

August 22, 2019

Project 171.05027.008

Mr. Kevin Martin  
Compliance & Procedures Specialist  
Maine Department of Environmental Protection  
17 State House Station  
Augusta, Maine 04333-0017

RE: Response to Review Comments  
Nordic Aquafarms Inc., Land-based Aquaculture Facility  
Belfast, Maine  
L-28319-26-A-N

Dear Mr. Martin:

This letter provides responses to the Department of Environmental Protection letter from Kevin Martin to Elizabeth Ransom dated July 3, 2019. For clarity, the entire comment from the letter has been copied below and italicized. Responses are in regular text, and on the attached plans and figures as referenced below.

Natural Resources Protection Act (NRPA) application

Preamble: As discussed in individual responses below, additional assessment of site drainages and wetlands delineation was conducted by Normandeau on July 3, 2019. A Revised Wetland and Stream Survey Map is included as **Attachment A**. Changes include the elongation of streams S3 and S6, along with the expansion of wetland W15 and delineation of wetland W19. These wetland and stream updates, along with minor development alterations, are reflected in the Revised Wetland and Stream Impact Map included as **Attachment B**. Please refer specifically to these drawings to view the most updated wetland and stream mapping. An updated summary of project wetland and stream impacts is provided below in **Tables 1 through 3**. These tables supersede tables provided in the previously submitted NRPA application.

**Table 1. Freshwater Wetlands Impact Table**

Wetland ID	<sup>1</sup> Cowardin Class	<sup>2</sup> Temporary Impacts (SF)	Permanent Impacts (SF)	Impact Total (SF)	Impact Characterization
W1	PFO	0	115,674	115,674	Direct, Fill
W2	PFO	0	24,612	24,612	Direct, Fill
W3	PFO	0	5,057	5,057	Direct, Fill
W4	PFO	0	692	692	Direct, Fill
W5	PSS	0	18,672	18,672	Direct, Fill
W6	PFO	2,716	3,120	5,835	Direct, Fill
W13	PEM	0	556	556	Direct, Fill
W15	PEM	0	8,789	8,789	Direct, Fill
W16	PSS	1,245	0	1,245	Direct, Excavation
W19	PEM	0	13,217	13,217	Direct, Fill
Totals	PFO	2,716	149,154	151,870	
	PSS	1,245	18,672	19,917	
	PEM	0	22,562	22,562	
<b>Grand Total</b>	<b>All</b>	<b>3,960</b>	<b>190,389</b>	<b>194,349</b>	

- 1 Cowardin Class: PSS = Palustrine Scrub-Shrub; PFO = Palustrine Forested; PEM = Palustrine Emergent  
2 All temporary impacts will be restored in-place.

**Table 2. Coastal Wetlands Impact Table**

Coastal Zone	Wetland ID	<sup>1</sup> Cowardin Class	Pipeline Station	<sup>2</sup> Temporary Impacts (SF)	Permanent Impacts (SF)	Impact Total (SF)	Impact Characterization
Intertidal	Salt Marsh (W11)	E2EM	5+00 to 5+57	2,295	0	2,295	Direct, Excavation
Intertidal	Cobble Beach (W11)	M2US	5+57 to 5+67	486	0	486	Direct, Excavation
Intertidal	Mudflat	M2US	5+67 to 13+50	78,300	0	78,300	Direct, Excavation
Subtidal	Surf Zone	M1UB	13+50 to 32+00	185,000	0	185,000	Direct, Excavation
Subtidal	Transition Zone	M1UB	32+00 to 36+00	40,000	2,994	42,994	Direct, Excavation, Fill
Subtidal	Underwater Zone 1	M1UB	36+00 to 42+00	60,000	880	60,880	Direct, Excavation, Fill
Subtidal	Underwater Zone 2	M1UB	42+00 to 68+90	269,000	2,751	271,751	Direct, Excavation, Fill
Subtidal	Underwater Zone 3	M1UB	68+90 to 69+25	3,500	78	3,578	Direct, Excavation, Fill
Totals		E2EM		2,295	0	2,295	
		M2US		78,786	0	78,786	
		M1UB		557,500	6,703	564,203	
<b>Grand Total</b>				<b>638,580</b>	<b>6,703</b>	<b>645,283</b>	

- 1 Cowardin Class: E2EM = Estuarine Intertidal Emergent; M2US = Marine Intertidal Unconsolidated Shore; M1UB = Marine Subtidal Unconsolidated Bottom  
2 All temporary impacts will be restored in-place.

**Table 3. Streams Impact Table**

Stream ID	Flow Regime	<sup>1</sup> Temporary Impacts (LF)	Permanent Impacts (LF)	Impact Total (LF)	<sup>1</sup> Temporary Impacts (SF)	Permanent Impacts (SF)	Impact Total (SF)	Impact Characterization
S3	Intermittent	0	917	917	0	2,751	2,751	Direct, Fill
S5	Intermittent	0	472	472	0	2,832	2,832	Direct, Fill
S6	Intermittent	0	474	474	0	1,422	1,422	Direct, Fill
S8	Intermittent	13	0	13	65	0	65	Direct, Fill
S9	Intermittent	107	0	107	428	0	428	Direct, Excavation, Fill
<b>Grand Total</b>		<b>120</b>	<b>1,863</b>	<b>1,983</b>	<b>493</b>	<b>7,005</b>	<b>7,498</b>	

- 1 All temporary impacts will be restored in-place.

Mr. Kevin Martin  
Maine Department of Environmental Protection

1. Nordic states that the proposed project would result in 144,000 square feet of permanent alteration to the coastal wetland and 108,000 square feet of temporary alteration of the coastal wetland (Attachment 9, page 21). Further breakdown these impact numbers to explain how much of the alteration would occur to intertidal area and subtidal area and by using the Cowardin classification system for wetlands and deepwater habitats.

Impacts to coastal wetlands have been revised and classified in accordance with the Cowardin System and are presented in **Table 2** above. The impacts have been calculated using the width and length of construction easement for temporary impacts and the footprint of the permanent structures (pipe anchors) on top of the sediment in Belfast Bay for permanent impacts requiring compensation, as presented in the August 13, 2019 Anchoring Requirements for Submerged Pipelines Memorandum (**Attachment C**). The temporary areas include the salt marsh, cobble beach, intertidal and subtidal areas where the pipes will be buried. The permanent impact area is the subtidal portions of the proposed intake and discharge anchoring structures at the point where the pipeline is exposed on the bottom of Belfast Bay to the point of termination in Belfast Bay. Cowardin class for intertidal and subtidal areas were designated based on Mean Low Water elevation -5.4 ft. (NAVD 88) and Mean High Water elevation +4.8 ft. (NAVD 88). The transition from buried to surface pipes is at Station 32+00 for discharge and intake pipes. The discharge pipe terminates at Station 42+00. See the Intake & Discharge Engineering Drawings for details (**Attachment C**).

2. For the proposed work associated with coffer dam system installation and placement of the pipe anchors, please provide the square footage of proposed permanent and temporary impact to the coastal wetland and the Tidal Waterfowl and Wading Bird Habitat.

Within the designated Tidal Waterfowl and Wading Bird Habitat (TWWH) area (**Attachment D**) the pipe will be entirely buried, resulting in only temporary impacts associated with construction activities. The pipe trench will be backfilled with excavated material, and the construction area returned to its original profile, with excess excavated material removed from the site. No pipe anchors are needed where the pipe is buried. During construction, all disturbance, including the coffer dam used to transition the pipe from the upland area to the tidal mudflat, will be contained to an average 100 ft wide construction easement. The coffer dam will be used within the 40 ft easement on the Eckrote property. The area impacted by the coffer dam will be returned to its original condition, as described for the pipe trench area; see the updated Compensation Plan drawings for more details (**Attachment E**, Sheet 2). The expected temporary impacts to the coastal wetland have been presented above in **Table 2**; the expected impacts to the TWWH are listed by wetland type in **Table 4** below.

<b>Table 4. Area of Temporary Construction Disturbance in TWWH, by Wetland Type, within the 100 ft Construction Footprint Width</b>		
<b>*Wetland Type</b>	<b>Pipe Length (ft)</b>	<b>Maximum Area of Construction Disturbance (ft<sup>2</sup>)</b>
Intertidal Salt Marsh (E2EM)	57	5,700
Intertidal Cobble Beach (M2US)	10	1,000
Intertidal Mudflat (M2US)	783	78,300
Subtidal (M1UB)	420	42,000
Total	1,270	127,000

Mr. Kevin Martin  
 Maine Department of Environmental Protection

\*E2EM = Estuarine, Intertidal, Emergent; M2US= Marine, Intertidal, Unconsolidated Shore, M1UB= Marine, Subtidal, Unconsolidated Bottom, M2RS = Marine, Intertidal, Rocky Shore

3. Nordic states that the proposed project would result in 144,000 square feet of permanent alteration to the coastal wetland (Attachment 9, page 21). The compensation plan (Attachment 13, page 13) proposes to compensate for 2,611 square feet of the permanent alteration to the coastal wetland. Please revise the compensation plan to compensate for the remaining 141,389 square feet of permanent alteration, or, if no additional compensation is proposed, please explain why.

Proposed compensation has been outlined in the original permit application. Additional impacts resulting from changes in stream designation, revised freshwater wetland boundaries and revised coastal wetland impacts are proposed to be compensated for via the In-Lieu-Fee program.

**Table 5** and the calculations below summarize the compensation plan for all impacts.

**Table 5. On-Site Stream Compensation**

Compensation Area	Functions and Values Provided	Compensation Amount	Compensation Ratio	Total Compensated
Riparian Restoration	-Wildlife Habitat -Improved QHEI Scores* -Visual Quality**	2.05 acre	2:1	1.025 acre
Deeded Riparian Buffer	-Wildlife Habitat	4.77 acre	8:1	0.596 acre
Aquatic Passage Improvements	-Wildlife Habitat -Flood flow Alteration*** -Improved QHEI Scores*	0.014 acre	2:1	0.007 acre
<b>Totals</b>				<b>1.628 acre</b>

\* Refer to the question #6 response for more information on the QHEI score.

\*\* This is an added value provided through restoration plantings; refer to the question #6 response for details.

\*\*\* Floodflow alteration as it relates to S9 will continue to be provided under proposed conditions.

To compensate for freshwater and coastal wetland impacts not compensated for through on-site restoration, the project will pay into the in-lieu-fee program as calculated below using the following formula:

$$(\text{Direct wetland impact [sq. ft.] x (Natural resource enhancement \& restoration cost per sq. ft. + Average assessed land valuation per sq. ft.)}) \times (\text{Resource multiplier})$$

The natural resource enhancement and restoration cost for Waldo County is \$3.61 per sq. ft. and the average assessed land value is \$0.09 per sq. ft. The resource multiplier for coastal wetlands and wetlands of special significance is 2. All other resources are set at a multiplier of 1.

Mr. Kevin Martin  
Maine Department of Environmental Protection

Coastal Wetlands:

These are the permanent sq. ft. impacts from the pipe anchors in the subtidal area. We have assumed the restore-in-place temporary coastal wetland impacts do not require compensation beyond the restoration of these areas.

$$(6,703 \times (\$3.61 + \$0.09)) \times (2) = \$49,602.20$$

Freshwater Wetlands:

These impacts are totaled from the sq. ft. of permanent impacts to freshwater wetlands and streams minus the on-site compensation number of 70,916 sq. ft. (1.628 acres). We have assumed that all restore-in-place temporary impacts, including wetlands of special significance, do not require compensation beyond the restoration of these areas.

$$((190,389 - 70,916) \times (\$3.61 + \$0.09)) \times (1) = \$442,050.10$$

Total Compensation: \$491,652.30

4. *There are conflicting values of coastal impacts across a few sections of the NRPA application that should be reconciled. Specifically, see the proposed coastal impacts stated on Appendix B (Attachment 0, page 55), compared with the coastal wetland impacts stated in Attachment 1, in Attachment 9 on page 21, and in Attachment 13 on page 13.*

Impact values have been revised to address the conflicts in coastal impact numbers and to address changes in NRPA jurisdictional streams and revised wetland boundaries. A summary of all project-related impacts to freshwater wetlands, streams, and coastal wetlands is presented in **Tables 1 through 3** above.

5. *Please provide additional description of on-site techniques that were and will be considered to avoid and minimize natural resource impacts, including, but not limited to, different building locations or configurations, minimum widths of driveways, and numbers of parking spaces.*

The number of parking spaces were based on Nordic's projected employee count (100) and Belfast's requirement for 1.2 spaces per employee. The 120 spaces included 8 paved spaces at the WWTP, and 2 paved at the existing Building 10. With a current understanding of how employee shifts will work at the facility, this has been revised to accommodate a projected 85 employees. This reduces the number of parking spaces to 105 spaces, as shown on updated engineering drawings CP101-CP107 included as **Attachment F**. Although more expensive and difficult to maintain than typical asphalt, 46 spaces will be constructed with pervious pavement to reduce natural resource impacts.

The driveways allow for two-way traffic to provide best function of the facility, although the drives are not sized to be generous on space. City of Belfast requirements are 25-foot width for two-way driveways and 26-foot width for 2-way driveways with parking. The facility driveways are 25 feet wide and include a striped 3-foot wide pedestrian zone, and also include parking. Most municipal standards for parking are for 24 feet, which the project will satisfy by utilizing

Mr. Kevin Martin  
Maine Department of Environmental Protection

the pedestrian zone for car maneuvering in and out of spaces. This design minimizes pavement and total site disturbance while allowing for site functionality. In addition, the driveway located south of Building 2 will be constructed with a half lane of pervious pavement. See updated engineering drawings CP101-CP107 for details (**Attachment F**).

Multiple potential building layouts were considered for the facility, but due to the size of the RAS tanks in the grow-out buildings, and the need to maintain adequate buffers and stormwater protection for the site, limited options were possible that accommodate the six planned modules. The design presented in the application provides a compact and efficient layout that maximizes site buffers, preserves S9, and minimizes impacts to other site wetlands.

*6. Please provide additional information that demonstrates why and how the proposed compensation plan would offset the lost functions and values of the impacted streams. For instance, the narrative should evaluate and compare the functions and values that would be lost by the proposed alteration of on-site streams (labeled as S3, S5, and S6) versus the functions and values that would be gained by the proposed restoration and preservation of stream S9 and the proposed culvert replacement at stream S8.*

Normandeau has completed a Stream Assessment Report for the project site which has been included as **Attachment G**. This Stream Assessment Report includes a Qualitative Habitat Evaluation Index (QHEI). A Functions and Values Assessment (FVA) of site streams was previously completed and incorporated into the May 8, 2019 Natural Resources Report (page 8, Table 3) submitted as part of the original NRPA application. Please refer to these specific reports for details on the methodologies and results of the assessments.

The permanent impacts being proposed to the upper reaches of S3, S5, and S6 are being offset by installing a drainage system that will route clean groundwater to the streams to prevent drying while also controlling flows with a weir system that will prevent erosion. This will compensate for the potential loss of groundwater recharge discharge and flood flow alteration, which were identified as functions during the FVA. Additionally, these streams showed “none” to “moderate” erosion during the QHEI portion of the Stream Assessment. The drainage system will maintain stream quality by preventing possible further erosion.

The culvert crossing at S9 located between wetlands W8 and W9 will be constructed using a natural bottom culvert in order to avoid impacts to the streambed and allow it to continue to naturally manage floodflow during storm events. This will maintain the floodflow alteration function of S9, previously identified during the FVA. Additionally, the use of the open bottom culvert will maintain the natural substrate of the streambed, and not negatively impact the substrate value it was given during the QHEI. Additionally, by utilizing a wide culvert span and maintaining existing, natural flows, this culvert crossing will not have a negative impact on the streams channel morphology, bank erosion or pool/glide and riffle/run quality, as these parameters were evaluated during the QHEI.

The impact Compensation Plan proposes riparian buffer restoration around the length of S9. The three sampling reaches of S9 (S9a, S9b, S9c) generally scored low when evaluating their respective riparian zones during the QHEI. S9a scored “narrow,” S9b scored “none,” and S9c scored “moderate.” The riparian buffer restoration is focused around S9a and S9b, which increase the quality and width of the riparian zone, improving their QHEI scores. Additionally, the buffer

Mr. Kevin Martin  
 Maine Department of Environmental Protection

restoration and proposed stream plantings will enhance the instream cover parameter by providing overhanging vegetation to the stream, which is all but entirely absent in S9b. These plantings will also improve or maintain bank erosion control and riparian zone quality. The Deeded Riparian Buffer protects S9 and the protection and improvements to S9 will result in increasing the QHEI values for some metrics of these portions of S9.

The table below summarizes the expected improvement in QHEI scores for the portions of S9 benefitting from the buffer restoration:

**Table 6.**

Stream Reach	Current QHEI Instream Cover	Expected QHEI Instream Cover	Current QHEI Bank Erosion & Riparian Zone	Expected QHEI Bank Erosion & Riparian Zone	Current Total QHEI	Expected Total QHEI
S9a	3	3	7	8	39	40
S9b	4	6	4	6	17	21

In addition to improving the QHEI scores for S9a and S9b with the buffer restoration and stream plantings, the corrugated pipe culverts currently on S8 under the driveway at 282 Northport Road will be removed and replaced with an improved structure for aquatic passage. This will improve substrate quality in this location, as a minimum of 12 inches of natural streambed material will be placed on top of the existing substrate. The culvert upgrade will also enhance aquatic passage through the stream corridor between the lower and middle sections of S8. Additionally, by introducing a riparian buffer to S9b and enhancing the buffer to S9a, this will also enhance wildlife movement throughout the upper reaches of the stream by providing shelter to migrating wildlife, which is currently nonexistent in S9b.

Overall, the proposed natural resources impact compensation plan will improve the quality and value of onsite streams by enhancing or maintaining critical stream characteristics such as cover, riparian buffer width and quality, floodflow alteration, erosion control, habitat connectivity and visual quality.

*7. The Department visited the site of the proposed project on May 17, 2019. (See the attached site visit summary.) Based on the Department’s observations, Drainages D3, D5, and D6 appear to be channels between defined banks that exhibit two or more characteristics of a stream as defined in 38 M.R.S. §480-B(9). For this reason, the Department requests that additional site surveys of these areas be conducted, with the total amount of proposed stream alteration re-assessed and quantified in linear feet and in square feet.*

Normandeau visited the site with representatives of ME DEP and Ransom Consulting on July 3, 2019 to view the site drainages. Additional mapping of site drainages and wetlands delineation was conducted by Normandeau on July 3, 2019. Drainages D3, D5 and D6 have been converted to S3, S5 and S6, respectively. Revisions to the classification of these drainages are reflected on the revised Wetland and Stream Survey map (**Attachment A**) and included in **Table 3** above.

The linear feet of stream impacts have been re-assessed based on GPS mapping of the streams on July 19, 2019 and the subsequent changes to D3, D5 and D6. To assess square feet of stream

Mr. Kevin Martin  
Maine Department of Environmental Protection

impacts each bank of each stream was GPS located on July 19, 2019. These impacts are noted in **Table 3** above.

8. *Based on the Department's observations at its May 17, 2019, site visit and given that the functions and values for the streams as outlined in the application are wetland-oriented, the Department requests that the applicant submit a qualitative assessment that includes an evaluation of all physical and biological parameters of each stream. The Department further requests that components and scoring techniques of a Qualitative Habitat Evaluation Index or similar evaluation method be incorporated into the qualitative assessment.*

A qualitative assessment of all site streams was conducted on July 19-22, 2019, using the Qualitative Habitat Evaluation Index, concurrent with additional mapping of site drainages and wetlands delineation. Results of this assessment are included in the attached Stream Assessment Report, dated July 29, 2019 (**Attachment G**). In summary the QHEI found that overall the streams scored low. The streams exhibited low invertebrate diversity, largely due to minimal water, and low quality silty substrate and the streams do not have characteristics conducive to providing fish habitat due to either intermittent flows or no potential connection to known downstream fish habitat, low dissolved oxygen, and poor substrate quality. The streams assessed received QHEI scores between 18 and 42 out of 100, and corresponding Index of Biotic Integrity (IBI) ratings were between poor and very poor.

9. *Please submit wetland determination data forms for all on-site wetlands. Only data forms for wetlands W1, W5, W10, and W11 have been included in the NRPA application to date (Attachment 12, Appendix A). In addition, the topography and vegetation observed in Wetland W15 by the Department at its May 17, 2019, site visit indicates that Wetland W15 may be greater in size than originally delineated by the applicant. Please provide any additional information you may have supporting this delineation. Further, observations from the Department's site visit suggest that Wetland W1 is a wet meadow freshwater wetland and a forested freshwater wetland, as compared to the applicant's wetland determination data form for Wetland W1, which states that this wetland is a forested freshwater wetland. Please confirm whether the Wetland W1 data form accurately states the appropriate wetland classification for Wetland W1, and that the location of the Army Corps Data Plot points are correctly depicted on the plan titled "Belfast Aquaculture Project Wetland and Stream Survey," which is found in the natural resources report, titled "Natural Resources Report," prepared by Normandeau Associates and dated May 8, 2019.*

**Data Forms:** Data forms have been compiled and are included in **Attachment H**. The compilation includes forms for W1 and W14 (2 transects, 4 plots to document the wet meadow and forested area, all of which is labeled as W1 on the survey plan, which is explained below), W5, W10, W11 (wetland plot only for W11 as the adjacent area is wetland and documented by the plots completed in W10), W15 and W19. Data forms were initially intended to represent each wetland type encountered (forested, wet meadow, etc.) on each of the three properties delineated. Therefore, forms were not completed for all wetlands.

**W15:** Field data indicates that wetlands on the Perkins property were delineated during a dry year (2018). In 2019 spring rainfall was high. Wet meadows are particularly prone to rapid expansion into transition zones during wet years, especially those consisting predominately of *Calamagrostis canadensis*. A revision to the wetland delineation extending W15 and adding a

Mr. Kevin Martin  
Maine Department of Environmental Protection

wetland finger to S10 (W19), are shown on the Revised Wetland and Stream Survey dated July 26, 2019 (**Attachment A**). The data forms for W15, and W19 are also attached (**Attachment H**).

**W1 versus W14:** Wetland delineations occurred over the course of time as additional lands were incorporated into the project site. The first to be delineated was the Water District property. The second was the Eckrote property and the third was the Perkins property. The dates of the delineations are shown on the map titled Revised Wetland and Stream Survey (**Attachment A**). W1 was the first wetland to be delineated on the Water District property on May 3 and 4, 2018. On July 24, 2018 the Eckrote property was delineated and the numbering sequence picked up where we left off at number 10 (W10). When the Perkins property became available the wetlands were delineated on August 27-28, 2018, again picking up the numbers where we left off at number 13 (W13). Once all wetlands were delineated W1 and W14 were determined to be contiguous, were joined, and the number W14 was eliminated with the area becoming part of W1. As noted in the Natural Resources Report dated May 8, 2019 (Page 4, Paragraph 4) W1=W14. Attached (**Attachment H**) is the data form for W14, the plots for which are shown on the Revised Wetland and Stream Survey map in the wet meadow area of W1.

*10. Please submit a schedule for implementation of the proposed culvert replacement at Stream S8 in accordance with the Department's Wetlands and Waterbodies Rules, Chapter 310 § 6(H).*

The proposed culvert replacement at Stream S8, assuming property owner approval, would be conducted during November to April work window or subsequent periods of low flow conditions. Culvert construction is planned for the same mobilization as the pipeline construction to reduce potential impacts to natural resources.

*11. Please provide a separate, more detailed planting plan for the entire length of proposed restoration area at stream S9. The information provided appears to be more of a landscaping plan than a restoration plan.*

The planting plan for the Stream S9 restoration areas has been revised and is attached (**Attachment E**). It includes a set of four sheets: Sheet 1 shows the deeded buffer, Sheet 2 shows the specifications for all aspects of restoration (restore in place impacts and riparian restoration areas) and, Sheet 3 shows cross sections for restore in place areas for the sewer force main and Rte.1 by-pass. Sheet 4 provides details for planting and seeding.

*12. Please provide a copy of the missing planting plan for Area A1 to insert among the other area planting plans in Attachment 13 of the NRPA application.*

Drawing LP101a (Area A1) was not included as an appendix to the Compensation Plan because LP101a only references "restoration area" polygons which refers to the Compensation Plans (**Attachment E**). For a clearer distinction between the restoration plantings and general landscaping, project landscaping plans (LP#### plans) have been updated to remove call outs on restoration area plantings and include notes to refer to separate restoration area plans for details. Updated landscaping plans (LP101, LP101a, LP102, LP107, and LP501) have been included as **Attachment I**.

Mr. Kevin Martin  
Maine Department of Environmental Protection

*13. Please submit cross sectional plans that depict all grading changes that are necessary to implement the proposed restoration at stream S9.*

Cross sections of existing conditions at the temporary crossings of S9 have been developed (**Attachment E**, Sheet 3). Cross sections are provided for the sewer crossing of S9 and the Route 1 by-pass crossing of S9. The existing condition cross sections will be used to restore these areas to original grade once the sewer line is installed and the by-pass is removed. Additional grading changes for restoration planting are not planned.

*14. Please provide draft deed restriction language that would protect the proposed restoration and preservation areas at stream S9 in perpetuity.*

Drafts of the deed restrictions for the two properties included in the Stream S9 restoration are included as **Attachment J**.

*15. Please confirm whether the total amount of proposed freshwater wetland alteration includes the 2,000 square feet of alteration associated with NRPA Permit-by-Rule #67077.*

Based on the proposed development layout, the 2,000 square feet of freshwater wetland alteration associated with NRPA Permit-by-Rule #67077 will be permanently impacted by the development and have been included in permanent impact numbers.

*16. On Drawing CS101, there are two areas that are labeled as “shoreline stabilization.” Similarly, there is one area labeled as “shoreline stabilization” on Drawing CS103. Please indicate whether these shoreline stabilization areas are existing or proposed, and, if proposed, submit the necessary NRPA application materials.*

The two areas referenced on Drawings CS101 and CS103 as “shoreline stabilization” are for existing areas of stabilization not associated with the proposed project.

#### Site Location of Development Act (Site Law) application

*1. Please confirm Nordic is seeking NRPA and Site Law approval for all phases and the full buildout of this parcel, and not just portions of the phasing. (Section 1.3, Construction Plan.)*

Yes, Nordic is seeking NRPA and Site Law approval for all phases and the full buildout of this parcel, and not just portions of the phasing.

*2. Please identify and submit representative application materials for any off-site anchor prefabrication/pipe assembly locations. Specifically, if off-site staging areas would be created with new disturbed areas and impervious areas, additional details are needed. Any other applicable Site Law criteria such as noise control, hours of construction, use of concrete batch plants, etc., at these off-site locations should also be submitted. (Section 1.3.1, Construction, page 9.)*

In preparation and planning for the proposed development, the construction phasing has been laid out so that a storage and laydown space on site can be used. This location is clearly identified on the permit application drawings CE110-CE118. If site contractors require staging of materials or

Mr. Kevin Martin  
 Maine Department of Environmental Protection

fabrication offsite, it will be done at commercial facilities that are currently utilized and permitted for such uses.

For offsite marine activities, the contractor will be utilizing an existing marine facility already permitted and in operation for similar services (loading/unloading of barges, storage of materials). The final location for marine activities has not been selected yet, as competitive pricing closer to the time of construction will determine the final location.

3. *Chapter 373 of the Site Law Rules requires an applicant to demonstrate financial capacity to design, construct, operate, and maintain a proposed development. The financial capacity information contained in the application focuses on design and construction of the development. Please provide financial capacity information for operation and maintenance of the facility. (Section 3.)*

The original application material focused on the financial capacity of the project. The Board of Nordic Aquafarms AS expects continued equity contributions from the current investors as discussed in Appendix 3-A of the Site Law application. The project and start-up of operations and maintenance will be funded by the sources shown here. Finally, cash flow from operations will sustain the ongoing operation post construction and initial start-up.

Estimated Funding by Source	Equity	Debt	CF	Total
<b>Total Project Combined</b>	<b>40%</b>	<b>50%</b>	<b>10%</b>	<b>100%</b>
<b>Initial Working Capital for Ops and Mtc</b>	<b>50%</b>	<b>50%</b>	<b>0%</b>	<b>100%</b>
<b>Ongoing Support for Ops and Mtc</b>			<b>100%</b>	<b>100%</b>

4. *In Table 2 of the Noise Impact Assessment, calculated numeric values should be submitted from the CadnaA computer sound model results for each of the protected locations, instead of a statement that the sound levels will be less than applicable noise standards. (Section 5 Noise.)*

A revised Table 2 including the calculated numeric values has been included as **Attachment K**.

5. *Please clarify that any construction activities occurring between 7:00 pm and 7:00 am would meet the noise control provisions of Site Law Rule Chapter 375(10)(C)(2). Additionally, please clarify whether any nighttime construction activities would occur on the water. If construction activities for pipe installation that would occur on the water would take place during nighttime hours, please provide noise assessment data for those activities. (Section 5 Noise.)*

All construction on site will comply with the noise control provisions of Site Law Rule Chapter 375(10)(C)(2). In addition, no nighttime construction between 7:00 pm and 7:00 am is planned to take place on the water.

6. *Please clarify whether the Visual Impact Assessment addresses just the NRPA Chapter 315 scenic standards, or both Chapter 315 and the applicable Site Law statutory and regulatory standards. (Section 6 Visual Quality and Scenic Character.)*

Mr. Kevin Martin  
Maine Department of Environmental Protection

The Visual Impact Assessment addresses the NRPA Chapter 315 scenic standards and the applicable Site Law statutory and regulatory standards.

*7. Special measures for summer construction are provided in the sediment control section of the application. Similar measures for winter, spring and fall construction should be included, as well, specifying measures to be taken during conditions that would be anticipated to occur. (Section 14.7 Soil Erosion and Sediment Control Best Management Practices.)*

The reference in the original text to summer construction is a recognition that summer conditions pose challenges that are not covered by basic soil erosion and sediment control measures that are typically deployed for control of stormwater runoff from exposed areas during more “standard” year-round rain events (i.e. more intense, short duration storms and dry conditions that produce detrimental dust conditions). It is acknowledged that winter construction also has specific challenges and a section has been added to the attached revised narrative to cover this (**Attachment L**). This section also covers fall preparations for winter conditions and preparations for the end of winter Spring thaw. The prevailing climate in Maine during the remainder of the year (late Spring and early Fall) are considered “average” and are generally typified by an absence of extreme or unusual weather conditions. Erosion control measures during these periods are covered by the original narrative.

*8. Please describe how turbid runoff would be treated during construction. Silty loam soils on site could create turbid water conditions in the temporary sedimentation basins. Even with the 80,000-sf limit of disturbed soils, heavy rain or snow events could produce significant amounts of turbid runoff, with little additional treatment room available between the developed area, the 250-foot area retained by the City, and the Little River. Please provide additional information about: designing the temporary sedimentation basins for greater than a 10-year storm; describing how turbid flow discharging out of the temporary sedimentation basins via the risers/outlet pipes would be treated before discharge; and modeling the temporary sedimentation basins so they do not drain completely between rain events. Proposed measures to treat turbidity should be submitted, including during winter construction activities. (Section 14 Basic Standards.)*

It is acknowledged that any exposure of native soil materials in the contributing construction area could potentially create turbid water conditions in the temporary sediment basins. These Best Management Practices (BMPs) have been designed in accordance with good engineering practice, and in accordance with the applicable regulations and standards to remove suspended sediments from construction runoff, and hence minimize the discharge of turbid water to downstream receiving waters. It should be noted that the aim of the design is to *reduce and minimize* turbidity in runoff from the site and not to completely eliminate it under all conditions.

Sediment erosion and transport in drainageways is a natural morphological process that is essential to maintaining many features in the physical landscape. For example, turbid runoff was observed in the site drainageways during snowmelt conditions in March 2019 (see photograph above). This was not associated with precipitation or construction activity and is a natural



Mr. Kevin Martin  
Maine Department of Environmental Protection

condition. The goal of the design is to prevent excessive amounts of sediment from leaving the site and causing significant detrimental impacts during construction.

Clear standards for the design of sediment basins and other similar impoundments is contained within the United States Environmental Protection Agency (U.S. EPA) National Pollutant Discharge Elimination System General Permit for Discharges from Construction Activities (as modified). The U.S. EPA authorized the State of Maine Department of Environmental Protection to administer NPDES program in most areas of the State and the State has produced its own version of this document (MPDES Construction General Permit). However, the State administered document provides no clear guidance on the design of sediment basins. The Maine Erosion and Sediment Control BMPs Manual for Designers and Engineers gives design guidance for the use of permanent stormwater basins as sediment basins only. Therefore, the governing national (U.S. EPA) document is referenced for design guidance. Section 2.2 of the U.S. EPA General Permit is entitled **Erosion and Sediment Control Requirements** and includes the following subsection:

***“2.2.12 If you install a sediment basin or similar impoundment:***

*Situate the basin or impoundment outside of any water of the U.S. and any natural buffers established under Part 2.2.1;*

- a. Design the basin or impoundment to avoid collecting water from wetlands;
- b. Design the basin or impoundment to provide storage for either:
  - i. The calculated volume of runoff from a 2-year, 24-hour storm (see Appendix H); or
  - ii. 3,600 cubic feet per acre drained.
- c. Utilize outlet structures that withdraw water from the surface of the sediment basin or
- d. similar impoundment, unless infeasible;<sup>25</sup>
- e. Use erosion controls and velocity dissipation devices to prevent erosion at inlets and outlets; and
- f. Remove accumulated sediment to maintain at least one-half of the design capacity and conduct all other appropriate maintenance to ensure the basin or impoundment remains in effective operating condition.” (bold text added).

The design requirement for sediment basins to meet the requirements of the U.S. EPA (NPDES) General Permit for Construction Activity, as stated above is that they should be sized to provide storage for the **2-year 24-hour storm event**. This is a design storm event with a statistical probability of 50% of occurring in any given year. The reason for the selection of the 2-year 24-hour design storm event, as explained by U.S. EPA staff to the designer was in tacit recognition that designing temporary sediment basins for larger storm events would not be practically feasible on the majority of construction sites, and thus would place an undue burden on applicants attempting to comply with the General Permit.

For this project, in recognition of the sensitivity of abutting natural resources and downstream receiving waters, the design of the basins has been undertaken to provide storage and filtrations of the **10-year 24-hour storm event** (10% probability of occurrence in any given year). This

Mr. Kevin Martin  
Maine Department of Environmental Protection

effectively reduces the risk of exceedance of the design criteria by **five times**, when compared to the applicable design standard. It is not practically feasible to provide greater storage capacity than this and allow discharge from the basins via the treatment benches. In the event of rainfall greater than the 10-yr 24-hour storm event some runoff will inevitably discharge via the basin primary outlet risers. However, the basins have been designed in accordance with good engineering practice, maximizing the flow paths between inlets and outlets and discharging from the surface of the basin to minimize any turbidity in the outflow. Furthermore, the construction method includes numerous upstream soil erosion and sediment control measures that are specifically designed to reduce the potential for soil exposure and sediment transport. These include the provision of diversion BMPs, the addition of geotextile fabric and granular borrow over exposed subgrades, and the installation of edge drains). It is our opinion that the combination of these measures provides the best available and practically feasible treatment of construction runoff, in accordance with the applicable regulatory requirements and good engineering practice.

In theory it would be possible to add some type of filtration device to the primary outlet to further reduce any potential suspended sediments in runoff discharging via the riser pipes. However, this would also reduce the peak outflow through the primary outlet, leading to earlier discharge over the emergency overflow weir, and hence in our opinion would provide no significant overall benefit.

All of the basins have been modeled to accept and treat the design storm event with the basin starting elevation set at the bench drain outlet (i.e. the model considers the basins to be full to the bench drain prior to occurrence of any storm event). Please see the HydroCAD model and previously provided runoff and routing output results for details.

In the event that unusual winter conditions temporarily prevent outflow from the basins through the bench drains, temporary dirt bags will be deployed to assist with dewatering. However, it is unlikely that this condition will endure during conditions where unfrozen precipitation is falling or anticipated. Inspections and frequent maintenance of the bench drains will be required to maintain the function of the outlets.

*9. With regard to Drawing CP105, please describe the purpose of the proposed gravel access driveway in the upper left portion of the drawing, near the west end of Building 1. Could it be removed or relocated outside of the wetland to reduce impacts?*

The additional gravel access driveway can be removed. A revised drawing CP105 is included as **Attachment F**.

*10. Please review and respond accordingly to the attached stormwater management technical review memorandum dated June 25, 2019.*

The response to the June 25, 2019 technical review memorandum is provided as a separate memo that was submitted on August 12, 2019.

Mr. Kevin Martin  
Maine Department of Environmental Protection

Please see the grading plans in **Attachment M** that include spot elevations for the plunge pools, which were inadvertently left off from the plan set provided with the technical memorandum responses.

*11. Please submit the electronic files of the HydroCAD model for the following areas:*

- a. The temporary sediment basin sizing model in Appendix 14-A.*
- b. The pre-development conditions model in Appendix 12-D.*
- c. The post-development conditions model in Appendix 12-E.*

The pre-and post-development conditions models and sediment basin sizing model, as revised by the comments above, are provided with the electronic submission of this letter and on a pen drive accompanying the hard copy of this letter.

Please contact me with any questions or comments.

Sincerely,

RANSOM CONSULTING, INC.

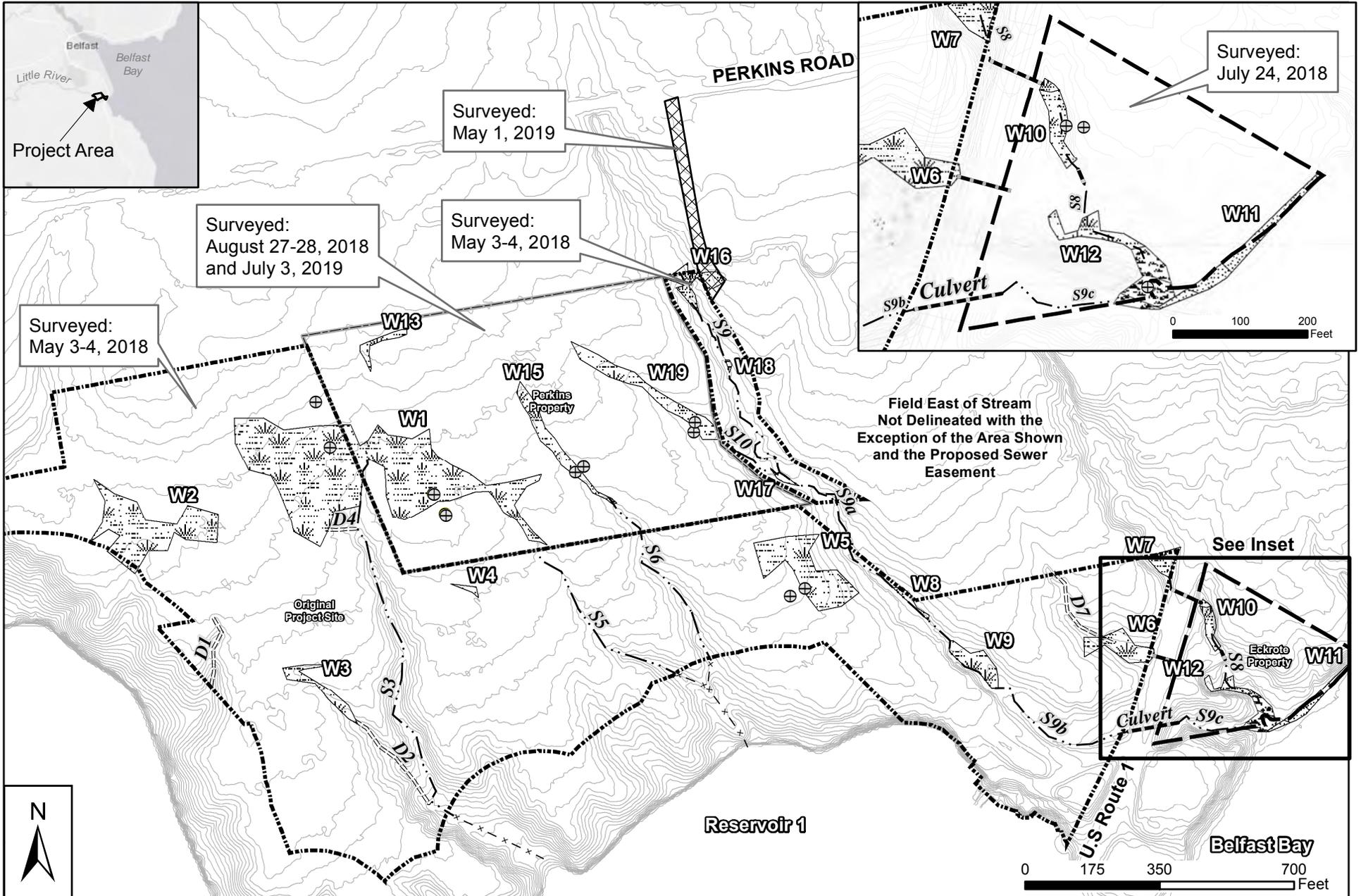
Elizabeth M. Ransom, P.G.  
Senior Project Manager

EMR:jar

**ATTACHMENT A**

Revised Wetland and Stream Survey Map

Response to Review Comments  
Nordic Aquafarms Inc., Land-based Aquaculture Facility  
Belfast, Maine  
L-28319-26-A-N



**Belfast Aquaculture Project**  
**Revised Wetland and Stream Survey**  
**Date: August 14, 2019**

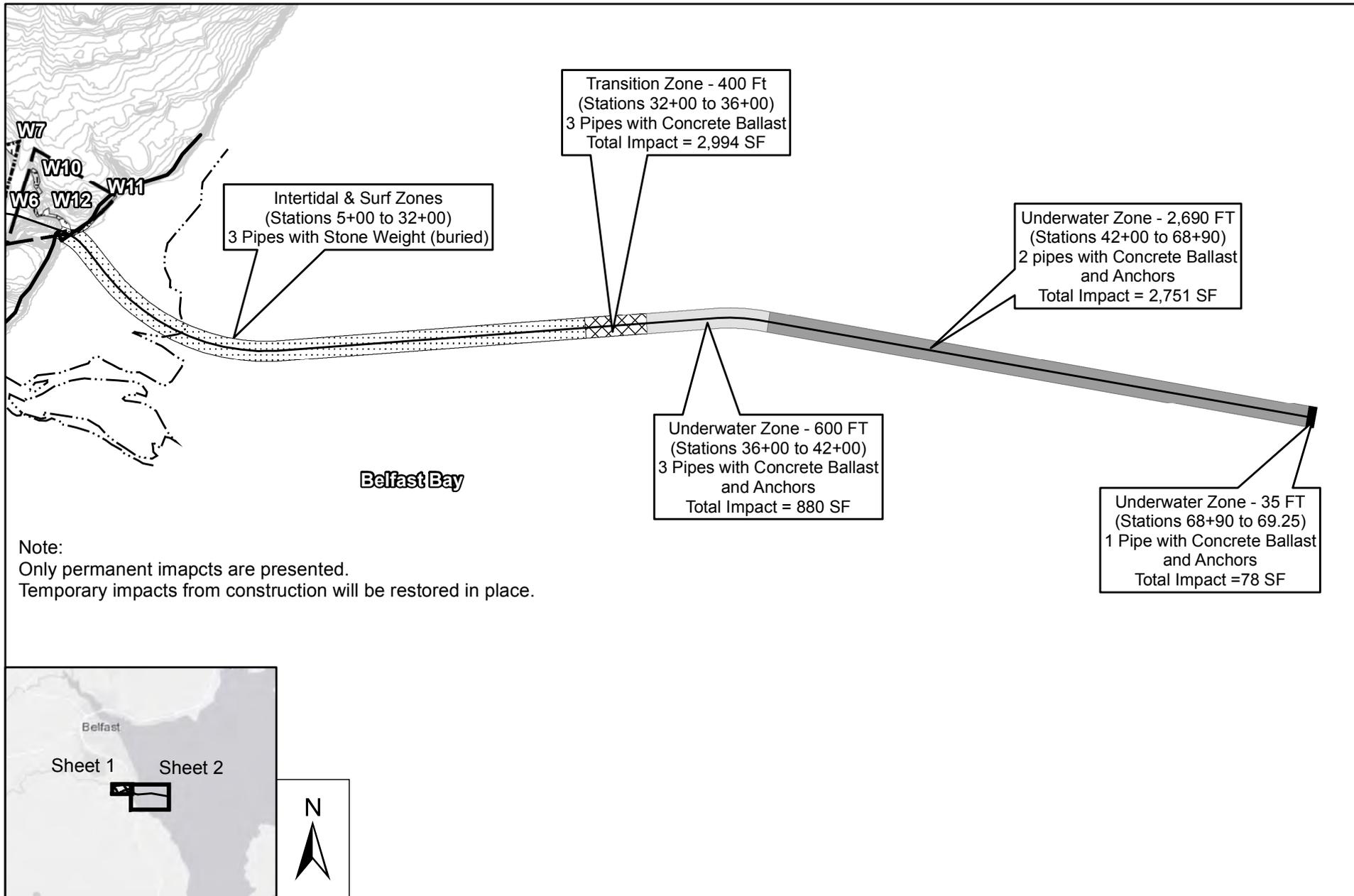
<b>Wetland Survey Date</b>	Existing Culvert	Palustrine Wetlands
May 3-4, 2018	Intermittent Stream	Salt Marsh
July 24, 2018	Drainage	Cobble Beach
August 27-28, 2018 and July 3, 2019	Stream Not Field Delineated	2 Foot Contours
May 1, 2019		Army Corps Data Plot



**ATTACHMENT B**

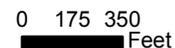
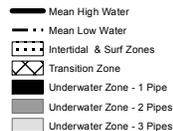
Revised Wetland and Stream Impact Map

Response to Review Comments  
Nordic Aquafarms Inc., Land-based Aquaculture Facility  
Belfast, Maine  
L-28319-26-A-N



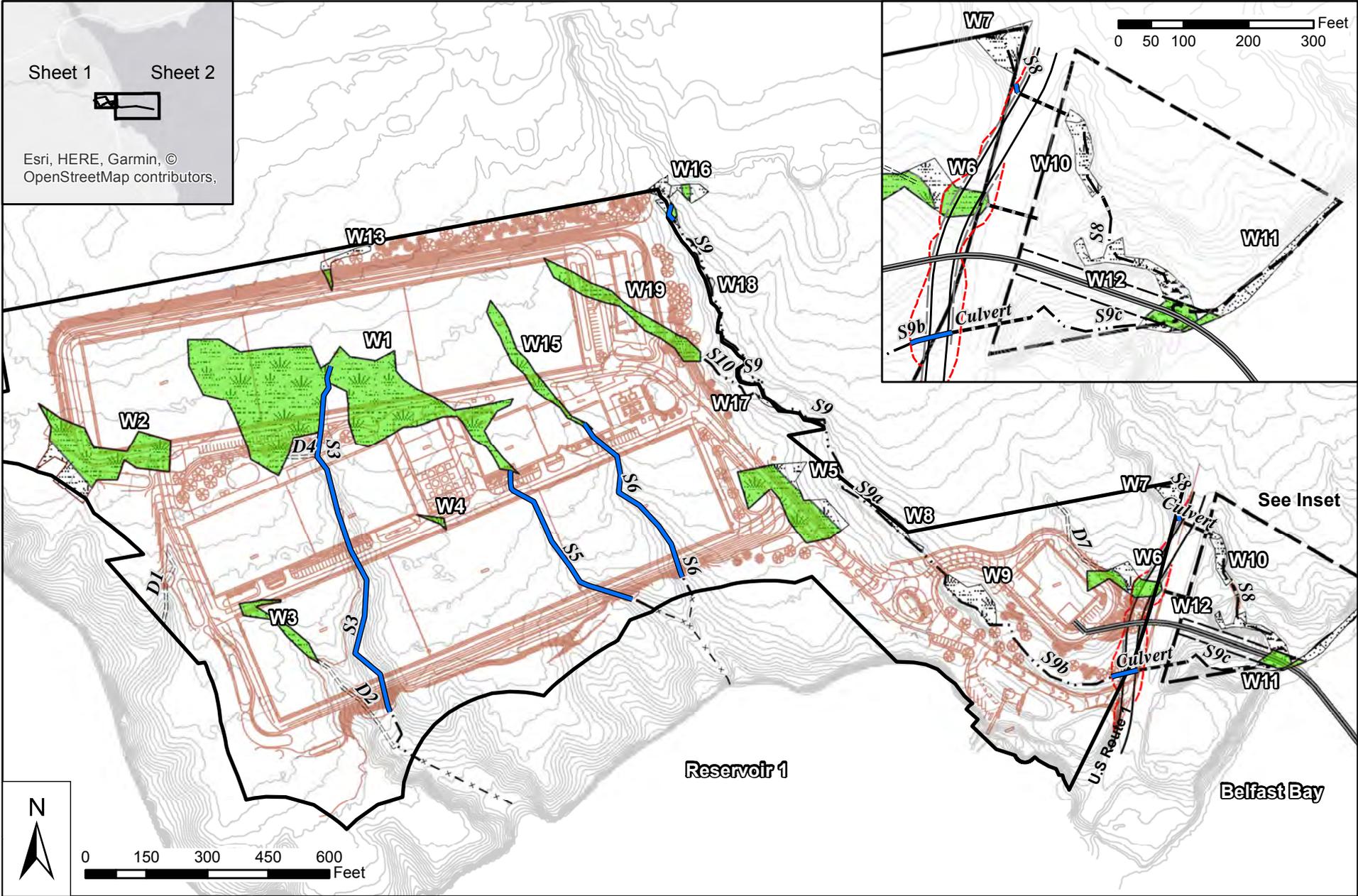
**Belfast Aquaculture Project**  
**Wetland and Stream Impact Mapping**  
**August 16, 2019**

Sheet 2 of 2



Sheet 1      Sheet 2

Esri, HERE, Garmin, ©  
OpenStreetMap contributors,



**Belfast Aquaculture Project**  
**Wetland and Stream Impact Mapping**  
 August 16, 2019      Sheet 1 of 2

Palustrine Wetlands	Existing Culvert	Pipeline Route	Limit of Work
Salt Marsh	Intermittent Stream	Site Boundary	40' Pipeline Easement
Cobble Beach	Drainage	Proposed Development	Temp US Bypass
Wetland Impact	Stream/Drainage Not Field Delineated	Existing Contours (2 ft)	Temporary Route 1 By-Pass
	Stream Impact	Eckrote Parcel	Culvert



**ATTACHMENT C**

Anchoring Requirements for Submerged Pipelines Memorandum

Response to Review Comments  
Nordic Aquafarms Inc., Land-based Aquaculture Facility  
Belfast, Maine  
L-28319-26-A-N



## MEMORANDUM

TO: Craig Weaver  
CC: Parker Hadlock  
FROM: Jim Wilson, P.E.  
DATE: August 13, 2019  
RE: Anchoring Requirements for Submerged Pipelines (REV1)

---

As requested, we have worked with ATM to review anchoring requirements for the submerged pipelines to consider alternatives that have less environmental impact than the approach shown in the Issued for Permit Drawings. As previously explained, the details contained therein were chosen to keep construction cost, Project schedule, long-term maintenance and diver needs to a minimum.

From earlier Work, we knew that all alternatives required a precast anchor, if for no other purpose than to overcome the buoyancy of the pipe so we could submerge it in place. Even with relatively tight spacing of the concrete anchors, we would also need supplemental anchoring to resist shear forces and potential erosion that can be caused by weather, tides and current.

### 1.1 Concrete Anchors

To overcome buoyancy and anchor the pipes in place, ATM suggests the precast anchors should be equal to 200 pounds per lineal foot of pipe supported. ATM suggested a 15-foot spacing of the anchors. A benefit of this spacing is that it will allow the pipes to remain suspended above the seafloor having no permanent environmental impact.

We analyzed the load requirements at 15-foot spacings to determine a weight requirement of 3,000, 6,000 and 9,000 pounds for the one-, two- and three-pipe installations. Based on details on Drawing CS501 (attached), we were able to establish the area of the face of the anchor and calculate a minimum anchor thickness to achieve the load requirements. From there, we determined a standard 2-foot thickness for all anchors will meet the design criteria.

The dimensions of the base of each anchor can be established as:

- 3-Pipe Anchor: 11' X 2' = 22 SF
- 2-Pipe Anchor: 7'-6" X 2' = 15 SF
- 1-Pipe Anchor: 4'-6" X 2' = 9 SF



## 1.2 Supplemental Anchoring

As noted, the precast anchors are insufficient alone to ensure the pipes remain stable against currents, tides and weather. Three supplemental anchoring methods were considered to further anchor the pipelines:

- Rock Mattresses: A stone-filled basket, that can be lowered in place with a barge-mounted crane.
- Helical Anchors: Requires a mechanical drive to install and are often used in marine applications for mooring yards and other anchor points.
- Pile Anchors: Guide piles will be used by Cianbro during installation of the pipelines to keep the alignment in the approved location. They are intended to be temporary and spaced as needed to insure the preferred alignment.

Of the three options, the rock mattresses allow much of the Work to occur on the deck of the barge. Diver assistance is required to observe and confirm placement. Another positive of this approach is that no further maintenance of the rock mattresses would be expected after proper placement of the mattresses during construction.

Helical anchors can be driven from a barge; however, we have not been able to determine how barge-mounted equipment will perform aligning to the concrete anchors. It is believed that this will be a somewhat diver-intensive effort during the initial installation. Due to electrolysis, sacrificial anode bags would also be required at each location. How quickly those require replacement is a function of the seawater and will not be known until post-construction annual inspections begin. It can be expected that replacement will occur in the range of 1-5 years. Inspections may be performed by underwater camera, but anode pack replacement will require a diver.

As noted, guide piles are part of Cianbro's plan for the construction to insure proper alignment. We have also considered how the piles themselves could be left in-place and used successfully as supplemental anchors. They would need to be cut off and chained to the concrete anchors. This too is diver-intensive.

We believe that a combination of 1) concrete anchors and helical anchors or 2) concrete anchors with helical and guide pile anchors would achieve a stable pipeline installation with much less permanent seabed impact. Attached are updated details (Sheet CS501) for your review.

Spacing of the supplemental anchors is required at bends and at approximately 90- to 100-foot intervals or approximately every 6 concrete anchors. This translates to roughly 80 supplemental anchors and anode packs over the length of the exposed pipe. We have assumed that the helical anchors and guide piles would essentially result in negligible seabed permanent disturbance.

## 1.3 Impact

For the purposes of our Work, we have focused on the portion of the pipelines that permanently affects the seabed. The following 5 zones have been considered:

1. Sta. 32+00 to 33+00: Within this area, the tops of precast anchors will begin to be exposed to the seabed. The pipe will still be below the surface. Based on the 15-foot spacing, we anticipate the tops of seven 3-pipe anchors may be exposed.
2. Sta. 33+00 to 36+00 (Transition Zone): This is the distance it takes for the three pipes to emerge from the seabed according to our profile on Sheet CS101. We assumed impact is the anchor



footprint plus the diameter of the pipes. This is a bit conservative because the pipelines will not be buried to the mid-line for much of the distance, but it seems appropriate.

3. Sta. 36+00 to 42+00 (First Underwater Zone): This is the distance from the Transition Zone to the Outfall Structure. This is also a three-pipe alignment; however, the pipes will be fully supported above the seabed by the anchors spaced 15 feet apart. The concrete anchors will be on the seabed but the pipes themselves will not.
4. Sta. 42+00 to 68+90 (Continued Underwater Zone): This is the two-pipe intake alignment after passing the Outfall Diffuser location. The concrete anchors are a bit smaller and will continue to support the pipes above the seabed. Impact is the concrete anchors footprint plus the Intake Structure footprint.
5. Sta. 68+90 to 69+25 (Continued Underwater Zone): This is the short one-pipe trench between the two intake structures. The impact here is the concrete anchor footprint plus the other Intake Structure.

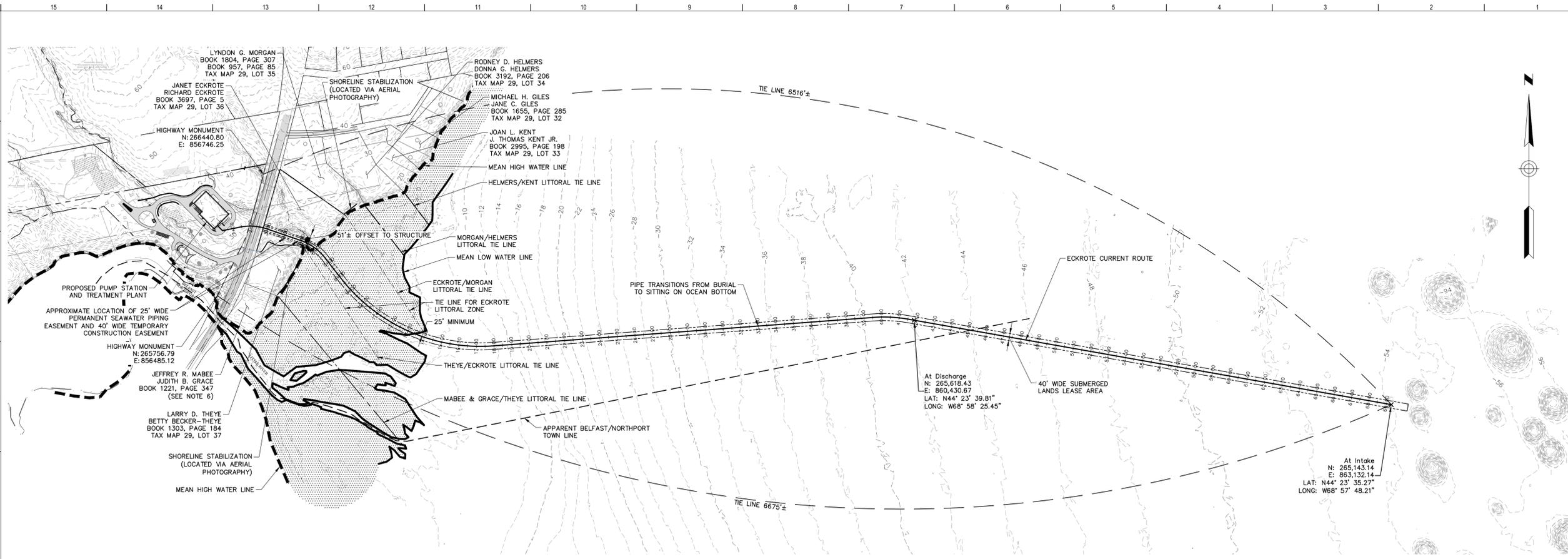
We prepared a spreadsheet to evaluate the seabed impact of this approach with concrete anchors at a 15-foot interval and supplemental helical or guide pile anchors spaced at roughly 90 feet. As noted above, we have ignored the negligible impact of the helical anchors and possible pile anchors. Instead, we have calculated the area of impact for each concrete base anchor, any pipe impacts and the impact of the intake structures.

Updated details on attached Sheet CS501 reflect the dimensions and characteristics of the installation. Based on the size and spacing characteristics discussed above, we calculated the permanent impact to be 6,549 SF. See Table 1 below for how we arrived at that number.

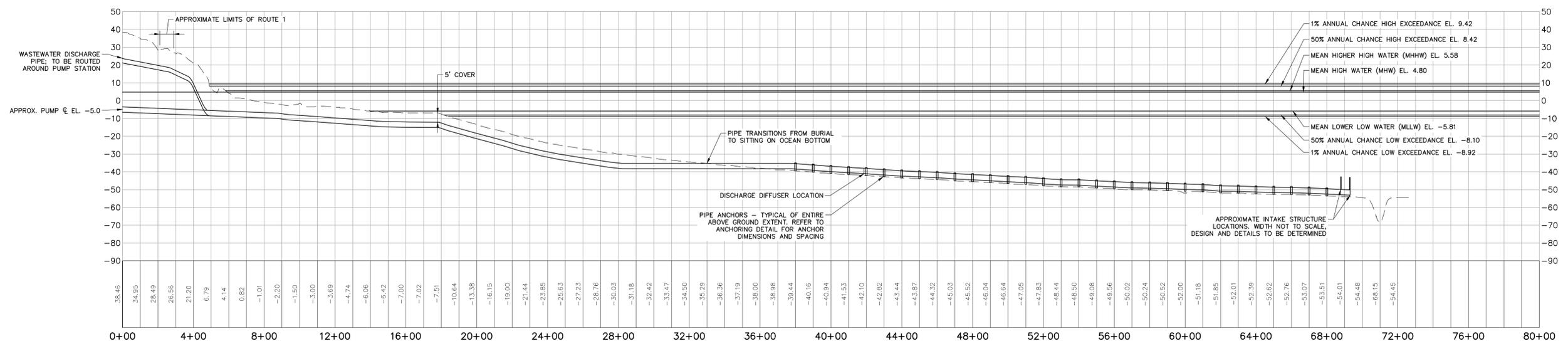
Table 1: Anchoring Data

STA	STA	Length (FT)	Anchors Required (@ 15' OC)	Actual Anchors	Anchor Base (SF)	Anchor Impact (SF)	Pipe Impact (SF)	Intake Impact (SF)	Total Impact (SF)
32+00	33+00	100	6.67	7	22	154			154
33+00	36+00	300	20	20	22	440	2,400		2,840
36+00	42+00	600	40	40	22	880			880
42+00	68+90	2,690	179.33	180	15	2,700		51	2,751
68+90	69+25	35	2.33	3	9	27		51	78
								TOTAL	6,703





**PLAN**  
SCALE: 1" = 300'



**PROFILE STA. 0+00 TO STA. 80+00**  
HORIZONTAL SCALE: 1" = 300'  
VERTICAL SCALE: 1" = 30'

- PLAN REFERENCES:**
- BOUNDARY & TOPOGRAPHIC SURVEY DATED 4-2-2018 BY GOOD DEEDS INC., 109 MAIN STREET, BELFAST, ME 04915, (207) 338-5743
  - 2 FOOT LIDAR CONTOURS OBTAINED FROM THE MAINE OFFICE OF GIS. <https://www.maine.gov/megis/>
  - BATHYMETRY DATA PROVIDED BY NORMANDEAU ASSOCIATES, ENVIRONMENTAL CONSULTANTS IN OCTOBER 2018.
  - LITTORAL ZONE & TOWN LINE IS BASED ON A PLAN BY GARTLEY & DORSKY ENGINEERING SURVEYING, 59 UNION STREET, UNIT 1, P.O. BOX 1031 CAMDEN, ME 04843-1031, DATED NOVEMBER 14, 2018 AND REVISED FEBRUARY 22, 2019.
  - VERTICAL DATUM IS REFERENCED TO NAVD88 (FEET).

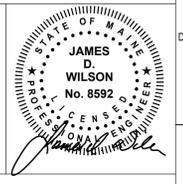
- NOTES:**
- PROPOSED FEATURES ARE APPROXIMATE IN LOCATION AND SCALE.
  - PIPE ALIGNMENT IS SETBACK GREATER THAN 25 FEET FROM TIE LINES.
  - ANCHORING LOCATIONS ARE SCHEMATIC ONLY. REFER TO ANCHORING DETAILS FOR ANCHOR DIMENSIONS AND SPACING.
  - SINGLE PIPE ROUTE SHOWN FOR CLARITY; SYSTEM CONSISTS OF TWO NOMINAL 30" INTAKE PIPES AND ONE NOMINAL 36" DISCHARGE PIPE.

**RANSOM** Consulting Engineers and Scientists

**WOODARD & CURRAN**  
41 Hutchins Drive  
Portland, Maine 04102  
800.426.4262 | www.woodardcurran.com  
COMMITMENT & INTEGRITY DRIVE RESULTS

REV	DESCRIPTION	DATE

**REVISED FOR PERMIT**  
08-14-19  
CURRENT ISSUE STATUS:



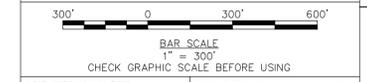
TRUE NORTH:  
SMRT Architects and Engineers  
144 Fore Street, PO Box 618  
Portland, Maine 04104

ARCHITECTURE | ENGINEERING | PLANNING | INTERIORS | ENERGY **SMRT**

**NORDIC AQUAFARMS**

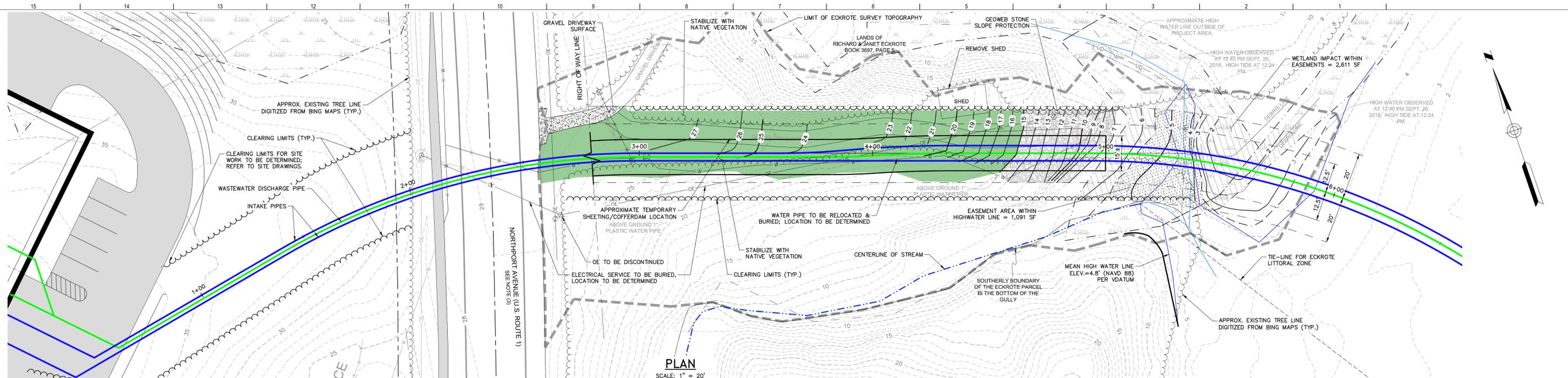
BELFAST, MAINE

**INTAKE/DISCHARGE PIPING  
PLAN & PROFILE**

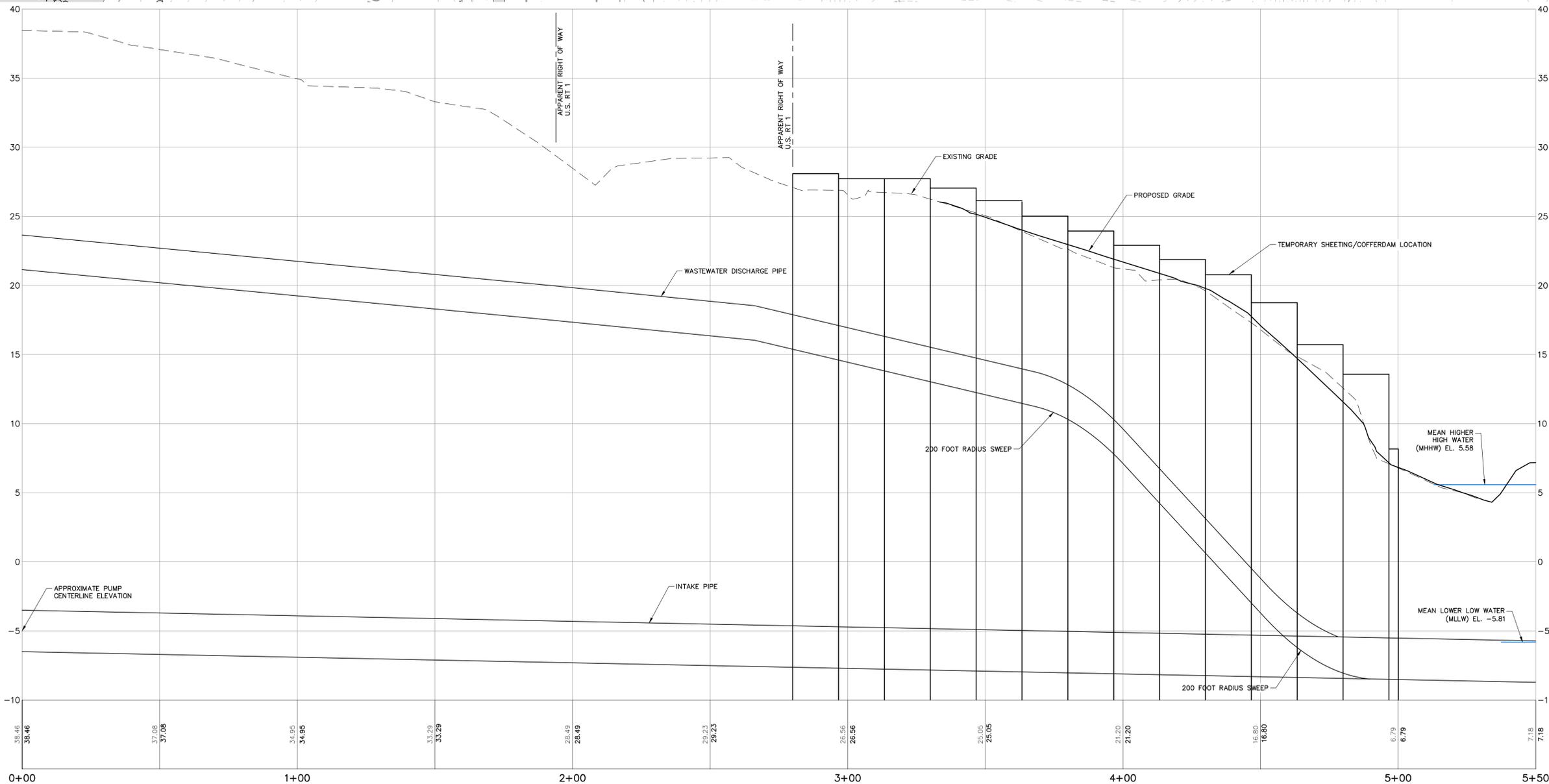


PROJECT MANAGER: PROJECT NO: 18076

JOB CAPTAIN: **CS101**



**PLAN**  
SCALE: 1" = 20'



**PROFILE STA. 0+00 TO STA. 5+50**

HORIZONTAL SCALE: 1" = 20'  
VERTICAL SCALE: 1" = 4'

**RANSOM** Consulting Engineers and Scientists

**WOODARD & CURRAN**  
41 Hutchins Drive  
Portland, Maine 04102  
800.426.4262 | www.woodardcurran.com  
COMMITMENT & INTEGRITY DRIVE RESULTS

REV	DESCRIPTION	DATE
	REVISED FOR PERMIT	08-14-19

TRUE NORTH:

STATE OF MAINE  
JAMES D. WILSON  
No. 8592  
REGISTERED PROFESSIONAL ENGINEER

SMRT Architects and Engineers  
144 Fore Street, PO Box 618  
Portland, Maine 04104

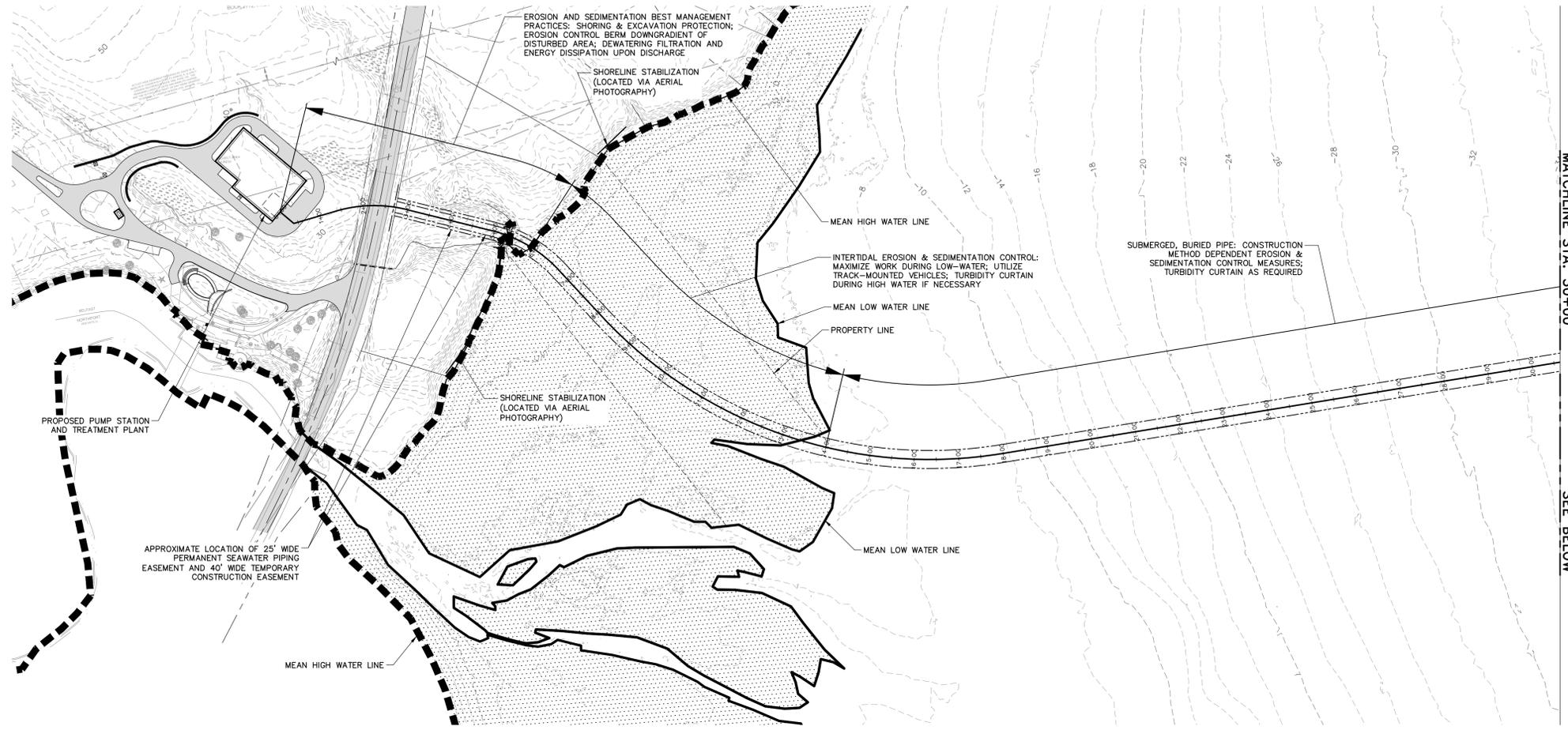
**NORDIC AQUAFARMS**  
BELFAST, MAINE

**ECKROTE EASEMENT  
PLAN & PROFILE**

20' 0 20' 40'  
BAR SCALE  
1" = 20'  
CHECK GRAPHIC SCALE BEFORE USING

PROJECT MANAGER: PROJECT NO: 18076  
JOB CAPTAIN: **CS102**





**PLAN**  
SCALE: 1" = 150'

MATCHLINE STA. 30+00  
SEE BELOW

- PLAN REFERENCES:**
- BOUNDARY & TOPOGRAPHIC SURVEY DATED 4-2-2018 BY GOOD DEEDS INC., 109 MAIN STREET, BELFAST, ME 04915, (207) 338-5743
  - 2 FOOT LIDAR CONTOURS OBTAINED FROM THE MAINE OFFICE OF GIS. <https://www.maine.gov/megis/>
  - BATHYMETRY DATA PROVIDED BY NORMANDEAU ASSOCIATES, ENVIRONMENTAL CONSULTANTS IN OCTOBER 2018.
  - LITTORAL ZONE & INTERTIDAL ZONE SURVEY IS BASED ON A PLAN BY GARTLEY & DORSKY ENGINEERING SURVEYING, 59 UNION STREET, UNIT 1, P.O. BOX 1031 CAMDEN, ME 04843-1031, DATED NOVEMBER 14, 2018.
  - VERTICAL DATUM IS REFERENCED TO NAVD88 (FEET).

- NOTES:**
- PROPOSED FEATURES ARE APPROXIMATE IN LOCATION AND SCALE.
  - PIPE ALIGNMENT IS SETBACK GREATER THAN 25 FEET FROM LITTORAL SIDELINES.
  - ANCHORING LOCATIONS ARE SCHEMATIC ONLY. REFER TO ANCHORING DETAILS FOR ANCHOR DIMENSIONS AND SPACING.
  - SINGLE PIPE ROUTE SHOWN FOR CLARITY; SYSTEM CONSISTS OF TWO NOMINAL 30" INTAKE PIPES AND ONE NOMINAL 36" DISCHARGE PIPE.

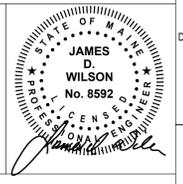
**RANSOM** Consulting Engineers and Scientists

**WOODARD & CURRAN**

41 Hutchins Drive  
Portland, Maine 04102  
800.426.4262 | [www.woodardcurran.com](http://www.woodardcurran.com)  
COMMITMENT & INTEGRITY DRIVE RESULTS

REV	DESCRIPTION	DATE

REVISED FOR PERMIT  
08-14-19  
CURRENT ISSUE STATUS:



TRUE NORTH:  
SMRT Architects and Engineers  
144 Fore Street, PO Box 618  
Portland, Maine 04104

ARCHITECTURE | ENGINEERING | PLANNING | INTERIORS | ENERGY **SMRT**

**NORDIC AQUAFARMS**

BELFAST, MAINE

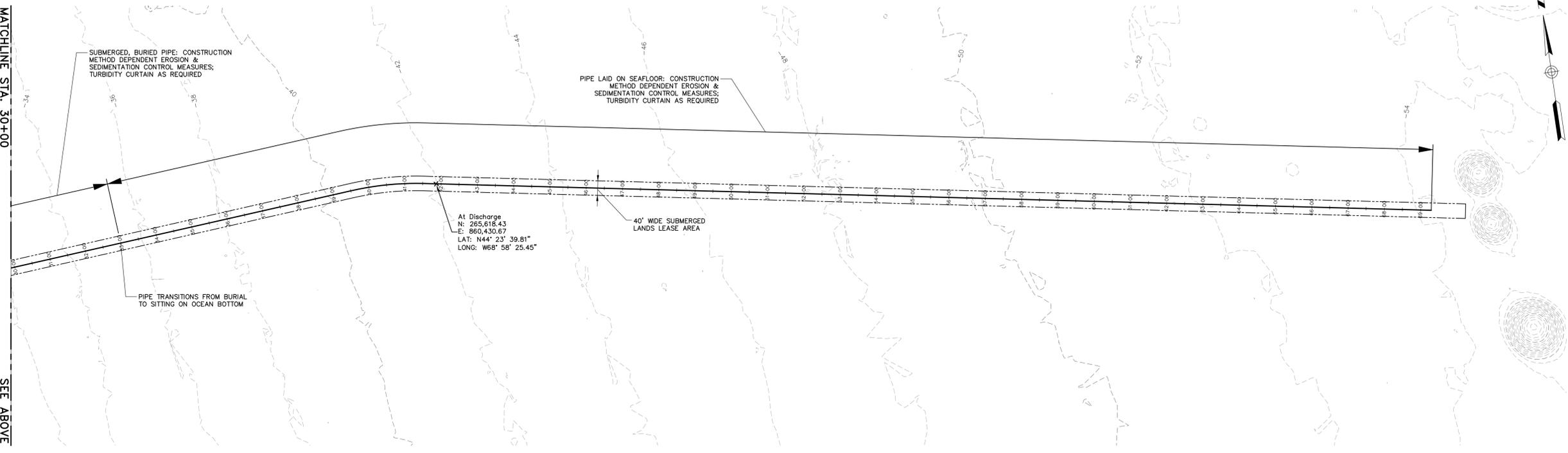
**EROSION CONTROL PLAN**

300' 0 300' 600'

BAR SCALE  
1" = 300'  
CHECK GRAPHIC SCALE BEFORE USING

PROJECT MANAGER:	PROJECT NO: 18076
JOB CAPTAIN:	<b>CS104</b>

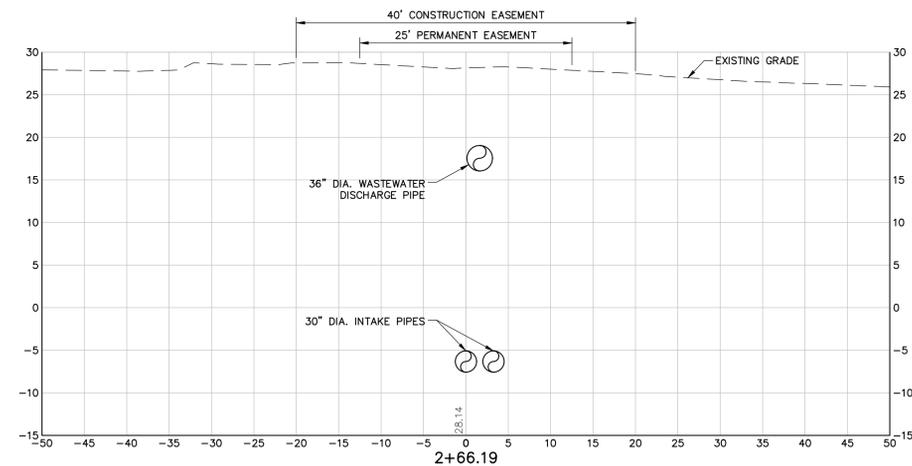
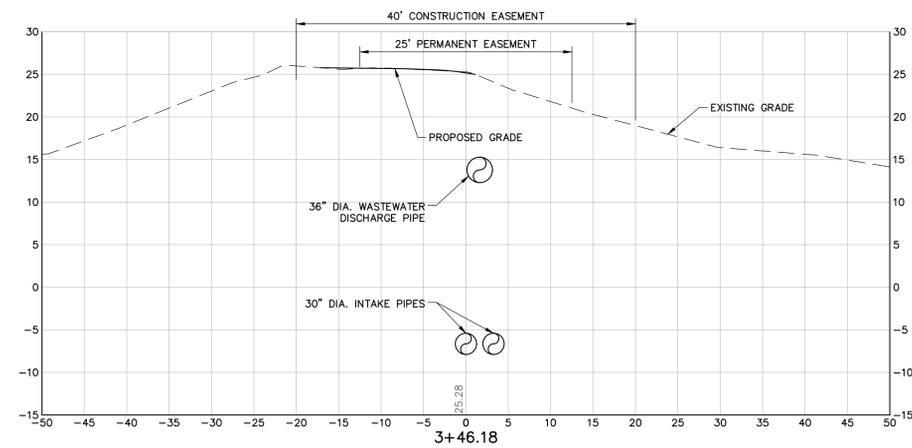
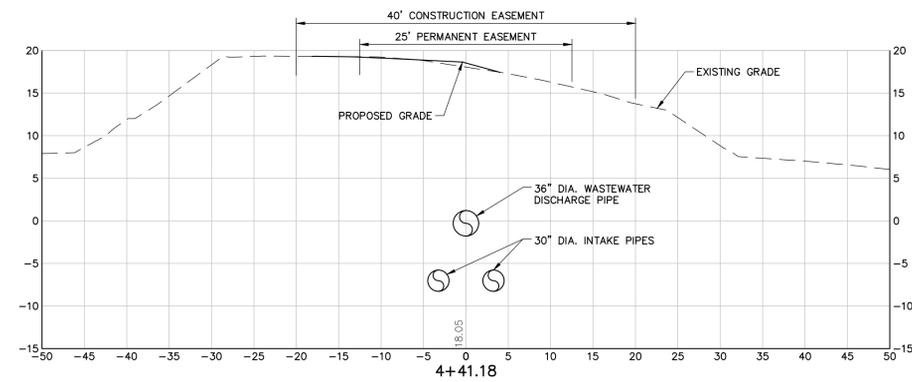
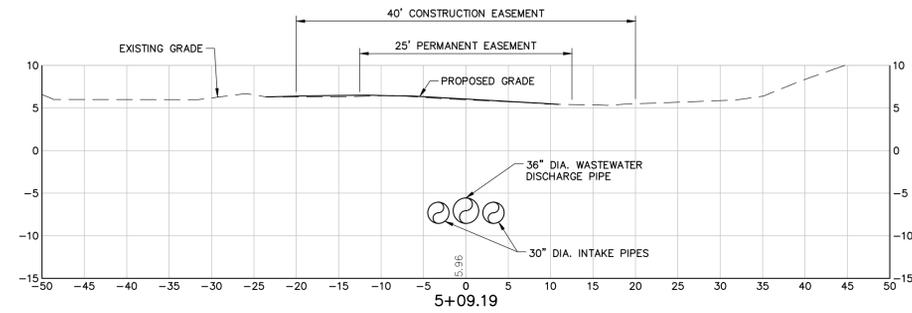
NOT FOR CONSTRUCTION



**PLAN**  
SCALE: 1" = 150'

MATCHLINE STA. 30+00  
SEE ABOVE

\\woodardcurran.net\shares\Projects\0231714\_00\_Clanbro - Maine Aquaculture\Drawings\Civil\0231714\_00\_CS104.dwg, Aug 14, 2019 - 4:35pm, JEVERETT



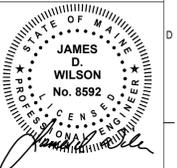
**RANSOM** Consulting Engineers and Scientists

**WOODARD & CURRAN**  
 41 Hutchins Drive  
 Portland, Maine 04102  
 800.426.4262 | www.woodardcurran.com  
 COMMITMENT & INTEGRITY DRIVE RESULTS

REV	DESCRIPTION	DATE

REVISED FOR PERMIT  
 08-14-19

CURRENT ISSUE STATUS:



TRUE NORTH:  
 SMRT Architects and Engineers  
 144 Fore Street, PO Box 618  
 Portland, Maine 04104

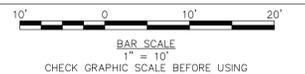


ARCHITECTURE | ENGINEERING | PLANNING | INTERIORS | ENERGY

**NORDIC AQUAFARMS**

BELFAST, MAINE

**CROSS SECTIONS**

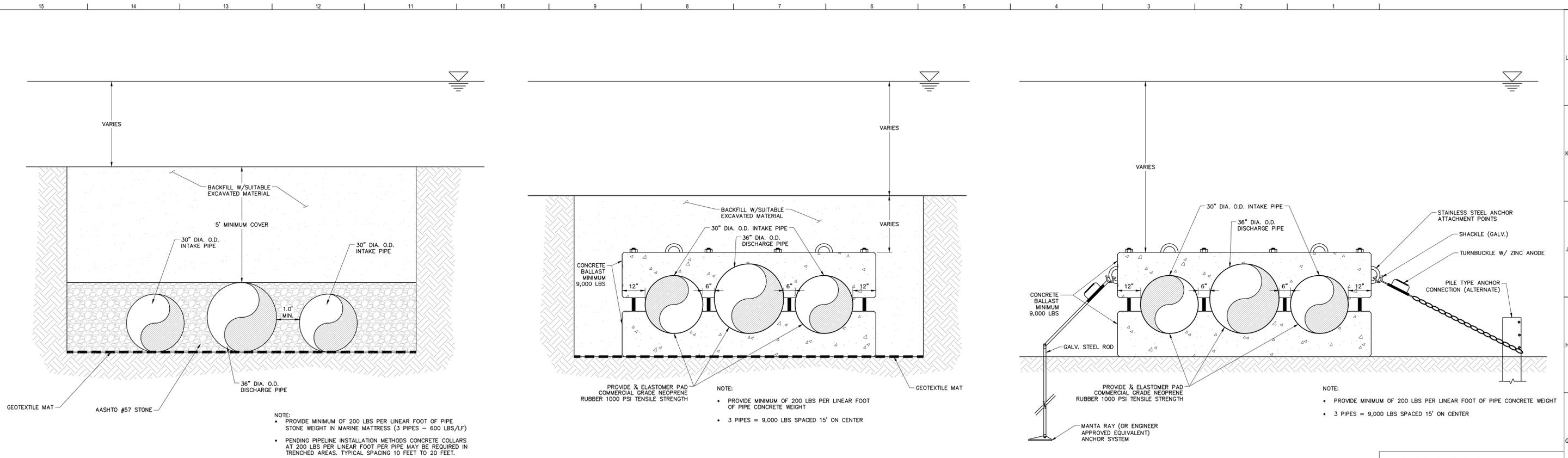


PROJECT MANAGER: PROJECT NO: 18076

JOB CAPTAIN: **CS301**

©copyright 2018 SMRT INC.

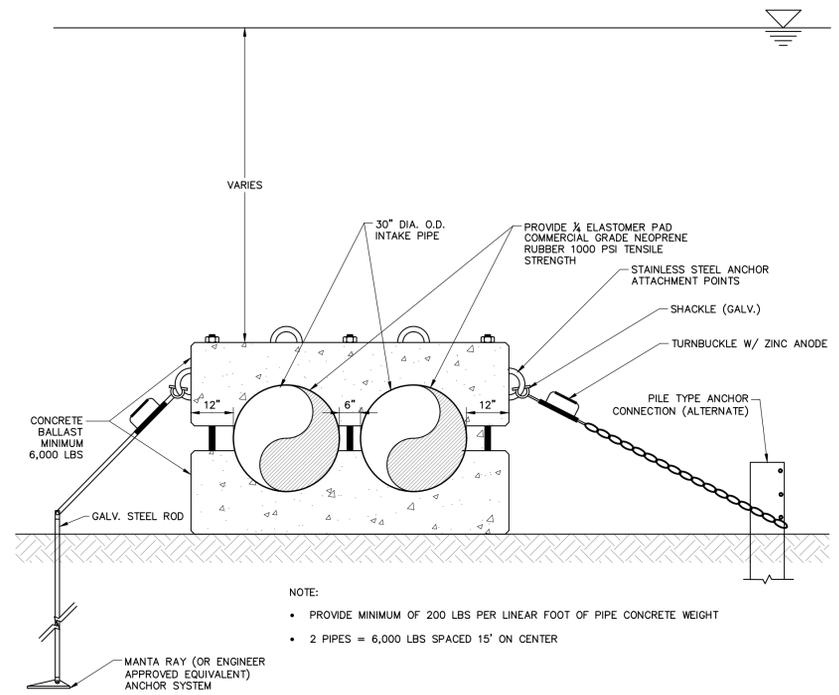
NOT FOR CONSTRUCTION



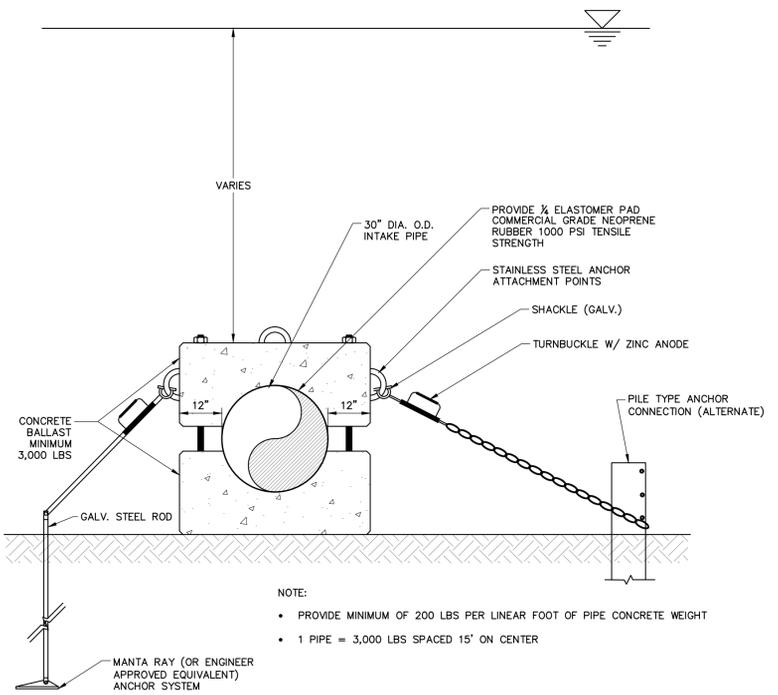
1  
####  
NOT TO SCALE  
CONCEPTUAL NOT FOR CONSTRUCTION

2  
####  
NOT TO SCALE  
CONCEPTUAL NOT FOR CONSTRUCTION

3  
CS501  
NOT TO SCALE  
CONCEPTUAL NOT FOR CONSTRUCTION



4  
CS501  
NOT TO SCALE  
CONCEPTUAL NOT FOR CONSTRUCTION



4A  
CS501  
NOT TO SCALE  
CONCEPTUAL NOT FOR CONSTRUCTION

**RANSOM** Consulting Engineers and Scientists

41 Hutchins Drive  
Portland, Maine 04102  
800.426.4262 | www.woodandcurran.com  
COMMITMENT & INTEGRITY DRIVE RESULTS

REV	DESCRIPTION	DATE

REVISED FOR PERMIT  
08-14-19

CURRENT ISSUE STATUS:

STATE OF MAINE  
JAMES D. WILSON  
No. 8592  
Professional Engineer

TRUE NORTH:

SMRT Architects and Engineers  
144 Fore Street, PO Box 618  
Portland, Maine 04104

ARCHITECTURE | ENGINEERING | PLANNING | INTERIORS | ENERGY

**SMRT**

**NORDIC AQUAFARMS**

BELFAST, MAINE

CIVIL DETAILS - 1

PROJECT MANAGER:	PROJECT NO:	18076
JOB CAPTAIN:		<b>CS501</b>





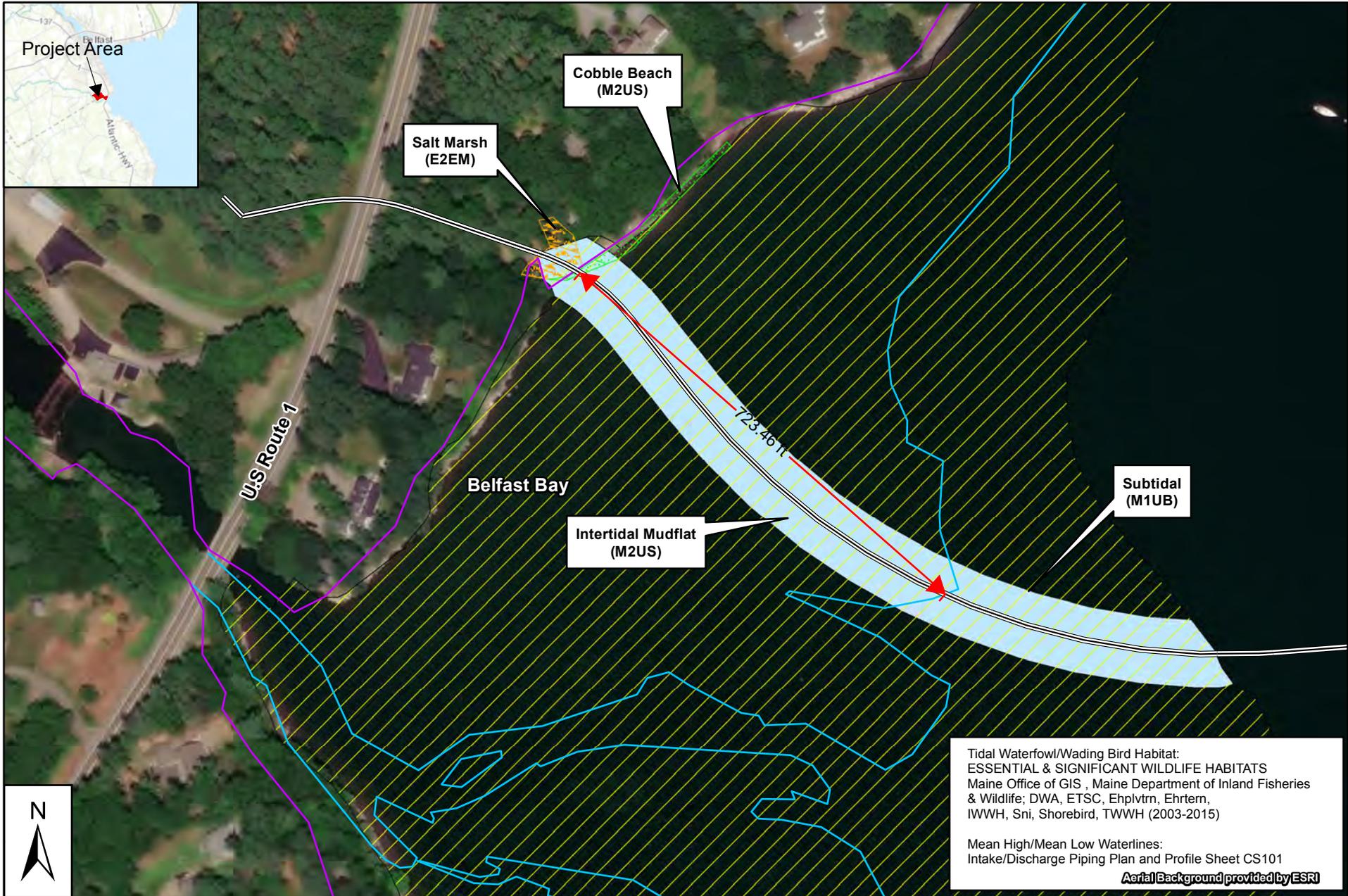




**ATTACHMENT D**

Tidal Waterfowl and Wading Bird Habitat Pipeline Impact Area

Response to Review Comments  
Nordic Aquafarms Inc., Land-based Aquaculture Facility  
Belfast, Maine  
L-28319-26-A-N



**Belfast Aquaculture Project  
 Pipeline Impact Area TWWH  
 Date: August 13, 2019**

- Pipeline Route
- Mean High Water
- Mean Low Water
- Salt Marsh
- Cobble Beach
- Tidal Waterfowl/Wading Bird Habitat (TWWH)
- Temporary Pipeline TWWH Impact Area

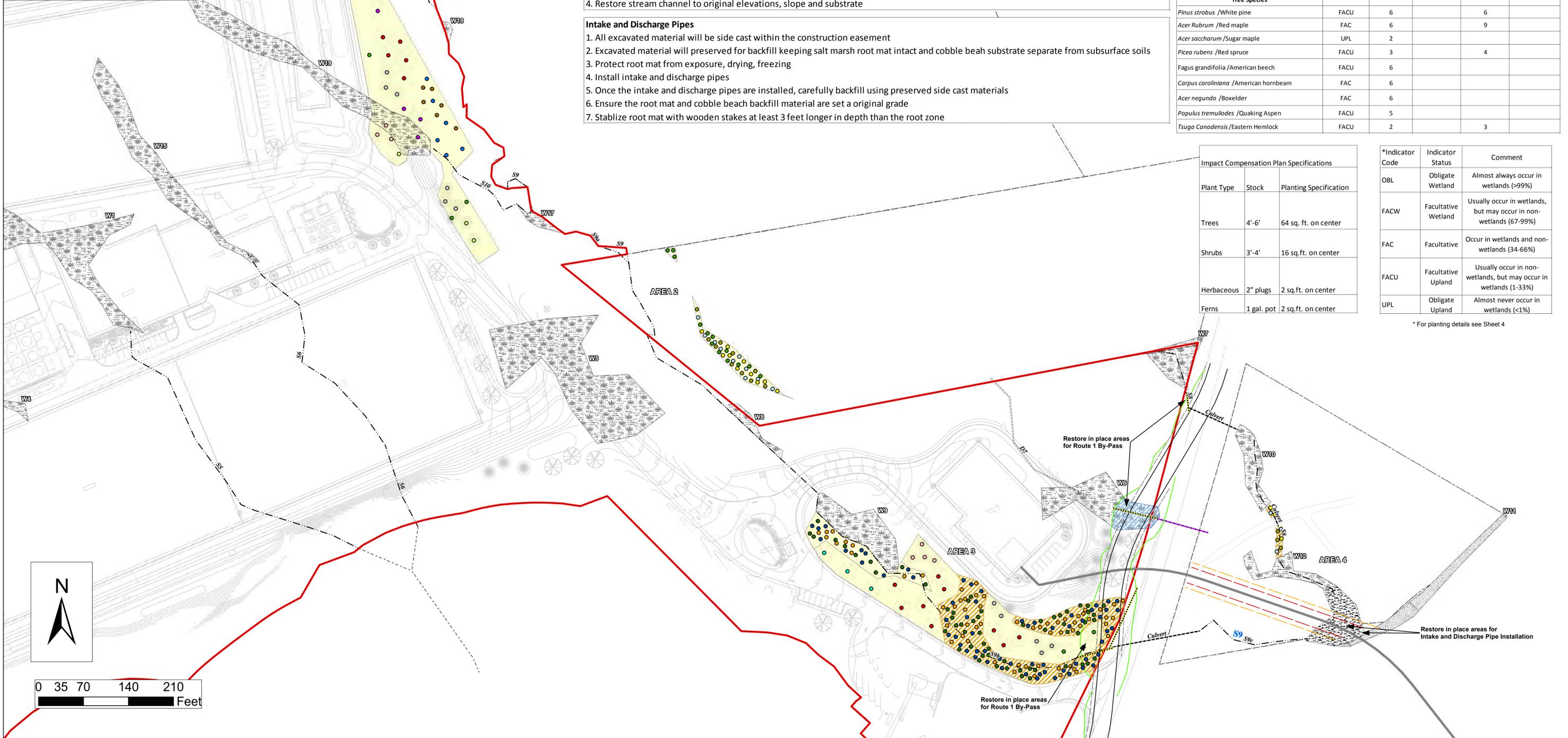
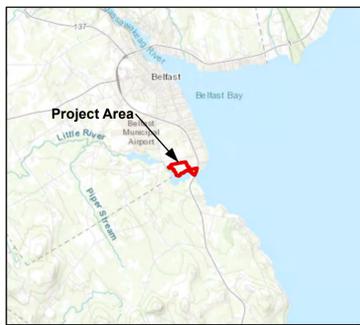
0 100 200 400 Feet



**ATTACHMENT E**

Updated Compensation Plan Drawings Sheet 1 – Sheet 4

Response to Review Comments  
Nordic Aquafarms Inc., Land-based Aquaculture Facility  
Belfast, Maine  
L-28319-26-A-N



**Restore in Place Specifications**

**Sewer Force Main**

1. All excavated material will be side cast within the construction easement
2. Install Force Main
3. Backfill to original grade using side cast material
4. Restore stream channel and wetlands to original elevations, slope and substrate
5. Hydroseed disturbed area using New England Wetland Mix or equivalent at manufacturers specifications

**Rte 1 By-Pass**

1. A temporary adequately sized culvert will be placed along the stream channel
2. Once the intake and discharge pipes are installed all temporary areas will be removed and restored to original grades
3. The wetland area will be restored to original grade and hydroseeded with New England wet mix or equivalent at manufacturers specifications
4. Restore stream channel to original elevations, slope and substrate

**Intake and Discharge Pipes**

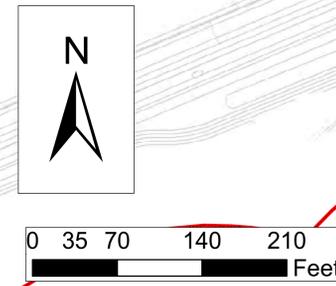
1. All excavated material will be side cast within the construction easement
2. Excavated material will be preserved for backfill keeping salt marsh root mat intact and cobble beach substrate separate from subsurface soils
3. Protect root mat from exposure, drying, freezing
4. Install intake and discharge pipes
5. Once the intake and discharge pipes are installed, carefully backfill using preserved side cast materials
6. Ensure the root mat and cobble beach backfill material are set a original grade
7. Stabilize root mat with wooden stakes at least 3 feet longer in depth than the root zone

Herbaceous Species	*Indicator Code	Planting Specification/Number of Stock			
		Restoration Area 1	Restoration Area 2	Restoration Area 3	Restoration Area 4
<i>Onoclea sensibilis</i> /Sensitive Fern	FACW			60	
<i>Acorus americana</i> /Sweetflag	OBL			60	
<i>Aster novae-angliae</i> /New England Aster	FACW			60	
New England Wet Mix/Conservation Wildlife Mix	See Sheet 4			See Sheet 4	See Sheet 4
Shrub Species					
<i>Cornus racemosa</i> /Gray Dogwood	FAC		10		3
<i>Hamamelis virginiana</i> /Witch Hazel	FAC		10		3
<i>Alnus incana</i> /Speckled Alder	FACW		10		3
<i>Cornus alternifolia</i> /Alternate-leaved dogwood	UPL	3	13	3	
Tree Species					
<i>Pinus strobus</i> /White pine	FACU	6		6	
<i>Acer rubrum</i> /Red maple	FAC	6		9	
<i>Acer saccharum</i> /Sugar maple	UPL	2			
<i>Picea rubens</i> /Red spruce	FACU	3		4	
<i>Fagus grandifolia</i> /American beech	FACU	6			
<i>Carpus caroliniana</i> /American hornbeam	FAC	6			
<i>Acer negundo</i> /Boxelder	FAC	6			
<i>Populus tremuloides</i> /Quaking Aspen	FACU	5			
<i>Tsuga Canadensis</i> /Eastern Hemlock	FACU	2		3	

Impact Compensation Plan Specifications		
Plant Type	Stock	Planting Specification
Trees	4'-6'	64 sq. ft. on center
Shrubs	3'-4'	16 sq.ft. on center
Herbaceous	2" plugs	2 sq.ft. on center
Ferns	1 gal. pot	2 sq.ft. on center

*Indicator Code	Indicator Status	Comment
OBL	Obligate Wetland	Almost always occur in wetlands (>99%)
FACW	Facultative Wetland	Usually occur in wetlands, but may occur in non-wetlands (67-99%)
FAC	Facultative	Occur in wetlands and non-wetlands (34-66%)
FACU	Facultative Upland	Usually occur in non-wetlands, but may occur in wetlands (1-33%)
UPL	Obligate Upland	Almost never occur in wetlands (<1%)

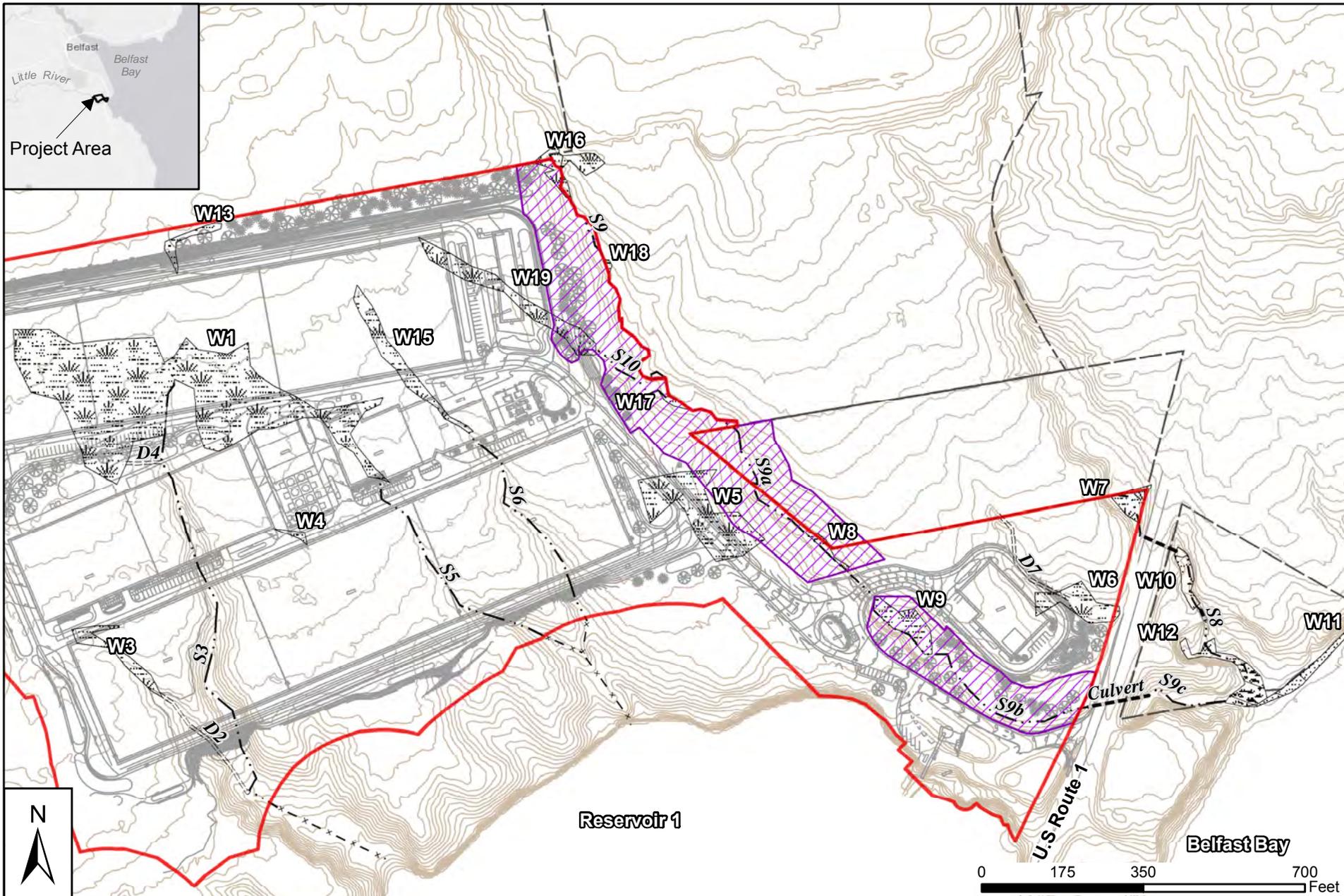
\* For planting details see Sheet 4



**Belfast Aquaculture Project  
Impact Compensation Plan  
Date: August 16, 2019**

<ul style="list-style-type: none"> <li>● Alternate-leaved Dogwood</li> <li>● American Beech</li> <li>● American Hornbeam</li> <li>● Boxelder</li> <li>● Eastern Hemlock</li> <li>● Gray Dogwood</li> <li>● New England Aster</li> <li>● Quacking Aspen</li> <li>● Red Maple</li> <li>● Red Spruce</li> <li>● Sensitive Fern</li> <li>● Speckled Alder</li> <li>● Sugar Maple</li> <li>● Sweetflag</li> <li>● White Pine</li> <li>● Witch Hazel</li> <li>■ Conservation Wildlife Mix</li> <li>■ New England Wet Mix</li> </ul>	<ul style="list-style-type: none"> <li>--- 25' Easement</li> <li>--- 40' Easement</li> <li>--- Temp US Bypass</li> <li>--- Temporary Route 1 By-Pass</li> <li>--- Culvert</li> <li>--- Temporary Culvert</li> <li>--- Limit of Work</li> <li>--- Existing Culvert</li> <li>--- Intermittent Stream</li> <li>--- Drainage</li> <li>--- Stream/Drainage Not Field Delineated</li> <li>--- Current Pipeline Route</li> <li>--- Sewer Easement</li> </ul>	<ul style="list-style-type: none"> <li>■ Palustrine Wetlands</li> <li>■ Salt Marsh</li> <li>■ Cobble Beach</li> <li>■ Riparian Restoration Area</li> <li>■ Project Area</li> <li>■ Other Belfast Parcels</li> </ul>
---	---	---

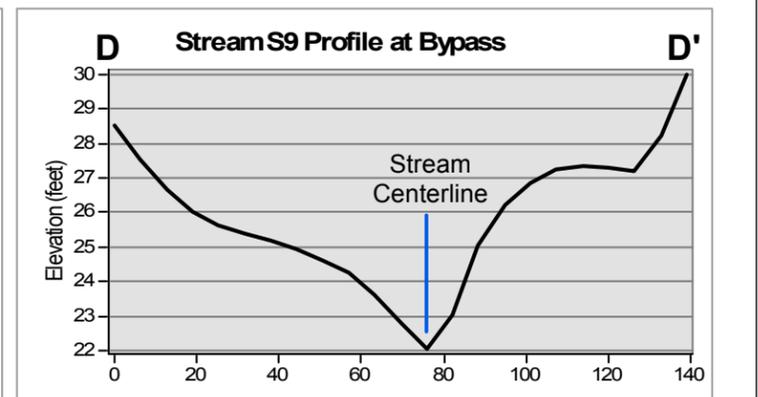
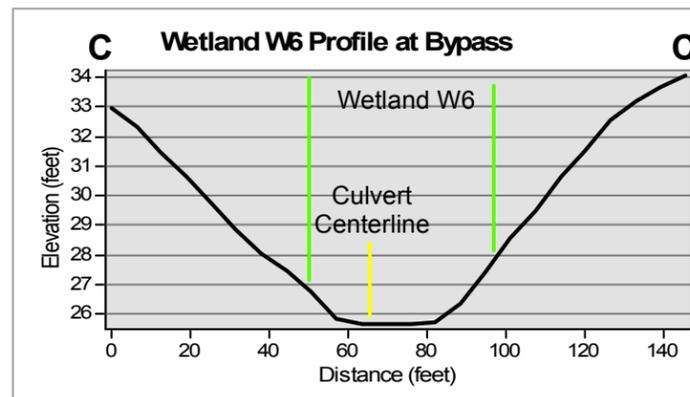
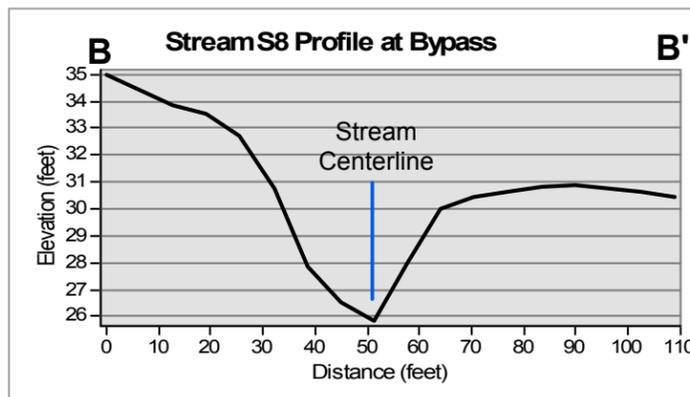
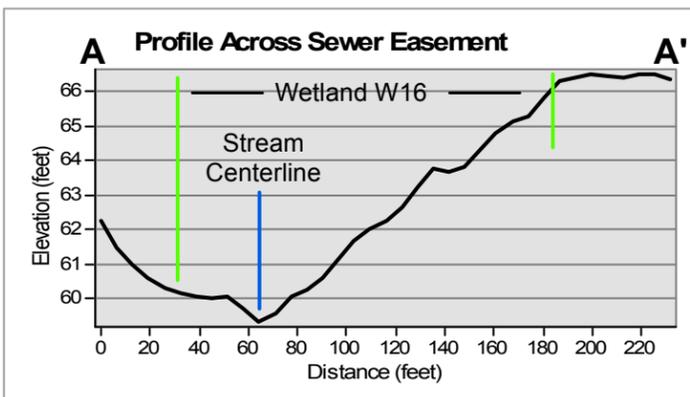




**Belfast Aquaculture Project  
Deeded Riparian Buffer Map  
Date: August 16, 2019**

- |                                 |                        |                          |
|---------------------------------|------------------------|--------------------------|
| — Existing Culvert              | Palustrine Wetlands    | — Existing 2 ft Contours |
| - - - Intermittent Stream       | Salt Marsh             | — Proposed Development   |
| === Drainage                    | Cobble Beach           | ▭ Project Area           |
| x - Stream Not Field Delineated | Deeded Riparian Buffer | ▭ Other Belfast Parcels  |





**Belfast Aquaculture Project  
Cross Section Map  
Date: August 16, 2019  
SHEET 3**

- |                        |                    |               |                     |
|------------------------|--------------------|---------------|---------------------|
| Cross Section Profiles | Existing Culvert   | Catch Basin   | Palustrine Wetlands |
| Intermittent Stream    | New Culvert (temp) | Storm Manhole | Salt Marsh          |
| Drainage               | Toe of Fill        | 2-ft Contours | Cobble Beach        |



**NEW ENGLAND WETLAND PLANTS, INC**

820 WEST STREET, AMHERST, MA 01002  
 PHONE: 413-548-8000 FAX 413-549-4000  
 EMAIL: INFO@NEWP.COM WEB ADDRESS: WWW.NEWP.COM

**New England Wetmix (Wetland Seed Mix)**

Botanical Name	Common Name	Indicator
<i>Carex vulpinoidea</i>	Fox Sedge	OBL
<i>Carex scoparia</i>	Blunt Broom Sedge	FACW
<i>Carex lurida</i>	Lurid Sedge	OBL
<i>Carex lupulina</i>	Hop Sedge	OBL
<i>Poa palustris</i>	Fowl Bluegrass	FACW
<i>Bidens frondosa</i>	Beggar Ticks	FACW
<i>Scirpus atrovirens</i>	Green Bulrush	OBL
<i>Asclepias incarnata</i>	Swamp Milkweed	OBL
<i>Carex crinita</i>	Fringed Sedge	OBL
<i>Vernonia noveboracensis</i>	New York Ironweed	FACW+
<i>Juncus effusus</i>	Soft Rush	FACW+
<i>Aster lateriflorus (Symphyotrichum lateriflorum)</i>	Starved/Calico Aster	FACW
<i>Iris versicolor</i>	Blue Flag	OBL
<i>Glyceria grandis</i>	American Mannagrass	OBL
<i>Mimulus ringens</i>	Square Stemmed Monkey Flower	OBL
<i>Eupatorium maculatum (Eutrochium maculatum)</i>	Spotted Joe Pye Weed	OBL

PRICE PER LB. \$135.00 MIN. QUANTITY 1 LBS. TOTAL: \$135.00 APPLY: 18 LBS/ACRE :2500 sq ft/lb

The New England Wetmix (Wetland Seed Mix) contains a wide variety of native seeds that are suitable for most wetland restoration sites that are not permanently flooded. All species are best suited to moist ground as found in most wet meadows, scrub shrub, or forested wetland restoration areas. The mix is well suited for detention basin borders and the bottom of detention basins not generally under standing water. The seeds will not germinate under inundated conditions. If planted during the fall months the seed mix will germinate the following spring. During the first season of growth several species will produce seeds while other species will produce seeds after the second growing season. Not all species will grow in all wetland situations. This mix is comprised of the wetland species most likely to grow in created/restored wetlands and should produce more than 75% ground cover in two full growing seasons.

The wetland seeds in this mix can be sown by hand, with a hand-held spreader, or hydro-seeded on large or hard to reach sites. Lightly rake to insure good seed-to-soil contact. Seeding can take place on frozen soil, as the freezing and thawing weather of late fall and late winter will work the seed into the soil. If spring conditions are drier than usual watering may be required. If sowing during the summer months supplemental watering will likely be required until germination. A light mulch of clean, weed free straw is recommended.

New England Wetland Plants, Inc. may modify seed mixes at any time depending upon seed availability. The design criteria and ecological function of the mix will remain unchanged. Price is \$/bulk pound, FOB warehouse, Plus SH and applicable taxes.

**NEW ENGLAND WETLAND PLANTS, INC**

820 WEST STREET, AMHERST, MA 01002  
 PHONE: 413-548-8000 FAX 413-549-4000  
 EMAIL: INFO@NEWP.COM WEB ADDRESS: WWW.NEWP.COM

**New England Conservation/Wildlife Mix**

Botanical Name	Common Name	Indicator
<i>Elymus virginicus</i>	Virginia Wild Rye	FACW-
<i>Schizachyrium scoparium</i>	Little Bluestem	FACU
<i>Andropogon gerardii</i>	Big Bluestem	FAC
<i>Festuca rubra</i>	Red Fescue	FACU
<i>Sorghastrum nutans</i>	Indian Grass	UPL
<i>Panicum virgatum</i>	Switch Grass	FAC
<i>Chamaecrista fasciculata</i>	Partridge Pea	FACU
<i>Desmodium canadense</i>	Showy Tick Trefoil	FAC
<i>Asclepias tuberosa</i>	Butterfly Milkweed	NI
<i>Bidens frondosa</i>	Beggar Ticks	FACW
<i>Eupatorium purpureum (Eutrochium maculatum)</i>	Purple Joe Pye Weed	FAC
<i>Rudbeckia hirta</i>	Black Eyed Susan	FACU-
<i>Aster pilosus (Symphyotrichum pilosum)</i>	Heath (or Hairy) Aster	UPL
<i>Solidago juncea</i>	Early Goldenrod	

PRICE PER LB. \$39.50 MIN. QUANTITY 2 LBS. TOTAL: \$79.00 APPLY: 25 LBS/ACRE :1750 sq ft/lb

The New England Conservation/Wildlife Mix provides a permanent cover of grasses, wildflowers, and legumes for both good erosion control and wildlife habitat value. The mix is designed to be a no maintenance seeding, and is appropriate for cut and fill slopes, detention basin side slopes, and disturbed areas adjacent to commercial and residential projects.

New England Wetland Plants, Inc. may modify seed mixes at any time depending upon seed availability. The design criteria and ecological function of the mix will remain unchanged. Price is \$/bulk pound, FOB warehouse, Plus SH and applicable taxes.

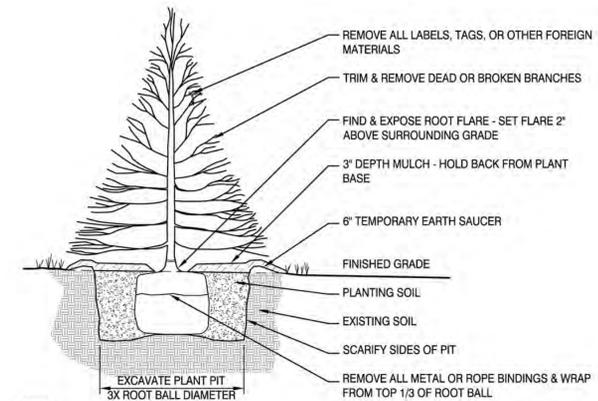
**Seeding Notes for Areas 1, 2, and 4:**

- Restore to original grade (see cross sections on Sheet 3)
- Hydroseed mulch all areas of disturbed soil

**Seeding Notes for Area 3:**

- Scarify and decompact soils in areas to be seeded
- Hydroseed mulch with specified seed mix or equivalent

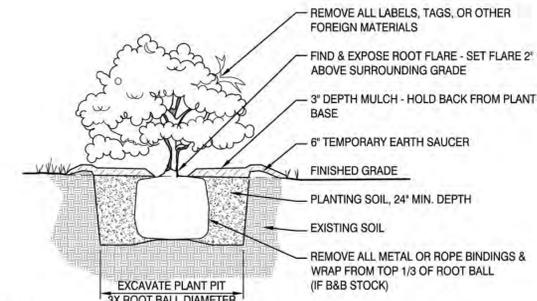
**Planting details provided by SMRT**



NOTES:

1. TREE TO BE SET PLUMB.
2. SECURE TREE AS MAY BE REQUIRED ACCORDING TO TREE SIZE, LOCATION, & WIND/WEATHER CONDITIONS.
3. IF USING ROOTBALL STABILIZATION, FOLLOW MANUFACTURER'S RECOMMENDATIONS.

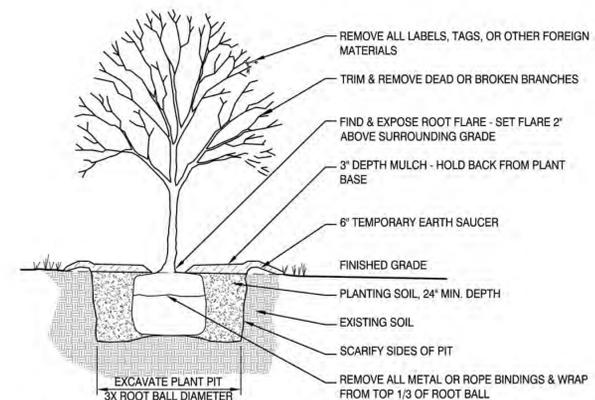
STANDARD EVERGREEN TREE PLANTING (H1) NOT TO SCALE



NOTES:

1. SHRUB TO BE SET PLUMB.

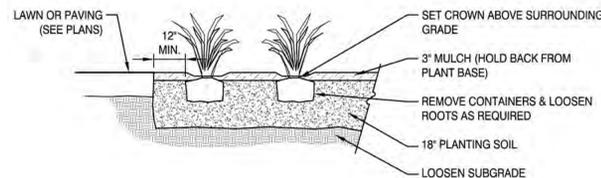
STANDARD SHRUB PLANTING (D1) NOT TO SCALE



NOTES:

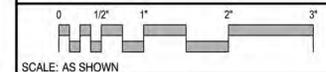
1. TREE TO BE SET PLUMB.
2. SECURE TREE AS MAY BE REQUIRED ACCORDING TO TREE SIZE, LOCATION, & WIND/WEATHER CONDITIONS.
3. IF USING ROOTBALL STABILIZATION, FOLLOW MANUFACTURER'S RECOMMENDATIONS.

STANDARD DECIDUOUS TREE PLANTING (A1) NOT TO SCALE



STANDARD PERENNIAL PLANTING (A5) NOT TO SCALE

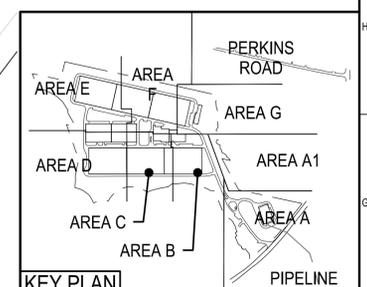
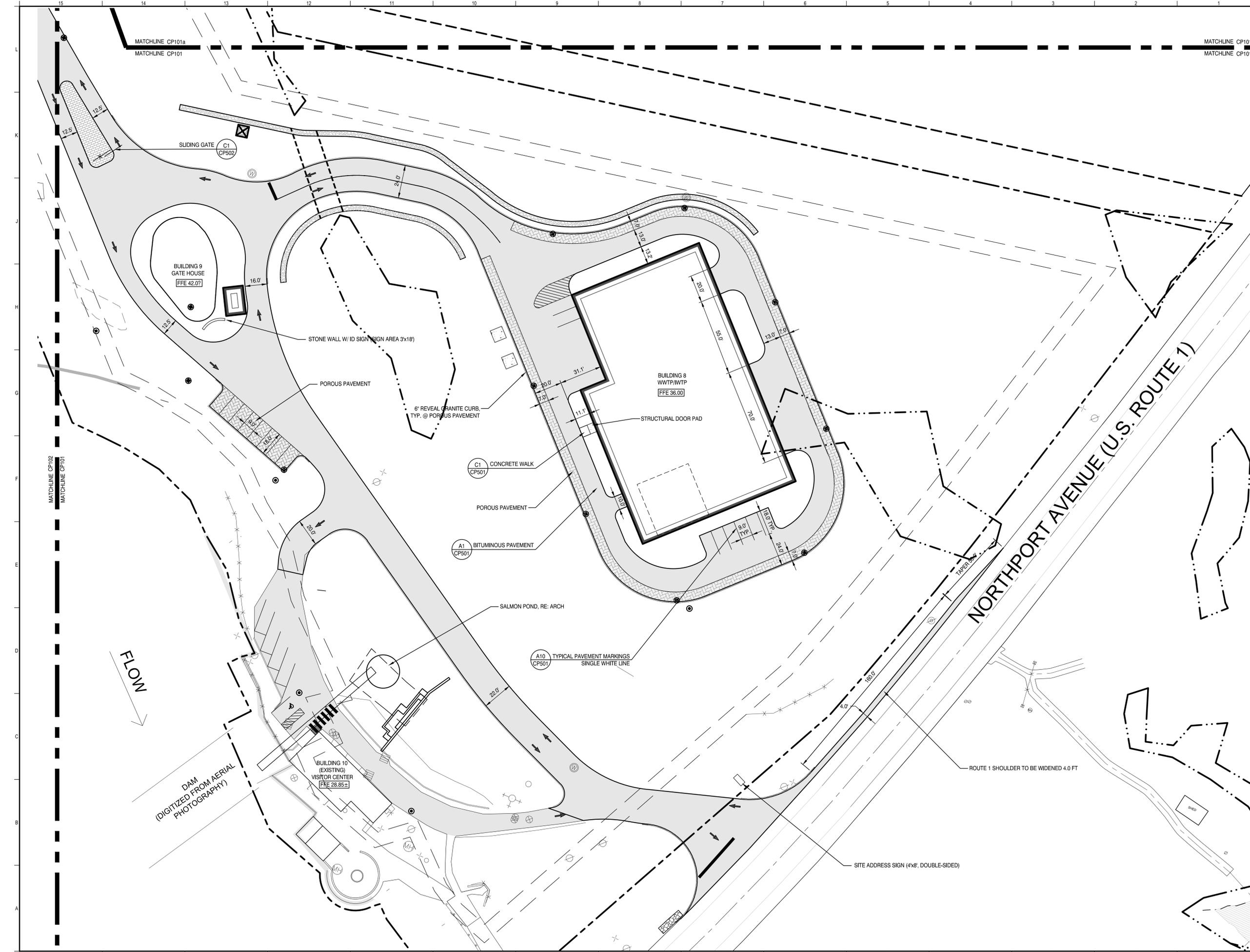
NORDIC AQUAFARMS  
 285 NORTHPORT AVENUE  
 BELFAST, MAINE  
 PLANTING DETAILS



**ATTACHMENT F**

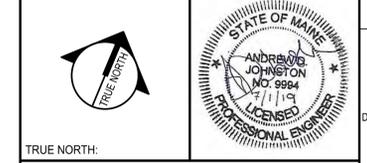
Updated Site Layout Plan Drawings CP101-CP107

Response to Review Comments  
Nordic Aquafarms Inc., Land-based Aquaculture Facility  
Belfast, Maine  
L-28319-26-A-N



REV	DESCRIPTION	DATE
1	REISSUED FOR PERMIT	7-03-19
0	ISSUED FOR PERMIT	5-14-19

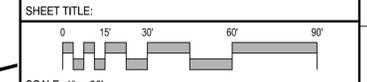
CURRENT ISSUE STATUS:



TRUE NORTH:  
 SMRT Architects and Engineers  
 144 Fore Street/P.O. BOX 618  
 Portland, Maine 04104  
 1.877.700.7678  
 www.smrtinc.com  
 ARCHITECTURE | ENGINEERING | PLANNING | INTERIORS | ENERGY  
**SMRT**  
**RANSOM** Consulting Engineers and Scientists  
 Ransom Consulting Engineers and Scientists  
 400 Commercial Street, Suite 400  
 Portland, Maine 04101

**NORDIC AQUAFARMS**  
 285 NORTHPORT AVENUE  
 BELFAST, MAINE

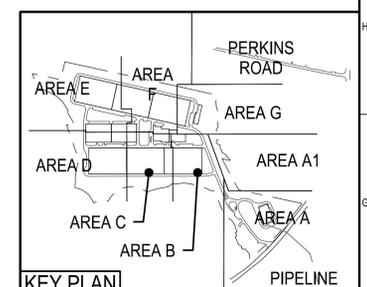
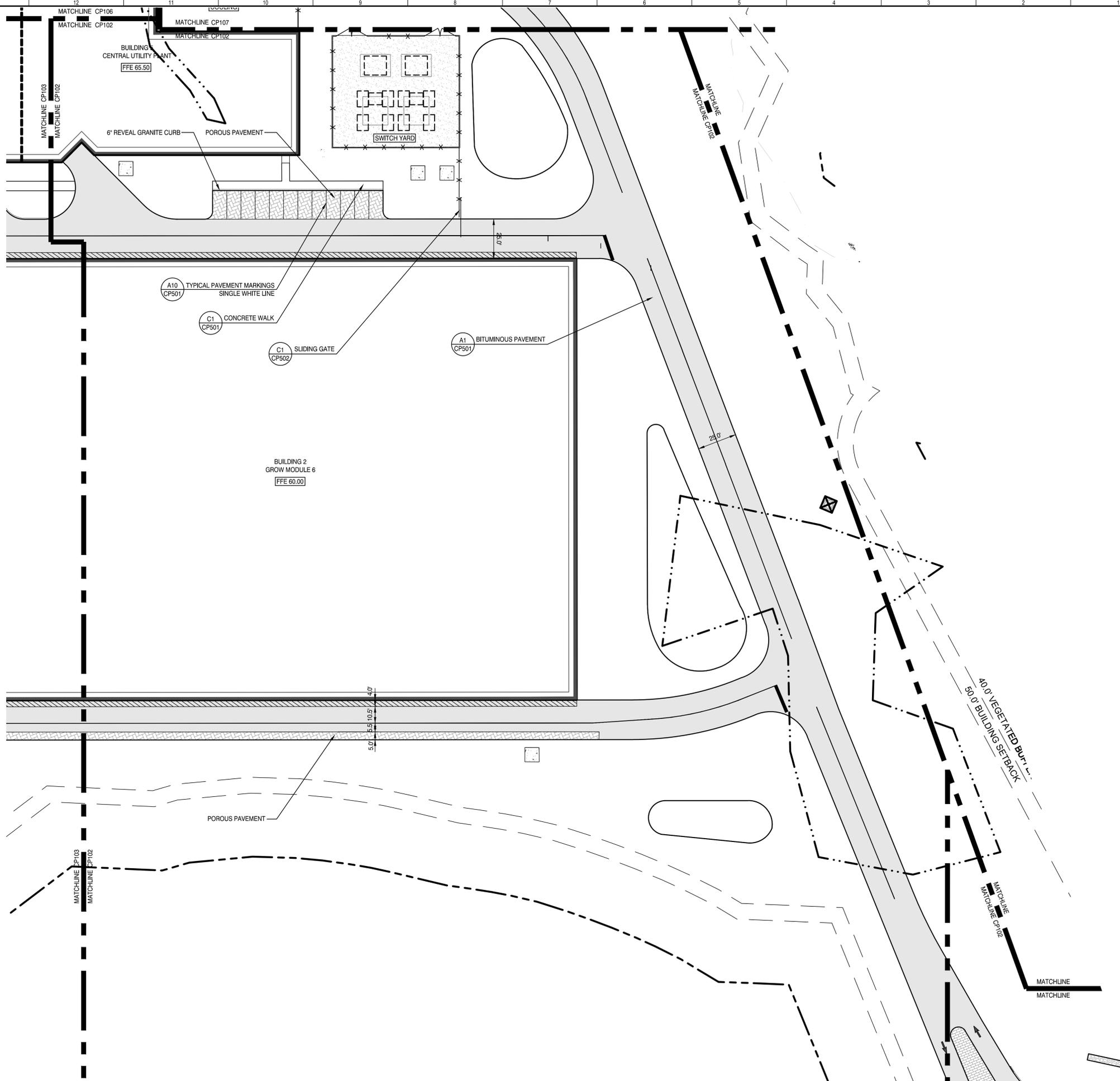
**SITE LAYOUT PLAN**  
**AREA A**



PROJECT MANAGER: ADB PROJECT NO: 18076  
 A/E OF RECORD:  
 JOB CAPTAIN: SP  
 DRAWN BY: WSM  
 SMRT FILE: CP101-18076 SHEET No.

**CP101**

NOT FOR CONSTRUCTION



REV	DESCRIPTION	DATE
1	REISSUED FOR PERMIT	7-03-19
0	ISSUED FOR PERMIT	5-14-19

**CURRENT ISSUE STATUS:**

TRUE NORTH

ANDREW JOHNSTON  
NO. 9994  
LICENSED PROFESSIONAL ENGINEER

SMRT Architects and Engineers  
144 Fore Street/P.O. BOX 618  
Portland, Maine 04104  
1.877.700.7678  
www.smrinc.com

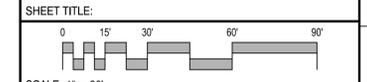
ARCHITECTURE | ENGINEERING | PLANNING | INTERIORS | ENERGY

**RANSOM** Consulting Engineers and Scientists  
Ransom Consulting Engineers and Scientists  
400 Commercial Street, Suite 400  
Portland, Maine 04101

**NORDIC AQUAFARMS**  
285 NORTHPORT AVENUE

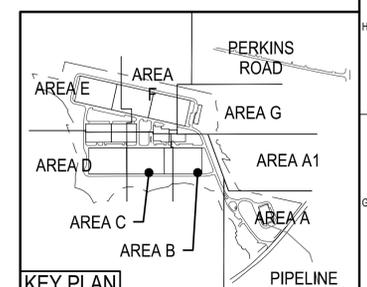
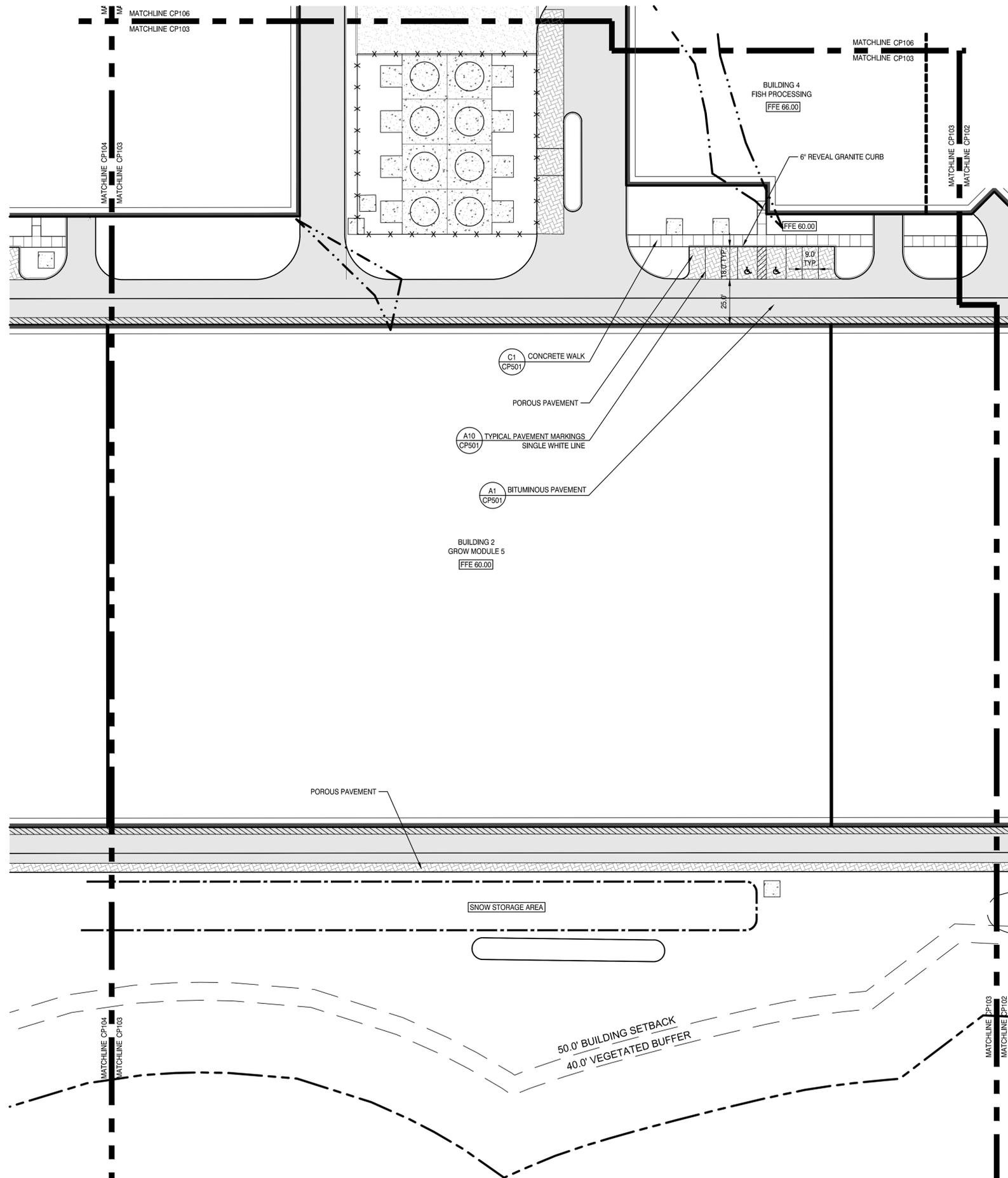
BELFAST, MAINE

**SITE LAYOUT PLAN**  
AREA B



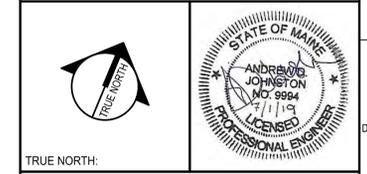
PROJECT MANAGER:	ADB	PROJECT NO:	18076
A/E OF RECORD:			
JOB CAPTAIN:	SP		
DRAWN BY:	WSM		
SMRT FILE:	CP102-18076	SHEET No.	CP102

NOT FOR CONSTRUCTION



REV	DESCRIPTION	DATE
1	REISSUED FOR PERMIT	7-03-19
0	ISSUED FOR PERMIT	5-14-19

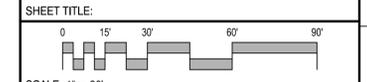
CURRENT ISSUE STATUS:



SMRT Architects and Engineers  
 144 Fore Street/P.O. BOX 618  
 Portland, Maine 04104  
 1.877.700.7678  
 www.smrting.com  
 ARCHITECTURE | ENGINEERING | PLANNING | INTERIORS | ENERGY  
**SMRT**  
**RANSOM** Consulting Engineers and Scientists  
 Ransom Consulting Engineers and Scientists  
 400 Commercial Street, Suite 400  
 Portland, Maine 04101

**NORDIC AQUAFARMS**  
 285 NORTHPORT AVENUE  
 BELFAST, MAINE

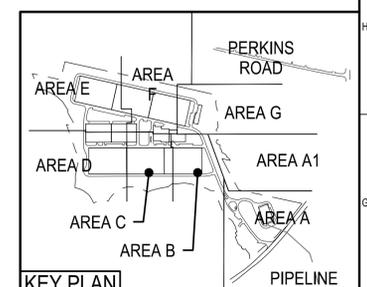
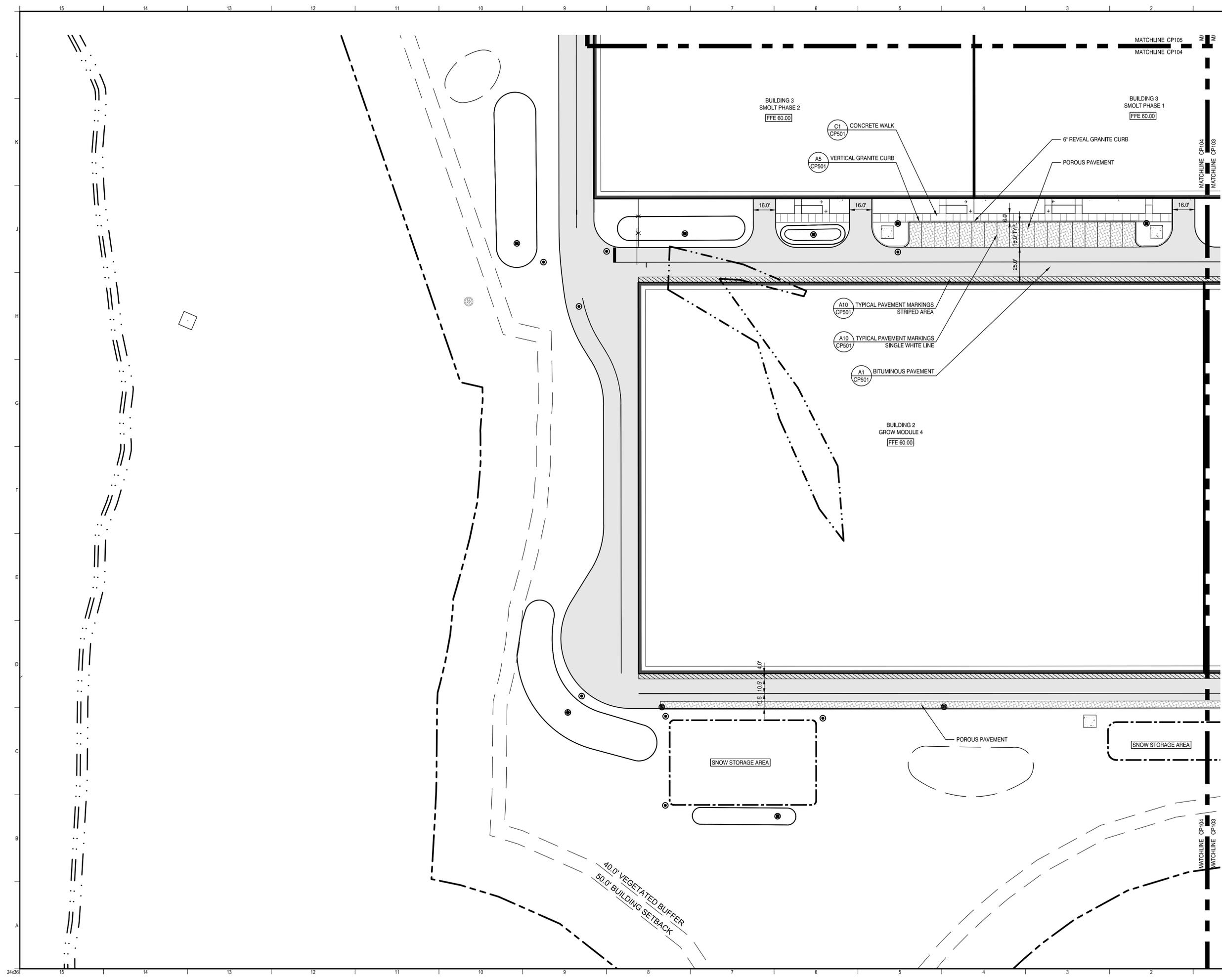
**SITE LAYOUT PLAN**  
 AREA C



PROJECT MANAGER: ADB PROJECT NO: 18076  
 A/E OF RECORD:  
 JOB CAPTAIN: SP  
 DRAWN BY: WSM  
 SMRT FILE: CP103-18076 SHEET No.

**CP103**

NOT FOR CONSTRUCTION



REV	DESCRIPTION	DATE
1	REISSUED FOR PERMIT	7-03-19
0	ISSUED FOR PERMIT	5-14-19

CURRENT ISSUE STATUS:

TRUE NORTH

ANDREW JOHNSON  
No. 9994  
LICENSED PROFESSIONAL ENGINEER

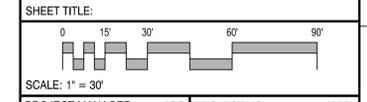
SMRT Architects and Engineers  
144 Fore Street/P.O. BOX 618  
Portland, Maine 04104  
1.877.700.7678  
www.smrting.com

ARCHITECTURE | ENGINEERING | PLANNING | INTERIORS | ENERGY

**RANSOM** Consulting Engineers and Scientists  
Ransom Consulting Engineers and Scientists  
400 Commercial Street, Suite 400  
Portland, Maine 04101

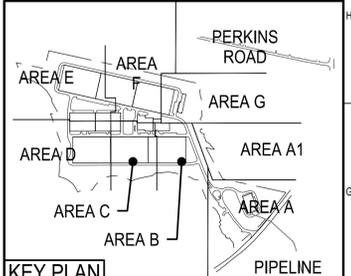
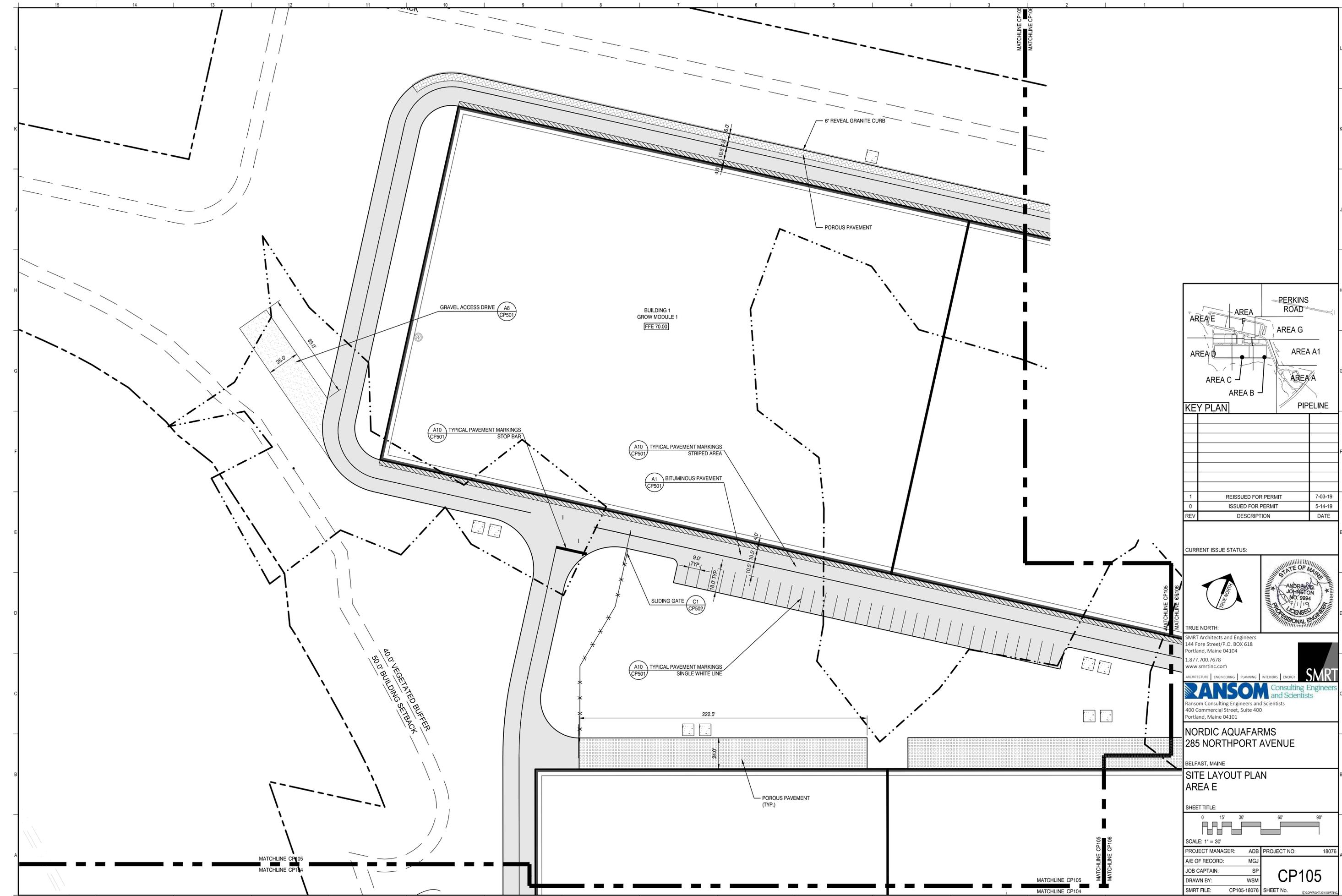
**NORDIC AQUAFARMS**  
285 NORTHPORT AVENUE

BELFAST, MAINE  
**SITE LAYOUT PLAN**  
AREA D



PROJECT MANAGER:	ADB	PROJECT NO:	18076
A/E OF RECORD:			
JOB CAPTAIN:	SP		
DRAWN BY:	WSM		
SMRT FILE:	CP104-18076	SHEET No.	CP104

NOT FOR CONSTRUCTION



REV	DESCRIPTION	DATE
1	REISSUED FOR PERMIT	7-03-19
0	ISSUED FOR PERMIT	5-14-19

TRUE NORTH:

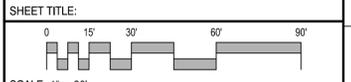
SMRT Architects and Engineers  
144 Fore Street/P.O. BOX 618  
Portland, Maine 04104  
1.877.700.7678  
www.smrting.com

ARCHITECTURE | ENGINEERING | PLANNING | INTERIORS | ENERGY

**RANSOM** Consulting Engineers and Scientists  
400 Commercial Street, Suite 400  
Portland, Maine 04101

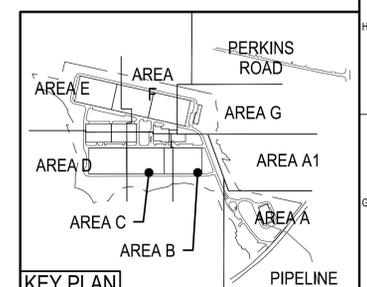
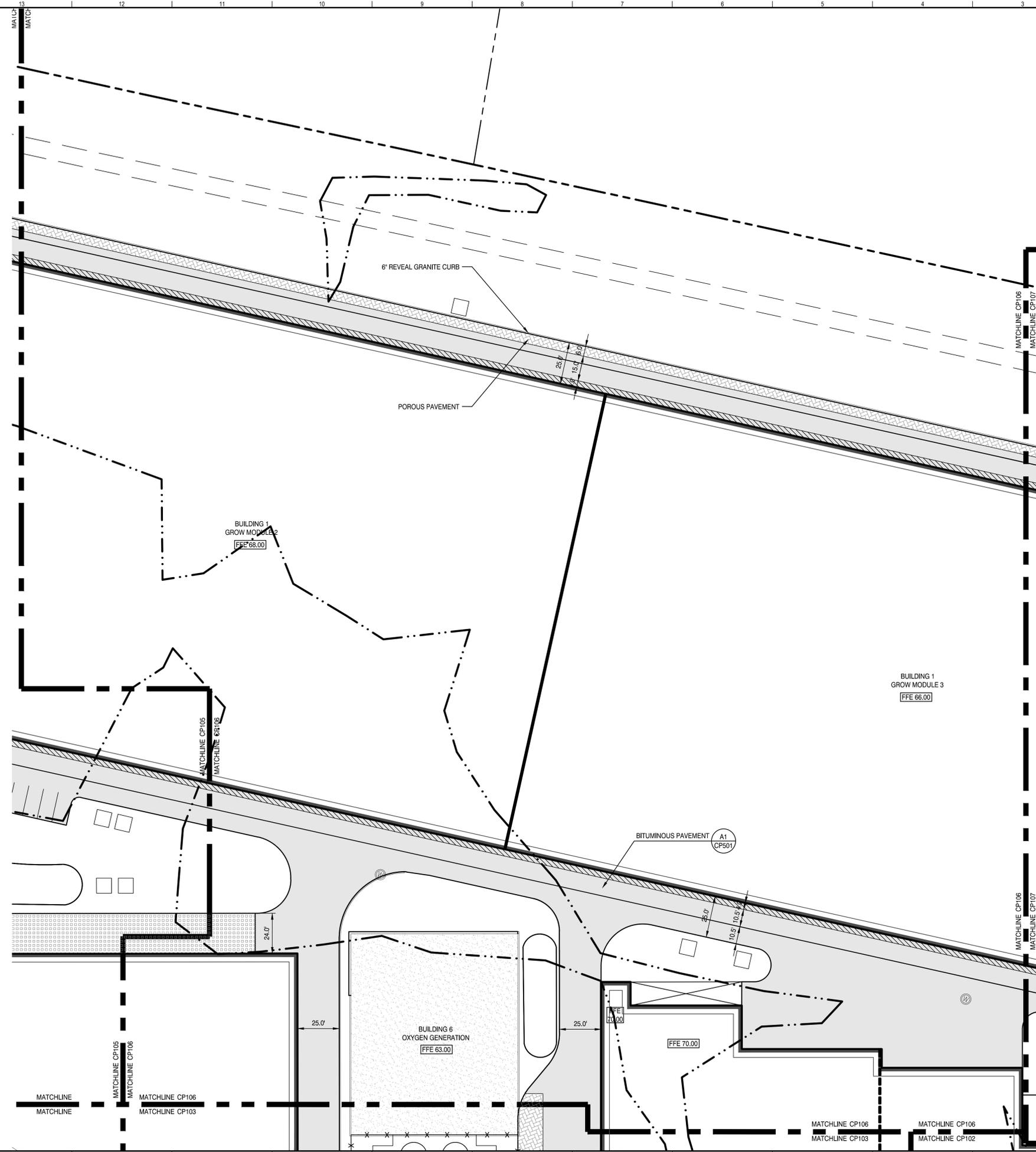
**NORDIC AQUAFARMS**  
285 NORTHPORT AVENUE  
BELFAST, MAINE

**SITE LAYOUT PLAN**  
AREA E



PROJECT MANAGER:	ADB	PROJECT NO.:	18076
A/E OF RECORD:	MGJ		
JOB CAPTAIN:	SP		
DRAWN BY:	WSM		
SMRT FILE:	CP105-18076	SHEET No.:	<b>CP105</b>

NOT FOR CONSTRUCTION



REV	DESCRIPTION	DATE
1	REISSUED FOR PERMIT	7-03-19
0	ISSUED FOR PERMIT	5-14-19

CURRENT ISSUE STATUS:

TRUE NORTH

ANDREW JOHNSTON  
No. 9994  
LICENSED PROFESSIONAL ENGINEER

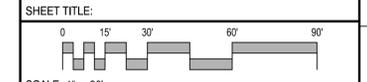
SMRT Architects and Engineers  
144 Fore Street/P.O. BOX 618  
Portland, Maine 04104  
1.877.700.7678  
www.smrinc.com

ARCHITECTURE | ENGINEERING | PLANNING | INTERIORS | ENERGY

**RANSOM** Consulting Engineers and Scientists  
Ransom Consulting Engineers and Scientists  
400 Commercial Street, Suite 400  
Portland, Maine 04101

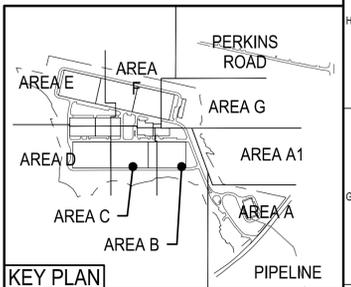
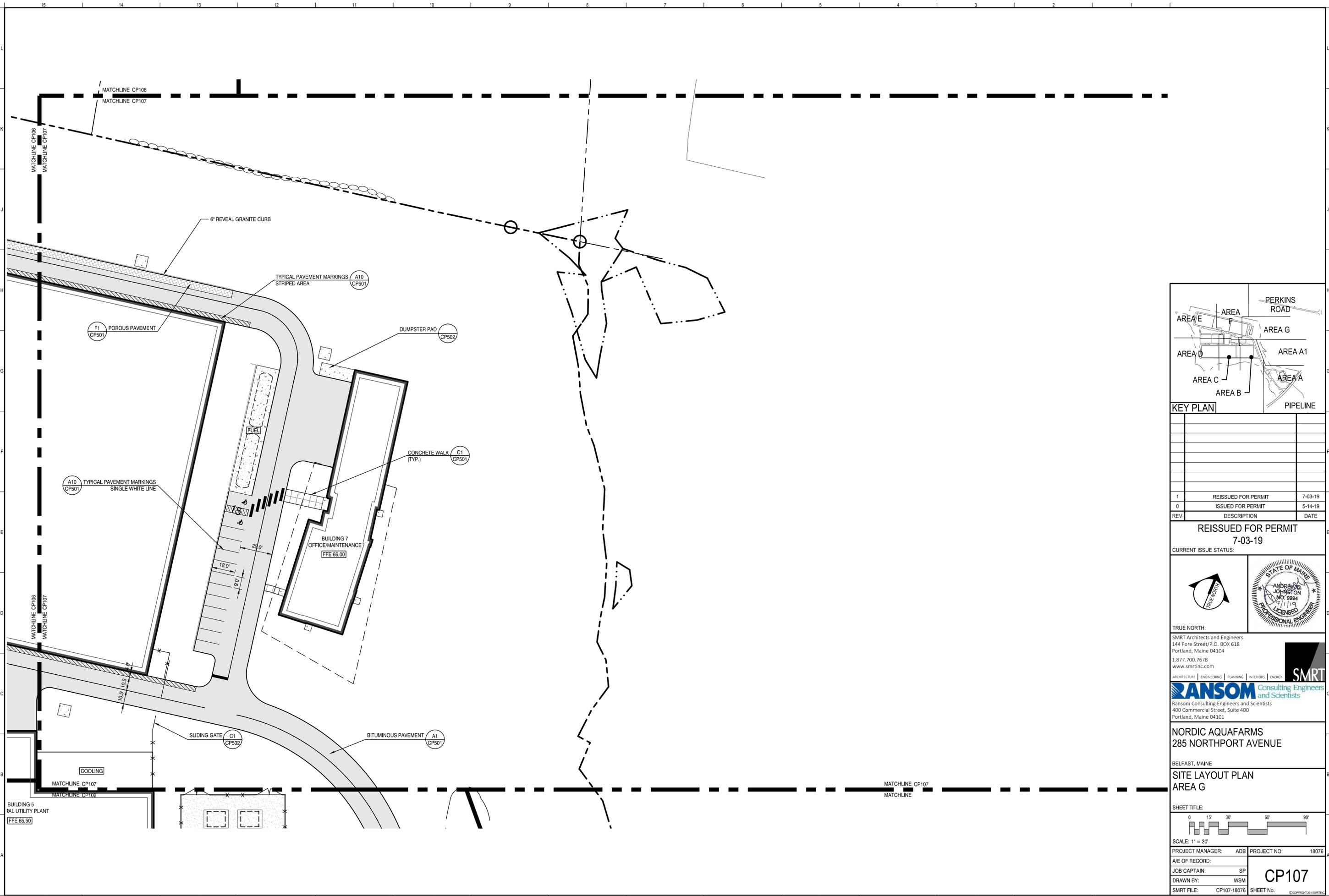
**NORDIC AQUAFARMS**  
285 NORTHPORT AVENUE  
BELFAST, MAINE

**SITE LAYOUT PLAN**  
AREA F



PROJECT MANAGER:	ADB	PROJECT NO.:	18076
A/E OF RECORD:	MGJ		
JOB CAPTAIN:	SP		
DRAWN BY:	WSM		
SMRT FILE:	CP106-18076	SHEET No.:	<b>CP106</b>

NOT FOR CONSTRUCTION



REV	DESCRIPTION	DATE
1	REISSUED FOR PERMIT	7-03-19
0	ISSUED FOR PERMIT	5-14-19

**REISSUED FOR PERMIT**  
7-03-19

CURRENT ISSUE STATUS:

TRUE NORTH

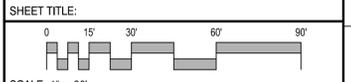
SMRT Architects and Engineers  
144 Fore Street/P.O. BOX 618  
Portland, Maine 04104  
1.877.700.7678  
www.smrting.com

ARCHITECTURE | ENGINEERING | PLANNING | INTERIORS | ENERGY

**RANSOM** Consulting Engineers and Scientists  
Ransom Consulting Engineers and Scientists  
400 Commercial Street, Suite 400  
Portland, Maine 04101

**NORDIC AQUAFARMS**  
285 NORTHPORT AVENUE  
BELFAST, MAINE

**SITE LAYOUT PLAN**  
AREA G



PROJECT MANAGER:	ADB	PROJECT NO.:	18076
A/E OF RECORD:			
JOB CAPTAIN:	SP		
DRAWN BY:	WSM		
SMRT FILE:	CP107-18076	SHEET No.:	<b>CP107</b>

NOT FOR CONSTRUCTION

**ATTACHMENT G**

Stream Assessment Report

Response to Review Comments

Nordic Aquafarms Inc., Land-based Aquaculture Facility

Belfast, Maine

L-28319-26-A-N



**Stream Assessment Report  
Nordic Aquafarms Aquaculture Facility  
285 Northport Avenue  
Belfast, Maine**

**Prepared For**

Ransom Consulting Engineers and Scientists  
400 Commercial Street  
Suite 404  
Portland, Maine 04101

**Submitted By**

Normandeau Associates, Inc.  
550 Forest Avenue  
Suite 201  
Portland, Maine 04101  
(207) 518-6765  
[www.normandeau.com](http://www.normandeau.com)

**July 29, 2019**

## Table of Contents

	Page
1.0 INTRODUCTION .....	1
2.0 METHODS .....	1
3.0 RESULTS .....	2
3.1 QHEI .....	2
4.0 WATER QUALITY .....	6
5.0 INVERTEBRATE SURVEY .....	6
6.0 FISHERIES .....	7
7.0 CONCLUSION .....	7
APPENDIX A	
QHEI DATA SHEETS	
APPENDIX B	
PHOTO LOG	

## List of Figures

	<b>Page</b>
Figure 1. Belfast Aquaculture Project Stream Assessment Map.....	4

## List of Tables

	<b>Page</b>
Table 1. QHEI Scoring Summary.....	2
Table 2. Water Quality Results.....	2
Table 3. Invertebrate Survey Results.....	7

## 1.0 Introduction

Ransom Consulting, Inc. (Ransom) contracted Normandeau Associates, Inc. (Normandeau) to conduct stream assessments at the site of the proposed Nordic Aquafarms Aquaculture facility in Belfast, Maine. This assessment was conducted on streams that fall under jurisdiction of the Natural Resource Protection Act (NRPA) and is in response to comments provided by the Maine Department of Environmental protection in a letter dated July 3, 2019.

## 2.0 Methods

Wetland Scientists from Normandeau conducted the stream assessment on July 19, 2019 utilizing “Methods for Assessing Habitat in Flowing Waters: Using the Qualitative Habitat Evaluation Index (QHEI)”. The QHEI was developed as an index of macro-habitat quality using physical parameters important to aquatic life. The scoring process assigns numbers to each physical parameter (metric) that, when summed, provide an index that can range in the negative to positive with a maximum score assigned to each metric. The metrics are:

- Substrate
- In stream cover
- Channel morphology
- Riparian Zone
- Pool Quality
- Riffle Quality
- Gradient

Each metric is then summed for a cumulative score for the given stream. The higher the cumulative score the better the habitat quality. Maximum score is 100. A cumulative score of  $\geq 70$  is considered excellent while scores of  $< 30$  are considered very poor.

QHEI data sheets were completed and are included in this report as Appendix A. The results of the QHEI surveys are summarized in **Table 1**. In addition to conducting QHEI’s, water quality (temperature, dissolved oxygen and pH) was also assessed on five of the six streams (one of the six streams was dry at the time of the survey) utilizing a Yellow Springs Instrument (YSI) which was calibrated in the field. Results of the water quality monitoring are presented in **Table 2**. Invertebrate surveys were conducted at each stream utilizing a D net for kick-net sampling when possible, dip-netting when there was no flow in the stream, and visual observation when there wasn’t enough standing water to submerge the net. The streams were also evaluated for their potential to provide fish habitat based on specific stream characteristics observed in the field and the results the water quality assessment.

For the purposes of this survey, S9 was divided into three sampling reaches (S9a, S9b, and S9c) due to noticeably different stream characteristics and surrounding habitat (**Figure 1**).

### 3.0 Results

The following summarizes the results of the QHEI survey, water quality analyses, invertebrate survey, and fish habitat assessment.

#### 3.1 QHEI

The QHEI evaluates streams based on six parameters: 1) substrate, 2) instream cover, 3) channel morphology, 4) bank erosion and riparian zone, 5) pool/glide and riffle/run quality, and 6: gradient/drainage area. A score of up to 20 can be given to parameters 1-3 & 5, and a score of up to 10 can be given to parameters 4 & 6. The maximum cumulative QHEI score that can be given to a stream is 100.

**Table 1** provides the QHEI scoring results for the eight sampling reaches within each of the six NRPA regulated streams within the project area:

**Table 1. QHEI Scoring Summary**

Stream ID	Substrate Max. 20	Instream Cover Max. 20	Channel Morphology Max. 20	Bank Erosion & Riparian Zone Max. 10	Pool/Glide & Riffle/Run Quality Max. 20	Gradient & Drainage Area Max.10	Total Max. 100	Rating
S3	7	6	10	9	-2	6	36	Poor
S5	6	6	10	9	-2	6	35	Poor
S6	6	10	10	4	-2	6	38	Poor
S8	7.5	6	12	6	1	6	38.5	Poor
S9a	7	10	10	7	-1	6	39	Poor
S9b	-1	4	4	4	-1	6	17	Very Poor
S9c	8.5	5	13	6.5	3	6	42	Poor
S10	6	9	9	4	-2	6	32	Poor

**Table 2. Water Quality Results**

	Temperature (Degrees Celsius)	pH	Dissolved Oxygen (Mg/L)
S3	16	6.3	3.02
S5	15.8	6	1.20
S6	16.1	6.2	0.81
S8	16.5	6.5	7.78
S9a	17.88	6.7	7.35
S9b	19.6	6.6	6.28
S9c	17.2	6.5	3.82
S10	Dry	Dry	Dry

### **Substrate**

The substrate parameter is scored based on the following criteria: type, origin, and quality (amount of silt and embeddedness). Of the 20 possible points, S9c scored the highest at 8.5, whereas S9b scored the lowest with -1. S8 scored 7.5, S3 and S9a scored 7's and S5 and S6 scored 6. All eight sampling reaches generally scored low in this category due to the amount of silt and embeddedness identified within each stream.

### **Instream Cover**

The instream cover parameter is scored based on the amount and quality of natural, overhanging or instream shelter available to fish and wildlife. While as these streams are intermittent and unlikely to provide suitable habitat to fish, this parameter was still evaluated. Of the 20 possible points, S9a and S6 scored the highest with 10 due to the presence of overhanging vegetation, and S10 scored 9 having similar characteristics. S3, S5, and S8 all scored 6 and S9b scored the lowest with 4 as this stream occurs within maintained lawn and overhanging vegetation is sparse. Logs and/or woody debris were observed within S3, S5, S6, and S8, and boulders were also observed within S8.

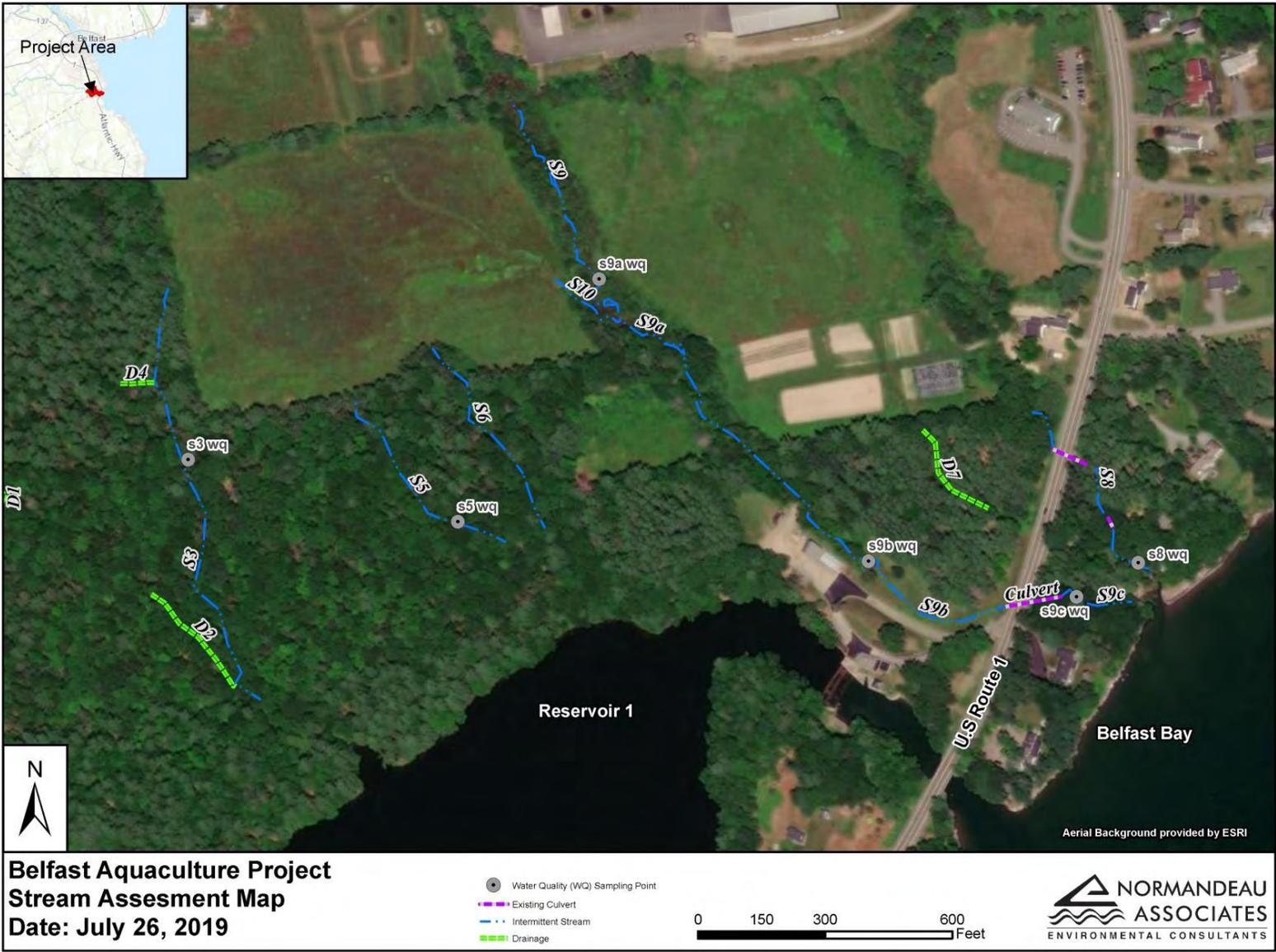


Figure 1. Belfast Aquaculture Project Stream Assessment Map.

### Channel Morphology

The channel morphology parameter is scored based on the quality of the stream channel in regards to sinuosity, development, channelization, and stability. It is important to note that “channelization” refers to anthropogenic channelization (ditching, etc.) and not natural channel development, which is discussed as a positive stream attribute in the Wetlands Delineation report Normandeau submitted for this project. Of the 20 possible points, S9c scored the highest with 13 due to low sinuosity (most streams scored ‘none’), fair development, no channelization and moderate stability. S9b scored the lowest with no sinuosity, poor development, recent or no recovery from channelization, and low stability. S3, S5, S6 and S9a were all similar in channel characteristics and scored 10 and S8 scored a 12, as it had similar characteristics to S9c except for scoring “none” for sinuosity.

### Bank Erosion and Riparian Zone

The bank erosion and riparian zone parameter is scored based on the quality of the surrounding buffer, floodplain, and presence or lack of bank erosion. Of the 10 possible points, S3 and S5 both scored the highest with 9. These two streams are similar in that they both had little or moderate bank erosion, moderate to wide riparian width, and scored high for floodplain quality with either forest or shrub/old field. S6 and S9b scored the lowest with 4. S9b scored low due to having no riparian width and the immediate floodplain being within a maintained lawn; S9b did however show no to little bank erosion due to thick vegetation (grass) along the banks and lack of noticeable flows able to cause erosion. S6 scored low due to heavy/severe erosion and a very narrow riparian width. The remaining streams fell between 7 and 6.5 due to visible erosion and low riparian/floodplain quality: S9a scored 7, S9c scored 6.5, and S8 scored 6.

### Pool/Glide and Riffle-Run

The pool/glide and riffle-run parameter is scored based on the depth and width of these features, as well as velocity, substrate type and embeddedness. Of the 20 possible points, the streams scored a range of -2 to 3 (S9c being the highest scoring), largely because these streams are intermittent, mostly lacked flowing water and do not possess riffle and run characteristics.

### Gradient

The gradient parameter is based on the elevation drop within the sampling area. The six streams all received the score of “moderate,” as they are all intermittent with short sampling areas and are all within similar terrain. Drainage area was not calculated for these streams due to the fact that they are all intermittent with small drainage areas, and this calculation does not add or subtract from the QHEI score.

### Summary

Of the 100 total possible QHEI points, the highest scoring sampling stretch was S9c with 42, largely because of the longer hydroperiod resulting in higher scores for substrate, instream cover, channel morphology, and pool/glide and riffle/run quality. S9b scored the lowest with 17, largely because of its channelization, riparian clearing, and other anthropogenic influences. S8 was the second highest scoring stream with 39 and had similarities to S9c in its relatively high scores in substrate quality and channel morphology. S3, S5, S6 and S9a all scored low, within the 30’s, as they had relatively similar

characteristics including a shorter flowing hydroperiod, moderate substrate stability, and higher levels of silt and embeddedness.

Although our highest observed score of 42 is higher on the QHEI scale when compared to our lowest observed score of 17, both of these scores indicate low quality habitat. Rankin 1989<sup>1</sup> gives us some context for understanding the observed scores by comparing them to the Index of Biotic Integrity (IBI). Karr 1981<sup>2</sup> elaborates on the strength of IBI and why it is thought to be superior to purely rating aquatic habitat based solely on diversity of species. IBI is a complex rating system for fisheries and invertebrate communities which ensures that species diversity is weighted to reflect the relative environmental tolerances of the species present. This reduces the chances of an artificially inflated habitat quality rating produced by an abundance of only species which can tolerate poor conditions.

With this contextual information in mind, the QHEI scores can be put into perspective. Based on the documented relationship between QHEI and IBI which can be found in Rankin 1989, a QHEI score of 42 would equate to just over 30 on the IBI scale. Karr 1981 suggests that this would fall within the “Poor” rating which is assigned to any score between 28 and 35. A QHEI score of 17 would equate to an IBI score of just over 20, which would receive the worst designation IBI can give, “very poor”.

## 4.0 Water Quality

A YSI was used to sample water quality (temperature, dissolved oxygen and pH) on five of the six streams, and 8 sampling stretches. S10 did not have standing water to sample at the time of the survey. **Table 2** summarizes the results of each sample.

The temperature ranges were typical of what to expect given the atmospheric temperature of approximately 75 degrees Fahrenheit and relative amount of shade, or lack thereof, over each sampling area. The pH was slightly acidic in all of the sampling reaches. Dissolved oxygen was low in most sampling reaches (4 mg/L is generally considered the minimum needed to support populations of fish) with the exception of S8, S9a, and S9b.

## 5.0 Invertebrate Survey

A D-net was used to survey for invertebrates by conducting kick-netting wherever there was flowing water. Kick-netting was only possible in S8, S9a and S9c as they had slight flows. Dip-netting was done at S9b because there was no flowing water; and invertebrates were recorded as visually observed in S3, S5, S6, and S10 because there were no pools deep enough to submerge the net.

**Table 3** summarizes the results of the invertebrate survey. An ‘X’ indicates ‘presence’ and a ‘-’ indicates absence.

---

<sup>1</sup> Rankin E. T. 1989. The Qualitative Habitat Evaluation Index [QHEI]: Rationale, Methods, and Application. State of Ohio Environmental Protection Agency. Ecological Assessment Section. Division of Water Quality. Planning and Assessment.

<sup>2</sup> Karr, James. (1981). Assessment of Biotic Integrity Using Fish Communities. Fisheries. 6. 21-27.

**Table 3. Invertebrate Survey Results**

Stream Sampling Stretch	Mosquito Larvae	Beetle Larvae	Amphipods	Oligochaetes	Snails
S3	X	-	-	-	-
S5	X	-	-	-	-
S6	X	X	-	-	-
S8	-	-	X	-	-
S10	-	-	-	-	-
S9a	-	-	-	-	X
S9b	-	-	-	-	-
S9c	-	-	-	X	X

The stream reaches sampled exhibited low invertebrate diversity, as just five species were observed. Mosquito and beetle larvae presence was observed in S3, S5, and S6, and the only water in these streams were isolated stagnant pools. A beetle larvae was also observed in S6. Amphipods were observed in S8 which is adjacent to Belfast Bay, and oligochaetes were observed in S9c, which is also adjacent to Belfast Bay. Snails were observed in S9a and S9c.

## 6.0 Fisheries

During the stream assessment, each sampling reach was evaluated for the potential to provide fish habitat. The potential to provide fish habitat was evaluated based on 1) presence and flow of water, 2) substrate quality, 3) dissolved oxygen, 4) and connectivity to known downstream fish habitat. Connectivity, or lack thereof, was determined based on downstream barriers such as hung culverts and natural barriers including topography and downed logs.

S3, S5, S6, S9a, S9b and S10 were determined to have no potential to provide fish habitat. S3, S5, S6, S8 and S10 have no potential connection with known downstream fish habitat. S10 had no standing water at the time of the survey, while stagnant, shallow, isolated pools were observed in S3, S5, and S6, which is not conducive to providing habitat for fish. Additionally, S3, S5 and S6 all showed dissolved oxygen numbers below 4mg/L (see **Table 2**), which is considered the general accepted minimum needed to support fish populations. S9b is a low gradient, silty, stagnant stretch of stream; upstream from a perched culvert under Route 1 to S9c, so it not considered to provide potential fish habitat. The substrate types in all sampling reaches besides S8 and S9c were predominantly silt based, which is not optimal for fish populations because it can damage gills and cover up eggs.

S8 and S9c are the only two sampling stretches that have an intermittent connection with Belfast Bay. However, both stretches had shallow, isolated pools and did not show an existing connection with Belfast Bay, so the potential for these streams to contain fish is very low.

## 7.0 Conclusion

Eight sampling reaches within six intermittent streams were evaluated utilizing the QHEI method. Overall the streams scored low out of 100 available points. This is largely because each stream was intermittent and mostly made up of silt, with the exception of S8 and S9c. Each stream also lacked

flowing water that could aid in the identification of pools, glides, riffles and runs with the exception of S8, S9a and S9c; however, riffles and runs were identified based on substrate formations and not active flowing water.

Water quality wasn't conducive to providing fish habitat, particularly in regards to dissolved oxygen with the exception of S8, S9a and 9b.

The streams exhibited low invertebrate diversity, largely due to minimal water, and low quality silty substrate, with the exception of S8 and S9c which had higher quality gravel and cobble for substrate.

Overall, the streams do not have characteristics conducive to providing fish habitat due to either intermittent flows or no potential connection to known downstream fish habitat, low dissolved oxygen, and poor substrate quality.

With all of the streams assessed at the Nordic Aquafarms property receiving QHEI scores between 18 and 42, and corresponding IBI ratings between poor and very poor, it is unlikely that these streams provide adequate habitat to support viable fish populations and generally represent overall low quality stream habitat. However, it is important to note that the project design and proposed impact compensation package focuses on the two highest scoring streams, S9 and S8. The Deeded Riparian Buffer protects all of S9 and the Riparian Restoration plan for S9 focuses on the lowest scoring reaches of S9. The protection and improvements to S9 and the culvert replacement for S8 will result in increasing the QHEI values for some metrics of these two streams.

# **Appendix A**

## **QHEI Data Sheets**

Stream & Location: S3 RM: Date: 7 / 19 / 19

Sean Moriarty and Ben Griffith Scorers Full Name & Affiliation: Normandeau Associates

River Code: N/A - N/A - N/A STORET #: N/A Lat./ Long.: 44.39604 68.99549 Office verified location

1] SUBSTRATE Check ONLY Two substrate TYPE BOXES; estimate % or note every type present. Check ONE (Or 2 & average). BEST TYPES: BLDR /SLABS [10], BOULDER [9], COBBLE [8], GRAVEL [7], SAND [6], BEDROCK [5]. OTHER TYPES: HARDPAN [4], DETRITUS [3], MUCK [2], SILT [2], ARTIFICIAL [0]. ORIGIN: LIMESTONE [1], TILLS [1], WETLANDS [0], SANDSTONE [0], RIP/RAP [0], LACUSTURINE [0], SHALE [-1], COAL FINES [-2]. QUALITY: HEAVY [-2], MODERATE [-1], NORMAL [0], FREE [1], EXTENSIVE [-2], MODERATE [-1], NORMAL [0], NONE [1]. Substrate Maximum 20: 7

2] INSTREAM COVER Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts. AMOUNT: EXTENSIVE >75% [11], MODERATE 25-75% [7], SPARSE 5-<25% [3], NEARLY ABSENT <5% [1]. Cover Maximum 20: 6

3] CHANNEL MORPHOLOGY Check ONE in each category (Or 2 & average). SINUOSITY: HIGH [4], MODERATE [3], LOW [2], NONE [1]. DEVELOPMENT: EXCELLENT [7], GOOD [5], FAIR [3], POOR [1]. CHANNELIZATION: NONE [6], RECOVERED [4], RECOVERING [3], RECENT OR NO RECOVERY [1]. STABILITY: HIGH [3], MODERATE [2], LOW [1]. Channel Maximum 20: 10

4] BANK EROSION AND RIPARIAN ZONE Check ONE in each category for EACH BANK (Or 2 per bank & average). RIVER RIGHT LOOKING DOWNSTREAM. EROSION: NONE / LITTLE [3], MODERATE [2], HEAVY / SEVERE [1]. RIPARIAN WIDTH: WIDE > 50m [4], MODERATE 10-50m [3], NARROW 5-10m [2], VERY NARROW < 5m [1], NONE [0]. FLOOD PLAIN QUALITY: FOREST, SWAMP [3], SHRUB OR OLD FIELD [2], RESIDENTIAL, PARK, NEW FIELD [1], FENCED PASTURE [1], OPEN PASTURE, ROWCROP [0]. CONSERVATION TILLAGE [1], URBAN OR INDUSTRIAL [0], MINING / CONSTRUCTION [0]. Riparian Maximum 10: 9

5] POOL / GLIDE AND RIFFLE / RUN QUALITY MAXIMUM DEPTH: > 1m [6], 0.7-<1m [4], 0.4-<0.7m [2], 0.2-<0.4m [1], < 0.2m [0]. CHANNEL WIDTH: POOL WIDTH > RIFFLE WIDTH [2], POOL WIDTH = RIFFLE WIDTH [1], POOL WIDTH < RIFFLE WIDTH [0]. CURRENT VELOCITY: TORRENTIAL [-1], VERY FAST [1], FAST [1], MODERATE [1], SLOW [1], INTERSTITIAL [-1], INTERMITTENT [-2], EDDIES [1]. Recreation Potential: Primary Contact, Secondary Contact. Pool / Current Maximum 12: -2

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species: Check ONE (Or 2 & average). NO RIFFLE [metric=0]. RIFFLE DEPTH: BEST AREAS > 10cm [2], BEST AREAS 5-10cm [1], BEST AREAS < 5cm [metric=0]. RUN DEPTH: MAXIMUM > 50cm [2], MAXIMUM < 50cm [1]. RIFFLE / RUN SUBSTRATE: STABLE [2], MOD. STABLE [1], UNSTABLE [0]. RIFFLE / RUN EMBEDDEDNESS: NONE [2], LOW [1], MODERATE [0], EXTENSIVE [-1]. Riffle / Run Maximum 8: 0

6] GRADIENT (N/A f/mi) DRAINAGE AREA (N/A m²) VERY LOW - LOW [2-4], MODERATE [6-10], HIGH - VERY HIGH [10-6]. %POOL: N/A %GLIDE: N/A %RUN: N/A %RIFFLE: N/A Gradient Maximum 10: 6

**AJ SAMPLED REACH**

Check ALL that apply

Comment RE: Reach consistency/Is reach typical of stream?, Recreation/ Observed - Inferred, Other/ Sampling observations, Concerns, Access directions, etc.

**METHOD**

- 
- BOAT
- 
- 
- WADE
- 
- 
- L. LINE
- 
- 
- OTHER

**STAGE**

- 1st -sample pass- 2nd
- 
- 
- HIGH
- 
- 
- 
- UP
- 
- 
- 
- NORMAL
- 
- 
- 
- LOW
- 
- 
- 
- DRY
- 

This sampling reach is generally consistent throughout. Flowing water was not present at the time of the survey and water was only observed in small, stagnant, isolated pools. See Stream Assessment Report for more details.

**DISTANCE**

- 
- 0.5 Km
- 
- 
- 0.2 Km
- 
- 
- 0.15 Km
- 
- 
- 0.12 Km
- 
- 
- OTHER
- 
- 
- <0.12Km
- 
- meters

**CLARITY**

- 1st -sample pass- 2nd
- 
- 
- < 20 cm
- 
- 
- 
- 20-<40 cm
- 
- 
- 
- 40-70 cm
- 
- 
- 
- > 70 cm/ CTB
- 
- 
- 
- SECCHI DEPTH
- 

**CANOPY**

- 
- > 85% - OPEN
- 
- 
- 55% -<85%
- 
- 
- 30% -<55%
- 
- 
- 10% -<30%
- 
- 
- <10% - CLOSED

- 1st N/A cm
- 
- 2nd N/A cm

**CJ RECREATION**
 AREA DEPTH  
 POOL:  >100ft<sup>2</sup>  >3ft
**BJ AESTHETICS**

- 
- NUISANCE ALGAE
- 
- 
- INVASIVE MACROPHYTES
- 
- 
- EXCESS TURBIDITY
- 
- 
- DISCOLORATION
- 
- 
- FOAM / SCUM
- 
- 
- OIL SHEEN
- 
- 
- TRASH / LITTER
- 
- 
- NUISANCE ODOR
- 
- 
- SLUDGE DEPOSITS
- 
- 
- CSOs/SSOs/OUTFALLS

**DJ MAINTENANCE**

- PUBLIC / PRIVATE /
- BOTH**
- / NA
- 
- ACTIVE / HISTORIC / BOTH / NA
- 
- YOUNG-SUCCESSION-OLD
- 
- SPRAY / SNAG / REMOVED
- 
- MODIFIED / DIPPED OUT / NA
- 
- LEVEED / ONE SIDED
- 
- RELOCATED / CUTOFFS
- 
- MOVING-BEDLOAD-STABLE
- 
- ARMoured / SLUMPS
- 
- ISLANDS / SCOURED
- 
- IMPOUNDED / DESICCATED
- 
- FLOOD CONTROL / DRAINAGE

Circle some &amp; COMMENT

**EJ ISSUES**

- WWTP / CSO / NPDES / INDUSTRY
- 
- HARDENED / URBAN / DIRT&GRIME
- 
- CONTAMINATED / LANDFILL
- 
- BMPs-CONSTRUCTION-SEDIMENT
- 
- LOGGING**
- / IRRIGATION / COOLING
- 
- BANK / EROSION / SURFACE
- 
- FALSE BANK / MANURE / LAGOON
- 
- WASH H
- <sub>2</sub>
- O / TILE / H
- <sub>2</sub>
- O TABLE
- 
- ACID / MINE / QUARRY / FLOW
- 
- NATURAL / WETLAND / STAGNANT
- 
- PARK / GOLF / LAWN / HOME
- 
- ATMOSPHERE / DATA PAUCITY

**FJ MEASUREMENTS**

- x̄ width 2'
- 
- x̄ depth 4"
- 
- max. depth
- 
- x̄ bankfull width 6'
- 
- bankfull x̄ depth 3'
- 
- W/D ratio
- 
- bankfull max. depth
- 
- floodprone x
- <sup>2</sup>
- width
- 
- entrench. ratio

Legacy Tree:

**Stream Drawing:**

See Figure 1.

Stream & Location: S5 RM: Date: 7 / 19 / 19

Sean Moriarty and Ben Griffith Scorers Full Name & Affiliation: Normandeau Associates

River Code: N/A - N/A - N/A STORET #: N/A Lat./ Long.: 44.39614 / 68.99358 Office verified location

1] SUBSTRATE Check ONLY Two substrate TYPE BOXES; estimate % or note every type present. Check ONE (Or 2 & average). BEST TYPES: BLDR / SLABS [10], BOULDER [9], COBBLE [8], GRAVEL [7], SAND [6], BEDROCK [5]. OTHER TYPES: HARDPAN [4], DETRITUS [3], MUCK [2], SILT [2], ARTIFICIAL [0]. ORIGIN: LIMESTONE [1], TILLS [1], WETLANDS [0], SANDSTONE [0], RIP/RAP [0], LACUSTURINE [0], SHALE [-1], COAL FINES [-2]. QUALITY: HEAVY [-2], MODERATE [-1], NORMAL [0], FREE [1], EXTENSIVE [-2], MODERATE [-1], NORMAL [0], NONE [1]. Substrate Maximum 20: 6

2] INSTREAM COVER Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts. AMOUNT: EXTENSIVE >75% [11], MODERATE 25-75% [7], SPARSE 5-<25% [3], NEARLY ABSENT <5% [1]. Cover Maximum 20: 6

3] CHANNEL MORPHOLOGY Check ONE in each category (Or 2 & average). SINUOSITY: HIGH [4], MODERATE [3], LOW [2], NONE [1]. DEVELOPMENT: EXCELLENT [7], GOOD [5], FAIR [3], POOR [1]. CHANNELIZATION: NONE [6], RECOVERED [4], RECOVERING [3], RECENT OR NO RECOVERY [1]. STABILITY: HIGH [3], MODERATE [2], LOW [1]. Channel Maximum 20: 10

4] BANK EROSION AND RIPARIAN ZONE Check ONE in each category for EACH BANK (Or 2 per bank & average). RIPARIAN WIDTH: WIDE > 50m [4], MODERATE 10-50m [3], NARROW 5-10m [2], VERY NARROW < 5m [1], NONE [0]. FLOOD PLAIN QUALITY: FOREST, SWAMP [3], SHRUB OR OLD FIELD [2], RESIDENTIAL, PARK, NEW FIELD [1], FENCED PASTURE [1], OPEN PASTURE, ROWCROP [0]. CONSERVATION TILLAGE [1], URBAN OR INDUSTRIAL [0], MINING / CONSTRUCTION [0]. Riparian Maximum 10: 9

5] POOL / GLIDE AND RIFFLE / RUN QUALITY MAXIMUM DEPTH: > 1m [6], 0.7-<1m [4], 0.4-<0.7m [2], 0.2-<0.4m [1], < 0.2m [0]. CHANNEL WIDTH: POOL WIDTH > RIFFLE WIDTH [2], POOL WIDTH = RIFFLE WIDTH [1], POOL WIDTH < RIFFLE WIDTH [0]. CURRENT VELOCITY: TORRENTIAL [-1], VERY FAST [1], FAST [1], MODERATE [1], SLOW [1], INTERSTITIAL [-1], INTERMITTENT [-2], EDDIES [1]. Recreation Potential Primary Contact Secondary Contact. Pool / Current Maximum 12: -2

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species: Check ONE (Or 2 & average). RIFFLE DEPTH: BEST AREAS > 10cm [2], BEST AREAS 5-10cm [1], BEST AREAS < 5cm [metric=0]. RUN DEPTH: MAXIMUM > 50cm [2], MAXIMUM < 50cm [1]. RIFFLE / RUN SUBSTRATE: STABLE (e.g., Cobble, Boulder) [2], MOD. STABLE (e.g., Large Gravel) [1], UNSTABLE (e.g., Fine Gravel, Sand) [0]. RIFFLE / RUN EMBEDDEDNESS: NONE [2], LOW [1], MODERATE [0], EXTENSIVE [-1]. Riffle / Run Maximum 8: 0

6] GRADIENT (N/A ft/mi) DRAINAGE AREA (N/A mi^2). VERY LOW - LOW [2-4], MODERATE [6-10], HIGH - VERY HIGH [10-6]. %POOL: N/A %GLIDE: N/A %RUN: N/A %RIFFLE: N/A Gradient Maximum 10: 6

**AJ SAMPLED REACH**

Check ALL that apply

Comment RE: Reach consistency/Is reach typical of stream?, Recreation/ Observed - Inferred, Other/ Sampling observations, Concerns, Access directions, etc.

**METHOD**

- BOAT  
 WADE  
 L. LINE  
 OTHER

**STAGE**

- 1st -sample pass- 2nd  
 HIGH  
 UP  
 NORMAL  
 LOW  
 DRY

This sampling reach is generally consistent throughout. Flowing water was not present at the time of the survey and water was only observed in small, stagnant, isolated pools. See Stream Assessment Report for more details.

**DISTANCE**

- 0.5 Km  
 0.2 Km  
 0.15 Km  
 0.12 Km  
 OTHER  
 <0.12Km  
 meters

**CLARITY**

- 1st -sample pass- 2nd  
 < 20 cm  
 20-<40 cm  
 40-70 cm  
 > 70 cm/ CTB  
 SECCHI DEPTH

**CANOPY**

- > 85% - OPEN  
 55% -<85%  
 30% -<55%  
 10% -<30%  
 <10% - CLOSED

- 1st N/A cm  
 2nd N/A cm

**CJ RECREATION**

- AREA DEPTH  
 POOL:  >100ft<sup>2</sup>  >3ft

**BJ AESTHETICS**

- NUISANCE ALGAE  
 INVASIVE MACROPHYTES  
 EXCESS TURBIDITY  
 DISCOLORATION  
 FOAM / SCUM  
 OIL SHEEN  
 TRASH / LITTER  
 NUISANCE ODOR  
 SLUDGE DEPOSITS  
 CSOs/SSOs/OUTFALLS

**DJ MAINTENANCE**

- PUBLIC / PRIVATE / BOTH / NA  
 ACTIVE / HISTORIC / BOTH / NA  
 YOUNG-SUCCESSION-OLD  
 SPRAY / SNAG / REMOVED  
 MODIFIED / DIPPED OUT / NA  
 LEVEED / ONE SIDED  
 RELOCATED / CUTOFFS  
 MOVING-BEDLOAD-STABLE  
 ARMoured / SLUMPS  
 ISLANDS / SCOURED  
 IMPOUNDED / DESICCATED  
 FLOOD CONTROL / DRAINAGE

Circle some &amp; COMMENT

**EJ ISSUES**

- WWTP / CSO / NPDES / INDUSTRY  
 HARDENED / URBAN / DIRT&GRIME  
 CONTAMINATED / LANDFILL  
 BMPs-CONSTRUCTION-SEDIMENT  
 LOGGING / IRRIGATION / COOLING  
 BANK / EROSION / SURFACE  
 FALSE BANK / MANURE / LAGOON  
 WASH H<sub>2</sub>O / TILE / H<sub>2</sub>O TABLE  
 ACID / MINE / QUARRY / FLOW  
 NATURAL / WETLAND / STAGNANT  
 PARK / GOLF / LAWN / HOME  
 ATMOSPHERE / DATA PAUCITY

**FJ MEASUREMENTS**

- $\bar{x}$  width 1'  
 $\bar{x}$  depth 1/4"  
 max. depth  
 $\bar{x}$  bankfull width 3'  
 bankfull  $\bar{x}$  depth 2'  
 W/D ratio  
 bankfull max. depth  
 floodprone x<sup>2</sup> width  
 entrench. ratio

Legacy Tree:

**Stream Drawing:**

See Figure 1.

Stream & Location: S6 RM: Date: 7 / 19 / 19

Sean Moriarty and Ben Griffith Scorers Full Name & Affiliation: Normandeau Associates

River Code: N/A - N/A - N/A STORET #: N/A Lat./ Long.: 44.39684 / 68.99313 Office verified location

1] SUBSTRATE Check ONLY Two substrate TYPE BOXES; estimate % or note every type present. Check ONE (Or 2 & average). BEST TYPES: BLDR /SLABS [10], BOULDER [9], COBBLE [8], GRAVEL [7], SAND [6], BEDROCK [5]. OTHER TYPES: HARDPAN [4], DETRITUS [3], MUCK [2], SILT [2], ARTIFICIAL [0]. ORIGIN: LIMESTONE [1], TILLS [1], WETLANDS [0], SANDSTONE [0], RIP/RAP [0], LACUSTURINE [0], SHALE [-1], COAL FINES [-2]. QUALITY: HEAVY [-2], MODERATE [-1], NORMAL [0], FREE [1], EXTENSIVE [-2], MODERATE [-1], NORMAL [0], NONE [1]. Substrate Maximum 20. Score: 6.

2] INSTREAM COVER Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts. AMOUNT: EXTENSIVE >75% [11], MODERATE 25-75% [7], SPARSE 5-<25% [3], NEARLY ABSENT <5% [1]. Cover Maximum 20. Score: 10.

3] CHANNEL MORPHOLOGY Check ONE in each category (Or 2 & average). SINUOSITY: HIGH [4], MODERATE [3], LOW [2], NONE [1]. DEVELOPMENT: EXCELLENT [7], GOOD [5], FAIR [3], POOR [1]. CHANNELIZATION: NONE [6], RECOVERED [4], RECOVERING [3], RECENT OR NO RECOVERY [1]. STABILITY: HIGH [3], MODERATE [2], LOW [1]. Channel Maximum 20. Score: 10.

4] BANK EROSION AND RIPARIAN ZONE Check ONE in each category for EACH BANK (Or 2 per bank & average). RIVER RIGHT LOOKING DOWNSTREAM. EROSION: NONE / LITTLE [3], MODERATE [2], HEAVY / SEVERE [1]. RIPARIAN WIDTH: WIDE > 50m [4], MODERATE 10-50m [3], NARROW 5-10m [2], VERY NARROW < 5m [1], NONE [0]. FLOOD PLAIN QUALITY: FOREST, SWAMP [3], SHRUB OR OLD FIELD [2], RESIDENTIAL, PARK, NEW FIELD [1], FENCED PASTURE [1], OPEN PASTURE, ROWCROP [0]. CONSERVATION TILLAGE [1], URBAN OR INDUSTRIAL [0], MINING / CONSTRUCTION [0]. Riparian Maximum 10. Score: 8.

5] POOL / GLIDE AND RIFFLE / RUN QUALITY MAXIMUM DEPTH: > 1m [6], 0.7-<1m [4], 0.4-<0.7m [2], 0.2-<0.4m [1], < 0.2m [0]. CHANNEL WIDTH: POOL WIDTH > RIFFLE WIDTH [2], POOL WIDTH = RIFFLE WIDTH [1], POOL WIDTH < RIFFLE WIDTH [0]. CURRENT VELOCITY: TORRENTIAL [-1], VERY FAST [1], FAST [1], MODERATE [1], SLOW [1], INTERSTITIAL [-1], INTERMITTENT [-2], EDDIES [1]. Recreation Potential Primary Contact Secondary Contact. Pool / Current Maximum 12. Score: -2.

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species: Check ONE (Or 2 & average). NO RIFFLE [metric=0]. RIFFLE DEPTH: BEST AREAS > 10cm [2], BEST AREAS 5-10cm [1], BEST AREAS < 5cm [metric=0]. RUN DEPTH: MAXIMUM > 50cm [2], MAXIMUM < 50cm [1]. RIFFLE / RUN SUBSTRATE: STABLE [2], MOD. STABLE [1], UNSTABLE [0]. RIFFLE / RUN EMBEDDEDNESS: NONE [2], LOW [1], MODERATE [0], EXTENSIVE [-1]. Riffle / Run Maximum 8. Score: 0.

6] GRADIENT (N/A ft/mi) DRAINAGE AREA (N/A mi^2). VERY LOW - LOW [2-4], MODERATE [6-10], HIGH - VERY HIGH [10-6]. %POOL: N/A %GLIDE: N/A %RUN: N/A %RIFFLE: N/A. Gradient Maximum 10. Score: 6.

**AJ SAMPLED REACH**

Check ALL that apply

Comment RE: Reach consistency/Is reach typical of stream?, Recreation/ Observed - Inferred, Other/ Sampling observations, Concerns, Access directions, etc.

**METHOD**

- 
- BOAT
- 
- 
- WADE
- 
- 
- L. LINE
- 
- 
- OTHER

**STAGE**

- 1st-sample pass- 2nd
- 
- 
- HIGH
- 
- 
- 
- UP
- 
- 
- 
- NORMAL
- 
- 
- 
- LOW
- 
- 
- 
- DRY
- 

This sampling reach is generally consistent throughout. Flowing water was not present at the time of the survey and water was only observed in small, stagnant, isolated pools. See Stream Assessment Report for more details.

**DISTANCE**

- 
- 0.5 Km
- 
- 
- 0.2 Km
- 
- 
- 0.15 Km
- 
- 
- 0.12 Km
- 
- 
- OTHER
- 
- <0.12
- 
- meters

**CLARITY**

- 1st-sample pass-- 2nd
- 
- 
- < 20 cm
- 
- 
- 
- 20-<40 cm
- 
- 
- 
- 40-70 cm
- 
- 
- 
- > 70 cm/ CTB
- 
- 
- 
- SECCHI DEPTH
- 

**CANOPY**

- 
- > 85% - OPEN
- 
- 
- 55% -<85%
- 
- 
- 30% -<55%
- 
- 
- 10% -<30%
- 
- 
- <10% - CLOSED

- 1st N/A cm
- 
- 2nd N/A cm

**CJ RECREATION**
 AREA DEPTH  
 POOL:  >100ft<sup>2</sup>  >3ft
**BJ AESTHETICS**

- 
- NUISANCE ALGAE
- 
- 
- INVASIVE MACROPHYTES
- 
- 
- EXCESS TURBIDITY
- 
- 
- DISCOLORATION
- 
- 
- FOAM / SCUM
- 
- 
- OIL SHEEN
- 
- 
- TRASH / LITTER
- 
- 
- NUISANCE ODOR
- 
- 
- SLUDGE DEPOSITS
- 
- 
- CSOs/SSOs/OUTFALLS

**DJ MAINTENANCE**

- PUBLIC / PRIVATE / BOTH / NA
- 
- ACTIVE / HISTORIC / BOTH / NA
- 
- YOUNG-SUCCESSION-OLD
- 
- SPRAY / SNAG / REMOVED
- 
- MODIFIED / DIPPED OUT / NA
- 
- LEVEED / ONE SIDED
- 
- RELOCATED / CUTOFFS
- 
- MOVING-BEDLOAD-STABLE
- 
- ARMoured / SLUMPS
- 
- ISLANDS / SCOURED
- 
- IMPOUNDED / DESICCATED
- 
- FLOOD CONTROL / DRAINAGE

Circle some &amp; COMMENT

**EJ ISSUES**

- WWTP / CSO / NPDES / INDUSTRY
- 
- HARDENED / URBAN / DIRT&GRIME
- 
- CONTAMINATED / LANDFILL
- 
- BMPs-CONSTRUCTION-SEDIMENT
- 
- LOGGING / IRRIGATION / COOLING
- 
- BANK / EROSION / SURFACE
- 
- FALSE BANK / MANURE / LAGOON
- 
- WASH H
- <sub>2</sub>
- O / TILE / H
- <sub>2</sub>
- O TABLE
- 
- ACID / MINE / QUARRY / FLOW
- 
- NATURAL / WETLAND / STAGNANT
- 
- PARK / GOLF / LAWN / HOME
- 
- ATMOSPHERE / DATA PAUCITY

**FJ MEASUREMENTS**

- x̄ width 2'
- 
- x̄ depth 6"
- 
- max. depth
- 
- x̄ bankfull width 5'
- 
- bankfull x̄ depth 3'
- 
- W/D ratio
- 
- bankfull max. depth
- 
- floodprone x
- <sup>2</sup>
- width
- 
- entrench. ratio

Legacy Tree:

**Stream Drawing:**

See Figure 1.

Stream & Location: S8 RM: Date: 7 / 19 / 19

Sean Moriarty and Ben Griffith Scorers Full Name & Affiliation: Normandeau Associates

River Code: STORET #: Lat./ Long.: 44.39592 / 68.9673 Office verified location

1] SUBSTRATE Check ONLY Two substrate TYPE BOXES; estimate % or note every type present. Check ONE (Or 2 & average). BEST TYPES: BLDR / SLABS [10], BOULDER [9], COBBLE [8], GRAVEL [7], SAND [6], BEDROCK [5]. OTHER TYPES: HARDPAN [4], DETRITUS [3], MUCK [2], SILT [2], ARTIFICIAL [0]. ORIGIN: LIMESTONE [1], TILLS [1], WETLANDS [0], SANDSTONE [0], RIP/RAP [0], LACUSTURINE [0], SHALE [-1], COAL FINES [-2]. QUALITY: HEAVY [-2], MODERATE [-1], NORMAL [0], FREE [1], EXTENSIVE [-2], MODERATE [-1], NORMAL [0], NONE [1]. Substrate Maximum 20. Score: 7.5

2] INSTREAM COVER Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts. AMOUNT: EXTENSIVE >75% [11], MODERATE 25-75% [7], SPARSE 5-<25% [3], NEARLY ABSENT <5% [1]. Cover Maximum 20. Score: 6

3] CHANNEL MORPHOLOGY Check ONE in each category (Or 2 & average). SINUOSITY: HIGH [4], MODERATE [3], LOW [2], NONE [1]. DEVELOPMENT: EXCELLENT [7], GOOD [5], FAIR [3], POOR [1]. CHANNELIZATION: NONE [6], RECOVERED [4], RECOVERING [3], RECENT OR NO RECOVERY [1]. STABILITY: HIGH [3], MODERATE [2], LOW [1]. Channel Maximum 20. Score: 12

4] BANK EROSION AND RIPARIAN ZONE Check ONE in each category for EACH BANK (Or 2 per bank & average). RIVER RIGHT LOOKING DOWNSTREAM. EROSION: NONE / LITTLE [3], MODERATE [2], HEAVY / SEVERE [1]. RIPARIAN WIDTH: WIDE > 50m [4], MODERATE 10-50m [3], NARROW 5-10m [2], VERY NARROW < 5m [1], NONE [0]. FLOOD PLAIN QUALITY: FOREST, SWAMP [3], SHRUB OR OLD FIELD [2], RESIDENTIAL, PARK, NEW FIELD [1], FENCED PASTURE [1], OPEN PASTURE, ROWCROP [0]. CONSERVATION TILLAGE [1], URBAN OR INDUSTRIAL [0], MINING / CONSTRUCTION [0]. Riparian Maximum 10. Score: 6

5] POOL / GLIDE AND RIFFLE / RUN QUALITY MAXIMUM DEPTH: > 1m [6], 0.7-<1m [4], 0.4-<0.7m [2], 0.2-<0.4m [1], < 0.2m [0]. CHANNEL WIDTH: POOL WIDTH > RIFFLE WIDTH [2], POOL WIDTH = RIFFLE WIDTH [1], POOL WIDTH < RIFFLE WIDTH [0]. CURRENT VELOCITY: TORRENTIAL [-1], VERY FAST [1], FAST [1], MODERATE [1], SLOW [1], INTERSTITIAL [-1], INTERMITTENT [-2], EDDIES [1]. Recreation Potential Primary Contact Secondary Contact. Pool / Current Maximum 12. Score: -2

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species: Check ONE (Or 2 & average). RIFFLE DEPTH: BEST AREAS > 10cm [2], BEST AREAS 5-10cm [1], BEST AREAS < 5cm [metric=0]. RUN DEPTH: MAXIMUM > 50cm [2], MAXIMUM < 50cm [1]. RIFFLE / RUN SUBSTRATE: STABLE [2], MOD. STABLE [1], UNSTABLE [0]. RIFFLE / RUN EMBEDDEDNESS: NONE [2], LOW [1], MODERATE [0], EXTENSIVE [-1]. Riffle / Run Maximum 8. Score: 3

6] GRADIENT (N/A ft/mi) DRAINAGE AREA (N/A mi^2). VERY LOW - LOW [2-4], MODERATE [6-10], HIGH - VERY HIGH [10-6]. %POOL: N/A %GLIDE: N/A %RUN: N/A %RIFFLE: N/A. Gradient Maximum 10. Score: 6

**AJ SAMPLED REACH**

Check ALL that apply

Comment RE: Reach consistency/Is reach typical of stream?, Recreation/ Observed - Inferred, Other/ Sampling observations, Concerns, Access directions, etc.

**METHOD STAGE**

- BOAT
  - WADE
  - L. LINE
  - OTHER
- DISTANCE**
- 0.5 Km
  - 0.2 Km
  - 0.15 Km
  - 0.12 Km
  - OTHER

- 1st -sample pass- 2nd
- HIGH
  - UP
  - NORMAL
  - LOW
  - DRY

This sampling reach is generally consistent throughout. Flowing water was not present at the time of the survey and water was only observed in small, stagnant, isolated pools. See Stream Assessment Report for more details.

- CLARITY**
- 1st -sample pass- 2nd
- < 20 cm
  - 20-<40 cm
  - 40-70 cm
  - > 70 cm/ CTB
  - SECCHI DEPTH

- CANOPY**
- 1st N/A cm
- 2nd N/A cm
- > 85% - OPEN
  - 55% -<85%
  - 30% -<55%
  - 10% -<30%
  - <10% - CLOSED

meters

**BJ AESTHETICS**

- NUISANCE ALGAE
- INVASIVE MACROPHYTES
- EXCESS TURBIDITY
- DISCOLORATION
- FOAM / SCUM
- OIL SHEEN
- TRASH / LITTER
- NUISANCE ODOR
- SLUDGE DEPOSITS
- CSOs/SSOs/OUTFALLS

**DJ MAINTENANCE**

- PUBLIC / PRIVATE / BOTH / NA
- ACTIVE / HISTORIC / BOTH / NA
- YOUNG-SUCCESSION-OLD
- SPRAY / SNAG / REMOVED
- MODIFIED / DIPPED OUT / NA
- LEVEED / ONE SIDED
- RELOCATED / CUTOFFS
- MOVING-BEDLOAD-STABLE
- ARMOURED / SLUMPS
- ISLANDS / SCOURED
- IMPOUNDED / DESICCATED
- FLOOD CONTROL / DRAINAGE

Circle some & COMMENT

**EJ ISSUES**

- WWTP / CSO / NPDES / INDUSTRY
- HARDENED / URBAN / DIRT&GRIME
- CONTAMINATED / LANDFILL
- BMPs-CONSTRUCTION-SEDIMENT
- LOGGING / IRRIGATION / COOLING
- BANK / EROSION / SURFACE
- FALSE BANK / MANURE / LAGOON
- WASH H<sub>2</sub>O / TILE / H<sub>2</sub>O TABLE
- ACID / MINE / QUARRY / FLOW
- NATURAL / WETLAND / STAGNANT
- PARK / GOLF / LAWN / HOME
- ATMOSPHERE / DATA PAUCITY

**FJ MEASUREMENTS**

- $\bar{x}$  width 2'
- $\bar{x}$  depth 4"
- max. depth
- $\bar{x}$  bankfull width 7'
- bankfull  $\bar{x}$  depth 2'
- W/D ratio
- bankfull max. depth
- floodprone x<sup>2</sup> width
- entrench. ratio

Legacy Tree:

**CJ RECREATION** AREA DEPTH  
POOL:  >100ft<sup>2</sup>  >3ft

**Stream Drawing:**

See Figure 1.

Stream & Location: S9a

RM: Date: 7 / 19 / 19

Sean Moriarty and Ben Griffith

Scorers Full Name & Affiliation: Normandeau Associates

River Code: N/A - N/A - N/A STORET #: N/A

Lat./ Long.: 44.39713 / 68.99134

Office verified location

1] SUBSTRATE Check ONLY Two substrate TYPE BOXES; estimate % or note every type present

Check ONE (Or 2 & average)

Substrate assessment form with categories: BEST TYPES, OTHER TYPES, ORIGIN, and QUALITY. Includes checkboxes for various substrate types and a score of 7.

2] INSTREAM COVER Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts

AMOUNT

Check ONE (Or 2 & average)

Instream Cover assessment form with categories: UNDERCAT BANKS, OVERHANGING VEGETATION, SHALLOWS, ROOTMATS, POOLS, ROOTWADS, BOULDERS, OXBOWS, AQUATIC MACROPHYTES, LOGS OR WOODY DEBRIS. Includes checkboxes and a score of 10.

3] CHANNEL MORPHOLOGY Check ONE in each category (Or 2 & average)

Channel Morphology assessment form with categories: SINUOSITY, DEVELOPMENT, CHANNELIZATION, STABILITY. Includes checkboxes and a score of 10.

4] BANK EROSION AND RIPARIAN ZONE Check ONE in each category for EACH BANK (Or 2 per bank & average)

Bank Erosion and Riparian Zone assessment form with categories: EROSION, RIPARIAN WIDTH, FLOOD PLAIN QUALITY, CONSERVATION TILLAGE, URBAN OR INDUSTRIAL, MINING / CONSTRUCTION. Includes checkboxes and a score of 7.

5] POOL / GLIDE AND RIFFLE / RUN QUALITY

Pool / Glide and Riffle / Run Quality assessment form with categories: MAXIMUM DEPTH, CHANNEL WIDTH, CURRENT VELOCITY, Recreation Potential. Includes checkboxes and a score of -2.

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species:

Check ONE (Or 2 & average).

NO RIFFLE [metric=0]

Riffle / Run Quality assessment form with categories: RIFFLE DEPTH, RUN DEPTH, RIFFLE / RUN SUBSTRATE, RIFFLE / RUN EMBEDDEDNESS. Includes checkboxes and a score of 1.

6] GRADIENT (N/A ft/mi) DRAINAGE AREA (N/A mi^2) VERY LOW - LOW, MODERATE, HIGH - VERY HIGH, %POOL, %GLIDE, %RUN, %RIFFLE. Includes checkboxes and a score of 6.

**AJ SAMPLED REACH**

Check ALL that apply

Comment RE: Reach consistency/Is reach typical of stream?, Recreation/ Observed - Inferred, Other/ Sampling observations, Concerns, Access directions, etc.

**METHOD**

- BOAT  
 WADE  
 L. LINE  
 OTHER

**STAGE**

- 1st -sample pass- 2nd  
 HIGH   
 UP   
 NORMAL   
 LOW   
 DRY

This sampling reach is generally consistent throughout. Flowing water was not present at the time of the survey and water was only observed in small, stagnant, isolated pools. See Stream Assessment Report for more details.

**DISTANCE**

- 0.5 Km  
 0.2 Km  
 0.15 Km  
 0.12 Km  
 OTHER  
 <0.12Km  
 meters

**CLARITY**

- 1st -sample pass- 2nd  
 < 20 cm   
 20-<40 cm   
 40-70 cm   
 > 70 cm/ CTB   
 SECCHI DEPTH

**BJ AESTHETICS**

- NUISANCE ALGAE  
 INVASIVE MACROPHYTES  
 EXCESS TURBIDITY  
 DISCOLORATION  
 FOAM / SCUM  
 OIL SHEEN  
 TRASH / LITTER  
 NUISANCE ODOR  
 SLUDGE DEPOSITS  
 CSOs/SSOs/OUTFALLS

**DJ MAINTENANCE**

- PUBLIC / PRIVATE / BOTH / NA  
 ACTIVE / HISTORIC / BOTH / NA  
 YOUNG-SUCCESSION-OLD  
 SPRAY / SNAG / REMOVED  
 MODIFIED / DIPPED OUT / NA  
 LEVEED / ONE SIDED  
 RELOCATED / CUTOFFS  
 MOVING-BEDLOAD-STABLE  
 ARMoured / SLUMPS  
 ISLANDS / SCOURED  
 IMPOUNDED / DESICCATED  
 FLOOD CONTROL / DRAINAGE

Circle some &amp; COMMENT

**EJ ISSUES**

- WWTP / CSO / NPDES / INDUSTRY  
 HARDENED / URBAN / DIRT&GRIME  
 CONTAMINATED / LANDFILL  
 BMPs-CONSTRUCTION-SEDIMENT  
 LOGGING / IRRIGATION / COOLING  
 BANK / EROSION / SURFACE  
 FALSE BANK / MANURE / LAGOON  
 WASH H<sub>2</sub>O / TILE / H<sub>2</sub>O TABLE  
 ACID / MINE / QUARRY / FLOW  
 NATURAL / WETLAND / STAGNANT  
 PARK / GOLF / LAWN / HOME  
 ATMOSPHERE / DATA PAUCITY

**FJ MEASUREMENTS**

- $\bar{x}$  width 1'  
 $\bar{x}$  depth 4"  
 max. depth  
 $\bar{x}$  bankfull width 6'  
 bankfull  $\bar{x}$  depth 2'  
 W/D ratio  
 bankfull max. depth  
 floodprone x<sup>2</sup> width  
 entrench. ratio

Legacy Tree:

**CANOPY**

- > 85% - OPEN  
 55% -<85%  
 30% -<55%  
 10% -<30%  
 <10% - CLOSED

- 1st N/A cm  
 2nd N/A cm

**CJ RECREATION**

AREA DEPTH

POOL:  >100ft<sup>2</sup>  >3ft**Stream Drawing:**

See Figure 1.

Stream & Location: S9b RM: Date: 7 / 19 / 19

Sean Moriarty and Ben Griffith Scorers Full Name & Affiliation: Normandeau Associates

River Code: N/A - N/A - N/A STORET #: N/A Lat./ Long.: 44.39539 / 68.98895 Office verified location

1] SUBSTRATE Check ONLY Two substrate TYPE BOXES; estimate % or note every type present. Check ONE (Or 2 & average). BEST TYPES: BLDR /SLABS [10], BOULDER [9], COBBLE [8], GRAVEL [7], SAND [6], BEDROCK [5]. OTHER TYPES: HARDPAN [4], DETRITUS [3], MUCK [2], SILT [2], ARTIFICIAL [0]. ORIGIN: LIMESTONE [1], TILLS [1], WETLANDS [0], SANDSTONE [0], RIP/RAP [0], LACUSTURINE [0], SHALE [-1], COAL FINES [-2]. QUALITY: HEAVY [-2], MODERATE [-1], NORMAL [0], FREE [1], EXTENSIVE [-2], MODERATE [-1], NORMAL [0], NONE [1].

2] INSTREAM COVER Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts. AMOUNT: EXTENSIVE >75% [11], MODERATE 25-75% [7], SPARSE 5-<25% [3], NEARLY ABSENT <5% [1].

3] CHANNEL MORPHOLOGY Check ONE in each category (Or 2 & average). SINUOSITY: HIGH [4], MODERATE [3], LOW [2], NONE [1]. DEVELOPMENT: EXCELLENT [7], GOOD [5], FAIR [3], POOR [1]. CHANNELIZATION: NONE [6], RECOVERED [4], RECOVERING [3], RECENT OR NO RECOVERY [1]. STABILITY: HIGH [3], MODERATE [2], LOW [1].

4] BANK EROSION AND RIPARIAN ZONE Check ONE in each category for EACH BANK (Or 2 per bank & average). RIVER RIGHT LOOKING DOWNSTREAM. EROSION: NONE / LITTLE [3], MODERATE [2], HEAVY / SEVERE [1]. RIPARIAN WIDTH: WIDE > 50m [4], MODERATE 10-50m [3], NARROW 5-10m [2], VERY NARROW < 5m [1], NONE [0]. FLOOD PLAIN QUALITY: FOREST, SWAMP [3], SHRUB OR OLD FIELD [2], RESIDENTIAL, PARK, NEW FIELD [1], FENCED PASTURE [1], OPEN PASTURE, ROWCROP [0]. CONSERVATION TILLAGE [1], URBAN OR INDUSTRIAL [0], MINING / CONSTRUCTION [0].

5] POOL / GLIDE AND RIFFLE / RUN QUALITY MAXIMUM DEPTH: > 1m [6], 0.7-<1m [4], 0.4-<0.7m [2], 0.2-<0.4m [1], < 0.2m [0]. CHANNEL WIDTH: POOL WIDTH > RIFFLE WIDTH [2], POOL WIDTH = RIFFLE WIDTH [1], POOL WIDTH < RIFFLE WIDTH [0]. CURRENT VELOCITY: TORRENTIAL [-1], VERY FAST [1], FAST [1], MODERATE [1], SLOW [1], INTERSTITIAL [-1], INTERMITTENT [-2], EDDIES [1]. Recreation Potential: Primary Contact, Secondary Contact. Pool / Current Maximum 12.

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species: Check ONE (Or 2 & average). NO RIFFLE [metric=0]. RIFFLE DEPTH: BEST AREAS > 10cm [2], BEST AREAS 5-10cm [1], BEST AREAS < 5cm [metric=0]. RUN DEPTH: MAXIMUM > 50cm [2], MAXIMUM < 50cm [1]. RIFFLE / RUN SUBSTRATE: STABLE (e.g., Cobble, Boulder) [2], MOD. STABLE (e.g., Large Gravel) [1], UNSTABLE (e.g., Fine Gravel, Sand) [0]. RIFFLE / RUN EMBEDDEDNESS: NONE [2], LOW [1], MODERATE [0], EXTENSIVE [-1]. Riffle / Run Maximum 8.

6] GRADIENT (ft/mi) DRAINAGE AREA (mi^2). VERY LOW - LOW [2-4], MODERATE [6-10], HIGH - VERY HIGH [10-6]. %POOL: N/A, %GLIDE: N/A, %RUN: N/A, %RIFFLE: N/A. Gradient Maximum 10.

**AJ SAMPLED REACH**

Check ALL that apply

Comment RE: Reach consistency/Is reach typical of stream?, Recreation/ Observed - Inferred, Other/ Sampling observations, Concerns, Access directions, etc.

**METHOD**

- 
- BOAT
- 
- 
- WADE
- 
- 
- L. LINE
- 
- 
- OTHER

**STAGE**

- 1st-sample pass- 2nd
- 
- 
- HIGH
- 
- 
- 
- UP
- 
- 
- 
- NORMAL
- 
- 
- 
- LOW
- 
- 
- 
- DRY
- 

This sampling reach is generally consistent throughout. Flowing water was not present at the time of the survey and water was only observed in small, stagnant, isolated pools. See Stream Assessment Report for more details.

**DISTANCE**

- 
- 0.5 Km
- 
- 
- 0.2 Km
- 
- 
- 0.15 Km
- 
- 
- 0.12 Km
- 
- 
- OTHER
- 
- <0.12Km
- 
- meters

**CLARITY**

- 1st-sample pass-- 2nd
- 
- 
- < 20 cm
- 
- 
- 
- 20-<40 cm
- 
- 
- 
- 40-70 cm
- 
- 
- 
- > 70 cm/ CTB
- 
- 
- 
- SECCHI DEPTH
- 

**CANOPY**

- 
- > 85% - OPEN
- 
- 
- 55% -<85%
- 
- 
- 30% -<55%
- 
- 
- 10% -<30%
- 
- 
- <10% - CLOSED

- 1st N/A cm
- 
- 2nd N/A cm

**CJ RECREATION**
 AREA DEPTH  
 POOL:  >100ft<sup>2</sup>  >3ft
**BJ AESTHETICS**

- 
- NUISANCE ALGAE
- 
- 
- INVASIVE MACROPHYTES
- 
- 
- EXCESS TURBIDITY
- 
- 
- DISCOLORATION
- 
- 
- FOAM / SCUM
- 
- 
- OIL SHEEN
- 
- 
- TRASH / LITTER
- 
- 
- NUISANCE ODOR
- 
- 
- SLUDGE DEPOSITS
- 
- 
- CSOs/SSOs/OUTFALLS

**DJ MAINTENANCE**

- PUBLIC / PRIVATE / BOTH / NA
- 
- ACTIVE / HISTORIC / BOTH / NA
- 
- YOUNG-SUCCESSION-OLD
- 
- SPRAY / SNAG / REMOVED
- 
- MODIFIED / DIPPED OUT / NA
- 
- LEVEED / ONE SIDED
- 
- RELOCATED / CUTOFFS
- 
- MOVING-BEDLOAD-STABLE
- 
- ARMoured / SLUMPS
- 
- ISLANDS / SCOURED
- 
- IMPOUNDED / DESICCATED
- 
- FLOOD CONTROL / DRAINAGE

Circle some &amp; COMMENT

**EJ ISSUES**

- WWTP / CSO / NPDES / INDUSTRY
- 
- HARDENED / URBAN / DIRT&GRIME
- 
- CONTAMINATED / LANDFILL
- 
- BMPs-CONSTRUCTION-SEDIMENT
- 
- LOGGING / IRRIGATION / COOLING
- 
- BANK / EROSION / SURFACE
- 
- FALSE BANK / MANURE / LAGOON
- 
- WASH H
- <sub>2</sub>
- O / TILE / H
- <sub>2</sub>
- O TABLE
- 
- ACID / MINE / QUARRY / FLOW
- 
- NATURAL / WETLAND / STAGNANT
- 
- PARK / GOLF / LAWN / HOME
- 
- ATMOSPHERE / DATA PAUCITY

**FJ MEASUREMENTS**

- $\bar{x}$
- width 3'
- 
- $\bar{x}$
- depth 1'
- 
- max. depth
- 
- $\bar{x}$
- bankfull width 7'
- 
- bankfull
- $\bar{x}$
- depth 3'
- 
- W/D ratio
- 
- bankfull max. depth
- 
- floodprone x
- <sup>2</sup>
- width
- 
- entrench. ratio

Legacy Tree:

**Stream Drawing:**

See Figure 1.

Stream & Location: S9c

RM: Date: 7 / 19 / 19

Sean Moriarty and Ben Griffith

Scorers Full Name & Affiliation: Normandeau Associates

River Code: N/A - N/A - N/A STORET #: N/A

Lat./ Long.: 44.39547 / 68.98747

Office verified location

1] SUBSTRATE Check ONLY Two substrate TYPE BOXES; estimate % or note every type present

Check ONE (Or 2 & average)

Substrate assessment table with categories: BEST TYPES, OTHER TYPES, ORIGIN, QUALITY. Includes checkboxes for BLDR/SLABS, BOULDER, COBBLE, GRAVEL, SAND, BEDROCK, etc. Score: 8.5

2] INSTREAM COVER Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts

AMOUNT

Check ONE (Or 2 & average)

Instream Cover assessment table with categories: UNDERHANGING BANKS, OVERHANGING VEGETATION, SHALLOWS, ROOTMATS, POOLS, ROOTWADS, BOULDERS, OXBOWS, AQUATIC MACROPHYTES, LOGS OR WOODY DEBRIS. Score: 5

3] CHANNEL MORPHOLOGY Check ONE in each category (Or 2 & average)

Channel Morphology assessment table with categories: SINUOSITY, DEVELOPMENT, CHANNELIZATION, STABILITY. Includes checkboxes for HIGH, MODERATE, LOW, NONE. Score: 13

4] BANK EROSION AND RIPARIAN ZONE Check ONE in each category for EACH BANK (Or 2 per bank & average)

Bank Erosion and Riparian Zone assessment table with categories: EROSION, RIPARIAN WIDTH, FLOOD PLAIN QUALITY. Includes checkboxes for NONE, MODERATE, HEAVY, etc. Score: 6.5

5] POOL / GLIDE AND RIFFLE / RUN QUALITY

Pool/Glide and Riffle/Run Quality assessment table with categories: MAXIMUM DEPTH, CHANNEL WIDTH, CURRENT VELOCITY. Includes checkboxes for >1m, 0.7-1m, etc. Score: -1

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species:

Check ONE (Or 2 & average).

NO RIFFLE [metric=0]

Riffle/Run Quality assessment table with categories: RIFFLE DEPTH, RUN DEPTH, RIFFLE / RUN SUBSTRATE, RIFFLE / RUN EMBEDDEDNESS. Includes checkboxes for BEST AREAS >10cm, etc. Score: 4

6] GRADIENT (N/A ft/mi) DRAINAGE AREA (N/A mi^2) VERY LOW - LOW, MODERATE, HIGH - VERY HIGH. %POOL, %GLIDE, %RUN, %RIFFLE. Score: 6

**AJ SAMPLED REACH**

Check ALL that apply

Comment RE: Reach consistency/Is reach typical of stream?, Recreation/ Observed - Inferred, Other/ Sampling observations, Concerns, Access directions, etc.

**METHOD**

- 
- BOAT
- 
- 
- WADE
- 
- 
- L. LINE
- 
- 
- OTHER

**STAGE**

- 1st-sample pass- 2nd
- 
- 
- HIGH
- 
- 
- 
- UP
- 
- 
- 
- NORMAL
- 
- 
- 
- LOW
- 
- 
- 
- DRY
- 

This sampling reach is generally consistent throughout. Flowing water was not present at the time of the survey and water was only observed in small, stagnant, isolated pools. See Stream Assessment Report for more details.

**DISTANCE**

- 
- 0.5 Km
- 
- 
- 0.2 Km
- 
- 
- 0.15 Km
- 
- 
- 0.12 Km
- 
- 
- OTHER

**CLARITY**

- 1st -sample pass-- 2nd
- 
- 
- < 20 cm
- 
- 
- 
- 20-<40 cm
- 
- 
- 
- 40-70 cm
- 
- 
- 
- > 70 cm/ CTB
- 
- 
- 
- SECCHI DEPTH
- 

**BJ AESTHETICS**

- 
- NUISANCE ALGAE
- 
- 
- INVASIVE MACROPHYTES
- 
- 
- EXCESS TURBIDITY
- 
- 
- DISCOLORATION
- 
- 
- FOAM / SCUM
- 
- 
- OIL SHEEN
- 
- 
- TRASH / LITTER
- 
- 
- NUISANCE ODOR
- 
- 
- SLUDGE DEPOSITS
- 
- 
- CSOs/SSOs/OUTFALLS

**DJ MAINTENANCE**

- PUBLIC / PRIVATE / BOTH / NA
- 
- ACTIVE / HISTORIC / BOTH / NA
- 
- YOUNG-SUCCESSION-OLD
- 
- SPRAY / SNAG / REMOVED
- 
- MODIFIED / DIPPED OUT / NA
- 
- LEVEED / ONE SIDED
- 
- RELOCATED / CUTOFFS
- 
- MOVING-BEDLOAD-STABLE
- 
- ARMoured / SLUMPS
- 
- ISLANDS / SCOURED
- 
- IMPOUNDED / DESICCATED
- 
- FLOOD CONTROL / DRAINAGE

Circle some &amp; COMMENT

**EJ ISSUES**

- WWTP / CSO / NPDES / INDUSTRY
- 
- HARDENED / URBAN / DIRT&GRIME
- 
- CONTAMINATED / LANDFILL
- 
- BMPs-CONSTRUCTION-SEDIMENT
- 
- LOGGING / IRRIGATION / COOLING
- 
- BANK / EROSION / SURFACE
- 
- FALSE BANK / MANURE / LAGOON
- 
- WASH H
- <sub>2</sub>
- O / TILE / H
- <sub>2</sub>
- O TABLE
- 
- ACID / MINE / QUARRY / FLOW
- 
- NATURAL / WETLAND / STAGNANT
- 
- PARK / GOLF /
- LAWN / HOME**
- 
- ATMOSPHERE / DATA PAUCITY

**FJ MEASUREMENTS**

- $\bar{x}$
- width 3'
- 
- $\bar{x}$
- depth 4"
- 
- max. depth
- 
- $\bar{x}$
- bankfull width 20'
- 
- bankfull
- $\bar{x}$
- depth 2'
- 
- W/D ratio
- 
- bankfull max. depth
- 
- floodprone x
- <sup>2</sup>
- width
- 
- entrench. ratio

Legacy Tree:

**CANOPY**

- 
- > 85% - OPEN
- 
- 
- 55% -<85%
- 
- 
- 30% -<55%
- 
- 
- 10% -<30%
- 
- 
- <10% - CLOSED

- 1st N/A cm
- 
- 2nd N/A cm

**CJ RECREATION**

- AREA DEPTH
- 
- POOL:
- 
- >100ft
- <sup>2</sup>
- 
- >3ft

**Stream Drawing:**

See Figure 1.

Stream & Location: S10 RM: Date: 7 / 19 / 19

Sean Moriarty and Ben Griffith Scorers Full Name & Affiliation: Normandeau Associates

River Code: STORET #: Lat./ Long.: 44.39738 / 68.99205 Office verified location

1] SUBSTRATE Check ONLY Two substrate TYPE BOXES; estimate % or note every type present. Check ONE (Or 2 & average). Includes categories: BEST TYPES, OTHER TYPES, ORIGIN, and QUALITY. Includes a sub-score of 6.

2] INSTREAM COVER Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts. Includes categories: UNDERHANGING BANKS, OVERHANGING VEGETATION, SHALLOWS, ROOTMATS, POOLS, ROOTWADS, BOULDERS, OXBOWS, BACKWATERS, AQUATIC MACROPHYTES, LOGS OR WOODY DEBRIS. Includes a sub-score of 9.

3] CHANNEL MORPHOLOGY Check ONE in each category (Or 2 & average). Includes categories: SINUOSITY, DEVELOPMENT, CHANNELIZATION, and STABILITY. Includes a sub-score of 9.

4] BANK EROSION AND RIPARIAN ZONE Check ONE in each category for EACH BANK (Or 2 per bank & average). Includes categories: EROSION, RIPARIAN WIDTH, and FLOOD PLAIN QUALITY. Includes a sub-score of 4.

5] POOL / GLIDE AND RIFFLE / RUN QUALITY MAXIMUM DEPTH, CHANNEL WIDTH, CURRENT VELOCITY. Includes a sub-score of -2.

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species: Check ONE (Or 2 & average). Includes categories: RIFFLE DEPTH, RUN DEPTH, RIFFLE / RUN SUBSTRATE, RIFFLE / RUN EMBEDDEDNESS. Includes a sub-score of 0.

6] GRADIENT (ft/mi) DRAINAGE AREA (mi^2). Includes categories: VERY LOW - LOW, MODERATE, HIGH - VERY HIGH. Includes a sub-score of 6.

**AJ SAMPLED REACH**

Check ALL that apply

Comment RE: Reach consistency/Is reach typical of stream?, Recreation/ Observed - Inferred, Other/ Sampling observations, Concerns, Access directions, etc.

**METHOD**      **STAGE**

- BOAT      1st-sample pass- 2nd
- WADE       HIGH
- L. LINE     UP
- OTHER      NORMAL
- LOW
- DRY

**DISTANCE**

- 0.5 Km
- 0.2 Km
- 0.15 Km
- 0.12 Km
- OTHER

**CLARITY**

- 1st -sample pass-- 2nd
- < 20 cm
- 20-<40 cm
- 40-70 cm
- > 70 cm/ CTB
- SECCHI DEPTH

meters

**CANOPY**

- > 85% - OPEN
- 55% -<85%
- 30% -<55%
- 10% -<30%
- <10% - CLOSED

1st N/A cm

pass

2nd N/A cm

**CJ RECREATION**

AREA DEPTH

POOL:  >100ft<sup>2</sup>  >3ft**BJ AESTHETICS**

- NUISANCE ALGAE
- INVASIVE MACROPHYTES
- EXCESS TURBIDITY
- DISCOLORATION
- FOAM / SCUM
- OIL SHEEN
- TRASH / LITTER
- NUISANCE ODOR
- SLUDGE DEPOSITS
- CSOs/SSOs/OUTFALLS

**DJ MAINTENANCE**

- PUBLIC / PRIVATE / BOTH / NA
- ACTIVE / HISTORIC / BOTH / NA
- YOUNG-SUCCESSION-OLD
- SPRAY / SNAG / REMOVED
- MODIFIED / DIPPED OUT / NA
- LEVEED / ONE SIDED
- RELOCATED / CUTOFFS
- MOVING-BEDLOAD-STABLE
- ARMOURED / SLUMPS
- ISLANDS / SCOURED
- IMPOUNDED / DESICCATED
- FLOOD CONTROL / DRAINAGE

Circle some &amp; COMMENT

**EJ ISSUES**

- WWTP / CSO / NPDES / INDUSTRY
- HARDENED / URBAN / DIRT&GRIME
- CONTAMINATED / LANDFILL
- BMPs-CONSTRUCTION-SEDIMENT
- LOGGING / IRRIGATION / COOLING
- BANK / EROSION / SURFACE
- FALSE BANK / MANURE / LAGOON
- WASH H<sub>2</sub>O / TILE / H<sub>2</sub>O TABLE
- ACID / MINE / QUARRY / FLOW
- NATURAL / WETLAND / STAGNANT
- PARK / GOLF / LAWN / HOME
- ATMOSPHERE / DATA PAUCITY

**FJ MEASUREMENTS**

- $\bar{x}$  width .5'
- $\bar{x}$  depth 2"
- max. depth
- $\bar{x}$  bankfull width 4'
- bankfull  $\bar{x}$  depth 3'
- W/D ratio
- bankfull max. depth
- floodprone x<sup>2</sup> width
- entrench. ratio

Legacy Tree:

**Stream Drawing:**

See Figure 1.

## **Appendix B**

### **Photo Log**



**Photo #: 1**

S3 – dry portion covered with pine needles.



**Photo #: 2**

S3 – looking downstream near edge of the project area.



**Photo #: 3**

S3 – near upstream start of channelized flows.



**Photo #: 4**  
S5 – looking downstream from middle section.



**Photo #: 5**  
S5 – Looking upstream from middle section.



**Photo #: 6**  
S5 – Looking upstream in upper portion.



**Photo #: 7**

S6 – Looking downstream from upstream portion.



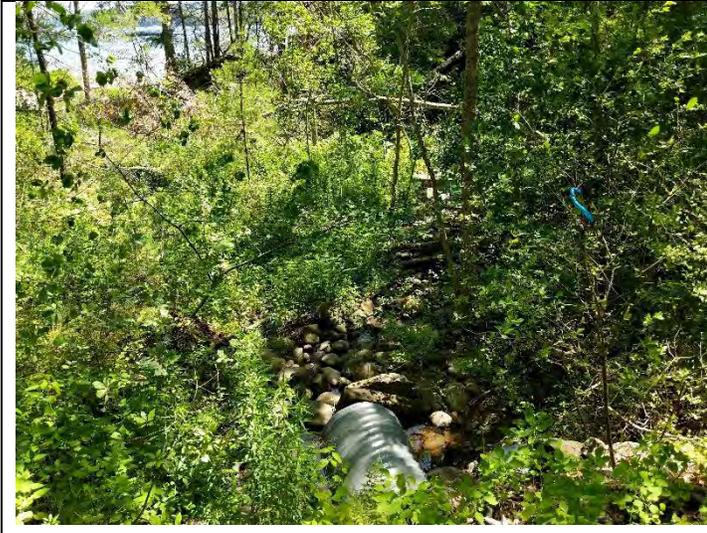
**Photo #: 8**

S6 – Isolated small pool.



**Photo #: 9**

S8 – Looking downstream from Eckrote driveway.



**Photo #: 10**

S8 – Looking downstream from Route 1.



**Photo #: 11**

S8 – Looking upstream from the downstream portion.



**Photo #: 12**

S9a – Densely vegetated portion, facing downstream.



**Photo #: 13**

S9a – Densely vegetated portion looking upstream.



**Photo #: 14**

S9b – Cleared reach, facing downstream.



**Photo #: 15**

S9b – Cleared reach, facing upstream.



**Photo #: 16**

S9c – Lower reach near Belfast Bay, facing downstream.



**Photo #: 17**

S9c – Lower reach, facing upstream.



**Photo #: 18**

S10 – Looking downstream from field.



**Photo #: 19**  
S10 – Facing upstream  
from the edge of the  
field.



**Photo #: 20**  
S10 – Facing upstream  
from shrub portion.

**ATTACHMENT H**

Wetland Determination Data Forms

Response to Review Comments  
Nordic Aquafarms Inc., Land-based Aquaculture Facility  
Belfast, Maine  
L-28319-26-A-N

## WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Nordic Aquaculture Project City/County: Belfast/Waldo Sampling Date: 5/18/2018  
 Applicant/Owner: Nordic Aquaculture State: Maine Sampling Point: W1-wet  
 Investigator(s): E. Lema Section, Township, Range: N/A  
 Landform (hillslope, terrace, etc.): Flat Local relief (concave, convex, none): None  
 Slope (%): 0 Lat.: 44.2351 Long.: -68.547 Datum: NAD83  
 Soil Map Unit Name: Swanville Silt Loam 0-3% slopes NWI Classification: N/A  
 Are climatic/hydrologic conditions of the site typical for this time of the year?        (If no, explain in remarks)  
 Are vegetation       , soil       , or hydrology        significantly disturbed? Are "normal  
 Are vegetation       , soil       , or hydrology        naturally problematic? circumstances" present? Yes  
 (If needed, explain any answers in remarks)

### SUMMARY OF FINDINGS

Hydrophytic vegetation present? <u>      </u> <u>Y</u> Hydric soil present? <u>      </u> <u>Y</u> Indicators of wetland hydrology present? <u>      </u> <u>Y</u>	<b>Is the sampled area within a wetland?</b> <u>      </u> <u>Y</u>  If yes, optional wetland site ID: <u>      </u> <u>W1</u>
Remarks: (Explain alternative procedures here or in a separate report.)	

### HYDROLOGY

<b>Primary Indicators (minimum of one is required; check all that apply)</b> <input type="checkbox"/> Surface Water (A1) <input checked="" type="checkbox"/> Water-Stained Leaves (B9) <input checked="" type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Aquatic Fauna (B13) <input checked="" type="checkbox"/> Saturation (A3) <input type="checkbox"/> Marl Deposits (B15) <input checked="" type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Oxidized Rhizospheres on Living <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Roots (C3) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Recent Iron Reduction in Tilled <input type="checkbox"/> Inundation Visible on Aerial <input type="checkbox"/> Soils (C6) <input type="checkbox"/> Imagery (B7) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Sparsely Vegetated Concave <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Surface (B8)	<b>Secondary Indicators (minimum of two required)</b> <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery <input type="checkbox"/> (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input checked="" type="checkbox"/> FAC-Neutral Test (D5) <input type="checkbox"/> Microtopographic Relief (D4)
<b>Field Observations:</b> Surface water present? Yes <u>      </u> No <u>      </u> <u>X</u> Depth (inches): <u>      </u> Water table present? Yes <u>      </u> <u>X</u> No <u>      </u> Depth (inches): <u>8-14"</u> Saturation present? Yes <u>      </u> <u>X</u> No <u>      </u> Depth (inches): <u>0</u> (includes capillary fringe)	<b>Indicators of wetland hydrology present?</b> <u>      </u> <u>Y</u>
Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:	
Remarks: <u>Obvious wetland hydrology at surface.</u>	

**VEGETATION - Use scientific names of plants**

**Sampling Point:** W1-wet

Tree Stratum					50/20 Thresholds		
Plot Size ( )	Absolute % Cover	Dominant Species	Indicator Status		20%	50%	
1 <u>Pinus strobus</u>	40	Y	FACU	Tree Stratum	19	48	
2 <u>Abies balsamea</u>	25	Y	FAC	Sapling/Shrub Stratum	10	25	
3 <u>Acer rubrum</u>	25	Y	FAC	Herb Stratum	3	8	
4 <u>Quercus rubra</u>	5	N	FACU	Woody Vine Stratum	0	0	
5 _____	_____	_____	_____	<b>Dominance Test Worksheet</b>			
6 _____	_____	_____	_____	Number of Dominant Species that are OBL, FACW, or FAC: <u>5</u> (A)			
7 _____	_____	_____	_____	Total Number of Dominant Species Across all Strata: <u>7</u> (B)			
8 _____	_____	_____	_____	Percent of Dominant Species that are OBL, FACW, or FAC: <u>71.43%</u> (A/B)			
9 _____	_____	_____	_____	<b>Prevalence Index Worksheet</b>			
10 _____	95 = Total Cover	_____	_____	Total % Cover of:			
				OBL species <u>0</u> x 1 = <u>0</u>			
				FACW species <u>2</u> x 2 = <u>4</u>			
				FAC species <u>110</u> x 3 = <u>330</u>			
				FACU species <u>48</u> x 4 = <u>192</u>			
				UPL species <u>0</u> x 5 = <u>0</u>			
				Column totals <u>160</u> (A) <u>526</u> (B)			
				Prevalence Index = B/A = <u>3.29</u>			
Sapling/Shrub Stratum					Hydrophytic Vegetation Indicators:		
Plot Size ( )	Absolute % Cover	Dominant Species	Indicator Status		Rapid test for hydrophytic vegetation		
1 <u>Frangula alnus</u>	40	Y	FAC	<input checked="" type="checkbox"/>	Dominance test is >50%		
2 <u>Abies balsamea</u>	10	Y	FAC	<input type="checkbox"/>	Prevalence index is ≤3.0*		
3 _____	_____	_____	_____	<input type="checkbox"/>	Morphological adaptations* (provide supporting data in Remarks or on a separate sheet)		
4 _____	_____	_____	_____	<input checked="" type="checkbox"/>	Problematic hydrophytic vegetation* (explain)		
5 _____	_____	_____	_____	<input type="checkbox"/>	*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic		
6 _____	_____	_____	_____	<b>Definitions of Vegetation Strata:</b>			
7 _____	_____	_____	_____	<b>Tree</b> - Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.			
8 _____	_____	_____	_____	<b>Sapling/shrub</b> - Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.			
9 _____	_____	_____	_____	<b>Herb</b> - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.			
10 _____	_____	_____	_____	<b>Woody vines</b> - All woody vines greater than 3.28 ft in height.			
11 _____	_____	_____	_____	<b>Hydrophytic vegetation present?</b> <u>Y</u>			
12 _____	_____	_____	_____				
13 _____	_____	_____	_____				
14 _____	_____	_____	_____				
15 _____	15 = Total Cover	_____	_____				
Herb Stratum					Hydrophytic vegetation present?		
Plot Size ( )	Absolute % Cover	Dominant Species	Indicator Status		Rapid test for hydrophytic vegetation		
1 <u>Dryopteris intermedia</u>	10	Y	FAC	<input checked="" type="checkbox"/>	Dominance test is >50%		
2 <u>Maianthemum canadense</u>	3	Y	FACU	<input type="checkbox"/>	Prevalence index is ≤3.0*		
3 <u>Osmundastrum cinnamomeum</u>	2	N	FACW	<input type="checkbox"/>	Morphological adaptations* (provide supporting data in Remarks or on a separate sheet)		
4 _____	_____	_____	_____	<input checked="" type="checkbox"/>	Problematic hydrophytic vegetation* (explain)		
5 _____	_____	_____	_____	<input type="checkbox"/>	*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic		
6 _____	_____	_____	_____	<b>Definitions of Vegetation Strata:</b>			
7 _____	_____	_____	_____	<b>Tree</b> - Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.			
8 _____	_____	_____	_____	<b>Sapling/shrub</b> - Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.			
9 _____	_____	_____	_____	<b>Herb</b> - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.			
10 _____	_____	_____	_____	<b>Woody vines</b> - All woody vines greater than 3.28 ft in height.			
11 _____	_____	_____	_____	<b>Hydrophytic vegetation present?</b> <u>Y</u>			
12 _____	_____	_____	_____				
13 _____	_____	_____	_____				
14 _____	_____	_____	_____				
15 _____	15 = Total Cover	_____	_____				
Woody Vine Stratum					Hydrophytic vegetation present?		
Plot Size ( )	Absolute % Cover	Dominant Species	Indicator Status		Rapid test for hydrophytic vegetation		
1 _____	_____	_____	_____	<input type="checkbox"/>	Dominance test is >50%		
2 _____	_____	_____	_____	<input type="checkbox"/>	Prevalence index is ≤3.0*		
3 _____	_____	_____	_____	<input type="checkbox"/>	Morphological adaptations* (provide supporting data in Remarks or on a separate sheet)		
4 _____	_____	_____	_____	<input type="checkbox"/>	Problematic hydrophytic vegetation* (explain)		
5 _____	_____	_____	_____	<input type="checkbox"/>	*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic		
6 _____	_____	_____	_____	<b>Definitions of Vegetation Strata:</b>			
7 _____	_____	_____	_____	<b>Tree</b> - Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.			
8 _____	_____	_____	_____	<b>Sapling/shrub</b> - Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.			
9 _____	_____	_____	_____	<b>Herb</b> - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.			
10 _____	_____	_____	_____	<b>Woody vines</b> - All woody vines greater than 3.28 ft in height.			
11 _____	_____	_____	_____	<b>Hydrophytic vegetation present?</b> <u>Y</u>			
12 _____	_____	_____	_____				
13 _____	_____	_____	_____				
14 _____	_____	_____	_____				
15 _____	0 = Total Cover	_____	_____				

Remarks: (Include photo numbers here or on a separate sheet)

Herbaceous layer sparse due to early season. Morphological adaptations are in the form of extensive networks of tree roots at or above the soil surface in response to a high water table. White Pine and hemlock are especially pronounced throughout wetland areas.

**SOIL**

**Sampling Point:** W1-wet

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type*	Loc**		
0-2	7.5YR2.5/1	100					Loam/Muck	
2-12	2.5Y4/1	45	10YR4/6	10	C	M	Silt Loam	
	10YR5/2	45						
12-18+	2.5Y4/1	80	10YR4/6	15	C	M	Silty Clay Loam	
			2.5Y6/1	5	D	M		

\*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains

\*\*Location: PL=Pore Lining, M=Matrix

**Hydric Soil Indicators:**

- Histisol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)
- Dark Surface (S7) (LRR R, MLRA 149B)
- Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- Thin Dark Surface (S9) (LRR R, MLRA 149B)
- Loamy Mucky Mineral (F1) (LRR K, L)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)

**Indicators for Problematic Hydric Soils:**

- 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- Coast Prairie Redox (A16) (LRR K, L, R)
- 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- Dark Surface (S7) (LRR K, L)
- Polyvalue Below Surface (S8) (LRR K, L)
- Thin Dark Surface (S9) (LRR K, L)
- Iron-Manganese Masses (F12) (LRR K, L, R)
- Piedmont Floodplain Soils (F19) (MLRA 149B)
- Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- Red Parent Material (F21)
- Very Shallow Dark Surface (TF12)
- Other (Explain in Remarks)

\*Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):  
 Type: \_\_\_\_\_  
 Depth (inches): \_\_\_\_\_

**Hydric soil present?**   Y  

**Remarks:**

Soil color difficult to distinguish due to multiple matrix colors within the fine textured soils. Many prominent con

**WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region**

Project/Site: Nordic Aquaculture Project City/County: Belfast/Waldo Sampling Date: 5/18/2018  
 Applicant/Owner: Nordic Aquaculture State: Maine Sampling Point: W1-up  
 Investigator(s): E. Lema Section, Township, Range: N/A  
 Landform (hillslope, terrace, etc.): Flat Local relief (concave, convex, none): None  
 Slope (%): 0 Lat.: 44.235 Long.: -68.545 Datum: NAD83  
 Soil Map Unit Name: Boothbay Silt Loam 3-8% Slopes NWI Classification: N/A  
 Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)  
 Are vegetation \_\_\_\_\_, soil \_\_\_\_\_, or hydrology \_\_\_\_\_ significantly disturbed? Are "normal  
 Are vegetation \_\_\_\_\_, soil \_\_\_\_\_, or hydrology \_\_\_\_\_ naturally problematic? circumstances" present? Yes  
 (If needed, explain any answers in remarks)

**SUMMARY OF FINDINGS**

Hydrophytic vegetation present? <u>    N    </u> Hydric soil present? <u>    N    </u> Indicators of wetland hydrology present? <u>    N    </u>	<p align="center"><b>Is the sampled area within a wetland?</b> <u>    N    </u></p> If yes, optional wetland site ID: _____
Remarks: (Explain alternative procedures here or in a separate report.)	

**HYDROLOGY**

Primary Indicators (minimum of one is required; check all that apply) <input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> Marl Deposits (B15) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Oxidized Rhizospheres on Living <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Roots (C3) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Recent Iron Reduction in Tilled <input type="checkbox"/> Inundation Visible on Aerial <input type="checkbox"/> Soils (C6) <input type="checkbox"/> Imagery (B7) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Sparsely Vegetated Concave <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Surface (B8)	Secondary Indicators (minimum of two required) <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery <input type="checkbox"/> (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> FAC-Neutral Test (D5) <input type="checkbox"/> Microtopographic Relief (D4)
Field Observations: Surface water present? Yes _____ No <u>  X  </u> Depth (inches): _____ Water table present? Yes _____ No <u>  X  </u> Depth (inches): _____ Saturation present? Yes _____ No <u>  X  </u> Depth (inches): _____ (includes capillary fringe)	<p align="center"><b>Indicators of wetland hydrology present?</b> <u>    N    </u></p>
Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:	
Remarks: Upland forest	



**SOIL**

**Sampling Point:** W1-up

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type*	Loc**		
0-3	10YR3/3	100					Loam	
3-10	10YR4/2	100					Silt Loam	
10-18+	2.5Y4/2	90	10YR4/6	10	C	M	Silt Loam	

\*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains

\*\*Location: PL=Pore Lining, M=Matrix

**Hydric Soil Indicators:**

- Histisol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)
- Dark Surface (S7) (LRR R, MLRA 149B)
- Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- Thin Dark Surface (S9) (LRR R, MLRA 149B)
- Loamy Mucky Mineral (F1) (LRR K, L)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)

**Indicators for Problematic Hydric Soils:**

- 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- Coast Prairie Redox (A16) (LRR K, L, R)
- 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- Dark Surface (S7) (LRR K, L)
- Polyvalue Below Surface (S8) (LRR K, L)
- Thin Dark Surface (S9) (LRR K, L)
- Iron-Manganese Masses (F12) (LRR K, L, R)
- Piedmont Floodplain Soils (F19) (MLRA 149B)
- Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- Red Parent Material (F21)
- Very Shallow Dark Surface (TF12)
- Other (Explain in Remarks)

\*Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: \_\_\_\_\_

Depth (inches): \_\_\_\_\_

**Hydric soil present?**   N  

Remarks:

Upland, fine textured soils promote some redox formation.

**WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region**

Project/Site: Nordic Aquaculture Project City/County: Belfast/Waldo Sampling Date: 5/18/2018  
 Applicant/Owner: Nordic Aquaculture State: Maine Sampling Point: W5-wet  
 Investigator(s): E. Lema Section, Township, Range: N/A  
 Landform (hillslope, terrace, etc.): slope Local relief (concave, convex, none): Convex  
 Slope (%): 2 Lat.: 44.2347 Long.: -68.593 Datum: NAD83  
 Soil Map Unit Name: Boothbay Silt Loam 3-8% slopes NWI Classification: N/A  
 Are climatic/hydrologic conditions of the site typical for this time of the year?        (If no, explain in remarks)  
 Are vegetation X, soil X, or hydrology        significantly disturbed? Are "normal  
 Are vegetation       , soil       , or hydrology        naturally problematic? circumstances" present? Yes  
 (If needed, explain any answers in remarks)

**SUMMARY OF FINDINGS**

Hydrophytic vegetation present? <u>      </u> <u>Y</u> Hydric soil present? <u>      </u> <u>Y</u> Indicators of wetland hydrology present? <u>      </u> <u>Y</u>	<p align="center"><b>Is the sampled area within a wetland?</b> <u>      </u> <u>Y</u></p> If yes, optional wetland site ID: <u>      </u> <u>W5</u>
Remarks: (Explain alternative procedures here or in a separate report.)  Disturbed old field, partially planted with Balsam Fir. Likely developed wetland characteristics due to compaction/disturbance.	

**HYDROLOGY**

Primary Indicators (minimum of one is required; check all that apply) <input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> Marl Deposits (B15) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Oxidized Rhizospheres on Living <input type="checkbox"/> Drift Deposits (B3) <input checked="" type="checkbox"/> Roots (C3) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Recent Iron Reduction in Tilled <input type="checkbox"/> Inundation Visible on Aerial <input type="checkbox"/> Soils (C6) Imagery (B7) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Sparsely Vegetated Concave <input type="checkbox"/> Other (Explain in Remarks) Surface (B8)	Secondary Indicators (minimum of two required) <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input checked="" type="checkbox"/> FAC-Neutral Test (D5) <input type="checkbox"/> Microtopographic Relief (D4)
Field Observations: Surface water present? Yes <u>      </u> No <u>      </u> <u>X</u> Depth (inches): <u>      </u> Water table present? Yes <u>      </u> No <u>      </u> <u>X</u> Depth (inches): <u>      </u> Saturation present? Yes <u>      </u> No <u>      </u> <u>X</u> Depth (inches): <u>      </u> (includes capillary fringe)	<p align="center"><b>Indicators of wetland hydrology present?</b> <u>      </u> <u>Y</u></p>
Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:  	
Remarks: Site is an old field, dominated by hydrophytes, disturbance likely altered hydrology. Marginal area.	



**SOIL**

**Sampling Point:** W5-wet

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type*	Loc**		
0-3	10YR3/2	100					Silt Loam	
3-11	2.5Y4/2	70	10YR4/6	5	C	M	Silty Clay Loam	
	10YR3/3	20	2.5Y5/1	5	D	M	Silty Clay Loam	
11-18	2.5Y4/1	85	10YR4/6	15	C	M	Silty Clay Loam	

\*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains

\*\*Location: PL=Pore Lining, M=Matrix

**Hydric Soil Indicators:**

- Histisol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)
- Dark Surface (S7) (LRR R, MLRA 149B)
- Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- Thin Dark Surface (S9) (LRR R, MLRA 149B)
- Loamy Mucky Mineral (F1) (LRR K, L)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)

**Indicators for Problematic Hydric Soils:**

- 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- Coast Prairie Redox (A16) (LRR K, L, R)
- 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- Dark Surface (S7) (LRR K, L)
- Polyvalue Below Surface (S8) (LRR K, L)
- Thin Dark Surface (S9) (LRR K, L)
- Iron-Manganese Masses (F12) (LRR K, L, R)
- Piedmont Floodplain Soils (F19) (MLRA 149B)
- Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- Red Parent Material (F21)
- Very Shallow Dark Surface (TF12)
- Other (Explain in Remarks)

\*Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: \_\_\_\_\_

Depth (inches): \_\_\_\_\_

Hydric soil present? Y

Remarks:

Ap above 11 inches. Significantly disturbed, mixed matrices.



**VEGETATION - Use scientific names of plants**

**Sampling Point:** W5-up

Tree Stratum	Plot Size ( )	Absolute % Cover	Dominant Species	Indicator Status
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
		<u>0</u>	= Total Cover	
Sapling/Shrub Stratum	Plot Size ( 15 )	Absolute % Cover	Dominant Species	Indicator Status
1	<i>Frangula alnus</i>	10	Y	FAC
2				
3				
4				
5				
6				
7				
8				
9				
10				
		<u>10</u>	= Total Cover	
Herb Stratum	Plot Size ( 5 )	Absolute % Cover	Dominant Species	Indicator Status
1	<i>Solidago rugosa</i>	35	Y	FAC
2	<i>Solidago canadensis</i>	15	Y	FACU
3	<i>Hieracium greenii</i>	15	Y	FACU
4	<i>Rumex crispus</i>	2	N	FAC
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
		<u>67</u>	= Total Cover	
Woody Vine Stratum	Plot Size ( )	Absolute % Cover	Dominant Species	Indicator Status
1				
2				
3				
4				
5				
		<u>0</u>	= Total Cover	

**50/20 Thresholds**

	20%	50%
Tree Stratum	0	0
Sapling/Shrub Stratum	2	5
Herb Stratum	13	34
Woody Vine Stratum	0	0

**Dominance Test Worksheet**

Number of Dominant Species that are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across all Strata: 4 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 50.00% (A/B)

**Prevalence Index Worksheet**

Total % Cover of:

OBL species	<u>0</u> x 1 =	<u>0</u>
FACW species	<u>0</u> x 2 =	<u>0</u>
FAC species	<u>47</u> x 3 =	<u>141</u>
FACU species	<u>30</u> x 4 =	<u>120</u>
UPL species	<u>0</u> x 5 =	<u>0</u>
Column totals	<u>77</u> (A)	<u>261</u> (B)
Prevalence Index = B/A =	<u>3.39</u>	

**Hydrophytic Vegetation Indicators:**

Rapid test for hydrophytic vegetation

Dominance test is >50%

Prevalence index is ≤3.0\*

Morphological adaptations\* (provide supporting data in Remarks or on a separate sheet)

Problematic hydrophytic vegetation\* (explain)

\*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

**Definitions of Vegetation Strata:**

**Tree** - Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

**Sapling/shrub** - Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

**Herb** - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

**Woody vines** - All woody vines greater than 3.28 ft in height.

**Hydrophytic vegetation present?** N

Remarks: (Include photo numbers here or on a separate sheet)

**SOIL**

**Sampling Point:** W5-up

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type*	Loc**		
0-9	10YR3/3	100					Loam	
9-14	10YR4/3	95	2.5Y5/1	5	D	M	Silt Loam	
14-20	2.5Y4/1	80	2.5Y4/6	10	C	M	Silty Clay Loam	
			10YR4/3	10	C	M		

\*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains

\*\*Location: PL=Pore Lining, M=Matrix

**Hydric Soil Indicators:**

- Histisol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)
- Dark Surface (S7) (**LRR R, MLRA 149B**)
- Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- Loamy Mucky Mineral (F1) (**LRR K, L**)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)

**Indicators for Problematic Hydric Soils:**

- 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- Coast Prairie Redox (A16) (**LRR K, L, R**)
- 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- Dark Surface (S7) (**LRR K, L**)
- Polyvalue Below Surface (S8) (**LRR K, L**)
- Thin Dark Surface (S9) (**LRR K, L**)
- Iron-Manganese Masses (F12) (**LRR K, L, R**)
- Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- Red Parent Material (F21)
- Very Shallow Dark Surface (TF12)
- Other (Explain in Remarks)

\*Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: \_\_\_\_\_

Depth (inches): \_\_\_\_\_

**Hydric soil present?**   N  

Remarks:

Mixed matrix does not meet hydric soil criteria. Disturbed.



**VEGETATION** - Use scientific names of plants

**Sampling Point:** W10-wet

Tree Stratum	Plot Size ( 30 )	Absolute % Cover	Dominant Species	Indicator Status
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
		<u>0</u> = Total Cover		
Sapling/Shrub Stratum	Plot Size ( 15 )	Absolute % Cover	Dominant Species	Indicator Status
1	<i>Alnus incana</i>	40	Y	FACW
2				
3				
4				
5				
6				
7				
8				
9				
10				
		<u>40</u> = Total Cover		
Herb Stratum	Plot Size ( 5 )	Absolute % Cover	Dominant Species	Indicator Status
1	<i>Impatiens capensis</i>	30	Y	FACW
2	<i>Onoclea sensibilis</i>	20	Y	FACW
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
		<u>50</u> = Total Cover		
Woody Vine Stratum	Plot Size ( )	Absolute % Cover	Dominant Species	Indicator Status
1				
2				
3				
4				
5				
		<u>0</u> = Total Cover		

**50/20 Thresholds**

	20%	50%
Tree Stratum	0	0
Sapling/Shrub Stratum	8	20
Herb Stratum	10	25
Woody Vine Stratum	0	0

**Dominance Test Worksheet**

Number of Dominant Species that are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across all Strata: 3 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 100.00% (A/B)

**Prevalence Index Worksheet**

Total % Cover of:

OBL species	<u>0</u>	x 1 =	<u>0</u>
FACW species	<u>90</u>	x 2 =	<u>180</u>
FAC species	<u>0</u>	x 3 =	<u>0</u>
FACU species	<u>0</u>	x 4 =	<u>0</u>
UPL species	<u>0</u>	x 5 =	<u>0</u>
Column totals	<u>90</u> (A)		<u>180</u> (B)
Prevalence Index = B/A =			<u>2.00</u>

**Hydrophytic Vegetation Indicators:**

Rapid test for hydrophytic vegetation

Dominance test is >50%

Prevalence index is ≤3.0\*

Morphological adaptations\* (provide supporting data in Remarks or on a separate sheet)

Problematic hydrophytic vegetation\* (explain)

\*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

**Definitions of Vegetation Strata:**

**Tree** - Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

**Sapling/shrub** - Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

**Herb** - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

**Woody vines** - All woody vines greater than 3.28 ft in height.

**Hydrophytic vegetation present?** Yes

Remarks: (Include photo numbers here or on a separate sheet)

**SOIL**

**Sampling Point:** W10-wet

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type*	Loc**		
0-2	10YR4/1	100					Silt Loam	
2-12	10YR5/1	80	10YR4/4	20	C	PL	Silt Loam	
-								
-								
-								
-								
-								
-								
-								
-								
-								
-								
-								
-								
-								

\*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains

\*\*Location: PL=Pore Lining, M=Matrix

**Hydric Soil Indicators:**

- Histisol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)
- Dark Surface (S7) (**LRR R, MLRA 149B**)

- Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- Loamy Mucky Mineral (F1) (**LRR K, L**)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)

**Indicators for Problematic Hydric Soils:**

- 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- Coast Prairie Redox (A16) (**LRR K, L, R**)
- 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- Dark Surface (S7) (**LRR K, L**)
- Polyvalue Below Surface (S8) (**LRR K, L**)
- Thin Dark Surface (S9) (**LRR K, L**)
- Iron-Manganese Masses (F12) (**LRR K, L, R**)
- Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- Red Parent Material (F21)
- Very Shallow Dark Surface (TF12)
- Other (Explain in Remarks)

\*Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: \_\_\_\_\_

Depth (inches): \_\_\_\_\_

**Hydric soil present?** Yes

Remarks:

**WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region**

Project/Site: Nordic Aquaculture City/County: Belfast Sampling Date: 7/24/2018  
 Applicant/Owner: Ransom State: Maine Sampling Point: W10 up  
 Investigator(s): Ben G. Section, Township, Range: \_\_\_\_\_  
 Landform (hillslope, terrace, etc.): Hilltop Local relief (concave, convex, none): Convex  
 Slope (%): 2 Lat.: \_\_\_\_\_ Long.: \_\_\_\_\_ Datum: \_\_\_\_\_  
 Soil Map Unit Name \_\_\_\_\_ NWI Classification: \_\_\_\_\_  
 Are climatic/hydrologic conditions of the site typical for this time of the year? No (If no, explain in remarks)  
 Are vegetation \_\_\_\_\_, soil \_\_\_\_\_, or hydrology \_\_\_\_\_ significantly disturbed? Are "normal  
 Are vegetation \_\_\_\_\_, soil \_\_\_\_\_, or hydrology \_\_\_\_\_ naturally problematic? circumstances" present? No  
 (If needed, explain any answers in remarks)

**SUMMARY OF FINDINGS**

Hydrophytic vegetation present? <u>No</u> Hydric soil present? <u>No</u> Indicators of wetland hydrology present? <u>No</u>	<b>Is the sampled area within a wetland?</b> <u>No</u> If yes, optional wetland site ID: _____
Remarks: (Explain alternative procedures here or in a separate report.)	

**HYDROLOGY**

<b>Primary Indicators (minimum of one is required; check all that apply)</b> <input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> Marl Deposits (B15) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Oxidized Rhizospheres on Living <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Roots (C3) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Recent Iron Reduction in Tilled <input type="checkbox"/> Inundation Visible on Aerial <input type="checkbox"/> Soils (C6) <input type="checkbox"/> Imagery (B7) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Sparsely Vegetated Concave <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Surface (B8)	<b>Secondary Indicators (minimum of two required)</b> <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery <input type="checkbox"/> (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> FAC-Neutral Test (D5) <input type="checkbox"/> Microtopographic Relief (D4)
<b>Field Observations:</b> Surface water present?    Yes _____ No <u>X</u> Depth (inches): _____ Water table present?      Yes _____ No <u>X</u> Depth (inches): _____ Saturation present?        Yes _____ No <u>X</u> Depth (inches): _____ (includes capillary fringe)	<b>Indicators of wetland hydrology present?</b> <u>No</u>
Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:	
Remarks:	

**VEGETATION - Use scientific names of plants**

**Sampling Point:** W10 up

Tree Stratum		Plot Size ( 30 )	Absolute % Cover	Dominant Species	Indicator Status
1	<i>Pinus strobus</i>		70	Y	FACU
2					
3					
4					
5					
6					
7					
8					
9					
10					
			70 =	Total Cover	
Sapling/Shrub Stratum		Plot Size ( 15 )	Absolute % Cover	Dominant Species	Indicator Status
1	<i>Prunus serotina</i>		30	Y	FACU
2	<i>Acer platanoides</i>		10	Y	UPL
3	<i>Quercus rubra</i>		3	N	FACU
4					
5					
6					
7					
8					
9					
10					
			43 =	Total Cover	
Herb Stratum		Plot Size ( 5 )	Absolute % Cover	Dominant Species	Indicator Status
1	<i>Hypochaeris radicata</i>		5	Y	FACU
2	<i>Trientalis borealis</i>		5	Y	FAC
3	<i>Maianthemum canadense</i>		2	N	FACU
4	<i>Quercus rubra</i>		2	N	FACU
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
			14 =	Total Cover	
Woody Vine Stratum		Plot Size ( )	Absolute % Cover	Dominant Species	Indicator Status
1					
2					
3					
4					
5					
			0 =	Total Cover	

**50/20 Thresholds**

	20%	50%
Tree Stratum	14	35
Sapling/Shrub Stratum	9	22
Herb Stratum	3	7
Woody Vine Stratum	0	0

**Dominance Test Worksheet**

Number of Dominant Species that are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across all Strata: 5 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 20.00% (A/B)

**Prevalence Index Worksheet**

Total % Cover of:

OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	5	x 3 =	15
FACU species	112	x 4 =	448
UPL species	10	x 5 =	50
Column totals	127	(A)	513 (B)

Prevalence Index = B/A = 4.04

**Hydrophytic Vegetation Indicators:**

Rapid test for hydrophytic vegetation

Dominance test is >50%

Prevalence index is ≤3.0\*

Morphological adaptations\* (provide supporting data in Remarks or on a separate sheet)

Problematic hydrophytic vegetation\* (explain)

\*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

**Definitions of Vegetation Strata:**

**Tree** - Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

**Sapling/shrub** - Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

**Herb** - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

**Woody vines** - All woody vines greater than 3.28 ft in height.

**Hydrophytic vegetation present?** No

Remarks: (Include photo numbers here or on a separate sheet)



**WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region**

Project/Site: Nordic Aquaculture City/County: Belfast Sampling Date: 7/24/2018  
 Applicant/Owner: Ransom State: Maine Sampling Point: W11 wet  
 Investigator(s): Ben G. Section, Township, Range: \_\_\_\_\_  
 Landform (hillslope, terrace, etc.): Shoreline Local relief (concave, convex, none): None  
 Slope (%): 2 Lat.: \_\_\_\_\_ Long.: \_\_\_\_\_ Datum: \_\_\_\_\_  
 Soil Map Unit Name \_\_\_\_\_ NWI Classification: \_\_\_\_\_  
 Are climatic/hydrologic conditions of the site typical for this time of the year? No (If no, explain in remarks)  
 Are vegetation \_\_\_\_\_, soil \_\_\_\_\_, or hydrology \_\_\_\_\_ significantly disturbed? Are "normal  
 Are vegetation \_\_\_\_\_, soil \_\_\_\_\_, or hydrology \_\_\_\_\_ naturally problematic? circumstances" present? No  
 (If needed, explain any answers in remarks)

**SUMMARY OF FINDINGS**

Hydrophytic vegetation present? <u>Yes</u> Hydric soil present? <u>Yes</u> Indicators of wetland hydrology present? <u>Yes</u>	<b>Is the sampled area within a wetland?</b> <u>Yes</u>  If yes, optional wetland site ID: _____
Remarks: (Explain alternative procedures here or in a separate report.)	

**HYDROLOGY**

<b>Primary Indicators (minimum of one is required; check all that apply)</b> <input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> Marl Deposits (B15) <input type="checkbox"/> Water Marks (B1) <input checked="" type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Oxidized Rhizospheres on Living <input type="checkbox"/> Drift Deposits (B3) <input checked="" type="checkbox"/> Roots (C3) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Recent Iron Reduction in Tilled <input type="checkbox"/> Inundation Visible on Aerial <input type="checkbox"/> Soils (C6) Imagery (B7) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Sparsely Vegetated Concave <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Surface (B8)	<b>Secondary Indicators (minimum of two required)</b> <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> FAC-Neutral Test (D5) <input type="checkbox"/> Microtopographic Relief (D4)
<b>Field Observations:</b> Surface water present?    Yes _____ No <u>X</u> Depth (inches): _____ Water table present?      Yes _____ No <u>X</u> Depth (inches): _____ Saturation present?        Yes _____ No <u>X</u> Depth (inches): _____ (includes capillary fringe)	<b>Indicators of wetland hydrology present?</b> <u>Yes</u>
Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:	
Remarks: <u>At low tide</u>	

**VEGETATION** - Use scientific names of plants

**Sampling Point:** W11 wet

Tree Stratum	Plot Size ( 30 )	Absolute % Cover	Dominant Species	Indicator Status
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
		0 = Total Cover		
Sapling/Shrub Stratum	Plot Size ( 15 )	Absolute % Cover	Dominant Species	Indicator Status
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
		0 = Total Cover		
Herb Stratum	Plot Size ( 5 )	Absolute % Cover	Dominant Species	Indicator Status
1	<i>Spartina alterniflora</i>	50	Y	OBL
2	<i>Juncus gerardii</i>	50	Y	OBL
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
		100 = Total Cover		
Woody Vine Stratum	Plot Size ( )	Absolute % Cover	Dominant Species	Indicator Status
1				
2				
3				
4				
5				
		0 = Total Cover		

**50/20 Thresholds**

	20%	50%
Tree Stratum	0	0
Sapling/Shrub Stratum	0	0
Herb Stratum	20	50
Woody Vine Stratum	0	0

**Dominance Test Worksheet**

Number of Dominant Species that are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across all Strata: 2 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 100.00% (A/B)

**Prevalence Index Worksheet**

Total % Cover of:

OBL species	100	x 1 =	100
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column totals	100	(A)	100 (B)
Prevalence Index = B/A =	<u>1.00</u>		

**Hydrophytic Vegetation Indicators:**

     Rapid test for hydrophytic vegetation

Dominance test is >50%

Prevalence index is ≤3.0\*

     Morphological adaptations\* (provide supporting data in Remarks or on a separate sheet)

     Problematic hydrophytic vegetation\* (explain)

\*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

**Definitions of Vegetation Strata:**

**Tree** - Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

**Sapling/shrub** - Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

**Herb** - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

**Woody vines** - All woody vines greater than 3.28 ft in height.

**Hydrophytic vegetation present?** Yes

Remarks: (Include photo numbers here or on a separate sheet)

**SOIL**

**Sampling Point:** W11 wet

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type*	Loc**		
0-2	10YR2/1	100					Peat	
####	Gley1 6/10Y	70	10YR3/6	30	C	PL	Loamy Sand	
-								
-								
-								
-								
-								
-								
-								
-								
-								
-								
-								
-								
-								
-								
-								
-								
-								

\*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains

\*\*Location: PL=Pore Lining, M=Matrix

**Hydric Soil Indicators:**

- Histisol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)
- Dark Surface (S7) (**LRR R, MLRA 149B**)

- Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- Loamy Mucky Mineral (F1) (**LRR K, L**)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)

**Indicators for Problematic Hydric Soils:**

- 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- Coast Prairie Redox (A16) (**LRR K, L, R**)
- 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- Dark Surface (S7) (**LRR K, L**)
- Polyvalue Below Surface (S8) (**LRR K, L**)
- Thin Dark Surface (S9) (**LRR K, L**)
- Iron-Manganese Masses (F12) (**LRR K, L, R**)
- Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- Red Parent Material (F21)
- Very Shallow Dark Surface (TF12)
- Other (Explain in Remarks)

\*Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: \_\_\_\_\_

Depth (inches): \_\_\_\_\_

**Hydric soil present?** Yes

Remarks:

**WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region**

Project/Site: Belfast City/County: Belfast Sampling Date: 8/28/2018  
 Applicant/Owner: Ransom/Nordic State: Maine Sampling Point: W14-wet  
 Investigator(s): Ben G. Section, Township, Range: \_\_\_\_\_  
 Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave  
 Slope (%): 0 Lat.: 44.3970965 Long.: -68.9952423 Datum: \_\_\_\_\_  
 Soil Map Unit Name Boothbay NWI Classification: Upland  
 Are climatic/hydrologic conditions of the site typical for this time of the year? No (If no, explain in remarks)  
 Are vegetation X, soil \_\_\_\_\_, or hydrology \_\_\_\_\_ significantly disturbed? Are "normal  
 Are vegetation \_\_\_\_\_, soil \_\_\_\_\_, or hydrology \_\_\_\_\_ naturally problematic? circumstances" present? No  
 (If needed, explain any answers in remarks)

**SUMMARY OF FINDINGS**

Hydrophytic vegetation present? <u>Yes</u> Hydric soil present? <u>Yes</u> Indicators of wetland hydrology present? <u>Yes</u>	<b>Is the sampled area within a wetland?</b> <u>Yes</u>  If yes, optional wetland site ID: _____
Remarks: (Explain alternative procedures here or in a separate report.)	

**HYDROLOGY**

<b>Primary Indicators (minimum of one is required; check all that apply)</b> <input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> Marl Deposits (B15) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Oxidized Rhizospheres on Living <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Roots (C3) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Recent Iron Reduction in Tilled <input type="checkbox"/> Inundation Visible on Aerial <input type="checkbox"/> Soils (C6) Imagery (B7) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Sparsely Vegetated Concave <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Surface (B8)	<b>Secondary Indicators (minimum of two required)</b> <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input checked="" type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input checked="" type="checkbox"/> FAC-Neutral Test (D5) <input checked="" type="checkbox"/> Microtopographic Relief (D4)
<b>Field Observations:</b> Surface water present?    Yes _____ No <u>X</u> Depth (inches): _____ Water table present?      Yes _____ No <u>X</u> Depth (inches): _____ Saturation present?        Yes _____ No <u>X</u> Depth (inches): _____ (includes capillary fringe)	<b>Indicators of wetland hydrology present?</b> <u>Yes</u>
Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:	
Remarks: <u>Moderate drought</u>	

**VEGETATION** - Use scientific names of plants

**Sampling Point:** W14-wet

Tree Stratum	Plot Size ( 30 )	Absolute % Cover	Dominant Species	Indicator Status
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
		0 = Total Cover		

Sapling/Shrub Stratum	Plot Size ( 15 )	Absolute % Cover	Dominant Species	Indicator Status
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
		0 = Total Cover		

Herb Stratum	Plot Size ( 5 )	Absolute % Cover	Dominant Species	Indicator Status
1	<i>Calamagrostis canadensis</i>	85	Y	OBL
2	<i>Vicia cracca</i>	25	N	UPL
3	<i>Trifolium pratense</i>	15	N	FACU
4	<i>Leontodon hispidus</i>	10	N	UPL
5	<i>Geranium maculatum</i>	5	N	FACU
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
		140 = Total Cover		

Woody Vine Stratum	Plot Size ( )	Absolute % Cover	Dominant Species	Indicator Status
1				
2				
3				
4				
5				
		0 = Total Cover		

**50/20 Thresholds**

	20%	50%
Tree Stratum	0	0
Sapling/Shrub Stratum	0	0
Herb Stratum	28	70
Woody Vine Stratum	0	0

**Dominance Test Worksheet**

Number of Dominant Species that are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across all Strata: 1 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 100.00% (A/B)

**Prevalence Index Worksheet**

Total % Cover of:

OBL species	85	x 1 =	85
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	20	x 4 =	80
UPL species	35	x 5 =	175
Column totals	140	(A)	340 (B)
Prevalence Index = B/A =			2.43

**Hydrophytic Vegetation Indicators:**

Rapid test for hydrophytic vegetation

Dominance test is >50%

Prevalence index is ≤3.0\*

Morphological adaptations\* (provide supporting data in Remarks or on a separate sheet)

Problematic hydrophytic vegetation\* (explain)

\*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

**Definitions of Vegetation Strata:**

**Tree** - Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

**Sapling/shrub** - Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

**Herb** - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

**Woody vines** - All woody vines greater than 3.28 ft in height.

**Hydrophytic vegetation present?** Yes

Remarks: (Include photo numbers here or on a separate sheet)

**SOIL**

**Sampling Point:** W14-wet

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type*	Loc**		
0-2	10YR4/1	100					Silt Loam	
4-12	10YR5/1	80	10YR5/6	20	C	PL	Silt Loam	
-								
-								
-								
-								
-								
-								
-								
-								
-								
-								
-								
-								
-								
-								
-								
-								
-								

\*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains

\*\*Location: PL=Pore Lining, M=Matrix

**Hydric Soil Indicators:**

- Histisol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)
- Dark Surface (S7) (**LRR R, MLRA 149B**)

- Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- Loamy Mucky Mineral (F1) (**LRR K, L**)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)

**Indicators for Problematic Hydric Soils:**

- 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- Coast Prairie Redox (A16) (**LRR K, L, R**)
- 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- Dark Surface (S7) (**LRR K, L**)
- Polyvalue Below Surface (S8) (**LRR K, L**)
- Thin Dark Surface (S9) (**LRR K, L**)
- Iron-Manganese Masses (F12) (**LRR K, L, R**)
- Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- Red Parent Material (F21)
- Very Shallow Dark Surface (TF12)
- Other (Explain in Remarks)

\*Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: \_\_\_\_\_

Depth (inches): \_\_\_\_\_

**Hydric soil present?** Yes

Remarks:

**WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region**

Project/Site: Belfast City/County: Belfast Sampling Date: 8/28/2018  
 Applicant/Owner: Ransom/Nordic State: Maine Sampling Point: W14-up  
 Investigator(s): Ben G. Section, Township, Range: \_\_\_\_\_  
 Landform (hillslope, terrace, etc.): Mound Local relief (concave, convex, none): Convex  
 Slope (%): 2 Lat.: 44.396975 Long.: -68.9951379 Datum: \_\_\_\_\_  
 Soil Map Unit Name Boothbay NWI Classification: Upland  
 Are climatic/hydrologic conditions of the site typical for this time of the year? No (If no, explain in remarks)  
 Are vegetation X, soil \_\_\_\_\_, or hydrology \_\_\_\_\_ significantly disturbed? Are "normal  
 Are vegetation X, soil \_\_\_\_\_, or hydrology \_\_\_\_\_ naturally problematic? circumstances" present? No  
 (If needed, explain any answers in remarks)

**SUMMARY OF FINDINGS**

Hydrophytic vegetation present? <u>No</u> Hydric soil present? <u>Yes</u> Indicators of wetland hydrology present? <u>No</u>	<b>Is the sampled area within a wetland?</b> <u>No</u> If yes, optional wetland site ID: _____
Remarks: (Explain alternative procedures here or in a separate report.)	

**HYDROLOGY**

<b>Primary Indicators (minimum of one is required; check all that apply)</b> <input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> Marl Deposits (B15) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Oxidized Rhizospheres on Living <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Roots (C3) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Recent Iron Reduction in Tilled <input type="checkbox"/> Inundation Visible on Aerial <input type="checkbox"/> Soils (C6) <input type="checkbox"/> Imagery (B7) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Sparsely Vegetated Concave <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Surface (B8)	<b>Secondary Indicators (minimum of two required)</b> <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery <input type="checkbox"/> (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> FAC-Neutral Test (D5) <input type="checkbox"/> Microtopographic Relief (D4)
<b>Field Observations:</b> Surface water present?    Yes _____ No <u>X</u> Depth (inches): _____ Water table present?      Yes _____ No <u>X</u> Depth (inches): _____ Saturation present?        Yes _____ No <u>X</u> Depth (inches): _____ (includes capillary fringe)	<b>Indicators of wetland hydrology present?</b> <u>No</u>
Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:	
Remarks:	

**VEGETATION** - Use scientific names of plants

**Sampling Point:** W14-up

Tree Stratum	Plot Size ( 30 )	Absolute % Cover	Dominant Species	Indicator Status
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
		<u>0</u> = Total Cover		

Sapling/Shrub Stratum	Plot Size ( 15 )	Absolute % Cover	Dominant Species	Indicator Status
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
		<u>0</u> = Total Cover		

Herb Stratum	Plot Size ( 5 )	Absolute % Cover	Dominant Species	Indicator Status
1	<i>Trifolium pratense</i>	50	Y	FACU
2	<i>Vicia cracca</i>	30	Y	UPL
3	<i>Leontodon hispidus</i>	15	N	UPL
4	<i>Galium mollugo</i>	5	N	UPL
5	<i>Geranium maculatum</i>	5	N	FACU
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
		<u>105</u> = Total Cover		

Woody Vine Stratum	Plot Size ( )	Absolute % Cover	Dominant Species	Indicator Status
1				
2				
3				
4				
5				
		<u>0</u> = Total Cover		

**50/20 Thresholds**

Tree Stratum	20%	50%
Tree Stratum	0	0
Sapling/Shrub Stratum	0	0
Herb Stratum	21	53
Woody Vine Stratum	0	0

**Dominance Test Worksheet**

Number of Dominant Species that are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across all Strata: 2 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 0.00% (A/B)

**Prevalence Index Worksheet**

Total % Cover of:

OBL species	<u>0</u> x 1 = <u>0</u>
FACW species	<u>0</u> x 2 = <u>0</u>
FAC species	<u>0</u> x 3 = <u>0</u>
FACU species	<u>55</u> x 4 = <u>220</u>
UPL species	<u>50</u> x 5 = <u>250</u>
Column totals	<u>105</u> (A) <u>470</u> (B)
Prevalence Index = B/A =	<u>4.48</u>

**Hydrophytic Vegetation Indicators:**

Rapid test for hydrophytic vegetation

Dominance test is >50%

Prevalence index is ≤3.0\*

Morphological adaptations\* (provide supporting data in Remarks or on a separate sheet)

Problematic hydrophytic vegetation\* (explain)

\*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

**Definitions of Vegetation Strata:**

**Tree** - Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

**Sapling/shrub** - Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

**Herb** - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

**Woody vines** - All woody vines greater than 3.28 ft in height.

**Hydrophytic vegetation present?** No

Remarks: (Include photo numbers here or on a separate sheet)

**SOIL**

**Sampling Point:** W14-up

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type*	Loc**		
0-2	10YR4/1	100					Silt Loam	
2-12	10YR5/1	99	10YR5/6	1	C	PL	Silt Loam	
-								
-								
-								
-								
-								
-								
-								
-								
-								
-								
-								
-								
-								

\*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains

\*\*Location: PL=Pore Lining, M=Matrix

**Hydric Soil Indicators:**

- Histisol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)
- Dark Surface (S7) (**LRR R, MLRA 149B**)

- Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- Loamy Mucky Mineral (F1) (**LRR K, L**)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)

**Indicators for Problematic Hydric Soils:**

- 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- Coast Prairie Redox (A16) (**LRR K, L, R**)
- 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- Dark Surface (S7) (**LRR K, L**)
- Polyvalue Below Surface (S8) (**LRR K, L**)
- Thin Dark Surface (S9) (**LRR K, L**)
- Iron-Manganese Masses (F12) (**LRR K, L, R**)
- Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- Red Parent Material (F21)
- Very Shallow Dark Surface (TF12)
- Other (Explain in Remarks)

\*Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: \_\_\_\_\_

Depth (inches): \_\_\_\_\_

**Hydric soil present?** Yes

Remarks:

**WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region**

Project/Site: Belfast Aquaculture City/County: Belfast/Waldo Sampling Date: 7/3/2019  
 Applicant/Owner: Nordic Aquaculture State: ME Sampling Point: W15-wet  
 Investigator(s): B. Griffith Section, Township, Range: \_\_\_\_\_  
 Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave  
 Slope (%): 2 Lat.: \_\_\_\_\_ Long.: \_\_\_\_\_ Datum: WGS1984  
 Soil Map Unit Name: Boothbay Silt Loam 3-8% slopes NWI Classification: \_\_\_\_\_  
 Are climatic/hydrologic conditions of the site typical for this time of the year? No (If no, explain in remarks)  
 Are vegetation \_\_\_\_\_, soil \_\_\_\_\_, or hydrology \_\_\_\_\_ significantly disturbed? Are "normal  
 Are vegetation \_\_\_\_\_, soil \_\_\_\_\_, or hydrology \_\_\_\_\_ naturally problematic? circumstances" present? Yes  
 (If needed, explain any answers in remarks)

**SUMMARY OF FINDINGS**

Hydrophytic vegetation present? <u>Y</u> Hydric soil present? <u>Y</u> Wetland hydrology present? <u>Y</u>	<b>Is the sampled area within a wetland?</b> <u>Y</u>  If yes, optional wetland site ID: _____
Remarks: (Explain alternative procedures here or in a separate report.)  _____ _____	

**HYDROLOGY**

Primary Indicators (minimum of one is required; check all that apply) <input checked="" type="checkbox"/> Surface Water (A1)                      _____ Water-Stained Leaves (B9) <input checked="" type="checkbox"/> High Water Table (A2)                    _____ Aquatic Fauna (B13) <input checked="" type="checkbox"/> Saturation (A3)                              _____ Marl Deposits (B15) _____ Water Marks (B1)                      _____ Hydrogen Sulfide Odor (C1) _____ Sediment Deposits (B2)                _____ Oxidized Rhizospheres on Living _____ Drift Deposits (B3)                    _____ Roots (C3) _____ Algal Mat or Crust (B4)                _____ Presence of Reduced Iron (C4) _____ Iron Deposits (B5)                      _____ Recent Iron Reduction in Tilled _____ Inundation Visible on Aerial        _____ Soils (C6) Imagery (B7)                                    _____ Thin Muck Surface (C7) _____ Sparsely Vegetated Concave      _____ Other (Explain in Remarks) Surface (B8)	Secondary Indicators (minimum of two required) _____ Surface Soil Cracks (B6) _____ Drainage Patterns (B10) _____ Moss Trim Lines (B16) _____ Dry-Season Water Table (C2) _____ Crayfish Burrows (C8) _____ Saturation Visible on Aerial Imagery (C9) _____ Stunted or Stressed Plants (D1) _____ Geomorphic Position (D2) _____ Shallow Aquitard (D3) _____ FAC-Neutral Test (D5) _____ Microtopographic Relief (D4)
---	---

Field Observations: Surface water present? Yes <u>X</u> No _____ Depth (inches): <u>2</u> Water table present? Yes <u>X</u> No _____ Depth (inches): <u>0</u> Saturation present? Yes <u>X</u> No _____ Depth (inches): <u>0</u> (includes capillary fringe)	<b>Wetland hydrology present?</b> <u>Y</u>
--	--

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:  
 \_\_\_\_\_  
 \_\_\_\_\_

Remarks:  
 Exceptionally wet June





## WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Belfast Aquaculture City/County: Belfast/Waldo Sampling Date: 7/3/2019  
 Applicant/Owner: Nordic Aquaculture State: \_\_\_\_\_ Sampling Point: W15-Up  
 Investigator(s): B. Griffith Section, Township, Range: \_\_\_\_\_  
 Landform (hillslope, terrace, etc.): Mound Local relief (concave, convex, none): Convex  
 Slope (%): 2 Lat.: \_\_\_\_\_ Long.: \_\_\_\_\_ Datum: WGS1984  
 Soil Map Unit Name: Boothbay Silt Loam 3-8% Slopes NWI Classification: \_\_\_\_\_  
 Are climatic/hydrologic conditions of the site typical for this time of the year? No (If no, explain in remarks)  
 Are vegetation \_\_\_\_\_, soil \_\_\_\_\_, or hydrology \_\_\_\_\_ significantly disturbed? Are "normal  
 Are vegetation \_\_\_\_\_, soil \_\_\_\_\_, or hydrology \_\_\_\_\_ naturally problematic? circumstances" present? Yes  
 (If needed, explain any answers in remarks)

### SUMMARY OF FINDINGS

Hydrophytic vegetation present? <u>  N  </u> Hydric soil present? <u>          </u> Wetland hydrology present? <u>  N  </u>	<b>Is the sampled area within a wetland?</b> <u>  N  </u>  If yes, optional wetland site ID: _____
Remarks: (Explain alternative procedures here or in a separate report.)  <div style="height: 40px;"></div>	

### HYDROLOGY

<b>Primary Indicators</b> (minimum of one is required; check all that apply) <input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> Marl Deposits (B15) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Oxidized Rhizospheres on Living <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Roots (C3) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Recent Iron Reduction in Tilled <input type="checkbox"/> Inundation Visible on Aerial <input type="checkbox"/> Soils (C6) <input type="checkbox"/> Imagery (B7) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Sparsely Vegetated Concave <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Surface (B8)	<b>Secondary Indicators</b> (minimum of two required) <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery <input type="checkbox"/> (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> FAC-Neutral Test (D5) <input type="checkbox"/> Microtopographic Relief (D4)
<b>Field Observations:</b> Surface water present? Yes <u>      </u> No <u>  X  </u> Depth (inches): _____ Water table present? Yes <u>      </u> No <u>  X  </u> Depth (inches): _____ Saturation present? Yes <u>      </u> No <u>  X  </u> Depth (inches): _____ (includes capillary fringe)	<b>Wetland hydrology present?</b> <u>  N  </u>
Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:  <div style="height: 40px;"></div>	
Remarks:  <div style="height: 40px;"> <p style="margin-left: 20px;">Exceptionally wet June</p> </div>	

**VEGETATION - Use scientific names of plants**

**Sampling Point:** W15-Up

Tree Stratum	Plot Size ( )	Absolute % Cover	Dominant Species	Indicator Staus
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

**50/20 Thresholds**

	20%	50%
Tree Stratum	0	0
Sapling/Shrub Stratum	0	0
Herb Stratum	27	68
Woody Vine Stratum	0	0

**Dominance Test Worksheet**

Number of Dominant Species that are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across all Strata: 1 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 0.00% (A/B)

Sapling/Shrub Stratum	Plot Size ( )	Absolute % Cover	Dominant Species	Indicator Staus
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

**Prevalence Index Worksheet**

Total % Cover of:

OBL species	15	x 1 =	15
FACW species	1	x 2 =	2
FAC species	6	x 3 =	18
FACU species	20	x 4 =	80
UPL species	92	x 5 =	460
Column totals	134	(A)	575 (B)
Prevalence Index = B/A =			4.29

Herb Stratum	Plot Size ( 5xR )	Absolute % Cover	Dominant Species	Indicator Staus
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				

**Hydrophytic Vegetation Indicators:**

Rapid test for hydrophytic vegetation

Dominance test is >50%

Prevalence index is ≤3.0\*

Morphological adaptations\* (provide supporting data in Remarks or on a separate sheet)

Problematic hydrophytic vegetation\* (explain)

\*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

**Definitions of Vegetation Strata:**

**Tree** - Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

**Sapling/shrub** - Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

**Herb** - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

**Woody vines** - All woody vines greater than 3.28 ft in height.

Woody Vine Stratum	Plot Size ( )	Absolute % Cover	Dominant Species	Indicator Staus
1				
2				
3				
4				
5				

**Hydrophytic vegetation present?** N

Remarks: (Include photo numbers here or on a separate sheet)



## WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Belfast Aquaculture City/County: Belfast/Waldo Sampling Date: 1/3/2019  
 Applicant/Owner: Nordic Aquaculture State: ME Sampling Point: W19-Wet  
 Investigator(s): B. Griffith Section, Township, Range: \_\_\_\_\_  
 Landform (hillslope, terrace, etc.): Mound Local relief (concave, convex, none): Convex  
 Slope (%): 3 Lat.: \_\_\_\_\_ Long.: \_\_\_\_\_ Datum: WGS1984  
 Soil Map Unit Name: Boothbay Silt Loam 3-8% Slopes NWI Classification: \_\_\_\_\_  
 Are climatic/hydrologic conditions of the site typical for this time of the year? No (If no, explain in remarks)  
 Are vegetation \_\_\_\_\_, soil \_\_\_\_\_, or hydrology \_\_\_\_\_ significantly disturbed? Are "normal  
 Are vegetation \_\_\_\_\_, soil \_\_\_\_\_, or hydrology \_\_\_\_\_ naturally problematic? circumstances" present? Yes  
 (If needed, explain any answers in remarks)

### SUMMARY OF FINDINGS

Hydrophytic vegetation present? <u>Y</u> Hydric soil present? <u>Y</u> Wetland hydrology present? <u>Y</u>	<b>Is the sampled area within a wetland?</b> <u>Y</u>  If yes, optional wetland site ID: _____
Remarks: (Explain alternative procedures here or in a separate report.)  <div style="height: 40px;"></div>	

### HYDROLOGY

<b>Primary Indicators</b> (minimum of one is required; check all that apply)	<b>Secondary Indicators</b> (minimum of two required)
<input type="checkbox"/> Surface Water (A1) <input checked="" type="checkbox"/> High Water Table (A2) <input checked="" type="checkbox"/> Saturation (A3) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	<input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> Marl Deposits (B15) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Other (Explain in Remarks)
<input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> FAC-Neutral Test (D5) <input type="checkbox"/> Microtopographic Relief (D4)	
<b>Field Observations:</b> Surface water present? Yes <u>      </u> No <u>X</u> Depth (inches): _____ Water table present? Yes <u>X</u> No <u>      </u> Depth (inches): _____ Saturation present? Yes <u>X</u> No <u>      </u> Depth (inches): <u>0</u> (includes capillary fringe)	<b>Wetland hydrology present?</b> <u>Y</u>
Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:  <div style="height: 40px;"></div>	
Remarks:  <div style="height: 40px;"> <p style="margin-left: 20px;">Exceptionally wet June</p> </div>	





## WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Maine Aquaculture City/County: Waldo/Belfast Sampling Date: 7/3/2019  
 Applicant/Owner: Nordic State: ME Sampling Point: W19-UPL  
 Investigator(s): Benjamin Griffith Section, Township, Range: \_\_\_\_\_  
 Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Convex  
 Slope (%): 4 Lat.: 44.39758555 Long.: -68.99261121 Datum: WGS1984  
 Soil Map Unit Name: Boothbay silt loam (0-8% slopes) NWI Classification: UPL  
 Are climatic/hydrologic conditions of the site typical for this time of the year? No (If no, explain in remarks)  
 Are vegetation \_\_\_\_\_, soil X, or hydrology \_\_\_\_\_ significantly disturbed? Are "normal  
 Are vegetation \_\_\_\_\_, soil \_\_\_\_\_, or hydrology \_\_\_\_\_ naturally problematic? circumstances" present? Yes  
 (If needed, explain any answers in remarks)

### SUMMARY OF FINDINGS

Hydrophytic vegetation present? <u>  N  </u> Hydric soil present? <u>  N  </u> Wetland hydrology present? <u>  N  </u>	<b>Is the sampled area within a wetland?</b> <u>  N  </u>  If yes, optional wetland site ID: _____
Remarks: (Explain alternative procedures here or in a separate report.)  <div style="border: 1px solid black; height: 40px; width: 100%;"></div>	

### HYDROLOGY

<b>Primary Indicators</b> (minimum of one is required; check all that apply) <input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> Marl Deposits (B15) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Oxidized Rhizospheres on Living <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Roots (C3) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Recent Iron Reduction in Tilled <input type="checkbox"/> Inundation Visible on Aerial <input type="checkbox"/> Soils (C6) <input type="checkbox"/> Imagery (B7) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Sparsely Vegetated Concave <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Surface (B8)	<b>Secondary Indicators</b> (minimum of two required) <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery <input type="checkbox"/> (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> FAC-Neutral Test (D5) <input type="checkbox"/> Microtopographic Relief (D4)
<b>Field Observations:</b> Surface water present? Yes <u>  </u> No <u>  X  </u> Depth (inches): _____ Water table present? Yes <u>  </u> No <u>  X  </u> Depth (inches): _____ Saturation present? Yes <u>  </u> No <u>  X  </u> Depth (inches): _____ (includes capillary fringe)	<b>Wetland hydrology present?</b> <u>  N  </u>
Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:  <div style="border: 1px solid black; height: 40px; width: 100%;"></div>	
Remarks:  <div style="border: 1px solid black; height: 40px; width: 100%;"></div>	

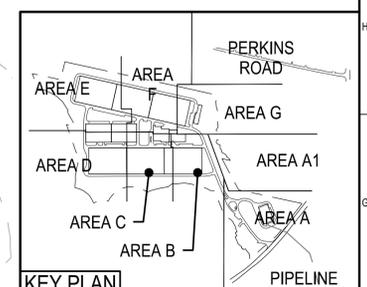
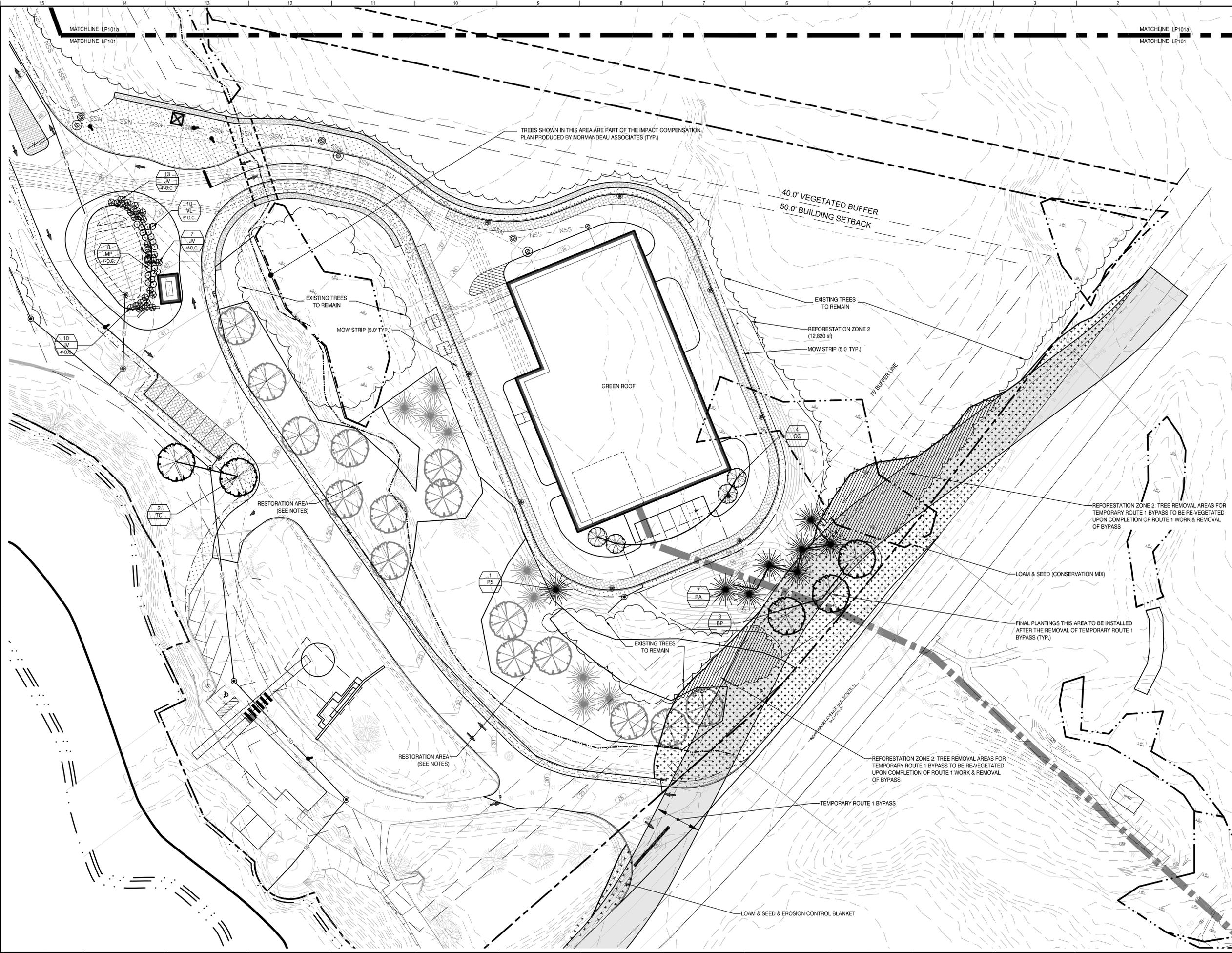




**ATTACHMENT I**

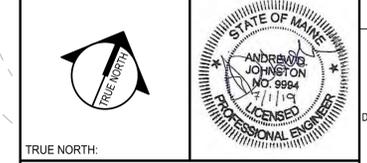
Updated Landscaping Planting Plans LP101, LP101A, LP102, LP107, and LP501

Response to Review Comments  
Nordic Aquafarms Inc., Land-based Aquaculture Facility  
Belfast, Maine  
L-28319-26-A-N



REV	DESCRIPTION	DATE
2	RESPONSE TO ADDITIONAL DEP QUESTIONS	7-25-19
1	REISSUED FOR PERMIT	7-03-19
0	ISSUED FOR PERMIT	5-14-19

**RESPONSE TO DEP**  
7-25-19  
CURRENT ISSUE STATUS:



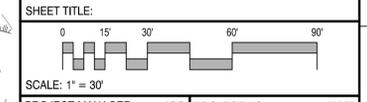
SMRT Architects and Engineers  
144 Fore Street/P.O. BOX 618  
Portland, Maine 04104  
1.877.700.7678  
www.smrting.com

ARCHITECTURE | ENGINEERING | PLANNING | INTERIORS | ENERGY

**RANSOM** Consulting Engineers and Scientists  
Ransom Consulting Engineers and Scientists  
400 Commercial Street, Suite 400  
Portland, Maine 04101

**NORDIC AQUAFARMS**  
285 NORTHPORT AVENUE  
BELFAST, MAINE

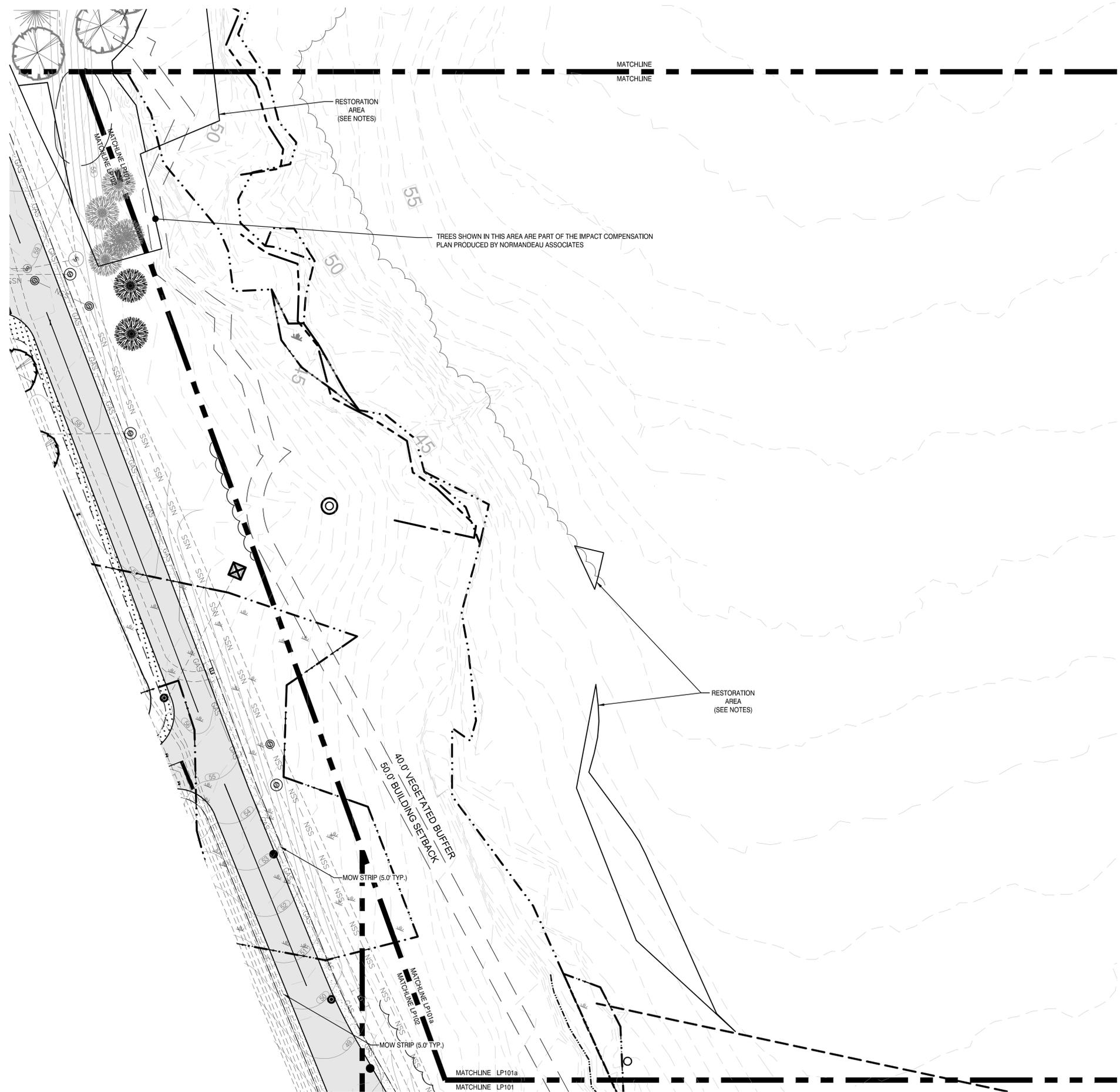
**PLANTING PLAN**  
AREA A



PROJECT MANAGER: ADB PROJECT NO: 18076  
A/E OF RECORD: MGJ  
JOB CAPTAIN: SP  
DRAWN BY: WSM  
SMRT FILE: LP101-18076 SHEET No.

**LP101**

NOT FOR CONSTRUCTION



RESTORATION AREA  
(SEE NOTES)

TREES SHOWN IN THIS AREA ARE PART OF THE IMPACT COMPENSATION PLAN PRODUCED BY NORMANDEAU ASSOCIATES

RESTORATION AREA  
(SEE NOTES)

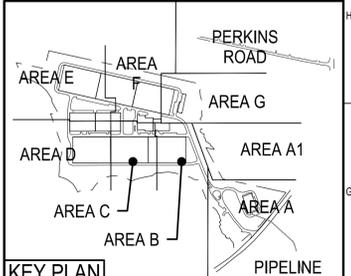
40.0' VEGETATED BUFFER  
50.0' BUILDING SETBACK

MOW STRIP (6.0' TYP.)

MOW STRIP (6.0' TYP.)

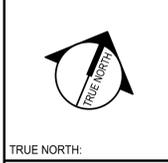
MATCHLINE LP101a

MATCHLINE LP101



REV	DESCRIPTION	DATE
1	REISSUED FOR PERMIT	7-03-19
0	ISSUED FOR PERMIT	5-14-19

CURRENT ISSUE STATUS:



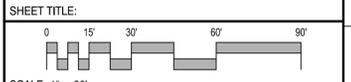
SMRT Architects and Engineers  
144 Fore Street/P.O. BOX 618  
Portland, Maine 04104  
1.877.700.7678  
www.smrinc.com



ARCHITECTURE | ENGINEERING | PLANNING | INTERIORS | ENERGY  
**RANSOM** Consulting Engineers and Scientists  
Ransom Consulting Engineers and Scientists  
400 Commercial Street, Suite 400  
Portland, Maine 04101

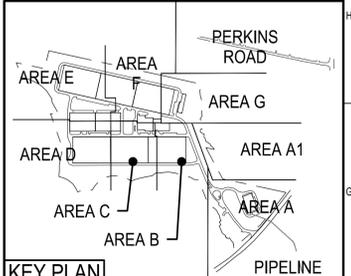
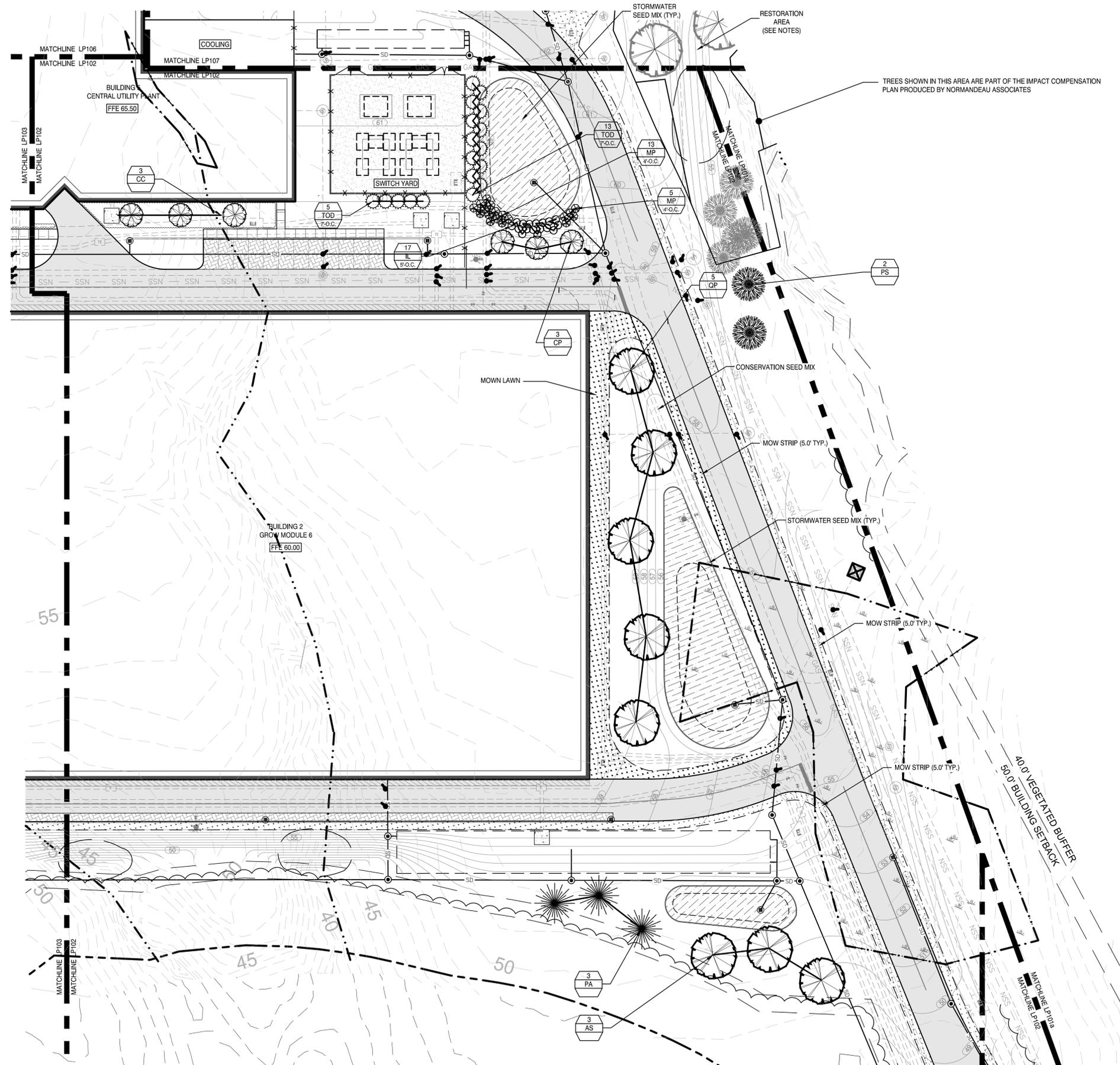
**NORDIC AQUAFARMS**  
285 NORTHPORT AVENUE  
BELFAST, MAINE

**PLANTING PLAN**  
AREA A1



SCALE: 1" = 30'	PROJECT MANAGER: ADB	PROJECT NO: 18076
A/E OF RECORD:	JOB CAPTAIN: SP	<b>LP101a</b>
DRAWN BY: WSM	SMRT FILE: LP101a-18076	

NOT FOR CONSTRUCTION



REV	DESCRIPTION	DATE
1	REISSUED FOR PERMIT	7-03-19
0	ISSUED FOR PERMIT	5-14-19

CURRENT ISSUE STATUS:

TRUE NORTH

ANDREW JOHNSTON  
NO. 9994  
7/1/19  
LICENSED PROFESSIONAL ENGINEER

SMRT Architects and Engineers  
144 Fore Street/P.O. BOX 618  
Portland, Maine 04104  
1.877.700.7678  
www.smrtinc.com

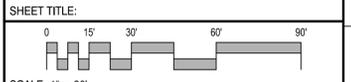
ARCHITECTURE | ENGINEERING | PLANNING | INTERIORS | ENERGY

**SMRT**

**RANSOM** Consulting Engineers and Scientists  
Ransom Consulting Engineers and Scientists  
400 Commercial Street, Suite 400  
Portland, Maine 04101

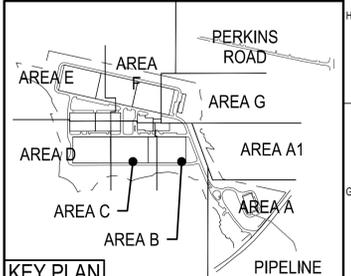
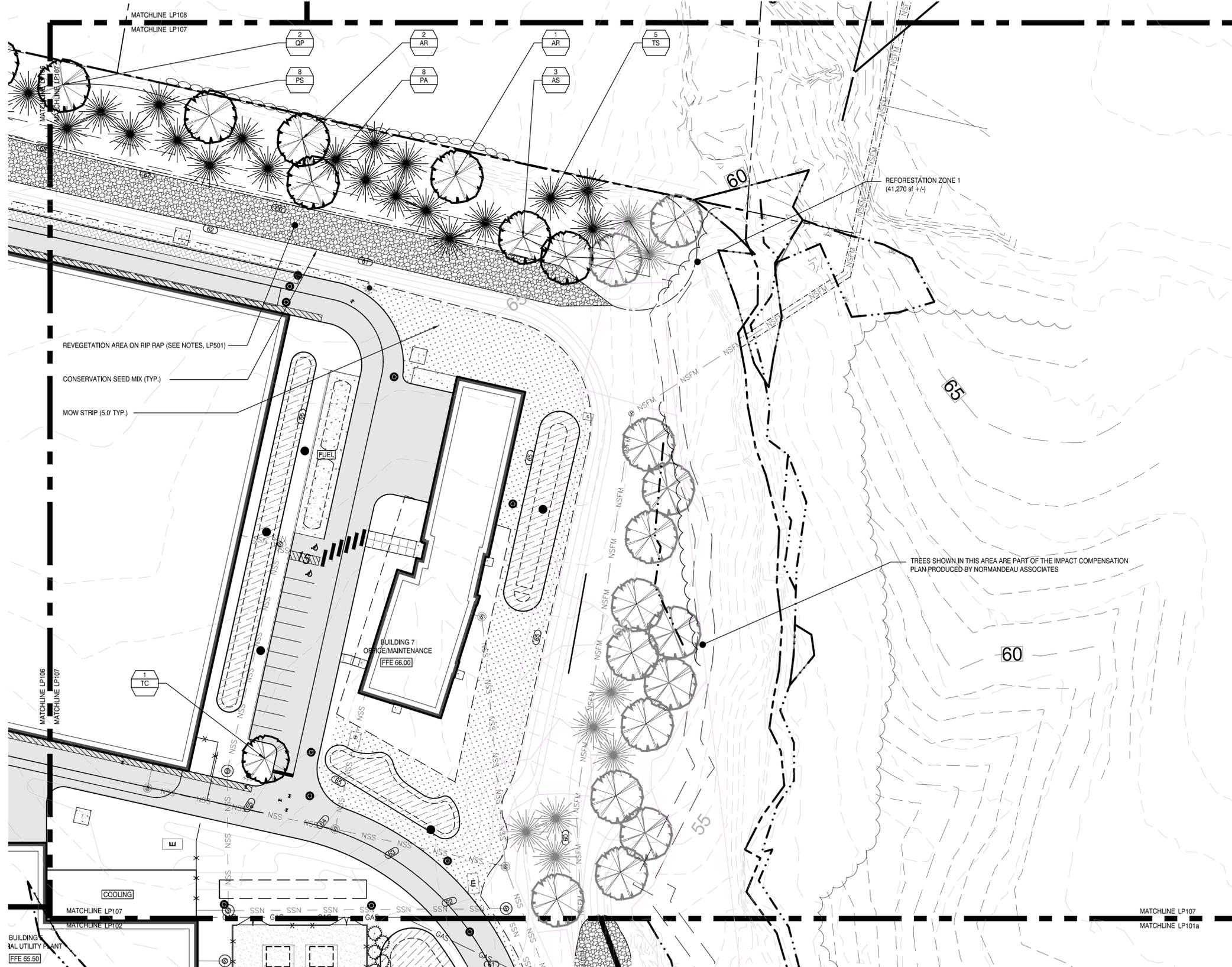
**NORDIC AQUAFARMS**  
285 NORTHPORT AVENUE  
BELFAST, MAINE

**PLANTING PLAN**  
AREA B



PROJECT MANAGER:	ADB	PROJECT NO.:	18076
A/E OF RECORD:			
JOB CAPTAIN:	SP		
DRAWN BY:	WSM		
SMRT FILE:	LP102-18076	SHEET No.:	<b>LP102</b>

NOT FOR CONSTRUCTION



REV	DESCRIPTION	DATE
1	REISSUED FOR PERMIT	7-03-19
0	ISSUED FOR PERMIT	5-14-19

CURRENT ISSUE STATUS:

TRUE NORTH:

SMRT Architects and Engineers  
 144 Fore Street/P.O. BOX 618  
 Portland, Maine 04104  
 1.877.700.7678  
 www.smrtinc.com

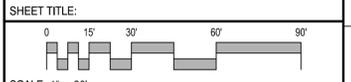
ARCHITECTURE | ENGINEERING | PLANNING | INTERIORS | ENERGY

**RANSOM** Consulting Engineers and Scientists  
 Ransom Consulting Engineers and Scientists  
 400 Commercial Street, Suite 400  
 Portland, Maine 04101

**NORDIC AQUAFARMS**  
 285 NORTHPORT AVENUE

BELFAST, MAINE

**PLANTING PLAN**  
 AREA G

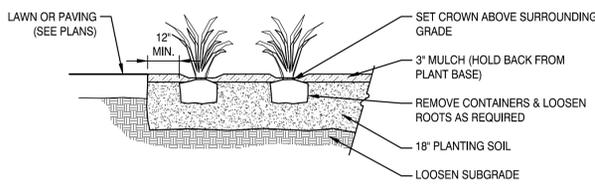


PROJECT MANAGER:	ADB	PROJECT NO.:	18076
A/E OF RECORD:	ADJ		
JOB CAPTAIN:	SP		
DRAWN BY:	WSM		
SMRT FILE:	LP107-18076	SHEET No.:	<b>LP107</b>

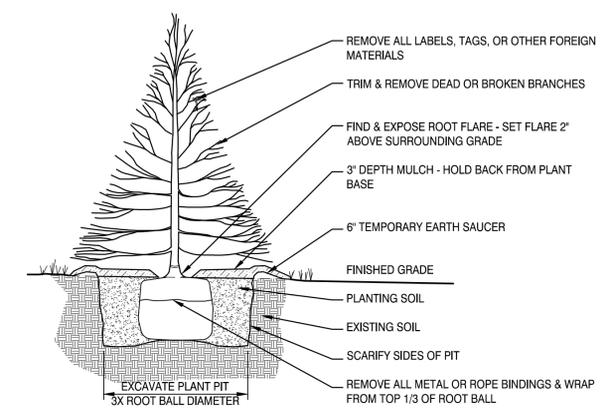
PLANT LIST - REFORESTATION AREAS					
MARK	SCIENTIFIC NAME / COMMON NAME	PERCENTAGE OF MIX	QUANTITY	SIZE/CONDITION	REMARKS
<b>Zone 1</b>					
AREA (ACRES)	1				
RATE (#/ACRE)	450				
<b>TREES</b>					
AB	Abies balsamia / Balsam Fir	12	51		
AR	Acer rubrum / Red Maple	11	47		
AR	Acer sacharum / Sugar Maple	2	9		
BA	Betula alleghaniensis / Yellow Birch	4	17		
BP	Betula papyrifera / Paper Birch	2	9		
PR	Picea rubens / Red Spruce	4	17		
PS	Pinus strobus / Eastern White Pine	9	38		
PG	Populus grandidentata / Bigtooth Aspen	13	56		
QR	Quercus rubra / Red Oak	45	192		
TC	Tsuga canadensis / Eastern Hemlock	3	13		
<b>Zone 2</b>					
AREA (ACRES)	0				
RATE (#/ACRE)	450				
<b>TREES</b>					
AB	Abies balsamia / Balsam Fir	12	16		
AR	Acer rubrum / Red Maple	11	14		
BP	Betula papyrifera / Paper Birch	12	16		
FG	Fagus grandiflora / American Beech	2	3		
PS	Pinus strobus / Eastern White Pine	51	67		
PG	Populus grandidentata / Bigtooth Aspen	10	13		

MARK	SCIENTIFIC NAME / COMMON NAME	SIZE CAL	SIZE HT	ROOT	REMARKS
<b>TREES</b>					
AR	Acer rubrum / Red Maple	2" - 2.5"	12"-14'	B & B	Full, matched specimens
AS	Acer sacharum / Sugar Maple	2" - 2.5"	12"-14'	B & B	Full, matched specimens
BP	Betula papyrifera 'Renaissance Reflection' / Paper Birch	-	8'-10'	B & B	Full, matched specimens; clump form; 3-stem min.
CA	Cornus alternifolia / Pagoda Dogwood	-	8'-10'	B & B	Full, matched specimens
CC	Crataegus crusgalli var. inermis / Cockspur Thornless Hawthorn	1 1/2"	8'-10'	B & B	Full, matched specimens
MS	Malus Donald Wyman / Donald Wyman Crabapple	1 1/2"	8'-10'	B & B	Full, matched specimens
FG	Fagus grandifolia / American Beech	2" - 2.5"	12"-14'	B & B	Full
PA	Picea abies / Norway Spruce	-	5' - 10'	B & B	Equal parts: 5'-6', 6'-8', 8'-10'. Randomly mix.
PR	Picea rubra / Red Spruce	-	5' - 10'	B & B	Equal parts: 5'-6', 6'-8', 8'-10'. Randomly mix.
PS	Pinus strobus / Eastern White Pine	-	5' - 10'	B & B	Equal parts: 5'-6', 6'-8', 8'-10'. Randomly mix.
QP	Quercus palustris / Pin Oak	2" - 2.5"	12"-14'	B & B	Full, matched specimens
TC	Tilia cordata 'Greenspire' / Littleleaf Linden	2" - 2.5"	12"-14'	B & B	Full, matched specimens
TS	Tsuga canadensis / Eastern Hemlock	-	5' - 10'	B & B	Equal parts: 5'-6', 6'-8', 8'-10'. Randomly mix.
TOD	Thuja occidentalis 'Douglasii' / Douglas Arborvitae	-	6'-8'	B & B	Full
<b>SHRUBS</b>					
CS	Cornus sericea 'Baileyi' / Red Twig Dogwood	#3	3'	Cont.	
IV	Ilex verticillata 'Winter Red' & 'Apollo' / Winterberry	#3	3'	Cont.	Equal numbers of each in each mass; mixed
JV	Juniperus virginiana 'Grey Owl' / Grey Owl Juniper	#3	3'	Cont.	
MP	Myrica pensylvanica / Bayberry	#3	3'	Cont.	
VC	Viburnum carlesii / Koreanspice Viburnum	#3	3'	Cont.	
VL	Viburnum lentago 'Mohican' / Viburnum	#3	3'	Cont.	
VAS	Vaccinium angustifolium / Lowbush Blueberry	-	-	sod	
<b>PERENNIALS</b>					
CP	Carex pensylvanica / Pennsylvania Sedge	#1	-	Cont.	2 year clump
DM	Dryopteris marginalis / Marginal Wood Fern	#1	-	Cont.	2 year clump
HS	Hemerocallis 'Stella d'Oro' / Daylily	#1	-	Cont.	2 year clump
MD	Monarda didyma 'Jacob Cline' / Bee-Balm	#1	-	Cont.	2 year clump
PV	Panicum virgatum 'Northwind' / Switch Grass	#1	-	Cont.	2 year clump
RF	Rudbeckia fulgida 'Goldstrum' / Black-eyed Susan	#1	-	Cont.	2 year clump
SS	Schizachyrium scoparium 'Blue Paradise' / Little Bluestem	#1	-	Cont.	2 year clump
SH	Sporobolus heterolepis / Prairie Dropseed	#1	-	Cont.	2 year clump

- ALL DISTURBED AREAS NOT OTHERWISE TREATED OUTSIDE THE PERIMETER DRIVE LIMITS TO BE STABILIZED AS FOLLOWS:
  - UPPER CUT SLOPE: TEMPORARY RIPRAP TO REMAIN. APPLY SLURRY OF TOPSOIL TO A DEVELOPED DEPTH OF 4 INCHES IN THE INTERSTITIAL SPACES BETWEEN STONES. HYDROSEED/MULCH WITH "NEW ENGLAND ROADSIDE MATRIX UPLAND SEED MIX" (BASIS OF DESIGN) BY NEW ENGLAND WETLAND PLANTS, INC., OR APPROVED EQUAL.
  - PERIMETER CUT/FILL SLOPES: SCARIFY AND DECOMPACT SOILS BEFORE APPLYING 6 INCHES LOAM. COMPACTING AS SPECIFIED. HYDROSEED/MULCH WITH "NEW ENGLAND CONSERVATION/WILDLIFE MIX" (BASIS OF DESIGN) BY NEW ENGLAND WETLAND PLANTS, INC., OR APPROVED EQUAL.
  - STORMWATER MANAGEMENT BASINS: PLACE 6 INCHES LOAM TO SIDE SLOPES. HYDROSEED/MULCH WITH "NEW ENGLAND CONSERVATION/WILDLIFE MIX" (BASIS OF DESIGN) BY NEW ENGLAND WETLAND PLANTS, INC., OR APPROVED EQUAL. APPLY JUTE EROSION CONTROL MESH AND PEG AT REGULAR INTERVALS PER MANUFACTURER RECOMMENDATIONS TO PREVENT FLOATING OF SEED UNTIL SECURELY ROOTED. NOTE: VEGETATION IN STORMWATER BASINS IS TO BE FULLY ESTABLISHED AND SOILS STABILIZED PRIOR TO INTRODUCTION OF STORMWATER DRAINAGE.
- ALL DISTURBED AREAS NOT OTHERWISE TREATED INSIDE THE PERIMETER DRIVE LIMITS TO BE LOAMED (6 INCHES) AND SEEDED WITH LAWN MIX UNLESS NOTED OTHERWISE.
- LIMITS OF MOWING TO BE AS SHOWN AND GENERALLY 5-FEET +/- PAST THE EDGE OF PAVING.
- AREAS LABELED "RESTORATION AREAS" ARE TO BE REVEGETATED AS SPECIFIED (REFER TO RIPARIAN BUFFER AND RESTORATION PLAN FOR DETAILS).

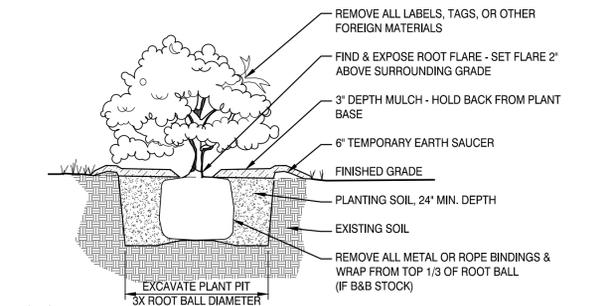


PLANTING NOTES (A10)



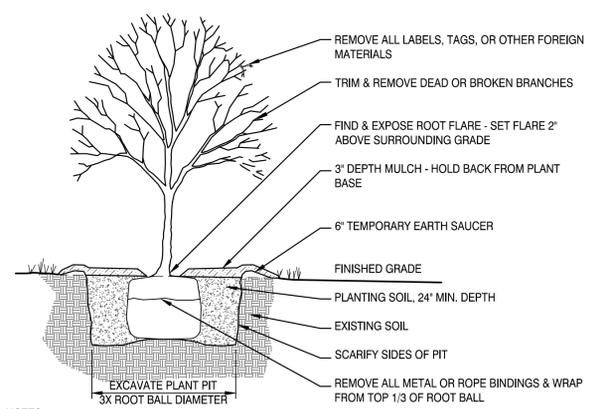
- NOTES:
- TREE TO BE SET PLUMB.
  - SECURE TREE AS MAY BE REQUIRED ACCORDING TO TREE SIZE, LOCATION, & WIND/WEATHER CONDITIONS.
  - IF USING ROOTBALL STABILIZATION, FOLLOW MANUFACTURER'S RECOMMENDATIONS.

STANDARD EVERGREEN TREE PLANTING (H1) NOT TO SCALE



- NOTES:
- SHRUB TO BE SET PLUMB.

STANDARD SHRUB PLANTING (D1) NOT TO SCALE



- NOTES:
- TREE TO BE SET PLUMB.
  - SECURE TREE AS MAY BE REQUIRED ACCORDING TO TREE SIZE, LOCATION, & WIND/WEATHER CONDITIONS.
  - IF USING ROOTBALL STABILIZATION, FOLLOW MANUFACTURER'S RECOMMENDATIONS.

STANDARD DECIDUOUS TREE PLANTING (A1) NOT TO SCALE

REV	DESCRIPTION	DATE
1	REISSUED FOR PERMIT	7-03-19
0	ISSUED FOR PERMIT	5-14-19

CURRENT ISSUE STATUS:

TRUE NORTH:

SMRT Architects and Engineers  
144 Fore Street/P.O. BOX 618  
Portland, Maine 04104  
1.877.700.7678  
www.smrtinc.com

ARCHITECTURE | ENGINEERING | PLANNING | INTERIORS | ENERGY

**RANSOM** Consulting Engineers and Scientists  
400 Commercial Street, Suite 400  
Portland, Maine 04101

NORDIC AQUAFARMS  
285 NORTHPORT AVENUE  
BELFAST, MAINE

PLANTING DETAILS & SCHEDULE

SHEET TITLE:

SCALE: AS SHOWN

PROJECT MANAGER: ADB	PROJECT NO: 18076
A/E OF RECORD: MGJ	JOB CAPTAIN: SP
DRAWN BY: WSM	SMRT FILE: LP501-18076

LP501

SMRT No. SHEET No. 18076

**ATTACHMENT J**

Draft Deed Restrictions

Response to Review Comments  
Nordic Aquafarms Inc., Land-based Aquaculture Facility  
Belfast, Maine  
L-28319-26-A-N

DRAFT Deed Restriction Language for NAF regarding Stream 9 Buffer

WHEREAS a portion of the property owned by Nordic Aquafarms Inc. as shown on Exhibit A attached hereto (the “Protected Property”) is a natural area that provides significant habitat for wildlife and plants and wetland functions and values; and

WHEREAS Nordic Aquafarms Inc. (“NAF”) plans to construct a land based aquafarm adjacent to the Protected Property and, after the review by Federal and State regulatory agencies has obtained from the United States Army Corps of Engineers Permit # \_\_\_\_\_ and from the Maine Department of Environmental Protection Site Location of Development, Natural Resource Protection, Water Quality Certification Order # \_\_\_\_\_ (collectively “the Permits”); and

WHEREAS the Permits require that NAF preserve wetlands against future development; and

WHEREAS the specific conservation values of the Protected Property are documented in an inventory of important features of the property entitled “Natural Resource Compensation Plan” dated May, 10, 2019 and prepared by Normandeau Associates, Inc. (“Compensation Plan”), attached hereto as Exhibit B; and

WHEREAS Grantor intends that the conservation values of the Protected Property, as described in the Compensation Plan, be preserved and maintained in perpetuity; and

WHEREAS Grantor further intends, as owner of the Protected Property, to preserve and protect the conservation values of the Protected Property.

NOW THEREFORE, KNOW ALL MEN BY THESE PRESENTS, in consideration of the facts above recited, and the covenants herein contained, the Grantor does hereby restrict the Protected Property pursuant to the following affirmative rights, terms, covenants and restrictions that will run with the Protected Property in perpetuity and be binding on the Grantor, its successors and assigns forever:

1. Purpose. It is the purpose of this restriction assure that the Protected Property will be retained forever as a riparian buffer that includes wetlands, floodplain and upland areas, and to prevent any use of the Protected Property that will impair or impede the conservation values of the Protected Property.
2. Rights of Grantor. (a) Grantor may freely access and use the Protected Property for any and all uses consistent with the Purpose stated herein; (b) NAF, its successors and assigns shall regularly and no less than annually, inspect the Protected Property to ensure that activity upon and maintenance of the Protected Property is consistent with the conservation values for the Protected Property set forth in Exhibit A; (c) NAF shall also use reasonable diligence to detect and promptly restore conditions on the Protected Property that are inconsistent with the conditions described in Exhibit B; (d) the Maine Department of Environmental Protection and

City of Belfast may, with reasonable advance notice to Grantor, access the Protected Property in order to ensure its condition is consistent with the Compensation Plan.

3. Prohibited Uses/Covenants. Neither the Grantor nor its successors or assigns shall perform the following acts nor permit others to perform them, except as may be required in the course of any permitted activity herein or implementation of the Compensation Plan:

(a) no soil, loam, peat, sand, gravel, concrete, rock or other mineral substance, refuse, trash, vehicle bodies or parts, rubbish, debris, junk waste, pollutants or other fill material will be placed, stored or dumped on the Protected Property and the surface waters contained thereon, nor shall the topography of the area be altered or manipulated in any way except as may be temporarily permitted pursuant to the Compensation Plan;

(b) no trees, grasses, shrubs, vines or other vegetation on the Protected Property shall be cut, destroyed or sprayed with herbicides, insecticides, fungicides, or fertilizers, except as necessary to maintain vegetation described in the Compensation Plan and subject to the conditions and restrictions set forth below: (i) *de minimis* flower picking shall be allowed, (ii) control of invasive species shall be allowed, (iii), removal of vegetation that is inconsistent with the Compensation Plan or that is diseased shall be allowed.

(c) no building, sign, fence, utility pole, or temporary or permanent structure will be constructed, placed, or permitted to remain on the Protected Property unless shown on Exhibit A or described in the Compensation Plan;

(d) no trucks, cars, motorized dirt bikes, ATVs, bulldozes, backhoes, or other motorized vehicles or mechanical equipment shall be permitted on the Protected Property except as described in the Compensation Plan.

4. Permitted Uses. Passive recreational, educational and scientific uses which are not inconsistent with the preservation of the riparian buffer and wetlands situated on the Protected Property, are permitted.

5. Recordation. NAF shall record this instrument in the Waldo County Registry of Deeds.

6. Warranties and Representations. Grantor represents that Grantor owns the Protected Property in fee simple and has good right to grand and convey this restriction.

7. Amendment: This restriction may be amended with the prior written consent of the Maine Department of Environmental Protection.

IN WITNESS WHEREOF, Grantor has executed and sealed this instrument the day and year first above written.

Witness:

GRANTOR NAME HERE

\_\_\_\_\_

By  
Its

\_\_\_\_\_

STATE OF MAINE  
COUNTY NAME, ss.

\_\_\_\_\_, 2019

Personally appeared, the above named \_\_\_\_\_,  
\_\_\_\_\_ of \_\_\_\_\_, and acknowledged the foregoing  
instrument to be his/her free act and deed in his/her said capacity and the free act of said  
\_\_\_\_\_.

Before me,

\_\_\_\_\_  
Notary Public/Attorney at Law

Printed Name: \_\_\_\_\_

My Commission Expires: \_\_\_\_\_

DRAFT

DRAFT Deed Restriction Language for Cassida regarding Stream 9 Buffer

WHEREAS a portion of the property owned by Mr. Sam and Ms. Jacki Cassida (“Grantor”) and shown on Exhibit A attached hereto (the “Protected Property”) is a natural area that provides significant habitat for wildlife and plants and wetland functions and values; and

WHEREAS Nordic Aquafarms Inc. (“NAF”) plans to construct a land based aquafarm adjacent to the Protected Property and, after the review by Federal and State regulatory agencies has obtained from the United States Army Corps of Engineers Permit # \_\_\_\_\_ and from the Maine Department of Environmental Protection Site Location of Development, Natural Resource Protection, Water Quality Certification Order # \_\_\_\_\_ (collectively “the Permits”); and

WHEREAS the Permits require that NAF preserve wetlands against future development; and

WHEREAS the specific conservation values of the Protected Property are documented in an inventory of important features of the Property entitled “Natural Resource Compensation Plan” dated May, 10, 2019 and prepared by Normandeau Associates, Inc. (“Compensation Plan”), attached hereto as Exhibit B; and

WHEREAS Grantor intends that the conservation values of the Protected Property, as described in the Compensation Plan, be preserved and maintained in perpetuity; and

WHEREAS Grantor further intends, as owner of the Protected Property, to convey to NAF the right to preserve and protect the conservation values of the Protected Property in common with Grantor.

NOW THEREFORE, KNOW ALL MEN BY THESE PRESENTS, in consideration of the facts above recited, and the covenants herein contained, the Grantor does hereby restrict the Protected Property pursuant to the following affirmative rights, terms, covenants and restrictions that will run with the Protected Property in perpetuity and be binding on the Grantor, its successors and assigns forever:

1. Purpose. It is the purpose of this restriction assure that the Protected Property will be retained forever as a riparian buffer that includes wetlands, floodplain and upland areas, and to prevent any use of the Protected Property that will impair or impede the conservation values of the Protected Property.
2. Rights of Grantor. Grantor may freely access and use the Protected Property for any and all uses consistent with the Purpose stated herein.
3. Rights of NAF: NAF, its agents and employees, the Maine Department of Environmental Protection and the City of Belfast shall have the right, in a reasonable manner and at reasonable times, after giving at least 24 hours’ notice to the Grantor, its successors and assigns, to enter the

property for the purposes of investigation to ensure that the activity upon and maintenance of the Protected Property is consistent with the conservation values for the Protected Property set forth in Exhibit A.

4. Enforcement. NAF shall also have the right to enforce by proceedings at law or in equity the covenants in this instrument, including but not limited to the right to require the restoration of the Protected Property to the condition described in Exhibit B.

5. NAF Obligations. It is understood by the parties hereto that NAF shall have the obligation to undertake any and all actions required by the Permits and that Grantor, by implementing this restriction and that Grantor assumes no obligations imposed by the Permits, and further assumes no responsibility for complying therewith and, further, shall not in any way be responsible for nor obligated to maintain the Protected Property, including without limitation its wetlands and associated conservation values.

6. Prohibited Uses/Covenants. Neither the Grantor nor its successors or assigns shall perform the following acts nor permit others to perform them, except as may be required in the course of any permitted activity herein or implementation of the Compensation Plan:

(a) no soil, loam, peat, sand, gravel, concrete, rock or other mineral substance, refuse, trash, vehicle bodies or parts, rubbish, debris, junk waste, pollutants or other fill material will be placed, stored or dumped on the Protected Property and the surface waters contained thereon, nor shall the topography of the area be altered or manipulated in any way except as may be temporarily permitted pursuant to the Compensation Plan;

(b) no trees, grasses, shrubs, vines or other vegetation on the Protected Property shall be cut, destroyed or sprayed with herbicides, insecticides, fungicides, or fertilizers, except as necessary to maintain vegetation described in the Compensation Plan and subject to the conditions and restrictions set forth below: (i) *de minimis* flower picking shall be allowed, (ii) control of invasive species shall be allowed, (iii), removal of vegetation that is inconsistent with the Compensation Plan or is diseased shall be allowed.

(c) no building, sign, fence, utility pole, or temporary or permanent structure will be constructed, placed, or permitted to remain on the Protected Property unless shown on Exhibit A or described in the Compensation Plan;

(d) no trucks, cars, motorized dirt bikes, ATVs, bulldozes, backhoes, or other motorized vehicles or mechanical equipment shall be permitted on the Protected Property except as described in the Compensation Plan.

7. Permitted Uses. Passive recreational, educational and scientific uses which are not inconsistent with the preservation of the riparian buffer and wetlands situated on the Protected Property, are permitted.

8. Recordation. NAF shall record this instrument in the Waldo County Registry of Deeds upon execution by Grantor.

9. Warranties and Representations. Grantor represents that Grantor owns the Protected Property in fee simple and has good right to grand and convey this restriction.

IN WITNESS WHEREOF, Grantor has executed and sealed this instrument the day and year first above written.

Witness:

GRANTOR NAME HERE

\_\_\_\_\_

By  
Its

\_\_\_\_\_

STATE OF MAINE  
COUNTY NAME, ss.

\_\_\_\_\_, 2019

Personally appeared, the above named \_\_\_\_\_,  
\_\_\_\_\_ of \_\_\_\_\_, and acknowledged the foregoing  
instrument to be his/her free act and deed in his/her said capacity and the free act of said  
\_\_\_\_\_.

Before me,

\_\_\_\_\_  
Notary Public/Attorney at Law

Printed Name: \_\_\_\_\_

My Commission Expires: \_\_\_\_\_

**ATTACHMENT K**

Revised Table 2. Estimated Project Sound Levels for Routine Operation of Both Phase 1 and Phase 2

Response to Review Comments  
Nordic Aquafarms Inc., Land-based Aquaculture Facility  
Belfast, Maine  
L-28319-26-A-N

**Reference: Acentech Report No. 0480r3 (April 2019)**

Acentech Project No. 631096

**Nordic Aquafarms Salmon Facility**

**Belfast, Maine**

**Construction, Operation, and Maintenance Noise Impact Assessment**

**Table 2. (Revised)  
Estimated Project Sound Levels for  
Routine Operation of Both Phase 1 and Phase 2**

<b>Nearby Protected Locations and Distance From Project Center</b>	<b>Estimated Project Sound Levels (dBA)</b>
1 Northwest 975 ft.	34
2 North 585 ft.	37
3 Southeast 790 ft.	44
4 Southeast 1,230 ft.	39
5 South 950 ft.	38
6 West 2,115 ft.	31

(16 July 2019)

**ATTACHMENT L**

Revised Soil Erosion and Sedimentation Control Plan Narrative

Response to Review Comments  
Nordic Aquafarms Inc., Land-based Aquaculture Facility  
Belfast, Maine  
L-28319-26-A-N

## 14. SOIL EROSION AND SEDIMENTATION CONTROL

### 14.1. INTRODUCTION

Atlantic Resource Consultants (ARC) has been retained for the preparation of soil erosion and sediment control plans for a new aquaculture facility and the associated site improvements on a parcel of land at 285 Northport Avenue in the City of Belfast, Maine. The majority of the site is currently vacant and includes the former Belfast Water District intake and treatment building from Belfast Reservoir Number One, the former water supply source for the City of Belfast. The remainder of the site is largely undeveloped and consists of mature woodland and grass pasture. This site topography slopes in a generally southeasterly direction towards the reservoir and drains via several steep gullies. The majority of these drain into the reservoir, with the exception of the easternmost feature that drains, via a culvert under Route One directly to Penobscot Bay.

The project proposes development of the site to construct a land-based aquaculture facility that will include two large buildings, each consisting of three modules, two smaller Smolt Buildings, a Processing Building, a Central Utility Plant and several other smaller support services and utility buildings. Access roads, parking areas, utility services and stormwater BMPs will be constructed to serve the facility. The overall area of development at the site is approximately 38 acres.

The development will be constructed in two major phases, and these will be further divided into smaller sub-phases in order to effectively manage the construction process and minimize the soil erosion and sediment control risks associated with earthwork development projects of this scale.

A detailed soil erosion and sediment control plan has been developed to guide the management of major earthwork activities at the site. This plan includes a detailed breakdown of project phasing to minimize the exposure of erodible soils and to prevent significant sediment transport both within the site, and to downstream receiving waters. The project Soil Erosion and Sediment Control Plan is intended to be a live document and will be regularly reviewed and amended throughout the construction process to ensure the continued effectiveness of the Best Management Practices at the site, and the adequate protection of downstream resources.

### 14.2. EXISTING SITE CONDITIONS AND SOIL TYPES

The project site is located at 285 Northport Avenue in the City of Belfast, Maine. The current cover conditions at the site include the impervious paved, gravel and roof areas associated with the previous use. These are all adjacent to the Route One access driveway and encompass an area of approximately 3 acres that formed the Belfast Water District offices and equipment storage facility. The area of the site closest to Reservoir Number One is predominantly wooded, with some unmaintained woods roads providing informal trail access. The northern portion of the development site is currently grassed pasture and has been recently used as a hay field. The grassed area of the site is approximately 11 acres. The topography of the site slopes in a generally southwesterly direction towards the reservoir at an average gradient of between 2 and 3%. There are several steep gullies formed by drainageways that traverse the site. The westerly gullies drain to the reservoir, the easternmost drainageway discharges to a culvert under Route One, crossing the property to the south of the road, and discharging directly to the bay.

Predominant surface soil types at the site are identified as Boothbay and Swanville silt loams by the Natural Resource Conservation Service (NRCS) Web Soil Survey. The susceptibility of soils to erosion is indicated on a relative "K" scale of values over a range of 0.02 to 0.69. The "K" value is frequently used with the universal soil loss equation. The higher values are indicative of the more erodible soils. The K values of the mapped soils at the project site are as follows:

Soil Name	Soil Description	K Value
Boothbay	Silt loam	0.37
Swanville	Silt loam	0.28

Based on a review of the K values, the onsite soils in the area exhibit low to moderately susceptible to erosion after the cover material is stripped.

A more detailed geotechnical investigation of the site has been undertaken by Ransom Consulting, Inc. The explorations generally found glaciomarine silt and clay deposits overlying glacial till and bedrock. A soft, compressible glaciomarine silt and clay deposit was identified and this is likely to consolidate under loading from proposed site fills and building foundations. The current development plan includes removal and off-site disposal of this problematic soil layer. The material will be replaced with imported Granular Borrow material to form a stable and competent subgrade for the proposed improvements.

Natural resource mapping on the site was undertaken in 2018 by Normandeau Associates as part of the site investigations for this project. The mapping identified a number of freshwater wetlands and streams at the site. The natural resources are described in detail in the wetland delineation report that accompanies this submission.

### 14.3. EXISTING EROSION PROBLEMS

No significant existing erosion problems have been identified at the project site.

### 14.4. CRITICAL AREAS

The critical areas of the site include the freshwater wetland resources downstream of the construction work area. There are also a number of streams on the project site that fall under the Natural Resource Protection Act jurisdiction. These streams are intermittent and have been designated with the prefix "S" as shown on Figure 14.1 on the following page. Non-jurisdictional drainages are designated with the prefix "D". Three streams extend off site and drain into the adjacent Reservoir One.

Following development of the site the lower reaches of these streams will have been cut off from the hydrological source which is primarily surface run off and groundwater discharge during seasonal high water tables.

To prevent these streams from drying up they will be fed by clean water from a series of foundation drains and bypass culverts that are intended to intercept groundwater from the site both during and post-construction. Riprap plunge pool outlets will be constructed at the discharge points of the new drains to dissipate flow velocities and allow non-erosive discharge to downstream receiving channels. The bypass culverts, foundation drains, and outlet locations are shown on the Soil Erosion and Sediment Control Phasing Plans (Sheets CE-111 to CE-118). In summary, the volume of water will be sufficient to maintain intermittent flows and the plunge pool outlet design will prevent erosion.

Critical resources downstream from the site include Belfast Reservoir Number One and Penobscot Bay.

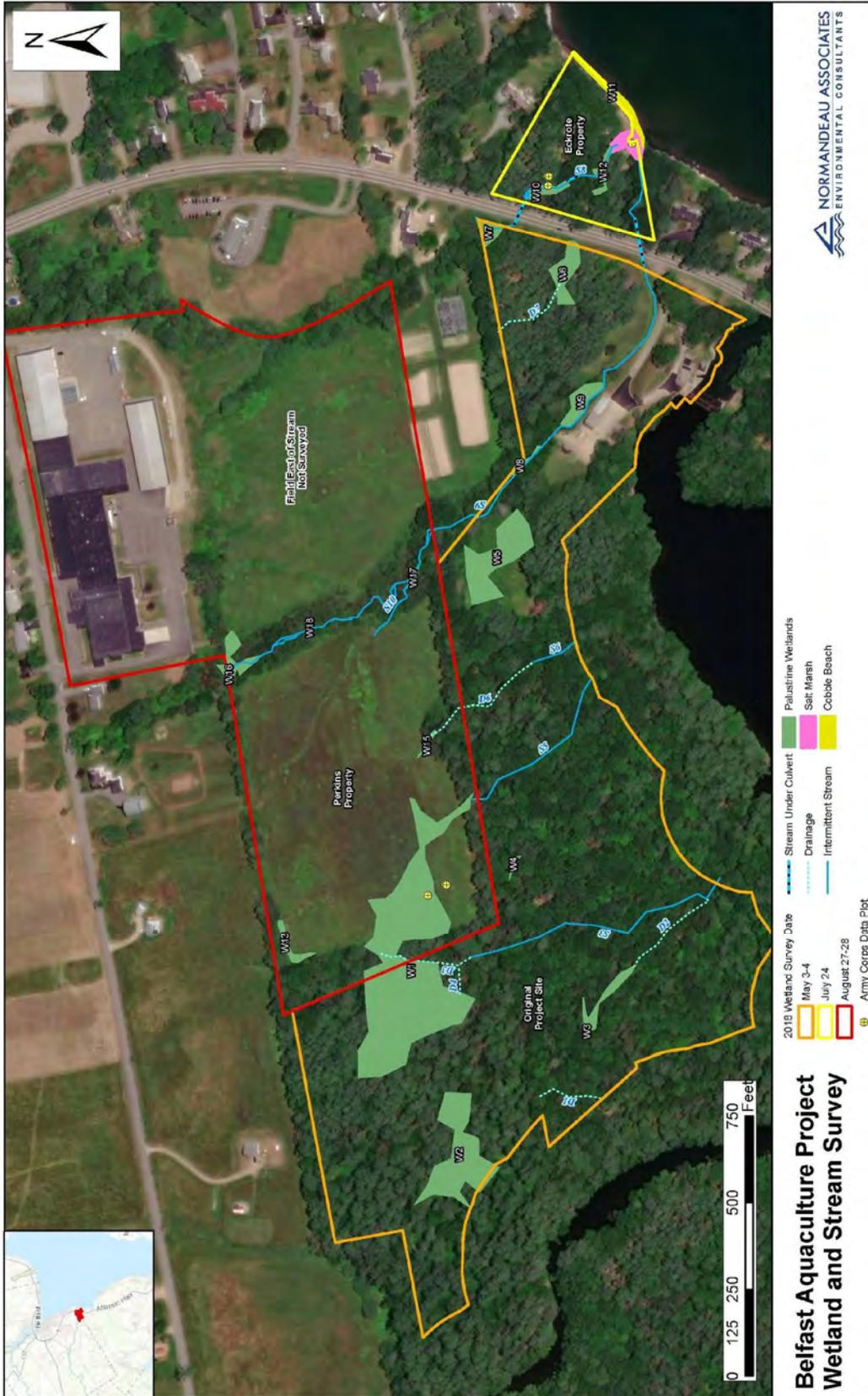


FIGURE 14.1

## 14.5. SOIL EROSION AND SEDIMENTATION CONTROL PLAN AIMS AND OBJECTIVES

The primary goals of the Soil Erosion and Sediment Control Plan for the project are to avoid and minimize the potential for soil erosion to the maximum extent practical, and to prevent sediment transport to downstream areas, receiving waters and natural resources. Measures will also be taken to ensure sediment is not tracked onto adjacent streets and that stockpiles of controlled imported construction materials are protected from potential contamination by native soils and other deleterious matter. In order to achieve these aims it will be essential to minimize exposure of native soil materials during construction and to install, observe and maintain a range of Best Management Practices.

The primary methods included in the Soil Erosion and Sedimentation Control Plan to be implemented for this project are as follows:

- Construction Phasing - The major earthwork activities will be phased to minimize the area of potentially erodible native soils exposed at any given time. This will minimize the potential for soil erosion and runoff contamination during inclement weather conditions. It will also reduce the potential for sediment transport and result in manageable quantities of accumulation in treatment Best Management Practices. A detailed construction and Soil Erosion and Sediment Control Phasing Plan is included in **Attachment A**.
- Diversion of Run-on from Upstream Areas – Diversion measures will be installed at the beginning of construction to capture and divert surface runoff and groundwater around the work area, reducing the need for de-watering in excavation areas.
- Perimeter Controls – Perimeter sediment barriers will be installed downstream of all work areas to prevent the transport of sediment to receiving waters and natural resources. Stabilized construction entrances (wheel cleaning pads) will be installed at all site entrances to prevent tracking of sediments onto roadways.
- Temporary Cover Materials – The plan includes the installation of temporary cover materials in some areas to prevent erosion from occurring during construction.
- Rapid Stabilization of Excavated Areas – Cover materials including geotextile fabric and imported granular borrow will be placed over exposed native soils immediately after excavation and subgrade preparation to minimize the period of soil exposure.
- Stabilization of drainage outlets and channels to avoid rill and gully erosion.
- Inlet Protection – Silt sacks and coir logs will be installed to protect drainage inlets and conveyances from sediment contamination.
- On-site sediment barriers - On-site measures to capture sediment (hay bales, silt fence, etc.) before it is conveyed to sediment sumps.
- Temporary Sediment Basins and Sumps – Sediment capture and treatment BMPs will be installed to provide detention, storage and treatment of any sediment contaminated runoff generated at the site.
- Permanent Measures – Stormwater BMPs, conveyances and stable permanent cover materials will be installed to provide long-term protection of the site and receiving waters.

## 14.6. DESCRIPTION AND LOCATION OF LIMITS OF ALL PROPOSED EARTH MOVEMENTS

The proposed project will require major earth moving at the site. The area of proposed development will cover approximately forty acres of the site in total. Substantial cuts and fills will be required to achieve the final grades for the development. Removal of the problematic compressible silt and clay deposits from beneath the proposed improvements will require large volumes of excavation, material export and import of replacement Granular Borrow materials to the site prior to construction of site improvements.

This obviously has major implications on the scope of earthwork required to prepare the site and on materials handling, haulage and disposal. It also presents a significant opportunity to rapidly stabilize the site at an earlier than normal stage of construction. The removal of fine-grained, native soil materials followed by immediate cover of exposed areas with imported granular borrow will effectively limit the potential for soil erosion and mobilization of fine sediments. Large areas of the site will be quickly stabilized, providing a sound working surface for construction

Careful phasing of the project will allow these activities to occur simultaneously, limiting the area of the site that is "open" (i.e. disturbed and not stabilized) at any given time. This will have the additional benefit of increasing the efficiency of materials haulage. Trucks exporting unsuitable materials from the site will be available to convey imported granular material as part of a round trip operation.

## **14.7. SOIL EROSION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICES**

### **Construction Schedule**

The primary and most proactive best management practice for soil erosion and sediment control at the site is careful planning and phasing of construction tasks. The major earthwork activities have been broken into manageable phases in order to efficiently accomplish the necessary work while minimizing the risks associated with exposure of native fine-grained soils. The installation of Best Management Practices is integrated into the individual phases to ensure that effective diversion, cover and perimeter control measures are in place to protect the work area, limit soil exposure times and prevent transport of sediment to downstream areas. Major earthwork phasing is described in the narrative and shown on the Earthwork and Soil Erosion and Sediment Control Phasing Plans included in **Attachment A**, and in the project plan set.

### **Temporary Erosion/Sedimentation Control Measures**

As part of the site development, the Contractor will be obligated to implement the following erosion and sediment control devices. These devices shall be installed as indicated on the plans or as described within this report. For further reference on these devices, see the Maine Erosion and Sediment Control Best Management Practices (BMPs) Manual for Designers and Engineers, Maine DEP, October 2016.

1. Crushed stone stabilized construction entrances will be placed at any construction access points from adjacent streets, and at interior locations shown on the phasing plans. The locations of the construction entrances shown on the drawings should be considered illustrative and will need to be adjusted as appropriate and located at any area where there is the potential for tracking of mud and debris onto existing roads or streets. Stone stabilized construction entrances will require the stone to be removed and replaced, as it becomes covered or filled with mud and material tracked by vehicles exiting the site.
2. A Runoff Diversion Trench and upgradient silt fence barrier shall be installed at the northern side of the site prior to major earthmoving activities. The BMPs shall be installed in accordance with the details provided and are intended to divert surface runoff and groundwater around the construction area, minimizing the need for de-watering.
3. Bypass culverts will be installed in gullies and drainageways to intercept groundwater seeps, convey clean water through the construction area and maintain baseflow in downstream receiving channels.
4. Riprap plunge pool outlets shall be constructed at the end of bypass culverts and channels, to dissipate flow velocities and allow non-erosive discharge to downstream receiving channels.
5. Silt fence shall be installed down slope of any disturbed areas to trap runoff borne sediments. The silt fence shall be installed per the detail provided in the plan set and inspected immediately after each rainfall, and at least weekly in the absence of significant rainfall. The Contractor shall make repairs immediately if there are any signs of erosion or sedimentation below the fence line.

If such erosion is observed, the Contractor shall take proactive action to identify the cause of the erosion and take action to avoid its reoccurrence. Proper placement of stakes and keying the bottom of the fabric into the ground is critical to the fence's effectiveness. If there are signs of undercutting at the center or the edges or impounding of large volumes of water behind the fence, the barrier shall be replaced with a stone check dam and measures taken to avoid the concentration of flows not intended to be directed to the silt fence. Wood chips from clearing can be used in front of the silt fence to provide an extra margin of safety and security for the silt fence. This practice is encouraged, provided the chips are removed when the fence is removed. Silt fencing with a maximum stake spacing of 6 feet should be used, unless the fence is supported by wire fence reinforcement of minimum 14 gauge and with a maximum mesh spacing of 6 inches, in which case stakes may be spaced a maximum of 10 feet apart. The bottom of the fence should be properly anchored a minimum of 6" per the plan detail and backfilled. Silt fence shall be installed along the downgradient side of construction work areas, with locations being adjusted along with the construction phasing areas. The Contractor may use erosion mix in place of single row silt fence barrier.

6. Twin rows of siltation fence with hay bales shall be installed at the foot of steep slopes and adjacent to protected natural resources (wetland areas).
7. Erosion Control Mix - Erosion control mix is a dense, processed mixture of intertwining shredded wood fragments and grit that will stabilize a site immediately without vegetation. This product may be used in place of silt fence to protect downstream areas not adjacent to natural resources. Erosion control mix consists primarily of organic material and may include: shredded bark, stump grindings, or partially composted wood products and shall be placed to form berms in accordance with the detail on the plan set. Care shall be taken to ensure berms are level and provide an even depth of protection throughout the length of the berm. The Contractor shall make repairs immediately if there are any signs of erosion or breaches in the berm, and supplement berms with additional material if settlement is observed.
8. Stone check dams, silt logs, or hay bale barriers will be installed at any evident concentrated flow discharge points during construction and earthwork operations.
9. All slopes steeper than 4:1 shall receive erosion control blankets, or temporary riprap stabilization. Where temporary riprap is used, slopes shall be stabilized with loam, seed and erosion control blanket, or sod when the riprap is removed for final stabilization. Slope stabilization fabric shall be a fully biodegradable double net, coir fiber blanket, anchored in accordance with manufacturers recommendations.
10. Areas of visible erosion and the temporary sediment sumps shall be stabilized with crushed stone. The size of the stone shall be determined by the Contractor's designated representative in consultation with the Owner.
11. Temporary sediment sumps and sediment basins will provide sedimentation control for stormwater runoff from disturbed areas during construction until stabilization has been achieved. The sides and floors of sediment basins shall be stabilized with geotextile fabric laid over prepared subgrade materials. Outlets shall be as shown on the construction drawings and shall include sand filters around all risers and outlet pipes.
12. Dirtbags™ will be required to be on site and available for construction dewatering. The Contractor will be required to provide four Dirtbags™ with one prepared for operation prior to commencing any trenching operations.
13. Silt logs may be used in areas where sheet flow drains off impervious surfaces to spread and filter the flow. Silt logs should be anchored in accordance with manufacturer recommendations.

### **Special Measures for Summer Construction**

The summer period is generally optimum for construction in Maine, but it is also the period when intense short duration storms are most common, making denuded areas very susceptible to erosion. Dust

control needs to be the most stringent, and the potential to establish vegetation is often restricted by moisture deficit in the summer. During these periods, the Contractor must:

1. Implement a program to apply dust control measures on a daily basis except those days where precipitation is sufficient to suppress dust formation. This program shall extend to and include adjacent streets.
2. Spray any mulches with water after anchoring to dampen the soil and encourage early growth. Spraying may be required several times. Temporary seed may be required until the late summer seeding season.
3. Cover stockpiles of fine-grained materials, or excavated soils which are susceptible to erosion. To protect from the intense, short-duration storms which are more prevalent in the summer months.
4. Take additional steps when needed, including watering, or covering excavated materials to control fugitive dust emissions to minimize reductions in visibility and the airborne disbursement of fine-grained soils. This is particularly important given the potential presence of soil contaminants, and the proximity of along the adjacent streets and properties.
5. These measures may also be required in the spring and fall during the drier periods of these seasons.

### **Special Measures for Winter Construction**

The winter construction season runs from November 1<sup>st</sup> through April 15<sup>th</sup>, however little or no vegetation growth can be anticipated after October 15<sup>th</sup>. Additional stabilization measures should be provided in the Fall (by November 15<sup>th</sup>) in preparation for winter conditions and permanent seeding should occur at least 45 days before the first killing frost. More frequent site inspections and BMP maintenance should be scheduled at the site towards the end of winter in preparation for the Spring thaw. The following additional winter measures should be taken:

- **Overwinter Hay Mulch** should be applied at double the normal rate (150 pounds per 1000 square feet or 3 tons/acre) and should be anchored with netting (peg and twine) or a tackifier to prevent mulch displacement before freezing conditions. No soil should be visible through the mulch. Hay mulch cannot be applied over snow.
- **Dormant Seeding and Mulch** should be applied at 3 times the specified amount after the first killing frost. All dormant seeding beds should be covered with overwinter mulch or an anchored erosion control blanket.
- **Temporary vegetation** should be applied by October 1st (to prepare for winter conditions) with winter rye at 3 pounds per 1000 square feet and mulched with anchored hay at 75 pounds per 1000 square feet or with erosion control blanket. If the rye fails to grow at least three inches and have 75% coverage by November 1st, the area should be stabilized for overwinter protection.
- **Erosion control mix** is the best overwinter cover, but is not recommended for slopes steeper than 1:1 or in areas with flowing water.
- **Erosion Control Blankets** should be used on slopes where hay would be disturbed by wind or water. The matting should be installed, anchored and stapled in accordance with the manufacturer's recommendations. Full contact between the blanket and the soil is critical for an effective erosion control cover.
- **Riprap** should be properly sized and installed to ensure long-term stability. In the winter, newly constructed ditches and channels should be stabilized with riprap. Widening of the channel may be required to accommodate the placement of stones. Angular riprap is preferred to round stone (tailings).
- **Sod** may be used for late-season stabilization (after October 1st), but it is not recommended for slopes steeper than 3:1 or in areas with groundwater seeps. Follow the supplier's instructions.

A brief Winter Construction Risk Analysis is included on the following page:

Overwinter Construction Risk Analysis		
Subject	Risk	Mitigation
Increased precipitation with no vegetation uptake or evaporation	More surface runoff that can be directed to erosion control measures	Observation and frequent maintenance of BMPs, temporary dewatering deployment
Frozen Grounds	The soil loses its capacity to retain water and cause more surface runoff and potential erosion	Prompt cover and stabilization of exposed soils, maintenance of fill embankments and high traffic areas
Vegetative Ground Cover	Cannot be established outside of growing season.	Seed areas at least 45 days between first frost
Runoff Diversion	Snow or icing may clog diversion structures.	Observation, maintenance and clearing of snow from BMPs where practical
Sedimentation Basins	Can be overwhelmed by spring flows.	Install before ground is frozen, stabilize upstream areas prior to Spring thaw
Silt Fence	Difficult to install on frozen ground. Often fails during spring melt	Use erosion control mix berms if required during winter conditions
Erosion Control Blankets	Cannot be anchored on frozen ground	Install prior to frost, or replace with temporary riprap stabilization over winter
Hydro-seeding	Stabilizers are ineffective in cold temperatures	Install prior to winter
Vegetated Swales	Cannot be established outside of growing season	Establish and seed 45 days prior to first frost, stabilize with temporary riprap
Impervious Stabilization	Base gravel on driving/parking areas. Pavement cannot be installed in winter.	Install sacrificial surface where necessary, frequent winter maintenance of gravel surfaces
'Mud' Season	Spring thaw	Frequent preventative maintenance of BMPs, focus on stabilization prior to onset of thaw

### Permanent Erosion Control Measures

The following permanent erosion control measures have been designed as part of the Erosion/Sedimentation Control Plan:

1. The drainage conveyance systems have been designed to intercept and convey the 25-year storm.
2. All areas disturbed during construction, but not subject to other restoration (paving, riprap, etc.), will be loamed, limed, fertilized, mulched, and seeded. Fabric netting, anchored with staples, shall be placed over the mulch in areas where the finish grade slope is greater than 10 percent. Native topsoil shall be stockpiled and temporarily stabilized with seed and mulch and reused for final restoration when it is of sufficient quality.
3. Stormwater BMPs have been designed to capture, treat and discharge runoff from the developed areas of the site in a non-erosive manner to downstream receiving waters. Details of the Stormwater Management Plan are included in Section 12.

- Catch basins shall be provided with sediment sumps for all outlet pipes that are 12" in diameter or greater or where winter sand use is contemplated. A sediment collection bag shall be installed in all basins.

#### **Timing and Sequence of Erosion/Sedimentation Control Measures**

The following general construction sequence shall be followed to ensure the effectiveness of soil erosion and sediment control measures. The detailed phasing plan and narrative should be referred to for the delineation of individual construction phases and descriptions of the associated BMPs and work methods. It is anticipated that project earthwork progress and phasing will be reviewed throughout the project as part of the overall construction schedule management for the project. Therefore, the following is intended for outline guidance only.

1. Install construction entrances.
2. Install safety and construction fence to secure the site for clearing and mobilization.
3. Install perimeter siltation fence and erosion control barriers. Particular attention shall be paid to areas upstream of protected natural resources and in the vicinity of the streams at the project site. Signs shall be erected periodically along these perimeter barriers indicating that the downstream areas are off limits to all construction activities.
4. Install diversion BMPs and stabilized outlet plunge pools to convey water from upstream areas around the project site.
5. Install temporary sediment basins and sumps as shown on the project plans and details.
6. Construct activities on the site to optimize the handling of materials and restrict the denuded areas to the time stipulated, as described in the project phasing plan.
7. Install granular borrow and pavement gravel materials to raise the site to the design subgrade elevation.
8. Construct stabilized pads for foundation and building construction.
9. Maintain erosion controls and stabilized areas throughout the construction period.
10. Install binder pavement.
11. Landscape (loam and seed).
12. Install surface pavements.
13. Install striping, signage, and miscellaneous site improvements.
14. Review the site improvements, identify punch list items and required revisions.
15. Remove any temporary erosion control measures.

The Contractor must maintain an accurate set of record drawings indicating the date when an area is first denuded, the date of temporary stabilization, and the date of final stabilization. On October 1 of any calendar year, the Contractor shall submit a detailed plan for stabilizing the site for the winter and a description of what activities are planned during the winter.

#### **14.8. PERMIT REQUIREMENTS**

This project will require review and approval by Federal, State and Local Regulatory Authorities. Permit approvals from these bodies may include specific conditions related to soil erosion and sediment control in addition to the standards described below. The Owner and Contractor will be responsible for review of, and adherence to any and all specific permit conditions applicable to the project, and these will become part of the Contract Documents for the project.

The scale and nature of the project will require coverage under the Maine Pollutant Discharge Elimination System (MPDES) General Permit - Construction Activity. The following procedures will be required to meet the minimum regulatory standards associated with this permit:

##### **Preconstruction Conference**

Prior to any construction at the site, representatives of the Contractor, the Project Engineer, the Owner, Regulatory Agency Representatives and the City of Belfast City Engineer shall meet to discuss the

scheduling of the site construction and the designation of the responsible parties for implementing the plan. The Contractor shall be responsible for scheduling the meeting. Prior to the meeting, the Contractor will prepare a detailed schedule and a marked-up site plan indicating areas and components of the work and key dates showing date of disturbance and completion of the work. The Contractor shall conduct a meeting with employees and sub-contractors to review the erosion control plan, the construction techniques which will be employed to implement the plan and provide a list of attendees and items discussed at the meeting to the Owner. Three copies of the schedule, the Contractor's meeting minutes, and marked-up site plan shall be provided to the Owner.

**Inspection of Soil Erosion and Sediment Control Measures**

The CM shall prepare a list and designate by name, address and telephone number all individuals who will be responsible for implementation, inspection, and maintenance of all erosion control measures identified within this section and as contained in the Erosion and Sedimentation Control Plan of the contract drawings. Specific responsibilities of the inspector(s) will include:

- Execution of the Contractor/Subcontractor Certification contained in **Attachment C** by any and all parties responsible for erosion control measures on the site.
- A weekly certification stating compliance, any deviations, and corrective measures necessary to comply with the erosion control requirements of this section shall be prepared and signed by the inspector(s).

Inspection of the project work site shall include:

1. Identification of proper erosion control measure installation in accordance with the erosion control detail sheet or as specified in this section.
2. Determine whether each erosion control measure is properly operating. If not, identify damage to the control device and determine remedial measures.
3. Identify areas which appear vulnerable to erosion and determine additional erosion control measures which should be used to improve conditions.
4. Inspect areas of recent seeding to determine percent catch of grass. A minimum catch of 90 percent is required prior to removal of erosion control measures.
5. All erosion controls shall be removed within 30 days of permanent stabilization except for mulch and netting not detrimental to the project. Removals shall include but not be limited to all silt fence, hay bales, inlet protection, and stone check dams.
6. Accumulated silt/sediment should be removed when the depth of sediment reaches 50 percent of the barrier height. Accumulated silt/sediment should be removed from behind silt fencing when the depth of the sediment reaches 6 inches.
7. Silt sacks should be removed and replaced at least every three months and at any time where the weekly inspection reveals that siltation has significantly retarded the rate of flow through the silt sack.
8. If inspection of the site indicates a change should be made to the erosion control plan, to either improve effectiveness or correct a site-specific deficiency, the inspector shall immediately implement the corrective measure and notify the Owner of the change.

A summary of standard Erosion Control Inspections is given in the table below. It is anticipated that inspection and maintenance tasks will be adapted throughout the project to reflect field conditions and construction progress:

EROSION AND SEDIMENT CONTROL MEASURES AND ACTIVITY	INSPECTION FREQUENCY		
	Weekly	Before & After a Storm	After Construction
<b>SEDIMENT BARRIERS</b>			

EROSION AND SEDIMENT CONTROL MEASURES AND ACTIVITY	INSPECTION FREQUENCY		
	Weekly	Before & After a Storm	After Construction
Sediment barriers are installed prior to soil disturbances	X	X	
Silt fences are keyed in and tight	X	X	
Barriers are repaired and replaced as necessary	X	X	
Barriers are removed when the site is stabilized - Silt fence should be cut at the ground surface			X
<b>TEMPORARY STABILIZATION</b>			
Areas are stabilized if idle for 14 days or more	X	X	
Daily stabilization within 100 ft of a natural resource	X	X	
<b>MULCH</b>			
Seed and mulch within 7 days of final grading. Ground is not visible	X	X	
Erosion control mix is 4-6 inch thick	X	X	
Erosion control blankets or hay mulch are anchored	X	X	
<b>VEGETATION</b>			
Vegetation provides 90% soil cover	X		X
Loam or soil amendment were provided	X		X
New seeded areas are mulched and protected from vehicle, foot traffic and runoff	X	X	X
Areas that will remain unworked for more than 1 year are vegetated with grass	X		
<b>SLOPES AND EMBANKMENTS</b>			
Final graded slopes and embankments are stabilized	X	X	X
Diversions are provided for areas with rill erosion	X	X	X
Areas steeper than 2:1 are riprapped	X		
Stones are angular, durable and various in size	X		
Riprap is underlain with a gravel layer or filter fabric	X		
<b>STORMWATER CHANNELS AND CULVERTS</b>			
Ditches and swales are permanently stabilized– channels that will be riprapped have been over-excavated	X	X	X
Ditches are clear of obstructions, accumulated sediments or debris	X	X	X
Ditch lining/bottoms are free of erosion	X	X	X
Check dams are spaced correctly to slow flow velocity	X		
Underlying filter fabric or gravel is not visible	X	X	X
Culvert aprons and plunge pools are sized for expected flows volume and velocity	X		
Stones are angular, durable and various in size	X		
Culverts are sized to avoid upgradient flooding	X	X	
Culvert protection extends to the maximum flow elevation within the ditch	X	X	X
Culvert is embedded, not hanging	X	X	X
<b>CATCH BASIN SYSTEMS</b>			
Catch basins are built properly	X		
Accumulated sediments and debris are removed from sump, grate and collection area		X	X
Floating debris and floating oils are removed from trap			X
<b>ROADWAYS AND PARKING SURFACES</b>			

EROSION AND SEDIMENT CONTROL MEASURES AND ACTIVITY	INSPECTION FREQUENCY		
	Weekly	Before & After a Storm	After Construction
The gravel pad at the construction entrance is clear from sediments	X	X	
Roads are crowned		X	X
Cross drainage (culvert) is provided	X		
False ditches (from winter sand) are graded		X	X
<b>BUFFERS</b>			
Buffers are free of erosion or concentrated flows		X	X
The downgradient of spreaders and turnouts is stable		X	X
Level spreaders are on the contour			X
The number of spreaders and ditch turnouts is adequate for flow distribution		X	X
Any sediment accumulation is removed from within spreader or turnouts		X	X
<b>STORMWATER BASINS AND TRAPS</b>			
Embankments are free of settlement, slope erosion, internal piping, and downstream swamping		X	X
All flow control structure or orifices are operational and clear of debris or sediments		X	X
Any pre-treatment structure that collects sediment or hydrocarbons is clean or maintained		X	X
Vegetated filters and infiltration basins have adequate grass growth			X
Any impoundment or forebay is free of sediment		X	X
<b>WINTER CONSTRUCTION (November 1st-April15th)</b>			
Final graded areas are mulched daily at twice the normal rate with hay, and anchor (not on snow)	Daily		
A double row of sediment barrier is provided for all areas within 100 ft of a sensitive resource (use erosion control mix on frozen ground)	Daily		
Newly constructed ditches are ripped	Daily		
Slopes greater than 8% are covered with an erosion control blanket or a 4-inch layer of erosion control mix	Daily		
<b>HOUSEKEEPING PUNCH LIST</b>			
All disturbed areas are permanently stabilized, and plantings are established (grass seeds have germinated with 90% vegetative cover)			X
All trash, sediments, debris or any solid waste have been removed from stormwater channels, catch basins, detention structures, discharge points, etc.			X
All ESC devices have been removed: (silt fence and posts, diversions and sediment structures, etc.)			X
All deliverables (certifications, survey information, as-built plans, reports, notice of termination (NOT), etc.) in accordance with all permit requirements have been submitted to town, Maine DEP, association, owner, etc.			X

### Maintenance of Soil Erosion and Sediment Control Measures

The following general maintenance requirements shall apply to the installed erosion control BMPs. Additional maintenance may be required based on field conditions, or at the recommendation of the Project Engineer, Third Party Inspector, Owners Representative, or regulatory authorities:

1. Stabilized Construction Entrances - Stone stabilized construction entrances will require the stone to be removed and replaced, as it becomes covered or filled with mud and material tracked by vehicles exiting the site.
2. The surface of the Runoff Diversion Trench shall be inspected on a weekly basis and cleared of any accumulating surface debris that could reduce the capacity of the BMP to divert surface water. The outlets should be inspected to ensure that groundwater flows are being adequately conveyed around the construction area.
3. The upgradient (diversion) silt fence barrier shall be repaired or replaced immediately if any breaches are found, or there are signs of undercutting. Sediment and debris shall be removed from the upstream side of the barrier periodically. The downstream ends of the barrier should be checked for any erosion caused by concentrated flows running along the barrier. These areas should be repaired immediately with stone check dams to prevent further damage.
4. Inlets and outlets of bypass culverts shall be cleared of accumulating debris and any signs of erosion shall be repaired immediately with riprap.
5. Riprap plunge pool outlets shall be cleared of debris and monitored for sediment accumulation. If sediment reaches a depth of six inches, it shall be removed, and the plunge pool repaired or reconstructed.
6. Silt Fence Barriers - The Contractor shall make repairs immediately if there are any signs of erosion or sedimentation below the fence line. If such erosion is observed, the Contractor shall take proactive action to identify the cause of the erosion and take action to avoid its reoccurrence. If there are signs of undercutting at the center or the edges or impounding of large volumes of water behind the fence, the barrier shall be replaced with a stone check dam and measures taken to avoid the concentration of flows not intended to be directed to the silt fence.
7. Silt Fence Haybale Barriers - The Contractor shall maintain the silt fence as described above. Should the central haybale barrier deteriorate, or show signs of contamination, the material shall be removed and replaced.
8. Erosion Control Mix - The Contractor shall maintain erosion control berms to ensure they remain level and continue to provide an even depth of protection throughout the length of the berm. The Contractor shall make repairs immediately if there are any signs of erosion or breaches in the berm, and supplement berms with additional material if settlement is observed.
9. Stone check dams, silt logs, or hay bale barriers installed at concentrated flow discharge points shall be inspected and cleared of accumulated debris periodically. If sediment accumulation is observed, this shall be removed when it reaches a depth of not more than six inches.
10. Slopes stabilized with erosion control blankets, or temporary riprap stabilization shall be inspected and repaired if any signs of rill erosion or stone displacement are observed. Sloughing of slopes or evidence of slip, rotational or base failure shall be reported immediately to the project engineer for design of remedial actions.
11. Any open graded areas of visible erosion and the temporary sediment sumps shall be stabilized with crushed stone. The size of the stone shall be determined by the contractor's designated representative in consultation with the Owner.
12. Temporary sediment sumps and sediment basins shall be inspected on a weekly basis. Routine maintenance shall include the removal of debris around inlets and outlets, repair of any uneven areas on basin berms, repair of any observed rill erosion in embankments and replacement of bench and outlet control filter material when slow drainage is observed.
13. Anchoring of silt logs shall be checked on a weekly basis. These shall be removed and replaced when clogged with sediment.
14. Mulched areas shall be repaired when ground is visible through the mulch layer. Anchoring of erosion control blankets and hay mulch shall be repaired if any evidence of separation is observed.
15. Vegetated areas shall be over-seeded and stabilized where 90% cover is not achieved.

### **Reporting Requirements**

In addition to the weekly certifications, the inspector(s) shall maintain written reports recording construction activities on site which include:

1. Dates when major grading activities occur in a particular areas of the site.
2. Dates when major construction activities cease in a particular area, either temporarily or permanently.
3. Dates when an area is stabilized.
4. Inspection of the project work site on a weekly basis and after each significant rainfall event (0.25 inch or more within any consecutive 24-hour period) during construction until permanent erosion control measures have been properly installed and the site has been stabilized.
5. A log (report) must be kept summarizing the scope of the inspection, name(s) and qualifications of the personnel making the inspection, the date(s) of the inspection, and major observations relating to operation of erosion and sedimentation controls and pollution prevention measures. Major observations must include BMPs that need maintenance, BMPs that failed to operate as designed or proved inadequate for a particular location, and location(s) where additional BMPs are needed. For each BMP requiring maintenance, BMP needing replacement, and location needing additional BMPs, note in the log the corrective action taken and when it was taken.

### **Record Keeping**

1. All certifications, inspection forms, and written reports prepared by the inspector(s) shall be filed with the Owner, and the Permit File contained on the project site, and available for inspection and review upon request. All written certifications, inspection forms, and written reports must be filed within one (1) week of the inspection date.
2. Inspections Reports and Logs must be made accessible to regulatory agency staff and a copy must be provided upon request.
3. Copies of all reports must be kept on file and available upon request for a period of at least three years from the completion of permanent stabilization.

## **14.9. CONSTRUCTION PROCUREMENT AND ADMINISTRATION**

The project will be constructed by a Construction Manager under contract to the Owner/Applicant. The Construction Manager will submit a detailed schedule for the completion of the work, broken into specific tasks, with anticipated milestones and completion dates, at the start of construction. The project schedule will be reviewed at regular bi-weekly project meetings, with updates and amendments to be recorded in the project file.

The work will be conducted in sections which will limit the amount of exposed area to those areas in which work is expected to be undertaken during the next 30 days. Exposed areas will be covered and stabilized as rapidly as practical. All areas will be permanently stabilized within 7 days of final grading and temporarily stabilized within 7 days of initial disturbance or before a predicted storm event of over ½" of rain. The area of denuded, non-stabilized construction shall be limited to the minimum area practicable. An area shall be considered to be denuded until the subbase gravel is installed in parking areas, or the areas of future loam and seed have been loamed, seeded, and mulched, or stabilized with erosion control blanket.

The Contractor must maintain an accurate set of record drawings indicating the date when an area is first denuded, the date of temporary stabilization, and the date of final stabilization. On October 1 of any calendar year, the Contractor shall submit a detailed plan for stabilizing the site for the winter and a description of what activities are planned during the winter.

The Contractor must install any added measures which may be necessary to control erosion/sedimentation and fugitive dust emissions from the site, with adjustments made dependent upon forecasted and actual site and weather conditions.

The Contractor has sole responsibility for complying with the erosion/sediment control report, including control of fugitive dust, and shall be responsible for any monetary penalties resulting from failure to comply with these standards.

Once construction has been completed, long-term maintenance of the stormwater management system will be the responsibility of the applicant. Operations & Maintenance items with a list of maintenance requirements and frequency are listed at the end of Section 12 of the Maine DEP Permit Application.

## **Attachments**

Attachment A – Soil Erosion and Sediment Control Phasing Plans and Narrative

Attachment B – Temporary Sediment Basin Sizing Calculations

Attachment C - Sample Erosion Control Compliance Certification and Inspection Forms

## **ATTACHMENT A**

Major Earthwork Phasing Narrative & Soil Erosion and Sediment  
Control Phasing Plans

## **ATTACHMENT B**

### Temporary Sediment Basin Sizing Calculations

## **ATTACHMENT C**

Sample Erosion Control Compliance Certification and Inspection Forms

**CONTRACTOR/SUBCONTRACTOR CERTIFICATION**

**PROJECT INFORMATION**

Project Name:

Address:

**CONTRACTOR/SUBCONTRACTOR INFORMATION**

Firm Name:

Address:

Telephone:

Type of Firm:

**CERTIFICATION STATEMENT**

"I certify under penalty of law that I understand the terms and conditions of the Maine Construction General Permit (MCGP) permit that authorizes the stormwater discharges associated with construction activity from the project site identified as part of this certification."

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Typed Name

\_\_\_\_\_  
Title

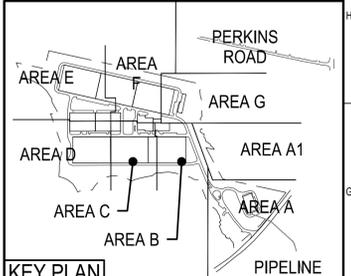
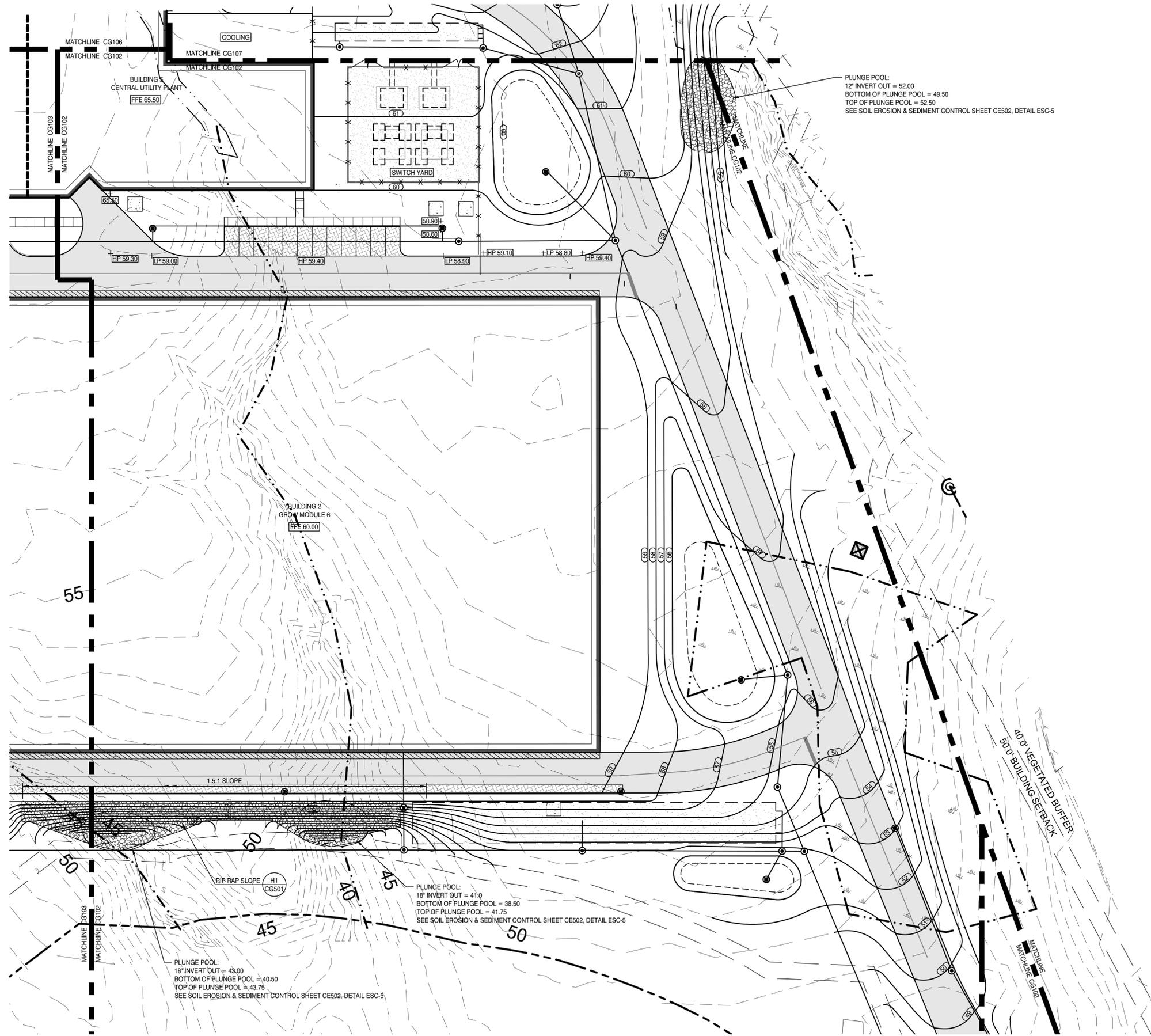
\_\_\_\_\_  
Date

**ATTACHMENT M**

Revised Grading Plans

Response to Review Comments  
Nordic Aquafarms Inc., Land-based Aquaculture Facility  
Belfast, Maine  
L-28319-26-A-N

NOTE:  
SEE CS- DRAWING SERIES FOR STORMWATER SYSTEM INFORMATION.



REV	DESCRIPTION	DATE
2	RESPONSE TO ADDITIONAL DEP QUESTIONS	7-25-19
1	REISSUED FOR PERMIT	7-03-19
0	ISSUED FOR PERMIT	5-14-19

**RESPONSE TO DEP**  
7-25-19

CURRENT ISSUE STATUS:

TRUE NORTH

ANDREW JOHNSTON  
NO. 9994  
LICENSED PROFESSIONAL ENGINEER

SMRT Architects and Engineers  
144 Fore Street/P.O. BOX 618  
Portland, Maine 04104  
1.877.700.7678  
www.smrtinc.com

ARCHITECTURE | ENGINEERING | PLANNING | INTERIORS | ENERGY

**RANSOM** Consulting Engineers and Scientists  
Ransom Consulting Engineers and Scientists  
400 Commercial Street, Suite 400  
Portland, Maine 04101

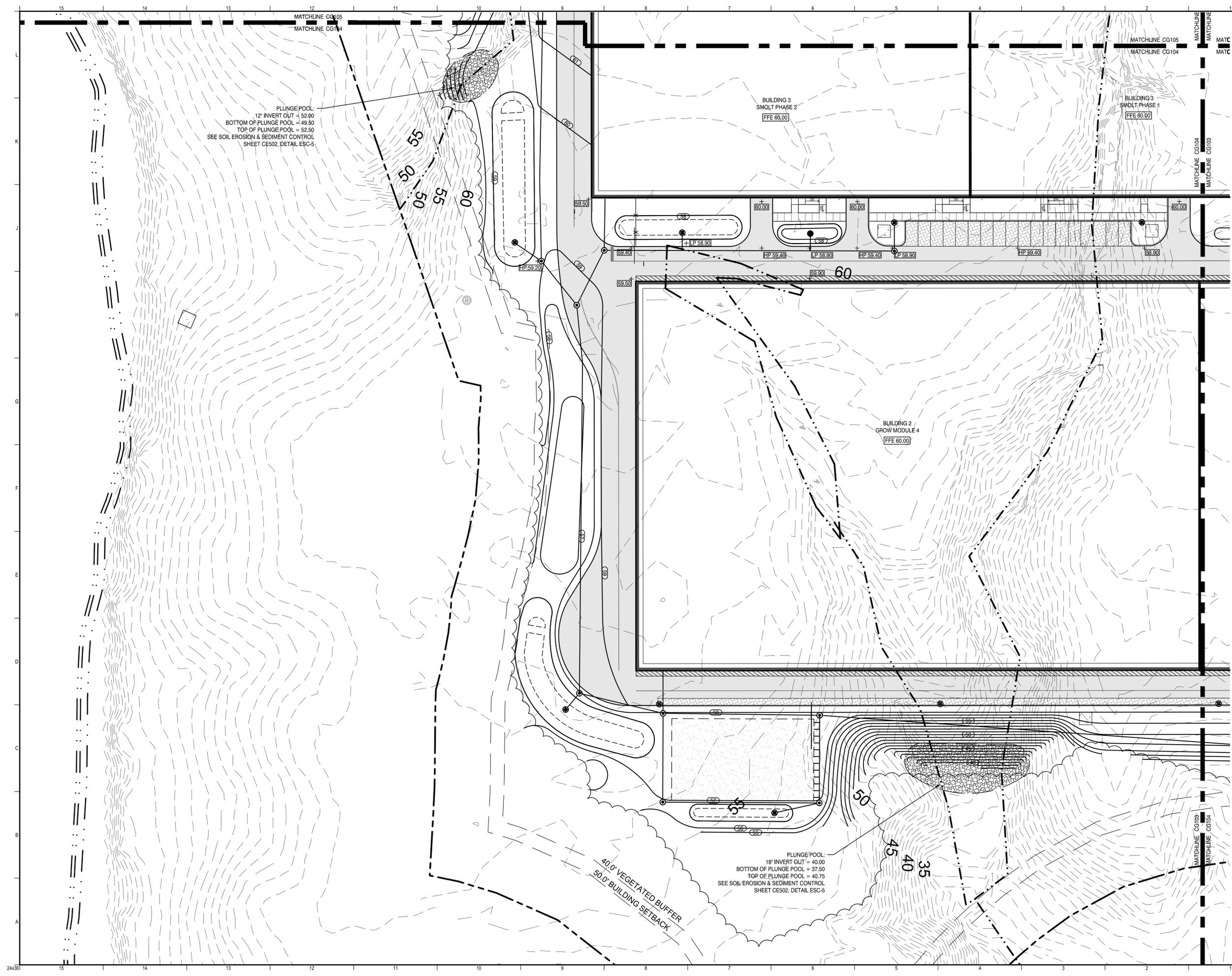
**NORDIC AQUAFARMS**  
285 NORTHPORT AVENUE  
BELFAST, MAINE

**GRADING PLAN**  
AREA B

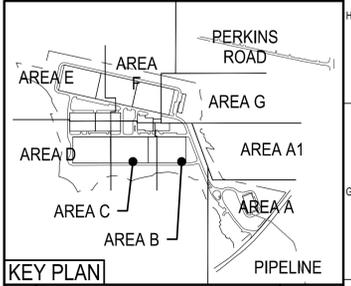
SHEET TITLE:

SCALE: 1" = 30'

PROJECT MANAGER:	ADB	PROJECT NO.:	18076
A/E OF RECORD:			
JOB CAPTAIN:	SP		
DRAWN BY:	WSM		
SMRT FILE:	CG102-18076	SHEET No.:	<b>CG102</b>



NOTE:  
SEE CS- DRAWING SERIES FOR STORMWATER SYSTEM INFORMATION.



REV	DESCRIPTION	DATE
2	RESPONSE TO ADDITIONAL DEP QUESTIONS	7-25-19
1	REISSUED FOR PERMIT	7-03-19
0	ISSUED FOR PERMIT	5-14-19

**RESPONSE TO DEP**  
7-25-19

CURRENT ISSUE STATUS:

TRUE NORTH

ANDREW JOHNSTON  
NO. 9994  
7/1/19  
LICENSED PROFESSIONAL ENGINEER

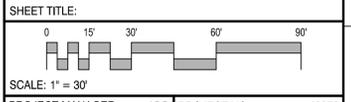
SMRT Architects and Engineers  
144 Fore Street/P.O. BOX 618  
Portland, Maine 04104  
1.877.700.7678  
www.smrting.com

ARCHITECTURE | ENGINEERING | PLANNING | INTERIORS | ENERGY

**RANSOM** Consulting Engineers and Scientists  
Ransom Consulting Engineers and Scientists  
400 Commercial Street, Suite 400  
Portland, Maine 04101

**NORDIC AQUAFARMS**  
285 NORTHPORT AVENUE

BELFAST, MAINE  
**GRADING PLAN**  
AREA D



PROJECT MANAGER: ADB PROJECT NO: 18076  
A/E OF RECORD:  
JOB CAPTAIN: SP  
DRAWN BY: WSM  
SMRT FILE: CG104-18076 SHEET No. CG104