ECONOMIC PROFILE OF THE ALASKA HIGHWAY

Submitted to:

Government of Yukon
Department of Economic Development

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February 2016

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EXECUTIVE SUMMARY

This economic profile report examines how the Alaska Highway's traffic flows and ongoing operation make a difference today, and are expected to make a difference in the future, to valued economic and social components in those areas where the Highway is located, including public and private businesses, resource use, government, tourism, security and emergency response, and communities.

The Alaska Highway (the "Highway") is a key interjurisdictional corridor built during World War II as a secure inland military supply route. It extends from Dawson Creek in northeastern British Columbia to Fairbanks in Alaska, passing through Fort Nelson, B.C. and the southern areas of Yukon (including Watson Lake, Whitehorse and Haines Junction) as well as Tok and Delta Junction in Alaska. It includes the Haines Road connecting Haines Junction to the port of Haines, Alaska.

The economic profile of the Highway is examined by considering the difference between economic and social effects of traffic flows and highway operation (1) "with the Highway" and (2) "without the Highway", i.e., a scenario assuming an alternative transportation regime absent the key features of the Highway. Heavy commercial traffic activity entering and exiting Yukon through the Highway and other gateways was estimated in this study for 2014. Other Highway traffic and related Highway maintenance and capital costs were also examined.

Scenario without the Highway - Alternative Transportation Regime

Long before the Alaska Highway, "Inside Passage" or marine access was well developed for passengers and freight through the Alaska ports of Skagway (for access to and from Yukon) and Anchorage as well as Valdez (for access to and from interior Alaska). Absent the Alaska Highway, it is expected that the Inside Passage gateway would have supported almost all of the transportation infrastructure that exists today in Alaska as well as in central and western Yukon.

Similarly, within northeastern B.C. it is expected that highway and rail infrastructure between Dawson Creek and Fort Nelson would have developed by today absent the Alaska Highway

Accordingly, the key features of the current transportation infrastructure that would not exist without the Alaska Highway are focused in three areas:

- Southwestern Alaska:
    - Alaska Highway from Delta Junction to the Yukon Border (Beaver Creek); and
    - Top of the World Highway from Alaska to Dawson.
- Southern Yukon:
    - Alaska Highway from Beaver Creek to Haines Junction, and from Johnson's Crossing to Watson Lake and the B.C. border;
    - Robert Campbell Highway from Ross River/ Canol Road to Watson Lake; and
    - Nahanni Range Road from Robert Campbell Highway into the Northwest Territories.

- Northeastern British Columbia:
    - Alaska Highway from Yukon Border to Fort Nelson; and
    - Stewart Cassiar Highway between the Cassiar region in northeastern B.C. and Yukon or other areas in northeastern or northwestern (e.g., Stewart) B.C.

Alaska Highway Traffic Compared with Other Gateways in 2014

The Alaska Highway accounted for 70% (slightly over 300,000 tonnes) of the heavy commercial traffic tonnage inbound for use in Yukon in 2014, an increase from 60% in 2009 (217,000 tonnes), with almost all of this Highway traffic arriving through the Watson Lake gateway. Most of this Highway traffic in 2014 was community resupply (only 15% of community resupply tonnage entered Yukon via the Inside Passage). The balance of this Highway heavy commercial inbound traffic was development freight for resource activities or bulk fuel (about 45% of the bulk fuel tonnage entered Yukon via the Inside Passage). The Highway's Watson Lake gateway also accounted for 70% (119,000 tonnes) of the heavy commercial tonnage outbound from Yukon in 2014, reflecting shipments from the Wolverine and Cantung mine projects (the balance of heavy commercial outbound shipments went through the Inside Passage, reflecting shipments from the Minto mine project).

The Alaska Highway in 2014 accounted for about 168,200 tonnes of additional heavy commercial "through traffic", a decrease of 39% from this tonnage in 2009 (272,000 tonnes), moving through Yukon between BC/Alberta and Interior Alaska or Inuvik, Northwest Territories (NWT) via the Dempster Highway. Slightly over half of this traffic in 2014 entered Yukon through Watson Lake for shipment mainly to interior Alaska, with some traffic (including LNG bulk fuel) going to Inuvik, NWT. The balance of this traffic entered Yukon through the interior Alaska gateway for shipment mainly to the continental United States. This information indicates that the vast majority of heavy commercial freight inbound or outbound from Alaska moves through marine ports in Alaska.

The Alaska Highway in 2014 accounted for 45% of the 366,500 summer visitors to Yukon, with about 24% of these visitors entering at Beaver Creek (from Alaska) and about 76% entering at Watson Lake (from British Columbia). In contrast, about 38% of summer visitors in 2014 entered Yukon from Skagway (Inside Passage), 12% entered by air, and 4% entered from Alaska though Haines or Little Gold (Top of the World highway).

Alaska Highway Summary Economic Profile

Economic impacts of the Alaska Highway's traffic and operation are focused mainly in Yukon, but also affect Alaska, northern British Columbia, and parts of NWT (e.g., Inuvik and resource projects in western NWT on the border with Yukon). These impacts reflect the extent to which the Highway's existence alters economic and social conditions from what would likely have occurred under the alternative transportation regime absent the key features of the Highway.

Key impacts of the Highway on valued economic and social components are summarized in Table ES-1 below.

Table ES-1: Key Impacts of Alaska Highway on Valued Components

	Impact Today (2014)	Potential Change in 2025
Private and Public Businesses		
Community Re-Supply, Bulk Fuel	Most of resupply inbound tonnage to Yukon comes via the Highway vs Inside Passage: • Faster delivery (2 vs 8 days). • Greater flexibility for smaller shipments/partial loads. • Highway sets competitive market cap (monopoly access issues without Highway). • Inuvik, NWT LNG supply option facilitated.	No material change, other than Highway access benefits re: enhanced LNG supply options (ability for road access suited to small volumes and northern BC/Alberta supply options; avoid added regulatory issues re import through US port).
Local Community Businesses	Access and service to highway traffic for communities in southeastern Yukon and north-west of Haines Junction, as well as in Tok, AK and northeastern BC; Avoids added transportation costs if community is isolated and had to be supplied by winter road/ air.	No material change.
Resource Sector		
Regional Impact	Highway provides infrastructure needed for resource activity and mine development in southeastern Yukon, NWT border with Yukon, and Cassiar region of northern B.C. (needed for Wolverine, Cantung and past Cassiar mine developments).	Mines and related exploration and pre-development work in eastern Yukon and on border with NWT (that require access via Nahanni Range Road) can potentially develop or resume operation; includes Selwyn, Kudz Ze Kayah, and Mactung projects.
Development Freight, bulk fuel	Enhanced transport options and cost savings offered by Highway for resource activity developments in all Yukon regions.	Potentially much greater benefits; LNG supply for mines from northern B.C./Alberta options.
Governments		
Yukon Highway Costs	Increased maintenance and capital costs for portions that exist only due to Alaska Highway ($13.8 million maintenance, $21.9 million capital). Offsets available from Skakwak Agreement funding from the United States.	No material change, subject to renewal of Skakwak funding.
Employment	Increase in size of dept. for Energy, Mines and Resources, Highways and Public Works, and potentially other departments or bodies addressing assessment and licensing of development projects. Location of highway maintenance camps and related employment and spending in communities such as Burwash Landing, Beaver Creek, and Destruction Bay.	No material change.
Revenues	Increased resource revenues, including taxes and royalties from mining activities in eastern Yukon.	Potential material change from new mines in eastern Yukon.
Services	Increase in services outside of Whitehorse.	No material change.

Tourism		
Yukon Visitors	Up to 197,000 visitors enter Yukon via Highway (44% of 2014 Yukon visitors). • Total Yukon GDP impact of up to $63.6 million. • Total Yukon employment impact of up to 890 FTEs.	No material change.
Diversity	Visitor options enhanced to include driving from southern Canada/ Lower 48 States or Alaska (in addition to cruise ships and air). Enhanced tourist visits in southeastern Yukon.	No material change.
Security & Emergency Response		
Security	Flexibility for transportation of goods/ personnel between Alaska/ Yukon and southern Canada/ Lower 48 States. For Yukon, secure access to external markets through multiple gateways.	No material change.
Emergency Response	Greater resiliency for emergency response systems and greater connectivity with neighbouring jurisdictions.	No material change.
Communities		
Whitehorse	Highway impacts related to enhanced Yukon development, including tourism, resource development and enhanced transport access for supply of certain private businesses (e.g., box stores).	No material change.
Watson Lake	The Highway enables Watson Lake to be a regional services centre for southeastern Yukon, with greatly increased population plus benefits from Highway through traffic and increased resource activity in the local region.	No material change.
Haines Junction	Enhanced population and economic activity due to Highway impacts in the region.	No material change.
Other communities	Communities other than Watson Lake that are not isolated, have increased population and enhanced business and other benefits from the Highway (in some case, community existence is due to Highway): • **Alaska:** Tok. • **Yukon:** Beaver Creek, Burwash Landing, Destruction Bay, Teslin, Swift River. • **British Columbia**: Fireside, Coal River, Muncho Lake, Toad River, Contact Creek.	No material change.
First Nations	Access to potential resource development and other business development opportunities; access to services and lower cost goods and services supplied today by road access that would not exist without the Alaska Highway.	Enhanced opportunities for Kaska First Nations in southeastern Yukon related to mine resource developments.

In summary, economic impacts of the Alaska Highway vary significantly for two fundamentally different impact areas as described below.

1. **Regions and communities in Yukon and the Alaska Interior that are dominated by the Inside Passage Connection -** The effects of the Alaska Highway today on Inside Passage connected areas in western and central Yukon as well as in Alaska would be limited due to the considerable impact that the existing Inside Passage gateway has on the development of these areas. Specifically, the existing connection between Whitehorse and Skagway via Inside Passage and assumed related development of highway access from Whitehorse to Dawson City, Keno and Faro supports development of much of the infrastructure that provided a foundation for social and economic development in the Yukon.

   For western and central Yukon, the loss of the Alaska Highway would not generally restrict the inbound/ outbound supply of products or resources, community resupply and development freight as well as outbound ore product shipments. However, loss of road connections to British Columbia (and, to a much lesser extent, the Alaska interior) would impact Yukon private and public businesses as there would effectively be only one major transportation gateway into Yukon with no possibility of truck transportation from southern Canada and the Lower 48 States. This would potentially impact how Yukon businesses are able to operate (with reduced speed and flexibility of delivery through marine ports versus the Alaska Highway), and would also expose Yukon businesses to a potential monopoly environment due to the lack of option to the Inside Passage gateway to Yukon.

   Looking out to 2025, up to five potential major new mine developments could occur in this region, with or without the Alaska Highway. The Highway will provide some transport cost savings for inbound resource development freight relative to what would be required without the Highway. For bulk fuel deliveries to at least the potential Casino and Wellgreen mines, the Highway is also currently expected to deliver critical LNG supplies from northeastern B.C. or northwestern Alberta. The ability to secure equivalent cost effective LNG supplies without the Highway (i.e., by marine transport through a US port via inside passage) is uncertain today.

2. **Regions and Communities in Yukon, Alaska and northeastern BC that would be effectively isolated or would not exist absent the development of the Alaska Highway -** The Alaska Highway had an important role in connecting several communities in northeastern B.C. and eastern Yukon to Whitehorse/ Alaska, and without the Highway these areas would remain undeveloped (or potentially not exist) due to lack of developed infrastructure available to support exploration and development activities.

   Without the Alaska Highway, two mines operating in the region in 2014 (Wolverine in Yukon and Cantung in NWT) would not have existed. LNG shipments to Inuvik, NWT would also likely not have been economically feasible.

   Looking out to 2025, up to three potential major new mine developments could occur in this region with the Highway in place, providing material economic and other benefits to a range of valued components in Yukon. However, these new developments are dependent on the road structure facilitated by the Alaska Highway, and would not likely develop absent the Alaska Highway. Inability

to develop each mine would have a material adverse impact on Yukon (i.e., loss of GDP, full time equivalent jobs and related wages and salaries and loss of mining royalties), as well as on local First Nations communities.

Recommendations

Review of the economic profile results for the Highway supports the following recommendations:

1. **Further focused study of the Shakwak Portion of the Highway may support future funding applications:** It is recommended that the results of this study be refined or further focused to support efforts to secure future Shakwak funding. For example, future work could document the use of the Shakwak portion of the highway by US citizens, including Highway use to provide access to Haines and Skagway ferries to Southeast Alaska and points south.

2. **Further review and assessments regarding how more competitive transportation rates may be secured for Yukon businesses:** The study underlines the important role that having a second option for transporting goods into Yukon may play in ensuring competitive rates for Yukoners and Yukon businesses. Further assessments may explore ways to foster continued competition between marine and Highway access in order to gain more competitive or attractive rates for Yukon. The following areas may be explored further in this regard:

    a. Review options to ensure more efficient and cost effective Inside Passage transport via Skagway and Haines.

    b. Review options to ship less-than-full-load ("LTL") containers at lower cost - the Economic Profile indicates growth in LTL shipments along the Alaska Highway corridor; consider ways to develop a more competitive and cost-effective option from southern Canadian ports, through the marine port of Skagway.

    c. Review options to make smaller shipments more cost competitive in order to support mining development in Yukon - LNG barge shipments may be available from Fortis BC's Tilbury Island liquefaction facility, if LTL shipments through Skagway could be optimized, it may provide lower cost fuel deliveries for developing mines in western Yukon that are considering use of LNG as source of power for mine operation (e.g., Wellgreen, Casino, and Kaminak).

3. **Further review and assessment regarding how the Alaska Highway may continue to play an important role fostering development in eastern Yukon and the North:** Combined with other transportation routes such as the Klondike Highway and the Dempster Highway, the Alaska Highway may continue to play an important role in fostering development of eastern Yukon and the north. The following potential examples are noted for future review:

    a. Support for eastern Yukon mining - mine road improvement to support future developments in eastern Yukon (e.g., Selwyn, Kudz Ze Kayah, Mactung).

    b. Link from Dempster to deep water port (e.g. Yukon's King Point) – extension and reinforcement of highway system through Yukon to arctic/ NWT.

c. Develop Rail Extension from rail heads at Fort Nelson or Dease Lake - to Alaska Highway and beyond to service Yukon mines and/or points in Alaska.

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1.0 INTRODUCTION AND APPROACH TO ECONOMIC PROFILE

The Alaska Highway (the "Highway", or the "Project") is a key interjurisdictional corridor built during World War II as a secure inland military supply route that extends from Dawson Creek in northeastern British Columbia, through the southern areas of Yukon (including Watson Lake, Whitehorse and Haines Junction), and ending at Fairbanks, Alaska. It includes the Haines Road connecting to the port of Haines, Alaska.

This report provides an overall economic profile of the Alaska Highway that includes consideration of its social and economic valued components ("VCs")[1] and the impacts of the Highway in northeast BC, Yukon and Alaska, as well as other neighbouring regions which use the highway as a major feeder or connecter route. Due to the historic importance of the Alaska Highway in Yukon and its continued importance as the only inland connection between Yukon and the rest of Canada, particular focus has been placed on the Yukon portion of the Highway.

The economic profile for the Alaska Highway uses an impact assessment approach that examines how the Highway has made a difference to the economic and social conditions of those areas where it is located. Expressed another way, it describes the impacts of the Highway on the main economic and social components that it affects. An impact assessment test typically applied in environmental and socio-economic impact assessments has been used for defining and delineating what difference the Alaska Highways has made. This form of impact assessment test compares:

1. The current economic and social effects of the Alaska Highway; and
2. What the economic and social effects would have been if the Highway did not exist and an alternative transportation regime had been in place instead.

The difference between economic and social effects 'with the Highway' and 'without the Highway' represents the net contribution or the social and economic impact of the Highway.[2] Both beneficial and adverse contributions (e.g., transportation cost savings and reduced roles for particular communities) are considered in defining impacts.

The economic profile and associated impact analysis is applied initially in the baseline situation today, which covers the historical and current circumstances 'with' and 'without' the Alaska Highway. The economic profile then considers how the impacts of the Alaska Highway on economic and social valued components would change under defined potential future scenarios, focusing on potential changes by 2025 from the Baseline Economic Profile impacts identified for today.

[1] Valued components are economic or social attributes identified as having social and economic significance that are either beneficially or adversely affected by some aspect of the defined project.

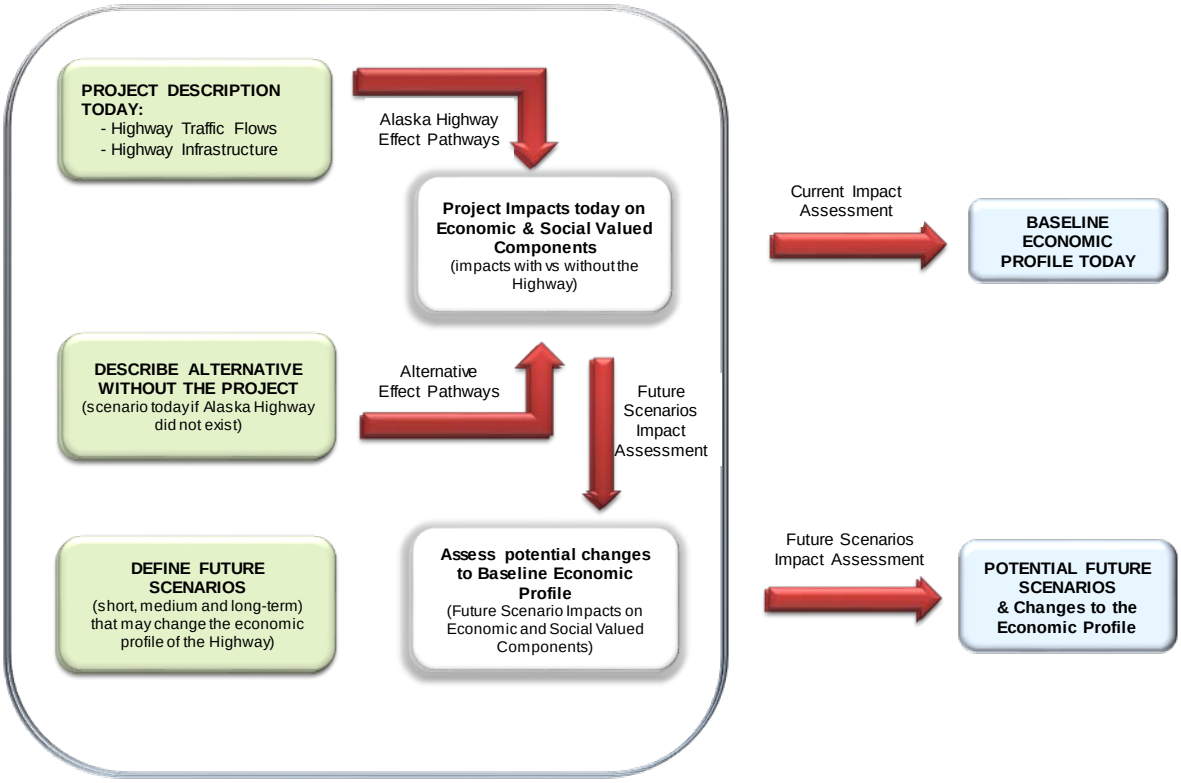
[2] This method uses the socio-economic impact assessment approach familiar to environmental and socio-economic impact assessments which requires practitioners to assess impacts of a proposed new project or development by considering (1) existing conditions and how these are expected to unfold in the future without the project; and (2) the impact of the project on existing conditions and how this is expected to unfold in the future. For standard project impact assessments, the hypothetical to be considered is the "world with the project" (as the project is not yet licenced and constructed at the time of the assessment). For the current study, the known condition is the "world with the project" and the hypothetical is the "world without the project".

The Economic Profile takes into account the following as the main drivers or pathways to economic and social impacts from the Alaska Highway:

- Current and projected traffic flows, and particularly heavy haul traffic flows related to fuel, resource development projects and community re-supply; and
- Expenditures and other factors related to construction and operation of the Highway that can have economic and social consequences.

This overall approach is illustrated in Figure 1-1 below and outlined in further detail in Section 1.1 below.

Figure 1-1: Methodology for Economic Profile / Socio-Economic Impact Assessment of the Alaska Highway – Current Situation and Future Scenarios



1.1 KEY STEPS FOR CONDUCTING ECONOMIC PROFILE

The impact assessment for the Economic Profile of the Alaska Highway followed five key steps as summarized below.

Step 1: Definition of Project Description

Impact assessments are typically undertaken to determine the impact that a defined project or development will have on the surrounding environment. The project description must describe in sufficient detail the key potential pathways of effect from the Alaska Highway (the "Project") to identified socio-economic valued

components. For the Economic Profile of the Alaska Highway this included consideration of the following key drivers or effects pathways for the Highway:

1. **Highway Traffic Flows** – This included current and projected inbound and outbound heavy traffic demand volumes at Yukon gateways, as well as light traffic volumes on the Highway (e.g., tourist traffic and local traffic), and included review of heavy traffic connections between the Alaska Highway and Northern and Remote Routes (e.g., the Klondike Highway, the Dempster Highway and Highway 37 in B.C.).
2. **Projected Construction and Operation** – This included current and projected construction and operation and maintenance activities and costs for the Alaska Highway.

Step 2: Identification of Economic and Social Valued Components (VCs)

In socio-economic impact assessment VCs are economic or social attributes that are either beneficially or adversely affected by some aspect of the defined Project. For this assessment, valued components were identified as being economic or social attributes directly affected, or facilitated by, Alaska Highway traffic flows and/or construction and operation activities. Using this criteria, the following economic and social valued components were selected for the assessment:

- **Private and Public Business** - including impacts on regional and local businesses as well as public utilities that rely on the Alaska Highway for delivery of goods to Yukon.
- **Resource Sector** – including impacts on mines/ mineral exploration, oil and gas and forestry that rely on the Alaska Highway for delivery of supplies/ materials and for export of product to external markets.
- **Governments** – including delivery of services locally and regionally and revenues and costs related to the operation of the Alaska Highway.
- **Tourism** – impacts related to visitors and visiting tourists that travel along the Alaska Highway or use the Highway to visit Yukon, northeastern B.C. or Alaska.
- **Security and Emergency Response** – impacts related to the importance of the Highway to national security or for facility emergency response coordination between Yukon, Alaska and British Columbia.
- **Communities** – consideration of broad impacts on the economic and social fabric of local and First Nations communities located in the vicinity of the Alaska Highway, including impacts that the existence of the Alaska Highway has on the presence, role and size of the community, access to services, and economic activities.

The assessment recognized the need to focus on key impacts of the Alaska Highway on selected VCs. Quantitative assessments were undertaken to the extent that such information was available for selected VCs. Where quantitative analysis was not feasible, qualitative assessments were provided.

Step 3: Definition and Description of Alternative without the Project

In addition to defining the Project as it exists today (and understanding how it is expected to unfold into the future), it was necessary to identify a “world without the Project” scenario to ascertain how the people travelling and products being shipped today on the Alaska Highway would be affected if the Alaska Highway did not exist. This step required a detailed review and assessment of the historical transportation patterns, activity profiles and developments in the areas served today by the Alaska Highway.

Step 4: Assess Baseline Impacts Today of Alaska Highway on Economic and Social VCs

Effects pathways are pathways of impact between the Project and valued economic and social components being assessed. Effects pathways must be identified and defined in order to determine whether there is an impact of the Highway on specific VCs, and the extent of the impact. For this assessment, effects pathways were considered cause-effect linkages that connect traffic flow and/or construction and operation/maintenance costs for the Alaska Highway to identified valued components. The baseline impact or economic profile of the Alaska Highway today was determined by assessing the likely change to the VCs considering the world without the Highway compared to the world with the Highway.

Of necessity, the assessment focused on key impacts or notable issues raised by the assessment and did not attempt to research, assess or quantify every impact or issue that might arise when comparing the world with and without the Alaska Highway.

Step 5: Assess Project Impacts on Economic and Social VCs under Defined Future Scenarios

A range of potential future scenarios was defined for 2025 in order to assess potential changes in Project impacts on VCs compared to the current Baseline.

1.2 DATA COLLECTION & REVIEW PROCESS

For the Economic Profile, particular emphasis was placed on traffic flow information for heavy freight, tourist and local traffic as important sources of direct impact for selected valued components today and in the future. The following primary sources of quantitative information were used for the assessment:

- Bulk traffic flows based on truck weigh scale data at key Yukon entry/exit points as well as average daily traffic information reviewed for Yukon, northern B.C. and Alaska.
- Key person interviews undertaken in September 2015 to collect first-hand traffic and infrastructure information from weigh scale officials, government and industry (including mining, oil and gas and other existing and potential projects), and Yukon Highways and Public Works (required and planned capital improvements).
- Desktop surveys of secondary data including review of relevant studies and available data from existing published sources. This included review of information available from the Department of Tourism and Culture regarding Yukon visitors, as well as similar information publically available for northern British Columbia and Alaska.

The proposed approach recognized that there are practical limits on the extent of the assessment that could be performed in the time available and focused on using readily available traffic flow information at the outset to help define the issues for assessment.

Details on the quantitative information sources used in the study, and their limitations, are provided in appendices.

The approach to the assessment included interim deliverables and monthly progress reviews from September to December with the Project Steering Committee. This included reviews of the overall approach, rationale for VC selection and definition, review of the alternative without the Project scenario,

and future scenarios definitions and review of interim findings regarding the Economic Profile and Future Scenarios Assessment.

1.3 OUTLINE OF ECONOMIC PROFILE REPORT

The Economic Profile Report proceeds as follows:

- Section 2: Alaska Highway Project Description;
- Section 3: Alternative Without the Project Scenario;
- Section 4: Baseline Economic Profile for the Alaska Highway; and
- Section 5: Future Scenarios & Changes to Baseline Economic Profile.

More detailed supporting information is provided in the following appendices:

- Appendix A – Existing Conditions;
- Appendix B – Baseline Economic Profile;
- Appendix C – Overview of Yukon Economy;
- Appendix D – Tourism;
- Appendix E – Communities Baseline; and
- Appendix F – Future Scenarios.

2.0 ALASKA HIGHWAY PROJECT DESCRIPTION

The Alaska Highway is a long established Core Route[3] that directly contributes to, or facilitates, important economic and social impacts for residents, First Nations, communities, businesses, governments and visitors of/to the Yukon, northeastern and northwestern British Columbia, Alaska and even portions of the Northwest Territories ("NWT") (served by the Dempster Highway). It extends 2,647 km, commencing at Dawson Creek, British Columbia, crossing through southern Yukon and ending at Fairbanks, Alaska, and includes the Haines Road, and is divided into three segments (see Figure 2-1, which highlights segments related to Alaska Highway construction during World War II):[4]

- **British Columbia (Highway 97) -** British Columbia is responsible for maintaining sections of the Highway from kilometres 0-133. Public Works and Government Services Canada ("PWGSC") is responsible for maintaining the section from km 133 (north of Fort St. John) to km 968 (at the B.C. – Yukon Border).
- **Yukon (Highway 1) -** The responsibility for the operation, maintenance and site work of the Yukon segment of the Highway, including the Shakwak portion, was devolved to the Government of Yukon from PWGSC in 1992.
- **Alaska (Highway 2) –** the portion of the Highway between Yukon/Alaska border (at Beaver Creek) and Fairbanks, AK is maintained by the Alaska Department of Transportation and Public Facilities.

2.1 HISTORY AND DEVELOPMENT OF THE ALASKA HIGHWAY

2.1.1 World War II Construction

The Alaska Highway was initially constructed over a nine month period in 1942. The Project was initially led by the U.S. military and undertaken in response to the bombing of Pearl Harbour and the capture of the Aleutian Islands by the Japanese military, in order to address concerns regarding the vulnerability of marine shipping lanes on the west coast to enemy attack. A Canada-U.S. Permanent Joint Board of Defence determined a route between Dawson Creek and Fairbanks that closely followed the Northwest Staging Route airfields. A second supply road from the Port of Haines was also built with a connection point to the Alaska Highway at Haines Junction.[5]

Canada granted a right of way for the Alaska Highway and the United States financed construction which was undertaken by the U.S. Public Roads Administration. Following World War II, Canada assumed responsibility for maintenance and improvements of the Alaska Highway in Canada, including the Haines Road.

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[3] Core Routes are considered to be "Key interprovincial and international corridor routes (the original 1988 NHS routes, the amended September 2004 NHS additions and links to key intermodal facilities and major border crossings that connect to these routes)". Source: Transport Canada. 2011. National Highway System. Retrieved from: https://www.tc.gc.ca/eng/policy/acg-acgd-menu-highways-2149.htm [accessed December 16, 2015].

[4] Figure 2-1 shows construction to Big Delta, Alaska. A highway already existed between Fairbanks and Big Delta.

[5] Source: Ingram, Rob. 1991. The Alaska Highway: A Thematic Overview. Yukon Historic Sites Inventory, page 7. Retrieved from: http://www.tc.gov.yk.ca/publications/The_Alaska_Highway_A_Thematic_Overview_1991_02.pdf [accessed February 12, 2016].

Figure 2-1: Map of the Alaska Highway Construction (1943)[6]

Source: Yukon Archives. United States. Federal Works Agency. Public Roads Administration, 1943. Map H-1179 (annotated copy); see http://www.alaskahighwayarchives.ca/en/resources/hwymap.php. [Accessed December 29, 2015].

In addition to highway construction activities, a second project undertaken by the US Army in 1943 involved construction of an oil pipeline (CANOL pipeline) from Norman Wells, NWT to an oil refinery in Whitehorse, in order to supply vehicles and machinery used in construction of the highway, the northwest staging route and to meet other wartime demand. A road was also built from Whitehorse to Norman Wells to support the construction of the pipeline (today's Canol Road, Highway 6 in Yukon). The Northwest Territories segment was later abandoned.

Until WWII, Whitehorse was a small, seasonal transportation town "tied to the rhythms of the Yukon River navigation system and dominated by the White Pass and Yukon Route railway and steamship company."[7] With Alaska Highway and the Canol Pipeline construction activities, the population of Whitehorse expanded

[6] The Richardson Highway between Valdez and Fairbanks (and passing through Big Delta) existed before the Alaska Highway was built. The vehicles began traveling the Richardson Highway in 1913 and by the late 1920s and early 1930s the Richardson Highway was used extensively by truckers. At Big Delta, supply trucks and other traffic could connect with the existing road network. Sources: BLM Alaska Frontiers. 2005. Alaska's Richardson Highway: Connecting Valdez and Fairbanks for 100 Years. Retrieved from: https://www.blm.gov/style/medialib/blm/ak/aktest/culture_res/culture_pdfs.Par.93060.File.dat/richardsonhwy.pdf [accessed January 4, 2016]; and Weingroff, Richard F. n.d. The Road to Civil Rights. Retrieved from: https://www.fhwa.dot.gov/highwayhistory/road/road.pdf [accessed January 4, 2016].

[7] Source: Coates, Ken and W.R. Morrison. 1994. The Federal Government and Urban Development in Northern Canada after World War II, Whitehorse and Dawson City, Yukon Territory. BC Studies, no. 104, Winter 1994, page 27.

from a few thousand to tens of thousands,[8] resulting in the re-location of federal departments, as well as the RCMP from Dawson City to Whitehorse.[9] War-time construction activities also resulted in a number of infrastructure investments and developments in Whitehorse, and the orientation of development shifted away from the river and railway and towards the airport and escarpment.[10]

Similar to Whitehorse the orientation of communities in northeastern B.C., Yukon and Alaska also shifted towards the road, and a number of communities that continue to exist today started as service areas for either the Alaska Highway or the northwest staging route (including Watson Lake and Haines Junction).

Construction of the Alaska Highway, combined with other changes during WWII, also resulted in material changes for aboriginal communities in northeastern B.C. and southern Yukon. Specifically, economic opportunities presented by the highway drew community members towards Whitehorse and other areas along the road,[11] and as occurred more broadly in the territory community life became "oriented towards the road[12]", with both short-term and long-term effects on communities including, "changes in the annual cycle, settlement patterns, sources of subsistence and cash income, social organization, values, education, health conditions and alcohol use."[13]

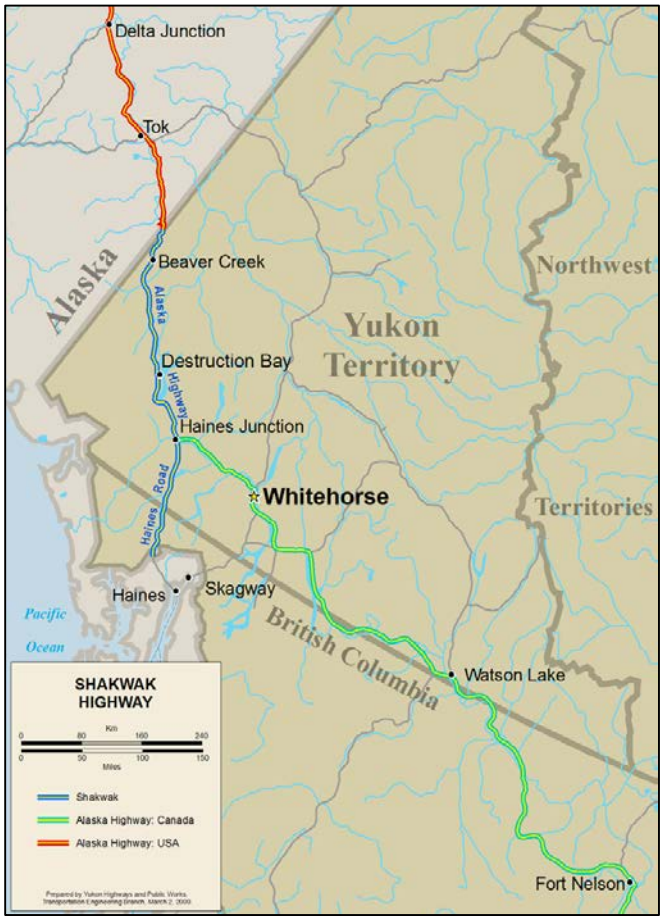
The existence of the highway also improved transportation and communication between communities and between Yukon and the outside world.[14]

2.1.2 Post-War Developments

In 1946, responsibility for maintaining and developing the Yukon portion of the Alaska Highway passed to the Canadian Army, and the Northwest Highway System wing of the Royal Canadian Engineers. Strict restrictions were placed on highway travel over the following years and travellers were required to obtain permits to use the highway.

[8] See, Alaska Highway: A Thematic Overview, page 13. This included administrators, maintenance workers, soldiers and construction workers, project managers and support personnel.
[9] The Federal Government and Urban Development in Northern Canada after World War II, page 28. This also led to the decision to shift the territorial capital from Dawson City to Whitehorse in the 1950's.
[10] The Federal Government and Urban Development in Northern Canada after World War II, page 28.
[11] Source: Ingram, Rob. 1991. The Alaska Highway: A Thematic Overview. Yukon Historic Sites Inventory, page 15. Retrieved from: http://www.tc.gov.yk.ca/publications/The_Alaska_Highway_A_Thematic_Overview_1991_02.pdf [accessed February 12, 2016].
[12] Source: Ingram, Rob. 1991. The Alaska Highway: A Thematic Overview. Yukon Historic Sites Inventory, page 9. Retrieved from: http://www.tc.gov.yk.ca/publications/The_Alaska_Highway_A_Thematic_Overview_1991_02.pdf [accessed February 12, 2016].
[13] Source: Cruikshank, Julie. The Gravel Magnet: Some Social Impacts of the Alaska Highway on Yukon Indians, page 1. Retrieved from: https://jukebox.uaf.edu/ak_highway/Assets/maps_docs/TheGravelMagnet.pdf [accessed February 12, 2016]
[14] Source: Ingram, Rob. 1991. The Alaska Highway: A Thematic Overview. Yukon Historic Sites Inventory, page 10. Retrieved from: http://www.tc.gov.yk.ca/publications/The_Alaska_Highway_A_Thematic_Overview_1991_02.pdf [accessed February 12, 2016].

Figure 2-2: Shakwak Portion of the Yukon Highways [highlighted in blue]



Source: Yukon Highways and Public Works, http://www.hpw.gov.yk.ca/pdf/shakwakprojectbrochure09.pdf [accessed on January 5, 2016].

By 1964, the Canadian portions of the Alaska Highway were transferred to the Canadian Department of Public Works. Post-war improvement efforts included paving all sections of the highway and straightening the road, reducing highway length. Post war efforts also focussed on the area between Dawson Creek, B.C. and Whitehorse, Yukon, and sections in sparsely populated areas northwest of Whitehorse, which did not receive attention, began to deteriorate.

The section northwest of Whitehorse (including the Haines Road) became known as the Shakwak section of the Alaska Highway.

While PWGSC maintains its sections of the highway and provides required capital improvements, B.C. MOT's Highways Department administers its provincial regulations for safety standards and enforcement.

The responsibility for the Alaska Highway and Haines Road in Yukon passed to Canada after WWII. However, the U.S. government has maintained an ongoing interest in the maintenance of the Haines Road and the northwest end of the Alaska Highway as these corridors provide the only land link between the Port of Haines, Alaska and the Alaska Interior. American travellers make up 80% to 85% of people using this route.[15]

In the 1970's, the U.S. congress initiated a review of the feasibility of paving the Shakwak portion of the Highway (including the portion of the Highway extending from Haines, Alaska to Haines Junction, Yukon and the portion extending from Haines Junction northwest to Beaver Creek) in order to provide an all-weather road between Southeast Alaska and the Alaska Interior (see Figure 2-2).

[15] In 2011, average annual daily traffic (AADT) at the Pleasant border crossing was 85, with daily traffic increasing to between 180 and 197 in the months of July and August. The AADT count has continued to decrease from 112 ten years ago and 120 twenty years ago. At Haines Junction the AADT was 227, reaching between 450 and 474 in July and August. Sources: Yukon Highways and Public Works. 2009. The Shakwak Highway Project Upgrade. Retrieved from: http://www.hpw.gov.yk.ca/pdf/shakwakprojectbrochure09.pdf; and State of Alaska Department of Transportation and Public Facilities. 2015. Northern Region Annual Traffic Volume Report. Retrieved from: http://dot.alaska.gov/stwdplng/transdata/traffic_reports.shtml [both accessed on October 14, 2015].

Subsequently, in 1977, the United States and Canada negotiated and signed an agreement (the "Shakwak Agreement" or "Shakwak Project") focused on ensuring the completion of improvements to the Shakwak portion of the Alaska Highway, and on facilitating transportation between Canada and the United States. Under the Shakwak Agreement, the United States agreed to provide funding for capital upgrades to the Canadian portion of the Alaska Highway (to an agreed upon standard[16]) and Canada agreed to provide land and granular resources and to maintain the highway after construction.[17]

The Shakwak Project covers 518 km of the Alaska Highway, with 74 km located in northwestern British Columbia and the balance in northwest Yukon. The Canadian portion of the Haines Road and 214 km of the Alaska Highway between Haines Junction and the Canada-U.S. Border north of Beaver Creek have been completed. As this stretch of highway is built over "ice rich" soils and permafrost conditions, the Shakwak Project has also encountered considerable construction challenges.[18]

Since the Shakwak Agreement was signed, over $1.5 billion (US) has been spent by both countries on upgrading and maintaining the Alaska Highway System in Canada over the period 1977-2009. The Yukon and Canadian governments have accounted for 74% of capital and maintenance costs (including the Shakwak Highway and Haines Road), while the U.S. and Alaskan governments have accounted for 26% of shared expenditures.[19] Overall, approximately $489 million in capital improvements have occurred since 1977 (allowing for completion of over 90% of reconstruction efforts[20]), with the *Safe, Accountable, Flexible, and Efficient Transportation Equity Act: A Legacy for Users (SAFETEALU)* providing $30 million per year from 2005 to 2009.

2.2 KEY FEATURES OF THE ALASKA HIGHWAY TODAY

The Alaska Highway is a key artery in the Yukon Highway system that links mineral production areas in the territory to tidewater at the Port of Skagway, and provides direct trucking access to the territory from southern Canada via Watson Lake.[21] Highway system connections in British Columbia also provide access via the Cassiar Highway to the B.C. Ports of Stewart, Kitimat and Prince Rupert. The Highway is also the

[16] Yukon Highways and Public Works notes the objective to reconstruct the approximate 500 km stretch to a modern two-lane 100 km per hour standard. This material also notes the highway is being reconstructed to a Bituminous Surface Treatments (BST) Standard.

[17] In 1992, responsibility for the Alaska Highway was devolved to Yukon from Public Works Canada and Yukon consequently became involved in the Shakwak Project.

[18] Conditions that cause permafrost to melt will result in ice rich soils liquefying; as this soil freezes it will expand or heave causing damage on road surfaces.

[19] The brochure notes the following regarding share of expenditures (in Canadian dollars): Canada ($920.6 million or 60% of total expenditures); Yukon ($223.1 million or 14% of total expenditures); United States ($361.4 million or 23% of total expenditures); and Alaska ($38.1 million or 3% of total expenditures). Updated information provided by Yukon Highways and Public Works indicates that the total US contributions were reported as $446 million in 2015 (US$). Source: Yukon Highways and Public Works. The Shakwak Highway Project Upgrade. Retrieved from http://www.hpw.gov.yk.ca/pdf/shakwakprojectbrochure09.pdf [February 12, 2016].

[20] The North Alaska Highway and Haines Road have undergone major improvements, with over 90% of the reconstruction work completed. During the same timeframe, the more southerly sections of the Alaska Highway have been almost completely reconstructed with only a relatively short section in northern BC remaining to be upgraded. Specific work to date has included: reconstruction of the Haines Road (109 miles/175 km) and the North Alaska Highway (126 miles/ 348 km). 76 miles/ 122 km of the Haines Road and 4 miles of the North Alaska Highway have been paved and 5 bridges replaced. A major permafrost test section has also been set up on the highway near Beaver Creek.

[21] The total length of the highway is 2,647 km, with 943.9 km within the Yukon (comprising approximately 20% of the Yukon Public Road System).

key road connection linking southeastern Yukon to Whitehorse and the rest of the territory and is the only road connection between the Lower 48 States and the Alaska Interior.

2.2.1 Key Strategic Features of the Highway

As context for the Alaska Highway today, key strategic features of the Highway that have benefited both the United States and Canada are summarized below.

- **Ongoing role regarding National and Military Security:** The Alaska Highway historically played an important role for the United States related to national and military security. Today, the Alaska Highway continues to provide an alternative transportation route into the region, and serves as a transportation route for military personnel travelling to and from Alaska. It is the only access by land between the Lower 48 States and the Pacific Command bases located in Alaska. It also provides a land-based link to the Arctic Ocean, a region of considerable potential military, economic and environmental importance for both Canada and the United States.[22]

- **Cooperation between Canada and the U.S. regarding civil security, economic integration and strategies for the Arctic Region**: Historically the Alaska Highway has helped to facilitate cooperation between Canada and the United States. The Alaska Highway was one of the first large scale construction projects jointly advanced by the United States and Canada. The highway provides a physical link between the two countries and has also helped to foster stronger relationships between Yukon, Alaska and British Columbia due to the social, economic and other ties that have developed along the corridor. For example, Alaska, Yukon and British Columbia are all signatories to the Pacific Northwest Emergency Management arrangement (PNEMA[23]), a regional cooperative framework for emergency management and disaster relief. Yukon and Alaska depend on the Shakwak portion of the Alaska Highway for implementation of PNEMA (i.e., transportation of heavy equipment arriving from the south must use the highway in all or in part). The presence of the highway also supports continental economic integration as it facilitates movement of freight between the Lower 48 States/ southern Canada and Yukon and the Alaska Interior.[24]

- **Energy Security and Resource Development Activities:** The Shakwak portion of the Alaska Highway is the only year-round road connection between Alaska and the North America road system, and serves as a transportation link to the North Slope oilfields and resource development activities in the Chukchi Seas, the Beaufort Sea, Northeast British Columbia and the Southeast Yukon Natural Gas Basin.[25] The presence of the corridor may also help facilitate future exploration,

[22] Source: Government of Yukon Highways and Public Works Transportation Engineering. The Shakwak Project: A Vital Strategic Link.
[23] Signatories to PNEMA include Alaska, Washington, Oregon, Idaho, British Columbia, Alberta and Yukon.
[24] Source: United States Department of State. Report in response to Senate Report 113-81, "Importance of the 1977 Bilateral Agreement with Canada for the Reconstruction of Canadian Portions of the Alaska Highway to U.S. Economic and Energy Interests (Senate Report 113-81, Department of State, Foreign Operations, and Related Programs Appropriations Act, 2014, Div. K, P.L. 113-76.
[25] See United States Department of State report in response to Senate Report 113-81.

drilling, resupply and pipeline construction[26] and may play an important role in ensuring continued North American energy security.[27]

- **Tourism and Public and Private Businesses:** The Alaska Highway has served as the backbone to tourism activities that benefit a number of small communities (as well as larger urban centres) along its route. The Highway supports a number of parks, lodgings, service stations, stores and restaurants which generate significant employment opportunities for local residents. The Highway also continues to facilitate other economic development in the region, connecting major projects with marine ports in Alaska and northern B.C.

- **Important Alternative to Marine Transport**: The presence of the Highway provides a critical alternative supply route for the region. Absent the Highway, freight deliveries to Yukon would be restricted predominantly to marine transport at the Port of Skagway. Advantages that truck transport provide to existing small to mid-sized Yukon businesses would not exist. More critically, the presence of an alternative route/ option to transport goods into Yukon also introduces greater competition to the market place and provides a limit for what the market can charge for transportation of goods into/ out of Yukon.

2.2.2 Alaska Highway Connections to Major Transportation Gateways

The Alaska Highway connects to three major Yukon gateways that link the Yukon with external markets. It provides the only truck access into the territory from southern Canada and/or Interior Alaska and also provides an alternative to marine transport via Inside Passage. Connection to the Dempster Highway via the Klondike Highway provides truck access between the Yukon and Inuvik, NWT, and the Top of the World Highway provides an alternate route between Interior Alaska and Dawson City, as long as ice conditions permit ferry operations there.

The role of each main Yukon gateway is reviewed below:

1. **Watson Lake Gateway -** Watson Lake is the main point of entry for inbound highway freight to Yukon originating in southern Canada and the U.S. and is the main gateway for through freight destined for Interior Alaska or Inuvik and surrounding communities in NWT (via Dempster Highway). Inbound truck traffic enters Yukon at this gateway over Highway 97 (from Edmonton, Fort Nelson or Vancouver) or over B.C. Highway 37 (primarily from ports of Prince Rupert and Stewart).[28] As illustrated in Figure 2-3 below, this gateway has become the principal bulk transport gateway for Yukon community re-supply,[29] bulk fuel[30] and development freight,[31] with materially increased volumes noted in 2014 compared to 2009. In 2014, Wolverine Mine and Cantung Mine also used this gateway to ship product

[26] For example, the Alaska Highway Natural Gas Transmission System that would potentially support transmission of Alaska North Slope gas to the Lower 48 States.
[27] Some of the traffic on the Shakwak portion of the Alaska Highway consists of US vehicles travelling to/ from Alaska, bringing heavy equipment into the state for construction, mining and petroleum production.
[28] Source: PROLOG/ EBA. 2010. Northern Transportation Systems Assessment, Phase I Report: Transportation Demand Assessment, page 57.
[29] For example, community resupply may include agricultural products, general merchandise, household goods, livestock and mobile homes.
[30] For example, petroleum products, propane, asphalt and flammable liquids.
[31] For example, construction materials, iron, pipe and steel, equipment and machinery.

to market via B.C. Highway 37 and B.C. ports at Stewart, Prince Rupert or Vancouver (however, both of these mines were shut down in 2015). Appendix A provides further detail regarding existing heavy traffic and light traffic volumes through this gateway.

2. **Inside Passage Gateway (Skagway) –** The Yukon highway system is connected to tidewater at Skagway and Haines via the South Klondike Highway (Highway #2 to the Port of Skagway) or the Haines Road (Highway #3 to the Port of Haines). Inside Passage has historically played a critical role in resource development in Yukon as developments in Mayo (the United Keno Hill Mine or "UKHM") and Faro (the Faro or Anvil Range mine) have relied on outbound transport to Whitehorse and then to Skagway via the Klondike Highway. For a period of time B.C.'s Cassiar Mine relied on Skagway for outbound asbestos shipments using an intermodal road and rail transport system, when the White Pass and Yukon Route Railway carried commercial freight between Whitehorse and Skagway. Today, the Minto Mine continues to rely on this route to ship its product to market.[32] While the majority of community re-supply and development freight volumes enter Yukon via Watson Lake, Inside Passage accounts for about 30% of total freight tonnage inbound to Yukon and continues to provide an important and more cost effective alternative for less time sensitive traffic. Inside Passage also provides a significant volume of bulk fuel supply to Yukon (with approximately 45% of total deliveries via this gateway). Appendix A provides further detail regarding existing heavy traffic and light traffic volumes through this gateway.

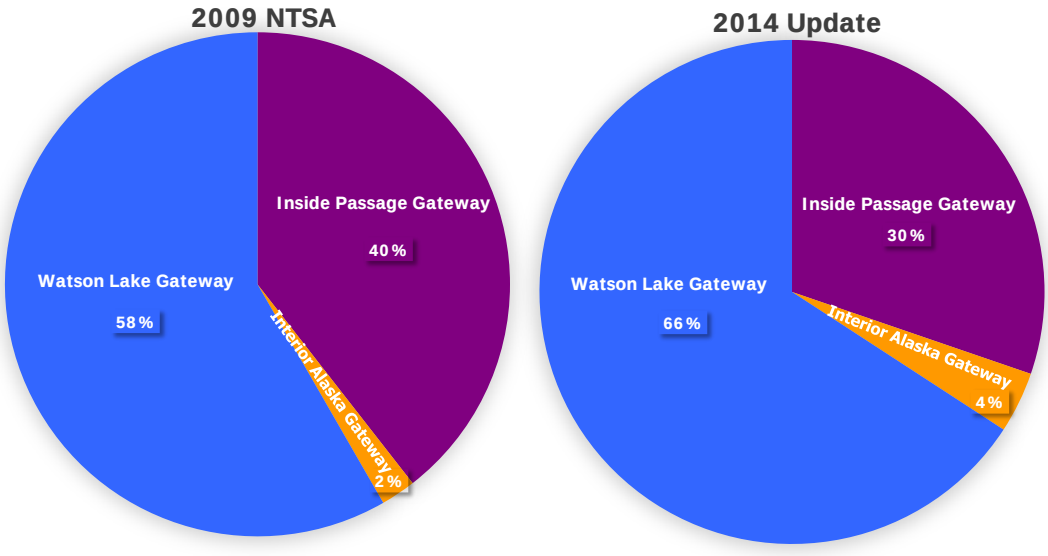
3. **Interior Alaska Gateway –** Southbound Alaska Highway truck traffic enters Yukon through this gateway on the Canada/ U.S. border at Beaver Creek. However, this gateway accounts for only about 4% of total freight inbound for Yukon (see Figure 2-3). Appendix A provides further detail regarding existing heavy traffic and light traffic volumes through this gateway.

Figure 2-3 summarizes the share of heavy commercial traffic flows inbound in 2009 and 2014 for Yukon destinations that arrived through each of the above gateways.

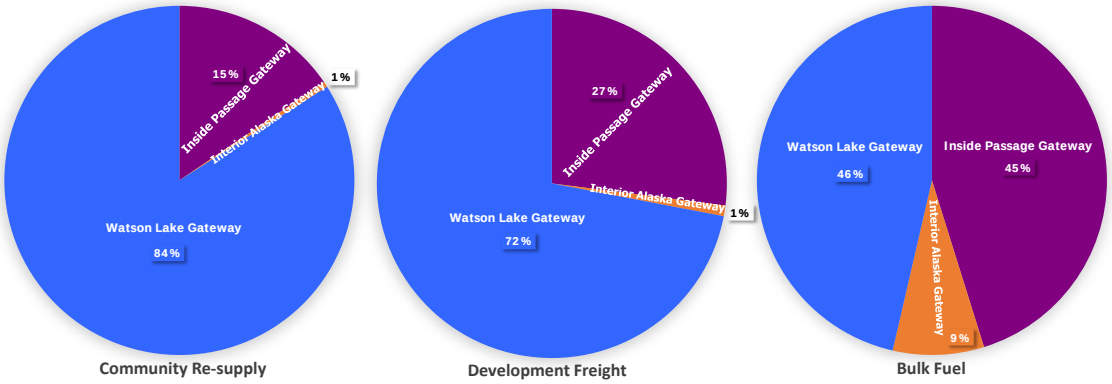
"Through traffic" currently moves from B.C./ Alberta through Yukon via the Alaska Highway and other connected highways or roads to either the Interior Alaska or NWT (Inuvik and surrounding communities). However, through traffic volumes are significantly smaller compared to Yukon-bound freight, with material reductions in volume noted in 2014 compared to 2009. Most through traffic passes through either Watson Lake Gateway or Interior Alaska Gateway and is bound for the U.S. Appendix A provides further detail regarding through traffic volumes through each major gateway.

[32] In 2014, Bellekeno mine also used this gateway to ship product to market (for partial year).

Figure 2-3: Percent Share of Heavy Commercial Traffic Flows inbound for Yukon: 2009 NTSA and 2014 Update (tonnes) [33]



Percent Share of 2014 Updated Heavy Commercial Traffic by Gateway and Commodity (tonnes)



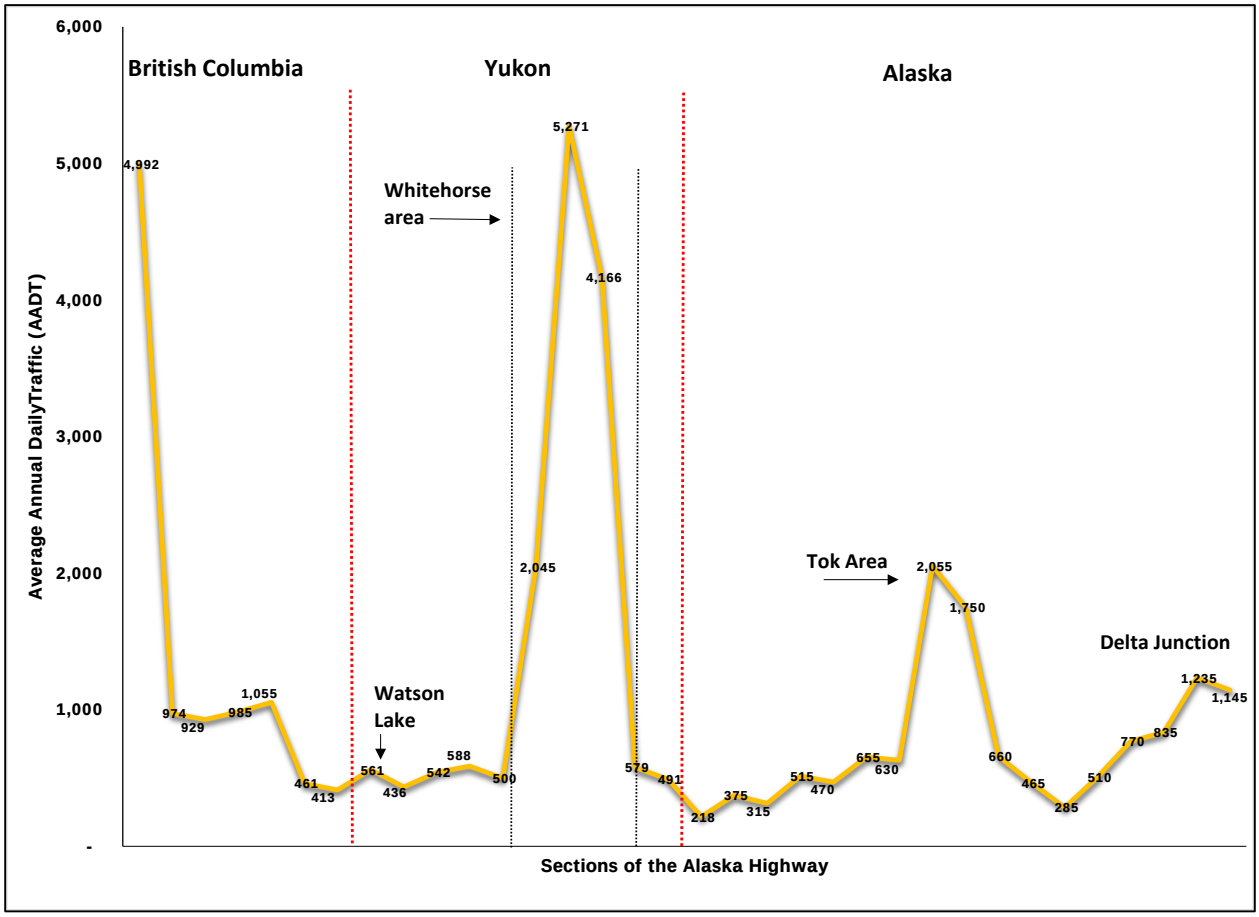
2.2.3 Alaska Highway Average Daily Traffic Flows

Figure 2-4 below provides a summary of the average annual daily traffic on the Alaska Highway throughout all three segments of the Highway. Average daily traffic on the B.C. and Alaska segments of the highway ranges between 300 and 2,000 vehicles with traffic flows increasing near cities. For the Yukon segment of the Alaska Highway, average daily traffic outside the Whitehorse area ranges between 400 and 600 vehicles, increasing materially on entering and exiting the Whitehorse area.

[33] See Table A-1 in Appendix A for details. Excludes "through traffic" that enters Yukon en route to Alaska or NWT. Information for 2009 is from the Northern Transportation System Assessment (NTSA) as prepared for Transport Canada by PROLOG Canada in association with EBA Engineering Consultants Ltd. The updated information for 2014 was prepared by PROLOG Canada for the current Economic Profile study and is based on data collected from weigh scales.

The average daily traffic flow along the Alaska Highway in Yukon is higher during summer for the portion of the Alaska Highway outside of Whitehorse. For example, the Watson Lake Weigh Scale count location summer traffic flows (May 1 to September 30 inclusive) were about 40% higher than annual average daily traffic flows, with a similar trend identified for the portion of the Alaska Highway northwest of Whitehorse.

Figure 2-4: Average Annual Daily Traffic on the Alaska Highway: 2011[34]



[34] Note the average annual daily traffic for 2010 was used for the sections of the Alaska Highway where no information was available for 2011. The traffic flow data includes all types of traffic. Source: Yukon Highways and Public Works. 2011. Yukon Traffic Count Summary for 2011. Retrieved from: http://www.hpw.gov.yk.ca/pdf/traf2011.pdf [accessed October 14, 2015]; Government of British Columbia. 2015. Traffic Data Program. Retrieved from: http://www.th.gov.bc.ca/trafficdata/index.html [accessed October 14, 2015]; and State of Alaska Department of Transportation and Public Facilities. 2015. Northern Region Annual Traffic Volume Report. Retrieved from: http://dot.alaska.gov/stwdplng/transdata/traffic_reports.shtml [accessed on October 14, 2015].

2.2.4 Alaska Highway Maintenance and Capital Costs

The Alaska Highway is the longest road in Yukon (about 932 km) or about 19% of the 4,822 km road and highway system maintained by the Department of Highways and Public Works.[35] About 75% of Yukon's existing highway network requires year-round maintenance and about 25% requires summer-only maintenance work. There are 23 maintenance camps that provide highway maintenance work in Yukon, including 7 camps on the Alaska Highway located at Watson Lake, Swift River, Teslin, Whitehorse, Haines Junction, Destruction Bay and Beaver Creek. The Alaska Highway comprises 26% of total km of highways that require year-round maintenance. Appendix A provides details of the maintenance and capital costs for each camp, including camps along the Alaska Highway.

[35] The road and highways system currently includes 351 km paved surface, about 1,977 km Bituminous Surface Treatment (BST), 2,486 km gravel surface roads and about 7.4 km bridges.

3.0 ALTERNATIVE WITHOUT THE PROJECT SCENARIO

In order to assess impacts of the Alaska Highway it is necessary to identify and describe in sufficient detail a "world without the Project" scenario to determine how the people and products being shipped on the Alaska Highway today would be affected if the Highway did not exist.

The "without the Project" scenario recognizes that the Inside Passage has historically (i.e., prior to the Alaska Highway being developed) been a major gateway for both travellers and freight into and out of these regions and continues to be a major gateway today (with or without the Alaska Highway).[36] Absent the Alaska Highway, access to each of the three regions wherein the Alaska Highway is located would be generally restricted to the Inside Passage plus air traffic.

As detailed below, this scenario would effectively see minimal impacts to B.C. and southeastern Alaska, but would effectively divide Yukon into two regions (see Figure 3-2 that follows):

1. **Inside Passage Connected Areas: –** generally in western and central Yukon, as well as in interior Alaska, where access would continue to exist via the established rail and road connections to Skagway /Haines or Anchorage /Valdez; and

2. **Regions Dependent on Alaska Highway for Development –** this includes areas southeast of Johnson's Crossing and northwest of Haines Junction that without the development of the Alaska Highway would have no road connections with other communities in Yukon or with B.C. or Alaska.

Figure 3-1 provides a picture of the region with the Alaska Highway, while Figure 3-2 provides a snap shot of the region for the scenario without the Alaska Highway. Table 3-1 that follows provides a summary of the key changes to infrastructure without the Alaska Highway in Alaska, Yukon and British Columbia (including potential key impacts on communities along the Highway).

[36] Connection via rail to the Port of Skagway, as first developed in the 1900s, served as a major gateway for the Klondike Gold Rush, and provided the territory's main supply line to outside markets, providing the key transportation route for freight and passengers into the territory, as well as shipping ore out of the territory. Even after the Alaska Highway was completed and opened to the public, Inside Passage continued to be the main Gateway to Yukon for many years and continues as a significant gateway today. Source: Yukon Department of Tourism and Culture. 1997. South Klondike Highway Interpretive Plan. Retrieved from: http://www.tc.gov.yk.ca/publications/South_Klondike_Hwy_2005.pdf [accessed February 12, 2016].

Figure 3-1: Region with the Alaska Highway

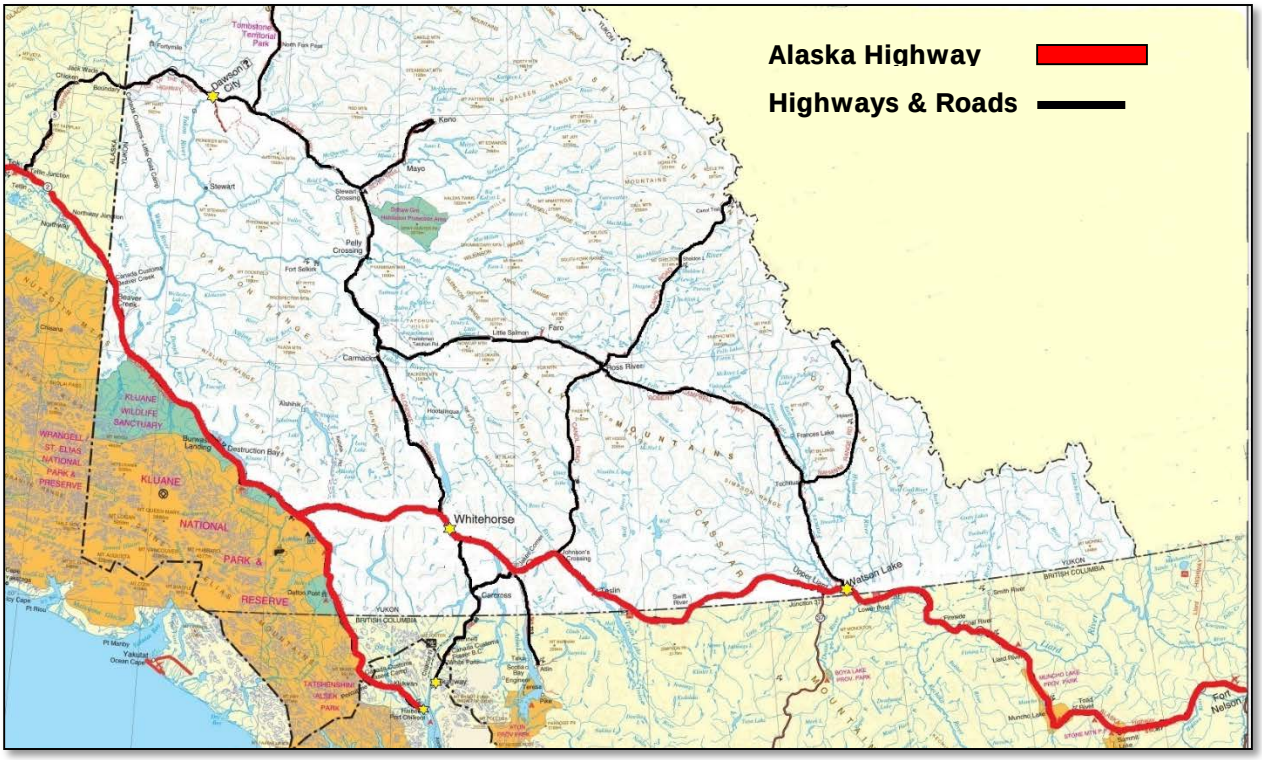


Figure 3-2: Region in Scenario without the Alaska Highway

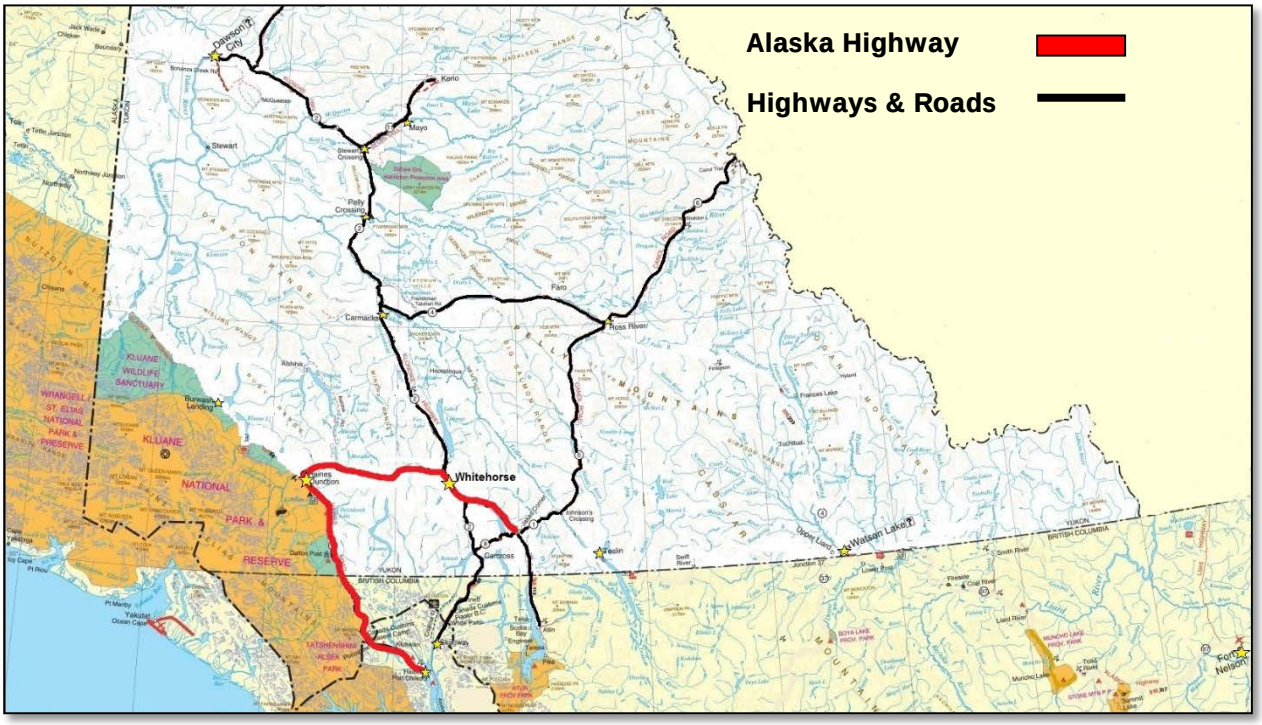


Table 3-1: Summary of Changes to Existing Infrastructure without the Alaska Highway

	Infrastructure that <u>will continue</u> to exist without Highway	Infrastructure that <u>will cease to exist</u> without Highway	Impacts on communities
Alaska	Marine access through existing ports.	No Top of the World Highway access to Dawson City. No Access to Yukon and Lower 48 States via the Alaska Highway from Delta Junction to Yukon Border (Beaver Creek).	**<u>In south eastern Alaska:</u>** Tok would be isolated.
Yukon	Marine access through Port of Skagway and Port of Haines via the South Klondike Highway. The following would continue to exist: • Klondike Highway (North and South); • Dempster Highway; • Silver Trail; • Robert Campbell Highway between Carmacks and Ross River (connecting to Canol Road); • Canol Road; • Haines Road (connecting Haines to Haines Junction); • Highway connection between Haines Junction and Whitehorse and between Whitehorse and Johnson's crossing; and • Atlin Road.	No highway connection between Beaver Creek and Haines Junction. No road connection between Whitehorse and Watson Lake. No extension of Robert Campbell Highway from Ross River/ Canol Road south to Watson Lake. No Nahanni Range Road from Roberta Campbell Highway into Northwest Territories.	**<u>In northwestern Yukon:</u>** Burwash Landing would be isolated. Beaver Creek and Destruction Bay would no longer exist. **<u>In southeastern Yukon</u>** Swift River, Watson Lake and Teslin would be isolated.
Northern British Columbia	Continued access up to Fort Nelson area via road and rail. Access from Fort Nelson and Dawson Creek area to southern B.C. and Port of Stewart.	No road connection between Watson Lake and northern B.C. (to Fort Nelson). No Stewart Cassiar Highway between Cassiar region in northeastern B.C. and Yukon, or other areas in northeastern or northwestern B.C. (Stewart).	**<u>In northern B.C.:</u>** Toad River, Muncho Lake, Coal River, Fireside, Contact Creek would be isolated or would not exist.

Section 3.1 provides a more detailed summary of the key assumptions regarding the scenario without the Alaska Highway for each of the above regions.

3.1 INSIDE PASSAGE CONNECTED AREAS

Absent the Alaska Highway, the Port of Skagway would effectively be the main point for inbound and outbound resources to/from western/central Yukon, as well as for supplies such as food and fuel. The Haines port is also assumed to contribute to Inside Passage traffic to this part of Yukon. It is assumed that highway access along the Skagway transportation gateway to Yukon would have developed as it in fact occurred and would provide for road connections to Whitehorse, Dawson City, Keno and Faro in response to both population and mine developments. Highway access through the Yukon River valley and down to Atlin, B.C. is also assumed given the presumed development of a road between Carcross and Johnson's Crossing to connect to the Canol Road.

The following assumptions are specifically noted:

1. **Connection between Whitehorse and Ports at Skagway and Haines** - With the White Pass & Yukon Route rail connection between Skagway and Whitehorse starting in 1900, the Port of Skagway would exist today and provide inside passage service to the Yukon. The Port of Haines would also exist. A road connection would exist between Haines and Haines Junction and would connect to Whitehorse via Haines Junction; however, it is assumed that there would be no "through" highway connection between Haines and the interior of Alaska. Given its more accessible southern location and established role as a transportation hub and the critical point of access to external markets, with or without the Alaska Highway, it is also assumed that Whitehorse would inevitably have established itself as a more desirable location for government and business headquarters in the territory.[37]

2. **Road Connection from Port of Skagway to Dawson City via the North and South Klondike Highway** - It is assumed that with or without the Alaska Highway, the Klondike Highway would have developed in any event and would connect the Port of Skagway with Dawson City. However, it is assumed that the North Klondike Highway would terminate at that location and that there would be no highway connection from Dawson City west to Alaska (no Top of the World Highway). With established connection to Dawson City via the Klondike Highway it is assumed that highway connections to major mine developments north of Whitehorse would also exist to support major mine developments at Faro and in the Elsa/Keno area.[38] As such, without the Alaska Highway both the Silver Trail and the Robert Campbell Highway as far east as Ross River are assumed to exist.

[37] See discussion of Whitehorse in Section 4.1.6 and Appendix E, Section 3.1.1. With the collapse of the Gold Rush prior to the 1940s the role and influence of Dawson City within the territory had already declined considerably. The construction of the Alaska Highway may have facilitated a more rapid transition than would have otherwise occurred, but it is concluded that this transition would nonetheless have occurred without the Alaska Highway.

[38] It is noted that the Faro and UKHM mines were sufficient to justify Canada's development of major transmission and hydro generation grid infrastructure to support these two mines.

3. **Canol Road connection and extension of road infrastructure to Johnson's Crossing and the Yukon River valley into Atlin -** It is assumed that the Canol Road (Highway #6) would have developed as a service road required for the Canol Pipeline constructed during WWII to service an oil refinery located in Whitehorse with product from Norman Wells, NWT.[39] A road would have been completed from Whitehorse to Johnson's Crossing, associated with the Canol route development noted above, and highway access from Whitehorse through the Yukon River valley to Atlin B.C.[40] is assumed given the presumed development of a road between Carcross and Johnson's Crossing to connect to the Canol Road. There would be no road access further east of Johnson's Crossing.

4. **Road Connection to Northwest Territories via the Dempster Highway** - Whether or not the Dempster Highway developed is arguable. For the purpose of this study, it is assumed that the Dempster Highway would have been developed without the Alaska Highway as part of the Diefenbaker government "roads to resources" policy to promote exploration work and to help determine the extent of Canadian resources.

5. **Alaskan Port Connections to the Alaska Interior -** Road and rail connections between Anchorage and the Alaska interior are assumed as these transportation linkages occurred without the Alaska Highway. Highway access from Fairbanks to at least Delta Junction is also assumed to exist.[41] Other port developments in Alaska are also assumed to have occurred under this scenario at Haines and other areas, as the Alaska Highway did not stimulate any of these developments. The extent to which "inside passage" from these ports to Yukon or Alaska would have developed without the Alaska Highway is not clear; however, resolution of this uncertainty is not likely to materially impact the overall assessment of Alaska Highway economic impacts. Absent the Alaska Highway, the Haines to Fairbanks Pipeline also would not have been viable.[42]

3.2 REGIONS DEPENDENT ON ALASKA HIGHWAY FOR DEVELOPMENT

It is assumed that highway access from Dawson Creek to Fort Nelson would have developed without the Project to service resource development in this area.

Beyond this, it is assumed that without the Project highway access would not have developed from Fort Nelson to the Yukon southeastern border near Watson Lake and then down to Cassiar B.C. using the routes selected by current highways. Based on early reliance of the Cassiar mine on the Alaska Highway to

[39] Construction of the Canol pipeline was driven by US military wartime requirements, and development of the pipeline is assumed to have occurred (and been required) absent the Alaska Highway. It is assumed the product would have been taken out via Inside Passage to Skagway (a pipeline was developed for this purpose, and reversed after the war to provide petroleum products to Whitehorse). However, it is assumed that without the Alaska Highway there would have been no pipeline developed connecting Whitehorse and Fairbanks.

[40] The Atlin Road was built by the Canadian Army from 1950 to 1951, connecting the village of Atlin, British Columbia, with the Tagish Road just one mile west of the Alaska Highway at historic mile 866 (Jake's Corner).

[41] Tok was one of the communities created to support construction of the Highway and it is assumed that Tok would not have existed absent the Alaska Highway.

[42] The Haines-Fairbanks Pipeline was owned by the U.S. Army and operated from 1955 to 1973 and transported refined fuel from a deep-water port at Haines to Fort Greely, Eielson Air Force Base, and Ladd Air Force Base. At the time the pipeline "was considered a logistical asset and the most reliable, efficient means of transporting the vast quantities of fuel needed in interior Alaska." Source: Hollinger, Kristy. 2003. The Haines-Fairbanks Pipeline. Retrieved from: http://www.arlis.org/docs/vol1/AlaskaGas/Report4/Report_CEMML_2003_HainesFairbanksPipeline.pdf. [accessed February 12, 2016].

transport product to market (via Whitehorse and Skagway), it is assumed that the development of the Cassiar mine was dependent on the Alaska Highway corridor for its development in the 1950's. Based on B.C. Government interest in connecting northern B.C. communities, access would likely have been extended from Stewart into northwestern B.C. However, it is assumed that without the Project the access from Stewart would not have extended to the Cassiar region (or to the Yukon border).

The following assumptions are specifically noted for the scenario without the Project:

1. **No road connection from Haines/Skagway or Yukon to the Alaska Interior -** The Haines Road (Highway 3) is assumed to exist without the Project as part of the road network connecting to Haines Junction (but would not continue northwest beyond Haines Junction). A road link is also assumed between Haines Junction and Whitehorse. It is assumed that a version of the Haines Road with connection to Whitehorse would have been constructed as a supply road during WWII when a pipeline was constructed between the Port of Haines and Haines Junction/Whitehorse to provide an alternate route for the supply of fuel to a large marine tank farm at the Port.[43] A road connection between Haines Junction and Whitehorse would also be supported without the Project by the development of hydro-electric infrastructure at Aishihik (Aishihik Generating Station and Transmission Line).

2. **Isolated Communities in northwestern Yukon and Southeastern Alaska -** With no assumed road connection or pipeline extending from Haines Junction west towards Fairbanks, the Villages of Burwash Landing and Destruction Bay in Yukon and Tok, Alaska would be isolated with winter road and air access only, and the village of Beaver Creek is assumed not to exist (as it was established as a border station subsequent to construction of the Alaska Highway).

3. **No road connection between British Columbia and Yukon/ the Alaska Interior** - Without the Project, it is assumed that there would be no highway connection between Watson Lake and Whitehorse, or between Fort Nelson and Watson Lake. Without the pre-existing Alaska Highway, the Cassiar mine is also assumed to not have been feasible in the 1950's,[44] and there would consequently be no Cassiar mine-related highway connection developed between northeast B.C. and Watson Lake. It is also assumed that without the Alaska Highway there likely would not be a

[43] The Haines Road was developed in WWII as a project associated with the construction of the Alaska Highway. The Narrow gauge White Pass and Yukon Route was working full time and another supply line was needed. The United States Army of Engineers started to build the road south from Haines Junction in March 1943 and linked up with the Public Roads Administration contractors on August 1st near Chilkat Pass.

[44] This article was written by a former Chief Geologist at Cassiar between 1958 and 1974, and published in Mining Magazine in 1989. It notes, "Without the Alaska Highway and the Watson Lake airport, built in 1942 by the vicissitudes of war, it [development of the Cassiar Mine] would have been impossible. The mine is on the top of a mountain in northern B.C. at 6,000 feet elevation, 86 miles south of Mile 648 on the Alaska Highway and 100 road miles from Watson Lake, Yukon. A tote-road, had been bulldozed through the low hills and swamps of the Liard Plain three years before as far as Good Hope Lake, just inside the Cassiar Mountains, to supply a seasonal gold-dredging operation known as Moccasin Mines. Beyond this point Cassiar had to construct 18 miles of access road following McDame Creek through the mountains to the deposit." Source: Plumb, Bill. 1989. The Making of a Mine - The Early Days of Cassiar. Retrieved from: http://www.cassiar.ca/cassiar_town/cassiar.htm [accessed February 12, 2016].

highway today connecting the Cassiar mining area with the rest of northeastern B.C. at Fort Nelson or with the port at Stewart B.C.[45]

4. **No development of road connection between Ross River and Watson Lake via the Robert Campbell Highway** – Absent development of a connection between southeastern Yukon and northern B.C. it is assumed without the Project that the Robert Campbell Highway would not extend southeast of Ross River/the Canol Road and there would also be no development of the Nahanni Range Road to service mining developments in the vicinity of Tungsten, NWT. Consequently, without the Project it is assumed that there would be no mine development in eastern Yukon/Western NWT.

5. **Isolated Communities in southeastern Yukon** - Based on these assumptions, without the Project Watson Lake and other communities in Yukon southeast of Johnson's Crossing would be isolated (i.e., only winter road and air access).

6. **Rail and road connections within northeastern and northwestern British Columbia -** It is assumed that, without the Project, rail and road connections would likely have occurred within Northeastern and Northwestern British Columbia (as occurred historically). Specifically, rail connection would have been extended to Fort Nelson (as occurred in 1971).[46] Road infrastructure would have developed connecting communities in northwestern B.C. to Stewart; however, without the Alaska Highway there is no clear basis to assume that such developments would have extended to the Yukon border.

[45] The Stewart-Cassiar Highway was originally developed as a roadway that extended south from the Alaska Highway to serve the Cassiar mining district, eventually reaching Dease Lake and joining a road to Telegraph Creek. To the south, logging roads extended north almost as far as Meziadin Junction. Development of the high-grade Cassiar Asbestos mine in the spring of 1951 occurred (using the Alaska Highway access) in one of the most inaccessible and remote areas of Canada, and is assumed to have been a key requirement for eventual development of the Stewart-Cassiar Highway from Stewart B.C. to Yukon.

[46] Source: Creighton, C. Willis. 1972. North to the Yukon. Retrieved from: http://www.exporail.org/can_rail/Canadian%20Rail_no248_1972.pdf [accessed February 12, 2016].

4.0 BASELINE ECONOMIC PROFILE FOR THE ALASKA HIGHWAY

Baseline economic impacts of the Alaska Highway are considered and assessed in the context of traffic relating to the following fundamentally different impact areas:

1. **Regions and Communities in Yukon and the Alaska Interior Dominated by the Inside Passage Connection –** This relates to areas where development of infrastructure has been heavily influenced by the pre-existing Inside Passage connection to Skagway (developed in 1901 prior to the construction of the Alaska Highway). As detailed in discussion below, the effects of the Project on Inside Passage connected areas in western and central Yukon are limited due to the considerable impact that the existing Inside Passage corridor would continue to have on the development of these areas absent the Alaska Highway. In a similar vein, Project effects on areas of the Alaska Interior connected to the Gulf of Alaska by road or rail would also be limited.

2. **Regions and Communities in Yukon, Alaska and Northeast B.C. that would be effectively isolated or not exist absent the development of the Alaska Highway –** This includes areas north of Fort Nelson, B.C. and southeastern Yukon where development of infrastructure and communities has been driven by, and dependent on, the construction of the Alaska Highway, as well as communities northwest of Haines Junction (including Tok, Alaska) that would effectively be isolated or not exist without the Alaska Highway.

The baseline assessment for the above two impact areas also addresses economic impacts of the Alaska Highway in northern B.C. and interior Alaska, as well as in Yukon and the Alaska ports of Skagway and Haines. The assessment also focuses on traffic to and from the above two impact areas, as well as economic impacts from “through traffic” on the Alaska Highway which currently moves through Yukon between B.C. and Interior Alaska or Inuvik and surrounding communities in northwest of NWT via the Alaska Highway, and which would no longer move through Yukon absent the Alaska Highway.[47] However, as noted in the assessment, the economic impact of this "through traffic" is expected to be minimal.

4.1 INSIDE PASSAGE CONNECTED AREAS

While the Alaska Highway has had a profound impact on the history and development of Whitehorse (as well as other areas along the highway in central and western Yukon), the impact of the Highway today is mitigated by the dominant role that the Inside Passage connection through Skagway has played in Yukon. The existing connection between Whitehorse and Skagway via Inside Passage and assumed related development (without the Project) of highway access from Whitehorse to Dawson City, Keno and Faro supports development of much of the infrastructure that provided a foundation for social and economic development of the territory. The following are specifically noted in this regard:

[47] The 2014 data from weigh scales shows that approximately 76,000 tonnes of heavy freight moving from interior Alaska through Yukon to northeast BC and points beyond, and about 92,000 tonnes entering Yukon at Watson Lake and moving through to Inuvik and surrounding communities in NWT, and Alaska. These 2014 freight volumes are materially lower than shown in 2009 data. See Appendix A for details.

- Loss of the Alaska Highway would not generally restrict inbound/ outbound supply of products or resources to/from western and central Yukon. Even with the Alaska Highway, the Port of Skagway continues to be an important supply route for bulk fuel supply into western and central Yukon, community resupply and development freight, as well as for outbound ore product shipments from Yukon. It also remains today an important port of entry to Yukon (nearly two-thirds of people entering Yukon through customs borders enter through Skagway).[48] With or without the Alaska Highway, Skagway would continue to be an important port for inbound and outbound resources to/from western/central Yukon. The Haines Port would also contribute to inside passage traffic with this part of Yukon. The only change is that the link to Skagway/ Haines would likely have somewhat greater importance without the Alaska Highway.

- With an established connection to Skagway, highway infrastructure in western and central Yukon would develop to serve major mines and population centers (Whitehorse, Dawson and Mayo). Consequently, major resource activity would continue to occur in western and central Yukon (e.g., UKHM mine and Faro mine developments, more recent Minto and Keno region mine developments, and related supporting infrastructure).

Effects pathways to economic and social valued components in the Inside Passage connected areas are described in further detail below. Given expected limited effects of the Project on areas of the Interior Alaska with road and rail connections to marine ports on the Gulf of Alaska, a similar analysis is not provided for VCs in this region of Alaska.

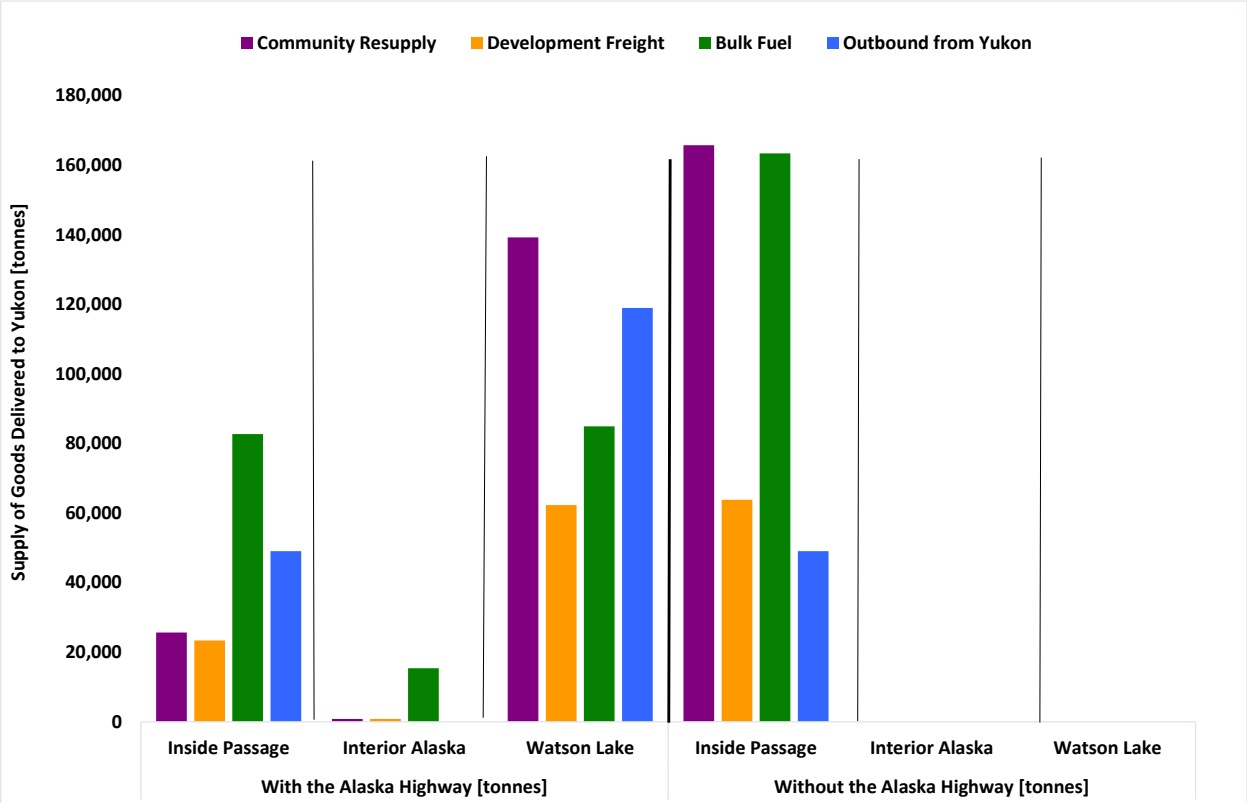
4.1.1 Private and Public Business

It is assumed that the supply of goods to private and public businesses in Whitehorse and throughout western and central Yukon would generally continue without the Alaska Highway as it exists today. This assumption may overstate total volumes without the Project to the extent that traffic estimates also relate to other areas of Yukon that would be isolated without the Alaska Highway - and to the extent that the supply of certain specific goods (as noted below) may be materially affected.

Changes in traffic volumes through the Port of Skagway and related changes to costs for public and private business in Yukon are summarized in detail in Appendix B of this Report. Figure 4-1 below summarizes at a high level the material changes in volumes of freight passing through Skagway in 2014 that would occur without the Alaska Highway.

[48] Yukon Tourism Indicators, Year-End Report, 2014 shows that about two-thirds of the border crossings to Yukon are through Fraser border crossing, between Skagway and Carcross [in 2014, about 220,276 people entered to Yukon via Fraser border crossing which is about 64% of the total border crossings for that year]. Source: Government of Yukon Department of Tourism and Culture. 2014. Yukon Tourism Indicators. Retrieved from: http://www.tc.gov.yk.ca/pdf/2014_TourismIndicators_YearEndReport.pdf [accessed on November 3, 2015]. Also, the 2012/13 Yukon Visitor Tracking Program: Pathways Report shows that about 54% of all summer visitors to Yukon entered through Alaska and 51% of them through Fraser port. Source: Yukon Larger Than Life. n.d. 2012/2013 Yukon Visitor Tracking Program: Pathways Report. Retrieved from: http://www.tc.gov.yk.ca/publications/2012-2013_YVTP_Pathways_Report.pdf [accessed on November 3, 2015].

Figure 4-1: Volumes (Tonnes) inbound to Yukon through major Yukon Gateways with and without the Alaska Highway (2014) [49]



In summary, the following major changes in deliveries are noted today due to the Project:

- **Community Resupply -** With the Alaska Highway, 84% of community resupply demand for Yukon is delivered through the Watson Lake Gateway, with 15% delivered through Inside Passage and less than 1% through the Interior Alaska. Without the Highway, community resupply demand for Yukon would all be delivered through Skagway, representing an increase of more than 5 times (or about 140,000 tonnes) for deliveries through this gateway.

  In a without the Highway scenario there would be changes to the size and composition of Yukon's population that would impact the volume and types of goods shipped to Yukon. Further, with a different shipping route, and material differences regarding the timing and flexibility for deliveries, there would also be potential changes to the types of businesses operating in Yukon which would also alter the composition of goods transported (also affecting costs and volumes for deliveries). However, quantification of these impacts are outside the scope of this study.

- **Development Freight -** With the Alaska Highway, 72% of development freight for Yukon enters via the Watson Lake Gateway, with 27% delivered through Inside Passage and less than 1%

[49] See Appendix B, Table B-1 for detailed table. This figure excludes "through traffic". Approximately 76,000 tonnes of heavy freight moved from Interior Alaska through Yukon to northeastern B.C. and points beyond, and about 92,000 tonnes enter Yukon at Watson Lake on route to Alaska or NWT (see Appendix A).

entering via Interior Alaska. Without the Highway, development freight volumes for Wolverine and Cantung in 2014 would have ceased as without the Alaska Highway these mines in eastern Yukon and on the NWT border with Yukon are assumed not to have existed. Other development freight volumes for Yukon would be delivered through Skagway without the Highway, representing an increase of 173% (or about 40,500 tonnes) for deliveries through this gateway.

- **Bulk Fuel –** With the Alaska Highway, 46% of bulk fuel demand for Yukon enters via the Watson Lake Gateway, with 45% delivered through Inside Passage and 9% delivered through Interior Alaska. Without the Highway, bulk fuel volumes for Wolverine and Cantung in 2014 would have ceased as without the Alaska Highway these mines in eastern Yukon and on the Yukon border with NWT are assumed not to have existed. Other bulk fuel volumes for Yukon would be delivered through Skagway without the Highway, representing an increase of 97% (or about 80,600 tonnes) for deliveries through this gateway.

While the overall demand is not assumed to change materially in a "without the Highway" scenario, cost and other impacts to Private/ Public businesses for these deliveries into Yukon would change. Table 4-1 below summarizes the major changes in estimated costs for inbound delivery of goods for Yukon in a without the Highway scenario ("through traffic", which is excluded from Table 4-1, would also be impacted):[50]

- **Community Re-Supply –** Total transportation costs for deliveries into Yukon via Inside Passage are expected to be $25.4 million per year **lower** compared to transportation costs via Watson Lake. In a without the Highway scenario there would be changes to the size and composition of Yukon's population that would impact the volume and types of goods shipped to Yukon (affecting costs and volumes for deliveries).[51] A different shipping route, and material differences regarding the timing and flexibility for deliveries, may also result in potential changes to the types of businesses operating in Yukon and consequently the composition of goods transported. However, quantification of these impacts are outside the scope of this study.

- **Development Freight –** Total transportation costs for deliveries into Yukon via Inside Passage are expected to be $1.9 million per year **higher** compared to transportation costs via Watson Lake. Development freight volumes for Wolverine in eastern Yukon and Cantung (on the border with NWT) would not exist without the Alaska Highway, and this change accounts for a $5.4 million reduction in expected transportation costs without the Alaska Highway.

- **Bulk Fuel Transport** – Transportation rate estimates for fuel delivery are materially **lower** for Inside Passage compared to the Watson Lake Gateway ($29.4/tonne compared to $265.5/ tonne), resulting in a $17.1 million **reduction** in costs in a without the Alaska Highway scenario. Bulk fuel transport freight volumes for Wolverine in eastern Yukon and Cantung (on the border with NWT)

[50] Approximately 76,000 tonnes of heavy freight moved from Interior Alaska through Yukon to northeastern B.C. and points beyond, and about 92,000 tonnes enter Yukon at Watson Lake on route to Alaska or NWT.

[51] For the purpose of the assessment, the "without the Alaska Highway" impact to Yukon's population is assumed to be not significant. However, it is recognized that to the degree that lack of road access to southern Canada and loss of a second gateway into the territory would adversely impact Yukon's competitiveness and ability to attract workers, the territorial population may decrease.

would not exist without the Alaska Highway, and this change accounts for a $5.2 million reduction in expected transportation costs without the Alaska Highway.

Table 4-1: Transportation Cost Impacts for Heavy Traffic Inbound to Yukon with and without the Alaska Highway: 2014[52]

	2014 Tonnes	Estimated Total Transportation Cost, $000				2014 Tonnes would not exist without the Alaska Highway		2014 Tonnes Delivered via Inside Passage	Estimated Total Transportation Cost of all goods via Inside Passage, $000	Cost Impact, $000
		Via Inside Passage	Via Interior Alaska	Via Watson Lake	Total	Tonnes	Transportation Cost, $000			
	A	C	D	E	F=C+D+E	G	H	I=A-G	J	K=J-(F-H)
Community Resupply	165,736	8,161	265	69,698	78,124	0	0	165,736	52,686	-25,438
Development Freight	86,572	6,683	245	14,770	21,699	22,700	5,380	63,872	18,249	1,930
Bulk Fuel	183,065	2,431	2,189	22,550	27,169	19,700	5,230	163,365	4,800	-17,138

Costs for delivery to Yukon through Inside Passage may be materially lower than through Watson Lake or Interior Alaska Gateways for bulk fuel and (to a lesser extent) community resupply deliveries that currently use the Alaska Highway. However, Yukon businesses and consumers would not be likely to capture the cost savings from such lower unit transportation costs through Inside Passage, and it is likely that any delivery cost savings without the Alaska Highway would accrue to businesses outside of Yukon that supply goods into Yukon.

The Alaska Highway is used today for such bulk fuel and community resupply shipments despite the ability to use the Inside Passage. This highlights the value that the Alaska Highway provides as an important alternative supply route available to Yukon private and public businesses, and the specific characteristics truck delivery has that are not available with marine transport via Inside Passage. For example, a number of small and mid-sized Yukon businesses are able to reduce inventory costs and required floor space by receiving smaller and more regular shipments with less than full ("LTL") truck loads[53]. For these businesses there is value in reducing the risk of carrying large amounts of inventory and costs related to extra storage/ floor space for stock. Once-a-week barge service over Skagway would not likely meet the specific needs of these companies.[54] Many large retailers such as Canadian Tire, Superstore and Walmart also have contractual relationships with southern carriers that feature high-volume, multi-destination distribution on long term service agreements.

In summary, the option of delivery via truck transport afforded by the Alaska Highway provides a number of advantages for Yukon businesses and consumers that would not be available if the only access into

[52] See Appendix B, Table B-1 for detailed table and transportation cost estimates.

[53] A survey of mid-sized businesses in the Whitehorse area that ship a significant amount of general freight into Yukon that was undertaken by PROLOG a few years prior to this study indicates that the vast majority of these businesses use highway truck services from (mainly) Edmonton or Vancouver-based suppliers. Over 90% of these mid-sized businesses ship less than full truckloads (LTL) reflecting a preference for smaller shipments and virtual daily supply that reduces inventory costs and required floor space.

[54] Full load ISO inter-modal container marine barge service is currently available to the LTL shippers and the large volume retailers and is not used – suggesting that it does not meet their specific needs. Of the few mid-sized businesses that ship full loads (TL) many either have or are already using the Inside Passage Barge service (e.g., Yukon Liquor, Northland Beverages, Whitehorse Beverages, Northerm Windows and the supplier of calcium chloride for the Department of Highways).

Yukon was via marine transport (Inside Passage). This includes the following advantages specific to the truck delivery via the Alaska Highway:

- Truck transport via highway is typically faster than marine transport with the ability to deliver goods and materials to Yukon from B.C./Alberta within two days, compared to the eight days required for marine transport (assuming there would be no added delay issues related to accommodating small loads).[55]

- Truck transport via highway is more flexible than marine transport which better suits the requirements of many Yukon businesses (e.g., big box stores such as Walmart or Canadian Tire), that prefer to order smaller shipments (i.e., partial truck loads) and receive virtually daily supply service (reducing inventory costs and required floor space).[56]

In a without the Highway scenario there would be changes to the size and composition of Yukon's population that would impact the volume and types of goods shipped to Yukon.[57] Also, without the highway it is expected that some Yukon businesses would experience critical impacts on the service and products that can be provided. However, within the constraints of this study it is not possible to quantify the share of traffic that would be permanently reduced or the overall cost and other impacts Yukon business would experience with this material change in delivery methods and options.[58]

The Alaska Highway is also used for deliveries of liquefied natural gas (LNG) supplies from British Columbia to Inuvik, NWT and to Whitehorse for use at Yukon Energy's natural gas-fired generating facility.[59] Without the highway connection through B.C. it would be difficult for these entities to secure equivalent cost effective LNG supplies at current small volumes by marine transport through a U.S. port via Inside Passage - and such difficulties might well have prevented development in the last few years of this specific option to displace diesel fuel generation by these two utilities. Shipment of supply through U.S. customs would also be considerably more complex than current deliveries from B.C.[60]

The existence of a second corridor (i.e., the Alaska Highway) connecting southeastern Yukon to British Columbia also has strategic importance for Yukon and Alaska private and public business:

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[55] For example, businesses that provide custom products cannot maintain large inventories but must respond to customer demand for fast service. These companies currently receive 2-4 day highway delivery from southern suppliers, however, using barge-based service out of Vancouver the overall delivery time would be at least 8 days and would be dependent on having enough volume to consolidate full containers.

[56] Over 90% of small and mid-sized Yukon businesses receiving deliveries via the Highway ship less than full loads (LTL). These businesses typically want to minimize inventory due to the potential high costs and risks of carrying inventory. Inventory costs and risks are minimized by having frequent small shipments rather than infrequent large ones. The larger the shipper the greater the impact would be of having to live with the existing once-a week service.

[57] For the purpose of the assessment, the "without the Alaska Highway" impact to Yukon's population is assumed to be not significant. However, it is recognized that to the degree that lack of road access to southern Canada and loss of a second gateway into the territory would adversely impact Yukon's competitiveness and ability to attract workers, the territorial population may decrease.

[58] For example, it is possible that without the highway and with a predictable level of reliable competition that LTL barge services would evolve with rates reflecting added costs associated with additional handling and consolidation of individual shipments.

[59] Yukon Energy's two natural-gas fired generators became operational in late June 2015. NWT Power Corporation's use of LNG deliveries in Inuvik started in early 2014.

[60] Use of Inside Passage ports in the US such as Skagway would require resolution of all related U.S. FERC, Coast Guard and other legal requirements affecting ability to ship a new fuel product in bulk from a Canadian source through a US port to an ultimate Canadian end use destination. It is understood from past discussions with Casino representatives that past review of these issues indicated a need to resolve a host of planning issues that would not arise through use of the currently planned LNG supply delivery via the Alaska Highway.

- The connection through southeastern Yukon provides a direct, over land connection between Yukon and the rest of Canada, and between Alaska and the rest of mainland United States. Absent this route into Canada via the Alaska Highway, Yukon would effectively be isolated and dependent on transportation linkage through the United States and Alaska would be totally reliant on marine and air access.

- An alternate interior connection to Yukon establishes a competitive market limit on transportation costs for goods into and out of Yukon in that, absent this second transportation route, parties using the Ports of Skagway and Haines would effectively have a monopoly on transportation of goods into Yukon.[61]

4.1.2 Resource Sector

In 2014, there were three mines in operation in areas impacted by the Alaska Highway: Minto in western Yukon, Wolverine in eastern Yukon, and Cantung in NWT close to the Yukon border.[62] Minto access to external markets was via Inside Passage at the Port of Skagway and its total outbound volumes would therefore not be affected in the without the Highway scenario. However, Wolverine and Cantung access to external markets was via the Watson Lake gateway and these mines are assumed not to exist without the Alaska Highway. Non-development of these two mines would reduce total outbound production volumes for 2014 by approximately 119,000 tonnes, relating to shipments made through the Watson Lake gateway [see Appendix B, Table B-1].

Looking at development freight and bulk fuel inbound freight shipments for mines, mining companies operating in Yukon tend to have procurement capabilities/ requirements that are aligned with marine shipment, and have established service agreements with both suppliers and their carriers. As such, current and future operating mines likely would not experience the same types or levels of disadvantages/ issues that would be experienced by small to medium sized public and private businesses in a without the Highway scenario. Impacts on potential future mine developments are addressed in further detail in Section 5 of this Report.

Impacts without the Alaska Highway related to inbound shipments specific to the resource sector in 2014 would occur for development freight and bulk fuel.[63]

As summarized with regard to private and public businesses, the following development freight impacts are estimated in 2014 without the Alaska Highway (see Table 4-1):

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[61] This notes that the opening of the Alaska Highway "was viewed in Seattle and Vancouver as a challenge to the traditional monopoly theretofore enjoyed by West-Coast ports over Yukon trade and transportation," and the highway was "instrumental in bringing an end to the exclusive monopoly of Seattle, Vancouver and the White Pass and Yukon Route railway." Source: Bennett, Gordon. 1972. Yukon Transportation: A History. In Canadian Historic Sites: Occasional Papers in Archaeology and History No 19. Retrieved from: http://parkscanadahistory.com/series/chs/19/chs19-1a.htm [accessed February 12, 2016].

[62] Cantung mine is located in NWT, however, it used the Nahanni Road for outbound shipment of mine production.

[63] Resource development and construction industries receive shipments of such products as lumber, bagged cement, reinforcing bars and other steel products, equipment and mine supplies that are trucked to Yukon by specialty motor carriers, generally southern-based. Mining companies and large contractors tend to have procurement capabilities (also generally based in major centres in the south) and established service agreements with both suppliers and their carriers (generally southern based). Deliveries are typically by tridem (three-axle) long trailers, 8-axle or dual trailer B-Trails – with 30 and 40 tonne payloads respectively and feature rates that are negotiated and generally based on term contracts.

- Without the Highway, all development freight volumes for Yukon would be delivered through Skagway (with the Highway, it is assumed that all development freight for mines in 2014 entered Yukon through the Watson Lake gateway);
- Without the Highway, development freight volumes for Wolverine in eastern Yukon and Cantung (in NWT close to the Yukon border) would not exist and this change accounts for a $5.4 million reduction in expected transportation costs without the Alaska Highway; and
- Total transportation costs for remaining development freight deliveries into Yukon via Inside Passage are expected to be $1.9 million per year higher compared to transportation costs via Watson Lake.

Higher costs for development freight shipments may adversely impact the costs (and ultimately the feasibility) of certain exploration activities in Yukon, especially operations with more marginal economics, and would potentially reduce the level of exploration activity in the territory and ultimately the ability to advance certain deposits to the development or production stage.

As reviewed in Table 4-1, bulk fuel transport freight volumes for Wolverine and Cantung would also not exist without the Alaska Highway and this change accounts for a $5.2 million reduction in expected transportation costs without the Alaska Highway. Minto's bulk fuel inbound freight in 2014 is assumed to be through the Inside Passage, and therefore not affected in the without the Alaska Highway scenario.

4.1.3 Government

Given the strong connection of Yukon to the outside world through Inside Passage, infrastructure and resource development in central and western Yukon is generally expected to have developed as it is today even without the Alaska Highway.

The following are noted with regard to impacts on Government (at all levels) in the Inside Passage connected areas:

- **Governance and Service Delivery** – With or without the Project, it is expected that Whitehorse would develop as Yukon's capital and regional business, transportation and government services hub (largely as it is today).[64] Without the Alaska Highway, the role of Whitehorse today might even be expanded for certain areas of service delivery, as there would likely be reduced availability of services along the Highway in southeastern Yukon or northwestern Yukon, and more people would need to travel to Whitehorse for access to services. However, this would be balanced against a potentially lower overall Yukon population.[65]

- **Highway capital and maintenance costs** – Government costs would generally be the same, with or without the Alaska Highway, for the highways in this area, e.g., the Klondike Highway (extending from Carcross to Dawson City), the Silver Trail, the portion of the Robert Campbell

[64] It is expected that while a larger share of the population would reside in Whitehorse, the population itself would not likely increase. Government workers make up a large share of Yukon population. Loss of mineral exploration and development in southeastern Yukon and a reduction in total kilometres of highway to maintain would result in lower staffing requirements for EMR and Highways and Public Works. Consequently, the total Yukon population could be slightly reduced.

[65] For the purpose of the assessment, the "without the Alaska Highway" impact to Yukon's population is assumed to be not significant. However, it is recognized that to the degree that lack of road access to southern Canada and loss of a second gateway into the territory would adversely impact Yukon's competitiveness and ability to attract workers, Yukon population may decrease.

Highway extending from Carmacks and terminating at Ross River, Tagish Road, Atlin Road and for the portion of the Alaska Highway assumed to have been completed to connect Whitehorse and Haines Junction and between Haines Junction and Haines (Haines Road). However, it is also expected that there would be no U.S./ Canada funding arrangements (Shakwak Agreement) to address capital and operating and maintenance requirements for the connection between Haines and Haines Junction (and no highway connection extending north from Haines Junction).

The Alaska Highway portion north of Haines Junction to Yukon/Alaska border is about 324 km [about 65% of roads included in Shakwak Agreement], while Haines Road is about 174 km long [about 35% of roads included in Shakwak Agreement]. Without the Alaska Highway the total cost for this segment between 1977 and 2009 would have been reduced by 65% [about $0.975 million compared to US $1.5 billion (nominal dollars) spent between 1977 and 2009 by both countries on upgrading and maintaining the Alaska Highway System in Canada]; however, the Government of Canada and Yukon government would have been responsible for all costs without the Shakwak Agreement.[66]

- **Yukon Economic Impacts** – Pathways of impact to Government would potentially result from the cost or other impacts to supply (described under Private and Public Business) that may adversely affect operations or competitiveness for local businesses in Yukon or competitiveness of resource development and add to costs for Government.
    - **Public and Private Business**: As noted, Yukon businesses and consumers would not likely capture any of the cost savings from lower unit transportation costs through Inside Passage; instead Yukon businesses may be adversely impacted by an inability to access a more timely and more flexible mode of delivery, and also by the loss of a competitive alternative to the Ports of Skagway and Haines. Limits and restrictions on how businesses can operate within Yukon, as well as potential exposure to a monopoly environment, would potentially have an adverse effect on the development of the businesses community in Yukon and ultimately the overall economy; however, it is not possible within the confines of this study to quantify or further define the extent of any impacts in this regard.

      To the extent that loss of the Highway reduced tourist traffic in Inside Passage connected areas, there will also be potential economic impacts that flow from loss of revenues in the retail trade and accommodations and food services sector.

    - **Mining Activity:** Historic and currently existing mines in Yukon (with the exception of Wolverine in eastern Yukon and Cantung in NWT close to the Yukon border which are addressed in section 4.2) have used the Inside Passage connection to transport material out of Yukon, and taxes and royalties and other benefits to the Yukon government from

[66] Information from Yukon Highways and Public Works notes that between 1977 and 2009 over US $1.5 billion (nominal dollars) has been spent by both countries on upgrading and maintaining the Alaska Highway System in Canada, including: Canada ($920.6 million or 60% of total expenditures); Yukon ($223.1 million or 14% of total expenditures); United States ($361.4 million or 23% of total expenditures); and Alaska ($38.1 million or 3% of total expenditures). Source: Yukon Highways and Public Works. The Shakwak Highway Project Upgrade. Retrieved from http://www.hpw.gov.yk.ca/pdf/shakwakprojectbrochure09.pdf [accessed February 12, 2016].

existing mining activities in Inside Passage connected areas are expected to be the same with or without the Project.

- **Exploration Activity:** Potential cost increases for lower volume development freight transported into Yukon through Skagway (rather than through the Watson Lake Gateway) for exploration may adversely affect the level of future exploration activities in these areas of Yukon (and related effects on the Yukon economy and Government).

4.1.4 Tourism

Approximately 443,300 people visited Yukon in 2014, and 83% of total Yukon visitors entered Yukon in peak tourism and mining/mineral exploration months (between May and September).[67]

- Currently, the majority of the recorded international tourist traffic entering Yukon crosses at the Fraser border crossing (between Skagway and Carcross),[68] reflecting a large number of cruise ship passengers entering Alaska and touring Yukon as part of their Alaskan cruise. Notably, visitors entering Yukon via Alaska (i.e., through Skagway) tend to have shorter stays in Yukon (average 3 nights in Yukon compared to visitors entering via British Columbia or by air who average 10 and 11 nights in Yukon respectively).[69]

- There is no border crossing at Watson Lake and information available regarding tourists entering Yukon at this gateway is more limited than for other Yukon entry points. However, based on estimates from the Yukon Department of Tourism and Culture, in summer of 2012 approximately 107,800 visitors entered Yukon from British Columbia at the Watson Lake gateway (without going through a border crossing).[70]

Yukon visitors by entry point are summarized for the summer of 2014 in Figure 4-2.[71] The Alaska Highway accounted for 45% of the 366,500 summer visitors to Yukon, with about 24% of these visitors entering at Beaver Creek (from Alaska) and about 76% entering at Watson Lake[72] (from British Columbia). In contrast, about 38% of summer visitors entered from Skagway (Fraser or by train to Carcross), 12% entered by air, and 4% entered from Alaska through Haines or Little Gold (Top of World Highway).

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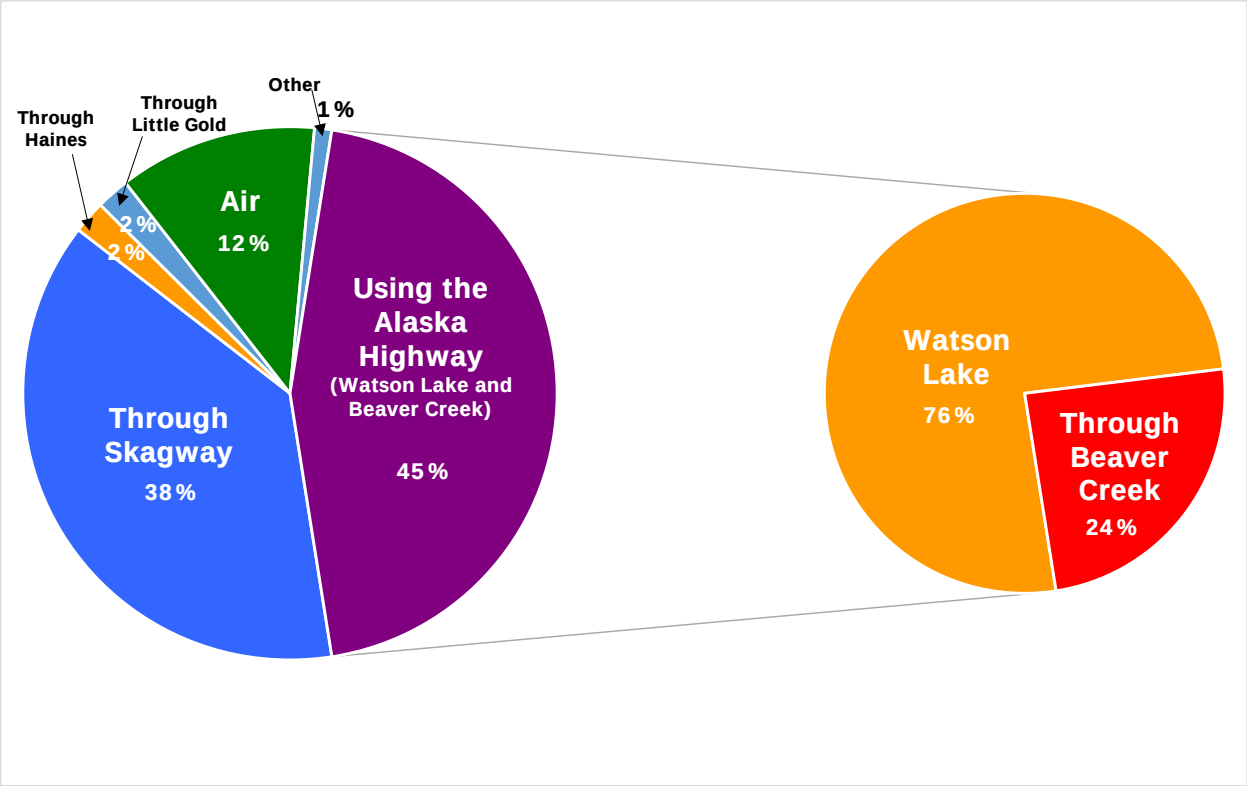
[67] Source: Government of Yukon Department of Tourism and Culture. 2014. Yukon Tourism Indicators: 2014 Year-End Report. Retrieved from: http://www.tc.gov.yk.ca/pdf/2014_TourismIndicators_YearEndReport.pdf [accessed on November 3, 2015].
[68] Please see Appendix D, Table D-1.
[69] See Appendix D, Table D-2, which shows most visitors entering via Alaska are American (77%) and enter via motorcoach (43%) or train (19%). About 32% enter via car or truck and only 7% enter via recreational vehicle. In contrast, for visitors entering Yukon via B.C. 39% enter using a car or truck and 52% enter using a recreational vehicle.
[70] 2012/13 Yukon Visitor Tracking Program - Summer Report notes that "domestic highway traffic (entry through the Alaska Highway or Cassiar Highway) accounted for 34% of visitors entering. Also, additional 12% of visitors entered Yukon through domestic and international air. Source: Yukon Government Department of Tourism and Culture. 2013. 2012/2013 Yukon Visitor Tracking Program: Summer Report. Retrieved from: http://www.tc.gov.yk.ca/publications/2012-2013-YVTP_Summer_Report.pdf [accessed on November 3, 2015].
[71] Please see Appendix D, Table D-1 for details. In order to provide an approximate allocation of the 2014 visitors by entry point, the estimates by entry point for 2012/13 have been applied.
[72] This also includes visitors entering through BC Highway 37.

Figure 4-2: Estimated Yukon Visitors in Summer 2014 by Entry Point[73]



Yukon businesses attributed $249.5 million of their gross revenue in 2012 to tourism.[74] Retail Trade had the highest reported tourism-related gross revenue with about 31% of the total gross revenues attributed to tourism, followed by Accommodation and Food Services with about 20% of the total. Based on the number of visitors to Yukon in 2014, the estimated average gross revenue per visitor would be about $563.[75]

Table 4-2 estimates the impact of the Alaska Highway to Yukon tourism and assumes that without the Alaska Highway the total number of annual Yukon visitors would be reduced by about 44%, or approximately 197,000 visitors (56% of visitors would be unaffected). This is an extreme, worst case assessment that assumes that tourists currently entering via Watson Lake or other entry points that would be isolated without the highway would not visit Yukon via another gateway/ means of entry. As summarized below, it is likely that a portion of visitors entering Yukon via Watson Lake, Beaver Creek or Little Gold

[73] See Appendix D, Table D-1 and Figure D-2. The figure is estimated by applying pathway proportions from the summer 2012 Yukon Visitor Tracking Program to total visitation numbers from Yukon Tourism Indicators 2014 Year-End Report. Source: Government of Yukon Department of Tourism and Culture. 2014. Yukon Tourism Indicators: 2014 Year-End Report. Retrieved from: http://www.tc.gov.yk.ca/pdf/2014_TourismIndicators_YearEndReport.pdf [accessed on November 3, 2015].

[74] The survey notes that these statistics represent "perceived Yukon GDP attributed to tourism." These calculations depend on the businesses' perception of the percent of revenue attributed to each sector of the Yukon economy. For some businesses this value may be an approximation or based on subjective impressions. The business survey information estimated that total GDP attributable to tourism was $113.8 million in 2012. Source: Yukon Bureau of Statistics. 2013. Yukon Business 2013. Retrieved from: http://www.eco.gov.yk.ca/pdf/2013_Business_Survey_Report.pdf [accessed on October 30, 2015].

[75] Based on information from Department of Tourism and Culture, there were approximately 442,200 visitors in 2012/13 which would yield to about $564/visitor using estimated average gross revenue. This is very close to the estimate calculated based on 2014 visitors, and consequently 2014 visitor numbers are used for this assessment.

would still enter Yukon and visit more accessible areas of the territory. However, a more useful estimate cannot be provided within the scope of this study.

Table 4-2: Estimated Impact of the Alaska Highway to Tourism[76]

Location of Entry	Estimate	% of total	Estimate Without the Alaska Highway	
			Estimate	% of total
A	B	C	D	E
Estimated Summer Visitors - 2014				
Pleasant Camp	7,300	2%	7,300	4%
Little Gold	7,300	2%		
Fraser	102,600	28%	102,600	53%
Train (into Carcross)	36,600	10%	36,600	19%
Beaver Creek	40,300	11%		
Watson Lake	124,600	34%		
Air	44,000	12%	44,000	23%
Other	3,800	1%	3,800	2%
Total Summer	**366,500**	**100%**	**194,300**	**100%**
Estimated Winter Visitors - 2014				
Entered via Alaska	23,000	30%	23,000	44%
Entered via BC	24,600	32%		
Air	29,200	38%	29,200	56%
Total Winter	**76,800**	**100%**	**52,200**	**100%**
Total 2014	**443,300**	**100%**	**246,500**	**100%**
Impact of the Alaska Highway			**-196,800**	**-44%**

The following impacts on visitors are specifically noted:

- Tourist traffic from Haines or Skagway to Yukon (entering/existing Haines Junction, Carcross or Whitehorse) is expected to continue unaffected without the Alaska Highway. A portion of the tourist traffic between Haines and Haines Junction would continue to exist (without connection to Alaska) as tourists would either visit the Kluane National Park or other wilderness and wildlife attractions in the area or enjoy driving a scenic route to Whitehorse.[77] However, it is assumed that traffic through/on the Alaska Marine Highway would also increase absent access into Alaska via the Haines Road and the Alaska Highway. Instead of travelling to central/interior Alaska through Yukon from Skagway/Haines, visitors would use the Alaska Marine Highway, reducing the number of visitors to Yukon.

[76] Number of visitors for 2014 as illustrated in Table D-1, columns D and E. The numbers are rounded to the nearest 100.
[77] The Alaska portion of the Haines Road received State recognition as an Alaska State Scenic Byway in 1998. The corridor provides access to the Chilkat River and the Alaska Chilkat Bald Eagle Preserve in Alaska, as well as the Kluane National Park and Reserve in Canada.

- Tourist traffic that currently enters/ or exits Yukon via Watson Lake, Beaver Creek or Little Gold (traversing Top of The World Highway to Dawson[78]), is assumed to cease. Without the Alaska Highway, such Yukon tourist traffic would either not exist or would enter/exit Yukon via air or via the Inside Passage ports on the Alaska coast (Skagway/ Haines). However, Dawson would still have significant appeal and tourists would likely either drive to Dawson up the North Klondike Highway from Skagway/Whitehorse or fly into Dawson City. While the activity of travelling the highway and exploring its history would be lost (and the portion of visitors primarily attracted to Yukon/Alaska to undertake this activity would be lost), a portion of visitors would be able to pursue and experience the other activities in other areas of Yukon and Alaska.

- The character or type of tourist traffic entering Yukon would also likely change without the Highway as a greater proportion of tourist traffic would likely relate to individuals entering Yukon via rail or motorcoach as part of an Alaskan cruise, or flying directly into Whitehorse or Dawson City. Cruise ship passengers tend to spend a relatively shorter time in Yukon (average 3 nights), while tourists that enter Yukon using cars, vans and light trucks through Watson Lake and Beaver Creek are much more likely to spend more time in Yukon (7 – 10 days). Longer stays may result in more spending in the territory's hotels, restaurants, resorts and public venues compared to cruise ship passengers.

4.1.5 Security and Emergency Response

As noted in Section 2, the Alaska Highway was essentially a mega-project built by the military during World War II to satisfy wartime national security requirements for the United States. Specifically, it provided an alternative supply route for supplies, military personnel and equipment in the event that west coast marine shipping lines were compromised. While the threat of attack ended after the WWII, the US military presence in Alaska continued following the war, as post war tensions with the Soviet Union increased during the Cold War. The military presence in Alaska continues today, and Alaska has continued to be considered a "vital strategic interest" for the United States.[79]

Since the time of construction, the presence of the Highway has also provided a physical link between Canada and the United States that has fostered a deep connection between B.C., Yukon and Alaska, and that has informed strategies regarding civil security and emergency response. Today, the Alaska Highway continues to provide the only access by land between the Lower 48 states and Alaska, as well as the only

[78] The 2014 Yukon Tourism Indicators Report (page 5) notes that a major tour operator changed its business model in 2014 from transporting passengers by motorcoach from Fairbanks, AK to Dawson City to using flights. This would support the view that a portion of visitors currently crossing through Beaver Creek or Little Gold simply would fly into Yukon (landing at Dawson City or Whitehorse) and would not be lost. Source: Government of Yukon Department of Tourism and Culture. 2014. Yukon Tourism Indicators: 2014 Year-End Report. Retrieved from: http://www.tc.gov.yk.ca/pdf/2014_TourismIndicators_YearEndReport.pdf [accessed January 10, 2016].

[79] Colonel Thomas Bell's report notes "simply put, Alaska represents a vital U.S. strategic interest in the arctic. In that status, the state incurs significant American equities with responsibility levels similar to some countries. In the future, as global warming trends continue and maritime shipping lanes open, Alaska and the JPARC may become even more strategically vital to America". Source: Bell, Colonel Thomas. 2012. Strategic Importance of the Joint Pacific Alaska Range Complex. Strategy Research Project. United States Army War College Class of 2012.

land link between Yukon and southern Canada.[80] It also provides a land-based link to the Arctic Ocean, a region of considerable potential military, economic and environmental importance for both Canada and the U.S.

It is expected that without the Highway there would be an adverse impact on both security and emergency response arrangements in this region. The following are specifically noted:

- **Security:** With regard to Pacific Command bases located in Alaska, while marine passage and air transport are the predominant means of transporting personnel and equipment to/from Alaskan bases, the importance of maintaining an alternative inland route would remain. As such, military operations would likely be adversely affected without the Alaska Highway, including Inside Passage connected areas in Yukon and Alaska, as the Inside Passage fails to provide the same flexibility and security for all areas of Yukon and Alaska as exists with the Inland Passage connection provided by the Alaska Highway.

  For Yukon, lack of inland passage to southern Canada raises concerns regarding secure access to external markets and port infrastructure. Without the Highway, Yukon (and Yukon businesses) would be dependent on continued, secure access to port infrastructure in Skagway, AK. To the extent that the Port of Skagway was compromised or shutdown by a catastrophic event or industrial actions/ strikes, etc., Yukon would be vulnerable. Further, to the extent that contracts or rates for service would need to be re-negotiated, Yukon (or Yukon businesses) would have a more limited bargaining position.

- **Emergency Response:** Alaska, Yukon and British Columbia are all signatories to PNEMA,[81] a regional cooperative framework for emergency management and disaster relief. Yukon and Alaska both depend on the Shakwak portion of the Alaska Highway for implementation of PNEMA (i.e., transportation of heavy equipment arriving from the south requires access and use of some portion of the Highway; evacuation of residents in times of emergency would also rely on Highway access).[82] The Alaska Highway contributes to the overall resilience of emergency response systems in both Alaska and Yukon, providing a separate means of access for transportation of emergency supplies from outside the jurisdiction in the event that marine or other access became compromised.[83] Without the Alaska Highway, this alternate inland transportation system would not

[80] This reviews the transportation industry in Alaska and notes that while marine and air transport dominate the market, with a relatively small amount of freight trucked via the Alaska Highway, "the highway forms a vital link"; as an example, it is noted that during the 2002 West Coast port lockout, truck traffic along the highway increased. Source: Alaska Department of Labor and Workforce Development and Murkowski, Frank H. 2005. Alaska Economic Trends: Transportation. Retrieved from: http://labor.state.ak.us/trends/jan05.pdf [accessed February 10, 2015].

[81] Pacific Northwest Emergency Management Arrangement.

[82] The important role the Highway may play in emergency response may be seen by its use in responding to the 1964 Alaska earthquake. Specifically, the Alaska Highway provided an "important overland route to the lower forty eight states". Source: University of Alaska. 1964. Monthly Review of Business and Economic Conditions. University of Alaska, Institute of Business, Economic and Government Research. May 1964. Retrieved from: http://www.iser.uaa.alaska.edu/Publications/formal/arsecs/arsec_1_1_1964.pdf [accessed February 12, 2016].

[83] Government of Yukon Submission to the Canada Transportation Act Review Panel – April 2015, outlines overall concerns regarding the vulnerability of the existing Yukon transportation infrastructure due to lack of alternative routes that would provide for overall resiliency for the system. However, the submission also notes the need to rely on northern transportation networks in neighbouring jurisdictions for transportation of goods and services when required.

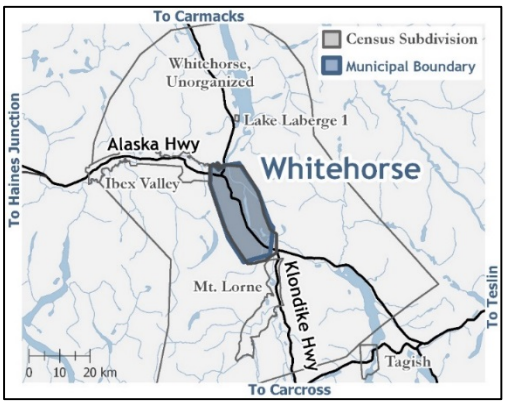
exist for Alaska and for Yukon which would potentially weaken the ability to respond to, or offer assistance regarding, emergency incidents in either jurisdiction.

4.1.6 Communities

Communities in western/central Yukon connected to the Klondike Highway[84] or with connecting roads or highways expected to have developed with or without the Alaska Highway[85] are expected to experience minimal change with or without the Alaska Highway with the exception of Haines Junction.

Whitehorse

The capital of the Yukon and its largest community (with over 75% of the total Yukon population[86]), Whitehorse lies within the shared traditional territory of the Ta'an Kwach'an Council (TKC) and the Kwanlin Dun First Nation (KDFN).[87] Historically, First Nations used the area around Whitehorse for food gathering and as a meeting place.



Source: http://www.sewp.gov.yk.ca/region?regionId=YK.WH

With its location at the head of navigable waters on the Yukon River, Whitehorse became an important stop on the way to gold fields further north, and with development of the White Pass & Yukon Route Railway in the early 1900's (connecting Whitehorse to the Port of Skagway), Whitehorse became the central hub for transportation into and out of the territory.

It is expected that the role and size of Whitehorse would be very similar without the Alaska Highway, and that it would continue as the dominant hub of economic and government activities within the Yukon.

The following are specifically noted in this regard:

- **Without the Alaska Highway, Whitehorse would continue to be the dominant population centre in Yukon -** Given its southern location and connection to external markets via Skagway, Whitehorse would remain the population centre for the territory and a large share of the total Yukon population would continue to reside there.[88] It is likely that a portion of the

[84] E.g., Dawson City, Whitehorse, Carcross, Carmacks and Stewart Crossing.
[85] E.g., the Silver Trail connecting Mayo, Keno and Elsa to the Klondike Highway; the Robert Campbell Highway connecting Faro and Ross River and the portion of the Alaska Highway connecting Whitehorse to Haines Junction.
[86] This includes the City of Whitehorse, Mount Lorne, Ibex Valley, Marsh Lake and surrounding areas.
[87] Both TKC and KDFN have a Final Agreement and a Self-governing Agreement. In 1956, the Marsh Lake and Lake Laberge Indian Bands were joined to create what is known today the Kwanlin Dün First Nation. The Ta'an Kwäch'än lands extended north to Hootalinqua, south to Marsh Lake, west to White Bank Village (confluence of Takhini and Little Rivers), and east to Winter Crossing on the Teslin River (Ta'an Kwäch'än Council 2008). As of October 2015, KDFN reported a total registered population of 991 and TKC reported a total registered population of 268 (see Appendix E, Table E-4).
[88] While Dawson City was the capital of the territory prior to the construction of the Alaska Highway, it was already suffering economic and population declines due to the end of the mining boom in Yukon prior to World War II. Transfer of the capital from Dawson City to Whitehorse may have been expedited by the existence of the Alaska Highway (and its related construction activity centred in Whitehorse during the war), but the location of population and services further south at the transport rail/road transfer point of Whitehorse likely made the transfer of government and government support services to Whitehorse inevitable with or without the Alaska Highway.

population resident today in communities that would be isolated without the Highway (e.g., Watson Lake) would become centred in Whitehorse. This would include community members currently resident in Beaver Creek, Destruction Bay, Burwash Landing, and Watson Lake. This may also include community members in Haines Junction which may be adversely impacted by loss of through traffic between the Alaska Interior and Haines.

However, while Whitehorse's share of the total Yukon population could increase, the overall Yukon population (and potentially Whitehorse's population) may in fact be lower for the following reasons:

- Loss of mineral exploration and development in southeastern Yukon and a reduction in total kilometres of highway that require maintenance may result in lower staffing requirements for EMR and Highways and Public Works.
- Lack of road access and inability to secure more flexible and timely delivery may impact the composition of the local business community, and ultimately may make it more difficult to attract individuals and businesses to Whitehorse.

- **Without the Alaska Highway, Whitehorse would continue to be the centre of government and transportation and service hub for Yukon –** The construction of the Alaska Highway is credited with "undermining Dawson's role as the territorial capital" and positioning Whitehorse as the most dominant community in Yukon after the 1940s.[89] However, it is expected that given its more accessible southern location and established role as transportation hub and the critical point of access to external markets, with or without the Alaska Highway, Whitehorse would inevitably have established itself as a more desirable location for government and business headquarters in the territory. Further, with the collapse of the Gold Rush prior to the 1940s the role and influence of Dawson City within the territory had already declined considerably. The construction of the Alaska Highway may have facilitated a more rapid transition than would have otherwise occurred, but it is concluded that this transition would nonetheless have occurred without the Alaska Highway.

  The following are noted regarding the continued importance of Whitehorse without the Alaska Highway:

  - Given access to the Port of Skagway through Whitehorse, Whitehorse would remain the transportation hub and regional services centre for Yukon; without the Highway the increased number of isolated communities northwest of Whitehorse and southeast of Whitehorse could likely further enhance the role and importance of Whitehorse as a transportation hub and regional services centre. As discussed in further detail in Section

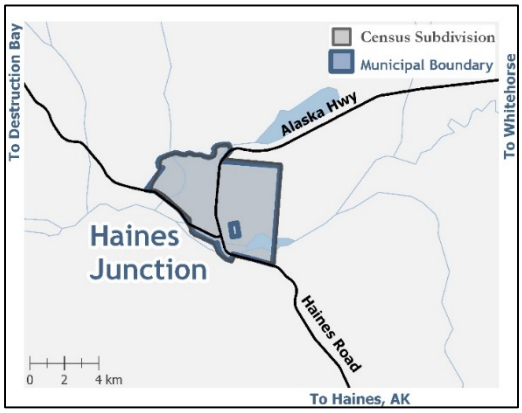
[89] The Alaska Highway: A Yukon Perspective notes that "prior to the spring of 1942 the population of Whitehorse was approximately 400. In the space of a few months it had risen to 20,000, and some people estimate that it peaked at over 40,000 in 1943" It also notes that "Whitehorse's new status came at the expense of the one-time Yukon capital, Dawson City, which was bypassed when the Army chose a route for the highway in 1942." Source: Yukon Archives. n.d. The Alaska Highway: A Yukon Perspective. Retrieved from: http://www.alaskahighwayarchives.ca/en/chap3/2boombustdawsoncity.php [accessed on January 6, 2016]. Also, the State of Rural Canada Report notes that one of the effects of the Highway's construction was "the undermining of Dawson's role as the territorial capital and the emergence of Whitehorse as the largest community in the Yukon". Source: Coates, Ken and Amanda Graham. 2015. State of Rural Canada 2015, pages 79-82. Retrieved from: http://sorc.crrf.ca/yukon/ [accessed on January 6, 2016].

4.2, southeastern Yukon would effectively become isolated with very limited road access to British Columbia and/or the rest of Yukon. Watson Lake would consequently have a significantly smaller population and its role as an economic and service delivery hub in southeastern Yukon would be significantly diminished. A lower level of services would be available at Watson Lake and residents of communities in southeastern Yukon would be likely be required to travel to Whitehorse for medical, educational and other types of services.

- Given that Whitehorse would be expected to remain the centre of government and location of territorial and federal government headquarters without the Highway, it would remain the traffic support services center (highway O&M base).
- Given access to external markets through the Port of Skagway, it would remain as the major mining services support centre in the territory.

Haines Junction

The community of Haines Junction is located at the junction of the Alaska Highway and the Haines Road[90], 158 kilometres west of Whitehorse, and is a popular tourist destination. Haines Junction is located within the traditional territory of the Champagne and Aishihik First Nations (CAFN).[91]



Source: http://www.sewp.gov.yk.ca/region?regionId=YK.HJ

Haines Junction would continue to exist without the Alaska Highway, given the assumed supply road constructed during WWII to support the pipeline constructed between the Port of Haines and Haines Junction/ Whitehorse in order to provide an alternate route for fuel (see discussion in Section 3.2 of this report)[92]. Haines Junction would also continue to be accessible by car with assumed access to both Whitehorse and Haines (via the Haines Road). However, there would be no road access further northwest of Haines Junction. With no road connection to the Alaska interior, and no connection to communities further northwest of Haines Junction that would exist without the Alaska Highway (i.e., Burwash Landing), the role of Haines Junction as a service provider (for local or tourist through traffic) would be minimized. However, it is expected that Haines Junction would still have access to certain emergency, health and education services within the community.

The following key impacts would potentially occur without the Alaska Highway:

[90] It is assumed in this study that a version of the Haines Road (with connection to Whitehorse and the port of Haines, but not to any areas north of Haines Junction) would have been constructed as a supply road during WWII (even without the full Alaska Highway) when a pipeline was constructed between Haines and Haines Junction/Whitehorse to supply fuel to a large marine tank farm at the port.

[91] Champagne and Aishihik First Nations have signed land claims and self-government agreements. As of October 2015, these First Nations reported a total registered population of 890 (see Appendix E, Table E-4).

[92] A connection between Haines Junction and Whitehorse would also be supported by later construction activities related to the Aishihik Generating Station and Transmission line.

- **Reduction in population** – It is not feasible to predict the impact on population that loss of the Alaska Highway connection would have on Haines Junction; however, it is expected that without the Alaska Highway the population of Haines Junction (which was 895 in 2015) would be much smaller due to an overall lower regional population (with Beaver Creek and Destruction Bay not likely to exist and a smaller, isolated population at Burwash Landing); as well as a lower level of economic activity in the area with reduced through traffic along both the Haines Road and between Haines Junction and Whitehorse. A lower population may also result in a reduction in services available within the community (with community members needing to travel more often to Whitehorse to access a greater range of medical, education and other services).[93]

- **Reduction in through traffic and community services or businesses focused on serving through traffic** – Without the Alaska Highway connecting Yukon to the Alaska Interior, there would be a material reduction in through traffic passing through Haines Junction, which would adversely affect community services or businesses that rely on tourist or other through traffic. While the exact impacts cannot be readily quantified, the following is noted based on existing conditions reviewed in Appendix A:

    - Average Daily Traffic in the vicinity of Haines Junction would be reduced from the following existing conditions (based on 2010 average daily traffic volumes):

        - **Along the Haines Road average daily traffic is between 50 to 100 -** It is expected that a portion of the tourist traffic between Haines and Haines Junction would continue to exist (without connection to Alaska) as tourists would either visit the Kluane National Park or other wilderness and wildlife attractions in the area or enjoy driving the scenic route to Whitehorse.[94] However, it is assumed that traffic through/on the Alaska Marine Highway would also increase absent access into Alaska via the Haines Road and the Alaska Highway. Instead of travelling to central/interior Alaska through Yukon from Skagway/Haines, visitors would use the Alaska Marine Highway. This may also reduce the number of visitors travelling to Yukon along the Haines Road.

        - **Along the Alaska Highway north of Haines Junction, average daily traffic is between 150 and 300** – As the road system would not extend west of Haines Junction, this traffic would no longer exist. Residents of communities north of Haines Junction would no longer be able to travel by road to Haines Junction, or through Haines Junction to Whitehorse.

        - **Between Whitehorse and Haines Junction, average daily traffic is between 300 to 599** – A portion of this existing traffic would relate to local residents travelling between Whitehorse and Haines Junction (or communities north of Haines Junction), however, a portion would also relate to tourists

[93] As noted in Appendix E, community members already must travel to Whitehorse to access certain services.
[94] The Alaska portion of the Haines Road received State recognition as an Alaska State Scenic Byway in 1998. The corridor provides access to the Chilkat River and the Alaska Chilkat Bald Eagle Preserve in Alaska, as well as the Kluane National Park and Reserve in Canada.

travelling from B.C. through Yukon to Alaska, as well as commercial heavy traffic (through freight from Canada or the Lower 48 States to Alaska). The following commercial traffic volumes currently passing through Whitehorse and Haines Junction would cease absent the Alaska Highway (based on Table A-2 provided in Appendix A):

Interior Alaska Gateway	2009 Trucks	2014 Trucks
Community Resupply	3,183	2,351
Development Freight	1,474	1,371
Bulk Fuel	-	196
Total Volumes	**4,657**	**3,918**

A reduction of through traffic through Haines Junction would result in fewer businesses in the community focused on serving highway traffic (tourist or otherwise). Appendix E reviews existing services and amenities available in the community; it is expected that these services and amenities would be significantly reduced without the Highway.

- **Reduction in visitors to the Kluane National Park** – As noted above, it is expected that a portion of tourists would still travel from Haines (along the Haines Road) or from Whitehorse to visit the Kluane National Park. However, total visitors would likely be reduced, as US visitors would not be able to continue on to the Alaska interior. Within the scope of this study it is not feasible to quantify potential impacts on the Kluane National Park.

- **Reduction in highway support services and O&M base** - Without the Alaska Highway, a portion of the costs for the Haines Junction camp would be reduced by the portion of highway north of Haines Junction. It is likely that this would also reduce the level of employment and spending in the community.

The development of the Alaska Highway historically had a material impact on local First Nation communities when road access was a direct result of this development. Specifically, economic opportunities presented by the Highway drew community members towards Whitehorse and other areas along the road,[95] and as occurred more broadly in the territory community life became "oriented towards the road",[96] with both short-term and long-term effects on communities including, "changes in the annual cycle, settlement patterns, sources of subsistence and cash income, social organization, values, education, health conditions and alcohol use."[97] However, given that road interconnections with a number of communities are expected to exist with or without the Alaska Highway, minimal impacts are expected on First Nations in central/western Yukon in Inside Passage connected areas. With or without the Alaska Highway there would

[95] Source: Ingram, Rob. 1991. The Alaska Highway: A Thematic Overview. Yukon Historic Sites Inventory, page 15. Retrieved from: http://www.tc.gov.yk.ca/publications/The_Alaska_Highway_A_Thematic_Overview_1991_02.pdf [accessed February 12, 2016].
[96] Source: Ingram, Rob. 1991. The Alaska Highway: A Thematic Overview. Yukon Historic Sites Inventory, page 9. Retrieved from: http://www.tc.gov.yk.ca/publications/The_Alaska_Highway_A_Thematic_Overview_1991_02.pdf [accessed February 12, 2016].
[97] Source: Cruikshank, J. 1985. The Gravel Magnet: Some Social Impacts of the Alaska Highway on Yukon Indians, page 1. Retrieved from: https://jukebox.uaf.edu/ak_highway/Assets/maps.../TheGravelMagnet.pdf [accessed February 12, 2016].

be road development (and its related effects on local First Nations including KDFN, TKC and CAFN) as well as similar resource development (and its related effects on local First Nations) in these areas.

Communities in northwestern Yukon that would effectively be isolated without the Alaska Highway are reviewed in Section 4.2.

4.2 REGIONS DEPENDENT ON ALASKA HIGHWAY FOR DEVELOPMENT

The Alaska Highway has had an important role in connecting communities in northeastern B.C. (north of Fort Nelson) and eastern Yukon to Whitehorse/Alaska. Without the development of the Alaska Highway, it is assumed that communities in these areas (and in western Yukon, between Haines Junction and the Alaska border, as well as Tok, Alaska) would be isolated (or would no longer exist), and resources in these areas would also remain undeveloped due to lack of developed infrastructure available to support exploration and development activities.

Effects pathways to economic and social valued components in regions dependent on the Alaska Highway for development are reviewed below. For reference, recent (2011) Average Daily Traffic on each segment of the Alaska Highway is summarized in Figure 1-4.

4.2.1 Private and Public Business

Without the Project, it is assumed that the supply of goods that support private and public business activity would be severely curtailed (or cut off all together) in regions dependent of the Alaska Highway for development. As reviewed in Section 4.2.2, without the Highway two mines active in this area in 2014 would not have existed.

As addressed below in the discussion of communities, loss of the Alaska Highway would result in isolation or non-existence of some Yukon communities and resource activities (as well as potentially communities in eastern Alaska and Northeastern B.C. that developed specifically, or to a major extent, as a result of the Alaska Highway). This would also mean loss of a number of businesses that grew up along the Highway to service through traffic (heavy transport or tourist traffic).

Any shipments by land to remaining communities and resource activities would rely on the Inside Passage access to Yukon plus (it is assumed) winter road or air, thereby adding greatly to costs compared to what occurs with the Alaska Highway. The economic profile impacts of the Alaska Highway today in these areas is addressed by this qualitative assessment, without attempting to provide quantitative cost impacts similar to those provided in Section 4.1.1 for Inside Passage connected areas in western/central Yukon.

4.2.2 Resource Sector

Lack of developed road infrastructure in eastern Yukon regions dependent on the Alaska Highway for development would severely limit mining exploration and/or development activities in these areas. Without the Alaska Highway, it is expected that the Wolverine and Cantung (located in NWT close to the Yukon border) mines operating in 2014 would not have developed, and exploration activities related to Selwyn, Mactung, or Kudz Se Kayah would not occur and/or would be severely curtailed compared to recent and current activity levels.

While the Cassiar asbestos mine is assumed not to have been developed in northern B.C. in the 1950s without the Alaska Highway, it is expected that oil and gas resources in the Fort Nelson area would likely have developed along with road connection up to Fort Nelson from Dawson Creek. Such activities would likely have supported resource activities in northeastern B.C. (tied to Fort Nelson), including the oil and gas development of the Kotaneelee area in extreme south-east Yukon.

4.2.3 Government

The loss of mine exploration and development activities in eastern Yukon would result in loss of Government resource revenues from mining activities (the existing Wolverine mine operating in 2014, or potential future activities).[98] Lower mining related activities might also result in a smaller government presence, as there would be less need for some current employees/branches. Less resources would be needed for review of mining project licencing and assessment submissions and ongoing monitoring of mining projects. Less bodies would likely also be required for highway monitoring, upkeep and maintenance. Departments such as Energy, Mines & Resources, Environment and Highways and Public Works would likely be the most impacted.

Without the Alaska Highway, there would also be lower highway capital and operation and maintenance costs for governments in BC/Canada, Yukon and Alaska/United States due to reduction in highway infrastructure in each jurisdiction (i.e., sections of the highway between Fort Nelson and Watson Lake; between Watson Lake and Whitehorse; and between Haines Junction and Tok (as well as the lost section of Robert Campbell Highway between Ross River and Watson Lake).

Existing capital and operation and maintenance expenditures for segments of the Alaska Highway within Yukon are reviewed in Appendix A. Without the Alaska Highway it is estimated that 2014/15 maintenance costs would be 32% lower than the 2014/15 actuals with the Alaska Highway (i.e., would be reduced to $29.8 million). Maintenance camps would not exist in Watson Lake, Swift River, Tuchitua, Beaver Creek and Destruction Bay, and activities and costs would be reduced for activities undertaken at other maintenance camps at Haines Junction, Dawson, Ross River and Teslin. Loss of maintenance camps (or reduction in required maintenance activities) in these communities would also reduce related employment (and related spending) within each community.

Similar to the maintenance costs, the capital costs without the Alaska Highway would also be lower. The impact of the Alaska Highway for 2011/12 and 2012/13 is double reflecting higher than average capital spending for the highway portion and roads that would not have existed without the Alaska Highway. For the recent years, 2013/14 and 2014/15, the impact of the Alaska Highway is ranging between 64% and 76% of overall Yukon highway capital costs, still reflecting higher than average capital spending for the portion of highways and roads that would not have existed without the Alaska Highway. See Appendix B for further detailed information and summary tables.

[98] The Cantung mine in NWT close to the Yukon border also operated in 2014 and would have been impacted as it used road access along the Alaska Highway to ship product to market. Impacts on this mine without the Alaska Highway would potentially affect any resource revenues for the NWT government.

4.2.4 Tourism

Without the Alaska Highway, tourist traffic currently destined for regions of eastern Yukon dependent on the Alaska Highway for development would be severely curtailed.

For communities that would be isolated without the Alaska Highway,[99] tourism activity and revenues would cease or be materially reduced; however, a portion of these visitors would enter Yukon via alternate means, (i.e., via air passage or through Skagway) and would visit other more accessible areas of Yukon.

Considering Yukon Input-Output Multiplier Impacts[100], Yukon would experience the following economic impacts due to the assumed reduction in Yukon visitors without the Alaska Highway.[101]

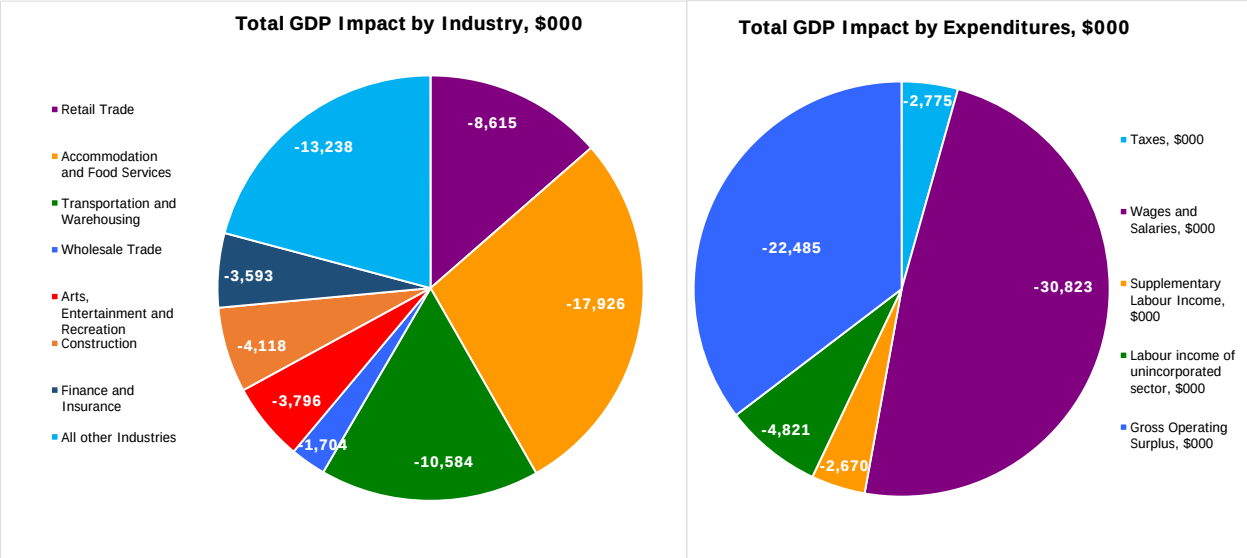
- Tax Revenue Impacts to Yukon would be reduced by about $2.7 million.
- Salaries and Wages would be reduced by about $30.8 million.
- Supplementary Labour Income would be reduced by about $2.7 million.
- Labour income of unincorporated sector would be reduced by about $4.8 million.
- Other Operating Surplus would be reduced by about $22.5 million.
- Total GDP impact would be about $63.6 million lower.
- Employment for businesses would be reduced by 890 FTEs.

As reviewed in Section 4.1.4, this is an extreme, worst case assessment that assumes that tourists currently entering via Watson Lake or other entry points that would be isolated without the Highway would not visit Yukon via another gateway/ means of entry. It is likely that a portion of visitors entering Yukon via Watson Lake, Beaver Creek or Little Gold would still enter Yukon and visit more accessible areas of the territory.

Figure 4-3 illustrates the GDP impact from tourism by industry and by expenditures.

[99] E.g., Watson Lake, Beaver Creek, Destruction Bay, Burwash Landing.
[100] Further detail regarding use of the input-output model is provided in Appendix D. Destination British Columbia, a BC Crown Corporation, used an input-output tool to estimate economic impact from tourism including 2013 CCAA Women's Soccer National Championship: Economic Impact Assessment and Economic Significant of Mountain Biking in Rossland and Golden. Source: BC Stats. n.d. BC Input-Output Model Report: Mountain Biking in Rossland and Golden. Retrieved from: http://www.destinationbc.ca/getattachment/Research/Research-by-Activity/Land-based/RosslandGoldenMntBike_EI_FINAL.pdf.aspx; and BC Stats. n.d. 2013 Canadian Collegiate Athletic Association Women's Soccer National Championship Surrey, BC Economic Impact Assessment. Retrieved from: http://www.destinationbc.ca/getattachment/Research/Research-by-Activity/Land-based/2013-CCAA-Women-s-Soccer-National-Championship-EIA-Study.pdf.aspx.
[101] The estimate is based on 2014 visitor numbers, as well as input output model based on 2010 Statistics Canada multipliers [combined direct, indirect and induced impact].The calculations are based on summary level.

Figure 4-3: Total Estimated GDP Impact from Tourism without the Alaska Highway



The following are considered key markets for northern B.C. tourism[102]:

- B.C. residents (69% of visitation and 55% of total tourist spending);
- Alberta residents (13% of visitation and 20% of total tourist spending); and
- Alaska residents (2% of visitation and 1% of spending).

Given current market share for this segment of the highway is dominated by B.C. and Alberta visitors, loss of the Alaska Highway north of Fort Nelson may not have a material impact on tourism in this region (outside of specific impacts on communities that would be isolated without the Alaska Highway). While the tourist experience of driving down the Alaska Highway corridor would be lost, other similar experiences likely exist in northern B.C. for the affected tourists. However, it is possible that some of the tourist traffic currently on the Alaska Highway would be diverted to Yukon, Alaska or other areas outside of this part of northern B.C.

Available information indicates that in 2003 (between May and September), 139,700 vehicles travelled north of Fort Nelson on the B.C. portion of the Alaska Highway. Non-commercial vehicles accounted for 86% of total traffic on average (120,600 non-commercial vehicles). The total number of travellers was estimated at 320,400. It was noted that 8% of the traffic counted originated from Yukon; 10% originated from Alberta; 22% originated from B.C.; and 17% originated from Alaska.[103]

Looking at interior Alaska, and based on review of existing information to date, only a small volume of the total visitor traffic to/from Alaska is via the Alaska Highway (with cruise ship passengers accounting for

[102] Source: Destination British Columbia. Northern British Columbia Regional Tourism Profile January 2015. Retrieved from: http://www.destinationbc.ca/getattachment/Research/Research-by-Region/Northern-BC/RegionalProfiles_Northern-BC_2014.pdf.aspx [accessed January 5, 2016].

[103] Source: Tourism British Columbia. 2005. Northern Rockies – Alaska Highway Visitor Research Project January, 2005. Retrieved from: http://www.destinationbc.ca/getattachment/Research/Research-by-Region/Northern-BC/Final_Report_for_the_Northern_Rockies_-_Alaska_Highway_Visitor_Research_Project-sflb.pdf.aspx [accessed on January 5, 2016].

50% of the annual visitor volume and flights accounting for 46% of the total annual visitor volume). Consequently, it is expected that the presence or absence of the Alaska Highway (or the alternative without the Project) would have a minimal impact overall on the tourism industry in Alaska.[104] Similar to the situation in southeastern Yukon, it is expected that communities in areas of Alaska that would be isolated without the Highway (such as Tok, Alaska) would experience specific adverse effects due to loss of highway through traffic.

4.2.5 Security and Emergency Response

The connection through southeastern Yukon provides a direct, over land connection between Yukon and the rest of Canada, and between Alaska and the rest of mainland U.S. Absent this route into Canada via the Alaska Highway, Yukon would effectively be isolated and dependent on air access or transportation linkage through the US port of Skagway, and Alaska would be totally reliant on marine and air access.

4.2.6 Communities

Absent the Alaska Highway, communities in southeastern Yukon, in western Yukon between Haines Junction and the Alaska Interior, and between Fort Nelson and Whitehorse that developed along or primarily as a result of the Alaska Highway would either not exist or be isolated and materially reduced in size/ economic activity. Excluding Watson Lake in southeastern Yukon and communities in western Yukon (Beaver Creek, Burwash Landing, Destruction Bay), these communities include: Toad River, BC; Muncho Lake, BC; Coal River, BC; Fireside, BC; Contact Creek, BC; Swift River, YK; Teslin, YK and Tok, Alaska. A summary of the types of services available at each of these communities that would be impacted without the Alaska Highway is provided in Appendix E.

Overall, the types of social and economic impacts that communities isolated without the Alaska Highway would face can be understood by reviewing the types of challenges currently faced by the community of Old Crow, Yukon's only isolated community:

- Isolated communities experience higher costs for delivery of goods and services delivered via air or winter road, which is reflected in the costs for goods and services available to community members, including heating fuel, building materials, food and government support services.[105] While Air North delivers most community supplies to Old Crow, Hercules aircraft are also chartered to deliver larger bulk materials and equipment that cannot be delivered via winter roads or smaller Air North aircraft. The typical charter rate for a Hercules aircraft was approximately $40,000

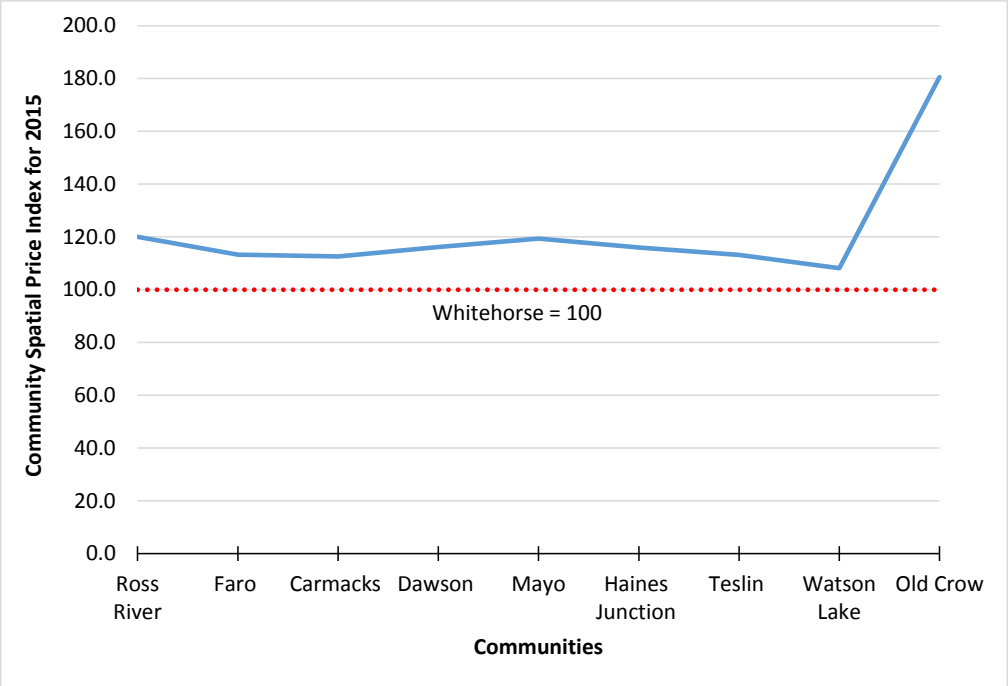
[104] Source: State of Alaska. Economic Impact of Alaska's Visitor Industry, 2013-14 Update February 2015. Retrieved from: http://www.akrdc.org/assets/docs/vis%20industry%20impacts%202013_14%203_24.pdf [accessed February 12, 2016].

[105] This notes that in the past a winter road has been constructed connecting Old Crow to Eagle Plans on the Dempster Highway. However, due to the high cost of the road, it has only been built under special circumstances. Permanent roads are considered prohibitively expensive. An ice road open for only a few weeks can cost more than $1 million to build and maintain. With climate change ice road options may no longer be feasible for the community within the next 25 years. Source: 2009.The Vuntut Gwitchin Integrated Community Sustainability Plan, page 6. Retrieved from: http://www.vgfn.ca/pdf/vgfn%20icspg.pdf [accessed February 12, 2016].

($2007) per flight. Costs for an ice road may also range between $750,000 and $1.2 million ($2008) depending on the length of the season and operation and the weather conditions.[106]

- Isolated communities also have a higher cost of living due to the higher costs for the delivery of basic necessities via air or winter road. For example, Old Crow's remote location and reliance on air resupply means the cost of living, and imported food in particular, is 70-100% higher than Whitehorse.[107] Community Price Index information for available Yukon communities provided in Appendix E indicates that most food and other items are materially higher in cost in Old Crow compared to Whitehorse and other Yukon communities such as Watson Lake. The material difference for Old Crow, compared to other communities is illustrated in Figure 4-4 below.

Figure 4-4: Community Spatial Price Index for April 2015[108]



- Isolated communities may also experience significant health issues as higher costs for basic necessities, such as food, may result in community members making poor nutritional choices.[109]

- Isolated communities also face considerable coordination and logistical planning challenges to undertake community construction and infrastructure projects as use of winter roads and Hercules aircraft requires careful planning to make most effective use of available transportation and to

[106] Source: Vuntut Gwitchin First Nation. 2009. Vuntut Gwitchin Integrated Community Sustainability Plan, page 13-14. Retrieved from: www.vgfn.ca/pdf/vgfn%20icspg.pdf [accessed February 12, 2016].
[107] Source: Yukon Community Profiles. 2014. Old Crow: Cost of Living. Retrieved from: http://www.yukoncommunities.yk.ca/old-crow/cost-of-living [accessed February 12, 2016].
[108] Source: Government of Yukon Socio-Economic Web Portal. n.d. Community Spatial Price Index. Retrieved from: http://www.sewp.gov.yk.ca/subject [accessed on January 5, 2016].
[109] The Plan notes that Hyperlipidemia (elevated fat in the blood stream) was noted as the largest health problem identified by the community nurse. Source: Vuntut Gwitchin First Nation. 2009. Vuntut Gwitchin Integrated Community Sustainability Plan, page 17. Retrieved from: www.vgfn.ca/pdf/vgfn%20icspg.pdf [accessed February 12, 2016].

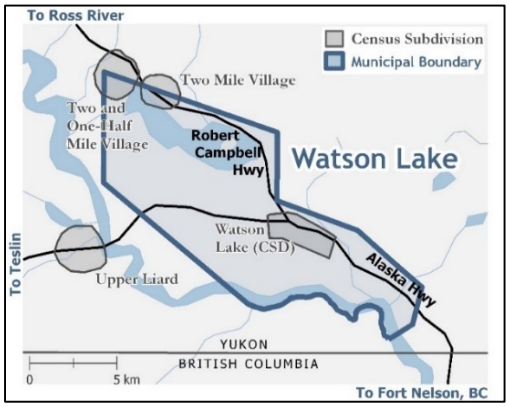
minimize costs. For Old Crow, community planning, major projects and infrastructure investments must be coordinated to align with winter road availability (which is typically on a three-year cycle), and to minimize costs and make most effective use of available transportation.[110] The impacts of climate change make it more difficult to predict winter weather and raise concerns regarding the future feasibility of winter road access to isolated communities.[111]

- Due to isolation and smaller population, economic opportunities for isolated communities are more limited. Old Crow has faced higher unemployment rates and lower participation rates compared to Yukon averages,[112] and the First Nation and Yukon government provide the main source of employment in the community.

- Smaller size and isolation also impact infrastructure development and service delivery for isolated communities. For Old Crow service delivery and costs are shared between the First Nation and Yukon government. Further detail regarding the services provided is included in Appendix E.

Isolated Communities in Southeastern Yukon (Watson Lake and surrounding communities)

Watson Lake is located at the junction of the Alaska Highway, the Robert Campbell Highway extending into the central Yukon and the Northwest Territories, and the Stewart-Cassiar Highway extending from central British Columbia to Yukon. Given its history and status as the only inland gateway connecting southern Canada and the Lower 48 States to Yukon and the Alaska interior it has become a critical transportation hub in southeastern Yukon.



Source: http://www.sewp.gov.yk.ca/region?regionId=YK.WLR

The community lies within the traditional territory of the Liard First Nation,[113] part of the Kaska Tribal Council, and includes the Town of Watson Lake, as well as adjoining settlements of the Liard First Nation, including Upper Liard. The Liard band office is located in Watson Lake and serves seven reserves, including Upper Liard, Lower Post, Two-and-a-Half Mile, and Watson Lake. The 2011 National Household Survey indicates that at the time of the survey approximately 40% of the population in Watson Lake was Aboriginal, and 88% of the population of Upper Liard was Aboriginal.[114]

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[110] The Plan notes that if an ice road is planned on a three year cycle than this cycle is used for planning capital projects logistics. Source: Vuntut Gwitchin First Nation. 2009. Vuntut Gwitchin Integrated Community Sustainability Plan, page 13. Retrieved from: www.vgfn.ca/pdf/vgfn%20icspg.pdf [accessed February 12, 2016].

[111] The Plan notes that winter roads may not be possible for Old Crow within the next few decades. Source: Vuntut Gwitchin First Nation. 2009. Vuntut Gwitchin Integrated Community Sustainability Plan, page 13-14. Retrieved from: www.vgfn.ca/pdf/vgfn%20icspg.pdf [accessed February 12, 2016].

[112] Source: Vuntut Gwitchin First Nation. 2009. Vuntut Gwitchin Integrated Community Sustainability Plan, page 4. Retrieved from: www.vgfn.ca/pdf/vgfn%20icspg.pdf [accessed February 12, 2016].

[113] Liard First Nation is one of three Yukon-based First Nations that do not have land claim agreements. Source: Yukon Community Profiles. 2014. Watson Lake: First Nations. Retrieved from: http://www.yukoncommunities.yk.ca/watson-lake/watson-lake-first-nations [accessed February 12, 2016].

[114] See Appendix E, Section 3.2.1. About 94% of the Watson Lake population with Aboriginal identity were First Nations and about 6% were Metis.

Absent the Alaska Highway, Watson Lake would no longer be a major gateway to the Yukon and there would be no inland connection between the Yukon/Alaska Interior and southern Canada. Accordingly, Watson Lake would no longer serve as a key transportation and service hub in this region, or as a distribution centre for mining, tourism, outfitting, trapping, and logging activities in southern Yukon, northern British Columbia and portions of the Northwest Territories.

The existing diverse business community based on mining, tourism and transportation services would be lost, and with a smaller and isolated population development of viable business opportunities in the community would be more difficult and more constrained in size and scope. Overall, the potential impacts on Watson Lake business development and employment can be understood by comparing the current number of Watson Lake businesses (and business-related employment) with the level of businesses (and business-related employment) in Old Crow in 2013: Watson Lake had 101 reported businesses with 322 reported workers; and in the same year Old Crow had 8 reported businesses and 16 reported workers.

Without the Highway, local and regional residents would be expected to experience the following types of impacts:

- **With a smaller population Watson Lake would likely no longer be incorporated as a municipality:**[115] As an unincorporated community, Watson Lake would not have authority to develop or pass by-laws or to collect municipal taxes or issue building permits, and business or other municipal licences.[116]

- **Loss of employment and business opportunities related to current exploration and mining development within the region:** Absent the Alaska Highway, it is expected that there would be no road infrastructure developed in southeastern Yukon, including the Nahanni Range Road extending to the Cantung Mine and the Robert Campbell Highway extending northwest towards Ross River. Absent this developed road infrastructure, mineral exploration and mine development activities in eastern Yukon would be significantly impacted and there would be little related economic activities for communities such as Watson Lake.[117] Local businesses that would potentially be impacted (or lost) with reduced mining and other resource use activities would include three building supplies stores, 17 construction (or related) companies, two electricians, and 4 welding and welding supply shops.

[115] The Integrated Community Sustainability Plan: Unincorporated Yukon (2011) notes that unemployment rates tend to be higher in unincorporated communities with lower levels of income, and some unincorporated communities in Yukon have unemployment rates over double the Yukon average. Median incomes follow a corresponding pattern; that is, significantly lower in most parts of unincorporated Yukon, but somewhat higher in most rural residential areas close to Whitehorse. Source: Government of Yukon. 2011. Integrated Community Sustainability Plan: Unincorporated Yukon, page 13. Retrieved from: http://www.infrastructure.gov.yk.ca/pdf/unincorporated_yukon_ICSP_January_26_2011(1).pdf [accessed February 12, 2016].

[116] The communities of Carcross, Ibex Valley, Marsh Lake, Mount Lorne, and Tagish have the only form of local governance in unincorporated Yukon by way of Local Advisory Councils (LACs). LACs do not have taxing, spending or bylaw-making authority, and work in a strictly advisory capacity to the Minister of Community Services, with support from departmental staff. Source: Government of Yukon. 2011. Integrated Community Sustainability Plan: Unincorporated Yukon. Retrieved from: http://www.infrastructure.gov.yk.ca/pdf/unincorporated_yukon_ICSP_January_26_2011(1).pdf [accessed February 12, 2016].

[117] Watson Lake has recently provided services for a significant mining presence in the area including two operating hard rock mines (Wolverine and Cantung). The world's largest lead-zinc deposit is under development (Selwyn mine), and many mining exploration companies are active in the area. Source: Yukon Community Profiles. 2014. Watson Lake: Economic Activity. Retrieved from: http://www.yukoncommunities.yk.ca/watson-lake/watson-lake-economic-activity [accessed February 12, 2016].

- **Loss of business and employment activities related to tourist and other through traffic along the Alaska Highway:** Absent the Highway and related road linkages, there would be no through traffic between northeastern BC and western Yukon/ Alaska and related businesses/ services that have developed along the Highway to service this traffic would be lost.

  The following businesses that currently service highway travel would be lost or significantly adversely impacted: two bed and breakfasts and six hotels and motels; two RV parks; and six gas, towing or vehicle repair shops. Other impacted businesses would include four grocery or convenience stores (not including the petro Canada station), and four restaurants.

  A number of attractions that have developed in Watson Lake would also not likely exist without the Alaska Highway including the following: Watson Lake Signpost Forest[118], Northern Lights Space and Science Centre and Heritage House Wildlife and Historic Museum.

- **Loss of access to other communities in northeastern BC and southeastern Yukon:** Road access/ bus service would not be available and transport between communities in southern Yukon and northeastern BC would be more difficult[119]. Transport to larger centres such as Whitehorse would need to be undertaken by aircraft and would be less convenient for community members.[120]

- **Constrained access to services and loss of services due to materially smaller population and isolation from other communities:** Without the Alaska Highway, and with a materially smaller population and isolated community, services for Watson Lake and surrounding communities would be significantly constrained and would likely approximate services currently provided in other communities such as Burwash Landing, Destruction Bay and Beaver Creek. The reduction in services and amenities without the Highway would impact both Watson Lake and surrounding communities in southern Yukon and northern BC. The following are specifically noted:

  - Certain community services would be provided by the Yukonl government (as well as by the local First Nation) and not by the municipal government[121]. This would include services such as water delivery and sewage.

  - Primary school facilities would likely be available (kindergarten to grade 9), with secondary school students attending high school in Whitehorse. There would likely be a teacher/ principal with an education assistant.[122]

[118] This attraction directly relates to highway construction and would not existing without the Alaska Highway.
[119] The town currently has scheduled bus service that links the community to Whitehorse as well as other communities in Yukon and southern BC.
[120] The town is currently served by the Watson Lake Airport which in the past had service from national and regional airlines, but currently has more limited operations (corporate and charter services). The runway is capable of supporting a 737 aircraft. The airport building is recognized by the historic Sites and Monuments Board of Canada. A float plane base is also located at the north end of Watson Lake near the airport.
[121] Typically, the delivery of basic community services is a shared responsibility between the local self-governing First Nation and Government of Yukon for communities that have a mixed First Nation and non-First Nation population and a more equal distribution of First Nation settlement and Crown lands. Given the population distribution in Watson Lake is predominantly First Nation this would likely be the case for any unincorporated community in a without the Highway scenario.
[122] This is in contrast to the current separate elementary school and high school facilities which offer grades kindergarten to seven and grades eight to twelve, and employ multiple staff, remedial tutors, multiple education assistants, aboriginal language teacher and administrative support staff.

- Emergency services would be much more modest than currently available. Any RCMP detachment available to service Watson Lake and surrounding communities would be significantly smaller.[123] Similarly, medical facilities, if any, would consist at most of a health facility with a nurse practitioner, volunteer ambulance and medevac services.[124] It is expected that there would still be volunteer firefighters and ambulance attendants. Residents would need to fly to Whitehorse or other larger centres for dental, optometry and other similar services. Social services currently offered in Watson Lake, including two full time social workers, a probation officer and a full time resident counsellor from Yukon Family Services and a shelter for women and children would likely not be available within the community.

- The following community service groups currently active in Watson Lake would likely not be operating, or would have constrained operations: Watson Lake Chamber of Commerce, Watson Lake Seniors Club, Ski Club, Community Club, South East Yukon Proper Land Use Society, Search and Rescue Services and Cadets.

- The following recreational infrastructure would not likely be available, or would be significantly limited: golf course, nature trails, alpine ski hill, Nordic ski trails, water slide, community playgrounds, recreation centre (community hall, squash course, fitness room, youth centre, bowling alley, hockey arena, curling club and banquet facilities). However, opportunities for outdoor recreation, including camping, hiking, fishing, hunting, boating and snowmobiling would continue to exist.

- **Increased costs for delivery of goods and services to Watson Lake and nearby communities:** Absent the highway there would be no road connections into the adjacent areas of BC and no road connections between this region and Whitehorse,[125] making travel for local residents and delivery of services to the area more difficult and potentially more costly.[126] It would be expected that absent the Alaska Highway, with increased costs for delivery of goods and services to the community via air or winter road, that costs would be higher. As summarized in Figure 4-4 above, Watson Lake would shift from having the lowest costs of living (outside of Whitehorse) to having one of the highest costs of living in Yukon (outside of Old Crow).

- **Loss of access to/from other communities, including Whitehorse and communities in northern BC:** Due to its size and location a number of local businesses and major national and international company branches in Watson Lake provide access to thousands of products and

[123] The current facility includes one sergeant, one corporal and seven constables, a significantly smaller community such as Beaver Creek is staffed by three officers and Destruction Bay and Burwash Landing do not have a local detachment and are serviced out of Haines Junction).
[124] Existing medial services in Watson Lake are far more extensive with a 12 bed hospital staffed with three full time physicians and a pharmacy, 24 hour emergency treatment, short term admissions a full time Nurse in Charge and a number of general duty nurses and a homecare nurse. Other public health services run out of the hospital include two full time nurses that provide service to Watson Lake, Upper Liard and Lower Post and a registered message therapist, and optometry services provided regularly from Whitehorse and dental services provided by a visiting dentist from Whitehorse.
[125] Existing bus service via Greyhound Canada and/or Watson Lake Bus lines would not exist reducing accessibility for local residents.
[126] The Vuntut Gwitchin Integrated Community Sustainability Plan 13 notes that there are only 12 private vehicles in Old Crow due to the difficulty of getting vehicles into the community. The primary modes of transportation are ATV, snow mobile, as well as cycling and walking. Source: Vuntut Gwitchin First Nation. 2009. Vuntut Gwitchin Integrated Community Sustainability Plan, page 13. Retrieved from: www.vgfn.ca/pdf/vgfn%20icspg.pdf [accessed February 12, 2016].

services to companies, governments, and individuals operating in Eastern Yukon and northern British Columbia.[127] Absent the Alaska Highway this level of service would not exist in Watson Lake and would not be available to these other communities, reducing the business opportunities for local Watson Lake residents as well as opportunities for greater delivery of service to outlying areas.

The Kaska Dena Council First Nations in this area would be impacted today by the loss of the Alaska Highway in the area and the resulting loss of resource development opportunities, services and access to lower cost goods and services supplied today by road access that would not exist without the Alaska Highway.

Western Yukon Isolated Communities: Burwash Landing, Destruction Bay and Beaver Creek

Three communities in western Yukon would be materially impacted if there was no Alaska Highway development: Burwash Landing, Destruction Bay and Beaver Creek. Each of these communities exists today primarily due to the highway, serving either government services functions or seasonal tourism/ traffic flows along the highway.

Source: http://www.sewp.gov.yk.ca/region?regionId=YK.AKHWYN

These are each very small (population of less than 150), unincorporated communities with services provided by the Yukon government or jointly provided by the Yukon government and local First Nation in the case of Burwash Landing (Kluane First Nation) and Beaver Creek (White River First Nation).[128] In each case the services and amenities available in the community reflect the small size of the community and in many cases are shared between communities (or available from other communities such as Haines Junction or Whitehorse).

Burwash Landing is located within the traditional territory of the Southern Tutchone, and the community is the administrative centre for the Kluane First Nation which is also the principal employer in the community.[129] Beaver Creek is home to the White River First Nation whose traditional territory overlaps with the Kluane First Nation.[130] The following are specifically noted regarding impacts of the Alaska Highway on these communities:

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[127] Source: Yukon Community Profiles. 2014. Watson Lake: Employment Services. Retrieved from: http://www.yukoncommunities.yk.ca/watson-lake/watson-lake-community-government-services/watson-lake-employment-services [accessed February 12, 2016].

[128] Following construction of the Highway, Burwash Landing became the administrative centre for the Kluane First Nation, and Beaver Creek became the administrative centre for White River First Nation. These First Nations provide housing and municipal services for members including water, sewer, local road maintenance and community recreation.

[129] As illustrated in Appendix E, Table E-4, in October 2015, Kluane First Nation reported a total registered population of 175, of which most either lived off reserve (54.3%) or on Crown land (42.9%). Source: Yukon Community Profiles. 2014. Burwash Landing: First Nations. Retrieved from: http://www.yukoncommunities.yk.ca/burwash-landing/first-nations [accessed November 24, 2014].

[130] As illustrated in Appendix E, Table E-4, in October 2015, White River First Nation reported a total registered population of 153, of which nearly 70% resided off reserve.

- **Without the Alaska Highway Burwash Landing would likely be the only community to exist northwest of Haines Junction:** Destruction Bay and Beaver Creek are primarily government services communities that owe their existence to the Alaska Highway and would not likely exist without the Highway. Destruction Bay was established as a centre for construction and maintenance on the Alaska Highway, and this remains its primary role and function today, while Beaver Creek was founded in 1955, primarily as a service community for the highway and currently serves as a port of entry to Canada from Alaska. In contrast, Burwash Landing predates the construction of the Highway, serving first as a First Nation traditional summer camp location and then location of a trading post in the early 1900s. While the settlement was relatively isolated prior to the construction of the Alaska Highway, Highway construction led more families to move to Burwash Landing from surrounding areas. It is expected that, without the Highway, Burwash Landing would be even smaller in size as fewer people would be drawn to the community and more people in the region would be drawn towards connected communities such as Haines Junction or Whitehorse.

- **Burwash Landing would remain an unincorporated community with services provided by either the territorial government or combination of territorial and First Nations governments:** Burwash Landing, Destruction Bay and Beaver Creek are all very small, unincorporated communities with services provided by the territorial government. In the case of Burwash Landing and Beaver Creek services are also provided to First Nations members in each community by the Kluane First Nation (Burwash Landing) and White River First Nation (Beaver Creek).[131] Services and amenities available in each of these communities today already reflect the small size of the community and in many cases are shared between communities, or residents must travel to larger centres such as Haines Junction or Whitehorse.

    - Without the Alaska Highway, school and medical services in Destruction Bay that are shared with Burwash Landing would be located in Burwash Landing. This would include the primary school[132] and the nursing facility.[133] Students would continue to attend high school in Haines Junction (if such facilities continued to be available there) or Whitehorse. School and medical services provided in Beaver Creek would no longer be required.[134]

    - RCMP services are provided to both Destruction Bay and Burwash Landing from the detachment at Haines Junction and it is expected that Burwash Landing would continue to be serviced from Haines Junction. Emergency medevac service would be available as well as volunteer fire fighter service and volunteer ambulance services. The RCMP detachment in Beaver Creek would no longer be required.[135]

[131] See Appendix E, Section 3.2.3.
[132] The Kluane Lake School in Destruction Bay provides kindergarten to grade eight to both Burwash Landing and Destruction Bay with school bus service between the two communities.
[133] A nursing facility in Destruction Bay is staffed by one nurse is available to service both Destruction bay and Burwash Landing, with 24 hour ambulance service is available.
[134] Beaver Creek has its own school that offers kindergarten to Grade 9; it is a two classroom, multi-grade school with one teacher/principal a native language instructor and educational assistant. The Beaver Creek Health Facility provides a nurse practitioner on call 24 hours.
[135] Beaver Creek has its own RCMP detachment staffed by three officers.

  - The extent to which other services and amenities are available in Burwash Landing is not certain.[136] It is noted that there is not currently a local food store in Burwash Landing or Destruction Bay and community members currently either order goods and materials by phone/ internet or purchase basic supplies in bulk at other communities such as Whitehorse or Tok, Alaska.[137] Many community members in Burwash Landing and Beaver Creek also secure a significant portion of their food supply from hunting, fishing and trapping. Without the Alaska Highway, community members would not be able to drive to other communities to purchase goods in bulk and would need to rely on delivery of goods via Air North. The convenience of driving to other nearby communities to access goods and services would be lost.

- **Without the Alaska Highway there would be fewer employment and business opportunities available in the vicinity of Burwash Landing**: Currently, the Kluane First Nation is the principal employer in Burwash Landing. However, private sector employment in the construction, mining, tourism and the service industry is available, and proximity to Kluane National Park has provided some increased through traffic and potential for tourism development in the region. Absent the Alaska Highway there would be no through traffic and limited ability for visitors to the Kluane National Park to access the community. The businesses and/or services that have developed in the Burwash Landing area to service tourism or highway traffic would be significantly reduced or would not exist (including services currently provided in Destruction Bay).[138]

Without the Alaska Highway, Burwash Landing would like remain the administrative centre for the Kluane First Nation, and the First Nation would remain the principal employer in the community. As Beaver Creek would not exist without the Highway, it would no longer serve as an administrative centre for the White River First Nation. Given the White River First Nation have traditional territory in this area, and would have strong ties to the land, it is expected that they would either have their own settlement within their traditional territory or would locate their administrative centre in or near Burwash Landing. The Kluane First Nation and White River First Nation would each be adversely impacted today by loss of economic development opportunities related to Highway access and Highway through traffic, as well as higher costs for delivery of goods and services to the area absent the Highway.

Other Communities that would be impacted in a Without the Highway scenario:

In addition to the communities in southeast and western Yukon, the following other communities would be impacted in a "Without the Highway" scenario:

- **Communities between Fort Nelson and Whitehorse** that developed along the Alaska Highway, with businesses that service tourists/ travellers, would no longer exist or be materially reduced in activity. Excluding Watson Lake, these communities include: Toad River, BC; Muncho Lake, BC; Coal River, BC; Fireside, BC; Contact Creek, BC; Swift River, YK; and Teslin, YK.

[136] The types of services and amenities currently available to these communities include: a library (including free public internet and computer access), a bank (open two days a week), restaurant, hotel, post office, recreational centre and community hall.
[137] Residents travel to a larger community and continue to purchase in bulk and order materials and goods by phone or on line.
[138] An RV Park and motel in Destruction Bay offer a range of services including hotel accommodations, RV parking, a restaurant, laundromat, general store and a service station.

- **Isolated Communities in Alaska** – Tok, Alaska was one of the communities that was created to support construction of the Highway, which would not have existed absent the Alaska Highway. It is assumed that without the Alaska Highway the Alaska Marine Highway, which exists today, would have been the only connection between Southeast Alaska and Interior Alaska. It is also noted that highway access from Fairbanks to Delta Junction was developed prior to the Alaska Highway development.

- **Northeastern BC –** There is a strong basis for assuming that without the pre-existing Alaska Highway, the Cassiar mine would not have been feasible in the 1950's and there would not be highway connection of the Cassiar area to Yukon or to other BC regions.

4.3 SUMMARY CONCLUSIONS

The economic profile of the Alaska Highway today may be summarized and understood by considering two fundamentally different impact areas:

1. **Regions and communities in Yukon and the Alaska Interior that are dominated by the Inside Passage connection via Skagway** – The effects of the Alaska Highway on Inside Passage connected areas in western and central Yukon are limited due to the considerable impact that the existing Inside Passage corridor has (and would continue to have) on the development of these areas absent the Alaska Highway[139]. The existing connection between Whitehorse and Skagway via Inside Passage and assumed related development of highway access from Whitehorse to Dawson City, Keno and Faro supports development of much of the infrastructure that provided a foundation for social and economic development of the territory.

   Loss of the Alaska Highway would not generally restrict to/from western and central Yukon the inbound/ outbound supply of products or resources, community resupply and development freight as well as outbound ore product shipments from Yukon. However, loss of road connections to British Columbia (and, to a much lesser extent, the Alaska Interior) would impact Yukon Public and Private businesses as there would effectively be only one major transportation gateway into Yukon with no possibility of truck transportation from southern Canada and the Lower 48 States. This would potentially impact how Yukon businesses are able to operate (with reduced speed and flexibility of delivery through marine ports versus the Alaska Highway), and would also expose Yukon businesses to a potential monopoly environment due to the lack of options to the Inside Passage gateway to Yukon.

2. **Regions and communities in Yukon, Alaska and northeastern BC that would be effectively isolated or would not exist absent the development of the Alaska Highway[140]** – The Alaska Highway had an important role in connecting communities in northeastern BC and eastern Yukon to Whitehorse/ Alaska, and without the Highway communities in these areas would be isolated (or would no longer exist), and resources in these areas would

[139] In a similar vein, Alaska Highway impacts on areas of the Alaska Interior connected to the Gulf of Alaska by road or by rail would be limited.

[140] This includes areas north of Fort Nelson, B.C., and southeastern Yukon where development of infrastructure and communities has been driven by and dependent on the construction of the Alaska Highway, as well as communities along the Alaska Highway northwest of Haines Junction (up to, and including, Tok, Alaska).

remain undeveloped due to lack of developed infrastructure available to support exploration and development activities. Without the Highway, two mines operating in the region in 2014 (Wolverine and Cantung) would not have existed.

5.0 FUTURE SCENARIOS & CHANGES TO BASELINE ECONOMIC PROFILE

The future scenarios assessment of the Alaska Highway focuses on potential changes within Yukon by 2025 that may affect the impacts of the Alaska Highway on economic and social valued components. This focus is to highlight where there may be material changes by 2025 from the Baseline Economic Profile of the Project's current impacts as provided in Section 4.

5.1 APPROACH TO FUTURE SCENARIOS ASSESSMENT

The future scenarios impact assessment for the Alaska Highway focuses on changes in freight and light traffic movements into and out of Yukon resulting from changes in population and/or development of resource projects (new mines or oil and gas developments). Potential changes in spending on the Alaska Highway and other routes connecting to the Highway are also considered. The methods for determining changes in forecast freight and light traffic movements as well as highway maintenance and capital costs for the future scenarios assessment are reviewed in detail in Section 2 of Appendix F.

The future scenarios assessment assumes that material changes by 2025 from the Baseline Economic Profile of the Project's current impacts will be primarily limited to changes related to major resource development activities in Yukon or adjacent NWT areas. Available projections for Yukon population trends absent major new resource development are noted - but such population trends do not result in material changes by 2025 in the Highway's economic profile.

Future resource development timing in Yukon and adjacent areas in NWT that may interact with the Highway by 2025 remain very uncertain. Given the uncertainty regarding the timing and sequence of future resource development projects, the future scenarios assessment of Highway impacts considers the following range of potential low, medium and high mine developments that could potentially occur in the medium-term, i.e., by 2025, for the two Yukon regions identified in the Baseline Economic Profile.[141]

- **Inside Passage Connected Areas ("Western Region"):**
    - Low (Eagle Gold mine).
    - Medium (add Casino mine).
    - High (add Wellgreen, Kaminak and Carmacks Copper mines).
- **Regions Dependent on Alaska Highway for Development ("Eastern Region"):**
    - Low (no mine activity).
    - Medium (add Selwyn mine).

[141] A more detailed summary of each mine development is provided in Appendix F, as well as the basis for not including any specific potential oil and gas developments in these future medium-term scenarios. In summary, these mine developments were selected for inclusion in this assessment based on information available at this time on potential probable producing mines with mineable, proven reserves and an experienced mining company that has a potentially financeable project which has entered, or is expected in the near future to enter, licencing and regulatory review processes.

- High (add Mactung and Kudz Ze Kayah mines).

Consequent changes to population trends for Yukon that would result from such mine developments are also uncertain.[142] Given this uncertainty, this assessment does not attempt to quantify the potential impacts of specific major new resource project developments on population and community development trends.

The Baseline Economic Profile indicates minimal economic impact from the Highway today related to current "through traffic" (i.e., traffic moving through Yukon between northern B.C. and interior Alaska or northwestern NWT), or related to the Highway's current traffic moving through northern B.C. and/or interior Alaska. There is no apparent basis to anticipate changes to these assessments under potential future scenarios for 2025, beyond direct impacts on potential liquefied natural gas (LNG) production at Fort Nelson (to supply Yukon and NWT resource projects) and on the Cassiar-Stewart highway and the port of Stewart due to added resource export shipments from new mines in eastern Yukon and adjacent NWT areas. Accordingly, no future scenarios are specifically considered for these traffic movements.

Based on the above assumptions, the future scenarios assessment proceeds as follows:

- **Future scenario changes in Yukon non-resource traffic**: These changes, which are relatively minor by 2025 compared with the current baseline, are summarized on an overall Yukon basis for each of the following:
  - Community Supply Requirements (Community re-supply and bulk fuel);
  - Light Traffic; and
  - Tourist Volumes.
- **Future scenario changes in resource development requirements (freight and bulk fuel):** These changes, which are potentially very material by 2025, are reviewed separately for each of the two Yukon regions identified in the Baseline Economic Profile; and
- **Future scenario changes in Highway costs**: These changes by 2025 are summarized on an overall Yukon basis for each of the following:
  - Highway Maintenance Costs; and
  - Highway Capital Costs.

[142] Population and community development trends are assessed absent consideration of major new resource project developments as changes to population trends as a result of major new resource developments are uncertain (as to timing or sequence of developments and overall impacts on Yukon population trends. Review of the impact of Faro Mine in the 1980s and 1990s shows that closure of a large mine development may impact the overall Yukon population. The 2013 Yukon Economic Outlook also notes that following the final closure of the Faro mine in 1998, Yukon experienced six consecutive years of declining population which saw the population fall just below 30,000 in 2003. It is expected that such impacts on Yukon population growth trends would be more muted in future to the extent that major mine developments hire more fly-in/fly-out staff.

5.2 FUTURE SCENARIO CHANGES IN YUKON NON-RESOURCE TRAFFIC

5.2.1 Community Supply Requirements (Community Re-supply and Bulk Fuel)

Heavy traffic volume changes associated with community-oriented demand were forecast based on projected population changes over time. The base used for this forecast included (a) 2014 transportation demand for Yukon; and (b) Yukon population projections for 2011-2021 available from the Yukon Bureau of Statistics.[143]

Table 5-1 below summarizes population projections and growth rates based on Yukon Bureau of Statistics population projections from 2011-2021. At the overall Yukon population level, and for most communities, these population projections are assumed for all future scenarios with the Alaska Highway. For future scenarios without the Highway, communities that are assumed to be isolated (e.g., Watson Lake) or not to exist (e.g., Beaver Creek) without the Highway would have a much lower baseline population today and therefore a much lower population projection than shown in Table 5-1. However, the overall impact of such cases on Yukon's population projection with or without the Highway is assumed to be not significant.[144]

Table 5-1: Yukon Population Projection used for Future Scenarios[145]

Forecast Period	Total Yukon		Population Projection by Community							
			Whitehorse		Dawson		Watson Lake		All Other Communities	
	Population Projection	Growth over 2014	Population Projection	Growth over 2014	Population Projection	Growth over 2014	Population Projection	Growth over 2014	Population Projection	Growth over 2014
Projection for 2014	36,716		27,947		1,963		1,565		5,241	
Projection for 2020	39,671	8.05%	30,344	8.58%	2,111	7.54%	1,661	6.13%	5,555	5.99%
Projection for 2025	42,021	14.45%	32,276	15.49%	2,223	13.26%	1,732	10.68%	5,789	10.45%

Table 5-2 provides forecast volumes for heavy traffic associated with Yukon community re-supply and bulk fuel freight based on 2014 estimated demand and population growth projections provided in Table 5-1. It indicates that overall Yukon community supply demand is expected to increase by about 8% in 2020 (over 2014 demand) and then by a further 6% in 2025. However, the annual average increase over the period

[143] Statistics Canada also has a population projection for Yukon for the years 2013-2038, however it is based on seven scenarios ranging from -0.24% to 2.12%. Yukon Bureau of Statistics growth rates are within the range projected by Statistics Canada. The population projection from Yukon Bureau of Statistics is also within reasonable range compared to actuals to date. For example, January 2015 estimated actuals from Yukon Bureau of Statistics shows total Yukon population at 37,178 compared to projected 37,225 with only 0.1% difference. The 2011-2014 actuals are also within 1-2% difference from the projected population numbers. Source: Yukon Bureau of Statistics. 2011. Population Projections 2021. Retrieved from: http://www.eco.gov.yk.ca/stats/pdf/Projections2011.pdf [accessed September 18, 2015].

[144] Table 5-1 shows that population for Watson Lake is projected to increase by about 1% per year. However, without the Alaska Highway this community is assumed to be isolated with a much lower population in 2014. An isolated community's annual population growth could be very low, potentially similar to the isolated community of Old Crow [no increase in population in the last 10 years]. However, without the Alaska Highway people currently living in Watson Lake are in effect assumed in this analysis to be living in other accessible communities with no significant overall impact to the total Yukon population.

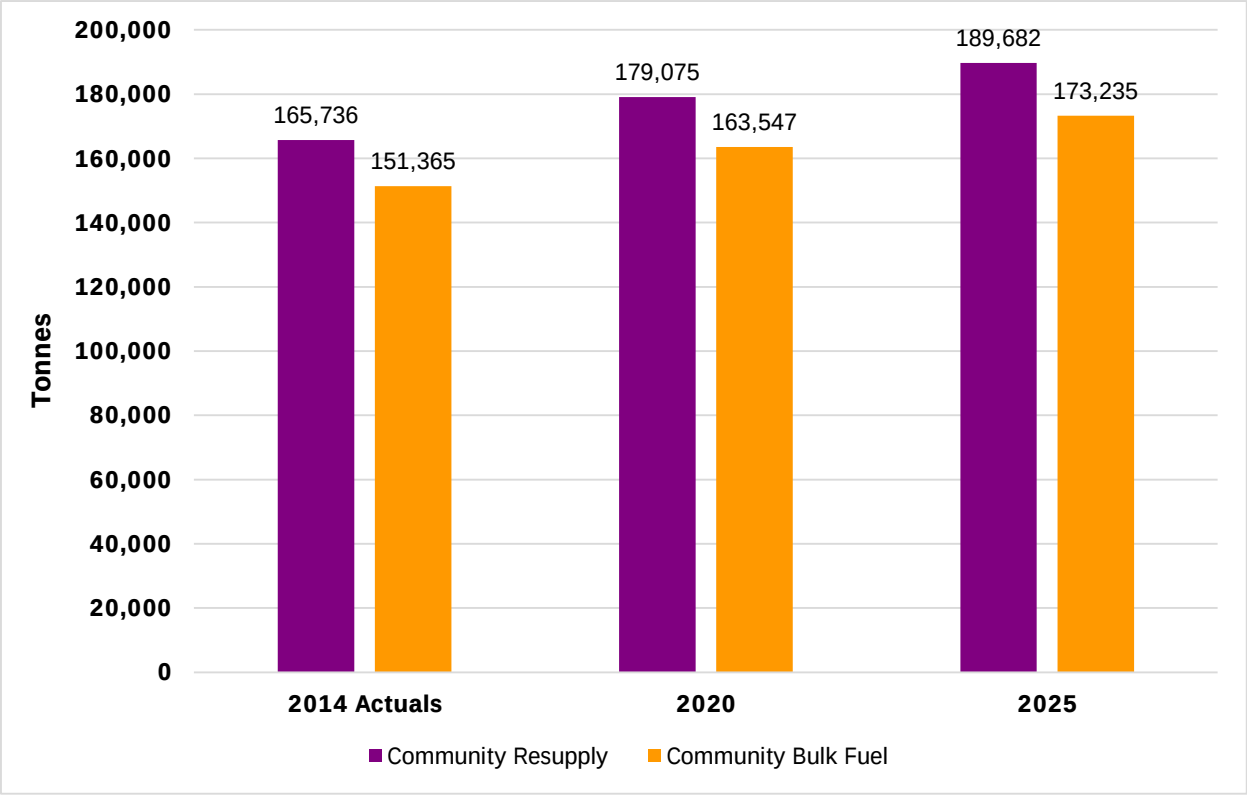
[145] The annual average population growth for the years 2022-2025 is assumed to be at the same level as for 2021. Source: Yukon Bureau of Statistics. 2011. Population Projections 2021. Retrieved from: http://www.eco.gov.yk.ca/stats/pdf/Projections2011.pdf [accessed on September 18, 2015].

from 2014 to 2025 is only 1.2% per year, and indicates minimal overall change from the Baseline Economic Profile today for community re-supply and bulk fuel traffic for Yukon Private/Public Business.

Table 5-2: Projection for Yukon Community Re-Supply & Bulk Fuel Heavy Traffic[146]

	2014 Actuals		2020		2025	
	Trucks	Tonnes	Trucks	Tonnes	Trucks	Tonnes
Inbound to Yukon for Yukon - Community re-supply						
Community Resupply	8,010	165,736	8,655	179,075	9,168	189,682
Community Bulk Fuel	3,679	151,365	3,976	163,547	4,211	173,235
Total Inbound to Yukon	**11,690**	**317,101**	**12,631**	**342,622**	**13,379**	**362,916**

Figure 5-1: Projection for Yukon Community Re-Supply & Bulk Fuel Heavy Traffic



[146] See Appendix A for 2014 commercial heavy traffic volumes.

5.2.2 Light Traffic

Light traffic includes traffic from Yukon residents/residents from local communities along the Alaska Highway, as well as tourist traffic, and excludes traffic flows related to community re-supply, bulk fuel and resource development.

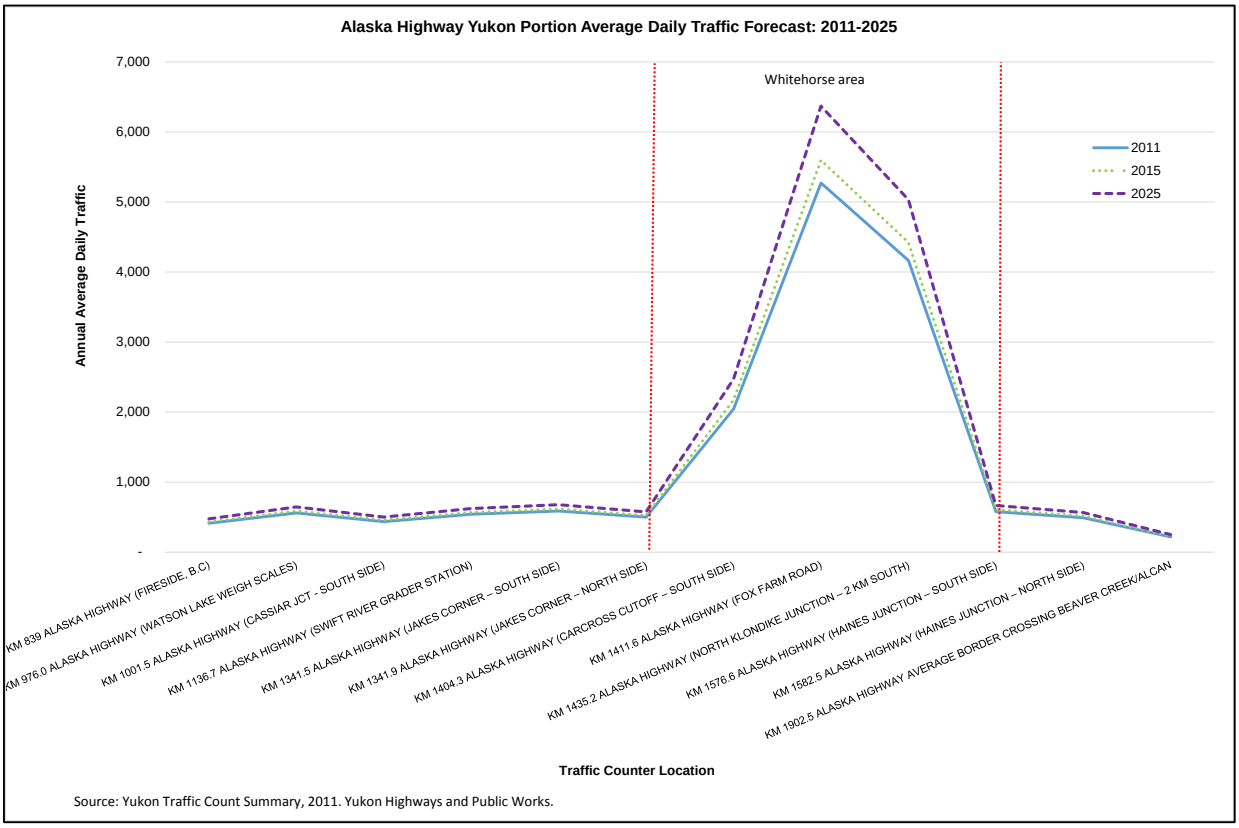
The Baseline Economic Profile analysis examines average daily traffic flow on the Yukon portion of the Alaska Highway based on traffic flow data for 2009-2011 that is assumed to include tourist as well as local resident traffic. Future light traffic flows are estimated to 2025 based on 2011 traffic counts and average annual population growth rates for Yukon based on the Yukon Bureau of Statistics projections outlined in Table 5-1.[147]

Figure 5-2 below provides a summary of 2011 Average Annual Daily Traffic (AADT) flows on the Alaska Highway commencing in British Columbia [Route 97 close to Dawson Creek] and terminating in Alaska [Delta Junction]. Forecast AADT flows are also shown for 2015 and 2025.[148]

For the Yukon portion of the Alaska Highway, 2011 data shows average daily traffic outside of the Whitehorse area ranging between about 400 and 600 vehicles, and increasing to about from 450 to 700 vehicles in 2025. In the Whitehorse area, 2011 data shows the average daily traffic reaches about 2,100 vehicles at the intersection of Alaska Highway and the South Klondike Highway, and reaches about 5,250 vehicles near McCrae, and then decreases to about 4,000 vehicles close to the intersection with the north Klondike Highway. With the higher than average population growth rate for Whitehorse the average daily light traffic volumes in the Whitehorse area are forecast to increase to the range between 2,500 and 6,300 vehicles in 2025.

[147] The tourism growth rates are within the range of the population growth rate levels, e.g., Yukon Economic Outlook for 2015 notes an increase in border crossings by about 1.5% in 2016 over 2015. Therefore, it is assumed that the light traffic flow projection also takes into account growth in tourism.
[148] Forecast AADT flows are based on population growth rates applied to the 2011 AADT flows.

Figure 5-2: Average Daily Traffic Forecast for the Yukon segment of the Alaska Highway: 2011-2025



5.2.3 Tourist Volumes

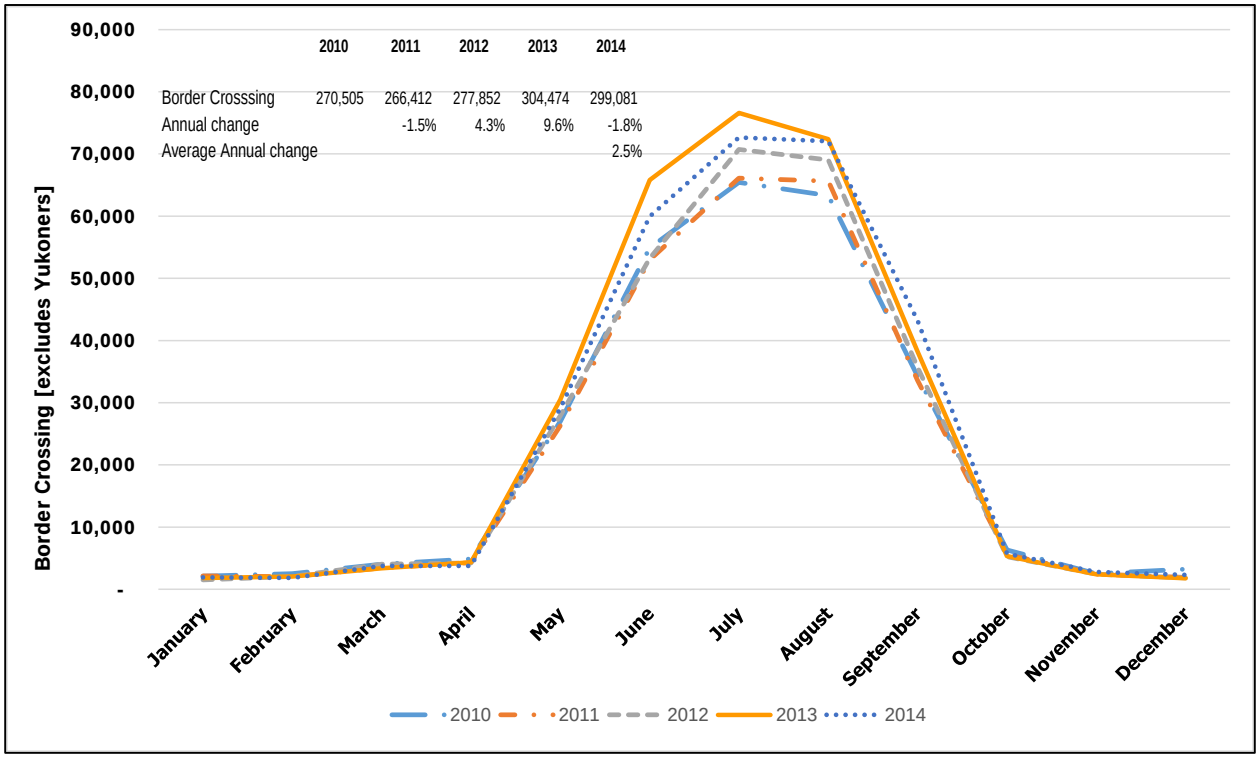
It is estimated that 443,300 people visited Yukon in 2014[149], about 2.2% lower than the 2013 estimate for Yukon visitors. Yukon Department of Tourism and Culture estimates also indicate that in the summer of 2012 about 54% of the total visitors entered Yukon via Alaska and about 12% through airports. Most border crossing visitors are international visitors.[150]

Figure 5-3 below summarizes the annual change in border crossings to Yukon (excluding Yukoners) for 2010-2014. It indicates that while 2014 border crossings were about 1.8% lower than 2013 crossings, there was an average annual increase of 2.5% over the five-year period from 2010-2014.

[149] Numbers are based on Yukon Tourism Indicators Year-End Report 2014. Source: Government of Yukon Department of Tourism and Culture. 2014. Yukon Tourism Indicators: 2014 Year-End Report. Retrieved from: http://www.tc.gov.yk.ca/pdf/2014_TourismIndicators_YearEndReport.pdf [accessed on November 3, 2015].

[150] Yukon Tourism Indicators Year End Report 2014 shows that about 78% of the border crossings into Yukon are residents of the US and other overseas countries. Source: Government of Yukon Department of Tourism and Culture. 2014. Yukon Tourism Indicators: 2014 Year-End Report. Retrieved from: http://www.tc.gov.yk.ca/pdf/2014_TourismIndicators_YearEndReport.pdf [accessed on November 3, 2015].

Figure 5-3: Annual Border Crossings: 2010-2014[151]



The 2015 Yukon Economic Outlook[152] indicates that while total border crossings are expected to remain below 2013 levels, 1.5% growth in total annual border crossings is expected for 2015 with similar growth levels anticipated for 2016.

Based on historical trends and the 2015 Yukon Economic Outlook forecasts, the overall volume of visitors for the future scenarios assessment is forecast to increase on average at the modest rate of 1.5% per year over the period to 2025.

5.3 FUTURE SCENARIO CHANGES IN RESOURCE DEVELOPMENT REQUIREMENTS (FREIGHT AND BULK FUEL)

Timing for development of future mines in Yukon and adjacent areas of the Northwest Territories that would rely on Alaska Highway for access is uncertain, and will depend on a range of factors that include: global commodity prices and economic growth, available financing, regulatory stability, past performance of projects and mineral prospects outside of Yukon.

[151] Prepared based on Yukon Tourism Indicator Reports. Figures exclude Yukoners, crossings in commercial vehicles, train and marine crossings. Further, 2010 to 2013 figures exclude arrivals by air, whereas 2014 figures include direct international arrivals by air. The exclusion of air arrivals has a minimal impact to the 2010 to 2013 border crossing trends. Source: Government of Yukon Department of Tourism and Culture. 2014. Yukon Tourism Indicators: 2014 Year-End Report. Retrieved from: http://www.tc.gov.yk.ca/pdf/2014_TourismIndicators_YearEndReport.pdf [accessed on December 2, 2015].

[152] Source: Yukon Economic Development. 2015. Yukon Economic Outlook October 2015. Retrieved from: http://economics.gov.yk.ca/Files/2015/YukonEconomicOutlook_October2015.pdf [accessed on December 2, 2015].

The 2015 Yukon Economic Outlook notes that while mining related activities will continue to be a prominent contributor to Yukon's economy, weak mineral prices and underperformance by the global mining industry will continue to adversely affect Yukon's mining sector in the near-term, creating uncertainty for exploration, development and production prospects.[153]

Estimated inbound and outbound freight and bulk fuel volumes, as well as other summary information, have been developed for the range of potential mine developments considered in the medium term future scenarios assessment.[154] These mine developments were selected for inclusion in this assessment based on information available at this time on potential probable producing mines with mineable, proven reserves and an experienced mining company that has a potentially financeable project which has entered, or is expected in the near future to enter, licencing and regulatory review processes.

The potential mine developments included are separated into two defined Yukon regions:

- "Western Yukon" [Inside Passage Connected Areas as defined in Sections 2 and 4 of this Report] where there would continue to be access to external markets without the Alaska Highway via the Inside Passage Gateway at Skagway; and

- "Eastern Yukon" [Regions Dependent on Alaska Highway for Development as defined in Sections 3 and 4 of this Report] where there would be no highway access to external markets without the Alaska Highway.

The Western Region accounts for all of the mine-related traffic in the baseline and the low 2025 future scenario. Under the medium and high 2025 future scenarios, the Western Region accounts for 63-65% of the inbound development freight (excluding bulk fuel) but only 28-36% of the outbound mine shipment volumes.

- Compared to total Yukon demand in 2014, in 2025 (with all assumed potential mines in service for the specified scenario) heavy traffic volume for **inbound development freight** excluding bulk fuel:

    - Would decrease by about 42% under low scenario with the Alaska Highway (i.e., inbound freight for the two potential new Western Region mines would be about 42% less than for the current Minto mine [and partial year operation in 2014 of the Bellekeno mine], which may simply reflect differences in estimated mine requirements) and decrease of 22% without the Alaska Highway;

    - Would increase by about close to five times under medium scenario with the Alaska Highway [increase by about four times without the Alaska Highway]; this reflects the material jump in inbound freight requirement related to each of the assumed two additional

[153] Source: Yukon Economic Development. 2015. Yukon Economic Outlook October 2015, page 12. Retrieved from: http://economics.gov.yk.ca/Files/2015/YukonEconomicOutlook_October2015.pdf [accessed on November 29, 2015].

[154] See Appendix F, Table F-3 and Attachment F-1 (which provides a summary for each potential mine development listed Table F-3 as well as a map outlining the location for each potential mine development). Table F-4 summarizes the estimated change in volumes of inbound development freight (excluding bulk fuel) and outbound production freight with and without the Alaska Highway for the scenario assessment compared to the Baseline Economic Profile. Table F-5 provides the estimated volume of the bulk fuel and LNG demands.

mines (the Casino project in the Western Region and the Selwyn project in the Eastern Region – and that without the Alaska Highway, no mine development is assumed in the Eastern Region); and

- Would increase by about close to 5.5 times under high scenario with the Alaska Highway [increase by about five times without the Alaska Highway]; this reflects the assumed four additional mines (two in the Western Region, and two in the Eastern Region).

- Compared to total Yukon demand in 2014, in 2025 (with all assumed potential mines in service for the specified scenario) heavy traffic volume for **outbound production freight**:
  - Would decrease close to 100% under the low scenario with and without the Alaska Highway (highlights much lower outbound production freight estimated for the two new Western Region mines compared with the existing Minto mine);
  - Would increase by about nine times under the medium scenario with the Alaska Highway [increase by about more than eight times without the Alaska Highway]; the estimates highlight the much higher outbound production freight volumes estimated for the new Selwyn mine in the Eastern Region (which is assumed not to be developed without the Alaska Highway) compared with the new Casino mine in the Western Region; and
  - Would increase by about 12 times under the high scenario with the Alaska Highway [increase by about 15 times without the Alaska Highway]; these estimates continue to reflect the differences shown for the medium scenario plus the impact of the assumed four additional new mines (two of which are in the Eastern Region).

It is noted that to the extent that LNG is used for on-site power generation and other needs by potential future mines there will be related impacts on bulk fuel transportation requirements for future scenarios.[155]

5.3.1 Western Region Potential Mine Developments

Western Region potential mines are expected to use the Inside Passage (i.e., Skagway and/or Haines ports) for outbound production shipments. Alaska Highway impacts related to the Western Region mines are expected to be limited to transportation of certain inbound supplies to the mines. Inbound and outbound volumes related to resource development in the Western Region are dominated by the Casino mine (included in the medium and high scenarios).

Future scenario transportation cost estimates (2015$) for mine developments in the Western Region, including construction and development freight to future potential mines (but excluding bulk fuel costs) are summarized as follows:[156]

[155] See Appendix F, Table F-5. It is expected the new large mines like Casino would be served by on-site thermal generation units, i.e. without connecting to the Yukon electrical grid and therefore increasing the demand for the bulk fuel delivery, which is expected to mainly include LNG shipped from LNG facilities in northeastern B.C. or Alberta. The estimated LNG delivery for Casino mine is about 365,000 m^3/annually which is about 4,000 truck-loads.
[156] See Table F-6 in Appendix F.

- **Under the Low Scenario** - total development freight transportation costs with the Alaska Highway are about $12 million in 2025, about $2.4 million lower than the without the Alaska Highway scenario (where freight is delivered by Inside Passage);
- **Under the Medium Scenario** – total development freight transportation costs with the Alaska Highway are about $72 million in 2025, about $15 million lower than the without the Alaska Highway scenario (where freight is delivered by Inside Passage); and
- **Under the High Scenario** – total development freight transportation costs with the Alaska Highway are about $87 million in 2015, about $18 million lower than the without the Alaska Highway scenario (where freight is delivered by Inside Passage).

For each Western Region future scenario for 2025 there is no assumed impact on outbound production costs as product is expected to be shipped to market via Skagway with and without the Alaska Highway.

At least two Western Region future scenario mines (Casino and Wellgreen) are expected to use liquefied natural gas (LNG) for mine site power generation and other energy loads. Bulk fuel delivery for these mines consequently assumes delivery of LNG to mine site via the Alaska Highway (assuming supply of LNG from northeastern B.C. or northwestern Alberta).[157] The without the Alaska Highway scenario for these mines would present a range of complications related to LNG bulk fuel supply, including concerns regarding obtaining a cost effective and secure supply chain for LNG shipped to mine site via marine transport through the U.S. port of Skagway.[158]

5.3.2 Eastern Region Potential Mine Developments

Mine developments in the Eastern Region of Yukon included in the future scenarios assessment require access to external markets via the Alaska Highway (and related local highways developed as a result of the Alaska Highway) for export/sale of production, and without the Alaska Highway it is assumed that these mine developments would not exist.

Inbound and outbound volumes related to resource development in the Eastern Region are dominated by the Selwyn mine (included in the medium and high scenarios). As none of the mines included in the Eastern Region future scenarios assessment are assumed to exist without the Alaska Highway no transportation cost assessment has been undertaken for these mines.

While the economic and social impact that each Eastern Region mine development would have on the Yukon with and without the Alaska Highway cannot be accurately estimated within the ambit of this study, it is expected that each mine development would have a material economic impact on Yukon. In a without

[157] Secure cost-based LNG supply is viewed as critical to feasible development of a mine such as the Casino development as it offers materially lower cost electric power than would be available with any other practical alternative.

[158] For example, assuming LNG supplies would need to come from an established Canadian domestic supply source such as the Fortis facility at Delta B.C. (which is currently being expanded with provision for marine loading capability), use of Inside Passage ports in the US such as Skagway would require resolution of all related U.S. FERC, Coast Guard and other legal requirements affecting ability to ship a new fuel product in bulk from a Canadian source through a US port to an ultimate Canadian end use destination. It is understood from past discussions with Casino representatives that past review of these issues indicated a need to resolve a host of planning issues that would not arise through use of the currently planned LNG supply delivery via the Alaska Highway.

the Highway scenario, the inability to develop each mine would therefore also be expected to have an adverse material economic impact on Yukon.

The following provides some context for potential economic impacts that mine developments have in Yukon[159]:

- The performance of Yukon's economy is linked to the performance of the global mineral industry, and the performance of mineral prices;
- Mining related activities remain a prominent contributor to Yukon's economy, estimated at 19% of Gross Domestic Product in 2014 [22% of real GDP in 2012 and about 21% in 2013[160]]; and
- Exploration spending in 2015 is expected to be at 2014 levels, with expenditures expected to be over $100 million and spending related to exploration activity on the Selwyn project comprises a substantial portion of the total.[161]

Available information indicates that the Selwyn mine and related Howard's Pass Access Road Upgrade Project required for access to the mine site is expected to result in the following range of economic and social impacts[162]:

- Upgrades to the Howard's Pass Access Road were completed in 2014, including eight new bridges and road reconstruction to allow all-season access.[163] To date it is estimated that over 800 person days of employment have been created for community members on the Howard's Pass Access Road, and local contractors and joint venture companies have been awarded more than $12 million in contracts for work on the road.[164]
- Future proposed upgrades would expand and upgrade the 79 km long road to a two lane gravel road and potentially affect the local economy through the provision of direct and indirect

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[159] Source: Yukon Economic Development. 2015. Yukon Economic Outlook October 2015, page 12-15. Retrieved from: http://economics.gov.yk.ca/Files/2015/YukonEconomicOutlook_October2015.pdf [accessed on November 29, 2015]; and Statistics Canada. 2015. CANSIM Table 379-0030 Gross domestic product (GDP) by North American Industry Classification System (NAICS), chained 2007 dollars. Retrieved from: http://www5.statcan.gc.ca/cansim/a26?lang=eng&id=3790030 [accessed on December 17, 2015].

[160] Source: Statistics Canada. 2015. CANSIM Table 379-0030 Gross domestic product (GDP) by North American Industry Classification System (NAICS), chained 2007 dollars. Retrieved from: http://www5.statcan.gc.ca/cansim/a26?lang=eng&id=3790030 [accessed on December 17, 2015].

[161] Yukon Economic Outlook for 2015 forecast growth in exploration spending in 2015. However, since the release of the outlook Natural Resource Canada revised 2015 forecast numbers which expects that 2015 exploration spending would be lower than 2014 levels. Source: Natural Resources Canada. 2015. Total Mineral Resource Development Investments, by Province and Territory, 2012 - 2014 Annual and 2015Footnote1 Revised Spending Intentions. Retrieved from: http://sead.nrcan.gc.ca/expl-expl/ExploTable.aspx?FileT=34&Lang=en [accessed on December 17, 2015].

[162] An application to upgrade the access road connecting the project to the Nahanni Range Road, a highway located in the NWT and Yukon. June 2015. Source: Selwyn Chihong Mining Ltd. 2015. Howard's Pass Access Road Upgrade Project 2015 Land Use and Water Licence Application Package June 2015. Volume 3 Appendices to Project Description Report Part 2 of 2. Retrieved from: http://www.reviewboard.ca/upload/project_document/EA-1516-01_07_Application_to_the_MVLWB_Volume_3_-_Appendices_to_PDR__Part_2_of_2__Appendices_IX_to_X.PDF [accessed on November 30, 2015].

[163] Source: Selwyn Chihong Mining Ltd. 2015. Project Fact Sheet. Retrieved from: http://selwynchihong.com/wp-content/uploads/2015/09/SCML_ProjectFactsheet.pdf [accessed on December 18, 2015].

[164] Source: Selwyn Chihong Mining Ltd. 2015. Howard's Pass Access Road Upgrade Project 2015 Land Use and Water Licence Application Package June 2015. Volume 3 Appendices to Project Description Report Part 2 of 2. Retrieved from: http://www.reviewboard.ca/upload/project_document/EA-1516-01_07_Application_to_the_MVLWB_Volume_3_-_Appendices_to_PDR__Part_2_of_2__Appendices_IX_to_X.PDF [accessed on December 18, 2015].

employment opportunities and increased business activity due to project spending on goods and services.

- The greatest potential for benefits for the Selwyn project relate to the supply of construction labour, equipment, fuel and contracting related to camp operations.
    - The construction phase for the project is currently expected to result in about 1500 person years of employment, with about 750 jobs created at the mine operations and between 300 to 350 jobs for the concentrate trucking;
    - Road traffic is estimated to be about 200 heavy truck loads a day [loaded and empty], including concentrate shipments, liquefied natural gas, parts, equipment, supplies etc. This includes up to 15 loads/day of LNG shipped to the mine site and, about 15 loads/day of lead and 55 loads/day of zinc shipped from the site.
- The Kaska Dena Council First Nations, including the Liard First Nation and Ross River Dena Council, are also expected to benefit from the Selwyn mine project through negotiation of a Socio-economic Participation Agreement ("SEPA") with the mine. The SEPA is expected to provide financial benefits to Kaska over the life of the Project based on the profits of the Project.[165] First Nation members would also likely benefit from employment and training opportunities.

Unlike the Casino mine Selwyn Chihong has not yet completed its feasibility study or submitted its proposal to the Yukon Environmental and Socio-economic Assessment Board ("YESAB"). Considering the similarity in size of investment[166] the estimated Casino mine economic impact factors help to highlight (without addressing the specific and distinct features of the Selwyn project) the magnitude of the economic impacts from development of large scale mine projects such as the Selwyn Chihong project.[167]

While much smaller in scale than the Selwyn Project, the Mactung and Kudz Ze Kayah mines in the Eastern Region (high future scenario) would each also provide material economic impact benefits to Yukon.[168] Three similar but small mines in operation in 2012 and 2013[169] had a share of mining, quarrying and oil &

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[165] Source: Selwyn Chihong Mining Ltd. 2015. Frequently Asked Questions. Retrieved from: http://selwynchihong.com/community/sepa-faq/ [accessed on November 29, 2015]; and Canadian Northern Economic Development Agency.2011. Archived - Backgrounder - CanNor Encourages First Nations Participation in Yukon Mining Sector. Retrieved from: http://www.cannor.gc.ca/eng/1389209496617/1389209537930 [accessed on November 29, 2015].

[166] About $2.5 billion per Table 1-4 of the 2013 Casino Project Feasibility Study. Source: Huss, Conrad, et al. 2013. Casino Project Form 43-101F1 Technical Report Feasibility Study. Yukon, Canada. January 25, 2015. Retrieved from: http://www.westerncopperandgold.com/_resources/reports/CasinoNI43-101-Jan2013.pdf [accessed on November 29, 2015].

[167] The estimated Gross Domestic Impact construction impact of the Casino Project to Yukon is about $363 million [which was estimated to be about 13.6% of the total Yukon GDP for 2011 at nominal prices]. Over the life of the Casino project [about 22 years, which is twice as long as the current estimate for Selwyn] it is estimated that the Casino Project would contribute about $6.4 billion to GDP in Yukon with about 24,000 full time equivalent jobs and generate $1.1 billion in wages and salaries. It is also estimated that the annual average Yukon Mining Royalty would be about $56 million. It should be noted that for minerals, forestry, water and land revenues, Yukon's grant from the federal government would be reduced by a dollar for each extra dollar received over the $6 million cap. In August 2012, the cap was raised to $6 million for all natural resources revenue and this amendment also provides opportunity for Yukon government to elect 50/50 revenue share where the deduction in territorial formula financing payments should be equal to 50% of the annual resource revenues regardless of the amount of the revenues, subject to clauses noted in the agreement. Source: Casino Mine Corporation. 2013. Economic Impacts of the Casino Mine Project. March 2013. Retrieved from: http://www.casinomining.com/_resources/pdfs/mnp_report.pdf [accessed on November 29, 2015]; and Government of Yukon. 2012. Get the Fact on Resource Revenue Arrangements. Retrieved from: http://www.gov.yk.ca/news/get-thefacts_dta.html [accessed on January 8, 2016].

[168] Table F-3 provides an expected workforce for Mactung of 260 and for Kudz Ze Kayah of 300.

[169] Minto (2007), Bellekeno (2011) and Wolverine (2012).

gas extraction accounted for more than 20% of real GDP in 2012 and 2013.[170] Without the Alaska Highway, similar economic benefits from Mactung and Kudz Ze Kayah would not occur.

5.4 FUTURE SCENARIO CHANGES IN HIGHWAY COSTS

5.4.1 Highway Maintenance Costs

The future scenarios analysis uses 2014/15 actual maintenance costs by camp and applies an inflation adjusted average annual increase of 1.1% based on review of maintenance cost increases over the last 10 years. This may be conservative given somewhat higher recent annual growth rates [1.8%/year for the last five years]. Estimates of future highway maintenance costs exclude any consideration of added capital cost requirements related to new mine and other resource developments (such developments will include added capital costs, as well as arrangements for cost sharing with the developers as well as potentially with the federal government).

Table 5-3: Highway Maintenance Cost Forecast ($2014/15)

Year	With the Alaska Highway, $000	Without the Alaska Highway, $000	Alaska Highway Impact, $000	Alaska Highway Impact (%)
	A	B	C=A-B	D=(C/B)
2020	46,146	31,524	14,622	46%
2025	48,808	33,342	15,466	46%

With a forecast 1.1% average annual increase, by 2020 maintenance costs with the Alaska Highway would be about $46.1 million and without the Alaska Highway would be about $31.5 million. By 2025, with the Alaska Highway this cost would be about $48.8 million, and without the Alaska Highway would be about $33.3 million. By 2025, the added cost of about $15.5 million with the Highway results in an estimated $9.5 million impact to Yukon GDP with 93 jobs and $4.2 million in salaries and wages.[171]

5.4.2 Highway Capital Costs

Review of Yukon highways capital costs indicates that capital costs may change materially each year depending on the investment required for each highway. As summarized in Table 5-9, historical trends in highway capital expenditures indicate:

[170] Source: Statistics Canada. 2015. CANSIM Table 379-0030 Gross domestic product (GDP) by North American Industry Classification System (NAICS), chained 2007 dollars. Retrieved from: http://www5.statcan.gc.ca/cansim/a26?lang=eng&id=3790030 [accessed on December 17, 2015].

[171] Estimated based on Yukon input-output model which is based on 2010 Statistics Canada multipliers [combined direct, indirect and induced impact for Transportation engineering construction]. Source: Government of Yukon Economic Development. n.d. GDP Impact Assessment Tool (Yukon). Retrieved from: http://economics.gov.yk.ca/gdp.aspx [accessed on December 4, 2015].

- An approximate 20% increase in 2012/13 over 2011/12;
- A reduction of 18% in 2013/14 over 2012/13; and
- An increase of 15% in 2014/15.

Table 5-4 also estimates the portion of the Yukon highway capital costs that would remain without the Alaska Highway.[172]

Table 5-4: Highway Capital Costs: 2011/12 to 2014/15 and Forecast 2020 and 2025

	Highway Capital Costs, $000			
	Total	Estimate Without the Alaska Highway	Alaska Highway Impact	Alaska Highway Impact (%)
	A	B	C=A-B	D=C/B
2011/12	44,873.7	22,211.5	22,662.2	102%
2012/13	54,010.5	26,954.5	27,056.0	100%
2013/14	44,173.6	26,856.5	17,317.1	64%
2014/15	50,926.1	29,015.2	21,910.9	76%
Average Annual Change	4.3%			86%
Average Annual Change after Inflation Adjustment	2.5%			
Forecast 2020 ($2014/15)	57,663.7	31,068.8	26,595.0	86%
Forecast 2025 ($2014/15)	65,292.8	35,179.3	30,113.5	86%

The average annual highway capital cost increase in 2014/15 over 2011/12 was 4.3%. With inflation adjustments[173] the average annual increase would be at 2.5%. An annual average increase of 2.5% was accordingly used to forecast capital expenditures for 2025 with and without the Alaska Highway (see Table 5-4). Estimates of future capital costs exclude any consideration of added capital cost requirements related to new mine and other resource developments (such developments will include added capital costs, as well as arrangements for cost sharing with the developers as well as potentially with the federal government).

[172] Excludes costs for: Alaska Highway from B.C./Yukon border to Johnsons Crossing and from Haines Junction to Yukon/Alaska border; Nahanni Range Road; Top of the World Highway in Yukon; and Robert Campbell Highway south of Canol Road.

[173] Based on Whitehorse Consumer Price Index, with 2002=100 2014 was at 124.4 and 2011 at 118.1. Source: Government of Yukon Economic Development. 2013. Whitehorse CPI Based Inflation Calculator. Retrieved from: http://economics.gov.yk.ca/cpi.aspx [accessed on November 20, 2015].

Future appropriation of U.S. funds towards the Shakwak Highway pursuant to the Shakwak Agreement between U.S. and Canada may materially impact future required capital spending for the Shakwak portion of the Alaska Highway (or future highway conditions for this segment of the Alaska Highway).[174]

In 2012, a new two year transportation re-authorization bill was signed into law;[175] however, funding authorization for the Shakwak Highway Project was not included in the bill, and the U.S. House of Representatives has not earmarked any further funds for the Shakwak Highway. Without Shakwak funding in place, Alaska Highway paving efforts between Haines Junction and Beaver Creek have been on hold, and in recent years Yukon government funding for this portion of the Alaska Highway has declined (from approximately $25 million in 2012 to $10 million in 2015).[176]

Work on the Highway as outlined in the Shakwak Agreement has not been completed and the road has not been fully constructed to a standard that provides a comprehensive and modern, two-lane all-weather highway[177]. Without continued funding, remaining work on the Shakwak portion of the Highway may be scaled back.

5.5 SUMMARY CONCLUSIONS

Future scenarios for 2025 show a range of potentially major changes from the Baseline Economic Profile of the Highway for resource development freight and bulk fuel traffic and related valued component potential mine development impacts. These changes differ depending on whether the potential future mine developments are in Western Yukon versus Eastern Yukon (as defined below):

- **Western Yukon (where access via the Skagway Inside Passage exists without the Alaska Highway)** – Up to five potential major new mine developments could occur in this region by 2025, with or without the Alaska Highway. The Highway will provide some transport cost savings for inbound resource development freight relative to what would be required without the Highway. For bulk fuel deliveries to at least the Casino and Wellgreen mines, the Highway is also currently expected to deliver critical LNG supplies from northeastern B.C. or northwestern Alberta. The ability to secure equivalent cost effective LNG supplies without the Highway (i.e., by marine transport through a US port via Inside Passage) is uncertain today.

- **Eastern Yukon (where existing highway and Inside Passage access is assumed not to exist without the Alaska Highway)** – Up to three potential major new mine developments

[174] The Shakwak Highway is the only land link to Alaska from the Lower 48 States and connects the Alaska panhandle to the Alaska interior. In 1977, Canada and the U.S. entered into an agreement (the Shakwak Agreement) to improve highway sections in Canada and facilitate transportation within Canada and between Canada and the U.S. Under this agreement, the U.S. agreed to provide funding for reconstruction of the highway, while Canada would manage reconstruction, provide land and granular resources and maintain the highway. The agreement covers a 325 mile stretch of the highway that includes the Haines Road and northern section of the Alaska Highway.

[175] Moving Ahead for Progress in the 21st Century Act (Map-21).

[176] Source: Yukon News. No new money for Shakwak roadwork. Retrieved from http://yukon-news.com/news/no-new-money-for-shakwak-roadwork/. [accessed February 12, 2016].

[177] The construction standards for the Shakwak portion of the Highway were higher with U.S. funding than they would otherwise have been. The Haines Highway is almost entirely constructed to an asphalt-concrete standard that is only found on a few other road segments on Yukon's highway network (e.g., Whitehorse corridor, towns and bridge approaches). Other highway reconstruction projects in Yukon with similar traffic volumes would have had BST applied. Without the Shakwak funding this work would have been scaled back, but not cancelled, and would likely have occurred over a longer timeframe as the North Alaska Highway and Haines Road would not have been high priorities for Yukon or PWGSC.

could occur in this region by 2025 with the Alaska Highway, providing material economic and other benefits to a range of valued components in Yukon. However, these new developments are dependent on the road structure facilitated by the Alaska Highway, and would not likely develop absent the Alaska Highway. Inability to develop each mine would have a material adverse impact on Yukon (i.e., loss of GDP, full time equivalent jobs and related wages and salaries and loss of mining royalties), as well as on local First Nations and communities.

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APPENDIX A:

ALASKA HIGHWAY EXISTING CONDITIONS

1.0 INTRODUCTION

This appendix provides detailed review of available information regarding Alaska Highway traffic volumes and the maintenance and capital costs for portions of the highway within Yukon.

2.0 EXISTING ALASKA HIGHWAY TRAFFIC VOLUMES

This section reviews available information regarding existing commercial heavy traffic volumes and light traffic volumes (including tourism traffic). Information regarding the existing conditions is provided for 2014, where available. However, in certain cases data for 2014 is not available and the most recent available data has been used to assess the existing conditions (e.g., light traffic flow volumes are based on 2011 traffic counts).

2.1 COMMERCIAL HEAVY TRAFFIC VOLUMES

Table A-1 below provides a summary of commercial heavy traffic volumes for 2014 based on data collected from Weigh Scales for each gateway, and shows the following regarding heaving traffic volumes for 2014.

- **Community Re-Supply**[1] – based on available data for 2014, approximately 38% of total heavy traffic demand entering Yukon relates to community re-supply, with approximately 84% of this demand delivered through the Watson Lake gateway, about 15% through Inside Passage and less than 1% through Interior Alaska.
- **Development Freight**[2] – based on available data for 2014, approximately 20% of total heavy traffic demand entering Yukon relates to development freight, with about 72% of this demand delivered through the Watson Lake gateway, about 27% through Inside Passage and less than 1% through Interior Alaska.
- **Bulk Fuel Transport**[3] – based on available data for 2014, approximately 42% of total heavy traffic demand entering Yukon relates to bulk fuel freight, with about 46% of this demand currently delivered through the Watson Lake gateway, about 45% through Inside Passage and about 9% through Interior Alaska.

When compared to the 2009 Northern Transportation System Assessment (NTSA) report data[4] the following trends or changes are also noted regarding 2014 heavy traffic volumes:

- The total inbound heavy traffic for Yukon in 2014 was 21% higher than 2009 NTSA volumes (about 4% average annual change).
    - There was a 49% increase in bulk fuel delivery to Yukon in 2014 compared to 2009 NTSA volumes (about 8% increase per year from 2009 to 2014);

[1] For example, agricultural products, general merchandise, household goods, livestock and mobile homes, etc.
[2] For example, construction materials, iron, pipe and steel, equipment and machinery, etc.
[3] For example, petroleum products, propane, asphalt and flammable liquids, etc.
[4] PROLOG Canada Inc. 2011. Northern Transportation System Assessment. January 2011.

  - There was a 21% increase in development freight deliveries to Yukon in 2014 compared to 2009 NTSA volumes about 4% increase per year from 2009 to 2014).
  - There was a minimal (1%) increase in community re-supply freight in 2014 compared to 2009 NTSA volumes (or less than 0.25% increase per year from 2009 to 2015). However, there was a material shift in delivery gateway for community resupply (as noted below).

- The following changes regarding heavy traffic volumes through each Yukon delivery gateway compared to 2009 NSTA volumes are also noted:
  - The Watson Lake gateway, i.e., eastern gateway through the Alaska Highway, is now the principal transportation gateway for Yukon community re-supply traffic accounting for about 84% of the total Yukon community re-supply volumes (up from about 67% in 2009 volumes shown in the NTSA). The Watson Lake Gateway also accounts for about 66% of the total freight inbound to Yukon (up from about 58% in 2009 volumes shown in the NTSA).
  - The Inside Passage gateway continues to provide a significant alternative for less time sensitive traffic, accounting for about 30% of the total freight inbound to Yukon (down from about 39% in 2009 volumes shown in the NTSA).
  - The Interior Alaska gateway accounts for about 4% of the total freight inbound to Yukon (about 2% in 2009 volumes shown in the NTSA).
- 2014 outbound freight was 168,104 tonnes compared to 54,000 tonnes in the 2009 NSTA. The outbound tonnes reflect mine production from Minto, Wolverine and Cantung.[5]

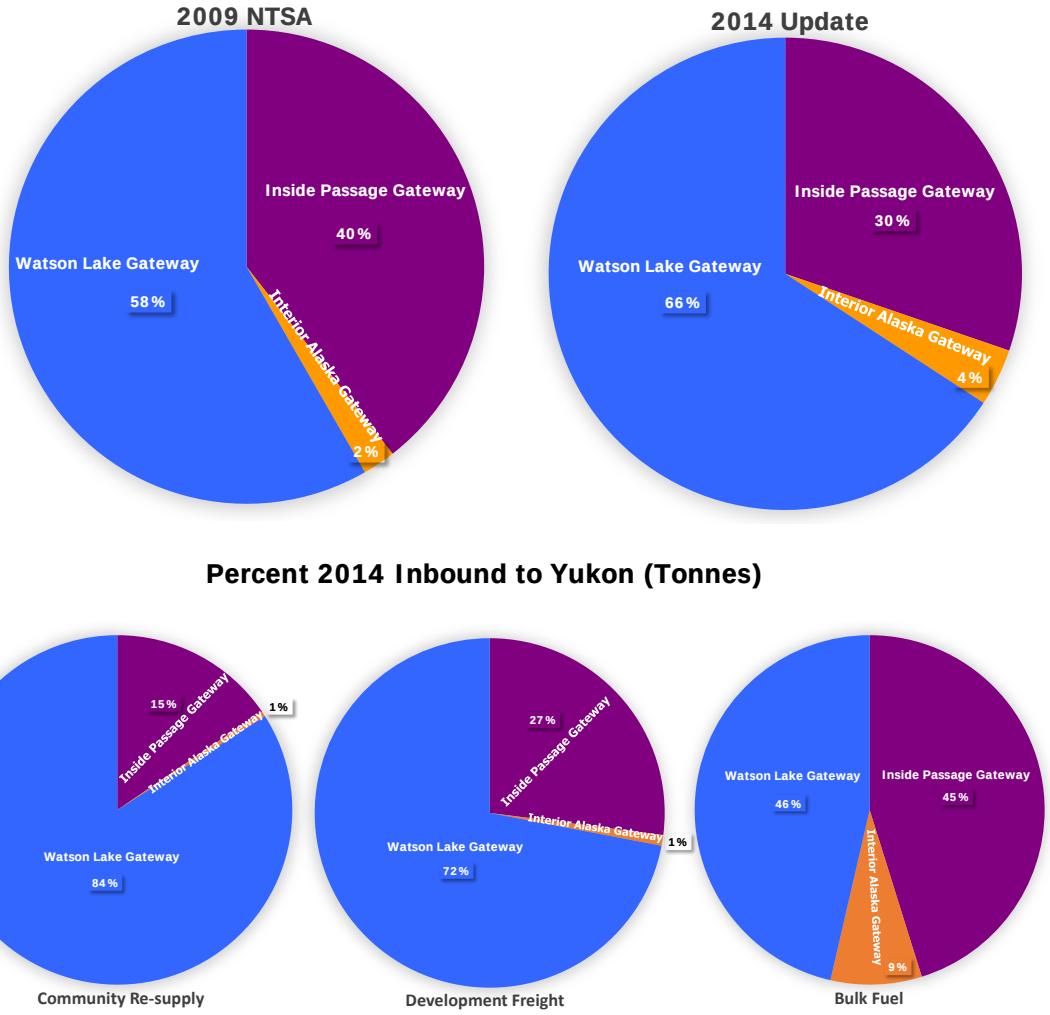
[5] Cantung mine is located in Northwest Territories, however, it used the Nahanni Road for inbound of supplies and outbound of mine production.

Table A-1: Commercial Heavy Traffic Volumes in the 2009 NTSA and Updated for 2014 (Inbound and Outbound from Yukon)

	2009 NTSA		Updated to 2014 with Project	
	Trucks	Tonnes	Trucks	Tonnes
Inbound to Yukon for Yukon	A	B	C	D
Inside Passage Gateway				
Community Resupply	2,009	53,400	864	25,673
Development Freight	1,177	24,200	688	23,392
Bulk Fuel	1,573	63,900	1,987	82,722
Total Inbound to Yukon	**4,758**	**141,500**	**3,539**	**131,787**
Outbound from Yukon	**1,023**	**54,000**	**1,023**	**49,104**
Interior Alaska Gateway				
Community Resupply	0	0	49	833
Development Freight	0	0	25	858
Bulk Fuel	281	8,000	417	15,411
Total Inbound to Yukon	**281**	**8,000**	**490**	**17,101**
Watson Lake Gateway				
Community Resupply	4,168	110,460	7,098	139,230
Development Freight	2,995	47,340	1,463	62,322
Bulk Fuel	1,260	51,200	2,078	84,933
Total Inbound to Yukon	**8,423**	**209,000**	**10,639**	**286,485**
Outbound from Yukon			**2,479**	**119,000**
Total				
Community Resupply	6,177	163,860	8,010	165,736
Development Freight	4,172	71,540	2,176	86,572
Bulk Fuel	3,114	123,100	4,481	183,065
Community Bulk Fuel			*3,679*	*151,365*
Bulk Fuel for Mines			*802*	*31,700*
Total Inbound to Yukon	**13,462**	**358,500**	**14,668**	**435,373**
Outbound from Yukon	**1,023**	**54,000**	**3,502**	**168,104**

Figure A-1 illustrates use of each gateway for inbound of commercial freight in 2014.

Figure A-1: Percent Commercial Heavy Traffic Volumes (Tonnes) in 2009 NTSA and Updated for 2014 (Inbound to Yukon)



"Through traffic" between B.C./Alberta and Interior Alaska and Inuvik and surrounding communities in Northwest Territories ("NWT") currently moves through Yukon via the Alaska Highway and other connected highways/roads (e.g., Dempster Highway). Table A-2 provides a summary of commercial heavy through traffic. Table A-2 provides summary of commercial heavy through traffic and indicates as follows:

- In 2014, total through traffic (from/to B.C./Alberta, U.S. and NWT through Yukon) was 39% lower than 2009 NTSA through traffic volumes. The reduction in through traffic for each Yukon gateway was as follows:
    - About 41% reduction of through traffic via Watson Lake gateway (about 60% of the total reduction).

- o About 34% reduction of through traffic via Interior Alaska gateway (about 35% of the total reduction).
- o The through traffic via Inside Passage almost ceased (reduction of 85% which is about 5% of the total reduction) due to increased usage of the Alaska Marine Highway.

- About 87% of 2014 through traffic was bound for the U.S. and about 13% was bound for Inuvik and surrounding communities in NWT.

Table A-2: Commercial Heavy Traffic Volumes in 2009 NTSA and Updated for 2014: Through Traffic[6]

	2009 NTSA Total Inbound Through Freight		2014 Total Inbound Through Freight		Through Freight to NWT		Through Freight to the USA	
	Trucks	Tonnes	Trucks	Tonnes	Trucks	Tonnes	Trucks	Tonnes
	A	B	A	B	C	D	E	F
Inside Passage Gateway								
Community Resupply	233	6,000	30	900			30	900
Development Freight	0	0	0	0			0	0
Bulk Fuel	0	0	0	0			0	0
Total Inbound to Yukon	**233**	**6,000**	**30**	**900**	**0**	**0**	**30**	**900**
Interior Alaska Gateway								
Community Resupply	3,183	84,900	2,351	39,964	0	0	2,351	39,964
Development Freight	1,474	30,300	1,371	30,169	0	0	1,371	30,169
Bulk Fuel	0	0	196	5,877	0	0	196	5,877
Total	**4,657**	**115,200**	**3,918**	**76,009**	**0**	**0**	**3,918**	**76,009**
Watson Lake Gateway								
Community Resupply	4,198	111,240	2,618	45,364	431	8,195	2,186	37,169
Development Freight	1,364	42,260	1,350	30,507	74	2,448	1,275	28,059
Bulk Fuel	86	3,500	453	16,307	271	10,841	182	5,466
Total	**5,648**	**157,000**	**4,421**	**92,178**	**777**	**21,485**	**3,644**	**70,694**
Total								
Community Resupply	7,613	202,140	4,999	86,228	431	8,195	4,567	78,032
Development Freight	2,838	72,560	2,721	60,675	74	2,448	2,647	58,227
Bulk Fuel	86	3,500	649	22,184	271	10,841	378	11,343
Total	**10,537**	**278,200**	**8,369**	**169,088**	**777**	**21,485**	**7,592**	**147,603**

[6] The commercial heavy traffic volumes [approximately 76,000 tonnes] shown for Interior Alaska Gateway are outbound freight from Interior Alaska to Inside Passage and to the southern United States; commercial heavy traffic volumes shown for the Watson Lake Gateway [approximately 70,700 tonnes] as going to the USA are inbound freight to Interior Alaska.

2.2 LIGHT TRAFFIC VOLUMES

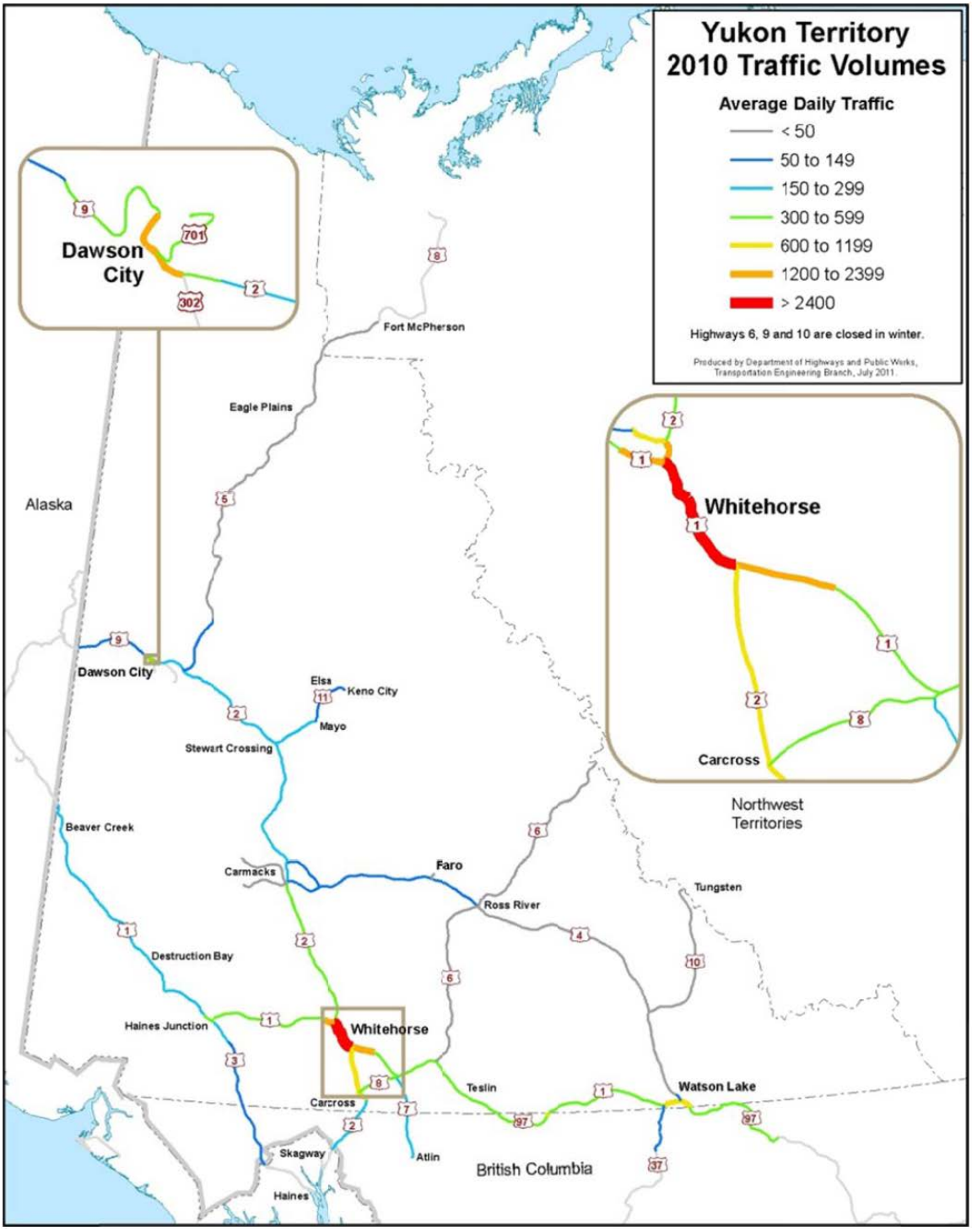
The light traffic data is based on information from the 2011 Yukon Traffic Count Summary prepared by Yukon Highways and Public Works.[7]

Figure A-2 below illustrates average daily traffic volumes for each Yukon highway monitored in 2010, and indicates that average daily traffic flows are higher along the Alaska Highway compared to other Yukon highways and road connections.

- **Yukon Highways with average daily traffic of less than 50:** The Dempster Highway, Canol Road, Nahanni Range Road and Robert Campbell Highway (between Ross River and Watson Lake);
- **Yukon Highways with average daily traffic between 50 and 150**: Top of the World Highway, Haines Road, and Robert Campbell Highway between Ross River and Carmacks;
- **Yukon Highways with average daily traffic between 150 and 300:** Klondike Highway north of Carmacks and Alaska Highway north of Haines Junction;
- **Yukon Highways with average daily traffic between 300 and 600:** Klondike Highway between Whitehorse and Carmacks as well as on the Alaska Highway outside of Whitehorse to Watson Lake and Haines Junction; and
- The average daily traffic increases materially near Whitehorse as detailed below.

[7] Source: Yukon Government Department of Highways and Public Works. 2011. Yukon Traffic Count Summary 2011. Retrieved from: http://www.hpw.gov.yk.ca/pdf/traf2011.pdf [accessed on October 14, 2015].

Figure A-2: Average Daily Traffic on Yukon Highways: 2010[8]



[8] Source: Yukon Government Department of Highways and Public Works. 2011. Yukon Traffic Count Summary 2011. Retrieved from: http://www.hpw.gov.yk.ca/pdf/traf2011.pdf [accessed on October 14, 2015].

Figure A-2 provides 2011 Average Annual Daily Traffic (AADT) flows on the Alaska Highway starting from British Columbia (Route 97 close to Dawson Creek) and ending at Alaska (Delta Junction).

- As Figure A-2 illustrates the average daily traffic on the B.C. portion of the Alaska Highway ranges between 450 and 5,000, and on the Alaska portion ranges between 300 and 2,000. On both of these portions of the Alaska Highway the traffic flow is high near and inside cities.

- For the Yukon portion of the Alaska Highway average daily traffic outside of the Whitehorse area ranges between about 400 and 600. In the Whitehorse area, AADT increases to about 2,100 at the intersection of Alaska Highway and the South Klondike Highway, and to about 5,050 near McCrae (Fox Farm Road), and then decreases to about 4,000 close to the intersection of the north Klondike Highway.

The average daily traffic flow in Yukon is higher during summer for the portion of the Alaska Highway outside of Whitehorse.

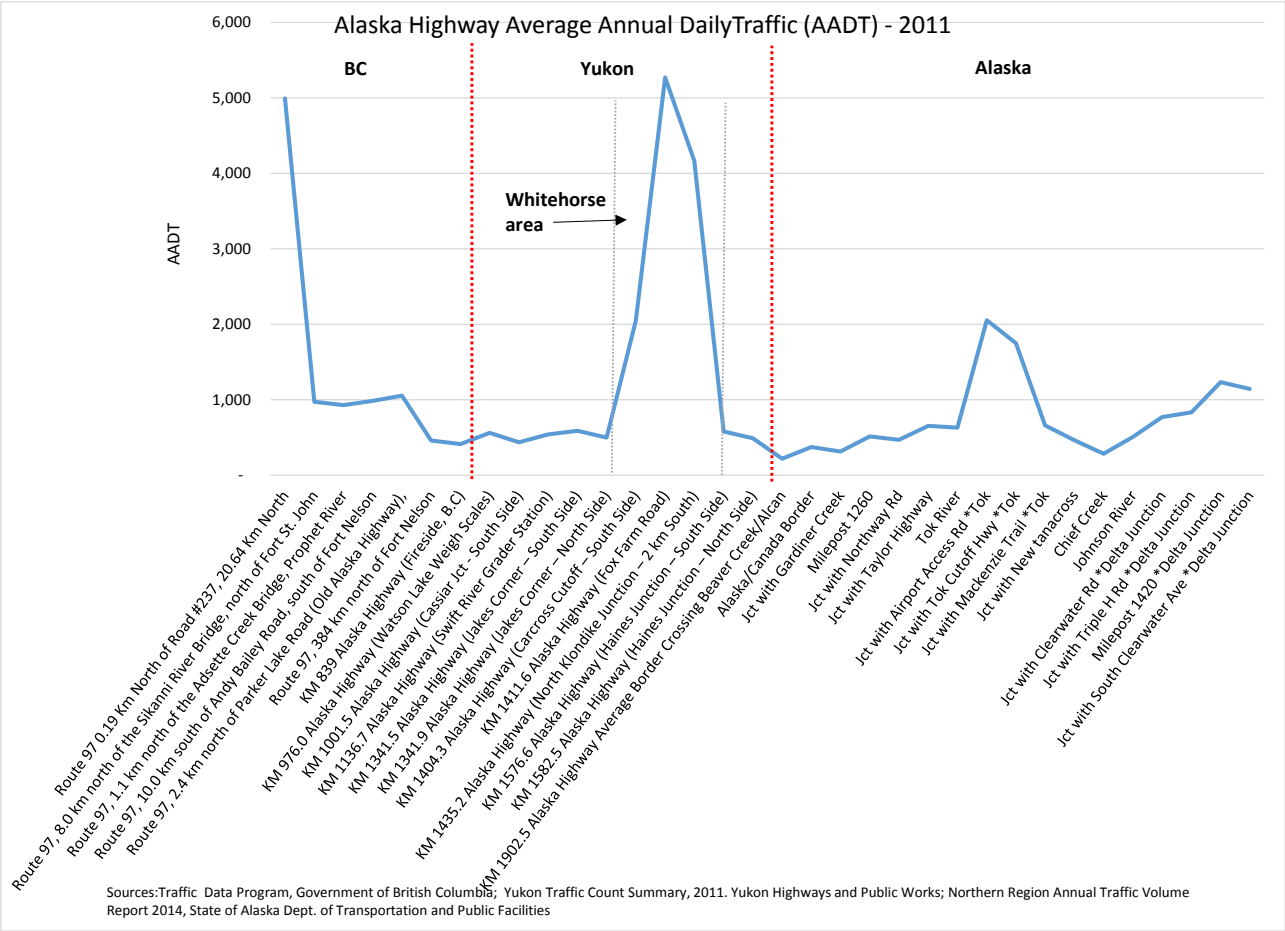
- For example, the Watson Lake Weigh Scale count location summer traffic flows (May 1 to September 30 inclusive) were about 40% higher than annual average daily traffic flow. A similar trend can be identified for the portion north of Whitehorse.

- By contrast, there is no large difference in summer versus winter traffic flows in the Whitehorse area (for example, summer average daily traffic counts near McCrae (Fox Farm Road) is only about 25% higher than annual average daily traffic counts).

Information regarding the type of traffic is available based on manual counting at border crossings (by Canada Customs Border Services) and at the Whitehorse Weigh Scale;

- For km 1,937 of the Alaska Highway eastbound traffic at Beaver Creek (based on data from Canada Customs Border Services included in the 2011 Yukon Traffic Count Summary):
    - Cars - 88 average daily based on a total of 32,122 counts for 2011;
    - Buses – 0.52 average daily based on a total of 190 counts for 2011;
    - Trucks - 14 average daily based on a total of 5,191 counts for 2011;
- For km 1,392 of the Alaska Highway (Whitehorse Weigh Scale data for 2000):
    - About 78% is cars;
    - About 16.8% is buses; and
    - About 5.2% is trucks.

Figure A-3: Average Annual Daily Traffic on the Alaska Highway: 2011[9]



Sources:Traffic Data Program, Government of British Columbia; Yukon Traffic Count Summary, 2011. Yukon Highways and Public Works; Northern Region Annual Traffic Volume Report 2014, State of Alaska Dept. of Transportation and Public Facilities

[9] Note average annual daily traffic for 2010 was used where no information was available for 2011. Yukon Traffic Count Summary for 2011. Retrieved from: http://www.hpw.gov.yk.ca/pdf/traf2011.pdf [accessed October 14, 2015]; Government of British Columbia. 2015. Traffic Data Program. Retrieved from: http://www.th.gov.bc.ca/trafficdata/index.html [accessed October 14, 2015]; and State of Alaska Department of Transportation and Public Facilities. 2015. Northern Region Annual Traffic Volume Report. Retrieved from: http://dot.alaska.gov/stwdplng/transdata/traffic_reports.shtml [accessed on October 14, 2015].

2.3 TOURISM

Tourism is a vital component of Yukon's economy[10], and is one of the largest industries contributing to Yukon's GDP and employment.

The Yukon Tourism Indicators, Year-End Report, 2014[11] indicates that 443,300 people visited Yukon in 2014. The following is specifically noted regarding total Yukon visitors:

- Approximately 366,500 people or about 83% of total visitors came to Yukon in summer tourism and mining peak months, between May and September;
- About 76,800 people, or about 17% of total visitors, came to Yukon in shoulder months; and
- The report indicates that 341,707 people crossed international borders into Yukon, including 42,626 Yukoners. It is noted that currently the majority of the recorded international tourist traffic entering Yukon crosses through border crossings at Fraser (between Skagway and Carcross),[12] and reflects a large number of cruise ship passengers entering Alaska and touring Yukon as part of their Alaskan cruise.

As there is no port of entry at Watson Lake, information available regarding tourists entering into Yukon at this entry point is more limited than for other Yukon entry points. However, based on estimates from the Yukon Department of Tourism and Culture, in summer of 2012 approximately 142,800 visitors entered Yukon without going through a border crossing (approximately 104,700 entered through Watson Lake and 38,100 entered Yukon through domestic air).

The detailed information on tourism is provided in Appendix D.

3.0 EXISTING HIGHWAY MAINTENANCE AND CAPITAL COSTS

The Yukon Department of Highways and Public Works maintains about 4,822 km of roads, including about 351 km of paved surface, about 1,977 km of Bituminous Surface Treatment (BST), 2,486 km of gravel surface roads and about 7.4 km of bridges. The longest road is the Alaska Highway (about 932 km Yukon portion) which is about 19% of total Yukon highways. This is followed by the Klondike Highway (about 654 km or 14%), the Robert Campbell Highway (about 582 km or 12%), the Dempster Highway (about 465 km or 10%), and Canol Road (about 451 kms or 9%). Other roads (including Haines Road, Nahanni Range Road, Top of the World Highway and Silver Trail) are between 100 km and 175 km long, or are about 2% to 4% each of the total Yukon roads.

[10] Source: Yukon Department of Tourism and Culture. 2015. Tourism. Retrieved from: http://www.tc.gov.yk.ca/tourism.html [accessed on December 16, 2015].
[11] Numbers are based on Yukon Tourism Indicators Year-End Report 2014, Government of Yukon, Department of Tourism and Culture. Source: Government of Yukon Department of Tourism and Culture. 2014. Yukon Tourism Indicators. Retrieved from: http://www.tc.gov.yk.ca/pdf/2014_TourismIndicators_YearEndReport.pdf [accessed on November 3, 2015].
[12] Approximately 2/3 of International visitors at Yukon Border Crossings are visitors entering Yukon from Skagway at the Fraser Border Crossing (220,276 of 341,707 border crossings in 2014); a smaller number of crossings occur at Pleasant (Haines) (29,674 crossings in 2014). See Appendix D for further detail.

In addition to the ongoing capital and maintenance work on the highways, the Shakwak Agreement between U.S. and Canada[13] addresses the capital and maintenance work for the Shakwak portion of the Alaska Highway. Since the Shakwak Agreement was signed, over $1.5 billion (US, nominal dollars) has been spent by both countries on upgrading and maintaining the Alaska Highway System in Canada over the period 1977 -2009 years. The Yukon and Canadian governments have accounted for 74% of capital and maintenance costs (including Shakwak Highway and Haines Road), while the U.S. and Alaskan governments have accounted for 26% of shared expenditures.[14] Available information indicates that approximately $489 million in capital improvements have occurred since 1977 (allowing for completion of over 90% of reconstruction efforts),[15] with the *Safe, Accountable, Flexible, and Efficient Transportation Equity Act: A Legacy for Users (SAFETEALU)* providing $30 million per year from 2005 to 2009. At the time it was noted that future funding was required for the following activities:

- Rehabilitation and stabilization of areas affected by melting permafrost between Destruction Bay and the border near Beaver Creek (estimated cost of $70 million US);
- Pave remaining 68 miles of the Haines Road (estimated cost of $35 million);
- Pave 67 miles of Alaska Highway south of Destruction Bay (estimated cost of $39 million US); and
- Pave 145 miles from Destruction Bay to the Alaska border (until permafrost is stabilized, paving cannot occur and once stabilization is achieved paving is estimated to cost $93 million $2009 dollars).

In 2012, a new two year transportation re-authorization bill was signed into law (*Moving Ahead for Progress in the 21st Century Act* (Map-21)); however, funding authorization for the Shakwak Highway Project was not included in the bill, and the US House of Representatives has not earmarked any further funds for the Shakwak Highway. Without the Shakwak funding in place, Alaska Highway paving efforts between Haines Junction and Beaver Creek have been on hold, and in recent years Yukon Government

[13] The Shakwak Highway is the only land link to Alaska from the lower 48 states and connects the Alaska panhandle to the Alaska interior. In 1977, Canada and the U.S. entered into an agreement (the Shakwak Agreement) to improve highway sections in Canada and facilitate transportation within Canada and between Canada and the U.S. Under this agreement, the U.S. agreed to provide funding for reconstruction of the highway, while Canada would manage reconstruction, provide land and granular resources and maintain the highway. The agreement covers a 325 mile stretch of the highway that includes the Haines Road and northern section of the Alaska Highway.

[14] The brochure notes the following regarding share of expenditures (in Canadian dollars): Canada ($920.6 million or 60% of total expenditures); Yukon ($223.1 million or 14% of total expenditures); United States ($361.4 million or 23% of total expenditures); and Alaska ($38.1 million or 3% of total expenditures). Updated information provided by Yukon Highways and Public Works indicates that the total US contributions were reported as $446 million in 2015 (US$). Source: Yukon Highways and Public Works. The Shakwak Highway Project Upgrade. Retrieved from http://www.hpw.gov.yk.ca/pdf/shakwakprojectbrochure09.pdf [February 12, 2016].

[15] The North Alaska Highway and Haines Road have undergone major improvements, with over 90% of the reconstruction work completed. During the same timeframe, the more southerly sections of the Alaska Highway have been almost completely reconstructed with only a relatively short section in northern B.C. remaining to be upgraded. Specific work to date has included: reconstruction of the Haines Road (109 miles/175 km) and the North Alaska Highway (126 miles/ 348 km). 76 miles/ 122 km of the Haines Road and 4 miles of the North Alaska Highway have been paved and 5 bridges replaced. A major permafrost test section has also set up on the highway near Beaver Creek.

funding for this portion of the Alaska Highway has declined (from approximately $25 million in 2012 to $10 million in 2015).[16]

Work on the Highway as outlined in the Shakwak Agreement has not been completed and the road has not been fully constructed to a standard that provides a comprehensive and modern, two-lane all-weather highway.

3.1 HIGHWAY MAINTENANCE COSTS

Out of the total 4,822 km of Yukon roads, about 75% require a year-round maintenance and about 25% require summer-only maintenance work. There are 23 maintenance camps that provide highway maintenance work, including seven camps on the Alaska Highway. Figure A-4 illustrates the location of camps and their service areas.

The historical highway maintenance cost data is provided in Table A-3. Overall highway maintenance costs increased from $28.3 million in 1994/95 to $43.6 million in 2014/15 in nominal dollar equivalent, with a compound average annual increase of 2.2%. With inflation adjustments[17] the average annual increase would be at 0.5% over 20 years, 1.1% over the last 10 years, and 1.8% for the last five years (a higher average annual increase).

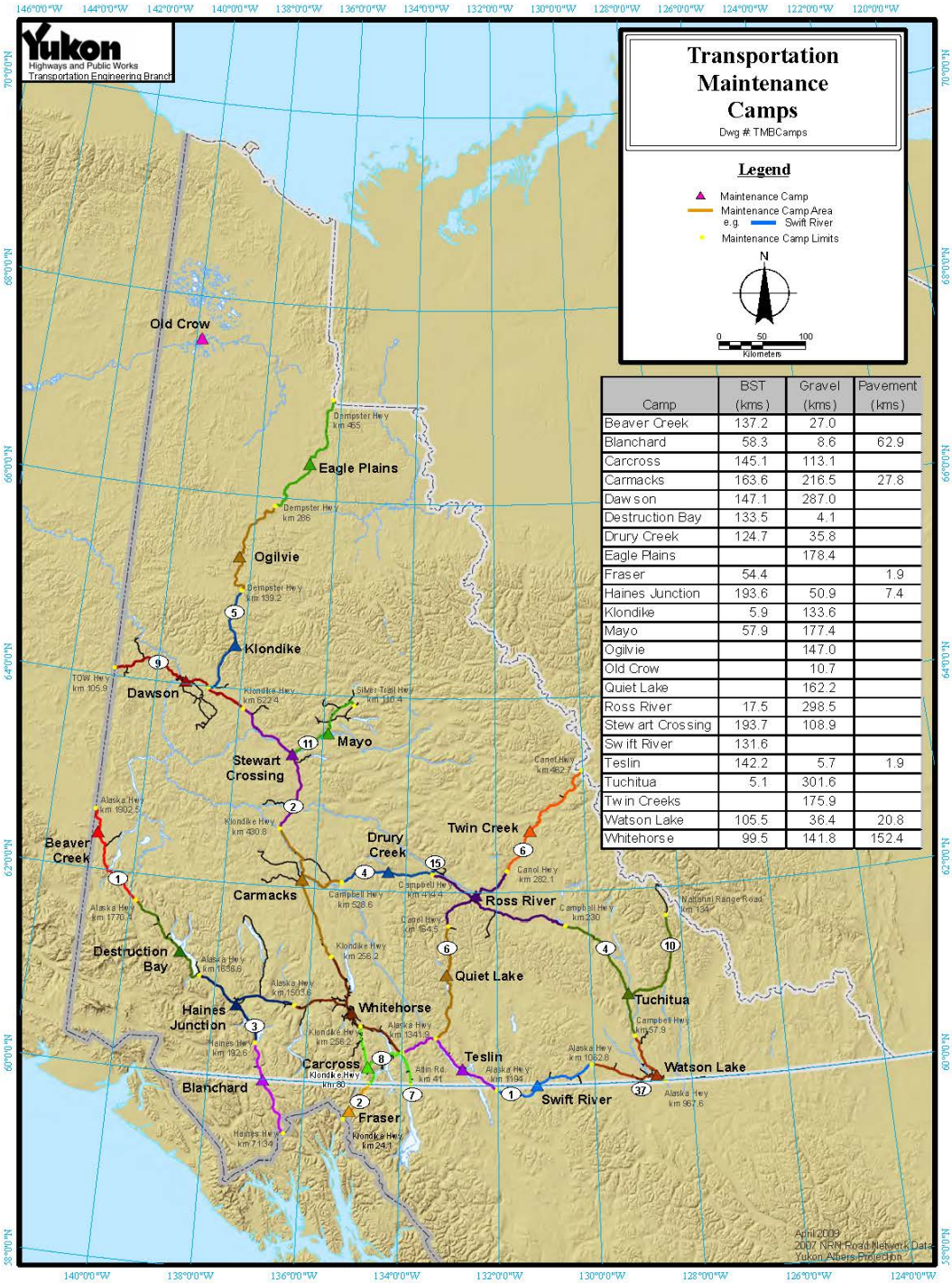
Table A-4 summarizes highway maintenance costs by camps for 2014/15. The total maintenance costs were at $43.6 million, which includes $7.8 million system overhead allocation costs.

The average maintenance cost per km is about $9,000/km, with higher than average costs for the following camps: Fraser (from Yukon/B.C. border to Skagway) at about $34,400/km, Eagle Plains (Dempster Highway) at about $17,900/km, Watson Lake (Watson Lake area for Alaska Highway and Campbell Highway) at about $17,500/km, and Ogilvie (Dempster Highway) at about $16,300/km.

[16] Source: Yukon News. No new money for Shakwak roadwork. Retrieved from http://yukon-news.com/news/no-new-money-for-shakwak-roadwork/ [accessed February 12, 2016].

[17] Based on Whitehorse Consumer Price Index, with 2002=100 2014 was at 124.4, 1994 at 88.7. Source: Government of Yukon Economic Development. 2013. Whitehorse CPI Based Inflation Calculator. Retrieved from: http://economics.gov.yk.ca/cpi.aspx [accessed on November 20, 2015].

Figure A-4: Yukon Highway Maintenance Camps[18]



Camp	BST (kms)	Gravel (kms)	Pavement (kms)
Beaver Creek	137.2	27.0	
Blanchard	58.3	8.6	62.9
Carcross	145.1	113.1	
Carmacks	163.6	216.5	27.8
Dawson	147.1	287.0	
Destruction Bay	133.5	4.1	
Drury Creek	124.7	35.8	
Eagle Plains		178.4	
Fraser	54.4		1.9
Haines Junction	193.6	50.9	7.4
Klondike	5.9	133.6	
Mayo	57.9	177.4	
Ogilvie		147.0	
Old Crow		10.7	
Quiet Lake		162.2	
Ross River	17.5	298.5	
Stewart Crossing	193.7	108.9	
Swift River	131.6		
Teslin	142.2	5.7	1.9
Tuchitua	5.1	301.6	
Twin Creeks		175.9	
Watson Lake	105.5	36.4	20.8
Whitehorse	99.5	141.8	152.4

[18] Provided by Department of Highways and Public Works.

Table A-3: Highway Maintenance Cost for 1994/95 through 2014/15 ($000)

Year	Maintenance Costs	Camp Overhead Costs	Head Office Costs	Total	Annual Change
1994-1995	22,327	5,949	-	**28,276**	
1995-1996	21,328	6,371	-	**27,700**	-2%
1996-1997	22,023	6,638	2,817	**31,478**	14%
1997-1998	19,245	6,008	2,949	**28,202**	-10%
1998-1999	19,041	6,197	2,541	**27,779**	-1%
1999-2000	18,711	6,604	2,303	**27,619**	-1%
2000-2001	20,471	6,367	2,510	**29,348**	6%
2001-2002	22,188	6,414	2,683	**31,286**	7%
2002-2003	21,305	7,036	2,328	**30,669**	-2%
2003-2004	21,486	7,547	2,034	**31,068**	1%
2004-2005	22,675	6,452	3,164	**32,290**	4%
2005-2006	21,099	9,041	3,332	**33,473**	4%
2006-2007	18,470	7,738	2,781	**28,989**	-13%
2007-2008	21,247	7,532	4,771	**33,549**	16%
2008-2009	23,187	7,016	5,266	**35,468**	6%
2009-2010	23,081	7,985	5,523	**36,590**	3%
2010-2011	22,032	7,679	6,212	**35,923**	-2%
2011-2012	22,485	8,067	7,276	**37,828**	5%
2012-2013	24,132	9,273	6,935	**40,340**	7%
2013-2014	26,988	10,075	7,620	**44,683**	11%
2014-2015	24,813	10,542	8,274	**43,629**	-2%

Table A-4: Detailed Highway Maintenance Cost for 2014/15 ($)[19]

	Camp	Camp Spending	Camp Overhead	System Overhead Allocation	Highway Project Cost Allocation	Total	Total Highway Served, km	Average Maintenance Cost per km
		$	$	$	$	$	km	$/km
12	Mayo	953,606	358,072	298,511	-	**1,610,189**	226	7,128
13	Stewart Crossing	1,838,612	461,217	575,548	30,149	**2,905,526**	303	9,602
14	Dawson	3,415,996	446,696	1,069,323	18,325	**4,950,341**	434	11,406
16	Klondike	947,004	734,996	296,445	-	**1,978,445**	140	14,182
17	Ogilvie	1,175,762	858,193	368,054	-	**2,402,008**	147	16,340
18	Eagle Plains	2,097,482	445,402	656,583	-	**3,199,467**	178	17,934
19	Old Crow	17,021	91,405	5,328	-	**113,754**	11	10,631
33	Fraser	945,444	680,080	295,956	15,715	**1,937,196**	56	34,408
34	Carcross	1,842,882	430,285	576,885	22,780	**2,872,832**	260	11,037
35	Whitehorse	2,526,517	646,420	790,886	99,386	**4,063,209**	417	9,742
36	Haines Junction	631,718	410,428	197,749	30,703	**1,270,599**	252	5,038
37	Destruction Bay	649,577	475,929	203,340	45,646	**1,374,491**	137	10,004
38	Beaver Creek	766,635	497,341	239,983	52,786	**1,556,744**	164	9,481
39	Blanchard	548,491	667,242	171,696	-	**1,387,429**	130	10,697
52	Ross River	705,028	447,642	220,698	-	**1,373,368**	316	4,346
53	Tuchitua	937,089	909,884	293,341	-	**2,140,314**	307	6,979
54	Watson Lake	1,758,591	443,919	550,499	95,947	**2,848,956**	163	17,521
55	Swift River	523,369	396,456	163,832	36,934	**1,120,591**	132	8,515
58	Teslin	751,948	409,517	235,385	43,246	**1,440,096**	150	9,613
59	Drury Creek	490,892	374,445	153,666	-	**1,019,003**	161	6,345
60	Carmacks	1,289,094	356,589	403,530	14,992	**2,064,205**	401	5,150
	Quiet Lake						162	
	Twin Creeks						176	
Total		**24,812,758**	**10,542,157**	**7,767,239**	**506,609**	**43,628,764**	4,822	9,049

3.2 HIGHWAY CAPITAL COSTS

Review of Yukon highways capital costs indicates that capital costs may change materially each year depending on the investment required for each highway. Table A-5 below provides the historical trends in highway capital expenditures and shows an approximate 20% increase in 2012/13 over 2011/12, a reduction of 18% for the following year (2013/14) and an increase of 15% in 2014/15.

The average annual increase in 2014/15 over 2011/12 was 4.3%. With inflation adjustments[20] the average annual increase would be at 2.5%.

[19] The maintenance cost for Twin Creeks and Quiet Lake camps [both serve Canol Road] are rolled into maintenance cost for Ross River and Teslin camps.

[20] Based on Whitehorse Consumer Price Index, with 2002=100 2014 was at 124.4 and 2011 at 118.1. Source: Government of Yukon Economic Development. 2013. Whitehorse CPI Based Inflation Calculator. Retrieved from: http://economics.gov.yk.ca/cpi.aspx [accessed on November 20, 2015]..

Table A-5: Highway Capital Costs for 2011/12 to 2014/15 ($000)

Years	Total Highway Capital Costs, $000
2011/12	44,873.7
2012/13	54,010.5
2013/14	44,173.6
2014/15	50,926.1
Average Annual Change	4.3%
Average Annual Change after Inflation Adjustment	2.5%

APPENDIX B:

BASELINE CONDITIONS WITHOUT THE ALASKA HIGHWAY

1.0 INTRODUCTION

This appendix provides detailed analysis of the "without the Alaska Highway" scenario impacts on current traffic volumes and maintenance and capital costs for highways within Yukon (Appendix A detailed these conditions today with the Alaska Highway).

2.0 EXISTING HIGHWAY TRAFFIC VOLUMES WITHOUT THE ALASKA HIGHWAY

This section provides information on current traffic volumes without the Alaska Highway and reviews (a) commercial heavy traffic volumes, and (b) light traffic and tourist volumes.

2.1 IMPACT ON COMMERCIAL HEAVY TRAFFIC VOLUMES

With the exception of changes related to loss of the Wolverine and Cantung[1] mines, without the Alaska Highway, it is assumed that the supply of goods to Private/ Public Business in Whitehorse and throughout western/ central Yukon will continue through Inside Passage as it existed in 2014. This may overstate the volumes without the Project to the extent that traffic estimates also relate to the other areas of Yukon that would be isolated without the Alaska Highway. However, this impact is assumed to be not significant.

While the overall Yukon demand assumed (excluding the Wolverine and Cantung mine impacts) would not change without the Alaska Highway, the costs and impact to Private/Public Business for these deliveries into Yukon would be expected to change.[2]

Table B-1 illustrates as follows regarding transportation costs without the Alaska Highway:[3]

- **Community Re-Supply** – the total transportation costs for deliveries into Yukon would be expected to be lower via Inside Passage by approximately $25.4 million per year compared to deliveries via the Watson Lake gateway.
- **Development Freight** – the total transportation costs for deliveries to Yukon would be expected to increase, adding approximately $1.9 million costs through Inside Passage compared to the Watson Lake Gateway (after considering reductions due to loss of the Wolverine and Cantung mines).
- **Bulk Fuel Transport** – the transportation rate estimate of fuel delivery is cheaper through Inside Passage than the estimate for Watson Lake Gateway ($29.4/tonne compared to

[1] Cantung mine is located in Northwest Territories, however, it used the Nahanni Road for inbound of supplies and outbound shipments of mine production.
[2] In a without the Highway scenario there would be changes to the size and composition of Yukon's population that would impact the volume and types of goods shipped to Yukon. Further, with a different shipping route, and material differences regarding the timing and flexibility for deliveries, there would also be potential changes to the types of businesses operating in Yukon which would also alter the composition of goods transported (also affecting costs and volumes for deliveries). However, quantification of these impacts are outside the scope of this study.
[3] It is noted that Yukon customers are not likely to capture the benefits of lower unit transportation cost through the Inside Passage. Please see further details in this section below.

$265.5/tonne); therefore, the Inside Passage the transportation cost for these deliveries would be reduced by about $17.2 million (after considering reductions due to loss of the Wolverine and Cantung mines).

As Table B-1 illustrates, the transportation cost today for Yukon community resupply and bulk fuel delivery via Watson Lake (i.e., using the Alaska Highway) is estimated to be notably higher than the transportation cost for such deliveries via Inside Passage gateways (i.e., the alternative without the Alaska Highway). This result leads to further exploration of the reasons why Yukon businesses continue today to use the Alaska Highway for delivery of goods (Table B-1 illustrates that over 80% of Yukon community resupply deliveries for Yukon Private/Public Business loads occur today through the Alaska Highway via Watson Lake). The analysis shows that the Highway offers advantages in timing, flexibility and customer impacts:

- Delivery by highway is faster than by marine transport, e.g., goods/material can be delivered by the Highway within two days to Yukon from B.C./Alberta (versus about eight days by marine transport, assuming that there are no delay issues related to accommodating small loads). Significant shortages may occur within days, especially for perishable items.

- Deliveries by highway also are flexible compared to marine transport. This may better suit operation of many Yukon businesses (e.g., big box stores) that prefer to order smaller shipments (e.g., partial truck loads) and receive virtually daily supply service (reducing inventory costs and required floor space). Also delivery reliability, transit time and frequency may be as important to certain local business as transportation rates, especially small businesses.

- Ultimately, without the Highway it is possible that some Yukon businesses would experience critical impacts on the service and products that they can provide. It is not feasible in this study, however, to provide useful assessments as to what share of this traffic might be permanently reduced without the Alaska Highway. Also, added volumes through the Inside Passage would likely lead to improved cost efficiencies and frequency which also cannot be assessed at this time.

In addition to the above, the Alaska Highway today also delivers liquefied natural gas (LNG) supplies to Inuvik, Northwest Territories ("NWT") and Yukon Energy[4] from southern B.C. - and without the Highway, ability to secure equivalent cost effective LNG supplies by marine transport through a U.S. port via Inside Passage is uncertain today.

In 2014, there were three mines in operation, Minto in western Yukon, Wolverine in eastern Yukon and Cantung in NWT close to the Yukon border. The Minto mine currently uses the Inside Passage for transport of product from the mine site to market. As such, there will be no impact without the Alaska Highway on outbound resource shipments under the baseline scenario. However, without the Alaska Highway both the Wolverine and Cantung mines are assumed not to exist. The loss of these mines in 2014 would reduce development freight inbound to Yukon and NWT by about 22,700 tonnes and would reduce bulk fuel inbound to Yukon by about 19,700 tonnes. Outbound production from these mines would also cease (about 119,000 tonnes in 2014).

[4] Yukon Energy notes that two LNG generators became operational in late June 2015. See Appendix C.

There are also economic impacts from "through traffic" which currently moves through Yukon between B.C./Alberta and Interior Alaska/NWT via the Alaska Highway, and which would no longer move through Yukon absent the Alaska Highway[5]. The economic impact on Yukon of such through traffic is assumed to be minimal. It is assumed that the traffic would be re-routed and incur higher costs for the affected parties – but absent more detailed information on this traffic (i.e., the specific cargoes, as well as origins and destinations), economic impact estimates have not been developed.

[5] As provided in Appendix A, about 76,000 tonnes of heavy freight moving from Interior Alaska through Yukon to northeast B.C. and points beyond, and about 92,000 tonnes entering Yukon at Watson Lake and moving through to Alaska and NWT [Inuvik and surrounding communities].

Table B-1: Transportation Cost Impacts with and without the Alaska Highway[6]

	2009 NTSA		Updated to 2014 with Project		2014 without Project		2014 Change in Volume			Transport Cost Estimate, $/Tonne	Transportation Cost Impact, $
	Trucks	Tonnes	Trucks	Tonnes	Trucks	Tonnes	Trucks	Tonnes Via Inside Passage	Tonnes Would Not Exist		
Inbound to Yukon for Yukon	A	B	C	D	E	F	G=E-C	H=F-D	I	J	K=H*J
Inside Passage Gateway											
Community Resupply	2,009	53,400	864	25,673	8,010	165,736	7,147	140,063		$317.9	$44,524,628
Development Freight	1,177	24,200	688	23,392	1,643	63,872	955	40,480		$285.7	$11,565,635
Bulk Fuel	1,573	63,900	1,987	82,722	3,999	163,365	2,012	80,643		$29.4	$2,369,563
Total Inbound to Yukon	**4,758**	**141,500**	**3,539**	**131,787**	**13,653**	**392,973**	**10,114**	**261,186**			**$58,459,826**
Outbound from Yukon	**1,023**	**54,000**	**1,023**	**49,104**	**1,023**	**49,104**	**0**	**0**			**$0**
Interior Alaska Gateway											
Community Resupply	0	0	49	833	0	0	-49	-833		$317.9	-$264,802
Development Freight	0	0	25	858	0	0	-25	-858		$285.7	-$245,000
Bulk Fuel	281	8,000	417	15,411	0	0	-417	-15,411		$142.0	-$2,188,618
Total Inbound to Yukon	**281**	**8,000**	**490**	**17,101**	**0**	**0**	**-490**	**-17,101**			**-$2,698,421**
Watson Lake Gateway											
Community Resupply	4,168	110,460	7,098	139,230	0	0	-7,098	-139,230	0	$500.6	-$69,697,722
Development Freight	2,995	47,340	1,463	62,322	0	0	-1,463	-62,322	22,700	$237.0	-$9,390,467
Bulk Fuel	1,260	51,200	2,078	84,933	0	0	-2,078	-84,933	19,700	$265.5	-$17,319,255
Total Inbound to Yukon	**8,423**	**209,000**	**10,639**	**286,485**	**0**	**0**	**-10,639**	**-286,485**	**42,400**		**-$96,407,444**
Outbound from Yukon			**2,479**	**119,000**	**0**	**0**	**-2,479**	**-119,000**	**119,000**		**$0**
Total											
Community Resupply	6,177	163,860	8,010	165,736	8,010	165,736	0	0	0		-$25,437,896
Development Freight	4,172	71,540	2,176	86,572	1,643	63,872	-533	-22,700	22,700		$1,930,168
Bulk Fuel	3,114	123,100	4,481	183,065	3,999	163,365	-482	-19,700	19,700		-$17,138,311
Community Bulk Fuel			*3,679*	*151,365*	*3,198*	*151,365*					
Bulk Fuel for Mines			*802*	*31,700*	*802*	*12,000*					
Total Inbound to Yukon	**13,462**	**358,500**	**14,668**	**435,373**	**13,653**	**392,973**	**-1,015**	**-42,400**	**42,400**		**-$40,646,038**
Outbound from Yukon	**1,023**	**54,000**	**3,502**	**168,104**	**1,023**	**49,104**	**-2,479**	**-119,000**	**119,000**		**$0**

[6] The update of the 2009 NTSA data for 2014 is based on data collected from Weigh Scales. Inbound and outbound freight for Wolverine and Cantung are assumed not to exist without the Alaska Highway.

Table B-2 provides summarizes the advantages and disadvantages for highway versus marine transport delivery to Yukon.

Table B-2: Comparison of Advantages/ Disadvantages for Marine Delivery vs Highway Delivery to Yukon (existing conditions)

	Marine Delivery	Highway Delivery
Volume & Price	• Due to large capacity for shipping fuel by barge average unit transportation cost: o Is lower for shipping fuel ($29.4/tonne) o Is lower for general freight ($317.9/tonne). • Lower unit transportation cost may not benefit Yukon businesses or consumers[7]. • Average unit costs for development freight are higher.	• Due to less-than-full truckload shipments, the average unit transportation cost: o Is higher for fuel ($265.5/tonne) o Is higher for general freight ($500.6/tonne) • Unit costs for general freight delivered would be much lower with full truckload shipments[8]. • Average unit costs for development freight are lower.[9]
Timing & Flexibility	• About eight days.[10] • Less flexible compared to truck transport along the highway. • Weekly deliveries may not suit small businesses and/ or businesses that sell perishable products.	• Deliveries within two days to Yukon from B.C./Alberta • More flexible compared to marine delivery. • May better suit operation of many Yukon businesses[11] that prefer to order smaller shipments and receive virtually daily supply service[12].
Impact on Customers	• Marine Transport benefits: o Mining companies and large contractors.[13] o Certain mid-sized businesses with larger storage capabilities.[14] • Other small to mid-sized businesses may see material disadvantages if required to rely on marine transport rather than highway transport.	• For certain small to medium sized businesses, delivery reliability, transit time and frequency may be as important as transportation rates. • Longer delivery time, and requirement for a full truck load would require greater storage (increasing these costs & risks).

[7] Skagway waterfront is tightly controlled by the White Pass & Yukon Route and Alaska Marine Lines (AML), and cargo-handling arrangements for use of its public dock must be made with these companies or with the Town of Skagway.
[8] Between $219.4/tonne and $292.5/tonne compared to average $317.9/tonne via marine delivery through Skagway.
[9] Approximately $237/tonne via Highway compared to $285.7/tonne for marine delivery. Highway rates for most of these deliveries are negotiated multi-year agreements.
[10] The only general cargo marine service currently delivering cargo to Yukon is Alaska Marine Lines (AML), operating weekly service between Seattle, WA and Skagway, AK.
[11] It is noted that over 90% of the small and mid-sized businesses ship less than full truckloads (LTL).
[12] This reduces costs and risks for businesses related to inventory costs and required floor space.
[13] Mining companies and large contractors tend to have procurement capabilities/requirements that are aligned with marine shipment, and have established service agreements with both suppliers and their carriers.
[14] Due to lower transportation costs, the following either have, or are already using, Inside Passage barge service: Yukon Liquor, Northland Beverages, Whitehorse Beverages, Northerm Windows, and the supplier of calcium chloride for the Department of Highways.

2.2 IMPACT ON LIGHT TRAFFIC AND TOURIST VOLUMES

Without the Alaska Highway there would be no connection between Yukon and northern British Columbia, or between Interior Alaska and the Lower 48 States, and light traffic volumes would not exist in the following areas:[15]

- On the Alaska Highway north of Haines Junction (Figure A-2 in Appendix A notes shows that the Average Daily Traffic in 2010 was between 150 and 299);
- On the Alaska Highway between Johnson's Crossing and Yukon/B.C. border (Figure A-2 in Appendix A notes shows that the Average Daily Traffic in 2010 was between 300 and 599);
- On the Top of the World Highway (Figure A-2 in Appendix A notes shows that the Average Daily Traffic in 2010 was between 50 and 149);
- On the Nahanni Range Road (Figure A-2 in Appendix A notes shows that the Average Daily Traffic in 2010 was below 50);
- On the Robert Campbell Highway between Watson Lake and Ross River (Figure A-2 in Appendix A notes shows that the Average Daily Traffic in 2010 was below 50);

Traffic on the above noted road sections includes tourist traffic. The impact to the economy from tourism is reviewed in detail in Appendix D. In summary the following is noted regarding tourism volumes without the Alaska Highway (a more detailed analysis on tourism is provided in Appendix D):

- About 56% of the 2014 visitors to Yukon are already entering Yukon through Skagway and Haines (Fraser and Pleasant Camp border crossings) or through Whitehorse and Dawson City airports, and would be unaffected.
- Visitors entering Yukon via Beaver Creek (the Alaska Highway), Little Gold (traversing Top of The World Highway to Dawson) and via Watson Lake (via the Alaska Highway through B.C.) are assumed to cease.[16] It is estimated that the number of visitors to Yukon would be reduced by about 44%, or approximately 197,700 visitors. However, this assessment is based on a "worst case scenario" that assumes tourists currently entering via Watson Lake, or other entry points that would be isolated without the Alaska Highway, would not enter via other means.

The remaining portion of the light traffic is assumed to move through Whitehorse and other accessible residential areas/communities with minimal impact to the economy as a whole. Therefore no attempt has been made to estimate impact from these specific light traffic volume changes without the Project.

[15] The traffic counts may also include other types of traffic, such as trucks. However, a large portion of the traffic is cars.

[16] It is assumed that Dawson City would still draw Alaska visitors and that visitors would continue to drive from Skagway up the North Klondike to Dawson City. However, the volume of visitors would be uncertain. It is also assumed that traffic on the Alaska Marine Highway would likely increase as more visitors travelling through Yukon from Skagway/Haines to central/interior Alaska would use the Alaska Marine Highway. This would likely result in a corresponding reduction in visitors to Yukon which would offset the number of people travelling to Dawson through Skagway. Consequently, for the purpose of this study it is assumed that visitors coming through Little Gold would cease.

3.0 IMPACT ON HIGHWAY MAINTENANCE AND CAPITAL COSTS

Highway maintenance and capital cost impacts in Yukon without the Alaska Highway are estimated by removing the cost related to the portion of the roads that would not exist. The cost that cannot be directly linked to the road portion is estimated based on average cost per km.

3.1 HIGHWAY MAINTENANCE COST IMPACT

Maintenance costs are provided by camps in Appendix A. For the without the Highway scenario, maintenance costs are estimated based on average maintenance cost per km (i.e. the maintenance costs for the highways that would not have existed without the Alaska Highway are removed). As illustrated in Table B-3, without the Alaska Highway maintenance cost for 2014/15 are estimated to be reduced to $29.8 million (or about 32% lower than the 2014/15 actuals with the Alaska Highway).

Without the Alaska Highway the following roads and/or portions of Yukon highways would not exist:[17]

- Alaska Highway north of Haines Junction:
    - The maintenance cost for Beaver Creek (about $1.55 million) and Destruction Bay (about $1.37 million) camps would not exist, and a portion of the costs for Haines Junction camp would be reduced by the portion of the highway north of Haines Junction (about $0.335 million impact).
- Alaska Highway between Johnson's Crossing and Yukon/B.C. border:
    - The maintenance cost for Watson Lake (about $2.85 million), Swift River (about $1.12 million) and Teslin (about $1.44 million) camps would not exist.
- The Top of the World Highway:
    - The maintenance cost for the Dawson camp would be reduced to the portion of the highway west of Dawson (about $2.47 million impact).
- The Nahanni Range Road:
    - The maintenance cost for Tuchitua camp would not exist (about $2.14 million impact), including the portion of the Robert Campbell Highway served by Tuchitua camp.
- Robert Campbell Highway between Watson Lake and Ross River:
    - The maintenance cost would be reduced based on the impact for Tuchitua camp (as noted above), plus a portion of the maintenance cost for the Ross River camp (about $0.533 million impact).

[17] See Section 3 of the Economic Profile of the Alaska Highway report for details regarding the roads that would not exist in the Without the Highway Scenario. Figure A-4 in Appendix A provides maintenance camp locations and service areas.

Table B-3: Highway Maintenance Cost for 2014/15 with and without the Alaska Highway ($)[18]

	Camp	Camp Spending	Camp Overhead	System Overhead Allocation	Highway Project Cost Allocation	Total	Total Highway Served, km	Average Maintenance Cost per km	Net Without the Alaska Highway, km	Impact Without the Alaska Highway	Net Without the Alaska Highway
		$	$	$	$	$	km	$/km	km	$	$
12	Mayo	953,606	358,072	298,511	-	**1,610,189**	226	7,128	226	-	1,610,189
13	Stewart Crossing	1,838,612	461,217	575,548	30,149	**2,905,526**	303	9,602	303	-	2,905,526
14	Dawson*	3,415,996	446,696	1,069,323	18,325	**4,950,341**	434	11,406	217	2,475,170	2,475,170
16	Klondike	947,004	734,996	296,445	-	**1,978,445**	140	14,182	140	-	1,978,445
17	Ogilvie	1,175,762	858,193	368,054	-	**2,402,008**	147	16,340	147	-	2,402,008
18	Eagle Plains	2,097,482	445,402	656,583	-	**3,199,467**	178	17,934	178	-	3,199,467
19	Old Crow	17,021	91,405	5,328	-	**113,754**	11	10,631	11	-	113,754
33	Fraser	945,444	680,080	295,956	15,715	**1,937,196**	56	34,408	56	-	1,937,196
34	Carcross	1,842,882	430,285	576,885	22,780	**2,872,832**	260	11,037	260	-	2,872,832
35	Whitehorse	2,526,517	646,420	790,886	99,386	**4,063,209**	417	9,742	417	-	4,063,209
36	Haines Junction*	631,718	410,428	197,749	30,703	**1,270,599**	252	5,038	186	335,031	935,568
37	Destruction Bay*	649,577	475,929	203,340	45,646	**1,374,491**	137	10,004		1,374,491	-
38	Beaver Creek*	766,635	497,341	239,983	52,786	**1,556,744**	164	9,481		1,556,744	-
39	Blanchard	548,491	667,242	171,696	-	**1,387,429**	130	10,697	130	-	1,387,429
52	Ross River*	705,028	447,642	220,698	-	**1,373,368**	316	4,346	193	533,122	840,246
53	Tuchitua*	937,089	909,884	293,341	-	**2,140,314**	307	6,979		2,140,314	-
54	Watson Lake*	1,758,591	443,919	550,499	95,947	**2,848,956**	163	17,521		2,848,956	-
55	Swift River*	523,369	396,456	163,832	36,934	**1,120,591**	132	8,515		1,120,591	-
58	Teslin*	751,948	409,517	235,385	43,246	**1,440,096**	150	9,613		1,440,096	-
59	Drury Creek	490,892	374,445	153,666	-	**1,019,003**	161	6,345	161	-	1,019,003
60	Carmacks	1,289,094	356,589	403,530	14,992	**2,064,205**	401	5,150	401	-	2,064,205
	Quiet Lake						162		162		
	Twin Creeks						176		176		
Total		**24,812,758**	**10,542,157**	**7,767,239**	**506,609**	**43,628,764**	4,822	9,049	3,363	**13,824,514**	**29,804,249**

Note: *- the highlighted camps would be affected without the Alaska Highway.

[18] The maintenance cost for Twin Creeks and Quiet Lake camps [both serve Canol Road] are rolled into the maintenance cost for the Ross River and Teslin camps.

3.2 HIGHWAY CAPITAL COSTS IMPACT

Similar to maintenance costs, capital costs without the Alaska Highway are estimated by removing the costs directly spent on road and highway segments that would not exist without the Alaska Highway, as well as the average cost per km (where the cost is not directly allocated to the portion of the highway).[19]

Table B-4 provides the impact on capital costs without the Alaska Highway from 2011/12 to 2014/15:

- For 2011/12 and 2012/13, the impact of the Alaska Highway is double, reflecting higher than average capital spending for highway and road segments that would not exist without the Alaska Highway;[20]
- For 2013/14 and 2014/15, the impact of the Alaska Highway ranges between 64% and 76%, reflecting higher than average capital spending for the highway and road segments that would not exist without the Alaska Highway.

TableB-4: Highway Capital Costs for 2011/12 to 2014/15 with and without the Alaska Highway ($000)

	Highway Capital Costs, $000			
Years	Total Highway Capital Costs, $000	Estimate Without the Alaska Highway	Alaska Highway Impact	Alaska Highway Impact (%)
	A	B	C=A-B	D=C/B
2011/12	44,873.7	22,211.5	22,662.2	102%
2012/13	54,010.5	26,954.5	27,056.0	100%
2013/14	44,173.6	26,856.5	17,317.1	64%
2014/15	50,926.1	29,015.2	21,910.9	76%

[19] Excludes costs for: Alaska Highway from B.C./Yukon border to Johnsons Crossing and from Haines Junction to Yukon/Alaska border; Nahanni Range Road; Top of the World Highway in Yukon; and Robert Campbell Highway south of Canol Road.

[20] It is estimated that about 27% of the total Yukon highways would not have existed without the Alaska Highway. The average capital costs for the sections of highway that would not exist without the Alaska Highway are higher than for the sections of highways that would exist with or without the Alaska Highway. The capital cost impact of the highways that would not have existed without the Alaska Highway is 102% in 2011/12 [compared to 27% share of the highway length], 100% in 2012/13, 64% in 2013/14 and 76% in 2014/15.

APPENDIX C:
OVERVIEW OF YUKON'S ECONOMY

1.0 INTRODUCTION AND OVERVIEW

This appendix provides a high level background summary for Yukon's existing economy, including the critical role that transportation infrastructure has played in economic development of the territory.

2.0 TRANSPORTATION INFRASTRUCTURE AND ECONOMIC DEVELOPMENT OF TERRITORY

Yukon's economic development has been influenced by the development of critical transportation infrastructure linking almost all Yukon communities and connecting Yukon to external markets. Key transportation links in this regard have been through marine ports at Skagway and Haines, and through the Alaska Highway. This includes the following key developments:

- **Linkage to Inside Passage Gateway at Skagway**: In the early 1900's, completion of the White Pass and Yukon Route (WPYR) connected southern Yukon (Whitehorse) to the marine port at Skagway and provided a critical expansion to Yukon's transportation system. Passengers and goods bound for the Gold Rush near present-day Dawson City were delivered to Whitehorse and then shipped downstream along the Yukon River to Dawson City via paddlewheel boats.[1] By the 1960's, the WPYR also served the Faro mine. However, after the development of a roadway along the WPYR rail route, the rail system shifted away from industrial use. Today, WPYR no longer runs trains to Whitehorse, and instead operates during the tourist season, transporting cruise ship passengers from Skagway to Carcross.[2]

- **Development of Commercial Aviation Infrastructure**: Commercial aviation was established in Yukon in the 1920's, and by the early 1940's a series of aerodromes were constructed across Yukon as part of the Northwest Staging Route.[3] Today, the government of Yukon maintains and operates four airports and 25 aerodromes throughout the territory. Over the last decade, passenger and aircraft movement at Erik Nielsen Whitehorse International Airport has steadily increased from approximately 150,000 enplaning and deplaning passengers in 2000 to over 300,000 enplaning and deplaning passengers in 2014.[4] Aircraft movements at community airports and aerodromes have also become linked to resource development activity, peaking when mineral exploration activities in the territory increase.[5]

- **Development of Critical Highway Infrastructure**: The construction of the Alaska Highway in 1942 provided a road connection extending from Dawson Creek, B.C. to Fairbanks, Alaska, and leaving as a post war legacy a major highway artery connecting Yukon and Interior Alaska to the

[1] Source: Government of Yukon. 2015. Submission to the Canada Transportation Act Review Panel. April 2015, page 5. Retrieved from: https://www.tc.gc.ca/eng/ctareview2014/pdf/Government%20of%20Yukon%20Submission.pdf [accessed February 12, 2016]
[2] Source: Government of Yukon. 2015. Submission to the Canada Transportation Act Review Panel. April 2015, page 8-9. Retrieved from: https://www.tc.gc.ca/eng/ctareview2014/pdf/Government%20of%20Yukon%20Submission.pdf [accessed February 12, 2016]
[3] Source: Government of Yukon. 2015. Submission to the Canada Transportation Act Review Panel. April 2015, page 5. Retrieved from: https://www.tc.gc.ca/eng/ctareview2014/pdf/Government%20of%20Yukon%20Submission.pdf [accessed February 12, 2016]
[4] Source: Government of Yukon. 2015. Submission to the Canada Transportation Act Review Panel. April 2015, page 10. Retrieved from: https://www.tc.gc.ca/eng/ctareview2014/pdf/Government%20of%20Yukon%20Submission.pdf [accessed February 12, 2016]
[5] Source: Government of Yukon. 2015. Submission to the Canada Transportation Act Review Panel. April 2015, page 8. Retrieved from: https://www.tc.gc.ca/eng/ctareview2014/pdf/Government%20of%20Yukon%20Submission.pdf [accessed February 12, 2016]

rest of Canada and the Lower 48 States via inland passage. The Yukon Highway system was expanded in the 1950's (as part of the Roads to Resources initiatives of the Diefenbaker government) to include construction of the Klondike Highway north to Dawson City, and in the 1970's expanded to include road connections to mineral developments and other Yukon communities. A connection to NWT via the Dempster Highway was completed in 1979.[6]

Yukon's well-developed highway network sets it apart from other northern Canadian jurisdictions and provides a key foundation for economic development for the territory:[7]

- Yukon highways form part of the National Highway System, and the Alaska Highway and the South Klondike Highway are designated as Core Routes, and the North Klondike and Dempster Highways designated as Northern Remote Routes.
- All season connections are maintained on major highways with the BC interior (as well as with the Atlin area), with Alaska (interior and two ports), and with Inuvik, NWT.
- Major highways today also connect all Yukon communities except for Old Crow; these major connections also extend into critical areas for mineral development in western Yukon, eastern Yukon and western NWT, and have provided critical infrastructure support for major mine developments such as the United Keno Hill Mine (near Keno City, Yukon), the Faro Mine (near Ross River, Yukon), and the Cantung mine (in western NWT on the border with Yukon).
- The connection to the Port of Skagway (initially via the WPYR and later via the South Klondike Highway) has also been critical to the development of the Yukon economy. Aside from being the key port connecting most resource development activities to date in Yukon to external markets, it also has been a critical conduit for tourist traffic between Alaska and Yukon, as cruise ship passengers will often travel to Carcross or Whitehorse via the WPYR or bus.

3.0 ECONOMIC HIGHLIGHTS FOR THE YUKON ECONOMY

This appendix provides a high level background summary for Yukon's existing economy.

Overall, the largest components of Yukon's economy relate to public administration and resource development activities. However, activities that support the tourism industry (retail, accommodation, etc.) also contribute materially to the Yukon economy. Highlights are reviewed below for the following:

- Population and Labour Force;
- Gross Domestic Product;
- Key Economic Sectors; and
- Role of Government.

[6] See Northern Transportation Systems Assessment, Executive Summary, page 16. See also Northern Transportation Systems Assessment, Phase 1 Report, page 134 for description of transportation infrastructure in Yukon, NWT and Nunavut; Government of Yukon. 2015. Submission to the Canada Transportation Act Review Panel. April 2015, page 5. Retrieved from: https://www.tc.gc.ca/eng/ctareview2014/pdf/Government%20of%20Yukon%20Submission.pdf [accessed February 12, 2016]

[7] Source: Government of Yukon. 2015. Submission to the Canada Transportation Act Review Panel. April 2015, page ii. Retrieved from: https://www.tc.gc.ca/eng/ctareview2014/pdf/Government%20of%20Yukon%20Submission.pdf [accessed February 12, 2016]

3.1 POPULATION AND LABOUR FORCE

In 2015, Yukon's population grew for the 12th consecutive year,[8] and as of June 2015, Yukon's population was estimated at 37,343,[9] (an approximate 20% increase over the last ten years, representing an annual average increase of 1.8%). Notably, the City of Whitehorse accounted for over 77% of Yukon total population at 28,872, and Whitehorse's population gains accounted for the majority of overall Yukon population growth in 2015 over 2014 (about 85% of the annual change).

As of November 2015, the Yukon labour force averaged 21,200,[10] up 700 from 2014 level. The unemployment rate was 4.2%, the lowest unemployment rate amongst Canadian provinces and territories, and lower than the national unemployment rate of 7.1%. For the same period in the prior year the territorial unemployment rate was at 4.4%.

The service-producing sector accounted for about 84% of total employment, while 16.0% were employed in the goods-producing sector. Approximately 39.5% of working Yukoners were employed by one of the levels of government in the territory, while the remaining 60.5% were employed in the private sector with about 26.2% as self-employed.

3.2 GROSS DOMESTIC PRODUCT

In 2014, Yukon's real GDP contracted for a second consecutive year [after nine consecutive year over year increases], decreasing by approximately 0.8% to $2.264 billion. An annual decline in mineral production as a result of weak mineral prices and an ongoing slowdown in the global mining industry was the primary contributor to the reduction in GDP.[11] Table C-1 below provides a summary of Yukon GDP for 2010-2014 at chained 2007 dollars. In summary, the following is specifically noted:

- GDP from mining, quarrying and oil & gas extraction was a significant contributor to Yukon's economy, at 19% of total GDP in 2014 (at 2007 dollars); however, it was down from an estimated contribution of over 21% in 2012 and 2013.
- GDP related to Public Administration contributed about 21-22% to Yukon's GDP over the last five years (2010-14), highlighting the important role the public sector plays in Yukon's economy.

[8] Review of the impact of Faro Mine in the 1980s and 1990s shows that closure of a large mine development may impact the overall Yukon population. The 2013 Yukon Economic Outlook also notes that following the final closure of the Faro mine in 1998, Yukon experienced six consecutive years of declining population which saw the population fall just below 30,000 in 2003.
[9] Yukon Bureau of Statistics, Population Report June 2015. In a without the Highway scenario there would be changes to the size and composition of Yukon's population that would impact the volume and types of goods shipped to Yukon. Further, with a different shipping route, and material differences regarding the timing and flexibility for deliveries, there would also be potential changes to the types of businesses operating in Yukon which would also alter the composition of goods transported (also affecting costs and volumes for deliveries). However, these impacts cannot be assessed with any accuracy in this study [accessed December 18, 2015].
[10] Source: Yukon Bureau of Statistics. 2015. Yukon Employment November 2015. Retrieved from: http://www.eco.gov.yk.ca/stats/pdf/employment_nov15.pdf [accessed on December 18, 2015].
[11] Source: Statistics Canada. 2015. CANSIM Table 379-0030 Gross domestic product (GDP) by North American Industry Classification System (NAICS), chained 2007 dollars. Retrieved from: http://www5.statcan.gc.ca/cansim/a26?lang=eng&id=3790030 [accessed December 17, 2015].

Table C-1: Yukon GDP for 2010-2014 at Chained 2007 Dollars, $Millions

	2010	2011	2012	2013	2014
North American Industry Classification System (NAICS)					
All industries	2,111.6	2,214.8	2,302.9	2,283.5	2,264.3
Goods-producing industries	610.4	652.1	718.8	684.6	649.5
Service-producing industries	1,512.7	1,576.5	1,604.8	1,613.5	1,623.2
Goods-producing industries					
Agriculture, forestry, fishing and hunting	4.2	4.2	4.1	3.6	3.5
Mining, quarrying, and oil and gas extraction	329.2	330.2	517.1	489.7	437.1
Utilities	36.9	38.4	40.4	40.1	38.9
Construction	218.2	249.0	169.6	167.3	173.1
Manufacturing	14.5	17.0	21.1	13.7	13.9
Service-producing industries					
Wholesale trade	29.6	37.2	37.0	35.2	30.3
Retail trade	104.9	106.5	110.2	106.7	107.8
Transportation and warehousing	60.2	68.0	70.2	63.3	66.5
Information and cultural industries	63.2	64.9	63.7	62.8	62.1
Finance and insurance	59.6	73.5	74.4	76.3	74.6
Real estate and rental and leasing	261.6	273.7	286.5	296.0	299.3
Professional, scientific and technical services	56.7	57.2	58.8	59.2	59.0
Management of companies and enterprises	7.7	7.9	7.9	6.9	6.0
Administrative and support, waste management and remediation se	27.9	28.7	28.4	29.1	29.8
Educational services	115.9	116.3	120.8	119.4	120.2
Health care and social assistance	154.1	155.7	161.9	165.6	170.8
Arts, entertainment and recreation	9.1	8.0	8.3	8.9	8.4
Accommodation and food services	64.5	69.3	70.5	69.0	67.1
Other services (except public administration)	33.9	35.4	33.2	33.3	33.7
Public administration	464.0	476.2	475.0	483.1	488.4

3.3 KEY ECONOMIC SECTORS

Resource development, tourism and the public sectors continue to be the key economic sectors in Yukon's economy.

3.3.1 Resource Development

Resource development activities related to both exploration and production continue to have a significant impact on Yukon's economy, and Yukon residents and businesses benefit from direct employment as well as spending on mineral exploration and mining activities. Resource development activities also support local businesses, and contribute towards financing of government infrastructure through royalties, taxes and fees paid to the government. Overall, mining-related activities are a prominent contributor to Yukon's economy with 19% of total GDP in 2014 (at 2007 dollars).

The significant impact the mining sector has on the Yukon economy is highlighted by the contraction in territorial GDP for the second consecutive year in 2014 [after nine consecutive increases], which is attributed to decline in mineral production[12] due to weak mineral prices and an ongoing slowdown in the global mining industry.

The following are specifically noted:

- Following record expenditures in 2011, mainly development of the Minto, Bellekeno and Wolverine mines, and mineral exploration and deposit appraisal expenditures declined in both 2012 and 2013.[13]
- Mineral resource development investment in Yukon was at $336.8 million in 2012, reduced to $192.1 million in 2013 and $146.0 million in 2014, and is expected to be about $121.4 million in 2015.[14]
- In the 2012/13 fiscal year, Yukon Government's Resource Revenues[15] were at $3.99 million, increasing to $4.086 million in 2013/14 and decreasing to $2.58 million in 2014/15 fiscal year.[16]
- In 2009, the Yukon Government received about $5.9 million in royalty payments from Minto mine; in 2010 mine royalty payments reduced to $3.8 million; and by 2013 total mine royalty payments were $0.215 million [Minto $0.215 million, Bellekeno $0 and Wolverine $0].[17]

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[12] The closure of the Bellekeno mine in September 2013 and lower than expected production from the other producing mines. The January 2015 announcement of the suspension of operations of the Wolverine also will have impact to the overall economy.
[13] Source: Yukon Economic Development. 2015. Yukon Economic Outlook for 2015. Retrieved from: http://economics.gov.yk.ca/Files/2015/YukonEconomicOutlook_October2015.pdf [accessed December 21, 2015].
[14] Total Mineral Resource Development Investments, by Province and Territory, 2012 - 2014 Annual and 2015, Natural Resource Canada http://sead.nrcan.gc.ca/expl-expl/ExploTable.aspx?FileT=34&Lang=en [accessed December 17, 2015].
[15] These revenues include revenues from minerals, forestry, water and land revenues. Yukon's grant from the federal government would be reduced by a dollar for each extra dollar received over the $6 million cap [in August 2012 the cap was raised to $6 million for all natural resources revenue http://www.gov.yk.ca/news/get-thefacts_dta.html, accessed on January 8, 2016].
[16] Government of Yukon, Department of Finance. 2015. Comparative Schedule of Revenues for the Year Ended March 31, 2015. Retrieved from: http://www.finance.gov.yk.ca/pdf/public_accounts/2014-15pub-s01.pdf [accessed February 8, 2016]; and Government of Yukon, Department of Finance. 2015. Comparative Schedule of Revenues for the Year Ended March 31, 2015. Retrieved from: http://www.finance.gov.yk.ca/pdf/public_accounts/Schedule_1_-_Comparative_Schedule_of_Revenues.pdf [accessed February 8, 2016].
[17] Yukon Government, Department Energy, Mines and Resources. 2015. Royalties. Retrieved from: http://www.emr.gov.yk.ca/mining/royalty_narrative.html [accessed December 21, 2015].

3.3.2 Tourism

Tourism is a vital component to the sustainability of Yukon's economy,[18] and related activities contribute to the diversity of the territorial economy and support employment across a range of territorial businesses including the following: retailers, grocery stores, accommodations providers, restaurants, sports and recreational activities and providers of arts and culture. Many businesses benefit annually from visitors to the territory, including creating new jobs to serve visitors. In 2012, Yukon businesses attributed almost $250 million of their gross revenue to tourism.[19]

3.3.3 Retail Trade

Retail trade contributes about 5% to Yukon's GDP.

Retail sales tend to be influenced by the performance of the mining sector, as well as the tourism industry in Yukon. However, the slight increase in retail sales in 2014, is also attributed in part to growing household income and territorial increases in population and employment.

Food and beverage stores are the largest segment of Yukon retail sales sector, with about 30% of total sales; however, motor vehicle and parts dealers, sales related to gas stations, and retail related to health and personal care have also made large contributions to the retail trade sector. "Big box" stores such as Walmart also contribute to the retail sector.

3.3.4 Construction

The construction industry is one of the large contributors to Yukon's economy. In 2010 and 2011, the construction industry share of Yukon's GDP was about 10-11%. After declining in 2012 and 2013 [about 7%], the value of construction (as reflected in building permits) slightly increased in 2014 with an 8% share of Yukon's GDP.

3.3.5 Energy

Yukon is home to significant onshore and offshore hydrocarbon resources. Yukon's onshore sedimentary basins contain an estimated 14.77 trillion cubic feet (Tcf) of conventional natural gas and 663 million barrels (MMbbls) of conventional oil. Recent interest in Yukon's hydrocarbon potential has been in the Kotaneelee field in Southeast Yukon and in the Eagle Plain Basin in Northern Yukon. However, currently all energy derived from natural gas consumed in Yukon is imported from outside gas refineries.

Yukon's coal resources are largely undeveloped.

[18] Source: Yukon Department of Tourism and Culture. 2015. Tourism. Retrieved from: http://www.tc.gov.yk.ca/tourism.html [accessed on December 16, 2015].
[19] Source: Yukon Bureau of Statistics. 2013. Yukon Business Survey 2013. Retrieved from: http://www.eco.gov.yk.ca/pdf/2013_Business_Survey_Report.pdf [accessed December 21, 2015].

Most of Yukon's residential and commercial power users (including the Minto mine) are supplied today by a hydro-based grid, and hydroelectric generation is currently the predominant source of electrical energy.[20] Thermal generation units on the hydro grid (i.e., diesel and recent LNG generation units) are mostly used today to support the grid during peak periods and other times when the demand exceeds available hydraulic capacity.[21] Two natural gas-fired generator units in Whitehorse that became operational on the grid in late June 2015,[22] are supplied with LNG transported from Fortis BC's Tilbury facility[23] in Delta, B.C. using the Alaska Highway. The LNG displaces higher cost diesel generation for Yukon grid power supplies. Wind also provides small amount electrical energy on the grid.

4.0 ROLE OF THE GOVERNMENT

While the mining sector is the largest private sector economic driver in the territory, the public sector has a significant impact on territorial GDP and is a dominant force in the economy with the largest share of employment in Yukon.

4.1 ROLE OF GOVERNMENT IN PROVIDING SERVICES

The Yukon Government plays an important role in providing services to the public.

- In the fiscal year ending March 2014, total government expenses were $1,134.0 million,[24] with approximately 90% of these being accounted for by the following:
    - $341.4 million, or about 30%, of the total expenses related to providing health and social services;
    - $190.0 million of expenses related to highways and public works;
    - $163.8 million of expenses related to education;
    - $124.2 million of expenses related to community services;
    - $76.8 million of expenses related to energy, mines and resources
    - $65.2 million of expenses related to justice;
    - $35.4 million of expenses related to environment; and
    - $24.8 million of expenses related to tourism and culture.

- In the fiscal year ending March 2014, total Yukon Government revenues were $1,185.9 million.[25]

[20] Watson Lake, Old Crow, and communities along the Alaska Highway northeast of Haines Junction are not on the grid and are supplied solely by diesel generation.
[21] Yukon electrical grid is isolated and not connected to other grids.
[22] Source: Yukon Energy Corporation. 2016. Liquefied Natural Gas. Retrieved from: https://www.yukonenergy.ca/.energy-in-yukon/our-projects-facilities/back-up-electricity/liquid-natural-gas/when-is-it-being-done/ [accessed on January 8, 2016].
[23] Source: FortisBC. 2015. Michael Mulcahy Op Ed: Liquefied natural gas remains a smart choice. Retrieved from: http://www.fortisbc.com/MediaCentre/NewsReleases/2015/Pages/Michael-Mulcahy-Op-Ed-Liquefied-natural-gas-remains-a-smart-choice.aspx [accessed on January 8, 2016].
[24] Source: Government of Yukon. 2015. Comparative Schedule of Expenses, Schedule 3. Retrieved from: http://www.finance.gov.yk.ca/pdf/public_accounts/Schedule_3_-_Comparative_Schedule_of_Expenses.pdf [accessed on December 24, 2015].
[25] Source: Government of Yukon. Comparative Schedule of Revenues, Schedule 1. Retrieved from: http://www.finance.gov.yk.ca/pdf/public_accounts/Schedule_1_-_Comparative_Schedule_of_Revenues.pdf [accessed on December 21, 2015].

- Federal transfers through territorial formula financing grants and other transfers accounted for a substantial share of the government revenues at $977.1 million or 82% of total revenues in 2013/14 fiscal year.
- The second major contributor is taxation which accounted for about 11.5% of the revenues in 2013/14 fiscal year.

4.2 ROLE OF THE GOVERNMENT IN MINING SECTOR

Yukon obtained administration and control over its land and resources through a process of negotiated devolution. Responsibility for onshore oil and gas resources was transferred to the Yukon government on November 19, 1998. Federal and Yukon legislation implemented the transfer of responsibility for public lands, forests, water and minerals, and gas from coal from the federal government to Yukon, as provided for in the April 1, 2003 Devolution Transfer Agreement. With these transfers, Yukon obtained the resource management powers and responsibilities similar to a province.

The Government of Yukon encourages investment in the territory and a number of priority sectors[26] exist that have unique financial incentives to attract investment to Yukon.

Invest Yukon,[27] is a government run website that encourages investment to Yukon; it notes that the Government of Yukon spends more per capita on direct financial incentives for exploration in the mining industry than any other Canadian jurisdiction, dedicates a percentage of its total budget to direct exploration incentives, and actively promotes its abundant mineral wealth to world markets.

The Fraser Institute Annual Survey of Mining Companies, 2014[28] shows Yukon in the top 10 jurisdictions in the world for investment based on the Investment Attractiveness Index.

Yukon mines are subject to different tax and royalty rates summarized in Table C-2 below. In addition to the 5% goods and services tax (GST), mining corporations pay a combined 30% corporate tax rate and an after-profit royalty rate depending on the size of the operation.

Under the *Quartz Mining Act* (QMA), a royalty is a share of profits from a Yukon mine reserved for the Government of Yukon as owner of the mineral rights (a portion is also paid to Yukon First Nations). The royalty rate is calculated based on a mine's total value of output.

[26] Invest Yukon lists six priority sectors: Film and Sound; Forestry; Innovation and Technology; Mining and Exploration; Oil and Gas; Tourism and Culture. Source: Invest Yukon. 2015. Priority Sectors. Retrieved from: http://www.investyukon.com/Invest/Priority-Sectors [accessed on December 21, 2015].
[27] Source: Invest Yukon. 2015. Priority Sectors – Mining Exploration. Retrieved from: http://www.investyukon.com/Invest/Priority-Sectors/MiningExploration.aspx [accessed on December 21, 2015].
[28] Source: Jackson, Taylor. 2014. Fraser Institute Annual Survey of Mining Companies 2014. Retrieved from: https://www.fraserinstitute.org/sites/default/files/survey-of-mining-companies-2014.pdf [accessed on December 21, 2015].

Table C-2: Yukon Mining Royalty Rates[29]

	Royalties
Profit-based <$10,000	0%
Profit-based <$1m	3%
Profit-based <$5m	5%
Profit-based +1% for each additional $5m to a max of 12	+1% up to 12%

The Government of Yukon website notes that it is developing a new set of regulations to better manage industrial resource access roads through the life of a project.[30]

Up until August 2012, Yukon had one arrangement with Canada for oil and gas revenues and another arrangement for minerals, forestry, water and land revenues. Under these arrangements, the Government of Yukon could retain up to $3 million of revenue generated from resources such as mining and slightly over $3 million from oil and gas revenues. For minerals, forestry, water and land revenues, Yukon's grant from the federal government was reduced by a dollar for each extra dollar received over the $3 million cap. In August 2012, the governments of Canada and Yukon amended existing agreements. As a result of the amendments, the cap was raised from $3 million to $6 million for all natural resources revenue.[31] The amendments also provide an opportunity for the Government of Yukon to elect a 50/50 revenue share where the deduction in territorial formula financing payments should be equal to 50% of the annual resource revenues regardless of the amount of the revenues, subject to clauses noted in the agreement.

[29] Invest Yukon. 2015. Corporate Tax and Royalty Rates. 2015. Retrieved from: http://www.investyukon.com/Invest/Priority-Sectors/MiningExploration/corporate-tax-and-royalty-rates [accessed December 21, 2015].
[30] Government of Yukon Energy, Mines and Resources. 2014. Resource Access Roads. Retrieved from: http://www.emr.gov.yk.ca/lands/resource_access_roads.html [accessed December 21, 2015].
[31] Government of Yukon. 2012. Get the Facts. Retrieved from: http://www.gov.yk.ca/news/get-thefacts_dta.html [accessed January 8, 2016].

APPENDIX D:

TOURISM BASELINE CONDITIONS AND IMPACTS WITHOUT THE ALASKA HIGHWAY

1.0 INTRODUCTION

Tourism is a vital component to the sustainability of Yukon's economy,[1] and tourism-related activities contribute to the diversity of the economy and support employment across a wide variety industries including retailers, grocery stores, accommodations providers and restaurants as well as sports and recreational activities and arts and culture. A number of different businesses across Yukon benefit annually from visitors to the territory.

This appendix provides a detailed review of the existing tourism industry in Yukon as well as the impact of the Alaska Highway on this industry. While this appendix also provides some high level information on impacts of the Alaska Highway on Northern British Columbia and Alaska, the focus of the assessment is on the Yukon.

2.0 TOURISM IN YUKON: EXISTING CONDITIONS

The Yukon Tourism Indicators, Year-End Report, indicates that in 2014 approximately 443,300 people visited Yukon.[2] The following is specifically noted regarding total 2014 Yukon visitors:

- Approximately 366,500 people, or about 83% of total visitors, entered Yukon during the peak summer tourism and mining months, between May and September; and about 76,800 people (or about 17% of total Yukon visitors) entered Yukon during the shoulder months.

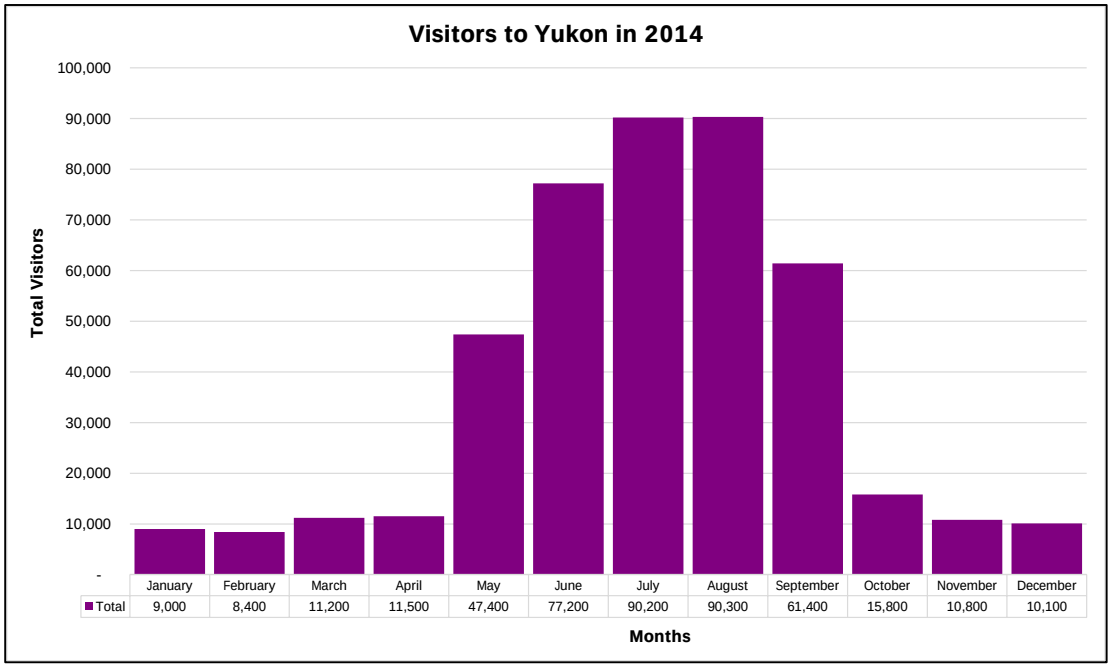
- 341,707 people crossed international borders into Yukon, including 42,626 Yukoners. The majority of the recorded international tourist traffic that entered Yukon crossed through border crossings at Fraser (between Skagway and Carcross), reflecting a large number of cruise ship passengers entering Alaska and touring Yukon as part of their Alaskan cruise.

- There is no port of entry at Watson Lake and information available regarding tourists entering Yukon at this entry point is more limited than for other entry points into Yukon. However, based on estimates available from the Yukon Department of Tourism and Culture, in summer of 2012 approximately 107,800 visitors entered Yukon without going through a border crossing through British Columbia [i.e. Watson Lake gateway].[3]

Figure D-1 below provides the monthly distribution of Yukon visitors over the course of 2014.

[1] Yukon Government Department of Tourism and Culture. 2015. Tourism. Retrieved from: http://www.tc.gov.yk.ca/tourism.html [accessed on December 16, 2015].
[2] Numbers are based on Yukon Tourism Indicators Year-End Report 2014. Source: Government of Yukon Department of Tourism and Culture. 2014. Yukon Tourism Indicators. Retrieved from: http://www.tc.gov.yk.ca/pdf/2014_TourismIndicators_YearEndReport.pdf [accessed on November 3, 2015].
[3] 2012/13 Yukon Visitor Tracking Program - Summer Report notes that domestic highway traffic (entry through the Alaska Highway or Cassiar Highway) accounted for 34% of visitors. Also, an additional 12% of visitors entered Yukon through domestic and international air. Source: Yukon Government Department of Tourism and Culture. 2013. 2012/2013 Yukon Visitor Tracking Program: Summer Report. Retrieved from: http://www.tc.gov.yk.ca/publications/2012-2013-YVTP_Summer_Report.pdf [accessed on November 3, 2015].

Figure D-1: Total Yukon Visitors, 2014[4]



The 2012/2013 Yukon Visitor Tracking Program[5] provides further detail regarding total estimated visitors at each entry point into Yukon (including entry points that are not border crossings). Columns B and C of Table D-1 below summarize by entry point the 2012 summer visitors and 2012/13 winter visitors. The same detailed information is not available for 2014. To provide an approximate allocation of the 2014 visitors by entry point, the percentages from column C have been applied to the total number of estimated visitors for 2014 (as summarized in Figure D-1[6]) in order to estimate the 2014 visitors by entry point [column D].

[4] Numbers are based on Yukon Tourism Indicators Year-End Report 2014. Source: Government of Yukon Department of Tourism and Culture. 2014. Yukon Tourism Indicators. Retrieved from: http://www.tc.gov.yk.ca/pdf/2014_TourismIndicators_YearEndReport.pdf [accessed on November 3, 2015].

[5] Source: Yukon Government Department of Tourism and Culture. 2015. Yukon Visitor Tracking Program. Retrieved from: http://www.tc.gov.yk.ca/isu_vtp.html [accessed on November 3, 2015].

[6] Summer months assumed May through September.

Table D-1: Estimated Yukon Visitors by Entry Point[7]

Location of Entry	2012/13 Estimate		2014 Estimate	Notes
	Estimate	% of total		
A	B	C	D	E
Estimated Summer Visitors - 2012				
Pleasant Camp	6,300	2%	7,300	Haines, AK to Haines Junction
Little Gold	6,300	2%	7,300	Tok, AK to Dawson City
Fraser	88,800	28%	102,600	Skagway, AK to Carcross
Train (into Carcross)	31,700	10%	36,600	Skagway, AK to Carcross
Beaver Creek	34,900	11%	40,300	
Watson Lake	107,800	34%	124,600	
Air	38,100	12%	44,000	Visitors on domestic and international flights exiting Whitehorse
Other	3,300	1%	3,800	
Total Summer	**317,200**	**100%**	**366,500**	
Estimated Winter Visitors - based on 2012/13				
Entered via Alaska	22,700	30%	23,000	
Entered via BC	24,200	32%	24,600	
Air	28,800	38%	29,200	
Total Winter	**75,700**	**100%**	**76,800**	

Note: The total summer and winter visitor numbers in Column D is based on Figure D-1 [366,500 visitors entered Yukon during the peak summer tourism and mining months, between May and September; and about 76,800 people during the shoulder months]. The approximate allocation by entry point estimated by applying the percentages from column C.

[7] Watson Lake entry point includes approximately 88% entered via the Alaska Highway and 12% via Highway 37. The numbers are rounded to the nearest 100.

Figure D-2 below summarizes estimated 2014 Yukon summer visitors by entry point illustrated in Table D-2.

Figure D-2: Estimated Yukon Visitors in Summer 2014 By Entry Point[8]

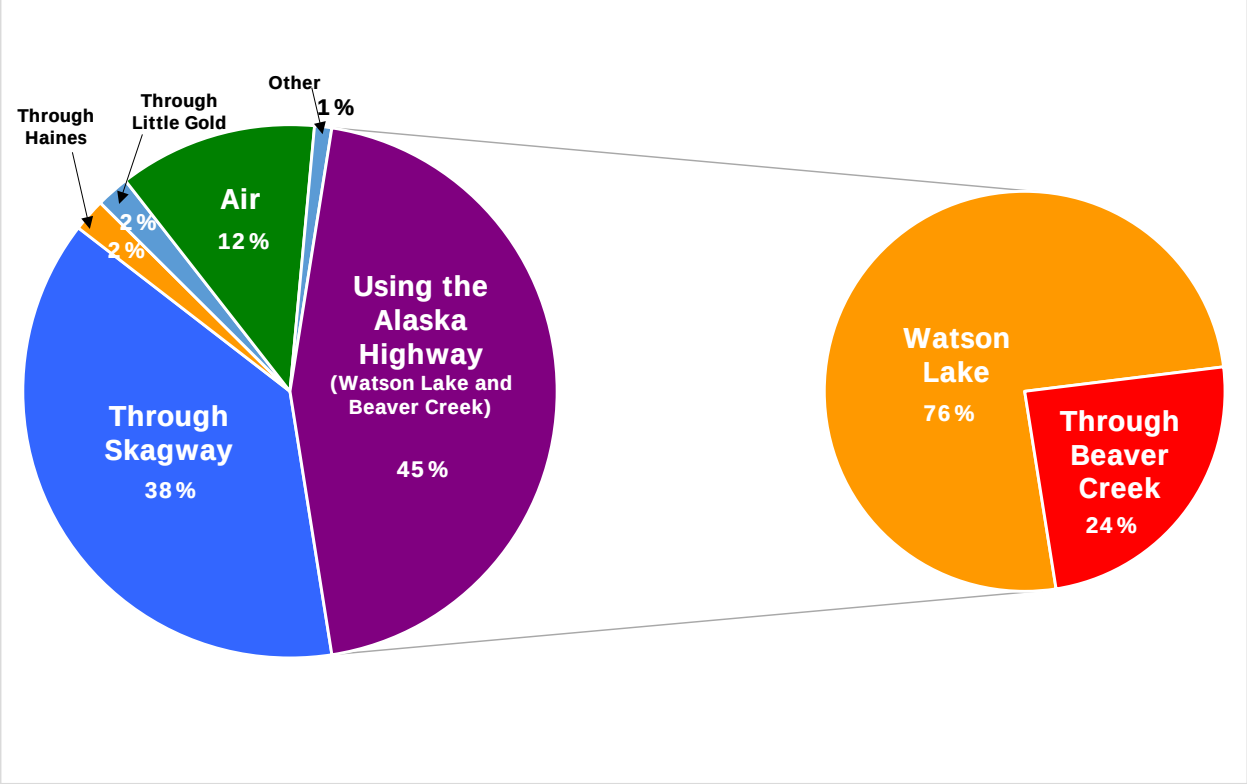
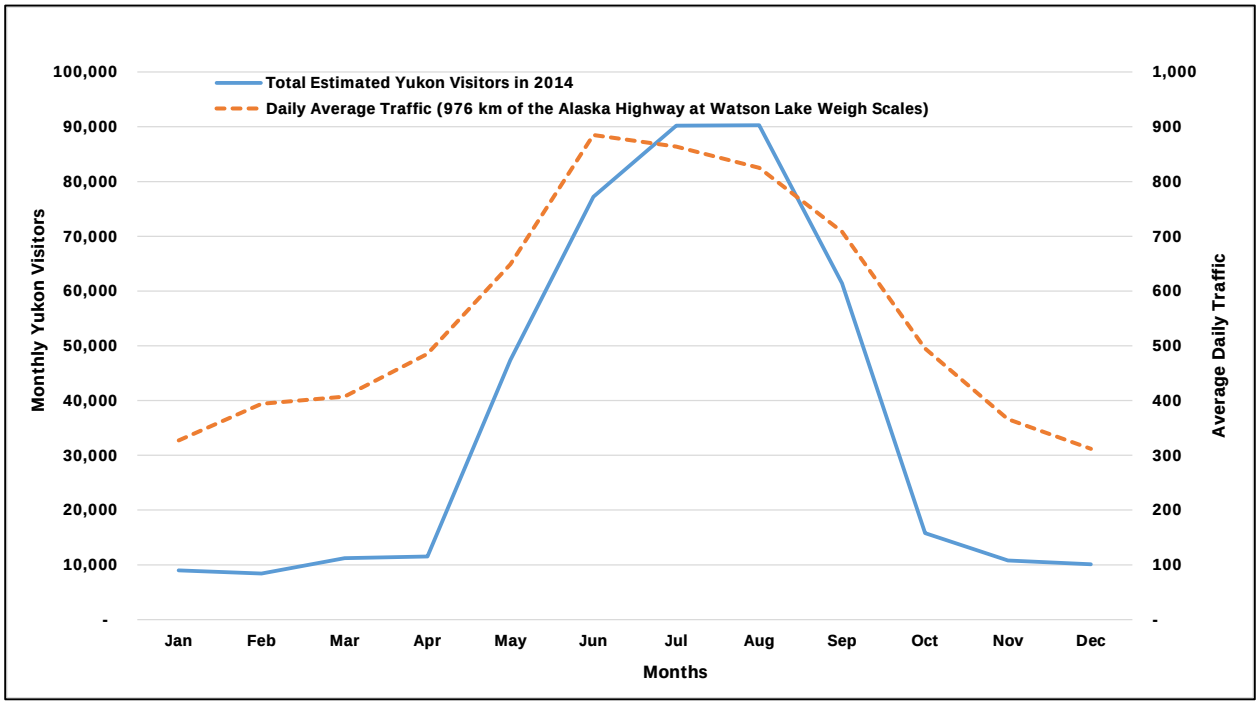


Figure D-3 compares monthly Yukon visitors in 2014 to the average daily traffic on the Alaska Highway near Watson Lake in 2011.[9] The seasonality of visitors generally follows an annual pattern similar to the average daily traffic counted near Watson Lake on the Alaska Highway. Specifically, both the average daily traffic near Watson Lake and the visitors entering Yukon peak over the period between May and September (i.e., peak mining and tourist season), and are significantly reduced during the shoulder season.

[8] The figure is prepared based on numbers from Yukon Tourism Indicators Year-End Report 2014. Source: Government of Yukon Department of Tourism and Culture. 2014. Yukon Tourism Indicators. Retrieved from: http://www.tc.gov.yk.ca/pdf/2014_TourismIndicators_YearEndReport.pdf [accessed on November 3, 2015]

[9] 2014 traffic data is not available and therefore 2011 traffic data is used. The review of the traffic counts for the 2000-2011 period shows similar seasonality, and it is assumed that the seasonality of the traffic flow in 2014 would be similar to 2011.

Figure D-3: Yukon Visitors without Border Crossing Compared to Average Daily Traffic in the Alaska Highway near Watson Lake[10]



Tables D-2 through D-4 below indicate that based on 2012/2013 Yukon Visitor Tracking Program surveys:

- Approximately 45% of summer visitors entered Yukon using the Alaska Highway, either via Watson Lake (34%)[11] or via Beaver Creek (11%);
- Visitor spending per person per day among visitors who included the southern region[12] of Yukon and Whitehorse on their trip was high compared to the other regions;
- About 36% of the estimated summer visitors that entered Yukon using the Alaska Highway were Authentic Experiencers.[13] Of those, more visitors entered through Watson Lake (76%) than entered through Beaver Creek (24%). Historians, Rejuvenators and Cultural Explorers[14] represented between 15% and 17% of total summer visitors entering Yukon via the Alaska Highway. Although Authentic Experiencers have lower than average spending per day [$76/day], on average they do spend a longer time in Yukon compared to other visitor types. As illustrated

[10] The average traffic data is from Yukon Traffic Count Summary, 2011. Source: Yukon Highways and Public Works. 2011. Yukon Traffic Count Summary for 2011. Retrieved from: http://www.hpw.gov.yk.ca/pdf/traf2011.pdf [accessed November 3, 2015].
[11] Includes visitors that entered via the Alaska Highway (88% of total Watson Lake) and Highway 37 (12% of total Watson Lake).
[12] The southern region includes the communities of Carcoss, Tagish and Atlin, BC.
[13] The 2012/2013 Yukon Visitor Tracking Program notes: "Authentic Experiencers are travellers looking for authentic, tangible engagement with destinations; they seek to understand the history of the places they visit."
[14] The 2012/2013 Yukon Visitor Tracking Program notes: "Historians are defined by their focused interest in the history, culture and natural surroundings of the places they visit"; "Rejuvenators are identified as family-oriented people who travel with others to escape from the stresses of everyday life to get pampered and indulge themselves"; "Cultural Explorers are defined by their love of constant travel and continuous opportunities to embrace, discover and immerse themselves in the culture, people and settings of the places they visit."

in Table D-5, average spending per day for Historians, Rejuvenators and Cultural Explorers was between $87/day and $103/day compared to the $82/day average; and

- Visitors that included in their trip communities that would be isolated without the Alaska Highway[15] cited the following as important to their decision to visit the Yukon: to drive the Alaska Highway; for wildlife viewing opportunities; to visit and to experience Alaska; and experience time in the wilderness.

Table D-2 below summarizes information regarding Yukon visitors by pathway based on 2012/2013 Yukon Visitor Tracking Program.

Table D-2: Yukon Visitors by Pathway[16]

	Percentage of Total	Transportation Used to Enter Yukon						Average Nights in Yukon	Visitor Origin		
		Car or truck	Recreational vehicle	Motorcycle	Air	Motorcoach	Train		US	Canada	Overseas
Entered via Alaska	54%	32%	7%	0%	0%	43%	19%	3	77%	10%	13%
Entered via British Columbia	33%	39%	52%	6%		3%		10	60%	32%	8%
Entered via Air	12%				100%			11	6%	73%	20%

Based on summer 2012 Yukon Visitor Tracking Program, Table D-3 below provides communities and regions included in the trip, and the experiences considered important to the Yukon trip.

[15] Watson Lake, Teslin and Western communities (Beaver Creek, Destruction Bay, Burwash Landing).
[16] The numbers are subject to rounding. Source: Yukon Larger Than Life. n.d. 2012/2013 Yukon Visitor Tracking Program: Pathways Report. Retrieved from: http://www.tc.gov.yk.ca/publications/2012-2013_YVTP_Pathways_Report.pdf [accessed on November 3, 2015].

Table D-3: Communities and Regions Visited[17]

Communities and Regions	What was important on their Yukon trip			Average Nights in Yukon	Visitor spend [$/day in Yukon]
Whitehorse	Wildlife viewing opportunities	Visit a place that few others have been to	To visit and experience Alaska	7	$82
Dawson City	To visit and experience Alaska	Wildlife viewing opportunities	Visit a place few others had been to	8	$78
Southern Region (Carcross, Tagish, Atlin)	To visit and experience Alaska	Wildlife viewing opportunities	Tag on a Yukon land tour to a cruise	3	$82
Haines Junction	To visit and experience Alaska	To drive the Alaska Highway	Wildlife viewing opportunities	7	$71
Watson Lake & Teslin *	To drive the Alaska Highway	Wildlife viewing opportunities	Experience time in the wilderness	10	$67
Western Region (Beaver Creek, Destruction Bay, Burwash Landing)*	To drive the Alaska Highway	To visit and experience Alaska	Challenge myself	7	$68
Central Region (Carmacks, Ross River, Faro, Mayo, Keno City, Pelly Crossing)	Experience time in the wilderness	Visit a place that few others have been to	Wildlife viewing opportunities	15	$64
Northern Region (Old Crow, Tombstone, Inuvik)	Wildlife viewing opportunities	To visit Dawson City	Visit a place that few others have been to	12	$68

* - communities that would be isolated without the Alaska Highway.

Table D-4 below provides Yukon explorer types by entry point, percentage of total visitors and average daily spending in Yukon based on 2012/2013 Yukon Visitor Tracking Program [for summer 2012].

[17] The average nights in Yukon, and average visitor spend per person per day in Yukon, were calculated as among those who indicated they visited the region. The average spending and average nights do not indicate that the money and nights spend in that community directly. Source: Yukon Larger Than Life. n.d. 2012/2013 Yukon Visitor Tracking Program: Pathways Report. Retrieved from: http://www.tc.gov.yk.ca/publications/2012-2013_YVTP_Pathways_Report.pdf [accessed on November 3, 2015].

Table D-4: Yukon Explorer Types[18]

	All 2012 Summer Visitors	Yukon Explorer Types					
		Authentic Experiencers	Cultural Explorers	Familiarity Seekers	Free Spirits	Historians	Rejuvenators
By Entry Point							
Watson Lake	34%	29%	13%	11%	4%	24%	44%
Carcross	38%	37%	55%	68%	88%	23%	17%
Whitehorse	12%	17%	12%	13%	6%	12%	9%
Beaver Creek	11%	9%	11%	6%	1%	34%	27%
Dawson City	2%	3%	8%	1%	0%	4%	1%
Haines, Alaska	2%	5%	1%	0%	1%	2%	2%
By Trip Purpose							
Visit Alaska	46%	37%	51%	44%	68%	34%	55%
Visit Yukon specifically	20%	27%	17%	17%	7%	19%	11%
Road trip/drive Alaska highway	14%	15%	12%	3%	6%	28%	13%
Take a cruise	11%	14%	17%	31%	19%	2%	7%
Other	9%	7%	3%	5%	0%	17%	14%
% of Total Visitors	**100%**	**29%**	**19%**	**23%**	**13%**	**9%**	**7%**
Average Spend per Day	**$82**	**$76**	**$88**	**$96**	**$77**	**$103**	**$87**

Table D-4 also indicates that the main purpose of the trip for about 14% of all Yukon visitors was to drive the Alaska Highway (with a higher proportion among historians [28%]).

Table D-5 below provides gross revenues and Gross Domestic Product (GDP) attributed to tourism.[19] The following is noted:

- Yukon businesses attributed $249.5 million of their gross revenue in 2012 to tourism. The industry with the highest reported tourism-related gross revenue was Retail Trade, with about 31% of the total gross revenues attributed to tourism, followed by Accommodation and Food Services (with about 20% of the total).
- Based on the number of visitors to Yukon in 2014, the estimated average gross revenue per visitor would be about $563.[20]

[18] Watson Lake entries include visitors that entered via the Alaska Highway (88% of total Watson Lake) and Highway 37 (12% of total Watson Lake). Source: Yukon Larger Than Life. n.d. 2012/2013 Yukon Visitor Tracking Program: Visitor Segmentation Report, pages 18 and 23. Retrieved from: http://www.tc.gov.yk.ca/publications/2012-2013_YVTP-Visitor_Segmentation_Report.pdf [accessed on November 3, 2015].

[19] The survey notes that these statistics represent "perceived Yukon GDP attributed to tourism" since these calculations are entirely dependent on the businesses' perception of the percent of their revenue attributed to each of these sectors of the Yukon economy and although some businesses may be able to calculate this value with precision, many businesses may have reported this value as an approximation or based on subjective impression. The survey information also estimated that the total GDP attributable to tourism was $113.8 million in 2012. This GDP impact was not used in the analysis and GDP impact was estimated based on Statistics Canada input/output multipliers for 2010 for Yukon. Source: Yukon Bureau of Statistics. 2013. Yukon Business 2013. Retrieved from: http://www.eco.gov.yk.ca/pdf/2013_Business_Survey_Report.pdf [accessed on October 30, 2015].

[20] Based on information from Department of Tourism and Culture, there were approximately 442,200 visitors in 2012/13 which would yield to about $564/visitor using the estimated average gross revenue. Considering it is close to the estimate calculated based on 2014 visitors, 2014 visitor numbers are used.

Table D-5: Gross Revenues and GDP Attributed to Tourism in 2012 for Yukon

	Estimated Gross revenues attributed to Tourism, $000
By North American Industry Classification System (NAICS)	
Retail Trade	77,400
Accommodation and food services	50,500
Transportation and warehousing	35,600
Wholesale trade	17,800
Arts, entertainment and recreation	12,400
Construction	11,900
Finance and insurance	10,000
All other industries	33,900
Total	**249,500**
Total Yukon Visitor in 2014	**443,300**
Average per Visitors, $/Visitor	**563**

3.0 IMPACT OF THE ALASKA HIGHWAY

Table D-6 provides the estimated impact of the Alaska Highway on tourism in Yukon, and assumes that without the Alaska Highway the total number of visitors to Yukon would be reduced by about 44% or approximately 196,800 visitors. The conclusions provided in Table D-7 are based on a "worst case scenario" that assumes that tourists currently entering via Watson Lake, or other entry points that would be isolated without the Alaska Highway, would not enter via other means. This is discussed in greater detail below.

Table D-6: Estimated Impact of the Alaska Highway to Tourism[21]

Location of Entry	Estimate	% of total	Estimate Without the Alaska Highway	
			Estimate	% of total
A	B	C	D	E
Estimated Summer Visitors - 2014				
Pleasant Camp	7,300	2%	7,300	4%
Little Gold	7,300	2%		
Fraser	102,600	28%	102,600	53%
Train (into Carcross)	36,600	10%	36,600	19%
Beaver Creek	40,300	11%		
Watson Lake	124,600	34%		
Air	44,000	12%	44,000	23%
Other	3,800	1%	3,800	2%
Total Summer	**366,500**	**100%**	**194,300**	**100%**
Estimated Winter Visitors - 2014				
Entered via Alaska	23,000	30%	23,000	44%
Entered via BC	24,600	32%		
Air	29,200	38%	29,200	56%
Total Winter	**76,800**	**100%**	**52,200**	**100%**
Total 2014	**443,300**	**100%**	**246,500**	**100%**
Impact of the Alaska Highway			**-196,800**	**-44%**

3.1 IMPACT TO NUMBER OF VISITORS TO YUKON

It is assumed that about 56% of the 2014 visitors to Yukon would be unaffected in the scenario without the Alaska Highway, i.e., these visitors are already entering Yukon through Skagway and Haines (Fraser and Pleasant Camp border crossings) or through Whitehorse and Dawson City airports.

Table D-6 assumes that without the Alaska Highway visitors coming to Yukon via Beaver Creek (the Alaska Highway) and Little Gold (traversing Top of The World Highway to Dawson), as well as visitors entering Yukon via Watson Lake (via the Alaska Highway through B.C.) are assumed to cease.[22] This is an extreme assumption and the following is noted in this regard:

[21] Number of visitors for 2014 as illustrated in Table D-1, column D.

[22] It is assumed that Dawson City would still draw Alaska visitors and that visitors would continue to drive from Skagway up the North Klondike to Dawson City. However, the volume of visitors would be uncertain. It is also assumed that traffic on the Alaska Marine Highway would likely increase as more visitors travelling through Yukon from Skagway/Haines to central/interior Alaska would use the Alaska Marine Highway. This would likely result in a corresponding reduction in visitors to Yukon which would offset the number of people travelling to Dawson through Skagway. Consequently, for the purpose of this study it is assumed that visitors coming through Little Gold would cease.

- For communities that would be isolated without the Alaska Highway,[23] tourism activity and revenues would cease or be materially reduced; however, it is expected that a portion of these visitors would enter Yukon via alternate means, (i.e., via air passage or through Skagway) and would visit other more accessible areas of Yukon.

- Table D-6 assumes that the level of visitors from Haines to Haines Junction may continue (without connection to Alaska) related to tourists travelling to the Kluane National Park, or driving a scenic route to Whitehorse.

- Table D-3 summarizes the rationale underlying the visits to communities that would become isolated without the Alaska Highway, and indicates that "driving the Alaska Highway", "wildlife viewing opportunities", "experience time in the wilderness" and "to visit and experience Alaska" were important considerations for these visitors' trip to Yukon. While the activity of travelling the highway and exploring its history would be lost (and the portion of visitors primarily attracted to Yukon/Alaska to undertake this activity would be lost), a portion of visitors would likely be able to pursue and experience the other noted types of activities in other areas of Yukon and Alaska.

3.2 IMPACT TO YUKON ECONOMY

Table D-3 indicates that the average daily spending by visitor varies by the community visited.

- The highest spending indicated is among summer visitors who included the southern region, including Whitehorse [$82/day per visitor].

- The average spending by summer visitor who included Watson Lake/Teslin and the western region in their trip is lower compared to the average spending in Whitehorse and other southern region communities such as Carcross and Tagish. However, the trip duration is longer for summer visitors who included Watson Lake/Teslin in their trip [average 10 nights for those who visited Watson Lake/Teslin compared to average 7 nights for those who included Whitehorse, 3 nights in the other southern communities and 8 nights in Dawson City].[24]

Considering the above, for the purpose of impact analysis it is assumed that average gross revenue per visitor estimated in Table D-4 ($563/visitor) will apply to all visitors to Yukon year-round.

[23] E.g., Watson Lake, Beaver Creek, Destruction Bay, Burwash Landing.

[24] The average nights in Yukon and average visitor spend per person per day in Yukon were calculated as among those who indicated they visited the region. The average spending and average nights do not indicate that the money and nights spend in that community directly.

Table D-7 below summarizes impacts to the Yukon economy related to reduced visitors without the Alaska Highway based on Yukon Input-Output Multiplier Impact Results.[25]

This model is used to derive the general economic impact of change in the output in a Yukon industry using multipliers from Statistics Canada. The outcome provides impact of the change to:

- Gross Domestic Product (GDP)[26] as a measure of the value added (the unduplicated total value of goods and services) to the economy and includes household income (wages, salaries and benefits, etc.) as well as profits and other income earned by corporations.
- Employment estimates generated by the model are derived from estimated wage costs using information on average annual wages in an industry.[27]
- Government tax revenue estimates generated by the model include income taxes as well as commodity taxes. Territorial and federal tax revenues include federal and territorial personal and corporation income taxes.

The model estimates how the Yukon economy will be affected from changes in expenditures. The model outcomes indicate the following impacts result from reduced visitors to Yukon without the Alaska Highway [based on Yukon Economic Impact Calculator]:[28]

- Tax Revenue Impacts to Yukon would be reduced by about $2.7 million.
- Salaries and Wages would be reduced by about $30.8 million.
- Supplementary Labour Income would be reduced by about $2.7 million.
- Labour income of the unincorporated sector would be reduced by about $4.8 million.
- Other Operating Surplus would be reduced by about $22.5 million.
- Total GDP impact would be about $63.6 million lower.

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[25] Destination British Columbia, a BC Crown Corporation, used the input-output tool to estimate economic impact from tourism including 2013 CCAA Women's Soccer National Championship: Economic Impact Assessment and Economic Significant of Mountain Biking in Rossland and Golden. Source: BC Stats. n.d. BC Input-Output Model Report: Mountain Biking in Rossland and Golden. Retrieved from: http://www.destinationbc.ca/getattachment/Research/Research-by-Activity/Land-based/RosslandGoldenMntBike_EI_FINAL.pdf.aspx; and BC Stats. n.d. 2013 Canadian Collegiate Athletic Association Women's Soccer National Championship Surrey, BC Economic Impact Assessment. Retrieved from: http://www.destinationbc.ca/getattachment/Research/Research-by-Activity/Land-based/2013-CCAA-Women-s-Soccer-National-Championship-EIA-Study.pdf.aspx.

[26] The model outcome also shows total output, which is not shown in the analysis as it may overstate the economic impact due to double counting some of the components.

[27] The estimate of the total number of jobs covers two main categories: employee jobs and self-employed jobs (including persons working in a family business without pay). The employee jobs are converted to full-time equivalents based on the overall average full-time hours worked in either the business or government sectors.

[28] The input-output model is based on 2010 Statistics Canada multipliers (combined direct, indirect and induced impact). The calculations are based on summary level. The construction industry results are based on multipliers for repair construction; finance and insurance also includes real estate, rental and leasing and holding companies; all other industry results are based on multipliers for other services (except public administration). The results for wholesale and retail industries are estimated based on gross margins as the input rather than gross revenue (the gross margins are based on CANSIM Table 080-0023 for retail based on average for 2008-2012; CANSIM Table 081-0014 for wholesale trade based on 2008-2010 average as data for 2011 and 2012 were suppressed).

- Employment for businesses would be reduced by 890 FTEs.

Figure D-4 illustrates the GDP impact from tourism by industry and by expenditures.

Table D-7: Total Impact to Yukon Economy from Reduced Visitors without the Alaska Highway[29]

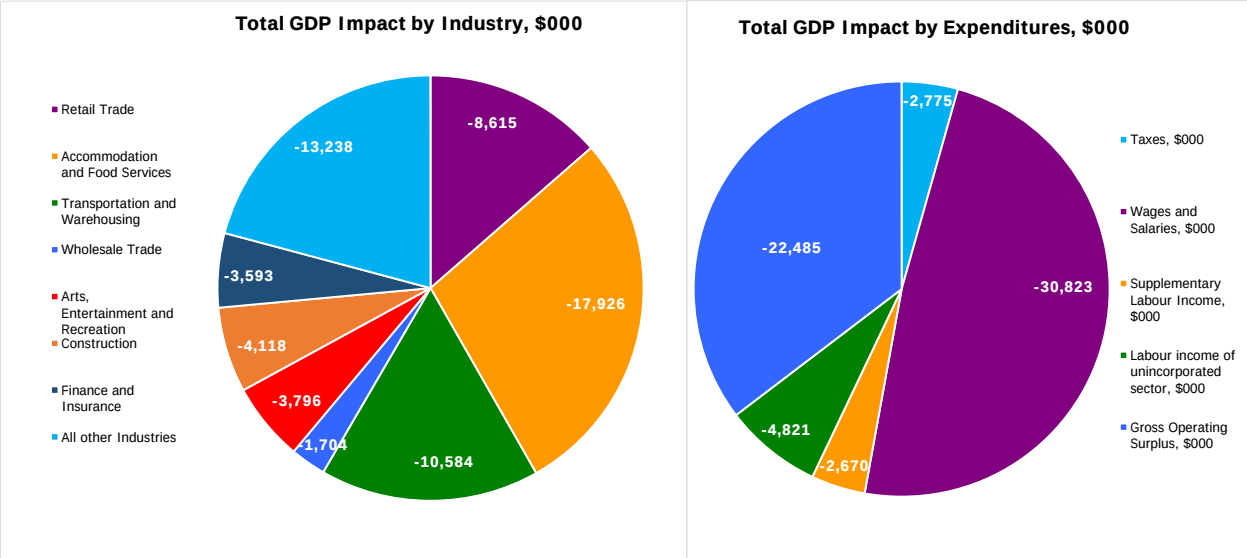
	Estimated Gross Revenues Attributed to Tourism, $000			Estimated GDP from Tourism - based Yukon Economic Impact Calculator						
	Total Yukon With Alaska Highway	Total Yukon Visitors	Per Visitor	Taxes, $000	Wages and Salaries, $000	Supplementary Labour Income, $000	Labour income of unincorporated sector, $000	Gross Operating Surplus, $000	Total GDP Impact, $000	Employment [FTE]
	A	B	C=A/B	D	E	F	G	H	I=Sum (D:H)	J
By North American Industry Classification System (NAICS)										
Retail Trade	77,400	443,300	175	441	9,927	882	662	7,500	19,412	273
Accommodation and Food Services	50,500	443,300	114	3,030	22,220	2,020	1,515	11,615	40,400	800
Transportation and Warehousing	35,600	443,300	80	712	11,392	1,068	712	9,968	23,852	210
Wholesale Trade	17,800	443,300	40	121	2,061	202	121	1,334	3,839	31
Arts, Entertainment and Recreation	12,400	443,300	28	496	4,092	372	1,364	2,232	8,556	153
Construction	11,900	443,300	27	476	2,856	357	2,023	3,570	9,282	89
Finance and Insurance	10,000	443,300	23	300	2,000	100	400	5,300	8,100	30
All other Industries	33,900	443,300	76	678	14,916	1,017	4,068	9,153	29,832	620
Total	**249,500**		**563**	**6,254**	**69,464**	**6,018**	**10,865**	**50,672**	**143,273**	**2,206**

	Estimated Gross Revenues Attributed to Tourism, $000			Estimated GDP Impact from Tourism without the Alaska Highway - based Yukon Economic Impact Calculator						
	Total Yukon With Alaska Highway	Total Yukon Without Alaska Highway	Impact Without Alaska Highway	Taxes, $000	Wages and Salaries, $000	Supplementary Labour Income, $000	Labour income of unincorporated sector, $000	Gross Operating Surplus, $000	Total GDP Impact, $000	Employment [FTE]
	A	B	C=B-A	D	E	F	G	H	I=Sum (D:H)	J
Impact without the Alaska Highway										
Retail Trade	77,400	43,039	-34,361	-196	-4,405	-392	-294	-3,328	-8,615	-121
Accommodation and Food Services	50,500	28,081	-22,419	-1,344	-9,860	-896	-672	-5,154	-17,926	-267
Transportation and Warehousing	35,600	19,796	-15,804	-316	-5,055	-474	-316	-4,423	-10,584	-93
Wholesale Trade	17,800	9,898	-7,902	-54	-914	-90	-54	-592	-1,704	-14
Arts, Entertainment and Recreation	12,400	6,895	-5,505	-220	-1,816	-165	-605	-990	-3,796	-68
Construction	11,900	6,617	-5,283	-211	-1,267	-158	-898	-1,584	-4,118	-39
Finance and Insurance	10,000	5,561	-4,439	-133	-887	-44	-177	-2,352	-3,593	-13
All other Industries	33,900	18,850	-15,050	-301	-6,619	-451	-1,805	-4,062	-13,238	-275
Total	**249,500**	**138,736**	**-110,764**	**-2,775**	**-30,823**	**-2,670**	**-4,821**	**-22,485**	**-63,574**	**-890**

Total Yukon Visitor in 2014	**443,300**
Average per Visitors, $/Visitor	**563**
Total Visitor Without the Alaska Highway	**246,500**

[29] The impact without the Alaska Highway is estimated based on average gross revenue per visitor per industry. The input-output model was used to derive the general economic impact for a Yukon industry using 2010 Input Output Multipliers from Statistics Canada. Source: Government of Yukon Economic Development. n.d. GDP Impact Assessment Tool (Yukon). Retrieved from: http://economics.gov.yk.ca/gdp.aspx [accessed on December 3, 2015]; Government of Yukon Economic Development. n.d. Economic Impact Assessment Tool (Yukon). Retrieved from: http://economics.gov.yk.ca/impact.aspx [accessed on December 3, 2015].

Figure D-4: Total Estimated GDP Impact from Tourism without the Alaska Highway



4.0 NORTHERN BRITISH COLUMBIA

Geographically, Northern British Columbia ("Northern BC") is the largest tourism region in British Columbia, covering about 569,000 km^2 of the province.

The tourism profile for Northern BC[30] indicates about 1,204 businesses in Northern BC tourism industry and related employment of about 6,900. Further, in 2012 total overnight visitors to the Northern BC region were about 6% of total BC visitors [about 1.027 million visitors], generating about $391.8 million in tourism related revenues for businesses.

Table D-8 summarizes total overnight visitors to the Northern BC region by origin of visitors.

[30]Source: Destination British Columbia. Northern British Columbia Regional Tourism Profile January 2015. Retrieved from: http://www.destinationbc.ca/getattachment/Research/Research-by-Region/Northern-BC/RegionalProfiles_Northern-BC_2014.pdf.aspx [accessed on November 10, 2015].

Table D-8: Number of Overnight Visitors to Northern BC and Related Spending in 2012[31]

	Overnight Visitors		Total Spending ($000)		Average Spending per Visitor, $/Visitor
	Total Visitors	% of total Northern BC	Total Visitors	% of total Northern BC	
BC residents	711,000	69%	214,380	55%	302
Other Canadian residents	163,000	16%	94,576	24%	580
US residents	106,000	10%	50,437	13%	476
Other international residents	47,000	5%	32,386	8%	689
Total Northern BC	**1,027,000**	100%	**391,779**	100%	381
Total BC	**17,905,000**		**8,614,261**		481
Northern BC % of total BC	6%		5%		

The regional tourism profile does not provide a breakdown of visitors noted in Table D-8 by main destination. However, the majority [about 76%] of the US residents surveyed in the Northern Rockies – Alaska Highway Visitor Research Project noted that their main destination was Alaska.[32]

The Northern Rockies – Alaska Highway Visitor Research Project (2003) undertaken to provide data on the characteristics and volume of travellers along the Alaska Highway and to support marketing plan design and product development in the Northern Rockies also indicates as follows:

- About 83% of the travellers noted the purpose of their travel was leisure;
- About 10% of travellers were visiting friends and relatives; and
- About 5% of travellers were travelling for businesses purposes.

Table D-9 summarizes results from the survey of the visitors to Northern Rockies District.

[31] Data from Destination BC, a Crown Corporation owned by Province of British Columbia. Regional Tourism Profile, http://www.destinationbc.ca/getattachment/Research/Research-by-Region/Northern-BC/RegionalProfiles_Northern-BC_2014.pdf.aspx (accessed on November 10, 2015). The average spending per visitor if calculated based on total spending divided by number of visitors.

[32] Research Services of Tourism British Columbia, January 2005. The research was conducted to provide data on the characteristics and volume of travellers along the highway and to support marketing plan design and product development in the Northern Rockies – Alaska Highway region. Source: Destination British Columbia. Northern British Columbia Regional Tourism Profile January 2015. Retrieved from: http://www.destinationbc.ca/getattachment/Research/Research-by-Region/Northern-BC/RegionalProfiles_Northern-BC_2014.pdf.aspx [accessed on November 12, 2015].

Table D-9: Origin, Trip Purpose and Main Destination of the Northern Rockies Visitors[33]

	Canadian Residents	US Residents	Overseas
Origin	49%	45%	6%
Trip Purpose			
Leisure	82%	82%	96%
Visit friends and relatives	11%	6%	3%
Business and other	6%	11%	1%
Destination			
Alaska	20%	76%	40%
Northeast BC	27%	2%	8%
Yukon	24%	1%	11%
Other	29%	21%	41%

The Northern Rockies District, Value of Tourism Research Project notes that between October 2006 and September 2007 approximately 224,200 people visited the Northern Rockies District.[34]

However, since 2007 the number of travellers has changed. For example, the publication from BC Stats, Visitor entries in 2011: A Year in Review,[35] shows that since 2001, the volume of travellers to the province had been reduced by roughly one-third (–33.2%). The detailed table shows a decrease in the number of visitors in 2012, the year with data available for Northern BC as shown in Table D-8, over 2007 by about 9%. With a 9% downward adjustment, the estimated approximate total visitors to the Northern Rockies District would be about 204,000 [224,200 noted in Northern Rockies District, Value of Tourism Research Project, December 2007 reduced by 9%].

- Assuming the percentage of the origin of the travellers did not change as illustrated in Table D-10 [i.e. 45% of travellers are US visitors], it is estimated that about 91,800 visitors may be US residents [204,000 estimated above multiplied by 45% as per Table D-9] which would be within a reasonable range of US residents that visited the Northern BC as a whole as illustrated in Table D-8 [about 106,000].
- Table D-9 notes that the main destinations for about 77% of the US visitors were Alaska and Yukon. With the above estimated total US visitors [91,800], the number of tourists that would travel along the Alaska Highway through northeastern BC to Yukon and Alaska would be about 71,000.[36]

[33] The table is prepared based on Northern Rockies – Alaska Highway Visitor Research Project report (2005), pages 8-12.
[34] Northern Rockies District, Value of Tourism Research Project, December 2007. http://www.travelnbc.com/wp-content/uploads/2011/10/Northern_Rockies_Value_of_Tourism.pdf (accessed on November 12, 2015).
[35] See Visitor Entries in 2011: A Year in Review at http://www.bcstats.gov.bc.ca/StatisticsBySubject/BusinessIndustry/Tourism.aspx (accessed on November 12, 2015).
[36] 77% of estimated total of 91,800 visitors.

- Using the same assumption and approach for Canadian and overseas residents it can be estimated that about 44,000 of the Canadian residents[37] [and about 6,000 of the overseas residents[38] that visited the Northern Rockies District would travel the Alaska Highway through northeastern BC to Yukon and Alaska.
- In total, about 121,000 Northern Rockies District visitors' main destination would be Alaska and Yukon and they would use the Alaska Highway to get to Yukon and Alaska. With average spending of $381 per visitor,[39] without the Alaska Highway the total impact to Northern BC tourism would be about $46.101 million. This is about 11% of the total spending for Northern BC and about 0.5% of total spending for BC as noted in Table D-8.

5.0 ALASKA

The Alaska Visitor Statistics Program VI Interim Visitor Volume Report[40] notes that the vast majority (or about 96% of the 2014 summer visitors to Alaska) entered or exited Alaska via air and cruise ships (with about 58% via cruise ships). The number of visitors to Alaska by exit mode shows that about 3% or about 56,100 visitors travelled to Alaska during the summer season via highway [i.e. using Yukon highways as an exit mode]. The Fall/Winter 2014/15 report[41] indicates that visitors travelling via highway outside of the summer season were about 9,900 (for a total of about 66,000 visitors in that year). These numbers represent estimated travellers by exit mode, i.e., estimated based on means of final exit from the State of Alaska. This would not represent the number of visitors from Alaska to Yukon.[42]

The 2013-14 update of the Economic Impact of Alaska's Visitor Industry[43] shows that in 2013-14 total spending for an estimated 1.932 million visitors was $1.82 billion [excluding tickets] or about US$942 per visitor, i.e., the average visitor spent about US$942 on their trip. The report also shows the impact on employment is about one employment-related job for each 50 visitors.[44] Using an estimated annual visitor impact of about 66,000 visitors without the Alaska Highway, the impact of the Highway would be

[37] 49% are Canadian residents as per Table D-9 multiplied by 204,000 total estimated visitors to Northern Rockies District would be approximately 100,000 visitors and further multiplied by 44% as the sum of main destination to Yukon [24% as per Table D-8] and Alaska [20% as per Table D-8] = about 44,000].

[38] 6% of 204,000= about 12,000 multiplied by 51% to Yukon and Alaska = about 6,000.

[39] Northern Rockies District, Value of Tourism Research Project shows that annual direct expenditures by visitors estimated at $47.580 million or about $212 per visitor for 2007. With about 5% annual increase in the cost of travel the value for 2014 would be lower than average of $381 estimated for Northern BC.

[40] McDowell Group. 2014. Alaska Visitor Statistics Program VI Interim Visitor Volume Report Summer 2014, prepared for Department of Commerce, Community, and Economic Development Division of Economic Development, December 2014. https://www.commerce.alaska.gov/web/Portals/6/pub/TourismResearch/AVSP/2013_2014/AVSP%20VI%20Summer%202014%20FINAL.pdf [accessed November 12, 2015].

[41] Source: McDowell Group. 2014. Alaska Visitor Statistics Program VI Interim Visitor Volume Report Fall/Winter 2014, prepared for Department of Commerce, Community, and Economic Development Division of Economic Development, July 2014. Retrieved from: https://www.commerce.alaska.gov/web/Portals/6/pub/TourismResearch/AVSP/AVSP%20Fall%20Winter%202014_15%20REVISED.pdf [accessed November 12, 2015.

[42] The estimate do not take into account the cruise ship or air visitors going to Yukon through border crossing and coming back to Alaska and leave in cruise ship or in air plane. The note on page 10 of the Summer 2014 Alaska Visitor Statistics Program VI Interim Visitor Volume Report regarding the elimination of double counting confirm that.

[43] Source: McDowell Group. 2014. Economic Impact of Alaska's Visitor Industry 2012-13 Update, prepared for Department of Commerce, Community, and Economic Development Division of Economic Development, January 2014. Retrieved from: https://www.commerce.alaska.gov/web/Portals/6/pub/TourismResearch/AVSP/Visitor%20Industry%20Impacts%202013%201_30.pdf [accessed on November 12, 2015].

[44] The total visitor-related employment in Alaska is estimated to be about 39,000. With a total of 1,932 million visitors it would be 1 visitor related job per about 50 visitors.

about $82.7 million[45] spending impact and about 1,320 employment impact [66,000 visitors divided by 50].

[45] Estimated based on US$942 per visitor spending multiplied by 66,000 visitor impact and Bank of Canada November 12, 2015 exchange rate of US$1=CAD$1.33.

APPENDIX E:
COMMUNITY BASELINE CONDITIONS

1.0 INTRODUCTION AND OVERVIEW

This Appendix provides detailed review of Yukon communities impacted by the Alaska Highway.

Historically, Yukon's population has been materially impacted by resource developments and major construction projects that have occurred in the territory (and has been subject to boom and bust cycles driven by these developments). During the Klondike Gold Rush, Yukon's population peaked at approximately 27,000 people, and then plummeted after the Gold Rush reaching about 4,000 in the 1920s. The population experienced another boom during WWII with the construction of several major infrastructure projects related to wartime requirements (e.g., the Alaska Highway and the CANOL pipeline).[1] The population of Whitehorse was most affected by these developments.[2] With new resource developments, including the United Keno Hill Mine Development (UKHM) mine in the 1950s and the Faro mine in the 1960s, Yukon's population began to increase at a higher rate, doubling by 1971 (18,388) compared to 1951 (9,096) and reaching 30,000 by 1996.

- Table E-1 provides the estimated Yukon population (by community) from 2005 to 2015, and indicates that about 77% of the total Yukon population live in Whitehorse, followed by Dawson (about 6% of total Yukon population) and Watson Lake (about 4% of total Yukon population). The total First Nation population in Yukon is about 7,650, with about 54% living in the Whitehorse area, 8% living in the Watson Lake area, and about 5% living in the Dawson area.

- Table E-1 also notes that over the last 10 years Yukon's estimated population increased by 6,121, or 19.6%, with about 86% of this increase occurring in the Whitehorse population. Further, the annual average increase in population for Yukon over the last ten years was about 1.8%, while the average annual increase in population for Whitehorse was 2.0%. Old Crow, the only isolated community in Yukon (with no all-weather road access) had almost no change in population over the last 10 years.

Background information regarding each of the communities affected by the Alaska Highway is reviewed in greater detail below.

2.0 ALASKA HIGHWAY COMMUNITIES: BASELINE SUMMARY

Baseline economic impacts of the Alaska Highway are considered and assessed in the context of traffic relating to the following fundamentally different impact areas:

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[1] Yukon Transportation: A History, by Gordon Bennet, Canadian Historic Sites: Occasional Papers in Archaeology and History No. 19, notes that an influx of soldiers and contractors into the territory during WWII more than doubled Yukon's population. Except for two troop companies that were not relieved until July 1943, all military personnel directly involved in the construction of the Highway were withdrawn before 1943 construction season, and completion of the road proceeded under direction of the Public Roads Administration which employed 81 private contractors and 14,000 civilians over the following two years.

[2] "The Alaska Highway: a Yukon Perspective" notes that "prior to the spring of 1942 the population of Whitehorse was approximately 400. In the space of a few months it had risen to 20,000, and some people estimate that it peaked at over 40,000 in 1943. When the Army came to town municipal services, including water and sewer, garbage disposal, and electricity supply were in a rudimentary state, and the influx created an emergency situation."
Source: Alaska Highway Archives. Retrieved from: http://www.alaskahighwayarchives.ca/en/chap3/2boombustdawsoncity.php [accessed January 6, 2016].

1. **Regions and Communities in Yukon and the Alaska Interior Dominated by the Inside Passage Connection –** This relates to areas where development of infrastructure has been heavily influenced by the pre-existing Inside Passage connection to Skagway (developed in 1901 prior to the construction of the Alaska Highway). The effects of the Project on Inside Passage connected areas in western and central Yukon are limited due to the considerable impact that the existing Inside Passage corridor would continue to have on the development of these areas absent the Alaska Highway. In a similar vein, Project effects on areas of the Alaska Interior connected to the Gulf of Alaska by road or rail would also be limited.

2. **Regions and Communities in Yukon, Alaska and Northeast B.C. that would be effectively isolated or not exist absent the development of the Alaska Highway –** This includes areas north of Fort Nelson, B.C. and southeastern Yukon where development of infrastructure and communities has been driven by and dependent on the construction of the Alaska Highway, as well as communities northwest of Haines Junction (including Tok, Alaska) that would effectively be isolated or not exist without the Alaska Highway.

The discussion that follows reviews some of the relevant information available regarding the key Yukon communities in each of the impact areas. This provides an effective baseline for understanding some of the key changes that would result when considering the world without the Highway. Also included in the baseline assessment is a summary of key information for Old Crow which is the only isolated community in Yukon today. Old Crow is considered as a case study for understanding the potential effects that lack of road access would have on communities that would be isolated in a without the Highway scenario.

3.0 INSIDE PASSAGE CONNECTED AREAS

Communities in western/central Yukon connected to the Klondike Highway,[3] or with connecting roads or highways expected to have developed with or without the Alaska Highway,[4] are expected to experience minimal change with or without the Alaska Highway with the exception of Haines Junction.

3.1.1 Whitehorse and Surrounding Areas

The capital of the Yukon, and its largest community (with over 70% of the total Yukon population[5]), Whitehorse lies within the shared traditional territory of the Ta'an Kwach'an Council ("TKC") and the Kwanlin Dun First Nation ("KDFN").[6] As illustrated in Table E-4, as of October 2015, KDFN reported a total registered population of 991, and TKC reported a total registered population of 268.

Historically, First Nations used the area around Whitehorse for food gathering and as a meeting place. The settlement of Whitehorse developed during the Klondike Gold Rush as a transportation hub; Whitehorse was the head of navigable waters on the Yukon River and an important stop on the journey

[3] i.e., Dawson City, Whitehorse, Carcross, Carmacks and Stewart Crossing.
[4] i.e., the Silver Trail connecting Mayo, Keno and Elsa to the Klondike Highway; the Robert Campbell Highway connecting Faro and Ross River and the portion of the Alaska Highway connecting Whitehorse to Haines Junction.
[5] This includes the City of Whitehorse, Mount Lorne, Ibex Valley, Marsh Lake and surrounding areas.
[6] Both TKC and KDFN have a Final Agreement and a Self-governing Agreement. In 1956, the Marsh Lake and Lake Laberge Indian Bands were joined to create what is known today the Kwanlin Dün First Nation. The Ta'an Kwäch'än lands extended north to Hootalinqua, south to Marsh Lake, west to White Bank Village (confluence of Takhini and Little Rivers), and east to Winter Crossing on the Teslin River (Ta'an Kwäch'än Council 2008).

to the gold fields further north. Once the White Pass & Yukon Route Railway linked Whitehorse with the Alaskan port of Skagway, Whitehorse became the central hub for transportation into and out of the territory.

Since the Klondike Gold Rush era, Whitehorse experienced a series of population booms and busts, mainly linked to mining and highway construction. In 1953, the Yukon government relocated the capital from Dawson City to Whitehorse, cementing Whitehorse's role as the centre of population, government, services and business in the territory. The majority of the territorial population resident in Whitehorse subsequently steadily increased from 29% of the total territorial population in 1951 to 77% of the total territorial population in 2015. Table E-1 indicates that over the past ten years the Whitehorse population increased by 22%, with an average annual increase of 2%. Yukon Bureau of Statistics population projections show expected ongoing growth in Whitehorse's population (and for the Yukon overall) over the next ten years. It is expected that the development of new mines would also impact the Whitehorse and overall territorial population.

Government activity provides considerable economic stability to the Whitehorse area, with Whitehorse serving as the headquarters for territorial and federal government offices. The Council of Yukon First Nations also has its headquarters in Whitehorse. Table E-8, notes that the public sector was the largest source of employment in 2011, employing about 27% of the total population aged 15 years and over.

Most major Yukon businesses, utility companies and services also operate out of the city. Figure E-2 illustrates that in 2013 Whitehorse businesses accounted for about 77% of all territorial businesses surveyed and about 82% of employees. Tourism has also become a major source of economic growth for the city. Outside of the public sector, the following sectors were the largest sources of employment in 2011 (see Table E-8): 12.8% employed in the retail trade, 9.0% employed in construction, 7.1% employed in accommodation and food services and 6.9% in Health care and social assistance.

As shown in Table E-9, in 2010 approximately 4% of households earned less than $10,000, with an additional 4% earning between $10,000 and $19,999, a total of 32% of the households earned less than $50,000. Approximately 61% of households earned less than median income, while the remaining 39% earned more than median income. The average employment income was $64,114 for the same period, which is about 3% higher than the Yukon average.

Given its role as a regional transportation and services hub and centre of government, there are a wide range of facilities and services available in Whitehorse that support local residents as well as persons from other Yukon communities.

3.1.2 Haines Junction

Haines Junction is located at the junction of the Alaska Highway and the Haines Road,[7] 158 kilometres west of Whitehorse, and is a popular tourist destination. While the village was not established until 1942, during construction of the Alaska Highway, the surrounding area served as a crossroads prior to highway

[7] It is assumed in this study that a version of the Haines Road (with connection to Whitehorse and the port of Haines, but not to any areas north of Haines Junction) would have been constructed as a supply road during WWII (even without the full Alaska Highway) when a pipeline was constructed between Haines and Haines Junction/Whitehorse to supply fuel to a large marine tank farm at the port.

construction and is located on an early trade route used by the Coastal Tlingit and Chilkat peoples. The Southern Tutchone also used it as a temporary staging area for trapping, hunting and fishing.

In addition to serving as the location of an Alaska Highway construction camp and supply and service centre to the US military during WWII, Haines Junction was also a pass-through site for the CANOL pipeline (built between 1943 and 1944) and later Fairbanks product pipeline.

The following is specifically noted regarding relevant key baseline indicators:

- **Population and Demographics**: in 2015, Haines Junction total population was 895, accounting for about 2% of the total Yukon population (See Table E-1). Over the last ten years, the community population increased by about 9.5% with an average annual change of 1%. Haines Junction is also located within the traditional territory of the Champagne and Aishihik First Nations (CAFN)[8]; the administrative centre for these First Nations is located in Haines Junction, however, there is also an office in Whitehorse. As of October 2015, the First Nations reported a total registered population of 890. (See Table E-4).

- **Employment and Income:** As shown in Table E-8, the Public administration sector was the largest source of employment for Haines Junction's labour force, employing over 42% of the total population aged 15 years and over; the second largest was employment in accommodation and food services (11.5%), followed by construction (9%), arts, entertainment and recreation (7.7%) and education services (5.1%). Table E-9 indicates that in 2010 approximately 8% of households earned less than $20,000 and a total of 29% of the households earned less than $50,000. Approximately 65% of households earned less than median income, while the remaining 35% earned more than median income. The average employment income was $57,902 for the same period, which is about 7% lower than the Yukon average.

- **Businesses & Employees:** Figure E-2 illustrates that in 2013 Haines Junction businesses accounted for about 2.5% of all Yukon businesses surveyed and about 1.3% of employees.

- **Cost of Living**: Figure E-2 illustrates that the Community Spatial Price Index for April 2015 was 116 (compared to 100 in Whitehorse). Most surveyed products in Haines Junction were higher than Whitehorse, with much higher prices for meat and dairy, as well as health and personal care products (Table E-5).

Haines Junction is also the administrative centre, the location of the main park visitor reception centre to Kluane National Park and Reserve (KNPR) and the main staging area for its operations.[9] The Kluane Game Sanctuary was established in 1942,[10] and in 1972 much of it was designated the Kluane National

[8] Champagne and Aishihik First Nations have signed land claims and self-government agreements.
[9] Source: Parks Canada. Retrieved from: http://www.pc.gc.ca/eng/pn-np/yt/kluane/visit/1.aspx [accessed on January 6, 2016].
[10] The Gravel Magnet: Some Social Impacts of the Alaska Highway on Yukon Indians, Julie Cruikshank notes that sport hunting and fishing along the highway corridor by US military personnel and contractors during construction severely depleted wildlife in the vicinity of the highway and resulted in restrictions (including establishment of the Kluane Game Sanctuary) which adversely affected local First Nations hunting and fishing rights. Absent the Alaska Highway there would have been less disruption by US military personnel and contractors, however, it is expected that there would still be some disruption due to construction of the Canol pipeline and related road construction between Whitehorse, Haines Junction and the Port of Haines.

Park Reserve. In 1980, the Kluane National Park and Reserve was also designated a UNESCO World Heritage Site as a globally significant mountain wilderness.

An Economic Impact Study of the KNPR undertaken in 2006 indicates that the KNPR has played a material role in the growth and economic development of Haines Junction, positively impacting population growth, employment and income,[11] and indicated that the following economic impacts may be associated with the KNPR:

- At the time of the study, the average annual expenditure by Parks Canada associated with KNPR was $2.11 million, with payroll accounting for about $1.2 million annually and about 29% of remaining spending on goods and services in Haines Junction and 48% of the rest in Yukon.

- At the time of the study, total annual visitor spending associated with the KNPR was noted to be about $3.2 million based on 75,478 non-resident visitors spending an average of $42.50 each. Visitor Exit Surveys indicated that natural attractions were the biggest draw for visitors and that people stayed in the region longer than in most other regions and spent more in the region than in most other Yukon regions.

- At the time of the study, economic impacts from all spending associated with the KNPR were noted to add $2.5 million annually to Yukon's GDP; labour income was noted to be enhanced by $2.2 million.

- At the time of the study, employment related to KNPR was noted to generate more than 57 person years of employment from spending, with the Yukon government receiving an additional $57,000 in property and excise taxes.

Other factors that may have impacted growth and economic development for Haines Junction that were noted in the study included: the scenic nature of the area and its influence on tourism, major construction projects (e.g., the Shakwak project), decentralization of the territorial government and growth of the Champagne and Aishihik First Nation municipal government.[12]

Facilities and services available in Haines Junction are summarized in Table E1-1 of Attachment E1. Many of the facilities and services available in Haines Junction are also available to serve the needs of nearby communities. Specifically, the RCMP detachment also serves Destruction Bay and Burwash Landing (communities without and RCMP detachment); the Haines Junction Health Centre also provides some services (e.g., x-ray services) to persons from Destruction Bay or Burwash Landing; social worker/ childcare services for Burwash Landing and Destruction Bay are provided from Haines Junction;[13] and the local high school also serves education requirements for students in Beaver Creek, Destruction Bay and Burwash Landing (these communities only have kindergarten to grade 8 or grade 9).

[11] An economic impact study undertaken by Canadian Parks and Wilderness Society, Yukon Chapter (2006).
[12] The study noted that these factors alone would not explain why the Haines Junction economy had performed better than comparable communities.
[13] For Haines Junction as well as other communities in north-western Yukon that would be isolated without the Alaska Highway there are limited pharmacy services (emergency only) and other services such as detox, alcohol and drug, dietitian and dental are available from Whitehorse.

3.2 REGIONS DEPENDENT ON THE ALASKA HIGHWAY FOR DEVELOPMENT

Communities in southeastern Yukon and northwestern British Columbia (north of Fort Nelson) would be materially impacted without the Alaska Highway. Many of these communities would become isolated and would either not exist or would be materially reduced in size. Economic development in areas that would become isolated would also be materially constrained due to lack of road access, i.e., lack of through traffic that currently supports local retail and other businesses and significant constraints on resource development activities within the region (mineral exploration, mining, forestry, etc.). Table E-10 provides a high-level summary of potentially affected communities, populations and services that would be impacted in a without the Highway Scenario.

3.2.1 Watson Lake and Surrounding Communities

Watson Lake is located in the southeastern corner of Yukon, 455 kilometres to the southeast of Whitehorse and 14 km northwest of where the Alaska Highway crosses the British Columbia border. It is located at the junction of the Alaska Highway, the Robert Campbell Highway extending into the central Yukon and the Northwest Territories, and the Stewart-Cassiar Highway extending from central British Columbia to Yukon. Given its history and status as the only inland gateway connecting southern Canada and the Lower 48 States to Yukon and the Alaska interior, Watson Lake has become a critical transportation hub in the region.

The community lies within the traditional territory of the Liard First Nation, part of the Kaska Tribal Council, and includes the Town of Watson Lake, as well as adjoining settlements of the Liard First Nation, including Upper Liard. The 2011 National Household Survey[14] indicates that approximately 40% of the population in Watson Lake was Aboriginal,[15] while about 88% of the population of Upper Liard was Aboriginal.[16]

Watson Lake was established in 1939 as one location along the Northwest Staging Route, and served as a supply and accommodation centre for both airport construction (which occurred in 1941) and Alaska Highway construction (which commenced in 1942). Subsequent to completion of these wartime construction projects, it became a service centre for the both the highway and for resource development activities in the upper Liard River region (including providing support for mining exploration and development activities as well as for the forestry industry that developed in the area). It has over its history experienced the boom and bust cycles that flow from dependence on resource development activities[17].

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[14] Census and National Household Survey information presented for Watson Lake is a combination of multiple census subdivisions this will provide a more representative estimate of the regional statistics. Census subdivisions within Watson Lake Region: Two and One-Half Mile Village, Two Mile Village, Upper Liard, Watson Lake (CSD).

[15] For Watson Lake, about 94% of the Aboriginal population were First Nations and about 6% were Metis. Source: Yukon Government. 2014. Aboriginal Population. Retrieved from: http://sewp.gov.yk.ca/data?regionId=YK.WLR&subjectId=POPCOM&groupId=POPCOM.ABOR&dataId=NHS_2011_ABOR_POP&tab=region.

[16] Source: Statistics Canada. 2013. 2011 National Household Survey. Retrieved from: http://www12.statcan.gc.ca/nhs-enm/2011/dp-pd/prof/details/Page.cfm?Lang=E&Geo1=CSD&Code1=6001032&Data=Count&SearchText=Upper%20Liard&SearchType=Begins&SearchPR=01&A1=All&B1=All&GeoLevel=PR&GeoCode=10#tabs1 [accessed January 7, 2016].

[17] Selwyn Resources Ltd. Watson Lake Socio-Economic Community Profile (2009), page 33.

Watson Lake was incorporated in 1984, and since then has provided essential community services such as maintaining roads within municipal boundaries, addressing health and safety issues, provision of water and sewer services, landfill and solid waste management, recreation facilities, neighbourhood parks and community beautification programs. The town is responsible for development, implementation and monitoring of the Official Community Plan, and also has authority to develop and pass by-laws for the municipality and collects taxes including property taxes, water and sewer, building permits, business licenses and dog licenses.[18]

Today, Watson Lake is considered the key transportation and services centre for southern Yukon, Northern B.C. and a portion of the Northwest Territories.[19] Due to its size and location a number of local businesses and major national and international company branches in Watson Lake provide access to thousands of products and services to companies, governments, and individuals operating in Eastern Yukon and northern British Columbia.[20]

The following is specifically noted regarding relevant key baseline indicators:

- **Population and Demographics:** As provided in Table E-1, in 2015, Watson Lake had a total population of 1,469, which accounted for about 4% of the total Yukon population. Over the last ten years, the Watson Lake population decreased by about -3% with an average annual change of -0.4%. Yukon Bureau of Statistics population projections expect less than 1% annual growth in population over the next ten years.

  Watson Lake is also located within the traditional territory of the Kaska Dena and is considered home to the Liard First Nation. As illustrated in Table E-4, as of October 2015, the Liard First Nation reported a total registered population of 1,191, of which more than 57% resided off reserve (AANDC 2015).[21] The Liard band office is located in Watson Lake and serves seven reserves, including Upper Liard, Lower Post, Two-and-a-Half Mile, and Watson Lake. Liard First Nation is one of three Yukon-based First Nations that do not have land claim agreements (Yukon Communities 2014).[22]

  Employment and Income: Table E-8 indicates that the public administration sector was the largest source of employment for Watson Lake's labour force, employing over 30% of the total population aged 15 years and over. The second largest source of employment was in the accommodation and food services sector (9.2%), followed by retail trade sector (9.1%), construction sector (8.3%) and health care and social assistance sector (8.3%), mining, quarrying, and oil and gas extraction sector (7.5%) and education services sector (5.0%). As shown in Table E-9, in 2010 approximately 9% of the households earned less than $20,000 and a total of 42% of the households earned less than $50,000. Over 65% of households earned less than median income, while remaining earned more than median income. The average

[18] Selwyn Resources Ltd. Watson Lake Socio-Economic Community Profile (2009), page 16.
[19] Source: http://www.watsonlake.ca/about-watson-lake/history/ [accessed on October 27, 2015].
[20] Source: Yukon Community Profiles. Watson Lake. Retrieved from: http://www.yukoncommunities.yk.ca/watson-lake/watson-lake-community-government-services/watson-lake-employment-services.
[21] Source: http://fnp-ppn.aandc-aadnc.gc.ca/fnp/Main/Search/FNRegPopulation.aspx?BAND_NUMBER=502&lang=eng.
[22] Source: http://www.yukoncommunities.yk.ca/watson-lake/watson-lake-first-nations.

employment income was $56,590 for the same period, which is about 9% lower than Yukon average.

- **Businesses & Employees:** Figure E-2 indicates that in 2013 Watson Lake businesses accounted for about 3.2% of all Yukon businesses surveyed and about 2.4% of employees.
- **Cost of Living**: Figure E-2 provides the Community Spatial Price Index for April 2015 and indicates that it was 108.2 for Watson Lake (compared to 100 in Whitehorse). Gasoline was cheaper in Watson Lake compared to Whitehorse. Dairy products were the same cost as in Whitehorse. All other surveyed products in Watson Lake were higher than Whitehorse, with much higher prices for health and personal care and household operation products (Table E-5).

Federal,[23] territorial and municipal governments currently provide services to Watson Lake and surrounding communities. This includes a 12 bed hospital, education facilities, offices for highways and public works, health and social services offices including justice workers, a court house, a community library, environmental and conservation offices, tourism and culture heritage facilities, energy mines and resources office, mining recorder office, airport maintenance operations. The Yukon Housing Corporation and The Yukon Liquor Corporation have offices or facilities in town. YESAB also has a designated office in Watson Lake. Facilities and services currently available in Watson Lake are summarized in Table E1-2 of Attachment E1.

[23] A full service Canada Post outlet in Watson Lake provides mail service with mail trucked to Watson Lake five days a week. Yukon has an agreement with Canada for provision of an RCMP detachment in Watson Lake and the Department of Indian and Northern Affairs has a regional office in town.

3.2.2 Village of Teslin

Teslin is located in southeastern Yukon at Mile 804 (Km 1244) on the Alaska Highway. Established in 1898, Teslin briefly served as a stopover for people travelling the Canadian route to the Klondike, and later the Hudson Bay Co. established a trading post at the Village.[24] Teslin is situated within the traditional territory of the Teslin Tlingit First Nation. Following the construction of the Alaska Highway in 1942, the Teslin Tlingit First Nation made Teslin their permanent home at Teslin.[25] Cultural activities undertaken by the First Nation in the Village of Teslin include an elders group, subsistence food preparation, language programs, spirit camps, arts and craft. In 1993, Teslin Tlingit First Nation became one of the first four First Nations to sign Land Claims agreements and become a self-governing body.[26]

The following is specifically noted regarding relevant key baseline indicators:

- **Population and Demographics:** In 2015, Teslin had a total population of 480, which accounted for just over 1% of the total Yukon population. Over the last ten years, Teslin's population increased by about 15% with an average annual change of 1.4%. In October 2015, Teslin Tlingit First Nation reported a total population of 599, of which more than 90% resided either off reserve (55.4%) or on Crown Land (38.5%) (AANDC 2015).[27]

- **Employment and Income:** Table E-8 indicates that the public administration sector was the largest source of employment for Teslin's labour force, employing over 43% of the total population aged 15 years and over. The second largest source of employment was in construction sector (13%) followed by education services (8.7%), retail trade (8.7%) and transport and warehousing (8.7%). As shown in Table E-9, in 2010 approximately 9% of the households earned less than $20,000 and a total of 39% of the households earned less than $50,000. Over 55% of households earned less than median income, while remaining earned more than median income. The average employment income was $54,078 for the same period, which is about 13% lower than Yukon average.

- **Businesses & Employees:** Figure E-2 indicates that in 2013 Teslin businesses accounted for about 1.1% of all Yukon businesses surveyed and about 0.4% of employees.

- **Cost of Living**: Figure E-2 provides the Community Spatial Price Index for April 2015 and indicates that it was 113.2 for Teslin (compared to 100 in Whitehorse). All surveyed items were expensive in Teslin compared to Whitehorse, with much higher prices for meat, household operation products, bread and other food items (Table E-5).

Facilities and services currently available in Teslin are summarized in Table E1-3 of Attachment E1.

[24] Source: http://www.teslin.ca/
[25] Source: http://www.yukoncommunities.yk.ca/teslin/first-nations
[26] Source: Council of Yukon First Nations. 2016. Teslin Tlingit Council. Retrieved from: http://cyfn.ca/nations/teslin-tlingit-council/ [accessed January 6, 2016].
[27] Source: AANDC. 2015. Available at http://fnp-ppn.aandc-aadnc.gc.ca/fnp/Main/Search/FNRegPopulation.aspx?BAND_NUMBER=499&lang=eng [accessed November 18, 2015].

3.2.3 Communities in Western Yukon: Burwash Landing, Destruction Bay and Beaver Creek

Three communities in western Yukon would be materially impacted if there was no Alaska Highway development: Burwash Landing, Destruction Bay and Beaver Creek. Each of these communities exists today primarily due to the highway, serving either government services functions or serving seasonal tourism/ traffic flows along the highway.

These are all very small (population of less than 150), unincorporated communities with services provided by the territorial government or jointly provided by the territorial government and local First Nation in the case of Burwash Landing (Kluane First Nation) and Beaver Creek (White River First Nation).[28] In each case the services and amenities available in the community reflect the small size of the community and in many cases are shared between communities (or available from other communities such as Haines Junction or Whitehorse).

Education (grades kindergarten to grade 8) and health services (one nurse practitioner) are shared between Destruction Bay and Burwash Landing (17 km north of Destruction Bay); and for all three communities, students must attend high school in either Haines Junction or Whitehorse. Police services for Destruction Bay and Burwash Landing are available from Haines Junction, while Beaver Creek has its own RCMP detachment. Additional information for each community is summarized below, while information on facilities and services available in each community is provided in Table E1-4 of Attachment E1.

Destruction Bay

In 2015, the total population in Destruction Bay was 50, which is less than 0.2% of the total Yukon population (see Table E-1). Over the last ten years there has been a 15% decrease in population (a reduction of 9 people).

Burwash Landing

The establishment of a settlement at Burwash Landing predates the construction of the Alaska Highway. However, prior to the construction of the highway the settlement was relatively isolated. With highway construction in 1942 more families moved to Burwash Landing from surrounding areas, and the community became the administrative centre for the Kluane First Nation.

In 2015, the total population in Burwash Landing was 107, which is less than 0.5% of the total Yukon population (Table E-1). Over the last ten years the population in Burwash Landing increased by 18 people which would be about 20%, or an average annual increase of 2%. Burwash Landing is located within the traditional territory of the Southern Tutchone.[29] As illustrated in Table E-4, in October 2015, Kluane First

[28] Following construction of the Highway, Burwash Landing became the administrative centre for the Kluane First Nation, and Beaver Creek became the administrative centre for White River First Nation. The First Nations provide housing and municipal services for members including water, sewer, local road maintenance and community recreation.

[29] Source: Yukon Community Profiles. 2014. Burwash landing. Retrieved from http://www.yukoncommunities.yk.ca/burwash-landing/first-nations [accessed November 24, 2014].

Nation reported a total registered population of 175, of which most either lived off reserve (54.3%) or on Crown land (42.9%).[30]

Table E-8 indicates that the public administration sector was the largest source of employment for the Burwash Landing labour force, employing about 50% of the total population aged 15 years and over. The second largest source of employment was in the construction sector (15%). The Kluane First Nation is the principal employer at Burwash Landing. However, the private sector also provides employment in the construction, mining, service sector, and tourism fields. The community's proximity to Kluane National Park and through traffic along the highway also supports businesses and employment related to tourism and/or servicing highway travellers.

Beaver Creek

Beaver Creek was founded in 1955, primarily as a service community for the Alaska Highway. It is the last community before entering the Alaska border and serves as a Canada Customs and Immigration checkpoint.

In 2015, the total population in Beaver Creek was 121, which accounted for less than 0.5% of the total Yukon population (Table E-1). Over the last ten years population in Beaver Creek increased and decreased with no impact by 2015 (i.e. the same population in 2015 as it was in 2005). Beaver Creek is also home to the White River First Nation who have lived on the land for over 10,000 years, and whose traditional territory overlaps with the Kluane First Nation.[31] As illustrated in Table E-4, in October 2015, White River First Nation reported a total registered population of 153, of which nearly 70% resided off reserve.[32]

Government services, which include the Canadian Border Services Agency, territorial government, and First Nation administration provide most of the employment opportunities in Beaver Creek. Local lodges and restaurants provide employment during the tourist season (May through September). Mineral exploration activity in the region holds potential for a greater demand for labour and services. The community also relies on subsistence and traditional activities. Many secure a significant portion of their food supply from hunting and fishing, and some earn cash through trapping.[33]

Table E-8 indicates that the public administration sector was the largest source of employment for Beaver Creek labour force, employing about 67% of the total population aged 15 years and over. The second largest source of employment was in accommodation and food services sector (13%).

3.2.4 Tok, Alaska

Situated at the Tok Cut-off (an extension of the Glenn Highway), Tok is located approximately 93 miles from the Canadian border. Founded in 1942, Tok originated as an Alaska Road Commission camp during

[30] Source: http://fnp-ppn.aandc-aadnc.gc.ca/fnp/Main/Search/FNRegPopulation.aspx?BAND_NUMBER=503&lang=eng.
[31] Source: http://www.yukoncommunities.yk.ca/beaver-creek/first-nations
[32] Source: http://fnp-ppn.aandc-aadnc.gc.ca/fnp/Main/Search/FNRegPopulation.aspx?BAND_NUMBER=506&lang=eng.
[33] Source: http://www.yukoncommunities.yk.ca/beaver-creek/economic-activity-and-development

construction of the Alaska and Glenn[34] highways.[35] Following the opening of the Alaska Highway to civilian traffic, Tok became a permanent settlement for newcomers, building a post office and road house (1946). In 1947, Tok opened its first school, which was housed in the Alaska Road Commission building. A larger school was later built in 1958 to accommodate Tok's growing population. Tok eventually developed into a transportation trade and service centre. In July of 1990, the town was nearly demolished by a major fire that burned over 100,000 acres of land.[36]

Today, Tok remains relatively isolated from the rest of Alaska, with travelling distances of nearly four hours to Fairbanks and more than six hours to Anchorage. The town is known as the "Sled Dog Capital of Alaska" and hosts the Race of Champions, a sled dog race in late March that features the largest field of any sprint race in Alaska.[37] Tok also provides access to the Tetlin National Wildlife Refuge and houses the headquarters for the U.S. Fish and Wildlife Service preserve.

Relevant key baseline indicators include:

- **Population and Demographics:** According to the 2010 U.S. Census, Tok had a total population of 1,258,[38] which accounted for less than 0.5% of the total Alaska population.
- **Employment and Income:** In 2014, trade, transportation and utilities was the largest source of employment for Tok's labour force, employing over 20% of all workers. The second largest source of employment was in local government (18.5%) followed by leisure and hospitality (14.8%), state government (12.9%) and educational and health services (9.9%).[39] Approximately 46% of resident workers earned less than $20,000 and a total of 77% of the households earned less than $50,000, which was approximately 9 percentage points higher than the state average.

Services and facilities available in Tok include hotels, accommodations, restaurants, gas stations and auto repair, gift shops, sporting goods store, liquor store and car washes. There are several full-service RV parks in the Tok area, as well as eight churches, a public library, a K–12 school, and a post office.[40] Additional information on Tok's facilities and services is provided in Table E1-5 of Attachment E1.

3.3 ISOLATED COMMUNITIES: KEY CHALLENGES AND ISSUES

In order to understand potential impacts on communities that would become isolated in a without the Highway scenario, the characteristics of, and issues faced by, isolated communities were reviewed. Old

[34] The Glenn Highway was constructed in 1942 (part of the Alcan Highway project) as a shortcut between coastal forts and the Alaska Highway.
[35] Source: Tok, Alaska Chamber of Commerce. 2012. Welcome to Tok. Available from: http://www.tokalaskainfo.com/ (accessed January 6, 2016).
[36] Source: http://explorenorth.com/alaska/history/tok-history.html.
[37] Source: Travel Alaska. 2016. About Tok. Retrieved from: https://www.travelalaska.com/destinations/communities/tok.aspx (access January 6, 2016).
[38] Source: Alaska Department of Commerce, Community, and Economic Development. https://www.commerce.alaska.gov/dcra/DCRAExternal/community/Details/ab6ef320-baf8-4200-bd06-2515b83119cc.
[39] Source: http://live.laborstats.alaska.gov/alari/details.cfm?yr=2014&dst=01&dst=03&dst=04&dst=06&dst=07&r=3&b=25&p=324
[40] Source: The Milepost. 2015. Tok. Available at: http://www.themilepost.com/communities/alaska/q-t/tok (accessed January 6, 2016).

Crow was considered as a case study for understanding the potential effects that lack of road access would have on communities that would be isolated in a without the Highway scenario.

Overall, the types of social and economic impacts that these communities would face without the Alaska Highway can be understood by reviewing the challenges currently faced by the community of Old Crow, which is Yukon's only isolated community today.

3.3.1 Old Crow

Old Crow is the most northerly community in Yukon, situated on the banks of the Porcupine River, near to the Vuntut National Park. It is home to the self-governing Vuntut Gwitchin First Nation ("VGFN"). It is the only Yukon community that cannot be accessed by all-weather road. Access to Old Crow is mainly through air service,[41] a gravel airstrip is maintained by the Yukon government. The only other access to Old Crow is through the river system.

The following is specifically noted regarding relevant key baseline indicators:

- **Population and Demographics:** There are about 258 people living in Old Crow, and about 220 are First Nations. Over the last ten years, the population slightly increased and decreased, and the total population in 2015 was the same as it was ten years ago. (See Table E-1).

- **Income and Employment:** The Vuntut Gwitchin First Nation is the primary employer in the community; however, Yukon government services also employs individuals providing services such as healthcare, education or conservation.[42] As shown in Table E-8, the public administration sector was the largest source of employment for Old Crow's labour force, employing over 63% of the total population aged 15 years and over. The second largest area of employment was education services (11.1%), followed by retail trade (7.4%), construction (7.4%) and transportation and warehousing (7.4%).

- **Businesses & Employees:** Figure E-2 indicates that in 2013 Old Crow businesses accounted for about 0.3% (total of 8 businesses) of all Yukon businesses surveyed and about 0.1% of employees (16 workers reported).

- **Cost of Living**: Figure E-2 provides the Community Spatial Price Index for April 2015 for Old Crow, and notes that it was at 180.5 compared to 100 in Whitehorse (the highest in Yukon). All surveyed products in Old Crow were higher than Whitehorse and the rest of Yukon, with much higher prices for household operation products, fruit and vegetables, bread and other food items (Table E-5). Food and non-food items in Old Crow are eligible for a subsidy under Nutrition North Canada ("NNC").[43] The NNC notes that "Old Crow does not usually have access to any surface transportation at any time, and as a result, its retailers and residents cannot take advantage of lower cost methods of transportation such as sealifts, barges, ferries and winter roads. For this reason, NNC also subsidizes a number of non-perishable food items and non-food items in this

[41] A local airline has a route from Whitehorse to serve Dawson City, Old Crow, Inuvik, Northwest Territories and Fairbanks, Alaska. Source: http://www.yukoncommunities.yk.ca/old-crow/community-and-government-services/infrastructure.
[42] Source: http://www.yukoncommunities.yk.ca/old-crow/population-and-labour-force.
[43] Source: http://www.nutritionnorthcanada.gc.ca/eng/1369230082316/1369230105932 [accessed on December 24, 2015].

community."[44] In the 2013/14 fiscal year, the community received about $161,222 of subsidy under NNC (or 73,940 kilograms of products were subsidized).[45]

The services in Old Crow reflect the small population and isolation of the community; most groceries and personal care items are ordered from shops in Whitehorse and flown into the community. Many community members also secure a significant portion of their food supply from hunting.[46] The community website notes that community members "rely heavily on the land and on the Porcupine Caribou Herd for food, shelter and medicines".[47] Services available in Old Crow include the following:

- The school offers Kindergarten to Grade 12, with approximately 35 students (2012). High school courses are offered along with job training and certification, on-the-land skills and cultural training. Yukon College provides a local campus in Old Crow with courses offered online or through tele-conferencing facilities.[48]

- A nursing facility is staffed by two nurse practitioners on-call 24 hours per day.[49] Air ambulance is provided from Whitehorse – travel time of three hours.

- Other services available in the community include: RCMP detachment with three officers, a post office, bank, gas services, grocery/ hardware store and bed and breakfast.[50]

- Electricity is provided by ATCO Electric Yukon. ATCO Electric Yukon in its 2013-15 General Rate Application[51] notes that during outages and emergency situations for Old Crow "the response time would take multiple days" and "this is primarily due to the logistics of securing air transportation to the community". Residents in Old Crow pay the same electricity rates as other Yukon communities for the first 2,500 kW.h/month of consumption. However, a rate of 30.77 cents/kW.h is charged to non-government residential ratepayers in Old Crow for electricity consumption over 2,500 kWh (this is compared to 13.99/kW.h for non-government residential ratepayers in other Yukon diesel communities).

3.3.2 Summary of Potential Impacts for Isolated Communities

Isolated communities face a number of challenges ranging from access to important services, such as health care and safety, to access food supplies /nutrition and access to cost effective and reliable energy. Overall, the types of social and economic impacts faced by isolated communities may be understood by reviewing the issues faced by Old Crow (Yukon's only isolated community). The following types of issues and challenges are specifically noted:

- Isolated communities experience higher costs for delivery of goods and services via air or winter road, which is reflected in the costs for goods and services available to community members,

[44] Source: http://www.nutritionnorthcanada.gc.ca/eng/1415548276694/1415548329309#tpc2 (accessed on December 24, 2015).
[45] Source: http://www.nutritionnorthcanada.gc.ca/eng/1414596570182/1414596655833#h3 (accessed on December 24, 2015).
[46] Source: http://www.yukoncommunities.yk.ca/old-crow/community-and-government-services.
[47] Source: http://www.oldcrow.ca/index2.htm (accessed on December 24, 2015).
[48] Source: http://www.yukoncommunities.yk.ca/old-crow/schools-and-training.
[49] Source: http://www.yukoncommunities.yk.ca/old-crow/community-and-government-services/health-services.
[50] Source: http://www.yukoncommunities.yk.ca/old-crow/business-services.
[51] Source: http://yukonutilitiesboard.yk.ca/proceedings/yecl-2013-15-general-rate-application/.

including heating fuel, building materials, food and government support services.[52] While Air North delivers most community supplies to Old Crow, Hercules aircraft are also chartered to deliver larger bulk materials and equipment that cannot be delivered via winter roads or smaller Air North aircraft. The typical charter rate for a Hercules aircraft for Old Crow may approximate $40,000 ($2007) per flight.[53] Costs for an ice road from Eagle Plains on the Dempster Highway into Old Crow have ranged between $750,000 and $1.2 million (in 2008 dollars) depending on the length of the season and operation and the weather conditions.[54]

- Isolated communities also have a higher cost of living due to the higher costs for delivery of basic necessities.[55] Available Community Price Index information for Yukon communities provided in Table E-5 and Figure E-1 indicates that most food and other items are materially higher in cost in Old Crow compared to Whitehorse and other Yukon communities.[56] It is noted that most food and medicaments for isolated communities are provided under Nutrition North Canada which is a Government of Canada subsidy program to provide Northerners in isolated communities with improved access to food.[57]

- Most food delivered to isolated communities is also transported from southern communities over long distances which increases the cost and may compromise the quality of the food. Higher costs for this food may also contribute to significant health issues in isolated communities as residents may make poor nutritional choices.[58]

- Isolated communities also face considerable coordination and logistical planning challenges to undertake community construction and infrastructure projects as use of winter roads and Hercules aircraft requires careful planning to make most effective use of available transportation and to minimize costs. Due to cost and environmental conditions, winter roads are not available to Old Crow each year and community planning, major projects and infrastructure investments must be coordinated to align with winter road availability (which is typically on a three year cycle) and to minimize costs and make most effective use of available transportation.[59] With climate change, it is also increasingly difficult to predict winter weather. It has also been noted that due to climate change winter roads may not be possible in Old Crow within the next few decades.[60]

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[52] The Vuntut Gwitchin Integrated Community Sustainability Plan at page 6 notes that in the past a winter road has been constructed connecting Old Crow to Eagle Plans on the Dempster Highway. However, due to the high cost of the road, it has only been built under special circumstances. Permanent roads are considered prohibitively expensive. An ice road open for only a few weeks can cost more than $1 million to build and maintain. With climate change ice road options may no longer be feasible for the community within the next 25 years.

[53] Source: The Vuntut Gwitchin Integrated Community Sustainability Plan, page 14.

[54] Source: The Vuntut Gwitchin Integrated Community Sustainability Plan page 13-14.

[55]The Vuntut Gwitchin Integrated Community Sustainability Plan at page 6 notes the cost of living in Old Crow is much higher than any other Yukon community and notes that to offset extra costs a federal government employee living in Old Crow would receive an isolated post allowance of $18,260 (in 2007) and in Whitehorse they would receive $4,069. This allowance is made up of an environment allowance, living cost differential and fuel and utilities differential. Under this scheme the living cost differential for Old Crow makes up close to half of the amount ($9,725).

[56] Source: http://www.yukoncommunities.yk.ca/old-crow/cost-of-living.

[57] Source: http://www.nutritionnorthcanada.gc.ca/eng/1415538638170/1415538670874.

[58] The document notes that Hyperlipidemia, (elevated fat in the blood stream) was noted as the largest health problem identified by the community nurse. The Vuntut Gwitchin Integrated Community Sustainability Plan at page 17.

[59] The document notes that if an ice road is planned on a three year cycle than this cycle is used for planning capital projects logistics. Source: The Vuntut Gwitchin Integrated Community Sustainability Plan at page 13.

[60] Source: The Vuntut Gwitchin Integrated Community Sustainability Plan at page 13-14.

- Due to isolation and smaller population, economic opportunities for isolated communities are more limited, with higher unemployment rates and lower participation rates compared to Yukon averages.[61] First Nations and territorial government would provide the main sources of employment in the community.

- Smaller size and isolation also impact infrastructure development and service delivery for isolated communities. For Old Crow, service delivery is shared between the local and territorial government, with the VGFN covering 80% of the cost of water delivery and sewage, education, and operation of the youth centre, heritage hall recreation facilities (ball diamond, playgrounds, Skateboard park) and cemetery; and the Yukon government operating and maintaining the municipal hall, solid waste disposal facilities, sewage lagoon road system, the fire department (including maintenance of the fire hall, fire truck for volunteer fire service) and the airport. The Yukon government is also responsible for flood protection and river bank stabilization, the school (which offers kindergarten to grade 9),[62] RCMP and nursing station.[63] Within Old Crow, roads also vary in width, surface quality and conditions, and upgrading roads and drainage in the community has been identified as a key priority.[64]

- Energy requirements in isolated communities are supplied through local generators, mostly supplied from diesel units,[65] and there can be significant challenges in meeting energy requirements, including providing reliable and affordable energy.[66]

- Remote communities may also experience barriers to quality health care in, especially in communities with small populations.[67]

[61] For example, Labour Force Participation National Household Survey 2011 shows participation rate for Yukon at 77.3% with 9.8% unemployment rate, while participation rate for Old Crow for the same period was 73.7% with 14.3% unemployment rate. Source: Government of Yukon Socio-Economic Web Portal.
Source:
http://www.sewp.gov.yk.ca/data?regionId=YK&subjectId=ECON&groupId=ECON.LBF&dataId=NHS_2011_LFS_PART&tab=subject (accessed on January 6, 2016).
[62] After grade 9 students leave the community and generally attend grades 10-12 in Whitehorse while staying in residence.
[63] Source: The Vuntut Gwitchin Integrated Community Sustainability Plan, Executive Summary
[64] Source: The Vuntut Gwitchin Integrated Community Sustainability Plan, page 14 and 22.
[65] Normal Wells in Northwest Territories uses natural gas as a source for electric generation.
[66] Most of the isolated communities face challenges with outages especially during winter time peaks. The maintenance and replacement of the units are done through flight in/outs which makes it very expensive compared to the communities that have road access. It is also difficult to deal with the emergency situations such as in Pangnirtung power plant fire. Source: http://www.gov.nu.ca/eia/news/local-state-emergency-declared-pangnirtung (accessed on December 24, 2015).
[67] Source: Health Issues in Rural Canada, http://publications.gc.ca/Collection-R/LoPBdP/BP/bp325-e.htm (accessed on December 24, 2015).

Table E-1: Yukon Annual (June) Population by Community, 2005 to 2015[68]

Western/ Central - Connected	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	First Nation Population by Community (2014)	First Nation Population as percentage of Total Population
Carcross	444	430	437	431	446	430	477	469	465	467	504	248	53%
Carmacks	378	410	426	453	480	500	547	564	553	563	557	362	64%
Dawson City	1,826	1,781	1,876	1,889	1,904	1,891	1,973	2,023	2,041	2,059	2,067	363	18%
Faro	381	386	382	385	404	413	394	394	397	383	375	39	10%
Haines Junction	817	805	804	818	828	856	857	873	888	908	895	309	34%
Mayo	378	401	388	460	461	452	467	486	504	492	477	265	54%
Pelly Crossing	281	294	284	308	324	346	344	350	377	397	378	324	82%
Ross River	345	348	355	383	375	361	404	403	400	400	411	294	74%
Tagish	187	198	212	220	225	245	258	261	256	271	262	54	20%
Whitehorse Area	**23,608**	**24,005**	**24,446**	**25,300**	**26,078**	**26,872**	**27,212**	**27,976**	**28,179**	**28,713**	**28,872**	**4151**	**14%**
Other	111	96	91	98	93	91	68	66	64	61	60	19	31%
Subtotal	**28,756**	**29,154**	**29,701**	**30,745**	**31,618**	**32,457**	**33,001**	**33,865**	**34,124**	**34,714**	**34,858**	**6,428**	**19%**

Isolated without Alaska Highway	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	First Nation Population by Community (2014)	First Nation Population as percentage of Total Population
Beaver Creek	120	108	101	106	104	99	117	119	122	115	121	36	31%
Burwash Landing	89	85	88	101	106	101	104	102	110	112	107	82	73%
Destruction Bay	59	56	56	49	48	48	50	51	46	42	50	8	19%
Teslin	417	411	428	449	470	475	491	485	472	470	480	270	57%
Watson Lake	**1,522**	**1,515**	**1,567**	**1,596**	**1,561**	**1,569**	**1,537**	**1,543**	**1,495**	**1,534**	**1,469**	**606**	**40%**
Subtotal	**2,207**	**2,175**	**2,240**	**2,301**	**2,289**	**2,292**	**2,299**	**2,300**	**2,245**	**2,273**	**2,227**	**1,002**	**44%**
Isolated with or without Alaska Highway													
Old Crow	259	279	271	248	250	235	263	257	265	264	258	220	83%
Total Yukon Population	**31,222**	**31,608**	**32,212**	**33,294**	**34,157**	**34,984**	**35,563**	**36,422**	**36,634**	**37,251**	**37,343**	**7,650**	**21%**

Notes to the table:

1. Population of unorganized areas are assigned to the nearest community.
2. Whitehorse Area includes City of Whitehorse and surrounding area as well as the community of Marsh Lake.
3. Other includes communities such as Champagne, Elsa, Johnson's Crossing, Keno City, Stewart Crossing, Swift River, etc.
4. Without the Alaska Highway the population of Haines Junction would be lower due to no connection to interior Alaska (lower businesses opportunities, etc.). However, this impact is assumed to be not significant.

[68] Source: Yukon Bureau of Statistics, Population Report June 2015. Available at http://www.eco.gov.yk.ca/stats/pdf/populationJun_2015.pdf (accessed December 18, 2015).

Table E-2: Historic Population for Yukon Communities: Western/ Central Communities Dominated by Inside Passage Connection[69]

	Yukon	Carcross	Carmacks	Clinton Creek	Dawson City	Elsa	Faro	Haines Junction	Marsh Lake	Mayo	Pelly Crossing	Ross River	Tagish	Whitehorse
1901	27,219				9,142									
1911	8,512				3,015									
1921	4,157				975									
1931	4,230				819									
1941	4,914				1,043						76	53		754
1951	9,096	182	148		783	147				241	66	88		2,594
1956	12,190	176	130		851	247		114		249	89	178		2,570
1961	14,628	175	218		881	395		199		342	151	132		5,031
1966	14,382	199	311		742	592		195		479	137	173		4,771
1971	18,388	188	348	381	762	298	863	183		462	141	317		11,277
1976	21,836		346		838		1,544	268		448				13,311
1981	23,153		256		697		1,652	366		398				14,814
1986	23,504	210	280		900	290	400	340		320	175	350	105	15,195
1991	27,797	183			972		1,221	477		243	216	324	58	17,925
1996	30,766	196	466		1,287		1,261	574		324	238	352	69	19,157
2001	28,674	152	431		1,251		313	531		366	328	337	206	19,058
2006	30,372	280	425		1,327		341	589		248	296	313	222	20,461
2011	33,897	289	503		1,319		344	593	619	226	336	352	391	23,376

Impact of resource developments and major construction projects to Yukon Population:

- During Klondike Gold Rush in the 1900s the Yukon population peaked at approximately 27,000 people.
- After the Gold Rush the Yukon population reduced to about 4,000 in the 1920s.
- The Yukon population experienced another boom during WWII with the construction of several major infrastructure projects related to wartime requirements (e.g., the Alaska Highway and the CANOL pipeline). The population of Whitehorse was most affected by these developments.
- With new resource developments, including the United Keno Hill Mine Development ("UKHM") mine in the 1950s and the Faro mine in the 1960s, Yukon's population began to increase at a higher rate, doubling by 1971 (18,388) compared to 1951 (9,096) and reaching 30,000 by 1996.

[69] Information taken from Yukon Bureau of Statistics, Yukon Community Historical Population, 1901 to 2011, Source for information noted is Statistics Canada Censuses. Notes provided indicate Yukon total figures include some small communities not individually listed. Boundaries of geographic areas may change from one census to another.

Table E-3: Communities Effectively Isolated Absent the Development of the Alaska Highway

	Yukon	Old Crow*	Beaver Creek	Burwash Landing	Destruction Bay	Watson Lake	Teslin
1901	27,219						
1911	8,512						
1921	4,157						
1931	4,230						
1941	4,914	124				58	171
1951	9,096	153				238	269
1956	12,190	173	41			356	254
1961	14,628	217	96			796	231
1966	14,382	218	114			779	324
1971	18,388	206	120			861	340
1976	21,836					808	241
1981	23,153					748	310
1986	23,504	230	115	65	45	825	180
1991	27,797	256	104	77		912	181
1996	30,766	278	131	58		993	189
2001	28,674	299	88	68	43	912	123
2006	30,372	253	112	73	55	846	141
2011	33,897	245	103	95	35	802	122

* Old Crow is isloated with or without the Alaska Highway.

Table E-4: Registered Population for Reserves, October 2015[70]

	Whitehorse Areas		Haines Junction area		Watson Lake area	Teslin area	Beaver Creek area	Burwash Landing area
	Kwanlin Dün First Nation	Ta'an Kwäch'än	Aishihik	Champagne	Liard First Nation	Teslin Tlingit Council	White River First Nation	Kluane First Nation
Registered On Own Reserve	6	23	1	0	123	3	6	0
Males	*1*	*14*	*1*	*0*	*70*	*1*	*2*	*0*
Females	*5*	*9*	*0*	*0*	*53*	*2*	*4*	*0*
Registered On Other Reserves	16	1	1	11	33	5	0	2
Males	*10*	*0*	*0*	*6*	*19*	*1*	*0*	*0*
Females	*6*	*1*	*1*	*5*	*14*	*4*	*0*	*2*
Registered On Own Crown Land	572	73	85	213	309	231	36	75
Males	*316*	*33*	*42*	*109*	*181*	*127*	*19*	*37*
Females	*256*	*40*	*43*	*104*	*128*	*104*	*17*	*38*
Registered On Other Band Crown Land	23	6	4	32	40	25	6	2
Males	*10*	*3*	*2*	*16*	*27*	*15*	*3*	*1*
Females	*13*	*3*	*2*	*16*	*13*	*10*	*3*	*1*
Registered On No Band Crown Land	4	0	1	1	4	3	0	0
Males	*1*	*0*	*0*	*0*	*3*	*3*	*0*	*0*
Females	*3*	*0*	*1*	*1*	*1*	*0*	*0*	*0*
Registered Off Reserve	370	165	95	446	682	332	105	96
Males	*182*	*78*	*36*	*202*	*319*	*160*	*47*	*40*
Females	*188*	*87*	*59*	*244*	*363*	*172*	*58*	*56*
Total Registered Population	**991**	**268**	**187**	**703**	**1,191**	**599**	**153**	**175**

[70] Source: Aboriginal Affairs and Northern Development Canada.

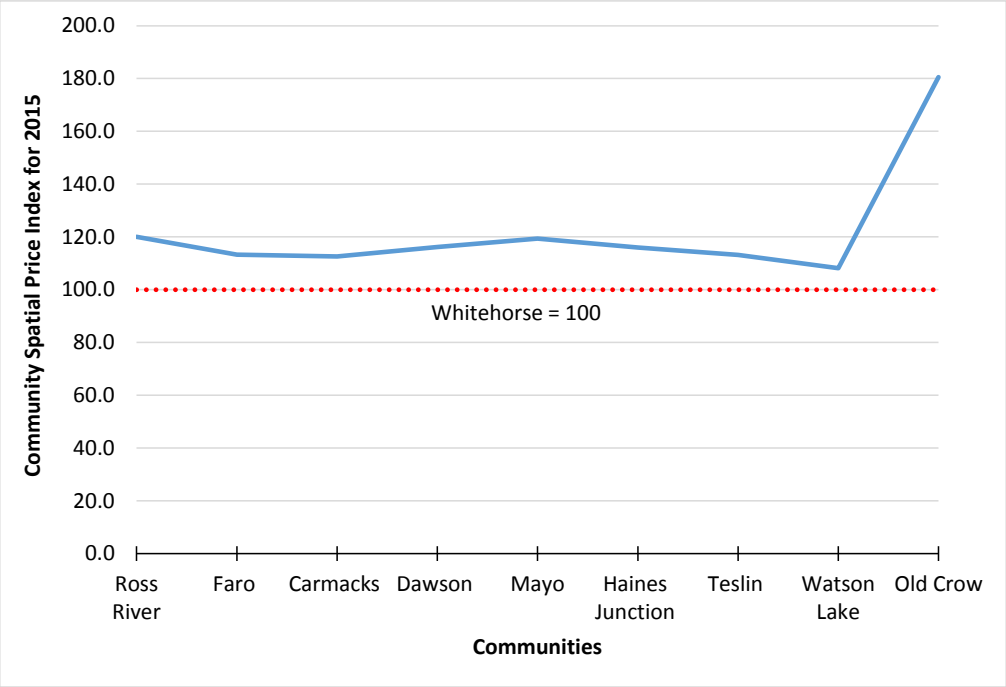
Table E-5: Community Spatial Price Index for April 2015

	Whitehorse = 100								
	Ross River	Faro	Carmacks	Dawson	Mayo	Haines Junction	Teslin	Watson Lake	Old Crow
Meat	123.1	93.0	115.2	108.6	124.5	166.7	132.3	107.7	116.3
Dairy/ eggs	105.3	105.9	115.0	116.7	119.1	117.8	117.1	100.0	145.5
Fruit/ Vegetables	142.0	127.1	126.9	121.2	166.5	110.6	117.6	114.2	177.8
Bread/ Cereal	127.6	129.6	121.2	117.0	116.4	115.7	119.9	110.0	170.3
Other Foods	137.0	132.2	116.8	121.4	115.2	109.3	119.7	115.1	226.4
Household Operations	140.0	112.5	108.1	127.9	117.9	101.3	121.1	120.5	212.6
Health & Personal Care	133.6	111.5	111.7	129.4	110.5	137.5	113.8	127.1	114.7
Gasoline	105.7	108.2	108.1	113.7	109.3	104.2	105.4	98.9	
Cigarettes	110.1	101.5	106.9	108.2	114.6	114.5	102.1	104.7	
Total	**120.0**	**113.3**	**112.6**	**116.2**	**119.4**	**116.0**	**113.2**	**108.2**	**180.5**

Notes:

1. Source: Government of Yukon Socio-Economic Web Portal http://www.sewp.gov.yk.ca/subject (accessed on January 5, 2016).
2. The index compares prices in Whitehorse to prices in other Yukon communities (Whitehorse = 100).
3. Data for Haines Junction as of April 2011. As of October 2011, there is no longer a general store operating in Haines Junction.

Figure E-1: Community Spatial Price Index for April 2015



Notes:

1. Source: Government of Yukon Socio-Economic Web Portal http://www.sewp.gov.yk.ca/subject (accessed on January 5, 2016).
2. The index compares prices in Whitehorse to prices in other Yukon communities (Whitehorse = 100).
3. Data for Haines Junction as of April 2011. As of October 2011, there is no longer a general store operating in Haines Junction.

Table E-6: Number of Businesses and Workers by community

	Total Yukon		Whitehorse		Haines Junction		Watson Lake		Teslin		Old Crow		Other Communities	
	Number of Businesses	Workers Reported (no.)	Number of Businesses	Workers Reported (no.)	Number of Businesses	Workers Reported (no.)	Number of Businesses	Workers Reported (no.)	Number of Businesses	Workers Reported (no.)	Number of Businesses	Workers Reported (no.)	Number of Businesses	Workers Reported (no.)
2013	3,141	13,641	2,408	11,161	79	177	101	322	34	56	8	16	511	1,909
2010	2,792	11,870	2,182	10,259	63	185	105	320	27	43	6	13	409	1,050
2009	2,951	10,239	2,247	8,646	70	166	118	335	40	55	8	15	468	1,022
2008	2,855	11,754	2,158	9,983	72	149	131	414	38	60	7	18	449	1,130
2007	2,500	12,308	1,945	9,946	57	187	108	459	37	216	10	85	343	1,415
2003	1,996	8,630	1,556	7,302	56	106	96	302	15	40			273	880
2001	2,066	9,581	1,571	7,768	72	143	117	371	19	65			287	1,234

Notes:

1. Source: Government of Yukon Socio-Economic Web Portal http://www.sewp.gov.yk.ca/subject (accessed on January 5, 2016).
2. Businesses are businesses with contact addresses in noted community.
3. Socio-Economic Web Portal notes that figures are derived from the Yukon Business Survey, the survey design, as well as the selection criteria of the types of businesses included in the survey, has varied depending on the focus in any given year and therefore, direct comparisons over time should be used with caution.

Table E-7: Labour Force by Occupation and by Community, 2011

Labour Force by Occupation	Yukon	Connected Communities		Isolated Communities					
		Whitehorse	Haines Junction	Burwash Landing	Destruction Bay	Beaver Creek	Watson Lake	Teslin	Old Crow
Total labour force population aged 15 years and over by occupation - (NOC) 2011	21,245	14,890	395	55	x	75	630	120	140
Occupation - not applicable	370	230	0	0	x	0	35	10	0
All occupations	20,880	14,665	395	55	x	75	600	110	135
Management occupations	2,515	1,755	50	15	x	10	60	15	15
Business, finance and administration occupations	3,640	2,755	55	0	x	25	80	20	20
Natural and applied sciences and related occupations	1,625	1,120	30	0	x	0	35	0	10
Health occupations	940	665	15	0	x	0	20	0	0
Occupations in education, law and social, community and government services	3,010	2,080	55	10	x	15	105	20	30
Occupations in art, culture, recreation and sport	730	455	20	0	x	0	15	0	0
Sales and service occupations	4,060	3,100	70	10	x	10	120	20	20
Trades, transport and equipment operators and related occupations	3,680	2,365	85	20	x	15	145	25	35
Natural resources, agriculture and related production occupations	390	165	15	0	x	0	20	0	0
Occupations in manufacturing and utilities	290	205	0	0	x	0	0	0	0

Notes:

1. Source: Government of Yukon Socio-Economic Web Portal http://www.sewp.gov.yk.ca/subject (accessed on January 5, 2016).
2. Values have been subjected to a confidentiality procedure known as random rounding.
3. In some cases, the census subdivision boundary does not match the municipal boundary. To provide a more representative estimate of demography in the geographic area some census subdivisions were combined. For example, the census subdivisions of Teslin (6001006) and Teslin Post 13 (60010006) were combined; Two and One-Half Mile Village (6001034), Two Mile Village (6001033), Upper Liard (6001032), and Watson Lake (6001003) were combined.
4. Numbers for Destruction Bay and other communities with “0” suppressed for confidentiality reasons.
5. Socio-Economic Web Portal notes the source of the data is Statistics Canada, National Household Survey (NHS) Profile, 2011 National Household Survey.
6. Old Crow is isolated with or without the Alaska Highway.

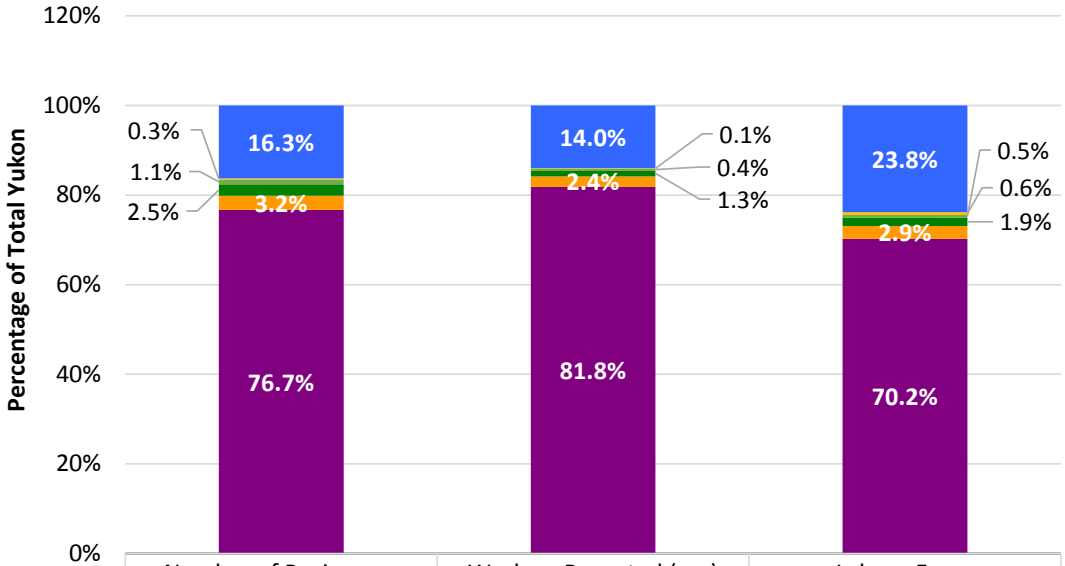
Table E-8: Labour Force by Industry and by Community, 2011

Labour Force by Industry	Yukon	Connected Communities		Isolated Communities					
		Whitehorse	Haines Junction	Burwash Landing	Destruction Bay	Beaver Creek	Watson Lake	Teslin	Old Crow
Total labour force population aged 15 years and over by industry	21,245	14,895	390	60	x	75	635	120	140
Industry - not applicable	370	225	0	0	x	0	35	0	0
All industries	20,880	14,660	390	60	x	75	600	115	135
Agriculture, forestry, fishing and hunting	145	20	10	0	x	0	10	0	0
Mining, quarrying, and oil and gas extraction	705	335	0	0	x	0	45	0	0
Utilities	200	155	0	0	x	0	0	0	0
Construction	1,935	1,315	35	15	x	0	50	15	10
Manufacturing	330	240	0	0	x	0	0	0	0
Wholesale trade	235	165	0	0	x	0	10	0	0
Retail trade	2,265	1,875	15	0	x	0	55	10	10
Transportation and warehousing	845	620	10	0	x	0	35	10	10
Information and cultural industries	590	520	0	0	x	0	0	0	0
Finance and insurance	255	220	0	0	x	0	0	0	0
Real estate and rental and leasing	180	125	0	0	x	0	10	0	0
Professional, scientific and technical services	1,045	840	10	0	x	0	10	0	0
Management of companies and enterprises	15	0	0	0	x	0	0	0	0
Administrative and support, waste management and remediation services	600	405	10	0	x	0	20	0	0
Educational services	1,190	815	20	0	x	0	30	10	15
Health care and social assistance	1,385	1,015	10	0	x	0	50	0	0
Arts, entertainment and recreation	500	240	30	0	x	0	0	0	0
Accommodation and food services	1,460	1,045	45	0	x	10	55	0	0
Other services (except public administration)	960	740	10	0	x	0	30	0	0
Public administration	6,035	3,970	165	30	x	50	180	50	85

Notes:

1. Source: Government of Yukon Socio-Economic Web Portal http://www.sewp.gov.yk.ca/subject (accessed on January 5, 2016).
2. Values have been subjected to a confidentiality procedure known as random rounding.
3. In some cases, the census subdivision boundary does not match the municipal boundary. To provide a more representative estimate of demography in the geographic area some census subdivisions were combined. For example, the census subdivisions of Teslin (6001006) and Teslin Post 13 (60010006) were combined; Two and One-Half Mile Village (6001034), Two Mile Village (6001033), Upper Liard (6001032), and Watson Lake (6001003) were combined.
4. Numbers for Destruction Bay and other communities with “0” suppressed for confidentiality reasons.
5. Socio-Economic Web Portal notes the source of the data is Statistics Canada, National Household Survey (NHS) Profile, 2011 National Household Survey.
6. Old Crow is isolated with or without the Alaska Highway.

Figure E-2: Share of Businesses, Workers and Labour Force



	Number of Businesses	Workers Reported (no.)	Labour Force
Other Communities	16.3%	14.0%	23.8%
Old Crow	0.3%	0.1%	0.6%
Teslin	1.1%	0.4%	0.5%
Haines Junction	2.5%	1.3%	1.9%
Watson Lake	3.2%	2.4%	2.9%
Whitehorse	76.7%	81.8%	70.2%

Notes:

1. Source: Government of Yukon Socio-Economic Web Portal http://www.sewp.gov.yk.ca/subject (accessed on January 5, 2016).
2. Prepared based on numbers provided in Tables E-6 and E-8.

Table E-9: Household and Employment Income, 2010

	Yukon	Whitehorse	Haines Junction	Watson Lake	Teslin
Household total income in 2010 of private households	14,120	9,310	260	465	115
Under $5,000	300	215	0	10	0
$5,000 to $9,999	245	140	0	10	0
$10,000 to $14,999	220	105	0	15	0
$15,000 to $19,999	520	305	20	25	10
$20,000 to $29,999	1,000	550	15	40	10
$30,000 to $39,999	1,285	695	25	45	15
$40,000 to $49,999	905	515	15	50	10
$50,000 to $59,999	995	630	20	45	10
$60,000 to $79,999	2,025	1,275	45	70	10
$80,000 to $99,999	1,750	1,235	30	55	15
$100,000 to $124,999	1,520	1,095	25	35	15
$125,000 to $149,999	1,260	885	35	35	0
$150,000 and over	2,100	1,670	25	45	0
Median household total income $	96,404	102,965	96,294	73,741	67,710
Average household total income $	107,394	114,151	99,680	86,255	70,641
Population aged 15 years and over who worked full year, full time and with employment income in 2010	10,795	7,920	175	290	55
Median employment income in 2010 $	60,124	61,998	59,691	52,903	51,519
Average employment income in 2010 $	62,245	64,114	57,902	56,590	54,078

Notes:

1. Source: Government of Yukon Socio-Economic Web Portal http://www.sewp.gov.yk.ca/subject (accessed on January 5, 2016).
2. In some cases, the census subdivision boundary does not match the municipal boundary. To provide a more representative estimate of demography in the geographic area some census subdivisions were combined. For example, the census subdivisions of Teslin (6001006) and Teslin Post 13 (60010006) were combined; Two and One-Half Mile Village (6001034), Two Mile Village (6001033), Upper Liard (6001032), and Watson Lake (6001003) were combined.
3. Numbers for other small communities were suppressed for confidentiality reasons. The data for Burwash Landing, Destruction Bay and Beaver Creek was suppressed and not provided.
4. Socio-Economic Web Portal notes the source of the data is Statistics Canada, National Household Survey (NHS) Profile, 2011 National Household Survey.

Table E-10: Communities along the Highway that would be impacted in Without the Highway Scenario[71]

	Community	Population	km marking	Amenities/services	Attractions and Facts
Yukon	Toad River		671.7	Toad River Lodge, food, gas, diesel, lodging, camping	Toad River Lodge is home of the world famous hat collection
	Muncho Lake	29	699	Lodging, restaurant, gas groceries, boats and motors.	Known for deep green and blue waters
	Coal River		822.7	Coal River Lodge & RV, food, gas, diesel, lodging and camping	
	Fireside			Food, showers, camping, and Fireside Car & Truck Stop	
	Contact Creek		912	Coffee shop, snacks, gas, diesel, car repairs, towing, and Contact Creek Lodge	
	Watson Lake	1563	980	All services. See Appendix E.	Created out of contruction of a military airport (1941) and construction of the Alaska Highway (1942) (see Appendix E for additional information).
	Swift River		1136.7	No services	
	Teslin	450	1143	See Appendix E.	(see Appendix E for additional information).
	Haines Junction	840	1578.5	Food: Frosty's and local hotels/motels Lodging: The Raven Motel, Kluane Park Inn, Parkside Inn and Cozy Corner Motel & Restaurant Area lodging: Kathleen Cabins and Mount Logan Other: Fas Gas (gas and grocery)	Established in 1942 following WWII and the construction of the Alaska Highway; historic Mile Post 1016; Our Lady of the Way Catholic Mission (1954) and the Village Monument (see Appendix E for additional information).
	Destruction Bay	55	1684.4	Food, gas, diesel, lodging, camping (Talbot Arm Motel), and emergency services.	(see Appendix E for additional information).
	Burwash Landing	84	1700	Airport	Kluane Museum of Natural History and Kluane National Park Rocking Star Adventures (see Appendix E for additional information).
	Beaver Creek	112	1870.6	Restaurants, cabins, campground, showers, laundromat (Buckshot Betty's), fuel, gift shop, RV park and motel (Beaver Creek RV Park & Motel), visitor information centre (seasonal) and airstrip.	(see Appendix E for additional information).
Alaska	Northway Junction, AK	136	Mile 1264	Campground, gas and store	
	Tok, AK	1435	Mile 1314	Visitor information centre, gift shop, restaurant, lodging, campgrounds, and gift & souvenir shops.	Transportation srvice and trade centre (see Appendix E for additional information).
	Dot Lake, AK	13	Mile 1361.3	Post office	Headquarters for Dot Lake Native Corp.

Note: due to the reconstruction of Alaska Highway, there is a 40 mile/ 64 km difference between Yukon and Alaska Log Numbers when crossing the border. Yukon and BC replaced old km posts while Alaska still uses original milepost markers.

[71] Source: Bells Travel Guide at: http://www.bellsalaska.com/road%20logs/alaska-highway-log.pdf (accessed January 10, 2016).

ATTACHMENT E1:

COMMUNITY FACILITIES & SERVICES

Table E1-1: Facilities and Services Available in Haines Junction[72]

<table>
<tr><th>Health & Social Services[73]</th><th>Accommodations[74]</th><th>Recreation</th></tr>
<tr><td rowspan="2">• Health Centre – nursing facility with 3 nurse practitioners and 1on-call nurse available 24 hours/day.
• Doctor visits 3 times per month (1 day/week).
• Champagne and Ashihik First Nations Health & social services – incl. income assistance & Elder's programs.
• Social Services – provided by Yukon Health & Social Services.
• Yukon Healthline 811 – staffed by registered nurses.
• Dental Services: Yukon Children's Dental Program provides diagnostic, preventative and restorative dental services, scheduled through the Haines Junction School.</td><td rowspan="2">• Alcan Motor Inn.
• Aspen Place Suite.
• Carnivore Cabins.
• Cozy Corner Motel and Restaurant.
• Dalton Trail Lodge.
• Glacier View Inn.
• Haines Junction FasGas and RV Park.
• Haven in the Willows Vacation Rental.
• Kathleen Lake Lodge.
• Kluane Bed and Breakfast.
• Kluane Green Sprout
• Kluane RV Kampground.
• Parkside Inn.
• The Raven Hotel.
• Stardust Motel.
• The Cabin.
• Wanderer's Inn Backpackers Hostel.</td><td>• Da Kų Cultural Centre.
• Dalton Trail Lodge.
• Kluane National Park.
• Curling rink.
• Shakwak Pool (summer pool).
• Community hall with basketball court and playground.
• St. Elias Convention Centre.
• Bill Brewster Arena.</td></tr>
<tr><td>Communication
• Northwestel (internet and phone services)
• Bell Mobility and Latitude Wireless (cell phone providers).
Food and Grocery
• Currently no grocery store. Basic non-perishable food and limited dairy/produce are offered by some local businesses.[75]</td></tr>
<tr><th>Transportation, Gas & Vehicle Repair</th><th>Emergency Services</th><th>Housing Services</th></tr>
<tr><td>• No regularly scheduled services to community.
• Airport – chip-sealed tarmac adjacent to community (maintained by YG).
• Current road conditions call 511.
• Yukon Dept. Hwys and Public Works.</td><td rowspan="2">• 24 hour ambulance service (volunteer staff after hours).
• Police – RCMP detachment 24 hours/ day, 7 days a week.
• Fire – volunteer fire with pumper truck and water tanks.
• Medevac – available 24 hours for emergencies direct to the most suitable medical facility (non-Yukon residents without insurance are charged for this service).</td><td>• Yukon Housing Corporation – offers 22 social housing units and seven staff units; "offers programs and services that enable home renovations, construction of additional rental suites, mortgages and financing."</td></tr>
<tr><td>Education & childcare services
• Shawkwunlee Daycare.
• Early Learning & Childcare Services (preschool).
• St. Elias Community School (K – 12).
• Yukon College – Haines Junction campu.s</td><td>Municipal Services
• Village of Haines junction – water and waste water services; operate landfill and recycling; and maintain municipal roads.
• Yukon Dept. Hwys and Public Works maintenance of surrounding highways.
• YECL Aishihik Lake hydro with diesel backup.</td></tr>
</table>

[72] Source: Haines Junction Community profile http://yukoncommunities.yk.ca/haines-junction; and Haines Junction Village website http://www.hainesjunctionyukon.com/.
[73] http://www.yukoncommunities.yk.ca/haines-junction/community-and-government-services/healthcare-services.
[74] Source: http://www.hainesjunctionyukon.com/index.php/business/business-directory/accomodation
[75] http://www.hainesjunctionyukon.com/index.php/visitor-services/our-community/community-services.

Table E1-2: Facilities and Services Available in Watson Lake[76]

Education & Childcare Services	Medical & Social Services	Accommodations
• Johnson Elementary School (K-Gr. 7) – approx. 30 staff members (teachers, aids, support). • Watson Lake Secondary School (Gr. 8-12) – approx. 16 staff members. • Watson Lake School Council. • Yukon College. • Denetia Elementary School (K-Gr.7) - Located in Lower Post, British Columbia. • Aboriginal Head Start Program. • Watson Lake Creative Playgroup. • Healthy Moms/Healthy Babies. • Watson Lake Day Care. • Child Development Centre.	• Watson Lake Hospital – approx. 36 employees. • Watson Lake Health Centre. • Yukon HealthLine. • Home Care. • Parhelion Medical Services. • Help & Hope For Families. • Many Rivers Counselling & Support Services. • Victim Services. • Youth Probation Services.	• Campgrounds & RV Services o Downtown RV Park; o Signpost Services RV; o Watson Lake Campgrounds – a Government run campground with 55 camp sites, hiking trails, playground, kitchen shelter and a boat launch. • Cozy Nest Hideaway (B&B). • Stampeder's B&B Cabins. • A Nice Motel. • Air Force Lodge. • Andrea's Hotel. • Big Horn Hotel. • Cedar Lodge Motel. • Dragon's Den Hotel.
Emergency Services	**Recreation**	**Transportation, Gas & Vehicle Repair**
• RCMP. • Fire Department. • Ambulance. • Public works.	• Sign Post Forest. • Northern Lights Space and Science Centre. • Public Library. • Morgan Chaddock Recreation Centre. • Mt. Maichen Ski Hill & Chalet. • Parks: Wye Lake Park, Lucky Lake Park and Water Slide, Watson Lake Skate Board Park. • Playgrounds: 2 Mile, Pool, Teslin Crescent, Highland Avenue, Woodland Crescent, Nisutlin Way.	• Regular bus service. • Rent a car agency. • Taxi service. • Modern paved airport with two scheduled flights a day (one to Whitehorse and one to Edmonton). • Three air charter firms.

[76] Source: Watson Lake community profile http://yukoncommunities.yk.ca/watson-lake; and Watson Lake town website http://www.watsonlake.ca/.

Table E1-3: Facilities and Services in Teslin[77]

Municipal Services	Emergency Services	Education & Childcare Services
• Village of Teslin – water and waste water services; operate landfill, and maintain local roads. • Yukon Dept. Hwys. and Public Works maintenance of surrounding highways • YECL supplies power with backup diesel generator. • Area residents living outside of the municipal boundary receive services from the Yukon government.	• 24 hour ambulance service (volunteer staff after hours). • Police – RCMP detachment based in Teslin. • Fire – volunteer fire with pumper truck and water tanks located in Teslin. • Medevac – available 24 hours for emergencies direct to the most suitable medical facility (non-Yukon residents without insurance are charged for this service).	• Two childcare centres: Cody's Lil' Critters and Dluwkat Hit Daycare. • Teslin school (Pre-K to Grade 9) – 18 staff members. • Students in grades 10-12 attend high school in Whitehorse. • Yukon College – Teslin campus (post-secondary). • Teslin Tlingit Council Workforce Development – education and training support for TTFN members.
Health & Social Services	**Housing Services**	**Recreation**
• Teslin Tlingit Council –a range of services from traditional counseling to temporary financial assistance. • Health Centre - nursing facility staffed with two nurses on-call 24 hours/day. • Social Services – provided by Teslin Tlingit Council and Yukon Health & Social Services. • Elder Care – provided by Teslin Tlingit Council. • HealthLine - Yukon HealthLine 811 is a free, confidential 24-hour service staffed by specially trainees' registered nurses. • Dental Services - Yukon Children's Dental Program provides diagnostic, preventative and restorative dental services, scheduled through the Teslin School.	• Yukon Housing Corporation – offers 22 social housing units and seven staff units; "offers programs and services that enable home renovations, construction of additional rental suites, mortgages and financing." • Teslin Tlingit Council – maintains council housing and oversees housing infrastructure. • Village of Teslin – list local businesses and services located in Teslin on its website.[78] • Yukon Housing Corporation – offers 21 staff units and nine social housing units; programs and services that enable home renovations, construction of additional rental suites, mortgages and financing.	• Teslin Recreation Complex with indoor hockey arena, curling sheet, a large hall used for meetings, banquets, dances and sporting events and is equipped with a kitchen, bar, and a stage. • New recreation facility with indoor ice arena, community centre, baseball diamond, skateboard park, playground, skiing and walking trails, public docking, and school gymnasium. • Nisutlin River Delta National Wildlife Area. • George Johnston Museum (local history). • Teslin Curling Club (hosts Sweetheart Bonspiel every February).
Transportation, Gas & Vehicle Repair	**Communication**	**Accommodations & Grocery**
• Teslin Airport. • Greyhound bus service. • Nisutlin Trading Post – gas station. • Falcon Aviation Services.	• Northwestel (internet and phone services). • Bell Mobility and Latitude Wireless (cell phone providers).	• Yukon Motel. • Nisutlin Trading Post. • Timberpoint Campground Services. • Nisutlin Trading Post – groceries.

[77] Source: Yukon Community Profiles http://yukoncommunities.yk.ca/teslin/community-government-services; Village of Teslin http://www.teslin.ca/businesses/business.html; and Yukon Education Student Network http://www.yesnet.yk.ca/schools/teslin/staff.html.

[78] Businesses listed on the website include TD Bank, Tim's Saddle Shack (retail), various contractors, Nisutlin Outfitting, and janitorial services. http://www.teslin.ca/businesses/business.html.

Table E1-4: Facilities and Services in Burwash Landing, Destruction Bay, and Beaver Creek

	Burwash Landing	Destruction Bay	Beaver Creek
Accommodations	• Burwash landing Resort & RV.	• Cottonwood RV Park & Campground. • Talbot Arm Motel.	• 1202 Motor Inn. • Ida's Motel & Restaurant. • Buckshot Betty's Restaurant and Rooms (campground with tent sites only).
Communication	• Northwestel – internet and phone. • Bell Mobility and Latitude Wireless – cell providers.	• Northwestel – internet and phone • Bell Mobility and Latitude Wireless – cell providers	• Northwestel – internet and phone. • Bell Mobility and Latitude Wireless – cell providers.
Education & Childcare	• Kluane Daycare - full service day care . • Kluane Lake School (K-Gr. 8) - located in Destruction Bay; students transported by bus. • Secondary school - students continue on to secondary school in Haines Junction or Whitehorse.	• Kluane Lake School (K-Gr. 8) located in Destruction Bay; five staff members. • Secondary school - students continue on to secondary school in Haines Junction or Whitehorse.	• Nelnah Bessie John School (K-Gr. 9) - two classrooms, one teacher/principal, a native language instructor, and educational assistant. • Secondary school - students continue on to secondary school in Haines Junction or Whitehorse.
Emergency Services	• Ambulance - 24 Hour service based in Destruction Bay (17 kilometers s. of Burwash Landing). • Police - RCMP detachment based out of Haines Junction (127 kilometers SE of Burwash Landing). • Medevac - Available 24 hours for emergencies direct to the most suitable medical facility (non-Yukon residents charged for service).	• Ambulance - 24 Hour service. • Police - RCMP detachment based out of Haines Junction Medevac - Available 24 hours for emergencies direct to the most suitable medical facility (non-Yukon residents charged for service).	• Ambulance – 24 hours service staffed by volunteers after hours. • Police – based in Beaver Creek; staffed by three officers. • Fire – volunteer fire service. • Medivac - Available 24 hours for emergencies direct to the most suitable medical facility (non-Yukon residents charged for services).
Food & Grocery			• Beaver Creek Market • Buckshot Betty's Restaurant and Rooms
Health & Social Services	• Kluane First Nation provides a range of services that assist it citizens and the community to live more healthy and pro-active lives. • Health Centre - nursing facility staffed by one nurse (located in Destruction Bay). • Social Services - provided by Kluane First Nation. • Elder Care - provided by Kluane First Nation (homemaker services and social interaction for Elders). • Home Care - provided by Kluane First	• Health Centre - nursing facility with one staff.	• Beaver Creek Health Facility – on call nurse practitioner 24 hours. • Home Care - White River First Nation provides home care services to members. • Social Services –White River First Nation provides social assistance to members. • Yukon HealthLine 811 - free, confidential 24-hour service staffed by specially trainees' registered nurses. • Elder Care - White River First Nation provides elder care to members. • Yukon Children's Dental Program

	Burwash Landing	Destruction Bay	Beaver Creek
	Nation (home care for individuals with physical barriers) • Additional Care - Kluane First Nation provides scheduled medical and shopping transportation for individuals with disabilities, Elders and social assistance recipients. • Yukon HealthLine 811 - free, confidential 24-hour service staffed by registered nurses • Yukon Children's Dental Program provides diagnostic, preventative and restorative dental services, scheduled through the Kluane Lake School.		provides diagnostic, preventative and restorative dental services, scheduled through the local school.
Housing Services	• Homes all owned and maintained by Kluane First Nation under Public Works program. • Septic pump outs - completed twice weekly. • Water delivery - completed three times weekly by certified water delivery operators. • Repairs and renovations - completed by team of carpenters and labourers. • New construction projects - managed by the department.	• See Burwash Landing.	• Yukon Housing Corporation - offers 3 staff units in Beaver Creek and programs and services that enable home renovations, construction of additional rental suites, mortgages and financing. • White River First Nation - provides information on housing for their citizens.
Municipal Services	• The Kluane First Nation - water, sewer, local road maintenance and community recreation. • Yukon Dept. of Hwys and Public - maintains the highways around Burwash Landing. • Community and recycling bins -trucked out of community by the Yukon government. • Power – YECL diesel generators; and solar panels and, two windmills in partnership with Kluane First Nation.	• See Burwash Landing.	• Yukon Dept. of Hwys and Public Works - responsible for public highways, airstrips, buildings and information systems. • Power – supplied by YECL diesel generators.
Parks & Recreation	• Community rec centre - indoor ice rink, weight room, youth elder room, women's sewing club, and elder's	• Tachäl Dhäl Interpretive Centre.	• Community club with gym. • Summer pool. • Two baseball diamonds (community

	Burwash Landing	Destruction Bay	Beaver Creek
	luncheon. • Jacquot Hall - after school program, indoor soccer, badminton, volleyball, floor hockey, community library, and computers for community access. • Kluane National Park – Rocking Star Adventures. • Kluane Museum of Natural History.		sponsors baseball tournament in July). • Yukon Visitor Information Centre. • Yukon Wildlife Wilderness Adventures.
Transportation, Gas & Vehicle Repair			• Gravel airstrip maintained year-round.

Table E1-5: Facilities and Services in Tok, Alaska[79]

Communication	**Education & Childcare Services**
Alaska Power & Telephone (power, phone, internet, and ACS cellular.	• Tok School (pre-K through Gr. 12) – 18 teachers. • Alaska REACH Academy (pre-K through Gr. 12) – 1 teacher.
Municipal Services	**Emergency Services**
• Electric utility – Alaska Power and Telephone Company.	• Tok Volunteer Fire Department. • Tok Alaska State Trooper Post.
Recreation	**Transportation, Gas & Vehicle Repair**
• Mukluk Land – mini golf, museum, etc. • Tetlin National Wildlife Refuge. • Chicken Gold Camp & Outpost - recreational gold mining and panning on their claims, tours of the Pedro Dredge, a National Historic Site and kayaking excursions.	• Northern Energy Corporation – fuel. • Toklat Napa Auto – fuel. • Young's Chevron – fuel. • Village Gas. • 40-Mile Air – regular scheduled flights to Fairbanks. • Interior Alaska Bus Lines. • Warbelow. • Wright Air Service. • Tok Air Service – fly in float trips.
Grocery and Retail	**Multi-service Businesses**
• All Alaska Gifts & Crafts. • Jack Wade Gold Co. & Mining Museum. • Jorgensen Realty. • Patsy's Hangin Baskets. • Rural Alaska Real Estate. • Three Bears Alaska Inc. (full grocery).	• Chicken Creek RV Park & Cabins The Goldpanner Gift - 40 Mile Steakhouse - mini-golf, recreational mining, daily tours of The Historic Town of Chicken featuring Tisha's Schoolhouse. Accommodations include Creekside Cabins; offer Gas and Diesel; 40 Mile Steakhouse offers breakfast, lunch and dinner. • The Goldpanner gift stop.
Accommodations	**Healthcare & Social Services**
• Alaska Stoves Campground. • Alaska Range Motel. • Burnt Paw/Cabins Out Back B&B. • Caribou Cabins. • Cloudberry Cabin. • Cleft of Rock B&B. • Cozy Cabin. • Fast Eddy's Restaurant & Young's Motel and RV Park. • Golden Bear Motel & RV Park. • Log Cabin Wilderness Lodge. • Mentasta Lodge. • Snowshoe Motel & Fine Arts & Gifts. • Sourdough RV Park/Campground. • Tok Line Camp B&B. • Tok Motels and Liquor/Mini Mart. • Tok RV Village. • Tundra Lodge & RV Park.	• Tok Clinic – primary and preventive care. • Tok Public Health Center – primary and preventive care. • Upper Tanana Health Center – primary and preventive care. • Tok Area Counseling Center – behavioural health. • Upper Tanana Alcohol Program – substance treatment.

[79] Alaska Department of Commerce, Community, and Economic Development. Tok Community Information. https://www.commerce.alaska.gov/dcra/DCRAExternal/community/Details/ab6ef320-baf8-4200-bd06-2515b83119cc.

APPENDIX F:
FUTURE SCENARIOS

1.0 INTRODUCTION

This Appendix provides detailed review of the future scenarios and impact of the Alaska Highway for the Economic Profile of the Alaska Highway (the "Project") on economic and social valued components. The focus is to investigate potential changes by 2025 from the Baseline Economic Profile of the Project's current impacts.

Future scenarios for 2025 show a range of potentially major changes from the Baseline Economic Profile of the Highway for resource development freight and bulk fuel traffic and related valued component potential mine development impacts. These changes differ depending on whether the potential future mine developments are in Western Yukon versus Eastern Yukon (as defined below):

- **Western Yukon (where access via the Skagway Inside Passage exists without the Alaska Highway)** – Up to five potential major new mine developments could occur in this region by 2025, with or without the Alaska Highway. The Highway will provide some transport cost savings for inbound resource development freight relative to what would be required without the Highway. For bulk fuel deliveries to at least the Casino and Wellgreen mines, the Highway is also currently expected to deliver critical LNG supplies from northeastern B.C. or northwestern Alberta. The ability to secure equivalent cost effective LNG supplies without the Highway (i.e., by marine transport through a US port via Inside Passage) is uncertain today.

- **Eastern Yukon (where existing highway and Inside Passage access is assumed not to exist without the Alaska Highway)** – Up to three potential major new mine developments could occur in this region by 2025, providing material economic and other benefits to a range of valued components in Yukon. However, these new developments are dependent on the road structure facilitated by the Alaska Highway, and would not likely develop absent the Alaska Highway. Inability to develop each mine would have an adverse impact on Yukon (i.e., loss of GDP, full time equivalent jobs and related wages and salaries and loss of mining royalties), as well as on local First Nations and communities.

2.0 FORECAST METHODOLOGY

The future scenarios assessment of Alaska Highway impacts focuses on potential changes within Yukon by 2025 that may interact with the Alaska Highway. The focus is to investigate potential changes by 2025 from the Baseline Economic Profile of the Project's current impacts.

Future resource development timing in Yukon and adjacent Northwest Territories ("NWT") areas that may interact with the Highway remains very uncertain, both overall and for specific projects. Population and community development trends are assessed absent major new resource projects; however, changes to these trends as a result of major new resource development timing are also likely to be uncertain.[1]

[1] Review of the impact of Faro Mine in the 1980s and 1990s shows that closure of a large mine development may impact the overall Yukon population. The 2013 Yukon Economic Outlook also notes that following the final closure of the Faro mine in 1998, Yukon experienced six consecutive years of declining population which saw the population fall just below 30,000 in 2003. However, such impacts may be more muted in future to the extent that new major mine developments hire more fly-in/fly-out staff.

Based on discussion with the Project Steering Committee, future scenarios focus on the following range of potential low, medium and high Yukon mine developments[2] in the medium-term (i.e., 10 years out, or the year 2025) for two defined Yukon regions: Western Yukon (where access via the Skagway Inside Passage exists without the Alaska Highway) and Eastern Yukon (where existing highway and inside passage access is assumed not to exist without the Alaska Highway).

- **Western Yukon (connected by Skagway Inside Passage)**
    - Low (Eagle Gold)
    - Medium (add Casino)
    - High (add Wellgreen, Kaminak and Carmacks Copper mines)
- **Eastern Yukon (connected today by Alaska Highway [including access to Stewart or Skagway Inside Passage])**
    - Low (no mine activity in this region)
    - Medium (add Selwyn)
    - High (add Mactung and Kudz Ze Kayah)

Details of each potential mine developments are provided in Attachment F1.

Assessments of potential future scenario impacts related to the Project focus on changes in freight and light traffic movements in and out of Yukon related to changes in population and/or development of resource projects (new mines or oil and gas developments). Potential changes in spending on the Alaska Highway and other routes connecting to the Highway are also considered.

- **Changes in community re-supply and bulk fuel supply for community needs** – heavy traffic volumes associated with community-oriented demand are forecast based on projected population changes based on current trends without adjustment for different mine development scenarios. Future heavy transportation demand is estimated by multiplying 2014 transportation demand for Yukon by the ratio of the future population over 2014 population estimates.[3] Traffic generated by periodic, one of a kind events may not be fully captured in the per capita tonnage rates. It is recognized that projected population (and therefore projected community-oriented traffic) may well be low if the medium or high scenario resource developments occur.
- **Changes in light traffic volumes along the highway** – light traffic volumes are determined using the same methodology used to determine supply for community needs, i.e., based on population growth.

[2] The low, medium and high scenarios are based on information available at this time and for illustrative purpose only. The developments depend on a range of factors that include: global commodity prices, available financing, regulatory stability, past performance of projects, mineral prospects outside of Yukon and global economic growth which may impact likelihood of the potential mine developments in the future.
[3] See Table A-1 in Appendix A for review of Yukon commercial freight demand (2009 and 2014).

- **Changes in tourism volumes** – forecast tourism volumes are determined using 2014 estimated visitors and estimated forecast change in 2016 over 2015 in Yukon Economic Outlook.
- **Changes in resource development freight and bulk fuel traffic –** potential traffic related directly to future resource developments, such as mines, are estimated on the basis of information obtained from project proponents as well as publicly available information from Yukon government. The wide range of medium term scenarios examined for Yukon mine projects reflects the extent to which timing for development of specific projects remains highly uncertain at this time due to changes of prices for commodities in world market and other factors.
- **Changes in Highway maintenance and capital cost** – the forecast highway maintenance and capital costs are estimated based on historical trends.

The Baseline Economic Profile (Section 4 of this report) indicated minimal economic impact from the Highway today related to current "through traffic" (i.e., traffic moving through Yukon between northern B.C. and interior Alaska or northwestern NWT),[4] or related to the Highway's current traffic moving through northern B.C. and/or interior Alaska. There is no apparent basis to anticipate changes for future scenarios in this assessment of "through traffic" and/or traffic impacts outside Yukon, beyond direct impacts on potential liquefied natural gas (LNG) production at Fort Nelson (to supply Yukon and NWT resource projects) and on the Cassiar-Stewart highway and the port of Stewart due to added resource export shipments from new mines in eastern Yukon and adjacent NWT areas. Accordingly, no future scenarios are specifically considered for these traffic movements.

3.0 SUMMARY OF FUTURE SCENARIOS

The sections below provides details of the summary of the future scenarios.

3.1 CHANGES IN COMMUNITY RE-SUPPLY AND BULK FUEL SUPPLY FOR COMMUNITY NEEDS

The change in volumes of the heavy traffic associated with community-oriented demand is forecast based on projected population changes. The base for the forecast is (a) 2014 transportation demand for Yukon and (b) Yukon population projections available from the Yukon Bureau of Statistics Population Projections for 2011-2021.[5]

Table F-1 below provides population projections and growth rates based on the Yukon Bureau of Statistics 2011-2021 population projection. At the overall Yukon population level, and for most communities, these projections are assumed for all future scenarios with the Highway. For future

[4] See Table A-2 in Appendix A for review of "through-traffic" heavy freight volumes in 2009 and 2014.
[5] Source: http://www.eco.gov.yk.ca/stats/pdf/Projections2011.pdf. Statistics Canada also has a population projection for Yukon for the years 2013-2038, however it is based on seven scenarios ranging from -0.24% to 2.12%. Yukon Bureau of Statistics growth rates are within the range projected by Statistics Canada. The population projection from Yukon Bureau of Statistics is also within reasonable range compared to actuals to date. For example, January 2015 estimated actuals from Yukon Bureau of Statistics shows total Yukon population at 37,178 compared to projected 37,225 with only 0.1% difference. The 2011-2014 actuals are also within 1-2% difference from the projected population numbers.

scenarios without the Highway, communities that are assumed to be isolated (e.g., Watson Lake) or not to exist (e.g., Beaver Creek) without the Highway would have a much lower baseline population today and therefore a much lower population projection than shown in Table F-1 - however, the overall impact of such cases on Yukon's projected population, with or without the Highway, is assumed to be not significant.[6]

Table F-1: Yukon Population Projection used for Future Scenarios[7]

Forecast Period	Total Yukon		Population Projection by Community							
			Whitehorse		Dawson		Watson Lake		All Other Communities	
	Population Projection	Growth over 2014	Population Projection	Growth over 2014	Population Projection	Growth over 2014	Population Projection	Growth over 2014	Population Projection	Growth over 2014
Projection for 2014	36,716		27,947		1,963		1,565		5,241	
Projection for 2020	39,671	8.05%	30,344	8.58%	2,111	7.54%	1,661	6.13%	5,555	5.99%
Projection for 2025	42,021	14.45%	32,276	15.49%	2,223	13.26%	1,732	10.68%	5,789	10.45%

Table F-2 provides forecast volumes of the heavy traffic associated with Yukon community re-supply and bulk fuel freight based on 2014 estimated demand and population growth as provided in Table F-1.

[6] The table shows that population projection for Watson Lake is about 1% increase per year. However, without the Alaska Highway this community is assumed to be isolated with a much lower population in 2014. An isolated community's annual population growth could also be very low, potentially similar to the isolated community of Old Crow [no increase in population in the last 10 years]. However, without the Alaska Highway people currently living in Watson Lake are in effect assumed in this analysis to be living in other accessible communities with no significant overall impact to the total Yukon population.

[7] Source: 2011-2021 population projection Yukon Bureau of Statistics, with 2001-2011 Reference Period http://www.eco.gov.yk.ca/pdf/Projections2011.pdf [accessed on September 18, 2015]. The annual average population growth for the years 2022-2025 is assumed to be at the same level as for 2021.

Table F-2: Projection for Yukon Community Re-Supply & Bulk Fuel Heavy Traffic

	2014 Actuals		2020		2025	
	Trucks	Tonnes	Trucks	Tonnes	Trucks	Tonnes
Inbound to Yukon for Yukon - Community re-supply						
Community Resupply	8,010	165,736	8,655	179,075	9,168	189,682
Community Bulk Fuel	3,679	151,365	3,976	163,547	4,211	173,235
Total Inbound to Yukon	**11,690**	**317,101**	**12,631**	**342,622**	**13,379**	**362,916**

Table F-2 shows that the overall Yukon community re-supply demand in 2020 would increase by about 8% over 2014 and further by about 6% in 2025 with the annual average increase of 1.2%.

In summary, review of future scenarios to 2025 demonstrates only minimal overall change (e.g., about 1.2% per year annual average higher traffic) from the baseline in the Highway's economic profile impacts today with regard to community re-supply and bulk fuel traffic for Yukon Private/Public Business.

3.2 CHANGES IN LIGHT TRAFFIC VOLUMES ALONG THE HIGHWAY

Light traffic includes traffic from Yukon residents/residents from local communities along the Alaska Highway, as well as tourist traffic, and excludes traffic flows related to community re-supply, bulk fuel and resource development.

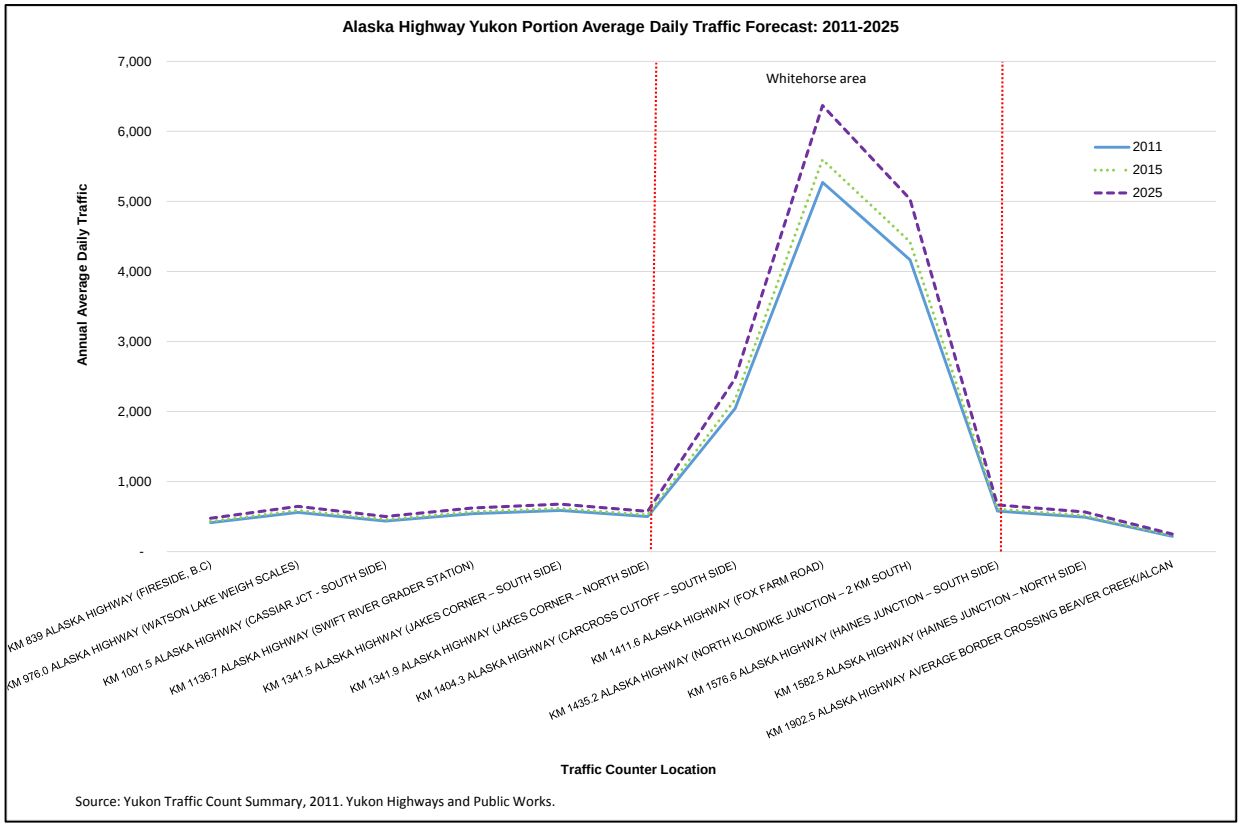
The baseline analysis examines average daily traffic flow on the Yukon portion of the Alaska Highway based on traffic flow data for 2009-2011 that is assumed to include tourists as well as local residents. The future light traffic flows are estimated to 2025 based on 2011 traffic counts and the population average annual growth rates for Yukon based on the Yukon Bureau of Statistics projection as outlined in Table F-1 above.[8]

Figure F-1 below provides a summary of Average Annual Daily Traffic (AADT) flows in 2011 on the Alaska Highway starting from British Columbia [Route 97 close to Dawson Creek] and ending at Alaska [Delta Junction]. Forecast AADT flows are also shown for 2015 and 2025 based on population growth rates applied to the 2011 AADT flows.

For the Yukon portion of the Alaska Highway average daily traffic outside of the Whitehorse area ranges between about 400 and 600 vehicles in 2011 increasing to about from 450 to 700 vehicles in 2025. In the Whitehorse area, 2011 data shows the average daily traffic reaches about 2,100 vehicles at the intersection of Alaska Highway and the South Klondike Highway, and to about 5,250 vehicles near the intersection of Fox Farm Road, and then decreases to about 4,000 vehicles close to the intersection with the north Klondike Highway. With the higher than average population growth rate for Whitehorse the average daily light traffic volumes in the Whitehorse area are forecast to increase to the range between 2,500 and 6,300 vehicles in 2025.

[8] The tourism growth rates are within the range of the population growth rate levels, e.g., Yukon Economic Outlook for 2015 notes an increase in border crossings by about 1.5% in 2016 over 2015. Therefore, it is assumed that the light traffic flow projection also takes into account growth in tourism.

Figure F-1: Alaska Highway Yukon Portion Average Daily Traffic Forecast: 2011-2025



3.3 CHANGES IN TOURISM VOLUMES

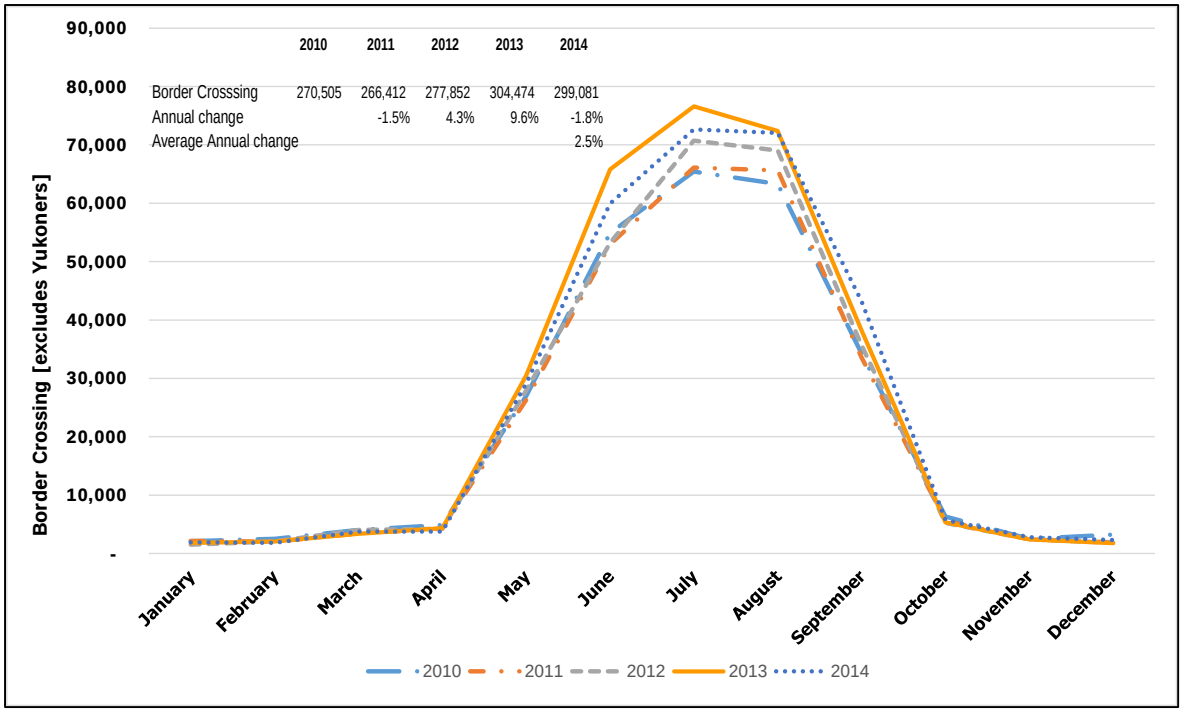
The Yukon Tourism Indicators, Year-End Report, 2014[9] indicates that 443,300 people visited Yukon in 2014. This is about 2.2% lower than the estimate for 2013 at 453,200. Yukon Department of Tourism and Culture estimates indicate that in summer of 2012 about 54% of the total visitors entered Yukon via Alaska and about 12% through airports. Most of the border crossing visitors are international visitors.

Figure F-2 below shows the annual change in border crossings to Yukon (excluding Yukoners) for 2010-2014. Border crossings in 2014 were about 1.8% lower than in 2013. However, over the five year period there was an average annual increase of 2.5%. Yukon Economic Outlook for 2015[10] notes that while remaining below the 2013 level, a return to growth is anticipated with border crossings growing about 1.5% in 2015 and similar growth expected in 2016.

[9] Numbers are based on Yukon Tourism Indicators Year-End Report 2014. Source:, Government of Yukon, Department of Tourism and Culture. Available at http://www.tc.gov.yk.ca/pdf/2014_TourismIndicators_YearEndReport.pdf [accessed on November 3, 2015].

[10] Source: October 2015 version. http://economics.gov.yk.ca/Files/2015/YukonEconomicOutlook_October2015.pdf [accessed on December 2, 2015].

Figure F-2: Annual Border Crossings: 2010-2014[11]



Considering the historical changes and forecast from Yukon Economic Outlook for 2015 it is assumed that the overall volume of visitors will increase on average by 1.5% per year over the period to 2025.

3.4 CHANGES IN RESOURCE DEVELOPMENT FREIGHT AND BULK FUEL TRAFFIC

The timing of future development of the mining sector in Yukon and adjacent NWT areas relying on the Alaska Highway access is uncertain, and depends on a range of factors that include: global commodity prices, available financing, regulatory stability, past performance of projects, mineral prospects outside of Yukon and global economic growth.

The Yukon Economic Outlook for 2015 notes that while mining related activities remain a prominent contributor to Yukon's economy, weak mineral prices and an underperforming global mining industry are expected to continue to weigh on Yukon's mining sector in the near-term, creating uncertainty for exploration, development and production prospects.[12]

Table F-3 provides estimated inbound and outbound freight and bulk fuel volumes, as well as other summary information, for the range of potential mine developments considered in the medium term (i.e., by 2025) future scenarios assessment. These mine developments were selected for inclusion in this

[11] Source: Prepared based on Yukon Tourism Indicator Reports. http://www.tc.gov.yk.ca/Stats_and_Figures.html [accessed on December 2, 2015]. Figures exclude Yukoners, crossings in commercial vehicles, train and marine crossings. Further, 2010 to 2013 figures exclude arrivals by air, whereas 2014 figures include direct international arrivals by air. The exclusion of air arrivals has a minimal impact to the 2010 to 2013 border crossing trends.

[12] Source: Yukon Economic Outlook, October 2015, page 12. http://economics.gov.yk.ca/Files/2015/YukonEconomicOutlook_October2015.pdf [accessed on November 29, 2015].

assessment based on information available at this time on potential probable producing mines with mineable, proven reserves and an experienced mining company that has a potentially financeable project which is into (or soon will be into) the regulatory process for development.

The potential mine developments in Table F-3 are separated into two defined Yukon regions: Western Yukon (where access via the Skagway Inside Passage exists without the Alaska Highway) and Eastern Yukon (where highway access is assumed not to exist without the Alaska Highway). Figure F-3 provides a map outlining the location of each potential mine development.

Table F-4 provides the estimated change in 2025, compared to the 2014 baseline, in volumes of inbound development freight (excluding bulk fuel) and outbound production freight with and without the Alaska Highway. The Western Region accounts for all of the mine-related traffic in the baseline and the low 2025 future scenario. Under the medium and high 2025 future scenarios, the Western Region accounts for 63-65% of the inbound development freight but only 28-36% of the outbound mine shipment volumes. Table F-4 shows the following:

- With all assumed potential mines in service, by 2025 the heavy traffic volume for development freight inbound compared to demand for all Yukon in 2014:
    - Would decrease by about 42% under the low scenario with the Alaska Highway [decrease by about 22% without the Alaska Highway];
    - Would increase by about close to five times under the medium scenario with the Alaska Highway [increase by about four times without the Alaska Highway];
    - Would increase by about close to 5.5 times under the high scenario with the Alaska Highway [increase by about five times without the Alaska Highway];
- With all assumed potential mines in service, by 2025 the heavy traffic volume for outbound production freight compared to all Yukon in 2014:
    - Would decrease close to 100% under the low scenario with and without the Alaska Highway;
    - Would increase by about nine times under the medium scenario with the Alaska Highway [increase by about more than eight times without the Alaska Highway];
    - Would increase by about 12 times under the high scenario with the Alaska Highway [increase by about 15 times without the Alaska Highway];

As reviewed below, the bulk fuel transportation impact related to the potential mines and the Alaska Highway differs from past experience to the extent that LNG is the fuel required for these projects to provide for on-site power generation as well as various energy needs[13]. Table F-5 provides the estimated volume of the bulk fuel and LNG demands.

[13] It is expected the new large mines like Casino would be served by on-site thermal generation units, i.e. without connecting to the Yukon electrical grid and therefore increasing the demand for the bulk fuel delivery which is expected to mainly include LNG shipped from LNG facilities in northeastern B.C. or Alberta.

Table F-3: Future Scenarios - Estimated Inbound and Outbound Volumes for Potential Yukon Mines in 2025

Mines	Type	Expected Mine Life (years)	Expected Total Mine Onsite Workforce	Annual Outbound Production (tonnes)	Annual Inbound Fuel (tonnes)	Annual Inbound Supplies (tonnes)	Onsite Power	Access	Notes
Western Region of Yukon									
Low Scenario									
Eagle Gold	Precious M.	10	400	5	8,245	50,000	20 MW; Grid	Klondike Tie-in	Inbounds - IP and/or AK Hwy
Medium Scenario [Low Scenario plus]									
Casino	Base Metal	22	700	453,000	197,047	255,100	155 MW	Klondike Hwy	Export over Skagway
High Scenario [Medium Scenario plus]									
Wellgreen	Plat/ Base Metal	26	296	300,000	100,000	40,000	59 MW	AK Hwy 1/Hwys 2 or 3	Exp. Over Skagway or Haines
Kaminak Coffee Gold	Precious M.	11	180	5	70,000	10,000	5 MW	Gold Rd./Klondike Hwy	Inbounds - IP and/or Hwy 2
Carmacks Copper	Cu Cathodes	7	168	13,200	4,890	11,000	12 MW; Grid	Klondike/RC Hwys	Export over Skagway
Eastern Region of Yukon									
Medium Scenario									
Selwyn	Base Metal	11+	750	1,226,927	185,824	183,165	90 MW	Nahanni RR/RC Hwys	Export over Stewart, BC
High Scenario [Medium Scenario plus]									
Mactung Tungsten	Tungsten	11	260	13,900	18,335	14,470	13 MW	No. Canol/ RC Hwys	Truck via Hwy 1; or Skagway
Kudz Ze Kayah	Base Metal	14	300	140,000	7,000	2,850	11 MW	RC Hwy 4 to BC Hwy 37	Likely export over Stewart, BC

Source: Information based on publicly available data as well as information provided by development proponents.

Table F-4: Future Scenarios - Estimated Inbound and Outbound Volumes for Potential Yukon Mines in 2025 (Excludes bulk fuel inbound freight)

	2014 With the Alaska Highway		2014 Without the Alaska Highway		2025 With the Alaska Highway		2025 Without the Alaska Highway		Impact	
	Trucks	Tonnes	Trucks	Tonnes	Trucks	Tonnes	Trucks	Tonnes	Trucks	Tonnes
	A	B	C	D	E	F	G	H	I=G-E	J=H-F
Development Freight - Inbound										
Western Region										
Low Scenario					1,257	50,000	1,257	50,000	0	0
Medium Scenario (includes Low)					7,668	305,100	7,668	305,100	0	0
High Scenario (includes Medium)					9,202	366,100	9,202	366,100	0	0
Eastern Region										
Low Scenario					0	0	0	0	0	0
Medium Scenario (includes Low)					4,604	183,165	0	0	-4,604	-183,165
High Scenario (includes Medium)					5,039	200,485	0	0	-5,039	-200,485
Total Yukon										
Low Scenario	2,176	86,572	1,643	63,872	1,257	50,000	1,257	50,000	0	0
Medium Scenario (includes Low)	2,176	86,572	1,643	63,872	12,272	488,265	7,668	305,100	-4,604	-183,165
High Scenario (includes Medium)	2,176	86,572	1,643	63,872	14,241	566,585	9,202	366,100	-5,039	-200,485
Production - Outbound										
Western Region										
Low Scenario					0	5	0	5	0	0
Medium Scenario (includes Low)					9,438	453,005	9,438	453,005	0	0
High Scenario (includes Medium)					15,963	766,210	15,963	766,210	0	0
Eastern Region										
Low Scenario					0	0	0	0	0	0
Medium Scenario (includes Low)					25,561	1,226,927	0	0	-25,561	-1,226,927
High Scenario (includes Medium)					28,767	1,380,827	0	0	-28,767	-1,380,827
Total Yukon										
Low Scenario	3,502	168,104	1,023	49,104	0	5	0	5	0	0
Medium Scenario (includes Low)	3,502	168,104	1,023	49,104	34,999	1,679,932	9,438	453,005	-25,561	-1,226,927
High Scenario (includes Medium)	3,502	168,104	1,023	49,104	44,730	2,147,037	15,963	766,210	-28,767	-1,380,827

Table F-5: Future Scenarios - Estimated Inbound Fuel Volumes for Potential Yukon Mines in 2025

	Bulk Diesel Fuel - 2025		LNG - 2025		Total Fuel With the Alaska Highway - 2025		Total Fuel Without the Alaska Highway - 2025		Impact - 2025	
	Trucks	Tonnes	Trucks	Tonnes	Trucks	Tonnes	Trucks	Tonnes	Trucks	Tonnes
	A	B	C	D	E=A+C	F=B+D	G	H	I=G-E	J=H-F
Western Region										
Low Scenario	206	8,245	0	0	206	8,245	206	8,245	0	0
Medium Scenario (includes Low)	1,091	43,645	4,041	161,647	5,132	205,292	5,132	205,292	0	0
High Scenario (includes Medium)	3,413	136,500	6,092	243,681	9,505	380,182	9,505	380,182	0	0
Eastern Region										
Low Scenario	0	0	0	0	0	0			0	0
Medium Scenario (includes Low)	1,250	50,000	3,396	135,824	4,646	185,824			-4,646	-185,824
High Scenario (includes Medium)	1,883	75,335	3,396	135,824	5,279	211,159			-5,279	-211,159
Total Yukon										
Low Scenario	206	8,245	0	0	206	8,245	206	8,245	0	0
Medium Scenario (includes Low)	2,341	93,645	7,437	297,470	9,778	391,115	5,132	205,292	-4,646	-185,824
High Scenario (includes Medium)	5,296	211,835	9,488	379,505	14,784	591,340	9,505	380,182	-5,279	-211,159

Source: Information based on publicly available data as well as information provided by development proponents.

3.4.1 Western Region Potential Mine Developments

As Table F-3 illustrates, the future scenarios for 2025 include five potential mine developments in the western region: one mine under the low scenario [Eagle Gold], one additional mine under the medium scenario [Casino], and three additional mines under the high scenario [Wellgreen, Kaminak Coffee Gold and Carmacks Copper].

Table F-3 indicates that the western region potential mines are expected to use the Inside Passage (i.e., Skagway and/or Haines ports) for outbound production shipments. Alaska Highway impacts related to the western region mines are expected to be limited to transportation of certain inbound supplies to the mines. Tables F-4 and F-5 summarize the inbound and outbound volumes for the baseline and each 2025 future scenario - the Casino mine, which is included in the medium and high scenarios, dominates the potential volumes for these future scenarios.

As illustrated in Table F-6, the transportation cost of the development and construction freight to the potential mines estimated to be:

- About $2.4 million lower with the Alaska Highway [about $12 million] compared to transportation cost without the Alaska Highway via Inside Passage [about $14 million];
- About $15 million lower with the Alaska Highway [about $72 million] compared to transportation cost without the Alaska Highway via Inside Passage [about $87 million]; and
- About $18 million lower with the Alaska Highway [about $87 million] compared to transportation cost without the Alaska Highway via Inside Passage [about $105 million].

Table F-6: Estimated Inbound (excluding bulk fuel) and Outbound Volumes for Western Region Potential Mines (2015$)

	2025		Transportation Cost, $/tonne		Transportation Cost, $000		Cost Impact, $000
	Trucks	Tonnes	Via Inside Passage	Via Watson Lake	Via Inside Passage	Via Watson Lake	
	A	B	C	D	E=B*C	F=B*D	G=E-F
Western Region Potential Mines							
Low Scenario							
Development Freight - Inbound	1,257	50,000	285.7	237.0	14,286	11,850	2,436
Production - Outbound	0	5			Assumed no impact		
Medium Scenario [includes Low Scenario]							
Development Freight - Inbound	7,668	305,100	285.7	237.0	87,171	72,309	14,863
Production - Outbound	9,438	453,005			Assumed no impact		
High Scenario [includes Medium Scenario]							
Development Freight - Inbound	9,202	366,100	285.7	237.0	104,600	86,766	17,834
Production - Outbound	15,963	766,210			Assumed no impact		

As reviewed in Table F-5, the bulk fuel delivery for operation of at least two of these mines (Casino and Wellgreen) includes liquefied natural gas (LNG) delivery that is assumed to be supplied by highway from northeastern B.C. or northwestern Alberta to the potential mine site for electric energy generation and potentially other energy loads. Secure cost-based LNG supply is viewed as critical to feasible development of a mine such as the Casino development as it offers materially lower cost electric power than would be

available with any other practical alternative. The estimated LNG delivery for Casino mine is about 365,000 m^3/annually which is about 4,000 truck-loads. Without the Alaska Highway there would be a range of complications to address related to LNG bulk fuel supply for a mine such as Casino, including the economic cost and security of obtaining an adequate alternative source of LNG that is shipped to the mine by marine transport through a US port via the Inside Passage.

3.4.2 Eastern Region Potential Mine Developments

As illustrated in Table F-3, there are three potential mine developments by 2025 in the eastern region of Yukon: no potential mines are assumed in this region under the low scenario; Selwyn Chihong is assumed under medium scenario; and Mactung and Kudz Ze Kayah are added under the high scenario.

As Figure F-3 illustrates, access to each of the above eastern Yukon mines presumes existence of the Alaska Highway, i.e., each of these mine developments would use the Alaska Highway to export/sale its production. Without the Alaska Highway it is assumed that the above mine developments would not exist. Tables F-4 and F-5 summarize the inbound and outbound volumes for the baseline and each 2025 future scenario - the Selwyn mine, which is assumed in the medium and high scenarios, dominates the potential volumes for these future scenarios. None of these mines is assumed to exist without the Alaska Highway - and therefore no transport cost assessment is done for these mines with and without the Alaska Highway.

It is not feasible in this study to estimate the impact from development of the above eastern region mines to the Yukon's economy as a whole as well as impact to the Yukoners. However, each mine development would have a notable economic impact on Yukon – and, without the Alaska Highway, inability to develop each mine would therefore also have a big negative economic impact on Yukon.

To help understand these potential economic impacts in Yukon from mines, it is relevant to note the following from the Yukon Economic Outlook for 2015[14] as well as economic indicators from Statistics Canada:

- Mining related activities remain a prominent contributor to Yukon's economy, estimated at 19 per cent of Gross Domestic Product in 2014 [22 per cent of real GDP in 2012 and about 21% in 2013];[15]
- The performance of Yukon's economy is linked to the performance of the global mineral industry, and the performance of mineral prices; and
- Exploration spending in 2015 is expected to be at 2014 level, with expenditures expected to be over $100 million and spending related to exploration activity on the Selwyn project comprises a substantial portion of the total.[16]

[14] Source: Yukon Economic Outlook for 2015, pages 12-15. http://economics.gov.yk.ca/Files/2015/YukonEconomicOutlook_October2015.pdf [accessed on November 29, 2015].
[15] Source: Statistics Canada CANSIM Table 379-0030 Gross domestic product (GDP) by North American Industry Classification System (NAICS), chained 2007 dollars http://www5.statcan.gc.ca/cansim/a26?lang=eng&id=3790030 [accessed on December 17, 2015].

Unlike the Casino mine, Selwyn Chihong has not yet completed its feasibility study or submitted its proposal to the Yukon Environmental and Socio-economic Assessment Board (YESAB). Considering the similarity in size of investment,[17] the estimated Casino mine economic impact factors help to highlight (without addressing the specific and distinct features of the Selwyn project) the magnitude of the economic impacts from development of large scale mine projects such as the Selwyn Chihong project.[18]

Economic impacts are further elaborated by the Howard's Pass Access Road Upgrade Project 2015 Land Use and Water Licence Application Package[19] filed by Selwyn Chihong, which notes that:

- The construction phase will result in about 1500 person years of employment, and there will be about 750 jobs created at the mine operations and between 300 to 350 jobs for the concentrate trucking; and
- Road traffic is estimated to be about 200 heavy truck loads a day on the road [loaded and empty]. This will include concentrate shipments, liquefied natural gas, parts, equipment, supplies etc. The expected trucking is up to 15 loads of LNG will be trucked to the site per day, approximately 15 loads of lead per day and approximately 55 loads of zinc per day will be shipped from the site.

Selwyn-Chihong Mining Ltd notes that it completed upgrades to the Howard's Pass Access Road in 2014 with eight new bridges and road reconstruction to allow all-season access[20]. Howard's Pass Access Road Upgrade Project proposed to expand and upgrade the 79 km long road to a two lane gravel road. It notes that the road upgrades have the potential to affect the local economy through the provision of direct and indirect employment opportunities and increased business activity due to project spending on goods and services. The greatest potential for benefits relate to the supply of construction labour, equipment, fuel and contracting related to camp operations. To date it is estimated that over 800 person days of employment have been created for community members on the Howard's Pass Access Road.

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[16] Yukon Economic Outlook for 2015 forecast growth in exploration spending in 2015. However, since the release of the outlook Natural Resource Canada revised 2015 forecast numbers which expects that 2015 exploration spending would be lower than 2014 levels. Source: http://sead.nrcan.gc.ca/expl-expl/ExploTable.aspx?FileT=34&Lang=en [accessed on December 17, 2015].

[17] About $2.5 billion per Table 1-4 of the Casino Project Feasibility Study, 2013. Source: http://www.westerncopperandgold.com/_resources/reports/CasinoNI43-101-Jan2013.pdf [accessed on November 29, 2015].

[18] The estimated Gross Domestic Impact construction impact of the Casino Project to Yukon is about $363 million [which was estimated to be about 13.6% of the total Yukon GDP for 2011 at nominal prices]. Over the life of the Casino project [about 22 years, which is twice as long as the current estimate for Selwyn] it is estimated that Casino Project would contribute about $6.4 billion to GDP in Yukon with about 24,000 full time equivalent jobs and generate $1.1 billion in wages and salaries. It is also estimated that the annual average Yukon Mining Royalty would be about $56 million. It should be noted that for minerals, forestry, water and land revenues, Yukon's grant from the federal government would be reduced by a dollar for each extra dollar received over the $6 million cap. In August 2012 the cap was raised to $6 million for all natural resources revenues and this amendment also provides opportunity for Yukon government to elect 50/50 revenue share where the deduction in territorial formula financing payments should be equal to 50% of the annual resource revenues regardless of the amount of the revenues, subject to clauses noted in the agreement. Source: http://www.gov.yk.ca/news/get-thefacts_dta.html, accessed on January 8, 2016]; http://www.casinomining.com/_resources/pdfs/mnp_report.pdf [accessed on November 29, 2015].

[19] An application to upgrade the access road connecting the project to the Nahanni Range Road, a highway located in the NWT and Yukon. June 2015. Source: Available on The Mackenzie Valley Environmental Impact Review Board's website http://www.reviewboard.ca/upload/project_document/EA-1516-01_07_Application_to_the_MVLWB_Volume_3_-_Appendices_to_PDR__Part_2_of_2__Appendices_IX_to_X.PDF [accessed on November 30, 2015].

[20] Source: http://selwynchihong.com/wp-content/uploads/2015/09/SCML_ProjectFactsheet.pdf [accessed on December 18, 2015].

Local contractors and Joint Venture companies have been awarded more than $12 million in contracts for work on the road.[21]

The Selwyn project also has benefits to the local First Nation communities during the operation period. The proposed Socio-economic Participation Agreement (SEPA) which is expected to be voted by Kaska Nation in February 2016 provides financial benefits to Kaska over the life of the Project based on the profits of the Project.[22]

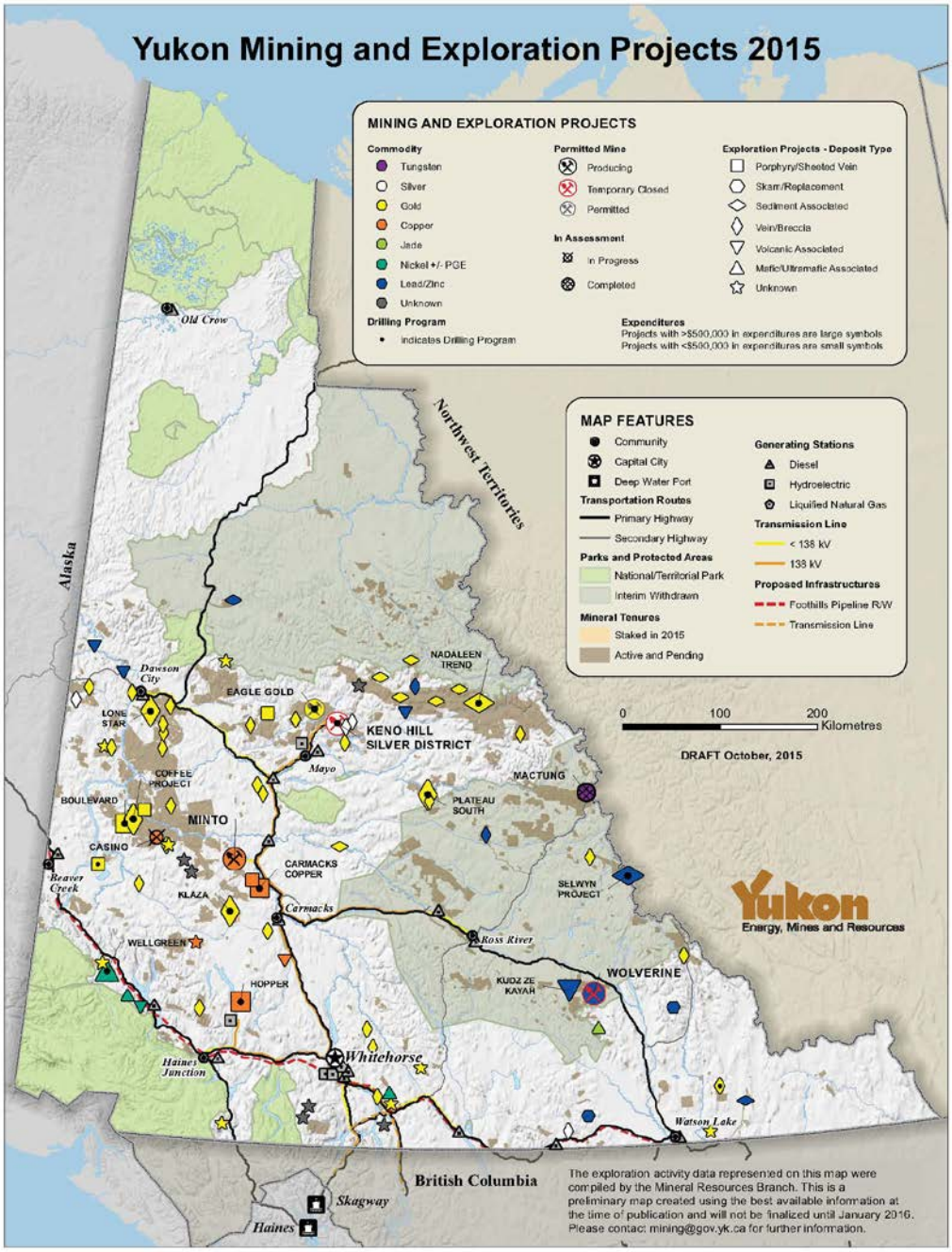
Although not as large as the Selwyn Project, the Mactung project and the Kudz Se Kayah project each also offer material economic impact benefits to Yukon. As Table F-3 shows, the expected number of workforce estimated to be similar for each of these two projects. With three similar smaller mines, Minto (2007), Bellekeno (2011) and Wolverine (2012) in service the share of mining, quarrying and oil & gas extraction accounted for more than 20 per cent of real GDP in 2012 and 2013.[23] Absent the Highway, similar economic impacts from the Mactung and Kudz Se Kayah projects would be unlikely to occur in the foreseeable future.

[21] Source: Howard's Pass Access Road Upgrade Project 2015 Land Use and Water Licence Application Package, Volume 3. http://www.reviewboard.ca/upload/project_document/EA-1516-01_07_Application_to_the_MVLWB_Volume_3_-_Appendices_to_PDR__Part_2_of_2__Appendices_IX_to_X.PDF [accessed on December 18, 2015].

[22] Source: http://selwynchihong.com/community/sepa-faq/ [accessed on November 29, 2015].

[23] Source: Statistics Canada CANSIM Table 379-0030 Gross domestic product (GDP) by North American Industry Classification System (NAICS), chained 2007 dollars http://www5.statcan.gc.ca/cansim/a26?lang=eng&id=3790030 [accessed on December 17, 2015].

Figure F-3: Potential Mining and Exploration Projects[24]



[24] Source: Yukon government, Department of Energy, Mines and Resources. Available at http://www.emr.gov.yk.ca/mining/pdf/yukon-mining-exploration-projects-8.5x11-oct2015.pdf [accessed on October 7, 2015].

3.5 NATURAL GAS DEVELOPMENTS

The impact of natural gas developments to Yukon are analyzed under two scenarios for 2017-2041 in a report (Economic Impacts of Natural Gas Development in the Yukon Territory) by the Canadian Energy Research Institute.[25] The report includes two gas industry development scenarios. Scenario 1 represents modest domestic development. Scenario 2 offers more significant development of Yukon's resources, whereby domestic needs are met and surplus gas is exported. The maps of the developments show that both scenarios would not be affected without the Alaska Highway. Please see Attachment F2 for details of these natural gas development scenarios.

3.6 CHANGES IN HIGHWAY MAINTENANCE COSTS

The future scenarios analysis uses 2014/15 actual maintenance costs by camp and applies an inflation adjusted average annual increase of 1.1% based on review of maintenance cost increases over the last 10 years. This may be conservative given the somewhat higher recent annual growth rates [1.8%/year for the last five years]. Estimates of future highway maintenance costs exclude any consideration of added capital cost requirements related to new mine and other resource developments (such developments will include added capital costs, as well as arrangements for cost sharing with the developers as well as potentially with the federal government).

With 1.1% average annual increase, the maintenance costs by 2020 with the Alaska Highway would be about $46.1 million [Table F-8] and without the Alaska Highway about $31.5 million; by 2025 with the Alaska Highway this cost would be about $48.8 million and without the Alaska Highway about $33.3 million. The added cost of $15.5 million by 2025 with the Highway results in about $9.5 million impact to Yukon GDP with estimated 93 jobs and about $4.2 million salaries and wages.[26]

Table F-8: Highway Maintenance Cost Forecast ($2014/15)

Year	With the Alaska Highway	Without the Alaska Highway	Alaska Highway Impact	Alaska Highway Impact (%)
	A	B	C=A-B	D=(C/B)
2020	46,145,719	31,523,664	14,622,054	46%
2025	48,807,877	33,342,273	15,465,604	46%

[25] Source: Canadian Energy Research Institute, March 2015, http://www.ceri.ca/images/stories/Study_142_-_Economic_Impacts_of_Hydrocarbon_Development_in_the_Yukon_Territory_-_FINAL_-_March_2015.pdf [accessed on November 29, 2015].

[26] Estimated based on Yukon input-output model which is based on 2010 Statistics Canada multipliers [combined direct, indirect and induced impact for Transportation engineering construction]. Source: http://economics.gov.yk.ca/gdp.aspx [accessed on December 4, 2015].

3.7 CHANGES IN HIGHWAY CAPITAL COSTS

Review of Yukon highways capital costs indicates that capital costs may change materially each year depending on the investment required for each highway. Table F-9 below illustrates the historical trends in highway capital expenditures which shows an approximate 20% increase in 2012/13 over 2011/12, a reduction of 18% for the following year (2013/14) and an increase of 15% in 2014/15. Table F-9 also estimates the portion of the Yukon highway capital costs that would remain without the Alaska Highway.[27]

The average annual increase in 2014/15 over 2011/12 was 4.3%. With inflation adjustments[28] the average annual increase would be at 2.5%. An annual average increase of 2.5% was accordingly used to forecast capital expenditures for 2025 with and without the Alaska Highway (see Table F-9). Estimates of future capital costs exclude any consideration of added capital cost requirements related to new mine and other resource developments (such developments will include added capital costs, as well as arrangements for cost sharing with the developers as well as potentially with the federal government).

Table F-9: Highway Capital Costs: 2011/12 to 2014/15 and Forecast 2020 and 2025

	Highway Capital Costs, $000			
	Total	**Estimate Without the Alaska Highway**	**Alaska Highway Impact**	**Alaska Highway Impact (%)**
	A	**B**	**C=A-B**	**D=C/B**
2011/12	44,873.7	22,211.5	22,662.2	102%
2012/13	54,010.5	26,954.5	27,056.0	100%
2013/14	44,173.6	26,856.5	17,317.1	64%
2014/15	50,926.1	29,015.2	21,910.9	76%
Average Annual Change	4.3%			86%
Average Annual Change after Inflation Adjustment	2.5%			
Forecast 2020 ($2014/15)	57,663.7	31,068.8	26,595.0	86%
Forecast 2025 ($2014/15)	65,292.8	35,179.3	30,113.5	86%

One factor that may materially impact future required capital spending for the Shakwak portion of the Alaska Highway (or future highway conditions) relates to future appropriation of US funds towards the

[27] Excludes costs for: Alaska Highway from BC/Yukon border to Johnsons Crossing and from Haines Junction to Yukon/Alaska border; Nahanni Range Road; Top of the World Highway in Yukon; and Robert Campbell Highway south of Canol Road.

[28] Based on Whitehorse Consumer Price Index, with 2002=100 2014 was at 124.4 and 2011 at 118.1. Source: Available at http://economics.gov.yk.ca/cpi.aspx [accessed on November 20, 2015].

Shakwak Highway pursuant to the Shakwak Agreement between US and Canada.[29] Since the Shakwak Agreement was signed, over $1.5 billion (US) has been spent by both countries on upgrading and maintaining the Alaska Highway System in Canada for 1977-2009 years. The Yukon and Canadian governments have accounted for 74% of capital and maintenance costs (including Shakwak Highway and Haines Road), while the U.S. and Alaskan governments have accounted for 26% of shared expenditures.[30] Available information indicates that approximately $489 million in capital improvements have occurred since 1977 (allowing for completion of over 90% of reconstruction efforts[31]), with the *Safe, Accountable, Flexible, and Efficient Transportation Equity Act: A Legacy for Users (SAFETEALU)* providing $30 million per year from 2005 to 2009. At the time it was noted that future funding was required for the following activities:

- Rehabilitation and stabilization of areas affected by melting permafrost between Destruction Bay and the border near Beaver Creek (estimated cost of $70 million US);
- Pave remaining 68 miles of the Haines Road (estimated cost of $35 million);
- Pave 67 miles of Alaska Highway south of Destruction Bay (estimated cost of $39 million US); and
- Pave 145 miles from Destruction Bay to the Alaska border (until permafrost is stabilized, paving cannot occur and once stabilization is achieved paving is estimated to cost $93 million $2009 dollars).

In 2012, a new two year transportation re-authorization bill was signed into law [*Moving Ahead for Progress in the 21st Century Act* (Map-21)]; however, funding authorization for the Shakwak Highway Project was not included in the bill, and the US House of Representatives has not earmarked any further funds for the Shakwak Highway. Without the Shakwak funding in place, Alaska Highway paving efforts between Haines Junction and Beaver Creek have been on hold, and in recent years Yukon government funding for this portion of the Alaska Highway has declined (from approximately $25 million in 2012 to $10 million in 2015).[32]

[29] The Shakwak Highway is the only land link to Alaska from the lower 48 states and connects the Alaska panhandle to the Alaska interior. In 1977, Canada and the U.S. entered into an agreement (the Shakwak Agreement) to improve highway sections in Canada and facilitate transportation within Canada and between Canada and the U.S. Under this agreement, the U.S. agreed to provide funding for reconstruction of the highway, while Canada would manage reconstruction, provide land and granular resources and maintain the highway. The agreement covers a 325 mile stretch of the highway that includes the Haines Road and northern section of the Alaska Highway.

[30] Source: http://www.casinomining.com/_resources/pdfs/mnp_report.pdf [accessed on November 29, 2015]. http://www.hpw.gov.yk.ca/pdf/shakwakprojectbrochure09.pdf notes as follows regarding share of expenditures: Canada ($920.6 million or 60% of total expenditures); Yukon ($223.1 million or 14% of total expenditures); United States ($361.4 million or 23% of total expenditures); and Alaska ($38.1 million or 3% of total expenditures).

[31] The North Alaska Highway and Haines Road have undergone major improvements, with over 90% of the reconstruction work completed. During the same timeframe, the more southerly sections of the Alaska Highway have been almost completely reconstructed with only a relatively short section in northern BC remaining to be upgraded. Specific work to date has included: reconstruction of the Haines Road (109 miles/175 km) and the North Alaska Highway (126 miles/ 348 km). 76 miles/ 122 km of the Haines Road and 4 miles of the North Alaska Highway have been paved and 5 bridges replaced. A major permafrost test section has also set up on the highway near Beaver Creek.

[32] Source: http://www.casinomining.com/_resources/pdfs/mnp_report.pdf [accessed on November 29, 2015]. http://yukon-news.com/news/no-new-money-for-shakwak-roadwork/.

Work on the Highway as outlined in the Shakwak Agreement has not been completed and the road has not been fully constructed to a standard that provides a comprehensive and modern, two-lane all-weather highway.

ATTACHMENT F1 – FUTURE SCENARIO POTENTIAL MINE DEVELOPMENTS

Future scenarios focus on the following range of potential low, medium and high Yukon mine developments in the medium-term (i.e., 10 years out, or the year 2025) for two defined Yukon regions: Western Yukon (where access via the Skagway Inside Passage exists without the Alaska Highway) and Eastern Yukon (where existing highway and inside passage access is assumed not to exist without the Alaska Highway).

- **Western Yukon (connected by Skagway Inside Passage)**
    - Low (Eagle Gold)
    - Medium (add Casino)
    - High (add Wellgreen, Kaminak and Carmacks Copper)
- **Eastern Yukon (connected today by Alaska Highway [including access to Stewart or Skagway Inside Passage])**
    - Low (no mine activity in this region)
    - Medium (add Selwyn)
    - High (add Mactung Tungsten and Kedz Ze Kayah)

A brief summary for each of these potential mine developments is provided below by region.

Western Region Potential Mine Developments

- **Eagle Gold (Victoria Gold)**[33] - The Eagle Gold Project is located in central/ northern Yukon approximately 85 km north-northeast of the village of Mayo. Victoria Gold completed its YESAB assessment and received its Quartz Mining Licence for the Eagle Gold Project in September 2013. Victoria Gold states that the Eagle Gold Project is "shovel ready" to commence construction when market conditions turn around, and its currently expected operation would approximate 10 years.

  The Yukon Economic Outlook (Yukon government) for 2015 indicates expected development in 2016-17 with production commencing in 2018. However, with weaker commodity prices today it is expected that there will be delays with timing of this mine. For the purpose of the current study, it is assumed that development is delayed due to market conditions, but that operations commence before or by 2025.

[33] Source: http://www.casinomining.com/_resources/pdfs/mnp_report.pdf [accessed on November 29, 2015]; http://www.vitgoldcorp.com/s/dublin_gulch.asp?ReportID=534838 [accessed on October 9, 2015].

- **Casino (Western Copper and Gold)**[34] - The Casino project is a copper, gold, molybdenum and silver deposit located in western/central Yukon, approximately 300 km northwest of Whitehorse. The deposit is centered on the 70 million year old Patton Porphyry, which intrudes older, surrounding rocks in the area. The Yukon Economic Outlook for 2015 indicates forecast development over the period from 2016 to 2019 with full production by 2020 (subsequent weakness in commodity prices will delay this). The mill will process about 120,000 tonnes of ore per day over a 22-year mine life. The Casino project is forecast to have significant impacts over the medium and long-term with development costs of $2.5 billion and a requirement for up to 1,000 workers at peak construction. On-site power generation is to use LNG supplied from new facilities in northeastern B.C. For the purpose of the current study, it is assumed that development is delayed due to market conditions and regulatory review delays, but that operations commence before or by 2025.

- **Wellgreen**[35] **-** The Wellgreen project is located approximately 317 km northwest of Whitehorse in southwestern Yukon. The Wellgreen project hosts a large PGM and Nickel deposit that is accessible via an all-weather road from the paved Alaska Highway, with a major all-season trucking route leading to deep sea ports at Haines and Skagway, Alaska. On-site power generation is to use LNG. The 2015 PEA base case average annual production assumes: 209,000 ozsPGM+Au(3E) and 128 Mlbs Ni+Cu in concentrate over the first 16 years. Initial capex is assumed to be CAD$586M (includes $100M contingency) for a 25 year base case mine life. For the purposed of the current study, it is assumed that development proceeds and that operations commence before or by 2025.

- **Kaminak (Coffee Gold)**[36] **-** The Coffee project is located in west-central Yukon, within the emerging White Gold District, approximately 130km south of Dawson City and approximately 160km northwest of Carmacks. Mine life of 11 years is estimated with peak production of 231,000 ounces per annum (year 1) and average Life of Mine (LOM) production of 167,000 ounces of gold. For the purposes of the current study, it is assumed that development proceeds and that operations commence before or by 2025.

- **Carmacks Copper (Copper North)**[37] – Carmacks Copper is located in central Yukon, 192 km north of Whitehorse, and 38 km northwest of the town of Carmacks. Project life is estimated to be about 7 years. This mine project completed a YESAB review, but did not secure Yukon Water Board licensing, and has been the subject of renewed engineering and resource planning assessments. For the purposed of the current study, it is assumed that development is successfully restarted with operations commencing before or by 2025.

Eastern Region Potential Mine Developments

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[34] Source: http://www.casinomining.com/_resources/pdfs/mnp_report.pdf [accessed on November 29, 2015]. http://www.casinomining.com/project/overview/ [accessed on October 9, 2015].
[35] Source: http://www.casinomining.com/_resources/pdfs/mnp_report.pdf [accessed on November 29, 2015]. http://www.wellgreenplatinum.com/projects/wellgreen/overview [accessed on October 9, 2015].
[36] Source: http://www.kaminak.com/coffee/overview/ [accessed on October 9, 2015].
[37] Source: http://www.coppernorthmining.com/s/Carmacks.asp?ReportID=555818&_Type=Carmacks [accessed on October 9, 2015].

- **Selwyn-Chihong** - The Selwyn-Chihong project is a proposed zinc-lead mine located in Howard's Pass in eastern Yukon [straddling the border with the Northwest Territories] and is one of the largest undeveloped zinc-lead deposits in the world. It has the largest expected annual production compared to the other similar Yukon mine developments [more than 1.2 billion tonnes annually]. The Selwyn mine's currently estimated life is 11+ years; however, it is anticipated that additional mineral reserve confirmations will support a much longer mine life. Estimated capital cost is estimated at US$ 2 billion, with US$ 950 million annual operating costs.[38] On-site power generation is to use LNG from new facilities in northeastern B.C. The estimated capital investment amount is estimated to be at the same level as the Casino mine development.[39]

- **Mactung -** The proposed Mactung project is located approximately eight kilometers northwest of Macmillan Pass (on the North Canol Road approximately 250 km from Ross River) in the Mt. Allan area. The expected life for the mine is about 11 years. The Amended Technical Report on the Mactung Property provides the following estimates:[40]

    - Total capital cost estimated of $402.055 million [Table 24.1 of the Technical Report, indicates the cost is based on June 2008 market conditions with no provision for cost escalation beyond this date]. Figure 23.4 of the Technical Report shows that during the 31 month construction season there will be between 35 and 250 workers on the construction site, with an average of 116 workers/month for the first seven month increasing to an average 235 workers/month for the next 24 months;

    - Annual operating costs are estimated to be as follows (all dollars have not been escalated from the 2009 Technical Report numbers):

        - Annual mine operating cost at $27.839 million, including $14.387 million labour cost for 131 personnel [Table 25.4 of the technical report]; plus

        - $26.563 million annual cost for process operating, including $5.047 million labour costs for 64 personnel; plus

        - $9.963 million annual cost for general administrative costs, including $2.3 million labour cost for 22 personnel; plus

        - $11.299 million surface services operating costs, including $2.739 million labour cost for 36 personnel.

    - Total royalty payments over the life of the mine are estimated at $17.366 million (see Table 27.4 of the Technical Report).

- **Kudz Se Kayah**[41] - The Kudz Se Kayah project is located in southeastern Yukon, approximately 260 km northwest of Watson Lake, and 115 km southeast of Ross River. The project has an existing historic inferred geological resource of 12.8 million tonnes at 0.81% Cu, 5.9% Zn, 1.7%

[38] Source: http://selwynchihong.com/wp-content/uploads/2015/09/SCML_ProjectFactsheet.pdf [accessed on November 29, 2015].
[39] About $2.5 billion per Table 1-4 of the Casino Project Feasibility Study, 2013. Source http://www.westerncopperandgold.com/_resources/reports/CasinoNI43-101-Jan2013.pdf [accessed on November 29, 2015].
[40] Amended Technical Report on the Mactung Property, 2009, http://www.natungsten.com/i/pdf/Tech-Report-Mactung.pdf [accessed on November 30, 2015].
[41] Source: http://www.bnri.com/documents/BMC_purchases_KZK.pdf [accessed on October 9, 2015].

Pb, 1.38 g/t Au with additional silver credits. Further information on this development is not available at this time. The expected workforce is estimated to be similar to Mactung.

ATTACHMENT F2 - NATURAL GAS DEVELOPMENT SCENARIOS IN YUKON

Economic Impacts of Natural Gas Development in the Yukon Territory by Canadian Energy Research Institute[42] analyzed the impact of natural gas developments to Yukon under two scenarios for 2017-2041. The report includes two gas industry development scenarios. Scenario 1 represents modest domestic development. Scenario 2 offers more significant development of Yukon's resources, whereby domestic needs are met and surplus gas is exported. The maps of the developments show that both scenarios would not be affected without the Alaska Highway.

Scenario 1

This scenario considers a domestic pipeline option from Eagle Plain basin to Stewart Crossing, with a lateral line to the Casino mine site (Figure F2-1 provides a copy from the referenced report). This pipeline would be constructed and operated over the 2017-2041 timeline:

- Natural gas development capital and operating investment under Scenario 1 would equal $9,758 million in all Canadian provinces.
- Scenario 1 could provide the territory with 50 MMcf/d of natural gas for 80 years, assuming no further exploration or development.
- Natural gas development under Scenario 1 would create a total of $10,506 million of GDP impact in Canada, with $875 million of that GDP impact in Yukon over the 2017-2041 timeline.
- Natural gas development under Scenario 1 would create and preserve a total of 62,000 person years of employment in Canada, with 6,000 person years of the employment created and preserved in Yukon over the 2017-2041 timeline.
- Natural gas development under Scenario 1 would create total tax receipts of C$2,077 million in Canada, with C$101 million of those receipts in Yukon over the 2017-2041 timeline.
- Natural gas development under Scenario 1 would create royalty income for Yukon of $452.9 million[43] from $3,870 million in sales gas value over the 2017-2041 timeline.

Scenario 2

Scenario 2 offers a domestic and export pipeline option to move natural gas from Peel Plateau & Plain basin and Eagle Plain basin to Stewart Crossing and then further south to the US border near Haines, Alaska; a lateral line would also be built between Stewart Crossing and the Casino mine site [see Figure

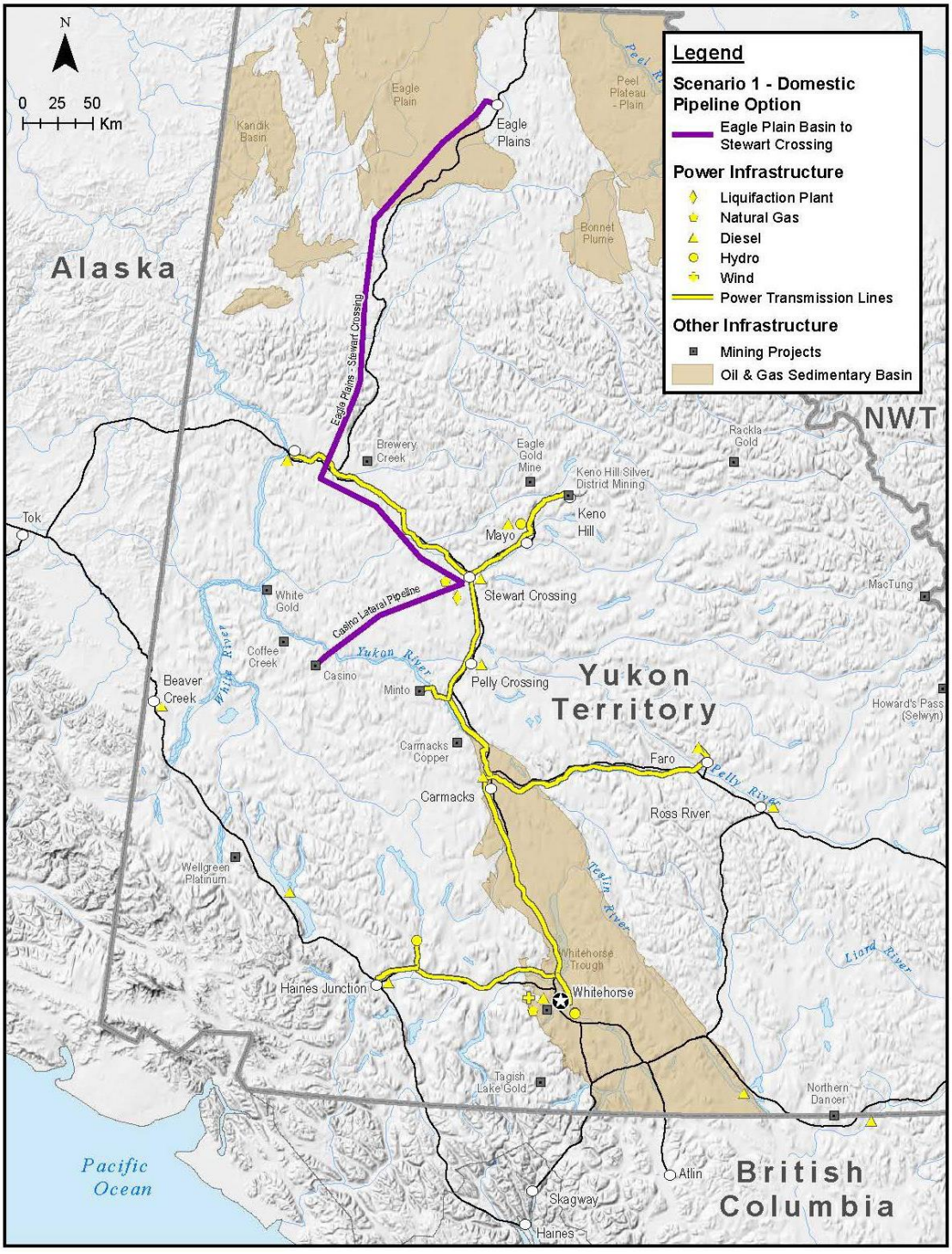
[42] Source: Canadian Energy Research Institute, March 2015, http://www.ceri.ca/images/stories/Study_142_-_Economic_Impacts_of_Hydrocarbon_Development_in_the_Yukon_Territory_-_FINAL_-_March_2015.pdf [accessed on November 29, 2015].

[43] It should be noted that for minerals, forestry, water and land revenues Yukon's grant from the federal government would be reduced by a dollar for each extra dollar received over the $6 million cap. In August 2012 the cap was raised to $6 million for all natural resources revenues and this amendment also provides opportunity for Yukon government to elect 50/50 revenue share where the deduction in territorial formula financing payments should be equal to 50% of the annual resource revenues regardless of the amount of the revenues, subject to clauses noted in the agreement. Source: http://www.gov.yk.ca/news/get-thefacts_dta.html, accessed on January 8, 2016].

F2-2]. A generation and liquefaction facility at Stewart Crossing would provide on-grid supply and serve other off-grid mines. The export pipeline would feed a small LNG plant to be constructed in Haines. All pipelines and facilities would be built and operated over the 2017-2041 timeline:

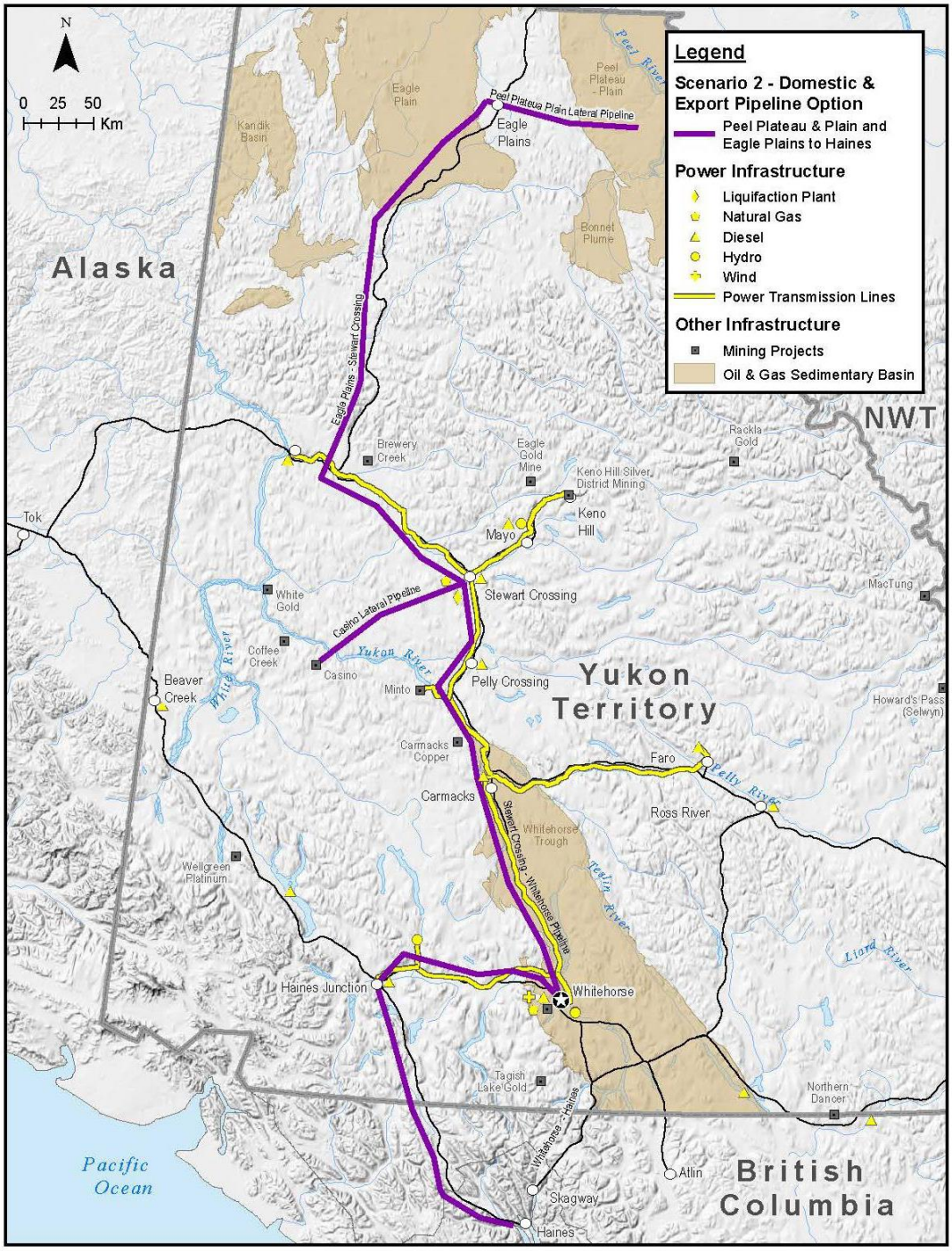
- Under Scenario 2, estimated total capital and operating investment in all Canadian provinces from 2017-2041 would equal $27,653 million.
- Scenario 2 could provide the territory with 50 MMcf/d of natural gas and the Haines plant with 180 MMcf/d of natural gas for 24 years, assuming no further exploration or development.
- Natural gas development under Scenario 2 would create a total of $32,791 million in GDP impact in Canada, with $2,712 million of that GDP impact felt in Yukon over the 2017-2041 timeline.
- Natural gas development under Scenario 2 would create and preserve 191,000 person years of employment in Canada with 19,000 of the person years created and preserved in Yukon over the 2017-2041 timeline.
- Natural gas development under Scenario 2 would create tax receipts of $6,497 million, with $314 million of those receipts in Yukon over the 2017-2041 timeline.
- Natural gas development under Scenario 2 would create royalty income for Yukon of $1,360 million from $13,530 million in sales gas value over the 2017-2041 timeline.

Figure F2-1: Natural Gas Development Scenario 1 Route Map[44]



[44] Based on Figure 4.1 of Economic Impacts of Natural Gas Development in the Yukon Territory by Canadian Energy Research Institute.

Figure F2-2: Natural Gas Development Scenario 1 Route Map[45]



[45] Based on Figure 4.7 of Economic Impacts of Natural Gas Development in the Yukon Territory by Canadian Energy Research Institute.