Wabush Mines,
Scully Mine Division

Decommissioning and Rehabilitation of Wabush Mines Scully Mine – Wabush, NL

Environmental Assessment Registration

Pursuant to the Newfoundland & Labrador Environmental Protection Act (Part X)

Prepared for:
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TF1529019

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

1.0 INTRODUCTION

Project Name: *Decommissioning and Rehabilitation of Wabush Mines, Wabush, NL*

Wabush Mines, Scully Mine Division (Wabush Mines) is located in Wabush, Newfoundland and Labrador. The development of Wabush Mines began in 1957 and the mine was operated from 1965 to 2014. On February 11, 2014, operations at Wabush Mines were ceased due to economic factors and financial performance. For most of 2014 the site was preserved in a "warm idle" state while strategic options were reviewed. On November 12, 2014, the Department of Natural Resources (DNR) were informed of the decision to officially close Wabush Mines.

Wabush Mines is proposing to decommission and rehabilitate the mining and milling facility and infrastructure in accordance with its draft Rehabilitation and Closure Plan, 2015, which was submitted in September 2015 to DNR for review and acceptance. A Rehabilitation and Closure Plan, 2014 had been reviewed and accepted by the DNR and the Department of Environment & Conservation (ENVC) in late 2014. ENVC informed Wabush Mines on February 9, 2015 that the Decommissioning and Rehabilitation of Wabush Mines (the Project) is required to be registered for Environmental Assessment (EA) under Part X of the *Environmental Protection Act*. This *Environmental Assessment Registration* has been prepared in relation to the proposed Project by Wabush Mines, with assistance from Amec Foster Wheeler Environment & Infrastructure.

1.1 Nature of and Rationale for the Undertaking

Wabush Mines is a conventional open pit mining operation located in the southwest corner of Labrador approximately three kilometres from the Town of Wabush as shown in Figure 1-1. The mine pits are located west of the Town of Wabush and south of the Town of Labrador City and are accessed via the plant access road off Hwy 530. The tailings management area (Flora Lake) is situated east of the Town of Wabush. The ore deposit covers an area of approximately 23 square kilometres (km^2). Wabush Mines consists of open pit mines, a concentrator and support processing facilities, waste rock and tailings management facilities and a spur railway line that connects to the Quebec North Shore and Labrador (QNS&L) Railway. Until the time of closure, the site had an annual production capacity of 5.6 million tonnes of iron concentrate, which was shipped on the QNS&L Railway to Wabush Mines facilities in Pointe Noire, Quebec, and then shipped throughout North America and Europe. Approximately 500 persons were employed at its mining and processing operations in Western Labrador.

Since closure of the mine in November 2014, staff numbers have been reduced and early stage implementation of the Project has begun in the form of shutting off power to the buildings, the removal of pumps and related infrastructure from the open pits and subsequent start of the flooding of the pits, revegetation of exposed tailings and securing the site to prevent unrestricted access. The latter two activities are consistent with stated expectations of ENVC to perform activities to enhance environmental quality and public safety in advance of satisfying the EA requirements. Wabush Mines is committed to fully implementing the 2015 Rehabilitation and Closure Plan and rehabilitating the site to a condition that protects public safety and health, and that is compatible with the intended future land use.

Wabush Mines plans to decommission the site and rehabilitate the land in a safe and environmentally sound manner to achieve the following objectives, as stated in its 2015 Rehabilitation and Closure Plan for the site:

- Restore affected landscapes to a physically and chemically stable and safe environment, in order to protect public health and safety;
- Reduce or eliminate potential adverse environmental effects associated with each phase of the Project;
- Create a post closure site where no permanent water treatment or other operational measures are necessary to ensure that acceptable water and air quality will continue, in perpetuity; and
- Return the property to the Crown after monitoring demonstrates closure objectives have been met.

The rehabilitation work that will be carried out will result in overall improvements to air and water quality in the immediate vicinity of the site and will enhance the ecological value and potential of the altered site.

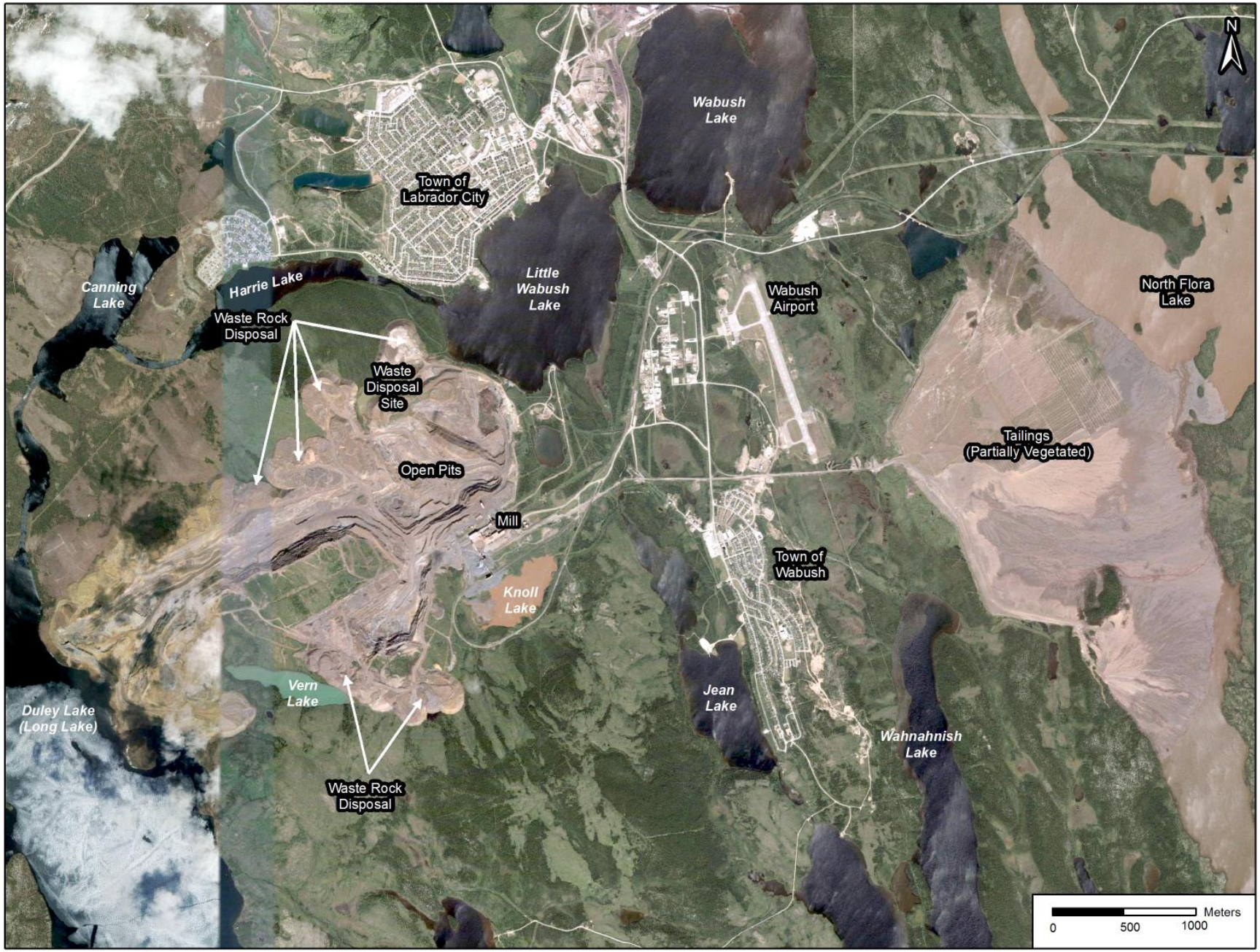

Figure 1-1 Project Site Layout

1.2 Identification of the Proponent

Wabush Mines is owned by Cliffs Natural Resources whose wholly-owned subsidiary, Cliffs Mining Company, manages the Wabush Mines operation.

Name of Corporate Body: Cliffs Natural Resources

Corporate Address:
200 Public Square, Suite 3300
Cleveland, OH 44114
United States

Labrador City Operations Address: PO Box 3000, Wabush, NL Canada A0R 1B0

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Principal Contact Person for the Purposes of Environmental Assessment:
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1.3 Environmental Assessment Process and Requirements

The *Newfoundland and Labrador Environmental Protection Act* (NL EPA, Part 10) requires anyone who plans a project that could have a significant effect on the natural, social or economic environment (an "Undertaking") to present it for examination through the provincial EA process. The associated *Environmental Assessment Regulations* (Part 3) list those projects that require registration and review.

Under the NL EPA (definitions), an Undertaking "includes an enterprise, activity, project, structure, work or proposal and a modification, **abandonment, demolition, decommissioning, rehabilitation** and an extension of them that may, in the opinion of the minister, have a significant environmental effect" (emphasis added).

Following public and governmental review of this EA Registration, the Minister of Environment and Conservation will determine whether the Project may proceed, subject to any terms and conditions and

other applicable legislation, or whether further assessment is required.
The *Canadian Environmental Assessment Act (CEAA 2012)* is the legislative basis for federal EA in Canada. As per Section 5 of CEAA 2012, a federal environmental assessment focuses on potential adverse environmental effects that are within federal jurisdiction, including on

- fish and fish habitat,
- other aquatic species,
- migratory birds,
- federal lands,
- effects that cross provincial or international boundaries,
- effects that impact on Aboriginal peoples, such as their use of lands and resources for traditional purposes, and
- changes to the environment that are directly linked to or necessarily incidental to any federal decisions about a project.

The Minister of the Environment may also designate a project that is not currently listed in these Regulations if there is the potential for environmental effects in areas of federal jurisdiction or public concerns about such effects. This Project is not expected to trigger federal EA.

2.0 PROJECT DESCRIPTION

The following section provides greater detail on the Project including its location, main components and the various activities that will be associated with it.

2.1 Geographic Location and Site Layout

The Wabush Mines property is located in the southwest corner of Labrador approximately three kilometers from the Town of Wabush as shown in Figure 1-1. The mine is located in an area of undulating hills that reach elevation heights of 686 metres (m) and low lying areas with elevations of approximately 533 m. The ground cover consists of barren rock, marsh and coniferous forests. There are several lakes surrounding the mine site; they include Jean Lake, Knoll Lake, Flora Lake, Wahnahnish Lake, Little Wabush Lake, Harrie Lake, Vern Lake and Long/Duley Lake.

The mine pits are located west of the Town of Wabush and south of the Town of Labrador City and are accessed via the plant access road off Hwy 530. The tailings management area (Flora Lake) is situated east of the Town of Wabush. Figure 1-1 shows the location of the Project relative to Wabush and Labrador City.

The boundaries of the disturbed areas at the open pits and at the Flora Lake tailings management areas are shown in Figure 2-1 and Figure 2-2.

2.2 Land Ownership

The Project area is located entirely within the boundaries of the mine operating site and the Project is taking place on land that is covered by mining leases as shown in Figure 2-3.

2.3 Alternatives to the Project

Prior to closing Wabush Mines, the site was maintained in a warm idle state from February until October 2014 while strategic options were reviewed and alternatives to closure were searched for by the owner that would allow the mine to continue operating. Alternatives to closure were examined including:

- The sale of Wabush Mines to MFC Industrial, a global commodity supply chain company which has had a royalty stream from Wabush Mines since 2010. MFC expressed interest in purchasing Wabush Mines but negotiations to reach an agreement, as of October 2015, have been unsuccessful.

- Restarting the mining operation if the value of iron concentrate increased. The value of iron has further decreased since the closure.

- The undertaking of an international sales campaign in April and May 2015 to determine if there were any serious interests from mining or investment companies in acquiring Wabush Mines. This effort did not result in any offers to purchase or operate the mine.

- Any positive results from the search for new ownership could result in changes to the Project.

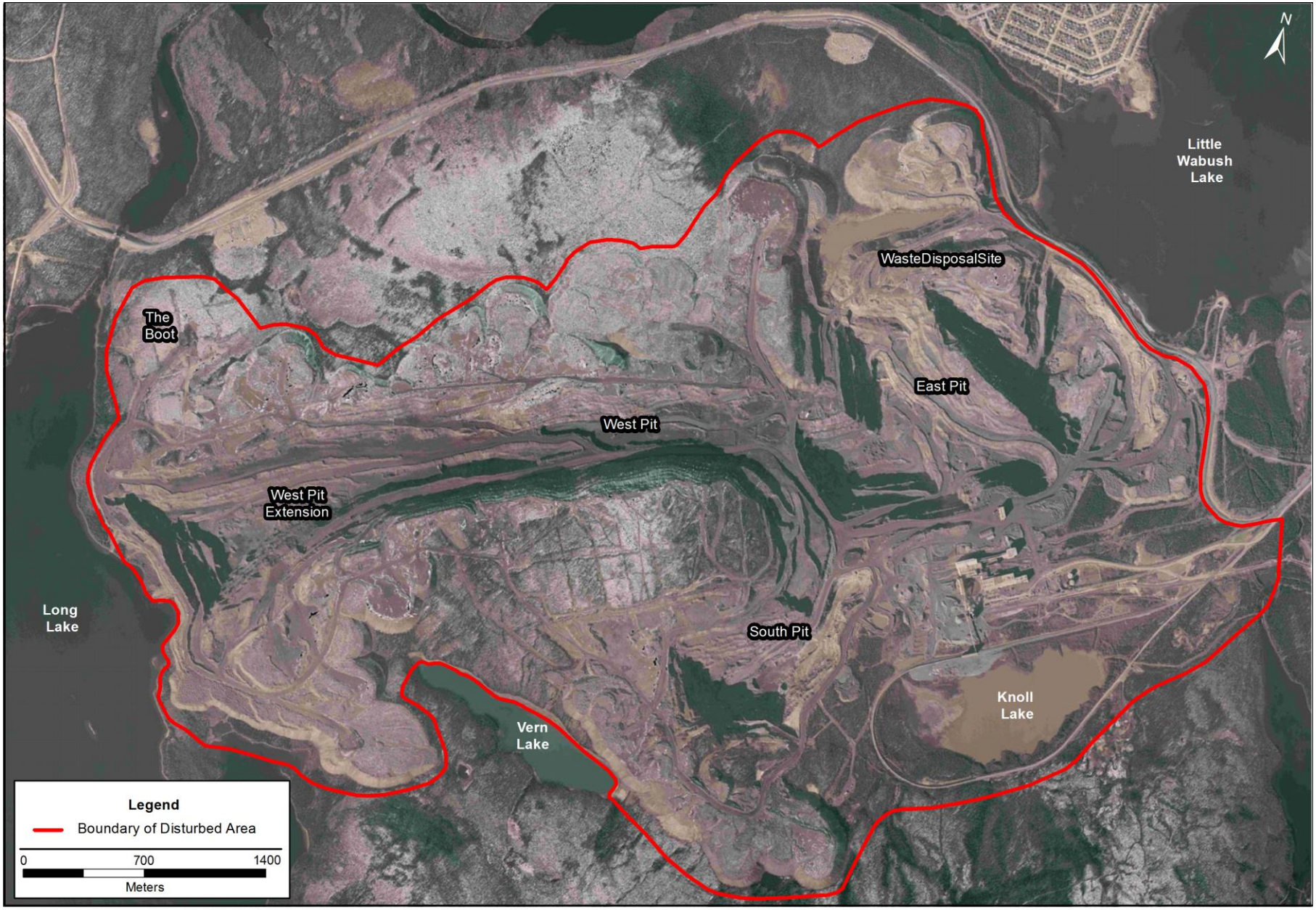

Figure 2-1 **Approximate Boundary of Area Disturbed by Mining (not including Tailings Area)**

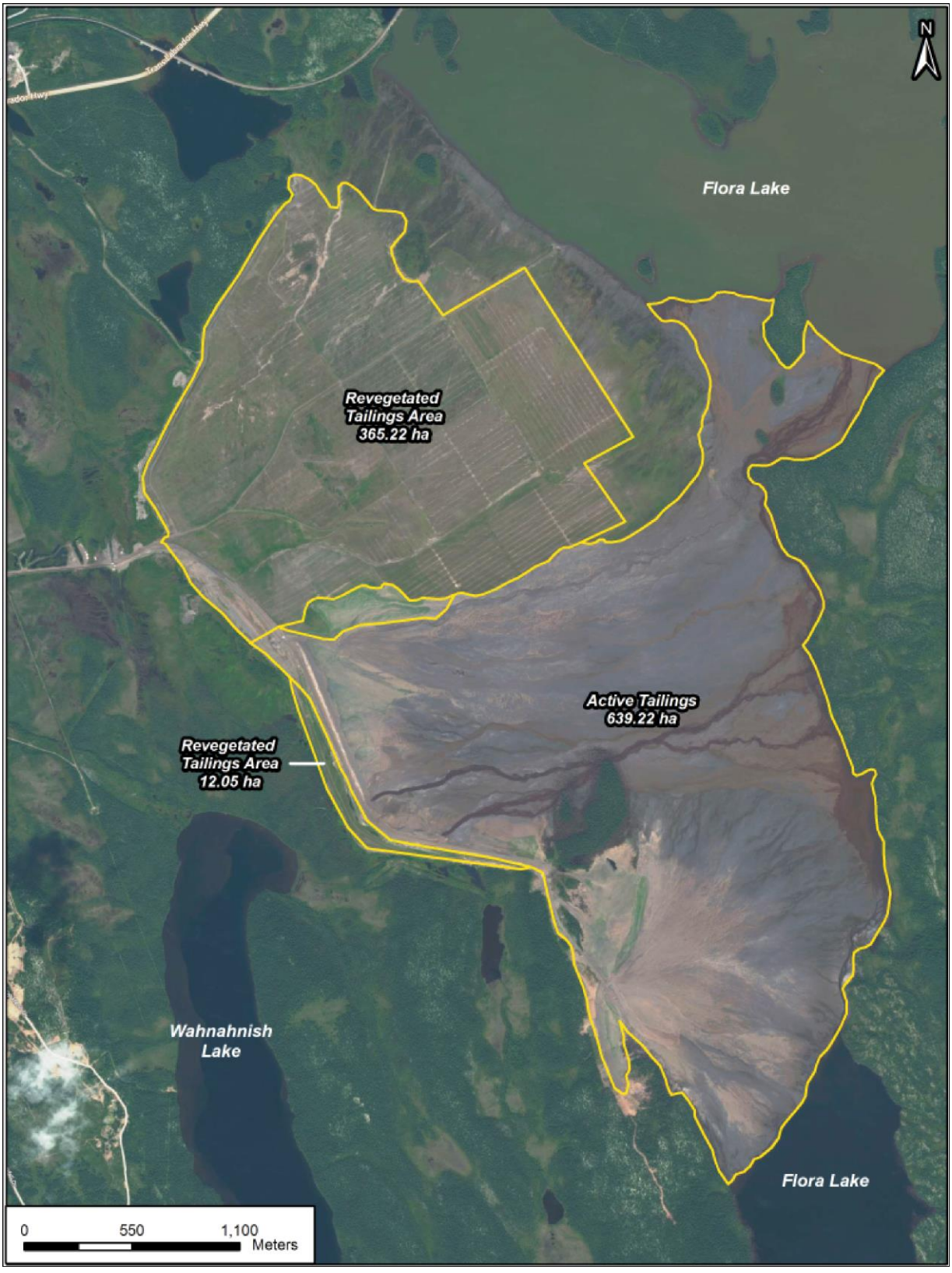

Figure 2-2 Approximate Boundary of Area Disturbed by Tailings, 2014

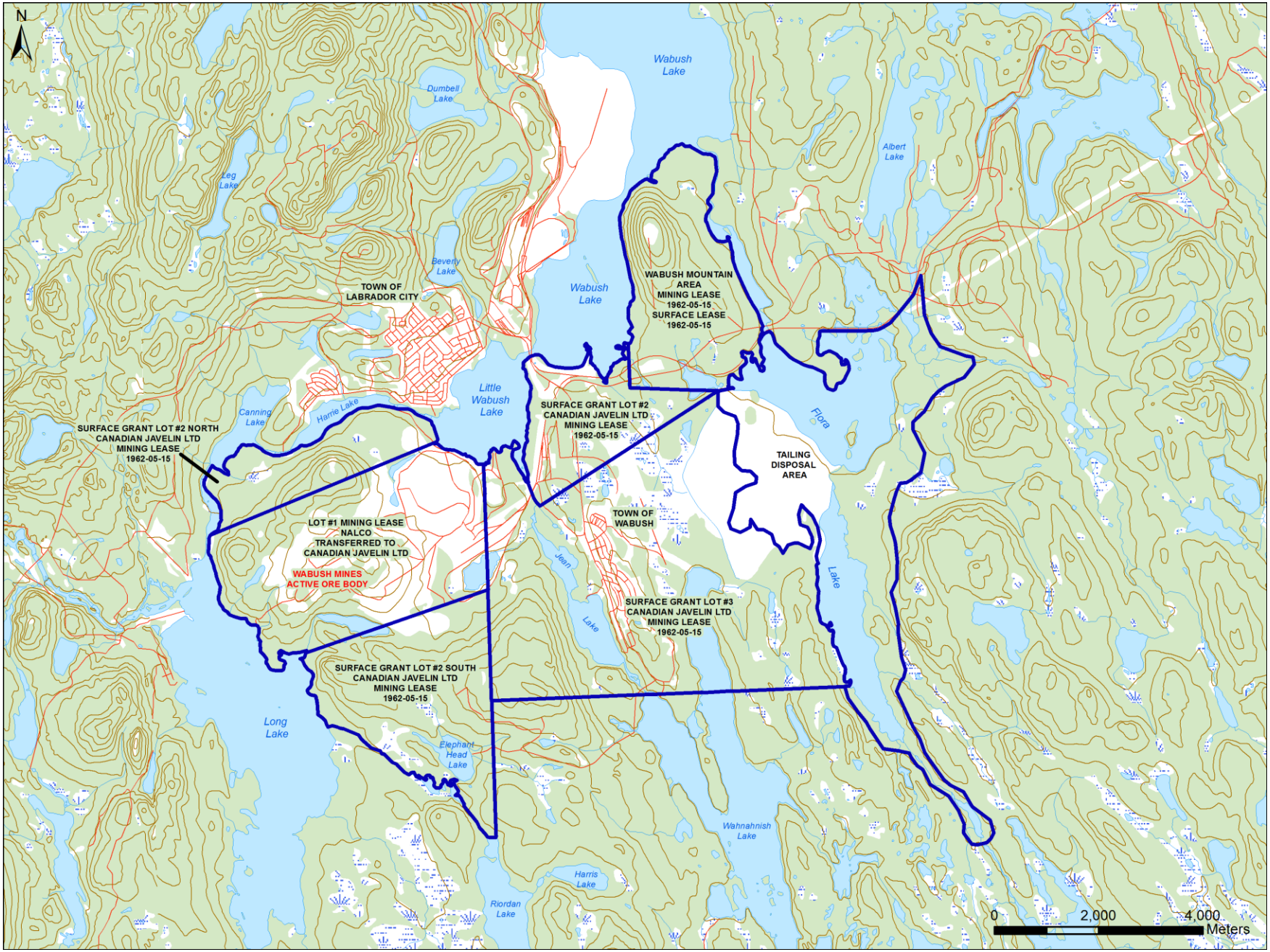

Figure 2-3 **Wabush Mines – Mining Leases**

2.4 Environmental Criteria

The success of meeting the Project's objectives as stated in Section 1.1 is measured by compliance with a combination of mandatory regulatory criteria, which are set out in federal and provincial legislation, and on provincial and federal environmental quality guidelines for protection of the environment.

2.4.1 Applicable Federal and Provincial Regulations

Criteria are established in the following Newfoundland and Labrador and Federal legislation:

- NL *Water Resources Act*
  - *Environmental Control Water and Sewer Regulations, 2003* (ECWSR)
- NL *Environmental Protection Act*
  - *Air Pollution Control Regulations, 2004*
  - *Halocarbon Regulations*
  - *Storage and Handling of Gasoline & Associated Products Regulations*, 2003
  - *Used Oil Control Regulations*
  - *Heating Oil Storage Tank System Regulations*, 2003
  - *Storage of PCB Waste Regulations, 2003*
  - *Waste Management Regulations, 2003*
- NL *Occupational Health and Safety Act*
  - *Occupational Health and Safety Regulations, 2012*
- NL *Mining Act*
  - *Mining Regulations*
  - Draft Mining Act Guidelines (2010)
- Federal *Fisheries Act*
  - *Metal Mining Effluent Regulations* (MMER)
- Federal *Transportation of Dangerous Goods Act*

With respect to waste management issues, the Project is also guided by comments from ENVC regarding restrictions on the use of open pits and the site waste disposal site for waste disposal (email dated Jan 5, 2013 from Craig Bugden, Manager of Waste Management, to Guylaine Joncas, attached as Appendix A).

2.4.2 Surface Water

<u>During decommissioning and rehabilitation activities</u>
Compliance with the MMER and the ECWSR discharge criteria at all the existing Final Discharge Points, as defined under MMER.

<u>After mine closure and site decommissioning and rehabilitation completion (at least 3 years after operations cease)</u>
Surface water concentrations to meet the Canadian Council of Ministers of the Environment (CCME) Canadian Water Quality Guidelines for the Protection of Freshwater Aquatic Life (FAL). If the background water quality concentrations do not meet these standards, the goals for remediation will be to achieve background levels.

2.4.3 Groundwater

Atlantic Partnership in RBCA Implementation (PIRI) *2012. Atlantic PIRI Tier I Risk Based Corrective Action* (RBCA) *Risk Based Screening Levels* (RBSLs)

> Analytical data for benzene, toluene, ethylbenzene, xylene (BTEX) and total petroleum hydrocarbons (TPH) in groundwater will be compared against the 2012 Atlantic PIRI RBCA RBSLs on provincial sites.

Ontario Ministry of the Environment (OMOE), 2011. *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act*, prepared by OMOE April 15, 2011; and

Health Canada*, 2012. Guidelines for Canadian Drinking Water Quality. Updated August 2012*

> Analytical data for various parameters (*i.e.,* metals, PAHs, PCBs, VOCs, *etc*.) in groundwater will be compared against the 2011 OMOE Site Condition Standards (SCS) for provincial sites. These are currently used by the Province of NL for the assessment of groundwater not being used for drinking water (with the exception of BTEX/TPH). At sites where the groundwater is being utilized for drinking water, the Health Canada Drinking Water Quality Guidelines (Health Canada 2012) will also apply.

After closure of the mine and mill, should the surface and/or groundwater goals not be achieved with the planned remediation activity, human health and ecological risk assessment will be performed to determine if additional remediation or risk management is required.

2.4.4 Air Quality

Air Pollution Control Regulations under the *Environmental Protection Act*

> These are the measures of acceptable air quality within a receiving environment regardless of the industrial activities in the area. The air pollutant of concern after mine closure would be suspended particulate matter. Determination at the end of site remediation (at least 3 years after the cessation of mine and mill production) would be made on the need for further air quality monitoring or if additional remediation work is required for purposes of improvements to air quality.

2.4.5 Soil Quality

The evaluation of soil quality and decision making on required action associated with impacted soil will be guided by ENVC's Policy Directive (PPD05-01) entitled "Management of Impacted Sites". The Policy Directive establishes a risk based approach to management of impacted sites and uses soil quality criteria in the Impacted site Management Process. The criteria typically considered are:

- *CCME - Canadian Soil Quality Guidelines (CSQGs)* for metals, PAHs and PCBs; and
- *Atlantic RBCA RBSLs, 2012* for petroleum hydrocarbons.

Wabush Mines will work closely with ENVC in using the Policy Directive in the assessment and decision making on soil quality and any required action, both during rehabilitation and post closure.

2.5 Intended Future Land Use Statement

The site has been impacted by over 50 years of mining and industrial activity and thus it is not practical or feasible that it be returned to its pre-mining condition. The objectives of the Rehabilitation and Closure Plan and this Project are stated in Section 1.1 and include rehabilitation efforts to ensure that the site has been rehabilitated to a condition that protects public safety and health and to a condition where no further environmental degradation takes place. Given the northern location of the site, harsh climatic conditions, scarcity of natural soils and the short growing season, it will likely take many years for a self-sustaining natural vegetative cover to become fully established. The post-closure rehabilitated mine site will, over time, blend into the surrounding environment and will become increasingly more compatible with the existing surrounding land use. The existing land use of the area surrounding the mine is primarily wilderness land supporting a variety of natural wildlife. The area is remote and consequently is not currently being used for other resource harvesting, tourism and/or recreation other than subsidence/recreational harvesting of firewood and vegetation and recreational use by local residents.

Mining is the primary industry in the immediate area. The Government of Newfoundland and Labrador considers that the Wabush/Labrador City area will remain as a mining center for many years into the future. In the event that mining ceases in the immediate area, the region will remain a service area for western Labrador. While the area will likely continue to be a viable center, it is the assumption of Wabush Mines that the mine site infrastructure will not be converted for other industrial purposes or uses. Consequently the Project includes total removal of all of the existing industrial buildings and associated infrastructure from the Wabush Mines site. Disturbances caused by mining such as the open pits, waste rock dumps and tailings management area will remain. However, one of the objectives of this Project is to implement appropriate rehabilitation measures that will see the areas disturbed by mining activity both physically and chemically stabilized. This will minimize post closure intervention and/or maintenance by either Wabush Mines, any successors or by the Province of Newfoundland and Labrador.

Because the Town of Wabush will continue to function after the Wabush Mines closure, especially if the potential for new mining ventures is realized, properties in the Town owned by Wabush Mines should be of interest and value to private or community interests.

2.6 Project Components

The following sections describe the Project components and the activities that will be carried out to implement the rehabilitation and closure of the Wabush Mines site:

1) General Activities
2) Reclamation Methods
3) Open Pits
4) Unprocessed Materials and Mine Waste Stockpiles

5) Site Buildings and Infrastructure
6) Site Roads and Rail Lines
7) Tailings Management Area
8) Waste Disposal Areas
9) Sewage Treatment Plant
10) Water Quality
11) Environmental Site Assessment
12) Long Term Monitoring

2.6.1 General Activities

In general terms, rehabilitation of the Wabush Mines site will consist of the following activities:

- Removal and appropriate disposal of all hazardous chemicals, reagents and materials from both the mine and surface facilities that could otherwise present a risk of future environmental harm;
- Demolition and removal of all above-grade buildings, foundations and other infrastructure (*e.g.*, overhead piping, electrical cables) no longer required once the mine has closed;
- Shipping and sale of salvageable material if prevailing salvage markets and scrap prices and associated economics permit;
- Disposal of all non-salvageable, non-hazardous demolition debris into an approved on-site or near-site waste disposal site;
- Cleanup of all surface yards including removal and appropriate disposal of all materials;
- Assessment of soil contamination in the area of the surface facilities and implementation of appropriate management measures (*i.e.*, remediation or human health and ecological risk management) to address contaminated soils identified;
- Removal of fencing, re-contouring of roadways and restoration of natural drainage patterns wherever practical;
- Decommissioning of seven tunnels;
- Continued revegetation of the tailings management area to control erosion and, where practical, re-vegetation of the process areas and non-flooded mine site footprints. Revegetation of the latter will be limited by soil availability;
- Continued flooding of the open pits to enhance environmental stability;
- Building barriers or berms around the open pits to reduce accessibility;
- Building barriers or berms around the waste dump crests and vegetating the dump slopes that are visible from the Towns of Wabush and Labrador City;
- Monitoring activities and programs to evaluate site erosion, pit wall stability, surface water and groundwater quality, pit infilling, site access control and treated and revegetated areas, including implementation of required corrective measures to deal with environmental concerns that may arise in the post-closure time period; and
- Preparing a Health and Safety Plan for use in implementing the Project.

2.6.2 Reclamation Methods

The methodologies to be used in the reclamation of various areas include:

- Tailings management area – revegetation by direct seeding and hydro-seeding (see Figure 2-2)
- Rock dump slopes exposed to Labrador City and Wabush – revegetation by hydro-seeding (see Figure 2-6)
- Building footprints – borrow material cover and revegetation (see Figure 2-6)
- Plant site, roads and railway line – scarification and promotion of natural vegetation, re-contouring where needed and single application of seed (see Figure 2-8)
- Areas of contaminated soils – combination of Environmental Risk Assessment and removal and treatment to satisfy the Soil Quality Criteria (Section 2.4.5). Treatment would include a bio-remediation system, either established on-site or at existing facilities off-site

There are minimal stockpiles of overburden, topsoil or other organic growth media available for rehabilitation use. If possible, these stockpiles will be used as a source of growth media for use in areas where establishment of a vegetative cover is essential for future erosion control.

Three different methods of land reclamation are proposed:

- Scarification only. This method will typically be applied to all areas where erosion is not an immediate concern (*e.g.*, plant site yards, roadways, parking lots, etc.). The upper surface of the natural ground will be scarified with a grader mounted scarifier unit to loosen the hard packed fill and graded to provide precipitation run-off along controlled pathways. The surface will receive a single application of seed (appropriate type of seed for the climate) and then be left to allow for the natural in-growth of native vegetation over an extended time period.
- Seeding only (preceded by scarification). This method will typically be applied in areas where a self-sustaining vegetation cover needs to be established within a two-year window to prevent erosion damage (*e.g.*, tailings management area). Mulching and appropriate fertilizers will be applied in conjunction with the seeding.
- Capping and Seeding. This method will be applied in areas covering remaining concrete building slabs. This method calls for the placement of a thin layer of borrow material prior to seeding to provide support and boost rate of vegetation success. If acidic conditions are encountered, neutralizing material such as crushed limestone may be required at selected locations.
- Hydro-seeding. This method will be applied on steep slopes of waste rock piles where the slopes are visible to the communities and also as a second application of seed on tailings.

Typically in most areas, the natural ground surface will be scarified to loosen the hard packed fill, graded to provide precipitation run-off along controlled pathways and receive a single application of seed. The material would then be left to allow for the natural in-growth of native vegetation over time. Most of the site roadways will be reclaimed in this manner. Should there be areas where dust issues are and remain a problem after site remediation, Wabush Mines would give attention to reducing the problem. This could include additional applications of seeding.

Table 2-1 provides an overview of the estimated areas that will receive rehabilitation activities to provide a vegetation cover. These areas are illustrated in Figure 2-4.

Table 2-1: Area of Reclamation Using Vegetation

Location	Areas			
	Scarification	**Seeding**	**Cap and Seed**	**Hydro-seeding**
Waste rock slopes				39 ha*
Buildings area			20 ha	
Roads and rail line	37 ha**			
General mill area and waste disposal areas	75 ha			
Tailings		640 ha***		

*The 39 ha was determined with estimates of expanded waste rock slope faces out to 2024. The 39 ha has been kept, realizing that second applications are likely for some of the steep slopes.

**All of the rail line and the roads to be taken out of service will receive scarification. The remaining road area will be maintained as roads for closure and long term activities.

***The non-seeded portion of the tailings upon closure is 640 ha of the total tailings area of 1110 ha. Approximately 200 ha of the 640 ha were revegetated in 2015.

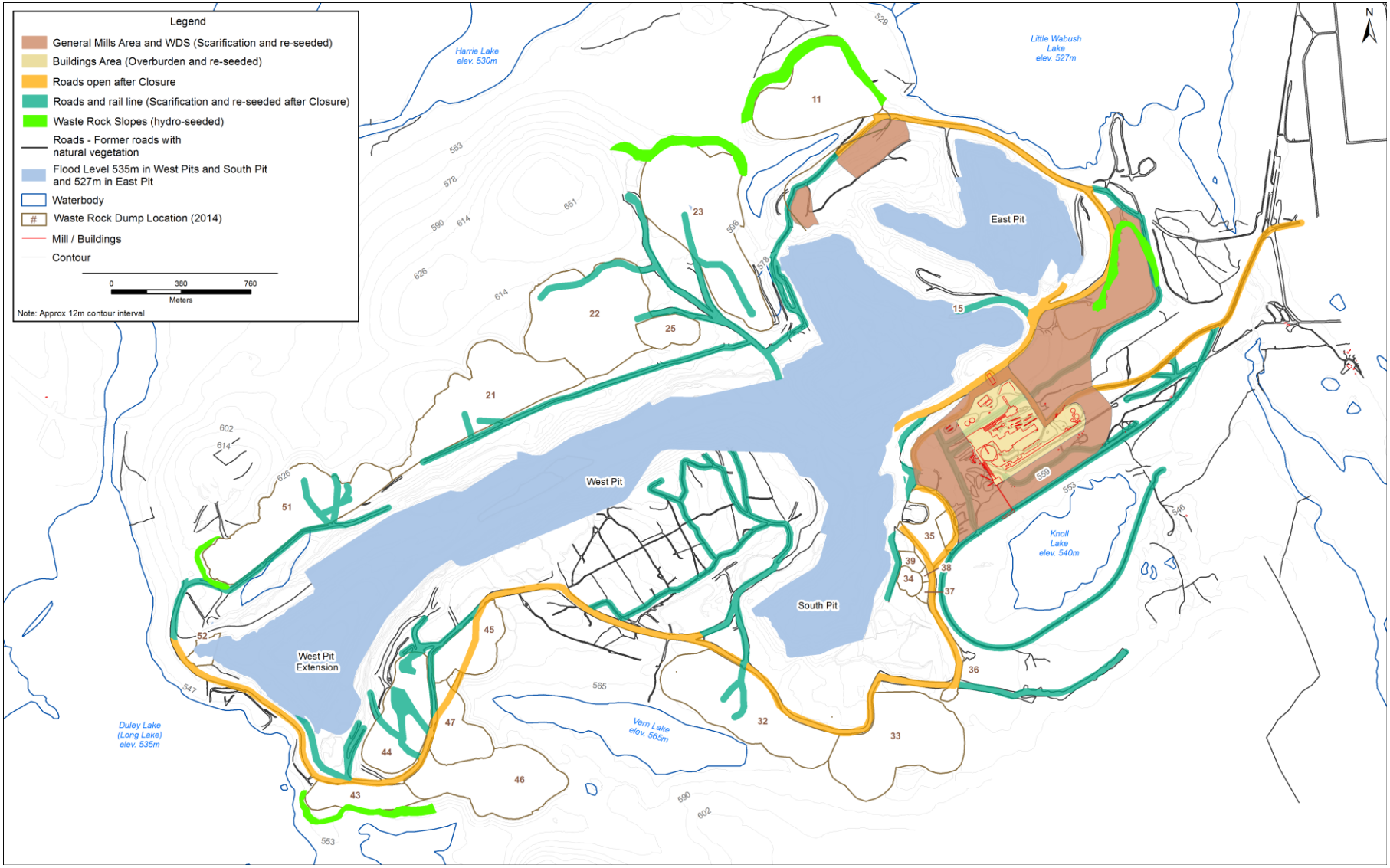

Figure 2-4 Areas for Reclamation

2.6.3 **Open Pits**

A total of five open pits (South Pit, East Pit East, East Pit West, West Pit and West Pit Extension) have been mined over a period of approximately 50 years to nominal pit depths of approximately 75 m below original ground surface. The locations of these open pits in relation to the plant site and other infrastructure are shown in Figure 2-1.

Closure of the open pits will involve the following procedure:

- All potentially hazardous material (*e.g.*, hydrocarbons, chemicals, reagents) and all equipment and machinery will be removed from the open pits well ahead of rising water levels. This activity was carried out in December 2014 prior to the removal of the dewatering pumps. DNR and ENVC were consulted prior to the pumps being shut off and removed.
- Permanent rock fill berms or barriers will be constructed across the ramp access roads into each of the pit areas to prevent vehicular access into the pits along these ramps. Where practical, ditches will be constructed along the outward sides of the berms and culverts will be installed through the berms to allow surface water run-off to flow into the pits and eliminate ponding and erosion alongside the berms. Most of the barriers were installed in 2015;
- A permanent protective rock fill berm or barrier of approximately 3 m in height will be constructed around the perimeter of the pits. This is intended to prevent inadvertent access by recreational vehicles. There will also be culverts installed through the berms to allow surface water flow into the pits. The material used for the berms will be stockpiled ore and waste rock and will be assessed for quality prior to use. The pit perimeter estimate is 17,200 m for the combined East, West, West Extension and South pits. A geotechnical study on the stability of each of the pit walls under flooded conditions was carried out in November 2014 to determine the safe set-back distances of the berms. Based on this study, the locations of the waste rock berms and approximate locations of the culverts are shown in Figure 2-5.
- Safety signs will be established around the perimeters of the pits. The details on the size of the signs, the messaging and languages on the signs have been determined to ensure the public is aware of the safety hazards. The actual number of signs will be sufficient to serve the purpose stated. (See Figure 2.13 for examples of the safety signs.)
- Natural flooding of the open pits began in December 2014 with the removal of the dewatering pumps. A hydrogeological study conducted in November 2014 concluded the following with respect to pit flooding:
    - The flooding period for the open pits is expected to be between two and five years, largely due to elevated hydraulic conductivity values in the rock walls between both the East Pit East and Little Wabush Lake and the West Pit Extension and Duley Lake. Pit flooding may occur over a longer time period should bulk hydraulic conductivity values be lower than provided in the background reports.
    - The anticipated final water level in the East Pit East is the same water level as Little Wabush Lake, approximately 527 meters above sea level (masl).
    - The anticipated final water level for the remaining pits is the same water level as Duley Lake, approximately 535 masl.

- Given that the East Pit East is separated from the rest of the mine by a rock wall of lower hydraulic conductivity, there will likely remain a disparity between the two water levels, though there may be some equalization over time.
- Surface water overflow from the pits to surrounding water bodies is not anticipated due to high hydraulic conductivity geological features between the pits and the surrounding lakes.
- Water level effects on the surrounding water bodies are not anticipated.

In the 2005 version of the Wabush Mines Rehabilitation and Closure Plan, an option for the disposal of non-hazardous demolition debris was the use of the open pit. In an email dated January 15, 2013 from ENVC (attached as Appendix A), Wabush Mines was informed that ENVC does not support or accept this approach. Accordingly, such disposal of the building demolition debris has been removed from the 2015 Rehabilitation and Closure Plan.

Wabush Mines has estimated that the above-ground quantity of concrete that will be crushed and removed from the site will be approximately 10,000 m^3 or 24,000 tonnes (using a specific gravity of 2.4 for concrete). Wabush Mines may approach ENVC again to determine if the concrete can be disposed of in the pit. If this remains unsuitable, it will be disposed of in the current Wabush Mines Waste Disposal Facility (WMWDF) or at the Labrador West Regional Waste Disposal Facility (LWRWDF) with appropriate approval.

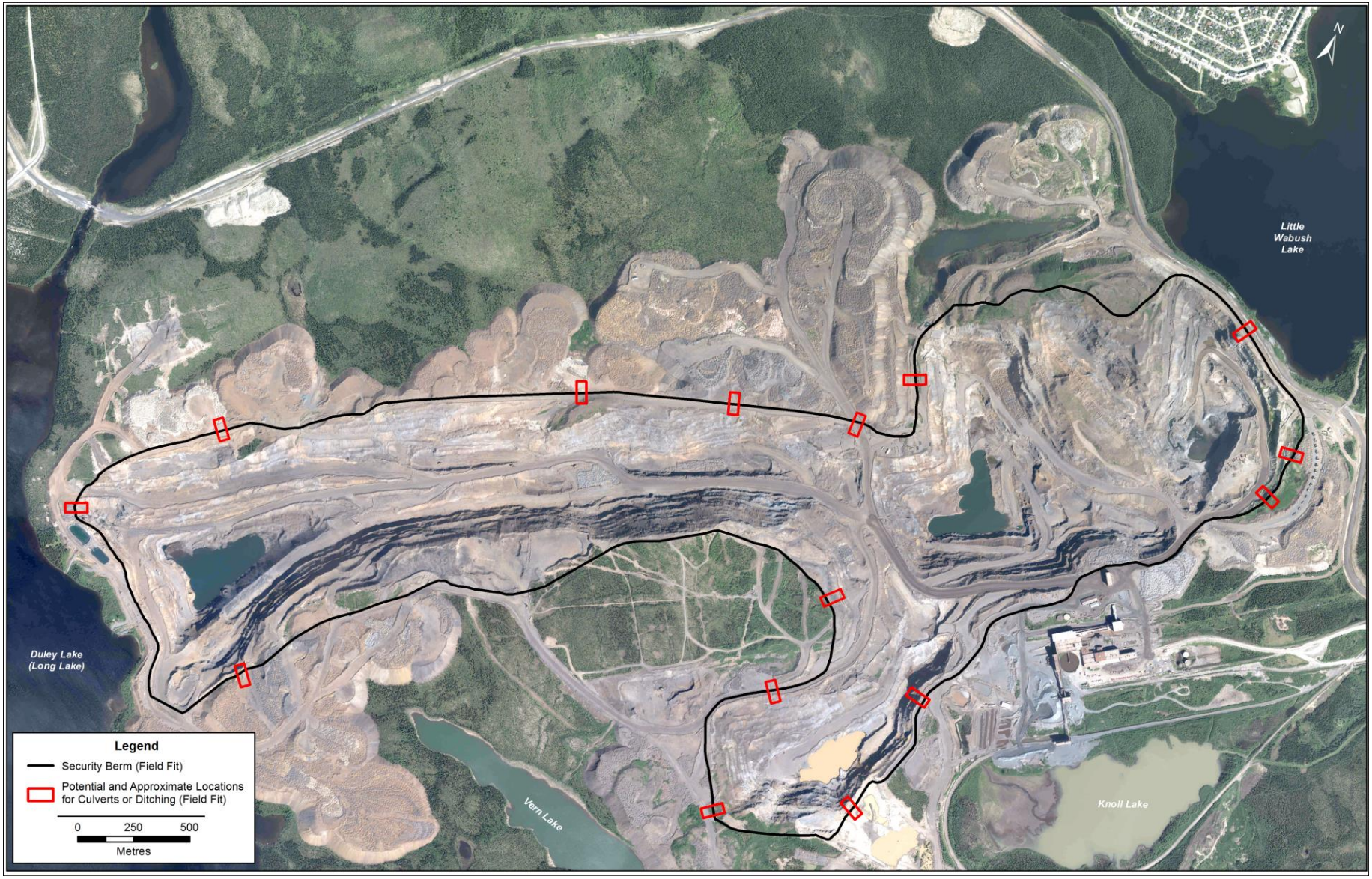

Figure 2-5 Recommended Security Berm Location

2.6.4 Unprocessed Materials and Mine Waste Stockpiles

This consists of ore stockpiles, concentrate storage stockpiles, and waste rock dumps.

2.6.4.1 Ore Stockpiles

The 2014 Rehabilitation and Closure Plan included the processing of all remaining ore stockpiles through the metallurgical plants to recover the contained metal values. This has not occurred due to the sudden closure of the operation. The ore stockpiles that existed at the time of closure will be used in the construction of berms around the pits and waste rock stockpiles. Any remaining ore after the berm construction will be disposed of at the WMWDF.

2.6.4.2 Concentrate Stockpiles

There are no remaining concentrate stockpiles at the site. All concentrate stockpiles were shipped off site during the warm idle period.

2.6.4.3 Waste Rock Dumps

Waste rock dumps are located at several locations around the perimeter of the open pits. Rock fill berms will be constructed at safe distances from the crests of the waste rock dumps along the perimeter of the dumps to prevent inadvertent access with recreational vehicles. The berms will be constructed with stored ore and waste rock material. A geotechnical slope stability study will be conducted to determine the safe setback distances for the safety berms. The locations of the waste rock berms are shown in Figure 2-6.

Waste rock dump slopes exposed to the Towns of Wabush and Labrador City will be vegetated by hydro-seeding. The limiting factors for waste rock slope revegetation are slope steepness and accessibility, and availability of overburden and topsoil. In 2014, a limited area was hydro-seeded to assess whether this technique would be successful. The results of the hydro-seeding as observed in 2014 and 2015 are encouraging for successful revegetation of the slopes (see Figure 2.14). The remaining waste rock dump slopes exposed to the Towns and portions of the waste rock slopes facing Duley Lake will be revegetated over the course of the Project.

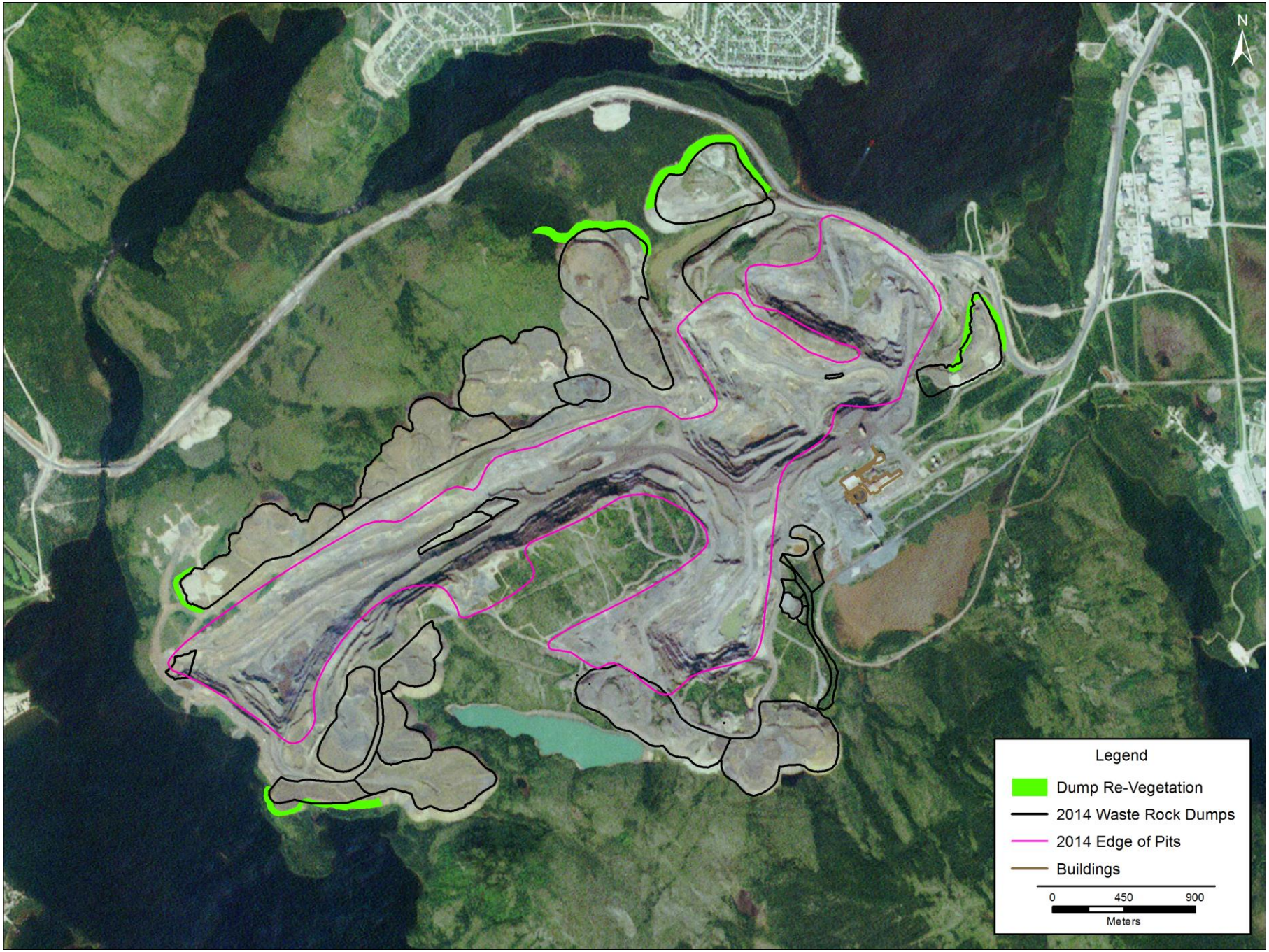

Figure 2-6 **Waste Rock Dumps and Areas of Revegetation**

2.6.5 Site Buildings and Infrastructure

All site buildings and associated infrastructure will be cleaned out, demolished and removed. Site buildings and infrastructure include surface buildings, power transmission lines and electrical equipment, pipelines, service tunnels, machinery, equipment and storage tanks, and unsold property in the Town of Wabush.

2.6.5.1 Surface Buildings

The site buildings were partially cleaned out in 2014 as part of the care and maintenance of the site during the warm idle period. The clean-out will be completed prior to demolition and will include the removal of any remaining in-process material from within the buildings and equipment including ore bins, transfer points, intermediate storage bins, solution and slurry storage tanks, sumps, flushing of pipelines, removal of spillage and removal of dust accumulations within ducts. The material recovered from the clean-out during the warm idle period was removed from site in 2014. The handling and disposal or removal of materials during the facilities demolition will be conducted as per the procedures outlined in Sections 2.6.1 and 2.6.8.

During the warm idle period, any potentially hazardous materials such as chemicals, reagents, antifreeze, and hydrocarbons (e.g., lubricating oils, hydraulic fluids and grease) were collected into secure containers and moved to the warehouse for secure storage. These materials will be removed prior to demolition as per the procedures outlined in Sections 2.6.1 and 2.6.8. All instruments using nuclear source material were removed from the site to a licensed handling facility during the warm idle period.

Asbestos-containing materials will be removed by a licensed contractor, packaged and disposed of by burial in an approved, licensed asbestos disposal facility. Table 2-2 details the locations and amounts of asbestos containing materials as determined in the most recent inventory of asbestos, conducted in 2013. This represents the quantities of asbestos-containing materials that are currently on-site.

Table 2-2 2013 Summary of Asbestos-Containing Materials at Wabush Mines

Location	Flooring ft^2	Ceiling ft^2	Walls ft^2	Piping Straight *Linear ft*	Piping Fittings *Each*	Ductwork ft^2	Tanks ft^2
Administration Building	6237		12378		66		8
Maintenance & Warehouse	80		320	40	26		60
Boiler House Building	205			334	432		3374
Mill Building	9018	160	3400	70	235		68
Ore Storage Building					91		
High Tension Building					78	200	
Dryer Building					14		
Load Out Bin Building							
Classifier Building					86		
Crusher Building					99	260	
Exterior, Truck Storage, Pumphouse Areas				200	38		20200
Total (imperial)	**15,540 ft^2**	**160 ft^2**	**16,098 ft^2**	**644 ft**	**1165**	**460 ft^2**	**23,710 ft^2**
Total (metric)	**1444 m^2**	**15m^2**	**1495m^2**	**196 m**	**1165**	**43 m^2**	**2202 m^2**

- Summary Prepared by AMEC Environment and Infrastructure
- Based on Series of 2013 Hazardous Materials Assessment Reports Prepared by All-Tech Environmental Services

Once all the buildings have been completely cleaned out, they will be turned over to a third party contractor who will remove any equipment or material with salvage value. This salvaged equipment and material will be shipped off site to be sold for its value. Equipment and material with no salvage value will be demolished and the demolition debris hauled to the disposal area. Options for disposal include burial in the current WMWDF or at the LWRWMF. All above grade concrete foundations and structures will be broken up and removed. The broken concrete will be disposed of in the WMWDF or the LWRWMF or buried adjacent to the buildings' footprints and covered with the excavated soil. At grade concrete foundations will be broken up, covered with a soil cover and revegetated. The actual procedures for the demolition of buildings and structures will be determined with the third party contractor.

The inventory of site buildings, with the approximate sizes and estimated quantities of construction materials requiring disposal are listed in Table 2-3. The locations of the buildings relative to one another on the mill site are shown in Figure 2-7.

Table 2-3: Inventory of Major Buildings

Location	**Structure**	**Approximate dimensions** (length x width x height)	**Materials of Construction**	**Estimated quantities of construction materials**
Mill Site	Security Building	13m x 5m x 3m	Concrete, steel frame, steel siding, glass, gyprock	30 tonnes above grade concrete, 25 tonnes other material
Mill Site	Security Garage	15m x 4m x 3m	Concrete, steel frame, steel siding	30 tonnes above grade concrete, 20 tonnes other material
Mill Site	Boiler Room	30m x 30m x 11m	Concrete, steel frame, steel siding,	1,370 tonnes above grade concrete, 266 tonnes other material
Mill Site	Administration Building	12m x 46m x 12m	Concrete, steel frame, steel siding, glass, gyprock	1,074 tonnes above grade concrete, 186 tonnes other material
Mill Site	Maintenance Shops and Warehouse Haulage Truck Repair	61m x 160m x 14m 29m x 73m x 18m	Maintenance shops and haulage truck repair: Concrete, steel frame, steel siding	Maintenance shops and haulage truck repair: 2,000 tonnes above grade concrete, 1,463 tonnes other material Building
Mill Site	Crusher Building	18m x 61m x 30m	Concrete, steel frame, steel siding	68 tonnes above grade concrete, 536 tonnes other material
Mill Site	Ore Storage Building	30m x 91m x 30m	Concrete, steel frame, steel siding	12,962 tonnes above grade concrete, 688 tonnes other material
Mill Site	Classifier Building	46m x 46m x 37m	Concrete, steel frame, steel siding	740 tonnes above grade concrete, 537 tonnes other material
Mill Site	Concentrator Building	61m x 137m x 30m	Concrete, steel frame, steel siding	5,185 tonnes above grade concrete, 1,244 tonnes other material
Mill Site	Dryer Building	37m x 43m x 30m	Concrete, steel frame, steel siding	370 tonnes above grade concrete, 395 tonnes other material

Location	**Structure**	**Approximate dimensions** (length x width x height)	**Materials of Construction**	**Estimated quantities of construction materials**
Next to Wabush Lake	Water Pump House	9m x 11m x 6m	Concrete, steel frame, steel siding	100 tonnes above grade concrete, 105 tonnes other material
Mill Site	High Tension Building	67m x 15m x 61m	Concrete, steel frame, steel siding	1,296 tonnes above grade concrete, 505 tonnes other material
Mill Site	Load Out Bin Building	12m x 76m x 37m	Concrete, steel frame, steel siding	259 tonnes above grade concrete, 480 tonnes other material
Mill Site	Conveyor Galleries		Concrete, steel frame, steel siding	740 tonnes above grade concrete, 731tonnes other material
Mill Site	Mine Dry # 8 Reel House #6 Reel House #9 Transfer Tower (Dryer Building) #9a Transfer Tower	24m x 66m x 5m 10m x 34m x 14m 16m x 23m x 14m 10m x 7m x 27m 11m x 11m x 20m	All five are: Concrete, steel frame, steel siding	The five combined: 0 tonnes above grade concrete, 426 tonnes other material
Mill Site	Jones Separator Building	34m x 11m x 18m	Concrete, steel frame, steel siding	592 tonnes above grade concrete, 141 tonnes other material
Mill Site	Other Concrete Foundations		Concrete	1,814 tonnes above grade concrete
Mill Site	Truck Storage	24m x 66m x 10m	Concrete, steel frame, steel siding	80 tonnes above grade concrete, 229 tonnes other material

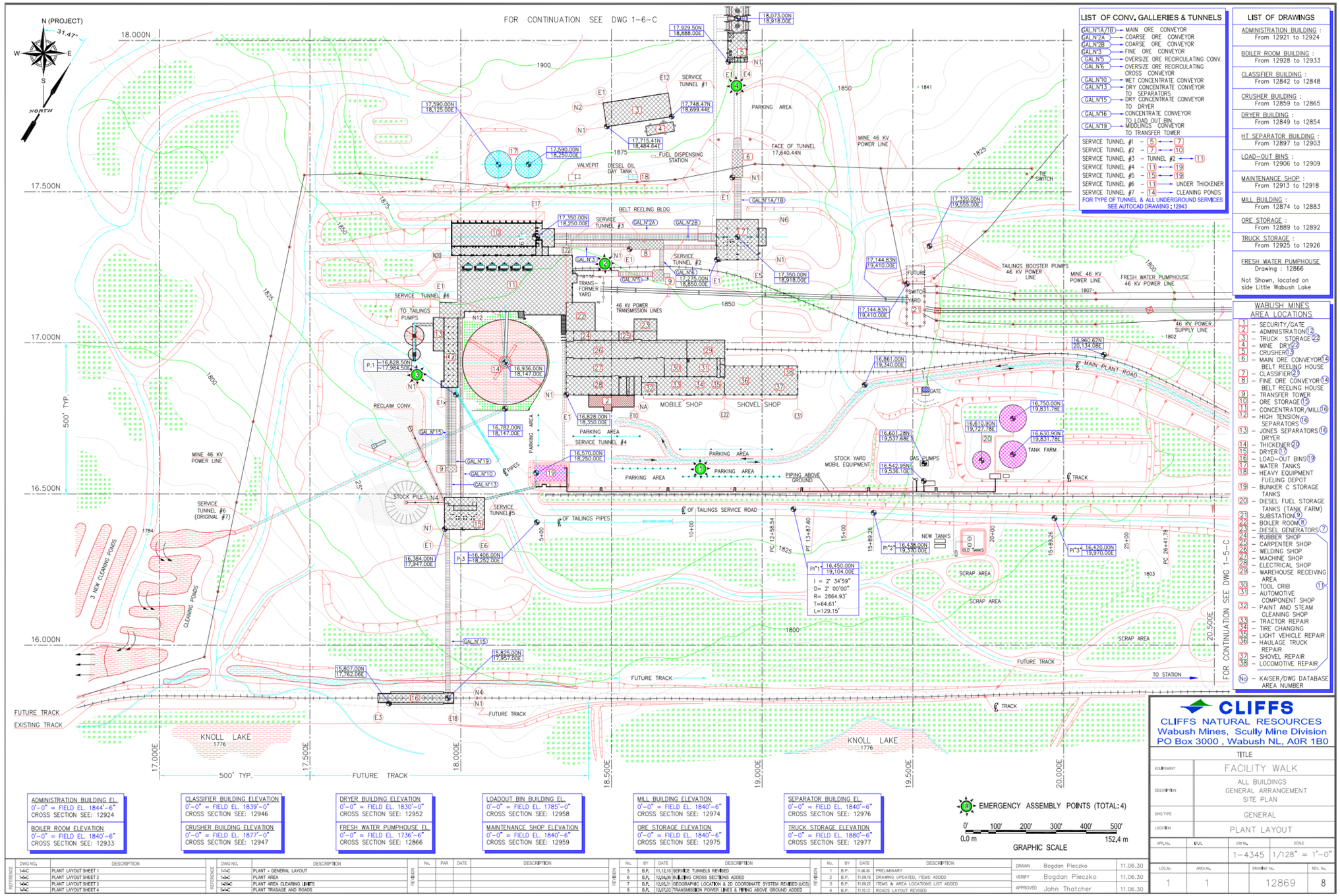

Figure 2-7 **Surface Buildings and Service Tunnels**

2.6.5.2 Infrastructure

Site infrastructure consists of power transmission lines, electrical equipment, pipelines, service tunnels, machinery, equipment, and storage tanks.

Power Transmission Lines and Electrical Equipment

All electrical power distribution poles, towers and cabling that are the property of Wabush Mines will be decommissioned and removed. Buried power lines will be de-energized and cut off 0.3 m below surface with the buried section left in the ground. No cables will be left penetrating the surface. Consideration will be given to removing the buried cables should metal salvage costs make it viable. Power poles preserved with creosote, copper chromium, arsenic or mixtures will be disposed of in accordance with the provincial Treated Waste Wood Guidance (GD-PPD-075). Concrete footings will be removed and disposed of in the WMWDF and/or buried and covered nearby. The final disposal location(s) will be determined in consultation with ENVC. There are approximately 650 wooden power poles on the mine site carrying 30 kilometres (km) of power cabling.

Pipelines

Surface pipelines will be purged, dismantled and removed along with the support trestles and other associated infrastructure. Material with salvage value will be removed from site and sold. Material with no salvage value will be disposed of in the WMWDF.

Buried pipelines will be purged, typically cut off immediately below surface and the ends capped or sealed with the buried pipeline sections remaining buried in place. Large diameter buried pipelines (greater than 122 centimetre (cm)) will be assessed on a case-by-case basis and may require backfilling to prevent future ground subsidence. Sites where pipelines are removed will be restored, rehabilitated and/or risk managed as required. See Section 2.6.11 for information about Environmental Site Assessment (ESA), which will be carried out as part of the decommissioning and rehabilitation activities.

Pipelines to be decommissioned include:

- 9 km of triple 30.5 cm schedule 20 rubber lined tailings lines;
- 2 km of 20 cm schedule 40 seal water line;
- 2.4 km of 15 cm schedule 40 seal water line;
- 2.5 km of 10 cm schedule 40 seal water line;
- 1.8 km of 76 cm freshwater supply pipeline; and
- 6 km dewatering lines in the East, West, and West Pit Extension pits.

All of the dewatering lines in the open pits were removed in early 2015.

Service Tunnels

There are seven service tunnels (approximately 1.5 to 3.5 m below ground surface) requiring decommissioning (see Figure 2-7):

- Service Tunnel #1 – steel corrugated oval shaped tunnel from the crusher building to the classifier building with approximate dimensions of 206 m long, 2.6 m high and 2.1 m wide and a volume of 912 m^3;
- Service Tunnel #2 – concrete rectangular shaped tunnel from the classifier building to the mill basement with approximate dimensions of 145 m long, 3.1 m high and 2.5 m wide and a volume of 1064 m^3;
- Service Tunnel #4 - steel corrugated circular shaped tunnel from the day tanks to the boiler room with approximate dimensions of 163 m long and 152 cm in diameter and a volume of 304 m^3;
- Service Tunnel #5 - steel corrugated circular shaped tunnel from the day tanks to the dryer building with approximate dimensions of 54 m long and 152 cm in diameter and a volume of 76 m^3;
- Service Tunnel #6 - steel corrugated circular shaped tunnel from the mill basement to Knoll Lake - 353 m long and 213 cm in diameter. Approximate volume is 1520 m^3;
- Conveyor Tunnel #1-B - concrete arc shaped tunnel from the crusher building to gallery #1-B – 88 m long, 4.5 m maximum height and 6.5 m maximum width. Approximate volume is 1292 m^3; and
- Recirculation Conveyor Tunnel #5 – concrete rectangular shaped tunnel from gallery #5 to concentrator building with approximate dimensions of 38.5 m long, 3.4 m high and 2.8 m wide and a volume of 836 m^3.

The tunnels are used to house various mechanical and electrical components. The tunnels decommissioning plan is as follows:

- decontaminate the fuel pipelines in Service Tunnels # 4 and 5; and
- fill all tunnels by injecting a lean concrete or expandable material to prevent their collapse.

Machinery, Equipment and Storage Tanks

All machinery and equipment with salvage value will be removed and sold for that salvage value. Machinery and equipment with no salvage value will either be removed for scrap markets or disposed of in the WMWDF (subject to approval by ENVC) or other approved disposal facilities, possibly the LWRWDF. All machinery and equipment, including mobile equipment, to be sold as scrap or disposed of will be purged of all potentially hazardous materials (*e.g.*, lubricants, fuel, coolants, batteries) and steam cleaned to remove dust and dirt from the operations prior to disposal.

There are no underground storage tanks on site. Current records indicate 24 above ground storage tanks (AST) which will be purged and removed. An ESA of the tank farm area has been completed and will be expanded to cover soil surrounding and underneath the tanks after they are removed. Any contaminated soils will be remediated or risk managed. The tank farm is shown on Figure 2-7.

2.6.5.3 Property in the Town of Wabush

Wabush Mines owns or owned some 240 properties in the Town of Wabush which are mainly housing units. The housing units occupied by Wabush Mines employees have been offered to these employees to purchase. As of September 2015, some 107 units had been sold.

In addition to the housing units, Wabush Mines also owns:

- The JR Smallwood Middle School which is currently operated by the Labrador School Board;
- Two apartment complexes on Bowater Street; and
- One housing/office unit on Carson Street.

The intention is to sell the remaining housing units, the apartment complexes and the office/housing unit. The ultimate ownership of the school will be discussed with the Provincial Government. Should Wabush Mines be unable to sell its remaining properties in the Town of Wabush, it will undertake the proper demolition of the unsold properties. Timelines for this have not been determined and consultation with the Town of Wabush would be sought before such demolition would occur.

A spill of heating oil occurred at one of the housing units (12 Dunfield Street) in the past and cleanup of the site is planned to be conducted in 2016. Contaminated soils will be removed and treated as discussed in Section 2.6.2.

2.6.6 **Site Roads and Rail Lines**

All site roads, which are not required for post closure maintenance and monitoring, will be decommissioned and rehabilitated. The main site access road, the road to the Flora Lake tailings management area and the roads to water monitoring sites and pit maintenance areas will be maintained. There are approximately 29 km of roads to be decommissioned. Figure 2-8 shows the various roads that will remain above the pit flood area. Typically road decommissioning and rehabilitation will involve the removal and landfilling of asphalt topping, scarification and loosening of the top surface of the road, a single application of seed and the natural re-growth of native vegetation. Where erosion or sedimentation is a concern, the surface will be re-contoured to prevent ponding of run-off and to ensure free drainage off the roadways. All culverts or stream crossing structures will be removed and the natural drainage pathways re-established. Excavation banks at such stream crossings will be appropriately armoured to prevent erosion. Permits under Section 48 of the *Water Resources Act* may be required and permitting will be in place prior to any work being done.

Inadvertent access to the site will be prevented by gating and locking all site roads used for the long-term monitoring program. In addition, 3 m high berms will be constructed near the edges of each of the mine pits and on access roads to the pits (see Sections 2.6.3 and 2.6.4.3).

There are approximately 10 km of railway line owned and used by Wabush Mines which tie into the QNS&L railway system of which 1.9 km is common to the Bloom Lake railway line. Upon closure 8.1 km of railway line, consisting of 3.2 km of spur lines to the milling buildings and 4.9 km of the Knoll Lake loop, will be

reclaimed (see Figure 2-8). The decommissioning and rehabilitation of the Wabush Mines rail lines will involve the removal of all rail lines and ties. There are approximately 13,000 railway ties to be removed. All of the steel rails and wooden ties will be salvaged and shipped off- site for reuse, scrap value or disposal outside of Labrador by a third party. During operations, such material was removed by contractors for its scrap value or re-use. An Environmental Site Assessment (ESA) will be conducted on the 8.1 km gravel bed supporting the wooden ties and any contamination will be evaluated for clean-up or risk management. Rehabilitation may involve scarifying and loosening the top surface to facilitate natural re-vegetation as described in Section 2.6.2. Where erosion or sedimentation is a concern, the surface will be re-contoured. Culverts or stream crossing structures will be removed and natural drainage pathways will be re-established.

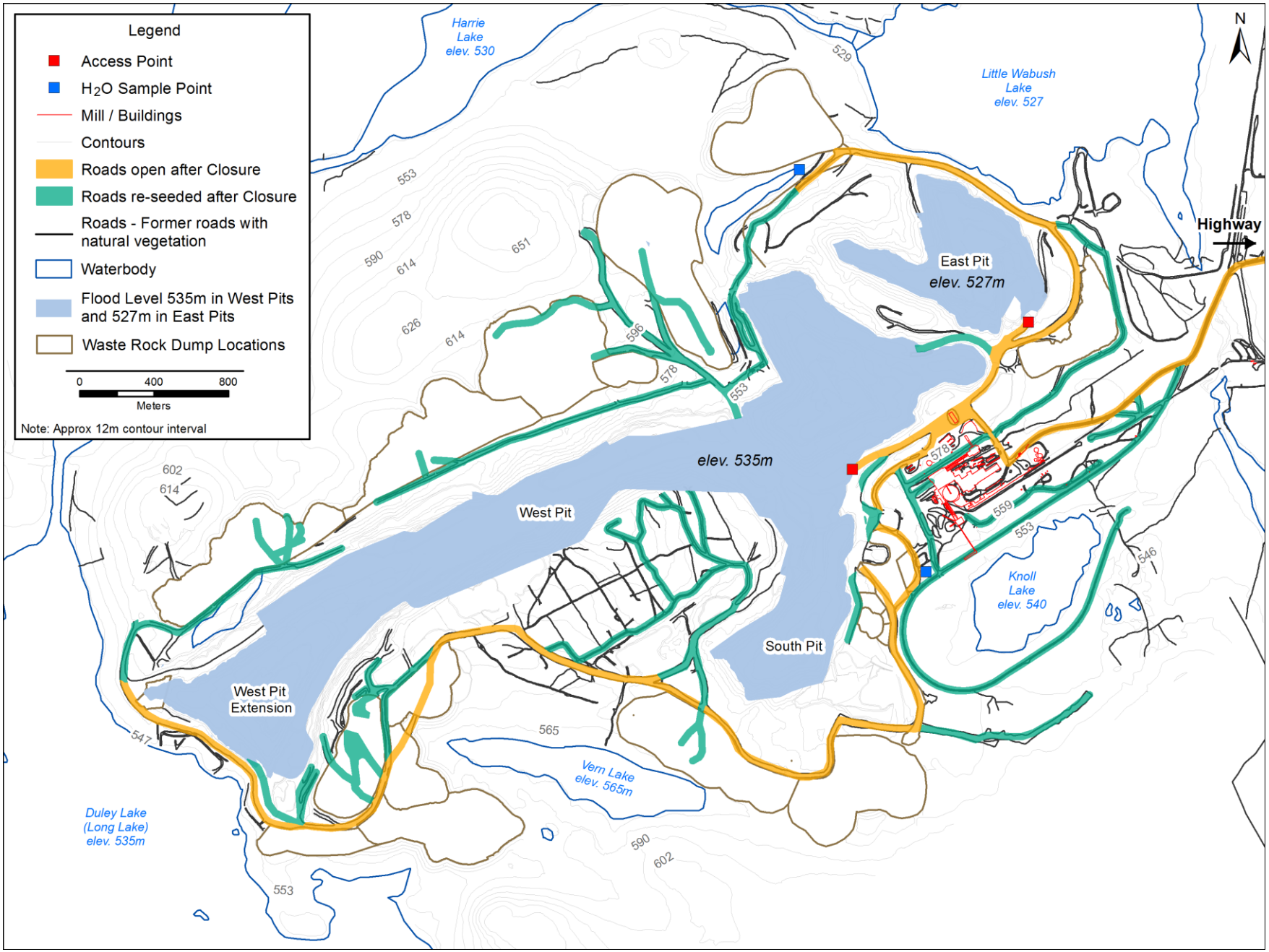

Figure 2-8 **Site Roads and Railway Lines**

2.6.7 Tailings Management Area

A May 2013 aerial photograph of the Flora Lake Tailings Management Area (TMA) is shown in Figure 2-2. Tailings disposal over the operational life of the mine began in the northern portion of Flora Lake and extended south. Tailings have been deposited to an elevation of 589 m, some 51 m above the original Flora Lake water surface elevation of 538 m. Figure 2-9 provides a contoured view of the TMA as of 2013 and Figure 2-10 provides a series of cross sections of the TMA taken from the contoured view.

The tailings dikes along the western and northern walls of the TMA are inspected on a regular basis and are reported to be stable in terms of static and dynamic (psuedo-static) stability and liquefaction (Golder 2013). As part of the progressive rehabilitation program exercised over the past several years, wind erosion had been limited through a vegetative cover. Prevention of surface water erosion had been and will continue to be addressed by slope contouring and drainage control to complement the vegetative cover. Wabush Mines has committed in the 2015 Rehabilitation and Closure Plan to conduct a third party Dam Safety Review, consistent with the protocols established by the Canadian Dam Association, on the tailings dikes throughout the TMA. This will be in addition to the regular dike inspections described above.

A significant point in the consideration of the integrity and stability of the tailings dikes is that the dikes do not hold back water as their bases or toes are above both the water elevation in Flora Lake and the phreatic surface in the tailings. The consequences of a stability problem would, therefore, not be severe and be relatively easy and inexpensive to repair.

Over the life of the operation, Wabush Mines has developed a tailings surface area of approximately 1110 hectares. Up to 2014 and as a good demonstration of progressive rehabilitation, 425 hectares of vegetative cover have been established on inactive areas of the TMA. With the exception of 2009, Wabush Mines has invested in revegetation programs on an annual basis with varying combinations of seeding and fertilization of new areas and fertilization of established areas being performed. Since 2003 there has been sacrificial seeding of approximately 352 hectares and permanent vegetation covers placed on approximately 425 hectares. The active area of the TMA at closure was approximately 640 hectares, for which revegetation is being undertaken with the implementation of the 2015 Rehabilitation and Closure Plan. This is viewed as one of the higher priority items because of the potential for dust liftoff during dry weather.

Experience to date has demonstrated that the tailings can be seeded and fertilized using conventional agricultural equipment. Early experience demonstrated that irrigation was not critical to successful vegetation and this was discontinued several years ago. Over the years of revegetation, success has been realized in establishing self-sustaining vegetation covers on all surfaces – gentle sloped areas, high sloped dikes and horizontal benches.

The post closure tailings revegetation program began in 2015. Approximately 200 ha were revegetated using a program somewhat different from past progressive rehabilitation programs. The 2015 program consisted of direct seeding, using a precision drill seeder, with a second application using hydro-seeding. This method is successful on sandy tailings material, wherever a farm tractor can be maneuvered safely. The typical materials used in the past, again with success, have included a hay mulch (approximately 4500

kg/ha), fertilization with poultry manure (approximately 400 kg/ha) and seeding with the contractor's seed mixtures (approximately 290 kg/ha). A similar mixture was used in 2015 for the drill seeding. For the hydroseeding the materials included a seed blend (fall rye, red clover, buck wheat, oat and red fescue), mulch, fertilizer, hen manure, potash and perennial flowering. Revegetation will continue in 2016 and the 2015 approach (methodology and materials) will be assessed and augmented in 2016. The tailings revegetation program is planned to be completed in 2017.

Water treatment associated with tailings management consists of natural (unaided) settling of solids in Flora Lake, approved under MMER for tailings management. Water quality in Flora Lake, as measured at its discharge (Final Discharge Point under MMER) at the Flora Lake Outlet Arm which flows into Flora River and then Wabush Lake (see Figure 2-12), has been in compliance with the metal criteria in the MMER and ECWSR and the acute lethality criteria in the MMER with few exceptions. The typical water quality as measured and reported also meets or exceeds the CCME criteria for Protection of Freshwater Aquatic Life described in Section 2.4.2. There have been occasions during spring thaw and run-off when suspended solids have exceeded the MMER and ECWSR criteria for brief periods of time. Upon the completion of the tailings revegetation, water quality in and discharging from Flora Lake should be as good as or better than it typically was during mine operation. No further post closure treatment is anticipated to be needed.

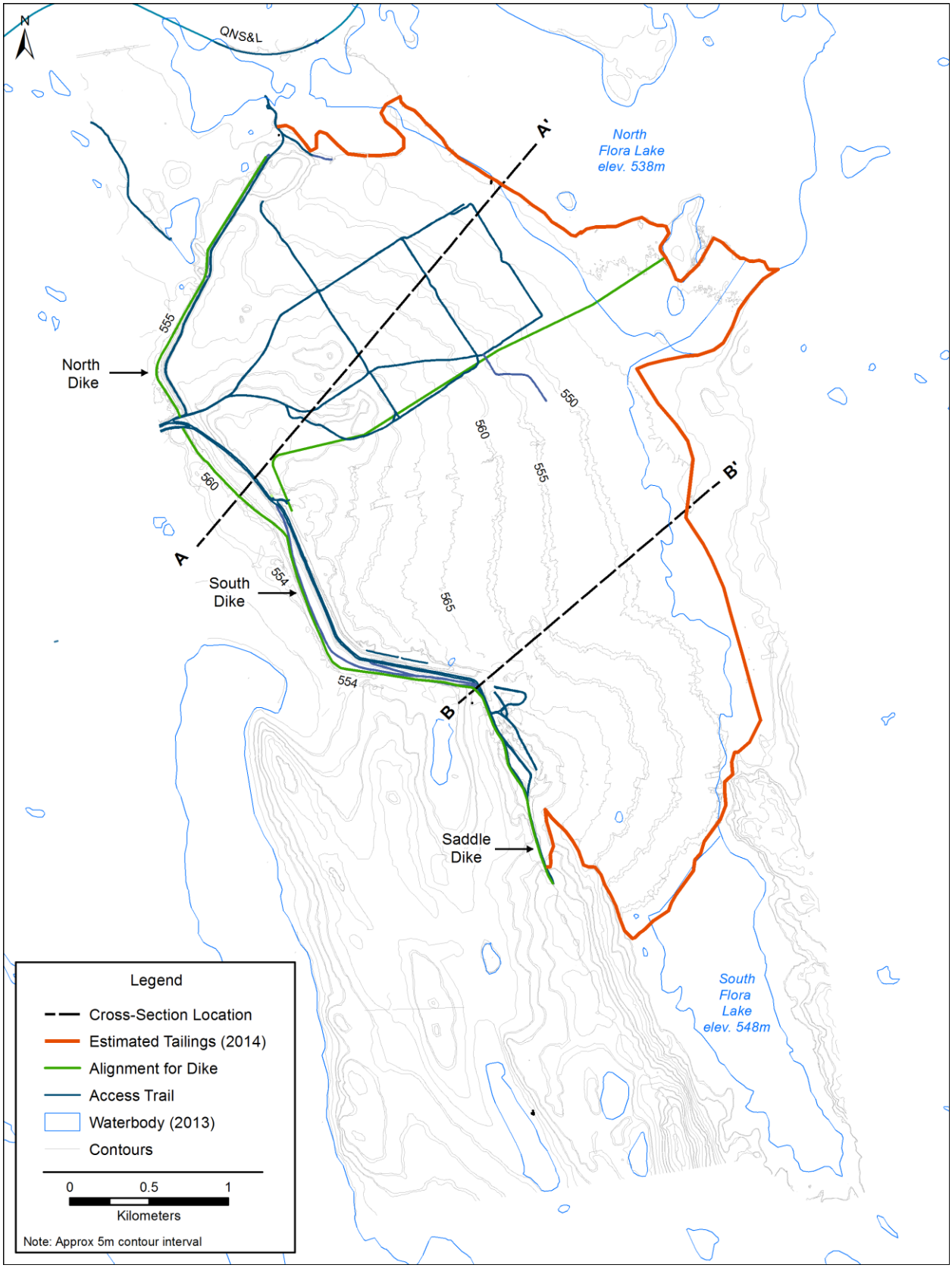

Figure 2-9 **Tailings Cross-Section Layout**

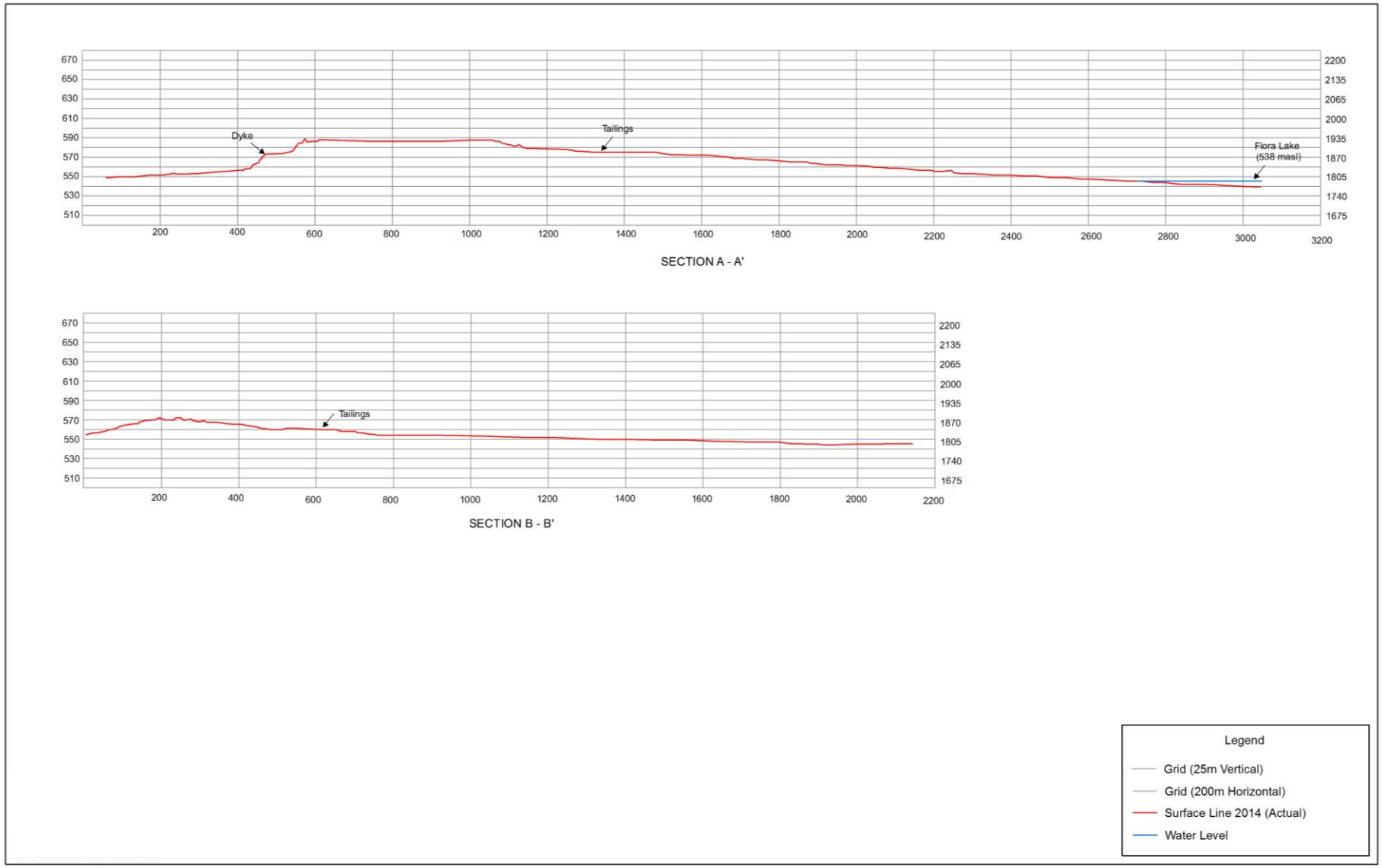

Figure 2-10 Tailings Cross-Sections

2.6.8 Waste Disposal Areas

The Wabush Mines Waste Disposal Facility (WMWDF) is a permanent non-hazardous solid waste disposal site and is located in an area of the East Pit East where mining had been completed. The location of the existing landfill on the mine site is shown in Figure 2-11. The site is approximately 3 hectares in size and, at an elevation of 570 m, is located above the proposed flood levels of the East Pit East (527 masl). The site has capacity for growth both to the south, as well as increasing its depth or elevation with extension to the west. A conservative estimate is that it can triple in size if needed. The landfill currently operates under a Certificate of Approval (LB-WMS08-01001E) and cannot accept highway tires, hazardous materials, petroleum contaminated soil and liquid phase petroleum. Special waste disposal must be approved by Service NL and would be disposed of in a selected area designated for this purpose only.

Waste management issues for the Project execution include:

- Options for disposal of all salvageable (recyclable) metals and other typical recyclable materials are limited by the expectations for waste management expressed by ENVC (see ENVC email dated January 15, 2013 in Appendix A);
- Non-hazardous solid waste will be disposed of at either or both of the WMWDF and the Labrador West Regional Waste Management Facility (LWRWMF). Decisions on disposal sites will be made during the decommissioning activity and in consultation with regulatory agencies;
- All other wastes (as described below) will be removed from site by licensed waste management companies for acceptable management;
- In the event that some mine and mill equipment and other non-hazardous materials are not removed for reuse or scrap metal recycling, Wabush Mines will discuss with ENVC an acceptable approach for disposal of these wastes, including the possible use of the WMWDF;
- Any expansion of the WMWDF would be done after the expansion design has been submitted to and approved by ENVC.

The WMWDF has effectively been progressively reclaimed as it has advanced by covering exposed debris with a layer of waste rock. Its eventual closure will be completed in accordance with the Wabush Mines operating Certificate of Approval (No. AA12-055569), the WMWDF Certificate of Approval, the Environmental Protection Act, applicable provincial regulations and the ENVC Guidance Document GD-PPD-074 or any of their successors.

Handling of “other waste”:

- The asbestos disposal area in the WMWDF has not been used in recent years and has been closed. Disposal of asbestos during the decommissioning will be off-site by licensed waste management companies at licensed waste management facilities;
- Metals are stored at a lay down area in the WMWDF. Metals collected and stored at the WMWDF consist of large pieces of building structure, machinery and mobile equipment, scrap metal, piping, small parts and machinery and coated wire and electrical cable. Metals from demolition of building structures, machinery and equipment if feasible will be removed by a licensed metals recycler and transported to markets by either rail or road. Any metals that have no salvage or

scrap value shall be disposed of in accordance with provincial regulations;

- Plastics are collected and stored throughout the site in the appropriate bins/drums. Where feasible, they will be shipped off-site for recycling or reuse. Plastics that are not shipped off-site for reuse or recycling will be disposed of at the WMWDF;
- Off the Road (OTR) tires are tires with a rim diameter greater than 64.5 cm, *e.g.*, forklift tires and other industrial tires that are not eligible for the provincial Used Tire Recycling Program. OTR tires are stored at a lay down area within the WMWDF for regular off-site removal, where they are returned to the suppliers for reuse or recycling. This practice will continue through the decommissioning until it is no longer viable. Tires that have not been returned to the suppliers for reuse or recycling and have no market value will be disposed of in accordance with provincial regulations, with approval from Service NL. The number of tires is expected to be minimal and limited to tires that are unable to be retreaded and tires that currently serve as on-site berms;
- Conveyor belts are rolled and stored at a lay down area within the WMWDF for off-site removal by a third party for reuse or recycling. This practice will continue until it is no longer viable. The conveyor belts that cannot be reused or recycled will be disposed of in accordance with provincial regulations, with approval from Service NL;
- Non-treated wood, which includes pallets, scrap wood and spools, is currently stored at a lay down area within the WMWDF for regular pick-up. The wood is returned for refund, reused or recycled as appropriate. This practice will continue during decommissioning until it is no longer viable. Wood that cannot be returned, reused or recycled will be disposed of at the WMWDF;
- Treated wood, which includes railway ties and poles, is currently removed from site upon replacement or removal from service. As practiced during operations, during decommissioning all railway ties will be removed from site by a third party. It is anticipated that, due to the good condition of the railway ties and poles, the majority of them can be reused or recycled;
- All windows from demolition of building structures will be disposed of at either the WMWDF or the LWRWMF;
- All hazardous materials on-site are collected in properly identified bins and drums and stored in an ENVC approved, spill proof waste storage shed for off-site disposal by a licensed waste management contractor. This practice will continue during decommissioning;
- All hydrocarbon materials on-site are collected in properly labeled drums for off-site disposal by a licensed waste management contractor as per the ENVC. This practice will continue during decommissioning.

The concentrator yard area (also known as the Kaiser yard) and Hay Lake storage yard had been used as laydown areas and had contained varying amounts of material (old equipment and material). The Kaiser yard had also been used as the landfill for the construction phase of the Wabush Mines and the early days of the Town of Wabush (prior to the establishment of the waste disposal facility in Wabush). These areas are shown in Figure 2-11. These areas have been closed for such use and will be remediated in keeping with Provincial Government expectations. Such material is now stored at the WMWDF and is periodically removed and disposed of off-site as described above.

2.6.9 **Sewage Treatment Plant**

Domestic sewage and grey water from Wabush Mines is treated in a dedicated sewage treatment plant located on the mine site. The sewage treatment plant will continue to be used until the site decommissioning is almost complete. Then the equipment on site will be salvaged or demolished and disposed of using the procedures as described earlier under Section 2.6.5. Sludge from the sewage treatment plant was cleaned out during the warm idle period and disposed of in the WMWDF. Sludge currently accumulating in the system will be cleaned out as necessary and disposed of consistent with past practices and in accordance with provincial regulations.

2.6.10 **Water Quality**

Currently, the water quality as measured by Wabush Mines at its approved Final Discharge Points (FDPs) is, with few exceptions, in compliance with discharge criteria in the federal MMER and the provincial ECWSR. The typical water quality as measured and reported also meets or exceeds the CCME-FAL described in Section 2.4.

Once the pits are flooded with groundwater and surface run-off, it is anticipated that water quality will remain as good as or better than it typically was during mine operation. No further treatment is anticipated to be needed after closure. The recently completed hydrological study of the mine pit flooding and overflow controls has indicated there is no surface overflow expected from the flooded pits to any of the surrounding water bodies due to high hydraulic conductivity geological features between the pits and the surrounding lakes (Amec Foster Wheeler 2015). The water levels in the pits will be monitored for at least two years to provide more information on inflow rates into the pits.

Water treatment associated with tailings management consists of natural (unaided) settling of solids in Flora Lake, approved under MMER for tailings management. Now that tailings disposal to Flora Lake has ceased the area will be revegetated, and water quality in and discharging from Flora Lake should be as good as or better than it typically was during mine operation. No further treatment is anticipated to be needed after closure.

Surface run-off from the rest of the site will follow natural water courses which will be sampled at suitable locations following final decommissioning to confirm that discharge criteria are met. Suitable sampling locations will be determined in consultation with ENVC and Environment Canada (EC). A site wide groundwater monitoring program will also be conducted which will assist decisions on the need for groundwater rehabilitation and determine the groundwater flow regime on the site. This scope for this study is currently being prepared.

Figure 2-11 Waste Disposal Areas

2.6.11 **Environmental Site Assessment**

A number of Environmental Site Assessments are called for – at the current WMWDF, Hay Lake former storage yard, along the railway line, at the demolished buildings and tank farm. In addition, a program of soil contamination assessment will be conducted in all areas that have not been previously addressed during operations in which hydrocarbon products have been stored, used or known to have been spilled over the mine life. These investigations will centre on storage facilities, service shops, utilities, tank farms and the plant site. If excavation is required, clean fill will be brought in to backfill the areas from where contaminated soil has been removed. The decommissioning and rehabilitation Project includes an Environmental Site Assessment of suspected areas of soil contamination and ecological risk-assessment of the areas if required. Any contaminated soil that is reclaimed will either be treated on-site in a new constructed bio-remediation facility (subject to ENVC approval) or removed from site by a licensed waste management contractor and transported to special waste disposal facilities, approved for the management of contaminated soils.

2.6.12 **Long Term Monitoring**

It is anticipated that a surface and ground water quality monitoring program will be maintained for ten years after the pits are flooded and have reached equilibrium, subject to demonstrated need for it to continue. The timeframe for the pits to flood is expected to be between two and five years, as discussed in Section 2.6.10. Figure 2-12 shows the locations for the Final Discharge Points at which surface water quality is currently monitored at a frequency to meet the regulatory requirements of the MMER and ECWSR. With closure, the five Final Discharge Points (West Pit Extension Settling Basin, East Pit Dewatering #2, Tailings Line Emergency Dump Basin, East Pit Dewatering East and Flora Lake Discharge) will continue to be monitored unless decisions are made with ENVC and EC to change the monitoring sites or the sampling frequency.

Similarly, a site-wide groundwater monitoring program will be established. The scope for the implementation of this program is currently being prepared. The monitoring program, including well locations, frequency of sample collection and analytical parameters will be established in consultation with the Water Resource Management Division (WRMD) of ENVC. The results from this program will be reviewed over time with the WRMD and the monitoring program will be amended in accordance with any risk assessment results and regulatory requirements. There are currently 18 groundwater monitoring well locations at the tank farm area of the mill site. These 18 monitoring wells are sampled on a biannual basis. The site-wide groundwater monitoring program will include some of these wells, as well as other wells at strategic locations to be decided.

Following the initial three-year decommissioning period, the surface and ground water quality results will be assessed and the programs will be adjusted in accordance with the trends established during that monitoring period and the regulatory requirements. It is expected that environmental monitoring will continue until it can be demonstrated that the site is chemically and physically stable and is not causing any further environmental degradation to the receiving environment. The decisions on monitoring duration and number of monitoring locations will be made in conjunction with ENVC and EC. As mentioned

above, it is anticipated that such monitoring activity would continue for a period of ten years following the completion of the flooding of the pits.

Compliance will also be maintained with all of the requirements under Section 32 of the MMER. Section 32 is entitled “Recognized Closed Mine Requirements” and it sets out requirements for notifications to EC, production rates and biological monitoring.

Post-closure monitoring will necessitate jointly operating the existing Real-Time Water Quantity/Quality Monitoring Station for a minimum of two years after site rehabilitation and closure activities are completed, or by mutual agreement, until the natural baseline conditions are restored, and/or it has been determined that Real-Time Water Quantity/Quality Monitoring is no longer warranted. While no additional Real-Time Water Quantity/Quality Monitoring Stations are anticipated, should the need arise during or after the projected time-line, the WRMD of ENVC will be prepared to partner with the proponent, to install, operate and maintain additional stations as necessary.

As prescribed in the 2015 Rehabilitation and Closure Plan, regular inspections to monitor stability of the tailings dikes, pit walls and waste dumps will be conducted by suitably qualified professionals. Any changes in the monitoring frequency and/or duration of monitoring will be made in conjunction with ENVC, DNR and EC. A significant point in the consideration of the integrity and stability of the tailings dikes is that the dikes do not hold back water as their bases or toes are above both the water elevation in Flora Lake and the phreatic surface in the tailings. The consequences of a stability problem would, therefore, not be severe and be relatively easy and inexpensive to repair.

An annual amount of funding has been included in the decommissioning and rehabilitation budget for ongoing maintenance of dikes, vegetation, drainage courses and roads or other infrastructure required for inspections, monitoring and maintenance in the long term.

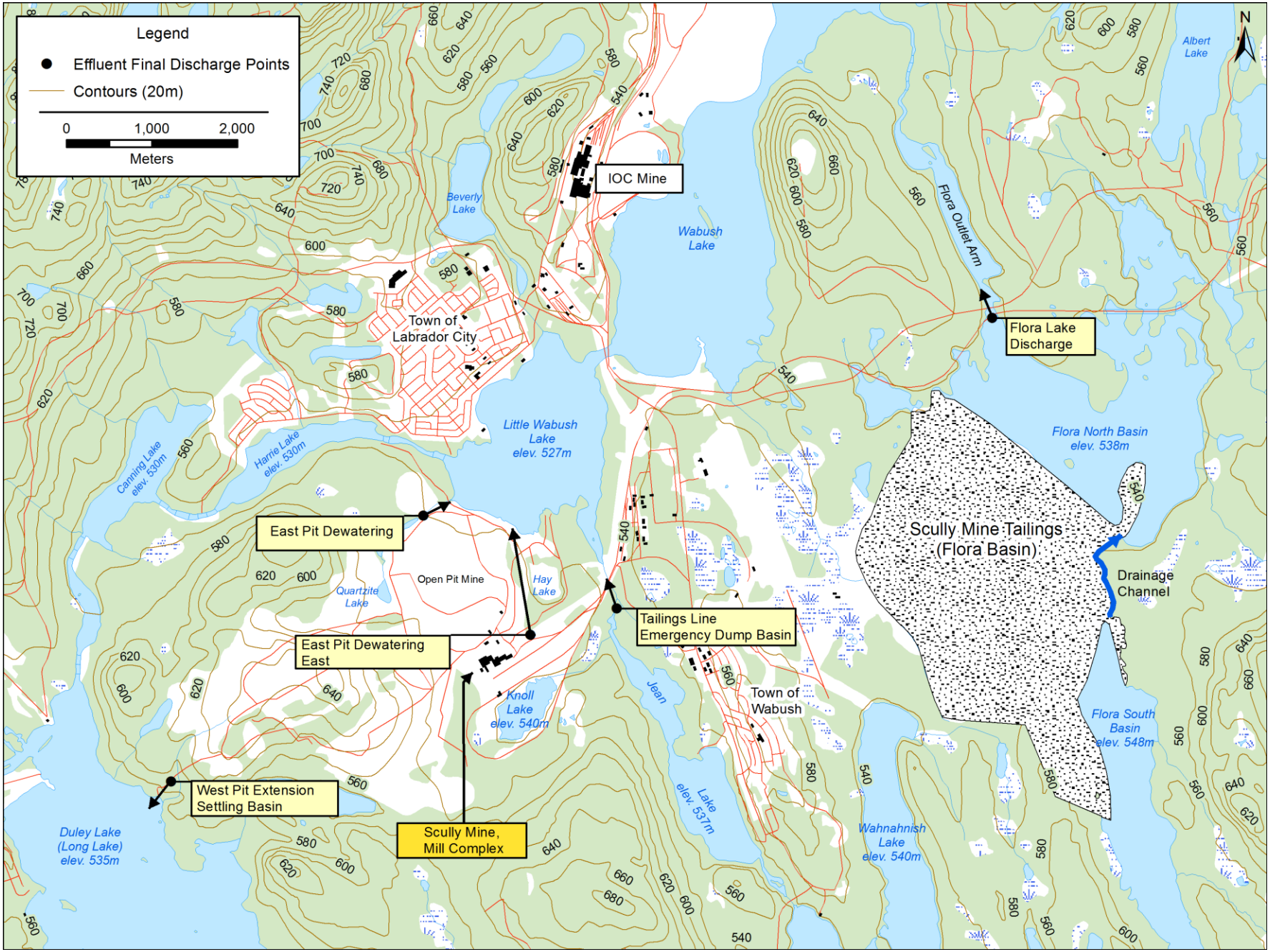

Figure 2-12 **Final Discharge Points and Effluent Monitoring Stations**

Signage along the Landfill Road

Entrance to All Pits Gated and Signage

Figure 2-13 Safety Signage and Access Road Gates – September 2015

Waste Rock Dump #14 Facing West

Waste Rock Dump #11 Facing North

Figure 2-14 Waste Rock Slopes and Revegetation from 2014 Trials – Sept 2015

2.7 Possible Accidents and Malfunctions

During the decommissioning and rehabilitation of Wabush Mines, an accidental or other unplanned event is an unlikely, but unfortunately possible, outcome. Some of the potential accidental events or malfunctions that may be associated with the Project and which are relevant for EA purposes include:

- an accidental spill of chemicals, fuels or other deleterious substances into the terrestrial and/or aquatic environments, and
- a fire or explosion of equipment, potentially extending into adjacent areas.

Human health and safety and environmental protection have always been the highest priority for Wabush Mines during the mine operation and will continue to be paramount in the detailed planning and implementation of the decommissioning and rehabilitation Project. Comprehensive Health, Safety and Environmental Management Plans and Procedures will be developed and will be updated and amended as required as the Project progresses. All activities will be carried out in compliance with relevant legislation, standards and guidelines.

2.8 Effects of the Environment on the Project

Topographic features, climatic conditions, upstream and downstream water bodies, hydrogeological conditions and other environmental factors will influence the scheduling of the Project. The 2015 Rehabilitation and Closure Plan has taken the effects of the environment into account. The proposed schedule for the decommissioning and rehabilitation activities is outlined in section 2.11 and is limited by the harsh winter climate in Labrador West, noting that only limited work can occur in the winter months.

2.9 Labour Force and Occupations

The Project will create employment opportunities in a variety of occupations. Throughout the 3 to 5 year period of decommissioning and rehabilitation activities, the Project will require an estimated total of 131 workers in a number of different occupations. Table 2-4 describes the maximum numbers of employees for each occupation throughout the 3 to 5 year period. The timing and duration of each of the occupations will be dictated by the execution of the activities as per the Project Schedule (see Section 2.11 and Appendix B). For example, the amount of demolition work to be carried out and the expected timeframe for completion requires four (4) crane operators. Depending on the final project schedule, crane operators may not be required until 2018. Similarly, the labour force estimate requires 50 labourers to complete the necessary work. However, it is unlikely there will be 50 labourers required onsite at the same time, and some of these positions may be hired back for subsequent project activities depending on the final scheduling. The labour force estimates and associated person-months or work will be fine-tuned when contractors are hired and detailed schedules are determined.

Table 2-4 Occupations Likely to be represented in the Decommissioning and Rehabilitation Work Force

Occupation	Estimated Number	Relevant NOC Code
Civil Engineer	1	2131
Construction Inspector	4	2264
Construction Supervisor	1	7302
Cost Clerk	2	1431
Crane Operator	4	7371
Drafting Technologist	1	2253
Electrical Engineer	1	2133
Electrician	6	7241
Foreman	8	7302
Geotechnical Engineer	1	2144
Environmental Technician	1	2254
Heavy Equipment Operator	30	7521
Hydrogeologist	1	21113
Labourers	50	7611
Land Surveyor	2	2154
Mechanic	2	7311
Project Manager	1	0711
Health and Safety Officer	1	2263
Safety Officer	1	2263
Superintendent	2	0711
Truck Driver	10	7511
Groundwater Well Drillers	1	7373
TOTAL	**131**	

Project implementation will be carried out on a contractual basis, with workers hired at the discretion of Wabush Mines and the contractor and in accordance with the hiring practices and policies of both. Wabush Mines supports employment and gender equity in its hiring and contracting practices, and is committed to maximizing the use of the local workforce and Newfoundland and Labrador companies.

The 2015 Rehabilitation and Closure Plan estimates that the labour intensive period will be seasonal, up to 6 to 9 months per year, and over a five year period (including 2015). Once the decommissioning and rehabilitation work is complete, the Project will require environmental monitoring to continue until it can be demonstrated that the site is chemically and physically stable and is not causing any further environmental degradation to the receiving environment. Long term, seasonal monitoring positions will likely be filled contractually. Similarly, any ongoing maintenance of rehabilitated sites will likely be conducted through contractors.

2.10 Project Documents

A series of geotechnical, hydrogeological, and field studies are required to prepare for the implementation

of the decommissioning and rehabilitation of Wabush Mines. Some of these studies have already been completed. The remaining studies are planned to be conducted in 2016. The studies and their status are listed below:

1. Geotechnical stability of pit walls under flooding conditions (study complete)
2. Hydrogeological and hydrology study of mine pit flooding and overflow controls (study complete)
3. Hydrology/sediment study of flow from South Flora Lake to North Flora Lake (2016)
4. Dam safety reviews for the TMA (2016)
5. Hydrogeological study of the mine site (2016)
6. Geotechnical stability analysis of the waste rock slopes and associated berms (2016)

The reports associated with the above studies will be provided to DNR and ENVC upon completion and the federal Department of Fisheries and Oceans (DFO) will be informed of the water-related studies.

2.11 Project Schedule

Decommissioning and rehabilitation activities commenced in 2015 and are planned for completion in 2019. As stated in Section 1.2, the 2015 activities are consistent with stated expectations of ENVC to perform activities to enhance environmental quality and public safety in advance of satisfying the EA requirements. Post-closure environmental monitoring and maintenance programs will continue at the mine for a period of 10 years, *i.e.*, through 2024. Water monitoring could extend to 2027. The degree of monitoring and maintenance will diminish over this period as the site stabilizes and it can be demonstrated that closure objectives have been achieved.

Periodic monitoring and some maintenance activities may be required beyond 2024, such as periodic inspection and maintenance of dams and re-vegetated areas and periodic water quality monitoring associated with the outflow from Flora Lake. These requirements will be discussed with and determined in consultation with ENVC and DNR.

The estimated Project schedule is shown in Appendix B. The schedule will be revisited before the decommissioning and rehabilitation commences. While the overall completion dates will remain the same, it is possible that priorities will change. For example, earlier emphasis is now being given to environmental and public safety issues, *e.g.*, tailings revegetation and open pit berms. The actual demolition of the plant facilities are planned for years 4 and 5.

2.12 Project Funding

The Project will be privately funded. Government financial assistance is not required nor requested. The amount of the estimated cost of the Project is currently held in surety by the Government of Newfoundland and Labrador for the closure and decommissioning of Wabush Mines.

2.13 Environmental Management and Protection

As part of its corporate structure and previous operations, Wabush Mines had in place a comprehensive environmental management system including various associated plans and procedures designed to avoid or reduce the environmental effects of its activities. Table 2-5 provides a list of some of the Wabush Mines environmental management and protection plans. These plans and procedures will be revised and updated and additional procedures will be developed as necessary as the Project planning and implementation progress.

Table 2-5 Select Wabush Mines Environmental Management Plans

Title	Current Version
Wabush Mines Scully Mine - Contingency Plan for Environmental Releases	July 11, 2014
Hazardous Materials Management Plan	July 2013
Spill Response and Reporting SOP	June 2014
Dust Suppression Plan	May 2014
Wabush Mines Spring Runoff Monitoring Program	March 2014
Waste Management Plan	Nov 2013

The proposed Project will be carried out in accordance with all applicable legislation and regulations, including the environmental protection and planning measures defined through this EA review, and in compliance with Wabush Mines' policies, procedures and standards.

2.14 Emergency Response and Reporting Plan(s)

While in operation and during the warm idle period, Wabush Mines had a Contingency Plan and a Security and Public Safety Plan that identified potential emergency situations, responsibilities and procedures in the event of an unplanned incident, such as an incident that may affect human health or safety, or the accidental release of hazardous material, and the procedures required for the effective response and reporting of such an incident. These plans will be revised and updated as required during the decommissioning and rehabilitation of the site to ensure that the safety of the environment and the public is protected during all phases of the Project.

2.15 Other Required Environmental Approvals

In addition to approval under the provincial EA process, the proposed Project will require a number of other permits and authorizations. A listing of some of the main permits, licences, approvals and other authorizations that may be required for the Project is provided as Appendix C.

3.0 EXISTING ENVIRONMENT

The following provides an overview of the existing environmental setting for the proposed Project,

including a description of relevant components of the biophysical and socioeconomic environments.

3.1 Natural Environment

The area around Wabush Mines is a heavily used area and has been affected by mining operations for the past five decades. Many components of the natural environment have been altered or affected to varying extents.

3.1.1 Climate

Wabush Mines is located in Western Labrador. The site is located within the extensive *Mid Subarctic Forest* ecoregion (Meades 1989; 1990), which encompasses the upland plateaus of central and western Labrador. This area has a continental, subarctic climate with cool, short summers and long, severe, cold winters. At Wabush Lake, daily average temperatures range from - 22.7 ^{o}C in January to + 13.7 ^{o}C in July, with 482.6 mm of rainfall and 445.7 cm of snowfall per year and prevailing westerly winds (Environment Canada 2004).

3.1.2 Geology and Topography

The area of Wabush Mines is situated in the Labrador Trough, which comprises a thick Proterozoic sedimentary sequence. As part of the Grenville Orogeny the area has undergone medium to high-grade metamorphism and extensive multi-phase deformation to form a terrain that is characterized by thrusting and non-cylindrical folding. All mapped geological units within the area fall within the Knob Lake Group, of which the Middle Iron Formation of the Sokomon Formation (Wabush Iron Formation) is the primary unit of economic interest (see Figure 3-1). The topography of Wabush Mines area is typical of the larger, surrounding region, and is largely bedrock controlled and somewhat rugged with rolling hills and valleys.

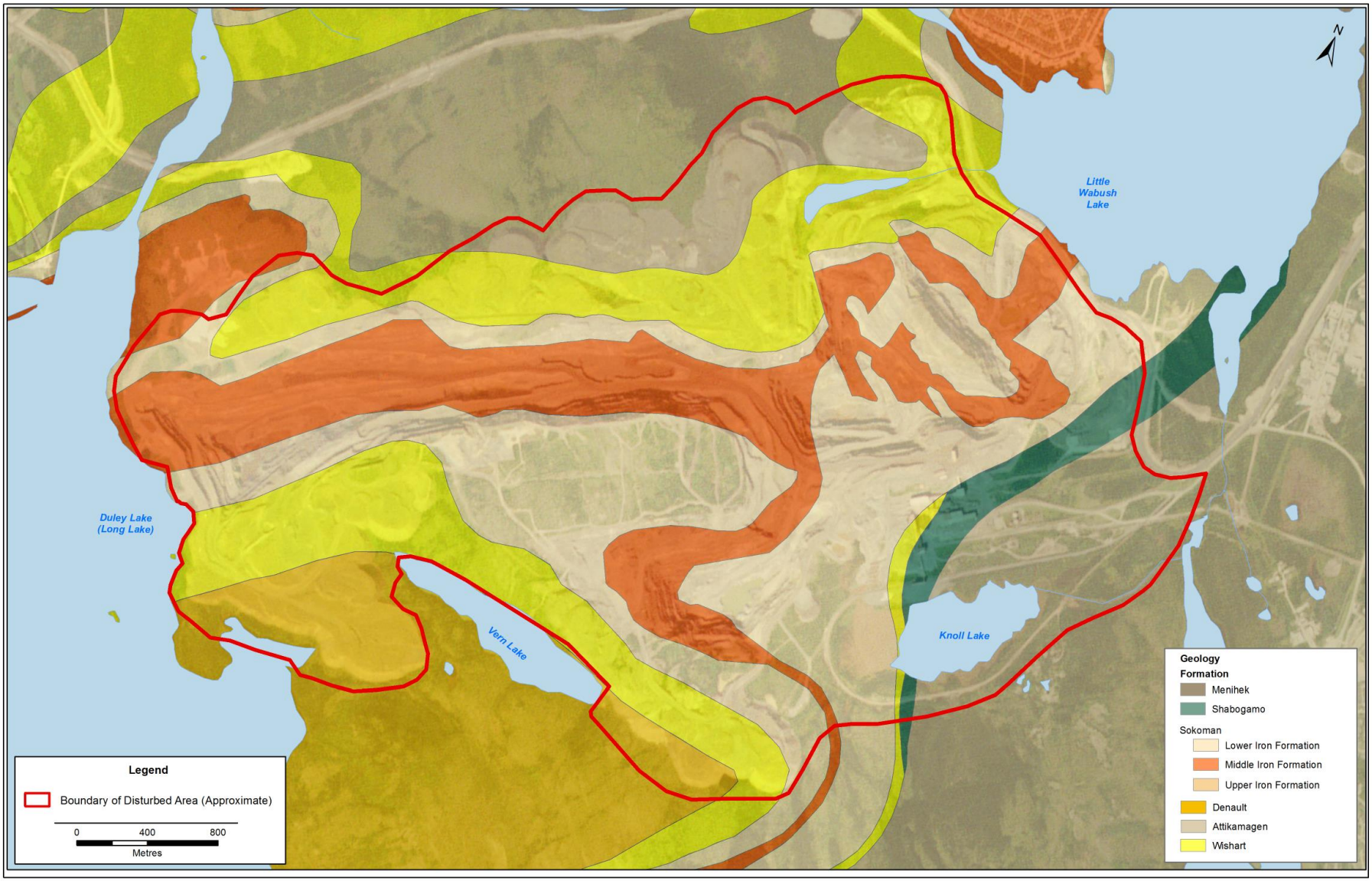

Figure 3-1 Geology of Wabush Mines

3.1.3 Vegetation and Soils

Black spruce is the dominant tree species in the area, with intermittent hardwoods and open lichen woodlands being common and characteristic of this region. The area around Wabush Mines itself has been impacted by mining-related activities since the 1960s and is characterized by patches of mixed wood forest interspersed with areas of moss, lichen cover and exposed rock and earth, with roads, trails and other previously disturbed and developed areas being present throughout the area. There are no listed or rare plant species that are known to occur within the area of decommissioning and rehabilitation.

3.1.4 Hydrology and Hydrogeology

The Wabush Mines area is located within the greater Wabush Lake/Duley Lake watershed area (Figure 3-2). The surface water surrounding Wabush Mines is part of the Western Labrador Watershed that eventually discharges to the Churchill River. Wabush Mines is located in the vicinity of Duley (Long) Lake, Little Wabush Lake, Harrie Lake, Canning Lake, Quartzite Lake, and Knoll Lake (see Figure 2-12 and Table 3-1). Hay Lake was also located within the mine footprint; it was drained during mine site dewatering activities.

Table 3-1. Lakes Surrounding Wabush Mines

Lake	Elevation (masl)
Duley Lake	535
Little Wabush Lake	527
Harrie Lake	530
Canning Lake	530
Quartzite Lake	539
Vern Lake	565
Knoll Lake	540

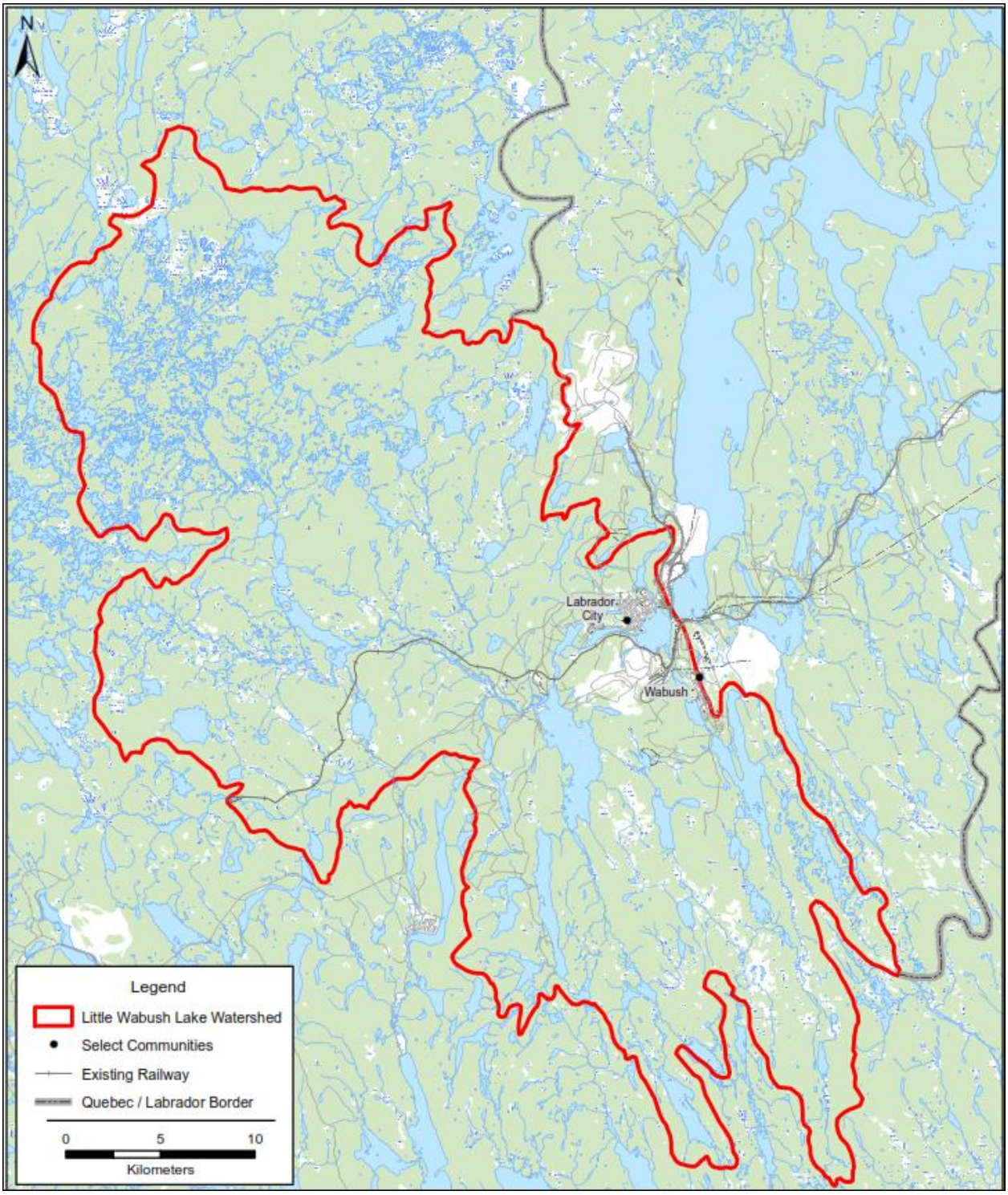

Figure 3-2 Little Wabush Lake Watershed Boundary

3.1.5 Fish and Fish Habitat

The area of fish habitat that is relevant to the Project includes Flora Lake, Duley Lake, and all the surrounding waterbodies that are fish-bearing and could potentially be affected by decommissioning and rehabilitation activities at Wabush Mines (see Figure 2-12 and Table 3-1). The fish species that typically frequent the waters of the Labrador West region, and that have been captured in the area include burbot, lake chub, longnose dace, northern pike, atlantic salmon, brook trout, lake trout, lake whitefish, round whitefish, mottled sculpin, threespine stickleback, longnose sucher, and white sucker (e.g., Bradbury et al. 1999, Grant and Lee 2004). The decommissioning and rehabilitation activities will not occur near or in any of the lakes or waterbodies surrounding Wabush Mines with the exception of the tailings revegetation in the Flora Lake TMA, which will be done by hydroseeding and which will employ standard practices and precautions to avoid runoff into Flora Lake. As mentioned in Section 2.6.3, the anticipated final water levels in the open pits once they have completed flooded are such that no effects on surrounding water bodies, and therefore fish habitat, are anticipated.

3.1.6 Wildlife

The interior of Western Labrador, with its open, stunted forests and extensive wetlands, provides habitats for a range of wildlife that are typical of boreal forest ecosystems. Wildlife species that are known or likely to occur in the general region include muskrat, beaver, red fox, marten, voles, porcupine, lynx, wolf, moose and black bear.

Although individuals from the migratory George River caribou herd have occasionally and sporadically entered the region in past years, the Project site is outside of the herd's current range. The area is also outside the range of the threatened Lac Joseph woodland caribou herd (Schmelzer et al, 2004), as confirmed through an aerial census conducted by the provincial government in March 2009 (Schmelzer 2010).

The presence of large-scale mining activity in and around the Project area for the past five decades has limited the use of the site by most wildlife.

3.1.7 Avifauna

Common resident and migratory species of birds in the interior of Western Labrador include raptors, waterfowl, passerines and upland game birds. Any birds residing in the immediate area would be somewhat accustomed to noise associated with mining, such as from blasting activities and loud machinery.

3.2 Human Environment

The Labrador West region includes the communities of Labrador City (38.83 km^2) and Wabush (46.25 km^2), which had a combined population of 9,228 residents and 3,751 residences in 2011 (Statistics Canada 2012).

Mining and mineral processing, together with related support industries, are the main economic focus of the region (Labrador West 2012). In 2006 the region had a total labour force of 5,310 workers, of which 2,215 (42 percent) worked in resource-based industries. In that year, the region had a labour force participation rate of 73 percent, an unemployment rate of 9 percent (less than half the provincial rate), and over 85 percent of total income in the region came from employment earnings (Statistics Canada 2006). The average family income in these communities in 2011 was approximately $140,300, which was over 45 percent higher than that for the province as a whole that year (NL Community Accounts 2012).

The existing land use of the area surrounding Wabush Mines is primarily wilderness land supporting a variety of natural wildlife. The area is remote and consequently is not currently being used for other resource harvesting, tourism and/or recreation other than subsidence/recreational harvesting of firewood and vegetation and recreational use by local residents.

The Government of Newfoundland and Labrador considers that the Wabush/Labrador City area will remain as a mining center for many years into the future. In the event that mining ceases in the immediate area, the region will become a service area for western Labrador.

A number of Aboriginal organizations have asserted land claims to areas in Western Labrador. These land claims are at varying stages of acceptance, negotiation and settlement.

The Labrador Innu currently number about 2,500 and reside primarily in two communities - Sheshatshiu in Central Labrador and Natuashish on the Labrador North Coast. The Innu Nation has an asserted land claim which has been accepted for negotiation by both the federal and the provincial governments, and which extends to Western Labrador. The provincial and federal governments and Innu Nation have completed detailed agreements on these matters, including a tripartite Innu Land Rights Agreement-in-Principle, which was ratified by the Innu on June 30, 2011, and signed by the three parties on November 18, 2011 (AANDC 2011).

The NunatuKavut Community Council (NCC) is an organization that reports a membership of over 6,000 members who reside primarily in Southern and Central Labrador. Originally established as the Labrador Métis Association in 1985, the NCC has asserted a land claim that covers much of Central, Western and Southeastern Labrador.

In addition to Aboriginal communities in Labrador, there are also Aboriginal organizations in Quebec who have asserted claims in areas in Western Labrador, including the Matimekush Lac John First Nation, the Naskapi Nation of Kawawachikamach and the Uashat mak Mani-Utenam First Nation.

4.0 CONSULTATION

Wabush Mines views the EA process as an effective means to inform residents of the Towns of Wabush and Labrador City and all interested parties of the approach being planned to decommission the Wabush Mines operation and rehabilitate the affected area. Through the EA registration and review process

interested parties have the opportunity to bring forward their views and to identify issues and ask questions about the Project for consideration in governmental (regulatory) review and decision-making. Wabush Mines is pleased to meet with interested parties, to answer any questions with respect to the Project, to gather any comments and concerns that are raised about the Project and to exchange information in this regard as required.

4.1 Regulatory Consultation

Wabush Mines has provided and will continue to provide Project information to, and correspond and meet with, the provincial government. Relevant provincial and federal government departments will participate in the review of this EA Registration and associated regulatory decisions.

The preparation of the 2014 Rehabilitation and Closure Plan was conducted with ongoing communication with DNR. Both DNR and ENVC were involved in the review of drafts and the acceptance of the final version. With the decision to close the operation, Wabush Mines held meetings with DNR and ENVC in November 2014 to discuss the closure and early actions for late 2014 and early 2015.

Subsequent to the submission in the September 2014 of the Rehabilitation and Closure Plan, the closure of Wabush Mines was announced. The draft 2015 Rehabilitation and Closure Plan is intended to provide current information regarding its implementation. Changes were made in the 2015 Plan to:

- reflect the current conditions of the mine site and facilities where they are different than what was projected in 2014 for a 2024 closure – both in the Plan text and figures;
- reflect changes in the order and scheduling of rehabilitation and closure activities;
- include the progressive rehabilitation activities planned in the 2014 Plan and not completed before closure; and
- adjust the list of projected activities and cost estimates to reflect what has been conducted to date and changes to cost estimates of specific activities where quotations for the work have been received.

The 2015 Plan has been prepared with the knowledge of DNR and it has been submitted to DNR for consideration and distribution as determined by DNR. DNR has informed Wabush Mines that its review of the 2015 Plan will be conducted after the Project's release from EA.

The Project will require a range of environmental permits and other authorizations (see section 2.15 and Appendix C). The post-EA permitting process will provide the opportunity for relevant regulatory departments and agencies to establish specific terms and conditions such as the issuance of a Certificate of Approval to implement the Project and relevant Permits that may be required. Wabush Mines and/or its contractors will identify, apply for and adhere to all required permits and other authorizations that are required for Project construction and/or operations.

4.2 Stakeholder and Public Consultation

Wabush Mines held a meeting with the Towns of Wabush and union officials in 2014 to inform of the decision to close Wabush Mines.

This EA Report will be made available to all interested parties, including the Towns of Wabush and Labrador City, for their information, review and comment as part of the EA process. Wabush Mines is prepared to communicate with these organizations to answer any questions with respect to the Project, to gather any comments and concerns they may have about the Project and to exchange information with them in this regard as required.

4.3 Aboriginal Consultation

This EA Report will be made available to all relevant Aboriginal organizations, for their information, review and comment as part of the EA process. Wabush Mines will be pleased to be guided by the governmental authorities on any Project-specific requirements with respect to Aboriginal consultation.

5.0 POTENTIAL ENVIRONMENTAL ISSUES AND THEIR MANAGEMENT

The following sections provide the results of an environmental effects analysis for the proposed Project, including each of its associated components and activities. The analysis focuses upon, and is organized according to, the following themes:

1) Atmospheric and Acoustic Environment

2) Terrestrial Environment

3) Freshwater Environment

4) Socioeconomic Environment

The analysis for each includes a discussion and description of the likely environmental issues (adverse and positive) that may be associated with the Project. Environmental planning and mitigation measures to avoid or reduce environmental effects are identified and considered integrally with the analyses. The assessment also includes possible accidental events and malfunctions that could potentially occur during each component of the Project. The potential cumulative environmental effects of the Project in combination with other projects and activities that have been or will be carried out are also addressed. This is followed by a summary and evaluation of the likely residual (after mitigation) environmental effects of the Project.

The Project to decommission and rehabilitate the Wabush Mines site will ultimately have positive environmental effects on the atmospheric, terrestrial and freshwater environments. The socioeconomic environment is also positively affected by the Project since a number of jobs will be created by the implementation of the Project.

5.1 Atmospheric and Acoustic Environment

The environmental analysis for the Atmospheric and Acoustic Environment includes consideration of any likely implications of the Project on air quality and noise levels within and around the Project area and nearby communities.

Wabush Mines has carried out an ambient air monitoring program in Western Labrador for a number of years, which includes sampling on a 6 day National Air Pollution Surveillance (NAPS) schedule for total suspended particulate matter (TSP), particulate matter less than 2.5 microns (PM2.5), particulate matter less than 10 microns (PM10) and sulphur dioxide (SO_2) at two locations in and around Wabush, namely on Bond Street near the Provincial Building and on Bowater Street at the JR Smallwood Middle School. Government regulators have real-time access to the air monitoring data to ensure compliance with air quality standards. The two stations will continue to operate during the decommissioning and rehabilitation of the site.

5.1.1 During Decommissioning and Rehabilitation

The main potential interactions between the Project and the Atmospheric and Acoustic Environment relate to the use of vehicles and equipment, primarily during demolition and removal of site buildings and infrastructure, surface crushing facilities, and roads and rail lines.

These activities will be similar in noise and dust emissions to some of the activities that were carried out while Wabush Mines was in operation. The activities will occur within a localized area over a relatively short period, will take place within an area that has been previously developed, and that is several kilometres from local communities. Project-related vehicles and equipment will be maintained in good repair and inspected regularly and any associated air emissions from equipment and vehicles will conform to applicable regulations and guidelines. Fugitive dust from demolition activities will be controlled as necessary using dust control agents such as water.

As the tailings management area dries out, dusting becomes a possibility. As such, revegetation of the tailings management area is a high priority. The combination of drill seeding and hydroseeding which was conducted in 2015 is reported to have been effective in suppressing dust.

Any negative emissions or interactions with the Atmospheric and Acoustic Environment during the Project are likely to be negligible (and within existing regulations or standards), localized and short-term (intermittent during the decommissioning and rehabilitation period).

It is more likely that positive effects to the Atmospheric and Acoustic Environment will be realized during the implementation of the Project because the emissions that were associated with the mine operation, such as emissions from the mine haul trucks and mineral processing facilities are no longer being produced. Additionally, explosives blasting, which was part of the mining operations, will no longer be

carried out.

5.1.2 Long Term Monitoring and Maintenance

Once the site has been completely decommissioned, on-site activity will consist of water quality monitoring, inspection and maintenance of revegetated areas, tailings embankments, safety berms, and site security measures, as necessary.

Any potential emissions or interactions with the Atmospheric and Acoustic Environment during this phase are likely to be negligible, unless the revegetation of the tailings area is unsuccessful and dusting becomes a problem. If this occurs, and the continuation of revegetation efforts will be assessed.

5.1.3 Potential Accidents and Malfunctions

The potential accidental events or malfunctions during Project implementation that would be most relevant to the Atmospheric or Acoustic Environments would be a machine malfunction resulting in a fire or explosion or an explosion or a fire in one of the site buildings as it is being cleaned out. These events are very unlikely. However, as described earlier, Wabush Mines will have in place a Contingency Plan to respond to such an accidental event should one occur. These measures will also be further defined and reinforced through the eventual federal and provincial government permits and other approvals that will be required for the Project implementation.

5.1.4 Cumulative Environmental Effects

As previously mentioned, the proposed Project will be in a localized area and of relatively short and intermittent duration. Therefore, the decommissioning and rehabilitation of Wabush Mines is not likely to contribute measurably to overall air quality or noise levels in the area.

5.1.5 Environmental Effects Summary and Evaluation

A summary of potential environmental interactions, identified mitigation measures, and the residual environmental effects of the Project on the Atmospheric and Acoustic Environment is provided in Table 5.1.

Table 5-1 Environmental Effects Assessment Summary: Atmospheric and Acoustic Environment

Environmental Component	Project Phase / Potential Interaction			Key Considerations and Environmental Mitigation	Residual Effects
	Decommissioning and Rehabilitation	Long Term	Issues / Interactions		
Air Quality	•		▪ Equipment use (vehicles, fuel consumption) ▪ Possible accidental event (fire) ▪ Operation of equipment (vehicles, demolition equipment) ▪ Possible accidental event (fire, explosion)	▪ Localized and short-term demolition activity. ▪ Standard construction practices and equipment maintenance. ▪ Project activities have little or no air emissions or detectable noise. ▪ Project activities have lower levels of air emissions or detectable noise than mine operational activities ▪ Location is on an existing mine site. ▪ Accidental event prevention and response plans in place	P
Noise Levels	•				P

Key:

•	Potential Project Interaction (by Phase)
N	No likely adverse residual environmental effect
NS	Not significant adverse residual environmental effect
S	Significant adverse residual environmental effect
P	Positive residual environmental effect

The proposed Project is likely to result in positive environmental effects on the Atmospheric and Acoustic Environment.

5.2 Terrestrial Environment

The Terrestrial Environment is comprised of relevant components of the "on-land" biophysical environment which may interact with the Project, including vegetation, soils, landforms and wildlife. The terrestrial environment at Wabush Mines has been significantly modified during the life of the mine by activities such as the development of the open pits and waste disposal sites, deposition of waste rock around the open pits, development and use of the tailings management area, and establishment of buildings, conveyors, roads, railway lines, pipelines, and tunnels. Additional effects on the terrestrial environment will occur during the decommissioning and rehabilitation in the form of scarification and promotion of natural vegetation after buildings, roads, and railway lines are removed, re-contouring of slopes, re-establishment of natural drainage pathways and revegetation of waste rock dump slopes and the tailings management area.

5.2.1 During Decommissioning and Rehabilitation

The main activities affecting the terrestrial environment during Project execution are the removal of site buildings, railway lines, and roads no longer in use and the reclamation of these areas and the tailings management area and waste rock slopes by either active revegetation or scarification of the ground surface and promotion of natural vegetation. The areas to be reclaimed are shown in Figure 2-4.

The reclamation activities will have a positive effect on the terrestrial environment because they will provide a basis for the re-establishment of natural, native plant growth in the mine footprint area and allow natural habitats to reclaim the Project area.

A number of Environmental Site Assessments (ESAs) are called for – at the current WMWDF, the former Hay Lake and Kaiser storage yards, along the railway line, and at the demolished buildings and tank farm sites. Once these have been completed and any required soil remediation has been completed, a positive effect on the terrestrial environment will be realized.

Given the presence of mining activity within and around the Project area for the past five decades, the Project site likely provides limited or no wildlife habitat at present. Recent studies have confirmed that the area is not within the current range of the migratory and sedentary caribou populations which occur in Western and Central Labrador. Any wildlife (such as avifauna) that use the area have likely habituated somewhat to on-going human activity. The decommissioning and rehabilitation of the site will have a long term positive effect on wildlife in the area by providing habitat that was previously unavailable while the mine was operating.

While decommissioning and rehabilitation activities are ongoing, the following measures will be implemented to reduce the potential for interactions between these activities and any wildlife that may occur in the area:

- Work areas will be kept clear of garbage
- Personnel will not hunt or harass wildlife while on site
- Pets will not be permitted on site
- Equipment and vehicles will yield the right-of-way to wildlife
- Any nuisance animals will be dealt with in consultation with the NL Inland Fish and Wildlife Division

Wabush Mines currently has procedures in place for the management of solid and hazardous wastes, which will continue to apply during the decommissioning and rehabilitation of the site. Waste materials generated through decommissioning and rehabilitation activities will be removed from the area and disposed of at the WMWDF, the LWRWMF, or at other approved sites if the wastes are special wastes or hazardous. There will therefore be no adverse interaction between construction waste materials and the environment.

5.2.2 Long Term Monitoring

During the long term monitoring phase of the Project there will be no soil or vegetation disturbance, and therefore, little or no potential for further effects on the terrestrial environment. The long term monitoring will include inspections of revegetated areas for growth and run-off and erosion. Funding has been included in the decommissioning and rehabilitation budget for ongoing maintenance of dikes, vegetation, drainage courses and roads or other infrastructure required for inspections, monitoring and maintenance in the long term.

No interactions with or adverse effects on the Terrestrial Environment are therefore anticipated during this phase of the Project.

5.2.3 Potential Accidents and Malfunctions

Potential accidental events or malfunctions during Project construction and/or operations such as a fire or a spill of fuel or other chemicals could affect vegetation, soils and/or other aspects of the Terrestrial Environment in or around the Project area. The resulting environmental effects of such an incident would clearly depend upon the nature and magnitude of the event.

As indicated previously, Wabush Mines will have a Contingency Plan in place to respond to potential accidents and malfunctions, such as a fire, spill, or other associated event. These measures will be applied to (and refined as required for) the Project activities, and will be further reinforced through the various federal and provincial government permits, other authorizations and regulations, and compliance standards that will be relevant to the construction and operation of the Project.

5.2.4 Cumulative Environmental Effects

The effects of the Project on the Terrestrial Environment will be limited to the site area. As such, any benefits will not overlap or interact cumulatively with those of other projects and activities in the area. The additional plant and wildlife habitat may have a positive effect on overall biodiversity in the region. However, as previously stated, the site has been affected by mining activities for almost 60 years and the rehabilitation objectives are to physically and chemically stabilize the area, and not to revert it back to its original undisturbed state. Therefore, the additional habitat will not likely contribute significantly to any overall, cumulative environmental effects to the Terrestrial Environment in the region.

5.2.5 Environmental Effects Summary and Evaluation

A summary of potential environmental interactions, identified mitigation measures, and the residual environmental effects of the Project on the Terrestrial Environment is provided in Table 5-2.

Table 5-2 Environmental Effects Assessment Summary: Terrestrial Environment

Environmental Component	Project Phase / Potential Interaction			Key Considerations and Environmental Mitigation	Residual Effects
	Rehabilitation and Decommissioning	Long Term	Issues / Interactions		
Vegetation	•		▪ Vegetation of demolished building sites ▪ Vegetation of waste rock dumps and tailings area ▪ Scarification of removed roads and railway lines ▪ ESA and remediation or removal of contaminated soil	▪ Localized and small project "footprint" ▪ Compliance with regulations and permits ▪ Accidental event prevention and response	P
Soils	•				P
Wildlife		•		▪ Currently negligible use by wildlife ▪ New habitat available once site is rehabilitated	P
Terrestrial Species at Risk				▪ None known to occur in or near Project area	N

Key:

•	Potential Project Interaction (by Phase)
N	No likely adverse residual environmental effect
NS	Not significant adverse residual environmental effect
S	Significant adverse residual environmental effect
P	Positive residual environmental effect

The proposed Project is likely to result in significant positive environmental effects on the Terrestrial Environment.

5.3 Freshwater Environment

The Freshwater Environment includes surface and groundwater (quantity and quality) and fish and fish habitat which may interact with the Project. Two main considerations for effects on the freshwater environment are the flooding of the open pits and the effects on Flora Lake with the stabilization of the tailings management area. General decommissioning and rehabilitation activities that may affect the freshwater environment include any activities that may result in erosion or sediment-laden run-off entering a water body. The results of the ESAs may also indicate the potential for groundwater contamination but this will not be known until the ESAs are carried out.

A hydrogeological study to predict final water levels in the open pits after flooding was conducted and concluded that water level effects to the surrounding water bodies are not anticipated. Long term dewatering at Wabush Mines has not impacted the surrounding water bodies as the water was pumped back into the receiving environment creating equilibrium between dewatering effects on the water table and discharge to Little Wabush Lake and Duley Lake. Cessation of dewatering will also reach equilibrium between the open pits and the surrounding water bodies. It is not anticipated that water from the pits will flow overland into the receiving environment.

Flora Lake is a designated tailings impoundment area and the 2014 Mine Development Plan predicted the entire south end of the Lake would be filled with tailings by 2024. Closure of the mine in 2014 means that this area remains accessible for fish habitat.

5.3.1 During Decommissioning and Rehabilitation

Activities associated with the re-contouring of slopes, re-establishment of natural draining pathways, demolition of buildings and roads may result in run-off that may affect the freshwater environment.

Site drainage will be managed as required to prevent water containing sediment and/or other substances from entering adjacent water bodies and watercourses. If silt-laden water is produced, it will be discharged to a vegetated area or a sedimentation basin prior to release into a watercourse or water body. A clearly marked buffer zone in accordance with any required permits will be maintained between any areas of ground disturbance and watercourses.

Any removal of watercourse structures such as culverts will be conducted in the dry by diverting or pumping water around the construction area. Erosion control measures (*e.g.*, sediment traps and filter fabric) will be put in place during activities as appropriate to minimize erosion and siltation of water bodies.

If any in-stream work is required, it will be undertaken in compliance with government regulations, permits, and applicable DFO guidelines. To avoid sensitive periods for fish, any such activity will be conducted between June 15 and September 15, unless otherwise approved.

5.3.2 Long Term Monitoring

During the long term monitoring phase of the Project there will be no additional, direct interactions with the Freshwater Environment aside from sampling and maintenance activities.

As previously mentioned, the flooding of the open pits will not cause any changes to the existing levels of nearby water bodies and the cessation of tailings disposal in Flora Lake means no additional interactions or adverse effects to the Freshwater Environment are anticipated.

5.3.3 Potential Accidents and Malfunctions

A spill of chemicals or fuel or other accidental events during the decommissioning and rehabilitation phase may affect water resources and/or fish and fish habitat in or around the Project area. Again, the resulting environmental effects of such an incident would depend upon the nature and magnitude of the event.

Wabush Mines will have various measures, plans and procedures in place to prevent a spill or other associated event at its Labrador West operations, as well as to respond to such an accident should one occur. These measures will be applied to (and refined as required for) the decommissioning and rehabilitation activities as well as further reinforced through the various federal and provincial government permits that will be required for the implementation of the Project.

5.3.4 Cumulative Environmental Effects

Water resources as well as fish and fish habitat in the Wabush Mines area have been affected by development projects and activities in the region for the past five decades. As discussed previously, the flooding of the open pits is not expected to affect surrounding water bodies. There will be no fish passage between the open pits and surrounding water bodies. It is not expected that the flooding of the pits will have any measurable effects on the freshwater environment.

5.3.5 Environmental Effects Summary and Evaluation

A summary of potential environmental interactions, identified mitigation measures, and the residual environmental effects of the Project on the Freshwater Environment is provided in Table 5-3.

Table 5-3 Environmental Effects Assessment Summary: Freshwater Environment

Environmental Component	Project Phase / Potential Interaction			Key Considerations and Environmental Mitigation	Residual Effects
	Decommissioning and Rehabilitation	Long Term	Issues / Interactions		
Surface Water (Quantity and Quality)	•		▪ Run-off from demolition, scarification, or placement of overburden / topsoil / fertilizer / mulch on areas to be reclaimed ▪ Run-off from hydro-seeding of waste rock dump slopes ▪ Potential accidental spills	▪ Compliance with regulations and permits ▪ Design mitigation (erosion and sediment control plan, spill containment, *etc*.) ▪ Accidental event response	N
Groundwater (Quantity and Quality)	•		▪ Potential accidental spills	▪ Compliance with regulations and permits ▪ Design mitigation (spill containment, *etc*.) ▪ Accidental event response	N
Fish and Fish Habitat	•		▪ Run-off from revegetation efforts on tailings management area ▪ Potential accidental spills	▪ Compliance with regulations and permits ▪ Design mitigation (erosion and sedimentation control plan, spill containment, *etc*.) ▪ Accidental event response	N
Freshwater Species at Risk				▪ None known to occur in or near Project area	N

Key:
- • Potential Project Interaction (by Phase)
- N No likely adverse residual environmental effect
- NS Not significant adverse residual environmental effect
- S Significant adverse residual environmental effect
- P Positive residual environmental effect

The proposed Project is not likely to result in significant environmental effects on the Freshwater Environment.

5.4 Socioeconomic Environment

The Socioeconomic Environment includes relevant components of the human and cultural environments, including historic and heritage resources, land and resource use (commercial, municipal, traditional, recreational), human health and well-being, community services and infrastructure, and economy.

Historic and heritage resources include sites, objects or other materials of historic and archaeological, paleontological, architectural, cultural and/or spiritual importance. In Newfoundland and Labrador, such resources are protected under provincial legislation and valued by Aboriginal and other people in the province. There are no known historic and heritage resources within the Project area. The site has already been heavily impacted, and is located within an area that has been subject to on-going mining activity for the past five decades. It is therefore unlikely that the area contains, or that the Project will result in the disturbance or destruction of historic and heritage resources.

Public access to the Project area is restricted, and land and resource uses and other activities therefore do not currently take place on the site. No interactions with, or adverse effects upon, commercial, municipal, traditional or recreational activities in the area are therefore anticipated.

5.4.1 During Decommissioning and Rehabilitation

Demolition activities and associated ground disturbance have the potential to disturb or destroy archaeological sites and other historic and heritage resources. Although the likelihood of encountering any historic or heritage resources is small, standard precautionary and reporting procedures will be implemented. Should an accidental discovery of historic resources occur, all work will cease in the immediate area of the discovery until authorization is given for the resumption of the work. Any archaeological materials encountered will be reported to the Provincial Archaeology Office, including information on the nature of the material discovered and the location and date of the find.

In addition, given that Project will be characterized by fairly standard and routine activities and practices, will occur within a localized area over a relatively short period, and will take place within an area that has been previously developed and several kilometres from local communities, the Project is not expected to have any negative implications for human health and well-being in local communities or elsewhere.

The closure of Wabush Mines resulted in the loss of hundreds of jobs to the region. The implementation of the decommissioning and rehabilitation Project will create some new jobs for the duration of the Project, as described in section 2.9. These jobs will be mostly seasonal and relatively short term (three to four years). The size of the workforce that will be needed to carry out the decommissioning and rehabilitation will not place any additional demands on community infrastructure and services. As such, the decommissioning and rehabilitation Project will have a positive effect on the socioeconomic environment.

5.4.2 Long Term Monitoring

Once decommissioning and rehabilitation activities are completed, there will be no additional ground disturbance, and therefore, little or no potential for effects to historic and heritage resources. The precautionary and reporting procedures implemented for the decommissioning and rehabilitation phase will, however, continue to be in place throughout the life of the Project.

Again, given the nature and location of the Project and its activities, no interactions with local commercial, municipal, traditional or recreational land and resource use activities are anticipated, nor will there be any implications for human health and well-being.

5.4.3 Potential Accidents and Malfunctions

An accidental event or malfunction during the Project, such as a fire or spill, could affect the Socioeconomic Environment through, for example, an effect on human health and well-being and an increased demand for local safety and health services. As described earlier, the probability of such an event occurring is low, and any potential effects would depend upon the specific nature and magnitude of the event.

Wabush Mines will have various measures, plans and procedures in place to respond to a fire, explosion or other associated event during the Project implementation. These measures will be applied to (and refined as required for) the decommissioning and rehabilitation activities, as well as further reinforced through the various federal and provincial government permits that will be required for the Project.

5.4.4 Cumulative Environmental Effects

As described above, given the nature, scale and timing of this Project it will likely not affect most aspects of the socioeconomic environment, and any effects it does have will be primarily positive, particularly in terms of the short term economic benefits. The Project is not likely to contribute measurably to the overall, cumulative adverse effects of any past, on-going and future projects and activities in the region.

5.4.5 Environmental Effects Summary and Evaluation

A summary of potential environmental interactions, identified mitigation measures, and the residual environmental effects of the Project on the Socioeconomic Environment is provided in Table 5-4.

Table 5-4 Environmental Effects Assessment Summary: Socioeconomic Environment

Environmental Component	Project Phase / Potential Interaction			Key Considerations and Environmental Mitigation	Residual Effects
	Decommissioning and Rehabilitation	Long Term	Issues / Interactions		
Historic and Heritage Resources	•		▪ Ground disturbance	▪ Localized and short-term construction activity ▪ Low potential for historic and heritage resources ▪ Standard precautionary and reporting procedures	N
Land and Resource Use		•	▪ Potential industrial use	▪ Currently a restricted area ▪ No public use of the site	P
Human Health and Well-Being	•		▪ Possible accident affecting human health	▪ Distance from and minimal interaction with communities ▪ Accidental event response ▪ Potential positive effect due to safer conditions around the open pits and waste rock piles	N P
Community Services and Infrastructure				▪ Timing and scale of Project activities ▪ Distance from and minimal interaction with communities	N
Economy	•	•	▪ Employment and business opportunities ▪ Infrastructure for future growth	▪ Positive effects (direct and indirect)	P

Key:

- • Potential Project Interaction (by Phase)
- N No likely adverse residual environmental effect
- NS Not significant adverse residual environmental effect
- S Significant adverse residual environmental effect
- P Positive residual environmental effect

The proposed Project is not likely to result in significant adverse environmental effects on the Socioeconomic Environment and will result in short term economic benefits.

5.5 Environmental Monitoring and Maintenance

Any environmental issues which may be associated with the Project can be addressed and mitigated through the use of good construction and operational practices and procedures, supported by Wabush Mines' environmental and health and safety management system and associated plans and procedures, which will be implemented and strictly adhered to throughout the duration of the Project. These will be further addressed through the specific environmental permitting requirements and compliance standards and guidelines which will apply to the Project.

Once the Project is complete, as determined by the objectives described in Section 1.1, the land will be returned to the Crown. Throughout the Project life, Cliffs remains committed to obtaining all required authorizations for the Project, and to complying with the monitoring requirements associated with all applicable federal and provincial regulations.

6.0 SUMMARY AND CONCLUSION

Wabush Mines is submitting a Project Registration to initiate the provincial EA process for the decommissioning and rehabilitation of Wabush Mines (the Project). Wabush Mines has closed ten years sooner than expected due to unforeseen economic circumstances. Wabush Mines is required to implement its Rehabilitation and Closure Plan, which was approved by DNR and ENVC in 2014 and subsequently updated and submitted to DNR in 2015. This EA Project Registration describes the Project components and the potential environmental issues (adverse and positive) that may result from each one, and identifies environmental planning and mitigation measures to avoid or reduce those environmental effects.

The Project will be implemented so as to avoid or reduce potential adverse environmental effects and to optimize socioeconomic benefits to the Wabush region. It will be undertaken in accordance with Wabush Mines' environmental and health and safety policies, plans and practices, to help ensure that all activities are carried out in a safe and environmentally responsible manner.

The Project will be implemented in accordance with applicable legislation and regulations, including the environmental protection and planning measures defined in this document, and in compliance with Wabush Mines' policies, procedures and standards.

In addition to EA review, the Project will eventually require a range of additional environmental permits and other authorizations from federal and provincial government departments and agencies. The post-EA permitting process will provide the opportunity for relevant regulatory departments and agencies to receive and review additional Project information, and to establish specific terms and conditions to minimize adverse environmental effects. Wabush Mines is committed to complying with all relevant legislation and regulations, and the conditions of any required approvals.

By decommissioning and rehabilitating Wabush Mines to a condition that satisfies the intended land use statement (see Section 2.5) and meets the closure objectives described in Section 1.1, Wabush Mines will

return to the Crown and to the residents of Wabush an area that is safe, stable, and in which all potential long term environmental, human health, or ecological risks have been addressed and mitigated.

7.0 REFERENCES

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Date: November 23, 2015

Pat Ryan
Senior Area Manager, Utilities and Facilities
Wabush Mines, Scully Mine Division

APPENDIX A

Letter from Craig Bugden to Guylaine Joncas re: Concrete Waste Disposal

From: Bugden, Craig [mailto:cbugden@gov.nl.ca]
Sent: January-15-13 11:17 AM
To: Joncas, Guylaine
Cc: McDonald, Tammy; Pittman, Dexter
Subject: RE: Site Closure Plan

Guylaine:

Further to our review of your Mine Rehabilitation Plan, following are some statements that we extracted from the plan that are relevant to waste management (excluding mine process wastes such as tailings and waste rock). Our comments are in bold type.

- Demolition and removal of all above-grade buildings, foundations and other infrastructure (e.g. overhead piping, electrical cables) no longer required once the mine has closed; shipping and sale of salvageable material if prevailing salvage markets and scrap prices and associated economics permit; disposal of all non-salvageable, non-hazardous demolition debris into an approved onsite landfill. **Comment: The Department does not support the on-site disposal of these large quantities of demolition wastes. Other waste disposal alternatives must be explored and proposed.**
- Cleanup of all surface yards including removal and appropriate disposal of all materials. **Comment: See above.**
- If the open pits are selected as the disposal site, debris from the demolition of the surface buildings and infrastructure will be placed in the bottom of the open pits and then covered with waste rock or other suitable cover material to ensure that debris is fully covered and cannot be released once the pits flood. **Comment: See 1st bullet comments. Disposal by burial and then flooding is not considered an acceptable option for these wastes.**
- Asbestos containing materials will be removed by a licensed contractor, packaged and disposed of by burial in an approved licensed asbestos disposal facility. It is planned that an asbestos burial facility at the Wabush site would be used for this purpose, assuming appropriate regulatory approvals are obtained. The inventory of asbestos containing materials is conducted on an annual basis and is included as part of the Progressive Rehabilitation Schedule. **Comment: We would need a written request that outlines your proposed method of managing this waste. Burial of asbestos waste is acceptable at an approved facility provided the waste is properly packaged and sealed.**
- Equipment and material with no salvage value will be demolished and the demolition debris hauled to the disposal area. Options for disposal include burial in a landfill adjacent to the building footprint or burial in the open pits. All above grade concrete foundations and structures will be broken up and removed. The broken concrete will be disposed of in the disposal area. At grade concrete foundations will be broken up, covered with a soil cover and revegetated. **Comment: See 1st bullet comments. We could consider allowing on-site disposal of concrete rubble and the burial of at-grade foundations.**
- Buried power lines will be de-energized, cut off 0.3 m below surface with the buried section left in the ground. No cables will be left penetrating the surface. Power poles preserved with creosote, copper chromium, arsenic, mixtures, will be disposed of in accordance with provincial
  regulations. Concrete footings will be removed and disposed of in the disposal area. There are approximately 550 wooden power poles on the mine site carrying 30

kilometres of power cabling. **Comment: In-situ abandonment of buried power lines seems reasonable as well as on-site burial of concrete footings. We would need representative sampling from power poles plus approximate quantity before providing further direction.**

- Surface pipelines will be purged, dismantled and removed along with the support trestles and other associated infrastructure. Material with salvage value will be removed from site and sold. Material with no salvage value will be disposed of in the proposed demolition landfill to be possibly located in the bottom of one of the open pits. **Comment: See 1st and 3rd bullet comments.**
- All machinery and equipment with salvage value will be removed and sold for that salvage value. Machinery and equipment with no salvage value will be disposed of with the demolition debris in the proposed demolition disposal area. **Comment: See 1st and 3rd bullet comments.**
- The surface crushing plant, the associated ore receiving bins, conveyor galleries, the screen house, the fine ore bins, the concentrator and all of the associated infrastructure will be cleaned out and then demolished using the procedures as outlined in the preceding Section 2.4.1. **Comment: See 1st and 3rd bullet comments.**
- The concentrator yard area and Hay Lake storage yard contain significant amounts of material (old equipment and material) that will be removed and disposed of at closure. In most cases this material will have little salvage value and will be disposed of in the disposal area. **Comment: See 1st and 3rd bullet comments.**
- Wabush Mines currently operates a permanent non-hazardous solid waste disposal site in an area of the South pit where mining has been completed. This landfill has effectively been progressively reclaimed as it has advanced by covering exposed debris with a layer of waste rock. **Comment: What is the elevation of the landfill in relation to future water levels once operations cease?**
- Typically road reclamation will involve the removal and landfilling of asphalt topping and scarification and loosening of the top surface of the road to facilitate the natural regrowth of native vegetation. **Comment: What is the approximate quantity of asphalt that you would expect to remove?**
- The reclamation of the rail lines will involve the removal of all rail lines and ties. There are approximately 10 kilometres of rail lines. There exists a secure landfill on the Mine Site where lower quality railway ties can be disposed. The steel rails and good quality timbers will be salvaged and shipped off site and some of the lower quality timbers will be disposed of in accordance with provincial regulations. **Comment: See 1st and 3rd bullet comments.**
- All storage tanks will be removed and if possible sold for their salvage value. **Comment: See 1st and 3rd bullet comments.**

In summary we cannot accept the on-site disposal/flooding of large quantities of various types of demolition debris. Further options for re-use, recycling or disposal at approved facilities must be explored.

APPENDIX B

Schedule of Decommissioning and Rehabilitation Activities

Schedule of Decommissioning and Rehabilitation Activities

WABUSH MINES	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025 to 2115
	Post Closure Activities										Long Term Monitoring
Open Pits											
Install Warning Signs	X	X									
Block access ramps and roads (completed)											
Construct Berm to Protect Exposed Highwall	X	X	X								
Remove all hazardous materials (completed)											
Remove dewatering well piping, pumps and sumps (completed)											
Waste Rock Dumps											
Install Warning Signs	X	X									
Block access ramps and roads (4 of 5 completed)	X										
Construct Berms to Protect Exposed Slopes	X	X	X								
Minor slope and surface re-contouring in preparation for revegetation		X									
Revegetation (seed, fertilizer and mulch)		X	X								
Engineering Study - Geotechnical Stability of Waste Rock Dumps		X									
Tailings Management Area											
VEGETATE REMAINING EXPOSED TAILINGS/DAM SAFETY											
Site Preparation and apply seed and fertilizer	X	X	X								
Spreading of Chemical Fertilizer and Manure After Initial seeding Year		X	X	X	X	X					
Operation, Maintenance and Surveillance (OMS) Manual for the TMA		X									
Dam safety review (2015 and 2019)		X									
REMOVE TAILINGS PIPELINES and POWERLINES			X								
REMOVE MODULAR PUMP STATIONS											
Clean out Buildings to Remove Remaining in process materials			X								
Remove all remaining reagents, hydrocarbons, etc			X								
Decontaminate Process Equipment			X								

DECOMMISSIONING AND REHABILITATION OF WABUSH MINES
ENVIRONMENTAL ASSESSMENT REGISTRATION

WABUSH MINES	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025 to 2115
	Post Closure Activities										Long Term Monitoring
Demolish Building and Remaining Equipment				X							
Haul and Place Non-Hazardous. Debris into Disposal Area				X							
ROUTE between SOUTH and NORTH FLORA LAKES											
Hydrologic and TSS Study of route between the lakes		X									
Stabilize the route, if needed				X							
Decommissioning & Removal of Buildings, Roads & Other Infrastructure											
BUILDINGS, CONVEYOR GALLERIES, MAINTENANCE SHOPS, MINE DRY, REEL HOUSES, TRANSFER TOWER, THICKENERS, CRUSHER, ORE STORAGE, ETC.											
Clean out and remove remaining in process materials			X								
Remove all remaining reagents, hydrocarbons, etc (completed)											
Decontaminate Process Equipment			X								
Demolish Building and Remaining Equipment and Haul for Disposal				X	X						
Break up & Remove Above Grade Concrete Foundations				X							
Conduct an engineering risk based assessment of soil contamination				X	X						
ASBESTOS ABATEMENT			X								
RAILWAY TRACK & TIE REMOVAL											
Railway Track and Tie Removal			X								
Environmental Site Assessment of rail bed			X								
FUEL & WATER TANK REMOVAL											
Removal of Remaining Fuel (assumed to be self-financing)			X								
Fuel & Water Tank Removal			X	X							
MISCELLANOUS INFRASTRUCTURE											
Decommissioning and Infilling of 7 Service Tunnels			X	X							
Removal of above Ground Plant Site Piping & Trestles			X								
SITE YARDS, ROADS & PARKING AREAS NO LONGER REQUIRED											
Remove and dispose of used materials and equipment from site yards			X								

WABUSH MINES	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025 to 2115
	Post Closure Activities										Long Term Monitoring
Conduct an engineering risk based assessment of soil contamination			X								
Site regrading and revegetation in the site yards			X								
Removal of Culverts from site roads				X							
Grading towards natural drainage on site roads no longer required			X	X							
Scarification of Road Surfaces				X							
Scarification of Parking Areas				X							
Revegetation (seed, fertilizer & mulch)			X	X							
ELECTRICAL POWER DISTRIBUTION											
Removal of Power Cables				X							
Removal & Disposal of Power Poles - Wood				X							
Removal & Disposal of Power Towers - Steel				X							
Removal & Disposal of Concrete Footings				X							
Removal of Electrical Sub Stations				X							
Regrading and Cleanup of Sub Stations				X							
Disposal of Chemicals, Waste Oil, Waste Glycol, etc											
LABORATORY CHEMICALS, WASTE SOLVENTS, WASTE ANTI-FREEZE & GLYCOL, PROCESS CHEMICALS											
Remove and drain from all systems.		X									
Ship off-site for disposal or return to supplier		X	X								
FUEL											
Removal of Remaining Fuel			X	X							
Clean Out of Fuel Tanks prior to Removal - small gas tanks			X	X							
Clean Out of Fuel Tanks prior to Removal - Bunker C Bulk Tanks		X	X								
Remove and dispose of sludge from the tanks				X							
Removal of Fuel Tanks - small gas tanks		X	X		X						
Removal of Fuel Tanks - Bunker C and Diesel Tanks		X	X	X	X						

DECOMMISSIONING AND REHABILITATION OF WABUSH MINES
ENVIRONMENTAL ASSESSMENT REGISTRATION

WABUSH MINES	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025 to 2115
	Post Closure Activities										Long Term Monitoring
Oils/lubricants - ship off-site for disposal		X									
Cleaning of Waste Oil Tanks		X									
Demolition & Disposal of Storage Tanks		X		X							
PROCESS CHEMICALS											
Shipment of Chemicals to Supplier		X									
Disposal of Chemicals		X									
OTHER											
Removal of instruments containing nuclear materials (completed)											
Shipping to a licensed disposal facility		X									
Disposal of Explosives			X								
Disposal of PCB Containing Light Ballasts			X								
Ship hazardous waste to a company in Quebec (5 tanker trailers)			X								
Management of Special Waste Materials											
TIRES & OLD CONVEYOR BELTING											
Dispose of old tires and conveyor belting not removed after decommissioning				X							
SOLID WASTE LANDFILL SITE											
Use and close WMWDF	X	X	X	X	X						
SEWAGE TREATMENT PLANT											
Clean Out Sewage Treatment Plant		X			X						
Remove and Dispose of Treatment Plant & Facilities					X						
Contaminated Soil											
Excavate and remediate contaminated soils		X	X	X							
Post Closure Activities											
YEARS 1 TO 4 AFTER CLOSURE (2015-2018)											

DECOMMISSIONING AND REHABILITATION OF WABUSH MINES
ENVIRONMENTAL ASSESSMENT REGISTRATION

WABUSH MINES	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025 to 2115
	Post Closure Activities										Long Term Monitoring
Environmental Management Staffing	X	X	X	X							
Operating Supplies	X	X	X	X							
Surface Water Quality Sample Analysis (8 stations - Monthly)		X	X	X							
Final Discharge Points Water Quality Sample Analysis (5 stations – weekly)	X	X	X								
Groundwater Quality Sample Analysis (18 wells - 3 times per year)	X	X	X	X							
Geotechnical Inspections	X	X	X	X							
Vehicle	X	X	X	X							
YEARS 5 TO 13 AFTER CLOSURE (2019-2027)											
Environmental Management Staffing					X	X	X	X	X	X	X (2025 - 2027)
Environmental Reporting to Government Agencies					X	X	X	X	X	X	X (2025 - 2027)
Operating Supplies					X	X	X	X	X	X	X (2025 - 2027)
Surface Water Quality Sample Analysis (8 stations - Quarterly)					X	X	X	X	X	X	X (2025 - 2027)
Groundwater Quality Sample Analysis (18 wells - 3 times per year)					X	X	X	X	X	X	X (2025 - 2027)
Long Term Site Monitoring and Maintenance											
TAILINGS BASIN											
Geotechnical Inspection											X
OPEN PITS, WASTE ROCK DUMPS, PLANT SITE											
Erosion Repair											X
Heavy Equipment Support											X

APPENDIX C

List of Potentially Applicable Permits and Authorizations

List of Potentially Applicable Permits and Authorizations (Provincial, Federal, Municipal)

Approval Potentially Required	Legislation / Regulation	Project Component / Activity Requiring Approval or Compliance	Department or Agency	Requirements
Government of Newfoundland and Labrador				
Certificate of Approval for any Alteration to a Body of Water	*Water Resources Act*	Any activities which may alter a water body	Water Resources Division, Department of Environment and Conservation	Permits are required for construction activities within 15 m of the high watermark of any water body. An application form is required for each alteration.
Certificates of Approval for any Instream Activity (including Culvert Installation, Bridges and Fording a Watercourse)	*Water Resources Act*	Any in-stream activity	Water Resources Division, Department of Environment and Conservation	Approval is required for any in-stream activity, including culvert installations and fording activities, before undertaking the work. This also includes any development within 15 m of the high watermark of any water body.
Certificate of Approval for Construction site Drainage	*Water Resources Act*	Any run-off from the project site being discharged to receiving waters	Water Resources Division, Department of Environment and Conservation	Approval is required for any run-off from the project site being discharged to receiving waters.
Water Use Authorization	*Water Resources Act*	Water withdrawal for use during reclamation activities	Water Resources Division, Department of Environment and Conservation	Water use authorization is required for all beneficial uses of water.
Permit to Burn	*Forestry Act* and *Forest Fire Regulations*	Any burning required during the Project	Department of Natural Resources	A permit is required to light fires outdoors between April and December. Permits are not issued during forest fire season.
Certificate of Approval for Storing and Handling Gasoline and Associated Products	*Environmental Protection Act,* and *Storage and Handling of Gasoline and Associated Products Regulations*	Storing and handling gasoline and associated products	Engineering Services Division, Service NL	A Certificate of Approval is required for storing and handling gasoline and associated products.
Permit for Storage, Handling, Use or Sale of Flammable and Combustible Liquids	*Fire Prevention Act,* and *Fire Prevention Flammable and Combustible Liquids Regulations*	Storing and handling flammable liquids	Engineering Services Division, Service NL	This permit is issued on behalf of the Office of the Fire Commissioner. Approval is based on a review of information provided for the Certificate of Approval for Storing and Handling Gasoline and Associated Products.
Compliance Standard	*Dangerous Goods*	Storing, handling and	Department of	If the materials are

Approval Potentially Required	Legislation / Regulation	Project Component / Activity Requiring Approval or Compliance	Department or Agency	Requirements
	Transportation Act and *Regulations*	transporting fuel, oil and lubricants and other dangerous goods	Transportation and Works	transported, handled and stored fully in compliance with the regulations, a permit is not required. A Permit of Equivalent Level of Safety is required if a variance from the regulations is necessary. Transporting goods considered dangerous to public safety must comply with regulations.
Certificate of Approval for a Waste Management System	*Environmental Protection Act* and *Waste Management Regulations*	Waste disposal associated with construction and operation	Department of Environment and Conservation, Department of Health and Community Services	Approval is required for waste disposal (e.g., incineration or burying). Used tires must be disposed according to regulations.
Permit to Destroy Problem Animals	*Wildlife Act*	Dealing with nuisance wildlife	Department of Natural Resources	The Department provides direction on handling nuisance animals. Details on the situation must be provided for a permit to be issued.
Compliance Standard	*Fire Prevention Act,* and *Fire Prevention Regulations*	On-site structures (temporary or permanent)	Engineering Services Division, Service NL	All structures must comply with fire prevention standards.
Compliance Standard	*Environmental Control Water and Sewage Regulation* under the *Water Resources Act*	Any waters discharged from the project	Pollution Prevention Division, Department of Environment and Conservation	A person discharging sewage and other materials into a body of water must comply with the standards, conditions and provisions prescribed in these regulations for the constituents, contents or description of the discharged materials.
Compliance Standard	*Sanitation Regulations*, under the *Health and Community Services Act*	Sewage and waste disposal	Department of Health and Community Services	Outlines standards for sewage and waste disposal.
Compliance Standard	*Occupational Health and Safety Act* and Regulations	Project-related occupations	Service NL	Outlines minimum requirements for workplace health and safety. Workers have the right to refuse dangerous work.

Approval Potentially Required	Legislation / Regulation	Project Component / Activity Requiring Approval or Compliance	Department or Agency	Requirements
				Proponents must notify Minister of start of construction for any project greater than 30 days in duration.
Compliance Standard	*Workplace Hazardous Materials Information System (WHMIS) Regulations*, under the *Occupational Health and Safety Act*	Handling and storage of hazardous materials	Operations Division, Service NL	Outlines procedures for handling hazardous materials and provides details on various hazardous materials.
Certificate of Approval	*Environmental Protection Act* and associated *Regulations*	Project operations	Pollution Prevention Division, Department of Environment and Conservation	Certificate of Approval (CofA) pursuant to the NL Environmental Protection Act (2002)
Government of Canada				
Compliance Standard	*Fisheries Act*, Section 36(3), Deleterious Substances	Any run-off from the project site being discharged to receiving waters	Environment Canada Department of Fisheries and Oceans	Environment Canada is responsible for Section 36(3) of the *Fisheries Act*. However, DFO is responsible for matters dealing with sedimentation. Discharge must not be deleterious and must be acutely non-lethal.
Policy	*Federal Policy on Wetland Conservation*	Any disruption of wetland habitat	Environment Canada	The goals of this policy should be considered where a project could affect wetland habitat.
Compliance standards; permits may be required.	*National Fire Code*	On-site structures (temporary or permanent)	Service NL	Approval is required for fire prevention systems in all approved buildings.
Compliance standards; permits may be required.	*National Building Code*	On-site structures (temporary or permanent)	Service NL	Approval is required for all building plans.

Approval Potentially Required	Legislation / Regulation	Project Component / Activity Requiring Approval or Compliance	Department or Agency	Requirements
Compliance Standard; Permit may be required.	*Migratory Birds Convention Act* and *Regulations*	Any activities which could result in the mortality of migratory birds and endangered species and any species under federal authority	Canadian Wildlife Service, Environment Canada	The Canadian Wildlife Service should be notified about the mortality of any migratory bird in the project area, including passerine (songbirds) and waterfowl species. Prohibits disturbing, destroying or taking a nest, egg, nest shelter, eider duck shelter or duck box of a migratory bird, and possessing a live migratory bird, carcass, skin, nest or egg, except when authorized by a hunting permit.
Municipalities				
Development or Building Permit	*Urban and Rural Planning Act, 2000,* and Relevant Municipal Plan and Development Regulations	Development within municipal boundary	Community Council	A permit is required for any development or building within municipal boundaries.
Approval for Waste Disposal	*Urban and Rural Planning Act, 2000,* and Relevant Municipal Plan and Development Regulations	Waste disposal	Community Council	The use of a community waste disposal site in Newfoundland and Labrador by proponents/contractors to dispose of waste requires municipal approval. Restrictions may be in place as to what items can be disposed of a municipal disposal site.