VERSION 3 UPDATE SUMMARY

The project description as presented in Chapter 5 remains the same with the following minor changes:

- *The on-site accommodation camp location has been changed in response to comments from the Ministry of Natural Resources and Forestry (MNRF) and the Ontario Ministry of Environment and Climate Change (MOECC). The MNRF and MOECC indicated that the assumed camp location was too close to Sawbill Bay and that an assessment of alternative locations should be completed. In response, CMC provided a supplemental assessment of alternative camp locations (see Part 2 of the Version 3 Alternatives Assessment TSD) and a new location, to the north of the access road and west of the Tailing Management Facility (TMF), was selected as the preferred location for the on-site accommodation camp. The updated location is presented in a revised Figure 5-1 (as provided in the response T(3)-10 - Addendum Part A; Table A-1).*
- *The fiber optic line and auxiliary power line were determined to be unnecessary through engineering work that was occurring in parallel with the development of the EIS/EA. As these components were deemed to be unnecessary, they no longer require consideration in the EIS/EA (see response to EAB7-NEW - Addendum Part B; Table B-1).*

References to comment responses and supplemental documentation that pertain to the project description are provided within the appropriate section herein.

At the request of the MOECC, metrics of key project infrastructure and study areas are provided in Table 5-A below for convenience.

Table 5-A: Metrics of Key Project Infrastructure and Study Areas

Item	Metric	Value
Mine Study Area	Area	2,063.7 ha
Linear Infrastructure Study Area	Area	263.1 ha
Tailings Management Facility (including dams and Reclaim Pond)	Area	763.0 ha
Waste Rock Management Facility	Area	165.9 ha
Hardtack/Sawbill Access Road	Length	26.1 km
Mine Access Road	Length	8.3 km
Combined Access Road (from Hwy 622 to the site Parking Lot)	Length	34.5 km
West Pit	Area	100.6 ha
	Max. Depth[(a)]	318.4 m
East Pit	Area	54.4 ha
	Max. Depth[(a)]	227.7 m

Note:

a) Maximum depth is calculated as the average surface elevation of the pit footprint minus the lowest elevation in the pit at full build-out.

5.0 PROJECT DESCRIPTION

This chapter follows and expands upon the Project Description provided in Section 4.0 of the ToR. As required by the ToR, the Project Description has been prepared in accordance with the Ontario *Environmental Assessment Act* (EAA), R.S.O. 1990, which states under Chapter E. 18, subsection 6.1(2) that the EIS/EA Report for the Project will include a detailed project description that identifies all components of the Project, through all Project phases including projected timelines. The Project Description also provides information in accordance with Sections 5.2 and 5.3 of the EIS Guidelines. Information required under Section 5.1 of the EIS Guidelines (Need for and Purpose of the Project) is provided in Section 1.2.

Project planning has included an alternatives assessment as described in Chapter 4. Based on the work completed to date and the assessment of alternatives, a preferred Project has been defined and is the subject of this chapter.

This chapter provides a general discussion of the Project and activities that will take place during each of the four Project phases: construction, operations, closure and post-closure. Key Project components presented in Chapter 1 are described in more detail in this chapter.

Figure 5-1 provides the general arrangement of the Project Site during the operations phase. Table 5-1 outlines the Project activities for each key Project component by Project phase.

5.1 Project Schedule and Phasing

As summarized in Section 1.3, the Project schedule will include four phases: construction (2.5 years), operations (11 years); closure (2 years) and post-closure (10 years). Post-closure is expected to last 10 years; however, it will be influenced by the duration of pit flooding (approximately 218 years). Figure 1-4 provides a simplified Project schedule.

5.1.1 Construction Phase

Version 3 Update: A description of the preliminary framework for the draining of Mitta Lake and the accompanying mitigation measures, including the No Net Loss plan for fish, is provided in response to T-62 (see Addendum Part A; Table A-1), MNR-9, MNRF-9 and MNRF-9B (see Addendum Part B; Table B-1). Clarification regarding aggregate resource development and permitting are provided in responses to T-1 and T(2)-06.

'No Net Loss Plan' (NNLP) refers to 'Offsetting Plan' under the current Fisheries Act.

The construction phase will begin once all relevant permits have been received. The construction phase is expected to last 2.5 years (i.e., 30 months) and includes general activities as follows:

- Upgrading access roads.
- Construction of transmission lines and communication lines.
- Construction of worker accommodation camp.
- Site Grading and construction of laydown areas.
- Transport of equipment to the Project Site.
- Preparation of site components and facilities.

- Construction of infrastructure.
- Construction of initial containment structures for the Tailings Management Facility (TMF).

Currently, access to the site is via a gravel road that will require upgrading in order to transport equipment and supplies to the site for construction. Upgrading of the all-weather access road and construction of the electrical transmission line will be undertaken at the beginning of the construction phase to facilitate movement of equipment to the site. Aggregate Sites will be identified, and rehabilitated upon completion, as per the *Aggregate Resources Act.* Some Aggregate Sites will be kept accessible and operating to provide materials for on-going maintenance of the road throughout the operations and closure/post-closure phases.

During the construction phase, equipment will be transported to the site and site preparation activities will be undertaken. Clearing, grubbing, and site grading will be undertaken where infrastructure is to be placed. Site drainage will be constructed in the initial stages, including the draining of Mitta Lake. The ore deposit is located directly under Mitta Lake.

The Project will include draining the water from Mitta Lake into the adjacent Marmion Reservoir. A fish salvage and relocation plan will be developed according to DFO guidelines and OHRG's No Net Loss Plan (NNLP) and will incorporate consultation with Aboriginal communities. Detailed planning and logistics for this activity has not been undertaken to date; but will be finalized with Aboriginal input prior to the Construction Phase of the Project. A preliminary outline of the planning considerations for the draining of Mitta Lake is provided below.

Water will be used as part of mine commissioning/operation where possible. Water will be pumped to the PPCP and allowed to settle until the TSS is suitable for discharge to the Marmion Reservoir. Lake sediment collection and disposal methods will be identified. Removal of sediment and shallow overburden may be required as part of the pre-treatment preparation of the open pit. Sediment will be disposed of in the overburden stockpile.

Alternative locations for fish relocation will be examined through an assessment of logistics. The NNLP considers stocking of four fishless headwater lakes/ponds as part of the offset projects. Sawbill Bay will also be considered as an alternative location. Discussion with local bait fishers will take place to determine interest in using some of the fish within Mitta Lake as a baitfish source for sale to the public.

Methods of fish capture will be described including planned sampling, handling, transport and release. Depending on the identified site of relocation, fish may be transported from Mitta Lake to their new location by ATV or helicopter. Acclimation needs will be considered and a protocol for fish handling and treatment will be developed. Some mortality of fish is expected and plans for disposal of dead fish will be developed in consideration of potential wildlife issues. Discussions with Aboriginal groups through the RSA committees and the Métis consultation committee will ensure appropriate cultural and spiritual protocols are followed.

Site drainage during construction will be managed through ditches, pumping stations and holding ponds prior to any necessary treatment and eventual discharge. Site drainage will be managed to ensure that runoff does not cause erosion, flooding or contamination in downstream areas.

Site preparation will necessitate removal of soils in some areas. Removed soils will be placed in the overburden stockpile, and protected against erosion, for future use in reclamation.

In the early stages of construction, existing site access roads will be upgraded and new access roads will be constructed, where required. Access roads will also be required for Aggregate Sites and the sites will be opened to provide access to construction materials.

Site grading will be completed in the processing plant and truck shop areas including the construction of ponds to manage runoff, process water and provide emergency spill containment, and cut and fill to create pads to support structures, and provide relatively level areas for yard and laydown purposes. The excavated material, which will be primarily rock, will be used for construction of the berms for the fuelling facility and explosives plant, as well as pads for various site infrastructure (e.g., temporary ore and waste rock stockpiles). During these activities, erosion protection will be constructed to limit runoff and sedimentation in adjacent watercourses.

The laydown areas will be prepared for receiving equipment and supplies that are brought to site. Laydown areas will be rehabilitated upon completion of construction if not required during operations. In preparing these areas, site grading will include cutting and filling over large areas to provide adequate space. Fill slopes around the perimeter of the processing plant and truck shop areas will be constructed using excavated rock material, and the toe of slopes will be kept above the regulated high-water level of Marmion Basin/Sawbill Bay to the extent possible. Where necessary, seepage collection ditches will be installed at the toe of fill slopes to intercept runoff and seepage from the fill areas and to avoid water quality impacts to Sawbill Bay.

In some areas north of the processing plant it will be necessary to extend the toe of slope into the area between the high and low water levels, which will have some impact on seasonal fish habitat. In these limited cases, imported clean aggregate material or rock that has undergone supplemental testing to confirm it is appropriate for use will be used, and these areas have been incorporated in OHRG's NNLP. These areas are shown on Figure 5-2.

OHRG will install a temporary concrete batch plant following the completion of the access road. When no longer required, the concrete batch plant will be removed from the Project Site. To produce aggregate during construction, OHRG will mobilize a mobile jaw crusher, cone crusher and screening plant. When no longer required, the mobile crushing and screening plant will be demobilized. During site preparation and operation of the concrete plant, drainage will be managed through ditches, pumping stations and holding ponds prior to any necessary treatment and eventual discharge. Site drainage will be managed to ensure that runoff does not cause erosion, flooding or contamination in downstream areas.

The worker accommodation camp will be constructed in the same general area of the former exploration camp. Any existing offices may continue to be used during the construction phase, while new office facilities are constructed.

The site infrastructure, including a water supply pipeline, storage and maintenance areas, permanent support facilities such as a paramedic station and offices will be constructed. Construction of facilities where potentially hazardous materials are stored or used, such as fuels and lubricants will include mitigation measures, such as impermeable surfaces and spill containment and clean-up equipment, in order to minimize potential environmental impacts. Fuel storage areas will be constructed, including berms to contain potential spills.

The TMF, including a containment area and tailings pipeline will be constructed during this phase. The pipeline will be constructed above ground, with drainage points and spill containment areas located at naturally occurring low points along the route. The pipeline will follow the existing on-site road alignments or alternate required alignments. The pipeline will be protected on the inward side of the road by a berm. Similarly, on the outward side, the road bed would be bermed to protect the pipelines. Ditching would direct potential spillage to the constructed containment areas. Where the pipeline deviates from existing on-site roads, a construction access road will be constructed that will also be used as a service road for the pipeline during operations.

Vehicle and machinery maintenance facilities will have drainage systems constructed that direct water (e.g., wash water) to the ETP. Sewage will be piped or trucked to the sewage treatment facility as appropriate. Spills containment and cleanup materials will be maintained on-site. Waste management systems, including a sewage treatment system for domestic sewage will be constructed.

5.1.2 Operations Phase

The operations phase is expected to last for 11 years. General activities that will occur during operations include:

- Maintaining site Access Roads, transmission lines and communication.
- Maintaining worker accommodation camp.
- Operation of the Mine.
- Storage and production of explosives.
- Operation of Process Facilities including ore stockpiles.
- Operation of mine waste facilities (waste rock stockpile, overburden stockpiles, TMF and pipelines).
- Transport of equipment and supplies to and from the Project Site.
- Transport of workforce to and from the Project Site.
- Transport of gold doré bars off-site.

An inventory of Project equipment during operations is provided in Section 5.2.1.

During the operations phase, the process will begin for removing the ore (economically valuable material) through development of the open pits. Mine ramps will be advanced progressively through the operating life of the mine using blasting. The mining process will generate waste rock (uneconomic material), which will be removed from the pit and disposed of in the waste rock stockpile.

Seepage collection systems will be installed at the low points around the perimeter of the waste rock stockpile. This will allow the seepage water quality to be monitored. Runoff and seepage will be directed to the storm water management system for re-use in the processing plant or for treatment, if required, prior to discharge. Additional information on runoff and seepage systems is provided in Section 5.2.7.

Equipment, supplies (e.g., fuel, explosives and consumables) and workers to support the operation of the site will be transported along an access road on an as-required basis. Supporting infrastructure will include maintenance facilities, warehouses, water supply plant, explosives manufacturing plant, sewage treatment plant, and an electrical substation.

The Project includes a processing plant with an average projected throughput of approximately 60,000 tonnes per day. The production rate may be improved or increased over time. During operations, open pit mining methods will be used to mine ore from the ore deposit. Two open pits will be developed to access the ore. As mining proceeds, pit dewatering will be necessary to access the ore, which is below the water table. Ramps will be used to move personnel and equipment into and out of the mine, and to move ore and waste rock to the surface.

Mined ore will be removed from the pit uncrushed via truck haulage and placed directly into the gyratory crusher for immediate processing or placed into the stockpiles for processing in the future. The ore stockpiles will be protected with ditching to control runoff. The processing plant will be generally consistent with technology used at the Canadian Malartic Mine in Quebec that Osisko Mining Corporation (Osisko) is currently operating. The OHRG Project will include crushing, grinding, flotation, cyanidation leaching, carbon-in-pulp gold recovery, gold elution, gold electro-winning, smelting using an induction furnace, cyanide destruction and tailings production. The tailings will be managed on-site in a tailings management facility (TMF). Operation of the TMF will include pumping of the tailings slurry from the ore processing facility to the TMF. Further detail about the TMF is provided in Section 5.2.5. An alternative assessment for the TMF is provided in Chapter 4.

It is expected the mine will have an average workforce of 550 persons during operations. This number was used for economic modelling and an estimate of 1,200 persons was used for environmental modelling of potential effects. In addition to the mine workings and the processing plant, the operations phase includes a number of facilities to support the mining operation. These include worker facilities (including First Aid facilities), offices and facilities to support these functions, such as sewage treatment facilities, waste disposal and potable water supply. A worker accommodation camp for up to 1,200 workers was included for evaluation of potential effects.

Domestic sewage will be treated on-site at a sewage treatment facility (located nearby the worker accommodation camp) and treated effluent will be discharged to Sawbill Bay. Sewage solids will be disposed of off-site by a suitably licensed hauler to a sewage waste disposal facility licensed to receive such material. Solid wastes from the worker accommodation camp, mine offices and workshops will be disposed of at an off-site municipal landfill. Secondary containment, oil/grit separators and spill response measures will be implemented at the warehouse, fuel storage and vehicle maintenance and workshop areas, to protect water quality.

5.1.3 Closure and Post-closure Phases

Version 3 Update: Clarification regarding the closure phase is provided in the responses to EAB2 (alternatives evaluation); MNR-Closure (closure plan) ; MNDM 5 and T-38 (monitoring and water quality for the pit filling); MNDM-4 and T-54 (overburden use revegetation); MOE Waste 1 (On-site landfill); MOE-GW 1, T-35, T-39, T-40 and T-43 (seepage collection system). See Addendum Part A; Table A-1 and Addendum Part B; Table B-1 for responses to comments.

- These two phases are discussed together because they are closely related.
- Mine closure follows the completion of mineral extraction, processing and transportation activities, and involves the removal of Project facilities and infrastructure which supported those activities. The overall objective of the closure plan is to prevent personal injury or property damage that is reasonably foreseeable as a result of closing out the Project, and to restore the Project Site to its former use or an acceptable alternative, to the extent possible.
- The mine closure and post-closure phases are expected to last for 12 years (2 years for closure and 10 years for post-closure). General activities that will occur during closure and post-closure include:
- Stabilization of tailings surface and revegetation.
- Cessation of pit dewatering operations.

- Pumping of water from various seepage collection ponds to the open pits until water quality is acceptable for direct discharge to the environment.
- Grading of the surface of the waste rock stockpile and overburden stockpile.
- To the extent practical, using overburden stockpile materials as cover to promote vegetation growth in various site areas.
- Decommissioning of site infrastructure.
- Establishment of open pit “safe lines” based on a rock mechanics evaluation.

At closure, the tailings beach will be directly revegetated. The tailings will be tested to determine what nutrients are lacking and then the surface will be seeded and fertilized. It may also be advantageous to apply organic mulch, such as pulp mill sludge. Details of the revegetation (i.e., seed mixture, fertilizer, mulch) will be verified prior to closure using test plots on inactive parts of the TMF surface.

Runoff collected in the TMF perimeter ditch system will initially be pumped back into the Reclaim Pond, which in turn will be pumped to the open pits. When the water quality of the reclaim water is consistently acceptable for environmental discharge the pumping stations will be breached and pumping to the open pits ceased.

The tailings dams will remain in place as permanent impoundment structures; they will be designed and constructed to be stable under long return period floods and seismic events associated with closure. It should not be necessary to further upgrade the stability of the dams at closure.

Remediation of the waste rock stockpile at closure will involve re-grading the stockpile crest to reduce infiltration into the stack and control erosion. Drainage measures (i.e., chute drains and grading of benches) will be put in place to safely convey runoff to the toe of the waste rock stockpile, and suitable erosion protection will be provided where required. The waste rock stockpile will be physically stable without vegetation, and therefore no active revegetation is proposed. The waste rock is not expected to be acid generating and therefore does not require a soil cover. Runoff collected in the pumping stations surrounding the waste rock stockpile will be pumped to the open pits until such time that the water quality in the individual pumping stations is acceptable for direct environmental discharge.

All stockpiled low grade ore will be processed during operations. At closure, the area of the stockpile will be re-graded to improve drainage and the area revegetated. Runoff collected in the pumping stations surrounding the low grade ore stockpile will be pumped to the open pits until such time that the water quality in the individual pumping stations is acceptable for direct environmental discharge.

At closure, some of the overburden may be used for re-grading to facilitate closure. After that, the remaining material in the overburden stockpile will be re-graded. The top surface of the overburden stockpile will be graded to help shed runoff and reduce infiltration. The overburden stockpile is expected to be geochemically benign and will likely support vegetation without the need for topsoil. Drainage measures (i.e., chute drains and grading of benches) will be put in place to safely convey runoff to the toe of the overburden stockpile, and suitable erosion protection will be provided. Water collected in the seepage collection ponds along the perimeter ditches will be monitored at closure, and will continue to be pumped to the open pits until the water quality is acceptable for direct environmental discharge.

At closure, the tailings pipeline and pumping system will be decommissioned. For the first one or two years after closure, the reclaim water pipeline will continue to be used to transfer excess water from the TMF reclaim pond to the open pits.

The water quality in the TMF reclaim pond is expected to improve within one or two years after closure as the cyanide, ammonia and thiosalts will decay after processing ceases. Suspended solids will also decrease as the tailings surface is revegetated and erosion reduced. When the water quality in the TMF reclaim pond is suitable for discharge to the environment, the spillway will be upgraded to allow direct discharge of water from the TMF reclaim pond into Sawbill Bay. At that point, pumping and treatment of water from the TMF will cease and the reclaim water pump and pipeline system will be decommissioned.

Surface runoff flows from all decommissioned mine facilities will initially be pumped into the east pit. When the water quality from the seepage collection ponds is acceptable for direct environmental discharge, pumping to the east pit will cease and runoff flows will be discharged directly to the environment.

The eventual post-closure water elevation in the open pits will be elevation 420 masl. The east and west pits will be connected via an excavated channel, with the west pit overflowing to Sawbill Bay near the operational discharge point through an engineered discharge channel. The open pits are predicted to take approximately 218 years to flood. It is expected that stratification of water in the flooded open pits will result in surficial water quality that is suitable for discharge to Marmion Reservoir. However, if stratification of the water does not produce acceptable water quality, the following treatment options will be considered:

- Treating the water in the flooded open pits prior to overflow by chemical or biological means.
- Treatment of the overflow water in a Wetland Treatment System prior to discharge into Marmion Reservoir.

Prior to closure, a rock mechanics evaluation of the open pit slopes will be carried out. If any unstable areas are identified, then “safe lines” will be established. A fence or rock barrier wall will be constructed around the pit perimeter to prevent inadvertent access by the public to any slopes. The fence or wall will be located outside of any safe lines.

The site facilities (e.g., the Processing Plant and equipment, the maintenance shops, the camp, etc.) will be redundant after closure. Portable facilities such as trailers will be removed from the site. Permanent facilities will be decommissioned and demolished. Materials will be salvaged or sold as scrap to the extent possible. Other non-hazardous demolition waste will be disposed of in a solid waste landfill to be licensed within the TMF. Any hazardous materials or liquid wastes will be removed from the site for management and disposal in accordance with applicable legislation. Any soils impacted by hydrocarbons will be either bio-remediated on site or shipped to a licenced facility.

Once the processing plant and other site infrastructure are demolished, the remaining runoff reporting to the process plant collection pond (PPCP) should no longer require treatment. At that time, the PPCP and the Effluent Treatment Plant (ETP) will be decommissioned. Normal runoff flow directions in the vicinity of the processing plant will be restored.

5.2 Project Components

The following sections provide additional detail on the key Project components. Note that each mine Facility will incorporate a runoff collection system as described under Section 5.2.7. Remediation activities at closure are discussed for each component under Section 5.1.3. The final design of Project components and facilities may be modified depending on actual conditions encountered during construction and operations.

5.2.1 Mine

Version 3 Update: Minor clarifications regarding the emulsion storage and manufacturing facilities are provided in the response to T-49. Clarification on the site drainage collection system is provided in the response to A-11 (see Addendum Part A; Table A-1).

A NI 43-101 Technical Report on the Hammond Reef deposit was produced by SGS Geostat Ltd. with contributions from G Mining Services Inc. (GMS) in December 2011. Subsequent to the December 2011 report, additional drilling was completed to upgrade the resource to the indicated category to allow for conversion to reserves in accordance with the guidelines of the National Instrument NI 43-101. This mine description is based on available information as of February 2013 as supplied by GMS and is provided only for the purposes of defining the project description for use in the EIS/EA Report.

Significant tonnages of gold mineralization at the Hammond Reef deposit are mineable using open pit methods. Ore will be extracted through the development of two open pits, referred to as the east pit and the west pit, which will be progressively developed throughout operations. A conceptual plan of the mine layout is provided on Figure 5-1.

Mining of the open pits will produce three types of material: overburden, ore and waste rock (uneconomic material). Overburden will be stripped by excavator and hauled by truck to the overburden stockpile. Waste rock and ore will be drilled and blasted, with the blasted material loaded into trucks by hydraulic front shovel and wheel loader and hauled to the appropriate location by truck. Ore will be either temporarily stored in the low grade stockpile, the live ore stockpile, or immediately processed. Waste rock will be stored in a Waste Rock Stockpile located east of the east pit. The subsections below provide further details on the pit geometry and mining methods.

The Hammond Reef gold mineralization dips shallowly (20-35°) to the S-SW with the dominant strike aligned along the prevalent NE-SW shear system. This resource is defined by a database which has up to 413,412 gold assay values in mostly 1.5-metre-long assay intervals in up to 2,144 core holes totalling 618,596 meters. The reader is referred to existing NI 43-101 compliant documents (e.g. December 2011 Technical report) for official valuations of proven and probable resources. It is expected that the deposit valuation will be updated if necessary as part of ongoing resource evaluation work, however the update is not expected to materially change the project as described herein.

The potential resource covers an area of approximately 2.00 km x 3.00 km. For the purposes of the EIS/EA evaluation, the open pits have preliminary slope angles for the footwall stratigraphy of 40°, and up to 50° for the hanging wall stratigraphy when no pre-shear blast techniques are employed (Newcomen and Kinakin 2009). Steeper angles can be excavated with pre-shear blasting techniques, which is the anticipated method. Several pit slope design sectors have been defined for the east pit (41-Zone) and the west pit (A-Zone) indicating inter-ramp angles varying from 45° to 53° as illustrated in Figure 5-3.

For the open pit optimization, a 35-m offset (a minimum of 30 m offset from the Marmion Reservoir at 416 m elevation corresponding to the high-water level of the reservoir) from the Marmion Reservoir was applied. The Mitta Lake footprint lies completely within the west pit footprint (Figure 5-1) and must be removed. Water from Mitta Lake will be pumped out into the Marmion Reservoir prior to operations. Lake bottom sediment, combined with surrounding soil overburden and stripping materials will be stockpiled in the overburden stockpile, where feasible, and used for progressive reclamation of the Mine.

5.2.1.1 Mine Plan

The mine plan as provided herein and as used for the EIS/EA assessment is defined based on data available as of February 2013. It is expected that minor changes in the mine plan may result from updated resource modelling as part of ongoing work if necessary, however the update is not expected to materially change the project as described herein or the EIS/EA assessment thereof.

As indicated above the reader is referred to NI 43-101 compliant documents for the official reserve and resource estimates, however for the purposes of mine planning it is assumed that approximately 227.2 Mt of material will be mined by open pit mining methods and processed. Figure 5-4 illustrates the expected pit configuration relative to nearby infrastructure at the end of the operations phase. The Project operations phase is estimated at 11 years. An additional two years of pre-production will occur concurrently with the construction phase. Figures 5-5 and 5-6 show the pit shells during the initial phase and final phase of operations, respectively.

The pit designs are based on an assumed average processing rate of approximately 60,000 tonnes per day, which amounts to 21.9 million tonnes per year, for a projected 11-year mine life. The production rate may be improved or increased over time. The open pit will be developed in a series of horizontal benches blasted into rock which will be described in more detail in future feasibility documents.

An access ramp into the pit is required to allow heavy equipment to access and remove the blasted rock from the pit floor. The pit design as assessed includes a single access ramp with an appropriate width and grade. The access ramp will be continuously developed during the operations phase as the open pits are advanced. The final ramp configuration will be oriented in such a way as to minimise the travel distance between the pit, crusher, and waste rock stockpile.

5.2.1.2 Mining Method

Mining rates from the open pit will vary based on the mill feed requirements, haulage distance, and the stripping ratio in the pit during that period. For assessment purposes it is assumed that the overall tonnage of material moved (waste plus ore) will average 140,000 tonnes per day from the open pit operation, with blasting carried out as required. For an average daily mine production of 140,000 tonnes, approximately 76 holes will be drilled (equivalent to approximately 1100 meters of drilling) and loaded/blasted with approximately 45,000 kg of emulsion every day. During the operations phase, the open pit will operate on two 12-hour shifts, 7 days per week.

The main production equipment is expected to include the following:

- Self-propelled blast hole drills designed for 270 mm holes.
- Hydraulic face shovels.
- Front-end wheel loaders.
- Haul trucks.
- Bulldozers.
- Road graders.
- Wheel dozer.
- Excavators.
- Tool carriers.
- Bulk explosives pump trucks.
- Service trucks.
- Fuel lube trucks.
- Off-road lowboy.
- Water trucks.
- Bulk explosives pump trucks.
- Portable light stands.
- Light duty service trucks.
- Mobile diesel-driven pit dewatering pumps.

Explosives, blasting agents and the related delivery and blast hole loading equipment will be provided by an explosives supplier. The explosives supplier will provide an on-site ANFO and emulsion storage and manufacturing facilities that will be located approximately 2 km northeast from the east pit and north off the mine site road. The final installation will conform to applicable requirements (NRCan 2010).

5.2.1.3 Low-grade Ore Stockpile

Some low-grade ore excavated from the open pits will temporarily be stored in the low-grade ore stockpile, to be processed at a later date during operations (Figure 5-1). The low-grade ore stockpile is a temporary structure that will not exist after mining operations cease. For the purposes of this assessment it is assumed that the low-grade ore stockpile will have the following estimated dimensions:

- A bench height of 10 m.
- Overall slope of 38 degrees (1.3H:1V).
- A height of 70 m, maximum length of 700 m, width of 570 m.
- Capacity of between 20 and 25 Mt over a footprint of 20 to 25 ha.

Runoff from the stockpile will be collected in a perimeter ditch system, with all collected flows pumped to the PPCP. Section 5.2.7 discusses the site water management strategy in more detail.

Prior to construction of the low grade ore stockpile, the foundation will be stripped of vegetation and organic soils. Ore hauled to the stockpile from the pit will be spread out by dozer in lifts generally under 2 m in thickness. The stockpile is temporary in nature and will therefore be constructed near the angle of repose to reduce the overall stockpile footprint.

5.2.2 Waste Rock Management Facility

Version 3 Update: Clarification on the WRMF runoff collection system is provide in response T-44 (see Addendum Part A; Table A-1).

The Waste Rock Management Facility (WRMF) comprises the waste rock stockpile (WRS) and a transfer area. The WRS will be located directly east of the east pit. An alternative assessment was conducted to determine the optimal location for the WRMF (Chapter 4). The selected location for the WRMF is shown in Figure 5-1. The WRS will be developed throughout the operations phase as waste rock is generated from the open pits. For the purposes of the environmental assessment the WRS is estimated to have the following approximate configuration at the end of operations:

- A bench height of 10 m.
- A catch bench width between 10 and 15 m.
- A bench face angle of 38 degrees (1.3 H:1V).
- An approximate height of 130 m, length of 1750 m, width of 1200 m.
- Overall slope of 22 degrees (2.5H:1V).
- Capacity ranging between 180 and 210 Mt over a footprint of 150 to 175 ha.

The majority of waste rock produced from the open pits will be disposed of in either the WRS or the west pit; however, consideration will be given for the use of the waste rock as a source of aggregate, pending suitable physical and geochemical characteristics. Minor amounts of waste rock may be used for construction of various site components, including dams, roads, building foundations, and rock pads. The material may be also used for fill in areas north of the processing plant where it will be necessary to extend the toe of slope into the area between the high and low water levels.

All waste rock generated from the west pit will be hauled to the WRS for disposal. Once mining of the west pit is complete, approximately 16 Mt of waste rock from the east pit will be backfilled into the west pit while the rest of the waste rock from the east pit goes to the WRS. Waste rock will be hauled from the pits to the WRS using the mine haul trucks, and the material spread by dozer. WRS design does not require compaction of the material, however, nominal compaction will be provided by haul truck traffic. As construction of the stockpile progresses the bench faces will be trimmed back to the final design slope. Figure 5-4 shows the final WRS configuration.

The WRMF will include a runoff collection system. A runoff collection ditch will be excavated around the entire WRS, collecting the runoff into pumping stations situated at topographic lows. Runoff collected in the pumping stations will be pumped downstream to the PPCP, for use as reclaim in the plant or treatment and discharge to the environment. Section 5.2.7 discusses the site water management strategy in further detail.

An annual estimate of Mine Rock production is provided below in Table 5-2.

5.2.3 Overburden Stockpile

Version 3 Update: Clarification related to the overburden stockpile is provided in the responses to A-11 (drainage system) (see Addendum Part A; Table A-1); and MNDM-4 (revegetation) (see Addendum Part B; Table B-1).

During the development of the mine, overburden will be removed to expose the top of the ore deposits and to allow surface mining to proceed. To the extent possible and practical, stripped overburden materials will be stockpiled and used for construction and reclamation activities. In a similar fashion, soils disturbed during the construction of the plant site, and other site components will be, to the extent possible and practical, initially stockpiled. Soils and overburden will be stored separately within the overburden stockpile area. As progressive reclamation occurs, soils will be recovered from the stockpile and spread over reclaimed areas that would benefit from soil addition. Although the size of the overburden stockpile may vary depending on the amount of materials available and the timing of progressive rehabilitation, for the purposes of assessment, the overburden stockpile estimated dimensions are assumed to be as follows:

- A bench height of 10 m.
- A catch bench width of 10 m.
- A bench face angle of 27 degrees (1.95H:1V).
- An approximate height of 40 m, maximum length of 1,100 m, maximum width of 500 m.
- Overall slope of 19 degrees (2.9H:1V).
- An approximate capacity ranging between 10 and 15 Mt over a 30 to 40 ha footprint.

Runoff from the stockpile will be collected in perimeter ditch system, with the collected water pumped to the PPCP for use as re-claim in the plant or treatment and discharge.

5.2.4 Ore Processing Facility

The Project is currently assessed based on an average production rate of approximately 60,000 metric tonnes per day of run of mine ore from the Mine. The production rate may be improved or increased over time. Ore processing consists of the following main components:

- Crushing and Grinding Circuits.
- Flotation Circuit.
- Regrind and thickening circuit.
- Leach Circuit.
- Carbon-in-Pulp Circuit.
- Gold Elution Circuit.
- Electrowinning Circuit and Refining to Gold Doré Bars.
- Cyanide Detoxification Circuit.
- Tailings Thickener.

A simplified process overview is shown in Figure 5-7, and a more detailed diagrammatic flowsheet is shown in Figure 5-8. An inventory of process chemicals and their expected consumption rate are provided in Table 5-3 along with their supply and storage methods.

The major steps in processing, chemical use, and waste streams from the processing plant are described in the following sections.

5.2.4.1 Crushing and Grinding Circuits

Haul trucks will transport run of mine ore from the pits to the gyratory crusher for primary crushing. The primary crusher building will include a dust collection system as well as the air make-up equipment to maintain a safe and clean working environment inside the crusher building. The crushed ore will be conveyed to a covered live ore stockpile which will be covered for dust containment. Ore is reclaimed from the live stockpile using conveyors to feed a coarse grinding circuit of semi-autogenous grinding (SAG) mills in closed circuit with screens and pebble crushers. The reclaimed ore is conveyed to two SAG mills in parallel (one SAG per grinding line) where each SAG is processed in a closed circuit with a single deck classifying screen. The SAG mills are located in the processing plant. The screen oversize (coarse material) is conveyed to two pebble crushers, which are housed in a separate building. The pebble product is recycled back to the SAG mill.

The fine grinding circuit consists of ball mills in closed circuit with hydrocyclones for size classification. The screen undersize from the coarse grinding circuit is combined with the ball mill discharge and is pumped to the grinding hydrocyclones. The underflow (coarse material) from the hydrocyclones feeds the ball mill circuit. Discharge from the ball mills is returned to the hydrocyclones for size classification. The overflow (fine material) from the hydrocyclones gravity flows to the flotation circuit.

5.2.4.2 Flotation and Regrind Circuit

The flotation circuit separates the gold-bearing particles from the non-gold bearing particles. Less than 10% by mass of the solids in the slurry contain gold-bearing particles. Hydrocylone overflow from the grinding circuit gravity flows to the flotation circuit where the gold-bearing particles adhere to bubbles and float to the surface of the flotation cells, and are skimmed off the surface to produce the flotation concentrate which is then pumped to the regrind circuit. The flotation tails are pumped to the tailings thickener for disposal in the TMF.

The regrind circuit is comprised of the regrind hydrocyclones, regrind mills and concentrate thickener.

The flotation concentrate is pumped to the regrind hydrocylones. The underflow (coarse material) from the regrind hydrocyclones feeds two stages of regrind mills. The discharge from the second stage of regrind mills and the overflow (fine material) from the regrind hydrocyclones is pumped to the concentrate thickener. The concentrate thickener is located outside the processing plant and thickens the slurry to approximately 45% solids, suitable for feeding the leach circuit.

The flotation process requires the addition of lime, potassium amyl xanthate (PAX), methyl isobutyl carbinol (MIBC) and thickening flocculant.

5.2.4.3 Leach Circuit

The leach circuit consists of six leach tanks in series located outside the processing plant. Oxygen is added to raise the oxygen level of the solution phase in order to increase the leaching kinetics. From the leach tanks, the slurry flows by gravity to the carbon-in-pulp (CIP) circuit.

The leaching process requires the addition of lime, oxygen and sodium cyanide.

5.2.4.4 Carbon-in-Pulp Circuit

The carbon in pulp (CIP) circuit is located inside the processing plant and consists of eight tanks in series. In the CIP circuit, activated carbon is added to adsorb the gold from the slurry liquid phase. The CIP circuit is designed in such a way that the carbon in each tank and the slurry is transferred from tank to tank via the inter-stage pump screens. The loaded carbon is pumped from the selected tank to be emptied to a loaded carbon screen where the loaded carbon is separated from the slurry. The loaded carbon is transferred into stripping vessels in the gold elution circuit. The slurry flowing from the last CIP tank in the series is barren of gold and is considered as process tailings and is sent to the cyanide detoxification circuit prior to the tailings thickener. The CIP process uses natural coconut shell type activated carbon.

5.2.4.5 Gold Elution Circuit

Caustic solution is pumped through the column of carbon in the pressurized stripping vessel to elevate the pH. Cyanide can also be added to improve stripping efficiency. The solution is heated to approximately 140°Celsius and then is passed through the pressurized stripping vessel, stripping the gold from the loaded carbon back into solution. The solution is pumped to the electrowinning (EW) circuit. The stripped carbon is transferred to the carbon reactivation kilns where it is reactivated by heating to approximately 650ºC in a reducing atmosphere. The carbon is then re-used in the CIP circuit. Fresh carbon is regularly added to compensate for attrition losses.

The gold elution process requires nitric acid, caustic soda and cyanide. Anti-scalant is added in the water tank to minimize maintenance in the piping system. It is also used in the gold elution circuit to keep the carbon clean.

5.2.4.6 Electrowinning Circuit and Refining to Gold Doré Bars

The pregnant solution – now loaded with gold – is sent to the electrowinning (EW) circuit where gold is precipitated onto stainless steel cathodes in the form of a sludge. The gold sludge is pressure washed from the cathodes and then filtered, dried and sent to a refining furnace where the gold is poured into gold doré bars. A wet scrubber will collect the fumes from the furnace. Silver in the ore leaches and is stripped along with the gold and eventually recovered in the EW cells. The entire electrowinning and refining functions are enclosed in a secure area with limited access. A secure room with vault door is provided to store dried electrowinning cell sludge and gold bars. The refining process requires the use of smelting fluxes.

5.2.4.7 Cyanide Detoxification Circuit

The slurry from the CIP circuit is pumped to the detoxification plant where the cyanide content is significantly reduced to less than 5 ppm using the SO_2/Air process. The circuit consists of reactor tank located outside the processing plant and reagent mixing and holding tanks located inside the processing plant. The process uses sulfur dioxide as the main chemical reagent. Soluble copper, from copper sulfate, provides the catalyst to the cyanide removal reaction; dissociated metals are precipitated as hydroxides and strong cyanide complexes are precipitated as insoluble salts, predominantly in the presence of copper. The detoxified slurry is pumped to the tailings thickener. The cyanide detoxification circuit requires lime, SO_2, and copper sulphate.

5.2.4.8 Tailings Thickener

The detoxified slurry is combined with flotation tails in the tailings thickener which is located outside the processing plant. The thickener overflow is recycled as process water. The thickener underflow is thickened to between 50% and 70% solids and is pumped to the TMF for disposal. The tailings thickener requires addition of a flocculant.

5.2.5 Tailings Management Facility

Version 3 Update: A description of the tailings pipeline and Tailings Management Facility through the project life cycle is provided in the response to MNR-5 and MNR-7, respectively (see Addendum Part B; Table B-1).

An alternative assessment was conducted to determine the optimal location and configuration of the TMF (Chapter 4). For the preferred configuration the OHRG tailings dams were designed according to Canadian Dam Association (CDA) Guidelines and MNR Guidelines. The MNR has authority to approve dams in Ontario and CDA guidelines are referenced in the Ontario Mine Closure regulations. The design of the OHRG tailings dam will be peer reviewed by an independent expert in tailings dam construction and operation.

In addition, the Mining Association of Canada (MAC) provides guidelines for best practices for management of tailings dams. OHRG intends to develop a customized tailings management system that address the specific needs of OHRG, meets applicable regulations at local, Provincial and Federal levels and meets Industry Best Management Practices where possible. The management system will include:

- A framework for tailings management.
- Sample checklists for implementing the framework through the life cycle of a tailings facility.

The framework will offer a foundation for managing tailings in a safe and environmentally responsible manner through the full life cycle of a tailings facility from site selection and design, through construction and operation, to eventual decommissioning and closure.

The tailings management framework will be expanded into checklists that address the various stages of the life cycle. These checklists will provide a basis for developing a customized management system, operating procedures and manuals, exposing gaps within existing procedures, identifying training requirements, communicating with Communities of Interest, obtaining permits, conducting internal audits, and aiding compliance and due diligence, at any stage of the life cycle.

- Construction of the TMF Stage 1A starter dykes will be required during the construction phase, and the TMF brought on-line to an operational state prior to commissioning of the process plant.
- It is anticipated that the TMF components required for start-up would be constructed in the summer prior to start-up, and would be augmented by pre-production mining of waste rock in the open pit and other aggregate pits as required. Construction of the TMF would include the following main components:
- Tree and brush removal from the TMF footprint.
- Dam foundation site preparation (e.g., clearing, grubbing and topsoil excavation from the dam footprints).
- Installation of temporary sediment control structures.
- Diversion ditching around the TMF (as required).

- Runoff/seepage collection ditches and sumps around the TMF.
- Reclaim water pond, pump station and piping for return of water to the processing plant.
- Perimeter containment dykes around the TMF.
- Access road to the TMF tailings discharge location(s), seepage pump station(s).
- Tailings pipeline from the processing plant to the TMF.

The TMF has been designed to accommodate approximately 230 Mt of tailings produced during the 11-year mine life. Tailings from the milling process will be deposited at a nominal solids rate of approximately 60,000 tpd. The required storage volume to accommodate the 230 Mt of tailings is approximately165 Mm^3, considering a dry density of 1.4 t/m^3 for the deposited tailings.

Perimeter containment of the TMF will exploit natural topography where possible, in addition to the construction of containment dykes. Prior to waste rock placement the dam foundation will be stripped and all organic soils excavated. Perimeter dykes will be constructed of compacted waste rock placed in thin lifts, and will be progressively raised throughout the mine life using the downstream construction method. An HDPE liner will only be required on the upstream slopes of the Stage 1A starter dams to control seepage losses, and will not be installed on subsequent dam raises. The proposed dykes are homogenous rockfill structures, with an upstream transition zone to prevent migration of tailings through the dam waste rock fill. The transition zone is also provided on the starter dams, as added protection against particle migration should a significant tear in the liner develop. The dams have a crest width of approximately 10m, downstream slope of 3H:1V and upstream slope of 2H:1V (note the Stage 1A starter dams have a 3H:1V upstream slope to more easily facilitate liner installation).

The thickened tailings will be delivered to the TMF at a range of 50% to 70% solids by weight. A conical discharge method is proposed for deposition of thickened tailings with a central discharge point that will be gradually raised to achieve the required storage capacity (approximately 165 Mm^3 tailings). The details of the deposition plan will be developed at the detailed design stage. With a conical tailings discharge method precipitation runoff will drain in all directions. To avoid water accumulation and ponding around the north, east and southwest perimeter containment dams, tailings will also be discharged from the crest of the perimeter dams in these areas so that water will naturally drain within the tailings basin towards the reclaim pond at the southeast end of the TMF. Tailings that are end discharged from these perimeter dams will form tailings beaches which will direct internal drainage towards the reclaim pond. Discharge pipelines and points will be raised after construction of the subsequent construction stage is complete.

All runoff and water released from the tailings due to consolidation/settlement will be collected in the TMF reclaim pond. The TMF reclaim pond has been sized with a total capacity of approximately 6.2 Mm^3, which provides sufficient capacity to run the mill under average climatic conditions without drawing additional freshwater from Marmion Reservoir beyond the minimum plant requirements, as well as provide sufficient capacity to contain the design storm event. The TMF includes a spillway which, under upset or emergency conditions, would convey excess flows to Sawbill Bay to maintain the structural integrity of the TMF.

The tailings deposition plan has been developed assuming a deposited tailings slope of approximately 3% above water and 10% below water. Figure 5-9 illustrates the proposed stages of tailings deposition and dam construction throughout the operations phase. The TMF will be constructed in stages as follows:

- **Stage 1A:** Prior to start-up, low-permeability water retaining starter dams will be constructed around the TMF perimeter with a crest elevation of 434.5 masl. Tailings will initially deposited from a central deposition point to form a radial tailings beach slope towards the perimeter containment dams. This stage can accommodate 36.4 Mm^3 of tailings solids equivalent to production during the first 2.3 years of mine operation. The maximum tailings discharge elevation (i.e., top of cone) at end of this stage is estimated at 468 m. During this stage, water will accumulate along the inside perimeter of the containment dams forming two separate ponds located in the southwest and east ends of the TMF. Eventually these two ponds will merge and migrate towards the south end of the TMF, but in the interim it will be necessary to connect the two ponds with an excavated ditch. This stage will have a reclaim pond capacity of approximately 6.2 Mm^3 with a pond elevation of approximately 432.5 m.
- **Stage 1B:** This stage provides an additional estimated 10.7 Mm^3 of tailings storage capacity (through to the end of the Year 3). Tailings deposition will continue from the central discharge point as well as the crests of the southwest and east dams. The southwest and east tailings containment dams will be constructed with waste rock while the reclaim pond perimeter dam will be raised with a water-retaining liner. All dam raises will be constructed with the downstream method. The rockfill tailings containment dams will have a crest elevation of 441 masl during this stage while the lined reclaim pond dam crest elevation will be approximately 437 masl. To provide about 6.2 Mm^3 of water storage, the reclaim pond elevation increases to approximately 435 masl during this stage.
- **Stages 2, 3 and 4:** Tailings deposition will continue in the TMF after raising the tailings containment dams by the downstream method with waste rock. For the remainder of the mine life, tailings will be deposited from the central discharge point as well as the perimeter tailings containment dams to create a reclaim pond at the southeast end of the TMF. The capacity of the reclaim pond will remain at about 6.2 Mm^3 during each stage.

5.2.6 Support and Ancillary Infrastructure

<u>Version 3 Update</u>: The project will no longer include fiber optic lines and auxiliary power lines, for which the reasoning is provided in EAB7-NEW (see Addendum Part B; Table B-1). Minor clarifications regarding the emulsion storage and manufacturing facilities are provided in response to T-49 (see Addendum Part A; Table A-1). A draft Best Management Practices Plan (BMPP) for the control of fugitive dust is provided in the response to T(3)-01.

Site infrastructure will be completed progressively such that those components required for construction are completed first, followed by those components required for start-up of operations. Stockpile and laydown areas will be prepared for equipment and supplies that are brought to site. Clearing, grubbing and site levelling will be undertaken where infrastructure is to be placed. During operations, maintenance of facilities will be required.

Site components or activities considered under this heading are:

- Chemicals, fuel and explosive storage.
- Hazardous and non-hazardous waste handling.
- Air pollution control equipment.
- Office and Support Facilities.

5.2.6.1 Chemicals, Fuel and Explosives Storage

The supply of explosives will be carried out under a contractor-provided service for delivery of explosives to each blast hole. A licensed contractor will maintain an explosives factory on-site and will supply all infrastructure and vehicles required to deliver the explosive product to the hole. This includes an on-site ANFO and emulsion storage and manufacturing facilities that will be located approximately 2 km northeast of the east pit in a location north off the mine site road Figure 5-1. The explosives contractor will be required to supply the magazine(s) for storage of initiation and detonation consumables and to maintain the supply for operations. All temporary storage facilities will be constructed to meet Natural Resources Canada's requirements under the *Explosives Act*. A graded area for the explosives contractor to locate the magazine(s) will be located on-site as per requirements of the explosives licence, and the contractor will be responsible for the installation of the initiation system and detonating devices at the blast site and firing. Handling of explosives is legislated and methods will be required to meet regulations.

The mining operation will utilize liquids and fuels including diesel, gasoline, lubricating and waste oil, antifreeze/glycol and propane, as required for heavy equipment operation, heating, back-up power generation and small vehicles. The processing operation will consume chemicals used in the processing plant as detailed in Section 5.2.4. Chemicals and fuels will be brought to site by trucks and stored in an appropriate area on site with adequate secondary containment. Separate storage sites for petroleum and other chemical and reagents will be required for the Project and will be constructed according to the Technical Standards and Safety Act (2000). Fuel storage areas will be lined and bermed, the location of these areas is shown in Figure 5-1.

5.2.6.2 Hazardous and Non-hazardous Waste Management

All non-hazardous solid wastes will be transported off-site to an authorized landfill for disposal. The Town of Atikokan (Town) has expressed an interest in working with OHRG to accept non-hazardous waste from the Project Site. Hazardous waste will be stored on-site in sealed containers in lined, bermed areas for shipment off site to licensed facilities. Hazardous waste storage facilities will comply with the MOE's Guidelines for Environmental Protection Measures at Chemical Waste Storage Facilities. Transporters of hazardous materials are required to be trained and registered according to the federal Transportation of Dangerous Goods Regulation.

5.2.6.3 Air Pollution Control Equipment

In Ontario, Section 9 of the *Environmental Protection Act* (EPA) requires that an Environmental Compliance Approval (ECA) (Air and Noise) must be obtained before installation or modification of all atmospheric emission sources. A facility is also required to meet the air quality standards, as stated in Ontario Regulation (O.Reg.) 419/05. In addition to establishing compliance with the air standards, facilities are also required to demonstrate compliance with the MOE noise guidelines.

OHRG will follow all required workplace requirements defined under the Ontario *Occupational Health and Safety Act* and any other applicable regulatory instruments to comply with appropriate workplace practices.

Major air emissions at the Project Site include: (1) dust and noise resulting from mining activities (such as blasting, crushing, heavy vehicle traffic), and (2) exhaust and noise from diesel generators and mobile equipment. Fugitive dust sources may be separated into two broad categories: process sources and open dust sources. Process sources of fugitive emissions are those associated with mining operations, such as rock crushing, that alter the characteristics of a feed material. Open dust sources are those that generate non-ducted emissions, such as material storage and vehicle movements.

Dust is an occupational hazard issue and may have negative impacts when deposited on the surrounding surface lands and waters. Dust and noise from the site are readily managed with best management practices (BMPs), which can be incorporated into the design of the mine. BMPs could include, but are not limited to, the use of dust suppressant on piles and roadways, road sweeping and watering, reducing speed limits for on-site vehicles, wetting of material prior to handling, and enclosing of crushers and drop points.

5.2.6.4 Office and Support Facilities

The Project Site will include an administration building, plant and truck shop. The following ancillary structures will be constructed adjacent to the processing plant:

- Administration/technical services/first aid station/mine dry complex.
- Maintenance shop.
- Warehouse building.
- Cold storage building.
- Fuel storage tanks
- Backup generator.

Communication links to site will be by fiber optics and satellite, with on-site communications by cell phone and radio as required. The fiber optics line will be carried on poles from the off-site Atikokan Generating Station to a point on the Sawbill-Hardtack Road where the line will be strung on the same towers used to carry the overhead hydro wires to the Project Site.

Full time security staff will be employed on site to monitor site access through a main control gate and maintain security on-site. They will also be responsible for providing adequate gold security, including closed circuit monitoring, restricted access to the gold refining facilities, and safe on-site transfer of refined doré bars. Gold will be trucked off site by a recognized security trucking firm.

The site will have a first aid room as well as an ambulance, which can transfer personnel in need of more intensive medical attention to hospital facilities in Atikokan as required. The site currently has two helipads certified for use in the event of a medical emergency.

5.2.6.5 Worker Accommodation Camp

<u>Version 3 Update:</u> *In response to comments received from the MNRF and MOECC, (see MNR-11 - see Addendum Part B; Table B-1) the on-site accommodation camp was relocated. The new accommodation camp location is northeast of Sawbill Bay, about 300 m from the access road and 300 m from the TMF. The location is outside the 120-m buffer-zone surrounding Sawbill Bay and is on relatively high ground, away from wetlands. A revised version of the site layout map (Figure 5-1) is provided in response T(3)-10 (see Addendum Part A; Table A-1).*

The Project will include an up to 1,200-person worker accommodation camp at the north end of Sawbill Bay that will operate year-round (Figure 5-1). The location of the potable water intake for the worker accommodation camp, and the treated sewage water discharge locations are in Sawbill Bay of the Upper Marmion Reservoir (Figure 5-1).

The potable water requirement for the worker accommodation camp is estimated to be 300 m^3/day during operations.

There will be an on-site treatment system for potable water. Domestic sewage from the worker accommodation camp and operations will be treated on-site for permitted disposal. Both the potable water treatment system and the sewage treatment system will be packaged treatment systems available from various manufacturers and will be installed near the on-site worker accommodation camp. Sewage from the other site building operations will be stored in septic tanks and trucked to the sewage treatment system. A sewage works ECA will be required for sanitary sewage facility.

5.2.7 Water Management System

Version 3 Update: In response to comments received from the MNRF and MOECC the accommodation camp fresh water intake and effluent discharge were relocated. A revised version of the site layout map (Figure 5-1) is provided in response T(3)-10 (see Addendum Part A; Table A-1). Clarifications regarding the operations of the water management system are provided in response to MNRF-WTCM 5 (see Addendum Part B; Table B-1).

Fresh water will be required for ore processing and domestic use. The processing plant will require an estimated 34,000 m^3/day of water. Fresh water requirements based on processing plant make-up needs are estimated to be 7,200 m^3/day. The fresh water requirement for the worker accommodation camp is estimated to be 300 m^3/day. Marmion Reservoir is adjacent to the Project and is technically and economically feasible as a water source.

A Permit to Take Water (PTTW) will be required under Section 34 of the *Ontario Water Resources Act* for takings more than 50,000 L/day from a lake, stream, river or groundwater source (water needs for operation are predicted to be less than 9 Mm^3/yr. Agreements are in place through the *2004-2014 Seine River Water Management Plan* with a number of small hydro-electric operators downstream to maintain minimum flows, and sourcing of process water will be determined with respect to these commitments. Potable water will be supplied from two separate locations on Marmion Reservoir (Figure 5-1). Fresh intake process water will be drawn from an intake point adjacent to the processing plant. Potable water supply for the worker accommodation camp will be drawn from a point adjacent to the worker accommodation camp. Intakes will be appropriately screened to minimize impacts to aquatic life as per DFO guidelines.

To the extent practicable, water required by the processing plant will be provided through recycling and re-use of process water, collected runoff and mine water, and reclamation from the TMF reclaim pond. Use of fresh water will be required for certain applications in the processing plant, and this fresh water will be obtained from an intake in Marmion Reservoir.

A surface water drainage system will be installed to collect the runoff generated from each site component. Ditches excavated through native soil will divert runoff flows to a series of pumping stations (Figure 5-10), which in turn will pump all collected flows to the PPCP for treatment or use as re-claim water in the mill. During operations, runoff will be directed to PPCP and treated water will be discharged into Sawbill Bay. At closure, all collected site runoff will initially be pumped to the east pit. When the water quality has been consistently proven acceptable for direct environmental discharge, the runoff will be allowed to flow naturally to the environment.

A detailed water balance was completed for the Project and is provided in the Site Water Quality TSD; a site flow logic diagram is shown in Figure 5-11. The major water management operations include the following:

- Open pit dewatering.
- Process water from reclaimed water and surface water sources.
- Seepage and surface water collection systems associated with the various components.
- Discharge of effluent from effluent treatment Plant (ETP).
- Water diversion during mining operations.
- Dust suppression.
- Potable water sources.

Volumes of water to be pumped are provided in the Site Water Quality TSD. Pit dewatering will be through in-pit conventional pumping.

Waste water will be treated if necessary to achieve either federal and provincial environmental guidelines or relevant site-specific water quality objectives. Runoff collection and settling ponds will be constructed on the mine site, along with necessary infrastructure including pipelines. The proposed PPCP is located at the southwest corner of the plant site (Figure 5-11).

The PPCP will be divided into two separate cells. Surface water runoff collected from various site components, including stockpiles and the TMF will be captured in a one cell (i.e., runoff cell), and will be used as reclaim water in the mill. The other cell of the PPCP will allow for passive containment in the event of a spill (i.e., emergency spill cell) from a process plant vessel failure (e.g., leach tank or tailings thickener).

Water balance modeling has calculated that the volume of water that will accumulate in the PPCP from the various site runoff collection systems during the Environmental Design Storm (EDS – 24-hour 100-year storm) is approximately 350,000 m^3. The capacity of the spill cell is about 100,000 m^3 and the runoff cell is about 300,000 m^3.

The perimeter containment and interior dykes will consist of a rock fill embankment with side slopes of 1.5H:1V. Low permeability containment will be provided by a geomembrane liner in the emergency spill pond. An emergency spillway will be provided on the PPCP in order to discharge excess flows into the west pit under upset conditions.

5.2.8 Linear Infrastructure

<u>Version 3 Update</u>: Details regarding road widening and water crossings for the access road and transmission line are provided in responses to MNR-3, MNRF 3, MNRF 3B and MNRF 1B and in Part 4 of the Version 3 Alternatives Assessment TSD (see Addendum Part B; Table B-1).

Currently, access to the site is via a gravel road that will require upgrading in order to transport equipment and supplies to the site for construction; electrical and communications lines will also be required. During the construction period upgrading of the all-weather access road and construction of the electrical transmission line will be undertaken. Construction of the transmission line and upgrading of the access road will take priority, as overall Project construction and operations depends on having suitable electricity and access to the Project Site. Water crossings have been identified (Figure 5-12) and will be addressed appropriately from a permitting perspective, and are included in the assessment of potential Project effects.

5.2.8.1 Roads

The expected traffic to and from the proposed mine consists of transportation of employees, as well as transportation of equipment and supplies to support the construction and operation of the mine site (e.g., fuel, explosives), which will be shipped on an as-required basis. An alternative assessment for an all-weather road is provided in Chapter 4. The main access to the site will be via approximately 60 km of road from Atikokan, using a series of existing paved and gravel roads which will be upgraded (mine access road), which will include upgrades to existing stream crossings. A mine site road and other on-site roads will be constructed to access and maintain the various Project components and access aggregate sources. The construction of the roads will meet the requirements and will follow the environmental guidelines provided by MNR in the Environmental Guidelines for Access Roads and Water Crossings document.

The expected traffic use and patterns are discussed in Appendix 2.III of the Socio-economic Environment TSD (Traffic Impact Study). During operations roads will be maintained through periodic maintenance activities and plowing as necessary. At closure the mine site road and on-site roads will be decommissioned unless they are required for future access during monitoring. Following closure, the mine site road will be turned over to the Crown.

5.2.8.2 Power Supply and Fibre Optics

Version 3 Update: The fiber optic line and auxiliary power line were determined to be unnecessary through engineering work that was occurring in parallel with the development of the EIS/EA. As these components were deemed to be unnecessary, they no longer require consideration in the EIS/EA (see response to EAB7-NEW - Addendum Part B; Table B-1).

An alternative assessment for the transmission corridor related to power supply ~~and fibre optics line~~ is provided in Chapter 4. The Mine will require approximately 120 MW of power which will be supplied to the site via a new 19 km, 230 kV transmission line connected to a tie-in substation, feeding an on-site substation on-site. The project transmission line would connect just off Highway 622 and the proposed route will cross a number of rivers as shown on Figure 5-12. OHRG will construct steel towers and use wood poles (9 steel towers and 85 wood poles) on the ground to carry an overhead transmission line to service the Project Site.

Back-up power supply will be provided on-site by two diesel generators (1 x 1,500 kW at 600 V and 1 x 2,500 kW at 4.16 kV) for the processing plant and smaller units (250 kW at 600V) for other buildings (total less than 5 kW).

During operations the power supply ~~and fibre optic~~ lines and transmission corridor will be maintained appropriately. At closure, the project transmission line and towers will be appropriately decommissioned once they are no longer required.

5.2.9 Aggregate Sites

<u>Version 3 Update</u>: Clarification regarding aggregate resources is provided in the responses to T-1 and T(2)-06 (see Addendum Part A; Table A-1).

Aggregate Sites will be identified, and rehabilitated upon completion, as per the Aggregate Resources Act. Some Aggregate Sites will be kept open to provide materials for on-going maintenance of the road or site facilities. Initial activities on the aggregate sites will include:

- Installation of temporary sediment control structures.
- Clearing and grubbing.
- Stripping and stockpiling of overburden material as necessary.
- Excavation, crushing and screening of materials.
- Transportation of materials.

5.3 Estimated Project Workforce

This section discusses human resources needs and management required throughout the duration of the Project (i.e., construction, operations, and closure and post-closure). The initial focus is on employment and permitting, with ongoing monitoring being required throughout the construction phase. During operations, maintenance of employee records and training will be required in addition to continued monitoring, and permitting. Reviewing and adapting management practices will be required as will anticipating and planning for closure needs.

The peak workforce from direct employment during construction is assessed as 1200 full-time employees, consisting of earthworks, concrete, structural steel, mechanical, electrical, instrumentation, and piping jobs. For the purposes of assessment, the worker accommodation camp is assumed to house 1,200 people.

In the operations phase the Project will be in operation 24 hours a day, 365 days a year. The life of mine is estimated to be 11 years, plus two years of pre-production during the construction phase. The main work force will likely be on rotation and could consist of four crews working a staggered 12-hour shift, on a 1-week on and 1-week off rotation.

Most operations jobs for the Project will have minimum education requirements, including high school completion (or a General Equivalency Diploma) and technical or academic training. Some of the major qualifications for the Project are estimated as follows:

- 5% of jobs for professionals are expected to require a university degree (e.g., engineering, science).
- 35% of jobs are expected to require a trade certificate or journeyman qualification.
- 10% of jobs are expected to require a technical education.
- About 50% of jobs are expected to require a high school completion.
- Employment is further discussed Chapter 8 and in the Socio-economic Environment TSD.

Other management responsibilities include:

- Managing the workforce and camp.
- Developing and managing environmental policies and protocols.
- Developing health safety and environment (HS&E) programs and training programs.
- Developing and implementing monitoring plans.
- Regular liaison with permitting agencies regarding fulfilment of permitting and monitoring requirements and submission of applicable monitoring reports.

5.4 Progressive Reclamation and Closure

Progressive reclamation and closure is considered to be part of the Project. OHRG will look for opportunities to take advantage of closure activities during the operations phase where possible. Section 5.1.3 briefly discusses closure and more detailed information is provided in the Conceptual Closure and Rehabilitation Plan.

5.5 In-design Mitigation Measures

Version 3 Update: Confirmation regarding offsets for flammable material is provided in response to T-60 (see Addendum Part A; Table A-1).

Project design has included mitigation measures where possible, regarding the following:

- Relocation of Infrastructure to avoid fish-bearing water bodies.
- Discussion with Aboriginal groups to avoid “special sites” that have been identified in the vicinity of the project.
- Adherence to set-back criteria and adjustments to the pit shell to maintain a buffer zone between the pit and the lake.
- Using the west pit to store some of the waste rock from east pit in order to reduce the size of the waste rock stockpile.
- Avoidance of Lynxhead Narrows as an effluent discharge point due to identification of walleye spawning area.
- Inclusion of a water management system and contingency for treatment of suspended solids if necessary.
- Inclusion of a cyanide destruction circuit within the process.
- Use of existing transportation corridors where possible to minimize requirements for additional environmental disturbance.
- Clearance of flammable material within a 30-m buffer of Project infrastructure.
- Relocation of camp water intake and discharge to avoid walleye spawning areas.

OHRG will continue to evaluate and incorporate mitigation into the Project design when feasible and viable to do so or where required.