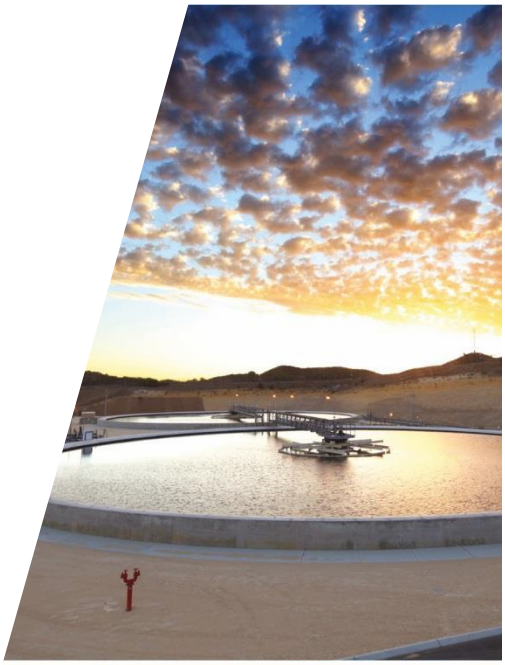


Executive Summary
Project Description

Boat Harbour Remediation Project

Nova Scotia Lands Inc.

Executive Summary

The Boat Harbour Effluent Treatment Facility (BHETF), located in north central Nova Scotia on the Northumberland Strait (latitude 45º39'48" longitude 62º39'4"), was constructed in 1967 and reconfigured several times since its construction. The use of the BHETF for the reception and treatment of effluent from the Kraft Pulp Mill must cease no later than January 31, 2020, in accordance with the *Boat Harbour Act*. Boat Harbour, known as A'se'k in Mi'kmaq, was originally a tidal estuary connected to the Northumberland Strait and is currently a closed effluent stabilization basin, operating under a lease agreement with the Province by the Kraft Pulp Mill owner. Once operations have ceased, the Province will remediate Boat Harbour, and lands associated with the BHETF, and restore Boat Harbour to a tidal estuary. This is the subject of this study, referred to as the Boat Harbour Remediation Project (the Project or BHRP), for which Nova Scotia Lands Inc. (NS Lands) is the Proponent. The primary representative for the purpose of the Project Description is Angela Swaine, Senior Project Manager, who can be reached by email at Angela.Swaine@novascotia.ca.

The main components of the BHETF include: the wastewater effluent pipeline (over 3 km in length) that runs from the Kraft Pulp Mill and extends eastward, below the East River of Pictou (East River), to the BHETF property; twin settling basins and an Aeration Stabilization Basin (ASB) west-southwest of Boat Harbour; and the stabilization lagoon (Boat Harbour). Effluent from Boat Harbour discharges through a dam (northeast of Boat Harbour) into an estuary before being released to the Northumberland Strait. Prior to the construction of the twin settling basins and ASB, effluent was routed by open ditch from the pipeline on the east side of Highway 348 to a natural wetland area (Former Ponds 1, 2, and 3) before being discharged into the stabilization lagoon.

Under current operating conditions, the Industrial Approval allows for up to 75,000 m^3 of wastewater is discharged from the Kraft Pulp Mill to the BHETF daily. Wastewater is conveyed by the wastewater effluent pipeline and raw effluent ditch to the twin settling basins where partial removal of suspended solids occurs. One settling basin is used at a time (duty basin), while the other basin is dewatered and previously settled solids are removed from the basin and transported off-Site to the Kraft Pulp Mill for disposal. An automated nutrient addition system adds urea and diammonium phosphate to the effluent as it is conveyed through a second effluent ditch to the ASB. Floating aerators are used to aerobically treat the effluent within the ASB prior to discharge into Boat Harbour. The ASB discharge point to Boat Harbour (Point C) is governed by the discharge criteria specified in the BHETF Industrial Approval (IA) (No 2001-076657-A01). As the effluent flows through the dam from Boat Harbour into the estuary, it is monitored at Point D in accordance with the IA.

The 6.7 ha sludge disposal cell is located southeast of the ASB and has a total capacity of 220,000 m^3 (waste). As shown on Figure 1, the sludge disposal cell is located on provincially-owned lands, and is surrounded by undeveloped mixed woodlands and Indian Reserve Lands (including IR37 to the south and IR24G to the east). Access to the sludge disposal cell is via a single lane gravel roadway off the ASB perimeter road. The sludge disposal cell is secured by a perimeter fence with an access gate in the northwest corner. The sludge disposal cell is operated under IA No. 94-032. Leachate generated in the sludge disposal cell is currently returned to the ASB via the decant and leachate collection systems. The existing leachate contains elevated concentrations of

select metals[1] as compared to criteria[2], including barium, cadmium, copper, lead, nickel, selenium, silver, and zinc.The Study Area for the Project spans from the effluent pipeline, described above, from the first standpipe on the mill property, through existing and historic BHETF lands, Boat Harbour and its banks, extending to the Northumberland Strait. The Study Area is shown on Figure 1 attached. Land ownership is comprised of private, federal, and provincial ownership. The total Site area is approximately 546 ha, of which 141 ha is Boat Harbour. The Site and surrounding properties are not zoned, according to the (Draft) Pictou County Land Use By-Law, dated May 6, 2014. The southern portion of the Pictou Landing First Nation (PLFN) land within the Study Area, however, is zoned as "Forest Management Area" and the northern portion, containing residences, is zoned "Residential", according to the Pictou Landing Band By-Law No. 1.

The nature and extent of contamination at the Site has been determined by GHD through the completion of Phase 1, 2, and supplemental Phase 2 Environmental Site Assessments, as well as a number of studies completed by others. Samples of the Kraft Pulp Mill raw effluent (collected both during production and while under routine maintenance) were compared to applicable Provincial or Federal surface water criteria, as well as Provincial or Federal human health criteria for drinking water. Results indicated both PCBs and dioxins and furans were below the applicable criteria, while metals exceed the marine criteria for barium, boron, cadmium, copper, lead, mercury, and zinc. Metals parameters reported to exceed the Provincial human health criteria were sodium and vanadium.

The BHETF contains approximately 1,000,000 m^3 of unconsolidated contaminated sludge/sediment including approximately 385,000 m^3 unconsolidated sludge/sediment within Boat Harbour. The sludge layer in Boat Harbour is an average of 20 cm thick, with thickness ranging from 10 cm to 1 m or more. Once consolidated through dewatering, the total dewatered sludge/sediment volume to be managed is estimated to be between 312,500 and 517,700 m^3. It is estimated that sludge accumulates in Boat Harbour at a rate of approximately 4 mm per year under normal BHETF operation. The wetlands contain approximately 260,000 m^3 of sludge and root mass with an estimated thickness of 0.3 m over the impacted wetland area. For Project planning and approval purposes, the proponent will seek approval for a total capacity of 660,000 m^3, which represents the total air space available for the disposal of waste without expanding the footprint of the sludge disposal cell. The sludge is impacted with metals, polycyclic aromatic hydrocarbons (PAHs), and dioxins/furans (D&F). In addition to management of sludge/sediment, an estimated 5,700,000 m^3 of water will need to be treated during remediation prior to discharge.

The remedial solution for the BHETF includes the following:

- Management of residual mill effluent within the BHETF
- Management and removal, treatment, and disposal of impacted sediments/sludge and dewatering effluent from former effluent ditch, twin settling basins, ASB, and Boat Harbour stabilization lagoon

1 Sludge Disposal Cell – Boat Harbour Effluent Treatment Facility, 2015 Monitoring Report, March 2016.

2 Criteria is most stringent value of NSE Tier 1 EQSs for Surface Water (Marine) and CCME Water Quality Guidelines for the Protection of Aquatic Life (Marine). For TEQ (dioxins and furans) based on NSE Tier 1 EQS for Groundwater (Potable Groundwater Values).

- Risk management and/or removal, treatment, and disposal of impacted sediments/sludge in the natural wetlands and estuary
- Risk management and/or removal, treatment and disposal of impacted soil and surface water
- Vertical expansion, modification, use and closure of the existing sludge disposal cell
- Decommissioning of BHETF infrastructure including the pipeline, causeway, dam, and support facilities
- Restoration of Highway 348 including construction of a bridge in the location of the existing causeway

Bench scale testing has been completed to assess and determine applicable treatment methods, and pilot scale testing is ongoing to refine treatment methods, production rates, and potential emissions during remediation. Detailed design of the remedial solution will be completed mid to late 2019. The proposed remediation activities are estimated to be completed in 5-7 years commencing at earliest in 2020.

The closure of the BHETF operations and remediation of BHETF will result in a significant reduction in emissions, discharges, and wastes compared to current operations. Under current conditions, up to 75,000 m^3 of wastewater is conveyed to the BHETF daily [27 million m^3 annually]. Through the treatment system solids are settled out in the settling basins, ASB and BH. It is estimated that approximately 5,400 m^3 of sludge settled out in the ASB annually is transferred to the sludge disposal cell annually. It is also estimated that 4 mm of sludge accumulated on the floor of BH annually. Pretreated wastewater is discharged to the estuary at a rate equal to the inflow. During remediation approximately 1,000,000 m^3 of unconsolidated contaminated sludge/sediment including approximately 385,000 m^3 unconsolidated sludge/sediment within Boat Harbour will be removed, dewatered and placed in the sludge disposal cell. In addition to management of sludge/sediment, an estimated 5,700,000 m^3 of water will need to be treated during remediation prior to discharge to the estuary. Post remediation it is estimated at less than 2,500 m^3 of leachate will be generated per year.

Over a 25-year operating period the BHETF is estimated to generate 368,580 tonnes of carbon dioxide equivalent (CO_2e) from direct sources and energy indirect sources, while over the 25-year remediation and post-remediation period [comprised of 5-7 years remediation and 17-20 post remediation] the emissions generated are estimated to decrease by 85 percent to 53,500 tonnes CO_2e over the 25 year period.

Under the Nova Scotia *Environment Act*, Schedule A of the Environmental Assessment Regulations lists Designated Undertakings that will be subject to an Environmental Assessment. It has been determined by the Minister of Environment that the Project is a rehabilitation of an undertaking and is required to register as a Class II undertaking.

Under the *Canadian Environmental Assessment Act, 2012* (CEAA 2012), an environmental assessment may be required of designated projects. A designated project includes one or more physical activities that are listed in the Regulations Designating Physical Activities as well as any physical activity incidental to those listed physical activities. The current *Regulations Designating Physical Activities (which are subject to ongoing consultation and may change in the future)* includes the following Item that may apply to the proposed undertaking:

***30**. The expansion of an existing facility used exclusively for the treatment, incineration, disposal or recycling of hazardous waste that would result in an increase in hazardous waste input capacity of 50% or more.*

The Project will involve the vertical expansion and refurbishment of an existing on-Site sludge disposal cell to accept sludge/sediment, construction and demolition debris, and industrial waste generated as a result of the proposed Project. The sludge disposal cell was constructed and approved in 1995 to accept the sludge from the BHETF. The sludge disposal cell has received approximately 188,000 m^3 of unconsolidated sludge to date (estimated 129,000 m^3 once fully dewatered) and has been assessed during the Phase 2 Environmental Site Assessment, as having functional integrity. It will require planned refurbishment for liner and leachate collection systems and vertical expansion to increase air space available for the disposal of wastes generated during remediation.

Refurbishment will be completed in two or more sequences to accommodated disposal of new waste and management of the existing sludge within the sludge disposal cell. The majority of the sludge will be pumped into geotubes located in the sludge disposal cell and will dewater by gravity over time, with the addition of optimizing chemicals (i.e., polymer, coagulant, lime). Mechanically excavated sludge would be placed in a dump truck and end dumped into the sludge disposal cell. End dumped sludge would be deposited in lifts of approximately 1-3 m, followed by compaction to maximize sludge disposal cell air space, and used to fill the gaps between the filled geotube bags. Leachate would be managed via the leachate collection system. During the remediation period, liner and leachate collection system performance will be monitored and the infrastructure will be maintained through routine cleaning. Once remediation of the BHETF is completed, including dam decommissioning, and all wastes are placed in the sludge disposal cell, the sludge disposal cell will be completed with final cover. The final cover contours will be designed to accommodate the final waste volumes, minimize precipitation infiltration through the cap, control the release of landfill gas, and accommodate end use. As part of sludge disposal cell closure, infrastructure for long-term monitoring and care of the sludge disposal cell will be constructed. This will include required groundwater and leachate monitoring wells, gas monitoring probes, surface water monitoring station, perimeter fencing, signage as needed and access road for long-term maintenance and inspection. A truck loading station will be constructed to facilitate off site disposal of leachate generated within the disposal cell at a licenced facility.

Accidents and malfunctions refer to events that are not part of any Project activities that have been proposed. Many accidents and malfunctions are preventable and their probability and impact can be severely limited by applying a precautionary approach during planning and design, developing thorough emergency response procedures, and ensuring mitigation measures are incorporated into standard operating procedures. Potential accidents and malfunctions that could occur during transportation of the remediated wastes to the sludge disposal cell include fuel and hazardous material spills, erosion and sediment control failure, mobile equipment accident, forest and/or site fires. With respect to accidents and malfunctions in relation to the management of the sludge disposal cell, implementation of standard operating procedures will ensure that emergencies, accidents and malfunctions and the potential for the environment to affect the project are addressed. The sludge disposal cell and associated infrastructure will be inspected on a regular basis and repairs completed as needed. Contingency plans and standard operating procedures

may address events/situations including, but not limited to, leachate seeps/leachate system failure/ spills/ slope failure, natural disasters, and accidents and injuries. PLFN is a Mi'kmaq First Nation located at the mouth of Pictou Harbour on the Northumberland Strait of Nova Scotia. The Mi'kmaq people have a long-existing, unique, and special relationship with the land and its resources, which involves the use and conservation of natural resources and spiritual ideologies. PLFN has a long standing history of concern related to the effluent flowing from the Kraft Pulp Mill to Boat Harbour, known as A'se'k, that later became the site of the BHETF. PLFN was instrumental in negotiating with the Province of Nova Scotia to close the treatment facility, which was embodied in the *Boat Harbour Act* in 2015.

A Mi'kmaq Ecological Knowledge Study (MEKS) was conducted by Membertou Geomatics Solutions. The Study found that Mi'kmaq land and resource use was reported on the Project site, and that hunting and gathering were found to be the most common activities described as occurring. Within the broader Study Area, hunting, fishing, and gathering were the most commonly reported activities. All activities were recounted as taking place in the recent and long-term past. Current use is limited mainly to fur-bearing creatures as species of harvest. Recreational aquatic activities such as swimming and canoeing are reported as having been historically common in the waters surrounding PLFN in Pictou Harbour, Chance Harbour, Boat Harbour, and other local waters.

Archaeological assessment work was also carried out. The Project Study Area contains known and potential sites of significance and recorded archaeological sites in the Provincial registry. All aspects of the project planning carefully consider the known and potential sites with appropriate studies completed in any area where land disturbance has or will occur as part of the Project.

Through the proposed remediation Project, it is PLFN's hope that A'se'k be restored to allow the community to re-establish its relationship with the water and land of A'se'k. In this regard, the Project's effects on health, socio-economic conditions, and physical and cultural heritage as a result of changes caused through remediation activities are net positive in relation to PLFN.

Preliminary discussion of potential federal funding has taken place and a provincial submission has been filed with Infrastructure Canada for funding under the Investing in Canada Infrastructure Program (ICIP). In support of the funding submission, Climate Change Resilience and Greenhouse Gas Mitigation Assessments were completed.

Federal Permits may be required for implementation of the Project as follows:

- Fisheries and Oceans Canada: Approval under the *Fisheries Act* may be required for works that have the potential to result in serious harm to fish including decommissioning of the pipeline underwater, decommissioning of the dam, removal of sediments in the wetlands and estuary, and construction of the bridge at Highway 348.
- Transport Canada: Approval under the *Navigation Protection Act* may be required for decommissioning of the dam, and works within the marine environment such as sediment removal in the estuary, if needed. In addition, compliance with the *Transportation of Dangerous Goods Act* will be required for the movement of liquid and solid wastes off-Site.

- Environment and Climate Change Canada: The *Migratory Birds Convention Act* and the *Species at Risk Act* are applicable in relation to terrestrial flora and avian species and habitat protection for all Project activities.
- Indigenous Services Canada approval, in conjunction with Pictou Landing First Nation's consent by Band Council Resolution, is required for access to and the conduct of assessments, investigations and remediation activity, if any, on federal crown lands.

Environmental baseline studies were carried out to establish the physical and biological setting at the Site as part of the Environmental Assessment. The baseline study program was developed following a workshop with the regulatory agencies. Studies included: Land; Water; Terrestrial and Aquatic Ecosystems; Species at Risk Act (SARA) Listed Species; Terrestrial Habitat and Vegetation; Wetlands; Water Course/Aquatic Habitat; Mammals and Wildlife; Birds; Archeological/Cultural Heritage Resources; and Economic and Social.

The remediation activities proposed would effectively reduce or eliminate the potential for unacceptable risk of contaminants to ecological receptors by removing the exposure pathway. However, the remediation activities would cause potential short-term impacts to the existing habitat including, changes to fish and fish habitat, as defined in the Fisheries Act; marine plants, as defined in the Fisheries Act; and, migratory birds, as defined in the Migratory Birds Convention Act, 1994. It should be noted that as the proposed Project is the remediation of BHETF and subsequent return to a tidal estuary condition, the long-term changes to fish and fish habitat, marine plants, and migratory birds will be positive.

One of the main concerns with respect to potential short-term effects to the environment is related to placing and storing of the impacted dredged sediment. The expansion of the existing sludge disposal cell and the modifications to the leachate collection and sludge disposal cell liner system will allow for the controlled and effective management of the impacted sediment and materials that are classified as hazardous waste. Impact management measures will be implemented to reduce the potential impacts of the placement and storage of hazardous waste-bearing sediments.

Remediation of Boat Harbour has the potential to cause changes to federal lands, within the Province of Nova Scotia, but is not expected to cause interprovincial effects or any effects outside of Canada. With respect to changes to federal lands, while some of the project components are located within and will interact with Federal lands, the sludge disposal cell itself (which relates to the designated physical activity under the Regulation) is not located on Federal lands. Best management practices and monitoring programs will be implemented to mitigate the potential effects caused by the placement and storage of the impacted sediment in the existing sludge disposal cell to the nearby federal lands.

Remedial efforts to remove the impacted sediment and material to the placement and storage facility may have short-term impacts to the PLFN’s community through increased noise, light and potentially odours. All of these possible negative aspects will be mitigated through techniques typical of construction and sludge removal projects and are anticipated to be effectively managed. The anticipated long-term environmental changes resulting from carrying out the Project on aboriginal peoples are positive, as the remediation of Boat Harbour will address the current sediment contamination and enable the return of Boat Harbour to a tidal estuary. This will allow the land to be re-established as an area used for traditional recreation, fishing, hunting and gathering,

as well as for physical, mental, spiritual and emotional purposes by the Mi'kmaqThe loss of A'se'k over 50 years ago was devastating to the community. The long-term storage of impacted sediment and material in the facility may not completely mitigate this issue but a clean Boat Harbour is a positive improvement over existing conditions.

The existing level of knowledge associated with the remediation of Boat Harbour is high within communities in Pictou County, Nova Scotia. The pipeline breach in 2014 and subsequent *Boat Harbour Act* in 2015, were well reported and a high level of engagement by various communities and groups occurred prior to and subsequent to the *Boat Harbour Act* proclamation.

As Chief of PLFN, Andrea Paul has the delegated authority of the Nova Scotia Mi'kmaq to speak on Boat Harbour. As such, engagement, consultation, and Mi'kmaq participation in the Project is focused on the PLFN community.

NS Lands has implemented a robust engagement program with PLFN since 2014. Engagement components include:

- Funding a full time Community Liaison Coordinator from PLFN, commencing in April 2016. The Community Liaison Coordinator is in the community full time with a focus on providing Project information and facilitating Project information flow. In November 2017, the Province funded two additional full time support staff to assist the Community Liaison Coordinator with the development and implementation of PLFN specific community activities focused on information and knowledge sharing between PLFN Band members, NS Lands, GHD, and the Independent Project Monitor for air quality.
- Establishing a Boat Harbour Clean-up Committee (BHCC), which is led by the NS Lands Project Leader and the Chief of PLFN and comprised of selected Band council members and PLFN community members as well as representatives from NS Lands and the Nova Scotia Office of Aboriginal Affairs. The BHCC typically meets on a monthly basis since May 2015. The Boat Harbour Steering Committee preceded the BHCC and began meetings in August 2014 with the objective of determining a timeline for closure of Boat Harbour to industrial effluent.
- Participation of the PLFN Community Liaison person and other members of the PLFN community in the Boat Harbour Environmental Advisory Committee (BHEAC). The BHEAC is led by NS Lands with participation of federal and provincial regulators and advisors, academia, NS Lands, and GHD. The BHEAC typically meets on a monthly basis since January 2016.

NS Lands initiated formal consultation with the Mi'kmaq of Nova Scotia under the August 31, 2010 Mi'kmaq-Nova Scotia-Canada Consultation Terms of Reference, which included the provision of the Remedial Options Decision Document for their review. NS Lands received formal correspondence from the Mi'kmaq of Nova Scotia, because of the consultation, on May 31, 2018.

NS Lands finalized and presented specific remedial options relative to each Project component to the Nova Scotia Executive Council on August 9, 2018. The remedial options presented to Executive Council considered the Remedial Options Decision Document, the positions laid out in the formal correspondence from the Mi'kmaq of Nova Scotia arising from the consultation, and the analysis of the Proponent Project Team. This Project Description incorporates direction subsequently received from Nova Scotia Executive Council.

Furthermore, GHD on behalf of NS Lands prepared a PLFN Engagement Plan, which outlines the proposed engagement activities including stakeholder management, engagement communications materials, in-person events, and reporting. Implementation of the PLFN Engagement Plan is a joint responsibility with NS Lands and PLFN Community Liaison, with technical support from GHD.

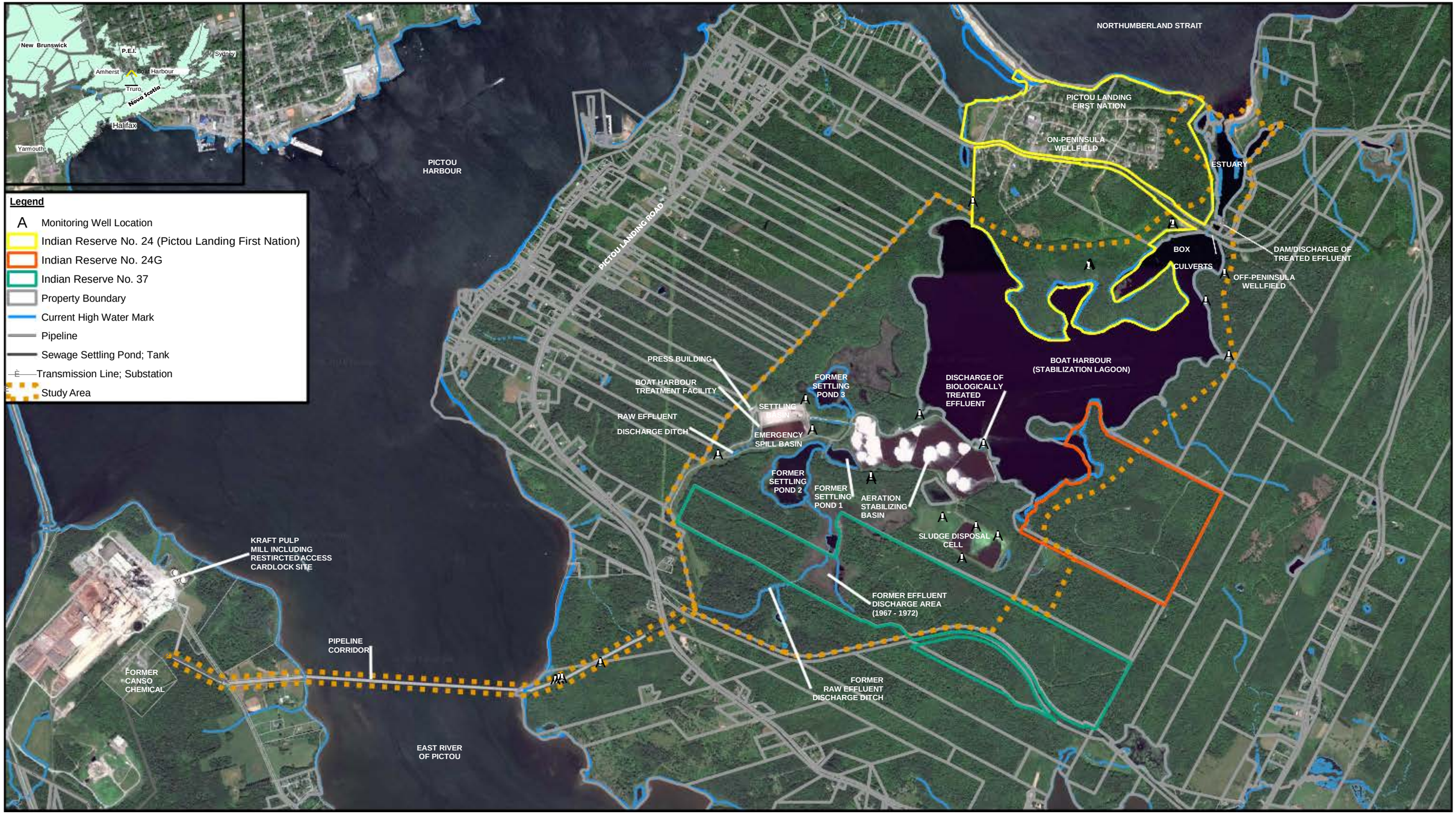
PLFN primary concerns are related to use of the existing sludge disposal cell, based on engagement/consultation activities completed to date.

During the planning, design, and regulatory processes relative to the approval of pilot scale testing activities, NS Lands has held three public meetings with the broader community in October 2016, April 2018, and May 2018. NS Lands has also engaged with industry stakeholders to explain and discuss Project direction and plans including Northern Pulp Workforce, Northern Pulp Executive, Northumberland Fishermen's Association, and Environmental Services Association Maritimes.

During preparation of the PD, two workshops were held with representatives from the following agencies to introduce the Project and discuss their roles in the Project going forward:

- Nova Scotia Office of Aboriginal Affairs
- Fisheries and Oceans Canada
- Canadian Environmental Assessment Agency
- Environment and Climate Change Canada
- Nova Scotia Environment
- Nova Scotia Transportation and Infrastructure Renewal
- Nova Scotia Department of Lands and Forestry
- Transport Canada
- Health Canada
- Indigenous Services Canada

This Project Description has been prepared to fulfill the requirements of subsection 8(1) of CEAA 2012, to submit a description of the designated Project to the Canadian Environmental Assessment Agency that includes information prescribed by applicable regulations (*Prescribed Information for the Description of a Designated Project Regulations*) to inform the decision on whether a federal environmental assessment of the Project is required.



Source: Imagery @2017 Google CNES / Airbus, DigitalGlobe, Landsat / Copernicus

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Meters

Coordinate System:
NAD 1983 CSRS UTM Zone 20N

NOVA SCOTIA LANDS INC
BOAT HARBOUR, NS
PROJECT DESCRIPTION DOCUMENT

11148275-12
Dec 3, 2018

STUDY AREA

FIGURE 1

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