Giant Mine Remediation Project

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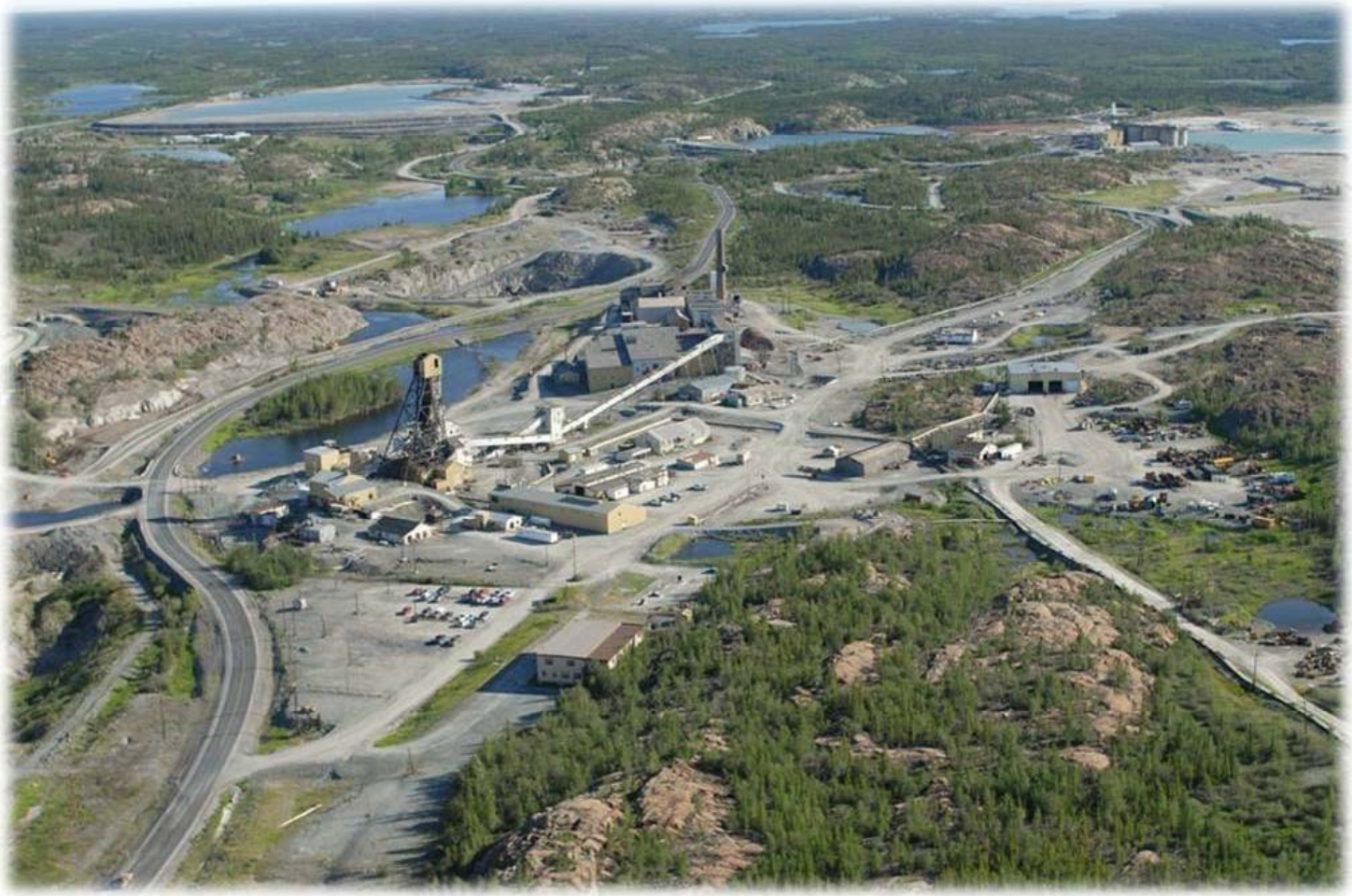
Giant Mine Remediation Project Description



Objectives

- Outline upcoming site work
- Allow industry members to see where they might fit into the project and/or better position themselves for it
- Create a forum for larger companies to meet local businesses to develop strategic working relationships

Site Stabilization Plan

Addressing high risk site issues:

- In 2011, five mine site elements were identified that pose a high risk to worker and public safety

- Due to the urgent nature of the risks, planning and action took place to address the risks

- The Site Stabilization Plan addresses these risks

Site Stabilization Plan

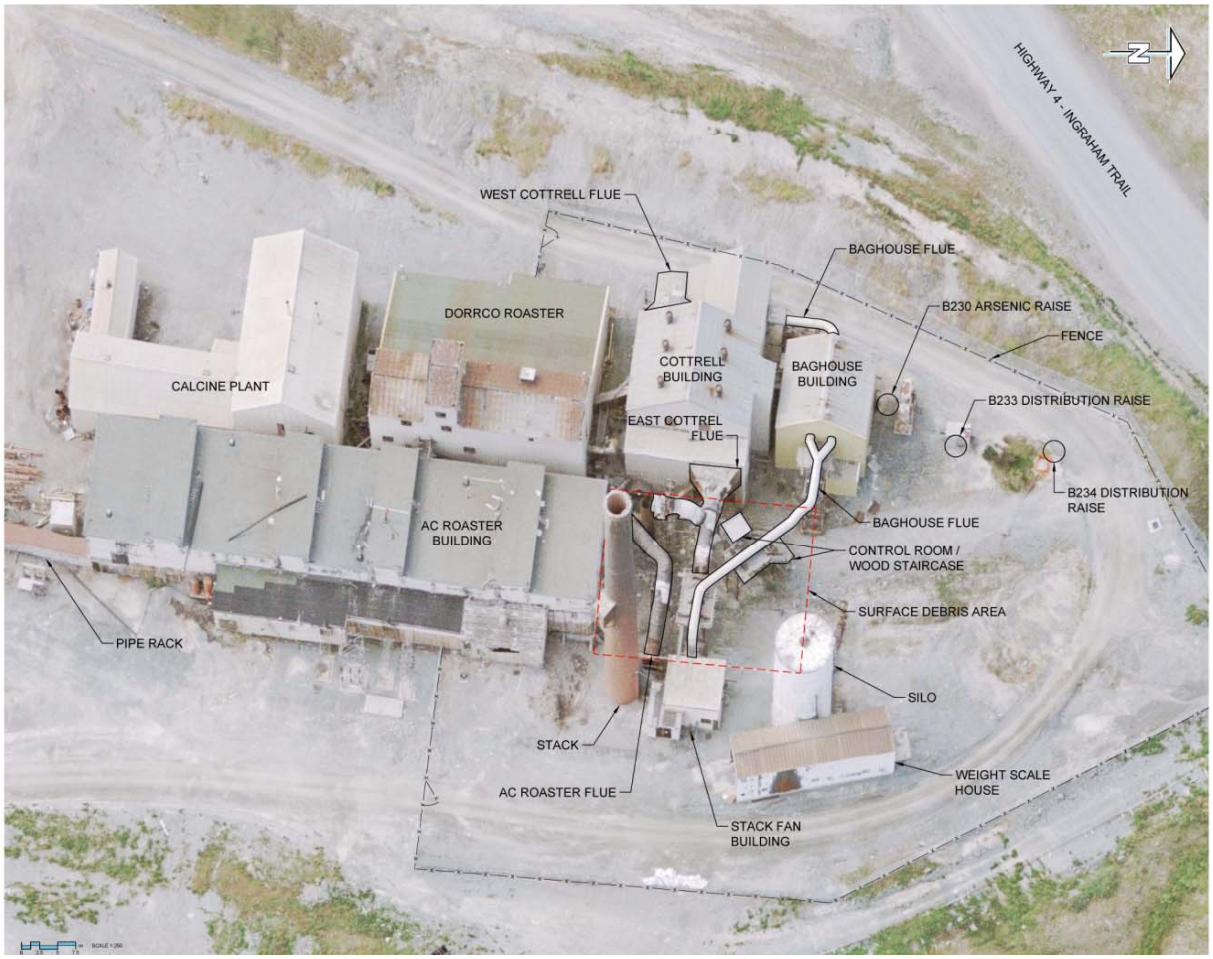
- Mill Conveyor Gallery (done)
  - Contained asbestos and deconstructed
- Roaster Complex
  - Decontamination and deconstruction
- Underground Stabilization
  - Backfill void spaces and additional investigations

Roaster decontamination/deconstruction

Major scopes:

- Roaster complex - nine major structures
- Design - prepare decontamination/deconstruction plan
- Decontaminate roaster complex
- Deconstruction roaster complex
- Establish/operate material storage area

Roaster decontamination/deconstruction



Roaster complex waste (preliminary)

- Arsenic containing waste: ~4,900 m^3.
  - Safely store for future on-site disposal under a separate contract.
- Non-arsenic hazardous waste (PCBs, chemicals, ozone depleting substances, etc.) ~ 50 m^3.
  - Take offsite for appropriate disposal.
- Non-hazardous waste material (cleaned steal, wood, concrete, etc.) ~2,100 m^3.
  - Organize/neatly store in materials storage area for on-site disposal.
- Semi-processed ore wastes ~400 m^3.
  - Safely store on-site for future disposal under separate contract.
- Establish/operate temporary material storage area during work

Underground stabilization

- Major scopes:
  - Rehabilitate underground access - 4000 m
  - Placement of backfill - 130,000 m^3
  - Investigative drilling -1500m
  - Drift plug construction - 25 plugs
  - Construction of buttress at C1 Pit

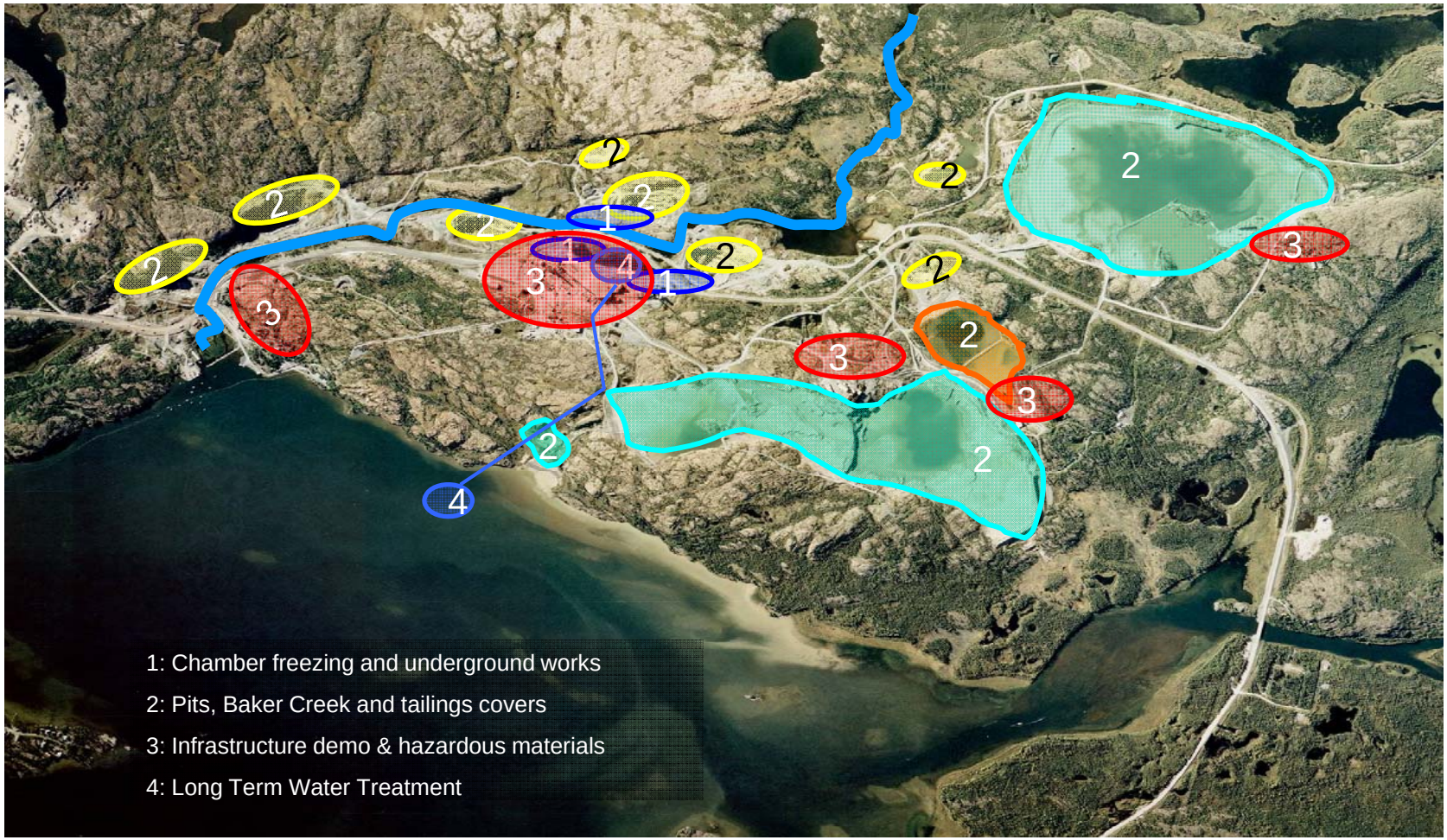
Giant Mine Remediation Plan

- Implementation of site wide remediation plan
- Will start after the Environmental Assessment review process and subsequent detailed design is completed

Remediation Plan by component

- Care and maintenance
- Surface demolition and debris
- Surface water management
- Tailings rehabilitation
- Openings to surface
- Contaminated soils
- Open pit closures
- Borrow sources
- Underground works
- Freeze program
- Baker Creek
- New water treatment plant and marine discharge
- Offsite/utilities/municipal services

Overall remediation work



Care and maintenance

Major scopes:

- Maintaining regulatory and environmental compliance
- Safety and security
- Heating systems
- Mine ventilation
- Mine dewatering
- Inspection and maintenance of underground infrastructure and arsenic chambers
- Surface water management
- Inspection and maintenance of tailings impoundments
- Effluent treatment

Surface demolition and debris

Major scopes:

- Collect/dispose of ~ 57,000 m^3 of non-hazardous waste from building demolition and surface debris collection
- Collect/dispose of ~14,000 m^3 of hazardous waste from building demolition, surface debris collection, and underground hazardous waste collection
- Landfill Construction
  - design waste volume – 400,000 m^3
  - intermediate fill – 120,000 m^3
  - final cover - 110,000 m^3
  - estimated area – 110,000 m^2
  - uncontaminated materials to be recycled if possible

Demolition/recycling possibilities

Surface water management

Major scopes:

- Construct seven sumps for active storage: 23,330 m^3
- Improve 11 existing drainage channels: 46,800 m^3
- Construct seven contact water channels: 11,550 m^3
- Construct 15 contact water storage ponds: 70,550 m^3
- Construct 11 non-contact water channels: 133,450 m^3
- Construct 21 non-contact water storage ponds: 135,900 m^3
- Construct five spillways:
  - Excavate 150,100 m^3 of material
  - Place 13,400 m^3 of material

Tailings rehabilitation

Major scopes:

- Tailings, settling and polishing pond covers ~ 95 hectares
  - Grading to promote drainage
  - Place cover system consisting of:
    - 400 mm of 75 mm minus material
    - Geotextile
    - 700 mm of silt or silty clay
  - Revegetation
  - Depending on the depth of the tailings, coarse bridging material may have to be placed over the tailings

Tailings containment areas – 95 hectares

Openings to surface

Major scopes:

- Formally close 37 openings to surface
- Includes adits, raises, shaft, portals, and stope breakthroughs
- Includes engineered concrete caps, rock fill, etc.

Contaminated soils

Major scopes:

- Contaminated material in 12 areas: 643,700 m^3
- Excavate 75,700 m^3 of marginally contaminated material, (<3000 mg/kg arsenic). Mainly soil potentially available for intermediate fill in nonhazardous landfill
- Excavate 565,000 m^3 of heavily contaminated material, (>3000 mg/kg arsenic). Mostly waste rock, possibly available for use as backfill for B1 and B2 pits
- Excavate/treat 3000 m^3 of petroleum hydrocarbon-contaminated soil. Soil to be disposed of based on As levels.
- If contaminated material exceeds thickness of 2 m below grade, area will be capped similar to that of the tailings: 40 mm coarse grained material, geotextile, and 70 mm fine grained material

Open pit closures

Major scopes:

- Eight open pits on property
- B1 pit will be backfilled, possibly others
- Seven remaining open pits will be closed with a combination of backsloping, fencing, berms and signage
- Range of 200,000 m^3 to 375,000 m^3 of loading, hauling, placing rock material for backfill, berms, etc.

Borrow sources

Major scopes:

- Excavate, load, haul and place ~967,000 m^3 of fine grain soils from onsite borrow sources for tailings and landfill covers
- Blast, crush, haul and place ~1,147,000 m^3 of coarse grain soils
    - Spillway construction can produce sufficient quarry volume
    - Coarse grain material required for tailings cover, open pits, sludge areas and landfill cover.

Underground works

Major scopes:

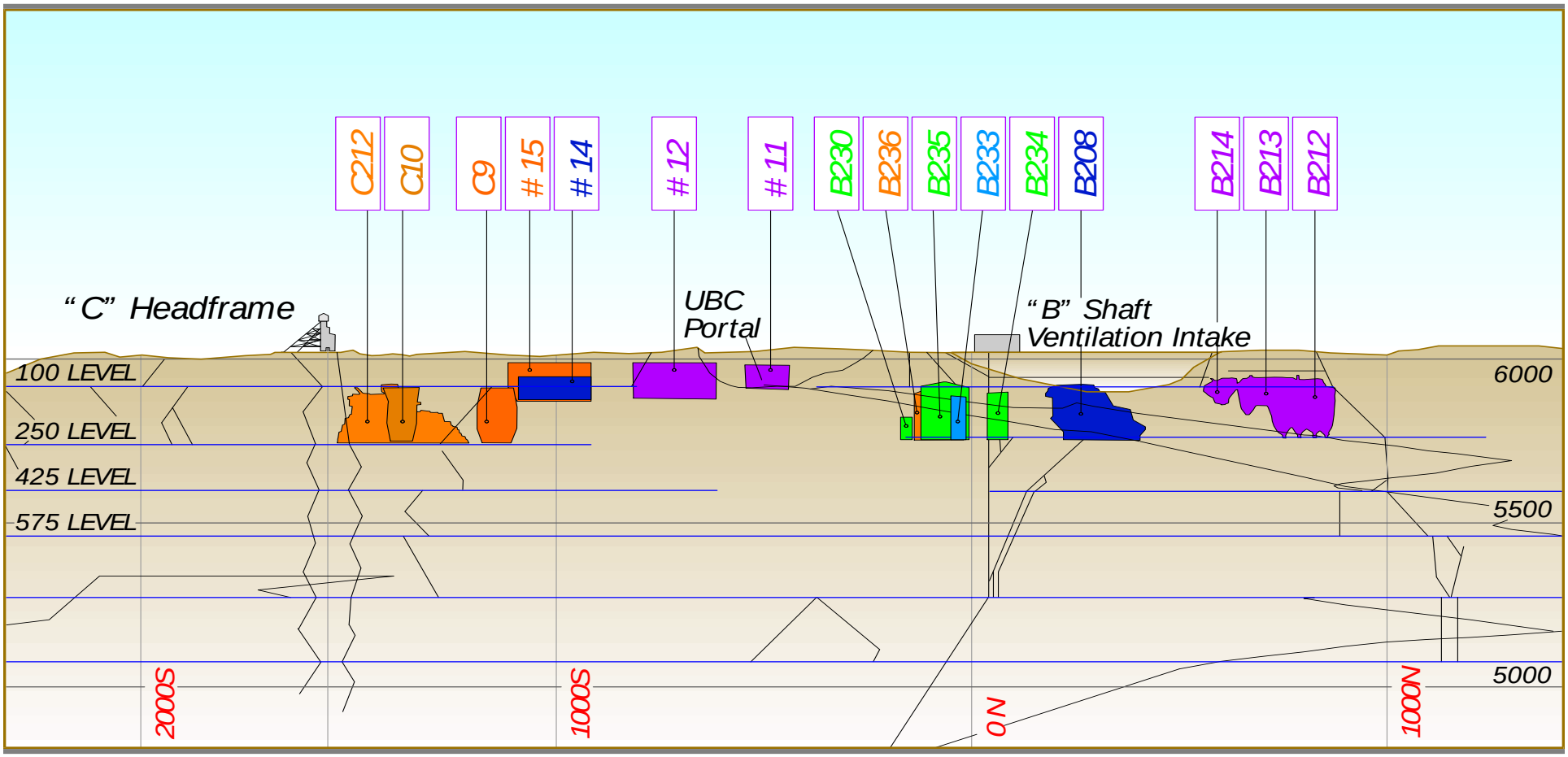
- Backfilling underground, crown pillars, key adjacent stopes to arsenic storage chambers
- Underground mining rehabilitation and new development – 11,300 m
- Backfilling underground – 400,000 m^3 to 500,000 m^3
- Geotechnical drilling for investigations and backfill delivery – 4,200 m, on surface and underground locations
- Potential for underground development for backfill production

Freeze program

Major scopes:

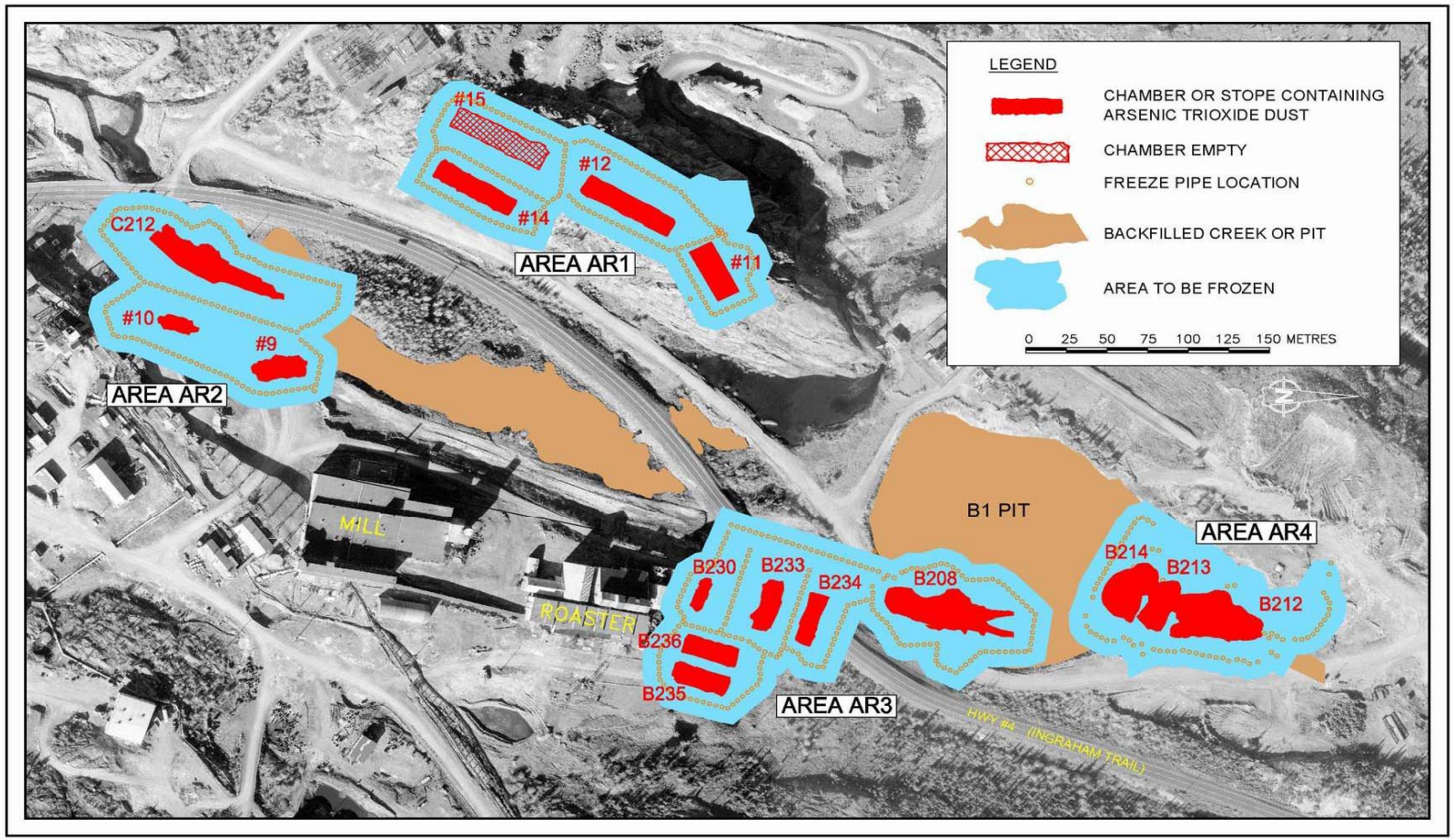
- Four freeze areas: AR1 to AR4
- Surface drilling – 59,630 m
- Prepare drill pad – 135,000 m3
- Freeze Plant(s) and thermosyphons; supporting mechanical/electrical systems
- Complex undertaking with significant implementation risks
- Freeze Optimization Study (FOS) to better define design parameters

Freeze program



Frozen chamber to scale: B208 and Precambrian Building

Arsenic trioxide storage areas to freeze



Baker Creek

At present:

- Seven reaches: Reach 0 (lower) to Reach 6 (upper)
- Historic tailings and contaminated sediments in the creek
- Poor hydraulic capacity; risk of flooding underground workings
- Creek channel needs realignment to execute remediation plan

Baker Creek

Major scopes:

- On-site realignment of Baker Creek to accommodate 1:500 flow, and mitigate risks is the current option being evaluated
- Realignment of some reaches
- Possible sediment removal

Water treatment plant and marine diffuser

Major scopes:

- Design, construct, operate new water treatment plant for arsenic removal using iron coprecipitation
- Design capacity is ~1840 m^3 /day (peak flow) at ~280 mg/L arsenic (peak concentration)
- Long-term underground to surface pumping system, from 425 level
- Total length of discharge line is 2784 m
- Discharge diffuser in Yellowknife Bay

Offsite, utilities, municipal services

Major scopes:

- Fire suppression is by tanked supply
- Water and sewer is by truck services
- Estimated workforce of 2.5 million person-hours over the course of the project
- Annual employment ranges from 25 to 350 people depending on the phase of the project.
- Other services:
    - Administration
    - Logistics
    - Camp services and support

Conclusion