Form DEPLW0105-B2003
Revised December 23, 2008
Updated February 22, 2018

Maine Department of Environmental Protection

General Application for Waste Discharge License (WDL) / Maine Pollutant Discharge Elimination System (MEPDES) Permit

Regulatory requirements for the preparation and filing of applications may be found in Chapters 2, 521 and 522 of the Department's rules.

GENERAL INSTRUCTIONS

1. This general form is to be used to make application for the discharge of pollutants to the surface waters of the State, from all source except from privately owned discharges subject to the Over Board Discharge Program requirements.

2. Applicants are responsible for publishing public notice of their application at the time it is filed with the Department. See pages 7 and 8.

3. For a proposed new discharge of wastewater of more than 25,000 gallons per day or a project involving licenses from more than two bureaus in DEP, an applicant must conduct a public informational meeting before submitting an application to the Department. See page 7.

4. In some circumstances an applicant must have a pre-application or pre-submission meeting with the Department prior to filing of an application. See page 9.

5. At the time an application is filed with the Department, a copy must be provided to the municipal office and notice provided to all abutters by certified mail. See page 7.

6. Application fees must be paid at the time an application for a **new** discharge or permit is filed. Contact the Department for additional information and calculation of the fee amount. For existing discharges, fees are charged on an annual basis and application fees are not required with an application for permit renewal.

7. Attach additional sheets as necessary in answering specific questions. Be sure to number each sheet to identify the question to which it pertains.

8. Failure to fully complete all required forms or to pay necessary application fees will result in the application being returned.

9. After completing the application, submit 2 copies to:

   Maine Department of Environmental Protection
   Bureau of Water Quality
   Division of Water Quality Management
   State House Station 17
   Augusta, Maine 04333-0017

10. Please read the entire application form before furnishing any information. If you need any assistance in filling out the form or required attachments, please contact the Department at the above address or by calling (207) 287-7688.

This application is for a:
☒New discharge ☐Renewal ☐Increased discharge ☐Transfer of owner ☐Modification ☐Other: ______

If assigned: MEPDES#: ME WDL #: W - - - -

FACILITY AND APPLICANT INFORMATION

1. Facility Information (911 Address):
   Facility Name: Nordic Aquafarms Inc Receiving Water Name(s): Belfast Bay
   Town: Belfast State: ME Zip: 04915
   Global Positioning System (GPS) reference data if available
   Facility Type: ☐ Federal ☐ State ☐ Other Public ☒ Private ☐ Other

2. Applicant Information:
   Name: Nordic Aquafarms Inc Telephone: 207-323-4911
   Address: 159 High Street, PO Box 283 e-mail: erik.heim@nordicaquafarms.com
   Town: Belfast State: ME Zip: 04915

3. Owner Information (if different from Applicant):
   Name: Telephone:
   Address: e-mail:
   Town: State: Zip:

4. Operator Information (if different from Applicant/Owner):
   Name: Telephone:
   Address: e-mail:
   Town: State: Zip:

NOTE: If a wastewater treatment facility is operated under a contract with third party, the contract for services must be reviewed and approved by the Department.

5. Cognizant Official (Person to whom correspondence regarding this application should be sent):
   Name: Elizabeth Ransom Telephone: 207-772-2891
   Address: 400 Commercial Street, Suite 404 e-mail: elizabeth.ransom@ransomenv.com
   Town: Portland State: ME Zip: 04101

6. Person in responsible charge of the treatment facility operations:
   Name: Nathan Dill Telephone: 207-772-2891
   Operator's license #: Grade: Professional Engineer? ME License # 14142
   Note that upon commencement of operations Nordic Aquafarms will have hired a licensed operator who will take over responsible charge of the treatment facility.

7. Briefly describe nature of business and activities requiring WDL /MEPDES Permit:

   Nordic Aquafarms Inc is proposing the development of a land-based recirculating aquaculture system (RAS) to raise Atlantic salmon.

ELECTRONICALLY SIGNED DECISIONS

8. Electronically signed decision options. To expedite processing of applications and reduce paper usage, **all final decisions on an application will be electronically signed by the Commissioner (or his/her designee) and will be sent to the respective e-mail addresses provided for the Applicant and the Cognizant Official** listed on this application, unless the "opt out" signature block is signed below.

I hereby decline to receive an electronically signed decision on the WDL/MEPDES permit via e-mail and choose to receive manually signed (hand written) decision via regular (U.S. Postal) mail.

Sign to DECLINE only

(Applicant): **Date:**

SUPPORTING MATERIALS AND REQUIRED ATTACHMENTS

9. For **new and transfer applications only** from privately-owned facilities, include:

☒ A Certificate of Good Standing issued by the Maine Secretary of State. See Attachment 1.

☒ Proof of Title, Right or Interest (TRI) in the property on which the treatment system and outfall pipes and structures are or will be located. See Chapter 2 of the Department's rules for TRI criteria. See Attachments 2 through 6.

10. For **transfer applications only**, answer the following then skip to the Certification on page 6.

A. Name of current/former owner:
B. Describe any planned changes in the current discharge:

C. Provide a statement describing the technical and financial capacity to comply with the current permit conditions and applicable laws and rules. (use a separate sheet)

11. Unless submitted previously and there have been no changes, provide a topographic map (or other map if a topographic map is unavailable) extending one mile beyond the property boundaries of the source, depicting the facility and each of its intake and discharge structures See Attachment 7.

12. If modification of an existing permit is being requested, attach a statement describing the nature of the modification and the reasons or circumstances necessitating the change. Include any relevant modified process flow schematics available.

State of Maine

Department of the Secretary of State

I, the Secretary of State of Maine, certify *that according to the provisions of the Constitution and Laws of the State of Maine, the Department of the Secretary of State is the legal custodian of the Great Seal of the State of Maine which is hereunto affixed and of the reports of qualification of foreign business corporations in this State and annual reports filed by the same.*

I further certify *that NORDIC AQUAFARMS INC., a DELAWARE corporation, is a duly qualified foreign business corporation under the laws of the State of Maine and that the application for authority to transact business in this State was filed on February 21, 2018.*

I further certify *that said foreign business corporation has filed annual reports due to this Department, and that no action is now pending by or on behalf of the State of Maine to forfeit the authority to transact business in this State and that according to the records in the Department of the Secretary of State, said foreign business corporation is a legally existing business corporation in good standing under the laws of the State of Maine at the present time.*

In testimony whereof, I have caused the Great Seal of the State of Maine to be hereunto affixed. Given under my hand at Augusta, Maine, this tenth day of September 2018.

Matthew Dunlap
Secretary of State

OPTIONS AND PURCHASE AGREEMENT

This Options and Purchase Agreement, dated as of this 30 day of January, 2018, is by and between the **BELFAST WATER DISTRICT**, a quasi-municipal, consumer-owned water utility district having an address of 285 Northport Avenue, Belfast, Maine 04915 (the "Seller"), **NORDIC AQUAFARMS, INC.**, a Delaware corporation having an address of c/o Nordic Aquafarms AS, Øraveien 2, 1630 Gml Fredrikstad, Norway (the "NAF"), and the **CITY OF BELFAST**, a municipal corporation having an address of 131 Church Street, Belfast, Maine 04915 (the "City").

TERMS AND CONDITIONS:

1. Property Descriptions.

a. Premises. Seller owns the land depicted on Exhibit A hereto as the "Realty" together with any improvements thereon and appurtenances thereto, located in Belfast, Maine, containing approximately 18 acres, such land being a portion of the land identified on the City of Belfast Tax Map 29 as Lot 39 and specifically excluding the Lower Dam (hereinafter defined) (the "Realty"). Seller also owns the land located in Belfast, together with any improvements thereon and appurtenances thereto, northerly of the Cassida Property (as such term is defined in the Evaluation Agreement by and between the parties dated substantially herewith (the "Evaluation Agreement")) and easterly of the Waterfront Parcel (hereinafter defined), such land being depicted on Exhibit A in yellow dots above the lot marked "Cassida Property" and is marked "Additional Parcel", such land being a portion of the land identified on the City of Belfast Tax Map 29 as Lot 39 and containing approximately 12 acres (the "Additional Parcel"). The Realty and Additional Parcel, together with all right, title and interest of Seller in and to any land lying in the bed of any street, road, avenue, lane or other way (opened or proposed) adjacent to or abutting or adjoining such premises, together with all rights, privileges, rights of way and easements appurtenant to such premises, and all other appurtenances and rights associated with the property, including subterranean rights, air rights, water rights, riparian and littoral rights, rights in submerged lands, all sewer and utility rights allocated to the Realty and all rights and entitlements to the development of the Property is hereinafter referred to as the "Real Property"). All buildings, fixtures and other improvements located thereon is hereinafter referred to as the "Improvements", and, together with the Real Property, the "Premises".

b. Lower Dam. Seller owns the dam structure located on the southeasterly portion of the Realty, which dam separates Belfast Reservoir Number One on Little River from Belfast Bay, and all appurtenances, rights, privileges and easements pertaining thereto including any flowage rights and access over the remaining land of Seller (the "Lower Dam").

c. Waterfront Parcel. Seller owns (i) the portion of City of Belfast Tax Map 29, Lot 39 which runs along the northerly shore of Little River, such land being depicted on Exhibit A as inside the red lines which are outside of the yellow lines and marked

"Waterfront Parcel", (ii) the entirety of the Town of Northport Tax Map U1, Lot 6, which lot runs along the southerly shore of Little River between the Northport/Belfast town line and Route 1, (iii) the entirety of the City of Belfast Tax Map 4, Lot 23-C, which lot runs along the southwesterly shore of Little River northerly of the Northport/Belfast town line being approximately 3 acres, and Seller may have (iv) right, title and interest over the land (Tax Map 4, Lot 10) owned by a third-party for access to "Perkins Road" running from the northerly bound of the BWD premises on Lot 29, Map 39 to said Perkins Road (collectively (i) to (iv), with all appurtenances, rights, privileges and easements pertaining thereto, the "Waterfront Parcel").

2. Options; Terms; Purchase Prices. Seller hereby grants to NAF the following options to purchase (collectively, the "Options", and individually, an "Option"):

a. Premises Option. NAF shall have an option to purchase the Premises for twelve (12) months from the date hereof, provided, however, NAF shall have the right to extend this Option for an additional six (6) months by giving written notice of and payment for the extension to Seller on or before three hundred thirty (330) days from the date hereof (the "Premises Option"). At NAF's election, on the Closing Date (as hereinafter defined) for the Premises Option, assuming Seller has the legal right to do so, Seller shall also grant to NAF an easement(s) appurtenant to the Premises over both the land owned by a third-party and the Waterfront Parcel for access to "Perkins Road," a public right-of-way existing generally to the north of the Premises, which easement(s) shall be in a location and upon dimensions as NAF and the City may mutually agree. The total purchase price for the Premises is ONE MILLION FIFTY NINE THOUSAND and 00/100 Dollars ($1,059,000.00) (being NINE HUNDRED SEVENTY FIVE THOUSAND and 00/100 Dollars ($975,000.00) for the Realty and EIGHTY FOUR THOUSAND and 00/100 Dollars ($84,000.00) for the Additional Parcel) (the "Premises Purchase Price").

b. Lower Dam Option. NAF shall have an option to purchase the Lower Dam for a term ending on the earlier to occur of the following: two (2) years from the date of Closing on the Premises or, if NAF does not exercise its Premises Option, upon the expiration of the Premises Option (the "Lower Dam Option"). The total purchase price for the Lower Dam shall be ONE and 00/100 Dollars ($1.00) (the "Lower Dam Purchase Price").

3. Waterfront Parcel Agreement. Seller agrees to sell and the City agrees to buy, upon the terms and conditions hereinafter set forth and upon NAF closing on the purchase of the Premises, the Waterfront Parcel subject to easements necessary for the infrastructure related to NAF's land-based aquaculture facility on the Premises and related improvements project (the "Project") so long as such easements do not unreasonably interfere with the nature path located on the Waterfront Parcel. At the City's election, assuming Seller has the legal right to do so, Seller shall also grant to the City an easement(s) appurtenant to the Waterfront Parcel over the land owned by a third-party for access to "Perkins Road," a public right-of-way existing generally to the north of the Premises, which easement(s) shall be in a location and upon dimensions as NAF and the City may mutually agree. The total purchase price for the Waterfront Parcel shall be up to ONE HUNDRED THOUSAND and 00/100 Dollars ($100,000.00) in the sole

discretion of BWD (the "Waterfront Parcel Purchase Price"). It shall be a condition to the Premises Option Closing that the City is contemporaneously purchasing the Waterfront Parcel from Seller on the terms and conditions herein. It shall be a condition precedent to the closing on the Waterfront Parcel that NAF is contemporaneously purchasing the Premises from Seller on the terms and conditions herein. The City agrees that the use of the Waterfront Parcel shall be restricted to conservation and passive recreation uses, subject to easements necessary for the Project as aforesaid.

4. Option Consideration. For the Options, NAF shall pay to Seller an option consideration of THIRTY THOUSAND DOLLARS and 00/100 ($30,000.00) at the time of execution of this Agreement for the initial option term. If NAF decides to extend its option for any property for the additional six (6) months set forth above then NAF shall pay to Seller an additional option consideration of FIFTEEN THOUSAND DOLLARS and 00/100 ($15,000.00) (collectively, together with interest earned thereon, if any, the "Options Consideration"). The Options Consideration shall be deemed paid to Seller when delivered to NAF's attorney described in Section 15 below ("Escrow Agent"). The Options Consideration shall be deposited in a federally insured interest-bearing bank account and disbursed according to the terms of this Agreement.

If NAF (a) does not exercise an Option or (b) fails to close on a purchase once it has exercised the Option for it, in either case due to a reason other than (y) a default by NAF or Seller as described below or (z) a failure to fulfill the title condition precedent described in Section 5b below, then all Options Consideration paid to Seller shall be retained by Seller, as liquidated damages and Seller's sole and exclusive remedy for any such breach. Further, if Seller, having the right, terminates the Evaluation Agreement pursuant to Sections 2A or 2B thereof, then all Options Consideration paid to Seller shall be returned to NAF. If NAF exercises an Option, the relevant Options Consideration shall be applied to the Purchase Price (hereinafter defined), as set forth below.

5. Exercise of Option/Purchase and Sale Agreement. NAF shall exercise its Options, if at all, as to the Premises or the Lower Dam at any time during the relevant Option term by delivering written notice to Seller of its intent to do so (the "Notice of Election to Purchase"). Upon any exercise of an Option as aforesaid, the following terms and provisions shall apply to conveyance of the relevant property:

a. Purchase Price. The Premises Purchase Price, Lower Dam Purchase Price and Waterfront Parcel Purchase Price are individually each referred to as a "Purchase Price" hereinafter and shall be paid as follows:

i. Premises. Subject to any adjustments and prorations hereafter described, at the Closing NAF shall pay the Premises Purchase Price to Seller or its agent as follows:

1. NAF shall receive a credit for all Options Consideration paid to Seller; and

2. NAF shall pay the balance to Seller in lawful currency of the

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United States of America in immediately available funds by wire transfer to an account designated by Seller in writing.

ii. Lower Dam. Subject to any adjustments and prorations hereafter described, at the Closing NAF shall pay the Lower Dam Purchase Price of ONE and 00/100 Dollar ($1.00) to Seller in immediately available funds by wire transfer to an account designated by Seller in writing.

iii. Waterfront Parcel. Subject to any adjustments and prorations hereafter described, at the Closing the City shall pay the Waterfront Parcel Purchase Price to Seller or its agent in lawful currency of the United States of America in immediately available funds by wire transfer to an account designated by Seller in writing.

b. Deed. The relevant property shall be conveyed by Seller in fee simple absolute, by a good and sufficient quitclaim deed with covenant in accordance with the Short Form Deeds Act, 33 M.R.S.A. §761, *et seq.* (each a "Deed"), running to NAF or the City, as applicable, or their nominee or designee in accordance with Section 17 below. A Deed shall convey a good and clear record and marketable title to the Premises or Waterfront Parcel, as applicable, insurable on the current ALTA Standard Owners Form at standard rates, with standard printed exceptions for parties in possession and mechanics' liens deleted, free from all mortgages and monetary liens and all other encumbrances except: (i) those matters listed on Exhibit B attached hereto, and (ii) any matters created by or suffered by the relevant buyer. A Deed shall convey title to the Lower Dam, free from all mortgages and monetary liens and all other encumbrances except: (i) those matters listed on Exhibit B attached hereto, and (ii) any matters created by or suffered by NAF. Each Deed shall be in proper form for recording and shall be duly executed, acknowledged and delivered by Seller at the Closing.

It shall be a condition precedent to all Closings that the relevant buyer has obtained a title commitment in form and substance acceptable to it, with such endorsements as it may require, and if it is unable to obtain such a title commitment, NAF may, at its option, (i) rescind the Notice of Election to Purchase as though the Notice of Election to Purchase had not been delivered, or (ii) extend the sixty (60) day time period provided for the Option Closing by no more than sixty (60) days in order to obtain such title commitment.

c. Closing. Unless extended pursuant to the terms of this Agreement, the closing of the transactions contemplated hereunder (each individually a "Closing" occurring on a "Closing Date") shall take place as follows:

i. Premises Closing Date. The Closing of the Premises shall occur at 10:00 a.m. on the thirtieth (30th) day following the receipt by Seller of the Notice of Election to Purchase the Premises, or such earlier date as may be mutually agreed upon by the parties (such date, as the same may be extended pursuant to the terms of this Agreement, the "Premises Closing Date").

ii. Waterfront Parcel Closing Date. The Closing of the Waterfront Parcel shall occur on the same day and immediately after the closing on the Premises (such date, as the same may be extended pursuant to the terms of this Agreement, the "Waterfront Parcel Closing Date").

iii. Lower Dam Closing. The Closing of the Lower Dam shall occur at 10:00 a.m. on the thirtieth (30th) day following the receipt by Seller of the Notice of Election to Purchase the Lower Dam or such earlier date as may be mutually agreed upon by the parties (such date, as the same may be extended pursuant to the terms of this Agreement, the "Lower Dam Closing Date").

Each Closing shall occur at the offices of the City's attorney described in Section 15 below. If a Closing Date shall fall on a Saturday, Sunday or legal holiday, the Closing Date shall automatically be extended to the next business day. The Closing may be conducted in the customary manner of an escrow closing by the parties making delivery of all closing documents and funds to the Title Company on or prior to the Closing Date, and in such event the attendance of the parties at Closing shall not be required. Time is of the essence in this Agreement.

Each Closing shall not be deemed to be completed until all documents and payments as aforesaid have been properly delivered (and recorded where appropriate) to the satisfaction of all parties.

Seller may, at the relevant Closing, use the relevant Purchase Price, or any portion thereof, to clear the title of any and all encumbrances or interests provided that all such instruments so procured are recorded simultaneously with the delivery of the relevant Deed.

d. Seller Closing Deliverables. At each Closing, Seller shall deliver the following documents, reasonably satisfactory in form and substance to the relevant buyer, properly executed and acknowledged as required:

i. A Deed;

ii. Evidence reasonably satisfactory to NAF and to the Title Company or the City and its attorney of Seller's authority and the authority of the signatory on behalf of Seller to convey the relevant property pursuant to this Agreement;

iii. As to the Premises and Waterfront Parcel, affidavits sufficient for the Title Company orNAF's or the City's attorney to delete any exceptions for parties in possession and mechanics' or materialmen's liens from the owner's title insurance policy (the "Title Insurance");

iv. Such other instruments as the relevant buyer may reasonably request consistent with the terms of this Agreement, so long as said documents do not create any new or continuing obligations on behalf of Seller.

e. Buyer Closing Deliverables. At each Closing, the relevant buyer shall deliver, or cause to be delivered, the following payment and documents, reasonably satisfactory in form and substance to Seller, properly executed and acknowledged as required:

i. The relevant Purchase Price, as adjusted in accordance with the terms hereof;

ii. A closing statement setting forth the Purchase Price and the closing adjustments and prorations as further described below (the "Closing Statement");

iii. The Federal and State of Maine tax certificate and disclosures; and

iv. Such other instruments as Seller may reasonably request consistent with the terms of this Agreement.

f. NAF's Conditions to Closing. Without limiting any other conditions to NAF's obligations to close set forth in this Agreement, the obligations of NAF under this Agreement are subject to the satisfaction at the time of each Closing of each of the following conditions (any of which may be waived in whole or in part by NAF at or prior to Closing):

i. There shall be no final judgment materially affecting the ability of Seller to perform its obligations rendered against Seller, or if, within thirty (30) days after entry thereof, such judgment shall have been discharged or execution thereof stayed, or if, within thirty (30) days after the expiration of any such stay, such judgment shall have been discharged.

ii. All of the representations by Seller set forth in this Agreement or any Exhibit attached hereto shall be true and correct in all material respects. With respect to any representation made to the best of Seller's knowledge, the condition to Closing shall be not only that such representation still be true to the best of Seller's knowledge, but that the specific fact or condition that was the subject of the representation also be true.

iii. Seller shall have performed, observed and complied with all material covenants and agreements required by this Agreement to be performed by Seller at or prior to Closing.

iv. Subject to the provisions of Sections 5(k) and 7 hereof, the physical and environmental condition of the Premises shall not have changed adversely after the date hereof, reasonable wear and tear and acts caused by NAF excepted.

If any of NAF's foregoing conditions is not fully satisfied on or before the Closing Date and it is susceptible to cure by Seller, Seller shall use reasonable efforts to satisfy such condition, in which event Seller shall have a period not exceeding thirty (30) days after the Closing Date to satisfy such condition, and the Closing Date shall be extended accordingly. If (despite Seller's reasonable efforts to cure where applicable), any such condition is not fully satisfied on or before the extended Closing Date, NAF shall have the option to either (x) terminate this Agreement by notice to Seller, in which event this Agreement shall terminate and all obligations of the parties hereto shall cease without further recourse or remedy of the parties hereunder, except for those obligations which are stated herein to survive the termination of this Agreement and the Options Consideration paid to Seller shall be returned to NAF forthwith, (y) waive such condition and proceed to consummate the transaction contemplated hereby in accordance with the provisions of this Agreement, or (z) if any such condition is susceptible of being cured by NAF, then NAF shall have the right, but not the obligation, to take such actions and incur such costs and expenses as necessary to satisfy such condition and any and all costs and expenses incurred by NAF shall be deducted from the relevant Purchase Price at Closing. Notwithstanding the foregoing, in the event that the failure to satisfy any condition precedent to Closing is caused by a breach by Seller of its obligations set forth in this Agreement, Seller shall be deemed to be in default hereunder, in which event the foregoing cure period and NAF's option shall not be applicable and the provisions of Section 12 below shall apply.

g. The City's Conditions to Closing. Without limiting any other conditions to the City's obligations to close set forth in this Agreement, the obligations of the City under this Agreement are subject to the satisfaction at the time of the Closing on the Waterfront Parcel of each of the following conditions (any of which may be waived in whole or in part by the City at or prior to Closing):

i. There shall be no final judgment materially affecting the ability of Seller to perform its obligations rendered against Seller, or if, within thirty (30) days after entry thereof, such judgment shall have been discharged or execution thereof stayed, or if, within thirty (30) days after the expiration of any such stay, such judgment shall have been discharged.

ii. All of the representations by Seller set forth in this Agreement or any Exhibit attached hereto shall be true and correct in all material respects. With respect to any representation made to the best of Seller's knowledge, the condition to Closing shall be not only that such representation still be true to the best of Seller's knowledge, but that the specific fact or condition that was the subject of the representation also be true.

iii. Seller shall have performed, observed and complied with all material covenants and agreements required by this Agreement to be performed by Seller at or prior to Closing.

iv. Subject to the provisions of Sections 5(k) and 7 hereof, the physical and environmental condition of the Premises shall not have changed adversely after the date hereof, reasonable wear and tear and acts caused by the City excepted.

If any of the City's foregoing conditions is not fully satisfied on or before the Closing Date and it is susceptible to cure by Seller, Seller shall use reasonable efforts to satisfy such condition, in which event Seller shall have a period not exceeding thirty (30) days after the Closing Date to satisfy such condition, and the Closing Date shall be extended accordingly. If (despite Seller's reasonable efforts to cure where applicable), any such condition is not fully satisfied on or before the extended Closing Date, the City shall have the option to either (x) terminate this Agreement by notice to Seller, in which event this Agreement shall terminate and all obligations of the parties hereto shall cease without further recourse or remedy of the parties hereunder, except for those obligations which are stated herein to survive the termination of this Agreement, (y) waive such condition and proceed to consummate the transaction contemplated hereby in accordance with the provisions of this Agreement, or (z) if any such condition is susceptible of being cured by the City, then the City shall have the right, but not the obligation, to take such actions and incur such costs and expenses as necessary to satisfy such condition and any and all costs and expenses incurred by the City shall be deducted from the Waterfront Parcel Purchase Price at Closing. Notwithstanding the foregoing, in the event that the failure to satisfy any condition precedent to Closing is caused by a breach by Seller of its obligations set forth in this Agreement, Seller shall be deemed to be in default hereunder, in which event the foregoing cure period and the City's option shall not be applicable and the provisions of Section 12 below shall apply.

h. Seller's Conditions to Closing. Without limiting any other conditions to Seller's obligations to close set forth in this Agreement, the obligations of Seller under this Agreement are subject to the satisfaction at the time of each Closing of each of the following conditions (any of which may be waived in whole or in part by Seller at or prior to Closing):

i. NAF and Seller shall have entered into a water supply agreement pursuant to which NAF will have the right to purchase, and Seller will commit to supply to NAF, water for use in connection with the Project (the "Water Supply Agreement").

ii. NAF and Seller shall enter into a license agreement pursuant to which Seller shall have the irrevocable right to occupy the office and garage facilities existing on the Realty as of the date hereof for a period ending on the earlier to occur of the following: (y) on the first (1st) anniversary of the Premises Closing Date, or (z) Seller is able to move its offices, equipment and vehicles into and provide services to the public from its new headquarters and associated operations facilities (the "License Agreement"), such agreement to be on commercially reasonable terms mutually agreeable to NAF and Seller and to (a) provide that Seller pay taxes, utilities and other occupancy costs and expenses but no license or rental fee, and (b) include a holdover penalty/damages provision.

iii. Seller has acquired an MPUC Order/Opinion, subject to and in accordance with Section 2A of the Evaluation Agreement.

iv. As to the Premises Closing, the City shall be contemporaneously closing on the purchase of the Waterfront Parcel.

If any of Seller's foregoing conditions is not fully satisfied on or before a Closing Date, Seller shall have the option to either (y) terminate this Agreement by notice to the other parties, in which event this Agreement shall terminate and the Options Consideration shall be retained by Seller (unless the failure of condition results from a breach or default of Seller, in which event the Options Consideration shall be returned to NAF forthwith) and all obligations of the parties hereto shall cease without further recourse or remedy of the parties hereunder, except for those obligations which are stated herein to survive the termination of this Agreement, or (z) waive such condition and proceed to consummate the transaction contemplated hereby in accordance with the provisions of this Agreement.

i. Apportionment of Taxes and Other Charges. All normal and customarily proratable items, including, without limitation, real estate taxes and assessments (if applicable), utility bills (except as hereinafter provided) and collected rents and other income (if any), shall be prorated as of a relevant Closing Date, Seller being charged and credited for all of the same relating to the period up to the Closing Date and the relevant buyer being charged and credited for all of the same relating to the period on and after the Closing Date. If the amount of any such item is not known at the time of the delivery of the relevant Deed, such item shall be apportioned on the basis of the comparable period of the prior year or a current estimate, with a reapportionment within ninety (90) days of the Closing Date or as soon thereafter as the amount of the item is actually determined. Final readings and final billings for utilities will be made if possible as of the Closing Date, in which event no proration shall be made at the Closing with respect to utility bills. Otherwise a proration shall be made based upon the parties' reasonable good faith estimate, and a readjustment made within thirty (30) days after Closing or such later date as shall be necessary so that such readjustment may be based upon actual bills for such utilities. Seller shall be entitled to receive a return of all deposits presently in effect with the utility providers, and the relevant buyer shall be obligated to make its own arrangements for deposits with the utility providers. The provisions of this Section shall survive the Closing for a period of twelve (12) months, and in the event of any error in performing the prorations contemplated by this Agreement or if information becomes available subsequent to the Closing indicating that the prorations performed at Closing were not accurate, the parties hereto shall be obligated to re-prorate the closing adjustments to correct such errors and to reflect such new information. A detailed statement shall setting forth the manner of computation of the aforesaid pro-ration adjustments shall be included on the Closing Statement.

j. Closing Costs. Each of Seller and the relevant buyer shall be responsible for preparing such documents as it is obligated to deliver pursuant to Sections 5d and 5e hereof and for its own legal expenses. Seller and the relevant buyer agree to allocate closing costs as follows:

i. Transfer/conveyance taxes (if applicable) shall be divided evenly between Seller and the relevant buyer.

ii. A buyer's title insurance expenses and premiums shall be paid by that buyer.

iii. The cost of an update to the most recent survey of the Premises or of a new survey and any related surveyor's certificate shall be paid by NAF.

iv. The cost of preparation and recordation of any releases and termination statements required to clear title to the Premises shall be paid by Seller.

v. The cost of preparation of each Deed shall be paid by Seller.

vi. The costs of performing each Closing and drafting any other closing documents not described in Sections 5d and 5e hereof, and any escrow charges shall be paid by the relevant buyer.

k. Condition of Premises at Closing and Closing Inspection. At a Closing, but without limiting any of the other conditions to Closing hereunder and except as may be provided in the License Agreement, full possession of the relevant property, free of all tenants and occupants and of all personal property located on the relevant property and owned by Seller is to be delivered to the relevant buyer at the Closing, the relevant property to be then in the same condition as on the date hereof, reasonable use and wear excepted, and excepting the removal of any buildings and/or fixtures by Seller; provided such removal does not create and unsafe condition, nuisance or other violation of law. NAF and the City and their agents, employees, representatives or independent contractors shall be entitled to an inspection of the relevant property prior to the Closing in order to determine whether the condition thereof complies with the terms of this Section.

6. Entire Agreement Herein. The parties understand and agree that their entire agreement is contained herein, in the Water Supply Agreement and Evaluation Agreement that no warranties, guarantees, statements, or representations shall be valid or binding on a party unless set forth in this Agreement. It is further understood and agreed that all prior understandings and agreements heretofore had between the parties are merged in this Agreement

which alone fully and completely expresses their agreement and that the same is entered into after full investigation, neither party relying on any statement or representation not embodied in this Agreement. This Agreement may be changed, modified, altered or terminated only by a written agreement signed by the parties hereto.

7. Condemnation. If all or a material part of the Realty or Additional Parcel is taken by condemnation, eminent domain or by agreement in lieu thereof, or any proceeding to acquire, take or condemn all or part of the Realty or Additional Parcel is threatened or commenced, NAF may either terminate this Agreement (in which event NAF shall be entitled to a return of the Options Consideration paid to Seller), or purchase the Realty or Additional Parcel in accordance with the terms hereof, without reduction in the relevant Purchase Price, together with an assignment of Seller's rights to any award paid or payable by or on behalf of the condemning authority. Otherwise NAF shall complete the transaction and shall receive an assignment of Seller's rights to the award therefor at Closing. If Seller has received payments from the condemning authority and if NAF elects to purchase the Realty or Additional Parcel, Seller shall credit the amount of said payments against the relevant Purchase Price at the Closing. For the purposes hereof, a part of the Realty or Additional Parcel shall be deemed "material" if in NAF's judgment the taking thereof would adversely affect NAF's ability to pursue the proposed Project as such term is defined in the Evaluation Agreement.

8. Representations of Seller. In order to induce the buyers to enter into this Agreement and to consummate the purchase of the Premises, Seller hereby represents to each as of the date of this Agreement and as of each Closing Date that the following representations of Seller are true and correct in all material respects:

a. Seller has the power and authority to enter into this Agreement and complete the transactions contemplated herein, all action necessary to authorize the execution and delivery of this Agreement has occurred, the individual executing this Agreement and all documents to be executed by Seller are duly authorized, and this Agreement and all such documents that are to be executed by Seller and delivered to the relevant buyer at the relevant Closing are duly authorized, executed and delivered by Seller and enforceable against Seller in accordance with its terms.

b. There are no leases, licenses or other forms of occupancy agreements affecting the Premises or Waterfront Parcel or any maintenance, management or other contracts affecting either of these that will survive the Closing.

c. There is not now pending nor, to Seller's best knowledge, has there been threatened, any action, suit or proceeding against or affecting the Premises or Waterfront Parcel or Seller with respect thereto, whether before or by any federal or state court, commission, regulatory body, administrative agency or other governmental body, domestic or foreign, or otherwise.

d. Seller has not received notice of any pending or threatened proceeding for a taking or condemnation of the Premises or Waterfront Parcel.

e. Seller has not received notice of any assessment for public improvements applicable to the Premises or Waterfront Parcel.

f. Seller has not received notice of any proposal for or pending moratorium, rezoning, overlay, or other change to the land use classification or restrictions affecting the Premises or Waterfront Parcel.

g. Seller's rights, title and interest in and to and ownership of the Premises or Waterfront Parcel and all portions thereof and rights appurtenant thereto have never been challenged or questioned.

9. Representations of Buyer. NAF and the City hereby represent and warrant to Seller as of the date hereof and as of each Closing Date that the following representations of it are true and correct in all material respects:

a. It has the power and authority to enter into this Agreement and complete the transactions contemplated herein, all action necessary to authorize the execution and delivery of this Agreement has occurred, the individual executing this Agreement and all documents to be executed by it are duly authorized, and this Agreement and all such documents that are to be executed by it and delivered to Seller at the Closing are duly authorized, executed and delivered by it and enforceable against it in accordance with its terms.

b. There are no proceedings pending or, to its knowledge, threatened against it in any court or before any governmental authority or any tribunal which, if adversely determined, would have a material adverse effect on its ability to purchase the relevant property or to carry out its obligations under this Agreement, the Water Supply Agreement (as to NAF only), or the Evaluation Agreement.

10. Maintenance; New Leases or Agreements, Etc. Between the date hereof and the Closing:

a. Seller shall maintain all of its property subject to this Agreement in at least the same condition as the same is in at the date hereof, reasonable wear and tear and the consequences of any taking by eminent domain excepted. Seller shall maintain insurance on the Premises as currently insured.

b. Seller shall not enter into any lease, license or other occupancy agreement of all or any part of its property subject to this Agreement or any other agreement affecting such property without the relevant buyer's prior written consent (which the relevant buyer may withhold in its sole and absolute discretion).

c. Seller shall not make any commitments or representations to any other Governmental Authorities, any adjoining property owners, and civic association or interest groups concerning its property subject to this Agreement that would be binding upon the relevant buyer in any manner.

d. Seller shall promptly deliver to the relevant buyer copies of any notices or other correspondence it receives from any other Governmental Authorities (as such terms is defined in the Evaluation Agreement) regarding its property subject to this Agreement.

11. Broker. Each party represents hereby to the other that it dealt with no broker in the consummation of this Agreement and each party shall indemnify and save the other harmless from and against any claim arising from the breach of such representation by the indemnifying party. The provisions of this Section shall survive the Closing or, if applicable, the termination of this Agreement.

12. Default; Remedies. Either party shall be in default hereunder if they fail to fulfill its obligations as set forth in this Agreement, Water Supply Agreement or Evaluation Agreement.

a. In the event of a material default by Seller hereunder, then the relevant buyer shall deliver to Seller a written notice of such material breach, which notice shall set forth complete information describing the nature of the material breach. In the case of a non-monetary default, Seller shall use its reasonable efforts to cure any such breach, default or failure and in such event the Closing Date shall be extended by a written notice from Seller to the other parties for a period of up to thirty (30) days as specified in said notice. If, despite Seller's reasonable efforts, Seller fails to cure any such breach, default or failure on or before the extended Closing Date, each buyer shall have the right to exercise any one of the following remedies:

i. terminate this Agreement by written notice to Seller, in which event the Options Consideration paid to Seller for all purchases that have not yet closed shall be paid (or repaid, as the case may be) to NAF, and (except for those obligations which are stated herein to survive the termination of this Agreement) all obligations of the parties under this Agreement shall terminate; provided, however, if such default is as a result of a willful breach by Seller, in addition to a return of the Option Consideration, NAF and the City shall each be entitled to immediate payment from Seller of all reasonable out of pocket costs incurred by that party in connection with this Agreement and the Project (including under and pursuant to the Evaluation Agreement); or

ii. seek specific performance of this Agreement; or

iii. if any default by Seller is susceptible of being cured by NAF or the City, then NAF and the City shall have the right, but not the obligation, to take such actions and incur such costs and expenses as necessary to cure such default and any and all costs and expenses incurred by it shall be deducted from the relevant Purchase Price at the Closing; or

iv. waive the default and proceed to consummate the transaction contemplated hereby in accordance with the provisions of this Agreement.

The foregoing remedies shall be NAF's and the City's sole and exclusive remedies and each waives consequential damages against Seller, except in the event of fraud or intentional default by Seller.

b. In the event of a material default by NAF or the City hereunder, then Seller shall deliver to the other parties a written notice of such material breach, which notice shall set forth complete information describing the nature of the material breach. In the case of a non-monetary default, the defaulting party shall use its reasonable efforts to cure any such breach, default or failure and in such event the Closing Date shall be extended by a written notice from the defaulting party to Seller for a period of up to thirty (30) days as specified in said notice. If, despite the defaulting party's reasonable efforts, the defaulting party fails to cure any such breach, default or failure on or before the extended Closing Date, Seller shall have the right to exercise any one of the following remedies: terminate this Agreement by written notice to the other parties, in which event the Options Consideration paid to Seller for all purchases that have not yet closed shall be given to Seller as its sole remedy, at law or in equity, and (except for those obligations which are stated herein to survive the termination of this Agreement) all obligations of the parties under this Agreement shall terminate; provided, however, if such default is as a result of a willful breach by NAF or the City, in addition to retaining the Option Consideration, Seller shall each be entitled to immediate payment from the breaching party of all reasonable out of pocket costs incurred by Seller after the date the applicable Option was exercised pursuant to a Notice of Election to Purchase.

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13. Continuation and Survival of Representations, Indemnifications and Covenants. All provisions, covenants, representations, warranties, indemnifications and covenants of the parties contained herein or made in writing pursuant to this Agreement are intended to be and shall remain true and correct as of the time of Closing, shall be deemed to be material, shall survive the execution and delivery of this Agreement, and shall survive the Closing (unless and to the extent otherwise provided herein).

14. Recording. It is agreed hereby that this Agreement shall not be filed for recording with the Register of Deeds for the County of Waldo or with any other governmental body but that a memorandum of this Agreement may be recorded at any party's request.

15. Notices. Any notice or communication which may be or is required to be given pursuant to the terms of this Agreement shall be in writing (from either a party hereto or its counsel) and shall be sent to the respective party at the address set forth in the first paragraph of this Agreement, by hand delivery, by postage prepaid certified mail, return receipt requested, by a nationally recognized overnight courier service that provides tracing and proof of receipt of items mailed, or to such other address as either party may designate by notice similarly sent. Notices shall be effective upon receipt or attempted delivery if delivery is refused or the party no longer receives deliveries at said address and no new address has been given to the other party pursuant to this paragraph. A copy of any notice to NAF shall also be simultaneously sent to Mintz, Levin, Cohn, Ferris, Glovsky & Popeo, P.C., One Financial Center, Boston, Massachusetts 02111, Attention: Daniel O. Gaquin, Esq. A copy of any notice to the City shall

understandings between the parties, including those contained in any letter of intent and any extensions or modifications thereof, and represents the full and complete understanding of the parties hereto in conjunction with the Water Supply Agreement or in the Evaluation Agreement. It being the intent of the parties that all obligations of the parties are contained only in this Agreement, and the entire agreement of the parties is fully set forth herein.

IN WITNESS WHEREOF, the parties hereto have executed this Options and Purchase Agreement as an instrument under seal as of the day and year first written above.

SELLER:

BELFAST WATER DISTRICT

By: ____________________________
Name: Keith Pooler
Title: Superintendent
Hereunto Duly Authorized

BUYERS:

NORDIC AQUAFARMS, INC.

By: ____________________________
Name: Erik Heim
Title: President
Hereunto Duly Authorized

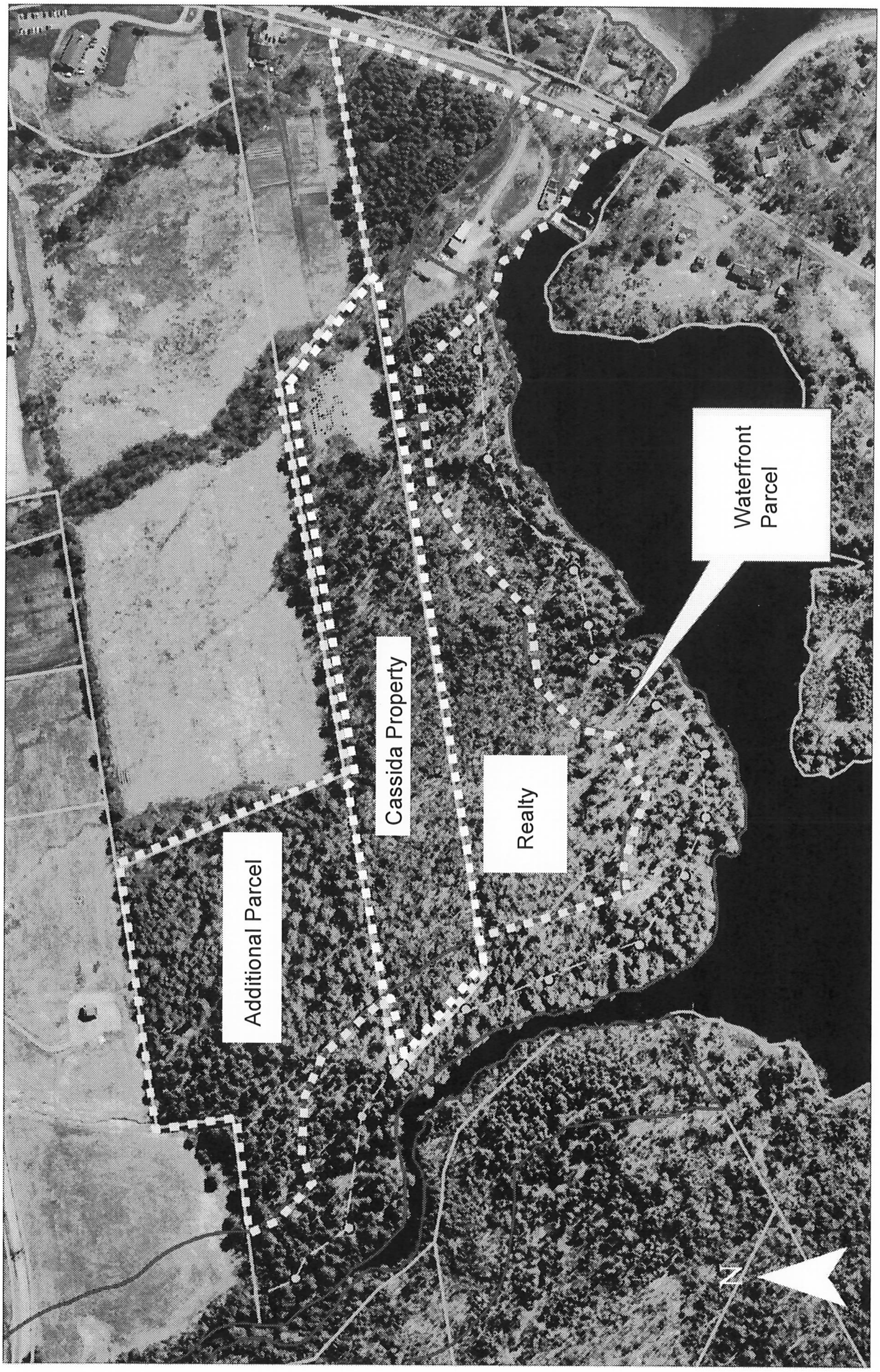
CITY OF BELFAST

By: ____________________________
Name: Joseph Slocum
Title: City Manager
Hereunto Duly Authorized

EXHIBIT A

DEPICTION OF REAL PROPERTY

EXHIBIT A



District Land - @ 30 Acres
Cassida Land - @ 14 Acres (white dash)
Total Land - @ 44 Acres (yellow dash)

Red Line - Shoreland Zone - 250' from HAT
Green Line - 100' Structure Setback in Resource
Protection Shoreland Zone

200 100 0 200 400 600 800 Feet

EXHIBIT B

PERMITTED ENCUMBRANCES

1. meter vault

2. water supply line for Northport Village Corporation

3. access and utility easements benefiting Seller's remaining land including the Additional Parcel and Lower Dam

LEASE

This Lease (this "Lease") is made and entered into as of January 29, 2018 (the "Effective Date") by and between Samuel E. Cassida, an individual resident of the State of Maine, having an address of 271 Northport Avenue, Belfast, Maine 04915 ("Landlord"), and Nordic Aquafarms, Inc., a Delaware corporation, having an address care of Nordic Aquafarms AS Øraveien 2, 1630 Gml Fredrikstad, Norway ("Tenant").

ARTICLE ONE
Demised Premises

Section 1.1 Landlord, for and in consideration of the rents and additional rents hereinafter reserved, and upon and subject to the terms, conditions, covenants and agreements hereinafter set forth, by these presents does hereby GRANT, DEMISE AND LEASE unto Tenant the following described real property:

> Approximately 12.2 acres, Northport Avenue (Rear Land), City of Belfast Tax Map 4, Lot 104 (the "Land"), TOGETHER WITH any and all improvements presently on the Land and those buildings and improvements hereafter erected on the Land by Tenant (it being understood that Tenant has no obligation to erect any buildings or other improvements on the Land); TOGETHER with all and singular the appurtenances, rights, privileges and easements now or hereafter appertaining thereto; * ALL of said property being hereinafter collectively called the "Demised Premises."

* excepting the 30' wide easement described in Waldo Registry BK 4153 Pg 74 SC

ARTICLE TWO
Term; Habendum

Section 2.1 TO HAVE AND TO HOLD the Demised Premises for a term of thirty (30) years commencing on the Commencement Date (as defined in Rider A attached hereto and incorporated herein by reference) and expiring at midnight on the thirtieth (30th) anniversary of the Commencement Date, unless this Lease shall sooner end and terminate or be extended (as may be extended or earlier terminated, the "Term"). For the purpose hereof, a "Lease Year" shall be each successive period of twelve (12) calendar months during the Term, with the first Lease Year commencing on the Commencement Date and expiring on the last day of the calendar month following the one year anniversary of the Commencement Date.

Section 2.2 Tenant shall have the option to extend the Term for four (4) additional five (5) year periods upon written notice to Landlord given not less than three months (3) prior to the expiration of the then-current Term.

ARTICLE THREE
Use of Demised Premises

Section 3.1 Tenant may use, develop, alter and operate the Demised Premises for a land-based aquaculture facility and related improvements and any use or purpose allowed by applicable law (any such use, the "Project"), including any use or purpose for which Tenant may obtain any Governmental Approval (hereinafter defined).

Section 3.2 Tenant may pursue any application, approval, authorization, permit, special permit, site plan approval, waiver, zoning change, variance or relief from zoning or other land use law, ordinance, rule or regulation as Tenant may deem necessary or desirable (collectively, "Governmental Approvals"). Landlord shall cooperate with Tenant, and not contest or otherwise interfere with, any proposed use of the Demised Premises, including by executing upon request any documentation required by the applicable Governmental Authority (hereinafter defined) related to Tenant's development, use or occupancy of the Demised Premises. Landlord acknowledges that Tenant may integrate the Demised Premises or parts thereof into a development project involving adjacent property not owned or controlled by Landlord and Landlord irrevocably consents thereto.

Section 3.3 Landlord and Tenant agree that if any Governmental Authority shall require the execution and delivery of any instrument to evidence or consummate the dedication of any street or right of way adjoining the Demised Premises, and/or if any Governmental Authority or any public utility company shall require the execution and delivery of any rights of way, easements and grants, in, over, under, through or adjoining the Demised Premises to provide any necessary or desirable utility, service or facility for the benefit of the Demised Premises, then both such parties will execute, acknowledge and deliver, any such instrument or document as may be required. Landlord also agrees to execute, acknowledge and deliver such instruments or documents as Tenant may reasonably request in connection with any tax contests or other proceeding relating to the use, operation, or ownership of the Demised Premises.

ARTICLE FOUR
Annual Rent

Section 4.1 Tenant covenants and agrees to pay to Landlord rent ("Annual Rent") in the amount set forth herein, in annual installments, in advance, on the first day of each Lease Year commencing on the Commencement Date. Annual Rent for the first Lease Year shall be in the amount of [redacted] On the first day of the second (2nd) Lease Year, and on the first day of each Lease Year thereafter (each such date being referred to herein as a "Change Date"), the Annual Rent shall be increased by the lesser of (i) the percentage increase in the Consumer Price Index for All Urban Consumers - All Items as published by the Bureau of Labor Statistics for the U.S. Department of Labor for the Boston-Brockton-Nashua, MA-NH-ME-CT metropolitan area (base year 1982-84=1001) (the "Index") from the Change Date to the current Change Date, and (ii) three percent (3%). The Annual Rent as so increased shall remain in effect until the next succeeding Change Date. If the Index has not been published as of the applicable Change Date, then Tenant shall continue to pay the Annual Rent at the rate for the preceding Lease Year until such time as the applicable Index is published, and the parties shall make an adjustment, retroactive to the Change Date, and the shortfall, if any, shall be due and payable with Tenant's next succeeding payment of Annual Rent. Notwithstanding the foregoing, Tenant shall pay to Landlord the sum of [redacted] upon the execution of this Lease as an advance payment of Annual Rent, which sum (i) shall be non-refundable if this Lease is terminated pursuant to Rider A, and (ii) shall be credited to the Annual Rent for the first Lease Year upon the Commencement Date.

Section 4.2 All amounts payable under Section 4.1, as well as all other amounts payable by Tenant to Landlord under the terms of this Lease ("Additional Rent" and collectively with Annual Rent, the "Rent"), shall be paid at the address of Landlord set forth in Section 13.2, or at such other place as Landlord may designate by notice to Tenant.

ARTICLE FIVE
Taxes, Insurance and Other Charges

Section 5.1 Tenant agrees that it will pay and discharge, or cause to be paid and discharged, punctually as and when the same shall become due and payable without penalty, all real estate taxes, personal property taxes and all other governmental impositions and charges of every kind and nature whatsoever (collectively, "Tax" or "Taxes") which, at any time during the Term, shall be or become due and payable and which shall be levied, assessed or imposed upon or against the Demised Premises or any improvements thereon. Tenant acknowledges that the Demised Premises has been assessed as "tree growth" property and a penalty or catch-up payment may result when the Demised Premises is removed from such status. Tenant shall be responsible for any such penalty or catch-up payment, provided Landlord shall cooperate with Tenant to minimize or reduce the same.

Section 5.2 Nothing contained in this Lease shall require Tenant to pay any estate, inheritance, succession, capital levy or transfer tax of the Landlord, or any income, excess profits or revenue tax or any other tax, assessment, charge or levy upon the Rent payable by Tenant under this Lease.

Section 5.3 Any Tax relating to a fiscal period of the taxing authority which is partly within the Term and partly subsequent to the Term shall, whether or not such Tax shall be assessed, levied, imposed or become a lien upon the Demised Premises or shall become payable during the Term, be apportioned between Landlord and Tenant as of the expiration of the Term, so that Landlord shall pay the portion of such Tax applicable to the period after the expiration of the Term, and Tenant shall pay the remainder thereof.

Section 5.4 Tenant shall have the right to contest the amount or validity, in whole or in part, of any Tax, or to seek a reduction in the valuation of the Demised Premises as assessed for real estate or personal property tax purposes. Any contest as to the validity or amount of any Tax, or assessed valuation upon which such Tax was based, whether before or after payment, may be made by Tenant in the name of Landlord and/or of Tenant, as Tenant shall determine, and Landlord agrees that it will, at Tenant's expense, cooperate with Tenant in any such contest. Tenant shall be entitled to any refund of any such Tax and penalties or interest thereon.

Section 5.5 During the Term, Tenant shall maintain commercial general liability insurance, identifying Landlord as an additional insured, against claims for personal injury, death and property damage occurring upon, in or about the Demised Premises.

ARTICLE SIX
Repairs and Maintenance

Section 6.1 Tenant shall have no maintenance or repair obligations under this Lease, but Tenant shall be responsible for any and all maintenance or repairs required or desired to be made by Tenant to the Demised Premises or any improvements thereon.

Section 6.2 Landlord shall not be required to make any alterations, repairs, additions or improvements, or to furnish any services or facilities of any kind, to the Demised Premises or any improvements thereon.

ARTICLE SEVEN
Public Utilities and Services

Section 7.1 Tenant agrees to pay or cause to be paid all charges for utilities or services provided to the Demised Premises and any improvements thereon throughout the Term. Tenant expressly agrees that Landlord is not required to furnish to Tenant or any other occupant of the Demised Premises any utilities or services of any kind. Landlord, upon Tenant's request and at Tenant's sole expense, will join with Tenant in any application for obtaining or continuing any of the foregoing utilities or services.

ARTICLE EIGHT
Tenant's Improvements and Alterations

Section 8.1 Tenant shall have the right at any time during the Term to make, at its cost and expense, any repairs, replacements, additions, betterments, changes, or restorations to the Demised Premises, including any improvements thereon, and to demolish or raze any such improvements.

Section 8.2 Landlord agrees that at the request of Tenant, Landlord will, at Tenant's sole cost and expense, either (a) file any applications or petitions, in which Tenant will join if required, or (b) join in any applications or petitions filed by Tenant, to obtain all approvals, licenses and permits required from any town, city, county, state and federal governments and of each and every department, entity, bureau and duly authorized official thereof and of any successor or future governmental authority, department, entity, bureau and duly authorized official thereof, and of the local board of fire underwriters having jurisdiction and/or any other corporation, body or organization possessing similar authority and exercising similar functions (collectively, "Governmental Authorities") for any alterations and will actively support such applications and petitions. Tenant shall be solely responsible for the preparation, filing and processing of all such applications or petitions.

Section 8.3 Title to all improvements shall vest in Tenant until the expiration or earlier termination of this Lease, whereupon title to the improvements shall vest in Landlord.

ARTICLE NINE
Casualty

Section 9.1 Should the whole or any part of the improvements then on the Demised Premises be partially or wholly damaged by a casualty after the Commencement Date, Tenant shall have the option to terminate this Lease, in which event the parties shall have no further rights or obligations hereunder, other than those that are expressly stated to survive the expiration or termination hereof. Whether or not Tenant elects to terminate the Lease, Tenant shall not be required to restore or rebuild the damaged improvements.

ARTICLE TEN
Condemnation

Section 10.1 In the event that the Demised Premises, or any part thereof, shall be taken in condemnation proceedings or by exercise of any right of eminent domain or by agreement between Landlord, Tenant and those authorized to exercise such right (any such matters being herein referred as a "Taking"), Landlord, Tenant and any leasehold mortgagee shall have the right to participate in any Taking proceedings or agreement for the purpose of protecting their interests hereunder. Each party so participating shall pay its own expenses therein.

Section 10.2 In the event of a Taking, Tenant shall have the option to terminate this Lease on the date of such Taking, in which event the parties shall have no further rights or obligations hereunder, other than those that are expressly stated to survive the expiration or termination hereof. Whether or not Tenant elects to terminate the Lease, Tenant shall not be required to restore or rebuild any affected improvements.

Section 10.3 In the event of a Taking, any award, compensation or insurance proceeds to which Landlord and Tenant may become entitled shall be allocated in the following order of priority: (i) to Tenant, for its interest in any improvements on the Demised Premises; (2) to Tenant, for the value of its leasehold interest in the Demised Premises; and (iii) to Landlord, for the value of its fee interest in the Demised Premises.

ARTICLE ELEVEN
Assignment, Leasing and Mortgages

Section 11.1 Without Tenant's prior written approval, which may be withheld in Tenant's sole and absolute discretion, Landlord shall not (a) directly or indirectly cause or permit any mortgage, deed of trust, lien, assessment lien, assessment, obligation, interest, encumbrance or encroachment or liability whatsoever to be placed against (whether recorded or not) the Demised Premises or take any other action that could adversely affect title to the Demised Premises, or (b) enter into any agreement or commitment to do any of the foregoing.

Section 11.2 Tenant shall have the right, without the consent of the Landlord, at any time and from time to time, to assign its interest in this Lease, or to sublet the whole or any portion or portions of the Demised Premises for the use and purposes permitted under this Lease.

ARTICLE TWELVE
Event of Default

Section 12.1 If Tenant shall default in the payment of Rent when and as the same shall be due and payable and such default shall continue for a period of thirty (30) days after receipt by Tenant of written notice thereof from Landlord, Landlord may terminate the Lease upon thirty (30) days' prior written notice to Tenant; provided, however, Tenant may void such termination by curing the Rent default prior to the expiration of such thirty (30) day period.

ARTICLE THIRTEEN
Miscellaneous Provisions

Section 13.1 Invalidity of Particular Provisions. If any term or provision of this Lease or the application thereof to any person or circumstance shall, to any extent, be invalid or unenforceable, the remainder of this Lease, or the application of such term or provision to persons or circumstances other than those as to which it is held invalid or unenforceable, shall not be affected thereby, and each term and provision of this Lease shall be valid and be enforced to the fullest extent permitted by law.

Section 13.2 Notices. All notices and other communications required or permitted hereunder (collectively, "Notices") shall be in writing and shall be sent by registered or certified mail, or overnight delivery by a nationally recognized public or private carrier, return receipt requested, postage prepaid, addressed to the party to receive such Notice at the address set forth below:

If to Landlord, to:	Samuel E. Cassida 271 Northport Avenue Belfast, Maine 04915
With a copy to:	Lee Woodward, Jr. Law Offices 56 Main Street Belfast, ME 04915 Attn: Lee Woodward, Jr. Email: woodward@lwoodwardlaw.com
If to Tenant, to:	Nordic Aquafarms AS Øraveien 2, 1630 Gml Fredrikstad Norway
With a copy to:	Mintz, Levin, Cohn, Ferris, Glovsky & popeo, P.C. One Financial Center Boston, MA 02111 Attn: Daniel O. Gaquin

Email: dogaquin@mintz.com

Either party may, by Notice given as aforesaid, change its address or add any additional addresses for all subsequent Notices. Notices given by mail shall be deemed given three (3) days after mailing in accordance with the requirements of the United States Postal Service, and all other Notices shall be deemed given or the date of delivery.

Section 13.3 Quiet Enjoyment. Landlord covenants that Tenant shall quietly have and enjoy the Demised Premises during the term of this Lease, without hindrance or molestation by anyone claiming by, through or under Landlord; subject, however, to the exceptions, reservations and conditions of this Lease.

Section 13.4 Confidentiality. Each party agrees that it shall keep confidential the terms of this Lease, the documents and information supplied by the other party to it and all information, surveys, reports, tests and studies relating to the Demised Premises obtained by either party before or after the Effective Date (collectively, the "Confidential Information"). Disclosure of Confidential Information by either party shall not be prohibited if that disclosure is information that is or becomes a matter of public record or public knowledge from sources other than the other party or its agents, employees, contractors, consultants or attorneys. Notwithstanding the foregoing, either party may disclose otherwise Confidential Information where disclosure (i) is required by applicable law or by an order of a court or other Governmental Authority having jurisdiction after giving reasonable notice to the other party with, to the extent practicable, adequate time for such other party to seek a protective order; (ii) is reasonably necessary and is made to that party's or its affiliate's employees, officers, directors, attorneys, accountants or other advisors who are advised of the confidential nature of such information; or (iii) is required to enforce the rights and remedies under this Agreement of either Tenant or Landlord. Nothing contained herein shall prohibit or restrict Tenant from disclosing information as may be required in connection with Tenant's application to obtain any Governmental Approvals to develop and operate the Project. In addition, within five (5) days of the Effective Date, Landlord and Tenant shall execute a notice of lease, in substantially the form attached hereto as Exhibit A and incorporated herein by reference, and either party shall be entitled to record the same.

Section 13.5 Entire Agreement. This Lease and the documents referred to herein contain the entire agreement between the parties pertaining to the subject matter hereof, and any executory agreement hereafter made shall be ineffective to change, modify or discharge it in whole or in part unless such executory agreement is in writing and signed by the party against whom enforcement of the change, modification or discharge is sought. This Lease cannot be changed or terminated orally.

Section 13.6 Brokers. Each party hereby represents and warrants to the others that it has not dealt with any broker or agent in connection with this Lease and covenants to pay, hold harmless and indemnify the other party from and against any and all costs, expense or liability (including legal fees incurred in defending against any claim) for any compensation, commission and charges claimed by any broker or agent with respect to this Lease or the negotiation hereof or otherwise arising from a breach of the foregoing warranty.

Section 13.7 Successors and Assigns. The covenants, conditions and agreements in this Lease shall bind and inure to the benefit of Landlord and Tenant and their respective legal representatives, successors and permitted assigns.

Section 13.8 No Merger. It is the intent and purpose of the parties hereto that this Lease shall remain in full force and effect until duly terminated and shall not be deemed to have merged with the interest of Landlord created by virtue of any lien upon the Demised Premises or any other interest therein or any portion thereof held by Landlord.

Section 13.9 Governing Law. This Lease shall be construed in accordance with and shall be governed by the laws of the State of Maine.

Section 13.10 Estoppel Certificate. Landlord shall, without charge, at any time and from time to time, within ten (10) days after Tenant's request, certify by written instrument duly executed and acknowledged in recordable form and deliver to Tenant or to any leasehold mortgagee or assignee or any proposed mortgagee or assignee, or any other person interested in this Lease specified by Tenant such usual and customary matters included in estoppel certificates.

ARTICLE FOURTEEN
Option to Purchase

Section 14.1 Landlord hereby grants to Tenant the exclusive option to purchase the Demised Premises (the "Purchase Option") on the terms and conditions set forth in this Article 14. Tenant may exercise the Purchase Option at any time during the Term (and any extension thereof) by delivering notice to Landlord of its intent to do so (the "Notice of Election to Purchase"). In the event Tenant delivers the Notice of Election to Purchase, the purchase price of the Demised

Premises shall be [redacted] LESS any Annual Rent paid by Tenant to Landlord under this Lease up to [redacted] paid by Tenant to Landlord (together with closing costs payable in accordance with Section 14.3), and the consummation of the sale (the "Closing") shall occur no more than sixty (60) days following the receipt by Landlord of the Notice of Election to Purchase, unless such sixty (60) day period is extended pursuant to Section 14.2. As an example, if Tenant exercises the Purchase Option during the third Lease Year, having paid [redacted] in Annual Rent, the Purchase Price payable at Closing is [redacted].

Section 14.2 Landlord shall convey to Tenant the Demised Premises free and clear of all liens, encumbrances, charges and restrictions, other than liens, encumbrances, charges and restrictions acceptable to Tenant. It shall be a condition precedent to the Closing that Tenant has obtained a title commitment in form and substance acceptable to Tenant, with such endorsements as Tenant may require, and if Tenant is unable to obtain such a title commitment, Tenant may, at its option, (i) rescind the Notice of Election to Purchase and continue its lease of the Demised Premises pursuant to the terms of this Lease as though the Notice of Election to Purchase had not been delivered, or (ii) extend the thirty (30) day time period provided for Closing by no more than sixty (60) days in order to obtain such title commitment.

Section 14.3 At Closing, Landlord shall execute and deliver to Tenant a good and sufficient quitclaim deed with covenants running to Tenant or Tenant's nominee or designee. Landlord and Tenant shall execute and deliver such additional documents or instruments as are necessary and customary to cause the transfer of the Demised Premises from Landlord to Tenant. All recording fees, all costs relating to the preparation of a survey and all title insurance premiums incurred in connection with the purchase of the Demised Premises by Tenant shall be paid by Tenant, and all transfer taxes, recordation taxes, stamp taxes, documentary taxes or similar impositions shall be paid as is customary for property similar to the Demised Premises in the jurisdiction in which the Demised Premises is located. If the Purchase Option has not been exercised prior to the expiration of the Term, the Purchase Option shall, without further action of any party, automatically terminate and thereafter shall be null and void and of no further force or effect, and neither party shall have any further rights or obligations with respect to the Purchase Option. If the Closing occurs, this Lease shall automatically terminate effective as of the Closing and the parties shall have no further rights or obligations hereunder, other than those that are expressly stated to survive the expiration or termination of this Lease.

[Signatures on following page]

IN WITNESS WHEREOF, the parties hereto have duly executed this instrument under seal as of the day and year first above written.

LANDLORD:

Sam Cassida
Samuel E. Cassida,, individually

TENANT:

NORDIC AQUAFARMS, INC.

By:____________________
Name: Erik Heim
Title: President

Exhibit A

NOTICE OF LEASE AND OPTION TO PURCHASE

Memorandum of Lease and Option to Purchase

PREPARED BY AND RETURN TO:

____
____
____

MEMORANDUM OF LEASE AND OPTION TO PURCHASE

This Memorandum of Lease (this "Memorandum") is entered into as of January 29, 2018, by and between Samuel E. Cassida, an individual resident of the State of Maine, having an address of 271 Northport Avenue, Belfast, Maine 04915 ("Landlord"), and Nordic Aquafarms, Inc., a Delaware corporation ("Tenant"). Landlord and Tenant have entered into that certain Lease dated January 29, 2018 (the "Lease") with respect to the Property (as defined below). It is the desire of the parties hereto to enter into this Memorandum for the purpose of recording the same and giving notice of the existence of the Lease and the option to purchase (as described below), as more particularly described in this Memorandum.

Parties to Lease Agreement	Landlord:	Samuel E. Cassida 271 Northport Avenue Belfast, Maine 04915
	Tenant:	Nordic Aquafarms, Inc., Nordic Aquafarms AS Øraveien 2, 1630 Gml Fredrikstad, Norway
Date of Lease	January 28, 2018	
Description of Property	The property described on Exhibit A attached hereto (the "Property")	
Term	Thirty (30) years commencing on the Commencement Date (as defined in the Lease) and expiring on the thirtieth (30th) anniversary of the Commencement Date, subject to any extensions provided in the Lease	
Option to Purchase	The Lease includes an option to purchase the Property effective upon the Commencement Date and terminating upon the expiration of the Term	
Purpose of Memorandum	This Memorandum is executed for the purpose of giving record notice of the fact of execution of the above described Lease and the option to purchase as provided for therein in lieu of recording the Lease itself and is not intended to modify, limit or otherwise alter the terms, conditions and provisions of the Lease	

This Memorandum shall extend to and be binding upon the parties hereto and their legal representatives, heirs, successors and assigns.

[Signatures on following page]

Executed as a sealed instrument as of the date first above written.

LANDLORD:

____
Samuel E. Cassida, individually

TENANT:

NORDIC AQUAFARMS, INC.

By:______________________________________
Name: Erik Heim
Title: President

STATE OF MAINE :
: ss
COUNTY OF WALDO :

On this, the ____ day of _____________, 2018, before me, the undersigned notary public, personally appeared Samuel E. Cassida, proved to me through satisfactory evidence of identification, which was __ photographic identification with signature issued by a federal or state government, or ___ personal knowledge of the undersigned, to be the person whose name is signed on the preceding document, and acknowledged to me that he signed it voluntarily for its stated purpose

IN WITNESS WHEREOF, I hereunto set my hand and official seal.

____
Notary Public

STATE: ______________ :
: ss
COUNTY OF _______ :

On this, the ____ day of _____________, 2018, before me, the undersigned notary public, personally appeared __________, proved to me through satisfactory evidence of identification, which was __ photographic identification with signature issued by a federal or state government, or ___ personal knowledge of the undersigned, to be the person whose name is signed on the preceding document, and acknowledged to me that he signed it voluntarily as an authorized President of Nordic Aquafarms, Inc., a Delaware corporation, for its stated purpose.

IN WITNESS WHEREOF, I hereunto set my hand and official seal.

____
Notary Public

Rider A

ARTICLE ONE

Conditions to Lease

Section 1.1 Landlord shall deliver, and Tenant shall accept, possession of the Demised Premises upon the earlier of (x) the fulfillment of each of the conditions set forth in items (a) – (d) below (collectively, the "Conditions") to the satisfaction of Tenant, in Tenant's sole discretion, or (y) thirty (30) days after the expiration of the Permitting Period (the "Commencement Date"). If at any time prior to the Commencement Date, any Conditions remain unfulfilled, Tenant shall have the right to waive any such unfulfilled Conditions by written notice to Landlord and take possession of the Demised Premises, whereupon the Commencement Date shall be deemed to have occurred. Upon the occurrence of the Commencement Date, Landlord and Tenant shall execute a written instrument stating the date thereof and the expiration of the Term. Notwithstanding the foregoing or anything else to the contrary, Tenant shall have no obligation to accept possession of the Demised Premises unless the Conditions have been fulfilled to Tenant's satisfaction, in Tenant's sole discretion.

(a) The Diligence Period (as defined below) shall have expired and Tenant shall not have terminated the Lease in accordance with Section 2.6 below.

(b) The Permitting Period (as defined below) shall have expired and Tenant shall not have terminated the Lease in accordance with Sections 3.3 below.

(c) Tenant shall close on the purchase of immediately adjacent real property owned by the Belfast Water District (the "BWD"), which real property is generally located to the south of the Demised Premises (the "BWD Property").

(d) The City of Belfast (the "City") shall close on the purchase of real property owned by the BWD, which real property is immediately adjacent to and generally located to the south of the BWD Property (the "City Property").

ARTICLE TWO

Due Diligence

Section 2.1 Commencing on the Effective Date and continuing for a period of three (3) months thereafter, unless further extended by Tenant as hereinafter provided or until the Lease is earlier terminated (as may be extended or earlier terminated, the "Diligence Period"), Tenant and its agents and representatives (together with the equipment or machinery of any such party) shall have a license for access to the Demised Premises at all reasonable times for the purpose of conducting inspections and tests of the Demised Premises, including surveys; architectural, engineering, water quality and capacity, geo-technical, environmental and hydrogeological inspections and tests (including test pits, sampling, borings and drilling); and any other due diligence investigations, tests or analyses that Tenant may deem necessary or desirable for Tenant's development and operation of the Project (collectively, the "Due Diligence"); provided that all such Due Diligence shall be conducted by Tenant in compliance with Tenant's responsibilities set forth in Section 2.2 below. Such license shall include the right of Tenant and its agents and representative to remove trees, construct roads and alter terrain (collectively, "Terrain Work") to accommodate any equipment or machinery of such party; provided that any such Terrain Work shall be conducted in consultation with Landlord. If after the expiration of the Diligence Period, Tenant has been unable to complete any Due Diligence to Tenant's satisfaction, Tenant shall have the right to extend the Diligence Period for up to two (2) additional three (3) month periods, in each case by written notice to Landlord prior to the expiration of the then-current Diligence Period.

Section 2.2 In conducting any Due Diligence of the Demised Premises, Tenant and its agents and representatives shall: (i) comply with all applicable laws; (ii) promptly pay when due the costs of all Due Diligence done with regard to the Demised Premises; (iii) not permit any liens to attach to the Demised Premises by reason of the exercise of its rights hereunder; and (iv) promptly repair any damage to the Demised Premises and restore any areas disturbed resulting directly from any Due Diligence substantially to their condition prior to the performance of such Due Diligence; provided, however that such repair and restoration obligation shall not apply to any Terrain Work.

Section 2.3 Except for Landlord's negligence, gross negligence or willful misconduct or any matter arising from the mere discovery of a pre-existing condition at the Demised Premises, Tenant hereby agrees to indemnify and hold Landlord harmless from, all third-party claims, liabilities, damages, losses, costs, expenses (including, without limitation, reasonable attorneys' fees), actions and causes of action arising out of personal injury and/or property damage directly caused by any entry onto the Demised Premises by, or any Due Diligence performed by, Tenant, its agents, independent contractors, servants and/or employees. The provisions of this Section 2.3 shall survive the termination of the Lease.

Section 2.4 During the Diligence Period, Tenant shall obtain and maintain, at its expense: (i) statutory Worker's Compensation and Employers Liability Insurance with available limits of not less than $1,000,000.00, which insurance must contain a waiver of subrogation; (ii) Commercial General Liability coverage with available limits of not less than $2,000,000.00 in combined single limits for bodily injury and property damage and covering the contractual liabilities assumed under this Agreement; (iii) business automobile liability insurance with available limits of not less than $1,000,000 combined single limit for bodily injury and/or property damage per occurrence; and (iv) such other insurance as Landlord may reasonably require. Such policy(s) shall provide primary (and not merely contributory coverage) to Landlord. Tenant shall provide Landlord with evidence of such insurance policies upon the request of Landlord.

Section 2.5 In order to facilitate Tenant's Due Diligence, Landlord will promptly, but in any event no later than ten (10) days after the date hereof, supply Tenant with any and all information relating to the Demised Premises (including, without limitation, title information, surveys, environmental reports, engineering studies, tax bills, legal notices, permits, approvals and such other information as Tenant may reasonably request) in Landlord's possession or under Landlord's control.

Section 2.6 Tenant may, for any reason or for no reason, terminate the Lease at any time prior to the expiration of the Diligence Period.

ARTICLE THREE

Permitting

Section 3.1 For a period six (6) months after the expiration of the Diligence Period, unless further extended by Tenant as hereinafter provided or until the Lease is earlier terminated (as may be extended or earlier terminated, the "Permitting Period"), Tenant shall diligently pursue all final, unappealable Governmental Approvals from any Governmental Authorities necessary or desirable for the development and operation of the Project. The process, sequence and schedule for pursuing the Governmental Approvals shall be determined by Tenant; provided that Tenant shall, in Tenant's good faith reasonable business judgment, commence pursuit of the Governmental Approvals and file the necessary applications therefor as soon as reasonably practicable. For the avoidance of doubt, Tenant shall have the right, but not the obligation, to pursue any Governmental Approvals during the Diligence Period.

Section 3.2 If prior to the expiration of the Permitting Period, Tenant has applied for and is awaiting such Governmental Approvals from the Governmental Authorities, Tenant shall have the right to extend the Permitting Period for up to two (2) consecutive three (3) month periods, in each case by written notice to Landlord prior to the expiration of the then-current Permitting Period. If Tenant is diligently pursuing or defending any legal appeals of the Governmental Approvals, the Permitting Period shall toll until the final resolution of such appeals.

Section 3.3 If, after having used commercially reasonable efforts to do so, Tenant has not obtained the Governmental Approvals from the Governmental Authorities prior to the expiration of the Permitting Period, then Tenant may terminate the Lease by written notice to Landlord prior to the expiration of the Permitting Period, whereupon all obligations of the parties hereto shall cease and the Lease shall be terminated and the parties shall have no further rights or obligations under the Lease, other than those that are expressly stated to survive the expiration or termination thereof. For the purposes hereof, commercially reasonable efforts shall not require Tenant to continue its permitting efforts if Tenant determines in its good faith judgment that all Governmental Approvals for the Project cannot reasonably be obtained on terms which make the Project feasible. For the purposes hereof, "obtained" shall mean the applicable Governmental Approval has been issued in final form, with terms and conditions acceptable to Tenant in its sole discretion (including any offsite requirements), and all applicable appeal periods have expired without an appeal having been filed or any such appeal has been finally resolved to Tenant's satisfaction.

Section 3.4 It shall be Tenant's responsibility to obtain, and to pay for, all Governmental Approvals necessary or desirable for the development and operation of the Project. Landlord shall cooperate with Tenant as reasonably necessary (including signing applications in a timely manner) to obtain such Governmental Approvals; provided that Tenant shall promptly reimburse Landlord for all reasonable costs incurred by Landlord in connection with Landlord's cooperation.

PURCHASE AND SALE AGREEMENT

This Purchase and Sale Agreement (this "Agreement") is made this 22ND day of August, 2018 (the "Effective Date") by and among **Goldenrod Properties, LLC**, a Maine limited liability company with a mailing address of P.O. Box 345, Belfast, ME 04915 ("Seller"), and **Nordic Aquafarms, Inc.** a Delaware corporation having an address of c/o Nordic Aquafarms AS, Øraveien 2, 1630 Gml Fredrikstad, Norway, or its assignee ("Buyer");

WHEREAS, the Buyer is pursuing permits and approvals from the City of Belfast and State of Maine, including where applicable its agencies, and the acquisition of real property in connection therewith, for the purpose of permitting, constructing and operating an aquafarm in the City of Belfast, Maine (the "Project"), which includes real property owned by the Seller as described herein.

NOW, THEREFORE, in consideration of One Dollar and other good and valuable consideration, receipt and sufficiency of which is hereby acknowledged, and the mutual covenants contained herein, the parties agree as follows:

1. PURCHASE AND SALE. Seller agrees to sell and Buyer agrees to buy (a) a portion of the Seller's land located on Perkins Road, in the City of Belfast, in the State of Maine, containing approximately 14.62 acres as bounded by the existing ditch/swale on the east side and as bounded by the previously established property lines on the other 3 sides, to be more particularly described by a survey to be completed and agreed to by Seller and Buyer and generally depicted on Exhibit A hereto (the "Fee Interest"); and (b) a lease of certain property during the construction by Buyer of the Project on a portion of the remainder of the Seller's property for parking, storage, and other construction needs (the "Construction Lease") (the Fee Interest and Construction Lease may be referred to collectively as the "Premises").

2. TITLE; DEED. The Fee Interest will be conveyed at the closing of the transactions contemplated by this Agreement (the "Closing") by a good and sufficient quitclaim deed with covenant running to Buyer and the deed shall convey good and marketable title to the land described therein, free from encumbrances and liens of any type whatsoever, except those encumbrances and liens that are satisfactory to Buyer in accordance with Section 5(C) below. The Construction Lease shall be for a term of forty eight (48) months with an option to renew for an additional twelve (12) months and conveyed by a separate, unrecorded lease agreement and shall be limited to the portions of property owned by Seller to be more fully described therein as necessary for the permitted construction activity of Buyer in connection with the Project and shall include access to the Premises from Perkins Road. The terms of the Construction Lease shall include the right by Buyer to use travel ways from Perkins Road across the Seller's property on the east driveway entrance and behind existing warehouse "B", to perform any necessary topsoil removal and stockpiling onsite and provide any gravel surfacing for Buyer's needs in connection with construction of the Project. During the term of the Construction Lease, Buyer will maintain adequate dust control, sweeping and repair of construction caused road debris and/or damage. Any signage or other incidentals for construction related to this road and

lot will be provided, maintained and removed by Buyer. Upon the termination of the Construction Lease, Buyer will leave any stockpiled topsoil and any installed gravel surface for the benefit and ownership of Seller, but otherwise completely vacate the premises subject to the Construction Lease in an acceptable manner. Rent under the Construction Lease shall be [redacted] per month for one term of not less than four (4) years with an option by Buyer to extend the Construction Lease for one (1) additional year upon the same terms and conditions, including the payment of rent in an amount equal to [redacted] per month. The term shall commence upon the beginning of the construction of the Project. The parties will coordinate the traffic patterns and other details to best accommodate each party's needs.

3. PURCHASE PRICE; DEPOSIT; ESCROW AGENT.

A. Purchase Price. The agreed purchase price for the Fee Interest is [redacted] (the "Purchase Price") payable as follows (subject to the prorations and other adjustments provided in this Agreement):

i. A deposit in the amount of [redacted] shall be paid by Buyer on the date hereof as a non-refundable deposit and shall effectively act as an option fee (the "Initial Deposit"). This Initial Deposit will be applied to the Purchase Price at the Closing; and

ii. A deposit in the amount of [redacted] shall be paid by Buyer as a refundable deposit (subject to the terms and conditions in this Agreement) within three days after receipt by Buyer of approval of Buyer's environmental permit application for the Project (the "Second Deposit"); and

iii. [redacted] shall be paid by Buyer to Seller at the Closing by immediately available funds.

4. TIME FOR PERFORMANCE; DELIVERY OF DEED. The Closing shall occur at such time (during normal business hours) and on such a business day (the "Closing Date") selected by Buyer by written notice given at least thirty (30) business days prior thereto (the "Closing Notice") at the offices of Drummond Woodsum in Portland, Maine or Buyer's preferred location, but in no event shall the Closing shall take place later than August 1, 2019 (the "Outside Closing Date").

5. CONTINGENCIES. The obligations of Buyer hereunder are conditioned upon each of the following, any of which may be waived by Buyer in whole or in part:

A. Inspections. Within six (6) months of the Effective Date, Buyer may, in its discretion, cause to be performed the following inspections, the results of which must be satisfactory to Buyer:

a. Feasibility Study

b. Water Quality
c. Wetlands
d. Environmental
e. Land Use
f. Zoning
g. Survey
h. Permits and approvals

All inspections will be performed by inspectors chosen and paid for by Buyer. Buyer shall promptly commence its due diligence investigation of the Premises and shall promptly inform Seller of any results that are unsatisfactory to Buyer.

B. Title Commitment. Within six (6) months of the Effective Date, Buyer shall have obtained a title insurance commitment with respect to the Premises satisfactory to Buyer in its sole discretion.

C. Survey. Upon execution of this Agreement, Buyer shall engage a surveyor to prepare a plan and legal description of the Premises, to be prepared within one hundred twenty (120) days following the date hereof. Once the survey and proposed legal description has been prepared, the Buyer shall transmit the same to Seller for its review and approval. The Seller shall have thirty (30) days to review and approve of the survey, which approval shall not be unreasonably withheld. If the Seller does not respond within such thirty (30) day period, the survey and proposed legal description shall presumptively describe the Premises. If the Seller objects to the proposed survey and legal description of the Premises, then the Seller shall specify the basis for its objection and Buyer shall have ten (10) days following receipt of such objections to submit a revised survey addressing Seller's concerns. If the Buyer and Seller cannot agree on a proposed survey and legal description, then each of Buyer and Seller agree to submit such dispute to mediation with a mutually agreed mediator.

If Buyer does not obtain satisfaction of one or more of the contingencies referenced in paragraphs A and B above and so notifies Seller in writing of its intent to terminate this Agreement, the Second Deposit, if already made, shall be returned to Buyer, this Agreement shall terminate and the parties shall be relieved of all further obligations hereunder.

6. CLOSING DOCUMENTS. At the Closing:

A. Purchase Price. Buyer shall deliver to Seller that portion of the Purchase Price payable at the Closing, as adjusted pursuant to the terms hereof;

B. Deed and Lease. Seller shall execute, acknowledge and deliver to Buyer the deed as provided herein and Buyer and Seller shall each execute and deliver the Construction Lease;

C. Title Affidavits. Seller shall deliver to Buyer executed originals of such customary certificates, evidence of authority, affidavits or letters of indemnity as the title insurance company issuing the title insurance policy on the Premises shall require in order to issue such policy and to omit therefrom all exceptions for unfiled mechanics', materialmen's or similar liens and parties in possession and brokers' liens;

D. Nonforeign Person Affidavit. Seller shall deliver to Buyer such affidavits and certificates, in form and substance reasonably satisfactory to Buyer, as Buyer shall deem necessary to relieve Buyer of any obligation to deduct and withhold any portion of the Purchase Price pursuant to Section 1445 of the Internal Revenue Code;

E. Notification to Buyer of Withholding Tax Requirement. Buyer shall deliver to Seller an executed original certificate in form and substance reasonably satisfactory to Seller acknowledging receipt of notification of the withholding tax requirements of the State of Maine;

F. Maine Resident Affidavit. Seller shall deliver to Buyer such executed affidavits and certificates, in form and substance reasonably satisfactory to Buyer, as Buyer shall deem necessary, to inform Buyer of its obligation, if any, to deduct and withhold a portion of the Purchase Price pursuant to 36 M.R.S.A. § 5250-A;

G. Underground Oil Storage Tank Certification. Seller shall deliver to Buyer a written notice, in form and substance reasonably satisfactory to Buyer, which written notice shall certify the registration numbers of the underground oil storage facilities located on the Premises, the exact location of the facilities, whether or not they have been abandoned in place, and that the facilities are subject to regulation by the Maine Board of Environmental Protection;

H. Real Estate Transfer Tax Declaration. Seller and Buyer shall execute a Real Estate Transfer Tax Declaration in the form required to be recorded with the deed and the real estate transfer tax imposed by the State of Maine shall be paid by the Seller and Buyer in accordance with law;

I. Prorations. Subject to Section 12 below, real estate taxes assessed by the City of Belfast, Maine and water and sewer use charges shall be paid by Seller as of the Closing Date;

J. Other Documents. Seller and Buyer shall execute, acknowledge and deliver such other documents and items as Seller's and/or Buyer's attorney may reasonably require.

K. Corporate Documents. Seller shall deliver to Buyer a copy of Seller's Articles of Organization, By-Laws, resolutions authorizing this Agreement and the transactions contemplated by this Agreement and an incumbency certificate of any officer of Seller executing this Agreement and any documents contemplated herein, all certified by the appropriate officer of Seller as being true, correct and in full force and effect on the date of the execution of this Agreement and the Closing.

7. ACCESS TO PREMISES. Seller hereby agrees that Buyer, its agents and subcontractors, may enter upon the Premises, at reasonable times, with all necessary equipment for all purposes reasonably associated with the purchase of the Premises, including, without limitation, conducting Buyer's due diligence investigations on the Premises and adjacent properties which may be part of the Project and Seller shall cooperate with Buyer in connection with permitting such access. All surveys, inspections or tests conducted on behalf of Buyer shall remain the property of Buyer.

8. POSSESSION AND CONDITION OF PREMISES. Except as provided in this Section 8, full possession of the Premises shall be delivered to Buyer at the Closing (or, if applicable, after Seller's possession of the Premises after the Closing), the Premises to be at such time (a) in the same condition as they now are (or as contemplated to be improved hereunder), reasonable wear thereof excepted, and (b) in compliance with all laws, including without limitation, all environmental, building and zoning laws. Buyer or its agent may inspect the Premises at any time prior to the Closing and again prior to Seller's vacation of the Premises in order to determine whether the condition thereof complies with the terms of this paragraph.

9. EXTENSION TO PERFECT TITLE OR MAKE PREMISES CONFORM. Seller hereby agrees that it shall not voluntarily permit any encumbrance not existing on the Effective Date to affect the Premises without obtaining the prior written consent of Buyer, which consent shall not be unreasonably withheld or delayed. If Seller shall be unable to give title or to make conveyance, or to deliver possession of the Premises, all as herein stipulated, or, if at the time of Closing the Premises do not conform with the provisions of this Agreement, then Seller shall remove any defects in title, or to deliver possession as provided herein, or to make the Premises conform to the provisions of this Agreement, as the case may be, in which event Seller shall give written notice thereof to Buyer at or before the time for performance hereunder, and thereupon the time for performance hereof shall be extended until the thirtieth (30th) day after such notice, but in no event later than the Outside Closing Date. Any and all encumbrances affecting the Premises created by Seller from and after the Effective Date shall be removed by Seller prior to or at the Closing.

10. FAILURE TO PERFECT TITLE OR MAKE PREMISES CONFORM. Subject to Section 11 below, if at the expiration of such extension of time, Seller shall have failed to remove any defects in title, deliver possession, or make the Premises conform, as the case may be, all as agreed in this Agreement, then at Buyer's option (i) the Deposit made under this Agreement shall be forthwith refunded to Buyer or (ii) Buyer shall have the right to specifically enforce the terms and provisions of this Agreement. Upon a refund by Seller pursuant to clause (i) above, all other obligations of all parties hereto shall cease, this Agreement shall be void without recourse of the parties hereto, and neither party shall be in default under this Agreement.

11. BUYER'S ELECTION TO ACCEPT TITLE AND CONDITION. Buyer shall have the election, at either the original or any extended time for performance, to accept such title to the Premises in its then condition as Seller can deliver and to pay therefor the Purchase Price with appropriate deduction therefrom, in which case Seller shall convey such title or deliver the Premises in such condition.

12. ADJUSTMENT OF UNASSESSED AND ABATED TAXES. If the amount of real estate taxes referred to above is not known at the time of the Closing, they shall be apportioned on the basis of the real estate taxes assessed for the immediately preceding year, with a reapportionment as soon as the new tax rate and valuation can be ascertained. If the taxes which are to be apportioned shall thereafter be reduced by abatement, the amount of such abatement, less the reasonable cost of obtaining the same, shall be apportioned between the parties, provided that neither party shall be obligated to institute or prosecute proceedings for an abatement unless herein otherwise agreed.

13. BROKERAGE. Seller and Buyer each represent and warrant to the other that no brokers, agents or consultants have been employed with respect to this transaction by either of them, and Seller and Buyer agree to indemnify and hold the other harmless from any claim by any other broker or agent claiming compensation in respect of this transaction, or alleging an agreement with Seller or Buyer, as the case may be.

14. BUYER'S DEFAULT. In the event Buyer fails to consummate the purchase of the Premises, in accordance with the provisions of this Agreement, for any reason other than those reasons specified in this Agreement as giving rise to a right in Buyer to terminate the transaction contemplated by this Agreement, Seller shall retain the Initial Deposit as liquidated damages in full and complete satisfaction of all claims against Buyer, and not as a penalty, whereupon all obligations of the parties to one another shall cease and this Agreement shall be null and void without recourse to the parties hereto and shall not be the subject matter of any litigation between the parties.

15. SELLER'S DEFAULT. In the event that Seller is in default or fails to comply with any of the terms and conditions of this Agreement, Seller shall return to Buyer the Deposit, and Buyer may terminate this Agreement and pursue all remedies available at law and equity, including, without limitation, an action for specific performance, it being agreed that no adequate remedy at law exists and the Property is of unique importance and value to the Buyer.

16. WARRANTIES, REPRESENTATIONS AND INDEMNIFICATION.

A. By Seller. Seller represents and warrants as of this date and as of each date through and including the Closing that:

i. Seller holds good and marketable title to the Premises.

ii. Seller is not a "foreign person" within the meaning of Section 1445 of the Internal Revenue Code.

iii. Seller is a limited liability company duly formed and validly existing under the laws of the State of Maine.

iv. Seller is in good standing in the State of Maine and has all necessary corporate authority to execute and deliver this Agreement and to consummate the transactions contemplated by this Agreement. This Agreement has been duly authorized by all necessary corporate action on the part of Seller, has been executed by a duly authorized representative of Seller and is the binding obligation of Seller enforceable in accordance with its terms.

v. This Agreement and the performance hereof by Seller will not contravene any law, judgment, order, injunction, decree or any contractual restriction or arrangement binding on Seller or by which any of Seller's assets or properties may be affected.

vi. No consent, approval, order or authorization of any court or other governmental entity is required to be obtained by Seller in connection with the execution and delivery of this Agreement or the performance hereof by Seller.

vii. There is no pending or, to the best of Seller's knowledge, threatened action or proceeding (including, but not limited to, any condemnation or eminent domain action or proceeding) before any court, governmental agency or arbitrator relating to or arising out of the ownership of the Premises or any portion thereof, or which may adversely affect Seller's ability to perform this Agreement, or which may affect the Premises or any portion thereof.

viii. The Premises are in compliance with all statutes, ordinances, rules, regulations, orders and requirements of all federal, state and local authorities and any other governmental entity having jurisdiction over the Premises (including, without limitation, environmental, land use and zoning laws and ordinances), and Seller has not received any notice from any such governmental entity of any violation of any of such statutes, ordinances, rules, regulations, orders and requirements.

ix. Seller does not know of, and have not received written notice of, any default or breach by Seller under any of the covenants, conditions, restrictions, rights-of-way or easements, if any, affecting the Premises or any portion thereof, and, to the best of Seller's knowledge, no such default or breach now exists, and no event has occurred and is continuing which, with notice or the passage of time, or both, would constitute a default thereunder.

x. Seller has not received any notice of assessment for benefits or betterments which affects the Premises and do not have knowledge that any such assessment is pending or threatened.

xi. Seller has no knowledge that any portion of the Premises has ever been used as a landfill or as a dump to receive refuse or waste, and, except in accordance with all applicable laws and regulations, there are and have been no Hazardous Materials (as hereinafter defined) used, generated, manufactured, disposed of, or stored in, on, under, or about the Premises. Seller has no knowledge that any asbestos containing materials or waste oil are on the Premises. The Premises meet and satisfy all federal, state and local environmental standards. As used herein, the term "Hazardous Materials" shall mean inflammables, oils, petroleum, explosives, radioactive materials and hazardous waste, including, without limitation, substances defined as "hazardous substances", "hazardous materials", "hazardous matter", or "toxic substances" in the Comprehensive Environmental Response, Compensation and Liability Act of 1980, as amended (CERCLA), the Hazardous Materials Transportation Act, the Toxic Substances Control Act, the Clean Air Act, the Clean Water Act and the Resources Conservation and Recovery Act, or any similar state or local law, or in any regulations promulgated pursuant thereto, or in any other applicable law.

xii. Seller states that there are no underground oil storage facilities on the Premises.

xiii. There are no lead-based paint or lead-based paint hazards on the Premises.

xiv. No work has been performed or is in progress at, and no materials have been furnished to, the Premises or any portion thereof which may give rise to mechanic's, materialmen's or other liens against the Premises or any portion thereof.

xv. Seller has no knowledge of any Disclosable Matter (as hereinafter defined) which has not been disclosed to Buyer in writing and which could have a material adverse effect on the ownership or operation of the Premises subsequent to the Closing. As used herein, a Disclosable Matter shall mean any fact or condition known to Seller relating to the Premises other than (i) any fact or condition relating to the present real estate and financial markets in the area where the Premises are located or elsewhere, (ii) any fact in the public domain or which has been the subject of a public disclosure, (iii) any fact or condition actually known by Buyer, or (iv) any facts or conditions disclosed in the written reports obtained by Buyer in connection with this transaction.

xvi. Seller shall deliver to Buyer within ten (10) days of the execution of this Agreement, copies of all surveys, soils, water, engineering and environmental reports concerning the Premises, if any, including water quality tests, in its possession or control and Seller further agrees to make available to the Buyer, after the date hereof, any such documents which Seller hereafter acquires, whether generated by the Seller or others.

xvii. Seller shall deliver to Buyer within ten (10) days of the execution of this Agreement, copies of all municipal, state and federal approvals for the development of the Premises, together with any applicable permits for the Premises, if any, in its possession or control and Seller further agrees to make available to the Buyer, after the date hereof, any such documents which Seller hereafter acquires, whether generated by the Seller or others.

B. Survival. Buyer's performance under this Agreement is conditioned upon the truth and accuracy of Seller's warranties and representations expressed herein as of the Closing. All warranties, representations, covenants and agreements expressed herein shall survive the Closing and any termination of this Agreement. Seller agrees to indemnify and hold harmless Buyer, its designee and their respective successor and assigns from and against any liability, cost, damage, loss, claim, expense or cause of action (including, but not limited to, attorneys' fees and court costs and costs of enforcement of this indemnity) incurred by or threatened against such other party as a result of any breach by Seller of any of the covenants, warranties or representations contained in this Agreement. This Agreement to indemnify and hold harmless shall survive the Closing and shall include, but not be limited to, the presence of any Hazardous Materials located on the Premises on or before the Closing Date.

17. WITHHOLDING TAX REQUIREMENT. Any other provision of this Agreement notwithstanding, Buyer shall, unless an exemption applies, be entitled to withhold at the Closing all amounts required to be withheld under 36 M.R.S.A. §5250-A or any other applicable federal or state law, and any such withheld amounts shall be credited against the Purchase Price as if paid to Seller at Closing.

18. SPECIAL TERMINATION RIGHT. In the event any Hazardous Materials, asbestos containing materials or waste oil are discovered at the Premises any time prior to the Closing, Buyer may, at its option, terminate this Agreement by written notice to Seller, whereupon Seller the Initial Deposit and Second Deposit shall be promptly returned to Buyer.

19. MISCELLANEOUS.

A. This Agreement shall be binding upon and inure to the benefit of the heirs, successors and assigns of the parties hereto. No party shall have the right to assign this Agreement without the prior consent of the other party, except that Buyer may assign this Agreement to any entity in which Buyer owns a majority of the equity interests without Seller's consent.

B. Any notice relating in any way to this Agreement shall be in writing and shall be sent by registered or certified mail, return receipt requested, or by a nationally recognized overnight courier, addressed as follows:

To Seller:

To Buyer:

and such notice shall be deemed delivered two (2) days after so posted. Either party may, by such manner of notice, substitute person or addresses for notice other than those listed above.

C. This Agreement may not be modified, waived or amended except in a writing signed by the parties hereto. No waiver of any breach or term hereof shall be effective unless made in writing, signed by the party having the right to enforce such a breach, and no such waiver shall be construed as a waiver of any subsequent breach. No course of dealing or delay or omission on the part of any party in exercising any right or remedy shall operate as a waiver thereof or otherwise be prejudicial thereto.

D. Any and all prior and contemporaneous discussions, undertakings, agreements and understandings of the parties are merged in this Agreement, which alone fully and completely expresses the entire agreement of the parties. All terms and conditions of this Agreement shall survive the Closing.

E. This Agreement shall be governed by and construed and enforced in accordance with the laws in effect in the State of Maine.

F. Unless otherwise expressly provided, whenever a provision of this Agreement refers to a matter being satisfactory, it shall mean satisfactory in such party's sole discretion.

G. Time shall be of the essence hereunder.

H. This Agreement may be executed in one or more counterparts, all of which shall collectively constitute a single instrument.

I. Any dates in this Agreement may be extended, at Buyer's option, in the event of any governmental action, including, without limitation, a moratorium on development, imposed, declared or otherwise instituted by a municipality or any other similar governmental authority for a number of days equal to the days such moratorium or similar government action is pending.

J. Disclosure. Except as and to the extent required by law, without the prior written consent of the other party, neither the Buyer nor the Seller nor its brokers, representatives or employees, and each shall instruct its representatives not to, directly or indirectly, make any public comment, statement or communication with respect to, or otherwise disclose or permit the disclosure of the existence of discussions regarding, a transaction between the parties, or any of the terms, conditions or other aspects of the transactions proposed in this letter of intent, except that the Buyer and its representatives are hereby authorized to disclose any aspect of this transaction in connection with the conduct of its due diligence.

K. Confidentiality. Except as and to the extent required by law, the Seller will not disclose or use, and it shall cause its representatives not to disclose or use and Confidential Information with respect to the Buyer furnished, or to be furnished, by the Buyer in connection herewith at any time or in any manner except in connection with the transaction discussed in this letter of intent or in furtherance of its due diligence review or efforts to secure financing for this transaction. For purposes of this letter of intent, "Confidential Information" means any information concerning the Buyer's identity, assets, or the Property; provided that it does not include information that the Seller can demonstrate (i) is generally available to or known by the public other than as a result of improper disclosure by the Seller or (ii) is obtained by the Seller from a source other than the Buyer or its representatives, provided that such source was not bound by a duty of confidentiality to the Buyer with respect to such information.

[SIGNATURE PAGE FOLLOWS]

IN WITNESS WHEREOF, the parties hereto have executed or caused this instrument to be executed as of the date and year first above written.

WITNESS:

SELLER:
GOLDENROD PROPERTIES, LLC

By: ______________________
Name: SCOTT L. HAWTHORNE
Title: MANAGER

BUYER:
NORDIC AQUAFARMS, INC.

By: ______________________
Name: ERIK HEIM
Title: CEO

EASEMENT PURCHASE AND SALE AGREEMENT

This Easement Purchase and Sale Agreement (this "Agreement"), dated as of this 6th day of August, 2018, is by and between **RICHARD AND JANET ECKROTE**, 42 Grandview Avenue, Lincoln Park, New Jersey 07035 (the "Seller"), and **NORDIC AQUAFARMS, INC.**, a Delaware corporation having an address of c/o Nordic Aquafarms AS, Oraveien 2, 1630 Gml Fredrikstad, Norway (the "Buyer").

RECITALS

A. Seller is the owner of approximately 2.78 acres of land located at 282 Northport Avenue, Belfast, Maine, identified on the City of Belfast Tax Map 29 as Lot 36, and the building and improvements thereon, and all rights and interests appurtenant thereto (the "Premises").

B. Seller desires to sell and Buyer desires to purchase a perpetual, subsurface easement (the "Easement") under a portion of the Premises for the purpose of constructing, maintaining, owning and operating water pipes and related equipment (the "Utilities") on the terms and subject to the conditions set forth herein. The portion of the Premises that will be burdened by the Easement is referred to herein as the "Easement Area."

C. Accordingly, for the consideration hereinafter named, and for other good and valuable consideration, receipt and sufficiency of which is hereby acknowledged, the parties do hereby agree as follows:

AGREEMENT

1. Purchase Price. Buyer shall pay to Seller the sum of [redacted], as follows:

a. $[redacted] as security for Buyer's performance hereunder (together with all interest earned thereon, the "**Deposit**") within three (3) business days after the full execution of this Agreement to Seller's counsel, Lee Woodward, Jr. ("**Escrow Agent**"), who shall deposit it in a federally insured interest-bearing money market account and disburse it according to the terms of this Agreement. The Deposit shall be non-refundable to Buyer, except in the event of Seller's default hereunder, and shall be applied in reduction of the Purchase Price payable at the Closing or as otherwise provided under this Agreement.

b. $[redacted] cash proceeds on the Closing Date, in lawful currency of the United States of America in immediately available funds by certified funds or by wire transfer to an account or accounts designated by Seller.

c. In addition to the foregoing cash consideration, Buyer shall, at Buyer's expense, perform the various improvements listed in Section 3(b) below.

In addition to the Deposit, within three (3) business days after the full execution of this Agreement, Buyer shall also pay to Seller (or directly to Lee Woodward, Jr., for Seller's benefit), the sum of [redacted] as reimbursement for legal fees incurred by Seller in connection with the transaction memorialized by this Agreement.

2. Closing. The Closing shall occur on August 16, 2019 or such earlier date as shall be mutually agreed by the parties hereto (the "Closing Date"), at Law Offices of Lee Woodward Jr., 56 Main Street, Belfast, Maine 04915, or such other location as mutually agreed by the parties. Buyer shall have the right to accelerate the Closing to an earlier date upon not less than ten (10) business days prior written notice to Seller.

3. Grant of Easement. (a) Easement Agreement. Seller shall convey the Easement to Buyer or its nominee or designee pursuant to mutually acceptable, commercially reasonable easement agreement (the "Easement Agreement") containing usual and customary terms for perpetual, subsurface utility easements, which shall include, without limitation, the right of Buyer and its contractors and agents to access the Premises with men, equipment and machinery, as reasonably necessary for the initial installation of the Utilities and related construction activities, (x) provided Buyer shall communicate with Seller and coordinate Buyer's activities so as to avoid unreasonable interference with Seller's use of the Premises (particularly to the extent any activities are undertaken during summer months when Seller and its guests or invitees are using the Premises); and (y) subject to Buyer's obligation to restore any portions of the Premises disturbed by such construction and to perform the improvements set forth in Section 3(b) below. The Easement Agreement shall convey a good and clear record and marketable title to the Easement, insurable on the current ALTA Standard Owners Form at standard rates, with standard printed exceptions for parties in possession and mechanics' liens deleted, free from all mortgages and monetary liens and all other encumbrances prohibiting or making unfeasible Buyer's use of the Easement for its intended purposes, and shall be in proper form for recording and shall be duly executed, acknowledged and delivered by Seller at the Closing. Seller shall obtain any third party consents that may be required to grant the Easement to Buyer, such as the consent of any mortgage lender. Buyer's counsel shall prepare the Easement Agreement for review and comment by Seller and Seller's counsel.

(b) Improvements to Seller's Premises. Buyer covenants to perform the following improvements to the Premises, at Buyer's cost and expense, either after the Closing and contemporaneously with Buyer's construction activities or during Buyer's diligence activities as Buyer deems expedient:

a. Install a new underground water pipe running from Route 1 along the Premises' existing drive way to the existing camp building on the Premises.

b. Install a new underground electrical conduit running from Route 1 along the Premises' existing drive way to the existing camp building on the Premises.

c. Unearth and “reset” the two (2) existing drainage pipes under the existing driveway on the Premises.

d. Remove the large oak tree overhanging the camp and thin out dead trees in the pine grove in the northwest part of the Premises.

e. Place large, excavated stones to strengthen existing retaining walls, to the extent feasible and practicable.

f. Dismantle the boathouse on the Premises and, upon Seller’s request, and to the extent feasible and practicable, salvage old barn boards from the boathouse. In the event Seller elects to retain any salvaged barn boards, Seller shall be responsible to removing such boards from the Premises, and/or storing and securing such boards on Premises ty from Buyer, and acceptance of such boards by Seller shall be deemed a waiver of any claims against Buyer related thereto.

g. Perform test bores in front of the garage on the Premises to determine the feasibility of installing a basement or septic system is feasible. Any reports produced in connection therewith shall be promptly delivered to Seller.

h. Plant a reasonable amount of shrubbery on the new easement area after the installation and related work is complete.

i. Add fresh gravel at the driveway entrance when the Buyer’s construction is complete.

Notwithstanding anything to the contrary, if any of the foregoing improvements to be performed by Buyer for the benefit of Seller requires any governmental or regulatory approvals (including, without limitation, those related to work upon or impacting any wetlands), Seller shall be responsible for obtaining any such approval, at Seller’s cost and expense. Seller and Buyer shall communicate, cooperate and coordinate so as to cause such work to be performed expeditiously and efficiently without interfering with Seller’s use of the Premises or the pursuit of Buyer’s installation of the Utilities in the Easement Area to facilitate Buyer’s Project and/or Buyer’s Project more generally.

4. Location of Easement Area. A drawing of the proposed location of the permanent Easement Area and a temporary construction easement area is attached hereto as Exhibit A. Seller and Buyer acknowledge and agree that the final location of the Easement Area (and corresponding temporary construction easement area) may be subject to adjustment based on the result of Buyer’s inspections and to Buyer’s receipt of all applicable governmental and regulatory approvals necessary for Buyer’s use of the Easement for its intended purposes, provided Buyer agrees that the Easement Area shall be located to the south of the old barn and existing driveway entrance. If Buyer determines that it is impractical or not feasible to locate the Easement south of the old barn and existing driveway entrance, and the parties are unable to agree on another, mutually acceptable location, this Agreement shall terminate and the Deposit shall be retained by Seller.

5. Buyer's Inspections.

a. Seller acknowledges the Buyer intends to conduct certain investigations of the Premises to determine the suitability for Buyer's purposes, including title searches; obtaining a survey; geotechnical, environmental and hydrogeological tests (including geotechnical borings, sampling, and drilling); and determining the compliance of the Easement Area with all applicable laws, rules, codes and regulations. Buyer and Buyer's agents and contractors shall have the rights to enter onto the Premises with vehicles, equipment and machinery to conduct such inspections as Buyer deems appropriate, including for Buyer's engineering inspection(s), site evaluations, and such other inspections and investigations as Buyer deems appropriate.

b. Buyer shall provide reasonable notice of any such entry and coordinate the same with Seller so as to schedule its testing activities to the extent practical and feasible for times Seller and its invitees or guests are not using the Premises, and in all cases to avoid unreasonable interference with the use of the Premises by Seller, and its invitees or guests.

c. In conducting any inspections, Buyer and its agents and representatives: (i) (together with the equipment or machinery of any such party) shall have a license to access the Premises at all reasonable times for the purpose of conducting such inspections; (ii) not unreasonably interfere with Seller's use of the Premises and endeavor to schedule its testing activities for times Seller and its invites and guest are not using the Premises; (iii) comply with all applicable laws; (iv) promptly pay when due the costs of all inspections and tests, (v) not permit any liens to attach to the Premises by reason of the exercise of its rights hereunder; and (vi) promptly repair any damage to the Premises not resulting from the actions of Seller or its invitees or guests, and restore any areas disturbed resulting directly from any such inspections, investigations or tests substantially to their condition prior to the performance of such due diligence.

d. In order to facilitate Buyer's due diligence, Seller will promptly upon Buyer's request therefor, supply Buyer with any and all information relating to the Premises (including, without limitation, title information, surveys, environmental reports, engineering studies, tax bills, legal notices, permits, approvals and such other information as Buyer may reasonably request) in Seller's possession or under Seller's control.

e. Except as arising from Seller's negligence, gross negligence, or willful misconduct or any matter arising from the mere discovery of a pre-existing condition at the Premises, Buyer hereby agrees to indemnify and hold Seller harmless from, all third-party claims, liabilities, damages, losses, costs, expenses (including, without limitation, reasonable attorneys' fees), actions, and causes of action arising out of personal injury and/or property damage directly caused by any entry onto the Premises by, or any inspections or tests performed by Buyer, its agents, independent contractors, servants and/or employees.

f. Buyer shall obtain and maintain, at its expense: (i) statutory Worker's Compensation and Employers Liability Insurance with available limits of not less than $1,000,000.00, which insurance must contain a waiver of subrogation; (ii) Commercial General Liability coverage with available limits of not less than $2,000,000.00 in combined single limits for bodily injury and property damage and covering the contractual liabilities assumed under this Agreement; (iii) business automobile liability insurance with available limits of not less than $1,000,000 combined single limit for bodily injury and/or property damage per occurrence; and (iv) such other insurance as Seller may reasonably require. Such policy(s) shall provide primary (and not merely contributory coverage) to Seller. Buyer shall provide Seller with evidence of such insurance policies upon the request of Seller.

6. Conditions to Closing

a. Buyer's Conditions to Closing. Without limiting any other conditions to Buyer's obligations to close set forth in this Agreement, the obligations of Buyer under this Agreement are subject to the satisfaction at or before the time of Closing of each of the following conditions (any of which may be waived in whole or in part by Buyer, in writing, at or prior to Closing):

i. There shall be no final judgment materially affecting the ability of Seller to perform its obligations rendered against Seller, or if, within thirty (30) days after entry thereof, such judgment shall have been discharged or execution thereof stayed, or if, within thirty (30) days after the expiration of any such stay, such judgment shall have been discharged.

ii. Seller shall have performed, observed and complied with all material covenants and agreements required by this Agreement to be performed by Seller at or prior to Closing.

iii. Buyer shall have obtained all permits necessary or desirable for the development and operation of the land-based aquaculture facility that Buyer intends to construct across the public right-of-way from the Premises (the "Project"), and Buyer shall have determined, in its sole discretion, that the Easement Area is suitable for use in connection with the Project.

If any of Buyer's foregoing conditions is not fully satisfied on or before the Closing Date, Buyer shall have the option to either (x) terminate this Agreement by notice to Seller, in which event this Agreement shall terminate and all obligations of the parties hereto shall cease without further recourse or remedy of the parties hereunder, and the Deposit shall be retained by Seller, or (y) waive such condition and proceed to consummate the transaction contemplated hereby in accordance with the provisions of this Agreement. Notwithstanding the foregoing, in the event that the failure to satisfy any condition precedent to Closing is caused by a breach by Seller of its obligations set forth in this

Agreement, Seller shall be deemed to be in default hereunder, in which event the provisions of Section 9 below shall apply.

b. Seller's Conditions to Closing. Without limiting any other conditions to Seller's obligations to close set forth in this Agreement, the obligations of Seller under this Agreement are subject to the satisfaction at the time of the Closing of each of the following conditions (any of which may be waived in whole or in part by Seller at or prior to Closing):

i. There shall be no final judgment materially affecting the ability of Buyer to perform its obligations rendered against Buyer, or if, within thirty (30) days after entry thereof, such judgment shall have been discharged or execution thereof stayed, or if, within thirty (30) days after the expiration of any such stay, such judgment shall have been discharged.

ii. Buyer shall have performed, observed and complied with all material covenants and agreements required by this Agreement to be performed by Buyer at or prior to Closing.

If any of Seller's foregoing conditions is not fully satisfied on or before the Closing Date, Seller shall have the option to either (x) terminate this Agreement by notice to Buyer, in which event the Deposit shall be retained by Seller, and this Agreement shall terminate and all obligations of the parties hereto shall cease without further recourse or remedy of the parties hereunder, or (y) waive such condition and proceed to consummate the transaction contemplated hereby in accordance with the provisions of this Agreement. Notwithstanding the foregoing, in the event that the failure to satisfy any condition precedent to Closing is caused by a breach by Buyer of its obligations set forth in this Agreement, Buyer shall be deemed to be in default hereunder, in which event the provisions of Section 10 below shall apply.

c. Closing Costs. Each of Seller and Buyer shall be responsible for their own legal expenses incurred in connection with this Agreement. Seller and Buyer agree to allocate closing costs as follows:

i. Transfer/conveyance taxes (if applicable) shall be divided evenly between Seller and Buyer.

ii. Buyer's title insurance expenses and premiums shall be paid by Buyer.

iii. If applicable, the cost of an update to the most recent survey of the Easement Area or of a new survey and any related surveyor's certificate shall be paid by Buyer.

iv. The cost of preparation and recordation of any releases and termination statements as may be required in connection with the title policy described in Section 3 hereof shall be paid by Seller.

v. The cost of preparation of the Easement Agreement shall be paid by Buyer.

vi. The costs of performing Closing and of any escrow charges shall be paid by Buyer.

d. Condition of Premises at Closing and Closing Inspection. At Closing, but without limiting any of the other conditions to Closing hereunder, full possession of the Easement Area, free of all tenants and occupants and of all personal property located on Easement Area and owned by Seller is to be delivered to Buyer at the Closing, the Premises to be then in the same condition as on the date hereof, reasonable use and wear excepted. Buyer and its agents, employees, representatives or independent contractors shall be entitled to an inspection of the Easement Area prior to the Closing in order to determine whether the condition thereof complies with the terms of this Section.

7. Entire Agreement Herein. The parties understand and agree that their entire agreement is contained herein, and that no warranties, guarantees, statements, or representations shall be valid or binding on either party unless set forth in this Agreement. It is further understood and agreed that all prior understandings and agreements heretofore had between the parties are merged in this Agreement which alone fully and completely expresses their agreement and that the same is entered into after full investigation, neither party relying on any statement or representation not embodied in this Agreement. This Agreement may be changed, modified, altered or terminated only by a written agreement signed by the parties hereto.

8. Condemnation. If all or a material part of the Easement Area is taken by condemnation, eminent domain or by agreement in lieu thereof, or any proceeding to acquire, take or condemn all or part of the Premises is threatened or commenced, Buyer may either terminate this Agreement (in which event Buyer shall be entitled to a return of the Deposit), or purchase the Easement Area (as may be relocated or adjusted pursuant the mutual agreement of Buyer and Seller) in accordance with the terms hereof, without reduction in the Purchase Price, together with an assignment of Seller's rights to any award paid or payable by or on behalf of the condemning authority. Otherwise Buyer shall complete the transaction and shall receive an assignment of Seller's rights to the award therefor at Closing. If Seller has received payments from the condemning authority and if Buyer elects to purchase the Easement Area, Seller shall credit the amount of said payments against the Purchase Price at the Closing. For the purposes hereof, a part of the Premises shall be deemed "material" if in Buyer's judgment the taking thereof would adversely affect the Easement Area's usefulness with respect to the Project and/or the Buyer's ability to pursue the Project.

9. Maintenance; New Leases or Agreements, Etc. Between the date hereof and the Closing:

a. Seller shall maintain the Easement Area in at least the same condition as the same is in at the date hereof, reasonable wear and tear and the consequences of any taking by eminent domain excepted. Seller shall maintain insurance on the Premises as currently insured.

b. Seller shall not enter into any lease, license or other occupancy agreement of all or any part of the Easement Area or any other agreement affecting the Easement Area, without Buyer's prior written consent (which Buyer may withhold in its sole and absolute discretion).

c. Seller shall not make any commitments or representations to any governmental authorities, any adjoining property owners, and civic association or interest groups concerning the Easement Area to this Agreement that would be binding upon Buyer in any manner.

d. Seller shall promptly deliver to Buyer copies of any notices or other correspondence it receives from any governmental authorities regarding the Premises.

10. Default; Remedies. Either party shall be in default hereunder if they fail to fulfill their obligations as set forth in this Agreement.

a. In the event of a material default by Seller hereunder, Buyer shall have the right to exercise any one of the following as its sole and exclusive remedies:

i. terminate this Agreement by written notice to Seller, in which event the Deposit shall be returned to Buyer, and all obligations of the parties under this Agreement shall terminate;

ii. seek specific performance of this Agreement; or

iii. waive the default and proceed to consummate the transaction contemplated hereby in accordance with the provisions of this Agreement.

b. In the event of a material default by Buyer hereunder, Seller shall have the right to terminate this Agreement by written notice to Buyer, in which event the Deposit shall paid to Seller as its sole remedy, at law or in equity, and all obligations of the parties under this Agreement shall terminate.

11. Continuation of Representations, Indemnifications and Covenants. All provisions, covenants, representations, warranties, indemnifications and covenants of the parties contained herein are intended to be and shall remain true and correct as of the time of Closing.

12. Recording. It is agreed hereby that this Agreement shall not be filed for recording with the Register of Deeds for the County of Waldo or with any other governmental body but that a memorandum of this Agreement may be recorded at any party's request.

13. Notices. Any notice or communication which may be or is required to be given pursuant to the terms of this Agreement shall be in writing (from either a party hereto or its counsel) and shall be sent to the respective party at the address set forth in the first paragraph of this Agreement, by hand delivery, by postage prepaid certified mail, return receipt requested, by a nationally recognized overnight courier service that provides tracing and proof of receipt of items mailed, or to such other address as either party may designate by notice similarly sent. Notices shall be effective upon receipt or attempted delivery if delivery is refused or the party no longer receives deliveries at said address and no new address has been given to the other party pursuant to this paragraph. A copy of any notice to Buyer shall also be simultaneously sent to Mintz, Levin, Cohn, Ferris, Glovsky & Popeo, P.C., One Financial Center, Boston, Massachusetts 02111, Attention: Daniel O. Gaquin, Esq. A copy of any notice to Seller shall also be simultaneously sent to Lee Woodward, Jr., Esquire, 56 Main Street, Belfast, ME 04915. Notices by any party may be sent by such party's counsel.

14. Broker. Each party represents hereby to the other that it dealt with no broker in the consummation of this Agreement and each party shall indemnify and save the other harmless from and against any claim arising from the breach of such representation by the indemnifying party. The provisions of this Section shall survive the Closing or, if applicable, the termination of this Agreement.

15. Captions. The captions in this Agreement are inserted only for the purpose of convenient reference and in no way define, limit or prescribe the scope or intent of this Agreement or any part hereof.

16. Successors and Assigns.

a. This Agreement shall be binding upon the parties hereto and their respective successors and assigns.

b. Buyer may not assign this Agreement and the rights or benefits hereof, except that Buyer may assign this Agreement, without Seller's consent, to an entity that directly or indirectly controls, is controlled by or is under common control with Buyer or any institutional investor partner of Buyer. The term "control" means the power to direct the management of such entity through voting rights, ownership or contractual obligations.

17. Governing Law. The laws of the State of Maine shall govern the validity, construction, enforcement and interpretation of this Agreement.

18. Title Matters. Any matter or practice arising under or relating to this Agreement which is the subject of a title standard or practice standard of the Maine State Bar Association shall be governed by such standard to the extent applicable.

19. Multiple Counterparts. This Agreement may be executed in any number of

identical counterparts. If so executed, each of such counterparts shall constitute this Agreement. In proving this Agreement, it shall not be necessary to produce or account for more than one such counterpart.

[Remainder of page intentionally left blank]

IN WITNESS WHEREOF, the parties hereto have executed this Easement Purchase and Sale Agreement as an instrument under seal as of the day and year first written above.

SELLER:

8/6/18

RICHARD ECKROTE

Janet Eckrote 8/6/18

JANET ECKROTE

BUYER:

NORDIC AQUAFARMS, INC.

By: ______________________________
Name:
Title:

IN WITNESS WHEREOF, the parties hereto have executed this Easement Purchase and Sale Agreement as an instrument under seal as of the day and year first written above.

SELLER: 8/6/18

RICHARD ECKROTE

Janet Eckrote 8/6/18

JANET ECKROTE

BUYER:

NORDIC AQUAFARMS, INC.

By:
Name: Erik Heim
Title: CEO

Exhibit A

Proposed Easement Area


N
29 / 39
Belfast Water District
Route One
29 / 36
Eckrote
40' wide temporary construction easement (Typ.)
25' wide permanent seawater piping easement (Typ.)
Approx. Property line (Typ.)
29 / 37
Theye
Penobscot Bay
bing
0
60
120 Ft
JOB NUMBER
FILENAME
DRAWN BY
Cory Verrill
PROJECTION
NAD83 UTM19N
SCALE
1 in = 30 feet
Nordic Aquafarms
Eckrote Parcel
Seawater Easement Sketch
CIANBRO
101 Cianbro Square, PO Box 1000
Pittsfield, ME 04967
www.cianbro.com
DATE
7/31/2018
FIGURE
Eckrote Easement

STATE OF MAINE
DEPARTMENT OF AGRICULTURE, CONSERVATION & FORESTRY
BUREAU OF PARKS & LANDS
22 STATE HOUSE STATION
AUGUSTA, MAINE 04333

PAUL R. LEPAGE
GOVERNOR

WALTER E. WHITCOMB
COMMISSIONER

October 10, 2018

Joanna Tourangeau, Esq.
Drummond Woodsum
84 Marginal Way, Suite 600
Portland ME 04101

RE: Submerged Lands Application - Nordic Aquafarms, Inc.

Dear Ms. Tourangeau:

The Bureau of Parks and Lands (Bureau), within the Maine Department of Agriculture, Conservation and Forestry, has received your client's Submerged Lands Application to install pipes at its property in Belfast. Pursuant to Title 12 M.R.S.A., Section 1801 & 1862, the Bureau of Parks and Lands serves as trustee of submerged lands for the State of Maine. Submerged lands include all land below the mean low-water mark seaward to the 3-mile territorial state boundary, including all land below the mean low-water mark of tidal rivers upstream to the farthest natural reaches of the tides.

Because the proposal will involve new structures over 500 square feet in size on submerged lands, a lease from the Bureau is required. The lease gives your client the right to use submerged lands as proposed in the application for a term not exceeding 30 years. There is a 30-day review and public comment period to determine if the proposed use <u>will not</u>:

- unreasonably interfere with customary or traditional public access ways to, or public trust rights (fishing, fowling, recreation, and navigation) in, on or over the submerged lands;
- unreasonably interfere with fishing or other existing marine uses of the area;
- unreasonably diminish the availability of services and facilities necessary for commercial marine activities; and
- unreasonably interfere with ingress and egress of riparian owners

The public comment period ends on **November 9, 2018.** The request for a lease may be granted, granted with conditions, or denied. If the application is approved, a lease will be sent to your client for signature and payment. If we receive comments in opposition or the application is denied, we will issue our preliminary decision and there will be a 30-day reconsideration period.

Annual rent is charged for a lease and the minimum amount is $150.00 per year. The submerged lands lease year runs from January 1st to December 31st with payment due February 1st of each year. Pro-rated rent for the current year is due and payable upon execution of the lease. Please note that any approval will be conditional upon the Bureau receiving proof of title, right or interest in the upland property. The Purchase and Sale agreement is adequate for processing of the application.

The lease fee for the proposed 15-foot-wide pipe corridor is calculated at a base rate of $0.05/square foot (sf) of leased area plus an adjustment factor derived from the municipally assessed value of the adjacent upland lot. Based on this information, the estimated annual lease fee would be $4,517.69 for 83,550 square feet of submerged lands. The lease fee may be adjusted once in every five-year period if the upland is reassessed by the municipality or to conform to applicable regulations and laws.

Additional information about the Submerged Lands Program is available on our website at www.maine.gov/dacf/publiclands. If you have any questions, please feel free to contact me at (207) 287-4922 or by email to carol.dibello@maine.gov. Thank you.

Sincerely,

Carol DiBello

Carol DiBello
Submerged Lands Coordinator

cc: Erik Heim (via email)

TAKEN FROM U.S.G.S. 7.5 MINUTE BELFAST AND SEASPORT, MAINE–1976 (REVISED 1979).

CONTOUR INTERVAL IS 20 FEET

SITE COORDINATES: LATITUDE 44° 23'43.8"N
LONGITUDE 68° 59'17.0"W

N
W E
S

0 1,000 2,000 4,000

SCALE in FEET 1:24,000

RANSOM Consulting Engineers and Scientists

SITE LOCATION MAP

PREPARED FOR:

NORDIC AQUAFARMS, INC.
159 HIGH STREET
PO BOX 283
BELFAST, MAINE

SITE:

PROPOSED COMMERCIAL LAND–BASED AQUACULTURE FACILITY
285 NORTHPORT AVENUE
BELFAST, MAINE

PROJECT: 171.05027.008

FIGURE: 1

PM File: NAF-F1_SLM.mxd

13. Attachments for specific activities and circumstances. For each specific question, check 'Yes' or 'No' to indicate if the statement is applicable to a discharge or activity described in this application. Where 'Yes' is checked, attach the applicable form.

Specific Question	Yes	No	Applicable Form
A. Is this facility a publicly owned treatment works treating sanitary wastewaters?	☐	☑	DEP Form: Publicly Owned Treatment Facilities (DEPLW0106)
B. Does this application seek authorization to introduce septage into treatment works?	☐	☑	DEP Form: Disposal of Septage and Holding Tank Wastes in Wastewater Treatment Facility (DEPLW0507-A2004)
C. Is this application for a subsurface wastewater disposal system?	☐	☑	DEP Form: Application for Subsurface Wastewater Disposal System (DEPLW0313-B2005)
D. Is this application for a land surface (including spray irrigation) wastewater disposal system?	☐	☑	DEP Form: Application for Surface Wastewater Disposal System (DEPLW0450-B2005)
E. Is this a food processing facility or POTW that treats food processing wastewaters?	☑	☐	DEP Form: Food Processing Facilities (DEPLW1999-19)
F. Is this an existing discharge of industrial process wastewater?	☐	☑	EPA Form: 2C
G. Is this to be a new discharge of industrial process wastewater?	☑	☐	EPA Form: 2D
H. Is this a discharge of non-contact cooling water?	☐	☑	EPA Form: 2E
I. Is this discharge of storm water associated with an industrial activity?	☐	☑	EPA Form: 2F
J. Is this a discharge of non-process wastewater?	☐	☑	EPA Form 2E
K. Is this application for an Atlantic salmon net pen facility?	☐	☑	DEP Form: Supplemental Information for Atlantic Salmon Aquaculture Net Pen (for Individual Permit) (DEPLW0956)
L. Is this a fish hatchery or rearing facility?	☑	☐	DEP Form: Fish Rearing Facilities (DEPLW1999-18)
M. Does this application involve a new or modified outfall structure?	☑	☐	DEP Form: Outfall Information (DEPLW1999-17)
N. Is this application for a waste snow dump?	☐	☑	DEP Form: Supplemental Information for Snow Dumps (DEPLW0249)

OUTFALL AND TREATMENT INFORMATION

Use attachments as necessary to provide details for each discharge point and treatment system.

14. Describe each discharge location. Include all combined sewer overflow (CSO) points, bypasses, emergency discharge points, at pump stations, etc.

Outfall Number/Name	Description, Volume Discharged and Receiving Water
Outfall 1	One 36" diameter pipe discharging 7.7 million gallons per day (mgd) to Belfast Bay. The outfall will be located approximately 3300 feet (1000 meters) from shore in approximately 35 feet (10.7 meters) of water at mean low tide.

If any of the above-listed discharges (other than CSOs) are intermittent or seasonal, please describe the nature, circumstances and duration of each.

Not Applicable.

15. Briefly describe current treatment facilities or methods for each discharge.

See Attachment 8.

16. If this is a renewal application, please describe all significant modifications to the treatment facilities (and collection system if applicable) since the last permit application was filed.

Not Applicable.

17. Are new or expanded treatment facilities or outfall structures being proposed? Yes If so, please include a construction schedule. Plans and specifications must be submitted to the Department for review and approval prior to construction of the facilities. See Attachment 9.

18. If this application is for a new or increased discharge, include a statement that:

A. describes in detail the nature of and reason for the requested increase in pollutant loading to the receiving water;
B. if the Department determines that the discharge will diminish the remaining assimilative capacity of the receiving water, demonstrates that alternative methods to reduce or eliminate the increased discharge are not feasible. Include engineering and economic analyses that consider alternative methods of production, process controls, wastewater minimization methods, improved wastewater treatment methods and alternate disposal sites; and
C. if the Department determines that the discharge will diminish the remaining assimilative capacity of the receiving water, demonstrates that the increased pollutant load will result in important social and economic benefits to the State.

See Attachments 10 through 14 for a statement addressing subsections A through C above, reports utilizing CORMIX and ADCIRC software to model effluent discharge dilution in Belfast Bay, a review of the technical CORMIX and ADCIRC reports, and a summary of water quality data collected from Belfast Bay.

CERTIFICATION

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

Additionally, by signing below, I certify that

(1) Notice of this application has been made by publication in **The Bangor Daily News** newspaper circulated in the area where the project site is located on or about **September 21, 2018** (a copy of advertising form is included in this application; (2) notice has been sent by certified mail or Certificate of mailing to owners of land abutting the discharge site (a copy of the list of abutters is included in this application); and (3) notice and a copy of this application have been provided to the clerk of the municipality(ies) where the discharge is located. (4) Further, if this is a new discharge over 25,000 gallons per day, a public meeting attended by approximately **175-200 m**embers of the public was held on **October 4, 2018**.

The forgoing steps have been taken in accordance with the instructions attached to this application and the provisions of Chapters 2 and 522 of the Department's rules.

By:

Signature: Date:
Printed Name: Joanna B. Tourangeau Telephone: 207-772-1941
Title: Counsel for Nordic Aquafarms

Assisting parties. If the applicant has been assisted in preparing this application, the person assisting must sign below.

Signature: Date:
Printed Name: Elizabeth Ransom Telephone: 207-772-2891
Affiliation: Ransom Consulting, Inc.
Address: 400 Commercial Street, Suite 404
Town: Portland State: Maine Zip: 04101
Professional Certification: Professional Geologist, License #505

See following pages for requirements on public notice, public meeting, pre-applications meetings and pre-submission meetings.

See Attachment 15 for a letter authorizing Joanna B. Tourangeau and Elizabeth Ransom to act as agents on behalf of Nordic Aquafarms, Inc. and Attachment 16 for documentation of notifications.

Instructions for providing notices of the application. For all applications, the first 3 items must be completed. If the application is for a new discharge, you must also complete item 4.

1. *Publication of Public Notice.* Applicants for waste discharge permits are required to publish a public notice that the application is being file with the Department of Environmental Protection. The notice must be published within 30 days prior to the application being sent to the Department. The notice should be published in the legal advertisement section of a daily or weekly newspaper having general circulation in the area where the discharge will occur. If the public notice is not published at the proper time or if the application is returned because it is incomplete, you may be asked to have the notice published a second time.

Using the form on the next page, fill in the blanks with the appropriate information. Strike out all of the items (CSO, multiple discharge sources, etc.) in the second paragraph that do not apply to your discharge. The form may then be sent to the newspaper that is to publish the notice. Additionally, include a copy of the form with the application filed with the Department.

2. *Notice to Abutters.* Applicants are also required to send a copy of the public notice by certified mail or Certificate of Mailing to all abutting property owners within 30 days prior to the application being filed with the Department. For the purposes of public notice of this application, an "abutter" is any person who owns property that is both (1) adjoining and (2) within 1 mile of the delineated project boundary, including owners of property directly across a public or private right of way. Additionally, include a copy of the form with the application filed with the Department.

3. *Notice to Municipal Office.* Applicants are required to send a copy of the public notice by certified mail to the town or city clerk of each municipality where the discharge is located within 30 days prior to the application being filed with the Department. Applicants must also file a duplicate copy of the application with each municipality.

4. *Public Meeting.* Where the application is for a new discharge of greater than 25,000 gallons per day, you must hold a public meeting in accordance with Chapter 2, Section 8, of the Department's rules. Notice of the meeting must be sent to abutters and the clerk of the municipality(ies) where the discharge is located at least 10 days prior to the meeting. Notice of the meeting must be published in the same newspaper used to publish the notice of filing.

After all required notices have been made, sign the statement on the Certification page of the application.

NOTICE OF INTENT TO FILE
MAINE WASTE DISCHARGE LICENSE / MAINE POLLUTANT DISCHARGE ELIMINATION SYSTEM PERMIT APPLICATION

Please take note that, pursuant to 38 MRSA, Sections 413 and 414-A, ______________________ of _________________ intends to file a wastewater discharge permit application with the Department of Environmental Protection (DEP). The application is for the discharge of ____________________ of _________________________________ to the _________________ in _________________, Maine.

Include as applicable:

CSO: Included in this application is the discharge from ________________ Combined Sewer Overflows to____.

Multiple industrial point sources: The application includes ______________________________ associated with the primary activity described above.

Antidegradation: The application proposes a new or increased discharge that may lower existing receiving water quality within its legal classification, and the application contains a statement regarding important social and economic benefits resulting from the activity causing the discharge, pursuant to 38 MRSA, Section 464.

Mixing Zone: The application includes a request for establishment of a mixing zone in the __________________, inside of which classifications standards and uses not need to be met, pursuant to 38 MRSA, Section 451.

The application will filed on or about ___________ and will be available for public inspection at DEP's Augusta office during normal business hours. A copy may also be seen at the municipal offices in _______________________.

A request for a public hearing or request that the Board of Environmental Protection assume jurisdiction over this application must be received by the DEP, in writing, no later than 20 days after the application is found acceptable for processing, or 30 days from the date of this notice, whichever is longer. Requests shall state the nature of the issue(s) to be raised. Unless otherwise provided by law, a hearing is discretionary and may be held if the Commissioner or the Board finds significant public interest or there is conflicting technical information.

During the time specified above, persons wishing to receive copies of draft permits and supporting documents, when available, may request them from DEP. Persons receiving a draft permit shall have 30 days in which to submit comments or to request a public hearing on the draft.

Public comment will be accepted until a final administrative action is taken to approve, approve with conditions or deny this application. Written public comments or requests for information may be made to

Maine Department of Environmental Protection
Division of Water Quality Management
Department of Environmental Protection
State House Station #17
Augusta, Maine 04333-0017
Telephone (207) 287-7688

Pre-application and pre-submission meetings

Pre-application meetings. Pre-application meetings between the applicant and the Department are an opportunity for the applicant to determine the statutory and regulatory requirements that apply to a specific project and to identify a Project Manager for the application. The purpose of these meetings is to identify issues, processing times, fees and the types of information and documentation necessary for the Department to properly assess the project. The applicant shall consult the appropriate bureau Permit Assistance Coordinator to determine what information the applicant must provide before or during a pre-application meeting. Any applicant may request a pre-application meeting. The Department shall make a date available for the meeting as expeditiously as possible, but no later than 30 days from receipt of a written request and receipt of all information required for a pre-application meeting by the bureau. The Department shall prepare a written summary of all pre-application meetings.

For waste discharge permits, pre-application meetings are required prior to submission to or acceptance by the Department of an application for the following:

New wastewater discharge license for a discharge greater than 25,000 gallons per day (38 M.R.S.A. Sections 413, et seq.);

Projects requiring new or amended licenses involving more than two bureaus.

Pre-submission meetings. Pre-submission meetings between the applicant and the Department occur after the applicant has finished preparing the application for submission. These meetings are an opportunity to review the assembled application to ensure that the necessary information has been included prior to filing the application with the Department. An applicant may request a pre-submission meeting by contacting the Project Manager, or the Permit Assistance Coordinator for the bureau if no Project Manager has been identified. The Department shall make a date available for the meeting as expeditiously as possible, but no later than 20 days from receipt of a written request.

For waste discharge permits, a pre-submission meeting is required prior to submission to or acceptance by the Department of an application for the following:

Any application for which a pre-application meeting was held; or

Any application that has been previously rejected by the Department (see Chapter 2, Section 7-B of the Department's rules).

Waivers. The requirement of a pre-application or pre-submission meeting may be waived by written notice from the Department and agreement by the applicant. The Department will agree to waive a pre-application or pre-submission meeting if the Department is satisfied that such a meeting would be of no value in achieving the purposes noted above.

Note: The waiver of a pre-application or pre-submission meeting does not waive the public informational meeting required for new discharges of more than 25,000 gallons per day.

?ee Attachment 17 for pre-submission meeting waiver.

NORDIC
AQUAFARMS
SUSTAINABLE AQUACULTURE

WASTEWATER TREATMENT

NORDIC AQUAFARMS RAS PROJECT

MAINE, USA Sept 11th 2018

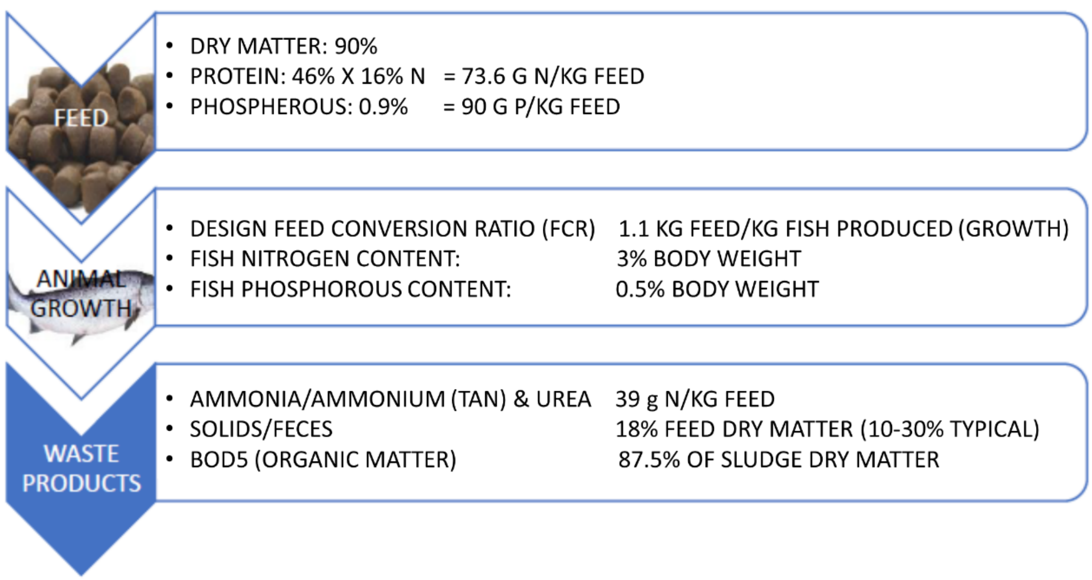
In relation to the planned aquaculture project by Nordic Aquafarms Inc. in Maine, USA, we hereby provide an overview of the Effluent/Wastewater treatment plant technology.

INTRODUCTION & BACKGROUND

The project concerns a land-based production of Atlantic salmon from eggs to market size, using proven state-of-the-art Recirculation Aquaculture System (RAS) technologies for maintaining optimal water quality for fish production with minimal water exchange.

PRODUCTION & POLLUTANTS

As with any animal production, nutrients are generated from the feed and animal metabolism. The exact composition varies with nutritional requirements for species and size as well as manufacturer, but essentially consists of proteins, lipids, carbohydrates, phosphorous and minerals. Of importance when considering environmental impact, is the BOD, total N and P.



TOTAL PARAMETERS FOR NORDIC AQUAFARMS, MAINE:

Wastewater treatment is undertaken in two steps:

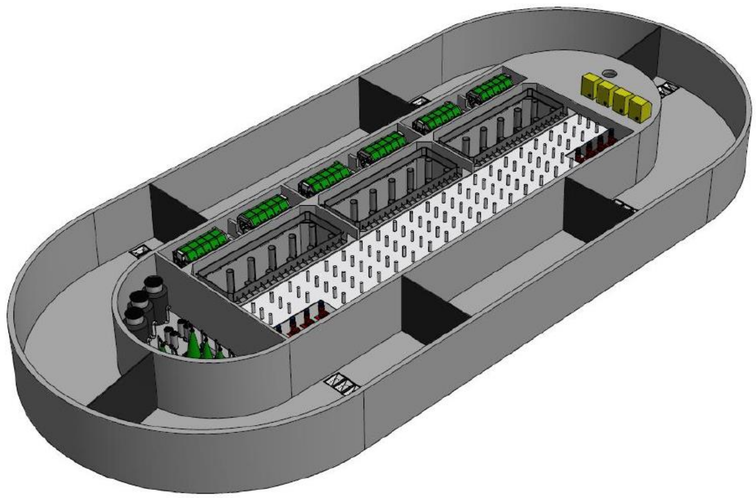
1. **Primary internal water treatment system (Recirculating Aquaculture System)**

   Function: Mechanical, biological and gas balancing in order to maintain a high level of water quality suitable for culturing Atlantic Salmon

2. **Effluent/Wastewater Treatment Plant**

   Function: Mechanical, biological and chemical treatment of final discharge

1. RAS DESCRIPTION



Water Flow in a D-ended RAS

The total tank volume in a production unit is 8500 m^3. Water circulation is 2 x tank volumes per hour or 17,000 m^3 / hour. The water flows from the tank by gravity through several outlets at the bottom of the tank effectively removing feces/feed residues from the tank to the water treatment units, where it is mechanically treated by drum filters with 60 µm mesh size. In order to backwash the drum-filters, spray water is taken from the Denitrification MBBR (ref. below) where total N concentrations are lowest.

From the drum filters the water is led by gravity to the aerobic Moving Bed Bio-Reactors (MBBRs) for biological treatment of ammonium to nitrate and reduction of organic matter.

A side-stream of approx. 8% of the recirculating flow is diverted on a loop after aerobic biological treatment through a second MBBR, operating under anoxic conditions for denitrification of nitrate to free nitrogen.

After mechanical / biological cleaning, the water passes over the central CO2 degassing unit mounted above the pump. The CO2 degassing unit consists of a countercurrent flow cascade based on a water distribution with "Crown Nozzles" and dimensioned at an air / water rate of 8:1. The suction effect by the ventilation in the cascade forms a small vacuum, which also removes any N2 gas supersaturation. Alkalinity / pH control is done automatically via the SCADA system which uses duplicate sensors to measure pH in the pump sump. If the values produced by the two sensors do not match, an alarm is triggered, and the dose is stopped. This ensures optimal levels of pH and alkalinity for the fish and nitrifying bacteria in the bioreactors.

The water is from the pump sump pumped back to the tank with Lykkegaard propeller pumps. Oxygen is added partly into the main water supply line and partly with high pressure oxygen cones.

WATER QUALITY PARAMETERS IN CULTURE TANK AT MAXIMUM FEEDING

PARAMETER	VALUE	UNITS
Oxygen	≥ 95%	Saturation
Total Ammonium (TAN)	≤ 1.5	mg NH4-N/l
Nitrite	≤ 0.5 /	mg NO2-N/l
Nitrate	≤ 100	mg NO3-N/l
CO2 (free)	≤ 15	mg CO2/l
Turbidity	≥ 5 - ≤ 0.7	NTU
Suspended matter	≤ 10	mg/l

Waste Water Treatment Process Overview

All water discharge pipework from the RAS come directly from the internal water treatment system's mechanical filters and (to a lesser extent) system overflow pipes.

The pipes will all lead to the central Waste Water Treatment Plant (WWTP).

The WWTP is designed for peak flow capacity of the rinse/backwash water from internal mechanical filtration in the RAS as indicated on the attached P&ID.

All water used for backwashing the rotating drum filters is taken directly from the internal RAS denitrification bio-reactor where the Total Nitrogen (TN) level is lowest. The denitrification unit is designed to maintain NO3-N levels between 10-30 mg NO3-N/l.

Design specifications Waste Water Treatment Plant (WWTP)

WWTP SEQUENCE OF TREATMENT:

1. Aerobic Moving bed bio-reactor (MBBR)
2. Chemical precipitation of total P
3. Micro-Filtration (0.4 µm pore size) in Membrane Bio-Reactors (MBR)
4. Sludge Dewatering, decanter centrifuges, supernatant returned to biological treatment
5. Final liquid effluent UV-C sterilization prior to discharge

BIOLOGICAL PRE-TREATMENT

All wastewater from the RAS units is lead directly to an equalization tank/pump station and into the primary biological treatment for additional total nitrogen (TN) removal.

The biological treatment is based on proven Moving Bed Bio-Reactor (MBBR) technology. The designs are based on practical experience from the engineering team over many years and consistent with common design practices (Metcalf & Eddy and ASCE 5th Edition "Design of Municipal Wastewater Treatment Plants").

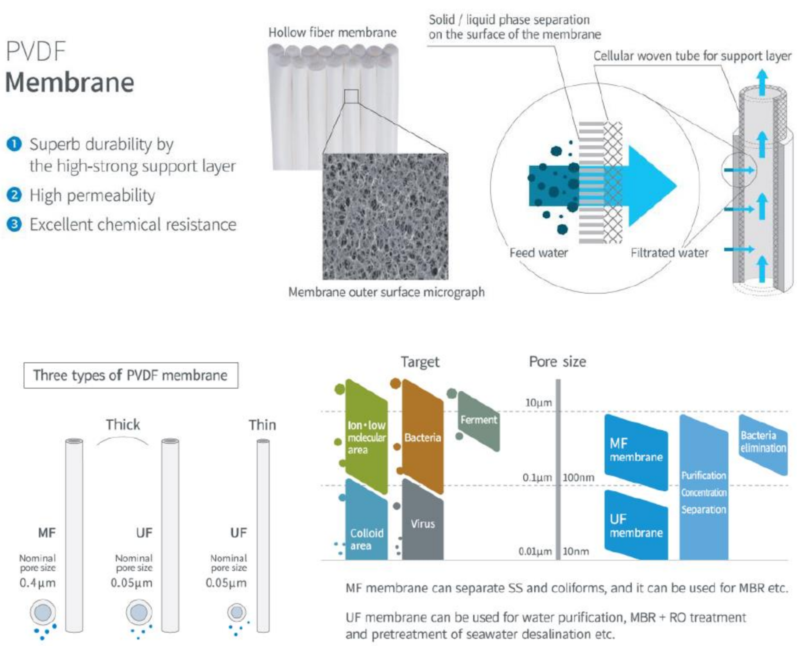
1. 4 x Aerobic MBBR in parallel: Soluble BOD oxidation
   Volume/aerobic MBBR: 150 m^3/tank
   Total Volume: 600 m^3
   HRT: 30 min (peak)
   Peak Loading: 20,160 kg BOD/day
   Carrier Fill Fraction: 50%
   Carrier Elements: bulk surface area: 800 m^2/m^3
   Total Carrier Surface: 240.000 m^2
   Total BOD carrier loading rate: 84 g COD/m^2/day
   Soluble BOD removal rate: 30 g BOD/m^2/day
   Aeration Requirement: 3000 Nm^3/hr, coarse bubble

The biological treatment is installed with capacity for variable recirculation flow from the aerobic to the pre-anoxic MBBR for N removal.

Biological phosphorous removal will occur in practice via aerobic/anoxic MBBRs used. and will be designed for removal only by chemical precipitation/MBR removal below.

BIOLOGICAL/MECHANICAL POLISHING TREATMENT

For final polishing, water from the biological treatment is passed through STERAPORE Hollow Fiber Membrane Bio-Reactors from world-renowned Mitsubishi with in-line addition of FeCl for phosphorus precipitation.



Here, fine solids removal takes place with 0.4 µm mesh membranes (Micro Filtration) These effectively remove and allow for additional aerobic biological polishing. Outlet TSS is maintained at a constant level of 1.5% (Ref. Mitsubishi design requirement) and measured with in-line real-time TSS measurement.

The MBR units are equipped with automatic Clean-In-Place (CIP) systems.

Membrane Modules: 56M2400FF

Design Flow: 1218 m^3/hr (peak)

Membrane surface/module: 2400 m^2

Membrane Tank Volumes: 4 x 200 m^3 (800 m^3 total) in parallel

Total number of modules: 24

Total membrane Surface: 24 x 2400 m^2 = 57.600 m^2

Membrane surface area: 2400 m^2 per module x 4 modules x 4 treatment trains = 28.800 m^2 total

Design Flux: 0.3 m/day avg. 0.5 m/d peak

Design MLSS concentration: 10.000 mg/l

The permeate is drawn by lobe pumps through UV-C sterilization to discharge and the retentate is pumped to the sludge thickening unit.

SLUDGE THICKENING

Captured sludge from the MBR treatment is pumped to the sludge thickening unit for reduction of sludge volume.

Sludge thickening consists of decanter centrifuges, provided by Alfa Laval.

Separation takes place in a horizontal, cylindrical bowl equipped with a screw conveyor. The sludge enters the bowl through a stationary inlet tube and is accelerated smoothly by an inlet distributor. The centrifugal force that results from the rotation then causes sedimentation of the solids on the wall of the bowl.

The conveyor rotates in the same direction as the bowl, but slightly slower, moving the solids towards the conical end of the bowl. The cake leaves the bowl through the solids discharge openings into the casing. Separation takes place throughout the entire length of the cylindrical part of the bowl, and the clarified liquid leaves the bowl by flowing over adjustable plate dams into the casing.

Decanter Centrifuge: 3 x Aldec 45 Decanter Centrifuge

Design Flow: 40 m^3/hr, 1.5% DS in feed/unit

Thickened Sludge: 10 – 20% DS in outlet cake

Liquid fraction: Return to MBBR

Comments on the technology and design criteria:

The processes in the design of the WWTP and associated technologies/equipment have all been proven in domestic and industrial wastewater treatment industries as well as in RAS facilities. The chosen suppliers of the MBR and sludge thickening are both well-known and respected internationally for quality and performance.

The level of treatment prior to discharge is, however, unprecedented in aquaculture to our knowledge. Common requirements for RAS projects are typically limited to BOD/TSS removal > 70%. Due to increased legislation and increase in the industry in general, more measures are now being installed to reduce nitrogen loads and, to some extent, phosphorous.

The performances of the Membrane Filters with precipitation of total P as well as the dewatering have been confirmed by the suppliers (Mitsubishi and Alfa Laval, respectively) and biological treatment performance is deemed well within safety in design criteria.

The WWTP operations and removal efficiencies exceed standard practices for municipal and industrial wastewater.

With kind regards,

Simon Declan Dunn

Senior Engineer, Nordic Aquafarms

NAF Denmark

	Date	Name	Drawing title		
			Waste water plant		
Drawn	25-09-18	SK	Drawing number: xx		Revison: 06
Checked	25-09-18	SD			
Approved	xx	xx	Sheet: 1	Project: NAF WWTP US	xx

Construction Schedule

This schedule will commence upon final receipt of all necessary permits and approvals for the project.

1. Construction start within 1-3 months of completion of permitting. To include infrastructure connection to site, landscaping, smolt facility and waste water treatment plant.
2. Construction start of grow-out modules and processing facility approximately 6-9 months after initial construction phase. Final steps in Phase 1 construction is expected to be complete in 12-15 months.
3. Timeline for Phase 2 expansion (additional smolt and grow-out modules), will be decided once Phase 1 development is complete.

Overall Project Development and Discharge Summary

Nordic Aquafarms Inc is planning to construct a land-based salmon farm in Belfast, Maine based on know-how and designs developed and implemented in Norway and Denmark. The facility value chain will include a hatchery that receives delivery of salmon eggs and spans the entire process with output of head-on gutted fish and filets. The hatchery will be subject to quarantine measures to ensure biosecurity. The facility will not include brood stock. Local planning and construction will be managed by our local US team and Maine construction partners, in partnership with our Norwegian engineering team.

Any fish farm will have a primary discharge of nutrients related to feed metabolism. In this case, feces, feed particles and dissolved nutrients will be key discharge factors to manage.
With scaling up of land-based farms, the need to employ environmental technologies increases. We are also of the opinion that this industry as a whole must raise its environmental standards in the years to come. Today, we see very few farms internationally that reduce nitrogen and phosphorous discharge because they have not had incentives to do so.

For this reason, Nordic Aquafarms has pursued significant development related to efficient discharge treatment. Nordic Aquafarms is employing tried and proven technologies to significantly reduce nutrients, including nitrogen and phosphorous. Our waste water treatment infrastructure involves investments to minimize local environmental impact. The joint conclusion from us and our US consultants, is that the residual discharge will have minimal environmental impact due to the high level of nutrient removal and the chosen discharge point off shore.

CORMIX and ADCIRC modelling has also been conducted by our US partner Ransom Consulting to evaluate potential impact in local waters, and to assess the best possible position for the discharge point. This modelling shows that the facility discharge will not impact eelgrass beds or other potential sensitive receptors. The modelling shows that the residual nutrients being discharged are sufficiently treated and diluted to be protective of Belfast Bay. See separate attachments for CORMIX and ADCIRC modeling.

With nutrient removal rates at 99 percent for many key discharge parameters, we are not familiar with any larger smolt or grow-out facilities that are even close to these removal rates. Our analysis of back-ground water quality parameters in the bay also show that our discharge of particles (TSS) is lower than existing values in the bay. In our experience, our removal rates are also higher than most other industries treating a discharge.

In conclusion, Nordic Aquafarms is applying state of the art technologies and standards that go well beyond current industry standards. Further discharge reductions are not feasible with current available technologies. Actual residual discharge figures are included in the application.

RANSOM Consulting Engineers and Scientists

Memo

400 Commercial Street, Suite 404, Portland, Maine 04101, Tel (207) 772-2891, Fax (207) 772-3248

Byfield, Massachusetts Portsmouth, New Hampshire Hamilton, New Jersey Providence, Rhode Island

www.ransomenv.com

Date:	September 27, 2018
To:	Nordic Aquafarms
From:	Nathan Dill, P.E.
Subject:	Near-field Dilution of Proposed Discharge

This memorandum provides a summary of estimated initial dilution of wastewater discharge from the proposed Nordic Aquafarms Recirculating Aquaculture System into Belfast Bay, Maine. This memorandum focuses on dilution of the effluent that would occur within the near-field region. That is, the region near the discharge port where mixing is dominated by forces of the discharge itself, and thus can be influenced by the outfall design.

Understanding the near-field dilution of a wastewater discharge is typically important when there is a need to assess impacts of toxic pollutants on aquatic organisms near the outfall. However, in this case, the proposed discharge for Nordic Aquafarms does not contain any toxic components, and there is no need to define a mixing zone. As such, the information in this memorandum is provided primarily to elucidate near-field mixing processes and aid in outfall design.

To aid in understanding near-field mixing process and outfall design, dilution has been evaluated for a variety of possible conditions, including a single-port or multi-port diffuser, and for a range of conditions representative of seasonal and tidal variations in ambient conditions. Dilution values and associated information provided in this memorandum are representative of the dilution that would occur within the plume after 15 minutes of travel time along the plume centerline from the point of discharge.

DILUTION MODELING WITH CORMIX

The Cornell Mixing Zone Expert system (CORMIX)[1] is a series of software subsystems for the analysis, prediction, and design of aqueous toxic or conventional discharges into diverse water bodies. CORMIX utilizes a rule-based, expert systems approach to determine the relative importance of various physical processes, and then applies the appropriate numerical modules to simulate mixing, dilution, and plume trajectory in both near-field and far-field regions. The result is a qualitative and quantitative description of the discharge as it evolves from a near-field jet dominated by effluent characteristics and port geometry to a far-field plume transported and

[1]Doneker, R.L. and G.H. Jirka. CORMIX1: An Expert System for Mixing Zone Analysis of Conventional and Toxic Single Port Aquatic Discharges. 1990, USEPA: Athens, GA.

dispersed by ambient conditions. The expert system methodology reduces the potential for user input error, resulting in a reliable system for jet/plume analysis. CORMIX is supported by the U.S. Environmental Protection Agency (USEPA) and is widely applied and accepted by the environmental community. CORMIX version 11.0 was used for the analysis documented in this report.

EFFLUENT AND DISCHARGE

CORMIX requires specification of various parameters that describe the physical characteristics of the effluent, as well as the geometry of the outfall and discharge port. The following effluent and discharge port characteristics have been assumed based on information provided by Nordic Aquafarms:

- Flow rate of 0.337 m^3/s (7.7 mgd)
- Effluent Density 1014.8 kg/m^3 (representative of a 2:1 mixture of seawater:freshwater at approximately 13 degrees C)
- Discharge port diameter 0.762 m (2.5 feet), or 0.381 m (1.25 feet)
- Discharge port oriented 20 degrees above horizontal, perpendicular to ambient flow direction 1.5 meter (5 feet) above bottom
- Alternative multi-port diffuser with three 0.3 meter (1 foot) diameter ports, spaced 15 m (50 feet) apart, oriented perpendicular to ambient flow. Discharge ports oriented 20 degrees above horizontal and perpendicular to ambient flow direction.
- Outfall located at depth of 8 meters, 500 meters from the shoreline; or depth of 15 meters, 1000 meters from the shoreline.

AMBIENT CONDITIONS

Ambient conditions have been characterized using information from available literature.[2,3,4] It is noteworthy that none of the available data used to approximate ambient tidal current velocity conditions were collected specifically in the area of the proposed discharge in Belfast Bay. Although an attempt has been made to use information that is relevant to the Belfast Bay region in northwestern Penobscot Bay, the available tidal current velocity data were collected in locations that generally farther offshore and in deeper water than the proposed discharge locations.

[2] Burgund, H.R. 1995. The Currents of Penobscot Bay, Maine, Observations and a Numerical Model. Senior thesis presented to the faculty of the Department of Geology and Geophysics, Yale University.
[3] Normandeau, 1978. An Oil Pollution Prevention Abatement & Management Study for Penobscot Bay, Maine. Volume II, Chapters 6-7. Prepared for the State of Maine Department of Environmental Protection Division of Oil Conveyance Services under Contract No. 907313.
[4] Fandel, C. L., T.C. Lippmann, J.D. Irish, L.I.Brothers. 2016. Observations of Pockmark Flow Structure in Belfast, Bat, Maine. Part 1: Current-induced Mixing. Geo-Mar Lett.

The following assumptions have been made to describe the depth averaged tidal current range and seasonal stratification at the proposed discharge location within Belfast Bay:

- Tidal currents of 0.05 m/s for slack tide, 0.2 m/s for flood and ebb tide.
- Ambient density stratification for winter, spring, summer, and fall seasons as illustrated in Figure 1 and Figure 2 for the deep and shallow discharge location, respectively.

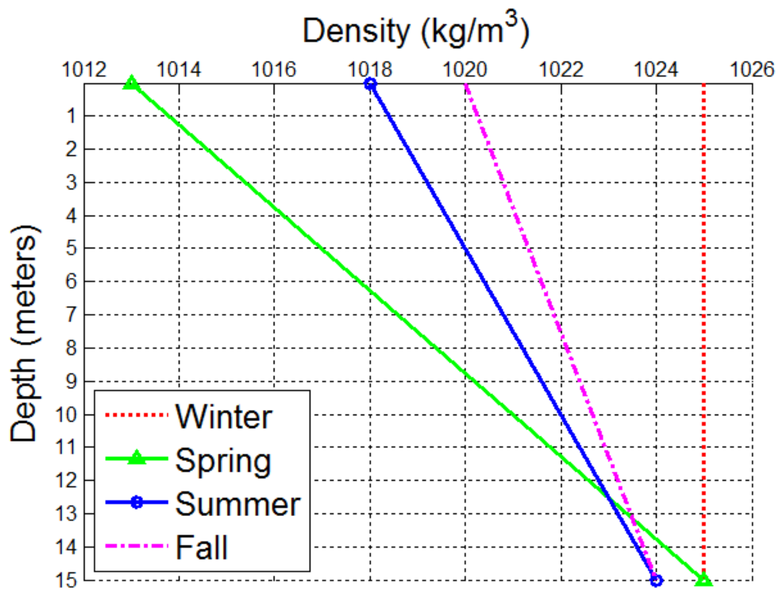


Figure 1. Assumed seasonal density profiles at deep discharge location

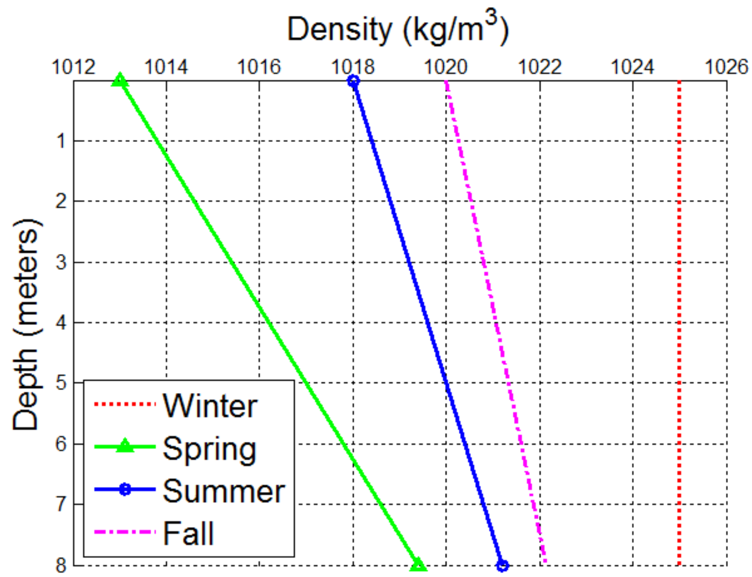


Figure 2. Assumed seasonal density profiles at shallow discharge location

RESULTS AND DISCUSSION

The range of ambient conditions and discharge locations results in a total of 32 unique CORMIX simulations for consideration with a single port discharge, or 16 unique simulations for the multi-port diffuser. The results describing the predicted CORMIX flow class and near-field dilution for the single port discharges are listed in Table 1. Results for the multiport diffuser are listed in Table 2. Important plume characteristics given in Table 1 and Table 2 include the distance from the discharge port at 15 minutes travel time[5], dilution at 15 minutes travel time, and the associated percent of initial concentration excess.

The dilution is the proportion of ambient water to effluent entrained in the plume. For example, if 1 liter of effluent is mixed with enough ambient water to make 10 liters of mixed water, the resulting dilution is 10. The percent initial concentration excess is related to the dilution by the following equation; it allows for easy estimation of the concentration of a specific wastewater constituents when the effluent concentration and background concentrations are known. For example, if the excess concentration (i.e. effluent concentration minus background concentration) is 100 mg/l, a 10% initial concentration excess would mean the concentration at the end of the near-field region is predicted to be 10 mg/l (above background).

$$C = Cs + \frac{1}{S}(Cd - Cs)$$

[5] This distance is calculated along the portion of the plume centerline downstream from the discharge port. where upstream intrusion is predicted the length of the plume may approach twice this distance. Upstream intrusion is generally predicted when the ambient current speed is low relative to the influence of buoyancy. This tends to occur during simulations representative of slack tide conditions.

Where C is the concentration corresponding to dilution, S. Cs is the background concentration, and Cd is the effluent concentration[6].

CORMIX input files, session reports and prediction files are available upon request.

Shallow Discharge Location

At the shallow discharge location CORMIX predicts the possibility of 3 different flow classifications for the range discharge and ambient configurations (classes H2, H4-90, and S3 for single port discharge, and MU6, MS1, MS4, and MU1V for the multi-port diffuser). It is likely that the discharge jet-plume will evolve through these different flow classes within the tidal cycle and throughout the seasons.

Shallow Single Port

For the single port discharge the H2 class occurs when the current speed is relatively high and discharge port is large, while the H4-90 class occurs for the smaller port size and at slack tides. In general, the "H" classes describe a jet/plume that is dominated by buoyancy in a relatively uniform ambient layer. This results in a plume that rises quickly after the discharge port and forms a layer at the water surface. For the H4-90 class, the plume may become attached to the bottom at times because the depth becomes relatively small when compared to the length of the initial jet, and the discharge is nearly horizontal. The S3 class, which describes a plume that becomes trapped below the surface within the ambient stratification, is only predicted during slack tides in the spring season when the stratification is strong, and currents are weak.

Shallow Multi-Port

The MU6 flow class is predicted for the multi-port diffuser at the shallow discharge location during the winter season for both slow and fast current speed. MU6 is also predicted during spring, summer, and fall when the current speed is low. MU6 describes a plume that becomes vertically mixed throughout the water column within the near field region as turbulence from the discharge jet dominates the relative unimportance of the stratification. In contrast, "MS" classes are predicted with stratification dominates resulting in buoyant plume that quickly rises after the point of discharge and becomes trapped below the surface within the ambient stratification. This occurs for both current speeds during the spring, and when currents are faster in the summer and fall. The MS4 class, which occurs in spring during slow currents, differs from the MS1 class in that significant upstream intrusion of the plume may occur. During the summer and fall when the current is faster, upstream intrusion of the trapped plume is prevented by the speed of the current.

Deep Discharge Location

Deep Single Port

At the deep discharge location CORMIX predicts the possibility of 6 flow classes (H1, H2, H4-90, S1, S3, S4, and S5). In general, the "H" classes describe a jet/plume that is dominated by

[6] Fischer, H.B., E.J. List, R.C.Y. Koh, J.Imberger, N.H.Brooks,. 1979. Mixing in Inland and Coastal Waters. Academic Press Inc., New York, NY. 483 p.

buoyancy in a relatively uniform ambient layer. This results in a plume that rises quickly after the discharge port and forms a layer at the water surface. At the deep discharge location these conditions primarily occur during the winter season when there is no stratification, and in the fall when stratification is weak and the smaller discharge port is used. In general, "S" classes describe a near-bottom discharge of buoyant plume that becomes trapped in the ambient stratification. The behavior can be qualitatively described by considering that a less dense effluent discharged into the ambient water will entrain ambient water lowering the density of the plume while it rises in the water column until it forms a stable layer where the density of the ambient water above the layer is less than the density of the plume. More detail of the behavior is elucidated by considering whether the plume is more jet like or plume like, and whether the ambient current dominates the jet/plume. In the S1 or S3 class the plume has a more jet like behavior, while S4 or S5 indicate a more plume like behavior. The more jet like conditions occur with the smaller port diameter, which tends to increase the dilution. The S1 or S4 classes occur when currents are stronger during flood or ebb tides indicating that the plume will be strongly deflected increasing dilution. The S3 or S5 classes occur during slack tide when some buoyant upstream intrusion of the plume is expected, tending to reduce dilution somewhat.

Deep Multi-Port

In general buoyancy is more important at the deep discharge location and plume behavior will be more stable because of the greater depth. When current speeds are fast during flooding or ebbing tides the deep multi-port diffuser is plume is classified the same as it is for the shallow discharge location. That is, a fully vertically mixed near-field plume during winter, and a trapped buoyant plume in the spring, summer, and fall seasons that is strongly deflected by the ambient current. When current speeds are low significant upstream intrusion is predicted. During slack tides in winter the plume is predicted to rise to the surface and intrude upstream (MU1V), while during slack tides in the other seasons the upstream intruding plume is expected to become trapped within the ambient stratification.

Table 1. CORMIX Results for Single Port Discharge at 15 minutes Travel Time

Location	Current (m/s)	Season	Port Diameter (m)	CORMIX Flow Class	Distance From Port* (m)	Dilution	% Initial Conc. Excess
Shallow	0.2	Winter	0.761	H2	182.2	51.5	2.0
Shallow	0.2	Winter	0.381	H4-90	183.9	51.1	2.0
Shallow	0.2	Spring	0.761	H2	182.0	73.5	1.4
Shallow	0.2	Spring	0.381	H4-90	185.9	83.0	1.2
Shallow	0.2	Summer	0.761	H2	182.6	60.7	1.7
Shallow	0.2	Summer	0.381	H4-90	187.9	72.8	1.4
Shallow	0.2	Fall	0.761	H2	182.6	60.2	1.7
Shallow	0.2	Fall	0.381	H4-90	184.8	56.9	1.8
Shallow	0.05	Winter	0.761	H4-90	46.3	7.7	13.0
Shallow	0.05	Winter	0.381	H4-90	83.9	48.7	2.1
Shallow	0.05	Spring	0.761	S3	47.5	7.3	13.9
Shallow	0.05	Spring	0.381	S3	48.7	14.8	6.8
Shallow	0.05	Summer	0.761	H4-90	66.3	24.1	4.2
Shallow	0.05	Summer	0.381	H4-90	82.6	32.8	3.0
Shallow	0.05	Fall	0.761	H4-90	46.5	7.2	13.9
Shallow	0.05	Fall	0.381	H4-90	83.6	38.7	2.6
Deep	0.2	Winter	0.761	H1	186.1	96.9	1.0
Deep	0.2	Winter	0.381	H2	187.0	116.4	0.9
Deep	0.2	Spring	0.761	S4	182.3	47.4	2.1
Deep	0.2	Spring	0.381	S1	184.8	79.6	1.3
Deep	0.2	Summer	0.761	S4	183.3	58.8	1.7
Deep	0.2	Summer	0.381	S1	186.1	97.3	1.0
Deep	0.2	Fall	0.761	S4	184.2	68.4	1.5
Deep	0.2	Fall	0.381	H2	187.4	106.8	0.9
Deep	0.05	Winter	0.761	H4-90	48.8	16.4	6.1
Deep	0.05	Winter	0.381	H4-90	91.3	104.9	1.0
Deep	0.05	Spring	0.761	S5	47.5	9.3	10.8
Deep	0.05	Spring	0.381	S3	49.1	16.4	6.1
Deep	0.05	Summer	0.761	S5	48.6	13.0	7.8
Deep	0.05	Summer	0.381	S3	50.9	20.6	4.9
Deep	0.05	Fall	0.761	S5	48.6	12.6	8.0
Deep	0.05	Fall	0.381	S3	52.2	24.0	4.2

*straight line distance to plume centerline at 15 minutes travel time from port. In some cases, the plume may be significantly wider than this distance and may include upstream intrusion.

Table 2. Summary of CORMIX Results for Diffuser at 15 minutes Travel Time

Location	Current (m/s)	Season	CORMIX Flow Class	Distance From Port* (m)	Dilution	% Initial Conc. Excess
Shallow	0.2	Winter	MU6	180.2	212.2	0.5
Shallow	0.2	Spring	MS1	190.5	50.3	2.0
Shallow	0.2	Summer	MS1	194.7	66.8	1.5
Shallow	0.2	Fall	MS1	197.6	80.9	1.2
Shallow	0.05	Winter	MU6	47.5	43.9	2.3
Shallow	0.05	Spring	MS4	53.5	13.5	7.5
Shallow	0.05	Summer	MU6	47.5	43.6	2.3
Shallow	0.05	Fall	MU6	47.5	43.7	2.3
Deep	0.2	Winter	MU6	180.6	350.1	0.3
Deep	0.2	Spring	MS1	192.2	56.9	1.8
Deep	0.2	Summer	MS1	195.5	72.1	1.4
Deep	0.2	Fall	MS1	197.8	84.3	1.2
Deep	0.05	Winter	MU1V	69.2	61.5	1.6
Deep	0.05	Spring	MS4	55.1	17.5	5.7
Deep	0.05	Summer	MS4	55.8	19.3	5.2
Deep	0.05	Fall	MS4	58.1	24.0	4.2

RECOMMENDATIONS

- In general, the results indicate that a reduced port size will lead to higher outlet velocity and increased initial dilution. It is recommended that the smaller port size be considered in design of the outfall, for either the single port or multi-port diffuser.

- The multi-port diffuser yields similar initial dilution as the single port with smaller outlet diameter. However, the behavior of the multi-port diffuser is more consistent at the different depths in terms of CORMIX flow classifications. This suggests the plume behavior from a multi-port diffuser may be less sensitive to the outfall location.

- The results presented here assume the discharge is occurring at full capacity. Discharge at a reduced rate at facility start up may require design modifications to achieve similar initial dilution at reduced discharge rates. The use of duckbill type check valves on the outfall ports may be considered to help maintain outlet velocities under a range of discharge flow rates. Furthermore, the use of a multi-port diffuser may facilitate a scaling up of the discharge flow rate as ports may be initially closed and then opened in sequence as the discharge capacity is increased.

- Site specific ambient conditions data should be collected during facility operations to evaluate whether observations are significantly different than model assumptions and predictions.

- The application of the CORMIX model in tidal environments is limited by an assumption of steady-state conditions. This precludes the ability of CORMIX to estimate long term dilution when it is possible for reversing tidal currents to recirculate the plume past the discharge location. Evaluation of the 2-dimensional far-field behavior of the plume and the potential for recirculation of discharged water and build up of effluent in the receiving water body is discussed in an additional memo that accompanies the Maine Pollutant Discharge Elimination System (MEPDES) Permit Application.

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Memo

Date:	October 2, 2018
To:	Nordic Aquafarms
From:	Nathan Dill, P.E.
Subject:	Far-field Dilution of Proposed discharge

This memorandum provides a summary of the estimated far-field plume behavior and dilution of wastewater discharge from the proposed Nordic Aquafarms Recirculating Aquaculture System (RAS) into Belfast Bay, Maine. Far-field transport, dispersion, and dilution of the RAS wastewater has been investigated through a combination of two-dimensional hydrodynamic modeling with the ADvanced CIRCulation Model (ADCIRC)[1] and numerical particle tracking with the Maureparticle[2] particle tracking model. Initial near-field dilution of the discharge was investigated with the Cornell Mixing Zone Expert system (CORMIX) model and is described in a separate memorandum[3].

FAR-FIELD DILUTION APPROACH

Near-field dilution modeling performed with CORMIX assumes a steady-state for the RAS wastewater discharge and ambient conditions. In tidal environments where the ambient current may change significantly within a few hours, the steady-state assumption is only valid for near-field mixing processes on relatively short time scales (e.g. less than an hour or so). Furthermore, the near-field modeling with the steady-state assumption may overestimate long-term dilution because it does not consider the potential for recirculation of the discharge plume with tidal reversals. For example, a plume that develops during an ebbing tide may reverse direction and travel past the outfall during the following flood tide, effectively increasing the background concentration of wastewater constituents. Over many tidal cycles the background concentration achieves a dynamic equilibrium condition where the rate of wastewater discharge is in balance with the flushing characteristics of the receiving waterbody and dispersion of the plume. To better understand far-field behavior of the wastewater plume, a two-dimensional hydrodynamic

[1] Luettich, R.A., J.J. Westering, N.W.Scheffner, 1992. "ADCIRC: An Advanced Three-Dimensional Circulation Model for Shelves, Coasts, and Estuaries, Report 1, Theory and Methodology of ADCIRC-2DDI and ADCIRC-3DL". Technical Report DRP-92-6, Vicksburg, MS: U.S. Army Engineer Waterways Experiment Station

[2] Dill, N. L., 2007. "Hydrodynamic modeling of a hypothetical river diversion near Empire, Louisiana". LSU Master's Theses. 660. https://digitalcommons.lsu.edu/gradschool_theses/660

[3] Ransom Consulting, 2018. Near-field Dilution of Proposed Discharge Update, Memorandum to Nordic Aquafarms, September 17, 2018.

modeling and particle tracking approach is employed. A numerical hydrodynamic model is used to estimate time-dependent and spatially variable depth averaged currents. The current velocity field from the hydrodynamic model is then used to drive a particle tracking model that is in turn applied to estimate dilution and concentrations.

TWO-DIMENSIONAL HYDRODYNAMIC MODELING

An existing ADCIRC model, previously developed by Ransom[4], has been used to simulate tidal circulation in Belfast Bay to aid in evaluation of the far-field behavior of the effluent plume. ADCIRC is a state-of-the-art numerical model that solves the Generalized Wave Continuity Equation (GWCE) form of the Shallow Water Equations (SWE). The SWE are set of mathematical equations that govern the motion of fluid in the ocean and coastal areas through laws of conserved mass and momentum. ADCIRC employs the finite element method on an unstructured triangular computational grid that allows for high spatial resolution in coastal areas. ADCIRC's capabilities include simulation of water level and current velocity driven by astronomical tides, and wind and atmospheric pressure. ADCIRC has been applied in the 2-Dimensional Depth Integrated (2DDI) mode and has been forced with astronomic tides on the open ocean boundary and 280 cubic meters per second inflow at the Penobscot River Boundary. No wind forcing was included in the model simulation for this effort, which is generally considered to be conservative with respect to mixing processes. Figure 1 shows the extent of the model domain and inset detail of the model's triangular unstructured grid near the proposed outfall location.

ADCIRC Model Validation

The ADCIRC model was used to simulate tides during the period from June 20, 1999 to August 4, 1999 to provide a representative data set of tidal current velocities for this effort. This time period was selected because water level observations are available at the nearby National Oceanic and Atmospheric Administration National Ocean Service (NOAA NOS) station at Fort Point, Maine. The relative location of the Fort Point tide station and proposed outfall location is shown in Figure 2. A comparison of observed water levels to modeled water levels at the Fort Point Station is shown in Figure 3. In addition, a comparison of modeled water levels to harmonically predicted high and low tides at the subordinate NOS tide station at Belfast is shown in Figure 4. Visual inspection of the water level time series suggests good agreement between model results and observations. Although specific observations of tidal currents are not available in the vicinity of the proposed outfall location, the simulation of accurate water levels suggests that depth averaged current velocities are reasonable.

[4] Ransom Consulting, Inc. 2017. Present and Future Vulnerability to Coastal Flooding at Grindle Point and the Narrows. Report prepared for the Town of Islesboro, Maine, August 21, 2017.

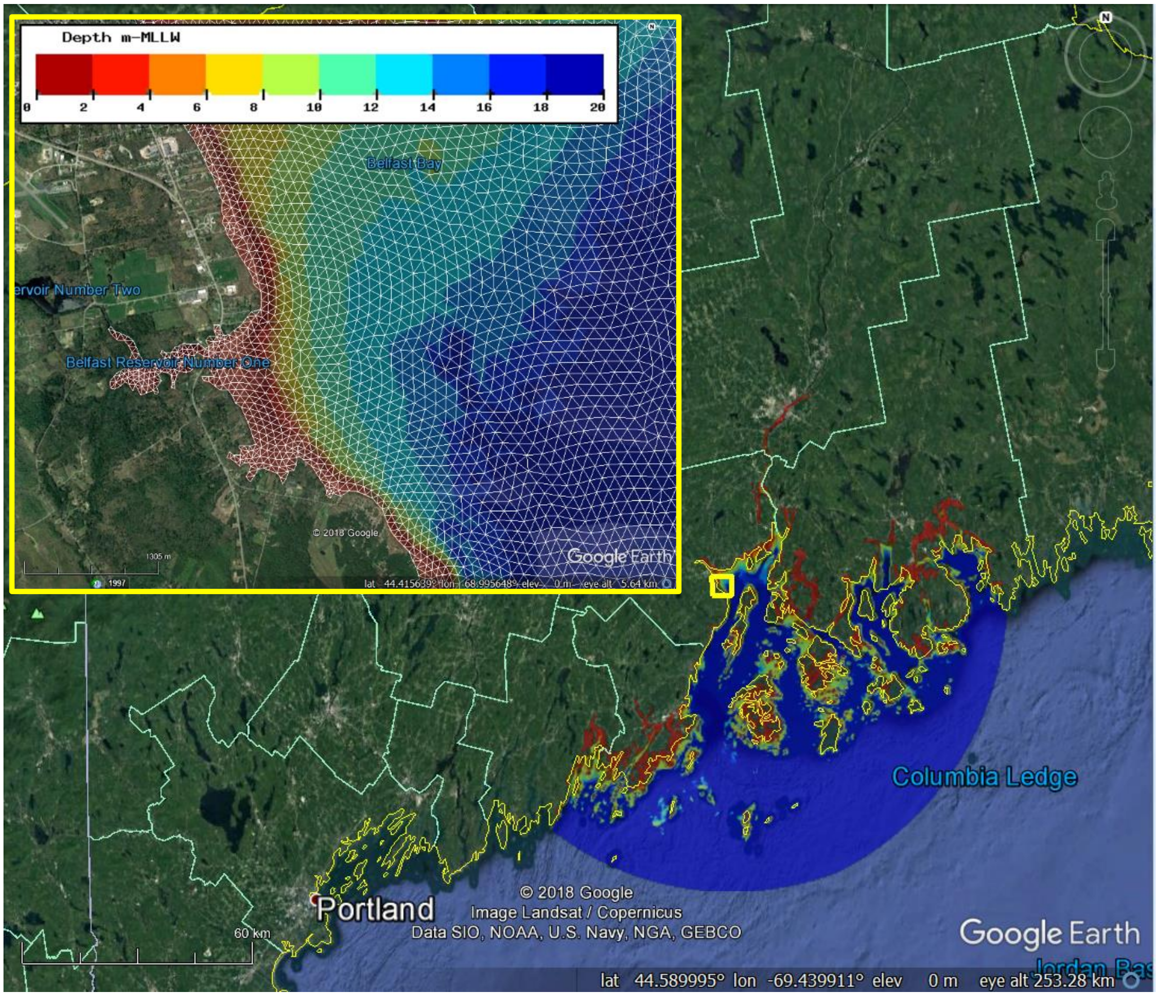

Figure 1. Penobscot Bay ADCIRC model domain and detail in Belfast Bay.

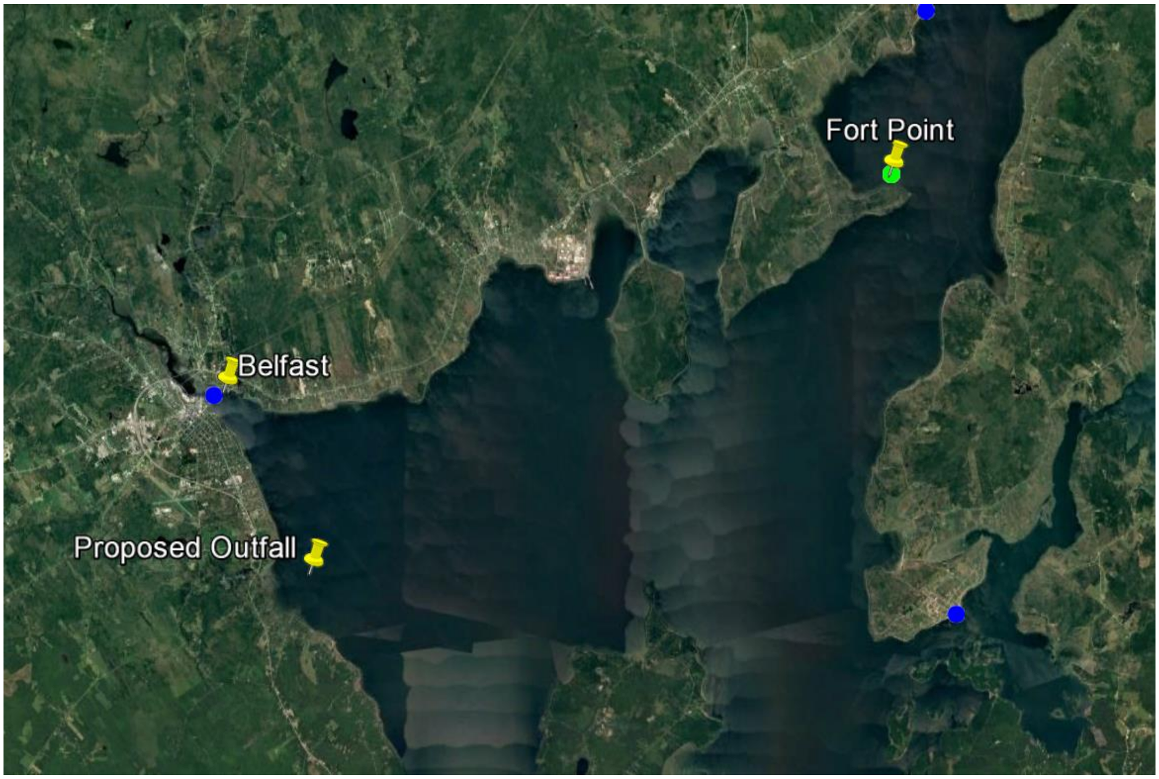

Figure 2. Location of NOAA NOS stations at Belfast (8415191) and Fort Point (8414721), and approximate location of proposed outfall.

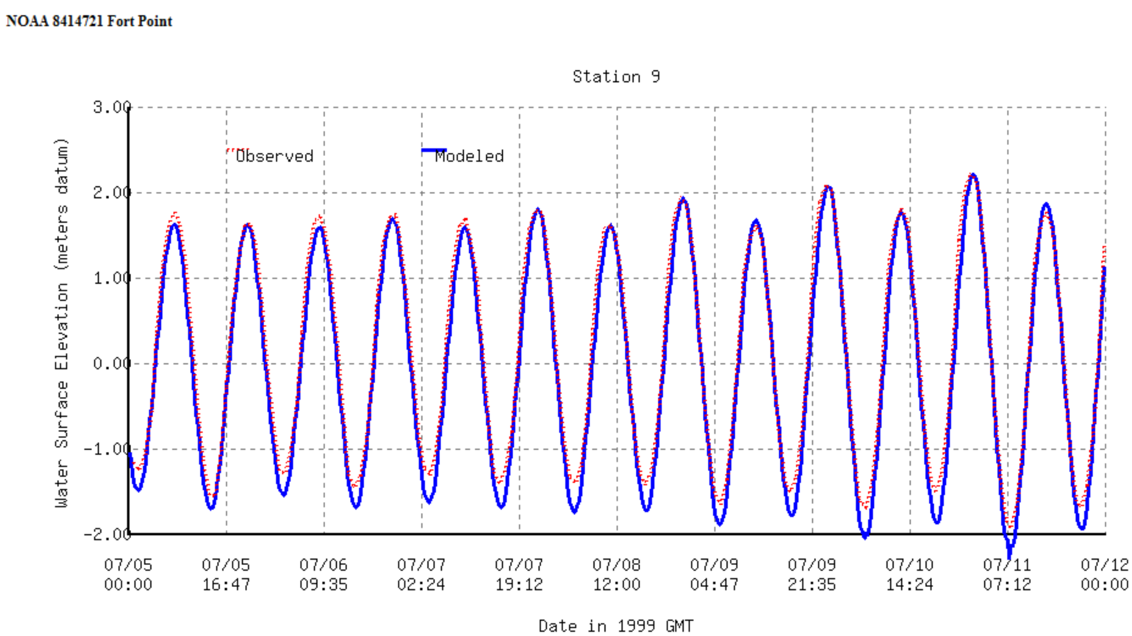

Figure 3. Comparison of modeled water level and observed hourly water level at NOS station 8414712 at Fort Point, Maine during a portion of the simulation period.

NOAA 8415191 Belfast

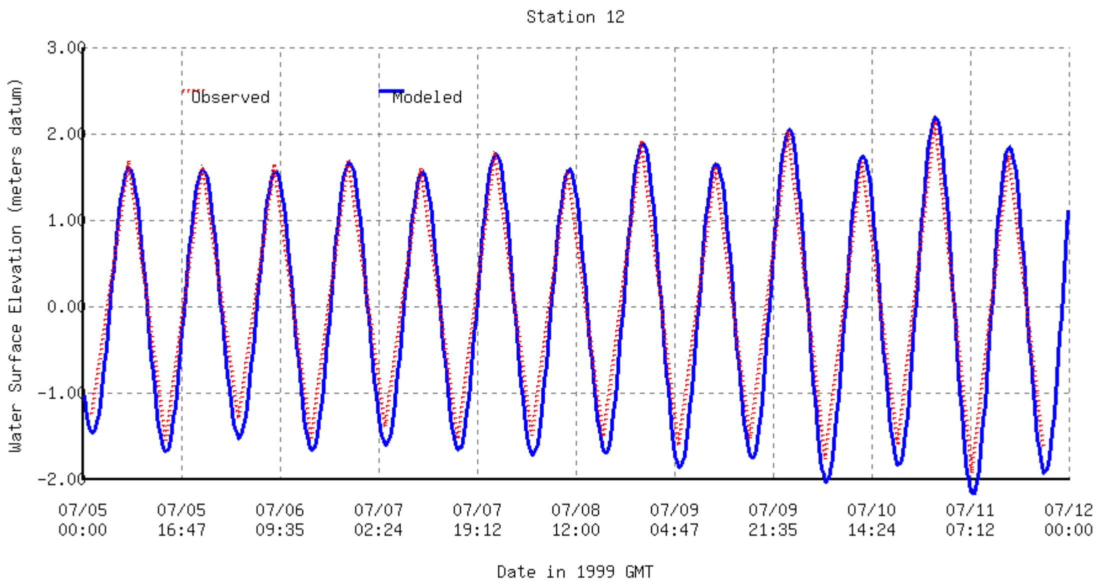

Figure 4. Comparison of modeled water level and harmonically predicted high-low tide data at NOS station 8415191 at Belfast, Maine during a portion of the simulation period.

PARTICLE TRACKING FAR-FIELD DILUTION

The particle tracking model was run with the following configuration and assumptions:

- Particles are released at a constant rate from the outfall location. Initial particle locations were randomly generated along a 50-meter line that extends east from -68.972526 degrees Longitude and 44.395004 degrees latitude. This release configuration is consistent with effluent discharge and initial dilution from the multi-port diffuser considered in the CORMIX modeling.
- Particles are released at a rate of 1 per 30 seconds over a period of 28 days, resulting in a total of 80640 particles that are tracked during the simulation.
- An effluent flow rate of 0.338 m^3/s is assumed such that each particle represents the mass of effluent constituents (e.g. Total Nitrogen) contained within 10 m^3 of effluent.
- A horizontal eddy diffusivity of 2 m^2/s is simulated through random walk displacement.
- Particles are tracked using the 2nd order Runge-Kutta method to integrate the dynamic depth averaged current velocity field.
- For dilution calculations it is assumed that the plume will become well mixed within upper portion of the water column in far-field timescales, which is assumed to have a 10-meter thickness. This assumption is reasonable during stratified conditions in the warmer seasons of the year, and conservative during winter months when CORMIX predicts full vertical mixing.
- Dilution is calculated by counting the number of particles within each model grid element and dividing the effluent volume associated with the particles by the sum of ambient volume in the upper layer and effluent volume within grid element.

- Effluent Concentrations may be calculated using the following equation using initial and background concentrations listed in Table 1; where *C* is the concentration corresponding to dilution, *S*. *Cs* is the background concentration, and *Cd* is the effluent concentration[5].

$$C = Cs + \frac{1}{S}(Cd - Cs)$$

- The effects of wind and/or waves on the mixing and current velocity field is neglected. Winds and waves tend to enhance turbulence, increasing mixing and dilution. Neglecting the effect of wind and waves tends to produce conservative estimates of dilution and plume concentrations.
- No uptake or decay of nutrients is considered, which is also considered to be conservative, as some level of uptake or decay is likely.

Table 1. Effluent Concentrations for proposed discharge and background concentrations.

	Total Suspended Solids (TSS)	**Biochemical Oxygen Demand (BOD)**	**Total Nitrogen (TN)**	**Ammonium Nitrogen (NH_4)**	**Phosphorus (P)**
Daily Discharge (kg)	185	162	673	0.07	5.8
Concentration (mg/l)	6.33	5.55	23.02	0.0024	0.20
Assumed Background Concentration (mg/l)	17	2.0	0.17†±	0.075†	0.013

†Not detected at the reporting limit for all samples
±Background concentration as per communication with MEDEP

RESULTS AND DISCUSSION

Dilution of the proposed RAS wastewater was determined at hourly intervals throughout the 28-day particle tracking simulation. Visualization of the model results show that after approximately 14 days of continuous release a dynamic equilibrium condition is reached where the rate of discharge is effectively balanced by diffusion and dispersion rates. Figure 5 shows a sequence of snapshots of the base 10 logarithm of the dilution throughout a typical tidal cycle near the end of the particle tracking simulation after the plume has had sufficient time to reach a dynamic equilibrium state. Although it varies somewhat throughout the tidal cycle and with neap and spring tidal phases, the minimum dilution near the center of the plume is approximately 30. The maximum dilution shown in the figure is approximately 300 at the edge of the colored area shown in Figure 5. Outside this area the dilution is greater. The dilution results may be used to estimate the concentration of RAS wastewater constituents using the above equation given effluent and background concentrations.

[5] Fischer, H.B., E.J. List, R.C.Y. Koh, J.Imberger, N.H.Brooks,. 1979. Mixing in Inland and Coastal Waters. Academic Press Inc., New York, NY. 483 p.

It is our understanding from communication with Maine DEP that there are no specific regulatory criteria for nutrient concentrations in Belfast Bay. However, recent investigations in the Great Bay Estuary by the New Hampshire Department of Environmental Services (NHDES) suggest that nitrogen may act as a limiting nutrient with respect to undesirable macroalgae and phytoplankton growth. NHDES also found correlation between nitrogen and dissolved oxygen concentrations suggesting a threshold above which nitrogen concentrations may lead to hypoxic conditions. Data from the Great Bay suggest that median total N concentrations should be less than 0.34-0.38 mg/l to prevent the replacement of eelgrass habitat with macroalgae growth. Furthermore, correlation of median total N concentrations with dissolved oxygen measurement suggests that total N should be less than or equal to 0.45 mg/l to prevent hypoxic conditions with dissolved oxygen concentrations less than 5 mg/l[6]. Although characteristics of the Great Bay Estuary are different than the Belfast Bay - with respect to temperature, freshwater input, tidal prism, and stratification, for example – the Great Bay criteria may be considered as guidance in the absence of specific criteria for Belfast Bay.

The State of Maine has identified two locations near the proposed outfall location where eelgrass beds are present. The location of eelgrass beds, the proposed outfall, and the median total N concentration are shown in Figure 6. The median total N concentration was determined by calculating total N concentration from hourly dilution snapshots over the final 14 days of the simulations. Values for each snapshot were then rank ordered and the 50th percentile was taken as the median.

Overall, the results indicate that the eelgrass beds will not be impacted by concentration greater than 0.3 mg/l and that the bay will not generally be exposed to total N concentrations greater than about 0.4 mg/l. However, it is important to understand that the model results are only an approximation based on numerous simplifying assumptions listed above. Actual conditions may vary from these assumptions such that actual concentrations are different than predicted. For the most part, conservative assumptions have been made so that the predicted concentrations will tend to be greater than concentrations influenced by real world conditions. For example, the model neglects the effects of wind and waves on the current velocity and mixing. These effects would tend to increase turbulence leading to increased diffusion and dispersion of the plume, and the reduce concentrations. Also, real world conditions will lead to uptake and decay of nutrients, which would tend to reduce concentrations compared to the model results where no decay has been assumed.

The information presented here is based entirely upon numerical modeling with limited knowledge of the in-situ conditions at the proposed outfall site. It is important to understand that hydrodynamic modeling is not an exact science. As such, any predictions presented here should be considered only as estimates of the proposed dilution and plume behavior. Numerous assumptions and simplifications have been made in this analysis, which contribute to significant uncertainty in the modeling results. In general, these simplifications and assumptions are reasonably conservative, such that errors would tend to over-predict negative impacts. However, it is possible that predictive error could under-estimate impacts. Thus, it is recommended that a

[6] New Hampshire Department of Environmental Services. 2009. Numeric Nutrient Criteria for the Great Bay Estuary. Prepared by Philip Trowbridge, P.E., June 2009. 73 pages.

field data collection program be designed and implemented to provide site specific data for further analysis, and to validate the accuracy of model results.

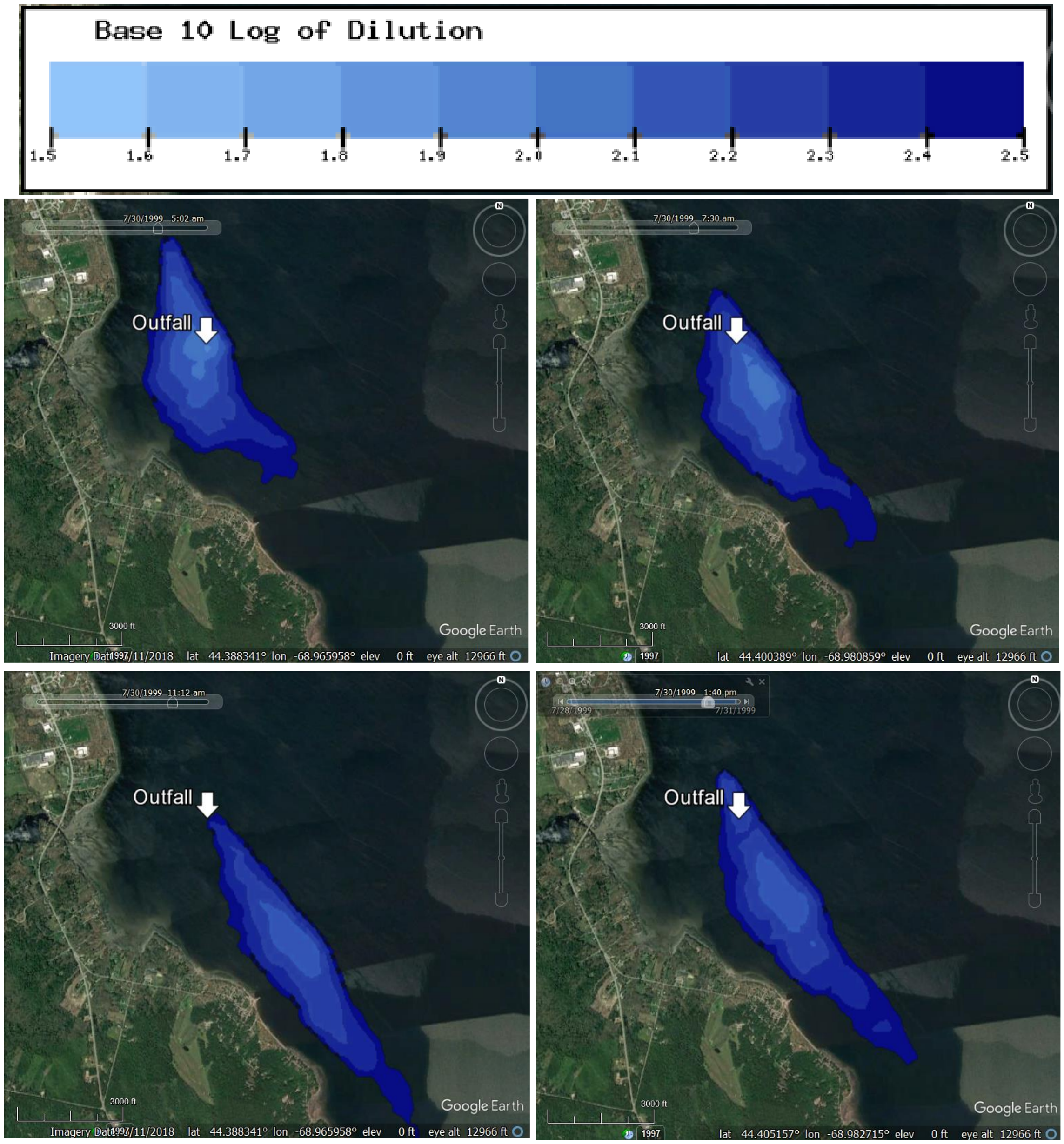

Figure 5. Snapshots of plume dilution throughout a typical tidal cycle. high slack (upper left), mid-ebb (upper right), low slack (lower left), mid-flood (lower right).

Figure 6. Time Averaged Median Total Nitrogen Concentration

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ENVIRONMENT & HEALTH

MEMO

Project name	Belfast Bay Surface Water Discharge Assessment
Project no.	1690008668
Client	Nordic Aquafarms
To	Erik Heim (Nordic Aquafarms)
From	Derek Pelletier, Richard Wenning, Kyle Fetters

Date October 16, 2018

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At the request of Nordic Aquafarms Inc. (NAF), Ramboll reviewed two technical memoranda prepared by Ransom Consulting Engineers and Scientists (Ransom) describing near-field and far-field dispersion modeling of discharge water from NAF's proposed salmon Recirculating Aquaculture System (RAS) facility in Belfast, Maine. Ransom's Near-field Dilution of Proposed Discharge memo was dated September 27, 2018, and the Far-field Dilution of Proposed discharge memo was dated October 2, 2018. This memorandum conveys Ramboll's findings.

Context for this Work

NAF is proposing to construct and operate the salmon RAS facility in two phases, with the first phase expected to be operational in approximately two years. During Phase 1, the facility is anticipated to produce 15,000 metric tons of salmon per year. Five years following completion of Phase 1, salmon production is expected to double during Phase 2 operation to approximately 30,000 metric tons annually. The anticipated volume of water discharged daily to Belfast Bay during Phase 1 operations is 3.85 million gallons per day (mgd) and NAF expects for that volume to double to 7.7 mgd during Phase 2 operations.

Water management is an important consideration for Phase 1 and 2 commercial operations. To achieve the optimal growth conditions for Atlantic salmon in their growth tanks, NAF proposes to draw ocean water from Belfast Bay and blend with a freshwater supply. A filtration system will manage water quality in the continuously circulating tanks by removing food debris and fish feces and adjusting important water quality parameters. The filtration system is designed to maintain water quality at optimal growth conditions such that the majority of the water used in the RAS can be recycled indefinitely. The RAS is not a completely closed water circulation system; some RAS fish tank water will be discharged – after filtration and treatment – in a controlled manner to Belfast Bay through an outfall located offshore from the Belfast facility.

As part of the permitting process for NAF's proposed facility, Ransom was tasked by NAF to conduct an analysis of the anticipated consequences associated with the release of water from the facility to Belfast Bay. Ransom's work addressed two important aspects – characterize the initial dispersion of discharge water in the immediate vicinity of the outfall (referred to as the near-field condition), and characterize the potential dispersion of nutrients (specifically, total nitrogen) in Belfast Bay, further away from the outfall (referred to as the far-field condition). Near-field dispersion of the discharge water was examined using the Cornell Mixing Zone Expert system (CORMIX) model. Far-field dispersion of discharge water from the outfall was examined using a combination of two-dimensional hydrodynamic modeling with the ADvanced CIRCulation Model (ADCIRC) and numerical particle tracking with the Maureparticle particle tracking model.

Focus of Ramboll's Review

Ramboll's experts in water quality modeling and US Clean Water Act compliance reviewed Ransom's two technical memoranda, focusing on evaluating the application and assumptions of the near-field and far-field models used to examine the potential influence of nitrogen[1] in the discharge water released to Belfast Bay during Phase 1 and 2 RAS operations. Ramboll focused on the following questions:

- Were the models used by Ransom the appropriate tools for their work objectives?
- Do the model assumptions appropriately reflect anticipated RAS operations?
- Were the characteristics of the Belfast Bay aquatic environment considered appropriately in the model?
- Are the model results pertaining to nitrogen applicable to the thresholds for protection of eelgrass beds and dissolved oxygen that were identified by the Maine Department of Environmental Protection (DEP)?

Ramboll did not independently replicate or validate Ransom's near-field and far-field model calculations for this review. Ramboll understands that Ransom's work was developed in consultation with Maine DEP; Ramboll did not participate in technical discussions between Ransom and Maine DEP regarding the development of model scenarios and selection of model assumptions.

Findings

1. *Were the models used by Ransom the appropriate tools for their work objectives?*

   The ADCIRC and CORMIX models are appropriate for evaluating the questions of dispersion and transport of substances released from outfalls into an open water bay or ocean environment. Both models are commonly used to evaluate surface water discharges from outfalls.[2,3] CORMIX is an appropriate tool to optimize outfall port design and discharge depth for rapid mixing of discharge waters with ambient surface waters. ADCIRC is an appropriate tool to examine the influence of tides and wind-driven water circulation on near shore activities that involve interaction with the marine environment.

[1] Ramboll's review focuses on total nitrogen discharges because nitrogen is typically the limiting nutrient in estuarine waters and is the primary cause of anthropogenic eutrophication and hypoxia in coastal waters (Howarth and Marino 2006).

[2] http://www.cormix.info/applications.php

[3] https://adcirc.org/

2. *Do the model assumptions appropriately reflect anticipated RAS operations?*

   The estimated discharge rates and effluent concentrations used in Ransom's modeling work are consistent with the estimates that we have been provided by NAF.

3. *Were the characteristics of the Belfast Bay aquatic environment considered appropriately in the models?*

   The CORMIX model used to estimate near-field dispersion incorporated information on ambient conditions in Penobscot Bay and Belfast Bay from the available literature. Ransom acknowledges that "none of the available data to approximate ambient current conditions were collected specifically in the area of the proposed discharge in Belfast Bay." Given these constraints, Ransom's use of the closest available data is reasonable and appropriate.

   The ADCIRC model used to examine far-field dispersion of discharge water appropriately characterized tidal conditions and water circulation patterns in Belfast Bay (shown in Ransom's Figures 3 and 4). The eelgrass beds located closest to the proposed outfall locations (Ransom's Figure 6) are consistent with those mapped by the Maine Department of Marine Resources based on aerial photos from 2001-2010.[4] Finally, ambient water quality data are reportedly based on measured data recommended by Maine DEP (Ransom's Table 1). While the state of knowledge regarding the behavior of surface water in Belfast Bay and northern Penobscot Bay is limited (as acknowledged above by Ransom), the assumptions used in Ransom's modeling work are sufficiently conservative to capture reasonable and plausible worst-case aquatic conditions in the Bay.

4. *Are the model results pertaining to nitrogen applicable to the thresholds for protection of eelgrass beds and dissolved oxygen that were identified by Maine DEP?*

   Ramboll finds that it is appropriate to compare ADCIRC model results describing total nitrogen to the thresholds for protection of eelgrass beds and dissolved oxygen[5] that were identified by Maine DEP because both sets of values are representative of average conditions. Ransom calculated the estimated time averaged median concentrations of total nitrogen near the proposed outfall over the final 14 days of the model simulations. This is a reasonable and appropriate approach for calculating the central tendency of the predicted total nitrogen concentrations over time. The thresholds that Maine DEP identified to be protective of eelgrass beds and dissolved oxygen were derived from work conducted in southern New England coastal marine waters and based on average nitrogen concentrations (NHDES 2009, Benson et al. 2013). As such, the model results depicted in Figure 6 of Ransom's far-field memorandum are comparable to the threshold limits specified by Maine DEP.

   The total nitrogen thresholds for the protection of eelgrass beds and dissolved oxygen conditions specified by Maine DEP as applicable to Belfast Bay are similar to the numeric thresholds used by Maine DEP to assess permits for water discharges from the City of Portland and City of South Portland wastewater treatment facilities (MEPDES Permit ME0102075 and Draft Permit ME0100633, respectively). The total nitrogen thresholds are based on environmental monitoring work conducted

[4] https://www.maine.gov/dmr/science-research/species/documents/6-upperpenbay.pdf

[5] Potential effluent impact on DO as defined by Maine DEP determined by a correlation of data from Great Bay, New Hampshire (NHDES 2009).

in Great Bay, NH, and in southern Massachusetts estuaries. Average surface water nitrogen concentrations at specific locations were correlated with eelgrass habitat metrics and dissolved oxygen conditions (NHDES 2009; Benson et al. 2013). The impacts associated with nitrogen loads in those ecosystems, however, are influenced by site-specific factors such as tidal exchange rates, freshwater flow rates, water depth, and stratification, among others. The embayments of southern Massachusetts and Great Bay, for example, are shallower and likely to have lower tidal exchange rates than in Belfast Bay. Estuaries with lower exchange rates (i.e., higher residence times) and shallow mixing depths tend to be more sensitive to total nitrogen loading than deep, well mixed estuaries (Evans and Scavia 2013). Extrapolating numeric threshold limits derived from one location to another is not an unusual regulatory approach, particularly where limits derived from examination of sensitive environmental conditions are applied to an environment with less sensitive environmental conditions. Still, while the application of nitrogen thresholds in Belfast Bay that are developed from estuaries likely to be more sensitive to total nitrogen loads is conservative (i.e., protective), there is uncertainty associated with the numeric total nitrogen threshold.

Conclusion

Ramboll finds the analyses presented in Ransom's modeling memoranda are scientifically defensible; nitrogen concentrations and dissolved oxygen conditions associated with water releases from NAF's proposed offshore outfall during salmon RAS production are predicted to have minimal impacts on dissolved oxygen conditions and eelgrass beds in Belfast Bay. While modeled results are estimates, Ransom's work is sound and reflects reasonable and plausible worst-case conditions.

Ramboll agrees with Ransom's recommendation for field data collection to generate data to validate the model results. In addition, it would be reasonable to conduct baseline monitoring of water quality and eelgrass conditions at the two eelgrass bed locations identified in the far-field dispersion memo (Figure 6)[6]. After installation and operation of the outfall, monitoring could continue periodically until the influence of the discharge water has been sufficiently characterized.

References

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Evans, M., and D. Scavia. 2013. Exploring estuarine eutrophication sensitivity to nutrient loading. Limnology and Oceanography 58(2): 569–578.

Howarth, R.W., and R. Marino. 2006. Nitrogen as the limiting nutrient for eutrophication in coastal marine ecosystems: Evolving views over three decades. Limnology and Oceanography 51(1): 364-376.

[6] Any monitoring program should also include nearby reference sites for comparison because numerous factors can influence eelgrass health.

Maine Pollutant Discharge Elimination System (MEPDES). 2017. Proposed Draft Permit Number ME0100633. https://www.epa.gov/sites/production/files/2017-08/documents/draftme0100633permit.pdf

Maine Pollutant Discharge Elimination System (MEPDES). 2017. Final Permit Number ME0102075.

New Hampshire Department of Environmental Services (NHDES). 2009. Numeric Nutrient Criteria for the Great Bay Estuary. R-WD-09-12. June. https://www.des.nh.gov/organization/divisions/water/wmb/wqs/documents/20090610_estuary_criteria.pdf

Maine Aquaculture
Water Quality Summary
Belfast Bay
Belfast, Maine

Submitted By
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October 16, 2018

NORMANDEAU ASSOCIATES
Environmental Consultants

October 16, 2018

Project No. 23631.001

Elizabeth Ransom
Ransom Environmental
Pease International Tradeport
112 Corporate Drive
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Electronically sent via email to elizabeth.ransom@ransomenv.com and drew.fuchs@ransomenv.com

Re: Water Quality Summary
Belfast Bay
Belfast, Maine

Dear Ms. Ransom:

Normandeau Associates, Inc. (Normandeau) is pleased to present the results of water quality sampling conducted in Belfast Bay at the proposed Nordic Aquaculture facility intake and discharge locations. Site visits were completed on August 23, 2018 and August 24, 2018 and again on September 7, 2018 consistent with our proposed scopes of work. Water quality data were collected by discrete depth samples submitted for laboratory analysis of multiple parameters as well as in-situ measurements with a YSI water quality data sonde. Samples and measurements were collected from the two proposed intake stations on August 23-24 and from the two proposed discharge stations on September 7. An additional water sample was also collected on September 7 and submitted for laboratory analysis from a location on the Little River below the lower reservoir dam. This report presents our methods for data collection, sampling locations, and results summaries. Original laboratory reports can provided upon request.

Thank you for the opportunity to work with you on this important project, please let me know if you have any questions or wish to discuss this further.

Sincerely,

Normandeau Associates, Inc.

Joel M Detty

Project Manager

Introduction and Methods

Water quality data were collected in Belfast Bay at the proposed Nordic Aquaculture facility intake and discharge locations on August 23-24, 2018 and September 7, 2018. Samples and in-situ measurements were collected from two intake stations and two discharge stations along the proposed submerged intake/discharge pipe route Options 1 and 2A. Samples and in-situ measurements were collected at low tide and high tide at each station and consisted of water column profile measurements using a YSI 6920 water quality data sonde and water sample collection for laboratory analysis. Water samples were collected at discrete depths using a Kemmerer water sampler. Intake location sample were collected August 23-24, 2018 and discharge location samples were collected on September 7, 2018. A single water sample was also collected from the Little River below the lower reservoir dam at low tide on September 7, 2018.

A YSI 6920 multiparameter data sonde was used to record water quality profile readings and was calibrated before and after each sampling event as per manufacturer recommendations. A Kemmerer water sampler was used for collection of water samples and was cleaned with distilled water between each sample as per standard protocol for water quality sampling. As the Kemmerer sampler was unable to collect sufficient sample volume to fill all sample bottles with a single "grab", multiple samples had to be collected from each depth and composited in a clean plastic compositing container. Once the container was full, it was distributed into the individual sample containers which were then preserved and stored as per laboratory instructions. The compositing container was reused for all samples and was cleaned using the same protocol as the Kemmerer water sampler. Nitrile gloves were used during sample collection and were changed after each sample. Laboratory samples were transferred to Alpha Analytical Laboratory in Portsmouth, NH at the end of each sample day within the recommended hold times for all analytes.

Garmin and Trimble GPS units were used to navigate to each station and to mark the location where data collection occurred.

Intake Stations

Two intake stations, Station 1 (intake/discharge pipe Option 1) and Station 2 (intake/discharge pipe Option 2A) were located at the terminus of the proposed pipe routes (See Figure 1). Water quality data was collected from both stations on August 23, 2018 during low tide and on August 24, 2018 at high tide. Before water quality data could be collected, a depth of at least 55 ft. was required at each station. During high tide, a depth of 56 feet was reached at both stations; however, during the low tide samples the observed depth at both stations was approximately 50 ft. Once anchored on station for sampling, a GPS point was recorded to mark the sampling location.

Water Quality Profile Readings

Water quality profile readings were recorded during low tide at Station 2 on August 23, 2018 at 14:36 and at Station 1 at 15:31. The predicted low tide in Belfast Bay on August 23, 2018 was at 15:48. High tide water quality profiles were recorded at Station 2 on August 24, 2018 at 10:00 and at 11:35 at Station 1. The predicted high tide in Belfast Bay on August 24, 2018 was at 10:35. A duplicate reading was also taken at Station 2 at 10:21 as quality control field duplicate. The duplicate reading consisted of restarting the YSI after the initial profile reading then repeating the standard water quality profile procedure to perform a duplicate measurement. Profile readings were recorded beginning at 0.5 meters below the surface of the water and then repeated every meter down through the profile where the following parameters were recorded: Temperature, Turbidity, pH, Depth, Dissolved oxygen (mg/L and % saturation), Salinity (not recorded on August 23), and Specific Conductance. At both Station 1 and 2 during low tide, YSI readings were recorded to a depth of 15 meters and during high tide to a depth of 17 meters. YSI profile readings for both intake stations are presented in Tables 1 and 2.

Sample Collection

After water quality profiles were complete, water samples were collected for laboratory analysis. Using a Kemmerer water sampler, a total of four samples were collected throughout the water column at each station. In addition, one field duplicate sample was collected as a quality control. At both stations, the upper samples were collected at a depth of 0.5 meters and the bottom samples were collected approximately 10 feet (3 meters) above the bed surface with two samples collected at equal intervals in between the upper and lower samples. During low tide on August 23, 2018 (predicted low tide at 15:48), samples were collected at 14:59 from Station 2 and at 16:00 from Station 1 at the following depths: 0.5 meters, 4.0 meters, 8.0 meters, and 12 meters. During high tide on August 24, 2018 (predicted high tide at 10:35), samples were collected at 10:59 from Station 2 and at 12:00 from Station 1 at the following depths: 0.5 meters, 4.0 meters, 8.0 meters, and 12 meters. A duplicate sample was collected at Station 2 at 5.0 meters. Samples were analyzed for total suspended solids, nitrogen-ammonia, nitrogen-nitrate/nitrite, total nitrogen, nitrogen-TKN, total phosphorus, chemical oxygen demand and BOD 5-day. Sample collection data and results for both intake stations are presented in Tables 4 and 5.

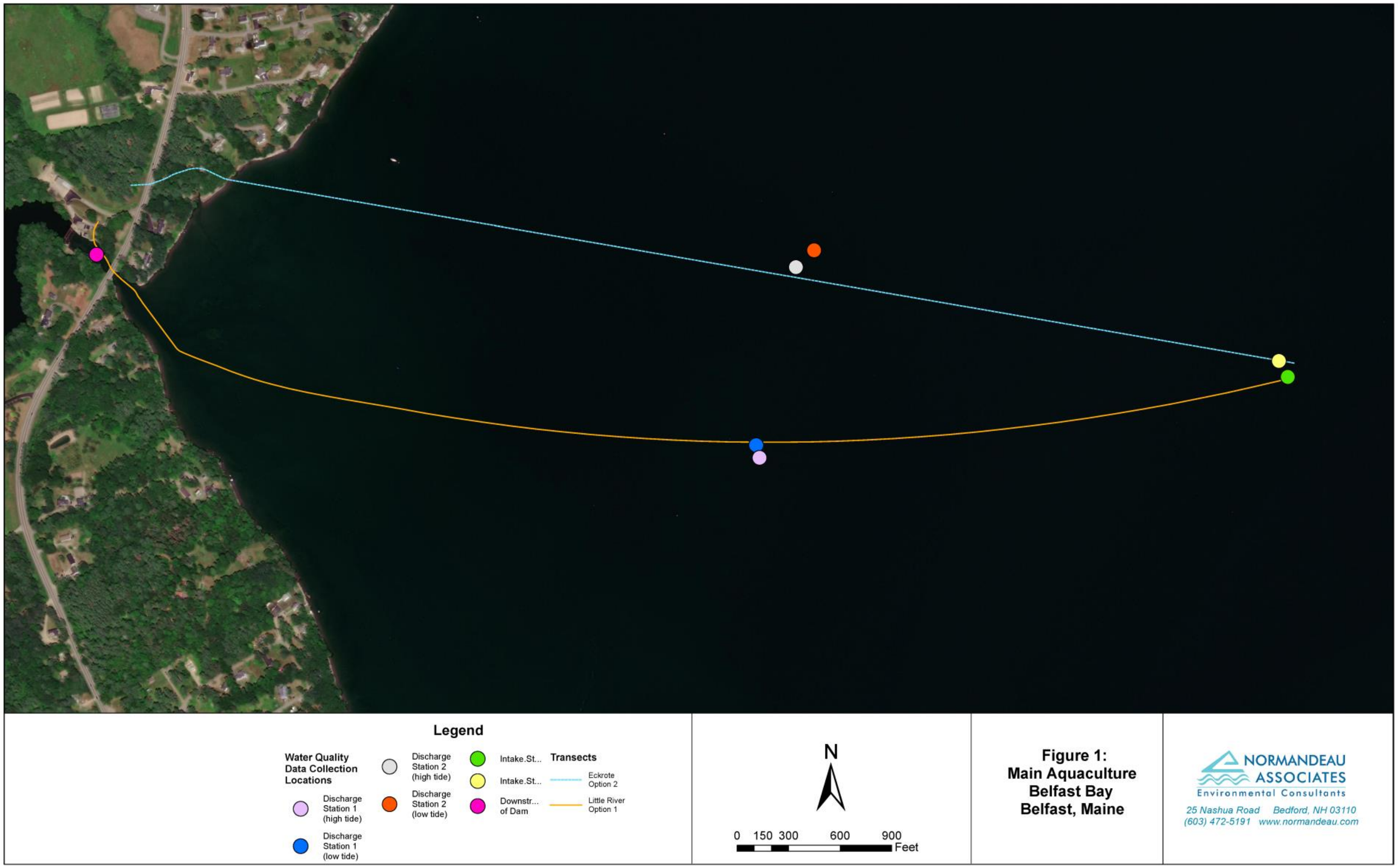

Figure 1. Sampling stations map

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Discharge Stations

Two discharge stations, Station 1 (intake/discharge pipe Option 1) and Station 2 (intake/discharge pipe Option 2A) were located along the proposed pipe routes (See Figure 1) closer to shore and in shallower water than the intake stations. Water quality data were collected from both discharge stations on September 7, 2018 during low and high tide conditions. Before water quality data could be collected at high tide, a depth of at least 40 feet was required at each station and 30 feet at each station during low tide. During high tide, a depth of 42 feet was measured at Station 1 and 44 feet at Station 2, while at low tide a depth of 32 feet was measured at Station 1 and 35 feet at Station 2. Once anchored on station, a GPS point was recorded to mark the sampling location. For the discharge stations, 4 GPS points were recorded to mark the sampling locations – i.e. 1 point for each station at high tide and low tide (See Figure 1).

Water Quality Profile Readings

Water quality profile readings were recorded during high tide on September 7, 2018 at Station 1 at 9:00 and at Station 2 at 11:16. The predicted high tide in Belfast Bay on September 7, 2018 was at 9:12. Before water quality profiles were recorded at Station 1, the dissolved oxygen probe was replaced due to an equipment failure and the YSI meter was recalibrated. During low tide on September 7, 2018, YSI profile readings were recorded at Station 1 at 14:39 and at 15:42 at Station 2. The predicted low tide in Belfast Bay on August 23, 2018 was at 15:14. A field duplicate reading was also taken at Station 1 at 14:52. As mentioned previously, this was done by restarting the YSI sonde after the initial profile reading and completing a second duplicate reading following the same standard procedure. Profile readings were recorded beginning at 0.5 meters below the surface of the water and then repeated every meter down through the water column with the following parameters measured and recorded: Temperature, Turbidity, pH, Depth, Dissolved oxygen (mg/L and % saturation), Salinity, Specific Conductance. At Station 1 during high tide, YSI readings were recorded to a bottom depth of 13 meters and during low tide to a bottom depth of 9 meters while at Station 2, readings were recorded to a bottom depth of 14 meters during high tide and 11 meters during low tide. Water quality profile readings for both intake stations are presented in Table 3.

Sample Collection

After water quality profiles were complete, water samples were collected for laboratory analysis. Using a Kemmerer water sampler, a total of four samples were collected throughout the water column at each station. In addition, one field duplicate sample was collected as a quality control. At both stations, the upper samples were collected at a depth of 0.5 meters and the bottom samples were collected approximately 10 feet (3 meters) from the bed surface with two samples collected at equal intervals in between the upper and lower samples. During high tide on September 7, 2018 (predicted high tide at 9:12), samples were collected at 9:42 from Station 1 and at 11:35 from Station 2 at the following depths: 0.5 meters, 4.0 meters, 7.0 meters, and 10.0 meters. During low tide on September 7, 2018 (predicted low tide at 15:14), samples were collected at 15:08 from Station 1 and at 16:11 from Station 2 at the following depths: 0.5 meters, 3.0 meters, 5.0 meters, and 7.0 meters. A duplicate sample was collected at Station 1 at 5.0 meters. Samples were analyzed for total suspended solids, nitrogen-ammonia, nitrogen-nitrate/nitrite, total nitrogen, nitrogen-TKN, total phosphorus, chemical oxygen demand and BOD 5-day. Sample collection data and results for both discharge stations are presented in Table 6.

Little River Sample

One sample was collected from the Little River immediately below the lower reservoir dam located off Route 1 during ebb conditions at 13:26 on September 7, 2018 (predicted low tide was at 15:14). The sample was collected approximately 50 feet downstream from the dam in a small channel of running water flowing towards Belfast Bay. As it was an ebbing tide, there did not appear to be any inflow from the bay. The sample was analyzed for nitrogen-nitrate/nitrite, total nitrogen, nitrogen-TKN, and total phosphorus. These results are presented in Table 6.

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Table 1. Summary of Water Quality Readings Taken at Intake Locations on August 23, 2018 in Belfast Bay, Belfast, Maine

STATION 1	**Temperature** (°C)	**Specific Conductivity** (µmhos/cm)	**pH** (units)	**DO** (mg/L)	**DO** (%)	**Turbidity** (ntu)
15:31, Low Tide, depth in meters						
0.5	18.96	44,586	8.18	9.02	113.7	0.00
1.0	18.90	44,645	8.17	9.11	116.4	0.00
2.0	18.75	44,696	8.17	9.29	116.8	0.00
3.0	18.41	44,893	8.18	9.61	121.9	0.00
4.0	15.40	47,702	8.07	9.01	108.1	0.00
5.0	15.06	47,765	8.04	8.76	108.9	0.00
6.0	14.65	48,151	8.02	8.76	104.2	0.00
7.0	14.06	48,588	7.98	8.68	97.3	0.00
8.0	12.57	49,040	7.82	7.56	86.5	0.00
9.0	11.69	49,349	7.71	6.02	70.5	0.00
10.0	11.29	49,483	7.71	6.00	67.1	0.00
11.0	11.25	49,517	7.70	6.09	68.1	0.00
12.0	11.29	49,557	7.75	6.01	67.9	0.00
13.0	11.31	49,572	7.77	6.33	71.0	0.00
14.0	11.33	49,583	7.77	6.32	70.8	0.00
15.0	11.35	49,596	7.79	6.17	71.1	0.00

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STATION 2	**Temperature** (°C)	**Specific Conductivity** (µmhos/cm)	**pH** (units)	**DO** (mg/L)	**DO** (%)	**Turbidity** (ntu)
14:36, Low Tide, depth in meters						
0.5	18.84	44,544	8.14	9.19	113.5	0.00
1.0	18.84	44,537	8.13	9.23	118.3	0.00
2.0	18.79	44,607	8.13	9.12	120.3	0.00
3.0	18.13	44,800	8.14	8.83	111.6	0.00
4.0	17.90	45,018	8.15	9.77	123.1	0.00
5.0	15.19	47,511	8.01	9.35	109.5	0.00
6.0	14.99	47,834	8.02	8.26	107.9	0.00
7.0	13.75	48,333	7.90	7.58	98.6	0.00
8.0	12.63	48,902	7.8	7.25	84.1	0.00
9.0	11.47	49,362	7.68	6.23	66.4	0.00
10.0	11.50	49,379	7.69	6.16	69.6	0.00
11.0	11.25	49,470	7.72	6.44	72.8	0.00
12.0	11.25	49,500	7.73	6.18	69.0	0.00
13.0	11.29	49,532	7.75	6.22	68.8	0.00
14.0	11.30	49,550	7.77	6.15	69.0	0.00
15.0	11.31	49,555	7.76	6.43	71.6	0.00

Table 2. Summary of Water Quality Readings Taken at Intake Locations on August 24, 2018 in Belfast Bay, Belfast, Maine

STATION 1	Temperature (°C)	Specific Conductivity (µmhos/cm)	pH (units)	DO (mg/L)	DO (%)	Turbidity (ntu)
11:35, High Tide, depth in meters						
0.5	18.73	44,301	8.11	9.42	119.6	0.00
1.0	19.26	44,192	8.10	9.49	119.5	0.00
2.0	18.01	44,511	8.09	9.49	121.3	0.00
3.0	17.70	44,712	8.08	9.23	115.9	0.00
4.0	16.71	45,597	8.00	8.96	107.8	0.00
5.0	15.18	46,999	7.96	8.81	105.6	0.00
6.0	14.02	47,412	7.86	7.89	93.5	0.00
7.0	13.31	48,235	7.86	7.87	91.4	0.00
8.0	13.00	48,385	7.84	7.26	79.8	0.00
9.0	12.87	48,450	7.83	7.25	83.6	0.00
10.0	12.25	48,532	7.77	7.00	79.8	0.00
11.0	11.84	48,649	7.73	6.63	74.6	0.00
12.0	11.48	48,819	7.75	6.51	72.9	0.00
13.0	11.46	48,815	7.76	6.37	71.3	0.00
14.0	11.41	48,835	7.76	6.15	68.8	0.00

15.0	11.41	48,835	7.76	6.34	70.9	0.00
16.0	11.42	48,847	7.77	6.32	69.9	0.00
17.0	11.42	48,848	7.77	6.38	71.4	0.00
STATION 2	**Temperature** (°C)	**Specific Conductivity** (µmhos/cm)	**pH** (units)	**DO** (mg/L)	**DO** (%)	**Turbidity** (ntu)
10:00, High Tide, depth in meters						
0.5	18.26	44,366	8.10	7.64	96.3	0.00
1.0	18.17	44,401	8.13	7.56	95.1	0.00
2.0	18.00	44,440	8.15	7.77	97.7	0.00
3.0	17.85	44,538	8.15	7.86	99.0	0.00
4.0	17.49	45,028	8.13	7.66	95.3	0.00
5.0	15.10	46,832	7.96	7.28	87.1	0.00
6.0	14.76	47,255	7.98	6.72	80.1	0.00
7.0	13.51	47,659	7.88	6.06	70.6	0.00
8.0	12.92	48,748	7.87	6.10	72.0	0.00
9.0	11.91	48,639	7.78	5.64	63.7	0.00
10.0	11.52	48,810	7.77	5.58	62.2	0.00
11.0	11.51	44,818	7.77	5.23	58.6	0.00
12.0	11.47	48,812	7.78	5.41	61.4	0.00
13.0	11.47	48,849	7.79	5.60	62.8	0.00
14.0	11.43	48,855	7.78	5.56	61.3	0.00

15.0	11.43	48,867	7.78	5.49	61.0	0.00
16.0	11.43	48,812	7.79	5.38	60.3	0.00
17.0	11.43	48,880	7.79	5.48	61.4	0.00
10:21, High Tide, depth in meters						
0.5 (duplicate)	18.39	44,393	8.14	7.33	92.7	0.00
1.0 (duplicate)	18.45	44,440	8.14	7.30	92.1	0.00
2.0 (duplicate)	18.02	44,521	8.15	6.76	84.8	0.00
3.0 (duplicate)	17.91	44,590	8.14	7.07	89.1	0.00
4.0 (duplicate)	17.70	44,692	8.14	6.59	82.5	0.00
5.0 (duplicate)	15.67	46,477	8.00	6.83	82.4	0.00
6.0 (duplicate)	14.65	47,149	7.98	6.62	78.6	0.00
7.0 (duplicate)	13.31	47,767	7.87	5.82	67.4	0.00
8.0 (duplicate)	12.64	48,571	7.85	5.35	61.3	0.00
9.0 (duplicate)	12.05	48,605	7.77	5.15	58.2	0.00
10.0 (duplicate)	11.52	48,818	7.77	4.99	56.2	0.00
11.0 (duplicate)	11.48	48,801	7.79	5.27	60.5	0.00
12.0 (duplicate)	11.48	48,821	7.79	5.09	57.3	0.00
13.0 (duplicate)	11.44	48,864	7.78	5.12	57.4	0.00
14.0 (duplicate)	11.42	48,871	7.79	5.09	56.9	0.00
15.0 (duplicate)	11.42	48,881	7.79	5.17	56.2	0.00
16.0 (duplicate)	11.43	48,859	7.79	5.25	58.7	0.00
17.0 (duplicate)	11.43	48,869	7.79	5.17	57.9	0.00

Table 3. Summary of Water Quality Readings Taken at Discharge Locations on September 7, 2018 in Belfast Bay, Belfast, Maine

STATION 1	Temperature (°C)	Specific Conductivity (µmhos/cm)	pH (units)	DO (mg/L)	DO (%)	Turbidity (ntu)
9:00, High Tide, depth in meters						
0.5	18.23	44,242	7.95	8.78	110.1	0.00
1.0	18.15	44,271	7.94	8.67	108.9	0.00
2.0	18.14	44,260	7.93	8.63	108.5	0.00
3.0	18.13	44,280	7.92	8.61	108.3	0.00
4.0	18.13	44,325	7.92	8.59	107.9	0.00
5.0	18.11	44,322	7.92	8.55	107.4	0.00
6.0	17.98	44,409	7.91	8.48	106.7	0.00
7.0	16.02	46,307	7.81	8.34	101.5	0.00
8.0	15.71	46,436	7.78	7.95	96.0	0.00
9.0	15.17	46,779	7.76	7.81	93.6	0.00
10.0	14.60	47,072	7.73	7.65	90.7	0.00
11.0	13.87	47,465	7.64	7.10	82.4	0.00
12.0	13.39	47,701	7.64	6.35	73.4	1.20
13.0	13.05	47,840	7.62	6.03	69.5	2.50

14:39, Low Tide, depth in meters						
0.5	18.75	44,302	7.91	8.71	110.9	0.00
1.0	18.77	44,294	7.91	8.71	110.7	0.00
2.0	18.28	44,327	7.92	8.83	111.3	0.00
3.0	17.91	44,718	7.89	8.75	109.4	0.00
4.0	17.52	45,375	7.88	8.71	108.5	0.00
5.0	16.91	45,892	7.86	8.69	107.0	0.00
6.0	16.50	45,967	7.80	8.10	99.4	0.00
7.0	16.12	46,245	7.78	7.95	96.8	0.00
8.0	15.63	46,527	7.75	7.79	94.1	0.00
9.0	14.56	47,117	7.69	7.53	89.1	0.00
14:52, Low Tide, depth in meters						
0.5 (duplicate)	18.78	44,311	7.96	8.55	108.8	0.00
1.0 (duplicate)	18.74	44,316	7.93	8.61	109.6	0.00
2.0 (duplicate)	18.31	44,350	7.93	8.75	110.4	0.00
3.0 (duplicate)	17.88	44,762	7.90	8.68	108.7	0.00
4.0 (duplicate)	17.39	45,485	7.89	8.68	108.1	0.00
5.0 (duplicate)	17.05	45,844	7.89	8.69	107.5	0.00
6.0 (duplicate)	16.49	46,006	7.81	8.30	100.7	0.00
7.0 (duplicate)	16.04	46,322	7.78	7.93	96.4	0.00
8.0 (duplicate)	15.45	46,681	7.75	7.72	92.7	0.00

9.0 (duplicate)	14.45	47,191	7.68	7.25	85.8	0.00
STATION 2	**Temperature** (°C)	**Specific Conductivity** (µmhos/cm)	**pH** (units)	**DO** (mg/L)	**DO** (%)	**Turbidity** (ntu)
11:16, High Tide, depth in meters						
0.5	18.72	44,329	7.94	8.64	109.6	0.00
1.0	18.58	44,334	7.94	8.62	109.3	0.00
2.0	18.36	44,327	7.95	8.65	109.2	0.00
3.0	18.28	44,334	7.95	8.65	109.1	0.00
4.0	18.20	44,370	7.95	8.66	109.1	0.00
5.0	18.15	44,435	7.94	8.63	108.4	0.00
6.0	16.97	45,632	7.88	8.42	103.9	0.00
7.0	16.76	45,915	7.88	8.38	103.3	0.00
8.0	16.65	46,046	7.89	8.40	103.4	0.00
9.0	15.93	46,435	7.85	8.35	101.2	0.00
10.0	15.57	46,608	7.85	8.22	99.3	0.00
11.0	14.3	47,312	7.73	7.62	89.1	0.00
12.0	13.61	47,601	7.64	6.71	77.2	0.60
13.0	12.85	48,005	7.61	6.23	71.5	1.80
14.0	12.83	47,817	7.44	5.98	68.5	no data
15:42, Low Tide, depth in meters						

0.5	18.59	44,359	7.93	8.72	110.6	0.00
1.0	18.59	44,361	7.93	8.73	110.7	0.00
2.0	18.57	44,360	7.93	8.73	110.7	0.00
3.0	18.12	44,584	7.93	8.83	111.1	0.00
4.0	17.83	45,061	7.90	8.72	109.3	0.00
5.0	17.60	45,663	7.92	8.76	109.7	0.00
6.0	17.24	45,895	7.91	8.79	109.3	0.00
7.0	15.89	46,047	7.80	8.09	98.1	0.00
8.0	15.35	46,785	7.79	8.02	96.8	0.00
9.0	15.93	46,954	7.71	7.53	89.1	0.00
10.0	13.99	47,407	7.59	6.59	76.0	0.00
11.0	13.60	47,593	7.57	6.32	73.4	1.40

Table 4. Summary of Results of Laboratory Analyses of Water Quality Samples Collected from Intake Locations on August 23, 2018 in Belfast Bay, Belfast, Maine

STATION 1	Solids, Total Suspended (mg/L)	Nitrogen, Ammonia (mg/L)	Nitrogen, Nitrate/Nitrite (mg/L)	Total Nitrogen (mg/L)	Nitrogen, Total Kjeldahl (mg/L)	Phosphorus, Total (mg/L)	Chemical Oxygen Demand (mg/L)	BOD 5-day (mg/L)
16:00, Low Tide								
0.5 meters	10.0	<0.024	<0.033	<0.30	0.195	0.012	1200	<2.0
4.0 meters	14.0	<0.024	<0.033	<0.30	0.225	0.012	640	<2.0
8.0 meters	13.0	<0.024	<0.033	<0.30	0.196	0.009	900	<2.0
12 meters	12.0	<0.024	<0.033	<0.30	0.172	0.014	1200	<2.0
STATION 2	**Solids, Total Suspended (mg/L)**	**Nitrogen, Ammonia (mg/L)**	**Nitrogen, Nitrate/Nitrite (mg/L)**	**Total Nitrogen (mg/L)**	**Nitrogen, Total Kjeldahl (mg/L)**	**Phosphorus, Total (mg/L)**	**Chemical Oxtgen Demand (mg/L)**	**BOD 5-day (mg/L)**
14:59, Low Tide								
0.5 meters	11.0	<0.024	<0.033	<0.30	0.221	0.013	1200	<2.0
4.0 meters	45.0	0.031	<0.033	<0.30	0.242	0.012	680	<2.0
8.0 meters	17.0	0.025	<0.033	<0.30	0.273	0.017	1200	<2.0
12 meters	13.0	<0.024	<0.033	<0.30	0.192	0.013	750	<2.0

NORMANDEAU ASSOCIATES
Environmental Consultants

Table 5. Summary of Results of Laboratory Analyses of Water Quality Samples Collected from Intake Locations on August 24, 2018 in Belfast Bay, Belfast, Maine

STATION 1	Solids, Total Suspended (mg/L)	Nitrogen, Ammonia (mg/L)	Nitrogen, Nitrate/Nitrite (mg/L)	Total Nitrogen (mg/L)	Nitrogen, Total Kjeldahl (mg/L)	Phosphorus, Total (mg/L)	Chemical Oxygen Demand (mg/L)	BOD 5-day (mg/L)
12:00, High Tide (AM)								
0.5 meters	9.6	<0.024	0.090	<0.30	0.185	0.012	790	<2.0
5.0 meters	8.6	<0.024	<0.033	<0.30	0.191	0.012	960	<2.0
9.5 meters	11.0	<0.024	<0.033	<0.30	0.188	0.021	900	<2.0
14.0 meters	11.0	<0.024	0.11	<0.30	0.183	0.019	1300	<2.0
STATION 2	**Solids, Total Suspended (mg/L)**	**Nitrogen, Ammonia (mg/L)**	**Nitrogen, Nitrate/Nitrite (mg/L)**	**Total Nitrogen (mg/L)**	**Nitrogen, Total Kjeldahl (mg/L)**	**Phosphorus, Total (mg/L)**	**Chemical Oxtgen Demand (mg/L)**	**BOD 5-day (mg/L)**
10:59, High Tide (AM)								
0.5 meters	10.0	0.039	0.095	<0.30	0.194	0.012	1000	<2.0
5.0 meters	9.2	<0.024	0.10	<0.30	0.235	0.013	810	<2.0
5.0 meters (duplicate)	9.4	<0.024	<0.033	<0.30	0.223	0.013	750	<2.0
9.5 meters	8.5	<0.024	<0.033	<0.30	0.202	0.017	1200	<2.0
14.0 meters	11.0	0.045	0.097	<0.30	0.182	0.024	770	<2.0

Table 6. Summary of Results of Laboratory Analyses of Water Quality Samples Collected from Discharge Locations and Dam on September 7, 2018 in Belfast Bay, Belfast, Maine

STATION 1	Solids, Total Suspended (mg/L)	Nitrogen, Ammonia (mg/L)	Nitrogen, Nitrate/Nitrite (mg/L)	Total Nitrogen (mg/L)	Nitrogen, Total Kjeldahl (mg/L)	Phosphorus, Total (mg/L)	Chemical Oxygen Demand (mg/L)	BOD 5-day (mg/L)
9:42, High Tide (AM)								
0.5 meters	8.5	<0.024	<0.033	0.42	0.418	0.013	1100	<2.0
4.0 meters	8.8	0.024	<0.033	0.78	0.780	0.009	1000	<2.0
7.0 meters	8.6	<0.024	<0.033	0.53	0.531	0.016	1400	<2.0
10 meters	9.0	<0.024	0.046	0.32	0.321	0.015	1100	<2.0
15:08, Low Tide (PM)								
0.5 meters	7.5	<0.024	<0.033	<0.30	0.195	0.015	670	<2.0
3.0 meters	7.8	<0.024	0.034	<0.30	0.238	0.014	860	<2.0
5.0 meters	6.9	<0.024	<0.033	<0.30	0.198	0.012	660	<2.0
5.0 meters (duplicate)	9.5	<0.024	<0.033	<0.30	0.204	0.010	800	<2.0
7.0 meters	10.0	<0.024	<0.033	<0.30	0.142	0.016	750	<2.0
STATION 2	**Solids, Total Suspended (mg/L)**	**Nitrogen, Ammonia (mg/L)**	**Nitrogen, Nitrate/Nitrite (mg/L)**	**Total Nitrogen (mg/L)**	**Nitrogen, Total Kjeldahl (mg/L)**	**Phosphorus, Total (mg/L)**	**Chemical Oxtgen Demand (mg/L)**	**BOD 5-day (mg/L)**
11:35, High Tide (AM)								

0.5 meters	7.7	<0.024	<0.033	<0.30	0.259	0.010	1400	<2.0
4.0 meters	9.4	<0.024	0.052	<0.30	0.153	0.014	720	<2.0
7.0 meters	7.4	<0.024	<0.033	<0.30	0.274	0.010	720	<2.0
10 meters	9.4	<0.024	<0.033	0.33	0.333	0.016	800	<2.0
16:11, Low Tide (PM)								
0.5 meters	7.2	<0.024	0.036	<0.30	0.226	0.011	770	<2.0
3.0 meters	7.1	<0.024	<0.033	<0.30	0.247	0.011	690	<2.0
5.0 meters	9.0	<0.024	<0.033	0.48	0.476	0.009	1000	<2.0
7.0 meters	9.3	0.034	<0.033	0.38	0.376	0.014	900	<2.0

BELOW DAM	**Solids, Total Suspended (mg/L)**	**Nitrogen, Ammonia (mg/L)**	**Nitrogen, Nitrate/Nitrite (mg/L)**	**Total Nitrogen (mg/L)**	**Nitrogen, Total Kjeldahl (mg/L)**	**Phosphorus, Total (mg/L)**	**Chemical Oxtgen Demand (mg/L)**	**BOD 5-day (mg/L)**
13:26, Ebbing Tide (PM)								
Downstream side of dam	No data collected	No data collected	0.036	0.48	0.480	0.021	No data collected	No data collected

NORDIC AQUAFARMS
SUSTAINABLE AQUACULTURE

Nordic Aquafarms Inc
511 Congress Street
Portland, ME 04101

www.nordicaquafarms.com

October 16, 2018

Mr. Kevin Martin
Commissioner's Office
Maine Department of Environmental Protection
17 State House Station
Augusta, ME 04333-0017

Dear Mr. Martin:

This letter authorizes Attorney Joanna B. Tourangeau of Drummond Woodsum and Elizabeth Ransom of Ransom Consulting to act as agents on behalf of Nordic Aquafarms, Inc. in connection with any applications being filed with the Department of Environmental Protection for Nordic Aquafarms project in Belfast, Maine. These applications include, but are not limited to applications pursuant to Maine statutes implementing the MEPDES Program, the Site Law, and the Natural Resource Protection Act and any other related applications that may be required for this project.

Thank you for your attention to this matter.

Sincerely,

Eric Heim
President

BDN

Todd McLeod | Print Sales Manager

Legal Notices

NOTICE OF INTENT TO FILE
MAINE WASTE DISCHARGE LICENSE/MAINE POLLUTANT DISCHARGE ELIMINATION SYSTEM PERMIT APPLICATION AND NOTICE OF PUBLIC INFORMATIONAL MEETING

Please take note that, pursuant to 38 MRSA, Sections 413 and 414-A, **Nordic Aquafarms intends to file a wastewater discharge permit application with the Department of Environmental Protection (DEP)**. This application is for the discharge of up to 7.7 million gallons per day of wastewater from land based aquaculture to Penobscot Bay in Belfast, Maine. **The application will be filed on or about October 19, 2018** and will be available for public inspection at DEP's Augusta office during normal business hours. A copy may also be seen at the municipal offices in Belfast, Maine.

Please take note that, pursuant to Chapter 2 of the Department of Environmental Protection Rules, Nordic Aquafarms intends to hold a **Public Informational Meeting on October 4, 2018 at 6:00 p.m. at the Troy A. Howard Middle School, 173 Lincolnville Ave, Belfast, ME 04915**. The applicant will inform the public of the project and its anticipated environmental impacts, along with information about opportunities for public comments on the project.

A request for public hearing or request that the Board of Environmental Protection assume jurisdiction over this application must be received by the DEP, in writing, no later than 20 days after the application is found acceptable for processing, or 30 days from the date of this notice, whichever is longer. Requests shall state the nature of the issue(s) to be raised. Unless otherwise provided by law, a hearing is discretionary and may be held if the Commissioner or the Board finds significant public interest or there is conflicting technical information.

During the time specified above, persons wishing to receive copies of draft permits and supporting documents, when available, may request them from DEP. Persons receiving a draft permit shall have 30 days in which to submit comments or to request a public hearing on the draft.

Public comment will be accepted until a final administrative action is taken to approve, approve with conditions or deny this application. Written public comments or requests for information may be made to the Division of Water Quality Management, Department of Environmental Protection, State House Station #17, Augusta, ME 043330017. Telephone: (207) 287-3901.

Sept. 21, 2018

September 24, 2018

AFFIDAVIT OF PUBLICATION

This is to certify the advertising

OF: Drummond Woodsum

RE: Notice of Intent to File - Nordic Aquafarms

ON: September 21, 2018

Signed:

Todd McLeod
Print Sales Manager

Then personally appeared the above named Todd McLeod, Print Sales Manager, and acknowledged the foregoing instrument to be his free act and deed in his said capacity and the free act and deed of said corporation.

Before me,

Barbara G. Mower

Barbara G. Mower
Notary Public
My commission expires November 9, 2024

BARBARA G. MOWER
NOTARY PUBLIC
State of Maine
My Commission Expires
November 9, 2024

Legal Notices

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Sept. 21, 2018

Legal Notices

TOWN OF PITTSFIELD
PUBLIC HEARING NOTICE

The Pittsfield Town Council will hold a Public Hearing on Tuesday, October 2, 2018 at 6:30 pm in the Pittsfield Municipal Building Council Chambers to consider the following:

ORDINANCE 18-03: (Public Hearing) That the Town Council hereby Ordains that Chapter 2B General Assistance Ordinance, Appendices A-D be rescinded and the new Appendices A-D be adopted to reflect the revised maximums for the period of October 01, 2018 - September 30, 2019. And to continue to use Appendices E-F set forth and filed with the Department of Health and Human Services (DHHS) until any new appendices are approved.

Sept. 21, 2018

Legal Notices

PUBLIC HEARING

BY ORDER of the **Hermon Planning Board**, a Public Hearing has been scheduled for **Tuesday, October 2, 2018 at 6:30pm**, in the Public Safety Meeting Room, for the purpose of reviewing an amendment to Lot 32 of Skyway Valley Country Estates, Map 50 Lot 37.

Sept. 21, 2018

Legal Notices

INVITATION TO BID
TOWN OF PITTSFIELD
SEWER RECONSTRUCTION

The Town cordially invites bids for sewer reconstruction of portions of Madawaska Avenue. Sealed bids will be received by the Owner at their offices until 10:00 am prevailing local time, October 12, 2018. Work must be completed by June 15, 2019. The work generally consists of the following which is not an all-inclusive list: Provision of sewer reconstruction activities for approximately 1,434 feet, including but not limited to sewer main, manholes, services to the right-of-way and trench/curb/sidewalk repair. This project is partially funded by the Northern Border Regional Commission (NBRC) including some federal funding, so all federally mandated Davis-Bacon Wage Rates, Equal Opportunity, and Disadvantaged Business opportunities must be addressed by bids and performance of work. A copy of the NBRC manual for grant administration, compliance and monitoring is available upon request. The pre-bid site visit and conference will take place at 10:00 am on October 5, 2018 at the Town Offices. Plans and specifications are available for a fee by contacting Plymouth Engineering, Inc, P.O. Box 46, Plymouth, ME 04969 or 207-257-2071.

Sept. 21, 2018

Lega

NOTICE O

Notice is hereby given that in accorda
closure and Order of Sale entered A
gage Research Center, LLC d/b/a Vete
ed Liability Company v. John W. Koch
District Court, Division of Bangor, Do
judged the foreclosure of a mortgage
Koch, who acquired title as Jenifer L.
Systems, Inc. acting solely as nomine
Veterans United Home Loans, its suc
26, 2015 and recorded in the Penobsc
at Page 280, should the period of red
of the property by the mortgagors, a
mortgage will be conducted on

October 26, 2018 commencing at 10:3
age LLP, 190 U.S. Route One, 2nd Floo

The property is located at 105 Eaton
Maine, reference as described in said

The sale will be by public auction. All
make a deposit of $5,000.00 in cash,
public sale made payable to Shechtm
non-refundable as to the highest bidd
be paid within thirty (30) days of the
tive of Mortgage Research Center, L
Missouri Limited Liability Company is
this notice, no sale shall be deemed t
ule a subsequent sale are reserved.

Additional terms will be announced at

Mortgage Research Center, LLC d/b/a
Limited Liability Company,
By its attorneys, Shechtman Halperin
John Michael Ney, Jr., Esq.
1080 Main Street, Pawtucket, RI 0286
(401) 272-1400

Sept. 21, 28, Oct. 5, 2018

Legal

NOTICE OF PUBLIC

By virtue of and in execution of a Jud
the Penobscot County Superior Court
No. RE-2013-139 brought by Federal
Moffat A.C. and Beatrice Arras Gardr
A.C. and Beatrice Arras Gardner Trus
mortgage recorded in the Penobscot
Page 215, the statutory ninety (90) d
without redemption, notice is hereby
October 16, 2018 at 4:00 PM at 2 Gorge
the premises described in said mortga
buildings thereon, situated in the to
State of Maine, described in said mo
enue. TERMS OF SALE The property
sale, who shall pay a deposit of Ten T
in cash, certified check or funds accep
of sale. The successful bidder shall be
Agreement with said Federal National
Ten Thousand and No/100 Dollars ($1
terest bearing deposit thereon providi
the date of the public sale, at which tir
and payable in cash or certified funds
sociation as aforesaid, which will the
The sale shall be made subject to: (a)
reveal, (b) any unpaid taxes or asses
and (c) any facts which an accurate
property shall be sold "as is" and "wh
expressed, implied or otherwise. Othe
ed: S/John A. Doonan, Esq., Bar No.
5746 Attorney for Federal National N
Longoria, LLC 100 Cummings Center,
2670

Sept. 7, 14, 21, 2018

Abutters – Nordic Aquafarm Project

Name	Map/Lot	Property Address	Mailing Address
City of Belfast			131 Church Street Belfast, ME 04915
Belfast Water District	Belfast: 029-039 Northport: U01-06	285 Northport Ave, Belfast Atlantic Hwy, Northport	285 Northport Ave Belfast, ME 04915
Robert F. Prescott, Jr.	004-28-A	Herrick Road	448 Town Farm Rd Bucksport, ME 04416
Rosemary R. Prescott	004-28	30 Herrick Road Belfast, ME 04915	same
Kyle E. Engstrom Heather Ross Engstrom	004-23-A	20 Herrick Road Belfast, ME 04915	same
Debby A. Heath	004-23-D	14 Herrick Road Belfast, ME 04915	same
George Flimlin Larissa Flimlin	004-10	52 Perkins Road	530 E Jimmie Leeds Rd. Galloway, NJ 08205
Eleanor G. Daniels Donna L. Broderick	004-10-A	28 Perkins Road Belfast, ME 04915	Same
Lisa Jo Desmarteau James T. Desmarteau	004-12-D	26 Perkins Road	10855 SW Visconti Way Port Saint Lucie, FL 34986
Golden Rod Properties, LLC	004-12-A	22 Perkins Road	PO Box 345 Belfast, ME 04915
R.W. & J.E. Curtis Irrevocable Trust	004-12	34 Perkins Road Belfast, ME 04915	same
Samuel Cassida Jacqueline Cassida	029-040	271 Northport Ave Belfast, ME 04915	Same
Jeffrey R. Mabee Judith B. Grace	029-038	290 Northport Ave Belfast, ME 04915	same
Larry D. Theye Betty Becker-Theye	029-037	286 Northport Ave Belfast, ME 04915	same
Richard Eckrote Janet Eckrote	029-036	282 Northport Ave	42 Grandview Ave Lincoln Park, NJ 07035
Lyndon W. Morgan	029-035	1 Tozier Street Belfast, ME 04915	same

Voluntary notice given at the request of the following parties:

Islesboro Islands Trust, c/o Stephen Miller, PO Box 182, 376 West Bay Road, Islesboro, ME 04848

Jim and Amy Grant, 67 Perkins Road, Belfast, ME 04915 (Map 004, Lot 009)

CERTIFIED MAIL® RECEIPT
Domestic Mail Only
For delivery information, visit our website at www.usps.com®
OFFICIAL USE
342200-F
Certified Mail Fee
Extra Services & Fees (check box, add fee as appropriate)
☐ Return Receipt (hardcopy) $
☐ Return Receipt (electronic) $
☐ Certified Mail Restricted Delivery $
☐ Adult Signature Required $
☐ Adult Signature Restricted Delivery $
Postage
Total Postage
Sent To
City of Belfast
131 Church St
Belfast, ME 04915
PORTLAND MAINE SEP 21 2018 04101 Postmark Here
PS Form 3800, April 2015 PSN 7530-02-000-9047 See Reverse for Instructions
7016 1370 0000 5049 2582

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

City of Belfast
131 Church St
Belfast, ME 04915

9590 9402 2715 6351 6823 29

2. Article Number (Transfer from service label)

7016 1370 0000 5049 2582

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X [illegible signature] ☐ Agent ☐ Addressee

B. Received by (Printed Name) C. Date of Delivery

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☒ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Insured Mail
☐ Insured Mail Restricted Delivery (over $500)
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☒ Return Receipt for ~~Merchandise~~
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

PS Form 3811, July 2015 PSN 7530-02-000-9053 Domestic Return Receipt

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CERTIFIED MAIL® RECEIPT
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For delivery information, visit our website at www.usps.com®
OFFICIAL USE
342200-F
Certified Mail Fee
Extra Services & Fees (check box, add fee as appropriate)
☐ Return Receipt (hardcopy) $
☐ Return Receipt (electronic) $
☐ Certified Mail Restricted Delivery $
☐ Adult Signature Required $
☐ Adult Signature Restricted Delivery $
Postage
Total Postage
Sent To
Belfast Water District
285 Northport Ave
Belfast, ME 04915
PORTLAND MAINE SEP 21 2018 04101 Postmark Here
PS Form 3800, April 2015 PSN 7530-02-000-9047 See Reverse for Instructions
7016 1370 0000 5049 2575

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

Belfast Water District
285 Northport Ave
Belfast, ME 04915

9590 9402 2715 6351 6823 12

2. Article Number (Transfer from service label)

7016 1370 0000 5049 2575

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X Frank Short ☐ Agent ☐ Addressee

B. Received by (Printed Name) C. Date of Delivery

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

BELFAST ME 04915 SEP 26 2018 USPS

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☒ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Insured Mail
☐ Insured Mail Restricted Delivery (over $500)
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☒ Return Receipt for ~~Merchandise~~
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

PS Form 3811, July 2015 PSN 7530-02-000-9053 Domestic Return Receipt

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CERTIFIED MAIL® RECEIPT
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For delivery information, visit our website at www.usps.com®
OFFICIAL USE
342200-F
Certified Mail Fee
Extra Services & Fees (check box, add fee as appropriate)
☐ Return Receipt (hardcopy) $
☐ Return Receipt (electronic) $
☐ Certified Mail Restricted Delivery $
☐ Adult Signature Required $
☐ Adult Signature Restricted Delivery $
Postage
Total Postage
Sent To
Robert F. Prescott, Jr.
448 Town Farm Road
Bucksport, Me 04416
Street and Apt. No.
City, State
PORTLAND MAINE SEP 21 2018 04101 Postmark Here
PS Form 3800, April 2015 PSN 7530-02-000-9047 See Reverse for Instructions
7016 1370 0000 5049 2568

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

Robert F. Prescott, Jr.
448 Town Farm Road
Bucksport, Me 04416

9590 9402 2715 6351 6823 05

2. Article Number (Transfer from service label)

7016 1370 0000 5049 2568

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X Nichole Prescott ☐ Agent ☐ Addressee

B. Received by (Printed Name) Nichole Prescott C. Date of Delivery 9-27-18

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☒ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Insured Mail
☐ Insured Mail Restricted Delivery (over $500)
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☒ Return Receipt for ~~Merchandise~~
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

PS Form 3811, July 2015 PSN 7530-02-000-9053 Domestic Return Receipt

U.S. Postal Service™
CERTIFIED MAIL® RECEIPT
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For delivery information, visit our website at *www.usps.com*®.

24266 OFFICIAL USE NA

Certified Mail Fee $

Extra Services & Fees *(check box, add fee as appropriate)*
- ☐ Return Receipt (hardcopy) $
- ☐ Return Receipt (electronic) $
- ☐ Certified Mail Restricted Delivery $
- ☐ Adult Signature Required $
- ☐ Adult Signature Restricted Delivery $

Postage $

Total Postage and Fees $

Sent To
Rosemary R. Prescott
30 Herrick Road
Belfast, ME 04915-9755

Street and ...
City, State

PS Form 3800, April 2015 PSN 7530-02-000-9047 See Reverse for Instructions

Postmark Here: PORTLAND MAINE SEP 21 2018 04101

7016 1370 0000 5049 2551

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:
Rosemary R. Prescott
30 Herrick Road
Belfast, ME 04915-9755

9590 9402 2715 6351 6822 99

2. Article Number *(Transfer from service label)*
7016 1370 0000 5049 2551

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X R P Jones ☐ Agent ☐ Addressee

B. Received by *(Printed Name)* Rosemary Prescott-Jones

C. Date of Delivery 9/26/18

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
- ☐ Adult Signature
- ☐ Adult Signature Restricted Delivery
- ☑ Certified Mail®
- ☐ Certified Mail Restricted Delivery
- ☐ Collect on Delivery
- ☐ Collect on Delivery Restricted Delivery
- ... Restricted Delivery
- ☐ Priority Mail Express®
- ☐ Registered Mail™
- ☐ Registered Mail Restricted Delivery
- ☑ Return Receipt for Merchandise
- ☐ Signature Confirmation™
- ☐ Signature Confirmation Restricted Delivery

PS Form **3811**, July 2015 PSN 7530-02-000-9053 Domestic Return Receipt

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Domestic Mail Only

For delivery information, visit our website at *www.usps.com*®.

24266 OFFICIAL USE NA

Certified Mail Fee $

Extra Services & Fees *(check box, add fee as appropriate)*
- ☐ Return Receipt (hardcopy) $
- ☐ Return Receipt (electronic) $
- ☐ Certified Mail Restricted Delivery $
- ☐ Adult Signature Required $
- ☐ Adult Signature Restricted Delivery $

Postage $

Total ... $

Sent To
Kyle E. Engstrom
Heather Ross Engstrom
20 Herrick road
Belfast, ME 04915

Street ...
City, S...

PS Form 3800, April 2015 PSN 7530-02-000-9047 See Reverse for Instructions

Postmark Here: PORTLAND MAINE SEP 21 2018 04101

7016 1370 0000 5049 2544

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:
Kyle E. Engstrom
Heather Ross Engstrom
20 Herrick road
Belfast, ME 04915

9590 9402 2715 6351 6822 82

2. Article Number *(Transfer from service label)*
7016 1370 0000 5049 2544

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X K Engstrom ☐ Agent ☐ Addressee

B. Received by *(Printed Name)* Kyle Engstrom

C. Date of Delivery

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

BELFAST ME 04915 SEP 28 2018 USPS

3. Service Type
- ☐ Adult Signature
- ☐ Adult Signature Restricted Delivery
- ☑ Certified Mail®
- ☐ Certified Mail Restricted Delivery
- ☐ Collect on Delivery
- ☐ Collect on Delivery Restricted Delivery
- ... Mail
- ... Mail Restricted Delivery
- ☐ Priority Mail Express®
- ☐ Registered Mail™
- ☐ Registered Mail Restricted Delivery
- ☑ Return Receipt for Merchandise
- ☐ Signature Confirmation™
- ☐ Signature Confirmation Restricted Delivery

PS Form **3811**, July 2015 PSN 7530-02-000-9053 Domestic Return Receipt

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U.S. Postal Service™
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24266 OFFICIAL USE NA

Certified Mail Fee $

Extra Services & Fees *(check box, add fee as appropriate)*
- ☐ Return Receipt (hardcopy) $
- ☐ Return Receipt (electronic) $
- ☐ Certified Mail Restricted Delivery $
- ☐ Adult Signature Required $
- ☐ Adult Signature Restricted Delivery $

Postage $

Total Postage and Fees $

Postmark Here: PORTLAND MAINE SEP 21 2018 04101

Debby A. Heath
14 Herrick Road
Belfast, ME 04915

7017 1450 0000 3024 1708

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PORTLAND MAINE SEP 21 2018 04101
Postmark Here

Certified Mail Fee
Extra Services & Fees (check box, add fee as appropriate)
☐ Return Receipt (hardcopy) $
☐ Return Receipt (electronic) $
☐ Certified Mail Restricted Delivery $
☐ Adult Signature Required $
☐ Adult Signature Restricted Delivery $
Postage
Total Postage
Sent To George Flimlin
Larissa Flimlin
Street and 530 E Jimme Leeds Rd
City, State, Galloway, NJ 08205
PS Form 3800, April 2015 PSN 7530-02-000-9047 See Reverse for Instructions

7016 1370 0000 5049 2537

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

George Flimlin
Larissa Flimlin
530 E Jimme Leeds Rd
Galloway, NJ 08205

9590 9402 2715 6351 6822 75

2. Article Number (Transfer from service label)

7016 1370 0000 5049 2537

PS Form 3811, July 2015 PSN 7530-02-000-9053

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X ☐ Agent ☐ Addressee
B. Received by (Printed Name) G Flimlin
C. Date of Delivery 10/5/18
D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☒ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
Insured Mail
Insured Mail Restricted Delivery (over $500)
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☒ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

Domestic Return Receipt

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PORTLAND MAINE SEP 21 2018 04101
Postmark Here

Certified Mail Fee
Extra Services & Fees (check box, add fee as appropriate)
☐ Return Receipt (hardcopy) $
☐ Return Receipt (electronic) $
☐ Certified Mail Restricted Delivery $
☐ Adult Signature Required $
☐ Adult Signature Restricted Delivery $
Postage
Total Postage
Sent To Eleanor G. Daniels
Donna L. Broderick
Street and 28 Perkins Rd
City, State, Belfast, ME 04915
PS Form 3800, April 2015 PSN 7530-02-000-9047 See Reverse for Instructions

7016 1370 0000 5049 2520

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

Eleanor G. Daniels
Donna L. Broderick
28 Perkins Rd
Belfast, ME 04915

9590 9402 2715 6351 6821 45

2. Article Number (Transfer from service label)

7016 1370 0000 5049 2520

PS Form 3811, July 2015 PSN 7530-02-000-9053

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X Eleanor G Daniels ☐ Agent ☒ Addressee
B. Received by (Printed Name)
C. Date of Delivery
D. Is delivery address different from item 1? ☒ Yes
If YES, enter delivery address below: ☐ No

38 Perkins Rd

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☒ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
Insured Mail Restricted Delivery
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☒ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

Domestic Return Receipt

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PORTLAND MAINE SEP 21 2018 04101
Postmark Here

Certified Mail Fee
Extra Services & Fees (check box, add fee as appropriate)
☐ Return Receipt (hardcopy) $
☐ Return Receipt (electronic) $
☐ Certified Mail Restricted Delivery $
☐ Adult Signature Required $
☐ Adult Signature Restricted Delivery $
Postage
Total Postage
Sent To Lisa Jo Desmarteau
James Thomas Desmarteau
Street and 10855 SW Visconti Way
City, State, Port Saint Lucie, FL 34986
PS Form 3800, April 2015 PSN 7530-02-000-9047 See Reverse for Instructions

7016 1370 0000 5049 2780

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

Lisa Jo Desmarteau
James Thomas Desmarteau
10855 SW Visconti Way
Port Saint Lucie, FL 34986

9590 9402 2715 6351 6821 38

2. Article Number (Transfer from service label)

7016 1370 0000 5049 2780

[redacted]

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X ☐ Agent ☐ Addressee
B. Received by (Printed Name)
C. Date of Delivery
D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☒ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
Insured Mail
Insured Mail Restricted Delivery (over $500)
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☒ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

Domestic Return Receipt

CERTIFIED MAIL® RECEIPT
Domestic Mail Only
For delivery information, visit our website at www.usps.com®.
24200-IC INAF USE

Certified Mail Fee
Extra Services & Fees (check box, add fee as appropriate)
Return Receipt (hardcopy) $
Return Receipt (electronic) $
Certified Mail Restricted Delivery $
Adult Signature Required $
Adult Signature Restricted Delivery $
Postage
Total Postage
Sent To: Goldenrod Properties LC
Street and: PO Box 345
City, State: Belfast, ME 04915

PORTLAND MAINE SEP 21 2018 04101 Postmark Here

PS Form 3800, April 2015 PSN 7530-02-000-9047 See Reverse for Instructions

7016 1370 0000 5049 2773

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

Goldenrod Properties LC
PO Box 345
Belfast, ME 04915

9590 9402 2715 6351 6821 21

2. Article Number (Transfer from service label)

7016 1370 0000 5049 2773

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X [signature] ☐ Agent ☐ Addressee

B. Received by (Printed Name): Alex Hawthorne

C. Date of Delivery: 9/26/18

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

SEP 26 2018 04915 USPS

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☒ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
...ail
...ail Restricted Delivery
...)
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☒ Return Receipt for ~~Merchandise~~
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

PS Form 3811, July 2015 PSN 7530-02-000-9053 Domestic Return Receipt

CERTIFIED MAIL® RECEIPT
Domestic Mail Only
For delivery information, visit our website at www.usps.com®.
24200FICNAF USE

Certified Mail Fee
Extra Services & Fees (check box, add fee as appropriate)
Return Receipt (hardcopy) $
Return Receipt (electronic) $
Certified Mail Restricted Delivery $
Adult Signature Required $
Adult Signature Restricted Delivery $
Postage
Total Postage
Sent To: R.W. and J.E. Curtis Irrevocable Trust
Street and: 34 Perkins Road
City, State: Belfast, ME 04915

PORTLAND MAINE SEP 21 2018 04101 Postmark Here

PS Form 3800, April 2015 PSN 7530-02-000-9047 See Reverse for Instructions

7016 1370 0000 5049 2766

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

R.W. and J.E. Curtis Irrevocable Trust
34 Perkins Road
Belfast, ME 04915

9590 9402 2715 6351 6821 14

2. Article Number (Transfer from service label)

7016 1370 0000 5049 2766

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X Jacqueline E Curtis ☐ Agent ☑ Addressee

B. Received by (Printed Name)

C. Date of Delivery: 9/25

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☒ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
...ail
...ail Restricted Delivery
...0)
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☒ Return Receipt for ~~Merchandise~~
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

PS Form 3811, July 2015 PSN 7530-02-000-9053 Domestic Return Receipt

CERTIFIED MAIL® RECEIPT
Domestic Mail Only
For delivery information, visit our website at www.usps.com®.
24200-IC INAF USE

Certified Mail Fee
Extra Services & Fees (check box, add fee as appropriate)
Return Receipt (hardcopy) $
Return Receipt (electronic) $
Certified Mail Restricted Delivery $
Adult Signature Required $
Adult Signature Restricted Delivery $
Postage
Total Postage
Sent To: Samuel Cassida
Jacqueline Cassida
Street: 271 Northport Ave
City, State: Belfast, ME 04915-1223

PORTLAND MAINE SEP 21 2018 04101 Postmark Here

PS Form 3800, April 2015 PSN 7530-02-000-9047 See Reverse for Instructions

7016 1370 0000 5049 2759

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

Samuel Cassida
Jacqueline Cassida
271 Northport Ave
Belfast, ME 04915-1223

9590 9402 2715 6351 6821 07

2. Article Number (Transfer from service label)

7016 1370 0000 5049 2759

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X Sam Cassida ☐ Agent ☑ Addressee

B. Received by (Printed Name)

C. Date of Delivery: 9/26

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☒ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
...ail
...ail Restricted Delivery
(over $500)
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☒ Return Receipt for ~~Merchandise~~
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

PS Form 3811, July 2015 PSN 7530-02-000-9053 Domestic Return Receipt

CERTIFIED MAIL® RECEIPT
Domestic Mail Only
For delivery information, visit our website at www.usps.com®.
OFFICIAL USE
Certified Mail Fee
Extra Services & Fees (check box, add fee as appropriate)
Return Receipt (hardcopy) $
Return Receipt (electronic) $
Certified Mail Restricted Delivery $
Adult Signature Required $
Adult Signature Restricted Delivery $
Postage
Total Postage
Sent To
Street and Apt. No.
City, State
Jeffrey R. Mabee
Judith B. Grace
290 Northport Ave
Belfast, ME 04915
PORTLAND MAINE 04101 SEP 21 2018
Postmark Here
PS Form 3800, April 2015 PSN 7530-02-000-9047 See Reverse for Instructions
7016 1370 0000 5049 2742

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

Jeffrey R. Mabee
Judith B. Grace
290 Northport Ave
Belfast, ME 04915

9590 9402 2715 6351 6820 91

2. Article Number (Transfer from service label)

7016 1370 0000 5049 2742

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X ☐ Agent ☐ Addressee

B. Received by (Printed Name) Jeffrey Mabee
C. Date of Delivery

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

USPS BELFAST ME 04915 SEP 26 2018

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☒ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Insured Mail
☐ Insured Mail Restricted Delivery (over $500)
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☒ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

PS Form 3811, July 2015 PSN 7530-02-000-9053 Domestic Return Receipt

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OFFICIAL USE
Certified Mail Fee
Extra Services & Fees (check box, add fee as appropriate)
Return Receipt (hardcopy) $
Return Receipt (electronic) $
Certified Mail Restricted Delivery $
Adult Signature Required $
Adult Signature Restricted Delivery $
Postage
Total Postage
Sent To
Street and Apt. No.
City, State
Larry D. Theye
Betty Becker-Theye
286 Northport Ave
Belfast, ME 04915
PORTLAND MAINE 04101 SEP 21 2018
Postmark Here
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Betty Becker-Theye
286 Northport Ave
Belfast, ME 04915

9590 9402 2715 6351 6820 84

2. Article Number (Transfer from service label)

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X Larry Theye ☐ Agent ☐ Addressee

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Street and Apt. No.
City, State
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Janet Eckrote
42 Grandview Ave
Lincoln Park, NJ
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PS Form 3800, April 2015 PSN 7530-02-000-9047 See Reverse for Instructions

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1. Article Addressed to:

Richard Eckrote
Janet Eckrote
42 Grandview Ave
Lincoln Park, NJ

9590 9402 2715 6351 6824 66

2. Article Number (Transfer from service label)

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Postage

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Total Postage and Fees

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PORTLAND MAINE SEP 21 2018 04101

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Sent To: Lyndon W. Morgan

Street and Apt. No.: 1 Tozier Street

City, State: Belfast, ME 04915

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1. Article Addressed to:

Lyndon W. Morgan
1 Tozier Street
Belfast, ME 04915

9590 9402 2715 6351 6824 35

2. Article Number (Transfer from service label)

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A. Signature

X [signature]

- [ ] Agent
- [ ] Addressee

B. Received by (Printed Name)

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BELFAST ME 04915 SEP - 4 2018 USPS

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Postage

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Interested Party

Sent To: Stephen Miller

Islesboro Islands Trust

Street and Apt. No.: PO Box 182

376 West Bay Road

City, State: Islesboro, Maine 04848

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1. Article Addressed to:

Stephen Miller
Islesboro Islands Trust
PO Box 182
376 West Bay Road
Islesboro, Maine 04848

9590 9402 2715 6351 6823 36

2. Article Number (Transfer from service label)

7016 1370 0000 5049 2599

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X

- [ ] Agent
- [ ] Addressee

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- [ ] Collect on Delivery
- [ ] Collect on Delivery Restricted Delivery
- [ ] Insured Mail
- [ ] Insured Mail Restricted Delivery (over $500)
- [ ] Priority Mail Express®
- [ ] Registered Mail™
- [ ] Registered Mail Restricted Delivery
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- [ ] Signature Confirmation™
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Public Information Meeting

Nordic held a Public Information Meeting regarding this application (the "PIM") on October 4, 2018 at 6:00 p.m. at the Troy A. Howard Middle School located at 173 Lincolnville Ave, Belfast, Maine 04915. The following parties represented Nordic Aquafarms and presented at the PIM: Erik Heim, President of Nordic Aquafarms, David Noyes and Carter Cyr of Nordic Aquafarms, Attorney Joanna B. Tourangeau of Drummond Woodsum, counsel to Nordic Aquafarms, Elizabeth Ransom, Principal of Ransom Consulting and Nate Dill of Ransom Consulting.

Approximately 175-200 members of the public attended the PIM. Two hundred copies of the Maine Department of Environmental Protection's Information Sheet Public Participation in the Licensing Process (copy attached) were made available to attendees. Sign in sheets, attached hereto, were available to provide an estimate of attendees.

Robin Dostie, a court reporter and Notary Public in and for the State of Maine transcribed the hearing. The transcript of the PIM is included with this application.

Copies of the PowerPoint presentation slides from the PIM are available on the City of Belfast website at https://www.cityofbelfast.org/index.aspx?NID=366 Slides are located under "Maine Department of Environmental Protection Permit Process" heading. The PIM was broadcast live on the City of Belfast channel BEL TV and a recording can be viewed here: https://www.cityofbelfast.org/index.aspx?NID=262

We understand that the Department has received questions regarding the scope of the notice provided for the PIM. While the notice complied with the abutter notification requirements of Chapter 2 of the Department Rules, transparency is of the utmost importance to Nordic. Going forward, Nordic will continue to voluntarily provide notice of meetings and applications to entities who request it. Nordic will also voluntarily submit copies of DEP applications to the Town of Northport to assist interested parties in reviewing those applications. Finally, Nordic is increasing the size of the notice area (where notice is required by DEP) to include notice to property owners (as shown on readily available Belfast and Northport tax maps) within a one mile radius of the discharge.

Information Sheet

Public Participation in the Licensing Process

Dated: April 2018   Contact: (207) 287-7688

SUMMARY

Maine law charges the Commissioner of the Department of Environmental Protection (D.E.P.) with evaluating license applications for many different activities that affect Maine's environment. Individuals and legal entities may participate at various points during license application processing. Individuals must recognize that the Commissioner's charge may, under certain circumstances, be overtaken by the Board of Environmental Protection (Board). This INFORMATION SHEET, in conjunction with consulting statutory and regulatory provisions referred to in this document, will assist with your understanding of the potential opportunities for participation in the Commissioner's process; other specific provisions that apply to the Board are not addressed in this INFORMATION SHEET. A failure to participate during the licensing process will result in a person's only option for influence over that decision being the filing of an appeal. D.E.P.'s *Rules Concerning the Processing of Applications and Other Administrative Matters (Chapter 2)*, 06-096 C.M.R. ch. 2, was promulgated, in part, to provide guidance on this process.

1. **PUBLIC ACCESS TO INFORMATION**. Records submitted to D.E.P. are generally available to the public under Maine's Freedom of Access Act, 1 M.R.S. §§ 400-414. Other than portions claimed to be confidential by law when submitted to D.E.P., all license application materials are readily available for review and copying at our offices in Augusta, Portland, Bangor, and Presque Isle.
2. **PUBLIC NOTICE**. Maine law requires applicants to publicly make known their intent to submit an application to D.E.P. It is the responsibility of an individual who is interested in following or participating in the license decision-making process to act after seeking out that notice or, if you are an abutter, to act when noticed directly by mail.
   A. **Public Informational Meetings**. Informational meetings are held by persons prior to submitting a licensing application to D.E.P. for the purpose of informing the public about an anticipated project. These meetings are held at a location near to a proposed project and are by design open to the public. Abutters to the anticipated project location receive notice in the mail of the meeting time and location, and notice is also published in newspapers serving the area of the project.
   B. **Application Filing**. Prior to filing an application with D.E.P., abutters to the project location receive notice in the mail of the anticipated filing date, and it is also published in newspapers serving the area of the project.
3. **INTERESTED PERSONS**. Individuals can acquire materials submitted to D.E.P., attend public informational meetings, request that a public hearing be held on a filed application, request that the Board take jurisdiction over an application, and provide comments on an application or a draft decision.

A. **Maximum Participation**. Participation in a D.E.P. licensing decision to the maximum extent possible requires a person to submit a written request stating his or her desire to acquire material related to an application. The individuals who do are known as "interested persons." Once a request is filed, interested persons will be provided with the opportunity to inspect and copy materials on file at D.E.P.; they also receive direct notice of public informational, pre-application and pre-submission meetings, and public hearings. The timing of an interested person's request to be part of the process will determine the number of events potentially available to him or her.

B. **Public Informational Meetings**. Informational meetings are held to inform the public about environmental impacts that are anticipated from a project. Interested persons may ask questions at such a meeting. Questioners should be aware that answers may not be available during the meeting.

C. **Pre-application and Pre-Submission Meetings**. D.E.P. often meets with potential applicants to identify regulatory and processing issues that need consideration. Pre-application and pre-submission meetings will typically not be attended by interested persons, in part because such a meeting is not, by law, a "public proceeding" freely open to attendance under Maine's Freedom of Access Law. Although the decision to allow individuals other than an applicant to attend is D.E.P.'s to make, interested persons invited to attend such a meeting should expect only to observe, since public input cannot be received at this time in the licensing process.

D. **Application Comments**. Interested persons and any other member of the public may submit written comments, including technical information, at any time during the course of an application's processing. It is in that person's interest to submit information early in the process in order to ensure adequate time for consideration by the D.E.P. staff member evaluating the application.

E. **Draft Order Comments**. Interested persons will receive the Commissioner's draft licensing decision at least five (5) working days prior to final action. Written comments may be submitted on that draft decision. Reasonable notice of when the Commissioner anticipates issuing a final decision on the draft order will also be provided to interested persons.

F. **Public Hearing Requests**. People may request that a public hearing be held on a filed application within 20 days after its acceptance as complete for processing by D.E.P. Such a request must satisfy requirements found in Section 7 of Chapter 2. The Commissioner will typically order that a hearing be held where credible conflicting technical information appears to exist regarding a licensing criterion.

G. **BEP Jurisdiction Requests**. People may request that the Board assume jurisdiction over a filed application within 20 days after D.E.P. accepts it as complete for processing. Such a request must satisfy Section 17 of Chapter 2. Board jurisdiction is not available for windpower development projects or general permits for tidal energy demonstration projects.

ADDITIONAL INFORMATION

If you have questions or need additional information on the appeal process, contact the D.E.P. by calling (207) 287-7688. All Maine D.E.P. rules and laws are available via the internet by following the links provided at: http://www.maine.gov/dep/.

Note: D.E.P. provides this INFORMATION SHEET for general guidance only; it is not intended for use as a legal reference. Maine law governs every citizen's rights.

OC/F2003/r.1-2004/r.2-2008/r.3-2018

Nordic Aquafarms Public Information Meeting
October 4, 2018
Sign In Sheet

NAME	EMAIL ADDRESS
Tim Sam[illegible]	
Eric Cohen-S[illegible]	
[illegible]	
Michelle Gr[illegible]	[redacted]
[illegible]	
Leo Pelle[illegible]	
Bianca Pelle[illegible]	
Jeriolt Engstrom	
Logan Chipman	
D[illegible] Cooke	[redacted]
Mary Weaver Dutch	
[illegible]	
[illegible]	
David Comfort	
Beverly Comfort	
Robyn Tarantino	[redacted]
JASON MITCHELL	
Joe McElwee	
Ethan Hughes	N/A
NATHANIEL BAER	[redacted]
Miriam Watkins	N/A
Doug GURNIC	
A. Nickerson	
[illegible]	
Ellie Daniels	[redacted]
Donna Broderick	
Zafra Whitcomb	
Suzanne Stone	
Marion Brown	
Camille Giglio	
Frank Giglio	
Sunny Giglio	
Wilder Giglio	
Rebekah Heikkila	[redacted]
Joanne Moesswilde	

Nordic Aquafarms Public Information Meeting
October 4, 2018
Sign In Sheet

NAME	EMAIL ADDRESS
CARMEN KRYSTOSEK	[redacted]
Jim Owen	[redacted]
SID BLOCK	[redacted]
MICHAEL TIPPELL	[redacted]
GRETA Z Guleezian	[redacted]
GARY GULEZIAN	[redacted]
Sadie Lloyd	[redacted]
Janie Phillips	[redacted]
Andy Stevenson	[redacted]
Paul Porada	[redacted]
Betty Sue Easton	[redacted]
Shelley Fein	[redacted]
STEVEN FEIN	[redacted]
Wayne Marshall	[redacted]
Amy Green	[redacted]
Emmett Downes	[redacted]
Judy Johnson	[redacted]
GARY KEMPTON	[redacted]
PAUL JURUTKA	[redacted]
Nancy Durand Lanson	[redacted]
Meredith Brookins	[redacted]
Phyllis Coelho	[redacted]
Eileen Wolper	[redacted]
Te Querry	[redacted]
Stephanie Querry	[redacted]
KATE HARRIS	[redacted]
Babette Cohen-Solal	
Armonie cohen-solal	
KATHRYN SHAGAS	[redacted]
Robyn Duffy	[redacted]
Chad Mills	[redacted]
Donna Dubrow	[redacted]
Daniel Hebert	[redacted]
Susie O'Keeffe	[redacted]

Nordic Aquafarms Public Information Meeting
October 4, 2018
Sign In Sheet

NAME	EMAIL ADDRESS
Pat Kaplan / Alan Kaplan	[redacted]
Philip Conkling	
Red Webster	
Ilona Mattson	
[illegible]	
Jim Wilson	[redacted]
Dave Losee	
John Krueger	
Jim Grant	
Amy Grant	
Wendy Krueger	
JONATHAN FULFORD	
Steve Miller	
Helen A. Barrett	
Betty Becker-Theye	[redacted]
Larry Theye	
DONNA SHORT	
Betsy Headley	
Helen Burlingame	[redacted]
Cary Slocum	
CARLTON MILLS	
Martha Block	
[illegible]	
JIM HUNTING	
Chris Horning	
Patti LeClair	
JIM LECLAIR	
Jessica M. Carr	
Ernie Cooper	
Deborah Capwell	
Larry Litchfield	
WM CRESSEY	
David Wharff	
Karl Beiser	

Nordic Aquafarms Public Information Meeting
October 4, 2018
Sign In Sheet

NAME	EMAIL ADDRESS
Janine Cary	[redacted]
Bruce Reinemann	[redacted]
Wendy Reinemann	
A. WATKINS	
Samantha Langlois	
Susan + Walden Cutting	
Christopher Anderson	
Audra Novino McTague	
GEIR GÅSEIDNES	
DECLAN O'CONNOR	
Paul Bennacki	
Jon Morgan	
Josephine Cooley	
Betsy Shell	
Chris Rector	
Shey Conover	
Bill Colcord	
Dorothy Colcord	
Joellen Gaseidnes	
DON PERKINS	
Bethany Allgrove	
Jan Dodge	
MARY BIGELOW	

Nordic Aquafarms Public Information Meeting
October 4, 2018
Sign In Sheet

NAME	EMAIL ADDRESS
Elizabeth Hebert	[redacted]
ETHAN DUBROW	
SUZANNE RICO	
Jennifer Buttery	
Adam Lynn	
Abigail Curtis	
James Merkel	
Alison Feibel	
Alicia Galero	

NOTICE OF INTENT TO FILE MAINE WASTE DISCHARGE LICENSE/MAINE POLLUTANT DISCHARGE ELIMINATION SYSTEM PERMIT APPLICATION
AND NOTICE OF PUBLIC INFORMATIONAL MEETING

IN RE NORDIC AQUAFARMS, INC.

Public Meeting At The Troy A. Howard Middle School

Reported by Robin J. Dostie, a Notary Public and court reporter in and for the State of Maine, on October 4, 2018, at the Troy A. Howard Middle School, 173 Lincolnville Avenue, Belfast, Maine, commencing at 6:00 p.m.

REPRESENTING NORDIC AQUAFARMS, INC.
JOANNA TOURANGEAU, ESQ., DRUMMOND WOODSUM
ERIK HEIM, NORDIC AQUAFARMS
ELIZABETH RANSOM, RANSOM CONSULTING
NATE DILL, RANSOM CONSULTING
DAVID NOYES, NORDIC AQUAFARMS
CARTER CYR, NORDIC AQUAFARMS

TRANSCRIPT OF PROCEEDINGS

MS. TOURANGEAU: Good evening. Welcome. My name is Joanna Tourangeau. I am an attorney from Drummond Woodsum who is here tonight on behalf of Nordic Aquafarms. I am an environmental permitting and compliance lawyer based out of Portland who has been working in this field for 15, 16, 17 years, something like that. I stopped counting. I started in 2000.

Also with me tonight is Erik Heim, the President of Nordic Aquafarms. He's worked on three similar projects. He is going to give an overview of the project, the treatment systems, the discharge quantities and quality. To his left is Elizabeth Ransom from Ransom Consulting. She has 30 years experience with environmental assessments and projects. She is going to give an overview of the discharge permit parameters and the Belfast Bay background conditions. To her left is Nate Dill, also from Ransom Consulting with 13 years experience and he is going to present modeling of conditions with the discharge in Belfast Bay.

We are here tonight to talk first about the overall public process for the project. I am going to give that overview and what we are doing tonight

is the MEPDES permit application public information meeting. This is one of several information meetings that will be held for the overall project. The overall project will also require a federal permit under the U.S. Army Corps of Engineers for the intake and outfall construction on the bottom of Belfast Bay and for impacts to protected resources like wetland. We will also be applying in the future for a Site Location of Development Act Permit and a Natural Resources Protection Act Permit from the DEP. Under the Natural Resources Protect Act, we will also be required to obtain a Significant Groundwater Wells permit. All of those three permits at the state level that are indicated up there will also require that we do additional meetings like the one we're having tonight. So those meetings will have additional meetings like this where we will be answering questions about all of the other aspects of the project. Once we get through and into that state level and federal level process, we will also be submitting applications at the city of Belfast level to comply with all of the local ordinances and there will be a public process associated with those applications as well, so this is the first of what will be many opportunities for public questions

regarding our proposed project.

Tonight, we are here to talk about the discharge from the project that is being proposed in our draft application. The public information meeting is required by DEP to be held in advance of us submitting our application while the application is still in draft form. We are required to submit to DEP a rough estimate of the number of people that are here tonight, so if you haven't signed in on the sign-in sheet that will very much help me in terms of counting how many folks were here tonight.

We are also having a court reporter here tonight, Robin Dostie, thank you, who is making a transcript of the entire hearing. This is in part because the main purpose of this meeting is for us to answer questions about the discharge to Belfast Bay and one of the things that I will need to do is create is a list of the questions about the discharge that were asked at tonight's meeting and ensure that we provide a narrative response to those questions and hopefully we will be able to answer all of the questions that are had here tonight as well and that will be in the transcript. To the extent there is a question that comes up that we cannot answer tonight, we will pull that question out of the transcript and then provide a narrative response in our application. Please understand the application is still in draft, that's the point of this meeting, so there may be some changes from the information that we present tonight in response to the comments, the questions that we receive. We understand that the city of Belfast has also asked that there be an additional public meeting following our submission of our application to the DEP and we support that request.

Copies of our application will be submitted on or around October 19 will go to the DEP's office in Augusta. A copy will go to the city of Belfast. You can review those in either location. I have been advised by the DEP that it will also go on their website as will all comments and other written materials on the application under what's labeled on their website as the major projects section, so if you wish to review it on the internet it's available there as well.

Tonight, we are hoping to keep our presentation to approximately one hour. As I mentioned earlier, we have a court reporter here, we also have an ASL interpreter for those who require that assistance. This meeting is also being broadcast live on the regular channel that is used

for city meetings. There are 200 copies of the DEP fact sheet regarding all of the public process that is required for submission of the MEPDES permit, which is what this is, that are in the back and in the front, that's where the sign-in sheets are also located. Many of you picked that up. It's the two-page flier that some of you might have picked up and that gives you all of the contact information for DEP and how to participate in the application as it goes forward.

So what is this permit for? I'm going to go backwards actually. We are planning to take a bio break at 8 o'clock so that folks can have a minute. I am not going to base it on when we finish our presentation or where we are in the questions, but when it gets to be 8 o'clock I'm going to interrupt whoever is kind of up and we're going to take a quick 5 minute bio break and come back and we have the room until 9.

So what is this permit for? In 1972, the Clean Water Act made it illegal to discharge any pollutant from point source into navigable waters without a permit. The State of Maine regulates such discharges under their MEPDES program and that is the program that we have in draft application form that

we are here to discuss tonight. What that meant for Belfast is that discharges like those that were historically associated with the chicken farms are now illegal, so there will not be those kinds of contaminants going directly into Belfast Bay.

I am going to turn it over at this point to Mr. Heim to start off with a general discussion of the project.

MR. HEIM: Good evening. I am going to just give a brief overview of the project.

AUDIENCE MEMBER: We can't really hear you.

MR. HEIM: You can't hear us?

AUDIENCE MEMBER: No.

MR. HEIM: Okay. I understand we have to have it almost in our mouth for it to work properly.

AUDIENCE MEMBER: And if you could step back so we can have eyesight of interpreter.

MR. HEIM: So -- yeah, can you all see the screen?

AUDIENCE MEMBER: Maybe go behind the podium.

MR. HEIM: I'll go behind here. Okay. I'll hide behind here so everybody can see. I realize that not everybody has maybe been to our meetings, so I'm going to give just a brief overview of what we

are talking about.

AUDIENCE MEMBER: Can't hear you.

MR. HEIM: Can't hear you. Okay. I'm going to try and speak as loud as I can. So our production is dependent on clean water and that means we have an interest in keeping it clean and that's also part of the purpose of what we're going to be talking about today and how we are going to achieve that. And for those of you who haven't been to these meetings just a short explanation of what we're talking about. This is an indoor operation where we have an operation that goes from salmon eggs to what we call smolt, that would be small salmon, and then take them through the growth stage to harvest size. And this facility would basically produce filets and so-called head-on gutted fish. Only fresh product only going by road transport to Northeast region. Today most of the salmon is flown in by airplane to the U.S. from abroad.

The benefit of having all of this in one place is traceability. You can trace every step of the process, you know exactly where it comes from and that is something that consumers increasingly are concerned with. All of this is based on so-called recirculation systems. This means that we recirculate water in the system and clean it continuously and one of the benefits of that is that you reduce water usage. Historically, they were using flow through systems for land-based systems. It required a lot more water than we do today. And the alternative is sea pen production, which is not that common in the U.S. anymore. I believe the only place left is northern Maine. Beyond that, a number of other countries do still work with sea pen production.

Okay. I am just going to explain how we ended up here. We did a scientific search of the entire coastline from Washington D.C. up to Canada. We had a long list of criteria that are important in terms of deciding a good site. In every case there is trade-off in terms of sites. One of the reasons we ended up in this water, the region, is clean water, cold water. It's excellent conditions for salmon. And also the other issues that we looked at is what's a nice community for employees to move to and work in, is there power access, what's the proximity to larger consumer markets so we can deliver fresh product, high quality fresh product. All of these considerations came together. We probably walked 20 sites in Maine and this particular

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area and this site was the one where all these things came together in a good way. So that means it's not easy to find good sites for these kind of projects.

In terms of why should this be interesting for Maine, and more specifically Belfast, it's a matter of creating jobs. It's a lot of business for vendors, companies locally and in Maine, and that also means indirect job creation in other companies. We have a number of academic institutions in Maine who work with aquaculture and obviously there is synergies in terms of that whole academic branch in Maine, also given the political interest in growing the aquaculture sector for Maine in the future. So there is a number of things that come together and of course there is also the value creation that also means tax revenue, which is significant. I believe this project will by far be the largest taxpayer in Belfast as well. So we look at the holistic picture of this in terms of this and look at it up against the disadvantages and what we'd be working to do is minimize disadvantages and this is the first part of the impacts that come along with that.

So I think one important thing to just go through is we are not a sea pen operation. We are a company that sort of went against the incumbent

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industry and we wanted to do things differently and typically a lot of the things that have been associated with salmon production are related to sea pen. So a couple of the things that are important is that when you're talking about discharge today we're going to talk about the advance technology that's already been used in industrial wastewater treatment across the globe, but we are one of the first companies really investing in this because we believe it is the future. And the other thing is a lot of the things that you filter out from a discharge is high in nutrients and that's a resource. And if you look at the industry today, the byproducts value added processing is a part of the future because it creates value in jobs also and that's exactly what we're doing in this project.

Everything we take in or release for water is also treated for bacteria and pathogens. One of the most important things for us is to prevent stuff in the bay coming into our facility. That's the source of disease for us, so we treat that vigorously on the way in and we do the same on the way out. So that's also something that's different from sea pens where you're basically open to free movement of these things. And we also have extensive barriers to fish

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escape, which has been a traditional challenge to some extent in sea pen operations and so that's also an issue that's addressed. Typically, sea pens have been treating for sea lice and parasites. We filter them out before they can reach our fish, so we don't use those kind of medications. That's another benefit. And obviously we develop this on private property while other operations are in open water public space and domain. Finally, there is the issue of what you give your fish. There is a great variation in practices in this area. Our focus is a high quality product and that means what you feed your fish will determine the quality of your product you get out the other end. We're going to get back to that also.

So a little bit about the timeline. We've been -- we started this process last winter. Currently, we are working our way through permitting, that also requires engineering, so that's currently ongoing. And this project is then planning on working through all of this towards next summer where engineering is basically going to put us in a place where it's possible to start construction, that's the rough timeline.

And that, I believe, Elizabeth, are you

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going to do the permits thing?
MS. RANSOM: Sure.
MR. HEIM: I will get back to the specific water treatment and discharge figures after Elizabeth is done her part.
MS. RANSOM: Good evening. Am I able to be heard? Is this close enough?
MS. TOURANGEAU: Speak up too.
MS. RANSOM: Okay. And I apologize, folks, for the thumping background. There is nothing we've been able to do about that. I do apologize.
So what does this permit regulate? As Joanna mentioned earlier, the reason we have a MEPDES permit process is due to the Clean Water Act. In the early '70s there was a list of things in particular that we knew we wanted to keep out of our waters whether it was rivers or oceans and there were various types of pollutants that were described. When we think of pollutants there are two types of pollutants that we can list. One are things that are considered toxic and there is an actual toxic substances list that was created in 1977.
AUDIENCE MEMBER: It's very hard to hear you, Elizabeth.
MS. RANSOM: I'm sorry, I'm not quire

sure --
MS. TOURANGEAU: Talk right into the mic.
MS. RANSOM: There we go. So there are two types of pollutants that are typically regulated under a discharge permit. One of those would be the types of things that we think of as toxic substances. Those are things like pesticides, heavy metals, things that we can all kind of relate to as being clearly not good for us. But it also regulates non-conventional pollutants such as nutrients and that is what this facility is producing. It's compounds like oxygen, nitrogen, and phosphorous, things that are necessary for life, but if we have too much of them they're harmful too. How many of us have been to a doctor and had somebody say you need to reduce your cholesterol and stop eating so much of X? We obviously need carbohydrates and protein to survive, but obviously too much of a great thing isn't great for us, so that's what we're here to talk about tonight. Nordic Aquafarms waste stream will discharge low levels of residual nutrients, not toxic, but that nutrients still is something that is regulated under the MEPDES process.
So what are those nutrients? I'm going to talk about what some of those key things are. So

some of the key nutrients that are typically regulated and looked at under the MEPDES permit include total suspended solids, biological oxygen demand, nitrogen, and phosphorous. So what are those? So TSS is the amount -- is an actual measurement of the amount of solids in water that can be trapped by a .2 micron filter, so that's a really small filter. And the good thing about this is it allows us to actually take a measurement from a laboratory that is standardized and tell you, jee, what kind of an impact are we having? So is my treatment system working the way it's supposed to and taking those solids out before we discharge something to sea. Because think about it, we all know what TSS or too much TSS looks like. How many go swimming in the bay after a storm and it kicks up a lot of stuff and we can see floaty things when we're out there in the bay, that's TSS. That's things like phytoplankton, silt, decaying plants, animal waste, sewage, there is a lot of things that can go into TSS and that's one of the parameters that Nordic is going to need to monitor when they have a discharge. If TSS is too high, over time the solids that come out of the TSS are obviously not good for marine life and can cover the benthic communities at the bottom of

the bay, so we want to keep TSS low.
So then we also want to look at something like biological oxygen demand. This is a general parameter that is commonly put onto a discharge permit. I would gather that it's something that your local wastewater -- municipal wastewater treatment plant also monitors. It's a measurement of the amount of dissolved oxygen needed by aerobic organisms to break down the organic matter in water over time. So when BOD levels are high the oxygen levels decrease because the oxygen that's available in the water is being consumed. So when DO goes down some of our most beloved sea creatures are not really happy. So those levels of DO, for example, are things that lobsters don't like. So we want to keep BOD low and in turn we want to keep DO in the right range.
So another vital thing that we'll be measuring is nitrogen. Nitrogen is the most abundant element in the earth's atmosphere. We all need nitrogen for production of amino acids and the building blocks for protein. Plants also need it for photosynthesis. And in sea water we have a lot of different sources of nitrogen. There is agricultural runoff, there is point discharges such as wastewater,

there is general runoff from lawns and other development and then there is atmospheric deposition. In fact, the majority of the nitrogen that we have in sea water is naturally occurring from atmospheric deposition. But if we have too much nitrogen it can lead to increased plankton and combined with too much phosphorous it can lead to algal blooms. So this is a parameter that obviously we want to make sure we monitor going forward and that the discharge is monitored for going forward so we know there is not too much nitrogen being released to the bay.

And another parameter that you'll commonly hear when people are talking about in particular algal blooms is phosphorous. It's also another common earth element and it's found in sea water and it's essential for plant life, but, again, too much of the phosphorous can also add to the potential for the algal blooms and the degradation of the water quality, so that's something we're going to be looking to keep monitoring from the facility. Common sources of phosphorous include also things like agricultural runoff and lawn fertilizer and animal waste.

So, again, we are primarily interested in having on the permit the things that would be coming

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from the facility as nutrients. We're trying as a part of the process that Erik will be talking about to do a good job of treating for those and also by removing as much of the solids as possible we're going to keep some of those things down even before it gets into the treatment plant in some ways because a lot of those solids are things that can be reused and recycled.

And Erik is now going to come up and tell you a little bit -- oh, actually, before he does, I've got one more very important slide. Sorry.

So what are the levels out there now? That's a really important starting place, right. We have a bay that I think most of the people in this room really love and want to keep looking good. And so one of the things we need to do is we need to understand what are background conditions, how healthy is the bay now and that way we know going forward if we're having an impact. There are places in the bay where there are regular datapoints that have been collected over the years. There are certain stations where data goes back, you know, you can look back to certain academic studies that have gone back to the 1970s. There are other places where the EPA has collected some data in the 2000s, but

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none of those were exactly in the point of where this project is planning to discharge, so we've started to establish a dataset for this project. We've gone out over the past few months and started to collect some data.

So just real briefly, a summary is the TSS we've found to be in the range of 6.9 to 11 milligrams per liter. And, again, for those who aren't used to thinking in those terms that's parts per million. BOD is currently low. We've been at or near the laboratory detection limit of 2 milligrams per liter. Phosphorous has ranged from .012 to .024 milligrams per liter. And nitrogen has ranged from .17 to .08 milligrams per liter out in the area of the discharge. And then we've taken some additional samples of nitrogen and phosphorous up close to the Little River Dam because we frequently see some of these parameters are higher in fresh water than they are in the ocean itself and we did, in fact, find that the nitrogen kind of right off from the Little River is a little higher. It was up to a .78 milligrams per liter. And I don't expect everybody to memorize those numbers, but I think you're going to find those ranges come in handy later as we start talking about what's coming from the discharge

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itself.

And with that, I think Erik is going to come back and tell you a little bit more about the treatment process.

MR. HEIM: Thank you. So we're going to talk through a little bit what we are doing for treatment of the discharge and the technologies behind that. And an interesting sort of history both in the U.S. and Europe when you look at how companies generally in various industries have moved through these processes. If you look at most permits today in Maine none of them contain requirements for phosphorous and nitrogen, for example. But this is a change that's coming politically in the U.S. and we've seen in the U.S. and we've seen the same in Europe as well and it's important because all of these things do influence ecosystems.

I'm going to take you a little bit through the process in rough steps. This is the wastewater treatment process and typically you would have industrial companies who are discharging and applying various levels of wastewater treatment. You can have municipal infrastructure doing the same and so are we. The basic component coming into this is basically feed and feces from fish, and I'm going to

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talk briefly about feed afterwards, but that's really the basis for the discharge and this is what contains the various nutrients that we're talking about.

So this is a multi-step process and the important thing is to address the issues that Elizabeth was just talking about. The first step is nitrogen. In this case, we are one of the few companies in the world who implement denitrification as it's called. It's a filter system populated by bacteria that breakdown by nitrogen in very simple terms. So in this case, this is a part actually of the production environment so it's continuously reducing nitrogen in the fish tanks before discharge. This facility reduces 85 percent of nitrogen produced in the fish tanks. We are not familiar with anyone doing this. That's the pretreated water and in those fish tanks there is also a treatment process removing CO2 and other types of substances, but the pretreated water goes to the wastewater plant. So typically you will see in lots of wastewater treatment plants potentially also drinking water in some cases are treating for P reduction and this is also the case here. There is a process in the wastewater plant that reduces phosphorous by 99 percent before the water is discharged.

Then there is something that is quite unique to this industry, which is membrane microfiltration. Now, this goes down to a mesh size of 0.4 micro. That means it also takes out bacteria. That gives an idea how finely mesh this is. So this is part of what takes out almost all particles and bacterial elements that might be there in the first place.

And then there is a final step which is called UV light dosing. UV neutralizes pathogens and there is a very strong dose that basically is treating every drop of water going through the system. It's the same with the intake water as well. So the combination of the system is really what addresses some of the issues that Elizabeth was talking about and what I'm going to do then is to take it a little bit further so you can see what this means. And an additional question is in a facility like this you are dealing with live creatures, so everything in this facility has backup systems. Should the power go out, they will kick in immediately and that's also the case for this.

Just to show you a little bit more about microfiltration. Like I was saying, 0.4 micro. It's very, very finely meshed. And then the final step is the 300 micro dose of UV light going through this

water and that will pretty much take out every bug you can think about in this case, but the primary strategy we have is to never let bugs in the first place from the bay in the system. That's why we also treat the intake water and that's also why the risk of discharging anything of bacterial nature is very low in this process.

Just a final step in terms of the treatment process. So there are solids coming out of various parts of this treatment process. All these solids they go through a special dewatering process and what you end up with is a sludge very high and rich in nutrients. And this sludge is in Maine's case going to biogas production. Other cases we see, for example, Norway, it's used for fertilizer, other types of projects, but in Maine we are sending it to biogas production. And the -- yeah, and that basically means none of this is going into the ocean. It's being recycled.

Just about -- a few words about the feed profile. So any time you calculate your discharge you start with parameters related to the feed. How much feed are you using, what the are nutrient profiles that you're looking at for your feed and that's the whole basis for what we do also. And in

the industry today there is a wide variety of feed ingredients you can choose from and there is also new ones coming into the industry on a continuous basis. So this basically means that any producer can almost tailor their feed in any way they want. So in our calculations, we take in the feed types and ranges that we are interested in looking at --

AUDIENCE MEMBER: The slide is gone.

MR. HEIM: Oh, what happened?

AUDIENCE MEMBER: I hope this doesn't happen with the fish farm.

AUDIENCE MEMBER: Maybe dim the lights so we can see the slides better.

MR. HEIM: Can we reduce the lights?

MS. RANSOM: I'm sure we can.

MR. HEIM: We can try to see if we can make that happen. So when we start sourcing our feed, so we pretty much know the profile of the nutrients in the feeds that we're going to be looking at, but we have a lot of choices in terms of ingredients. So the U.S. in terms of the feed producers we are talking to, all of them are highly focused on being USDA, FDA and ISO compliant in terms of anything they use in their feeds. So everything is following federal law in the U.S. and basically as the same with the food products we eat ourselves. It's highly regulated in the U.S. as it is Europe. So this is just to let you know that this is how the process works. You start with the amount of feed, the feed profile and then you get to the sort of composition of feed that you're looking for.

Just a couple of words also, medications is a chemical that's also included in the application. Now, the way this works in the U.S. you have to list every conceivable substance you will ever use and that's why we also then list every conceivable and, for example, some substances we will change over time for various reasons so we have to list alternatives also. All of this will be included in the application. This is just some internal comments related to that, for example, antibiotics are not used in the industry anymore, at least not in Europe, but there could be a contingency case where you would need to use if for a short period of time for fish welfare purposes and so these are the kind of things we will list in the application. Any use of these will be handled through a U.S. veterinary according to U.S. law just so we are clear on that.

Okay. I'm going to get right into the actual discharge and give you the factual figures.

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These figures are based on the total future production of 33,000 metric tons. When we start production, Phase 1, the figures will be half of this. And TSS, as Elizabeth described, this facility reduces 99 percent of the gross discharge through the wastewater treatment. That leaves 185 kilos per day or also in the concentration as commonly used as 6.3 milligrams per liter. The background value in the bay is 6.9 to 11. That means the water we are discharging has a lower level of TSS than the bay.

The next one is BOD as this one explains. This facility discharges 162 kilos per day fully developed. That's a 99 percent removal of BOD or also 5.5 milligrams per liter. The background value in the bay is approximately 2. That means our discharge at the pipe is slightly higher and as the modeling will show in the next part of the presentation that is diluted quickly to background values in the bay.

Phosphorous. 99 percent removal. 5.8 kilos per day or 0.2 milligrams per liter. Background values are 0.12 to 0.24, slightly higher than the bay background values. Again, the modeling will demonstrate how quickly this is diluted a short distance from the pipe end.

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Nitrogen. 85 percent removal. It's the most difficult one to remove as all wastewater plants know. Our benefit here is we can remove it continuously in the production, otherwise we would require a pretty large holding tank structure to reduce this. 673 kilos per day, concentration of 23 milligrams per liter. Background measured is .17 to .48. Again, most of the modeling we have done that you will see is based upon nitrogen because it is a bit higher than the background and we want to show what that means. Important thing in nitrogen is ammonia. It's the most harmful element in nitrogen. Total discharge per day is 0.7 kilos per day or 003 milligrams per liter. The background levels in the bay are higher than this concentration.

So how much nitrogen is this really? We have looked at studies done on the bay before that have mapped out the various sources. I believe this was touched upon earlier by Elizabeth. Based upon that study, this total discharge makes about 0.75 percent of the nitrogen coming into this bay. So that gives you an idea of the amount in relation to the natural sources or other input sources that are coming into the bay today.

Just before we look at more of the modeling

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of this, one of the important things that we do in Europe and we will be doing here it's also dependent on DEP requirements and what they're asking is monitoring of this, so we have self-imposed monitoring programs and there will be DEP requirements related to those. Most of these factors are measured by sensors and also manual lab tests on a regular basis. There are kept logs for this. They can be audited at any time by the authorities. And obviously we have a self-interest in monitoring these and making sure that we comply with the law. As in Europe, there is a penalty if you don't stick to the permits that you receive.

So that leaves us really with the next step, which is the modeling that has been done for the bay. This has been done by Ransom. It's also being quality assured independently by the Ramboll Environmental, a large environmental company in the U.S. Their report on that will also be submitted with the application.

So I'm going to turn over to you.

MR. DILL: Thanks, Erik. Can you all hear me all right?

AUDIENCE MEMBER: Fine.

MR. DILL: So my job here, I guess, to give

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you kind of a little bit of introduction has been to come up with an assessment or prediction of what's going to happen with this discharge when it goes out into the bay. And I think one thing that's important to understand going into this is that we've just -- we've just learned from what Erik and Elizabeth talked about that the water that is actually being discharged is really very, very clean. And so when we talk about what happens after that, it's -- we're looking at how that water is getting mixed with the water that's in the bay and how that is even further getting diluted and so any components that are in that water the concentration of them is going to be reduced significantly.

So to kind of start with the end result here, I think we're looking at this figure here and what this is showing you -- and I think I have a laser here I can point to. This location right here is where the outfall -- there will be a pipe that extends off-shore here underneath the water and near the bottom it will be discharging the effluent from that, the wastewater from that pipe right around in this area. It's about a thousand meters off-shore here. And one of the things that we've looked at is what are the populations that are nearby that might

be sensitive to this. And so we now from -- we know from the state they have records that document in the past at least there had been some eel grass here and eel grass is one of the things that's known to be sensitive to nitrogen concentrations. So one of the things we looked at is, you know, what's the impact going to possibly be there. And so what this figure is showing you here, this blue -- this little blue area here, you know, some of the lighter blue to a darker blue is an estimate of the nitrogen concentration. I apologize, it's kind of hard to read what this shows here, but on the dark blue end of it on the edge of it, which I'm kind of trying to circle with the laser here, that's a value of about .3 milligrams per liter of nitrogen, which is -- has been shown in other estuaries, not necessarily in Belfast Bay, but, you know, we don't really have that type of information for this specific location, that if the nitrogen concentration stays below that level it doesn't really have any impact. And so we can see here it's not even really getting close to these areas. So that's kind of the end of all of the work that I did that has shown, you know, that has shown this and so I'm going to try to explain how we got there so you can understand a little bit.

My task has been to try to predict what's going to happen in this very, very complicated natural system. There is all sorts of factors that complicate this. There is just simply the understanding of the physics of the flow of the water, the, you know, factors like the weather that we can't predict and sort of just the chaotic nature of what happens in natural systems. And so the -- different than a lot of sort of other -- you might think of more traditional engineering where, you know, you might be able to calculate very precisely the flexion in a steel beam if you know what the load is on it. Trying to predict what's going to happen in a system like this is much more complicated. We take a similar approach. We look at what physics says and physics, you know, we have laws of physics like the Newton's second law, conservation of momentum, conservation of mass. We can use those to write down mathematical equations and then we can simplify those equations so that we can solve them and we use computer programs to solve them. And so what we have done here is a computer model that basically solves the equations that describe the physics of water flowing in the bay. And so, you know, it's what -- how is that water driven by the

tides, by the gravity, from the moon and the sun and how is that water forced by water that is flowing down the river and coming into the bay and then how is that water constrained by the depth, you know, and the geometry of the shoreline of the bay. And so we make, you know, sort of the best attempt that we can to be able to understand to solve those equations to be able to predict what those currents are going to be.

And what this is -- what this is showing here is this is a computer model called ADCIRC that we ran and I think if I click, will it...

MS. RANSOM: I can do that.

MR. DILL: Oh, there it goes. It goes. So what this is showing here is this is the results from the model simulation that -- this is, I guess, for perspective here, Belfast is up here, this is Islesboro down here, I think this is North Haven, so this is kind of the upper Penobscot Bay. And I might have to click again. Oops. If I can make it...

MS. RANSOM: If it's easier, I could do it.

MR. DILL: There it goes again. What this is showing, you can see there is little pink arrows here and the color is indicating how fast the current is flowing and the little pink arrows are indicating what direction it's going. And so what this is showing is this is about a two day period where you can see how -- it gives you an idea of how the currents circulate around in the bay and you can see it's pretty complicated. So once we've calculated that we kind of have an estimate of how that water moves around and what we can do is we can use the computer again to go on to this next one here to kind of put little -- put little tracers that will move around with that current. And so what animation showing you is just what would happen if you were to kind of scatter, you know, a bunch of, you know, ping pong balls around the bay and watch them go during that same time period. And you can see what happens is -- let me see if I can get it to go again. If you kind of keep your eye on -- maybe pick sort of an orange one or red one from here and just kind of follow it you will see they kind of move back and forth as the tide goes and then they also kind of tend to drift. And you can see how they kind of get stirred up and you can imagine how -- you can kind of see now how they're getting mixed up and so what we're trying to do is predict how that mixing happens and we use these little, you know, numerical drifters to do that. And you can actually -- you can actually

see a lot about, you know, what's going on there by looking at this picture. You can, you know, you can get an idea of, you know, if you were to fall overboard and off of your boat and just drift with the tide for a couple of days where you might end up.

All right. So that was showing -- if I could -- I'll go back and I'm going to play this one more time. This is kind of showing what happens if you put a whole bunch of ping pong balls all over the place and just let them drift around and how they mix together. But in order to -- in order to predict, you know, estimate what's going to happen with the discharge that's being continuously released, instead of scattering the ping pongs all over in the beginning and see where they go, we kind of take ping pong balls and we just kind of release them one at a time after another continuously. And in this simulation -- in this case, we ran the simulation for a month doing that and you can see that after about two weeks in that simulation the, you know, they move with the tide, they move with the current and they drift and they move back and forth and you kind of -- the ping pong balls also kind of spread out naturally because of the turbulence of the water and other effects.

And once -- and what we've seen in this case after about two weeks you kind of reach this sort of equilibrium where the rate that the ping pong balls are being distributed into the bay is -- it matches the rate that they're sort of disbursing and diffusing and so you kind of reach this sort of quasi steady state. So that's what we're looking for and once we've done that -- this is another -- let's see. Oops. We can use those ping pong balls to represent something like -- something that's in the discharge water. And, you know, for example, the nitrogen -- the amount of nitrogen. And then we can go back and after we've looked at where they've all spread out, we can calculate what that nitrogen concentration is and we can estimate what it's going to be.

And let's see if I can get this to -- oh, you know what, it's really hard to see here because the nitrogen concentration, this is about .5 milligrams per liter and this is that value of about .3 that the eel grass might be sensitive to and if you look really hard here --

MS. RANSOM: Do you want me to play it from your animation?

MR. DILL: Yeah. If you could play the one on the USB stick, I think it might be a little better

quality.

MS. RANSOM: Yeah, it might work a little bit easier for us.

MR. DILL: That's my heart thumping that you can all hear.

MS. RANSOM: There we go.

MR. DILL: It looks like it's fading away. So what we're looking at here is this is about 25 days of what the tide does and this is based on a -- this is actually based on tidal observations from the Fort Point Tide Station for a time period in 1999. We simulated that time period because there was data collected at the tide station there and we were able to compare that to the hydrodynamic model and demonstrate that it actually reproduces the same tide level. If you -- I think one of these will make it play in a loop. I don't know...

MS. TOURANGEAU: I'm just going to hang out here and make it...

MR. HEIM: That one next to it.

MR. DILL: Turn repeat on. Yup. So this little red dot moving up and down here is just showing you the time and what you can see here is this is that nitrogen concentration. And so we're looking at now the nitrogen concentration is varying over time. And one thing that we've noticed from this that we learned from this is that when the tide is -- tide range is larger, so when we have a spring tide the currents are stronger and that -- that tends to spread out the discharge more and so it keeps that -- the concentration to that -- below that level that -- below that .3 level that we can't even really see it on here. And so you'll watch as it comes back from the beginning here, we really don't see much -- we really don't see much going on here when the tide is big. It's just kind of getting washed out, you know, you can imagine it's kind of getting smeared out. And then when you get up here when the tide range gets a little bit smaller you start to see that -- you start to see the concentration show up a little bit here. And then during that neap tide you start to see the concentration because the currents aren't moving much, but then when it gets back to a spring tide again it spreads out more.

And I'm going to just jump back again and so -- oh, yeah, we need to go back to the PowerPoint. Sorry. So the information that we have on how the nitrogen affects things like the eel grass bed is based on measurements that are taken over time at multiple sites, but, you know, different samplings

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over a period of time and some statistics that are done based on those measurements and other observations about how, you know, how wildlife is, you know, living within the water. And so those statistics use a median value, so if you were to keep taking samples over time, if you took a sample every day for the next hundred days or if you took a sample every hour for the next few days and you measured all those values of nitrogen because it changes all of the time, it's constantly varying from all of the other different types of sources, and were to find the value that was the median value, so an average value, we calculated that average -- that median value and that's what is shown here. So if you look at those -- the results from that animation and you were to average that over time this is the result that you'd get. And that average value is the value that we have -- that we actually have that we can correlate with other sorts of things that would lead to impacts. And so that's what this is showing here. That's the average over that entire simulation.

And I'm going to just jump back ahead here. So what I just talked about was what happens in what we call a far field, so when the discharge is released into the bay and now it's being driven by,

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you know, what's happening to it is largely driven by the currents. It's the -- the actual outfall itself, the structure that the water is coming out of doesn't really have any affect on the mixing. It's really what's going on naturally. It's the tidal currents and other factors, it's the wind, it's the waves that are controlling that. So but what happens right near the -- right near the outfall, this is where the concentration is of that wastewater are highest and so we used it on another model and this model is called CORMIX and this is a model that's used -- sort of a standard model that's used for wastewater discharges all over the country. It's developed and approved by the EPA. And what this does is this model looks at the physics of what happens when that water comes out of the -- out of the end of the pipe and it's got a lot of momentum and you can kind of envision, you know, the water coming out and it's pushing against the existing water and it's creating a whole lot of turbulence and it's mixing it all together and so that's what this model shows. What we do -- what this model does is it calculates a dilution and a dilution is a specific number that is the ratio of -- sort of the ratio of the amount of one substance or one volume of water mixed in with

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another volume of water. So you can imagine if you took like a cup of orange juice, for example, and put it into an empty gallon jug and -- who knows how many cups there are in a gallon? I think it's 16.

AUDIENCE MEMBER: 16.

MR. DILL: 16. So then if you filled that jug the rest of the way up with water you'd have a dilution of 16. So what we're looking at here is that dilution number. Once you understand what that dilution number is, if you know the concentration of something, which we're already in this case if we're looking at nitrogen or phosphorous or TSS or BOD those concentrations are already very, very small. So that orange juice has already been diluted 100 times or more and then you're diluting it even more. And so this -- that dilution number really tells you how much that, you know, that substance is being reduced in concentration. So this -- what this figure is showing is that just in that initial area right outside the outfall -- and this is actually what -- this is a -- if you can imagine that you were looking down -- looking down from above, this is sort of a plan view, a bird's eye view of what the discharge looks like, and you can imagine the currents flowing in this direction and so, you know,

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the tidal current changes, so we do this with different currents flowing in different directions, but this is just one example. So the current is flowing this way and the discharge is being, you know, ejected perpendicular to the current and you can see that the momentum from the discharge is pushing it out here and it's mixing with the ambient water. And then finally, the current kind of takes over and moves it along here. And once you get out in this area, which is only -- this is only -- this is like less than 10 meters away from the outfall pipe, that dilution -- dilution is already more than 20 and this is actually what's showing is this the concentration. So the concentrations here are only 5 percent of what they are down here. And that's just within the first 10 meters of this. That's the plan view.

We can also look at it as if you were standing on the bottom looking -- sitting on the bottom of the bay looking out at the pipe and so this is upward, you know, the surface of the water is up here. And, again, the current is going in this direction. The discharge in this case it's -- the water is a little bit fresher than sea water and so fresh water tends to float so it wants to rise and so

you can see it's rising up because of the buoyancy and the current is also pushing it down. And, again, once we get, you know, about 10 meters away, so 10 meters off the bottom and sort of 10 meters downstream those concentrations are already less than 5 percent of what the concentration was that was coming out of the pipe.

And, you know, I think that's all -- that's all I had, I think. I'll hand it back over to you, Elizabeth.

MS. RANSOM: So what does that mean really? You know, part of what we're trying to help people understand is that we are starting with fairly low concentrations due to the level of treatment that Erik is doing in the facility itself. And once they get there, they're going to be further diluted by the dynamics of the bay itself.

So we hope that through this presentation you've come to understand that the treatment systems that are being used by Nordic Aquafarms are state-of-the-art. They're proven technologies for other industries that are being combined in new ways to make Nordic Aquafarms discharge one of the cleanest of its kind. This discharge will meet or exceed all of the applicable DEP standards and there

will be ongoing testing to demonstrate that is stays that way over time. This discharge will meet the sensitivity parameters that DEP and other organizations in New England have established for eel grass, which is a noted sensitive receptor that exists in the bay.

And I think with that, I'm going to turn this back to Joanna, who will start laying out some ground work for questions.

MS. TOURANGEAU: So momentarily, we are going to switch to the question and comment period for the discharge license process. I am going to need a couple of minutes to shift things around. We're going to move this podium back here and turn it around. I'm going to ask folks that want to ask questions about the MEPDES licensing to form a line here and be prepared to state your name and ask your question. I am -- we have this space until 9 o'clock, so we have plenty of time for questions, but I am going to ask that we limit the discussion tonight to the purpose of this meeting for the DEP, which is to address comments to the discharge permit. I understand that folks very likely have significant additional questions about other aspects of the project. Like I said earlier in the beginning of the

meeting, there will be additional public informational meetings to address and city meetings to address all of those issues.

I am going to run a clean meeting tonight. I am going to invite you all to be civil and courteous to address your questions and to provide your name so that the court reporter can get the information. We will make every effort to answer your questions tonight. As I also said earlier, if we cannot answer your question tonight it will be pulled out of the transcript and put into a list of questions with narrative responses that go with our application to the DEP. Please use your time not to provide significant comments about other parts of the project, but limit your comments to the discharge licensing aspects of the project. If you are not doing that, unfortunately I will interrupt you so that people that do have those questions can use the time that we have set aside.

At this point, I am going to start moving things around and then we will be ready for questions. I am going to stand up and try to direct traffic with the questions because we only have two microphones, so I am going to give one of those microphones to the podium for folks to use and I am going to pass this one around like a baton so that folks that are answering questions can have it.

AUDIENCE MEMBER: Are we going to be able to go take a bathroom break?

MS. TOURANGEAU: Absolutely. It's going to take a second, so. Yup. We're going to do another one at 8, but this will take probably two minutes.

(Break.)

MS. TOURANGEAU: All right. It looks like we have a pretty long line here, so let's start moving back so that we can get to the questions and see if we can keep on track here. So like I said a few moments ago, I am going to field questions as they come in and try to pass them off to the correct person to the best of my ability, okay. Please, please if you don't mind, state your name before you start and if you have a complicated name that's hard to spell, if you wouldn't mind helping out the court reporter we would very much appreciate it. All right.

AUDIENCE MEMBER: Paul Bernacki, Belmont, Maine. B-E-R-N-A-C-K-I. Hi, Nate. Paul Bernacki, nice to meet you in-person.

MR. DILL: Nice to meet you, Paul.

AUDIENCE MEMBER: (Paul Bernacki.) My

questions are for Nate about his presentation about tidal flow.

MR. DILL: Nice to me you too, Paul.

AUDIENCE MEMBER: (Paul Bernacki.) What I'll do is I will as part of a sentence give you a series and I know you can keep up with me. So I'll give you a series of point issues that I'd like you to just respond to instead of grilling you in some way.

MR. DILL: Of course.

AUDIENCE MEMBER: (Paul Bernacki.) First is summer, winter, thermocline, seasonal, and climate variation, water solidity issues, especially in the subbay of the Little River estuary area, periods of slack tide especially during the summer when the tide ranges are a lot less and the flow is less, wind forcing such as the northeast storms and the prevailing summer southwest storms and how those affect your modeling and have you actually done any localized multi-water level drifter tests to prove out the model as opposed to just doing a mathematical model based upon the tide station at Fort Point which is about 7 -- 6 or 7 miles away by water and is really close to the eastern Penobscot Bay channel, which is much deeper. That's enough for the meeting

tonight. I tried to make it light.

MR. DILL: Okay.

AUDIENCE MEMBER: (Paul Bernacki.) Thank you, Nate.

MR. DILL: So I think the first thing that you mentioned to address has to do with the stratification in the water column. And I'm just going to go through these and then I can hopefully recall them again. The second thing has to do with seasonal changes. I guess that is in some way related to the stratification. Periods of slack tide, wind forcing and then localized tests -- localized observations, I think, I'll put it that way.

So to go back to the -- to go back to stratification, so there is sort of a wealth of data in Penobscot Bay at large that demonstrates that stratification is significant in the estuary, so what that means is you have -- you tend to have -- you tend to have water that varies with the season, so I guess we'll start with the -- with the spring season. The spring season you tend to have a lot of water coming down the river. That water is fresh water. The fresh water is buoyant. It tends to float on top of the denser salt water and so what happens is you

end up having multi-layers of water flowing and, you know, from other modeling and other data that I've seen out there this tends to create a sort of circulation in the bay where water on the surface tends to be transported out of the bay towards the ocean and water near the bottom tends to be transported more up the bay and that creates sort of a circulation, which to some extent increases mixing in some ways, but also because of the stratification it limits water from mixing within different layers. And so as we go on into the summer season you get less fresh water but the sun starts to heat up the water at the surface, so warmer water like fresh water is less dense than colder water and so, again, you start of maintain that stratification. And then as you get into the fall and, you know, the water is still pretty warm, you also sort of maintain that stratification, eventually you get colder weather and the colder weather starts to reduce the temperature of the water at the surface. And as you go and transition into the wintertime, so this is, you know, mid-winter, late winter, what happens is the water is cold at the surface. Everything is frozen in the watershed, so there is not a lot of water coming down the river and during the wintertime you get more of a complete mixing so there is less stratification.

And so what have we done to address this? In the CORMIX modeling where we look at the near field, that initial mixing, that is in large part dependent on the stratification in the water column and the density difference between the discharge water and the ambient water. And so depending on how strong that stratification is and how -- and how different that density is between the effluent or the discharge water and the ambient water that initial mixing behaves differently. And so when you have times of the strong stratification what happens is the water -- the water is released near the bottom and so it's -- that water is fresher so it's less dense, but as it mixes with the denser water that's around it, it becomes more and more dense as it's rising in the water column. And under certain conditions -- and this also depends on the current speed, so it varies with the tide whether it's slack tide or high tide and the tide is going back and forth throughout the day this tends to vary, that discharge that's coming out will become trapped. It will either rise all the way up to the surface in some cases or it will be trapped within a layer below the surface but near the surface. And so what we've

done -- looking at the CORMIX results, we understand that this is going to be a buoyant discharge and that in many cases under most conditions through the seasons it's going to tend to stay in the upper part of the water column. It may come up to the surface and remain in a layer that's 5, 10 meters thick initially. And we're talking just initially within the first couple of hours after it's ejected from the pipe. And that -- and then during other time periods the current -- the tidal currents may be strong enough, the stratification may be weak enough that there is enough turbulence all the way through the water column that it might mix all the way from the bottom to the top. And so we've got to kind of understand that from the CORMIX modeling. We have a lot of detailed calculations from the CORMIX modeling.

What makes this very complicated is that it changes with the season and it changes with the tide and so as the tide transitions from slack tide to a full flood or a full ebb, the state of that behavior is going to change and that actually will tend to increase the dispersion and mixing of the effluent. So that -- I think that kind of addresses the -- I think somewhat addresses the thermocline, the

stratification issue and the seasonality.

I think I'll also talk a little bit about the tidal periods here. So you mentioned slack tides in the summer, that's a time when the stratification is strong and during slack tides there is not going to be a whole lot of ambient turbulence to mix things up, but that condition is only going to last for a couple of hours and then the current picks up and it will tend to increase that mixing. That's what we're seeing from the model.

So I'm going to move on here to wind. Wind forcing. So the two-dimensional model that we showed, the one where I showed the current arrows and then ultimately the ping pong balls and the ones that we used to calculate that nitrogen concentration, that model can be forced with wind. In this case, we did not force it. It can also be forced with waves. In this case, we did not apply any wind in the model and the reason for that is because wind can have a -- wind can have a significant effect on those currents and it can have an effect on the, you know, the surface currents more so than the bottom currents, but it can actually create, you know, three-dimensional circulation in cases. Wind tends to create more circulation. It tends to create more

turbulence in the water which leads to more mixing and wind also creates waves and waves tend to create turbulence in the upper layer of the water and that also tends to create more turbulence. So by not including wind in the model we have essentially made a conservative prediction. If we were to include wind and we were to include sort of naturally variable wind, we would see that you would -- that that -- that that area where those ping pong balls are moving would tend to spread out and mix more horizontally. That model is two-dimensional, so it doesn't -- it calculates a depth average current. So it doesn't -- it doesn't -- it doesn't calculate the current at different depth layers in the model. And so because of that -- and that's just a simplification of the model. It makes it easier for the model to solve the problem. Because of that, when we calculated the concentration we assume that all of the, I'll call them, ping pong balls were in the upper layer of the water column. So we assume that they aren't mixing all the way down to the bottom and so, you know, in some cases when the stratification is strong that's pretty reasonable. In other cases when there is more -- less stratification or there is more vertical mixing that's a conservative assumption we would tend to -- we would tend to over estimate the concentrations from what you would see.

And I think it's also important to kind of reflect back on the fact that that vertical mixing and how strong that tendency to be trapped within the layer varies with the tide. So on one tide, you know, on one portion of the tide you may have the effluent being sort of trapped near the surface, but then when the tide changes and the current speed picks up it's all going to get mixed. And so as you go further in time, if you look at a ping pong ball that was released, you know, within an hour or two we can see from the CORMIX modeling that it may be stratified -- trapped in the stratification, but when you look two days later, the tide has changed four times already, there's a good chance it's going to be pretty well vertically mixed.

And then I guess I'll go to your final question, have we done any localized tests. I'm looking at where things would go and the answer is -- the answer is -- the answer is no, not really. We have the -- we have the water level data from core point. We worked with the available data that we have for this analysis. And so the -- and what we

have is water level data that was -- the closest data that we have that we can use to validate our model that's sort of a standard practice with this model is that you take the model results, you compare them to observations and then you demonstrate that the model is able to reproduce things that were actually observed and that gives you some level of confidence that the model is reasonably predicting other things in other areas where you haven't observed it. And that's really the -- the point of the model is to provide us with information in areas where we don't have observations. It is helpful the more observations you have the better confidence you can have in your model, but also the more observations you have the less you need the model. So I guess that's -- that's my response.

AUDIENCE MEMBER: (Paul Bernacki.) Just one follow-up.

MR. DILL: Sure.

AUDIENCE MEMBER: (Paul Bernacki.) Can you tell me what the planned temperature of the outflow water will be? Range?

MR. DILL: I might not get this right. I'm going to say is it 13 centigrade, I think is the -- is that...

MS. RANSOM: Give or take.

MR. DILL: Yeah, 13 to 16.

MR. HEIM: 13 to 16 Celsius.

MR. DILL: So if you multiply it by 9/5 and add 32.

AUDIENCE MEMBER: (Paul Bernacki.) And the salinity is still the stated three parts salt water to one part fresh water?

MR. HEIM: Mid 20s. Mid 20s parts per thousand.

AUDIENCE MEMBER: (Paul Bernacki.) What is that?

MR. DILL: The salinity of the discharge water is about 20 parts per thousand. Mid 20s parts per thousand. And that's, yeah, approximately what you'd get if you approximately mix one part fresh water with two parts salt water.

AUDIENCE MEMBER: (Paul Bernacki.) Two parts or three parts? Two parts or three parts?

MR. DILL: Approximately two parts salt water and one part fresh water.

AUDIENCE MEMBER: (Paul Bernacki.) And so the -- all of the water that's going into the various -- the smolt grow out and the grow out, all of those water temperatures will be combined in an

average temperature by the time they get to the outflow?

MR. DILL: That's my understanding, yes.

AUDIENCE MEMBER: (Paul Bernacki.) That's my understanding. Okay. Thanks, Nate.

MR. DILL: You're welcome.

MS. TOURANGEAU: Mr. Bernacki, can I also add to that to say that Nate did a wonderful job briefly summarizing two memorandums that are in that draft application, one on the near field modeling, one on the far field modeling and a pier review that was done by Ramboll kind of looking at both of those modeling reports. So that will all be in the actual application when it goes in and that will give a much more fulsome answer to your very helpful questions. Thank you.

AUDIENCE MEMBER: Hi. My name is Lawrence, L-A-W-R-E-N-C-E, last name is Reichard, R-E-I-C-H-A-R-D. I am from Belfast. And in the spirit of full disclosure, I am a columnist for the Republican Journal newspaper here in Belfast. My question is all of the facts and figures and the presentation that we've seen here this evening seem to be based on best case scenarios where nothing goes wrong. As Mr. Heim knows, I was recently in Norway and Denmark and I spoke -- while on that trip, I spoke with Professor Are Nyland of the University of Bergen, and that's A-R-E, last name N-Y-L-A-N-D. And he said that regardless of what precautions are taken in filtering and such there is always a possibility of virus and disease in a land-based fish farm. And if and when there is an outbreak of virus or disease in a land-based fish farm then those fish will -- those tanks -- the affected tanks will have to be drained, all of the fish in them, probably hundreds of thousands, will have to be slaughtered and then those tanks will have to be cleaned.

My question is -- and I also I also -- I also spoke with Bent Urup, who I believe invented the RAS system that will -- that Nordic Aquafarms would use here in Belfast if they're successful. And he said that the cleaning mechanisms that Nordic intends to use here would not be sufficient to deal with the outbreak of a virus or disease, thus the tanks would have to be cleaned. My question is what chemicals will be used to clean the tanks if and when there is an outbreak of virus or disease in the tank?

MS. TOURANGEAU: Should I refer to Ian?

MR. HEIM: Yeah, go ahead.

MS. TOURANGEAU: So we are privileged

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tonight that Mr. Ian Bricknell, who is a fish disease and sea life expert with 40 years of experience from the University of Maine has volunteered his time tonight to answer those kind of questions. Come on up Mr. Bricknell. B-R-I-C-K-N-E-L-L.

MR. BRICKNELL: Well, thank you for that question. That was really interesting. I'm a fish disease person. My PhD is in aquatic physiology and I've studied fish diseases for 39 years now. I know I look very young and dapper, that's just the way it is, but. It's all of the foreman I use.

But one of the things to bear in mind with this is it's like any farm, there is always a risk of disease. You're on the coast, a storm will throw up wild sea water, those aerosols can enter any farm and there is a risk to that. But of course that risk assessment is always part of any biosecurity plan and I'm sure that's been taken into account. So when it actually comes to the chance of those outbreaks occurring you can reduce that markedly by ensuring that the fish that are being ground are vaccinated against those diseases. And most of the common viral and bacterial diseases in salmon farming, and there are very, very good vaccines available. I know, I had a patent on one back in 1989 for aeromonas

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salmonicida. And these things would eradicate those diseases as effectively as the polio vaccine did for polio in the United States. So I think if you're concerned about that one of the things that you'll need to make sure of is that the fish are vaccinated before they go in. And of course like any other form of farmed animals, if the animal has had an accident they go on to veterinary care and of course there will be antibodies used in that.

Now, looking at those filtration systems, I don't see how they can make those comments about them not being adequate without actually looking at the discharge rates, looking filter efficiency based on that science, which I don't think are available yet.

AUDIENCE MEMBER: (Lawrence Reichard.) I didn't say that.

MR. BRICKNELL: Well, I thought you said that you were looking at the chemicals that were going to be cleaning it and you were saying that the diseases were going to occur.

AUDIENCE MEMBER: (Lawrence Reichard.) And you said yourself that that is possible.

MR. BRICKNELL: It is, but you're going now through a .4 micron filter. Well, that's about the quarter of the size of the bacteria, so all of the

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bacteria will be trapped in those filters under those situations. I mean, this is the way sterile blood products are made, for example, for transfusion of plasma or saline. They are often ultra filtered to remove all those bacteria.

AUDIENCE MEMBER: (Lawrence Reichard.) So you yourself said that disease outbreak is possible. Can you answer the question, what chemical will be used to clean the tanks in the event of a disease outbreak? You have not answered the question.

MR. BRICKNELL: Well, I'm not -- I'm not the person who is going to discuss their biosecurities for cleaning the tank because it's --

AUDIENCE MEMBER: (Lawrence Reichard.) Well, that was the question.

MR. BRICKNELL: Well, I'm talking about the actual disease component that you are suggesting. Now, there are many things you can clean the tank with, hydrogen peroxide, hypochlorite, iodofols. There is books on this. I mean, it's a standard thing. This is something that any veterinarian could advise you on as part of their training.

AUDIENCE MEMBER: (Lawrence Reichard.) Are you aware that there was a study released just this summer that linked the use of hydrogen peroxide,

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which is the most common chemical used to clean fish tanks that this was linked to the -- to death of crustations?

MR. BRICKNELL: It depends on the study you're talking about. Do you have the author's name?

AUDIENCE MEMBER: (Lawrence Reichard.) Are you aware of any such study?

MR. BRICKNELL: Well, it depends on the concentration. If you take crustations and put them in a hydrogen peroxide solution they will die.

AUDIENCE MEMBER: (Lawrence Reichard.) Well, yeah, I suppose that's true.

MR. BRICKNELL: It is very true.

AUDIENCE MEMBER: (Lawrence Reichard.) Yes. So they -- so hydrogen peroxide is toxic to crustations.

MR. BRICKNELL: It's toxic to you. If you go and eat hydrogen peroxide you will be dead in half an hour.

AUDIENCE MEMBER: (Lawrence Reichard.) Okay. Well, I'd still like to know what Nordic Aquafarms intends to use to clean those tanks.

MR. BRICKNELL: Well, I'll push it back to you.

MS. TOURANGEAU: Thank you, Dr. Bricknell.

Erik.

MR. HEIM: So just a couple of comments. First of all, Bent Urup has not designed our systems. We were involved in an investment project with him in Denmark and he has no --

AUDIENCE MEMBER: We can't hear you.

AUDIENCE MEMBER: Can't hear you.

AUDIENCE MEMBER: Use the mic.

MR. HEIM: I'm sorry. Bent Urup has not been involved in any designs that we are looking at in Norway for further developments and also in the U.S. just to make that clear. He was involved in an early investment we did in Denmark and did designs for that. We are way beyond that level today just to set the record straight on that. He has no involvement in our business. He was an early entrepreneur that was involved in our Danish operation and is now currently doing other things just to set the record straight on that.

In terms of cleaning, so in terms of pathogens in general the main thing is to keep them out and that's what the system is designed for and then you always have worst case scenarios with humans, animals or anyone that you can never be 100 percent sure about preventing disease. So what we

are doing is to prevent that as much as possible.

Now, in terms of cleaning it really depends on what you are looking at. There is no one answer to that. There is a variation of cleaners you can use and they will all be listed in our permit application. Hydrogen peroxide, generally something we avoid. I am not a big fan of it, but it is something that is used in the industry. We will be looking at other substances and there is going to be a range of them listed in the application. So I would advise that you take a look at that when it comes. It always will depend on the circumstances of what we are dealing with.

What I can say is we run our facilities in Denmark for three years, we have never had disease. So the point here is really to reduce the risk of disease and that's what the whole set up is designed for also here in Belfast. It's just like flying an airplane, there is always a risk it will fall down from the sky but I still fly, you know, because the risk is much lower than it was many decades ago. So that's where the industry and we are going is the preventative measures.

And I'd like to say finally it's impossible for a professor in Norway who doesn't understand our

designs and what we've done to comment on our technology. We are way beyond what you typically see in small facilities in Norway today in terms of these technologies.

AUDIENCE MEMBER: My name is Mary Bigelow. That's B-I-G-E-L-O-W. I live in Belfast. I want to thank you for this presentation. I've been hungry for numbers for months, so I'm glad to finally see some numbers. So thank you.

One question I do have, even though I totally am encouraging you guys, will there be a sampling manhole which the state or the municipalities could have access to without having to ask permission from Nordic Aquafarms? Is there any plan for such a thing?

MR. HEIM: So the discharge data? I'm sorry, you mean discharge data?

AUDIENCE MEMBER: (Mary Bigelow.) No, a sampling manhole so that if --

MR. HEIM: What's that?

AUDIENCE MEMBER: (Mary Bigelow.) -- if, for example, heaven forbid you didn't last at this site and somebody else bought it --

MR. HEIM: Yeah.

AUDIENCE MEMBER: (Mary Bigelow.) -- and

then we suspected they weren't behaving themselves, it's really sometimes good for the municipality to have a manhole outside the property of the industrial plant, which has -- which can be accessed, padlocked and what not that would permit sampling by the state or the municipality.

MS. TOURANGEAU: So our MEPDES permit should it issue will have sampling criteria --

AUDIENCE MEMBER: (Mary Bigelow.) Yup.

MS. TOURANGEAU: -- and will require quarterly testing that will go to a state accredited lab with chain of custody and all those things. The DEP will be able to come on site at any time and validate those data. And, you know, the manhole, I'm not sure that that idea would work because the discharge system will run from the wastewater treatment plant on land via pipe out to an outfall, so what we are talking about are monitoring stations that are around the outfall, but a manhole would have to go down through the water to the pipe, so I'm not sure that I 100 percent understand your question.

AUDIENCE MEMBER: (Mary Bigelow.) Where I'm coming from is I'm a former chief operator of a wastewater treatment plant in Vermont and not in my town but in a different town there was a terrible

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problem with a very green supposedly producer dumping large amounts of cream, milk and sugar down the drain and they could never catch them. And they finally ended up having to put manholes in because the industry denied everything and as soon as they got those manholes in there was peace in the kingdom.

MS. TOURANGEAU: Hmm. I think that our equivalent of manholes here would be the kind of background monitoring system that we're talking about including as part of the permit that would be -- and maybe I'll turn it over to Elizabeth to talk about that a little more because I'm not familiar with the specifics, but I think that would be the equivalent of the manhole.

MS. RANSOM: I do know, Mary, there has been some discussion about, you know, we've started, as I said, to get some background data from the bay itself --

AUDIENCE MEMBER: (Mary Bigelow.) Yup.

MS. RANSOM: -- because obviously not only do you want to know what they're putting into the pipe, but you want to understand what the effects are out in the bay. So there has been some discussion about maybe having some of that sampling not just done by Nordic and the people Nordic pays for but

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whether or not that might be something where there are either university or community or other representatives that are involved in that and so that would allow for some impartial non-paid by Nordic people to be having a way to get at the evidence directly as to what's going on versus having something that comes through a Nordic monitored program.

AUDIENCE MEMBER: (Mary Bigelow.) In extreme cases such as what happened in this adjacent town in Vermont, they ended up putting a sampling device down the manhole and they could say X number of gallons at such and such concentration during this hour, this hour, this hour. It did not leave any room for the industry to say, oh, it's background, it's not me, it's my neighbor. It's just right on the pipe.

MS. RANSOM: I understand. I'd be interested in actually getting some of the details from you and perhaps we can kind of take it off-line --

AUDIENCE MEMBER: (Mary Bigelow.) Yup.

MS. RANSOM: -- because obviously this pipe is going to be under, you know, buried and, you know --

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AUDIENCE MEMBER: (Mary Bigelow.) Sure.

MS. RANSOM: -- with a significant water column above it, so we --

AUDIENCE MEMBER: Couldn't it be on land?

MS. RANSOM: Yeah, that's what I -- I'd be curious, like I said, to get some details from you when we can talk about it.

AUDIENCE MEMBER: (Mary Bigelow.) Okay. And I really applaud the work you've done tonight. Thank you.

MS. RANSOM: Thank you, Mary.

AUDIENCE MEMBER: Good evening. My name is Chris Wright. That's with a W. I'm going to ask a different question, but I guess thinking about the concern for what happens and what are the chemicals or whatever that are used or if there is a virus or bacteria that slips through the filters, the ultraviolet, et cetera, of course, it's in everybody's interest -- everybody's interest that that not happen. But in the event that it does happen, we would like to know what is used to clean such large tanks with very large amounts of water, 10s of thousands of fish. We need to know what happens if that happens and that's not out of the realm of possibility. I don't think anybody would

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ever say it is. So that's -- that's my most important question.

MS. TOURANGEAU: I can turn this over if you want more detail, but I do know that the -- one of the components that will be an exhibit to the application to the DEP when it's submitted is a chemical list and that chemical list will include every chemical that will be used at the facility including all of redundant chemicals meaning, you know, certain ones need to be rotated and used differently for cleaning products so that, you know, resistance doesn't build and that kind of thing. And I'm not a scientist, so others can -- David Cyr can...

MR. NOYES: Hi. My name is David Noyes.

MS. TOURANGEAU: David Noyes, sorry.

MR. NOYES: I'm the CTO for Nordic Aquafarms.

AUDIENCE MEMBER: We can't hear you.

MR. NOYES: So I've spent about a decade now working in RAS facilities and I can assure you that the majority of the cleaning is done with elbow grease and manpower. But recently there have been a lot of fantastic robotic cleaners that allow continuous non-stop cleaning of the tanks and so you

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don't have to get to that level. We've employed them recently out at the USDA and I absolutely advocate for them because they save an immense amount of manpower and basically allow you to achieve this magnificent amount of constant cleanliness in the tanks and the systems to prevent any buildup of any organics.

AUDIENCE MEMBER: (Chris Wright.) I'm sorry, that doesn't answer my question at all. That sounds great that there are ways to clean the tanks that are on a scheduled regular basis. What I'm asking you is what happens if the facility in Belfast faces a viral or bacterial outbreak and things have to be cleaned up? What do they clean it up with and it would really not -- we don't want to hear about a list of chemicals. We'd like to know what the chemicals are, but aside from that what happens to all of the fish and all of that water that is now infected? And we don't have to -- this doesn't have to be hypothetical. I'm sure there are cases in the industry someplace that you can refer to.

MR. HEIM: Sure. Just a couple comments in the case --

AUDIENCE MEMBER: Louder.

MR. HEIM: Okay. So and I think it's very

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healthy to always think about worst case scenarios. I mean, anybody working with either humans or animals should take that into consideration. So our primary source of potential disease is the bay just to make it clear because eggs we bring in go through quarantine and health certificate testing with veterinaries in Maine, so these are isolated systems. So if we were to come in a scenario where a disease comes in it depends on what it is. Typically, what you will see in the industry if there is a detection of disease you will take in a veterinary -- authorized veterinary right away to asses the appropriate way of dealing with it. And in the U.S. one form of treatment can potentially be described depending on what it is. It's difficult to generalize because it can be different things.

Worst case scenario in the industry is they slaughter out the fish from a tank due to disease situation and that's typically that our slaughtering facility is or the processing facility is prepared to do. And, again, what the -- what is done with that depends on what it is. One way of dealing with it is to grind it up and also put it in diluted acid solution to neutralize bacteria in it. This is a common practice in the industry. And this happens in

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sea pens as well. In terms of the tanks, typically if you have a tank with disease, you will empty it out, it will go through the same biosecurity measures that we just discussed and given the strength of those we are not in the situation where we need to disinfect with chemicals this water because we have high grade water filtration equipment in this facility that will take bacteria, that will take virus. Typically, what we will do is to empty the tank and let it sit dry for a longer period of time and you would dry clean it out with chemicals depending on what you have that are approved in the U.S. for this purpose. And that means that you're not really discharging large amounts of this cleaner out into the ocean. You will let the tank sit dry probably for a number of weeks, maybe months depending on what it is. So every scenario here, I mean, there is experience in the industry with dealing with various kinds of virus if they should occur and the answer to each situation is a different solution depending on what it is.

AUDIENCE MEMBER: (Chris Wright.) So do I understand you correctly that the water might actually be evaporated so you're not dealing with hundreds of thousands of gallons of infected water?

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MR. HEIM: In the cases where you cannot efficiently treat -- let me make it clear, there are first of all, vaccinations to prevent this for a number of the common diseases. In the worst case scenarios where you cannot treat there will be a solution to do a short-term treatment solution for this. Your alternative then is to take out the fish and you would empty out the tank, the water would go through those biosecurity measures I just described, which is drinking water grade cleaning equipment. In other words, it's safe to drink that water basically if it hadn't been for the salinity. It's typically the type of treatment you would also be using for drinking water in some areas to prevent virus and bacteria infections. And that results in emptying out the tank, you let it dry out and you can do surface cleaning or equipment cleaning with the appropriate cleaner that a veterinary prescribes. That's the way it is. And that also means that you're not really emptying huge amounts of cleaners into the ocean. This will dry out and be washed out afterwards with water, probably -- probably weeks or months after a dry out period. But, again, it depends what it is, yup.

AUDIENCE MEMBER: (Chris Wright.) Thank

you. I have one more quick question on the ping pong balls. So it seemed to me watching those ping pong balls that they didn't actually leave the bay; is that correct? I mean, and what I was paying attention to at that point when I was watching the ping pong balls was solids. So those solids will all stay in the bay or generally stay in the bay?

MR. DILL: Yeah, so that's a good observation. The tidal excursion -- so if you were to put a ping pong ball in the bay out there now and watch it go for a couple of days it's not going to leave the bay. It depends on where you put it though. Over time with the tidal current and the other -- there is actually a residual current and I don't know if you were watching it you could see some of the redder or oranger ones that started out more north in the bay. Those -- they migrate and they migrate slowly and what we saw that if -- when you look in Belfast Bay itself, so if you look at a drifter that was placed in Belfast Bay it takes about -- after about two weeks or so it will find its way out into -- into the sort of mid-Penobscot, lower Penobscot Bay. This depends a lot on what the river currents are doing. It depends a lot on what the winds are doing. But, yes, you're right, it is a

good observation that the -- the Penobscot Bay is not a small bay. There are a lot of small bays where the amount of water that comes in and out with the tide can go all the way out in the ocean on one tide and then get washed down the shore. Well, this is a very, very large bay and even though the tide range is very large, the -- there is not enough -- it's not enough of an excursion to actually push it all the way out of the bay on every tide. So you see -- but you do see over time, you know, up to two weeks that those -- that those particles do actually migrate away from Belfast Bay and, you know, but there will also be other things that are migrating in from other places, so it's -- and if you -- if you watch it more carefully there tends to be some circulations. And this has been documented in some other studies too where in one case, you know, and there is some conflicting evidence and I think it probably has to do with differences in the river discharge, differences in the stratification and the densely driven currents in the bay that sometimes you might -- you might find that there is sort of a circulation that goes counterclockwise, you know, around Islesboro and then other times you might see circulation go the other way around Islesboro. And

actually if you look at the results just from the simulation that we did it was about a month long simulation you can see that actually some of those particles that go counterclockwise around Islesboro they start drifting counterclockwise and there are some other ones that start drifting clockwise around Islesboro. The ones that tended to be further to the south tended to go clockwise and the ones that were to the north tended to go kind of up in the Belfast Bay and then come down around the west side of Belfast Bay.

AUDIENCE MEMBER: (Chris Wright.) You know, I guess my concern was so the solids that come out of -- if they don't go say make their way out to the ocean some percentage of them ends up in the bay.

MR. DILL: Yeah. I think that if the -- well, actually what we see from the information is that the amount of solids that will be coming out of the discharge is less than what is currently in the bay. So this system -- the proposed system is filtering solids out of the bay.

AUDIENCE MEMBER: (Chris Wright.) Thank you.

MR. DILL: You're welcome.

AUDIENCE MEMBER: I'm Natalie Charles. I

live in Belfast. Natalie is N-A-T-A-L-I-E. The historical and recent status of Penobscot Bay lists it as Maine's largest and most productive fishery and estuary system. It is also known as one of the most significant estuaries on the eastern seaboard. It can produce high quantities of wild fish, but has been severely mismanaged detracting each of the regional ecosystems, the economy and the culture. The waters and rivers have been cleaned considerably since the days of chicken processing and many industrial polluters have gone out of business, left the area or reduced their outflow. At this critical time, you are proposing to locate a 7.7 million gallon per day outflow pipe deep within the estuary not even close to deep ocean currents. Can you please provide scientific evidence -- hard scientific evidence to support your claim that the overflow would indeed be in deep ocean currents and have no negative impacts on the bay and its recovery. And I would like to see scientific articles and I'm happy to leave my email address here.

MS. TOURANGEAU: Thank you.

AUDIENCE MEMBER: (Natalie Charles.) You're welcome.

MS. TOURANGEAU: Could you -- would you mind

writing your email address down for me?

AUDIENCE MEMBER: (Natalie Charles.) Sure. That would be great.

MS. TOURANGEAU: Do you mind if I proceed to other people while you're --

AUDIENCE MEMBER: Do you want to answer her question? She had several questions there I thought.

MS. TOURANGEAU: I thought she had asked for more scientific articles on those issues to be emailed to her.

AUDIENCE MEMBER: (Natalie Charles.) If you could address what you can that would be great.

MR. HEIM: Well, I guess the water questions is more -- I think we have addressed it, but we can summarize it again.

MR. DILL: I'm not sure if I heard the first part of your question. The -- you did ask to provide evidence that the discharge would be in deep ocean currents. I think the answer to that question is no. In order to reach deep ocean currents you would have to go hundreds of miles off shore and that -- it's just simply not practical to put a pipe hundreds of miles off-shore. And from what -- from what -- what we've done -- in the analyses that we've done that's not necessary. The -- within the -- within the

estuary that -- the discharge within the estuary -- and this is pretty much every wastewater discharge is like this, I'm not aware of any, you know, there may be some locations where the deep ocean is right next to the shoreline that you can actually discharge wastewater into the deep ocean. You know, the analysis of the concentrations and the dilutions indicates that it's not -- that the concentrations of nitrogen aren't going to be high enough to impact, you know, what evidence we have that suggests we're at a threshold level. So even that discharge into the estuary it should be sufficient and that's what we're looking at. And I don't know if you can maybe reiterate your question.

AUDIENCE MEMBER: (Natalie Charles.) Well, if there were -- you could send, again, articles, peer reviewed articles that prove what you're saying, that agree with what you're saying that would be helpful.

MR. DILL: Okay.

MS. TOURANGEAU: Thanks, Nate.

AUDIENCE MEMBER: Hi. I always like to just sigh hi to everyone in the room so I feel a little bit more human. My name is Ethan Hughes and I'm a resident of Belfast and I also have a background in

science conservation and long explanations are typical in the field of science. We have given the respected time for answers from many of your experts even when they're not answering our questions. I ask you to please give me the same respect. I want a reminder to Nordic and Erik that you are guests in our country and not the other way around and please honor your hosts. I appreciates the local police presence just in case Nordic gets a little out of hand.

MS. TOURANGEAU: We're wild. We're wild and crazy.

AUDIENCE MEMBER: (Ethan Hughes.) It would be great if you were wild enough to do wild salmon, but that's another conversation. I just want to note the elephant in the room that there is it a power imbalance with citizens and corporations. You can stop our sharing, but we can't actually stop yours. And I just want to invite that it would be wonderful for Nordic to start having a equal power sharing with the citizens. That would be great.

And so now I have a question for Erik specifically. Thanks. So you seem very sure about the safety of this experiment and I actually admire that confidence, but why does the President of the

International Salmon Farming Association, John Davidson, in his report of 2016 state that he is -- the entire association is against land-based aquafarms because of disease, effluence, carbon footprint. They say no to raising Atlantic salmon to adults. It's illegal to be organic when they're in the tanks and there is cramped conditions for the fish. The Scottish salmon producer organizations also frame it as Atlantic salmon land-based is an environmentally unfriendly option, not financially viable. I urge you to read these reports for the sake of the bay and for Belfast to balance your confidence with some of this humility that there is actually other world experts that are coming up with very different conclusions than Nordic. And, yeah, I think that would be great. I can point you to those write-ups.

And now I'm going to tend with my question. So the way you frame this experiment it sounds great. Jobs, clean tax, clean water, tax support, great filtration, cutting edge, economic boom. The population density in Europe is much higher, so actually you had a concern about less flying by being in Maine, why not go to Norway? Surely you don't want to rob the Norwegian's of this incredible

opportunity if it's so incredible. Why come to Maine? Well, Norway is too regulated for a farm of this scale that's experimental. You don't have the permits. So for an entire country you're going to do 10 times the amount that are permitted in Norway in just one town. So Norway is too strict for your experiment, so you have come to Maine because the U.S. offers less strict environmental, socioeconomic and hydraulic restrictions and also regulations for 7.7 million gallons a day of effluent into the bay is okay in the United States, so welcome. And here is my question. Tell me, Erik, will 7.7 million gallons of effluent released daily into the bay have no ill effect? 7.7 million gallons daily have no ill effect to the bay and its ecosystem?

(Applause.)

MR. HEIM: Well, I believe that's what we've been trying to answer today.

AUDIENCE MEMBER: Please hold the microphone up.

MR. HEIM: Yeah. So in the end I don't think the quantity of water matters, it's what it contains and that's what we've been trying to focus on today. So and that's been very important for us to address that exactly what that contains. So and

if you look in general we are taking water and putting water back, as long as you don't add things that eventually harm an ecosystem that's been our goal and what's what we're aiming for.

As far as the other comments are concerned why not Norway. We are expanding in Norway. There are farms the same size being permitted in Norway right now. The reason we're here is that the CO2 equation you're referring to, when you buy a salmon from Norway it's three times higher than if you produce it locally because of airfreight. And over 90 percent of the salmon sold in this country are airfreighted into this country with three times the CO2 than if you produce it locally, so there is an environmental argument for that.

As far as -- as far as comments from some of these people, it's important to be aware of that the sea pen industry has been fighting land-based because they perceive it as a threat. In Norway, they perceive land-based to be a threat to the natural advantage of Norway salmon production. They don't like people coming into this industry because it's a competitive concept, so you will definitely find people in the industry who will talk against land-based, but you will also find many environmental

organizations who praise land-based including the Atlantic Salmon Federation, who has been quite clear about their view on this, and also the Monterey Seafood Watch, who also rates seafood in terms of standard sustainability. So I think like anything, there is always going to be people who have different views and that's fair, we respect that and I'm familiar with all of them. And we do read them and we do talk to what they write and we do listen to them and we have dialogue with them and that's fair. I think that's the way it needs to be. Just like sea pen is a big discussion topic in the U.S. and has its own issues as far as I'm concerned.

AUDIENCE MEMBER: (Ethan Hughes.) Yeah. Thanks. You're really articulate, but you didn't answer my question. And I also wanted to add you said as long as you're putting water back into the bay, but there will be another hundreds of millions a year of gallons of fresh water that are coming from aquifers into the bay, so that's a new water coming in.

MR. HEIM: So that additional -- I can answer that additional question. We did address that in the earlier meeting. So if you look at the Little River, it's the end of a big watershed. And this is something that's been mapped by Ransom over here. This watershed empties into that area of the Little River. Some of it goes surface, some of it goes through the ground. All of it empties out in the bay in this area. So we are just taking a part of that water that was otherwise going to the ocean, borrowing it for a while, treating it and sending it in the same way it was going in the first place.

AUDIENCE MEMBER: (Ethan Hughes.) Some of those are protected deep wells aquaculture, you know, I mean, they're not moving into the bay. They're in -- that fresh water is protected and sealed.

MR. HEIM: We can have Ransom, who has been doing the modeling and investigation on that.

AUDIENCE MEMBER: (Ethan Hughes.) I actually want to ask you the question again. Just tell me will the 7.7 million gallons of effluent cause no harm to the bay, yes or no?

MR. HEIM: I cannot see that with what we described today that it will cause harm to this bay.

AUDIENCE MEMBER: (Ethan Hughes.) Okay.

MR. HEIM: That's why we have also got independent parties to review that to conclude on that because for me personally that's also priority. It's bad business for us if we cause harm to the bay.

AUDIENCE MEMBER: (Ethan Hughes.) And that's the reason I'm very suspicious because there is no way to do 7.7 million without impacting the system, so I hope you do some more research. Thank you for your time.

MR. HEIM: Okay. Yup.

MS. TOURANGEAU: Thank you, Mr. Hughes.

AUDIENCE MEMBER: Do you want to...

MS. TOURANGEAU: Um... How are folks feeling? Should we take a quick break? Is everyone all right?

AUDIENCE MEMBER: No.

MS. TOURANGEAU: Keep going.

AUDIENCE MEMBER: Good evening. I'm Andy Stevenson. I'm a resident here in Belfast. And I have a couple of questions and I'd like to start with Mr. Heim. In your presentation earlier you mentioned and I think I either heard it wrong or I didn't understand it completely, but you said that none of the permits in Maine have limits for nitrogen or phosphorous. Did I misunderstand what you meant?

MR. HEIM: I can answer that briefly or actually, Elizabeth.

MS. RANSOM: Yeah, I can answer that. Hi, Andy. The majority of permits -- MEPDES permits that

are written in the State of Maine do not yet actually contain limits for nitrogen and phosphorous within the permits. There are generally limits provided for BOD and TSS and then there is a requirement to monitor for those compounds but there are not generally limits set. That being said, the trend at the moment is to start adding those limits. So we would not be surprised to find a requirement in the actual permit that's written for this project. But if you look up and down the coast, I think you'll find the majority of the permits that are out there from primarily municipal treatment plants, but also some of the other industry permits that are out there, I think you'll find the majority do not actually contain a limit for nitrogen and phosphorous.

AUDIENCE MEMBER: (Andy Stevenson.) Okay. All right. So that answers my question. We're talking about permits for primarily publicly owned treatment plants?

MS. RANSOM: That's correct.

AUDIENCE MEMBER: (Andy Stevenson.) Okay. Second, Mr. Heim, you talked also about the monitoring about the reporting program which is great and the fact that DEP and U.S. EPA can come and look

at your records and your reports at any time. Would there be any interest in having the public be able to come in and look at those records as well?

MR. HEIM: Well, what I would expect is that the DEP eventually will define what is required and what they'd like to see. I don't know the procedures of the DEP in terms of making public records, but certainly that could be a part of the procedure so that the public would have access to whatever report. I don't know, again, but maybe Joanna can comment on that.

MS. TOURANGEAU: All of the testing and monitoring and sampling results that are submitted to the state, anything that's submitted to the DEP that's required as part of any monitoring program will automatically be a public record.

AUDIENCE MEMBER: (Andy Stevenson.) Okay. All right. And would be available from DEP but not necessarily from Nordic?

MS. TOURANGEAU: It varies. Sometimes they'll put it right up --

AUDIENCE MEMBER: (Andy Stevenson.) Yeah.

MS. TOURANGEAU: -- and sometimes they'll ask the regulated entity to make it available.

AUDIENCE MEMBER: (Andy Stevenson.) Okay.

MS. TOURANGEAU: It varies. And we'll know more when a permit -- when and if a permit issues.
AUDIENCE MEMBER: (Andy Stevenson.) Okay. So on that point, I would suggest that Nordic consider having those records available at Little River at the facility as part of your public or your community outreach program.
Moving on. Mr. Dill, man, I've got to tell you, I'm a water quality monitor and I love the little ping pong balls. That was neat. But the ping pong balls are only showing us what's happening on surface, correct? I mean, it wasn't a full water column modeling simulation.
MR. DILL: The hydrodynamic model, the far field model is a two-dimensional depth average model, so it's an estimate of depth average currently.
AUDIENCE MEMBER: (Andy Stevenson.) Okay. Okay.
MR. DILL: We made an assumption that based on the CORMIX results which does give you three-dimensional information that the -- in order to calculate the concentrations that the ping pong balls would all stay within the upper 10 meters of the water column --
AUDIENCE MEMBER: (Andy Stevenson.) Okay.

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MR. DILL: -- so they're not mixing down into the deeper parts of the bay.
AUDIENCE MEMBER: (Andy Stevenson.) Okay.
MR. DILL: And we think that that's a conservative assumption because over time you would tend to get more mixing especially in the sort of far field time scales when you're looking at days to weeks rather than just the first, you know, hour or so after the effluent leaves the pipe.
AUDIENCE MEMBER: (Andy Stevenson.) All right. Then would it be accurate to say that there has not yet been any modeling or actual sampling information about water quality below let's say that 10 meter or that level?
MS. RANSOM: Actually, I can take a piece of that. So there are in addition to sort of some of the publicly available data for, I mean, I think it even goes to even -- some of the samples maybe go as deep as 100 and -- about 60 meters down, but we've established some sampling stations where we've been looking at the water quality at 5 meter intervals from the surface down to the depth of where the discharge pipe is proposed.
AUDIENCE MEMBER: (Andy Stevenson.) Okay.
MS. RANSOM: So we have some data that has

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been gathered over the course of the past several months and we will be continuing to gather data as the project goes on so that we can, you know, have an understanding of not just one elevation surface or bottom but several elevations.
AUDIENCE MEMBER: (Andy Stevenson.) Would you be able to tell us a little bit more tonight if time allows about the monitoring and assessment that you plan to do between now and the time you start construction given that a permit might be granted?
MS. RANSOM: I think some of that will be something that comes out through the draft permit process through discussions with DEP. Obviously we want to make sure that whatever we're proposing is something that they feel is a good thing as well. So but what that might look like is you would look at, again, multiple depths, also multiple seasons and as we've been doing you would be looking at that during different portions of the tidal cycle because obviously things that you're seeing during an ebb tide might be different than during a flood tide.
AUDIENCE MEMBER: (Andy Stevenson.) Right. Okay. As far as monitoring the effects of the effluent on the marine environment I'd like to offer a wild suggestion tonight, which is that in addition

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to what I'll call mechanical sampling or chemical sampling or automated sampling or even hand sampling, Nordic Aquafarms considers putting in what I would call a three-dimensional biological sampling operation, which would essentially be a full water column installation of kelp, seaweed, muscles grown on ropes vertically and clams caged on the bottom as a way to reassure people over the long haul that the viability of the bay as a source for additional aquaculture or any other harmonious installation could be preserved.
MS. RANSOM: I think that's an interesting concept. I think we'd have to obviously get some input from some of the folks at DEP. I know, for example, the clam flat at the discharge area has been closed for some time, so I think that particular piece might, you know, require some additional input, but I'd be happy to speak with you further about what you're proposing.
AUDIENCE MEMBER: (Andy Stevenson.) Okay. Well, the people who know it far better than I are a group called GreenWave and I believe they're in Connecticut. They focus mostly on the West Coast, but they've developed this concept and I'm sure they would be happy to talk with you.

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MS. RANSOM: Awesome. Thank you.

AUDIENCE MEMBER: (Andy Stevenson.) Yeah. All right. I think that's it and I want to thank you all for the opportunity to talk tonight. Thank you.

AUDIENCE MEMBER: Hello. My name is Audra Novine McTague. A-U-D-R-A, M-C-T-A-G-U-E. And my question is regarding the time frame of your research. You said that the research that you presented was for the time period of one month and I'm assuming you guys are going to be here longer than that. And it is critical for operations like these to look at a time frame that is long-term and I mean 20 years or more. And so I'm wondering if you've done this research and what you have found.

MS. RANSOM: Great question. Let me do some clarification.

AUDIENCE MEMBER: Can you repeat the question?

MS. RANSOM: I'm sorry.

AUDIENCE MEMBER: Can you repeat the question? I couldn't hear.

MS. RANSOM: Sure. Her question was that she had understood from the presentation that we had been gathering data for about a month and that given the longevity of the project it was important to have

a much longer time frame of monitoring in order to understand potential impacts and I'm paraphrasing a bit there, but I think that's the gist of it.

MS. TOURANGEAU: Is that accurate?

AUDIENCE MEMBER: (Audra McTague.) Yes.

MS. RANSOM: So first of all, we've been as a consultant gathering data over the last several months, but there are -- and the reason for that is because we wanted to get some things as we narrowed down sort of where might that pipeline actually go, we wanted to narrow down things that were right at that discharge point. There have been, however, studies that have been going on in the bay since the 1970s and so there is a dataset for other areas within the bay that we can use to start establishing what does it look like historically, how has it changed, what are the different effects you might see at different times of the year, what are the different effects you might see upgrade or downgrade and upflow or downflow during different tide cycles. And so we've not only looked at our own dataset, but at some of the data that exists from other studies. So we have data that comes from the 1970s. We have data that comes from, you know, 2001 through 2010 provided from another study. So those datapoint

however some of them are, you know, maybe a kilometer from where we're discharging, so we're just now starting to make sure we gather data that is closer to the point that we're discharging so we have a more in-depth understanding of the place we're going to be proposing. And then as we mentioned, the intent is to have that be something where we can keep making comparisons going forward and the ultimate program is something that we expect the state is going to want to weigh in on and help us develop something that they feel is a sound approach to monitoring. But, you know, the permit process doesn't just stop when Erik gets his permit. He is required in his permit should they issue one to keep monitoring his discharge for as long as that plant operates and there, you know, there will be things that keep going into next decades.

AUDIENCE MEMBER: (Audra McTague.) Based on the these studies, what do you expect the long-term effects of your discharge to be?

MS. RANSOM: That's a good question. You know, we are looking at various different parameters and we have, you know, tried to the best of our ability to predict what we think is going to happen over time and, you know, obviously as we mentioned

some of the things he's discharging are actual improvements over what the bay has right now. So, you know, is, you know, I think we showed earlier a statistic that says his discharge is going to ultimately be less than one percent of the run-off that is currently coming into the bay for nitrogen. And so, you know, is he going to have a strong impact on the bay with anything he is discharging? No, because that bay is many trillions of gallons of water and he's discharging, you know, a small fraction into that. But over time, you know, you have things that are being discharged in one specific area over time we hope to see that, you know, the things that he's improving because he's treating and cleaning will potentially show some improvements and we hope that the things that we are discharging are not going to have the negative impacts. And, you know, we think that with the studies we've done, the modeling we've done, we've demonstrated that there should be no negative impacts. But, you know, we're going to keep monitoring to make sure that that's true.

MR. DILL: Can I say something about the modeling? I think you -- you mentioned -- you did mention the one month time frame and I think that may be because of the modeling that we showed it was a one month long simulation. Actually, the model simulation was actually 45 days. It was actually a little more than a month, but the initial part we just kind of cutoff because when you -- with this kind of modeling you have to spin up the tidal forcing, you know, so it's initially the water is perfectly still and it takes a couple weeks for the hydrodynamics to create a realistic current. At that point, then you can -- then we -- we compared the water levels to -- the observed water levels and showed that they were pretty accurately reproduced and so the currents are pretty accurate.

And I think one of the questions that I had going into this was, well, how long does the water in Belfast Bay stay in Belfast Bay. And so this is, you know, typically you might call this a residence time. So trying -- so this is one thing that we -- that we really wanted to understand because this is -- this is actually really important for understanding what these impacts are. And if you look at the results of that, you know, if you look at the tidal currents and the result of that simulation and one of the reasons why we do a one month long simulation is that's the amount of time it takes for the moon to go through a

full cycle and so you go through a full spring neap tidal cycle, which is really representative, you know, it's sort of enough -- a long enough period of time to represent what a long-term simulation of the tides would be. So like, for example, the reason why NOAA, the National Oceanic and Atmospheric Administration, collected tide data at Fort Point during that time period was so that they could then do an analysis on that and use that analysis to predict tides any time in the past, any time in the future. And so that -- that -- that one month long simulation is sufficient to give you a representation of what those tidal currents are doing. And what we saw from that simulation is that it -- when you -- when you release particles that are sort of scattered throughout the bay they tend to take about two weeks until they move, so if you saw that animation I was showing that had the different colored dots floating around, if you look for about two weeks of that simulation and you say you picked -- you tracked a couple of the particles and you watch them with your eyes they were in Belfast Bay, about two weeks later they're out of Belfast Bay and there is new ones that have come in from up the river or from the other side of Islesboro or there may be some of them that even

circulated up from on the west side of Islesboro. So that was able to sort of answer that question that you've got about this two week time frame and so then if you look at what the impact is on the concentration in the area, after -- after two weeks of a continuous release, you have a good representation of what the long-term impact is going to be and that was kind of the first slide that I talked about that showed a very small light blue area and so that was, you know, and with looking at nitrogen, because in this case nitrogen is really the thing we're most concerned about. TSS we're not so concerned about because it's actually lower than what's in the bay now.

So that -- so I guess to answer your question that impact area is very small where you would see that elevated nitrogen concentration and it wasn't anywhere near where some of the sensitive population of eel grass were that we had. So I hope that answers your...

AUDIENCE MEMBER: (Audra McTague.) Thanks.

MS. TOURANGEAU: I am going to say I see we still have quite a long line. I just want to flag for folks that we're getting -- we've got 45 minutes left for the room, so if you are kind of not getting

to your question quickly, can you please try to. And I apologize, we are just running out of time a little bit.

AUDIENCE MEMBER: Yeah, my name is James Merkel. I live in Belfast. And for full disclosure, I am running for city council, Ward 5, a write-in candidate. And what really concerns me is the lack of transparency and public engagement. I know this is the fourth information meeting where we're allowed to ask questions and you're the expert. And I used to be in your shoes as a former marketer of military hardware and I had all of the answers and the people asking me didn't and so this is a very hard scenario, but we were begging, this whole community, for an engagement and this is still you're the expert and we're asking questions, so I'll participate in that.

But several questions, I want to start with, again, on the currents. Now, I'm a sailor, so I'm out there quite a bit. On an -- I'm usually running back into the harbor with the tailwind, you know, out of south, that's normal. And I know you left this -- the wind out, but it's quite significant and Wejisue's (phonetic) report from 1999 says the currents out in that bay are really affected by salinity and that's from the Penobscot. There is a longshore current coming down the whole coast and it's also these other currents that wrap around Islesboro and it's very complex and it's even dependent on the wind direction, so I see that plume coming right into the -- past the park of the city, past the boathouse right into the harbor. You know, your ping pong balls are kind of showing it with the wind forcing that, which you didn't study. That's a quite common wind. And on the outgoing tide it's going to go right past Bayside and Kelly's Cove and these are beaches that people enjoy.

Now, Bayside has 1.6 pounds of nitrogen. You're talking about 1600, so that's what, my math, a thousand times more than Bayside Sewer. And Belfast City has 108 pounds of nitrogen versus your 1600, so this is like Belfast having a population of 98,000 people. It's like Portland putting their waste stream into, you know, equivalent to Belfast city's waste stream into our -- it's not a deep ocean current. I've heard Erik say it in three -- in two meetings so far that you're going for deep ocean currents. This is a deep estuary. It's a deep estuary where you are. And I saw your ping pong balls and I see your numbers, but I'm still saying would these citizens be sitting down and nodding

along because you can present data in very many different ways, but to putting 10 to 15 times more -- doubling the -- 15 times more sewage from Belfast Bay into -- and my children swim in those beaches, so like what guarantee do we have that the beaches aren't becoming horrible? Like, I mean, I don't know if there was -- if there was 15 sewers like just put into the Belfast Bay right in this estuary, I don't think I'd ask my boy to swim there. I think we'd go somewhere else, you know.

I mean, there is a lot of ways to present data, but this is another way to look at it and I'm just not clear. I need to have a gut feeling. I am a scientist too, but was looking at 1.6 from Bayside versus 1600 and I'm looking at 1600 versus 108 in nitrogen and we already have a closure. Our bays are closed for shellfish, toxic algae bloom, biotoxin. It's currently closed. And, you know, you say dilution is your solution to pollution and I teach sustainability at a university and we've been teaching that for 30 or 40 years. Like you say, well, we have the water so we can use it, but we at home turn the faucet off when we brush our teeth and when we do dishes and you're saying, well, it doesn't matter. So I just don't get this that it doesn't

matter that you're adding more to an already collapsed system. You know, you're saying, well, it's small, but it's more to an already collapsed system, so I don't get it.

MS. RANSOM: So I'm not a hundred percent sure of the question in there.

AUDIENCE MEMBER: (James Merkel.) Well, the question is how -- what guarantee when you're, you know, 10 to 15 Belfast city sewers and, you know, what happens if the beaches are smelly?

MS. RANSOM: So --

AUDIENCE MEMBER: (James Merkel.) You know, what -- what...

MS. RANSOM: -- the amount of nitrogen that currently is going in from other sources, the amount that --

AUDIENCE MEMBER: (James Merkel.) I heard you, yeah.

MS. RANSOM: -- is less than 1 percent is -- of that point source discharge, that 4.3 percent is going to go up by about three-quarters of a percent with this discharge. That's a pretty small amount. And when you look at the fact that the bay contains trillions of gallons of water --

AUDIENCE MEMBER: (James Merkel.) But what

happens if it's smelly at the beach, you know, I want to know. And, for example, like --

MS. RANSOM: Jim, I don't -- honestly, I don't think there is going to be any problems --

AUDIENCE MEMBER: (James Merkel.) You don't think so, right? Right.

MS. RANSOM: -- at the beach.

AUDIENCE MEMBER: (James Merkel.) No, I understand you don't think so. And then just the last question is Moulton Bay, Port Moulton Bay --

MR. DILL: I just wanted to respond to your question quickly.

AUDIENCE MEMBER: (James Merkel.) Yeah.

MR. DILL: Municipal sewage is much, much different than the water that's being proposed to be discharged here, so when you're talking about comparing the sewer discharge from a municipal sewage system, municipal wastewater treatment plant, you're not comparing apples to oranges.

AUDIENCE MEMBER: (James Merkel.) Right.

MR. DILL: And when you're talking about closures of shellfish bay -- shellfish areas and what drives largely the wastewater treatment discharge is bacteria concentrations, not nitrogen. And so that's the thing that you're concerned about at the beach when it comes to a municipal sewer discharge, so it's not an apples to oranges comparison.

AUDIENCE MEMBER: (James Merkel.) No.

MR. DILL: I just wanted to make that clear.

AUDIENCE MEMBER: (James Merkel.) Sure. And the other question I have is about the smell and the pheromones and kairomones that are in that water. Like Moulton Bay recently did a study in Nova Scotia finding 56 percent decrease in bearing lobster -- lobsters bearing eggs and 40 percent reduction in regular lobsters because they're sense field -- they find their bait by antennas. They have to smell their bait and if your whole world smells like salmon you can't find a trap or you can't even find the food for yourself to eat, so this Moulton Bay study was 11 years and it's quite conclusive. And I don't know if you have read it. They give -- they say the things that really affect it are sulfides and ammonium, toxic and -- and they have behavioral effects on adults and other lobsters at various stages.

MS. RANSOM: Jim, remember the -- among the numbers from this facility are .003 --

AUDIENCE MEMBER: (James Merkel.) Right. I saw that, but --

MS. RANSOM: -- so that's pretty low.

AUDIENCE MEMBER: (James Merkel.) -- but how about the sulfides? But what about the sulfides?

MS. RANSOM: Hydrogen sulfide.

AUDIENCE MEMBER: (James Merkel.) Yeah.

MR. HEIM: I think -- I am not familiar with that particular study, but this is not a sea pen operation.

AUDIENCE MEMBER: (James Merkel.) Oh, I know very clearly, but the plume is going to have odor of salmon. I mean, it's going to smell of salmon. It's going to have that odor.

MR. HEIM: We have no odor in our farms.

AUDIENCE MEMBER: (James Merkel.) It's going to have --

MR. HEIM: This water is clean.

AUDIENCE MEMBER: (James Merkel.) What about -- can it -- are the pheromones taken out, kairomones?

MR. HEIM: Again, if you take --

AUDIENCE MEMBER: (James Merkel.) I know what a .4 micron is is what you're saying, right?

MR. HEIM: Yeah, exactly. So if you -- if you have taken the perspective that this is going into trillions and trillions of gallons in a bay, it's like taking a couple drops of water in a bucket.

That's about where we are, okay. So I've been along the whole coastline in Norway, I never really detected any smell outside of these facilities. The only thing that you need to be concerned about is how you handle your sludge waste because if you extract and dispose of it here it will start smelling, so that's why you need to contain it and make sure it's not exposed to oxygen. I have never walked along any land-based facility where there is a strong smell coming from the ocean.

AUDIENCE MEMBER: (James Merkel.) I guess what I would like to see too though if you would study or show some peer study that would look at the plume and its affect on lobster harvest.

MR. HEIM: Okay. Well, we look at the receptors of the population.

MS. RANSOM: Actually, I can take a little bit of that question on lobster and I think that's something that's near and dear to every Mainer. One of the primary things from a discharge that can have a strong impact on lobster growth is actually your dissolved oxygen. The lobsters are quite sensitive particularly in their juvenile stage to the DO levels. And so at a DO level, for example, of 2 1/2 milligrams per liter, the juveniles show a 30 percent

reduction in their growth. And adults are sensitive too, you know, you start getting up to, you know, 3 1/2 milligrams per liter and even adults show, you know, some distress. The discharge from Nordic's facility is going to be at 4 1/2 give or take, if I'm not mistaken, and that level is actually a level that's considered safe for marine life, so that it's not a level that you would expect to see an impact to lobsters. But the primary -- I mean, obviously there is a variety of different things. If there were high TSS the lobsters are going to be sensitive to that too, but really here out of the discharge numbers that we're looking at from this facility the primary thing that we'd be focused on for the lobsters is the DO and that is one of the things that's -- there is a number of studies I could share with you on that.

AUDIENCE MEMBER: (James Merkel.) Right. And the odor plume is what they really seem to single out in the Moulton Bay study was the odor plume, it affects their antennae and their ability to find food because their whole world smells like salmon. And maybe you don't smell it up above, but it could be down in the waterfall, that smell.

MR. HEIM: What's the case example this is based on?

AUDIENCE MEMBER: (James Merkel.) Pardon?

MR. HEIM: What is the case example that is based on?

AUDIENCE MEMBER: (James Merkel.) Port Moulton Bay. It's an 11 year study. It's near pens, but pen is a, you know, it's putting out the salmon smell, you know, your pipe is going to put out a salmon smell.

MR. HEIM: What is -- what's going to smell is your -- basically your waste coming from the farm. Your feces, feed particles, wasted feed coming out, that's what really smells and that's not going into the bay here.

AUDIENCE MEMBER: (James Merkel.) Right. The last time I cooked salmon and I washed my hands 20 times and they still smelled like salmon.

MR. HEIM: Well, if you open up the fish --

AUDIENCE MEMBER: (James Merkel.) I was swimming in -- I was camping in grizzly bear territory in DC --

MR. HEIM: Yeah.

AUDIENCE MEMBER: (James Merkel.) -- and I washed them 20 times before I went to bed that night, I still smelled like salmon.

MR. HEIM: Certainly if you open up a salmon

it will smell like fish, but --

AUDIENCE MEMBER: (James Merkel.) And your hands will -- and the smell is -- that's what's affecting the lobsters, so I just really urge you to look at that and maybe answer it. I'll -- I have 76 questions, but I'll give them to you in writing.

MR. HEIM: That's fine.

AUDIENCE MEMBER: Good evening. I'm Ellie Daniels and I live in Belfast and I too have a disclosure that I am running as a write-in for Ward 1 on the Belfast City Council. I admit I'm really disappointed not to hear more about feed tonight because everything that I try to research about what the salmon are going to be fed tells me that it makes a very big difference in what gets out in the effluent. So I guess you have a resident expert here.

MR. DEMOS: I'm not an expert. I'm a representative for Skretting, it's a feed --

AUDIENCE MEMBER: We can't hear you.

MR. DEMOS: Okay. I am a representative for Skretting Global Feed Company. I live in Newport. I've sailed Penobscot Bay for 38 years. I've protested the tanks in Searsport, so I'm passionate about the bay. As far as fish feed is concerned

allow me to read the statement because I'm not an expert, but we have experts, we have PhDs and so forth.

AUDIENCE MEMBER: We can't hear you.

AUDIENCE MEMBER: Hold the mic up.

MR. DEMOS: We screen for pesticides and heavy metals. We have never added growth hormones, sex hormones, nor do we use raw fish as an ingredient. We don't use antibiotics to our non-medicated feed. We are USDA compliant, FDA registered and have all the third-party certifications. Our feed meets all of the requirements around the globe including the European Union. All our ingredients used in the manufacturing of Skretting feeds are approved by the American Feed Control of Fishes and Canadian Feed Inspection Agency. Our feed plants are regularly inspected by the Canadian Feed Inspection Agency and the FDA. Our plants are ISO 9001 GMP, BAP is best aquaculture practices, HACCP, I don't know what that stands for but it's one of our certifications. We have a global audit team, which is a part of the supplier approval program. Their role is to visit the suppliers and ensure that they're complying with the food safety requirements. Testing for contaminants are also an

integral part of the process. We reject any raw materials that don't comply with the standards. I have a quality assurance report if anybody is interested and if there are any questions, please.

AUDIENCE MEMBER: (Ellie Daniels.) Oh, I have questions. You're telling me about your certifications and I do appreciate that, but what is in the feed? What are the salmon going to be fed specifically?

MR. DEMOS: Well, there is fish meal --

AUDIENCE MEMBER: (Ellie Daniels.) Oh.

MR. DEMOS: -- there is fish oil, but here is the thing, it depends on the feed.

AUDIENCE MEMBER: (Ellie Daniels.) That's what we want to know.

AUDIENCE MEMBER: We need you to tell us.

AUDIENCE MEMBER: (Ellie Daniels.) Erik, can you answer what specifically your fish are going to be fed?

MR. DEMOS: It depends on the type of feed you're feeding. We have organic feed. We have low phosphorous feed. We have all kinds of different feed, so.

AUDIENCE MEMBER: (Ellie Daniels.) I would specifically like to know specifically what Nordic

Aquafarms is going to feed their fish.
MR. HEIM: Okay. I can speak about that. So we're not even close to making a final feed selection here. Right now, we're focused on the --
AUDIENCE MEMBER: Hold the microphone up.
MR. HEIM: Okay. We're not even close to making a final feed decision in the U.S. We are just making that in Norway, it would start up in two months over there. So generally what you will see in the feed, it's a growing amount of vegetable proteins --
AUDIENCE MEMBER: (Ellie Daniels.) What kind of vegetables, please?
MR. HEIM: There could be a whole range of vegetable proteins involved in their feed.
AUDIENCE MEMBER: (Ellie Daniels.) Are there soy proteins?
MR. HEIM: There can be soy. There are substitutes for soy. Any time you look at these proteins you want to be looking at where they're sourced from, how sustainable are they, for example, soy bean is something I'm also looking to reduce because among other things you look at how this is grown in Brazil with deforestation, not a big fan. You want to look at who has produced it, where it is

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produced to make sure that this is a safe, good product. Same with protein as other sources of vegetable protein as well.
AUDIENCE MEMBER: Like corn? Is there corn in the feed?
MR. HEIM: There can be, yes. Again, you always look at the sourcing of these things.
AUDIENCE MEMBER: (Ellie Daniels.) Are there animal byproducts in the feed?
MR. HEIM: That is used in some feeds, yes, it depends.
AUDIENCE MEMBER: (Ellie Daniels.) And how are animal byproducts certified in feed?
MR. HEIM: That is an issue we will be looking into in the U.S. Our concern is the sourcing of it and to be sure that is a safe, good sourcing. For example, we know that in the U.S. antibiotics is used in animal feeds in some cases. This is not something we see in Europe, so obviously that's one thing we're going to be looking at that we want to make sure that every source we have is antibiotics free in terms of that.
AUDIENCE MEMBER: (Ellie Daniels.) And where will you source your fish meal?
MR. HEIM: That's up to a discussion with

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the feed company in the end to see what their sourcing practice is. There are many practices regarding that. And then there is also alternatives coming into the business now in terms of algae and also insect proteins. Many good substitutes are coming in.
AUDIENCE MEMBER: (Ellie Daniels.) Well, they're just coming and I understand --
MR. HEIM: They are coming in.
AUDIENCE MEMBER: (Ellie Daniels.) -- that there is no quantity at all that has been done yet.
MR. HEIM: No, but we're not buying feed until two or three years from now, right, so in the next couple of years --
AUDIENCE MEMBER: (Ellie Daniels.) Yeah. Okay.
MR. HEIM: -- you're going to see a lot of developments in this industry. And the reason why is that this industry needs to meet the challenge of an extremely fast growing global aquaculture industry because that's where growth in seafood is coming from in the next decades and their challenge is to meet that industries needs in a sustainable matter, so there is an enormous amount of R&D going on in this industry right now.

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AUDIENCE MEMBER: (Ellie Daniels.) Yes, it's very profitable. I can see that from --
MR. HEIM: Actually, feed is a fairly low margin business. You have powerful buyers. They are pressing the feed companies on the margins, so it's not as profitable as you might think to be honest, so. Yeah.
MS. TOURANGEAU: We are getting -- I appreciate, Miss Daniels, that you have questions about the specifics about the feed and I appreciate --
AUDIENCE MEMBER: (Ellie Daniels.) Well, I appreciate the answers.
MS. TOURANGEAU: -- and I'm hoping that we can move to questions about the discharges. We're running short on time.
AUDIENCE MEMBER: (Ellie Daniels.) I do have questions about the discharge. Specifically, how big is the diameter of this effluent pipe and will there be one effluent pipe or two effluent pipes and how many water intake pipes?
MS. TOURANGEAU: So I'm going to preface letting you answer by saying that this permit is not for the construction of the intake and the outfall. That will be covered as I addressed in the first part

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in the other permits that are issued and you can answer it really quickly, but.

MS. RANSOM: Ellie, I can give you a brief discussion on that. As Joanna mentioned, we are going to be covering that in more detail when we get to the Army Corps permitting and there will be a lot more detail provided and some of that is still ongoing engineering. But one of the things that CORMIX modeling does look at is what are the best ways for that pipe end to appear so that the dilution you receive is the best possible that you can and so we're looking at anywhere from a 30 to 36 inch diameter pipe at the moment and there could be multiple ports particularly in the beginning when the flows are lower and there could also be diffusers involved. And all of those things will be looked at and engineered over the next few months to make sure that by the time we get to the Army Corps public meeting we have more answers for you.

AUDIENCE MEMBER: (Ellie Daniels.) Okay. I do want to know because it seems to be a moving target and I'm interested in the plume related to discharge and ports, is this the same as baffles, meaning that along the termination of the pipe you have multiple places that the effluent --

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MS. RANSOM: And we're about to get out of my realm of engineering.

AUDIENCE MEMBER: (Ellie Daniels.) Okay.

MS. RANSOM: But there are things, for example, like a duck bill where you can have something that opens when the flow reaches a certain level --

AUDIENCE MEMBER: (Ellie Daniels.) Exceeds a certain --

MS. RANSOM: -- and then comes back down, yes.

AUDIENCE MEMBER: (Ellie Daniels.) Okay. Well, early on in this process we were told that the pipe would be a mile and a half out in the bay and then we heard a mile and now we're hearing about it in meters. And so I had used my trusty iPhone, same thing with the kilos to pounds. I really think that an American permit might put American measures on these things so that we could understand them more. But I did use my phone, so I see now that you're talking about .62 miles out and my neighbor who lives down there on the shore talks about a half a mile of flats at low -- low tide. It's a very shallow bay out there, so we're not very far out.

MS. RANSOM: I can tell you that this refers

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to at mean low water, so the flats don't count essentially in our distance calculation. So if it's dry to some degree that doesn't -- so when we're talking about depths, for example, that 35 foot depth at the pipe outfall is at mean low water. So, yes, it's counting in our distance, but it's not counting in our depth distance. So the idea is we've looked at over time with the modeling different scenarios for what happens if you put the pipe at 500 meters, what happens if you put the pipe at 1,000 meters, what happens if you put the pipe out at 1500 meters and we've optimized through the modeling scenarios, you know, where do you see change occur and how do we make sure that that discharge isn't coming right back into the bay and the reason you don't have the pipe at, you know, 20 meters is because you're going to get better effects by going further out, but you also don't want to go so far out that you're, you know, getting to the other side of the bay. So part of what we've done -- why the number of changes and why we have a draft application process is so that we can understand the science before we settle on a number and obviously in early meetings we hadn't done the engineering yet and so we're working on it.

AUDIENCE MEMBER: (Ellie Daniels.) I have

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one last question that I don't believe anybody has addressed.

MS. TOURANGEAU: I --

AUDIENCE MEMBER: (Ellie Daniels.) Excuse me, other people have been able to get to the end of their --

MS. TOURANGEAU: I hear you and I am going to interrupt you just briefly to say that right now for the last two at about 15 minutes per person. We have seven people in line and about 20 minutes left, so I'm going to ask people to keep it short and apologize to people that are at the end of the line.

AUDIENCE MEMBER: (Ellie Daniels.) We all are aware that there is a second large salmon farm that is applying -- going through its discharge permit right now up in Bucksport and I am wondering if you know how the DEP will be handling the fact that two large facilities will be discharging into the bay and if there is some kind of a plan for a cumulative effect study related to two facilities.

MS. TOURANGEAU: It's not truly relevant to our permit, but I do -- I am aware that the DEP has issued a draft permit for that project that has been circulated, so that I'm sure when our permit comes in that that will be taken into consideration.

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AUDIENCE MEMBER: (Ellie Daniels.) Thank you. Just a procedural question. Someone had to submit their email in order to get a scientific study. We all submitted emails here, will we all receive scientific responses to those questions?

MS. TOURANGEAU: We -- like I said at the beginning of the meeting, I am going to pull the questions on the permitting criteria out and there will be narrative responses if they're not addressed in the transcript.

AUDIENCE MEMBER: (Ellie Daniels.) Thank you.

AUDIENCE MEMBER: Good evening. My name is Don Perkins. I run the Gulf of Maine Research Institute down in Portland and I would note I've done that for 24 years now. I have been watching the evolution of the aquaculture industry in Maine since the late 1980s with the first salmon farms. I was a co-founder of Friends of Casco Bay and so I have a deep interest in water quality and we're actively involved in understanding and stewarding the ecosystem along the coast of Maine as well as supporting the growth of a sustainable seafood industry. So I've been watching this. I've been watching the evolution of the RAS industry for the

past few years. We at GMRI from an economic point of view are interested in aquaculture as a diversification opportunity along this coast. And I came up here tonight -- I'm actually on vacation, but I came up here tonight having listened to this from a distance to just share an observation from the outside.

Number one, how you all decide as community to deal with this project is -- that's a local question and you have a healthy political process here to do that. I would note from a distance and as a party that has no dog in this fight, no financial relationship, no business relationship with Nordic, that this -- this is a state-of-the-art project. It's been engineered thoughtfully. I had an opportunity to grill them about their environmental impacts. The concentrations of nutrients going into the bay are small. The number of gallons is a big number, but it's trivial in the context of the volume of Belfast Bay. They are engineering -- and I've been in touch -- I've tracked this through the marine construction industry, friends in Norway who are very familiar with the evolution of RAS in Norway. Objectively, this is the best practice project. It's being introduced into a state that's known nationally

for having best practice --

AUDIENCE MEMBER: What's your question?

AUDIENCE MEMBER: Yeah, what's your question?

AUDIENCE MEMBER: (Don Perkins.) I'm going to get to it. I'm going to get to it. -- best practice regulatory practices. And so I think, you know, time will bear out examining this, but the engineering side has been very well done. I think to me the big risk question and where my question goes is on the operational side. Once you've built a state-of-the-art facility then it's a matter of how well you operate it. And I'm interested, Erik, in how you think about, you know, who you're going to hire, what kind of training and what kind of risk management you're going to do once it's built. Thank you.

MS. TOURANGEAU: Thank you.

MR. HEIM: And I totally agree. This kind of operation that we're looking at --

AUDIENCE MEMBER: It's not related to effluent, so why can he ask that question? It's not related to effluence. You just shut Ellie down.

MR. HEIM: I'll answer it briefly because it also does relate to your discharge. So, yes,

recruiting and training and people is a really important part of operations discipline. Operations discipline also goes into your practice and how you develop your protocols and your practices related to monitoring and following-up and making your discharge structure. So all of these things are linked together. So, for example, in terms of the water treatment plant, we have a CTO, David, down here, who has many years of experience. He will be one of the key people overseeing also the -- all of the wastewater plants and that experience is highly important and it's important to have people with discipline and competence to operate these things. So that's the short answer and I could talk about a lot more about the production side, but I'm not going to do that right now. But, yes, it is true, operations excellence is extremely important.

AUDIENCE MEMBER: Good evening. My name is Paul Dean and I live in Belfast. You may not be able to answer these questions. I have three. The first one, I don't know if the effluent line will be pressurized or not. And I heard earlier tonight, I thought, it's quite noisy in here, that the testing would be done quarterly on the effluent that comes out of it and then I heard about the possibility of the public sampling out further on the line. If that line is actually pressurized, you should be able to bring sample points up from it and sample on a more regular basis. I'm speaking tonight more that I can be on record with the DEP that I would encourage the testing be done on a more regular basis so that, you know, things that -- we'll know what will actually go out in the bay. I haven't heard anything about pH, but that would be another one.

That puts into effect that this is a -- with the DEP I have to mention about catastrophic tank failure. If you build this site will there be a berm around it to be able to take the waters from one or two tanks actually breaking down and what the emergency procedure would be for something like that?

Last and not least, but on this line that goes out, if it plugs, and I'm hearing things moving and stuff in the line, I'm hoping that you're planning to develop an emergency procedure because you have fish that would be dying shortly in the tanks without that outflow and what would you do in that emergency? And thank you very much.

MS. TOURANGEAU: Sir, I am not sure that I captured your last question about the fish dying in the tanks. Were you saying in the --

AUDIENCE MEMBER: (Don Perkins.) If the outflow of the, you know, the effluent line stops, plugs up.

MS. TOURANGEAU: Okay.

AUDIENCE MEMBER: (Don Perkins.) Possibility. Everything is a possibility at times and we can go from there.

MS. RANSOM: I can take a crack at some of those. Some of them will be partial answers and we'll hopefully get to some more detailed answers for you. Right at the moment I think the design is a little bit unclear still as to whether or not we're having a gravity flow or a pumped flow down the pipe and so I hope you'll come and repeat that question when we're doing our Army Corps permitting.

As far as the frequency of monitoring goes, there are certain parameters that get monitored in the plant daily, probably hourly, and that's ongoing throughout. Obviously this is -- these are living creatures that need the water quality to stay good within the plants and so some of that monitoring is conducted and logged with equipment, not manually, so that we can take those readings more frequently. But in addition, the permits are usually issued with monthly, weekly, and daily maximum values that you

need to meet so that the monitoring is actually conducted much more frequently than just monthly.

And as far as the public sampling piece goes, I think we're still working on developing what that might look like in terms of, you know, who might be working and participating on that and what that might involve and there certainly are both groups and individuals that expressed interest in joining that in some fashion.

As far as the questions about the tank collapse procedures and clogs in the effluent line, that actually somewhat gets back to Don's question previously. A lot of what we are -- we're all, you know, concerned about is risk management and when there is human error that's when we have the most risk and I certainly see this in my business as an environmental consultant as well. I send somebody into the field and they are more likely to get injured if they aren't following appropriate procedures. So it does in a lot of ways fall back to do you have appropriate procedures in place for these emergency situations and one of the things that actually is frequently requested in a draft permit is to see within a given time period from the issuance of that permit your plans for dealing with those

emergencies and so those are things that will be developed. The facility will have best management practices that their employees will be trained to follow and those will include things like cleaning pipes so that we hopefully don't have a situation that requires an emergency because the pipe is clogged. So, yeah, there is going to be a procedure for dealing with those kinds of emergency situations.

AUDIENCE MEMBER: Hi. My name is Shay Conover. I'm from Islesboro. And I agree, aquaculture done well is going to be an important part of the future of Maine's coastal economy. My husband and I are farm managers on the aquaculture lease site that was shown just south of the map of the discharge site and we also farm muscles on a site a couple miles away on Islesboro.

I have two questions. The first is just a clarifying question wondering if the water quality models that you have done, are those based on Phase 1 or Phase 2 discharge?

MS. TOURANGEAU: Both. I can answer that one.

AUDIENCE MEMBER: (Shay Conover.) Thank you. I thought I just missed that and I wanted to clarify.

And then the second, I guess, is our largest concern is Penobscot Bay for us is great in growing shellfish because while it -- because of it it is great, clean water, a lot of the reasons why you want to come here. We also are very fortunate in Penobscot Bay in that where there are often particularly in the summertime large amounts of time where we're -- folks are closed and other parts of the state for algal blooms, particularly red tide, and more Downeast in domoic acid. Penobscot Bay really has not had any of those closures this season and at the same time, you know, the coast of Maine has very clean water but potentially different mixes of nitrogen and the phosphorous and water temperatures are all very complex. But I'm interested in how, you know, what you are bringing into the water and how that might, you know, even slightly change our mix and potentially increase the amount of time where other farmers nearby may be closed to harvest is a concern.

MS. RANSOM: Hi. I'll try to take that one. So one of, you know, as we went through the presentation, obviously some of the critical factors to whether you develop things like algal blooms are things like your nitrogen and phosphorous discharge.

The -- the facility is taking denitrification seriously because obviously they want to be a good steward of this water and we fully believe that the discharge is not going to have a significant change to the nitrogen values that you have in the bay now, that the facility is going to be able to monitor their discharge as they start up. It's not like -- so we've shown numbers tonight for the full facility, so all that modeling and all those numbers that we showed you were for 33,000 metric tons at full capacity of this facility, but the facility is not going to get there over night. There is not going to be 33,000 metric tons of fish in the first year. It takes a long time to grow a salmon and it's going to take a long time to build this facility. So there is going to be many years of monitoring data that we'll have accumulated to see how they're doing and in the first months of operation they're going to have a small discharge with a small amount of nitrogen coming down the pipe and we're going to see how the bay responds to that. And as they grow, we'll continue to add to that dataset, so by the time they get to a full build-out situation we're going to have a pretty good understanding how that impacts the bay and whether you're seeing any impacts down in your

portion of the bay. And so we've tried with the information we have to place this pipe in a way that's going to not cause an impact to the bay, but we're also going to have a lot of time over the next few years to show that we're right and make sure that, you know, we don't get to a full phase facility without understanding the potential impacts of where it goes.

AUDIENCE MEMBER: (Shay Conover.) Right. I mean, I think local farmers don't have the economic ability to run that kind of experiment. I guess the other piece is just -- that might be helpful is to have some kind of comparative table to understand -- it was helpful to get the background levels in Penobscot Bay, I think that would be helpful to have that compared to other regions where there are aquaculture farms and how it would be -- we'd be able to more easily compare kind of environmental factors that other farmers are dealing with would be very helpful.

MS. RANSOM: Just real quick on that is one of the things that there is a lot of information for is some of the more closed estuaries, so you'll find, for example, in Great Bay at the Maine/New Hampshire border there is a fair bit of shellfish farming there

and there are a number of studies for that area. One of the things that's better about Penobscot, I guess, would be to say it's a bit more open. There is a bit more circulation happening and so your numbers up here tend to be better than what you might find in some of those other situations.

MR. NOYES: I just had one quick follow-up question. What are you growing in that lease site? Are you growing sugar kelp on your lease site, that one that was plotted?

AUDIENCE MEMBER: (Shay Conover.) Sorry. Currently --

MR. NOYES: Sugar kelp and muscles.

AUDIENCE MEMBER: (Shay Conover.) Currently, it's blue muscles, but it's permitted to grow sugar kelp as well as blue muscles.

MR. NOYES: Okay. And sugar kelp would be removing some of those nutrients we discussed?

AUDIENCE MEMBER: (Shay Conover.) Yes.

MR. NOYES: Okay. Thank you.

MS. TOURANGEAU: I'm going to just ask too if your information is on the sign-in sheet we would love to connect with you about monitoring.

AUDIENCE MEMBER: (Shay Conover.) Yup. That would be great.

MS. TOURANGEAU: Thank you.
AUDIENCE MEMBER: Hi. My name is Amy Green and I actually live in Monroe. I would love to live in Belfast where you have multiple job opportunities ready, but I haven't actually found affordable housing here. So the rezoning of your residential land into this massive industrial project was a shock for me to find out about.
And I did want to talk about the effluent from the run-off that would happen when you replaced 40 acres of woodlands with 18 football fields of impervious surface, pavement, rooftop, so that's a lot of run-off. Projections for our area of rainfall -- and I know that there are engineering practices for huge industrial areas. I don't live in a huge industrial area on purpose. I know this is a very -- it's almost as though folks are speaking like you're going to be exploited anyway, isn't it nice that it's so green and proper.
MS. TOURANGEAU: So we are looking for questions on the discharge.
AUDIENCE MEMBER: (Amy Green.) My question is how are you treating the run-off that will be gathered from rainfall off of here, that is my question.

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MS. TOURANGEAU: So that will be addressed in the site location of the Development Act Permit and the Natural Protection Act permits, which are still forthcoming. Right now, tonight, we're talking about the discharge from the wastewater treatment facility at the project.
AUDIENCE MEMBER: (Amy Green.) I was interpreting that as discharge as well.
MS. TOURANGEAU: The storm water doesn't go in there.
AUDIENCE MEMBER: (Amy Green.) It doesn't. Okay. Thank you.
MS. TOURANGEAU: Yup.
AUDIENCE MEMBER: Hi. My name is Joelle Gaseidnes and I live in Belfast.
THE REPORTER: Could you spell your last name for me, please?
AUDIENCE MEMBER: (Joelle Gaseidnes.) Sure. G-A-S-E-I-D-N-E-S.
THE REPORTER: Thank you.
AUDIENCE MEMBER: (Joelle Gaseidnes.) My question really is only about climate change and the warming of the Gulf of Maine, which is the second most quickly warming body of water on the planet. And I'm curious if you could just speak a little bit

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to what extent that's being factored into planning if the project goes well you'll be here 30, 40 years from now and the water will be a very different temperature, so that's my question.
MR. HEIM: Is your question the impact for the production, is that what you're thinking or?
AUDIENCE MEMBER: (Joelle Gaseidnes.) I just want to hear more about production as well as the models that you discussed regarding effluent using today's temperatures and today's scenarios --
MR. HEIM: Yup.
AUDIENCE MEMBER: (Joelle Gaseidnes.) -- but what does that look like when the water is warmer?
MR. HEIM: Exactly. So this is, I think, it's not directly related to discharge, but it's sort of interrelated. This is a concern I have for this industry when you look at so much of the seafood production in the world being dependent on the ocean conditions we have today. So one of the benefits of this production is that we have temperature control. We can -- we can adjust pH, we can adjust the oxygen levels in the water, all of these factors that can be influenced by climate change we can adjust and that's one of the big benefits of this production. Much

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more difficult to do if you are in the ocean. And that's what scares me, you know, when you look at coastlines change in temperatures and all of these conditions, new species coming in, current species in some cases disappearing. It's scary. So our contribution to this in terms of our surroundings is to minimize any contribution and impact to that process and I think the whole industry has a common responsibility. As of today, I am not familiar with anyone who has gone as far as us to do that, but I am sure this industry will be moving in that direction in the years to come because it's necessary.
AUDIENCE MEMBER: (Joelle Gaseidnes.) Yeah, I think my -- I mean, I appreciate that. My question was more specifically regarding you -- what is coming out in the effluent, coming into the bay --
MR. HEIM: Yup.
AUDIENCE MEMBER: (Joelle Gaseidnes.) -- it's assuming a certain temperature, it's assuming a certain mixing --
MR. HEIM: Yup.
AUDIENCE MEMBER: (Joelle Gaseidnes.) -- according to temperature and stratification according to temperature.
MR. HEIM: Yup.

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AUDIENCE MEMBER: (Joelle Gaseidnes.) And as the bay warms does that stratification change? Does the way in which it mixes become more favorable or less favorable?

MR. HEIM: I think you can answer that, Nate.

MR. DILL: I think I have a very quick answer to this question. The modeling that we have done considers a full seasonal changes and the -- and actually the data that was collected that we've used or sort of the best dataset that we've used we've looked at data, you know, going all the way back into the '70s. But one of the most comprehensive datasets on stratification in the bay was from '70s and the climate has changed significantly since then I would think in terms of climate variables if you look at long-term average temperatures and things. What's actually -- what's actually important for the -- for the physical behavior of the discharge is what is the temperature now today and we have looked at a range of temperatures that go from right around 0 to degrees to probably around 60 degrees in term of the ambient temperature in that modeling. Those variations -- just the seasonal variations are much, much larger --

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AUDIENCE MEMBER: (Joelle Graseidnes.) You're talking Celsius, right?

MR. DILL: No. No. Fahrenheit. I just --

AUDIENCE MEMBER: (Joelle Graseidnes.) No. Zero degrees?

MR. DILL: Yeah, the water gets pretty cold in the wintertime.

AUDIENCE MEMBER: (Joelle Graseidnes.) Okay.

MR. DILL: Yes, very cold.

AUDIENCE MEMBER: (Joelle Graseidnes.) Okay. Wow.

MR. DILL: And there --

AUDIENCE MEMBER: (Joelle Graseidnes.) Like below freezing?

MR. DILL: Yes. Yes. The surface -- the surface water of the bay gets --

AUDIENCE MEMBER: (Joelle Graseidnes.) Okay.

MR. DILL: -- down to freezing temperatures in the wintertime, yes.

AUDIENCE MEMBER: (Joelle Graseidnes.) All right.

MR. DILL: So, now, maybe not at the bottom, it might be warmer. You have -- you have a

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reverse -- you have a reverse of temperatures in the summertime when you have very cold, maybe, I don't know, 30 degree water toward the bottom. We're not -- I'm sorry, I just mixed my Celsius and Fahrenheit.

AUDIENCE MEMBER: (Joelle Graseidnes.) Yeah.

MR. DILL: Yeah. Sorry. Around 30 --

AUDIENCE MEMBER: (Joelle Graseidnes.) You're using what my grandfather used to call a super cool thing.

MR. DILL: Around 30, yes, 30 to 60 degrees in terms of Fahrenheit. I was giving the low end of Celsius and the high end of Fahrenheit to give the full range. But anyway, the point that I'm trying to make is that those seasonal variations are much bigger than any variation that we're going to see in terms of long-term temperature. And what's actually really important for the physical behavior of the plume is what is the -- what is the current temperature of that season, not so much the average over the long-term 30 year period, so.

AUDIENCE MEMBER: (Joelle Graseidnes.) Thank you.

MS. TOURANGEAU: I'm going to thank all of

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the people that have been coming along for managing their time so well. There is a gentleman who has to clean up after us who has stayed late because school closed early today and it's closed tomorrow, so he has given us some leeway. I want to use it as wisely as we possibly can, so please keep up the good work. Thank you.

AUDIENCE MEMBER: My name is Suzanne Stone. I live in Belfast. I haven't heard any studies about the dissolved organic carbon levels. I know that the high DOCs are causing dead spots in our ocean and I'm wondering if you've been studying those levels and how much are they coming out in the effluent and the discharge.

MS. RANSOM: Could you repeat that for me?

AUDIENCE MEMBER: (Suzanne Stone.) Yeah. I am asking about if your studies have been concerned with the dissolved organic carbon levels in the effluent as they're causing dead zones in our ocean.

MS. RANSOM: We have not specifically sampled for dissolved organ carbon levels. If you have specific studies and references that you'd like to provide with us, we'll be happy to look at that.

AUDIENCE MEMBER: (Suzanne Stone.) I was thinking they would be part of the samples that are

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studied.
MS. RANSOM: Yeah, I'd very much like to -- if you could provide us with the studies, I'd very much like to see what exactly they are monitoring by what method and so forth so that perhaps if it seems like something we should be adding to the monitoring program we can consider that.
AUDIENCE MEMBER: (Suzanne Stone.) Thank you.
MS. RANSOM: So if you can provide that it would be great. Is your email contact information available?
AUDIENCE MEMBER: (Suzanne Stone.) I will write it down.
MS. RANSOM: Thank you.
AUDIENCE MEMBER: Hi. I'm Camille Giglio and I'm a resident of Thorndike.
THE REPORTER: Could you spell your last name for me, please?
AUDIENCE MEMBER: (Camille Giglio.) G-I-G-L-I-O.
THE REPORTER: Thank you.
AUDIENCE MEMBER: (Camille Giglio.) I would love to know what are your plans for filtering out -- thanks to Ellie we know that there is a potential for

corn and soy in the feeds for the salmon, which is a pretty known kind of thing. I would love to know your plans for filtering out GMOs from this feed and the plans as far as the effluent and what gets through the UV filtration system and the other filters you're using. So along with the GMOs there is known carcinogens in GMO feed and so I'd love to know your plans for filtering out those things from the water as well.
MR. HEIM: So in terms of GMOs they're not allowed in Europe, so we have no GMO issues where I come from and it's something we've become more familiar with here in the U.S. That's is a big discussion.
AUDIENCE MEMBER: (Camille Giglio.) Yup.
MR. HEIM: So we have had discussions with this with our feed companies.
MR. DEMOS: No GMOs.
MR. HEIM: There is no GMOs in the feed. We -- I mean, you can get feed with GMO for sure, but we are making a conscious choice in terms of the quality of the product to say away from ingredients with GMOs just to make that clear.
AUDIENCE MEMBER: (Camille Giglio.) Okay. Just from -- I'm sure you already know, but soy as a

crop there is no non-GMO soy that exists, so that's another factor to keep in mind when thinking of the feed. And I meant to ask this in my second part of the question is vaccine run-off from -- you ensured us that you're vaccinating all of the fish.
MR. HEIM: Yes.
AUDIENCE MEMBER: (Camille Giglio.) The potential of vaccines coming into the water and into our bay and water supply, what are the plans for filtering that out as well of the water?
MR. HEIM: Yeah. So vaccines are administered not in the tanks. They go through a vaccination process. Basically they're pumped and go slide through a vaccination machine, they give them a small needle and they go back in.
AUDIENCE MEMBER: (Camille Giglio.) Right. But their bodies are actually detoxing the vaccines into the water and if you're talking about hundreds of thousands of fish --
MR. HEIM: The benefits --
AUDIENCE MEMBER: (Camille Giglio.) -- it accumulates quite a bit.
MR. HEIM: Yeah. So the benefit typically -- we have a gentleman here who wants to say something.

MR. BRICKNELL: I have actually spent a lot of time developing fish vaccines. Every single fish that gets a vaccine, the salmon anyway, will be injected either by a machine or by hand and their bodies will process it, but what you're doing is you're taking a bacteria or virus is grown in a laboratory quite naturally and the whole organism is going in and you're tricking the immune system into thinking it's got an infection, it breaks it down just as it would any natural infection.
AUDIENCE MEMBER: (Camille Giglio.) Yeah.
MR. BRICKNELL: There will be none of that excreted from the fish into the water. It's all processed by it's macrophages and it's put into a tissue called the pronephros at the top of its kidney and in the spleen and it becomes part of the fishes immune system.
AUDIENCE MEMBER: (Camille Giglio.) Right. I know what a vaccine is. I -- I -- as far as I know, vaccines still come out of our bodies and they're in our water supply.
MR. BRICKNELL: No, it doesn't.
AUDIENCE MEMBER: (Camille Giglio.) Okay. Thank you.
AUDIENCE MEMBER: Yes, my name is Robin

Duffy, D-U-F-F-Y. I live in Belfast. I'm a homeowner and taxpayer here. I think one thing that would be great is you guys keep referencing a lot of studies, but you're not making those available to the mass public. So any presentation I've ever been to where studies are referred to they're always given at the end of a slide or at the end, so it would be great if you could actually provide us with those like on a website or on the city website, I'd really appreciate that.

MS. TOURANGEAU: Can I respond to that really quickly?

AUDIENCE MEMBER: (Robin Duffy.) Sure.

MS. TOURANGEAU: The reports that accompany the modeling, which I think is where you're hearing those studies, have the citations to the studies in them and those will be in the application when it's submitted.

AUDIENCE MEMBER: (Robin Duffy.) Okay. Great. Thank you. You spoke about the BOD levels and how much harm can come to the lobster population if it's high and you said that you're going to control for the level of DO, am I correct about that so far?

MS. RANSOM: Close. BOD and DO are

interrelated --

AUDIENCE MEMBER: (Robin Duffy.) Right.

MS. RANSOM: -- so it's a little confusing. The parameter I was speaking about with regard to the lobsters in particular was the DO. There are a number of studies about DO and lobster shell growth.

AUDIENCE MEMBER: (Robin Duffy.) Okay.

MS. RANSOM: And the -- the BOD number is more of a general indicator --

AUDIENCE MEMBER: (Robin Duffy.) Okay.

MS. RANSOM: -- for the health of the ecosystem.

AUDIENCE MEMBER: (Robin Duffy.) So the DO is more specific?

MS. RANSOM: Correct.

AUDIENCE MEMBER: (Robin Duffy.) Okay. So Erik said that like with flying there is always a risk for anything, correct? I wanted to know like let's say that there is a pipe failure because I think that may happen as we just saw recently in the Carolinas there were all these CAFOs with all the -- the pig overflow, I mean, things do happen, right. Hurricanes happen, all kinds of issues happen. If there is pipe failure and high levels of DO, do you reach our working waterfront where fishermen and

lobstermen, lobster people make their living and we have this community here, do we really want to take this risk? Do you really want our community to take the risk because I know you made a joke and said you'd be happy to get on the plane, you still fly, you take the risk. I don't think that our community would want to take that risk, so that's one question I had for you.

MR. HEIM: Yup. Okay. So it's more discussion of probabilities. That's what I'm trying to get at. So if you take, for example, BOD, this is reduced in two stages in the system --

AUDIENCE MEMBER: (Robin Duffy.) I think people can't hear you.

MR. HEIM: Okay. If you take a sample of BOD it's reduced in two stages in the system. First it's reduced in the tanks because we have filtration in the tank system also.

AUDIENCE MEMBER: (Robin Duffy.) Right.

MR. HEIM: And there is a secondary reduction in the wastewater treatment plant, so there is two stages of that. So what would happen if you get a pressure loss anywhere in the piping, you would drastically reduce the pumping right away, stop feeding the fish so you would reduce your water need

quickly in the system. So you would very quickly be able to reduce your water exchange in the system and that's how we would deal with a situation like that. And if you have a pressure loss you identify the application and you fix it. So if, for example, the discharge pipe had a pressure loss that would not result in more BOD because it's already been reduced in the facility. If we have a pipe failure for whatever reason on the site we will be in a situation where we would have to take out the feeding of that part of the system, reduce the water cycle right away and if we stop feeding we can actually shut down that pipe and repair it right away. That being said, these are industrial grade pipes, it takes a lot for them to truly fail on a larger scale, so. And we have a professional contractor here in Maine, Cianbro, who is also present who has a long, long experience in building piping systems. So you are likely in very good hands with Maine experience and also doing business. But you're right, everything like this is things we have to think through and plan for and also always think how do we avoid the situations in terms of how we design and how we build. It's an important part of the design process.

AUDIENCE MEMBER: (Robin Duffy.) Okay. I

had just a couple other questions. Are you planning on processing fish on site and, if so, do you intend to use the Belfast sewer system for disposing of processing fluids?

MR. HEIM: There is a separate treatment plant for fish processing.

AUDIENCE MEMBER: (Robin Duffy.) Okay.

MR. HEIM: So that comes before the wastewater treatment system.

AUDIENCE MEMBER: (Robin Duffy.) Okay.

MR. HEIM: So this is also part of the application, so everything we have from the processing plant goes to a separate treatment process and that is also -- that was before the wastewater treatment process.

AUDIENCE MEMBER: (Robin Duffy.) Okay. And then finally I --

MS. TOURANGEAU: Is it going to Belfast?

MR. HEIM: Hmm? No, it's not.

AUDIENCE MEMBER: What?

MR. HEIM: It's going through multiple treatment stations.

MS. TOURANGEAU: She asked if it was also going to Belfast and I asked Erik to answer that question.

MR. HEIM: No, it's not going to Belfast.

AUDIENCE MEMBER: (Robin Duffy.) And just as a final comment, I just wanted to say I think any pollution into our waters is too much pollution.

AUDIENCE MEMBER: Hi. Bethany Allgrove. I live in Lincolnville. I'm really curious, how do you calculate discharge if you don't know what you're feeding the fish?

MR. HEIM: So the first step is to calculate the amount of feed you will use then we know this based upon so-called feed factor, how much -- how much feed we will use for every pound of salmon produced, so that helps us calculate the exact amount of feed we will use.

AUDIENCE MEMBER: Please hold the microphone closer.

MR. HEIM: Okay. And the next step in that process is to look at the typical feed profile that we would use and so what we've done there is to find interval of various nutrients in the feeds that are available in the market and we set the max values for the values in the feeds, that gives us a big interval to move inside of in terms of composing a final feed. And that's how you get to the figures you see here, which are the max discharge figures, not the average,

the maximum. That gives a lot of room for us to play with the final feed composition at the end before, so it could considerably be that the final feed that we end up with will reduce this discharge quite a bit potentially.

AUDIENCE MEMBER: (Bethany Allgrove.) But you said things were still being developed for feed --

MR. HEIM: What?

AUDIENCE MEMBER: (Bethany Allgrove.) You said new feeds are being developed. If we're not going to know what we're feeding them until 2020, but you're submitting application data in 2018, what's the process for updating the permit and the public information on those updates?

MR. HEIM: I think you will see that producers can change their feeds over time. That's very common. That is partly because the feed industry is developing, new options become available. So for us it's a matter of saying conservative assumptions in terms of what we know are available feeds, that gives us room to define a final feed in the end with what we see is available in the market a year or two from now. And it's conceivable that, you know, after one year of operations we may adjust that

because we see new options in the market. That's why, you know, saying that we will use this feed today, in four years we may have a very different feed in operation, but the limitations we always will work with is the assumptions that discharge is based upon and that's what we need to operate within.

AUDIENCE MEMBER: (Bethany Allgrove.) So I heard conservative figures and maximum figures and then I'm still trying to figure out where the numbers come from.

MR. HEIM: Yeah. So conservative maximum is sort of the same thing for us. We set maximum levels --

AUDIENCE MEMBER: (Bethany Allgrove.) Okay.

MR. HEIM: -- that are conservative for us. That means we have a lot of room to wiggle in in terms of adjusting feed formulas in the end and that's important for us.

MS. RANSOM: I can maybe help. I think if I'm understanding you, you're wondering, well, what happens if the number we put up today for the total nitrogen, for example, has to change because his feed source changes and that feed has a different amount of nitrogen coming out of that. The answer to that is he's put out a maximum that he believes his feed will be that number or less. So the way the permitting works is he's going to have a permit where there is going to be a level set that says this is how much nitrogen you're allowed to have come out of your facility daily, weekly, monthly, and he's going to have to adhere to that. So as long as the food choices get better and his feeds improve it's fine. You know, maybe he is instead of discharging 5 milligrams per liter of something he's now discharging 3, that's fine, he will meet his permit. But if he wants to go over that in the future, he would have to reapply for a new permit because he would then, you know, in theory be violating the permit by discharging too much. So he can -- he can come up with assumptions now that are based on realistic understanding of what the feed sources are, but when the final formulations come out as long as they leave him with the discharge that's lower he's okay.

AUDIENCE MEMBER: (Bethany Allgrove.) Okay. That answers my question. Thank you. I'm also asking if you can provide the ping pong balls. I'd like to see those -- I'd like to see what's coming from Bucksport added to the ping pong balls that are going to be in Belfast and then after their two weeks

where they leave the bay, I want to see them in Lincolnville. I'm very concerned about the beach qualities for Bayside and for Lincolnville, so if we can get the study expanded to show how it's going to affect all of Penobscot in a cumulative manner that would certainly help a lot of the concerns that the whole mid-coast has, not just Belfast.

MR. DILL: I can --

MS. TOURANGEAU: Okay. I'm getting the heads-up. We've got one more person after her, do we have time to and then take this gentleman quickly?

AUDIENCE MEMBER: (Custodian.) Very quickly.

AUDIENCE MEMBER: (Police Officer.) It could be a 15 minute question.

MR. DILL: With the ping pong ball, so there was -- first there was the animation that showed that has ping pong balls everywhere, that's not really representative of the discharge. We were starting them all over the place. We did another simulation where the ping pong balls were being released steadily from where the discharge location is and we ran that long enough so that they were essentially spreading out to the point that any impact they would have is minuscule. Dilutions, you know, of orders of

magnitude of like 10,000, so where it would be impossible to even measure the impact. And that area where you get that distance where you get to that area was totally shown within those figures, so you're so far away at that point that there is really -- there is really no impact essentially.

AUDIENCE MEMBER: (Bethany Allgrove.) Okay. So and that information will be in the permit, the study?

MR. DILL: Yes.

AUDIENCE MEMBER: (Bethany Allgrove.) Okay. Thank you.

AUDIENCE MEMBER: Hi. My name is Sid Block, B-L-O-C-K. I appreciate your patience. I'll help you clean up. I'm from Northport and my question, I had hoped somebody would ask, but nobody did. I don't understand why the pipe and the discharge are coming out so close to Northport along Bayside as opposed to going more directly out into the center of the -- of the bay. You're going right past the residential area and a community area with a beach and your dock and things like that as opposed to going directly out into the bay, so that is my question and a good comment.

MS. TOURANGEAU: I'm going to take a quick

shot at that and grab me if I'm wrong. I believe what we did was look for access to the bay that got us to the deepest area quickest.

AUDIENCE MEMBER: (Sid Block.) Okay. And --

MS. TOURANGEAU: Is that right?

MS. RANSOM: Yes.

AUDIENCE MEMBER: And my quick comment since Mr. Heim did mention the benefits of this even though this was a discharge situation is that before I lived in Northport I lived in Belfast and I do not remember when MBNA came to Belfast or Front Street Shipyard came to Belfast that my property taxes ever went down.

AUDIENCE MEMBER: That's right.

MS. TOURANGEAU: Thank you all.

(Hearing concluded at 9:17 p.m.)

C E R T I F I C A T E

I, Robin J. Dostie, a Court Reporter and Notary Public within and for the State of Maine, do hereby certify that the foregoing is a true and accurate transcript of the proceedings as taken by me by means of stenograph,

and I have signed:

____

Court Reporter/Notary Public

My Commission Expires: February 6, 2019.

DATED: October 16, 2018

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STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION

PAUL R. LEPAGE
GOVERNOR

PAUL MERCER
COMMISSIONER

October 16, 2018

Elizabeth Ransom
Ransom Consulting, Inc.

RE: Waiver of Pre-Submission Meeting

Elizabeth,

This letter is to document discussions at the September 12, 2018 pre-application meeting regarding combining the pre-application and pre-submission meeting required under the Department's *Rule Concerning the Processing of Applications and Other Administrative Matters* (Chapter 2). The Department acknowledges that it formally waives the requirement for a pre-submission meeting pursuant to Chapter 2 § 10(D).

Thank you,

Kevin Martin
Compliance & Procedures Specialist
Maine Department of Environmental Protection

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NORDIC AQUACULTURE

PRE-APPLICATION/PRE-SUBMISSION MEETING
Wednesday, September 12, 2018
DEP -Central Maine Regional Office
Ray Building, Room LW-3, 10:00 AM - Noon

****

Elizabeth Ransom gave a quick overview of the project as follows

- Full build out at approximately 31,000 metric tons,
- Facility will be built in two phases generally speaking. The first phase will include a water treatment plant and waste water treatment facility and smolt and grow out tanks. Phase II will include additional smolt and grow out tanks. Total construction time around 6 years.
- A fish processing plant is envisioned in the future but no plans have been prepared as of yet.
- Nordic has secured an easement for the intake and outfall structures to be located approximately 1,000 – 1,500 meters of shore. The pipes will be buried in the inter-tidal zone. The terminus of the intake pipe will be approximately 55 feet below mean low water and the terminus of the discharge outfall pipe will be located approximately 35 feet below mean low water.
- There was an extensive discussion on modeling that was conducted to support the application. Modelling indicates the discharge plume will likely only influence Western Penobscot Bay between the main land and the western side of Islesboro. The applicant has been conducting limited ambient water quality monitoring to establish baseline conditions in the vicinity of the discharge location.
- The application will contain a discussion on waste water treatment and expected discharge values for biochemical oxygen demand ((BOD), total suspended solids (TSS) and total nitrogen.
- Nordic expects to hold a public informational meeting during the first week of October.
- Nordic anticipates submitting the application for a discharge permit on or about the third week of October.

Form DEPLW1999-19
Revised: February 21, 2018

Maine Department of Environmental Protection
Waste Discharge Permit Application

Food Processing Facilities

This form must be attached to the General Application for a Waste Discharge License/MEPDES Permit (Form DEPLW0105-B2003)

Please answer all questions completely, using additional pages as necessary with responses clearly identified by item number on this form.

1. Facility Name: Nordic Aquafarms Inc NPDES # ME ________________

2. Attach a drawing showing the water flow through the facility. Please include the sources and volumes of intake water, operations contributing to wastewater discharges, treatment units and outfalls with numbers corresponding to those in the general application.

   See Attachment 1.

3. Is chlorine used in the process or is the intake water chlorinated? Yes If so, what is the concentration of chlorine in the final effluent(s)? less than 0.4 milligrams per liter (mg/L)

   See Attachment 2.

4. List chemicals used for sanitation or disinfection during production or clean-up operations, and maximum discharge concentrations.

   Nordic Aquafarms will use approved sanitation or disinfection products for cleaning the food processing facility. See Attachment 3 for a list of compounds.

5. List chemicals used in products or processing, and maximum discharge concentrations.

   See Attachment 3 for a list of compounds.

6. If boiler blowdown or non-contact cooling water is discharged, please complete EPA form 2E.

   Not Applicable.

7. How are sanitary wastes disposed of?

   Sanitary wastes will be disposed of through the City of Belfast municipal sewer system and treatment facility.

8. Please complete the attached table of products and productions rates. Complete a separate block for each product or type of production.

Product Name: Atlantic Salmon

Pounds per day processed			Processing period(s) each year		Daily effluent flows	
Average	Maximum	Total pounds per year processed	Total weeks per year	During the months of	Average	Maximum
220,000	264,000	66 million	50	Jan-Dec	96,000 gal.	115,000 gal.

Describe processing operation
The numbers above represent live weights. The final product is a head on, gutted salmon. The fish are humanely slaughtered, gutted and placed on ice.

Type of wastewater treatment
Fish processing water is sent through a 0.4 micron filter prior to entering the WWTP and sterilized by UV-C treatment along with the total final discharge.

Product Name: ______

Pounds per day processed			Processing period(s) each year		Daily effluent flows	
Average	Maximum	Total pounds per year processed	Total weeks per year	During the months of	Average	Maximum

Describe processing operation

Type of wastewater treatment

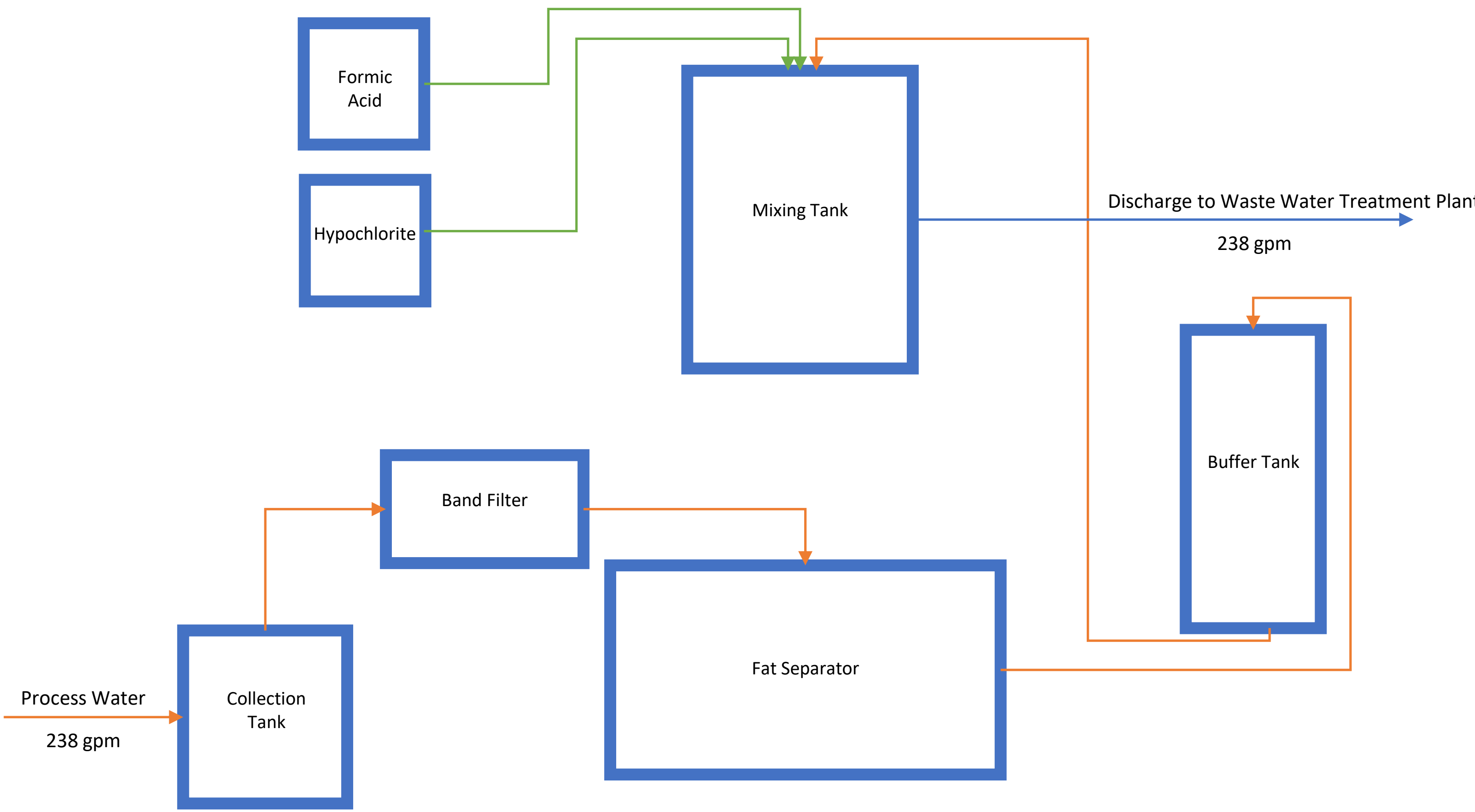
Product Name: ______

Pounds per day processed			Processing period(s) each year		Daily effluent flows	
Average	Maximum	Total pounds per year processed	Total weeks per year	During the months of	Average	Maximum

Describe processing operation

Type of wastewater treatment

NAF Fish Processing Facility – Process Water Treatment



Water used during fish processing originates from the municipal Belfast Water District supply. Wastewater generated undergoes initial disinfection and filtering prior to travelling to the Wastewater Treatment Plant. At the Wastewater Treatment Plant, fish processing water is blended with smolt and grow-out facility production water and undergoes full chemical and biological treatment prior to discharge into Belfast Bay.

Chlorine Disinfection of Fish Processing Water

All process water from fish processing will be subject to disinfection in a holding tank prior to discharge. In line with disinfection processes in the Norwegian industry, the initial chlorine concentration in the holding tank for processing water will be 50 milligrams per liter (mg/L). Processing water will remain in the holding tank for approximately 20 minutes until the chlorine has reacted and been reduced to a maximum concentration of 10 mg/L. The fish processing water is then released from the holding tank and mixed with production water from the grow-out and smolt production units on its way to the waste water treatment plant. Dilution with the wastewater from smolt and grow-out production units should result in a chlorine concentration of 0.4 mg/L. Further, reactions with biological matter during the intermixing with production waters and the waste water treatment process will significantly reduce concentrations prior to effluent discharge into Belfast Bay.

Chemicals for the Fish Farm

Note: Annual usage estimates represent approximate quantity required given a product is the only one used for this application. The quantities needed will be dependent on the site-specific conditions experienced which are difficult to establish prior to operations and are indicated as estimates only. Likely a fraction of the estimated annual use of each of these products will be used. All products listed will be used according to label.

Cleaners

Detergents

Aqualife® Multipurpose Cleaner. A biodegradable, nonhazardous cleaner that is designed specifically for use in fish hatcheries, aquaculture facilities, fish & food processing plants, & agricultural farms. Active ingredients: sodium hydroxide (1-5%), the product is phosphate free, contains no volatile organic compounds and is NSF certified for use in food processing facilities. Used according to the label at dilutions of 1:20. Approximate annual use: 2232 gallons/year (8449 l/year).

Gil Save®. High-foaming chlorinated, alkaline, liquid detergent, Gil Save is designed for foam and high pressure spray cleaning of meat and poultry plants, breweries, dairies and canneries. It is a complete product containing alkalis, water conditioners, chlorine and high-foaming wetting agents. Gil Save is an effective cleaner of food processing equipment by removing fatty and protein soils, pectin, mold, yeast and organic greases. Active ingredients: sodium hydroxide (7-9%), sodium hypochlorite (3-4%). Use according to label at concentrations of 0.2-3% (¼-4 oz/gal). Approximate annual use: 678 gallons/year (2567 l/year).

Clean in Place (CIP)

Gil Super CIP®. A heavy-duty, chelated-liquid caustic cleaner for use in CIP, boil-out, soak, spray clean and atomization cleaning systems, Gil Super CIP is formulated to remove protein, fatty and carbonized soils typically found in dairy and food processing. Active ingredients: sodium hydroxide (49%). Used according to label at 0.1-3% (1/8-4 oz/gal). Approx. annual use: 5840 gallons/year (22107 l/year).

Gil Hydrox®. A concentrated organic, liquid acid cleaner, Gil Hydrox rapidly removes milk/beer stone, alkaline/hard water film and stains/protein build-up from dairy and food processing equipment. It is specially formulated for use in CIP, spray and acid rinse operations. Active ingredients: glycolic acid (29-31%). Used according to label at 0.3-1.5% (½-2 oz/gal). Approx. annual use: 5840 gallons/year (22107 l/year).

Disinfectants/Sanitizers

Bleach. Active ingredient: sodium hypochlorite (8%) in concentrated form. Typically used at 100-1000 ppm for general cleaning/disinfection. Approximate annual use: 1500 gallons/year (5700 l/year).

Ozone. Ozone can be dissolved into water to provide an aqueous ozone solution that is stable, safe, easy to control, leaves no residue and has been granted GRAS approval by both the USDA and FDA for direct contact with food. This water containing ozone can replace chlorine as an antimicrobial agent or be used to supplement existing water rinses and achieve improved antimicrobial intervention. This is now a common application to sanitize fillet machines, cutting tables, knives, and all equipment that may be used in the seafood processing areas. Approximate annual use: TBD. Concentration in discharge = 0 ppm

Virkon® Aquatic. A powerful cleaning and disinfecting solution with efficacy against fish viruses, bacteria, fungi, and molds. Virkon® Aquatic is EPA registered (except in California where registration is pending) for the disinfection of environmental surfaces associated with aquaculture**.** Active ingredient: Potassium monopersulfate (21.4%). Used in accordance with label as a general cleaner and in footbaths. Working solution strengths normally range from 0.5% - 2.0%. Approx. annual use: 1100 lbs/year (500 kg/year).

Zep FS Formula 12167® Chlorinated Disinfectant and Germicide. A liquid chlorine sanitizer and deodorant for use in all types of food-handling establishments. Authorized as no rinse sanitizer for equipment. Provides deodorizing activity by destroying bacteria which generate many disagreeable odors. Can also be used to sanitize commercial laundry. Active ingredients: Sodium hypochlorite (5-10%) and sodium hydroxide (1-3%). Used according to label, effective at concentrations as low as 0.3% (1 oz/ 2 gallons). USDA applicable and EPA and Maine registered. Approx. annual use: 1980 gallons/year (7495 l/year).

Therapeutants

Compounds Potentially Used:

Note: the quantities needed will be dependent on the site-specific conditions experienced which are difficult to establish prior to operations and so are indicated as estimates only. All products listed will be used according to label use or a licensed veterinarian's prescription.

Parasite-S, Formalin-F, and Formacide-B. (Formalin). Active ingredient 37% formaldehyde. Used periodically according to the label if needed to alleviate fish health issues due to *saprolegniasis*, external protozoa and monogenetic trematodes. Typical dose rates from 25 ppm to 1,000 ppm. Approximate annual use: 925 gallons/year (3500 l/year).

Finquel® or Tricane-S. (Tricaine methanesulfonate). Used periodically in accordance with the label to reduce stress on the fish when handling small numbers for examination. Typical dose rates of 15-330 mg/L. Approximate annual use: 1.1 lbs/year (500 g/year).

Halamid® Aqua. (Chloramine-T). Active ingredients N-chloro, p-toluenesulfonamide and sodium salt trihydrate. Used periodically according to the label if needed to alleviate fish health issues due to bacterial gill disease. Typical dose range 12-20 ppm. Approximate annual use: 1100 lbs/year (500 kg/year).

Ovadine® (PVP Iodine). A buffered 1% Iodine solution (Iodophor) specifically formulated for use in disinfecting fish eggs. It contains a 10% Povidone-Iodine (PVP Iodine) complex, which provides 1% available iodine. Used according to the label at dose rates of 50 -100 ppm as available iodine solution. Estimated usage: 160 gallons/year (600 l/year).

Compounds Rarely Used Only in Emergency Situations:

Praziquantel. Considered as 100% active. Can be used if fish are suffering from trematode/cestode infections. Typical dose ranges from 5-200 ppm depending on length of standing bath treatment. Used as needed/intermittent or emergency use only, according to label use or as prescribed by a licensed veterinarian. Approx. annual use: 0 lbs/year (0 kg/year).

Potassium permanganate. Considered as 97% active. Can be used if fish are suffering from certain parasites and fungal infections in younger fish life-stages. Typical dose range 1.5-2.5 ppm. Used as needed/intermittent or emergency use only, according to label use or as prescribed by a licensed veterinarian. Approx. annual use: 0 lbs/year (0 kg/year).

Terramycin® 200. (oxytetracycline dehydrate, 44% active): Can be used as an in-feed treatment (maximum of 0.08 g active oxytetracycline/kg fish/day) if fish are suffering from certain bacterial infections. Used as needed/intermittent or emergency use only, according to label use or as prescribed by a licensed veterinarian. Approx. annual use: 0 lbs/year (0 kg/year).

Aquaflor®. (florfenicol; 50% active). Can be used as an in-feed treatment (maximum of 15 mg/kg fish/day) if fish are suffering from certain bacterial infections. Used as needed/intermittent or emergency use only, according to label use or as prescribed by a licensed veterinarian. Approx. annual use: 0 lbs/year (0 kg/year).

Romet® 30/Romet® TC. (sulfadimethoxine/ormetoprim, 30% active or 20% active, respectively). Can be used as an in-feed treatment (maximum of 50 mg/kg fish/day) if fish are suffering from certain bacterial infections. Used as needed/intermittent or emergency use only, according to label use or as prescribed by a licensed veterinarian. Approx. annual use: 0 lbs/year (0 kg/year).

Waste Water Treatment

Formic Acid (85%). Used for pH correction of fish processing water prior to disinfection with sodium hypochlorite. Approx. annual use: 18200 gallons/year (69000 l/year).

Bleach. Active ingredient: sodium hypochlorite (15%). Used to disinfect water used in fish processing. Applied at concentration of 50 mg/l. Estimated discharge concentration: 0.4 mg/l. Approx. annual use: 14800 gallons/year (56000 l/year).

Methanol. Used as supplemental carbon source in waste water treatment plants to stimulate denitrification processes. Approx. annual use: 1.5 million gallons/year (5.6 million l/year).

Form Approved. OMB No. 2040-0086. Approval expires 8-31-98.

Please print or type in the unshaded areas only	EPA I.D. NUMBER (*copy from Item 1 of Form 1*)	

Form **2D** NPDES

New Sources and New Dischargers
Application for Permit to Discharge Process Wastewater

I. Outfall Location

For each outfall, list the latitude and longitude of its location to the nearest 15 seconds and the name of the receiving water.

Outfall Number (*list*)	Latitude			Longitude			Receiving Water (*name*)
	Deg.	Min.	Sec.	Deg.	Min.	Sec.	
Outfall 1	**44**	**23**	**40**	**68**	**58**	**25**	**Belfast Bay**

II. Discharge Date (When do you expect to begin discharging?)

A reduced volume discharge is anticipated to begin in early 2020, with volume increasing in stages as the development progresses.

III. Flows, Sources of Pollution, and Treatment Technologies

A. For each outfall, provide a description of: (1) All operations contributing wastewater to the effluent, including process wastewater, sanitary wastewater, cooling water, and storm water runoff; (2) The average flow contributed by each operation; and (3) The treatment received by the wastewater. Continue on additional sheets if necessary.

Outfall Number	1. Operations Contributing Flow (*List*)	2. Average Flow (*Include Units*)	3. Treatment (*Description or List codes from Table 2D-1*)
Outfall 1	Wastewater Treatment Unit	7.7 million gallons per day (mgd)	See General Application Attachment 8 for treatment details.
	(Total, including smolt production	(5363 gallons per minute)	See EPA Form D - Attachment 1 for line drawing of facility water flow.
	units and processing facility)	(1218 cubic meters per hour)	

B. Attach a line drawing showing the water flow through the facility. Indicate sources of intake water, operations contributing wastewater to the effluent, and treatment units labeled to correspond to the more detailed descriptions in Item III-A. Construct a water balance on the line drawing by showing average flows between intakes, operations, treatment units, and outfalls. If a water balance cannot be determined (e.g., for certain mining activities), provide a pictorial description of the nature and amount of any sources of water and any collection or treatment measures.

C. Except for storm runoff, leaks, or spills, will any of the discharges described in Items III-A be intermittent or seasonal?

☐ YES (*complete the following table*) ☑ NO (*go to Section IV*)

Outfall Number	1. Frequency		2. Flow		
	a. Days Per Week (*specify average*)	b. Months Per Year (*specify average*)	a. Maximum Daily Flow Rate (*in mgd*)	b. Maximum Total Volume (*specify with units*)	c. Duration (*in days*)
Outfall 1	7	12	7.7 mgd	7.7 mgd	365

IV. Production

If there is an applicable production-based effluent guideline or NSPS, for each outfall list the estimated level of production (projection of actual production level, not design), expressed in the terms and units used in the applicable effluent guideline or NSPS, for each of the first 3 years of operation. If production is likely to vary, you may also submit alternative estimates (attach a separate sheet). **Not Applicable.**

Year	A. Quantity Per Day	B. Units Of Measure	c. Operation, Product, Material, etc. (*specify*)

CONTINUED FROM THE FRONT	EPA I.D. NUMBER (*copy from Item 1 of Form 1*)	Outfall Number

V. Effluent Characteristics

A and B: These items require you to report estimated amounts (*both concentration and mass*) of the pollutants to be discharged from each of your outfalls. Each part of this item addresses a different set of pollutants and should be completed in accordance with the specific instructions for that part. Data for each outfall should be on a separate page. Attach additional sheets of paper if necessary.

General Instructions *(See table 2D-2 for Pollutants)*
Each part of this item requests you to provide an estimated daily maximum and average for certain pollutants and the source of information. Data for all pollutants in Group A, for all outfalls, must be submitted unless waived by the permitting authority. For all outfalls, data for pollutants in Group B should be reported only for pollutants which you believe will be present or are limited directly by an effluent limitations guideline or NSPS or indirectly through limitations on an indicator pollutant.

1. Pollutant	2. Maximum Daily Value *(include units)*	3. Average Daily Value *(include units)*	4. Source *(see instructions)*
Flow	7.7 mgd	7.7 mgd	See Attachment 2 for additional details.
TSS	185 kg/day	185 kg/day	6.33 mg/L
BOD	162 kg/day	162 kg/day	5.55 mg/L
Total N	673 kg/day	673 kg/day	23.0 mg/L
Total P	5.8 kg/day	5.8 kg/day	0.20 mg/L
Ammonia	0.07 kg/day	0.07 kg/day	0.003 mg/L
pH	6.5-7.5	6.5-7.5	
Temperature (Summer)	15-18 C	15-18 C	
Temperature (Winter)	15-18 C	15-18 C	
Salinity	20-25 ppt	20-25 ppt	

CONTINUED FROM THE FRONT	EPA I.D. NUMBER (*copy from Item 1 of Form 1*)	

C. Use the space below to list any of the pollutants listed in Table 2D-3 of the instructions which you know or have reason to believe will be discharged from any outfall. For every pollutant you list, briefly describe the reasons you believe it will be present.

1. Pollutant	2. Reason for Discharge
Formalin/Formaldehyde	Parasite-S, Formalin-F, and Formacide-B (Formalin) - Active ingredient 37% formaldehyde. Used periodically if needed to alleviate fish health issues due to saprolegniasis, external protozoa and monogenetic trematodes. Typical dose rates from 25 ppm to 1000 ppm. Approximate annual use: 3500 L/yr (925 gallons/yr).

VI. Engineering Report on Wastewater Treatment

A. If there is any technical evaluation concerning your wastewater treatment, including engineering reports or pilot plant studies, check the appropriate box below.

☐ Report Available ☑ No Report

B. Provide the name and location of any existing plant(s) which, to the best of your knowledge resembles this production facility with respect to production processes, wastewater constituents, or wastewater treatments.

Name	Location
Sashimi Royal	Nordre Strandvej 66, 7730 Hanstholm, Denmark See Attachment 3 for Sashimi Royal water quality results.

EPA I.D. NUMBER (*copy from Item 1 of Form 1*)

VII. Other Information *(Optional)*

Use the space below to expand upon any of the above questions or to bring to the attention of the reviewer any other information you feel should be considered in establishing permit limitations for the proposed facility. Attach additional sheets if necessary.

Discharge monitoring

Nutrient and water performance parameters will be regularly monitored in the production modules to maintain thresholds for fish welfare. Parameters will be adjusted according to need by optimizing the operating parameters. Records from these measurements will be available as reports in the facility SCADA system.

The final discharge is subject to bi-weekly monitoring of nutrients in the discharge until the facility has reached full biomass. After the facility has reached full biomass, discharge analysis will be conducted on a monthly basis. The following will be measured and recorded in the discharge log: TSS (total suspended solids), BOD (biochemical oxygen demand), total N (nitrogen), P (phosphorous), pH and oxygen saturation. The facility will maintain a log with measurements available for reporting. If the Department imposes specific reporting requirements, Nordic Aquafarms will adjust to these to ensure compliance.

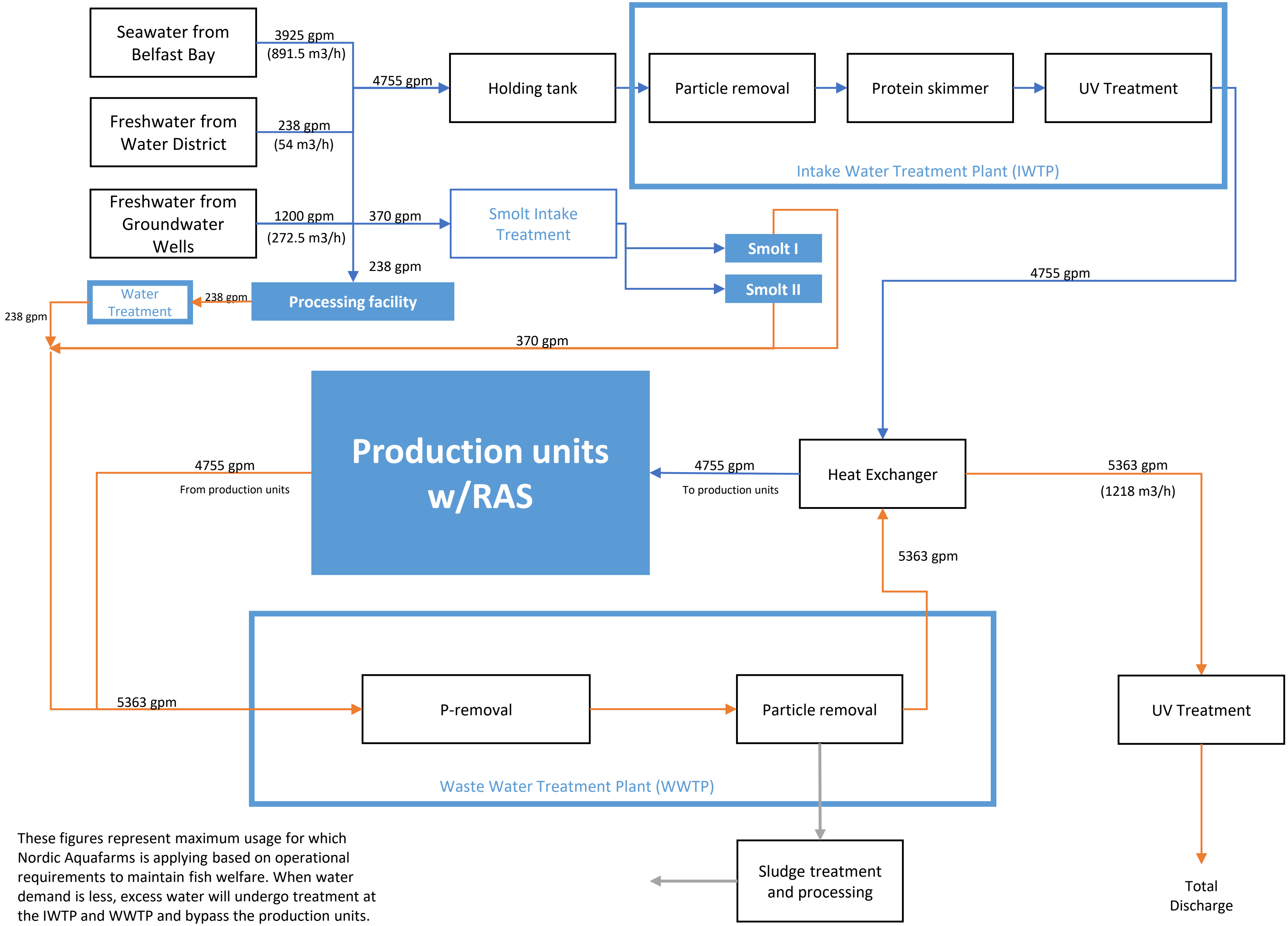
Procedures for monitoring are included in the company quality systems and operations guidelines internationally, and in Maine. It will be the responsibility of the on-site production director to execute these procedures and to ensure compliance. Compliance is a high priority for Nordic Aquafarms. Thus, regular audits will be conducted to ensure compliance with procedures.

In any given situation where measurements indicate that the discharge is approaching threshold levels, procedures dictate that management investigate and put in place necessary interventions. In most situations, this will be a question of optimizing performance of systems, something that will be a key priority in phase 1 of facility development. The environmental systems included in the design do have excess capacity in relation to communicated levels of discharge treatment. Our assessment is that it is therefore highly unlikely that the facility will reach threshold levels.

VIII. CERTIFICATION

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

A. Name and Official Title (*type or print*)	B. Phone No.
Erik Heim, Chief Executive Officer, Nordic Aquafarms Inc	207-323-4911
C. Signature	D. Date Signed



These figures represent maximum usage for which Nordic Aquafarms is applying based on operational requirements to maintain fish welfare. When water demand is less, excess water will undergo treatment at the IWTP and WWTP and bypass the production units.

EPA Form 2D
Question # V.A/B
Attachment 2

Gross / Net Discharge Figures - Belfast, Maine Facility

The table below summarizes our gross discharge of nutrients (before waste water treatment) and net discharge (after treatment).

Discharge Budget: 33 000 MT production of Atlantic Salmon, Nordic Aquafarms, Maine

	TSS	BOD	Total N	Total P	NH3	Unit
Smolt						
before treatment	226,748	198,405	68,248	17,118	2	kg/year
after treatment	2,267	1,984	10,237	171	2	kg/year
Phase 1 PB						
before treatment	3,235,594	2,831,144	778,939	96,535	12	kg/year
after treatment	32,356	28,311	116,841	965	12	kg/year
Phase 2 PB						
before treatment	3,235,594	2,831,144	778,939	96,535	12	kg/year
after treatment	32,356	28,311	116,841	965	12	kg/year
Processing Facility						
before treatment	57,143	62,857	10,400	859	1	kg/year
after treatment	571	629	1,560	9	1	kg/year
Total						
before treatment	6,755,078	5,923,551	1,636,527	211,048	27	kg/year
after treatment	**67,551**	**59,236**	**245,479**	**2,110**	**27**	**kg/year**
	185	**162**	**673**	**5.8**	**0.07**	**kg/day**
Concentration	6.33	5.55	23.0	0.20	0.003	mg/L
WWTP degree of removal	99%	99%	99%	85%	0%	

	Smolt	Phase 1	Phase 2	Processing Facility	Units
Discharge Volume	84	540	540	54	m3/h
	735,840	4,730,400	4,730,400	473,051	m3/year

Total Discharge Volume	1,218	m3/h
	10,669,691	m3/year

The process for achieving final discharge figures is a two-step process: 1) reduction of nutrients in the RAS system itself; and 2) final reductions in the centralized waste water treatment system.

Calculation of Nitrogen, Phosphorus and Biological Oxygen Demand (BOD) for Sashimi Royal Facility

Water Analysis (difference outlet - inlet)

Sample	1	2	3	4	5	6	7	8
Trial Date	19-01-2018	13-02-2018	14-03-2018	13-04-2018	23-05-2018	11-06-2018	02-07-2018	30-08-2018
BOD mg/l	28	7.5	21	6.6	11.00	28	35	44
Total N mg/l	90	59	89	87	72.00	90	29	79
Total P mg/l	10	4.5	6.5	3.8	4.20	10	7.3	8.3
Flow m3/day	470	433	479	640	835.00	Flow missing	726	1544
Comment								

<u>Estimated discharge per day</u>

	[kg/day]	[kg/day]	[kg/day]	[kg/day]	[kg/day]	[kg/day]	[kg/day]	[kg/day]	Average [kg/day]
BOD	13.16	3.53	9.87	3.10	5.17		16.45	20.68	10.28
Total N	42.30	27.73	41.83	40.89	33.84		13.63	37.13	33.91
Total P	4.70	1.95	3.11	2.43	3.51		5.30	12.82	4.83

	[metric ton/year]
BI5	**3.8 ton**
Total N	**12.4 ton**
Total P	**1.8 ton**

* Table translated from Danish using Google Translate.

The data presented above from the Danish Sashimi Royal facility operated by Nordic Aquafarms has been included to demonstrate compliance with monthly effluent monitoring. Although the facility is a smaller capacity and is raising a different fish species than the planned Maine facility, many monitored parameters will be the same. Additionally, waste water treatment procedures planned for Maine will be state of the art and result in significant improvements to effluent concentrations.

Form DEPLW1999-18
Revised: February 21, 2018

Maine Department of Environmental Protection
Waste Discharge Permit Application

Fish Rearing Facilities

This form must be attached to the General Application for a Waste Discharge License.
(Form DEPLW0105-B2003)

Please answer all questions completely, using additional pages as necessary with responses clearly identified by item number on this form.

1. Facility Name: Nordic Aquafarms Inc NPDES #ME

2. Source(s) of water supply and average monthly flow of each: Belfast Bay - 3,925 gpm (891.5 m3/h)
Groundwater Aquifer - 1,200 gpm (272.5 m3/h)
Belfast Water District - 238 gpm (54 m3/h)

3. Is any of the hatching or rearing water heated or cooled by mixing with water from another source, use heat exchangers, etc? **Yes** If yes, explain listing the volumes and maximum temperatures of each source. See Attachment 1.

4. Type(s) of feed used: Nordic Aquafarms plans to use commercially available non-GMO feed and is currently evaluating organic and/or custom designed feeds.

5. Amount of feed used. Average: 216,758 lbs/day Maximum: 253,456 lbs./day

6. Month(s) of maximum feeding: n/a - see question #8.

7. Species of fish raised: Atlantic Salmon

8. Maximum quantity of fish at any time.

Due to the continuous production flow concept, the quantity of fish will be quite stable. Fish will be introduced into the facility every month, as the harvest will be a daily process. Since it is not determined if all the units will be in sync or off-sync, it is difficult to tell the exact quantity of fish, but if it is assumed all units are in sync the facility should be at a maximum quantity of 8,039,682 fish or 13,550 metric tons (29,872,637 lbs) of fish. The facility will not have its own broodstock.

9. Attach a drawing showing the number, size and arrangement of all rearing tanks.

   See Attachment 2 for tank layouts of grow-out modules and smolt units.

10. Attach a list of all disinfectants used, giving for each the name, ingredients, frequency of use, concentration of use, and total quantity used per year.

    See Attachment 3.

11. Attach a list of drugs and/or therapeutic agents used, giving for each a name, ingredients, frequency of use, concentration of use, and total quantity used per year.

    See Attachment 3.

NORDIC AQUAFARMS
SUSTAINABLE AQUACULTURE

Water Sources and Temperature Control

Water temperature in the production environment is kept constant at 13°C (55°F) throughout the year. This temperature has been set based on our experience and assessments of ideal temperature for salmon, while this temperature is also proven to keep early sexual maturation of the fish at a minimum level in land-based systems. Smaller units related to hatching and pre-smolt production will be run at slightly lower temperatures.

The fresh and seawater sources to be used hold a slightly lower temperature than this through the year, upward to 11°C (52°F), based on our local temperature measurements. Water sources are on-site wells and seawater to be drawn in through the planned water intake system 1.9 kilometers (1.2 miles) off-shore at a depth of 13.7 meters (45 feet). A smaller supplementary fresh water supply is also available from the Belfast Water District, according to established local contracts.

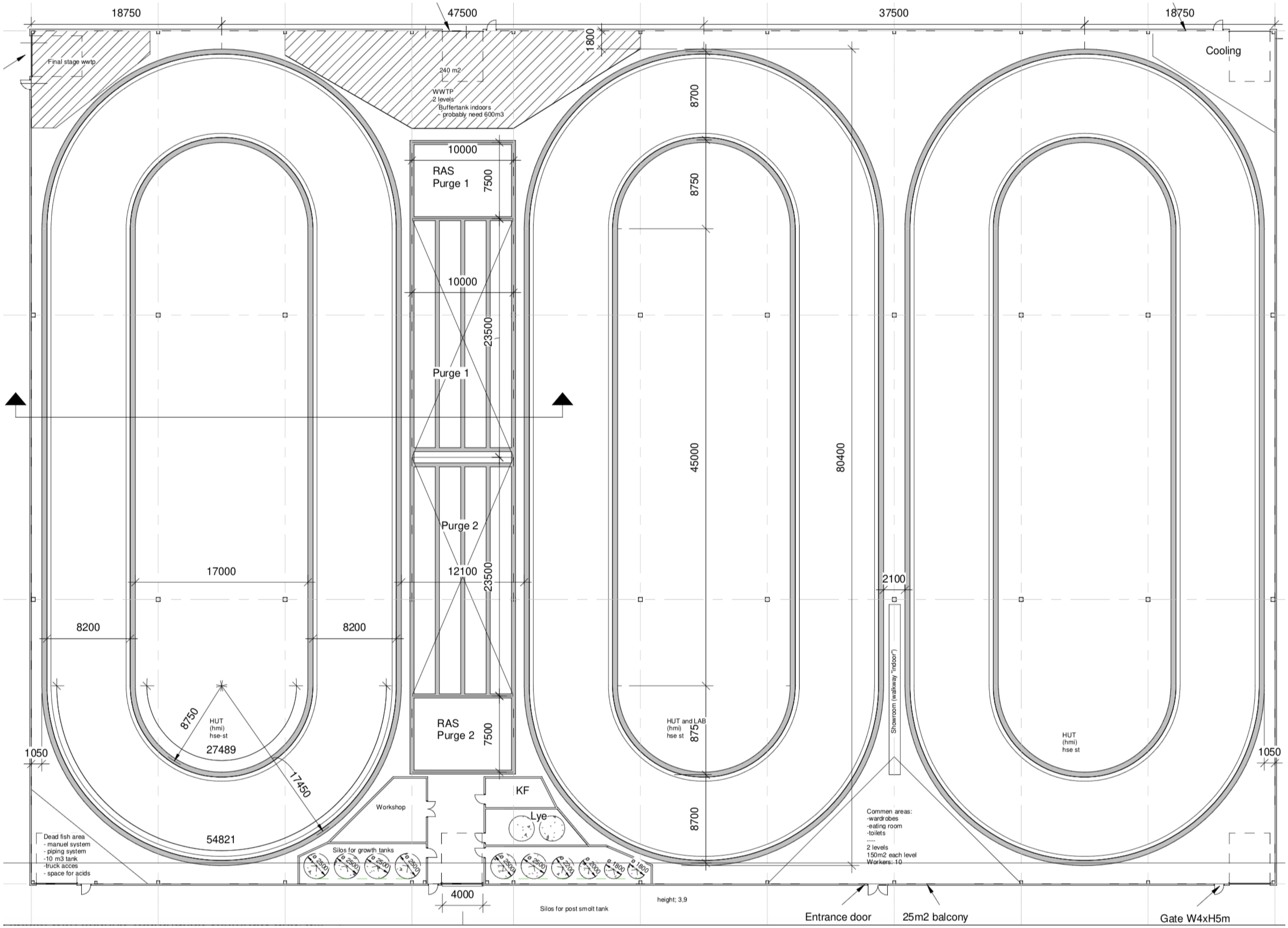
Given that the process equipment and the biomass in the system does contribute energy and heat, the primary temperature control need is cooling. The cooling need will be greatest in the summer season when sea and air temperatures rise. In Maine, with low water temperatures, the need for cooling is still limited compared to many other alternative locations. Air-based cooling systems integrated in the production modules will ensure stable temperatures in the production environment throughout the year. Given that air is used as the cooling medium, this cooling process will not have an effect on the discharge water temperature.

Given temperature differences between the intake water and the production water most of the year, these water flows are crossed in heat-exchangers to recapture energy. Given that the intake water will hold a lower temperature than the discharge water, this process will have a slight cooling or no temperature effect on the discharge water, rather than a heating effect.

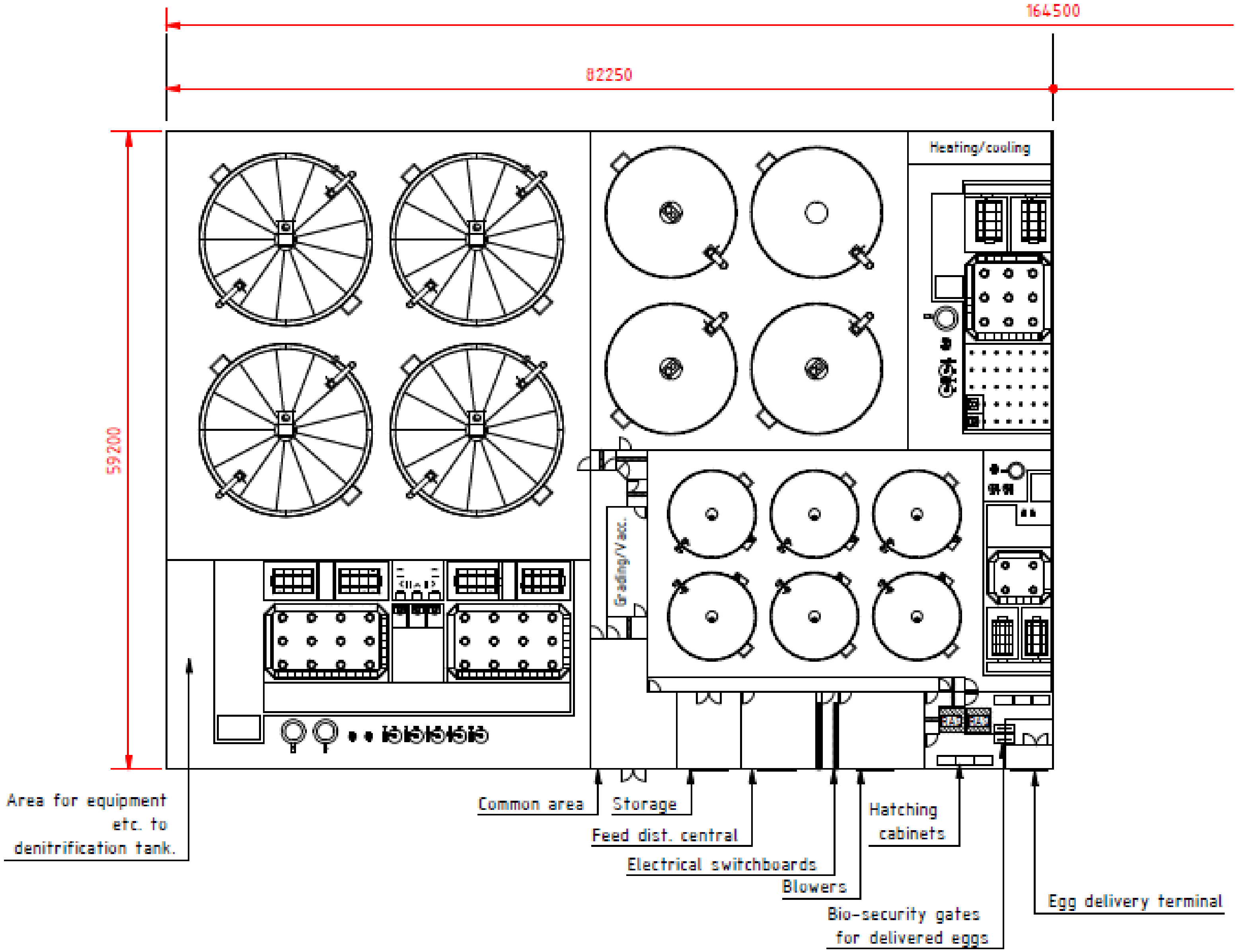
We anticipate temperature gains from the mechanical components used for solids removal, denitrification and U.V. disinfection in our waste water treatment plant.

The temperature of discharge water will be approximately 15-18°C (59-65°F) through the year. This will remain constant through the seasons.

Grow-Out Module Tank Layout



Smolt Unit



164500
82250
59200
Heating/cooling
Grading/Vacc.
Area for equipment etc. to denitrification tank.
Common area
Storage
Feed dist. central
Electrical switchboards
Blowers
Hatching cabinets
Bio-security gates for delivered eggs
Egg delivery terminal

Chemicals for the Fish Farm

Note: Annual usage estimates represent approximate quantity required given a product is the only one used for this application. The quantities needed will be dependent on the site-specific conditions experienced which are difficult to establish prior to operations and are indicated as estimates only. Likely a fraction of the estimated annual use of each of these products will be used. All products listed will be used according to label.

Cleaners

Detergents

Aqualife® Multipurpose Cleaner. A biodegradable, nonhazardous cleaner that is designed specifically for use in fish hatcheries, aquaculture facilities, fish & food processing plants, & agricultural farms. Active ingredients: sodium hydroxide (1-5%), the product is phosphate free, contains no volatile organic compounds and is NSF certified for use in food processing facilities. Used according to the label at dilutions of 1:20. Approximate annual use: 2232 gallons/year (8449 l/year).

Gil Save®. High-foaming chlorinated, alkaline, liquid detergent, Gil Save is designed for foam and high pressure spray cleaning of meat and poultry plants, breweries, dairies and canneries. It is a complete product containing alkalis, water conditioners, chlorine and high-foaming wetting agents. Gil Save is an effective cleaner of food processing equipment by removing fatty and protein soils, pectin, mold, yeast and organic greases. Active ingredients: sodium hydroxide (7-9%), sodium hypochlorite (3-4%). Use according to label at concentrations of 0.2-3% (¼-4 oz/gal). Approximate annual use: 678 gallons/year (2567 l/year).

Clean in Place (CIP)

Gil Super CIP®. A heavy-duty, chelated-liquid caustic cleaner for use in CIP, boil-out, soak, spray clean and atomization cleaning systems, Gil Super CIP is formulated to remove protein, fatty and carbonized soils typically found in dairy and food processing. Active ingredients: sodium hydroxide (49%). Used according to label at 0.1-3% (1/8-4 oz/gal). Approx. annual use: 5840 gallons/year (22107 l/year).

Gil Hydrox®. A concentrated organic, liquid acid cleaner, Gil Hydrox rapidly removes milk/beer stone, alkaline/hard water film and stains/protein build-up from dairy and food processing equipment. It is specially formulated for use in CIP, spray and acid rinse operations. Active ingredients: glycolic acid (29-31%). Used according to label at 0.3-1.5% (½-2 oz/gal). Approx. annual use: 5840 gallons/year (22107 l/year).

Disinfectants/Sanitizers

Bleach. Active ingredient: sodium hypochlorite (8%) in concentrated form. Typically used at 100-1000 ppm for general cleaning/disinfection. Approximate annual use: 1500 gallons/year (5700 l/year).

Ozone. Ozone can be dissolved into water to provide an aqueous ozone solution that is stable, safe, easy to control, leaves no residue and has been granted GRAS approval by both the USDA and FDA for direct contact with food. This water containing ozone can replace chlorine as an antimicrobial agent or be used to supplement existing water rinses and achieve improved antimicrobial intervention. This is now a common application to sanitize fillet machines, cutting tables, knives, and all equipment that may be used in the seafood processing areas. Approximate annual use: TBD. Concentration in discharge = 0 ppm

Virkon® Aquatic. A powerful cleaning and disinfecting solution with efficacy against fish viruses, bacteria, fungi, and molds. Virkon® Aquatic is EPA registered (except in California where registration is pending) for the disinfection of environmental surfaces associated with aquaculture**.** Active ingredient: Potassium monopersulfate (21.4%). Used in accordance with label as a general cleaner and in footbaths. Working solution strengths normally range from 0.5% - 2.0%. Approx. annual use: 1100 lbs/year (500 kg/year).

Zep FS Formula 12167® Chlorinated Disinfectant and Germicide. A liquid chlorine sanitizer and deodorant for use in all types of food-handling establishments. Authorized as no rinse sanitizer for equipment. Provides deodorizing activity by destroying bacteria which generate many disagreeable odors. Can also be used to sanitize commercial laundry. Active ingredients: Sodium hypochlorite (5-10%) and sodium hydroxide (1-3%). Used according to label, effective at concentrations as low as 0.3% (1 oz/ 2 gallons). USDA applicable and EPA and Maine registered. Approx. annual use: 1980 gallons/year (7495 l/year).

Therapeutants

Compounds Potentially Used:

Note: the quantities needed will be dependent on the site-specific conditions experienced which are difficult to establish prior to operations and so are indicated as estimates only. All products listed will be used according to label use or a licensed veterinarian's prescription.

Parasite-S, Formalin-F, and Formacide-B. (Formalin). Active ingredient 37% formaldehyde. Used periodically according to the label if needed to alleviate fish health issues due to *saprolegniasis*, external protozoa and monogenetic trematodes. Typical dose rates from 25 ppm to 1,000 ppm. Approximate annual use: 925 gallons/year (3500 l/year).

Finquel® or Tricane-S. (Tricaine methanesulfonate). Used periodically in accordance with the label to reduce stress on the fish when handling small numbers for examination. Typical dose rates of 15-330 mg/L. Approximate annual use: 1.1 lbs/year (500 g/year).

Halamid® Aqua. (Chloramine-T). Active ingredients N-chloro, p-toluenesulfonamide and sodium salt trihydrate. Used periodically according to the label if needed to alleviate fish health issues due to bacterial gill disease. Typical dose range 12-20 ppm. Approximate annual use: 1100 lbs/year (500 kg/year).

Ovadine® (PVP Iodine). A buffered 1% Iodine solution (Iodophor) specifically formulated for use in disinfecting fish eggs. It contains a 10% Povidone-Iodine (PVP Iodine) complex, which provides 1% available iodine. Used according to the label at dose rates of 50 -100 ppm as available iodine solution. Estimated usage: 160 gallons/year (600 l/year).

Compounds Rarely Used Only in Emergency Situations:

Praziquantel. Considered as 100% active. Can be used if fish are suffering from trematode/cestode infections. Typical dose ranges from 5-200 ppm depending on length of standing bath treatment. Used as needed/intermittent or emergency use only, according to label use or as prescribed by a licensed veterinarian. Approx. annual use: 0 lbs/year (0 kg/year).

Potassium permanganate. Considered as 97% active. Can be used if fish are suffering from certain parasites and fungal infections in younger fish life-stages. Typical dose range 1.5-2.5 ppm. Used as needed/intermittent or emergency use only, according to label use or as prescribed by a licensed veterinarian. Approx. annual use: 0 lbs/year (0 kg/year).

Terramycin® 200. (oxytetracycline dehydrate, 44% active): Can be used as an in-feed treatment (maximum of 0.08 g active oxytetracycline/kg fish/day) if fish are suffering from certain bacterial infections. Used as needed/intermittent or emergency use only, according to label use or as prescribed by a licensed veterinarian. Approx. annual use: 0 lbs/year (0 kg/year).

Aquaflor®. (florfenicol; 50% active). Can be used as an in-feed treatment (maximum of 15 mg/kg fish/day) if fish are suffering from certain bacterial infections. Used as needed/intermittent or emergency use only, according to label use or as prescribed by a licensed veterinarian. Approx. annual use: 0 lbs/year (0 kg/year).

Romet® 30/Romet® TC. (sulfadimethoxine/ormetoprim, 30% active or 20% active, respectively). Can be used as an in-feed treatment (maximum of 50 mg/kg fish/day) if fish are suffering from certain bacterial infections. Used as needed/intermittent or emergency use only, according to label use or as prescribed by a licensed veterinarian. Approx. annual use: 0 lbs/year (0 kg/year).

Waste Water Treatment

Formic Acid (85%). Used for pH correction of fish processing water prior to disinfection with sodium hypochlorite. Approx. annual use: 18200 gallons/year (69000 l/year).

Bleach. Active ingredient: sodium hypochlorite (15%). Used to disinfect water used in fish processing. Applied at concentration of 50 mg/l. Estimated discharge concentration: 0.4 mg/l. Approx. annual use: 14800 gallons/year (56000 l/year).

Methanol. Used as supplemental carbon source in waste water treatment plants to stimulate denitrification processes. Approx. annual use: 1.5 million gallons/year (5.6 million l/year).

Maine Department of Environmental Protection
Waste Discharge Permit Application

Outfall Information

DEPLW0102
Revised: 02/22/2018

This form must be attached to the General Application for a Waste Discharge License / MEPDES Permit
(Form DEPLW0105-B2003)

Please answer all questions completely, using additional pages as necessary with responses clearly identified by item number on this form.

1. Facility Name: Nordic Aquafarms Inc MEPDES # ME ____________

2. Attach a plan of the treatment facility or discharge sources showing the location of each outfall and the receiving water. Please number each outfall with the corresponding number from the permit application. See Attachment 1.

3. For each outfall, provide the following information. Please use additional forms as necessary to describe all outfall locations.

   A. Outfall name: Outfall 1 Outfall number: 1

   B. Flow discharged. Average: 7.7 MGD Maximum: 7.7 MGD

   C. Diameter of outfall pipe: 36 inches

   D. Depth below mean low water at outlet: 35 feet

   E. Describe any diffusers, mixers or similar structures used to disperse the effluent. Please include drawings or diagrams as appropriate. (use a separate sheet)

The discharge location will be equipped with a multi-port diffuser to enhance the distribution of effluent into the receiving water. Consideration is being given to the installation of flexible duckbill style valves on the diffuser ports. Compared to an open pipe port the duckbill valves can effectively reduce flow area to maintain greater exit velocity from the ports during lower effluent flow rate situations.

- -

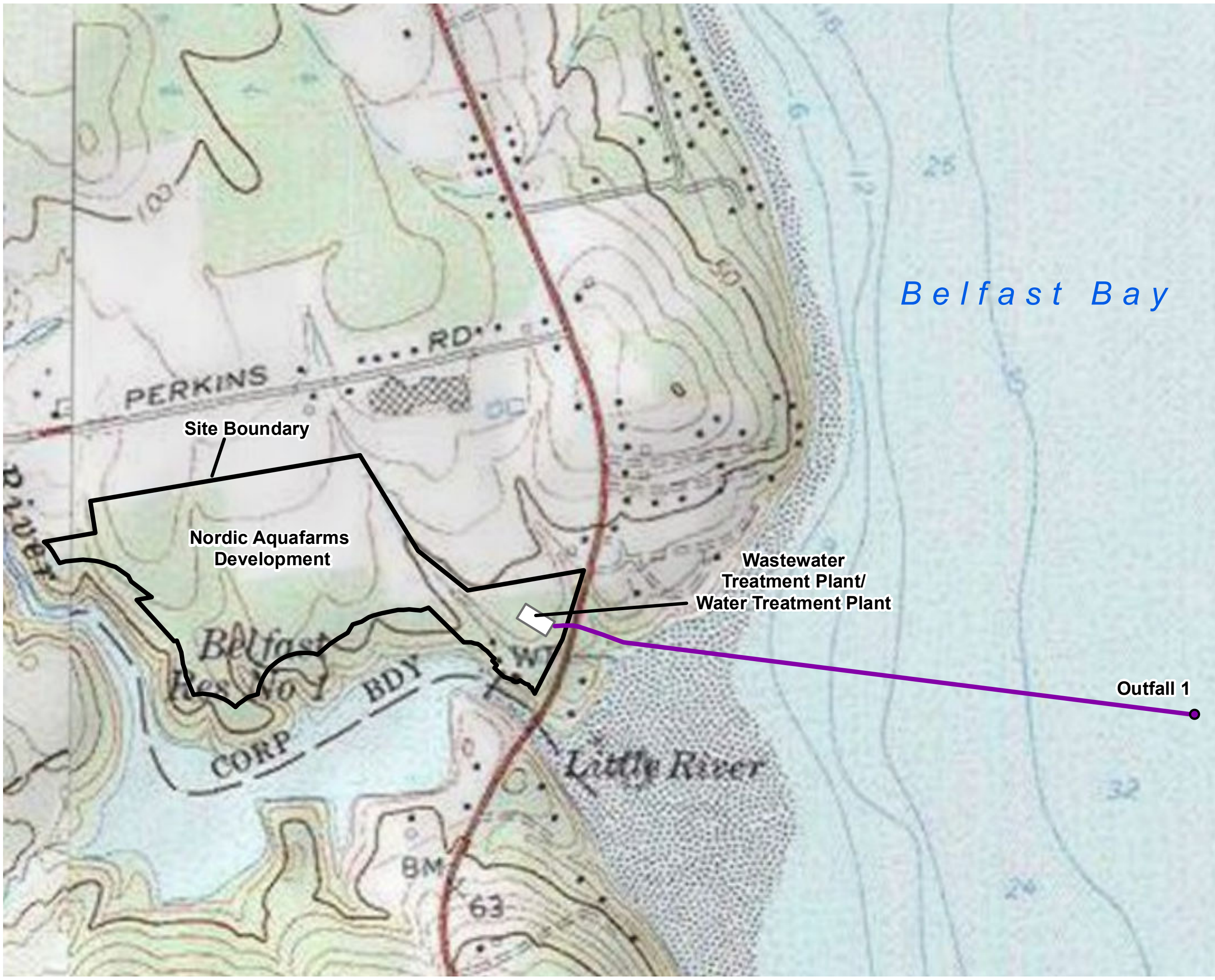
   A. Outfall name: ________________________ Outfall number: ______________

   B. Flow discharged. Average: __________MGD Maximum: __________MGD

   C. Diameter of outfall pipe: ___________inches

   D. Depth below mean low water at outlet: __________feet

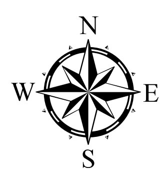
   E. Describe any diffusers, mixers or similar structures used to disperse the effluent. Please include drawings or diagrams as appropriate.

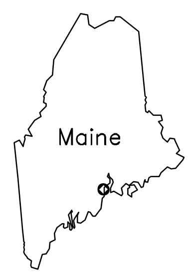


TAKEN FROM U.S.G.S. 7.5 MINUTE BELFAST AND SEASPORT, MAINE–1976 (REVISED 1979).

CONTOUR INTERVAL IS 20 FEET

SITE COORDINATES: LATITUDE 44° 23'43.8"N
LONGITUDE 68° 59'17.0"W





0 500 1,000 2,000
SCALE in FEET 1:1,000

RANSOM Consulting Engineers and Scientists

PREPARED FOR:

NORDIC AQUAFARMS, INC.
159 HIGH STREET
PO BOX 283
BELFAST, MAINE

SITE:

PROPOSED COMMERCIAL LAND–BASED AQUACULTURE FACILITY
285 NORTHPORT AVENUE
BELFAST, MAINE

PROPOSED OUTFALL MAP

PROJECT: 171.05027.008

FIGURE:

PM File: NAF-FX_PropOutfall.mxd

Questions from the October 4, 2018 Public Information Meeting

1. Is Nordic Aquafarms ("Nordic") willing to look at a living column to monitor Bay conditions like the one done by Green Wave out of Connecticut?

   The concept of a living column to assess in-situ impacts of discharge water on live organisms in Penobscot Bay is an interesting approach and will be included in the sampling program if requested by the Maine Department of Environment Protection (DEP).

2. A concern was expressed about "dead zones" in the ocean, and a request was made for scientific studies regarding "dead zones" in the ocean, which were defined by the questioner as areas with elevated dissolved organic carbon. What are the dissolved organic carbon levels in the effluent?

   Many parameters can be measured to assess hypoxic conditions that lead to oceanic "dead zones". Dissolved oxygen is a typical parameter that is monitored to assess the potential for hypoxic conditions. As discussed during the public information meeting, dissolved oxygen concentrations in the effluent are at levels that allow for growth of sensitive sea life such as lobsters.

3. Will you allow the public to view or conduct sampling?

   Sampling will be conducted as required by any final permit in accordance with specific protocols outlined in said permit. We have been contacted by groups with a documented science and/or environmental background that are interested in assisting with this sampling, and Nordic will discuss such future cooperative sampling opportunities.

4. What are tank collapse procedures if the fish tanks fail?

   Details pertaining to site development will be included in the Site Location of Development permit, which will include a description of the tanks and construction method to prevent risk if a tank were to collapse.

5. How will Nordic handle a clog in the effluent line?

   An inspection and maintenance protocol will be established to preserve the longevity and efficacy of the discharge pipeline. Given the dimensions of the pipeline is it not considered prone to clogs as flow will be continuous and discharge salinity is anticipated to discourage marine growth.

Additional pages of questions were submitted in writing by area residents following the Public Information Meeting. Many of these questions are addressed directly in the MEPDES permit application and included modelling reports, while others will be more appropriately addressed by information included in future permits, such as the Site Location of Development permit. Nordic has split these questions into general categories, to which Nordic Aquafarms has provided additional comment.

I. Treatment and Containment of viruses and disease.

1. Specifically, how will disease, viruses and sea lice will be managed within the facility and prevented from being transmitted to Penobscot Bay where they could impact wild populations.

   One of the major benefits of RAS is the ability to control the culture environment and prevent disease. All egg batches will be sourced from a reputable breeder with a staff veterinarian supervising a routine screening procedure for salmon diseases. Upon receipt, eggs will be further screened and quarantined in collaboration with independent fish health experts. The most likely source of disease risk would be the sea water used. All water entering the facility will be treated with ultra violet (UV) light (see Attachment F) using technology that is proven to neutralize parasites, bacteria and viruses. The internal RAS system will continuously treat the recirculating water; preventing the growth of any pathogens within the RAS system. Finally, all water leaving the facility will be treated with membrane filters and UV as well. We will also work with a licensed veterinarian, who is experienced in aquaculture, to assist us in adapting our established biosecurity measures to US requirements and conditions.

2. What is the impact of salmon feed on nutrient levels in discharge effluent?

   Knowledge of feeds currently available in the market allows Nordic to make the conservative estimates presented in the MEPDES application. Successful applicants for a MEPDES permit are given maximum limits which their discharge must stay below. We have a wide range of feed options within the discharge limits being applied for. As feed composition may change over time; we cannot specify use of a specific feed at this time. Any feed used will be in compliance with USDA and FDA requirements.

3. What is the impact of salmon pheromones on organisms in Belfast Bay?

   Discharge dispersion models suggest that the contents of the discharge will quickly be dispersed to background levels. Most pheromones should be removed by the filtration equipment. Based on the dispersion models, the filtration technology Nordic will use, and the surveys of the sea life surrounding the discharge location, the discharge will not have significant negative impacts on fish populations in the bay.

The following provides responses to specific written questions submitted at the conclusion of the Public Information Meeting. Questions have been consolidated into categories in order to avoid duplication. Nordic understands that responses to these questions are not required but has attempted to respond to all questions.

I. Viruses/disease:

1. 2018, CBC news reported "Virus at 2 Nova Scotia land-based fish facilities results in 600,000 salmon being killed ... Aquaculture Minister Keith Colwell said Thursday the two facilities are located close to each other but wouldn't name them." If Nordic has a disease outbreak, will it be required by law to disclose the location to the public?

   Nordic will follow all reporting requirements in the U.S. and Maine. We cannot speak to the biosecurity measures of these two Canadian facilities. Nordic Aquafarms will install significant upgraded biosecurity measures compared to most of the industry in addition to implementing our best practices for land-based operations, to prevent pathogenic material from entering or leaving the facility. We are not a net pen operation putting fish into the ocean.

2. If you have a disease or virus outbreak, will the tanks continue to circulate the disease into Penobscot Bay?

   Pathogenic materials will be unable to enter or leave the facility. The primary source of pathogens for RAS facilities is the water source they use. We will use proven disinfection technology at our intake to prevent pathogenic material from entering the facility. The tanks circulate on an internal water treatment loop that has UV disinfection integrated into the RAS for continuous disinfection of system water. Grow-out and processing tanks drain to a waste water treatment system that has micro-filtration to remove particles as small as 0.4 microns (a human hair is 50 microns). This is small enough to remove bacteria. For comparison, rod shaped Escherichia coli bacteria are 1 micron by 2 microns in size. After micro-filtration water is treated with a 300 mJ/cm3 dose of UV light for final disinfection prior to discharge.

3. We are going to require you to have, in place, a plan to halt all circulation into the bay should a virus or disease outbreak in your tanks. Please explain in detail the steps that you would take.

   Pathogenic material will be unable to enter or leave our facility. We have extensive standard operating procedures (SOPs) for contingency situations at our European facilities. These SOPs, best practices, and biosecurity measures will be adapted and further expanded for our Belfast facility.

   Our modules and tanks are separate entities and do not share water or materials from one module to the next. Materials and water from one module cannot and will not move from one module to another. This separation of modules provides an additional layer of biosecurity for the facility.

If one of our trained marine biologists were to observe something of concern, our SOPs require them to immediately report this to their supervisor. The fish in question would be removed and sent for further testing by an accredited lab and U.S. certified veterinarian. The recommendation of the veterinarian would then be followed. NORDIC will follow all regulations and reporting requirements in the U.S. and Maine.

4. Disease Vectors - According to Dr. Stephen Ellis, about I 0% of caged salmon are sent to market early because they are diseased with infectious salmon anemia (ISA) virus infections. Aquaculture industry has developed markets for the smaller, yet diseased fish, unbeknownst to the consumer. Can the sold fish, the cartons, or the destroyed fish all spread viruses and diseases?

   Nordic Aquafarms is a land-based operator with significantly reduced risk of disease. We do not sell fish with disease and have extensive internal procedures to prevent, detect and take action in relation to risk of disease. The FDA and USDA inspect, regulate, and certify fish sold to U.S. consumers to ensure they are free of disease through testing, inspections and explicit regulations and oversight.

   The regulating authorities do not allow infected fish to be sold to the public. For example. in 2001 and 2002, 1.5 million salmon were ordered to be eradicated by the Maine Dept. Of Marine Resources and the USDA APHIS in response to an ISA outbreak in Cobscook Bay, Maine where approximately 50% of the salmon in the state were being grown at that time. 1.5 million pounds is about 10% of the estimated 18 million pounds of salmon in Cobscook Bay at the time of the ISA outbreak.

   Nordic Aquafarms does not raise fish in cages. We will employ pathogen excluding technologies to prevent pathogenic material from entering the facility. The ability to safe guard our facility from pathogens that may be present in Penobscot Bay provides a distinct separation between land-based recirculating aquaculture systems and net pen grown fish. Our fish will be inspected and evaluated by Federal, State and private accredited labs to ensure we only produce and sell safe, premium quality fish. We will use a detailed HAACP plan in our facility and we will meet or exceed all state and federal regulations.

5. Can you provide scientific studies that prove that your outflow pipe into the bay can unequivocally not spread diseases, viruses or sea lice to other sea life, who then become carriers.

   The methods NORDIC will use to prevent pathogenic material and parasites from entering or leaving the facility are well documented and understood. A multi-step process will be employed to prevent the any potential pathogenic material or sea lice from entering or leaving the facility. We will micro-filter our effluent to remove particles through a 0.4-micron filter provided by Mitsubishi. Mitsubishi has applied and proven this technology in many industrial, and municipal settings around the world. Many of these successful applications are documented on Mitsubishi's website at: https://www.m-chemical.co.jp/sterapore/en/pdf/Mitsubishi_chemical_STERAPORE_Hollow_fiber_membrane_MBR_Case_report_EN.pdf.

For reference the smallest object the human eye can see is 40 microns, and the rod-shaped E. coli bacteria is 1 micron by 2 microns in size. While not every bacterium has been precisely measured for size, bacteria are thought to range from slightly less than 1 micron to 5 microns in size. Sea lice will be unable to pass through this filter. As a final step all effluent water will receive a 300mJ/cm3 dose of ultra violet light for disinfection prior to discharge.

UV light and its ability to effectively kill viruses and diseases is well documented:

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6. Erik Heim said that UV light will be used to treat outflow water. Please provide scientific studies that prove UV light is effective in killing viruses and diseases.

   Please see answer 5A.

7. The food for the fish is a vector for the spread of disease, especially as Nordic is stating that their feed mix will likely include smaller fish from abroad. Please provide the current protocols for testing for viruses and disease in the fish food.

   Spreading of disease in feed is very rare. Feed suppliers who transmit disease would go out of business if their product posed a disease threat to producers.

   Nordic Aquafarms has not chosen a final feed provider. However, we can look to Skrettings (also located in Maine) protocols as a fair description of current rigorous practice for testing fish feed in their production process. A statement read by George Demos of Skretting at the October 4th public informational meeting held by Nordic Aquafarms, confirmed that Skretting has both internal procedures for any disease prevention and are also fully compliant with all laws and regulations in the US. Our experience is that the larger feed suppliers is rigorous in this regard.

8. Journalist Mark Hume reported in the Globe and Mail, updated May 11, 2018 "The action, filed with the Federal Court by Ecojustice on behalf of Alexandra Morton, alleges the Minister of Fisheries and Oceans (DFO) acted "unlawfully" by issuing a license to Marine Harvest Canada Inc. to allow the farm to transfer fish carrying piscine reovirus (PRV)." The virus is deadly and causes heart and skeletal muscle inflammation in fish. "She said she first detected PRV last year when she tested samples of farmed salmon bought at Vancouver supermarkets. The Cohen Commission of Inquiry, which examined the collapse of sockeye stocks in the Fraser, warned that fish farms could be passing diseases to wild salmon. Ms. Morton said PRV could be to blame for the collapse of Fraser stocks." The Piscinc reovirus began in Norway, home to massive aquaculture facilities. Question: The Aquaculture industry has caused enormous unintended consequences. Can you provide scientific peer reviewed studies not conducted by the industry itself, that can prove that your RAS system's outflow pipe will not negatively affect wild stocks of fish?

   Nordic Aquafarms Inc. outflow pipe will not negatively affect wild stocks of fish. The discharge levels we are applying for are the best in the industry. We will apply best applicable technology to ensure pathogenic material cannot enter or leave the facility. The statement above describes a British Colombian net pen farm. NORDIC will site their facility on privately owned land where extensive barriers will prevent interaction with wild fish stocks. Similar methods of fish escapement have been used successfully for many years at other large Maine RAS facilities. Wolters, Masters, Vinci, and Summerfelt, 2009 describe fish exclusion, U.V. disinfection, and solids capture at a facility completed in 2007. The NCWMAC as described in Wolters 2009 paper in Aquaculture Engineering is sited next to an even larger RAS facility owned and operated by the University of Maine. The University of Maine facility was privately owned prior to the University purchasing it and has been in operation for several decades. Many different species have been raised at this facility over the decades. Both facilities discharge into Taunton Bay. Taunton Bay narrows

considerably at low tide and is quite long. So much so it is typically referred to as the Taunton River. There have been no documented negative effects on wild fish stocks from the outflow pipe of these RAS facilities.

9. Please explain in detail which diseases you will regularly monitor for?

   Pathogenic materials are unable to enter or leave our facility. We have extensive SOPs for all contingency situations at our European facilities. These SOPs, best practices, and biosecurity measures will be adapted for our Belfast facility. We have had no instances of disease outbreaks at our Danish facilities, as can be certified by our veterinarian. Nordic Aquafarms does not use antibiotics or vaccines in these facilities.

   If one of our trained marine biologists were to observe something of concern they will be required by SOPs to immediately report this to their supervisor. The fish in question would be removed and sent for further testing by an accredited lab and U.S. certified veterinarian. The recommendation of that veterinarian would then be followed. Fish will be regularly sent to accredited labs for testing for all and any infections.

10. Explain exact levels of disease that would trigger a shut-down of flow into the Bay.

    Pathogenic materials are unable to enter or leave the facility. The primary source of pathogens for RAS facilities is the water source they use. We will use proven disinfection technology at our intake to prevent any pathogenic material from entering the facility. All tanks circulate water through an internal water treatment loop that has UV disinfection integrated into the RAS for continuous disinfection of system water.

    All tanks drain to a WWTP that has micro-filtration to remove particles as small as 0.4 microns. This is small enough to remove bacteria. For comparison rod shaped Escherichia coli bacteria are 1 micron by 2 microns in size. After micro-filtration all water is treated with a 300 mJ/cm3 dose of U.V. light for disinfection prior to discharge.

    We have extensive SOPs for all contingency situations at our European facilities. These SOPs, best practices, and biosecurity measures will be adapted for our Belfast facility. Our modules are separate entities and do not share water or materials from one module to the next. If one of our trained marine biologists were to observe something of concern they will be required to immediately report this to their supervisor. The fish in question would be removed and sent for further testing in an accredited lab by a U.S. certified veterinarian. The recommendation of that veterinarian would then be followed, and any prescribed treatment documented

11. In the event of a mass die off of fish, please provide detailed information that, explains all of your flows of water, filters, fish, food stocks, equipment, and employees leaving the plant.

We have extensive SOPs for all contingency situations at our European facilities. These SOPs, best practices, and biosecurity measures will be adapted for our Belfast facility. All employees entering and leaving the facility will always pass through multiple biosecurity barriers so that no pathogenic materials enter or leave the facility. Feed will be stored in rodent proof containers separate from the fish modules to ensure both quality and biosecurity of the feed is maintained at all times. All equipment involved would be properly cleaned and disinfected. All water would be disinfected, properly treated, and drained. Any mortalities would be properly disposed of in adherence to state and federal regulations

12. Can you prove that you will not send diseases into the bay? Please provide documentation on these claims.

    A disease is the symptom of cell damage from infection by viruses, bacteria, or other microbes.

    Nordic Aquafarms has operated without disease outbreaks at its Danish facilities for 3 years; and the Belfast facility will have significantly upgraded biosecurity measures compared to these. The methods we will use to prevent pathogenic materials and parasites from entering or leaving the facility are well documented and understood. A multi-step process will be employed in our waste water treatment plant to ensure no pathogenic material can pass find its way to the bay. We will micro-filter our effluent to remove particles through a 0.4-micron filter provided by Mitsubishi. Mitsubishi has documented successful applications of this technology at industrial and municipal facilities around the globe. Many of these installations are listed on their website at: https://www.m chemical.co.jp/sterapore/en/pdf/Mitsubishi_chemical_STERAPORE_Hollow_fiber_membrane_MBR_Case_report_EN.pdf.

    For reference the smallest object the human eye can see is 40 microns, and the rod-shaped E. coli bacteria is 1 micron by 2 microns in size. While not every bacterium has been precisely measured for size, bacteria are thought to range from slightly less than 1 micron to 5 microns in size. As a final step all effluent water will receive a 300mJ/cm3 disinfecting dose of ultra violet light prior to discharge. U.V. light and its ability to effectively kill viruses, bacteria, other microbes, and diseases is well documented.

13. Can you prove that you will not send viruses into the bay? Please provide documentation on these claims.

See previous answers.

14. How will you handle diseased fish? Massive die-offs

See previous answers.

II. Feed

1. I have heard from Erik Heim that the fish food could be anything from insects to plants to smaller fish to waste from chicken and pig slaughterhouses. What the fish actually will eat turns out to have ramifications for Penobscot Bay and beyond, including distant marine systems. Questions: Nordic has claimed to be capturing a high percentage of phosphorus. Please explain methods used to remove phosphorus?

    We are using commercially available and proven water treatment technology that have been used in aquaculture, waste water treatment and drinking water treatment. Rotating drum

filters remove particles as small as 0.03 mm which contain phosphorous. Membrane Bioreactors (MBR) remove solids as small as 0.0004 mm and remove phosphorous by chemical precipitation. Mixed Bed Bioreactors (MBBRs) also remove some dissolved phosphorous via aerobic and anaerobic processes. Water is continuously filtered as it recirculates in the fish tanks. A small portion of the water in the fish tanks (1% of total volume each day) is exchanged continuously. All water is treated again at the waste water treatment plant prior to being discharged.

2. Provide the data on how dissolved phosphorous levels in the outflow pipe change depending upon the diet fed to fish in containment.

   The amount of phosphorous in the discharge would be proportional the amount in the feed. 99 percent of the phosphorous is removed in our waste water treatment plan before discharge of process water. Regardless of what feed we use we will be required to stay below the numbers we are permitted for.

3. If you are permitted to discharge certain levels of phosphorus, and later change the diet, will you commit to maintaining target levels?

   Yes. We are required by law to stay within any limits we are permitted for. Thus, we apply for a limit that we are confident we will not exceed.

4. A quote from the study in Aquaculture Engineering: "Total phosphorous (most of which was dissolved) was 4 times greater in the culture water of RAS that received the FMF (Fishmeal-free) diet, e.g., 4.3 ± 0.1 mg/L v. 0.9 ± 0.0 mg/L for the FM (Fishmeal) Diet. This was the first research attempt to formulate a fishmeal-free diet for Atlantic salmon with this ingredient profile and one of few studies to demonstrate uncompromised Atlantic salmon performance when feeding a diet without fishmeal. Dissolved Phosphorous levels can increase by four times simply by feeding fish a fishmeal-free diet that contains mixed nut meal, poultry meal, wheat flour, and com protein concentrate. Could a diet change at a future date cause 4 times the phosphorous to enter the bay?

   See above. We are not legally allowed to exceed the limits we are permitted for.

5. Will you feed fish slaughterhouse waste that includes any of the following: Pig blood or byproducts, chicken slaughterhouse waste, GMO com, GMO soy?

We will not use GMO's. Our feed will be USDA and FDA approved. We have not yet chosen a specific feed to use at our facility.

6. Aquaculture literature sites experiments in feeding the sludge back to the salmon and making chemical-based food stocks as ingredients to the fish pellets. What artificial inputs might the food contain?

   We will not feed fish sludge to the salmon, a practice we are not familiar with. Nordic Aquafarms is focused on sourcing a sustainably produced feed with natural components. Salmon feed is FDA and USDA regulated.

7. How will your salmon get their color? Will these chemicals be in the pipe?

   Natural antioxidants.

1. Ethoxyquin, a known carcinogen, is used to reduce rancidity and the chance of combustion during the transport of salmon feed, and its ingredients. That chemical then shows up in farm-grown salmon. Will NORDIC's fish feed contain this chemical? If yes, will it then be present in your discharge water? If not, how will you avoid it?

   We are focused on identifying and sourcing feed made with natural ingredients. We have not yet chosen a specific feed to use. Our feed will be USDA and FDA approved.

2. Will your fish feed contain soy? If it will, that means your discharge will contain known carcinogenic pesticides and fungicides associated with growing commercial soy, which is also genetically modified.

   Our feed will not contain GMO's or carcinogenic compounds. It is possible that our feed will contain some soy. The production and use of salmon feed are regulated by the FDA and USDA. We are committed to identifying and using a sustainably produced feed.

III. Pheromones

1. Sea Lice, kairomones, pheromones -- Studies conducted by the aquaculture industry and researchers have come to understand that salmon pheromones, kairomones and "fish smell" attract sea lice. Although the land-based salmon might be safe from sea lice, the outflow pipe will attract sea lice. How will this affect other species in the bay and wild salmon that are listed as endangered species? Might this make salmon recovery more difficult?

Parasites depend on higher densities of hosts to multiply and survive. They can become a problem in scenarios with high densities of these hosts. In RAS systems the host is removed from the ocean. Any lice are removed through the intake filters. Thus, populations of sea lice cannot be supported near the outfall.

2. An 11-year study in Port Mouton Bay, Atlantic Canada was released June 28, 2018. "Our results indicate that average market lobster catches per unit effort (CPUE) was significantly reduced by 42% and berried lobster counts by 56% in feed compared to fallow periods. Moreover, both market and berried lobster CPUE tended to be lower in fishing region 2, which included the fish farm, and higher in region 5, furthest away from the farm." The study reported:

3. Lobster "sniff' the odor seascape with their antennules and chemoreceptors found on their legs

    - Odors are used to locate food, find mates, detect predators and avoid environmental stresses

    - Sulphides and ammonium have toxic and behavioral effects on adults and other lobster life stages

    - In laboratory studies, 50% of lobsters die within 3 .3 days in low oxygen, low sulphides (5.5 µM) and ammonium (17 µM) conditions (Draxler et al. 2005)

        - Berried lobster is very sensitive to odours and temperature

        - Berried lobster show retreat behavior at 50 µM sulphide

    - (Butterworth et al. 2004); at 500 µM and regular oxygen conditions, 50% of lobster died in 22.5 hr.

The filtration technology we employ will prevent these conditions from occurring. They are potentially relevant to assess in relation to net pen operations.

4. Further, the study cited the effects of nitrogen pollution include:
    - Decrease in water quality
    - Increase in epiphyte growth on eelgrass
    - Increase in benthic algae
    - Increase in nuisance or "slime" algae

Please take the study's finding one by one and provide scientific data to show that your outflow pipe will not have similar negative impact.

By employing state of the art water treatment technologies, we reduce solids, phosphorous, biochemical oxygen demand (BOD) by 99%. Total nitrogen is reduced by 85%. Oceanographic

models were done to simulate the effects of the residual discharge contents (see Attachment I). The results of these models indicated the effluent would disperse quickly. We are confident this will prevent significant effects on surrounding water quality and fauna and will be monitoring developments. Note that this is a multi-phase development project to take place over a number of years. Significant amounts of monitoring data will be available before further expansion. This permit application is for a fully expanded facility.

5. Research suggests that pheromones and, more specifically, kairomones, produced by the salmon will present in the discharge water. Would you comment on the potential effects of these on wild salmon and other finfish species in our Bay?

   The main concentrations will be in the feces that is filtered out and composted or reused in other bi-product value enhancement processes. Material negative effects from the discharge are not anticipated as the discharge is quickly diluted in a large bay system.

6. Please provide scientific data to prove that the outflow odor plume will not have any effect on berried lobsters.

   Addressing questions 3 and 4 above:

   Dive surveys of the discharge area showed low occurrence of receptors (sea life) at the outfall location. Solids, phosphorous and biochemical oxygen demand will be reduced by 99% . We are confident that the rapid dispersal of residual quantities of these components to background levels will prevent significant negative environmental impacts.