

November 2021

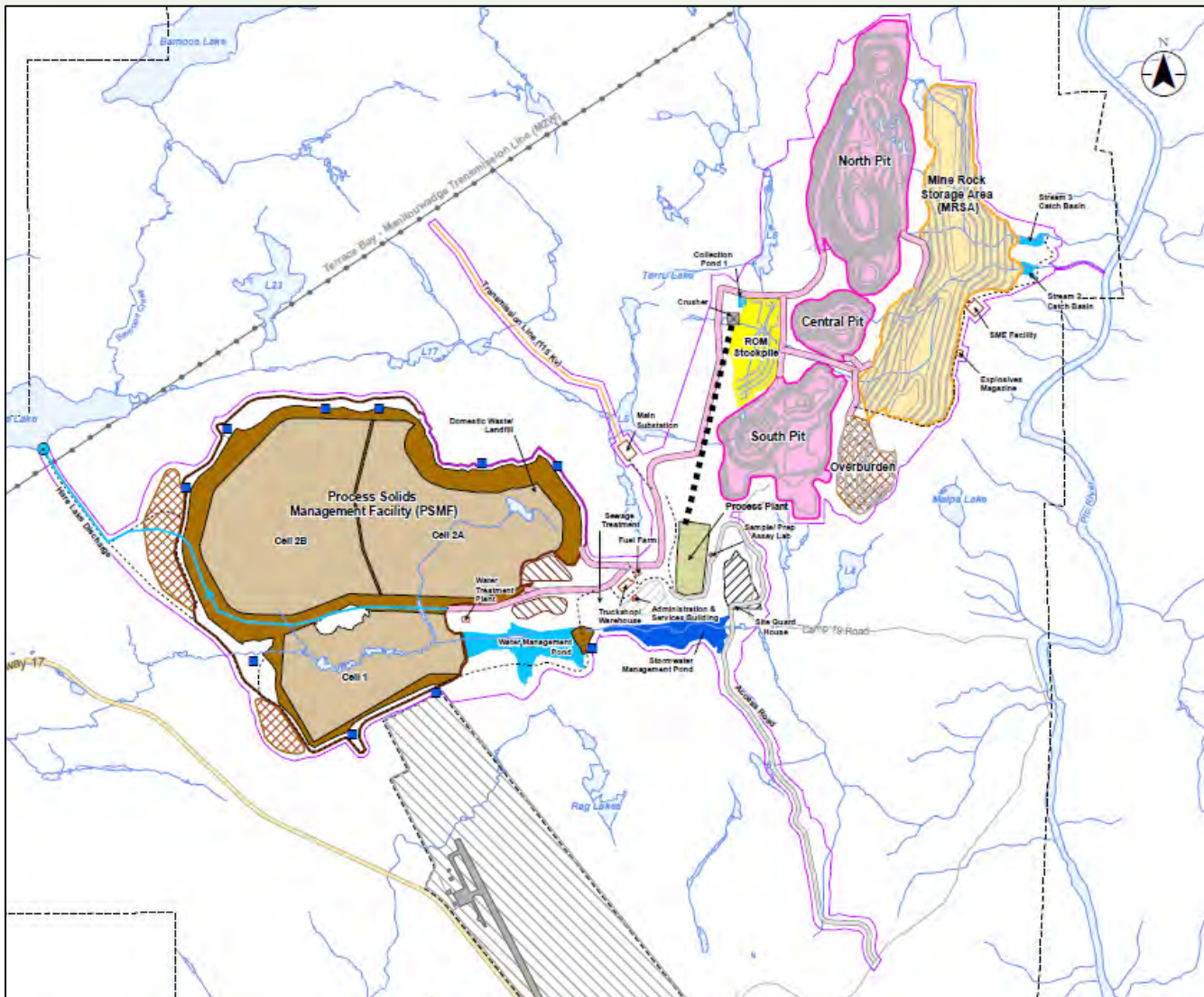
Closure Planning

# MARATHON PALLADIUM PROJECT

# GENERATION PGM



# PROJECT SUMMARY - REVIEW



Proposed Project Footprint

- Three planned open pits (central, north and south)
  - Measured and indicated resources 179.2 M tonnes
  - PSMF, water management ponds and stockpiles
- Mine rock storage area
  - 85-90% non-acid generating mine rock
  - Long term PAG storage in PSMF and open pits
- Process plant facility
  - 25,200 tonnes per day
- 2.2 km of new transmission line
- 2.5 km of new access road
- Excess water will be treated and discharged to Hare Lake

# MINE REHABILITATION CODE OF ONTARIO

Mine Rehabilitation Code of Ontario (Code) is published in Ontario Regulation 240/00 (as amended) and provides standards for mine rehabilitation.

The Code addresses all components of a mine development to ensure a site is safe, physically stable and chemically stable (i.e., acid rock drainage and metal leaching is controlled) after rehabilitation work is completed.

- Crown pillar & underground workings, mine openings, open pits
- Tailings impoundment areas, water impoundments, rock piles
- Building and infrastructure removal
- Machinery, equipment, storage tanks
- Petroleum products, chemicals, explosives
- Waste management sites, liquid and solid wastes
- Remediation of contaminated soil
- Protection of ground water and surface water quality
- Re-vegetation
- Monitoring program

Financial assurance must be provided by a proponent to cover rehabilitation costs.

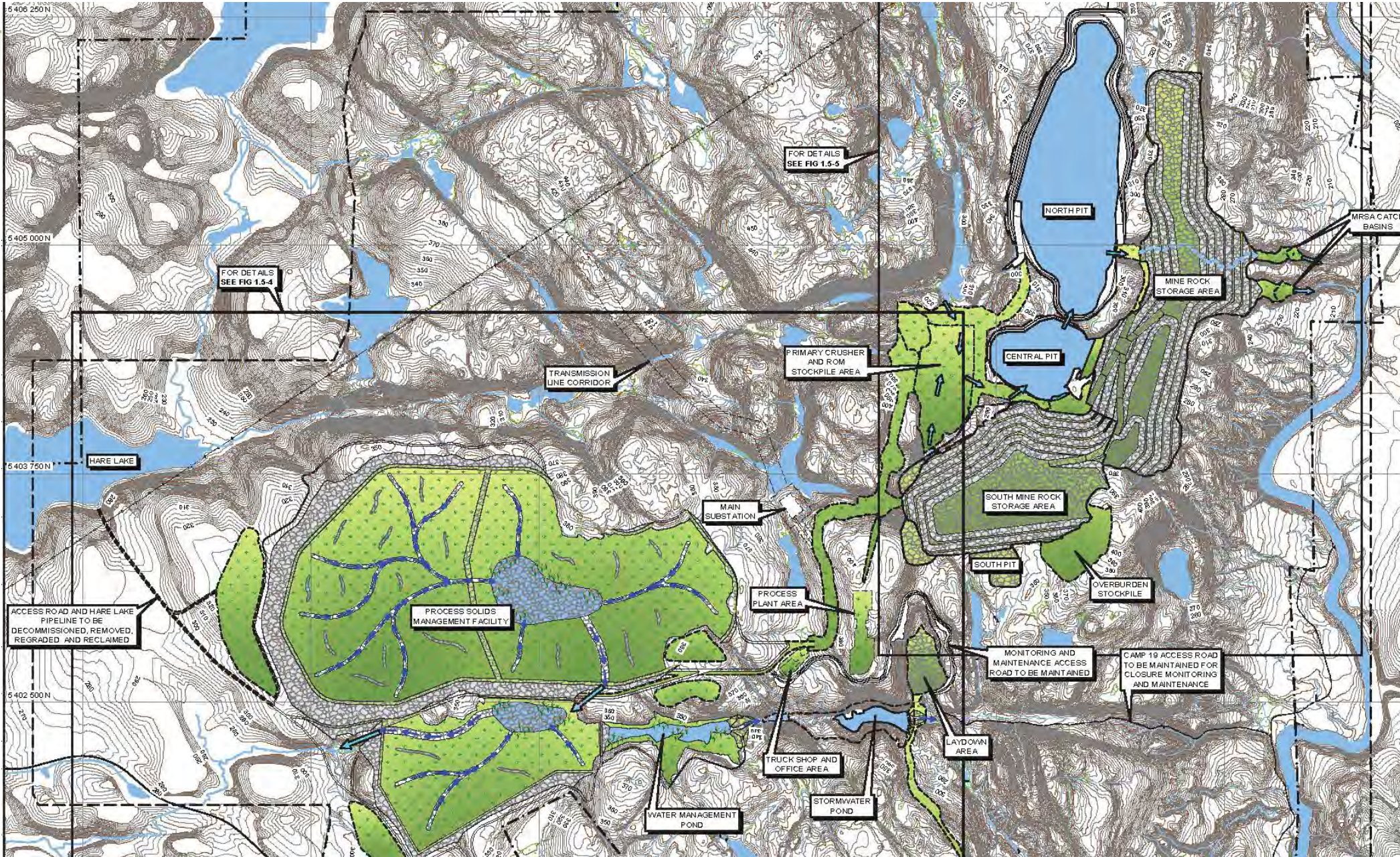


## REHABILITATION OBJECTIVES FROM THE CODE

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- Reclaim land within the Project footprint so it is physically stable (erosion protection) and chemically stable to prevent acid generation and metal leaching
- Maximize future use by plants and animals
- Reduce impacts to the natural environment, with progressively less impact than operations
- Consider access for traditional and other land-use activities
- Reflect the interests of Indigenous people, the public and government

# CLOSURE PLANNING - OVERVIEW



A re-vegetation program will be implemented that:

- Stabilizes disturbed surface areas to minimize erosion;
- Provides a self-sustaining cover;
- Enhances terrestrial habitat;
- Supports the end use of the site; and,
- Improves the aesthetic appearance of the site.

The program will involve:

- Scarification of roadways and other compacted areas;
- Improving stability and aesthetics;
- Application of soil cover where practical;
- Application of soil amendments as practical; and,
- Use of local species whenever and wherever possible.



Researchers at Lakehead University conducted greenhouse revegetation trials on Marathon PGM tailings during the summer of 2009.

The results showed that fertilizer and natural forest soil amendments improved plant growth significantly over unamended tailings.

Based on the results of the study it was recommended that natural forest soil stockpiled during the preproduction phase be used as a tailing amendment as it is expected to have longer lasting effects than fertilizer.

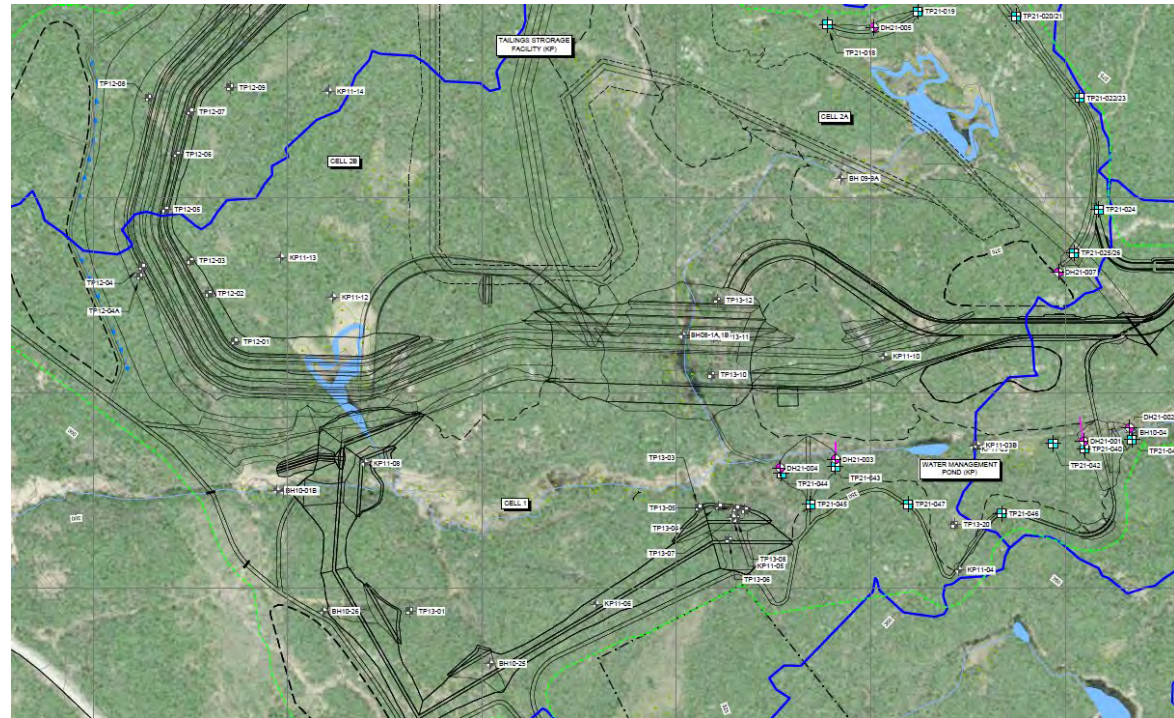
The revegetation plan will be a living document that will be updated as appropriate throughout the Project life to reflect changing conditions and lessons learned from vegetation test plots.

Section 38 to 40 of the Code protects water quality.

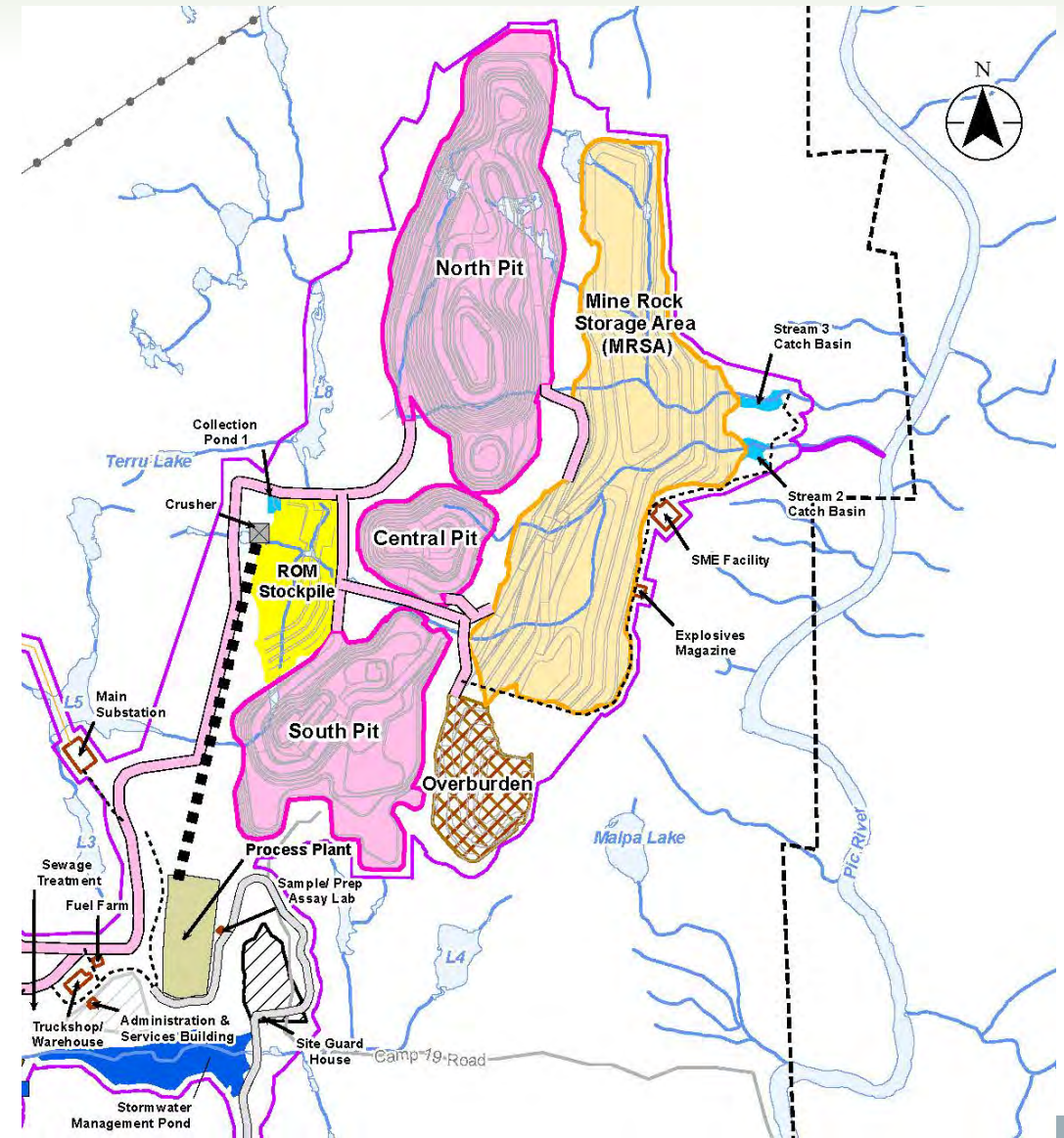
*The surface water quality of a closed out site shall meet the Provincial Water Quality Objectives or, where the proponent establishes that it is not practicable to meet the objectives set out therein, shall meet the background levels for water quality if the proponent establishes scientifically what those levels were (small mixing zones may be permitted but water needs to be “fishable, swimmable, drinkable”).*

*If aquatic life in the receiving water body has been adversely affected during the operating phase or the closure of the site, the closure plan shall be amended to specify the steps that will be taken to re-establish a diverse and viable aquatic community.*

- The SMP will drain to the open pits; overflow from the open pits will be consolidated in the North Pit and then eventually discharge to the Pic River via a porous rock fill beneath the MRSA
- Runoff from the PSMF will return to its natural drainage route (stream 6)

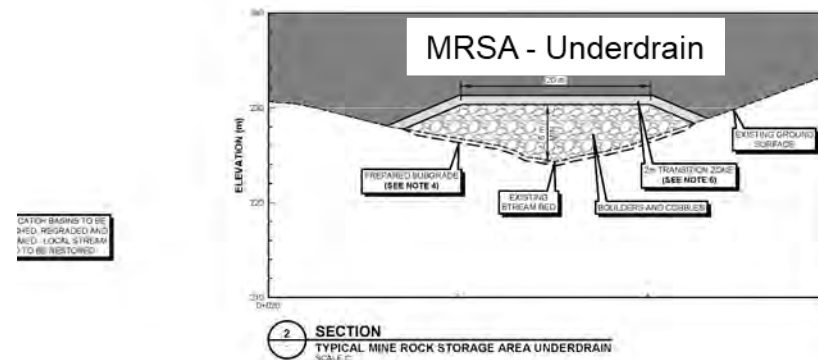
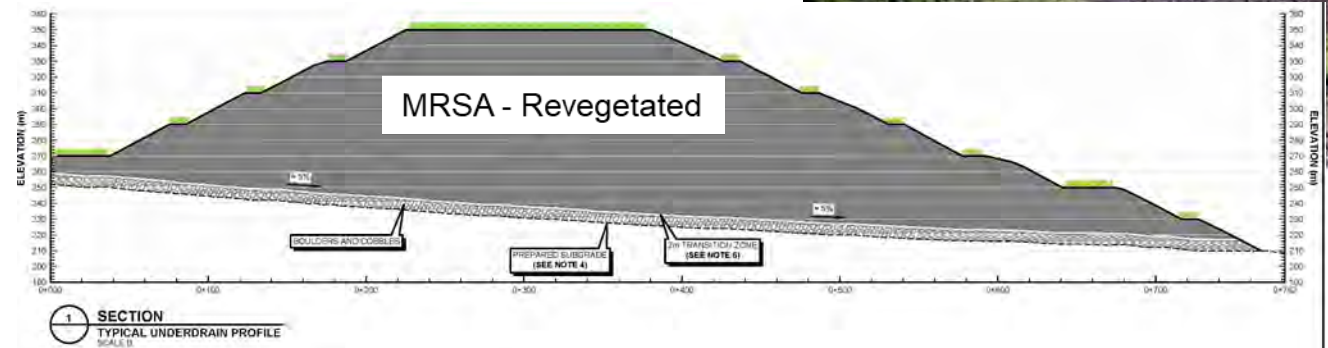
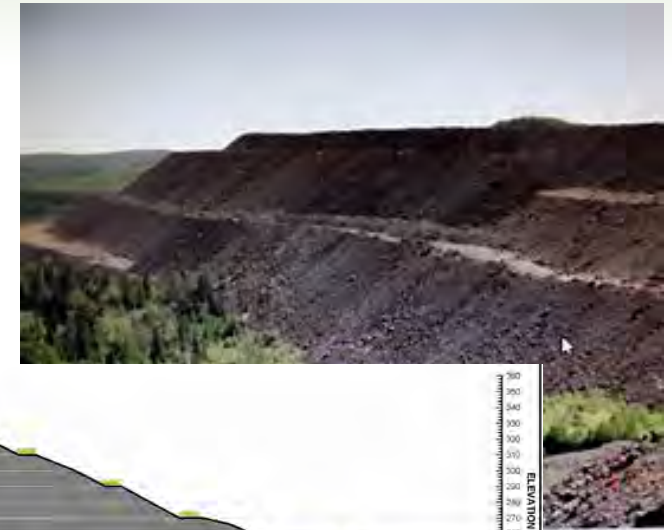


- South and Central pits that have been utilized for mine rock storage or for process solids storage will be capped with Type 1 (NAG) mine rock cover.
- Stream channels and fish habitat will be created and new drainage channels will be established so that water will drain from the South and Central Pits into the North Pit.
- The North Pit will overflow in approximately 25 years, an outlet stream will be created on the eastern side of the North Pit to drain through porous rockfill beneath the MRSA and into the Pic River.
- A boulder barrier will be constructed around the perimeter of the North Pit



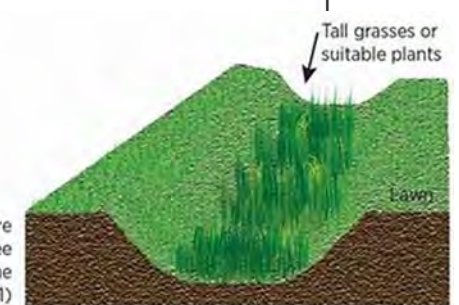


- Contour the intermediate slope benches, stockpile crest areas, access routes, to remove any areas of concentrated runoff
- Protect against erosion and sediment production
- Minimize standing water on top of MRSA
- Establish vegetative cover over the crest and slope benches
- Decommission and remove the runoff water management systems
- MRSA underdrain, vegetated swale downstream of MRSA catch basins with level spreaders in swale for passive treatment of TSS and nutrients in runoff at closure and in vegetated buffer strip along Pic River.



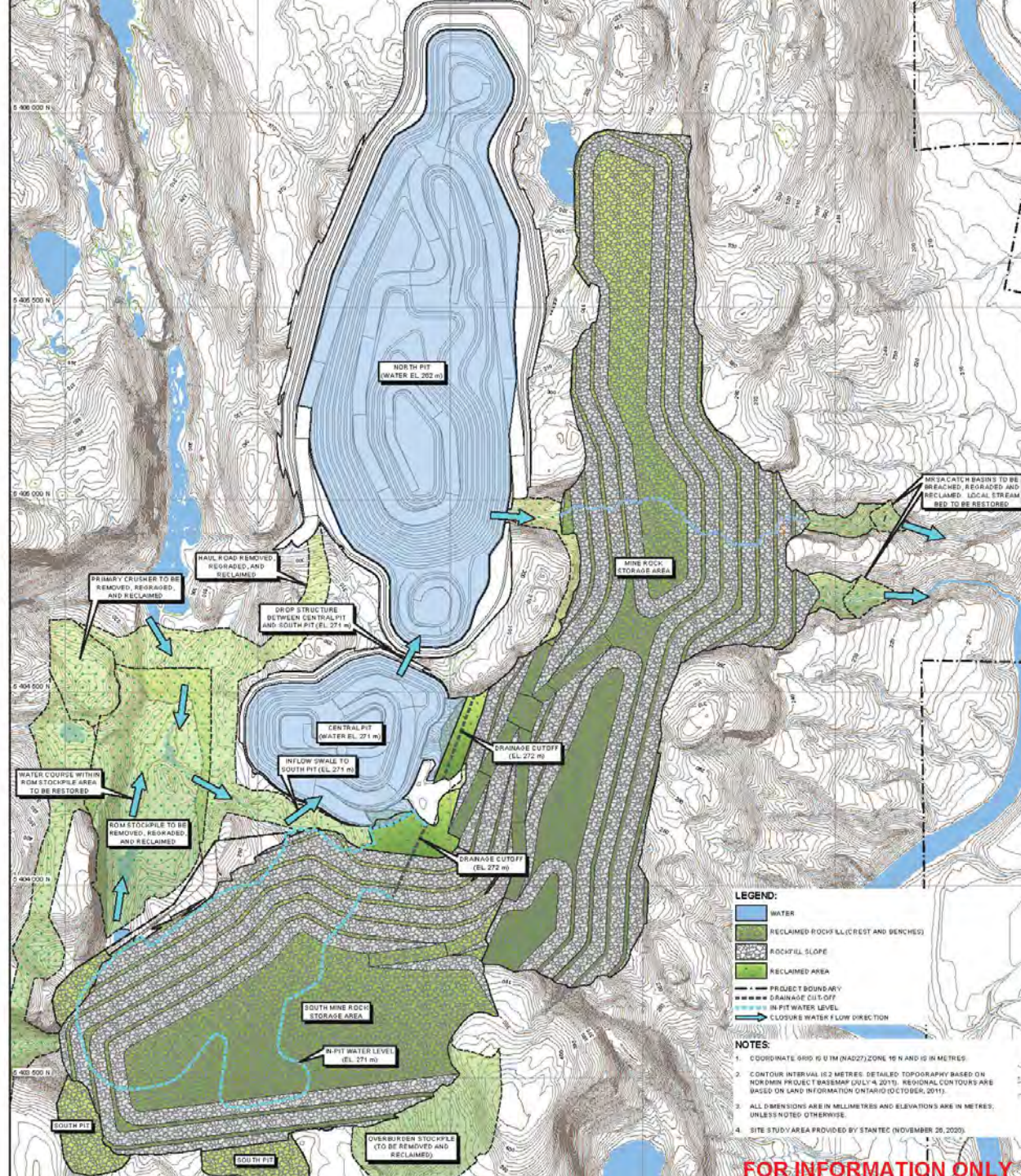
CATCH BASINS TO BE REDEGRADED AND REVEGETATED TO ORIGINAL STATE

swale sides slope are no steeper than three horizontal to one vertical (3:1)



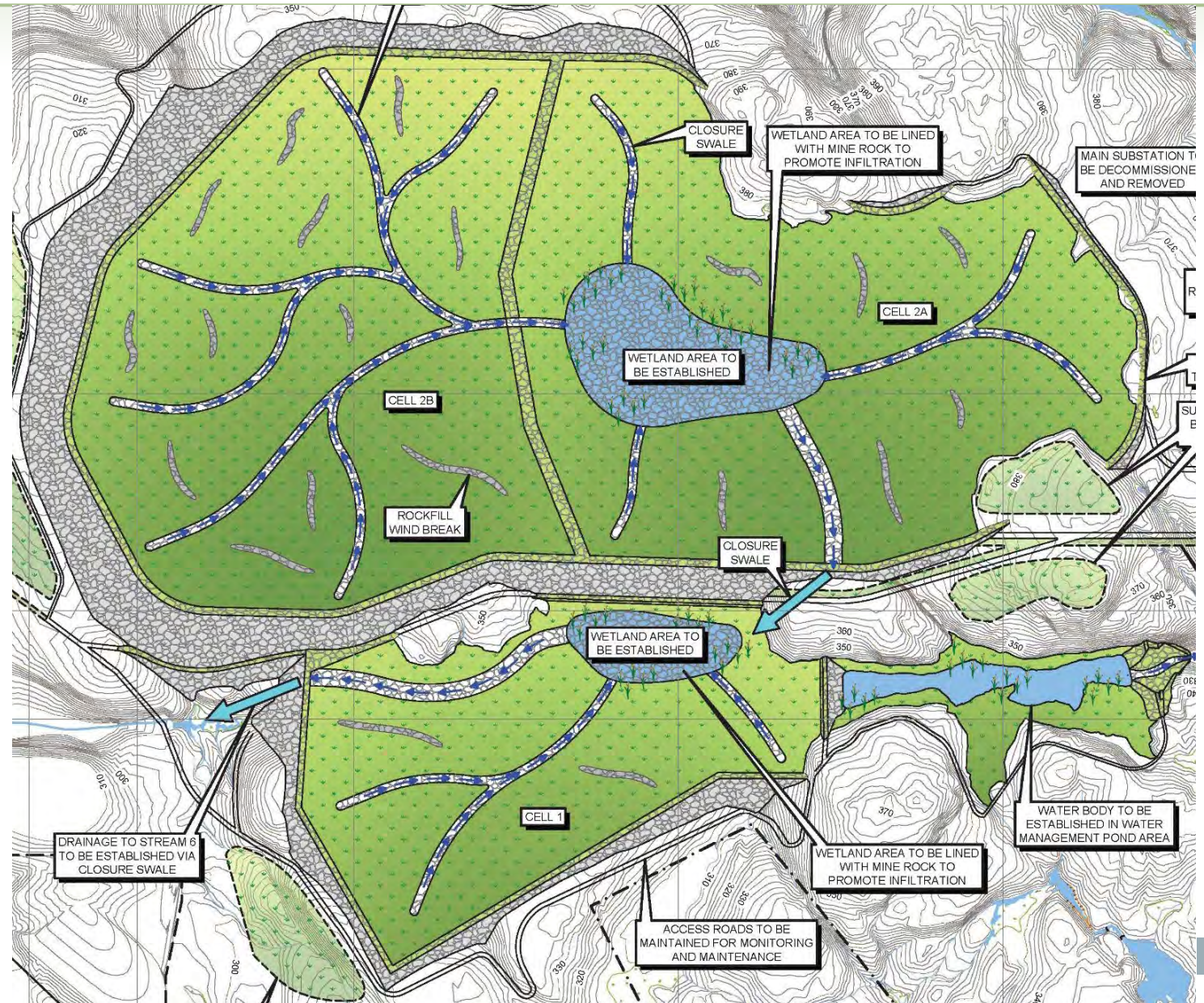
Bottom of swale, less than 6 feet wide, slopes 2% to 4% to exit point

Figure 1.5-5



FOR INFORMATION ONLY

- Contour the downstream slopes of the PSMF embankments to manage erosion
- Establish vegetation on re-graded embankment areas
- Establish drainage channels to control surface runoff and reduce standing water
- Runoff from cell 2 will continue to drain to cell 1 through the existing spillway.
- Runoff from cell 1 will continue to report to the spillway at the northwest abutment to flow to stream 6 through a new channel.
- Water Management Pond will transition to an open water wetland area with the goal of establishing a Moose Aquatic Feeding Area.



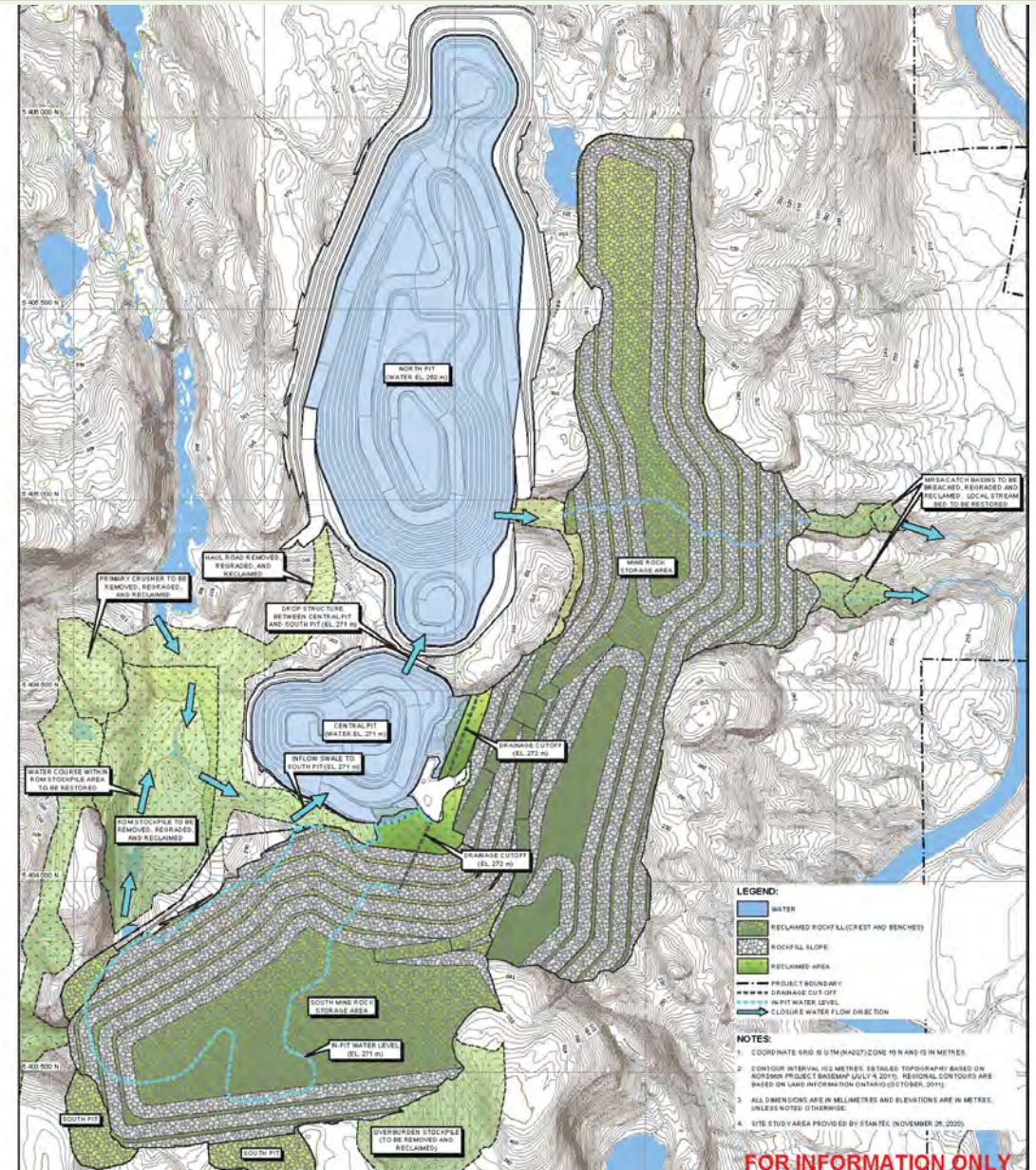
# REHABILITATION PLAN OVERVIEW - BUILDINGS AND ROADS

GENERATION PGM

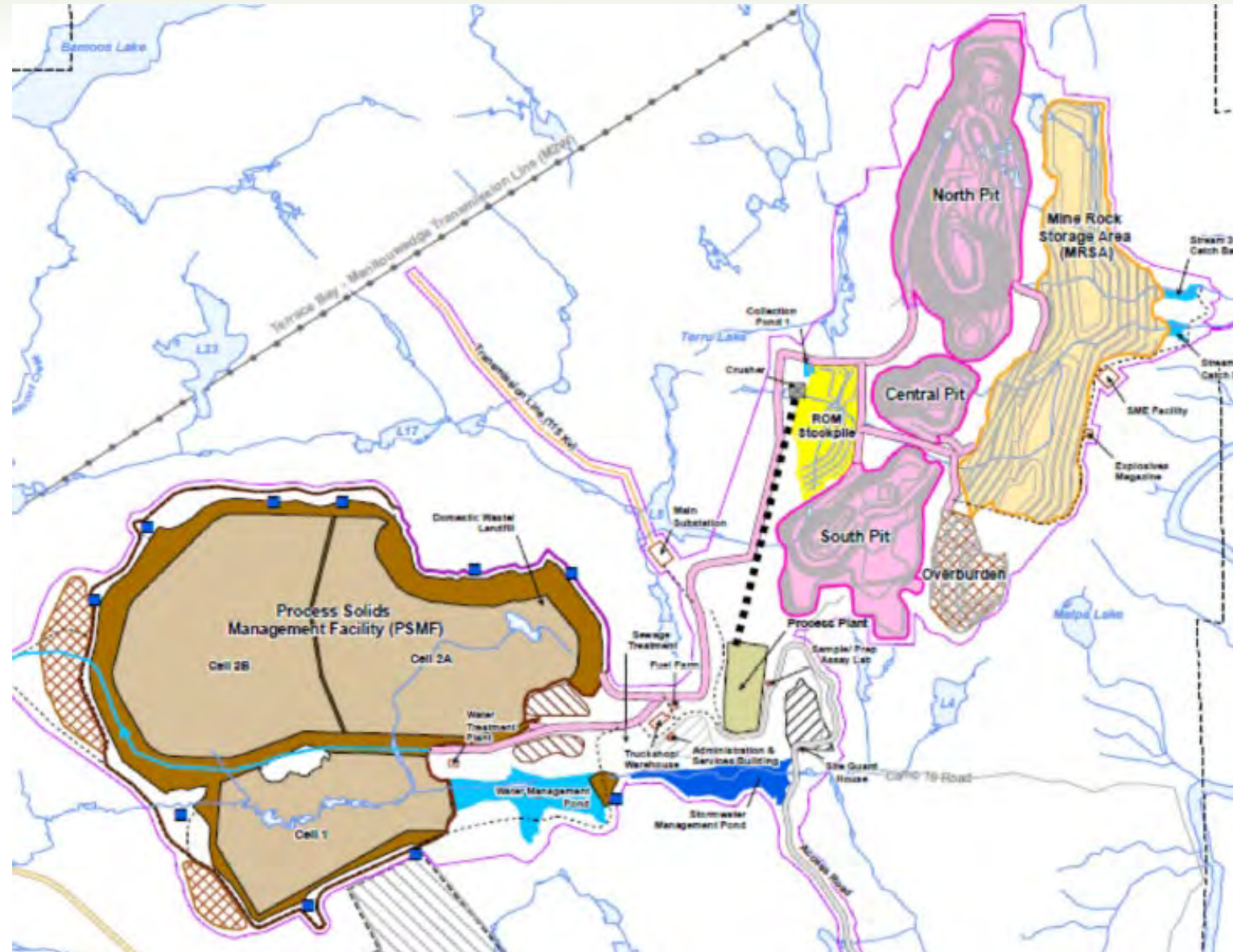
- All buildings, power lines, pipelines, waterlines and other structures will be dismantled and removed.
- Concrete rubble will be deposited in the main pit.
- Material will be recycled, sold, removed to the on-site disposal area or removed off-site as appropriate.
- The site roads will be maintained to allow inspections and maintenance.
- The main access road will be decommissioned.
- Site access will resume using former access and gated entrance along Camp 19 access road until land is returned to the Crown.



- Set aside oversize boulders to use for boulder fence around pit.
- Establish minimum 2 points of egress from pit for when it is flooded at closure.
- Soil stripping and strategic stockpiling and planting with non-invasive legume ground cover for soil fertility.
- Remove type 1 mine rock for use as aggregate off-site to the extent practical to reduce footprint.
- Construct MRSA in lifts with embankment slopes that are flat enough for long-term physical stability and do not require further grading or contouring at closure.



- Minimize waste on-site, remove equipment as it is taken out of service
- Minimize water in storage in PSMF and WMP
- To the maximum extent practical, progressive reclamation of the PSMF and associated structures will be implemented, especially with respect to Cell 2 after the process solids deposition has transitioned to open pits.



## Year 5 to 30

A detailed monitoring plan will be developed by independent qualified professionals that will focus on evaluating:

- The physical integrity of permanent man-made structures (e.g., dam safety inspections)
  - The relative success of the implementation of closure and rehabilitation activities (e.g., revegetation success, erosion proof)
  - The potential effects of the closed mine site on the environment (e.g., surface water and groundwater quality monitoring)
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- Anticipate pits flood in year 25



# Closure Cost and Financial Assurance

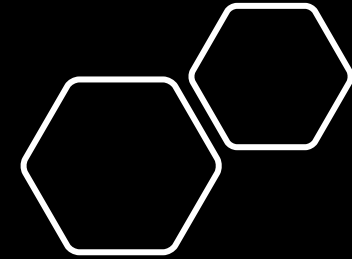
## Required financial assurance provisions:

- Closure plan/Mining Act for all rehabilitation items in the closure plan
  - Estimated to be \$60 million, refined estimate in progress
- Renewal fees under Crown Forest Sustainability Act for re-forestation
- Fisheries Act for fishery offsets / habitat compensation
- Hydro One/IESO for grid connection





# GENERATIONPGM



More Information on the Project can be found at

[www.genmining.com](http://www.genmining.com)

and the Impact Assessment Registry at

<https://iaac-aeic.gc.ca/050/evaluations/proj/54755?culture=en-CA>

**If you have additional questions,  
please email us at [comments@genpgm.com](mailto:comments@genpgm.com)**