11.0 CONCEPTUAL CLOSURE PLAN

The following is a conceptual closure plan based on the project description as outlined in Section 2. A certified closure plan, based on the conceptual closure plan, will be developed as per the Part VII requirements of the Ontario *Mining Act*, will be submitted separately to the Ministry of Northern Development Mines (MNDM).

Key Project components (Figures 11.1.1) include:

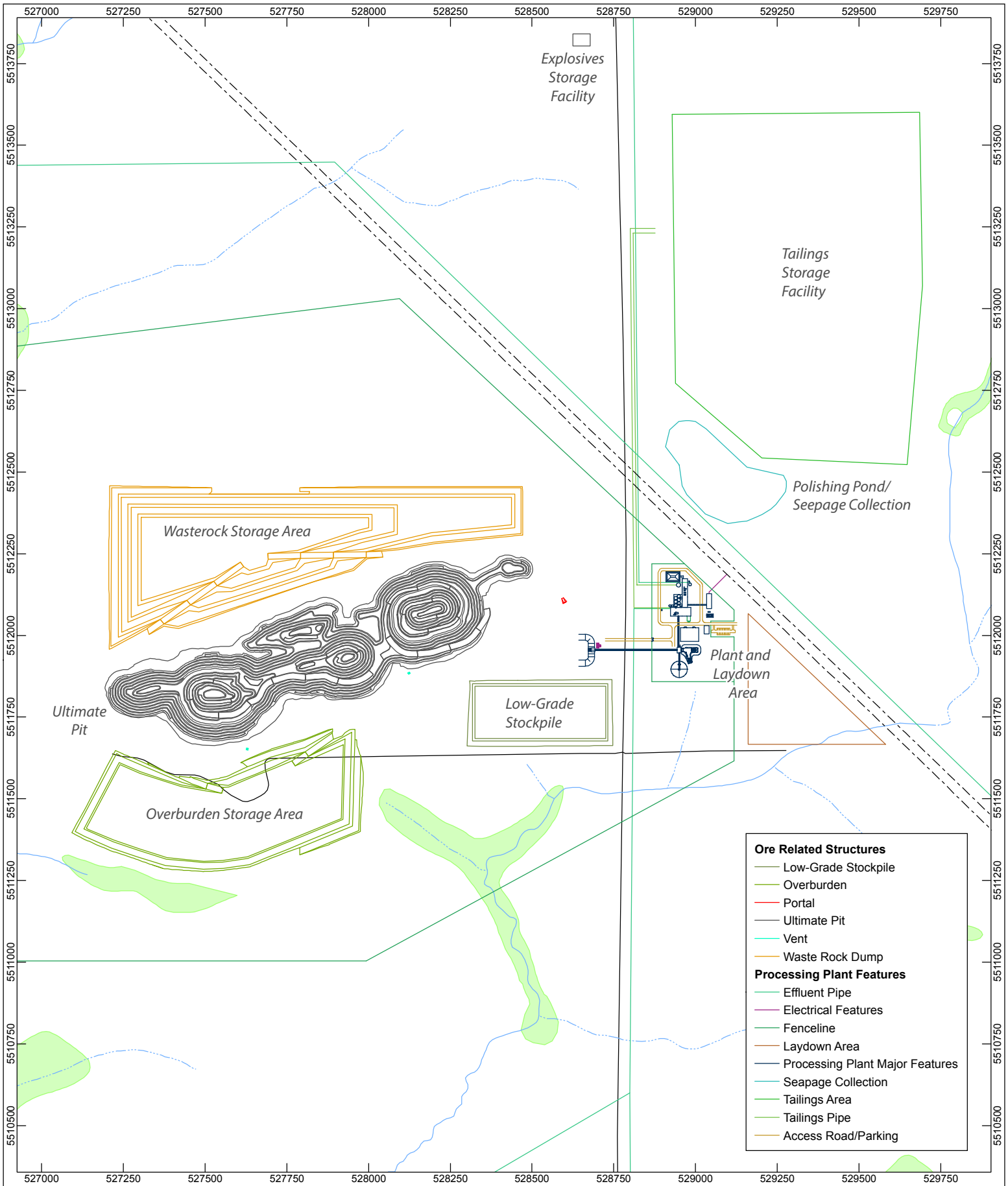
- An open pit mine, comprised of three sequentially developed and connected pits;
- An underground mine;
- An above-grade waste rock storage area (WRSA);
- A low-grade ore stockpile;
- An overburden stockpile;
- An ore processing facility, including a mill feed stockpile;
- A tailings storage facility (TSF), including a polishing pond;
- Supporting infrastructure, including truck shop, refueling station, substation, and explosives storage;
- A water management system, including a water intake, piping, and a water treatment plant; and
- Linear infrastructure, including mine roads and power distribution.

11.1 CLOSURE OBJECTIVES

The closure objectives follow the Mine Reclamation Code of Ontario (Ontario Regulation 240/00, Schedule 1). This code provides specific standards, procedures, and minimum requirements for closure of mine components in Ontario. Component objectives include:

- Mine openings - to ensure that inadvertent access to mine openings to the surface is prevented.
- Open pits - to limit potential hazards, maintain public safety and restore the site to an appropriate land use.
- Underground mining - to limit potential hazards, maintain public safety and restore the site to an appropriate land use.
- Tailings dams and other containment structures - to ensure the long-term physical stability of tailings dams and other containment structures.
- Physical stability - to ensure the safety of the site by requiring that all lands, water management structures and other mine-related structures are left in a stable condition.
- Re-vegetation – to:
    - stabilize surface materials and provide protection from wind and water erosion;
    - improve the appearance and aesthetics of the site;
    - enhance natural vegetation growth and establish self-sustainable vegetation growth; and
    - support the designated end use of the site.

In addition to these objectives, the closure plan takes advantage of progressive remediation opportunities for Project components.



GOLIATH GOLD PROJECT
DRYDEN, ONTARIO, CANADA

GENERAL ARRANGEMENT OF PROJECT SITE DURING OPERATIONS PHASE

FIGURE: 11.1.1 | REV.00

SCALE: 15 000

TREASURY METALS INC.

DESIGN: AT 20 FEB. 2014
GIS: AT 24 JUNE. 2014
CHECK: AT 12 SEP. 2014

Intermittent Watercourse
Permanent Watercourse
Roadway
Wetland
Waterbody
Utility Line

N

0 100 200 300
Meters

REFERENCE
Data by Treasury Metals Inc.
Projection: NAD83 UTM Zone 15N

11.2 PROGRESSIVE RECLAMATION

The sequential development of the three open pits and the two-stage mine plan (open pit followed by underground mining) provides the opportunity to conduct progressive reclamation of the surface developments prior to full mine closure.

11.2.1 Waste Rock Storage Area

During the initial phases of open pit development, waste rock will be placed in an above-grade WRSA. Waste rock from later phases of open pit development will be placed in the central and east pits. Approximately 12.9 Mt off waste rock will be placed in the WRSA while 12.1 Mt will be returned as backfill to the west and central pits. The WRSA will only be operated during the development of the west and central open pits. Once backfilling of the west pit commences, the WRSA will be closed and reclaimed.

Closure and reclamation of the WRSA will consist of placing a water-shedding cap over the WRSA that is tied into the up-gradient clay soil and vegetation of the cap and disturbed areas. The WRSA will be graded as required and a pioneer or base/stabilization layer will be placed over the waste rock to fill voids. A low permeable layer of clay will then be placed over the pioneer layer. The clay layer will be tied into the clay zone to provide complete encapsulation of the waste rock surface. A granular shedding layer will be placed over the clay layer to allow runoff to shed from the surface. A layer of topsoil, stockpiled from the site preparation activities, will then be placed over the granular layer and the final surface will be vegetated. Runoff collection ditches will be realigned to direct runoff into the open pits. All disturbed areas surrounding the WRSA that are not required for mine operation will be decommissioned and vegetated.

The west and central pits will be backfilled such that the waste rock will remain below the final water surface elevation of the flood pits. This will ensure the backfill remains underwater in the post-closure phase.

11.2.2 Open Pits

The open pit mine is comprised of three interconnected pits. The west pit and part of the central pit will be backfilled with waste rock from the development of the central and east pits. The pits will be prepared for closure and then allowed to flood through groundwater infiltration, precipitation, and surface runoff. A passive spillway will be constructed to allow the pit lake to discharge into an existing ephemeral tributary of Blackwater Creek. The open pit mine closure is intended to leave a functioning aquatic ecosystem while providing secure storage of waste rock underwater.

Once open pit mining and waste rock backfill operations have been completed the pits will be prepared for closure and flooding. The overburden slopes around the perimeter of the pits will be graded to a 3H:1V slope. The overburden will be armoured to an elevation of 1 m above the discharge spillway crest. The armouring will prevent erosion of the overburden by wave action, runoff, and ice action during pit flooding and water level fluctuations. Slope armouring will be sourced from a clean local quarry. The overburden slopes above the armouring will be vegetated to prevent erosion and sediment transport. Any excess overburden produced during the slope grading will be stockpiled for use in the closure of the TSF, if necessary, or placed in the pits. As the waste rock is currently classified PAG, the option of stockpiling boulders for a perimeter barrier is not available. Therefore, a berm will placed around the perimeter of the open pits as per s.25 of the Mine Reclamation Code. Clean, locally sourced material will be used to construct a perimeter berm. A passive spillway will be constructed to allow the pit lake to eventually discharge to Blackwater Creek. The elevation of the spillway will be set to ensure the lake level is maintained within the overburden above the bedrock. This will ensure that the waste rock and pit walls remain underwater during the post-closure phase. Any hydraulic connections with the underground operations, such as exploration drill holes, will be sealed as encountered during underground operations.

The pit walls and waste rock are currently classified as PAG although it is likely to take decades for the rock to go acid (Appendix K). Placing PAG rock under a water cover is a standard practice to prevent ARD/ML. Allowing the pit to fill unassisted through surface runoff and groundwater (once underground mining has ceased) would require an estimated 20 years which is near the low end of the estimated time for the rock to go acid. In order to ensure the rock has been covered within a suitable safety margin and ensure the secondary water treatment plant is available, should additional treatment be necessary, the pit fill will be assisted using clean water.

The water for pit filling will come from three sources: surface water runoff and precipitation, secondary treatment discharge, and groundwater from wells outside of the mine zone of influence (Table 11.2.1). It is assumed that there will be no groundwater inflows due to the underground mine dewatering.

Table 11.2.1 Annual Pit Water Requirements for Filling the Project Open Pits

Parameter	Value	Unit	
Pit Volume:	12,800,000	m^3	
Fill Time:	9	yr	
Annual Fill:	1,422,222	m^3	
Source	**Value**	**Unit**	**Proportion**
Runoff and Precipitation	362,534	m^3/yr	25.5%
RO Plant	535,455	m^3/yr	37.6%
Groundwater	524,233	m^3/yr	36.9%
Total	**1,422,222**	**m^3/yr**	**100.0%**

11.3 RECLAMATION AT CLOSURE

The closure phase of the Project will be initiated once the mining activities and ore processing have been completed. Closure activities include closure of the underground mine, TSF, and process plant and the reclamation of surface infrastructure.

11.3.1 Underground Mine

All infrastructure and equipment will be removed from the underground mine and any spills or waste will be cleaned up and removed. The ramp and portal will be sealed using clean, quarried rock backfilled to a minimum distance of 30 m from the portal entrance. The area around the portal will then be backfilled, covered with soil, and vegetated. This will ensure the portal is no longer visible and is not accessible. Ventilation raises will be sealed to prevent inadvertent access to the mine workings by humans and wildlife. The raises will be sealed using reinforced concrete or steel caps as per Ontario Regulation 240/00, s.24(2)(1). All works will be inspected by a qualified professional engineer prior to and after completion to ensure compliance with appropriate engineering and construction standards. The underground workings will then be allowed to flood through groundwater seepage and surface run-off.

11.3.2 Tailings Storage Facility

The TSF will be constructed as an above-grade facility contained by dams. All tailings from ore processing will be directed to the TSF during the operation phase. The TSF will be constructed through a series of lifts to the dams as tailings capacity is required.

Closure and reclamation of the TSF will consist of capping the final tailings beach surface and reclamation of the facility. Standing water that is present at the end of the operations will be removed and the final tailings beach surface re-graded, as required, to ensure it is totally free draining. Grading of the final tailings beach surface will

be completed in conjunction with placement of a pioneer or base/stabilization layer over the tailings surface for access. A low permeable layer of clay will then be placed over the pioneer layer. The clay layer will be tied into the embankment upstream clay zone to provide complete encapsulation of the tailings surface. A granular shedding layer will be placed over the clay layer to allow runoff to shed from the surface. A layer of topsoil, stockpiled from the site preparation activities, will then be placed over the granular layer and the final surface will be vegetated. The downstream slopes of the embankments will also be re-graded and covered with topsoil and vegetated.

The water reclaim pump, reclaim pipeline and tailings delivery and distribution pipelines will be decommissioned and removed from the site. The emergency overflow spillway will be decommissioned. The monitoring wells present in the crest of the dam will remain in-place as well as the monitoring wells located on the downstream area of the dam for use during the closure monitoring phase. Access roads that are no longer required will be scarified and vegetated.

11.3.3 Overburden Stockpile

The overburden stockpile will be partially reclaimed during the closure of the WRSA while excess overburden resulting from the cutback and grading around the pits may be added to the stockpile. At closure the overburden will be used as cover material for the TSF closure as well as other reclamation activities requiring fill. Any material remaining in the stockpile will be graded and vegetated.

11.3.4 Low-grade Ore Stockpile

The low-grade stockpile will store low-grade ore generated during the open pit mining phase. The stockpiled ore will be mixed and milled with the higher grade ore produced during the underground mining phase. The low-grade stockpile will be depleted by the completion of underground mining. At closure, any residual ore or PAG material on the stockpile pad will be removed and placed in the TSF. The stockpile pad will then be scarified and vegetated.

11.3.5 Project Infrastructure

Any salvageable materials, machinery, and equipment will be dismantled and removed from site for reuse or sale. All buildings and infrastructure will be dismantled and removed from site to a licensed landfill. All concrete foundations will be cut to within 0.5 m of grade and contoured with clean, locally sourced fill and vegetated.

Any unused petroleum products and processing chemicals will be removed from site at the end of operations and returned to the suppliers or sold to third party. Any areas contaminated by spills of hazardous materials during the project life will be delineated and remediated as appropriate to the specific contaminant risks and potential future site uses.

Any sludge remaining in the mine site settling ponds at closure will be removed and placed in the TSF. The pond liner also will be removed and disposed of in the mine underground. The pond berms will be recovered and used as cover material for the TSF. Disturbed areas will be vegetated. Any other water management structures such as ditches will be backfilled with overburden material and vegetated.

Explosives will be managed by a mine contractor who will supply stock on an as needed basis. Any unused stock at site will be removed by the contractor as per applicable health, safety, and environmental requirements.

The electrical substation will be decommissioned and removed from site once the secondary treatment plant has been decommissioned. Power line conductors and poles will be removed once power is no longer needed on the site. Pole holes will be backfilled and any areas vegetated.

The former Tree Nursery buildings will be retained and serve as the base of operations for closure and monitoring activities as well as ongoing mineral exploration programs.

11.4 POST-CLOSURE SITE CONDITIONS

11.4.1 Pre-development Infrastructure

The existing pre-development roads in the Project area will be returned to public use. These include Anderson, Normans, and Tree Nursery roads. The structures at the former Tree Nursery will also remain and, just like their pre-development role, will serve as the operation centre for ongoing mineral exploration activities in the region by Treasury.

11.4.2 Terrain

Terrain at the Project site will be relatively similar to pre-development conditions with the exception of the closed WRSA and TSF sites. At the WRSA site a low hill of approximately 36 ha and rising to 30 m above the pre-development terrain grade will remain. Contouring, reclamation, and vegetation will allow the hill to blend into the surrounding terrain features. At the TSF site a low, flattop plateau of approximately 76 ha and 10 m above the pre-development terrain grade will remain where there was previously a depression. As with the WRSA, contouring, reclamation, and vegetation will blend the site into the surrounding terrain features. Other reclaimed infrastructure sites such as the low-grade ore stockpile and process plant site will blend into the surrounding terrain.

11.4.3 Surface and Groundwater

At closure, the groundwater drawdown will be at the maximum extent. Once all mining has ceased the underground works will be allowed to flood with the groundwater elevations eventually returning to pre-development levels. It is anticipated the drawdown effects will be fully reversed in 20 to 30 years.

Stream channel alterations will be confined to Blackwater Creek tributaries. The upstream portion of the tributary at the TSF site will no longer exist; however, the runoff from the reclaimed TSF is expected to report to the remaining section of the tributary. The pre-development headwater wetland of beaver ponds at the open pit site will become a pit lake. In general, the Project site post-closure is expected to increase the average annual flow and maximum outflow in Blackwater as the terrain alterations will result in more efficient routing water from the sub-basins (Appendix O). Low flow conditions are predicted to remain similar to the pre-development conditions. The flow increases are within the capacity of the existing creek channels. Peak flows could be attenuated by converting surface water collection ponds, diversion ditches, and seepage ponds into retention ponds.

It is estimated that it will take nine years for the pits to fill through precipitation and surface runoff and augmented by secondary treatment discharge and other groundwater/surface water sources. The pit water quality is anticipated to be proportional to the sources. Therefore, water quality is expected to near background for surface and groundwater. Once the pit lake begins to discharge into the Blackwater Creek tributary the excess water will be derived of surface runoff and precipitation while groundwater contributions are anticipated to be negligible.

11.4.4 Aquatic Environment

A long, narrow pit lake comprising three basins will remain where there once was a headwater wetland of beaver ponds. The lake will increase in depth from the west to east as a result of the waste rock backfill placed in the west and central basins. The west basin will be shallow (i.e., 2 m to 3 m) and well within the euphotic zone for primary productivity. The east basin will be deep (i.e., 140 m) while the central basin depth will provide a transition zone. The central and east basins are expected to undergo thermal stratification which would separate the epilimnion from the hypolimnion. The stratification could either be seasonal or permanent. If the stratification remains permanent then the hypolimnion would become anoxic while the epilimnion would seasonally mix. Under both scenarios, it is expected the lake would support aquatic life. The shallow west basin and the contoured shores would provide productive littoral zone habitat which would give the pit lake a much higher proportion of

productive aquatic habitat than most pit lakes (Gammons *et al*. 2009). The pit lake would also provide habitat for small- and large-body fish species in a marshy area that is periodically impounded by beaver dams.

11.4.5 Terrestrial Environment

The Project was designed to have a minimal, compact footprint. All disturbed areas will be seeded with regionally acceptable pioneer plant species selected for rapid growth and colonization to provide soil stabilization and prevent erosion. It is anticipated that these communities will give way as the surrounding forest communities colonize the disturbed areas through natural forest succession. It is anticipated that the areas disturbed during mine development will eventually be indistinguishable and continuous with the surrounding forested areas.

11.5 POST-CLOSURE MONITORING

11.5.1 Physical Stability

Monitoring of the closed facility will consist of annual Dam Safety Inspections of the closed facility as well as Dam Safety Reviews for a period of five years following closure.

11.5.2 Chemical Stability and Biological Monitoring

Environment Canada will be notified when a date has been set to close the mine. A final biological monitoring study will be designed, submitted for review, and conducted prior to mine closure, as per Schedule 5, Division 3 of the MMER. A final interpretive report will be submitted to Environment Canada. Groundwater and surface water will continue to be monitored, as per the annual monitoring program, for three years following closure.