APPENDIX C

Gahcho Kué EIS Overview Workshop Presentations

October 2011

Gahcho Kué Project

Environmental Impact Statement Overview Session

October 25, 2011

Today's Session – Agenda & Purpose

- Introduce De Beers staff & consultants
- Explain the purpose of this 3 day session
- Provide an update regarding activity at the advanced exploration site at Kennady Lake
- Give an overview of the mine that we are proposing to construct and operate
- Look at the regulatory process ahead; identify the opportunities for communities to participate
- Outline De Beers' plans for continuing community engagement outside of the regulatory process
- Confirm the Agenda for the next two days
- Wrap-Up /Questions from today's session

The Project Team

- De Beers Canada Inc
  - Andrew Williams, Project Manager
  - Cathie Bolstad, Director of External and Corporate Affairs
  - Veronica Chisolm, Permitting Manager
  - Stephen Lines, EA and Permitting Coordinator

- Golder Associates
  - Amy Langhorne, Golder Project Manager
  - John Faithful, Technical Director
  - Damian Panayi, Terrestrial Team

Three Day Session at A Glance

Day 1 Focused time with communities who may be impacted

- Highlight what is happening at the advanced exploration camp now
- Provide overview of De Beers' approach to ongoing community engagement and planned activities in 2012
- Provide an opportunity for communities time to ask questions and make suggestions about the proposed project or the company's planned engagement activities

Days 2 & 3 Walking communities and regulators through De Beers Environmental Impact Statement

- Where to find things
- De Beers' approach and methods for impact assessment

De Beers Canada

Gahcho Project Introduction

October 25, 2011

De Beers in Canada

The Joint Venture Partners

- **De Beers Canada 51%**
- **Mountain Province Diamonds 49%**

- **De Beers is the operator and the Project Proponent**


Northwest Territories
Ekati
Diavik
Gameti
Wekweeti
Gahcho Kué
Snap Lake
Whati
Behchoko
Ndilo/Dettah
Yellowknife
Lutsel K'e
Ft. Providence
Ft. Resolution
Hay River

De Beers Canada

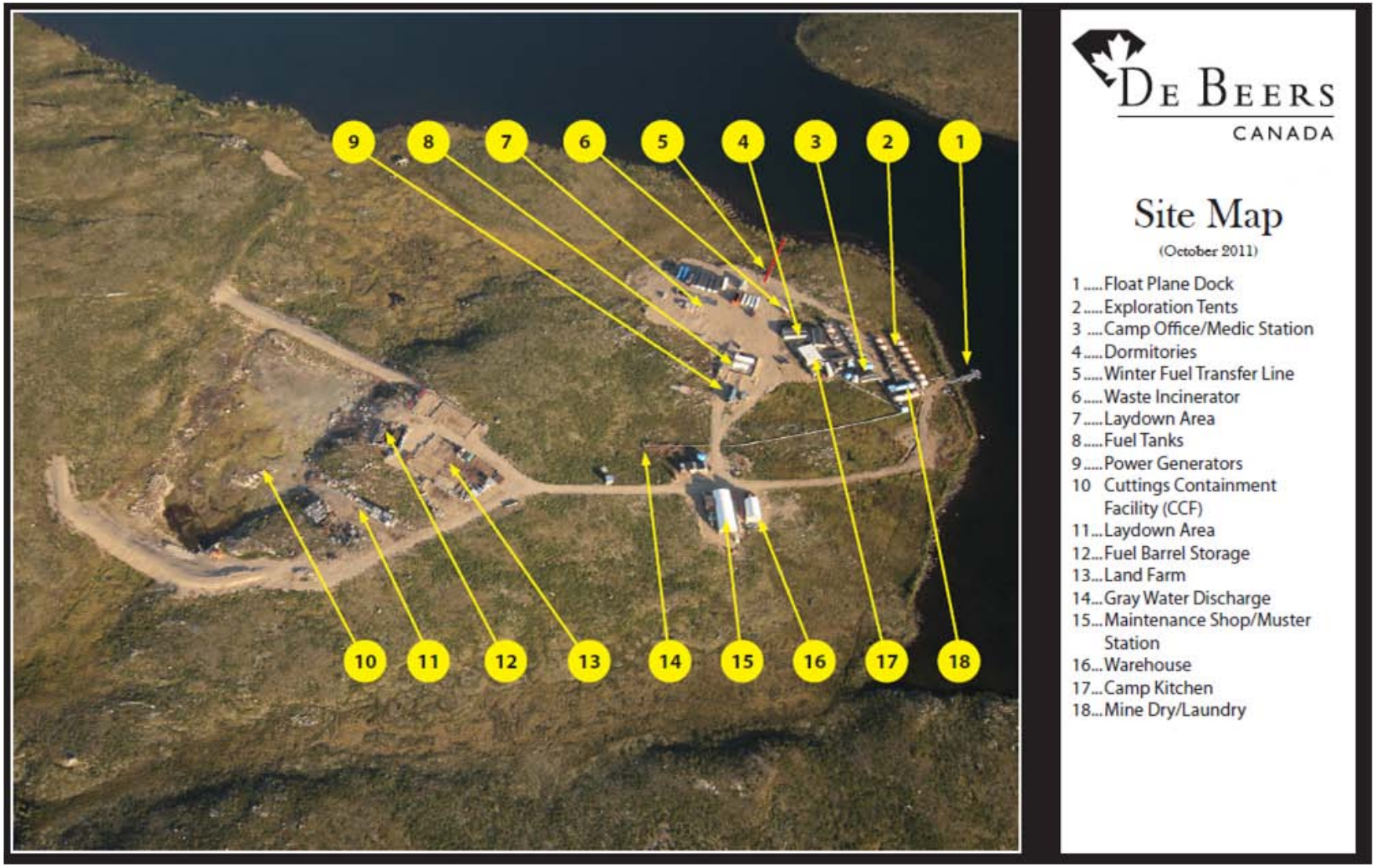
Kennady Lake Advanced Exploration Camp

October 25, 2011

Site History

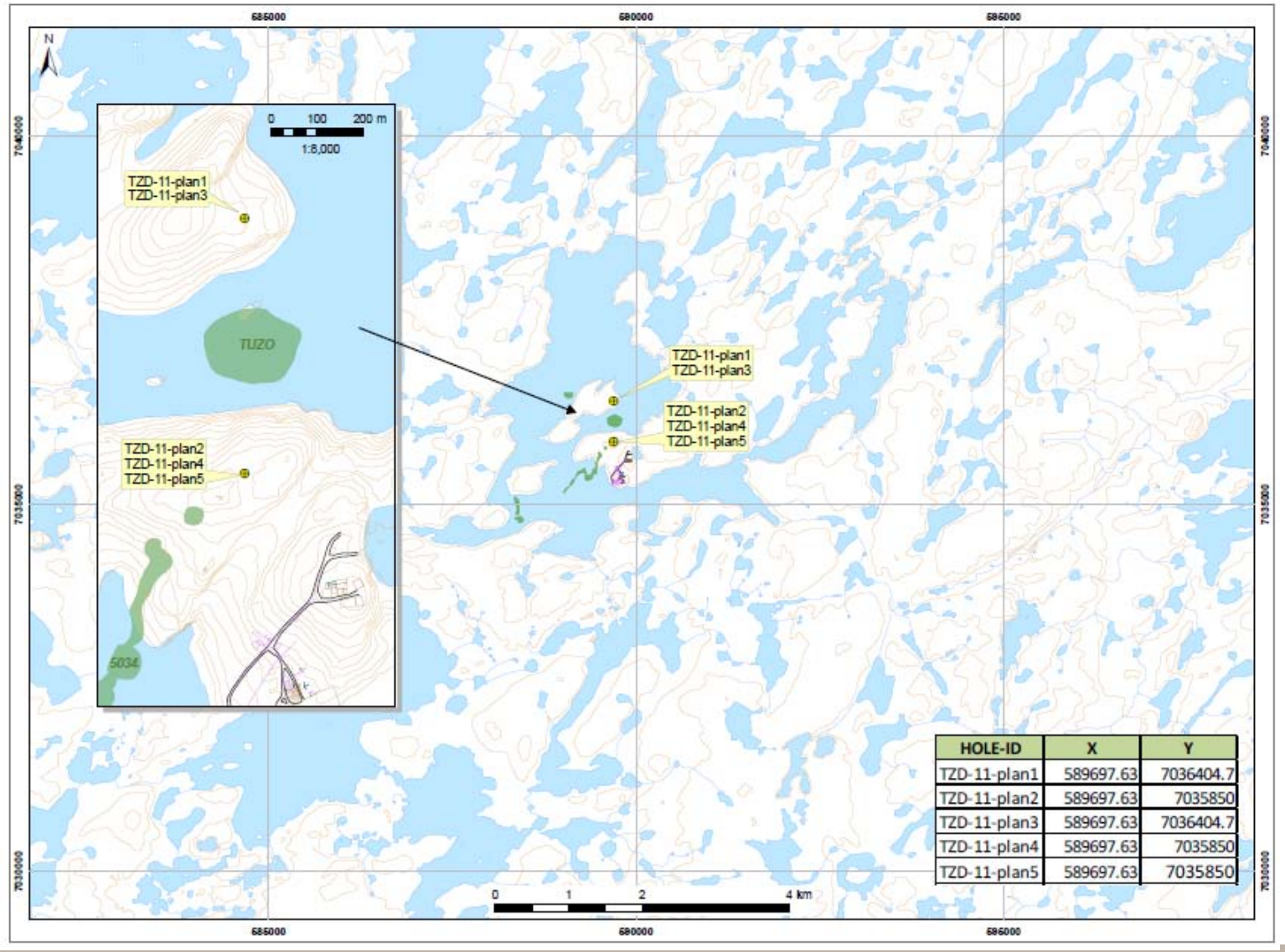
- 1992 Exploration initiated by Mountain Province Diamonds & Camphor Ventures
- 1995 Diamond-bearing kimberlite 5034 confirmed at site
- 1997 De Beers and Mountain Province Diamonds establish Joint Venture
- 1997 5034 Pit defined
- 1997 Hearne Pit and Tuzo Pit located
- 1999 Bulk Sampling Program
- 2001-02 Bulk Sampling
- 2004-08 Core Drilling Programs
- 2011 Tuzo Deep Drilling Program

Current Camp Layout



Site Photo August 2011

2011-2012 Drill Program



HOLE-ID	X	Y
TZD-11-plan1	589697.63	7036404.7
TZD-11-plan2	589697.63	7035850
TZD-11-plan3	589697.63	7036404.7
TZD-11-plan4	589697.63	7035850
TZD-11-plan5	589697.63	7035850

Land Based Drilling October 2011

Drill Site Set Up 2011

Moving Forward

- Camp Upgrades
- Progressive Reclamation
- Reclamation of existing camp during mining

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Gahcho Kué Project

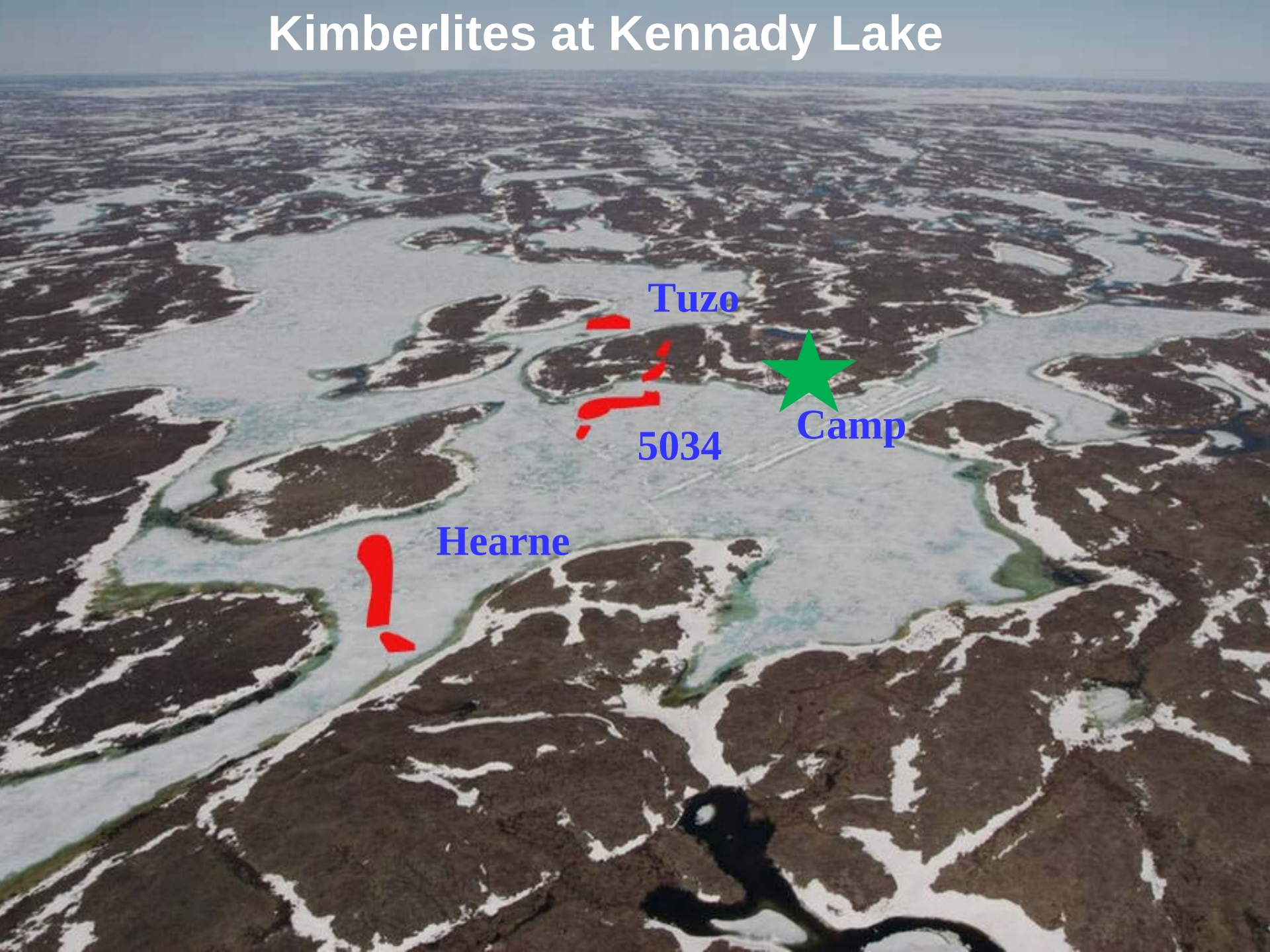
Project Description Overview

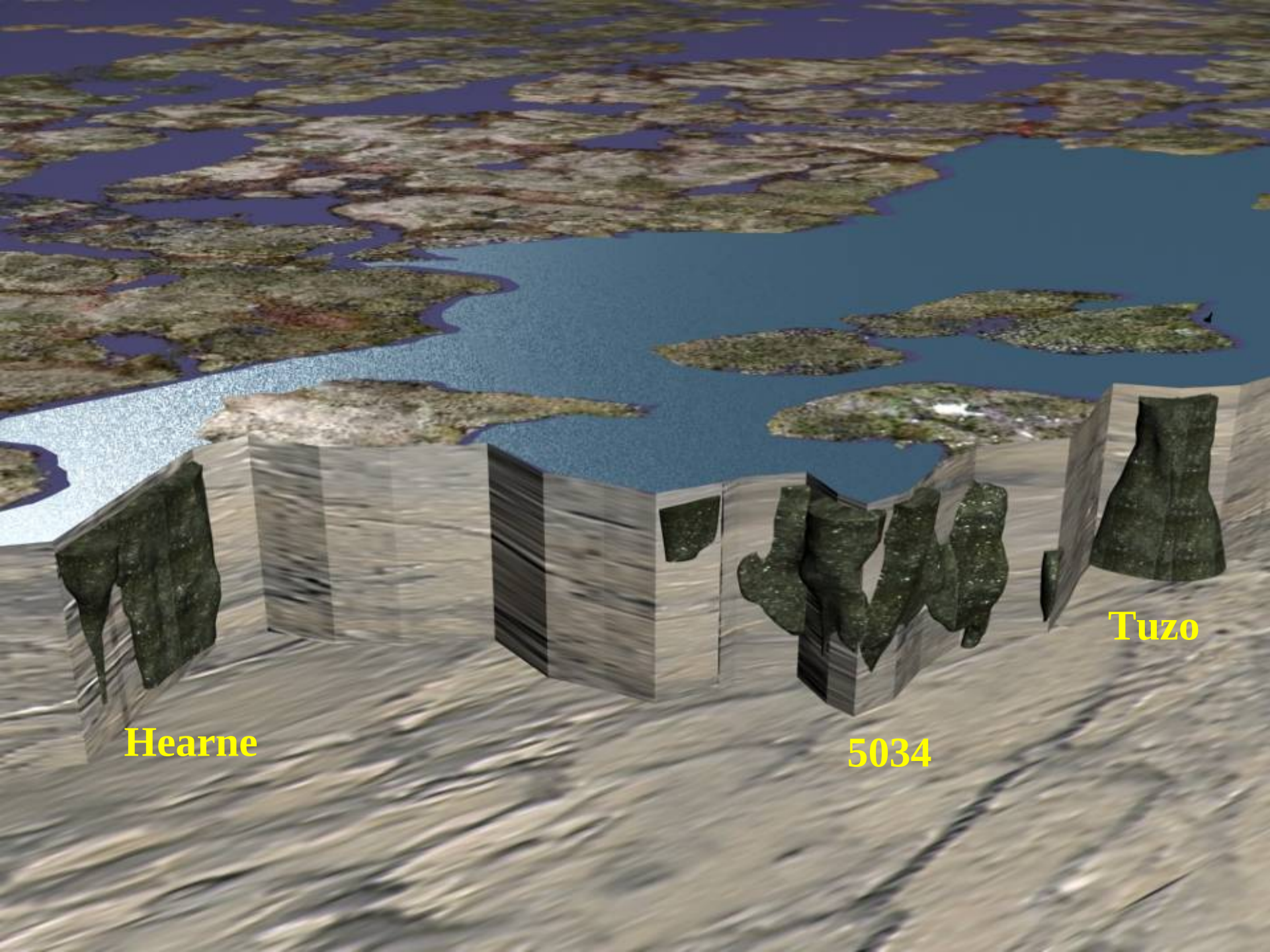
October 25, 2011

Kennady Lake

At 870 hectares, or 8.7 Km^2, Kennady Lake is about 1% of the size of Lac de Gras.

Kimberlites at Kennady Lake

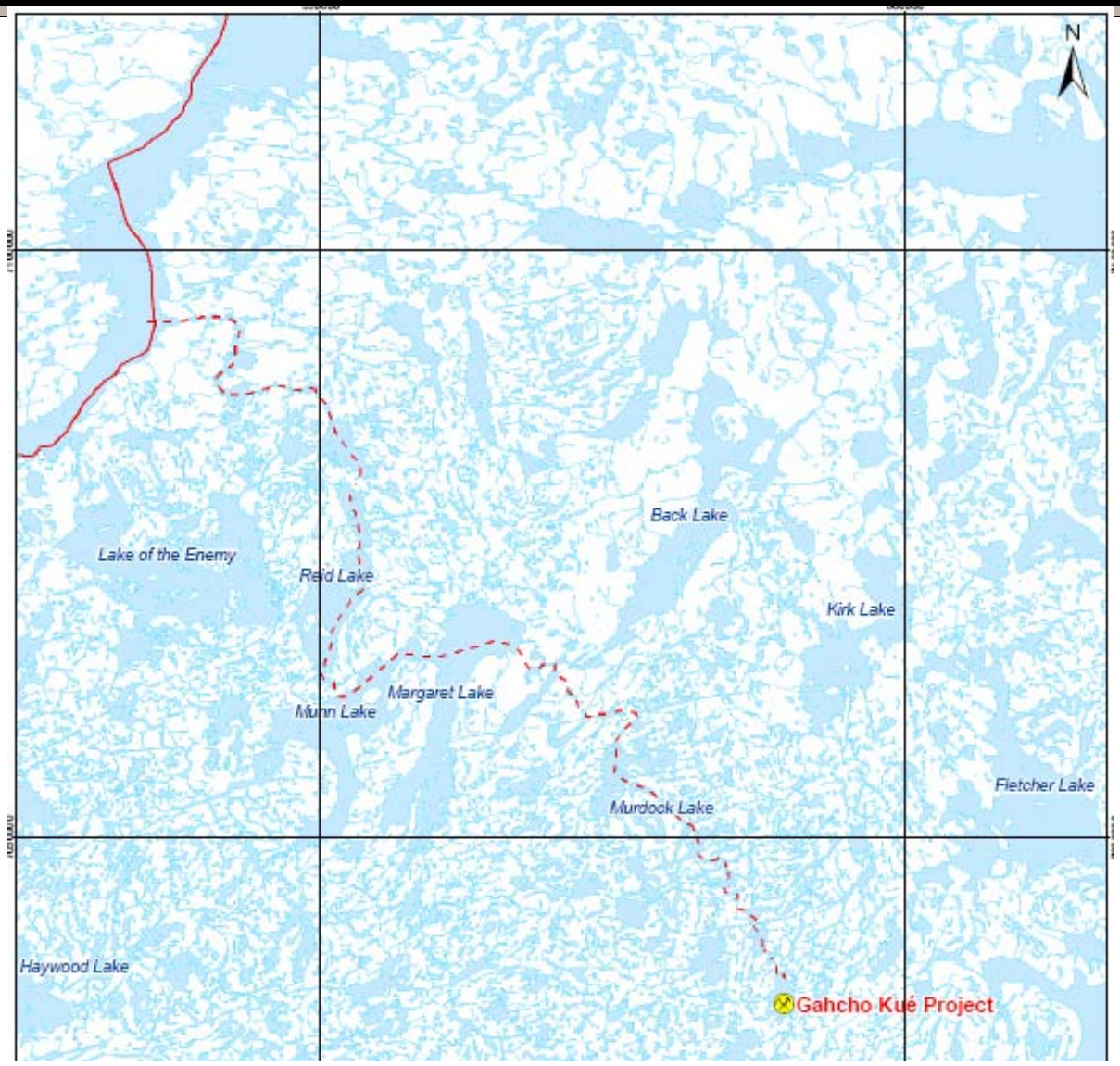



Hearne
5034
Tuzo

Key Project Features

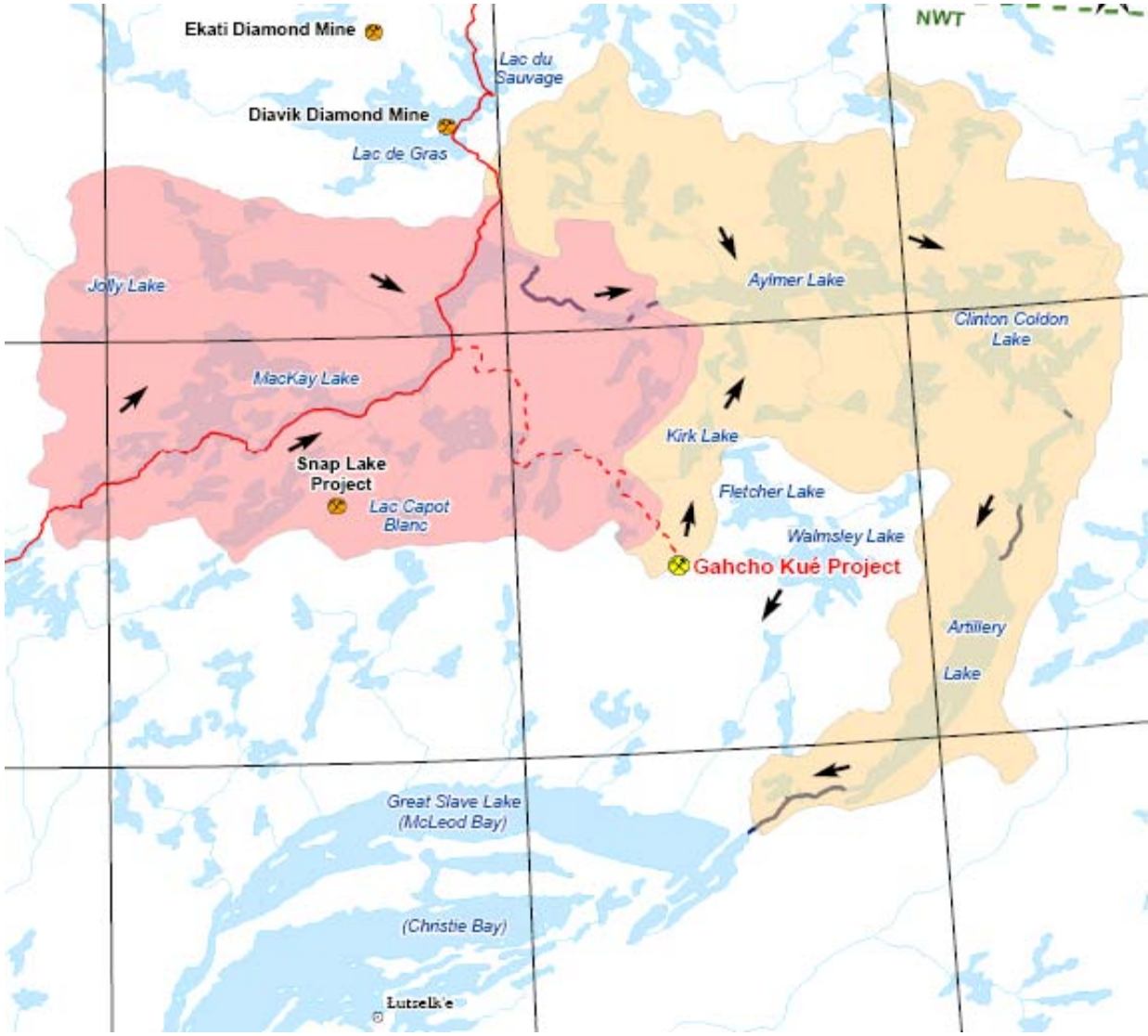
- The current Project Description represents a balance between environmental considerations, feasibility and economics
- Project approach is to minimize the size of disturbance footprint
- All operations are managed within the Kennady Lake watershed
- Controlled Area established to keep clean water away from the site and manage contact water within the site
- Project as designed will minimize refilling time for Kennady Lake, and therefore aquatic ecosystem recovery

Winter Road Access



Watershed

- Kennady Lake is one of many small lakes on the barrens.
- It flows into the Lockhart River drainage system.

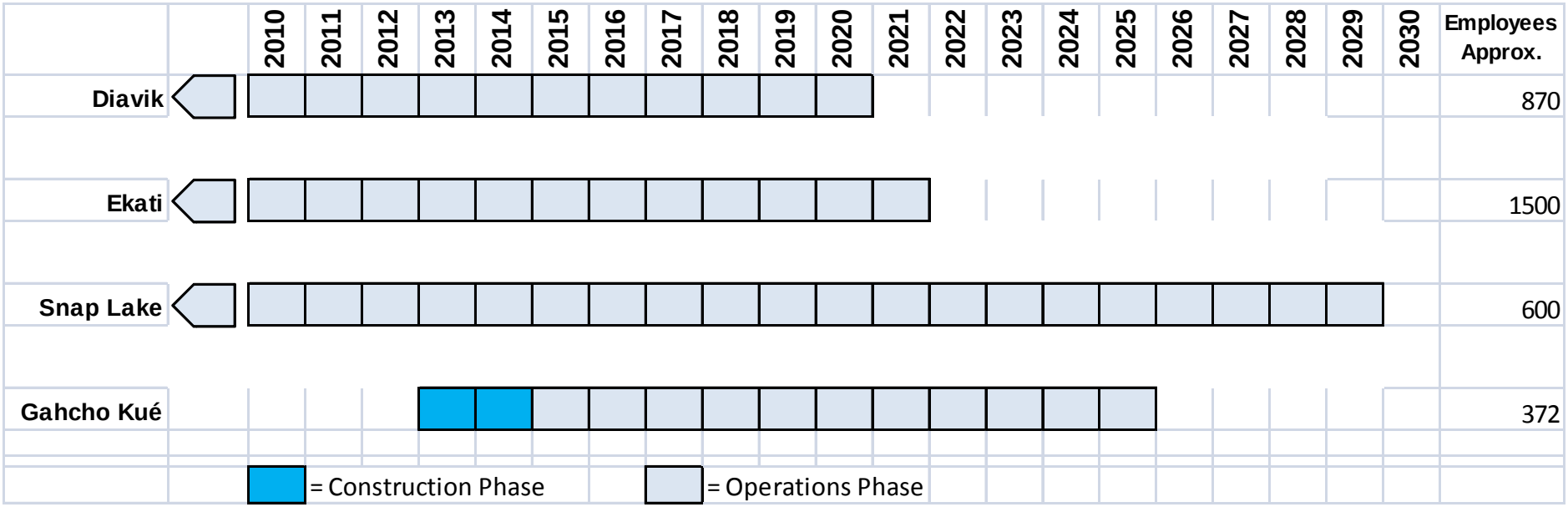


Employment

- Peak of nearly 700 Full Time Equivalents during construction
  - Includes on-site and off-site employees
  - Camp capacity of 432 persons
- 372 during operations (11 years)
- 100 or less during closure & reclamation
- The Gahcho Kué Project will provide an important contribution to the economic well-being of the region.

*one FTE is the number of hours worked that add up to one full-time employee.

Operating Life - Existing Diamond Mines



- The timing of the Gahcho Kué Project is important in maintaining economic sustainability for the region.

De Beers
CANADA

This is the mine we are proposing to build….

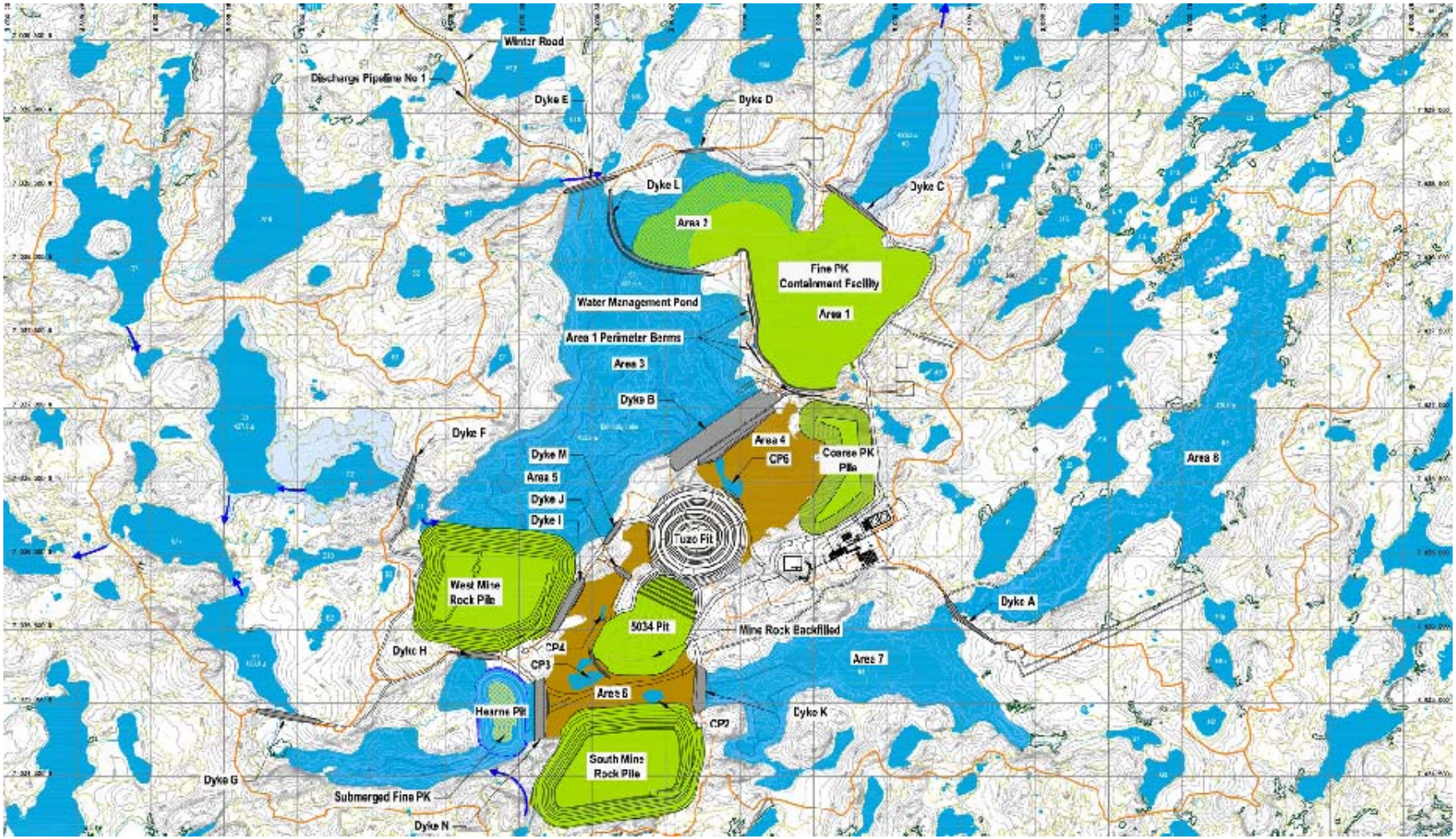
DVD

October 25, 2011

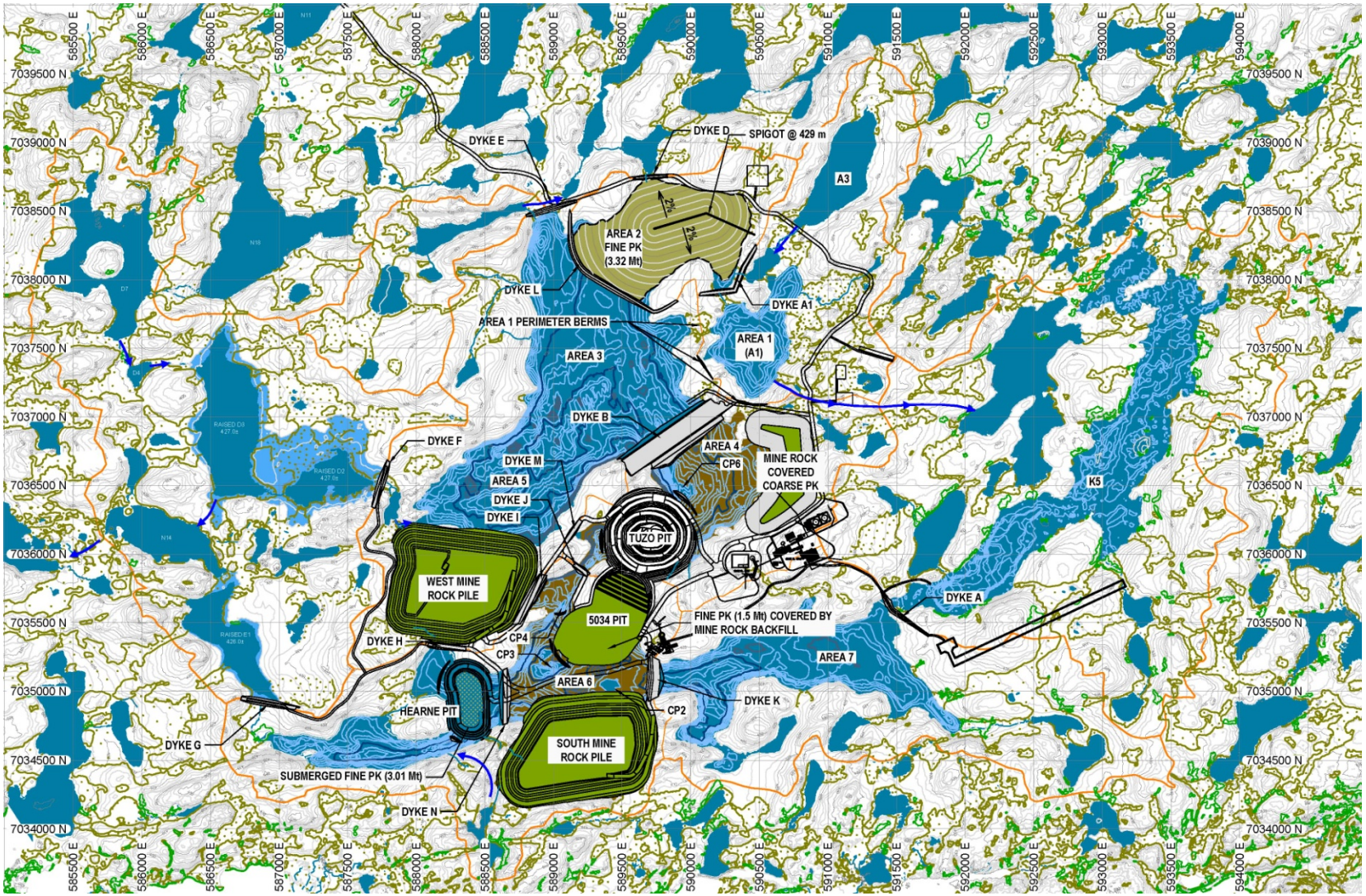
Project Update

- **Alternatives Analysis**
  - Alternatives for deposition of fine PK were identified to manage the potential for phosphorus input to Kennady Lake from the Fine PKC Facility
    - Alternatives scored on technical, environmental, and economic factors
  - The highest rated alternative involved a reduction in the size of the Fine PKC Facility footprint and is consistent with the phosphorus levels assessed in the EIS
  - Ongoing work includes:
    - Detailed engineering design
    - Water balance update and seepage modelling
    - Alternatives analysis reporting

Fine PKC Facility original footprint



Fine PKC Facility reduced footprint



Watersheds

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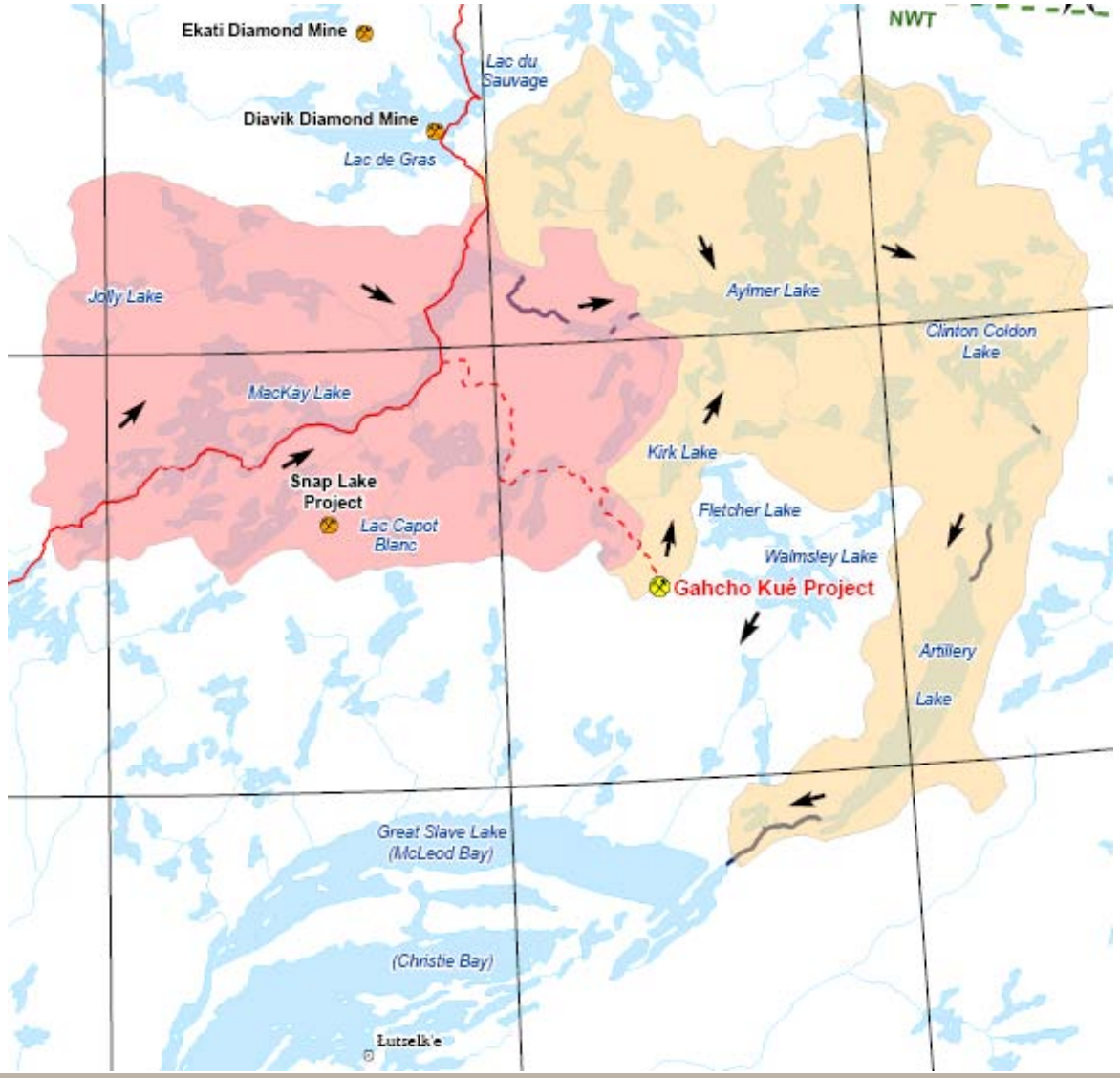
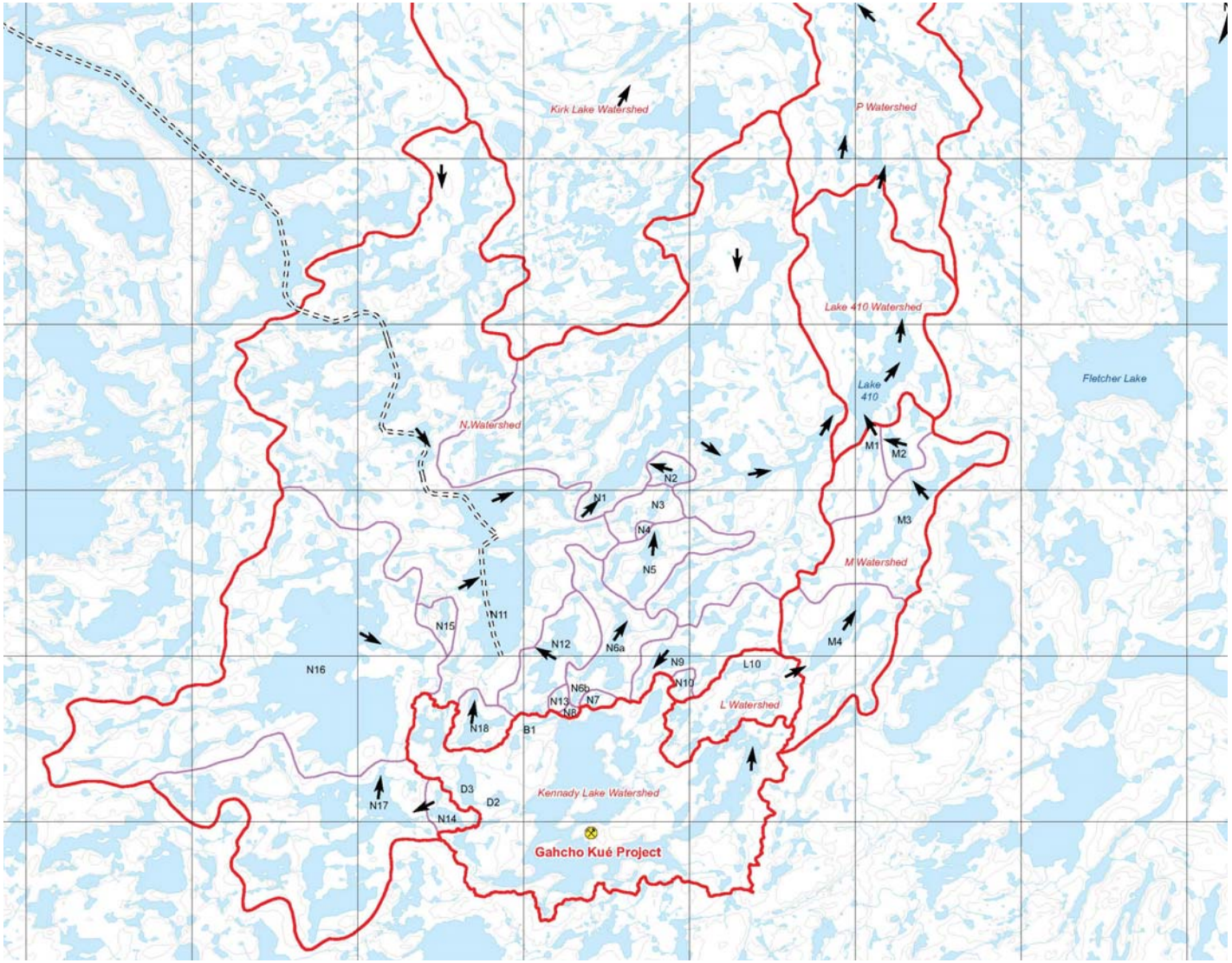


Downstream Flow Paths and N Watershed



EIS

Folder	Contents
Volume 1	Plain Language Summary Section 1 – Introduction Section 2 – Project Alternatives Section 3 – Project Description Section 4 – Community, Regulatory, and Public Engagement Section 5 – Traditional Knowledge Section 6 – Assessment Approach
Volume 2	Section 7 – Key Line of Inquiry: Caribou *(includes Appendix 7.II – Noise)*
Volume 3a	Section 8 – Key Line of Inquiry: Water Quality and Fish in Kennady Lake
Volume 3b	Section 8 – Key Line of Inquiry: Water Quality and Fish in Kennady Lake Appendices
Volume 4	Section 9 – Key Line of Inquiry: Downstream Water Effects Section 9 – Key Line of Inquiry: Downstream Water Effects Appendices
Volume 5	Section 10 – Key Line of Inquiry: Long-term Biophysical Effects, Closure and Reclamation
Volume 6a	Section 11.1 – Biophysical Subjects of Note Overview Section 11.2 – Subject of Note: Impacts on Great Slave Lake Section 11.3 – Subject of Note: Alternative Energy Section 11.4 – Subject of Note: Air Quality Section 11.5 – Subject of Note: Waste Rock and Processed Kimberlite Section 11.6 – Subject of Note: Permafrost, Groundwater and Hydrogeology Section 11.7 – Subject of Note: Vegetation *(includes Appendix 11.7.I - Geology, Terrain and Soils)*
Volume 6b	Section 11.8 – Subject of Note: Traffic and Roads Section 11.9 – Subject of Note: Waste Management and Wildlife Section 11.10 – Subject of Note: Carnivore Mortality Section 11.11 – Subject of Note: Other Ungulates Section 11.12 – Subject of Note: Species at Risk and Birds Section 11.13 – Subject of Note: Climate Change
Volume 7	Section 12 – Socio-economic Impact Assessment Section 13 – Cumulative Effects Section 14 – Conclusions

Gahcho Kué Project

EIR & Regulatory Process Overview

October 25, 2011

Where we are and how we got here

Date	Procedural Step
2005 November	Application for Type A Water Licence and Land Use Permit
2006 January	MVEIRB Environment Assessment Initiated
2006 April	EA Issue Scoping
2006 June	Decision to proceed with an EIR
2007 October	EIS Terms of Reference Issued
2010 December	EIS Submission
2011 March	Panel Conformity Determination
2011 April	Panel's draft Workplan for EIR issued
2011 May	De Beers Conformity Response (2,4, 5)
2011 July	De Beers Conformity Response (1 and 3)
2011 July	Panel's Positive Conformity Determination
2011 July	Panel's Final Workplan for remainder of EIR
2011 August	Participant Funding Awarded by AANDC
2011 October	De Beers Project Description and EIS Workshop

Where we are headed

Date	Procedural Step
2011 November	Panel EIS Analysis Session
2012 January	Information Requests Rd 1
2012 March	Information Request Responses
2012 May	Technical Sessions
2012 July	Information Requests Rd 2
2012 September	Information Request Responses
2012 October	Technical reports
2012 December	Public Hearings
2013	Panel Decision
2013	Minister's Decision
2013	MVLWB Regulatory Process

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Gahcho Kué Project

Community Engagement

October 2011

Community Engagement – General Approach

- Inform the potentially affected communities about the proposed Project;
  - Leadership (first)
  - Lands & Environment departments
  - Community at large

- Engage communities in a dialogue about the proposed Project to
  - Build understanding regarding the company's planned approach
  - Provide opportunities to provide comments, raise concerns, make suggestions and/or to address concerns

Community Engagement - Prior to EIS Conformity

- Meetings with Community Leadership – Our starting point
  - Discuss proposed project
  - Outline data collection and/or engagement activity planned and discuss how the community would like to participate
- Undertake Community Based Activities – specific to direction agreed with leadership
  - Publication and mail out of Newsletters, DVD's and/or other information
  - Public/Community Meetings
  - Host Community Open Houses
  - Group and/or individual meetings/discussions
  - Site Visits
  - Involvement in community data collection or community specific studies, including Traditional Knowledge Studies

Community Engagement – Looking Ahead

Proposed Gahcho Kue Project

Opportunities for Community Participation and Engagement

Q4 2011 to July 2013

Schedule of Planned Activities	Oct to Dec 2011	Jan to Mar 2012	Apr to Jun 2012	Jul to Sep 2012	Oct to Dec 2012	Jan to Mar 2013	Apr to Jul 2013
EIS Overview Sessions (De Beers with Communities and Regulators)	October						
EIS Analysis Sessions (Regulatory Process)	November						
DBC Dialogue with Leadership to discuss 2012 continued Engagement	November						
DBC to distribute a Newsletter to update communities		January					
Information Requests - Round #1 (Regulatory Process)		Jan to March					
Community Meetings / Open Houses		February					
DBC to distribute a Newsletter to update communities			April				
Technical Sessions (Regulatory Process)			May				
Information Requests - Round #2 (Regulatory Process, if required)				July			
DBC to distribute a Newsletter to update communities				July			
Site Visits (If requested) or 2nd Community Meeting			June to August				
DBC to distribute a Newsletter to update communities					October		
Public Hearing (Regulatory Process)					November		
DBC to distribute a Newsletter to update communities						January	
Community Meetings / Open Houses						February	
Panel Decision Regarding Environmental Impact Review							July
Traditional Knowledge or other studies	Ongoing - Depending on Communities						

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Gahcho Kué Project

Days 2 and 3 of EIS Overview Workshop

October 25, 2011

October 26, 2011

Topic	Time
Welcome	9:00 – 9:10
Introduction and EIR Process	9:10 – 9:30
EIS Structure	9:30 – 10:00
Break	10:00 – 10:15
Gahcho Kué Project Description	10:15 - noon
Lunch	Noon – 1:00
Closure and Reclamation	1:00 – 1:30
Assessment Approach	1:30 – 2:15
Break	2:15 – 2:30
Terrestrial	2:30 – 4:30

October 27, 2011

Topic	Time
Welcome	9:00 – 9:10
Aquatics	9:10 – 10:30
Break	10:30 – 10:45
Aquatics Continued	10:45 - noon
Lunch	Noon – 1:00
Air Quality and Noise	1:00 – 1:30
Socio-economic	1:30 – 3:00
Break	3:00 – 3:15
Path Forward	3:15 – 4:00

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Gahcho Kué Project

Path Forward

October 25, 2011

Path Forward

- Gahcho Kué Panel has released the final EIR Workplan, which identifies next steps, including the EIS Analysis Session
  - November 2011
  - De Beers Presentation of the EIS to the Panel and Parties

- We look forward to our continued engagement with you.


Wrap Up / Questions?

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Gahcho Kué Project

Assessment Approach

October 26, 2011

What is Environmental Impact Assessment?

- A process that identifies and assesses the environmental effects from the Project and provides a determination of the significance of effects.
- Assesses effects to the air, land, water, and people
  - Air includes air quality and noise levels
  - Land includes terrain and soils, vegetation, and wildlife
  - Water includes ground and surface water quality and quantity, and fish and other aquatic life
  - People includes archaeological, cultural, social, and economic components
- Process is iterative
  - assessment results may lead to changes in the Project design and identification of mitigation to eliminate or reduce environmental effects

Identify Key Issues and Potential Environmental Effects

- Project Description and preliminary knowledge of the existing environment
  - scoping of Project effects pathways (i.e., interactions between Project and biophysical and socio-economic environments)
- Engagement with the Public, First Nations and Métis, and government
- Issues identified in the *Terms of Reference for the Gahcho Kué Environmental Impact Statement* (Gahcho Kué Panel 2007) and the Report on the Environmental Assessment (MVEIRB 2006)
- Scientific knowledge and experience with other mines in the NWT and Nunavut

Identify Valued Components and Endpoints

- Valued Components (VCs)
  - physical, biological, cultural, social, and economic properties of the biophysical and human environments that are considered important to society
- Assessment Endpoints
  - key properties of VCs that should be protected for use by future human generations (incorporates *sustainability*)
  - used to assess significance of impacts on VCs
- Measurement Endpoints
  - quantifiable (measurable) expressions of assessment endpoints (chemical concentrations, rates, area, abundance, full time equivalents, family income)

Examples of Valued Components and Endpoints

Valued Component	Assessment Endpoint	Measurement Endpoints
Surface water	Suitability of Water Quality to Support a Viable Aquatic Ecosystem	-physical characteristics of water -water chemistry (e.g., concentrations of major ions, nutrients, and metals) -water levels and flow
Soils	Not applicable	-soil chemistry -soil quantity and distribution -soil erosion
Fish and fish habitat	Persistence of fish habitat and populations	-water chemistry -steam flow and lake levels -benthic invertebrates -plankton community
Socio-economics	Persistence of long-term social, cultural, and economic properties	-employment and income -education, training, and opportunities for youth -heritage resources

Spatial Boundaries

- Specific to VCs
  - Study areas were designed to capture factors that influence geographic distribution and movement patterns specific to each VC
  - Sometimes used a range of spatial scales to describe baseline conditions, and analyze and predict effects
- Local study area (LSA)
  - direct effects from the Project (geology, soil and habitat loss, water quantity and quality, individual animal mortality)
  - small-scale indirect effects on environment (changes to soil and vegetation from dust deposition)
- Regional study area (RSA)
  - mostly larger-scale indirect effects from Project activities on VCs (noise, dust and air emissions on animal movement and behaviour)
  - captures the maximum predicted extent of the combined direct and indirect effects from the Project on VCs
- Beyond Regional Study Area
  - for quantifying baseline conditions, and measuring and predicting cumulative effects on VCs with distributions and movements larger than the RSA (caribou, traditional land use)

Temporal Boundaries

- Development phases of the Project
  - construction
  - operation
  - closure

- Predicted duration of effects on VCs from Project
  - duration = amount of time between start and end of Project activity or stressor (related to Project phases) plus time required for the effect to be reversible
  - reversible = time required for Project to no longer influence a VC

- Incorporates sustainability
  - links duration of Project effects on VC to the amount of time that human use of ecological resources may be influenced

Pathway Analysis

- A screening level assessment that uses environmental design features and mitigation, experience, logic, and science to distinguish no linkage, secondary (minor), and primary pathways
- Consider all potential linkages between the Project and VCs
- Apply environmental design features and mitigation to remove the pathway or limit effects to VC assessment endpoints
  - Project designs, environmental best practices, management policies and procedures, and social programs
  - iterative process between Project engineers and environmental scientists

Project activity → change to environment → effect on VC

Pathway Analysis

- No Linkage – pathway is removed by environmental design features and mitigation so that the Project results in no detectable environmental change and no residual effects to a VC relative to baseline or guideline values;

- Secondary - pathway could result in a measurable and minor environmental change, but would have a negligible residual effect on a VC relative to baseline or guideline values; or

- Primary - pathway is likely to result in a measurable environmental change that could contribute to residual effects on a VC relative to baseline or guideline values.

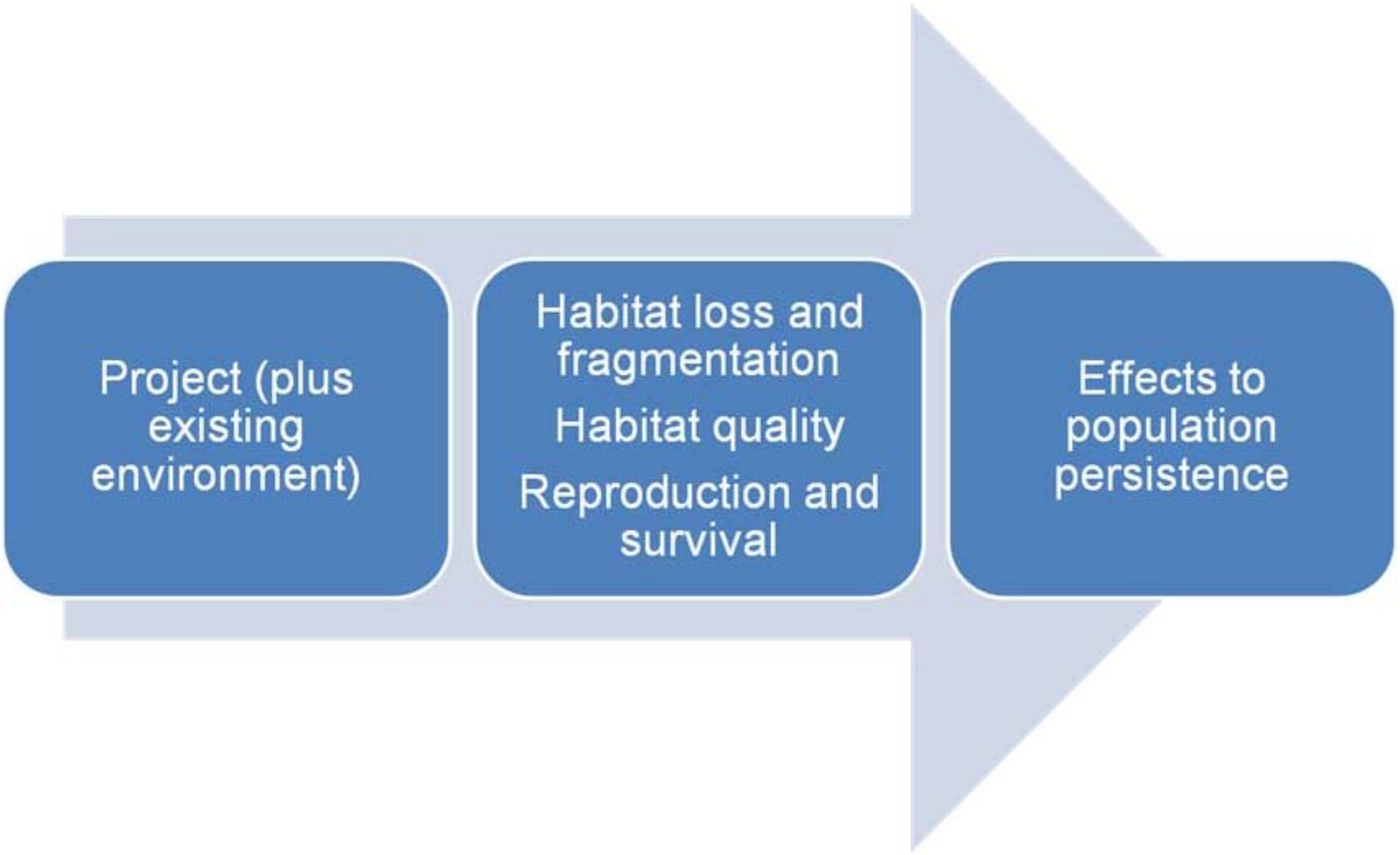
No linkage and secondary pathways are not predicted to have significant residual effects on VCs and are not considered further in the effects assessment

Primary pathways require further effects analysis and classification to assess the potential significance of impacts on VC assessment endpoints

Wildlife Examples

Project Component/Activity	Effects Pathways	Environmental Design Features and Mitigation	Pathway Assessment
Mine Rock Management	leaching of PAG mine rock may change the amount of different quality habitats, and alter wildlife movement and behaviour	• mine rock used to construct the dykes will be non-acid generating • any mine rock containing kimberlite will be separated from the tundra by at least 2 m of inert and kimberlite-free rock	No linkage
Project Footprint (e.g., pits, Fine PKC Facility, Coarse PK Pile, mine rock piles, Winter Access Road and Tibbitt-to-Contwoyto Winter Road)	aircraft/vehicle collisions may cause injury/mortality to individual animals	• speed limits will be established and enforced • wildlife will be provided with the “right-of-way” • Wildlife Effects Mitigation and Management Plan	Secondary
	direct loss and fragmentation of wildlife habitat from the physical footprint of the Project may alter animal movement and behaviour	• backfilling the mined-out pits with PK and mine rock will decrease the on-land Project footprint • compact layout of the surface facilities will limit the area disturbed at construction	Primary

Approach to Effects Analysis



Effects Analysis

- Analyses are quantitative where possible and qualitative where necessary
  - Baseline values and guideline values
  - Modelling and statistical analysis
  - Scientific literature
  - Government data and publications
  - Traditional Knowledge reports and publications
- Includes both Project-specific and cumulative changes (where applicable)
- Analyses completed at the appropriate spatial scale for the VC
  - Kennady Lake and Kirk Lake watersheds
  - Caribou annual and seasonal ranges
  - Communities in the North and South Slave Regions of the NWT
- Changes in measurement endpoints are then linked to effects on VC assessment endpoints in the residual impact classification and determination of significance

Residual Impact Classification

- The purpose of the residual impact classification is to describe the residual effects from the Project using a scale of common words
- Completed for each primary pathway and associated measurement endpoints
- For VCs with cumulative effects, incremental (Project-specific) and cumulative effects are classified
- The following criteria are used to classify and assess residual impacts of pathways on VC assessment endpoints
  - Direction
  - Magnitude
  - Geographic extent
  - Duration
  - Reversibility
  - Frequency
  - Likelihood
  - Ecological context

Environmental Significance

- Classification of residual impacts provides the foundation to determine significance of effects on VC assessment endpoints
  - Magnitude, geographic extent, and duration (includes reversibility) are the principal criteria
  - Considers the relative contribution of all primary pathways (weight of evidence approach)
  - Includes uncertainty and methods used to reduce uncertainty
  - Application of ecological principles (resilience and stability) and experienced opinion

- Is there a significant risk to the VC assessment endpoint from the incremental and cumulative effects of the Project and previous, existing, and future developments?

Uncertainty

- Provide key sources of uncertainty in effects analysis and impact classification
  - adequacy of baseline data for understanding current conditions and future changes not related to the Project (extent of future developments, climate change)
  - understanding of Project-related effects on complex ecosystems
  - knowledge of effectiveness of mitigation for limiting effects
- Discuss how uncertainty was addressed to increase level of confidence that effects will not be worse than predicted
  - using results from several models to increase confidence
  - results form long-term monitoring programs at Ekati, Diavik, and Snap Lake diamond mines
  - implementing a conservative approach so that impacts are typically overestimated

Monitoring and Follow-Up

- Monitoring typically includes one or more of the following categories:
  - **Compliance inspection**: monitoring to make sure company is meeting conditions of approval and commitments
  - **Environmental monitoring**: monitoring to track conditions or issues during Project lifespan, and implementation of adaptive management (e.g., monitoring fresh water intake and treated water discharge volumes during the life of a project).
  - **Follow-up**: designed to:
    - test the accuracy of effect predictions
    - reduce uncertainty
    - evaluate the effectiveness of mitigation, and provide appropriate feedback to operations for adaptive management
    - results from these programs can be used to increase the certainty of effect predictions in future environmental assessments

De Beers Canada

Gahcho Kué Project

Project Description

October 26, 2011

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Project Update

Project Update

- **Alternatives Analysis**
  - Alternatives for deposition of fine PK were identified to manage the potential for phosphorus input to Kennady Lake from the Fine PKC Facility
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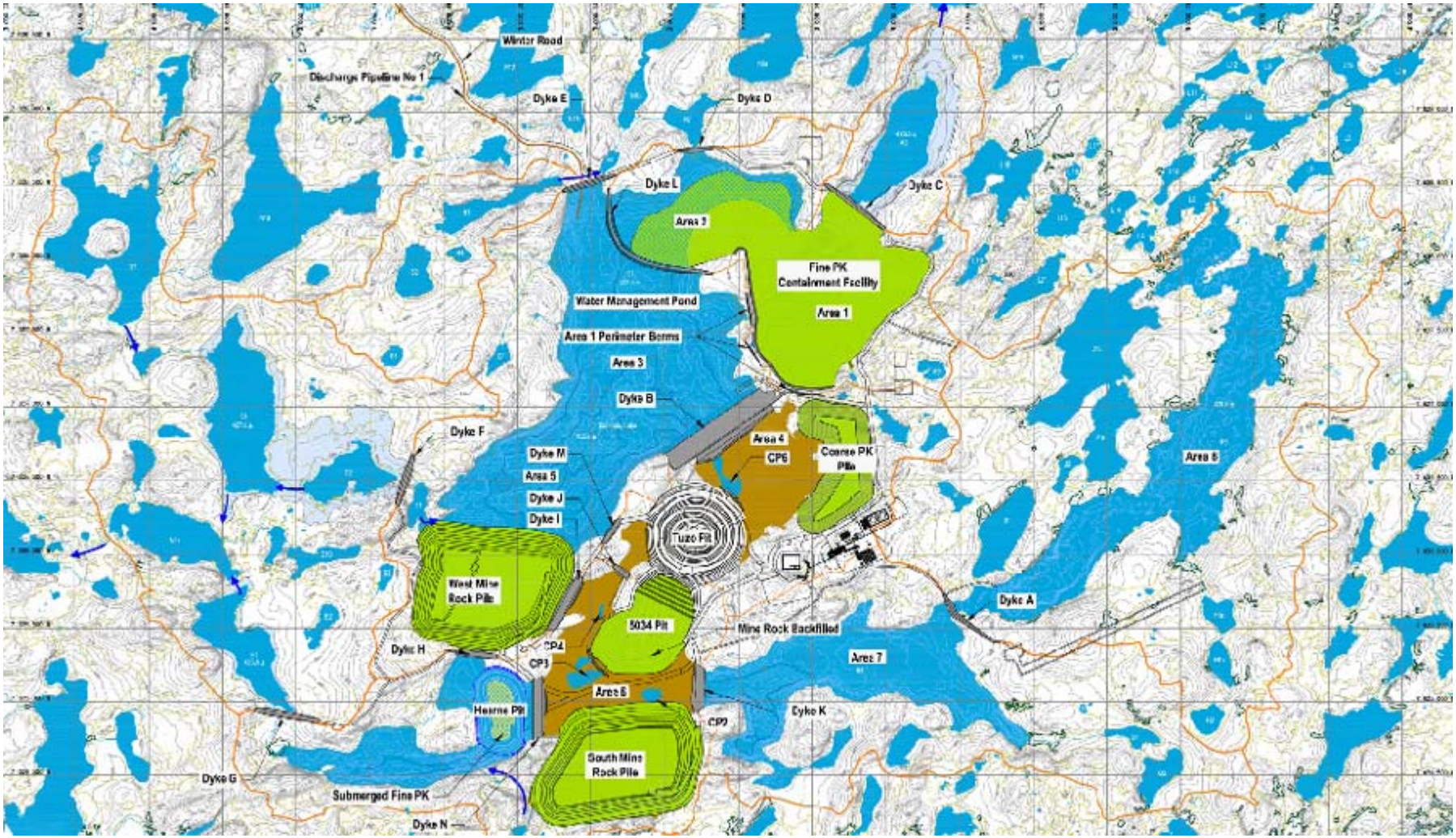
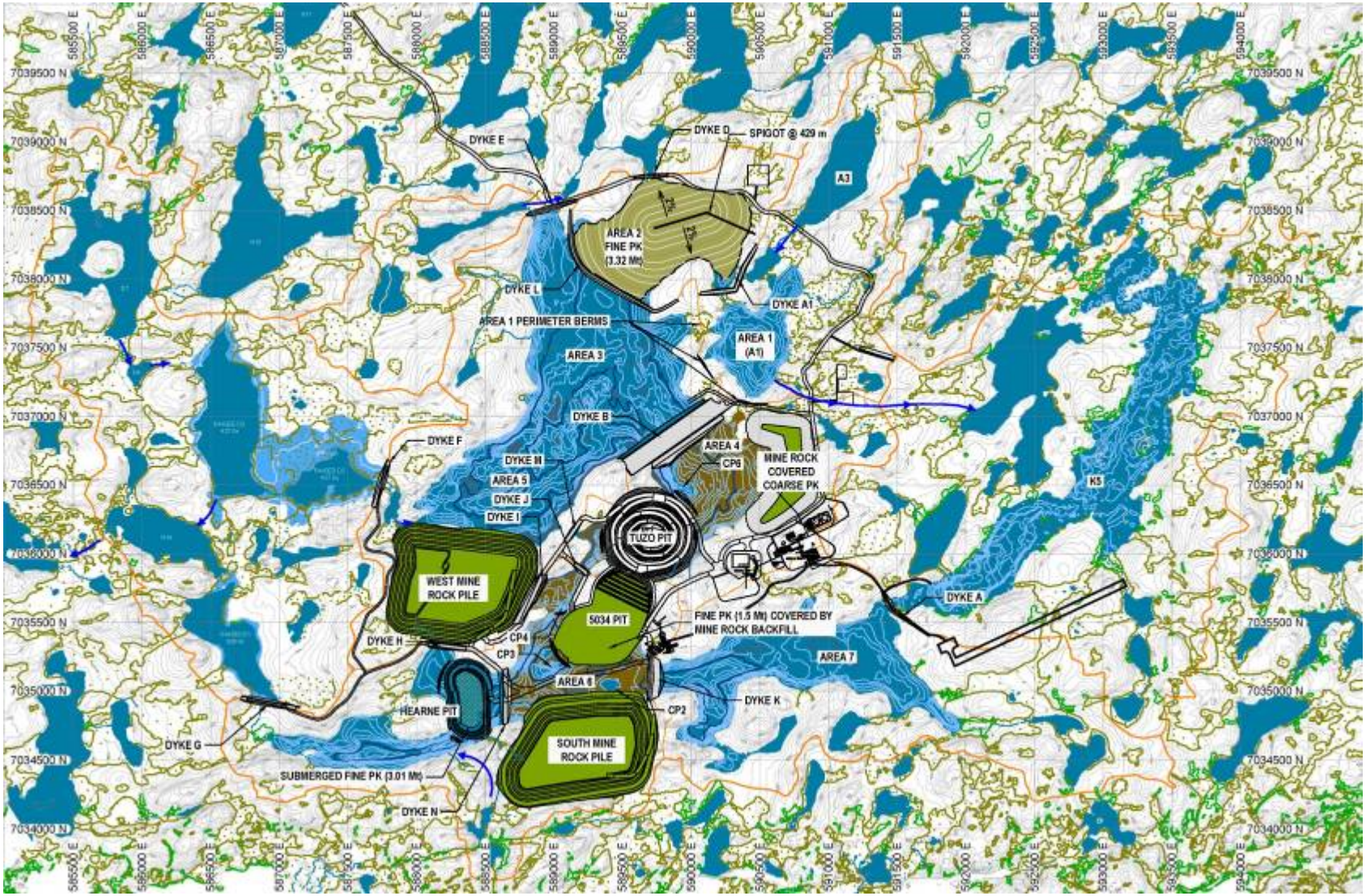
Fine PKC Facility original footprint



Fine PKC Facility reduced footprint



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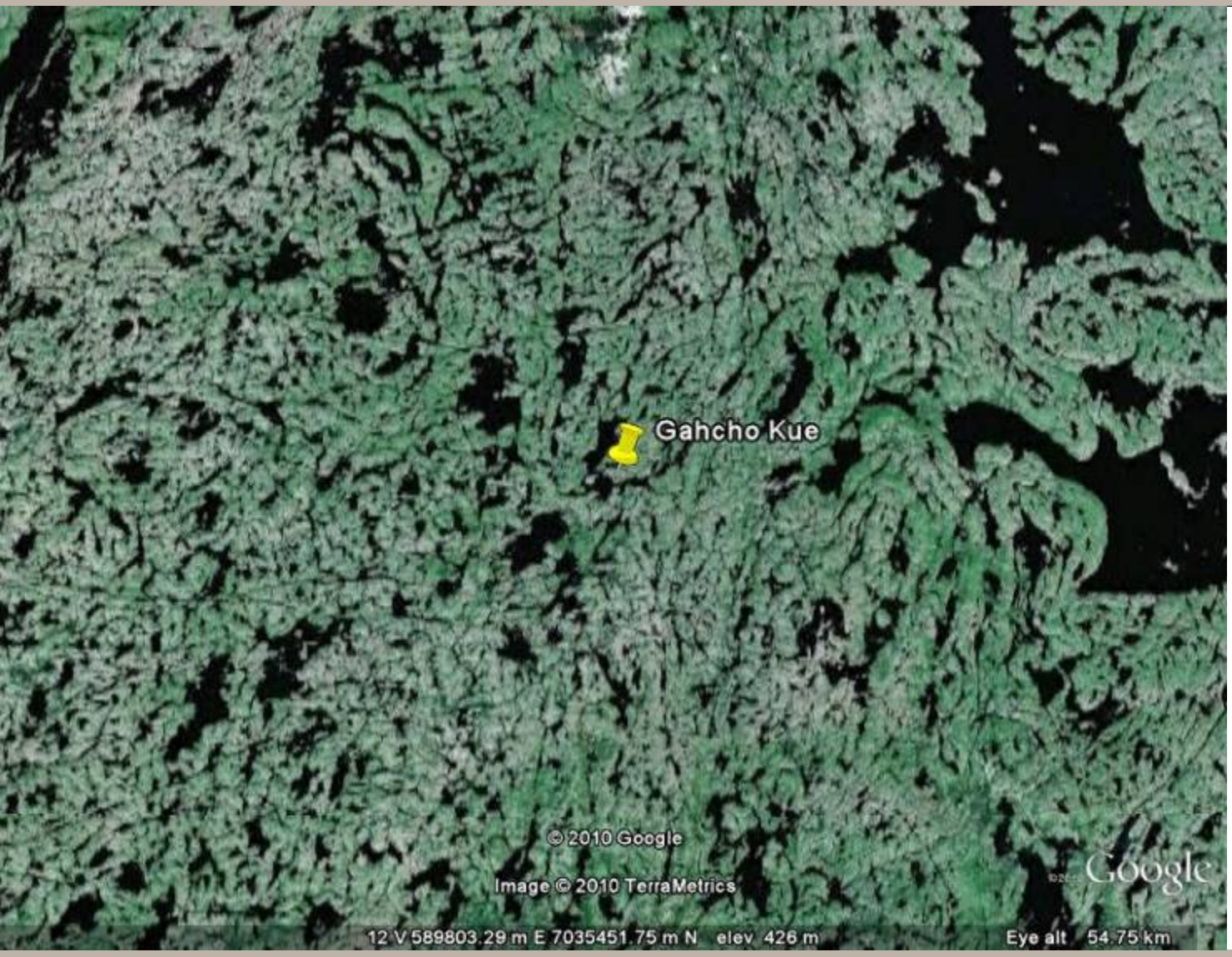
Project Description


Northwest Territories
Ekati
Diavik
Gameti
Wekweeti
Gahcho Kué
Snap Lake
Whati
Behchokò
Ndilo/Dettah
Yellowknife
Lutsel K'e
Ft. Providence
Ft. Resolution
Hay River

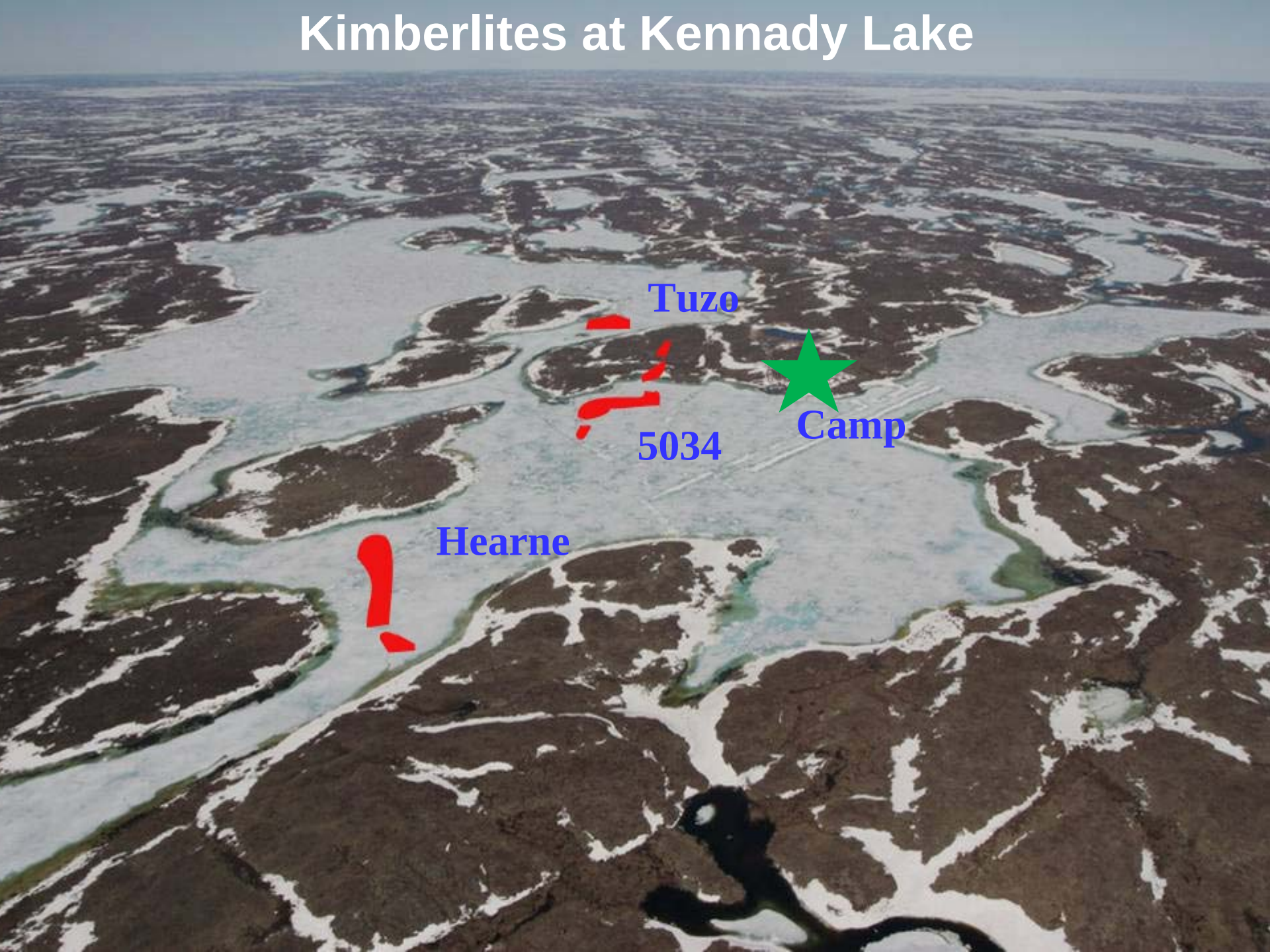
Gahcho Kué Project Location

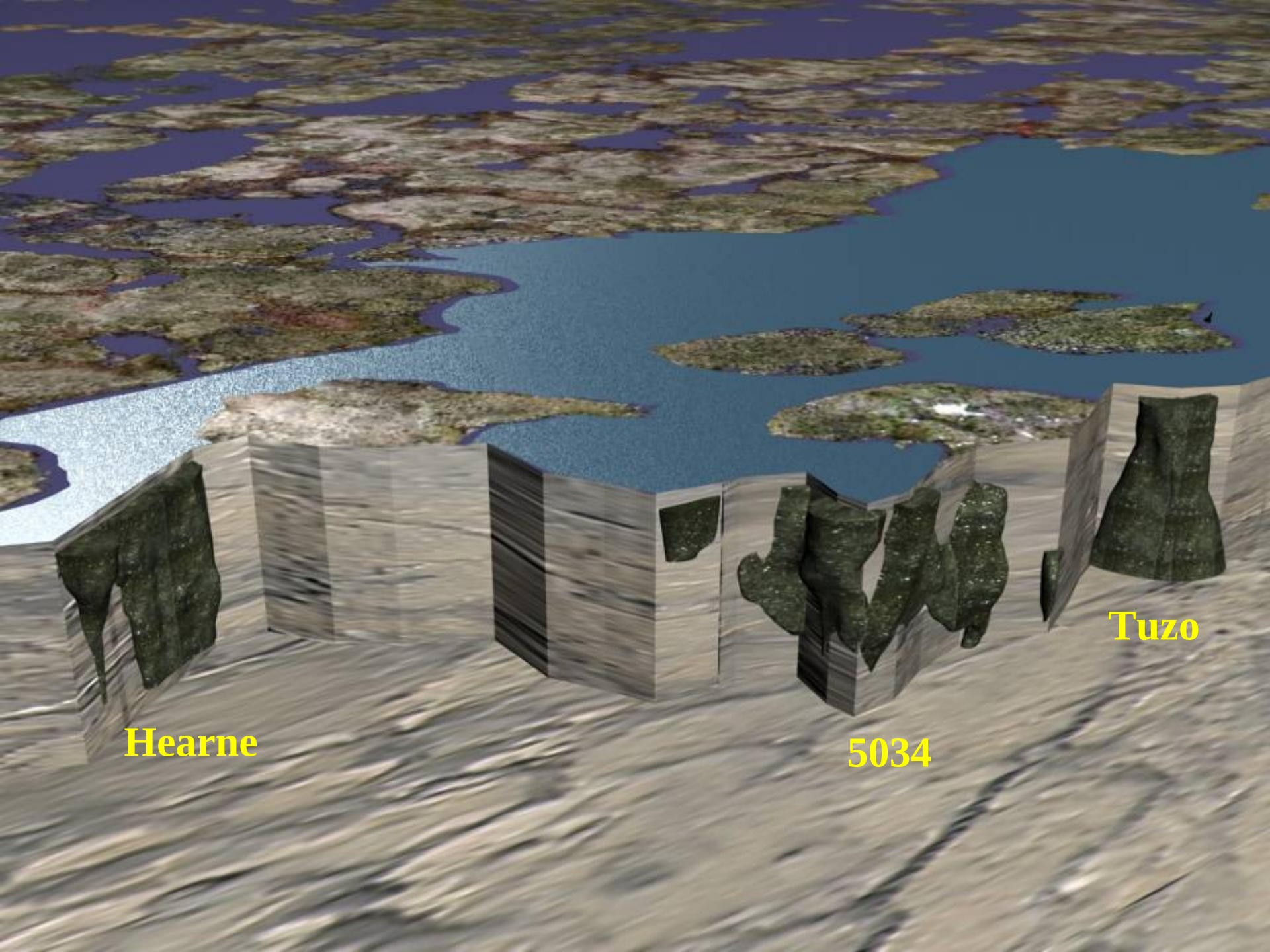


Google Earth Image of Kennady Lake

- Located in headwaters of the Lockhart River
- One of many small lakes in the region

Kimberlites at Kennady Lake

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- Project as designed will minimize refilling time for Kennady Lake, and therefore aquatic ecosystem recovery

Project Description – Order of Discussion

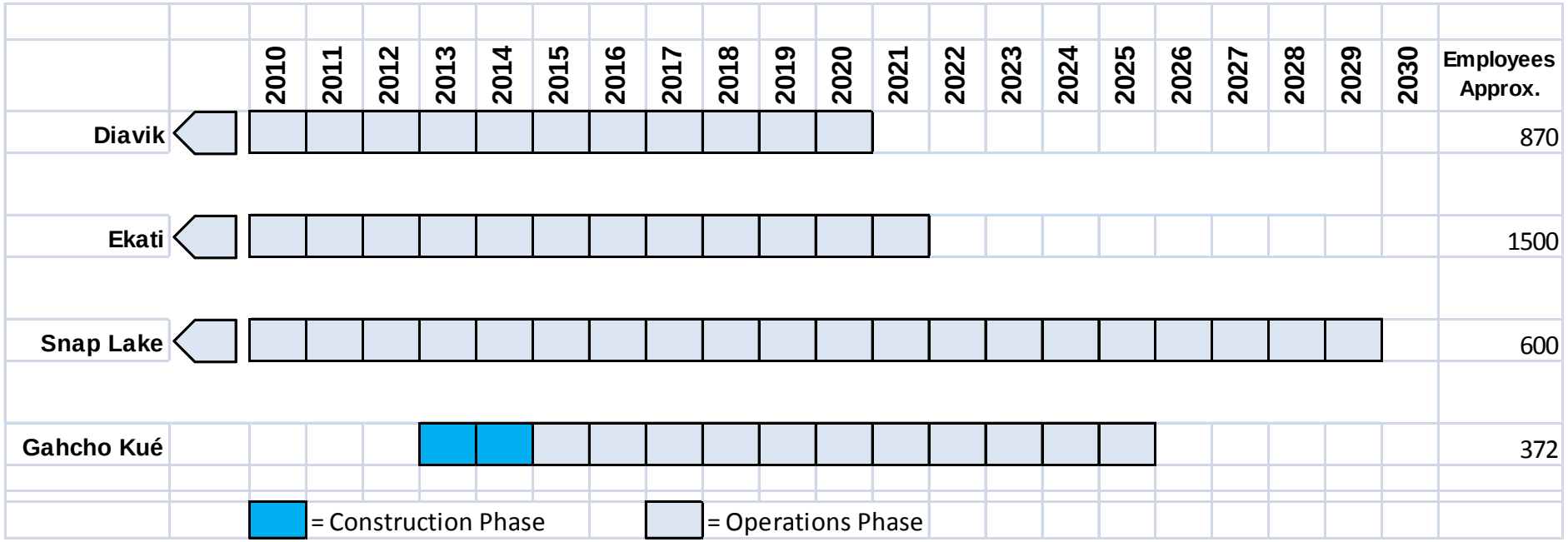
- Major Elements of the Project Description
  - Employment
  - Mining methods, mining sequence, Project timeline
  - Infrastructure, Surface footprint
  - Water management
  - Waste management
  - Closure

Employment

- Peak of nearly 700 Full Time Equivalents during construction
  - Includes on-site and off-site employees
  - Camp capacity of 432 persons
- 372 during operations (11 years)
- 100 or less during closure & reclamation
- The Gahcho Kué Project will provide an important contribution to the economic well-being of the region

*one FTE is the number of hours worked that add up to one full-time employee.

Operating Life - Existing Diamond Mines



- The timing of the Gahcho Kué Project is important in maintaining economic sustainability for the region

Mining Method

- The three ore bodies in Kennady Lake will be mined using open pit mining methods
- Underground mining alternative considered but not selected
  - Diamond-bearing kimberlite pipes are vertically aligned
  - Technically challenging (maintain sufficient layer of competent, water-tight rock between mine workings and overlying lake)
  - Safety concerns
  - Economically less favourable (capital and operating costs, ore sterilization)
  - Management of groundwater inflow to mine would have impacts on surface water quality

Mining Sequence and Extraction Rates

- Kimberlite pipes will be mined in the sequence (5034, Hearne, Tuzo)
- Parallel mining considered but not selected
  - More complex operation
  - Larger footprint (mine pits not available for storage)
  - Economically less favourable (capital and operating costs)
- The maximum sustainable extraction rate of 3.0 Mt/y selected
  - most ideal alternative from a financial, as well as environmental and technical perspective (reduce amount of groundwater to be managed)
- Other extraction rates tested but not selected
  - Faster rate would result in no pits available for backfilling
  - Slower rate uneconomic

Project Timeline

- Once EIR approval, permits, and licences obtained, construction will take 2 years (Yr -2 to Yr -1)
  - Installation of infrastructure, dewatering to allow construction of the mine and access ore bodies
  - After water above ore bodies drained, pre-stripping of first open pit (5034) and initial production mining will begin

Project Timeline

- Operational period (Yr 1 to 11): kimberlite mining and processing
  - 5034 ore body first to be mined, followed by Hearne in Yr 4, and Tuzo in Yr 5
  - Processing plant operating by beginning of Yr 1 – PK storage required by this point
  - 5034 backfilled with mine rock starting in Yr 5; Hearne backfilled with fine PK starting in Yr 8
  - Where possible, progressive decommissioning and reclamation (e.g., contouring mine rock and PK storage) as mining advances

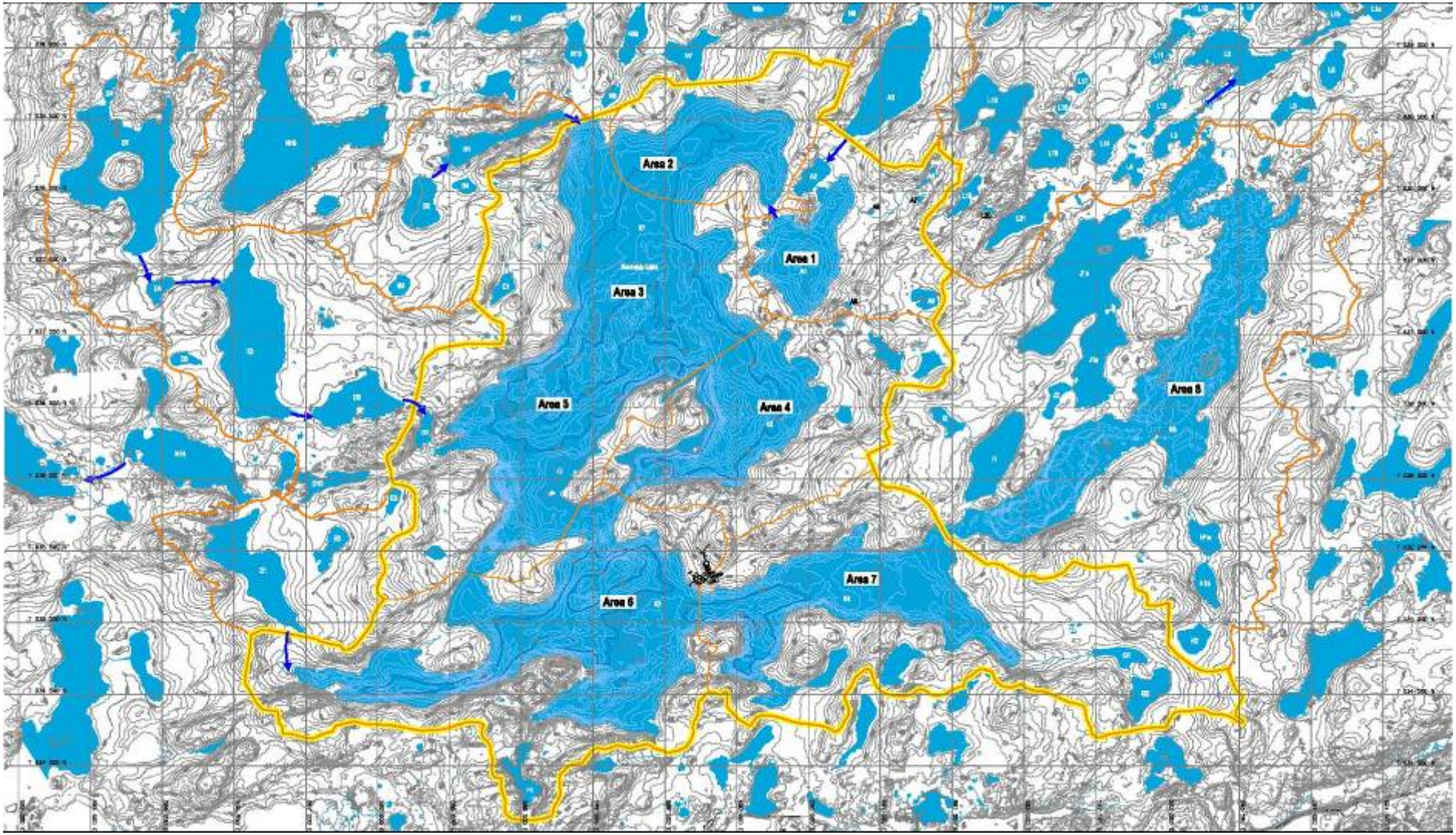
Project Timeline

- Interim closure within 2 yrs after mining completed (end of Yr 13)
  - Removal of most site infrastructure and disposal of materials on site or off site as appropriate
- Lake refilling and reclamation monitoring until remaining areas of Kennady Lake refilled
  - Flooding pits and returning Kennady Lake to original level by restoring natural drainage and pumping from Lake N11 (~8-16 yrs)
  - Removing all remaining site infrastructure (e.g., airstrip and camp)
  - Monitoring until Project site and Kennady Lake meet regulatory requirements

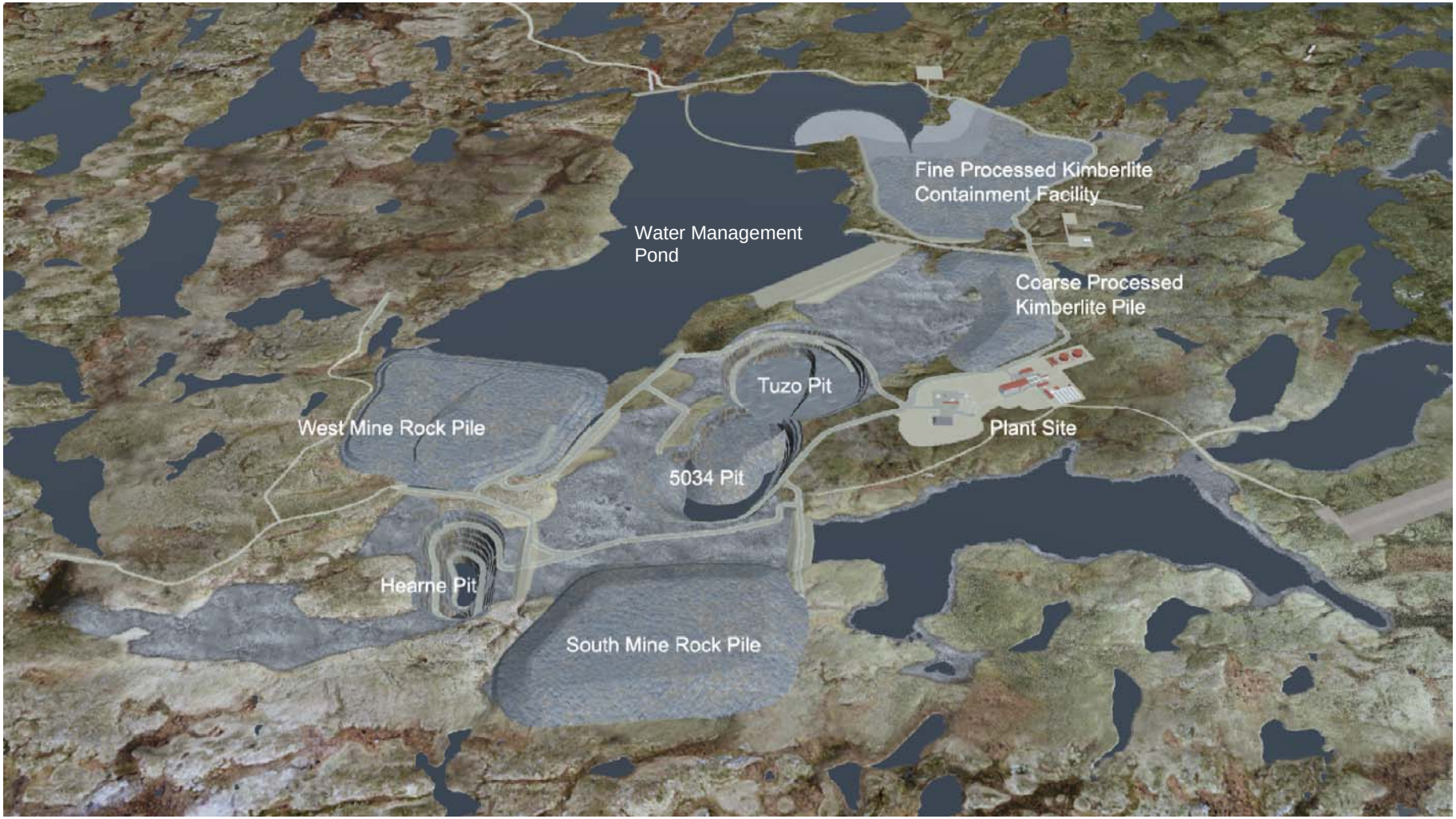
Surface Footprint

- Overall environmental and operational objective of minimizing project footprint
- Footprint restricted to a Controlled Area of the Kennady Lake watershed (except airstrip)
- Footprint features:
  - Mine pits, associated infrastructure and facilities
  - Water Management Pond (WMP) located within Controlled Area.
  - Dykes, diversion channels
  - Coarse PK Pile, Fine PKC Facility
  - Mine Rock Piles

Controlled Area



Full Extent of Operations – Year 7



Note : Fine PKC Facility footprint to be revised

Infrastructure

- Power generation (5 x 2,825 kilowatt (kW(e)) diesel-powered electric generator units)
- Processing plant
- Fuel storage (8 x 500,000 L tanks and 2 x 18 million L tanks)
- Accommodations complex (216 double occupancy rooms)
- Water Intake (Area 8)
- Airstrip (45m x 1620m)
- Winter access road (120 km starting at km 271 of the Tibbitt-to-Contwoyto road)
- Sewage treatment plant (effluent to the WMP and fine PK, sludge to the landfill)

Water Management Plan

Water Management Plan

- Key objectives of the Water Management Plan are:
  - Minimize the amount of water requiring discharge from the Controlled Area to downstream and adjacent watersheds
  - Manage mine water to minimize potential WQ effects within the Water Management Pond (WMP) during and after refilling (closure and post-closure)
  - Reconnect Kennady Lake with the downstream watershed following refilling
- Water Management Plan is detailed in Section 3.9 of the EIS Project Description
  - Summaries in Sections 8.4 and 9.4

Water Management Plan

- Key elements of the Water Management Plan:
  - A controlled area boundary around the mine
  - Dykes and diversion channels
  - Dewatering Kennady Lake for the construction and operation of the mine
  - Establishing a WMP to manage mine and process water
  - Infrastructure to transfer water between basins, pits and the WMP
  - Refilling Kennady Lake as quickly as possible to allow recovery of ecosystem

- Note that maps and figures still show the EIS Project footprint, as changes to the Fine PKC Facility footprint are not yet reflected

Water Management Plan

Key Project Phases:

- Construction – Years -2 to -1
  - Dewatering
  - Establishment of the Controlled Area
  - Infrastructure to transfer water between basins, pits and the WMP
- Operations – Years 1 to 11
  - Establishment of WMP
  - Operational discharge
  - Water management within the Controlled Area
- Closure (refilling) – Years 12 to 20
  - Refilling Kennady Lake – natural and supplemental inflows
- Closure (post-closure) – Years 20+
  - Recovery of Kennady Lake
  - Reconnection with downstream lakes upon meeting regulatory requirements

Water Management – Construction

Key Components:

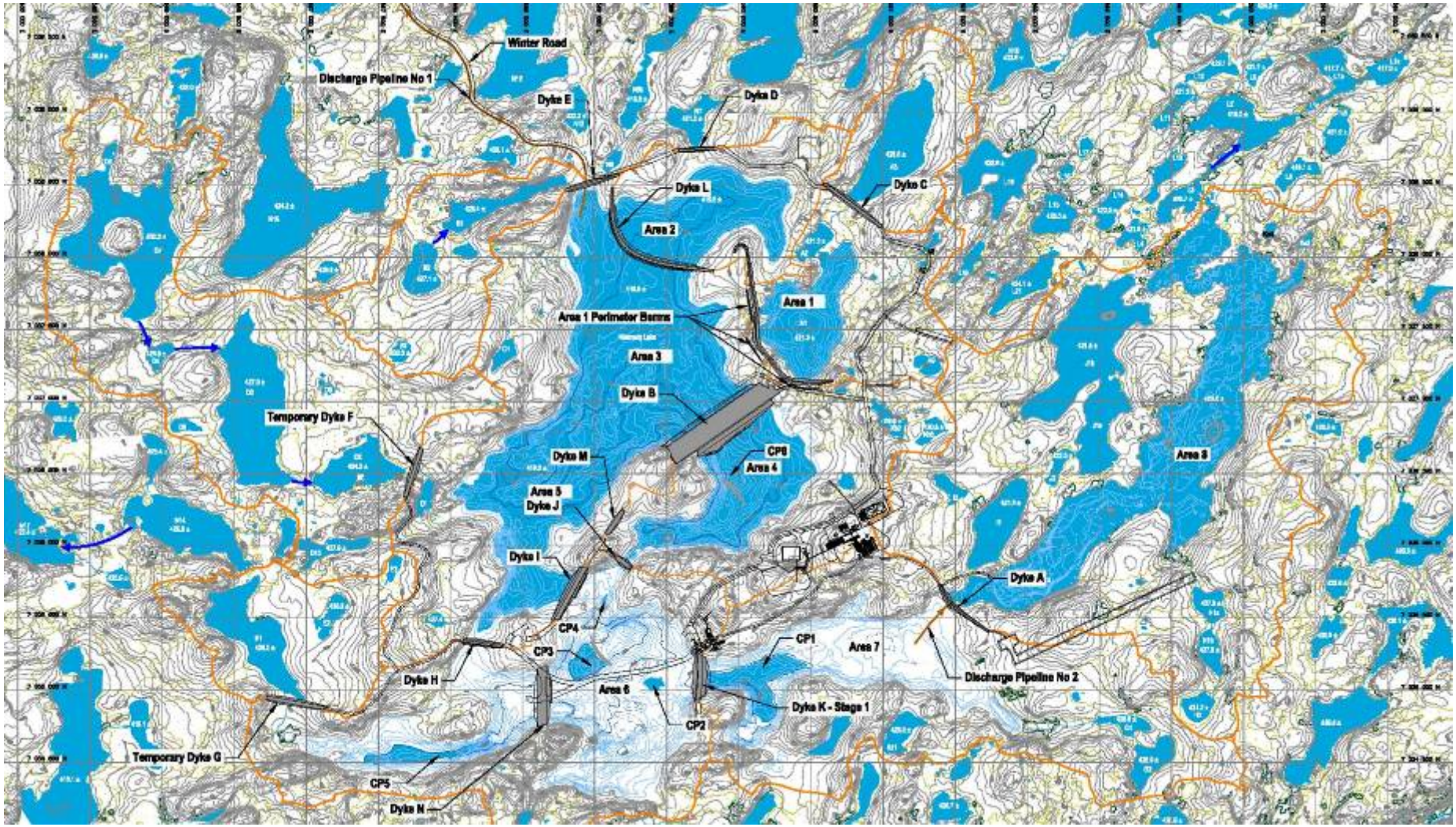
- Construction of Dyke A at the narrows separating Areas 7 and 8
  - Isolates the main body of Kennady Lake (i.e., Areas 2 to 7) from Area 8

- Construction of dykes to divert upper watershed runoff water away from Kennady Lake
  - Temporary diversion dykes will be placed across outlets of D and E watersheds (Dykes F, G)
  - *Permanent dyke for diversion of A watershed (Dyke A1) (date TBD)*
  - Establishes the Controlled Area

Water Management – Construction

- Dewatering of Kennady Lake (Areas 2 to 7)
  - Commences following completion of Dyke A
  - Water discharged to Lake N11 and Area 8
  - Fish Salvage
  - Habitat in Areas 2 to 7 not suitable for fish
- As water levels decrease, sills will be exposed and internal water retention dyke construction will start (Year -2):
  - i.e., Dykes H and I (between Areas 5 and 6), M (on Tuzo Island), K (between Areas 6 and 7), and J (between Areas 4 and 6)
  - Internal water retention Dyke K (between Areas 6 and 7) will start
  - Construction of Filter Dyke L (between Areas 2 and 3)
- Dewatering of areas 2 to 7 and water retention dykes are required to access ore bodies.

Water Management Areas – Dykes and Other Infrastructure



Note: map to be revised

Water Management – Operations

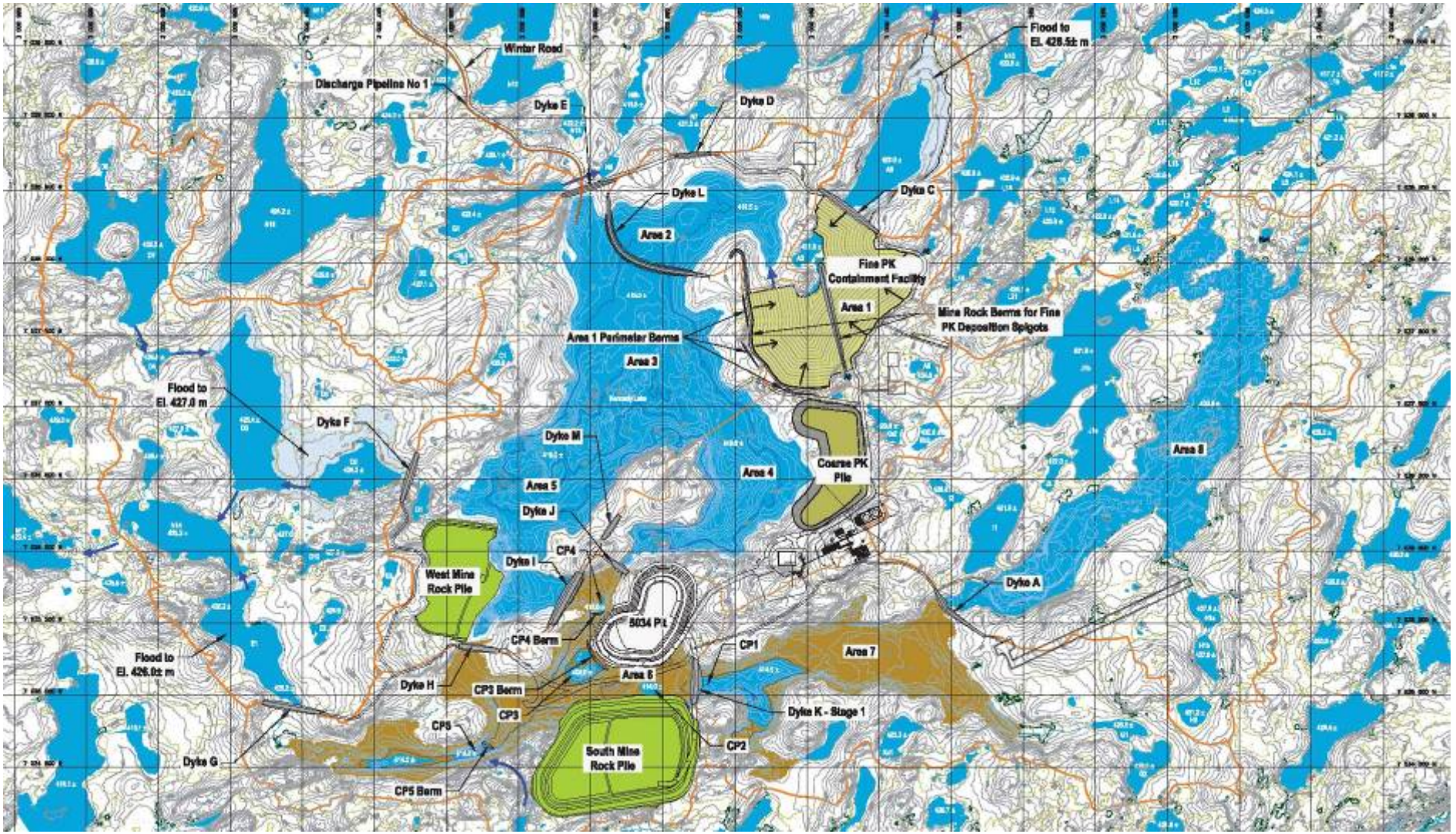
Key Components:

- Water Management Pond (WMP) (Areas 3 and 5) to store contact water and provide a source of process water
  - Inputs:
    - Open pit groundwater inflows; site runoff; seepage through filter Dyke L from Fine PKC Facility; runoff and seepage from mine rock piles, and the Coarse PK Pile; and process water
  - Outputs:
    - Should water within the WMP meet discharge criteria, water will be pumped to Lake N11

Water Management – Operations

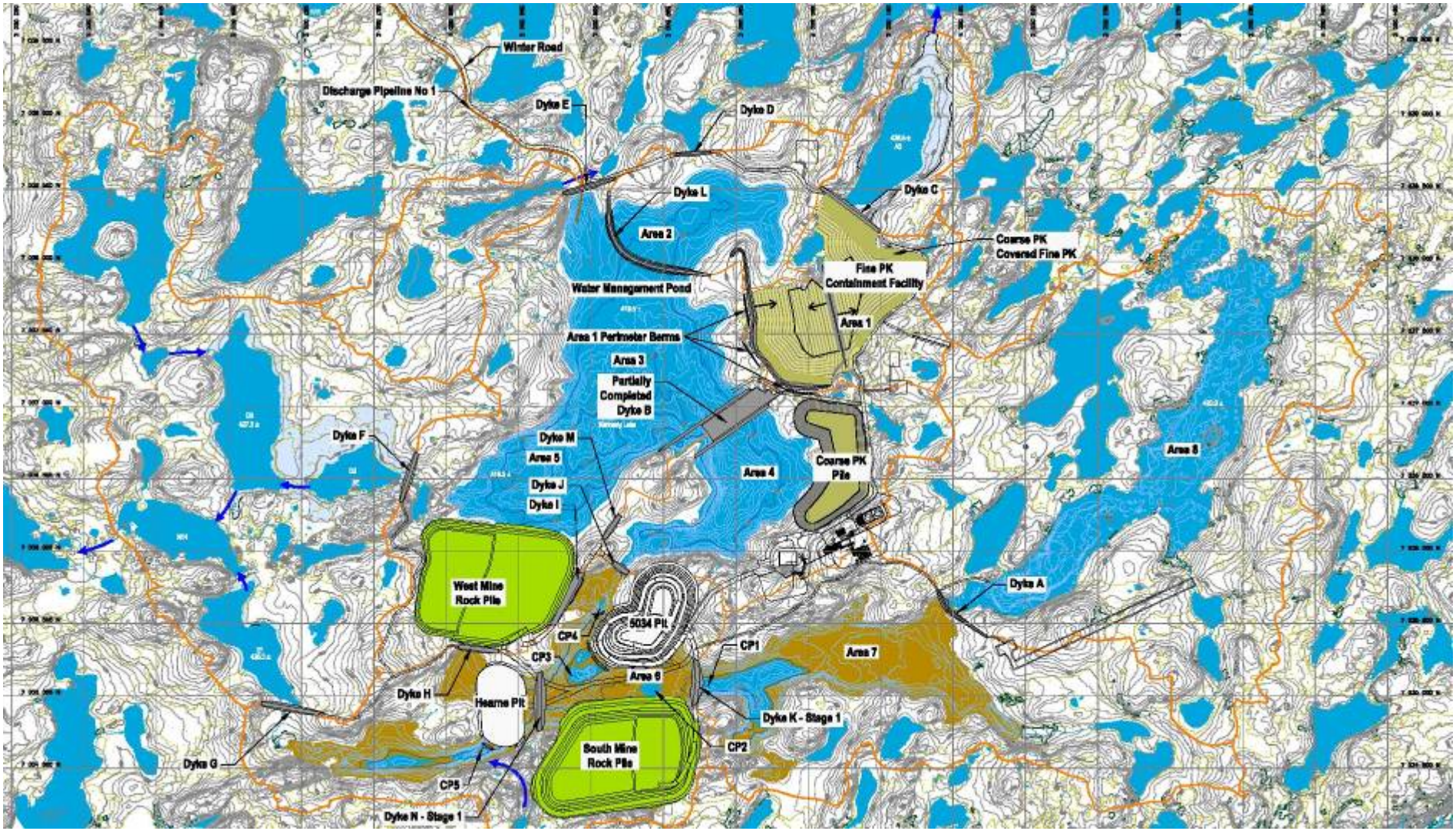
- Collection ponds will be established within the basins in dewatered Areas 6 and 7 to collect runoff and pumped pit groundwater inflows, which will be pumped to the WMP
- Water transfers within the Controlled Area
  - Groundwater inflows to 5034, Hearne, and runoff water from collection ponds in Areas 6 and 7 pumped to WMP

Water Management – Operations Years 1 to 3



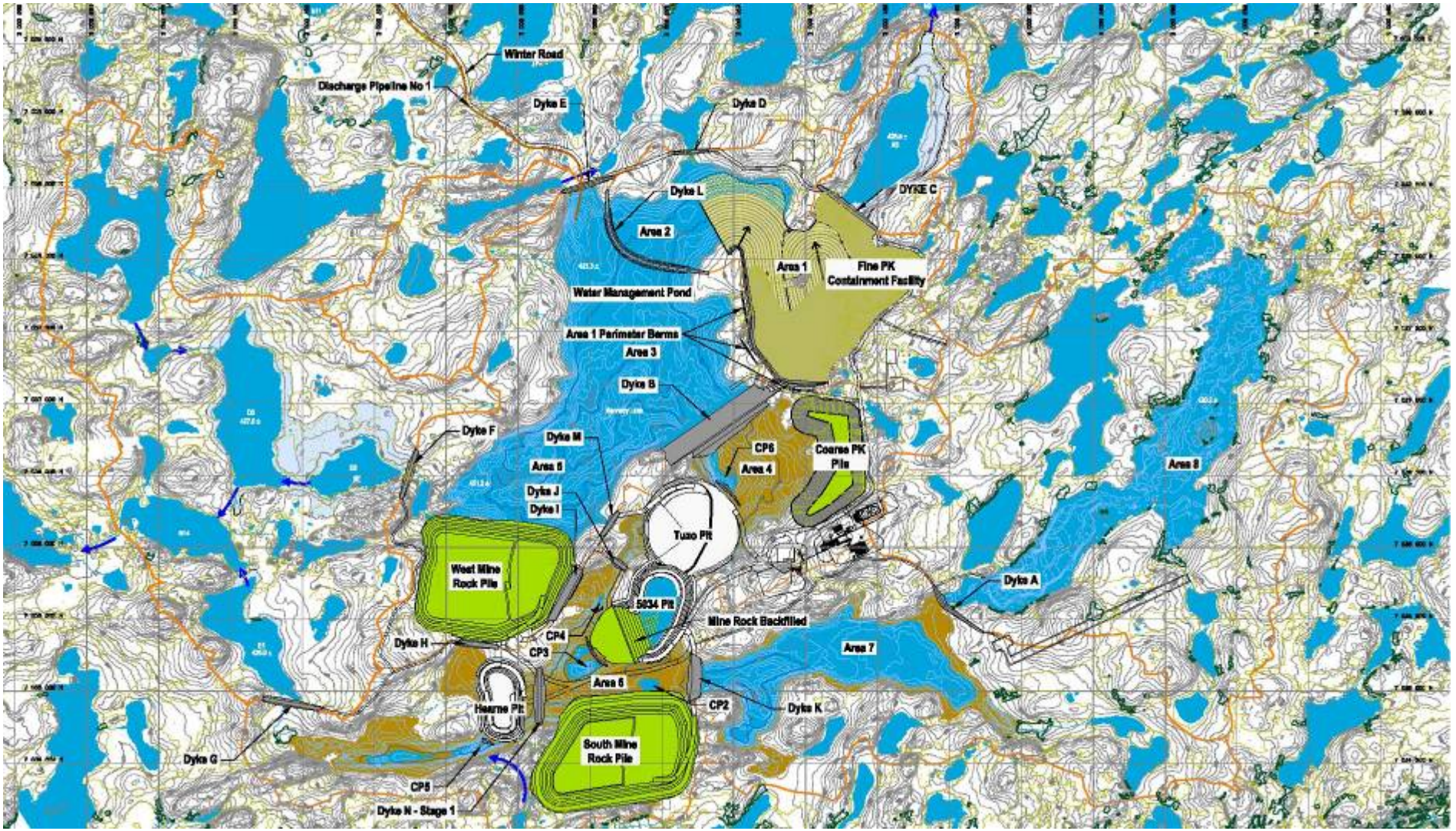
Note: map to be revised

Water Management – Operations Years 4



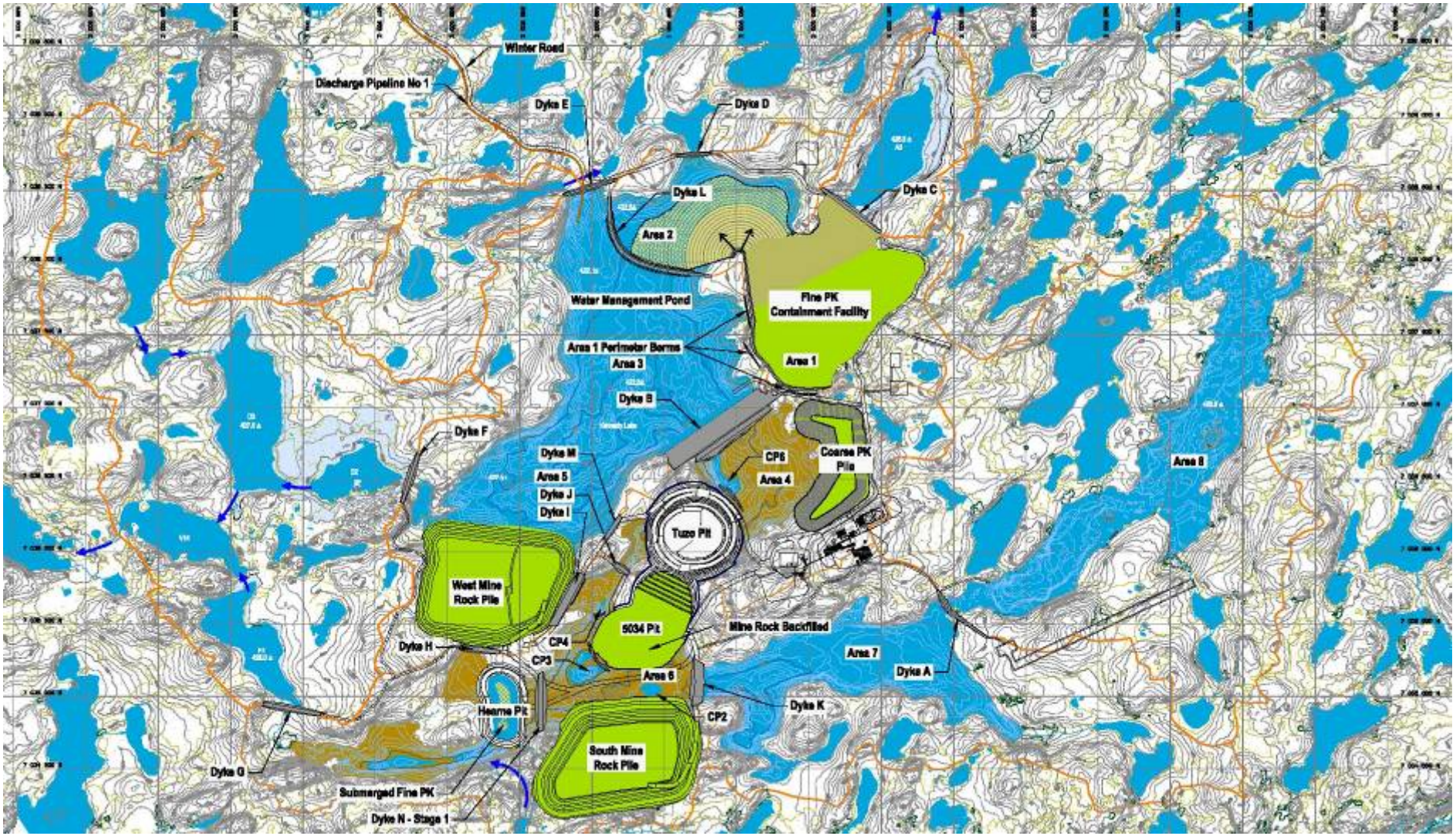
Note: map to be revised

Water Management – Operations Years 5 and 6



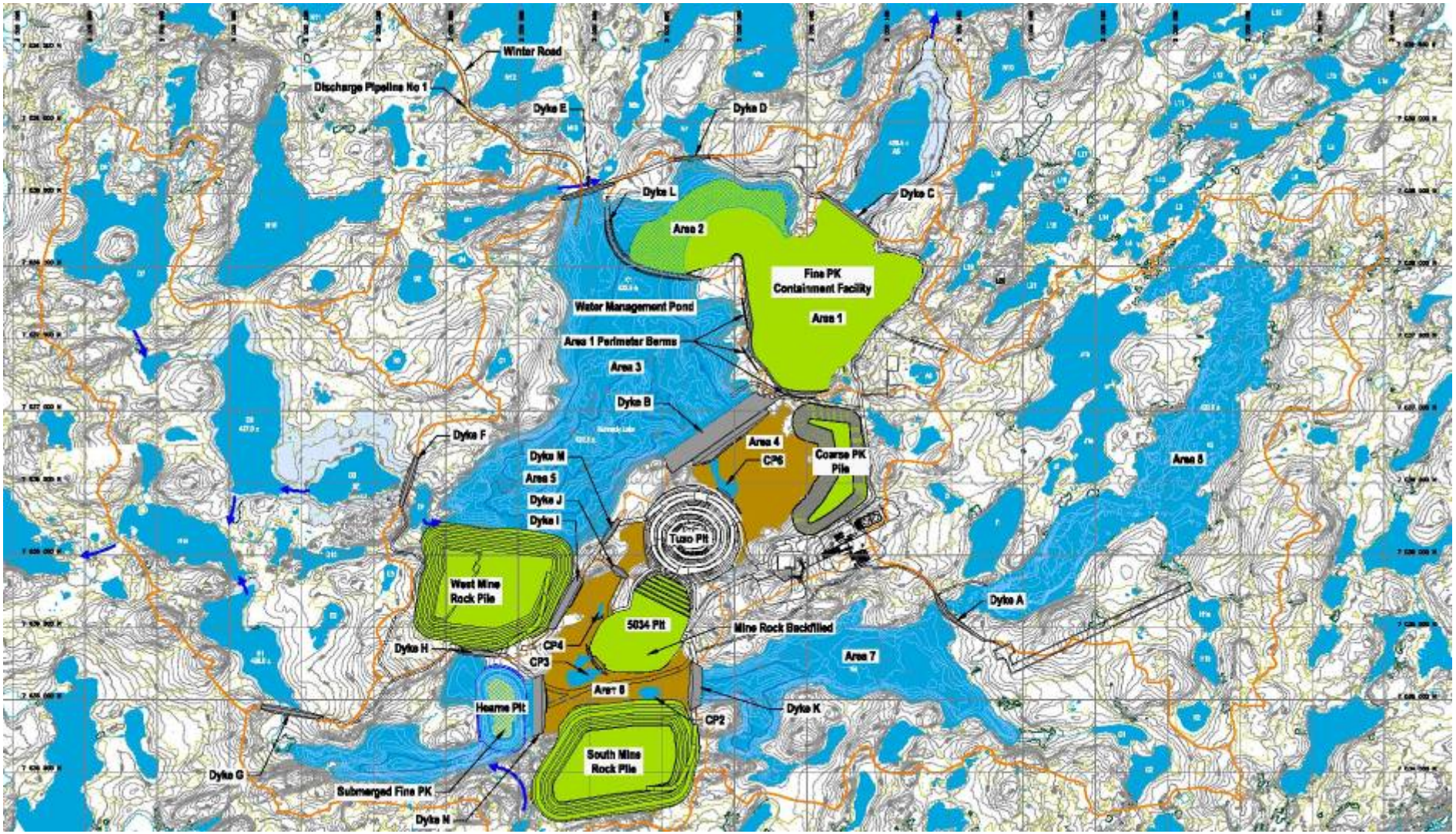
Note: map to be revised

Water Management – Operations Years 7 and 8



Note: map to be revised

Water Management – Operations Years 9 to 11



Note: map to be revised

Water Management - Closure and Reclamation

- Years 12 and 13 (interim closure)
  - Construction of in-lake compensation habitats and decommissioning of roads, diversion channels, and pipelines within Kennady Lake
  - Lowering of Dykes B, K and N to begin filling Tuzo pit and area of 5034
  - Lake refilling will be achieved by:
    - Natural runoff from upper *A,* B, D, E watersheds
    - Supplemental pumping from Lake N11 to speed refilling and recovery
- Years 14 to 19
  - Kennady Lake refilling continues

Once Areas 3 to 7 are refilled to same elevation as Area 8, and water quality within refilled lake is considered suitable for fish, Dyke A will be removed, and Areas 3 to 7 will be reconnected to Area 8

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Mine Waste Management

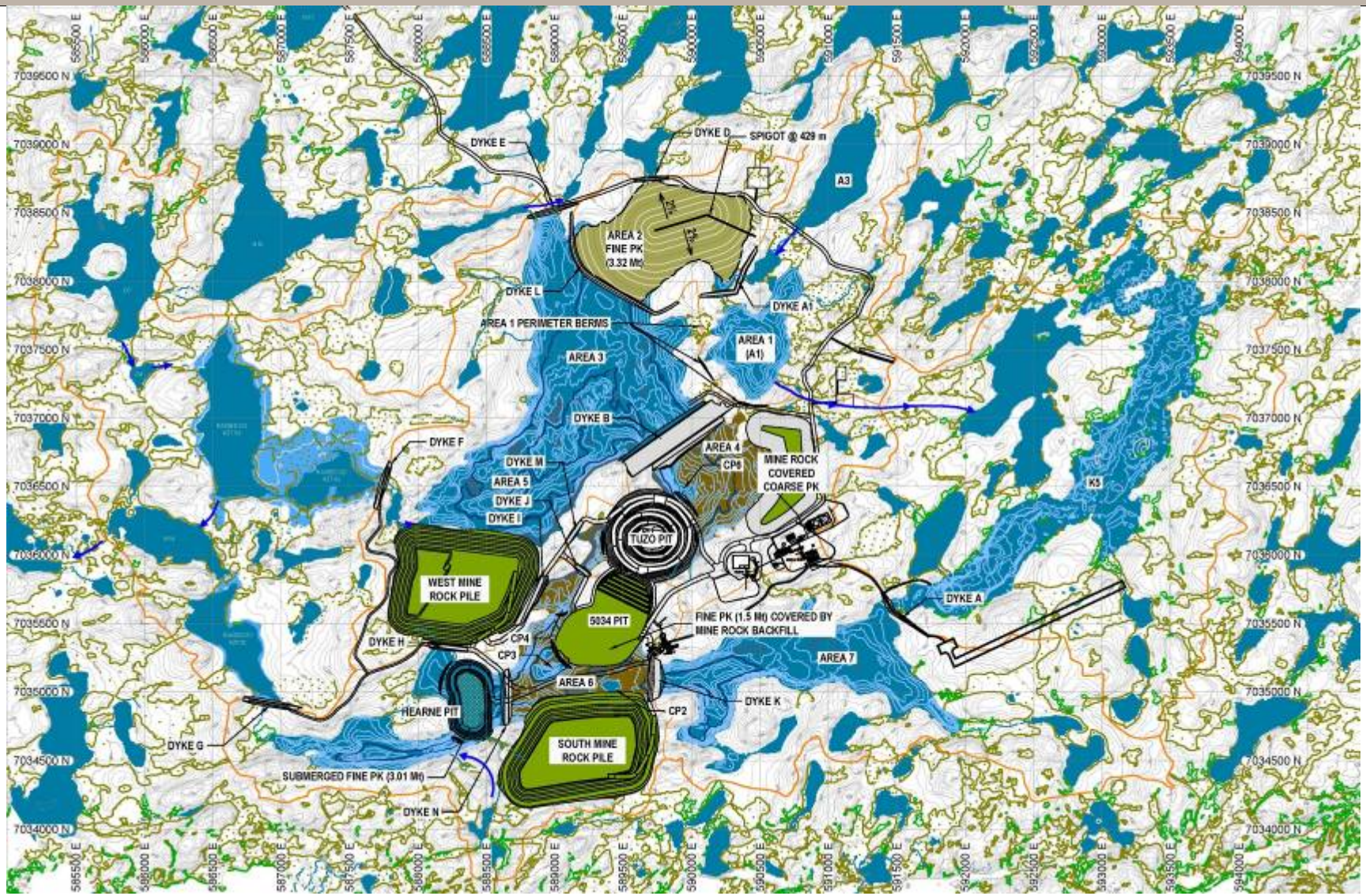
Mine Waste Management

- Recovery of diamonds from ore bodies will generate mine rock, coarse PK, and fine PK that will require on-site disposal
- Mine rock stored in mine rock piles in and adjacent to Area 5 (West Mine Rock Pile) and Area 6 (South Mine Rock Pile), and mined-out 5034 Pit
- Alternatives considered for mine rock piles (including on-land options) not selected
  - Larger footprint, extending into adjacent watersheds requires systems to capture and control runoff, increased truck haulage, less economically favourable (capital and operating costs)
- Coarse PK Pile on land beside process facility (Area 4)

Mine Waste Management

- Fine PK - disposed of in the Fine PKC Facility (Area 2) and mined-out 5034 and Hearne pit
- Alternatives considered for fine PK storage (including on-land or entirely within Kennady Lake options) not selected
  - More complex construction (e.g., higher dykes or impervious dykes, leakage detection systems, topographical challenges), increased maintenance and inspection (e.g., active operation of seepage and runoff control), higher risk of loss of containment, larger footprint, cost prohibitive (capital and operating costs)

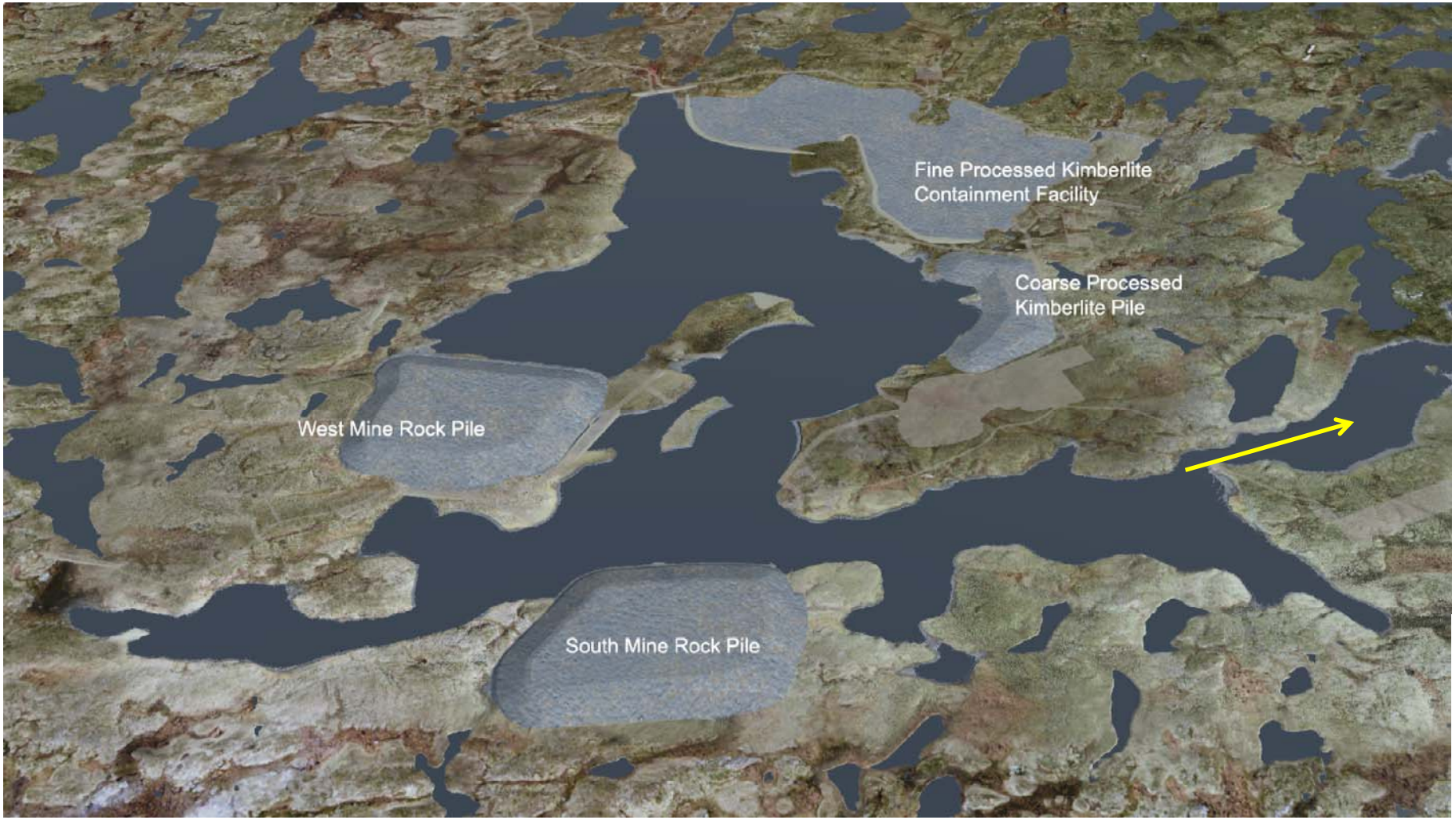
Mine Waste Storage Facilities



Waste Management

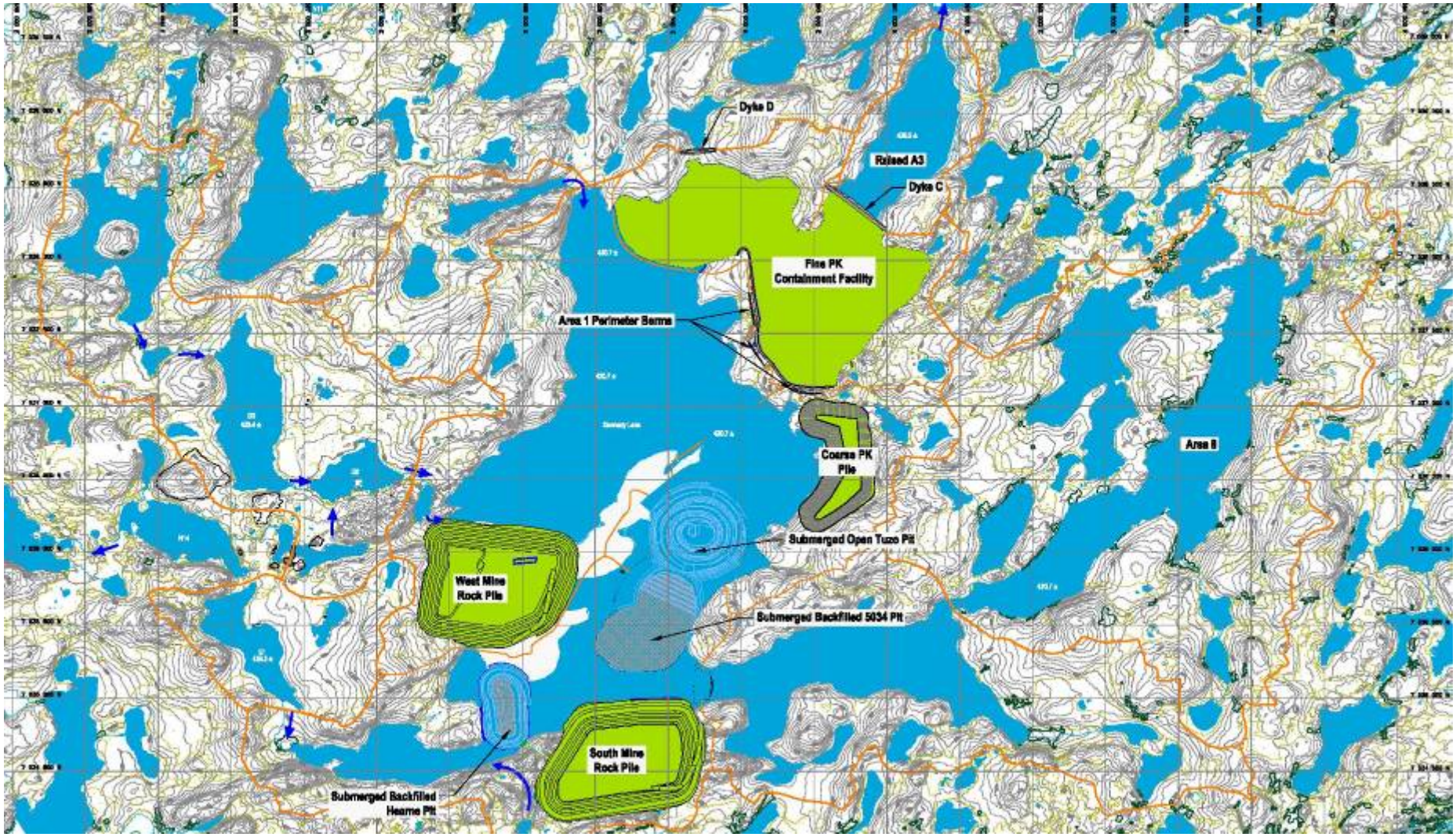
- On-site waste management areas will be used to contain and store wastes:
  - Landfill for inert solid wastes
  - Landfarm for petroleum-contaminated soils (constructed as required)
  - Incinerators for combustible waste and waste oil
  - A sewage treatment plant
  - Hazardous waste shipped off site to approved facility

Closure



Note : Fine PKC Facility to be revised

Final Reclamation



Note: map to be revised

Summary

- The current Project Description represents a balance between environmental considerations, feasibility and economics
- Project approach is to minimize the size of disturbance footprint
- All operations are managed within the Kennady Lake watershed
- Controlled Area established to keep clean water away from the site and manage contact water within the site
- Project as designed will minimize refilling time for Kennady Lake, and therefore aquatic ecosystem recovery

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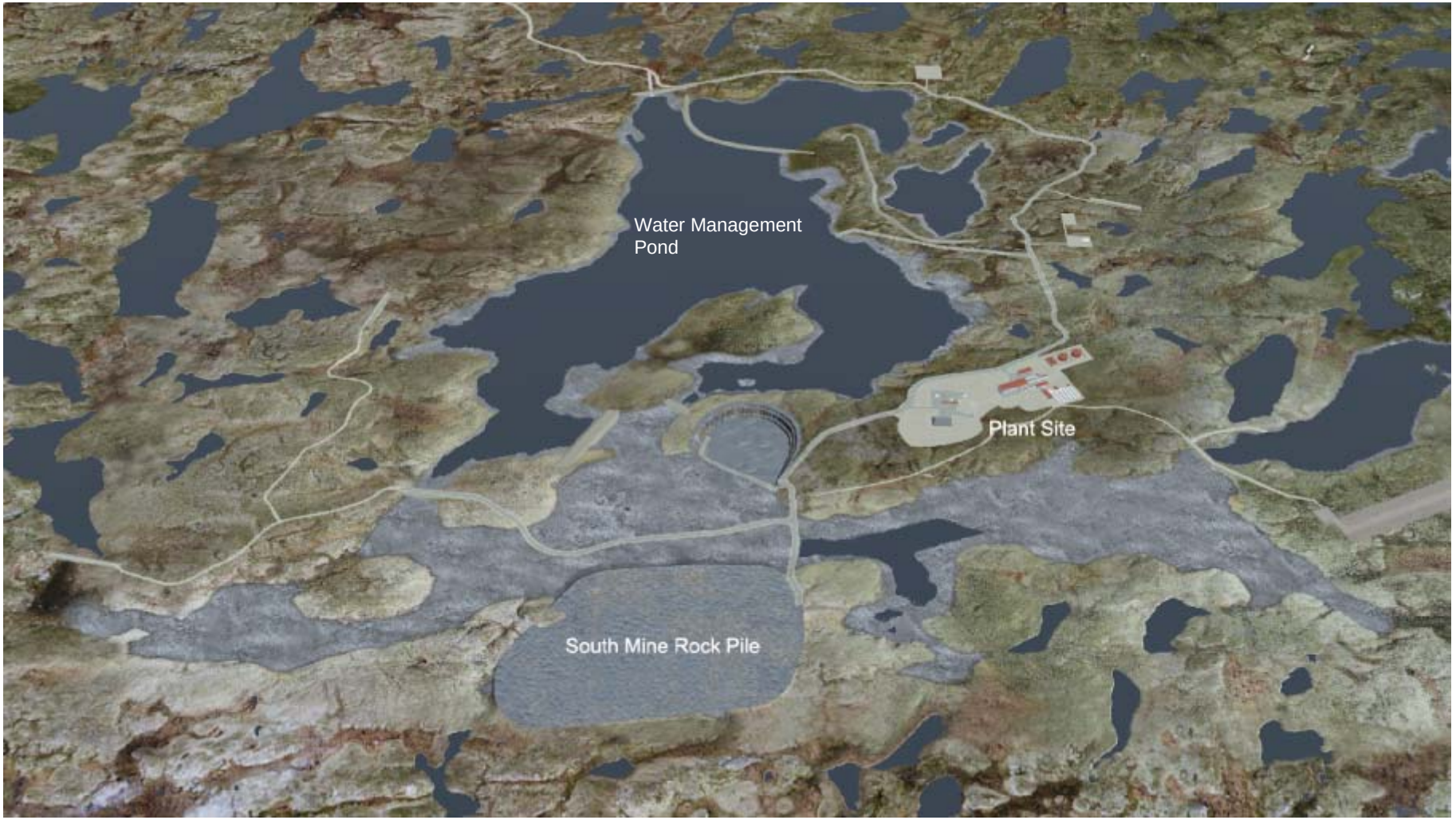
Project Description
Visualization

Kennady Lake - Pre-development

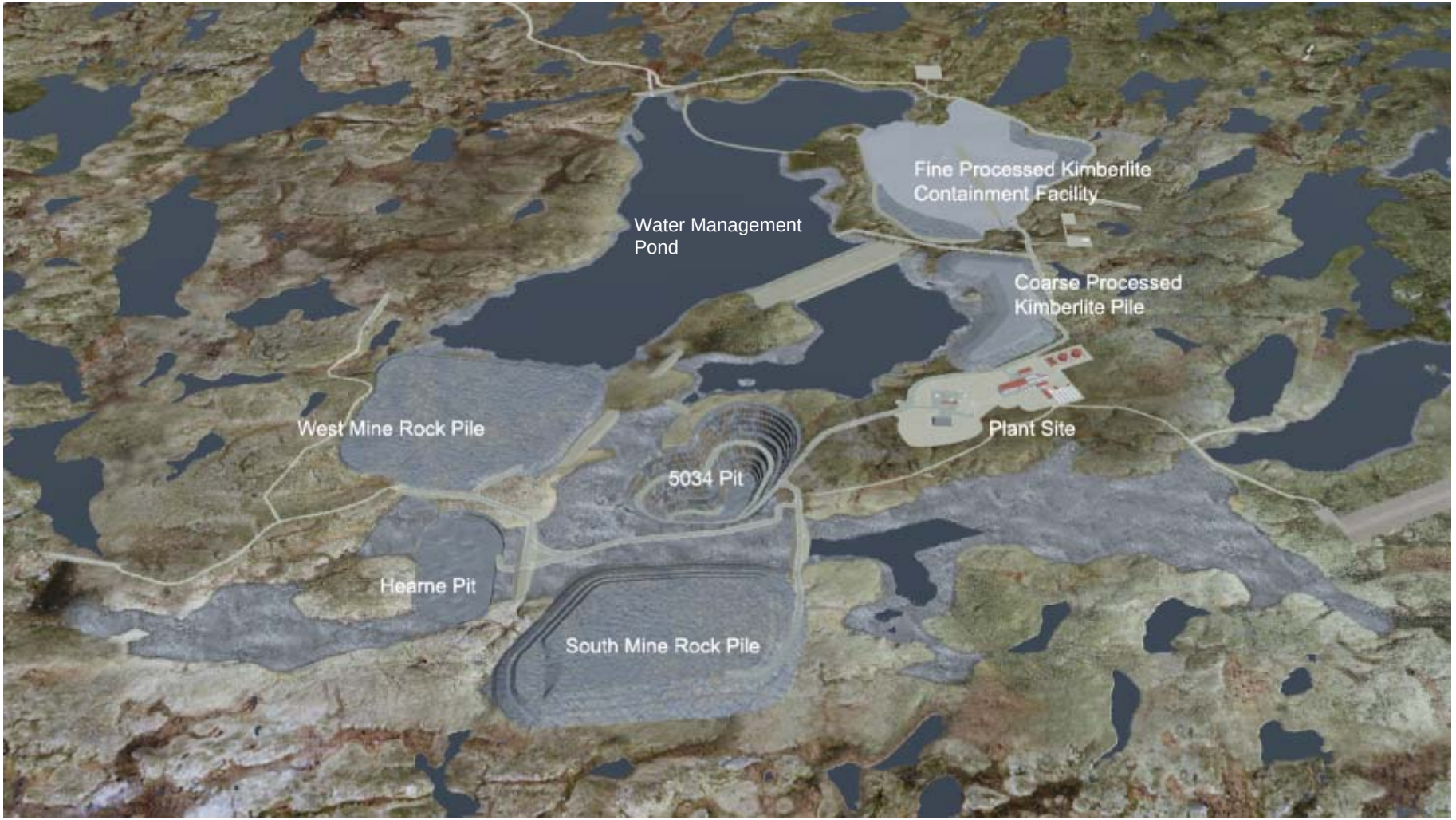
Construction

Operations – Years 1 to 3



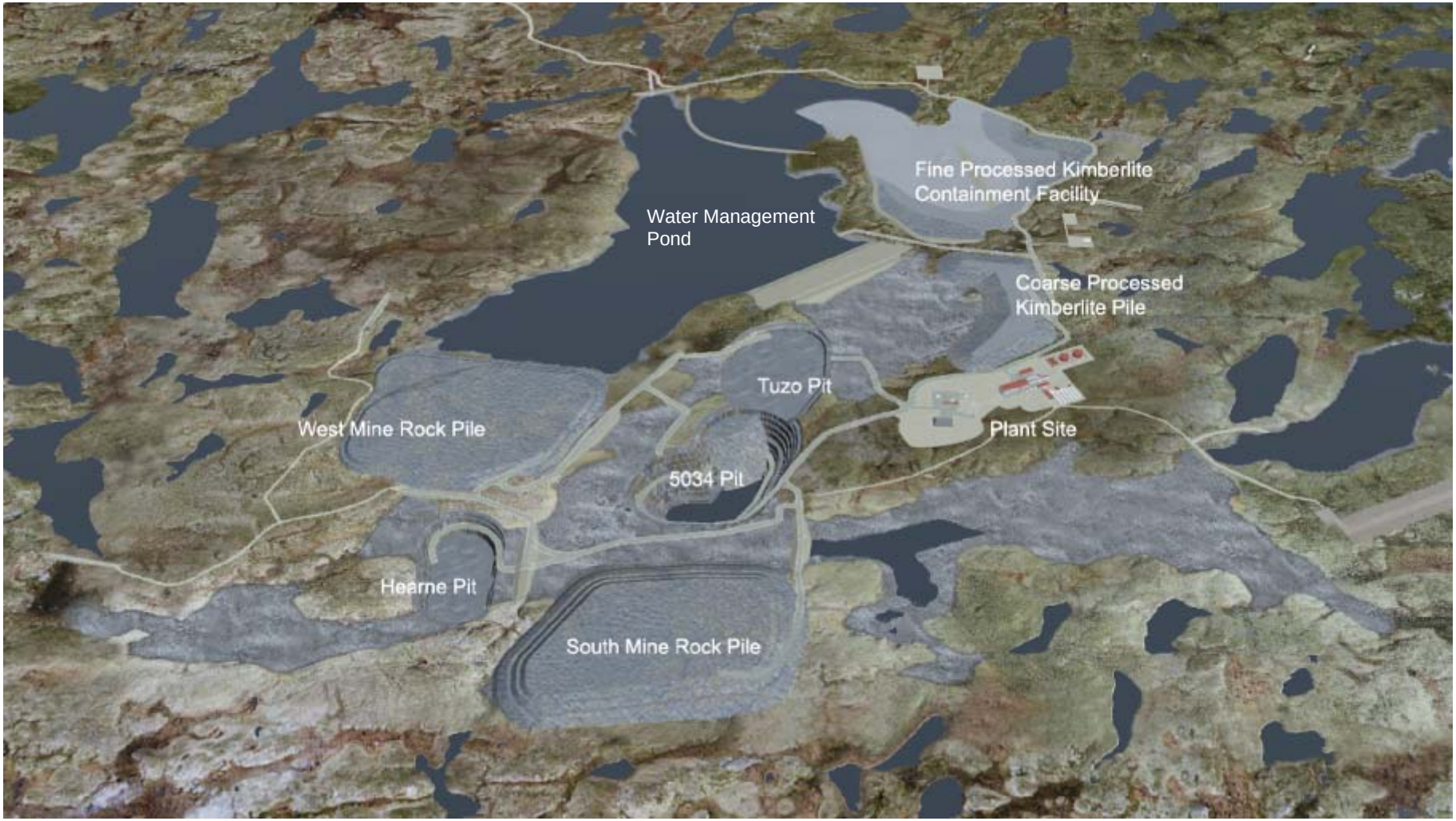
Note : Fine PKC Facility to be revised

Operations – Year 4



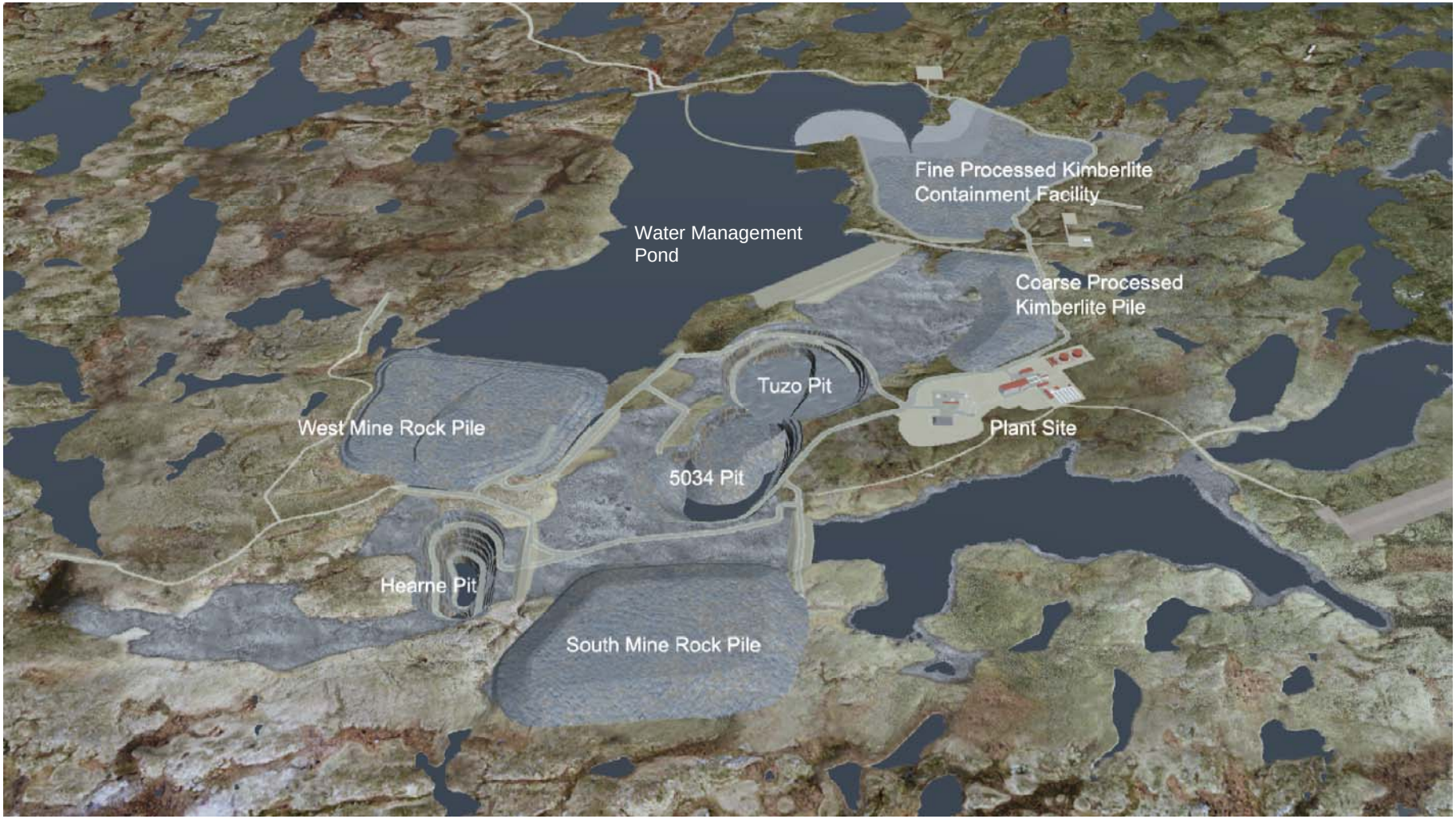
Note : Fine PKC Facility to be revised

Operations – Years 5 and 6



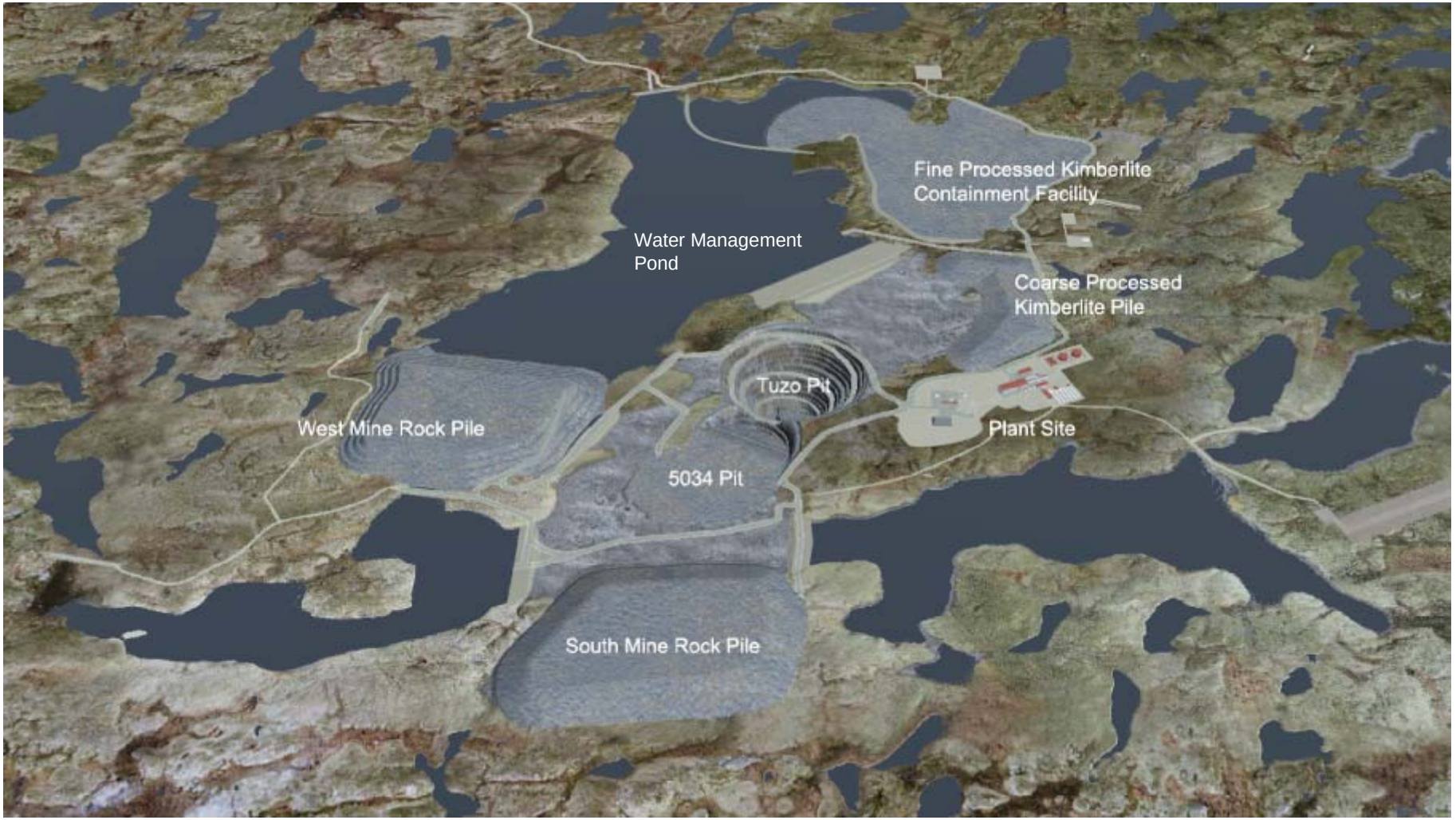
Note : Fine PKC Facility to be revised

Full Extent of Operations – Year 7



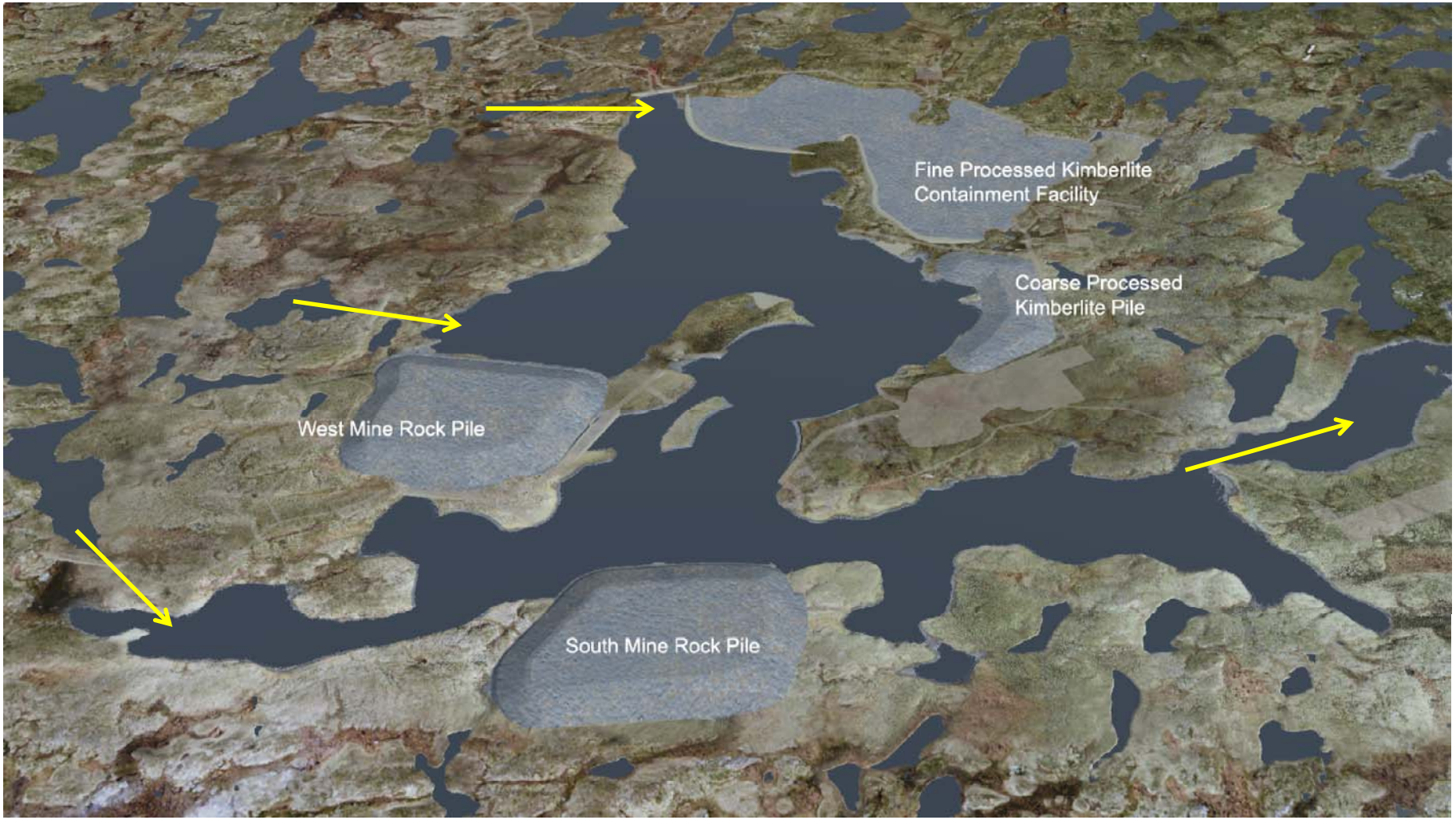
Note : Fine PKC Facility to be revised

End of Mining – Years 9 to 11



Note : Fine PKC facility to be revised

Closure



Note : Fine PKC Facility to be revised

De Beers Canada

Gahcho Kué Project

Structure of the EIS

October 26, 2011

Gahcho Kué Project EIS

Paul Cobban, De Beers Canada Inc. Permitting Manager, delivering the Gahcho Kué Environmental Impact Statement to Alan Ehrlich, Panel Manager of the Mackenzie Valley Environmental Impact Review Panel on December 23, 2010

Structure of the EIS

- The Terms of Reference issued by the Gahcho Kué Panel required that the assessment of the Key Lines of Inquiry and Subjects of Note “be comprehensive stand-alone analyses which require only minimal cross-referencing with other parts of the EIS”.
- The result was a document organized by Key Lines of Inquiry and Subjects of Note
- Baseline reports for each terrestrial discipline included as annexes and addenda to the EIS
- To be responsive to the Terms of Reference, only the information needed for the effects assessment within each Key Line Of Inquiry and Subject of Note was presented

EIS Sections

Volume	Section Title	Volume	Section Title
1	Plain Language Summary Section 1 – Introduction Section 2 – Project Alternatives Section 3 – Project Description Section 4 – Community, Regulatory, and Public Engagement Section 5 – Traditional Knowledge Section 6 – Assessment Approach	6b	Section 11.8 – Subject of Note: Traffic and Roads Section 11.9 – Subject of Note: Waste Management and Wildlife Section 11.10 – Subject of Note: Carnivore Mortality Section 11.11 – Subject of Note: Other Ungulates Section 11.12 – Subject of Note: Species at Risk and Birds Section 11.13 – Subject of Note: Climate Change
2	Section 7 – Key Line of Inquiry: Caribou *(includes Appendix 7.II – Noise)*	7	Section 12 – Socio economic Impact Assessment Section 13 – Cumulative Effects Section 14 – Conclusions
3a and 3b	3a: Section 8 – Key Line of Inquiry: Water Quality and Fish in Kennady Lake 3b: Appendices	Annexes and Addenda	Annex A Site Photographs Annex B – Air Quality Baseline Annex C – Noise Baseline Annex D – Bedrock Geology, Terrain and Soil Baseline Annex E – Vegetation Baseline Annex F – Wildlife Baseline Addendum FF – Additional Wildlife Baseline Information Annex G – Hydrogeology Baseline Annex H – Hydrology Baseline Annex I – Water Quality Baseline Addendum II – Additional Water Quality Baseline Information Annex J – Fisheries and Aquatic Resources Baseline Annex K – Socio economics Baseline Annex L – Archaeology Baseline Annex M – Traditional Knowledge and Traditional Land Use Baseline Annex N – Non traditional Land and Resource Use Baseline
4	Section 9 – Key Line of Inquiry: Downstream Water Effects		
5	Section 10 – Key Line of Inquiry: Long-term Biophysical Effects, Closure and Reclamation		
6a	Section 11.1 – Biophysical Subjects of Note Overview Section 11.2 – Subject of Note: Impacts on Great Slave Lake Section 11.3 – Subject of Note: Alternative Energy Section 11.4 – Subject of Note: Air Quality Section 11.5 – Subject of Note: Waste Rock and Processed Kimberlite Section 11.6 – Subject of Note: Permafrost, Groundwater and Hydrogeology Section 11.7 – Subject of Note: Vegetation *(includes Appendix 11.7.I Geology, Terrain and Soils)*		

EIS Sections Relevant to Terrestrial

Section Number	Section Title
2	Project Alternatives
3	Project Description
7	**Key Line of Inquiry: Caribou**
11.7	Subject of Note: Vegetation
11.7.I	Geology, Soils and Terrain Appendix
11.9	Subject of Note: Waste Management and Wildlife
11.10	Subject of Note: Carnivore Mortality
11.11	Subject of Note: Other Ungulates
11.12	Subject of Note: Species at Risk and Birds
13	Cumulative Effects Assessment
14	Summary and Conclusions
Annex D	Geology, Soils and Terrain Baseline
Annex E	Vegetation Baseline
Annex F / Addendum FF	Wildlife Baseline

EIS Sections Relevant to Aquatics

Section Number	Section Title
2	Project Alternatives
3	Project Description
8	**Key Line of Inquiry: Water Quality and Fish in Kennady Lake**
9	**Key Line of Inquiry: Downstream Water Effects**
10	**Key Line of Inquiry: Long-term Biophysical Effects, Closure, and Reclamation**
11.2	Subject of Note: Impacts on Great Slave Lake
11.6	Subject of Note: Permafrost, Groundwater, and Hydrogeology
13	Cumulative Effects Assessment
14	Summary and Conclusions
Annex G	Hydrogeology Baseline
Annex H / Addendum HH	Hydrology Baseline
Annex I / Addendum II	Water Quality Baseline
Annex J / Addendum JJ	Fisheries and Aquatic Resources Baseline

EIS Sections Relevant to Socio-economics

Section	Section Title
2	Project Alternatives
3	Project Description
12	**Socio economic Impact Assessment** Key Lines of Inquiry: Family and community cohesion; Social disparity within and between communities; and Long term social, cultural and economic effects. Subjects of Note: Employment, training, and economic development; Impacts on tourism potential and wilderness character; Demands on infrastructure; Culture, heritage and archaeology; Aboriginal rights and community engagement; and The proposed National Park.
13	Cumulative Effects Assessment
14	Summary and Conclusions
Annex K	Socio economics Baseline
Annex L	Archaeology Baseline
Annex M	Traditional Knowledge and Traditional Land Use Baseline
Annex N	Non traditional Land and Resource Use Baseline

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Gahcho Kué Project
Terrestrial

October 26, 2011

Terrestrial Workshop Outline

- Overview of Assessment and Key Concepts
- SON: Vegetation
- KLOI: Caribou
  - Baseline environment
  - Habitat, energetics, and population modeling
  - Assessment conclusion
- *Break with Q and A*
- SON: Carnivore Mortality
  - Baseline environment
  - Habitat and mortality analysis
  - Assessment conclusion
- SON: Other Ungulates
- SON: Species at-risk and Birds
- *Summary with Q and A*

EIS Sections Relevant to Terrestrial

Section Number	Section Title
2	Project Alternatives
3	Project Description
7	**Key Line of Inquiry: Caribou**
11.7	**Subject of Note: Vegetation**
11.7.I	Geology, Soils and Terrain Appendix
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11.12	**Subject of Note: Species at Risk and Birds**
13	Cumulative Effects Assessment
14	Summary and Conclusions
Annex D	Geology, Soils and Terrain Baseline
Annex E	Vegetation Baseline
Annex F	Wildlife Baseline

General Setting

Environmental Impact Statement

The weight of evidence from the analysis of the primary pathways predicts that the incremental impacts from the Project and cumulative impacts from the Project and other developments will not have a significant negative influence on the resilience and persistence of terrestrial VCs.

The EIS was based on multiple assessment approaches and endpoints per Valued Component

- To meet the Terms of Reference
- Was critical in reducing uncertainty in predictions

The EIS also addressed uncertainty by considering ecological conservatisms throughout the assessment

- Thus, impacts should not be worse than predicted.

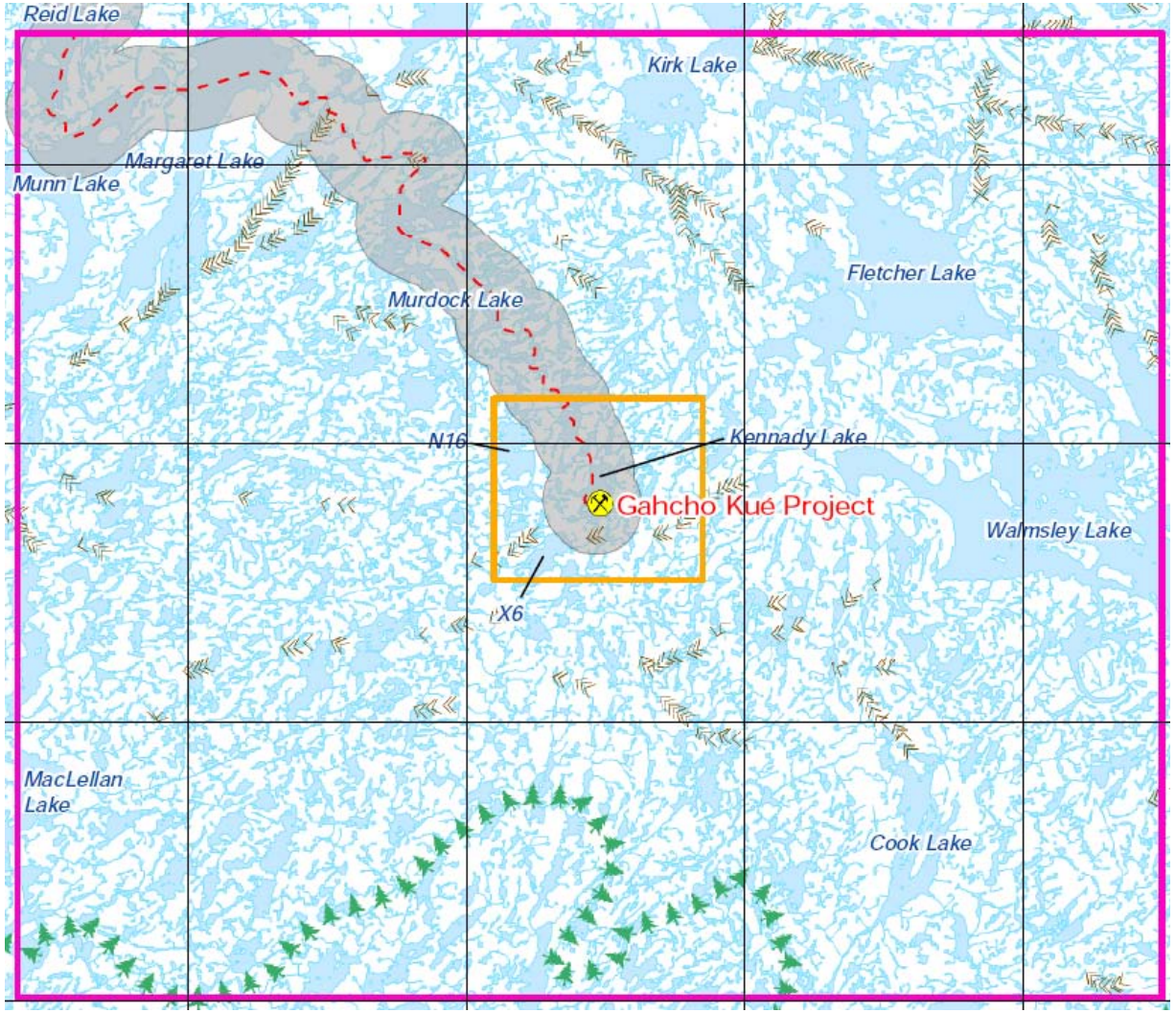
Study Area – Local and Regional

Local Study Area (LSA)

- 200 km^2
- Baseline field work
- Effects study area:
  - Vegetation, soils
- Includes
- Winter Access Road (120 km)

Regional Study Area (RSA)

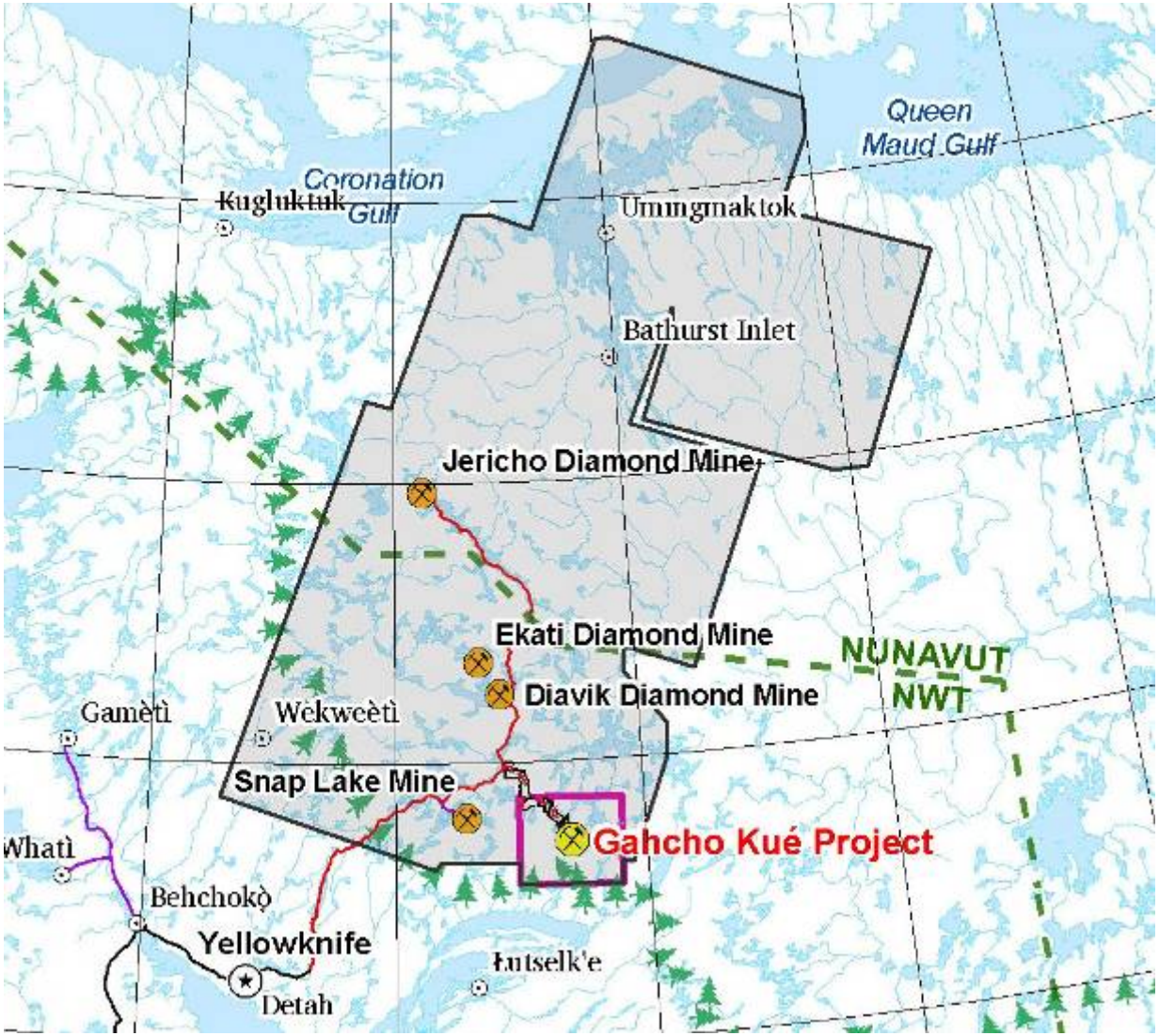
- 5,700 km^2
- Baseline field work
- Effects study area:
  - Muskoxen
  - Birds



Study Area – Cumulative Effects

Wolverine & Grizzly Bear

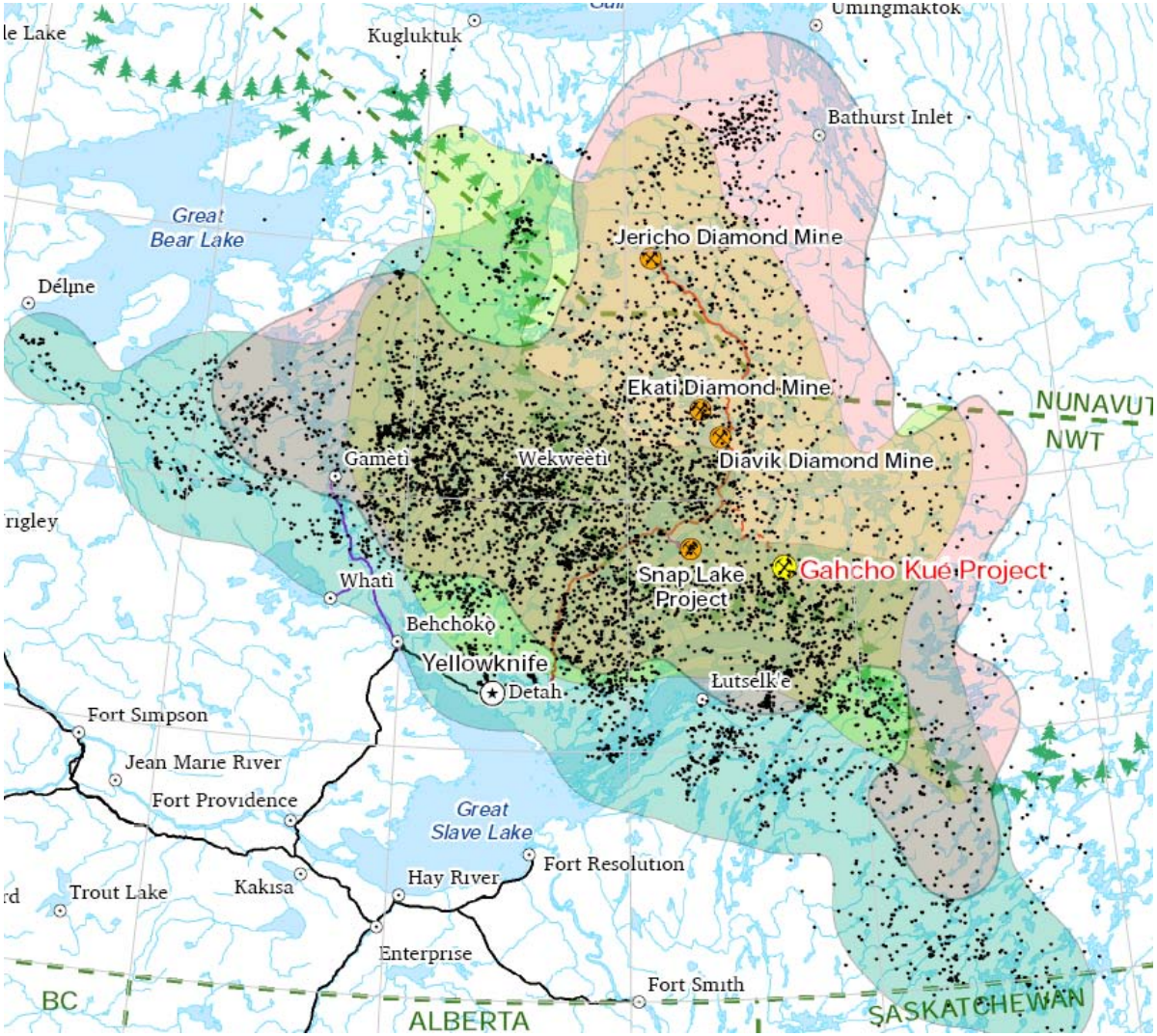
- Slave Geological Province (SGP)
  - best met the Terms of Reference
- Consistent with Johnson et al. (2005)
- High-resolution land cover dataset available
- Emphasizes region of human development
- 200,000 km^2



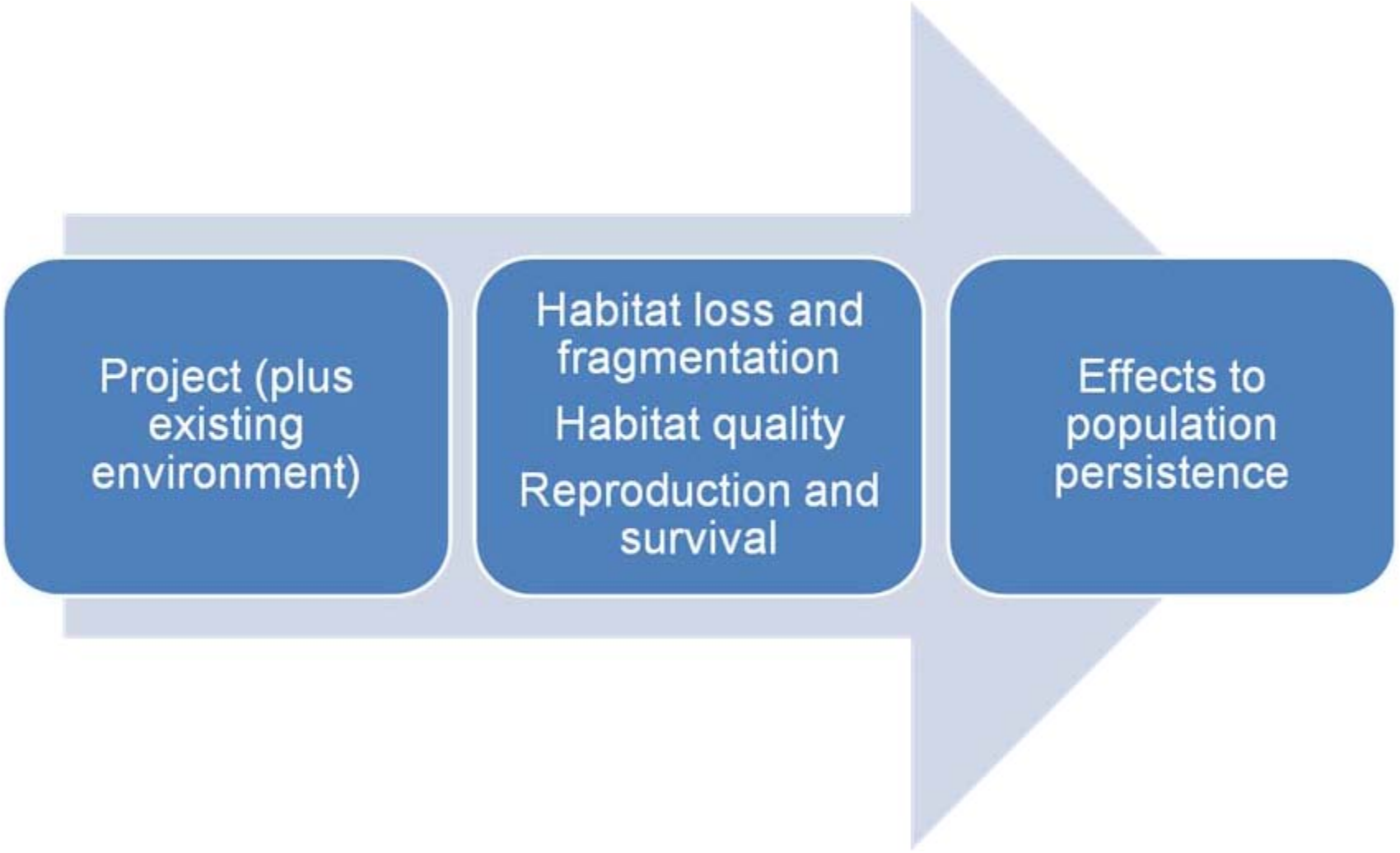
Study Area – Cumulative Effects

Migratory Tundra Caribou

- Study areas delineated for summer, northern migration, rut and winter range
- Based on GNWT collared caribou locations
- Kennady Lake within range of Bathurst, Beverly and Ahiak herds
- Largest overlap with Bathurst herd
- Land cover classification of Canada available



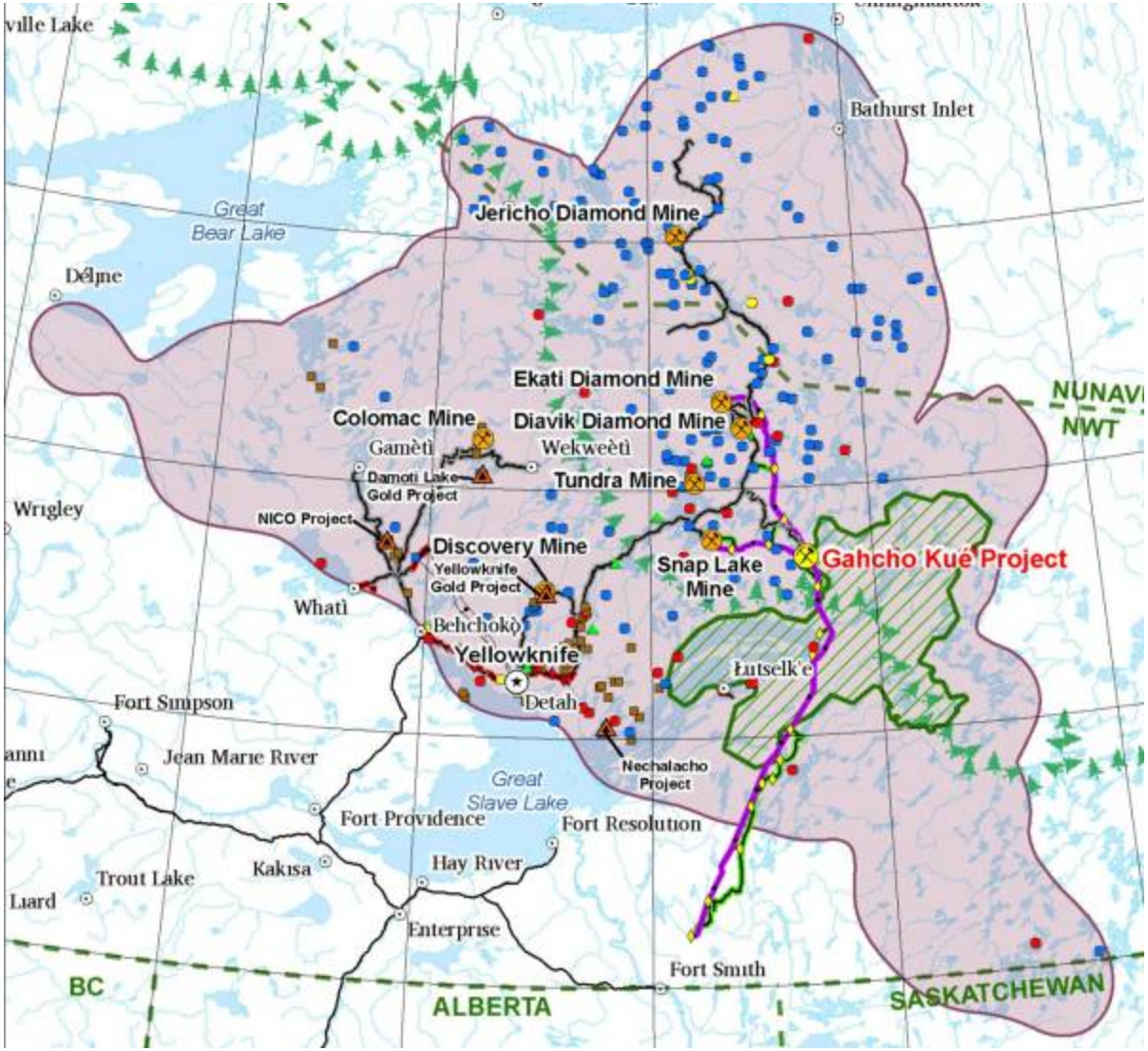
Conceptual Approach to Assessment



Methods Overview – Development Database

- Used to assess direct and indirect effects
- Includes previous, existing and foreseeable developments
- 16 types of developments
  - Footprint sizes vary
- Data sources: INAC, MVLWB, NRCAN, GNWT
  - Land-use permits

- *Footprint cover for annual home range of Bathurst caribou <1%*



Methods Overview – Habitat Change

- Key measurement endpoint for Values Components

- Habitat described using raster maps in GIS
  - large geographic areas are comprised of small cells (e.g., 200 x 200 m)
- Habitat described as a class (or type) on raster maps in GIS
  - Where raster cells are either esker, forest, heath tundra, etc.
- Also described as habitat suitability (or quality) using a model
  - Where raster 'cells' ranked 0 to 1
  - Habitat Suitability Indices (HSIs)
  - Resource Selection Functions (RSFs) $w(x) = \exp(B_1 x_1 + \ldots B_p x_p)$

- Direct changes to habitat calculated from development footprint
- Indirect changes calculated from a zone of influence (ZOI)
  - ZOIs applied to active developments only *(and for entire permit period)*

Methods Overview - Habitat Mapping

Example: reference **VS** application landscape for Muskoxen

Dark green colors are high-quality habitats
About 8% cumulative change

Methods Overview – Zone of Influence (ZOIs)

- Measures indirect effects from active developments
  - Can extend 1 to 15 km from active developments
  - Species-specific
  - Disturbance-specific
  - Describes avoidance where probability of animal occurrences are lower near footprint
  - Difficult to quantify (Polfus et al. 2011)

- How does it work in the assessment?
  - Reduces habitat quality by a disturbance coefficient (DC)
  - In this example:
    - Quality reduced from high to low-quality at 0 to 1 km
    - Quality reduced from high to good-quality at 1 to 5 km.

Terrestrial Workshop Outline

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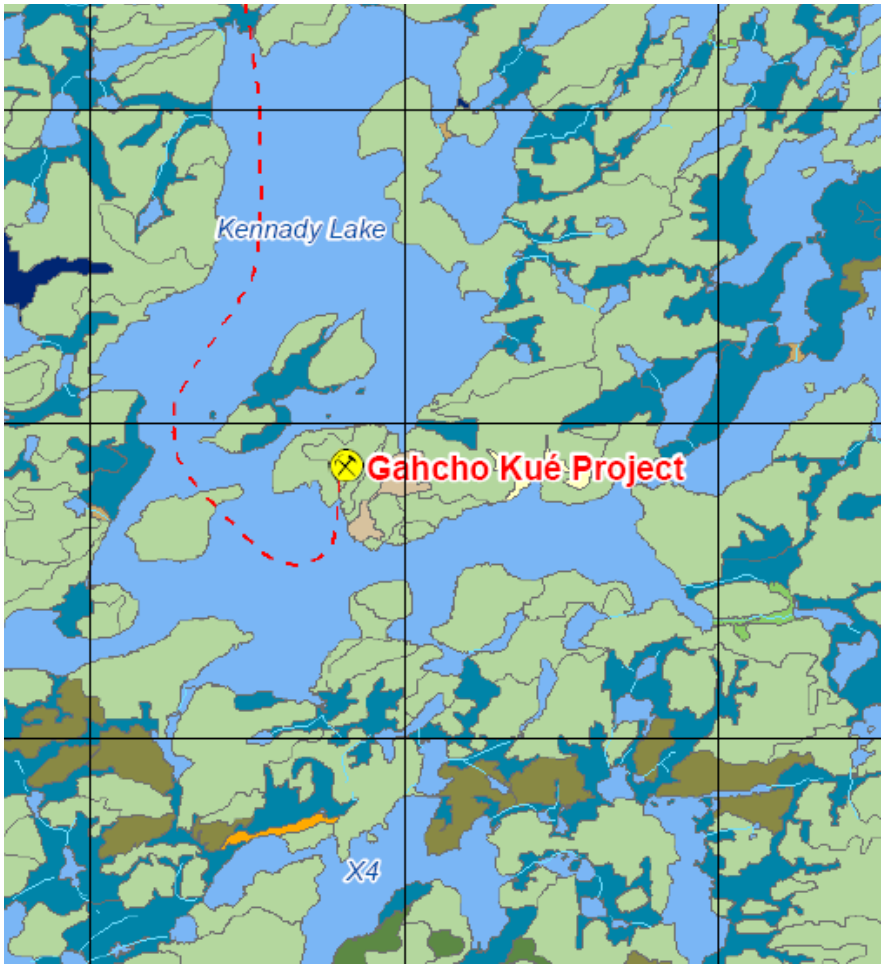
Gahcho Kué Project
SON: Vegetation (Section 11.7)

October 26, 2011

SON Vegetation - Baseline

- Completed terrain, soils and vegetation mapping for LSA, RSA, and Winter Access Road
- Surveys for rare plants and traditional use plants in 2004/2005

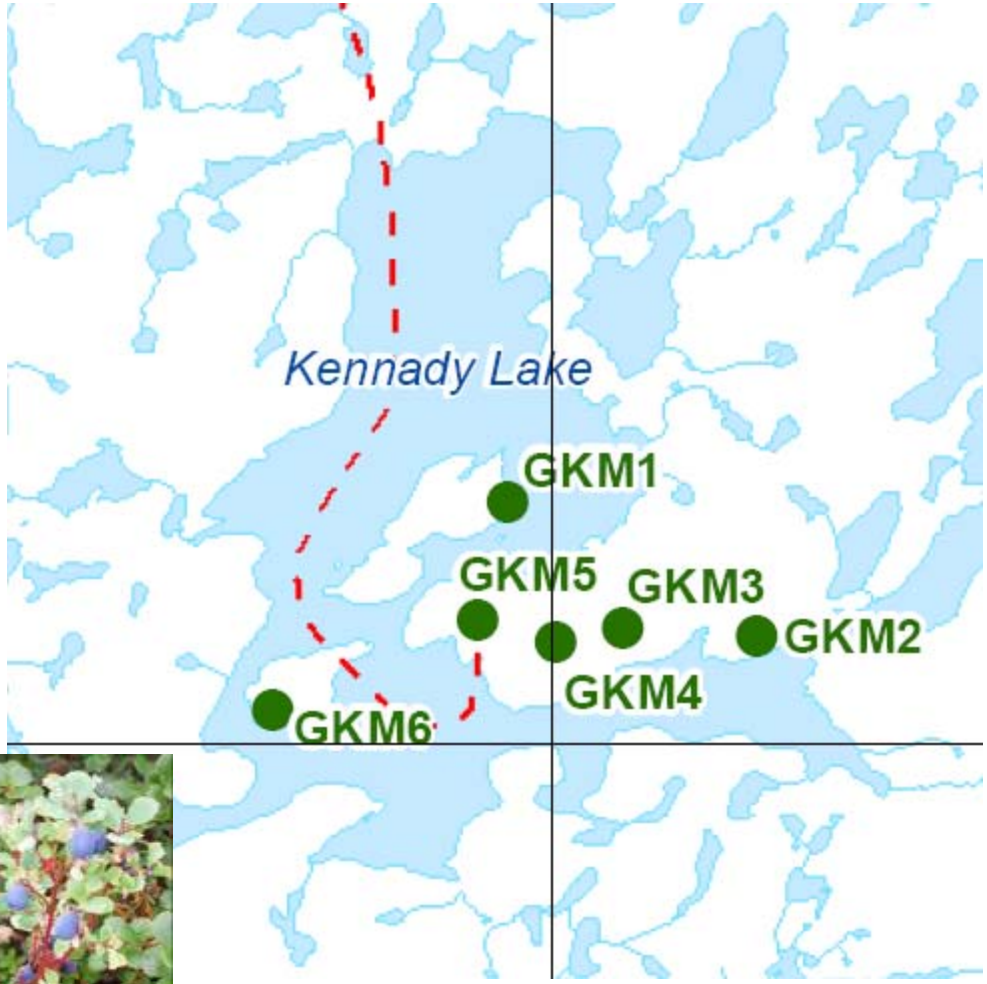
- LSA composed of
  - 37% upland
  - 33% wetland/riparian
  - 30% lakes
- RSA has similar composition
- 21 traditional-use plants recorded
  - Lutselk'e Dene First Nation
- No listed plant species detected
- Mapped rare plant habitat potential



SON Vegetation - Baseline

- Measured metal concentrations in soils and selected plants in LSA

- Considered a range of plant species that have:
  - broad occurrence in the area;
  - value for human and/or wildlife consumption; and
  - value as reclamation species.



SON Vegetation - Assessment

The Project should not result in significant adverse impacts to the persistence of vegetation ecosystems, listed plant species and use of traditional plants

About 32% of the Project footprint is terrestrial (392 ha)

- Where disturbed soils will be salvaged and stockpiled for reclamation
- Chemical properties of local soils not expected to change

- 2% of existing wetland and upland vegetation will be lost at LSA-scale
  - <1% will be lost at the RSA-scale
- <3% of vegetation ecosystems, which include traditional use plants, will be removed due to the Project within the LSA

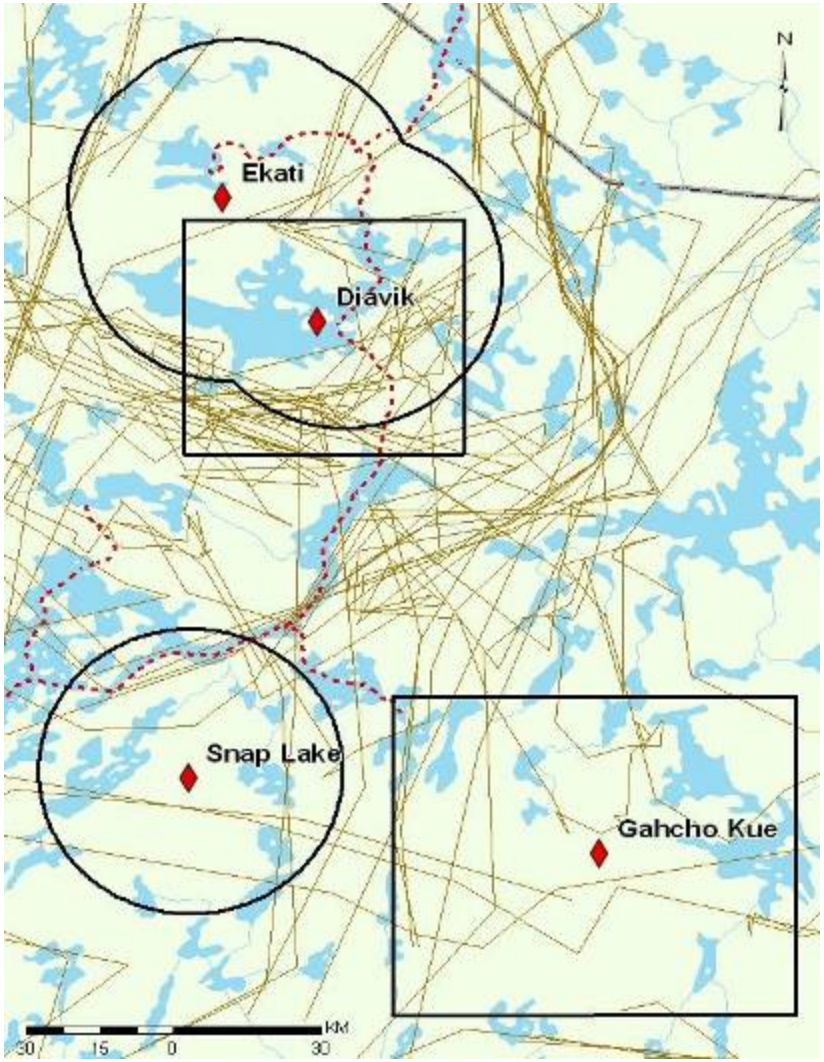
Gahcho Kué Project
KLOI: Caribou (Section 7)

October 26, 2011

KLOI Caribou - Baseline

- Aerial surveys in RSA, LSA, and along access road 1999 to 2005
- Mapped historical trails in RSA in summer 2010
- Aerial survey for snow tracks in 2011 northern migration
- Aerial surveys planned for autumn 2011

- Summarized GNWT collar data for 1996 to 2009 to determine seasonal ranges and describe movement patterns



KLOI Caribou – Direct Changes to Habitat Type

At the seasonal-range scale, cumulative direct disturbances of terrestrial habitat will be low (<2%) relative to a reference condition

Cumulative direct disturbance on area of each habitat type will be <1% per seasonal home range (Ahiak and Bathurst)

Approach:

- Per Season
  - N. migration, spring-summer, rut/autumn, and winter home ranges
- Applied Landcover Classification of Canada and FRAGSTATS
  - 12 habitat types (e.g., esker, heath tundra, forest).
- Applied footprints in development database plus Winter Access Road

KLOI Caribou – Changes to Habitat Quality

The combined changes from dust deposition, noise and other sensory disturbances is predicted to be within 15 km from the Project footprint (i.e., the ZOI)

The magnitude of cumulative declines in preferred habitat (from direct and indirect effects) across seasonal ranges is predicted to be low (ranging from 3 to 7% for Bathurst)

Approach:

- Mapped preferred habitat with RSF functions per season
  - Used equations in Johnson et al. (2005)
- Considered direct and indirect effects
  - Historical, existing and future footprints from database
  - Hypothetical disturbance coefficients (DCs) and ZOIs (up to 15 km)

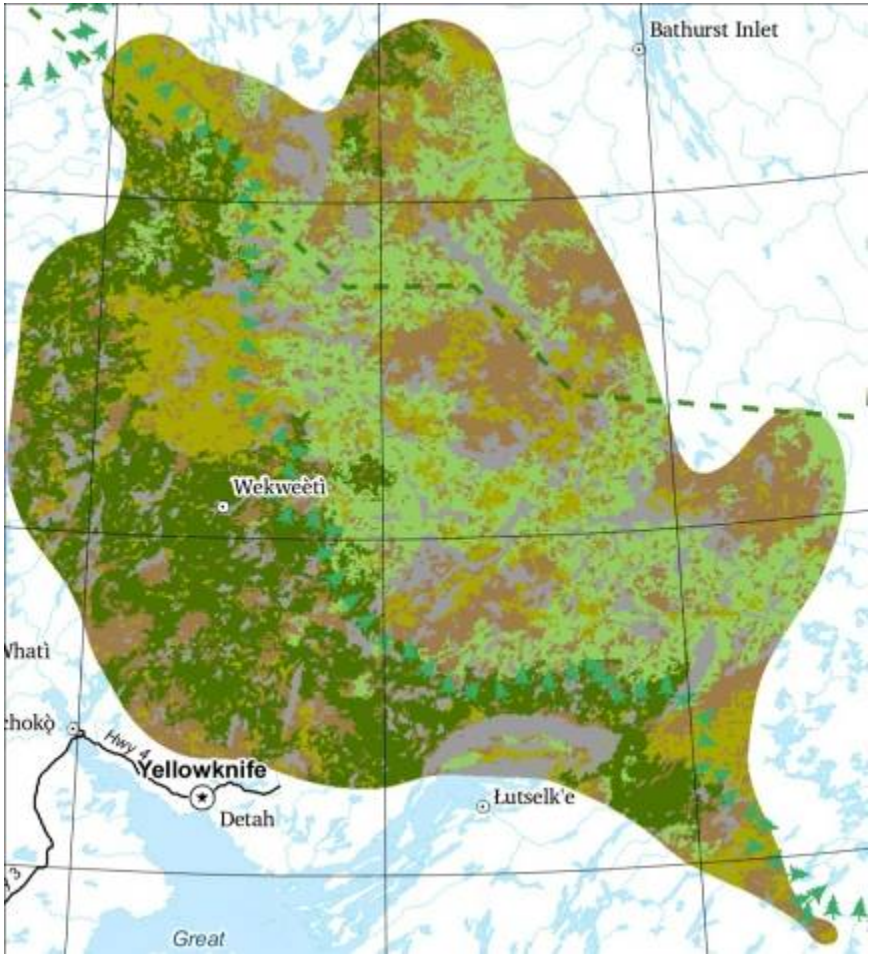
KLOI Caribou – Changes to Habitat Quality

- Largest decrease in preferred habitat in autumn/rut range
  - Incremental decreases from “2010 Baseline to Application” was <2%
  - Cumulative decreases from “Reference to Future” were <8%
    - Most losses occurred prior to 2006.

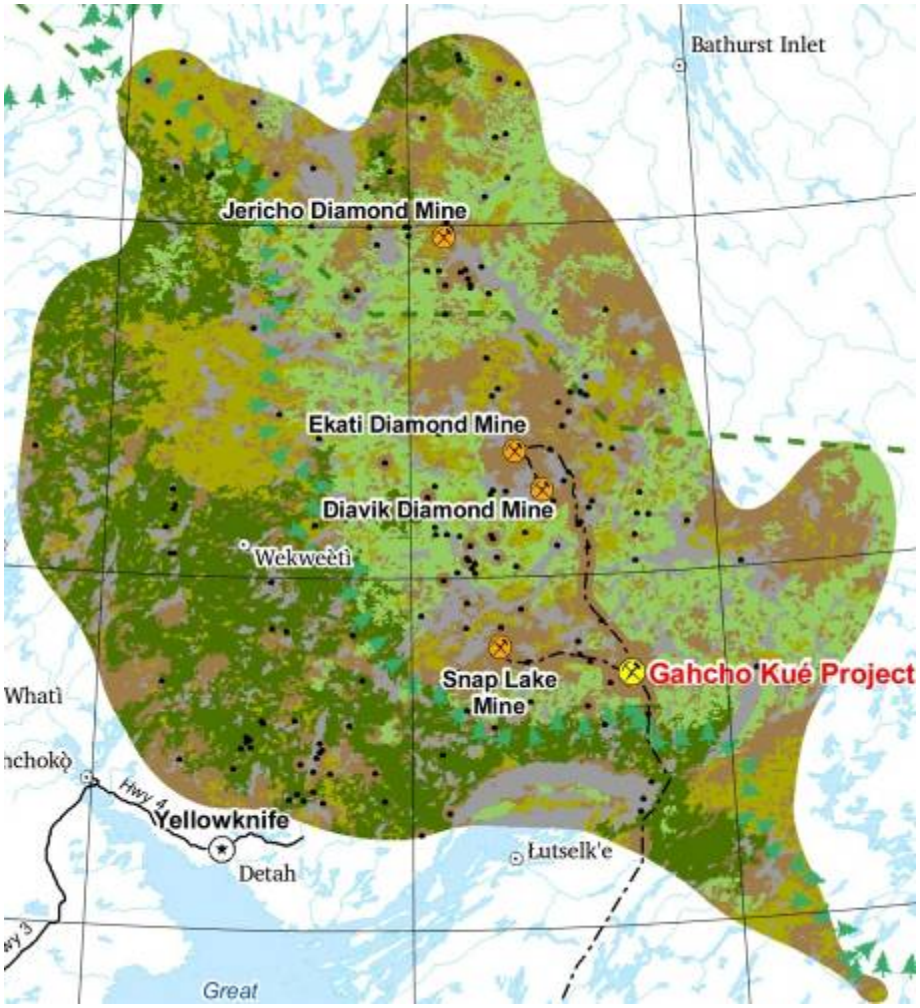
Habitat Quality	% Change Per Assessment Period					
	Reference to 2000	**2000 to 2006**	**2006 to 2010 Baseline**	**2010 Baseline to Appl.**	**Application to Future**	**Reference to Future**
High	-0.68	0.24	0.02	0.00	-0.03	-0.45
Good	-1.73	-4.93	3.29	-1.37	-2.03	-6.78
Low	-3.22	-2.23	1.49	-0.48	-1.72	-6.16
Poor	4.23	5.05	-3.22	1.33	2.55	9.94

KLOI Caribou – Autumn/Rut Habitat Maps

Historical Reference



Future Condition

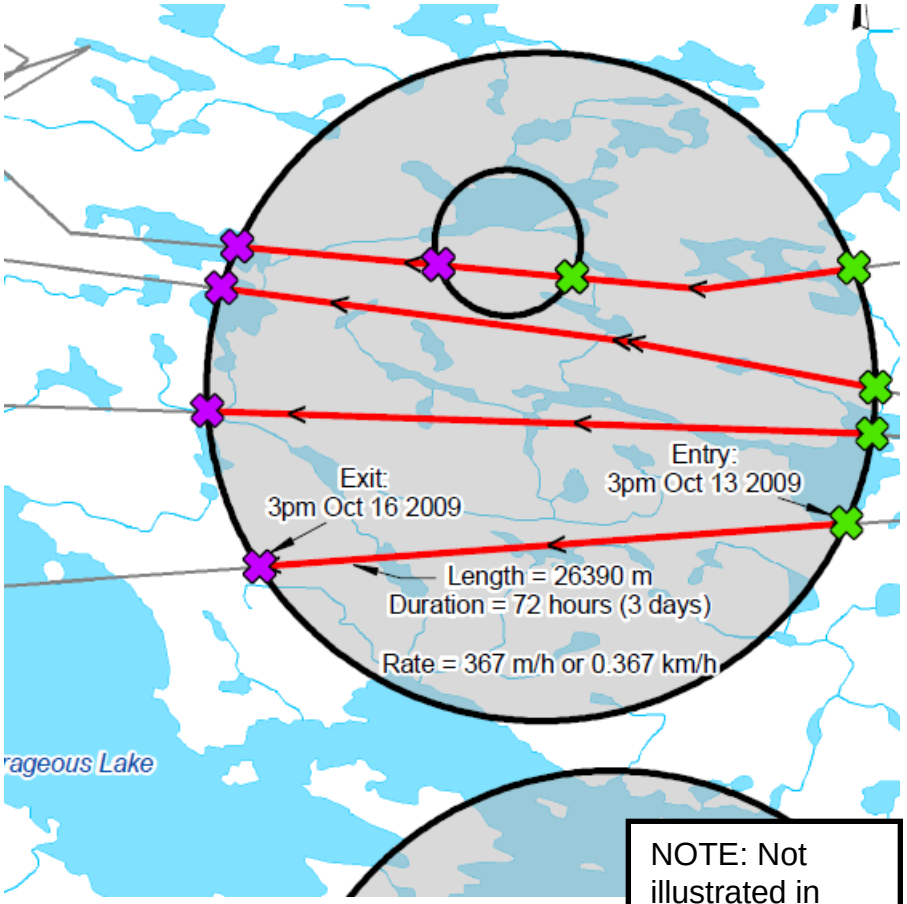


KLOI Caribou – Energetics Modelling

The magnitude of the cumulative decrease in fecundity (calf production) from the Project and other developments is predicted to be low (<3.1%)

Approach:

- Identified caribou paths
  - Used GNWT caribou data
  - 138-day exposure period
- Identified encounters with disturbance
  - ZOIs
- Calculated energy loss (Bradshaw et al. 1998; Weladji et al. 2003)
  - About 0.047 kg cost / disturbance
  - About 0.15 kg cost / days of potential insect harassment



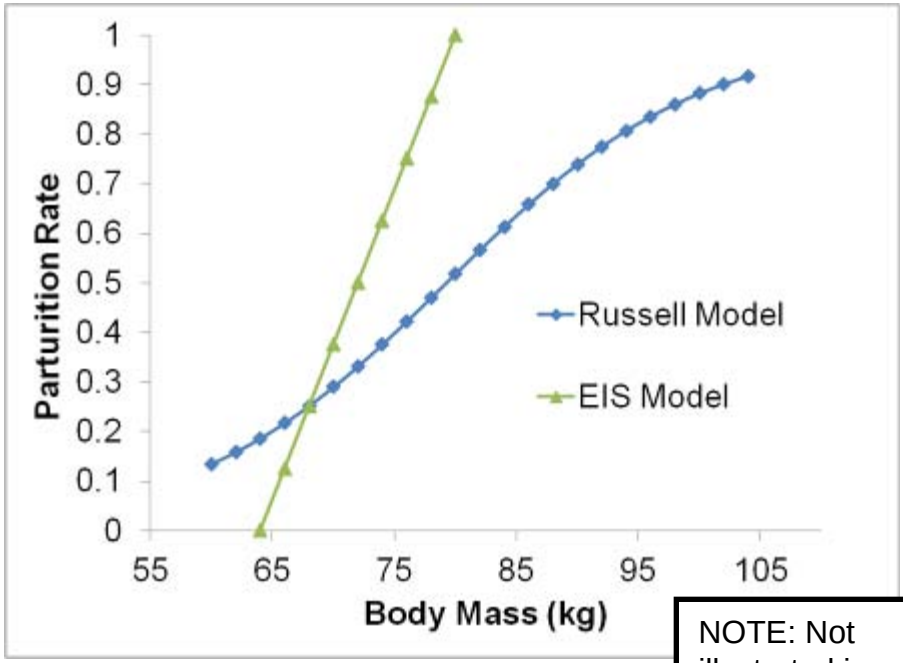
NOTE: Not illustrated in EIS

KLOI Caribou - Energy Modelling Results

- Bathurst cow may encounter up to 19 sensory disturbance events
  - May lose up to 0.5 kg (assumed strong response to most events)
- Cows may face up to 44 days of insects during the summer
  - May lose up to 6.6 kg during a high insect harassment year

Does weight loss affect reproduction?

- Implication of developments on parturition is minor.
  - Loss of 0.5 kg may decrease parturition rate by about 3%



NOTE: Not illustrated in EIS

KLOI Caribou - Population Viability Analysis

Incremental changes from the Project did not statistically influence the persistence of the Bathurst herd

Cumulative changes from the Project and other developments were statistically significant (moderate in magnitude)

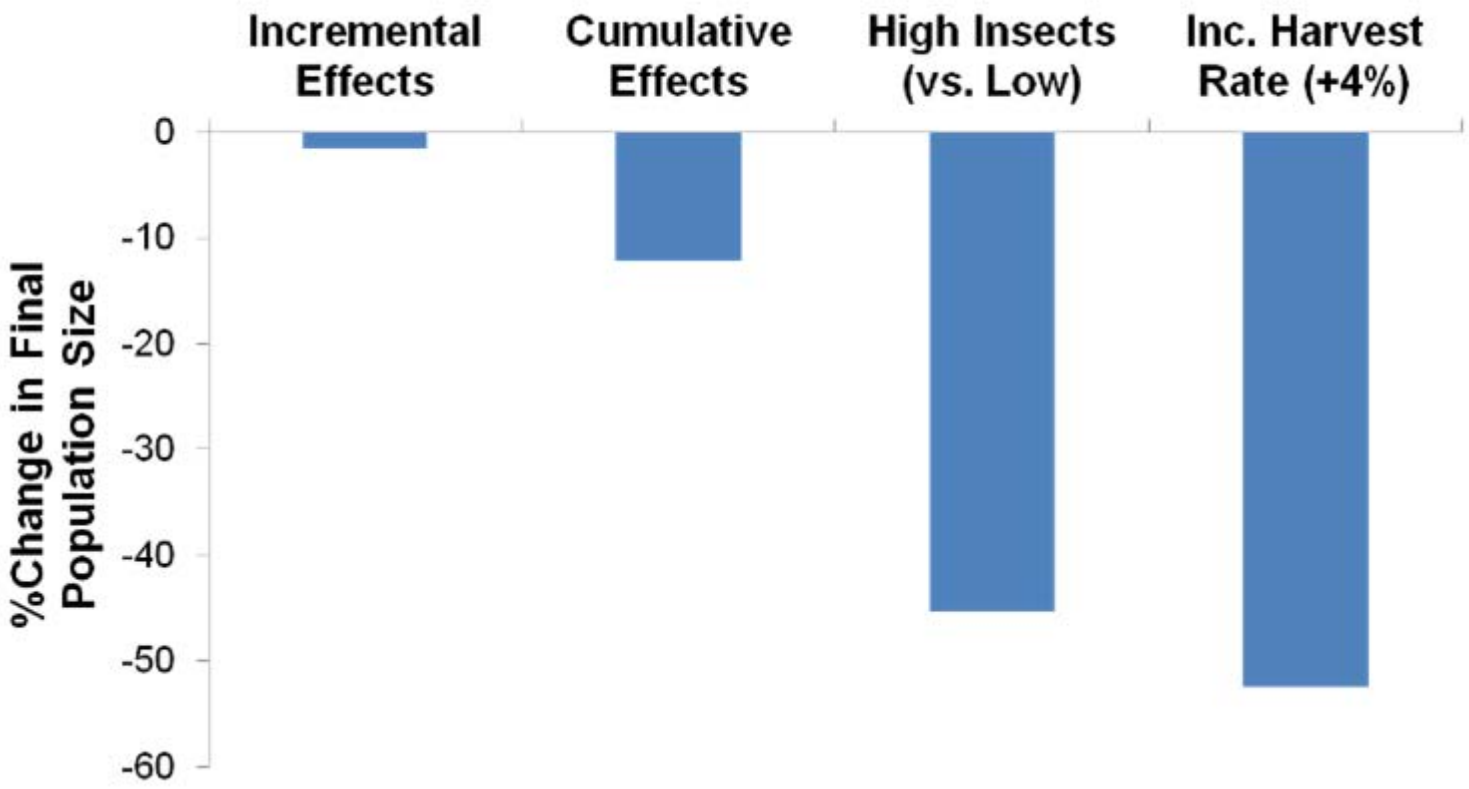
Population persistence most sensitive to changes in adult cow survival and harvest rate

PVA Approach:

- **Compared model outcomes, e.g., reference versus future condition**
- Incorporated results from habitat and energetic assessments
- Assessed relative contribution of natural and human-disturbances
- Used RAMAS software
- Measured using changes in final abundance and risk of decline (D-statistic)

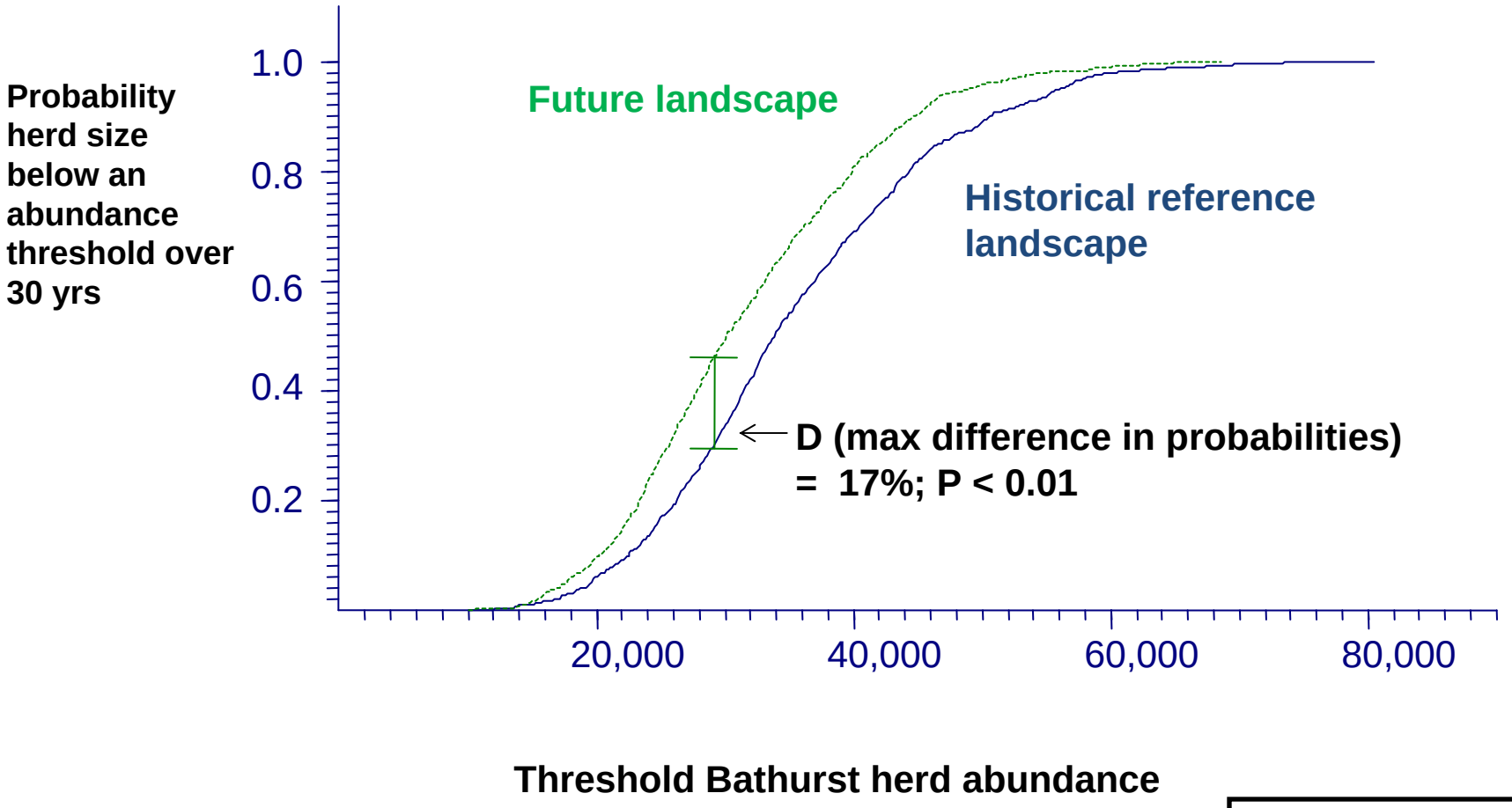
KLOI Caribou – PVA Results

Model output comparisons (based on 30-yr simulations)



NOTE: Not illustrated in EIS

KLOI Caribou – PVA Results



NOTE: Not illustrated in EIS

KLOI Caribou – Summary

Landscape will remain ‘intact’ and well below 40% habitat loss threshold where fragmentation effects occur for wildlife populations

- Reviewed in Swift and Hannon (2010)

The impacts from the Project should be reversible (except for the residual footprint, for example, the mine rock piles).

The Project and other developments should not have a significant adverse effect on the persistence of caribou populations.

Confidence in prediction is based on consistently low effect sizes from analyses, and the suite of conservatisms that were considered in models

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- SON: Carnivore Mortality
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- SON: Other Ungulates
- SON: Species at-risk and Birds
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Gahcho Kué Project

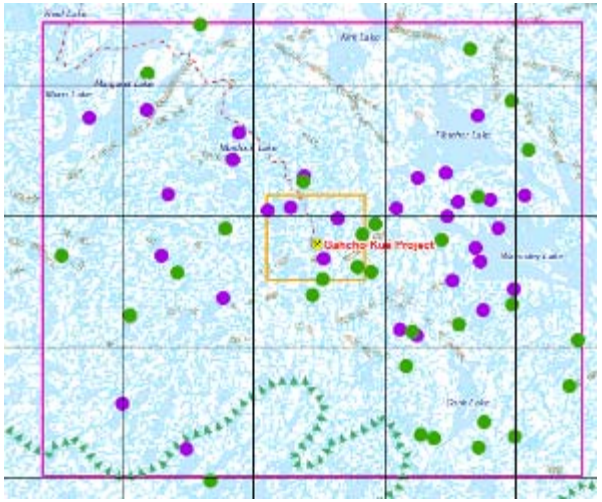
SON: Carnivore Mortality (Section 11.10)

October 26, 2011

SON Carnivore Mortality – Baseline

Grizzly Bear

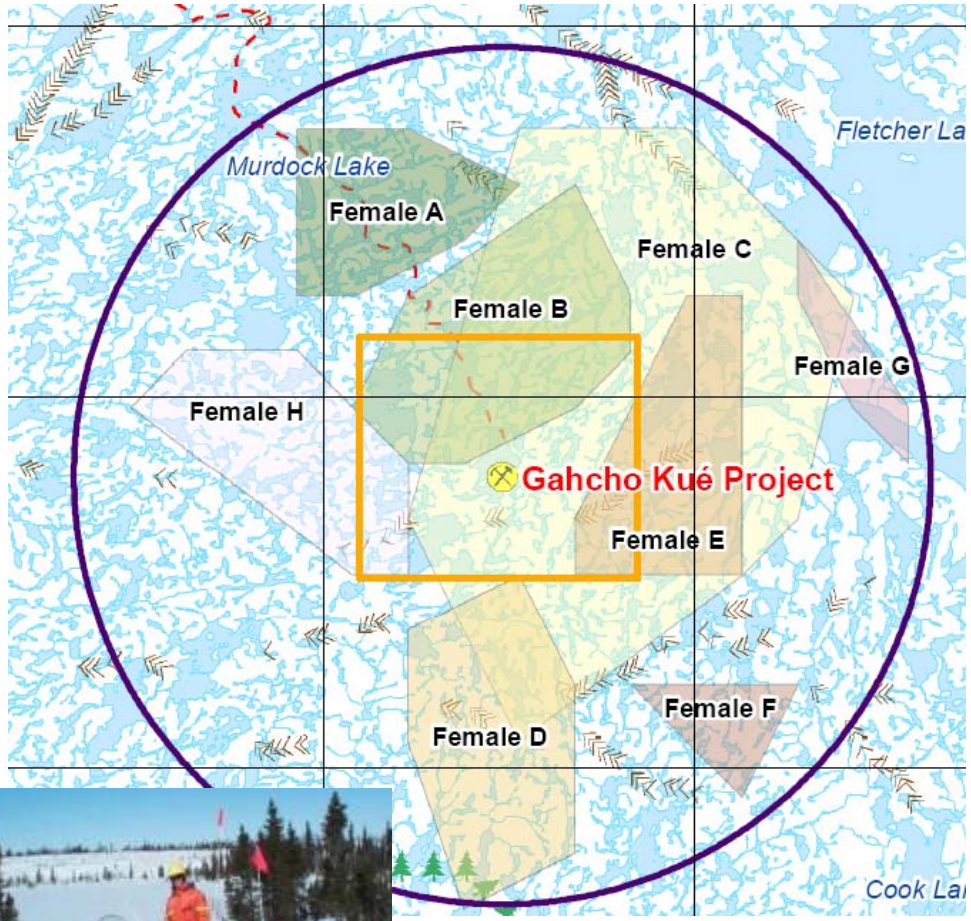
- Conducted surveys for bear sign in 2005 and 2007
- Eskers surveyed in 1998, 1999, 2001, 2004, and 2007
- 16 grizzly bears incidentally observed in 2004 and 2005
- Hair snagging (pilot) program completed in 2010 and 2011
  - Local knowledge and guidance from P. Enzoe



SON Carnivore Mortality – Baseline

Wolverine

- Hair snagging conducted in 2005 and 2006, 175 posts (1,600 km^2)
  - 17 animals identified in 2005 and 2006
- Surveys for snow tracks in 2004, 2005, 2010, 2011
  - Local knowledge and guidance from P. Enzoe
- Since 1999, 4 wolverine dens have been located



SON Carnivore Mortality – Assessment

Previous mining activities have led to carnivore mortality in the study region

- Examined long-term data for multiple mines in region
  - N = 54 mine years of data (1996 to 2009)
- 4 historical grizzly bear deaths, or 0.074 bears per mine/year
  - Very low risk
  - Potentially 1 bear mortality assuming 15-yr period
- 11 historical wolverine deaths, or 0.20 wolverine per mine/year
  - Potentially 3 wolverine mortalities assuming 15-yr period

- **Predictions are conservative**
  - the Project will implement waste management and wildlife mitigation procedures similar to that at the Snap Lake Mine

SON Carnivore Mortality – Grizzly Bear Habitat

Incremental decreases from indirect and direct changes to preferred habitat will be negligible (<1%)

Cumulative decreases to preferred habitat will be moderate (<13%)

- Largest effect observed for spring habitat
- Majority of losses on landscape occur prior to 2006

Spring Habitat Quality*	% Change 2010 Base. to Application	% Change Application to Future Scenario	Cumulative% Change Reference to Future
High (preferred)	0.00	-1.34	-7.31
Good (preferred)	-0.11	-1.19	-5.09
Low	-0.78	-1.15	-5.45
Poor	0.19	0.63	3.17
*Described using RSF equation in Johnson et al. (2005)			

SON Carnivore Mortality – Wolverine Habitat

Incremental decreases from indirect and direct changes to preferred habitat will be low (<2%)

Cumulative decreases to preferred habitat will be moderate (<19%)

- Largest change observed for winter season
- Large influence from Tibbitt-to-Contwoyoto Winter Road

Winter Habitat Quality*	% Change 2010 Base. to Application	% Change Application to Future Scenario	Cumulative% Change Reference to Future
High (preferred)	-0.38	-2.04	-10.42
Good (preferred)	-1.08	-0.76	-8.39
Low	-1.04	-1.16	-9.30
Poor	4.74	5.86	73.40
*Described using RSF equation in Johnson et al. (2005)			

SON Carnivore Mortality - Wolf Habitat

Incremental decreases from indirect and direct changes to preferred habitat will be negligible (<1%)

Cumulative decreases to preferred habitat will be moderate (11%)

- Majority of losses on landscape occurred prior to 2006

Spring-Autumn Quality*	% Change 2010 Base. to Application	% Change Application to Future Scenario	Cumulative% Change Reference to Future
High (preferred)	-0.70	-1.22	-5.59
Good (preferred)	-0.22	-1.22	-5.47
Low	-0.07	-2.14	-4.91
Poor	0.81	3.13	12.73
*Described using RSF equation in Johnson et al. (2005)			

Gahcho Kué Project
SON: Other Ungulates (Section 11.11)

October 26, 2011

SON Other Ungulates - Muskoxen and Moose

Incremental and cumulative losses of good and high-quality habitats of Moose and Muskoxen were low in magnitude

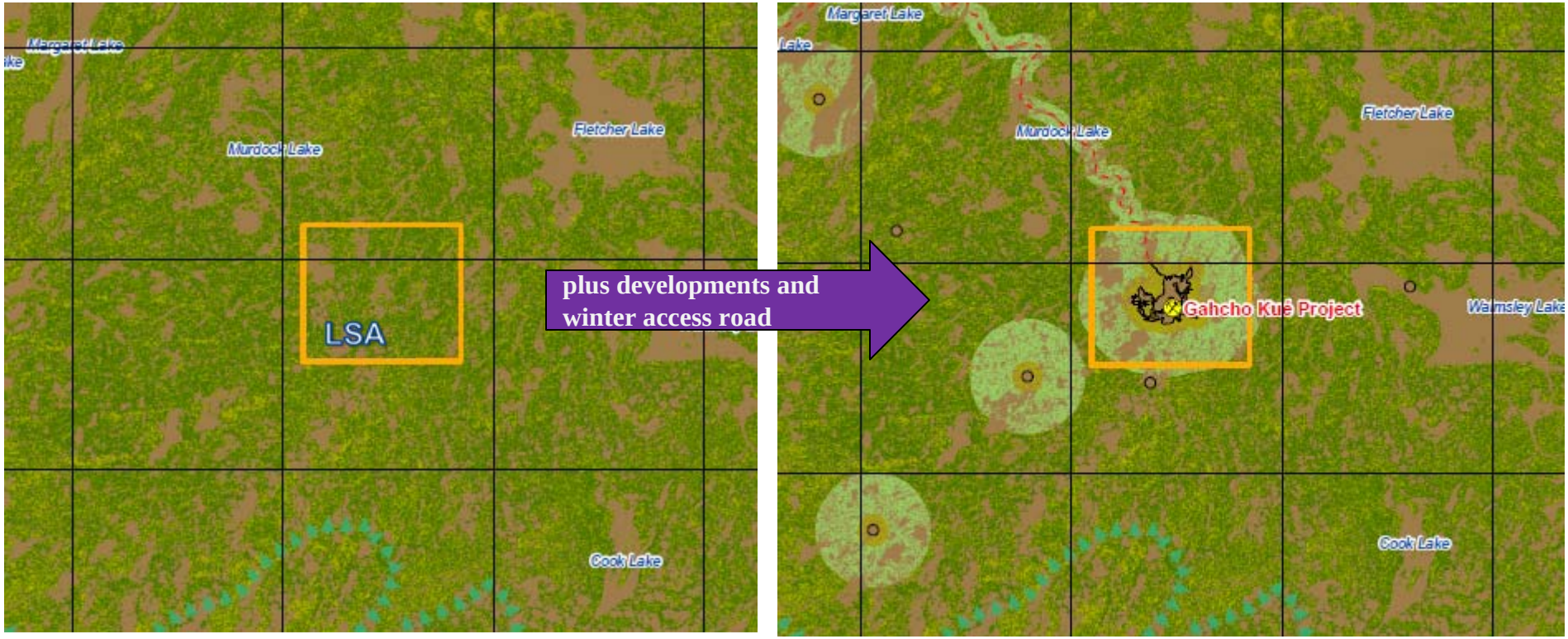
Changes from sensory disturbances are predicted to be within 5 km from the Project footprint (i.e., the ZOI)

- **Reviewed in Benitez-Lopez et al. (2010)**

- Applied Habitat Suitability Indices derived from scientific literature
  - RSA-scale assessment
  - Included species-specific ZOIs
  - Summer model for moose
    - Not in RSA during winter
    - No high-quality habitat in RSA
  - Winter model for muskoxen

SON Other Ungulates - Muskoxen Habitat

Reference **VS** application landscape for Muskoxen



Dark green colors are high-quality habitats
-1.1% incremental loss and -7.9% cumulative loss

Gahcho Kué Project

SON: Species at-Risk and Birds (11.12)

October 26, 2011

Wildlife Species At-Risk

- 6 species at risk have been observed
- Rusty blackbird may be at risk in the NWT, others are sensitive or secure

Common Name	COSEWIC Status	SARA Status	NWT Status
grizzly bear	special concern	no schedule	sensitive
wolverine	special concern	no schedule	sensitive
peregrine falcon	special concern	no schedule	sensitive
short-eared owl	special concern	schedule 3	sensitive
rusty blackbird	special concern	schedule 1	may be at risk
horned grebe	special concern	no schedule	secure

SON Species at-Risk and Birds – Baseline

- Upland birds
  - 25 hectare plots surveyed in 2004 and 2005 (20 plots surveyed in total)
  - 28 species of songbird, shorebird and ptarmigan detected
- Water birds
  - Surveyed lake perimeters and wetlands in LSA in 2004
  - 22 species observed
  - Kennady Lake and Lake X6 surveyed in spring 2010 and 2011
- Raptors
  - Surveyed known nest sites and highly suitable habitat from 1998 to 2005
  - 4 gyrfalcon and 11 peregrine falcon nests identified in RSA
  - short-eared owl, northern harrier, rough-legged hawk, golden eagle, bald eagle also observed
  - Surveys in 2010 and 2011

SON Species at-Risk and Birds – Assessment

Relative to 2010 baseline conditions, direct and indirect changes from the Project are expected to reduce the amount of suitable habitat for birds in the RSA by <1.0% (negligible in magnitude)

Cumulative changes are expected to decrease suitable habitat for birds in the RSA by <2.6% relative to reference conditions (low in magnitude)

Habitat Quality Modeling:

- Estimated upland bird densities per habitat type (using baseline data)
- Developed habitat suitability index (HSI) for water birds
- Developed RSF for raptor nest habitat (using baseline data)
- Mapped habitat quality across RSA
- Applied disturbance coefficients and ZOIs to active developments

SON Species at-Risk and Birds – Water Birds Results

A habitat suitability index identified key habitats (for waterfowl, grebes, etc.) as shallow/deep water, and sedge wetlands (about 36% of RSA).

– Incremental changes are expected to (directly and indirectly) decrease suitable habitat by <1%

– Cumulative changes are expected to decrease suitable habitat by 1.4% relative to reference.

Habitat Suitability Category	Reference (ha)	% Change Reference to 2010 Baseline	% Change 2010 to Application	% Change Application to Future	Cumulative % Change Reference to Future
High	108,287	-0.11	-0.17	-0.80	-1.08
Good	28,109	-0.03	-0.05	-0.26	-0.34
Low	14,755	0.12	0.11	1.04	1.27
Poor	417,393	0.03	0.12	0.02	0.16

SON Species at-Risk and Birds – Raptor RSF Results

An RSF identified preferred nesting habitat as areas of high slope and elevation (e.g., steep cliffs), which are uncommon in the RSA

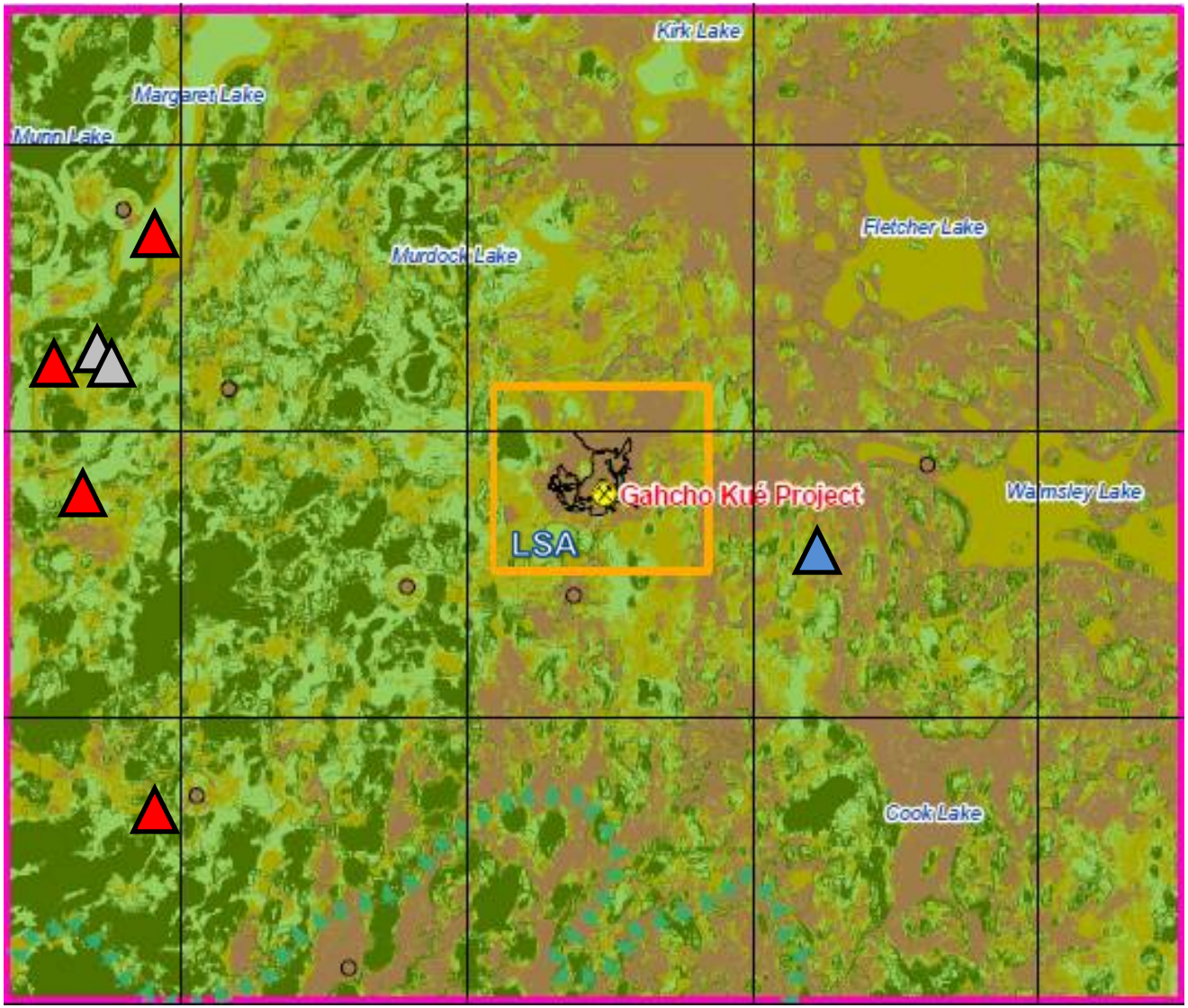
– Incremental changes are expected to (directly and indirectly) decrease suitable habitat by <1%

– Cumulative changes are expected to decrease suitable habitat by 1.6% relative to reference.

Habitat Category	% Change Reference to 2010 Baseline	% Change 2010 to Application	% Change Application to Future	Cumulative % Change Reference to Future
High	-0.24	-0.05	-0.75	-1.04
Good	0.00	-0.09	-0.49	-0.58
Low	0.09	-0.40	-0.01	-0.32
Poor	0.16	0.54	1.25	1.94

SON Species at-Risk and Birds – Raptor RSF Map (Application) in RSA

- Best habitats (e.g., cliffs) west of LSA
- See application map where dark green colors are higher-quality habitats
- Active nest locations are >16 km from site (see triangles)
  - Red = peregrine
  - Grey = gyrfalcon
  - Blue = short-eared owl



Terrestrial Assessment Summary

To meet the Terms of Reference and as part of assessing incremental and cumulative effects, the EIS used multiple approaches for making impact predictions

The EIS integrated uncertainty and ecological conservatisms throughout the assessment so impacts would not be worse than predicted

The weight of evidence from the analysis of the primary pathways predicts that the incremental impacts from the Project and cumulative impacts from the Project and other developments will not have a significant negative influence on the resilience and persistence of terrestrial VCs

De Beers
CANADA

Questions

October 26, 2011