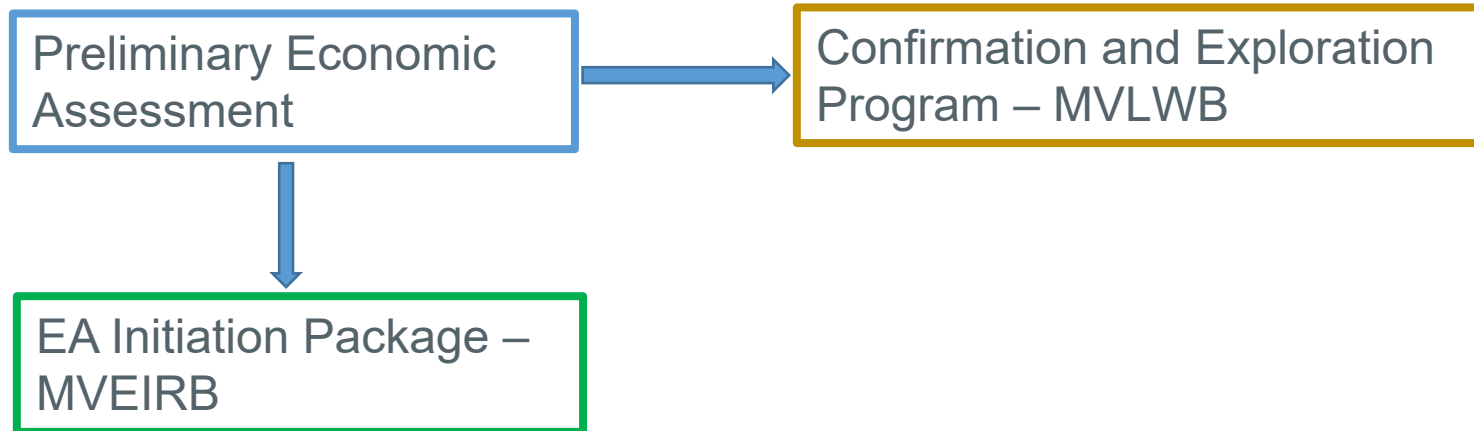


A photograph of a rock sample with a light-colored, crystalline matrix and darker, irregular inclusions, resting on a yellow surface. The rock is cut into several pieces, showing its internal texture.

**PINE POINT PROJECT  
NORTHWEST TERRITORIES  
TECHNICAL SCOPING SESSIONS**

May 4-5, 2021

# Project Permitting



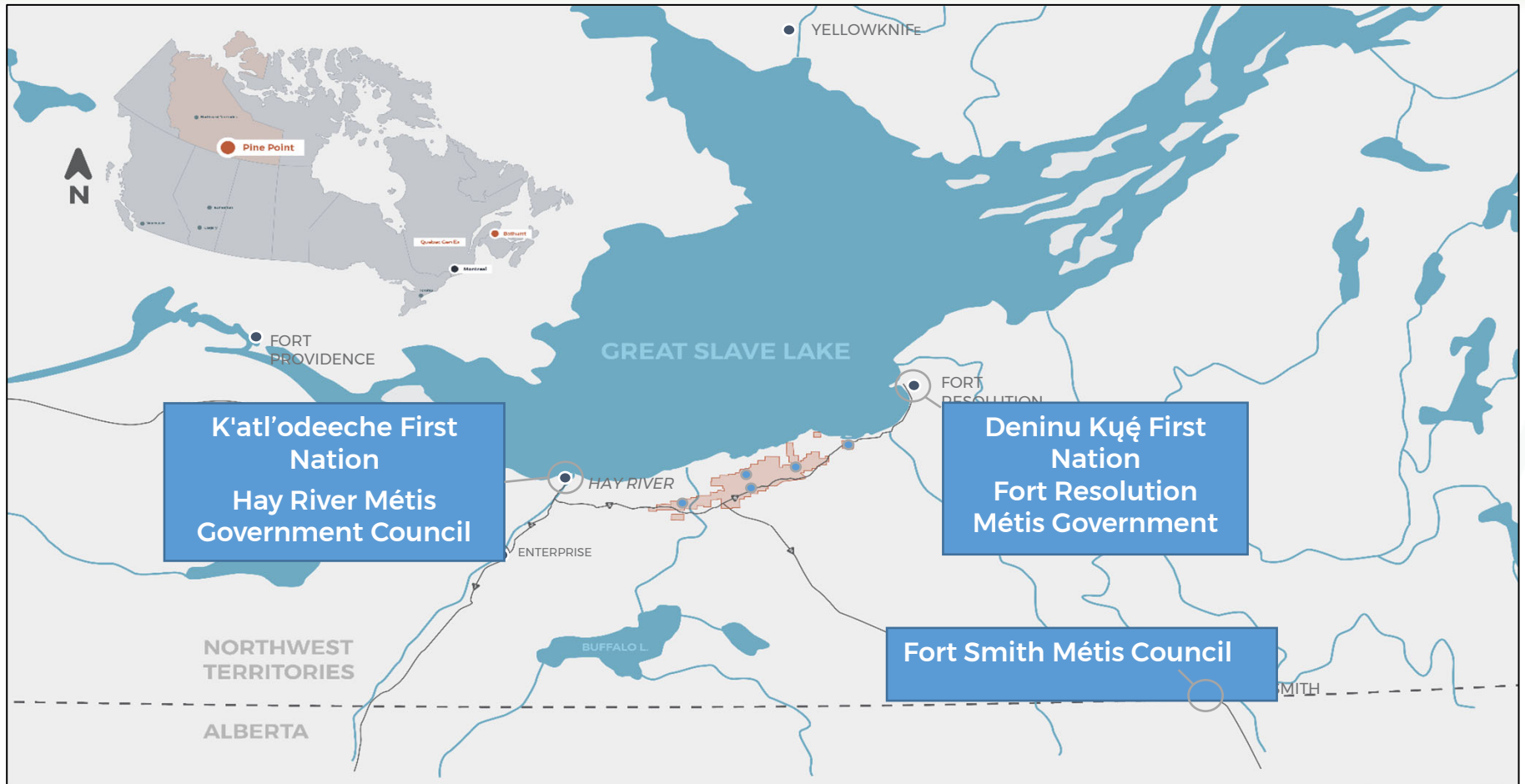
This presentation will review the Mining and Milling project that was described in the EA Initiation Package.

# The Pine Point Project



- Pine Point Mining Limited (PPML) is a wholly owned subsidiary of Osisko Metals (TSX V: OM). PPML was acquired from Darnley Bay Resources in February 2018.
- PPML is proposing to build a zinc/lead mine on the same site as the old Cominco Pine Point Mine.
- This presentation describes what the proposed future mine will be like and asks for your input into the Project and the environmental assessment process.

# Local Communities





# Location of the Project



- Hay River Airport and CN Rail Head From Edmonton
- Close to several communities

- Paved Highway Access
- Low-Cost Hydroelectric Power Available On Site From Taltson Dam
- Brownfield site with existing disturbances

# Google Maps Air Photo View



**Brownfield Site:** Plan is to use the previously disturbed areas as much as possible: roads, former open pits, pads, waste rock dumps, cut lines.



# Pine Point Mining Ltd.



- **1964 to 1988:** Cominco mined 64 million tonnes from 50 shallow open pit mines and two underground mines.
- **Nov 2016:** Darnley Bay Resources acquired the **Pine Point Project** from bankruptcy court. Prior to that the project was owned by **Tamerlane Ventures**.
- **Aug 2017:** Darnley Bay Resources changed its name to Pine Point Mining Ltd.
- **Feb 2018:** **PPML** was acquired 100% by **Osisko Metals Inc.** to obtain the Project.
- **2018-2020:** Exploration and drilling to establish Mineral Resource Estimate.
- **Jun 2020:** Pine Point Preliminary Economic Assessment (PEA).
- **Feb 4, 2021:** EA Initiation Package submitted to the MVEIRB.

# Cominco's Open Pit Mines



## Preliminary Economic Assessment (PEA)



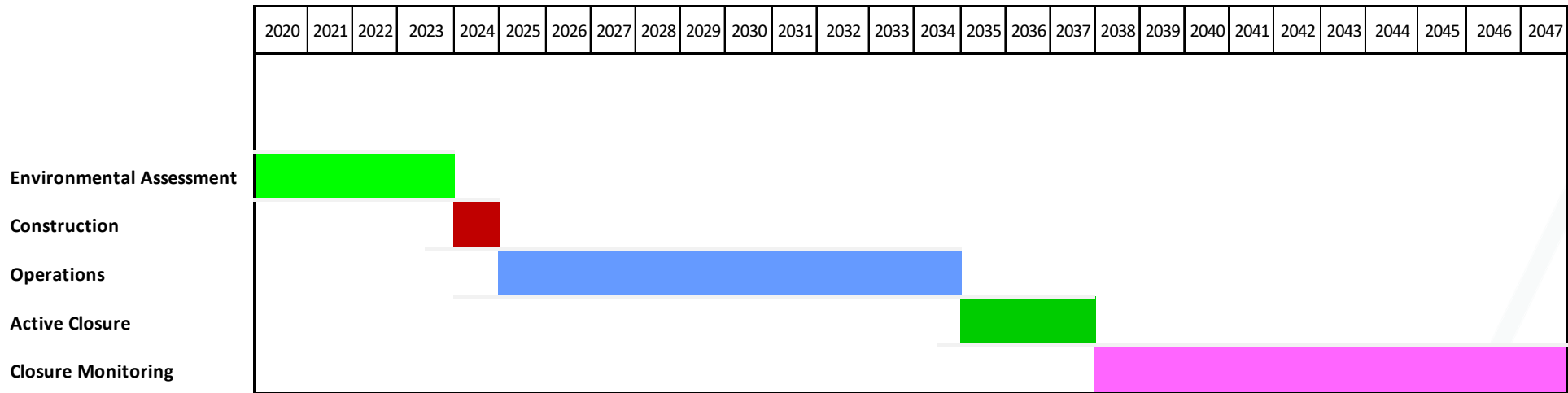
- PEA completed (see News Release: June 15, 2020)
  - 10 years of production at up to 11,250 tpd proceed plant feed rate
  - Exploration and delineation drilling can extend mine life
  - Build the proposed plant on the same site as the old Cominco plant
  - Truck the zinc/lead concentrate to a rail siding at Hay River
  - Manage groundwater by putting it in old pits or reinjecting it back underground
- Pine Point zinc concentrate is one of the cleanest in a world where other concentrates with impurities are forecasted to dominate the future global market
  - Traders and smelters want Pine Point concentrate to blend down impurities
- Zinc concentrate “Supply Crunch” is forecasted for 2023-25; if production coincides with this, prices are likely to be higher—a bonus for the early years of the Project

# Overview of the Proposed Mining and Milling Project



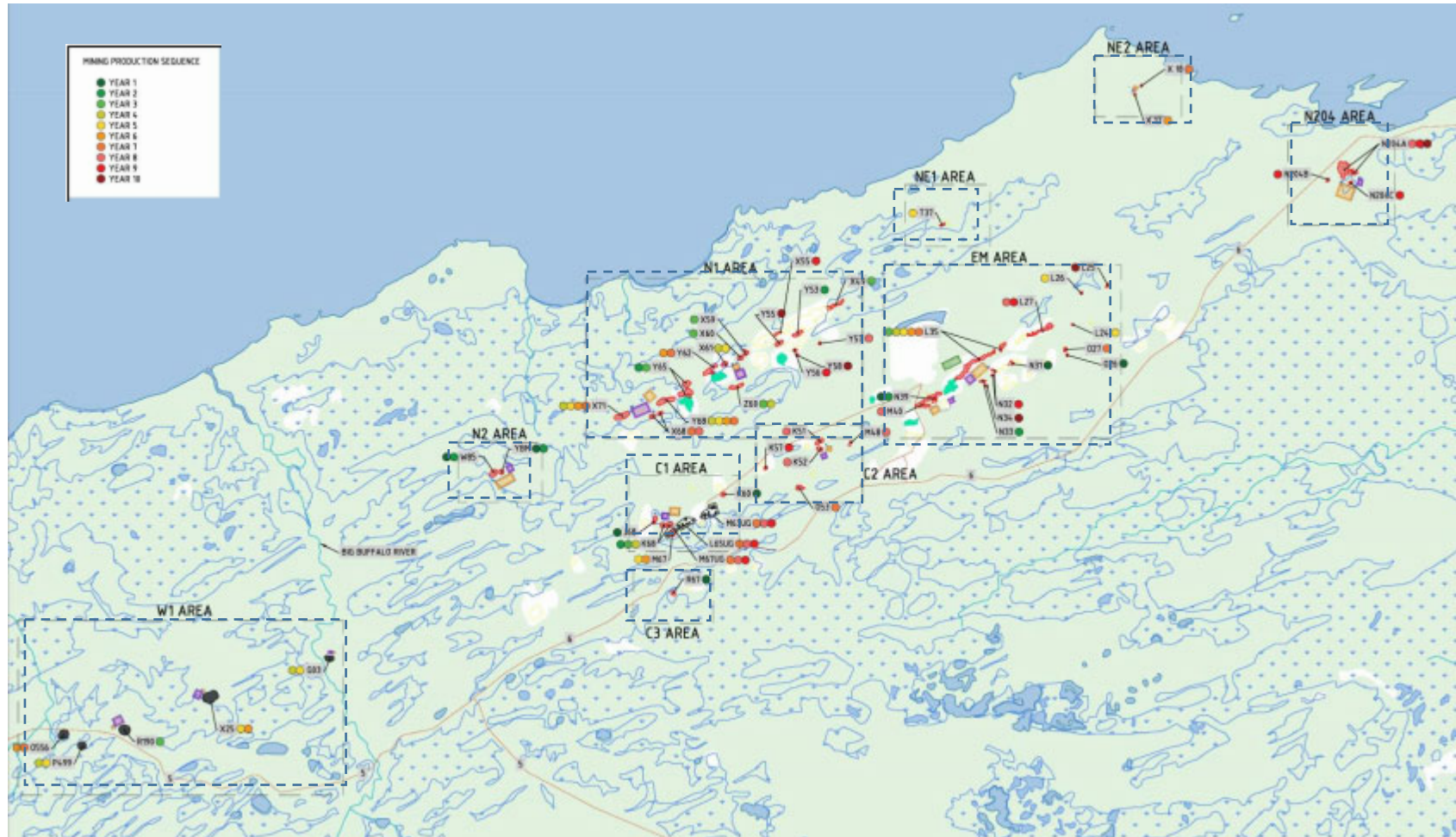
- **Life of Mine:** 10 years, mining 39.1 Mt of mineralization.
- **Brownfield Site:** use of previously disturbed areas as much as possible for access and infrastructure.
- **Open Pits (OP)** located East of the Buffalo River, will consist of several small pits and/or clusters of pits grouped together (e.g., as in the East Mill Zone).
- **Underground Mines (UG)** located west of the Buffalo River (West Zone) and in the Central Zone. West Zone will use cement grout curtains around the mine area to reduce water inflows during dewatering and operations.
- **Waste Rock:** to be placed on pads adjacent to open pits or placed in historical pits where feasible. UG mines will produce less waste rock. Acid rock drainage from the carbonate rocks is very local and minimal.
- **Water Influx:** water from open pits and underground workings will be pumped into historical pits or mined out new pits or re-injected back into the underground aquifer via reinjection wells.

# Project Overall Timeline





# Mining Clusters



# Overview: Open Pit Mining



- **Deposits Mined:** 47 deposits will be mined
- **Mineralization Mined:** total mineralized rock mined 32.6 Mt, between 2.6 to 4.1 Mt per year
- **Overburden:** 66.4 Mt to be stockpiled
- **Waste Rock:** 100.6 Mt to be stockpiled
- **Tailings:** disposal in selected historical and mined out open pits.
- **Mining Fleet:** trucks will be 100 t class, average of 15 trucks (plus 3-5 extra during peak production), three hydraulic shovels, five hydraulic excavators, front end loaders, etc.
- **Mining:** pits are grouped in clusters with the mineralization pits from multiple clusters to provide a consistent feed to the plant and to manage the water extracted

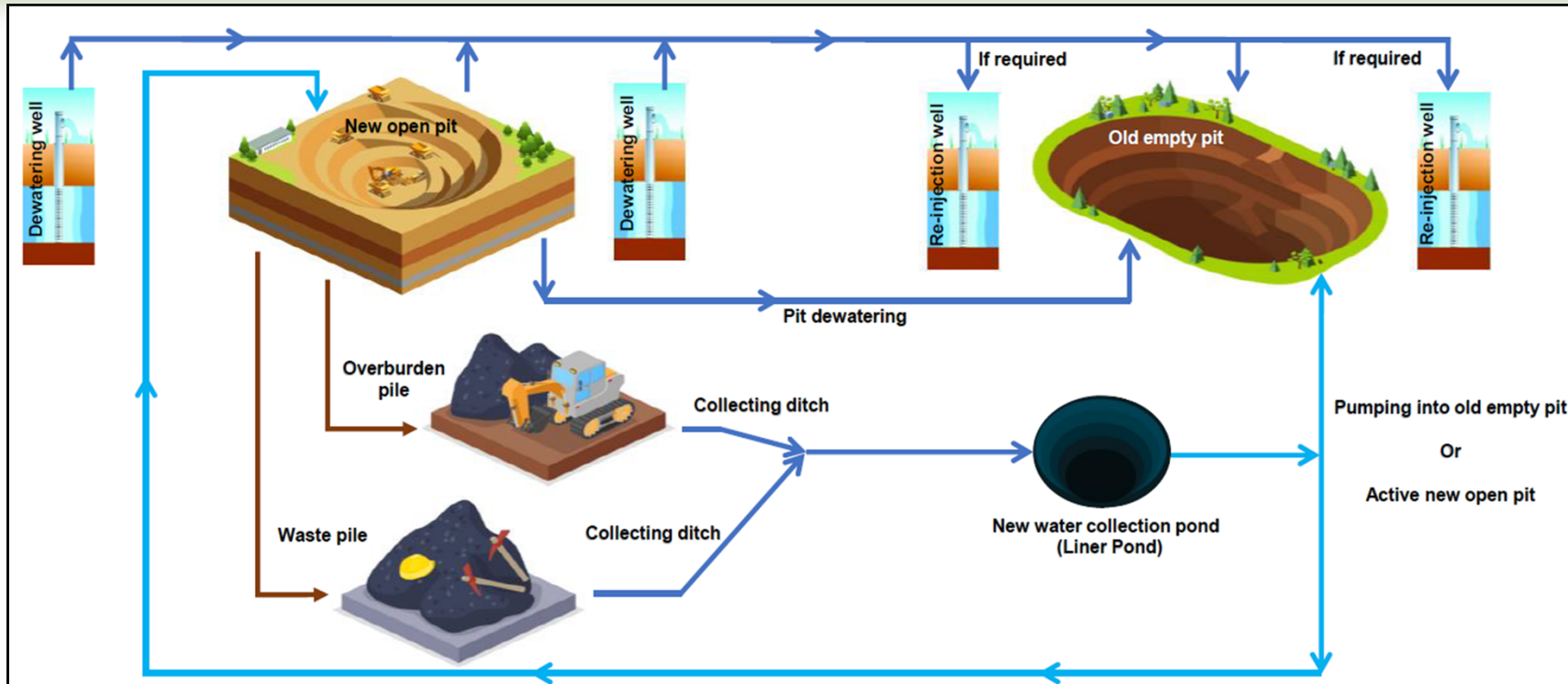
# OP Groundwater Management

- A ring of dewatering wells to be installed on the perimeter of each deposit.
- Depending on groundwater flow rates for each deposit, the number of wells will range from 0 (dry locations) to approximately 30.
- Water will be pumped into a nearby pit, far enough away so that the water does not return to the original pit while mining is underway.
- The water will be reinjected back underground using reinjection wells where a pit is too far away.

Old dewatering  
well locations



# Pit Dewatering & Waste Rock Stockpile Water Management



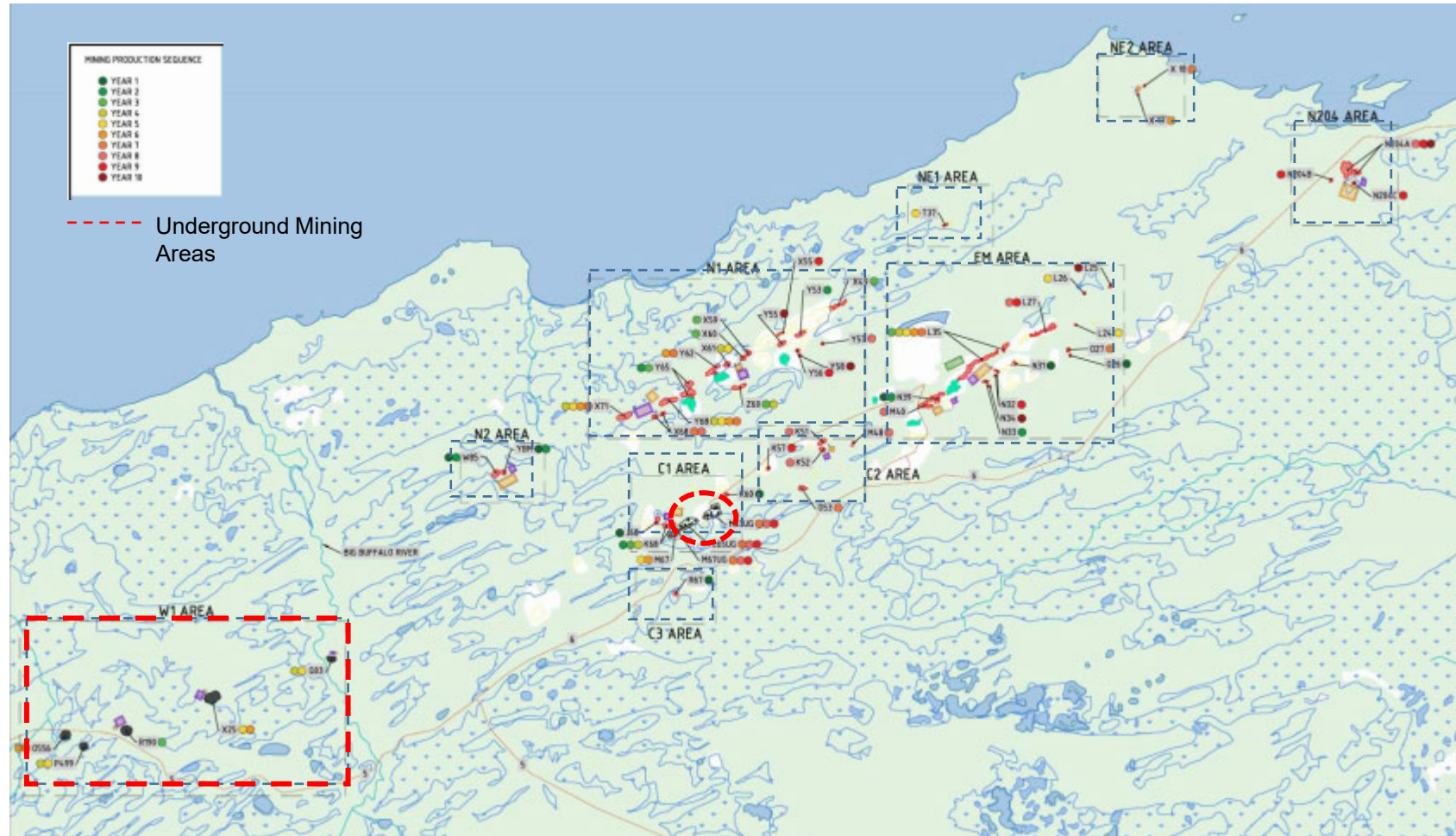
# Waste Rock Management



- The waste rock is limestone – there is minimal to no metal leaching or acid rock drainage (2 out of 82 samples classified as PAG)
- Waste rock volume expected to be 100.6 Mt
- Overburden volume is expected to be 66.4 Mt
- Existing or recently mined open pits, where possible, will be used to store waste rock or in new Waste Rock Storage Facilities (WRSFs) above ground
- New WRSFs will need to be constructed near the pit being mined
- Mineral-sorter rejects will be stockpiled temporarily near the process plant and then used to cover Tailings Deposition Areas (TDAs)



# Underground Mining Clusters



# Overview: Underground Mining

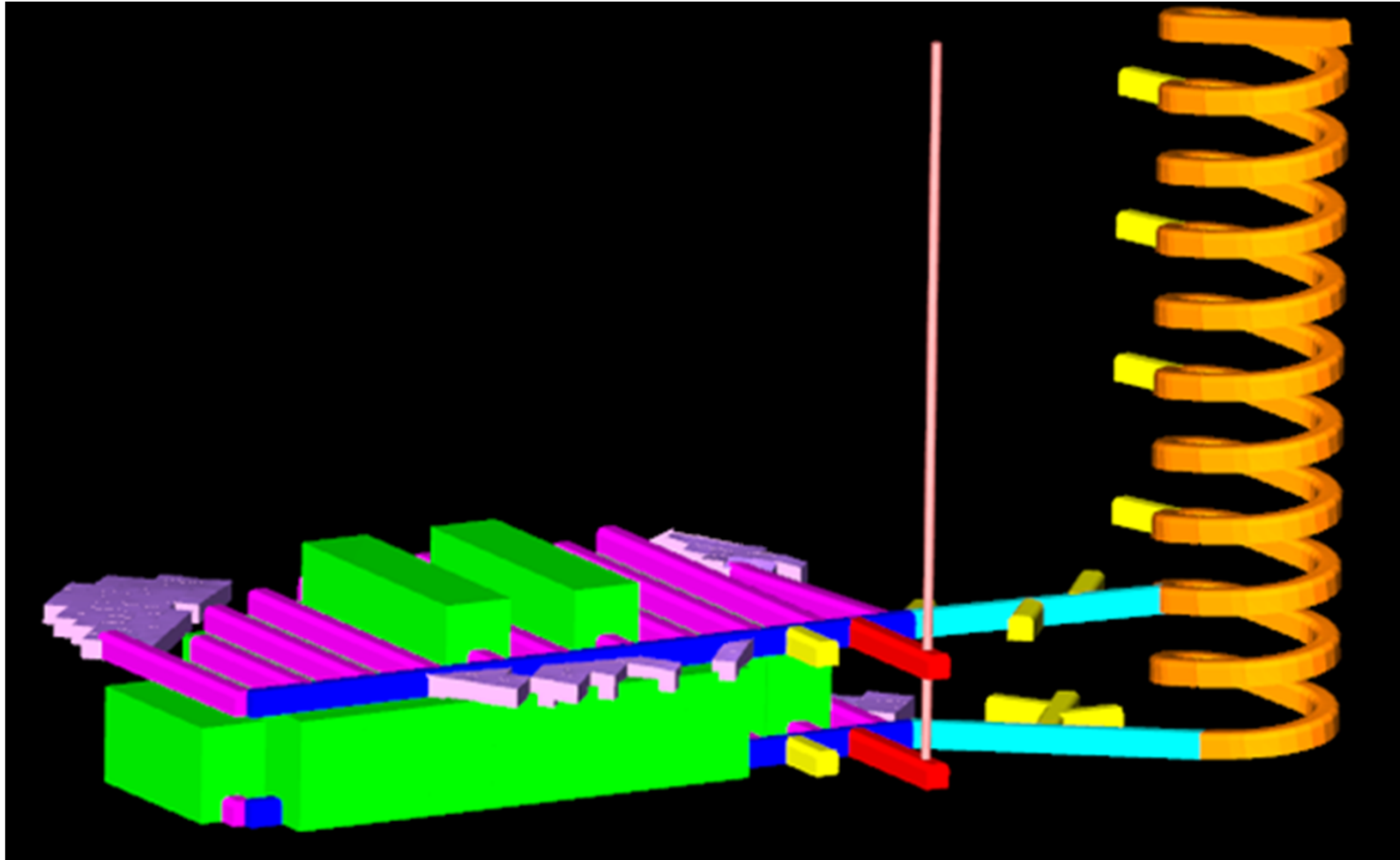


- **Two clusters:** deposits that will be underground mines are located in the west zone (5 deposits) and in the central zone (C1: 3 deposits)
- **Schedule:** From years 3 to 9
- **Mining:** A ramp from surface down to each deposit will be constructed and mineralized rock will be brought to surface using underground trucks. We are investigating accessing more than one deposit underground from a single ramp (e.g., R190 is close to two other deposits)
- **Waste rock:** Mined and temporarily brought to surface, and may be used to refill mined out stopes
- **Relocatable infrastructure:** utility buildings, fuels storage tanks, equipment, electrical substation
- **Water:** Grout wall around UG mine site to limit water ingress and ring of dewatering wells extracting groundwater and reinjecting it underground again



# UG Preliminary Designs

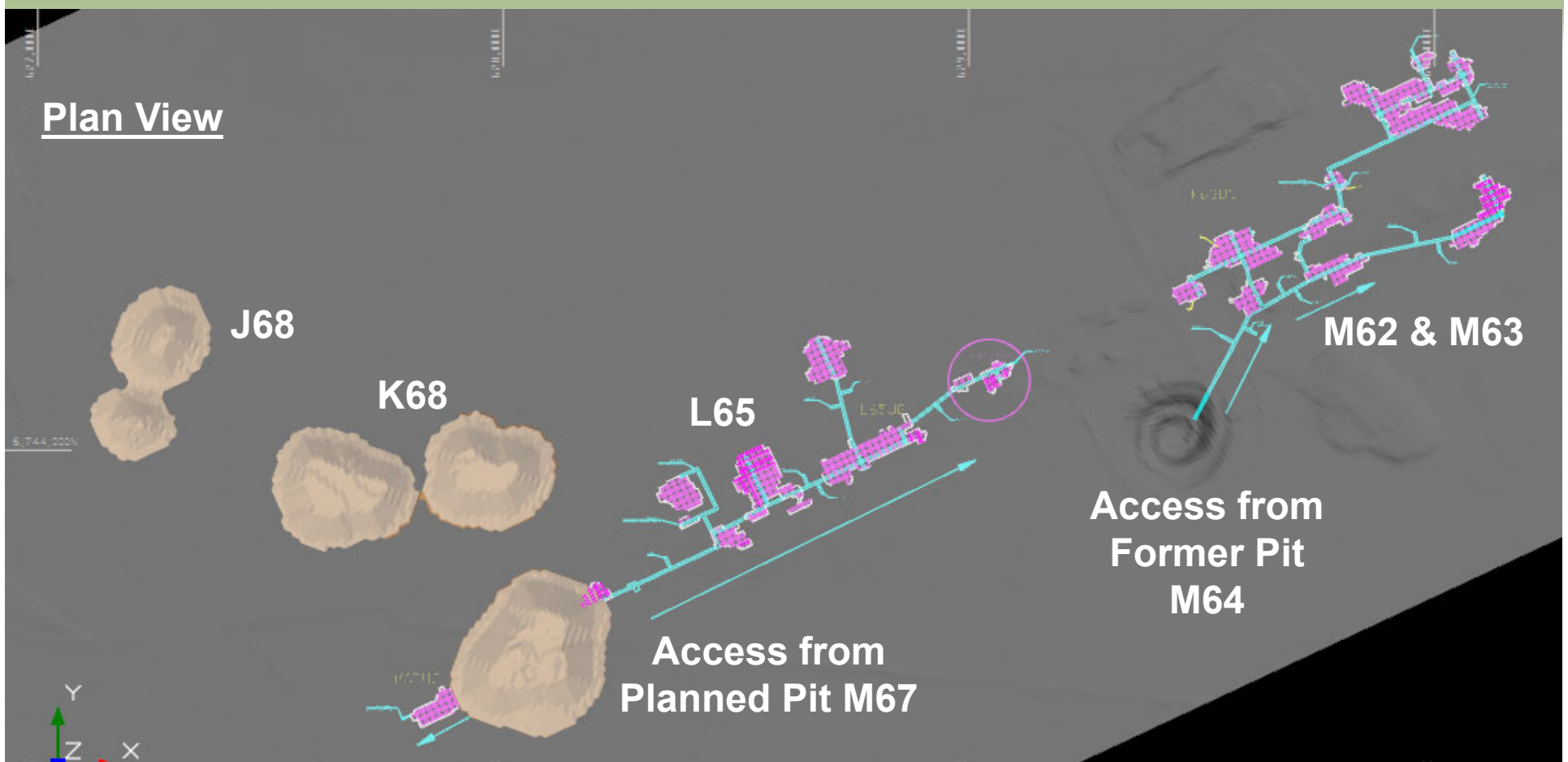
R190



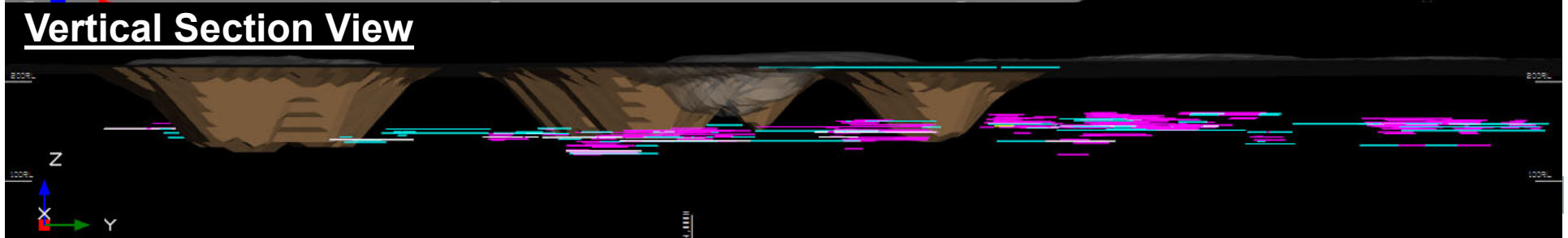
# UG Central Zone & Cluster C1 Pits



Plan View



Vertical Section View

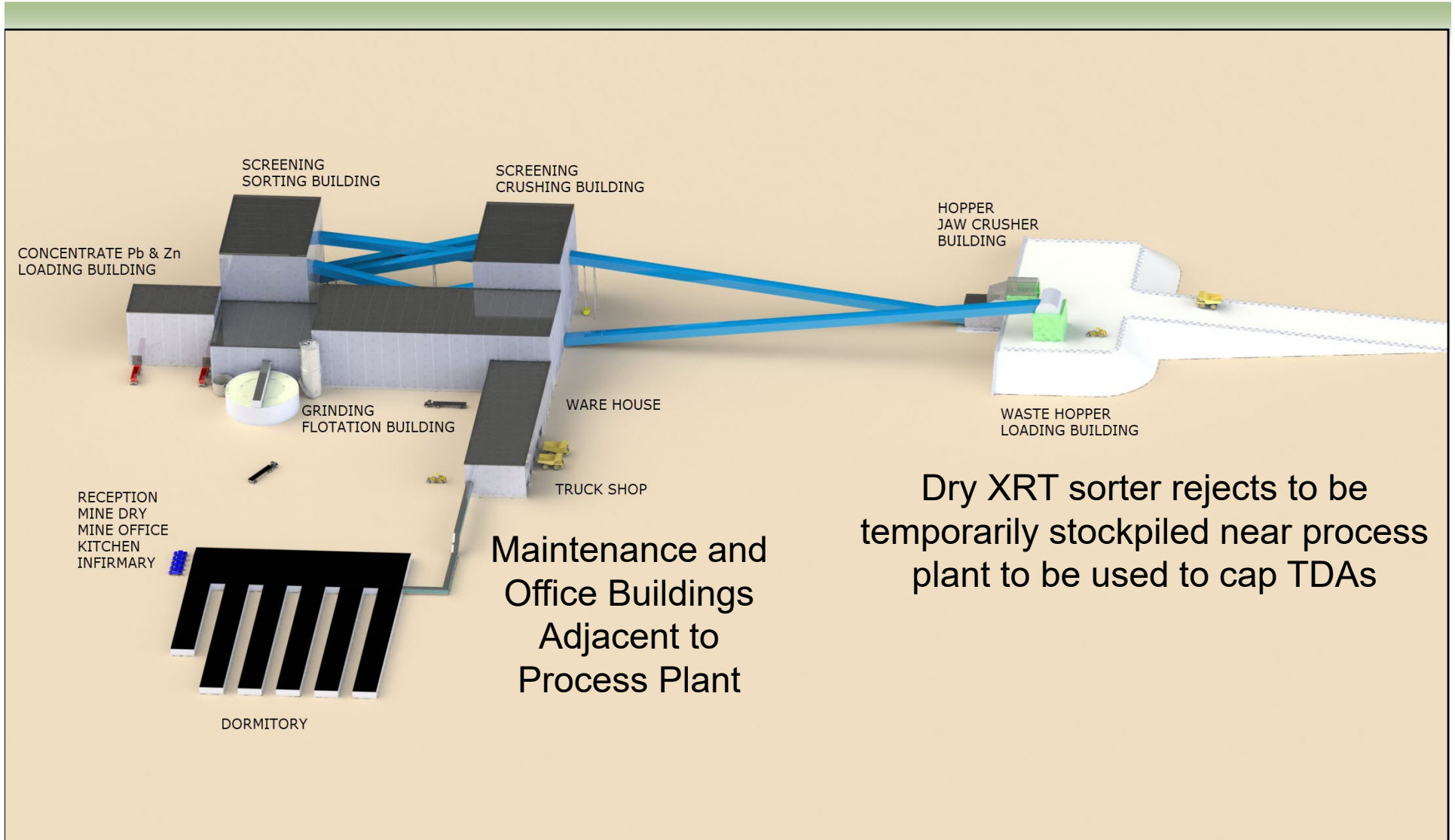


# Proposed Mineral Processing



- **Process Plant:** located on previously disturbed site of the old Cominco Plant
- **Concentrates:** transported by road to rail connection at Hay River.
- **Tailings:** disposal in selected historical and mined out open pits
- **Process Plant Water:** recycled using a nearby open pit mine as a water reservoir
- **Process Plant Capacity:** planning up to 11,250 tonnes per day (tpd)
- **Auxiliary Infrastructure:** camp, truck shop, workshops, warehouse and administration offices will be connected to plant building. Laydown areas will be located near to the plant and workshops.

# Plant Site Layout



Dry XRT sorter rejects to be temporarily stockpiled near process plant to be used to cap TDAs

# Processing Summary



- Pre-concentration is centralized at the process plant
  - Pre-concentration reduces mineralized material to be processed by about 40%, thereby reducing the capacity required for process plant, less tailings, less water and less reagent consumption
  - Dry XRT sorter rejects to be temporarily stockpiled process plant and then used to cap TDAs
- Conventional grinding and flotation circuit; similar to Cominco era
- Concentrate will be trucked to loadout area to transfer to rail.
- The process plant is expected to produce
  - 550-650 tonnes per day of **lead** concentrate
  - 1,000-1,150 tonnes per day of **zinc** concentrate
- Hay River transloading site will be a 1.2 km long railway spur with equipment to transfer the concentrates to rail cars

# Plant Site Infrastructure



- Camp located near process plant; capacity: 230 persons
- Mine dry (male and female facilities)
- Sewage septic tank and leaching field
- Warehouse, truck shop
- Water supply from Great Slave Lk pumphouse & water management ponds
- Access roads and 100 km of former haul roads
- Landfill (inert solid waste disposal) into old pits
- Excess Taltson hydro dam power will be used; potential to increase by 4 MW; to be discussed post PEA
  - Additional power supplied with CNG (compressed natural gas) generators
  - Studying lower carbon emission energy options
- Fuel and CNG storage tanks will be mainly for equipment

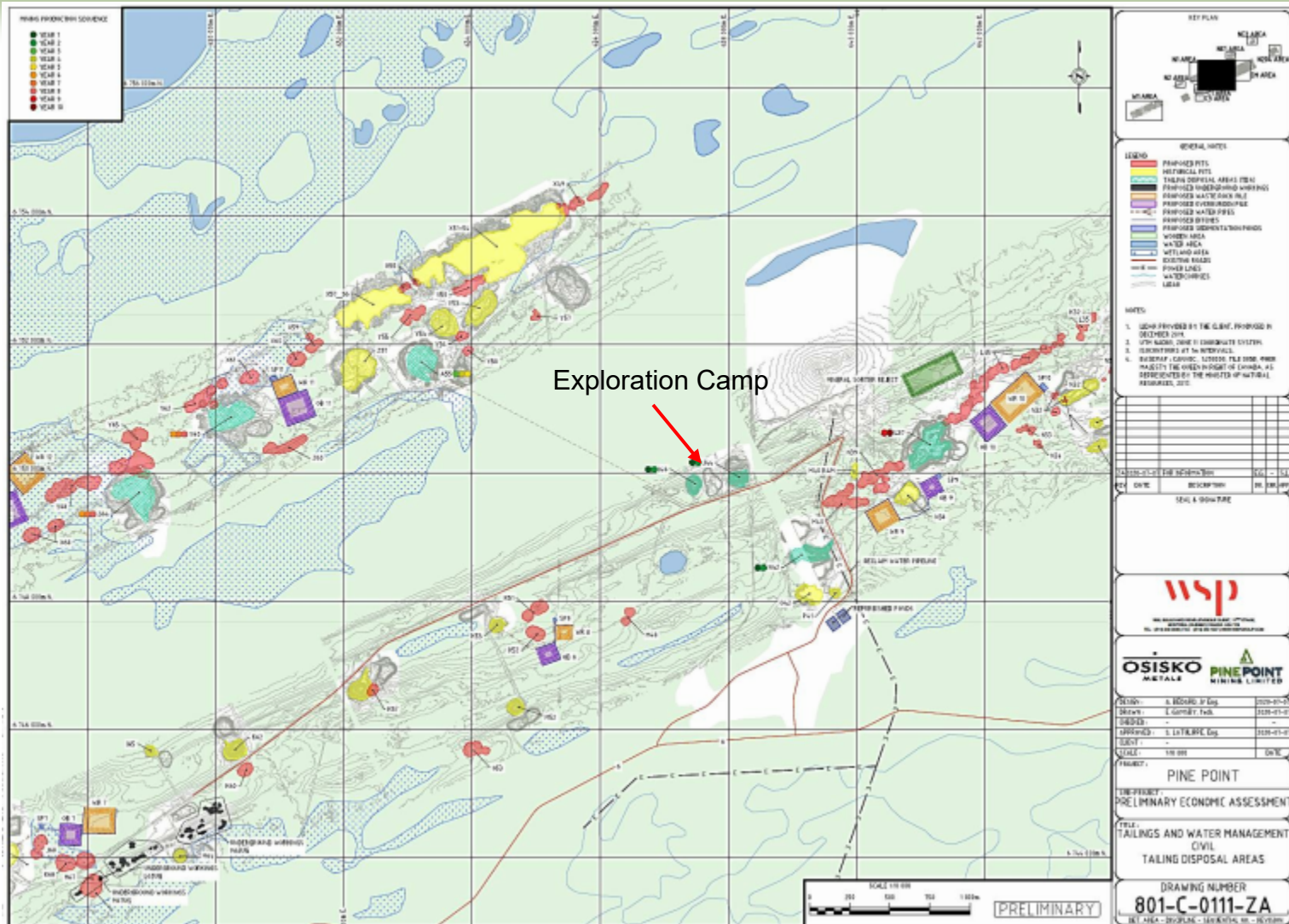
# Process Plant Tailings



- There is no planned “conventional” tailings management facility. The tailings will be deposited in mined out pits (Tailings Deposition Areas [TDAs]). Seven or more old pits will be used as TDAs.
- Tailings – thickened to 60% solids, pumped to TDA.
- Process plant is expected to require 40-45 m<sup>3</sup> of freshwater per hour to be sourced from Great Slave Lake
- Process water removed from tailings will be reused in the process plant to supplement the freshwater requirement
- The TDAs (the old pits) will be covered by mineral sorter rejects, which will then be covered by waste rock up to surface level



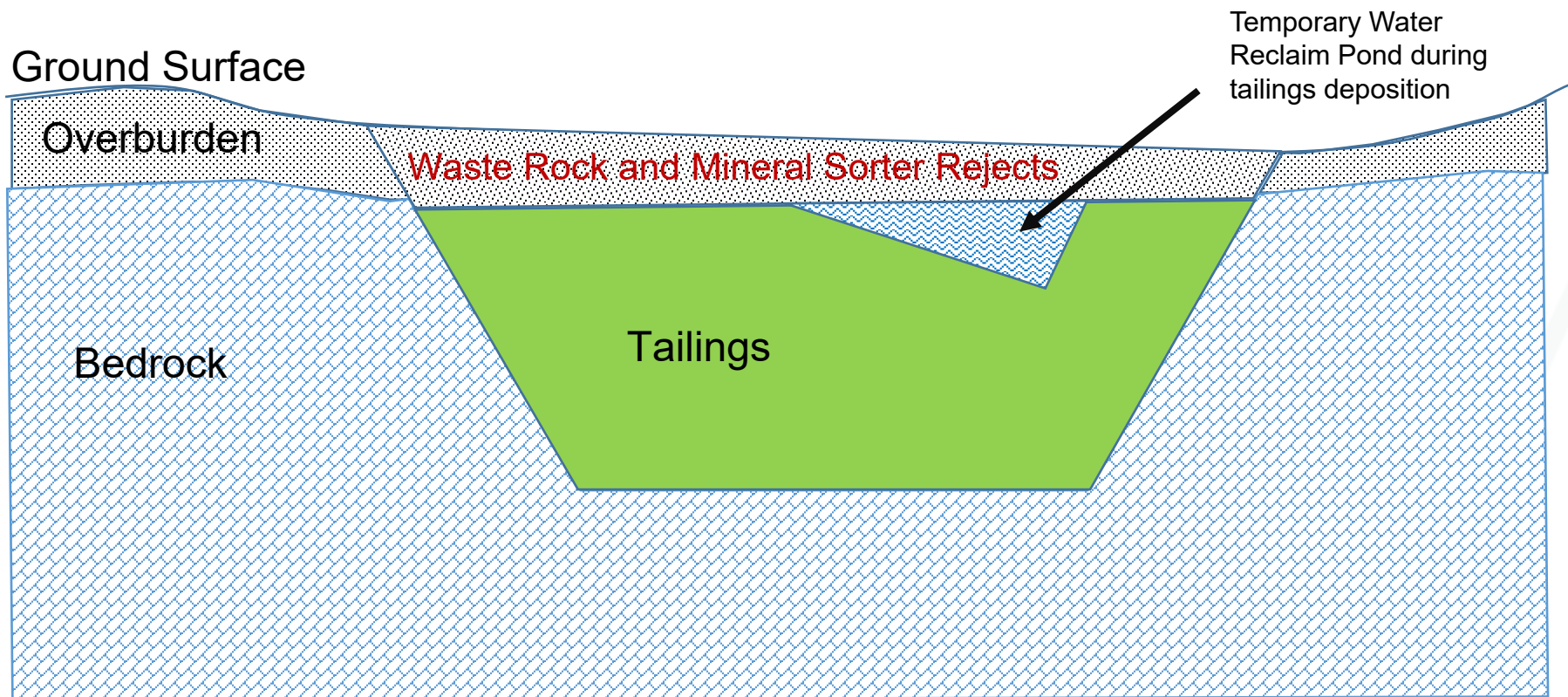
# TDA near Plant



Exploration Camp



# Tailings Deposition Area in Old Pit



# Accommodation



- Capacity for 230 employees
- TVs in each room and common areas, WiFi access points throughout
- Laundry rooms, fitness room, common area lounge, foosball, etc.
- Kitchen with a sitting capacity for 180 people
- Administration offices and mine dry



# Power Requirements



- The mining, process plant and site infrastructure power requirements will vary, ranging from 12.53 to 24.28 MW is the average annual power demand
- NTPC (Taltson) could supply around 9 to 12 MW of energy (winter-summer) using existing on site substation
- On site CNG will supplement power requirements when NTPC cannot meet requirements (e.g., winter) supplying 3.9 MW. An emergency diesel generator will provide power to key areas where NTPC power is not available.
- A second CNG plant for the underground mining will supply 7.8 MW
- A fleet of mobile trailer mounted natural gas gensets, the number required will vary according to need, supplying from 0.9 to 1.5 MW

# Workforce



- Local workforce as much as possible. Total 456 employees during operations and average of 280 for construction.
- Centralized camp rather than people commuting because of 12 hour shifts
- Shift Rotations not finalized during PEA. Different rotation options will be considered for the Feasibility Study (FS).
- Opportunities will exist for local employment and entrepreneurial contracting for further development of community capacities

# Closure



- Brownfield sites will be returned to the same condition as they are currently
- Greenfield areas will be returned to a similar ecologically productive state
- Progressive reclamation details will be further developed during EA and permitting and will be ongoing during operations
  - Several old pits will be used to store tailings and some waste rock (non-mineralized rock mined)
  - Above-ground storage piles for overburden and waste rock will be re-sloped and dust mitigation measures will be applied. Runoff will be directed back to the pits.
  - Closure plan to be developed with regulators and communities during EA and water licencing.



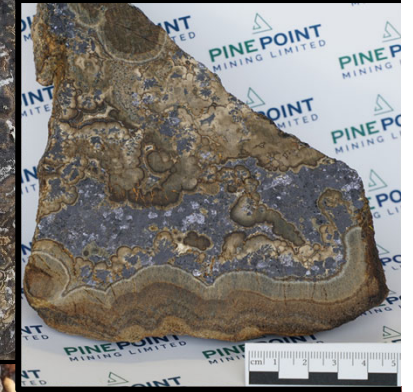
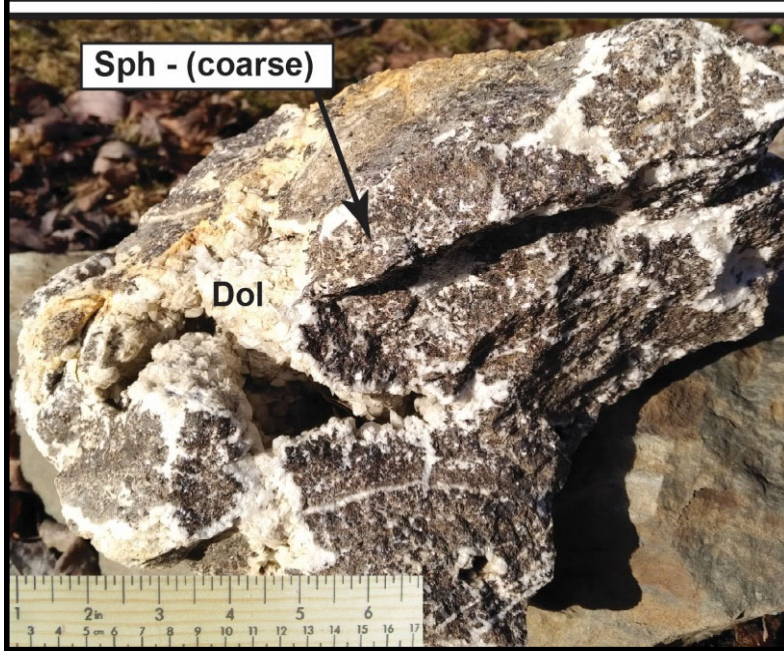
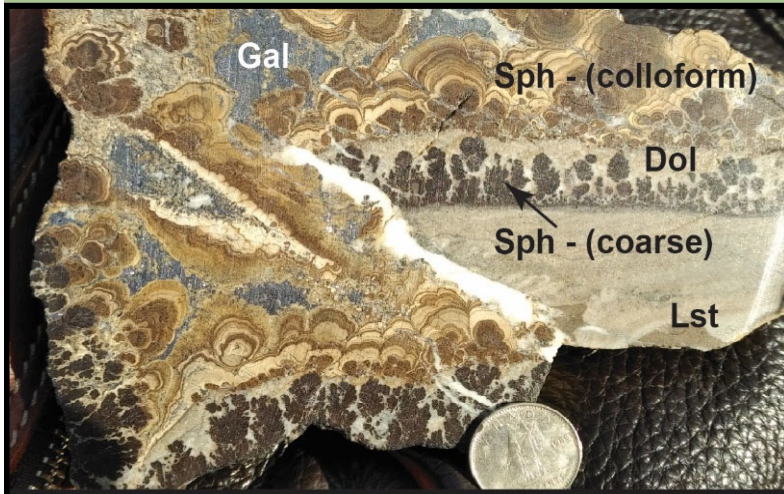
# Summary



- Preliminary Economic Assessment (PEA) completed and it concludes that the project is economically viable.



# Rock Samples





# Questions....





# EA Initiation Package



# EA Initiation Package



- The EA Initiation Package was prepared to meet MVEIRB's *Draft Environmental Assessment Initiation Guidelines for the Developer's of Major Projects*
  - Provides early information on the Project for engagement, scoping, and developing the Terms of Reference for the EA
  - Allows for focused/narrowed Developer's Assessment Report (DAR) on priority impact pathways

# EA Initiation Package Structure Overview



- Includes the following:

Volume 1	Project Description
Volume 2	Management and Monitoring Plans (framework versions)
Volume 3	Description of Existing Environment
Volume 4	Identification of Potential Project-Interactions and Proposed Mitigation Measures
Volume 5	Developer's Assessment Proposal
Volume 6	Concordance Table

## EA Initiation Package – PD and plans



- The Project Description describes the Project based on the PEA
  - Project engineering and design will continue to progress
  - Feedback from engagement can be considered where appropriate
  - Project engineering and environmental teams can work together to advance the Project
- Framework monitoring and management plan documents were included
  - Engagement and Collaboration Plan, Erosion and Sediment Control Plan, Spill Contingency Plan, Tailings and Waste Rock Management Plan, Waste Management Plan, Closure and Reclamation Plan, Wildlife Mitigation and Monitoring Plan, Aquatic Effects Monitoring Program
  - Preliminary documents; details to be provided in subsequent versions based on detailed design/engineering and feedback

- The Existing Environment section summarizes historical baseline studies for the Project
  - Numerous baseline studies conducted by Tamerlane and Darnley Bay
  - Publicly available information
  - Recent studies completed from 2018 and ongoing, including air quality, wildlife, and water quality
  - Historical data included and used to present the existing condition



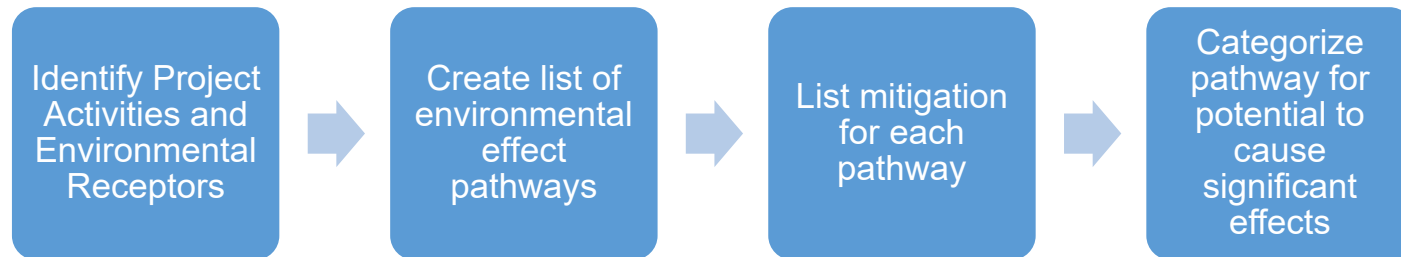
Stanley Louine deploying an ARU



Birch Creek



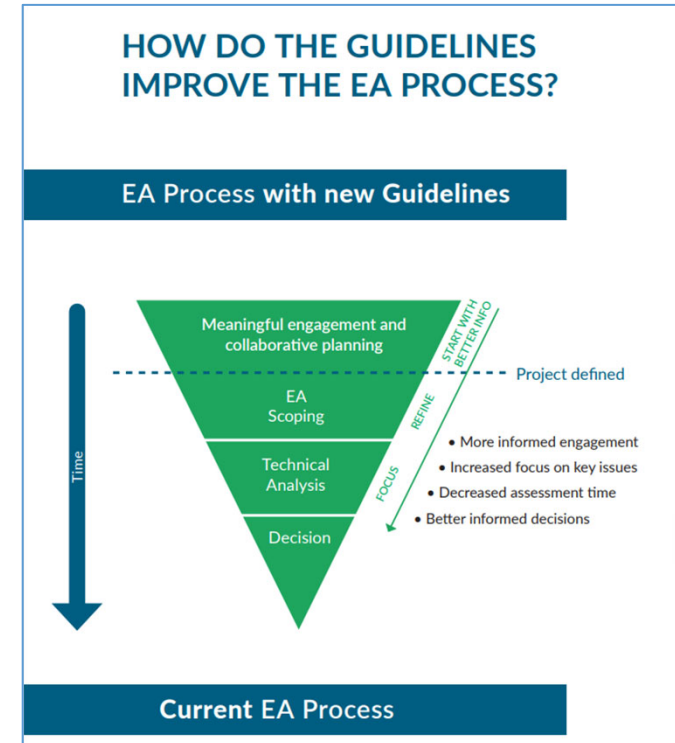
- Potential Project-environment interactions and proposed mitigation measures were identified in tables by component using pathway analysis approach
- Each pathway was evaluated with proposed environmental design features and mitigation to predict whether the pathway had potential to cause residual adverse effects



- Pathways were classified
  - **No pathway** – pathway removed (i.e., effect is avoided) by mitigation or design so that the Project would result in no measurable environmental change relative to existing conditions or guideline values (e.g., air, soil, or water quality guidelines), and therefore, would have no residual effect on a biophysical or human environment component.
  - **Secondary** – the pathway could result in measurable minor environmental change relative to existing conditions or guideline values, but the change is sufficiently small that it would have a negligible residual effect on a biophysical or human environment component.
  - **Primary** – the pathway is likely to result in an environmental change relative to existing conditions or guideline values, that could cause a greater than negligible effect on a biophysical or human environment component.

# DAP – Overall Approach

- In the DAP, the overall assessment approach is outlined
- Focus is on primary pathways identified in the Interactions and Mitigations document
  - pathways most likely to cause significant adverse effects
- Avoids extensive presentation of text and materials for pathways with little community concern/or measurable effect
- Focus on KLOIs



Excerpt from the MVEIRB Draft EA Initiation Guidelines

# Proposed KLOI and SON



- Key Lines of Inquiry (KLOI):
  - KLOI-1: Impacts to Water Quality
  - KLOI-2: Impacts to Caribou
  - KLOI-3: Impacts to Traditional Land and Resource Use
  - KLOI-4: Impacts to Social and Economic Conditions
- Subjects of Note (SON):
  - SON-1: Impacts to Air Quality, Noise, Vibration and Climate
  - SON-2: Impacts to Groundwater Quantity and Quality
  - SON-3: Impacts to Surface Water Quantity
  - SON-4: Impacts to Fish and Fish Habitat
  - SON-5: Impacts to Terrain and Soils
  - SON-6: Impacts to Vegetation
  - SON-7: Impacts to Wildlife
  - SON-8: Impacts to Heritage Resources
  - SON-9: Impacts to Non-Traditional Land and Resource Use

- Valued Components (VCs)
  - aspects of the biophysical, cultural, and socio-economic environment considered to have scientific, social, cultural, economic, historical, archaeological, or aesthetic importance
  - identified to be of concern by proponent, scientists, Indigenous peoples, government agencies, or the public
- Intermediate components of the biophysical environment
  - assessed to support VC assessments
  - include physical attributes of the biophysical environment upon which VCs rely (e.g., air quality and surface water quantity)
  - critical to the assessment, but the VC is the ultimate receptor of concern
  - except for significance determination, there is no difference in how VCs and intermediate components will be assessed in the DAR

## DAP – Reasonably Foreseeable Developments



Project	Proponent	Overview
Yellowknife City Gold Project	Gold Terra Resource Corporation	Gold exploration project, focusing on areas south of Con Mine and north of Giant Mine
Giant Mine Remediation Project	Governments of Canada and the Northwest Territories	Former Giant Mine located north of Yellowknife, lying within city limits and close to communities of Ndilq̄ and Dettah
NICO Cobalt-Gold-Bismuth-Copper Project	Fortune Minerals Limited	Cobalt, gold, and bismuth deposit located in the Tłı̄chq̄ region, ~50 km northwest from community of Whatı̄
Nechalacho Rare Earth Element Project	NWT Rare Earths Limited	Rare earth elements deposit located ~100 km southeast of Yellowknife near Hearne Channel on Great Slave Lake
Aurora Wood Pellet Project	Aurora Wood Pellets Limited	Proposed wood pellet mill north of Enterprise
Timber harvesting	Timberworks Inc.	Timber harvesting rights within a Forest Management Agreement area from Slave River to Buffalo River
Taltson Hydroelectric Expansion Project	Government of Northwest Territories	Expansion of the existing Taltson generating station to connect the Taltson Hydro System to the North Slave Hydro System

## DAP – Proposed Methods

- Detailed methods proposed for assessing the KLOI and SON are included in Tables 4-5 to 4-19 of the DAP
  - Outlines proposed modelling and analytical methods for primary pathways

<b>Assessment Approach for Individual Component</b>		
<b>Information Sources</b>		
<b>Valued Components, Assessment Endpoints, and Measurement Indicators</b>	<b>Valued Components (VCs)</b>	
	<b>Assessment Endpoints and Measurement Indicators</b>	
<b>Environmental Assessment Boundaries</b>	<b>Spatial Boundaries</b>	
	<b>Temporal Boundaries</b>	
	<b>Assessment Cases</b>	
<b>Input from Engagement</b>		
<b>Incorporation of Indigenous Traditional Knowledge (ITK)</b>		
<b>Existing Environment</b>		
<b>Project Interactions and Mitigations</b>		
<b>Residual Effects Analysis</b>		
<b>Residual Effects Classification and Determination of Significance (where applicable)</b>		
<b>Prediction Confidence and Uncertainty</b>		
<b>Monitoring and Follow-up</b>		
<b>Supporting Annexes</b>		



# Aquatic





# Proposed KLOI and SON - Aquatic



- Key Lines of Inquiry (KLOI):
  - KLOI-1: Impacts to Water Quality
  - KLOI-2: Impacts to Caribou
  - KLOI-3: Impacts to Traditional Land and Resource Use
  - KLOI-4: Impacts to Social and Economic Conditions
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## Aquatic – Valued and Intermediate Components

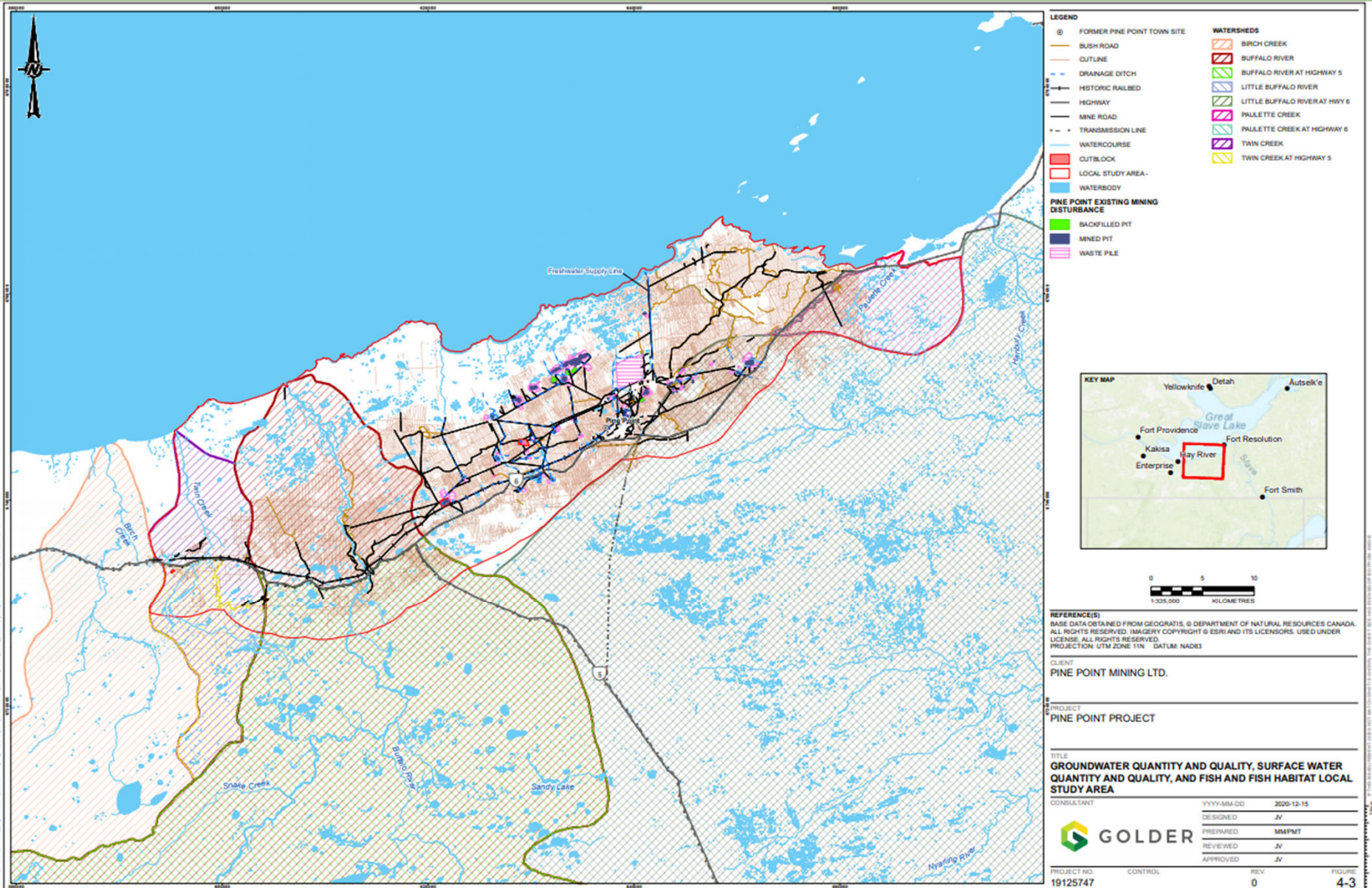


Biological Component	Valued Component
Fish and Fish Habitat	Great Slave Lake Fish Community; Twin Creek Fish Community; Buffalo River Fish Community; Paulette Creek Fish Community

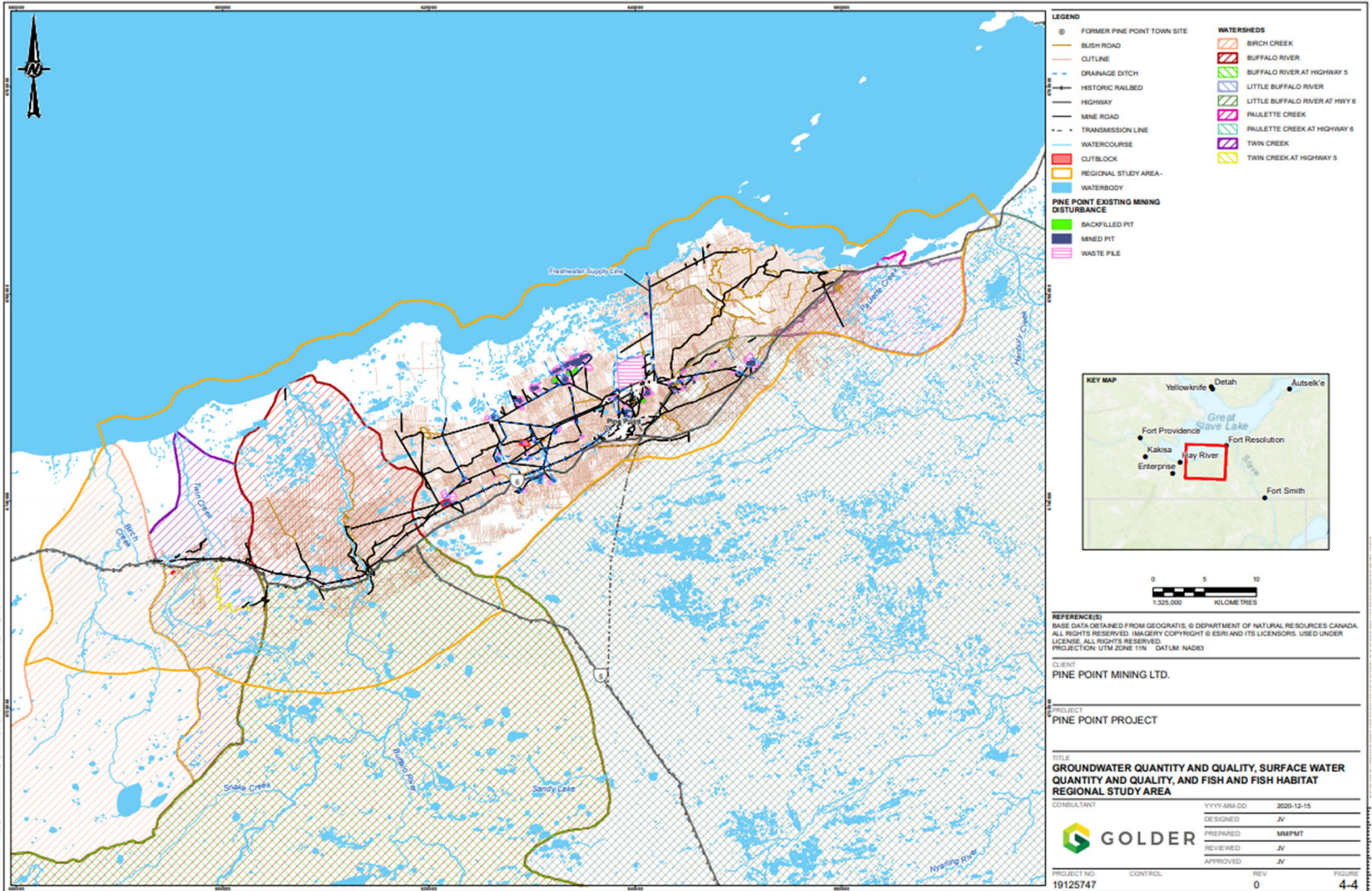
Environmental Component	Intermediate Component
Groundwater Quantity and Quality	Groundwater Quantity and Quality
Surface Water Quantity	Surface Water Quantity
Surface Water Quality	Water Quality

# Aquatics – LSA





# Aquatics – RSA



## Proposed Methods - Aquatic



- Focus will be on primary pathways
- Groundwater
  - Effects on groundwater quantity and quality will be evaluated with industry standard numerical groundwater flow model (e.g., FEFLOW, MODFLOW)
  - Groundwater drawdown and groundwater discharge to mine pits will be simulated for various assessment cases and time snapshots
  - Groundwater model predictions will be inputs to surface water quantity (hydrology) and surface water quality assessments
- Surface Water Quantity
  - Receiving environment surface water quantity model will integrate the hydrogeological quantity modelling and the mine site water balance; core model framework is expected to be GoldSim
  - Model will be based on a GIS sub-watershed analysis and consider rainfall and snowmelt runoff, lake storage and attenuation, lake evaporation, snow sublimation, as well as ice conditions at local lakes and streams, and mine site water management activities
  - Receiving environment surface water quantity model predictions will be used as inputs to the surface water quality and fish and fish habitat components

## Proposed Methods - Aquatic



- Surface Water Quality
  - Predictive site-wide and receiving water quality numerical model will be constructed to project water quality with potential to drain/discharge from site water management facilities (e.g., runoff and seepage from mine infrastructure) to the receiving environment
  - The water quality model will be integrated with the site water balance and receiving environment surface water quantity models, and factor in the hydrogeological modelling results
  - Core model framework is expected to be GoldSim
  - Depending on the water balance and Water Management Plan, other models may be used to supplement the site and receiving water quality models (e.g., CE-QUAL, CORMIX)
  - Focus of water quality assessment is expected to be on waterbodies with potential connectivity to fish-bearing waterbodies and watercourse, and inshore bounds of Great Slave Lake
  - Water quality model projections will be compared to existing environment conditions and applicable guidelines
  - Potential effects on Indigenous people from changes to water quality will be integrated and assessed in the traditional land and resource use section



## Proposed Methods - Aquatic



- Fish and Fish Habitat
  - Primary pathways relating to changes in fish habitat quality and quantity will involve qualitative evaluations that consider quantitative outcomes of the surface water quantity and water quantity modelling and assessment
  - For direct loss or alteration of fish habitat (e.g., road crossing structure or water intake), a quantitative assessment will be completed of potential changes to total area of habitat present and calculated as an absolute (i.e., area) of loss or alteration, as appropriate
    - Will consider the need for a conceptual Fisheries Offsetting Plan to offset the losses to fish habitat (i.e., harmful alteration, disruption or destruction of fish habitat as per the *Fisheries Act*)

# Air and Terrestrial



- Key Lines of Inquiry (KLOI):
  - KLOI-1: Impacts to Water Quality
  - KLOI-2: Impacts to Caribou
  - KLOI-3: Impacts to Traditional Land and Resource Use
  - KLOI-4: Impacts to Social and Economic Conditions
  
- Subjects of Note (SON):
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  - SON-6: Impacts to Vegetation
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  - SON-8: Impacts to Heritage Resources
  - SON-9: Impacts to Non-Traditional Land and Resource Use

# Air & Terrestrial – Valued and Intermediate Components

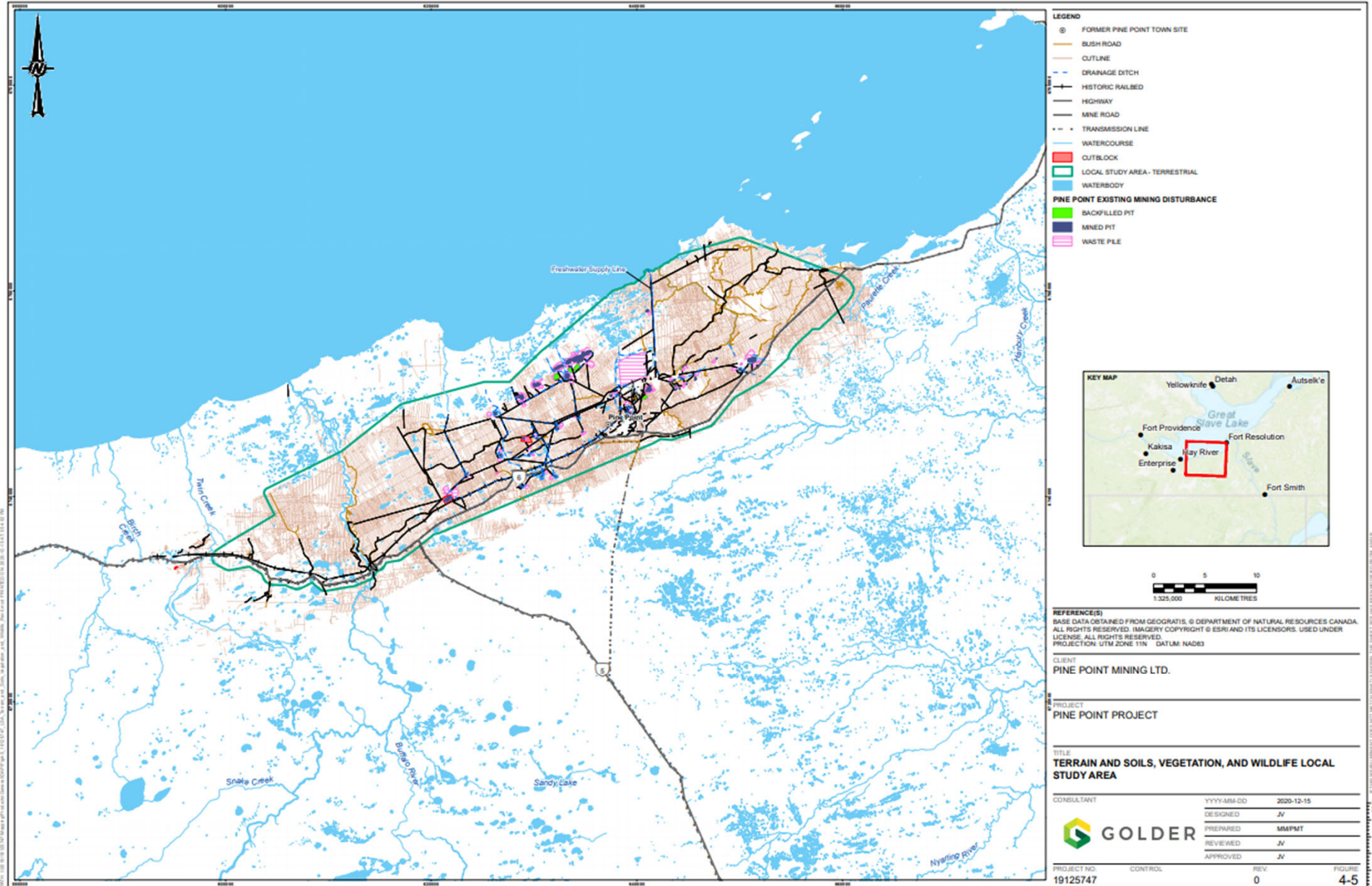


Biological Component	Valued Component
Vegetation	Vegetation (upland, wetland, riparian ecosystems)
Wildlife	Comprehensive assessment: Woodland Caribou (Boreal Population), Wood Bison, Wolverine, Gray Wolf, Little Brown Myotis, Olive-sided Flycatcher, Whooping Crane, Common Nighthawk, Evening Grosbeak, Yellow Rail, Rusty Blackbird
	Screening assessment: Northern Myotis, Short-eared Owl, Barn Swallow, Bank Swallow, Horned Grebe, Red-necked Phalarope, Northern Leopard Frog, Gypsy Cuckoo Bumble Bee, Yellow-banded Bumble Bee

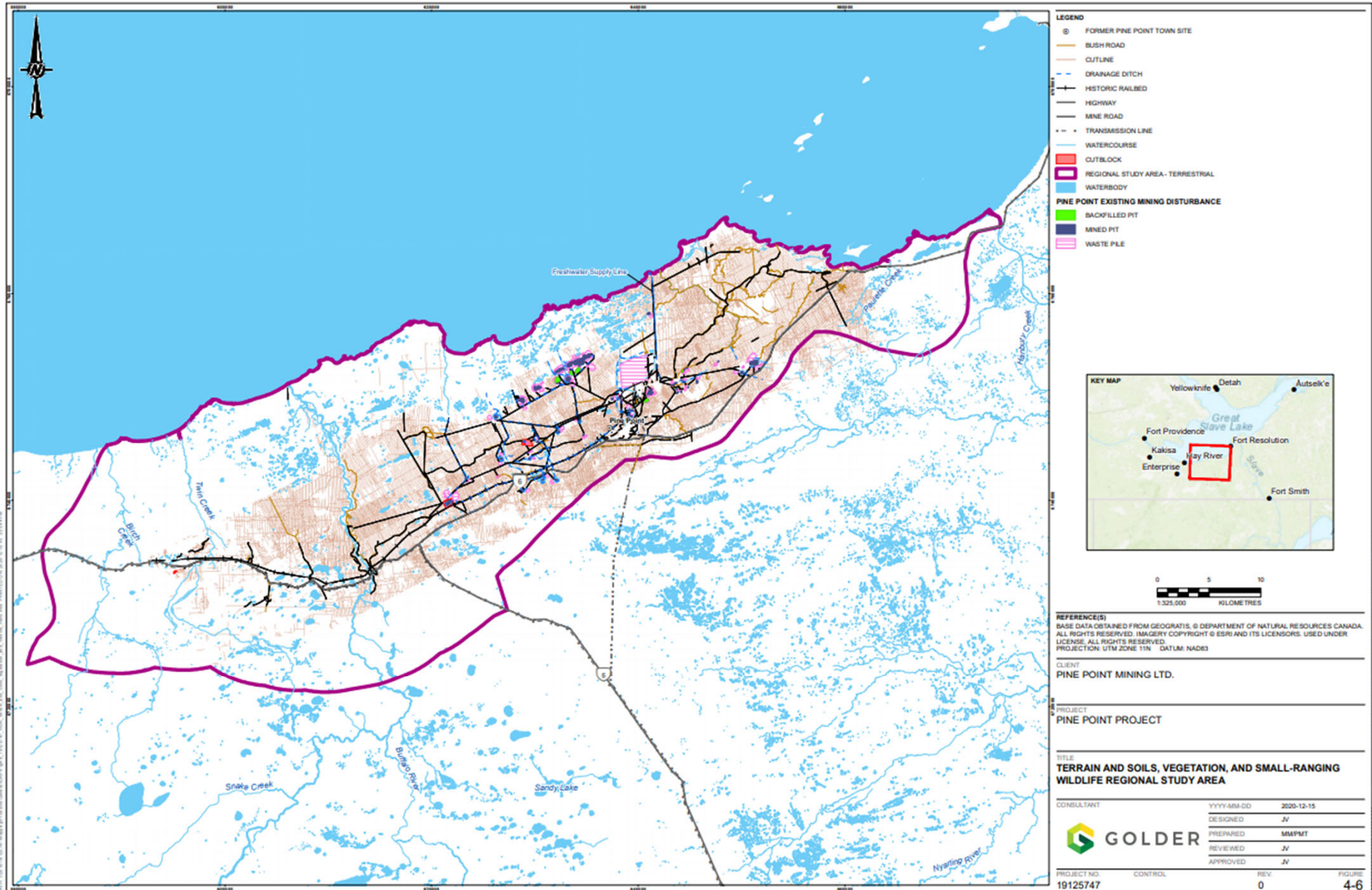
Environmental Component	Intermediate Component
Air Quality, Noise and Climate	Air Quality
	Noise
	Vibration
	Climate
Terrain and Soils	Terrain and Soils



# Terrain and Soils, Vegetation, and Wildlife LSA

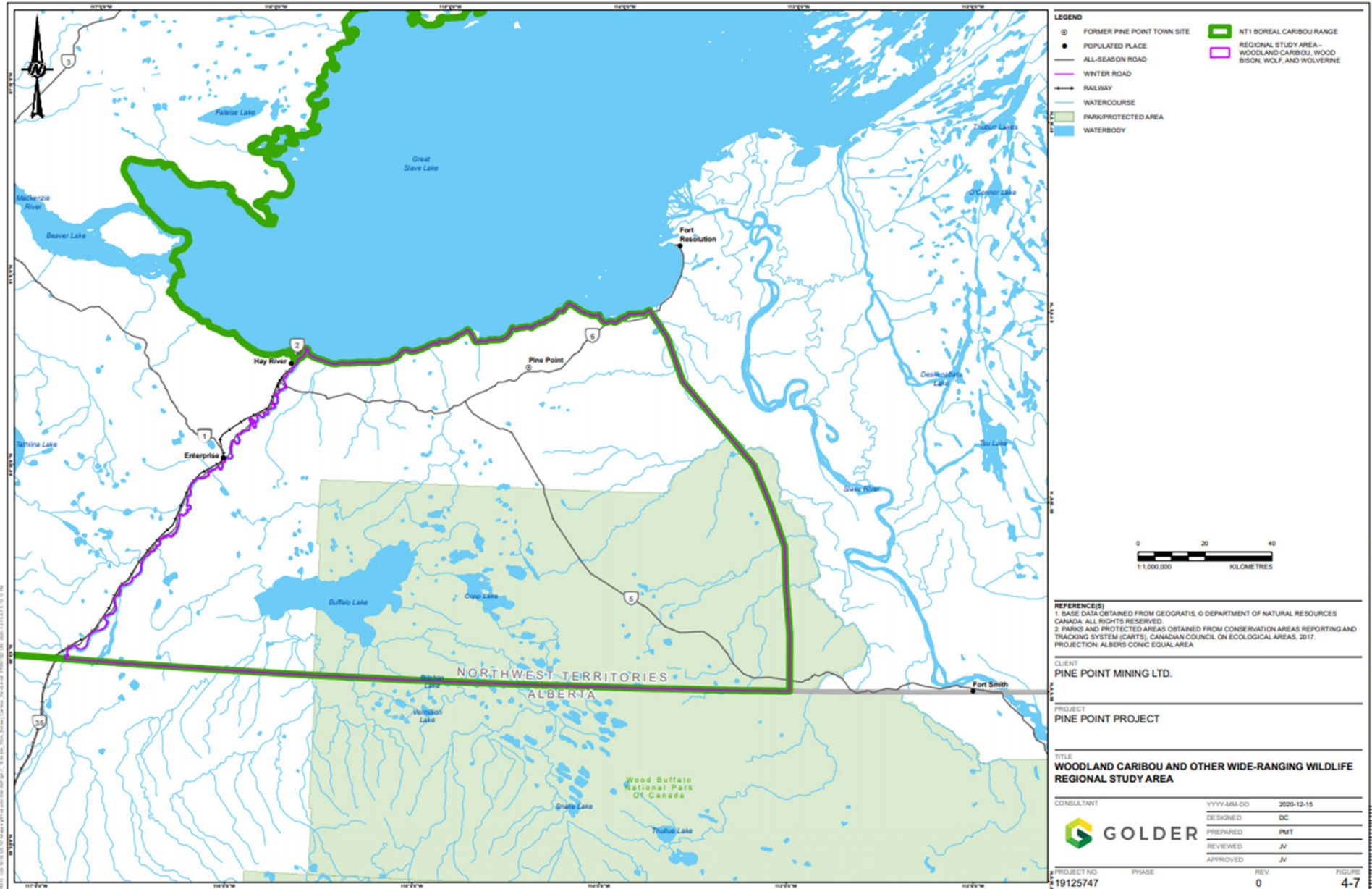


# Terrain and Soils, Vegetation, and Small Ranging Wildlife RSA





# Caribou and Wide Ranging Wildlife RSA



## Proposed Methods – Air and Terrestrial



- Focus will be on primary pathways
- Air Quality, Noise, and Climate
  - Emission sources will be quantified in an emissions calculation exercise and will be primary inputs to the CALPUFF dispersion model, which will predict ground level concentrations of the key parameters; the output of the model will be processed and compared to NWT air quality standards, as appropriate
  - Greenhouse gas emissions will be quantified from Project activities and evaluated in the context of the territorial and national totals
  - Computer noise models will be used to predict Project sound levels at sensitive receptors identified based on Indigenous Knowledge; predicted Project sound levels will be compared to thresholds from appropriate guidance documents
  - Numerical models of explosive blasting will be developed; results will be compared to thresholds from appropriate guidance documents

## Proposed Methods – Air and Terrestrial



- Terrain and Soils

- Distribution of terrain and soil types will be mapped using up to date aerial photography and LiDAR, and supported by the Ecological Landscape Classification (ELC) developed for the vegetation assessment
- This map will be used to determine the amount of soil removed or altered/disturbed by the Project

- Vegetation

- Availability and distribution of upland, wetland, and riparian ecosystems will be estimated from the ELC
- Fire and human disturbance data from government sources will also be incorporated as landcover layers in the ELC
- The ELC will be used to determine changes in the amount and distribution of upland, wetland, and riparian ecosystems. Part of the assessment will look at effects to listed plant species and traditional use plants
- Incremental and cumulative changes in the existing ELC and disturbance from the Project and other developments in the RSA will be determined for upland, wetland, and riparian ecosystems

## Proposed Methods – Air and Terrestrial



- Boreal Caribou

- Availability and distribution of suitable habitat for caribou in the RSA will be estimated and mapped using a habitat suitability model; the model will be used to determine changes in the amount of different quality habitats and their distribution
- The habitat suitability map includes fire and human disturbance data
- Effects from sensory disturbance on caribou will be captured quantitatively using a 500 m buffer around human disturbance, which is based on ECCC methods
- Incremental and cumulative changes in existing caribou habitat and disturbance from the Project and other developments in the RSA will be calculated and qualitatively assessed to provide context for predicted effects from the Project on caribou in this region of the NT1 Boreal Caribou Range
- At the scale of the NT1 Boreal Caribou Range, the incremental contribution from the Project to the loss of critical caribou habitat and associated total disturbance (including fire) relative to existing conditions will be calculated, as per ECCC methods. This is the scale for determination of significance.

## Proposed Methods – Air and Terrestrial



- Wildlife

- For small- and wide-ranging wildlife VCs, availability and distribution of suitable habitats in each applicable RSA will be estimated and mapped using habitat suitability models
- The habitat maps will include fire and human disturbance data
- The habitat models for the RSAs will be used to determine changes in the amount of different quality habitats and their distribution for each VC
- Effects from sensory disturbance will be determined qualitatively using scientific literature, government reports, and other publicly available information
- Incremental and cumulative changes in existing habitat and disturbance from the Project and other developments in the RSA will be determined for each VC



# Human Environment



# Engagement to Date



- Engagement focused on building relationships and communicating re: Project development
- Project engagement transitioned from Darnley Bay (2016-2017) to PPML (2017 onward); PPML is aware of the issues/concerns previously raised and considers them moving forward
- Most involved to date include DKFN, KFN, FRMG, HRMGC, the Town of Hay River, Hamlet of Fort Resolution
- PPML has been engaging with the community leadership and following their direction on preferred method of engagement

Indigenous Groups Prioritized for Involvement	Other Indigenous Groups with an Interest in the Project	Other Parties Informed Outside the Formal Engagement Plan
<p><b>Deninu Kue First Nation</b>  <b>Kat'odeeche First Nation</b>  <b>NWT Metis Nation</b></p> <ul style="list-style-type: none"> <li>■ Fort Resolution Metis Council</li> <li>■ Hay River Metis Council</li> <li>■ Fort Smith Metis Council</li> </ul>	<ul style="list-style-type: none"> <li>■ West Point First Nation</li> <li>■ Salt River First Nation</li> <li>■ Smith's Landing First Nation</li> <li>■ Yellowknives Dene First Nation</li> <li>■ Lutsel K'e Dene First Nation</li> <li>■ North Slave Metis Alliance</li> </ul>	<ul style="list-style-type: none"> <li>■ Business Owners (Hay River and Fort Resolution)</li> <li>■ Town of Hay River</li> <li>■ Hamlet of Fort Resolution</li> <li>■ City of Yellowknife</li> <li>■ Schools (Hay River and Fort Resolution)</li> <li>■ Deh Cho Land Use Planning Committee</li> <li>■ NWT and Nunavut Chamber of Mines</li> <li>■ Government of the Northwest Territories</li> <li>■ MVEIRB</li> <li>■ MVLWB</li> </ul>
<p><b>Other Interested Parties</b></p> <ul style="list-style-type: none"> <li>■ Cabin Owners</li> <li>■ Timberworks Inc.</li> <li>■ Teck Metals</li> <li>■ Avalon Advanced Metals</li> </ul>		

# Upcoming Engagement



Early  
Engagement to  
Date

- Upcoming engagement will continue as per the Engagement and Collaboration Plan framework outlined in the EA Initiation Package

**Environmental  
Assessment  
Process  
Engagement**

- Will include more emphasis on:
  - Collecting and incorporating Indigenous Knowledge
  - Mitigation for potential Project effects on the environment and communities
  - Benefit enhancement measures to maximize local uptake of opportunities
  - Awareness of community priorities, goals, and economic opportunities
  - Engagement regarding community wellbeing

Ongoing  
Construction and  
Operations  
Engagement

# Proposed KLOI and SON – Human Environment



- Key Lines of Inquiry (KLOI):
  - KLOI-1: Impacts to Water Quality
  - KLOI-2: Impacts to Caribou
  - KLOI-3: Impacts to Traditional Land and Resource Use
  - KLOI-4: Impacts to Social and Economic Conditions
  
- Subjects of Note (SON):
  - SON-1: Impacts to Air Quality, Noise, Vibration and Climate
  - SON-2: Impacts to Groundwater Quantity and Quality
  - SON-3: Impacts to Surface Water Quantity
  - SON-4: Impacts to Fish and Fish Habitat
  - SON-5: Impacts to Terrain and Soils
  - SON-6: Impacts to Vegetation
  - SON-7: Impacts to Wildlife
  - SON-8: Impacts to Heritage Resources
  - SON-9: Impacts to Non-Traditional Land and Resource Use

# Valued Components – Human Environment

Human Environment Component	Valued Component
Heritage Resources	Heritage Resources
Traditional Land and Resource Use	Traditional Land and Resource Use
Socio-economics	Population Demographics; Economic Development and Government Revenues; Employment and Education; Housing, Services and Infrastructure; Community Health and Wellbeing
Non-Traditional Land and Resource Use	Non-Traditional Land and Resource Use







## Proposed Methods – Human Environment



- Focus will be on primary pathways
- Heritage Resources
  - There are no primary pathways identified for heritage resources; secondary pathways will be addressed in the DAR using an abbreviated, tabular format and not carried forward for residual effects analysis, classification, and determination of significance
  - The Prince of Wales Northern Heritage Centre manages the permitting process to protect archaeological resources, including types of studies, and the need for mitigation and/or monitoring, where appropriate
  - A heritage resources management plan will be developed prior to construction
- Non-Traditional Land and Resource Use
  - Focused on land-based activities potentially impacted by the Project, such as commercial fishing, tourism, recreation, guided outfitting, industrial land uses, forestry.
  - Screening suggests pathway to be evaluated would include sensory disturbances to outfitted and recreational land use (primary pathway)

# Proposed Methods – Human Environment



- Traditional Land and Resource Use
  - In assessing changes in availability of wildlife and fish for traditional hunting, trapping, and fishing, water for drinking, plants for harvesting, the TLRU assessment considers the results of the wildlife, fish, vegetation, and water quality assessments
  - Land disturbance from the Project will be quantified for traditional use areas identified by Indigenous communities to assess availability of use areas
  - A qualitative assessment will be conducted incorporating several factors to describe impacts on use of the land and resources by Indigenous Peoples:
    - the results of engagement with Indigenous communities, contents of Indigenous Knowledge studies/assessments, level of concern expressed
    - changes in intangible values, including sense of place within the cultural landscape, and reduced ability to transfer knowledge to future generations
    - sensory disturbances (e.g., noise, light, odour, and visual disturbance) affecting the experience of Indigenous land users
    - changes in social and economic factors (both positive, and negative) affecting participation in traditional activities and changes in cultural values and practices

# Proposed Methods – Human Environment



- Social and Economic Conditions

- A quantitative assessment will be conducted for the economic pathways, including the Project's territorial economic and population effects (e.g., Input-Output modelling), and potential employment effects (e.g., projected workforce requirements relative to labour market conditions)
- Qualitative factors will also be an important part of the economic assessment (e.g., barriers to employment, contracting)
- A more qualitative assessment will be conducted for the social pathways identified, taking into consideration:
  - concerns and aspirations raised by potentially affected parties through engagement, consultation, and other means of input (e.g., ITK studies)
  - baseline conditions in potentially affected communities, with attention paid to differing contexts based on intersectional identity factors (e.g., gender, Indigeneity, age, or vulnerability)
  - results of applicable monitoring outcomes for communities in comparable contexts where mining has contributed to socio-economic effects
  - Project design or execution elements potentially interacting with socio-economic VCs and indicators (e.g., employment, rotations, contracting requirements, transportation, and worker housing)

# Proposed Methods – Human Environment

- Focus on Wellbeing
  - A project will affect people and communities in different ways. While benefits are usually expected, they may not be realized by all individuals, families, and communities. Further, some may experience adverse effects from a project.
  - The Socio-economic Assessment will bring together topics important to those potentially affected by the Project to conduct a holistic assessment of the interaction between the Project and community wellbeing.
  - This process needs to be collaborative and driven by community input received through engagement, consultation, and community-led Indigenous Knowledge studies. This work will unfold as the Project advances.





Thank you

