Appendix H

Reclamation Plan – Excerpt from Part 3 of the Mining and Reclamation Plan under the *Mining Act*

1.0 RECLAMATION AND CLOSURE PLAN

During and following the end of Operations, a Decommissioning, Reclamation and Closure Plan will be implemented to remove or reclaim facilities not required beyond Project Operation and to restore the Site to a stable self-sustaining condition. The initial, conceptual Plan described in this section is a living document that will become more comprehensive over time to reflect evolving Project design, the results of ongoing environmental and other studies, input from the Province and stakeholders, and environmental requirements up to the time of Closure.

The Plan takes into account baseline conditions, the proposed end land use objectives for different Project facilities that will undergo reclamation, requirements for habitat compensation or mitigation, and best management practices for protecting the environment and human health.

Studies for the EIA have generated detailed baseline environmental descriptions of the landscape and its associated terrestrial, aquatic, wildlife and human use values. The Study Area for EIA studies comprises the Project Development Area (PDA) where actual Operations will occur (approximately 1250 hectares [ha]), approximately 5000 hectare (ha) of immediately adjacent areas, watersheds connected to the PDA, and nearby locations to be used as reference sites of baseline environmental conditions.

The baseline environmental data are being used to anticipate potential environmental impact from the Project, and to identify measures for impact avoidance, mitigation or compensation. They also provide an important source of information for reclamation and closure planning.

In this document, "mining operations" (Operations) are defined as the development, construction, and operation of all mine facilities, up until the mineral resource has been fully depleted and processed.

The "closure period" (Closure) is defined as the time period between when mining operations cease and when the open pit proposed for the Project has filled with water as part of the reclamation strategy for that facility. Most of the active reclamation on the Site will occur during the closure period, including decommissioning the Site infrastructure and all Site preparation, re-vegetation and monitoring work required to reclaim each facility to its proposed end land use.

The "post-closure period" (Post-Closure) begins when the open pit has been filled and starts discharging water, treated as required to meet discharge quality standards set by the Province. Reclamation activities will be largely complete except for ongoing monitoring, care and maintenance of the Site.

1.1 GENERAL STRATEGIES

The general strategies for decommissioning, reclamation and closure are to:

1. Decommission and remove all buildings, equipment and infrastructure not required for future care and maintenance of the Site;
2. Stabilize terrestrial and aquatic environments;
3. Remediate disturbed areas using passive natural systems;
4. Recreate a natural environment dominated by native vegetation;
5. Restore aesthetics; and
6. Restore land use potential and possibly create new opportunities.

In the short-term and conceptually, reclamation and closure will focus on on-site restoration, particularly on establishing a stable growing medium to support pioneer vegetative species as soon as possible. Activities to be performed to facilitate this will include removing buildings, equipment and unneeded roads, preparing new landforms and covering them with overburden and soil, ensuring stable site drainage, and planting prepared areas with selected species. The new engineered channels to direct runoff from the quarry to the TSF, and from the TSF into the open pit (to accelerate its filling), will also be constructed at this time.

In the longer term and within about 10 years following this initial work, the open pit will be flooded and begin discharging water, which will be treated as required to meet the Project's permit conditions. This event will begin the Post-Closure period and most reclamation work will already be complete. Some reclaimed sites will be nearing their target end land use objectives, and future work will focus on rehabilitation, primarily stabilizing and encouraging diverse ecosystems and capabilities that resemble those that were present prior to Project development. The main work activities will be surveying reclamation success, spot-planting and reseeding where needed, water monitoring and treatment as necessary to protect the integrity of water resources, and Site monitoring and maintenance.

1.1.1 End Land Use Objectives

The specific reclamation undertaken for each Project facility will be defined by the tasks needed to achieve the desired end land use objective for that facility. End land use objectives are proposed in this conceptual Plan, but will be refined in consultation with the Province and stakeholders.

In general, wildlife habitat is a dominant element in all proposed end land use objectives because wildlife use is the primary and underlying component of all current uses in the Project area. Wildlife will also respond most quickly to reclamation efforts. The full recovery of other land use opportunities, such as recreational fishing or commercial forestry, cannot be expected in the short term and may never be possible (*e.g.*, due to safety concerns over access to and use of the pit lake). Over time, however, it is expected that most of the Project Site and its former uses will be restored to many of the natural conditions that existed pre-development.

1.1.2 Capability Goals

Capability is the capacity of a landscape unit to support a specified vegetation community and is measured by species diversity, density, survival and growth rates, annual biomass production units, percent vegetative cover, and other factors. The higher these measures are, the higher the capability.

Capability goals and monitoring will be used to measure how well reclamation achieves the end land use objective for each reclaimed facility. Goals are typically determined from baseline conditions and early reclamation research. Monitoring typically consists of surveys of reclaimed areas at regular intervals.

Little capability information has been reported for landscapes around the Project, presumably because the baseline work to date has focused on identifying species composition and rarity in the landscape rather than the capability of the landscape to support species. Therefore, capability goals for each Project facility will need to be established in the process of moving from a conceptual to a final Plan.

Capability surveys typically begin three to five years after a site has been first seeded or planted, and will occur at regular intervals thereafter. As capability goals are approached, monitoring intensity may increase over several consecutive years. Once capability goals have been reached, the Project facility will be considered successfully reclaimed to its end land use objective and will be considered sustainable.

1.1.3 Reclamation Research

At Closure, much of the Project site condition will be similar to typical disturbed sites, including the presence of scarified surfaces with poor fertility, high amounts of stones and cobbles at surface, and high spatial variability in drainage, moisture retention and moisture availability. Many of these typical conditions will be relatively easy to manage because of common experience in working with them elsewhere in the region.

Other conditions may be more difficult to manage. For example, TSF beach sediments will be infertile, droughty, and prone to wind erosion when dry. The TSF embankments will be a sloped surface of quarried rock and the pit environment will have steep, benched terrain; both will have little or no loose surficial material. These conditions may be challenging to reclaim and reclamation research will be undertaken to develop site-specific strategies.

On-site reclamation research will begin during the active mining period and continue into Closure. Findings will guide operational reclamation, identify/revise approaches for mitigating potential impacts, and provide a sound basis for site-specific reclamation planning. Research studies may include assessing different site preparation and planting techniques, identifying appropriate species composition, assessing the need for or rates of fertilizer applications, and monitoring species health and survival.

1.1.4 General Plan for Managing Surficial Materials

The general plan for managing surficial materials begins with evaluating the type, quality and quantity of materials, followed by using appropriate practices for salvage, storage, and replacement according to a schedule consistent with mine construction, operations and closure.

In general and whenever feasible, high quality surficial materials (such as Category 1 soils) will be used to reclaim more demanding areas such as TSF beaches and embankments. Less critical areas will be treated with less productive materials.

1.1.5 Salvage Strategy

To prepare for salvage, all working areas will be cleared of the vegetative cover prior to coming into production (*i.e.,* stripping the soil from the surface of the open pit). Following clearing, surficial materials (*i.e.,* topsoil, mineral soil) will be salvaged from the footprints of the TSF embankments, the footprint of the open pit and quarry, from the ore processing area (*i.e.,* plant site, primary crusher), and from access roads, water management ponds (WMPs), or other small operational areas that require a solid, safe geotechnical base without topsoil or mineral soil underneath.

As much as possible, Category 1 and 2 materials will be salvaged separately and be placed in two, distinct layers (or "lifts") within the same stockpile. The first layer in the stockpile will consist of the top 1.5 m of surficial material from the various work area footprints. Due to the limited amount of organic material available and its poor viability on its own for reclamation, organic materials will be salvaged and bulked together with the underlying mineral soil in this lift. Organic materials will be included in this first layer of material. Organic materials will include humus, roots, litter and coarse woody debris (branches, logs, stumps and logging slash). These materials will contain the bank of native seeds that will tolerate the range of conditions at the location from which the material was salvaged, will contribute organic matter and nutrients over the long-term, and minimize the risk of erosion once re-applied to reclaimed areas. Given suitable moisture and temperature conditions, coarse woody debris will also provide valuable substrate for soil fungi and other microorganisms, and habitat for insects, amphibians, reptiles and small mammals.

The second layer in the stockpile will consist of the surplus overburden (after exploitation as borrow on site) that underlies the topsoil and organic materials. The depth and volume of overburden salvaged will depend on the location from which it is salvaged (*i.e*., all overburden in the open pit footprint will be salvaged to bedrock, but under the TSF embankments the salvage depth will vary depending on when a suitable base is encountered as defined by the Geotechnical Engineer).

Salvaging activities will be scheduled as much as possible with consideration to moisture conditions. All materials, particularly the Category 1 materials, will be handled only when they are dry or stable enough to avoid compaction and structural degradation.

All stripped surficial materials will be preserved in stockpiles located around the Project Site. As much as possible, stockpiles will be separated according to category and lift, placed on prepared surfaces close to where they were salvaged. Stockpiles will be located to avoid water courses, to prevent losses or impact to the surrounding landscape, and so as to minimize the need for moving materials before they are needed for reclamation.

Sediment and erosion control measures will be implemented to manage runoff from all stockpiles. All stockpiles will be seeded before late summer to ensure a stable, vegetative cover before the on-set of winter.

1.1.6 Replacement Strategy

Salvaged materials will be reserved for use on the beaches and embankments in the TSF and on difficult to reclaim areas on the former plant site and access roads. Volume estimates have been calculated to determine the amount of materials available for each area. Currently, it is estimated that there will be enough surficial material salvaged to provide an approximately 25 cm-thick surface cap on all these sites, on average. Further engineering field studies will help to more accurately estimate the amount of this material available, and the quantities will be confirmed during Project construction. Once the quantities are confirmed, a more detailed replacement strategy will be developed that takes into account the needs for different purposes. If quantities are limited, it may be necessary to be more selective about which areas are re-vegetated; for example, the TSF embankment slopes could be terraced, and only the flat terrace surfaces would receive a capping of salvaged material.

Prior to replacement, sites to receive salvaged materials may be prepared by ripping (scarifying) the surface with blades on bulldozers and/or road graders, or with excavators equipped with toothed buckets. Extra care may be needed on sloping surfaces prone to erosion. Nearly flat sites may be gently re-contoured to provide surface water interception and diversion features. Graded and ripped sites may then be crown-chained to remove excessive amounts of boulders or other coarse debris.

Salvaged materials will be placed on the prepared sites at depths, of necessary quality, and using techniques specific to each facility (EvEco, 2013).

Clear records will be maintained showing the types and volumes of salvaged materials, and when and where they were stockpiled and replaced each year of Operations and Closure.

2.0 INFRASTRUCTURE REMOVAL

The following section describes the reclamation plan for the Project's infrastructure that is envisioned to be used during the operation of the Site.

2.1 BUILDINGS AND EQUIPMENT

Plant site buildings and equipment no longer required at Closure include the primary crusher, grinding/milling circuit and concentrator, APT plant, SME facility, conveyors, warehouse, truck shop, laboratory, and vehicle-fueling stations. An appropriate portion of the administration office and its freshwater supply and sanitation system, the Site water management and treatment systems, and one or two small buildings for housing equipment or supplies will be retained until no longer needed. All of the removable assets, which include everything except the buildings, will be disposed of prior to or concurrent with their dismantling. Following removal of the assets, most buildings will be either dismantled for re-use at another site or cut into pieces and sold or recycled as steel scrap. Mobile equipment, such as haul trucks, drills and loaders, will be sold and removed from the site.

Foundations will be broken or blasted down to or below ground level, and then backfilled to create natural-looking landforms. Broken concrete will be buried on-site. Other non-salvageable construction materials (*e.g.*, sheet metal, insulation, or roofing material) will be disposed of to an approved off-site facility.

After the building, equipment, and foundation teardowns are complete, there will be no visible features remaining on the plant site other than bare ground and the infrastructure required for Closure and Post-Closure care and maintenance. The area will be generally level at the crown of the hill on which the plant site was located and will grade to less than 20 percent slopes where the area merges with adjacent undisturbed lands. The area to be reclaimed will comprise approximately 80 hectares.

2.2 UTILITIES

All access roads, power supplies, sanitation infrastructure, freshwater supplies, water management structures, and other utilities will be decommissioned unless required for care and maintenance of the Site during Closure and Post-Closure.

All on-site power supplies and utility poles no longer needed will be decommissioned and removed from the Site to approved off-site facilities.

The main, 138 kV electrical transmission line supplying power to the Site will be retained until the Site is fully reclaimed, capability goals for each end land use objective have been achieved, and water resources have been restored to sustainable quality and levels. At this point, this transmission line may also be decommissioned and reclaimed. It will have been installed by and will remain the property of New Brunswick Power Transmission, and this agency will be responsible for planning and executing any decommissioning and subsequent reclamation activities on all aspects of the transmission line.

Sanitation infrastructure and freshwater supplies not required Post-Closure will be decommissioned. Above ground structures, such as pumps and pipes, will be removed, sold or recycled to an approved off-site facility. All below ground structures will remain in place and be reclaimed as part of the plant site reclamation described in the "Buildings and Equipment" section.

Chemicals, waste products, and potentially hazardous materials that are anticipated for use or generated on the Project Site are described by Samuel Engineering (2013). In general, this Reclamation Plan assumes that all these materials will be consumed, recycled, or relocated off-site before the property is placed into closure/reclamation status.

Inventories of chemicals used in ore processing and in the laboratory will be minimized as the end of mine life approaches. At the end of mine life, any unused process reagents will be returned to the suppliers. Anticipated small quantities of chemicals remaining in the laboratory will be offered to other users, such as contract laboratories or educational facilities. Chemicals that cannot be returned or distributed will be sent to an approved waste disposal facility.

Any hazardous wastes (*e.g.*, waste oil, oil filters and grease, spent fuels, explosive agents, remaining product, or chemicals) and related storage containers remaining after Operations will be returned to suppliers or sent to off-site disposal and/or recycling at approved facilities.

Other wastes, such as refuse and recyclable materials, will be collected for off-site disposal or recycling.

During the decommissioning work, an investigation will be conducted to determine the presence, if any, of contamination from accidental spills and long-term use of hazardous materials. Any identified incidents that have not already been cleaned up will be remediated according to practices approved and signed off by the New Brunswick Department of Environment.

2.3 TRANSPORTATION ACCESS

Access roads and utility corridors that have been established throughout the operational life of the mine will be decommissioned and reclaimed, if they are no longer required, to an end land use objective consistent with that on adjacent lands.

The primary access road (Fire Road) to the Site will be maintained after Closure. Secondary roads that may remain open include those leading to the rims of the open pit lake and quarry, to the top and bottom of the TSF embankments, and to the water management ponds (WMP) as these roads will be needed for future access to the water monitoring stations, for conducting geotechnical and reclamation inspections, and for on-going site maintenance. Roads that are only used for monitoring or inspections may be maintained for ATV access only, whereas other roads will be maintained for light duty truck access.

Road beds will be decommissioned by removing all non-native road bed materials (*e.g.*, steel grates, asphalt, or concrete). Culverts, fencing and gates, if present, will be left in place only if needed to maintain the long-term stability or security of a location. Decommissioned road beds will be prepared by ripping to a depth of approximately 50 cm to reduce compaction and provide suitable conditions for re-vegetation. Surficial materials will not be applied, except in areas where the road bed materials are determined to be inappropriate for supporting vegetative growth and overburden will be applied to an approximate depth of 25 cm. Soil will likely not be applied to the majority of the decommissioned road beds because re-vegetation is not expected to be challenging. The goal of the decommissioning work will be to establish a vegetative cover that closely resembles the undisturbed areas adjacent to the roads.

3.0 SITE STABILIZATION

The following section describes the general methodology that will be followed for stabilizing the soil and re-vegetating the various areas of the Site.

3.1 CONTOURING AND GRADING

Given the landscape position and the relatively small disturbance footprint area, the majority of the Site will be suitable for planting with a combination of upland or wetland forest, and/or shrub-riparian habitat depending on landscape position and the presence of reclaimed water management structures and watercourses. Several end land uses are possible under these habitats, including wildlife, traditional, recreational, and possibly commercial forestry use.

For areas outside of the TSF and open pit/quarry, these areas will typically be scarified and ripped to a depth of 50 cm, crown-chained to move large coarse debris near to or into swales and other drainage features, and smoothed out with dozers or graders as needed. Slopes will be graded to merge naturally into adjacent undisturbed areas. Grading may include decommissioning ditches and other water management structures that are no longer needed, or enhancing them to provide natural swales for channeling surface water into nearby watercourses.

3.2 RE-VEGETATION

The general plan for re-vegetation will be to develop self-sustaining, diverse vegetation communities that emphasize locally occurring native species and mimic the diversity of existing communities on the Project site. In order to have the highest possible re-vegetation success rate across the site, species from the surrounding area shall be used in the reclamation to ensure that the area is in-sync with its existing surroundings in terms of flowering, seed production, and breaking dormancy. Research trials will be conducted throughout the life of the mine on the use of seed and tree species from the immediate are of the Project.

The first task will be to establish a vegetative cover as soon as possible to increase organic matter and to reduce the risk of wind and water erosion. This may be achieved by introducing pioneering species, dominated by diverse graminoids and forbs, seeding with quickly-emerging mulch crops, adding fibre-based materials or takifiers in hydroseed mixes, or using flexible growth mediums (*e.g.*, Flexterra® Flexible Growth Medium) impregnated with seed blends appropriate for the conditions.

Hydroseed mixes will include species that are tolerant of drought and infertile conditions, with an emphasis on quickly emerging and native species. Grass species well suited to quickly anchor the soil, provide some nutrient and prevent erosion until the native seed bank is able to re-establish through natural colonization will be given consideration. Some of these species may not be appropriate to wetter areas, but wetter areas can be expected to naturally re-vegetate to full cover within three years.

In more easily reclaimed areas (*e.g.*, the plant site, the area between the TSF and the open pit, and at the base of the TSF embankments), early pioneering and hardy shrub species that will quickly re-establish at densities that may even exceed capability goals for the desired end land use objective. Former building sites, foundations and laydown areas will be capped with overburden to an approximate depth of 25 cm.

In difficult to reclaim areas (*i.e.*, those with pH or fertility challenges, or extreme and/or fluctuating moisture conditions), early work will focus on encouraging native species with tolerance to site-specific limitations. The seed bank present in the soil lift that may be applied as final cover on some sites will be a good source of species adapted to these kinds of conditions.

On sloped terrain susceptible to erosion, it will be prudent to quickly establish woody shrub cover. Where seepage or other adequate moisture is available, long willow stakes may be planted for this purpose in shrub-riparian habitats. Similarly, sweet fern (*Comptonia peregrina*) may be appropriate for drier areas of forested habitats.

Over time, re-vegetation efforts will focus on increasing diversity and achieving capability goals, such as for commercial forestry or wildlife and aquatic habitat uses. Work may include removing competition by non-commercial shrubs and trees, planting commercial tree species on suitable microsites, or periodically repairing riparian areas around the periphery of the Project Site that may have been damaged by seasonal flooding or beaver activity.

The research trials and monitoring programs will be valuable in determining if maintenance is required, such as brushing or thinning, or reseeding and hand planting with selected species that are found to thrive under specific conditions. Monitoring may also be required to periodically assess the presence and distribution of invasive species so that problematic populations can be responded to before they become well established.

Plant Site: Following site preparation, the Plant Site area will be re-vegetated according to the end land use objectives for upland and wetland forests and shrub-riparian habitats. Since little soil will have been applied to the area, there will be little native seed bank present, so the area will be hydroseeded to help accelerate the establishment of a vegetative cover.

Once a vegetative cover has been established and the area is stable, native shrubs and trees such as speckled alder (*Alnus incana), grey birch, trembling aspen and pin cherry will quickly invade within two decades*. To enhance the area for possible future commercial forestry use, spot planting of black spruce, balsam fir, hardwoods, or other locally occurring commercial tree species may be appropriate in areas where adequate moisture and mineral soil is present.

Access Roads and Utility Corridors: Re-vegetation work for the access roads and utility corridors will be done in a manner to establish a vegetative cover that closely resembles the adjacent areas. Ground scarifying to a depth of 50 cm and subsequent soil fill placement (where required) and re-vegetation will be the primary method of reclaiming these linear areas.

Open Pit: The open pit will not need to be re-vegetated as it is anticipated to be filled with water over time and form a permanent lake. The focus for reclamation for the open pit will therefore be to encourage natural re-vegetation, with limited intervention. In the shallow water on the rocky benches at the edges of the pit lake, some aquatic plants such as bulrush (*Scirpus* spp.) or cattail (*Typha* spp.) may be seen in the first few years, but vegetation population and diversity will likely remain low within the flooded portion for some time. Over time, sedges and pioneering species such as poverty oatgrass (*Danthonia spicata*), common mullein (*Verbascum thapsus*), or downy goldenrod (*Solidago puberula*) will introduce. In the longer term, shrub species such as leatherleaf (*Chamaedaphne calyculata*), speckled alder, mountain holly (*Ilex mucronata*), rhodora (*Rhododendron canadense*) sweet gale (*Myrica gale*) and willows may begin to appear. Over time, some natural habitats will emerge, such as rock outcrop on the pit rim and walls, possibly wetland habitat on shallow, submerged rock terraces, and upland forest in areas surrounding the pit.

Rock Quarry: Re-vegetation methods and species composition for all quarry areas that are not flooded like the open pit will be the same as described for similar areas, such as the plant site. The rate of establishment will likely be slow due to the exposed bedrock and lack of soil cover, and will be dominated by patches of bulrush and cattail growing in seepage zones or wet areas where water pools.

Tailings Storage Facility: Cattail and bulrushes are tolerant of the wide range of conditions that will likely prevail on the margins of the tailings pond (*i.e.,* on the tailings beach by the edge of the ponded water), so these plants are expected to proliferate in the littoral zone and disburse well through seed production and rhizomes. Through this natural process, this area of the TSF will likely develop as a Group 2 open water wetland habitat.

The prepared tailings beaches will have conditions conducive to the growth of mosses, sedges, rushes (*Juncus* spp.) and other species tolerant of sandy soil textures, basic soil pH, and a fluctuating water table. Their natural invasion will be augmented with seed blends containing cattail, bulrush, rushes, grasses and legumes, and by the use of mulches and fertilizers.

Once an acceptable ground cover is established, tailings beaches will be considered stable enough to plant shrubs and small trees to develop a shrub-riparian habitat. Shrub species may include willows, winterberry (*Ilex verticillata*), thinleaf alder (*Alnus incana subsp. tenuifolia*), Saskatoon (*Amelanchier alnifolia*), bearberry (*Arctostaphylos uva-ursi*), raspberry (*Rubus idaeus*), snowberry (*Gaultheria hispidula*), or rose species (*Rosa* spp.).

Wherever possible as determined in the final Reclamation Plan, the tailings embankment will be re-vegetated to upland and wetland forests depending on slope and aspect. Upper and southwest-facing slopes of the embankments will be subject to summer drought, so may be reclaimed to an upland forest habitat such as Group 2 intolerant hardwood habitat. The lower and northeast-facing slopes may be wetter, so may be reclaimed to Group 1 spruce-balsam fir or rich softwood habitats. Natural invasion by native species will be encouraged, enhanced with hydroseeding with native grasses and legumes, and hand planting with trees and shrubs. Species selection will resemble those in Group 2 upland forested habitats and Group 1 wetland forested habitats.

Some areas of exposed rock on the embankments may remain after the initial reseeding work, and they will be left as exposed rock outcrop habitat. If micro-sites are available, they may be hand planted with appropriate trees and shrubs.

3.3 CROWN PILLARS

Since the proposed Project will utilize open pit rather than underground mining methodology, there will be no crown pillars or other related underground mine workings at the Site to reclaim.

3.4 MINE OPENINGS

The Project will utilize an open pit mining methodology to extract the ore from the ground. After the ore body has been mined out, the open pit will consist of exposed rock at the pit rim and on all of the pit walls and benches. The open pit will cover an area of approximately 145 ha and range between 200 and 300 m deep (Samuel Engineering 2013). The ultimate base elevation of the bottom of the pit will be approximately 40 masl in the northeastern end. In the southwestern end, it will be between 90 masl and 170 masl, varying because of the presence of mined but non-economic rock that will have been placed there during the latter stages of Operations. Surrounding the open pit will be access roads, a network of surface water diversion and collection structures, and a narrow area surrounding the pit that may have been disturbed during operation of the pit.

It will not be possible to reclaim the open pit other than as an open-water feature once the pit lake has been established with an acceptable water quality at Post-Closure. Bare rock faces and benches that may remain exposed above the pit lake will likely be subject to wide temporal and spatial variability in moisture availability, depending on runoff from surrounding slopes, seepages from surrounding pit walls, and seasonal changes. Reclaiming these areas will be difficult not only due to the challenging terrain, but also because of safety concerns (*i.e.,* bench heights). Major earth moving or other significant reclamation treatment in the narrow, disturbed area surrounding the pit is not recommended, in order to protect adjacent undisturbed lands and watercourses. As such, the open pit will not be reclaimed other than to allow it to fill with water and to monitor and treat water quality, as required.

Because reclamation is not practical or even possible, the Proponent does not plan to develop habitats in the open pit. The pit lake will not likely be suitable fish habitat for many years due to the lack of mineral soil that would promote vegetation growth within the pit. The main end land use objectives for the open pit will thus be as an open water feature with some use by wildlife such as terrestrial birds, waterfowl, amphibians, reptiles, and small mammals. Large mammals will be excluded from the pit rim by installing and maintaining security fencing.

At Closure, the open pit will be allowed to fill with water as described in the sections below. The rim of the open pit cannot be safely re-contoured, crown-chained, or capped with salvaged surficial material because of access and safety concerns. Hence, it will likely remain as exposed rock outcrop. No preparation is planned for exposed rock walls, benches and roadways inside the pit.

The open pit and quarry will however be fenced, supplemented with earth/rock berms if deemed necessary, to prevent human and wildlife access. Much of the remaining site will be accessible, and any areas where operational security or fall protection is required will have fencing, berms, rock barriers and/or warning signs to discourage public and wildlife access.

3.5 TAILINGS POND STABILIZATION

The tailings storage facility will provide permanent storage of tailings, Barren (or waste) rock and any Mid-Grade Ore that is not processed prior to Closure. The rock quarry, which will be developed to generate rock fill for the tailings storage facility embankments, will be included in the reclamation plan for the TSF.

3.5.1 Barren Rock and Mid-Grade Ore Storage

At Closure, the Barren Rock and Mid-Grade Ore storage areas inside the TSF footprint will be submerged beneath a minimum of seven metres of tailings and/or water to provide a permanent, oxygen depleted environment to reduce the potential for acid rock drainage from these two materials. Any mined Barren Rock or Mid-Grade Ore that is left in the open pit near the end of mine life will ultimately be flooded under a minimum of 130 m of water. In either of the facilities, the intent is to leave no potentially acid generating (PAG) materials exposed after Closure. There are no end land use objectives, site preparation or re-vegetation procedures for the Barren Rock or Mid-Grade Ore that are permanently stored in either of these two areas, other than those previously described in the reclamation of the TSF and the open pit.

3.5.2 Rock Quarry

Similar to the Barren Rock and Mid-Grade Ore storage areas, some of the quarry will be submerged beneath tailings in the TSF, with the exception being the exposed walls and benches of the Phase 3 ridge and Phase 4 sink cut on the west side.

At mine closure, the Barren Rock inside the TSF footprint will already be submerged beneath a minimum of seven meters of tailings and therefore no reclamation efforts will be required. The remaining barren rock will be back filled into the pit and the pit flooded to ensure no barren rock is left exposed after closure. In order to facilitate flooding of the open pit, ahead of natural precipitation and run-off, a spill-way channel will be cut into the TSF embankment to allow additional volume to be shifted from the TSF to the open pit.

At Closure, a channel will be cut to connect the Phase 4 cut sink with the TSF, and the quarry will be allowed to naturally fill with precipitation and surface water runoff until a lake develops within the quarry that will ultimately connect with the tailings pond via this channel. There may also be a narrow fringe of land on the outer edges of the quarry that may have been disturbed during construction; however, this land will not be submerged after Closure and will be re-vegetated if natural vegetation has not already occurred.

The total estimated area of the quarry and surrounding disturbed areas at Closure is about 120 ha, of which a large part will be an aquatic feature connected to the tailings pond.

Reclamation options for the quarry will be challenging for the same reasons as for the open pit. Possible habitats include a combination of rock outcrop on the quarry rim, walls and benches that remain exposed above the quarry lake, some wetland habitat on shallow submerged rock terraces, and upland forest on drier sites in adjacent disturbed lands. Aquatic habitat for fish is likely not possible for the same reasons described for the open pit.

Most of these habitats, except for the pond, will be small and discontinuous, so the main end land use objective for the quarry will likely be for wildlife use only, including terrestrial birds, waterfowl, amphibians, reptiles and small mammals.

As with the open pit, the ultimate reclamation preparation for the quarry will depend on safety, stability, access, and habitat concerns. The quarry rim will likely remain exposed rock outcrop or may be re-contoured overburden (soil) to provide a smooth transition onto the steeper pit walls and provide wildlife with an egress route from the quarry Shallow submerged terraces will not be reclaimed, but encouraged to regenerate naturally.

All remaining areas will be prepared as for similar areas in the open pit and plant sites.

3.5.3 Tailings Storage Facility

The final configuration of the TSF at Closure will consist of a tailings pond bounded by tailings beaches and an outer perimeter of TSF embankments on three sides (north, east, and south sides), a saddle embankment on the fourth western side between the flooded rock quarry and the former plant site, the outer network of water management structures (*i.e.,* seepage collection ponds and channels), stockpiles of surficial materials to be used in reclamation, and roads to allow access. The TSF footprint, including the tailings pond, beaches, embankments and all surrounding infrastructure, will be occupying approximately 750 ha.

Final habitats and end land use objectives for the TSF footprint will vary considerably, because of high variability posed by different features: aspect, slope angle and position, moisture regime, and the presence/absence of applied surficial materials. Reclamation will thus result in a combination of both terrestrial and aquatic features that will provide for a diverse wildlife habitat.

The following habitats and uses are anticipated:

- The open water of the tailings pond will be an aquatic feature, used for resting and escape terrain by waterfowl.
- The beaches adjacent to the open water will be flat to gently sloping shorelines, reclaimed as shrub-riparian or open water wetland to provide forage, cover, and nesting habitat for waterfowl and shorebirds.
- The top of the TSF embankment (the crest) will be maintained as an access road.
- The downstream slopes of the TSF embankments may be reclaimed to grassland and forest cover of varying composition depending on aspect and moisture regime and the ability of the slope structure to maintain vegetation growth.

Although reclamation will focus on forested habitats, the end land use objective will remain primarily wildlife use by mammals, birds, reptiles, amphibians and insects. Commercial forestry use will be discouraged because the TSF is an engineered facility unsuited to logging activity. Over the long term, some of the reclaimed footprint may become suitable for traditional or recreational end land uses.

No preparation is required for the tailings pond, other than to cut a channel connecting it to the Phase 4 cut sink in the quarry, and to design an overflow channel that will deliver excess water from the tailings pond to the open pit. The level of the tailings pond will be managed into Post-Closure until end land use objectives are reached, to reduce the potential for dust generation, and to ensure that sufficient storage exists for storm inflows.

The TSF beaches will be composed of tailings sand with a loose structure, low fertility, and subject to wind erosion; highly variable moisture conditions due to a fluctuating water table; and a poor base for vehicles used in reclamation. Therefore a layer of cobble-size quarry rock, approximately 60 cm in thickness, will be placed on the beach surfaces. The applied rock will be incorporated and compacted into the underlying sand by the haul trucks and/or dozers to provide a cover against wind erosion, a trafficable base for vehicles, and to reduce water infiltration. It is expected that the final substrate will closely mimic the cobbly, sandy native parent materials found throughout much of the Site prior to Project development. Shallow swales, protected with exposed quarry rock, will be constructed at intervals across the prepared beaches to capture and direct surface water to the tailings pond.

A 25 cm thick layer of Category 1 soil will be applied to the entire prepared surface from the inner embankment wall to as close as possible to the edge of the tailings pond. Soil will not be applied to the swales. If necessary, the surface may be lightly scarified to loosen the structure and mix the soil into the underlying base.

Preparation of the TSF embankments for reclamation will begin during construction of the final embankment raise so that the appropriate sizes of quarried materials and desirable features on the

downstream embankment surfaces (*e.g.,* terraces or swales) are established according to the final Reclamation Plan. In general, the downstream slopes of the embankments will be composed of compacted quarried rock resting at an angle of about 26 degrees (2 horizontal : 1 vertical).

All materials for reclamation purposes will be sourced from the quarry and from stockpiles located near the quarry and along the toe of the TSF embankments.

3.6 GENERAL PLAN FOR WATER MANAGEMENT

The general plan for water management during Operations is to divert non-contact surface water away from the Site into natural drainages, and to collect all contact water in the TSF for recycling back to the plant for use as process water. Contact water in excess of Project water demand will be treated as necessary to meet water quality discharge criteria (that will be specified in the Project's permit(s)) and released.

It is predicted that a substantial reduction in seepage from the TSF will occur following closure due to the following factors:

- Tailings slurry deposition will cease on the surface of the facility. This will eliminate the rewetting that results from approximately 56,000 tonnes per day of slurry water being deposited on the tailings surface;
- Reduction in the extent and volume of the surface water pond; and
- Ongoing consolidation of the tailings solids and the corresponding reduction in hydraulic conductivity.

The Proponent expects that continual pumping from the water management ponds and/or groundwater inception wells back to the TSF will not be required long term due to these factors.

At the end of Operations and through Closure, the non-contact surface water diversion strategy will be maintained. Contact water will no longer be required for process use at the Project as the plant will be shut down and decommissioned. The Water Management Ponds around the TSF will be maintained to collect embankment runoff and seepage, and to pump collected water to the TSF unless its quality allows it to be discharged directly into downstream drainages. Engineered channels will be established between the quarry, the TSF, and the open pit to direct TSF runoff to the pit and accelerate its filling with water. The open pit will be allowed to fill to an elevation that maintains it as a groundwater sink, thus ensuring that groundwater in the area only flows towards the pit. It will take approximately 10 years to fill the open pit to this elevation (Knight Piésold 2013b) and until it does, surface contact water will not be discharged from the Site (with the possible exception of water from the Water Management Ponds, as above). Filling of the open pit to this elevation will mark the end of the Closure period and the beginning of the Post-Closure period.

During Post-Closure, the elevation of the pit lake will be maintained by pumping the lake water to the water treatment facility, and treating it as necessary prior to discharge. All water that needs to be discharged will be treated for as long as is necessary to meet the Project's permit conditions for discharge water quality. It is expected that the water treatment facility used during Operations will be re-mobilized for this purpose, although it may need to be refurbished and/or reconfigured to suit Post-Closure water treatment requirements. When the pit lake water is of sufficient quality to allow its discharge into downstream drainages, pumping and treatment will cease, the pit will be allowed to fill completely, and the pit lake will discharge to Sisson Brook through an engineered channel.

During Closure and Post-Closure, all on-site and down-gradient water management features that are no longer needed will be reclaimed as open water features, wetlands and/or other appropriate end land uses.

Best management practices for controlling runoff, erosion and sediment transport will be implemented at all times during all phases of the Project. These will include establishing appropriate site grades, applying mulches and hydroseed mixes to stabilize exposed surfaces, and establishing a network of straw barriers, silt fences, ditches, and/or WMPs down-gradient of all Site facilities to manage on-site surface water runoff and transported sediment. Any sediment trapped by ditches and WMPs will be collected periodically as part of regular maintenance of these structures.

3.6.1 Watercourse Reclamation

Portions of Sisson Brook and Bird Brook, a tributary to West Branch Napadogan Brook, and perhaps some small headwater streams to McBean Brook will or may be affected by Project development. The loss of these aquatic habitats will be compensated for according to a plan that must be approved by the Department of Fisheries and Oceans under the Fisheries Act before the Project can be authorized.

Other aquatic habitat compensation is incorporated into this Plan. For example, engineered drainage ditches as described in this Plan will be constructed to intercept and redirect non-contact, clean water to nearby watercourses, thus maintaining as much flow as possible to these drainages during Operations. After Closure, the ditches will remain or be re-configured for potential long-term use as productive aquatic habitat.

Other water management structures that require closure and reclamation include road culverts, WMPs around all Project facilities that are not required for long-term use, groundwater monitoring and pump-back wells down-gradient of the TSF embankment, and the engineered channels between the quarry and the TSF, between the TSF and the open pit, and as the eventual outlet of the pit lake. Many of these structures will be decommissioned and reclaimed as part of the reclamation of nearby Project facilities. Others, like some of the ditches and WMPs, the engineered channels, the groundwater and pump-back wells, and/or the water treatment facility will remain at the completion of Operations. They will be used to manage surface water runoff and monitor Site stability, and to ensure discharge water quality is suitable for release to watercourses.

Water management structures will be reclaimed to a combination of aquatic, wetland, and shrub-riparian habitats, depending on the type, size and location of the structure. For example, ditches, channels and other conduits may be reclaimed as watercourses with shrub-riparian habitat discharging to low-lying areas in receiving locations which may be reclaimed as mesotrophic forested wetland habitat. When no longer needed, WMPs may be reclaimed as open shallow-water aquatic habitat surrounded by shrub-riparian or fen-like habitats.

The engineered channels connecting the quarry, tailings pond, open pit lake, and Sisson Brook will not be actively reclaimed, but may naturally regenerate as a combination of rock outcrop and shrub-riparian habitats.

The end land use objectives for most of these habitats will be primarily for aquatic and wildlife use. End land use for commercial forestry will be discouraged along watercourses. Some traditional and recreational land use may be possible once the Site is fully reclaimed and stable.

3.6.2 Site preparation

All water management equipment not needed for long-term maintenance or monitoring, such as pipes, pumps, pump houses and well infrastructure, will be removed. Culverts under access roads that are no longer required will be removed to eliminate the risk of obstructions and deterioration. Decommissioned road surfaces will be re-contoured and scarified to allow the passage of surface water and to provide a suitable planting media.

The final Reclamation Plan will provide more detail on how aquatic, wetland, and shrub-riparian habitats will be recreated. In general, it is expected that berms around drainage ditches and sediment retention ponds will be broken down and removed, and stream channels will be constructed in all depressions as permanent, replacement watercourses. Gradual inlets and outlets will be excavated for the WMPs, possibly reinforced with stones, cobbles and woody debris and at a gradient to allow the passage of fish. The larger ponds will remain as open water features, so will not require further preparation after Closure.

Overburden and soil will not be applied to reclaimed watercourses because sediment deposition will occur naturally, and the associated terrestrial environments will be easy to re-vegetate because moisture will be readily available. Hydroseeding with fibre-based mulches, the use of fibre mats, and rip-rap reinforcement may be required to stabilize prepared surfaces and reduce the risk of erosion by seasonal flooding in watercourses.

Undisturbed watercourses downstream of the reclaimed structures will be monitored and maintained to ensure they maintain their original configuration as surface water flows return to pre-development rates.

Roads and equipment needed to maintain the Closure and Post-Closure water management and monitoring system will remain until the Site is fully stable and monitoring indicates water quality meets the Project's permit conditions for discharge. At that time, all remaining infrastructure will be decommissioned and reclaimed.

3.6.3 Re-vegetation

The final Reclamation Plan will also describe detailed methods for re-vegetation of watercourses. In general, methods will include a combination of hydroseeding with native species, the use of seeded fibre mats such as Flexterra®, and hand-planting black spruce, alder, hybrid birch and willow in suitable micro-sites. There will be a strong emphasis on techniques that encourage natural colonization of native species from nearby, undisturbed lands. For example, brushing and weeding may be required to remove vigorous, unwanted species to allow room for those that are more difficult or slow to return.

4.0 SITE DESCRIPTION AT CLOSURE

The Site will include the following elements at Closure.

- The open pit that will be flooded to create an aquatic feature.
- Permanent submersion of Barren Rock and Mid-Grade Ore within the TSF and at the bottom of the open pit.
- TSF embankments and beaches that will be undergoing re-vegetation with suitable species to provide forested, wetland, and open water habitats suitable for wildlife.
- Engineered channels connecting the quarry to the tailings pond and the tailings pond to the open pit, to manage the collection, treatment and discharge, as necessary, of on-Site water.
- Disturbed areas around the open pit, TSF, the former ore processing area (*i.e.,* primary crusher), and most of the plant site that will be decommissioned and reclaimed to forested, wetland and shrub-riparian habitats primarily suitable for wildlife use with potential for traditional, recreational and commercial forestry use.
- Appropriate surface and groundwater drainages in and around the Site and the ongoing restoration of all surrounding watercourses to open water, shrub-riparian and aquatic habitats suitable for use by wildlife and fish.
- Site buildings, equipment, roads and power supply needed for care and maintenance of the Site after Operations cease.

The conceptual closure and reclamation plan at various stages of the mine development is presented on Figure 4.1 to Figure 4.4. The plan has been divided into the following areas:

a) TSF Reclamation;
b) Open Pit Reclamation;
c) Barren Rock and Mid-Grade Ore Reclamation;
d) Decommissioning of Mine Site Infrastructure; and
e) Ongoing Post-Closure Monitoring and Reclamation Activities.

A description of the scope of work for each of the areas is presented below.

4.1 TSF RECLAMATION

- Selective discharge of tailings around the TSF during the final years of plant operations to establish a final tailings beach that will facilitate surface water management and reclamation. A surface pond will be maintained at the centre of the TSF.
- Tailings beaches will be capped with a layer of barren rock and topsoil from the topsoil stockpiles.
- Swales will be excavated in the beaches to make the grade less uniform and promote drainage. The beaches will then be hydroseeded and planted with appropriate vegetation.
- Downstream tailings embankment slopes will be capped with a layer of topsoil and hydroseeded, wherever possible.
- Removal of surface water diversion channels and access roads not required for long term monitoring.
- Construction of a permanent outlet channel and spillway from the TSF to the open pit. The TSF and surface pond will be designed to attenuate storm inflows to minimize the magnitude of spillway discharge flows and hence the size of the outlet channel.
- Removal of the water management ponds and collection systems at such time that suitable water quality for direct release is achieved.

4.2 OPEN PIT RECLAMATION

- A perimeter fence will be installed around the open pit.
- The pit will fill naturally with groundwater, precipitation and TSF discharge.
- Construction of a permanent outlet channel and spillway from the open pit to Sisson Brook.
- Open pit discharge may require water treatment prior to downstream release.

4.3 BARREN ROCK AND MID-GRADE ORE RECLAMATION

- Re-grading of the barren rock dump and mid-grade ore stockpile within the TSF to ensure permanent submersion below the final TSF elevation to mitigate potential onset of acid generation.

4.4 DECOMMISSIONING OF MINE SITE INFRASTRUCTURE

- Decommissioning and removal of all surface facilities and buildings.
- Building materials, pipelines, pumps, electrical equipment, septic systems, and machinery will be trucked to the nearest acceptable disposal facility and/or will be sold (if possible).
- Concrete foundations will be demolished and buried on site.

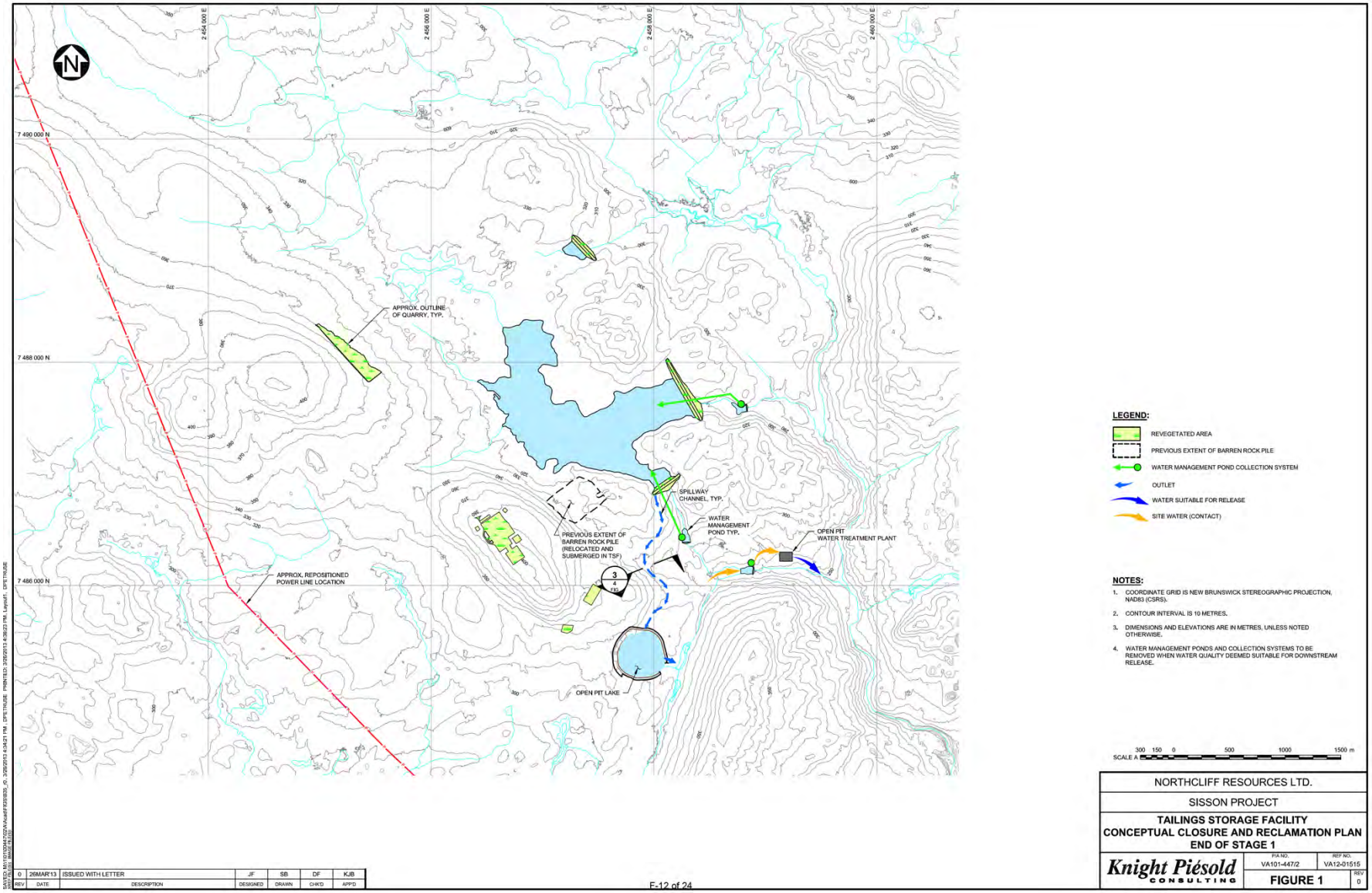

Figure 4.1 End of Stage 1

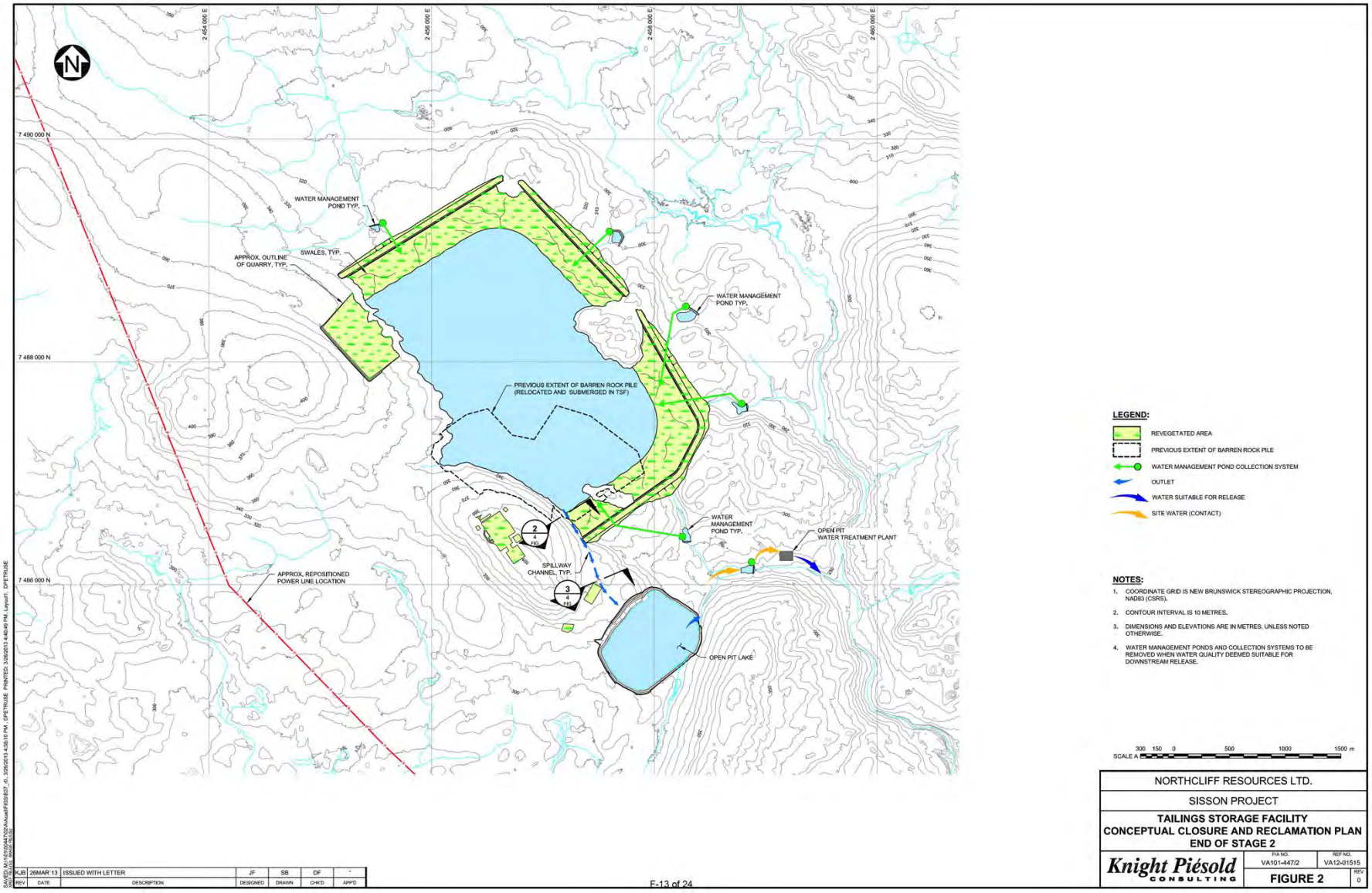

Figure 4.2 End of Stage 2

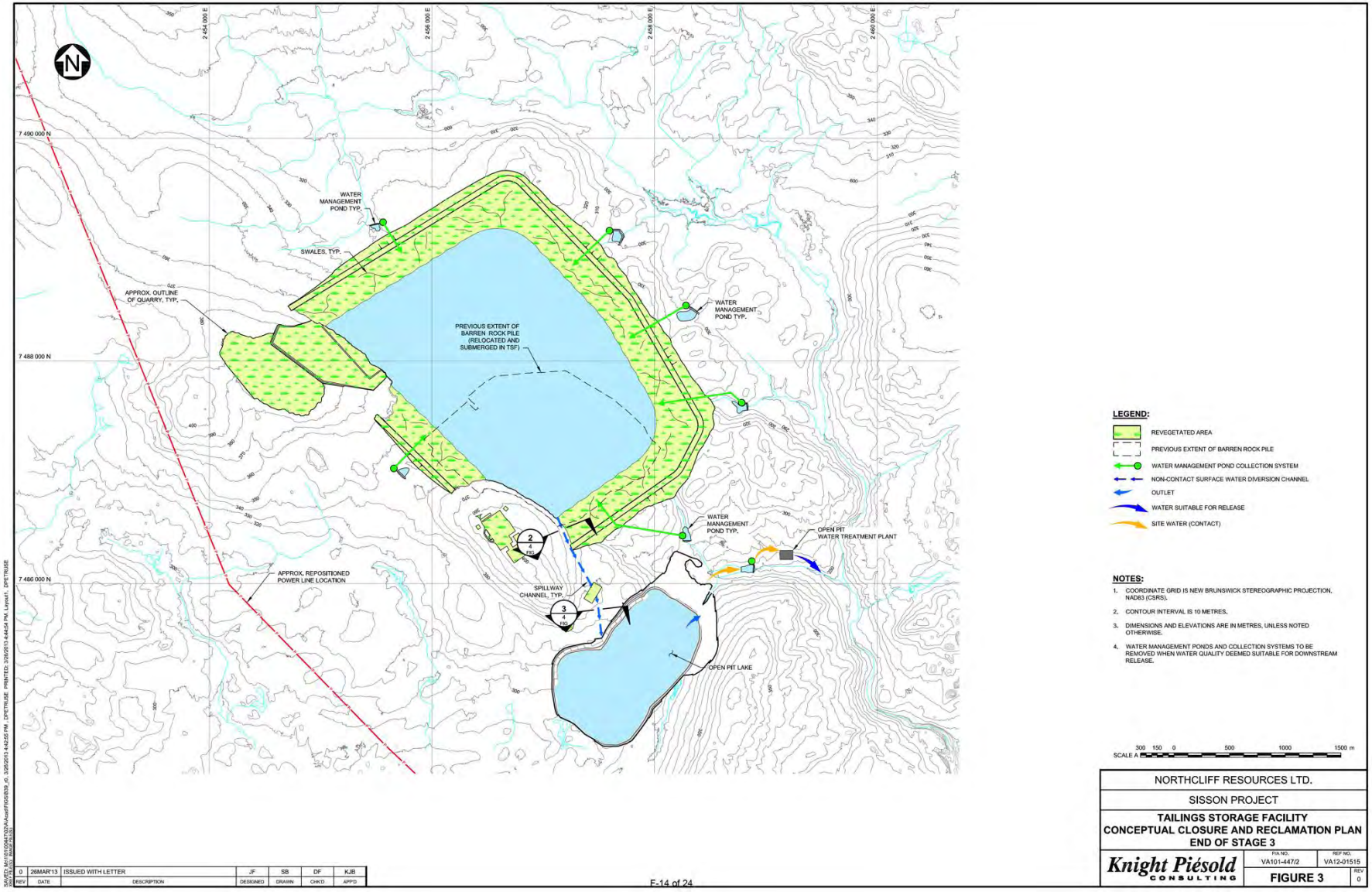

Figure 4.3 End of Stage 3

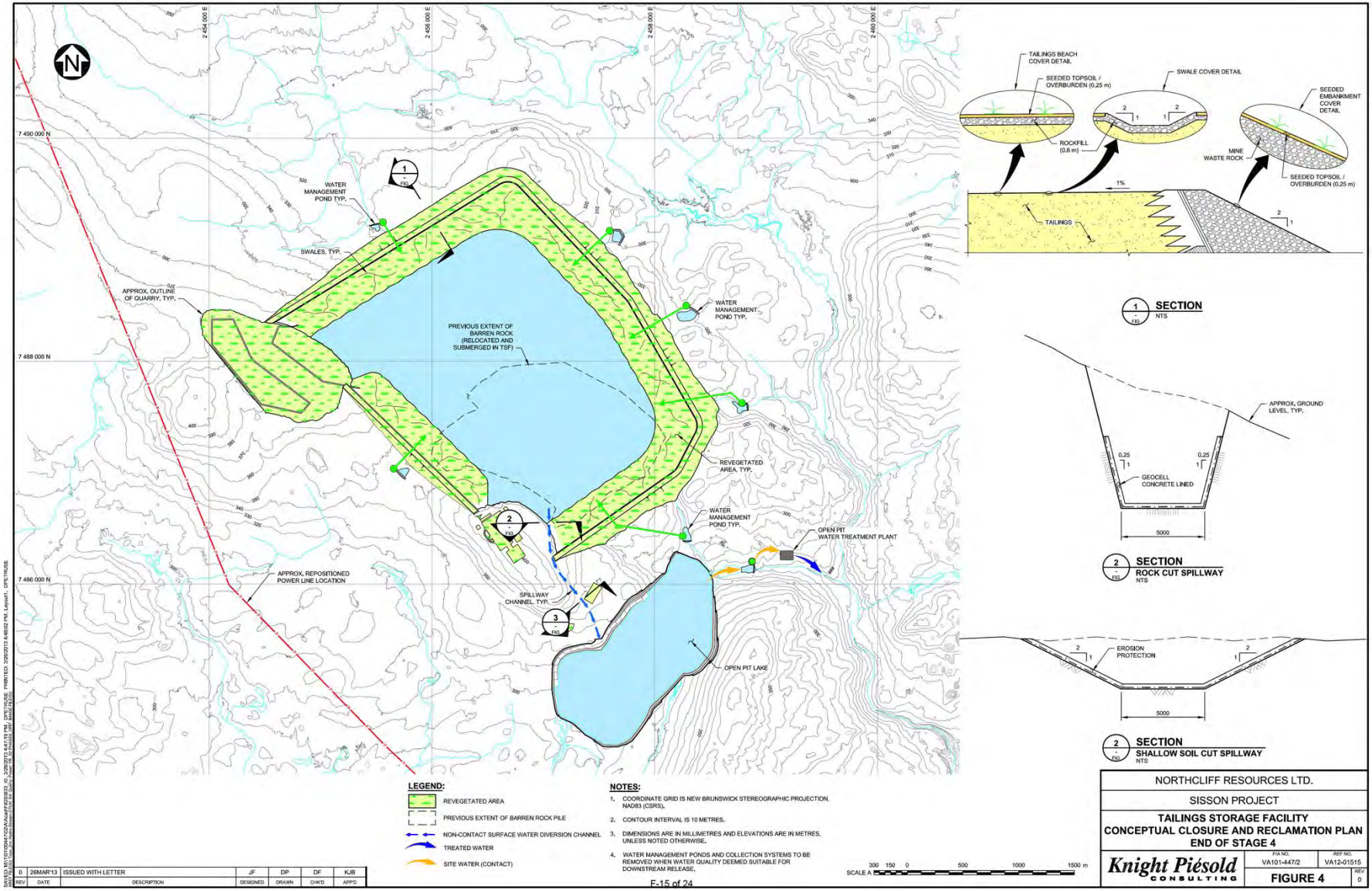

Figure 4.4 End of Stage 4

5.0 SITE SAFETY AND SECURITY

Because the open pit and quarry at Closure will remain as open water features with abrupt, steep, and sometimes unstable edges, they will present potential safety issues and liabilities. They thus warrant exclusion of both people and terrestrial wildlife, and will be fenced around the edges to prevent access. No other continuous fencing is planned.

Much of the remaining area will be accessible (particularly during the winter), so fencing, berms, rock barriers, or warning signs discouraging public access may be employed in target areas to prevent accidents and minimize exposure to potentially harmful conditions. Warning signs will be posted at regular intervals along fenced areas and along the base of the TSF, on posts of sufficient height so the signs will be visible during winter conditions.

The main access to the Site and the on-site access roads to the open pit and quarry will be restricted with locked gates. Locked gates will be accessible to mine personnel and contractors only. Any remaining buildings will be secured.

On-site roads required for Closure and Post-Closure maintenance will not be secured. Those required for water quality monitoring or vegetation surveys will be partially decommissioned with water bars and berms to discourage all traffic use, except by ATV or snow machines. All other on-site roads no longer required will be permanently decommissioned as described previously in other sections.

6.0 POST-RECLAMATION MONITORING

Certain aspects of the Reclamation Plan will require an ongoing commitment beyond the initial closure and active reclamation period. This generally includes engineering support, reclamation and water quality monitoring, and site maintenance.

Specific activities for the Site will include:

- maintenance of electrical infrastructure to ensure available power for needed Site equipment;
- maintenance of geotechnical instrumentation for long-term monitoring of the stability of the TSF;
- operation of the water treatment facility, as needed, to treat all surplus Site water for discharge to ensure it will meet the Project's permit conditions for discharge water quality;
- upkeep of water management infrastructure as needed, including ditches, engineered channels, WMPs, and groundwater monitoring and pump-back wells, to monitor, capture and pump runoff and seepage, if any, back to the TSF;
- water quality monitoring around the Site to support the effective collection and treatment of water, as required, before discharge to nearby watercourses; and
- upkeep of Site roads and buildings that are kept active to support ongoing inspection, monitoring, and maintenance.

The Proponent will be required to regularly inspect and report on the geotechnical stability of all Project facilities after Closure. Piezometers, inclinometers, and/or movement monuments will have been installed for this purpose within the TSF embankments and foundations during the various construction phases of the facility. Inspections and reporting will continue during the Closure period, including ongoing evaluations of instrumentation records and seepage flow rates and volumes, and may be required during Post-Closure to confirm the continued stability of the embankments.

Reclamation monitoring of all reclaimed areas will continue after the active reclamation period.

Each re-vegetated, reclaimed area will be monitored approximately five years after final planting to assess re-vegetation success. As vegetative cover approaches the capability goals established for the specified end land use objective(s) for the area, sites will be monitored more frequently. The frequency will depend on how close the area is to its capability goal, but is usually every two to three years until a

site's goals are reached. At that time, monitoring will occur annually for three consecutive years to confirm that the site is self-sustaining, and afterwards it will then be considered successfully reclaimed.

Areas on the Site that will be challenging to reclaim (such as the TSF beaches) will be inspected annually following initial re-vegetation to determine if they should be reseeded, replanted, fertilized or otherwise maintained. TSF embankments and other sloping areas will be monitored for signs of erosion; erosion controls will be implemented as needed. Once re-vegetation of these areas is considered stable, the monitoring schedule will conform to the schedule for other areas as described above.

The presence of non-native, invasive species on site will be monitored and controlled Post-Closure to ensure that populations do not establish on site, making it possible to infiltrate into the native, undisturbed surrounding environment. While the possibility of invasive species entering the project area from past activities such as logging, public access and other past activities, and by means of personnel and traffic movement throughout the life of mine exists, the proposed extent of land disturbance associated with the creation of the TSF, open pit, and quarry may negate any further migration or establishment of these native species. In addition, by limiting the footprint of the overall Project to a compact area, this will limit the extent of any disturbance in the surrounding areas. The Proponent recognizes the need to monitor and control invasive species at the Project site, and will ensure that provisions for doing so are included in the Land, Soil, and Biodiversity Management Plan.

Beaver activity on the mine site will be monitored annually. Problem beaver dams and beavers may need to be removed as needed by a local trapper.

Project design and water quality prediction studies will be discussed with the Province and used to determine a list of monitored parameters, the location of monitoring stations and a monitoring schedule during Operations. Details for a water quality monitoring program during Closure and Post-Closure will be included as part of the final Reclamation Plan for the Project. The program will specify monitoring objectives, components of the environment to be monitored, where, how often and for how long monitoring will occur, and how the results will be reported. Some monitoring concepts for surface water and groundwater during Closure and Post-Closure are described below.

Surface water monitoring programs for mining facilities at the close of active operations typically include end-of-pipe locations (to monitor on-site water quality at the point-of-discharge to the environment) to assess if discharge standards are being met; and receiving environment locations to verify that water treatment and discharge are maintaining the integrity of downstream water courses.

Monitoring frequency and parameters will be proposed in the final Reclamation Plan as outlined above, and specified by the Province in the Project's permit(s). At present and conceptually, the Proponent assumes it will likely be a function of the monitoring location and purpose. For example, monitoring may occur weekly at the discharge location, monthly at points downstream of the discharge location, and quarterly at reference locations. Monitoring parameters may include physical measurements such as flow rates or levels, general testing such as pH or total suspended solids, detailed chemical analyses for organic carbon, ion balance, or dissolved metals, and biological tests such as estimating in-stream fish populations or toxicity testing.

The presence and quality of groundwater seepage will be determined by the groundwater monitoring well system installed during Operations around the TSF embankments and Water Management Ponds. As during Operations, groundwater monitoring results will be used to determine the need for and location(s) of additional groundwater pump-back wells for returning water back to the TSF, or directly to the water treatment facility, for treatment and discharge. Wells and instrumentation will be monitored monthly during Operations and into the Closure and Post-Closure periods. Over time, this frequency will diminish until it is determined that groundwater quality is no longer a downstream risk to human or ecological health.

Closure and Post-Closure site maintenance will include physical inspections and repairs, as well as short-term maintenance of reclaimed areas. The water treatment facility and related infrastructure will be maintained until no longer needed. Other physical maintenance may include maintaining access roads, culverts, gates, fencing or signage, inspecting and repairing/replacing groundwater monitoring wells, pumps and piping, and ongoing waste management.

Reclamation maintenance may include repairing flood-damaged watercourses, inspecting and repairing slopes for and from erosion, clearing debris or sediment from ditches, culverts and Water Management Ponds, brushing or weeding unwanted vegetation to encourage growth of desired species, and spot-planting or hydro-seeding in select areas.

Maintenance will continue until end land use objectives of all reclaimed Site facilities have been reached, the quality of water discharged from the Site meets regulated criteria and no longer needs to be treated, and the Site is considered fully reclaimed and stable. At that time, roads, equipment, and other infrastructure no longer required will be decommissioned and reclaimed as described for similar components in this Plan.

7.0 SCHEDULE OF WORK

A detailed reclamation schedule will be developed after Operations begin, and will be updated in successive iterations of this Reclamation Plan. Conceptually, reclamation will begin as soon as possible after mine start-up, as much as mine development and operations allow. The Proponent recognizes that most Site areas may not be able to be reclaimed until Closure, but it is in the company's best interest to conduct as much progressive reclamation as possible prior to Closure. For example, reclamation may begin soon after mining begins in areas that were disturbed during construction but are no longer needed, such as old forestry roads, or internal haul roads that are superseded by others. Early reclamation also will be more cost-effective since The Proponent can use the available work force and equipment at the mine during Operations rather than the Proponent using contractors during Closure. Suitable surfaces for progressive reclamation work and research trials will be identified during Operations. Early reclamation work will provide valuable experience in identifying suitable treatment techniques for different areas after Operations cease.

The general plan for decommissioning, reclamation and closure at the completion of Operations has been discussed previously in several sections throughout this Reclamation Plan. It is expected that the bulk of the decommissioning and initial reclamation activities will take place over an initial spring/summer/fall period lasting about nine months. During this period, all decommissioning of Site infrastructure and roads not needed post-Operations will take place; the channels between the quarry and the TSF, and between the TSF and the open pit, will be constructed; the TSF embankments and beaches, and disturbed areas, will be prepared and receive their initial re-vegetation treatments; the open pit and quarry will be fenced; and the post-Operations monitoring and Site management programs will be established.

When the open pit has been filled, about 10 years later, the water treatment facilities will be re-furbished as required to treat surplus pit water before it is discharged to Sisson Brook.

Knight Piésold Ltd. has completed an active reclamation period schedule for the Project) which is presented in Figure 7.1.

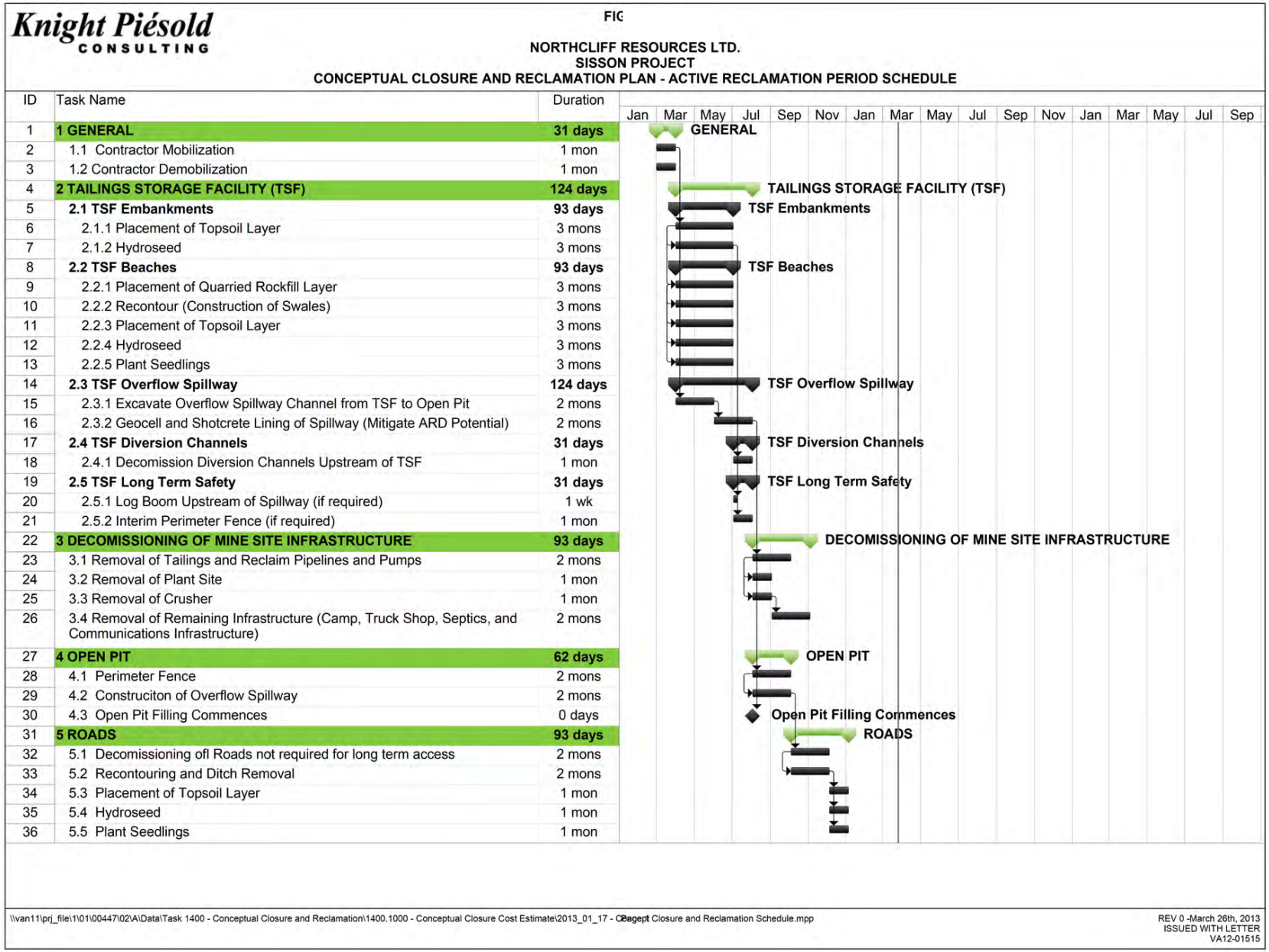

Figure 7.1 Active Reclamation Schedule

8.0 A RECLAMATION COST ESTIMATE

8.1 CAPITAL CONSTRUCTION COSTS, LONG-TERM MAINTENANCE, MONITORING AND WATER TREATMENT

A cost estimate for the conceptual closure and reclamation plan for the Project was developed (Knight Piésold, 2013a and SRK Consulting, 2013) based on a plan to achieve the following objectives:

- Minimize or eliminate residual environmental effects following closure;
- Establish conditions that allow the natural environment to recover from mining activities; and
- Establish long-term physical, chemical, and ecological stability in the disturbed area.

A number of assumptions were made about the end-use plan for the Site, including:

- Flooding of the open pit to create a lake;
- Permanent encapsulation of barren rock within the TSF;
- TSF embankments will be vegetated with suitable species;
- TSF impoundment area will include wildlife habitat such as littoral, wetland, and a lake area; and
- Appropriate drainage for surface and groundwater from the new landforms will be ensured.

Closure is defined as the time period between when the mine ceases operation and when the open pit has filled with water. The Post-Closure period is defined as the time after which the open pit has been flooded and begins discharging water, which is estimated to occur approximately 10 years after Closure.

The closure and reclamation plans will be updated throughout design, construction, and operation of the Project to help ensure that the objectives can be successfully achieved; the cost estimate and subsequent bonding requirements may also require adjustment as the Project evolves through the Environmental Assessment (EA) process, permitting, and operations.

8.2 ONGOING POST-CLOSURE EXPENSES

Certain aspects of the closure and reclamation plan will require ongoing commitment beyond the initial closure and active reclamation period. These generally include environmental monitoring, engineering support, and site maintenance; specific Post-Closure activities included in the cost estimate are:

- Upkeep of water management ponds and recycle pumps being used to collect seepage and embankment runoff, which will be retained until monitoring results indicate that runoff and seepage from the TSF is of suitable quality for untreated discharge.
- Groundwater monitoring wells and geotechnical instrumentation will be retained for long-term monitoring. Water quality will be assessed on a schedule defined in the detailed closure plan.
- Annual inspection of the TSF and an ongoing evaluation of water quality, flow rates, and instrumentation records will be performed.
- Maintenance of site roads that are kept active beyond closure to support ongoing monitoring and inspection requirements.
- Maintenance of electrical infrastructure to ensure that power is available for pumps where applicable.
- Water treatment at the open pit discharge point to Sisson Brook until water quality is deemed acceptable for direct release.

8.3 COST ESTIMATE METHODOLOGY

The reclamation cost estimate was developed by identifying the tasks required to achieve the defined closure and reclamation objectives. The quantities used for the cost estimate were based on neat-line

take-offs from the design figures with allowances for construction variances. Lump sum or provisional sum allowances were based on similar projects and estimates where sufficient detail did not exist to develop quantities for a particular line item.

The unit rates were developed using production rates, material costs, and contractor equipment rentals rates from the following sources:

- Caterpillar Performance Handbook (Edition 40);
- 2011-2012 BC Blue Book - Equipment Rental Rate Guide - BC Road Builders and Heavy Construction Association (July 2011); and
- 2010 RS Means Heavy Construction Cost Data (2010).

8.3.1 Assumptions

The following assumptions were used to develop the reclamation cost estimate:

- The work would be performed by a contractor using contractor equipment. The cost estimate assumes a worst case scenario that the mine goes bankrupt and the mine's assets, including the mining equipment, are sold off and not available to perform closure and reclamation work.
- Surface reclamation areas as shown on Figures 4.1 to 4.4.
- Tailings beaches capped with a 60 cm thick layer of rockfill from the quarry to provide a trafficable surface for topsoil and overburden placement.
- Disturbed areas will first be shaped, resurfaced with an average topsoil and overburden layer 25 cm thick, and then re-vegetated.
- Topsoil and overburden for resurfacing will be located in a stockpile within 2 km of the final destination.
- The open pit will fill naturally with precipitation, groundwater inflow, and TSF discharge (*i.e.,* no pumping required).
- Demolished concrete can be disposed of on-site (*i.e.,* buried).
- Salvage value of materials transported to a disposal site will cover any disposal fees (*i.e.,* net zero disposal fees).
- The TSF spillway will be constructed as a rock cut in the south abutment of the TSF embankment near the plant site.
- An open pit spillway to Sisson Brook will be constructed as a rock cut at the northeast side of the open pit.
- Water treatment will be bonded for assuming that it is required in perpetuity.
- Operating expenditures for water treatment can be scaled based on plant design flow (reduced operating expenditures if the mine closes prematurely, due to a smaller catchment area of the facilities and hence leading to lower design flows).
- Infrastructure from the plant clarification system used during mine operations can be partially utilized for the post-closure water treatment plant. A 50% reduction for the water treatment plant capital cost was assumed. This assumption for costing is based upon determination that the process water clarifier will be large enough to handle the mill reclaim flow rate combined with the surplus water sent to the Water Treatment Plant during operations, and should therefore be suitable for use Post-Closure when only surplus water needs treatment. The design of the clarifier and Water Treatment Plant will be reviewed during Basic Engineering to determine their suitability for both Operation and Post-Closure. If necessary, the cost estimate for Post-Closure water treatment equipment and operation can be revised for bonding calculation purposes. At Closure, as the actual environmental conditions become more clear, a water treatment plant may need to be custom built for flow sizing, water quality objectives, power requirements, *etc*. and any pre-existing equipment should not be assumed to be suitable for use, at least not for bonding calculation purposes. This rationale can be integrated into the 5 year bond review process as the Project advances.

8.3.2 Exclusions

The closure and reclamation cost estimate currently excludes costs for dump disposal fees for structures, pipelines, pumps, and foundations.

8.4 ESTIMATE BREAKDOWN

The closure and reclamation cost estimate is divided into the following sections:

a. Direct costs;
b. Indirect costs;
c. Post-closure ongoing expenses; and
d. Contingency.

8.4.1 Direct Costs

The direct costs include:

a. TSF Reclamation;
b. Open Pit Reclamation;
c. Barren Rock and Mid-Grade Ore Reclamation;
d. Decommissioning of Mine Site Infrastructure; and
e. Miscellaneous Allowances (Environmental Monitoring and Best Management Practices).

A summary of the estimated direct costs for closure and reclamation is presented in Table A-1 in Appendix A.

8.4.2 Indirect Costs

The indirect costs were estimated as a fixed percentage of the direct costs. Materials, services, and engineering/specialist input were estimated as lump sums.

The indirect costs included in the estimate are:

- Contractor mobilization and demobilization — 5% of estimated direct costs
- Construction management and indirects — 12% of estimated direct costs
- Materials and services such as power and insurance — $1,500,000 during active reclamation
- Engineering and specialist input — $1,000,000 during active reclamation

A summary of the estimated indirect costs for closure and reclamation are presented in Appendix A in Table A-2.

8.4.3 Ongoing Post-Closure Expenses

Annual Post-Closure expenses will be incurred beyond the active reclamation period. A bond will need to be posted such that any annual return earned on the initial investment will cover the estimated annual expenses in perpetuity. The on-going Post-Closure expenses are attributed to water treatment, and monitoring and maintenance of equipment.

The water treatment costs (SRK Consulting, 2013) are summarized below:

- Water Treatment Plant Capital Cost: $11,000,000
- Fixed Operating Costs: $800,000 per annum
- Variable Operating Costs: $300,000 per annum

The costs presented above represent Post-Closure water treatment at full mine development (*i.e.*, at the end of the projected mine life at 27 years). Water treatment costs for premature mine closure were estimated using a water treatment design flow factor, which is based on the catchment area reporting to the TSF that cannot be practically diverted around the facility and the approximate size of the open pit at each stage of the mine life. A summary of the water treatment design flow factors is presented in Table A-3 in Appendix A.

The capital costs (SRK Consulting, 2013) are presented for a standalone, newly constructed water treatment plant. However, based on the current mine design and feasibility study results, cost savings may be available by utilizing the clarification plant that would be built as part of the processing facilities. The closure and reclamation cost estimate assumes that 50% of the estimated capital cost of the water treatment plant will be required to upgrade the clarification plant for use as the Post-Closure water treatment plant. In addition to the clarification plant, a stand-alone water treatment plant will be required for Operations in Year 8; it is assumed that this plant can be used as the post-closure treatment plant at no additional cost.

Based on these assumptions and calculations, the estimated initial bond requirement for the ongoing Post-Closure fund is approximately 20 million dollars.

A summary of the estimated water treatment costs for Closure in any given operating year is presented in Table A-4 in Appendix A. For simplicity, no interest is assumed on any bonding contributions nor is any bond credit applied in subsequent years once the water treatment plant is built.

8.4.4 Allowances and Contingency

The following allowances have been included in the direct costs for items with limited design information:

- A $500,000 allowance to cover best management practices during the active reclamation period; and
- A $1,000,000 allowance for monitoring (environmental and geotechnical).

A contingency of 25% was allotted for the direct costs.

9.0 DESCRIPTION OF BONDS

Based on input from the Department of Energy and Mines (DEM) and the Department of the Environment and Local Government (DELG), there are three, distinct bonds that will be posted and maintained over the 27 year life of the Project to mitigate liability to the Province for:

- Reclamation;
- Environmental Protection; and
- Post-Closure Water Treatment.

9.1 RECLAMATION BONDING

Reclamation bonding will be initiated at the onset of construction and will cover a period of three years (Year -2 to Year +1, inclusive), which will span the two-year construction period plus the initial year for commissioning, start-up and up to full production. Potential reclamation efforts over this period would be the least significant during the mine life as only the construction of the Project will have been completed, with the mill commissioned and with a minimal mine footprint and overall tailings impact.

For this period, there will be fresh water (from precipitation) stored behind the tailings embankment (up to 8 million m^3), a minimum amount of tailings discharges into the TSF from commissioning activities (up to approximately 4 million m^3 or 1% of the total tailings volume), overburden piles developed from pre-stripping activities in the open pit (5.3 million tonnes or 2% of the total waste tonnes), and quantities of waste rock stored in the TSF basin (up to 13.0 million tones or 5% of the total waste tonnes) from initial mining activities.

The bond required for this three year period has been calculated based on closing requirement at the beginning of Year 2 of $7.5M. No discount rate has been assumed in the calculation of this requirement for simplicity. This bond would be posted to DEM when construction of the Project begins at the beginning of Year -2.

After this initial, three year period, a second bond would be posted for the next five year period (Year 2 to 6, inclusive) at the beginning of Year 2. Since the Project will be in full operation by this time and be looking forward for a 5 year operational period, the value of the new bond will be substantially greater than the initial bond to cover the reclamation cost associated with significantly more tailings and waste rock stored in the TSF as well as more process water mixed with fresh water in the TSF pond. To cover the maximum liability at the end of this period, a total bond value of $24.0M is estimated to be required assuming no discount rate and that no interest has accrued on the initial bond. The second bond, to be made available at the beginning of Year 2, will be provided to DEM for the difference. This new bond, with no interest or discount, will have an estimated value of $16.5M at the beginning of Year 2; when combined with the original bond value of $7.5M from the first period, the total value at the bonds at maturity at the end of Year 6 is $24.0M.

Subsequent bond needs would be reviewed and posted for each five (5) year period thereafter at the beginning of each of these periods (or some other agreed arrangement) to cover the liability associated over each period. At the end of the mine life, the total required bonding amount is estimated to be $41.8M, which would be covered by these periodic bond placements.

The bond values will vary based on the effective interest rate at the time of the bond placements and will be important in assessing the requirements given the long duration of the Project. For simplicity, the bond values presented in the last column of Table 9.1 assume no interest is earned; however, the interest rate at the time of each bond placement will change the bond value as interest will allow each bond to grow in value over time while they are held by the regulatory agency.

Table 9.1 indicates the initial bond amount and the total bond value at the end of each time period.

Table 9.1 Closure and Reclamation Security

DIRECT COST CONTINGENCY	25%
INDIRECT COST CONTINGENCY	0%
EFFECTIVE INTEREST RATE	0%

MINE YEAR	YEAR	DIRECT	INDIRECT	CONTINGENCY	TOTAL BOND LIABILITY (NO DISCOUNTING)	BONDS TO BE POSTED (NO DISCOUNTING)	CUMULATIVE VALUE OF BONDS (NO INTEREST)
-2	2015	$ 700,000	$ 2,900,000	$ 200,000	$ 3,700,000	**$ 7,500,000**	$ 7,500,000
-1	2016	$ 900,000	$ 2,900,000	$ 200,000	$ 4,000,000		$ 7,500,000
1	2017	$ 3,300,000	$ 3,300,000	$ 800,000	$ 7,500,000		$ 7,500,000
2	2018	$ 5,800,000	$ 3,700,000	$ 1,400,000	$ 10,900,000	**$ 16,500,000**	$ 24,000,000
3	2019	$ 8,100,000	$ 4,100,000	$ 2,000,000	$ 14,200,000		$ 24,000,000
4	2020	$ 10,400,000	$ 4,500,000	$ 2,600,000	$ 17,500,000		$ 24,000,000
5	2021	$ 12,700,000	$ 4,900,000	$ 3,200,000	$ 20,800,000		$ 24,000,000
6	2022	$ 15,000,000	$ 5,300,000	$ 3,700,000	$ 24,000,000		$ 24,000,000
7	2023	$ 17,300,000	$ 5,700,000	$ 4,300,000	$ 27,300,000	**$ 6,500,000**	$ 30,500,000
8	2024	$ 17,900,000	$ 5,800,000	$ 4,500,000	$ 28,100,000		$ 30,500,000
9	2025	$ 18,400,000	$ 5,900,000	$ 4,600,000	$ 28,900,000		$ 30,500,000
10	2026	$ 19,000,000	$ 6,000,000	$ 4,700,000	$ 29,700,000		$ 30,500,000
11	2027	$ 19,500,000	$ 6,100,000	$ 4,900,000	$ 30,500,000		$ 30,500,000
12	2028	$ 20,100,000	$ 6,200,000	$ 5,000,000	$ 31,300,000	**$ 4,700,000**	$ 35,200,000
13	2029	$ 20,700,000	$ 6,300,000	$ 5,200,000	$ 32,100,000		$ 35,200,000
14	2030	$ 21,400,000	$ 6,400,000	$ 5,300,000	$ 33,100,000		$ 35,200,000
15	2031	$ 22,100,000	$ 6,500,000	$ 5,500,000	$ 34,200,000		$ 35,200,000
16	2032	$ 22,800,000	$ 6,600,000	$ 5,700,000	$ 35,200,000		$ 35,200,000
17	2033	$ 23,500,000	$ 6,800,000	$ 5,900,000	$ 36,200,000	**$ 4,400,000**	$ 39,600,000
18	2034	$ 24,300,000	$ 6,900,000	$ 6,100,000	$ 37,200,000		$ 39,600,000
19	2035	$ 25,000,000	$ 7,000,000	$ 6,200,000	$ 38,200,000		$ 39,600,000
20	2036	$ 25,700,000	$ 7,100,000	$ 6,400,000	$ 39,200,000		$ 39,600,000
21	2037	$ 25,900,000	$ 7,200,000	$ 6,500,000	$ 39,600,000		$ 39,600,000
22	2038	$ 26,200,000	$ 7,200,000	$ 6,600,000	$ 40,000,000	**$ 1,800,000**	$ 41,400,000
23	2039	$ 26,500,000	$ 7,300,000	$ 6,600,000	$ 40,300,000		$ 41,400,000
24	2040	$ 26,700,000	$ 7,300,000	$ 6,700,000	$ 40,700,000		$ 41,400,000
25	2041	$ 27,000,000	$ 7,300,000	$ 6,700,000	$ 41,100,000		$ 41,400,000
26	2042	$ 27,200,000	$ 7,400,000	$ 6,800,000	$ 41,400,000		$ 41,400,000
27	2043	$ 27,500,000	$ 7,400,000	$ 6,900,000	$ 41,800,000	**$ 400,000**	$ 41,800,000

NOTES:

1. EFFECTIVE INTEREST RATE USED IS ZERO PERCENT FOR SIMPLICITY IN PRESENTING THE BONDING REQUIREMENTS.
2. BOND PAYMENTS OCCUR AT THE BEGINNING OF THE YEAR. BONDING REQUIREMENTS AND VALUES ARE CALCULATED AT THE END OF EACH YEAR.
3. ACTUAL BOND VALUES FOR EACH YEAR WILL BE DETERMINED BASED ON THE INTEREST RATE OF THE BOND SECURITY FOR EACH TIME PERIOD.

9.2 ENVIRONMENT PROTECTION BONDING

The environment protection bonding would be established in a progressive manner starting prior to construction and continuing for three years (*i.e.,* two years of construction plus a year for commissioning and startup) up to the end of the period in which full production is achieved. An initial contribution of $1.5M at the commencement of construction is estimated. This would be an amount equivalent to a $0.5M annual contribution for the three year period of construction and ramp-up, resulting in a $1.5M bond prior to the start of full production at the mine at the beginning of Year 2.

This bond would be established to accommodate the cost of monitoring during the active reclamation period (one year) and for a subsequent two-year mine Closure period.

The value of the bond is shown in Table 9.2.

Table 9.2 Closure and Reclamation Environmental Protection Security

DIRECT COST CONTINGENCY	0%
WATER TREATMENT CONTINGENCY	0%
EFFECTIVE INTEREST RATE	0%

MINE YEAR	YEAR	DIRECT - BMPs AND MONITORING	WATER TREATMENT	CONTINGENCY	TOTAL BOND LIABILITY (NO DISCOUNTING)	BONDS TO BE POSTED (NO DISCOUNTING)	CUMULATIVE VALUE OF BONDS (NO INTEREST)
-2	2015	$ 500,000		$ -	$ 500,000	**$ 1,500,000**	$ 1,500,000
-1	2016	$ 1,000,000	$ -	$ -	$ 1,000,000		$ 1,500,000
1	2017	$ 1,500,000	$ -	$ -	$ 1,500,000		$ 1,500,000
2	2018	$ 1,500,000	$ -	$ -	$ 1,500,000		$ 1,500,000
3	2019	$ 1,500,000	$ -	$ -	$ 1,500,000	**$ -**	$ 1,500,000
4	2020	$ 1,500,000	$ -	$ -	$ 1,500,000		$ 1,500,000
5	2021	$ 1,500,000	$ -	$ -	$ 1,500,000		$ 1,500,000
6	2022	$ 1,500,000	$ -	$ -	$ 1,500,000		$ 1,500,000
7	2023	$ 1,500,000	$ -	$ -	$ 1,500,000	**$ -**	$ 1,500,000
8	2024	$ 1,500,000	$ -	$ -	$ 1,500,000		$ 1,500,000
9	2025	$ 1,500,000	$ -	$ -	$ 1,500,000		$ 1,500,000
10	2026	$ 1,500,000	$ -	$ -	$ 1,500,000		$ 1,500,000
11	2027	$ 1,500,000	$ -	$ -	$ 1,500,000		$ 1,500,000
12	2028	$ 1,500,000	$ -	$ -	$ 1,500,000	**$ -**	$ 1,500,000
13	2029	$ 1,500,000	$ -	$ -	$ 1,500,000		$ 1,500,000
14	2030	$ 1,500,000	$ -	$ -	$ 1,500,000		$ 1,500,000
15	2031	$ 1,500,000	$ -	$ -	$ 1,500,000		$ 1,500,000
16	2032	$ 1,500,000	$ -	$ -	$ 1,500,000		$ 1,500,000
17	2033	$ 1,500,000	$ -	$ -	$ 1,500,000	**$ -**	$ 1,500,000
18	2034	$ 1,500,000	$ -	$ -	$ 1,500,000		$ 1,500,000
19	2035	$ 1,500,000	$ -	$ -	$ 1,500,000		$ 1,500,000
20	2036	$ 1,500,000	$ -	$ -	$ 1,500,000		$ 1,500,000
21	2037	$ 1,500,000	$ -	$ -	$ 1,500,000		$ 1,500,000
22	2038	$ 1,500,000	$ -	$ -	$ 1,500,000	**$ -**	$ 1,500,000
23	2039	$ 1,500,000	$ -	$ -	$ 1,500,000		$ 1,500,000
24	2040	$ 1,500,000	$ -	$ -	$ 1,500,000		$ 1,500,000
25	2041	$ 1,500,000	$ -	$ -	$ 1,500,000		$ 1,500,000
26	2042	$ 1,500,000	$ -	$ -	$ 1,500,000		$ 1,500,000
27	2043	$ 1,500,000	$ -	$ -	$ 1,500,000	**$ -**	$ 1,500,000

NOTES:

1. EFFECTIVE INTEREST RATE USED IS ZERO PERCENT FOR SIMPLICITY IN PRESENTING THE BONDING REQUIREMENTS.
2. BOND PAYMENTS OCCUR AT THE BEGINNING OF THE YEAR. BONDING REQUIREMENTS AND VALUES ARE CALCULATED AT THE END OF EACH YEAR.
3. WATER TREATMENT IS COVERED UNDER A SEPARATE BOND FOR LONG-TERM WATER TREATMENT. SEE TABLE 21.3.
4. ACTUAL BOND VALUES FOR EACH YEAR WILL BE DETERMINED BASED ON THE INTEREST RATE OF THE BOND SECURITY FOR EACH TIME PERIOD.

9.3 POST CLOSURE WATER TREATMENT BONDING

The period of Post Closure water treatment would commence once the open pit has filled, approximately 12 years after the end of Operations. This bonding would be in place at the commencement of the Post Closure period to cover the cost of water treatment in perpetuity.

Bond contributions would be made at the beginning of Year 2, once full production has been achieved and water treatment would be required, and would be placed as a separate capital cost (CAPEX) amount of $4.6M and an operating cost (OPEX) amount of $19.7M. As per the bonding placement procedure described for Reclamation Bonding, subsequent bonds for CAPEX and OPEX would be posted for each five year period thereafter at the beginning of each of these periods to cover the liability associated with each period. However, the CAPEX bond placement would end at Year 7 as the total CAPEX bond value would match the CAPEX value for the water treatment plant that would be built and operating by Year 8; hence no further bonding contributions to CAPEX would be necessary. Similarly, the OPEX bond placement would end at Year 17 as the total OPEX bond value would match the OPEX value for water treatment throughout the remaining 27 years of the mine life.

The value of these bonds at the end of the 27 year mine life would be $4.8M and $22.0M, respectively, for a combined total value of $26.8M if the CAPEX bond is not withdrawn upon completion of construction of the water treatment plant by Year 8.

The bond values will vary based on the effective interest rate at the time of the bond placements and over the project life. For simplicity, the estimated bond values presented assume no interest; however, the interest rate at the time of each bond placement will change the bond contribution as interest will allow the bonds to grow in value over time while they are held by the regulatory agency.

The progressive values of the bonds are shown in Table 9.3.

Table 9.3 Closure and Reclamation Long-term Water Treatment Security

WATER TREATMENT PERIOD	IN PERPETUITY	
Water Treatment Variable Opex at Full Size	$300,000	$/year
Water Treatment Fixed Annual Opex	$800,000	$/year
FULL WATER TREATMENT PLANT CAPEX	$11,000,000	
CLARIFICATION PLANT CREDIT FOR CLOSURE TREATMENT PLANT	50%	
COST TO USE CLARIFICATION PLANT AS CLOSURE TREATMENT PLANT	$5,500,000	
OPERATIONAL WATER TREATMENT PLANT CONSTRUCTION MINE YEAR	8	during operations
WATER TREATMENT CONTINGENCY	0%	
EFFECTIVE INTEREST RATE	0%	

MINE YEAR	YEAR	WATER TREATMENT CAPEX LIABILITY	PERPETUITY WATER TREATMENT OPEX LIABILITY	WATER TREATMENT CAPEX BONDS TO BE POSTED[4]	VALUE OF WATER TREATMENT CAPEX BOND (NO INTEREST)[4]	PERPETUITY WATER TREATMENT OPEX BONDS TO BE POSTED (NO INTEREST)[3]	VALUE OF WATER TREATMENT OPEX BONDS (NO INTEREST)[4]	CUMULATIVE VALUE OF WATER TREATMENT BONDS (NO INTEREST)[4]
-2	2015	$ -	$ -	**$ -**	$ -	**$ -**	$ -	$ -
-1	2016	$ -	$ -		$ -		$ -	$ -
1	2017	$ 3,500,000	$ 17,000,000		$ -		$ -	$ -
2	2018	$ 3,700,000	$ 17,500,000	**$ 4,600,000**	$ 4,600,000	**$ 19,700,000**	$ 19,700,000	$ 24,300,000
3	2019	$ 3,900,000	$ 18,000,000		$ 4,600,000		$ 19,700,000	$ 24,300,000
4	2020	$ 4,000,000	$ 18,400,000		$ 4,600,000		$ 19,700,000	$ 24,300,000
5	2021	$ 4,300,000	$ 19,100,000		$ 4,600,000		$ 19,700,000	$ 24,300,000
6	2022	$ 4,600,000	$ 19,700,000		$ 4,600,000		$ 19,700,000	$ 24,300,000
7	2023	$ 4,800,000	$ 20,300,000	**$ 200,000**	$ 4,800,000	**$ 1,500,000**	$ 21,200,000	$ 26,000,000
8	2024	$ -	$ 20,900,000		$ 4,800,000		$ 21,200,000	$ 26,000,000
9	2025	$ -	$ 21,000,000		$ 4,800,000		$ 21,200,000	$ 26,000,000
10	2026	$ -	$ 21,100,000		$ 4,800,000		$ 21,200,000	$ 26,000,000
11	2027	$ -	$ 21,200,000		$ 4,800,000		$ 21,200,000	$ 26,000,000
12	2028	$ -	$ 21,300,000		$ 4,800,000	**$ 100,000**	$ 21,300,000	$ 26,100,000
13	2029	$ -	$ 21,300,000		$ 4,800,000		$ 21,300,000	$ 26,100,000
14	2030	$ -	$ 21,300,000		$ 4,800,000		$ 21,300,000	$ 26,100,000
15	2031	$ -	$ 21,300,000		$ 4,800,000		$ 21,300,000	$ 26,100,000
16	2032	$ -	$ 21,300,000		$ 4,800,000		$ 21,300,000	$ 26,100,000
17	2033	$ -	$ 21,500,000		$ 4,800,000	**$ 700,000**	$ 22,000,000	$ 26,800,000
18	2034	$ -	$ 21,600,000		$ 4,800,000		$ 22,000,000	$ 26,800,000
19	2035	$ -	$ 21,800,000		$ 4,800,000		$ 22,000,000	$ 26,800,000
20	2036	$ -	$ 22,000,000		$ 4,800,000		$ 22,000,000	$ 26,800,000
21	2037	$ -	$ 22,000,000		$ 4,800,000		$ 22,000,000	$ 26,800,000
22	2038	$ -	$ 22,000,000		$ 4,800,000	**$ -**	$ 22,000,000	$ 26,800,000
23	2039	$ -	$ 22,000,000		$ 4,800,000		$ 22,000,000	$ 26,800,000
24	2040	$ -	$ 22,000,000		$ 4,800,000		$ 22,000,000	$ 26,800,000
25	2041	$ -	$ 22,000,000		$ 4,800,000		$ 22,000,000	$ 26,800,000
26	2042	$ -	$ 22,000,000		$ 4,800,000		$ 22,000,000	$ 26,800,000
27	2043	$ -	$ 22,000,000		$ 4,800,000	**$ -**	$ 22,000,000	$ 26,800,000

NOTES:

1. EFFECTIVE INTEREST RATE USED IS ZERO PERCENT FOR SIMPLICITY IN PRESENTING THE BONDING REQUIREMENTS.
2. BONDING REQUIREMENTS FOR THE WATER TREATMENT CAPEX ARE SATISFIED IN YEAR 8 WHEN THE WATER TREATMENT PLANT IS BUILT AND OPERATING.
3. POST-CLOSURE DISCHARGE VIA THE WATER TREATMENT PLANT WILL BE REQUIRED ONLY AFTER THE PIT IS FILLED TO THE PREDETERMINED MAXIMUM LEVEL.
4. BOND PAYMENTS OCCUR AT THE BEGINNING OF THE YEAR. BONDING REQUIREMENTS AND VALUES ARE CALCULATED AT THE END OF EACH YEAR.

9.4 SUMMARY OF BONDING REQUIREMENTS

The estimated costs for closure and reclamation throughout the mine life will increase over time. It is proposed that the bonding requirement shall be reviewed on a 5-year look forward basis once the mill reaches full production and adjusted as required. The estimated maximum bonding requirement is presented in Table 9.4 below at the start of construction, at the commencement of full production (beginning of Year 2) and at the end of the estimated life of the mine after 27 years.

Table 9.4 Bonding Summary

No.	Bond Description	Estimated Bond Requirement Start of Construction (Year -2)	Estimated Bond Requirement Full Production (Year 2)	Estimated Bond Requirement End of Life of Mine (Year 27)
1.	Reclamation	$7,500,000	$24,000,000	$41,800,000
2.	Environmental Protection	$1,500,000	$1,500,000	$1,500,000
3.	Post-Closure Water Treatment			
3a.	CAPEX Bond value	Nil	$4,600,000	Nil
3b.	OPEX Bond Value	Nil	$19,700,000	$22,000,000
	Totals	**$9,000,000**	**$49,800,000**	**$65,300,000**

NOTE:
No discount or interest rate was utilized for estimating the bonding requirements for each of these periods. This table assumes that the CAPEX bond for Post-Closure Water Treatment has been withdrawn once the water treatment plant has been built (Year 8), and hence this amount is shown as "Nil" at the End of Life of Mine (Year 27).

The closure bonding requirement generally increases over the mine life as additional development takes place and the Project footprint expands, which requires additional reclamation work and greater water treatment capacity.

The closure plan has been developed to a conceptual level and the cost estimate will require adjustment to account for changes in the scope, design, and permitting requirements as the Project is developed further. Studies carried out as part of the environmental assessment (EA) process and information received from this process will solidify decisions about the preferred end-use for the site after closure. For example, ongoing soil and vegetation studies will better define the soil replacement and re-vegetation strategy.

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APPENDIX A

Cost Breakdown Summaries

Knight Piésold CONSULTING

TABLE A-1

NORTHCLIFF RESOURCES LTD.
SISSON PROJECT

CLOSURE AND RECLAMATION
DIRECT COSTS

9/18/2014 12:55

QUANTITY ESTIMATE

MINE YEAR	TSF RECLAMATION											OPEN PIT	ENVIRONMENTAL		INFRASTRUCTURE
	EMBANKMENTS			TAILINGS BEACHES					WASTE ROCK DUMP	TSF SPILLWAY					
	RESURFACE	TOPSOIL (0.25m)	HYDROSEED	RESURFACE	ROCKFILL (0.6m)	TOPSOIL (0.25m)	HYDROSEED	PLANT SEEDLINGS		CHANNEL EXCAV	LINING	FENCE	BMP's	MONITORING	DECOMMISSION
	[m2]	[m3]	[m2]	[m2]	[m3]	[m3]	[m2]	[m2]	[m2]	[m3]	[m]	[m]	[PS]	[PS]	[LS]
-2	33,114	8,279	33,114	0	0	0	0	0	61,500	28,287	1,000	1,000	1	1	1
-1	66,229	16,557	66,229	0	0	0	0	0	123,000	28,287	1,000	2,000	1	1	1
1	117,756	29,439	117,756	203,880	122,328	50,970	203,880	203,880	364,500	28,287	1,000	3,750	1	1	1
2	169,282	42,321	169,282	407,760	244,656	101,940	407,760	407,760	606,000	28,287	1,000	5,500	1	1	1
3	233,690	58,422	233,690	619,685	371,811	154,921	619,685	619,685	613,000	28,287	1,000	5,700	1	1	1
4	298,098	74,524	298,098	831,610	498,966	207,902	831,610	831,610	620,000	28,287	1,000	5,900	1	1	1
5	362,505	90,626	362,505	1,043,535	626,121	260,884	1,043,535	1,043,535	627,000	28,287	1,000	6,100	1	1	1
6	426,913	106,728	426,913	1,255,460	753,276	313,865	1,255,460	1,255,460	634,000	28,287	1,000	6,300	1	1	1
7	491,321	122,830	491,321	1,467,385	880,431	366,846	1,467,385	1,467,385	641,000	28,287	1,000	6,500	1	1	1
8	534,079	133,520	534,079	1,508,647	905,188	377,162	1,508,647	1,508,647	664,333	28,287	1,000	6,667	1	1	1
9	576,837	144,209	576,837	1,549,909	929,945	387,477	1,549,909	1,549,909	687,667	28,287	1,000	6,833	1	1	1
10	619,595	154,899	619,595	1,591,171	954,703	397,793	1,591,171	1,591,171	711,000	28,287	1,000	7,000	1	1	1
11	662,354	165,588	662,354	1,632,433	979,460	408,108	1,632,433	1,632,433	734,333	28,287	1,000	7,167	1	1	1
12	705,112	176,278	705,112	1,673,695	1,004,217	418,424	1,673,695	1,673,695	757,667	28,287	1,000	7,333	1	1	1
13	747,870	186,968	747,870	1,714,957	1,028,974	428,739	1,714,957	1,714,957	781,000	28,287	1,000	7,500	1	1	1
14	783,547	195,887	783,547	1,773,057	1,063,834	443,264	1,773,057	1,773,057	811,000	28,287	1,000	7,643	1	1	1
15	819,225	204,806	819,225	1,831,157	1,098,694	457,789	1,831,157	1,831,157	841,000	28,287	1,000	7,786	1	1	1
16	854,902	213,725	854,902	1,889,257	1,133,554	472,314	1,889,257	1,889,257	871,000	28,287	1,000	7,929	1	1	1
17	890,579	222,645	890,579	1,947,357	1,168,414	486,839	1,947,357	1,947,357	901,000	28,287	1,000	8,071	1	1	1
18	926,256	231,564	926,256	2,005,457	1,203,274	501,364	2,005,457	2,005,457	931,000	28,287	1,000	8,214	1	1	1
19	961,934	240,483	961,934	2,063,557	1,238,134	515,889	2,063,557	2,063,557	961,000	28,287	1,000	8,357	1	1	1
20	997,611	249,403	997,611	2,121,657	1,272,994	530,414	2,121,657	2,121,657	991,000	28,287	1,000	8,500	1	1	1
21	1,029,317	257,329	1,029,317	2,138,078	1,282,847	534,520	2,138,078	2,138,078	986,835	28,287	1,000	8,625	1	1	1
22	1,061,023	265,256	1,061,023	2,154,500	1,292,700	538,625	2,154,500	2,154,500	982,670	28,287	1,000	8,750	1	1	1
23	1,092,729	273,182	1,092,729	2,170,921	1,302,553	542,730	2,170,921	2,170,921	978,505	28,287	1,000	8,875	1	1	1
24	1,124,435	281,109	1,124,435	2,187,343	1,312,406	546,836	2,187,343	2,187,343	974,340	28,287	1,000	9,000	1	1	1
25	1,156,142	289,035	1,156,142	2,203,764	1,322,259	550,941	2,203,764	2,203,764	970,175	28,287	1,000	9,125	1	1	1
26	1,187,848	296,962	1,187,848	2,220,186	1,332,111	555,046	2,220,186	2,220,186	966,010	28,287	1,000	9,250	1	1	1
27	1,219,554	304,888	1,219,554	2,236,607	1,341,964	559,152	2,236,607	2,236,607	961,845	28,287	1,000	9,375	1	1	1

COST ESTIMATE

UNIT RATE	$0.30	$7.00	$1.00	$0.30	$9.75	$7.00	$1.00	$1.00	$1.00	$14.60	$100	$16.50	$500,000	$1,000,000	$0.00	
MINE YEAR	TSF RECLAMATION											OPEN PIT	ENVIRONMENTAL AND MONITORING		INFRASTRUCTURE	TOTAL ESTIMATED COST
	EMBANKMENTS			TAILINGS BEACHES					WASTE ROCK DUMP	TSF SPILLWAY						
	RESURFACE	TOPSOIL (0.25m)	HYDROSEED	RESURFACE	ROCKFILL (0.6m)	TOPSOIL (0.25m)	HYDROSEED	PLANT SEEDLINGS		CHANNEL EXCAV	LINING	FENCE	BMP's	MONITORING	DECOMMISSION	
	[m2]	[m3]	[m2]	[m2]	[m3]	[m3]	[m2]	[m2]	[m]	[m3]	[m]	[m]	[PS]	[PS]	[LS]	
-2	$9,934	$57,950	$33,114	$0	$0	$0	$0	$0	$61,500	$412,990	$100,000	$16,500	$500,000	$1,000,000	$0	**$2,191,989**
-1	$19,869	$115,900	$66,229	$0	$0	$0	$0	$0	$123,000	$412,990	$100,000	$33,000	$500,000	$1,000,000	$0	**$2,370,988**
1	$35,327	$206,072	$117,756	$61,164	$1,192,698	$356,790	$203,880	$203,880	$364,500	$412,990	$100,000	$61,875	$500,000	$1,000,000	$0	**$4,816,932**
2	$50,785	$296,244	$169,282	$122,328	$2,385,397	$713,580	$407,760	$407,760	$606,000	$412,990	$100,000	$90,750	$500,000	$1,000,000	$0	**$7,262,876**
3	$70,107	$408,957	$233,690	$185,906	$3,625,157	$1,084,449	$619,685	$619,685	$613,000	$412,990	$100,000	$94,050	$500,000	$1,000,000	$0	**$9,567,676**
4	$89,429	$521,671	$298,098	$249,483	$4,864,918	$1,455,317	$831,610	$831,610	$620,000	$412,990	$100,000	$97,350	$500,000	$1,000,000	$0	**$11,872,476**
5	$108,752	$634,384	$362,505	$313,060	$6,104,679	$1,826,186	$1,043,535	$1,043,535	$627,000	$412,990	$100,000	$100,650	$500,000	$1,000,000	$0	**$14,177,276**
6	$128,074	$747,098	$426,913	$376,638	$7,344,439	$2,197,054	$1,255,460	$1,255,460	$634,000	$412,990	$100,000	$103,950	$500,000	$1,000,000	$0	**$16,482,075**
7	$147,396	$859,811	$491,321	$440,215	$8,584,200	$2,567,923	$1,467,385	$1,467,385	$641,000	$412,990	$100,000	$107,250	$500,000	$1,000,000	$0	**$18,786,875**
8	$160,224	$934,638	$534,079	$452,594	$8,825,583	$2,640,132	$1,508,647	$1,508,647	$664,333	$412,990	$100,000	$110,000	$500,000	$1,000,000	$0	**$19,351,866**
9	$173,051	$1,009,465	$576,837	$464,973	$9,066,966	$2,712,340	$1,549,909	$1,549,909	$687,667	$412,990	$100,000	$112,750	$500,000	$1,000,000	$0	**$19,916,857**
10	$185,879	$1,084,292	$619,595	$477,351	$9,308,350	$2,784,549	$1,591,171	$1,591,171	$711,000	$412,990	$100,000	$115,500	$500,000	$1,000,000	$0	**$20,481,848**
11	$198,706	$1,159,119	$662,354	$489,730	$9,549,733	$2,856,758	$1,632,433	$1,632,433	$734,333	$412,990	$100,000	$118,250	$500,000	$1,000,000	$0	**$21,046,839**
12	$211,534	$1,233,946	$705,112	$502,109	$9,791,116	$2,928,966	$1,673,695	$1,673,695	$757,667	$412,990	$100,000	$121,000	$500,000	$1,000,000	$0	**$21,611,830**
13	$224,361	$1,308,773	$747,870	$514,487	$10,032,500	$3,001,175	$1,714,957	$1,714,957	$781,000	$412,990	$100,000	$123,750	$500,000	$1,000,000	$0	**$22,176,821**
14	$235,064	$1,371,208	$783,547	$531,917	$10,372,384	$3,102,850	$1,773,057	$1,773,057	$811,000	$412,990	$100,000	$126,107	$500,000	$1,000,000	$0	**$22,893,183**
15	$245,767	$1,433,643	$819,225	$549,347	$10,712,269	$3,204,525	$1,831,157	$1,831,157	$841,000	$412,990	$100,000	$128,464	$500,000	$1,000,000	$0	**$23,609,545**
16	$256,471	$1,496,078	$854,902	$566,777	$11,052,154	$3,306,200	$1,889,257	$1,889,257	$871,000	$412,990	$100,000	$130,821	$500,000	$1,000,000	$0	**$24,325,908**
17	$267,174	$1,558,514	$890,579	$584,207	$11,392,039	$3,407,875	$1,947,357	$1,947,357	$901,000	$412,990	$100,000	$133,179	$500,000	$1,000,000	$0	**$25,042,270**
18	$277,877	$1,620,949	$926,256	$601,637	$11,731,923	$3,509,550	$2,005,457	$2,005,457	$931,000	$412,990	$100,000	$135,536	$500,000	$1,000,000	$0	**$25,758,632**
19	$288,580	$1,683,384	$961,934	$619,067	$12,071,808	$3,611,225	$2,063,557	$2,063,557	$961,000	$412,990	$100,000	$137,893	$500,000	$1,000,000	$0	**$26,474,994**
20	$299,283	$1,745,819	$997,611	$636,497	$12,411,693	$3,712,900	$2,121,657	$2,121,657	$991,000	$412,990	$100,000	$140,250	$500,000	$1,000,000	$0	**$27,191,357**
21	$308,795	$1,801,305	$1,029,317	$641,424	$12,507,759	$3,741,637	$2,138,078	$2,138,078	$986,835	$412,990	$100,000	$142,313	$500,000	$1,000,000	$0	**$27,448,531**
22	$318,307	$1,856,791	$1,061,023	$646,350	$12,603,824	$3,770,375	$2,154,500	$2,154,500	$982,670	$412,990	$100,000	$144,375	$500,000	$1,000,000	$0	**$27,705,705**
23	$327,819	$1,912,276	$1,092,729	$651,276	$12,699,890	$3,799,112	$2,170,921	$2,170,921	$978,505	$412,990	$100,000	$146,438	$500,000	$1,000,000	$0	**$27,962,878**
24	$337,331	$1,967,762	$1,124,435	$656,203	$12,795,956	$3,827,850	$2,187,343	$2,187,343	$974,340	$412,990	$100,000	$148,500	$500,000	$1,000,000	$0	**$28,220,052**
25	$346,842	$2,023,248	$1,156,142	$661,129	$12,892,021	$3,856,588	$2,203,764	$2,203,764	$970,175	$412,990	$100,000	$150,563	$500,000	$1,000,000	$0	**$28,477,226**
26	$356,354	$2,078,733	$1,187,848	$666,056	$12,988,087	$3,885,325	$2,220,186	$2,220,186	$966,010	$412,990	$100,000	$152,625	$500,000	$1,000,000	$0	**$28,734,400**
27	$365,866	$2,134,219	$1,219,554	$670,982	$13,084,153	$3,914,063	$2,236,607	$2,236,607	$961,845	$412,990	$100,000	$154,688	$500,000	$1,000,000	$0	**$28,991,574**

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	26MAR'13	ISSUED WITH LETTER VA12-01515	JF	DF	KJB

Knight Piésold CONSULTING

TABLE A-2

NORTHCLIFF RESOURCES LTD.
SISSON PROJECT

CLOSURE AND RECLAMATION
INDIRECT COSTS

9/18/2014 12:55

MINE YEAR	DIRECT COST	5%	12%	$ 1,500,000	$ 1,000,000	TOTAL ESTIMATED INDIRECT COST
		Mob/Demob (% of Directs)	Construction Management and Indirects (% of Directs)	Materials & Services (power, insurance) - Allowance	Engineering & Specialist Input - Allowance	
-2	$2,191,989	$109,599	$263,039	$1,500,000	$1,000,000	**$2,872,638**
-1	$2,370,988	$118,549	$284,519	$1,500,000	$1,000,000	**$2,903,068**
1	$4,816,932	$240,847	$578,032	$1,500,000	$1,000,000	**$3,318,878**
2	$7,262,876	$363,144	$871,545	$1,500,000	$1,000,000	**$3,734,689**
3	$9,567,676	$478,384	$1,148,121	$1,500,000	$1,000,000	**$4,126,505**
4	$11,872,476	$593,624	$1,424,697	$1,500,000	$1,000,000	**$4,518,321**
5	$14,177,276	$708,864	$1,701,273	$1,500,000	$1,000,000	**$4,910,137**
6	$16,482,075	$824,104	$1,977,849	$1,500,000	$1,000,000	**$5,301,953**
7	$18,786,875	$939,344	$2,254,425	$1,500,000	$1,000,000	**$5,693,769**
8	$19,351,866	$967,593	$2,322,224	$1,500,000	$1,000,000	**$5,789,817**
9	$19,916,857	$995,843	$2,390,023	$1,500,000	$1,000,000	**$5,885,866**
10	$20,481,848	$1,024,092	$2,457,822	$1,500,000	$1,000,000	**$5,981,914**
11	$21,046,839	$1,052,342	$2,525,621	$1,500,000	$1,000,000	**$6,077,963**
12	$21,611,830	$1,080,591	$2,593,420	$1,500,000	$1,000,000	**$6,174,011**
13	$22,176,821	$1,108,841	$2,661,218	$1,500,000	$1,000,000	**$6,270,060**
14	$22,893,183	$1,144,659	$2,747,182	$1,500,000	$1,000,000	**$6,391,841**
15	$23,609,545	$1,180,477	$2,833,145	$1,500,000	$1,000,000	**$6,513,623**
16	$24,325,908	$1,216,295	$2,919,109	$1,500,000	$1,000,000	**$6,635,404**
17	$25,042,270	$1,252,113	$3,005,072	$1,500,000	$1,000,000	**$6,757,186**
18	$25,758,632	$1,287,932	$3,091,036	$1,500,000	$1,000,000	**$6,878,967**
19	$26,474,994	$1,323,750	$3,176,999	$1,500,000	$1,000,000	**$7,000,749**
20	$27,191,357	$1,359,568	$3,262,963	$1,500,000	$1,000,000	**$7,122,531**
21	$27,448,531	$1,372,427	$3,293,824	$1,500,000	$1,000,000	**$7,166,250**
22	$27,705,705	$1,385,285	$3,324,685	$1,500,000	$1,000,000	**$7,209,970**
23	$27,962,878	$1,398,144	$3,355,545	$1,500,000	$1,000,000	**$7,253,689**
24	$28,220,052	$1,411,003	$3,386,406	$1,500,000	$1,000,000	**$7,297,409**
25	$28,477,226	$1,423,861	$3,417,267	$1,500,000	$1,000,000	**$7,341,128**
26	$28,734,400	$1,436,720	$3,448,128	$1,500,000	$1,000,000	**$7,384,848**
27	$28,991,574	$1,449,579	$3,478,989	$1,500,000	$1,000,000	**$7,428,568**

V:\1218\active\121811420\Closure Plan Review\[Closure Cost Breakdown for PNB (Response to IR) - 2014_08_25.xls]INDIRECT COSTS

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	26MAR'13	ISSUED WITH LETTER VA12-01515	JF	DF	KJB

Knight Piésold CONSULTING

TABLE A-3

NORTHCLIFF RESOURCES LTD.
SISSON PROJECT

CLOSURE AND RECLAMATION
WATER TREATMENT DESIGN FLOW FACTOR

MAUR (m/yr)	0.827
MAP (m/yr)	1.275
RC (OP)	0.9

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MINE YEAR	PIT LAKE VOLUME TO ELEVATION 270 masl	DIRECT PIT SURFACE AREA	UNDISTURBED AREA (PIT AREA +15%)	TSF INFLOW	AVERAGE PIT RUNOFF	GW INFLOW TO PIT	GW INFLOW TO PIT	AVERAGE GW INFLOW TO PIT (50%)	TOTAL INFLOW DURING FILLING	YEARS TO FILL	PIT OUTFLOW POST FILLING	WATER TREATMENT DESIGN FLOW FACTOR
	(m3)	(m2)	(m2)	(m3/yr)	(m3/yr)	(L/s)	(m3/yr)	(m3/yr)	(m3/yr)	(years)	(m3/yr)	
0	0	186,811	28,022	1,495,000	237,540	1	15,768	7,884	1,740,424	0	1,732,540	0.42
4	14,768,817	601,218	90,183	1,725,000	764,479	5	157,680	78,840	2,568,319	6	2,489,479	0.60
8	40,419,650	1,057,784	158,668	2,300,000	1,345,025	15	473,040	236,520	3,881,545	10	3,645,025	0.88
12	68,092,411	1,192,882	178,932	2,300,000	1,516,809	20	630,720	315,360	4,132,169	16	3,816,809	0.92
16	96,657,965	1,192,882	178,932	2,300,000	1,516,809	20	630,720	315,360	4,132,169	23	3,816,809	0.92
20	123,649,912	1,465,132	219,770	2,300,000	1,862,989	40	1,261,440	630,720	4,793,709	26	4,162,989	1.00
24	154,015,951	1,465,132	219,770	2,300,000	1,862,989	40	1,261,440	630,720	4,793,709	32	4,162,989	1.00
27	159,902,346	1,465,132	219,770	2,300,000	1,862,989	40	1,261,440	630,720	4,793,709	33	4,162,989	1.00

V:\1218\active\121811420\Closure Plan Review\[Closure Cost Breakdown for PNB (Response to IR) - 2014_08_25.xls]OPEN PIT FILLING

NOTES:

1. PIT VOLUMES CALCULATED IN CIVIL 3D FROM MMTS ANNUAL PIT STAGES, YEARS APPROXIMATED BASED ON REVISED PRODUCTION SCHEDULE
2. NON-DIRECT CATCHMENT AREA ASSUMED AS 115% OF DIRECT (BERMS AND DIVERSIONS TO BE CONSTRUCTED ABOVE PIT WALLS)
3. TSF INFLOW IN YEAR 0 ASSUMES 35% OF THE FULL TSF UPSTREAM CATCHMENT AREA IS DIVERTED
4. TSF INFLOW IN YEAR 5 ASSUMES 25% OF THE FULL TSF UPSTREAM CATCHMENT AREA IS DIVERTED

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	26MAR'13	ISSUED WITH LETTER VA12-01515	JF	DF	KJB

Knight Piésold CONSULTING

TABLE A-4

NORTHCLIFF RESOURCES LTD.
SISSON PROJECT

CLOSURE AND RECLAMATION
ONGOING WATER TREATMENT COSTS

Effective Interest Rate	5.00%	
Water Treatment Period	IN PERPETUITY	
Water Treatment Variable Opex at Full Size	$300,000	**$/YEAR**
Water Treatment Fixed Annual Opex	$800,000	**$/YEAR**
Full Capacity Water Treatment Plant CAPEX	$5,500,000	
Water Treatment Plant Constructed	10	**yr**

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MINE YEAR	YEARS TO FILL	WATER TREATMENT DESIGN FLOW FACTOR	IN PERPETUITY TOTAL OPEX	TOTAL CAPEX	TOTAL WATER TREATMENT	TOTAL WATER TREATMENT WITH INTEREST
-1	0	0.42	$ 16,525,575	$ 3,250,345	$ 19,775,920	$ 19,775,920
1	1	0.46	$ 17,018,149	$ 3,458,924	$ 20,477,073	$ 19,090,014
2	3	0.51	$ 17,493,034	$ 3,659,432	$ 21,152,465	$ 18,383,902
3	4	0.55	$ 17,953,060	$ 3,852,866	$ 21,805,926	$ 17,668,090
4	6	0.60	$ 18,400,418	$ 4,040,030	$ 22,440,448	$ 16,950,594
5	7	0.67	$ 19,062,738	$ 4,315,123	$ 23,377,861	$ 16,682,351
6	8	0.74	$ 19,704,203	$ 4,578,985	$ 24,283,188	$ 16,370,324
7	9	0.81	$ 20,328,314	$ 4,833,075	$ 25,161,388	$ 16,024,528
8	10	0.88	$ 20,937,743	$ 5,078,552	$ 26,016,294	$ 15,652,913
9	12	0.89	$ 21,027,221	$ 5,114,369	$ 26,141,590	$ 14,606,687
10	13	0.90	$ 21,116,427	$ -	$ 21,116,427	$ 10,957,467
11	15	0.91	$ 21,205,368	$ -	$ 21,205,368	$ 10,218,933
12	16	0.92	$ 21,294,048	$ -	$ 21,294,048	$ 9,529,892
13	18	0.92	$ 21,294,048	$ -	$ 21,294,048	$ 8,759,267
14	20	0.92	$ 21,294,048	$ -	$ 21,294,048	$ 8,050,957
15	22	0.92	$ 21,294,048	$ -	$ 21,294,048	$ 7,399,924
16	23	0.92	$ 21,294,048	$ -	$ 21,294,048	$ 6,801,537
17	24	0.94	$ 21,471,987	$ -	$ 21,471,987	$ 6,660,296
18	25	0.96	$ 21,648,933	$ -	$ 21,648,933	$ 6,521,242
19	25	0.98	$ 21,824,925	$ -	$ 21,824,925	$ 6,384,385
20	26	1.00	$ 22,000,000	$ -	$ 22,000,000	$ 6,249,734
21	27	1.00	$ 22,000,000	$ -	$ 22,000,000	$ 5,785,026
22	29	1.00	$ 22,000,000	$ -	$ 22,000,000	$ 5,354,872
23	31	1.00	$ 22,000,000	$ -	$ 22,000,000	$ 4,956,702
24	32	1.00	$ 22,000,000	$ -	$ 22,000,000	$ 4,588,139
25	32	1.00	$ 22,000,000	$ -	$ 22,000,000	$ 4,588,139
26	32	1.00	$ 22,000,000	$ -	$ 22,000,000	$ 4,588,139
27	33	1.00	$ 22,000,000	$ -	$ 22,000,000	$ 4,321,330

V:\1218\active\121811420\Closure Plan Review\[Closure Cost Breakdown for PNB (Response to IR) - 2014_08_25.xls]WATER TREATMENT

NOTES:

1. THE WATER TREATMENT PLANT CAPEX AND OPEX ARE BASED ON THE SRK CONSULTING MEMO DATED JANUARY 11, 2013.
2. A WATER TREATMENT PLANT IS REQUIRED DURING OPERATIONS FROM YEAR 10 ONWARDS FOR TSF DISCHARGE.
3. WATER TREATMENT IS ASSUMED TO BE REQUIRED IN-PERPETUITY.
4. ON-GOING MAINTENANCE COSTS FOR THE WATER TREATMENT PLANT DURING THE PIT FILLING PERIOD HAVE NOT BEEN INCLUDED.
5. OPEX WAS REDUCED FOR PREMATURE CLOSURE SCENARIOS BASED ON THE SMALLER TSF AND PIT CATCHMENT AREAS. COSTS WERE FACTORED USING A SCALING EQUATION BASED ON WTP DESIGN FLOW.
6. CONTINGENCY NOT INCLUDED ON WATER TREATMENT COSTS.

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