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**Town of Kittery
Planning Board Meeting
May 25, 2023**

ITEM 2– 35 Badgers Island West, Preliminary Site Plan and Shoreland Development Plan

Action: hold public hearing and review for completeness, continue, approve, or deny plan: Pursuant to §16.4 Land Use Regulations §16.7 and §16.9.3 Shoreland Development Review requirements of the Town of Kittery Land Use and Development Code, owner B.I.W. Group, LLC and agent John Chagnon with Ambit Engineering request approval to expand a legally non-conforming office building to provide 10 residential units on a legally conforming lot located on real property with the address of 35 Badgers Island West, Tax Map 1, Lot 34, in the Mixed-Use Badgers Island Zone (MU-BI), Shoreland Overlay Zone (OZ-SL-250’), Resource Protection Overlay Zone (OZ-RP) and the Commercial Fisheries/Maritime Use (OZ-CFMU).

Goal: The applicant is seeking a clear determination that the Board does/ does not support the proposed shoreland setback encroachment. The applicant proposes to capture and treat stormwater runoff from nearby public and off-site private areas and revegetate shoreline areas on the property to compensate for the proposed setback encroachment. If the Board supports the current proposal, then the applicant will develop additional architectural and site plan details as required for site plan review. If the Board does not support the current proposal, then the applicant will revise the scope of work. A revised scope may not include the drainage improvements and revegetation work that is currently proposed. The Board voted to accept the sketch plan for this proposal on February 9 but expressed differing opinions on this matter during the April 23 meeting.

5
6

PROJECT TRACKING

REQ'D	ACTION	COMMENTS	STATUS
NO	Sketch Plan	October 27, 2022, February 9, 2023	Accepted on 2/9/23
NO	Site Visit	November 14, 2022	Held
YES	Preliminary Site Plan Review Completeness/Acceptance	Possible on 4/27/2023	Pending
YES	Public Hearing	Scheduled May 25, 2023	
YES	Preliminary Site Plan Review Approval		
YES	Final Site Plan Review Approval		
YES	Shoreland Development Plan Review Plan Approval		

Applicant: Plan Review Notes reflect comments and recommendations regarding applicability of Town Land Use Development Code, and standard planning and development practices. Only the PB makes final decisions on code compliance and approves, approves with conditions or denies final plans. Prior to the signing of the approved Plan any **Conditions of Approval related to the Findings of Fact along with waivers and variances (by the BOA) must be placed on the Final Plan and, when applicable, recorded at the York County Registry of Deeds. PLACE THE MAP AND LOT NUMBER IN 1/4” HIGH LETTERS AT LOWER RIGHT BORDER OF ALL PLAN SHEETS. As per Section 16.4.4.13 - Grading/Construction Final Plan Required. - Grading or construction of roads, grading of land or lots, or construction of buildings is prohibited until the original copy of the approved final plan endorsed has been duly recorded in the York County registry of deeds when applicable.**

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8

Project Summary

35 Badgers Island West (“Property”) is located along the bank of the Piscataqua River within the Mixed-Use Badgers Island (MU-BI) zoning district, the Shoreland Overlay Zone (OZ-SL-250) and the Resource Protection Zone (OZ-RP). as well as Commercial Fisheries/Maritime Use (OZ-CFMU) The lot is legally conforming in size– there are 75-foot shoreland setbacks in the MU-BI base zone and the ability for the

13 Planning Board to approve less than that (down to 25 feet) when certain conditions are met to the Board’s
14 satisfaction. See **Shoreland Zoning** section for details.

15
16 The proposed project expands the existing building and converts the use from an office building to 10
17 residential units. The existing building does not meet the 75-foot setback requirements from the Highest
18 Annual Tide (HAT) with intrusion on the eastern side. This makes the existing building legally non-
19 conforming because the office building replaced a marine warehouse that formerly existed on the site. The
20 expansion proposes additions on both the north and south ends of the existing building and includes a 10-
21 stall underground parking garage under each of the proposed 2-story additions.

22 The sketch plan accepted by the Board on February 9th, 2023 showed that the northern addition
23 encroached on the 75-foot setback to the HAT line in four places as did a portion of the proposed
24 driveway. Packet for the February meeting here: [Planning Board Feb 9 2023 39 badgers island west.pdf](#)
25 Preliminary Plan Update: The northern addition encroaches on the 75-foot setback in two places as does a
26 portion of the proposed driveway and a portion of the proposed porous patio. The Applicant’s plan states
27 that the total land area of the lot is 58,985 square feet as measured from the mean high-water line (see
28 **Development Standards** for more details). Preliminary Plan Update: The total land area has been modified
29 per requirements noted in the February plan review notes under **Development Standards** to 54,883 square
30 feet. The current building footprint is 5,922 square feet and was built on the footprint of a 4,000 square foot
31 marine warehouse in 1994 and then added onto two years later. The proposed expansion of the building has
32 a post construction footprint of 13,422 square feet. Preliminary Plan Update: The building has a post-
33 construction footprint of 13,328 square feet.

34
35 **Shoreland Zoning and Preliminary Site Plan**

36
37 As stated previously, a portion of the existing building encroaches on the 75-foot shoreland setback for this
38 zone. Parts of the northern addition, a patio and a driveway also encroach. Preliminary Plan Update: The
39 Applicant is submitting the preliminary plan submission to provide additional details to the Board in regards
40 to meeting both the submission requirements of §16.7 Site Plan Review and §16.4.24(3) special conditions
41 of the MU-BI Zone found under §16.4.24(3) that allow a development to be located less than 75-feet from
42 the HAT if one of three requirements are found to be met to the Board’s satisfaction. The requirement the
43 Applicant is proposing to meet is §16.4.24(3)(c) (included with the Applicant’s cover letter materials)
44 which requires preservation of environmental quality by providing wildlife habitat, conserving shore cover
45 through plantings in the setback and implementation of stormwater BMPs to minimize water quality
46 degradation.

47
48 To see information on DEP’s verification of the 25-foot setback allowance and the Town attorney’s opinion
49 on the applicability of certain shoreland zoning regulations pertinent to this application, please look at the
50 February 9th planning review notes available from the link above.

51
52 **Previous Meetings**

53
54 The Board first heard this application on October 27, 2022 and a site walk was held on November 22, 2022.
55 The Board accepted the sketch plan on February 9th, 2023. The project has now moved to preliminary site
56 plan review.

57
58 **Development Standards – updated for Preliminary Site Plan**

59
60 This application contains detailed site information including shoreland, utility and grading plans, a revised
61 planting plan done by a landscape architectural firm, a lighting plan albeit not yet including photometrics
62 or fixture details, and a turning template plan. A parking plan shows parking underneath the two proposed

63 additions. It also contains material describing the type of BMP proposed, called a Jellyfish, along with the
64 stormwater (drainage) analysis. The Applicant is seeking guidance from the Board as to whether the revised
65 landscape plan along with the advanced stormwater treatment satisfies the Board’s requirements pertinent
66 to §16.4.24(3) since that determination will affect the proposed additions’ placement relative to the
67 shoreland setback.

68
69 Under §16.4.24 (D)(1)(a)-(h) dimensional requirements for the Mixed-use. Badgers Island (MU-BI)
70 zone:

71 **(a)** Minimum land area per dwelling unit: 3,000 square feet.
72 **[1]** For each of the first two dwelling units and thereafter: 6,000 square feet.
73 *The land area is 58,985 sf on plan note #4 on many of the plan sheets which represents land area*
74 *above mean high water. However, Kittery’s definition in 16.3.2 for Minimum land area per*
75 *dwelling unit states that the land area is calculated from the HAT landward, not from the mean*
76 *high water line.*

77
78 *The devegetation table on Sheet C2 shows the land area is 54,883 – perhaps that is calculated*
79 *based on the definition above and if so, the plans should be consistent in all cases since this plan*
80 *is also a shoreland zone plan.*

81
82 *For the lot size as presented (58,985 sf approximately) and number of units proposed, the density*
83 *calculation looks like this:*
84 *(2 units x 3,000 sf = 6,000 sf) + (8 units x 6,000 sf = 48,000 sf) = 54,000 sf.*
85 *Result: There appears to be enough land area to support 10 units based on the devegetation table*
86 *but the lot size should be consistent in the plan notes as well.*

- 87
88 **(b)** Minimum lot size: 6,000 square feet.
89 **(c)** Minimum street frontage: 50 feet.
90 **(d)** Minimum front yard: five feet.
91 **(e)** Minimum rear and side yards: 10 feet.

92
93 *All the above requirements appear to be met.*

94
95 **(f)** Maximum building height: 40 feet.
96
97 *The Applicant will be submitting elevation plans once guidance on whether the submission meets the*
98 *special conditions of §16.4.24(3) has been given by the Board to the Applicant.*

99
100 **(g)** Minimum setback from:
101 **[1]** Water body and wetland water-dependent uses: zero feet.
102 **[2]** All other uses (including buildings and parking): 75 feet unless modified, according to the
103 terms of Subsection **E** of this section.

104
105 *These standards are respectively, not applicable, and as stated earlier are subject to §16.4.24(3)(c).*

106
107 **(h)** Minimum open space on the site: 40%. (Note: The Planning Board may reduce the required open
108 space to 30% where it is clearly demonstrated that no practicable alternative exists to accommodate a
109 water-dependent use.)

110
111 *The devegetation table shows that 41.2% of the lot as proposed will be developed which leaves 58.8%*
112 *as “green” but the Applicant should indicate in a plan note that the open space standard is being*
113 *met.*

114
115 Under §16.4.24(3)(c):

116
117 *[1] There is little existing, significant, or otherwise, wildlife habitat for migratory songbirds or wading*
118 *birds with the possible exception of the “sparse marsh grass” area to the north. Could additional saltmarsh*
119 *grass be planted in this area?*

120 *[2] To meet the conservation of contiguous shore cover with contiguous plants requirement, a planting*
121 *plan was submitted for the setback area between the building and the revetment wall. The revised landscape*
122 *plan shows contiguous plantings that wrap the shoreline of the property with a grassed area between those*
123 *plantings and additional plantings next to the building. The plant list includes some native species. A peer*
124 *review of the landscaping plan will be done.*

125 *[3] Requires the implementation of a stormwater management plan which improves the quality of the water*
126 *released to the Piscataqua River. The proposed stormwater management system includes the Jellyfish*
127 *which is intended to handle stormwater not generated on the site, filter and treat it before it reaches the*
128 *river. The Jellyfish system is approved by DEP. Like most stormwater systems, maintenance is required,*
129 *the materials say it should be done every 6 months. The rest of the stormwater management system appears*
130 *to utilize the existing Town-owned stormwater drains or propose new drains which empty into the river.*
131 *Could the water quality be improved in more instances before the water enters the river? The Applicant*
132 *also states that the underground parking with the evaporative trench drains and the proposed removal of*
133 *the existing surface parking areas will remove the potential for automotive fluids and runoff from the*
134 *parking areas reaching the river.*

135
136 **Under §16.7.10 (C)(4)(a)-(w) Preliminary Site Plan – Plan Requirements**

137 There is an extensive list of plan requirements – what is not yet included in the submission is noted below.

138
139 Under (4)(k):

140 [1] Structural plans including elevation and floorplan of the building and proposed additions and details
141 such as building materials, colors and access points

142 [12] Some details on retaining walls, pedestrian ways and driveways are not yet included

143 Under (4)(n): Water District letter

144 Under (4)(o): Erosion and sedimentation control plan is not yet reviewed/approved by Town’s peer review
145 engineer

146 Under (4)(r): Vehicular traffic report – the applicant may want to request a waiver since a 10-unit residential
147 building will have much less impact than the office use it is replacing.

148 Under (4)(v): Letters of evaluation by public safety officials, public works commissioner and school
149 superintendent which will be collected by Planning staff

150
151 **Planning Board Procedural Steps**

152
153 This plan is currently in preliminary plan phase while simultaneously being reviewed as a shoreland zone
154 application. Preliminary phase: 1) requires the Applicant to submit a detailed development application per
155 16.7 10.C (4); 2) allows the Board to ask questions and request any needed additional information; and 3)
156 requires the Board to hold a public hearing to collect additional evidence from members of the public. If
157 the Board finds the application insufficient or requires additional information, the Board should request
158 that information be provided for the next submission.

159
160 As mentioned earlier, the Applicant is seeking direction from the Board pertaining to their request to be
161 allowed to proceed under §16.4.24(3)(c) with the proposed plan.

162

163 Staff recommendation: Discuss the proposal pertaining to §16.4.24 D(3)(c) to give the Applicant direction
164 on the building location relative to the shoreland setback without taking further action or continue the
165 preliminary plan. Staff generally find that the proposed stormwater and shoreland vegetation
166 improvements constitute adequately compensate for the limited setback encroachment that is requested.
167

168 **Recommended Motions**

169
170 *Move to open/ close a public hearing.*

171 *Move to continue the preliminary plan site plan application*

172
173 Move to continue preliminary plan application from owner/applicant owner B.I.W. Group, LLC and agent
174 John Chagnon with Ambit Engineering to request approval to expand a legally non-conforming building
175 and convert an existing office building to 10 residential units on a legally conforming lot located on real
176 property with the address of 35 Badgers Island West, Tax Map 44, Lot 71, in the Mixed-Use Badgers
177 Island Zone (MU-BI), Shoreland Overlay Zone (OZ-SL-250'), Resource Protection Overlay Zone (OZ-
178 RP) and the Commercial Fisheries/Maritime Use Zone (OZ-CFMU).
179



200 Griffin Road, Unit 3, Portsmouth, NH 03801
Phone (603) 430-9282 Fax 436-2315

15 May 2023

Dutch Dunkelberger, Chair
Kittery Planning Board
Town of Kittery
200 Rogers Road, Kittery, ME 03904

**Re: Preliminary Site Plan Review Application; Conversion to Residential
Tax Map 1, Lot 32, 35 Badgers Island West**

Dear Dutch and Planning Board Members:

On behalf of BIW Inc. we hereby submitted a REVISED package for **Preliminary Site Plan Review Approval** to the town. The application was recently reviewed by the Planning Board at your April 27, 2023, meeting. The Planning Board voted to schedule a Public Hearing for May 25, 2023. The hearing is to understand public comments regarding the Planning Board's approval of the buffer impacts as shown on the submitted application. Under Section 16.3.2.14.E of the Kittery Land Use Code a setback reduction to 25 feet from the HAT is allowed if the Planning Board finds that a development plan significantly contributes to the accomplishment of certain objectives. We believe that the project redevelopment satisfies Section (3) of Section 16.3.2.14.E and that this plan meets the criteria needed to allow the proposed minor intrusions into the buffer zone. The proposed re-use we believe will have some significant benefits for this end of Badgers Island, both from a use (traffic) perspective as well as, and more importantly to the buffer zone, an environmental perspective. We request that the **Planning Board vote** at this meeting, so that the applicant can continue to a final design, one way or the other.

This project proposes stormwater control and treatment of off-site runoff *on the subject parcel* where treatment does not currently exist. Runoff which comes from the town road and adjacent properties will be captured and treated; instead of just being conveyed to the tidal resource. The project proposes a minimum setback of 68 feet where 75 feet is required. The plan shows that the wetland buffer impact is reduced by 994 square feet, or 49%, from existing.

The plan set contains a professionally prepared Landscape Plan showing the proposed plantings. The plantings have taken into account the need for salt tolerant vegetation, as well as wildlife habitat. We hope that the Board agrees that this project will be a benefit to the community, and the environment. **We request that the Planning Board complete the review of this issue at the May meeting and take a vote, after public input, on this issue.**

The entire plan set (excluding the Detail(s) sheets) is included, however only the following plans have been revised in this submission:

- Cover Sheet – The Plan Submittal date has been updated.
- Shoreland Development Plan C2 – The plan has been adjusted to delete an existing tree that will be replaced with new stock, as shown on the Landscape Plan.
- Landscape Plan L1 – The plan has been updated to the current site layout and is a complete plan.
- Demolition Plan C5 – The plan shows the tree to be replaced denoted as being removed. The tree is a 14” cherry tree, at the northwest corner of the existing southerly surface parking lot.

We look forward to the Planning Board review of this submission and our in-person presentation at the Planning Board meeting. For the reasons stated, we respectfully request the Planning Board vote on the **Section 16.3.2.14.E conformance** issue. Thank you for your time and attention to this proposal.

Please contact me if you have any questions or concerns regarding this application.

Sincerely,

A handwritten signature in black ink, appearing to read 'J. Chagnon', with a long horizontal flourish extending to the right.

John R. Chagnon, PE
Ambit Engineering – Haley Ward
CC: Project Team

RESIDENTIAL CONVERSION

35 BADGERS ISLAND WEST
KITTERY, MAINE

AMENDED SITE PLAN SKETCH PLAN APPLICATION

OWNER & APPLICANT:
B.I.W. GROUP, LLC
41 INDUSTRIAL DRIVE, UNIT 20
EXETER, N.H. 03833

CIVIL ENGINEER & LAND
SURVEYOR:
AMBIT ENGINEERING, INC.
200 GRIFFIN ROAD, UNIT 3
PORTSMOUTH, N.H. 03801-7114
TEL: (603) 430-9282
FAX: (603) 436-2315

LANDSCAPE ARCHITECT:
WOODBURN & COMPANY
LANDSCAPE ARCHITECTURE
103 KENT PLACE
NEWMARKET, N.H. 03857
TEL: (603) 659-5949

INDEX OF SHEETS

- C1 - EXISTING CONDITIONS PLAN
- C2 - SHORELAND DEVELOPMENT PLAN
- L1 - LANDSCAPE PLAN
- C3 - UTILITY PLAN
- C4 - GRADING PLAN
- C5 - DEMOLITION PLAN
- C6 - PARKING PLAN
- T1 - TURNING TEMPLATE PLAN
- C7 - LIGHTING PLAN
- D1-D5 - DETAILS

OWNER:

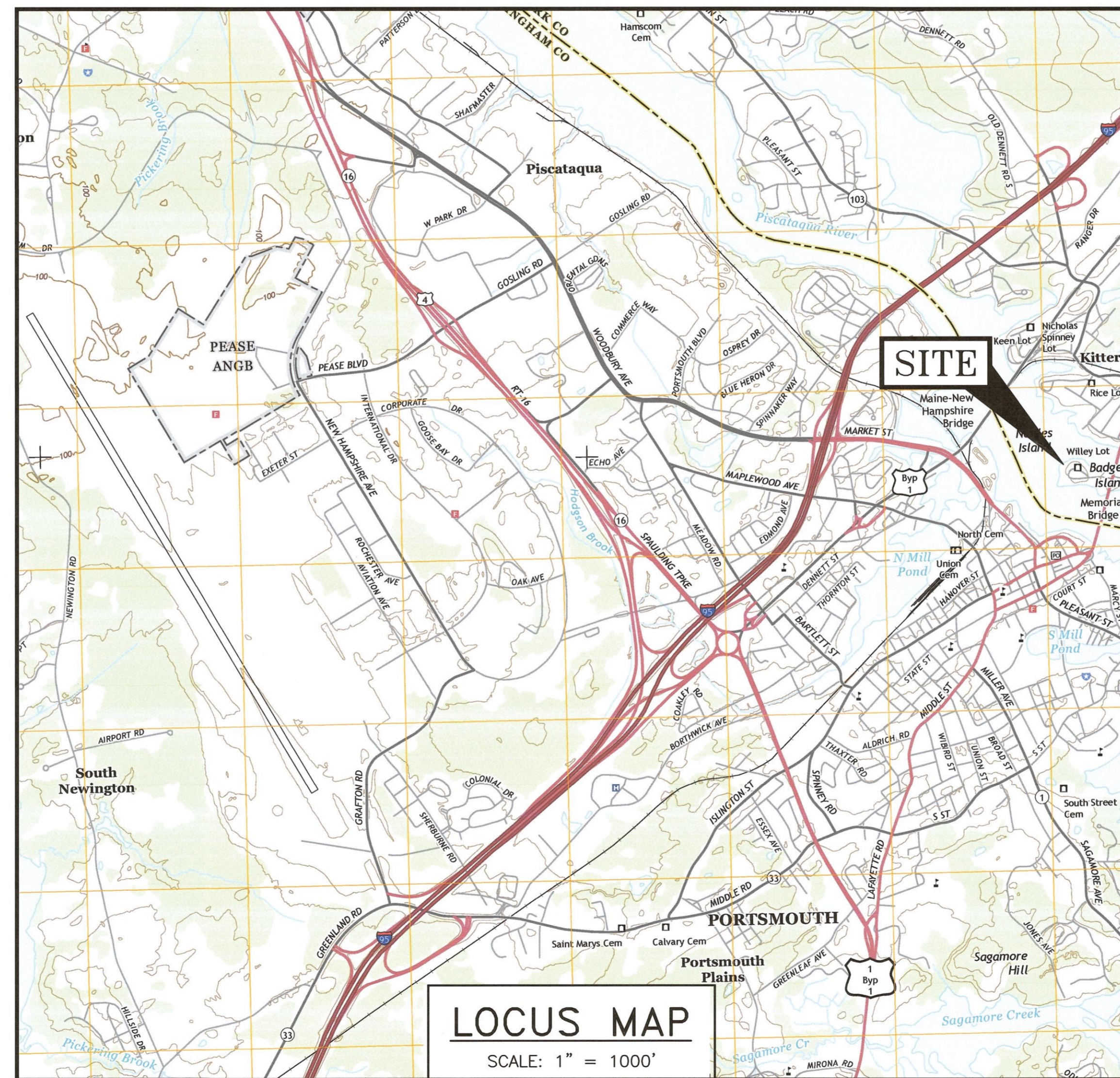
SIGNATURE

DATE

APPROVED BY THE KITTERY PLANNING BOARD

CHAIRMAN

DATE



LEGEND:

N/F	NOW OR FORMERLY
RP	RECORD OF PROBATE
YCRD	YORK COUNTY REGISTRY
	OF DEEDS
(17/21)	MAP 11/LOT 21
RR SPK FND	RAILROAD SPIKE FOUND / SET
IR FND	IRON ROD FOUND / SET
IP FND	IRON PIPE FOUND / SET
DH FND	DRILL HOLE FOUND
BND w/DH	BOUND WITH DRILL HOLE
ST BND w/DH	STONE BOUND WITH DRILL HOLE
RR SPK SET	
IR SET	
IP SET	
DH SET	
BND w/DH	
ST BND w/DH	
EXISTING	PROPOSED
FM	FM
S	S
G	G
D	D
W	W
	FORCE MAIN
	SEWER LINE
	GAS LINE
	STORM DRAIN
	WATER LINE
	UNDERGROUND ELECTRIC
	OVERHEAD ELECTRIC/WIRES
	EDGE OF WATER BODY
	EDGE OF WETLAND
	EDGE OF RESOURCE PROTECTION AREA
	AREA OF WETLAND DISTURBANCE
	OF DITCH/SWALE
100	CONTOUR
97x3	SPOT ELEVATION
	EDGE OF PAVEMENT (EP)
	WOODS / TREE LINE
	SECURITY FENCE
	WETLANDS
	SOIL SERIES
	UTILITY POLE
	WATER SHUT OFF/CURB STOP
	GAS SHUT OFF
	GATE VALVE
	HYDRANT
	CATCH BASIN
	TELEPHONE MANHOLE
	SEWER MANHOLE
	DRAIN MANHOLE
	WELL
	ASBESTOS CEMENT PIPE
	CENTERLINE
	CAST IRON PIPE
	CORRUGATED METAL PIPE
	COPPER PIPE
	CORRUGATED PLASTIC PIPE
	DUCTILE IRON PIPE
	ELEVATION
	EDGE OF PAVEMENT
	FINISHED FLOOR
	INVERT
	POLYVINYL CHLORIDE PIPE
	REINFORCED CONCRETE PIPE
	TO BE DETERMINED
	TEMPORARY BENCH MARK
	TYPICAL
	VITRIFIED CLAY PIPE
	PARKING SPACE COUNT



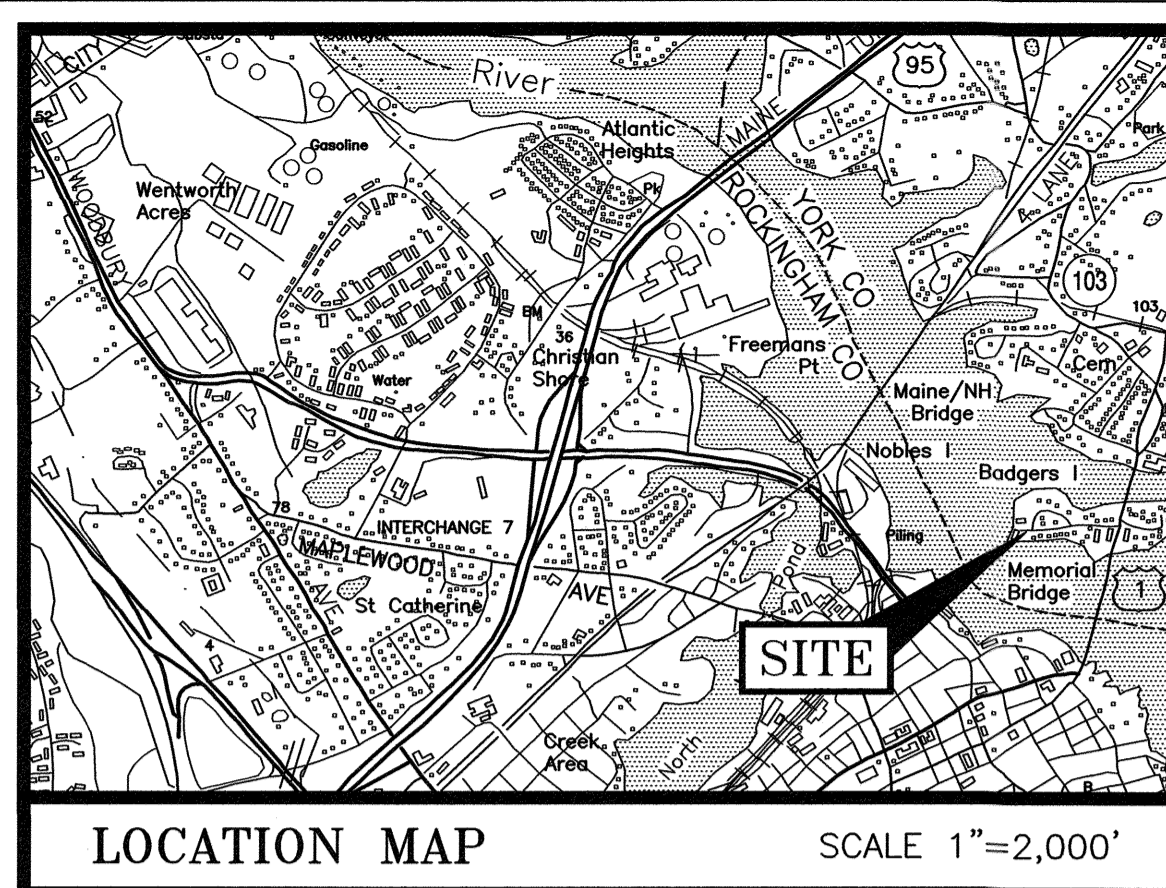
AMENDED SITE PLAN
TAX MAP 1, LOT 32
RESIDENTIAL CONVERSION
35 BADGERS ISLAND WEST
KITTERY, MAINE



WWW.HALEYWARD.COM

200 Griffin Road, Unit 3
Portsmouth, NH 03801
603.436.2315

PLAN SET SUBMITTAL DATE: 15 MAY 2023



LOCATION MAP SCALE 1"=2,000'

LEGEND:

- N/F NOW OR FORMERLY
- RP RECORD OF PROBATE
- YCRD YORK COUNTY REGISTRY OF DEEDS
- MAP 11 / LOT 21
- RAILROAD SPIKE FOUND
- IRON ROD/IRON PIPE FOUND
- IRON PIPE FOUND
- STONE/CONCRETE BOUND FOUND
- RAILROAD SPIKE SET
- IRON ROD SET
- DRILL HOLE SET
- GRANITE BOUND SET
- BOUNDARY
- BUILDING SETBACK
- MEAN HIGH WATER LINE
- MEAN SEA LEVEL
- MEAN LOW WATER
- MEAN LOWER LOW WATER
- MAINE DEP HIGHEST ANNUAL TIDE LINE
- WETLAND BUFFER LINE
- UNDERGROUND ELECTRIC
- OVERHEAD ELECTRIC/WIRES
- CONTOUR
- SPOT ELEVATION
- EDGE OF PAVEMENT (EP)
- WOODS / TREE LINE
- UTILITY POLE (w/ GUY)
- GAS SHUT OFF
- WATER SHUT OFF/CURB STOP
- GATE VALVE
- HYDRANT
- METER (GAS, WATER, ELECTRIC)
- CATCH BASIN
- SEWER MANHOLE
- DRAIN MANHOLE
- WETLAND BUFFER LINE
- UNDERGROUND ELECTRIC
- OVERHEAD ELECTRIC/WIRES
- CONTOUR
- SPOT ELEVATION
- EDGE OF PAVEMENT (EP)
- WOODS / TREE LINE
- UTILITY POLE (w/ GUY)
- GAS SHUT OFF
- WATER SHUT OFF/CURB STOP
- GATE VALVE
- HYDRANT
- METER (GAS, WATER, ELECTRIC)
- CATCH BASIN
- SEWER MANHOLE
- DRAIN MANHOLE

LEGEND: (CONTINUED)

- AIR CONDITIONING UNIT
- HEAT PUMP
- SIGNS
- CORRUGATED PLASTIC PIPE
- POLYVINYL CHLORIDE PIPE
- ELEVATION
- EDGE OF PAVEMENT
- FINISHED FLOOR
- INVERT
- TEMPORARY BENCHMARK
- TYPICAL
- VERTICAL/SLOPED GRANITE CURB
- LANDSCAPED AREA

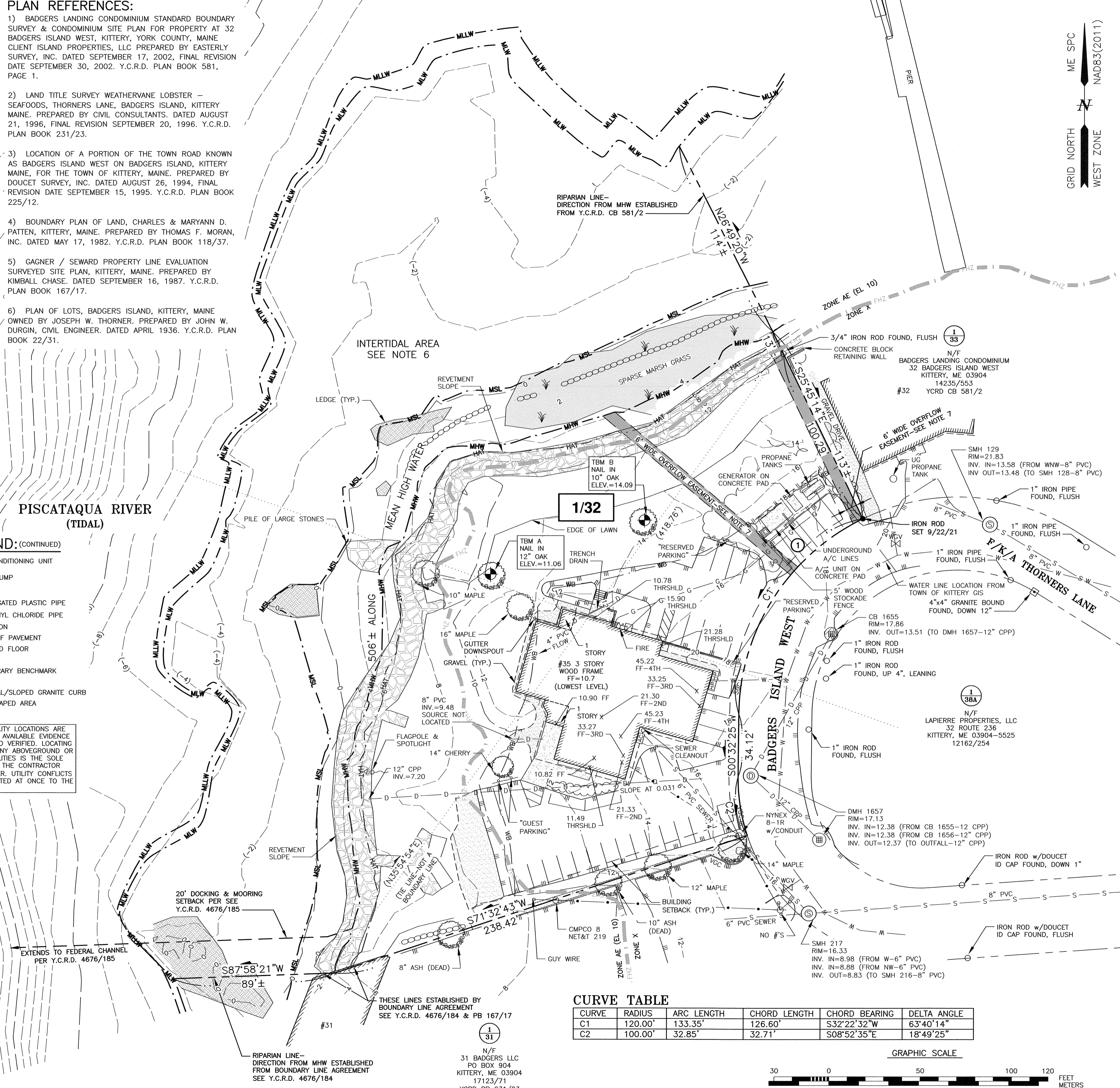
DEVEGETATED COVERAGE CALCULATION (TO HAT LINE)

STRUCTURE	EXISTING (S.F.)
MAIN STRUCTURE	5,922
PAVEMENT	12,289
GRAVEL AREAS	2,277
RETAINING WALLS	86
CONCRETE PADS/STEPS	957
REVETMENT	5392
TOTAL	26,923
LOT SIZE	54,883
% LOT COVERAGE	49.1%

UNDERGROUND UTILITY LOCATIONS ARE BASED UPON BEST AVAILABLE EVIDENCE AND ARE NOT FIELD VERIFIED. LOCATING AND PROTECTING ANY ABOVEGROUND OR UNDERGROUND UTILITIES IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR AND/OR THE OWNER. UTILITY CONFLICTS SHOULD BE REPORTED AT ONCE TO THE DESIGN ENGINEER.

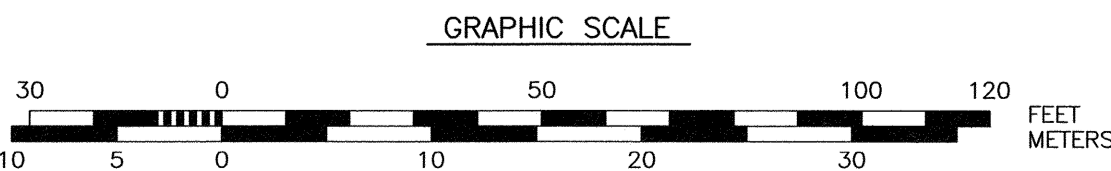
- PLAN REFERENCES:**
- BADGERS LANDING CONDOMINIUM STANDARD BOUNDARY SURVEY & CONDOMINIUM SITE PLAN FOR PROPERTY AT 32 BADGERS ISLAND WEST, KITTERY, YORK COUNTY, MAINE. CLIENT ISLAND PROPERTIES, LLC PREPARED BY EASTERLY SURVEY, INC. DATED SEPTEMBER 17, 2002. FINAL REVISION DATE SEPTEMBER 30, 2002. Y.C.R.D. PLAN BOOK 581, PAGE 1.
 - LAND TITLE SURVEY WEATHERVANE LOBSTER - SEAFOODS, THORNERS LANE, BADGERS ISLAND, KITTERY MAINE. PREPARED BY CIVIL CONSULTANTS. DATED AUGUST 21, 1996, FINAL REVISION SEPTEMBER 20, 1996. Y.C.R.D. PLAN BOOK 231/23.
 - LOCATION OF A PORTION OF THE TOWN ROAD KNOWN AS BADGERS ISLAND WEST ON BADGERS ISLAND, KITTERY MAINE, FOR THE TOWN OF KITTERY, MAINE. PREPARED BY DOUCET SURVEY, INC. DATED AUGUST 26, 1994, FINAL REVISION DATE SEPTEMBER 15, 1995. Y.C.R.D. PLAN BOOK 225/12.
 - BOUNDARY PLAN OF LAND, CHARLES & MARYANN D. PATTEN, KITTERY, MAINE. PREPARED BY THOMAS F. MORAN, INC. DATED MAY 17, 1982. Y.C.R.D. PLAN BOOK 118/37.
 - GAGNER / SEWARD PROPERTY LINE EVALUATION SURVEYED SITE PLAN, KITTERY, MAINE. PREPARED BY KIMBALL CHASE. DATED SEPTEMBER 16, 1987. Y.C.R.D. PLAN BOOK 167/17.
 - PLAN OF LOTS, BADGERS ISLAND, KITTERY, MAINE OWNED BY JOSEPH W. THORNER. PREPARED BY JOHN W. DURGIN, CIVIL ENGINEER. DATED APRIL 1936. Y.C.R.D. PLAN BOOK 22/31.

PISCATAQUA RIVER (TIDAL)



CURVE TABLE

CURVE	RADIUS	ARC LENGTH	CHORD LENGTH	CHORD BEARING	DELTA ANGLE
C1	120.00'	133.35'	126.60'	S32°22'32"W	63°40'14"
C2	100.00'	32.85'	32.71'	S08°52'35"E	18°49'25"



PURSUANT TO CHAPTER 90 PARTS 1 AND 2 OF THE SURVEY STANDARDS OF PRACTICE AS ADOPTED BY THE MAINE BOARD OF LICENSURE FOR PROFESSIONAL LAND SURVEYORS, THE FOLLOWING EXCEPTIONS TO PART 2 ARE NOTED:

- NO SURVEY REPORT HAS BEEN PREPARED.
- NO LAND DESCRIPTION HAS BEEN PREPARED.
- MONUMENTS HAVE NOT BEEN SET.

THIS SURVEY CONFORMS TO THE MAINE BOARD OF LICENSURE FOR PROFESSIONAL LAND SURVEYORS CHAPTER 90 STANDARDS OF PRACTICE, EFFECTIVE DATE APRIL 1, 2001 EXCEPT AS NOTED ON THIS PLAN.

JOHN R. CHAGNON, PLS #2276

2.24.23
DATE

31 BADGERS LLC
PO BOX 904
KITTERY, ME 03904
17123/71
YCRD PB 231/23

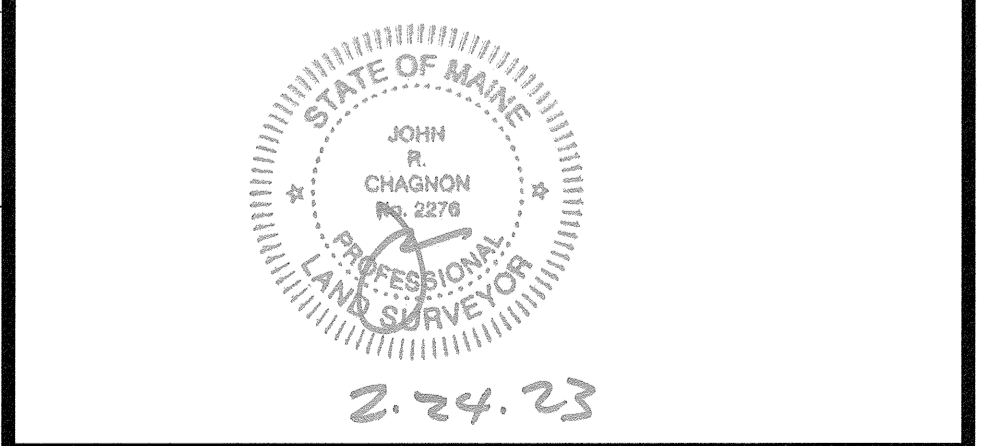
NOTES:

- PARCEL IS SHOWN ON THE TOWN OF KITTERY ASSESSOR'S MAP 1 AS LOT 32.
- OWNER OF RECORD:
B.I.W. GROUP, LLC
41 INDUSTRIAL DRIVE, UNIT 20
EXETER, NH 03833
18503/331 (FIRST PARCEL)
PLAN BOOK 22/31 (LOTS 14, 15, 16, & 17)
- A PORTION OF THE PARCEL IS IN A SPECIAL FLOOD HAZARD AREA, ZONE AE (EL 10), AS SHOWN ON PRELIMINARY FIRM PANEL 23031C07096. REVISED PRELIMINARY 4/14/2017.
- EXISTING LOT AREA:
58,985± S.F. (TO MEAN HIGH WATER)
1.3541± ACRES (TO MEAN HIGH WATER)
- PARCEL IS LOCATED IN THE MIXED USE - BADGERS ISLAND (MU-BI) ZONING DISTRICT AND IS SUBJECT TO THE RESOURCE PROTECTION (OZ-RP) AND SHORELAND-WATER BODY / WETLAND PROTECTION AREA (OZ-SL-250') OVERLAY DISTRICTS.
- DIMENSIONAL REQUIREMENTS:
MIN. LOT AREA: 6,000 SF
FRONTAGE: 50 FEET
SETBACKS: FRONT 5 FEET
SIDE 10 FEET
REAR 10 FEET
MAXIMUM BUILDING HEIGHT: 40 FEET
MINIMUM OPEN SPACE: 40%
- THE PURPOSE OF THIS PLAN IS TO SHOW THE EXISTING CONDITIONS ON ASSESSOR'S MAP 1 LOT 32 IN THE TOWN OF KITTERY.
- VERTICAL DATUM IS NAVD88. BASIS OF VERTICAL DATUM IS REDUNDANT RTN GNSS OBSERVATIONS. MHW, MSL, MLW, AND MLLW BASED ON NOAA STATION 8419870-SEAVEY ISLAND, PORTSMOUTH HARBOR, ME.
- AREA BETWEEN MEAN HIGH WATER AND MEAN LOW WATER ARE SUBJECT TO THE RIGHTS OF THE PUBLIC.
- PARCEL IS SUBJECT TO A 6' WIDE EASEMENT FOR "LAYING AND MAINTAINING AN OVERFLOW PIPE FROM A CEPTIC (sic) TANK ON THE CONVEYED LOT UNDER THE ROADWAY", BENEFITING LOTS 1, 2, 3, 4, AND 5 ON PLAN REFERENCE 6 (NOW ASSESSOR'S MAP 1 LOTS 38 & 38A). SAID EASEMENT WAS GRANTED AS BEING ON LOT 14 BUT ALONG THE COMMON LOT LINE OF 14 & 15 OR COMMON LINE OF 13 & 14, SEE Y.C.R.D. 1301/275. IT IS NOT CLEAR IN WHICH LOCATION THE PIPE WAS CONSTRUCTED.
- HIGHEST ANNUAL TIDE LINE SHOWN AT ELEVATION 5.8 PER LOCATION SEAVEY ISLAND IN MAINE DEP HIGHEST ANNUAL TIDE (HAT) LEVELS FOR YEAR 2018.

SITE DEVELOPMENT
35 BADGERS
ISLAND WEST
KITTERY, MAINE

NO.	DESCRIPTION	DATE
2	ADD PRELIMINARY FEMA FHZ LINES	2/24/23
1	ISSUED FOR APPROVAL	1/19/23
0	ISSUED FOR COMMENT	8/18/22

REVISIONS



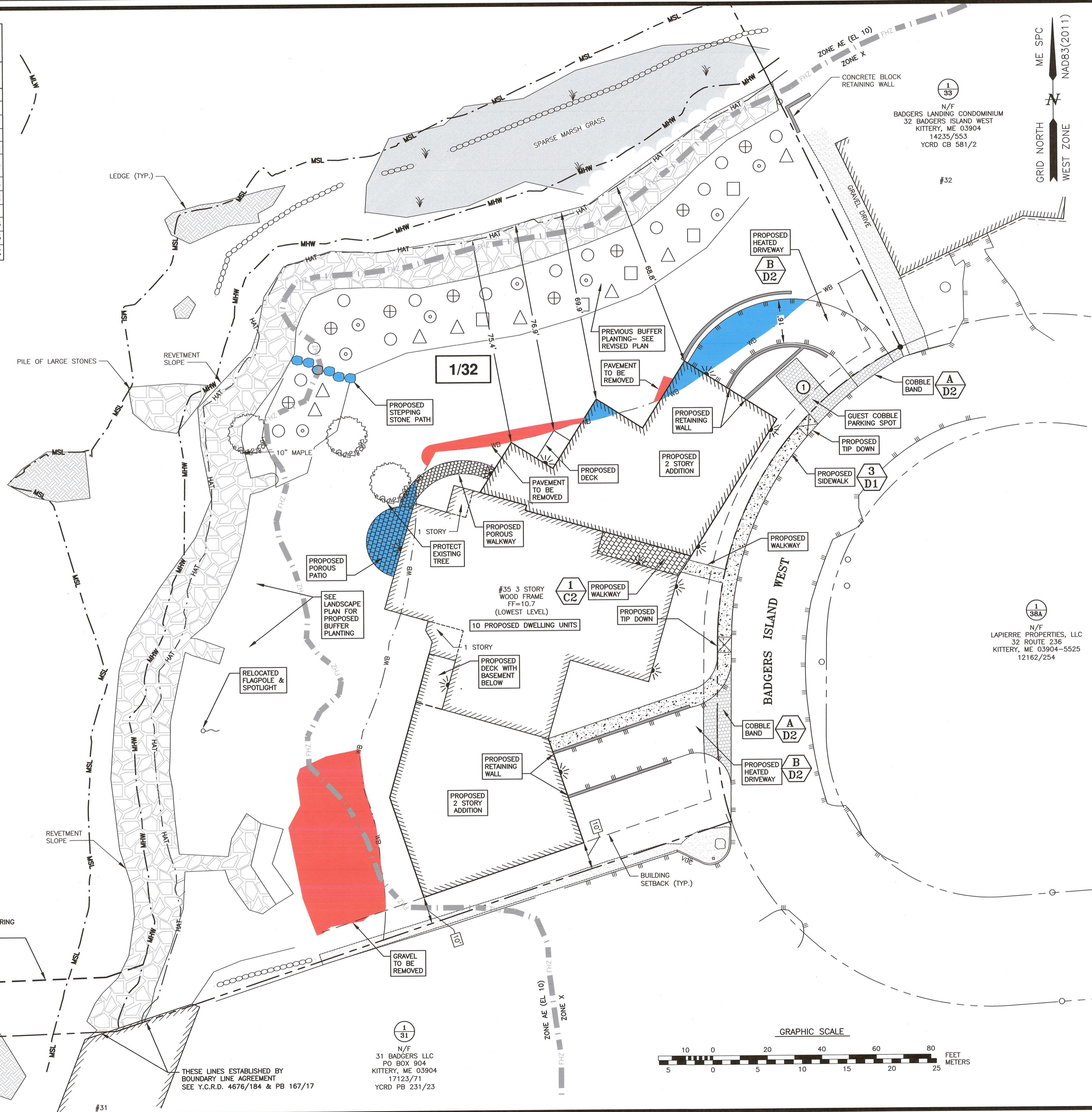
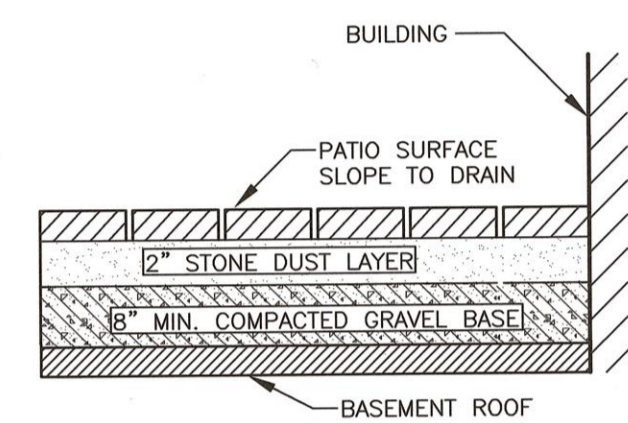
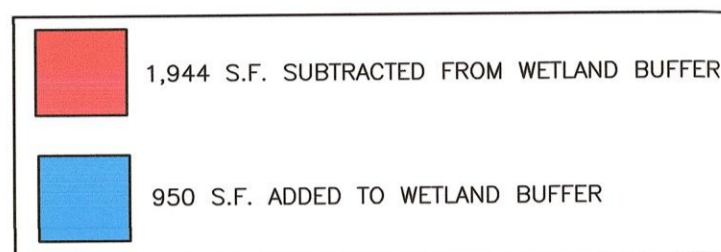
SCALE 1"=30' AUGUST 2021

EXISTING CONDITIONS PLAN **C1**

**DEVEGETATED COVERAGE CALCULATION
(TO HAT LINE)**

STRUCTURE	PRE-CONSTRUCTION (S.F.) *	POST-CONSTRUCTION (S.F.)
MAIN STRUCTURE	5,922	13,328
DECK	0	85
PAVEMENT	12,289	2,376
GRAVEL	2,277	0
RETAINING WALLS	86	169
CONCRETE PADS/STEPS/SIDEWALK	957	360
PATIOS/WALKWAYS	0	726
REVTMENT/RIPRAP	5,392	5,392
TOTAL	26,923	22,436
LOT SIZE	54,883	54,883
% DEVEGETATED AREA	49.1%	40.9%

* FROM RECENT APPROVAL.



NOTES:

- PARCEL IS SHOWN ON THE TOWN OF KITTERY ASSESSOR'S MAP 1 AS LOT 32.
- OWNER OF RECORD:
B.I.W. GROUP, LLC
41 INDUSTRIAL DRIVE, UNIT 20
EXETER, NH 03833
18503/331 (FIRST PARCEL)
PLAN BOOK 22/31 (LOTS 14, 15, 16, & 17)
- A PORTION OF THE PARCEL IS IN A SPECIAL FLOOD HAZARD AREA, ZONE AE (EL 10), AS SHOWN ON PRELIMINARY FIRM PANEL 23031C0709G, REVISED PRELIMINARY 4/14/2017.
- EXISTING LOT AREA:
58,985± S.F. (TO MEAN HIGH WATER)
1.3541± ACRES (TO MEAN HIGH WATER)
- PARCEL IS LOCATED IN THE MIXED USE - BADGERS ISLAND (MU-BI) ZONING DISTRICT AND IS SUBJECT TO THE RESOURCE PROTECTION (OZ-RP) AND SHORELAND-WATER BODY / WETLAND PROTECTION AREA (OZ-SL-250') OVERLAY DISTRICTS.
- DIMENSIONAL REQUIREMENTS:
MIN. LOT AREA: 6,000 SF
FRONTAGE: 50 FEET
SETBACKS: FRONT 5 FEET
SIDE 10 FEET
REAR 10 FEET
MAXIMUM BUILDING HEIGHT: 40 FEET
MINIMUM OPEN SPACE: 40%
- THE PURPOSE OF THIS PLAN IS TO SHOW A PROPOSED BUILDING EXPANSION CONCEPT ON ASSESSOR'S MAP 1 LOT 32 IN THE TOWN OF KITTERY.
- VERTICAL DATUM IS NAVD88. BASIS OF VERTICAL DATUM IS REDUNDANT RTN GNSS OBSERVATIONS. MHW, MSL, MLW, AND MLLW BASED ON NOAA STATION 8419870-SEAVEY ISLAND, PORTSMOUTH HARBOR, ME.
- AREA BETWEEN MEAN HIGH WATER AND MEAN LOW WATER ARE SUBJECT TO THE RIGHTS OF THE PUBLIC.
- HIGHEST ANNUAL TIDE LINE SHOWN AT ELEVATION 5.8 PER LOCATION SEAVEY ISLAND IN MAINE DEP HIGHEST ANNUAL TIDE (HAT) LEVELS FOR YEAR 2018.
- INTERIOR TRASH COLLECTION.

**SITE DEVELOPMENT
35 BADGERS
ISLAND WEST
KITTERY, MAINE**

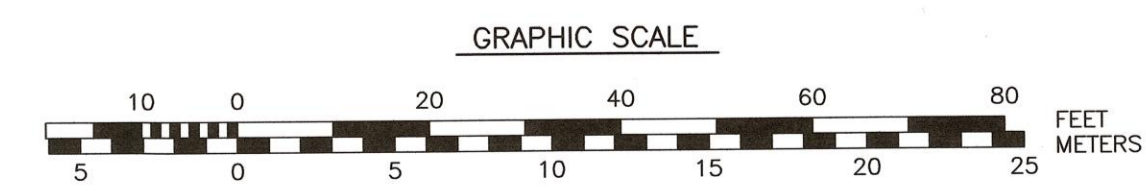
NO.	DESCRIPTION	DATE
4	TREE REPLACEMENT	5/15/23
3	BUILDING	4/6/23
2	ADD PRELIMINARY FEMA FHZ LINES	2/24/23
1	ISSUED FOR APPROVAL	1/19/23
0	ISSUED FOR COMMENT	8/18/22

REVISIONS

SCALE 1"=20' AUGUST 2022

SHORELAND DEVELOPMENT PLAN

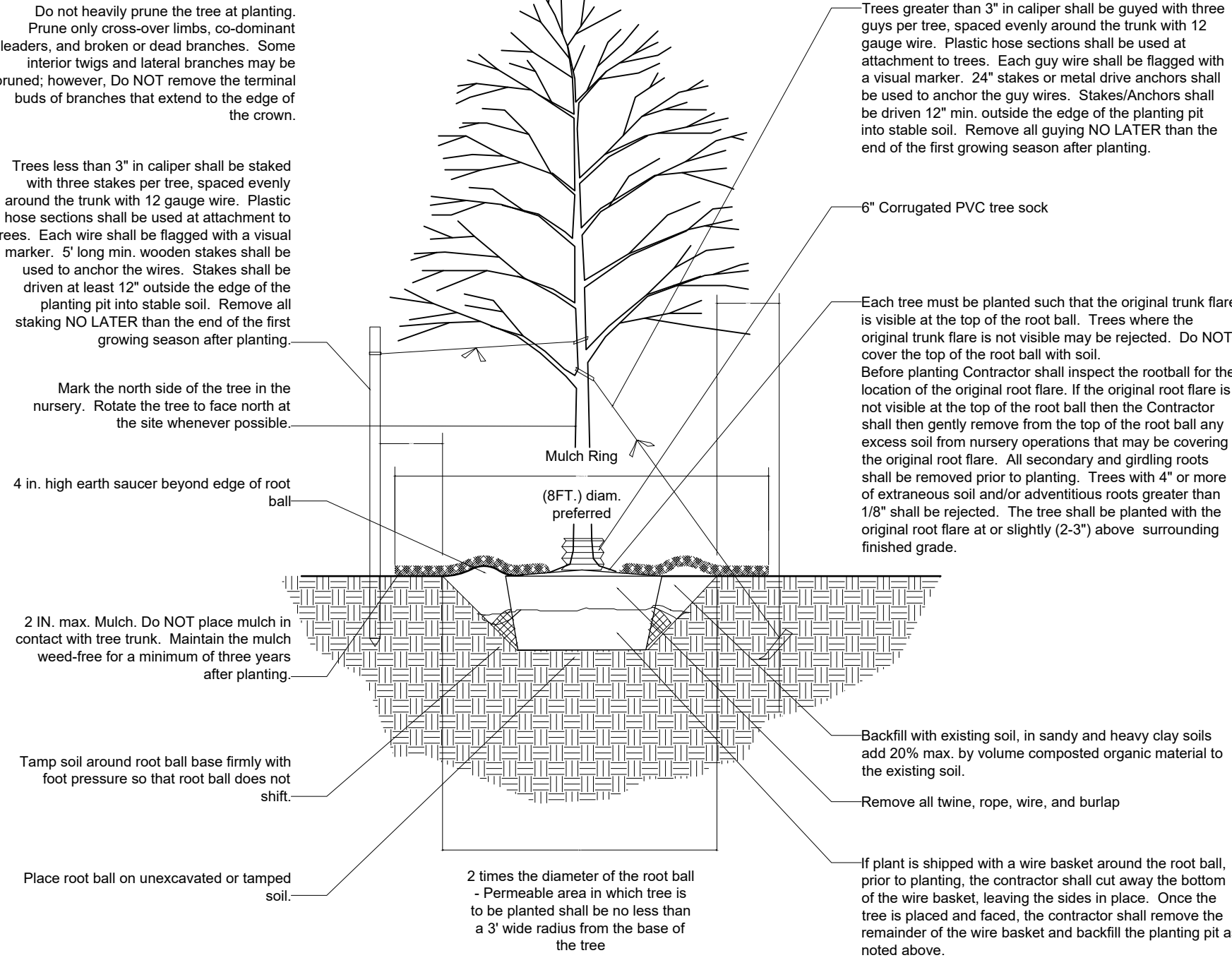
C2



P:\NH\0210135-1\shoretline_development\350323A_Badgers_Island_MSL\350323A_Badgers_Island_MSL\350323A_Site_Development\350323A_Site_Development.dwg, 1/19/23 11:58:11 AM

Landscape Notes

- Design is based on drawings by Ambit Engineering. Drawings may require adjustment due to actual field conditions.
- This plan is FOR REVIEW purposes ONLY, NOT for Construction. Construction Documents will be provided upon request.
- The Contractor shall follow best management practices during construction and shall take all means necessary to stabilize and protect the site from erosion.
- Erosion Control shall be in place prior to construction.
- Erosion Control shall comply with State and Local Erosion & Sedimentation Control Practices
- The Contractor shall verify layout and grades and inform the Landscape Architect or Client's Representative of any discrepancies or changes in layout and/or grade relationships prior to construction.
- It is the contractor's responsibility to verify drawings provided are to the correct scale prior to any bid, estimate or installation. A graphic scale bar has been provided on each sheet for this purpose. If it is determined that the scale of the drawing is incorrect, the landscape architect will provide a set of drawings at the correct scale, at the request of the contractor.
- Trees to Remain within the construction zone shall be protected from damage for the duration of the project by snow fence or other suitable means of protection to be approved by Landscape Architect or Client's Representative. Snow fence shall be located at the drip line or at the distance in feet from the trunk equal to the diameter of the tree caliper in inches, whichever is greater, and shall be expanded to include any and all surface roots. Do not fill or mulch on the trunk flare. Do not disturb roots. In order to protect the integrity of the roots, branches, trunk and bark of the tree(s) no vehicles or construction equipment shall drive or park in or on the area within the drip line(s) of the tree(s). Do not store any refuse or construction materials or portables within the tree protection area.
- Location, support, protection, and restoration of all existing utilities and appurtenances shall be the responsibility of the Contractor.
- The Contractor shall verify exact location and elevation of all utilities with the respective utility owners prior to construction. Call DIGSAFE at 811 or 888-DIG-SAFE (1-888-344-7233).
- The Contractor shall procure any required permits prior to construction.
- Prior to any landscape construction activities Contractor shall test all existing loam and loam from off-site intended to be used for lawns and plant beds using a thorough sampling of the supply. Soil testing shall indicate levels of pH, nitrates, macro and micro nutrients, texture, soluble salts, and organic matter. Contractor shall provide Landscape Architect with test results and recommendations from the testing facility along with soil amendment plans as necessary for the proposed plantings to thrive. All loam to be used on site shall be amended as approved by the Landscape Architect prior to placement.
- Contractor shall notify landscape architect or owner's representative immediately if at any point during demolition or construction a site condition is discovered which may negatively impact the completed project. This includes, but is not limited to, unforeseen drainage problems, unknown subsurface conditions, and discrepancies between the plan and the site. If a Contractor is aware of a potential issue and does not bring it to the attention of the Landscape Architect or Owner's Representative immediately, they may be responsible for the labor and materials associated with correcting the problem.
- The Contractor shall furnish and plant all plants shown on the drawings and listed thereon. All plants shall be nursery-grown under climatic conditions similar to those in the locality of the project. Plants shall conform to the botanical names and standards of size, culture, and quality for the highest grades and standards as adopted by the American Association of Nurserymen, Inc. in the American Standard of Nursery Stock, American Standards Institute, Inc. 230 Southern Building, Washington, D.C. 20005.
- A complete list of plants, including a schedule of sizes, quantities, and other requirements is shown on the drawings. In the event that quantity discrepancies or material omissions occur in the plant materials list, the planting plans shall govern.
- All plants shall be legibly tagged with proper botanical name.
- Owner or Owner's Representative will inspect plants upon delivery for conformity to Specification requirements. Such approval shall not affect the right of inspection and rejection during or after the progress of the work. The Owner reserves the right to inspect and/or select all trees at the place of growth and reserves the right to approve a representative sample of each type of shrub, herbaceous perennial, annual, and ground cover at the place of growth. Such sample will serve as a minimum standard for all plants of the same species used in this work.
- No substitutions of plants may be made without prior approval of the Owner or the Owner's Representative for any reason.
- All landscaping shall be provided with the following:
 - Outside hose attachments spaced a maximum of 150 feet apart, and
 - An underground irrigation system, or
 - A temporary irrigation system designed for a two-year period of plant establishment.
- If an automatic irrigation system is installed, all irrigation valve boxes shall be located within planting bed areas.
- The contractor is responsible for all plant material from the time their work commences until final acceptance. This includes but is not limited to maintaining all plants in good condition, the security of the plant material once delivered to the site, watering of plants, including seeding and weeding. Plants shall be appropriately watered prior to, during, and after planting. It is the Contractor's responsibility to provide clean water suitable for plant health from off site, should it not be available on site.
- All disturbed areas will be dressed with 6" of loam and planted as noted on the plans or seeded except plant beds. Plant beds shall be prepared to a depth of 12" with 75% loam and 25% compost.
- Trees, ground cover, and shrub beds shall be mulched to a depth of 2" with one-year-old, well-composted, shredded native bark not longer than 4" in length and 1/2" in width, free of woodchips and sawdust. Mulch for ferns and herbaceous perennials shall be no longer than 1" in length. Trees in lawn areas shall be mulched in a 5' diameter min. saucer. Color of mulch shall be black.
- Drip strip shall extend to 6" min. beyond roof overhang and shall be edged with 3/16" thick metal edger.
- In no case shall mulch touch the stem of a plant nor shall mulch ever be more than 3" thick total (including previously applied mulch) over the root ball of any plant.
- Secondary lateral branches of deciduous trees overhanging vehicular and pedestrian travel ways shall be pruned up to a height of 8' to allow clear and safe passage of vehicles and pedestrians under tree canopy. Shrubs and ornamental plantings adjacent to vehicular travel way shall not exceed three feet in height where sightlines would be blocked. If pruning is necessary to maintain the required maximum height, plants shall be pruned to a natural form and shall not be sheared.
- Snow shall be stored a minimum of 5' from shrubs and trunks of trees.
- The Landscape Contractor shall guarantee all lawns and plant materials for a period of not fewer than two years. Dead, dying, or diseased planting shall be removed and replaced within the growing season.
- Landscape Architect is not responsible for the means and methods of the Contractor.



Tree Planting Detail

Scale: NTS

Plant List

TREES

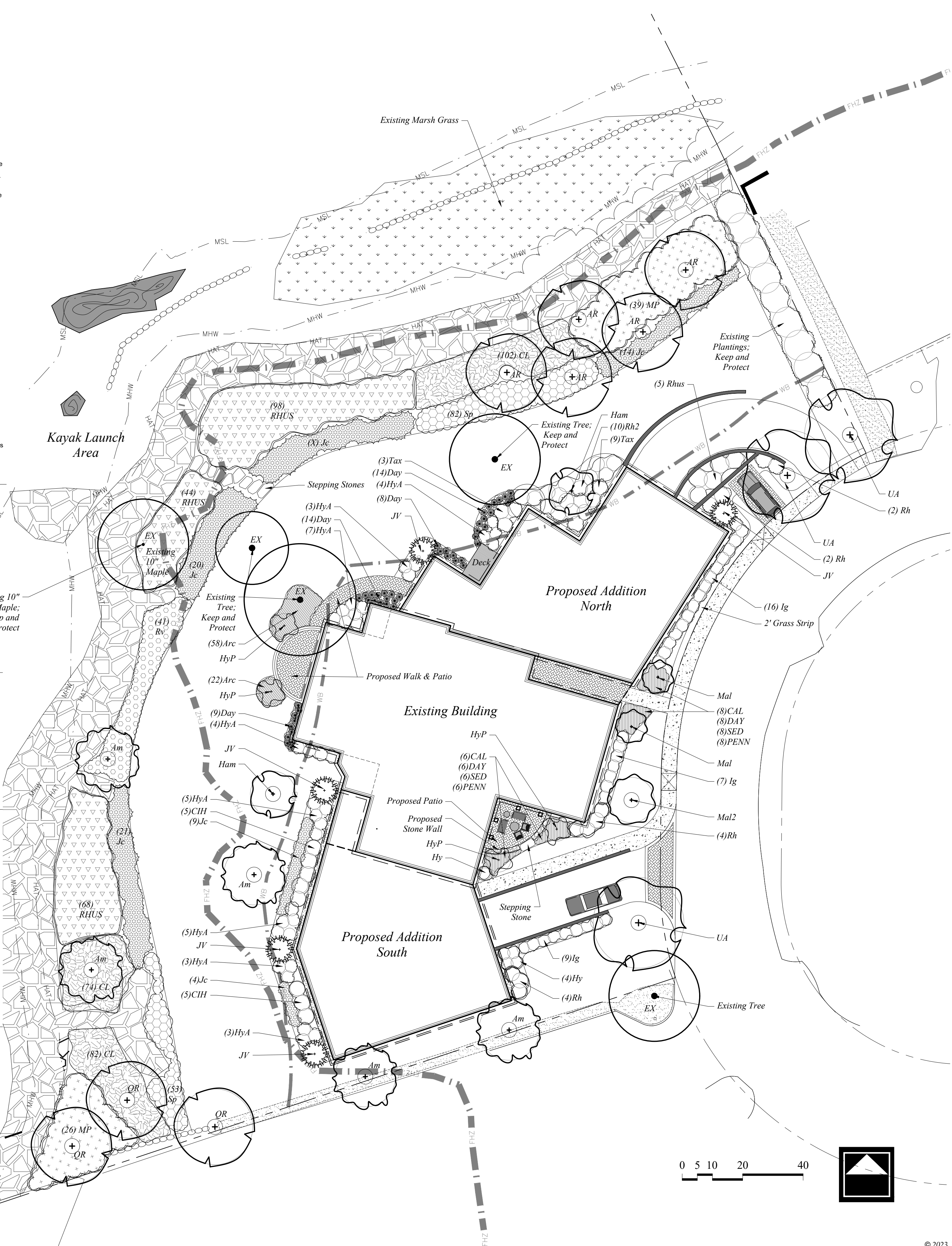
Symbol	Botanical Name	Common Name	Quantity	Size	Comments
Am	<i>Amelanchier grandiflora</i> 'Autumn Brilliance'	Autumn Brilliance Serviceberry	5	8-10' ht	BB multi-stemmed
AR	<i>Acer rubrum</i> 'October Glory'	October Glory Red Maple	6	3" cal.	BB
Ex		Existing tree to remain			
Ham	<i>Hamamelis x 'Arnold Promis'</i>	Arnold Promise Witch Hazel	2	7-8' ht.	BB multi-stemmed
JV	<i>Juniperus virginiana</i> 'Manhattan Blue'	Manhattan Blue Eastern Red Cedar	5	7-8' ht.	BB
Mal	<i>Malus 'Tina'</i>	Tina Crabapple	2	2.5' cal.	BB
Mal2	<i>Malus 'SugarTyme'</i>	Sugar Tyme Crabapple	1	2.5' cal.	BB
QR	<i>Quercus rubra</i>	Northern Red Oak	2	3" cal	BB
UA	<i>Ulmus americana</i> 'Princeton'	Princeton Elm	3	3" cal	BB

SHRUBS

Symbol	Botanical Name	Common Name	Quantity	Size	Comments
CIH	<i>Cornus 'Ivory Halo'</i>	Ivory Halo Dogwood	12	2-5'3" ht	BB
CL	<i>Clethra alnifolia</i> 'Hummingbird'	Hummingbird Clethra	258	2-5'3" ht	
HY	<i>Hydrangea macrophylla</i> 'All Summer Beauty'	All Summer Beauty Hydrangea (Blue hortensia)	5	2-5'3" ht	
HY2	<i>Hydrangea paniculata</i> 'Little Quickfire'	Little Quickfile Panicle Hydrangea	10	2-5'3" ht	
HYA	<i>Hydrangea a.</i> 'Incrediball'	Incrediball Hydrangea	34	5 gal	min. 30" ht
HyP	<i>Hydrangea paniculata</i> 'Limelight'	Limelight Hydrangea	4	10 gal	treeform, min. 30" ht
Ig	<i>Ilex glabra</i> 'Shamrock'	Shamrock Inkberry	25	5 gal	min. 18" ht./spread, full to ground
Jc	<i>Juniperus communis</i>	Common Juniper	162	3 gal	min. 18" ht./spread
MP	<i>Myrica pensylvanica</i>	Bayberry	60	2-5'3" ht	
RH	<i>Rhododendron chionoides</i>	Chionoides Rhododendron	11	2-5'3" ht	
Rh2	<i>Rhododendron 'Wilson'</i>	Wilson Rhododendron	10	3 gal	min. 18" ht./spread
RHUS	<i>Rhus aromatica</i> 'Grow Low'	Grow Low Sumac	210	3 gal	
Rv	<i>Rosa virginiana</i>	Virginia Rose	41	3 gal	
SP	<i>Spirea latifolia</i> 'Pink Mountain'	Pink Mountain Spirea	96	2 gal	min. 30" ht
Tax	<i>Taxus media</i> 'Everlow'	Everlow Yew	25	3 gal	min. 18" ht./spread

PERENNIALS, GROUNDCOVERS, VINES and ANNUALS

Symbol	Botanical Name	Common Name	Quantity	Size	Comments
Arc	<i>Arctostaphylos uva-ursi</i>	Bearberry	80	1 gal	min. 2 yr clumps
CAL	<i>Calamagrostis acutifolia</i> 'Karl Foerster'	Feather Reed Grass	14	1 gal	min. 2 yr clumps
DAY	<i>Daylily mix</i>	Mixed Daylilies	59	1 gal	min. 2 yr clumps
SED	<i>Sedum 'Autumn Joy'</i>	Autumn Joy Sedum	14	1 gal	min. 2 yr clumps
PENN	<i>Pennisetum alopecuroides</i> 'Hameln'	Hameln Dwarf Fountain Grass	14	1 gal	min. 2 yr clumps



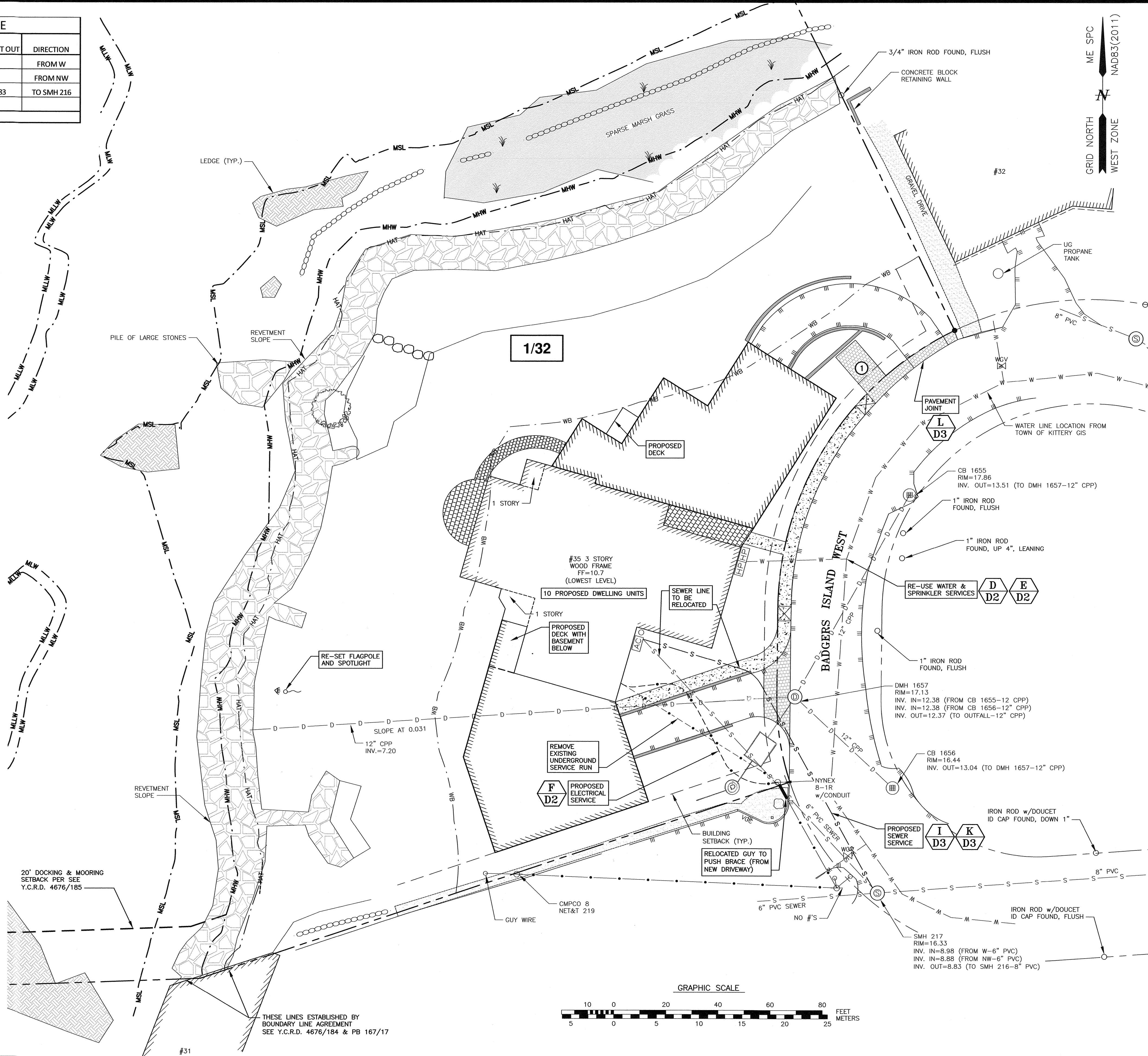
woodburn & company
 LANDSCAPE ARCHITECTURE
 108 Kent Place
 Newmarket, New Hampshire
 Phone: 603.659.5949

35 Badger's Island West
 LANDSCAPE PLAN
 for Hampshire Development Corporation
 35 Badger's Island West, Kittery, Maine

Drawn By: WSA
 Checked By: RW
 Scale: 1"=20'-0"
 Date: 2023-05-15 for PB submission
 Revisions:

L-1
 Sheet 1 of 1

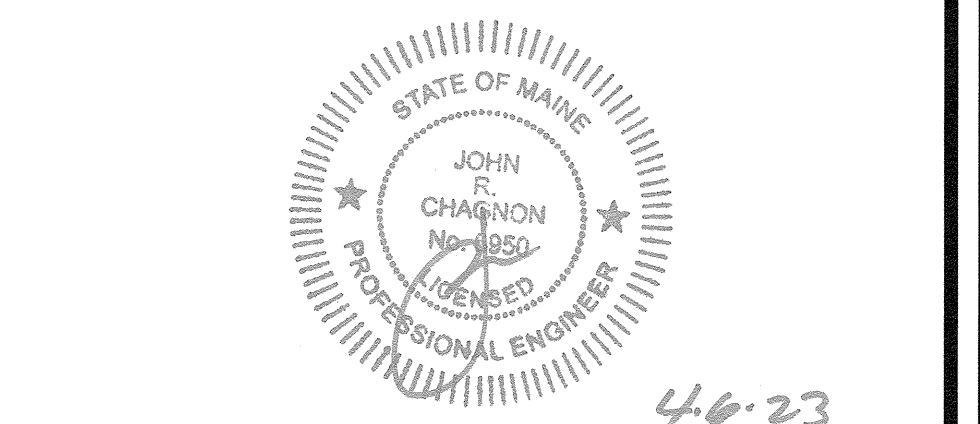
SEWER STRUCTURE SCHEDULE						
STRUCTURE	PROP/EX	RIM	PIPE SIZE/TYPE	INVERT IN	INVERT OUT	DIRECTION
SMH 217	EX	16.33	6" PVC	8.98		FROM W
			6" PVC	8.88		FROM NW
			8" PVC		8.83	TO SMH 216



- NOTES:**
- 1) THE CONTRACTOR SHALL NOTIFY DIG SAFE AT 1-888-DIG-SAFE (1-888-344-7233) AT LEAST 72 HOURS PRIOR TO COMMENCING ANY EXCAVATION ON PUBLIC OR PRIVATE PROPERTY.
 - 2) UNDERGROUND UTILITY LOCATIONS ARE BASED UPON BEST AVAILABLE EVIDENCE AND ARE NOT FIELD VERIFIED. LOCATING AND PROTECTING ANY ABOVEGROUND OR UNDERGROUND UTILITIES IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR AND/OR THE OWNER. UTILITY CONFLICTS SHOULD BE REPORTED AT ONCE TO THE DESIGN ENGINEER.
 - 3) CONTRACTOR SHALL INSTALL AND MAINTAIN EROSION CONTROL MEASURES IN ACCORDANCE WITH THE "MAINE EROSION AND SEDIMENT CONTROL BMP's" PUBLISHED BY THE MAINE D.E.P. IN 2016.
 - 4) CONTRACTOR SHALL FIELD VERIFY THE DEPTH OF EXISTING UTILITIES AND COORDINATE WITH THE ENGINEER PRIOR TO CONSTRUCTION OF THE PROPOSED UTILITIES.
 - 5) ALL UTILITIES SHOWN ARE TO REMAIN UNLESS NOTED OTHERWISE.
 - 6) COORDINATE UTILITY CONNECTIONS AND INSTALLATIONS WITH RESPECTIVE UTILITY COMPANIES AND SERVICE PROVIDERS.
 - 7) CONTRACTOR SHALL MAINTAIN UTILITY SERVICES TO ADJACENT PROPERTIES DURING CONSTRUCTION. PROVIDE PROPER NOTIFICATION OF ANY SERVICE INTERRUPTIONS.
 - 8) ALL WATER, SEWER, AND ROADWAY WORK TO BE COMPLETED TO KITTERY WATER DISTRICT AND TOWN OF KITTERY STANDARDS. WORK IN BADGERS ISLAND WEST SUBJECT TO TOWN MORATORIUM.

**SITE DEVELOPMENT
35 BADGERS
ISLAND WEST
KITTEY, MAINE**

NO.	DESCRIPTION	DATE
2	BUILDING	4/6/23
1	ISSUED FOR APPROVAL	1/19/23
0	ISSUED FOR COMMENT	8/18/22



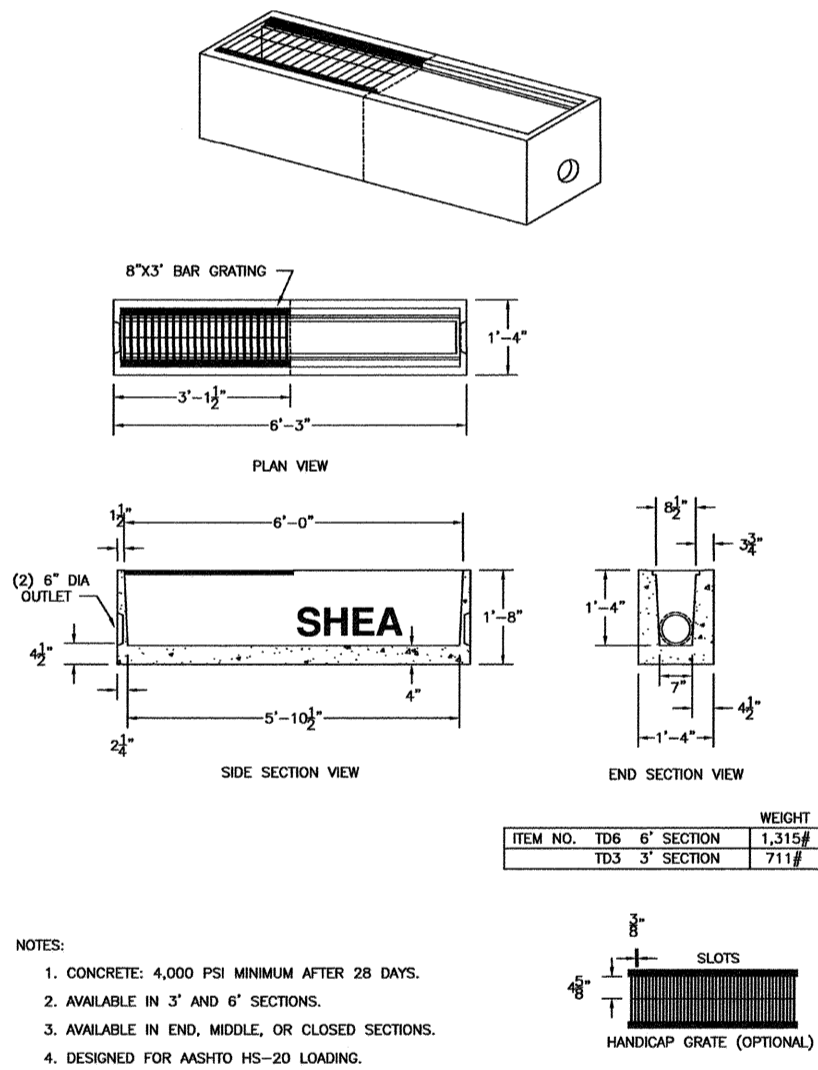
SCALE 1"=20' AUGUST 2022

UTILITY PLAN **C3**

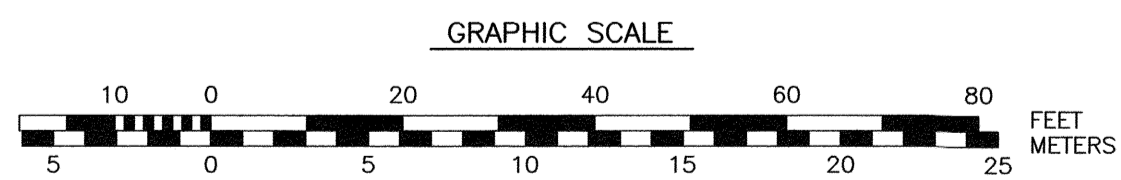
DRAINAGE STRUCTURE SCHEDULE						
STRUCTURE	PROP/EX	RIM	PIPE SIZE/TYP	INVERT IN	INVERT OUT	DIRECTION
DMH 1657	EX	17.13	18" CPP	12.38	12.37	W
TD 1	PROP	12.50	6" PVC	11.37	11.17	
TD 2	PROP	11.5	6" PVC	10.17	9.97	
JF FILTER	PROP	18.0	18" CPP	12.23	11.00	S
DMH 1	PROP	16.0	18" CPP	10.91	10.81	SW
DMH 2	PROP	13.0	18" CPP	10.07	9.97	SW
CB 1	PROP	9.9	18" CPP	7.63	7.53	NW
CB 2	PROP	16.8	12" CPP	13.63		NW

PIPE SCHEDULE			
PIPE #	PIPE SIZE	LENGTH	SLOPE
P0	18"	19'	0.0074
P1	18"	27'	0.01
P2	18"	24'	0.032
P3	6"	20'	0.01
P4	18"	83'	0.028
P5	18"	25'	0.004
P6	12"	20'	0.01
P7	12"	56'	0.004
P8	6"	20'	0.01
P9	12"	10'	0.01

*ALL PIPE TO BE HDPE
**P3 AND P6 ARE STRIP DRAINS

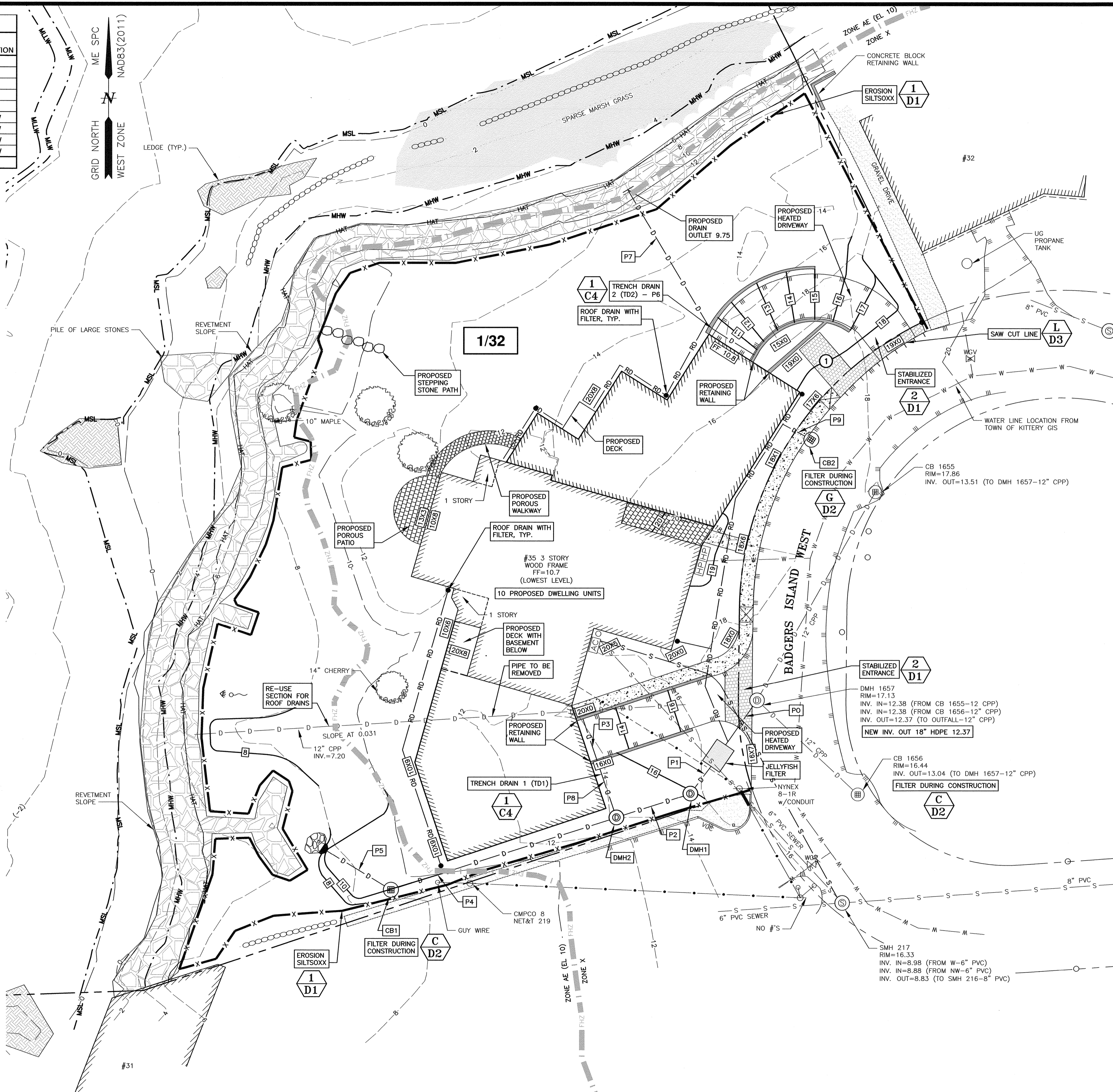


SHEA PRODUCT ID: TD3/TD6
TRENCH DRAIN 8"x16"
WEIGHT (LBS): 711#/1,315#



"I CERTIFY THAT THIS PLAN WAS PREPARED UNDER MY DIRECT SUPERVISION, THAT IT IS THE RESULT OF A FIELD SURVEY BY THIS OFFICE AND HAS AN ACCURACY OF THE CLOSED TRAVERSE THAT EXCEEDS THE PRECISION OF 1:15,000."

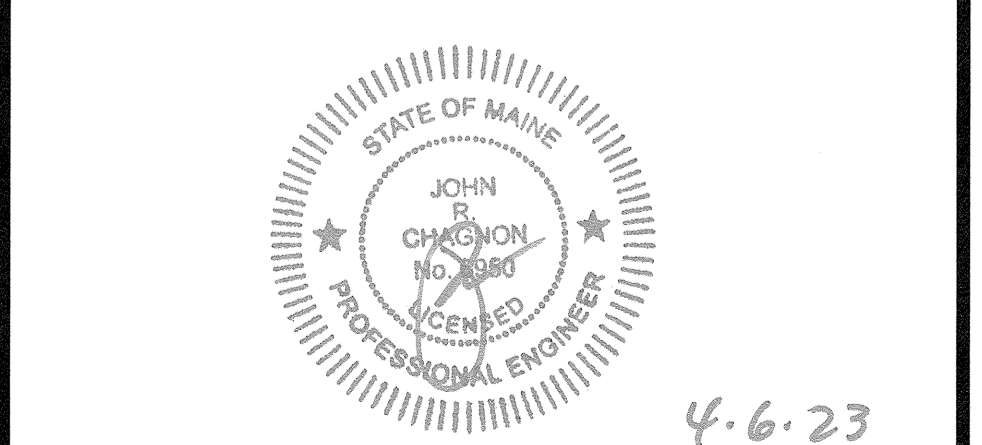
JOHN R. CHAGNON, LLS DATE



- NOTES:**
- 1) THE CONTRACTOR SHALL NOTIFY DIG SAFE AT 1-888-DIG-SAFE (1-888-344-7233) AT LEAST 72 HOURS PRIOR TO COMMENCING ANY EXCAVATION ON PUBLIC OR PRIVATE PROPERTY.
 - 2) UNDERGROUND UTILITY LOCATIONS ARE BASED UPON BEST AVAILABLE EVIDENCE AND ARE NOT FIELD VERIFIED. LOCATING AND PROTECTING ANY ABOVEGROUND OR UNDERGROUND UTILITIES IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR AND/OR THE OWNER. UTILITY CONFLICTS SHOULD BE REPORTED AT ONCE TO THE DESIGN ENGINEER.
 - 3) CONTRACTOR SHALL INSTALL AND MAINTAIN EROSION CONTROL MEASURES IN ACCORDANCE WITH THE "MAINE EROSION AND SEDIMENT CONTROL BMP'S" PUBLISHED BY THE MAINE D.E.P. IN 2016.
 - 4) TOTAL PROJECT DISTURBED AREA 41,535 S.F.
 - 5) VERTICAL DATUM IS NAVD88. BASIS OF VERTICAL DATUM IS REDUNDANT RTN GNSS OBSERVATIONS.

**SITE DEVELOPMENT
35 BADGERS
ISLAND WEST
KITTERY, MAINE**

NO.	DESCRIPTION	DATE
1	BUILDING, DRAINAGE	4/6/23
0	ISSUED FOR COMMENT	1/19/23



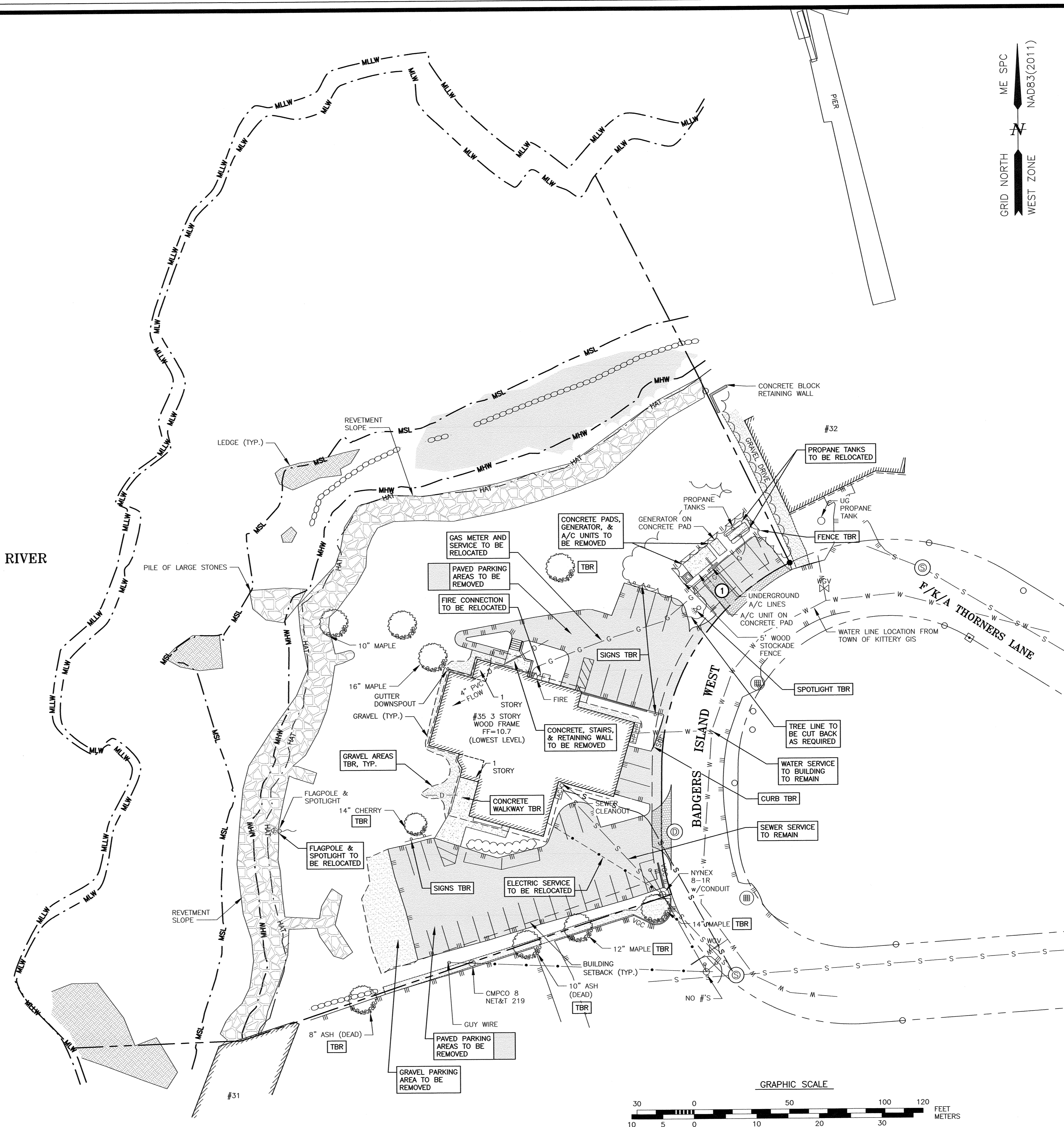
SCALE 1"=20' AUGUST 2022

GRADING PLAN **C4**

DEMOLITION NOTES:

- A) THE LOCATIONS OF UNDERGROUND UTILITIES ARE APPROXIMATE AND THE LOCATIONS ARE NOT GUARANTEED BY THE OWNER OR THE DESIGNER. IT IS THE CONTRACTORS' RESPONSIBILITY TO LOCATE UTILITIES AND ANTICIPATE CONFLICTS. CONTRACTOR SHALL REPAIR EXISTING UTILITIES DAMAGED BY THEIR WORK AND RELOCATE EXISTING UTILITIES THAT ARE REQUIRED TO BE RELOCATED PRIOR TO COMMENCING ANY WORK IN THE IMPACTED AREA OF THE PROJECT.
- B) ALL MATERIALS SCHEDULED TO BE REMOVED SHALL BECOME THE PROPERTY OF THE CONTRACTORS UNLESS OTHERWISE SPECIFIED. THE CONTRACTOR SHALL DISPOSE OF ALL MATERIALS OFF-SITE IN ACCORDANCE WITH ALL FEDERAL, STATE, AND LOCAL REGULATIONS, ORDINANCES AND CODES. THE CONTRACTOR SHALL COORDINATE REMOVAL, RELOCATION, DISPOSAL, OR SALVAGE OF UTILITIES WITH THE OWNER AND APPROPRIATE UTILITY COMPANY.
- C) ANY EXISTING WORK OR PROPERTY DAMAGED OR DISRUPTED BY CONSTRUCTION/DEMOLITION ACTIVITIES SHALL BE REPLACED OR REPAIRED TO THE ORIGINAL EXISTING CONDITIONS BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER.
- D) THE CONTRACTOR SHALL VERIFY LOCATION OF ALL EXISTING UTILITIES AND CALL DIG SAFE AT LEAST 72 HOURS PRIOR TO THE COMMENCEMENT OF ANY DEMOLITION/CONSTRUCTION ACTIVITIES.
- E) SAWCUT AND REMOVE PAVEMENT ONE FOOT OFF PROPOSED EDGE OF PAVEMENT TRENCH IN AREAS WHERE PAVEMENT IS TO BE REMOVED.
- F) IT IS THE CONTRACTOR'S RESPONSIBILITY TO FAMILIARIZE THEMSELVES WITH THE CONDITIONS OF ALL THE PERMIT APPROVALS.
- G) THE CONTRACTOR SHALL OBTAIN AND PAY FOR ADDITIONAL CONSTRUCTION PERMITS, NOTICES AND FEES NECESSARY TO COMPLETE THE WORK AND ARRANGE FOR AND PAY FOR ANY INSPECTIONS AND APPROVALS FROM THE AUTHORITIES HAVING JURISDICTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY ADDITIONAL AND OFF-SITE DISPOSAL OF MATERIALS REQUIRED TO COMPLETE THE WORK.
- H) THE CONTRACTOR SHALL REMOVE AND DISPOSE OF ALL EXISTING STRUCTURES, CONCRETE, UTILITIES, VEGETATION, PAVEMENT, AND CONTAMINATED SOIL WITHIN THE WORK LIMITS SHOWN UNLESS SPECIFICALLY IDENTIFIED TO REMAIN. ANY EXISTING DOMESTIC / IRRIGATION SERVICE WELLS IN THE PROJECT AREA IDENTIFIED DURING THE CONSTRUCTION AND NOT CALLED OUT ON THE PLANS SHALL BE BROUGHT TO THE ATTENTION OF THE OWNER AND ENGINEER FOR PROPER CAPPING / RE-USE.
- I) ALL WORK WITHIN THE TOWN OF KITTELY RIGHT OF WAY SHALL BE COORDINATED WITH THE TOWN OF KITTELY DEPARTMENT OF PUBLIC WORKS (DPW).
- J) REMOVE TREES AND BRUSH AS REQUIRED FOR COMPLETION OF WORK. CONTRACTOR SHALL GRUB AND REMOVE ALL STUMPS WITHIN LIMITS OF WORK AND DISPOSE OF OFF-SITE IN ACCORDANCE WITH FEDERAL, STATE, AND LOCAL LAWS AND REGULATIONS.
- K) CONTRACTOR SHALL PROTECT ALL PROPERTY MONUMENTATION THROUGHOUT DEMOLITION AND CONSTRUCTION OPERATIONS. SHOULD ANY MONUMENTATION BE DISTURBED, THE CONTRACTOR SHALL EMPLOY A LAND SURVEYOR TO REPLACE THEM.
- L) PROVIDE INLET PROTECTION BARRIERS AT ALL CATCH BASINS WITHIN CONSTRUCTION LIMITS AND MAINTAIN FOR THE DURATION OF THE PROJECT. INLET PROTECTION BARRIERS SHALL BE HIGH FLOW SILT SACK BY ACF ENVIRONMENTAL OR APPROVED EQUAL. INSPECT BARRIERS WEEKLY AND AFTER EACH RAIN OF 0.25 INCHES OR GREATER. CONTRACTOR SHALL COMPLETE A MAINTENANCE INSPECTION REPORT AFTER EACH INSPECTION. SEDIMENT DEPOSITS SHALL BE REMOVED AFTER EACH STORM EVENT OR MORE OFTEN IF WARRANTED OR FABRIC BECOMES CLOGGED. EROSION CONTROL MEASURES SHALL BE INSTALLED PRIOR TO THE START OF ANY CLEARING OR DEMOLITION ACTIVITIES.
- M) THE CONTRACTOR SHALL PAY ALL COSTS NECESSARY FOR TEMPORARY PARTITIONING, BARRICADING, FENCING, SECURITY AND SAFETY DEVICES REQUIRED FOR THE MAINTENANCE OF A CLEAN AND SAFE CONSTRUCTION SITE.
- N) ANY CONTAMINATED MATERIAL REMOVED DURING THE COURSE OF THE WORK WILL REQUIRE HANDLING IN ACCORDANCE WITH MEDEP REGULATIONS. CONTRACTOR SHALL HAVE A HEALTH AND SAFETY PLAN IN PLACE, AND COMPLY WITH ALL APPLICABLE PERMITS, APPROVALS, AUTHORIZATIONS, AND REGULATIONS.

PISCATAQUA RIVER
(TIDAL)

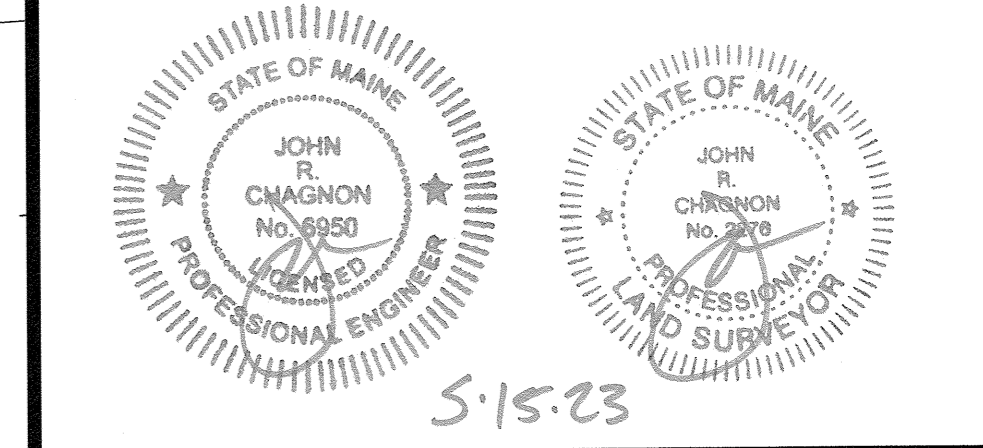


- NOTES:**
- A) THE CONTRACTOR SHALL NOTIFY DIG SAFE AT 1-888-DIG-SAFE (1-888-344-7233) AT LEAST 72 HOURS PRIOR TO COMMENCING ANY EXCAVATION ON PUBLIC OR PRIVATE PROPERTY.
 - B) UNDERGROUND UTILITY LOCATIONS ARE BASED UPON BEST AVAILABLE EVIDENCE AND ARE NOT FIELD VERIFIED. LOCATING AND PROTECTING ANY ABOVEGROUND OR UNDERGROUND UTILITIES IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR AND/OR THE OWNER. UTILITY CONFLICTS SHOULD BE REPORTED AT ONCE TO THE DESIGN ENGINEER.
 - C) CONTRACTOR SHALL INSTALL AND MAINTAIN EROSION CONTROL MEASURES IN ACCORDANCE WITH THE "MAINE EROSION AND SEDIMENT CONTROL BMP'S" PUBLISHED BY THE MAINE D.E.P. IN 2014.

**SITE DEVELOPMENT
35 BADGERS
ISLAND WEST
KITTELY, MAINE**

NO.	DESCRIPTION	DATE
1	14" CHERRY TBR	5/15/23
0	ISSUED FOR APPROVAL	1/19/23

REVISIONS



SCALE 1"=30' AUGUST 2021

DEMOLITION PLAN **C5**

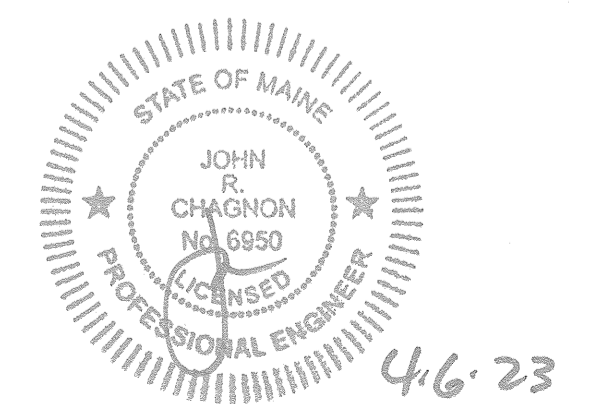
P:\NY0101015-1\mep\mha_Development\35BadgersIslandWest\35BadgersIslandWest.dwg, 5/15/2023 11:45:17 PM

NOTES:

- 1) PARCEL IS SHOWN ON THE TOWN OF KITTERY ASSESSOR'S MAP 1 AS LOT 32.
- 2) OWNER OF RECORD:
B.I.W. GROUP, LLC
41 INDUSTRIAL DRIVE, UNIT 20
EXETER, NH 03833
18503/331 (FIRST PARCEL)
PLAN BOOK 22/31 (LOTS 14, 15, 16, & 17)
- 3) THE PURPOSE OF THIS PLAN IS TO SHOW THE PARKING FOR THE PROPOSED SITE DEVELOPMENT ON ASSESSOR'S MAP 1 LOT 32 IN THE TOWN OF KITTERY.
- 4) REQUIRED PARKING:
TOTAL REQUIRED: 2 VEHICLES PER DWELLING UNIT
2X10=20 SPACES
TOTAL PROVIDED: 20 SPACES (2 ADA)
PLUS 1 OUTSIDE GUEST SPACE

**SITE DEVELOPMENT
35 BADGERS
ISLAND WEST
KITTERY, MAINE**

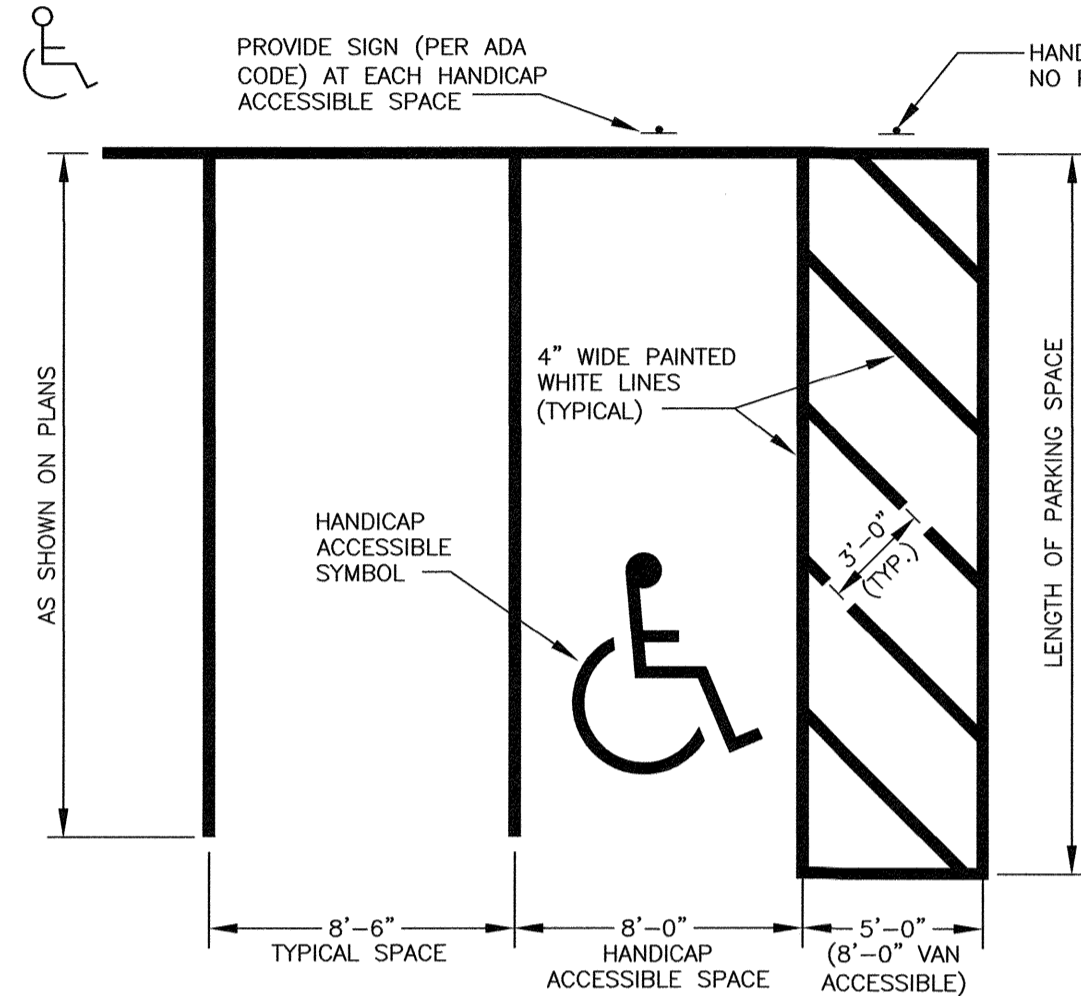
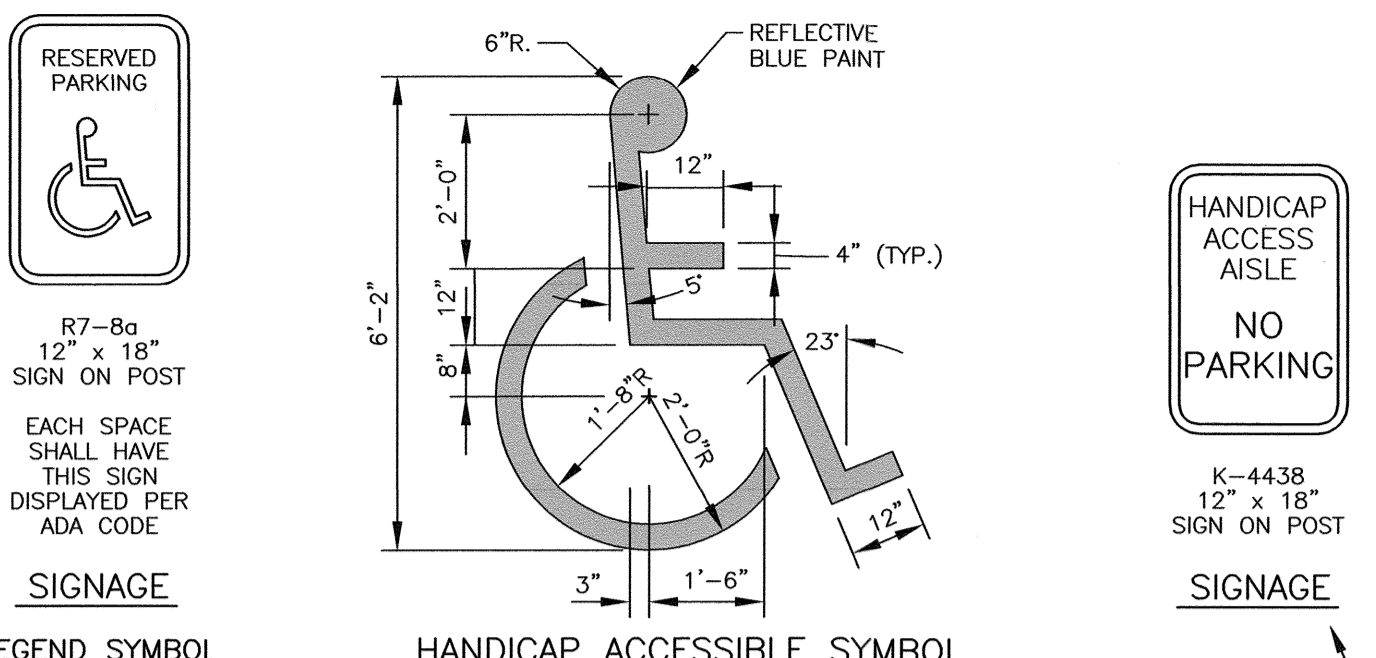
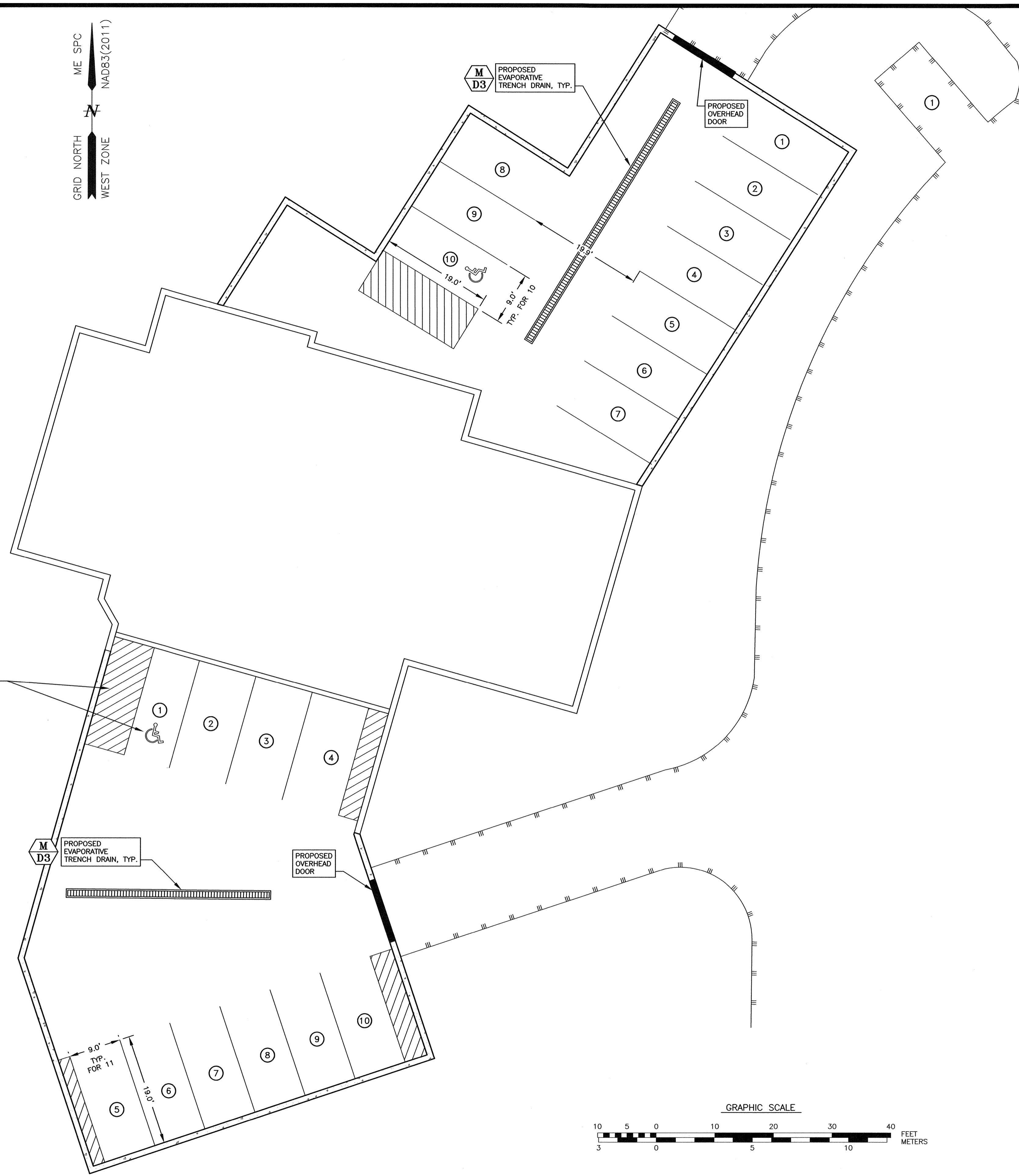
1	BUILDING	4/6/23
0	ISSUED FOR APPROVAL	1/19/23
NO.	DESCRIPTION	DATE
REVISIONS		



SCALE 1"=10' AUGUST 2022

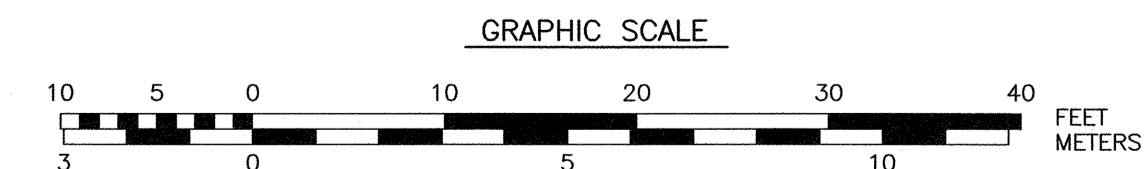
PARKING PLAN

C6



1 HANDICAP PARKING DETAIL
NTS

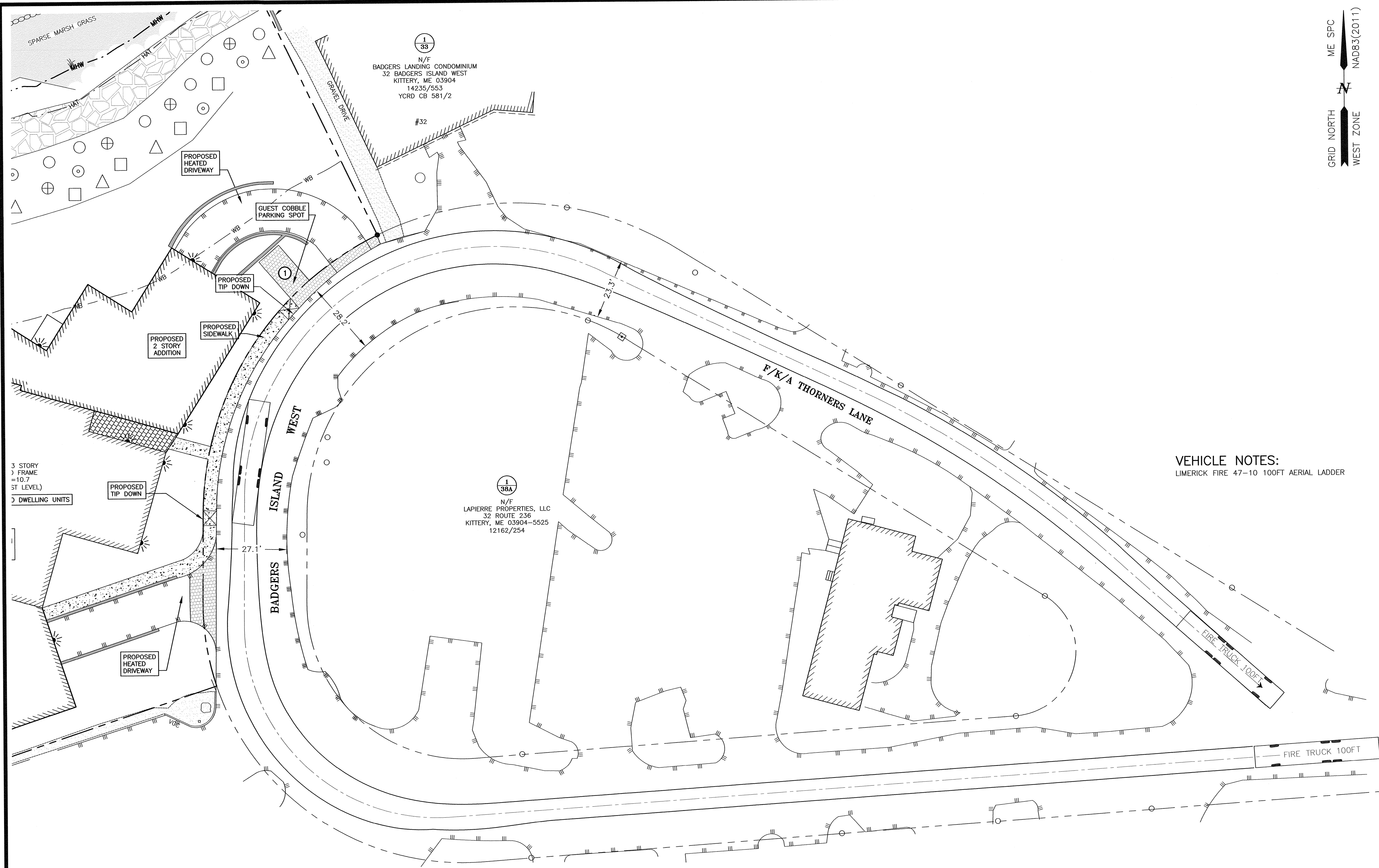
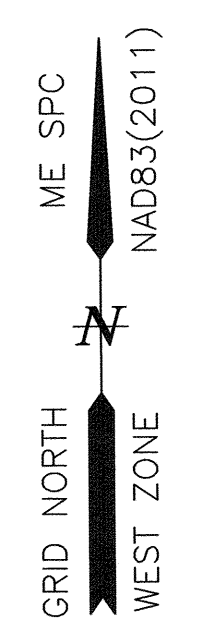
- NOTES:**
- 1) SYMBOL TO BE PAINTED IN ALL HANDICAPPED SPACES.
 - 2) SYMBOL, PAINT AND SIGNAGE TO CONFORM TO AMERICANS WITH DISABILITIES ACT (ADA).
 - 3) ALL VAN ACCESSIBLE SPACES SHALL HAVE "VAN ACCESSIBLE" PLATE INSTALLED ON SIGN POST BELOW HANDICAP SIGN.



P:\NH\010135-Hampshire_Developments\350-724-Badgers Island W (B5)\AC\35051724-Badgers Island West\Site Development\2022 Site Permitting\Plan & Specifications\35051724 Parking Plan 2023.dwg, 4/6/2023 10:00:04 PM, Penultimate Plotter Color T3200 (interplot).pc3

NOTES:

- 1) THE CONTRACTOR SHALL NOTIFY DIG SAFE AT 1-888-DIG-SAFE (1-888-344-7233) AT LEAST 72 HOURS PRIOR TO COMMENCING ANY EXCAVATION ON PUBLIC OR PRIVATE PROPERTY.
- 2) UNDERGROUND UTILITY LOCATIONS ARE BASED UPON BEST AVAILABLE EVIDENCE AND ARE NOT FIELD VERIFIED. LOCATING AND PROTECTING ANY ABOVEGROUND OR UNDERGROUND UTILITIES IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR AND/OR THE OWNER. UTILITY CONFLICTS SHOULD BE REPORTED AT ONCE TO THE DESIGN ENGINEER.
- 3) CONTRACTOR SHALL INSTALL AND MAINTAIN EROSION CONTROL MEASURES IN ACCORDANCE WITH THE "MAINE EROSION AND SEDIMENT CONTROL BMP's" PUBLISHED BY THE MAINE D.E.P. IN 2016.



1
33
N/F
BADGERS LANDING CONDOMINIUM
32 BADGERS ISLAND WEST
KITTERY, ME 03904
14235/553
YCRD CB 581/2

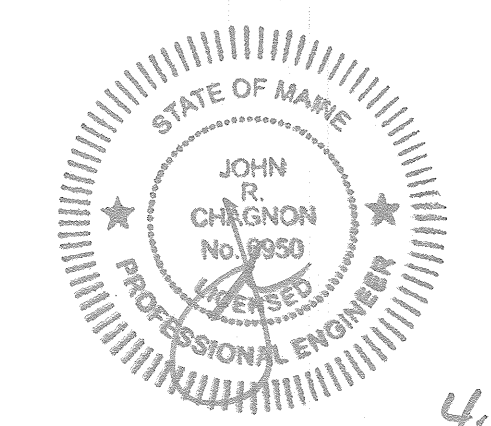
1
38A
N/F
LAPIERRE PROPERTIES, LLC
32 ROUTE 236
KITTERY, ME 03904-5525
12162/254

VEHICLE NOTES:
LIMERICK FIRE 47-10 100FT AERIAL LADDER

**SITE DEVELOPMENT
35 BADGERS
ISLAND WEST
KITTERY, MAINE**

NO.	DESCRIPTION	DATE
1	BUILDING	4/6/23
0	ISSUED FOR COMMENT	1/19/23

REVISIONS

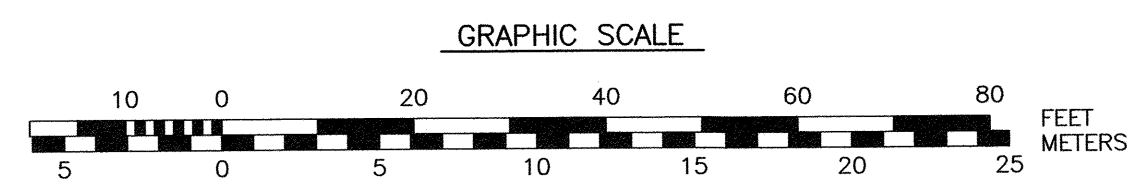


4.6.23

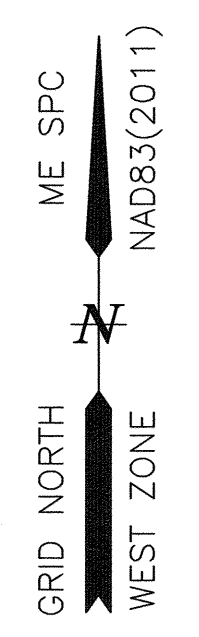
SCALE 1"=20' AUGUST 2022

**TURNING TEMPLATE
PLAN**

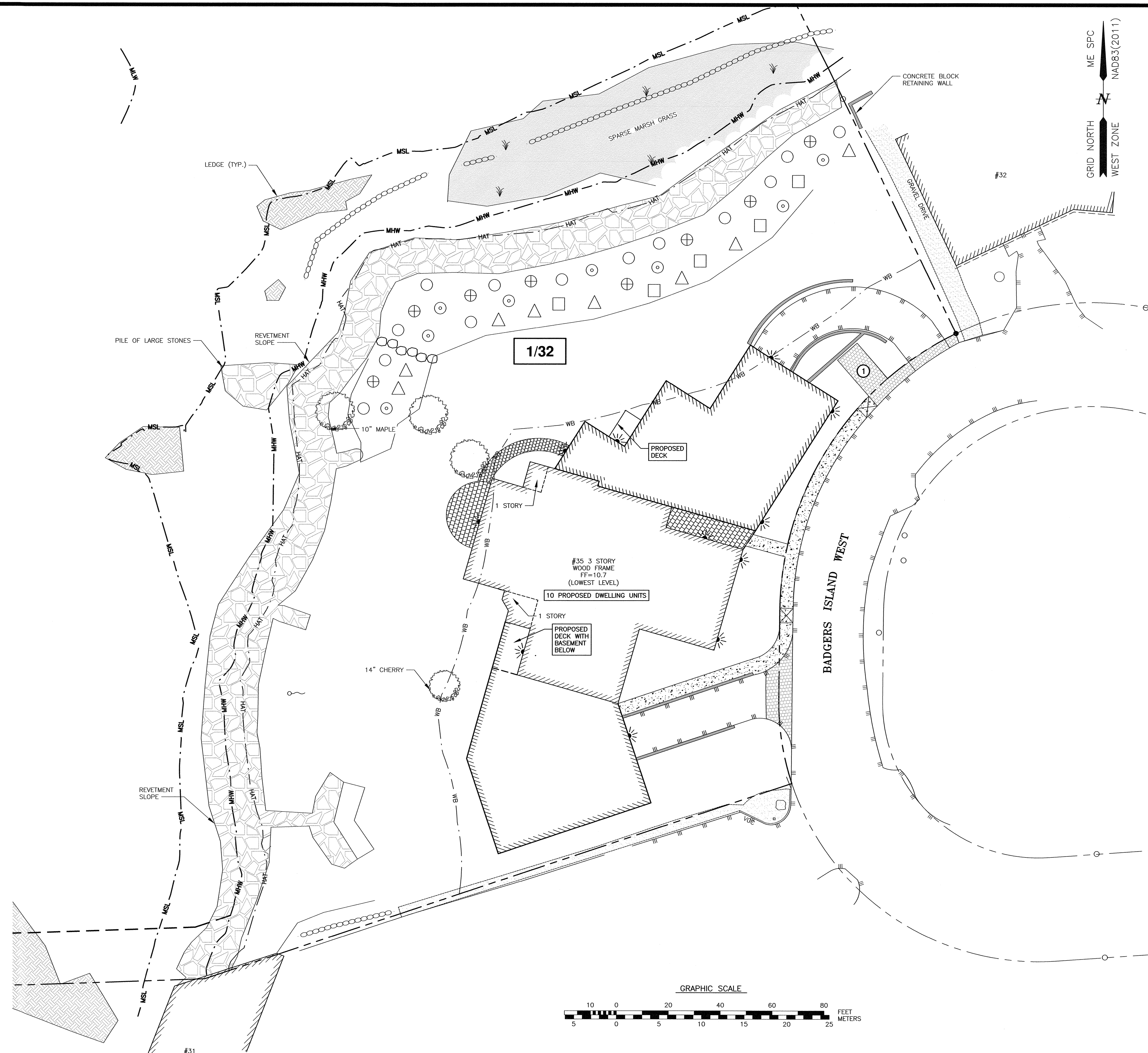
T1



P:\NH\010135-Hampshire_Development\3050.72-Badgers Island W (5) - RC\3050.72A - Hampshire_Development\3050.72A - Turning_Template\2023 NEW.dwg, 4/6/2023 3:54:43 PM, Portsmouth Plaster Canon T13000 (temporary).d3d



- NOTES:**
- 1) PARCEL IS SHOWN ON THE TOWN OF KITTERY ASSESSOR'S MAP 1 AS LOT 32.
 - 2) OWNER OF RECORD:
 B.I.W. GROUP, LLC
 41 INDUSTRIAL DRIVE, UNIT 20
 EXETER, NH 03833
 18503/331 (FIRST PARCEL)
 PLAN BOOK 22/31 (LOTS 14, 15, 16, & 17)
 - 3) THE PURPOSE OF THIS PLAN IS TO SHOW THE PROPOSED LIGHTING ON THE TOWN OF KITTERY ASSESSOR'S MAP 1 AS LOT 32.



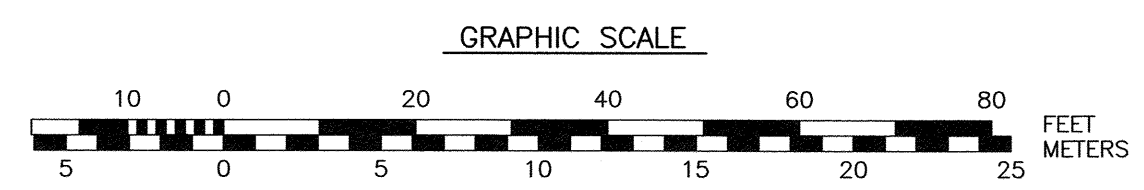
**SITE DEVELOPMENT
 35 BADGERS
 ISLAND WEST
 KITTERY, MAINE**

NO.	DESCRIPTION	DATE
1	BUILDING	4/6/23
0	ISSUED FOR COMMENT	1/19/23

REVISIONS	

SCALE 1"=20' AUGUST 2022

LIGHTING PLAN **C7**





200 Griffin Road, Unit 3, Portsmouth, NH 03801
Phone (603) 430-9282 Fax 436-2315

6 April 2023

Dutch Dunkelberger, Chair
Kittery Planning Board
Town of Kittery
200 Rogers Road, Kittery, ME 03904

**Re: Preliminary Site Plan Review Application; Conversion to Residential
Tax Map 1, Lot 32, 35 Badgers Island West**

Dear Dutch and Planning Board Members:

On behalf of BIW Inc. we submitted a package for **Preliminary Site Plan Review Approval** to the town. The site was recently reviewed by the Planning Board at Sketch Plan and was accepted as complete. Previously a Shoreland Application for *Revetment Repair*, was approved and has been completed, with the exception of landscaping installation; which will be revised. This proposal is to expand an existing building and revise the site use from Office to 10 Residential units. Currently the office use has existed for some time with various additions and expansions over the years. The use was intensive from a traffic and parking perspective; with approximately 200 employees in the building at its peak use. The proposed re-use we believe will have some significant benefits for this end of Badgers Island. We request that the application be put on the agenda for the **April 27th, 2023, Planning Board** meeting.

This project proposes stormwater control and treatment of off-site runoff on the subject parcel. Runoff which comes from the town road will be captured and treated; instead of just being conveyed to the tidal resource. The Existing Conditions Plan reflects the state of the site today; the Grading Plan includes the proposed site improvements to provide permanent and appropriate treatment of this run-off. The Ordinance allows the Planning Board to approve projects if it finds that a development plan significantly contributes to the accomplishment of certain objectives. The project submission outlines how the proposed improvements meet the objectives of the Comprehensive Plan and the Codes – see the attached section.

The project conforms to the Kittery Land Use and Development Code for the zone it occupies for allowable number of dwelling units, devegetated surfaces (a reduction from existing), and open space. The additions will meet the height limitations. The only variation from the code is in the setback to the HAT line. While the existing building does not comply with the current HAT delineation (minor intrusion) the proposal seeks to impact the HAT setback with the north side addition and proposes a minimum setback of 68 feet where 75 feet is required. The plan shows that removal of existing de-vegetated areas within the wetland buffer (setback), taking into account the proposed additions within the wetland buffer (setback), the wetland buffer impact is reduced by 994 square feet, or 49%.

The Code allows for intrusions into the 75-foot setback, in this local, provided certain objectives of the Comprehensive Plan are met. Specifically, Section 16.3.2.14.E (copy of Code Section attached) allows a setback reduction to 25 feet from the HAT if the Planning Board finds that a development plan significantly contributes to the accomplishment of certain objectives. In the case of this application we hereby submit, and ask the Planning Board to concur, that the redevelopment satisfies Section (3) of Section 16.3.2.14.E. The proposal will remove existing surface parking areas which drain to the adjacent resource untreated and replace those area with covered underground parking. This reduces the discharge of vehicle drip pollutants to zero and is a significant benefit to the environment. The parking plan on Sheet C6 details the layout of the underground parking. In order to fully manage the parking expectations of the unit owners and comply with the code the plan show the creation of 20 parking spaces – 2 per unit. In order to provide adequate space for parking and maneuvering the north addition needs to intrude slightly into the HAT setback, to a point closer than 75 feet but well above 25 feet. This can't be avoided since *the location of the existing building as well as the lot depth are set already*.

In addition to this improvement the developer is willing to provide, at their expense and placement, a stormwater treatment device to deal with untreated storm water coming from the adjacent street and property area, including a boat storage yard. Also, the buffer plantings are proposed to be expanded along the entire lot waterfront to provide additional cover for birds as well as eliminating lawn areas running to the resource. The plan set contains a professionally prepared Landscape Plan showing the proposed plantings. The plantings have taken into account the need for salt tolerant vegetation. In addition, a review by the town's peer review engineer is welcomed; and the developer is ready to cooperate with any additional recommendations where possible. We hope that the Board agrees that this project will be a benefit to the community and the environment. **We request that the Planning Board complete the review of this issue with this submission package.**

The following plans are included in our submission:

- Cover Sheet – This plan shows the design team, site location, and Legend.
- Existing Conditions Plan C1 – This plan shows the current improvements on the property (including the recently completed revetment) and the site boundary lines.
- Shoreland Development Plan C2 – This plan shows the location of the proposed building additions, decks, patios, walkways, and driveway entrances. The plan highlights the existing landscaping (trees) that will be retained. The plan contains the De-vegetated Coverage Table and details the changes to de-vegetated surfaces in the buffer zone.
- Landscape Plan L1 – This plan shows the proposed site landscaping. Particular attention should be placed on review of the buffer plantings. This plan does need to be revised on the street side to adjust to some last-minute building revisions.
- Utility Plan C3 – This plan shows the utilities required to service the proposed additions.
- Grading Plan C4 – This plan shows the proposed site grading and the location of the proposed drainage treatment facilities.
- Demolition Plan C5 – This plan shows the proposed demolition taking place on the property.
- Parking Plan C6 – This plan shows the layout of the covered parking.
- Turning Template Plan T1 – This plan shows that a fire truck will be able to safely travel on Badgers Island West given the proposed minor reduction in the roadway width with the addition of a proposed sidewalk.

- Lighting Plan C7 – This plan shows proposed site lighting locations; styles and lumen intensities to be determined. All fixtures are building mounted.
- Detail Sheets D1 to D5 – These plans show the construction details for the project.

Please also find the attached in support of this proposal:

Client Authorization
Property Deed
Certificate of Good Standing
USGS Map
Vicinity map
Tax Map
Site Photographs
Drainage Analysis
Jellyfish Filter Information
Soil Report
Land Use Code Section - Highlighted

We look forward to the Planning Board review of this submission and our in-person presentation at the Planning Board meeting. For the reasons stated, we respectfully request the Planning Board schedule the application for presentation. Thank you for your time and attention to this proposal.

Please contact me if you have any questions or concerns regarding this application.

Sincerely,



John R. Chagnon, PE
Ambit Engineering – Haley Ward
CC: Project Team

18 August, 2022


To Whom It May Concern

**RE: Client Representation for a proposed Amended Site Plan for BIW Group,
LLC at 35 Badgers Island West, Kittery, Maine**

This letter is to inform the Town of Kittery, and other parties in accordance with approval procedures that Ambit Engineering is authorized to represent the above-mentioned property as our agent in the approval process. This includes signatory powers on any and all applications.

Please feel free to call me if there is any question regarding this authorization.

Sincerely,


Shayne Forsley
BIW Group, LLC

Authorized Representative
41 Industrial Drive, Unit 20
Exeter, NH
03833

QUITCLAIM DEED WITH COVENANT

DLN: 1002040126646

Maine R.E. Transfer Tax Paid

GP Technology Solutions, LLC, a Delaware limited liability company with a mailing address of PO Box 9001, Kittery, ME 03904 (the "Grantor"), FOR CONSIDERATION PAID, grants to B.I.W. Group, LLC, a Maine limited liability company with a mailing address of 41 Industrial Drive, Unit 20, Exeter, NH 03833 (the "Grantee"), certain real property, together with any improvements thereon, located in the Town of Kittery, County of York, and State of Maine, more particularly described on Exhibit A attached hereto and made a part hereof.


Meaning and intending to convey the same premises conveyed to Grantor by Quitclaim Deed from GreenPages, Inc. dated November 19, 2020, and recorded in the York County Registry of Deeds in Book 18460, Page 790.

IN WITNESS WHEREOF, GP Technology Solutions, LLC has caused this instrument to be executed by Ronald Dupler, its duly-authorized Manager, thereunto duly authorized, as of this 22 day of December, 2020.

GP Technology Solutions, LLC




Witness

By: 

Ronald Dupler
Its duly-authorized Manager

Commonwealth of Massachusetts
County of Middlesex

On this 22nd day of December, 2020 before me, the undersigned Notary Public, personally appeared Ronald Dupler and proved to me through satisfactory evidence of identification, which was personal knowledge of the undersigned, to be the person who signed the preceding document in my presence, and acknowledged to me that he signed it voluntarily for its stated purpose, that it was his free act and deed in his capacity as Manager of GP Technology Solutions, LLC, and that it was the free act and deed of said LLC.



Notary Public

Ashley Dotchin

Print Name
My Commission expires: 12/31/24

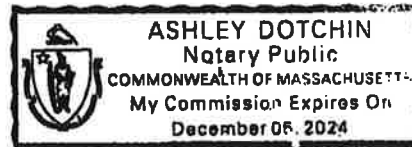


Exhibit A

Land with all improvements thereon, situated in the Town of Kittery, County of York, State of Maine, bounded and described as follows:

Four certain lots or parcels of land, situated on the Northerly side of Badgers Island in said Kittery, being more particularly described as Lots No. 14, 15, 16 and 17 on a certain plan of land, Badgers Island, Maine, dated April 1936, John W. Durgin, C.E., which plan is recorded in the York County Registry of Deeds, Plan Book 22, Page 31, subject however, to the existing rights of and public use of Veta Messaro and Ella E. Messaro to lay and maintain an overflow pipe across said Lot 14 as more particularly described in the deed from Annie E. Horner dated April, 1955 and recorded in the York County Registry of Deeds in Book 1301, Page 275.

Subject to and together with the benefit of the terms and provisions of a Boundary Line Agreement by and between Terry Gagner and William Seaward dated April 5, 1988 and recorded in the said Registry of Deeds in Book 4676, Page 184.

Excepting from the above described premises the land conveyed to the Town of Kittery by virtue of a Release Deed granted by GreenPages, Inc. et al , dated September 13, 1995 and recorded in the York County Registry of Deeds in Book 7561, Page 300.

Subject to the restrictions that installation of groundwater extraction wells is prohibited except with the consent of the State of Maine Department of Environmental Protection, or any successor agency. Nothing herein shall obligate the Grantee herein, or its successors and assigns, to obtain the consent of any party other than the Maine Department of Environmental Protection or its successor agency, including without limitations the Grantor herein or its successors or assigns, in order to undertake any of the activities specific to this paragraph.

Also, all right, title and interest in and to any filled lands between the lots described above and the Piscataqua River and in and to the shore and flats between the lots described above and the Piscataqua River.

Meaning and intending to describe the same premises in a Warranty Deed granted by William W. Seaward, Jr. dated October 17, 1994 and recorded in the York County Registry of Deeds in Book 7224, Page 202.

Also another certain lot or parcel of land, together with the buildings thereon, situated on the westerly side of Badgers Island, in the Town of Kittery, County of York, State of Maine, said lot being bounded and described as follows:

Beginning at a capped rebar set in the ground in the northerly sideline of a road called Badgers Island, West, at the southwesterly corner of the land herein conveyed as land of Charles Patten and thence running by said Patten land N 24 degrees 18' 14" E one hundred sixty-seven and twenty-three hundredths (167.23') feet to capped rebar set as the sideline of said road; thence turning and running by said road the following course; thence by said road southeasterly along a curve to the right having a radius of eight (80.00') feet and an arc length of fourteen and forty-four hundredths (14.44') feet to an iron pipe found; thence by said road S 42 degrees 55' 17" E one hundred ninety and thirty-six hundredths (190.36') feet to a

capped rebar set; thence by said road southerly along a curve to the right having a radius of twenty-five (25.00') feet and as arc length of sixty-two and eighty-three hundredths (62.83') feet to a capped rebar set; N78 degrees 55' 26" W one hundred ninety and thirty-six hundredths (190.36') feet to the point of beginning.

Meaning and intending to describe the same premises in a Warranty Deed granted by Lil's GreenDream, Inc. dated January 31, 2003 and recorded in the York County Registry of Deeds in Book 12483, Page 210.

The above-described properties are conveyed subject to all easements, covenants, restrictions, and agreements of record to the extent applicable and in effect.

State of Maine



Department of the Secretary of State

I, the Secretary of State of Maine, certify that according to the provisions of the Constitution and Laws of the State of Maine, the Department of the Secretary of State is the legal custodian of the Great Seal of the State of Maine which is hereunto affixed and that the paper to which this is attached is a true copy from the records of this Department.

In testimony whereof, I have caused the Great Seal of the State of Maine to be hereunto affixed. Given under my hand at Augusta, Maine, this twenty-second day of February 2022.



Handwritten signature of Shenna Bellows in black ink.

Shenna Bellows
Secretary of State

Additional Addresses

Legal Name	Title	Name	Charter #	Status
B.I.W. GROUP, LLC	Registered Agent		20215185DC	GOOD STANDING
Home Office Address (of foreign entity)		Other Mailing Address		

B.I.W. GROUP, LLC
35 BADGERS ISLAND WEST
KITTERY, MAINE

JOB NUMBER: 3050.72A
SCALE: 1" = 1000'
SUBMITTED: 08-18-2022



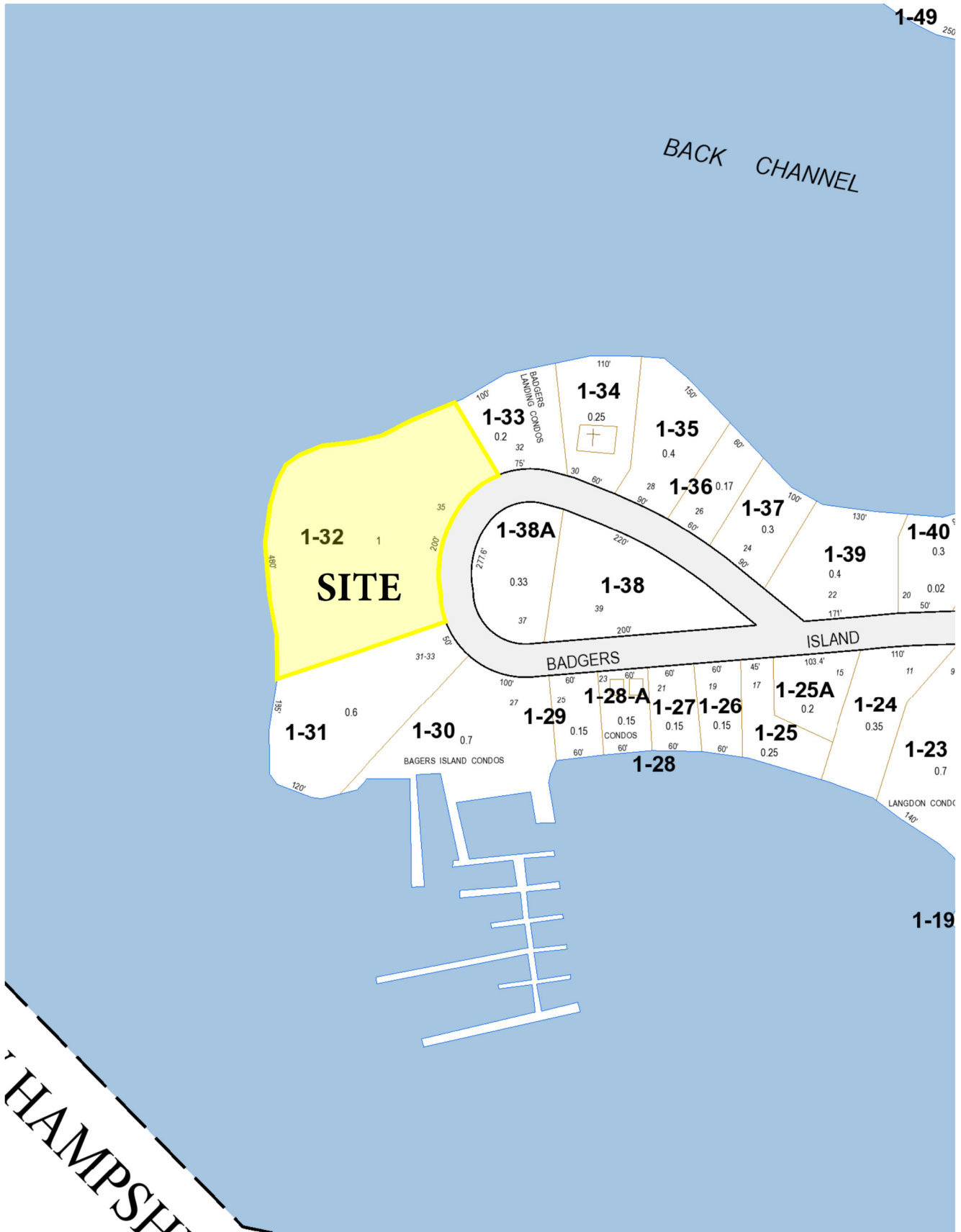
B.I.W. GROUP, LLC
35 BADGERS ISLAND WEST
KITTERY, MAINE

JOB NUMBER: 3050.72A
SCALE: 1" = 200'
SUBMITTED: 08-18-2022



B.I.W. GROUP, LLC
35 BADGERS ISLAND WEST
KITTERY, MAINE

JOB NUMBER: 3050.72A
NTS
SUBMITTED: 08-18-2022



Site Photograph #1

August 2021



Site Photograph #2

August 2021



Site Photograph #3

August 2021



Site Photograph #4

August 2021



Site Photograph #5

August 2021



Site Photograph #6

August 2021



Site Photograph #7

August 2021



Site Photograph #7

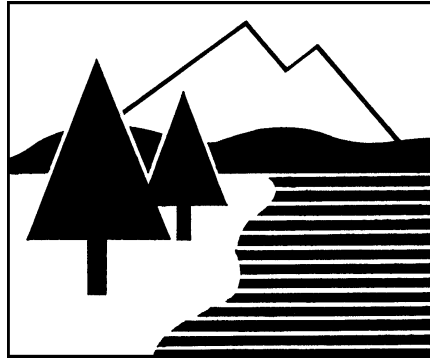
August 2021



DRAINAGE ANALYSIS

SITE DEVELOPMENT

**35 BADGERS ISLAND WEST
KITTERY, ME**

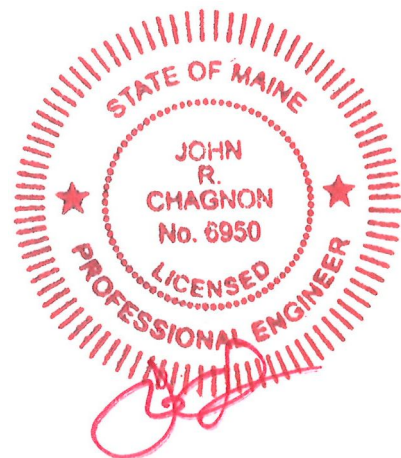


**PREPARED FOR
HAMPSHIRE DEVELOPMENT**

**19 JANUARY 2023
AMENDED: 06 APRIL 2023**



200 Griffin Road, Unit 3
Portsmouth, NH 03801
Phone: 603.430.9282; Fax: 603.436.2315
E-mail: jchagnon@haleyward.com
(Ambit Job Number 5010135.3050.72A)



6 April 2023

TABLE OF CONTENTS***REPORT***

Executive Summary	1
Introduction / Project Description	2
Site Specific Information	2
Pre and Post-Development Drainage	3
Offsite Infrastructure Capacity	4
Erosion and Sediment Control Practices	5
Conclusion	5
References	6

Existing Subcatchments	
Proposed Subcatchments	

APPENDIX

Vicinity (Tax) Map	A
FEMA FIRM Map	B
HydroCAD Drainage Analysis Calculations	C
Inspection & Long Term Maintenance Plan	D

EXECUTIVE SUMMARY

This drainage analysis examines the pre-development (existing) and post-development (proposed) stormwater drainage patterns for the Site Redevelopment at the property known as 35 Badgers Island West in Kittery, ME. The site is shown on the Town of Kittery Assessor's Tax Map 1 as Lot 32. The total size of the lot is 104,634± square-feet (2.402 acres) and the associated drainage area is 147,126± square-feet (3.378 acres).

The development will provide for building additions and associated utilities. The development has the potential to increase stormwater runoff to adjacent properties and should be designed in a manner to prevent that occurrence. The site contains an existing building and parking lot. The parking will be removed and replaced with the proposed structures, leading to a net decrease in contributing impervious area. The net decrease, as well as adhering to construction BMPs and the installation of a Jellyfish stormwater filter will offset the stormwater impact caused by the construction of the redevelopment.

INTRODUCTION / PROJECT DESCRIPTION

This drainage report is designed to assist the owner, contractor, regulatory reviewer, and others in understanding the impact of the proposed development project on local surface water runoff and quality. The project site is shown on the Town of Kittery, ME Assessor's Tax Map 1 as Lot 32. Bounding the site to the east is the cul-de-sac of Badger's Island West. Bounding the site to the west is the Piscataqua River. Bounding the site to the north is a condominium. Bounding the site to the south is a private business. A vicinity map is included in the Appendix to this report.

The proposed project includes two building additions, associated parking and utilities. This report uses the design to calculate the future impervious coverage of the proposed lot, as required by the Town.

This report includes information about the existing site and the proposed site necessary to analyze stormwater runoff and to design any required mitigation. The report includes impervious surface analyses and the associated operations and maintenance manual. The report will provide a narrative of the stormwater runoff. Proposed stormwater management and treatment structures and methods will also be described, as well as erosion and sediment control practices. To fully understand the proposed site development the reader should also review a complete site plan set in addition to this report.

SITE SPECIFIC INFORMATION

According to the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) number 2301710008D (effective date July 3, 1986), the proposed development is located in Zone C and is determined to be inside of the 0.2% annual chance floodplain. A copy of the FIRM map is included in the Appendix.

PRE AND POST-DEVELOPMENT DRAINAGE

In the pre-development condition, the site has been analyzed as three subcatchment basins (E1, E2, and E2a) based on localized topography and discharge location. Subcatchment E1 contains the north half of the property and flows toward the west boundary of Badgers Island (Discharge Point 1 or DP1). Subcatchment E2 contains the south half of the property and flows toward DP1. Subcatchment E2a contains area east of the property and flows toward DP1 through a drainage network located in Subcatchment E2. Proposed subcatchments P1, P2, and P2a occupy the same approximate space as subcatchments E1, E2, and E2a respectively and flow to the same discharge points. Subcatchment P2a is slightly larger than E2a and is run through a Jellyfish stormwater filter integrated into a modified drainage network. The subcatchments were analyzed for peak discharges using HydroCAD.

Table 1: Impervious Surfaces Analysis

Structure	Pre-Construction Impervious (S.F.)	Post-Construction Impervious (S.F.)
Main Structure	5,922	13,328
Deck	0	85
Pavement	12,289	2,376
Gravel	2,277	0
Retaining Walls	86	169
Concrete Pads/Steps/Sidewalk	957	360
Patios/Walkways	0	726
Revetment/Riprap	5,392	5,392
Total	26,923	22,436
Lot Size	54,883	54,883
% Devegetated Area	49.1%	40.9%

Table 2: Development Watershed Basin Summary

Watershed Basin ID	Basin Area (SF)	Tc (MIN)	CN	2-Year Runoff (CFS)	10-Year Runoff (CFS)	25-Year Runoff (CFS)
E1	71,648	6.9	92	6.23	10.13	13.15
E2	36,164	5.0	93	3.43	5.51	7.11
E2a	39,314	6.7	96	3.75	5.83	7.44
P1	64,973	7.2	91	5.44	8.96	11.69
P2	31,171	5.0	90	2.70	4.51	5.92
P2a	50,983	6.7	96	4.86	7.56	9.65

The proposed development has been designed to match the pre-development drainage patterns to the greatest extent feasible. A plan sheet detailing the subcatchments and direction of runoff are included in the Appendix.

Table 3: Pre-Development to Post-Development Comparison

Design Point	Q2 (CFS)		Q10 (CFS)		Q25 (CFS)		Description
	Pre	Post	Pre	Post	Pre	Post	
DP1	13.22	12.81	21.18	20.74	27.35	26.89	Piscataqua River

In the developed condition, the site will see a net reduction in impervious surfaces. As a result, discharge point DP1 will experience a net decrease in peak discharge for all design storms in the proposed condition.

OFFSITE INFRASTRUCTURE CAPACITY

There is an overall reduction in off-site flow due to the reduction in impervious surfaces proposed by the project. Any Town infrastructure utilized by the project, in particular drainage networks, will not see a change in peak flows from the existing conditions, as the receiving infrastructure is upstream of the proposed development. As a result, there is no anticipated negative impact to Town infrastructure.

EROSION AND SEDIMENT CONTROL PRACTICES

The erosion potential for this site as it exists is moderate due to the construction proposed in areas that are erodible when exposed. During construction, the major potential for erosion is wind and stormwater runoff. The contractor will be required to inspect and maintain all necessary erosion control measures, as well as installing any additional measures as required. All erosion control practices shall conform to “The Maine Stormwater Management Design Manual.” Some examples of erosion and sediment control measures to be utilized for this project during construction may include:

- Silt Soxx (or approved alternative) located at the toe of disturbed slopes
- Stabilized construction entrance at access point to the site
- Temporary mulching and seeding for disturbed areas
- Spraying water over disturbed areas to minimize wind erosion

After construction, permanent stabilization will be accomplished by permanent seeding, landscaping, and compacting/surfacing the access drives with gravel.

CONCLUSION

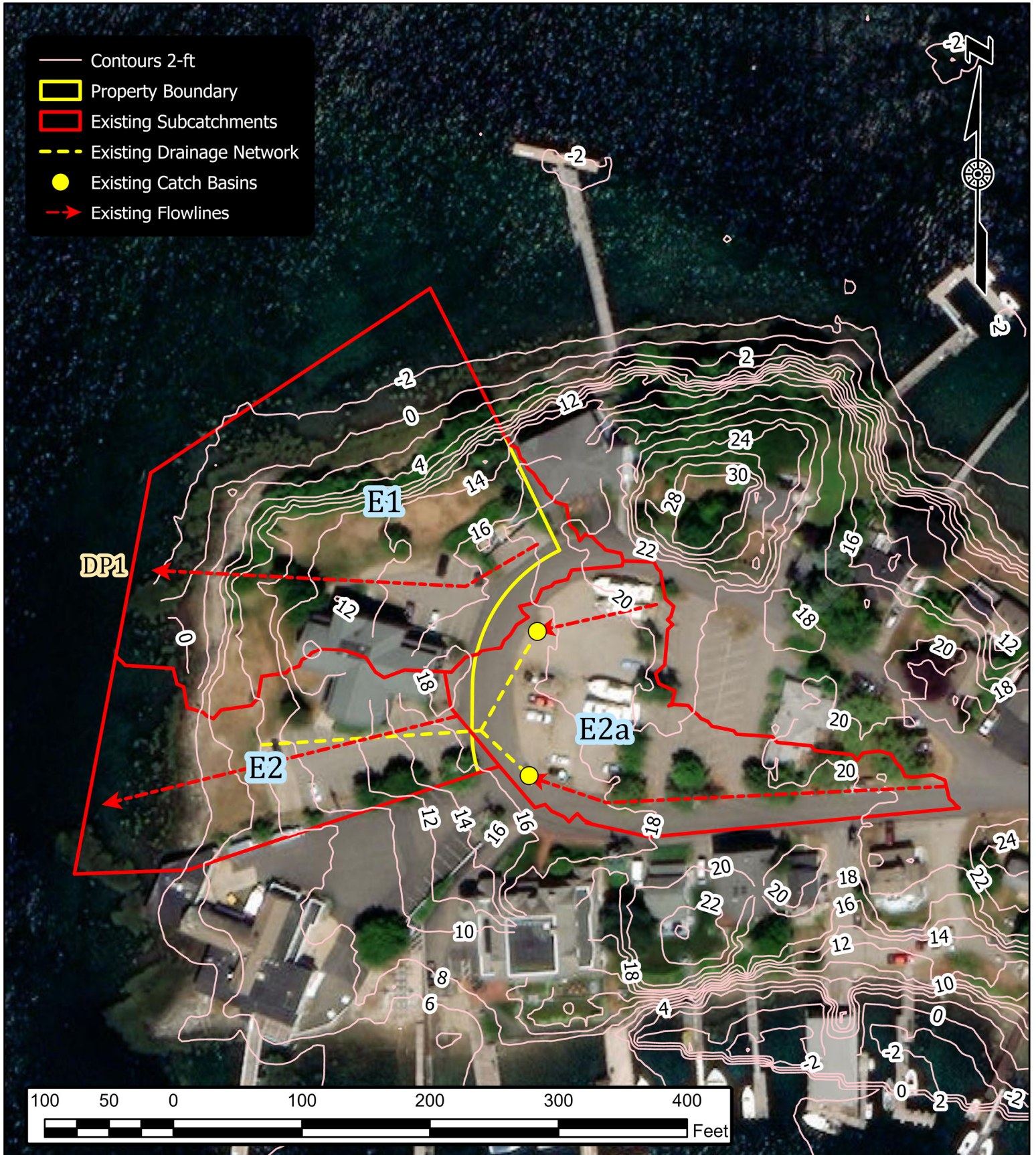
The proposed development has been designed to match the pre-development drainage patterns to the greatest extent feasible. With the reduction in impervious surfaces and installation of the Jellyfish filter, the post-development quality of the site runoff will be sufficiently increased to mitigate any issues caused by the proposed construction. Erosion and sediment control practices will be implemented for both the temporary condition during construction and for final stabilization after construction. Therefore, there are no negative impacts to downstream receptors or adjacent properties anticipated as a result of this project.

REFERENCES

1. Town of Kittery, ME. Land Use Development Code, Amended January 24, 2022.
2. Maine Department of Environmental Protection, *Maine Stormwater Management Design Manual (Volumes I-III)*, March 2016.
3. HydroCAD Software Solution, LLC. *HydroCAD Stormwater Modeling System Version 10.0* copyright 2013.

B.I.W. GROUP, LLC
 35 BADGERS ISLAND WEST
 KITTERY, MAINE

JOB NUMBER: 3050.72A
 SCALE: 1" = 100'
 SUBMITTED: 01-19-2023



B.I.W. GROUP, LLC
 35 BADGERS ISLAND WEST
 KITTERY, MAINE

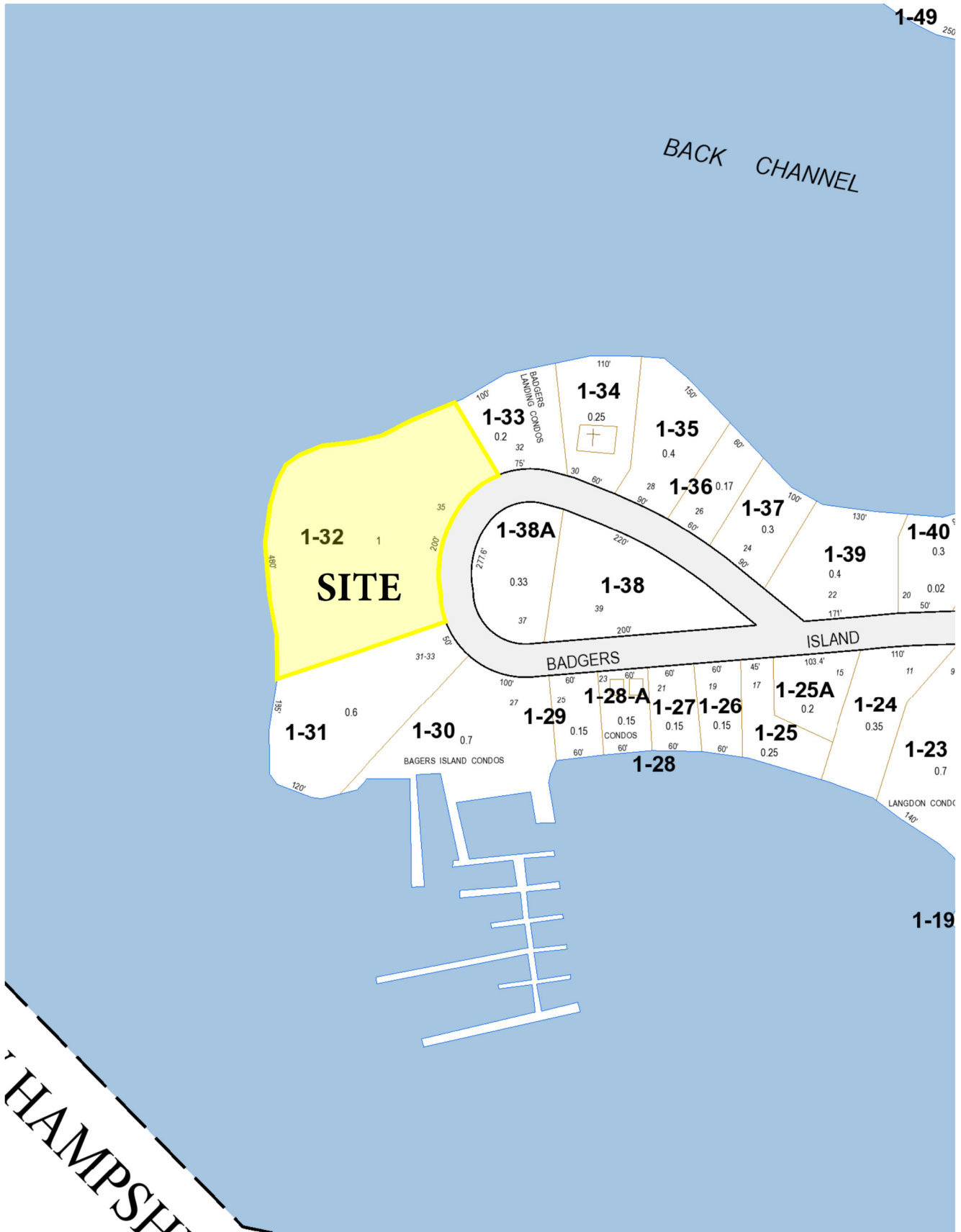
JOB NUMBER: 5010135.3050.72A
 SCALE: 1" = 100'
 SUBMITTED: 04-06-2023



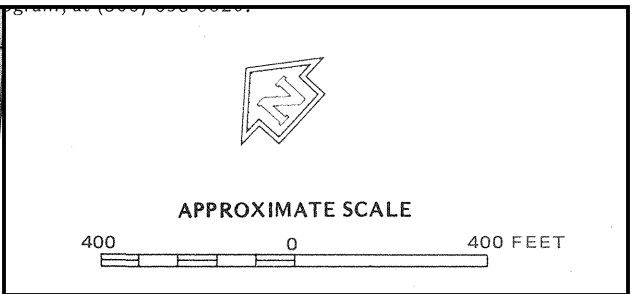
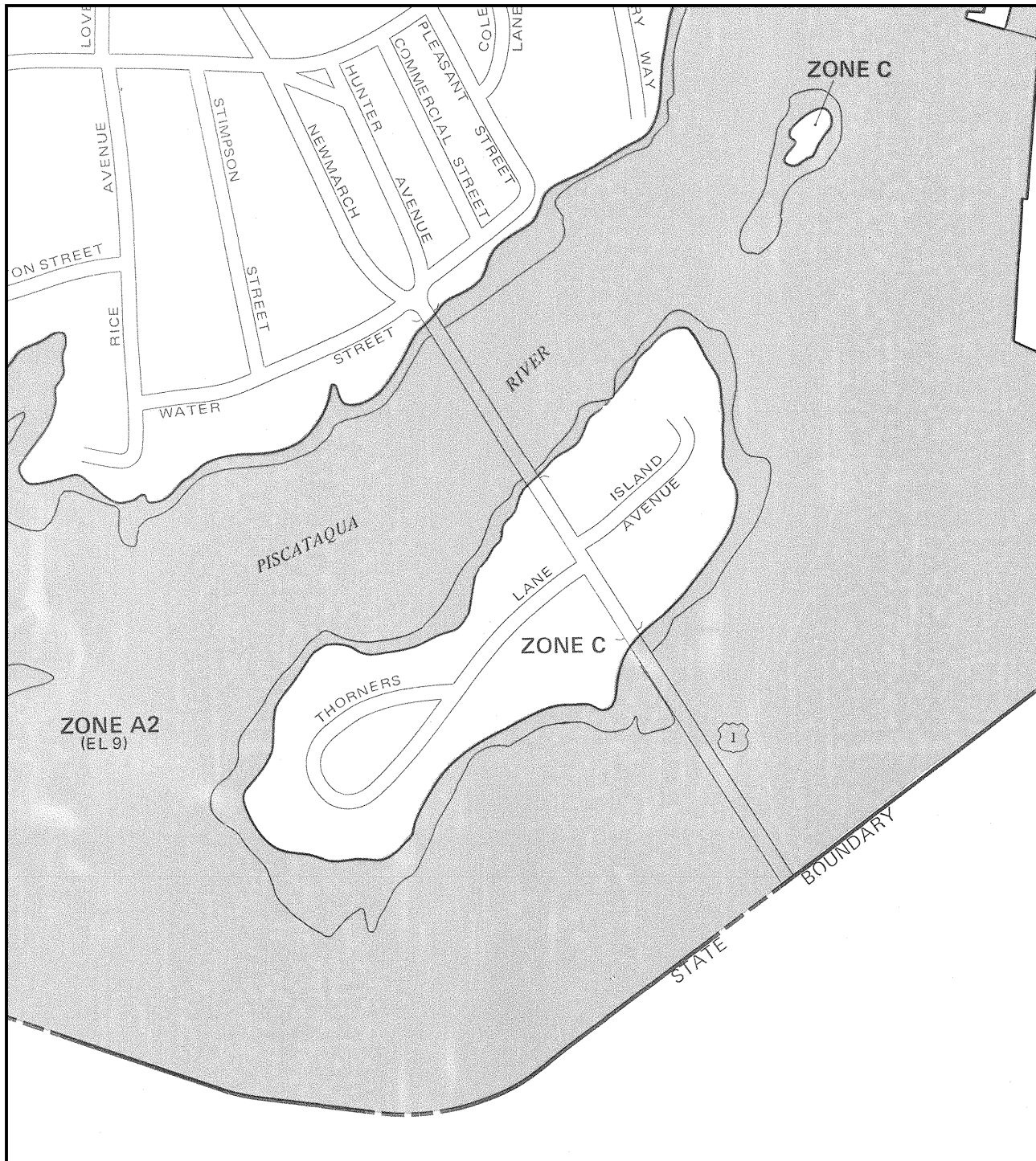
APPENDIX A
VICINITY (TAX) MAP

B.I.W. GROUP, LLC
35 BADGERS ISLAND WEST
KITTERY, MAINE

JOB NUMBER: 3050.72A
NTS
SUBMITTED: 08-18-2022



APPENDIX B
FEMA FIRM MAP



NATIONAL FLOOD INSURANCE PROGRAM


FIRM
FLOOD INSURANCE RATE MAP

TOWN OF
KITTERY, MAINE
YORK COUNTY

PANEL 8 OF 10
(SEE MAP INDEX FOR PANELS NOT PRINTED)

COMMUNITY-PANEL NUMBER
230171 0008 D

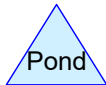
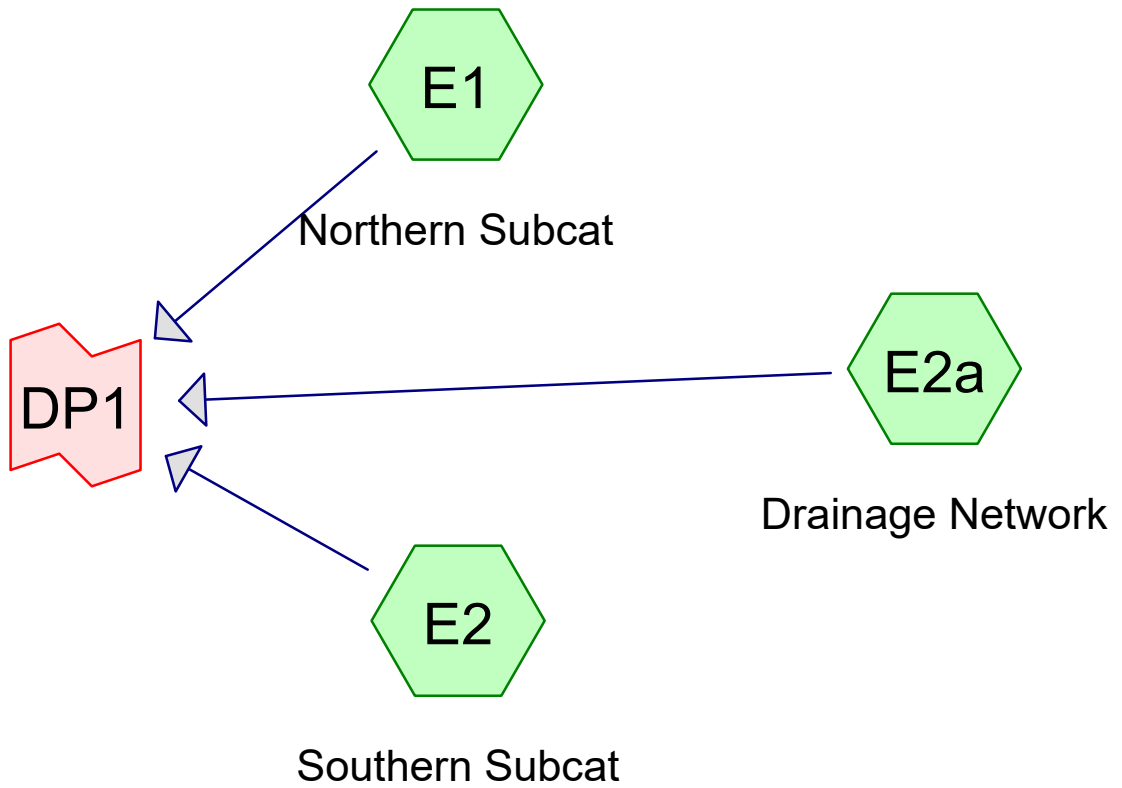
MAP REVISED:
JULY 3, 1986



Federal Emergency Management Agency

This is an official FIRMette showing a portion of the above-referenced flood map created from the MSC FIRMette Web tool. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For additional information about how to make sure the map is current, please see the Flood Hazard Mapping Updates Overview Fact Sheet available on the FEMA Flood Map Service Center home page at <https://msc.fema.gov>.

APPENDIX C
HYDROCAD DRAINAGE
ANALYSIS CALCULATIONS



Project Notes

Defined 5 rainfall events from output (39) IDF

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Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-yr	Type II 24-hr		Default	24.00	1	3.20	2
2	10-yr	Type II 24-hr		Default	24.00	1	4.86	2
3	25-yr	Type II 24-hr		Default	24.00	1	6.16	2

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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.676	80	>75% Grass cover, Good, HSG D (E1, E2, E2a)
0.156	96	Gravel surface, HSG D (E1, E2)
1.160	98	Paved parking, HSG D (E1, E2, E2a)
0.166	98	Roofs, HSG D (E1, E2, E2a)
0.097	98	Water Surface, 0% imp, HSG D (E1)
0.924	98	Water Surface, HSG D (E1, E2)
0.199	77	Woods, Good, HSG D (E1)
3.378	93	TOTAL AREA

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Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
3.378	HSG D	E1, E2, E2a
0.000	Other	
3.378		TOTAL AREA

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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	0.000	0.676	0.000	0.676	>75% Grass cover, Good	E1, E2, E2a
0.000	0.000	0.000	0.156	0.000	0.156	Gravel surface	E1, E2
0.000	0.000	0.000	1.160	0.000	1.160	Paved parking	E1, E2, E2a
0.000	0.000	0.000	0.166	0.000	0.166	Roofs	E1, E2, E2a
0.000	0.000	0.000	0.924	0.000	0.924	Water Surface	E1, E2
0.000	0.000	0.000	0.097	0.000	0.097	Water Surface, 0% imp	E1
0.000	0.000	0.000	0.199	0.000	0.199	Woods, Good	E1
0.000	0.000	0.000	3.378	0.000	3.378	TOTAL AREA	

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Type II 24-hr 2-yr Rainfall=3.20"

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 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 E1: Northern Subcat Runoff Area=71,648 sf 55.59% Impervious Runoff Depth>2.20"
Flow Length=585' Slope=0.0374 '/' Tc=6.9 min CN=92 Runoff=6.23 cfs 0.302 af

Subcatchment E2: Southern Subcat Runoff Area=36,164 sf 64.89% Impervious Runoff Depth>2.29"
Tc=5.0 min CN=93 Runoff=3.43 cfs 0.159 af

Subcatchment E2a: Drainage Network Runoff Area=39,314 sf 88.35% Impervious Runoff Depth>2.57"
Flow Length=411' Slope=0.0155 '/' Tc=6.7 min CN=96 Runoff=3.75 cfs 0.193 af

Link DP1: below 1,000.00 cfs Inflow=13.22 cfs 0.654 af
Primary=13.22 cfs 0.654 af Secondary=0.00 cfs 0.000 af

Total Runoff Area = 3.378 ac Runoff Volume = 0.654 af Average Runoff Depth = 2.32"
33.37% Pervious = 1.127 ac 66.63% Impervious = 2.250 ac

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Type II 24-hr 2-yr Rainfall=3.20"

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Summary for Subcatchment E1: Northern Subcat

Runoff = 6.23 cfs @ 11.98 hrs, Volume= 0.302 af, Depth> 2.20"

Routed to Link DP1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-yr Rainfall=3.20"

Area (sf)	CN	Description
15,046	80	>75% Grass cover, Good, HSG D
3,894	96	Gravel surface, HSG D
1,192	98	Paved parking, HSG D
8,075	98	Paved parking, HSG D
2,924	98	Roofs, HSG D
8,671	77	Woods, Good, HSG D
27,640	98	Water Surface, HSG D
4,206	98	Water Surface, 0% imp, HSG D
71,648	92	Weighted Average
31,817		44.41% Pervious Area
39,831		55.59% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.9	585	0.0374	1.41		Lag/CN Method,

Summary for Subcatchment E2: Southern Subcat

[49] Hint: Tc<2dt may require smaller dt

Runoff = 3.43 cfs @ 11.95 hrs, Volume= 0.159 af, Depth> 2.29"

Routed to Link DP1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-yr Rainfall=3.20"

Area (sf)	CN	Description
9,817	80	>75% Grass cover, Good, HSG D
2,880	96	Gravel surface, HSG D
7,292	98	Paved parking, HSG D
3,568	98	Roofs, HSG D
12,607	98	Water Surface, HSG D
36,164	93	Weighted Average
12,697		35.11% Pervious Area
23,467		64.89% Impervious Area

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

Summary for Subcatchment E2a: Drainage Network

Runoff = 3.75 cfs @ 11.97 hrs, Volume= 0.193 af, Depth> 2.57"

Routed to Link DP1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type II 24-hr 2-yr Rainfall=3.20"

Area (sf)	CN	Description
4,581	80	>75% Grass cover, Good, HSG D
33,992	98	Paved parking, HSG D
741	98	Roofs, HSG D
39,314	96	Weighted Average
4,581		11.65% Pervious Area
34,733		88.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7	411	0.0155	1.03		Lag/CN Method,

Summary for Link DP1:

Inflow Area = 3.378 ac, 66.63% Impervious, Inflow Depth > 2.32" for 2-yr event
 Inflow = 13.22 cfs @ 11.97 hrs, Volume= 0.654 af
 Primary = 13.22 cfs @ 11.97 hrs, Volume= 0.654 af, Atten= 0%, Lag= 0.0 min
 Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Primary outflow = Inflow below 1,000.00 cfs, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

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Type II 24-hr 10-yr Rainfall=4.86"

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 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 E1: Northern Subcat Runoff Area=71,648 sf 55.59% Impervious Runoff Depth>3.71"
Flow Length=585' Slope=0.0374 '/' Tc=6.9 min CN=92 Runoff=10.13 cfs 0.508 af

Subcatchment E2: Southern Subcat Runoff Area=36,164 sf 64.89% Impervious Runoff Depth>3.80"
Tc=5.0 min CN=93 Runoff=5.51 cfs 0.263 af

Subcatchment E2a: Drainage Network Runoff Area=39,314 sf 88.35% Impervious Runoff Depth>4.08"
Flow Length=411' Slope=0.0155 '/' Tc=6.7 min CN=96 Runoff=5.83 cfs 0.307 af

Link DP1: below 1,000.00 cfs Inflow=21.18 cfs 1.078 af
Primary=21.18 cfs 1.078 af Secondary=0.00 cfs 0.000 af

Total Runoff Area = 3.378 ac Runoff Volume = 1.078 af Average Runoff Depth = 3.83"
33.37% Pervious = 1.127 ac 66.63% Impervious = 2.250 ac

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Type II 24-hr 10-yr Rainfall=4.86"

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Summary for Subcatchment E1: Northern Subcat

Runoff = 10.13 cfs @ 11.98 hrs, Volume= 0.508 af, Depth> 3.71"

Routed to Link DP1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=4.86"

Area (sf)	CN	Description
15,046	80	>75% Grass cover, Good, HSG D
3,894	96	Gravel surface, HSG D
1,192	98	Paved parking, HSG D
8,075	98	Paved parking, HSG D
2,924	98	Roofs, HSG D
8,671	77	Woods, Good, HSG D
27,640	98	Water Surface, HSG D
4,206	98	Water Surface, 0% imp, HSG D
71,648	92	Weighted Average
31,817		44.41% Pervious Area
39,831		55.59% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.9	585	0.0374	1.41		Lag/CN Method,

Summary for Subcatchment E2: Southern Subcat

[49] Hint: Tc<2dt may require smaller dt

Runoff = 5.51 cfs @ 11.95 hrs, Volume= 0.263 af, Depth> 3.80"

Routed to Link DP1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=4.86"

Area (sf)	CN	Description
9,817	80	>75% Grass cover, Good, HSG D
2,880	96	Gravel surface, HSG D
7,292	98	Paved parking, HSG D
3,568	98	Roofs, HSG D
12,607	98	Water Surface, HSG D
36,164	93	Weighted Average
12,697		35.11% Pervious Area
23,467		64.89% Impervious Area

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

Summary for Subcatchment E2a: Drainage Network

Runoff = 5.83 cfs @ 11.97 hrs, Volume= 0.307 af, Depth> 4.08"

Routed to Link DP1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type II 24-hr 10-yr Rainfall=4.86"

Area (sf)	CN	Description
4,581	80	>75% Grass cover, Good, HSG D
33,992	98	Paved parking, HSG D
741	98	Roofs, HSG D
39,314	96	Weighted Average
4,581		11.65% Pervious Area
34,733		88.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7	411	0.0155	1.03		Lag/CN Method,

Summary for Link DP1:

Inflow Area = 3.378 ac, 66.63% Impervious, Inflow Depth > 3.83" for 10-yr event
 Inflow = 21.18 cfs @ 11.97 hrs, Volume= 1.078 af
 Primary = 21.18 cfs @ 11.97 hrs, Volume= 1.078 af, Atten= 0%, Lag= 0.0 min
 Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Primary outflow = Inflow below 1,000.00 cfs, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Existing Conditions 2023-01-18 David T

Type II 24-hr 25-yr Rainfall=6.16"

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 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 E1: Northern Subcat Runoff Area=71,648 sf 55.59% Impervious Runoff Depth>4.89"
Flow Length=585' Slope=0.0374 '/' Tc=6.9 min CN=92 Runoff=13.15 cfs 0.671 af

Subcatchment E2: Southern Subcat Runoff Area=36,164 sf 64.89% Impervious Runoff Depth>4.99"
Tc=5.0 min CN=93 Runoff=7.11 cfs 0.345 af

Subcatchment E2a: Drainage Network Runoff Area=39,314 sf 88.35% Impervious Runoff Depth>5.27"
Flow Length=411' Slope=0.0155 '/' Tc=6.7 min CN=96 Runoff=7.44 cfs 0.396 af

Link DP1: below 1,000.00 cfs Inflow=27.35 cfs 1.412 af
Primary=27.35 cfs 1.412 af Secondary=0.00 cfs 0.000 af

Total Runoff Area = 3.378 ac Runoff Volume = 1.412 af Average Runoff Depth = 5.02"
33.37% Pervious = 1.127 ac 66.63% Impervious = 2.250 ac

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Type II 24-hr 25-yr Rainfall=6.16"

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Summary for Subcatchment E1: Northern Subcat

Runoff = 13.15 cfs @ 11.98 hrs, Volume= 0.671 af, Depth> 4.89"

Routed to Link DP1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr Rainfall=6.16"

Area (sf)	CN	Description
15,046	80	>75% Grass cover, Good, HSG D
3,894	96	Gravel surface, HSG D
1,192	98	Paved parking, HSG D
8,075	98	Paved parking, HSG D
2,924	98	Roofs, HSG D
8,671	77	Woods, Good, HSG D
27,640	98	Water Surface, HSG D
4,206	98	Water Surface, 0% imp, HSG D
71,648	92	Weighted Average
31,817		44.41% Pervious Area
39,831		55.59% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.9	585	0.0374	1.41		Lag/CN Method,

Summary for Subcatchment E2: Southern Subcat

[49] Hint: Tc<2dt may require smaller dt

Runoff = 7.11 cfs @ 11.95 hrs, Volume= 0.345 af, Depth> 4.99"

Routed to Link DP1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr Rainfall=6.16"

Area (sf)	CN	Description
9,817	80	>75% Grass cover, Good, HSG D
2,880	96	Gravel surface, HSG D
7,292	98	Paved parking, HSG D
3,568	98	Roofs, HSG D
12,607	98	Water Surface, HSG D
36,164	93	Weighted Average
12,697		35.11% Pervious Area
23,467		64.89% Impervious Area

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

Summary for Subcatchment E2a: Drainage Network

Runoff = 7.44 cfs @ 11.97 hrs, Volume= 0.396 af, Depth> 5.27"

Routed to Link DP1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type II 24-hr 25-yr Rainfall=6.16"

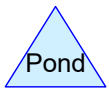
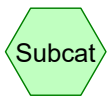
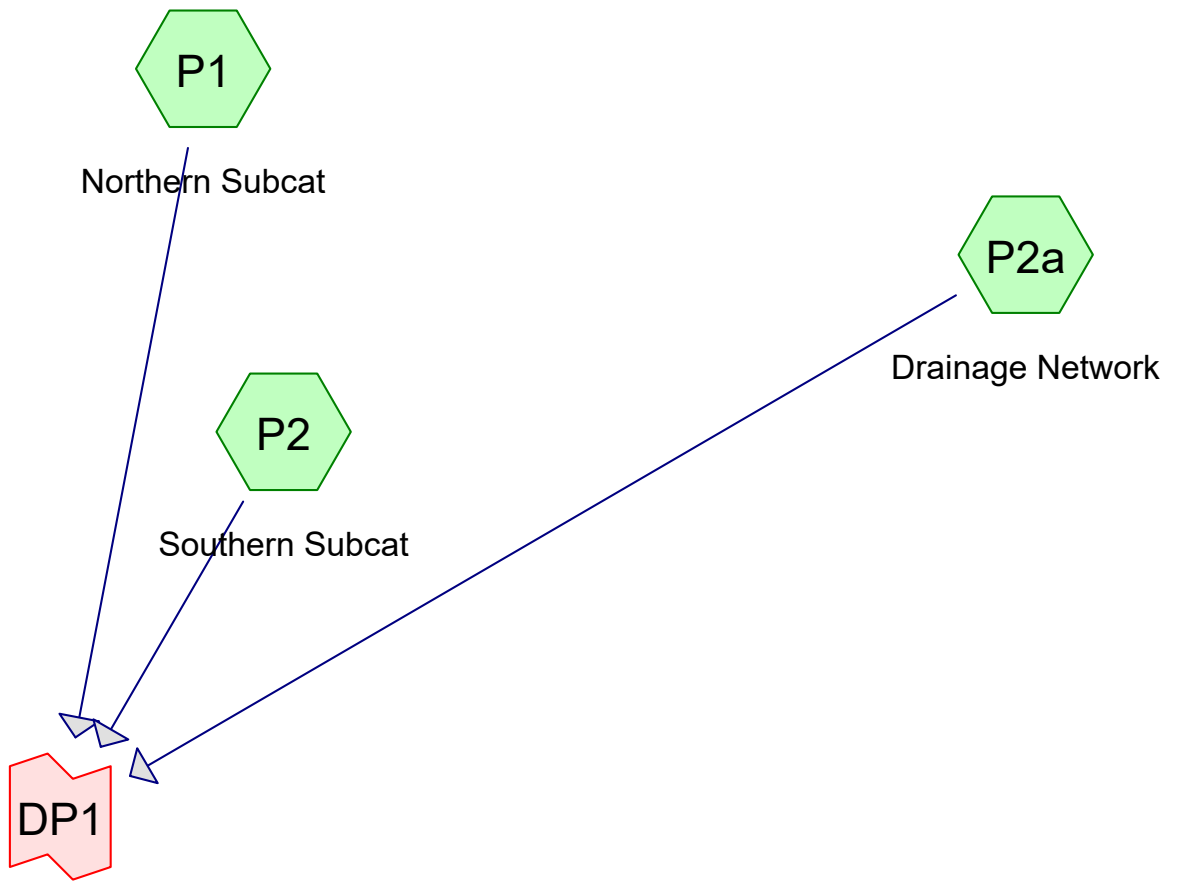
Area (sf)	CN	Description
4,581	80	>75% Grass cover, Good, HSG D
33,992	98	Paved parking, HSG D
741	98	Roofs, HSG D
39,314	96	Weighted Average
4,581		11.65% Pervious Area
34,733		88.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7	411	0.0155	1.03		Lag/CN Method,

Summary for Link DP1:

Inflow Area = 3.378 ac, 66.63% Impervious, Inflow Depth > 5.02" for 25-yr event
 Inflow = 27.35 cfs @ 11.97 hrs, Volume= 1.412 af
 Primary = 27.35 cfs @ 11.97 hrs, Volume= 1.412 af, Atten= 0%, Lag= 0.0 min
 Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Primary outflow = Inflow below 1,000.00 cfs, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs



Routing Diagram for Proposed Conditions 2023-04-06 David T
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Project Notes

Defined 5 rainfall events from output (39) IDF

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Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-yr	Type II 24-hr		Default	24.00	1	3.20	2
2	10-yr	Type II 24-hr		Default	24.00	1	4.86	2
3	25-yr	Type II 24-hr		Default	24.00	1	6.16	2

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Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.798	80	>75% Grass cover, Good, HSG D (P1, P2, P2a)
0.109	96	Gravel surface, HSG D (P1, P2)
0.932	98	Paved parking, HSG D (P1, P2, P2a)
0.011	50	Permeable Pavers (P1, P2)
0.332	98	Roofs, HSG D (P1, P2, P2a)
0.097	98	Water Surface, 0% imp, HSG D (P1)
0.924	98	Water Surface, HSG D (P1, P2)
0.175	77	Woods, Good, HSG D (P1)
3.378	92	TOTAL AREA

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Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
3.367	HSG D	P1, P2, P2a
0.011	Other	P1, P2
3.378		TOTAL AREA

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Ground Covers (selected 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	0.000	0.798	0.000	0.798	>75% Grass cover, Good	P1, P2, P2a
0.000	0.000	0.000	0.109	0.000	0.109	Gravel surface	P1, P2
0.000	0.000	0.000	0.932	0.000	0.932	Paved parking	P1, P2, P2a
0.000	0.000	0.000	0.000	0.011	0.011	Permeable Pavers	P1, P2
0.000	0.000	0.000	0.332	0.000	0.332	Roofs	P1, P2, P2a
0.000	0.000	0.000	0.924	0.000	0.924	Water Surface	P1, P2
0.000	0.000	0.000	0.097	0.000	0.097	Water Surface, 0% imp	P1
0.000	0.000	0.000	0.175	0.000	0.175	Woods, Good	P1
0.000	0.000	0.000	3.367	0.011	3.378	TOTAL AREA	

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Type II 24-hr 2-yr Rainfall=3.20"

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Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 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 P1: Northern Subcat Runoff Area=64,973 sf 53.03% Impervious Runoff Depth=2.26"
Flow Length=585' Slope=0.0374 '/' Tc=7.2 min CN=91 Runoff=5.44 cfs 0.281 af

Subcatchment P2: Southern Subcat Runoff Area=31,171 sf 54.31% Impervious Runoff Depth=2.17"
Tc=5.0 min CN=90 Runoff=2.70 cfs 0.129 af

Subcatchment P2a: Drainage Network Runoff Area=50,983 sf 86.16% Impervious Runoff Depth=2.75"
Flow Length=411' Slope=0.0155 '/' Tc=6.7 min CN=96 Runoff=4.86 cfs 0.268 af

Link DP1: below 1,000.00 cfs Inflow=12.81 cfs 0.678 af
Primary=12.81 cfs 0.678 af Secondary=0.00 cfs 0.000 af

Total Runoff Area = 3.378 ac Runoff Volume = 0.678 af Average Runoff Depth = 2.41"
35.22% Pervious = 1.190 ac 64.78% Impervious = 2.188 ac

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Type II 24-hr 2-yr Rainfall=3.20"

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Summary for Subcatchment P1: Northern Subcat

Runoff = 5.44 cfs @ 11.98 hrs, Volume= 0.281 af, Depth= 2.26"
Routed to Link DP1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-yr Rainfall=3.20"

Area (sf)	CN	Description
14,676	80	>75% Grass cover, Good, HSG D
3,570	96	Gravel surface, HSG D
1,192	98	Paved parking, HSG D
7,624	77	Woods, Good, HSG D
27,640	98	Water Surface, HSG D
4,206	98	Water Surface, 0% imp, HSG D
3,148	98	Roofs, HSG D
* 441	50	Permeable Pavers
2,476	98	Paved parking, HSG D
64,973	91	Weighted Average
30,517		46.97% Pervious Area
34,456		53.03% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.2	585	0.0374	1.35		Lag/CN Method,

Summary for Subcatchment P2: Southern Subcat

[49] Hint: Tc<2dt may require smaller dt

Runoff = 2.70 cfs @ 11.95 hrs, Volume= 0.129 af, Depth= 2.17"
Routed to Link DP1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-yr Rainfall=3.20"

Area (sf)	CN	Description
13,037	80	>75% Grass cover, Good, HSG D
1,183	96	Gravel surface, HSG D
12,607	98	Water Surface, HSG D
4,315	98	Roofs, HSG D
* 23	50	Permeable Pavers
6	98	Paved parking, HSG D
31,171	90	Weighted Average
14,243		45.69% Pervious Area
16,928		54.31% Impervious Area

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Type II 24-hr 2-yr Rainfall=3.20"

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

Summary for Subcatchment P2a: Drainage Network

Runoff = 4.86 cfs @ 11.97 hrs, Volume= 0.268 af, Depth= 2.75"
 Routed to Link DP1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 Type II 24-hr 2-yr Rainfall=3.20"

Area (sf)	CN	Description
7,056	80	>75% Grass cover, Good, HSG D
36,917	98	Paved parking, HSG D
7,010	98	Roofs, HSG D
50,983	96	Weighted Average
7,056		13.84% Pervious Area
43,927		86.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7	411	0.0155	1.03		Lag/CN Method,

Summary for Link DP1:

Inflow Area = 3.378 ac, 64.78% Impervious, Inflow Depth = 2.41" for 2-yr event
 Inflow = 12.81 cfs @ 11.97 hrs, Volume= 0.678 af
 Primary = 12.81 cfs @ 11.97 hrs, Volume= 0.678 af, Atten= 0%, Lag= 0.0 min
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Primary outflow = Inflow below 1,000.00 cfs, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

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Type II 24-hr 10-yr Rainfall=4.86"

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Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 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 P1: Northern Subcat Runoff Area=64,973 sf 53.03% Impervious Runoff Depth=3.85"
Flow Length=585' Slope=0.0374 '/' Tc=7.2 min CN=91 Runoff=8.96 cfs 0.478 af

Subcatchment P2: Southern Subcat Runoff Area=31,171 sf 54.31% Impervious Runoff Depth=3.74"
Tc=5.0 min CN=90 Runoff=4.51 cfs 0.223 af

Subcatchment P2a: Drainage Network Runoff Area=50,983 sf 86.16% Impervious Runoff Depth=4.39"
Flow Length=411' Slope=0.0155 '/' Tc=6.7 min CN=96 Runoff=7.56 cfs 0.429 af

Link DP1: below 1,000.00 cfs Inflow=20.74 cfs 1.130 af
Primary=20.74 cfs 1.130 af Secondary=0.00 cfs 0.000 af

Total Runoff Area = 3.378 ac Runoff Volume = 1.130 af Average Runoff Depth = 4.01"
35.22% Pervious = 1.190 ac 64.78% Impervious = 2.188 ac

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Type II 24-hr 10-yr Rainfall=4.86"

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Summary for Subcatchment P1: Northern Subcat

Runoff = 8.96 cfs @ 11.98 hrs, Volume= 0.478 af, Depth= 3.85"
Routed to Link DP1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=4.86"

Area (sf)	CN	Description
14,676	80	>75% Grass cover, Good, HSG D
3,570	96	Gravel surface, HSG D
1,192	98	Paved parking, HSG D
7,624	77	Woods, Good, HSG D
27,640	98	Water Surface, HSG D
4,206	98	Water Surface, 0% imp, HSG D
3,148	98	Roofs, HSG D
* 441	50	Permeable Pavers
2,476	98	Paved parking, HSG D
64,973	91	Weighted Average
30,517		46.97% Pervious Area
34,456		53.03% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.2	585	0.0374	1.35		Lag/CN Method,

Summary for Subcatchment P2: Southern Subcat

[49] Hint: Tc<2dt may require smaller dt

Runoff = 4.51 cfs @ 11.95 hrs, Volume= 0.223 af, Depth= 3.74"
Routed to Link DP1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=4.86"

Area (sf)	CN	Description
13,037	80	>75% Grass cover, Good, HSG D
1,183	96	Gravel surface, HSG D
12,607	98	Water Surface, HSG D
4,315	98	Roofs, HSG D
* 23	50	Permeable Pavers
6	98	Paved parking, HSG D
31,171	90	Weighted Average
14,243		45.69% Pervious Area
16,928		54.31% Impervious Area

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Type II 24-hr 10-yr Rainfall=4.86"

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

Summary for Subcatchment P2a: Drainage Network

Runoff = 7.56 cfs @ 11.97 hrs, Volume= 0.429 af, Depth= 4.39"
Routed to Link DP1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=4.86"

Area (sf)	CN	Description
7,056	80	>75% Grass cover, Good, HSG D
36,917	98	Paved parking, HSG D
7,010	98	Roofs, HSG D
50,983	96	Weighted Average
7,056		13.84% Pervious Area
43,927		86.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7	411	0.0155	1.03		Lag/CN Method,

Summary for Link DP1:

Inflow Area = 3.378 ac, 64.78% Impervious, Inflow Depth = 4.01" for 10-yr event
Inflow = 20.74 cfs @ 11.97 hrs, Volume= 1.130 af
Primary = 20.74 cfs @ 11.97 hrs, Volume= 1.130 af, Atten= 0%, Lag= 0.0 min
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Primary outflow = Inflow below 1,000.00 cfs, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Proposed Conditions 2023-04-06 David T

Type II 24-hr 25-yr Rainfall=6.16"

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Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 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 P1: Northern Subcat Runoff Area=64,973 sf 53.03% Impervious Runoff Depth=5.11"
Flow Length=585' Slope=0.0374 '/' Tc=7.2 min CN=91 Runoff=11.69 cfs 0.636 af

Subcatchment P2: Southern Subcat Runoff Area=31,171 sf 54.31% Impervious Runoff Depth=5.00"
Tc=5.0 min CN=90 Runoff=5.92 cfs 0.298 af

Subcatchment P2a: Drainage Network Runoff Area=50,983 sf 86.16% Impervious Runoff Depth=5.69"
Flow Length=411' Slope=0.0155 '/' Tc=6.7 min CN=96 Runoff=9.65 cfs 0.555 af

Link DP1: below 1,000.00 cfs Inflow=26.89 cfs 1.489 af
Primary=26.89 cfs 1.489 af Secondary=0.00 cfs 0.000 af

Total Runoff Area = 3.378 ac Runoff Volume = 1.489 af Average Runoff Depth = 5.29"
35.22% Pervious = 1.190 ac 64.78% Impervious = 2.188 ac

Proposed Conditions 2023-04-06 David T

Type II 24-hr 25-yr Rainfall=6.16"

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Summary for Subcatchment P1: Northern Subcat

Runoff = 11.69 cfs @ 11.98 hrs, Volume= 0.636 af, Depth= 5.11"

Routed to Link DP1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr Rainfall=6.16"

Area (sf)	CN	Description
14,676	80	>75% Grass cover, Good, HSG D
3,570	96	Gravel surface, HSG D
1,192	98	Paved parking, HSG D
7,624	77	Woods, Good, HSG D
27,640	98	Water Surface, HSG D
4,206	98	Water Surface, 0% imp, HSG D
3,148	98	Roofs, HSG D
* 441	50	Permeable Pavers
2,476	98	Paved parking, HSG D
64,973	91	Weighted Average
30,517		46.97% Pervious Area
34,456		53.03% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.2	585	0.0374	1.35		Lag/CN Method,

Summary for Subcatchment P2: Southern Subcat

[49] Hint: Tc<2dt may require smaller dt

Runoff = 5.92 cfs @ 11.95 hrs, Volume= 0.298 af, Depth= 5.00"

Routed to Link DP1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr Rainfall=6.16"

Area (sf)	CN	Description
13,037	80	>75% Grass cover, Good, HSG D
1,183	96	Gravel surface, HSG D
12,607	98	Water Surface, HSG D
4,315	98	Roofs, HSG D
* 23	50	Permeable Pavers
6	98	Paved parking, HSG D
31,171	90	Weighted Average
14,243		45.69% Pervious Area
16,928		54.31% Impervious Area

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Type II 24-hr 25-yr Rainfall=6.16"

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

Summary for Subcatchment P2a: Drainage Network

Runoff = 9.65 cfs @ 11.97 hrs, Volume= 0.555 af, Depth= 5.69"
Routed to Link DP1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr Rainfall=6.16"

Area (sf)	CN	Description
7,056	80	>75% Grass cover, Good, HSG D
36,917	98	Paved parking, HSG D
7,010	98	Roofs, HSG D
50,983	96	Weighted Average
7,056		13.84% Pervious Area
43,927		86.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7	411	0.0155	1.03		Lag/CN Method,

Summary for Link DP1:

Inflow Area = 3.378 ac, 64.78% Impervious, Inflow Depth = 5.29" for 25-yr event
Inflow = 26.89 cfs @ 11.97 hrs, Volume= 1.489 af
Primary = 26.89 cfs @ 11.97 hrs, Volume= 1.489 af, Atten= 0%, Lag= 0.0 min
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Primary outflow = Inflow below 1,000.00 cfs, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

APPENDIX D
INSPECTION & LONG TERM
MAINTENANCE PLAN



AMBIT ENGINEERING, INC.
A DIVISION OF HALEY WARD, INC.

***INSPECTION & LONG-TERM MAINTENANCE PLAN
FOR
SITE DEVELOPMENT***

**35 BADGERS ISLAND WEST
KITTERY, ME**

Introduction

The intent of this plan is to provide Hampshire Development (herein referred to as “owner”) with a list of procedures that document the inspection and maintenance requirements of the stormwater management system for this development. Specifically, the proposed Jellyfish Stormwater Filter and associated drainage structures (collectively referred to as the “Stormwater Management System”). The contact information for the owner shall be kept current, and if there is a change of ownership of the property this plan must be transferred to the new owner.

The following inspection and maintenance program is necessary to keep the stormwater management system functioning properly and will help in maintaining a high quality of stormwater runoff to minimize potential environmental impacts. By following the enclosed procedures, the owner will be able to maintain the functional design of the stormwater management system and maximize its ability to remove sediment and other contaminants from site generated stormwater runoff.

Annual Report

The owner shall prepare an annual Inspection & Maintenance Report. The report shall include a summary of the system’s maintenance and repair by transmission of the Inspection & Maintenance Log and other information as required. A copy of the report shall be delivered annually to the Kittery Code Enforcement Officer, if required.

Inspection & Maintenance Checklist/Log

The following pages contain the Stormwater Management System Inspection & Maintenance Requirements and a blank copy of the Stormwater Management System Inspection & Maintenance Log. These forms are provided to the owner as a guideline for performing the inspection and maintenance of the Stormwater Management System. This is a guideline and should be periodically reviewed for conformance with current practice and standards.

Stormwater Management System Components

The Stormwater Management System is designed to mitigate the quality of site-generated stormwater runoff. As a result, the design includes the following elements:

Non-Structural BMPs

Non-Structural best management practices (BMP's) include temporary and permanent measures that typically require less labor and capital inputs and are intended to provide protection against erosion of soils. Examples of non-structural BMP's on this project include but are not limited to:

- Temporary and Permanent mulching
- Temporary and Permanent grass cover
- Trees
- Shrubs and ground covers
- Miscellaneous landscape plantings
- Dust control
- Tree protection
- Topsoiling
- Sediment barriers
- Stabilized construction entrance
- Catch basin basket

Structural BMPs

Structural BMPs are more labor and capital-intensive structures or installations that require more specialized personnel to install. Examples on this project include but are not limited to:

- Contech Jellyfish Filter
- Bio Clean Downspout Filter
- Storm Drains
- Permeable Pavers

Inspection and Maintenance Requirements

The following summarizes the inspection and maintenance requirements for the various BMP's that may be found on this project.

1. **Grassed areas (until established):** After each rain event of 0.5" or more during a 24-hour period, inspect grassed areas for signs of disturbance, such as erosion. If damaged areas are discovered, immediately repair the damage. Repairs may include adding new topsoil, lime, seed, fertilizer and mulch.
2. **Plantings:** Planting and landscaping (trees, shrubs) shall be monitored bi-monthly during the first year to insure viability and vigorous growth. Replace dead or dying vegetation with new stock and

make adjustments to the conditions that caused the dead or dying vegetation. During dryer times of the year, provide weekly watering or irrigation during the establishment period of the first year. Make the necessary adjustments to ensure long-term health of the vegetated covers, i.e. provide more permanent mulch or compost or other means of protection.

3. **Bio Clean Downspout Filter:** Refer to the manufacturer's Operation and Maintenance manual for guidance, included herewith.
4. **Contech Jellyfish Filter:** Reference the attached operations and maintenance manual for proper maintenance of the system.
5. **Storm Drains:** Monitor accumulation of debris in catch basins monthly or after significant rain events. Remove sediments when they accumulate within the outlet pipe. During construction, maintain inlet protection until all roadways and parking areas have been stabilized. Prior to the end of construction, inspect the drains and basins for accumulations and remove and clean by jet-vacuuming.
6. **Permeable Pavers:** Ensure that sediments do not enter and plug pavement. Remove sediments, trash, and debris, as necessary. Repair outlet structures and appurtenances, as necessary. Vacuum at least twice annually.

Pollution Prevention

The following pollution prevention activities shall be undertaken to minimize potential impacts on stormwater runoff quality. The Contractor is responsible for all activities during construction. The Owner is responsible thereafter.

Spill Procedures

Any discharge of waste oil or other pollutant shall be reported immediately to the Maine Department of Environmental Protection (Maine DEP). The Contractor/Owner will be responsible for any incident of groundwater contamination resulting from the improper discharge of pollutants to the stormwater system, and may be required by Maine DEP to remediate incidents that may impact groundwater quality. If the property ownership is transferred, the new owner will be informed of the legal responsibilities associated with operation of the stormwater system, as indicated above.

Sanitary Facilities

Sanitary facilities shall be provided during all phases of construction.

Material Storage

No on site trash facility is provided until homes are constructed. The contractors are required to remove trash from the site. Hazardous material storage is prohibited.

Material Disposal

All waste material, trash, sediment, and debris shall be removed from the site and disposed of in accordance with applicable local, state, and federal guidelines and regulations. Removed sediments shall be if necessary dewatered prior to disposal.

Invasive Species

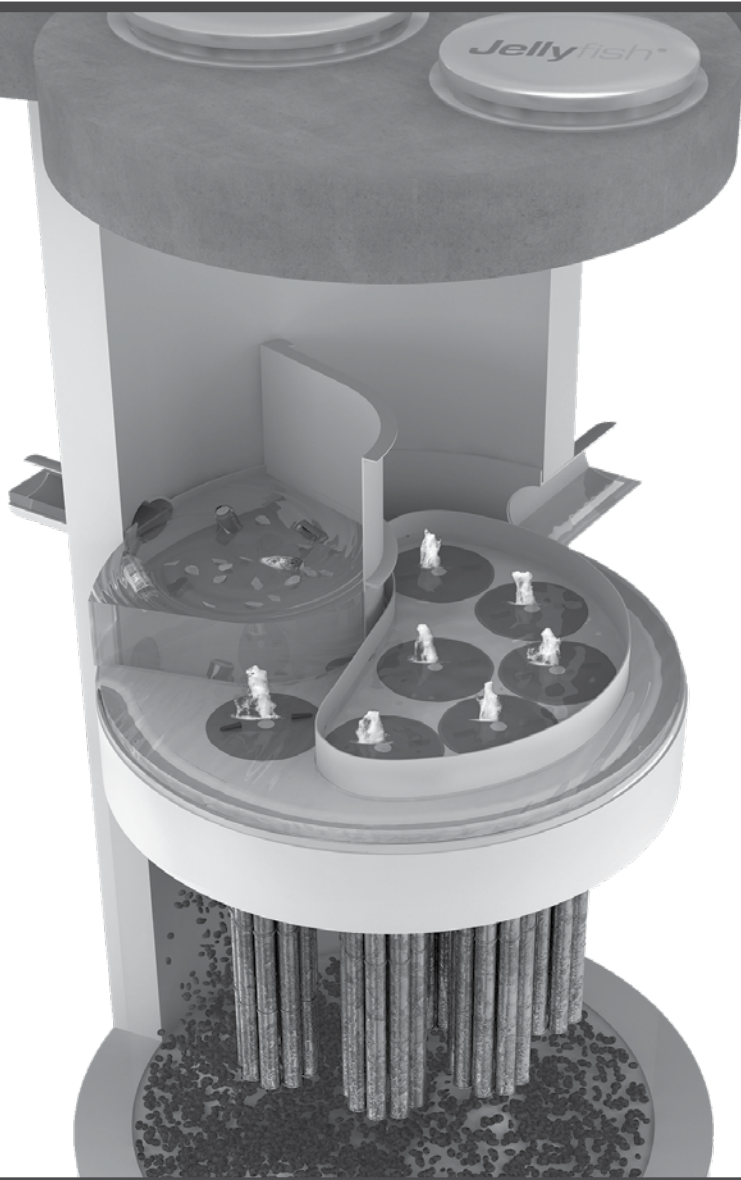
Monitor the Stormwater Management System for signs of invasive species growth. If caught early, their eradication is much easier. The most likely places where invasions start is in wetter, disturbed soils or detention ponds. Species such as phragmites and purple loose-strife are common invaders in these wetter areas. If they are found, the owner shall refer to the Invasive Plants List created by the Maine Department of Agriculture, Conservation & Forestry or contact a wetlands scientist with experience in invasive species control to implement a plan of action for eradication. Measures that do not require the application of chemical herbicides should be the first line of defense.



Figure 1: *Lythrum salicaria*, Purple Loosestrife. Photo by Liz West.

Figure 2: *Phragmites australis*. Photo by Le Loup Gris

Jellyfish[®] Filter Maintenance Guide





JELLYFISH® FILTER INSPECTION & MAINTENANCE GUIDE

Jellyfish units are often just one of many structures in a more comprehensive stormwater drainage and treatment system.

In order for maintenance of the Jellyfish filter to be successful, it is imperative that all other components be properly maintained. The maintenance and repair of upstream facilities should be carried out prior to Jellyfish maintenance activities.

In addition to considering upstream facilities, it is also important to correct any problems identified in the drainage area. Drainage area concerns may include: erosion problems, heavy oil loading, and discharges of inappropriate materials.

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1.0 Inspection and Maintenance Overview

The primary purpose of the Jellyfish® Filter is to capture and remove pollutants from stormwater runoff. As with any filtration system, these pollutants must be removed to maintain the filter's maximum treatment performance. Regular inspection and maintenance are required to insure proper functioning of the system.

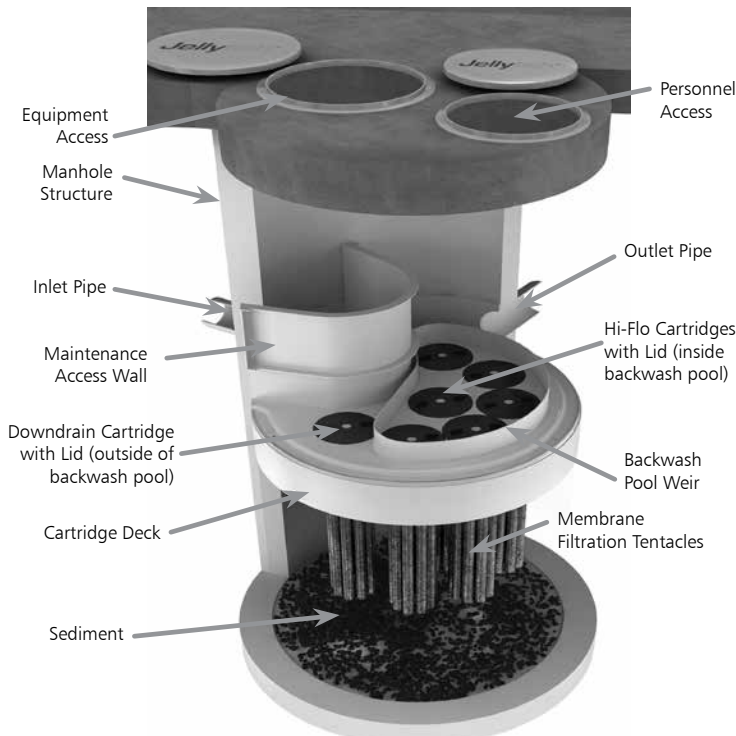
Maintenance frequencies and requirements are site specific and vary depending on pollutant loading. Additional maintenance activities may be required in the event of non-storm event runoff, such as base-flow or seasonal flow, an upstream chemical spill or due to excessive sediment loading from site erosion or extreme runoff events. It is a good practice to inspect the system after major storm events.

Inspection activities are typically conducted from surface observations and include:

- Observe if standing water is present
- Observe if there is any physical damage to the deck or cartridge lids
- Observe the amount of debris in the Maintenance Access Wall (MAW) or inlet bay for vault systems

Maintenance activities include:

- Removal of oil, floatable trash and debris
- Removal of collected sediments
- Rinsing and re-installing the filter cartridges
- Replace filter cartridge tentacles, as needed



Note: Separator Skirt not shown

2.0 Inspection Timing

Inspection of the Jellyfish Filter is key in determining the maintenance requirements for, and to develop a history of, the site's pollutant loading characteristics. In general, inspections should be performed at the times indicated below; *or per the approved project stormwater quality documents (if applicable), whichever is more frequent.*

1. A minimum of quarterly inspections during the first year of operation to assess the sediment and floatable pollutant accumulation, and to ensure proper functioning of the system.
2. Inspection frequency in subsequent years is based on the inspection and maintenance plan developed in the first year of operation. Minimum frequency should be once per year.
3. Inspection is recommended after each major storm event.
4. Inspection is required immediately after an upstream oil, fuel or other chemical spill.

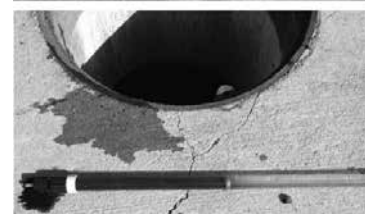
3.0 Inspection Procedure

The following procedure is recommended when performing inspections:

1. Provide traffic control measures as necessary.
2. Inspect the MAW or inlet bay for floatable pollutants such as trash, debris, and oil sheen.
3. Measure oil and sediment depth in several locations, by lowering a sediment probe until contact is made with the floor of the structure. Record sediment depth, and presences of any oil layers.
4. Inspect cartridge lids. Missing or damaged cartridge lids to be replaced.
5. Inspect the MAW (where appropriate), cartridge deck and receptacles, and backwash pool weir, for damaged or broken components.

3.1 Dry weather inspections

- Inspect the cartridge deck for standing water, and/or sediment on the deck.
- No standing water under normal operating conditions.
- Standing water inside the backwash pool, but not outside the backwash pool indicates, that the filter cartridges need to be rinsed.



Inspection Utilizing Sediment Probe

- Standing water outside the backwash pool is not anticipated and may indicate a backwater condition caused by high water elevation in the receiving water body, or possibly a blockage in downstream infrastructure.
- Any appreciable sediment ($\geq 1/16''$) accumulated on the deck surface should be removed.

3.2 Wet weather inspections

- Observe the rate and movement of water in the unit. Note the depth of water above deck elevation within the MAW or inlet bay.
- Less than 6 inches, flow should be exiting the cartridge lids of each of the draindown cartridges (i.e. cartridges located outside the backwash pool).
- Greater than 6 inches, flow should be exiting the cartridge lids of each of the draindown cartridges and each of the hi-flo cartridges (i.e. cartridges located inside the backwash pool), and water should be overflowing the backwash pool weir.
- 18 inches or greater and relatively little flow is exiting the cartridge lids and outlet pipe, this condition indicates that the filter cartridges need to be rinsed.

4.0 Maintenance Requirements

Required maintenance for the Jellyfish Filter is based upon results of the most recent inspection, historical maintenance records, or the site specific water quality management plan; whichever is more frequent. In general, maintenance requires some combination of the following:

1. Sediment removal for depths reaching 12 inches or greater, or within 3 years of the most recent sediment cleaning, whichever occurs sooner.
2. Floatable trash, debris, and oil removal.
3. Deck cleaned and free from sediment.
4. Filter cartridges rinsed and re-installed as required by the most recent inspection results, or within 12 months of the most recent filter rinsing, whichever occurs sooner.
5. Replace tentacles if rinsing does not restore adequate hydraulic capacity, remove accumulated sediment, or if damaged or missing. It is recommended that tentacles should remain in service no longer than 5 years before replacement.
6. Damaged or missing cartridge deck components must be repaired or replaced as indicated by results of the most recent inspection.
7. The unit must be cleaned out and filter cartridges inspected immediately after an upstream oil, fuel, or chemical spill. Filter cartridge tentacles should be replaced if damaged or compromised by the spill.

5.0 Maintenance Procedure

The following procedures are recommended when maintaining the Jellyfish Filter:

1. Provide traffic control measures as necessary.
2. Open all covers and hatches. Use ventilation equipment as required, according to confined space entry procedures.
Caution: Dropping objects onto the cartridge deck may cause damage.

3. Perform Inspection Procedure prior to maintenance activity.
4. To access the cartridge deck for filter cartridge service, descend into the structure and step directly onto the deck. Caution: Do not step onto the maintenance access wall (MAW) or backwash pool weir, as damage may result. Note that the cartridge deck may be slippery.
5. Maximum weight of maintenance crew and equipment on the cartridge deck not to exceed 450 lbs.

5.1 Filter Cartridge Removal

1. Remove a cartridge lid.
2. Remove cartridges from the deck using the lifting loops in the cartridge head plate. Rope or a lifting device (available from Contech) should be used. **Caution: Should a snag occur, do not force the cartridge upward as damage to the tentacles may result. Wet cartridges typically weigh between 100 and 125 lbs.**
3. Replace and secure the cartridge lid on the exposed empty receptacle as a safety precaution. Contech does not recommend exposing more than one empty cartridge receptacle at a time.

5.2 Filter Cartridge Rinsing

1. Remove all 11 tentacles from the cartridge head plate. Take care not to lose or damage the O-ring seal as well as the plastic threaded nut and connector.



Cartridge Removal & Lifting Device



2. Position tentacles in a container (or over the MAW), with the threaded connector (open end) facing down, so rinse water is flushed through the membrane and captured in the container.
3. Using the Jellyfish rinse tool (available from Contech) or a low-pressure garden hose sprayer, direct water spray onto the tentacle membrane, sweeping from top to bottom along the length of the tentacle. Rinse until all sediment is removed from the membrane. **Caution: Do not use a high pressure sprayer or focused stream of water on the membrane. Excessive water pressure may damage the membrane.**

4. Collected rinse water is typically removed by vacuum hose.
5. Reassemble cartridges as detailed later in this document. Reuse O-rings and nuts, ensuring proper placement on each tentacle.

5.3 Sediment and Floatables Extraction

1. Perform vacuum cleaning of the Jellyfish Filter only after filter cartridges have been removed from the system. Access the lower chamber for vacuum cleaning only through the maintenance access wall (MAW) opening. Be careful not to damage the flexible plastic separator skirt that is attached to the underside of the deck on manhole systems. Do not lower the vacuum wand through a cartridge receptacle, as damage to the receptacle will result.
2. Vacuum floatable trash, debris, and oil, from the MAW opening or inlet bay. Alternatively, floatable solids may be removed by a net or skimmer.



Vacuuming Sump Through MAW

3. Pressure wash cartridge deck and receptacles to remove all sediment and debris. Sediment should be rinsed into the sump area. Take care not to flush rinse water into the outlet pipe.
4. Remove water from the sump area. Vacuum or pump equipment should only be introduced through the MAW or inlet bay.
5. Remove the sediment from the bottom of the unit through the MAW or inlet bay opening.



Vacuuming Sump Through MAW

6. For larger diameter Jellyfish Filter manholes (≥ 8 -ft) and some vaults complete sediment removal may be facilitated by removing a cartridge lid from an empty receptacle and inserting a jetting wand (not a vacuum wand) through the receptacle. Use the sprayer to rinse loosened sediment toward the vacuum hose in the MAW opening, being careful not to damage the receptacle.

5.4 Filter Cartridge Reinstallation and Replacement

1. Cartridges should be installed after the deck has been cleaned. It is important that the receptacle surfaces be free from grit and debris.
2. Remove cartridge lid from deck and carefully lower the filter cartridge into the receptacle until head plate gasket is seated squarely in receptacle. **Caution: Do not force the cartridge downward; damage may occur.**
3. Replace the cartridge lid and check to see that both male threads are properly seated before rotating approximately 1/3 of a full rotation until firmly seated. Use of an approved rim gasket lubricant may facilitate installation. See next page for additional details.
4. If rinsing is ineffective in removing sediment from the tentacles, or if tentacles are damaged, provisions must be made to replace the spent or damaged tentacles with new tentacles. Contact Contech to order replacement tentacles.

5.5 Chemical Spills

Caution: If a chemical spill has been captured, do not attempt maintenance. Immediately contact the local hazard response agency and contact Contech.

5.6 Material Disposal

The accumulated sediment found in stormwater treatment and conveyance systems must be handled and disposed of in accordance with regulatory protocols. It is possible for sediments to contain measurable concentrations of heavy metals and organic chemicals (such as pesticides and petroleum products). Areas with the greatest potential for high pollutant loading include industrial areas and heavily traveled roads. Sediments and water must be disposed of in accordance with all applicable waste disposal regulations. When scheduling maintenance, consideration must be made for the disposal of solid and liquid wastes. This typically requires coordination with a local landfill for solid waste disposal. For liquid waste disposal a number of options are available including a municipal vacuum truck decant facility, local waste water treatment plant or on-site treatment and discharge.

Jellyfish Filter Components & Filter Cartridge Assembly and Installation

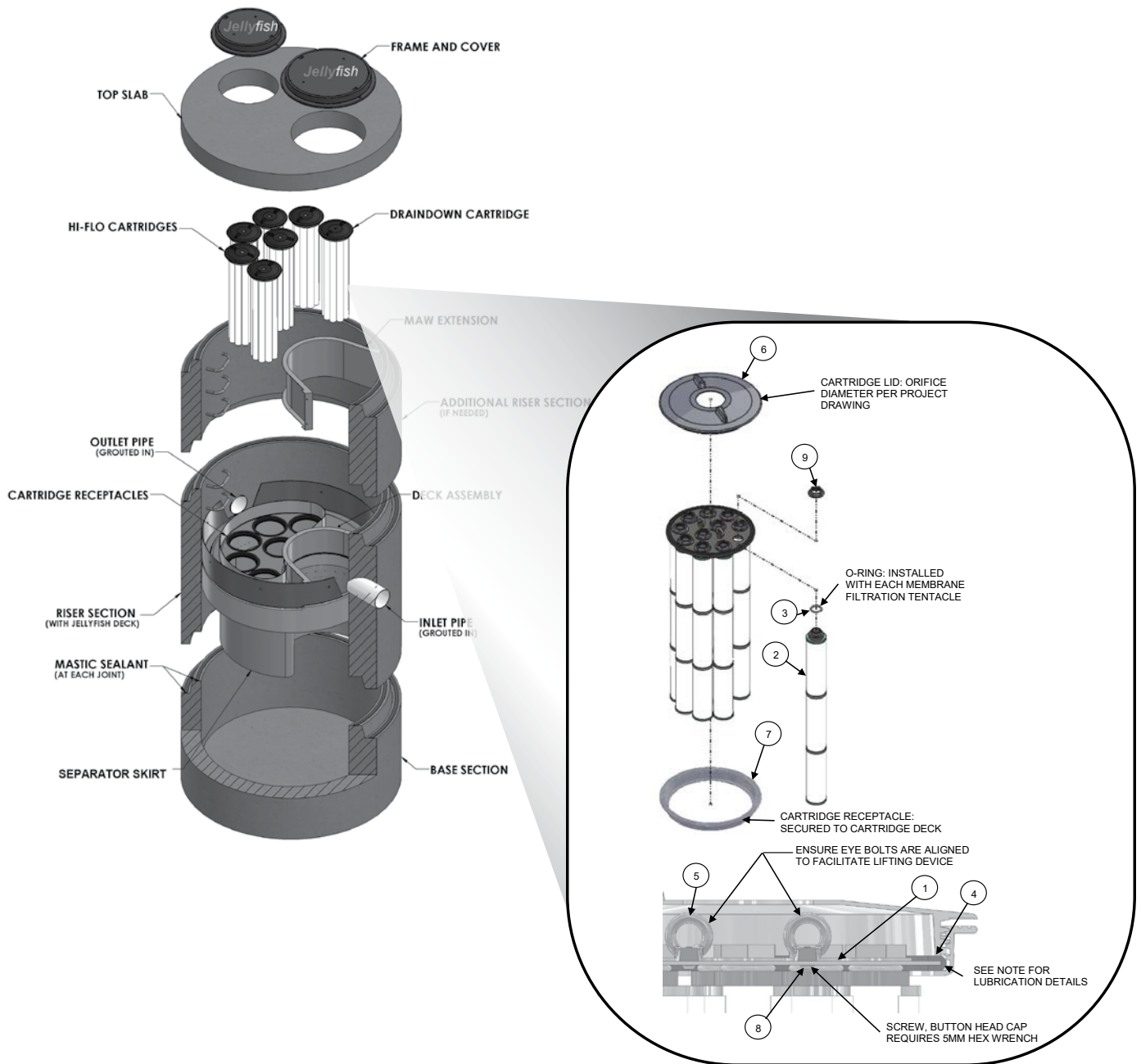


TABLE 1: BOM

ITEM NO.	DESCRIPTION
1	JF HEAD PLATE
2	JF TENTACLE
3	JF O-RING
4	JF HEAD PLATE GASKET
5	JF CARTRIDGE EYELET
6	JF 14IN COVER
7	JF RECEPTACLE
8	BUTTON HEAD CAP SCREW M6X14MM SS
9	JF CARTRIDGE NUT

TABLE 2: APPROVED GASKET LUBRICANTS

PART NO.	MFR	DESCRIPTION
78713	LA-CO	LUBRI-JOINT
40501	HERCULES	DUCK BUTTER
30600	OATEY	PIPE LUBRICANT
PSLUBXL1Q	PROSELECT	PIPE JOINT LUBRICANT

NOTES:

Head Plate Gasket Installation:

Install Head Plate Gasket (Item 4) onto the Head Plate (Item 1) and liberally apply a lubricant from Table 2: Approved Gasket Lubricants onto the gasket where it contacts the Receptacle (Item 7) and Cartridge Lid (Item 6). Follow Lubricant manufacturer's instructions.

Lid Assembly:

Rotate Cartridge Lid counter-clockwise until both male threads drop down and properly seat. Then rotate Cartridge Lid clockwise approximately one-third of a full rotation until Cartridge Lid is firmly secured, creating a watertight seal.

Jellyfish Filter Inspection and Maintenance Log

Owner:		Jellyfish Model No:	
Location:		GPS Coordinates:	
Land Use:	Commercial:	Industrial:	Service Station:
	Roadway/Highway:	Airport:	Residential:

Date/Time:						
Inspector:						
Maintenance Contractor:						
Visible Oil Present: (Y/N)						
Oil Quantity Removed:						
Floatable Debris Present: (Y/N)						
Floatable Debris Removed: (Y/N)						
Water Depth in Backwash Pool						
Draindown Cartridges externally rinsed and recommissioned: (Y/N)						
New tentacles put on Draindown Cartridges: (Y/N)						
Hi-Flo Cartridges externally rinsed and recommissioned: (Y/N)						
New tentacles put on Hi-Flo Cartridges: (Y/N)						
Sediment Depth Measured: (Y/N)						
Sediment Depth (inches or mm):						
Sediment Removed: (Y/N)						
Cartridge Lids intact: (Y/N)						
Observed Damage:						
Comments:						



Support

- Drawings and specifications are available at www.conteches.com/jellyfish.
- Site-specific design support is available from Contech Engineered Solutions.
- Find a Certified Maintenance Provider at www.conteches.com/ccmp

Jellyfish[®]

CONTECH[®]
ENGINEERED SOLUTIONS

800.338.1122

www.ContechES.com

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Maine Advisory List of Invasive Plants - 2019 revision

Common Name	Scientific Name	Ranking
American water lotus	<i>Nelumbo lutea</i>	Severely invasive
Amur honeysuckle*	<i>Lonicera maackii</i>	Severely invasive
Asiatic bittersweet*	<i>Celastrus orbiculatus</i>	Severely invasive
Bella honeysuckle*	<i>Lonicera x bella</i>	Severely invasive
Black locust*	<i>Robinia pseudoaccacia</i>	Severely invasive
Black swallowwort	<i>Cynanchum louiseae</i>	Severely invasive
Bohemian knotweed	<i>Fallopia x bohemica</i>	Severely invasive
Brazilian waterweed**	<i>Egeria densa</i>	Severely invasive
Canada thistle	<i>Cirsium arvense</i>	Severely invasive
Chinese yam	<i>Dioscorea polystachya</i>	Severely invasive
Chocolate vine; five-leaf akebia	<i>Akebia quinata</i>	Severely invasive
Common buckthorn	<i>Rhamnus cathartica</i>	Severely invasive
Common reed	<i>Phragmites australis</i>	Severely invasive
Curly pondweed**	<i>Potamogeton crispus</i>	Severely invasive
Eurasian milfoil**	<i>Myriophyllum spicatum</i>	Severely invasive
European alder	<i>Alnus glutinosa</i>	Severely invasive
European frog's bit**	<i>Hydrocharis morsus-ranae</i>	Severely invasive
False indigo*	<i>Amorpha fruticosa</i>	Severely invasive
Fanwort**	<i>Cabomba caroliniana</i>	Severely invasive
Flowering rush	<i>Butomus umbellatus</i>	Severely invasive
Garlic mustard*	<i>Alliaria petiolata</i>	Severely invasive
Giant knotweed	<i>Fallopia sachalinensis</i>	Severely invasive
Glossy buckthorn*	<i>Frangula alnus</i>	Severely invasive
Goutweed*	<i>Aegopodium podagraria</i>	Severely invasive
Hydrilla**	<i>Hydrilla verticillata</i>	Severely invasive
Inflated bladderwort	<i>Utricularia inflata</i>	Severely invasive
Japanese barberry*	<i>Berberis thunbergii</i>	Severely invasive
Japanese honeysuckle*	<i>Lonicera japonica</i>	Severely invasive
Japanese knotweed*	<i>Fallopia japonica</i>	Severely invasive
Japanese stilt grass*	<i>Microstegium vimineum</i>	Severely invasive
Morrow's honeysuckle*	<i>Lonicera morrowii</i>	Severely invasive
Ornamental jewelweed*	<i>Impatiens glandulifera</i>	Severely invasive
Pale swallowwort	<i>Cynanchum rossicum</i>	Severely invasive
Parrot feather**	<i>Myriophyllum aquaticum</i>	Severely invasive
Porcelainberry*	<i>Ampelopsis glandulosa</i>	Severely invasive
Reed canary grass	<i>Phalaris arundinacea</i>	Severely invasive
Slender-leaved naiad**	<i>Najas minor</i>	Severely invasive
Starry stonewort	<i>Nitellopsis obtusa</i>	Severely invasive
Starwort	<i>Callitriche stagnalis</i>	Severely invasive
Tall pepperwort	<i>Lepidium latifolium</i>	Severely invasive
Tartarian honeysuckle*	<i>Lonicera tatarica</i>	Severely invasive
Tree of heaven*	<i>Ailanthus altissima</i>	Severely invasive
Variable milfoil**	<i>Myriophyllum heterophyllum</i>	Severely invasive
Water chestnut**	<i>Trapa natans</i>	Severely invasive
Water lettuce	<i>Pistia stratiotes</i>	Severely invasive

*Plant regulated by the Do Not Sell list, Horticulture Program, DACF

**Aquatic plant regulated by Maine DEP

Maine Advisory List of Invasive Plants - 2019 revision

Common Name	Scientific Name	Ranking
Water soldier	<i>Stratiotes aloides</i>	Severely invasive
Wavyleaf basketgrass	<i>Oplismenus hirtellus ssp. undulatifolius</i>	Severely invasive
White cottonwood*	<i>Populus alba</i>	Severely invasive
Wineberry	<i>Rubus phoenicolasias</i>	Severely invasive
Winged euonymous*	<i>Euonymus alatus</i>	Severely invasive
Yellow floating heart**	<i>Nymphoides peltata</i>	Severely invasive
Yellow iris*	<i>Iris pseudacorus</i>	Severely invasive
Amur cork tree*	<i>Phellodendron amurense</i>	Very invasive
Amur maple*	<i>Acer ginnala</i>	Very invasive
Autumn olive*	<i>Elaeagnus umbellata</i>	Very invasive
Black jetbead	<i>Rhodotypos scandens</i>	Very invasive
Border privet	<i>Ligustrum obtusifolium</i>	Very invasive
California privet	<i>Ligustrum ovalifolium</i>	Very invasive
Callery ("Bradford") pear	<i>Pyrus calleryana</i>	Very invasive
Common barberry*	<i>Berberis vulgaris</i>	Very invasive
Creeping buttercup	<i>Ranunculus repens</i>	Very invasive
Dame's rocket*	<i>Hesperis matronalis</i>	Very invasive
English water grass	<i>Glyceria maxima</i>	Very invasive
European blackberry	<i>Rubus fruticosus</i>	Very invasive
Giant hogweed	<i>Heracleum mantegazzianum</i>	Very invasive
Hairy willow-herb	<i>Epilobium hirsutum</i>	Very invasive
Hardy kiwi	<i>Actinidia arguta</i>	Very invasive
Japanese hops	<i>Humulus japonicus</i>	Very invasive
Kudzu	<i>Pueraria lobata</i>	Very invasive
Leafy spurge	<i>Euphorbia esula</i>	Very invasive
Lesser celandine	<i>Ficaria verna</i>	Very invasive
Linden arrowwood	<i>Viburnum dilatatum</i>	Very invasive
Mile-a-minute vine*	<i>Persicaria perfoliata</i>	Very invasive
Multiflora rose*	<i>Rosa multiflora</i>	Very invasive
Narrowleaf bittercress	<i>Cardamine impatiens</i>	Very invasive
Norway maple*	<i>Acer platanoides</i>	Very invasive
Oriental photinia	<i>Photinia villosa</i>	Very invasive
Privet*	<i>Ligustrum vulgare</i>	Very invasive
Purple loosestrife*	<i>Lythrum salicaria</i>	Very invasive
Rugosa rose	<i>Rosa rugosa</i>	Very invasive
Water forget-me-not	<i>Myosotis scorpioides</i>	Very invasive
Wintercreeper	<i>Euonymus fortunei</i>	Very invasive
Yam-leaved virgin's bower	<i>Clematis terniflora</i>	Very invasive
Bicolor lespedeza, two-colored bush-clover	<i>Lespedeza bicolor</i>	Invasive, habitat-specific threats
Brown knapweed	<i>Centaurea jacea</i>	Invasive, habitat-specific threats
Chinese bindweed*	<i>Fallopia baldschuanica</i>	Invasive, habitat-specific threats
Chinese bush-clover	<i>Lespedeza cuneata</i>	Invasive, habitat-specific threats
Coltsfoot	<i>Tussilago farfara</i>	Invasive, habitat-specific threats

*Plant regulated by the Do Not Sell list, Horticulture Program, DACF

**Aquatic plant regulated by Maine DEP

Maine Advisory List of Invasive Plants - 2019 revision

Common Name	Scientific Name	Ranking
Dalmation toadflax	<i>Linaria dalmatica</i>	Invasive, habitat-specific threats
February daphne; paradise plant	<i>Daphne mezereum</i>	Invasive, habitat-specific threats
Fine-leaved sheep fescue	<i>Festuca filiformis</i>	Invasive, habitat-specific threats
Gray willow	<i>Salix cinerea</i>	Invasive, habitat-specific threats
Japanese tree lilac	<i>Syringa reticulata</i>	Invasive, habitat-specific threats
Mudmat	<i>Glossostigma cleistanthum</i>	Invasive, habitat-specific threats
One-rowed watercress	<i>Nasturtium microphyllum</i>	Invasive, habitat-specific threats
Oriental lady's thumb smartweed	<i>Persicaria longiseta</i>	Invasive, habitat-specific threats
Russian olive	<i>Elaeagnus angustifolia</i>	Invasive, habitat-specific threats
Siberian elm	<i>Ulmus pumila</i>	Invasive, habitat-specific threats
Siebold viburnum	<i>Viburnum sieboldii</i>	Invasive, habitat-specific threats
Spotted knapweed	<i>Centaurea stoebe</i>	Invasive, habitat-specific threats
Watercress	<i>Nasturtium officinale</i>	Invasive, habitat-specific threats
Wood blue grass	<i>Poa nemoralis</i>	Invasive, habitat-specific threats
Woodland angelica	<i>Angelica sylvestris</i>	Invasive, habitat-specific threats
Bittersweet or climbing nightshade	<i>Solanum dulcamara</i>	Potential to be invasive, monitor
Bull thistle	<i>Cirsium vulgare</i>	Potential to be invasive, monitor
Common mugwort*	<i>Artemisia vulgaris</i>	Potential to be invasive, monitor
Common valerian	<i>Valeriana officinalis</i>	Potential to be invasive, monitor
Creeping jenny	<i>Lysimachia nummularia</i>	Potential to be invasive, monitor
Cypress spurge*	<i>Euphorbia cyparissias</i>	Potential to be invasive, monitor
Princess tree*	<i>Paulownia tomentosa</i>	Potential to be invasive, monitor
Small carpgrass	<i>Arthraxon hispidus</i>	Potential to be invasive, monitor
Sycamore maple	<i>Acer pseudoplatanus</i>	Potential to be invasive, monitor
Western lupine	<i>Lupinus polyphyllus</i>	Potential to be invasive, monitor
Wild parsnip	<i>Pastinaca sativa</i>	Potential to be invasive, monitor
Yellow hornpoppy	<i>Glaucium flavum</i>	Potential to be invasive, monitor

Also evaluated in 2018; not meeting criteria for inclusion as invasive:

Common Name	Scientific Name	Outcome
Canada bluegrass, flat-stemmed bluegrass	<i>Poa compressa</i>	Not invasive at this time
Wild thyme	<i>Thymus pulegioides</i>	Not invasive at this time
European spindle-tree	<i>Euonymus europaeus</i>	Insufficient data to evaluate
False spiraea	<i>Sorbaria sorbifolia</i>	Insufficient data to evaluate
Fly honeysuckle	<i>Lonicera xylosteum</i>	Insufficient data to evaluate
Great watercress, great yellow-cress	<i>Rorippa amphibia</i>	Insufficient data to evaluate
Japanese fuki	<i>Petasites japonicus</i>	Insufficient data to evaluate
Wall lettuce	<i>Mycelis muralis</i>	Insufficient data to evaluate

*Plant regulated by the Do Not Sell list, Horticulture Program, DACF

**Aquatic plant regulated by Maine DEP

CATCH BASIN BASKET CONSTRUCTION MAINTENANCE SHEET

INSPECTION REQUIREMENTS		
ACTION TAKEN	FREQUENCY	MAINTENANCE REQUIREMENTS
-Check for damage to basket -Remove sediment from basket	Within 24 hours of rainfall, Daily during extended rainfall	-Repair basket as necessary to prevent particles from reaching drainage system, or to prevent flooding. -Empty basket after every storm, or if clogged.

MAINTENANCE LOG	
PROJECT NAME	
INSPECTOR NAME	INSPECTOR CONTACT INFO
DATE OF INSPECTION	REASON FOR INSPECTION <input type="checkbox"/> LARGE STORM EVENT <input type="checkbox"/> PERIODIC CHECK-IN
IS CORRECTIVE ACTION NEEDED? <input type="checkbox"/> YES <input type="checkbox"/> NO	DESCRIBE ANY PROBLEMS, NEEDED MAINTENANCE
DATE OF MAINTENANCE	PERFORMED BY
NOTES	

CLOSED DRAINAGE STRUCTURE LONG-TERM MAINTENANCE SHEET

INSPECTION REQUIREMENTS		
ACTION TAKEN	FREQUENCY	MAINTENANCE REQUIREMENTS
-Outlet Control Structures -Drain Manholes -Catch Basins	Every other Month	<i>Check for erosion or short-circuiting</i> <i>Check for sediment accumulation</i> <i>Check for floatable contaminants</i>
-Drainage Pipes	1 time per 2 years	<i>Check for sediment accumulation/clogging, or soiled runoff.</i> <i>Check for erosion at outlets.</i>

MAINTENANCE LOG	
PROJECT NAME	
INSPECTOR NAME	INSPECTOR CONTACT INFO
DATE OF INSPECTION	REASON FOR INSPECTION <input type="checkbox"/> LARGE STORM EVENT <input type="checkbox"/> PERIODIC CHECK-IN
IS CORRECTIVE ACTION NEEDED? <input type="checkbox"/> YES <input type="checkbox"/> NO	DESCRIBE ANY PROBLEMS, NEEDED MAINTENANCE
DATE OF MAINTENANCE	PERFORMED BY
NOTES	

PERMEABLE PAVER LONG-TERM MAINTENANCE SHEET

INSPECTION REQUIREMENTS		
ACTION TAKEN	FREQUENCY	MAINTENANCE REQUIREMENTS
<p><i>-Inspect pavement surface for the occurrence of sediment, trash, debris, or structural damage.</i></p> <p><i>-Check pavement for surface ponding</i></p>	<p>Frequently in first few months following construction, Bi-annually after</p>	<p><i>-Ensure that sediments do not enter and plug pavement. Remove sediments, trash, and debris, as necessary.</i></p> <p><i>-Repair outlet structures and appurtenances, as necessary.</i></p> <p><i>-Vacuum pavement at least twice annually.</i></p> <p><i>-Prevent vehicles with muddy wheels from accessing permeable pavement.</i></p>
<p><i>-No winter sanding permitted</i></p> <p><i>-Minimize application of salt</i></p>	<p>Continuous practice</p>	

MAINTENANCE LOG	
PROJECT NAME	
INSPECTOR NAME	INSPECTOR CONTACT INFO
DATE OF INSPECTION	REASON FOR INSPECTION <input type="checkbox"/> LARGE STORM EVENT <input type="checkbox"/> PERIODIC CHECK-IN
IS CORRECTIVE ACTION NEEDED? <input type="checkbox"/> YES <input type="checkbox"/> NO	DESCRIBE ANY PROBLEMS, NEEDED MAINTENANCE
DATE OF MAINTENANCE	PERFORMED BY
NOTES	

STABILIZED CONSTRUCTION ENTRANCE CONSTRUCTION MAINTENANCE SHEET

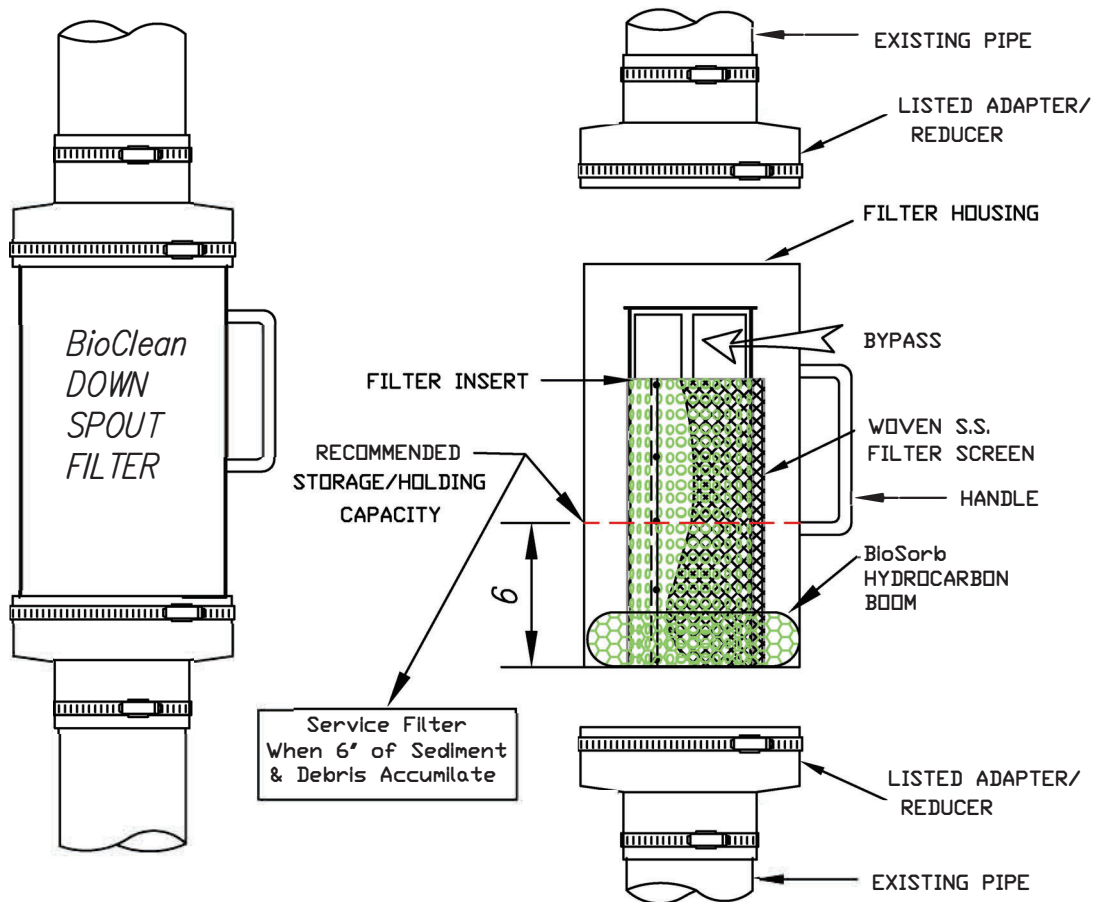
INSPECTION REQUIREMENTS		
ACTION TAKEN	FREQUENCY	MAINTENANCE REQUIREMENTS
ENTRANCE SURFACE <i>-Check for sediment accumulation/clogging of stone</i> <i>-Check Vegetative filter strips</i>	After heavy rains, as necessary	<i>-Top dress pad with new stone.</i> <i>-Replace stone completely if completely clogged.</i> <i>-Maintain vigorous stand of vegetation.</i>
WASHING FACILITIES (if applicable) <i>-Monitor Sediment Accumulation</i>	As often as necessary	<i>-Remove Sediments from traps.</i>

MAINTENANCE LOG	
PROJECT NAME	
INSPECTOR NAME	INSPECTOR CONTACT INFO
DATE OF INSPECTION	REASON FOR INSPECTION <input type="checkbox"/> LARGE STORM EVENT <input type="checkbox"/> PERIODIC CHECK-IN
IS CORRECTIVE ACTION NEEDED? <input type="checkbox"/> YES <input type="checkbox"/> NO	DESCRIBE ANY PROBLEMS, NEEDED MAINTENANCE
DATE OF MAINTENANCE	PERFORMED BY
NOTES	

SERVICE MANUAL

(Cleaning Procedures)

Bio Clean DOWNSPOUT FILTER Screen Type With Hydrocarbon Boom



TOOLS AND EQUIPMENT NEEDED:

1. Medium size flat scred driver
2. BioSorb hydrocarbon boom. 25-1/2" X 2" dia.
(Call Bio Clean to order)
3. Trash container or bag
4. Wooden dowel approx. 3' x 1/2' dia.

DETAIL OF PARTS

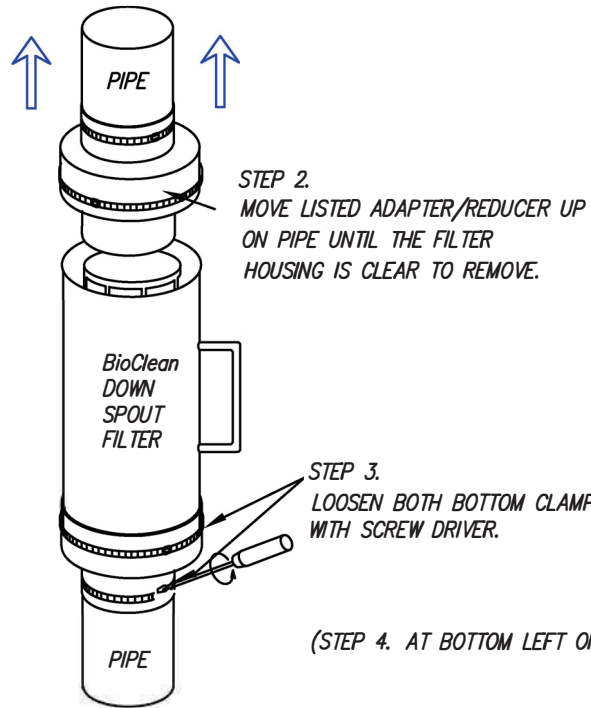
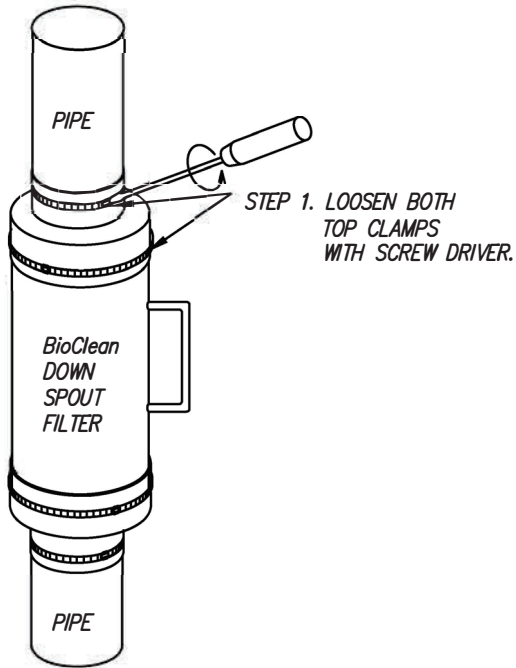
Bio Clean

A Forterra Company

P.O. BOX 869, Oceanside, Ca. 92049
(760) 433-7640 Fax (760) 433-3176
www.biocleanenvironmental.net

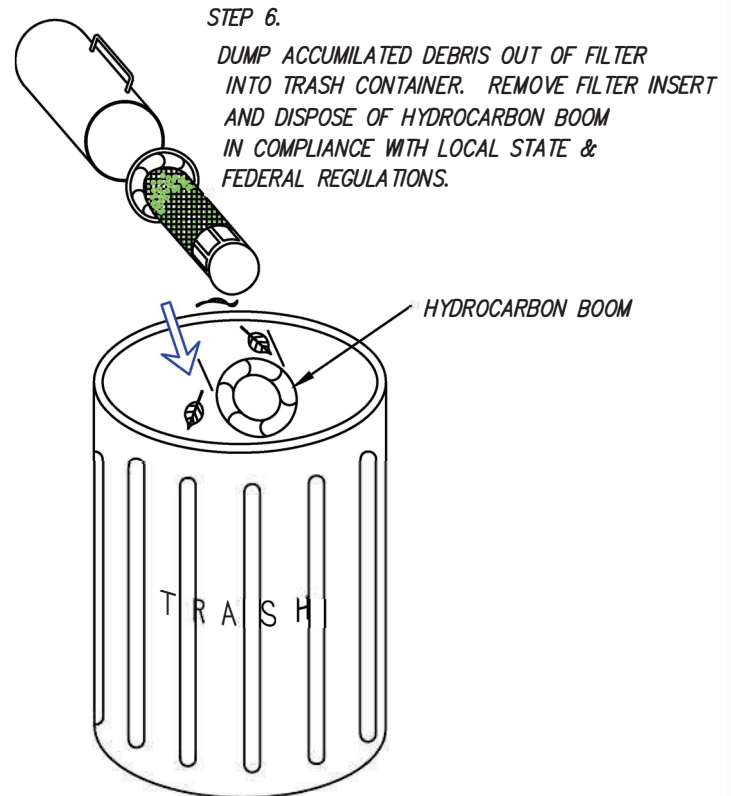
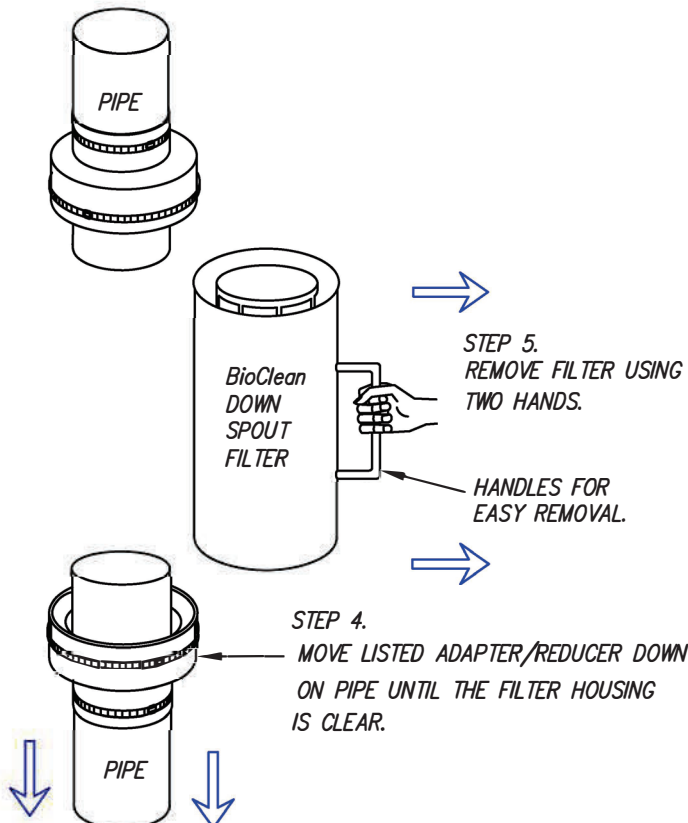


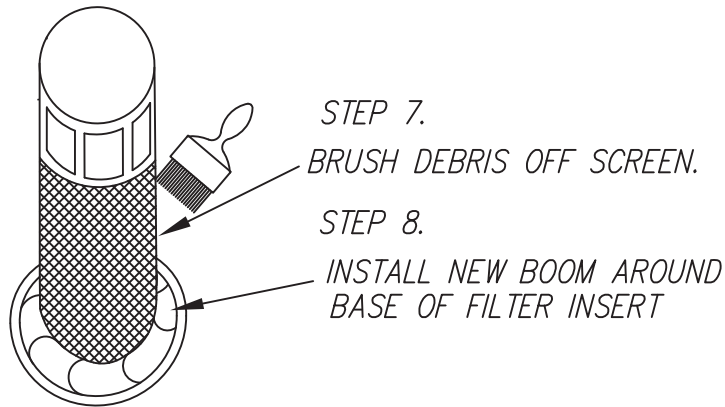
REMOVING FILTER



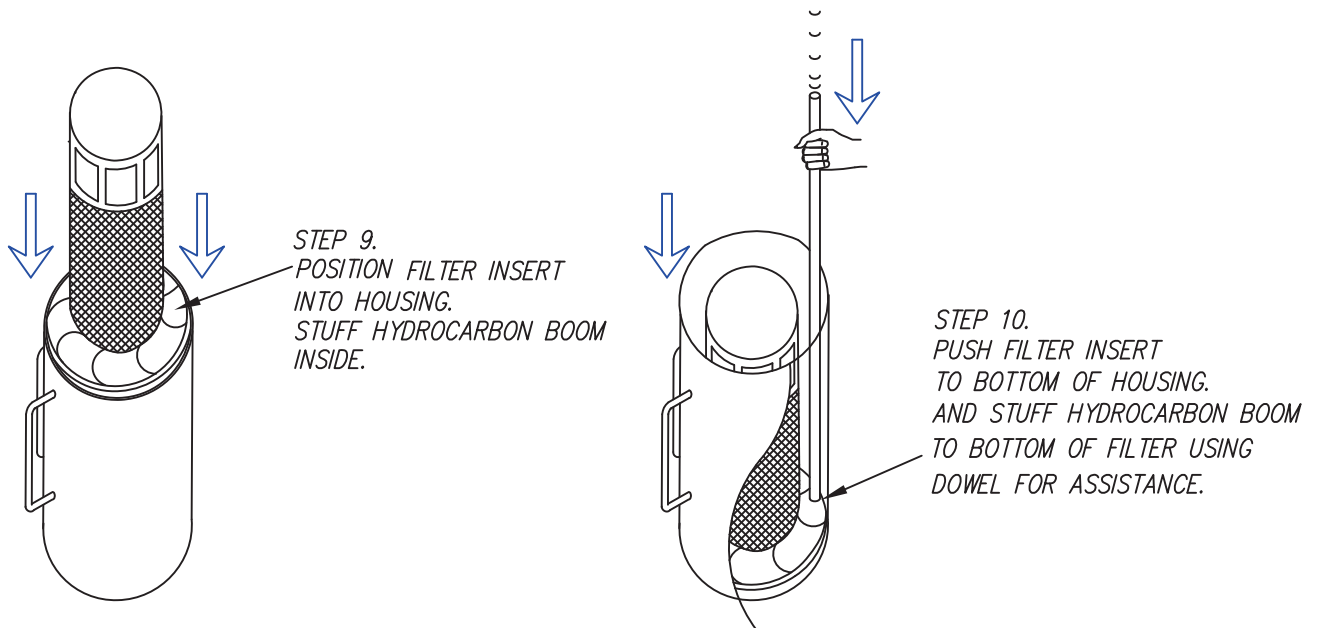
(STEP 4. AT BOTTOM LEFT OF PAGE)

CLEANING FILTER

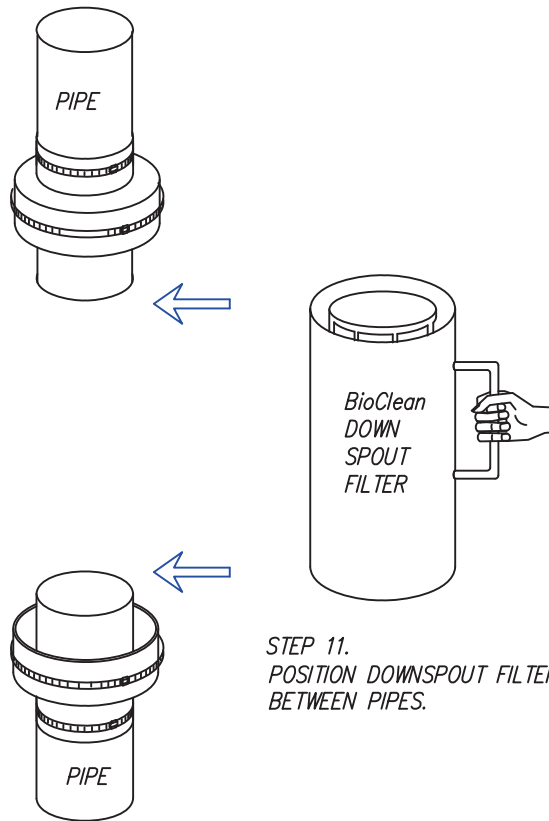




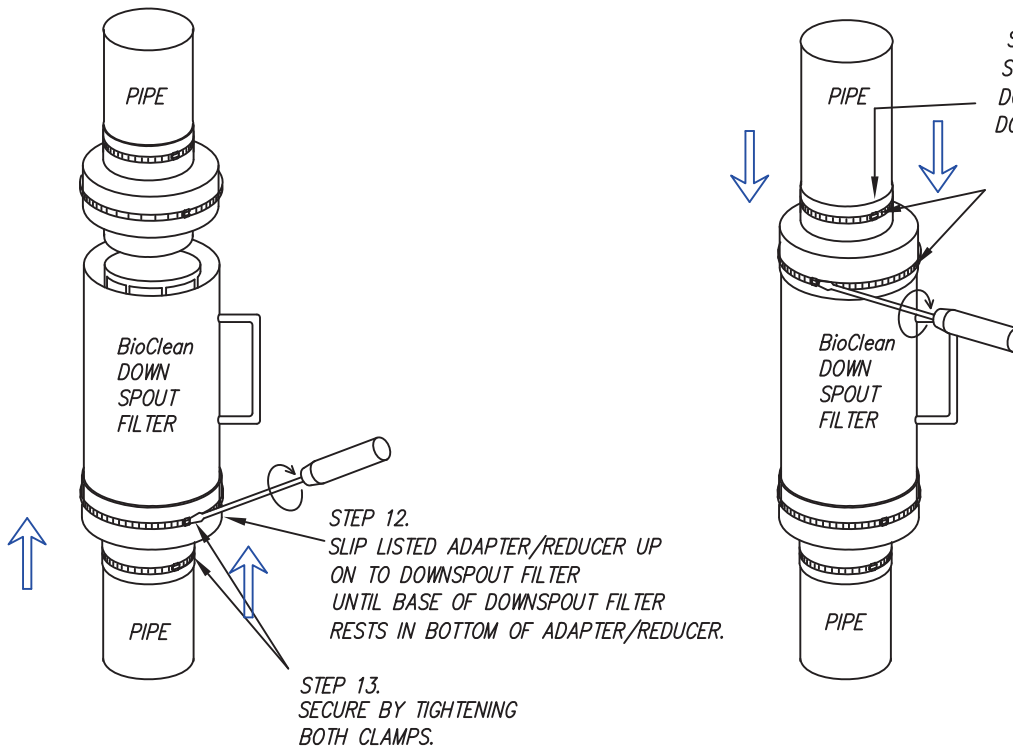
REPLACING FILTER INSERT



REPLACING FILTER



STEP 11.
POSITION DOWNSPOUT FILTER
BETWEEN PIPES.



STEP 14.
SLIP LISTED ADAPTER/REDUCER
DOWNWARD ON TO
DOWNSPOUT FILTER.

STEP 15.
SECURE BY TIGHTENING
BOTH CLAMPS
WITH SCREWDRIVER.

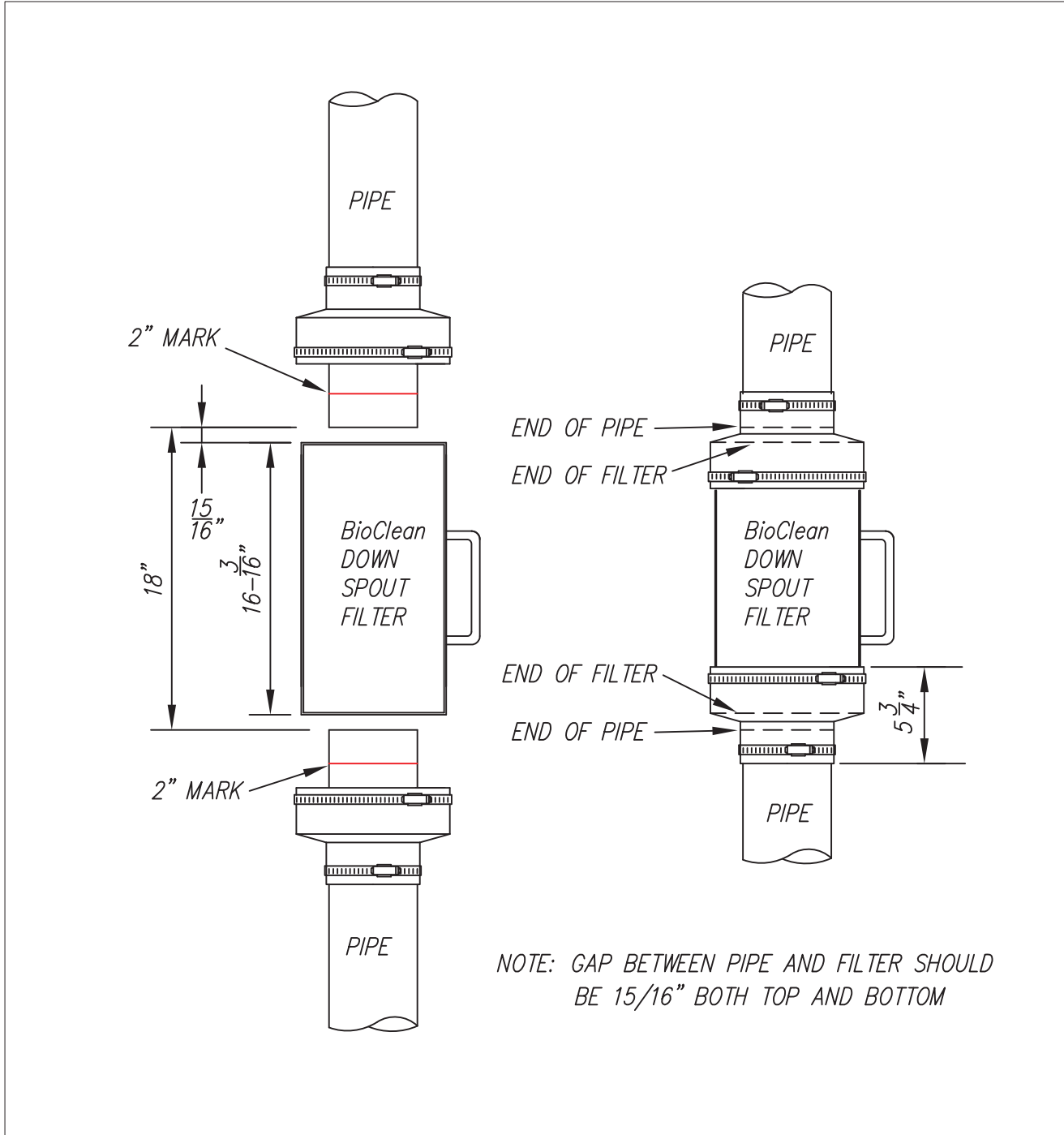
ENSURE CLAMPS
ARE PROPERLY TIGHTENED.
SERVICE COMPLETE.

STEP 12.
SLIP LISTED ADAPTER/REDUCER
UP ON TO DOWNSPOUT FILTER
UNTIL BASE OF DOWNSPOUT FILTER
RESTS IN BOTTOM OF ADAPTER/REDUCER.

STEP 13.
SECURE BY TIGHTENING
BOTH CLAMPS.

APPROPRIATE INSTALLATION

FILTER CENTERED BETWEEN PIPES WITH EVEN GAPS ON TOP AND BOTTOM



A Forterra Company

P.O. BOX 869, Oceanside, Ca. 92049
(760) 433-7640 Fax (760) 433-3176
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Jellyfish[®] Filter

Stormwater Treatment



The experts you need to solve your stormwater challenges



Contech is the leader in stormwater solutions, helping engineers, contractors and owners with infrastructure and land development projects throughout North America.

With our responsive team of stormwater experts, local regulatory expertise and flexible solutions, Contech is the trusted partner you can count on for stormwater management solutions.

Your Contech Team



STORMWATER CONSULTANT

It's my job to recommend the best solution to meet permitting requirements.



STORMWATER DESIGN ENGINEER

I work with consultants to design the best approved solution to meet your project's needs.



REGULATORY MANAGER

I understand the local stormwater regulations and what solutions will be approved.



SALES ENGINEER

I make sure our solutions meet the needs of the contractor during construction.

Contech is your partner in stormwater management solutions



Setting new standards in Stormwater Treatment – Jellyfish® Filter

The Jellyfish Filter has been tested in the field and laboratory, and has received approval from numerous stormwater regulatory agencies.

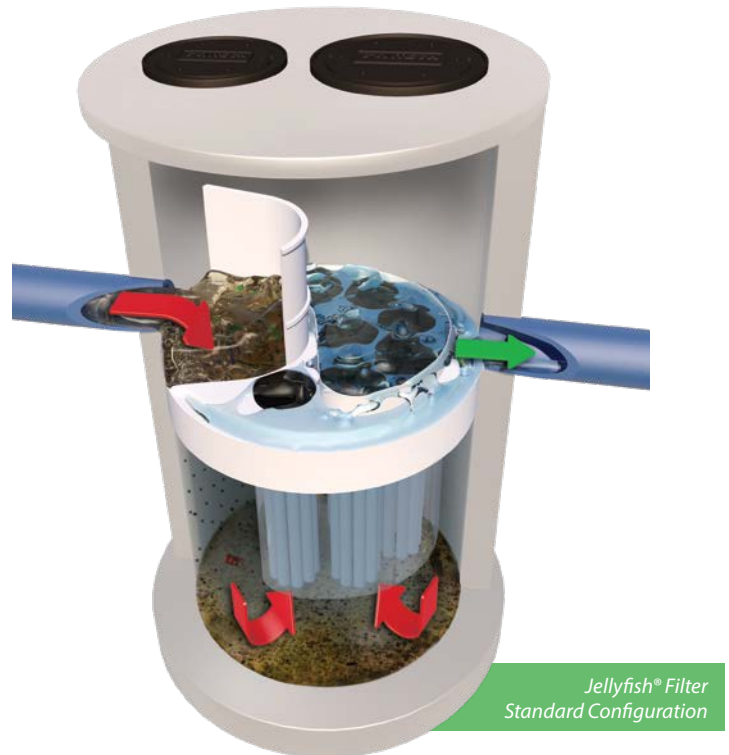
The Jellyfish Filter is a stormwater quality treatment technology featuring high flow pretreatment and membrane filtration in a compact stand-alone system. Jellyfish removes floatables, trash, oil, debris, TSS, fine silt-sized particles, and a high percentage of particulate-bound pollutants; including phosphorus, nitrogen, metals and hydrocarbons. The high surface area membrane cartridges, combined with up-flow hydraulics, frequent, passive backwashing, and rinseable/reusable cartridges ensure long-lasting performance.

Jellyfish® Filter

How the Jellyfish[®] Filter Treats Stormwater

Tested in the field and laboratory ...

- Stormwater enters the Jellyfish through the inlet pipe and traps floating pollutants behind the maintenance access wall and below the cartridge deck.
- Water is conveyed below the cartridge deck where a separation skirt around the cartridges isolates oil, trash and debris outside the filtration zone.
- Water is directed to the filtration zone and up through the top of the cartridge where it exits via the outlet pipe.
- The membrane filters provide a very large surface area to effectively remove fine sand and silt-sized particles, and a high percentage of particulate-bound pollutants such as nitrogen, phosphorus, metals, and hydrocarbons while ensuring long-lasting treatment.
- As influent flow subsides, the water in the backwash pool flows back into the lower chamber. This passive backwash extends cartridge life.
- The draindown cartridge(s) located outside the backwash pool enables water levels to balance.

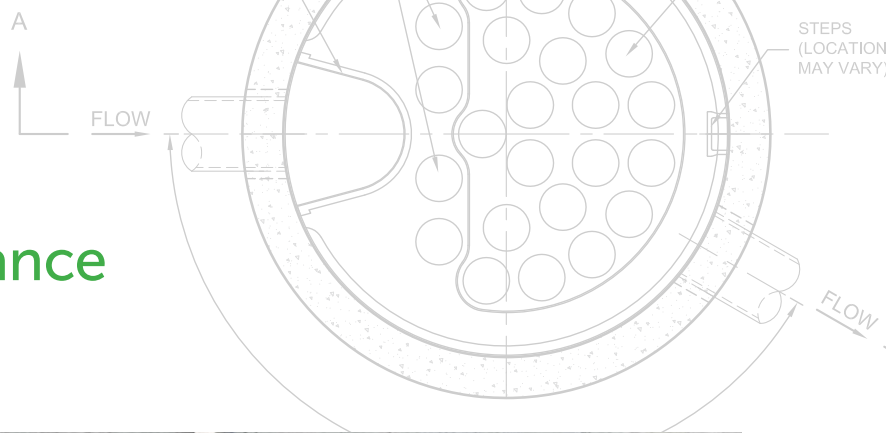


Learn More:
www.ContechES.com/jellyfish



Pretreat bioretention or infiltration with Jellyfish to extend service life.

Jellyfish® Filter Performance Testing Results



APPLICATION TIPS

- The Peak Diversion Jellyfish provides treatment and high-flow bypass in one structure, eliminating the need for a separate bypass structure.
- LID and GI are complemented by filtration solutions, as they help keep sites free from fine sediments that can impede performance, remove unsightly trash, and provide a single point of maintenance.
- Selecting a filter with a long maintenance cycle and low maintenance cost will result in healthy waterways and happy property owners.



The pleated tentacles of the Jellyfish® Filter provide a large surface area for pollutant removal.

POLLUTANT OF CONCERN	% REMOVAL
Total Trash	99%
Total Suspended Solids (TSS)	89%
Total Phosphorus (TP)	59%
Total Nitrogen (TN)	51%
Total Copper (TCu)	> 50%
Total Zinc (TZn)	> 50%



Sources:
 TARP II Field Study – 2012 JF 4-2-1 Configuration
 MRDC Floatables Testing – 2008 JF6-6-1 Configuration

Jellyfish[®] Filter Features and Benefits

FEATURE	BENEFITS
High surface area membrane filtration	Low flux rate promotes cake filtration and slows membrane occlusion
High design treatment flow rate per cartridge (up to 80 gpm (5 L/s))	Compact system with a small footprint, lower construction cost
Low driving head (typically 18 inches or less (457 mm))	Design flexibility, lower construction cost
Lightweight cartridges with passive backwash	Easy maintenance and low life-cycle cost

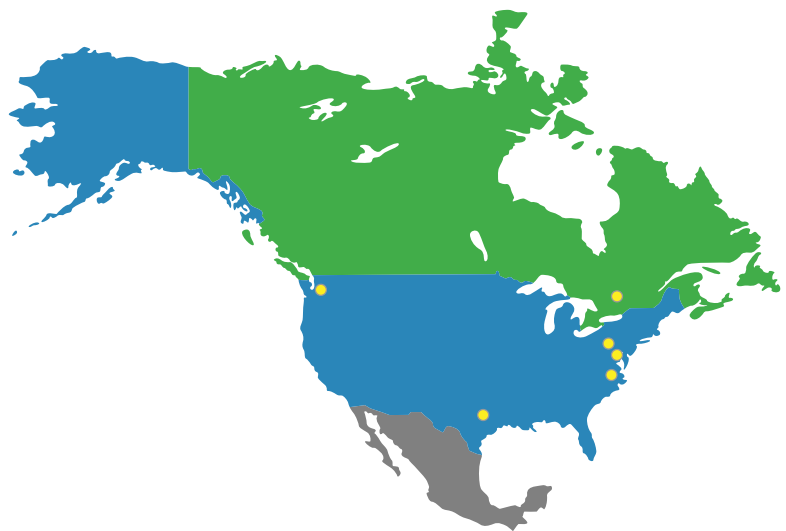


The Jellyfish Filter can be configured in a manhole, catch basin, or vault.

Select Jellyfish[®] Filter Certifications and Verifications

The Jellyfish Filter has been reviewed by numerous state and federal programs, including:

- Washington State Department of Ecology (TAPE) GULD – BASIC, Phosphorus
- Virginia Department of Environmental Quality (VA DEQ)
- Texas Commission of Environmental Quality (TCEQ)
- Canada ISO 14034 Environmental Management – Environmental Technology Verification (ETV)
- Philadelphia Water District (PWD)
- Maryland Department of the Environment (MD DOE)

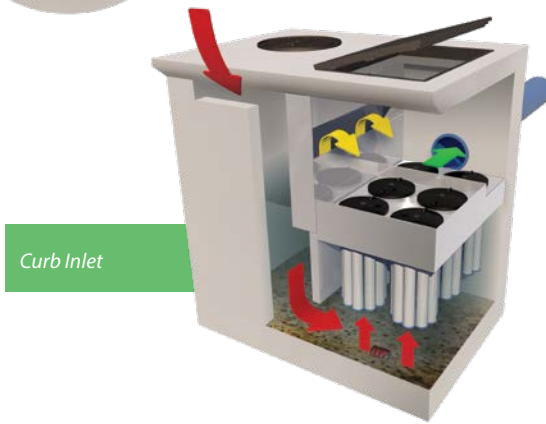
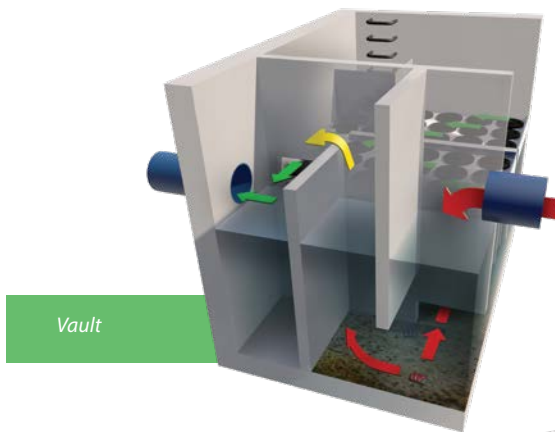
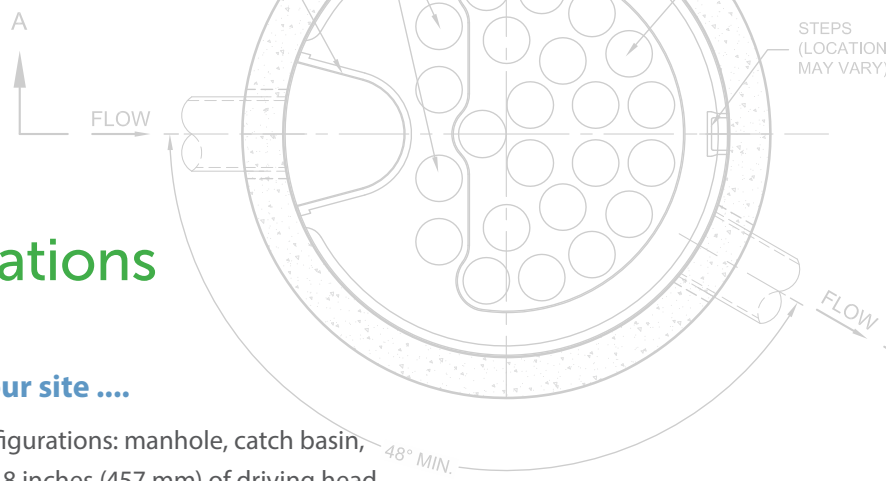


Field tested and performance verified

Jellyfish® Filter Configurations

Multiple system configurations to optimize your site

The Jellyfish Filter can be manufactured in a variety of configurations: manhole, catch basin, vault, fiberglass tank, or custom configurations. Typically, 18 inches (457 mm) of driving head is designed into the system. For low drop sites, the designed driving head can be less.



Jellyfish® Filter Maintenance

- Jellyfish Filter cartridges are light weight and reusable
- Maintenance of the filter cartridges is performed by removing, rinsing and reusing the cartridge tentacles.
- Vacuum extraction of captured pollutants in the sump is recommended at the same time.
- Full cartridge replacement intervals differ by site due to varying pollutant loading and type, and maintenance frequency. Replacement is anticipated every 2-5 years.
- Contech® has created a network of Certified Maintenance Providers to provide maintenance on stormwater BMP's.



The Jellyfish® Filter tentacle is light and easy to clean.

A partner you can rely on



STORMWATER
SOLUTIONS



PIPE
SOLUTIONS



STRUCTURES
SOLUTIONS

Few companies offer the wide range of high-quality stormwater resources you can find with us — state-of-the-art products, decades of expertise, and all the maintenance support you need to operate your system cost-effectively.

THE CONTECH WAY

Contech® Engineered Solutions provides innovative, cost-effective site solutions to engineers, contractors, and developers on projects across North America. Our portfolio includes bridges, drainage, erosion control, retaining wall, sanitary sewer and stormwater management products.

TAKE THE NEXT STEP

For more information: www.ContechES.com

NOTHING IN THIS CATALOG SHOULD BE CONSTRUED AS A WARRANTY. APPLICATIONS SUGGESTED HEREIN ARE DESCRIBED ONLY TO HELP READERS MAKE THEIR OWN EVALUATIONS AND DECISIONS, AND ARE NEITHER GUARANTEES NOR WARRANTIES OF SUITABILITY FOR ANY APPLICATION. CONTECH MAKES NO WARRANTY WHATSOEVER, EXPRESS OR IMPLIED, RELATED TO THE APPLICATIONS, MATERIALS, COATINGS, OR PRODUCTS DISCUSSED HEREIN. ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND ALL IMPLIED WARRANTIES OF FITNESS FOR ANY PARTICULAR PURPOSE ARE DISCLAIMED BY CONTECH. SEE CONTECH'S CONDITIONS OF SALE (AVAILABLE AT WWW.CONTECHES.COM/COS) FOR MORE INFORMATION.

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STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION



PAUL R. LEPAGE
GOVERNOR

PATRICIA W. AHO
COMMISSIONER

January 21, 2015

CONTECH Engineered Solutions LLC
71 US Route 1, Suite F
Scarborough, ME 04074
ATTN: Derek Berg

Dear Mr. Berg:

This letter is to inform you that the Department of Environmental Protection (Department) will review and approve, on a case-by-case basis, applicants' requests to use the Jellyfish Filter, manhole or vault housing, a cartridge deck supporting membrane filtration cartridges, as a low flow rate filter meeting the requirements of the General Standards (Section 4.B.) of the Stormwater Management Rules (Chapter 500) when sized, installed and maintained in accordance with the following provisions:

1. The Jellyfish Filter must be sized in accordance with the tested hydraulic loading rate, and is approved for a maximum rate of 80 gallons per minute (gpm) for each 54-inch long membrane filter cartridge (1.48 gpm per inch of cartridge length). The structure must include at least one draindown cartridge, which is approved for a hydraulic loading rate of 40 gpm per 54" cartridge (0.74 gpm per inch of cartridge length).
2. Upstream storage must be provided for the water quality/channel protection volume (WQv) consisting of the first 1.0 inch of runoff from impervious areas and 0.4 inch of runoff from lawns and landscaped areas. The WQv should be hydraulically isolated from any additional storage provided onsite by weirs or other means so that only the WQv is routed through the Jellyfish Filter. Additionally, the WQv must be detained for a minimum of 24 hours and a maximum of 48 hours (emptying time). Storage can typically be provided in an underground facility such as corrugated metal pipe, polypropylene chambers, concrete vaults or similar means.
3. All storage systems must include sufficient maintenance access for the removal of accumulated sediment and debris. It is desirable that a pretreatment structure be located upstream of the WQv storage to facilitate capture of coarse solids and trash.
4. The Jellyfish Filter must be delivered to the site and installed under the supervision of the manufacturer's representative.
5. The system must be inspected at least once every six months, and the filters maintained yearly per the manufacturer's guidelines to maintain the established efficiency for pollutant removal. A five-year binding inspection and maintenance contract must be provided prior to review and approval by the Department, and must be renewed before contract expiration.
6. The overall stormwater management design must meet all Department criteria and sizing specifications and shall be reviewed and approved by the Department prior to use.
7. Review and approval by the manufacturer for the proposed use and sizing of the Jellyfish Filter at each specific project is required to ensure conformance with the manufacturer's design specifications.

AUGUSTA
17 STATE HOUSE STATION
AUGUSTA, MAINE 04333-0017
(207) 287-7688 FAX: (207) 287-7826

BANGOR
106 HOGAN ROAD, SUITE 6
BANGOR, MAINE 04401
(207) 941-4570 FAX: (207) 941-4584

PORTLAND
312 CANCO ROAD
PORTLAND, MAINE 04103
(207) 822-6300 FAX: (207) 822-6303

PRESQUE ISLE
1235 CENTRAL DRIVE, SKYWAY PARK
PRESQUE ISLE, MAINE 04769
(207) 764-0477 FAX: (207) 760-3143

8. This approval is conditional to on-the-ground experience confirming that the Jellyfish Filter's pollutant removal efficiency and sizing are appropriate. The "permit shield" provision (Section 14) of the Chapter 500 rules will apply, and the Department will not require the replacement of the system if pollutant removals do not satisfy the General Standard Best Management Practices.

We look forward to working with you as these stormwater management structures are installed on new projects. And, we hope that this stormwater BMP will be included in our manual in the near future.

Questions concerning this decision should be directed to Marianne Hubert at (207) 215-6485 or Jeff Dennis at (207) 215-6376.

Sincerely,

A handwritten signature in black ink, appearing to read "Mark R. Bergeron". The signature is fluid and cursive, with a long horizontal stroke at the end.

Mark Bergeron, P.E.
Director, Division of Land Resource Regulation
Bureau of Land & Water Quality

C: Don Witherill, Maine DEP

VERIFICATION STATEMENT

GLOBE Performance Solutions

Verifies the performance of

Jellyfish[®] Filter JF4-2-1

Developed by Imbrium Systems, Inc.,
Whitby, Ontario, Canada

In accordance with

ISO 14034:2016

**Environmental management —
Environmental technology verification (ETV)**



John D. Wiebe, PhD
Executive Chairman
GLOBE Performance Solutions



August 3, 2017
Vancouver, BC, Canada

Verification Body
GLOBE Performance Solutions
404 – 999 Canada Place | Vancouver, B.C | Canada |V6C 3E2

Technology description and application

The Jellyfish® Filter is an engineered stormwater quality treatment technology designed to remove a variety of stormwater pollutants including floatable trash and debris, oil, coarse and fine suspended sediments, and particulate-bound pollutants such as nutrients, heavy metals, and hydrocarbons. The Jellyfish Filter combines gravitational pre-treatment (sedimentation and floatation) and membrane filtration in a single compact structure. The system utilizes membrane filtration cartridges comprised of multiple pleated filter elements (“filtration tentacles”) that provide high filtration surface area with the associated advantages of high flow rate, high sediment capacity, and low filtration flux rate.

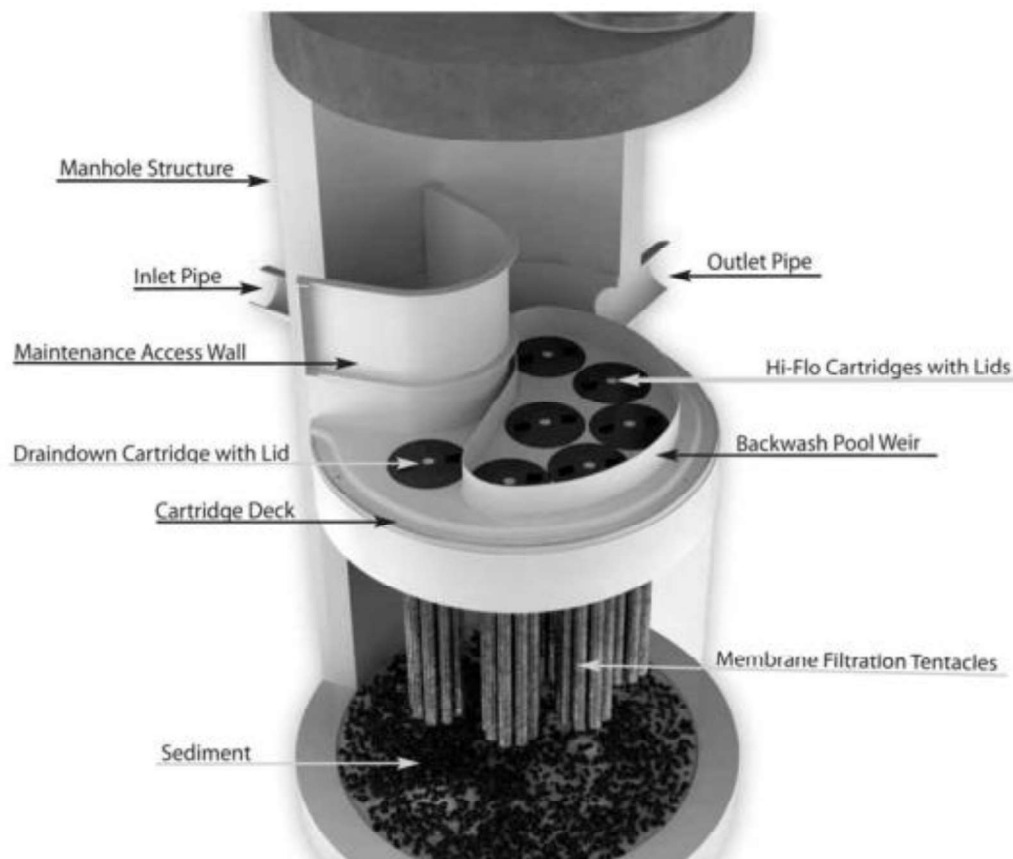


Figure 1. Cut-away graphic of a Jellyfish® Filter manhole with 6 hi-flo cartridges and 1 draindown cartridge

Figure 1 depicts a cut-away graphic of a typical 6-ft diameter Jellyfish® Filter manhole with 6 hi-flo cartridges and 1 draindown cartridge (JF6-6-1). Stormwater influent enters the system through the inlet pipe and builds a pond behind the maintenance access wall, with the pond elevation providing driving head. Flow is channeled downward into the lower chamber beneath the cartridge deck. A flexible separator skirt (not shown in the graphic) surrounds the filtration zone where the filtration tentacles of each cartridge are suspended, and the volume between the vessel wall and the outside surface of the separator skirt comprises a pretreatment channel. As flow spreads throughout the pretreatment channel, floatable pollutants accumulate at the surface of the pond behind the maintenance access wall and also beneath the cartridge deck in the pretreatment channel, while coarse sediments settle to the sump. Flow proceeds under the separator skirt and upward into the filtration zone, entering each filtration tentacle and depositing fine suspended sediment and associated particulate-bound pollutants on the outside surface of the membranes. Filtered water proceeds up the center tube of each tentacle, with the flow from each tentacle combining under the cartridge lid, and discharging to the top of the

cartridge deck through the cartridge lid orifice. Filtered effluent from the hi-flo cartridges enters a pool enclosed by a 15-cm high weir, and if storm intensity and resultant driving head is sufficient, filtered water overflows the weir and proceeds across the cartridge deck to the outlet pipe. Filtered effluent discharging from the draindown cartridge(s) passes directly to the outlet pipe, and requires only a minimal amount of driving head (2.5 cm) to provide forward flow. As storm intensity subsides and driving head drops below 15 cm, filtered water within the backwash pool reverses direction and passes backward through the hi-flo cartridges, and thereby dislodges sediment from the membranes which subsequently settles to the sump below the filtration zone. During this passive backwashing process, water in the lower chamber is displaced only through the draindown cartridge(s). Additional self-cleaning processes include gravity, as well as vibrational pulses emitted when flow exits the orifice of each cartridge lid, and these combined processes significantly extend the cartridge service life and maintenance cleaning interval. Sediment removal from the sump by vacuum is required when sediment depths reach 30 cm, and cartridges are typically removed, externally rinsed, and recommissioned on an annual basis, or as site-specific maintenance conditions require. Filtration tentacle replacement is typically required every 3 – 5 years.

Performance conditions

The data and results published in this Technology Fact Sheet were obtained from a field monitoring program conducted on a Jellyfish® Filter JF4-2-1 (4-ft diameter manhole with 2 hi-flo cartridges and 1 draindown cartridge), in accordance with the provisions of the TARP Tier II Protocol (TARP, 2003) and New Jersey Tier II Stormwater Test Requirements—Amendments to TARP Tier II Protocol (NJDEP, 2009). Testing was completed by researchers led by Dr. John Sansalone at the University of Florida’s Engineering School of Sustainable Infrastructure and Environment. The drainage area providing stormwater runoff to the test unit varied between 502 m² and 799 m² (5400 ft² to 8600 ft²) depending on storm intensity and wind direction. The unit was monitored for a total of 25 TARP qualifying storm events (i.e. ≥ 2.5 mm of rainfall) contributing cumulative rainfall of 381 mm (15 in) over the 13-month period between May 28, 2010 and June 27, 2011. Only TARP-qualified storms were routed through the unit, and maintenance was not required during the testing period based on sediment accumulation less than the depth indicated for maintenance, and also based on hydraulic testing performed on the system after the conclusion of monitoring.

Table 1 shows the specified and achieved amended TARP criteria for storm selection and sampling. **Table 2** shows the observed ranges of operational conditions that occurred over the testing period.

Table 1. Specified and achieved amended TARP criteria for storm selection and sampling

Description	Criteria value	Achieved value
Total rainfall	≥ 2.5 mm (0.1 in)	> 2.5 mm (0.1 in)
Minimum inter-event period	6 hrs	10 hrs
Minimum flow-weighted composite sample storm coverage	70% including as much of the first 20% of the storm	100%
Minimum influent/effluent samples	10, but a minimum of 5 subsamples for composite samples	Minimum of 8 subsamples for composite samples
Total sampled rainfall	Minimum 381 mm (15 in)	384 mm (15.01 in)
Number of storms	Minimum 20	25

Table 2. Observed operational conditions for events monitored over the study period

Operational condition	Observed range
Storm durations	26 – 691 min
Previous dry hours	10 - 910 hrs
Rainfall depth	3 – 50 mm
Initial rainfall to runoff lag time	1 – 34 min
Runoff volume	206 – 13,229 L
Peak rainfall intensity	5 – 137 mm/hr
Peak runoff flow rate	0.5 – 14.3 L/s
Event median flow rate	0.01 – 5.5 L/s

The 4-ft diameter test unit has sedimentation surface area of 1.17 m² (12.56 ft²). Each of the three filter cartridges employed in the test unit uses filtration tentacles of 137 cm (54 in) length, with filter surface area of 35.4 m² (381 ft²) per cartridge, and total filter surface area of 106.2 m² (1143 ft²) for the three cartridges combined. The design treatment flow rate is 5 L/s (80 gal/min) for each of the two hi-flo cartridges and 2.5 L/s (40 gal/min) for the single draindown cartridge, for a total design treatment flow rate of 12.6 L/s (200 gal/min) at design driving head of 457 mm (18 in). This translates to a filtration flux rate (flow rate per unit filter surface area) of 0.14 L/s/m² (0.21 gal/min/ft²) for each hi-flo cartridge and 0.07 L/s/m² (0.11 gal/min/ft²) for the draindown cartridge. The design flow rate for each cartridge is controlled by the sizing of the orifice in the cartridge lid. The distance from the bottom of the filtration tentacles to the sump is 61 cm (24 in).

Performance claims

The Jellyfish® Filter demonstrated the removal efficiencies indicated in **Table 3** for respective constituents during field monitoring of 25 TARP qualified storm events with cumulative rainfall of 381 mm, conducted in accordance with the provisions of the TARP Tier II Protocol (TARP, 2003) and New Jersey Tier II Stormwater Test Requirements—Amendments to TARP Tier II Protocol (NJDEP, 2009), and using the following design parameters:

- System hydraulic loading rate (system treatment flow rate per unit of sedimentation surface area) of 10.8 L/s/m² (15.9 gal/min/ft²) or lower
- Filtration flux rate (flow rate per unit filter surface area) of 0.14 L/s/m² (0.21 gal/min/ft²) or lower for each hi-flo cartridge and 0.07 L/s/m² (0.11 gal/min/ft²) or lower for each draindown cartridge
- Distance from the bottom of the filtration tentacles to the sump of 61 cm (24 in) or greater
- Driving head of 457 mm (18 in) or greater

Table 3. Mean, median and 95% confidence interval (median) for removal efficiencies of selected stormwater constituents

Parameter	Mean	Median	Median - 95% Lower Limit	Median - 95% Upper Limit
TSS	84.7	85.6	82.8	89.8
SSC	97.5	98.3	97.1	98.7
Total phosphorus	48.8	49.1	43.3	60.1
Total nitrogen	37.9	39.3	31.2	54.6
Zinc	55.3	69	39	75
Copper	83.0	91.7	75.1	98.9
Oil and grease	60.1	60	42.7	100

N.B. As with any field test of stormwater treatment devices, removal efficiencies will vary based on pollutant influent concentrations and other site specific conditions.

Performance results

The frequency of rainfall depths monitored during the study is presented in **Figure 2**. The median and 90th percentile rainfall depths were 11 mm and 31.7 mm, respectively. These values represent the depth of rainfall that is not exceeded in 50 and 90 percent of the monitored rainfall events.

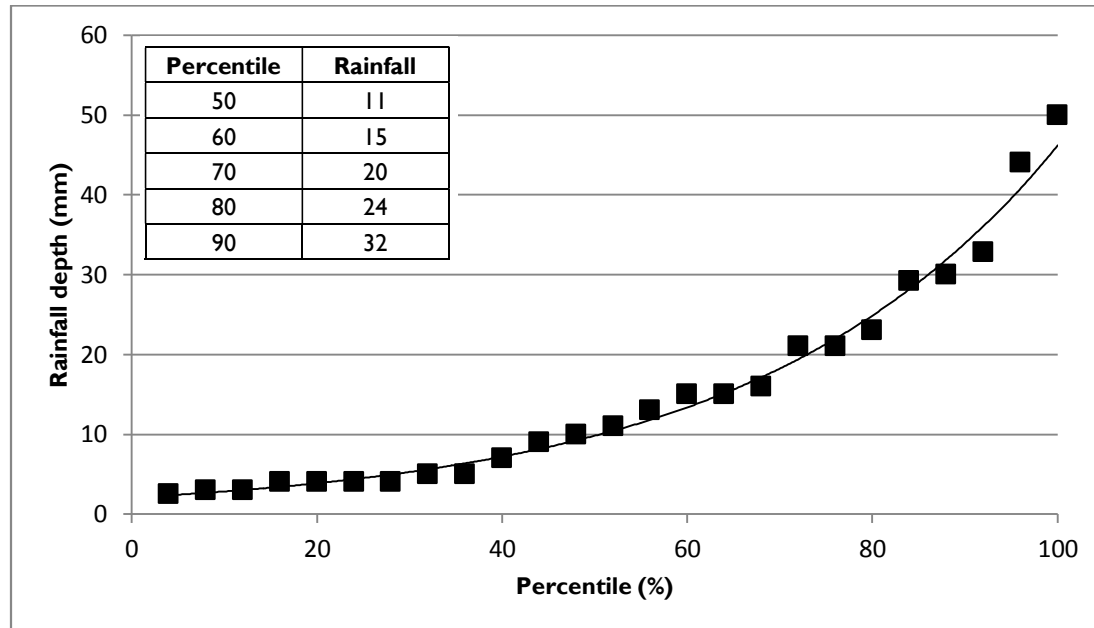


Figure 2. Rainfall depth frequency curve

Sediment removal performance was assessed by measuring the event mean concentration and mass of suspended sediment entering and leaving the unit during runoff events. This involved sampling the full cross-section of influent and effluent flows manually at 2 - 10 minute intervals for the full duration of each storm event and combining discrete samples into flow-weighted composites. Comparing the theoretical mass recovery from the sump calculated by the difference between the influent and effluent mass to the actual dry weight of the recovered sump mass showed an overall mass balance recovery of 94.5% over the study period.

The median d50 particle size (i.e. 50th percentile particle size) of the influent and effluent was 82 and 3 μm , respectively (**Figure 3**). The median influent particles sizes ranged between 22 and 263 μm , whereas median effluent particle sizes ranged between 1 and 11 μm .

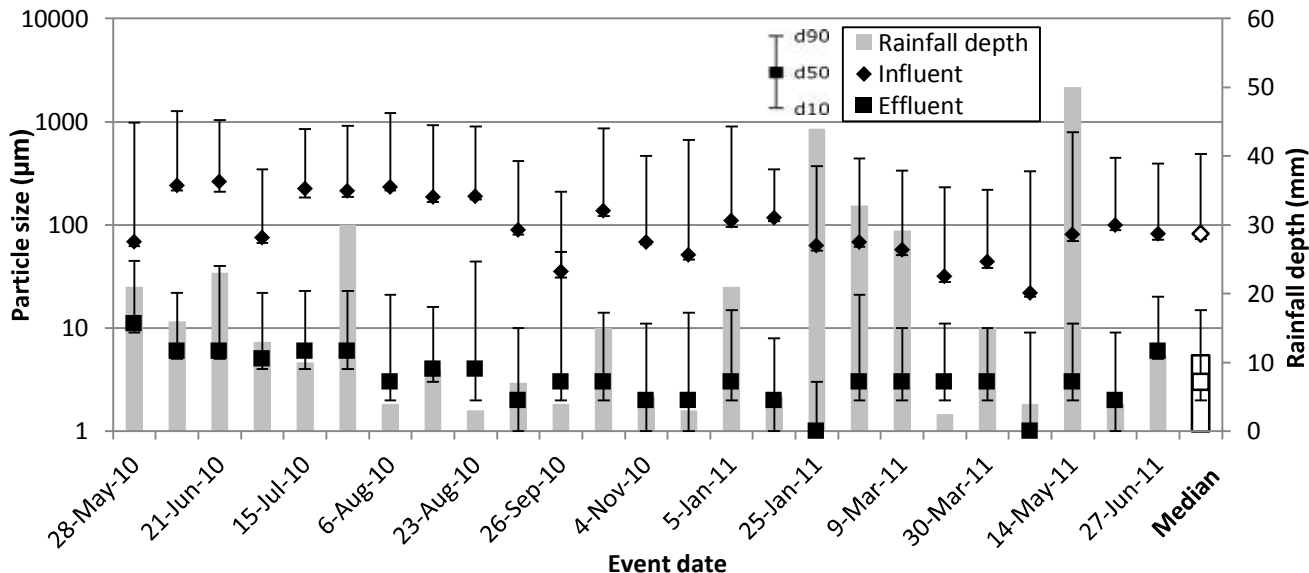


Figure 3. The rainfall depth and d10, d50, and d90 particle sizes of the influent and effluent composite samples for each monitored storm event over the 13-month testing period

Sampling of flows into and out of the Jellyfish Filter over the testing period showed statistically significant reductions ($p < 0.05$; Wilcoxon signed-rank test) in influent event mean concentrations for all selected stormwater constituents (Table 4 and Figure 4). Effluent event mean Suspended Sediment Concentrations (SSC) were below 19 mg/L during all monitored events. Load-based removal rates were also calculated based on the sum of loads over the study period. These removal rates ranged from 46.3 for Total Nitrogen to 98.6 for SSC (Table 4).

Table 4. Summary statistics for influent and effluent event mean concentrations for selected constituents

Water Quality Variable	Sampling Location	Min	Max	Median	Range	Mean	SD	Load based removal efficiency (%)
TSS	Influent (mg/L)	16.30	261.00	79.30	244.70	86.26	51.37	87.2
	Effluent (mg/L)	3.20	21.70	11.80	18.50	10.99	4.79	
SSC	Influent (mg/L)	78.20	1401.70	444.50	1323.50	482.26	338.34	98.6
	Effluent (mg/L)	2.80	18.10	7.30	15.30	7.88	3.77	
TP	Influent (µg/L)	887.00	8793.00	3063.00	7906.00	3550.20	1914.50	64.2
	Effluent (µg/L)	472.00	4769.00	1480.00	4297.00	1688.08	1059.98	
TN	Influent (µg/L)	1170.00	10479.00	3110.00	9309.00	3519.32	2161.47	46.3
	Effluent (µg/L)	553.00	6579.00	1610.00	6026.00	2091.76	1613.61	
Zn	Influent (µg/L)	0.005	7600.00	1500.00	7600.00	1792.00	1852.91	76.1
	Effluent (µg/L)	0.005	2760.00	450.00	2760.00	561.64	594.70	
Cu	Influent (µg/L)	0.001	880.40	79.50	880.40	171.28	229.33	92.1
	Effluent (µg/L)	0.001	51.30	6.90	51.30	14.36	17.22	
Oil and Grease	Influent (mg/L)	0.20	4.06	0.93	3.86	1.07	0.82	46.4
	Effluent (mg/L)	0.00	2.32	0.35	2.32	0.50	0.60	

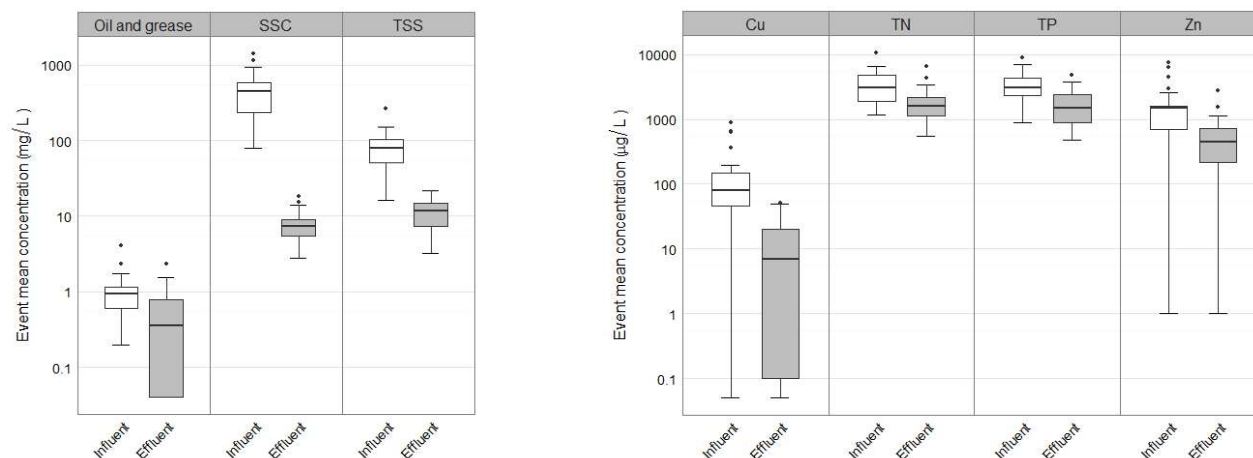


Figure 4. Boxplots showing the distribution of influent and effluent event mean concentrations (EMC) for selected stormwater constituents over the study period

Verification

The verification was completed by the Verification Expert, Toronto and Region Conservation Authority, contracted by GLOBE Performance Solutions, using the International Standard **ISO 14034:2016 Environmental management – Environmental technology verification (ETV)**. Data and information provided by Imbrium Systems to support the performance claim included the performance monitoring report prepared by University of Florida, Engineering School of Sustainable Infrastructure and Environment, and dated November 2011. This report is based on testing completed in accordance with the Technology Acceptance Reciprocity Partnership (TARP) Tier II Protocol (2003) and New Jersey Tier II Stormwater Test Requirements--Amendments to TARP Tier II Protocol (NJDEP, 2009).

What is ISO 14034:2016 Environmental management – Environmental technology verification (ETV)?

ISO 14034:2016 specifies principles, procedures and requirements for environmental technology verification (ETV), and was developed and published by the *International Organization for Standardization (ISO)*. The objective of ETV is to provide credible, reliable and independent verification of the performance of environmental technologies. An environmental technology is a technology that either results in an environmental added value or measures parameters that indicate an environmental impact. Such technologies have an increasingly important role in addressing environmental challenges and achieving sustainable development.

For more information on the Jellyfish® Filter please contact:

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Tel: 416-960-9900
info@imbriumsystems.com

For more information on ISO 14034:2016 / ETV please contact:

GLOBE Performance Solutions
World Trade Centre
404 – 999 Canada Place
Vancouver, BC
V6C 3E2 Canada
Tel: 604-695-5018 / Toll Free: 1-855-695-5018
etv@globeperformance.com

Limitation of verification

GLOBE Performance Solutions and the Verification Expert provide the verification services solely on the basis of the information supplied by the applicant or vendor and assume no liability thereafter. The responsibility for the information supplied remains solely with the applicant or vendor and the liability for the purchase, installation, and operation (whether consequential or otherwise) is not transferred to any other party as a result of the verification.

**Jellyfish[®] Filter
Owner's Manual**



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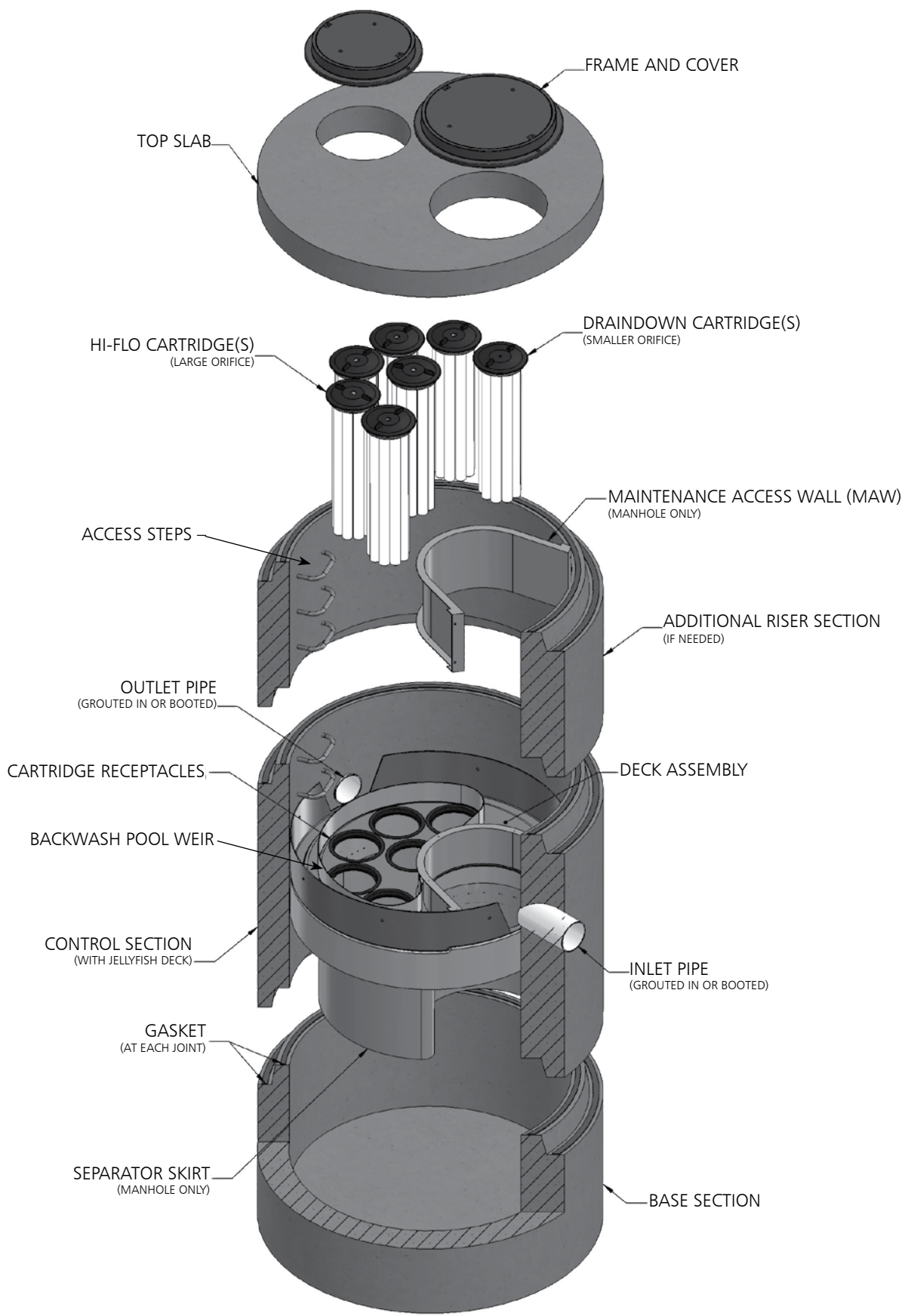
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THANK YOU FOR PURCHASING THE JELLYFISH® FILTER!

Contech Engineered Solutions would like to thank you for selecting the Jellyfish Filter to meet your project's stormwater treatment needs. With proper inspection and maintenance, the Jellyfish Filter is designed to deliver ongoing, high levels of stormwater pollutant removal.

If you have any questions, please feel free to call us or e-mail us:

Contech Engineered Solutions
9025 Centre Pointe Drive, Suite 400 | West Chester, OH 45069
513-645-7000 | 800-338-1122
www.ContechES.com
info@conteches.com



WARNINGS / CAUTION

1. FALL PROTECTION may be required.
2. WATCH YOUR STEP if standing on the Jellyfish Filter Deck at any time; Great care and safety must be taken while walking or maneuvering on the Jellyfish Filter Deck. Attentive care must be taken while standing on the Jellyfish Filter Deck at all times to prevent stepping onto a lid, into or through a cartridge hole or slipping on the deck.
3. The Jellyfish Filter Deck can be SLIPPERY WHEN WET.
4. If the Top Slab, Covers or Hatches have not yet been installed, or are removed for any reason, great care must be taken to NOT DROP ANYTHING ONTO THE JELLYFISH FILTER DECK. The Jellyfish Filter Deck and Cartridge Receptacle Rings can be damaged under high impact loads. This type of activity voids all warranties. All damaged items to be replaced at owner's expense.
5. Maximum deck load 2 persons, total weight 450 lbs.

Safety Notice

Jobsite safety is a topic and practice addressed comprehensively by others. The inclusions here are intended to be reminders to whole areas of Safety Practice that are the responsibility of the Owner(s), Manager(s) and Contractor(s). OSHA and Canadian OSH, and Federal, State/Provincial, and Local Jurisdiction Safety Standards apply on any given site or project. The knowledge and applicability of those responsibilities is the Contractor's responsibility and outside the scope of Contech Engineered Solutions.

Confined Space Entry

Secure all equipment and perform all training to meet applicable local and OSHA regulations regarding confined space entry. It is the Contractor's or entry personnel's responsibility to proceed safely at all times.

Personal Safety Equipment

Contractor is responsible to provide and wear appropriate personal protection equipment as needed including, but not limited to safety boots, hard hat, reflective vest, protective eyewear, gloves and fall protection equipment as necessary. Make sure all equipment is staffed with trained and/or certified personnel, and all equipment is checked for proper operation and safety features prior to use.

- Fall protection equipment
- Eye protection
- Safety boots
- Ear protection
- Gloves
- Ventilation and respiratory protection
- Hard hat
- Maintenance and protection of traffic plan

Chapter 1

1.0 – Owner Specific Jellyfish Filter Product Information

Below you will find a reference page that can be filled out according to your Jellyfish Filter specification to help you easily inspect, maintain and order parts for your system.

Owner Name:	
Phone Number:	
Site Address:	
Site GPS Coordinates/unit location:	
Unit Location Description:	
Jellyfish Filter Model No.:	
Contech Project & Sequence Number	
No. of Hi-Flo Cartridges	
No. of Cartridges:	
Length of Draindown Cartridges:	
No. of Blank Cartridge Lids:	
Bypass Configuration (Online/Offline):	

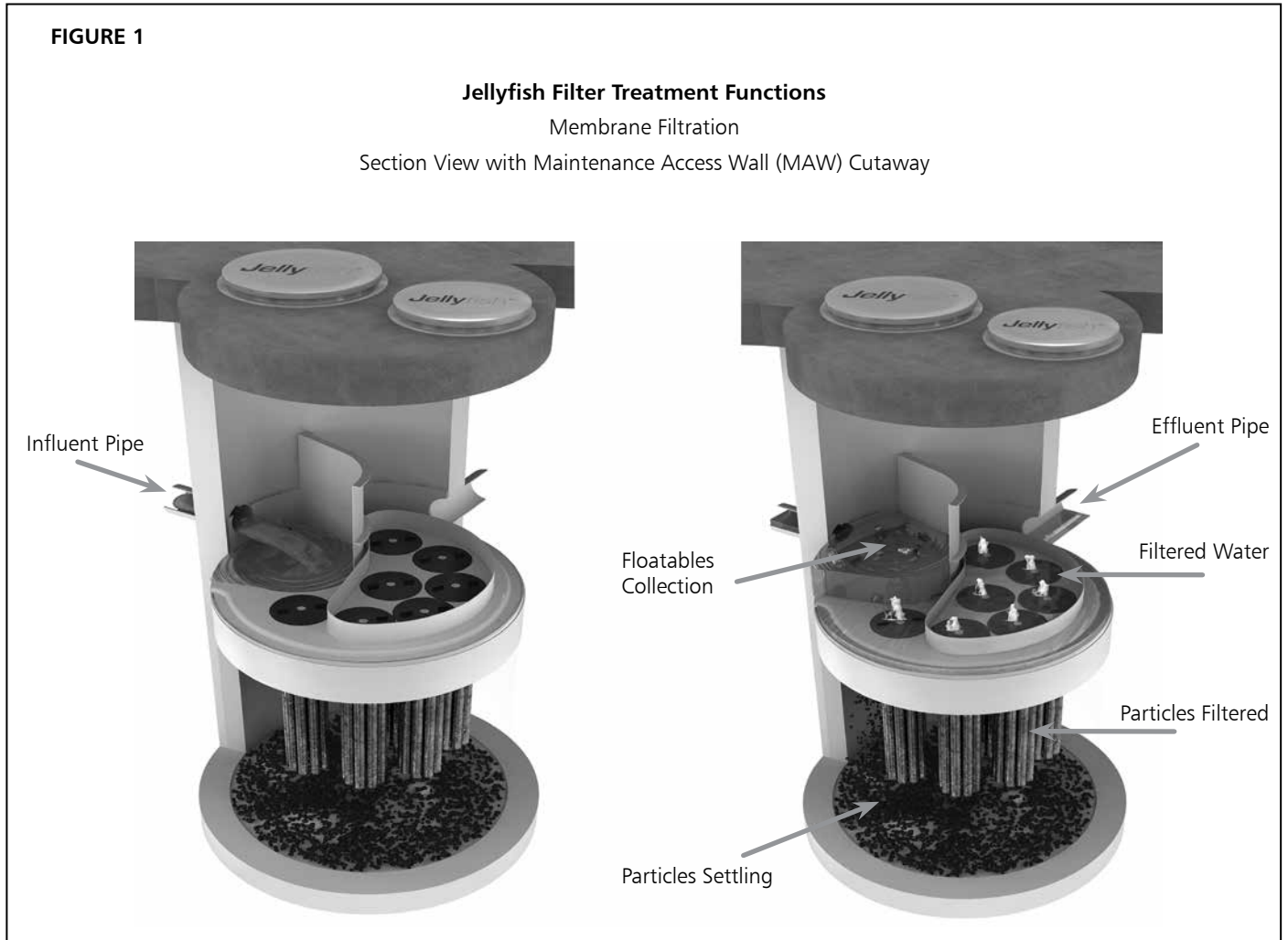
Notes:

Chapter 2

2.0 – Jellyfish Filter System Operations and Functions

The Jellyfish Filter is an engineered stormwater quality treatment technology that removes a high level and wide variety of stormwater pollutants. Each Jellyfish Filter cartridge consists of eleven membrane - encased filter elements (“filtration tentacles”) attached to a cartridge head plate. The filtration tentacles provide a large filtration surface area, resulting in high flow and high pollutant removal capacity.

The Jellyfish Filter functions are depicted in Figure 1 below.



Jellyfish Filter cartridges are backwashed after each peak storm event, which removes accumulated sediment from the membranes. This backwash process extends the service life of the cartridges and increases the time between maintenance events.

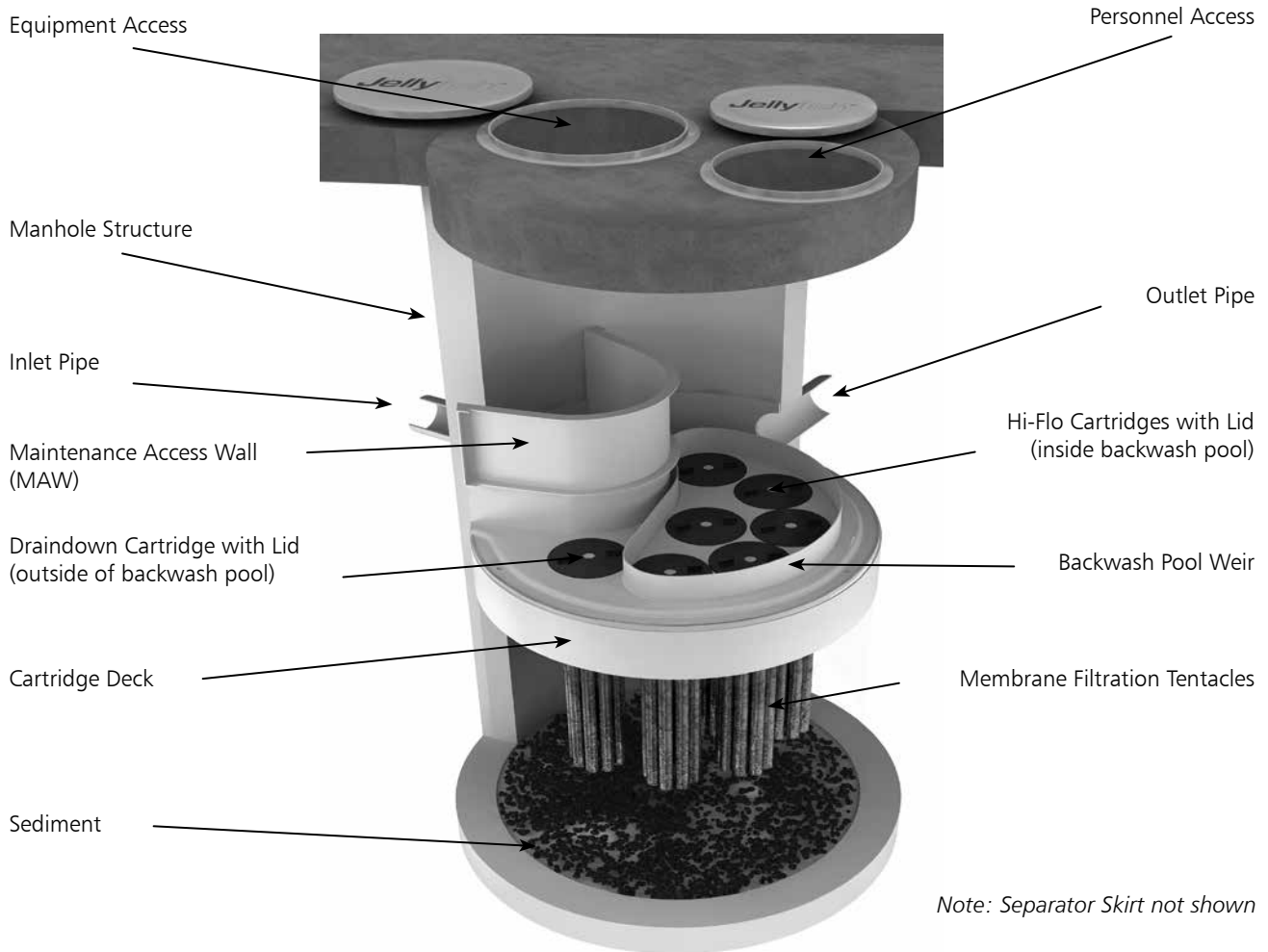
For additional details on the operation and pollutant capabilities of the Jellyfish Filter please refer to additional details on our website at www.ContechES.com.

2.1 – Components and Cartridges

The Jellyfish Filter and components are depicted in Figure 2 below.

FIGURE 2

Jellyfish Filter Components



Tentacles are available in various lengths as depicted in Table 1 below.

Table 1 – Cartridge Lengths / Weights and Cartridge Lid Orifice Diameters

Cartridge Lengths	Dry Weight	Hi-Flo Orifice Diameter	Draindown Orifice Diameter
15 inches (381 mm)	10 lbs (4.5 kg)	35 mm	20 mm
27 inches (686 mm)	14.5 lbs (6.6 kg)	45 mm	25 mm
40 inches (1,016 mm)	19.5 lbs (8.9 kg)	55 mm	30 mm
54 inches (1,372 mm)	25 lbs (11.4 kg)	70 mm	35 mm

2.2 – Jellyfish Membrane Filtration Cartridge Assembly

The Jellyfish Filter utilizes multiple membrane filtration cartridges. Each cartridge consists of removable cylindrical filtration “tentacles” attached to a cartridge head plate. Each filtration tentacle has a threaded pipe nipple and o-ring. To attach, insert the top pipe nipples with the o-ring through the head plate holes and secure with locking nuts. Hex nuts to be hand tightened and checked with a wrench as shown below.

2.3 – Jellyfish Membrane Filtration Cartridge Installation

- Cartridge installation will be performed by trained individuals and coordinated with the installing site Contractor. Flow diversion devices are required to be in place until the site is stabilized (final paving and landscaping in place). Failure to address this step completely will reduce the time between required maintenance.
- Descend to the cartridge deck (see Safety Notice and page 3).
- Refer to Contech's submittal drawings to determine proper quantity and placement of Hi-Flo, Draindown and Blank cartridges with appropriate lids. Lower the Jellyfish membrane filtration cartridges into the cartridge receptacles within the cartridge deck. It is possible that not all cartridge receptacles will be filled with a filter cartridge. In that case, a blank headplate and blank cartridge lid (no orifice) would be installed.



Cartridge Assembly

Do not force the tentacles down into the cartridge receptacle, as this may damage the membranes. Apply downward pressure on the cartridge head plate to seat the lubricated rim gasket (thick circular gasket surrounding the circumference of the head plate) into the cartridge receptacle. (See Figure 3 for details on approved lubricants for use with rim gasket.)

- Examine the cartridge lids to differentiate lids with a small orifice, a large orifice, and no orifice.
 - Lids with a small orifice are to be inserted into the Draindown cartridge receptacles, outside of the backwash pool weir.
 - Lids with a large orifice are to be inserted into the Hi-Flo cartridge receptacles within the backwash pool weir.
 - Lids with no orifice (blank cartridge lids) and a blank headplate are to be inserted into unoccupied cartridge receptacles.
- To install a cartridge lid, align both cartridge lid male threads with the cartridge receptacle female threads before rotating approximately 1/3 of a full rotation until firmly seated. Use of an approved rim gasket lubricant may facilitate installation.

3.0 Inspection and Maintenance Overview

The primary purpose of the Jellyfish® Filter is to capture and remove pollutants from stormwater runoff. As with any filtration system, these pollutants must be removed to maintain the filter's maximum treatment performance. Regular inspection and maintenance are required to insure proper functioning of the system. Maintenance frequencies and requirements are site specific and vary depending on pollutant loading. Additional maintenance activities may be required in the event of non-storm event runoff, such as base-flow or seasonal flow, an upstream chemical spill or due to excessive sediment loading from site erosion or extreme runoff events. It is a good practice to inspect the system after major storm events.

Inspection activities are typically conducted from surface observations and include:

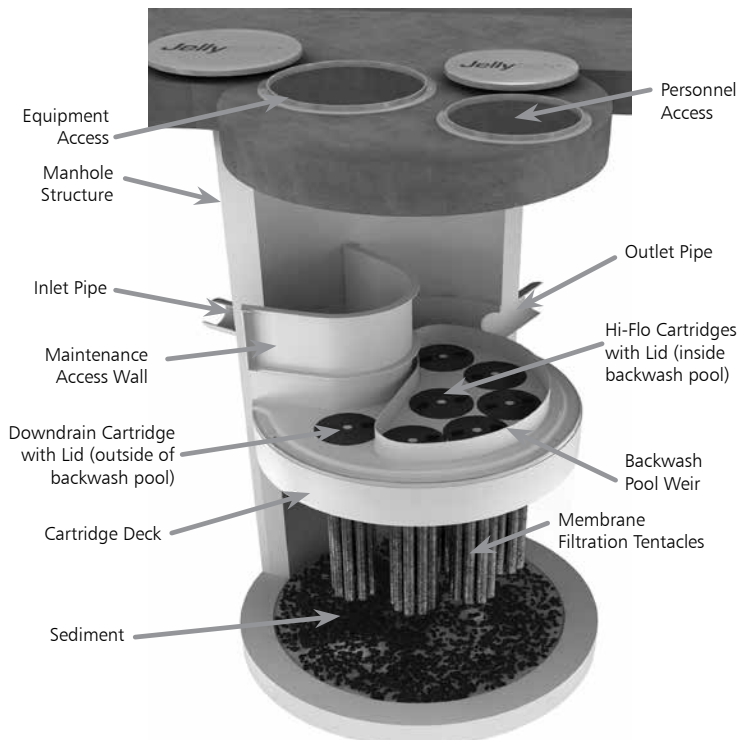
- Observe if standing water is present
- Observe if there is any physical damage to the deck or cartridge lids
- Observe the amount of debris in the Maintenance Access Wall (MAW) or inlet bay for vault systems

Maintenance activities include:

- Removal of oil, floatable trash and debris
- Removal of collected sediments
- Rinsing and re-installing the filter cartridges
- Replace filter cartridge tentacles, as needed

4.0 Inspection Timing

Inspection of the Jellyfish Filter is key in determining the maintenance requirements for, and to develop a history of, the site's pollutant loading characteristics. In general, inspections should be performed at the times indicated below; *or per the approved project stormwater quality documents (if applicable), whichever is more frequent.*



Note: Separator Skirt not shown

1. A minimum of quarterly inspections during the first year of operation to assess the sediment and floatable pollutant accumulation, and to ensure proper functioning of the system.
2. Inspection frequency in subsequent years is based on the inspection and maintenance plan developed in the first year of operation. Minimum frequency should be once per year.
3. Inspection is recommended after each major storm event.
4. Inspection is required immediately after an upstream oil, fuel or other chemical spill.

5.0 Inspection Procedure

The following procedure is recommended when performing inspections:

1. Provide traffic control measures as necessary.
2. Inspect the MAW or inlet bay for floatable pollutants such as trash, debris, and oil sheen.
3. Measure oil and sediment depth in several locations, by lowering a sediment probe until contact is made with the floor of the structure. Record sediment depth, and presences of any oil layers.
4. Inspect cartridge lids. Missing or damaged cartridge lids to be replaced.
5. Inspect the MAW (where appropriate), cartridge deck and receptacles, and backwash pool weir, for damaged or broken components.

5.1 Dry weather inspections

- Inspect the cartridge deck for standing water, and/or sediment on the deck.
- No standing water under normal operating conditions.
- Standing water inside the backwash pool, but not outside the backwash pool indicates, that the filter cartridges need to be rinsed.



Inspection Utilizing Sediment Probe

- Standing water outside the backwash pool is not anticipated and may indicate a backwater condition caused by high water elevation in the receiving water body, or possibly a blockage in downstream infrastructure.
- Any appreciable sediment ($\geq 1/16''$) accumulated on the deck surface should be removed.

5.2 Wet weather inspections

- Observe the rate and movement of water in the unit. Note the depth of water above deck elevation within the MAW or inlet bay.
- Less than 6 inches, flow should be exiting the cartridge lids of each of the draindown cartridges (i.e. cartridges located outside the backwash pool).
- Greater than 6 inches, flow should be exiting the cartridge lids of each of the draindown cartridges and each of the hi-flo cartridges (i.e. cartridges located inside the backwash pool), and water should be overflowing the backwash pool weir.
- 18 inches or greater and relatively little flow is exiting the cartridge lids and outlet pipe, this condition indicates that the filter cartridges need to be rinsed.

6.0 Maintenance Requirements

Required maintenance for the Jellyfish Filter is based upon results of the most recent inspection, historical maintenance records, or the site specific water quality management plan; whichever is more frequent. In general, maintenance requires some combination of the following:

1. Sediment removal for depths reaching 12 inches or greater, or within 3 years of the most recent sediment cleaning, whichever occurs sooner.
2. Floatable trash, debris, and oil removal.
3. Deck cleaned and free from sediment.
4. Filter cartridges rinsed and re-installed as required by the most recent inspection results, or within 12 months of the most recent filter rinsing, whichever occurs sooner.
5. Replace tentacles if rinsing does not restore adequate hydraulic capacity, remove accumulated sediment, or if damaged or missing. It is recommended that tentacles should remain in service no longer than 5 years before replacement.
6. Damaged or missing cartridge deck components must be repaired or replaced as indicated by results of the most recent inspection.
7. The unit must be cleaned out and filter cartridges inspected immediately after an upstream oil, fuel, or chemical spill. Filter cartridge tentacles should be replaced if damaged or compromised by the spill.

7.0 Maintenance Procedure

The following procedures are recommended when maintaining the Jellyfish Filter:

1. Provide traffic control measures as necessary.
2. Open all covers and hatches. Use ventilation equipment as required, according to confined space entry procedures. *Caution: Dropping objects onto the cartridge deck may cause damage.*
3. Perform Inspection Procedure prior to maintenance activity.

4. To access the cartridge deck for filter cartridge service, descend into the structure and step directly onto the deck. *Caution: Do not step onto the maintenance access wall (MAW) or backwash pool weir, as damage may result. Note that the cartridge deck may be slippery.*
5. Maximum weight of maintenance crew and equipment on the cartridge deck not to exceed 450 lbs.

7.1 Filter Cartridge Removal

1. Remove a cartridge lid.
2. Remove cartridges from the deck using the lifting loops in the cartridge head plate. Rope or a lifting device (available from Contech) should be used. *Caution: Should a snag occur, do not force the cartridge upward as damage to the tentacles may result. Wet cartridges typically weigh between 100 and 125 lbs.*
3. Replace and secure the cartridge lid on the exposed empty receptacle as a safety precaution. Contech does not recommend exposing more than one empty cartridge receptacle at a time.

7.2 Filter Cartridge Rinsing

1. Remove all 11 tentacles from the cartridge head plate. Take care not to lose or damage the O-ring seal as well as the plastic threaded nut and connector.
2. Position tentacles in a container (or over the MAW), with the



Cartridge Removal & Lifting Device



threaded connector (open end) facing down, so rinse water is flushed through the membrane and captured in the container.

3. Using the Jellyfish rinse tool (available from Contech) or a low-pressure garden hose sprayer, direct water spray onto the tentacle membrane, sweeping from top to bottom along the length of the tentacle. Rinse until all sediment is removed from the membrane. *Caution: Do not use a high pressure sprayer or focused stream of water on the membrane. Excessive water pressure may damage the membrane.*
4. Collected rinse water is typically removed by vacuum hose.

5. Reassemble cartridges as detailed later in this document. Reuse O-rings and nuts, ensuring proper placement on each tentacle.

7.3 Sediment and Floatables Extraction

1. Perform vacuum cleaning of the Jellyfish Filter only after filter cartridges have been removed from the system. Access the lower chamber for vacuum cleaning only through the maintenance access wall (MAW) opening. Be careful not to damage the flexible plastic separator skirt that is attached to the underside of the deck on manhole systems. Do not lower the vacuum wand through a cartridge receptacle, as damage to the receptacle will result.
2. Vacuum floatable trash, debris, and oil, from the MAW opening or inlet bay. Alternatively, floatable solids may be removed by a net or skimmer.
3. Pressure wash cartridge deck and receptacles to remove all



Rinsing Cartridge with Contech Rinse Tool

sediment and debris. Sediment should be rinsed into the sump area. Take care not to flush rinse water into the outlet pipe.

4. Remove water from the sump area. Vacuum or pump equipment should only be introduced through the MAW or inlet bay.
5. Remove the sediment from the bottom of the unit through the MAW or inlet bay opening.
6. For larger diameter Jellyfish Filter manholes (≥ 8 -ft) and some



Vacuuming Sump Through MAW

vaults complete sediment removal may be facilitated by removing a cartridge lid from an empty receptacle and inserting a jetting wand (not a vacuum wand) through the receptacle. Use the sprayer to rinse loosened sediment toward the vacuum hose in the MAW opening, being careful not to damage the receptacle.

7.4 Filter Cartridge Reinstallation and Replacement

1. Cartridges should be installed after the deck has been cleaned. It is important that the receptacle surfaces be free from grit and debris.
2. Remove cartridge lid from deck and carefully lower the filter cartridge into the receptacle until head plate gasket is seated squarely in receptacle. *Caution: Do not force the cartridge downward; damage may occur.*
3. Replace the cartridge lid and check to see that both male threads are properly seated before rotating approximately 1/3 of a full rotation until firmly seated. Use of an approved rim gasket lubricant may facilitate installation. See next page for additional details.
4. If rinsing is ineffective in removing sediment from the tentacles, or if tentacles are damaged, provisions must be made to replace the spent or damaged tentacles with new tentacles. Contact Contech to order replacement tentacles.

7.5 Chemical Spills

Caution: If a chemical spill has been captured, do not attempt maintenance. Immediately contact the local hazard response agency and contact Contech.

7.6 Material Disposal

The accumulated sediment found in stormwater treatment and conveyance systems must be handled and disposed of in accordance with regulatory protocols. It is possible for sediments to contain measurable concentrations of heavy metals and organic chemicals (such as pesticides and petroleum products). Areas with the greatest potential for high pollutant loading include industrial areas and heavily traveled roads. Sediments and water must be disposed of in accordance with all applicable waste disposal regulations. When scheduling maintenance, consideration must be made for the disposal of solid and liquid wastes. This typically requires coordination with a local landfill for solid waste disposal. For liquid waste disposal a number of options are available including a municipal vacuum truck decant facility, local waste water treatment plant or on-site treatment and discharge.

Jellyfish Filter Components & Filter Cartridge Assembly and Installation

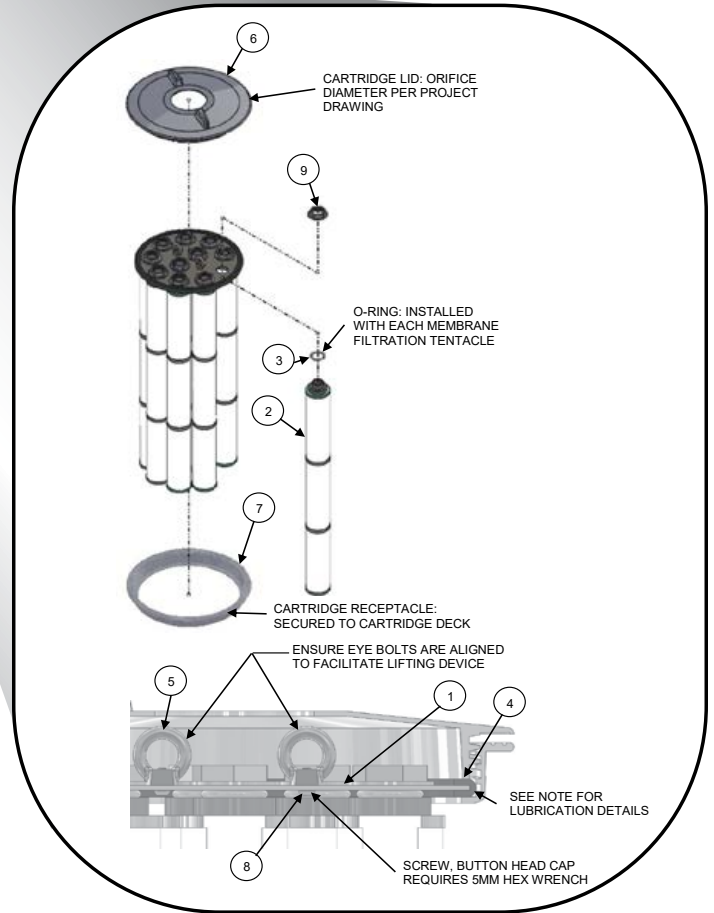
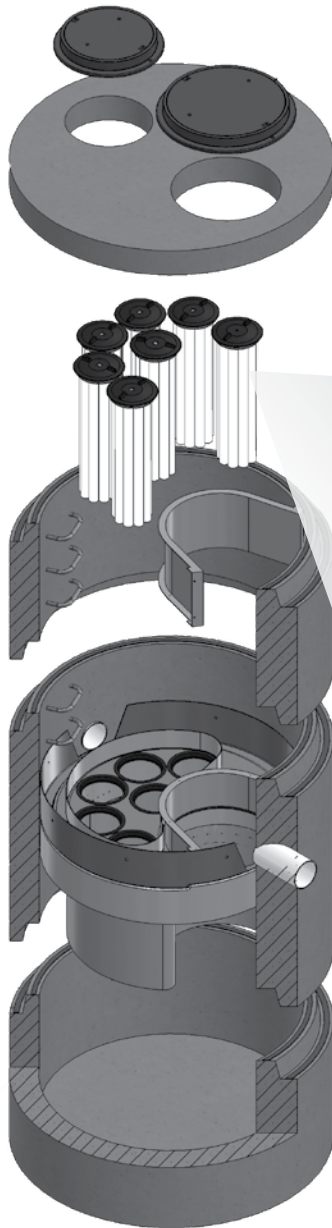


TABLE 1: BOM

ITEM NO.	DESCRIPTION
1	JF HEAD PLATE
2	JF TENTACLE
3	JF O-RING
4	JF HEAD PLATE GASKET
5	JF CARTRIDGE EYELET
6	JF 14IN COVER
7	JF RECEPTACLE
8	BUTTON HEAD CAP SCREW M6X14MM SS
9	JF CARTRIDGE NUT

TABLE 2: APPROVED GASKET LUBRICANTS

PART NO.	MFR	DESCRIPTION
78713	LA-CO	LUBRI-JOINT
40501	HERCULES	DUCK BUTTER
30600	OATEY	PIPE LUBRICANT
PSLUBXL1Q	PROSELECT	PIPE JOINT LUBRICANT

NOTES:

Head Plate Gasket Installation:

Install Head Plate Gasket (Item 4) onto the Head Plate (Item 1) and liberally apply a lubricant from Table 2: Approved Gasket Lubricants onto the gasket where it contacts the Receptacle (Item 7) and Cartridge Lid (Item 6). Follow Lubricant manufacturer's instructions.

Lid Assembly:

Rotate Cartridge Lid counter-clockwise until both male threads drop down and properly seat. Then rotate Cartridge Lid clock-wise approximately one-third of a full rotation until Cartridge Lid is firmly secured, creating a watertight seal.

Jellyfish Filter Inspection and Maintenance Log

Owner: _____ Jellyfish Model No.: _____

Location: _____ GPS Coordinates: _____

Land Use: Commercial: _____ Industrial: _____ Service Station: _____

 Road/Highway: _____ Airport: _____ Residential: _____ Parking Lot: _____

Date/Time:					
Inspector:					
Maintenance Contractor:					
Visible Oil Present: (Y/N)					
Oil Quantity Removed					
Floatable Debris Present: (Y/N)					
Floatable Debris removed: (Y/N)					
Water Depth in Backwash Pool					
Cartridges externally rinsed/re-commissioned: (Y/N)					
New tentacles put on Cartridges: (Y/N)					
Sediment Depth Measured: (Y/N)					
Sediment Depth (inches or mm):					
Sediment Removed: (Y/N)					
Cartridge Lids intact: (Y/N)					
Observed Damage:					
Comments:					

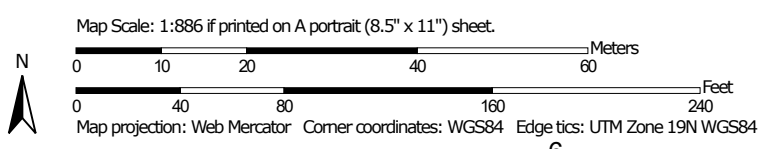
Custom Soil Resource Report for York County, Maine



Custom Soil Resource Report Soil Map



Soil Map may not be valid at this scale.



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: York County, Maine
 Survey Area Data: Version 20, Aug 31, 2021

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

Date(s) aerial images were photographed: Sep 19, 2021—Nov 1, 2021

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
UH	Urban land-Hooksan complex, 0 to 8 percent slopes	1.4	58.2%
W	Water bodies	1.0	41.8%
Totals for Area of Interest		2.4	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,

Custom Soil Resource Report

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.

York County, Maine

UH—Urban land-Hooksan complex, 0 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2x111
Elevation: 0 to 50 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

Urban land, coastal: 50 percent
Hooksan and similar soils: 30 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land, Coastal

Setting

Landform: Dunes
Down-slope shape: Linear
Across-slope shape: Linear

Typical profile

M - 0 to 10 inches: cemented material

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: 0 inches to manufactured layer
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Frequency of flooding: Rare
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: Unranked

Description of Hooksan

Setting

Landform: Dunes
Landform position (two-dimensional): Summit, shoulder, backslope, footslope
Landform position (three-dimensional): Side slope, base slope, crest
Down-slope shape: Convex
Across-slope shape: Linear, convex
Parent material: Sandy eolian deposits

Typical profile

C1 - 0 to 20 inches: sand
C2 - 20 to 30 inches: sand
C3 - 30 to 64 inches: sand

Custom Soil Resource Report

Properties and qualities

Slope: 0 to 8 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Excessively drained

Runoff class: Negligible

Capacity of the most limiting layer to transmit water (Ksat): Very high (14.17 to 99.90 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: Rare

Frequency of ponding: None

Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)

Available water supply, 0 to 60 inches: Low (about 5.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7e

Hydrologic Soil Group: A

Ecological site: R149BY002MA - Coastal Dunes

Hydric soil rating: No

W—Water bodies

Map Unit Composition

Water: 100 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Water

Setting

Landform: Hills


D. Standards.

- (1) The design and performance standards of Chapters 16.8 and 16.9 must be met, except where specifically altered in this subsection.
- (2) The following space standards apply.
 - (a) Minimum land area per dwelling unit: 3,000 square feet.
 - [1] For each of the first two dwelling units and thereafter: 6,000 square feet.
 - (b) Minimum lot size: 6,000 square feet.
 - (c) Minimum street frontage: 50 feet.
 - (d) Minimum front yard: five feet.
 - (e) Minimum rear and side yards: 10 feet.
 - (f) Maximum building height: 40 feet.
 - (g) Minimum setback from:
 - [1] Water body and wetland water-dependent uses: zero feet.
 - [2] All other uses (including buildings and parking): 75 feet unless modified, according to the terms of Subsection E of this section.
 - (h) Minimum open space on the site: 40%. (NOTE: The Planning Board may reduce the required open space to 30% where it is clearly demonstrated that no practicable alternative exists to accommodate a water-dependent use.)

E. Appropriate waterfront activity incentives. To encourage objectives of the Comprehensive Plan to: 1) provide public access to the waterfront; 2) retain and expand commercial water-dependent uses; and 3) take extraordinary steps to preserve the environmental quality of the shoreline and tidal waters, the required setback from water bodies and wetlands may be reduced to 25 feet where the Planning Board finds a development plan significantly contributes to accomplishment of the above objectives by satisfactorily achieving one or more of the following:

- (1) Public access. Grants an easement to the Town, or other acceptable party, providing public access to the waterfront at no charge to the general public via a developed accessible pedestrian route with appropriate signage or includes an outdoor deck or patio for customer seating at a restaurant open to the general public; or
- (2) Retain/expand commercial water-dependent uses. Provides for inclusion of commercial water-dependent use(s) on the property for the duration of the portion of the project that encroaches closer

than the normal minimum setback from water bodies and wetlands. Provision of fewer than six boat slips for leisure/recreational boating do not constitute a commercial water-dependent use for the purposes of this section; or

-  (3) Preserve the environmental quality of coastal resources. Protect existing wildlife habitat, conserve shore cover and ensure the quality of stormwater runoff by satisfying all of the following standards:
- (a) Retain and protect existing significant wildlife habitat that provides food, cover and/or nesting for migratory song birds and wading birds;
 - (b) In order to conserve shore cover, contiguous areas of shrubberies of varying height, such as dwarf species of barberry, serviceberry, holly, crabapple, dogwood, cotoneaster, euonymus, firethorn and/or rosa rugosa, as well as erosion-resistant ground cover plantings must be retained and planted, and existing trees retained, wherever practicable in the setback;
 - (c) Implementation of a stormwater management plan endorsed by the York County Soil and Water Conservation District (SCS), or the Town's engineering peer review consultant, that treats stormwater with appropriate BMPs and removes pollutants in accordance with the most-current edition of the Maine Department of Environmental Protection BMP Manual, Stormwater Management for Maine. Pollutants sought to be removed include suspended solids, nitrates, hydrocarbons and heavy metals. Such special treatment of the first flush of runoff may include detention, infiltration, filtering and trapping of pollutants. **[Amended 9-26-2011 by Ord. No. 11-15]**

F. Special parking standards.

- (1) Revised off-street parking standards. Off-street parking must be provided in accordance with § 16.8.9.4 unless modified below for the following uses:
 - (a) Dwellings: 1 1/2 parking space for each dwelling unit;
 - (b) Retail stores: one parking space for each 400 square feet of gross floor area;
 - (c) Drive-in restaurants, snack bars and fast-food outlets, but excluding restaurants where ordering and/or pickup of food may take place from a motorized vehicle: one parking space for every three seats, but in no case less than four spaces;
 - (d) Conference centers: one parking space for every 60 square feet in the largest assembly or meeting room.



May 18, 2023

Jason Garnham, Director of Planning and Development
Town of Kittery
200 Rogers Rd.
Kittery, ME 03904

**RE: Town of Kittery, Planning Board Services
35 Badgers Island West Residential Conversion Drainage Review
Tax Map 1, Lot 32
CMA #591.156**

Jason:

CMA Engineers has received the following information for Assignment #156, review of the plans and drainage analysis for a redevelopment at 35 Badgers Island West.

- 1) Residential Conversion, 35 Badgers Island West, Kittery, Maine, Amended Site Plan Sketch Application by Ambit Engineering, dated April 6, 2023.
- 2) Preliminary Site Plan Review Application and supporting documentation.

The proposed project includes two building additions and a change in use to residential at 35 Badgers Island West, Tax Map 1, Lot 32 in the Mixed-Use Badgers Island Zoning District (MU-BI), the Resource Protection Overlay (OZ-RP) and the Shoreland Overlay Zone (OZ-SL-250'). The application has been prepared by Ambit Engineering, Inc. of Portsmouth, NH on behalf of the owner B.I.W. Group, LLC.

Previously, a revetment repair was approved and completed with the exception of the landscaping installation. The project includes two proposed additions to the existing office building with heated driveways and a change in use to residential. Ten residential units are proposed. Access is from Badgers Island West. The development is located on a 1.35-acre lot. Utilities are proposed to be installed underground. Water supply is proposed off a Kittery Water District (KWD) main from Badgers Island West to the north and wastewater disposal is proposed off a Town sewer main also from Badgers Island West to the south.

Proposed stormwater treatment includes stormwater generated on-site and a portion of off-site runoff. Stormwater is managed through overland flow and a closed drainage system including roof drains and trench drains. Proposed treatment for off-site runoff is accomplished through a jellyfish filter.

We have the following comments that relate to the plans:

Cover

1. The legend should be updated to apply to the plans.

Sheet C1 – Existing Conditions Plan

1. The legend should be updated to apply to the plans.
2. Is the Devegetated Coverage Calculation necessary on this sheet?

Sheet C2 – Shoreland Development Plan

1. It is not clear why the proposed building and driveway need to encroach into the wetland buffer.

L-1 – Conceptual Landscape Plan

1. The proposed building configuration including driveways and walkways is different than what is shown on the plans. How does this change the landscape plan?

Sheet C3 – Utility Plan

1. The leader “Sewer Line to be Relocated” is confusing because it shows the existing and proposed sewer with leaders to both without a clear difference in the linetypes. Call out the new service separately (with the pipe size, material and slope). Is the invert out of the manhole the same? There should be details, notes, etc. on abandoning the old penetration, reconfiguring the manhole invert trough if necessary, etc.
2. Callout the new underground service run.
3. The leader “Re-Use Water and Sprinkler Services” points to one water service. What is the size? Is there capacity for domestic use and fire suppression in this one service?
4. The location of the sewer cleanout should be shown on the plans.

Sheet C4 – Grading Plan

1. What are the details of the proposed heated driveway?
2. Provide details and notes on termination of the existing pipe out of DMH #1657 proposed to be reused for roof drains.

Sheet C5 – Demolition Plan

1. There is a leader indicating “Sewer Service to Remain” but Sheet C3 indicates it is to be relocated.
2. The existing drainage pipe that is to be partially removed should be shown and called out to be removed on the plan.
3. The plans indicate that the “Gas...Service to be Relocated” but it is not shown elsewhere on the plans.
4. The limit of demolition should be expanded to include new pipe connection to DMH 1657.

Sheet T1 – Turning Template

1. The applicant has provided a turning template for the existing roadway, but none for the proposed site redevelopment. Does the fire department require proof of on-site access?

Sheet C7 – Lighting Plan

1. The plan should provide lighting calculations (illuminance), fixture type, mounting height, etc.

D2 – Details

1. Provide a detail for trench patch in Badger’s Island West.

We have the following comments on the drainage analysis:

1. While the drainage analysis shows that a reduction in impervious surface, and therefore stormwater flows is achieved in the developed condition, we note that neither the existing or proposed piping, structures, trench drains, permeable pavers and other treatment devices are modeled. We note that the existing piping is 12", which is the minimum pipe size allowed by the Ordinances. The capacity of the system in its existing and proposed configuration should be analyzed.
2. In the Executive Summary, the lot size is described as 104,634+ square-feet (2.402 acres) and listed as 58,985 square-feet (1.354 acres).
3. Below Table 2, the text indicates "A plan sheet detailing the subcatchments and direction of runoff are included in the Appendix." We note that there are two figures (pre and post development) attached to the body of the report.
4. A component of the stormwater design improvements is the use of a Jellyfish stormwater filter. There is no discussion on the filter, other than its location in the Pre- and Post-Development Drainage section and a mention in the conclusion. A discussion of the purpose and benefits of the practice would be useful.
5. The proposed subcatchments plan should include CB1 and CB2.
6. Has the condition of the existing structures (namely DMH #1657) been assessed? What size is DMH #1657? Is there room in the structure for another pipe penetration?
7. For the existing 12"CPP that is proposed to be reused for roof drains, there is a leader indicating "pipe to be removed." What portion of the pipe is to remain? How is it removed/terminated at DMH #1657? What is the proposed connection from the roof drain to the reused section of pipe?
8. DMH2 in the Drainage Structure Schedule on Sheet C4 is missing the invert in for P8.
9. CB2 does not have an invert out in the Drainage Structure Schedule on Sheet C4.
10. What size are the proposed roof drains? Please provide details.
11. The site plans include a permeable paver patio and walkway. Have test pits and/or infiltration tests been completed on the existing soils to assess infiltration capacity? In addition, there are no details provided for the permeable pavers (select materials, piping, etc.)
12. The source of the rainfall event amounts should be included.
13. The Inspection & Long-Term Maintenance Plan should indicate that reports are required to be submitted to Code Enforcement Officer by July 1.
14. Under the Permeable paver section in the Inspection & Long-Term Maintenance Plan, outlet structures and appurtenances are referenced. Please clarify.
15. The Permeable Paver Long-Term Maintenance Sheet references permeable pavement.
16. Has the jellyfish filter been designed in accordance with the specifications in the January 21, 2015 letter from Maine DEP? Are there design calculations or a project specific certification of compliance?

Should you have any questions, please do not hesitate to call.

Very truly yours,

CMA ENGINEERS, INC.



Jodie Bray Strickland, P.E.

Project Manager

JBS/kao

cc: John Chagnon, P.E., Ambit Engineering

To: Kittery, Maine Planning Board
From: Jeffrey Hyland, PLA, ASLA, CLARB
Maine License #LAR4319
Ironwood Design Group
Date: 5/18/2023
Re: Landscape Architecture Peer Review for Mixed Use Residential Development Project,
Tax Map Lot 34, 35 Badgers Island West, Kittery, Maine, 03904
Zoning: Mixed-Use Badgers Island Zone (MU-BI), Shoreland Overlay Zone (OZ-SL-250'), Resource
Protection Overlay Zone (OZ-RP) and the
Commercial Fisheries/Maritime Use (OZ-CFMU).

Dear Planning Board Members,

After reviewing the plans for the above referenced project, the following elements shown on or relating to the landscaping plans require clarification or remedy to comply with Title 16 Land Use and Development Code for the Town of Kittery, Maine, the Kittery Design Handbook, and landscape architectural best practices.

1. There are several inconsistencies between civil and landscape plans requiring coordination.
 - a. Building footprint, vehicle entry, and sidewalks vary between C drawings and L1.
 - b. Cobblestone guest parking spot is not shown on L1.
 - c. Several trees identified on C5 for removal are shown on L1.
 - d. Relocated flagpole is not shown on L1.
2. There are a few instances where underground utilities may be in conflict with proposed planting. It is recommended that underground utilities location be referenced on the landscape plan.
3. C7 – The lighting plan does not identify light fixture typologies being proposed, fixture quantities, lumens, distribution type, etc. and no construction details have been provided.
 - a. Title 16.10.5.2 of the Town of Kittery site plan standards required a photo-metric plan of existing and proposed lighting.
 - b. Reference the following plan for acceptable Kittery lighting standards:
<https://www.kitteryme.gov/sites/g/files/vyhlf3316/f/uploads/iv.pdf>
4. According to 16.2.24 (D)(1)(h) of the Town of Kittery Land Use Zone Regulations Mixed Use – Badger Island (MU_BI), the Minimum open space on the site: 40%. Zoning regulations suggest that submitted plans should have a clear note that the open space requirement is being met. Add note to that effect.
5. L1/Plant list - Correct the common name spelling of “Little Quickfire Hydrangea”.
6. L1/Plant list - Call out the location of Sedum “Autumn Joy” on the landscape plan.
7. Detail H/D3 shows a note to set the root ball on a 9” tamped mound of planting mix, but the shrub detail is showing that mound height to be 6”. Unify/clarify dimensions and callouts.

- a. To minimize settlement, it is recommended that mounded soil be compacted using a hand-tamper to a density of ~70%.
 - b. For B&B plants it is recommended that 2/3 of the wire basket and burlap and all lacing be completely removed when planting.
 - c. For B&B trees the root flair should be identified and set 1" above finish grade.
8. Detail 1/C2 appears to be a standard unit paver detail while the plan calls out a porous pavement for the patio and walkway.
9. Detail A/C2 doesn't specify that the cobble band detail applies to the cobble parking spot.
10. Add construction details for:
- a. Retaining wall and associated guardrail
 - b. Lighting
 - c. Heated driveway
 - d. Porous pavement for patio and walkways
 - e. Tip down (curb ramp)
 - f. Stepping stones
 - g. Existing tree protection
 - h. Loam and seeding
 - i. Perennial planting
 - j. Flagpole resetting
11. Additional recommendations (for Planning Board consideration):
- a. Provide detailed planting notes.
 - b. Define minimum standards for loam stripped for reuse and loam brought from off site. On-site loam should be screened.
 - c. Analyze loam before applying fertilizer. A standard soil analysis of the loam should be conducted to determine whether fertilizer is needed to support plant growth, and if so, how much.
 - d. Identify areas where anticipated snow storage is planned.
 - e. Add a note on the landscape plan stating that should the existing vegetated buffer be insufficient, additional plants will be installed. There appears to be an existing landscape buffer planting along the north-east property line, shown on the landscape plan (labeled ex) but not clearly shown on other drawings in the plan set.

Respectfully submitted,



Jeffrey R. Hyland, PLA, ASLA, CLARB
Principal, Ironwood Design Group
jhyland@fewood.com
c. 603.686.0278



Ambit Engineering Abutter Research

Name	<i>Hampshire Development</i>
Address	<i>35 Badgers Island West</i>
City, State	<i>Kittery, ME</i>

Date	<i>9/8/2021</i>	Job #	<i>3050.72A</i>
Job Name	<i>Hampshire Development</i>		
Town	<i>Kittery</i>		
Research by	<i>PAD</i>		

Applicant/Owner(s)

Map	Lot	Deed	Owner (s) First/Trust	Owner(s) Last, Trustee	Mailing Address	City	State	Zip	Street Address
<i>1</i>	<i>32</i>	<i>18503/331</i>	<i>B.I.W. Group, LLC</i>		<i>41 Industrial Drive, Unit 20</i>	<i>Exeter</i>	<i>NH</i>	<i>03833</i>	<i>35 Badgers Island West</i>

Engineer		Ambit Engineering Civil Engineers & Land Surveyors		200 Griffin Road, Unit #3	Portsmouth	NH	03801
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Other Consultants

Soil Scientist		<i>Soil Science of New England</i>		<i>999 Street Name</i>	<i>City</i>	<i>AA</i>	<i>12345</i>

Abutters

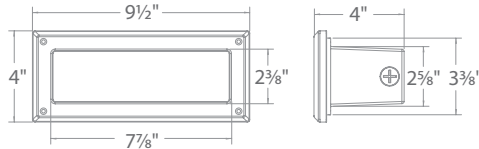
Job Name	Map	Lot	Deed	Owner (s) First/Trust	Owner(s) Last, Trustee	Mailing Address	City	State	Zip	Street Address
<i>hnpshire Developm</i>										
Job #	<i>3050.72A</i>									
<i>1</i>	<i>32</i>	<i>17123/71</i>	<i>31 Badgers LLC</i>			<i>PO Box 904</i>	<i>Kittery</i>	<i>ME</i>	<i>03904</i>	<i>31 Badgers Island West</i>
<i>1</i>	<i>33</i>	<i>14235/553</i>	<i>Badgers Landing Condominium</i>			<i>32 Badgers Island West</i>	<i>Kittery</i>	<i>ME</i>	<i>03904</i>	<i>32 Badgers Island West</i>
<i>1</i>	<i>38A</i>	<i>12162/254</i>	<i>LaPierre Properties, LLC</i>			<i>32 Route 236</i>	<i>Kittery</i>	<i>ME</i>	<i>03904</i>	<i>37 Badgers Island West</i>

OPAL BRICK LIGHTS Endurance™

WL-5105

WAC LIGHTING

Responsible Lighting®



Fixture Type:

Catalog Number:

Project:

Location:

LOCATION: Recessed into retaining wall, light facing driveway

PRODUCT DESCRIPTION

Die cast aluminum factory sealed housings with patent pending design for a water and dust proofing. IP66 rated outdoor brick light.

FEATURES

- IP66 and ETL & cETL Wet Location Listed
- ADA Compliant
- Factory-Sealed LED Light Engine
- Die-Cast Aluminum Construction (K-Alloy)
- 120V Direct Wire - No Driver Needed
- Frosted tempered glass lens for even illumination.

SPECIFICATIONS

Construction: Die-cast aluminum (K-Alloy)

Power: Line Voltage input (120V), 50/60Hz

CRI: 90

Dimming: 100% - 10% with Electronic Low Voltage (ELV) dimmer

Finish: Architectural Bronze, Black, Graphite and White

Standards: IP66, ADA, ETL & cETL Wet Location Listed

Rated Life: 80,000 hours

Operating Temperature: -40°C to 50°C (-40°F to 122°F)

ORDER NUMBER

		Power	Max Delivered Lumens	Color Temp	Finish
WL-5105-30	<i>Opal</i>	5.5W	110	3000K	ABZ <i>Architectural Bronze</i> ABK <i>Architectural Black</i> AGH <i>Architectural Graphite</i> AWT <i>Architectural White</i>

Example: **WL-5105-30-AGH**

WAC Lighting
www.waclighting.com
Phone (800) 526.2588 • Fax (800) 526.2585

Headquarters/Eastern Distribution Center
44 Harbor Park Drive • Port Washington, NY 11050
Phone (516) 515.5000 • Fax (516) 515.5050

Western Distribution Center
1750 Archibald Avenue • Ontario, CA 91760
Phone (800) 526.2588 • Fax (800) 526.2585

WAC LIGHTING

Cylinder

Wall Mount 3000K

Model	Color Temp & CRI	Lumens	Finish
WS-W190208	30 3000K - 80	260	BK Black
WS-W190212		515	BZ Bronze WT White

Example: **WS-W190208-30-BK**

FEATURES

- Multiple LED array for uniform illumination
- ACLED driverless technology
- 5 Year warranty

SPECIFICATIONS

Construction:	Die-cast aluminum
Power:	18W, 6W
Input:	120 VAC, 50/60Hz
Dimming:	ELV: 100-10%
Light Source:	Integrated LED
Lens:	Glass Lens
Rated Life:	50000 Hours
Mounting:	Installs over a 3" or 4" Junction Box, Can be mounted on wall in all orientations
Finish:	Electrostatically Powder Coated White, Bronze, Black
Operating Temp:	-40°F to 122°F (-40°C to 50°C)
Standards:	ETL, cETL, Wet Location Listed, ADA

Fixture Type: _____

Catalog Number: _____

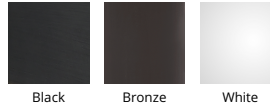
Project: _____

Location: _____

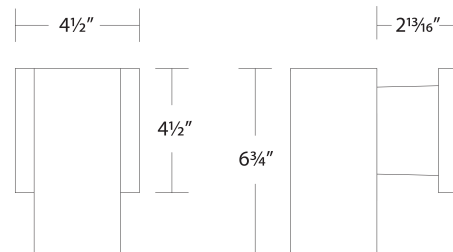
LOCATION: Surface mounted on walls at entry points (exterior doors)



FINISHES



LINE DRAWING



HAWK - model: WP-LED2

Endurance Wallpack

WAC LIGHTING

Responsible Lighting®

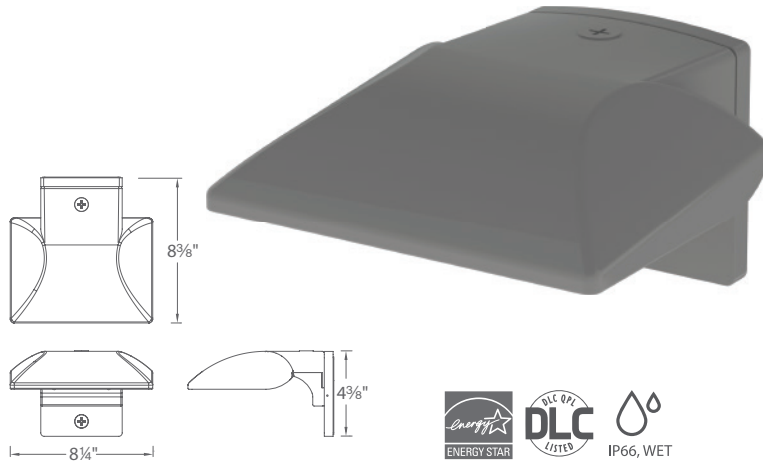
Fixture Type:

Catalog Number:

Project:

Location:

LOCATION: Above garage door entries



SPECIFICATIONS

Construction: Die-cast aluminum

Power: Integral driver in luminaire. Universal voltage input (120V-277V)

Dimming: 100% - 30% with 0 - 10V dimmer (120V - 277V)

100% - 15% with Electronic Low Voltage (ELV) dimmer (120V only)

Finish: Powder coated Bronze, Graphite, and White

Standards: Energy Star®, DLC Listed, IP66, Wet Location, ETL & cETL Listed

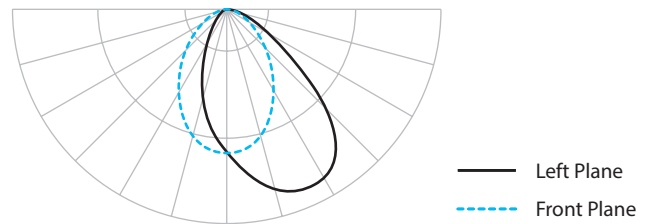
PRODUCT DESCRIPTION

Die cast aluminum factory sealed housings with patent pending design for a water and dust proof IP66 rated outdoor luminaire




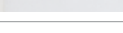
FEATURES

- Factory-Sealed LED Light Engine
- Die-Cast Aluminum Construction
- 20° Forward Throw Illumination
- Photo/Motion Sensor Compatible (Sold Separately)
- Built-in Level For Easy Adjustment
- Suitable to install in all directions
- Multi-Function Dimming: ELV (120V) or 0-10V
- 85 CRI
- 100,000 hour rated life

PHOTOMETRY




ORDER NUMBER

	Power	Comparable	Delivered Lumens		Color Temp		Finish		
			3000K	5000K	30	50	BZ	GH	WT
	WP-LED219 19W	39W HID	1345	1435	3000K	5000K	BZ	Bronze	
	WP-LED227 27W	70W HID	2050	2095	3000K	5000K	GH	Graphite	
							WT	White	


- -

Example: **WP-LED219-30-GH**

ACCESSORIES

 *Motion Sensor (120V)*

MS-120-BZ	Bronze
MS-120-GY	Gray
MS-120-WT	White

 *Photo Sensor (120V)*

PC-120-BZ	Bronze
PC-120-GY	Gray
PC-120-WT	White

WAC Lighting

www.waclighting.com

Phone (800) 526.2588 • Fax (800) 526.2585

Headquarters/Eastern Distribution Center

44 Harbor Park Drive • Port Washington, NY 11050

Phone (516) 515.5000 • Fax (516) 515.5050

Western Distribution Center

1750 Archibald Avenue • Ontario, CA 91760

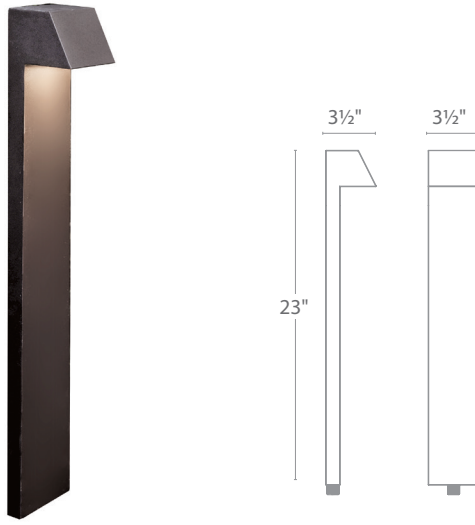
Phone (800) 526.2588 • Fax (800) 526.2585

QUAD LED PATH LIGHT

6091

WAC

LANDSCAPE LIGHTING



Fixture Type:

Catalog Number:

Project: _____

Location: _____

LOCATION: Landscape lighting at pathways

PRODUCT DESCRIPTION

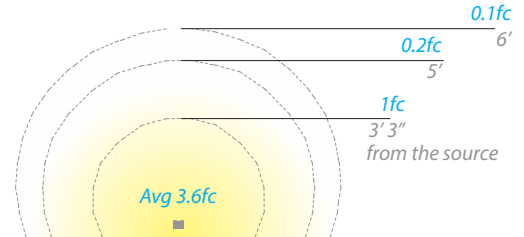
Sleek linear design blends seamlessly into pathways while providing soft, even illumination

SPECIFICATIONS

Input: 9-15VAC (Transformer is required)
Power: 3.0W / 4.5VA
Brightness: Up to 100 lm
CRI: 90
Rated Life: 60,000 hours

FEATURES

- IP66 rated, Protected against powerful water jets
- Factory sealed water tight fixtures
- Solid diecast corrosion resistant aluminum alloy
- Recommended spacing for installation: Residential 8 to 10ft; Commercial: 5 to 7ft
- Mounting stake, 6 foot lead wire, and direct burial gel filled wire nuts are included
- Maintains constant lumen output against voltage drop
- UL & cUL 1838 Listed



ORDERING NUMBER

		Color Temp	Finish
6091	<i>Quad</i>	27 2700K Warm White	BZ Bronze on Aluminum
		30 3000K Pure White	

6091-___BZ

Example: **6091-30BZ**

wacighting.com
 Phone (800) 526.2588
 Fax (800) 526.2585

Headquarters/Eastern Distribution Center
 44 Harbor Park Drive
 Port Washington, NY 11050

Central Distribution Center
 1600 Distribution Ct
 Lithia Springs, GA 30122

Western Distribution Center
 1750 Archibald Avenue
 Ontario, CA 91760

WAC Lighting retains the right to modify the design of our products at any time as part of the company's continuous improvement program.

QUAD LED PATH LIGHT

6091

WAC

LANDSCAPE LIGHTING

Surface Mount Flange/Stake



Includes three 7 inch threaded stainless steel stabilizing pins for ground mounting or surface mounts with four screws or over a junction box

5000-SCP-BZ
Bronze on Aluminum

Additional Mounting Stake



9000-ST9-BK
Durable PVC stake



Guardian Mount

*Heavy duty stainless steel spike to position fixture.
Formed from a single piece of metal*

9000-SP9-BZ
Stainless Steel

Magnetic Transformers

*Stainless Steel, 12-15V output, IP65 rated, UL 1838 listed
See transformer spec sheet for details and its accessories*

9075-TRN-SS
75W Max

9150-TRN-SS
150W Max

9300-TRN-SS
300W Max

9600-TRN-SS
600W Max



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TOWN OF KITTELY, MAINE

SEWER DEPARTMENT

200 Rogers Road, Kittery, ME 03904

Telephone: (207) 439-4646 Fax: (207) 439-2799

35 Badgers Island West
Kittery, ME 03904

April 14, 2023

RE:Sewer Availability

This letter is to confirm that the sewer system (piping and pumping stations) and the treatment facility have the capacity and ability to handle the increased flow from the project located at 35 Badgers Island West.

This letter only confirms the sewer department capacity, Impact and Entrance Fees will be calculated after the project receives all required approvals.

If you have further questions or concerns, please contact me.

Sincerely Yours

Timothy Babkirk

Timothy Babkirk
Superintendent of Sewer Services
Town of Kittery
200 Rogers Rd
Kittery ME 03904
1-207-439-4646
tbabkirk@kitteryme.org

Jason Garnham

From: Jeff Nawrocki <jeff@jsneng.com>
Sent: Tuesday, April 25, 2023 3:39 PM
To: Jason Garnham
Cc: Kearsten Metz; Kendra Amaral
Subject: RE: Thursday night Planning Board Meeting

Hi Jason,

Please pass on these comments to the board, and please let me know if you think a public comment session will occur as I would then participate.

Prior Green Pages Site – 35 Badgers Island West

We residents were shocked when we joined the Planning Board site walk and saw how huge the planned additions are. There is no reason such large and ever-permanent structures should be permitted.

Since the State enacted the 75' buffer law decades ago preventing anyone to expand more than 1/3 within the buffer in the life of the building, residents have been very restricted in what they can do. We have been turned down for many small requests. However, when the Badgers Island East marina/condo project was in planning stages, the Developer helped make a loophole that allowed unrestricted use of the buffer zone if public access was provided. First, it is important to note that each of these developments immediately puts up No Trespassing signs. Having investigated that, I learned that they all had problems with the public disrespecting the properties and numerous calls to police were made. So, likely another conversation, but this loophole has its problems in reality and likely never should have occurred. Unlike Marginal Way or Bar Harbor with mansions set well back from a walking path, these public ways are basically in the private yards with unclear rules and restrictions.

As you can imagine, residents feel very poorly treated when they can't add anything, but then these monstrous developments are allowed everything for an imaginary purpose.

During the site walk we also learned there are now two other loopholes to allow obliteration of the buffer zone. And, if only one of them is met, the Planning Board has the authority to make a completely subjective decision. Sounds like an invite to unethical behavior? My understanding is that the Developer plans to use a loophole regarding proper handling of surface water. Any large new development should have that requirement without giving the Developer whatever they want. The size of the intrusion into the buffer should be limited, and if it exceeds the State requirement then, at a minimum, the Developer should provide Public Access as it is currently written. Otherwise, what was the Public Access, with intent on connecting the island at some time, ever about?

Jeff Nawrocki and Mary Hansen
24 Badgers Island West
Kittery

Jeffrey S. Nawrocki, PE
President

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Portsmouth, NH 03801

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Phone: (603) 433-8639 Ext. 206