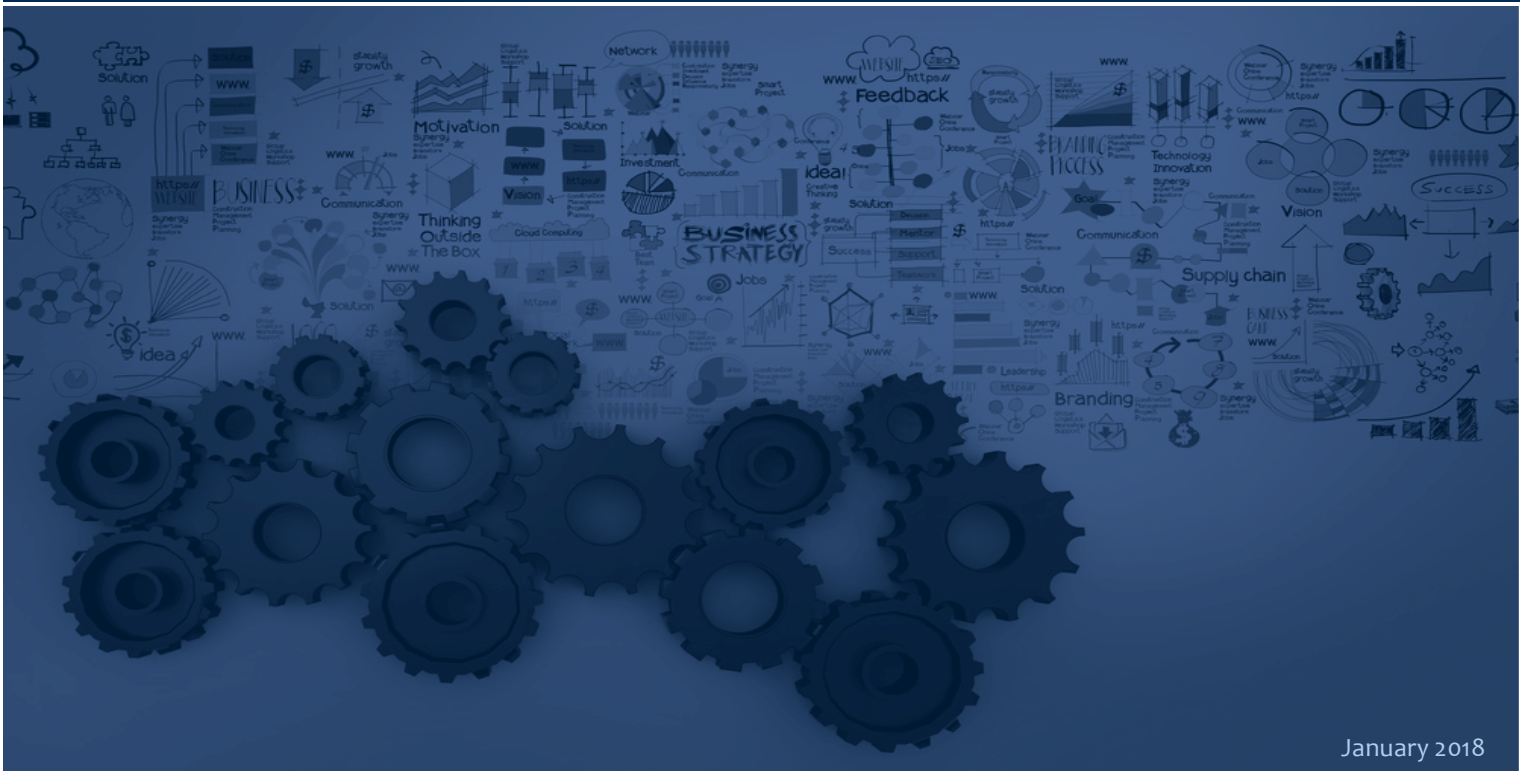


IMPACT ECONOMICS

# Briefing

## Economic Assessment of Grays Bay Road and Port Project

For Nunavut Resources Corporation



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# Summary

The Grays Bay Road and Port Project (GBRP) is a transportation system that will connect the Slave Geological Province to arctic tidewater. It consists of a 227 km all-season road from the Tibbitt-Contwoyto Winter Road to a deep-water port at Grays Bay on the Northwest Passage.

Key project details and the results from an assessment of the project's economic effects include:

- The total cost of construction has been estimated at \$527 million dollars and will require an estimated 2 ½ years to build.
- It is estimated that the Project will create 2,250 full-time equivalent<sup>1</sup> (FTE) jobs in Nunavut when factoring all direct, indirect, and induced effects, equal to an average of 900 FTE jobs annually during construction.
- The project will contribute \$189.5 million to Nunavut's GDP.
- Governments could generate as much as \$85 million in tax revenues from the construction activities.

The Project's purpose is to open up the Kitikmeot region to mineral exploration and development. The largest known mineral deposits in the region are at Izok Lake and High Lake. These zinc-copper properties contain an indicated resource worth more than US\$10 billion at today's prices. If developed, these properties would have a significant effect on the region's economy.

Assuming a feasible mine plan can be developed and using prudent assumptions for construction and operating costs, commodity prices, and exchange rates, the effects of the \$2 billion mining project could include:

- Creation of 1,260 FTE jobs in Nunavut annually for three years during construction and 1,400 FTE jobs each year for 11 years during operations.
- Mine construction would raise GDP in Canada by \$1.5 billion while the mineral production would add \$7.5 billion to GDP.
- Mining operations could contribute as much as \$665 million to government revenues through resource royalties, corporate tax, and personal income tax, and substantially more if the estimates were to include revenues from indirect taxes on goods and services and fuel, land taxes, import duties, and licensing, as well as Nunavut's 2% payroll tax.

Additionally, the road and port could become an important transportation route for mines operating in the NWT, while the port is expected to attract the interest of other users for such things as community resupply, marine safety, security, and tourism. While more difficult to quantify in terms of economic growth and job growth, these other uses would improve the quality of life and industrial opportunities through reduced costs and improved transportation efficiencies.

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<sup>1</sup> One full-time equivalent job is equal to one person working full time for an entire year. This one FTE job can be comprised of several people working part-time, where their collective effort equals one job. Furthermore, should an employee work overtime, their contribution would be greater than one FTE job. All results for employment in this report are given in FTEs.

# Grays Bay Road and Port Economic Assessment Highlights

## Introduction

The economic assessment has been divided into three parts: the economic effects of the Project’s construction; the potential economic effects of future development induced by the new infrastructure; and, the effects of both the construction and future development on public finance.

This briefing provides the results from the assessment. A more detailed report will be made available describing the technical aspects of this work.

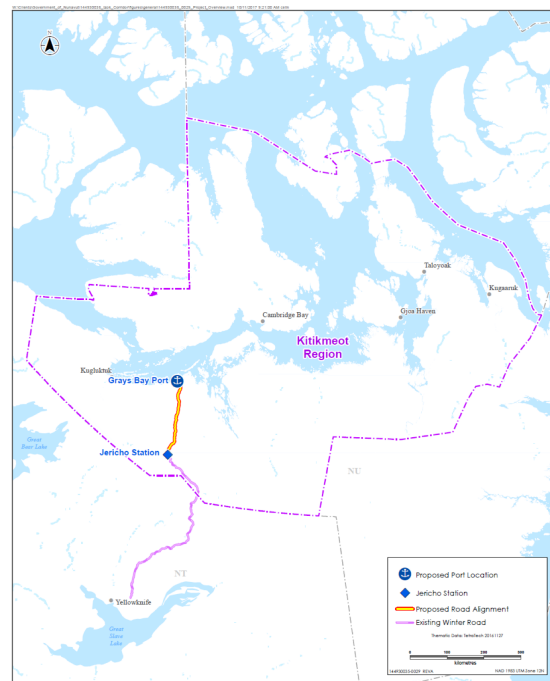
## Project Description

The Grays Bay Road and Port Project (GBRP) is a transportation system that will connect the Slave Geological Province to arctic tidewater. It consists of a 227 km all-season road from the Tibbitt-Contwoyto Winter Road to a deep-water port at Grays Bay on the Northwest Passage.

The Government of Nunavut and the Kitikmeot Inuit Association support the investment. Collectively, they believe that the GBPR is a “transformational project of national significance that will help to define northern economic development throughout the 21st century.”

Mineral interests in the region have studied the feasibility of the road and port for several decades in connection with potential mineral developments. The conclusion has always been the same; that the cost of this infrastructure is too high without public support to be included in the capital cost of the mining development. As a result, several known mineral deposits have been effectively stranded.

The GN and KIA believe the new infrastructure would rejuvenate interest in exploration and mineral development in the region. The port would facilitate efficiencies in community resupply and marine transportation more generally, while its strategic location would offer opportunities for Canada to exercise its sovereignty claim to the High Arctic and provide a measure of safety and security to the region and to the Northwest Passage.



# Summary of Results

## Grays Bay Road and Port Construction

The total cost of construction has been estimated at \$527 million dollars and will require an estimated 2 ½ years to build. Using data provided by the Project proponents, a project-specific simulation of Statistics Canada’s *Interprovincial Input-Output Model*, and published Input-Output Supply and Use matrices for Nunavut, it is estimated that the Project will create 2,250 FTE jobs in Nunavut when factoring all direct, indirect, and induced effects. This is equal to an average of 900 FTE jobs annually over the 2 ½-year project timeframe. Meanwhile, it is expected that Nunavut’s GDP will increase by \$189.5 million as a result of the project, or \$75.8 million on an annual basis.

These construction-based activities will spur economic benefits throughout Canada in the form of business spending and employment. Ontario and Alberta will benefit the most. GDP in those two provinces will increase by \$110 million and \$103 million while employment will receive a boost of 910 and 570 FTE jobs, respectively.

When considering the Canada-wide benefits, it is important to recognise that a majority of goods and services (including labour) needed are expected to originate from southern Canada, meaning almost all indirect and induced benefits will accumulate there. For instance, the Project proponent estimates that 75% of its labour force (direct jobs) will reside outside Nunavut. It was estimated that the \$527 million GBRP project will cause a net rise in Canada’s GDP of \$487 million and create 4,440 FTE jobs.

Results from the Economic Assessment of the GBRP Construction Project					
	Direct	Indirect	Induced	Total	Annual Average*
<b>Gross Output (\$, thousands)</b>					
Nunavut	527,000	3,000	9,700	540,000	216,000
Ontario		140,000	81,000	221,000	88,000
Alberta		141,000	62,300	203,000	81,000
All of Canada	527,000	414,000	215,000	1,156,000	462,000
<b>Gross Domestic Product (\$, thousands)</b>					
Nunavut	182,400	1,200	5,900	189,500	76,000
Ontario		64,000	45,800	110,000	44,000
Alberta		65,300	37,700	103,000	41,000
All of Canada	182,400	180,500	124,500	487,400	195,000
<b>Employment (# of FTE jobs)</b>					
Nunavut	2,220	12	20	2,250	900
Ontario		550	360	910	360
Alberta		340	230	570	230
All of Canada	2,220	1,330	900	4,440	1,780

Source: Statistics Canada Economic Accounts Division, Nunavut Resources Corporation, Nuna Logistics, and Impact Economics. Figures may not add up due to rounding. Note: \*assumes a 2½ year construction period.

## Economic Benefits from Potential Users of GBRP

While the economic benefits of the road and port construction are considerable, the Project’s real purpose is to open up the Kitikmeot region to mineral exploration and development. The road will pass through rich geological regions that are currently difficult and expensive to access and where known deposits are left stranded. The presence of a road and port will lower the future cost of mine construction and operations.

Despite good evidence that the GBRP will improve the feasibility of mineral development in the region, one should be cautious in reporting benefits of these induced opportunities. However, it is equally incorrect to ignore the possibilities altogether.

Two industrial activities that could grow as a result of the GBRP are examined in some detail in the report: mineral exploration and mining. As noted, other users would bring further benefits to the region through improved community resupply, marine safety and security, enhanced sovereignty, opportunities for tourism, and as an economical supply route for diamond mines operating in the Northwest Territories.

### MINERAL EXPLORATION

The money spent on exploration can provide important jobs and contract opportunities for resident labour and businesses. It is estimated that for every million dollars spent in Nunavut on exploration, GDP is given a \$518,000 boost and 5.2 direct FTE jobs are created in the territory.<sup>2</sup> Like most economic activity in Nunavut, there is a substantial benefit to other Canadian jurisdictions from exploration through indirect business demand and induced consumer spending. A million dollar investment in mineral exploration in Nunavut can create as many as 8.7 FTE jobs across the country when considering all direct, indirect, and induced effects.

Economic Benefits from Support Activities to Mining (effect from \$1 million investment in mineral exploration)				
	Direct	Indirect	Induced	Total
<b>Gross Domestic Product</b>				
Nunavut	518,000	41,500	74,000	633,500
All of Canada	518,000	236,800	178,300	933,000
<b>Employment (# of FTE jobs)</b>				
Nunavut	5.2	0.4	0.4	6.0
All of Canada	5.2	2.0	1.5	8.7

Source: Statistics Canada *Industry Accounts Division*. Input-Output multipliers of the industry: Support activities for mining.

<sup>2</sup> These estimates are derived from Statistics Canada’s *Interprovincial Input-Output Model*. The figure includes several industrial activities that support mining, including exploration.

## MINING

The real prize for investing in the GBRP will be mine development. The mining sector is a critical piece in the future success of Nunavut. Mining attracts much needed capital inflow to the region. It creates jobs at a scale that no other industry in the territory can match. And, when managed well, can be transformative in the socio-economic development of Nunavut communities.

The proposed road would connect several known mineral deposits to the port. The largest amongst these is Izok Lake, which is a potential zinc-copper mine with an indicated resource of 13.5 million tonnes at 13.3% zinc and 2.4% copper. Also adjacent to the road is High Lake, which is another zinc-copper deposit with an indicated resource of 7.9 million tonnes at 3.5% zinc and 3% copper. At today's prices— US\$1.50 per pound for zinc and US\$3.10 per pound for copper—this resource would be worth more than US\$10 billion. It is worth noting that zinc prices have been rising since mid-2016 and are approaching a historic high point.

These deposits are owned by the same company improving the possibility that a feasible mine plan can be developed. At the moment, this company is the most likely to become the first major industrial user of the road. The economic effects of the potential mine were estimated using the following assumptions:

- A feasible mine plan can be developed resulting in a successful environmental assessment that attracts the required capital investment and that leads to mine development;
- The total capital cost would be \$2.0 billion with a 3-year construction phase;
- 20% of capital expenditures and 7% of operational expenditures are directed to imports
- Production would span 11 years and would amount to 95% of the indicated resource assuming commodity prices 20% below current levels and an exchange rate of CDN\$1.25 to US\$1.00;
- Economic multipliers were estimated based on historical mining data for Nunavut and Canada and using Statistics Canada's *Interprovincial Input-Output Model*; and,
- Nunavummiut will supply 15% of the construction labour (direct and indirect), 25% of the operations labour (direct and indirect), and 100% of the induced labour within the territory.

A \$2 billion mine development is estimated to raise Nunavut's GDP by \$739 million spread over three years and create 3,770 FTE jobs. Similar to the GBRP project construction, the majority of indirect and induced effects would occur in southern Canada where most of the project's goods and services (including labour) will be purchased. The mine development would provide a \$1.5 billion boost to Canada's GDP and create more than 10,000 FTE jobs.

An operating mine of this size would cause GDP in Nunavut to rise by almost \$500 million annually while creating 1,400 FTE jobs when all direct, indirect, and induced effects are considered. Should Nunavut labour participation in the project grow to 25% of all direct and indirect jobs and 100% of all induced jobs, this project would bring about an increase in employment equal to 365 full-time equivalent jobs.

The results of this exercise are presented in the table below:<sup>3</sup>

<b>Potential Economic Effects from the Development of Izok and High Lake mineral deposits, \$,thousands and full-time equivalent jobs</b>					
	<b>MINE CONSTRUCTION (3 YEARS)</b>				
	<b>Direct</b>	<b>Indirect</b>	<b>Induced</b>	<b>Total</b>	<b>Annual Average</b>
	<b>Gross Domestic Product</b>				
Within Nunavut	556,000	175,000	9,000	739,000	246,000
All of Canada	556,000	662,000	285,000	1,503,000	501,000
	<b>Employment (# of FTE jobs)</b>				
Within Nunavut	2,090	1,640	40	3,770	1,260
All of Canada	2,090	5,900	2,590	10,580	3,530
	<b>MINE OPERATIONS (11 YEARS)</b>				
	<b>Direct</b>	<b>Indirect</b>	<b>Induced</b>	<b>Total</b>	<b>Annual Average</b>
	<b>Gross Domestic Product</b>				
Within Nunavut	5,000,000	400,000	38,000	5,438,000	494,000
All of Canada	5,000,000	1,470,000	1,080,000	7,550,000	687,000
	<b>Employment (# of FTE jobs)</b>				
Within Nunavut	11,200	3,300	400	14,900	1,400
All of Canada	11,200	17,600	9,500	38,200	3,500

Source: Statistics Canada *National and Provincial Input-Output Multipliers*. Impact Economics.

## Government Revenue Potential

Any economic activity generated either directly or indirectly from the GBRP project affords government the opportunity to generate revenue.

### GBRP PROJECT CONSTRUCTION

The modelling work completed for the project construction provides estimates of some tax revenues, including taxes on products such as GST and HST, federal and provincial gas tax, import duties, and municipal taxes. Combined, these taxes will bring in close to \$18 million when considering all levels of government and combining the direct and indirect effects. Adding in the induced effects, which represents the economic effect generated from \$287 million of new labour income entering the economy, generates a further \$25 million in government tax revenues.

Personal income taxes and corporate taxes should also be considered. These revenues are challenging to estimate because they are influenced by numerous assumptions including differing taxation rates across each jurisdiction, various tax exemptions and non-taxable credits, and, in the case of corporations, factors that affect profitability. These complexities were addressed through the use of

<sup>3</sup> The purpose of this exercise is to demonstrate how a mining project in the Kitikmeot region would affect Nunavut's economy. Without a defined mine plan, the estimates were based on known mineral data and reasonable assumptions on what a feasible project would look like. The results should be viewed as such.

simple methodologies that made use of prudent assumptions so as to not grossly over- or underestimate the revenue possibilities.

The modelling work provided an estimate of \$287 million in labour income from all direct and indirect employment. The average federal personal income tax rate was assumed to equal 10% of gross income, while provincial and territorial personal tax rates were set at 5%. Applying these assumptions to the estimated labour income generated from the GBRP project construction results in \$43 million in personal income tax revenue for all levels of government.

Corporate taxes required an assumption on profits. The model results included an estimate of direct and indirect gross output equal to \$941 million. It was assumed that profits represent 10% of this total and that the average corporate tax rate was 25% when combining federal, territorial, and provincial corporate tax regimes. These assumptions contribute to a direct corporate tax estimate equal to \$23.5 million.

Taken together, the GBRP project construction could generate an estimated \$85 million in direct and indirect tax revenues across Canada.

#### **ZINC-COPPER MINE OPERATIONS AT IZOK LAKE AND HIGH LAKE**

A large-scale profitable mining project will all but pay for the GBRP project's construction costs through the government tax revenues generated. The example used in this study was the development of zinc-copper deposits at Izok Lake and High Lake. Several assumptions were introduced in order to calculate potential tax revenues from this example, including a feasible mine plan, the gross value of production, capital depreciation, and profitability.

To ensure tax revenues were not overestimated only the mine's direct effects were used in calculating the tax estimates. Furthermore, only three taxes were assessed: mining tax, corporate tax, and income tax. This excludes important indirect taxes on goods and services and fuel, land taxes, import duties, and licensing, as well as Nunavut's 2% payroll tax. It should be noted that the indirect and induced effects from a mining project of this size would be substantial. If the tax potential from these multiplier effects were realized, the tax revenue from this project would more than double the estimates being reported.

The following assumptions were used to generate the results for the Izok Lake and High Lake mine example:

- Operating surplus was 37.5% of gross output
- Capital depreciation was calculated as the cost of construction plus 20% for sustaining capital
- The average mining tax rate (resource royalties) was calculated to equal 10.4% of calculated taxable profits
- Federal corporate tax rate was assumed to be 15% of calculated taxable profits
- Provincial/territorial corporate tax rate was 10% of calculated taxable profits
- Federal personal income tax rate was 10% of estimated labour income
- Provincial/territorial personal income tax rate was 5% of estimated labour income



The results are presented in the table below:

<b>Estimated Tax Revenues from the Direct Effect of a Zinc-Copper Mine in the Kitikmeot Region (\$, thousands)</b>	
Mining Tax (Resource Revenues)	\$140,400,000
Federal Corporate Income Tax	\$202,500,000
Provincial/Territorial Corporate Income Tax	\$135,000,000
Federal Personal Income Tax	\$125,000,000
Provincial/Territorial Personal Income Tax	\$62,500,000
<b>Total Estimated Tax Revenue</b>	<b>\$665,400,000</b>

### **CONCLUSION**

The Grays Bay Road and Port represents a potential watershed for the Nunavut economy. The \$527 million investment would open up the mineral-rich Slave Geologic Province in the Kitikmeot region and provide a supply route to operating mines in the Northwest Territories. The Grays Bay port would attract interest from other users including community resupply shipping companies and the Canadian coast guard, and could improve marine safety in the region as well as tourism opportunities.

This assessment demonstrates the potential economic effects of the construction project and how the new infrastructure might attract industrial activity, including mineral exploration and mining activities. Of particular interest is the possibility of a major zinc-copper mine that would become an important user of the road and port. An operation of this size would bring substantial positive change to the region's economy, while the tax revenues, from the direct effects alone, would cover the cost of construction.

From the perspective of public finance, the risks associated with the investment must be weighed against the potential return that includes all financial, economic, and social benefits that would be realized from a realistic long-term development scenario for the region with the road and port infrastructure in place.