23.0 GROUNDWATER

23.1 Location and Maps

The project is located within the Belfast and Searsport United States Geological Survey (USGS) 7.5-minute quadrangles. **Figures 23-1** through **23-3** depict the project boundary relative to the Maine Geological Survey (MGS) Significant Sand and Gravel Aquifer Map (**Figure 23-1**), MGS Surficial Geology Map (**Figure 23-2**), and MGS Bedrock Geology Map (**Figure 23-3**). There are no significant sand and gravel aquifers underlying the project and no bedrock wells are mapped on or immediately adjacent to the project. Surficial geology at the project site is mapped as clay, silt and sand glaciomarine deposits of the Presumpscot Formation. Bedrock geology at the project site is mapped as thinly interbedded metapelite and metasandstone of the Penobscot Formation.

23.2 Groundwater Sources and Quantity

Operation of the project will require the use of freshwater from multiple sources for fish rearing, fish processing, and domestic water use. To identify sources and quantities of freshwater available, Nordic retained Ransom Consulting, Inc. of Portland, Maine to conduct a site-specific hydrogeologic investigation. This investigation included a test well drilling program based on interpretation of a Sitewide electrical resistivity survey, four separate aquifer pumping tests, and development of a numerical groundwater flow model for the Site. Based on the work performed, the project proposes to extract 455 gallons per minute (gpm) of groundwater from the bedrock aquifer underlying the Site from a production well network comprised of three production wells located on the eastern and southeastern portions of the Site. Full details of this investigation are provided in the Hydrogeologic Investigation Report included as **Appendix 23-A**. This report includes discussion of all available freshwater resources to the project, including groundwater extraction, surface water withdrawal from Belfast Reservoir Number One, and available public water supply from the Belfast Water District (BWD), along with potential existing sources of groundwater contamination and anticipated impacts to existing groundwater users and natural resources. As further presented in Section 16, freshwater obtained from on-Site groundwater and surface water sources will be treated and used as process water for fish rearing, while freshwater for food processing and domestic use will be provided by the BWD public water supply.

23.3 Potential Sources of Contamination

As presented in the Hydrogeologic Investigation Report (**Appendix 23-A**), identified potential sources of contamination in the vicinity of the Site are not anticipated to represent a significant threat to groundwater quality at the Site. This conclusion was drawn from an assessment of two ASTM Phase I Environmental Site Assessments conducted in 2018 for different portions of the Site.

Construction and development of the project facility will introduce new potential sources of groundwater contamination. The potential sources of groundwater contamination during construction phases include fuel and hydraulic and lubricating oils used in the operation of vehicles and construction equipment. Similar sources of groundwater contamination present during construction will remain during project operation as employee vehicles and product transport trucks will regularly visit the Site and a backup power generator with independent fuel supply will be part of the facility.

Operational waste streams will include both solid and liquid wastes. Solid waste in the form of domestic waste, water treatment plant sludge and fish processing by-products will be removed from the Site for final reuse or disposal as presented in Section 18. Process wastewater from the RAS tanks and fish processing facility will be piped to a wastewater treatment plant for sterilization, treatment and discharge to Belfast Bay; details of this process have been previously submitted to the Maine Department of

Environmental Protection (MEDEP) as part of a Maine Pollutant Discharge Elimination System (MEPDES) permit application submitted on October 19, 2018. Domestic wastewater will be sent to the municipal wastewater treatment facility through a new sewer extension; additional details are presented in Section 17.

In addition, stormwater runoff from new impervious surfaces, including rooftops and pavement, will accumulate trace amounts of nitrogen and phosphorus. Based on the extent of Site development, the cumulative effect has the potential to impact groundwater quality if stormwater runoff is not properly managed in accordance with the stormwater design provided in Section 12.

23.4 Measures to Prevent Degradation

The procedures proposed to prevent groundwater degradation during construction of the project are incorporated into the erosion and sedimentation control requirements described in Section 14 and the accompanying erosion and sediment control plan sheets. In addition, the construction contractor will be required to provide a site-specific Spill Prevention, Control, and Countermeasures (SPCC) Plan to be submitted to the MEDEP prior to construction. This SPCC Plan will include procedures to ensure protection of groundwater, including training of on-site personnel to prevent, respond to, and report spills, and routine equipment inspection and maintenance.

Prior to the commencement of facility operations, an operational SPCC Plan will be developed by Nordic and submitted to the MEDEP for review to ensure risks of adverse groundwater impacts from spills are minimized. All chemicals stored at the site, including cleaners, therapeutants, and water treatment products, will adhere to safe storage guidelines and applicable spill protocols to be included in the operational SPCC plan. Project design stormwater management procedures, including stormwater treatment design, are described in Section 12.

To assess the effectiveness of groundwater degradation prevention measures and ensure adverse impacts to existing groundwater users, natural resources and waters of the State are not caused by the development or proposed groundwater extraction, a monitoring program will be implemented. The program will include monitoring of production wells, bedrock monitoring wells, private water supply wells, overburden monitoring wells, piezometers, surface water stages, wetlands, streams, and weather as detailed in the Water Resource Monitoring Plan included as **Appendix 23-B**.

23.5 Conclusion

In summary, the location of the project at the base of the Little River watershed, where it empties into Penobscot Bay, and the local usage of a municipal water supply greatly reduces the risk of adverse impacts from groundwater extraction and potential contamination that would adversely impact the public or natural resources.

Appendix 23-A

Hydrogeologic Investigation Report

Appendix 23-B

Water Resource Monitoring Plan Ransom