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ISSUED FOR USE

INUVIK TO TUKTOYAKTUK HIGHWAY – GRANULAR RESOURCES

MEETING TIME:	3:00 to 4:00 pm	**DATE:**	August 28, 2012
LOCATION:	IRC Office	**FILE:**	V23201487
ATTENDEES:	Inuvialuit Land Administration Commission and Staff Gurdev Jagpal, Regional Superintendent, Department of Transportation Robyn McGregor, Senior Transportation Engineer, Kiggiak-EBA Consulting Ltd.		

1.0 PRESENTATION

The Department of Transportation and its consultant, Kiggiak-EBA appreciated the opportunity to present information on the proposed material use for the construction and operation of the proposed Inuvik to Tuktoyaktuk Highway and answer questions from the Inuvialuit Land Administration Commission and staff. Presentation slides are attached and an electronic copy of the presentation was provided at the meeting.

2.0 DISCUSSION

Discussion followed the short presentation. Questions raised and answers provided are as follows:

- Materials for operations and maintenance are presented for years 1 to 20. Will there be slumping of the highway embankment in this period?
  - Some slumping will occur, as well as compaction in the embankment and consolidation (settling) of the existing ground beneath the road. Materials required in the first twenty years of operation are greater than in the second twenty years to account for this.
- Some of the highway will be close to lakes. Will the terrain in these areas require additional maintenance for the highway?
  - There are four terrain types that have been considered in the design and for those areas that are sensitive to thaw and erosion, strengthening and/or insulation of the subgrade will be included in the design. This may include geotextile (like that used on Tuk to Source 177 Access Road) on the existing ground, and geogrids and styrofoam insulation placed within the embankment. The height of the embankment needs to be sufficient for insulation and snow storage, but of a minimum thickness for self-clearing of the snow.

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  - Insulation has been used at Campbell Creek on the Dempster Highway. It is working for insulation but snow storage is a problem.
  - The design will include analysis from the heat and thawing point of view and the strength point of view relative to the terrain along the highway.
  - Winter construction will also help in keeping the ground frozen.
- What sorts of lessons were learned from the material sources that were used on the Dempster Highway?
  - Drainage of the sources is important. The proposed highway will have more ice problems in the sources so maintaining cover over the ice and drainage will be important.
  - Finding quality material is important. Pit Run is preferred.
- What can you tell us about the material quality and volume in Source 177?
  - Source 177 was used to construct the access road from Tuktoyaktuk to the source. The material is not of the best quality but is adequate for the embankment construction. The road is performing well.
  - Source 177 is a primary source for the construction of the highway and is listed in the ISR Granular Resource Management Plan as a primary source for the community of Tuktoyaktuk. The material quantities need to be proven through investigation, but published reports indicate volumes ranging from 1.9 million cubic metres to 19 million cubic metres; more than enough material to support the highway construction and operations, and the needs of the community.
- Will there be problems with ice thickness and other ice problems in the pits like on the Dempster?
  - In the pits on the Dempster there were some problems with ice melting and overflow but these areas now have good vegetation growth. For the proposed highway, the depth of the ice layer has been or will be confirmed with the investigations and a cover will be left over the ice to avoid thaw.
- What is below the ice layer; is there gravel below?
  - The thickness of the ice layer is not easy to determine and is likely 100 feet (30 m) or more in some cases. Even if there is gravel below the ice layer it is not practical to obtain it.
- What does the geotextile do?
  - The geotextile (like that used on the Tuktoyaktuk to Source 177 Road) provides some strength to the road, and a path for drainage, but is primarily a filter or separation between the natural ground and the embankment to keep the materials in place.
- What do we know about working with ice in the material sources and in ice rich areas?
  - In the material sources, we will try to avoid the ice rich layer leaving a cover of material on it, or will recover any exposed ice with the available overburden material before the pit is closed up at the end of the winter work.

  - The design in the ice rich areas will use lessons learned from the Dempster and other roads. On the original Dempster highway there was some slumping. In some of those locations, a bench construction was used with a wider embankment at the bottom, and steeper sideslopes on the rest of the embankment. In the three or four places where this was used, slumping did not occur again.
  - Airport Road is different. The chipseal surface was replaced by asphalt pavement 20 years ago. The problems that were seen just after this will not be seen on the proposed highway.
- There was a short discussion on the use of Calcium Chloride for dust control. All agreed that it was effective, but expensive because of the shipping costs to Inuvik.
- Some of the geotextile on the Tuktoyaktuk to Source 177 Access Road is being pulled up along the edges. How would this be prevented on the proposed highway?
  - There will be a greater thickness of embankment and the geotextile will be hidden under the sideslopes.
  - Also, the design will be well ahead of the construction and after construction ongoing monitoring will take place.
- Gurdev Jagpal of DOT indicated that the original request for the meeting may have been to also discuss the pits on the Dempster Highway, and offered to provide a visit to those pits if desired.

3.0 CLOSING

Chair Albert Elias thanked DOT and Kiggiak-EBA for the presentation. Robyn McGregor confirmed that she will prepare notes for this short meeting and provide them to Joshua Mackintosh for review. DOT will then provide these notes as part of the overall submission to the Environmental Impact Review Board for the proposed highway project.

Attachments:

PDF version of presentation slides

INUVIK TUKTOYAKTUK HIGHWAY
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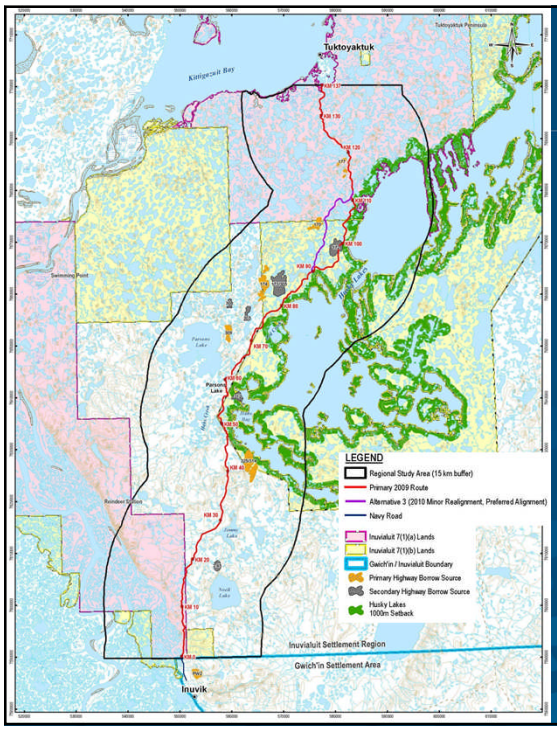
Inuvik to Tuktoyaktuk Highway
Inuvialuit Land Administration Commission
Granular Resources

August 28, 2012





Alignment:

- Primary 2009 Route
- Alt. 3 – 2010 Minor Realignment

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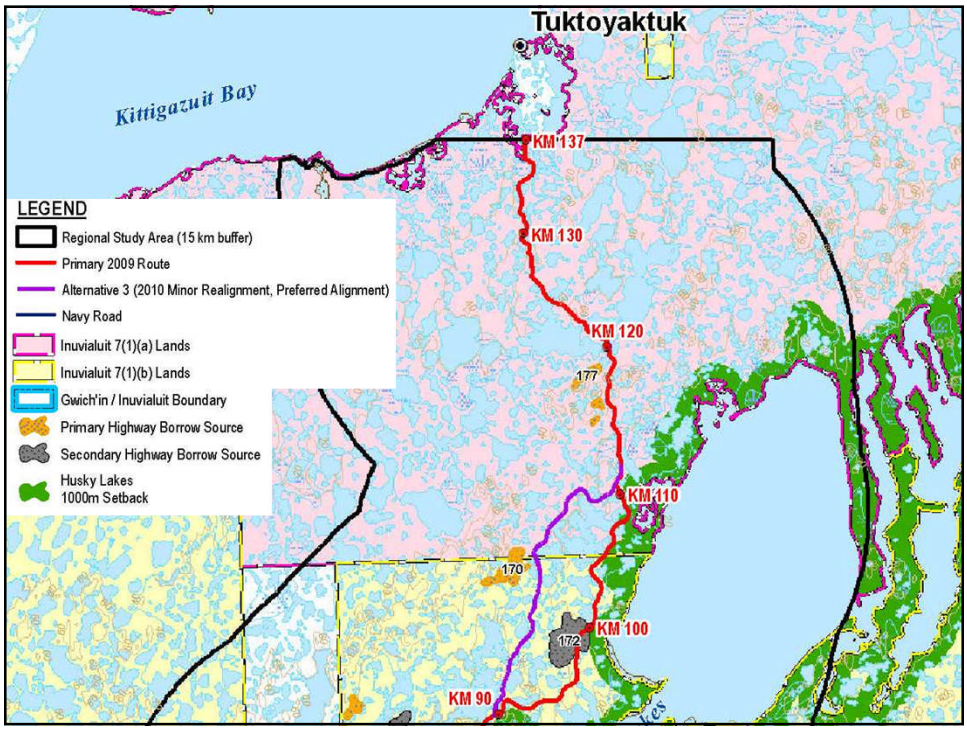
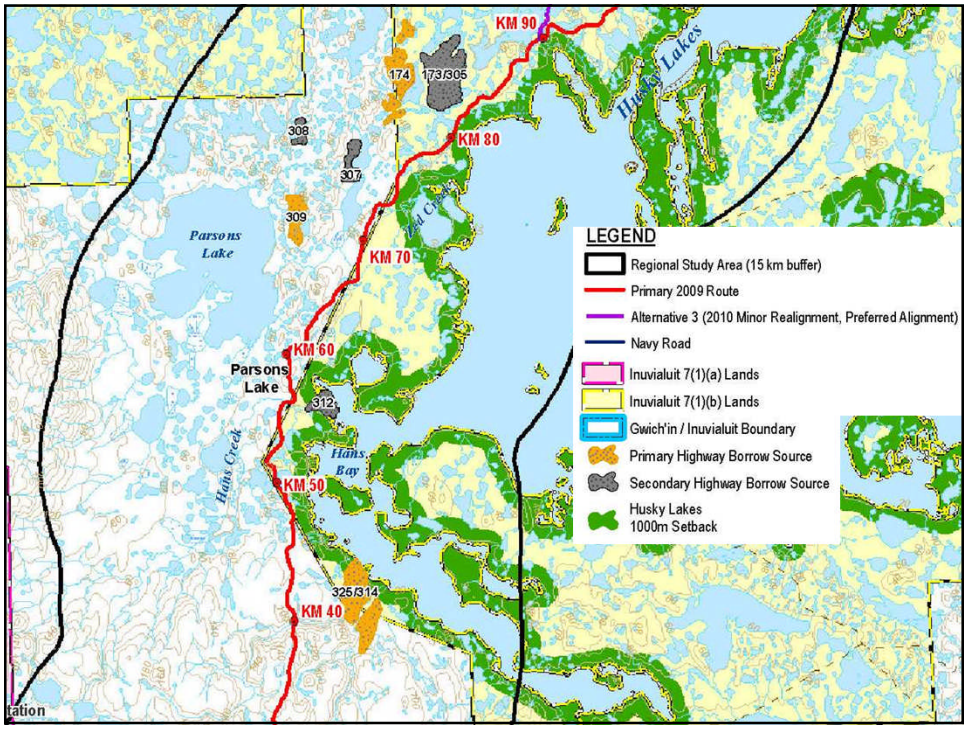
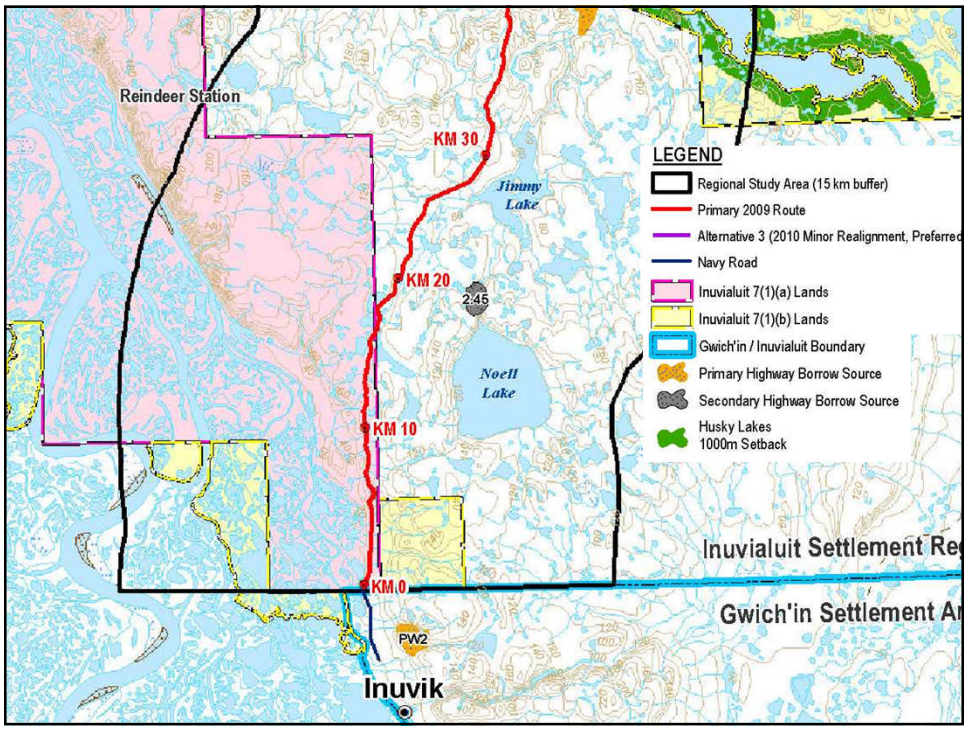
Material Sources Being Considered:

- Primary Sources:
  - 177
  - 174
  - 170
  - 309
  - 325/314
  - PW2
- Secondary Sources:
  - 172
  - 173/306
  - 307
  - 2.45
  - 308
  - 312




KM 90
174
173/305
Husky Lakes
308
KM 80
307
309
Parsons Lake
KM 70
KM 60
Parsons Lake
312
Hans Bay
Hans Creek
KM 50
325/314
KM 40
LEGEND
Regional Study Area (15 km buffer)
Primary 2009 Route
Alternative 3 (2010 Minor Realignment, Preferred Alignment)
Navy Road
Inuvialuit 7(1)(a) Lands
Inuvialuit 7(1)(b) Lands
Gwich'in / Inuvialuit Boundary
Primary Highway Borrow Source
Secondary Highway Borrow Source
Husky Lakes
1000m Setback


Reindeer Station
KM 30
Jimmy Lake
KM 20
245
Noell Lake
KM 10
KM 0
PW2
Inuvik
Inuvialuit Settlement Re
Gwich'in Settlement Ar
LEGEND
Regional Study Area (15 km buffer)
Primary 2009 Route
Alternative 3 (2010 Minor Realignment, Preferred
Navy Road
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Inuvialuit 7(1)(b) Lands
Gwich'in / Inuvialuit Boundary
Primary Highway Borrow Source
Secondary Highway Borrow Source
Husky Lakes
1000m Setback

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There is sufficient material to build and maintain the Highway for 50 years or more.

Source	Construction Embankment (m3)	Construction Surfacing (m3)	Operational Common & Crush - Year 1 to 20 (m3)	Operational Common & Crush - Year 21 to 40 (m3)	Operational Common & Crush - Year 41 to 50 (m3)	Estimated Total Requirement (m3)	Estimated Amount Available in Source (m3)
PW2	676,000	-	-	-	-	676,000	reported as "unlimited"
325/314	919,000	82,300	558,750	300,000	89,000	1,949,050	2,170,000
309	979,000	82,300	220,000	175,000	-	1,456,300	1,500,000
174	741,250	82,400	700,000	487,250	207,500	2,218,400	3,280,000
170	462,750	-	-	-	-	462,750	1,000,000
177	677,000	-	438,500	300,000	89,000	1,504,500	1,910,000
Totals	4,455,000	247,000	1,917,250	1,262,250	385,500	8,267,000	9,860,000

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Sharing of Resources:

- Town of Inuvik: no common sources identified
- Hamlet of Tuktoyaktuk: Source 177
- Mackenzie Gas Project: Sources 308 (2.025) & 309 (2.028)
- Tuktoyaktuk Harbour Improvements: no common sources identified.

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Respecting Husky Lakes

- Sources 314 and 325 are considered as a common source and the 1000 m setback from Husky Lakes will be respected.

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Other sources considered: 172, 173/305, 307 and 2.45

- Sources 172, 173/305, 307 and 2.45 have been identified by KAVIK-STANTEC (2012) as having material quantity estimates of 2,279,200 m^3 and are additional candidate sources for construction and/or maintenance of the Highway.

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Other sources considered: 312

- The far west portion of Source 312 may be a candidate for further investigation (Ripley, Klohn & Leonoff International Limited , 1972); however, area around Hans Creek is considered sensitive for hunting, fishing and other activities.
- A portion of 312 was investigated in the vicinity of the alignment and found to be not favourable.

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Other sources considered: 308

- Source 308 is a candidate for further investigation. It is reported by Ripley, Klohn & Leonoff International Limited (1972) as having material quantity estimates of 15,000 m^3; however, visual investigation (both by air and on the ground) show that Source 308 is likely to have greater quantities of material and that a ridge of potential material extends south from Source 308 and into Source 309.

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Surfacing Material

- Material suitable to crush for surfacing is expected to be found at Sources 174, 309, 325/314. If suitable material is not found at these sources, existing sources for surfacing material (Ya Ya Lake and Inuvik Airport Quarry) will be utilized.

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Bulking and Compaction

- Estimated quantities shown for construction and operations are compacted/in place quantities. Estimated available quantities in the sources are in-situ. Bulking of the materials once removed from the source is anticipated to be greater than the impact of compaction on quantities when the material is placed in the road, resulting in the in-situ measure of material removed from a source to be less than the estimated quantities for construction and operations shown.

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Using Tills:

- QUALITY:
  - Most of the sources identified for use are reported to have materials that are better quality than the till sources in the area. This is one of the main reasons why they have been chosen over other sources.
- MOISTURE:
  - The sources in the area that contain tills have higher moisture contents. Materials with higher moisture contents are difficult to work with during construction. They are more expensive to drill and blast to obtain the size and shape that can efficiently be handled and do not hold shape and structure in the road (embankment) when they are subject to thaw.
- PW2:
  - For the southern portion of the Highway (km 0 to km 40), Source PW2 is described by PWC 1977 to contain till. If the moisture content in the tills are high then it may be necessary to stockpile the material in the pit, allow it to thaw and lose moisture, then place it in the following season. This has its own disadvantages in that it introduces drainage problems in the pit and a single season may not be sufficient to allow for drying of the materials. With these materials, a larger spread area along the alignment may be required to allow for evaporation.

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Next Steps

- Investigation (drilling) of Sources PW2, 308, 309, 174, 177 to confirm material quantity and quality estimates and conduct site-specific studies, as needed, to support the regulatory approvals process (land use and quarry permits).
- Develop Pit Management Plans and secure Land Use and Quarry Permits prior to construction.

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Pit Management Plans:

- Development of Pit Management Plans include:
  - Estimated volume to be extracted
  - Consultations with land owners and other stakeholders
  - Discussions with regulators
  - Environmental constraints
  - Area to be developed
  - Pit development phasing plans for reclamation
- Pits will be developed following the applicable guidelines to mitigate impacts, minimize the footprint and best serve reclamation.

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Information Sources:

Source	Reference
PW2	Public Works Canada, 1976. Report : geotechnical investigation mile 970 (km 0) to mile 1059 (km 143) (Inuvik to Tuktoyaktuk), Mackenzie Highway : combined data - 1976 to 1980 / Canada. Public Works Canada. Western Region. October 1976. ASTIS 35303
325/314	Kavik-Stantec Inc., 2012. Inuvik - Tuktoyaktuk Highway 2012 Borrow Source Investigation, Borrow Source 314/325 Summary Report. Prepared for E Gruben's Transport Ltd. July 2012
309	Ripley, Klohn & Leonoff International Limited , 1972. Granular materials inventory, Zone III. Prepared for Department of Indian Affairs and Northern Development. 1972.
174	R.M Hardy & Associates Ltd., 1977. Granular Materials Inventory, Tuktoyaktuk, Northwest Territories. Prepared for Department of Indian and Northern Development. August 1977.
170	Kavik-Stantec Inc., 2012. Inuvik - Tuktoyaktuk Highway 2012 Borrow Source Investigation, Borrow Source 170 Summary Report. Prepared for E Gruben's Transport Ltd. July 2012
177	R.M Hardy & Associates Ltd., 1977. Granular Materials Inventory, Tuktoyaktuk, Northwest Territories. Prepared for Department of Indian and Northern Development. August 1977.