Policy. The goal of this policy is to improve water quality and address flooding problems, which are sometimes caused by development projects, by the implementation of performance standards for storm water management. These standards were issued as guidelines with the possibility that in several years, after review by design engineers, they might be implemented as regulations. The project was designed to meet and exceed all relevant standards established in the policy. The following sections describe how each of these standards will be achieved on this project by incorporating Best Management Practices into the design. In January, 2008, the revised policy was issued.

3.1 UNTREATED STORM WATER - Standard 1

Standard 1 recommends that no new storm water conveyance, such as storm drain outfalls, discharge untreated storm water directly to wetlands or waterways of the Commonwealth. Flows from woods, fields, and other undeveloped areas are to be considered uncontaminated, however, runoff from paved road surfaces should receive treatment prior to discharge.

In designing this project, provisions have been made so that the runoff from all proposed paved surfaces will receive proper treatment prior to discharge. All the proposed improvements will be located and graded such that runoff from the pavement will be directed to a series of BMP structures. Runoff from these areas will be collected and conveyed to the water quality measures through deep sump catch basins, manholes and subsurface piping. This collected runoff will receive treatment utilizing the proposed Best Management Practice (BMP) measures as further described under the discussions for Standards 2 through 9. Through the collection and treatment of all runoff from paved areas, DEP Standard 1 is satisfied.

3.2 POST DEVELOPMENT PEAK DISCHARGE RATES - Standard 2

Standard 2 prescribes that storm water management systems be implemented in order to ensure that post-development peak rates of discharge do not exceed existing rates of runoff for standard 2-year and 10-year design storms. In addition, the pre and post peak rates for the 100-year storm must be evaluated to assure that there will not be increased off-site flooding. Hydrologic calculations have been conducted in designing the storm water control measures to ensure that this standard is satisfied.

HydroCAD version 10.00, a computer aided design program, was selected for modeling the hydrology and hydraulics of storm water runoff for the site and its contributing drainage area. This program utilizes the latest techniques to predict the consequences of any given storm event and to verify that the drainage system is adequate to meet the performance standards for the area under consideration. The HydroCAD computer model uses TR-20 and TR-55 methodologies to generate runoff hydrographs and perform hydraulic routings through the modeled project.

Runoff hydrographs were generated for each subcatchment area. For both pre-development and post-development, all paved areas, roof areas and lawn areas were considered in determining composite runoff curve numbers for each subcatchment. The soils within the development area of this project are described as hydrologic soils groups C and D, according to the U.S.D.A. Soil Conservation Service mapping.

The attached Drainage Summary tabulates the fact that the post-development runoff rate is less than the pre-development rate of runoff for all design storm events. As such, the drainage system successfully moderates the flow for the full range of design storms and this standard is met.

3.3 RECHARGE TO GROUNDWATER - STANDARD 3

The loss of annual recharge to groundwater will be minimized through the infiltration of runoff from the paved and unpaved surface areas of the project site. The annual recharge from the post development site will approximate the annual recharge from the pre-development conditions based on an assessment of soil types. Standard 3 of the DEP Stormwater Policy prescribes that the storm water runoff volume to be recharged to groundwater should be determined using existing soil. According to the U.S.D.A. Soil Conservation Service mapping, the surficial soils are Hydrologic Soil Groups C and D. The DEP Stormwater Policy requires that a certain volume of runoff be infiltrated to groundwater based on the type of soil present and the amount of

impervious area being generated by the proposed development. For Type C soils, the recharge rate has been established to be 0.25 inches of runoff and 0.10 inches for Type D soils.

The amount of impervious area over D soils is 730 sf and 23,723 sf over C soils. So, the required volume of recharge is:

730 sf x 0.10 in + 23,723 sf x 0.25 in = 501 cf

It is important to note, however, recharge requirements only need to be met to the nearest extent practicable when the project is located in an area of C and/or D soils. Nevertheless, this design proposing infiltrating roof runoff in 6 subsurface Cultec 330 XLHD chambers with a 12-inch thick crushed stone bedding. Each chamber has a static capacity of 86.03 cubic feet. In total, 516 cf of recharge capacity is provided. Thus, this criterion is satisfied.

3.4 REMOVAL OF 80% OF TOTAL SUSPENDED SOLIDS - Standard 4

A series of stormwater BMP's have been designed in order to meet the objectives of removing 80% of the average annual load of total suspended solids. These proposed measures include:

- All catch basins to be installed on this project will be equipped with Massachusetts Highway Department standard hoods mounted over the catch basin outlet pipe.
- All catch basins will be constructed with a four (4) foot deep sump beneath the outlet pipe invert elevation.
- All runoff will be directed into the basin designed with water quality features.

The combination of the above features will result in the removal of at least 80% of the total suspended solids as demonstrating through the following tables:

A **BMP**	**B** **TSS Removal Rate***	**C** **Starting TSS Load****	**D** **Amount Removed (BxC)**	**E** **Remaining load (C-D)**
Deep-Sump, Hooded Catch Basin	25%	1.00	.25	0.75
Constructed Wetland Detention Basin w/ Pre-Treatment (Forebay)	80%	0.75	0.60	0.15
TOTAL TSS REMOVAL			**0.85 x 100 = 85% Removal**	

** Equals remaining load from previous BMP (E)

* TSS Removal Rates As Published in the DEP Storm Water Policy Handbook (3/97)

3.5 USES WITH HIGHER POTENTIAL POLLUTANT LOADS - Standard 5

The DEP Storm Water Management Policy - Standard 5 requires that storm water discharges with higher potential pollutant loads, such as gas stations, be provided with specific BMP's. The use of infiltration practices for these discharges prior to pretreatment is prohibited. This

development is not considered a use with a higher potential pollutant load. As such, this standard is satisfied.

It should be noted that a Source Control and Pollution Prevention Plan are included in the Operations and Maintenance Plan.

3.6 STORM WATER DISCHARGES TO CRITICAL AREAS - Standard 6

Standard 6 of the DEP Storm water Policy seeks to protect critical areas. Critical areas are specifically designated Outstanding Resource Waters (ORW's) such as shell fish beds, swimming beaches, cold water fisheries and recharge areas for public water supplies. Such areas require the use of specific BMP's. This project is not located within an area designated as a critical area. Therefore, this standard is satisfied.

3.7 REDEVELOPMENT OF PREVIOUSLY DEVELOPED SITES - Standard 7

Standard 7 applies to sites which have been previously developed and are being redeveloped. Diminished performance of BMP's is allowed in these areas. This project is not a re-development.

3.8 EROSION AND SEDIMENT CONTROL -Standard 8

Erosion and sediment control measures have been developed for this project and are included in the construction set of drawings. These plans show the proposed locations for erosion control devices. The following supplemental provisions are also a part of this plan.

Erosion and Sedimentation Control measures which are proposed to be implemented during construction include the installation of and silt sock and a stone construction entrance to limit siltation from construction equipment tires in the roadways.

- Erosion control devices such as silt fence, haybales and silt socks shall be inspected after every major rainfall runoff event (over 1½" depth of precipitation). All damaged or misaligned devices shall be immediately repaired. Silt shall be immediately removed from all areas of the silt fence when depth of accumulation exceeds 4 inches.

- Sumps and out falls shall be inspected after every major rainfall runoff event (over 1½" depth of precipitation). Silt shall be immediately removed from all sumps where the depth of accumulation exceeds 9 inches.)

- All exposed construction areas will be stabilized upon completion in order to minimize the time that these areas are unstabilized.

With the full impact of the measures presented on the Erosion and Sedimentation Control Plans, along with the provisions stipulated above, Standard 8 will be satisfied.

3.9 OPERATIONS AND MAINTENANCE PLAN - Standard 9

Standard 9 of the DEP Storm Water Policy prescribes the adoption of a formal operation and maintenance plan to ensure that the storm water management systems function properly as designed. The proposed Operations and Maintenance Plan is attached in an appendix to this report. The plan includes Stormwater operations and Maintenance procedures, Construction Period Pollution Control measures and a Source Control and Pollution Prevention Plan.

DRAINAGE SUMMARY

Site Plan
Storage Bays
Elm Street
Dighton, Massachusetts

Drainage Summary

Storm Event	Pre-Development Q_{max}(cfs)	Post-Development Q_{max}(cfs)
2 Yr (3.4")	0.67	0.43
10 Yr (4.8")	1.43	0.49
25 Yr (5.6")	1.91	0.52
100 Yr (7.0")	2.80	0.56

SOIL REPORT

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

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

Custom Soil Resource Report for Bristol County, Massachusetts, Northern Part

Elm Street, Dighton, MA

April 20, 2023

Preface

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

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

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

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

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

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

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Soil Map

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

Custom Soil Resource Report
Soil Map

MAP LEGEND

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

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

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

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: Bristol County, Massachusetts, Northern Part
Survey Area Data: Version 15, 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: Jun 14, 2022—Jul 1, 2022

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
1	Water	0.8	3.2%
71B	Ridgebury fine sandy loam, 3 to 8 percent slopes, extremely stony	6.8	25.8%
73A	Whitman fine sandy loam, 0 to 3 percent slopes, extremely stony	0.8	3.0%
306B	Paxton fine sandy loam, 0 to 8 percent slopes, very stony	6.7	25.6%
311B	Woodbridge fine sandy loam, 0 to 8 percent slopes, very stony	2.6	9.9%
312B	Woodbridge fine sandy loam, 0 to 8 percent slopes, extremely stony	1.4	5.3%
602	Urban land	7.0	26.7%
706E	Charlton-Rock outcrop-Paxton complex, 15 to 35 percent slopes	0.1	0.5%
Totals for Area of Interest		**26.2**	**100.0%**

Map Unit Descriptions

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

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

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They

generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

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

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

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

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

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

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

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

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

Bristol County, Massachusetts, Northern Part

1—Water

Map Unit Setting

National map unit symbol: 997q
Frost-free period: 120 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition

Water: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

71B—Ridgebury fine sandy loam, 3 to 8 percent slopes, extremely stony

Map Unit Setting

National map unit symbol: 2w69c
Elevation: 0 to 1,290 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Ridgebury, extremely stony, and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ridgebury, Extremely Stony

Setting

Landform: Drumlins, depressions, ground moraines, hills, drainageways
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Head slope, base slope
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Coarse-loamy lodgment till derived from gneiss, granite, and/or schist

Typical profile

Oe - 0 to 1 inches: moderately decomposed plant material
A - 1 to 6 inches: fine sandy loam
Bw - 6 to 10 inches: sandy loam
Bg - 10 to 19 inches: gravelly sandy loam
Cd - 19 to 66 inches: gravelly sandy loam

Properties and qualities

Slope: 3 to 8 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: 15 to 35 inches to densic material
Drainage class: Poorly drained
Runoff class: Very high

Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Ecological site: F144AY009CT - Wet Till Depressions
Hydric soil rating: Yes

Minor Components

Woodbridge, extremely stony

Percent of map unit: 10 percent
Landform: Ground moraines, hills, drumlins
Landform position (two-dimensional): Summit, backslope, footslope
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Whitman, extremely stony

Percent of map unit: 8 percent
Landform: Depressions
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Paxton, extremely stony

Percent of map unit: 2 percent
Landform: Ground moraines, hills, drumlins
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Convex, linear
Across-slope shape: Linear, convex
Hydric soil rating: No

73A—Whitman fine sandy loam, 0 to 3 percent slopes, extremely stony

Map Unit Setting

National map unit symbol: 2w695
Elevation: 0 to 1,580 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Whitman, extremely stony, and similar soils: 81 percent
Minor components: 19 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Whitman, Extremely Stony

Setting

Landform: Drumlins, ground moraines, hills, drainageways, depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Coarse-loamy lodgment till derived from gneiss, granite, and/or schist

Typical profile

Oi - 0 to 1 inches: peat
A - 1 to 10 inches: fine sandy loam
Bg - 10 to 17 inches: gravelly fine sandy loam
Cdg - 17 to 61 inches: fine sandy loam

Properties and qualities

Slope: 0 to 3 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: 7 to 38 inches to densic material
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Ecological site: F144AY041MA - Very Wet Till Depressions
Hydric soil rating: Yes

Minor Components

Ridgebury, extremely stony

Percent of map unit: 10 percent
Landform: Drumlins, depressions, ground moraines, hills, drainageways
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Head slope, base slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Scarboro

Percent of map unit: 5 percent

Landform: Drainageways, depressions, outwash terraces, outwash deltas
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Swansea

Percent of map unit: 3 percent
Landform: Marshes, bogs, swamps
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Woodbridge, extremely stony

Percent of map unit: 1 percent
Landform: Ground moraines, hills, drumlins
Landform position (two-dimensional): Summit, backslope, footslope
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

306B—Paxton fine sandy loam, 0 to 8 percent slopes, very stony

Map Unit Setting

National map unit symbol: 2w673
Elevation: 0 to 1,340 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Paxton, very stony, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Paxton, Very Stony

Setting

Landform: Ground moraines, hills, drumlins
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Convex, linear
Across-slope shape: Linear, convex
Parent material: Coarse-loamy lodgment till derived from gneiss, granite, and/or schist

Typical profile

Oe - 0 to 2 inches: moderately decomposed plant material
A - 2 to 10 inches: fine sandy loam

Bw1 - 10 to 17 inches: fine sandy loam
Bw2 - 17 to 28 inches: fine sandy loam
Cd - 28 to 67 inches: gravelly fine sandy loam

Properties and qualities

Slope: 0 to 8 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 20 to 43 inches to densic material
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 18 to 37 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 4.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: C
Ecological site: F144AY007CT - Well Drained Dense Till Uplands
Hydric soil rating: No

Minor Components

Woodbridge, very stony

Percent of map unit: 8 percent
Landform: Ground moraines, hills, drumlins
Landform position (two-dimensional): Summit, backslope, footslope
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Ridgebury, very stony

Percent of map unit: 4 percent
Landform: Drumlins, drainageways, depressions, hills, ground moraines
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Head slope, base slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Charlton, very stony

Percent of map unit: 3 percent
Landform: Hills
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

311B—Woodbridge fine sandy loam, 0 to 8 percent slopes, very stony

Map Unit Setting

National map unit symbol: 2t2qr
Elevation: 0 to 1,440 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Woodbridge, very stony, and similar soils: 82 percent
Minor components: 18 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Woodbridge, Very Stony

Setting

Landform: Ground moraines, hills, drumlins
Landform position (two-dimensional): Summit, backslope, footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Coarse-loamy lodgment till derived from gneiss, granite, and/or schist

Typical profile

Oe - 0 to 2 inches: moderately decomposed plant material
A - 2 to 9 inches: fine sandy loam
Bw1 - 9 to 20 inches: fine sandy loam
Bw2 - 20 to 32 inches: fine sandy loam
Cd - 32 to 67 inches: gravelly fine sandy loam

Properties and qualities

Slope: 0 to 8 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 20 to 43 inches to densic material
Drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 19 to 27 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 4.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s

Hydrologic Soil Group: C/D
Ecological site: F144AY037MA - Moist Dense Till Uplands
Hydric soil rating: No

Minor Components

Paxton, very stony
Percent of map unit: 10 percent
Landform: Ground moraines, hills, drumlins
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Convex, linear
Across-slope shape: Linear, convex
Hydric soil rating: No

Ridgebury, very stony
Percent of map unit: 8 percent
Landform: Hills, drainageways, drumlins, depressions, ground moraines
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Head slope, base slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

312B—Woodbridge fine sandy loam, 0 to 8 percent slopes, extremely stony

Map Unit Setting
National map unit symbol: 2t2qs
Elevation: 0 to 1,580 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition
Woodbridge, extremely stony, and similar soils: 82 percent
Minor components: 18 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Woodbridge, Extremely Stony

Setting
Landform: Ground moraines, hills, drumlins
Landform position (two-dimensional): Summit, backslope, footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Coarse-loamy lodgment till derived from gneiss, granite, and/or schist

Typical profile

Oe - 0 to 2 inches: moderately decomposed plant material
A - 2 to 9 inches: fine sandy loam
Bw1 - 9 to 20 inches: fine sandy loam
Bw2 - 20 to 32 inches: fine sandy loam
Cd - 32 to 67 inches: gravelly fine sandy loam

Properties and qualities

Slope: 0 to 8 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: 20 to 43 inches to densic material
Drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 19 to 27 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 4.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: C/D
Ecological site: F144AY037MA - Moist Dense Till Uplands
Hydric soil rating: No

Minor Components

Paxton, extremely stony

Percent of map unit: 10 percent
Landform: Ground moraines, hills, drumlins
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Convex, linear
Across-slope shape: Linear, convex
Hydric soil rating: No

Ridgebury, extremely stony

Percent of map unit: 8 percent
Landform: Hills, drainageways, drumlins, depressions, ground moraines
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Head slope, base slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

602—Urban land

Map Unit Setting

National map unit symbol: 9999
Frost-free period: 120 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

706E—Charlton-Rock outcrop-Paxton complex, 15 to 35 percent slopes

Map Unit Setting

National map unit symbol: 2x1k4
Elevation: 0 to 390 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 145 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Charlton, extremely stony, and similar soils: 35 percent
Rock outcrop: 25 percent
Paxton, extremely stony, and similar soils: 20 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Charlton, Extremely Stony

Setting

Landform: Ridges, hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex
Parent material: Coarse-loamy melt-out till derived from granite, gneiss, and/or schist

Typical profile

Oe - 0 to 2 inches: moderately decomposed plant material
A - 2 to 4 inches: fine sandy loam
Bw - 4 to 27 inches: gravelly fine sandy loam
C - 27 to 65 inches: gravelly fine sandy loam

Properties and qualities

Slope: 15 to 35 percent

Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 8.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B
Ecological site: F144AY034CT - Well Drained Till Uplands
Hydric soil rating: No

Description of Rock Outcrop

Setting

Landform: Ridges, hills
Parent material: Igneous and metamorphic rock

Typical profile

R - 0 to 79 inches: bedrock

Properties and qualities

Slope: 15 to 35 percent
Depth to restrictive feature: 0 inches to lithic bedrock
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Available water supply, 0 to 60 inches: Very low (about 0.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydrologic Soil Group: D
Hydric soil rating: No

Description of Paxton, Extremely Stony

Setting

Landform: Ground moraines, hills, drumlins
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex, linear
Across-slope shape: Linear, convex
Parent material: Coarse-loamy lodgment till derived from gneiss, granite, and/or schist

Typical profile

Oe - 0 to 2 inches: moderately decomposed plant material
A - 2 to 10 inches: fine sandy loam
Bw1 - 10 to 17 inches: fine sandy loam
Bw2 - 17 to 28 inches: fine sandy loam

Cd - 28 to 67 inches: gravelly fine sandy loam

Properties and qualities

Slope: 15 to 35 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: 20 to 43 inches to densic material
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 18 to 37 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 4.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: C
Ecological site: F144AY007CT - Well Drained Dense Till Uplands
Hydric soil rating: No

Minor Components

Gloucester, extremely stony

Percent of map unit: 6 percent
Landform: Ground moraines
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Montauk, extremely stony

Percent of map unit: 6 percent
Landform: Hills, recessionial moraines, ground moraines, drumlins
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex
Hydric soil rating: No

Woodbridge, extremely stony

Percent of map unit: 5 percent
Landform: Ground moraines, hills, drumlins
Landform position (two-dimensional): Summit, backslope, footslope
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Ridgebury, extremely stony

Percent of map unit: 3 percent
Landform: Drumlins, depressions, ground moraines, hills, drainageways
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Head slope, base slope

Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

ILLICIT DISCHARGE STATEMENT

Zenith Consulting Engineers, LLC

3 Main Street Lakeville, MA 02347
(508) 947-4208 - www.zcellc.com

- Civil Engineering
- Septic Design (Title 5)
- Septic Inspections (Title 5)
- Commercial and Industrial Site Plans
- Chapter 91 Permitting

ILLICIT DISCHARGE STATEMENT
(STANDARD #10)

RE: Elm Street storage Facility, Dighton, MA

Standard 10 of the Massachusetts Stormwater Handbook prohibits illicit discharges to stormwater management systems. The following is an illicit discharge compliance statement based on existing conditions and design conditions for the proposed project.

EXISTING CONDITIONS

The existing site is a vacant wooded area with an apparent abandoned leaching field. There is an existing drainage pipe outlet on the north side of the lot through which runoff from Elm Street discharges. Based on all the information available to the undersigned, and therefore, to the best of my knowledge, there are no current illicit discharges to the storm drainage system. If during construction, an illicit discharge is discovered, it shall be removed immediately.

PROPOSED DESIGN

The proposed project design does not include any illicit discharges. There are no points in the proposed storm drainage system where illicit discharges are likely to occur.

I hereby certify that the preceding is accurate.

_____

Representative
Zero Elm Street, LLC

DEP STORMWATER CHECKLIST

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

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 8[2]
- 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.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

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

9-29-23
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 Field[1]

☐ 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)

☐ 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

☐ 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

☐ 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.

INLET GRATE AND PIPE ANALYSIS

Input Values

SINGLE GRATE

K Values for grate R-3405-A with a transverse gutter slope of 2%	
LONGITUDINAL SLOPE (%)	K
1	19.00
1.5	20.75
2	22.50
2.5	23.75
3	25.00
3.5	26.25
4	27.50
4.5	28.75
5	30.00
5.5	31.25
6	32.50

DOUBLE GRATE

K Values for grate R-3403F-A with a transverse gutter slope of 2%	
LONGITUDINAL SLOPE (%)	K
1	22.80
1.5	25.55
2	28.30
2.5	29.55
3	30.80
3.5	32.05
4	33.30
4.5	34.55
5	35.80
5.5	37.05
6	38.30

ROADWAY PROPERTIES	
Roughness Coefficient of Bituminous Asphalt	0.016
Transverse Slope	0.02

Geometric Values for grate R-3405-A	
Square Dimention (in.)	23.6
Free Area (sq. ft.)	1.3

STORM EVENT	
100	Year

GUTTER DEPTH OF FLOW

$$D = \left(\frac{QN}{0.56Z\sqrt{S}}\right)^{\frac{3}{8}}$$

Q = Channel flow (cfs)
Z = Reciprocal of transverse slope (ft/ft)
S = Longitudinal Slope
N = Roughness Coefficient
D = Depth (ft)

GUTTER CAPACITY OF GRATE

$$Q = KD^{\frac{5}{3}}$$

Q = Grate capacity (cfs)
K = Grate coef. from "Inlet Grate Capacities Manual"
D = Depth of flow in feet (from previous equation)

ORIFICE FLOW EQUATION

$$Q = .6A\sqrt{2gh}$$

Q = Capacity (cfs)
A = Free open area (sq. ft.)
g = Acceleration of Gravity (32.2 ft/s^2)
h = Head (ft.)

WEIR EQUATION

$$Q = 3.3P(h)^{\frac{3}{2}}$$

Q = Capacity (cfs)
P = Perimeter (ft.)
h = Head (ft.)

CATCH BASINS IN DEPRESSIONS - 100 YEAR STORM

STRUCTURE	CONTRIBUTING FLOW (cfs)	CARRYOVER FLOW (cfs)	TOTAL FLOW (cfs)	SIDES ON CURB	(S)INGLE OR (D)OUBLE	P (ft)	HEAD OVER GRATE (ft)	ORIFICE		WEIR		MAX CAPACITY (cfs)	ACTUAL DEPTH (ft)	OVERFLOW (cfs)	OVERFLOW TO
								Q_{MAX} (cfs)	H (ft)	Q_{MAX} (cfs)	H (ft)				
PIPE NETWORK TO BASIN 1															
CB-1	1.11	0.00	1.11	1	S	5.9	0.25	3.13	0.03	2.44	0.15	2.44 cfs	0.15 ft.	0.00	na
CB-2	0.78	0.00	0.78	1	S	5.9	0.25	3.13	0.02	2.44	0.12	2.44 cfs	0.12 ft.	0.00	na
CB-3	0.93	0.00	0.93	1	S	5.9	0.25	3.13	0.02	2.44	0.13	2.44 cfs	0.13 ft.	0.00	basin
CB-4	0.76	0.00	0.76	1	S	5.9	0.25	3.13	0.01	2.44	0.11	2.44 cfs	0.11 ft.	0.00	basin

RATIONAL METHOD OF FLOWS TOWARD INLET GRATES - 100 YEAR STORM									
FROM	UNPAVED AREA	UNPAVED COEFFICIENT	PAVE/ROOF AREA	PAVE/ROOF COEFFICIENT	AREA ACRES	WEIGHTED COEFFICIENT	TOC MIN.	i	Q cfs
PIPE NETWORK TO BASIN 1									
CB-1	0	0.20	7682	0.90	0.18	0.90	6	7.0	1.11
CB-2	0	0.20	5367	0.90	0.12	0.90	6	7.0	0.78
CB-3	0	0.20	6449	0.90	0.15	0.90	6	7.0	0.93
CB-4	0	0.20	5255	0.90	0.12	0.90	6	7.0	0.76

OPEN CHANNEL FLOW CAPACITIES								
FROM	TO	PIPE DIA.	FROM INVERT	TO INVERT	PIPE LENGTH	SLOPE FT./FT.	N VALUE	Q FULL cfs
PIPE NETWORK TO BASIN								
CB-1	DMH-1	12	46.10	44.50	195	0.008	0.012	3.51
CB-3	DMH-1	12	44.80	44.50	18	0.017	0.012	5.00
DMH-1	FE-1	12	44.40	44.00	31	0.013	0.012	4.40
CB-2	DMH-2	12	46.20	44.50	167	0.010	0.012	3.90
CB-4	DMH-2	12	44.80	44.50	17	0.018	0.012	5.14
DMH-2	FE-2	12	44.40	44.00	29	0.014	0.012	4.55

ZENITH CONSULTING ENGINEERS, LLC
CIVIL ENGINEERING

3 MAIN STREET
LAKEVILLE, MA 02347
TEL: (508) 947-4208

Pipe Design Calculations

PROJECT Storage facility, Elm Street, Dighton

INLET GRATE AND PIPE ANALYSIS - 100 YEAR STORM
CALCULATED BY: RMF DATE
CHECKED BY: DATE

LOCATION		GRATE ANALYSIS						PIPE ANALYSIS							
FROM	TO	(S)ag or (G)utter	FLOW TO GRATE	GRATE CAPACITY	OVER-FLOW	DEPTH OF FLOW	FLOW TO PIPE	PIPE SIZE DIA.	LNGTH FT.	SLOPE FT./FT.	Q CAPACITY cfs	Q ACTUAL cfs	V FULL fps	V ACTUAL fps	CHECK?
PIPE NETWORK TO BASIN 1															
CB-1	DMH-1	S	1.11	2.44	0.00	1.8"	1.11	12	195	0.008	3.51	1.11	4.46	4.02	OK
CB-3	DMH-1	S	0.93	2.44	0.00	1.6"	0.93	12	18	0.017	5.00	0.93	6.36	4.82	OK
DMH-1	FE-1						2.04	12	31	0.013	4.40	2.04	5.60	5.46	OK
CB-2	DMH-2	S	0.78	2.44	0.00	1.4"	0.78	12	167	0.010	3.90	0.78	4.97	3.93	OK
CB-4	DMH-2	S	0.76	2.44	0.00	1.4"	0.76	12	17	0.018	5.14	0.76	6.55	4.75	OK
DMH-2	FE-2						1.54	12	29	0.014	4.55	1.54	5.79	5.32	OK

SEDIMENT FOREBAY SIZING CALCULATIONS

Zenith Consulting Engineers, LLC

Main Street Lakeville, MA 02347
(508) 947-4208 - www.zcellc.com

- Civil Engineering
- Septic Design (Title 5)
- Septic Inspections (Title 5)
- Commercial and Industrial Site Plans
- Chapter 91 Permitting

SEDIMENT FOREBAY SIZING CALCULATIONS

RE: Elm Street Storage Facility, Dighton, MA

FLOW TO FOREBAY

Impervious Area: 16,773 s.f.

Forebay Volume Required: $16{,}773 \text{ s.f.} \times \frac{1 \text{ ft}}{12 \text{in}} \times 0.1 \text{in} = 140 \text{ c.f.}$

Forebay Volume provided: 175 c.f.

PRE-DEVELOPMENT CALCULATIONS

2 Year 3.40"
10 Year 4.80"
25 Year 5.60"
100 Year 7.00"

Existing site

Subcat Reach Pond Link

Routing Diagram for Elm Street Dighton Pre
Prepared by {enter your company name here}, Printed 5/5/2023

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.733	70	Woods, Good, HSG C (S1)
0.018	77	Woods, Good, HSG D (S1)
0.752	**70**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.733	HSG C	S1
0.018	HSG D	S1
0.000	Other	
0.752		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.733	0.018	0.000	0.752	Woods, Good	S1
0.000	**0.000**	**0.733**	**0.018**	**0.000**	**0.752**	**TOTAL AREA**	

Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment S1: Existing site Runoff Area=32,740 sf 0.00% Impervious Runoff Depth=0.95"
Flow Length=156' Tc=9.8 min CN=70 Runoff=0.67 cfs 0.059 af

Total Runoff Area = 0.752 ac Runoff Volume = 0.059 af Average Runoff Depth = 0.95"
100.00% Pervious = 0.752 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment S1: Existing site

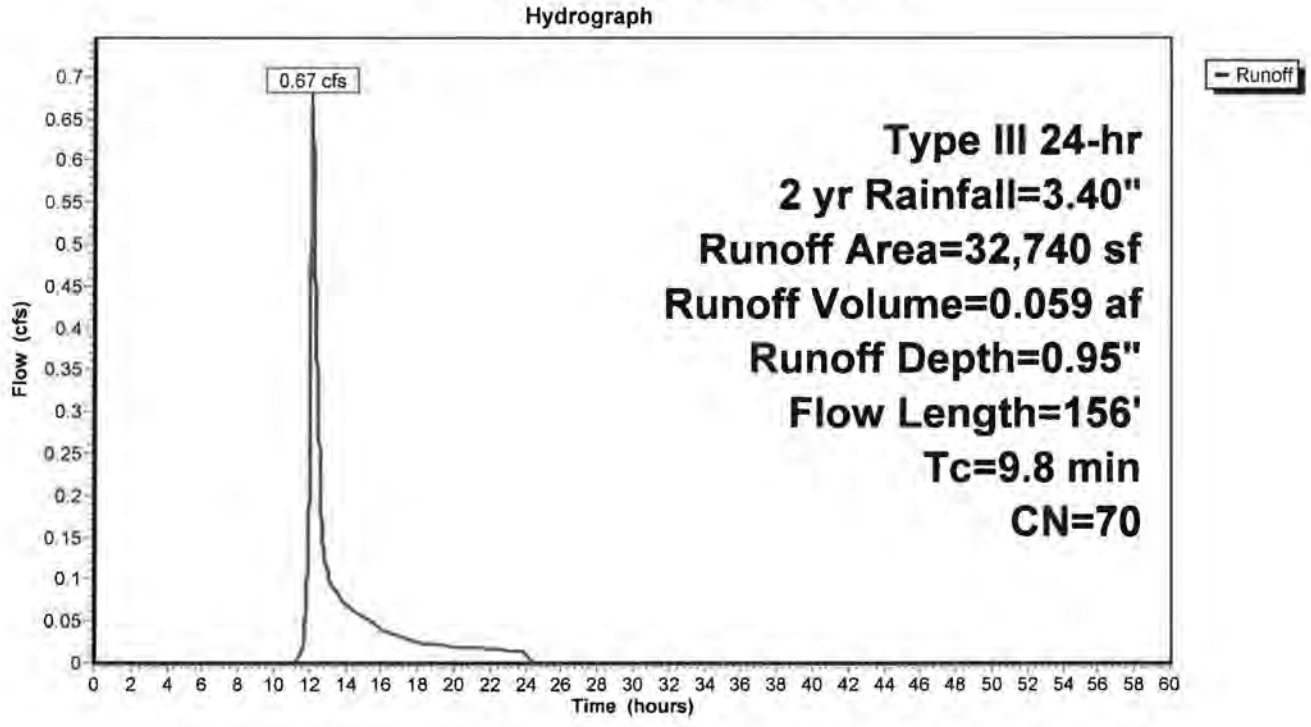
Runoff = 0.67 cfs @ 12.15 hrs, Volume= 0.059 af, Depth= 0.95"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Rainfall=3.40"

Area (sf)	CN	Description
796	77	Woods, Good, HSG D
31,944	70	Woods, Good, HSG C
32,740	70	Weighted Average
32,740		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.3	50	0.0500	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.43"
1.5	106	0.0520	1.14		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
9.8	156	Total			

Subcatchment S1: Existing site



Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment S1: Existing site Runoff Area=32,740 sf 0.00% Impervious Runoff Depth=1.89"
Flow Length=156' Tc=9.8 min CN=70 Runoff=1.43 cfs 0.118 af

Total Runoff Area = 0.752 ac Runoff Volume = 0.118 af Average Runoff Depth = 1.89"
100.00% Pervious = 0.752 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment S1: Existing site

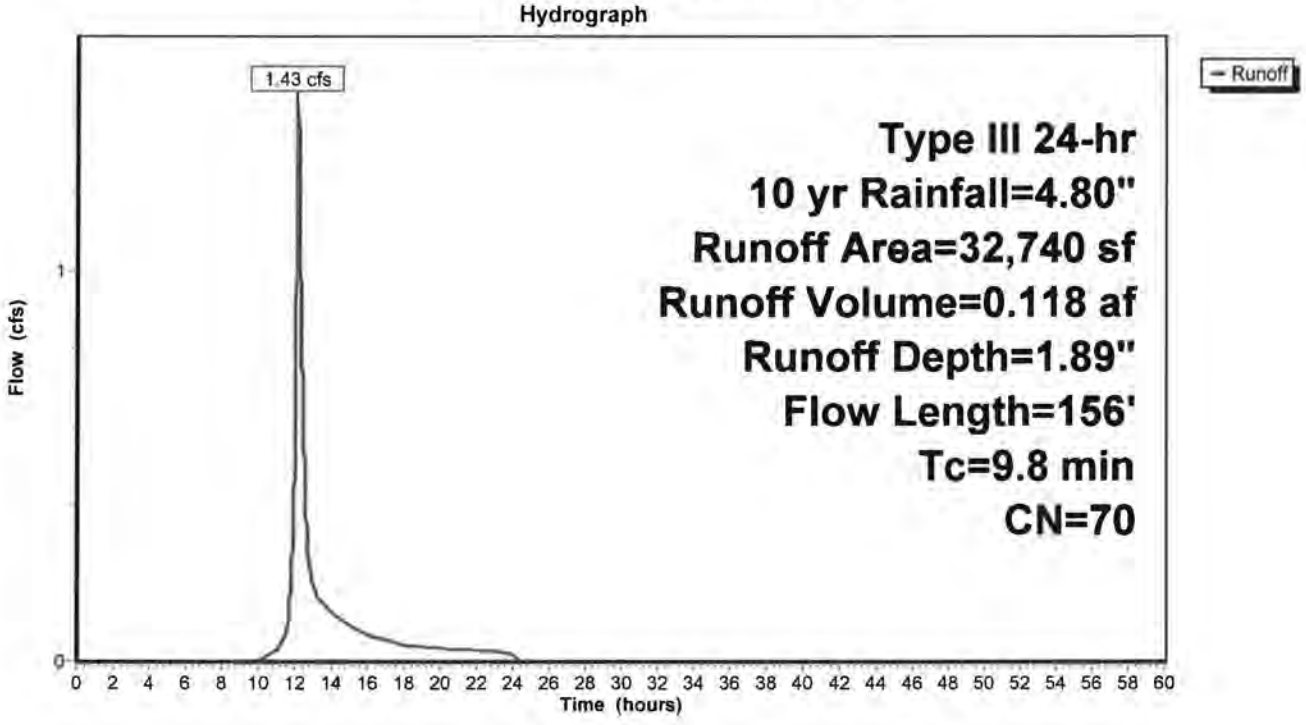
Runoff = 1.43 cfs @ 12.14 hrs, Volume= 0.118 af, Depth= 1.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=4.80"

Area (sf)	CN	Description
796	77	Woods, Good, HSG D
31,944	70	Woods, Good, HSG C
32,740	70	Weighted Average
32,740		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.3	50	0.0500	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.43"
1.5	106	0.0520	1.14		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
9.8	156	Total			

Subcatchment S1: Existing site



Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment S1: Existing site Runoff Area=32,740 sf 0.00% Impervious Runoff Depth=2.49"
Flow Length=156' Tc=9.8 min CN=70 Runoff=1.91 cfs 0.156 af

Total Runoff Area = 0.752 ac Runoff Volume = 0.156 af Average Runoff Depth = 2.49"
100.00% Pervious = 0.752 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment S1: Existing site

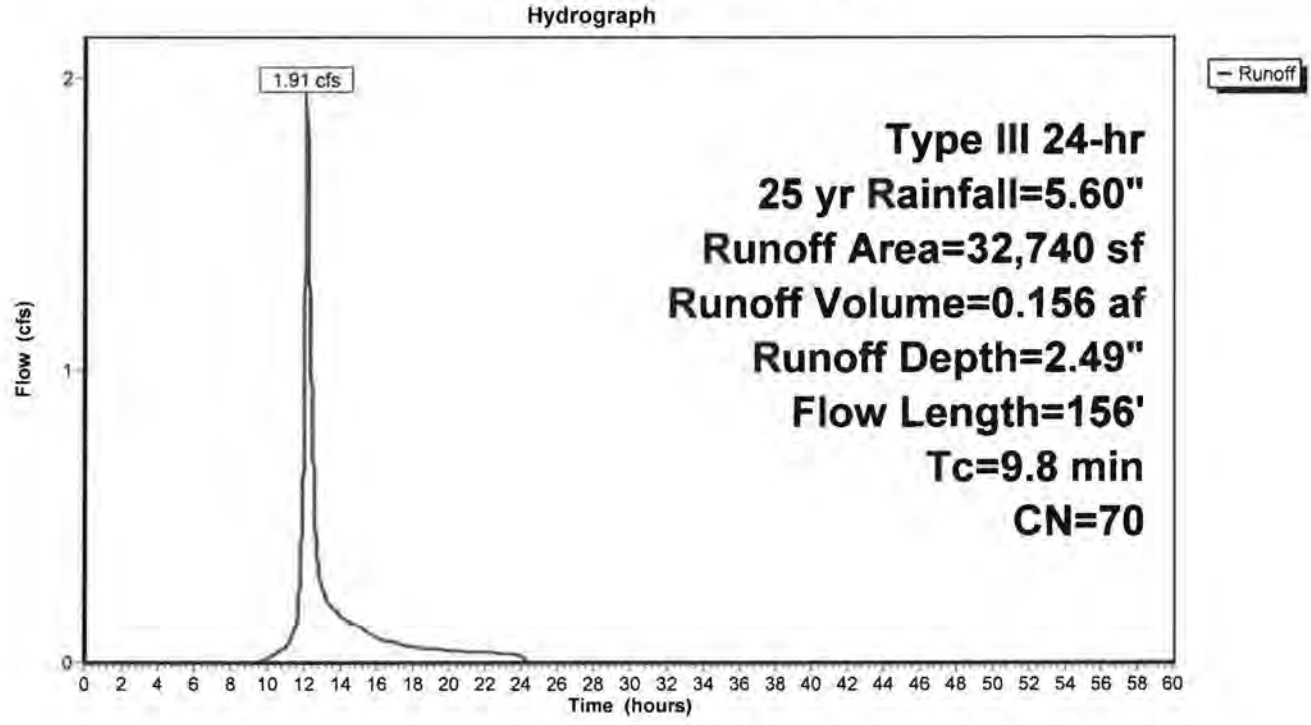
Runoff = 1.91 cfs @ 12.14 hrs, Volume= 0.156 af, Depth= 2.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.60"

Area (sf)	CN	Description
796	77	Woods, Good, HSG D
31,944	70	Woods, Good, HSG C
32,740	70	Weighted Average
32,740		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.3	50	0.0500	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.43"
1.5	106	0.0520	1.14		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
9.8	156	Total			

Subcatchment S1: Existing site



Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment S1: Existing site Runoff Area=32,740 sf 0.00% Impervious Runoff Depth=3.62"
Flow Length=156' Tc=9.8 min CN=70 Runoff=2.80 cfs 0.227 af

Total Runoff Area = 0.752 ac Runoff Volume = 0.227 af Average Runoff Depth = 3.62"
100.00% Pervious = 0.752 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment S1: Existing site

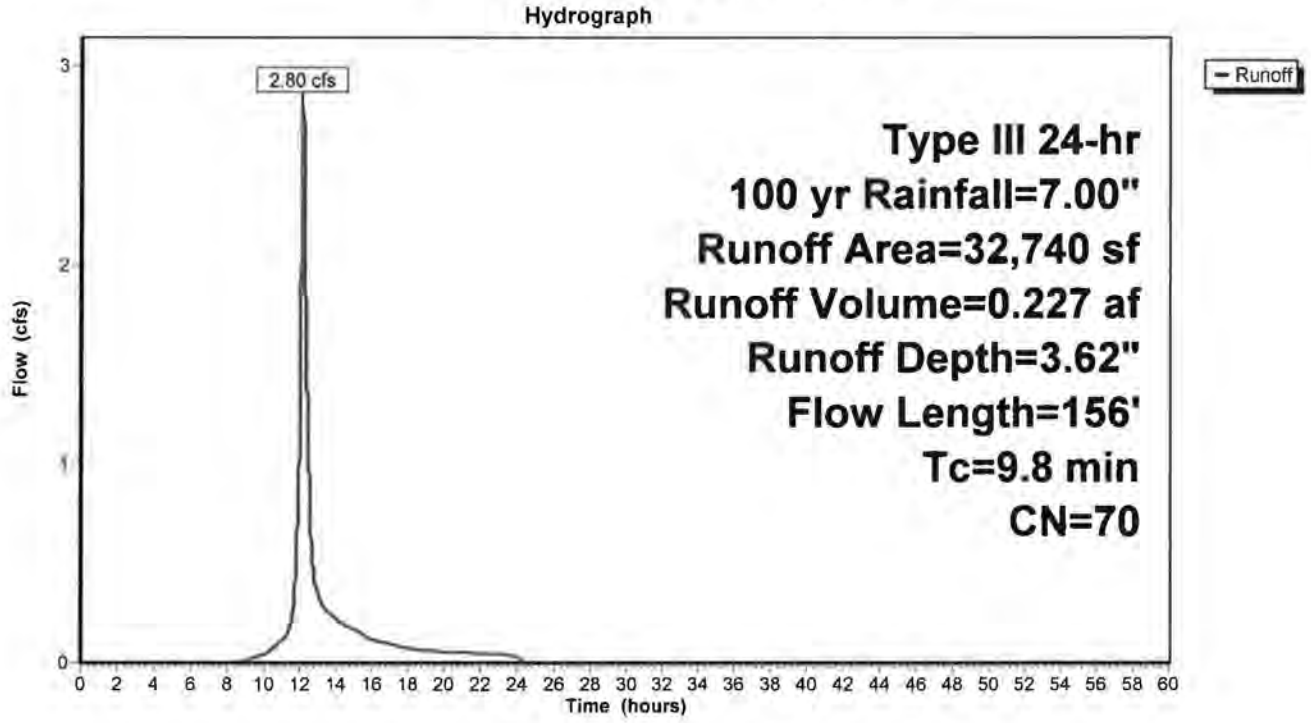
Runoff = 2.80 cfs @ 12.14 hrs, Volume= 0.227 af, Depth= 3.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 yr Rainfall=7.00"

Area (sf)	CN	Description
796	77	Woods, Good, HSG D
31,944	70	Woods, Good, HSG C
32,740	70	Weighted Average
32,740		100.00% Pervious Area

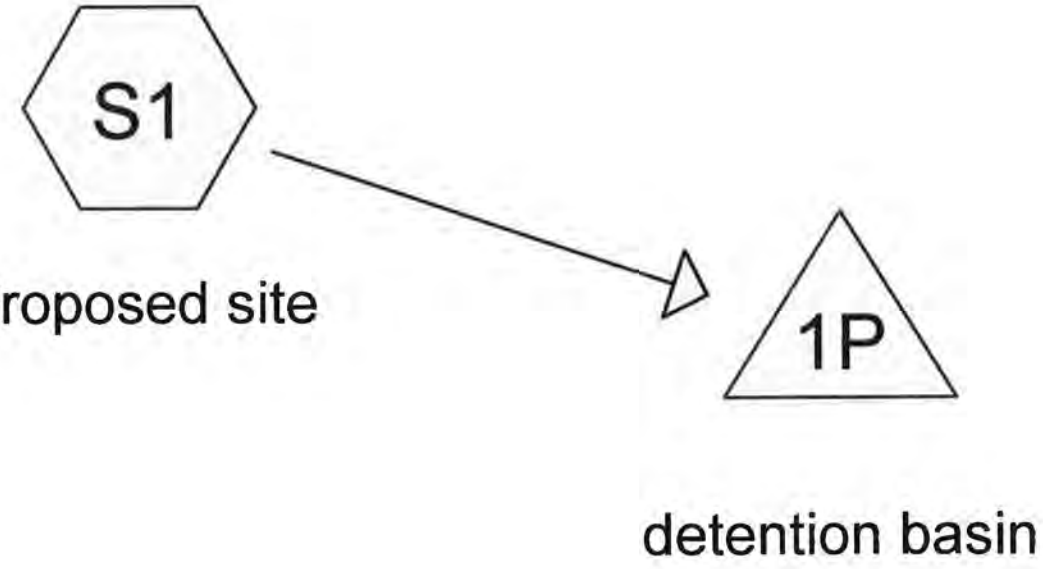
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.3	50	0.0500	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.43"
1.5	106	0.0520	1.14		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
9.8	156	Total			

Subcatchment S1: Existing site



POST-DEVELOPMENT CALCULATIONS

2 Year 3.40"
10 Year 4.80"
25 Year 5.60"
100 Year 7.00"



Subcat Reach Pond Link

Routing Diagram for Elm Street Dighton Post
Prepared by {enter your company name here}, Printed 5/5/2023

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.169	74	>75% Grass cover, Good, HSG C (S1)
0.023	98	detention basin bottom (S1)
0.395	98	paved (S1)
0.165	98	roof (S1)
0.752	**93**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.169	HSG C	S1
0.000	HSG D	
0.583	Other	S1
0.752		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.169	0.000	0.000	0.169	>75% Grass cover, Good	S1
0.000	0.000	0.000	0.000	0.023	0.023	detention basin bottom	S1
0.000	0.000	0.000	0.000	0.395	0.395	paved	S1
0.000	0.000	0.000	0.000	0.165	0.165	roof	S1
0.000	**0.000**	**0.169**	**0.000**	**0.583**	**0.752**	**TOTAL AREA**	

Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment S1: Proposed site Runoff Area=32,740 sf 77.53% Impervious Runoff Depth=2.64"
Tc=6.0 min CN=93 Runoff=2.24 cfs 0.165 af

Pond 1P: detention basin Peak Elev=45.51' Storage=2,455 cf Inflow=2.24 cfs 0.165 af
4.0" Round Culvert n=0.012 L=36.0' S=0.0278 '/' Outflow=0.43 cfs 0.165 af

Total Runoff Area = 0.752 ac Runoff Volume = 0.165 af Average Runoff Depth = 2.64"
22.47% Pervious = 0.169 ac 77.53% Impervious = 0.583 ac

Summary for Subcatchment S1: Proposed site

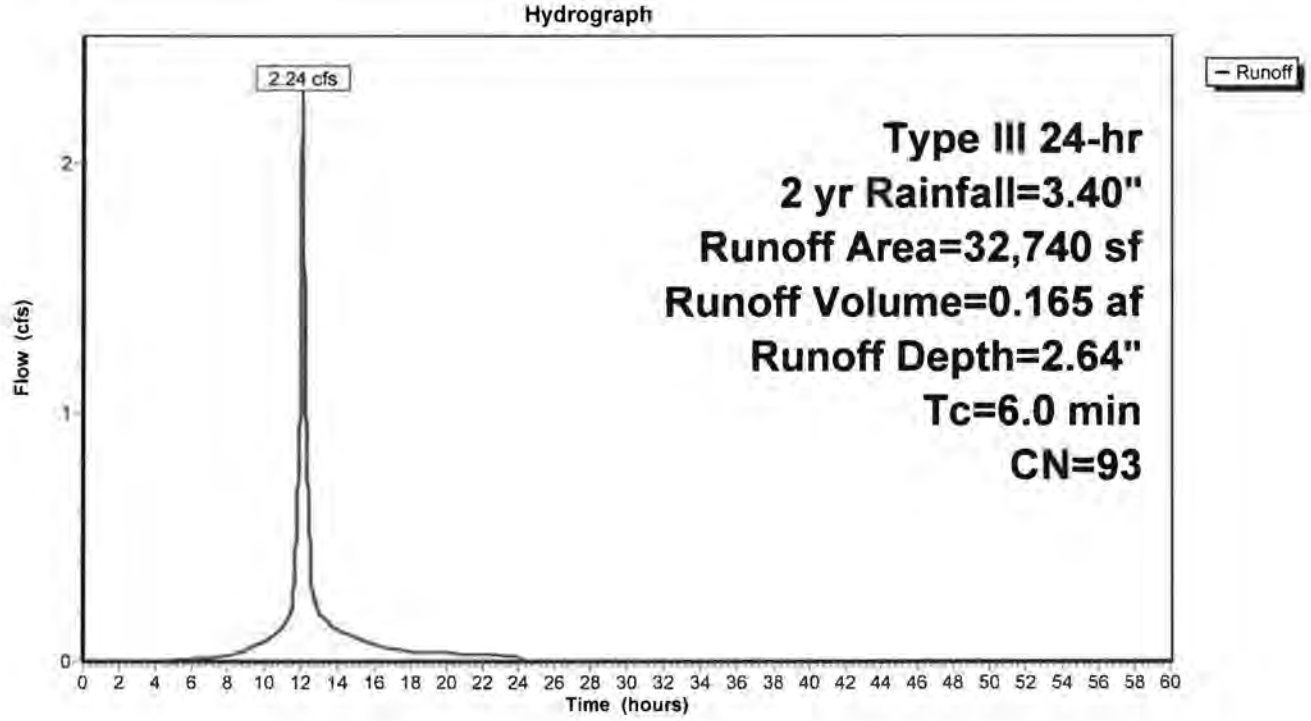
Runoff = 2.24 cfs @ 12.09 hrs, Volume= 0.165 af, Depth= 2.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Rainfall=3.40"

	Area (sf)	CN	Description
*	989	98	detention basin bottom
*	7,200	98	roof
*	17,194	98	paved
	7,357	74	>75% Grass cover, Good, HSG C
	32,740	93	Weighted Average
	7,357		22.47% Pervious Area
	25,383		77.53% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment S1: Proposed site



Summary for Pond 1P: detention basin

Inflow Area = 0.752 ac, 77.53% Impervious, Inflow Depth = 2.64" for 2 yr event
Inflow = 2.24 cfs @ 12.09 hrs, Volume= 0.165 af
Outflow = 0.43 cfs @ 12.52 hrs, Volume= 0.165 af, Atten= 81%, Lag= 26.3 min
Primary = 0.43 cfs @ 12.52 hrs, Volume= 0.165 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 45.51' @ 12.52 hrs Surf.Area= 2,279 sf Storage= 2,455 cf

Plug-Flow detention time= 62.7 min calculated for 0.165 af (100% of inflow)
Center-of-Mass det. time= 62.6 min (853.2 - 790.6)

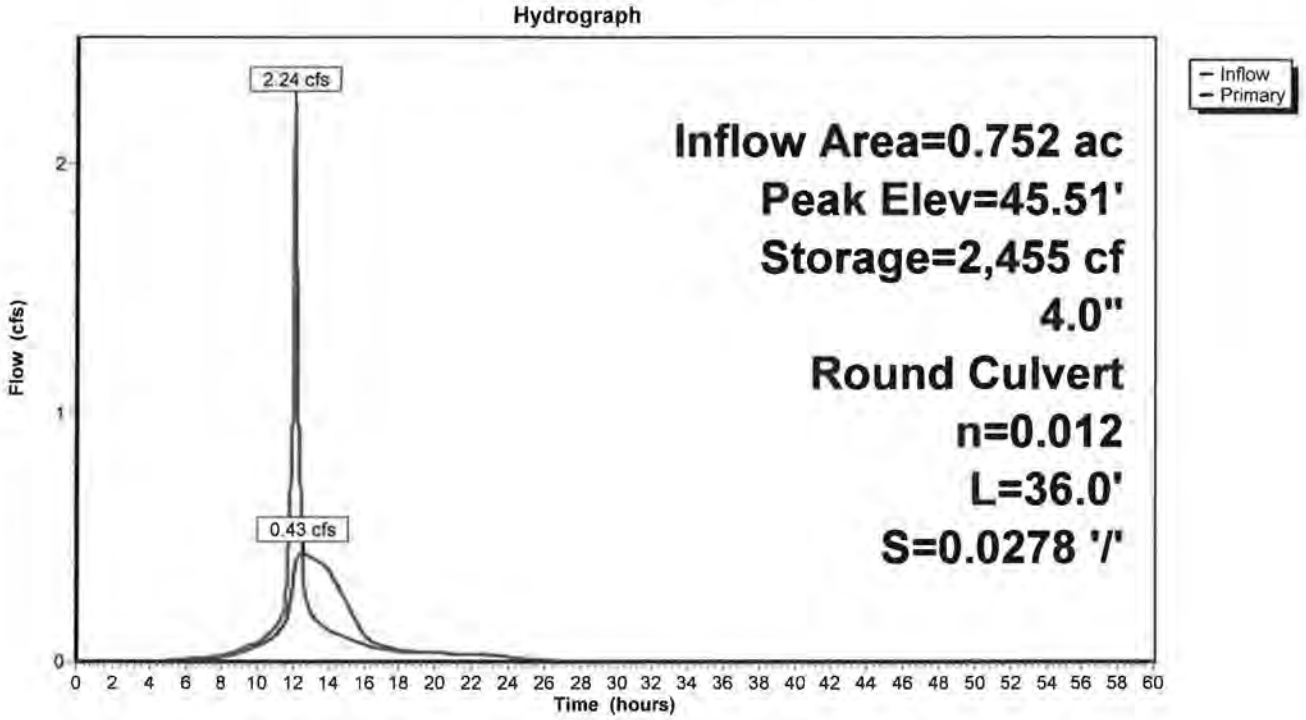
Volume	Invert	Avail.Storage	Storage Description
#1	44.00'	16,719 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
44.00	989	0	0
45.00	1,833	1,411	1,411
46.00	2,711	2,272	3,683
47.00	3,723	3,217	6,900
48.00	4,876	4,300	11,200
49.00	6,162	5,519	16,719

Device	Routing	Invert	Outlet Devices
#1	Primary	44.00'	**4.0" Round Culvert** L= 36.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 44.00' / 43.00' S= 0.0278 '/' Cc= 0.900 n= 0.012, Flow Area= 0.09 sf

Primary OutFlow Max=0.43 cfs @ 12.52 hrs HW=45.51' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 0.43 cfs @ 4.97 fps)

Pond 1P: detention basin



Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment S1: Proposed site Runoff Area=32,740 sf 77.53% Impervious Runoff Depth=4.00"
Tc=6.0 min CN=93 Runoff=3.32 cfs 0.251 af

Pond 1P: detention basin Peak Elev=46.12' Storage=4,027 cf Inflow=3.32 cfs 0.251 af
4.0" Round Culvert n=0.012 L=36.0' S=0.0278 '/' Outflow=0.49 cfs 0.251 af

Total Runoff Area = 0.752 ac Runoff Volume = 0.251 af Average Runoff Depth = 4.00"
22.47% Pervious = 0.169 ac 77.53% Impervious = 0.583 ac

Summary for Subcatchment S1: Proposed site

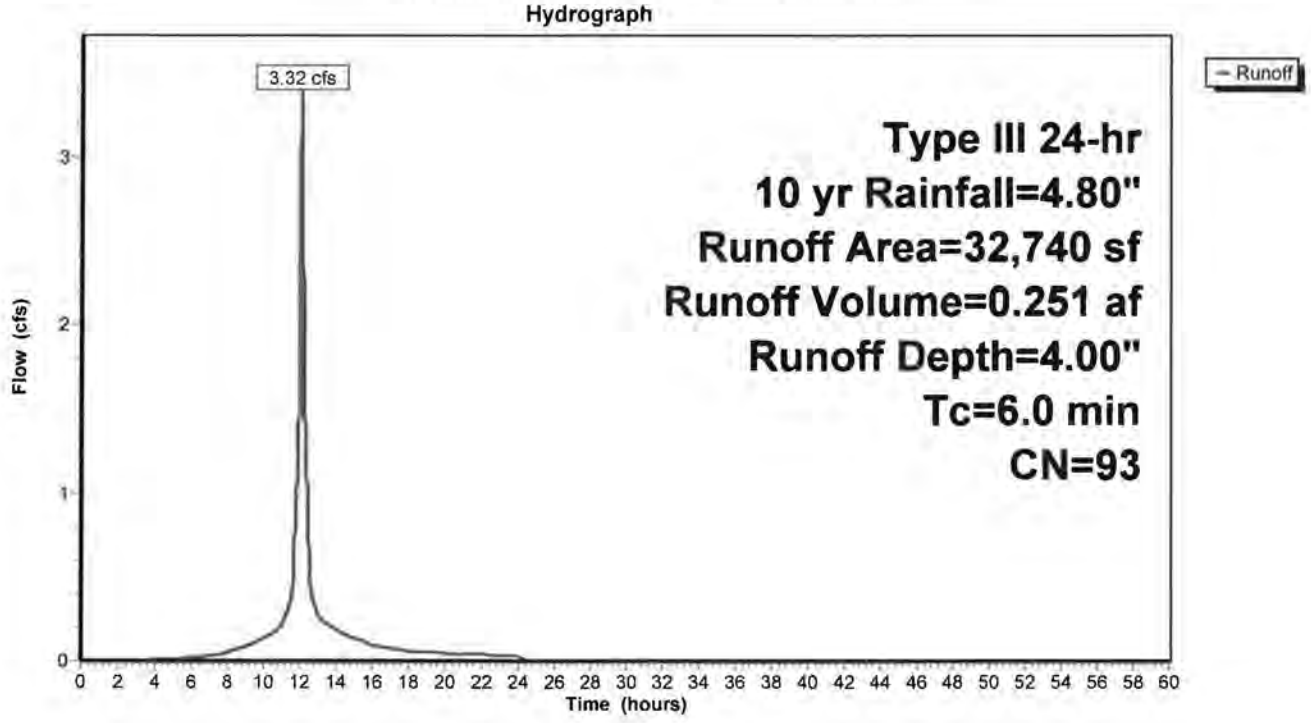
Runoff = 3.32 cfs @ 12.08 hrs, Volume= 0.251 af, Depth= 4.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=4.80"

	Area (sf)	CN	Description
*	989	98	detention basin bottom
*	7,200	98	roof
*	17,194	98	paved
	7,357	74	>75% Grass cover, Good, HSG C
	32,740	93	Weighted Average
	7,357		22.47% Pervious Area
	25,383		77.53% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment S1: Proposed site



Summary for Pond 1P: detention basin

Inflow Area = 0.752 ac, 77.53% Impervious, Inflow Depth = 4.00" for 10 yr event
Inflow = 3.32 cfs @ 12.08 hrs, Volume= 0.251 af
Outflow = 0.49 cfs @ 12.58 hrs, Volume= 0.251 af, Atten= 85%, Lag= 29.5 min
Primary = 0.49 cfs @ 12.58 hrs, Volume= 0.251 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 46.12' @ 12.58 hrs Surf.Area= 2,836 sf Storage= 4,027 cf

Plug-Flow detention time= 80.3 min calculated for 0.251 af (100% of inflow)
Center-of-Mass det. time= 80.2 min (859.7 - 779.5)

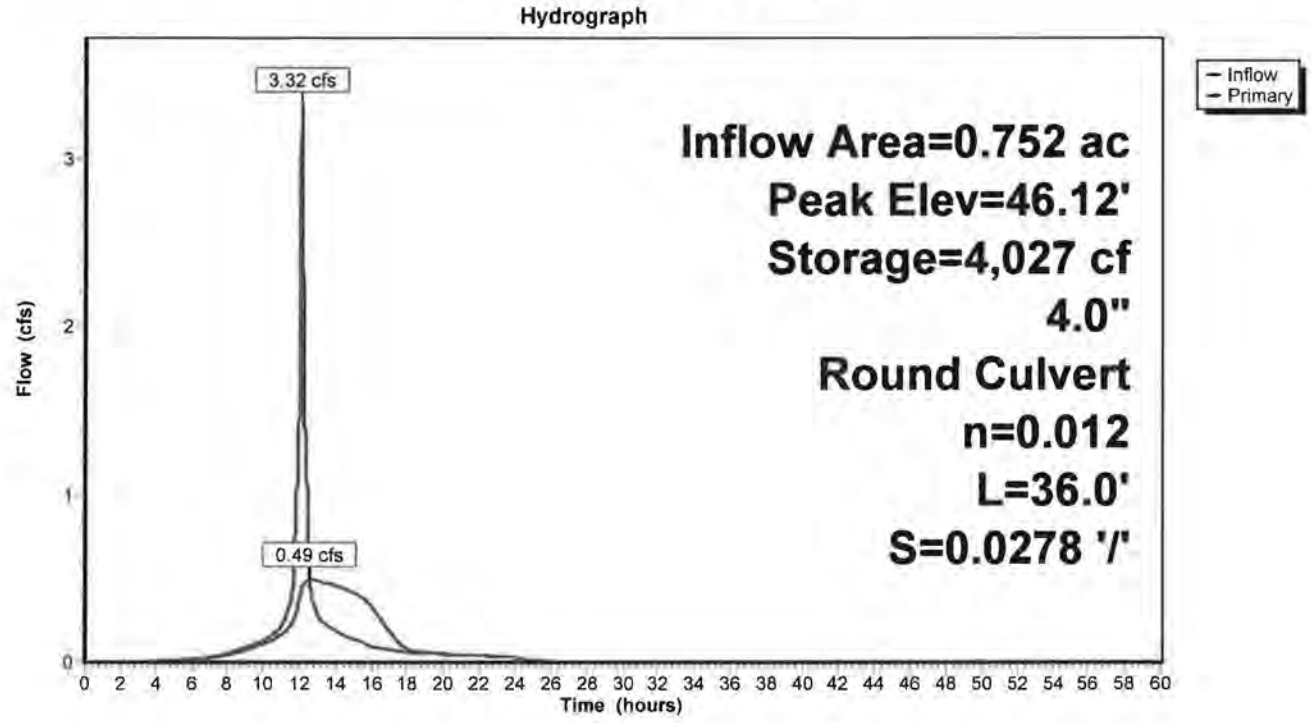
Volume	Invert	Avail.Storage	Storage Description
#1	44.00'	16,719 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
44.00	989	0	0
45.00	1,833	1,411	1,411
46.00	2,711	2,272	3,683
47.00	3,723	3,217	6,900
48.00	4,876	4,300	11,200
49.00	6,162	5,519	16,719

Device	Routing	Invert	Outlet Devices
#1	Primary	44.00'	**4.0" Round Culvert** L= 36.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 44.00' / 43.00' S= 0.0278 '/' Cc= 0.900 n= 0.012, Flow Area= 0.09 sf

Primary OutFlow Max=0.49 cfs @ 12.58 hrs HW=46.12' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 0.49 cfs @ 5.63 fps)

Pond 1P: detention basin



Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment S1: Proposed site Runoff Area=32,740 sf 77.53% Impervious Runoff Depth=4.79"
Tc=6.0 min CN=93 Runoff=3.94 cfs 0.300 af

Pond 1P: detention basin Peak Elev=46.44' Storage=4,976 cf Inflow=3.94 cfs 0.300 af
4.0" Round Culvert n=0.012 L=36.0' S=0.0278 '/' Outflow=0.52 cfs 0.300 af

Total Runoff Area = 0.752 ac Runoff Volume = 0.300 af Average Runoff Depth = 4.79"
22.47% Pervious = 0.169 ac 77.53% Impervious = 0.583 ac

Summary for Subcatchment S1: Proposed site

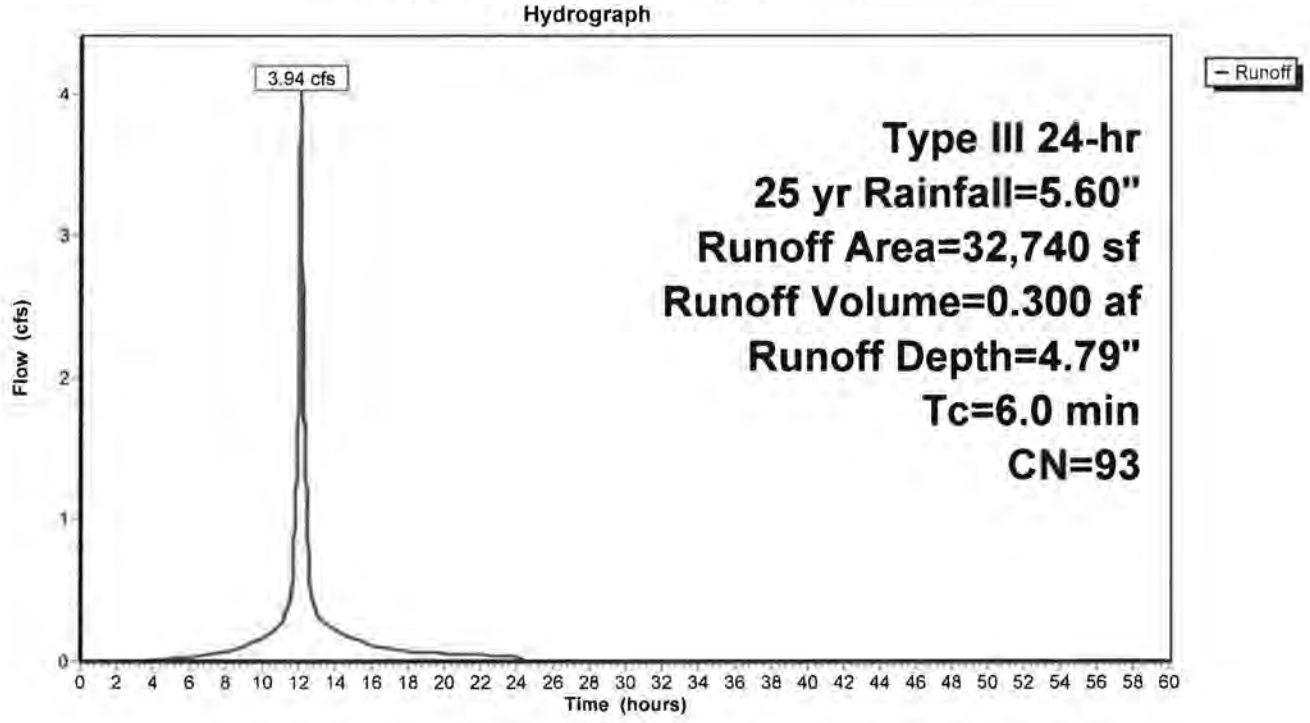
Runoff = 3.94 cfs @ 12.08 hrs, Volume= 0.300 af, Depth= 4.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.60"

	Area (sf)	CN	Description
*	989	98	detention basin bottom
*	7,200	98	roof
*	17,194	98	paved
	7,357	74	>75% Grass cover, Good, HSG C
	32,740	93	Weighted Average
	7,357		22.47% Pervious Area
	25,383		77.53% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment S1: Proposed site



Summary for Pond 1P: detention basin

Inflow Area = 0.752 ac, 77.53% Impervious, Inflow Depth = 4.79" for 25 yr event
Inflow = 3.94 cfs @ 12.08 hrs, Volume= 0.300 af
Outflow = 0.52 cfs @ 12.61 hrs, Volume= 0.300 af, Atten= 87%, Lag= 31.6 min
Primary = 0.52 cfs @ 12.61 hrs, Volume= 0.300 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 46.44' @ 12.61 hrs Surf.Area= 3,157 sf Storage= 4,976 cf

Plug-Flow detention time= 91.6 min calculated for 0.300 af (100% of inflow)
Center-of-Mass det. time= 91.6 min (866.6 - 775.0)

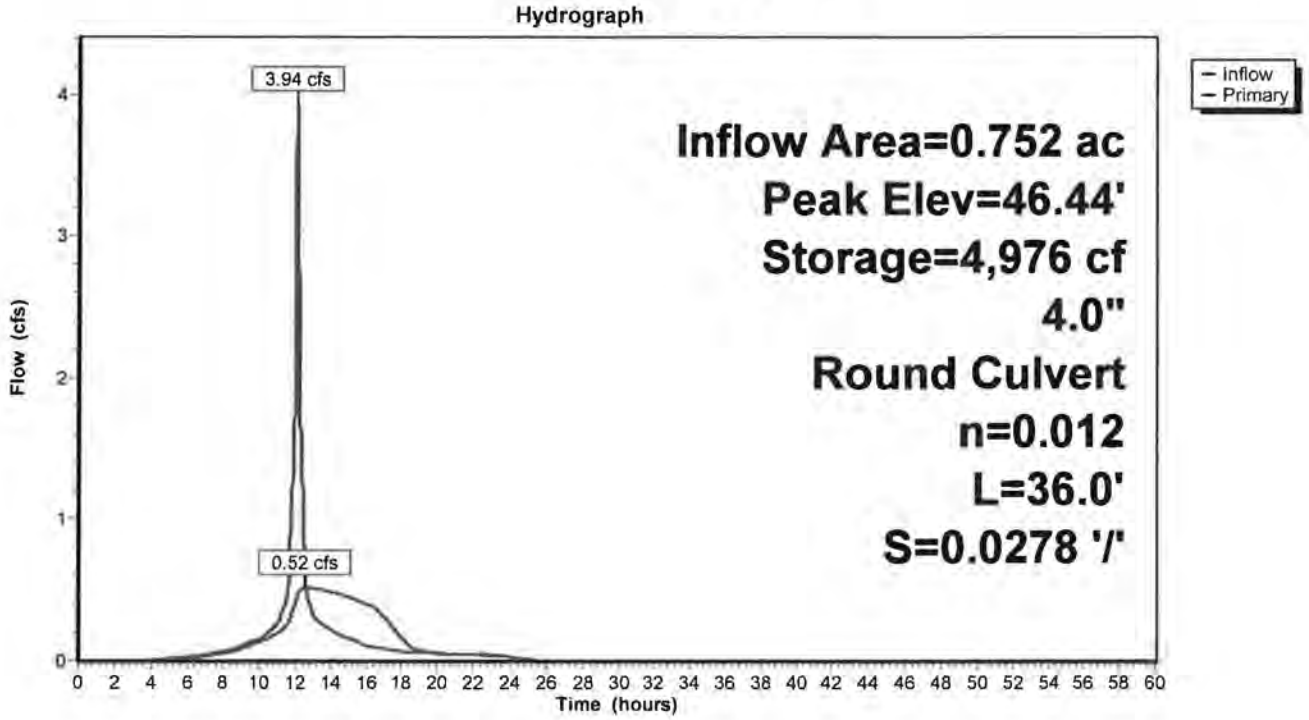
Volume	Invert	Avail.Storage	Storage Description
#1	44.00'	16,719 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
44.00	989	0	0
45.00	1,833	1,411	1,411
46.00	2,711	2,272	3,683
47.00	3,723	3,217	6,900
48.00	4,876	4,300	11,200
49.00	6,162	5,519	16,719

Device	Routing	Invert	Outlet Devices
#1	Primary	44.00'	**4.0" Round Culvert** L= 36.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 44.00' / 43.00' S= 0.0278 '/' Cc= 0.900 n= 0.012, Flow Area= 0.09 sf

Primary OutFlow Max=0.52 cfs @ 12.61 hrs HW=46.44' (Free Discharge)
↑**1=Culvert** (Barrel Controls 0.52 cfs @ 5.94 fps)

Pond 1P: detention basin



Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment S1: Proposed site Runoff Area=32,740 sf 77.53% Impervious Runoff Depth=6.17"
Tc=6.0 min CN=93 Runoff=5.00 cfs 0.387 af

Pond 1P: detention basin Peak Elev=46.95' Storage=6,716 cf Inflow=5.00 cfs 0.387 af
4.0" Round Culvert n=0.012 L=36.0' S=0.0278 '/' Outflow=0.56 cfs 0.387 af

Total Runoff Area = 0.752 ac Runoff Volume = 0.387 af Average Runoff Depth = 6.17"
22.47% Pervious = 0.169 ac 77.53% Impervious = 0.583 ac

Summary for Subcatchment S1: Proposed site

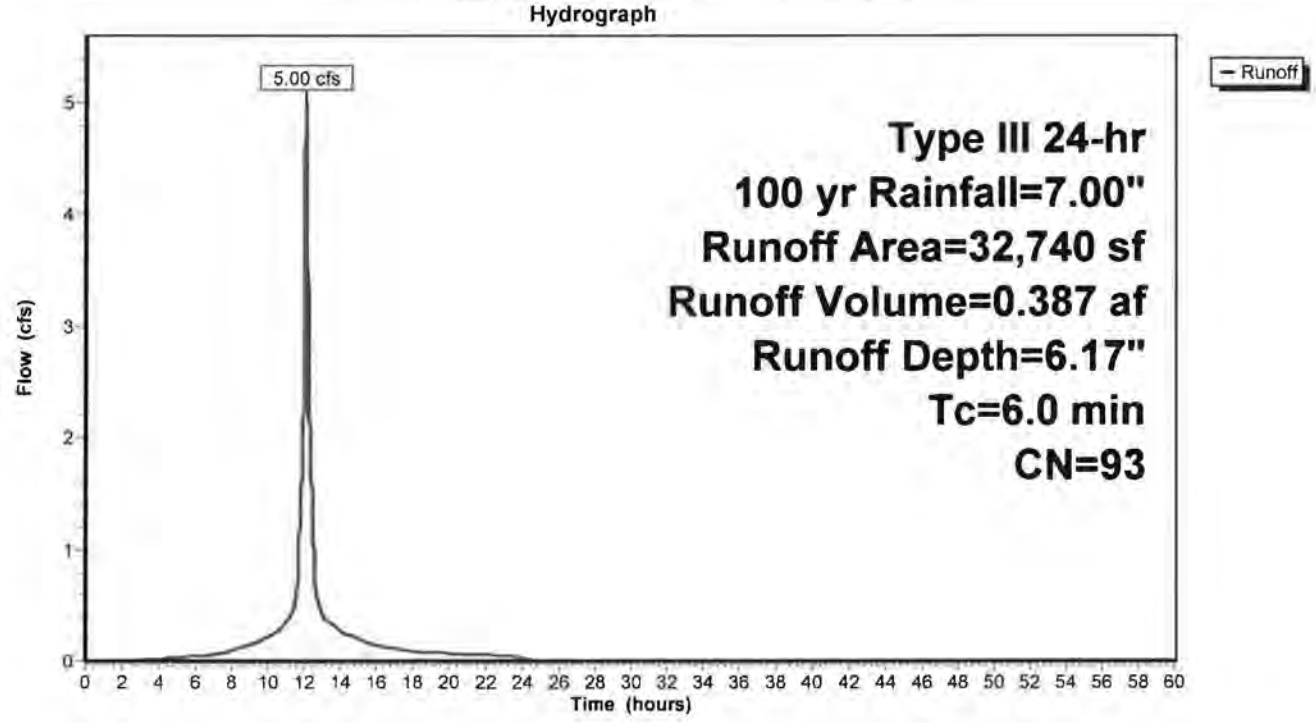
Runoff = 5.00 cfs @ 12.08 hrs, Volume= 0.387 af, Depth= 6.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 yr Rainfall=7.00"

	Area (sf)	CN	Description
*	989	98	detention basin bottom
*	7,200	98	roof
*	17,194	98	paved
	7,357	74	>75% Grass cover, Good, HSG C
	32,740	93	Weighted Average
	7,357		22.47% Pervious Area
	25,383		77.53% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment S1: Proposed site



Summary for Pond 1P: detention basin

Inflow Area = 0.752 ac, 77.53% Impervious, Inflow Depth = 6.17" for 100 yr event
Inflow = 5.00 cfs @ 12.08 hrs, Volume= 0.387 af
Outflow = 0.56 cfs @ 12.72 hrs, Volume= 0.387 af, Atten= 89%, Lag= 38.4 min
Primary = 0.56 cfs @ 12.72 hrs, Volume= 0.387 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 46.95' @ 12.72 hrs Surf.Area= 3,673 sf Storage= 6,716 cf

Plug-Flow detention time= 112.8 min calculated for 0.386 af (100% of inflow)
Center-of-Mass det. time= 112.9 min (881.7 - 768.8)

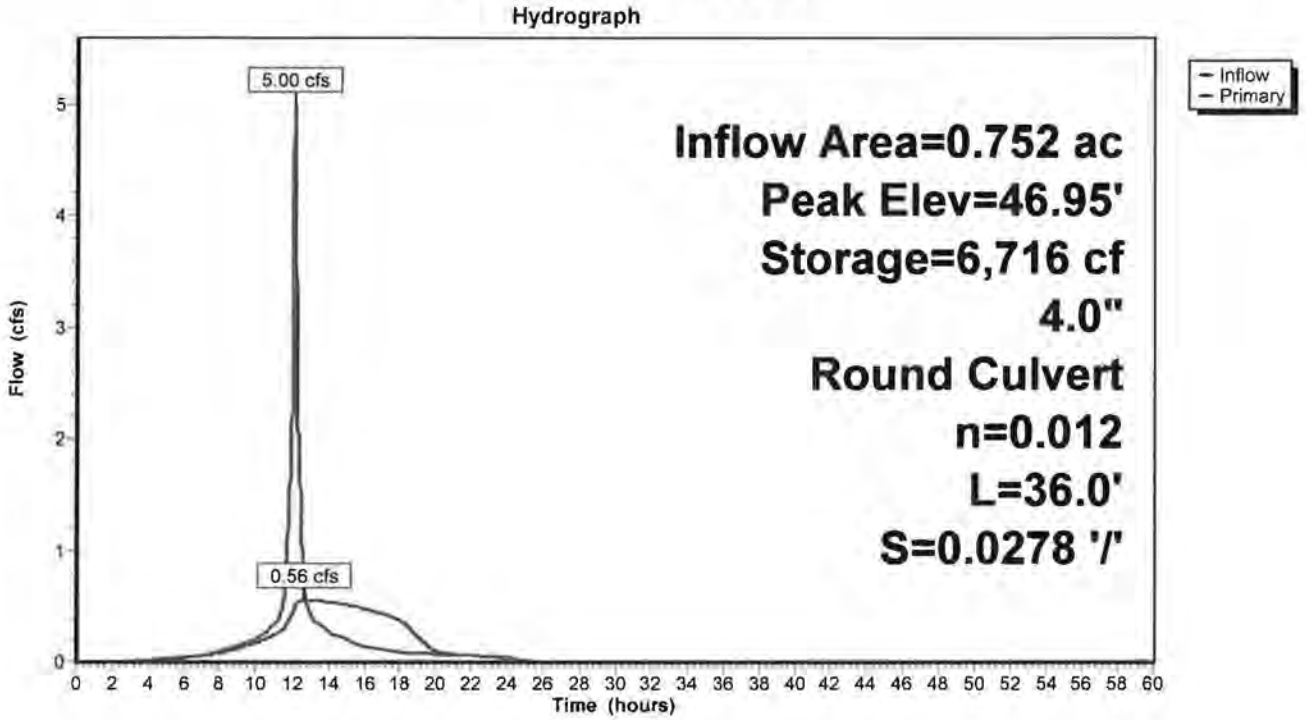
Volume	Invert	Avail.Storage	Storage Description
#1	44.00'	16,719 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
44.00	989	0	0
45.00	1,833	1,411	1,411
46.00	2,711	2,272	3,683
47.00	3,723	3,217	6,900
48.00	4,876	4,300	11,200
49.00	6,162	5,519	16,719

Device	Routing	Invert	Outlet Devices
#1	Primary	44.00'	**4.0" Round Culvert** L= 36.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 44.00' / 43.00' S= 0.0278 '/' Cc= 0.900 n= 0.012, Flow Area= 0.09 sf

Primary OutFlow Max=0.56 cfs @ 12.72 hrs HW=46.95' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 0.56 cfs @ 6.41 fps)

Pond 1P: detention basin



OPERATIONS AND MAINTENANCE PLAN

OPERATIONS AND MAINTENANCE PLAN
Elm Street Storage Bays, Elm Street, Dighton, MA

The following is the proposed operation and maintenance plan for the storm water management systems at the proposed storage bay facility located on Elm Street in Dighton, MA:

- Owner: Zero Elm Street, LLC
  9 Jessie Lane
  Berkley, MA 02779

- Parties responsible for Operation and Maintenance:
  Same as above

CONTENTS

1. Stormwater Management Systems Operations and Maintenance Plan
2. Construction Period Pollution Prevention Plan
3. Source Control and Long-term Pollution Prevention Plan

STORMWATER MANAGEMENT SYSTEMS
OPERATIONS AND MAINTENANCE PLAN
Elm Street Storage Bays, Elm Street, Dighton, MA

The storm water management facilities were designed to require little or no intervention in the operation and to require little or no maintenance once the project is built and stable vegetative cover is established. However, the drainage improvements shall be subject to the following maintenance schedule:

A. Routine Maintenance

1. Debris: All debris and litter are to be removed from all catch basins, swales, drainage basin and surrounding areas at least twice per year.

2. Re-seeding: Embankments that have excessive erosion or slumping are to be re-graded and seeded (with canary grass or tall fescue grass) during the spring or fall growing seasons as needed.

3. Inspect: Infiltration system shall be inspected for signs of proper functioning on a monthly basis. Any potential blockages in the down spouts will be removed if discovered. Gutters will be cleaned at least twice per year.

4. Mowing: The swales and drainage basin sideslopes shall be mowed at least twice per year. The basin bottom shall be inspected at each mowing event. If vegetation has accumulated that could cause a negative impact on the function of the infiltration, then it shall be removed.

B. Periodic Maintenance

1. All sumps will be inspected, at a minimum, four times per year. These structures shall be cleaned four times per year or whenever the depth of deposits is greater than or equal to one half the depth from the bottom of the unit to the invert of the lowest pipe in the basin. With the four-foot sumps that are specified, this depth equals two feet. In this cleaning, the entire contents of the sumps shall be removed.

C. Non-routine Maintenance

1. Structural: All swales, catch basins, pipes, drainage basin sideslopes, outfalls and spillway shall be inspected once every four (4) years for proper function, clogging, signs of deterioration and structural inadequacy. Any adverse situations are to be repaired as needed.

D. Non-periodic Inspection

1. The storm water management system shall be inspected after two years of full operation by a Registered Professional Civil Engineer to confirm its adequacy. The inspection shall include an examination of all components of the system including catch basins, drainage basin and swales.

E. Annual Budget

1. The estimated annual budget for the O & M is $500.

OPERATION AND MAINTENANCE PLAN LOG FORM

Refer to Site Plan for details on the drainage system. Use Log Form that follows as required upon completion of inspections and maintenance tasks, and file.

Elm Street Storage Bays, Elm Street, Dighton, MA
Drainage System

STORMWATER BMP'S

STRUCTURE	DATE INSPECTED	SEDIMENT BUILDUP (YES/NO)	IF SEDIMENT BUILDUP, DATE CLEANED
CB-1			
CB-2			
CB-3			
CB-4			
DMH-1			
DMH-2			
SEDIMENT FOREBAY			
DRAINAGE BASIN			
SPILLWAY			
SWALES			
OTHER:			

Note: Sediment to be removed from catch basins once the depth reaches 24".

REQUIRED MAINTENANCE:

_____

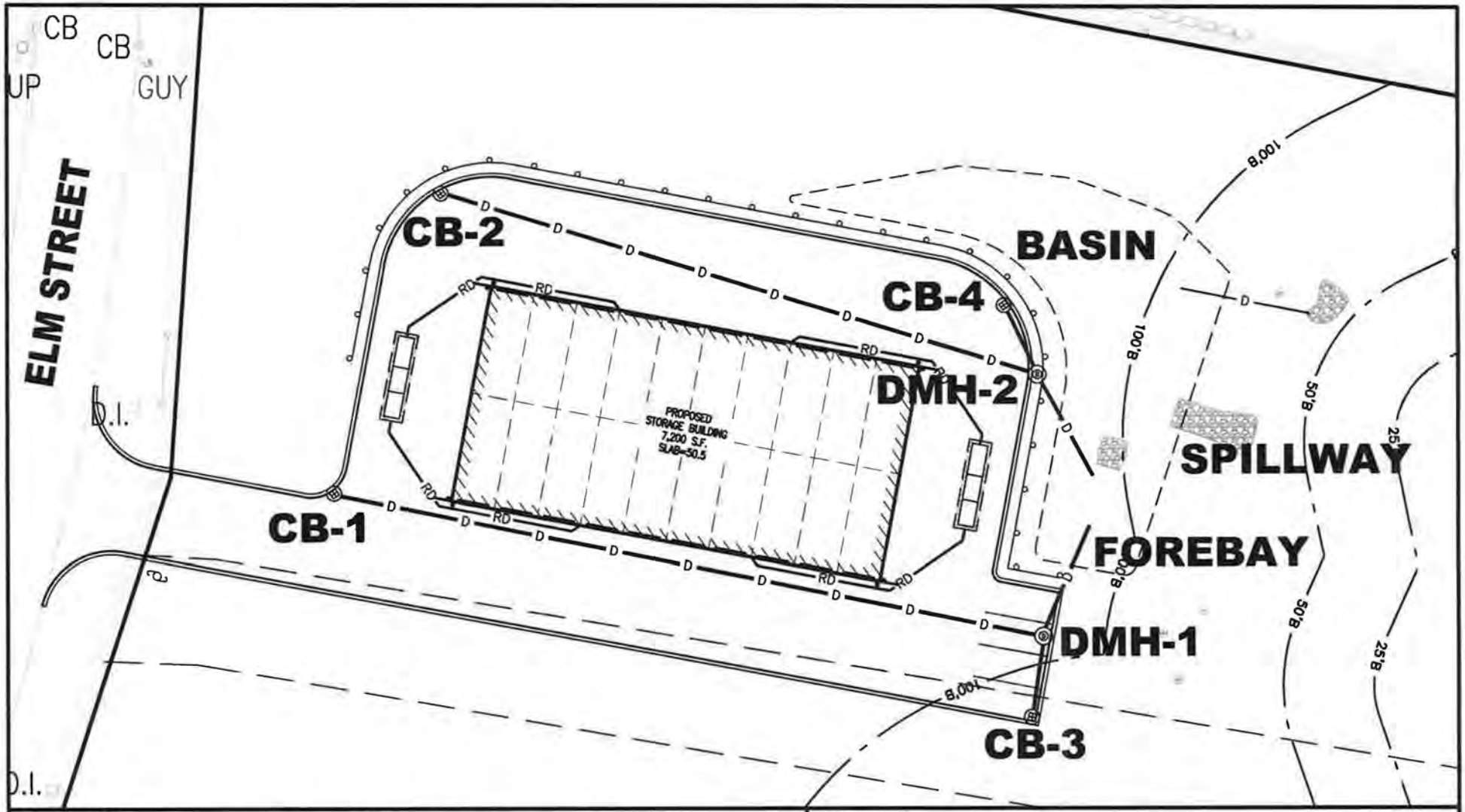
_____

_____

_____

_____

TO BE PERFORMED BY:_____ ON_____
INSPECTION BY:_____ DATE_____



SHEET NAME: **BMP LOCATION PLAN**

PROJECT SITE: **ELM STREET**
DIGHTON, MASSACHUSETTS

GRAPHICS SCALE
1 inch = 40 feet
0 40 80 120

ZCE
ZENITH CONSULTING ENGINEERS, LLC
3 MAIN STREET LAKEVILLE, MA 02347
PHONE: (508) 947-4208

C:\Users\tmorris\AppData\Local\Temp\AcPublish_10848\Site Plan – Elm St – Dighton_DRAINAGE PLANS.dwg

CONSTRUCTION PERIOD POLLUTION PREVENTION PLAN
Elm Street Storage Bays, Elm Street, Dighton, MA

1.0 INTRODUCTION

It is proposed to clear vegetation from a portion of the site then construct a storage building and supporting infrastructure. Nearby wetlands must be protected from sedimentation and erosion during construction. The following erosion and sediment control program material management practices and spill control program have been developed to protect this area.

2.0 PRECONSTRUCTION MEASURES

Prior to the initiation of any construction, erosion control measures shall be installed as shown on the plans. In addition, silt sacks shall be placed in all existing catch basin inlets.

3.0 CONSTRUCTION PERIOD MEASURES

The following are the minimal measures required for erosion and sediment control, material handling and for spill control.

3.1 EROSION AND SEDIMENTATION CONTROL

The following measures shall be maintained throughout the site construction phase of the project.

Catch Basin Protection

The proposed catch basins shall be protected with sit sacks prior to the completion of paving and stabilization of contributing areas. If excessive siltation is discovered to be entering the catch basin inlets, then hay bales shall also be placed around grates and catch basins within the construction/demolition areas to ensure that runoff entering the catch basin has been filtered through the bales prior to discharge.

Drainage Swale Haybale Check Dams

Haybales shall also be placed across any temporary ditches constructed by the contractor during construction to limit the transport of sediment into drainage systems and waterways.

Stabilized Construction Entrance

A temporary stabilized construction entrance shall be installed at the location shown on the erosion control plan. The purpose of the construction entrance is to remove sediment attached to vehicle tires and minimize its transport and deposition onto public road surfaces. The construction entrance shall be composed of a 6-inch thick (minimum) bed of 2-inch diameter crushed stone that extends a minimum of 50 feet. The construction entrance shall be a minimum of 24 feet wide. The crushed stone bed shall be removed and replenished as necessary to maintain the proper function.

Erosion and Sediment Control - Maintenance

The project general contractor shall have primary responsibility for implementing temporary and permanent controls described in the plan and shall be responsible for assuring Contractor compliance with contract documents including all erosion and sediment control measures.

- Damaged or deteriorated items shall be repaired or replaced immediately after identification.

- The underside of haybales should be kept in close contact with the earth and reset as necessary.

- Silt Socks shall be inspected after every major rainfall runoff event (over ½" depth of precipitation) or every 14 days, whichever occurs first. All damaged or misaligned fences shall be immediately repaired. Silt shall be immediately removed from all areas of the silt fence when depth of accumulation exceeds 9 inches. Each report shall be documented on the form enclosed here-in.

- Sumps shall be inspected after every major rainfall runoff event (over ½" depth of precipitation) or every 14 days, whichever occurs first. Silt shall be immediately removed from all sumps where the depth of accumulation exceeds 9 inches.

- All exposed construction areas shall be stabilized upon completion in order to minimize the time that these areas are un-stabilized.

3.2 MATERIALS MANAGEMENT PRACTICES

The following are the material management practices that shall be used to reduce the risk of spills or other accidental exposure of materials and substances to stormwater runoff. The Contractor's Superintendent shall be responsible for ensuring that these procedures are followed:

1. *Good Housekeeping*

   The following good housekeeping practices shall be followed on-site during construction:

   a. An effort shall be made to store only enough products required to do the job.
   b. All materials stored on-site shall be stored in a neat, orderly manner and, if possible, under a roof or in a containment area. At a minimum, all containers shall be stored with their lids on when not in use. Drip pans shall be provided under all dispensers.
   c. Products shall be kept in their original containers with the original manufacturer's label in legible condition.
   d. Substances shall not be mixed with one another unless recommended by the manufacturer.
   e. Whenever possible, all of a product shall be used up before disposing the

container.

f. Manufacturer's recommendations for proper use and disposal shall be followed.

g. The Contractor's Superintendent shall be responsible for daily inspections to ensure proper use and disposal of materials.

2. *Hazardous Substances*

These practices shall be used to reduce the risks associated with Hazardous Substances. Material Safety Data Sheets (MSDS's) for each product with hazardous properties that is used at the Project shall be obtained and used for the proper management of potential wastes that may result from these products. An MSDS shall be posted in the immediate area where such product is stored and/or used and another copy of each MSDS shall be maintained in the job trailer at the Project. Each employee who must handle a Hazardous Substance shall be instructed on the use of MSDS sheets and the specific information in the applicable MSDS for the product he/she is using, particularly regarding spill control techniques.

a. Products shall be kept in original containers with the original labels in legible condition.

b. Original labels and MSDS's shall be procured and used for each product.

c. If surplus product must be disposed, manufacturer's and local/state/federal required methods for proper disposal must be followed.

3. *Hazardous Waste*

It is imperative that all Hazardous Waste be properly identified and handled in accordance with all applicable Hazardous Waste Standards, including the storage, transport and disposal of the Hazardous Wastes. There are significant penalties for the improper handling of Hazardous Wastes. It is important that the Site Superintendent seeks appropriate assistance in making the determination of whether a substance or material is a Hazardous Waste. For example, Hazardous Waste may include certain Hazardous Substances, as well as pesticides, paints, paint solvents, cleaning solvents, pesticides, contaminated soils, and other materials, substances or chemicals that have been discarded (or are to be discarded) as being out-of-date, contaminated, or otherwise unusable, and can include the containers for those substances; other materials and substances can also be or become Hazardous Wastes, however. The Contractor's Superintendent is also responsible for ensuring that all site personnel are instructed as to these Hazardous Waste requirements and also that the requirements are being followed.

4. *Product Specific Practices*

The following product specific practices shall be followed on the job site:

<u>Petroleum Products</u>

All on-site vehicles shall be monitored for leaks and receive regular preventative

maintenance to reduce the chance of leakage. Petroleum products shall be stored in tightly sealed containers which are clearly labeled. Petroleum storage tanks shall be located at minimum 100 linear feet from drainage ways, inlets and surface waters. Any petroleum storage tanks stored on-site shall be located within a containment area that is designed with an impervious surface between the tank and the ground. The secondary containment must be designed to provide a containment volume that is equal to 110% of the volume of the largest tank. Any mobile petroleum tank shall be parked in a vehicular service area surrounded by a berm that provides a containment volume that is equal to 110% of the volume of the largest tank. Containment must provide sufficient volume to contain expected precipitation and 110% volume of the largest tank. Accumulated rainwater or spills from containment areas are to be promptly pumped into a containment device and disposed properly by a licensed Hazardous Waste transporter. Drip pans shall be provided for all dispensers. Any asphalt substances used on-site shall be applied according to the manufacturer's recommendations. The location of any fuel tanks and/or equipment storage areas must be identified on the Erosion Control Plan by the Contractor once the locations have been determined.

Fertilizers

Fertilizers shall be applied only in the minimum amounts recommended by the manufacturer. Once applied, fertilizer shall be worked in the soil to limit exposure to stormwater. The contents of any partially used bags of fertilizer shall be transferred to a sealable plastic bin to avoid spills.

Cleaning Solvents

All containers shall be tightly sealed and stored when not in use. Excess solvents shall not be discharged to the storm sewer system, but shall be properly disposed of according to manufacturer's instructions or state and federal regulations.

Concrete Wastes

Concrete trucks shall be allowed to wash out or discharge surplus concrete or drum wash water on the project site, but only in specifically designated diked and impervious washouts which have been prepared to prevent contact between the concrete wash and stormwater. Waste generated from concrete wash water shall not be allowed to flow into drainage ways, inlets, receiving waters or any location other than the designated concrete washout. Waste concrete may be poured into forms to make rip-rap or other useful concrete products. Concrete washouts shall be located at minimum 100 linear feet from drainage ways, inlets, surface waters and wetland resource areas.

The hardened residue from the concrete washout diked areas shall be disposed in the same manner as other non-hazardous construction waste materials or may be broken up and used on site as deemed appropriate by the Contractor. Maintenance of the washout is to include removal of hardened concrete. Facility shall not be filled beyond 95% capacity and shall be cleaned out once 75% full unless a new facility is constructed. The

Contractor's Superintendent shall be responsible for seeing that these procedures are followed. Saw-cut Portland Cement Concrete (PCC) slurry shall not be allowed to enter storm drains or watercourses. Saw-cut residue should not be left on the surface of pavement or be allowed to flow over and off pavement. Residue from saw-cutting and grinding shall be collected by vacuum and disposed of in the concrete washout facility.

5. Solid and Construction Wastes

All waste materials shall be collected and disposed of at an appropriate solid waste disposal area.

6. Sanitary Wastes

A minimum of one portable sanitary unit shall be provided for every ten (10) workers on the site. All sanitary waste shall be collected from the portable units a minimum of one time per week by a licensed portable facility provider in complete compliance with local and state regulations.

All sanitary waste units shall be located in an area where the likelihood of the unit contributing to stormwater discharges is negligible. Additional containment BMPs must be implemented, such as gravel bags or specially designed plastic skid containers around the base, to prevent wastes from contributing to stormwater discharges.

7. Contaminated Soils

Any contaminated soils (resulting from spills of hazardous substances or oil or discovered during the course of construction) which may result from construction activities shall be contained and cleaned up immediately in accordance with the procedures given in the Material Management Plan and in accordance with applicable state and federal regulations. Contaminated soils not resulting from construction activities, or which pre-existed construction activities, but which are discovered by virtue of construction activities, should be reported in the same manner as spills, but with sufficient information to indicate that the discovery of an existing condition is being reported. If there is a release that occurs by virtue of the discovery of existing contamination, this should be reported as a spill, if it otherwise meets the requirements for a reportable spill.

SOURCE CONTROL AND LONG-TERM POLLUTION PREVENTION PLAN
Elm Street Storage Bays, Elm Street, Dighton, MA

1.0 INTRODUCTION

The development of the above referenced facility has been designed to provide improved stormwater quality compared to existing conditions. In order for this to continue in the long term, it is necessary to implement the following Source Control and Pollution Prevention Plan.

2.0 RESPONSIBLE PARTY

Responsible Party: Zero Elm Street, LLC
9 Jessie Lane
Berkley, MA 02779

3.0 SOURCE CONTROL MEASURES

The most effective means of providing clean runoff is to prevent pollutants from coming into contact with the stormwater in the first place. This involves the following:

1. Keeping de-icing agents, fertilizers, stockpiles, etc. covered at all times. If practical, all such products shall be stored indoors or off-site.

2. All landscaping, fertilization and other grounds maintenance shall be done by professional groundkeepers who are trained at how to maintain the grounds.

3. Periodic parking lot sweeping program shall be implemented. This program shall include removal of windblown debris and litter from landscaped areas.

4. A supply of speedy dry type oil absorbent material shall be kept on-site to allow for the quick cleanup of minor spills.

4.0 SPILL PREVENTION AND RESPONSE PLAN

The Property Manager, shall train all personnel in the proper handling and cleanup of spilled Hazardous Substances or Oil. No spilled Hazardous Substances or Oil shall be allowed to come in contact with stormwater discharges. If such contact occurs, the stormwater discharge shall be contained on site until appropriate measures in compliance with state and federal regulations are taken to dispose such contaminated stormwater. It shall be the responsibility of the Property Manager to be properly trained, and to train all personnel in spill prevention and cleanup procedures.

In order to prevent or minimize the potential for a spill of hazardous substances or oil to come

into contact with stormwater, the following steps shall be implemented:

a. All hazardous substances or oil (such as pesticides, petroleum products, fertilizers, detergents, chemicals, acids, paints, paint solvents, cleaning solvents, additives for soil stabilization, concrete curing compounds and additives, etc.) shall be stored in a secure location, with their lids on, preferably under cover, when not in use.

b. The minimum practical quantity of all such materials shall be kept at the facility.

c. A spill control and containment kit (containing, for example, absorbent materials, acid neutralizing powder, brooms, dust pans, mops, rags, gloves, plastic and metal trash containers, etc.) shall be provided at the site.

d. Manufacturer's recommended methods for spill cleanup shall be clearly posted and site maintenance personnel shall be trained regarding these procedures and the location of the information and cleanup supplies.

e. It is the Property Manager's responsibility to ensure that all hazardous waste discovered or generated at the Project site are disposed properly by a licensed hazardous material disposal company. The Property Manager is responsible for not exceeding hazardous waste storage requirements mandated by the EPA or state and local authority.

A spill contingency plan shall be implemented including the following provisions:

Equipment necessary to quickly attend to inadvertent spills or shall be stored on-site in a secure but accessible location. Such equipment shall include:

1. Safety goggles.
2. Chemically resistant gloves and overshoe boots.
3. Water and chemical fire extinguishers.
4. Sand and shovels.
5. Suitable absorbent materials.
6. Storage containers.
7. First aid equipment.

In the event of a spill of hazardous substances or oil, the following procedures must be followed:

a. All measures must be taken to contain and abate the spill and to prevent the discharge of the hazardous substance or oil to stormwater or off-site. (The spill area must be kept well ventilated and personnel must wear appropriate protective clothing to prevent injury from contact with the hazardous substances.)

b. For spills of less than five (5) gallons of material, proceed with source control and containment, clean-up with absorbent materials or other applicable means unless an imminent hazard or other circumstances dictate that the spill should be treated

by a professional emergency response contractor.

c. For spills greater than five (5) gallons of material immediately contact a Massachusetts Licensed Site Professional L.S.P. Provide information on the type of material spilled, the location of the spill, the quantity spilled, and the time of the spill and proceed with prevention, containment and/or clean-up if so desired.

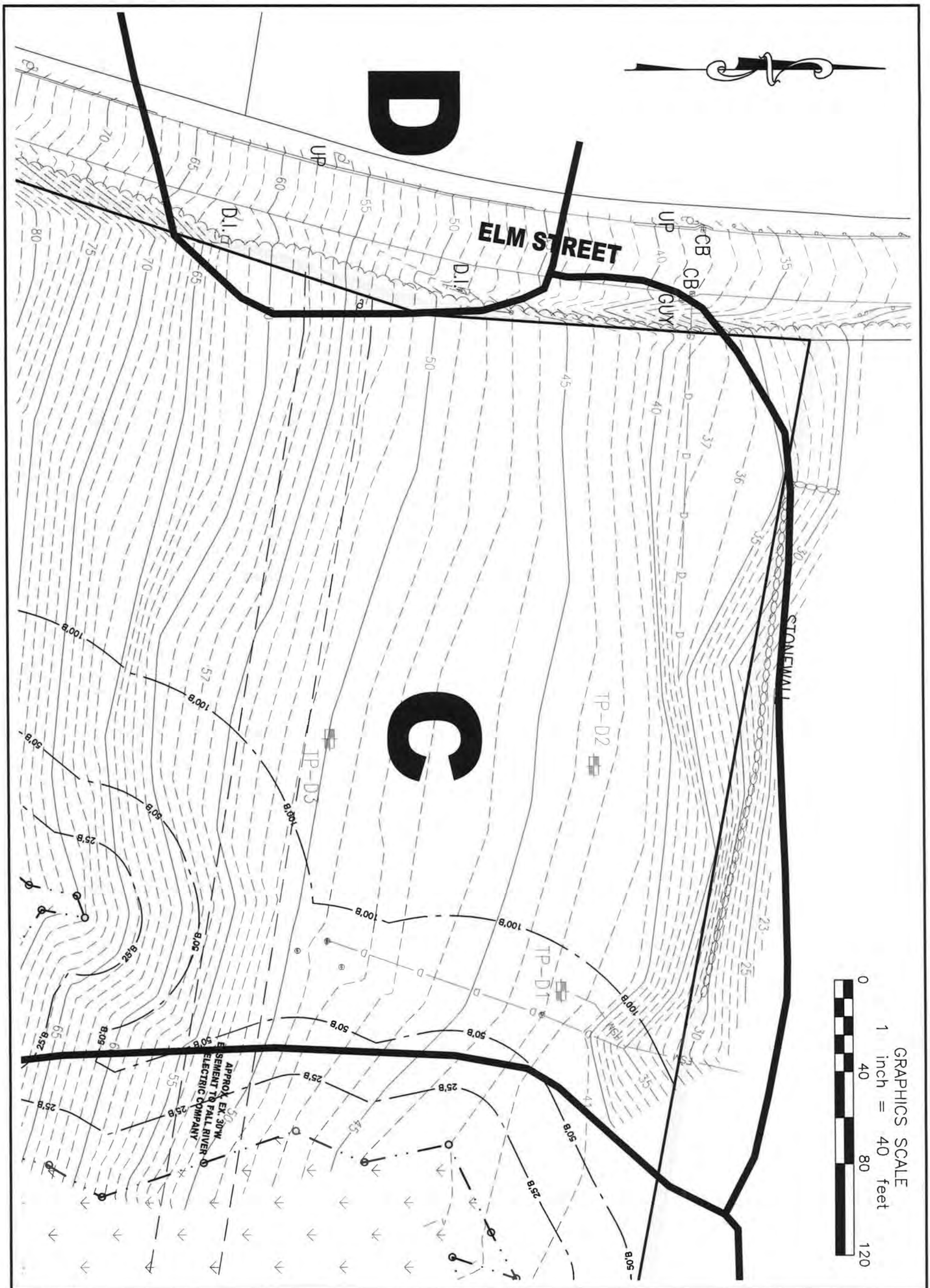
d. Spills of amounts that exceed reportable quantities of certain substances specifically mentioned in federal regulations 40 CFR 110, 40 CFR 117, and 40 CFR 302 must be immediately reported to the EPA National Response Center, Telephone (800) 242-8802.

The Property Manager shall be the spill prevention and response coordinator. He shall designate the individuals who shall receive spill prevention and response training. These individuals shall each become responsible for a particular phase of prevention and response. The names of these personnel should be posted in the material storage area and in the property office.

5.0 SNOW AND ICE REMOVAL

Snow removal shall be primarily done by mechanical removal rather than chemical application. The judicious use of sand and salt without chemical additives is allowed in order to protect the safety of the public.

PRE & POST-DEVELOPMENT DRAINAGE PLANS



SHEET NAME:

SOILS PLAN

PROJECT SITE:

ELM STREET
DIGHTON, MASSACHUSETTS

CLIENT INFO:

ZERO ELM STREET, LLC
9 JESSIE LANE
BERKLEY, MA 02779

ZCE

ZENITH CONSULTING ENGINEERS, LLC
3 MAIN STREET LAKEVILLE, MA 02347
PHONE: (508) 947-4208

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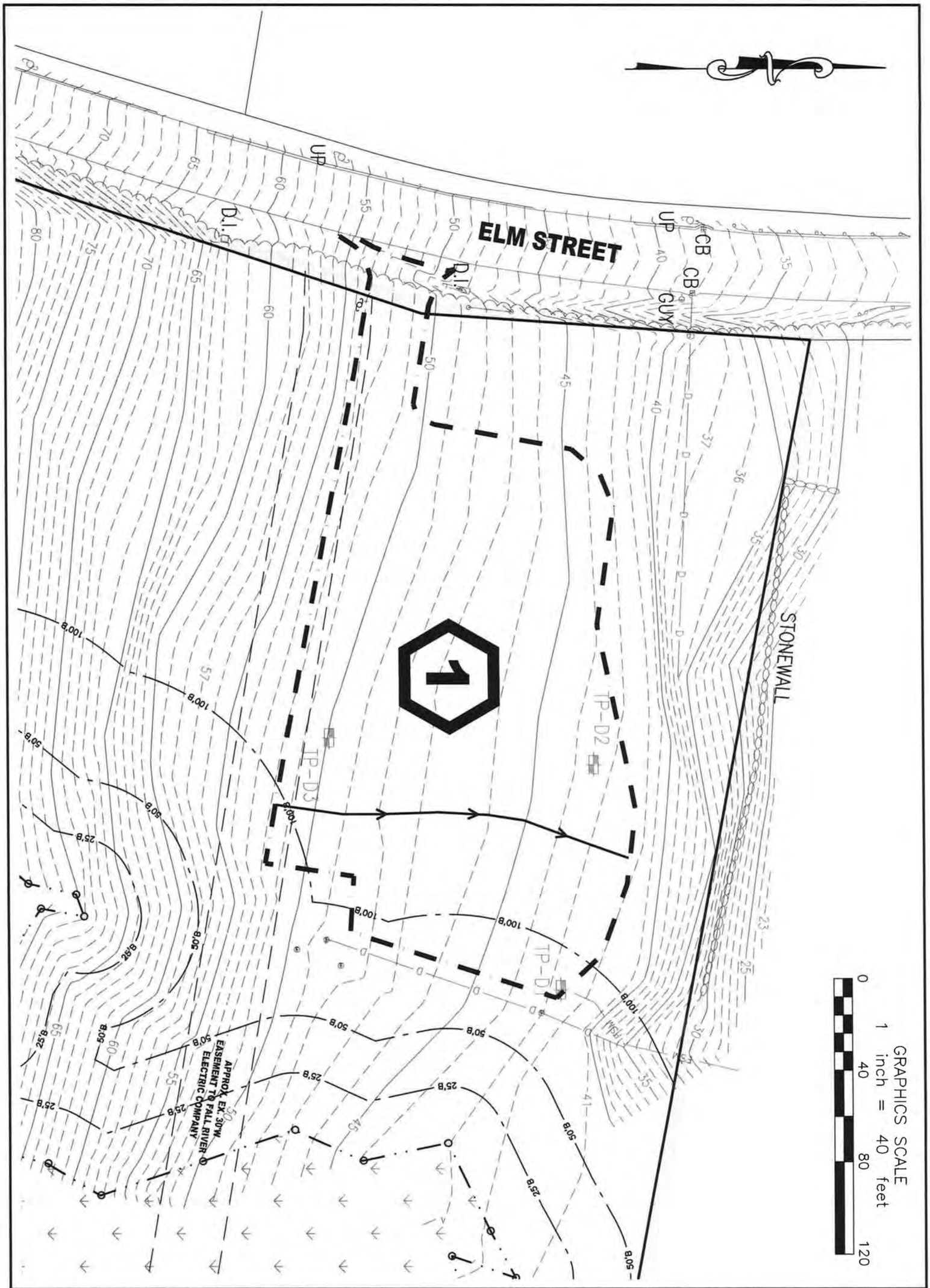

SHEET NAME:

PRE-DEVELOPMENT PLAN

PROJECT SITE:

ELM STREET
DIGHTON, MASSACHUSETTS

CLIENT INFO:

ZERO ELM STREET, LLC
9 JESSIE LANE
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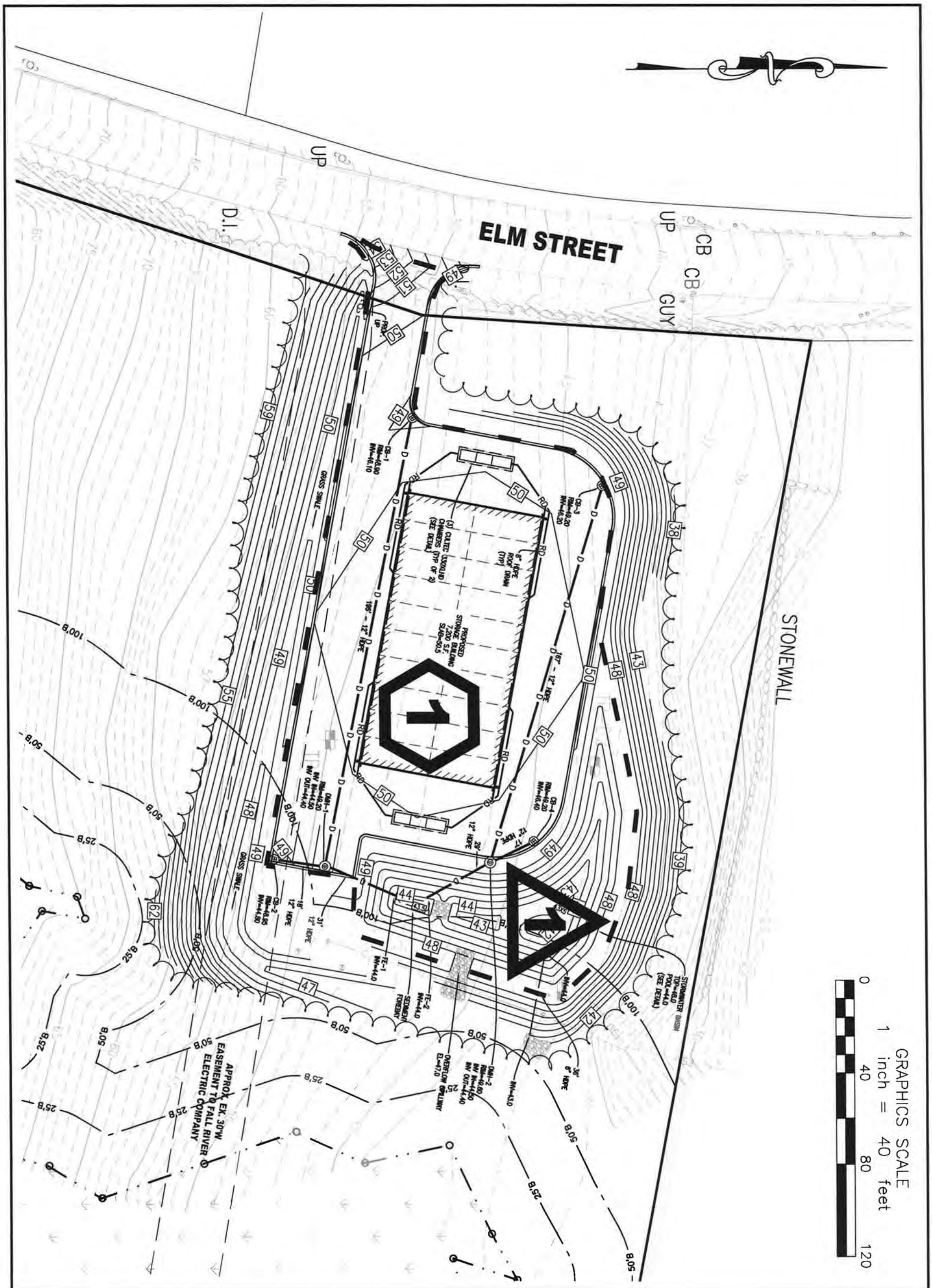

SHEET NAME:

POST-DEVELOPMENT PLAN

PROJECT SITE:

ELM STREET
DIGHTON, MASSACHUSETTS

CLIENT INFO:

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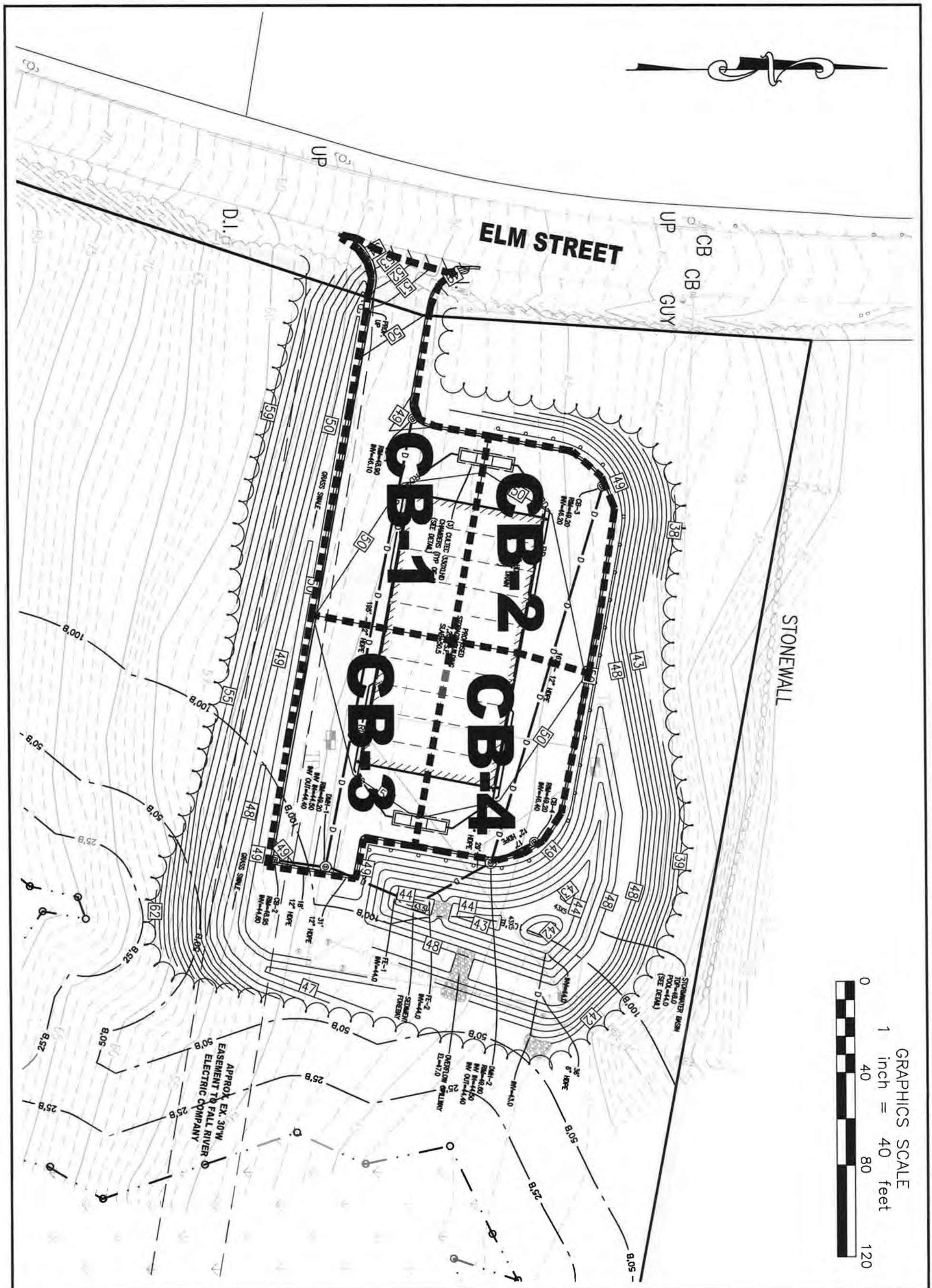

SHEET NAME:

CATCH BASIN AREAS PLAN

PROJECT SITE:

ELM STREET
DIGHTON, MASSACHUSETTS

CLIENT INFO:

ZERO ELM STREET, LLC
9 JESSIE LANE
BERKLEY, MA 02779

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