

Bathurst Inlet Port and Road Project

Presentation
to the
Nunavut
Mineral Development Advisory Group
January 23, 2001
Vancouver B.C.

Introduction

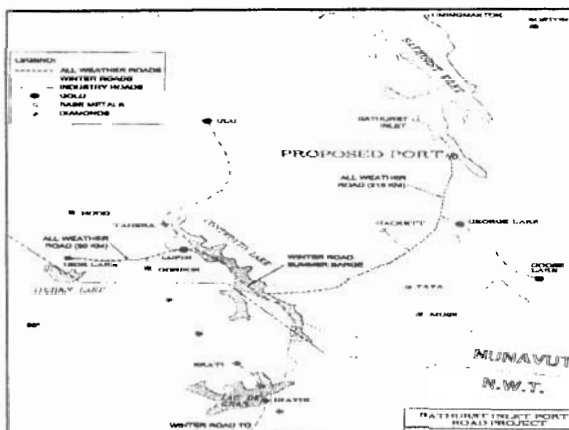
- The Slave Geological Province (SGP) is rich in mineral resources. About 40% of the SGP is in Nunavut (Kitikmeot).
- Full potential of SGP has not been developed because of a lack of transportation infrastructure.
- The only road access is by winter road from Yellowknife to Lupin Mine (630km).
- An arctic sea port and connecting roads would lead to significant growth in the area.

Infrastructure Solution

- Preliminary studies indicate the best option is a port on Bathurst Inlet and all-weather road to the Izok mineral deposit.
- Project built and operated by a partnership of Inuit, industry and government.
- The port and road would provide revenues from user fees or tolls.
- This infrastructure is part of the Nunavut "Transportation Strategy" Vision.
- Strong support from Kitikmeot Inuit Association and Kitikmeot Corporation.

The Project

- A port site on Bathurst Inlet, capable of handling 50,000 tonne OBO vessels.
- Facilities at the port for receiving, storing and shipping of base metal concentrates; fuel storage; bulk supply storage.
- All weather road to Contwoyto Lake (210km)
- Winter ice road and summer barge on Contwoyto Lake.
- All weather road - Lupin to Izok (80km). Izok is the major customer for the project.



Project Benefits

- Reduced capital and operating costs for mining exploration and development.
- Increased exploration activity
- Reduction in cost of fuel and supplies for the Kitikmeot communities.
- Significant increase in local employment
- Increased economic activity and taxation revenues in Nunavut.

Port Location

- Bathurst Inlet was selected over a Coronation Gulf site as the best location for the port :
 - lower capital and operating costs for the all weather road from Izok to the coast.
 - potential to service more mineral deposits and prospects.
 - the Coronation Gulf site would require another road to access mineral deposits

Project Phases

- Phase 1 - Scoping Studies - completed.
- Phase 2 - Feasibility Study and Environmental baseline, socio-economic, Traditional Knowledge, archaeology studies - in progress.
- Phase 3 - Environmental assessment and permitting process.
- Phase 4 - Construction.
- Phase 5 - Operation.

Project Schedule

	2001	2002	2003	2004	2005	2006
Feasibility Study						
Env. Baseline						
EA/Permitting						
Construction						
Operation						

Feasibility Study

- *Feasibility study* - a "bankable" study is required for project financing and is being carried out by Nishi-Khon / SNC-Lavalin Limited. Study will be complete in February.

Sub-contractors are:

- Kitikmeot Geosciences Ltd.
- Mollard and Associates.
- Geographic Air Surveys Ltd.
- McElhanney Associates.

Feasibility Study

- Analysis of port and road users.
- Site selection for the port site.
- Route selection for the all weather road.
- Dock site selection and route selection for the Contwoyto Lake barge.
- Brief review of environmental effects and mitigation methods, including abandonment and reclamation.
- Capital and operating costs for the project.
- Economic analysis of the project, including estimates of tariffs and user fees.
- Review of financing options.
- Analysis of labour resources and employment.

Port and Road Users

Potential users (existing)

- Lupin, Diavik, Ekati
- Nunavut communities
 - Cambridge Bay
 - Kugluktuk
 - Gjoa Haven
 - Taloyoak

Possible users (future)

- Izok
- Jericho
- George Lake, Goose Lake, Hope Bay
- Hackett River, Gondor

Bathurst Inlet Port

- Wharf suitable for handling 50,000 tonne vessels and ocean going barges;
- Fully enclosed concentrate receiving, storage and ship loading facilities owned by mine operator (Inmet);
- Lay down and container storage areas;
- Vessel unloading/loading equipment;
- 220 million liter fuel storage tank farm, barge and truck loading facilities;
- Accommodation, maintenance shops, airstrip and site services;

2nd from capital cost



Port Site Selection

- Starboard vessel approach from seaward with ample room for vessel turning/docking without tug assistance;
- Closed cell, sheet pile wharf in filled with crushed rock. Construction technique proven for the arctic;
- 13.5 m water depth close to shore, with steep drop-off;
- Marine geotechnical conditions were determined by drilling off the ice in May 2001. Bottom sediments are soft clays approx 15 m thick to bedrock;
- Rock foundations for major shore side structures;
- Local source of construction materials (eskers, rock outcroppings/quarry), keep haul distances under 10 km;
- Airstrip located on esker at south end of peninsula;
- Room for future expansion;

Shipping & Barging Distances

- Bathurst Inlet to Hay River - 2500 km
- Bathurst Inlet to Europe - 7200 km
- Barge routes to Nunavut Communities and Mines:
 - Gjoa Haven - 340 km
 - Cambridge Bay - 400 km
 - Kugluktuk - 440 km
 - Taloyoak - 960 km
 - Hope Bay - 180 km

Annual Shipping Volumes

Annual averages for first 10 years:

- Fuel 175,000 tonnes
 - Mines 157,000 tonnes
 - Communities 18,000 tonnes
- Supplies 42,000 tonnes
- Concentrates 339,000 tonnes

Shipping

- Ocean barge and tug to Kitikmeot communities;
- Normal shipping season during open ice period, mid-July to mid/late October (similar to existing shipping at Polaris and Nanisivik Mines);
- Majority of concentrate shipping will be via eastern route to Europe.

All-weather Road

- Bathurst Inlet to Contwoyto Lake - 210 km
- Lupin Mine barge terminal site to Izok - 79 km
- Road connections to mines from the all-weather road:
 - Ekati - 98 km (existing ice road)
 - Diavik - 127 km (existing ice road)
 - Jencho - 28 km
 - Gondor - 10 km
 - Hackett River - 25 km
 - George Lake - 19 km
 - Goose Lake - 55 km

Road Route Selection

- Three routes assessed using existing topo maps and aerial photos.
- Selected corridor flown at 1:15,000, 3.5 km wide, orthomosaic at 1:10,000 produced for use by engineering and environmental studies.
- Locate close to known and potential mines to maximize potential use.
- Select shortest route to reduce construction and trucking costs.
- Maximize route on bedrock and avoid poorly drained areas; follow smooth terrain, minimize road cuts.
- Minimize water crossings (rivers, creeks, fish bearing streams). Only 3 major river crossings (Amagog Creek, Mara River, Iichen Narrows).
- Source local construction materials (eskers, rock outcroppings/quarry), keep haul distances under 7 km.
- Maintain road embankment fills to average 1.6 m.
- Avoid environmentally sensitive and cultural/h heritage use area.

Road Criteria

- 70 km/hr all-weather road;
- 90 tonne design vehicle (55 tonne on ice roads);
- 8 m gravel running surface with 12 m wide turnouts every km and at bridges and stream crossings;
- 32 modular single lane steel bridges, 6 arch culverts and 76 rock fords in non-fish bearing creeks;
- 1.0 to 1.8 m rock fill road embankment;
- Construction quantities
 - Bathurst Inlet to Contwoyto lake - 4.6 million m³
 - Lupin to Izok lake - 1.6 million m³
- 30 km/hr ice road connecting Lupin to Bathurst inlet roadway along Contwoyto lake;

Contwoyto Lake Barge

- 69 km long barge route with minimum 5 m depth determined by soundings off ice in 2001;
- Tug and barge to carry 10 - 90 tonne trailers at 20 km/hr;
- 90 day ice-free period;
- Vessel unloading/loading mobile equipment;
- Trailer parking and barge wintering lay down area;
- Accommodation, spill response, barge fuelling, maintenance shop, airstrip and site services.
- Lupin and South Contwoyto rock fill barge ramps;

Land Ownership

- Inuit Owned Lands, total of 4,500 ha.
 - 142 km of road plus associated quarry sites.
 - South barge dock site on Contwoyto Lake.
- Crown Land, total of 4,600 ha.
 - Bathurst Inlet port site.
 - 148 km of road and associated quarry sites.
- Lupin Mine.
 - 12 km of existing roads, plus the north barge dock site.

Operating Seasons

- Shipping: normal "open water" season, mid July to mid/late October.
- Road operation:
 - Winter, January 31 to April 30.
 - Summer, July 15 to October 15.

(Note: based on Contwoyto Lake ice road and barge shipping seasons).

Capital Cost

	\$(Millions)
Bathurst Inlet Port	49
Bathurst to Contwoyto Lake Road - 210 km	83
Lupin to Izok Road - 80 km	29
Sub-total	\$161 million
Bathurst Inlet Fuel Storage	49
Contwoyto Barge sites	4
Total	\$ 214 million

*direct and indirect costs included

*includes royalties on borrow (approx. \$8.3 million)

Revenue

■ Tariffs/User Fees.

Road (travel over road network)

- Fuel @ \$ per tonne - km. (1 tonne fuel = 1,200 litres)
- Operating supplies/concentrates @ \$ per tonne -km.

Barge on Contwoyto Lake

- Rates \$ per tonne.

Port (handling and storage)

- Fuel @ \$ per tonne (\$ per litre).
- Operating supplies/concentrates @ \$ per tonne.

(The capital and operating costs for the project will be recovered through tariffs paid by the system users.)

Potential Employment Opportunities

■ Operation (average)

- Administrative 6
- Operation & Maintenance 72
- Trucking (contract to mining companies) 150

■ Construction (peak)

- Administration & Supervision 35
- Labour & Equipment Operators 265

Heritage Resources

- **Heritage resources** - the archaeology studies are being carried out by Fedirchuk McCullough & Associates.

Two field assistants were hired from Bathurst Inlet and Contwoyto lake.

Archaeology - Field Results

- Inventory – 100 archaeological sites

■ Site Types

- 5 precontact campsites
- 60 precontact artifact scatters
- 15 precontact isolated finds
- 5 stone features
- 7 historic/traditional sites
- 8 mixed types

Field Results continued.

■ Site Nature

- Majority are single component
- Few are multicomponent containing both precontact and historic/traditional remains
- Detailed assessment is required to determine whether the precontact scatters/campsites reflect more than one occupation

■ Site Values

- Based on scientific potential and perceived value to traditional residents as a monument to 'presence on the land'
- No further concern – isolated finds
- Mitigation (avoidance/further work)

Preliminary Recommendations.

- Avoidance or further study is recommended at 22 of the 100 inventoried sites if they are in conflict with proposed road construction or borrow extraction areas.
- Verification of the 22 sites relative to the final borrow requirements.
- Other sites, although not in conflict with proposed construction or borrow activities, may be impacted as a result of the provision of access into currently inaccessible areas.

Future Work - 2002

- **Impact Assessment**
 - Reroutes, additional or different borrow sources, additional facilities, etc.
- **Mitigation**
 - Sites that cannot be avoided
 - Sites identified as having scientific potential and value to traditional residents
 - Controlled collection and excavation; detailed mapping of structures/features; analysis and reporting requirements
 - Deposition of artifacts/records as per instruction of the Culture and Heritage Division

Environmental Baseline Studies

- Environmental baseline studies are being carried out by Rescan Environmental Services Ltd :
Sub-contractors:
 - Geowest Environmental Consultants
 - Kugluktuk Hunters and Trappers Ass'n.
 - New Economic Development Group

Environmental Studies

- Studies underway 2001:
- Vegetation/terrain/ecosystem classification
 - Geology/ARD
 - Fresh water environment
 - Marine environment
 - Wildlife (continues into 2002)
 - Atmospheric (to 200)
 - Community consultation
 - Socio-economic studies
- Studies to begin 2002:
- Traditional Knowledge
 - Marine mammals
 - Waterfowl, birds, raptors
- Total person field days in 2001 were 427, of which 226 were Inuit field assistants.

Reporting of Baseline Studies

- | | |
|--|------------|
| ■ Interim Wildlife | Jan 28/02 |
| ■ Fresh Water | Feb 15/02 |
| ■ Marine Water | Mar 15/02 |
| ■ Terrestrial (vegetation/terrain/geology) | Mar 31/02 |
| ■ Socio-economic | April 2002 |
| ■ Traditional Knowledge | Sept 2002 |
| ■ Final Wildlife | Sept 2002 |
| ■ Atmospheric | Sept 2002 |

Freshwater Environment - Streams

- 1) Fish and fish habitat.
- Reconnaissance survey (165 crossings).
 - Field assessment (75 crossings).
 - Fish assessment (electro-shocking)
 - Fish habitat assessment - 200m section surveyed for physical characteristics, water characteristics and photographed.
- 2) Aquatic Ecology.
- 9 selected streams.
 - Water/sediment
 - Benthic invertebrates and periphyton

Contwoyto Lake

1) Fish and fish habitat.

- Fish community and habitat assessment at the proposed barge dock sites.

2) Aquatic Ecology.

- Water and sediment at the south and north discharge.
- Physical parameters, water, sediment, zooplankton, benthic invertebrates and periphyton at the proposed barge dock sites and at a point near the centre of the lake.

3) Bathymetry.

- Bathymetry at the proposed dock sites.

Marine Environment

■ Physical Oceanography.

Temperature, oxygen, conductivity, water quality, sediment quality.

■ Biological Oceanography.

Phytoplankton, zooplankton

■ Fish

Gillnets, beach seines, lines and minnow traps.

■ Fish Habitat.

Aerial survey and ground survey.

Wildlife Studies

■ Terrestrial.

- Caribou, muskoxen, grizzly bears, wolves, foxes, raptors, waterfowl, songbirds, small mammals.
- Large mammal aerial surveys along the road alignment.
- Esker and den surveys - analysis of den sites.
- Small mammal trapping.

■ Marine.

Ringed seals.

Atmospheric Studies

■ Weather station.

- Tower installed on a hill above the port site, with solar panel and datalogger.

- Instruments:

temperature and humidity probe
wind sensor
tipping rain gauge
pyranometer (solar radiation)
sonic ranger (snowpack depth)

Bedrock Geology/ARD Studies

- Mapping bedrock outcrops within the road corridor. Identification of mineralized areas and carving stone deposits.

- 38 samples taken for acid base accounting analysis.

Surficial Geology/Soils and Landforms

- 160 plots established.

Information collected on parent materials, texture, surface expression, modifying processes, percent slope, drainage.

Vegetation and Terrain Analysis

- **Vegetation Surveys.**

740 plots completed

Information collected, vegetation types, percent cover for each species, slope, aspect, moisture regime, nutrient regime, percent substrate cover, terrain texture, drainage.

Traditional Knowledge Program

- Fully utilize existing Traditional Knowledge studies
- Extract information that is relevant for the Project Area
- Summarize in a report and use in baseline studies, interpreting data, and evaluating the environmental and socioeconomic impact of Project

Existing Traditional Knowledge Studies

- NTKP - whole project area, covers a wide variety of topics such as, transportation routes, harvesting, cultural resources, wildlife and fish.
- TNP - "caribou and calves", covers the calving grounds of the Bathurst Caribou herd.

Socio-Economic Study

Scope

- Profile baseline conditions in the four affected communities (e.g., demographics, employment and income, education, training and employment skills, etc.)
- Develop a Human Resource Development Plan
- Develop a Health and Safety Plan

Methodology

- detailed literature search
- questionnaire to survey residents
- visits to communities
- interviews

Community Consultations

- Kugluktuk. January 14/02; two meetings, one with council and the other with the public. Over 70 people attended.
- Bathurst Inlet. January 15/02; meeting with the BI residents in Cambridge Bay for the meeting, 14 attended.
- Cambridge Bay. January 15/02; public meeting, over 80 people attended.
- Taloyoak, Gjoa Haven, Kugaaruk; will take place late February or early March.
- Will be more meetings through the next two years.

Comments from Communities

- Caribou.
- Ice breaking.
- Oil/concentrate spills.
- Education/Training/Employment.
- Cost of living benefits to the Inuit in the Kitikmeot.
- Project economics.
- Need development to provide a future for our children.

Caribou

- Bathurst Caribou Herd
 - Range over the entire SGP
 - Now calving West of Bathurst Inlet, but to date not in the area of the road or port.
 - Spring migration through the project area coincides with the road closure for breakup
 - GN management status of this herd is "secure".

Caribou continued

- Victoria Island Caribou (also referred to as the Dolphin and Union Herd).
 - Summers on Victoria Island, including calving.
 - Migrates to the mainland for winter, across Dease Strait when ice is only 6 to 10 cms (mid to late October). Winters north of the project area.
 - GN management status, "sensitive"
 - COSEWIC status, threatened.

Caribou continued

- Queen Maud Caribou.
 - Western periphery of the summer and winter ranges includes the road route area around Nose Lake.
 - Calving is in the Queen Maud Gulf Bird Sanctuary to the east of Bathurst Inlet.
 - GN management status is "secure"

Next Step

- Submit a Draft Project Description and necessary applications to DIAND and KIA by end of February.

X NWB
X DFO?
X NRCAN?

Project Proponent

- A 50/50 Joint Venture between the Kitikmeot Corporation and Nuna Logistics Limited.
- Kitikmeot Corporation owns 25% of Nuna Logistics.
- Both companies are registered Inuit owned companies

Major Components of the Project

- Port site at Bathurst inlet.
- All weather road to Contwoyto Lake.
- Barge system on Contwoyto Lake.
- All weather road Lupin to Izok.
- Initially provide fuel and supplies to the Kitikmeot communities by barge, and fuel via the existing winter road to Lupin, Ekati and Diavik. Followed by service to Izok on start up.