STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION

JANET T. MILLS
GOVERNOR

GERALD D. REID
COMMISSIONER

MEMORANDUM

TO: Board of Environmental Protection

FROM: Staff, Bureau of Land Resources

RE: Nordic Aquafarms, Inc. – Proposed Impacts to Protected Natural Resources

DATE: May 13, 2020

Overview. On May 17, 2019, Nordic Aquafarms, Inc. (Nordic) filed an application for a Site Location of Development Act (Site Law) permit and an application for a Natural Resources Protection Act (NRPA) permit to construct a land-based salmon aquaculture facility. As part of its project, Nordic proposes to permanently and temporarily alter freshwater wetlands, coastal wetlands, and NRPA-jurisdictional streams. The amount of impact to these protected resources evolved during the Department's review of the project as a result of design changes, revised wetland delineations, and shifting wetland and stream boundaries – several areas initially identified as wetland drainages were later determined to be streams as defined in NRPA, 38 M.R.S. §§ 480-B(9).

Department staff visited the project site on several occasions to assess on-site natural resources. The Board also observed the locations of on-site natural resources at its site visits on October 24, 2019 and February 10, 2020.

The following table summarizes the proposed impacts:

Resource Type	Permanent Alteration	Temporary Alteration	Total
Freshwater Wetlands	192,070 square feet	3,960 square feet	196,030 square feet
Coastal Wetlands	6,703 square feet	638,580 square feet	645,283 square feet
Streams	1,917 linear feet	120 linear feet	2,037 linear feet

This memo focuses on evaluation of the potential impacts of the project on protected natural resources as defined in NRPA.

Statutory and Regulatory Criteria. Key standards related to review of the impact of the project on protected natural resources are:

- NRPA: 38 M.R.S. § 480-D(1), (3), (4), and (5); Ch. 310
- Site Law: 38 M.R.S. § 484(3); Ch. 375, §§ 3, 6, and 15

Site Law and NRPA require that an applicant develop a project consistent with State environmental standards and the provisions of these laws and accompanying rules.

While what qualifies as a protected natural resource is defined in NRPA and this act focuses on protecting these resources, the Department also considers these same impacts, along with impacts beyond those covered by NRPA, as part of its Site Law review.[1] The evaluation of the potential impacts of the project on resources not regulated by NRPA is outside the scope of this memo.

NRPA establishes that the Department shall grant a permit when it finds that the applicant has demonstrated the proposed activity meets the standards set forth in 38 M.R.S. § 480-D. This section contains the following standards that are particularly pertinent to review of the wetland and stream impacts proposed by the applicant:

> The activity will not unreasonably harm any significant wildlife habitat, freshwater wetland plant habitat, threatened or endangered plant habitat, aquatic or adjacent upland habitat, travel corridor, freshwater, estuarine or marine fisheries or other aquatic life. 38 M.R.S. § 480-D(3).
>
> The activity will not unreasonably interfere with the natural flow of any surface or subsurface waters. 38 M.R.S. § 480-D(4).
>
> The activity will not violate any state water quality law, including those governing the classification of the State's waters. 38 M.R.S. § 480-D(5).

The Wetlands and Waterbodies Protection Rules, 06-096 C.M.R. ch. 310 (last amended November 11, 2018), interpret and elaborate on the NRPA criteria for obtaining a permit. Pursuant to the General Standards found within Chapter 310, § 5, applicants must meet the following standards, Avoidance, Minimal Alteration, Compensation, and No Unreasonable Impacts:

> Avoidance. . . . The applicant shall provide an analysis of alternatives . . . in order to demonstrate that a practicable alternative does not exist. Ch. 310, § 5(A).
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> Minimal Alteration. The amount of wetland to be altered must be kept to the minimum amount necessary. Ch. 310, § 5(B).

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[1] The key Site Law standards that overlap with the NRPA, are Ch. 375, § 3 (no unreasonable alteration of natural drainage ways), § 6 (no unreasonable adverse effect on surface water quality), and § 15 (protection of wildlife and fisheries); they are not addressed individually in this memo.

> Compensation. Compensation is the off-setting of a lost wetland function with a function of equal or greater value. The goal of compensation is to achieve no net loss of wetland functions and values. Every case where compensation may be applied is unique due to differences in wetland type and geographic location. For this reason, the method, location and amount of compensation work necessary is variable. Ch. 310, § 5(C).
>
> No Unreasonable Impact. Even if a project has no practicable alternative and the applicant has minimized the proposed alteration as much as possible, the application will be denied if the activity will have an unreasonable impact on the wetland. "Unreasonable impact" means that one or more of the standards of the Natural Resources Protection Act, 38 M.R.S. §480(D), will not be met. Ch. 310, § 5(D)(1).

Issues Raised by Interveners. The topic of proposed impacts to protected natural resources is not a primary concern for Intervenors. In its pre-filed testimony, Upstream Watch declined to submit testimony specific to the alternative analysis, and streams and wetlands impacts, but reserved the right to cross examine and to offer rebuttal testimony. Upstream Watch then submitted rebuttal testimony stating concerns that insufficient time was devoted to the documentation of non-wetland biological species at the site.

Discussion

Department staff reviewed the proposed project, including information received from the public, intervenors, and during the public hearing, in consideration of the above referenced statutes and rules.

Avoidance. The applicant submitted an avoidance and minimization analysis for the proposed project completed by Ransom Consulting, Inc. The stated purpose of the project is to provide 33,000 metric tons of high quality and sustainable seafood to consumers in the Northeastern United States (US) per year. A tenet of the project purpose is to reduce the carbon emissions and transportation costs associated with importing farmed Atlantic Salmon to the Northeastern US. The production of 33,000 metric tons of salmon per year is necessary to be financially viable when considering the construction and operational expenses of the facility, as well as the need to sell the final product at a competitive price in the market.

After limiting the site selection to the Northeastern US, the applicant used geospatial desktop analysis of coastal land extending from Washington D.C. to the Canadian border to initially identify potential sites. Ideally, the facility would be located in close proximity to major cities in the Northeastern US, including Portland, Boston, New York City or Philadelphia, as these cities have existing infrastructure capable of transporting the final product. This analysis, as well as the need for clean and cold fresh and salt water, aided the applicant's determination that the most suitable location for the facility would be located within the State of Maine. After narrowing down the site selection to the most suitable sites, the applicant considered 10 criteria for the final site selection including - availability of property, access to clean and cold seawater, attractive

workplace location, buildable lot size, available road and utility infrastructure, effluent impacts to local waterbody, construction impact to natural resources, lack of adverse pre-existing environmental conditions, ground conditions favorable to construction and access to abundant freshwater resources.

Minimization. The applicant considered various layouts of the facility in an effort to minimize impacts to protected resources and maximize the use of upland areas, while still fulfilling the purpose of the project. The applicant considered four different facility layouts for the facility at the project site including:

- Option 1: Six modules occupying 39 acres
- Option 2: Three modules occupying 39 acres
- Option 3: Six modules occupying 54 acres
- Option 4: Five Modules occupying 54 acres

The applicant has selected option 3 - six modules on 54 acres. With additional land available, as compared to option 1 and 2, the development can be situated in a location that avoids impacting Stream 9 and associated floodplain and fringe wetlands, located on the eastern side of the property. Additionally, the larger project site allows the final developed area to have more moderate slopes and larger buffer areas from the Lower Reservoir and abutting property boundaries. The applicant did not select option 1 because that option would have resulted in greater impacts to the above-mentioned resource on the eastern side of the property and presented additional design and engineering challenges associated with fitting critical infrastructure on the site. The applicant did not select option 2 or option 4 primarily because they were found to be financial unfeasible from a business perspective – the scale of production would not be sufficient to meet the purpose of the project.

The applicant considered three different pipeline layouts to access the bay, in an effort to minimize environmental impacts:

- Option 1: Little River Route
- Option 2: Eckrote Property Route
- Option 3: Tozier Road Route

The applicant selected option 2, the Eckrote Property Route. Option 2 entails constructing a pipeline system that accesses the bay by crossing through a 40-foot wide construction easement located on the Eckrote property. This route will result in temporary stream, freshwater wetland and coastal wetland impacts. Option 1 would entail trenching the pipeline system within the channel of Little River to provide access to the bay. This option would result in substantial environmental impacts as the Little River channel and banks would require permanent stabilization measures following construction. Option 3 would entail routing sections of the pipeline system across a steep coastal bluff as well as along an existing drainage way with steep side slopes. This route would also require permanent stabilization measures following construction. Both option 1 and 3 were not selected because of the environmental impacts resulting from trenching and permanently stabilizing protected resources and steep slopes

adjacent to protected resources. Additionally, the applicant was further restricted to selecting Option 2 as the other options required obtaining multiple easements to gain access to the bay.

During the Department's review of the project, the applicant further minimized coastal wetland impacts by redesigning the pipeline system to be suspended off the seabed and anchored by concrete footers rather than resting on the seabed. This design change reduced the permanent impact to the coastal wetland from 144,000 square feet to the currently proposed impact of 6,703 square feet.

Compensation. The compensation package, shown in the table below, would satisfy Ch. 310, § 5(C) and would be consistent with compensation packages previously approved by the Department.

Resource Type	Impact Amount	Compensation Method	Total
Freshwater Wetlands	192,070 square feet	In-Lieu-Fee (ILF)	$710,659.00
Coastal Wetlands	6,703 square feet	ILF	$49,602.20
Streams	1,917 linear feet	Preservation, Enhancement	2,164 linear foot stream buffer 65.5 linear feet of stream enhancement

Streams-

The applicant proposes to permanently fill portions of Streams 3, 5 and 6 and the entirety of Stream 4. During the Department's review, Stream 4 was re-evaluated by the applicant and was determined to be a stream rather than a wetland drainage. Stream 4 is a tributary of Stream 3 and is 54 feet in length. All impacted streams flow into the Lower Reservoir and have intermittent flow regimes. (Attachment B of November 5, 2019 Nordic Response to Review Comments, titled Wetland and Stream Review, and dated November 4, 2019.)

The project was reviewed by the Department's Bureau of Water Quality (BWQ). In its review, the BWQ raised concerns that, as the project was initially proposed, the filling of the upper reaches of Streams 3, 5 and 6 would reduce the amount of flow in the remaining downstream reaches of those streams. In response to these comments, the applicant designed a conveyance system, that would capture surface runoff and shallow groundwater from a diversion trench upgradient of the impacted stream reaches, and outlet the collected water into streams 3, 5 and 6 to maintain instream flow below the filled portions of those streams. As proposed, this under-drained conveyance system would maintain existing flow paths of the impacted streams and upgradient contributing areas. This conveyance system would be integral to maintaining existing natural water flow, water quality and aquatic habitat at the project site. Because of the importance of this system, staff have drafted possible conditions the Board may wish to consider as a safe guard to ensure compliance with relevant standards if the Board finds all the approval standards have been satisfied. The conveyance system is shown on the included attachments,

"Soil Erosion & Sediment Control Phasing Plan-2 Phase 1A" and "Soil Erosion & Sediment Control Phasing Plan-2 Phase 2A" both dated October 25, 2019.

At the request of the Department, the applicant conducted stream habitat assessments for onsite streams on July 19, 2019 utilizing "Methods for Assessing Habitat in Flowing Waters: Using the Qualitative Habitat Evaluation Index (QHEI)". The QHEI evaluates and scores the quality of stream habitat 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. The score for each of the six parameters is totaled to give a cumulative score representative of the quality of the stream habitat. Cumulative scores greater than 70 are considered "excellent" and scores of less 30 are considered "very poor". S9 was divided into three sampling reaches given the segmented habitat conditions within the stream. The applicant also conducted surveys for aquatic macroinvertebrates while conducting the QHEI surveys.

Table 2. QHEI scores for on-site streams.

Stream ID	QHEI Score
S3	36
S5	35
S6	38
S8	38.5
S9a	39
S9b	17
S9c	42
S10	32

The highest scoring reach of streams on the site were Stream 9c, Stream 9a and Stream 8 with a QHEI scores of 42, 39 and 38.5 respectively. The lowest scoring reach onsite was Stream 9b, with a score of 17. This reach of stream 9 has been channelized and is lacking native riparian vegetation. All other streams on site, including the stream with proposed impacts, scored within a range of 32 and 38.5. This range of scores, 32 to 38.5, fall within the "poor" ranking according to the QHEI scoring system. An assessment for Stream 4 was not conducted by the applicant, because the re-evaluation of this stream occurred subsequent to the QHEI surveys. Given that the physical characteristics of Stream 4 are similar to all other on-site streams and in consideration of its location near Streams 3, 5, and 6, it is reasonable to conclude that the QHEI score of Stream 4 would be similar to those of Streams 3, 5, and 6.

The streams with proposed impacts are of low quality primarily due to their intermittent flow regimes and silty substrate. During the QHEI surveys, mosquito larvae were the only macroinvertebrate observed in the impacted streams although Department staff visited the site previously on May 17, 2019 and observed species indicative of higher water quality and stream habitat quality including mayflies, caddisflies and stoneflies. The impacted streams do not have characteristics favorable to providing fish habitat given the intermittent flow regime and silty substrate.

Although all streams onsite are of low quality, the proposed project has avoided permanently impacting reaches of relatively higher quality streams present at the site. To compensate for the

proposed stream impacts, the applicant has proposed to establish a deed restricted buffer along Stream 9. The buffer totals 2,164 linear feet and varies in width from 75 feet to 150 feet. The applicant proposes to enhance the buffer with native plantings. The enhancements within the buffer are expected to improve instream cover, bank stabilization and channel morphology of Stream 9, which will provide higher quality macroinvertebrate habitat. The applicant further proposes to restore or enhance a total of 65.5 linear feet of Streams 3, 5, 6 and 8. Restoration and enhancement measures include culvert removal and replacements and bank stabilization measures. These areas of restoration are located in reaches of streams off the project site.

Wetlands-

The applicant proposes to permanently impact forested, scrub shrub and emergent freshwater wetlands as a result of constructing the proposed aquaculture facility. Permanent freshwater wetland impacts total 192,070 square feet. The principle functions of these wetlands include floodflow alteration, sediment/shoreline stabilization, production export and wildlife habitat. The applicant would need to compensate for these impacts via payment to the in-lieu-fee program in the amount of $710,659.00.

The applicant is seeking to use the 75-foot riparian buffer area adjacent to Stream 9, to offset in-lieu-fee payments for freshwater wetlands. Because the buffer area only contains patches of wetlands, and because any future disturbance to the wetlands within the buffer area will be protected by the stream buffer itself, and therefore not at risk of development, Department staff determined this buffer should not be used to offset in-lieu-fee payments required to compensate for proposed freshwater wetland impacts. The applicant's proposed in-lieu-fee payment, including the buffer on Stream 9 to reduce the cost, totals $563,864.28 rather than $710,659.00 as calculated by Department staff and shown in the compensation table above. The applicants proposed an in-lieu-fee payment which also includes an error in calculation. In calculating the proposed in-lieu-fee payment for freshwater wetlands impacts, the applicant mistakenly used a cost multiplier of two for certain impacted wetlands on the site.

The applicant proposes to permanently alter unconsolidated subtidal coastal wetland. The permanent coastal wetland impacts total 6,703 square feet. The applicant proposes to compensate for these impacts via payment to the in-lieu-fee program in the amount of $49,602.20.

Potential Conditions

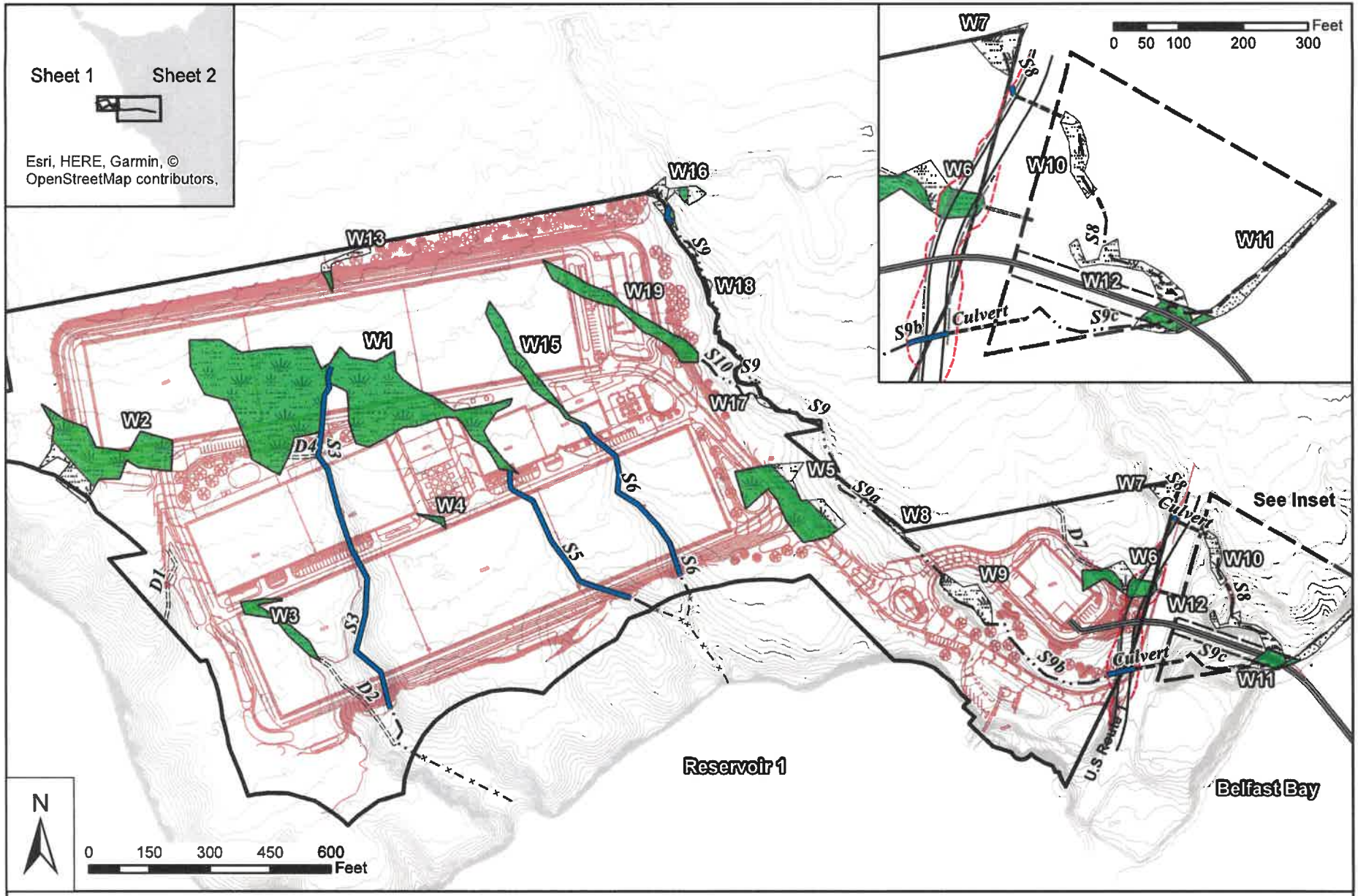
Should the Board find all the review standards have been met and issue a permit for the project, possible conditions the Board may wish to consider include:

1. Within six months of the completion of Phase 1 of the proposed project, the applicant shall submit a report to the Department for review demonstrating that the proposed conveyance system is functioning as intended and is capable of maintaining instream flow in the downstream reaches of streams 3, 5 and 6. Within six months of completion of full build-out of the proposed project, the applicant shall submit to the Department for review an updated report demonstrating that the conveyance system is functioning as

intended and is capable of maintaining instream flow in the downstream reaches of Streams 3, 5 and 6.

2. The applicant shall develop and submit a finalized plan for continuous in-situ monitoring of instream flows in the downstream reaches of streams 3, 5 and 6 following construction. Monitoring shall take place within six months of the completion of Phase 1 of the project until five years following the full build-out of the proposed project. During the monitoring period, the applicant shall submit collected instream flow data to the Department for review every six months. If the Department determines the conveyance system is not appropriately maintaining instream flow in the downstream reaches of Stream 3, 5 and 6, the applicant shall develop a plan to make the corrections and/or design changes necessary to maintain instream flow in Stream 3, 5 and 6. Monitoring equipment, locations, and methodology must be determined in consultation with the Department.

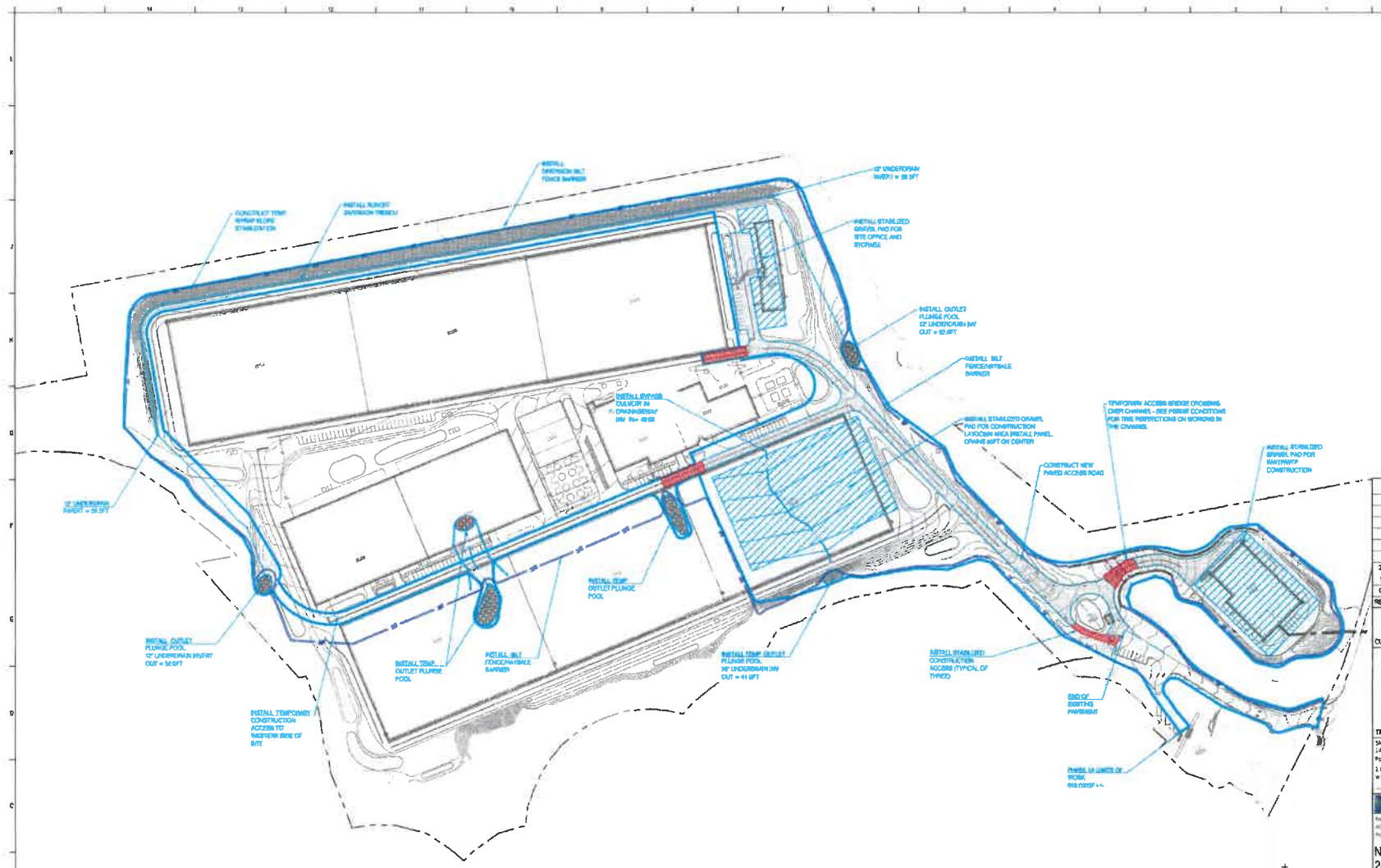
3. Prior to the start of construction, the applicant shall conduct additional baseline macroinvertebrate and QHEI stream habitat surveys within Stream 9 and the downstream reaches of Streams 3, 5, 6, and submit the reported data to the Department. The applicant shall continue to conduct these surveys on an annual basis until five years following the full build-out of the proposed project to ensure the functions of those reaches are maintained in Streams 3, 5, and 6 and improved in Stream 9. Prior to December 31 of each year, the applicant shall submit annual monitoring reports to the Department. Monitoring reports shall include QHEI survey data, observed macroinvertebrates, photographic documentation and a narrative of the observed condition of the subject streams. Surveys and annual reports shall be performed by a qualified professional. The surveys shall take place during an appropriate and consistent time each year, as determined in conjunction with the Department. If the Department determines the physical and biological characteristics of Streams 3, 5, and 6 are not equal to or better than their existing condition, the applicant shall submit a plan for enhancing these characteristics or compensating for the impacts. If the Department determines the physical and biological characteristic of Stream 9 are not equal to or better than characteristics lost due to the proposed project, the applicant shall submit a plan for enhancing these characteristics or compensating for the impacts. Sampling equipment, locations, and methodology must be determined in consultation with the Department.



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

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

NORMANDEAU ASSOCIATES
ENVIRONMENTAL CONSULTANTS



REV	DESCRIPTION	DATE
2	PER MDEP REVIEW COMMENTS	10-25-19
1	PER MDEP REVIEW COMMENTS	7-18-19
0	ISSUED FOR PERMIT	5-14-19

ISSUED FOR PERMIT
5-14-19
CURRENT ISSUE STATUS:

TRUE NORTH:

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NORDIC AQUAFARMS
285 NORTHPORT AVENUE
BELFAST, MAINE

SOIL EROSION & SEDIMENT CONTROL PHASING PLAN -2
PHASE 1A

SHEET TITLE:

0 30' 60' 120' 240'

SCALE: AS SHOWN

PROJECT MANAGER:	ADB	PROJECT NO:	19075
AVE OF RECORD:			
JOB CAPTAIN:	SP		CE111
DRAWN BY:	AJ		
SMRT FILE:	CE111-19075	SHEET No.	

NOT FOR CONSTRUCTION

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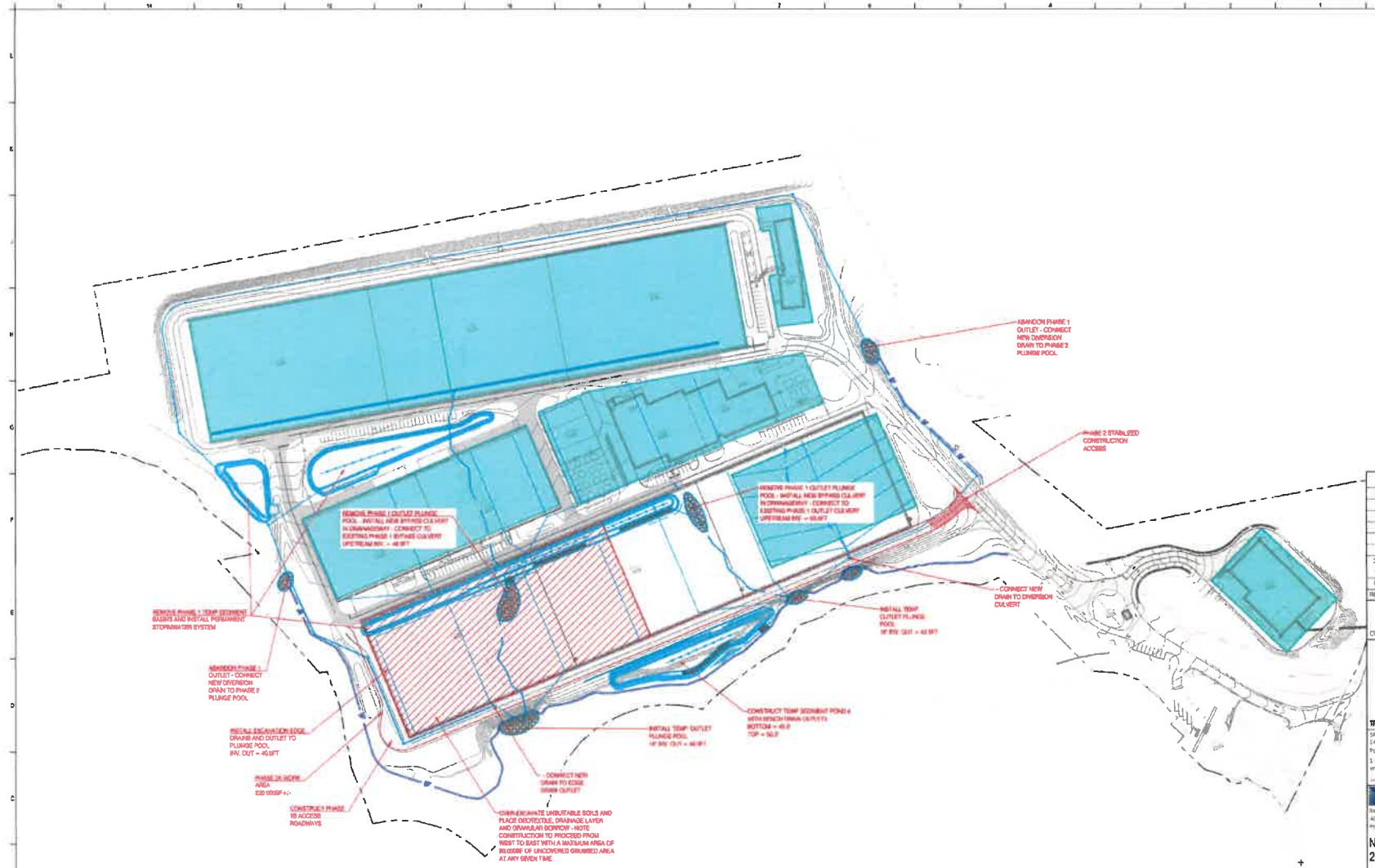

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REV	DESCRIPTION	DATE
2	PER MDEP REVIEW COMMENTS	10-25-19
1	PER MDEP REVIEW COMMENTS	7 16 19
0	ISSUED FOR PERMIT	5-14-19

ISSUED FOR PERMIT
5-14-19
CURRENT ISSUE STATUS.

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SOIL EROSION & SEDIMENT CONTROL PHASING PLAN -8 PHASE 2A
SHEET TITLE:

0 30' 100' 200' 300'
SCALE: AS SHOWN

PROJECT MANAGER:	ADB	PROJECT NO	18078
AVE OF RECORD			
JOB CAPTAIN	SP		
DRAWN BY:	AJ		
SMRT FILE:	CE117-18078	SHEET No.	

CE117

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