WATER RESOURCE MONITORING PLAN
PROPOSED COMMERCIAL LAND-BASED AQUACULTURE FACILITY
BELFAST WATER DISTRICT, CASSIDA BACK LOT AND
MATHEWS BROTHERS WEST FIELD PROPERTIES
285 NORTHPORT AVENUE
BELFAST, MAINE

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1.0 INTRODUCTION

Ransom Consulting, Inc. (Ransom) has prepared this Water Resource Monitoring Plan (WRMP) on behalf of Nordic Aquafarms, Inc. (Nordic) to support the planning, development, and operation of a commercial land-based Atlantic salmon aquaculture facility to be located off Northport Avenue in Belfast, Maine.

1.1 Site Description

Nordic has proposed construction of an aquaculture facility on portions of land owned by the Belfast Water District (BWD), Samuel Cassida, and Goldenrod Properties, LLC (referred to as Mathews Brothers) located outside a 250-foot wide shoreland buffer zone. In addition to the primary development parcel, the proposed development will include a 40-foot wide easement, located east of US Route 1 (also called Northport Avenue), to allow pipeline access to Belfast Bay. Collectively, these portions of properties comprise the "Site" and are shown in Figure 1.

The Site encompasses approximately 54 acres of gently-sloping terrain incised by several steep gullies. These gullies serve as drainage features for the Site and some have been identified as Natural Resource Protection Act (NRPA) jurisdictional streams. The majority of the Site is currently undeveloped forest or field, with scattered wetlands and minor development along Northport Avenue, currently improved with BWD's offices, former surface water intake and pumphouse, and maintenance garages. The Site is located north of the Little River and the Lower Reservoir (also called Belfast Reservoir 1), which is impounded by a 30-foot high concrete and masonry dam, which is constructed at the confluence of the Little River and Belfast Bay. The Lower Reservoir served as the public water supply for the City of Belfast from approximately 1887 to 1956, and then as a backup supply until 1980 when the BWD completely transitioned its water supply to groundwater sourced from the Goose River Aquifer. The current BWD public water supply wells are located approximately 6.5 miles north of the Site in a separate and distinct surface water and groundwater system.

1.2 Project Development

The proposed aquaculture facility will include the construction of salmon grow-out modules (buildings 1 and 2), smolt hatcheries (building 3), a fish processing facility (building 4), central utility plant (building 5), oxygen generation infrastructure (building 6), office and maintenance space (building 7), water treatment and wastewater treatment plant (building 8), gate house (building 9), visitor center (building 10), and necessary driveways and parking lots, as shown in Figure 2. Additional water and utility lines, stormwater management features, and ocean pipelines for seawater intake and wastewater discharge will run throughout the Site.

Based on the biological importance of freshwater for salmon rearing, the project design will incorporate a constant supply of freshwater based on available resources. The freshwater resources available include the bedrock aquifer underlying the Site, surface water from the Lower Reservoir, and municipal water purchased from the BWD. The proposed project design incorporates the extraction of up to 455 gallons per minute (gpm) from an on-Site bedrock production well network, 250 gpm in surface water withdrawal from the Lower Reservoir, and purchase of up to 500 gpm from the BWD municipal supply. The anticipated surface water withdrawal of 250 gpm is based on rules set forth in Maine Department of Environmental Protection (MEDEP) Chapter 587 allowing for a withdrawal of 70 gpm plus inflows to Belfast Reservoir Number One (also known as the Lower Reservoir). In order to account for inflows into Belfast Reservoir Number One in the planning process, a rate of 250 gpm is presented as a conservative

estimate of the baseflow of the Little River. This rate is derived from the estimated 5% duration flow of the Little River. These rates of groundwater extraction and surface water withdrawal were intentionally selected based on the findings of a hydrogeologic investigation and groundwater modeling conducted by Ransom and are safe yields that are not expected to cause adverse impacts to existing groundwater users, natural resources, or waters of the State. For a detailed discussion of the hydrology of the Little River watershed, the proposed surface water withdrawal, the BWD resources, and the proposed groundwater withdrawal please refer to the site-specific Hydrogeologic Investigation Report by Ransom[1].

Development and operation will be conducted in two phases following final project approvals and permitting. Phase 1 will involve the installation of project infrastructure and grow-out modules to support operation of the project at approximately 50% capacity. Phase 2 will involve construction of remaining grow-out modules for operation at 100% capacity. Based on this approach, use of each freshwater resource will begin below full capacity and groundwater extraction and surface water withdrawal will be monitored and documented prior to Phase 2 expansion.

1.3 Existing Groundwater Users, Natural Resources, and Waters of the State

As part of the hydrogeologic investigations conducted at the Site, to date, existing groundwater users, natural resources and waters of the State sensitive to groundwater extraction and surface water withdrawal were identified. These features include nearby, private water supply wells, Site streams, wetlands, the Little River and the Lower Reservoir. As described in the hydrogeologic report, available data indicate that there may be a limited hydraulic connection between the proposed production well locations and some nearby private water supply wells and a limited hydraulic connection between the bedrock aquifer system and surface water features including the Little River, Lower Reservoir and intermittent streams. While adverse impacts are not anticipated, monitoring points for each feature have been included in the monitoring plan described herein.

Site-specific hydrogeologic modeling does not indicate any meaningful impact to the Upper Reservoir (also called Belfast Reservoir 2) due to the proposed groundwater extraction or surface water withdrawal. The Upper Reservoir stage height, and by association surface area, is largely a function of the hydrologic conditions that the watershed experiences (i.e. precipitation, evapotranspiration, etc.) and dam operation.

1.4 Purpose

This monitoring plan has been assembled to evaluate conditions of the local groundwater and surface water resources that may be impacted from the proposed development, groundwater extraction and surface water withdrawal at the Site. This plan is based on the findings of site-specific hydrogeologic investigations conducted, to date, and potential impacts based on evaluation and modeling of the available data. Proper execution of this monitoring plan will accomplish the following objectives:

1. Continue baseline data collection to document the range of pre-development background conditions influenced by natural variability and existing watershed and aquifer withdrawals;

[1] "Hydrogeologic Investigation Report, Proposed Commercial Land-Based Aquaculture Facility, 285 Northport Ave, Belfast, Maine" by Ransom Consulting, Inc., dated April 2019.

2. Collect a robust dataset able to capture changes in conditions due to the development, groundwater extraction and surface water withdrawal and natural variations that may occur;

3. Evaluate a regularly updated dataset to assess potential impacts to existing groundwater users, natural resources, and waters of the State;

4. Establish performance criteria and warning levels to serve as thresholds indicating increased potential risk of adverse impacts; and

5. Trigger the implementation of an action plan to adjust operations should significant impacts be identified.

Nordic will implement this monitoring plan under the guidance of a Maine Licensed Certified Geologist or Professional Engineer with environmental monitoring experience. Data collection and interpretation will be conducted by qualified personnel under methods and protocols approved by the qualified environmental professional and MEDEP.

2.0 DATA COLLECTION

A comprehensive network of monitoring locations was developed as part of site-specific hydrogeologic investigations. Existing monitoring points include one proposed production well (pending appropriate permitting), 11 bedrock test wells, six residential water supply wells near the proposed development Site, six overburden piezometers installed near intermittent streams and wetlands, three staff gages installed in surface water bodies, and two stream flow gaging locations in the free-flowing Little River, as shown in Figure 1. Based on the current monitoring locations and the designed layout of the final aquaculture facility, shown in Figure 2, it is anticipated that six monitoring points [monitoring wells (DRX-101, DRX-103, PSD-101 & PSD-102) and piezometers (PZ-1S & PZ-1D)] will be removed during construction. To minimize spatial data gaps and address additional monitoring needs, additional monitoring locations are proposed to be added to the existing monitoring network to replace those lost during construction.

Current industry standard equipment and methods will be utilized to implement this monitoring plan and, methods used will follow current available guidance documents and standard operating procedures (SOPs) developed by MEDEP. A list of applicable SOPs has been included as Appendix A. Any deviations from the SOPs will be noted by field personnel and documented in the annual monitoring report to be submitted to the MEDEP as detailed in Section 4.0 of this plan.

Well installation and decommissioning shall be conducted in accordance with the Maine Well Drillers and Pump Installers Rules (144 CMR 232). Monitoring wells shall be maintained in accordance with MEDEP SOP DR#028, *Monitoring Well Maintenance and Development*.

2.1 Baseline Conditions

Prior to Nordic's groundwater extraction and surface water withdrawal operations, baseline water quality and water level data will be collected to evaluate baseline pre-development and water withdrawal conditions. Baseline water level and water quality data for select, existing monitoring points has been collected since the initial exploratory test wells were installed in February 2018 as part of due diligence and hydrogeologic investigations. This dataset, through January 2019, is presented in the Hydrogeologic Investigation report by Ransom and data collection at existing monitoring points has been on-going during the preparation of this monitoring plan. Additional monitoring parameters outlined in this plan will be collected prior to the start of construction, groundwater extraction, and surface water withdrawal following the monitoring frequency and methodologies outlined herein. Facility operations are not anticipated to begin until summer 2020.

Its anticipated that the on-going monitoring of private, water supply wells will provide sufficient data to evaluate typical use conditions, and physical characteristics of the wells (i.e., total well depth, pump depth, pump design, etc.) will be collected to contextualize potential impacts of water level drawdowns.

2.2 Monitoring points

The collection of data from individual monitoring locations for this monitoring plan is shown on Figure 3 along with their associated monitoring parameters and frequency, which are summarized in Table 1, and described below:

2.2.1 Water Supply Production Wells

Nordic proposes developing one of the existing groundwater investigation bedrock wells (PW-1), into a production well for groundwater extraction and installing two additional production wells immediately adjacent to existing test wells GWW-103 and DRX-102, to be named PW-2 and PW-3, respectively. Collectively, these three production wells will be operated as the network (e.g., well field) for groundwater extraction at the Site. Extraction rates and cumulative extraction volumes for the well field will be monitored through the incorporation of flow meters and totalizers into the piping design. Flow rate and total volume measurements will be recorded by personnel on a monthly basis, and if technically feasible, flow rate will also be automatically recorded on a more frequent basis.

2.2.2 Bedrock Monitoring Wells

The eleven, existing bedrock monitoring wells (NTB-101, NTB-102, NTB-103, GWW-101, GWW-102, GWW-103, DRX-101, DRX-102, DRX-103, PSD-101 and PSD-102) will be maintained to monitor groundwater levels within, and outside, the anticipated zone of contribution to the production well network. Three of these wells (GWW-101, GWW-103 and DRX-102) will be located immediately adjacent to production wells and serve as pumping observation wells. Based on the design layout of the aquaculture facility, it is anticipated that four monitoring wells (DRX-101, DRX-103, PSD-101 and PSD-102) will be removed during construction. Two replacement wells (BRK-201 and BRK-202) will be installed to maintain spatial coverage of the bedrock aquifer and minimize potential data gaps. Monitoring wells that are proposed to be removed during construction activities will be properly decommissioned by a Maine-licensed well driller, in accordance with state protocols.

Bedrock monitoring wells will be used to monitor water levels within the bedrock aquifer system underlying the Site. Water level data will be collected using automated pressure transducers and verified with manual measurements using electronic water level meters. Pressure records from transducers will be corrected for variations in barometric pressure with the use of a barometric pressure logger installed at the Site. Transducers will collect data on hourly intervals and these data will be downloaded for evaluation on a quarterly basis, unless otherwise specified. Manual measurements will be collected on a monthly basis for the first three months to corroborate accurate transducer operation. Following significant changes in groundwater extraction rates, such as the start of Phase 1 and Phase 2 operations, water level data will be downloaded from transducers on a monthly basis for evaluation.

In addition, bedrock monitoring wells GWW-101, GWW-103 and DRX-102 will be monitored for conductivity, as a proxy for salinity. Conductivity measurements will be collected on an hourly basis using down-well automated conductivity transducers and the data will be downloaded on a quarterly basis, unless otherwise specified. Following significant changes in groundwater extraction rates, such as the start of Phase 1 and Phase 2 operations, conductivity data will be downloaded from the transducers on a monthly basis for evaluation.

2.2.3 Private Water Supply Wells

The existing monitoring network includes six private, water supply wells (WSW-01, WSW-02, WSW-03, WSW-04, WSW-05, WSW-06) located north, south, and west of the Site along Reeds Lane, Atlantic Highway, and Herrick Road. Owners of an additional seven water supply wells

(P-WSW-07, P-WSW-10, P-WSW-11, P-WSW-12, P-WSW-13, P-WSW-14, P-WSW-15), located on Herrick Road, Atlantic Highway and Windward Lane, are anticipated to be approached for incorporation into the monitoring network based on outputs of the site-specific hydrogeologic model.

The specified water supply wells will have their water levels monitored, with the exception of P-WSW-10 whose pump design is not conducive to monitoring for technical reasons. Water level data will be collected using automated pressure transducers and verified with manual measurements using electronic water level meters. Pressure records from transducers will be corrected for variations in barometric pressure with the use of a barometric pressure logger installed at the Site. Transducers will collect data every 15 minutes and these data will be downloaded for evaluation on a quarterly basis. This interval is anticipated to capture the variable degree of well drawdown caused by normal water use from the supply wells. Following significant changes in groundwater extraction rates, such as the start of Phase 1 and Phase 2 operations, water level data will be downloaded from transducers on a monthly basis for evaluation.

In addition, water quality monitoring will be conducted on a quarterly basis at the private, water supply wells and will include parameters considered by the Maine Center for Disease Control and Prevention to be the standard suite of residential water quality tests. Quantitative water quality parameters to be analyzed include the following: coliform bacteria (enumerated), nitrate, nitrite, fluoride, sodium, chloride, copper, iron, manganese, lead, uranium, arsenic, hardness, pH and total dissolved solids (TDS). Qualitative descriptions of odor, color, turbidity and taste will also be recorded. If after two years of full capacity groundwater extraction, estimated to be approximately five years of monitoring, quarterly water quality samples from private wells indicate stable water quality, changes to the frequency and/or parameter list for water quality samples may be proposed.

Private, well water quality sampling will be conducted in accordance with MEDEP SOP DR#001, *Water Sample Collection from Water Supply Wells*. Continuous chain of custody of all samples will be maintained as specified in MEDEP SOP DR#012, *Chain of Custody Protocol*, from the point of collection until the sample is delivered to the contracting laboratory for analysis. Sample container requirements, preservation methods and maximum holding times for each parameter will be adhered to.

Samples will be analyzed by an environmental laboratory certified or accredited under the rules of the Maine Department of Health and Human Services, 10-144 CMR 263 (effective December 19, 2018). The laboratory will be required to provide a non-conformance summary that reports if all of the quality control criteria including initial calibration, calibration verification, surrogate recovery, holding time and method accuracy/precision for analysis were within acceptable limits. The laboratory report will also specify the detection limits of each procedure and the practical quantitation limits for each parameter. The analysts performing the work and the laboratory technical director will be required to certify the results.

2.2.4 Overburden Monitoring Wells

Installation of two overburden monitoring wells (OVB-101 and OVB-102) are proposed to monitor overburden groundwater quality at locations considered to be downgradient from the Site and within the 250-foot wide shoreland buffer zone adjacent to the Little River and Lower

Reservoir. Another overburden monitoring well (OVB-103) is proposed to be installed at a location considered to be upgradient from the Site to monitor background conditions that may change over time. Groundwater samples will be collected biannually in the spring and fall, when sufficient overburden groundwater is present to sample, and analyzed for total nitrogen and total phosphorus. Additionally, manual measurement water level data will be collected on a monthly basis using an electronic water level meter. The location of these wells within the shoreland buffer zone is subject to existing land agreements with the current property owner (BWD) and future property owner (City of Belfast). In the event these wells cannot be installed within the shoreland zone for any reason, the monitoring wells will be installed within the Site property boundary.

Water quality samples from overburden monitoring wells will be collected using low flow methodology in line with MEDEP SOP DR#003, *Groundwater Sampling Using Low Flow Purging and Sampling for Long-Term Monitoring.* Continuous chain of custody of all samples will be maintained as specified in MEDEP SOP DR#012, *Chain of Custody Protocol*, from the point of collection until the sample is delivered to the contracting laboratory for analysis. Sample container requirements, preservation methods and maximum holding times for each parameter will be adhered to.

Samples will be analyzed by an environmental laboratory certified or accredited under MEDEP's rules, 06-096 CMR 263 (effective December 19, 2018). The laboratory will be required to provide a non-conformance summary that reports if all of the quality control criteria including initial calibration, calibration verification, surrogate recovery, holding time and method accuracy/precision for analysis were within acceptable limits. The laboratory report will also specify the detection limits of each procedure and the practical quantitation limits for each parameter. The analysts performing the work and the laboratory technical director will be required to certify the results.

2.2.5 Piezometers

Six piezometers previously installed in overburden (PZ-1S, PZ-1D, PZ-2, PZ-3, PZ-4S and PZ-4D) will be maintained to monitor overburden groundwater levels at shallow (S) and deep (D) intervals. Based on the designed layout of the aquaculture facility, it is anticipated that two piezometers (PZ-1S and PZ-1D) will be removed during construction. An additional piezometer (PZ-5), is proposed to be installed as necessary to maintain spatial coverage of remaining natural resources and minimize significant data gaps. Where located in wetlands, piezometers will be installed to monitor hydrology within the approximate root zone of the associated wetland vegetation. Water level data will be collected on a monthly basis via manual measurements using electronic water level meters.

2.2.6 Major Surface Water Stages

Three existing surface water monitoring points, established as staff gages SG-2, SG-3 and SG-4, will be maintained and/or improved to monitor surface water levels in the Lower Reservoir, Upper Reservoir, and free-flowing Little River between the two reservoirs, respectively. Water level monitoring will be conducted via a combination of manual measurements using electronic water level meters and automated pressure transducers. Transducers will be deployed in surface water locations when ice conditions are favorable. Pressure records from transducers will be corrected for variations in barometric pressure with the use of a barometric pressure logger

installed at the Site. When able to be deployed, transducers will collect hourly water level data to be downloaded on a quarterly basis. When transducers are not able to be deployed, manual water level measurements will be recorded on a monthly basis.

Discharge of the free-flowing Little River, between the Upper Reservoir and Lower Reservoir, will be monitored at existing stream gaging transect SG-Mid on a monthly basis. Stream gaging will be conducted using a velocity meter and wading rod in accordance with the six-tenths or 2-point gaging methods, depending on water depth, described in United States Geological Survey (USGS) Water-Supply Paper 888[2]. Discharge will not be gaged when the river is frozen, or flows are too high to safely gage. Over time, a rating curve will be developed to assist in correlating stage height to discharge during periods of time where discharge cannot be directly measured. Prior to commencing surface water withdrawal from the Lower Reservoir, a feasibility assessment will be conducted regarding the installation of a remote monitoring system to measure stage in the Little River in real-time.

Nordic also proposes utilizing one pre-existing, surface water withdrawal location (SW-1) from the Lower Reservoir. Extraction rates and cumulative extraction volumes for the surface water withdrawal will be monitored through the incorporation of flow meters and totalizers into the piping design. Flow rate and total volume measurements will be recorded by personnel on a monthly basis, and if technically feasible, flow rate will also be automatically recorded on a more frequent basis.

2.2.7 Stream Monitoring

The discharge of NRPA jurisdictional streams located on-Site (S3, S5, S6, S9 and S10) will be monitored for the presence or absence of flow through monthly photo documentation. As these stream features also serve as drainage features, photos will not be collected during or immediately following a precipitation event. At a minimum, photos documenting stream conditions will be taken where streams cross the Site boundary and continue onto down-gradient property.

NRPA jurisdictional streams located on-Site will be monitored for aquatic macroinvertebrates in the late spring to early fall. Following a baseline assessment to be conducted in 2019, NRPA jurisdictional streams containing documented aquatic macroinvertebrates will be monitored for aquatic macroinvertebrates on an annual basis. This investigation will be conducted in accordance with general methods described in the NRPA Identification Guide for Rivers, Streams, and Brooks[3].

2.2.8 Wetland Biomonitoring

Two proposed wetland monitoring plots (MP-1 and MP-2) will be established at the Site within wetlands W9 and W7, respectively. The vegetative community within these plots will be assessed annually during the growing season between July 15 and September 30. Wetland plots will be established within the wetland boundary and will measure 5 meters (m) by 5 m. Each corner of the plot will be permanently marked with rebar and located with a global positioning

[2] Corbett, Don M., *Stream-Gaging Procedure: A Manual Describing Methods and Practices of the Geological Survey*, 1943. https://pubs.usgs.gov/wsp/0888/report.pdf
[3] Danielson, T. J. 2018. *Natural Resource Protection Act (NRPA) Streams, Rivers, and Brooks.* Maine Department of Environmental Protection, Augusta, ME.

system (GPS) receiver. One reference plot (RP-1) will be established off-site, in a wetland area outside of the direct, water supply production well network's zone of contribution. The final plot locations will be determined at the time of the initiation of baseline wetland biomonitoring.

Plot data will be recorded on a data form and will include a quantitative inventory of vascular plant species and an approximation of their absolute areal coverage within the plot. Trees (i.e. woody vegetation over 5 inches in diameter at breast height [dbh]) will be identified to species and percent areal cover will be visually estimated for species rooted and overhanging the plot. Saplings and shrubs (i.e. woody vegetation greater than 3 feet tall and less than 5 inches dbh) rooted in the plot will be identified to species and percent areal cover will be visually estimated for each species. Herbaceous plants, including woody plants less than 3 feet tall, will be identified to species, when possible, and percent areal cover for each species will be visually estimated. The data form will include the corresponding wetland rating for each species, as available from the U.S. Army Corps of Engineers National Wetland Plant List. Evidence of stressed or dying vegetation will be recorded as appropriate on the data forms. Evidence of wetland hydrology will also be recorded at the time of biomonitoring. Photographs will be taken from fixed locations to allow annual comparisons.

2.2.9 Precipitation

The existing Belfast National Oceanic and Atmospheric Administration (NOAA) Station (USC00170480), located approximately 3 miles north of the Site, will be utilized to collect daily precipitation and temperature data. In the event precipitation data collection at this station ceases or the delayed access to precipitation data becomes unreasonable, a weather station will be established at the Site to document precipitation data.

3.0 DATA EVALUATION

Data collected during the monitoring described above will be reviewed for quality assurance and quality control purposes. The available dataset will be evaluated on a monthly basis during the first three months of Phase 1 operation and first three months of Phase 2 operation, and on a quarterly basis otherwise to evaluate trends and identify the potential for adverse impacts.

3.1 Performance Criteria

In order to understand whether groundwater extraction, surface water withdrawal, or site development may have unreasonable adverse impacts to existing groundwater users, natural resources, or waters of the State, monitoring data collected will be compared to performance measurement criteria. The performance criteria described below for the project has been developed based on the hydrogeologic setting of the Site, which is located at the terminus of the Little River watershed immediately prior to groundwater and surface water discharge to Belfast Bay, and hydrogeologic modeling created and calibrated from data collected during four aquifer pumping tests.

3.1.1 Private water supply wells

There are two important water level conditions that will have defined performance criteria:

1. Potential change in average groundwater elevation in any given well due to pumping from Site production wells; and

2. Capacity of any given well to continue to provide adequate water given current usage and condition of the pump and associated equipment installed in the well.

To address the first condition described above, water elevation data (i.e. water level) for each month from any given private water supply well will be evaluated against baseline water elevation conditions for the same well. As discussed in Section 2.1, baseline conditions will be defined by on-going data collection prior to the anticipated operational start of Phase 1 in summer 2020. In order to account for seasonal water level variation, water elevation data collected during monitoring will only be compared to baseline data collected during the same month. To account for variability in water level from normal use of the well, the maximum daily water level will be used as the best available approximation of the true ambient groundwater elevation. The proposed evaluation will be completed for each full month of monitoring. The first step will be to calculate the average daily maximum water level observed in a given private, water supply well for the preceding month. Then, this average daily maximum will be compared to the average daily maximum water elevation from the baseline dataset for that well in the same month. Once this comparison has been completed, the results will be directly compared to the predicted average groundwater drawdown from the numerical groundwater flow model for the area near the well.

In addition to changes in average water elevation relative to baseline conditions, an assessment of water elevations compared to well and pump specific details, including total well depth, pump depth, and well fluctuation from normal use, will be conducted. Well specific details will be collected as baseline data prior to Phase 1 operation, as discussed in Section 2.1. The well specific details will be used to determine a minimum operational level of the well (i.e. the minimum water elevation in a well that still allows the well to function normally) specific to each

well. Daily minimum water elevations from each well can then be evaluated against the maximum reasonable drawdown to ensure private, water supply well functionality.

Water quality results from private water supply wells will be compared against baseline conditions and be qualitatively assessed for undesirable trends. For additional context, water quality parameters will be compared to Maine Center for Disease Control and Prevention (CDC) Maximum Exposure Guidelines (MEGs) for Drinking Water or, where no MEGs are present, United States Environmental Protection Agency (U.S. EPA) Secondary Maximum Contaminant Levels (SMCLs) which are non-mandatory water quality standards established by the U.S. EPA as drinking water guidelines for aesthetic considerations.

3.1.2 Wetlands

Wetland monitoring plot vegetation data will be analyzed to identify potential shifts in species diversity and abundance over time in relation to Site development and groundwater extraction. Water levels in shallow piezometers installed in each wetland plot to monitor hydrology within the approximate root zone of the associated wetland vegetation will be compared to baseline conditions and evaluated for declining trends.

3.1.3 Streams

Monitoring data collected for streams, including discharge and biomonitoring, will be used to evaluate changes relative to NRPA jurisdictional stream classification criteria. These criteria, outlined in the *NRPA Identification Guide for Rivers, Streams and Brooks*, include having a defined bed and bank and two or more of the following: a blue line on USGS map, continuous flow for at least six months each year, channel bed composed of mineral material, aquatic animals, and/or aquatic vegetation.

3.1.4 Lower Reservoir & Little River

Water levels recorded in the Lower Reservoir and discharge from the Little River will be compared to baseline conditions to evaluate the potential influence on groundwater extraction, surface water withdrawal, and Site development on the waterbodies. Due to the anticipated discharge of overburden groundwater to the Little River and Lower Reservoir, water quality results from overburden monitoring wells located between the Site and Lower Reservoir and Little River will be compared against baseline conditions and be assessed for declining water quality trends.

3.2 Warning Levels

To mitigate the potential risk of adverse impacts, performance criteria warning levels have been established. When a monitoring parameter exceeds a warning level, this will trigger an assessment of cause, be it a natural climatic signal or a result of Site operations. This assessment, to be provided as a supplemental report, will use monitoring points outside the zone of influence of Site development operations, including NTB-103, WSW-06, OVB-103, RP-1 or other identified reference preferably within the Little River watershed, to evaluate the climatic signal/response. Key components of this assessment include:

1. An assessment of available information and professional opinion regarding the cause of a parameter exceeding its associated warning level;

2. An assessment of the risk posed by a continuation of the trend resulting in the warning level exceedance;

3. An assessment of the available methods to mitigate the risk of the trend continuing;

4. A recommendation for action to be taken, if any, including changes in monitoring or data evaluation frequency; and

5. New warning levels, if applicable, based on the findings of the assessment report.

Warning levels have been defined by as follows:

3.2.1 Private water supply wells

Well-specific warning levels will be set to provide benchmarks that the two different water level performance criteria conditions (listed above in Section 3.1.1) can be compared to:

1. The warning level for the average daily maximum water level will be well-specific and defined as 115% of the maximum steady-state average drawdown predicted by the groundwater flow model for the area near the well. If the average daily maximum water level for a given month of baseline data minus the average daily maximum water level for the same month of monitoring data is more than 115% of the maximum steady-state drawdown predicted by the groundwater model, than the warning level has been exceeded.

2. If at any point, the daily minimum water level drops below the minimum operational water level of the well, as defined above, the warning level has been exceeded. If the minimum operational water level in the well is not within 20 feet of the well pump intake, then the minimum operational water level of the well will be considered to be 20 feet from the top of the pump intake.

3.2.2 Streams

The loss of a previously identified NRPA jurisdictional stream classification criterion (i.e. a defined bank and two or more of the following: a blue line on USGS map, continuous flow for at least six months each year, channel bed composed of mineral material, aquatic animals, and/or aquatic vegetation) will be considered a warning level exceedance for NRPA jurisdictional stream monitoring.

3.2.3 Lower Reservoir & Little River

Due to the unique position of the Lower Reservoir at the downstream terminus of the Little River (the Lower Dam discharges directly into a tidal inlet of Belfast Bay), minimum instream flows are not applicable to the Little River below the Lower Dam. The rules set forth in MEDEP Chapter 587 provide for a maximum allowable withdrawal from a surface water body such as the Lower Reservoir, even in the absence of inflow, of up to 1.0 acre-feet of water per acre of the

waterbody at normal high water between April 1 and July 31, and up to 2.0 acre-feet of water per acre of the waterbody at normal high water from August 1 to March 31. The Chapter 587 Rules also allow for any surplus water demonstrated to have been delivered to the Lower Reservoir beyond the maximum acre-foot withdrawals to be included in the overall withdrawal. These allowable withdrawal levels of 1.0 acre-feet and 2.0 acre-feet will serve as the water level warning levels for the Lower Reservoir.

3.3 Action Plan

If ongoing operational monitoring and performance criteria indicate that groundwater extraction and surface water withdrawal, will or have resulted in unreasonable adverse impacts to groundwater users or water dependent resources at the Site or vicinity, Nordic will submit a remedial action plan to the State for review and approval. Nordic acknowledges that under extreme scenarios this remedial action plan may require the installation of a water treatment system, alteration of an existing well and/or pump system, drilling of a new water supply well, or new connection to the public water supply system should adverse impacts to water quantity or water quality in private water supply wells be documented. Should the Lower Reservoir be drawn down below the allowances outlined in MEDEP Chapter 587, surface water withdrawal will be immediately reduced and discussed with MEDEP.

4.0 REPORTING

Nordic will prepare annual reports summarizing the monitoring data to the MEDEP, City of Belfast, and the Town of Northport. Reports for each fiscal year, ending December 31, will be submitted by March 31 of the following year. The reports will include a map of the Site showing sampling locations, a facility operation and Site development narrative, current and historic data tables, laboratory reports, chain of custody records, comparison of parameter values versus historical values, discussion of the dataset, and recommended changes, if any, to the monitoring plan. The report will include a discussion of performance criteria, warning levels, and trends in water quality and biomonitoring, along with potential contingency plans that may be relevant. Nordic will also provide MEDEP, City of Belfast, and the Town of Northport with a quarterly tracking report that will include volume of water withdrawn, water elevations, and additional parameters at monitoring points as presented in Table 1. These reports will be prepared and stamped by a certified geologist or professional engineer licensed in the State of Maine.

For the three months of groundwater extraction and surface water withdrawal following both initial Phase 1 and Phase 2 operation, Nordic will submit interim monthly reports of pumping rates, precipitation, groundwater and surface water levels. The interim report will assess any adverse impacts on water resources indicated by the monitoring data and propose operational modifications if appropriate. Interim reports will be submitted by the last business day of the following month.

Details of currently installed monitoring wells utilized for the hydrogeologic investigation and to define Site baseline conditions are included in Ransom's Hydrogeologic Report. Upon approval and finalization of the project design plan, details of new monitoring wells will be provided to MEDEP as a monitoring well installation report, either independent or in conjunction with the annual report, to be added as an addendum to the current document.

This reporting schedule will continue until the MEDEP determines that stable steady-state conditions have been obtained without unreasonable adverse impact to existing groundwater users, natural resources or waters of the State and sufficient data exist to define water levels under normal pumping conditions.

5.0 ADDITIONAL INFORMATION

Operational monitoring will provide specific information about the response of groundwater, surface water, and water dependent natural resources to the combined effects of long-term pumping, seasonal variation in precipitation, climatic patterns, individual storm events, and other water uses in the Little River watershed. Following analysis of these data, Nordic may request or the MEDEP may require modifications to the monitoring plan, including but not limited to, increases in monitoring frequency or data evaluation, reduction in monitoring frequency or data evaluation, response and remedial actions, changes to flow rates, or establishment of other performance criteria. This plan should be amended as necessary to reflect changes over time in the monitoring network and hydrogeologic model.

Table 1
Nordic Aquafarms Water Resource Monitoring Program
Monitoring Points Summary Table

Location	Parameter	Frequency
Production Wells		
PW-1	Flow rate, total volume	Monthly (at a minimum)
PW-2 (proposed)	Flow rate, total volume	Monthly (at a minimum)
PW-3 (proposed)	Flow rate, total volume	Monthly (at a minimum)
Bedrock Monitoring Wells		
NTB-101	Water level	Hourly with quarterly data downloads*
NTB-102	Water level	Hourly with quarterly data downloads*
NTB-103	Water level	Hourly with quarterly data downloads*
GWW-101 (PW-1 observation well)	Water level Conductivity	Hourly with quarterly data downloads* Hourly with quarterly data downloads*
GWW-102	Water level	Hourly with quarterly data downloads*
GWW-103 (PW-2 observation well)	Water level Conductivity	Hourly with quarterly data downloads* Hourly with quarterly data downloads*
DRX-101 *(to be decommissioned)*	Water level	Hourly with quarterly data downloads*
DRX-102 (PW-3 observation well)	Water level Conductivity	Hourly with quarterly data downloads* Hourly with quarterly data downloads*
DRX-103 *(to be decommissioned)*	Water level	Hourly with quarterly data downloads*
PSD-101 *(to be decommissioned)*	Water level	Hourly with quarterly data downloads*
PSD-102 *(to be decommissioned)*	Water level	Hourly with quarterly data downloads*
BRK-201 (proposed)	Water level	Hourly with quarterly data downloads*
BRK-202 (proposed)	Water level	Hourly with quarterly data downloads*
Private Water Supply Wells		
WSW-01	Water level Water quality	Every 15 minutes with quarterly downloads* Quarterly testing
WSW-02	Water level Water quality	Every 15 minutes with quarterly downloads* Quarterly testing
WSW-03	Water level Water quality	Every 15 minutes with quarterly downloads* Quarterly testing
WSW-04	Water level Water quality	Every 15 minutes with quarterly downloads* Quarterly testing
WSW-05	Water level Water quality	Every 15 minutes with quarterly downloads* Quarterly testing
WSW-06	Water level Water quality	Every 15 minutes with quarterly downloads* Quarterly testing
P-WSW-07 (proposed)	Water level Water quality	Every 15 minutes with quarterly downloads* Quarterly testing
P-WSW-10 (proposed)	*(Water level not monitored)* Water quality	*(Well design limitations)* Quarterly testing

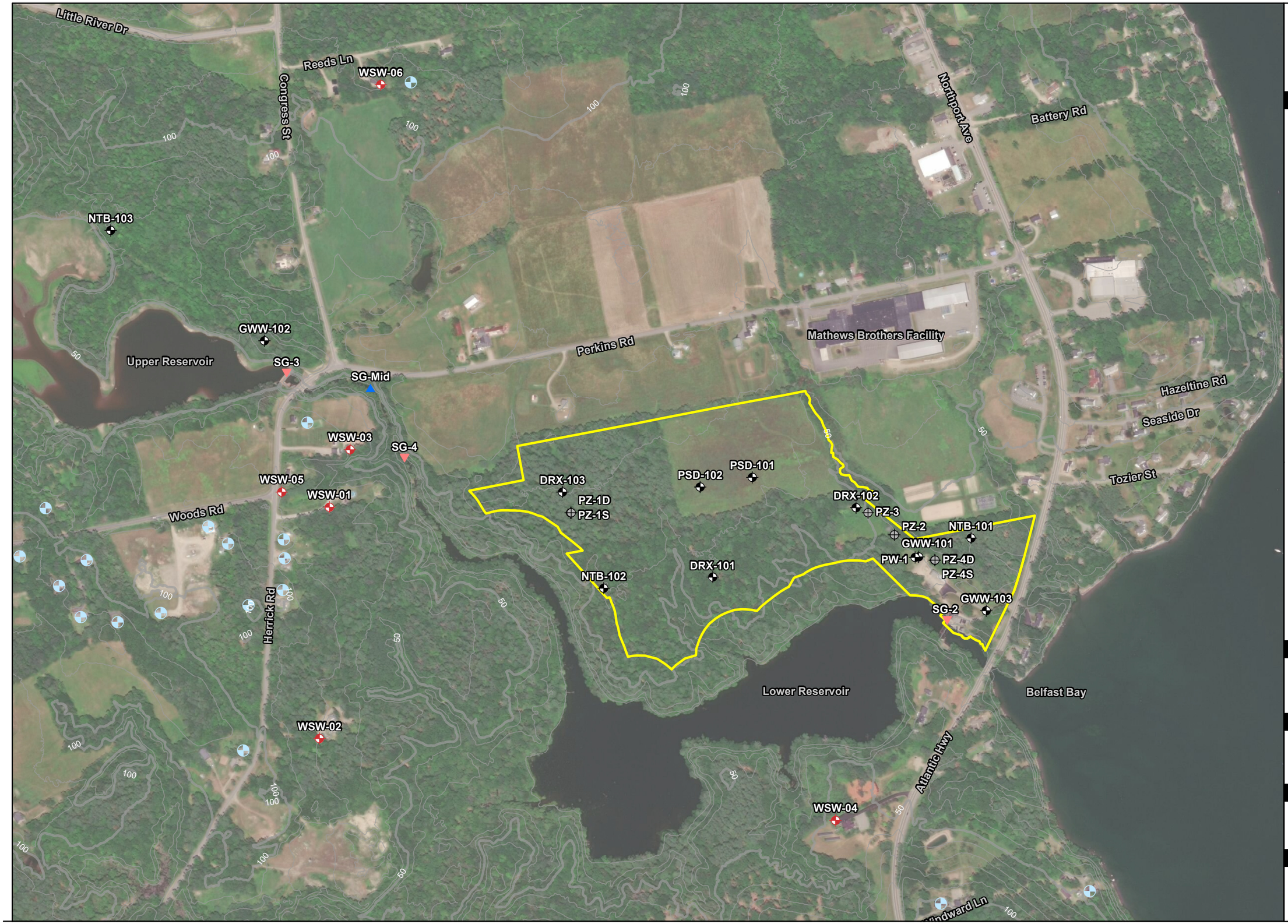
Table 1
Nordic Aquafarms Water Resource Monitoring Program
Monitoring Points Summary Table

Location	Parameter	Frequency
P-WSW-11 (proposed)	Water level Water quality	Every 15 minutes with quarterly downloads* Quarterly testing
P-WSW-12 (proposed)	Water level Water quality	Every 15 minutes with quarterly downloads* Quarterly testing
P-WSW-13 (proposed)	Water level Water quality	Every 15 minutes with quarterly downloads* Quarterly testing
P-WSW-14 (proposed)	Water level Water quality	Every 15 minutes with quarterly downloads* Quarterly testing
P-WSW-15 (proposed)	Water level Water quality	Every 15 minutes with quarterly downloads* Quarterly testing
Overburden Monitoring Wells		
OVB-101 (proposed)	Water level Nitrogen & Phosphorus	Monthly Biannual sampling (spring & fall)
OVB-102 (proposed)	Water level Nitrogen & Phosphorus	Monthly Biannual sampling (spring & fall)
OVB-103 (proposed)	Water level Nitrogen & Phosphorus	Monthly Biannual sampling (spring & fall)
Piezometers		
PZ-1S *(to be decommissioned)*	Water level	Monthly
PZ-1D *(to be decommissioned)*	Water level	Monthly
PZ-2	Water level	Monthly
PZ-3	Water level	Monthly
PZ-4S	Water level	Monthly
PZ-4D	Water level	Monthly
PZ-5 (proposed)	Water level	Monthly
Major Surface Water Stages		
SG-2 (Lower Reservoir)	Water level	Hourly with quarterly downloads**
SG-3 (Upper Reservoir)	Water level	Hourly with quarterly downloads**
SG-4 (Little River)	Water level	Hourly with quarterly downloads**
SG-Mid (Little River)	Flow rate	Monthly, safety and ice dependent
SW-1 (proposed surface water withdrawal - Lower Reservoir)	Flow rate, total volume	Monthly (at a minimum)
Stream Monitoring		
Stream S3	Flow (present/absent) Macroinvertebrates	Monthly Annually (late spring to early fall)
Stream S5	Flow (present/absent) Macroinvertebrates	Monthly Annually (late spring to early fall)
Stream S6	Flow (present/absent) Macroinvertebrates	Monthly Annually (late spring to early fall)
Stream S9	Flow (present/absent) Macroinvertebrates	Monthly Annually (late spring to early fall)

Table 1
Nordic Aquafarms Water Resource Monitoring Program
Monitoring Points Summary Table

Location	Parameter	Frequency
Stream S10	Flow (present/absent) Macroinvertebrates	Monthly Annually (late spring to early fall)
Wetland Biomonitoring		
Wetland W9 MP-1 (proposed)	Vegetation	Annually (growing season)
Wetland W7 MP-2 (proposed)	Vegetation	Annually (growing season)
RP-1 (proposed reference plot)	Vegetation	Annually (growing season)
Weather Station		
Belfast NOAA Station (USC00170480)	Precipitation & Temperature	Daily

*Following significant changes in groundwater extraction rates, such as the start of Phase 1 and start of Phase 2 operations, water level data will be downloaded from transducers on a monthly basis for evaluation.
**If ice conditions are not favorable for transducer installation, monthly manual water level measurements will be recorded.



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Consulting Engineers and Scientists

Legend & Notes

- Site Boundary
- Staff Gage
- Stream Gage-Manual
- Wetland Piezometer
- Monitoring Well
- Private Well-Monitored
- Private Well-Not Monitored Assumed Location

Notes

1. Site Plan based on available orthoimagery
2. Some features are approximate in location and scale.
3. This plan has been prepared for Nordic Aquafarms Inc. All other uses are not authorized unless written permission is obtained from Ransom Consulting, Inc.

Scale & Orientation

0 250 500

1 inch = 500 feet

Prepared For

Nordic Aquafarms, Inc.
159 High Street
Belfast, Maine

Site Address

Belfast Water District Property
285 Northport Avenue
Belfast, Maine

171.05027 | Apr 2019

Figure 1: Existing Monitoring Points

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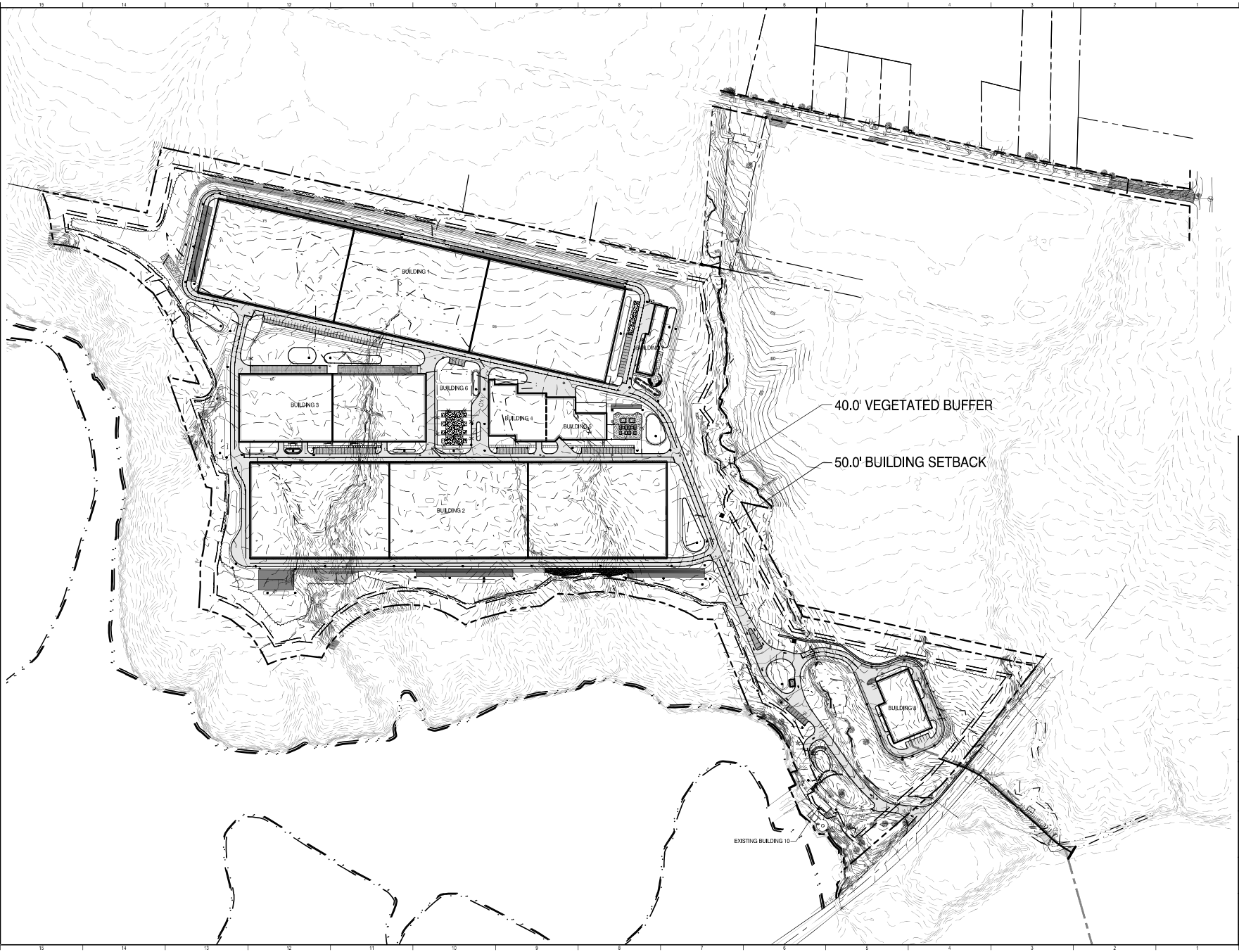
Figure 2



REV	DESCRIPTION	DATE

ISSUED FOR PERMIT - DRAFT
3-15-19

CURRENT ISSUE STATUS:

TRUE NORTH:

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

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

NORDIC AQUAFARMS
285 NORTHPORT AVENUE

BELFAST, MAINE

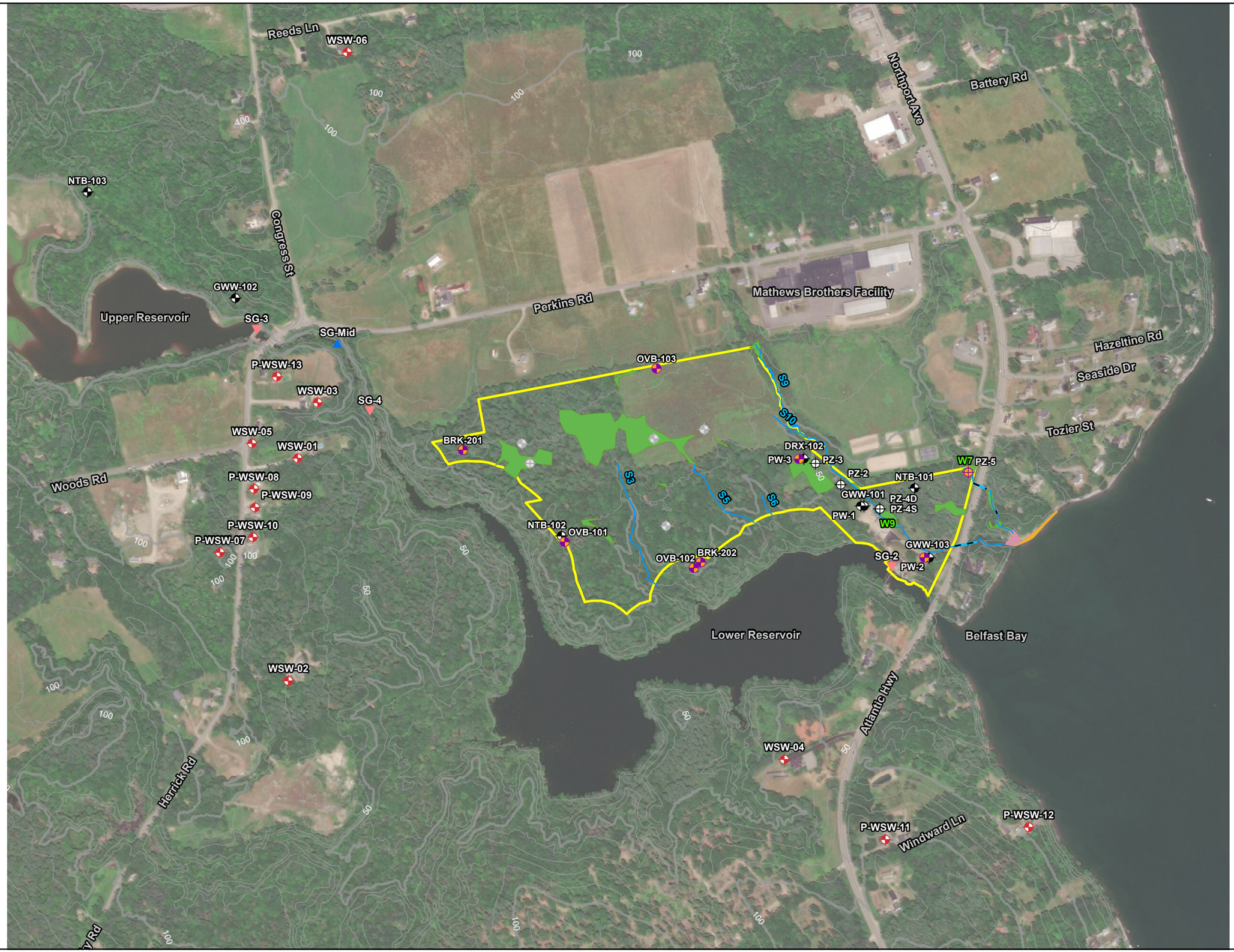
SITE CONTEXT PLAN

SHEET TITLE:

0 60' 120' 240' 360'

PROJECT MANAGER:	ADB	PROJECT NO:	18076
A/E OF RECORD:			
JOB CAPTAIN:	SP		C-102
DRAWN BY:	WSM		
SMRT FILE:	C-102-18076	SHEET No.	

NOT FOR CONSTRUCTION



RANSOM
Consulting Engineers and Scientists

Legend & Notes

- Site Boundary
- Monitoring Well
- Proposed Monitoring Well
- To Be Decommissioned
- Private Well
- Piezometer
- Proposed Piezometer
- Piezometer To Be Decommissioned
- Staff Gage
- Stream Gaging Transect
- Culvert
- Intermittent Stream
- Palustrine Wetlands
- Salt Marsh
- Cobble Beach
- 10-ft contours

Notes

1. Site Plan based on available orthoimagery
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Nordic Aquafarms, Inc.
159 High Street
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Site Address

Belfast Water District Property
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Belfast, Maine

171.05027 | Apr 2019

Figure 3: Proposed Monitoring Points

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APPENDIX A

Standard Operating Procedures

Water Resource Monitoring Plan
Proposed Commercial Land-Based Aquaculture Facility
Belfast Water District, Cassida Back Lot and Mathews Brothers West Field Properties
285 Northport Avenue
Belfast, Maine

Ransom Consulting, Inc.
Project 171.05027

MEDEP Standard Operation Procedures (SOPs)

SOP ID #	SOP Title
RWM-DR-001	Water Sample Collection from Water Supply Wells
RWM-DR-003	Groundwater Sampling Using Low Flow Purging and Sampling for Long-term Monitoring
RWM-DR-012	Chain of Custody Protocol
RWM-DR-028	Monitoring Well Maintenance and Development