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LOGISTICS OPPORTUNITIES And TRANSPORTATION IMPACTS

In the Northwest Territories during the Mackenzie Gas Project

Prepared for:

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And Transport Canada

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1. Summary and Introduction

The purpose of this report is to provide a comprehensive assessment of northern transportation opportunities and impacts during the Mackenzie Gas Project (MGP). Transportation opportunities are developed from the perspective of NWT communities along the MGP pipeline route that could benefit from local sourcing of logistics support. Transportation impacts are developed from the perspective of the NWT transportation system which will be supporting other projects as well as the MGP.

A four year schedule for MGP logistics activity is proposed in the *Application to the National Energy Board for Approval of the Mackenzie Valley Pipeline*. Project approval is anticipated in 2006 with preliminary logistics support for infrastructure construction starting in that year, followed by major movement of materials, equipment and supplies during 2007 and 2008 in the summer barging seasons preceding two winter construction seasons. Construction demobilization would take place in the Summer of 2009 with pipeline commissioning in late 2009 or early 2010.

In this report we have taken an heuristic approach, adjusting the monetary structure of economic input-output theory to best model a practical assessment of transportation impacts in the NWT as measured in physical units (i.e., tonnes, trucks, barges, railcars):

- Direct Impacts - we have developed primary logistics requirements that are part of each project (e.g., local trucks for gravel haul, concentrate haul, stockpile shuttles, rig moves, etc.). These are the short-haul impacts that result directly from on-site construction and operations incorporating intensive use of transport equipment.

- Indirect Impacts - we have determined the secondary cascade of supply chain linkages to the project (e.g., long distance rail, barge and truck transport for fuel, pipe, equipment, etc.). These are the transportation impacts that result indirectly from off-site material, equipment and supply procurement.

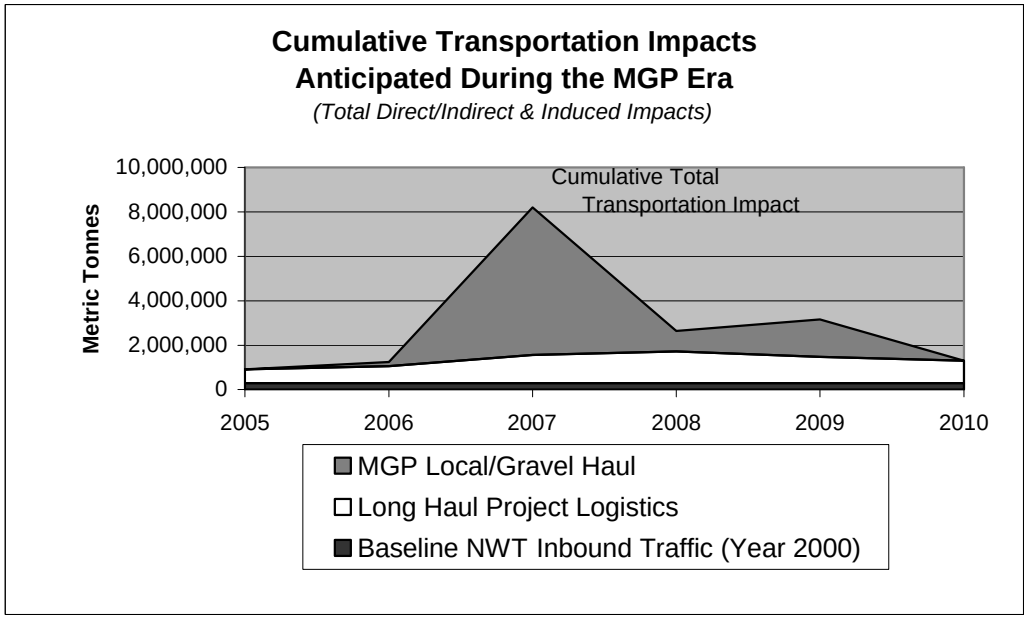
- Induced Impacts - we have applied to the combination of direct/indirect impacts an empirically developed spin-off activity multiplier that is consistent with both construction and transportation industry intensity ratios for the NWT (See Appendix).

Using physical capacity units (i.e., rail, truck and barge loads), we have projected both direct transportation impacts and succeeding rounds of indirect transportation impacts - or more precisely, backward supply chain linkages.

Using metric tonnes as a common denominator, we have applied the induced transportation multiplier to calculate the cumulative total impact of all projects across the NWT, regardless of mode. However, while we have objectively identified successive rounds of transport capacity demand, counting tonnes more than once yields an impractically large and, we believe, irrelevant measure that we have accordingly avoided.

Figure 1 encapsulates the full range of the research presented in the balance of this report. Cumulative Long Haul Logistics traffic from all projects during the MGP Era is at peak more than 4 times greater than normal NWT inbound traffic. And, the total transportation impact is more than 5 times greater than that, after adding the direct impact of local/gravel haul logistics - which also provide a major opportunity for community benefits.

Figure 1



Following this introductory Chapter 1 of the report, Chapter 2 outlines local logistics opportunities in each of three regions. These are also the direct MGP impacts which are reported with indirect MGP impacts in Chapter 3.

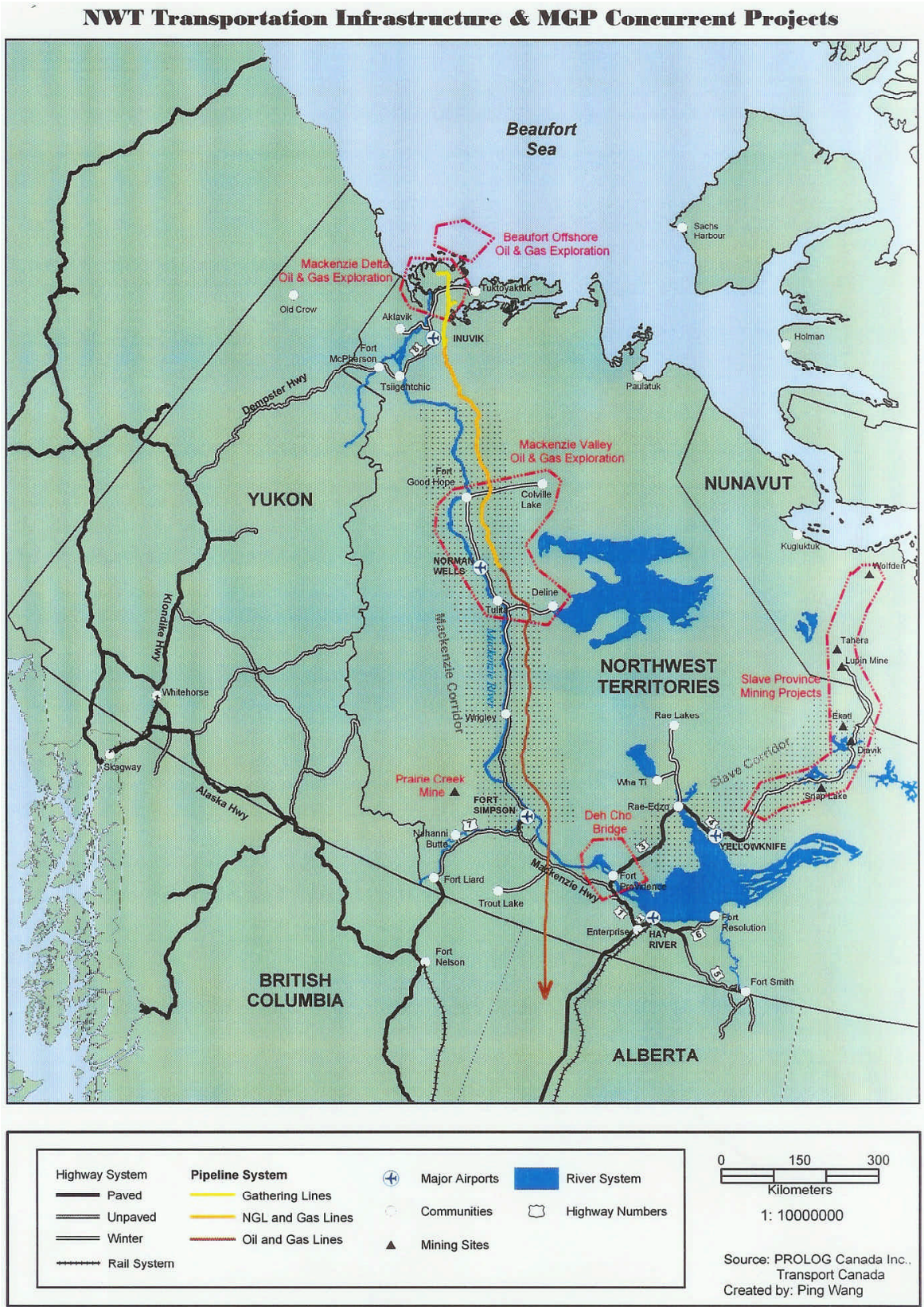
Chapters 4 and 5 present our determination of cumulative Mackenzie and Slave Corridor impacts from other projects occurring concurrently with the MGP and Chapter 6 provides our analysis of the cumulative impact where both corridors converge on the Hay River/Enterprise Gateway.

Chapter 7 is an overall assessment of direct, indirect and induced transportation impacts for all projects during the MGP era and Chapter 8 presents our conclusions.

Please note that all data used in this report is based on information provided by project sponsors and current or potential contractors as supplemented by consultant estimates where relevant data was not otherwise readily available.

Map 1 on the following page introduces both the NWT transportation infrastructure and the MGP era projects that are the subject of this report.

Map 1


NWT Transportation Infrastructure & MGP Concurrent Projects
Beaufort Sea
Beaufort Offshore Oil & Gas Exploration
Mackenzie Delta Oil & Gas Exploration
Mackenzie Valley Oil & Gas Exploration
Old Crow
Aklavik
Tuktoyaktuk
INUVIK
Fort McPherson
Tsiigehtchic
Dempster Hwy
Sachs Harbour
Holman
Paulatuk
Fort Good Hope
Colville Lake
YUKON
NUNAVUT
Kugluktuk
Wolfden
NORMAN WELLS
Deline
Tulit
Mackenzie River
Mackenzie Corridor
Klondike Hwy
Whitehorse
Skagway
Alaska Hwy
NORTHWEST TERRITORIES
Slave Province Mining Projects
Tahera
Lupin Mine
Ekati
Diavik
Rae Lakes
Wha Ti
Rae-Edzo
Snap Lake
Slave Corridor
YELLOWKNIFE
Deh Cho Bridge
Prairie Creek Mine
FORT SIMPSON
Nahanni Butte
Wrigley
Fort Liard
Trout Lake
Fort Providence
Mackenzie Hwy
Enterprise
HAY RIVER
Fort Resolution
Fort Smith
Fort Nelson
BRITISH COLUMBIA
ALBERTA
Highway System
Paved
Unpaved
Winter
Rail System
Pipeline System
Gathering Lines
NGL and Gas Lines
Oil and Gas Lines
Major Airports
Communities
Mining Sites
River System
Highway Numbers
0 150 300
Kilometers
1: 10000000
Source: PROLOG Canada Inc., Transport Canada
Created by: Ping Wang

2. MGP Regional Logistics Opportunities

The Mackenzie Gas Project will provide logistics business opportunities for communities along the pipeline route. In this Chapter those opportunities are organized and analyzed within three regions (See Map 2 on the following page):

- The Beaufort Delta Region – An area extending from the Beaufort Sea south through the Mackenzie Delta and centered around Inuvik.
- The Sahtu Settlement Region – An area encompassing the central Mackenzie Valley and centered around Norman Wells.
- The Deh Cho Region – An area encompassing the southern Mackenzie Valley and centered around Fort Simpson.

The following sections identify the scope of local logistics opportunities, quantify those opportunities in transportation terms and assess regional capabilities to meet them.

2.1 Local Construction Logistics Programs.

Major business opportunities for local firms with transportation capabilities include:

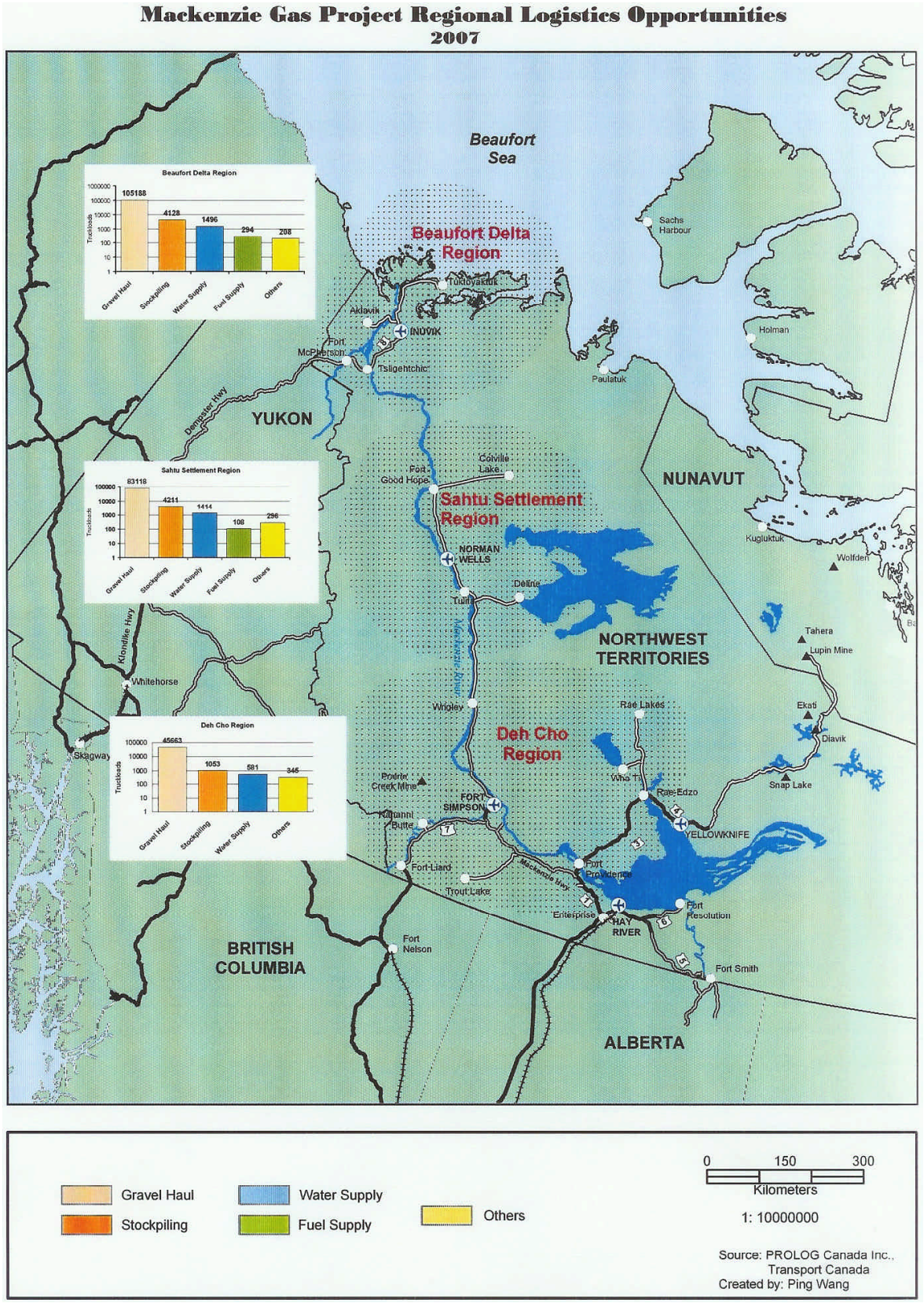
- Staging/Stockpiling – pipe, fuel, camps, equipment and facility modules.
- Construction Support – gravel, water and fuel haul, skid supply and expedited freight.
- Crew Transportation – local air and bus transfers between hub airports and camps.

2.1.1 Project Staging Logistics.

Shuttle truck operations will be required to complete stockpiling of project materials and mobilization of camps, equipment and modules prior to each winter construction season; and again following construction for retrograde movement during project demobilization.

Stockpiles will be established in close proximity to the pipeline right-of-way and facility work sites. Shuttle trucks will operate to them over a very short distance (typically less than 3 km) on project constructed all-weather spur roads from Mackenzie River barge landings in the Beaufort Delta and Sahtu Regions; or over somewhat longer distances where all-weather Mackenzie Highway access is available in the Deh Cho Region.

Map 2


Mackenzie Gas Project Regional Logistics Opportunities
2007
Beaufort Sea
Beaufort Delta Region
Beaufort Delta Region
105188
4128
1496
294
208
Gravel Haul
Stockpiling
Water Supply
Fuel Supply
Others
Tuktoyaktuk
Aklavik
INUVIK
Fort McPherson
Tsiigehtchic
Dempster Hwy
YUKON
Sachs Harbour
Holman
Paulatuk
Colville Lake
Fort Good Hope
Sahtu Settlement Region
Sahtu Settlement Region
83118
4211
1414
108
286
NORMAN WELLS
Tulita
Delina
Mackenzie River
NUNAVUT
Kugluktuk
Wolfden
NORTHWEST TERRITORIES
Tahera
Lupin Mine
Klondike Hwy
Whitehorse
Wrigley
Deh Cho Region
Deh Cho Region
45663
1053
581
345
Rae Lakes
Ekati
Diavik
Skagway
Prairie Creek Mine
FORT SIMPSON
Kakisa
Kakanni Butte
Who Tr
Rae-Edzo
Snap Lake
YELLOWKNIFE
Fort Liard
Trout Lake
Mackenzie Hwy
Fort Providence
Enterprise
HAY RIVER
Fort Resolution
BRITISH COLUMBIA
Fort Nelson
Fort Smith
ALBERTA
Gravel Haul
Stockpiling
Water Supply
Fuel Supply
Others
0
150
300
Kilometers
1: 10000000
Source: PROLOG Canada Inc.,
Transport Canada
Created by: Ping Wang

2.1.2 Granular Material Logistics

A very large quantity of granular material will be required for facility construction pads at gas plant, processing plant and compressor station sites. Along the pipeline route, granular material will also be required for all-weather access roads, stockpile and camp sites as well as for pipeline backfill.

The MGP is currently validating all known and existing borrow source sites, and investigating new sites. Some 140 locations have been identified to date, with 60 to 70 expected to be used. Five or six of the borrow source sites will be major quarry operations, and include crushing equipment. Three of these are near Inuvik and others are near Norman Wells, Tulita, and Little Chicago.

Accessing these sites and stripping the overburden is expected to be carried out commencing in summer 2006. Small, portable 40 man camps will be strategically located to carry out this activity. Equipment unavailable locally will be barged to these locations.

Truck haul distances vary from 7 to 24 kms for granular trucking for the pipeline construction spreads; and from 2 to 37 kms for the facility pads. 24 hour trucking operations are planned using standard end dump “doubles” each carrying 12.5 cubic metres (approx. 24 tonnes) payload.

2.1.3 Regional Supply Logistics

During construction, the MGP will locally source fresh water, bulk fuel and pipe skids (timbers to support pipe welding) as well as require hot shot trucking for expedited items:

- Potable water will be trucked to camps from closest available sources, except for town water supply access anticipated at Inuvik, Norman Wells and Hay River.
- Winter fuel truck operations from storage at Inuvik, Norman Wells and Hay River will top-up MGP on-site portable tanks positioned by truck prior to construction.
- Logging and portable mill operations with a commensurate requirement for local trucking are anticipated for pipe skid supply in each region.

2.1.4 Regional Personnel Logistics

MGP personnel will access regional hubs at Inuvik, Norman Wells and Fort Simpson on B737 aircraft from the South operated by the mainline northern carriers as scheduled services, extra sections and charter flights. Crews will transfer between these hubs and MGP camps by bus wherever possible. Otherwise, camps will be served by smaller fixed-wing aircraft. Helicopters will be used where conventional landing strips don't exist and during shoulder seasons when ground conditions may restrict fixed-wing operations.

2.1.5 Food Transport

The transport of food to the camps has not been worked out to the same level of detail as personnel movements. This will await detailed planning by catering companies in conjunction with the logistics management group.

When the pipeline spreads are in full operation it is expected that perishable food will be delivered to the camps on a weekly or semi-weekly basis.

Certain categories of food will be delivered by barge in sealed containers at the end of each shipping season.

Wherever possible food will be moved to the camps by less expensive surface transport. Air transport will only be used for fresh food and where the camp is not readily accessible by truck.

Estimated annual food requirements for the Mackenzie Gas Project are as follows:

Type	Mode	Annual Volume
Dry Staples	Truck & Barge	2,250,000 kg
Frozen Meats	Truck	1,125,000
Fresh Foods	Truck & Air	1,125,000

2.2 Regional Logistics Opportunities Analysis

Within each of the three regions (INUVIK/Beaufort Delta; NORMAN WELLS/Sahtu Settlement; FORT SIMPSON/Deh Cho) local logistics opportunities and capabilities have been analyzed for:

- Local trucking – for MGP stockpile sites and construction support
- Local flying/bussing – for MGP crew transfers to and from camps

2.2.1 INUVIK/Beaufort Delta Region (BDR)

For the Beaufort Delta Region, local business opportunities will arise from pipeline and compressor station construction logistics. Logistics opportunities will also be generated by drilling activity and production facility development at the three anchor fields of Taglu, Niglintgak and Parsons Lake and the Inuvik Area Facility (Gas Conditioning Plant). All this activity will generally take place over a five year period, 2006 to 2010.

Substantial transportation business benefits may be generated by Mackenzie Gas Project requirements for:

- *Shuttle trucks for 348,000 tonnes of project materials inbound by barge requiring almost 10,000 truckloads over 2 years; and by*
- *Trucking required for on-site construction support to move 3,231,961 tonnes requiring150,000 truckload over 4 years*
- *Aircraft and busses for 32,000 air passengers to anchor field camps; 5,000 air passengers and 8,000 bus passengers to pipeline and station camps.*

The potential for these logistics opportunities to benefit local business is discussed at the end of this section.

2.2.1.1 BDR Local Staging/Stockpiling.

Anticipated shuttle truck loads and fleet requirements which could be locally sourced for staging and stockpiling at MGP sites include the following:

Local NWT Trucking
For MGP Major Materials/Equipment Staging and Stockpiling

Staging/Stockpiling	Truck Type	Truck Loads	Fleet Size
	Pre-Mobilization Summer 2006		
Initial Equip/Tanks	Low Boy & Flat Deck Trailers	7	2
	Main Mobilization Summer 2007		
Line Pipe	80' pipe dollies and/or tractor	2,500	14
Bulk Fuel*	B Train Tank Trailers	300	1
Camp Units/Supply	Flat Deck Trailers & Vans	600	13
Const. Equipment	Low Boy & Flat Deck Trailers	1,000	19
		4,400	47
	Re-Mobilization Summer 2008		
Line Pipe	80' pipe dollies and/or tractors	600	3
Bulk Fuel*	B Train Tank Trailers	1,700	5
Camp Units/Supply	Flat Deck Trailers & Vans	500	20
Const. Equipment	Low Boy & Flat Deck Trailers	300	21
Facilities/Modules	Heavy Haul Equip and/or tractors	50	4
Drill Rigs/Supplies	Flat Deck Trailers	2,000	22
		5,150	75
	De-Mobilization Summer 2009		
Camps/Equipment	Low Boy & Flat Deck Trailers	2,400	73

* Summer barge to tank is by temporary pipeline with winter top-up by truck from Inuvik

See Tables in Appendix for Location and Quantity Details

2.2.1.2 BDR Local Supply Logistics.

Additional anticipated truck loads and fleet requirements which could be locally sourced for construction site logistics support include the following:

Local NWT Trucking
For MGP Construction and Camp Site Logistics

Commodity	Truck Type	Truck Loads	Fleet Size
	Pre-Construction Winter 2006-7		
Gravel	12.5 Truck & Pup End Dumps	78,100	83
Water	B – Train Tankers	900	1
Expedited Frt	10 Ton Van	200	1
		79,200	85
	Pre-Construction Summer 2007		
Gravel	12.5 Truck & Pup End Dumps	27,100	22
Water	B – Train Tankers	900	1
Expedited Frt	10 Ton Van	100	1
Temp Tanks	Flat Deck Trailer	(17)	7
		28,100	31
	First Construction Winter 2007-8		
Gravel	12.5 cubic metre Truck & Pup End Dumps	10,500	18
Water	B – Train Tankers	6,500	7
Pipe Skids	Flat Deck Trailer	100	3
Expedited Frt	10 Ton Van	400	1
		17,500	29
	Second Construction Winter 2008-9		
Gravel	12.5 cubic metre Truck & Pup End Dumps	14,700	27
Water	B – Train Tankers	5,650	6
Pipe Skids	Flat Deck Trailers	50	1
Expedited Frt	10 Ton Van	400	1
		20,800	35
	Post-Construction Winter 2009-10		
Gravel	12.5 cubic metre Truck & Pup End Dumps	4,200	10
Water	B – Train Tankers	250	1
Expedited Frt	10 Ton Van	50	1
		4,500	12

See Tables in Appendix for Location and Quantity Details

2.2.1.3 BDR Personnel Logistics.

Personnel will access a regional hub at Inuvik on B737 aircraft from the South operated by the mainline northern carriers as scheduled services, extra sections and charter flights.

Passengers will transfer between Inuvik and the camps in the Beaufort Delta Region by bus and small aircraft. Bus transport will be used for personnel transfers around the Inuvik area and to and from the camp at Campbell Lake. The remaining camps will be served by smaller fixed-wing aircraft and by helicopters, which will be used where conventional airports don't exist and during shoulder seasons when ground conditions restrict fixed-wing operations on floats or skis.

Passenger traffic related to pipeline construction will occur mainly around a three-month winter period in 2008 and 2009. Compressor station construction will occur during a similar timeframe.

Passenger traffic related to drilling and the construction of production facilities will occur over a somewhat longer period, which will vary between the three anchor fields.

Over the life of the project, traffic between Inuvik and the camps related to drilling and production facilities will amount to approximately 32,000 air passengers. Corresponding traffic between Inuvik and the pipeline and related facility camps will amount to 5,000 passengers by air and 8,000 passengers by bus.

Incremental short-haul traffic at Inuvik during the course of the project is detailed as follows by camp and mode.

Project Personnel Traffic - Inuvik

Inuvik To/From:	Sample Mode	2006	2007	2008	2009	2010	Total
Taglu	T/Otter	174	1,554	3,920	4,218	152	10,018
Niglintgak	T/Otter	486	2,554	3,512	2,418	2,994	11,964
Swimming Point	T/Otter	0	402	1,076	2,052	114	3,644
Lucas Point	Heli	30	30	190	114	152	516
Parsons Lake	Dash	0	0	3,436	5,688	0	9,124
Parsons Lake	T/Otter	0	570	0	0	0	570
Storm Hills pigging	Heli	0	0	412	576	0	988
Inuvik Area facility	Bus	30	1,134	190	2,232	176	3,762
Campbell Lake	Bus	72	925	136	2,760	0	3,893
Total:							***44,479***

2.2.1.4 BDR Transportation Capabilities.

A survey of firms with transportation capabilities was conducted in the Beaufort Delta Region.

Based on the response of 22 NWT firms with trucking capabilities, a qualitative assessment indicates relatively low local capability to benefit from logistics opportunities in this region without importing additional capacity from elsewhere.

Based on the response of 15 NWT passenger service providers, a qualitative assessment indicates a relatively high local capability to benefit from short haul air service opportunities but a low capability to benefit from busing opportunities without jeopardizing current customer service.

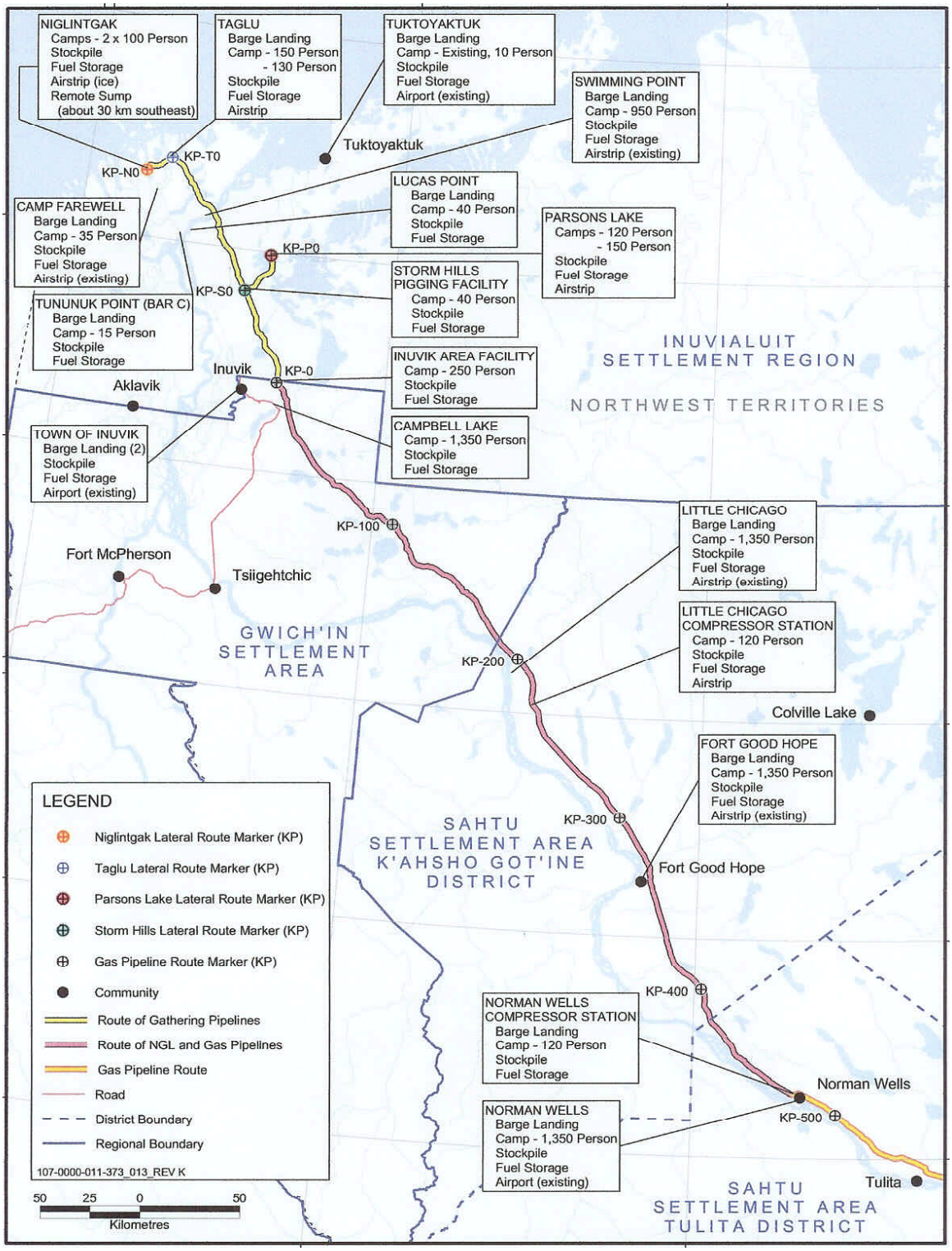
(See Appendix for details of this survey)

Map 3 on the following page shows local MGP logistics activity sites in the Beaufort Delta and Northern Sahtu Regions.

Map 3

Local Logistics Activity Sites

Beaufort Delta and Northern Sahtu Regions



Map provided courtesy of Imperial Oil Resources - Mackenzie Gas Project

2.2.2 NORMAN WELLS/Sahtu Settlement Region (SSR)

For the Sahtu Settlement Region, local business opportunities will arise from construction logistics for the pipeline and related compressor stations. Substantial transportation business benefits may be generated by Mackenzie Gas Project requirements for:

- *Shuttle trucks for 285,560 tonnes of project materials inbound by barge requiring some 7,500 truckloads over 2 years; and by*
- *Trucking required for on-site construction support to move 4 million tonnes requiring some 147,500 truckload over 4 years.*
- *Aircraft and busses for 23,000 air passengers and 7,000 bus passengers to and from pipeline or station camps mainly over 2 winter construction seasons.*

The potential for these logistics opportunities to benefit local business is discussed at the end of this section.

2.2.2.1 SSR Inbound Material Logistics. Anticipated shuttle truck loads and fleet requirements which could be locally sourced for staging and stockpiling at MGP sites include the following:

Local NWT Trucking
For Major Equipment/Materials Staging and Stockpiling

Staging/Stockpiling	Truck Type	Truck Loads	Fleet Size
	Pre-Mobilization Summer 2006		
Initial Equip/Tanks	Low Boy & Flat Deck Trailers	98	13
	Main Mobilization Summer 2007		
Line Pipe	80’ pipe dollies and/or tractor	3,000	8
Bulk Fuel	B Train Tank Trailers	100	1
Camp Units/Supply	Flat Deck Trailers & Vans	500	7
Const. Equipment	Low Boy & Flat Deck Trailers	800	10
		4,400	26
	Re-Mobilization Summer 2008		
Line Pipe	80’ pipe dollies and/or tractors	2,500	8
Bulk Fuel	B Train Tank Trailers	50	1
Camp Units/Supply	Flat Deck Trailers & Vans	400	9
Const. Equipment	Low Boy & Flat Deck Trailers	100	13
Facilities/Modules	Heavy Haul Equipment and/or tractors	50	5
		3,100	36
	De-Mobilization Summer 2009		
Camps/Equipment	Low Boy & Flat Deck Trailers	1,900	39

See Tables in Appendix for Location and Quantity Details

2.2.2.2 SSR Local Supply Logistics. Additional anticipated truck loads and fleet requirements which could be locally sourced for construction site logistics support include the following:

Local NWT Trucking
For MGP Construction and Camp Site Logistics

Commodity	Truck Type	Truckloads	Fleet Size
	Pre-Construction Winter 2006-7		
Gravel	12.5 cubic metre Truck & Pup End Dumps	67,100	49
Water	B – Train Tankers	400	1
Expedited Frt	10 Ton Van	208	2
		67,700	52
	Pre-Construction Summer 2007		
Gravel	12.5 cubic metre Truck & Pup End Dumps	16,000	11
Water	B – Train Tankers	100	1
Expedited Frt	10 Ton Van	100	1
		16,200	13
	First Construction Winter 2007-8		
Gravel	12.5 cubic metre Truck & Pup End Dumps	11,500	14
Water	B – Train Tankers	4,000	4
Pipe Skids	Flat Deck Trailer	100	2
Expedited Frt	10 Ton Van	300	2
		15,900	22
	Second Construction Winter 2008-9		
Gravel	12.5 cubic metre Truck & Pup End Dumps	27,100	37
Water	B – Train Tankers	4,200	4
Pipe Skids	Flat Deck Trailers	100	1
Expedited Frt	10 Ton Van	300	2
		31,700	44
	Post Construction Winter 2009-10		
Gravel	12.5 cubic metre Truck & Pup End Dumps	15,600	23
Water	B – Train Tankers	300	1
Expedited Frt	10 Ton Van	100	1
		16,000	25

See Tables in Appendix for Location and Quantity Details

2.2.2.3 SSR Personnel Logistics. Personnel will access a hub at Norman Wells on B737 aircraft from the South operated by the mainline northern carriers as scheduled services, extra sections and charter flights.

Passengers will transfer between Norman Wells and the camps in the Sahtu Settlement Region by bus and small aircraft. Bus transport will be used for transfers to and from the two camps adjacent to Norman Wells. The remaining camps in the region will be served by smaller fixed-wing aircraft.

Passenger traffic related to pipeline and compressor station construction will occur mainly around a three-month winter period in 2008 and 2009. Over the life of the project, traffic between Norman Wells and the pipeline and compressor station camps will amount to 23,000 passengers by air and 7,000 passengers by bus.

Incremental short-haul traffic at Norman Wells during the course of the project is detailed as follows by camp and mode.

Project Personnel Traffic – Norman Wells

Norman Wells To/From:	**Sample Mode**	**2006**	**2007**	**2008**	**2009**	**2010**	**Total**
Little Chicago comp	T/Otter	96	432	292	2,364	0	3,184
Little Chicago	Dash7	0	228	3,120	1,500	0	4,848
Little Chicago	T/Otter	78	640	608	132	500	1,958
Ft. Good Hope	Dash7	0	336	1,524	1,428	0	3,288
Ft. Good Hope	T/Otter	66	426	672	204	480	1,848
Norman Wells comp	Bus	0	672	1,468	1,140	50	3,330
Norman Wells	Bus	30	294	2,360	1,068	240	3,992
Tulita	T/Otter	0	0	0	132	0	132
Little Smith Creek	Dash	0	600	1,104	900	0	2,604
Little Smith Creek	T/Otter	66	306	200	168	300	1,040
Blackwater R. comp	T/Otter	0	720	1,488	1,122	72	3,402
Blackwater River	T/Otter	30	150	240	90	120	630
Total:							***30,256***

2.2.2.4 SSR Transportation Capabilities.

A survey of firms with transportation capabilities was conducted in the Sahtu Settlement Region.

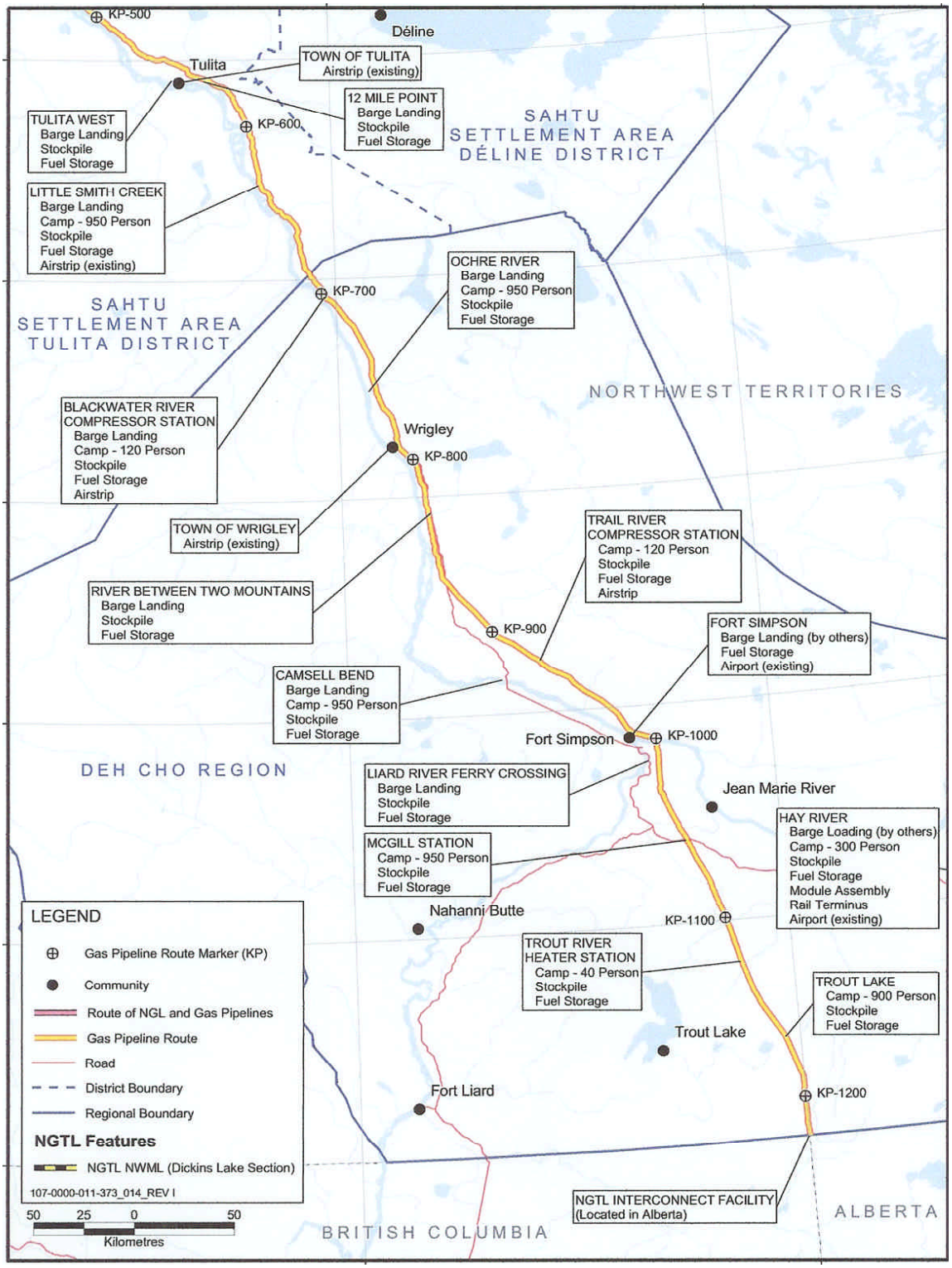
Based on the response of 22 NWT firms with trucking capabilities, a qualitative assessment in this region indicates high local capability to benefit from fuel haul opportunities, a moderate capability for local truck supply of pipe skids, but a relatively low capability for other local logistics in this region without importing additional capacity from elsewhere.

Based on the response of 15 NWT passenger service providers, a qualitative assessment indicates a relatively high local capability to benefit from short haul air service opportunities but a low capability to benefit from busing opportunities without jeopardizing current customer service.

(See Appendix for details of this survey)

Map 4 on the following page shows MGP local logistics activity sites in the Southern Sahtu and Deh Cho Regions.

Map 4
Local Logistics Activity Sites
Southern Sahtu Settlement and Deh Cho Regions



Map provided courtesy of Imperial Oil Resources - Mackenzie Gas Project

2.2.3 FORT SIMPSON/Deh Cho Region (DCR)

For the Deh Cho Region, passenger traffic will arise mainly from construction of the pipeline and related facilities. Substantial local transportation business benefits may be generated by Mackenzie Gas Project requirements for:

- *Shuttle trucks for 231,934 tonnes of project materials inbound by river and highway requiring more than 6,000 truckloads over 2 years;*
- *Trucking required for on-site construction support to move 1,331,305 tonnes requiring some 66,500 truckload over 4 years; and*
- *Aircraft and busses for 11,000 air passengers and 6,000 bus passengers to and from pipeline or station camps mainly over 2 winter construction seasons.*

The potential for these logistics opportunities to benefit local business is discussed at the end of this section.

2.2.3.1 SSR Inbound Material Logistics. Anticipated shuttle truck loads and fleet requirements which could be locally sourced for staging and stockpiling at MGP sites include the following:

Local NWT Trucking
For MGP Major Materials/Equipment Staging and Stockpiling

MGP Site Staging/Stockpiling	Truck Type	Truck Loads	Truck Fleets
	Pre-Mobilization summer 2006		
Initial Equipment	Low Boy & Flat Deck Trailers	59	11
	Main Mobilization Summer 2007		
Line Pipe	80' pipe dollies and/or tractor	1,500	8
Bulk Fuel	B Train Tank Trailers	260	
Camp Units/Supply	Flat Deck Trailers & Vans	230	3
Const. Equipment	Low Boy & Flat Deck Trailers	350	4
		2,340	16
	Re-Mobilization Summer 2008		
Line Pipe	80' pipe dollies and/or tractors	2,380	12
Bulk Fuel	B Train Tank Trailers	690	4
Camp Units/Supply	Flat Deck Trailers & Vans	730	21
Const. Equipment	Low Boy & Flat Deck Trailers	160	14
Facilities/Modules	Heavy Haul Equipment and/or tractors	50	8
		4,010	16
	De-Mobilization Summer 2009		
Camps/Equipment Demobe	Low Boy & Flat Deck Trailers	1,300	24

See Tables in Appendix for Location and Quantity Details

2.2.3.2 DCR Local Supply Logistics.

Additional anticipated truck loads and fleet requirements which could be locally sourced for construction site logistics support include the following:

Local NWT Trucking
Ancillary to MGP On-Site Construction

MGP Site Supply	Truck Type	Truck Loads	Truck Fleet
	Pre-Construction Winter 2006-7		
Gravel	12.5 Cubic Metre End Dumps	30,600	24
Potable Water	B – Train Tankers	400	1
Expedited Freight	10 Ton Van	200	2
		31,200	27
	Pre-Construction Summer 2007		
Gravel	12.5 Cubic Metre End Dumps	15,100	21
Potable Water	B – Train Tankers	200	1
Expedited Freight	10 Ton Van	100	1
		15,400	23
	First Construction Winter 2007-8		
Gravel	12.5 Cubic Metre End Dumps	800	2
Pipe Skids	Flat Deck Trailer	50	1
Potable Water	B – Train Tankers	2,250	2
Expedited Freight	10 Ton Van	400	2
		3,500	7
	Second Construction Winter 2008-9		
Gravel	12.5 Cubic Metre Pup End Dumps	6,800	8
Pipe Skids	Flat Deck Trailers	50	1
Potable Water	B – Train Tankers	2,800	3
Expedited Freight	10 Ton Van	550	2
		10,200	14
	Post Construction Winter 2009-10		
Gravel	12.5 Cubic Metre End Dumps	5,900	11
Potable Water	B – Train Tankers	200	1
Expedited Freight	10 Ton Van	100	1
		6,200	13

See Tables in Appendix for Location and Quantity Details

2.2.3.3 DCR Personnel Logistics.

Personnel will access a hub at Ft. Simpson on B737 aircraft from the South operated by the northern mainline carriers as scheduled services, extra sections and charter flights.

Passengers will transfer between Ft. Simpson and the camps in the Deh Cho Region by bus and small aircraft. Bus transport will be used for personnel transfers around the Ft. Simpson area and to and from the camps at Camsell Bend and McGill Station. The remaining camps will be served by smaller fixed-wing aircraft and helicopters.

Over the life of the project, traffic between Ft. Simpson and the pipeline and related facility construction camps will amount to 11,000 passengers by air and 6,000 passengers by bus.

Incremental short-haul traffic at Ft. Simpson during the course of the project is detailed as follows by camp and year.

Project Personnel Traffic – Ft. Simpson

Ft. Simpson ***Sample***

To/From:	**Mode**	**2006**	**2007**	**2008**	**2009**	**2010**	**Total**
Ochre River	Dash	0	0	1,464	900	0	2,364
Ochre River	T/Otter	30	198	360	132	0	720
Smith Creek	Dash	0	0	0	0	0	0
Trail R. comp	Heli	30	492	312	2,448	90	3,372
Camsell Bend	Bus	96	822	1,740	1,200	300	4,158
Ft. Simpson/Liard	Bus	0	0	80	0	30	110
McGill Stn.	Bus	0	48	1,284	136	60	1,528
Trout River heater stn	Heli	0	0	288	576	100	964
Trout Lake	Heli	0	0	600	2,056	200	2,856
NGTL interconnect	Heli	0	0	288	576	40	904

Total: ***16,976***

2.2.3.4 DCR Transportation Capabilities.

A survey of firms with transportation capabilities was conducted in the Deh Cho Region.

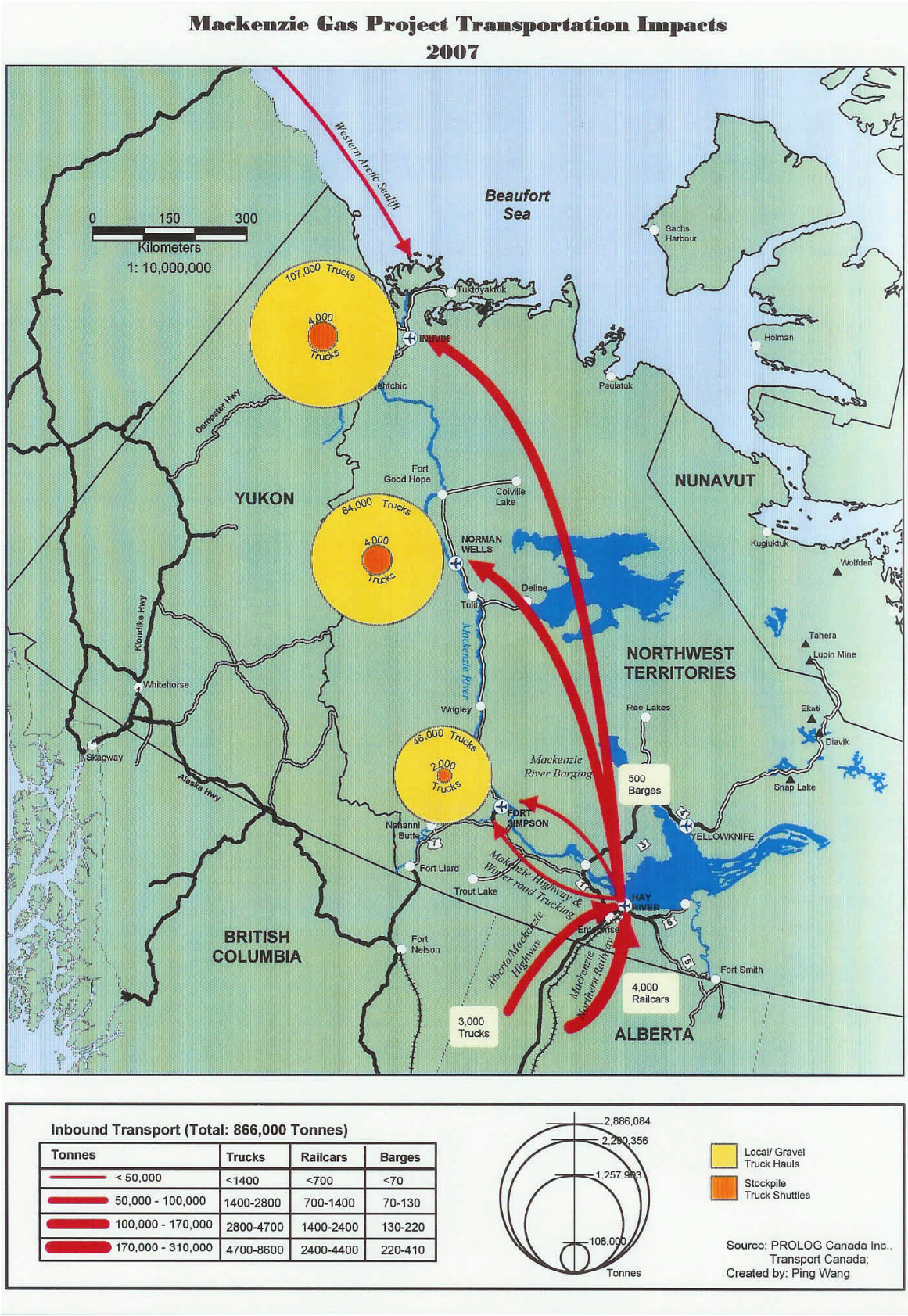
Based on the response of 22 NWT firms with trucking capabilities, a qualitative assessment in this region indicates a moderate to high local capability to benefit from local MGP construction logistics requirements.

Based on the response of 15 NWT passenger service providers, a qualitative assessment indicates a relatively high local capability to benefit from short haul air service opportunities but a low capability to benefit from busing opportunities without jeopardizing current customer service.

(See Appendix for details of this survey)

Map 5 on the following page highlights the direct impact of logistics opportunities identified at the regional level in this chapter; and introduces the indirect impact of linkages back through the supply chain that are covered in the next chapter.

Map 5


Mackenzie Gas Project Transportation Impacts
2007
Western Arctic Sealift
Beaufort Sea
0 150 300
Kilometers
1: 10,000,000
107,000 Trucks
4,000 Trucks
Tuktoyaktuk
Sachs Harbour
Holman
Paulatuk
Dempster Hwy
Fort Good Hope
Colville Lake
YUKON
NUNAVUT
84,000 Trucks
4,000 Trucks
NORMAN WELLS
Deline
Tulita
Kugluktuk
Wolfden
Klondike Hwy
Mackenzie River
NORTHWEST TERRITORIES
Tahera
Lupin Mine
Whitehorse
Wrigley
Rae Lakes
Ekati
Diavik
Skagway
Alaska Hwy
46,000 Trucks
2,000 Trucks
Mackenzie River Barging
500 Barges
Snap Lake
Nahanni Butte
FORT SIMPSON
YELLOWKNIFE
Fort Liard
Trout Lake
Mackenzie Highway & Winter road Trucking
HAY RIVER
Enterprise
Fort Nelson
BRITISH COLUMBIA
Alberta/Mackenzie Highway
Mackenzie Northern Railway
Fort Smith
4,000 Railcars
3,000 Trucks
ALBERTA
Inbound Transport (Total: 866,000 Tonnes)
Tonnes
Trucks
Railcars
Barges
< 50,000
<1400
<700
<70
50,000 - 100,000
1400-2800
700-1400
70-130
100,000 - 170,000
2800-4700
1400-2400
130-220
170,000 - 310,000
4700-8600
2400-4400
220-410
2,886,084
2,290,356
1,257,983
108,000
Tonnes
Local/ Gravel Truck Hauls
Stockpile Truck Shuttles
Source: PROLOG Canada Inc., Transport Canada;
Created by: Ping Wang

3. MGP Direct and Indirect Transportation Impacts

This chapter incorporates, as direct transportation impacts, the local construction logistics opportunities presented in the previous chapter and extends our assessment to include the indirect impact of MGP Major Procurement Programs. Table 1 shows full MGP impacts.

Table 1

Transporation Impacts of
THE MACKENZIE GAS PROJECT
Direct & Indirect Impacts in Metric Tonnes and Transport Loads

PRINCIPAL LOGISTICS PROGRAMS		2006	2007	2008	2009	2010	TOTAL
PIPE HAUL	*tonnes*		*240,780*	*189,700*			430,480
Mackenzie River Barge Loads @	800		257	168			
Mackenzie Highway Truck Loads @	35		673	1,317			
FUEL HAUL	*tonnes*		*65,680*	*126,140*			191,820
Mackenzie River Bargeloads @	800		80	154			
Mackenzie Highway Truckloads @	35		263	589			
CAMPS MOBE/SUPPLY/DEMOBE	*tonnes*		32,480	38,850	*71,330*		71,330
Mackenzie River Bargeloads @	800		45	39	*83*		
Mackenzie Highway Truckloads @	35			448	*448*	*Outbound*	
CONST EQUIP MOBE/DEMOBE	*tonnes*		61,100	16,000	*77,100*	*Demobilization*	77,100
Mackenzie River Bargeloads @	800		89	15	*100*		
Mackenzie Highway Truckloads @	35		350	29	*379*		
FACILITIES/MODULES MOVE-IN	*tonnes*			34,734			34,734
Mackenzie River Bargeloads @	800			71			
Mackenzie Highway Truckloads @	35			7			
ANCHOR FIELD DRILLING/SUPPLY	*tonnes*			60,070			60,070
Mackenzie River Bargeloads @	800			60			
Beaufort Sea Bargeloads							**865,534**
LOCAL TRANSPORT AT MGP SITES							
Fuel Tank Delivery	*tonnes*	3,690	630				
	Truck loads	172	28				
Pipe Skid Delivery	*tonnes*			7,792	4,675		
	Truck loads			325	195		
Expedited Supply	*tonnes*		6,270	9,900	12,300	1,750	
	Truck loads		627	990	1,230	175	
Fresh Water Haul	*tonnes*		67,669	276,818	342,873	18,934	
	Truck loads		2,506	12,791	12,699	701	
Granular Matl Haul	*tonnes*		6,434,124	628,467	1,336,335	707,868	
	Truck loads		233,968	22,853	48,594	25,741	
*Stockpile Shuttles	*tonnes*		356,680	388,440	123,141	*Outbound*	
	Truck loads		9,794	9,808	4,741	*Demobilization*	
DIRECT IMPACTS-at MGP Sites	*total tonnes*	3,690	6,508,693	922,977	1,696,183	728,551	
Total Truck	*loads*	172	246,924	46,767	67,459	26,617	
INDIRECT IMPACTS - NWT Inbound	*tonnes*		400,040	465,494	*148,430*		865,534
Mackenzie Delta Sealift	*vessels*			1			
Mackenzie River System	*barge loads*		471	507	*183*	*Outbound*	
Mackenzie Northern Railway	*railcar loads*		4,141	4,268		*Demobilization*	
Mackenzie Highway to River Barge	*truck loads*		2,674	4,276			
Mackenzie Highway to MGP Sites	*truck loads*		1,286	2,389	*826*		
TOTAL DIRECT/INDIRECT IMPACTS	*tonnes*	3,690	6,908,733	1,388,471	1,844,613	728,551	

* Stockpile shuttle tonnes include fuel transfer by temporary pipeline. Stockpile shuttle tonnes are excluded from Direct Impacts total tonnes to avoid counting the same tonnes twice.

3.1 Major Procurement and Logistics Programs.

Major procurement programs for pipe, fuel, camps, equipment and supplies in the South create significant northern transportation impacts in terms of inbound NWT logistics programs. Local construction logistics opportunities outlined in the previous chapter are the direct transportation impacts of the MGP. They include the local stockpile/shuttle truck operations to complete major procurement and logistics programs.

The backward supply chain linkages associated with these same procurement and logistics programs are indirect transportation impacts. The scope of the major MGP procurement and logistics programs is outlined below.

3.1.1 Pipe Delivery

Total MGP pipe procurement will exceed 430,000 tonnes of 30 inch mainline pipe. A massive indirect transportation impact results from the corresponding movement requirements for some 5,700 railcar loads, almost 2,000 truck loads and 425 barge loads over a two year logistics program.

Rail movement to Hay River will maximize the car load envelope with 11 double jointed (80') pipe lengths averaging 74 tonnes net weight per load. Loading may vary with car tare weight and load carrying capacity currently subject to a 220,000 pound weight-on-rail restriction north of High Level, Alberta.

Truck Movement from Hay River direct to landlocked stockpile sites south of the Camsell Bend (Ndulee) barge landing can be handled with 5 double joints at up to 35 tonnes net weight per load. (Note that special truck designs may allow permitting for 6 double joints at up to 42 tonnes per load.)

Marine movement for the balance of pipe will be to barge landings with truck shuttles to nearby stockpile sites. The average barge load (1500 and 1000 series barges) will be 144 double joint pipe lengths. Barge offloading times will vary depending on the pipe size, joint weight and size of barge, but typically for 30 inch line pipe each barge will be off-

loaded within 5 hours. 12 hours will be required to offload smaller 10 inch diameter pipe for the gathering system. (400-600 series spud barges will provide a dock face and crane platform for barge discharge.)

Truck shuttles between barge landings and stockpile sites will transfer 6 double joints per trip with 10 minutes to load at the barge landing and 10 minutes to unload at the stockpile. Shuttle truck travel times vary from about 2 hours at Inuvik, Little Chicago and Trail River to 30 minutes at all other sites where stockpile locations are adjacent to, or near the river.

3.1.2 Fuel Distribution

Total MGP fuel procurement will be approximately 192,000 tonnes. A large indirect transportation impact results from the corresponding movement requirements for some 2,700 railcar loads, 850 truck loads and 234 barge loads over a two year logistics program.

Rail movement to Hay River is in tank cars with up to 105,000 litre capacity which must be short-loaded, typically at 75,000 litres of diesel fuel, due to the 220,000 pound weight-on-rail restriction north of High Level. (In winter when the roadbed is frozen cars can be loaded to full capacity.) From Hay River, large B-Train tanker trucks carrying 48,000 litres (38 tonnes) on all-weather roads will transfer fuel for landlocked stockpile sites south of the Camsell Bend barge landing; and the balance of fuel will move on the Mackenzie River, filling out barge capacity up to 1,000 tonnes per load.

Temporary pipelines will be used to pump fuel from barges to temporary tank farms where the stockpile sites are close, or adjacent, to the barge landing site. The barge offloading rate, at current capabilities, is a relatively slow 1200–1300 litres per minute. This will require some 14 to 20 hours to complete barge discharge.

Where large permanent tanks are already available at Norman Wells and Inuvik, fuel will be pre-positioned for winter road transfer to more distant work sites and for mid-winter

top-ups at other sites. At Fort Good Hope, approximately 30% of the fuel requirement will be trucked during the winter from Norman Wells. A similar 30% top-up for Niglintgak, Taglu, and Parsons Lake fuel will also be supplied from Inuvik, over the winter road.

Travel times for these longer hauls will average 5 hours each way for Norman Wells, and 3 ½ hours from Inuvik. Tri-axle tank trucks transporting 33,000 litres (27 tonnes) will be used on all winter roads.

3.1.3 Camps Movement/Supply

Procurement of camp units and camp consumables will create a total 71,000 tonne movement requirement for mobilization, demobilization and supply of MGP camps. An indirect transportation impact results from the corresponding requirement for some 450 truckloads and 84 bargeloads over a three year logistics program.

Trucks will deliver camp units to Hay River for transfer to barges; or direct to landlocked camp sites south of the Camsell Bend barge landing. Camp units may be either fully assembled (60'x12'x10.5') or more easily transported "flat packs".

Typical bargeloads are estimated at 25 fully assembled units, each requiring a 30 minute crane transfer to trucks or 12.5 hours to discharge a full bargeload. Alternatively, partially assembled "flat-packs" require only 20 minutes to transfer 3 per lift from barge to truck or 10 hours to discharge a bargeload of 90 "flat packs". Shuttle truckloads are assumed at 24 tonnes net with travel times equivalent to pipe shuttles.

Conventional truck and barge delivery will pre-stage up to 50% of camps supply prior to each construction season. A further 25% is assumed to be delivered direct to camps by highway or winter road during the construction season. The balance of perishable and priority freight will be delivered by expedited air and truck services.

3.1.4 Construction Equipment Haul

Owner procured and/or contractor equipment will create a total 77,000 tonne mobilization and demobilization movement requirement. A large indirect transportation impact results from the corresponding inbound movement requirement for some 1,375 truck loads and 100 barge loads in a mobilization logistics program that precedes both main construction years. A similar transportation impact results from the outbound demobilization logistics program following the final construction year.

Of 1,375 equipment truckloads, 379 truckloads will continue directly to landlocked pipeline spreads south of Camsell Bend and the rest will be transferred to barges. Most construction equipment will mobilize to pipeline spreads from both Hay River (NTCL) and Fort Simpson (Cooper Barging) in 2007. The balance of equipment, primarily for facilities construction, will mobilize from Hay River in 2008.

A typical barge load is 1000 tonnes (NTCL), and 500 tonnes (Cooper Barging). Although some wheeled equipment may be “walked” off the barge direct to camp maintenance yards, the use of shuttle trucks with an average 28 tonne equipment load taking 10 minutes each for barge discharge is assumed.

3.1.5 Facilities/Modules Move-In

Module procurement will see some 35,000 tonnes of production and station facility modules pre-assembled for specialized truck and barge shipment. From Hay River, indirect transportation impacts will include the requirement to move 71 bargeloads and 7 over-the-road heavy haul truck loads under a logistics program planned for 2008.

Although relatively low tonnage, the logistics program for these outsized industrial units is the most complex of the project. Modules loaded to barge will vary in size from 122 tonne units fabricated in the south to 500 tonne units for Taglu, Niglintgak and Parsons Lake, assembled at Hay River.

The smaller modules are for compressor stations and the larger units for production pad processing plants and the Inuvik gas plant. Additional 300 tonne modules are planned for the Norman Wells and Inuvik Area Facilities. All modules will be mounted on specially built trailers or transporters and loaded up to 5 per 1500 series barge or 3 per 1000 series barge (for the 122 tonne modules). The same trailers or transporters will be used to transfer modules from barges onto permanent facility foundations.

A separate module procurement and logistics strategy is planned for the Niglintgak gas conditioning facility. Facility module movement will be via Western Arctic Sealift with the barge mounted module(s) towed around Alaska from a fabrication yard, likely in Asia. The barge mounted modular facility will be permanently grounded adjacent to the Niglintgak site.

3.1.6 Anchor Field Drilling/Supply

Procurement of some 60,000 tonnes of drill rigs and drilling supplies is required for the anchor field development programs. The corresponding indirect transportation impact is a logistics program requiring 2,000 truckloads transferring to 60 bargeloads in 2008.

A full drill rig will be mobilized to each anchor field along with drilling tubulars, chemicals and other well site consumables. Most of this traffic is assumed to originate in Alberta with truck movement to Hay River for furtherance by barge to the Mackenzie Delta. At barge landings in the Mackenzie Delta, combinations of loaders, fork lift trucks and a spud barge crane can simultaneously discharge barges to shuttle trucks at an estimated rate of 15 minutes per 30 tonne truckload.

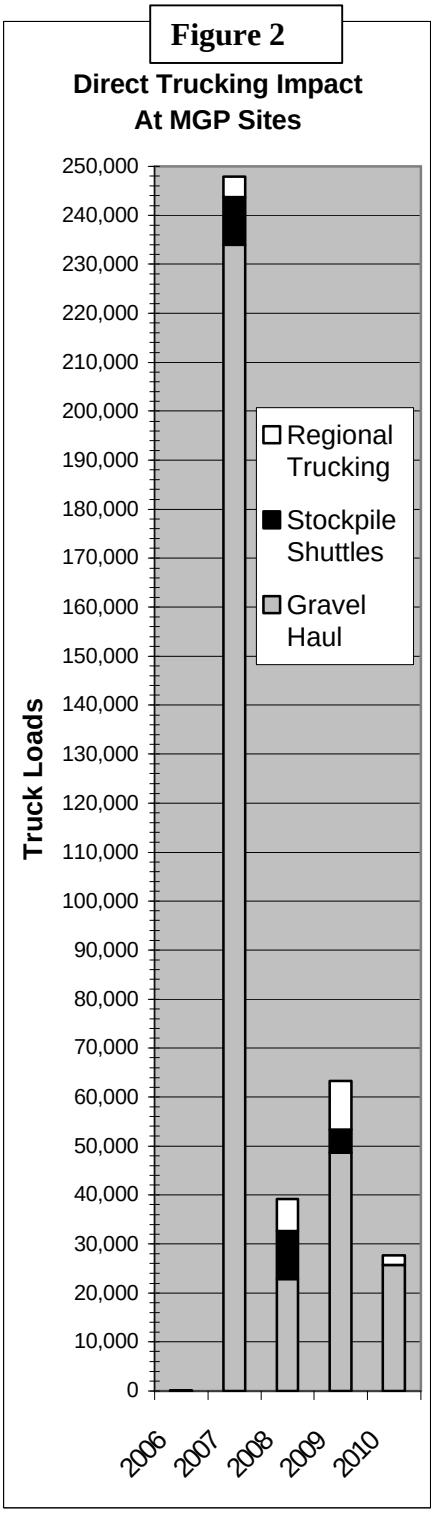
3.2 MGP Local Logistics

We have identified, as direct transportation impacts, the local logistics that are part of each project (e.g., local trucks for camp supply, gravel haul, concentrate haul, stockpile shuttles, rig moves, etc.).

These are the short-haul impacts that result directly from on-site construction support operations incorporating intensive use of transport equipment.

The direct transportation impacts at MGP Sites are comprised of short truck shuttles to MGP stockpiles primarily in summer and regional trucking and gravel haul primarily during the winter (See Figure 2)

Figure 2



3.2.1 Stockpile Staging Shuttles

Construction site mobilization, staging and demobilization shuttle operations will require approximately 10,000 truckloads during each of the two summers (2007 and 2008) prior to both winter construction seasons. A peak fleet requirement of over 200 trucks is anticipated.

More than 80% of the anticipated shuttle truck traffic will occur on specially constructed short spur roads - typically less than 3 km from barge landings to stockpile sites - and will take place during the summer barge season. Accordingly, beyond the all-weather road system, impacts on winter road operations or from encounters with the traveling public are unlikely.

3.2.2 Gravel Truck Haul

At peak (2007), the gravel haul for the entire MGP is currently anticipated to exceed 230,000 truckloads. However, it must be remembered that these are mostly winter road operations occurring in localized construction zones where the average haul is only about 13 km. Accordingly, highway encounters with the traveling public should be manageable.

While the total truckloads are, indeed, staggering by comparison to all other project transportation impacts, the true scope of the impact is perhaps better indicated by the relatively modest fleet requirement estimated at about 150 trucks.

3.2.3 Regional Supply Logistics

The composite peak requirement for regional supply logistics exceeds 12,000 truckloads comprised of the following:

- Potable Water Supply (2008-9 peak) - 8,350 truckloads/11 truck fleet
- Bulk Fuel Supply (2008-9 peak) - 2,450 truckloads/10 truck fleet
- Pipe Skid Supply (2007-8 peak) - 325 truckloads/6 truck fleet
- Expedited Supply (2008-9 peak) - 1,230 truckloads/3 truck fleet

The small truck fleet required for these local construction logistics programs is a more meaningful measure of transportation impact than total truckloads. With a small number of trucks continuously cycling a large number of truckloads, the impact is thinned out over the construction season.

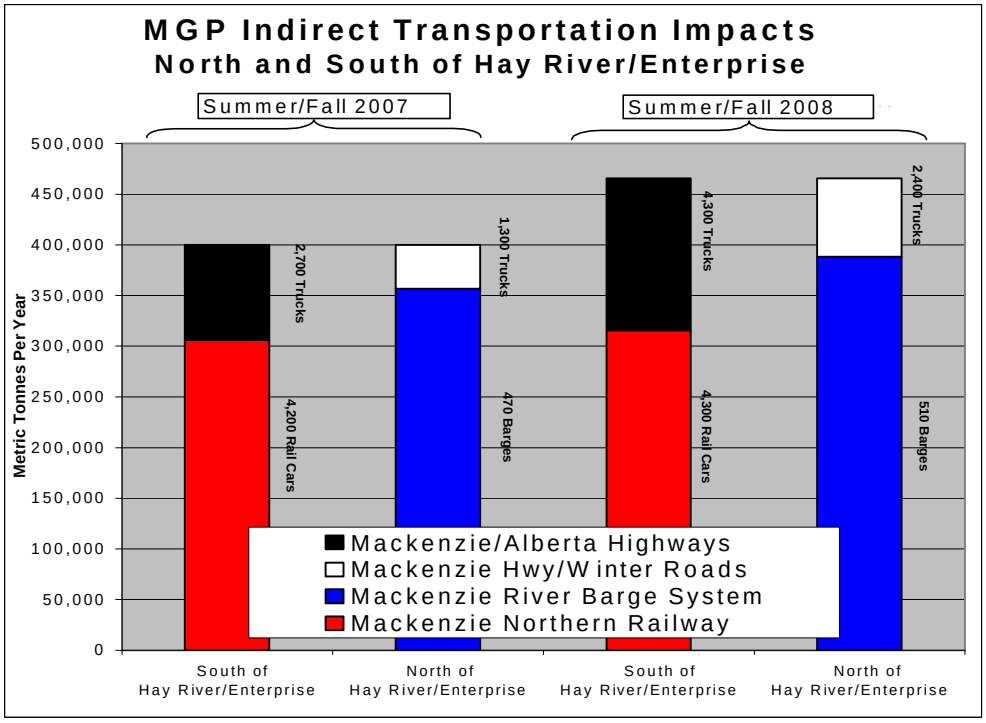
3.3 MGP Supply Chain Linkages.

We have determined the secondary cascade of supply chain linkages to the project (e.g., long distance rail, barge and truck transport for fuel, pipe, equipment, etc.). These are the transportation impacts that result indirectly from southern material, equipment and supply procurement.

Major procurement programs for the MGP create indirect transportation impacts that are paralleled both north and south of the Hay River/Enterprise Gateway, but with different modal combinations.

These parallel impacts increase together with the addition of facility construction requirements for the second winter construction season (2008-9), as shown in Figure 3.

Figure 3



3.3.1 Mackenzie Northern Railway

All project pipe and fuel will move by rail through the Hay River/Enterprise Gateway. 80% of this traffic should transfer directly from rail to river during the summer barging season without any impact on the NWT all-weather highway system. The balance of pipe and fuel traffic can transfer to trucks during the fall, avoiding any conflict with the annual influx of mine resupply traffic each winter (see Chapter 5).

It is anticipated that the Mackenzie Northern Railway will move more than 4,000 railcars (300,000 tonnes) of MGP pipe and fuel in each of the peak project years 2007 and 2008. This will keep over 70% of MGP traffic off the Alberta/Mackenzie public highway system south of Hay River/Enterprise.

3.3.2 Mackenzie/Western Arctic Barge System

Maximum use of barge operations is planned to provide essentially all transportation for MGP sites that are accessible by river. Hay River will be the primary transfer point from rail and truck to Mackenzie barge operations. However, Fort Simpson will be a secondary transfer point for barge movement of pipeline equipment spreads. As well, Western Arctic Sealift around Alaska to the Niglingtak Field will be used for marine movement of barge mounted production facilities from fabrication sites in Asia.

MGP impact on the Mackenzie River System increases from approximately 470 bargeloads in 2007 to over 500 bargeloads in 2008. Maximizing river use, will limit the Mackenzie Highway impact to less than 20% of MGP tonnage for southern project sites that cannot be reached by river.

3.3.3 Mackenzie Highway/Winter Road System

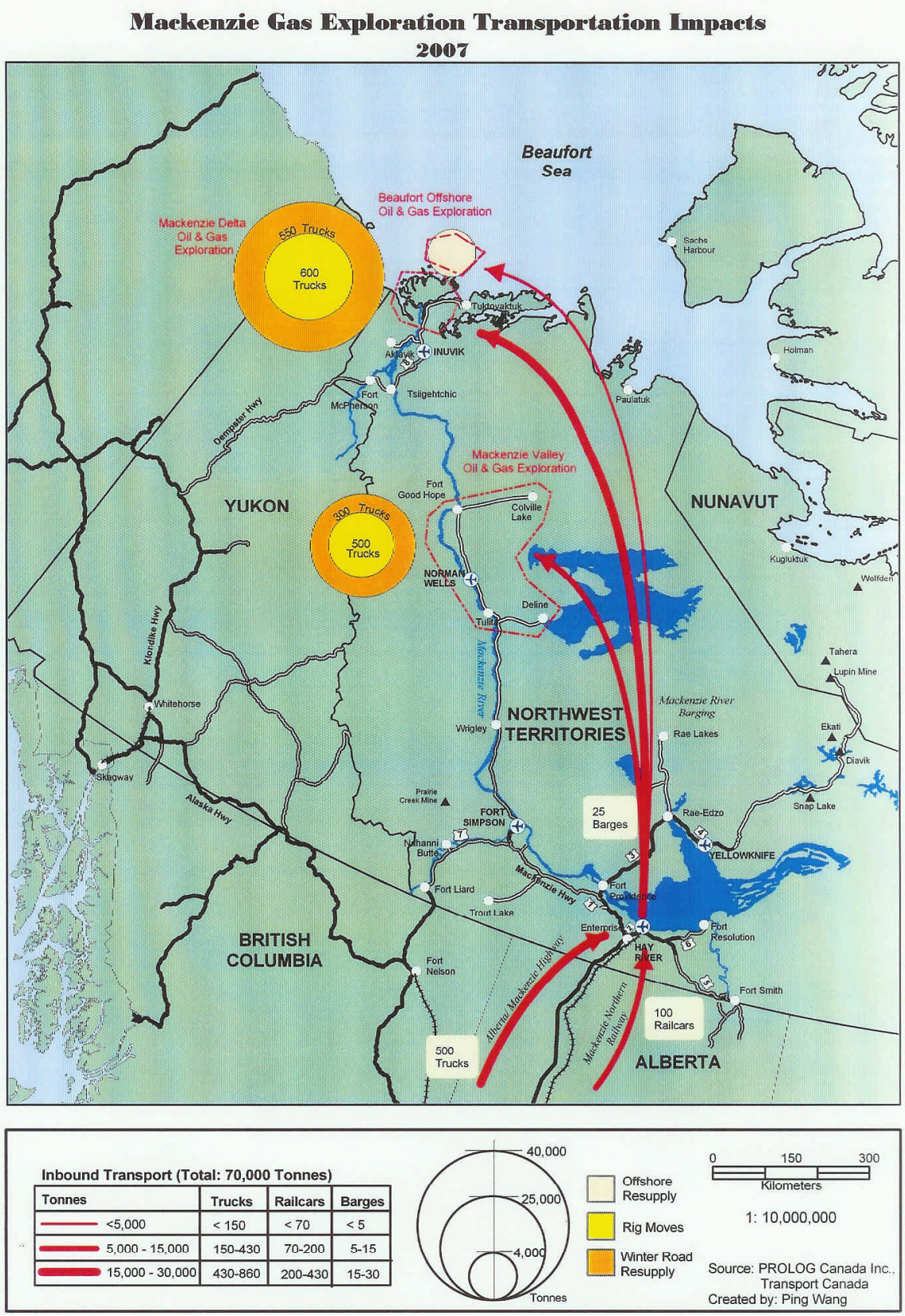
The indirect impact of major MGP procurement and logistics programs on the Mackenzie Highway System will derive from a combination of the following:

- trucks transferring fuel and pipe from the Mackenzie Northern Railway
- trucks moving equipment, modules and supplies from Alberta to MGP sites
- trucks transferring equipment, modules and supplies to Mackenzie River Barges

South of the Hay River/Enterprise Gateway the Peak Year 2008 impact is approximately 4,300 truckloads. North of the Hay River/Enterprise Gateway the Peak Year 2008 impact is approximately 2,400 truckloads. A total of some 6,700 truckloads will move into, out of, or through the Hay River/Enterprise Gateway during the Peak Year 2008.

Map 6 on the following page introduces both the direct impact of well site logistics and the indirect supply chain impacts for Offshore, Mackenzie Delta and Mackenzie Valley Gas Exploration covered in the next chapter.

Map 6


Mackenzie Gas Exploration Transportation Impacts
2007
Beaufort Sea
Beaufort Offshore Oil & Gas Exploration
Mackenzie Delta Oil & Gas Exploration
550 Trucks
600 Trucks
Sachs Harbour
Tuktoyaktuk
Holman
INUVIK
Aklavik
Fort McPherson
Tsiigehtchic
Paulatuk
Dempster Hwy
Mackenzie Valley Oil & Gas Exploration
Fort Good Hope
Colville Lake
YUKON
300 Trucks
500 Trucks
NUNAVUT
Kugluktuk
Wolfden
NORMAN WELLS
Deline
Tulit'a
Klondike Hwy
Mackenzie River
Tahera
Lupin Mine
Whitehorse
Wrigley
NORTHWEST TERRITORIES
Mackenzie River Barging
Rae Lakes
Ekati
Diavik
Skagway
Alaska Hwy
Prairie Creek Mine
FORT SIMPSON
25 Barges
Rae-Edzo
Snap Lake
Nahanni Butte
YELLOWKNIFE
Mackenzie Hwy
Fort Liard
Fort Providence
Trout Lake
Enterprise
Fort Resolution
HAY RIVER
BRITISH COLUMBIA
Fort Nelson
Alberta Mackenzie Highway
Mackenzie Northern Railway
Fort Smith
100 Railcars
500 Trucks
ALBERTA
Inbound Transport (Total: 70,000 Tonnes)
Tonnes
Trucks
Railcars
Barges
<5,000
< 150
< 70
< 5
5,000 - 15,000
150-430
70-200
5-15
15,000 - 30,000
430-860
200-430
15-30
40,000
25,000
4,000
Tonnes
Offshore Resupply
Rig Moves
Winter Road Resupply
0
150
300
Kilometers
1: 10,000,000
Source: PROLOG Canada Inc., Transport Canada
Created by: Ping Wang

4. Mackenzie Corridor Cumulative Transportation Impacts

The Mackenzie Corridor follows the Mackenzie River watershed into the Beaufort Sea. This chapter determines the transportation impacts of other Mackenzie Corridor projects taking place concurrently with the MGP impacts that were determined in the previous chapter. In particular the full scope of Mackenzie Gas Exploration is shown in Table 2.

Table 2
Transporation Impacts of
MACKENZIE GAS EXPLORATION
Direct & Indirect Impacts in Metric Tonnes and Transport Loads

PRINCIPAL LOGISTICS PROGRAMS	2005	2006	2007	2008	2009	2010
Beaufort Sea Offshore *Total Tonnes*	4,000	4,000	4,000	4,000	4,000	4,000
DRILL SHIP (SDC)	1	1	1	1	1	1
And TOWING VESSELS (mobe & reposition)	3	3	3	3	3	3
RIG SUPPLY *bargeloads @ 3 per season*	3	3	3	3	3	3
tonnes @ 1000 per barge	3,000	3,000	3,000	3,000	3,000	3,000
FUEL HAUL *bargeloads @ 1 per season*	1	1	1	1	1	1
tonnes @ 1000 per barge	1,000	1,000	1,000	1,000	1,000	1,000
Mackenzie Delta Onshore *Total Tonnes*	22,536	37,560	37,560	37,560	37,560	37,560
DRILL RIGS number of rigs	3	5	5	5	5	5
RIG MOBE/STAGE *barges @ 2 per rig*	6	10	10	10	10	10
MOVES PER RIG (remobe, reposition,demobe)	3	3	3	3	3	3
truckloads @ 40 per rig	360	600	600	600	600	600
tonnes @ 40 per truck	14,400	24,000	24,000	24,000	24,000	24,000
RIG SUPPLY *bargeloads @ 1000 tonnes*	6	10	10	10	10	10
truckloads @ 86 per rig	258	430	430	430	430	430
tonnes @ 24 per truck	6,192	10,320	10,320	10,320	10,320	10,320
FUEL HAUL *bargeloads @ 1000 tonnes*	2	3	3	3	3	3
truckloads @ 24 per rig	72	120	120	120	120	120
tonnes @ 27 per truck	1,944	3,240	3,240	3,240	3,240	3,240
Central Mackenzie Valley *Total Tonnes*	26,592	26,592	26,592	26,592	26,592	26,592
DRILL RIGS number of rigs	4	4	4	4	4	4
MOVES PER RIG (remobe, reposition,demobe)	3	3	3	3	3	3
truckloads @ 40 per rig	480	480	480	480	480	480
tonnes @ 40 per truck	19,200	19,200	19,200	19,200	19,200	19,200
RIG SUPPLY *bargeloads @ 1000 tonnes*	5	5	5	5	5	5
truckloads @ 50 per truck	200	200	200	200	200	200
tonnes @ 24 per rig	4,800	4,800	4,800	4,800	4,800	4,800
FUEL HAUL *bargeloads @ 1000 tonnes*	3	3	3	3	3	3
truckloads @ 24 per rig	96	96	96	96	96	96
tonnes @ 27 per truck	2,592	2,592	2,592	2,592	2,592	2,592
DIRECT IMPACTS						
Beaufort Sea Well Site Access *vessels*	4	4	4	4	4	4
Mackenzie Delta Summer Rig Staging *barges*	6	10	10	10	10	10
Winter Road Well Site Access *truck loads*	1,466	1,926	1,926	1,926	1,926	1,926
INDIRECT IMPACTS						
Mackenzie River Barge *barge loads*	26	35	35	35	35	35
Mackenzie Northern Rail *tankcar loads*	79	98	98	98	98	98
Mackenzie Hwy to Hay River *truck loads*	400	518	518	518	518	518
TOTAL DIRECT/INDIRECT IMPACTS *tonnes*	53,128	68,152	68,152	68,152	68,152	68,152

4.1 Mackenzie Corridor Concurrent Projects.

The Mackenzie Corridor embraces three areas of oil and gas exploration stimulated by the MGP - Beaufort Sea Offshore, Mackenzie Delta Onshore, and Central Mackenzie Valley. It also includes the Prairie Creek Mining Project in the Southern Mackenzie Watershed.

4.1.1 Beaufort Sea Offshore Drilling

Devon Canada Corporation holds drilling licences in the near off-shore Beaufort Sea just north of the Mackenzie Delta. Devon plans a multi-year drilling program using the bottom founded SDC (submersible drilling platform) currently moored at Herschel Basin. In 2005, three towing vessels will likely enter the Beaufort via the Northwest Passage during the open water repositioning season between mid-July and mid-October.

SDC resupply will require at least 4 Mackenzie barge loads each summer supplemented by helicopter airlift following positioning for the winter drilling season which typically extends from late December through early April. An 80 man rig crew will rotate two weeks on and one week off.

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4.1.2 Mackenzie Delta Onshore Drilling

In addition to development drilling in the three MGP anchor fields (Niglingtak, Taglu and Parsons Lake), there will be sustained exploration drilling by Chevron/BP and Encana in the Mackenzie Delta. Currently that is supported by 3 drilling rigs anticipated to increase to 5 rigs in 2007.

For each rig move annual remobilization and repositioning requires up to 40 truckloads plus an additional 110 truckloads per season for drilling supplies. Between seasons rigs are staged in the Mackenzie Delta on the equivalent of ten 1500 series barges.

An average drilling season is 110 days January through April and each rig can complete two wells per season. With five 75 man rig crews, a 375 man work force will be

supporting a sustained 10 well exploration program in each winter after 2007. Including three development drilling rigs for MGP anchor fields, a total fleet of eight rigs will then be operating in the Mackenzie Delta.

4.1.3 Central Mackenzie Valley Drilling

Apache/Paramount, Northrock and Petro-Canada are pursuing sustained exploration programs in the Central Mackenzie Valley. The Average drilling season is 60 days January through March.

Apache/Paramount has two rigs contracted at Colville Lake and Turton Lake, northeast of Norman Wells. These rigs are demobilized/remobilized at Norman Wells each season. A third rig to support a Petro-Canada drilling program at Colville Lake is also anticipated. Two wells per rig per season can be completed.

Northrock has a single rig under contract south of Tulita, drilling one well per season.

Each rig requires 40 truckloads for mobilization, repositioning or demobilization and another 110 truckloads per season of drilling supplies.

4.1.4 Prairie Creek Mining

Canadian Zinc Corporation owns this property located 170 km west of Fort Simpson and 20 km north of the Nahanni National Park. Originally the Cadillac Mine, production facilities were first installed in 1980 for mining silver, but closed shortly thereafter due to low silver prices. Currently, extensive geological, metallurgical and environmental studies are being carried out, focusing on rehabilitating the facilities to optimize recoveries of lead, zinc, copper, and silver. Mineral reserves are estimated at 11.8 million tonnes.

The company is extensively involved in permitting activities, and a drilling program is scheduled for summer 2005. Discussions on expansion of the boundaries of the national park could impact future development strategies. Canadian Zinc management are estimating production start-up in 2008.

Annual production of 200,000 tonnes of concentrates is anticipated by 2009 with truck transport to railhead at either Fort Nelson or Enterprise. Enterprise is assumed more likely, as a proposed all-weather road east to the Mackenzie Highway near Fort Simpson avoids bridging the Liard River, and Hwy 1 is a superior road. Some 5600 truckloads per year will be required to facilitate mining activity moving both outbound concentrate and inbound supplies.

The full scope of Prairie Creek transportation impacts is shown in Table 3. Note that fuel supply will be backhauled inbound on empty concentrate trucks.

Table 3

Transportation Impacts of
Prairie Creek Mine Project (2008 Start-Up)
Direct/Indirect Impacts in Metric Tonnes and Transport Loads

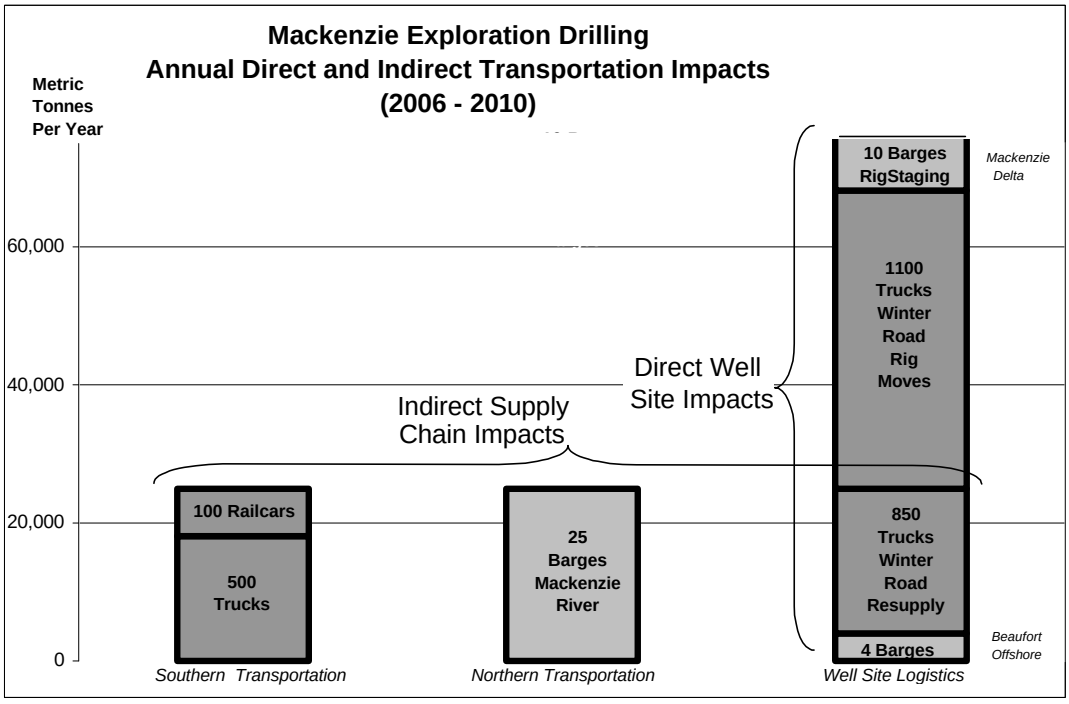
PRINCIPAL LOGISTICS PROGRAMS	2006	2007	2008	2009	2010
Inbound Mining Supply					
Total Via Enterprise or Fort Nelson *tonnes per year*			21,500	20,000	25,000
Equipment *tonnes per year*			10,000		
truck loads @ 28 tonnes/trk			357		
Resupply *tonnes per year*			4,000	10,000	15,000
truck loads @ 24 tonnes/trk			167	417	625
Fuel* *tonnes per year*			7,500	10,000	10,000
tankcar loads @ 70 tonnes/car			107	143	143
Outbound Concentrate					
Total Via Enterprise or Fort Nelson *tonnes per year*			100,000	200,000	200,000
Highway Haul *truck loads @ 40 tonnes/trk*			2,500	5,000	5,000
Railway Haul *car loads @ 70 tonnes/car*			1,429	2,857	2,857
DIRECT IMPACTS					
NWT Hwy Concentrate/Fuel Haul *truck loads*			2,500	5,000	5,000
INDIRECT IMPACTS					
Hwy from Alberta/BC to Mine Site *truck loads*			524	417	625
Rail via Enterprise or Fort Nelson *car loads*			1,536	3,000	3,000
TOTAL DIRECT/INDIRECT IMPACTS *tonnes*			121,500	220,000	225,000

* Fuel from railhead will be backhauled on concentrate trucks

4.2 Mackenzie Corridor Project Logistics Impacts

In addition to MGP logistics impacts identified in Chapter 3, both barge and truck support for MGP stimulated exploration activity will take place throughout the Mackenzie Corridor. Figure 4 combines the direct impact of well site logistics and the indirect impact of supply chain support.

Figure 4



In the Beaufort Sea, local marine transportation that is integral to SDC drilling operations is anticipated to include 1 fuel and 3 drilling supply bargeloads each summer. Note that the SDC itself will require marine movement using one 16-24,000 hp towing vessel plus two smaller assist tugs (Ice Class II). In the Mackenzie Delta, land rigs require an estimated 10 barges (1500 series equivalent) for summer stand-by staging and subsequent remobilization to new well sites.

In addition to marine operations, local truck activity integral to annual rig remobilization/ repositioning/demobilization will total approximately 1,100 truckloads for the Mackenzie Delta and Central Mackenzie Valley together. Drilling fuel and resupply will require an additional 850 winter truckloads in the Mackenzie Valley and Delta.

The full impact of direct and indirect marine activity integral to on and offshore drilling in the Beaufort Delta Region could require as much as 35 barges, if planned mainline Mackenzie River transportation from Hay River is not supplemented or replaced by Dempster Highway transportation.

Indirect Exploration Drilling supply chain impacts are 26 Mackenzie River bargeloads transferred from a combination of 100 railcars and 500 trucks.

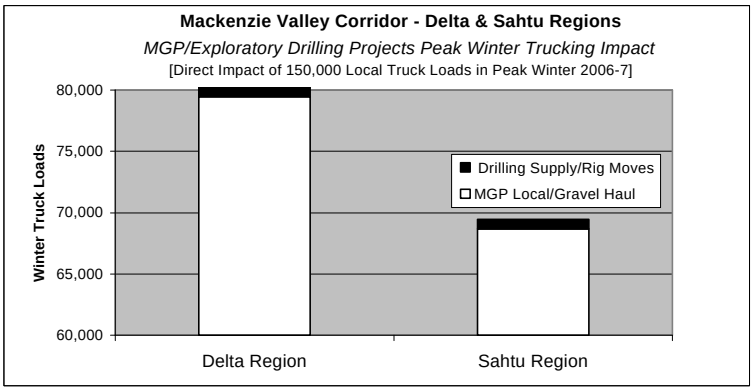
The following subsections provide a cumulative assessment of MGP transportation impacts combined with:

- Exploration Drilling Impacts on Beaufort Delta and Sahtu Region Trucking,
- Prairie Creek Mine Impacts on Deh Cho Region Trucking; and
- Exploration Drilling Impacts on Mackenzie River Barging.

4.2.1 Northern Mackenzie Corridor Local Trucking

In both the Beaufort Delta and Sahtu Regions, local trucking impacts peak during MGP pre-construction winter 2006-7 infrastructure gravel haul (See Figure 5). The anticipated annual exploratory drilling impact of over 1,000 winter truckloads in the Delta and over 750 in the Sahtu while more than double year 2000 activity in either region, is dwarfed by the magnitude of the gravel haul, especially in the Beaufort Delta Region.

Figure 5



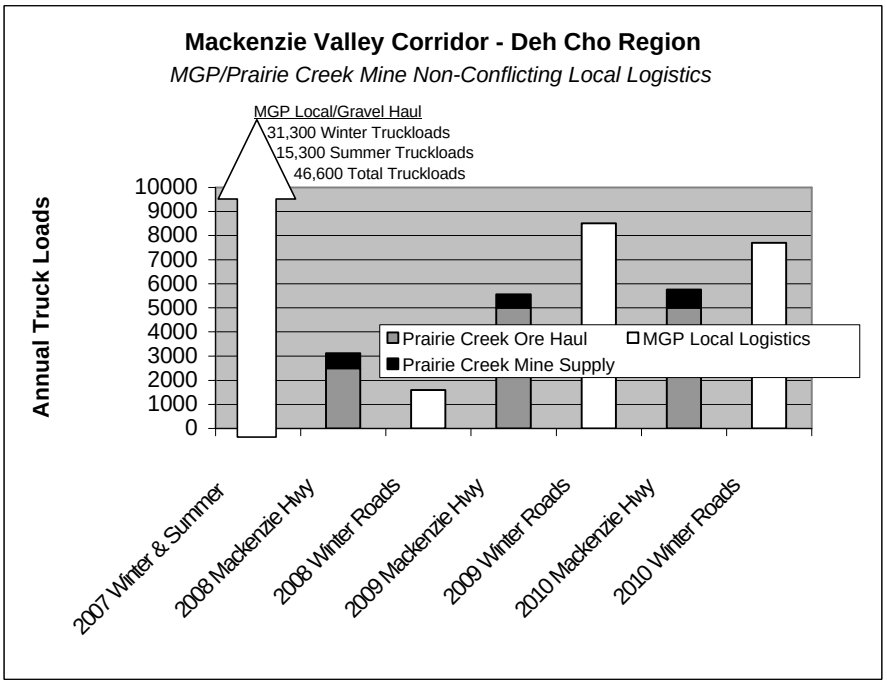
The cumulative impact of over 80,000 truckloads operating in the Delta over a 110 day winter road season is an average of 727 truck trips per day on the system or one every half hour. However, the cumulative impact of almost 70,000 truckloads operating in the Sahtu over a shorter 70 day season is an average of 1,000 truck trips per day on the system or more than one every 2 minutes, assuming two 12 hour shifts per day.

Caution must be taken with the interpretation of these impacts. MGP gravel and water hauls are localized around Little Chicago, Fort Good Hope, Tulita and Little Smith Creek with trip distances less than 20 km likely. Except for local MGP trucking around Fort Good Hope, interaction with rig moves and drilling resupply should not conflict unduly.

4.2.2 Southern Mackenzie Corridor Local Trucking

In the Deh Cho Region, the winter 2006-7 pre-construction peak gravel haul (over 30,000 truckloads) is followed by a summer 2007 gravel haul on all-weather highways that is only half as much but still huge. However, from a cumulative impact perspective, the MGP and Prairie Creek Mine project will not overlap until 2008 when that project gets underway (See Figure 6).

Figure 6



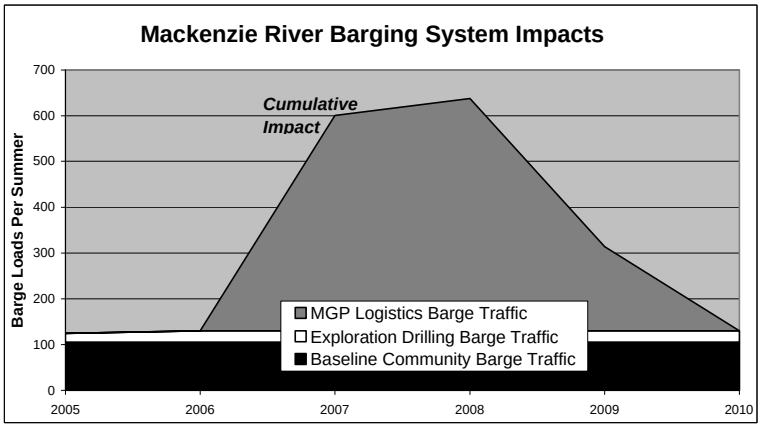
By that time the major impact of MGP local logistics will be largely confined to winter road operations that will not conflict with Prairie Creek mine year-around logistics operations on all-weather highways. Nevertheless, on the all-weather portion of the Mackenzie Highway, a 200,000 tonne/year outbound concentrate ore haul to railhead will increase trucking impacts (5,000 trucks per year in each direction) that coincide with MGP logistics for pipeline spreads south of Fort Simpson not reached by barge.

Prairie Creek trucking is assumed to an Enterprise/Hay River railhead via the Mackenzie Highway. However, Liard Highway routing to the Fort Nelson railhead is also an option. In that case Prairie Creek trucking would encounter Fort Liard area drilling logistics supported out of Fort Nelson - but neither would pose an MGP cumulative impact.

4.2.3 Mackenzie Corridor Project/Baseline Barging Impacts

Barge transportation is currently planned for all exploration drilling logistics in the Mackenzie Corridor. The level of barging system support is anticipated to increase to some 30 bargeloads per year that will be sustained at least through 2010 (See Figure 7).

Figure 7

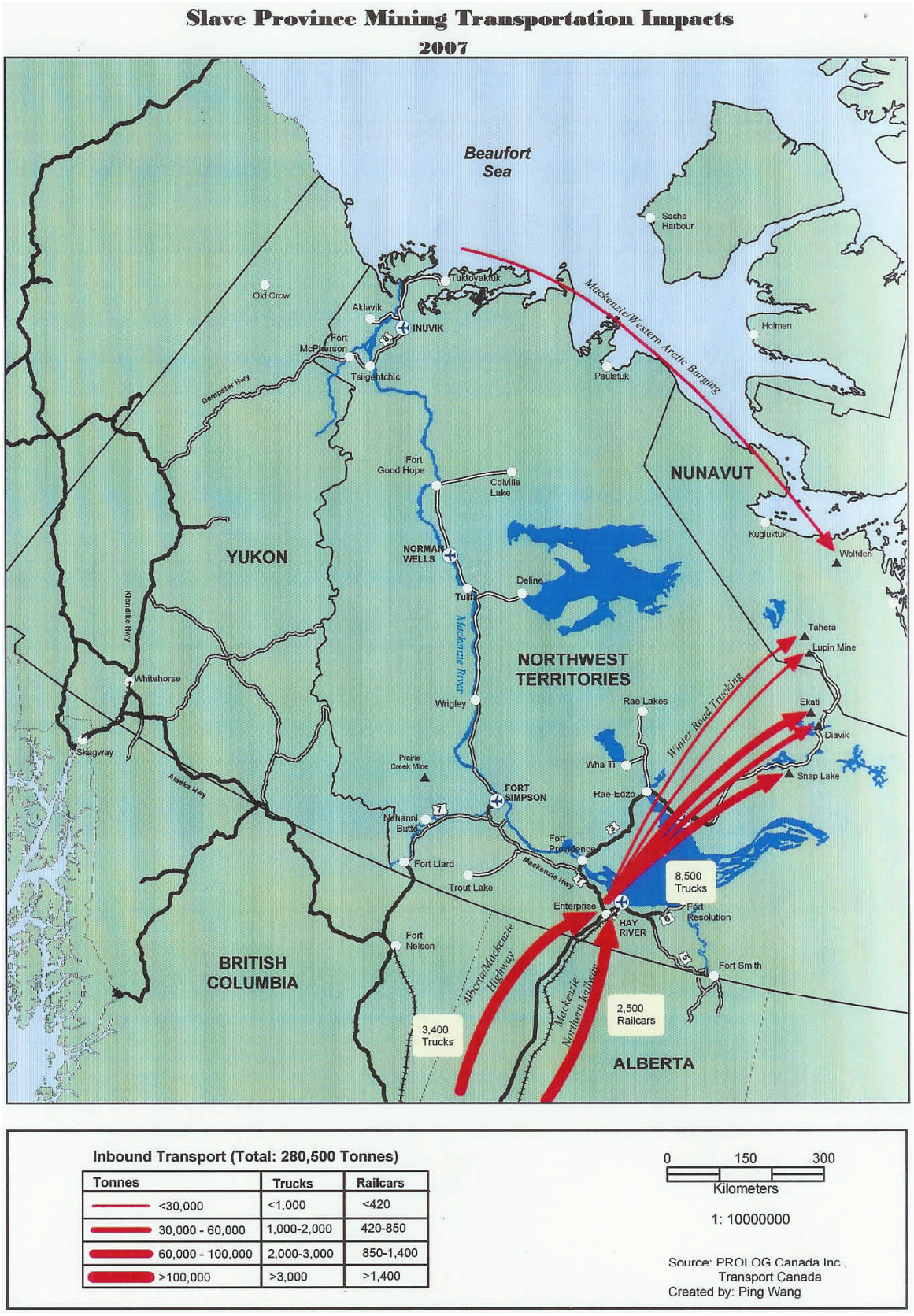


In 2006, this approximates a significant 30% increase over the baseline community (Year 2000) barging requirement. However, that increase becomes insignificant by comparison to the overwhelming influx of MGP barge traffic in each of the two succeeding summers (2007 and 2008), followed by a much lower but still large requirement for backhaul barge transportation during MGP demobilization in Summer 2009.

The cumulative barging impact during the two peak MGP years will exceed 600 bargeloads, approximately 6 times baseline barge traffic. For all practical purposes, this impact is unavoidable to the Central Mackenzie Valley. However, all-weather Mackenzie Highway access as far as Wrigley in the Southern Mackenzie Corridor and Dempster Highway Access as far as Inuvik in the Northern Mackenzie Corridor provide contingency alternatives which may be used for Exploration Drilling or MGP logistics.

Map 7 on the following page introduces the combination of direct/indirect transportation impacts in the Slave Corridor that are covered in the next chapter.

Map 7


Slave Province Mining Transportation Impacts
2007
Beaufort Sea
Sachs Harbour
Tuktoyaktuk
Old Crow
Aklavik
INUVIK
Fort McPherson
Tsiigehtchic
Dempster Hwy
Mackenzie/Western Arctic Barging
Holman
Paulatuk
Fort Good Hope
Colville Lake
NUNAVUT
Kugluktuk
Wolfden
YUKON
NORMAN WELLS
Deline
Tulita
Klondike Hwy
Mackenzie River
Tahera
Lupin Mine
NORTHWEST TERRITORIES
Whitehorse
Wrigley
Rae Lakes
Ekati
Diavik
Winter Road Trucking
Skagway
Alaska Hwy
Prairie Creek Mine
Wha Ti
Snap Lake
FORT SIMPSON
Rae-Edzo
Nahanni Butte
Fort Providence
Fort Liard
Trout Lake
Mackenzie Hwy
8,500 Trucks
Enterprise
HAY RIVER
Fort Resolution
Fort Nelson
BRITISH COLUMBIA
Alberta/Mackenzie Highway
Mackenzie Northern Railway
Fort Smith
2,500 Railcars
3,400 Trucks
ALBERTA
Inbound Transport (Total: 280,500 Tonnes)
Tonnes
Trucks
Railcars
<30,000
<1,000
<420
30,000 - 60,000
1,000-2,000
420-850
60,000 - 100,000
2,000-3,000
850-1,400
>100,000
>3,000
>1,400
0
150
300
Kilometers
1: 10000000
Source: PROLOG Canada Inc., Transport Canada
Created by: Ping Wang

5. Slave Corridor Cumulative Transportation Impacts

The Slave Corridor connects the mining projects of the Slave Geological Province at one end and includes the Deh Cho Bridge Project at the other. This chapter determines the transportation impacts of projects taking place concurrently with, but in a separate transportation corridor from, the Mackenzie Corridor impacts determined in the previous chapter. The full scope of direct and indirect impacts for Slave Province Mining Projects are shown in Table 4.

Table 4

Transporation Impacts of
SLAVE PROVINCE MINING PROJECTS
Direct & Indirect Impacts in Metric Tonnes and Transport Loads

PRINCIPAL LOGISTICS PROGRAMS				2005	2006	2007	2008	2009	2010
FUEL	*tonnes* @	*38.5*	*per truck*	115,500	155,925	163,625	150,150	159,775	159,775
	truck loads @	*50%*	*of total*	3,000	4,050	4,250	3,900	4,150	4,150
	tankcar loads @	*70*	*tonnes/car*	1,650	2,228	2,338	2,145	2,283	2,283
CEMENT	*tonnes* @	*26*	*per truck*	15,600	21,060	22,100	20,280	21,580	21,580
	truck loads @	*10%*	*of total*	600	810	850	780	830	830
	hoppercar loads @	*80*	*tonnes/car*	195	263	276	254	270	270
EXPLOSIVES	*tonnes* @	*45*	*per truck*	27,000	36,450	38,250	35,100	37,350	37,350
	truck loads @	*10%*	*of total*	600	810	850	780	830	830
EQUIP/CAMPS	*tonnes* @	*29*	*per truck*	8,700	11,745	12,325	11,310	12,035	12,035
	truck loads @	*5%*	*of total*	300	405	425	390	415	415
STEEL/TIRES	*tonnes* @	*24*	*per truck*	7,200	9,720	10,200	9,360	9,960	9,960
	truck loads @	*5%*	*of total*	300	405	425	390	415	415
LOCAL SUPPLY	*tonnes* @	*20*	*per truck*	24,000	32,400	34,000	31,200	33,200	33,200
	truck loads @	*20%*	*of total*	1,200	1,620	1,700	1,560	1,660	1,660
MINE SITE WINTER ROAD ACCESS									
Ekati Mine Total	*truck loads*			3,000	3,000	3,000	3,000	3,000	3,000
Diavik MineTotal	*truck loads*			1,600	1,600	1,600	1,600	1,600	1,600
Snap Lake Total	*truck loads*			500	2,200	2,100	1,700	1,700	1,700
Lupin Mine Total	*truck loads*			300	600	600	300	300	300
Tahera Mine Total	*truck loads*			450	550	300	300	300	300
Wolfden Mine Total	*truck loads*							300	300
Other Mine/Exploration	*truck loads*			150	150	900	900	1,100	1,100
Total Hwy/Winter Road Access	*truck loads*			6,000	8,100	8,500	7,800	8,300	8,300
DIRECT IMPACTS									
Mine Site Local Supply	*truck loads*			1,200	1,620	1,700	1,560	1,660	1,660
INDIRECT IMPACTS									
Highway from Alberta/BC	*truck loads*			2,400	3,240	3,400	3,120	3,320	3,320
Highway from Hay River/Enterprise	*truck loads*			3,600	4,860	5,100	4,680	4,980	4,980
Railway to Hay River/Enterprise	*car loads*			1,845	2,491	2,614	2,399	2,552	2,552
TOTAL DIRECT/INDIRECT IMPACTS	*tonnes*			198,000	267,300	280,500	257,400	273,900	273,900

5.1 Slave Corridor Concurrent Projects.

The Slave Corridor extends from the junction of Mackenzie Highway 1 and Yellowknife Highway 3 near Fort Providence to Yellowknife and the Tibbet to Contwoyto Lake Winter Road (Lupin Road). The Slave Corridor accesses Slave Geological Province mining projects in both NWT and Nunavut. Construction of the Deh Cho Bridge across the Mackenzie River at Fort Providence is also a project considered within this corridor.

5.1.1 Ekati Mine Development/Operations.

Ownership: BHP Billiton Diamonds Inc. (80%); Other Individuals (20%)

Production from this project, located on Lac de Gras some 300 km northeast of Yellowknife, commenced in October, 1998. The five million carats produced at Ekati account for approximately 6% of world diamond production by value, some $800 million annually. In excess of 12,000 tonnes of ore is processed each day. Estimated reserve life extends to 2015. The company currently has a payroll of 800 employees, and 650 others are employed by contractors active at the mine site. 28% of all workers are aboriginal.

While mining of ore commenced with open-pit methods originally, production mining of other kimberlite “pipes” has utilized underground mining operations. Just under 3000 truckloads of freight was shipped to the mine over the Tibbett to Contwoyto Lake Winter Road to facilitate 2004 operations, approximately 58% of the winter road’s total traffic. Some 60% of the total supplies shipped is fuel.

5.1.2 Diavik Mine Development/Operations

Ownership: Diavik Diamond Mines Inc. (60%)
– a subsidiary of Rio Tinto PLC; Aber Diamond Mines Ltd. (40%)

Mining operations at Diavik, also located in the Lac de Gras area, commenced in January, 2003 after $1.25 billion was invested in the construction of the mine. Reserves of 27 million tonnes suggest a mine life of 20 years, with annual production expected to

average 5.4 million carats. In fact, 7.6 million carats were produced in 2003, utilizing a workforce of 700, 38% of which are aboriginal.

Open-pit mining operations have been utilized to date and Diavik is planning a US $265 million expansion program for a second open-pit mine. As well, Diavik is conducting a feasibility study for its first underground mining operation. 1572 truckloads of materials and supplies were shipped to the mine over the winter road during the 2004 shipping season.

5.1.3 Snap Lake Mine Development/Operations

Ownership: DeBeers Canada Inc.

The Snap Lake project is located 220 km northeast of Yellowknife. Permits are now in place that will allow the company to immediately commence construction of dykes and mine facilities for the first phase. This activity will be facilitated by construction materials, equipment and supplies transported to the site over the Tibbett to Contwoyto Lake Winter Road, during the 2005 – 2007 mine development period.

Ore production is scheduled to start in 2007 and is forecast to reach an average rate of 3,000 tonnes per day, employing some 550 workers over a mine life of 20 years. 1700 truck loads per winter shipping season are forecast to facilitate mining operations at Snap Lake.

5.1.4 Lupin Mine Transition/Continuing Operations

Ownership: Echo Bay Mines Ltd. – subsidiary of Kinross Gold Corporation.

The Lupin mine, located 400 km north of Yellowknife on the west shore of Contwoyto Lake, commenced operations in 1982, and after many years of care and maintenance only, started up with limited operations again in 2003. Curtailed activity prior to final shut down is restricted to mining of the shaft and crown pillars, and compliance with the environmental management programs, including cement/backfill mix remediation.

288 truckloads of supplies were trucked to the Lupin mine site during the 2004 winter road season, much of which is cement and fuel. Similar volumes are anticipated during the MGP era as the mine site transitions into a research and/or training centre.

5.1.5 Jericho (Tahera) Mine Development/Operations

Ownership: Tahera Diamond Corporation

This property is located at the north end of Contwoyto Lake, 420 km north northeast of Yellowknife, in Nunavut. Mining will commence with open pit operations, and the production of 330,000 tonnes of ore per year. Underground operations are scheduled in 5 – 6 years after start-up. Some 160 people will be employed in mining and ore processing when the project is in full operation.

Following the successful conclusion of a Crown land lease transaction in February, 2005, with Indian and Northern Affairs Canada, Tahera will commence mine development activities. The schedule calls for mine development during 2005 and 2006 with commercial diamond production starting in 2006.

Surface access to the mine will be by the Tibbett to Contwoyto Lake Winter Road, and an all-weather road from Contwoyto Lake to the mine site.

5.1.6 The High Lake (Wolfden) Mine Development

Ownership: Wolfden Resources Inc.

This project is located 175 southeast of Kugluktuk, and 550 km northeast of Yellowknife, in Nunavut. The Wolfden plan involves exploitation of copper, zinc and silver base metal deposits at High Lake, and the Ulu gold property located south of High Lake, and previously owned by BHP and Kinross. A processing facility (ex Nanisivik plant) has been acquired and will be refurbished and installed at High Lake.

Wolfden is planning an all-weather road between High Lake and the Coronation Gulf at Gray's Bay, some 175 km east of Kugluktuk. A winter road will be built between the Ulu property and High Lake. Pre-feasibility studies and consultations will be carried out in 2005, with a target of 2007 for start-up. The servicing of mining operations and the transportation of concentrates will be largely handled over a port facility at Gray's Bay. Supplies will moved in by Western Arctic Sealift barge from the Mackenzie River. Some freight (est. 300 truckloads per year) will eventually be supplied from the south over the traditional winter road to Contwoyto Lake.

5.1.7 Deh Cho Bridge Project

This proposed facility will be located on Highway 3 over the Mackenzie River, near Fort Providence and the current ferry service pushouts. The concept was proposed by the Fort Providence Combined Council Alliance, and the project will be a partnership between the Council, NWT government, and third party investors, industry and financial institutions.

The project envisions creation of a new bridge corporation to raise equity and debt financing; operate tolls and maintain the bridge, secured by a 35 year concession agreement. The GNWT would acquire absolute ownership at the end of this period. Revenues will include a $5 to $6 per tonne toll fee applied to northbound (only) commercial vehicles, and a further annual fee direct from the GNWT, representing the avoidable costs of current ferry and ice bridge operations.

The planned structure itself involves earth-filled approaches; two concrete abutments at each end; nine concrete piers supporting continuous reinforced concrete deck spans; and a centre cable-stayed structure with sufficient height to permit passing navigation. The capital cost of the project is $55 million, and construction is now scheduled for 2006 and 2007.

316,000 tonnes of granular materials, reinforcing steel, cement, pre-cast concrete sections, and steel bents and railings will be used in the construction of the bridge and approaches. 13,000 truckloads will be used to position these materials.

The full scope of Deh Cho Bridge project logistics impacts are shown in Table 5.

Table 5

Transportation Impacts of
Deh Cho Bridge Project
Direct/Indirect Impacts in Metric Tonnes and Transport Loads

PRINCIPAL LOGISTICS PROGRAMS	2006	2007	TOTAL
Inbound Construction Supply			
Bridge Steel *tonnes per year*	2,378	4,640	7,018
truck loads @ 35 tonnes/trk	68	133	201
Pre-Cast Concrete *tonnes per year*		10,100	10,100
truck loads @ 27 tonnes/trk		374	374
Cement *tonnes per year*	1,670		1,670
truck loads @ 38 tonnes/trk	44		44
Fuel *tonnes per year*	10,000	8,000	18,000
truck loads @ 38 tonnes/car	263	211	474
Total Via Hay River/Enterprise Railhead *tonnes*	14,048	22,740	36,788
Rail Haul *car loads @ 70 tonnes/car*	201	325	526
Local Construction Gravel/Rock Haul			
Total via Hwy 3* Truck Haul *tonnes per year*	161,600	117,800	279,400
truck loads @ 24 tonnes/trk	6,733	4,908	11,642
DIRECT IMPACTS			
Gravel/Rock Haul *truck loads*	6,733	4,908	11,642
Inbound Construction Supply *truck loads*	375	717	1,092
INDIRECT IMPACTS			
NWT Hwys Inbound to Bridge Site *truck loads*	375	717	1,092
Rail to Hay River/Enterprise *car loads*	201	325	526
TOTAL DIRECT/INDIRECT IMPACTS*tonnes*	175,648	140,540	316,188

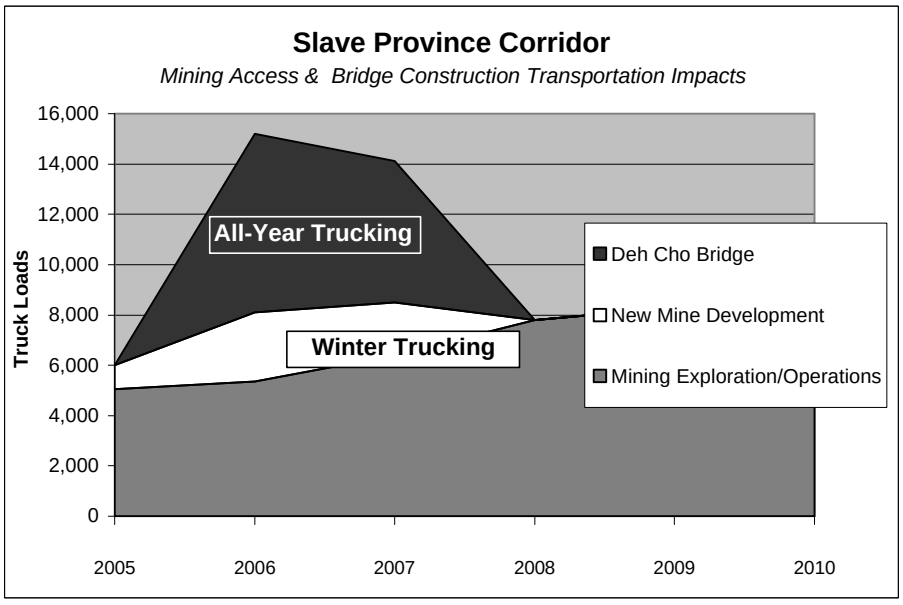
* note: approximately 27% will require a short haul of less than 5 km haul on Hwy 1

5.2 Slave Corridor Project Trucking Impacts

The cumulative impacts of Slave Corridor projects occurring concurrently with Mackenzie Corridor projects and the MGP are mitigated by divergence of the two corridors near Fort Providence. This section of the report provides a cumulative assessment of projects occurring *within* the Slave Corridor. (See following Chapter 6 for an assessment of cumulative impacts where both these corridors converge at the Hay River/Enterprise Gateway).

Within the Slave Corridor, cumulative impacts of Slave Province Mine development, exploration and operations as well as the Deh Cho Bridge project at Fort Providence are profiled in Figure 8.

Figure 8



The transportation impact of new mine development is anticipated to peak coincident with construction of the Deh Cho Bridge in 2006 and 2007. A peak impact of approximately 15,000 truckloads is expected during 2006.

About half of these are mine supply truckloads confined to a 60 day winter road season while the balance of Deh Cho Bridge construction traffic can operate on all-weather roads throughout most of the year.

5.2.1 Mine Access Winter Road Trucking

The Tibbet to Contwoyto Lake Winter Road is assumed to accommodate the direct impact of local resupply and service trucking between Yellowknife and the mine sites. As well, the indirect supply chain impact of mining materials procurement reaching back to vendors outside of the NWT includes a combination of rail/truck and through truck operations that extend through to the Winter Road. As a practical matter regardless of whether the impact is direct or indirect, the same number of trucks will be required in the Slave Province Corridor.

The previous Table 4 identifies combined direct and indirect Yellowknife Highway/Winter Road trucking impact of all Slave Province mining projects. (It also identifies the indirect rail impact which the Hay River/Enterprise Gateway Assessment includes in the next Chapter)

A peak of some 8,500 truckloads indicated during 2007 is attributed to Snap Lake Mine development. However, increasing mine operations and exploration supply is expected to keep total truckloads above 8,000 per season through 2010 and beyond. With a 60 day Winter Road operating window, the peak impact will average over 140 trucks per day each way (loaded and empty) or about 12 per hour.

5.2.2 Yellowknife Highway 3 Local Trucking

The previous Table 5 identifies the direct impacts of local construction gravel and rock hauling as well as the indirect impacts of long haul transportation required for procurement of project materials and supplies.

The direct impact of construction granular material haul on Yellowknife Highway 3 will exceed 11,500 truckloads over a two year construction period. More than half of this is gravel and rock haul for distances up to 207 km in both directions on Highway 3, and extending just a few kilometres onto Mackenzie Highway 1.

The balance is the common fill requirement that can be met within a 1 or 2 km haul from the bridge site. Accordingly, within a 2 km radius of the bridge project, the maximum impact will be a year around average of 46 trucks per day each way or about 8 per hour (assuming 12 hours per day and 250 construction days per year).

Within the Slave Corridor, the cumulative impact of this Deh Cho Bridge construction activity and Slave Province Mining traffic during the February-March Winter Road Season over the two year bridge construction period could average as much as 20 trucks per hour loaded or empty (one every 3 minutes), but only in the immediate area of the bridge site.

The indirect impact of sourcing bridge steel, concrete structures, cement and supplies from the south will result in an additional 1,000 truckloads that will move to the bridge site through the Hay River/Enterprise Gateway.

This long haul inbound logistics impact is part of the cumulative assessment, in the next chapter, of the Hay River/Enterprise Gateway where the Mackenzie and Slave Corridors both converge.

6. Hay River/Enterprise Gateway Cumulative Impacts

The Mackenzie Corridor and the Slave Corridor converge at the Hay River/Enterprise Gateway to the NWT Transportation System. This chapter provides a cumulative impact assessment for all of the MGP era projects focused on this common gateway.

Hay River/Enterprise is a multi-modal gateway to the NWT for:

- truck transfers to barge;
- rail transfers to barge and truck; and
- truck shipments through to NWT destination.

The cumulative impacts of all projects occurring concurrently with the MGP will be focussed on this gateway, peaking in 2008 as follows:

2008 Barge, Rail and Truck Loads (to nearest 100)

	Project Logistics	Baseline Resupply	Total Traffic
Barge Loads	500	100	600
Railcar Loads	7,200	1,300	8,500
Truck Loads	13,700	6,000	19,700

Over the four month summer shipping season, 600 barges - an average of 5 barges every day - will be loaded from rail cars and trucks at Hay River.

Over a combined winter road (60 day) and summer barge (120 day) season total of 180 days, 7,200 project related railcar loads - an average of 40 rail cars every day - will be transferred to trucks or barges at Hay River. The balance of 1,300 carloads will be transferred to truck for fuel supply to highway communities throughout the year - averaging an additional 4 rail cars per day.

Over a full year, almost 20,000 truckloads - or 40,000 trucks including empty return - will move through Enterprise either direct to destination, or to Hay River for barge transfers, or from Hay River railcar transfers. The total of these long haul movements at Enterprise will *average* 110

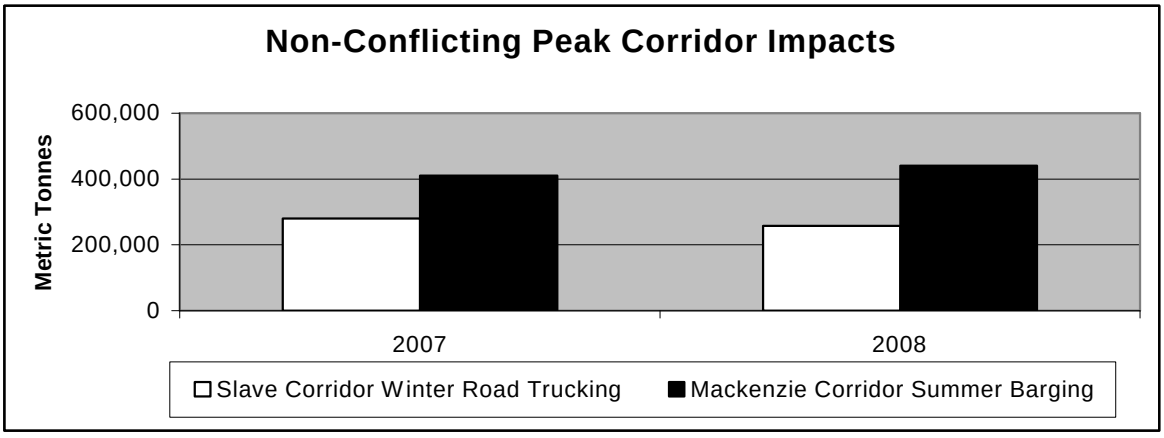
trucks per day or one every 13 minutes. Total long haul plus local vehicle congestion will be much greater than that average during the winter road and summer barge seasons.

The following sections separately profile cumulative impacts for transportation immediately North and South of the Hay River/Enterprise Gateway.

6.1 North of Hay River/Enterprise

North of this gateway, the cumulative impact of Mackenzie and Slave Corridor transportation will be mitigated to a significant extent by both the complementary seasonality and diverging nature of project traffic in the two corridors. Figure 9 profiles winter rail and/or truck mine traffic that is complementary to summer barge traffic transferred from truck or rail during peak MGP years 2007 and 2008.

Figure 9

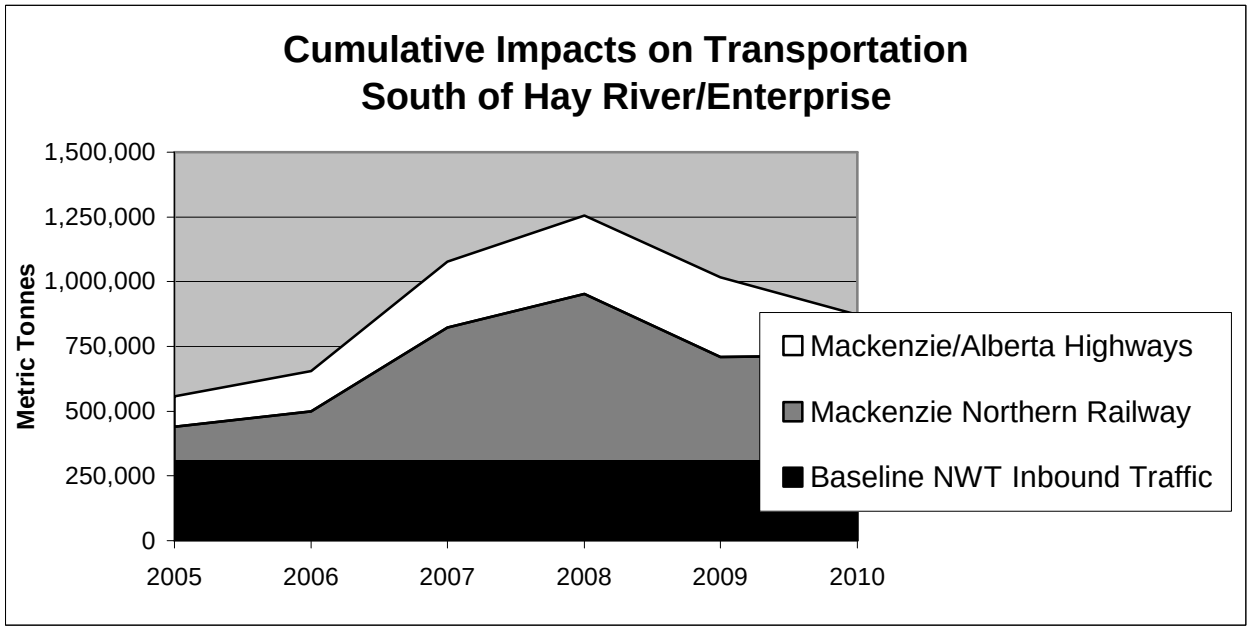


Nevertheless the shear volume of Mackenzie Corridor Activity that is currently scheduled to take place during the peak MGP Years 2007 and 2008 cannot be marginalized. To a baseline of some 100 bargeloads from Hay River in 2000, the cumulative impact of Mackenzie Corridor projects will add more than 500 additional bargeloads in both peak MGP years. Some of this barge traffic influx will inevitably miss the summer window for river transport and be added to the trucking impact of all-weather highway and winter road operations supporting projects in both the Mackenzie and Slave Corridors.

6.2 South of Hay River/Enterprise

South of this gateway, the cumulative indirect impact of rail and truck extensions for NWT supply chains are superimposed on Baseline NWT Inbound Traffic in Figure 10.

Figure 10



By the peak MGP year 2008, Hay River/Enterprise Gateway rail and truck traffic will push up from a baseline of 300,000 tonnes per year to over 1,200,000 tonnes per year, if all of the projects move ahead as planned. While truck traffic increases consistently throughout the period, peak MGP supply drives a disproportionate influx of rail traffic. After the peak, rail traffic falls off but to a much higher level sustained by outgoing concentrate as well as increasing mine fuel supply.

From the cumulative assessment of direct and indirect transportation impacts in this chapter, the next chapter completes a total impact assessment with the addition of induced impacts.

7. Total Transportation Impacts During the MGP

This chapter consolidates the assessment of direct and indirect transportation impacts and adds the transportation that will be *induced* by broader economic expansion which the MGP and concurrent projects will generate. Cumulative total transportation impacts of all major NWT projects currently scheduled between 2005 and 2010 are added to the Year 2000 NWT Baseline Inbound Traffic in Table 6. (Note that cumulative total transportation impacts have been arbitrarily reduced by a 6 1/2 million tonne local gravel haul in 2007 to avoid extreme distortion of NWT transportation system impacts.)

Table 6
Cumulative Transportation Impacts
Of Major NWT Projects during the MGP Era
Direct/Indirect & Induced Impacts in Metric Tonnes Moved

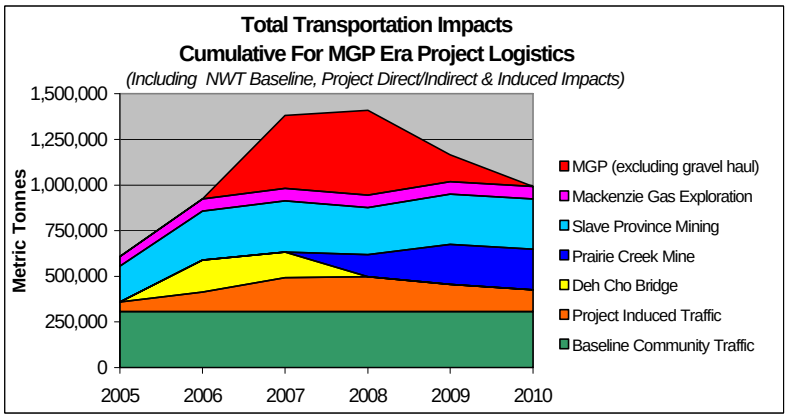
MAJOR PROJECTS	2005	2006	2007	2008	2009	2010
MACKENZIE GAS PROJECT						
NWT Work Site Transportation			*6,508,693*	*922,977*	*1,696,183*	
NWT Long Haul Transportation			*400,040*	*465,494*	*148,430*	
Total Direct/Indirect Impact			6,908,733	1,388,471	1,844,613	
MACKENZIE GAS EXPLORATION						
Beaufort Sea Offshore Drilling	*4,000*	*4,000*	*4,000*	*4,000*	*4,000*	*4,000*
Mackenzie Delta Onshore Drilling	*22,536*	*37,560*	*37,560*	*37,560*	*37,560*	*37,560*
Central Mackenzie Valley Drilling	*26,592*	*26,592*	*26,592*	*26,592*	*26,592*	*26,592*
Total Direct/Indirect Impact	53,128	68,152	68,152	68,152	68,152	68,152
SLAVE PROVINCE MINING						
Ekati Mine	*99,000*	*99,000*	*99,000*	*99,000*	*99,000*	*99,000*
Diavik Mine	*52,800*	*52,800*	*52,800*	*52,800*	*52,800*	*52,800*
Snap Lake MIne	*16,500*	*72,600*	*69,300*	*56,100*	*56,100*	*56,100*
Lupin Mine	*9,900*	*19,800*	*19,800*	*9,900*	*9,900*	*9,900*
Tahera Mine	*14,850*	*18,150*	*9,900*	*9,900*	*9,900*	*9,900*
Wolfden Mine	*0*	*0*	*0*	*0*	*9,900*	*9,900*
Exploration	*4,950*	*4,950*	*29,700*	*29,700*	*36,300*	*36,300*
Total Direct/Indirect Impact	198,000	267,300	280,500	257,400	273,900	273,900
PRAIRIE CREEK MINE				121,500	220,000	225,000
DEH CHO BRIDGE PROJECT		175,648	140,540			
Cumulative Direct/Indirect Impacts	251,128	511,100	7,397,925	1,835,523	2,406,665	567,052
Induced Transportation 1.21 multiplier	52,737	107,331	186,739	191,635	149,201	119,081
CUMULATIVE PROJECT IMPACTS	303,865	618,431	7,584,664	2,027,158	2,555,867	686,133
Plus NWT Baseline Inbound Transportation*	305,886	305,886	305,886	305,886	305,886	305,886
Cumulative NWT Transportation Impacts	609,751	924,317	7,890,550	2,333,044	2,861,753	992,019
Less Local Gravel/Rock Haul	0	161,600	6,626,493	922,977	1,696,183	0
NWT Long Haul Transportation Impacts	609,751	762,717	1,264,057	1,410,067	1,165,569	992,019
Increase over NWT Inbound Baseline*	**199%**	**249%**	**413%**	**461%**	**381%**	**324%**

*Year 2000 Baseline Undistorted by Major Construction Projects

7.1 Cumulative Impacts From Each MGP Era Project

Figure 11 profiles the total cumulative transportation impacts of MGP Era projects currently scheduled during the 2005-2010 time period. From this profile the impact of potential schedule slippages can be visualized.

Figure 11



Mackenzie Gas Exploration and Slave Province Mining show a consistent impact throughout the time period; and Deh Cho Bridge construction currently dovetails with Prairie Creek mine development. Generally, with the current layering of project impacts, MGP schedule slippage will not significantly change the cumulative impact of approximately 1.4 million tonnes over two peak years. However, if Deh Cho Bridge construction slips with the MGP and into Prairie Creek development, the cumulative impact will push up total tonnage to the 1.6 million tonne level.

7.2 Cumulative Impacts On NWT Transportation System

Figure 12 shows the same profile of total cumulative transportation impacts but from the perspective of various multi-modal combinations. The two year peak of about 1.4 million tonnes is pushed up primarily by an influx of rail to barge and rail to truck transfers.

Figure 12

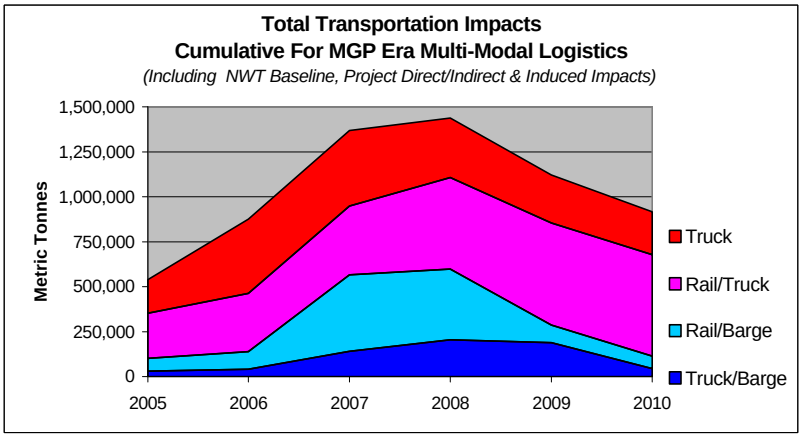
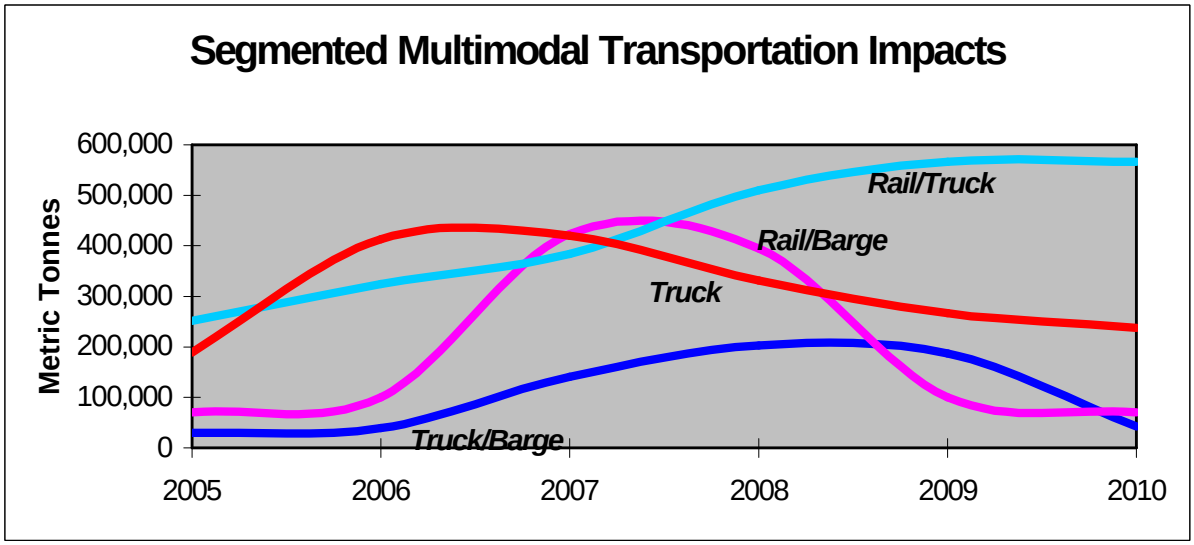


Figure 13 disagregates these cumulative impacts to show exactly how each modal combination is impacted. With exception of rail/truck traffic which shows a mining driven sustained increase, an MGP driven bell curve typical of project ramp-up to peak construction and fall-off during demobilization is shown.

Figure 13



However, these curves while similar are not identical due to sequencing of NWT project logistics:

- Through *Truck* impacts are driven up first by MGP pre-mobilization and Deh Cho Bridge construction in 2006 before declining through 2009 MGP demobilization.
- *Rail/Barge* impacts are driven up steeply and fall-off sharply around the 2007-2008 peak MGP pipe and fuel movement.
- *Truck/Barge* impacts are driven up gradually to an MGP peak in 2008 with delayed decline due to MGP demobilization in 2009.

In terms of current capacity to handle the influx of MGP and concurrent project traffic through 2010, with the exception of the Hay River/Enterprise Gateway, the conventional NWT

transportation infrastructure can likely accommodate the increased traffic density anticipated without new construction. (Much greater rail, river and highway traffic is routinely carried on similar systems further south).

However, unconventional aspects of NWT winter road and river crossing infrastructure may become capacity constrained during the MGP era. Unprecedented gravel haul will create winter road structural maintenance and traffic congestion problems – but only of a very localized nature which should be manageable with proper project control over primarily commercial traffic. River Crossings may require additional winter maintenance and supplemental summer ferry operations (e.g., repositioning of the Fort Providence Ferry with Deh Cho Bridge scheduled completion by the middle of the MGP.)

Around Enterprise and Hay River, highway congestion may become intense when passenger vehicles and trucks compete for the same pavement during winter and summer peaks in 2007 and 2008; and at Hay River terminal facilities, new investment in rail, barge and truck transfer capability will be required to maintain tonnage throughput at this potential bottleneck.

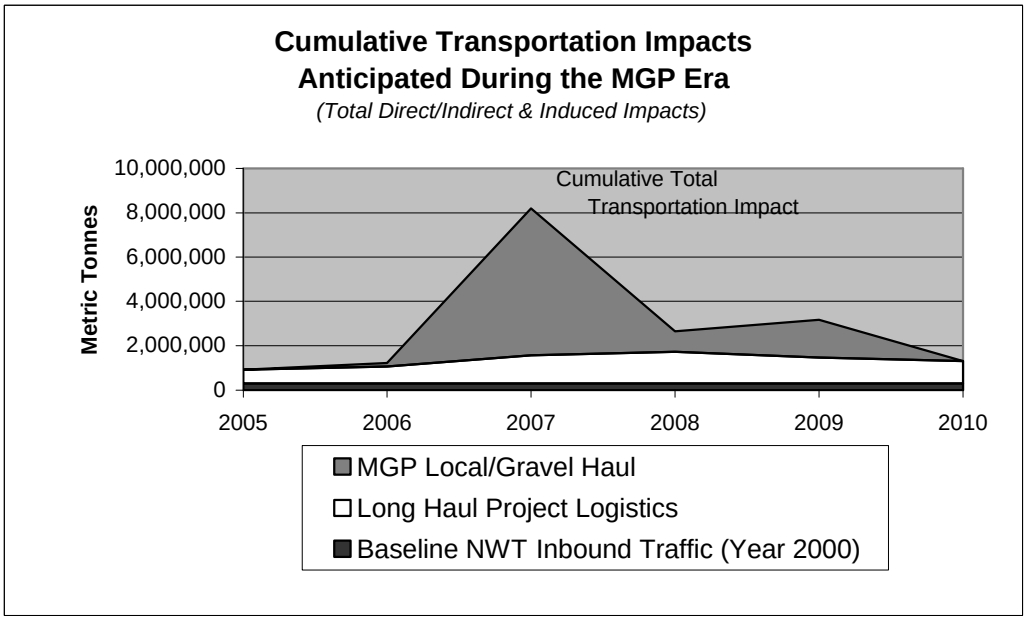
Traditionally, the NWT trade-off in capital investment versus increased maintenance costs has not been a critical issue for the all-weather highway, winter road and connecting rail fuel haul that are most intensively used to support Slave Corridor Mining Projects in winter when roadbeds are frozen. However, structural degradation can be expected to accompany MGP summer rail and truck traffic peaks in 2007 and 2008.

Figure 12 above shows that post-peak, while barge traffic declines back to previous levels, truck traffic is sustained at a higher level than pre-peak and rail/truck traffic does not decline at all. To the extent that this forecasts a prolonged increase in the NWT traffic base, both railway and highway reinvestment may be warranted - versus increased annual maintenance that otherwise will be required.

8. Contingency Impacts and Conclusions

The MGP and concurrent projects in the NWT will impose an unprecedented impact on the northern transportation system. The impact of long haul project logistics traffic will move total tonnage throughput from a baseline of 300,000 tonnes inbound at the Hay River/Enterprise Gateway in 2000 to over 1.4 million tonnes in 2008 - an increase of over 400%, *excluding the MGP gravel haul*. When the MGP local supply and gravel haul impact is included, total peak year tonnage is pushed up to 8 million tonnes (See Figure 14).

Figure 14



While that sort of traffic increase appears overwhelming, in this report we have shown there are mitigating circumstances that include both physical and seasonal divergence of Mackenzie and Slave Corridor project logistics north of the Hay River/Enterprise Gateway. However, at the Hay River/Enterprise Gateway itself the transportation impact, with annual throughput exceeding 1.4 million tonnes, will be massive if not overwhelming.

Although the basic MGP logistics strategy to maximize the economy of high volume, low cost river transportation appears feasible, it carries risks that could result in contingent transportation impacts not otherwise considered in this report. Natural risks range from low water levels reducing barge carrying capacity, to unseasonably warm weather reducing winter road windows, to unseasonably cold weather reducing summer barging seasons. In addition, late deliveries, supplemental purchases, congestion delays, work stoppages and a host of other operational risks, separately or in combination, could cause seasonal transportation windows to be missed.

Contingent transportation impacts which may be imposed by these risks include:

- Rerouting some barge traffic via the all-weather Mackenzie Highway and winter road to pipeline spreads north of Fort Simpson.
- Rerouting some barge traffic via the all-weather Alaska/Klondike/Dempster Highways and connecting winter roads to Mackenzie Delta pipeline spreads.
- Rerouting some barge traffic to a Fort Nelson railhead via the Liard/Mackenzie Highway connection to barge at Fort Simpson or direct to stockpile sites.

As well, contingent transportation impacts which could by imposed by changes in MGP procurement and logistics strategy include:

- Offshore pipe procurement with delivery via Western Arctic Sealift ocean barge or ship to the Mackenzie Delta.
- Offshore pipe procurement with delivery via ocean barge or ship to Skagway or Haines, Alaska and Dempster Highway haul to the Mackenzie Delta.

These are parallel transportation impacts that accompany contingency planning to assure a viable MGP logistics plan. The multiplicity of parallel contingency options makes it impractical to break out specific modal impacts in this report. However, while these contingency impacts may spread more widely over other components of the northern transportation system, at the summary level the total transportation impact will not likely change from 1.4 million tonnes throughput anticipated at the MGP peak.

APPENDIX

NWT Community Benefits Transportation Business Capability Survey

MGP Direct Transportation Impact Community Opportunities

Induced Impact Empirical Derivation Approach

NWT Community Benefits
Transportation Business Capability Survey

During pipeline construction there will be a major requirement for local short-haul trucking at construction and stockpile sites. There will also be a need to move large numbers of construction personnel to and from the camps by bus and air. These volumes represent an important opportunity for transportation providers in the Northwest Territories (NWT).

In the first part of this study we estimated construction site trucking required for a range of commodities (e.g. gravel, fuel, water, pipe skids) as well as shuttle trucking required to move materials to major stockpile sites. We have converted most of this activity into physical transportation units (e.g. truck loads).

We have also estimated expected passenger activity by region, broken down between air and surface transport. This activity relates mainly to the movement of personnel between the three airport hubs - Inuvik, Norman Wells and Ft. Simpson - and the camps.

In this section we report the results of a survey of northern transportation operators conducted to determine how much of this short-haul activity could be carried out by local service providers and, thereby, converted into economic benefits for the northern communities and regions. While most of the anticipated project logistics opportunities relate to truck, there are significant passenger opportunities in both bus and air.

Survey Findings – Truck

A total of 38 questionnaires were faxed to trucking firms that have a base of operations in the NWT. The recipients of the questionnaire were generally situated in communities along or near the Mackenzie Valley with a greater concentration in the more populated Deh Cho Region.

The questionnaire was accompanied by a detailed summary of the volumes of commodities that will require truck transport over the course of the pipeline project.

Companies that did not initially respond to the survey were re-canvassed by telephone at least once and in most cases two or three times.

In the end, 17 firms returned completed questionnaires of which one indicated that it would not be seeking pipeline related work. One reported verbally on its capability and four more indicated by telephone that they would not be pursuing pipeline opportunities. Accordingly, the total response to the questionnaire was 22 firms, representing a response rate of 58 percent.

It is noteworthy that most of the larger trucking firms responded to the survey. Thus, the response rate was much higher in terms of the share of northern trucking capacity that was represented by responding firms.

It is also important to note that some of the firms, particularly the larger ones, have fleet connections to Southern Canada and thus have the ability to bring in additional capacity from the South to meet the peak demands of the pipeline project. In such instances a question arises as to how much of the related benefits will actually flow to the northern economy.

The responses to the questions, other than those relating to tombstone information, are as follows. We have attempted to tabulate the responses according to the three regions: Deh Cho, Sahtu and Beaufort Delta.

Question: Is your company based in the Northwest Territories? If so, where?

Most of the trucking firms reported a primary base of operations in the Southern NWT, principally in Yellowknife and Hay River. Some firms reported operations in more than one community. For example, one firm reported a major presence in Yellowknife, Norman Wells and Inuvik. Two firms reported Inuvik as their main base of operations and two others reported a presence in that community. Several firms indicated an operating reach that extended well beyond their reported base of operations.

Question: What do you transport and how?

In this question the truckers were asked to report on the commodities that they are currently capable of carrying. Firms were grouped according to the commodities that they carry and the region or regions in which they have their base of operations. A number of firms demonstrated capability in more than one commodity and more than one region and, therefore, appear more than once in the tabulation.

The breakdown of firm capability according to commodity and reported base(s) of operations is shown as follows.

Commodity Capabilities - # Firms

	Deh Cho	Sahtu	Beaufort Delta
All Commodities	4	1	1
General Merchandise	3		1
Fuel	5		2
Gravel	5		2
Water	4		1
Pipe Skids	4	1	3
Equipment	7	1	2

Question: Where do you operate in the Northwest Territories?

The firms were asked to report on where they presently conduct most of their operations in the NWT. A number of firms reported operations in more than one region; others reported operations that are principally focused in one region. Not surprisingly, a large proportion of overall operations were shown to be concentrated in the Southern NWT.

The breakdown of the reporting firms according to the region or regions in which they currently operate is shown as follows.

Geographic Scope of Operations

	# Firms
All Regions	9
Deh Cho Region	5
Sahtu Region	2
Beaufort Delta Region	2

Question: What percentage of the transportation work could your firm currently handle?

In this question firms were asked to indicate their present capability to accommodate the expected pipeline-related volumes if construction were to begin today. It was assumed that the truckers would continue to serve their current customer base and would not significantly expand their fleet in the short-term, something that was reinforced in the telephone re-canvas.

Current capability was rated for each commodity in each region as **High, Medium** or **Low**. A High rating meant that there is currently enough trucking capacity for that commodity in that particular region to meet most of the requirements of the pipeline project. A Medium rating meant that there is currently some regional capacity to meet the needs of that commodity but that additional capacity would have to be brought in from the other regions or Southern Canada.

A Low rating meant that there is currently very little regional capacity to meet the transportation needs of that commodity and that most of the capacity would have to be brought in from elsewhere.

The current reported capability of the trucking firms to accommodate the regional requirements of the five commodity groups is summarized as follows.

Present Trucking Capability

	Deh Cho	Sahtu	Beaufort Delta Fuel
	High	High	Low
Gravel	Med	Low	Low
Equipment	High	Low	Low
Water	Med	Low	Low
Pipe Skids	High	Med	Low

The survey revealed that the trucking firms in the Deh Cho Region could currently handle most of the truck transport related to the movement of fuel, equipment and pipe skids but that added capacity would be required for gravel and water. For the Sahtu Region, the ratings are high and medium, respectively, for the movement of fuel and pipe skids but low for gravel, equipment and water. For the Beaufort Delta Region, the transportation capability is low in all commodity categories.

It is noteworthy that for certain high-rated commodities there appeared to be surplus truck capacity in one region that could be transferred to another, for example from the Deh Cho to the Sahtu.

Question: Recognizing that pipeline construction will not begin for another year or so, what percentage of the work . . . could your firm reasonably expand to handle?

In this question the firms were asked to estimate the extent to which they could expand their own operations to accommodate the expected volumes in the event pipeline construction were not to start for a year or two. Based on the same rating scheme, the future capability of the firms is summarized as follows.

Future Trucking Capability

	Deh Cho	Sahtu	Beaufort Delta
Fuel	High	High	Low
Gravel	High	Low	Low
Equipment	High	Low	Low
Water	High	Low	Low
Pipe Skids	High	Med	Med

Although the Deh Cho registered a high capability in all commodity groups, the ratings for the other two regions did not change significantly from current capabilities reported under the previous question. Based on comments received from individual firms, there is a reluctance to jeopardize service to existing customers, an unwillingness to take on additional fleet for a relatively short-term project and an inability to accurately predict market conditions that far into the future. A concern was expressed that the pipeline project might result in a bidding war for drivers, which are already in short supply.

Where there is insufficient local capability, additional capacity will be brought in from regions where there is a surplus or from Southern Canada.

Question: Please identify your equipment fleet:

The firms that did respond to this question reported on their fleets in a way that varied from trucker to trucker. While this made it difficult to develop precise estimates of hauling capability, it was possible to gain good insight about the order-of-magnitude ability of northern truckers to support pipeline construction and, thereby, retain the resulting economic benefits within the NWT.

Most of the reporting firms were relatively small and specialize in hauling only certain commodities. However, there were a few larger firms that reported much more diversified fleets and an ability to serve most of the commodity groups related to pipeline construction.

It became apparent that most of the trucking capacity resides with operators that are based in the Southern NWT. For example, RTL Robinson operates 200 trucks and 400 trailers that include flat decks, vans, tankers and end dumps. Matco Transportation operates 30 tractors and over 90 trailers that include both vans and flat decks. Northwest Transport reported an extensive northern fleet, also mainly vans and flat decks, and access to an even larger fleet through its association with Manitoulin Transport.

While the smaller trucking firms generally reported a regional focus for their operations, some of the major operators, like Matco, RTL and Northwest, reported an ability to operate along the entire length of the Mackenzie Valley. Collectively, Southern NWT based operators reported fleets with capability across all the main pipeline-related commodity groups (e.g. water, fuel, gravel, pipe skids). Some of the major operators, like Grimshaw, Northwest and Tli Cho Landtran, indicated an ability to augment their fleets with additional capacity from Southern Canada, which would tend to dilute the economic benefits flowing to the NWT.

The two Inuvik-based operators that we contacted, Bob's Welding and Gruben's Transport, reported a limited ability to support construction with their local fleets. However, Gruben's reported an ability to supplement its fleet through an association with Mullen Trucking of Calgary.

In summary, local trucking capability tends to decrease as one moves northward along the Mackenzie Valley. However, there is enough capacity, particularly in and around the Deh Cho Region, to ensure that a major share of the related economic benefits remain within the N.W.T. At the more northerly communities, where there is a shortage of trucking capacity, there is the potential to transfer capacity from the southern NWT. For any remaining requirements equipment will have to be brought in from Southern Canada.

Survey Findings – Passenger

A total of 21 questionnaires were faxed to passenger service providers that have a base of operations in the NWT. Twenty of these firms were air service providers and one was a bus company. The recipients of the questionnaire were generally situated in communities along the Mackenzie Valley with the greatest concentration located in the Deh Cho Region.

The questionnaire was accompanied by a summary of projected personnel movements that will require transportation support over the course of the pipeline project.

Firms that did not initially respond to the survey were re-canvassed by telephone at least once and in some cases two or three times.

Fifteen firms returned completed questionnaires, representing a response rate of 71 percent. Fourteen of the respondents were aviation providers, eleven in the fixed-wing category and three being helicopter operators. The one bus company also sent in a completed questionnaire. It is noteworthy that another firm, a trucker, reported some bussing capability in its response to the truck survey.

It is also noteworthy that almost all of the larger aviation firms responded to the survey. Accordingly, the response rate was much higher in terms of the share of northern passenger capacity that the responding firms represented.

It is also important to note that at least one northern firm has an affiliation with a firm in Southern Canada and, therefore, a related capability to bring in additional capacity from the South to meet the peak construction demands of the pipeline project. In such instances a question arises as to how much of the related benefits would actually accrue to the northern economy.

The responses to the questions, other than those relating to tombstone information, are as follows. We have categorized the responses according to the three regions: Deh Cho, Sahtu and Beaufort Delta.

Question: Is your company based in the Northwest Territories? If so, where?

Eleven of the firms reported a primary base of operations in the Deh Cho Region, mainly in Yellowknife. One reported a presence in Norman Wells (Sahtu) and one in Inuvik (Beaufort Delta). Another, a large helicopter operator, reported bases in all three regions.

The two bus operators, the one from this survey and the one from the truck survey, reported bases in the Deh Cho Region.

Question: What do you transport and how?

In this question the firms were basically asked to report on whether they transport passengers, cargo (freight) or both. A number of firms reported operations in more than one payload type and, therefore, appear more than once in the tabulation. One firm reported a medevac involvement.

The breakdown of reporting firms according to type of payload and regional base of operations is summarized as follows.

Firms by Payload Type

Air:	**Deh Cho**	**Sahtu**	**Beaufort Delta**
Passenger	12	2	2
Cargo (large and small)	10	2	1
Medevac	1		
Bus: Passenger & Freight	2		

Question: Where do you operate in the Northwest Territories?

Thirteen firms reported operations throughout the North. Three firms, including the two bus companies, reported operations mainly in the Deh Cho Region.

Six of the aviation firms operate scheduled services and nearly all of the reporting aviation firms have charter operations. One bus company operates both scheduled and charter services while the bus operation attached to the trucking company appears to only run charters.

Question: What percentage of the transportation work could your firm currently handle?

In this question firms were asked to indicate their current capability to accommodate the expected pipeline-related passenger volumes if construction were to begin today.

It is noteworthy that Canadian North, one of the reporting firms, is the only northern-based carrier offering mainline scheduled service to and from Southern Canada. It is assumed that they would mainly transport personnel on the longer-haul routes from the South to the three airport hubs at Ft. Simpson, Norman Wells and Inuvik. The remainder of the operators would focus on the movement of personnel between the hubs and the camps.

Current passenger capability was rated for each region as **High, Medium** or **Low.** A High rating meant that there is currently enough capacity in that particular region to accommodate the short-haul passenger requirements of the pipeline project. A Medium rating meant that there is currently some regional capacity to meet the passenger needs of the project but that additional capacity would have to be brought in from the other regions or Southern Canada. A Low rating meant that there is currently very little capability to meet passenger needs and that most of the capacity would have to be brought in from elsewhere.

The capability of northern-based operators to accommodate the passenger requirements of the pipeline project is summarized as follows:

Present Passenger Capabilities

	Deh Cho	Sahtu	Beaufort Delta
Fixed-wing **(e.g. Twin Otter, Dash-7, Dash-8)**	High	High	High
Rotary-wing (helicopter)	High	High	High
Bus	Low	Low	Low

It is noteworthy that the reporting aviation firms indicated a high capability to accommodate short-haul passenger demand in all regions and in both fixed-wing and rotary-wing categories. The bus operators have limited fleet currently available and would have difficulty responding to the needs of the project in addition to serving their regular customers.

Question: Recognizing that pipeline construction will not begin for another year or so, what percentage of the work . . . could your firm reasonably expand to handle?

The reporting aviation firms indicated the same high capability that was reported under the previous question. However, for a later construction start-up the operators would potentially make more capacity available across a greater variety of aircraft types (e.g. Dash-8-400).

One bus operator indicated an ability to increase its capability by bringing in additional capacity from Southern Canada.

Question: Please identify your equipment fleet.

The responding firms reported an extensive northern fleet, a portion of which is currently based elsewhere, as in the case of some of the Twin Otters and Bell 212 helicopters.

Scheduled below are the aircraft types that were reported as part of the northern fleet and are mentioned most often in the construction planning for the pipeline. The one aircraft type that is mentioned in the planning but does not appear in the reported fleet is the 65-passenger Dash-8-400.

Reported Aircraft Fleet

Type	Number	Capacity
B-737-200	6	112 Pax
DHC-6 Twin Otter	57	19
Dash-7 Combi	2	46
Dash-8-100	2	37
Bell 212 Helicopter	11	14
DHC-5 Buffalo	2	18,000 lbs

MGP Direct Transportation Impact Community Opportunities

Beaufort Delta Region

Local Transportation Opportunities

Local NWT Trucking Ancillary to MGP Inbound Logistics Support

Commodity	Truck Type	Truckloads	Fleet Size
	Pre-Mobilization Summer 2006		
Initial Equip/Tanks	Low Boy & Flat Deck Trailers	7	2
	Main Mobilization Summer 2007		
Line Pipe	80' pipe dollies and/or tractor	2,500	14
Bulk Fuel*	B Train Tank Trailers	300	1
Camp Units/Supply	Flat Deck Trailers & Vans	600	13
Const. Equipment	Low Boy & Flat Deck Trailers	1,000	19
		4,400	47
	Re-Mobilization Summer 2008		
Line Pipe	80' pipe dollies and/or tractors	600	3
Bulk Fuel*	B Train Tank Trailers	1,700	5
Camp Units/Supply	Flat Deck Trailers & Vans	5500	20
Const. Equipment	Low Boy & Flat Deck Trailers	300	21
Facilities/Modules	Heavy Haul Equip and/or tractors	50	4
Drill Rigs/Supplies	Flat Deck Trailers	2,000	22
		5,150	75
	De-Mobilization Summer 2009		
Camps/Equipment	Low Boy & Flat Deck Trailers	2,400	73

* Summer barge to tank is by temporary pipeline with winter top-up by truck from Inuvik

Local NWT Trucking Ancillary to MGP Inbound Logistics Support														
Within the INUVIK/Beaufort Delta Region														
Truck Ops During:			***Summer/Fall 2007***					***Summer/Fall 2008***						
To Stockpiles for:			***First Construction Winter 2007-8***					***Second Construction Winter 2008-9***						
At Project Location:			Delta/ KP 0-76	KP 76-202			Delta	Niglintgak	Taglu	Parsons Lake	KP 0			
For Pipeline/Facility:			Spread E1	Sread D1			Spread E2	Production Pad	Production Pad	Production Pad	Gas Plant			
Via Barge Landing at:			Inuvik	Little Chicago			Swimming Pt	Camp Farewell	Bar C/Taglu	Lucas Point/Tuk	Inuvik			
Tonnage To Move					**2007**							**2008**	**Region**	
Metric Tonnes					**Total**							**Total**	**Total**	
Line Pipe			39,800	48,810	**88,610**		18,560	1,800				**20,360**	***108,970***	
Bulk Fuel			11,180	19,810	**30,990**		9,410	9,950	19,940	16,170	6,220	**61,690**	***92,680***	
Camp Units/Supply			6,940	7,540	**14,480**		3,780	2,210	2,210	2,630	1,670	**12,500**	***26,980***	
Const Equipment			13,900	13,900	**27,800**			1,800	1,800	2,600	1,800	**8,000**	***35,800***	
Facilities/Modules								2,950	4,020	6,490	9,970	**23,430**	***23,430***	
Drill Rigs/Supply								18,280	17,590	24,200		**60,070**	***60,070***	
PROJECT TOTAL			71,820	90,060	**161,880**		31,750	36,990	45,560	52,090	19,660	**186,050**	***347,930***	
Trucks To Stockpiles														
Line Pipe			Summer Shuttle from Barge Landings						Summer Shuttle from Barge Landings					
Barge Offloads@	800	tonnes	49.8	61.0			23.2	2.3						
Truck Loadouts@	35	tonnes	1,137	1,395	**2,532**		530	51				**582**	***3,113***	
Truck Cycles/Barge Offload			2.14	6			14.4	22.8						
Truck Fleets/Barge Offload			10.7	3.8	**14**		1.6	1.0				**3**		
Bulk Fuel			Truck top-up from Inuvik tankage/balance by pipeline					Truck top-up from Inuvik tankage/balance by pipeline						
Barge Offloads @	700	tonnes	16	28			13	14	28	23	9			
Truck Loadouts @	27/38	tonnes	294	by pipeline	**294**		105	111	739	599	164	**1,716**	***2,010***	
Truck Cycles@Full Day Ops			8				4.8	3	3	6	9			
Truck Fleets @	90	Days	0.4		**1**		0.2	0.4	2.7	1.1	0.2	**4.7**		
Camp Mobe/Supply			Summer Shuttle from Barge Landings						Summer Shuttle from Barge Landings					
Barge Offloads@	720	tonnes	10	10			5	3	3	4	2			
Truck Loadouts@	24	tonnes	289	314	**603**		158	92	92	110	70	**521**	***1,124***	
Truck Cycles/Barge Offload			3.8	6			8.6	8.6	8.6	8.6	4.6			
Truck Fleets/Barge Offload			7.9	5.0	**13**		3.5	3.5	3.5	3.5	6.5	**20**		
Const Equipment			Summer Shuttle from Barge Landings						Summer Shuttle from Barge Landings					
Barge Offloads@	1000	tonnes	14	*28*				2	2	3	2			
Truck Loadouts@	28	tonnes	496	496	**993**			64	64	93	64	**286**	***1,279***	
Truck Cycles/Barge Offload			2.6	3.6				7.2	7.2	7.2	5.5			
Truck Fleets/Barge Offload			13.7	5.0	**19**			5.0	5.0	5.0	6.5	**21**		
Facilities/Modules									Summer Shuttle from Barge Landings					
Barge Offloads@		500						6	8	13	20			
Truck Loadouts@		500						6	8	13	*20*	**47**	***47***	
Truck Cycles/Barge Offload								1	1	1	1			
Truck Fleets/Barge Offload								1	1	1	1	**4**		
Drill Rigs/Supply									Summer Shuttle from Barge Landings					
Barge Offloads		1000						18	18	24				
Truck Loadouts		30						609	586	807		**2,002**	***2,002***	
Truck Cycles/Barge Offload								8.5	2.4	8.5				
Truck Fleets/Barge Offload								4	14	4		**22**		
PROJECT TOTAL														
Truck Loads			2,217	2,205	**4,422**		792	934	1,489	1,621	317	**5,154**	***9,576***	
Truck Fleets			33	14	**47**		5	15	26	14	14	**75**		

Beaufort Delta Region

Local Transportation Opportunities

Local NWT Trucking Ancillary to MGP On-Site Construction

Commodity	Truck Type	Truckloads	Fleet Size
	Pre-Construction Winter 2006-7		
Gravel	12.5 Truck & Pup End Dumps	78,100	83
Water	B – Train Tankers	900	1
Expedited Frt	10 Ton Van	200	1
		79,000	85
	Pre-Construction Summer 2007		
Gravel	12.5 Truck & Pup End Dumps	27,100	22
Water	B – Train Tankers	900	1
Expedited Frt	10 Ton Van	100	1
Temp Tanks	Flat Deck Trailer	(17)	7
		28,100	31
	First Construction Winter 2007-8		
Gravel	12.5 cubic metre Truck & Pup End Dumps	10,500	18
Water	B – Train Tankers	6,500	7
Pipe Skids	Flat Deck Trailer	100	3
Expedited Frt	10 Ton Van	400	1
		17,500	29
	Second Construction Winter 2008-9		
Gravel	12.5 cubic metre Truck & Pup End Dumps	14,700	27
Water	B – Train Tankers	5,650	6
Pipe Skids	Flat Deck Trailers	50	1
Expedited Frt	10 Ton Van	400	1
		20,800	35
	Post-Construction Winter 2009-10		
Gravel	12.5 cubic metre Truck & Pup End Dumps	4,200	10
Water	B – Train Tankers	250	1
Expedited Frt	10 Ton Van	50	1
		4,500	12

					Local NWT Trucking Ancillary to MGP On-Site Construction Support								
						Within the INUVIK/Beaufort Delta Region							
Truck Ops In:			***Summer 2006***				***Pre-Construction Winter 2006-7***						
Project Location:			KP 0			Niglintgak/Taglu	Parsons Lake	KP 0	Delta/ KP 0-76				
Pipeline/Facility:			Gas Plant			Production Pad	Production Pad	Gas Plant	Spread E1				
Staging Via:			Inuvik			Swimming Point	Lucas Point	Inuvik	Inuvik				
And/Or:			Campbell Lake			Bar C/Farewell	Tuktoyaktuk	Campbell Lake					
Tonnage to Move												**Subtotal**	
Metric Tonnes													
GRAVEL						1,176,582	524,286	446,600				2,147,468	
WATER						10,429	14,175	0	0			24,604	
FUEL TANKS			158										
MISCL RESUPPLY						650	490	940				2,080	
			158									**2,174,152**	
Trucks to Move It													
GRAVEL	m3					534,810	238,312	203,000				976,122	
Truck Loads @	12.5	m3				42,785	19,065	16,240				78,090	
Trucking Days Available						65	49	94					
Truck Cycles@Full Day Ops						11	40	13					
Truck Fleets/Days Available						60	10	13				83	
WATER	litres					10,428,750	14,175,000					24,603,750	
Truck Loads @	27,000	litres				386	525	0	0			911	
Truck Cycles@Full Day Ops						7.5	8.6	8.0	6.7				
Truck Fleets @	120	days				0.4	0.5	0.0	0.0			1	
FUEL TANKS	bargeloads		0.8										
Truck Loads @	9 tanks/barge		7										
Truck Cycles/Barge Offload			3										
Truck Fleets/Barge Offload			2.3										
MISCL RESUPPLY tonnes						650	490	940				2,080	
Truck Loads @ 1 per Day:						65	49	94				208	
Truck Cycle Time	*(trips per day)*					4	5	10					
Truck Fleet						0.3	0.2	0.1				1	
PROJECT TOTAL													
Truck Loads			**7**			43,236	19,639	16,334	0			**79,209**	
Truck Fleets			**2**			61	10	13	0			**85**	

					Local NWT Trucking Ancillary to MGP On-Site Construction Support								
						Within the INUVIK/Beaufort Delta Region							
Truck Ops In:			***Summer 2007***				**First Construction Winter 2007-8**						
Project Location			Niglintgak/Taglu	KP 0		Niglintgak/Taglu	Parsons Lake	Delta	Delta/ KP 0-76	KP 0	KP 76-202	
Pipeline/Facility			Camp/Stockpile	Gas Plant/Pig Fac		Production Pad	Production Pad	Spread E2	Spread E1	Gas Plant	Spread D1	
Staging Via:			Swimming Point	Inuvik,Storm Hills		Swimming Point	Lucas Point	Swimming Point	Inuvik	Inuvik	Little Chicago	
And/Or:				Campbell Lake		Bar C/Farewell	Tuktoyaktuk					
Tonnage to Move					**Subtotal**							**Subtotal**
Metric Tonnes												
GRAVEL				745,184	745,184				109,606		179,388	288,994
WEIGHTS						[initial engineering design does not anticipate pipeline weights]						
SKIDS									1,299		1,948	3,247
WATER				14,175	14,175	41,715	28,350		36,450	20,250	36,450	163,215
FUEL TANKS			203	180	383							
MISCL RESUPPLY						900	900		900	900		3,600
					759,742							**459,056**
Trucks to Move It												
GRAVEL	m3			338,720					49,821		81,540	131,361
Truck Loads @	12.5	m3		27,098	27,098				3,986		6,523	10,509
Trucking Days Available				94					35		35	
Truck Cycles@Full Day Ops				13					19.5		15.7	
Truck Fleets/Days Available				22	22				6		12	18
FUEL TANKS	bargeloads		1.0	0.9	1.9							
Truck Loads @	9 tanks/barge		9	8	17							
Truck Cycles/Barge Offload			3	1								
Truck Fleets/Barge Offload			3.0	4.0	7.0							
WEIGHTS	tonnes											
Truck Loads @	30											
Trips/Truck												
Truck Fleets												
SKIDS	number								100,000		150,000	250,000
Truck Loads @	1,848	each							54		81	135
Truck Cycles@Full Day Ops									3		1.3	
Truck Fleets @	30	days							0.6		2.1	3
WATER	litres		10,428,750	14,175,000		41,715,000	28,350,000	13,027,500	36,450,000	20,250,000	36,450,000	176,242,500
Truck Loads @	27,000	litres	386	525	911	1,545	1,050	483	1,350	750	1,350	6,528
Truck Cycles@Full Day Ops			8.0	8.0		7.5	8.6	8.6	6.7	6.0	9.6	
Truck Fleets @	120	days	0.4	0.5	0.9	1.7	1.0	0.5	1.7	1.0	1.2	7
MISCL RESUPPLY tonnes				900		900	900		900	900		3,600
Truck Loads @ 1 per Day:				90	90	90	90		90	90		360
Truck Cycle Time	*(trips per day)*			10		4	5		20	20		
Truck Fleet				0.1	0.1	0.3	0.2		0.1	0.1		1
PROJECT TOTAL												
Truck Loads			395	27,721	**28,116**	1,635	1,140		5,480	840	7,954	**17,532**
Truck Fleets			3	27	**30**	2	1.2		8	1.1	15	**29**

					Local NWT Trucking Ancillary to MGP On-Site Construction Suppor							
						Within the INUVIK/Beaufort Delta Region						
Truck Ops In:							**Second Construction Winter 2008-9**					
Project Location						Niglintgak/Taglu	Parsons Lake	Delta	Delta/ KP 0-76	KP 0	KP 76-202	
Pipeline/Facility						Production Pad	Production Pad	Spread E2	Spread E1	Gas Plant	Sread D1	
Staging Via:						Swimming Point	Lucas Point	Swimming Point	Inuvik	Inuvik	Little Chicago	
And/Or:						Bar C/Farewell	Tuktoyaktuk					
Tonnage to Move												
Metric Tonnes												
GRAVEL								116,140	109,606		179,388	
WEIGHTS							[initial engineering design does not anticipate pipeline weights]					
SKIDS								779				
WATER						41,715	28,350	26,055	18,225	20,250	18,225	
MISCL RESUPPLY						900	900	900	350	900		
Trucks to Move It												
GRAVEL	m3							52791	49,821		81,540	
Truck Loads @	12.5	m3						4,223	3,986		6,523	
Truck Cycles@Full Day Ops								12.4	19.5		15.7	
Truck Fleets @	35	days						10	6		12	
WEIGHTS	tonnes											
Truck Loads @	30											
Trips/Truck												
Truck Fleets												
SKIDS	number							60,000				
Truck Loads @	1,848	each						32				
Truck Cycles@Full Day Ops								1.8				
Truck Fleets @	30	days						0.6				
WATER	litres					41,715,000	28,350,000	26,055,000	18,225,000	20,250,000	18,225,000	
Truck Loads @	27,000	litres				1,545	1,050	965	675	750	675	
Truck Cycles@Full Day Ops						7.5	8.6	8.0	6.7	6.0	9.6	
Truck Fleets @	120	days				1.7	1.0	1.0	0.8	1.0	0.6	
MISCL RESUPPLY tonnes						900	900	900	350	900		
Truck Loads @ 1 per Day:						90	90	90	35	90		
Truck Cycle Time (trips per day)						4	5	4	20	20		
Truck Fleet						0.3	0.2	0.3	0.1	0.1		
PROJECT TOTAL												
Truck Loads						1,635	1,140	5,311	4,696	840	7,198	
Truck Fleets						2	1.2	12	7	1.1	12	

					Local NWT Trucking Ancillary to MGP On-Site Construction Suppor							
						Within the INUVIK/Beaufort Delta Region						
Truck Ops In:						**De-Mobilization Summer/Post-Construction Winter 2009-2010**						
Project Location						Niglintgak/Taglu	Parsons Lake	Delta	Delta/ KP 0-76	KP 0	KP 76-202
Pipeline/Facility						Production Pad	Production Pad	Spread E2	Spread E1	Gas Plant	Sread D1
Staging Via:						Swimming Point	Lucas Point	Swimming Point	Inuvik	Inuvik	Little Chicago
And/Or:						Bar C/Farewell	Tuktoyaktuk				
Tonnage to Move												
Metric Tonnes												
GRAVEL								116,140			
WATER								6,514			
MISCL RESUPPLY								350			
CAMPS/RETROGRADE											
CONST EQUIPMENT DEMOBE											
Trucks to Move It											
GRAVEL	m3							52,791			
Truck Loads @	12.5	m3						4,223			
Truck Cycles@Full Day Ops								12.4			
Truck Fleets @	35	days						10			
WATER	litres							6,513,750			
Truck Loads @	27,000	litres						241			
Truck Cycles@Full Day Ops								8.0			
Truck Fleets @	120	days						0.3			
MISCL RESUPPLY tonnes								350			
Truck Loads @ 1 per Day:								35			
Truck Cycle Time (trips per day)								4			
Truck Fleet								0.3			
PROJECT TOTAL											
Truck Loads											
Truck Fleets											
Demobilization											
CAMPS/RETROGRADE tonnes											
ShuttleTruckLoads@	24	tonnes									
Barge Backloads@	720	tonnes									
Truck Fleets/Barge Backload											
CONST EQUIP DEMOBE tonnes											
ShuttleTruckLoads@	28	tonnes									
Barge Backloads @ 500 & 1000 tonnes											
Truck Fleets/Barge Backload											
DEMOBILIZATION TOTAL											
Truck Loads											
Truck Fleets											

Sahtu Settlement Region

Transportation Opportunities

Local NWT Trucking
Ancillary to MGP Inbound Logistics Support

Commodity	Truck Type	Truckloads	Fleet Size
	Pre-Mobilization Summer 2006		
Initial Equip/Tanks	Low Boy & Flat Deck Trailers	98	13
	Main Mobilization Summer 2007		
Line Pipe	80' pipe dollies and/or tractor	3,000	8
Bulk Fuel	B Train Tank Trailers	100	1
Camp Units/Supply	Flat Deck Trailers & Vans	500	7
Const. Equipment	Low Boy & Flat Deck Trailers	800	10
		4,400	26
	Re-Mobilization Summer 2008		
Line Pipe	80' pipe dollies and/or tractors	2,500	8
Bulk Fuel	B Train Tank Trailers	50	1
Camp Units/Supply	Flat Deck Trailers & Vans	400	9
Const. Equipment	Low Boy & Flat Deck Trailers	100	13
Facilities/Modules	Heavy Haul Equipment and/or tractors	50	5
		3,100	36
	De-Mobilization Summer 2009		
Camps/Equipment	Low Boy & Flat Deck Trailers	1,900	39

			Local NWT Trucking Ancillary to MGP Inbound Logistics Support									
			Within the NORMAN WELLS/Sahtu Settlement Region									
Truck Ops During:			***Summer/Fall 2007***					***Summer/Fall 2008***				
To Stockpiles for:			***First Construction Winter 2007-8***					***Second Construction Winter 2008-9***				
At Project Location:			KP 326-473	KP 620-757			KP 473-620	KP 473	KP 202-326	KP 225		
For Pipeline/Facility:			Spread C1*	Spread B1*			Spread C2*	Comp Sta	Spread D2	Comp Sta		
Via Barge Landing at:			Ft Good Hope	Little Smith			Norman Wells	Norman Wells	Little Chicago	Little Chicago		
And/Or:			Norman Wells	Ochre River			Tulita		Ft Good Hope			
Tonnage Take-Offs					**2007**						**2008**	**Region**
Metric Tonnes					**Total**						**Total**	**Total**
Line Pipe			53,550	46,080	**99,630**		43,630		42,140		**85,770**	***185,400***
Bulk Fuel			9,740	9,610	**19,350**		10,050	3,780	9,340	3,780	**26,950**	***46,300***
Camp Units/Supply			7,400	5,200	**12,600**		8,200			700	**8,900**	***21,500***
Const Equipment			13,500	10,000	**23,500**			1,800		1,800	**3,600**	***27,100***
Facilities/Modules								2,230		3,140	**5,370**	***5,370***
PROJECT TOTAL			84,190	70,890	**155,080**		61,880	7,810	51,480	9,420	**130,590**	***285,670***
Trucks to Stockpiles												
Line Pipe			Summer Shuttle from Barge Landings					Summer Shuttle from Barge Landings				
Barge Offloads@	850/900	tonnes	*63.0*	*51.2*		850	51.3		49.6			
Truck Loadouts@	35	tonnes	1,530	1,317	**2,847**		1,247		1,204		**2,451**	***5,297***
Truck Cycles/Barge Offload			6	6			6		6			
Truck Fleets/Barge Offload			4.0	4.3	**8**		4.0		4.0		**8**	
Bulk Fuel				Winter Road top-up from Norman Wells tankage/balance by pipeline ex barge								
Barge Offloads@	700	tonnes	14	14			14	5	13	5		
Truck Loadouts@	27	tonnes	108	by pipeline	**108**		by pipeline	by pipeline	52	by pipeline	**52**	***160***
Truck Cycles@Full Day Ops			2.18						2.18			
Truck Fleets @	90	Days	0.6		**1**				0.3		**1**	
Camp Units/Supply			Summer Shuttle from Barge Landings					Summer Shuttle from Barge Landings				
Barge Offloads@	720	tonnes	10	7			11			1		
Truck Loadouts@	24	tonnes	308	217	**525**		342			29	**371**	***896***
Truck Cycles/Barge Offload			8.6	8.57			8.6			5		
Truck Fleets/Barge Offload			3.5	3.5	**7**		3.5			6.0	**9**	
Const Equipment												
Barge Offloads@	500	tonnes	27	20		1000		2		2		
Truck Loadouts@	28	tonnes	482	357	**839**			64		64	**129**	***968***
Cycles/Offload			3.6	3.6				7.2		4.5		
Truck Fleets			5.0	5.0	**10**			5.0		7.9	**13**	
Facilities/Modules			Summer Shuttle from Barge Landings					Summer Shuttle from Barge Landings				
Barge Offloads@	300	tonnes						7		*6*		
Truck Loadouts@	300	tonnes					0	7		26	**33**	***33***
Truck Cycles/Barge Offload								1		1		
Truck Fleets/Barge Offload								1.0		4.0	**5**	
PROJECT TOTAL												
Truck Loads			2,429	1,890	**4,319**		1,588	72	1,256	119	**3,035**	***7,354***
Truck Fleets			13.0	12.7	**26**		8	6	4	18	**36**	

Sahtu Settlement Region

Transportation Opportunities

Local NWT Trucking
Ancillary to MGP On-Site Construction

Commodity	Truck Type	Truckloads	Fleet Size
	Pre-Construction Winter 2006-7		
Gravel	12.5 cubic metre Truck & Pup End Dumps	67,100	49
Water	B – Train Tankers	400	1
Expedited Frt	10 Ton Van	208	2
		67,700	52
	Pre-Construction Summer 2007		
Gravel	12.5 cubic metre Truck & Pup End Dumps	16,000	11
Water	B – Train Tankers	100	1
Expedited Frt	10 Ton Van	100	1
		16,200	13
	First Construction Winter 2007-8		
Gravel	12.5 cubic metre Truck & Pup End Dumps	11,500	14
Water	B – Train Tankers	4,000	4
Pipe Skids	Flat Deck Trailer	100	2
Expedited Frt	10 Ton Van	300	2
		15,900	22
	Second Construction Winter 2008-9		
Gravel	12.5 cubic metre Truck & Pup End Dumps	27,100	37
Water	B – Train Tankers	4,200	4
Pipe Skids	Flat Deck Trailers	100	1
Expedited Frt	10 Ton Van	300	2
		31,700	44
	Post Construction Winter 2009-10		
Gravel	12.5 cubic metre Truck & Pup End Dumps	15,600	23
Water	B – Train Tankers	300	1
Expedited Frt	10 Ton Van	100	1
		16,200	25

				Local NWT Trucking Ancillary to MGP On-Site Construction Support							
				Within the NORMAN WELLS/Sahtu Settlement Region							
Truck Ops In:			***Summer 2006***				***Pre-Construction Winter 2006-7***				
Project Location:			KP 202	KP 330,473,625			KP 202	KP 330	KP 550	KP 625	
Pipeline/Facility:			Camp/Comp Sta	Camp/Comp Sta			Camp/Comp Sta	Camp Site	Staging Site	Camp Site	
Staging Via:			Little Chicago	Barge Landings			Little Chicago	Ft Good Hope	Tulita	Little Smith	
And/Or:											
Tonnage to Move					**Subtotal**						**Subtotal**
Metric Tonnes											
GRAVEL							1,049,180	475,398	41,745	279,411	1,845,734
WATER							3,645	3,645		2,565	9,855
FUEL TANKS			1,395	810	2,205						
RESUPPLY							650	710	190	510	2,060
					2,205						**1,857,649**
Trucks to Move It											
GRAVEL	m3						476,900	216,090	18,975	127,005	838,970
Truck Loads @	12.5	m3					38,152	17,287	1,518	10,160	67,118
Trucking Days Available							65	71	19	51	
Truck Cycles@Full Day Ops							18.5	30	15.7	45	
Truck Fleets/Days Available							32	8	5	4	49
WATER	litres						3,645,000	3,645,000		2,565,000	9,855,000
Truck Loads @	27,000	litres					135	135		95	365
Truck Cycles@Full Day Ops							9.6	9.6		9.6	
Truck Fleets @	120	days					0.1	0.1		0.1	0
FUEL TANKS	bargeloads		6.9	4.0	10.9						
Truck Loads @	9 tanks/barge		62	36	98.0						
Truck Cycles/Barge Offload			1.5	4.0	5.5						
Truck Fleets/Barge Offload			6.0	6.8	12.8						
MISCL RESUPPLY tonnes							650	710	190	510	2,060
Truck Loads @ 1 per Day:							65	71	19	51	206
Truck Cycle Time (trips per day)							5	2	6	1	
Truck Fleet							0.2	0.5	0.2	1.0	2
PROJECT TOTAL											
Truck Loads			62	36	**98**		38,352	17,493	1,537	10,306	**67,689**
Truck Fleets			6	7	**13**		32	9	5	6	**52**

				Local NWT Trucking Ancillary to MGP On-Site Construction Support						
				Within the NORMAN WELLS/Sahtu Settlement Region						
Truck Ops In:			***Summer 2007***			***First Construction Winter 2007-8***				
Project Location			KP 473		KP 202-326	KP 225	KP 326-473	KP 473-620	KP 473	KP 620-757
Pipeline/Facility			Comp Sta		Spread D2	Comp Sta	Spread C1*	Spread C2*	Comp Sta	Spread B1*
Staging Via:			Norman Wells		Little Chicago	Little Chicago	Ft Good Hope	Norman Wells	Norman Wells	Little Smith
And/Or:					Ft Good Hope		Norman Wells	Tulita		Ochre River
Tonnage to Move										
Metric Tonnes										
GRAVEL			440,000				206,985			109,912
WEIGHTS					[initial engineering design does not anticipate pipeline weights]					
SKIDS							1,948			1,299
WATER			3,645			4,860	36,450		4,860	25,650
FUEL TANKS										
MISCL RESUPPLY			900				900		900	900
Trucks to Move It										
GRAVEL	m3		200,000				94,084			49,960
Truck Loads @	12.5	m3	16,000				7,527			3,997
Trucking Days Available			40				35			35
Truck Cycles@Full Day Ops			36				23.2			23.2
Truck Fleets/Days Available			12				9			5
FUEL TANKS	bargeloads									
Truck Loads @	9 tanks/barge									
Truck Cycles/Barge Offload										
Truck Fleets/Barge Offload										
WEIGHTS	tonnes									
Truck Loads @	30									
Trips/Truck										
Truck Fleets										
SKIDS	number						150,000			100,000
Truck Loads @	1,848	each					81			54
Truck Cycles@Full Day Ops							2.2			1.5
Truck Fleets @	30	days					1.2			1.2
WATER	litres		3,645,000		18,225,000	4,860,000	36,450,000	18,225,000	4,860,000	25,650,000
Truck Loads @	27,000	litres	135		675	180	1,350	675	180	950
Truck Cycles@Full Day Ops			9.6		9.6	8.6	9.6	9.6	9.6	9.6
Truck Fleets @	120	days	0.1		0.6	0.2	1.2	0.6	0.2	0.8
MISCL RESUPPLY	tonnes		900				900		900	900
Truck Loads @ 1 per Day:			90				90		90	90
Truck Cycle Time (trips per day)			20				2		20	1
Truck Fleet			0.1				0.5		0.1	1.0
PROJECT TOTAL										
Truck Loads			**16,225**			180	9,048		270	5,091
Truck Fleets			**13**			0.2	12		0.2	8

				Local NWT Trucking Ancillary to MGP On-Site Construction Support						
				Within the NORMAN WELLS/Sahtu Settlement Region						
Truck Ops In:						**Second Construction Winter 2008-9**				
Project Location					KP 202-326	KP 225	KP 326-473	KP 473-620	KP 473	KP 620-757
Pipeline/Facility					Spread D2	Comp Sta	Spread C1*	Spread C2*	Comp Sta	Spread B1*
Staging Via:					Little Chicago	Little Chicago	Ft Good Hope	Norman Wells	Norman Wells	Little Smith
And/Or:					Ft Good Hope		Norman Wells	Tulita		Ochre River
Tonnage to Move										
Metric Tonnes										
GRAVEL					275,405		206,985	153,201		109,912
WEIGHTS						[initial engineering design does not anticipate pipeline weights]				
SKIDS					1,299			1,299		
WATER					36,450	4,860	18,225	36,450	4,860	12,825
MISCL RESUPPLY					450		350	900	900	350
Trucks to Move It										
GRAVEL	m3				125,184		94,084	69,637		49,960
Truck Loads @	12.5	m3			10,015		7,527	5,571		3,997
Truck Cycles@Full Day Ops					19.5		23.2	19.5		23.2
Truck Fleets @	35	days			15		9	8		5
WEIGHTS	tonnes									
Truck Loads @	30									
Trips/Truck										
Truck Fleets										
SKIDS	number				100,000			100,000		
Truck Loads @	1,848	each			54			54		
Truck Cycles@Full Day Ops					2.5			3.4		
Truck Fleets @	30	days			0.7			0.5		
WATER	litres				36,450,000	4,860,000	18,225,000	36,450,000	4,860,000	12,825,000
Truck Loads @	27,000	litres			1,350	180	675	1,350	180	475
Truck Cycles@Full Day Ops					9.6	8.6	9.6	9.6	9.6	9.6
Truck Fleets @	120	days			1.2	0.2	0.6	1.2	0.2	0.4
MISCL RESUPPLY tonnes					450		350	900	900	350
Truck Loads @ 1 per Day:					45		35	90	90	35
Truck Cycle Time (trips per day)					2		2	6	20	1
Truck Fleet					0.5		0.5	0.2	0.1	1.0
PROJECT TOTAL										
Truck Loads					11,464	180	8,237	7,065	270	4,507
Truck Fleets					17	0.2	10	10	0.2	6

				Local NWT Trucking Ancillary to MGP On-Site Construction Support							
				Within the NORMAN WELLS/Sahtu Settlement Region							
Truck Ops In:				**De-Mobilization Summer/Post-Construction Winter 2009-10**							
Project Location				KP 202-326	KP 225	KP 326-473	KP 473-620	KP 473	KP 620-757		
Pipeline/Facility				Spread D2	Comp Sta	Spread C1*	Spread C2*	Comp Sta	Spread B1*		
Staging Via:				Little Chicago	Little Chicago	Ft Good Hope	Norman Wells	Norman Wells	Little Smith		
And/Or:				Ft Good Hope		Norman Wells	Tulita		Ochre River		
											Subtotal
Tonnage to Move											
Metric Tonnes											
GRAVEL				275,405			153,201				428,606
WATER				3,645			3,645				7,290
RESUPPLY				350			350				700
CAMPS/RETROGRADE											21,500
CONST EQUIPMENT DEMOBE											27,100
											485,196
Trucks to Move It											
GRAVEL	m3			125,184			69,637				194,821
Truck Loads @	12.5	m3		10,015			5,571				15,586
Truck Cycles@Full Day Ops				19.5			19.5				
Truck Fleets @	35	days		15			8				23
WATER	litres			3,645,000			3,645,000				7,290,000
Truck Loads @	27,000	litres		135			135				270
Truck Cycles@Full Day Ops				9.6			9.6				
Truck Fleets @	120	days		0.1			0.1				1
MISCL RESUPPLY tonnes				350			350				700
Truck Loads @ 1 per Day:				35			35				70
Truck Cycle Time (trips per day)				2			6				
Truck Fleet				0.5			0.2				1
PROJECT TOTAL											
Truck Loads											**15,926**
Truck Fleets											**25**
Demobilization											
CAMPS/RETROGRADE tonnes											21,500
ShuttleTruckLoads@	24	tonnes									896
Barge Offloads@	720	tonnes									30
Truck Fleets/Barge Backload											16
CONST EQUIP DEMOBE tonnes											27,100
ShuttleTruckLoads@	28	tonnes									968
Barge Backloads @ 500 & 1000 tonnes											51
Truck Fleets/Barge Backload											23
DEMOBILIZATION TOTAL											
Truck Loads											**1,864**
Truck Fleets											**39**

Deh Cho Region

Transportation Opportunities

Local NWT Trucking
Ancillary to MGP Long Haul Logistics Support

MGP Site Staging/Stockpiling	Truck Type	Truck Loads	Truck Fleets
	Pre-Mobilization Summer 2006		
Initial Equipment	Low Boy & Flat Deck Trailers	59	11
	Main Mobilization Summer 2007		
Line Pipe	80' pipe dollies and/or tractor	1,500	8
Bulk Fuel	B Train Tank Trailers	260	
Camp Units/Supply	Flat Deck Trailers & Vans	230	3
Const. Equipment	Low Boy & Flat Deck Trailers	350	4
		2,340	16
	Re-Mobilization Summer 2008		
Line Pipe	80' pipe dollies and/or tractors	2,380	12
Bulk Fuel	B Train Tank Trailers	690	4
Camp Units/Supply	Flat Deck Trailers & Vans	730	21
Const. Equipment	Low Boy & Flat Deck Trailers	160	14
Facilities/Modules	Heavy Haul Equipment and/or tractors	50	8
		2,340	16
	De-Mobilization Summer 2009		
Camps/Equipment Demobe	Low Boy & Flat Deck Trailers	1,300	24

			Local NWT Trucking Ancillary to MGP Inbound Logistics Support										
			Within the FORT SIMPSON/Deh Cho Region										
Truck Ops During:			***Summer/Fall 2007***					***Summer/Fall 2008***					
To Stockpiles for:			***First Construction Winter 2007-8***					***Second Construction Winter 2008-9***					
To Project Location:			KP 907-1064	KP 907-1064		KP 700	KP 757-907	KP 933	KP 1064-1221	KP 1064-1221	KP 1136/1221		
For Pipeline/Facility:			Spread A1	Spread A1		Comp Sta	Spread B2*	Comp Sta	Spread A2	Spread A2	Heat/Meter Stas		
With Staging Via:			*Summer Barge To*	*Fall Truck To*		*Summer Barge To*	Camsell Bend	Camsell Bend	*Truck Direct To*	*Winter Road To*	Trout River &		
			Camsell Bend	McGill Station		Blackwater	& Ochre River	& Trail River	McGill Station	Trout Lake	Trout Lake		
Tonnage Take-Offs					**2007**							**2008**	**Region**
Metric Tonnes					**Total**							**Total**	**Total**
Line Pipe			28,990	23,550	**52,540**		37,480		14,290	31,800		**83,570**	***136,110***
Bulk Fuel			5,330	10,010	**15,340**	3,780	11,380	3,780	9,170	5,290	4,100	**37,500**	***52,840***
Camp Units/Supply			5,400		**5,400**	700	5,300	700	5,500	4,800	450	**17,450**	***22,850***
Const Equipment				9,800	**9,800**	1,800		1,800			800	**4,400**	***14,200***
Facilities/Modules						2,630		2,450			854	**5,934**	***5,934***
PROJECT TOTAL			39,720	43,360	**83,080**	8,910	54,160	8,730	28,960	41,890	6,204	**148,854**	***231,934***
Trucking to Stockpiles													
Line Pipe			From Barge	From Rail		Summer Shuttle from Barge Landings			Fall/Winter Truck Direct From Hay River				
Barge Offloads@	900	tonnes	32.2	Ex Hay River			41.6						
Truck Loadouts@	35	tonnes	828	673	**1,501**	0	1,071	0	408	909	0	**2,388**	***3,889***
Truck Cycles/Barge Offload			6	2.18		1	6	1	2.8	1.6	1		
Truck Fleets/Barge Offload			4.3	3.4	**8**	0.0	4.3	0.0	1.6	6.3	0.0	**12**	
Bulk Fuel			By Pipeline	From Rail		By Pipeline	By Pipeline	Trf to Truck	Fall/Winter Truck Direct From Hay River				
Barge Offloads@	700	tonnes	8	Ex Hay River		5	16	5					
Truck Loadouts@	38	tonnes		263	**263**			99	241	196	152	**689**	***952***
Truck Cycles@Full Day Ops				2.18				12	2.18	1.5	1.5		
Truck Fleets @	90	Days		1.3	**1**			0.1	1.2	1.5	1.1	**4**	
Camps/Supply			By Barge			Summer Shuttle from Barge Landings			Fall/Winter Truck Direct From Hay River				
Barge Offloads@	720	tonnes	8		**8**	1	7	1					
Truck Loadouts@	24	tonnes	225		**225**	29	221	29	229	200	19	**727**	***952***
Truck Cycles/Barge Offload			8.6			8.3	8.6	5.8	0.6	0.6	0.53		
Truck Fleets/Barge Offload			3.5		**3**	3.6	3.5	5.2	4.2	3.7	0.4	**21**	
Const Equipment				By Truck Direct		Summer Shuttle from Barge Landings			Fall/Winter Truck Direct From Hay River				
Barge Offloads@	1000	tonnes		Ex Edmonton		2		2					
Truck Loadouts@	28	tonnes		350	**350**	64		64			29	**157**	***507***
Truck Cycles				100		7.2		4.5			0.5		
Truck Fleets				*3.5*	**4**	5.0		7.9			0.6	**14**	
Facilities/Modules						Summer Shuttle from Barge Landings			Fall/Winter Truck Direct From Hay River				
Barge Offloads@	488	tonnes				5		5					
Truck Loadouts@	122	tonnes				22		20			7	**49**	***49***
Truck Cycles/Barge Offload						1		1			1.3		
Truck Fleets/Barge Offload						4.0		4.0			0.1	**8**	
PROJECT TOTAL													
Truck Loads			1,053	1,286	**2,340**	115	1,292	213	879	1,304	206	**4,009**	***6,349***
Truck Fleets			8	8	**16**	13	8	17	7	11	2	**58**	

Deh Cho Region

Transportation Opportunities

Local NWT Trucking
Ancillary to MGP On-Site Construction

MGP Site Supply	Truck Type	Truck Loads	Truck Fleet
	Pre-Construction Winter 2006-7		
Gravel	12.5 Cubic Metre End Dumps	30,600	24
Potable Water	B – Train Tankers	400	1
Expedited Freight	10 Ton Van	200	2
		31,200	27
	Pre-Construction Summer 2007		
Gravel	12.5 Cubic Metre End Dumps	15,100	21
Potable Water	B – Train Tankers	200	1
Expedited Freight	10 Ton Van	100	1
		15,400	23
	First Construction Winter 2007-8		
Gravel	12.5 Cubic Metre End Dumps	800	2
Pipe Skids	Flat Deck Trailer	50	1
Potable Water	B – Train Tankers	2,250	2
Expedited Freight	10 Ton Van	400	2
		3,500	7
	Second Construction Winter 2008-9		
Gravel	12.5 Cubic Metre Pup End Dumps	6,800	8
Pipe Skids	Flat Deck Trailers	50	1
Potable Water	B – Train Tankers	2,800	3
Expedited Freight	10 Ton Van	550	2
		10,200	14
	Post Construction Winter 2009-10		
Gravel	12.5 Cubic Metre End Dumps	5,900	11
Potable Water	B – Train Tankers	200	1
Expedited Freight	10 Ton Van	100	1
		6,200	13

				Local NWT Trucking Ancillary to MGP On-Site Construction Support									
					Within the FORT SIMPSON/Deh Cho Region								
Truck Ops In:			***Summer 2006***				***Pre-Construction Winter 2006-7***					
Project Location:			KP 757 & 933	KP 1067			KP 700	KP 757	KP 933	KP 1136		
Pipeline/Facility:			Camp Sites	Camp Site			Comp Sta	Camp Site	Comp Sta	Heater Sta		
Staging Via:			Ochre River	McGill Station			Blackwater	Ochre River	Trail River	Trout River		
And/Or:			Camsell Bend	Hay River				Smith Creek	Camsell Bend	Trout Lake		
Tonnage to Move					**Subtotal**							**Subtotal**
Metric Tonnes												
GRAVEL							355,190	274,362	59,400	151,580		840,532
WATER							2,565	2,565	2,565	2,565		10,260
FUEL TANKS			923	225	1,148		90	Summer 2006	90	158		338
RESUPPLY							570	610	650	300		2,130
					1,148							**853,260**
Trucks to Move It												
GRAVEL	m3						161,450	124,710	27,000	68,900		382,060
Truck Loads @	12.5	m3					12,916	9,977	2,160	5,512		30,565
Trucking Days Available							57	61	65	30		
Truck Cycles@Full Day Ops							25.7	51	21.2	18.5		
Truck Fleets/Days Available							9	3	2	10		24
WATER	litres						2,565,000	2,565,000	2,565,000	2,565,000		10,260,000
Truck Loads @	27,000	litres					95	95	95	95		380
Truck Cycles@Full Day Ops							9.6	9.6	7.8	8.6		
Truck Fleets @	120	days					0.1	0.1	0.1	0.1		0.4
FUEL TANKS	bargeloads		4.6	via truck direct			0.4	Summer 2006	0.4	via truck direct		
Truck Loads @	1	each	41	10	59		4	truckloads	4	7		7
Truck Cycles/Barge Offload			4.5	2.2/Day			2	cycles/barge	1	1.6/Day		
Truck Fleets/Barge Offload			4.0	1.0	11		2.0		4.0	1.0		1
MISCL RESUPPLY tonnes							570	610	650	300		2,130
Truck Loads @ 1 per Day:							57	61	65	30		213
Truck Cycle Time (trips per day)							1	2	6	2		
Truck Fleet							1.0	0.5	0.2	0.5		2
PROJECT TOTAL												0
Truck Loads			41	10	**59**		13,068	10,133	2,320	5,644		**31,165**
Truck Fleets			4	1	**11**		10	4	2	12		**27**

				Local NWT Trucking Ancillary to MGP On-Site Construction Support									
					Within the FORT SIMPSON/Deh Cho Region								
Truck Ops In:			***Summer 2007***					***First Construction Winter 2007-8***					
Project Location			KP 933	KP 907-1064		KP 700	KP 757-907	KP 933	KP 907-1064	KP 1064-1221	KP 1136/1221		
Pipeline/Facility			Comp Sta	Spread A1		Comp Sta	Spread B2*	Comp Sta	Spread A1	Spread A2	Heater/Meter Stas		
Staging Via:			Trail River	Camsell Bend		Blackwater	Ochre River	Trail River	Camsell Bend	McGill Station	Trout River		
And/Or:			Camsell Bend	McGill Station			Camsell Bend	Camsell Bend	McGill Station	Trout Lake	Trout Lake		
Tonnage to Move					**Subtotal**								**Subtotal**
Metric Tonnes													
GRAVEL			205,062	210,144	415,206				22,576				22,576
WEIGHTS						[initial engineering design does not anticipate pipeline weights]							
SKIDS									1,299				1,299
WATER			2,565	2,565	5,130	4,860		4,860	25,650		6,413		41,783
FUEL TANKS				90	90								
MISCL RESUPPLY			650	560	1,210	900		900	900		900		3,600
													69,258
Trucks to Move It													
GRAVEL	m3		93,210	95,520	188,730				10,262				10,262
Truck Loads @	12.5	m3	7,457	7,642	15,098				821				821
Trucking Days Available			65	56					35				
Truck Cycles@Full Day Ops			21.2	8.57					12				
Truck Fleets/Days Available			5	16	21				2				2
FUEL TANKS	bargeloads			via truck direct									
Truck Loads @	9 tanks/barge			4	4								
Truck Cycles/Barge Offload				2.2/Day									
Truck Fleets/Barge Offload				1.0	1.0								
WEIGHTS	tonnes												
Truck Loads @	30												
Trips/Truck													
Truck Fleets													
SKIDS	number								100,000				100,000
Truck Loads @	1,848	each							54				54
Truck Cycles@Full Day Ops									1.4				
Truck Fleets @	30	days							1.3				1
WATER	litres		2,565,000	2,565,000	5,130,000	4,860,000	12,650,000	4,860,000	25,650,000	6,412,500	6,412,500		60,845,000
Truck Loads @	27,000	litres	95	95	190	180	469	180	950	238	238		2,254
Truck Cycles@Full Day Ops			7.8	7.8		9.6	9.6	7.8	7.8	7.8	8.6		
Truck Fleets @	120	days	0.1	0.1	0.2	0.2	0.4	0.2	1.0	0.3	0.2		2.3
MISCL RESUPPLY tonnes			650	560	1,210	900		900	900		900		3,600
Truck Loads @ 1 per Day:			65	56	121	90		90	90		90		360
Truck Cycle Time (trips per day)			6	6		1		6	6		2		
Truck Fleet			0.2	0.2	0.3	1.0		0.2	0.2		0.5		2
PROJECT TOTAL													
Truck Loads			7,617	7,797	**15,413**	270		270	1,915		328		**3,489**
Truck Fleets			5.7	17.2	**23**	1.2		0.4	4.4		0.7		**7**

				Local NWT Trucking Ancillary to MGP On-Site Construction Support									
					Within the FORT SIMPSON/Deh Cho Region								
Truck Ops In:						**Second Construction Winter 2008-9**							
Project Location					KP 700	KP 757-907	KP 933	KP 907-1064	KP 1064-1221	KP 1136/1221			
Pipeline/Facility					Comp Sta	Spread B2*	Comp Sta	Spread A1	Spread A2	Heater/Meter Stas			
Staging Via:					Blackwater	Ochre River	Trail River	Camsell Bend	McGill Station	Trout River			
And/Or:						Camsell Bend	Camsell Bend	McGill Station	Trout Lake	Trout Lake			
Tonnage to Move													**Subtotal**
Metric Tonnes													
GRAVEL						108,194		22,576	54,927				185,698
WEIGHTS						[initial engineering design does not anticipate pipeline weights]							
SKIDS						649			649				1,299
WATER					4,860	25,650	4,860	12,825	25,650	2,538			76,383
MISCL RESUPPLY					900	900	900	900	900	900			5,400
													268,779
Trucks to Move It													
GRAVEL	m3					49,179		10,262	24,967				84,408
Truck Loads @	12.5	m3			0	3,934	0	821	1,997	0			6,753
Truck Cycles@Full Day Ops					1	23.2	1	12	75	1			
Truck Fleets @	35	days			0	5	0	2	1	0			8
WEIGHTS	tonnes												
Truck Loads @	30												
Trips/Truck													
Truck Fleets													
SKIDS	number					50,000			50,000				100,000
Truck Loads @	1,848	each				27			27				54
Truck Cycles@Full Day Ops						1.7			2				
Truck Fleets @	30	days				0.5			0.5				1
WATER	litres				4,860,000	25,650,000	4,860,000	12,825,000	25,650,000	2,538,000			76,383,000
Truck Loads @	27,000	litres			180	950	180	475	950	94			2,829
Truck Cycles@Full Day Ops					9.6	9.6	7.8	7.8	7.5	8.6			
Truck Fleets @	120	days			0.2	0.8	0.2	0.5	1.1	0.1			3
MISCL RESUPPLY tonnes					900	900	900	900	900	900			5,400
Truck Loads @ 1 per Day:					90	90	90	90	90	90			540
Truck Cycle Time (trips per day)					1	5	6	6	4	2			
Truck Fleet					1.0	0.2	0.2	0.2	0.3	0.5			2
PROJECT TOTAL													
Truck Loads					270	5,001	270	1,386	3,064	184			**10,176**
Truck Fleets					1	6	0.4	3	3	1			**14**

				Local NWT Trucking Ancillary to MGP On-Site Construction Support								
					Within the FORT SIMPSON/Deh Cho Region							
Truck Ops In:					**Post-Construction Winter/De-Mobilization Summer 2009-10**							
Project Location					KP 700	KP 757-907	KP 933	KP 907-1064	KP 1064-1221	KP 1136/1221		
Pipeline/Facility					Comp Sta	Spread B2*	Comp Sta	Spread A1	Spread A2	Heater/Meter Stas		
Staging Via:					Blackwater	Ochre River	Trail River	Camsell Bend	McGill Station	Trout River		
And/Or:						Camsell Bend	Camsell Bend	McGill Station	Trout Lake	Trout Lake		
Tonnage to Move												**Subtotal**
Metric Tonnes												
GRAVEL						108,194			54,927			163,121
WATER						2,565			2,565			5,130
RESUPPLY						350			350			700
CAMPS/RETROGRADE												22,850
CONST EQUIPMENT DEMOBE												14,200
												206,001
Trucks to Move It												
GRAVEL	m3					49,179			24,967			74,146
Truck Loads @	12.5	m3				3,934			1,997			5,932
Truck Cycles@Full Day Ops						23.2			10			
Truck Fleets @	35	days				5			6			11
WATER	litres					2,565,000			2,565,000			5,130,000
Truck Loads @	27,000	litres				95			95			190
Truck Cycles@Full Day Ops						9.6			7.5			
Truck Fleets @	120	days				0.1			0.1			1.0
MISCL RESUPPLY tonnes						350			350			700
Truck Loads @ 1 per Day:						35			35			70
Truck Cycle Time (trips per day)						5			4			
Truck Fleet						0.2			0.3			1.0
PROJECT TOTAL												
Truck Loads												**6,192**
Truck Fleets												**13**
Demobilization												
CAMPS/RETROGRADE tonnes						5,468		6,293	5,674	5,416		22,850
ShuttleTruckLoads@	25	tonnes				221		254	229	219		923
Barge Offloads@	720	tonnes				7		8	Truck Direct To Hay River			16
Truck Fleets/Barge or Truck Backload						3.5		8.7	4.2	4.1		20
CONST EQUIP DEMOBE tonnes												14,200
ShuttleTruckLoads@	28	tonnes							350	29		379
Barge Backloads@	1000	tonnes							Truck Direct To Hay River			
Truck Fleets/Barge or Truck Backload									4	1		4
DEMOBILIZATION TOTAL												
Truck Loads												**1,301**
Truck Fleets												**25**

Induced Transportation Impacts

In this report, an induced transportation multiplier has been empirically developed for NWT project logistics based upon actual trucking activity associated with Diavik Mine construction as compared to the increase in total NWT trucking activity. We believe that the Southern NWT Highway System and connecting Winter Road access to the Diavik Mine site provide a uniquely practical proxy for extrapolating the full range of future project logistics impacts that is relatively undistorted by externalities (e.g., concurrent Mackenzie River barge support for oil and gas exploration).

Based on GNWT Transportation Statistics reported during the 2001-2003 Diavik construction period for the Lupin Winter Road and for the Enterprise Weigh Scale including 2000 as a base year:

- First, we assume that winter road trucking operations accessing the Diavik mine site during a three year construction period effectively comprise the total of direct and indirect transportation in the NWT: **9,668 Direct/Indirect Trucks**
- Second, we assume that the total of trucks weighed at Enterprise in each construction year compared to the base year effectively comprise additional NWT transportation induced by Diavik construction: **2,113 Induced Trucks**
- Third we assume that the ratio of Induced Trucks to Direct/Indirect Trucks is a valid proxy for determination of induced transportation impacts on other NWT projects: **.21186 Multiplier (21%) applied to Direct/Indirect Transportation**

These empirical results are consistent with industry multipliers and intensity ratios used with the territorial input-output model maintained by the GNWT Bureau of Statistics. Equivalent input-output model multipliers for induced impacts are approximately 23% in both the Transportation and Construction Sectors. We attribute the difference to leakage inherent in the input-output model.