



Giant Mine Remediation Project

STATUS OF PROJECT



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- Remediation project still under Environmental Assessment review
- Preliminary design activities, based on the DAR were initiated during the EA phase. That work was completed in March 2013
- Report of EA included measures that were not included in the preliminary design



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ENGINEERING APPROACH



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- Preliminary design divided the project into 12 design packages
- To complete the design process it was decided that 4 engineering contracts would be used to establish the Crown's engineering team
 - Environmental Support Services
 - Mining Support Services
 - General Design Services (mechanical, electrical, etc.)
 - Civil Design Services (earthworks, water conveyance, integration)



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ENGINEERING APPROACH – CIVIL DESIGN

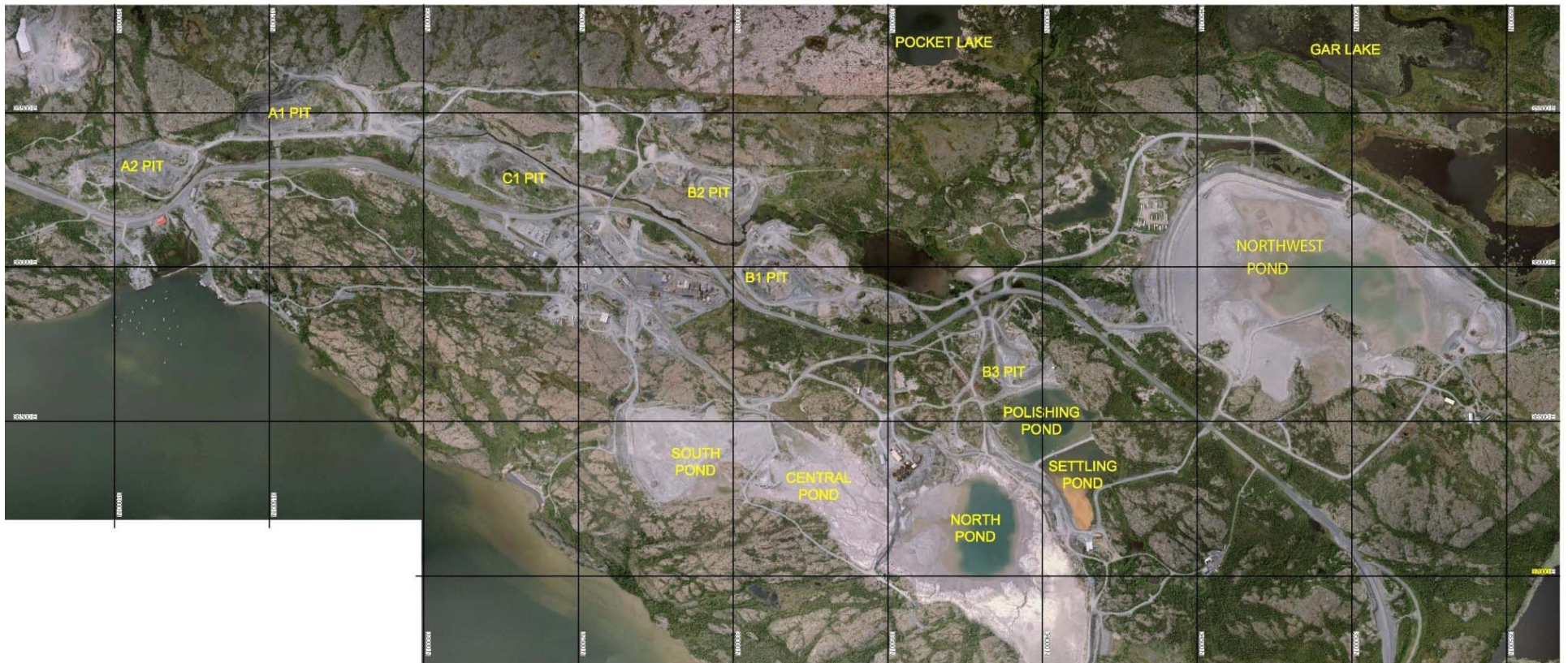
- Civil Design Package includes the following Preliminary Design packages
 - Tailings Rehabilitation
 - Borrow Source Development
 - Baker Creek Realignment
 - Surface Water drainage
- Civil Design Engineer will also act as a design integrator

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Tailings Remediation



Photo of site showing locations of the tailings containment areas



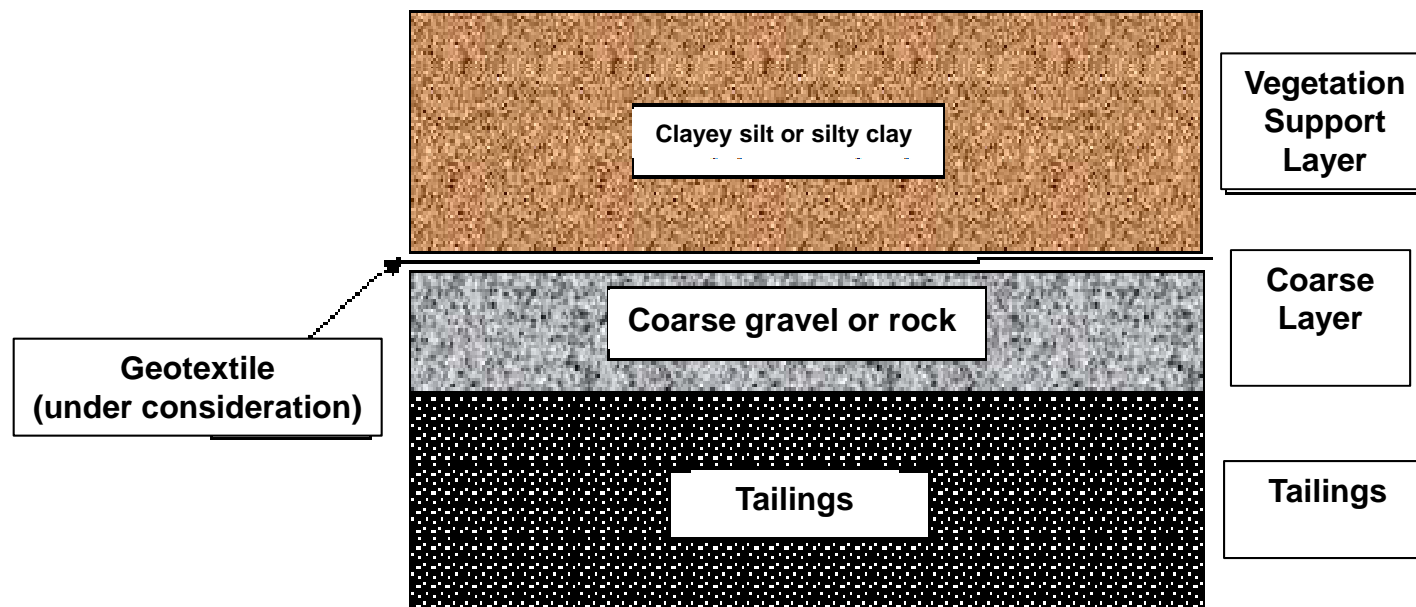
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Tailings Cover Design



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- Vegetation water storage layer constructed from on-site borrow
- Coarse layer constructed from rock from on-site quarries
- Tailings surface will be re-graded prior to placing cover





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Tailings Remediation



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- The tailings surface will be re-graded to uniform slopes and to promote drainage
- A portion of the tailings from the South and Central Ponds may be excavated to be used for underground backfill
- A potential landfill site is on one of the containment areas, tailings surface will be graded such that surface water will flow away and/or around the landfill
- The Polishing Pond and Settling Pond will be drained, re-graded and capped in a similar manner to the tailings containment areas
- Surface drainage from the water treatment ponds and tailings containment areas will be directed to constructed permanent spillways
- The spillways will direct surface water to the environment in post-closure period.

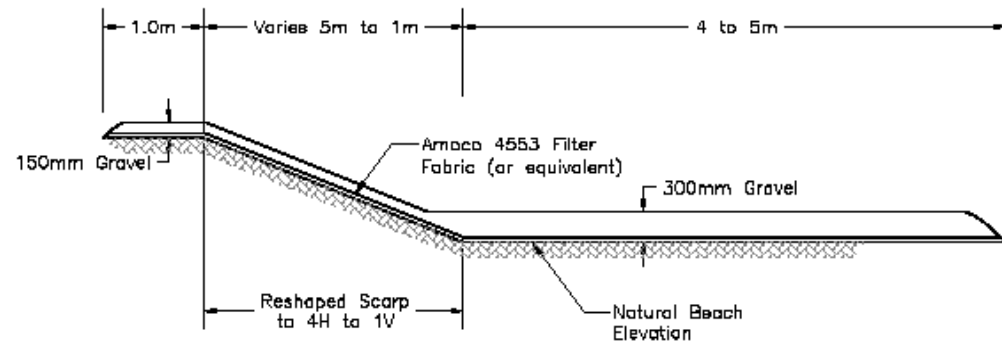
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Historic Foreshore Tailings

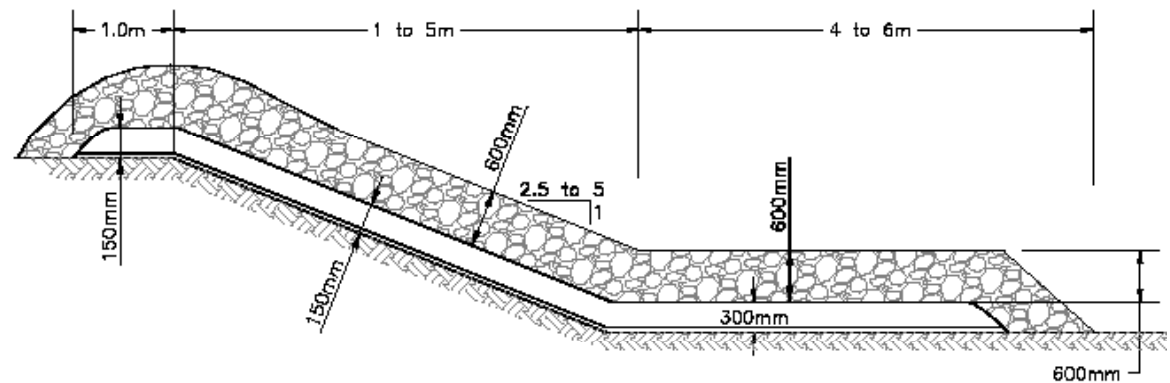


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- Existing design will be extended laterally and within foreshore area



**TYPICAL CROSS SECTION
GRAVEL AND FILTER LAYER**
NOT TO SCALE



**TYPICAL CROSS SECTION
RIP RAP PLACEMENT**
NOT TO SCALE



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Historic Foreshore Tailings

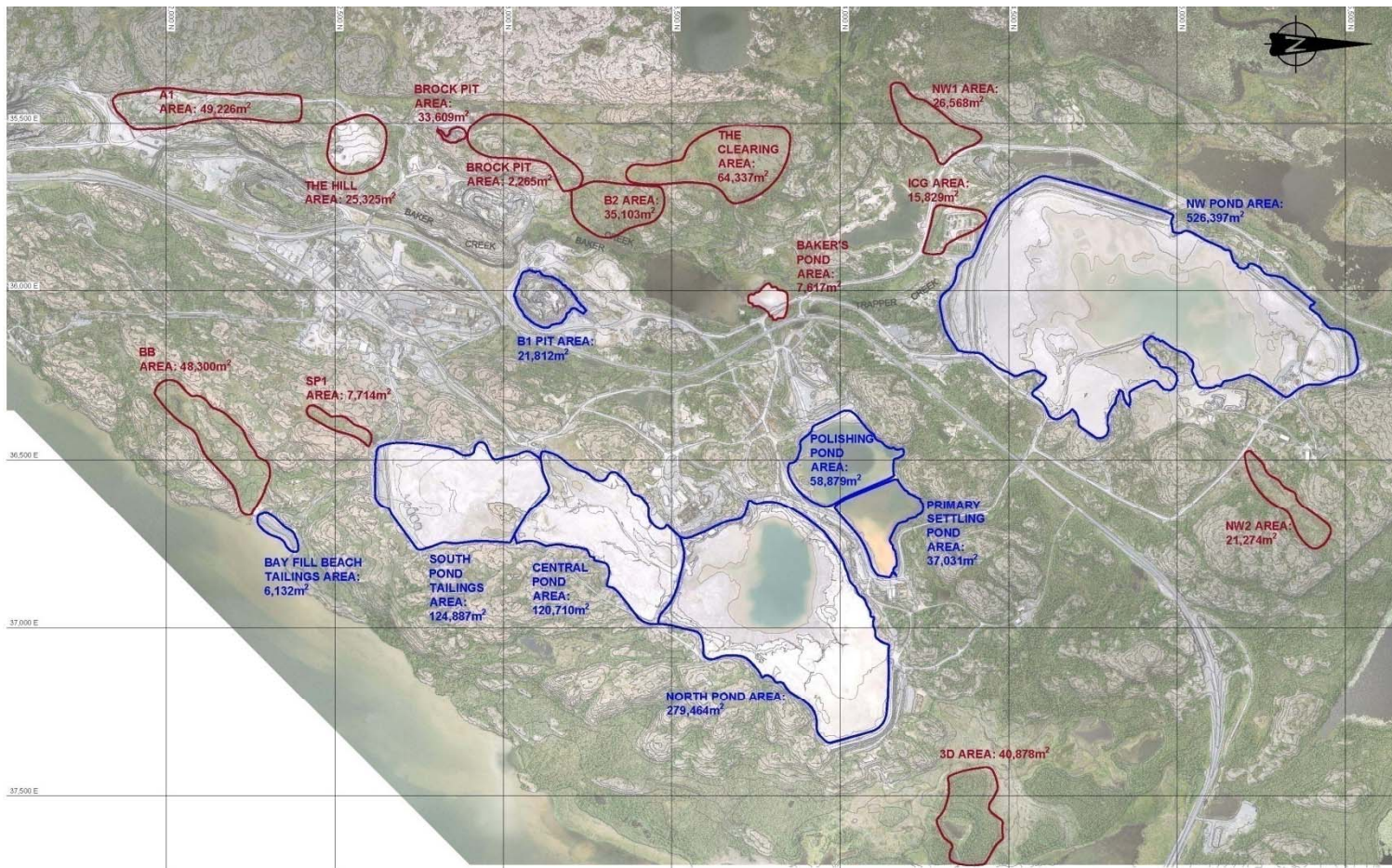


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- Existing design consists of rock over gravel over geotextile filter fabric
- Cover will be extended to cover tailings on the beach area
- Cover will be extended into the water, within the area directly affected by wave action
- Tailings further up the valley will be remediated as part of the contaminated soils program

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Borrow Source Site Map



PLAN
SCALE: 1:12500



LEGEND

- REMEDIATION AREAS
- BORROW SOURCE AREAS

NOTES

1. TOPOGRAPHIC CONTOURS SHOWN ARE IN METRES TO GMRP DATUM AT 2.5m INTERVALS.
2. COORDINATES SHOWN ARE IN METRES GMRP GRID.

REFERENCES

1. PWGSC, TOPOGRAPHIC CONTOURS, CAD FILES: GM-CONTOURS-pt5m-GRP.DWG, DATED NOVEMBER 16TH, 2009
2. PWGSC, AERIAL PHOTOGRAPH, IMAGE FILE: GIANTMINE_GRP.SID, DATED NOVEMBER 24TH 2009.

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Potential Fine-Grained Borrow Sites

Borrow Source	Estimated Fine-Grained Borrow Available (m³)
Narrow Valley – Back Bay (BB)	53,000
North of A1 Pit (A1)	121,200
Hill South of Brock Pit (Hill)	170,000
North of Brock Pit (Hill)	41,700
North of B2 Pit (B2)	19,500
Clearing East of Pocket Lake (Clearing)	285,000
East of Propane Tank Storage Yard (ICG)	30,000
Downstream of Dam 3D (3D)	108,000
Northeast of C1 Pit	6,000
Northwest One (NW1) – southwest of Northwest Pond	66,000
Northwest Two (NW2) – northeast of Northwest Pond	75,000
South Pond One (SP1) – south of South Pond	5,000
Fine Grained material from New Hwy. Construction	39,400
Total Estimated Volume of Fine-Grained Soil Borrow	1,019,800

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Estimated Sources of Coarse-Grained Borrow

Site	Estimated Coarse-Grained Borrow Available (m ³)
North Pond Spillway Quarry	1,020,000
Northwest Pond Area 1 (NWP 1)	327,464
Northwest Pond Area 2 (NWP 2)	
Northwest Pond Area 3 (NWP 3)	256,402
Northwest Pond Spillway	90,000
Spillways for Surface Runoff	129,200
Highway Rock Cut – Excess Volume	19,325
Total	1,842,391

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Material Requirements

Discipline	Soil	Crushed Rock	Geotex. Protect.	Rock Fill	Rip-Rap
	m3	m3	m3	m3	M3
TA-7 Tailings	824,664	592,412			
TA-8 Contam. Soil ¹	137,166	314,894			
TA-11- Baker Creek	40,000	93,800			
TA-12 Surf. Water	1,990	6,535	30,000		49,500
TA-13 Underground					
TA-15(1) Landfills	6,937	230,000	16,500	44,000	
TA-16 Open Pit Close.	42,994	198,823		177,704	
TA-17 Freeze Prgm. ¹		131,100			
TOTAL	1,053,751	1,567,564	46,500	221,704	49,500

¹ Cost of Rock for TA-8 and TA-17 includes the cost of Drilling & Blasting
 Cost for other TAs assumes that pre-blasted rock will be available.

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Existing and Historical Alignments



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Closure Design Considerations



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Key Concerns

❑ Flood Risk:

- ❑ The existing creek may not convey extreme flood flows or lower flows under anchor ice, rockfall or bank failure conditions
- ❑ Spillage to A2, B1 and C1 pits could occur if this is not addressed



❑ Environment:

- ❑ Water and sediment quality in Baker Creek are affected by historical deposits and upstream inputs
- ❑ Existing channel alignment includes alterations and diversions that limit fish habitat.



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Closure Design Considerations



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Objectives:

- ❑ Flood Risk: Provide flow conveyance through the site without spill to underground
 - ❑ Current design criteria consider the 500-year flood flow event, with 2 m anchor ice, plus 1 m freeboard
 - ❑ Minimize groundwater seepage to the underground workings
- ❑ Environment: Address habitat and contamination issues
 - ❑ Maintain a low flow channel for fish passage and habitat
 - ❑ Enhance/restore fish habitat in Baker Creek
 - ❑ Contaminated sediment management is still under review (a sediment study guided by the Federal Contaminated Sites Action Plan – FCSAP – is currently in progress).
- ❑ Restoring flow regime and habitat will be positive changes, as noted in the DAR

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Surface Water Closure Design Considerations

Key Concerns from the DAR:

- ❑ Before remediation is complete, arsenic-contaminated surface runoff could result in hazardous conditions to humans and wildlife



- ❑ Approximately 500,000 m³ of contaminated water is stored in the Northwest Pond, causing seepage into the mine workings below. This water is treated and discharged only during the open water season



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Closure Design Considerations



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Objectives:

- ❑ Collect contact water for treatment
 - ❑ During the closure period, collect and convey runoff from contact water areas to appropriate underground entry points
 - ❑ After closure, all existing tailings and other potentially contaminated areas will be reclaimed, and the only contact water areas will be in the general area of the effluent treatment plant
- ❑ Convey non-contact water off-site:
 - ❑ Minimize the volume of non-contact water entering the contaminated areas (thus becoming contact water), to reduce the cost of pumping and treating contaminated water
 - ❑ “Off-site” includes conveyance to Baker Creek and Yellowknife Bay