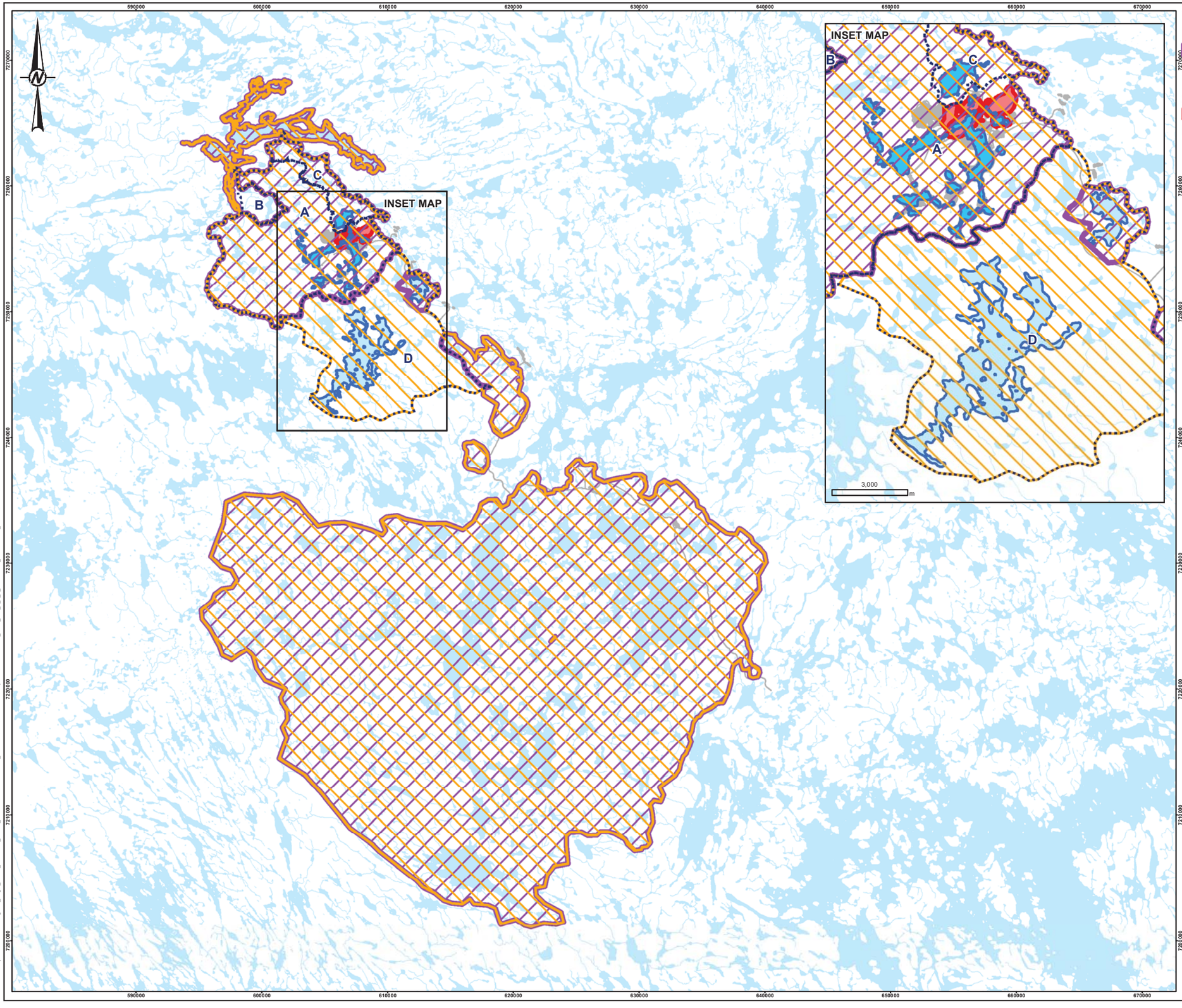

LEGEND

- SURFACE WATER/FISH HABITAT LOCAL STUDY AREA (EXPANDED)
- SURFACE WATER/FISH HABITAT LOCAL STUDY AREA (APPROVED)
- WATER QUALITY LOCAL STUDY AREA (EXPANDED)
- WATER QUALITY LOCAL STUDY AREA (APPROVED)
- WATERSHED
- EXPANSION INFRASTRUCTURE
- APPROVED INFRASTRUCTURE
- WATERCOURSE
- WATERBODY

0 6,000 12,000

1:300,000 METRES

REFERENCE(S)

1. INFRASTRUCTURE OBTAINED FROM AGNICO EAGLE MINES LIMITED.
2. WATERCOURSE AND WATERBODY DATA OBTAINED FROM NATURAL RESOURCES CANADA.

DATUM: NAD 83 CSRS PROJECTION: UTM ZONE 14

CLIENT

AGNICO EAGLE

AGNICO EAGLE MINES LIMITED:
MEADOWBANK DIVISION

PROJECT

WHALE TAIL PIT - EXPANSION PROJECT

TITLE

FRESHWATER ENVIRONMENT LOCAL STUDY AREAS

CONSULTANT

GOLDER

YYYY-MM-DD	2019-04-17
DESIGNED	DF/AP
PREPARED	CDB/MH
REVIEWED	AP/IM
APPROVED	KAB

PROJECT NO.	CONTROL	REV.	FIGURE
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3.2.6 Geology

Geology characteristics for the Expansion Project are consistent with the Approved Project given the expansion is within the same geographic area of the Approved Project.

The Amaruq property is underlain by Archean supra crustal rocks of the metamorphosed Woodburn Lake Group; the same sequence as at the Meadowbank Mine. These rocks are believed to have been deposited in a continental rift setting. They are comprised of mafic to ultramafic volcanic and volcaniclastic rocks interlayered with clastic sedimentary units that include greywacke, siltstone, mudstone, chert and banded iron formation. This rock sequence has been intruded by granitoid rocks and lamprophyres and underwent multiple deformation events and metamorphism to the upper greenschists facies. There are four Paleo-Proterozoic aged events of deformation recognized, two of which have significant effects on the geometry of the deposit.

The main lithological units associated with the Whale Tail deposit include: ultramafic komatiites, clastic sedimentary rocks, mafic volcanic rocks and felsic to intermediate intrusive rocks. Details on these lithological units are provided in (Golder 2016).

3.2.7 Hydrogeology

Relative to the Approved Project, the primary change to the mine development affecting groundwater inflow is the inclusion of the underground workings, and the additional management of saline groundwater during mining and closure. Whale Tail Pit is somewhat larger and deeper than the approved pit; however, the general potential effects of the Expansion Project related to this pit will be similar to the Approved Project. IVR Pit will be entirely located within permafrost and the potential effect of this pit on the groundwater flow regime will not be significant until post closure, when the permafrost below the pit is predicted to degrade, eventually forming an open talik which will connect the IVR Pit lake to the deeper groundwater flow system.

Existing conditions were described to provide context for groundwater quantity and quality assessment within the 2016 Hydrogeology Baseline Report (Approved Project FEIS Volume 6, Appendix 6-A; Agnico Eagle 2016b). For the Expansion Project, additional data was collected to verify baseline data and assumptions in the predictive hydrogeological modelling (Golder 2019a).

Two groundwater flow regimes that are typically present in areas of continuous permafrost are also present at the Project site: a deep groundwater flow regime beneath the base of the permafrost; and a shallow flow regime located in an active (seasonally thawed) layer at the ground surface. With the exception of areas of taliks (areas of locally thawed ground) beneath larger lakes, the two groundwater regimes are isolated from one another by thick permafrost.

The shallow groundwater regime is active only seasonally during the summer months, and the magnitude of the flow in this layer is typically several times less than runoff from snowmelt (Woo 2011). Groundwater in the active layer primarily flows to local depressions and ponds that drain to larger lakes; therefore, the total travel distance would generally extend only to the nearest pond, lake, or stream. Water in the surface active layer is stored in ground ice during the cold season and is then released when the ice thaws in late spring or early summer, thus providing flow to surface waterbodies (Woo 2011). During the warm season, groundwater in the active layer is recharged primarily by precipitation.

Groundwater flow within the deep groundwater flow regime is limited to the sub-permafrost zone. Regionally, this deep groundwater flow regime is connected to the ground surface only by open taliks underlying larger lakes. The elevations of these lakes are expected to be the primary control of the regional groundwater flow directions in the deep groundwater flow regime, with density gradients (density differences are the results of water chemistry, specifically salinity) providing a

secondary control on groundwater flow directions. Evaluation of density gradients versus elevation gradients indicates that density driven flow in this Project is not significant near the mine development, largely because the groundwater is not highly saline. The elevations of lakes with underlying open taliks in the baseline study area indicate that Whale Tail Lake is likely both a groundwater recharge and discharge zone. Hydraulic gradients are expected to range from slightly downward to slightly upward, with a downward gradient present in the north basin (flow of water from Whale Tail Lake to DS1) and an upward gradient present in the south basin (flow of water from Lake A70 to Whale Tail Lake). The Total Dissolved Solids (TDS) of groundwater (or salinity of groundwater) is expected to increase with depth, resulting in increased density of groundwater with depth. This can result in fluid density gradients which will tend to lessen the upward flow of denser groundwater water due to the buoyancy effect.

From late spring to early autumn, when temperatures are above 0˚C, the active layer thaws out. Within the active layer, the water table is expected to be a subdued replica of topography, and flow directions are expected parallel the topographic surface. Project area groundwater in the active layer flows to local depressions and ponds that drain to larger lakes at velocities estimated to range from about 0.004 to 0.08 m/day.

Taliks exist beneath waterbodies that have sufficient depth such that they do not freeze to the bottom over the winter. Beneath small waterbodies that do not freeze to the bottom over the winter, a talik bulb that is not connected to the deep groundwater flow regime will form (a closed talik). When the size of a waterbody is above a critical value, the talik beneath the waterbody will be an open talik, which connects to the deep groundwater flow regime beneath the permafrost. Elongated waterbodies with central pool(s) (where the depth is greater than the range of winter ice thickness), and a width of 300 m or greater are expected to have open taliks extending to the deep groundwater flow regime at the Project site. Circular lakes with a central pool (where depth is greater than the range of winter ice thickness) and a radius of 300 m or greater are expected to have open taliks extending to the deep groundwater flow regime.

For the Expansion Project, additional data were collected to verify baseline data and assumptions in the predictive hydrogeological modelling (Golder 2019a). The data collected included:

- Installation of a Westbay well systems in the talik zone below Whale Tail Lake in 2016 and 2018 to monitor hydraulic heads, test hydraulic conductivity, and collect groundwater samples from multiple intervals in the open talik.
- Collection of 49 additional measurements of hydraulic conductivity in unfrozen areas of bedrock.
- Thermal analysis in 2017 to refine the understanding of permafrost and talik characteristics near Whale Tail Lake and to provide input into the planning of a 2017 field thermistor installation program in the northern portion of the Lake.
- Thermal analysis in 2018 to forecast the evolution of permafrost beneath Whale Tail Pit and IVR Pit post-closure.

The above data collection was used to update the conceptual hydrogeological model that concluded that:

- A downward vertical hydraulic gradient is present in the area of Whale Tail Pit. This indicates that the prediction of the Whale Tail Pit and IVR Pit lakes being a groundwater recharge boundary is reasonable.
- A closed talik is present in the northern portion of Whale Tail Lake and an open talik is present in the southern portion of Whale Tail Lake.
- The hydraulic conductivity adopted in the Expansion Project (Golder 2019a) was conservative for the prediction of groundwater effects. Subsequent packer testing indicates the permeabilities of deep sub-permafrost bedrock is lower than what was assumed in the FEIS, which resulted in updated predicted inflows and TDS quality in the underground being lower than what was previously predicted in the FEIS.

3.2.8 Seismicity

Seismicity characteristics for the Expansion Project are consistent with the Approved Project given the expansion is at the same location as the Approved Project.

The mine site is located in an area of relatively low seismic risk. The peak ground acceleration (PGA) for the area was estimated using seismic hazard calculator from the 2010 National Building Code of Canada-Natural Resources Canada (NRC) website (NRC 2010). The estimated PGA is 0.019 g for a 5% in 50-year probability of exceedance (0.001 per annum or 1 in 1,000-year return) and 0.036 g for a 2% in 50-year probability of exceedance (0.000404 per annum or 1 in 2,475-year return) for the area.

3.3 Chemical Environment

3.3.1 Surface Water and Sediment Quality

Baseline surface water and sediment quality characteristics presented herein were extracted from the Volume 6 FEIS Addendum (Agnico Eagle 2018a).

Baseline water and sediment quality studies for the Whale Tail Pit study area and the haul road were completed in 2014 and 2017. The updated Core Receiving Environment Monitoring Program (CREMP 2018b) baseline study report prepared for the Addendum amalgamates the 2014 and 2015 monitoring data with data collected in 2016 and 2017. Additional data from the Whale Tail Pit study area core lakes and lakes under consideration for the alterative discharge location were collected in 2018.

In accordance with Type A Water Licence 2AM-WTP1826 (Part I, Condition 5) for the Approved Project, a Mercury Monitoring Plan was developed to define supplemental sampling methods and data evaluation techniques (Agnico Eagle 2018b). A compendium of mercury data collected to-date for water, sediment, benthic invertebrates, zooplankton and soil is available as a memorandum (Azimuth 2016).

Water quality data in the Project area were collected and analyzed for general parameters (field and laboratory), major ions, nutrients (carbon, phosphorus, and nitrogen), total and dissolved metals, and selected organic compounds. Water quality data were compared to the Canadian Council of Ministers of the Environment (CCME) Canadian Environmental Quality Guidelines (CEQG) for the protection of freshwater aquatic life (CCME 1999) and Canadian Drinking Water Quality Guidelines (CDWQG; Health Canada 2014). Health-based standards were given priority over aesthetic and operational guidelines. For additional context, the results were also qualitatively compared to the chemistry data from the reference lakes and compared against trigger and threshold values developed for the Meadowbank CREMP – Whale Tail Pit Addendum (Azimuth, 2016). For context, thresholds are considered regulatory guidelines or benchmarks below which adverse effects are not expected; triggers are early warning levels and are less than threshold values.

Sediment quality data were screened against the CCME interim sediment quality guidelines (ISQGs) and probable effect level (PEL) concentrations (CCME 2004).

3.3.2 Water Quality

The majority of water chemistry constituent concentrations were below the analytical detection limit for samples collected in 2014 and 2015.

Similar results were observed in 2016 and 2017. Chemical constituents with concentrations below the analytical detection limit included cyanides (free and total), most metals (total and dissolved), nitrate, nitrite and ammonia. No guideline

exceedances of the drinking water or aquatic life guidelines were observed for metals. Minor seasonal fluctuations were noted, as well as a slight increasing trend in specific conductivity at Whale Tail Lake (South Basin) and Mammoth lake.

The following sections provide a summary of results by study area.

Lakes – Whale Tail Pit Study Area and Reference Lakes

Water temperature in lakes ranged from 6.3 to 15.3°C during the summer months (2014 to 2017) with minor thermal stratification evident at some deeper locations. The water column was generally well mixed with uniform specific conductivity (generally less than 25 µS/cm) and sufficient oxygen to support aquatic life (i.e., above the CEQG threshold). Lake water pH was circum-neutral (6.2 to 7.7) in all lakes.

Surface water collected during the open water season was characteristic of low productivity headwater lakes in the Arctic; soft, with low alkalinity, low TDS (less than 45 mg/L), low turbidity (and corresponding high Secchi depth) and low Total Suspended Solids (TSS; less than 2 mg/L).

Nutrient concentrations were generally very low in all lakes (2014 to 2017), with most samples having concentrations below detection limits. The highest concentration of ammonia was measured in Whale Tail North Basin (0.1 mg-N/L) during September 2014, while the maximum concentration of total phosphorus (0.032 mg-P/L) was measured in Lake A76 during April 2016. Most samples had ammonia and total phosphorus concentrations that were less than 0.02 mg-N/L and 0.004 mg-P/L, respectively.

Concentrations of metals were below analytical detection limits in most samples; when concentrations were quantifiable, values were below the Canadian Council of Ministers of the Environment (CCME) Canadian Environmental Quality Guidelines (CEQG) for the protection of freshwater aquatic life (CCME 1999) and Canadian Drinking Water Quality Guidelines (CDWQG; Health Canada 2014) and. Samples collected for arsenic speciation in August 2017 contained low concentrations of the five species tested. Arsenite [As(III)] was the predominant form determined, with only minor contributions of dimethylarsonic acid (DMA) (<6% of dissolved As) determined in samples from Nemo Lake and Mammoth Lake. All other species [methylarsonic acid (MMA), As(V), AsB] were below the analytical detection limit (≤0.020 µg/L).

There were a small number of constituents with concentrations that exceeded the Meadowbank trigger values (i.e., conductivity, hardness, calcium, magnesium, and potassium); however, triggers for these constituents were based on baseline/reference data from the Meadowbank project lakes and were provided for context only. Overall, the 2014 to 2017 water quality results from the lakes in the Whale Tail Pit study area were similar to results from the reference lakes. For some constituents (e.g., chloride, electrical conductivity), a subtle increasing trend was noted at Whale Tail South and Mammoth when comparing data obtained from 2014 to 2017; the source of which is unknown at this time.

Baselines studies were carried out in Lake D1 and Lake D5, located within the watershed D. These lakes have been identified as potential alternate discharge locations and included in the adaptive management program for the Project.

Water quality in Lake D1 and Lake D5 were similar to that observed in other lakes of the Whale Tail Pit study area. Limnology profiles and surface water samples were collected in mid-August 2018. Surface water samples were also collected in late-September, when water temperatures had dropped to near freezing. Limnology profiles in mid-August indicated that the water column was well-mixed with dissolved oxygen concentrations within CEQG ranges, circumneutral pH, and similar conductivity as observed in the other lakes (lower in Lake D1 at approximately 15 µS/cm compared to Lake D5 at approximately 25 µS/cm).

Surface water in Lake D1 and D5 during the open-water season was characterized as having soft water (hardness less than 11 mg/L), low alkalinity (less than 10 mg/L), low TDS (less than 23 mg/L), low turbidity (less than 1 NTU), and low TSS (less than 2 mg/L). Most nutrients had concentrations reported results at less than or near detection limits. The exceptions were two samples (one from each lake) collected in late September that had total phosphorus concentrations of 0.007 mg-P/L. Concentrations of metals were below detection limits in most samples; when concentrations were quantifiable, values were below the CDWQG and CEQG. Conductivity, hardness, calcium, and magnesium concentrations in Lake D5 (but not in Lake D1) were greater than the CREMP (Azimuth 2016) trigger values. One sample from each lake was collected for arsenic speciation. Concentrations of all species were less than detection limits (≤0.020 µg/L) with the exception of arsenite [As(III)] in the sample from Lake D5, which was 0.048 µg/L or 37% of the total arsenic concentration.

Tributaries

In situ water quality measurements taken at the tributary stations in the Whale Tail Pit study area and the haul road study area show the water to be well oxygenated with dissolved oxygen concentrations consistently above 9.5 mg/L and low specific conductivity at all stations (i.e., less than or equal to 34 µS/cm). Tributary pH was circum-neutral (6.2 to 7.3) across all stations.

Nutrient concentrations were low in the tributaries with results less than the detection limit in most samples. Ammonia was less than the detection limit in most samples with a higher maximum concentration detected in a tributary from the Whale Tail Pit study area (0.007 mg-N/L) as compared to the maximum detected in the haul road study area (0.005 mg-N/L). Phosphorus was detected more frequently in the tributary samples as compared to the lake samples. In the Whale Tail Pit study area, total phosphorus ranged from less than the detection limit to 0.004 mg-P/L and ranged from less than the detection limit to 0.007 mg-P/L in the haul road study area. The median value in tributaries (in both study areas) was 0.002 mg-P/L while the median was less than the detection limit in the lakes.

Metals were below the analytical detection limit in most samples, and when they were detected, concentrations were below the CDWQG and CEQG, with two exceptions. Aluminum was above the CWQG at two stations (A55-A17 and A5-A4) in August; all other detectable metal concentrations were less than the CEQG and the CDWQG.

Concentrations in the tributary samples did not exceed the Meadowbank triggers and thresholds.

3.3.3 Sediment Quality

Sediment collected from lakes in the Whale Tail Pit study area contained concentrations of metals as sediment from reference lakes. Arsenic and chromium concentrations exceeded either ISQG or PEL in sediment samples collected in 2014 to 2017 from the Whale Tail Pit study area (Whale Tail Lake, Mammoth Lake, Nemo Lake) and in the reference lakes (Inuggugayualik Lake and Pipedream Lake). Chromium concentrations were also above Meadowbank trigger values at Pipedream Lake, Mammoth Lake, and select locations in Whale Tail Lake. Arsenic concentrations were above Meadowbank trigger values at Inuggugayualik Lake, Mammoth Lake, and Whale Tail Lake. Maximum arsenic and chromium concentrations were observed in the north basin of Whale Tail Lake (i.e., 1,760 mg/kg arsenic dry weight and 210 mg/kg chromium dry weight). Copper concentrations were above the ISQG in most samples from lakes sampled during 2014 to 2017. Concentrations of zinc, cadmium, lead and mercury were below ISQG guidelines at most locations and were below PEL guidelines in all samples. Similar concentrations of metals and guideline exceedances were observed for sediment obtained via grab sample compared to coring.

The particle size distribution in the top 3 to 5 cm of sediment from south Whale Tail Lake, Mammoth Lake, Pipedream Lake, and Inuggugayualik Lake was predominantly silt/clay, and characteristic of depositional areas in lakes from this region. A coarser particle size distribution was evident in samples collected from Nemo Lake and north Whale Tail Lake with sediment collected at similar depth (i.e., 8 ± 1.5 m) being predominantly silt/sand.

Sediment concentrations of hydrocarbons and polycyclic aromatic hydrocarbons were consistently low at all lakes sampled and below analytical detection limits.

Sediments collected from Lake D1 and Lake D5 in August 2018 were similar to sediment from other lakes in the Whale Tail Pit study area. As observed in the core and reference lakes, arsenic and chromium concentrations exceeded the ISQG and frequently also exceeded the PEL. Copper concentrations frequently exceeded the ISQG but did not exceed the PEL, and cadmium concentrations occasionally exceeded the ISQG. Chromium concentrations occasionally exceeded the CREMP (Azimuth 2016) trigger values in both lakes. Concentrations of lead, mercury, and zinc were below ISQG. Similar concentrations of metals and guideline exceedances were observed for sediment obtained via grab sample compared to coring. Particle size distribution was predominantly silt/clay. Concentrations of hydrocarbons and polycyclic aromatic hydrocarbons were consistently low in both lakes and below analytical detection limits.

3.3.4 Groundwater Quality

Existing conditions were described to provide context for groundwater quantity and quality assessment within the 2016 Hydrogeology Baseline Report (Approved Project FEIS Volume 6, Appendix 6-A; Agnico Eagle 2016b). For the Expansion Project, additional data were collected to verify baseline data and assumptions in the predictive hydrogeological modelling (FEIS Addendum Volume 6, Appendix 6-A; Agnico Eagle 2018a and Golder 2019a).

Groundwater quality for the Approved Project has been inferred to be similar to the Meadowbank Mine based on similar geology and permafrost conditions (Knight Piésold 2015a), namely, that the majority of groundwater inflow to the Whale Tail Pit is from a shallow closed talik. These data characterize the shallow groundwater quality (i.e., in the unfrozen portion or the talik bulb and in the shallow portion of the through talik) for the Expansion Project. Site-specific information on groundwater quality at depth (sub-permafrost) was obtained in 2016 through the installation and sampling of a Westbay system which provided groundwater flow and quality information at various depth intervals. Groundwater sampling and hydraulic head measurements of the Westbay multi-level system was undertaken in November 2018 (Golder 2019a) to supplement previous data collected from the Westbay multi-level system in 2016. This information was used to represent deep, sub-permafrost groundwater inflow to the base of the Whale Tail Pit and to the Underground workings. Consistent with previous interpretations, the IVR Pit is within permafrost and is not expected to have groundwater inflow during mining. Following reflooding and the formation of the IVR Pit lake, the permafrost is predicted to eventually melt and connect the IVR Pit lake to the deep bedrock flow system (Golder 2019a).

Shallow groundwater quality: Groundwater quality in the shallow, closed talik at the Whale Tail Pit is assumed to be that of the Meadowbank Mine as previously defined (Knight Piésold 2015a). It has high to very high hardness, neutral to slightly basic pH and good buffering capacity. As part of the FEIS Addendum, the TDS concentrations range from 193 to 1,900 mg/L. Based on the updated modelling, the TDS concentration was predicted to decrease from 120 mg/L in 2019 to 10 mg/L in 2025 (Golder 2019a). Groundwater inflow is controlled by the shallow bedrock hydraulic conductivity. Concentrations of fluoride, copper, iron, and selenium are elevated in comparison to guidelines for the protection of aquatic life and drinking water. The higher percentile values for nitrogen-containing compounds, aluminum, arsenic, boron, hexavalent chromium, molybdenum, and zinc exceed the CEQGs. Additionally, several of these parameters as well as chloride, manganese and sodium exceed aesthetic drinking water guidelines.

Sub-permafrost groundwater quality: The groundwater quality results obtained from the Westbay well system at Whale Tail provide reliable information on site-specific composition of groundwater to depths of 392 mbgs. Water quality was calculated based on analytical results received from each sample collected, from which was removed the proportion of fresh water introduced during drilling defined based on the range of fluorescein values observed during well development. Details of the test program are included in Golder (2017).

Salinity profile with depth: Site-Specific groundwater samples collected from the Westbay system in 2016 at depths between 276 m and 499 m indicate that the TDS content in the groundwater was between 3,198 mg/L and 4,100 mg/L, with an average of 3,700 mg/L (Golder 2019a). This range is slightly higher than the groundwater TDS concentration measured at Meadowbank from shallower depths (less than 200 m vertical depth), which is expected based on the deeper sample collection. The Westbay well data along with data from other sites in the Canadian shield were used to help extrapolate the TDS concentrations to deeper depths for the Project area. Consistent with other sites in the Canadian Shield, concentrations of TDS in groundwater are inferred to increase with depth, primarily in response to upward diffusion of deep-seated brines.

3.3.5 Geochemical Characterization of Waste Rock

Geochemical characterization of waste rock presented herein were extracted from Evaluation of the Geochemical Properties of Waste Rock, Ore, Tailings, Overburden and Sediment Report (Golder 2018c). This report builds on Golder (2016), submitted as part of the Approved Project, through the inclusion of additional waste rock samples to capture the expansion of Whale Tail Pit, as well as samples from IVR Pit and Underground.

The main lithological units that will be mined for the Expansion Project are the same as those of the Approved Project. They include: komatiites, sedimentary rocks (greywacke, iron formation and chert), basalts, and diorites. Similar to the Approved Project, mineralization in the Whale Tail Pit expansion, IVR Pit and underground is low sulphur, but the sulphur carries arsenic which is enriched in all waste rock types. The geochemical properties of these units in the proposed expansion areas are also similar.

As for the Approved Project, but with slightly different lithological proportions, most of the waste rock lithologies to be disturbed by mining of the Whale Tail Pit, Underground, and IVR Pit are non-potentially acid generating (NPAG - 79%) and include komatiite, iron formation, basalt, south greywacke and diorite. These units will not require means to control acid rock drainage (ARD).

PAG waste rock includes some komatiite and iron formation samples, as well as the chert and central greywacke units, while the north greywacke unit has a variable ARD potential. This unit occurs in all three mining zones evaluated to date. Testing is on-going to determine if this material is likely to develop acidic conditions in the long-term. To date, longer-running and additional kinetic test results are consistent with findings for the Approved Project, suggesting that the PAG rock is not likely to generate ARD at site for decades if no ARD control mechanisms were put in place (FEIS Addendum Volume 5, Appendix 5-E, Section 4.7; Agnico Eagle 2018a). This period of time is longer than the anticipated duration of mine construction and operations. ARD control mechanisms (a thermal cover of NPAG/NML waste rock) will nonetheless be implemented during mining operations. All PAG/ML waste rock developed from the Approved and Expansion Projects will be permanently stored in the WRSFs.

Arsenic continues to be the principal element of environmental interest. It is released in leachate from basalt, komatiite and iron formation waste rock at elevated concentrations relative to other waste rock and to site water quality criteria, in short- and long-term leach tests. These elevated concentrations do not mean that water contacting this rock at site will necessarily exceed the Effluent Limits (NWB 2AM-WTP1826) because conditions at site differ substantially from the aggressive leaching

conditions of the laboratory tests. The arsenic is anticipated to be sourced from sulphide minerals including arsenical pyrite, arsenopyrite and trace amounts of arsenic sulfosalts (gersdorffite) observed in komatiite and iron formation but with varying degree of exposure (i.e., some sulphides are locked in). As such, preventing oxidation is expected to minimize arsenic leaching. The effects of arsenic leaching from waste rock on the quality of mine effluent are evaluated in the water quality model (Golder 2019c).

Infrastructure construction and WRSF cover material will be sourced from mine development rock, particularly the diorite and south greywacke, as well as NPAG and low leachable (NML) rock from other units. PAG and ML rock will not be used for construction. Sampling and testing of waste rock for ARD and ML will continue during mine operation to segregate suitable waste for use in construction and closure from that which will report directly to the WRSFs, as described in the Operational ARD/ML Sampling and Testing Plan (Agnico Eagle 2019b). The ARD potential of waste rock will be classified based total sulphur and total inorganic carbon and the ML potential will be inferred from the total arsenic content; all analyses will be completed at the Meadowbank onsite assay laboratory.

All waste rock from underground will be managed in the Underground WRSF prior to use as backfill in the mine such that no waste rock from underground will remain on surface after mine closure. Underground waste rock will be managed separately from the Whale Tail Pit and IVR Pit waste rock as it is anticipated to have elevated salinity associated with drilling brine and deep groundwater.

3.3.6 Geochemical Characteristics of Ore and Tailings

A geochemical characterization program investigated the geo-environmental properties of both waste rock and ore at the Project. Geochemical characterization of ore presented herein were extracted from Evaluation of the Geochemical Properties of Waste Rock, Ore, Tailings, Overburden and Sediment Report (Golder 2018c).

Ore is PAG and metal leaching and will be stored temporarily in ore pads at the Whale Tail site. All ore will be shipped off-site before closure. Ore will ultimately report to tailings after processing at the Meadowbank Mill, with tailings management at the Meadowbank Mine regulated under the Meadowbank Water Type A Water Licence 2AM-MEA1826.

3.3.7 Geochemical Characterization of Overburden

Geochemical characterization of Overburden presented herein were extracted from the Evaluation of the Geochemical Properties of Waste Rock, Ore, Tailings, Overburden and Sediment from the Whale Tail Pit Report (Golder 2018c).

The overburden and lake sediment are NPAG based on the low sulphide sulphur content. Arsenic leaching potential is low in the overburden whereas it is elevated in the lake sediments. All lake sediment will be stored permanently in the WRSFs. The overburden will be co-disposed with the waste rock in the WRSFs or it will be temporary stored in the overburden stockpile.

3.4 Biological Environment

3.4.1 Vegetation

Baseline vegetation characteristics for the Project presented herein were extracted from Section 5.4 (FEIS Addendum, Volume 5; Agnico Eagle 2018a).

The 2014, 2015 and 2016 vegetation surveys identified 181 vascular plants in the Project area, of which 150 were identified to species level and 31 were identified to genus level. A total of 99 non-vascular plants (33 bryophytes and 66 lichens) were identified from field surveys. Of these, 10 specimens were identified to genus level.

The most common and widespread vascular species found were the northern Labrador-tea (*Rhododendron tomentosum*) and mountain cranberry (*Vaccinium vitis-idea*), which were both observed in 99 of the 126 plots surveyed and present in all ELC types. The overall findings indicate that the majority of the areas surveyed consist of low-diversity vascular plant communities dominated by fewer than 10 species. The most common and widespread non-vascular species found were arctic butterfingers lichen (*Dactylina arctica* ssp. *arctica*) and green witch's hair lichen (*Alectoria ochlroleuca*) which were observed respectively in 69 and 60 of the 126 plots surveyed and present in all ELC types.

Only two federally listed plant species (i.e., the moss species Porsild's bryum [*Haplodontium macrocarpum*] and felt-leaf willow [*Salix silicicola*]) have been identified within Nunavut; these species and suitable habitat were not observed within the LSA during field programs (Dougan and Associates, 2017). Of the 107 confirmed vascular species recorded during field programs, six are territorially listed as *Sensitive* (CESCC 2011). A full list of the vascular and non-vascular species recorded during field surveys and their CESCC status is presented in Section 5.4, Appendix 5-C (Approved Project FEIS Volume 5; Agnico Eagle 2016b).

3.4.2 Terrestrial Wildlife

Baseline terrestrial wildlife for the Project presented herein were extracted from Section 5.5 – Terrestrial Wildlife (FEIS Addendum Volume 5; Agnico Eagle 2018a).

Wildlife represents important ecosystem components, and some species are protected by legislation and/or are important to IQ. In addition to the environmental monitoring information collected at the Meadowbank Mine and wildlife baseline studies completed for the Approved Project during 2014 and 2015. In November of 2016, caribou were designated as threatened by COSEWIC (COSEWIC 2016). Recently, caribou from the Lorillard and Wager Bay herds were collared in spring (2018) and that information was collected and used to support the FEIS Addendum (Agnico Eagle 2018a).

Caribou are an important part of the Arctic ecosystem, and a key part of the culture and traditional economy of Nunavut. There are five migratory barren-ground caribou herds identified in the Kivalliq including the: Beverly, Ahiak, Wager Bay, Lorillard, and Qamanirjuaq (Approved Project FEIS Volume 5). As a result, Inuit traditionally did not live at or near the calving grounds but rather chose to remain at a distance and set up camps along the migration routes (Approved Project FEIS Volume 7). Elders have stated that there are no caribou calving grounds identified near the Project area (Approved Project FEIS Volume 7, Appendix 7-A; Agnico Eagle 2016b), and according to Nagy et al. (2011), the nearest calving ground to the Project is over 100 km away. No caribou mortalities have occurred on the AWAR since 2013 Terrestrial Environment (FEIS Addendum Volume 5; Agnico Eagle 2018a) as documented between 2007 and 2017.

Other land animals important to the communities include ungulates, such as muskox, and fur-bearing species, such as Artic wolves, Grizzly bears, wolverines and raptors. Small mammals are a significant food resource for a variety of predatory mammals and birds. Several species, including Arctic hare, Arctic ground squirrel, and northern collared lemming, were observed during 2014 baseline studies.

3.4.3 Avifauna

Avifauna for the Expansion Project are consistent with the Approved Project given the expansion is at the same location as the Approved Project.

Baseline studies near the Project in 2015 found a total density of 1.41 birds per hectare representing 13 species (Approved Project FEIS Volume 5, Appendix 5-C, Section 4.3.3.1; Agnico Eagle 2016b), results which were comparable to the control area in 2015.

Project baseline monitoring continued in 2016 for the upland breeding bird species with 22 species detected at 20 Whale Tail plots with a density of 1.19 birds per hectare (Dougan and Associates 2017). A total of 23 species were detected at 20 control plots with a density of 0.75 birds per hectare (Dougan and Associates 2017).

3.4.4 Aquatic Life

Baseline aquatic life for the Project presented herein were extracted from Section 6.5 – Fish and Fish Habitat (FEIS Addendum Volume 6; Agnico Eagle 2018a).

Burbot and forage fish species (Ninespine Stickleback and Slimy Sculpin) were added to the fish and fish habitat baseline study.

Fish and fish habitat baseline studies were completed in 2014, 2015, and 2016 including the areas in close proximity to the proposed haul road and Whale Tail Pit area. Lower trophic community (phytoplankton, zooplankton, benthic invertebrates, and periphyton) baseline studies were completed in close proximity to the Whale Tail Pit in 2014, 2015, 2016, and 2017.

Fish habitat was evaluated at 28 watercourses proposed to be crossed by the haul road. Watercourse descriptions are provided in Volume 6, Appendix 6-D– Fish and Fish Habitat Section of the Approved FEIS (Agnico Eagle 2016b). Three watercourses (at crossing km 16.0, km 23.9, and km 32.3) were classified as rivers (large, flowing open channels) with potential habitat for VCs, such as Arctic Char and Arctic Grayling. These large rivers provide spawning, rearing, and foraging habitat for small-bodied fish, and provide migratory corridors and various habitat functions for large-bodied fish (e.g., Arctic Char, Arctic Grayling).

Five streams (at km 3.4, km 10.7, km 20.0, km 26.1, and km 43.5) may also provide potential corridors for large-bodied fish. However, the majority of the crossing locations (n = 20) only had the potential for seasonal use by small-bodied fish such as Ninespine Stickleback or Slimy Sculpin. Six watercourses (at km 2.1, km 26.1, km 28.3, km 36.2, km 41.8, km 51.2) are unlikely to support fish due to lack of surface water flows (Approved FEIS Volume 6, Appendix 6-D; Agnico Eagle 2016b), all of which were characterized by contributing drainage areas of less than 4 km^2 in size. Sixteen crossing locations were on boulder-dominant stream sections, potentially restricting fish passage to upstream locations. Potential spawning habitat for Arctic Grayling (i.e., areas of gravel substrate) was identified at two watercourse crossings: km 16.0 and km 44.8.

A total of 52 fish were captured using 186 mins of fishing effort at 11 watercourse crossing locations along the haul road alignment. Five species were captured. Slimy Sculpin were the most abundant, followed by Arctic Char, Arctic Grayling, Burbot, and Ninespine Stickleback. Arctic Char were captured at three watercourses upstream of Pipedream Lake (Tasirjuaraajuk Lake), a lake that supports Arctic Char, based on IQ (Approved FEIS Volume 7, Appendix 7-A).

Minor route adjustments were identified for the haul road since 2015 as detailed design continued, and the road width will increase from 9.5 m to 15 m; however, no additional watercourses or waterbodies are crossed and existing crossings are either the same or have moved short distances (i.e., less than 50 m). Bathymetric surveys of 19 lakes in the LSA identified Lake A17 (Whale Tail Lake) as the largest lake by both surface area and volume. Coarse substrates (i.e., gravel, cobble, boulder, and bedrock) dominated the littoral zone of both Lake A16 (Mammoth Lake) and Lake A17 (Whale Tail Lake). The 16 small lakes surveyed for bathymetry ranged in maximum depths from 1.8 m in Lake A55 to 25.0 m in Lake A20. Surface areas ranged from 3.0 ha in each Lakes A47 and A49 to 63.0 ha in Lake A65 (Approved FEIS Volume 6, Appendix 6-M; Agnico Eagle 2016b).

Lake Trout spawning habitat was investigated in Whale Tail Lake during late-August 2016. A total of 15 high-potential spawning shoals were identified throughout the lake, based on depth, substrate, and slope. A total of 11 underwater video cameras deployed from August 27 to 31, 2016 were used to detect fish presence at these shoals in an attempt to verify

spawning shoal locations. Although no spawning was observed, Lake Trout were the most frequently observed fish species at these shoal locations, and one instance of a male Lake Trout following a female was recorded, which is behavior often associated with spawning. Data collection was limited to daylight hours due to technological constraints, which may have attributed to the lack of observed spawning behavior which most frequently takes place after dark. Lake Trout spawning was not assessed at other lakes within the Project area.

Fish habitat was assessed at 31 headwater streams of the A watershed. Potential Arctic Grayling spawning habitat (i.e., gravel substrate) was observed at two locations in Stream A63-A18, however, no Arctic Grayling eggs or adults were observed nor collected (Approved FEIS Volume 6, Appendix 6-K; Agnico Eagle 2016b).

A total of 2,270 fish were captured during baseline sampling in lakes and streams in the RSA near the Whale Tail Pit. Seven species were captured: Arctic Grayling, Arctic Char, Lake Trout, Round Whitefish, Burbot, Slimy Sculpin, and Ninespine Stickleback.

4.0 SECTION 4 • PROJECT DESCRIPTION

4.1 Location and Access

The Project is located approximately 150 km north of the hamlet of Baker Lake (**Error! Reference source not found.**), additional detail on the location is provided in Section 2.0.

Construction of the approved haul road with a top width of 9.5 m was completed in November 2018. The constructed haul road connects the Vault Pit to the Amaruq exploration camp site and will be upgraded as part of the Expansion Project to a double lane (15 m top width) to ensure safe passage of haul trucks as described in Section 2.0. Agnico Eagle has sole responsibility for the construction upgrade and ongoing inspection and maintenance of all of the components of the haul road, including the road bed, the bridges, the culverts, and the borrow/quarry sites used in the construction.

Meadowbank Mine relies on marine transportation (to Baker Lake) for most of its supplies including fuel, construction and operation equipment, materials and consumables, including dangerous goods, food, household goods and other non-perishable supplies. Agnico Eagle does not forecast changes to the existing transportation requirements related to the marine environment; in other words, no additional ship trips are expected to be added by the Expansion Project as compared to the level of shipping currently required to re-supply the Meadowbank Mine and Approved Project on an annual basis. The proposed marine activity will simply be extended for an additional four years of operations.

Personnel (non-local crew) will access the Project site via the currently approved Airport Facilities at the Meadowbank Mine from which they will be transported by the haul road directly to the Project site. There are no anticipated changes to the currently approved Airport Facilities at the Meadowbank Mine. Agnico Eagle initially proposed to progressively reclaim the small airstrip at the exploration site with surface material to be reused as construction material for the Approved Project. Upon further Project optimization, Agnico Eagle decided to use the existing airstrip as a construction access road for Whale Tail Dike. A section of the expanded haul road near the Whale Tail Pit site will be used as an emergency airstrip during the operation of the expansion.

The haul road will not be publicly accessible; rather it will be only used by Agnico Eagle and its employees of its contractors.

4.2 Site History

The Project site history dates back to 2003. Exploration activities by operators are summarized in Table B-1 in Appendix B.

Table A-2 in Appendix A provides a summary of all existing licenses, permits, and authorizations for Meadowbank Mine and the Project to date, organized by agencies.

4.3 Site Geology

The Amaruq properties are underlain by Archean supra crustal rocks of the metamorphosed Woodburn Lake Group. These rocks are believed to have been deposited in a continental rift setting and include mafic to ultramafic and volcaniclastic rocks interlayered with clastic sedimentary units that include greywacke, siltstone, mudstone, banded iron formation, and chert. This rock sequence has been intruded by granitoid rocks and lamprophyres and underwent multiple deformation events and metamorphism.

The geology of the Whale Tail deposit is described in more detail in the Geochemistry Report (FEIS Addendum Volume 5, Appendix 5-E; Agnico Eagle 2018). There is some consistency between the main lithological units found at Meadowbank Mine

(intermediate volcanic, iron formation, ultramafic, and quartzite) and those at the Whale Tail deposit, which include ultramafic komatiites, clastic sedimentary rocks, mafic volcanic rocks and felsic to intermediate intrusive rocks.

Three different mineralization styles are present at the Whale Tail deposit, with gold associated with pyrrhotite or arsenopyrite. Mineralization is hosted in the iron formation (as layers, lenses or disseminations), in chert (as silica flooding), and throughout the entire rock sequence (as veins).

Overburden in the Project area consists of shallow till overlying the undulating bedrock surface. There are also scattered bedrock outcrops and eskers as described in the Approved Project (Approved FEIS Volume 5, Appendix 5-A; Agnico Eagle 2016b).

4.4 Project Summary

Development plans and potential impacts and benefits resulting from the Approved Project and the Expansion Project have been presented on an ongoing basis to the general public, community organizations, community leaders, businesses, and government. The feedback obtained from this engagement activity has been incorporated in the Project planning to optimize the Project from an environmental and socio-economic point of view, including costs and operability. This is part of Agnico Eagle's approach to sustainable development in mining: to limit negative environmental and social impacts and to enhance positive impacts. Consistent with the Approved Project, Agnico Eagle has adopted a precautionary approach while developing the Expansion Project details for the purpose of evaluating its potential impacts. As such, conservative assumptions have been used for design criteria and performance modelling of the Expansion Project, ensuring a robust concept and conservative impact predictions.

As part of the exploration drilling program, some infrastructure has already been developed at the Project site and it will be developed further. The exploration program is being carried out following the approved Type B Water Licence and Land Use Permits; the approved exploration facilities are listed in Sections 1.0 and 2.7.

In relation to the existing exploration facilities, only the works related to upgrading the GSP-1 and WRSF for the proposed underground mine workings are covered in this ICRP Amendment, as the exploration facilities at the Project site are covered under the Exploration Facilities Conceptual CRPs (Agnico Eagle 2015a,b). The first stage of the haul road (i.e., the upgrade of the access road from 6.5 m width to 9.5 width) was completed in November 2018 under the Approved Project. The second stage of the haul road upgrade (i.e., the widening of the haul road from 9.5 m width to 15 m width) is part of the Expansion Project.

The two existing vent raises have been renamed for the Expansion Project as WHL #1 and WHL #2.

The new or expanded on-site infrastructure proposed for the Expansion Project is covered under this ICRP Amendment, and it includes the following:

- expansion of the Whale Tail Pit;
- mining of an additional open pit, the IVR Pit;
- underground mining workings below Whale Tail and IVR pits including a temporary main ventilation system, two new vent raises (IVR #1 and IVR #2) and an underground water management system;
- one new stockpile for ore from underground;
- expansion of the underground WRSF;
- expansion of the GSP-1;
- two new Groundwater Storage Ponds (referred to in this document as GSP-2 and GSP-3);

- a new Salt Water Treatment Plant Saltmaker (S-WTP) or low TDS treatment plant for brackish water;
- a new Salt Water Treatment Plant Saltmaker (S-WTP) or high TDS treatment plant for brine water;
- installation of a larger maintenance shop and additional wings to the Main Camp;
- an additional freshwater intake in Mammoth Lake to support explosive mixing;
- a new emulsion plant;
- an additional above ground fuel storage tank (500,000 L capacity);
- five additional underground fuel storage locations (with a total capacity of 700,000 L);
- expansion of Whale Tail Ore Stockpile No. 1;
- relocation and expansion of Whale Tail Ore Stockpiles No. 2 and No. 3;
- a new IVR Ore Stockpile No.4;
- a new IVR WRSF including a contact water collection system;
- two new water discharge diffusers into Whale Tail South Basin;
- a new alternate water discharge diffuser (adaptive management);
- expansion of the Whale Tail WRSF and a new contact water collection system (the WRSF includes a landfill);
- two new temporary NPAG WRSFs (No. 2 & 3);
- relocation of the overburden stockpile;
- two new CRF plants;
- three new water retention dikes (IVR D-1, IVR D-2 and IVR D-3);
- a new Whale Tail Dike seepage pump station;
- a new IVR Diversion;
- a new IVR Attenuation Pond and associated pond pump station;
- new incinerator, composter, and landfarm;
- new transportation routes to expansion facilities including internal access roads;
- widening of the haul road from 9.5 m to 15 m; and
- additional haul road quarries and esker borrow sources.

The infrastructure for the Approved Project and Expansion Project is described in detail below. See Figure 1.1-1 for locations.

Agnico Eagle commenced the construction of the Approved Project in 2018 and expects to ultimately achieve full production in 2019. Construction upgrades to support the Expansion Project will begin as soon as approval and permits for the amendment applications are received (anticipated for early 2020). Agnico Eagle is permitted to operate the Whale Tail Pit until 2022 with an initial amount of approximately 8.3 Mt of ore over a mine life of about three to four years (i.e., the Approved Project). Agnico Eagle is now proposing to mine an additional 15.2 Mt of ore from the expanded Whale Tail Pit, the IVR Pit, and underground operations. This would extend the mine life until 2026, for a total of eight-year operation for the Project.

The Approved Project will generate approximately 8.3 Mt of ore, 46.1 Mt of waste rock and 5.6 Mt of overburden (with very limited organic material) for a total of 51.7 Mt of waste. The Expansion Project will generate an additional approximately 15.2 Mt of ore, 121.7 Mt of waste rock, and 5.7 Mt of overburden soil, (with very limited organic material) for a total of 127.4 Mt of waste. The Approved and Expansion Project will generate in total 23.5 Mt of ore, 167.8 Mt of waste rock and 11.3 Mt of overburden for a total of 179.1 Mt.

As ore will be transported to Meadowbank Mine site for milling and processing, tailings (8.3 Mt for the Approved Project and 15.2 Mt of tailings for the Expansion Project) will report to Meadowbank Tailings Storage Facilities, which are authorized under the current Meadowbank Mine Certificate and Type A Water Licence.

Table 4.4-1, Table 4.4-2 and Table 4.4-3 present the milling schedule including mine waste production, along with the ore stockpile evolution and its maximum storage tonnage for the Approved Project, Expansion Project, and total proposed for the mine life (Project).

Table 4.4-1: Mine Plan by Year – Approved Project

Year	Ore Mined (t)	Ore Processed (t)	Waste Rock Excavated (t)	Overburden Excavated (t)
2017	*0*	0	461,625	199,454
2018	179,003	0	1,087,633	1,236,488
2019	2,196,993	1,642,500	17,238,276	4,111,005
2020	3,070,121	3,040,090	27,316,859	71,412
2021	2,833,027	3,596,554		
2022				
2023				
2024				
2025				
2026				
Total	**8,279,144**	**8,279,144**	**46,104,393**	**5,618,359**

Table 4.4-2: Mine Plan by Year – Expansion Project

Year	Ore Mined (t)	Ore Processed (t)	Waste Rock Excavated (t)	Overburden Excavated (t)
2017				
2018				
2019				
2020			2,384,454	2,875,737
2021	1,082,536	233,331	31,461,155	1,342,271
2022	4,674,860	3,070,030	31,707,096	281,150
2023	3,970,053	3,224,997	31,075,034	1,226,057
2024	4,793,044	3,238,079	24,002,432	0
2025	720,634	2,063,214	1,090,886	0
2026[(a)]		3,411,477		
Total	**15,241,127**	**15,241,127**	**121,721,057**	**5,725,215**

(a) Assumed balance of ore in stockpile is processed in 2026.

Table 4.4-3: Mine Plan by Year – Approved & Expansion Project (Project)

Year	Ore Mined (t)	Ore Processed (t)	Waste Rock Excavated (t)	Overburden Excavated (t)
2017	0	0	461,625	199,454
2018	179,003	0	1,087,633	1,236,488
2019	2,196,993	1,642,500	17,238,276	4,111,005
2020	3,070,121	3,040,090	29,701,313	2,947,149
2021	3,915,563	3,829,885	31,461,155	1,342,271
2022	4,674,860	3,070,030	31,707,096	281,150
2023	3,970,053	3,224,997	31,075,034	1,226,057
2024	4,793,044	3,238,079	24,002,432	0
2025	720,634	2,063,214	1,090,886	0
2026[(a)]		3,411,477		
Total	**23,520,271**	**23,520,272**	**167,825,450**	**11,343,574**

(a) Assumed balance of ore in stockpile is processed in 2026.

4.5 Project Components Description

4.5.1 Underground Mine Workings

Underground operations are planned beneath both the Whale Tail Pit and the IVR Pit. Common and well-known underground mining methods will be used by Agnico Eagle. Underground mining will be mainly (95%), long hole mining with some mechanized cut and fill in flat areas. The configuration will be a mix of transverse and longitudinal stoping. The underground mine will use the existing exploration ramp, and portal, as the main connection to surface for haulage of ore and will also use the two existing exploration vent raises (WHL #1 and WHL #2). Two new vent raises; IVR #1 and IVR#2 and a temporary main ventilation system, are proposed to support the underground operations.

Trucks and scoops are the equipment that will be used for ore extraction. Stopes will be filled with cemented rock fill or rock fill.

It is proposed that the underground operation below Whale Tail Pit will extend to 658 m below the lake water surface (i.e., to 505 m below sea level) and to 234 m below the lake water surface (i.e., to 83 m below sea level) for the underground operation below IVR Pit (FEIS Addendum Volume 6, Appendix 6-A; Agnico Eagle 2018a).

Two CRF plants are proposed for the Expansion Project; which will be located just east for the IVR Pit (near the IVR Diversion) and just east of the Whale Tail Pit (south of the Whale Ore Stockpile No. 1).

Waste rock from the underground mine will be temporarily stored on surface in the existing exploration underground WRSF which will be upgraded to accommodate additional waste storage as described in Section 4.5.3. Waste rock from the underground workings will be used as backfill in the mine such that no underground waste rock will remain on surface after operations.

During the operational phase of the underground mining, the anticipated average annual volume of water to be treated and discharged from the underground workings will range between 12,000 m^3/yr to 127,000 m^3/yr (Golder 2019b).

Runoff from underground waste rock is anticipated to contain salinity due to drilling brines (used for drilling in permafrost) and brackish groundwater below the permafrost. Salt leaching will be temporary. On-going kinetic testing has not yet shown any effect of salt on sulfide mineral reaction rate. Salt-water will be captured and treated during operations.

Underground contact water will be managed separately from the runoff from surface. The infrastructure for the management of underground contact water is summarized below (see details in Section 4.5.8):

- GSP-1 (former Pond AP-5) will contain high salinity flows from underground at the start of underground mining while 20% brine is being added to drilling water; and will also receive the brine concentrate from S-WTP (brackish).
- GSP-2 will become operational in 2022 to manage excess low salinity water from the underground inflows below the base of the permafrost.
- GSP-3 is planned as a contingency for operational flexibility and adaptive management opportunities in the event of an increase in groundwater flows or if the underground storage is permanently or temporarily unavailable.
- High salinity water (stored in GSP-1) will be treated through the S-WTP (brine), while low salinity water (stored in GSP-2) will be treated in the S-WTP (brackish).
- Treated effluent will be discharged into Mammoth Lake or Whale Tail Lake (South Basin) via the permitted diffusers (Golder 2019b).

4.5.2 Open Pit Mine Workings

Whale Tail Open Pit

At the end of operations, the approved Whale Tail Pit was planned to extend approximately 115 m below current water level of Whale Tail Lake (152.5 m) and have an ultimate footprint area of approximately 50 ha. The expansion of Whale Pit is planned to extend the pit approximately 282 m below current water level of Whale Tail Lake (i.e., to 129 m below sea level). The expansion Whale Tail Pit at its ultimate configuration will extend across the northern edge of Whale Tail Lake and it will have a total footprint area of 62 ha.

As indicated in Section 3.3.5 and as for the Approved Project, but with slightly different lithological proportions, most of the waste rock lithologies to be disturbed by mining of the Whale Tail Pit, Underground, and IVR Pit are non-potentially acid generating (NPAG - 79%). These units will not require means to control ARD. The remaining 21% of waste rock is classified as PAG. All PAG/ML waste rock developed from the Approved and Expansion Projects will be permanently stored in the WRSFs.

Various lithologies show metal leaching (ML) behaviour (leachable arsenic). The overburden and lake sediment are classified as NPAG based on the low sulphide sulphur content. The leachable arsenic content in the overburden was low whereas it is elevated in the lake sediments. All lake sediments will be stored permanently in the WRSFs. The overburden will be co-disposed with the waste rock in the WRSFs or will be temporary stored in the overburden stockpile (see Section 4.5.3 for details).

The geological setting of the ore body is important for open pit slope design and underground mine development. The Whale Tail Pit expansion considered comments received from interested parties during the technical review phase for the Approved Project. The design considerations for the expanded open pit slope designs and a typical cross-section of the deposits will be provided during the NWB regulatory review process.

Meadowbank experience indicates a preference for steeper bench faces and wider berms in order to comply with the Nunavut regulation of minimum ‘effective’ 8 m berms. The selected pit slope designs for the Whale Tail Pit (both approved and expanded sections) follow this approach whenever possible; however, drill and blast trials will be carried out early in the mine development to validate and optimize the design.

The mine design approach for the Approved Project pit rock zones consists of selective mining using 10 to 14.4 m benches. The final bench height will typically be 21 m and the bench face angle will vary from 65^{o} to 75^{o} depending on the pit wall. The inter-ramp angles will vary from 41^{o} to 53^{o}.

Bench scale stability was assessed for the permitted Whale Tail Pit by means of Kinematic and Limit-Equilibrium analyses to identify potential bench-scale planar, wedge and toppling instability. Consistent with the permitted Whale Tail Pit, the design and geotechnical stability for the proposed pit expansion will be monitored using the same best practices currently applied at Meadowbank Mine.

The Whale Tail deposit is partly located within Whale Tail Lake. As per the Approved Project the permitted approach to develop the pit involves isolating the pit area with three dikes (Whale Tail Dike, Mammoth Dike, and Northeast Dike). The isolated area will then be dewatered during operations and the dewatered water level will be maintained through the life of the Project by diverting most of the fresh water that would otherwise come in contact with the mine site to other sub-watersheds using diversion channels and by pumping (operational dewatering) the remaining contact water to the O-WTP for treatment before discharge into Mammoth Lake. The proposed expansion of the Whale Tail Pit has not changed the concept for the dewatering of the Whale Tail Lake (North Basin). It is proposed that the treated water could also be discharged

through two diffusers into Whale Tail Lake (South Basin) or other alternatives (adaptive management). The permitted Northeast Dike will be decommissioned sooner to allow the mining of the IVR Pit under the Expansion Project.

As per Type A Water Licence 2AM-WTP1826, Agnico Eagle will complete the dewatering of Whale Tail Lake (North Basin) in 2019 following the construction of the dikes and the fish out. The proposed expansion of the Whale Tail Pit will extend the duration of operations of the dewatered area of the Whale Tail Lake (North Basin). The construction of the IVR Pit will require the dewatering (and fish out) of Lake A49 and a series of shallow lakes and ponds and small watercourses north of Whale Tail Lake. Moving upstream from Whale Tail Lake, these are watercourse A46-A17, Lake A46, watercourse A47-A46, Lake A47, Lake A48, Watercourse A0-A48 and Lake A0. Use of Lake A53 for mining operations will also require approval under the *Fisheries Act*, including DFO-approved fish outs followed by dewatering during the open water seasons of 2020 to 2022.

Consistent with the Approved Project, flow of surface water into the Whale Tail Pit expansion area will be controlled using the permitted infrastructure which includes the Whale Tail Dike, Mammoth Dike, South Whale Tail Diversion Channel and Northeast Dike. The Whale Tail Dike will retain water upstream from the pit area. The normal water level of Whale Tail Lake (South Basin) will be raised by 4 m to reroute water flow towards the northwest passage through the South Whale Tail Diversion Channel into Mammoth Lake. The Mammoth Dike will limit the water flow from Mammoth Lake back into the pit during important flood events. The pit area also needs to be protected from water flowing from the North-East Sector. This natural flow pathway will be blocked by the Northeast Dike, allowing the water level to rise approximately 2 m before overflowing towards Nemo Lake. No significant changes to dike design for the Expansion Project are anticipated; although the Northeast Dike (which is within the IVR Pit footprint) will be removed once construction of the IVR Pit is initiated in Year 2 (2020).

Based on bathymetry provided for the Approved Project, the predicted volume of water in Whale Tail Lake (North Basin) is 3.4 Mm^3 at a level of 152.5 m. The lowest point in lake is at 135 m. It is assumed that the top 5 meters will consist of fresh water with low suspended solids. The remaining water volume may contain suspended solids from the re-suspension of lake-bottom sediments which will need to be removed prior to discharge into the environment. It is assumed that approximately two thirds of the volume (i.e., approximately 2.2 Mm^3) will be pumped directly to Whale Tail Lake (South Basin) if it meets discharge criteria (Dewatering Phase 1), and the remaining (i.e., approximately 1.1 Mm^3) will be pumped through the O-WTP for suspended solids control and then discharged to Whale Tail Lake (South Basin) during Dewatering Phase 2 (Golder 2019b).

During the operational phase of the Whale Tail Pit Expansion, the anticipated average annual volume of water to be managed in the Whale Tail Pit will range between 365,000 m^3/yr in Year 1 (2019) to 690,000 m^3/yr by the end of operations Year 7 (2025).

Contact water draining to the Whale Tail Pit sector will be pumped to Whale Tail Pit Attenuation Pond until the IVR Attenuation Pond is online in Year 4 (2022), after which it will be pumped to the IVR Attenuation Pond. All contact water will be monitored and treated as necessary before discharge during operation. The approved East Channel will be decommissioned during operations Year 4 (2022) in support of the Expansion Project. See Section 4.5.8 for additional details on water management components.

IVR Pit

The proposed approach to develop the IVR deposit involves isolating the pit area by controlling surface runoff. The isolated area will be dewatered in Year 2 (Year 2020) for the development and operation of the pit. The dewatered water level will be maintained through the life of the Project by diverting most the clean water to other sub-watersheds via the IVR Diversion

and by pumping (operational dewatering) the contact water to the O-WTP for treatment before discharge through diffusers into the Mammoth Lake.

At the end of operations, the proposed IVR Pit is planned to extend approximately 107 m below current water level of Whale Tail Lake (153.5 m) and will have an ultimate footprint area of approximately 43 ha.

A summary of the geochemistry characterization for the waste to be generated by the Project is provided in Section 3.3.5.

The mine design approach for the IVR Pit will be the same that which was used for the Approved Project based on results from geotechnical site investigation (see 3.2.3 for more details). Consistent with the permitted Whale Tail Pit, the pit design and geotechnical stability will be monitored using the same best practices currently applied at Meadowbank Mine. During the operational phase of the IVR Pit, the anticipated average annual volume of water to be managed from the pit will range between 85,000 m^3/yr in Year 2 (2020) and 198,000 m^3/yr by the end of operations Year 7 (2025) (Golder 2019b).

The IVR deposit is partly located within the footprints of Whale Tail Lake and Lakes A47 and A49. Dewatering of IVR Pit area is currently scheduled to begin in July 2020 and operation is planned to initiate in Year 3 (2021).

During operations, the contact water draining to the IVR Pit sector along with groundwater seepage from the pit will be managed to report to the proposed IVR Attenuation Pond and from there to the approved O-WTP for treatment. All contact water will be monitored and treated as necessary before discharge during operation. See Section 4.5.8 for additional details on water management components.

4.5.3 Waste Rock and Overburden Storage Facilities

The new or expanded WRSFs and overburden storage facilities for the Expansion Project will include the following:

- expansion of the approved Whale Tail WRSF to the southeast;
- a new IVR WRSF;
- expansion of the underground WRSF to the north (a temporary facility);
- two new temporary NPAG WRSFs (No. 2 & 3); and
- relocation of the overburden stockpile (temporary facility).

The ore stockpiles are described under Section 4.5.4 below.

For the Approved Project, approximately 2.5 Mt of NPAG/NML waste rock are planned to be used for construction of facilities such as roads, pads, and water management facilities (i.e., dikes, berms, rip rap, etc.). The remaining waste rock is planned to be trucked to the approved Whale Tail WRSF or IVR WRSF until the end of the open pit mining. The overburden is planned to be trucked to the approved Whale Tail WRSF to be co-disposed with the waste rock or to the approved temporary overburden stockpile.

For the Approved Project about 5.5 Mt of overburden are planned to be co-disposed within the Whale Tail WRSF. The remaining overburden, approximately 0.1 Mt, is planned to be temporarily stored in the temporary overburden stockpile for later use for different purposes during the construction, operation or closure stages. For the Approved Project, the temporary overburden stockpile was planned to be located in a 3.2 ha stockpile south of the Whale Tail open pit beside the Whale Tail Ore Stockpile No. 3. It is now proposed to relocate the temporary overburden stockpile closer to the south edge of the Whale Tail Pit (see Figure 1.1-1) and also to relocate the Whale Tail Ore Stockpile No. 3 to support the Expansion Project (see ore stockpile details in Section 4.5.4). The temporary overburden stockpile will have a footprint of approximately 1.8 ha.

The Approved Project will generate a total of 46.1 Mt of waste rock, and 5.6 Mt of overburden. The Expansion Project will generate a total of approximately 121.7 Mt of waste rock and 5.7 Mt of overburden. The combined Approved Project and Expansion Project will generate approximately 167.8 Mt of waste rock and 11.3 Mt of overburden. Approximately 40.3 Mt of NPAG waste rock will be used for construction activities such as roads, pads, and water management facilities (i.e., dikes, berms, rip rap, etc.). In addition, a total of about 10.0 Mm^3 will be used for the WRSFs thermal cover at closure. The remaining waste rock and overburden material from the Expansion Project will be hauled to the WRSFs or to the temporary overburden stockpile. Waste rock and overburden generated from the Whale Tail Pit expansion will be stored in the proposed expanded Whale Tail WRSF and the IVR WRSF. Waste rock and overburden generated from the IVR Pit is proposed to be permanently stored in the new IVR WRSF. All lake sediment will be stored permanently in the WRSFs.

The currently approved underground WRSF (i.e., Waste Rock Exploration Pad) (Licence No. 2BB-MEA1828) will be expanded to the north to accommodate additional storage from the Expansion Project. Waste rock from the underground workings will be used as backfill in the mine such that no waste rock will remain on surface after operations.

The permitted Whale Tail WRSF which will be located to the north-west of the Whale Tail Pit, will be expanded towards the south-east. The new IVR WRSF will be located east of the IVR Pit. The underground WRSF will remains at its current location; however, it will be expanded to the north. The proposed expanded Whale Tail WRSF and the new WRSFs for the Expansion Project have been designed with Contact Water Collection Systems to capture and control seepage and runoff. The locations of the WRSFs and temporary overburden stockpile were selected considering environmental, social, economic, and technical aspects. The waste rock storage footprints and associated water management infrastructure for the Project have been sized for up to eight years of mining to allow for potential resource growth.

The proposed expanded Whale Tail WRSF will have one pile and will occupy an area of approximately 119 ha compared to the 110 ha for the Approved Project. The new IVR WRSF will have one pile and will occupy an area of approximately 66 ha. The approved Whale Tail WRSF is currently designed to be approximately 95 m high, with bench heights of 20 m and an overall slope of 23 degrees (2.5H:1V); an angle generally considered gentle and stable for such facility. Similar design parameters will be used for the Expansion Project WRSFs including the proposed Whale Tail WRSF expansion. Agnico Eagle may increase overall height of the WRSFs in consideration of engineering optimization for increasing capacity. Slope stability analyses for the Expansion Project will be performed and provided 60 days prior to operations consistent with the Approved Project.

Consistent with the Approved Project, the WRSFs are designed to reduce impacts on the environment and to consider both the physical and geochemical stability of the stored waste rock and overburden. The WRSFs are designed considering the placement of the waste and overburden in layers spread using a dozer to reduce the footprint and to limit dust generation.

Also consistent with the Approved Project, the overburden will be removed first and placed into the WRSFs. As soon as waste rock material is available from the pits, the overburden (and lake sediments) will be surrounded with run of mine material to control the stability of the pile. Consistent with Meadowbank and approved Whale Tail Pit operations, a classification system will be used to identify and safely store NPAG, PAG, and ML rock. PAG mine rock will be stored at designated areas within the WRSFs for long-term chemical stability.

A summary of the geochemical properties of the overburden and waste rock including a summary of waste rock management including use of construction material is provided in the Waste Rock Management Plan (Agnico Eagle 2019c) and detailed geochemical properties are presented in Golder (2018c).

The approved mine landfill will continue to be located within the Whale Tail WRSF (see Section 4.5.7 for landfill details).

Consistent with the Approved Project, a closure cover will be progressively placed over the WRSFs to limit acid generating reactions and to control the migration of contaminants. The closure cover for the Approved Project will be 4.7 m thick based on cover thermal model results. Same cover thickness will be used for the Expansion Project. The closure cover will be constructed with NPAG/NML waste rock and is proposed for all WRSFs. The intent of the cover is to contain the yearly active layer inside the thickness of the cover and to maintain a temperature below 0° Celsius for the underlying rock. In the unlikely scenario of insufficient NPAG/NML waste rock material available to complete the recommended cover thickness, the design would need to be reassessed with consideration for insertion of a layer of fine material in the WRSF to reduce the active layer thickness and to limit air convection processes.

Also consistent with the Approved Project, by the time of permanent closure, it is expected that cover placement will have been completed over most of the sideslope areas of the WRSFs. Additional cover placement will be required on those parts of the upper side slopes where the cover has not yet been placed and on the top surface of the WRSFs. Thermistors will be installed in the WRSFs to monitor the rate of freeze back and permafrost development in the facilities. The locations for the thermistors will be determined during the final detailed design stage. The measured temperature within the WRSFs will provide background information for the study of permafrost development within the facilities. Shallow thermistor strings will also be installed to verify that the active layer depth does not exceed the thickness of the cover layer.

4.5.4 Buildings and Equipment

The main supporting facilities for the Approved Project development include:

- machinery and equipment for mining activities; and
- supporting infrastructure including: a communication tower, heli-pad, a power plant, a permanent camp (Main Camp), maintenance and on-site storage areas, a tank farm and three ore stockpiles (Ore Stockpiles No. 1 to 3).

The new or expanded main supporting facilities for the Expansion Project will include:

- expansion of the Main Camp (additional wings);
- a larger maintenance shop;
- an additional above ground storage tank (500,000 L capacity);
- five additional storage locations (with a total capacity of 700,000 L);
- an additional intake in Mammoth Lake to support explosive mixing;
- expansion of Whale Tail Ore Stockpile No. 1;
- relocation and expansion of Whale Tail Ore Stockpile No. 2 and No. 3 including contact water collection system;
- a new IVR Ore Stockpile No. 4;
- a new stockpile for ore from underground; and
- two new CRF plants.

Machinery and Mobile Equipment

Agnico Eagle will use the machinery and mobile equipment already on site that is currently in use for the Meadowbank Mine and Whale Tail Pit operations, with the addition of specialized long-distance haul trucks as identified for the Approved Project. Trucks and scoops will be required for the extraction of ore from underground mine workings. Information concerning vehicle types using the haul road is summarized in Table 4.5-1.

Table 4.5-1: Vehicle Information

Make	Model	Year	Weight Empty	Type
Caterpillar	777F	2008	163,000 lbs.	Rock haul
Western Star	4800SB	2012	66,000 lbs.	Explosive truck
Blue Bird	VISION SL	2014	27,507 lbs.	Bus
Kenworth	T800	2013	40,000 lbs.	Fuel truck
Ford	F250	2013	10,000 lbs.	Pickup
Kenworth	C500B	2006	128,000 lbs.	Truck w/float
Western Star	6900XD	2015	188,100 lbs.	Road haul truck

Supporting Facilities

The approved communication tower occupies an area of approximately 6,400 m^2 with a height of 45.5 m. With the expansion, the approved communication tower will remain in use for another four years.

The approved Power Plant is a diesel-fueled facility using reciprocating engines housed in the modular building with a floor area of 215 m². For the Approved Project, the two 1.8 MW/600 Volt (V) gensets have been relocated from the Vault Mine site to Whale Tail. An initial load estimation for the Approved Project has been completed which gives an expected load of 1,358 kilowatt (kW) representing less than 85% of the capacity of a single gen set. For the Expansion Project there will be seven Volvo Penta diesel generators installed in the power plant to provide power for the mine site. The generators to be installed will be 500 kW units with a power factor of 85%. There will be three CAT 3516 diesel generators installed for underground mine. The generators will be 1,875 kW with 85% power factor.

Due to the remote location of the mine, the Approved Project includes catered accommodation on-site for a total of up to 350 people, using both the existing exploration camp and additional 210 units (at the Main Camp). The approved Main Camp includes rooms, as well as a reception and security area, a kitchen and dining room, a laundry, recreational facilities, an administration building, and a first-aid clinic. Additional wings will be added to the Main Camp for the Expansion Project to accommodate a maximum of 544 people on-site (i.e., 154 new units are proposed).

The approved camp complex is an insulated structural wood frame building resting on a structural steel frame floor on piles. The approved camp is located at the industrial site pad. The proposed expanded main camp will have a total floor area of approximately 177,000 m^2 compared to the floor area for the Approved Project of approximately 112,000 m².

Consistent with the Approved Project, primary maintenance of mobile equipment for the Expansion Project will make use of existing infrastructure at Meadowbank Mine. For light maintenance, the approved industrial site includes one maintenance shop for mine equipment and one for haul trucks. A larger maintenance shop is proposed to support the Expansion Project. Consistent with the Approved Project, Agnico Eagle may also include a wash bay, a machine shop, and a welding shop. The concrete foundation will be designed according to the type of bay (e.g., for a wash bay, drains in the foundation will be designed for used water with a sump for an oil separator).

Also consistent with the Approved Project, the existing emulsion plant located near the Meadowbank Mine will be maintained with deliveries on an as need basis during Project operations. The haul road will be used to truck explosives between Meadowbank Mine and the Project site, with a minimum amount of explosives to be stored at the Whale Tail site.

Agnico Eagle proposes the installation of an additional intake in Mammoth Lake to support the Whale Tail emulsion plant operations. The use of water for explosives mixing is already authorized under the current water licence with source to be amended to Mammoth Lake. The intake will be constructed consistent with intake installed at Nemo Lake. Final design and construction drawings will be provided to the NWB for review 60 days prior to construction. Consistent with the Approved Project, the site will primarily use emulsion-based explosives during construction and operations to minimize the use of ammonium nitrate/fuel oil (ANFO). Presplit explosives will also be used to control the final pit walls, where required.

Also consistent with the Approved Project, the explosives storage facilities will be safely located away from vulnerable facilities, as stipulated by the federal and territorial *Explosives Use Act* and *Regulations*. The minimum setback distances between the proposed explosives storage facilities and the other mine site facilities will be governed by the *Quantity-Distance Principles User's Manual,* as published by the Explosives Branch of Natural Resources Canada. Use of these setback distances will ensure that the location of these proposed facilities will meet all federal and territorial regulations regarding safe siting of such facilities. Agnico Eagle will confirm compliance with legislative requirements for siting explosive storage facilities should a decision be made to relocate the facility. Any potential storage site will be located within the local study areas assessed in the FEIS Addendum (Agnico Eagle 2018a).

The construction and operation of the Project site will require the use of fuel (P-50 Fuel Diesel ULSD-43). Fuel will be supplied by marine fuel tankers at an annual volume of 96.8 million L (95 million L of ULSD and 1.8 million of Jet A). By comparison, the fuel usage for the Approved Project was projected to be 66.8 million L/year. The approved Bulk Fuel Storage Facility will be located east of the Main Camp adjacent to the mine operations haul road (see Figure 1.1-1).

Agnico Eagle has approval to store 500,000 L of diesel fuel under Type A Water Licence 2AM-WTP1826 to support open pit activities under the Approved Project and 1,900,000 L of diesel fuel under Water Licence 2BB-MEA1828 to support underground development and exploration activities. Under Type A Licence 2AM-WTP1826, Agnico Eagle adjusted the size of the fuel tank to one 1,500,000 L tank under the existing water licence to support open pit activities for the Approved Project. To support underground mining activities, as part of the Expansion Project, Agnico Eagle is proposing to add:

- one above ground storage tank with approximately 500,000 L capacity within the vicinity of the current Whale Tail Pit Fuel Farm; and
- 700,000 L storage capacity between five key storage locations.

In total, the proposed fuel storage capacity required for the Approved Project and the Expansion Project is a total of 2.7 ML.

Consistent with the Approved Project, the bulk fuel tank will be re-filled by a fuel truck on a regular basis throughout the year. The diesel tanks will be single-walled, constructed of welded steel, and designed, constructed, and located to meet the CCME guidelines for *Aboveground Storage Tank Systems Containing Petroleum and Allied Petroleum Products*. The approved fuel unloading facility will be located within a lined and bermed area sized to hold 110% of the volume of the largest tank. All other petroleum fuel and lubricant products will be delivered and stored in the original packing container from the manufacturer.

Consistent with the Approved Project, ore from the Expansion Project will be segregated by grade. The high-grade ore will be transported from the Amaruq site to the Meadowbank Mine for milling as part of the run of mine operation, while the low grade ore will be temporarily stockpiled in the ore pads until the end of the mining operations and then transported to the Meadowbank Mine for milling and processing.

Three ore stockpile facilities were included in the Approved Project. For the Expansion Project, Whale Tail Ore Stockpile No. 1 will be expanded, Whale Tail Ore Stockpile No. 2 and Whale Tail Ore Stockpile No. 3, will be relocated east of the IVR Pit and expanded. The Expansion Project also includes a new IVR Ore Stockpile No. 4, to be located along the northwest side of the expanded Whale Tail Pit, and one new stockpile for ore from the underground.

Consistent with the Approved Project, no ore will remain in the ore stockpiles by the end of operations.

Also consistent with the Approved Project, the mining plan considers that higher grade ores will be processed first, and lower grade ores will be stockpiled and processed at the end of operations. During the last year of operations Year 7 (2025), only low-grade ore material stockpiled from the pits operations will be processed.

4.5.5 Mine Infrastructure

Consistent with the Approved Project, ore from the Expansion Project will be segregated by grade. The high grade ore will be transported from the Amaruq site to the Meadowbank Mine for milling as part of the run of mine operation, while the low grade ore will be temporarily stockpiled in the ore pads until the end of the mining operations and then transported to the Meadowbank Mine for milling and processing.

Therefore, no milling and processing infrastructure will be constructed at the Amaruq site. Other infrastructure is covered under other sections (e.g., internal roads are provided in Section 4.5.6, power plant is provided in Section 4.5.4, etc.)

4.5.6 Transportation Routes

Haul Road

In November 2015, Agnico Eagle received approval to construct an access road under the Type B Water Licence (2BE-MEA1318), to connect the Vault Pit (one of the Meadowbank Mine pits) to the Amaruq exploration camp site in support of exploration activities. Vault Pit is approximately 8 km northeast of Meadowbank Mine site. The haul road is about 64 km long with a top width of 9.5 m (the upgrade of the access road; referred to as 'the haul road', from 6.5 m width to 9.5 m width was completed in November 2018 to accommodate increased traffic rates and haul trucks). To support the Expansion Project, Agnico Eagle proposes to upgrade the existing haul road from 9.5 m width to 15 m width to ensure safe passage of haul trucks.

Consistent with the Approved Project, road surfacing will be constructed using waste rock, crushed rock aggregates from the quarry sites, or natural aggregate from borrow pits in esker material. These quarries/borrow pits will be expanded to obtain material for haul road expansion construction. Two new (currently unpermitted) borrow pits (Km 8 and Esker 2 (ABC)) will be needed for the expansion of the haul road. The Vault quarry/borrow pit for the Approved Project will be expanded as part of the haul road upgrade.

Management, mitigation, and monitoring of borrow pits and quarry material will be implemented in accordance with the Whale Tail Pit Haul Road Management Plan (Agnico Eagle 2016c), Version 1 dated June 2016 approved by the NWB as provided in Part B, Item 14 of Type A Water Licence 2AM-WTP1526. As stipulated in Part B, Item 17, Agnico Eagle will review the Plans as required by changes in operation and/or technology and modify the Plans accordingly in the form of an addendum to be included in the Annual Report.

Consistent with the Approved Project, the bridges and culverts were already designed at the exploration stage to accommodate potential for use of the exploration road as a haul road. Consistent with the Approved Project, the haul road has 3 bridges, 8 large open bottomed arch culverts and 28 corrugated metal-pipe round culverts to pass watercourse

crossings. The bridges, open bottom arch culverts and round culverts allow for normal river and stream flow, and for fish migration at road water crossings. There are also many other localized drainage culverts to prevent erosion, reduce thaw susceptibility and washout of the road during freshet. The haul road upgrade for the Expansion Project has been designed to allow for caribou crossing.

Consistent with the Approved Project, Agnico Eagle has also allowed for temporary haul road closures due to caribou migration or inclement weather by appropriately sizing ore storage stockpiles, both on-site at Whale Tail and at Meadowbank Mill.

Internal Access and Haul Roads

A network of roads (service roads and haul roads) on the proposed Project site will be required to connect up and to access the various Project facilities. Consistent with the Approved Project, Project roads will be designed much like the Meadowbank road design and Approved Project as this design is suitable for the Arctic conditions.

4.5.7 Landfill and Other Waste Disposal Areas

Agnico Eagle proposes to upgrade the sewage treatment facilities for the Approved Project to accommodate a maximum of 544 people on-site. Sewage wastewater will continue to be treated using the upgraded Sewage Treatment Plant as per the Approved Project.

Sewage will be collected from the camp and change-room facilities and pumped to the sewage treatment system. The treated sewage would then be pumped to the Whale Tail Attenuation Pond and then discharged with other site contact water for the first years of operation. For the Expansion Project, once the IVR Attenuation Pond is operational, treated sewage effluent will be discharged to the IVR Attenuation Pond and discharged with other site contact water.

Consistent with the Approved Project, the waste management philosophy on-site will be to reduce, reuse, or recycle material where practicable. Non-salvageable, non-degradable, non-hazardous, non-putrescible solid waste material generated during construction, operations, and closure will be disposed of in a solid waste landfill (as described in the Landfill and Waste Management Plan submitted in support of the Approved Type A Water Licence Amendment Application). The landfill will not receive any waste that will attract birds or wildlife and it will be maintained in such a manner that windblown litter will be minimal. Following the example of Meadowbank, the approved landfill will be located within the Whale Tail WRSF and it will have berms on the south and east sides to protect debris from the wind. Also consistent with the Approved Project, the landfill will be covered with a minimum 2 m of NPAG waste rock at closure. The surface runoff from the landfill will be managed as part of the contact water system for the Whale Tail WRSF.

All organic wastes and combustibles from the Approved Project site were planned to be disposed of using the existing Meadowbank incinerator. Also, waste oil was planned to be collected and used on-site in waste oil burners. For the Approved Project, peak incinerated waste volumes were planned to remain similar to those occurring under current operational conditions at Meadowbank.

Agnico Eagle is now proposing to install an incinerator and a composter on-site at Whale Tail for the Expansion Project. The composter will be at the same location as the incinerator; the proposed location is west of the Main Camp. The objective of the composter is to reduce the amount of waste incinerated (i.e., reduce fuel consumption – reduce GHG emissions). Further details are provided in the Composter Management Plan (FEIS Addendum Volume 8, Appendix 8.A-5; Agnico Eagle 2018a). Organic material will be diverted from the incinerator to the composter (except if and when there are problems with

composter/maintenance). Combustible materials will be burned on site in the incinerator. Further details are provided in the Incinerator Waste Management Plan (FEIS Addendum Volume 8, Appendix 8.A-5; Agnico Eagle 2018a).

Similar to the waste management philosophy for the Approved Project, plans are to actively work towards minimizing spills through suitable work procedures for the Expansion Project. When spills cannot be prevented and do occur, the goal will be to limit the spread of the spill, and then to deal with any contaminated material resulting from the spill. Hydrocarbon contaminated soils generated during the construction, operation, and closure phases will be adequately addressed. Soil contaminated with light hydrocarbons, such as diesel, were planned to be treated in the Meadowbank Mine landfarm as part of the Approved Project. For the Project Expansion, Agnico Eagle foresees the need to optimize project operations with construction and operation of an on-site landfarm facility to treat and manage potential hydrocarbon contaminated soils. The proposed location of the facility is provided in Figure 1.1-1. A Landfarm Design and Management plan in support of Project operations has been included in the addendum applications. Refer to FEIS Addendum Volume 8, Appendix 8-A.4 (Agnico Eagle 2018a) for specific details.

Consistent with the Approved Project, materials contaminated with heavy hydrocarbons (not treatable in landfarm) (e.g., hydraulic fluid or grease) will be segregated, packaged and shipped south for treatment and/or disposal.

Also consistent with the Approved Project, hazardous wastes will be packaged for shipment off site to registered hazardous waste management facilities in the south. The accumulation of wastes will be avoided through an active waste management program. Hazardous waste will include the following:

- waste fuel: diesel fuel, oils and solvents, if not incinerated;
- lubricants: greases and other lubricants used for equipment operation and maintenance; and
- antifreeze.

4.5.8 Water Management Facilities

The Approved Project water management infrastructure included:

- four turbidity curtains;
- two contact water collection ponds (Whale Tail Attenuation Pond and Whale Tail WRSF Pond);
- two fresh water collection ponds (Whale Tail Lake (South Basin) and North-East Sector);
- three proposed water diversion channels (Whale Tail, East, and North, if deemed necessary);
- four water retention dikes (Whale Tail, Mammoth, Whale Tail WRSF, and North-East);
- two coffer/saddle dams;
- seven proposed culverts (Culverts 181, 182, 183, 184, 185, 186, and Mammoth Channel Culvert, if deemed necessary);
- a freshwater intake pump system at Nemo Lake;
- an Operation Water Treatment Plant (O-WTP);
- a Construction Water Treatment Plant;
- a Sewage Treatment Plant;
- pipeline and associated pump system;
- a potable water treatment plant; and
- a discharge diffuser located in Lake A16 (Mammoth Lake).

The new or expanded on-site water management infrastructure proposed for the Expansion Project include the following (see Figure 1.1-1):

- underground water management system;
- Contact Water Collection System for the new IVR Pit and expanded Whale Tail Pit;
- Contact Water Collection System for the new IVR WRSF, underground WRSF and expanded Whale Tail WRSF;
- expansion of the GSP-1;
- two new Groundwater Storage Ponds (GSP-2 and GSP-3);
- an additional freshwater intake in Mammoth Lake to support explosive mixing;
- two new water discharge diffusers into Whale Tail South Basin;
- a new alternate water discharge diffuser (adaptive management);
- three new water retention dikes (IVR-D-1, IVR D-2 and IVR D-3);
- a new Whale Tail Dike seepage pump station;
- a new IVR Diversion;
- a new IVR Attenuation Pond and associated pond pump station;
- new S-WTP (brackish) or low TDS treatment plant for brackish water; and
- new S-WTP (brine) or high TDS treatment plant for brine water.

Consistent with the Approved Project, the main objectives for water management are to reduce the flow of surface water runoff in the pits and to limit the impact on the receiving environment. In developing the water management plan, the following principles were followed:

- keep the different water types separated to the extent feasible;
- control and minimize contact water through diversion and containment;
- minimize freshwater consumption by recycling and reusing the contact and process water wherever feasible; and
- meet discharge criteria before any site contact water is released to the downstream environment.

Consistent with the Approved Project, the preferred site water management options were selected based on four aspects: society, environment, economy, and viability. As per the Approved Project the permitted approach to develop the Whale Tail Pit consists on isolating the pit area with three dikes (Whale Tail Dike, Mammoth Dike, and Northeast Dike), and diverting Whale Tail Lake (South Basin) to Mammoth Lake. The proposed expansion of the Whale Tail Pit has not changed the concept for the dewatering of the Whale Tail Lake (North Basin).

The proposed approach to develop the IVR deposit involves isolating the pit area by controlling surface runoff with the IVR Diversion and IVR D-1, IVR D-2, and IVR D-3 Dikes.

Consistent with the Approved Project, the Project site was divided into several management areas including contact water areas and non-contact water areas. Contact water will be collected in several ponds or sumps and pumped to attenuation ponds before being treated and discharged to Whale Tail Lake (South Basin) or alternative discharge location (adaptive management) until the end of operations. Non-contact water will be rerouted or discharged directly into the environment without treatment.

In support of the Expansion Project, Agnico Eagle has prepared a fully revised Whale Tail Pit-Expansion Project Water Management Plan (Agnico Eagle 2019b). A brief summary is provided below.

Non-Contact Water Management

Non-contact water is defined as surface water or runoff that is not physically or chemically affected by a mining project's development areas and/or activities. Non-contact surface water will be diverted and discharged directly into the environment without treatment.

The non-contact water sectors for the Project are (Golder 2019b):

- South Whale Tail Lake Sector: The water will flow through the South Whale Tail Diversion Channel and into Mammoth Lake.
- Northeast Sector: Runoff from the Northeast Sector is diverted to Lake A16 (Mammoth Lake) from June 2019 to July 2020, prior to the initiation of the IVR Pit. The water will be diverted towards Mammoth Lake via the O-WTP until the initiation of the IVR Pit. Once the IVR Pit is initiated, the Northeast Sector is reduced to the catchment area upstream of the IVR Diversion and diverted to Lake C38 (Nemo Lake) until closure.
- East Sector: To limit the flow of non-contact water into the Attenuation Pond, a diversion channel (East Channel) will collect and divert the flow of Lake A53 to Whale Tail Lake (South Basin) until IVR Attenuation Pond is initiated. Lake A53 will then become the IVR Attenuation Pond, no longer associated with non-contact water, and discussed in the next section. The East Channel will be decommissioned once the IVR Attenuation Pond is operational.

Contact Water Management

Contact water is defined as surface water or runoff that has been in contact with Project development areas and/or activities.

Contact water for the Project was categorized into the following twelve sectors (Golder 2019b):

- Quarry 1: Prior to mining activities, the natural area of Quarry 1 drains to Whale Tail Lake (North Basin). The Quarry 1 catchment is primarily used to manage contact water until Whale Tail Lake (North Basin) is dewatered and the Whale Tail Attenuation Pond becomes available. Contact water accumulated in Quarry 1 is discharged entirely to Lake A16 (Mammoth Lake) through the O-WTP once available in March 2019. Quarry 1 will become part of the Whale Tail Pit thereafter.
- Groundwater Storage Pond (GSP) Sector: A GSP system is designed to capture TDS (salt) affected waters. Up to three GSPs are planned to provide operational flexibility and adaptive management opportunity. GSP-1 will be used to store high salinity water from early mining operations through the permafrost. GSP-2 will be used to store low salinity water. A potential third pond GSP-3 is planned as a contingency.
- Underground Mine Sector: The Underground Mine Sector consists of the local catchment area of the underground mine which runs off through the mine ramp. This sector will be managed through the Underground Mine Stope and GSP-1 for high salinity water, and through GSP-2 for low salinity water. If necessary, excess water volumes may also be managed in GSP-3.
- Whale Tail Waste Rock Storage Facility Sector: Contact runoff from the Whale Tail WRSF and catchment area will be collected in the Whale Tail WRSF Contact Water Collection System and discharged to the Whale Tail Attenuation Pond starting in 2019. Once the IVR Attenuation Pond becomes operational in 2022, flows will discharge to the IVR Attenuation Pond until closure.
- North Sector: The North Sector consists of the northwest catchment area of Whale Tail Lake, just north of its natural lake outlet. The North Sector collection area will become operational once Whale Tail Lake (North Basin) is dewatered in 2019. It is intended to collect and convey contact water draining from the portion of the Whale Tail

WRSF encroaching on the Whale Tail Lake (North Basin) watershed starting 2021, to the active attenuation pond (i.e., either the Whale Tail Attenuation Pond or the IVR Attenuation Pond).

- Whale Tail Pit Sector: The proposed Whale Tail Pit is located in the northern portion of current Whale Tail Lake, just north of the Whale Tail Attenuation Pond. The Whale Tail Pit will be initiated following the dewatering of Whale Tail Lake (North Basin) in 2019. Its operational runoff will be conveyed to the active attenuation pond (i.e., either the Whale Tail Attenuation Pond or the IVR Attenuation Pond).
- Whale Tail Lake (North Basin)/Whale Tail Attenuation Pond Sector: The Whale Tail Attenuation Pond Sector is located just south of the Whale Tail Pit. It will become operational once Whale Tail Lake (North Basin) is dewatered in 2019. It is intended to manage all surface contact water until the IVR Attenuation Pond becomes operational in 2022. Collected water will be discharged to Lake A16 (Mammoth Lake) via the O-WTP during open water conditions. Prior to the pumping of underground water to surface in October 2020, contact water from the Whale Tail Attenuation Pond will be pumped to GSP-1 during winter conditions to prevent overflow of the Whale Tail Attenuation Pond. After October 2020, this collected water will be discharged to Lake A16 (Mammoth Lake) via the S-WTP (brackish) during winter (i.e., October 2020 to April 2022). Once the IVR Attenuation Pond becomes operational, the Whale Tail Attenuation Pond will only manage contact water from its local contributing area until closure.
- IVR Pit Sector: The proposed IVR Pit will be located just north of the Whale Tail Lake. The IVR Pit will be initiated in Q3 2020. Its operational runoff will be conveyed to the active attenuation pond (i.e., either the Whale Tail Attenuation Pond or the IVR Attenuation Pond).
- IVR Waste Rock Storage Facility Sector: The IVR WRSF will become operational once the IVR Pit is initiated. Runoff from the IVR WRSF will be captured by the IVR WRSF Contact Water Collection System prior to being pumped to the active attenuation pond (i.e., either the Whale Tail Attenuation Pond or the IVR Attenuation Pond).
- East Sector/IVR Attenuation Pond: The East Sector, inclusive of the Lake A53 catchment, is located east of Whale Tail Lake. The catchment will remain at baseline conditions until 2022, when it will become the IVR Attenuation Pond following fish out, construction of the IVR Attenuation Pond Dike, and dewatering of Lake A53. In 2018, its outlet drained naturally to Whale Tail Lake (North Basin), after which its flow will be diverted to Whale Tail Lake (South Basin) from 2019 to 2022. The IVR Attenuation Pond will be operational by freshet 2022. The IVR Attenuation Pond is intended to manage all contact water from 2022 to closure while discharging through the O-WTP during open water conditions.
- Whale Tail Lake (South Basin): Whale Tail Lake (South Basin) is located south of and adjacent to the proposed Whale Tail Dike. Whale Tail Lake (South Basin) was connected to Whale Tail Lake (North Basin) until the construction of the Whale Tail Dike in July 2018. Dewatering of Whale Tail Lake (North Basin) resulted in the flooding of Whale Tail Lake (South Basin) (to an elevation of 156 masl) and overflow into the Lake A16 (Mammoth Lake) watershed via an engineered channel during operations. From June 2021 to closure, Whale Tail Lake (South Basin) will receive effluent from the O-WTP. At the end of operations and into closure, the water level in the South Basin will be lowered permanently to 153.5 masl (i.e., 1 m above baseline level) by pumping the flooded volume into the Underground Mine and the IVR Pit.
- Industrial Camp Sector: Under the Approved Project, pads in the industrial sector are graded to redirect contact water towards the collection channel system. Under the Expansion Project, the contact water will continue to flow by gravity to the Whale Tail Attenuation Pond until the end of operations.
- Main Camp Sector: Under the Approved Project, water will drain from the camp sector pad and be directed toward the Whale Tail Attenuation Pond. This will continue under the Expansion Project.

Freshwater Intake

Under the Approved Project, freshwater for the Whale Tail Camp will be sourced from Whale Tail Lake and from Nemo Lake. Agnico Eagle now proposes the installation of an additional intake in Mammoth Lake to support emulsion plant operations. The use of water for explosives mixing is already authorized under the current water licence with source to be amended to Mammoth Lake. This new intake will be constructed consistent with the design of the existing intake installed at Nemo Lake.

Under the Approved Project, freshwater usage includes: potable use, fire suppression, dust suppression, drilling water (if contact water is not available), and water for the truck shop. The freshwater source at the Whale Tail site for the Approved Project was from the Whale Tail Lake during the first part of construction (i.e., Year 2018). The freshwater source for the camp use for the Expansion Project will be Whale Tail Lake (South Basin) and Lake C38 (Nemo Lake) from September 2018 to the end of operations and Whale Tail Lake (South Basin) alone at closure. Consistent with the Approved Project, freshwater is required to flood Whale Tail Lake (North Basin) at closure and will be sourced from the Whale Tail Lake (South Basin), diverted contact water and natural inflows to Whale Tail Lake (North Basin). Consistent with the Approved Project, Agnico Eagle will endeavor to reduce the amount of freshwater required for the Project, where possible.

Consistent with the Approved Project, freshwater will be sourced from each of the three source lakes through a fresh water intake and pump system. Freshwater use will switch from Whale Tail Lake (Lake A17) to Nemo Lake (Lake C38) for the periods mentioned above. Consistent with the Approved Project, the intakes (at Nemo Lake, South Whale Tail Lake and Mammoth Lake) will consist of vertical filtration wells fitted with vertical turbine pumps that supply water on demand.

Consistent with the Approved Project, freshwater will be pumped from the lakes through overland pipelines to insulated storage tanks located at the Main Camp for potable water treatment and located south of the camp for other freshwater uses. The freshwater pipelines will be high density polyethylene pipe, which will be insulated and heat traced.

Consistent with the Approved Project, the storage tank located at the Main Camp will provide both fire suppression water and freshwater storage prior to potable water treatment.

The design flow rate for the potable water for the Main Camp and accommodations (i.e., kitchen, laundry) for the Approved Project is 84 cubic metres per day (m^3/day), based on a 350 people camp capacity, (using both the existing exploration camp and the additional 210 units), and a nominal consumption of 240 L/day/person (Golder 2019b). Agnico Eagle has projected an increase of on-site staff for the Expansion Project in 2020, following reception of the amended licence, to 544 people. The design flow rate for the potable water for the Main Camp and accommodations for the Expansion Project will be increased to 130 m^3/day.

For the Expansion Project, between 33.6 m^3/day and 252 m^3/day will be required from Nemo Lake to meet the freshwater demands during construction and operations for camp use, truck shop, drilling water, makeup water for the underground workings, cement mixing and other miscellaneous uses. The current Type A Water Licence provides a maximum quantity of water use from Nemo Lake not to exceed 175,000 m^3/yr during construction, 45,750 m^3/yr for dust suppression and 191,750 m^3/yr for operation. Therefore, existing authorized volumes from Nemo Lake should be adequate for the Expansion Project.

Approximately 12 m^3/day will be required during closure for domestic use (consumption) and approximately 2,500 m^3/yr. will be required from Mammoth Lake for explosives mixing.

The current Type A Water Licence provides for a maximum quantity of water use from all sources not to be exceed 240,000 m^3 annually during construction and operation and a maximum of 10,655,000 m^3 annually during closure (including 17,600 m^3/yr. for domestic camp use and pumping during Whale Tail Pit flooding at closure).

Water Treatment Plants

For the Expansion Project, a new S-WTP (brackish) - or low TDS Treatment system - will be required to treat brackish water from underground inflows below the base of the permafrost. A new S-WTP (brine) or high TDS Treatment system will be required to treat brine water from the GSP-1.

For the Approved Project it was proposed that during operations that all site contact water would flow into or be pumped to the Attenuation Pond before treatment in the O-WTP, having an approximate hydraulic capacity of 2,000 m^3/h, to remove suspended solids. For the Approved Project, it was proposed that water would be treated to meet the discharge criteria and pumped to the receiving environment via the discharge pipeline(s) and the submerged diffuser(s).

For the Expansion Project, the IVR Attenuation Pond, once operational, is intended to manage contact water, and to discharge through the O-WTP.

For the Expansion Project, any water requiring treatment will be pumped to the water treatment plant(s) prior to discharge through the diffusers into Whale Tail Lake (South Basin) or other alternatives (adaptive management).

Agnico Eagle may require an additional discharge point(s) for the Expansion Project. Agnico Eagle is committed to maintaining discharge criteria according to the Type A Water Licence 2AM-WTP1826. Conceptual design and modelling results for the Expansion Project for alternative discharge locations (adaptive management) at lakes D1 and D5 were provided in the FEIS Addendum submitted to the NIRB (Agnico Eagle 2018a).

Effluent Diffusers

The Approved Project included only one mine effluent discharge point, where discharge water was planned to be reintroduced to Mammoth Lake after final treatment (from the O-WTP).

For the Expansion Project additional new diffusers are proposed at the Whale Tail Lake (South Basin) or other alternatives (adaptive management). The two discharge diffusers at Whale Tail Lake (South Basin) and other alternatives will be similar to the diffuser designed and authorized for Mammoth under the current Type A Water Licence.

Appendix A of the water balance report (Golder 2019b) presents the schematic diagrams of the water management strategy during the construction, operations, and closure phases for the Expansion Project. During the construction phase and the first two years of operation (Year 2018 to Year 2 [2020]), prior to the initiation of the Expansion Project, all contact water from the site will continue to be pumped or will continue to flow to the Whale Tail Attenuation Pond. During this period, the water stored in the Whale tail Attenuation Pond will be treated in the O-WTP and recycled to satisfy water demand for mining process and to minimize freshwater make-up requirements from Nemo Lake. The O-WTP is planned to be upgraded in June 2019 with an arsenic treatment unit. Consistent with the Approved Project, any excess water from the Whale Tail Attenuation Pond will be treated in the O-WTP prior to discharge to Mammoth Lake through the effluent diffuser during the open-water season. Dewatering flows from the underground mine will be stored on GSP-1 until the S-WTPs are commissioned in Year 2 (2020). During October 2020 and May 2021, the shallow groundwater will be treated in the S-WTP (brackish) before discharging into Mammoth Lake.

In Year 2 (2020) and Year 4 (2021), all surface contact water from the site will be pumped or will flow to the Whale Tail Attenuation Pond. Water stored in the Whale Tail Attenuation Pond will be treated in the O-WTP and discharged to the Whale Tail Lake (South Basin) or alternative discharge location during open-water seasons. The exception is the winter of 2019/2020 when excess water from the attenuation Pond is pumped to GSP-1.

Once the IVR Attenuation Pond is operational and until the end of operations, all contact water from the site will be pumped or will flow to the IVR Attenuation Pond. The Whale Tail Attenuation Pond will only collect local runoff. Water stored in the IVR Attenuation Pond will be treated in the O-WTP and discharged to the Mammoth Lake, Whale Tail Lake (South Basin) or alternative discharge location (adaptive management).

5.0 SECTION 5 • PERMANENT CLOSURE AND RECLAMATION

The pre-disturbance site conditions are summarized in Section 3.0. Figure 5.2-1 presents an aerial photo of the proposed mine site area taken in 2015. Pre-disturbance conditions are based on baseline data collection programs carried out since 2013. The expected areas of disturbance are shown on Figure 5.2-2.

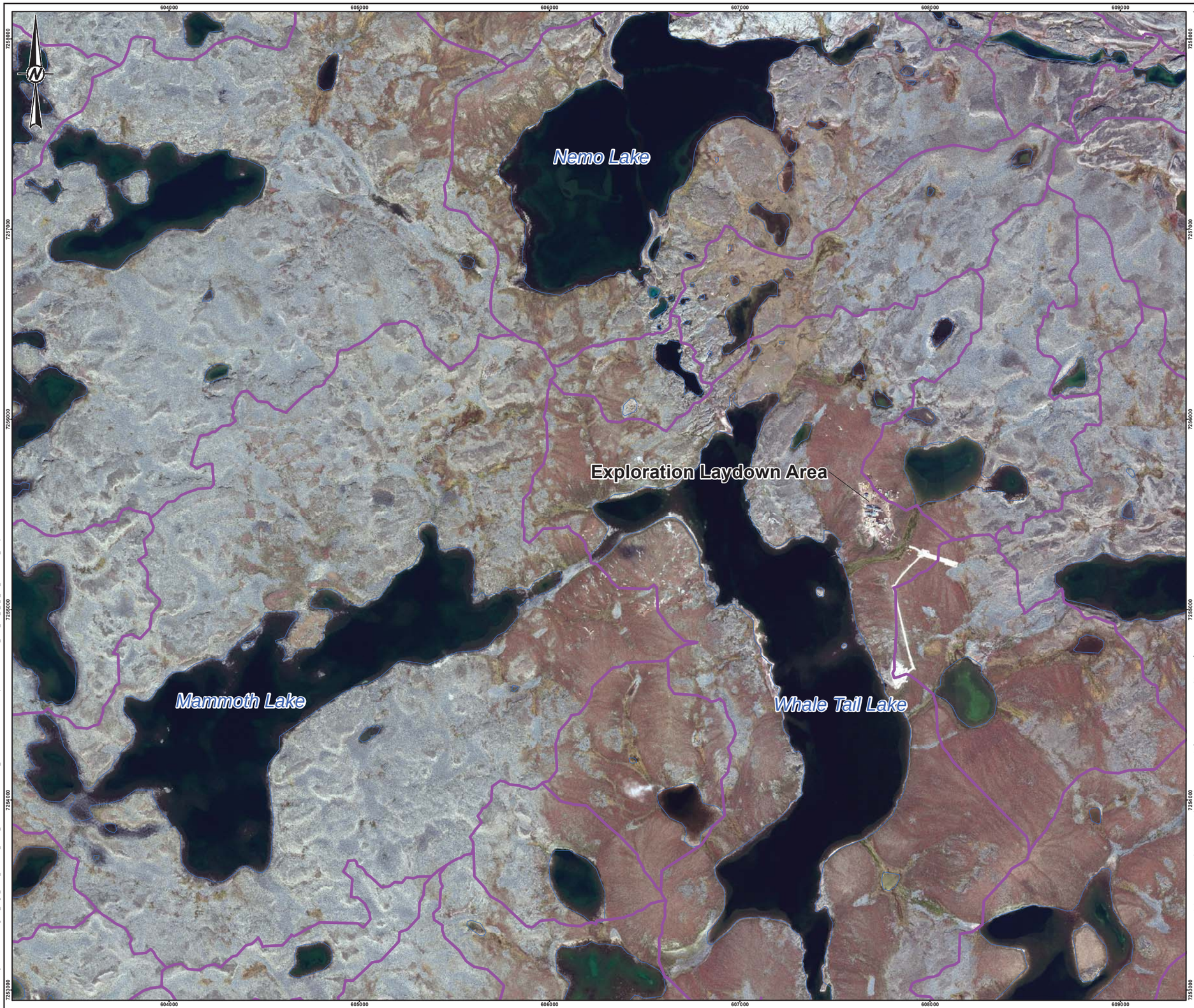
The area that will be disturbed during construction and operations for the entire Project is approximately 635 ha which includes the 325.1 ha permitted for the Approved Project (Figure 5.2-2). Consistent with the Approved Project, at closure, it is expected that the residual disturbances derived from the Project will be minor (Figure 1.1-3).

There will be three main stages of closure at the Project. Activities that take place during each stage are:

- **Progressive Reclamation Stage** (Operating Year 1 [2019] to Year 7 [2025]): during which reclamation of the WRSFs through cover placement will occur progressively during operation (Figure 1.1-1). Active care, maintenance, and monitoring will be required for the reclaimed areas of the WRSFs throughout this stage.
- **Closure Stage** (Year 8 [2026] to Year 24 [2042])*:* during which WRSF covers will be completed after completion of mine operations and processing of ore stockpiles, mining equipment will be removed, redundant infrastructure will be demolished and the flooding of the mined-out open pits and underground mine workings will occur (Figure 1.1-2) with a combination of natural runoff, seepage and contact water from the entire site, and water pumped from Whale Tail Lake (South Basin). The underground mine workings will be flooded in about 5 months (Year 8 [2026]). Flooding of the Whale Tail Lake (North Basin including the mined-out IVR Pit) to elevation 153.5 m (1 m above the original water level) is estimated to take approximately 16 years. Active care, maintenance, and monitoring will be required for the decommissioned and remaining facilities throughout this stage. Dikes will be decommissioned when water quality meets the regulatory closure objectives.
- **Post-closure Stage***:* (Year 25 [2043] onwards), will commence in Year 24 (2042) after flooding of the pits is completed and water quality is acceptable for direct discharge to the environment. During this stage, continued monitoring and maintenance will be carried out at a reduced frequency, depending on the results of the monitoring and measures of success selected for closure (Figure 1.1-3).

The closure stage may be reduced dependent upon water quality results through operations and treatment levels and adaptive management measures implemented that may lead to improved water quality sooner than predicted during the closure stage, thereby allowing for the decommissioning of the dikes prior to Year 24 (2042). A reduction in timeline for the closure stage may also trigger reductions in monitoring, and financial assurances (i.e., security deposits) posted for the Project.

The closure measures for the above stages are described in detailed in the following sections.



LEGEND

- WATERBODY
- WATERSHED

0 400 800

1:20,000 METRES

REFERENCE(S)

1. IMAGERY OBTAINED FROM PHOTOSET, ACQUIRED ON AUGUST 28, 2015
2. WATERBODY DATA OBTAINED FROM PHOTOSAT.

DATUM: NAD 83 CSRS PROJECTION: UTM ZONE 14

CLIENT

AGNICO EAGLE

AGNICO EAGLE MINES LIMITED:
MEADOWBANK DIVISION

PROJECT

WHALE TAIL PIT - EXPANSION PROJECT

TITLE

PRE-DISTURBANCE FOOTPRINT

CONSULTANT

GOLDER

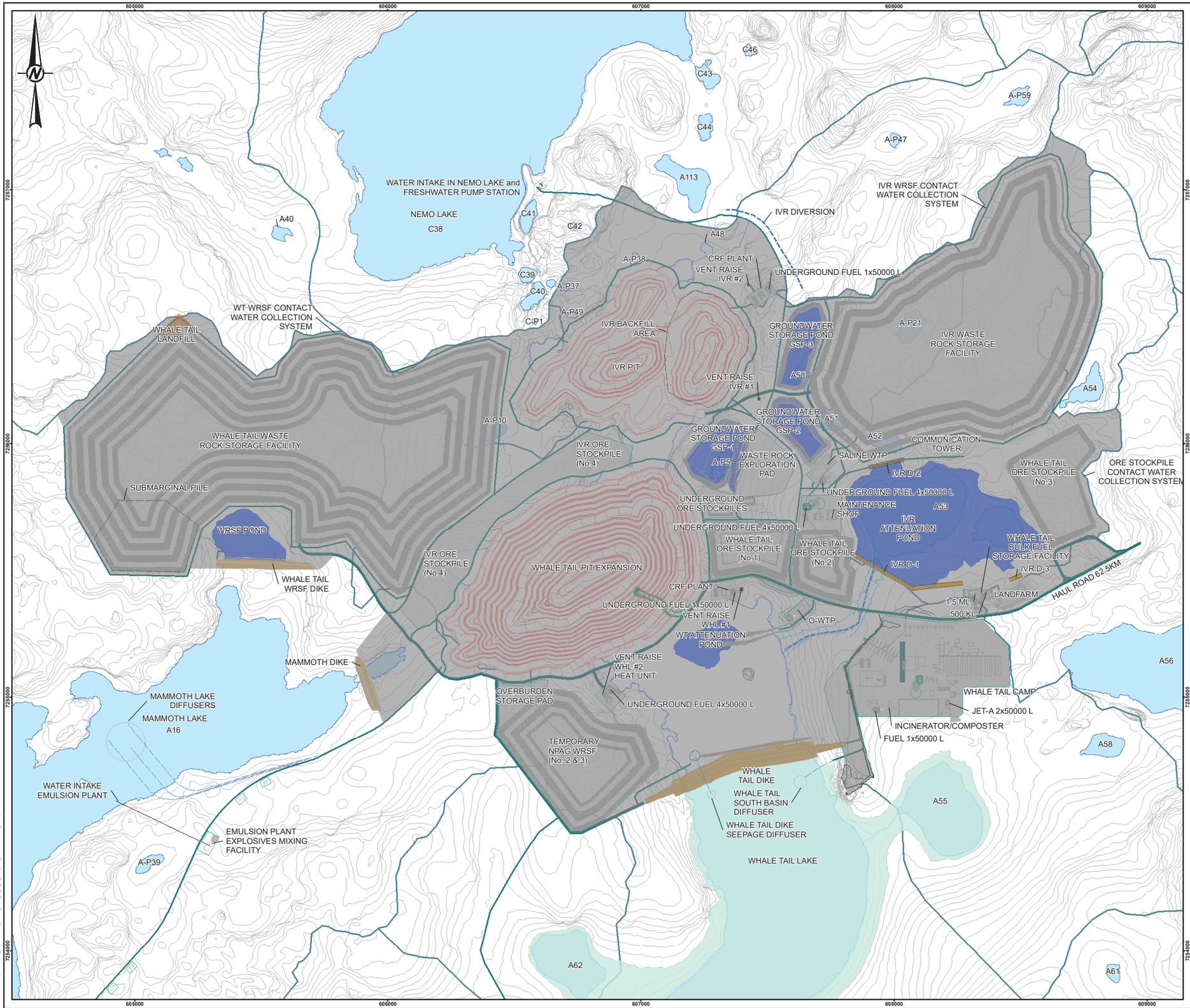
YYYY-MM-DD	2019-04-17
DESIGNED	AP
PREPARED	CDB/CD/MH
REVIEWED	AP/IM
APPROVED	KAB

PROJECT NO.	CONTROL	REV.	FIGURE
19120635	2000/2020	0	5.2-1

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

0 25mm

PATH: Y:\Journaby\CAD-GIS\Client\Agnico_Eagle_Mines_Ltd\Whale_Tail\19_PROJECTS\19120635\02_PRODUCTION\2000\MXD\Report\CRP\19120635_2000_FIG_5_2_1_Pre_Disturbance_Footprint.mxd PRINTED ON: 2019-04-17 AT: 2:25:49 PM



LEGEND

- WHALE TAIL WASTE ROCK STORAGE FACILITY
- DISTURBANCE FOOTPRINT
- WHALE TAIL LAKE (SOUTH BASIN) FLOODED LIMIT (WATER LEVEL 156.0m)
- NATURAL WATERSHED
- DIKE
- POND/SUMP
- ROAD
- WATERCOURSE
- WATERBODY

0 300 600

1:15,000 METRES

REFERENCE(S)

1. MEADOWBANK INFRASTRUCTURE AND PROPOSED WHALE TAIL HAUL ROAD ALIGNMENT OBTAINED FROM AGNICO EAGLE MINES LIMITED.
2. WATERCOURSE AND WATERBODY DATA OBTAINED FROM CANVEC © DEPARTMENT OF NATURAL RESOURCES CANADA. ALL RIGHTS RESERVED.

DATUM: NAD 83 CSRS PROJECTION: UTM ZONE 14

CLIENT

AGNICO EAGLE

AGNICO EAGLE MINES LIMITED: MEADOWBANK DIVISION

PROJECT

WHALE TAIL PIT - EXPANSION PROJECT

TITLE

PROJECT DISTURBANCE FOOTPRINT

CONSULTANT

GOLDER

YYYY-MM-DD	2019-05-14
DESIGNED	AP
PREPARED	CDB/CD/MH
REVIEWED	AP/IM
APPROVED	KAB

PROJECT NO.	CONTROL	REV.	FIGURE
19120635	2000/2020	0	5.2-2

5.1 Definition of Permanent Closure and Reclamation

Permanent closure is defined as the final closure of a mine site with no foreseeable intent by the existing proponent to return to either active exploration or mining. Permanent closure indicates that the proponent intends to have no further activity on the site aside from post-closure monitoring and potential contingency actions. Permanent closure does not, however, preclude the proponent or another party from pursuing opportunities at the existing site or in the area at a time beyond the foreseeable future (MVLWB/AANDC 2013).

5.2 Permanent Closure and Reclamation Requirements

This sub-section provides the permanent closure and reclamation requirements for each individual component of the Project. The components are categorized in sub-sections for clarity. The specified closure objectives may be revised with subsequent updates to the Closure and Reclamation Plan but are considered reasonable at this time to guide the advancement of closure planning. See the Water Management Plan (Agnico Eagle 2019b), and Mine Waste Rock Management Plan (Agnico Eagle 2019c), for additional details on the water management plan and water quality predictions, and the mine waste management plan.

See Figure 1.1-1 for Project component locations.

5.2.1 Underground Mine Workings

5.2.1.1 Project Component Description

The proposed Underground Mine workings are described in Section 4.5.1.

5.2.1.2 Pre-Disturbance, Existing, and Final Site Conditions

The pre-disturbance site conditions are summarized in Section 3.0. Figure 5.2-1 presents an aerial photo of the proposed mine site area taken in 2015. Pre-disturbance conditions are based on baseline data collection programs carried out since 2013.

The existing conditions at the underground mine workings area are not the same as the pre-disturbance conditions as underground exploration activities commenced in 2015. The existing underground mine workings facilities are described in detail in Section 4.5.1.

By the end of operations, the proposed underground operation below Whale Tail Pit will extend to 658 m below the lake water surface (i.e., to 505 m below sea level) and to 234 m below the lake water surface (i.e., to 83 m below sea level) for the underground operation below IVR Pit (FEIS Addendum Volume 6, Appendix 6-A; Agnico Eagle 2018a). Two new vent raises; IVR #1 and IVR#2 and a temporary main ventilation system, are proposed to support the underground operations.

The ultimate mine development of the Project is shown on Figure 1.1-1. The expected areas of disturbance are shown on Figure 5.2-2.

5.2.1.3 Closure Objectives and Criteria

The closure objectives and closure criteria for the underground mine workings are listed in Table 5.2-1.

Table 5.2-1: Closure Objectives and Criteria – Underground Workings

Component	Closure Objectives	Closure Criteria	Actions/ Measurements
Air	N/A	N/A	N/A
Land	Eliminate access to underground mine workings and surface openings	The portal and the decline ramp will be backfilled to eliminate the access to the underground mine workings. The vent raises will be capped. CRF fill passes will be plugged	Physical inspection and monitoring
	Remove hazardous materials from the underground mine	Fuels, oils, chemicals, etc. will be removed for disposal by a licensed handler prior to flooding	Physical inspection and monitoring
Water	Eliminate access to underground mine workings and surface openings	The portal and the decline ramp will be backfilled to eliminate the access to the underground mine workings. The vent raises will be capped. CRF fill passes will be plugged	Physical inspection and monitoring
	Allow underground to flood.	Underground mine to flood with natural groundwater seepage, and a combination of natural runoff and contact water from the entire site (i.e. Groundwater ponds), and water pumped from Whale Tail Lake (South Basin).	Initial physical monitoring to check inflow, but no inspection once ventilation is turned off.
Wildlife	Eliminate access to underground mine workings and surface openings	The portal and the upper section of the decline ramp will be backfilled to eliminate the access to the underground mine workings. The vent raises will be capped. CRF fill passes will be plugged	Physical inspection and monitoring
Health and Safety	Eliminate access to underground mine workings and surface openings	The portal and the decline ramp will be backfilled to eliminate the access to the underground mine workings. The vent raises will be capped. CRF fill passes will be plugged	Physical inspection
	Ensure the stability of underground workings during operations	The underground will be designed and mined to be physically stable; selected stopes will be back-filled with CRF during mining as needed. At the end of mining a geotechnical assessment of crown pillar stability will be completed.	Meet appropriate design levels, physical inspection by a qualified engineer and monitoring
Community	Consider community land use expectations and traditional knowledge in the closure planning	Community engagement will continue to be implemented	Public engagement
	Consider transition plans	Community programs will be established to transition into closure	Physical inspection

5.2.1.4 Consideration of Closure Options and Selection of Closure Activities

Backfilling the portal and the upper portion of the decline ramp and capping of the vent raises are considered to be the only viable option for eliminating access to the underground mine workings.

5.2.1.5 Engineering Work Associated with Selected Closure Activity

Guidance on generic engineering work options or strategies for closure of underground mine workings is provided in MVLWB/AANDC (2013). The relevant engineering works associated with the permanent closure activities for the underground mine workings are discussed below:

- At the end of mining a geotechnical assessment of crown pillar stability will be completed.
- An inspection and inventory of all equipment, machinery and materials in all areas of the underground workings will be carried out to evaluate their subsequent removal and handling.
- The salvage value of equipment and machinery is expected to be limited due to the site location and high transport costs. Therefore, it has been assumed that all machinery and equipment have no salvage value and they will be left

in the underground workings. The equipment and infrastructure will be de-energized, cleaned, drained, inspected and remediated, as appropriate, to eliminate the risk of dissipation of contaminants due to potential leakages.

- Phase 1 and 2 Environmental Site Assessments (ESAs) will be carried out to identify underground areas where soils may be contaminated by hydrocarbons.
- Contaminated soils suitable for remediation will be excavated and hauled to the on-site landfarm for remediation.
- Waste materials will be managed on an ongoing basis during the operations stage and consequently, there will be relatively little accumulation of these materials on-site at closure. Any remaining waste materials, acceptable for landfilling will be disposed in the Whale Tail Landfill.
- Unused fuel will be used to support the reclamation activities. Waste oils and waste fuels will be burnt in the on-site incinerator.
- Any hazardous wastes, including: batteries, soils contaminated with heavy hydrocarbons and explosives, not suitable for remediation, will be removed for disposal by a licensed handler.
- The vent raises will be capped with reinforced concrete plugs to eliminate inadvertent access into the underground workings by people and animals.
- The areas around the capped vent raises and the backfilled decline ramp will be re-graded to suit the surrounding topography to the extent possible. It is anticipated that a succession of indigenous plant species will naturally re-vegetate the surface over time.
- The ventilation system at the exploration ramp and portal will be removed and placed in the underground workings.
- The portal, including the box cut leading to the portal, will be backfilled to eliminate access into the underground workings by people and animals. The opening will be filled with NPAG waste rock material for at least 20 m into the adit.
- The underground workings will be actively flooded with a combination of natural runoff and contact water from the GSPs and IVR Attenuation Pond, and water pumped from Whale Tail Lake (South Basin). Studies have indicated that flooding to elevation 152.5 masl will take approximately 5 months. Groundwater inflows will also passively contribute to the flooding. The pipeline and pump system used during the mine dewatering stage will be relocated to allow flooding.

Details on the contact water management system at closure are presented in Section 5.2.9.

5.2.1.6 Predicted Residual Effects

Permafrost

Based on the thermistor and modelling results, the underground operation at Whale Tail will extend through the permafrost into non-frozen ground. The underground operation at IVR will likely be contained within the permafrost zone.

Based on the permafrost assessment (FEIS Addendum, Volume 5; Agnico Eagle 2018a), mining will result in permanent alteration of permafrost within the mined-out areas. Permafrost degradation and retreat due to excavation of the mined-out areas coupled with the inflow of groundwater to the underground operations, will extend below the permafrost.

Upon closure, the underground infrastructure will be actively and naturally flooded, and the flooding will accelerate thawing of permafrost zones immediately adjacent to the mine workings. However, due to the limited footprint, flooding of the underground infrastructure is not expected to have a significant impact on the overall permafrost thawing process under the pit lake. Any degradation of permafrost in the ground surrounding the underground operations is unlikely to revert back to

the pre-excavation state as the underground shafts will be flooded naturally, and the presence of water is likely to increase permafrost degradation.

The post-closure impacts of sealed vent raises and backfilled portal and access ramp are expected to be negligible.

5.2.1.7 Uncertainties

Uncertainty was addressed in the assessment by being conservative in defining impacts, incorporating information from available and applicable literature, and using past experience in similar areas including the experience gained from the Meadowbank Mine.

There are no currently identified uncertainties associated with the closing of the surface openings to the underground or flooding the underground works. Water quality of the flooded mine is an uncertainty as the water rock interactions in the underground workings are difficult to define; however, it was assumed that the underground mine water will be fully mixed. It is likely that, due to the emptying of the GSPs into the underground workings as well as the projected groundwater inflows while flooding, that the flooded underground workings will be characterized by a higher salinity concentration. If this is the case, there is potential for the higher salinity water to settle near the base of the underground workings due to density, which would limit movement of this water towards the pit and result in better than expected near surface water quality.

5.2.1.8 Closure and Post-Closure Monitoring, Maintenance, and Reporting

Guidance on monitoring and maintenance programs for closure and post-closure is provided in MVLWB/AANDC (2013). The overall post-closure monitoring and maintenance program for the Project are discussed in Section 9.0 along with the reporting requirements. The following presents the relevant post-closure monitoring and maintenance strategies for the underground facilities:

- Visual inspections of the reclaimed areas (especially at and around the sealed openings to surface).
- Check for surface expression (subsidence) of underground failure.
- Conduct geotechnical assessment of the risk within a zone on surface above any underground workings within 50 m of surface and mark this potential subsidence zone for future monitoring until the underground mine flooding is completed.
- Install and check thermistors where appropriate to monitor freeze-back in permafrost areas and to confirm that ground thermal regime returns to conditions predicted in design.
- Periodically backfill any areas of subsidence, should they occur.
- Monitor groundwater levels in the workings at start of closure period with reduced monitoring in the initial stages of post-closure.
- Instrumentation for groundwater levels will be placed in one or more vent raises as mining operation is completed.

5.2.1.9 Contingencies

There are no activities proposed as contingencies for the closure of the underground mine workings.

5.2.2 Open Pit Mine Workings

5.2.2.1 Project Component Description

The Open Pit workings are described in Section 4.5.2.

5.2.2.2 Pre-Disturbance, Existing, and Final Site Conditions

The pre-disturbance site conditions are summarized in Section 3.0. Figure 5.2-1 presents an aerial photo of the proposed mine site area taken in 2015. Pre-disturbance conditions are based on baseline data collection programs carried out since 2013.

The condition of waterbodies that will be impacted by the pits mining activities are presented in the Water Management Plan (Agnico Eagle 2019b). All mining components have been located to avoid or reduce impact on the local environment to the extent possible.

The existing conditions at the Whale Tail Pit are not the same as the pre-disturbance conditions as pre-stripping activities and other associated construction activities started in 2018. The existing conditions at the IVR Pit area are the same as the pre-disturbance conditions.

By the end of operations, the proposed Whale Tail Pit (including the expansion area) is planned to extend approximately 282 m below current water level of Whale Tail Lake (i.e., to -129 m below masl). The Whale Tail Pit at its ultimate configuration will extend across the northern edge of Whale Tail Lake and it will have a total footprint area of 62 ha. Within approximately 11 years, open talik is expected to form below the deepest portion of the Whale Tail Pit, and with time (approximately 50 years), the permafrost under the Whale Tail Lake will continue to thaw and the open talik that exists in the south part of Whale Tail Lake will have expanded to the north and include the area below the Whale Tail Pit Lake.

By the end of operations, the proposed IVR Pit is planned to extend approximately 107 m below current water level of Whale Tail Lake (153.5 m) and it will have an ultimate footprint area of approximately 43 ha. Following flooding and the formation of the IVR Pit lake, the permafrost is expected to melt and connect the IVR Pit lake to the sub-permafrost groundwater flow system (Golder 2019a). Modelling results confirmed that the IVR Pit lake would act as recharge boundary to the regional groundwater system once the permafrost layer beneath the lake melts (Golder 2019a). The IVR pit lake is predicted to be within permafrost during refilling and the permafrost below the pit lake to fully degrade over 1000 years.

The ultimate mine development of the Project is shown on Figure 1.1-1. The expected areas of disturbance are shown on Figure 5.2-2.

5.2.2.3 Closure Objectives and Criteria

The closure objectives and closure criteria for the pits mine workings are listed in Table 5.2-2.

Table 5.2-2: Closure Objectives and Criteria – Open Pits Workings

Component	Closure Objectives	Closure Criteria	Actions/ Measurements
Air	Meet Canadian Ambient Air Quality standards	Best management practices for controlling fugitive and exhaust emissions during active reclamation	Implement best practices. Routine air quality monitoring
Land	Minimize the potential for inadvertent access by humans to slopes that are dangerous or unstable during the flooding stage	Maintain waste rock berm constructed during operations	Geotechnical inspection to assess stability of post-mining slopes and to provide setback distances where necessary.
Water	Control contaminated flow from the flooded area which includes the pits areas	Integrate a water management plan to control contaminated flow from the flooded area and have these waters meet site permit water quality objectives	Implement a system to collect and contain these waters, routine monitoring and sampling; water treatment if required
	Ensure outflow from the flooded area meets water licence criteria	Prior to breaching the Mammoth Dike and the Whale Tail Dike, the water quality will be profiled to confirm it is suitable for release. Treatment options will be investigated, if necessary (e.g., in-situ treatment or through the O-WTP)	Routine monitoring and sampling; in-situ or water treatment at the O-WTP if required
	Control the rate of flooding	The dewatered Whale Tail Pit and IVR Pit will be actively flooded over a period of approximately 16 years to 153.5 m (1 m above the original water level)	Construction and operation of the active pit flooding system; routine monitoring and sampling
Wildlife	Discourage access to pits during flooding stage	Maintain waste rock berm constructed during operations. A plan will be developed to allow for reasonable exit should inadvertent access occur	Physical inspection; construction of rock barricades at pits access ramps
		Pits access ramps not used for flooding monitoring will be secured	
	Reduce the potential that water in the back-flooded area will affect wildlife health	Prior to breaching of the Mammoth Dike, the water quality will be profiled. Until it is suitable for release, the most appropriate treatment method will be determined if necessary (e.g., in-situ treatment or through the O-WTP)	Routine monitoring and sampling; in-situ or water treatment at the O-WTP, if required
Health and Safety	Allow emergency access and exit during flooding stage	A plan will be developed to allow for reasonable exit should inadvertent access occur	Physical inspection
	Reduce the potential for inadvertent access by humans to slopes that are dangerous or unstable during flooding stage	Maintain waste rock berm constructed during operations	Physical inspection by a qualified engineer
	Reduce the possibility that water quality in the restored Whale Tail Lake and downstream flows affect human health	The effluent water quality will be profiled. If it is not suitable for release, the most appropriate treatment method will be determined if necessary	Routine monitoring and sampling downstream
Community	Consider community land use expectations and traditional knowledge in the closure planning	Community engagement will continue to be implemented	Public engagement
	Consider transition plans	Community programs will be established to transition into closure	Physical inspection

O-WTP = operation water treatment plant

5.2.2.4 Consideration of Closure Options and Selection of Closure Activities

Closure activities for the pits were selected in consideration of the closure aspects listed below. This is considered the most appropriate closure plan based on the Meadowbank Mine experience.

Open Pit Perimeter - Wildlife Protection

The pits may be hazardous to wildlife species as wildlife may be injured by inadvertent access into the pit during the operations and flooding stage.

Environmental design features and mitigation, as well as current wildlife management practices used in other mining projects (Appendix C), will be implemented at the Project to limit wildlife injury and morbidity during the operations stage. As part of operations, a waste rock berm will be placed as part of the open pit periphery road on the side to the pits. Experience on other sites in the north has suggested that use of perimeter fences may not be appropriate because wolves can use fences to trap caribou and other prey.

Based on above, no additional closure activities have been included in this ICRP for the open pits perimeter; only monitoring of the existing berm will be carried out.

Once the water level has been restored in Whale Tail Lake to 153.5 m (1 m above the original lake level); the pits area will not represent a hazard to wildlife species as most of the pits area will be inundated.

Open Pit Stability

The pits slopes have been designed to be stable under operating conditions. At the end of mining, a geotechnical inspection will be carried out to evaluate the stability of the final pits slopes. If areas of marginal stability are identified, a setback distance will be established.

No additional closure activities (i.e., re-grading of slopes, erosion protection, re-vegetation, etc.) for the Whale Tail Pit have been included in this ICRP for the geotechnical and geochemical stability of the pit walls after closure as the pit will be flooded and most of the pit area will be inundated. Based on the water quality predictions, no additional rehabilitation is needed for the Whale Tail Pit exposed walls.

The water quality modelling has determined that, due to arsenic leaching from the lithologies in the IVR Pit high walls, rehabilitation of the exposed walls is needed to meet the water quality criteria. The exposed walls above the final water level (i.e., above 153.5 masl) will be mined at a flatter angle so that they can be covered with overburden after closure. Erosion protection will be placed over the cover.

Pits slopes below the final water will not present a hazard after closure. In areas where the wall may slightly exceed the final water level a waste rock berm will be constructed, including an appropriate setback depending on stability.

Flooding of the Open Pits

A detailed water management multiple account analysis (MAA) was completed for the Approved Project on various options for Project water management (FEIS Volume 1; Agnico Eagle 2016b). From the options evaluated for the Approved Project, the Whale Tail Diversion Channel to reroute the water flow from Whale Tail Lake (South Basin) towards the northwest passage through the South Whale Tail Diversion Channel into Mammoth Lake watershed obtained the best score. This option was selected due to lower capital costs and lower operating costs during construction and because it was more likely to be socially accepted as it is a passive water diversion system.

The Expansion Project has not changed this rerouting approach. Consistent with the Approved Project, the passive water management that provides this option will facilitate the closure and post-closure periods since the water accumulation from Whale Tail Lake (South Basin) will be used to re-flood the pits faster.

Also consistent with the Approved Project, the water level of Whale Tail Lake (South Basin) will be raised from July 2020 to May 2026 (i.e., an additional four years beyond May 2022 from the Approved Project to support the Expansion Project activities) and will discharge into Mammoth Lake through a southwest diversion channel during this period.

5.2.2.5 Engineering Work Associated with Selected Closure Activity

Guidance on engineering work options or strategies for the closure of open pits is provided in MVLWB/AANDC (2013). The relevant engineering works associated with the permanent closure activities for the open pits mine workings are discussed below.

Consistent with the Approved Project, pit access ramps not used during the flooding stage will be secured by rock berm barricades during the closure stage, berms will be constructed around the perimeter of the pits at a given setback in accordance with applicable mine regulations and rock mechanics studies conducted for pit stability during the operations stage.

The Whale Tail Pit and the IVR Pit are designed to have stable slopes during the mine life. The pits design and geotechnical stability will be monitored using the same best practices currently applied at Meadowbank Mine and proposed for the Approved Project.

Following completion of ore processing in 2026, site contact water including contact water in the underground mine watershed (GSP ponds) will be pumped into the underground mine; the remaining voids will be filled with Whale Tail Lake (South Basin) water. The dewatered Whale Tail Pit and IVR Pit area will be filled with a combination of natural runoff and contact water from the entire site (i.e., the Whale Tail and IVR WRSF Contact Water Collection Systems and the Whale Tail and IVR Attenuation ponds), and water pumped from Whale Tail Lake (South Basin). Contact water in the underground mine watershed (GSP ponds) will not be used for this purpose because of their anticipated higher salinity. This water will be used only to flood underground workings.

As part of the permitted Whale Tail Project Fisheries Offsetting, a sill will be constructed to increase the water level by 1 m to 153.5 masl and the Whale Tail Dike and Mammoth Dike will then be breached when the water quality monitoring results meet discharge criteria to allow water to naturally flow to the outside environment.

It is anticipated that the final volume of Whale Tail Lake (North Basin), up to 153.5 masl, will be approximately 72,000,000 m^3 and it will be flooded over 16 years. The sources of this water will comprise an initial transfer of approximately 8,280,000 m^3 from Whale Tail Lake (South Basin), and approximately 2,890,000 m^3/year annually thereafter.

Pump sizing for flooding and a more accurate estimate for the duration of flooding will be established during the detailed design phase of the Project to optimize pumping costs and to reduce potential impacts to Mammoth Lake. Agnico Eagle will follow the DFO Water Withdrawal Protocol (DFO 2010) when withdrawing water from Whale Tail Lake (South Basin).

The walls of the open pits will have been exposed for a number of years during mine operational phase, and some weathering may have occurred. As the pits are re-flooded, the water will contact the weathered rocks, which may affect the water quality by increasing concentrations of dissolved metals. The water quality model results indicated that the dikes around the pit lake will need to remain in place until the pit lake water quality is demonstrated to meet receiving water quality criteria. The water quality modelling has determined that, due to arsenic leaching from the lithologies in the IVR Pit high walls, rehabilitation of the exposed walls is needed to meet the water quality criteria. The IVR exposed walls above the final water level will be mined at a flatter angle so that they can be covered with overburden after closure. Erosion protection will be placed over the cover.

Water quality within the flooded pits and the Whale Tail Lake (North Basin) will be monitored during closure while the pits are re-flooding to verify the prediction of the water quality model.

Once the water in the re-flooded area is suitable for direct discharge to the environment, the pumping and pipelines systems will be removed. The Whale Tail Dike and Mammoth Dike will then be decommissioned, and the back-flooded area would then be maintained at a water level of 153.5 m and water from closed facilities will drain by gravity. The dikes will be breached at selected locations to a depth of approximately 3 m below average water level to account for ice formation and fish passage requirements. Excavated materials (rockfill) will be locally placed to extend shallower areas on the residual sides of the dike and breaches.

Further details on the contact water management system in closure is presented in Section 5.2.9.

5.2.2.6 Predicted Residual Effects

No discharges will occur to the downstream receiving environment during the re-flooding since all contact waters will be diverted to the Whale Tail Lake (North Basin) and IVR Pit.

The exposed Whale Tail Pit wall will be predominately comprised of south greywacke and south komatiite on the south wall, and north greywacke on the north wall, with lesser amounts of basalt, iron formation, central greywacke, and chert. The pits will be flooded at closure which will minimize sulphide mineral oxidation; thereby controlling the potential for acidic conditions to develop and also limiting arsenic release. The release of arsenic under submerged conditions from arsenic salts generated from exposure during mining is being evaluated as part of the water quality predictions (Golder 2019c). The north greywacke has a variable ARD potential and testing suggests that the delay to onset of ARD is likely to be much longer than the construction, operations and closure phases of the Project combined. However, if the north greywacke (or any other PAG/ML rock) were to be left exposed in the long-term on the highwall above the water level, a permanent control mechanism would be required.

The exposed IVR Pit wall will be predominately comprised of south komatiite and basalt with some north greywacke which has potential to release arsenic to runoff. The potential for arsenic release from the exposed pit walls was evaluated as part of the water quality predictions (Golder 2019c). Based on these predictions, a control mechanism will be implemented for IVR Pit walls that will be exposed above the final water level. Specifically, these slopes will be mined at a flatter angle in order to allow cover placement after closure. Erosion protection will be placed over the cover.

The effects to the receiving water quality have been evaluated through water quality modelling for the Expansion Project and presented in the FEIS Addendum Volume 6, Appendix 6-H (Agnico Eagle 2018a). Given the relatively small volume and small catchment of the first three receiving Lakes (Mammoth Lake, Lake A15, and Lake A12), the water quality in these lakes averaged over the closure period is predicted improve after operations.

Once the dikes are decommissioned and the water flow is reconnected between the south and north basin, predicted concentrations of major ions, nutrients (except phosphorus), and metals in Mammoth Lake, and downstream environments, for post-closure are predicted to be lower than aquatic life guidelines.

Permanent alteration of permafrost around the mined area is expected as the net effect of the following: (1) temporary permafrost aggradation due to excavation of the open pits; (2) potential groundwater inflows to the Whale Tail Open Pit during operations when its depth extends below the base of permafrost; and (3) degradation of permafrost and enlargement of the talik below the pits due to flooding of pits.

Modelling of the thermal conditions of the Whale Tail Pit lake during flooding and into post-closure by Golder (2018a) suggests the warm pit lake temperature will impact the permafrost under the pit, and talik zones will start to occur around the pit wall and floor. Within approximately 11 years, open talik is expected to form below the deepest portion of the pit, and with time (approximately 50 years), the permafrost under the Whale Tail pit lake will continue to thaw and the open talik that exists in the south part of Whale Tail Lake will have expanded to the north and include the area below the Whale Tail Pit Lake. The IVR Pit is in an area of regional permafrost and therefore degradation of the permafrost will occur over a longer time period; thermal modelling suggests that it will take approximately 1000 years for the regional permafrost to fully melt below the IVR pit lake.

5.2.2.7 Uncertainties

Uncertainty was addressed in the assessment by being conservative in defining impacts, incorporating information from available and applicable literature, and using past experience in similar areas including the experience gained from the Meadowbank Mine. The following uncertainties were identified during closure planning for the open pits.

Water Quality

Arsenic release from exposed Whale Tail and IVR Pit walls is a source of uncertainty in the prediction of the long-term water quality of the flooded pit lake and Whale Tail Lake (North Basin).

The source of the uncertainty lies in the occurrence of arsenic in the wall rock in waste rock and its leachability, particularly with respect to the IVR Pit, which has shown through geochemical testing to leach higher amounts of arsenic than similar lithologies in Whale Tail Pit. There is also uncertainty in the hydrogeochemical and hydrological conditions that will occur in the waste stockpiles and pit walls, and in the hydrological conditions in the Pit Lake and Whale Tail Lake, neither of which have been studied in detail.

Operational water quality modelling will be completed to assess water quality predictions.

5.2.2.8 Closure and Post-Closure Monitoring, Maintenance, and Reporting

Guidance on monitoring and maintenance programs for closure and post-closure is provided in MVLWB/AANDC (2013). The overall post-closure monitoring and maintenance program for the Project are discussed in Section 9.0 along with the reporting requirements. The following presents the relevant post-closure monitoring and maintenance strategies for the flooded area:

- visual inspections of the reclaimed areas;
- sample surface water and profiles of the flooded area; and
- inspect fish habitat in flooded area.

Further details on the contact water management system at closure is presented in Section 5.2.9.

5.2.2.9 Contingencies

The need for contingency measures in water quality control will be determined based on water quality monitoring during operations and closure before the pits are fully flooded and before Whale Tail Dike and the Mammoth Dike are decommissioned. During operations, the quality of contact water in the pits and groundwater seepage reporting from the walls of the pits and into the pit sumps will be sampled and the models will be rerun to evaluate closure conditions and need for adaptive management of flows or infrastructure closure requirement. During flooding, the surface water and profiles of

the flooded area will be sampled. If the results of water quality monitoring indicate that water in the flooded area is not suitable for direct discharge, in-situ treatment would be considered.

5.2.3 Waste Rock and Overburden Storage Facilities

5.2.3.1 Project Component Description

The proposed WRSFs and temporary overburden storage facilities are described in Section 4.5.3.

5.2.3.2 Pre-Disturbance, Existing, and Final Site Conditions

The pre-disturbance site conditions are summarized in Section 3.0. Figure 5.2-1 presents an aerial photo of the proposed mine site area taken in 2015. Pre-disturbance conditions are based on baseline data collection programs carried out since 2013.

The waterbodies that will be impacted by the WRSFs and temporary overburden storage facilities are presented in the Water Management Plan (Agnico Eagle 2019b). All mining components have been located to avoid or reduce the impact on the local environment to the extent possible.

Construction activities were initiated in 2018 at the permitted Whale Tail WRSF area. The permitted Whale Tail WRSF will be expanded vertically and horizontally to the southeast for the Expansion Project. At the end of operations, the proposed Whale Tail WRSF will occupy an area of approximately 119 ha and will have a maximum height of approximately 95 m.

The existing conditions at the IVR WRSF area are the same as the pre-disturbance conditions. At the end of operations, the IVR WRSF will occupy an area of approximately 66 ha and will have a maximum height of approximately 60 m.

The currently approved Underground WRSF will be expanded to the north to accommodate additional storage from the underground operations. By the end of operations, all of the waste rock stored in the Underground WRSF will be returned underground for use as backfill, with no underground waste rock remaining on surface at the end of mine life.

Construction activities were initiated in 2018 at the permitted temporary NPAG WRSF area. The existing conditions at the proposed NPAG WRSFs areas are the same as the pre-disturbance conditions. It is expected that the material stored in the temporary NPAG WRSFs will be used for various reclamation activities at closure.

The existing conditions at the proposed temporary overburden stockpile area are the same as the pre-disturbance conditions. At the end of operations, it is expected that the material from the temporary overburden storage stockpile will have been used for different purposes during the construction and operation stages.

The ultimate mine development of the Project is shown on Figure 1.1-1. The expected areas of disturbance are shown on Figure 5.2-2.

5.2.3.3 Closure Objectives and Criteria

The closure objectives and closure criteria for the WRSFs are listed in Table 5.2-3.

Table 5.2-3: Closure Objectives and Criteria – Waste Rock Storage Facility

Component	Closure Objectives	Closure Criteria	Actions/ Measurements
Air	Meet Canadian Ambient Air Quality standards	Best management practices for controlling fugitive and exhaust emissions during active reclamation.	Implement best management practices. Routine air quality monitoring
Land	Confirm the WRSFs slopes and top are stable	The Whale Tail WRSF and IVR WRSF will be designed for closure and will account for seismic and permafrost conditions	Physical inspection by a qualified engineer, and monitoring
Water	Confirm runoff and seepage is collected	The runoff and seepage from the Whale Tail WRSF and IVR WRSF will continue to be collected by the WRSF collection systems and redirected to Whale Tail Lake North Basin during active closure (flooding). Water will be monitored during the 16 years of flooding until results demonstrate that water quality conditions from the WRSFs are acceptable for direct discharge	Physical inspection. Routine monitoring and sampling Treatment if required
	Reduce water impacts	A thermal cover to limit acid generating reactions and migration of contaminants	Place thermal cover of NPAG/NML rock on the Whale Tail and IVR WRSF surface during progressive reclamation and at closure. Install thermistors to verify the predicted performance of the cover
	Confirm runoff and seepage from the WRSFs meet water licence criteria	As above for runoff and seepage	Routine monitoring and sampling
Wildlife	Ensure the WRSFs surfaces are safe for wildlife	WRSFs at post-closure will not compromise wildlife safety as the WRSFs will be covered with NPAG/ML rock and graded	Physical inspection
	Minimize the possibility that water from the WRSFs will affect wildlife health	The runoff and seepage from the Whale Tail WRSF and IVR WRSF will continue to be collected by the WRSF collection systems and redirected to Whale Tail Lake North Basin during active closure (flooding). Water will be monitored during the 16 years of flooding until results demonstrate that water quality conditions from the WRSFs are acceptable for direct discharge to the environment.	Routine monitoring and sampling
Health and Safety	Ensure the WRSFs are safe for monitoring and physical inspections	WRSFs at post-closure will not compromise people's health	Routine monitoring and physical inspection
Community	Consider community land use expectations and traditional knowledge in the closure planning	Community engagement will continue to be implemented	Public engagement
	Consider transition plans	Community programs will be established to transition into closure	Physical inspection

WRSF = waste rock storage facility

5.2.3.4 Consideration of Closure Options and Selection of Closure Activities

Construction / development of WRSFs with long-term stable slopes and placing the cover in a progressive manner is considered the most appropriate closure plan based on Meadowbank experience.

No other options for the WRSFs closure have been considered.

5.2.3.5 Engineering Work Associated with Selected Closure Activity

Consistent with the Approved Project, much of the closure and reclamation of the WRSFs will take place progressively during operations with the placement of the cover over the WRSFs slopes. The remaining closure and remediation requirements of the WRSFs will be completed after operations cease. Details of the closure activities are provided in the following subsections.

The engineering works associated with the progressive closure activities for the WRSFs are described in Section 6.2.3. Figure 1.1-1 shows the expected advance of WRSFs progressive reclamation by the end of the mine life.

Guidance on engineering work options or strategies for closure of WRSF is provided in MVLWB/AANDC (2013). The relevant engineering works associated with the permanent closure activities for the WRSFs are discussed below.

The WRSFs will be designed for long-term stability. Thus, no additional re-grading of the side slopes will be required at closure to enhance stability. It will be necessary to contour the top surface to ensure positive drainage and to prevent ponding.

A thermal cover will be progressively placed on the surface of the WRSFs as discussed in Section 4.5.3. Based on the cover thermal model results, the Whale Tail WRSF and the IVR WRSF will be covered with a 4.7 m thick closure cover which will be constructed with NPAG/NML waste rock. The intent of the cover is to contain the yearly active layer inside the thickness of the cover and to maintain a temperature below 0° Celsius for the underlying rock. The objective of the cover is the control of acid generating reactions and of migration of contaminants. Consistent with the Approved Project, the segregation of the PAG/NPAG and ML/Non-ML waste rock will occur during the operation of the mine. The covering of the top of the WRSFs will be mostly completed progressively during operations using rock hauled directly from the open pits or from a storage of NPAG (and non-ML to the extent possible) waste rock which will have been previously classified as NPAG and NML according to the guidance of the ARD/ML Sampling and Testing Plan.

Cover design will be revised during the detailed design phase of the Project and will be finalized during the operation phase of the Project based on the performance of the cover placed as progressive reclamation. It will also consider operational experience at other northern mine sites including the Meadowbank Mine, and available design guidelines including MEND Report 1.61.5c – Cold Regions Cover System Design Technical Guidance Document (MEND 2012). Thermistors will be installed to verify the predicted performance of the cover.

The contact water management system for the WRSFs will be maintained during the closure period. Consistent with the Approved Project, the water collected from the WRSFs will be monitored until water quality monitoring demonstrates that water flowing from this facility is acceptable for direct release to the environment.

Once water quality is acceptable for direct release based on criteria established through the water licensing process, the WRSF contact water management systems will be decommissioned (see Section 5.2.9 for decommissioning details).

All temporary stockpiles areas will be re-graded to suit the surrounding topography to the extent possible. It is anticipated that a succession of native community will naturally re-vegetate the areas over time.

5.2.3.6 Predicted Residual Effects

The following residual effects are predicted at the WRSFs after reclamation:

- The Whale Tail WRSF and the IVR WRSF will both remain as permanent features on the landscape. The vegetation communities which formerly occupied the areas will be permanently lost but it is expected that some of the native plant community will re-vegetate the WRSFs' cover surfaces over time.
- No significant adverse impact on the continued opportunity for traditional and non-traditional use of wildlife in the region is anticipated with the closure of the WRSFs or temporary overburden stockpiles.
- Runoff from the Whale Tail WRSF and the IVR WRSF and discharge from Whale Tail Lake (North Basin) will enter and mix into Mammoth Lake. Concentrations outside the mixing zone of the WRSFs contact water plume are predicted to meet receiving water quality criteria.

5.2.3.7 Uncertainties

The following uncertainties have been identified during closure planning of the WRSFs:

WRSFs Cover

The cover of waste rock is assumed to effectively host the active thaw depth in perpetuity over the entire WRSFs. Experience at Meadowbank Mine suggest there is likely to be very little water reporting to the base of the WRSFs during operations.

Water quality monitoring will be carried out during the operations stage to confirm the predictions.

Permafrost Development

The thermal conditions within the WRSFs will stabilize in time. The Thermal profile at closure will depend on the actual waste placement plan and schedule, initial waste temperatures when placed, and thermal conditions of the original ground before the waste materials are placed. For this reason, thermistors will be installed in the WRSFs to monitor the rate of freeze back and the progress of permafrost development in the facilities during the operations stage. In addition, shallow thermistor strings will be installed in the cover as it is progressively placed to verify the cover performance, (i.e. that the active zone thickness is less than the design cover thickness).

The locations for the thermistors will be determined during the final detailed design stage. Temperature readings will be taken according to the Approved Project Licence to track permafrost development within the WRSFs during operations and closure. The monitoring schedule will be reviewed and modified annually, as required, to reflect changes in operations and/or technology. The measured temperature within the WRSFs will provide background information for the study of permafrost development within the facilities.

Re-vegetation Considerations

The WRSFs will be allowed to naturally re-vegetate.

5.2.3.8 Closure and Post-Closure Monitoring, Maintenance, and Reporting

The overall post-closure monitoring and maintenance program for the Project are discussed in Section 9.0 along with the reporting requirements. The following presents the relevant post-closure monitoring and maintenance strategies for the WRSFs (guidance on generic monitoring and maintenance programs for closure and post-closure is provided in MVLWB/AANDC [2013]):

- periodic inspections will be performed by a geotechnical engineer to visually assess stability and performance of the WRSFs;
- ground conditions in the WRSFs will be monitored to confirm permafrost conditions are being established as predicted;
- thermistor data will be monitored to determine thermal conditions within the WRSFs to confirm predicted permafrost aggradation/encapsulation and to verify that the thickness of the active zone is less than the design thickness of the cover;
- water quality from controlled discharge points around the WRSFs will be monitored to confirm that drainage is performing as predicted and is not adversely affecting the environment; and
- any seepage areas from the toe of the WRSFs will be identified and monitored.

Further details on the contact water management system in closure are presented in Section 5.2.9.

5.2.3.9 Contingencies

On-going monitoring and treatment of seepage from the WRSFs will be the primary contingency until water quality meets criteria to direct discharge to the environment.

5.2.4 Tailings Storage Facility

Tailings from the Project will report to Meadowbank Tailings Storage Facility (TSF). All tailings produced by Meadowbank Mine will be deposited in accordance with the approved Mine Waste Rock and Tailings Management Plan. Closure of the TSF is covered under the Meadowbank Mine ICRP.

5.2.5 Buildings and Equipment

5.2.5.1 Project Component Description

The proposed buildings and equipment are described in Section 4.5.4.

5.2.5.2 Pre-Disturbance, Existing, and Final Site Conditions

The pre-disturbance site conditions are summarized in Section 3.0. Figure 5.2-1 presents an aerial photo of the proposed mine site area taken in 2015. Pre-disturbance conditions are based on baseline data collection programs carried out since 2013.

Construction of buildings and installation of equipment for the Approved Project was initiated in 2018. Therefore, the existing conditions at the buildings area are not the same as the pre-disturbance conditions.

The ultimate mine development of the Project is shown on Figure 1.1-1. The expected areas of disturbance are shown on Figure 5.2-2.

The expected area of disturbance associated with the proposed on-site and off-site Project facilities including the mine infrastructure described in Section 5.2.6 is approximately 635 ha.

5.2.5.3 Closure Objectives and Criteria

The closure objectives and closure criteria for the buildings and equipment are listed in Table 5.2-4.

Table 5.2-4: Closure Objectives and Criteria – Buildings and Equipment

Component	Closure Objectives	Closure Criteria	Actions/ Measurements
Air	Meet Canadian Ambient Air Quality standards	Best management practices for controlling fugitive and exhaust emissions during active reclamation	Implement best practices. Routine air quality monitoring
	Control dust generation from demolition and active reclamation activities	Best management practices to control dust	Implement controls and routine air quality monitoring
Land	Maintain required site infrastructure during active reclamation	Reduce the use of facilities after closure to promote early decommissioning	Physical inspection
	Clean up and remove machinery, materials and equipment	Machinery, materials and equipment will be removed off-site for salvage where economic to do so	Physical inspection
		Metals will be separated and shipped off-site as scrap if economical to do so or disposed on-site in designated areas for non-hazardous materials	Physical inspection

Component	Closure Objectives	Closure Criteria	Actions/ Measurements
	Remove all hazardous wastes	Hazardous wastes will be removed for disposal by licensed handler	Physical inspection
	Remove all fuels, chemicals and industrial wastes	During or prior to closure, site inventory of all these products will be updated	Physical inspection
		Any unused petroleum products or chemicals will be sold, returned to suppliers or disposed by a licensed handler. Excess fuel or oil will be burned in the on-site incinerator.	
	Remove surface infrastructure	Any above-ground infrastructure will be offered to the Kivalliq Inuit Association (the land owner) at closure for potential re-use elsewhere; otherwise, it will be dismantled and demobilized from site or disposed in the landfill	Physical inspection
		Remaining concrete foundations and slabs will be punctured and left in place and then covered with soil and the area will be re-graded to promote natural drainage	
	Remove contaminated soils	An assessment will be carried out to identify areas where soils may be contaminated by hydrocarbons	Physical inspection
		A more detailed investigations will be carried out of the potential soil contaminated areas (i.e., Phase 1 and 2 ESA investigations) to determine the extent of the contamination	Environmental Site Assessment
		Selected hydrocarbon contaminated soils will be excavated and hauled to the on-site landfarm for remediation	Physical inspection
Water	Ensure runoff is channeled through the watershed	Surfaces will be re-graded to promote natural drainage	Physical inspection and monitoring
Wildlife	Ensure the remaining surface areas are safe for wildlife use and access	Remaining areas will be scarified and remaining concrete foundations and slabs will be punctured and left in place and then covered with soil.	Physical inspection
Health and Safety	Ensure reclaimed areas support continuation of human land use activities	Human land use of the reclaimed area at post-closure will not compromise people's health	Routine monitoring and physical inspection
Community	Consider community land use expectations and traditional knowledge in the closure planning	Community engagement will continue to be implemented	Public engagement
	Consider transition plans	Community programs will be established to transition into closure	Physical inspection

5.2.5.4 Consideration of Closure Options and Selection of Closure Activities

If not properly reclaimed, wildlife maybe injured by entering reclaimed areas with depressions if subsidence occurs. Environmental design features and mitigation, as well as current wildlife management practices used in other mining projects will be implemented at the Project to limit wildlife injury such as re-contouring reclaimed areas to reduce hazards to wildlife. Buildings not required for post-closure activities will be dismantled and disposed in the landfill. Redundant equipment will be demobilized from the site if economic to do so or disposed in the landfill.

This is considered the most appropriate closure plan based on the Meadowbank Mine experience; no other closure options were considered.

5.2.5.5 Engineering Work Associated with Selected Closure Activity

Guidance on engineering options or strategies for closure of buildings and general infrastructure is provided in MVLWB/AANDC (2013). The relevant engineering works associated with the permanent closure activities for the supporting building and equipment removal are discussed below.

- Equipment used for closure activities (e.g., trucks, backhoes, etc.) will be removed from the Project site once they are no longer required. Most of the mobile equipment will be removed once the closure stage is complete. A small subset of equipment will be retained on-site to support any maintenance requirements during the post-closure stage.
- Phase 1 and 2 ESAs will be carried out to identify areas where soils may be contaminated by hydrocarbons; contaminated soils will be excavated and hauled to the on-site landfarm for remediation.
- Salvageable buildings and surface structures will be dismantled and demobilized from the site. The buildings will be offered to the KIA (the land owner) at closure for potential re-use elsewhere.
- Non-salvageable buildings and structures will be dismantled, or demolished, and inert non-hazardous materials will be disposed in the landfill area in the Whale Tail WRSF.
- Hazardous wastes will be removed for disposal by a licensed handler.
- Any above grade concrete structures will be demolished, and the rubble will be disposed of in the Whale Tail WRSF landfill. Any slabs on grade will be punctured and then left in place and covered with soil or non-potentially acid generating/non-metal leaching waste rock. Any subgrade foundations will be left in place.
- All disturbed site areas will be re-graded to suit the surrounding topography. In areas where the original ground surface was lowered for site grading or structural requirements, the slopes will be stabilized and contoured. Cover materials may be required for erosion and dust control. It is anticipated that a succession of indigenous plant species will naturally re-vegetate the surface over time.
- Fuel not required during the closure and reclamation activities will be sold, returned to suppliers, or burned in the on-site incinerator.
- Empty fuel tanks will be cleaned and certified, then they will be cut into strips and the steel sold as scrap if economically viable or deposited into the landfill.

5.2.5.6 Predicted Residual Effects

No significant residual effects have been identified for after closure of the supporting buildings but changes to terrain caused by the construction and subsequent reclamation of the facilities could result in some alteration or loss of plant populations and plant communities.

5.2.5.7 Uncertainties

The pre-disturbance terrain is covered by discontinuous vegetation interspersed with few bedrock outcroppings. The reclamation plan will be designed to encourage a natural succession of indigenous plant species within disturbed site areas. Grading and contouring would be done, where appropriate, to control soil erosion and to promote re-vegetation by natural colonization.

Active revegetation has not been planned at this time as part of the reclamation plan given the cold climate setting of the Project. Additional research on active revegetation may be considered in future iterations of the closure activities.

5.2.5.8 Closure and Post-Closure Monitoring, Maintenance, and Reporting

Guidance on generic monitoring and maintenance programs for closure and post-closure is provided in MVLWB/AANDC (2013). The overall post-closure monitoring and maintenance program for the Project are discussed in Section 9.0 along with the reporting requirements. The following presents the relevant post-closure monitoring and maintenance strategies for the supporting buildings and equipment:

- periodic inspections will be performed to visually assess the reclaimed areas; and
- all buildings and equipment left on-site during closure will be maintained until no longer required, at which time they will be removed from the site or demolished and disposed in the Whale Tail WRSF landfill.

5.2.5.9 Contingencies

There are no activities proposed as contingencies for the closure of the buildings and equipment.

5.2.6 Mine Infrastructure

No milling and processing infrastructure will be constructed at the site as described in Section 4.5.5.

5.2.7 Transportation Routes

5.2.7.1 Project Component Description

The proposed transportation routes are described in Section 4.5.6.

The haul roads within the open pits and between the open pits and underground portal and the ore pads will become redundant when mining ceases. The haul roads to the WRSFs will be maintained until the closure of the WRSFs is completed. The internal access roads, as needed, will be active until water quality meets discharge criteria during post-closure.

The Expansion Project will require the expansion of the approved 9.5 m wide haul road to a proposed 15 m wide haul road. The road allows Agnico Eagle to use Meadowbank infrastructure to the fullest extent possible and optimize operations.

5.2.7.2 Pre-Disturbance, Existing, and Final Site Conditions

The pre-disturbance site conditions are summarized in Section 3.0. Figure 5.2-1 presents an aerial photo of the proposed mine site area taken in 2015. Pre-disturbance conditions are based on baseline data collection programs carried out since 2013.

Ten km of roads were constructed on-site as part of the exploration activities surrounding the camp and communication tower. Approximately 33 km of additional roads have been constructed as part of the Approved Project and approximately 7 km of additional roads will be required as part of the Expansion Project.

The ultimate mine development of the Project is shown on Figure 1.1-1. The expected areas of disturbance are shown on Figure 5.2-2.

5.2.7.3 Closure Objectives and Criteria

The closure objectives and closure criteria for the transportation routes are listed in Table 5.2-5.

Table 5.2-5: Closure Objectives and Criteria – Transportation Routes

Component	Closure Objectives	Closure Criteria	Actions/ Measurements
Air	Meet Canadian Ambient Air Quality standards	Best management practices for controlling fugitive and exhaust emissions during active reclamation	Implement best practices. Routine air quality monitoring
	Control dust generation from decommissioning and active reclamation activities	Best management practices to control dust	Implement controls and routine air quality monitoring
Land	Scarify and re-grade redundant roads to a state compatible with the desired end use	Haul road surfaces will be scarified, culverts and bridges removed, and surfaces will be re-graded to promote natural drainage. Same will be done with internal access roads above flooding level.	Physical inspection
Water	Ensure runoff is channeled through the watershed	Scarified surfaces will be re-graded to promote natural drainage	Physical inspection
Wildlife	Ensure the remaining surface areas are safe for wildlife use and access	Scarified surfaces will be re-graded	Physical inspection
Health and Safety	Ensure reclaimed areas support continuation of human land use activities and do not become a source of contamination	Human land use of the reclaimed area at post-closure will not compromise people's health	Routine monitoring and physical inspection
Community	Consider community land use expectations and traditional knowledge in the closure planning	Community engagement will continue to be implemented	Public engagement
	Consider transition plans	Community programs will be established to transition into closure	Physical inspection

5.2.7.4 Consideration of Closure Options and Selection of Closure Activities

Consultation was undertaken in development of the road and road selection alternatives were discussed with community representatives (Approved Project FEIS Volume 7, Appendix 7-A; Agnico Eagle 2016b). Agnico Eagle modified the road route to take into account community preference and traditional knowledge and are working with the Department of Culture and Heritage to respectfully mitigate existing cultural heritage sites and have avoided all burial sites.

Haul Road Decommissioning

Agnico Eagle has committed to decommission the haul road once the Project reclamation has been completed and the site no longer requires ongoing care and maintenance. However, the community may want the haul road to remain open to allow public access with minimal restrictions. Consequently, Agnico Eagle will continue to operate the haul road as a privately-operated road with unrestricted public access for as long as access is required to the proposed Project site.

For a third party to take over the road(s) following closure of the proposed Project, that third party would have to complete its own arrangements with the landowners (the KIA and the hamlet), and its own environmental assessment and permitting process covering future use. Agnico Eagle does not own the land on which the roads are constructed and, thus, cannot transfer future ownership or use privileges to any third party. Agnico Eagle must complete its obligation to decommission and reclaim all roads unless directed otherwise by a combination of the landowners and other regulatory agencies who issued permits/authorizations for the roads.

5.2.7.5 Engineering Work Associated with Selected Closure Activity

Guidance on generic engineering work options or strategies for closure of transportation routes is provided in MVLWB/AANDC (2013). The relevant engineering works associated with the permanent closure activities for the transportation routes are discussed below.

- The roads not required for post-closure monitoring, and not assumed by the community or by a third party after consultation, will be decommissioned and the terrain will be restored. Decommissioning of the haul road will start from the site.
- Decommissioning will occur by loosening compacted surfaces and flattening side slopes.
- The road surfaces will be scarified, allowing the native plant community to naturally establish itself on the former road surface.
- Slopes will be stabilized against potential erosion.
- If necessary, wildlife access will be provided at suitable intervals by re-grading the embankment shoulders to provide flatter slopes.
- All bridges and culverts will be removed, and original drainage patterns will be restored.
- Stream crossings will be rehabilitated as they are encountered during the progression of the road decommissioning work.
- Cross-drain structures (cross-ditches) will also be installed where necessary between culvert sites. Where armouring rock (rip-rap) is required, this rock will be NPAG and non-metal leaching for the protection of aquatic life. Where affected watercourses are fish bearing, the timing of work will be restricted to within the designated DFO fisheries work window.
- The loosening of compacted surfaces will be accomplished by ripping the road bed using a dozer with a “ripper” attachment on the back. Successive passes with the dozer longitudinally along the road beds will eliminate the level road surfaces and make travel difficult. It is anticipated that, in this way, the abandoned roads will not be useable by wheeled vehicles (i.e., cars, trucks, and pick-up trucks). The road beds would still be useable by all-terrain vehicles or snowmobiles after final reclamation.

5.2.7.6 Predicted Residual Effects

No significant residual effects have been identified for after closure of the transportation roads but changes to terrain caused by the construction and subsequent reclamation of the facilities could result in some alteration or loss of plant populations and plant communities. The former haul road will also provide a snowmobile or ATV access corridor. This could result in added hunting pressure along the corridor.

5.2.7.7 Uncertainties

Refer to Section 5.2.5.7 with regards to revegetation.

It may not be visually apparent if PAG bedrock has been exposed along the corridor of the Project haul road.

5.2.7.8 Closure and Post-Closure Monitoring, Maintenance, and Reporting

Guidance on generic monitoring and maintenance programs for closure and post-closure is provided in MVLWB/AANDC [2013]. The overall post-closure monitoring and maintenance program for the Project are discussed in Section 9.0 along with the reporting requirements. The following presents the post-closure monitoring and maintenance strategies for the transportation routes

- periodic inspections will be performed to visually assess the reclaimed areas; and
- all roads to be used during closure will be maintained until they are no longer required.

5.2.7.9 Contingencies

If exposures on the Project haul road corridor result in acidification of surface water, then such impacts will be assessed, and an appropriate mitigation strategy will be put in place.

5.2.8 Landfill and Other Waste Disposal Areas

5.2.8.1 Project Component Description

The proposed landfill and other waste disposal areas are described in Section 4.5.7.

5.2.8.2 Pre-Disturbance, Existing, and Final Site Conditions

The pre-disturbance site conditions are summarized in Section 3.0. Figure 5.2-1 presents an aerial photo of the proposed mine site area taken in 2015. Pre-disturbance conditions are based on baseline data collection programs carried out since 2013.

The existing waste disposal currently authorized under 2BE-MEA1318 consists of incineration of waste, use of a greywater sump, use of latrine pits, and trench disposal of contaminated water. Any hazardous waste is placed into totes for hauling off site.

A new landfarm, incinerator, and composter are planned to be constructed in 2019 as part of the Expansion Project. The approved landfill will be located within the Whale Tail WRSF.

The ultimate mine development of the Project is shown on Figure 1.1-1. The expected areas of disturbance are shown on Figure 5.2-2.

5.2.8.3 Closure Objectives and Criteria

The closure objectives and closure criteria for the waste management facilities are listed in Table 5.2-6.

Table 5.2-6: Closure Objectives and Criteria – Waste Management Facilities

Component	Closure Objectives	Closure Criteria	Actions/ Measurements
Air	Meet Canadian Ambient Air Quality standards	Best management practices for controlling fugitive and exhaust emissions during active reclamation	Implement best practices. Routine air quality monitoring
	Control dust generation from decommissioning and active reclamation activities	Best management practices to control dust	Implement controls and routine air quality monitoring
Land	Treat light hydrocarbon contaminated soil in the new on-site landfarm	Light petroleum hydrocarbon contaminated soil will be treated in the on-site landfarm area during the active closure stage, after that the landfarm will be decommissioned.	Physical inspection, Phase II ESA
	Clean up and remove sewage plant materials	Once the active closure stage is completed, all salvageable components or materials will be cleaned up and removed off-site for salvage or disposed of in the on-site landfill	Physical inspection
		Metals will be separated and shipped off-site as scrap if economical to do so or disposed on-site in the Whale Tail WRSF landfill	
	Remove all hazardous wastes	Hazardous wastes will be removed for disposal by licensed handler as per operational practices	Physical inspection
	Remove sewage system infrastructure	Any above-ground infrastructure will be demolished, and the non-hazardous debris will be disposed in the Whale Tail WRSF landfill	

Component	Closure Objectives	Closure Criteria	Actions/ Measurements
	Remove all non-hazardous wastes	Remaining concrete foundations and slabs will be punctured, left in place and covered with soil. The area will be re-graded to promote natural drainage	Physical inspection
	Landfill is encapsulated in the Whale Tail WRSF	The landfill area will be covered at the end of active closure stage	Physical inspection
Water	Ensure runoff is channeled through the watershed	Surfaces will be re-graded to promote natural drainage	Physical inspection
Wildlife	Ensure the remaining areas are safe for wildlife use and access	Keep wildlife out of the landfill while it is active using day covers. The remaining areas will be re-graded to reduce hazards to wildlife	Physical inspection
Health and Safety	Ensure reclaimed areas support continuation of human land use activities	Human land use of the reclaimed area at post-closure will not compromise people's health	Routine monitoring and physical inspection
Community	Consider community land use expectations and traditional knowledge in the closure planning	Community engagement will continue to be implemented	Public engagement
	Consider transition plans	Community programs will be established to transition into closure	Physical inspection

5.2.8.4 Consideration of Closure Options and Selection of Closure Activities

Landfill

The landfill for non-hazardous solid waste will be maintained in such a manner that windblown litter will be controlled. Following the example of Meadowbank Mine, the landfill will be located within the Whale Tail WRSF to avoid the disturbance of additional land area and to centralize waste disposal for monitoring. The concept is similar to that of a landfill in which waste is buried. The surface runoff from the landfill will be managed as part of the Whale Tail WRSF contact water management system. After the landfill is no longer required, the wastes will be covered with a 2 m NPAG cover and integrated into the overall contours of the Whale Tail WRSF.

Wildlife Protection

If not properly reclaimed, wildlife maybe injured by entering reclaimed areas. Environmental design features and mitigation, as well as current wildlife management practices used in other mining projects will be implemented at the Project to limit wildlife injury. This will include the use of day covers to keep wildlife out while the landfill remains in active operation followed by covering and re-contouring the reclaimed area to reduce hazards to wildlife.

This is considered the most appropriate closure plan based on the Meadowbank Mine experience; no other closure options were considered.

5.2.8.5 Engineering Work Associated with Selected Closure Activity

Guidance on generic engineering work options or strategies for closure of waste management facilities is provided in MVLWB/AANDC (2013). The relevant engineering works associated with the permanent closure activities for the waste management facilities are discussed below.

- The leachate from the landfill is anticipated to be of very low ionic strength (dilute) due to controls on materials to be placed in the landfill. Moreover, drainage from the landfill is largely expected to freeze within the Whale Tail WRSF, with little to no seepage reporting to the water collection infrastructure.

- A minimum of 2.0 m thick NPAG waste rock cover will be placed over the landfill (integrated with the cover over the other parts of the surrounding Whale Tail WRSF). The cover will be placed at the end of active closure, when the landfill is no longer required. The surface will be graded to encourage drainage and to prevent ponding.
- The hazardous waste and contaminated soil (soil not treated through the on-site landfarm, (i.e., soil contaminated with heavy hydrocarbons or other contaminants not suitable for remediation in the landfarm)) will be segregated, packaged, and shipped south for treatment and/or disposal. Therefore, there will be little to no accumulation of such wastes during mine operations or closure at the Project site, subject to seasonal shipping considerations.
- Inert, non-combustible wastes will be disposed in the Whale Tail WRSF landfill.
- Domestic waste will be composted or burned in the on-site incinerator during operation and active closure as part of camp maintenance.
- Waste oils, solvents, and other hydrocarbons on-site will be burned in the on-site incinerator if approved (chlorinated substances will not be burned).
- The landfarm will be operational until Year 22 (2040). The remediated material from the landfarm will be excavated and placed in the Whale Tail WRSF landfill area below the final cover. After removal of all remediated material and the liner, and prior to closure and reclamation of the landfarm, the berm and base will be sampled to determine if these soils are free from Petroleum Hydrocarbons contamination. If the soils meet the required criteria, the landfarm area would then be re-graded to provide a positive surface drainage. If they do not meet the required criteria, the contaminated material will be shipped off-site for treatment and disposal. The surrounding berm will be breached to avoid water accumulation on the landfarm.

5.2.8.6 Predicted Residual Effects

No significant residual effects have been identified for closure of the waste management facilities but changes to terrain caused by the construction and subsequent reclamation of the facilities could result in some alteration or loss of plant populations and plant communities.

5.2.8.7 Uncertainties

Refer to Section 5.2.5.7 with regards to revegetation.

5.2.8.8 Closure and Post-Closure Monitoring, Maintenance, and Reporting

Guidance on generic monitoring and maintenance programs for closure and post-closure is provided in MVLWB/AANDC (2013). The overall post-closure monitoring and maintenance program for the Project are discussed in Section 9.0 along with the reporting requirements. The following presents the post-closure monitoring and maintenance strategies for the waste management facilities

- periodic inspections will be performed to visually assess the reclaimed areas;
- all waste management facilities to be used during active closure will be maintained until they are no longer required; and
- visual observations for cracking or slumping of the landfill cover and for underlying waste material pushing its way up through the cover will be completed periodically.

5.2.8.9 Contingencies

If the cover over the landfill deforms to an unacceptable degree, it will be regraded.

5.2.9 Water Management Facilities

5.2.9.1 Project Component Description

The proposed water management facilities are described in Section 4.5.8.

5.2.9.2 Pre-Disturbance, Existing, and Final Site Conditions

The pre-disturbance site conditions are summarized in Section 3.0. Figure 5.2-1 presents an aerial photo of the proposed mine site area taken in 2015. Pre-disturbance conditions are based on baseline data collection programs carried out since 2013.

The waterbodies that will be impacted by the open pit mining activities for the Approved Project are presented in the Water Management Plan submitted in support of the Type A Water Licence Amendment Application. In support of the Expansion Project, Agnico Eagle has prepared a fully revised amendment to the Whale Tail Pit Water Management Plan (Agnico Eagle 2019b). All mining components have been located to avoid or reduce impacts on the local environment to the extent possible.

The ultimate mine development of the Project is shown on Figure 1.1-1. The expected areas of disturbance are shown on Figure 5.2-2.

5.2.9.3 Closure Objectives and Criteria

The closure objectives and closure criteria for the water management facilities are listed in Table 5.2-7.

Table 5.2-7: Closure Objectives and Criteria – Water Management Facilities

Component	Closure Objectives	Closure Criteria	Actions/ Measurements
Air	Control dust generation from active reclamation activities	Best management practices to control dust	Implement controls and routine air quality monitoring
Land	Maintain surface water drainage control systems	Maintain water management components until they are no longer required	Physical inspection
	Ensure dikes and dams are stable	Dikes and dams will be breached once water quality meets licence criteria for direct discharge	Physical inspection by qualified engineer
	Remove surface infrastructure (i.e., pipelines, culverts, pump systems, WTP)	Whale Tail Lake, Nemo Lake, and Mammoth Lake fresh water intakes and distribution systems will be reclaimed	Physical inspection
		Components or materials will be cleaned up and salvageable materials removed	Physical inspection
		Any above ground pipelines will be dismantled, and associated distribution equipment will be salvaged or disposed of in the Whale Tail WRSF landfill	Physical inspection
		Reclaimed areas will be re-graded	Physical inspection
		Any culverts and equipment will be removed from site for salvage or disposed of in the Whale Tail WRSF landfill	Physical inspection
		Any above ground infrastructure will be demolished, and the non-hazardous debris will be disposed in the Whale Tail WRSF landfill	Physical inspection
		Any concrete slabs on grade will be perforated and covered and the areas will be re-graded to promote natural drainage. Foundations will be left in place.	Physical inspection
	Remove all hazardous wastes	Hazardous wastes will be removed for disposal by licensed handler as per operation practices	Physical inspection
Water	Ensure runoff is channeled through the watershed	Surfaces will be re-graded to promote natural drainage	Physical inspection

Component	Closure Objectives	Closure Criteria	Actions/ Measurements
	Ensure collected runoff and seepage meets water licence criteria	Collected runoff and seepage will be treated through the O-WTP or S-WTP (brackish) until water quality meets licence criteria for direct discharge	Routine monitoring and sampling
	Remove facilities when treatment is no longer required	When water quality from the mine components is deemed suitable for direct discharge to the environment the dikes will be breached	Routine monitoring and sampling
Wildlife	Discourage wildlife from entering the facilities	Wildlife will be discouraged from entering the facilities until water quality is acceptable	Routine water quality sampling
Health and Safety	Ensure the remaining areas are left in a healthy state that supports continuation of human land use activities	Human land use of the reclaimed areas at post-closure will not compromise people's health	Routine monitoring and physical inspection
Community	Consider community land use expectations and traditional knowledge in the closure planning	Community engagement will continue to be implemented	Public engagement
	Consider transition plans	Community programs will be established to transition into closure	Physical inspection

5.2.9.4 Consideration of Closure Options and Selection of Closure Activities

If not properly reclaimed, wildlife may be injured entering reclaimed areas. Environmental design features and mitigation, as well as current wildlife management practices used in other mining projects will be implemented at the Project to limit wildlife injury. This will include re-contouring reclaimed areas to reduce hazards to wildlife.

This is considered the most appropriate closure plan based on the Meadowbank Mine experience; no other closure options were considered.

5.2.9.5 Engineering Work Associated with Selected Closure Activity

Guidance on generic engineering work options or strategies for closure of water management facilities is provided in MVLWB/AANDC (2013). The relevant engineering works associated with the permanent closure activities for the water management facilities are discussed below.

Freshwater Intake and Potable Water Treatment Plant: the pumps will be removed from the freshwater intake for salvage if economic to do so. Above grade buildings will be demolished and the debris will be disposed in the Whale Tail WRSF landfill. The potable water treatment plant will be dismantled and salvaged or disposed of in the Whale Tail WRSF landfill when it is no longer required. Any slabs on grade from the potable water treatment plant will be left in place, perforated and covered. The areas will be re-graded to promote natural drainage and natural re-vegetation.

O-WTP and Mammoth Lake Effluent Diffusers: The O-WTP will be decommissioned once it is no longer required at the end of operations. Any concrete slabs on grade from the O-WTP will be perforated and covered, and the area will be re-graded to promote natural drainage and natural re-vegetation. The effluent pipelines and diffusers will be pulled out of the lakes, cut up into pieces and disposed of in the Whale Tail WRSF landfill.

TDS Treatment: The low TDS Treatment system or S-WTP (brackish) and high TDS Treatment system or STP (brine) will be decommissioned once they are no longer required (i.e., at the end of underground mine operations). Any concrete slabs on grade from the system will be perforated and covered, and the area will be re-graded to promote natural drainage and natural re-vegetation.

Dikes/Dams: The Northeast Dike will be decommissioned in Year 2 (2020), once the IVR Pit is initiated. The remaining water retention and dewatering berms/dams (i.e., WRSF Dike and IVR dikes) will be kept intact to provide a barrier between the facilities and surrounding lakes until the water quality (seepage and runoff collected from facilities, and from the flooding area) is considered acceptable for release to the environment without treatment. Once this is achieved, the remaining dikes will be decommissioned.

The Whale Tail Dike and Mammoth Dike will be decommissioned at selected locations to a depth of approximately 3 m below the minimum water level at Whale Tail Lake to account for ice formation and fish passage requirements for the dewatering dikes and to the original surface for the other containment structures.

Consideration will be given to breach staging, with above-water portions of the dike/dam in the decommissioned area removed during winter periods, when there will be little surface water flow, thereby minimizing the potential release of sediments to the neighboring lakes. The remainder of the breach would be completed during the following freshet. Exposed surfaces within the breach opening above normal lake water levels will be covered with erosion protection consisting of NPAG and non-ML materials when needed. These materials will also be used below the water surface.

It is expected that the breaching of the dikes will be sequenced as follows, see Section 5.2.2 for additional details on flooding of the Whale Tail Lake North Basin:

- Year 2 (Year 2020): The Northeast Dike will be decommissioned to allow development of the IVR Pit (Figure 1.1-1).
- Year 24 (Year 2042): The Whale Tail Dike, IVR dikes, Whale Tail Dike Seepage Pump Station and the Mammoth Dike will be decommissioned to re-establish the natural water flow in the Whale Tail Lake area once the Whale Tail Lake level has reached 153.5 m (1 m above the original water level) and water quality meets licence limits for release to the environment without treatment.
- The Whale Tail WRSF Dike will be decommissioned allowing the complete re-establishment of the natural drainage patterns for the Project. It is expected that the Whale Tail WRSF water quality meets licence limits for release to the environment without treatment.

Channels and ponds: The channels and ponds for contact water will be maintained as required in closure until site water quality monitoring results indicate that the water can be released directly to the environment without further treatment. No closure measures are necessary for the fresh water bypass channel from Whale Tail Lake (South Basin) to Mammoth Lake because its invert elevation will be above the final water level in the lake.

When they are no longer required, all water management infrastructure will be re-contoured and/or surface-treated according to site-specific conditions to minimize erosion from surface runoff to and enhance the site area for natural re-vegetation and wildlife habitat post-closure.

A sill will be constructed in the Mammoth Lake, upstream of the Mammoth Dike, to increase the water level by 1 m to 153.5 masl.

This ICRP assumes that the groundwater storage ponds and IVR Attenuation Pond will be backfilled with NPAG rock at closure. Other alternatives will be evaluated prior to closure.

Pipelines, culverts, pumps: Pipes, culverts and pipes will be maintained as required in closure until site water quality monitoring results indicate that the water can be released directly to the environment without further management. All

water management infrastructure will be dismantled and salvaged or disposed of in the Whale Tail WRSF landfill when it is no longer required. Reclaimed areas will be re-graded to promote natural drainage and natural re-vegetation.

Diversion channels: The diversion channels will be maintained as required in closure until site water quality monitoring results indicate that the water can be released directly to the environment without further management.

The channels will be re-contoured and/or surface-treated according to site-specific conditions to minimize erosion from surface runoff to and enhance the site area for natural re-vegetation and wildlife habitat post-closure.

Water quality predictions: As described in Sections 5.2.2.6 and 5.2.3.5.

5.2.9.6 Predicted Residual Effects

No significant residual effects have been identified for closure of the water management facilities but changes to terrain caused by the construction and subsequent reclamation of the facilities could result in some alteration or loss of plant populations and plant communities.

5.2.9.7 Uncertainties

The following uncertainties were identified during closure planning of the water management facilities:

Natural Re-vegetation

Refer to Section 5.2.5.7.

Water Quality

The water quality predictions provide an estimate of water quality under fully mixed conditions where the effluent and downstream lake overflows are being mixed instantaneously in the downstream receiving water body. In reality, mixing will occur over time and spatially within a mixing zone.

Operational water quality modelling will be completed to assess water quality predictions.

5.2.9.8 Closure and Post-Closure Monitoring, Maintenance, and Reporting

Guidance on generic monitoring and maintenance programs for closure and post-closure is provided in MVLWB/AANDC (2013). The overall post-closure monitoring and maintenance program for the Project are discussed in Section 9.0 along with the reporting requirements. The following presents the post-closure monitoring and maintenance strategies for the water management facilities

- water management points that were not anticipated will be identified and monitored;
- ongoing inspection and maintenance of the O-WTP and TDS Treatment systems will be conducted as long as they remain in operation;
- periodic inspections will be performed to visually assess the reclaimed areas;
- unstable areas will be identified and monitored; and
- all water management facilities to be used during closure will be maintained until they are no longer required.

5.2.9.9 Contingencies

Based on the water quality predictions, it is expected that the water quality in the flooded area will be acceptable to allow decommissioning of the Whale Tail Dike and the Mammoth Dike in Year 24 (2042).

The need for contingency measures in water quality control will be determined based on water quality monitoring during operations and closure before the pits are fully flooded and before Whale Tail Dike and the Mammoth Dike are decommissioned. During operations, the quality of contact water in the pits and groundwater seepage reporting from the walls of the pits and into the pit sumps will be sampled and the models will be rerun to evaluate closure conditions and need for adaptive management of flows or infrastructure closure requirement. During flooding, the surface water and profiles of the flooded area will be sampled. If the results of water quality monitoring indicate that water in the flooded area is not suitable for direct discharge, in-situ treatment would be considered.

5.2.10 Quarries and Borrow Sites

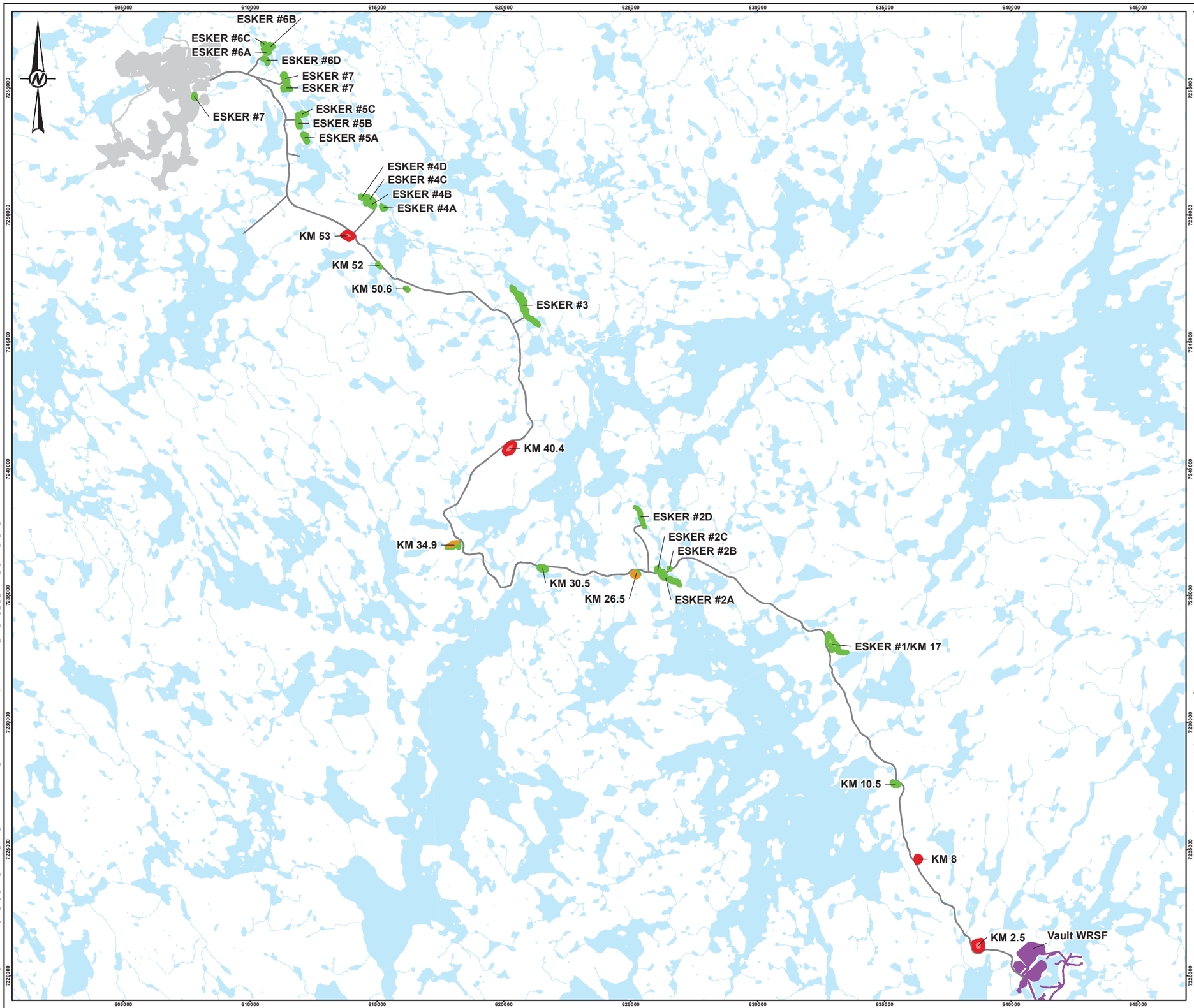
Construction of the exploration access road utilized a series of quarry sites from which road construction material was sourced. These quarries have been expanded as part of the Approved Project to obtain material for haul road construction, and for the Project components if needed.

Additional borrow/quarry material will be needed to undertake Expansion of the haul road upgrade as described in Section 4.5.6.

The borrow site locations that have been identified for the road construction and upgrade as part of the Approved Project are shown on Figure 5.2-.

Agnico Eagle intends to use suitable open pits waste rock where practical to minimize or eliminate the need for additional rock quarries.

The reclamation of the borrow sites are covered in the Exploration Facilities Conceptual CRPs (Agnico Eagle 2015a,b).



LEGEND

- WHALE TAIL
- ESKER/QUARRY (APPROVED)
- ESKER/QUARRY (EXPANSION)
- ESKER/QUARRY (NEW)
- INFRASTRUCTURE
- HAUL ROAD
- MEADOWBANK OPERATION AND INFRASTRUCTURE
- WATERCOURSE
- WATERBODY

0 3,000 6,000

1:150,000 METRES

REFERENCE(S)

1. INFRASTRUCTURE OBTAINED FROM AGNICO EAGLE MINES LIMITED, DRAWING AMQ 2025Q4V5.DWG.
2. WATERCOURSE AND WATERBODY DATA OBTAINED FROM NATURAL RESOURCES CANADA. DATUM: NAD 83 CSRS PROJECTION: UTM ZONE 14

CLIENT

AGNICO EAGLE

AGNICO EAGLE MINES LIMITED: MEADOWBANK DIVISION

PROJECT

WHALE TAIL PIT - EXPANSION PROJECT

TITLE

LOCATION OF BORROW PITS AND QUARRIES FOR THE PROJECT

CONSULTANT

GOLDER

YYYY-MM-DD	2019-04-17
DESIGNED	DF/AP
PREPARED	CDB/MH
REVIEWED	AP/IM
APPROVED	KAB

PROJECT NO.	CONTROL	REV.	FIGURE
1912065	2000/2020	0	5.2-3

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6.0 SECTION 6 • PROGRESSIVE RECLAMATION

6.1 Definition of Progressive Reclamation

Progressive reclamation takes place prior to permanent closure to reclaim components and/or to decommission facilities that are no longer required for the Project, because the activity has been completed, or the facilities no longer serve a purpose. Progressive reclamation can be completed during operations with the available resources to reduce future reclamation costs, to reduce the duration of environmental exposure, and to enhance environmental protection. Progressive reclamation may shorten the time for achieving closure objectives and may provide valuable experience on the effectiveness of certain measures that might be implemented during permanent closure (MVLWB/AANDC 2013).

6.2 Opportunities for Progressive Reclamation

The key closure activities that have been identified for progressive reclamation are summarized in the following sections for each individual component of the Project. The components are categorized in sub-sections for clarity. The progressive reclamations activities provided in this CRP will be updated in future versions of the ICRP to include new opportunities for progressive reclamation identified during operations.

6.2.1 Underground Mine Workings

Some of the underground workings will be backfilled with CRF or rock fill to provide support during underground operations. This will result in the progressive removal of all rock from the underground WRSF before mining ends.

6.2.2 Open Pit Mine Workings

The IVR exposed walls above the final water level will be mined at a flatter angle so that they can be covered with overburden after closure.

No other progressive reclamation activities have been identified for the open pits at this time.

6.2.3 Waste Rock and Overburden Storage Facilities

Closure and reclamation of the Whale Tail WRSF and IVR WRSF will take place progressively during operations with the placement of the cover over the WRSFs sideslopes. See Section 5.2.3.5 for cover design details.

The WRSFs will be designed for long-term stability. Thus, no additional re-grading or construction will be required for stability.

It will not be possible to progressively reclaim the uppermost bench or the top surface of the WRSFs, because these will be active until mine closure occurs.

6.2.4 Tailings Storage Facility

Tailings from the Project will report to Meadowbank TSF. Closure of the TSF is covered under the Meadowbank Mine ICRP.

6.2.5 Buildings and Equipment

Potential progressive reclamation activities for the buildings and equipment include:

- demobilize, remove, and decommission equipment and facilities as the facilities are identified as no longer being required for operations; and
- reduce inventories of consumables leading up to the end of operations.

6.2.6 Mine Infrastructure

No progressive reclamation activities have been identified for the mine infrastructure at this time.

6.2.7 Transportation Routes

No progressive reclamation activities have been identified for the proposed transportation routes at this time.

6.2.8 Landfill and Other Waste Disposal Areas

The landfill, landfarm, incinerator, and composter will be in active use throughout the mining period and also during the active closure period to receive materials from decommissioning. The final closure of the landfill, incinerator, and composter will occur at the end of the closure stage. It will not be possible to carry out progressive reclamation of the landfill.

No progressive reclamation activities have been identified for the other waste disposal areas identified in Section 5.2.8 at this time.

6.2.9 Water Management Facilities

The East Channel and Northeast Dike will be reclaimed in Year 4 (2022), prior to initiation of IVR Attenuation Pond and construction of IVR Pit.

6.2.10 Quarries and Borrow Sites

The quarries and borrow sites no longer required for operations will be progressively reclaimed. The closure activities are discussed in Section 5.2.10.

6.3 Completed Progressive Reclamation

Progressive reclamation has not been carried out at the Project site to date.

7.0 SECTION 7 • TEMPORARY CLOSURE

Temporary closure occurs when an advanced mineral exploration or mining operation ceases with the intent of resuming activities in the near future. Temporary closure could be due to an unplanned closure or a planned closure of certain facilities in a complex mining project (MVLWB/AANDC 2013).

The Project operation is planned to be continuous for the full proposed operating period. However, the mine may need to shut down for a short-term or indefinitely (long-term) due to economic, environmental and/or social factors. The plans for both of these closure periods are discussed below. Notification of temporary closure would be presented to the staff and the local population with at least 30 days' notice; if the conditions allow, a longer notice period will be provided where possible.

7.1 Temporary Closure Goal and Closure Objectives

The goal of temporary closure is ongoing protection of the environment, and regulatory compliance during the shutdown period. Temporary closure measures deemed necessary will depend upon the duration and extent of site activities/presence during the temporary closure. It is anticipated that water management and treatment facilities will function at the same level during temporary shutdown periods as during operations.

7.2 Temporary Closure Activities

The following temporary closure scenarios have been considered:

Short-term temporary closure: this would apply to any anticipated short term shut down or closure period of less than one year and could last for a period of weeks or several months (up to 12 months) based on economic, environmental, and social factors.

Long-term temporary closure: or indefinite shutdown is a cessation of mining and processing operation for an indefinite period of time greater than one year. The intention is that the mine will resume operations as soon as possible after the cause for the indefinite shutdown has been addressed. The site must maintain safety and environmental stability during this time. Possible causes for an indefinite shutdown could include prolonged adverse economic conditions or extended labour disputes. A decision on the estimated length of the indefinite shutdown would be made after the initial one-year period. Decisions on possible extensions to the indefinite shutdown would be made every 6 months thereafter and would be based on the conditions at that time. At present, the maximum length of time or number of extensions for interim shutdown before moving to final closure has not been defined.

The proposed short-term and long-term temporary closure activities are presented in the following subsections.

Short-term Temporary Closure

The following summarizes the measures that will be taken as required during a short-term temporary closure:

- Warning signs and berms will be erected as needed around the pit perimeters.
- Dewatering of the pits and any underground areas will continue as conducted during operations since flooding and subsequent dewatering may adversely impact stability of the pit walls or underground workings.
- Environmental monitoring and sampling will continue at regular intervals as set out in the Project operations and monitoring program and in accordance with all applicable licenses, permits, and authorizations.

- Routine geotechnical stability monitoring and maintenance will continue at a reduced rate compared to that conducted during operations. The pits areas and underground mine workings will be inspected routinely to check for rock falls, changes to groundwater inflows and overall integrity.
- All mobile equipment except for small service equipment required for pits inspections and underground workings will be removed from the mine workings and placed in secure on-site storage.
- Fuel, lubricants, and hydraulic fluids will be removed from the pits areas and stored in designated areas.
- Fluid levels in all fuel tanks will be recorded and monitored regularly for leaks, or fuel will be removed from the site.
- An inventory of chemicals and reagents, petroleum products, and other hazardous materials will be conducted. These materials will be secured appropriately, or the materials will be removed from the site.
- All explosives will be relocated to the main powder magazine and secured, disposed of, or removed from the site.
- Surface water management facilities will be maintained to manage contact water runoff.
- All contact water will be treated and discharged as per operations.
- Monitoring of water quality of the collection ponds will continue as per during operations.
- Unused water distribution lines will be drained but would be left in place.
- Minimum staffing levels will be maintained to carry out care and maintenance.
- The camp will be operated at reduced staffing level.
- Critical facilities (camp) will have nominal heat to prevent freezing of the facilities and possible damage.
- The sewage treatment plant and potable water treatment plant will continue to operate as needed.
- Hazardous wastes on-site will be collected and stored in an appropriate area for annual disposal to a registered disposal facility.
- In most circumstances, the haul road will continue to be open. The status of the road during such periods would be assessed by Agnico Eagle on a case-by-case basis.

Long-term Temporary Closure

The following summarizes the measures that will be taken as required in addition to the short-term temporary closure activities previously mentioned during a long-term temporary closure:

- Environmental and geotechnical monitoring and sampling will continue at the regular level as set out in the mine operations and monitoring program, and in accordance with all applicable licenses, permits and authorizations.
- Pumps and mobile equipment in the pits and underground workings will be relocated and the pits and underground workings will be allowed to begin flooding passively (from rainfall and groundwater inflow).
- If necessary, the working faces of the WRSFs slopes will be graded to ensure stability and drainage to the contact water management system adjacent to the waste rock storage facilities. As the WRSFs will be designed and operated for long-term stability, it is anticipated that any grading required will be limited to areas of recent dumping. The WRSFs will be monitored to ensure the site stays in compliance with any permits and/or licences.
- The dikes will be monitored and maintained. None of the dikes will be breached under temporary closure.
- Surface water control structures will be maintained as required. In areas where water quality is suitable for discharge, natural drainage courses may be re-established.
- Unused water distribution lines will be drained. Unused lines on surface will be removed and placed in a secure lay down area to reduce impacts on wildlife.
- Dependent on the cause of the closure, the haul road may be allowed to become inaccessible during the winter for cars and trucks. If Agnico Eagle requires continued presence on-site, then it is likely Agnico Eagle would maintain the road open in some manner over the winter.

7.3 Temporary Closure Monitoring, Maintenance, and Reporting

Monitoring and reporting during the short-term and long-term temporary closure will continue at the regular level as set out in the mine operations and monitoring programs, and in accordance with all applicable licenses, permits and authorizations.

The numbers of personnel on-site would be reduced to reduce operation costs. The staff present at site during temporary closure would be sufficient in number and expertise to successfully carry out care, maintenance and monitoring duties, and to address and remediate any potential problems that may arise. Sufficient equipment and supplies/reagents would be left on-site for any maintenance or reclamation activities that may need to take place.

7.4 Temporary Closure Contingency Program

The key staff present at site during temporary closure would be sufficient in number and expertise to successfully address and remediate any conditions or unforeseen events that may arise through the monitoring programs. The key staff at the site would also have access to external consultants and advisors, as required.

The contingency options and actions for events or incidents defined for operations would be also implemented during the temporary closure (i.e., spill responses and reports).

7.5 Temporary Closure Schedule

The temporary closure schedule would depend on when temporary closure occurs (i.e., what year of the operations stage and the time of year) and its duration, both of which are commonly uncertain. Therefore, the schedule for the activities presented in Section 7.2 would be developed as temporary closure advances. The sequence of activities for short-term and long-term temporary closure would, in summary, be as follows:

- Restrict access to the site, buildings, and infrastructure to authorized personnel as required.
- Carry out an inventory of chemicals and reagents, petroleum products, and other hazardous materials and secure the inventory appropriately or remove some of it from site.
- Post warning signs and berms as needed around the open pit perimeters.
- Remove all mobile mining equipment (except for small fleet of service equipment required for open pits and underground inspections) and place them in secure on-site storage.
- Temporary closure of unnecessary facilities and systems.
- Continue with environmental and geotechnical monitoring and sampling required for care, maintenance and monitoring at the regular level as set out in the mine operations and monitoring program, and in accordance with all applicable licenses, permits, and authorizations.

8.0 SECTION 8 • INTEGRATED SCHEDULE OF ACTIVITIES

This ICRP is based on permitting level design for many facilities and correspondingly the closure schedule for the overall Project (including the Expansion Project) is based on the preliminary closure methods and strategies discussed in the above sections. It is anticipated that the schedule will be refined throughout the Project life as the designs are advanced, and the closure methods and strategies are further developed. All schedules are subject to changes in mine plans and market conditions. The proposed preliminary closure schedule for the Project is presented in Table 8.0-1 and includes the following:

- Following completion of mining, the underground mine workings will be filled with a combination of natural runoff, groundwater seepage and contact water from the site (e.g., Groundwater Storage Ponds), and water pumped from Whale Tail Lake (South Basin) in Year 8 (2026).
- Following completion of mining in Year 8 (2026), the IVR Pit and Whale Tail Pit will be allowed to flood passively with a combination of natural runoff and contact water from the site.
- Following completion of underground mine workings flooding, the IVR Pit and the Whale Tail Pit will be flooded actively with water pumped from Whale Tail Lake (South Basin).
- In Year 24 (2042), the final water level of 153.5 m will be reached in the Whale Tail pit lake.
- The Whale Tail Attenuation Pond will be re-filled in Year 8 (2026) with contact water draining by gravity from the site.
- The Whale Tail Attenuation Pond will continue collecting water from various sectors. Eventually, it will start overflowing into the Whale Tail Lake North Basin.
- Contact water in the IVR Attenuation Pond will be pumped to re-fill the underground mine workings starting in Year 8 (2026). Once empty, the IVR Attenuation Pond will be backfilled with NPAG rock material in Year 9 (Year 2027).
- Contact water in the groundwater storage ponds will be pumped to re-flood the underground mine workings in Year 8 (2026). Once empty, the Groundwater Storage Ponds will be decommissioned in Year 9 (2027). Various reclamation activities will be evaluated prior to closure. Backfilling with NPAG rock material has been used as an initial assumption.
- The camp and other supporting facilities will be removed in stages.
- The freshwater pipeline pumping system from Nemo Lake will be dismantled in Year 8 (2026), after which time freshwater will be obtained from Whale Tail Lake (South Basin).
- The Mammoth Lake diffuser, Whale Tail Lake South Basin diffusers and other alternative diffusers will be dismantled in Year 8 (2026).
- The freshwater pipeline and pumping system from Whale Tail Lake (South Basin) will be dismantled in Year 24 (2042).
- The TDS Treatment system will be dismantled in Year 9 (2027).
- The Northeast Dike will be breached in Year 2 (2020).
- The South Whale Tail Lake Dike and Mammoth Lake Dike will be decommissioned in Year 24 (2042). A sill will be constructed in Mammoth Lake in Year 9 (2027).
- The O-WTP will be dismantled in Year 8 (2026) and rubble will be disposed of in the on-site landfill facility.
- Monitoring will be carried out for a minimum of 3 years after flooding of Whale Tail South Basin or until Year 27 (2045).

The schedule will be updated in subsequent ICRPs but will generally follow the present outline.

Table 8.0-1: Proposed Closure and Post-Closure Main Activities Schedule

Component	Description	Operating Stage (Progressive Reclamation)							Closure Stage[b]						Post-Closure Stage		
		Year 1 (2019)	Year 2 (2020)	Year 3 (2021)	Year 4 (2022)	Year 5 (2023)	Year 6 (2024)	Year 7 (2025)	Year 8 (2026)	Year 9 (2027)	Year 10 (2028)	Year 11-Year 18 (2029-2036)	Year 19-Year 23 (2037-2041)	Year 24 (2042)	Year 25 (2043)	Year 26 (2044)	Year 27 (2045)
Machinery and Mobile Equipment	- Decommission machinery and equipment and ship off-site (leaving only on-site equipment required for closure and post-closure activities) it has been assumed that all machinery and equipment from the underground mine workings have no salvage value and they will be left in the underground workings								X								
	- Remove equipment used for closure activities (e.g. trucks, backhoes)													X			
	- Remove equipment used for long-term maintenance (e.g. backhoes)																X
Nemo Lake Freshwater Pumping System	- Decommission system				X												
Mammoth Lake Freshwater Pumping System	- Decommission system																X
South Whale Tail Lake Freshwater Pumping System	- Decommission system													X			
Underground Mine Workings	- Active flooding of underground workings with contact water GSPs and IVR Attenuation Pond, water pumped from Whale Tail lake (South Basin) and groundwater inflows								X								
	- Remove ventilation system									X							
	- Cap vent raises with a concrete plug									X							
	- Backfill portal with NPAG waste rock material									X							
Whale Tail Pit	- Passive flooding of pit area with contact water draining from Industrial sector, Main Camp sector and Whale Tail Attenuation Pond sector and non-contact water from north sector and groundwater inflows								Year 8 to 24								X
	- Place warning signs around Pit perimeter and maintain berm from perimeter road								X								
IVR Pit	- Passive flooding of pit area with contact water draining from IVR WRSF, Whale Tail WRSF and IVR Pit sector and non-contact water from Northeast sector								Year 8 to 24								
	- Active flooding of pit area with non-contact water from Northeast sector and Whale Tail Lake (South Basin)									Year 9 to 24							
	- Place warning signs around pit perimeters and maintain berm from perimeters road								X								
Whale Tail WRSF IVR WRSF	- Cover placement	Year 1 to 9															
	- Passive discharge of WRSFs contact water into the pits								Year 8 to 24								
	- Breach Whale Tail WRSF Dike - Decommission Whale Tail WRSF Pond													X			
Underground WRSF NPAG WRSF	- Re-grade areas of former WRSFs to promote natural drainage and natural re-vegetation							X									
Overburden Stockpiles	- Re-grade areas of former Overburden Stockpiles to promote natural drainage and natural re-vegetation							X									
Mine Infrastructure and Support Buildings	- Decommission facilities and re-grade areas as needed								Year 8 to 24								
	- Decommission landfarm												X				
Water Management Facilities	- Breach Northeast Dike		X														
	- Breach IVR dikes									X							
	- Breach South Whale Tail and Mammoth dikes													X			
Water Management Facilities	- Remove pumping system from the Whale Tail Attenuation Pond, IVR Attenuation Pond and GSPs									X							
	- Decommission GSPs and IVR Attenuation Pond									X							
	- Decommission TDS Treatment									X							
	- Decommission O-WTP									X							

Component	Description	Operating Stage (Progressive Reclamation)							Closure Stage[b]						Post-Closure Stage		
		Year 1 (2019)	Year 2 (2020)	Year 3 (2021)	Year 4 (2022)	Year 5 (2023)	Year 6 (2024)	Year 7 (2025)	Year 8 (2026)	Year 9 (2027)	Year 10 (2028)	Year 11-Year 18 (2029-2036)	Year 19-Year 23 (2037-2041)	Year 24 (2042)	Year 25 (2043)	Year 26 (2044)	Year 27 (2045)
	- Decommission Mammoth Lake effluent diffuser									X							
	- Decommission Whale Tail Lake South Basin effluent diffusers or alternative diffusers									X							
	- Construction of sill in Mammoth Lake									X							
Haul Road	- Decommission of remaining haul road [a]																X
Monitoring									Monitor flooding areas and contact water reporting from closed mine facilities								

[a] Assumed for 20 years after operations; however, closure schedule dependent on monitoring results. Activities will occur when contact water quality satisfies water license criteria for direct discharge and/or access to the site is no longer required

[b] The closure stage may be reduced dependent upon water quality results through operations and treatment levels and adaptive management measures implemented that may lead to improved water quality sooner than predicted during the closure stage, thereby allowing for the decommissioning of the dikes prior to Year 24 (2042). A reduction in timeline for the closure stage may also trigger reductions in monitoring, and financial assurances (i.e., security deposits) posted for the Project

9.0 SECTION 9 • POST-CLOSURE SITE ASSESSMENT

The ICRP is a "living" document and includes a commitment to adaptive management and monitoring during all stages of the mine life to demonstrate the safe performance of the Project facilities and to reduce any contamination on the site or in the adjacent area after operations cease. Monitoring during operations and in closure will identify non-compliant conditions; allow timely maintenance and clean up as needed; allow timely planning for adaptive and corrective measures; and enable successful completion of the ICRP. In this way, the Project is not anticipated to contribute residual impacts to the environment after closure and reclamation (FEIS Volume 2; Agnico Eagle 2016).

Monitoring programs will be initiated during construction and operations to provide additional baseline information on which to base the Final Closure and Reclamation plan document. The adaptive management plans to be used in closure will follow the actions completed during operations and will be coordinated with the existing operational monitoring programs (e.g., Aquatic Effects Monitoring Plan, Terrestrial Ecosystem Management Plan) to set appropriate trigger levels, and mitigation plans and actions.

Monitoring and maintenance programs that are implemented during the closure and post-closure phases of the Project life will use the data collected during operational monitoring. The data collected in operation will assist with defining measures of success at closure and the performance of the reclamation and closure efforts. The data collected during post-closure monitoring will allow the procedures and activities to be adjusted or modified as necessary to confirm ongoing environmental protection, and will ultimately determine when final closure is complete, the closure objectives for the Project have been achieved, and the Project site and affected areas have been returned to viable and, wherever practicable, self-sustaining ecosystems that are compatible with a healthy environment and with human activities (Section 2.4).

It is anticipated that the post-closure monitoring stage will be 3 years.

It is planned that the haul road would be maintained for sufficient period to enable access to the site for minor maintenance required in the initial portion of the post-closure period. The haul road will be decommissioned once maintenance requirements at the Project site are anticipated to be minor and could be achieved with small crews sent to site via helicopter in the summer (see Section 5.2.7 for details on haul road closure). It is anticipated that the need for ongoing maintenance would be reduced with time and will not be required once the site is physically and chemically stable.

Reports requirements for closure and reclamation of all components of mine sites including submission schedule are outlined in the MVLWB/AANDC (2013) guidelines.

10.0 SECTION 10 • FINANCIAL SECURITY

The permanent closure and reclamation cost estimate for the Approved Project has been updated to a conceptual level considering the Expansion Project layout and infrastructure (Appendix F).

The cost estimate covers the closure and reclamation of all Project facilities as described in this report and was prepared using RECLAIM Version 7.0, March 2014, for permanent closure of the Project.

The financial assurance currently approved for the Approved Project is $26,286,000. The revised total closure cost estimate for the Project is $48,865,604. Therefore, there is an increment of $22,579,604.

11.0 SECTION 11 • REFERENCES

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APPENDIX A – REGULATORY INSTRUMENTS

Table A-1: Primary Applicable Acts, Regulations, and Guidelines Applicable to Closure and Reclamation

Acts	Regulations	Guidelines
Federal		
Canadian Environmental Protection Act (1999 c.33)	*Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations (SOR/2008-197)* *Environmental Emergency Regulations* (SOR/2003-307) *Interprovincial Movement of Hazardous Waste and Hazardous Recyclable Material Regulations* (SOR/2002-301) *Release and Environmental Emergency Notification Regulations* (SOR/2011-90)	Canadian Council of the Ministers of Environment - Environmental Code of Practice for Aboveground and Underground Storage Tank Systems Containing Petroleum and Allied Petroleum Products Notice with respect to substances in the National Pollutant Release Inventory Canada-Wide Standards for Particulate Matter (PM) and Ozone Canada-Wide Standards for Petroleum Hydrocarbons (PHC) In Soil
Canada Wildlife Act (1985 w9)		
Species at Risk Act (2002 c.29)		Species at Risk Policies
Canadian Transportation Accident Investigation and Safety Board Act (S.C. 1989, c. 3)	*Transportation Safety Board Regulations* (SOR/92-446)	
Navigable Waters Protection Act (R.S. 1985 c. N-22)	*Navigable Waters Works Regulations* (C.R.C., c. 1232) *Navigable Waters Bridges Regulations* (C.R.C., c. 1231)	
Fisheries Act (R.S.C. c. F-14) 35. (1) No person shall carry on any work, undertaking or activity that results in serious harm to fish that are part of a commercial, recreational or Aboriginal fishery, or to fish that support such a fishery. Projects that have the potential to obstruct fish passage, modify flow or result in the entrainment of fish may also cause serious harm to fish. In these situations, an authorization under Subsection 35(2) is required. Proponents are responsible for avoiding and mitigating serious harm to fish that are part of or support commercial, recreational or Aboriginal fisheries. When proponents are unable to completely avoid or mitigate serious harm to fish, their projects will normally require authorization under Subsection 35(2).	*Metal Mining Effluent Regulations* (SOR/ 2002-2222) *Marine Mammal Regulations* (SOR/93-56)	The Policy for the Management of Fish Habitat The Fisheries Protection Policy Statement, 2013 Fisheries Productivity Investment Policy: A Proponent's Guide to Offsetting
Canada Labour Code (R.S.C., 1985, c. L-2)	*Canada Labour Standards Regulations* (C.R.C., c. 986) *Canada Occupational Health and Safety Regulations* (SOR/86 304)	
Territorial Lands Act (R.S. 1985, c. T-7)	*Northwest Territories and Nunavut Mining Regulations* (C.R.C., c. 1516) *Territorial Land Use Regulations* (C.R.C. 1524)	

Acts	Regulations	Guidelines
	Territorial Quarrying Regulations (C.R.C. c. 1527)	
Nunavut Waters and Nunavut Surface Rights Tribunal Act (2002, c. 10)	*Northwest Territories Waters Regulations* (SOR/93/303)	
Nunavut Act (1993 c.28)	*Nunavut Archaeological and Paleontological Sites Regulations* (SOR/2001-220)	
Nunavut Land Claims Agreement Act (1993, c. 29)		
Territorial – Nunavut		
Environmental Protection Act (RSNWT (Nu) 1988, c E-7)	*Spill Contingency Planning and Reporting Regulations* (NWT Reg (Nu) 068-93)	Guideline on Dust Suppression Guideline for the General Management of Hazardous Waste in Nunavut Environmental Guideline for Waste Asbestos Guideline for Industrial Waste Discharges in Nunavut Guideline for Industrial Projects on Commissioner's Land
Historical Resources Act (RSNWT (Nu) 1988, c H-3)		
Territorial Parks Act (RSNWT (Nu) 1988, c T-4)	*Territorial Parks Regulations* (RRNWT (Nu) 1990 c T-13)	
Wildlife Act (RSNWT (Nu) 1988, c W-4)	*Wildlife General Regulations* (NWT Reg (Nu) 026-92) *Wildlife Licenses and Permits Regulations* (NWT Reg (Nu) 027-92) *Wildlife Management Barren-Ground Caribou Areas Regulations* (NWT Reg (Nu) 099-98) *Wildlife Management Zones Regulations* (RRNWT (Nu) 1990 c W-17) *Wildlife Regions Regulations* (NWT Reg (Nu) 108-98)	
Commissioner's Land Act (RSNWT 1988, c C-11)	*Commissioner's Land Regulations* (RRNWT 1990, c C-13)	
Mine Health and Safety Act (SNWT (Nu) 1994, c 25)	*Mine Health and Safety Regulations* (NWT Reg (Nu) 125-95)	

Table A-2: List of Existing Licenses/Permits for the Project

Permit/License	Type	Licensor	Approved Ops	Status	Begin of Term	End of Term	Comments
66H/8-02-1	Land Lease	CIRNAC	Whale Tail Pit Haul Road	Active	1-Jan-16	30-Dec-26	
66H/8-01-1	Land Use Lease	CIRNAC	Quarries/eskers along Haul Road, Communication tower, Inug Boat Launch	Active	1-Jan-16	31-Dec-26	
11-HCAA-CA7-00006	Letter of Advice	DFO	Construction at Amaruq Exploration Access Road	Active	14-Mar-16		No end term
16-HCAA-00370	Authorization	DFO	Development of Whale Tail Pit in Whale Tail Lake	Active	23-Jul-18	31-Dec-23	
WL-2018-054	Wildlife Research Permit	GN	Document the presence of terrestrial wildlife and critical habitat areas.	Active	15-May-18	14-May-19	
Memorandum of Understanding	Wildlife Research	GN	Participation in the Kivalliq Ungulate Monitoring Program along with the GN.	Active	1-Mar-17	1-Mar-20	
IIBA	Inuit Impact Benefit Agreement	KIA	Whale Tail Inuit Impact Benefit Agreement	Active	15-June-17		End date is Project Termination Date as identified in the Production Lease.
Mine Water Comp Agrmt	Water Compensation Agreement	KIA	Compensation for water consumption at Whale Tail site and any changes in water quality, quantity or flow due to project activities	Active	29-May-18	22-Jul-26	
KVCL314C01	Commercial Lease	KIA	Construction and operations at Whale Tail site as per 2018-2019 Workplan	Active	15-Aug-15	15-Aug-25	Negotiation ongoing for Production Lease
KVRW15F01	Land Use Permit	KIA	Whale Tail Pit Haul Road	Active	30-Nov-15	30-Nov-18	Negotiation ongoing for renewal
KVCA15Q01	Quarry Permit	KIA	Esker 7	Active	7-Aug-17	6-Aug-19	
KVCA15Q02	Quarry Permit	KIA	Eskers 5&6	Active	22-Nov-17	22-Nov-19	
KVCA17Q01	Quarry Permit	KIA	Quarry 1	Active			No more royalties to be paid as Quarry 1 is part of pit footprint
KVCA18Q01	Quarry Permit	KIA	Quarry km 10.5	Active	18-May-18	18-May-23	
	Subsurface Production Lease	NTI	Mining of Whale Tail Pit	Ongoing			Negotiation ongoing with NTI for Lease

Permit/License	Type	Licensor	Approved Ops	Status	Begin of Term	End of Term	Comments
Project Certificate No.008	Project Certificate	NIRB	Approval for the Whale Tail Pit and Haul Road Project to proceed subject to its Terms & Conditions	Active	15-Mar-18		
8BC-AEA1525	Water Licence Type B	NWB	Amaruq Exploration Access Road	Active	9-Nov-15	31-Dec-25	In the process of being canceled
2BC-WTP1819	Water Licence Type B	NWB	Whale Tail pre-development activities	Active	15-Mar-18	14-Mar-19	In the process of being canceled
2BB-MEA1828	Water Licence Type B	NWB	Amaruq Exploration Activities	Active	7-Mar-18	6-Mar-28	
2AM-WTP1826	Water Licence Type A	NWB	Whale Tail Pit project	Active	29-May-18	28-May-26	

CIRNAC = Crown-Indigenous Relations and Northern Affairs Canada (formally Indigenous and Northern Affairs Canada); DFO = Fisheries and Oceans Canada; GN = Government on Nunavut; KIA = Kivalliq Inuit Association; NTI = Nunavut Tunngavik Incorporated; NWB = Nunavut Water Board

Table A-3: Primary Project Approval Requirements

Permit/Approval Legislation	Administering Agency	Project Activity
Conformity Determination NuPPA, Nunavut Agreement (Article 11)	NPC	Project approval – allow project to proceed to screening
Project Certificate NuPPA, Nunavut Agreement (Article 12)	NIRB	Project approval
Inuit Impact and Benefit Agreement Nunavut Agreement (Article 26)	KIA	Project commencement
Mineral Production Lease	NTI	Required for mineral production
Inuit Water Rights Compensation Agreement Nunavut Agreement (Article 20)	KIA	May be required
Water Licence *Nunavut Waters and Nunavut Surface Rights Tribunal Act*	NWB	Required for water use and waste disposal
Class 1/Class 2 Archaeology Permit *Nunavut Archaeological and Paleontological Sites Regulations*	GN-CH	Required to conduct archaeology research and to mitigate archaeological sites to allow development to occur
IOL – Commercial Land Use Lease or Right of Way Nunavut Agreement	KIA	Long-term land tenure required for land use on Inuit Owned Lands; land required for infrastructure, roads and activities associated with construction, operations, and closure phases
IOL – Quarry Lease/Permit Nunavut Agreement	KIA	Required for quarrying of material on Inuit Owned Lands during construction, operation and closure
Crown Land – Lease/Land Use Permit *Territorial Lands Act* *Territorial Land Use Regulations*	CIRNAC	Required for quarrying of material on Crown land during construction, operation and closure
Approval and/or Exemption *Navigable Waters Protection Act* (sections 5, 22 and 23)	TC	Construction of works in navigable waters. Prescriptions of Sections 22 and 23 of the Navigable Waters Protection Act will be followed as necessary.
Fisheries Authorization for Harmful Alteration Disruption or Destruction (HADD) of Fish or Fish Habitat *Fisheries Act* (section 35)	DFO	Required if HADD cannot be avoided; if HADD can be avoided, DFO may provide a letter of advice outlining best management practices
Schedule II Authorization Metal and Diamond Mining Effluent Regulations	ECCC	Required for Schedule II designation.

Permit/Approval Legislation	Administering Agency	Project Activity
Licence for a Factory and Magazine *Explosives Act and Regulations*	NRCan	Required for construction of explosives factories and magazine(s) and storage of explosives
Permit to Store Detonators *Explosives Use Act* *Mine Health and Safety Act and Regulations*	Nunavut Mine Health and Safety Nunavut Workers Compensation Board	Required to store detonators in a magazine
Explosive Use Permit *Explosives Use Act* *Mine Health and Safety Act* and *Regulations*	Nunavut Mine Health and Safety Nunavut Workers Compensation Board	A permit is required to use explosives unless used in accordance with the regulations
Spill Contingency Plan Approval *Environmental Protection Act* *Spill Contingency Planning and Reporting Regulations*	GN-DoE	A Spill Contingency Plan must be filed with the Chief Environmental Protection Officer to store fuel in an above-ground facility with a 20,000 L capacity or greater
Wildlife Research Permit *Wildlife Act*	GN-DoE	Required to conduct some of the wildlife monitoring activities

CIRNAC = Crown-Indigenous Relations and Northern Affairs Canada (formally Indigenous and Northern Affairs Canada); CH: Culture & Heritage; DFO = Fisheries and Oceans Canada; DoE: Department of Environment; GN = Government on Nunavut; KIA = Kivalliq Inuit Association; NRCan = Natural Resources Canada; NTI = Nunavut Tunngavik Incorporated; NWB = Nunavut Water Board; TC = Transport Canada

APPENDIX B – SITE HISTORY

Table B-1: Summary of 2003 to 2018 Regulatory History

Date	Activity
March 31, 2003 to May 2016	• Refer to the Approved Project (FEIS Volume 2, Appendix 2-C) for history of Project
June 30, 2016	• Submission of the Whale Tail Pit and Haul Road Final Environmental Impact Statement and Type A Water Licence to the Nunavut Impact Review Board (NIRB) and Nunavut Water Board (NWB)
April 27-29 and May 1-2, 2017	• NIRB and NWB conduct a joint Technical Meeting and Pre-hearing Conference in Baker Lake
June 8, 2017	• NIRB and NWB jointly release a Technical Meeting and Pre-hearing Conference Decision Report
September 19-22, 2017	• NIRB Final Hearing held in Baker Lake
September 26-27, 2017	• NWB Public Hearing held in Baker Lake
February 15, 2018	• Ministers' Acceptance of the NIRB Final Hearing Report for the Whale Tail Pit Project
March 15, 2018	• NIRB Project Certificate [No. 008] issued for the Whale Tail Pit Project
July 11, 2018	• Minister Approved NWB Type A Water Licence 2AM-WTP1826 for the Whale Tail Pit Project
October 15, 2018	• Agnico Eagle notification of Self Assessment to Nunavut Planning Commission for the Whale Tail Pit Expansion
October 16, 2018	• NPC Referral to NIRB
October 19, 2018	• NIRB Receipt of Conformity Determination and Information Request for Agnico Eagle Mines Limited's Request for Reconsideration of Whale Tail Pit Project Certificate for the "Whale Tail Expansion" Project Proposal.
December 20, 2018	• Submission of the Whale Tail Pit Expansion Final Environmental Impact Statement to the Nunavut Impact Review Board (NIRB)

APPENDIX C – LESSONS LEARNED FROM OTHER PROJECTS

Development	Activity Which Led to Lesson	Lesson Learned	Adaptive Management Result
Ekati, Diavik, and Snap Lake mine sites	Open pit mining	Wildlife injury or mortality may occur by entering the open pit	A rock berm(s) will be constructed around the open pit during the operations stage
Ekati, Diavik, and Snap Lake mine sites	Mine site infrastructure	Wildlife injury or mortality may occur by entering mine site facilities	Disturbed areas will be re-contoured at closure reducing hazards to wildlife
Meadowbank mine site	Landfill located within WRSF	Birds or wildlife injury or mortality by entering the landfill	Landfill will be located within the WRSF and covered at closure reducing hazards to birds and wildlife
	WRSF thermal cover	Thermal cover placement and thermistors installation during operations as progressive reclamation to verify the predicted performance of the cover	Thermal cover will be placed and thermistors will be installed during operations to monitor cover performance and adapt the cover design as needed
Meliadine mine site	Saline water management strategy	Handling brackish and brine groundwater	Brackish and brine water will be managed separately to obtain better treatment results
Ekati and Diavik mines, Back River, Hope Bay, Horizon and Kearl Projects	Fish offsetting multiple accounts analysis	A variety of offsetting methods have been used for major projects in Canada; identifying offsetting options can be a challenge in the North because of the pristine environment	The selected offsetting measure will be a cost-effective method or concept that has been previously approved for developments in Nunavut; the selected offsetting measure will provide gains in fisheries productivity that will exceed losses incurred by the Project

APPENDIX D – GLOSSARY OF TERMS AND DEFINITIONS

Glossary of Terms and Definitions

Term	Definition
Active layer	The layer of ground above the permafrost which thaws and freezes annually.
Acid rock drainage (ARD)	Acidic pH rock drainage due to the oxidation of sulphide minerals that includes natural acidic drainage from rock not related to mining activity; an acidic pH is defined as a value less than 6.0.
Advanced mineral exploration	Any appurtenant undertaking in which the proponent requires a Type A or Type B water licence to carry out the proposed activities.
Approved Project	Project approved under Certificate NIRB No. 008 and Type A Water Licence NWB 2AM-WTP1826
Quarries and Esker Sites	Site from where soils and aggregates are obtained for use in earthworks construction.
Care and maintenance	The status of a mine when it undergoes a temporary closure.
Closure goal	The guiding statement that provides the vision and purpose of reclamation. Attainment of the closure goal happens when the proponent has satisfied all closure objectives. By its nature, the closure goal is a broad, high-level statement and not directly measurable.
Closure principles	The four core closure principles are 1) physical stability, 2) chemical stability, 3) no long-term active care requirements, and 4) future use (including aesthetics and values). The principles guide the selection of closure objectives.
Closure objectives	Statements that describe what the selected closure activities are aiming to achieve; they are guided by the closure principles. Closure objectives are typically specific to project components, are measurable and achievable, and allow for the development of closure criteria.
Closure options	A set of proposed alternatives for closing and reclaiming each mine component. The closure options are evaluated to determine the selected closure activity, which must be approved by the NWB.
Closure criteria	Standards that measure the success of selected closure activities in meeting closure objectives. Closure criteria may have a temporal component (e.g., a standard may need to be met for a pre-defined number of years). Closure criteria can be site-specific or adopted from territorial/federal or other standards and can be narrative statements or numerical values.
Contaminant	1) any physical, chemical, biological or radiological substance in the air, soil, or water that has an adverse effect; and 2) any chemical substance with a concentration that exceeds background levels, or which is not naturally occurring in the environment.
Effluent	Contact water flows that must be treated before being discharged to the environment.
Engagement	The communication and outreach activities a proponent undertakes with affected communities and Aboriginal organizations/governments prior to and during the operation of a project, including closure and reclamation phases.
Environmental Site Assessment (ESA)	Phase I ESA: A review of available information to determine the likelihood of actual or potential environmental impacts. Phase II ESA: An intrusive investigation involving sampling and testing to better define the nature and scope of any environmental impacts.
Expansion Project	Expansion and extension of the Whale Tail Pit operations to include a larger Whale Tail open pit, development of the IVR Pit, and underground operations
Explosives	Gunpowder, blasting powder, nitroglycerine, gun-cotton, dynamite, blasting gelatin, gelignite, fulminates of mercury or of other metals and every other substance made, manufactured or used with a view to produce a violent effect by explosion.
Kinetic test	A geochemical procedure for characterizing the chemical status of a sample through time during continued exposure to a known set of environmental conditions, such as a humidity cell.
Landfarm	Infrastructure that uses biological and physical processes to treat (remove contaminants) contaminated soil.
Land owner	The responsible authority with administrative control and ownership of a type of land classified as crown land, commissioners land or Inuit Owned Land. a. Crown land is land belonging to Her Majesty or in respect of which Government has the power of disposition. In Nunavut, this power rests with Aboriginal Affairs and Northern Development Canada (AANDC).

Term	Definition
	b. Commissions land is land belonging to the Commissioner for the Government of Nunavut; which typically is land within an established municipality administered by a Municipal Corporation and/or the Department of Community Government and Services (CGS) c. Inuit Owned Land (IOL) are those lands vested in the Designated Inuit Organization (DIO) pursuant the Nunavut Land Claims Agreement. For this Project the DIO is the Kivalliq Inuit Association.
Land use permit	For Crown land a Class A Permit or Class B Permit as required by the Territorial Land Use Regulations SOR/82-217, s.1; SOR/88-169, s.2 administered by AANDC Lands Department. For IOLs- Land Use Licence I, II or III or Commercial Lease I, II, III as defined by the DIO. For Commissioners land - a permit or lease as required by the Municipal Land Administration Policy.
Leachate	Water or other liquid that has washed (leached) from a solid material, such as a layer of soil or water; leachate may contain contaminants.
Long-term active care	A post-closure mine site is in long-term active care when sustained monitoring and maintenance of active facilities is required (e.g., for more than 25 years). This should be avoided whenever possible.
Metal leaching (ML)	The release of a metal from its solid-phase mineral into mine site drainage; described by concentrations in static tests and by metal release rates obtained from kinetic tests.
Passive long-term care	Occasional monitoring coupled with infrequent maintenance or repairs that takes place following reclamation in the post closure phase of the mine site. Many mine sites require ongoing passive care, which can be an acceptable practice.
Ore	Rock that is considered economic according to the parameters used in the ore reserve estimate. Ore will be processed at an existing Meadowbank mineral processing plant after it is mined from the Project open pit.
Overburden	A general term referring to soil and broken rock, lying above ore and mine rock, that can usually be removed without blasting; at mines in soft sedimentary rock like coal, overburden can be synonymous with mine rock.
Potentially acid generating (PAG)	Rock with an NP/AP ratio less than 2 as determined by static tests, as defined by MEND (2009). PAG rock can also be operationally defined based on the results of static testing such as ABA and NAG testing.
Permafrost	Bedrock or soil that maintains a temperature at or below 0º C for a continuous period of two years or more.
Progressive reclamation	Selected closure activities that can be taken at advanced mineral exploration and mine sites before permanent closure. Progressive reclamation takes advantage of cost and operating efficiencies by using the resources available from an operation to reduce the overall reclamation costs incurred. It enhances environmental protection and shortens the timeframe for achieving the closure objectives.
Proponent	Applicant for, or a holder of, a water licence and/or land use permit.
Reclamation	The process of returning a disturbed site to its natural state or which prepares it for other productive uses that prevents or minimizes any adverse effects on the environment or threats to human health and safety.
Reclamation research	Literature reviews, laboratory or pilot-scale tests, engineering studies, and other methods of resolving uncertainties. Proponents conduct reclamation research to answer questions pertaining to environmental risks; the design of reclamation research plans aims to provide data and information which will reduce uncertainties for closure options, selected closure activities, and/or closure criteria.
Remediation	The removal, reduction, or neutralization of substances, wastes, or hazardous material from a site in order to prevent or minimize any adverse effects on the environment and public safety now or in the future.
Risk assessment	Analysis of potential threats and options for mitigation for a given site, component, or condition. Risk assessments consider factors such as risk acceptability, public perception of risk, socio-economic impacts, benefits, and technical feasibility. It forms the basis for risk management.
Salvageable Materials	Decommissioned materials which can be sold or reused elsewhere.
Security deposit	Funds held by the Crown (Aboriginal Affairs and Northern Development Canada) or land owner that can be used in the case of abandonment of an undertaking to reclaim the site or carry out any ongoing measures that may remain to be taken after the abandonment of the undertaking.
Selected closure activity	The closure and reclamation activity chosen from the closure options for each Project component.
Stakeholders	Industry, federal agencies, the territorial government, Aboriginal organizations/governments, land owners, affected communities, and other parties with an interest in the Project.
Talik	Unfrozen ground surrounded by permafrost.

Term	Definition
Traditional Knowledge	Accumulative, collective body of knowledge, experience, and values built up by a group of people through generations of living in close contact with nature. It builds upon the historic experiences of a people and adapts to social, economic, environmental, spiritual, and political change.
Type A water licence	A Type A water licence is required if the use is of a type set out in column 2 of Schedule 2 and satisfies a criterion set out in column 5 in respect of an undertaking set out in column 1 of the Nunavut Water Regulations SOR/2013-69 (Note: despite definition of Type B water licence item a), a Type A licence is the appropriate licence for a use of waters if a Type A licence is required for another use of waters, or a deposit of waste, in respect of the same undertaking.)
Type B water licence	A Type B water licence required if a. The use is of a type set out in column2 of Schedule 2 and satisfies a criterion set out in column 4 in respect of an undertaking set out in column 1, or b. The use satisfies the criterion set out in paragraph 4(1)(a) but does not satisfy one or more criterion set out in paragraphs 4(1)(b) to (d) of the Nunavut Water Regulations SOR/2013-69
Waste rock	All unprocessed rock materials that a mining operation produces.

APPENDIX E – LIST OF ACRONYMS, ABBREVIATIONS, UNITS AND SYMBOLS

Acronym/Abbreviation	Definition
AANDC	Aboriginal Affairs and Northern Development Canada
Agnico Eagle	Agnico Eagle Mines Limited – Meadowbank Division
ARD	Acid Rock Drainage
ANFO	Ammonium Nitrate/Fuel Oil
AWAR	All-weather Access Road
CESCC	Canadian Endangered Species Conservation Council
CFR	Cemented Rock Fill Plant
CRP	Conceptual Closure and Reclamation Plan
CREMP	Core Receiving Environment Monitoring Program
DFO	Fisheries and Oceans Canada
FEIS	Final Environmental Impact Statement
Golder	Golder Associates Ltd.
GN	Government of Nunavut
GSP	Groundwater Storage Pond
HADD	Harmful Alteration Disruption or Destruction
HTO	Hunters and Trappers Organizations
INAC	Indian and Northern Affairs Canada
ICRP	Interim Conceptual Closure and Reclamation Plan
IOL	Inuit Owned Land
IQ	Inuit Qaujimajatuqangit
ISQG	Interim Sediment Quality Guidelines
KIA	Kivalliq Inuit Association
LSA	Local Study Area
ML	Metal Leaching
MVLWB	Mackenzie Valley Land and Water Board
NIRB	Nunavut Impact Review Board
NML	Non-Metal Leaching
NPAG	non-Potentially Acid-Generating
NTI	Nunavut Tunngavik Incorporated
NWB	Nunavut Water Board
OS	Overburden Stockpile
O-WTP	Operation Water Treatment Plant
PAG	Potentially Acid-Generating
PEL	Probable effect level
PGA	Horizontal peak ground acceleration
Project	Whale Tail Gold Project
PEL	Probable Effect Level
RSA	Regional Study Area
SNC	SNC-Lavalin
SWSP	Storm Water Storage Pond
TDS	Total Dissolved Solids
TSF	Tailings Storage Facility
TSS	Total Suspended Solids
WRSF	Waste Rock Storage Facility

List of Units and Symbols

centimetre	cm	megawatt	MW
cubic centimetre	cm3	metre	m
cubic metre	m^3	metres above sea level	masl
Cubic metre per tonne	m^3/t	metres per minute	m/min
day	d	metres per second	m/s
days per week	d/wk.	metric ton (tonne)	t
days per year	d/y	milligram	mg
degrees Celsius	°C	milligrams per litre	mg/L
gram	g	millilitre	mL
grams per litre	g/L	millimetre	mm
grams per tonne	g/t	million	M
greater than	> (use only in tables)	Million cubic meters	Mm^3
hectare (10 000 m^2)	ha	million tonnes	Mt
hour	h (not hr)	month	mo.
hours per day	h/d	parts per billion	ppb
hours per week	h/wk.	parts per million	ppm
hours per year	h/y	percent	%
inch	"(symbol, not “)	pound	lbs.
kilogram	kg	second (time) (not sec)	s
kilograms per cubic metre	kg/m^3	square centimetre	cm^2
kilograms per hour	kg/h	square kilometre	km^2
kilograms per square metre	kg/m^2	square metre	m^2
kilometre	km	Tonnes per day	t/day
kilometres per hour	km/h	Tonnes per cubic metre	t/m^3
less than	< (use only in tables)	week	wk.
litre	L	year	y
litres per minute	L/m	watts per square metre per day	$W/m^2/d^1$

APPENDIX F – RECLAIM

SUMMARY OF COSTS

CAPITAL COSTS	COMPONENT NAME	COST	LAND LIABILITY	WATER LIABILITY
OPEN PIT WT		$35,345	$0	$35,345
OPEN PIT IVR		$8,401,400	$0	$8,401,400
UNDERGROUND MINE		$245,553	$61,196	$184,357
TAILINGS FACILITY		$0	$0	$0
ROCK PILE WT		$5,483,400	$2,711,700	$2,771,700
ROCK PILE IVR		$3,441,000	$1,705,500	$1,735,500
BUILDINGS AND EQUIPMENT		$3,638,793	$1,110,697	$2,528,097
CHEMICALS AND CONTAMINATED SOIL MANAGEME		$831,929	$350,850	$481,078
SURFACE AND GROUNDWATER MANAGEMENT		$6,474,783	-	$6,474,783
INTERIM CARE AND MAINTENANCE		$902,046	-	$902,046
SUBTOTAL: Capital Costs		**$29,454,250**	**$5,939,943**	**$23,514,307**
PERCENT OF SUBTOTAL			**20%**	**80%**

INDIRECT COSTS		COST	LAND LIABILITY	WATER LIABILITY
MOBILIZATION/DEMOBILIZATION		$7,367,558	$1,485,792	$5,881,766
POST-CLOSURE MONITORING AND MAINTENANCE		$2,618,436	$528,051	$2,090,384
ENGINEERING	5%	$1,472,713	$296,997	$1,175,715
PROJECT MANAGEMENT	5%	$1,472,713	$296,997	$1,175,715
HEALTH AND SAFETY PLANS/MONITORING & QA/QC	1%	$294,543	$59,399	$235,143
BONDING/INSURANCE	1%	$294,543	$59,399	$235,143
CONTINGENCY	20%	$5,890,850	$1,187,989	$4,702,861
MARKET PRICE FACTOR ADJUSTMENT	0%	$0	$0	$0
SUBTOTAL: Indirect Costs		**$19,411,354**	**$3,914,625**	**$15,496,729**

TOTAL COSTS	**$48,865,604**	**$9,854,568**	**$39,011,036**

Note: Existing underground workings from explorations are covered under Type B land and water permits

2 **Open Pit Name:** **Whale Tail Pit** **Pit # 1**

ACTIVITY/MATERIAL	Notes	Units	Quantity	Cost Code	Unit Cost	Cost	% Land	Land Cost	Water Cost
CONTROL ACCESS									
Fence		m		#N/A	$0.00	$0		$0	$0
Signs	Assumed - as per Phase 1 approved RECLAIM	each	20	SH	$37.08	$742		$0	$742
Berm at crest	In place from perimeter road - as per Phase 1 approved RECLAIM	m3		#N/A	$0.00	$0		$0	$0
Block roads	Assumed: 3 entrances, each block 5m base, 1 m crest width, 1 m high, 2H:1V slopes and 30m long - as per Phase 1 approved RECLAIM	m3	270	RB1H	$17.05	$4,604		$0	$4,604
Other				#N/A	$0.00	$0		$0	$0
STABILITY STUDY									
Conduct stability and setback study		allow	1	EA	$20,000.00	$20,000		$0	$20,000
STABILIZE SLOPES									
Off-load crest, soil A		m3		#N/A	$0.00	$0		$0	$0
Off-load crest, soil B		m3		#N/A	$0.00	$0		$0	$0
Doze/trim overburden at crest		m3		#N/A	$0.00	$0		$0	$0
Drill & blast pit crest		m3		#N/A	$0.00	$0		$0	$0
Buttress slope		m3		#N/A	$0.00	$0		$0	$0
Other				#N/A	$0.00	$0		$0	$0
COVER/CONTOUR SLOPES									
Place fill, soil A		m3		#N/A	$0.00	$0		$0	$0
Place fill, soil B		m3		#N/A	$0.00	$0		$0	$0
Rip rap		m3		#N/A	$0.00	$0		$0	$0
Vegetate slopes		ha		#N/A	$0.00	$0		$0	$0
Vegetate pit floor		ha		#N/A	$0.00	$0		$0	$0
Other				#N/A	$0.00	$0		$0	$0
CONSTRUCT DIVERSION DITCHES									
Excavate ditches -soil	covered under Water Management	m3		#N/A	$0.00	$0		$0	$0
Excavate ditches -rock		m3		#N/A	$0.00	$0		$0	$0
Rip rap in channel base		m3		#N/A	$0.00	$0		$0	$0
CONSTRUCT SPILLWAY									
Excavate channel		m3		#N/A	$0.00	$0		$0	$0
Concrete		m3		#N/A	$0.00	$0		$0	$0
Rip rap		m3		#N/A	$0.00	$0		$0	$0
Other				#N/A	$0.00	$0		$0	$0
RECLAIM QUARRIES									
Contour slopes	covered under road rehabilitation	m3		#N/A	$0.00	$0		$0	$0
Place overburden		m3		#N/A	$0.00	$0		$0	$0
Vegetate		m3		#N/A	$0.00	$0		$0	$0
FLOOD PIT-Capital									
Remove stationary equipment (sump pumps) and dewatering pipeline	from Meadowbank estimate - as per Phase 1 approved RECLAIM	Allow	1	AE	$10,000.00	$10,000		$0	$10,000
Remove dewatering pipeline		m		#N/A	$0.00	$0		$0	$0
Remove power lines		each		#N/A	$0.00	$0		$0	$0
Construct diversion ditches		m3		#N/A	$0.00	$0		$0	$0
-Ditch, mat'l A		m3		#N/A	$0.00	$0		$0	$0
-Ditch, mat'l B		m3		#N/A	$0.00	$0		$0	$0
Construct embankment/dam		m3		#N/A	$0.00	$0		$0	$0
Supply/install pump station and piping system (including pumps)	Included in IVR Pit	each		#N/A	$0.00	$0		$0	$0
Supply/install piping system		m		#N/A	$0.00	$0		$0	$0
Remove pump post-closure		each		#N/A	$0.00	$0		$0	$0
Remove pipeline post-closure		m		#N/A	$0.00	$0		$0	$0
FLOOD PIT-Annual Cost									
Operate pumps to flood pit	associated cost is included under IVR Pit estimate	each		#N/A	$0.00	$0		$0	$0
Maintain pump/pipeline		allow		#N/A	$0.00	$0		$0	$0
Labour: fuel management, commissioning/decom		$/h		#N/A	$0.00	$0		$0	$0
Chemical addition, _____ kg/m3 of water		tonne		#N/A	$0.00	$0		$0	$0
Chemicals, purchase and shipping		tonne		#N/A	$0.00	$0		$0	$0
Passive/biological additives		$/ha		#N/A	$0.00	$0		$0	$0
Passive additives purchase and shipping		tonne		#N/A	$0.00	$0		$0	$0
Other- Pump operation cost		m3		#N/A	$0.00	$0		$0	$0
					Annual pumping costs	$0			
Number of years of pump flooding	pits flooding (total period 2026 - 2042) - approximately 16 years	years							
					Total pumping costs	$0		$0	$0
					Total	$35,345		$0	$35,345
					% of Total			0%	100%

Note: No water purchase is needed for back-flooding

Open Pit Name: IVR Pit **Pit # 2**

ACTIVITY/MATERIAL	Notes	Units	Quantity	Cost Code	Unit Cost	Cost	% Land	Land Cost	Water Cost
CONTROL ACCESS									
Fence		m		#N/A	$0.00	$0		$0	$0
Signs	Assumed	each	15	SH	$37.08	$556		$0	$556
Berm at crest	In place from perimeter road	m3		#N/A	$0.00	$0		$0	$0
Block roads	Assumed: 4 entrances, each block 5m base, 1 m crest width, 1 m high, 2H:1V slopes and 30m long	m3	360	RB1H	$17.05	$6,138		$0	$6,138
Other				#N/A	$0.00	$0		$0	$0
STABILITY STUDY									
Conduct stability and setback study		allow	1	EA	$20,000.00	$20,000		$0	$20,000
STABILIZE SLOPES									
Off-load crest, soil A		m3		#N/A	$0.00	$0		$0	$0
Off-load crest, soil B		m3		#N/A	$0.00	$0		$0	$0
Doze/trim overburden at crest		m3		#N/A	$0.00	$0		$0	$0
Drill & blast pit crest	Exposed pit walls (above flooded water level) will be mined at flatter slopes that can support cover placement - this will be an operations cost, not closure	m3		#N/A	$0.00	$0		$0	$0
Buttress slope		m3		#N/A	$0.00	$0		$0	$0
Other		m3		#N/A	$0.00	$0		$0	$0
COVER/CONTOUR SLOPES									
Place and compact overburden cover	one meter overburden cover will be placed on the exposed pit walls	m3	67600	SB3L	$5.10	$344,760		$0	$344,760
Geotextile		m2	67600	GSTL	$3.44	$232,544		$0	$232,544
Rip rap	Assumed placement of 0.3 m of rip rap	m3	20280	RR1L	$13.50	$273,780		$0	$273,780
Vegetate slopes		ha		#N/A	$0.00	$0		$0	$0
Vegetate pit floor		ha		#N/A	$0.00	$0		$0	$0
Other				#N/A	$0.00	$0		$0	$0
CONSTRUCT DIVERSION DITCHES									
Excavate ditches -soil		m3		#N/A	$0.00	$0		$0	$0
Excavate ditches -rock		m3		#N/A	$0.00	$0		$0	$0
Rip rap in channel base		m3		#N/A	$0.00	$0		$0	$0
CONSTRUCT SPILLWAY									
Excavate channel		m3		#N/A	$0.00	$0		$0	$0
Concrete		m3		#N/A	$0.00	$0		$0	$0
Rip rap		m3		#N/A	$0.00	$0		$0	$0
Other				#N/A	$0.00	$0		$0	$0
RECLAIM QUARRIES									
Contour slopes		m3		#N/A	$0.00	$0		$0	$0
Place overburden		m3		#N/A	$0.00	$0		$0	$0
Vegetate		m3		#N/A	$0.00	$0		$0	$0
FLOOD PIT-Capital									
Remove stationary equipment (sump pumps) and dewatering pipeline	from Meadowbank estimate	Allow	1	AE	$10,000.00	$10,000		$0	$10,000
Remove dewatering pipeline		m		#N/A	$0.00	$0		$0	$0
Remove power lines		each		#N/A	$0.00	$0		$0	$0
Construct diversion ditches		m3		#N/A	$0.00	$0		$0	$0
-Ditch, mat'l A		m3		#N/A	$0.00	$0		$0	$0
-Ditch, mat'l B		m3		#N/A	$0.00	$0		$0	$0
Construct embankment/dam		m3		#N/A	$0.00	$0		$0	$0
Supply/install pump station and piping system (including pumps)		each	1	AE	$800,000.00	$800,000		$0	$800,000
Relocate pipeline system	allowance to relocate system from U/G flooding to IVR Pit flooding	Allow	1	AE	$75,000.00	$75,000		$0	$75,000
Remove pump post-closure		each		#N/A	$0.00	$0		$0	$0
Remove pipeline post-closure		m		#N/A	$0.00	$0		$0	$0
FLOOD PIT-Annual Cost									
Operate pumps to flood pit	Average annual pumping - 53,856,637 m3 over 17 years	m3	3,254,227	POCL	$0.12	$390,507		$0	$390,507
Maintain pump/pipeline		allow		#N/A	$0.00	$0		$0	$0
Labour: fuel management, commissioning/decom		$/h		#N/A	$0.00	$0		$0	$0
Chemical addition, _____ kg/m3 of water	water used to flood mine workings, no treatment required	tonne		#N/A	$0.00	$0		$0	$0
Chemicals, purchase and shipping		tonne		#N/A	$0.00	$0		$0	$0
Passive/biological additives		$/ha		#N/A	$0.00	$0		$0	$0
Passive additives purchase and shipping		tonne		#N/A	$0.00	$0		$0	$0
Other- Pump operation cost		m3		#N/A	$0.00	$0		$0	$0
					Annual pumping costs	$390,507			
Number of years of pump flooding	pits flooding (total period 2026 - 2042) - approximately 16 years	years	17						
					Total pumping costs	$6,638,622		$0	$6,638,622
					Total	$8,401,400		$0	$8,401,400
					% of Total			0%	100%

Note: No water purchase is needed for back-flooding

1 **Underground Mine Name** **Whale Tail and IVR** **UG Mine #**

ACTIVITY/MATERIAL	Notes	Unit	Qty	Cost Code	Unit Cost	Cost	% Land	Land Cost	Water Cost
CONTROL ACCESS									
Fence		m		#N/A	$0.00	$0		$0	$0
Signs		each		#N/A	$0.00	$0		$0	$0
Block roads		m3		#N/A	$0.00	$0		$0	$0
Berm		m3		#N/A	$0.00	$0		$0	$0
Concrete wall in portals		m3		#N/A	$0.00	$0		$0	$0
Backfill portal	Covered under Type B Water Licence (2BE-MEA1318)	m3		SB1L	$4.30	$0		$0	$0
Cap raise WT# 1	Covered under Type B Water Licence (2BE-MEA1318)	m2		SRL	$645.00	$0		$0	$0
Cap raise WT #2	Covered under Type B Water Licence (2BE-MEA1318)	m2		SRL	$645.00	$0		$0	$0
Cap Raise IVR #1	Ventilation shaft IVR #1 - quantity assumed	m2	21	SRL	$645.00	$13,545	100%	$13,545	$0
Cap shaft IVR #2	Ventilation shaft IVR #2 - quantity assumed	m2	21	SRL	$645.00	$13,545	100%	$13,545	$0
Remove temporary main ventilation system	at exploration ramp/portal	LS	1	AE	$10,000.00	$10,000	100%	$10,000	$0
Cap raises transportation to site via flat bed truck	assumed that concrete caps will be constructed at Meadowbank and transported to site including load and unload	hours	10	hiabL	$155.00	$1,550	100%	$1,550	$0
Backfill adits		m3		#N/A	$0.00	$0		$0	$0
Backfill open stope		m3		#N/A	$0.00	$0		$0	$0
Concrete cap over open stope		m3		#N/A	$0.00	$0		$0	$0
Other				#N/A	$0.00	$0		$0	$0
REMOVE HAZARDOUS MATERIALS - they will be managed on an ongoing basis and consequently, there will be relatively little accumulation of these materials on-site at closure									
Remove hazardous materials (fluids, batteries, etc.) and stockpile them on surface, U/G labor	allowance for six shifts - 2 people	manhours	144	mechL	$49.00	$7,056	50%	$3,528	$3,528
Remove contaminated soils, U/G labor	allowance for four shifts with 2 laborers	manhours	96	lab-us	$31.00	$2,976	50%	$1,488	$1,488
Remove contaminated soils, equipment	allowance for four shifts with loader, including operator and fuel	hours	48	load-sl	$175.00	$8,400	50%	$4,200	$4,200
Disposal of contaminated soils	soils suitable for remediation in the Whale Tail landfarm will be sent to this facility for remediation - assumed	LS	1	AE	$10,000.00	$10,000	50%	$5,000	$5,000
Waste oils	Burn at on-site incinerator - allowance	litre	1,000	ORL	$0.43	$430	50%	$215	$215
Unused fuel	assumed to be used for the reclamation of other project components	litre		ORL	$0.43	$0		$0	$0
Waste batteries	includes fee and transportation	kg	500	PCRH	$2.50	$1,250	50%	$625	$625
Disposal of hazardous materials and soils contaminated with heavy hydrocarbons	to be removed for disposal by licensed handler	LS	1	AE	$10,000.00	$10,000	50%	$5,000	$5,000
Remove/decontam. stationary & elect. equip	assumed of no value and left in place	each		#N/A	$0.00	$0		$0	$0
Remove/decontam. mobile equipment	assumed of no value and left in place	each		#N/A	$0.00	$0		$0	$0
Remove misc. haz. mat & explosives	included above	kg		#N/A	$0.00	$0		$0	$0
Other	allowance - includes fee and transportation	LS	1	AE	$5,000.00	$5,000	50%	$2,500	$2,500
INSTALL BULKHEADS - not required									
Bulkheads to control water flow		each		#N/A	$0.00	$0		$0	$0
Grout bulkhead		m3		#N/A	$0.00	$0		$0	$0
FLOOD MINE									
Relocate dewatering pumping system	includes pumps and pipelines	LS	1	#N/A	$10,000.00	$10,000		$0	$10,000
Supply/install pump station and piping system (including pumps)	Included in IVR Pit	each		#N/A	$0.00	$0		$0	$0
Supply/install piping system		each		#N/A	$0.00	$0		$0	$0
Operate pumps to flood workings		m3	1,265,012	POCL	$0.12	$151,801		$0	$151,801
Other				#N/A	$0.00	$0		$0	$0
INSTALL GROUNDWATER COLLECTION SYSTEM - not required									
Excavate/install sumps		m2		#N/A	$0.00	$0		$0	$0
Install pumping wells		m3		#N/A	$0.00	$0		$0	$0
Install pumps/pipelines/power supply		m		#N/A	$0.00	$0		$0	$0
SPECIALIZED ITEMS -not required									
Install water quality monitoring pipes		each		#N/A	$0.00	$0		$0	$0
Install permanent pumping system		each		#N/A	$0.00	$0		$0	$0
Other				#N/A	$0.00	$0		$0	$0
Note:					**Total**	$245,553		$61,196	$184,357
					% of Total			25%	75%

2 **Rock Pile Name:** **Whale Tail**

ACTIVITY/MATERIAL	Notes	Units	Quantity	Cost Code	Unit Cost	Cost	% Land	Land Cost	Water Cost
STABILIZE SLOPES									
Flatten slopes with dozer		m3		#N/A	$0.00	$0		$0	$0
Flatten "bubble dump" areas		m3		#N/A	$0.00	$0		$0	$0
Divert runon, ditch mat'l A		m3		#N/A	$0.00	$0		$0	$0
Divert runon, ditch mat'l B		m3		#N/A	$0.00	$0		$0	$0
Toe buttress, drain mat'l		m3		#N/A	$0.00	$0		$0	$0
Toe buttress, fill mat'l A		m3		#N/A	$0.00	$0		$0	$0
Toe buttress, fill mat'l B		m3		#N/A	$0.00	$0		$0	$0
COVER ROCK PILE									
Subgrade preparation - doze surface		m3		#N/A	$0.00	$0		$0	$0
Soil cover - excavate,haul,spread&compact	Assumes that 80% of the cover will be placed during operations as progressive reclamation. The remaining 20% will be placed at closure. Closure cover thickness will be 4.7 m and will be constructed with NPAG/NML waste rock.	m3	1,238,000	SB1L	$4.30	$5,323,400	50%	$2,661,700	$2,661,700
Rock cover - excavate, haul & spread		m3		#N/A	$0.00	$0		$0	$0
Excavate downslope drainage channel & chute		m3		#N/A	$0.00	$0		$0	$0
Rip rap drainage channel and chute		m3		#N/A	$0.00	$0		$0	$0
Vegetate		ha		#N/A	$0.00	$0		$0	$0
Other				#N/A	$0.00	$0		$0	$0
VERY LOW PERMEABILITY COVER (in addition to above)									
Liner subgrade preparation - compact		m2		#N/A	$0.00	$0		$0	$0
Supply geomembrame		m2		#N/A	$0.00	$0		$0	$0
Install geomembrane		m2		#N/A	$0.00	$0		$0	$0
Protective cover - excavate,haul,spread&compact		m3		#N/A	$0.00	$0		$0	$0
Vegetate		ha		#N/A	$0.00	$0		$0	$0
Install infiltration/seepage instrumentation		allow		#N/A	$0.00	$0		$0	$0
CONSTRUCT DIVERSION DITCHES									
Excavate ditches -soil		m3		#N/A	$0.00	$0		$0	$0
Excavate ditches -rock		m3		#N/A	$0.00	$0		$0	$0
Rip rap in channel base		m3		#N/A	$0.00	$0		$0	$0
CONSTRUCT SEEPAGE COLLECTION POND									
Excavate seepage collection pond		m3		#N/A	$0.00	$0		$0	$0
Doze & spread excavated material		m3		#N/A	$0.00	$0		$0	$0
Vegetate spread material		ha		#N/A	$0.00	$0		$0	$0
Bedding layer		m3		#N/A	$0.00	$0		$0	$0
Supply geomembrane		m2		#N/A	$0.00	$0		$0	$0
Install geomembrane		m2		#N/A	$0.00	$0		$0	$0
Erosion protection layer		m3		#N/A	$0.00	$0		$0	$0
INSTALL GROUNDWATER COLLECTION SYSTEM									
Excavate/install sumps		m3		#N/A	$0.00	$0		$0	$0
Install pumping wells		m3		#N/A	$0.00	$0		$0	$0
Install pumps/pipelines/power supply		allow		#N/A	$0.00	$0		$0	$0
RELOCATE DUMPS									
Load, haul, dump or doze		m3		#N/A	$0.00	$0		$0	$0
Add lime		tonne		#N/A	$0.00	$0		$0	$0
Contour reclaimed area		ha		#N/A	$0.00	$0		$0	$0
Other	Waste Rock Survey (500 samples) - as per Phase 1 approved RECLAIM	allow	1	#N/A	$100,000.00	$100,000	50%	$50,000	$50,000
SPECIALIZED ITEMS									
Install permanent instrumentation	thermistors to be installed assume 5 - as per Phase 1 approved RECLAIM	Allow	1.2	AE	$50,000.00	$60,000		$0	$60,000
Install permanent instrumentation, drilling		each		#N/A	$0.00	$0		$0	$0
TREAT ROCK PILE SEEPAGE - "It is included on Water Treatment Sheet"									
HEAP LEACH SEEPAGE TREATMENT - Cyanide Detox									
Cyanide destruction water treatment pumping		m3		#N/A	$0.00	$0		$0	$0
Reagents		tonnes		#N/A	$0.00	$0		$0	$0
Electrician/mechanic to maintain treatment plant		allow		#N/A	$0.00	$0		$0	$0
Equipment maintenance and parts		allow		#N/A	$0.00	$0		$0	$0
					Annual treatment costs	$0			
Number of years of treatment		years							
					Total treatment costs	$0			$0
HEAP LEACH SEEPAGE TREATMENT - ARD/ML**									
Upgrade/modify pumping system - report to WTP		allow		#N/A	$0.00	$0			$0
					Total	$5,483,400		$2,711,700	$2,771,700
					% of Total			49.5%	50.5%

Note:

* For construction of passive treatment system refer to "Water Management". ARD/ML seepage treatment becomes post-closure water treatment cost

**Heap leach ARD/ML seepage treatment becomes post-closure water treatment cost

Rock Pile Name: **IVR** **1**

ACTIVITY/MATERIAL	Notes	Units	Quantity	Cost Code	Unit Cost	Cost	% Land	Land Cost	Water Cost
STABILIZE SLOPES									
Flatten slopes with dozer		m3		#N/A	$0.00	$0		$0	$0
Flatten "bubble dump" areas		m3		#N/A	$0.00	$0		$0	$0
Divert runon, ditch mat'l A		m3		#N/A	$0.00	$0		$0	$0
Divert runon, ditch mat'l B		m3		#N/A	$0.00	$0		$0	$0
Toe buttress, drain mat'l		m3		#N/A	$0.00	$0		$0	$0
Toe buttress, fill mat'l A		m3		#N/A	$0.00	$0		$0	$0
Toe buttress, fill mat'l B		m3		#N/A	$0.00	$0		$0	$0
COVER ROCK PILE									
Subgrade preparation - doze surface		m3		#N/A	$0.00	$0		$0	$0
Soil cover - excavate,haul,spread&compact	Assumes that 80% of the cover will be placed during operations as progressive reclamation. The remaining 20% will be placed at closure. Closure cover thickness will be 4.7 m and will be constructed with NPAG/NML waste rock.	m3	770,000	SB1L	$4.30	$3,311,000	50%	$1,655,500	$1,655,500
Rock cover - excavate, haul & spread		m3		#N/A	$0.00	$0		$0	$0
Excavate downslope drainage channel & chute		m3		#N/A	$0.00	$0		$0	$0
Rip rap drainage channel and chute		m3		#N/A	$0.00	$0		$0	$0
Vegetate		ha		#N/A	$0.00	$0		$0	$0
Other				#N/A	$0.00	$0		$0	$0
VERY LOW PERMEABILITY COVER (in addition to above)									
Liner subgrade preparation - compact		m2		#N/A	$0.00	$0		$0	$0
Supply geomembrame		m2		#N/A	$0.00	$0		$0	$0
Install geomembrane		m2		#N/A	$0.00	$0		$0	$0
Protective cover - excavate,haul,spread&compact		m3		#N/A	$0.00	$0		$0	$0
Vegetate		ha		#N/A	$0.00	$0		$0	$0
Install infiltration/seepage instrumentation		allow		#N/A	$0.00	$0		$0	$0
CONSTRUCT DIVERSION DITCHES									
Excavate ditches -soil		m3		#N/A	$0.00	$0		$0	$0
Excavate ditches -rock		m3		#N/A	$0.00	$0		$0	$0
Rip rap in channel base		m3		#N/A	$0.00	$0		$0	$0
CONSTRUCT SEEPAGE COLLECTION POND									
Excavate seepage collection pond		m3		#N/A	$0.00	$0		$0	$0
Doze & spread excavated material		m3		#N/A	$0.00	$0		$0	$0
Vegetate spread material		ha		#N/A	$0.00	$0		$0	$0
Bedding layer		m3		#N/A	$0.00	$0		$0	$0
Supply geomembrane		m2		#N/A	$0.00	$0		$0	$0
Install geomembrane		m2		#N/A	$0.00	$0		$0	$0
Erosion protection layer		m3		#N/A	$0.00	$0		$0	$0
INSTALL GROUNDWATER COLLECTION SYSTEM									
Excavate/install sumps		m3		#N/A	$0.00	$0		$0	$0
Install pumping wells		m3		#N/A	$0.00	$0		$0	$0
Install pumps/pipelines/power supply		allow		#N/A	$0.00	$0		$0	$0
RELOCATE DUMPS									
Load, haul, dump or doze		m3		#N/A	$0.00	$0		$0	$0
Add lime		tonne		#N/A	$0.00	$0		$0	$0
Contour reclaimed area		ha		#N/A	$0.00	$0		$0	$0
Other	Waste Rock Survey (500 samples)	allow	1	#N/A	$100,000.00	$100,000	50%	$50,000	$50,000
SPECIALIZED ITEMS									
Install permanent instrumentation	thermistors to be installed assume 5	Allow	0.6	AE	$50,000.00	$30,000		$0	$30,000
Install permanent instrumentation, drilling		each		#N/A	$0.00	$0		$0	$0
TREAT ROCK PILE SEEPAGE - "It is included on Water Treatment Sheet"									
HEAP LEACH SEEPAGE TREATMENT - Cyanide Detox									
Cyanide destruction water treatment pumping		m3		#N/A	$0.00	$0		$0	$0
Reagents		tonnes		#N/A	$0.00	$0		$0	$0
Electrician/mechanic to maintain treatment plant		allow		#N/A	$0.00	$0		$0	$0
Equipment maintenance and parts		allow		#N/A	$0.00	$0		$0	$0
					Annual treatment costs	$0			
Number of years of treatment		years							
					Total treatment costs	$0			$0
HEAP LEACH SEEPAGE TREATMENT - ARD/ML**									
Upgrade/modify pumping system - report to WTP		allow		#N/A	$0.00	$0			$0
					Total	$3,441,000		$1,705,500	$1,735,500
					% of Total			49.6%	50.4%

* For construction of passive treatment system refer to "Water Management". ARD/ML seepage treatment becomes post-closure water treatment cost
**Heap leach ARD/ML seepage treatment becomes post-closure water treatment cost

1 **Building / Equip Name:** **Bldg / Equip #:**

ACTIVITY/MATERIAL	Notes	Units	Quantity	Cost Code	Unit Cost	Cost	% Land	Land Cost	Water Cost
DISPOSE MOBILE EQUIPMENT									
Decontaminate and ship off-site		allow		#N/A	$0.00	$0		$0	$0
Decontaminate and dispose on-site		manhours	600	MECHL	$49.00	$29,400	50%	$14,700	$14,700
Other				#N/A	$0.00	$0		$0	$0
REMOVE BUILDINGS - see note below									
Accommodation Complex - Main Camp	area based on Figure 1.1.1	m2	18000	BRS1L	$45.00	$810,000	50%	$405,000	$405,000
Process Facilities - Crushers		m2		#N/A	$0.00	$0	50%	$0	$0
Offices, kitchen, ERT	as per Phase 1 approved RECLAIM	m2	1311	BRS1L	$45.00	$59,009	50%	$29,504	$29,504
Storage Facilities (Main Warehouse)	as per Phase 1 approved RECLAIM	m2	3699	BRS1L	$45.00	$166,455	50%	$83,228	$83,228
Water and Wastewater Treatment Facilities	as per Phase 1 approved RECLAIM	m2	178	BRS1L	$45.00	$8,030	50%	$4,015	$4,015
Power Plant	as per Phase 1 approved RECLAIM	m2	216	BRS1H	$65.00	$14,014	50%	$7,007	$7,007
Communication Tower	as per Phase 1 approved RECLAIM	m2	100	BRS1H	$65.00	$6,500	50%	$3,250	$3,250
Water treatment plant	Two treatment plants (for brackish water and brine water) - area based on Figure 1.1.1	m2	1500	BRS1L	$45.00	$67,500	50%	$33,750	$33,750
U/G Heating Plant	two plants assumed 30 x 30 m	m2	1800	BRS1H	$65.00	$117,000		$0	$117,000
Emulsion Plant		m2		#N/A	$0.00	$0		$0	$0
Cement Rock Fill Plants	2 CRF plants (dismantled and disposed in landfill located within WT WRSF)	m2	320	BRS1H	$65.00	$20,800	50%	$10,400	$10,400
AN Storage Facility		m2	50	BRS1L	$45.00	$2,250	50%	$1,125	$1,125
Shop area and others	area based on Figure 1.1.1	m2	4508	BRS1L	$45.00	$202,860	50%	$101,430	$101,430
Storage Facility at Laydown/Airstrip		m2		#N/A	$0.00	$0		$0	$0
Fuel tanks	On-Site bulk fuel tanks (1.5 ML) - as per Phase 1 approved RECLAIM	m2	213	BRS1H	$65.00	$13,851	50%	$6,925	$6,925
Fuel tanks	Additional tanks for (700,000 L and 500,000 L)	m2	170	BRS1H	$65.00	$11,081	50%	$5,540	$5,540
Fire protection- Pumping station	as per Phase 1 approved RECLAIM	m2	30	BRS1H	$65.00	$1,933	50%	$967	$967
Fresh water intake	as per Phase 1 approved RECLAIM	m2	200	BRS1L	$45.00	$9,000	50%	$4,500	$4,500
Reclaim pumps		m2		#N/A	$0.00	$0		$0	$0
Outfall & Diffuser	included in Water Management Tab	allow		#N/A	$0.00	$0		$0	$0
New incinerator, composter	assumed	m2	100	BRS1L	$45.00	$4,500	50%	$2,250	$2,250
Airstrip lighting, navigation, electrician		mandays		#N/A	$0.00	$0		$0	$0
Airstrip lighting, navigation, mechanical		mandays		#N/A	$0.00	$0		$0	$0
Break foundation slabs	Estimated area of slabs on grade	m2	11000.0	BRCS	$6.00	$66,000	50%	$33,000	$33,000
Consolidate & dump boneyard debris		m3		#N/A	$0.00	$0		$0	$0
Ramp portal		m2		#N/A	$0.00	$0		$0	$0
Workers Dry	as per Phase 1 approved RECLAIM	m2	668	BRS1L	$45.00	$30,042	50%	$15,021	$15,021
WTP & Fresh water pumping station	as per Phase 1 approved RECLAIM	m2	832	BRS1L	$45.00	$37,444	50%	$18,722	$18,722
WRSF Pond, Attenuation Pond pumphouses	as per Phase 1 approved RECLAIM	m2	24	BRS1L	$45.00	$1,098	50%	$549	$549
IVR Attenuation Pond pumphouse		m2	24	BRS1L	$45.00	$1,098	50%	$549	$549
Water Intake	included in Water Management Tab	m2		#N/A	$0.00	$0		$0	$0
LANDFILL FOR DEMOLITION WASTE									
Place rock cover	in WT WRSF cover cost	m3		#N/A	$0.00	$0		$0	$0
Place soil cover		m3		#N/A	$0.00	$0		$0	$0
Vegetate		ha		#N/A	$0.00	$0		$0	$0
GRADE AND CONTOUR PADS									
Accommodation Complex - Main Camp	area based on Figure 1.1.1 - includes surrounding facilities area	m2	179400	SCFYL	$0.43	$77,142	50%	$38,571	$38,571
Process Facilities - Crushers		m2		#N/A	$0.00	$0	50%	$0	$0
Offices, kitchen, ERT	area as per Phase 1 approved RECLAIM	m2	1204	SCFYL	$0.43	$518	50%	$259	$259
Storage Facilities (Main Warehouse)	area as per Phase 1 approved RECLAIM	m2	3699	SCFYL	$0.43	$1,591	50%	$795	$795
Water and Wastewater Treatment Facilities	area as per Phase 1 approved RECLAIM	m2	178	SCFYL	$0.43	$77	50%	$38	$38
Power Plant	area as per Phase 1 approved RECLAIM	m2	216	SCFYL	$0.43	$93	50%	$46	$46
Communication Tower	area as per Phase 1 approved RECLAIM	m2	100	SCFYL	$0.43	$43	50%	$22	$22
Water treatment plant	area based on Figure 1.1.1	m2	1500	SCFYL	$0.43	$645	50%	$323	$323
U/G Heating Plant		m2		#N/A	$0.00	$0		$0	$0
Emulsion Plant		m2		#N/A	$0.00	$0		$0	$0
Cement Rock Fill Plants	area based on Figure 1.1.1	m2	320	SCFYL	$0.43	$138	50%	$69	$69
AN Storage Facility	area as per Phase 1 approved RECLAIM	m2	50	SCFYL	$0.43	$22	50%	$11	$11
Shops and Other	area based on Figure 1.1.1	m2	4508	SCFYL	$0.43	$1,938	50%	$969	$969
Fuel tanks on site / Bulk fuel tank	area as per Phase 1 approved RECLAIM	m2	713	SCFYL	$0.43	$307	50%	$153	$153
Additional tanks	Add 500 m2 for containment berm	m2	670	SCFYL	$0.43	$288	50%	$144	$144
Fire protection- Pumping station	area as per Phase 1 approved RECLAIM	m2	29.7	SCFYL	$0.43	$13	50%	$6	$6
Fresh water intake	area as per Phase 1 approved RECLAIM	m2	200	SCFYL	$0.43	$86	50%	$43	$43
New incinerator, composter, and landfarm	landfarm area based on Figure 1.1.1 plus above assumption for incinerator and composter area	m2	10900	SCFYL	$0.43	$4,687	50%	$2,344	$2,344
Ramp portal		m2		#N/A	$0.00	$0		$0	$0
Workers Dry	area as per Phase 1 approved RECLAIM	m2	668	SCFYL	$0.43	$287	50%	$144	$144
WTP & Fresh water pumping station	area as per Phase 1 approved RECLAIM	m2	832	SCFYL	$0.43	$358	50%	$179	$179
WRSF Pond, Attenuation Pond pumphouses	area as per Phase 1 approved RECLAIM	m2	24	SCFYL	$0.43	$10	50%	$5	$5
Others		m2		#N/A	$0.00	$0		$0	$0
PUNCTURE LINED SUMPS									
Puncture liner and place soil cover		m3		#N/A	$0.00	$0		$0	$0
RECLAIM ROADS									
Remove culverts	per ICRP (7) + AWR ((153) - as per Phase 1 approved RECLAIM	each	160	AEM	$4,000.00	$640,000		$0	$640,000
Remove bridges	AWR (11 bridges per AEM) - as per Phase 1 approved RECLAIM	each	11	AEM	$50,000.00	$550,000		$0	$550,000
Scarify roads	Account only remain width of AWR of 62.5 km at 8.5 m width (15m - exploration 6.5m) + 8 km of local roads at 9.5 m width includes side slopes	ha	60.73	SCFYL	$4,300.00	$261,118	50%	$130,559	$130,559
Scarify airstrip	Covered under Type B Water Licence (2BE-MEA1318) - as per Phase 1 approved RECLAIM	ha		#N/A	$0.00	$0		$0	$0
Scarify WT ore piles and laydown areas	Including underground ore pile and underground waste rock pad and laydown areas - area based on Figure 1.1.1	ha	34.3	SCFYL	$4,300.00	$147,490	50%	$73,745	$73,745
Scarify IVR ore piles and laydown areas	area based on Figure 1.1.1	ha	14.9	SCFYL	$4,300.00	$64,070	50%	$32,035	$32,035
Scarify temporary NPAG WRSF and overburden areas	area based on Figure 1.1.1	ha	22.7	SCFYL	$4,300.00	$97,610	50%	$48,805	$48,805
Vegetate	Naturally re-vegetated - as per Phase 1 approved RECLAIM	ha		#N/A	$0.00	$0		$0	$0
Other	Close and Reclaim Borrow pits - as per Phase 1 approved RECLAIM	ha	73.6	AEM	$1,500.00	$110,400		$0	$110,400
SPECIALIZED ITEMS									
Dispose of misc. debris and laydown area refuse				#N/A	$0.00	$0		$0	$0
					Total	$3,638,793		$1,110,697	$2,528,097
					% of Total			31%	69%

1 **Chemicals/Soil Area Name:**

Note: The procedures, equipment and packaging for clean up and removal of chemicals or contaminated soils are highly dependent on the nature of the chemicals and their existing state of containment. Government guidelines should be consulted on an individual chemical basis. Any estimate made here should be considered very rough unless specific evaluations have been conducted.

ACTIVITY/MATERIAL	Notes	Units	Quantity	Cost Code	Unit Cost	Cost	% Land	Land Cost	Water Cost
HAZARDOUS MATERIALS AUDIT									
Hazardous materials audit	Not required - as per Phase 1 approved RECLAIM	mandays		#N/A	$0.00	$0		$0	$0
BUILDING DECONTAMINATION & CONSOLIDATION OF HAZARDOUS MATERIALS - they will be managed on an ongoing basis and consequently, there will be relatively little accumulation of these materials on-site at closure									
Environmental technician/coordinator		mandays		#N/A	$0.00	$0		$0	$0
Decontaminate: oil, fuel tanks		m2	1384		$22.80	$31,545	50%	$15,773	$15,773
Decontaminate maintenance shop		m2	4508		$22.80	$102,782		$0	$102,782
Decontaminate power plant		m2	216		$22.80	$4,916	50%	$2,458	$2,458
Decontaminate bulk fuel storage	above	m2			$22.80	$0	50%	$0	$0
Decontaminate ANFO plant		m2	50		$22.80	$1,140	50%	$570	$570
Decontaminate offices/warehouse/accom		m2	1204		$22.80	$27,446		$0	$27,446
Removal of asbestos siding on buildings		m2		#N/A	$0.00	$0		$0	$0
Removal of friable asbestos on equipment		m2		#N/A	$0.00	$0		$0	$0
Other				#N/A	$0.00	$0		$0	$0
HAZARDOUS MATERIALS REMOVAL- they will be managed on an ongoing basis and consequently, there will be relatively little accumulation of these materials on-site at closure									
Waste oils	as per Phase 1 approved RECLAIM	litre	30,000	ORL	$0.43	$12,900	50%	$6,450	$6,450
Waste fuel	as per Phase 1 approved RECLAIM	litre	160,000	ORL	$0.43	$68,800	50%	$34,400	$34,400
Waste batteries	includes fee and transportation - as per Phase 1 approved RECLAIM	allow	1	AE	$3,000.00	$3,000	50%	$1,500	$1,500
Assay & environmental lab reagents		kg		#N/A	$0.00	$0		$0	$0
Machine shop paints, solvents etc.	includes fee and transportation - as per Phase 1 approved RECLAIM	allow	1	AE	$10,000.00	$10,000	50%	$5,000	$5,000
Glycol	includes fee and transportation - as per Phase 1 approved RECLAIM	allow	1	AE	$20,000.00	$20,000	50%	$10,000	$10,000
Process reagents		kg		#N/A	$0.00	$0		$0	$0
Nuclear sources		allow		#N/A	$0.00	$0		$0	$0
Other hazardous materials	includes fee and transportation - as per Phase 1 approved RECLAIM	allow	1	AE	$20,000.00	$20,000	50%	$10,000	$10,000
HAZARDOUS MATERIALS									
Transportation to disposal facility		kg	30000	PCRL	$0.45	$13,500	50%	$6,750	$6,750
Disposal fees		tonnes	30	AE	$155.00	$4,650	50%	$2,325	$2,325
Other	supervision of hazmat abatement - as per Phase 1 approved RECLAIM	allow	1	AE	$40,000.00	$40,000	50%	$20,000	$20,000
CONTAMINATED SOILS									
Contam. soil investigation - Phase 1		each	1	CS1L	$7,500.00	$7,500	50%	$3,750	$3,750
Contam. soil investigation - Phase 2	More money required an ESA program - as per Phase 1 approved RECLAIM	allow	1	AE	$100,000.00	$100,000	50%	$50,000	$50,000
CONTAMINATED SOIL REMOVAL									
Excavate and transport to onsite landfarm (Site fuel, power plant, Mine maintenance shop)	Assumed quantities	m3	5000	SC4L	$9.30	$46,500	50%	$23,250	$23,250
Manage PHC contaminated soil in onsite landfarm		m3	5000	CSRL	$47.00	$235,000	50%	$117,500	$117,500
Reagents/stabilizing agent		m2		#N/A	$0.00	$0		$0	$0
Excavate and transport to offsite facility	Allowance for heavy oil impacts (10% of light fraction) - as per Phase 1 approved RECLAIM	m3	500	AE	$155.00	$77,500	50%	$38,750	$38,750
Contour decontaminated area	as per Phase 1 approved RECLAIM	m3	5000	DSL	$0.95	$4,750	50%	$2,375	$2,375
CONTAMINATED SOIL VERY LOW PERMEABILITY COVER									
Supply geomembrame, HDPE, ES3, GCL		m2		#N/A	$0.00	$0		$0	$0
Upper and lower bedding layers		m3		#N/A	$0.00	$0		$0	$0
Install geomembrane, HDPE, ES3, GCL		m2		#N/A	$0.00	$0		$0	$0
Erosion protection layer		m3		#N/A	$0.00	$0		$0	$0
Vegetate		m2		#N/A	$0.00	$0		$0	$0
Install infiltration/seepage instrumentation		allow		#N/A	$0.00	$0		$0	$0
Other				#N/A	$0.00	$0		$0	$0
OTHER									
				#N/A	$0.00	$0		$0	$0
					Total	$831,929		$350,850	$481,078
					% of Total			42%	58%

1 **Capital Expenditures and Short Term Water Treatment identified in 'Instructions' worksheet**

ACTIVITY/MATERIAL	Notes	Units	Quantity	Cost Code	Unit Cost	Cost
BREACH DYKE EMBANKMENT						
Remove (excavate) fill	Assumed a total of 5 breaches: 3 on Whale Tail Dyke, 1 on Mammoth Dyke, 1 on WRSF Dyke. Total dykes material will be removed and placed in the WT WRSF	m3	12,500	SC3L	$8.90	$111,250
Remove (excavate) fill	Breach IVR retention dikes D1, D2 and S3 including IVR diversion berm. Total dykes material will be removed and placed in the IVR WRSF	m3	13,500	SC3L	$8.90	$120,150
Contour water intake area		m3		#N/A	$0.00	$0
STABILIZE SEDIMENT PONDS/WATER MANAGEMENT PONDS						
Backfill GSP-1	up to elevation 158 m with NPAG	m3	235,561	SB1L	$4.30	$1,012,912
Backfill GSP-2	up to elevation 160 m with NPAG	m3	361,050	SB1L	$4.30	$1,552,515
Backfill GSP-3	Assumed	m3	433,260	SB1L	$4.30	$1,863,018
Backfill former lakes within IVR Attenuation Pond	Backfill with NPAG the former A53 lake and small lake within pond area	m3	331,300	SB1L	$4.30	$1,424,590
Doze & spread excavated material		m3		#N/A	$0.00	$0
Vegetate spread material		ha		#N/A	$0.00	$0
Rip rap in channel base		each		#N/A	$0.00	$0
Remove sediments from WRSF ponds and place them in the landfill	Relocate to landfill - as per Phase 1 approved RECLAIM	allow	1	AE	$10,000.00	$10,000
REDIRECT RUNOFF/CONSTRUCT DIVERSION DITCHES						
Excavate ditches -soil	assumed 100 m - as per Phase 1 approved RECLAIM	m3	720	SC3L	$8.90	$6,408
Excavate ditches -rock		m3		#N/A	$0.00	$0
Stabilize side slopes		m3		#N/A	$0.00	$0
Rip rap in channel base	assumed 100 m - as per Phase 1 approved RECLAIM	m3	220	RR2L	$14.20	$3,124
BREACH DITCHES						
Excavate breaches		m3		#N/A	$0.00	$0
Backfill/recontour	as per Phase 1 approved RECLAIM	m3	44,130	SB3L	$5.10	$225,063
Backfill/recontour	New IVR WRSF, expansion of WT WRSF and WT Ore Pile drainage collection system, channel length measured from Figure 1.1.1 = 6700 m (assumed volume of 20,100m3). Assumed 30% of this volume was for recontour of channels to restore drainage path (remaining assumed that will be filled with sediments with time) - similar to Phase 1 assumption	m3	6,030	SB3L	$5.10	$30,753
Install flow dissipation		m3		#N/A	$0.00	$0
Vegetate remainder of ditch		m2		#N/A	$0.00	$0
DECOMMISSION FRESH WATER SUPPLY						
Breach embankment		m		#N/A	$0.00	$0
Remove pump	Nemo Lake and Whale Tail (South Basin) - as per Phase 1 approved RECLAIM	LS	1	EA	$20,000.00	$20,000
Remove pipeline	Nemo Lake and Whale Tail (South Basin) - as per Phase 1 approved RECLAIM	LS	1	EA	$40,000.00	$40,000
Remove pump	Mammoth Lake (new intake, water to be used for explosive mixing)	LS	1	EA	$10,000.00	$10,000
Remove pipeline	to explosive mixing	LS	1	EA	$5,000.00	$5,000
WATER CONTROL IN RECLAMATION QUARRY						
Install pumping system		LS		#N/A	$0.00	$0
Remove pumping system		LS		#N/A	$0.00	$0
REMOVE PIPELINES						
Remove pipes		m		#N/A	$0.00	$0
Concrete plug deep pipes		m3		#N/A	$0.00	$0
Remove discharge diffusers	2 at Whale Tail South Basin	LS	2	#N/A	$20,000.00	$40,000
GROUNDWATER COLLECTION SYSTEM						
Excavate/install sumps		m3		#N/A	$0.00	$0
Install pumping wells		m3		#N/A	$0.00	$0
Install pumps/pipelines/power supply		LS		#N/A	$0.00	$0
CONSTRUCT CONTAMINATED WATER STORAGE POND						
Excavate pond		m3		#N/A	$0.00	$0
Doze & spread excavated material		m3		#N/A	$0.00	$0
Vegetate spread material		ha		#N/A	$0.00	$0
Bedding layer		m3		#N/A	$0.00	$0
Supply geomembrane		m2		#N/A	$0.00	$0
Install geomembrane		m2		#N/A	$0.00	$0
Erosion protection layer		m3		#N/A	$0.00	$0
CONSTRUCT PASSIVE TREATMENT SYSTEM (e.g. Constructed Wetland)						
Construct access roads		km		#N/A	$0.00	$0
Install HDPE piping system from collection pond		m		#N/A	$0.00	$0
Inter-cell flow structures		allow		#N/A	$0.00	$0
Install liners		m2		#N/A	$0.00	$0
Install growth media		m3		#N/A	$0.00	$0
Wetland vegetation		ha		#N/A	$0.00	$0
CONSTRUCT WATER TREATMENT PLANT						
Build treatment plant		LS		#N/A	$0.00	$0
Build sludge containment facility		LS		#N/A	$0.00	$0
					Total	$6,474,783

For cost of long-term/post-closure water treatment see "WATER TREATMENT" Worksheet"

1 **Post Closure Water Treatment - Identified as long term/post-closure in 'Instructions' worksheet**

ACTIVITY/MATERIAL	Notes	Units	Quantity	Cost Code	Unit Cost	Cost
ADDITION OF REAGENTS TO WTP						
H2O2		kg		#N/A	$0.00	$0
lime		kg		#N/A	$0.00	$0
ferric sulphate		kg		#N/A	$0.00	$0
ferrous sulphate		kg		#N/A	$0.00	$0
flocculents		kg		#N/A	$0.00	$0
Other		kg		#N/A	$0.00	$0
LABOUR AND SUPPLIES						
Annual fuel		litres		#N/A	$0.00	$0
Annual power		kW-h		#N/A	$0.00	$0
Electrician/mechanic to maintain treatment plant		allow		#N/A	$0.00	$0
Equipment maintenance and parts		allow		#N/A	$0.00	$0
Misc. supplies, hoses, tools		allow		#N/A	$0.00	$0
Communications		allow		#N/A	$0.00	$0
Other				#N/A	$0.00	$0
WATER MANAGEMENT						
Water Treatment (reagents, equip. Op., labour)		m3		#N/A	$0.00	$0
Water pumping from sumps and ponds to treatment plant		allow		#N/A	$0.00	$0
Annual Treatment Plant Servicing		manhours		#N/A	$0.00	$0
Treatment Plant Servicing Travel Allowance (Round Trip Flight/person)		visits		#N/A	$0.00	$0
WTP WATER SAMPLING AND ANALYSES						
Sampling equipment		allow		#N/A	$0.00	$0
Analyses		allow		#N/A	$0.00	$0
Shipping to laboratory		allow		#N/A	$0.00	$0
Reporting		allow		#N/A	$0.00	$0
Other				#N/A	$0.00	$0
SITE ACCESS						
Road maintenance (incl. snow removal)		allow		#N/A	$0.00	$0
Winter road tariff		allow		#N/A	$0.00	$0
Truck rental		allow		#N/A	$0.00	$0
Air support		allow		#N/A	$0.00	$0
				Annual water treatment costs		$0
Number of years of water treatment	No treatment is required as per water quality model predictions results	years	0			
					Total	$0

1 **Interim Care and Maintenance**

ACTIVITY/MATERIAL	Notes	Units	Quantity	Cost Code	Unit Cost	Cost
INTERIM CARE & MAINTENANCE						
on-site caretaker	one skilled labourer - 4 months + 12 days cross-shift travel, 10 hr per day	hours	1320	lab-sl	41	$54,120
extra personnel		hours	0	lab-sl	41	$0
-electrician		hours	0	elech	95	$0
-mechanic	maintaining pump systems - 4 months + 12 days cross-shift travel, 10 hr per day	hours	1320	mechh	72.85	$96,162
annual fuel	as per Phase 1 approved RECLAIM	litre	10000	fcdh	1.39	$13,900
misc. supplies	as per Phase 1 approved RECLAIM	allow	240	accmh	175	$42,000
pick-up truck	two trucks for full summer - daily rate	each	240	days	150	$36,000
small dozer		allow		#N/A	0	$0
small excavator		allow		#N/A	0	$0
snow machine		allow		#N/A	0	$0
communications		allow	1	#N/A	5000	$5,000
SNP/AEMP water sampling & reporting	Site ($25K) and AWR ($2.5k) Reporting - as per Phase 1 approved RECLAIM	each	1	#N/A	27500	$27,500
geotechnical assessment	Site ($25K) and AWR ($1k) Reporting - as per Phase 1 approved RECLAIM	each	1	#N/A	26000	$26,000
interim water treatment	pit flooding, no effluent	each		#N/A	0.0001	$0
other		each		#N/A	0	$0
			Annual	Interim C&M Cost		$300,682
Number of years of ICM		years	3		**Total**	$902,046

1 Post-Closure Monitoring & Maintenance:

ACTIVITY/MATERIAL	Notes	Units	Quantity	Cost Code	Unit Cost	Cost
MONITORING & INSPECTIONS						
Annual geotechnical inspection		each	1	VIS	$11,000.00	$11,000
Surface water sampling		each	2	WSH	$10,000.00	$20,000
Ground water sampling		each	2	WSH	$10,000.00	$20,000
Receiving/downstream water sampling		each	2	WSH	$10,000.00	$20,000
Monitoring program	Site ($100K) +AWR ($5K) - as per Phase 1 approved RECLAIM	each	1	AE	$105,000.00	$105,000
Survey inspection		each		#N/A	$0.00	$0
Regulatory costs*		each		#N/A	$0.00	$0
Site water monitoring (AEMP and SNP)		each		#N/A	$0.00	$0
- Active closure and flooding		each		#N/A	$0.00	$0
- Post pit flooding		each		#N/A	$0.00	$0
Air Quality Monitoring Program (AQMP)		each		#N/A	$0.00	$0
Wildlife Effects Monitoring Program (WEMP)		each		#N/A	$0.00	$0
Vegetation Monitoring		each		#N/A	$0.00	$0
Other				#N/A	$0.00	$0
COVER MAINTENANCE						
Repair erosion - infill gullies		allow		#N/A	$0.00	$0
Repair erosion - upgrade diversion ditches		allow		#N/A	$0.00	$0
Remove problem vegetation		allow		#N/A	$0.00	$0
Repair animal damage		allow		#N/A	$0.00	$0
Repair/upgrade access controls		allow		#N/A	$0.00	$0
Other				#N/A	$0.00	$0
SPILLWAY MAINTENANCE						
Repair erosion		m3		#N/A	$0.00	$0
Clear spillway		each		#N/A	$0.00	$0
CWTS MAINTENANCE						
Maintain flow, restore vegetation		allow		#N/A	$0.00	$0
WATER TREATMENT						
Water treatment - refer to water treatment tab		each	1	WT tab	$0.00	$0
POST-CLOSURE WATER TREATMENT						
Subtotal, Annual post-closure costs						$176,000
Discount rate for calculation of net present value of post-closure cost, %				3.00%		
Number of years of post-closure activity				20	years	
Present Value of payment stream						$2,618,436

*Regulatory costs - annual reporting, management plans, progress reports etc.

1 **Mobilization/Demobilization:**

ACTIVITY/MATERIAL	Notes	Units	Quantity	Cost Code	Unit Cost	Cost
MOBILIZE HEAVY EQUIPMENT						
Excavators	assume three excavators mobilized from Baker Lake - equipment cost in transit	hrs	9	exc-s	190.00	$1,710
Dump trucks	assume six dump trucks mobilized from Baker Lake - equipment time in transit	hrs	18	truck-s	225.00	$4,050
Dozers	assume three dozers mobilized from Baker Lake - equipment time in transit	hrs	9	dozersL	260.00	$2,340
Demolition shears	assume one set of shears mobilized from Baker Lake - equipment time in transit	hrs	3		200	$600
Crane	assume one crane mobilized from Baker Lake - equipment time in transit	hrs	3		250	$750
Loader	assume one loader mobilized from Baker Lake - equipment time in transit	hrs	3	load-s	175.00	$525
Float truck	Trip out and back from Baker Lake for each piece (except trucks)	hrs	54	truck-ll	300.00	$16,200
Light duty vehicles	assume four trucks mobilized from Baker Lake - equipment time in transit	hrs	12		25	$300
MOBILIZE MISC. EQUIPMENT						
Pump shipping		each		#N/A	0	$0
Pipe shipping		m		#N/A	0	$0
Minor tools and equipment	An allowance to cover the cost of purchase of small tools, equipment and the like as may be required to complete the decommissioning works - as per Phase 1 approved RECLAIM	allow	1	#N/A	50000	$50,000
Truck tires		allow		#N/A	0	$0
Other				#N/A	0	$0
MOBILIZE CAMP						
Maintain Camp Accommodations		allow		#N/A	0	$0
Reclamation activities		allow		#N/A	0	$0
Long term reclamation activities (eg pump flooding)		allow		#N/A	0	$0
MOBILIZE WORKERS						
Reclamation activities - transport	as per Phase 1 approved RECLAIM - plus 30% for the Expansion Project	manhours	788	AE	3300	$2,599,740
Reclamation activities - travel time	ten workers two hours two trips + AWR time (168+6) - as per Phase 1 approved RECLAIM - plus 30% for the Expansion Project	inhours	28587	AE	80	$2,286,960
Reclamation activities - transport		each		#N/A	0	$0
Long term reclamation activities (eg pump flooding) - travel time	as per Phase 1 approved RECLAIM	manhours	3370	#N/A	80	$269,568
Long term reclamation activities (eg pump flooding) - transport	as per Phase 1 approved RECLAIM - plus 30% for the Expansion Project	each	94	AE	3300	$308,880
Monitoring Airfare		each		#N/A	0	$0
WORKER ACCOMODATIONS						
Reclamation activities	Site (13786)+AWR (56) - as per Phase 1 approved RECLAIM - plus 30% for the Expansion Project	man-days	17995	ACCML	100	$1,799,460
Long term reclamation activities (eg pump flooding)		manmonths		#N/A	0	$0
MOBILIZE FUEL						
Fuel freight - reclamation activities	assume sufficient fuel is on site to complete the work - as per Phase 1 approved RECLAIM	litre		#N/A	0	$0
Fuel freight - long term reclamation activities	assume sufficient fuel is on site to complete the work - as per Phase 1 approved RECLAIM	litre		#N/A	0	$0
Fuel freight accommodations		litre		#N/A	0	$0
WINTER ROAD						
Construction and operation		km		#N/A	0	$0
Limited winter use		km		#N/A	0	$0
Winter road tariff		km		#N/A	0	$0
DEMOBILIZE HEAVY EQUIPMENT						
Excavators	assume three excavators mobilized from Baker Lake - equipment cost in transit	hrs	9	exc-s	190.00	$1,710
Dump trucks	assume six dump trucks mobilized from Baker Lake - equipment time in transit	hrs	18	truck-s	225.00	$4,050
Dozers	assume three dozers mobilized from Baker Lake - equipment time in transit	hrs	9	dozersL	260.00	$2,340
Demolition shears	assume one set of shears mobilized from Baker Lake - equipment time in transit	hrs	3		200	$600
Crane	assume one crane mobilized from Baker Lake - equipment time in transit	hrs	3		250	$750
Loader	assume one loader mobilized from Baker Lake - equipment time in transit	hrs	3	load-s	175.00	$525
Float truck	Trip out and back from Baker Lake for each piece (except trucks)	hrs	54	truck-ll	300	$16,200
Light duty vehicles	assume four trucks mobilized from Baker Lake - equipment time in transit	hrs	12		25	$300
Other		kmtonne		#N/A	0	$0
DEMOBILIZE CAMP						
		allow		#N/A	0	$0
DEMOBILIZE WORKERS						
crew travel time	cost in mobilization of workers - as per Phase 1 approved RECLAIM	mandays		#N/A	0	$0
crew transportation		each		#N/A	0	$0
WINTER ROAD						
Construction and operation		km		#N/A	0	$0
Limited winter use		km		#N/A	0	$0
Winter road tariff		km		#N/A	0	$0
					Total	**$7,367,558**

Note: Labour costs not included under mobilization - included elsewhere

Pumping Volumes

Source Water Balance 2019

Pit Flooding

Volume of Pumping from WT South basin drawdown to IVR Pit:

Volume (m3)	From Facility
8,280,000	WT south basin drawdown to 153.5 m in 2026
46,400,000	period 2027-2042 WT south basin final water level at 153.5 m (2,900,000 m3/year)
54,680,000	**Total**

Volume of Pumping from WT WRSF pond to IVR Pit:

From WT WRSF	
25,321	
2,923	
4,053	
7,818	
40,116	Total annual
641,851	**Total in approx. 16 years**

55,321,851	**Total Volume Pumped to Open Pits**

Underground Mine Workings Flooding

Volume of Pumping from GSP1, GSP2, IVR Att Pond and WT south basing to UG

Volume (m3)	From Facility
151,718	GSP1
169,293	IVR att Pond
75,637	GSP2
868,364	WT south basin
1,265,012	**Total Volume Pumped to UG**

56,586,863	**Total Pumping Volume**