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Abbreviations

AMIP	Alberta Municipal Infrastructure Program
CAPEX	capital expenditures
EIA	environmental impact assessment
EIS	environmental impact statement
GDP	gross domestic product
GreenTRIP	Green Transit Incentives Program
IOIC	input-output industry classification
LAA	local assessment area
NAICS	North American Industry Classification System
NHS	National Household Survey
OPEX	operational expenditures
PDA	Project development area
PY	person year (one person working for one year)
RAA	regional assessment area
RCMP	Royal Canadian Mounted Police
SCIPIOM	Statistics Canada Interprovincial Input-Output Model
SGC	standard geographic classification
STIP	Strategic Transportation Infrastructure Plan
ToR	terms of reference
VC	valued component

17.0 ASSESSMENT OF POTENTIAL EFFECTS ON EMPLOYMENT AND ECONOMY

This section describes the present employment and economic status of the Project area and the potential effects the construction and operation of the Springbank Off-stream Reservoir Project would have on employment and economy. Through employment and procurement of goods and services, the Project would provide employment and sources of revenue for regional residents and businesses.

17.1 SCOPE OF THE ASSESSMENT

17.1.1 Regulatory and Policy Setting

The environmental effects assessment for employment and economy has been prepared in accordance with the requirements of the provincial and federal requirements as presented in Volume 1, Section 1.3 of this assessment. The following provincial and regional policies and plans are also relevant to the assessment of economic effects:

- *Alberta Jobs Plan: Building an Economy for the Future* (Alberta Government 2016a), which outlines the Alberta Government's strategy to diversify the Alberta economy and increase jobs, partially though infrastructure improvement and development strategies.
- *Capital Plan 2016: Fiscal Plan* (Alberta Government 2016b), which allocates $692 million over five years to help communities recover from the 2013 flooding and to protect against future natural disasters.
- *2016-19 Major Construction Projects* (Alberta Transportation 2016a), which outlines Alberta Transportation's three-year plan and identifies major construction and rehabilitation projects; several of which relate to flood recovery and mitigation.

17.1.2 Engagement and Key Concerns

Alberta Transportation is committed to building ongoing relationships through effective consultation by addressing interests, priorities and concerns, and engaging those potentially affected by the Project in a timely manner. Consultation has been ongoing prior to and throughout the project planning process. It would continue through permitting and throughout the construction phase of the Project. Stakeholder feedback would be considered when making Project decisions, where possible and appropriate. See Section 6 for more details on the consultation process, including comments received during the environmental impact assessment (EIA).

TLRU information was considered during the preparation of all aspects of the EIA, including both methodology and analysis, as stipulated by the CEA Agency project guidelines. TLRU information contributed to the understanding of existing land uses, was used to identify lands that are used traditionally, and informed the assessment of potential Project effects. While this information did not directly affect the significance definition it has been incorporated into the analysis of effects on which the significance determination was based. This applies equally to effects assessed for construction, dry operations, flood operations and post-flood operations. Identified through the Project-specific Indigenous engagement program, Blood Tribe (Kainai First Nation), Piikani Nation, and Siksika Nation requested employment opportunities through a construction contract for the Project.

The Tsuut'ina Nation expressed concerns related to the impact that SR1 may have on Tsuut'ina's economic investments such as the Redwood Meadows Golf and Country Club.

The Tsuutina Nation stated "The Project will also have economic impacts on our community in that it will reduce our ability to develop our reserve lands as the Project will increase the risk that these lands will be subject to flooding and contamination, rendering them unsuitable for potential development. This represents a significant economic loss for our community. Should flood waters back up onto our reserve as a result of the Project, we will also face the costs associated with clean-up. We have experienced these costs first hand through the damage caused to our reserve in 2013. We are also concerned about impacts to our economic interests from the Project. Tsuut'ina owns and operates a golf course, the Redwood Meadows Golf and Country Club, in the northwest section of our reserve. Our concerns about possible contamination to our reserve lands extend to the golf course area. Should these lands be contaminated in any way, or access to them impeded, there will be significant financial consequences for our community".

As of January 1, 2018, no project-specific intangible concerns were identified with respect to employment and economy.

This section summarizes how information obtained through consultation and engagement with Indigenous communities, stakeholders and the public influenced the assessment. Table 17-1 lists the topics and key information and concerns that relate to the employment and economy VC, and summarizes the ways in which this consultation influenced the assessment.

Table 17-1 Influence of Consultation on the Assessment

Topic	Key Information or Concerns	Influence on the Assessment of the Employment and Economy VC
Project costs	• Cost-benefit analysis of the Project may have underestimated project costs	• Basis for estimates of project costs discussed in Section 17.4.2.
Economic impact	• Unquantified costs to taxpayers for (i) relocation and construction of county road infrastructure, and (ii) ongoing maintenance of project area	• Wording added to clarify that Alberta Transportation would bear all Project costs (see Section 17.4.2).
Economic potential of developable lands	• Project may reduce economic potential of developable lands	• Wording added to clarify economic potential of developable lands (see Section 17.4.4).
Flood cleanup costs	• Project may result in additional flood cleanup costs to local communities	• Addressed in Volume 3B: Effects Assessment (Flood Operations) – Employment and Economy.
Economic impacts of change in traditional harvesting	• Project may cause adverse economic effect by reducing traditional harvesting opportunities	• Addressed in Volume 3A, Section 14
Beneficial use of reservoir area	• Project should discuss potential beneficial use of reservoir area	• Potential beneficial use of reservoir area discussed in Section 12

17.1.3 Potential Effects, Pathways and Measurable Parameters

Table 17-2 presents the potential effects, pathways and measurable parameters for employment and economy.

Table 17-2 Potential Effects, Effects Pathways and Measurable Parameters for Employment and Economy

Potential Environmental Effect	Effect Pathway	Measurable Parameter(s) and Units of Measurement
Change in provincial economy	• Project spending would affect local and regional labour forces, populations, and businesses. • Project spending would contribute to municipal, provincial and federal tax revenue. • Provincial and federal gross domestic product (GDP) would also be affected.	• Value of provincial spending and related employment • GDP • Tax revenue
Change in regional labour force	• Employment, expenditures, and population growth related to industrial development can result in positive and adverse effects. • Adverse economic effects might occur when the labour, goods, and services required for a project exceed the existing capacity, potentially leading to supply issues and cost increases (e.g., wage inflation). • Provincial economic effects are the primary means by which the Project would deliver benefits.	• Qualified labour supply (persons), unemployment rate, wage levels, labour income
Change in regional economy	• Local, regional, and provincial businesses would benefit from project and consumer-related spending.	• Local and regional spending and related employment

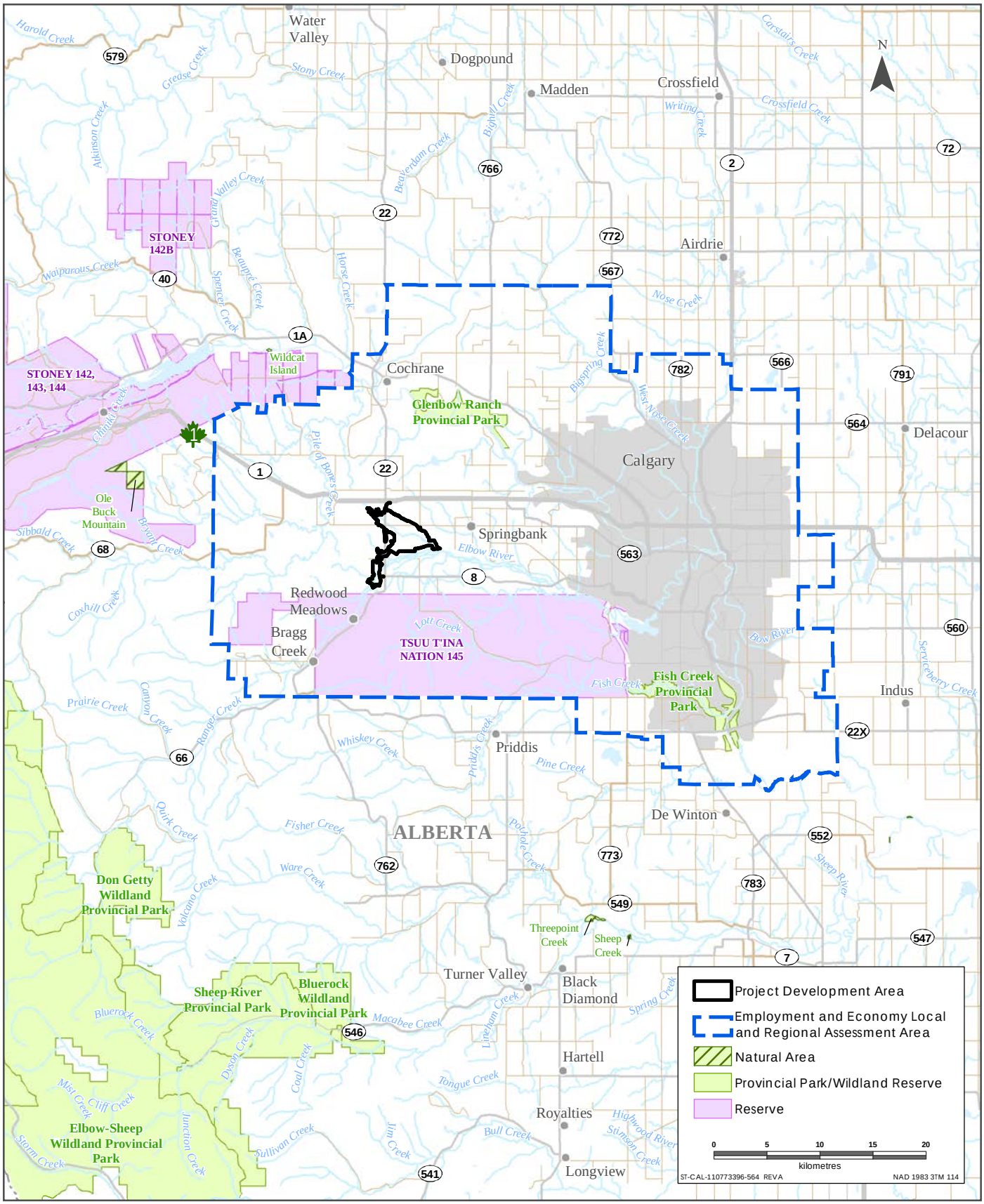
17.1.4 Boundaries

17.1.4.1 Spatial Boundaries

The spatial boundaries for the assessment of effects on employment and economy are the project development area (PDA), the local assessment area (LAA) and the regional assessment area (RAA). In this assessment, the LAA and RAA are the same area. LAA is used to refer to both the local and regional assessment areas. These are shown in Figure 17-1 and described in Table 17-3.

Table 17-3 Spatial Boundaries for Economic Conditions

Boundary	Description and Rationale for Selection
PDA	The PDA is the immediate area of Project activities and is the same for each VC. The PDA is limited to the anticipated area of physical disturbance associated with the construction and operation of the Project. The PDA is approximately 1,438 ha.
LAA	The LAA encompasses the communities that are most likely to be called upon to provide labour, goods and services required for construction and operations. It also encompasses the communities that have the greatest potential to experience adverse economic effects because of the Project. The LAA includes the following 2011 Statistics Canada Standard Geographical Classifications (SGCs): • Census Subdivisions – City of Calgary and Tsuut'ina Nation 145 (Sarcee 145) Indian Reserve • Census Tracts 8250200.03, 8250200.05, 8250200.06, 8250201.01, 8250205.01, 8250205.02, and 8250205.03
RAA	The RAA is defined as the spatial extent where cumulative effects are most likely to occur. For the economy and employment VC, the RAA is the same as the LAA.



Sources: Base Data - ESRI, Natural Earth. Thematic Data - ERBC, Stantec

Employment and Economy Spatial Boundaries

17.1.4.2 Temporal Boundaries

Temporal boundaries identify when effects on employment and economy may occur in relation to project phases and activities. A Project schedule is provided in Table 17-4.

Table 17-4 Project Schedule

Key Project Phase	Proposed Project Schedule[1]
Site preparation (clearing)	Q1 2019
Construction (excavation, grading, hauling, compaction, installation of concrete structures, installation of erosion protection, seeding)	Q2 2019 – Q4 2021
Operations	Q1 2022 - ongoing
NOTE: [1] Highway or road realignments or modifications are not included in the Project schedule.	

17.1.5 Residual Effects Characterization

Table 17-5 lists definitions for the characterization of residual environmental effects on employment and economy.

Table 17-5 Characterization of Residual Effects on Employment and Economy

Characterization	Description	Quantitative Measure or Definition of Qualitative Categories
Direction	The long-term trend of the residual effect	Positive – a residual effect that moves measurable parameters in a direction beneficial to employment and economy relative to existing conditions. Adverse – a residual effect that moves measurable parameters in a direction detrimental to employment and economy relative to existing conditions. Neutral – no net change in measurable parameters for the employment and economy relative to existing conditions.

Table 17-5 Characterization of Residual Effects on Employment and Economy

Characterization	Description	Quantitative Measure or Definition of Qualitative Categories
Magnitude	The amount of change in measurable parameters or the VC relative to existing conditions	Negligible – no measurable change from existing conditions Low – a measurable effect that cannot be distinguished from existing conditions within normal range of variability Moderate – measurable change but unlikely to pose a serious risk to employment and economy or to represent a management challenge High – measurable change that is likely to pose a serious risk to employment and economy
Geographic Extent	The geographic area in which a residual effect occurs	PDA – residual effects are restricted to the PDA LAA – residual effects extend beyond the PDA and potentially interact with those of other projects in the RAA
Frequency	Identifies how often the residual effect occurs	Single event – occurs once Multiple irregular event – occurs at no set schedule Multiple regular event – occurs at regular intervals Continuous – occurs continuously
Duration	The period of time required until the measurable parameter or the VC returns to its existing condition, or the residual effect can no longer be measured or otherwise perceived	Short-term – residual effect would last no longer than the construction phase Medium-term – residual effect extends through the construction phase through the first year of operations Long-term – residual effect lasts through the entirety of operations
Reversibility	Pertains to whether a measurable parameter or the VC can return to its existing condition after the project activity ceases	Reversible – the residual effect is likely to be reversed after activity completion and reclamation Irreversible – the residual effect is unlikely to be reversed
Ecological and Socio-economic Context	Existing conditions and trends in the area where residual effects occur	Resilient – employment and economy in the assessment area is diverse and dynamic, and able to accommodate an economic shock (i.e., an unexpected or unpredictable event, such as project capital and operational expenditures, that affects an economy) Not Resilient – employment and economy in the assessment area is fragile, with limited diversity, and with limited capacity to accommodate economic shock

Table 17-5 Characterization of Residual Effects on Employment and Economy

Characterization	Description	Quantitative Measure or Definition of Qualitative Categories
Timing	Periods of time where residual effects from Project activities could affect the VC	Seasonality – residual effect is greater in one season than another (e.g., spring/summer vs. fall/winter) Time of day – residual effect is greater during daytime or nighttime Regulatory – provincial or federal restricted activity periods or timing windows (e.g., migration, breeding, spawning) related to the VC Not applicable - the residual effect of Project activities will have the same effect on the VC, regardless of timing

17.1.6 Significance Definition

A significant adverse residual effect on the economic environment is defined as one that is distinguishable[1] from current conditions and trends, and cannot be managed or mitigated through adjustments to programs, policies, plans, or through other mitigation measures.

The residual effects assessment considers both positive and adverse effects after mitigation and other management measures are implemented. However, significance determination is made for adverse effects only.

17.2 EXISTING CONDITIONS FOR EMPLOYMENT AND ECONOMY

17.2.1 Methods

Information on existing employment and economy conditions was obtained from several statistical sources, including the 2006 and 2011 Statistics Canada Censuses, the 2011 National Household Survey (NHS), industry reports, and local and regional economic development plans. Additional information was gathered from publicly available independent socio-economic assessments of projects within the LAA.

[1] "Distinguishable" means that the adverse effect is measurable, predictable, and attributable to one or more project or cumulative interactions (i.e., it is not within the boundaries of normal variation of the measurable parameter under existing conditions).

17.2.2 Overview

As of 2016, the LAA population was 1,285,620 persons, which represents 31.6% of the provincial population. 2016 Statistics Canada Census data for Indigenous peoples will not be made publicly available until October 25, 2017. In 2011, approximately 3% of the LAA population was of Indigenous identity with the greatest proportion of Indigenous persons relative to total population (by location) in Tsuut'ina Nation 145 (Sarcee 145). Drawing from population projections developed by the Alberta Treasury Board and Finance, the population of Census division 6 (which includes Census subdivisions and tracts within the LAA) forecasts an increase in population from 2012 to 2041 ranging from 47% (low-growth scenario) to 92% (high-growth scenario).

The 2011 labour force in the LAA consisted of 677,460 persons over the age of 15 years, of whom 74% were employed or actively seeking work (participation rate). The unemployment rate of the LAA in 2011 was 6.0%. Of the employed labour force, approximately 37% were employed in basic industries, such as resource development, manufacturing, agriculture, and construction, and 55% were employed in non-basic industries (e.g., service sectors). Eight percent were employed in industries not captured under the North American Industry Classification System (NAICS). A basic to non-basic ratio of 0.68 has been estimated for the LAA.

Employment in occupations related to sales and service accounted for the greatest number of employed persons (22% of the labour force) with employment in trades, transport and equipment operators and related occupations (those most related to construction) accounting for 13.7% of the employed labour force. Of the LAA population aged 15 years and older, approximately 15% held no certificate, diploma or degree, 8.0% held an apprenticeship or trades certificate or diploma, and 20.4% held a bachelor degree.

17.2.2.1 Population

The population of the LAA increased approximately 13.4% between 2011 and 2016 from 1,133,607 persons to 1,285,620 persons and was equally comprised of males and females (see Table 17-6). In 2016, the population of the LAA accounted for 31.6% of the total population of Alberta. Most of the population lived in the City of Calgary (96.4%). Relative to Calgary, small numbers of people lived in rural areas (i.e., Census tract areas) in the LAA. The population of Tsuut'ina Nation 145 (Sarcee 145) in 2016 was 1,645 persons, down 19.9% from 2011 (Statistics Canada suggests caution be used when interpreting population estimates for Tsuut'ina Nation 145 [Sarcee 145] due to potential data discrepancies).

Table 17-6 2016 Population, LAA

Location	Male	Female	Total Population	Percent (%) Change 2011 to 2016	Percent (%) of LAA Population
Calgary	618,245	620,975	1,239,220	13.0	96.4
Tsuut'ina Nation 145 (Sarcee 145)	840	810	1,645	-19.9	0.1
8250200.03	1,265	1,290	2,550	4.2	0.2
8250200.05	2,230	2,210	4,440	7.6	0.3
8250200.06	2,590	2,475	5,065	4.6	0.4
8250201.01	3,470	3,380	6,850	14.2	0.5
8250205.01	4,285	4,480	8,765	30.9	0.7
8250205.02	1,680	1,750	3,430	10.6	0.3
8250205.03	6,755	6,900	13,655	75.5	1.1
LAA	**641,360**	**644,270**	**1,285,620**	**13.4**	**100.0**
Alberta	2,039,410	2,027,765	4,067,175	11.6	N/A
NOTES: N/A = not applicable NA = data not available					
SOURCE: Statistics Canada 2017					

Indigenous Population

As of 2011[2], approximately 30,485 persons in the LAA (3% of the total population) identified themselves as Indigenous. Although Indigenous peoples residing in the City of Calgary accounted for the largest number of Indigenous persons in the LAA (28,905 persons), the largest percentage of Indigenous people relative to the total population by location is associated with Tsuut'ina Nation 145 (Sarcee 145), where approximately 63% of the population is Indigenous (see Table 17-7).

[2] 2016 Statistics Canada Census data for Aboriginal peoples will not be made publicly available until October 25, 2017.

Table 17-7 2011 Indigenous Population, LAA

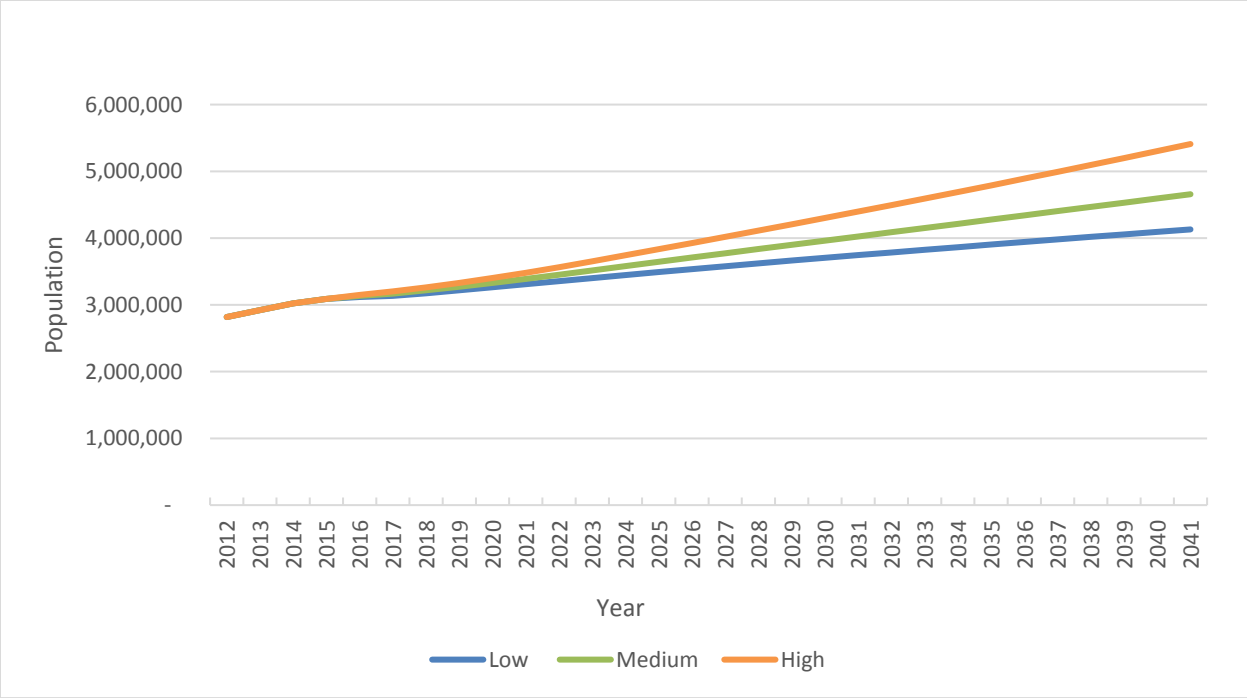
Location	Indigenous Population			Total Population	Indigenous Percentage (%) of Total Population
	Male	Female	Total		
Calgary	13,960	14,945	28,905	1,082,235	2.7
Tsuut'ina Nation 145 (Sarcee 145)	410	405	815	1,285	63.4
8250200.03	40	40	75	2,295	3.3
8250200.05	25	20	50	4,255	1.2
8250200.06	25	55	80	5,330	1.5
8250201.01	30	25	55	5,975	0.9
8250205.01	90	85	175	6,555	2.7
8250205.02	40	65	100	3,130	3.2
8250205.03	100	130	230	7,605	3.0
LAA	**14,720**	**15,770**	**30,485**	**1,118,665**	**2.7**
Alberta	108,300	112,395	220,695	3,567,975	6.2
SOURCE: (Statistics Canada 2013, 2007)					

As of December 2016, the registered population of Tsuut'ina Nation was 2,300 persons with 1,991 persons (approximately 87% of total membership) living on reserve (AANDC 2016). Females accounted for approximately 51% of the on-reserve population with males accounting for 49%. Of the remaining members, roughly 119 persons lived on other reserves or other Crown land, and 190 persons lived off-reserve or on non-Band Crown land (AANDC 2016).

Population Projections

The Alberta Treasury Board and Finance has prepared a series of population projections (low-, medium- and high-growth scenarios) for the Province of Alberta by Census division up to 2041. Disaggregated population projections are not available for Census subdivisions and Census tracts comprising the LAA; however, projections for Census Division 6 (which includes Foothills No. 31, Rocky View County, Calgary, and Mountain View County) are applicable to the LAA. Figure 17-2 shows population projections specific to Census Division 6 for low-, medium- and high-growth scenarios.

Under the low-growth scenario, the population of Census division 6 is estimated to increase 47% from 2012 (2,817,446 persons) to 2041 (4,129,810 persons) (Statistics Canada and Alberta Treasury Board and Finance [ATBF] 2016a). Under the medium-growth scenario, the population of Census Division 6 is estimated to increase 65% by 2041(to 4,656,970 persons), and 92% under a high-growth scenario (to 5,408,830 persons) (Statistics Canada and ATBF 2016b, 2016c).



SOURCE: Adapted from ATBF 2016a, b, c.

Figure 17-2 Population Projections, Census Division 6 (Low, Medium and High)

17.2.2.2 Labour Force

In 2011, the labour force of the LAA consisted of 677,460 persons over the age of 15 years (see Table 17-8). Of these individuals, approximately 74% (participation rate) were employed or actively seeking work and 6.0% were unemployed, with the participation rate and unemployment rate of the LAA being similar to that of the province overall. Of the locations comprising the LAA, the unemployment rate of Tsuut'ina Nation 145 (Sarcee 145) was the highest at 8.0% followed by Census tract 200.05 at 7.1%. Based on information provided in Table 17-8, there were approximately 40,480 unemployed workers in the LAA, 975 who live outside of the City of Calgary.

Table 17-8 2011 Labour Force Statistics (15 Years and Older), LAA

Location	Adult Population	Labour Force	Participation Rate (%)	Employed	Unemployed	Unemployment Rate (%)
Calgary	885,845	656,545	74.1	617,040	39,505	6.0
Tsuut'ina Nation 145 (Sarcee 145)	930	565	60.8	520	45	8.0
8250200.03	1,910	1,435	75.1	1,405	30	2.1
8250200.05	3,500	2,255	64.4	2,095	160	7.1
8250200.06	4,235	2,950	69.7	2,865	85	2.9
8250201.01	4,925	3,325	67.5	3,190	130	3.9
8250205.01	5,125	3,960	77.3	3,800	155	3.9
8250205.02	2,570	1,935	75.3	1,835	95	4.9
8250205.03	6,025	4,490	74.5	4,210	275	6.1
LAA	**915,065**	**677,460**	**74.0**	**636,960**	**40,480**	**6.0**
Alberta	2,888,735	2,115,640	73.2	1,993,225	122,415	5.8
NOTES: 2016 Statistics Canada Census information is currently unavailable. Labour information will be released November 29, 2017.						
SOURCE: (Statistics Canada 2013)						

17.2.2.3 Labour Force Employment by Industry

In 2011, approximately 40% of the LAA population was employed in basic industries and 60% in non-basic industries (see Table 17-9). Among basic industries, employment in health care and social assistance accounted for 10.1% of the LAA labour force, followed by construction (9.0%) and mining, quarrying, and oil and gas extraction (6.8%). Among non-basic industries, employment in professional, scientific and technical services accounted for 12.7% of the LAA labour force, followed by retail trade (11.4%).

Table 17-9 2011 Labour Force by Industry (15 Years and Older), LAA

	Industry	Employed Persons	Percent (%) of LAA Labour Force
Basic Industries	Agriculture, forestry, fishing and hunting	2,510	0.4
	Mining, quarrying, and oil and gas extraction	42,350	6.8
	Utilities	7,685	1.2
	Construction	56,575	9.0
	Manufacturing	38,375	6.1
	Educational services	41,555	6.6
	Health care and social assistance	63,220	10.1
	Total employment in basic industries	**252,270**	**40.3**
Non-basic Industries	Wholesale trade	29,300	4.7
	Retail trade	71,625	11.4
	Transportation and warehousing	36,125	5.8
	Information and cultural industries	15,405	2.5
	Finance and insurance	25,425	4.1
	Real estate and rental and leasing	14,980	2.4
	Professional, scientific and technical services	79,400	12.7
	Management of companies and enterprises	1,145	0.2
	Administrative and support, waste management and remediation services	27,035	4.3
	Arts, entertainment and recreation	15,210	2.4
	Other services (except public administration)	29,780	4.8
	Public administration	28,215	4.5
	Total employment in non-basic industries	**373,645**	**59.7**

NOTES:
2016 Statistics Canada Census information is currently unavailable. Labour information will be released November 29, 2017.

SOURCE: (Statistics Canada 2013)

Comparing the percentage of the LAA labour force employed in basic industries to those employed in non-basic industries (basic to non-basic ratio) provides context that can help characterize indirect and induced employment effects following an economic shock. A ratio less than one is indicative of a labour force that is more heavily employed in basic industries whereas a ratio greater than one is indicative of a labour force more heavily employed in non-basic industries. The basic to non-basic ratio of the LAA as of 2011 was 0.68. The provincial basic to non-basic ratio was 0.83 in 2011.

17.2.2.4 Labour Force Employment by Occupation

In 2011, employment in occupations related to sales and service accounted for the greatest number of employed persons (22% of the LAA labour force), followed by business, finance and administration (18.9%) (see Table 17-10). Employment in trades, transport and equipment operators and related occupations (those most related to construction) accounted 13.7% of the employed labour force. Participation in natural resources, agriculture and related production occupations accounted for the lowest percentage of the employed labour force (1.4%).

Table 17-10 2011 Labour Force by Occupation (15 Years and Older), LAA

Occupations	Total	Percent (%) of Labour Force
Management	76,135	11.4
Business, finance and administration	126,130	18.9
Natural and applied sciences and related	80,125	12.0
Health	38,140	5.7
Education, law and social, community and government services	66,640	10.0
Art, culture, recreation and sport	17,010	2.5
Sales and service	146,990	22.0
Trades, transport and equipment operators and related	91,125	13.7
Natural resources, agriculture and related production	9,390	1.4
Manufacturing and utilities	15,450	2.3
SOURCE: (Statistics Canada 2013)		

17.2.2.5 Individual Income

Table 17-11 lists the median and mean individual income for the LAA by location. In 2010, the overall average income of the LAA (median of $43,742, mean of $90,336) was greater than the provincial average (median of $36,306, mean of $50,956). All but two locations (Tsuut'ina Nation 145 [Sarcee 145] and Census tract 205.02) had average incomes greater than that of Calgary, the largest population centre in the LAA. Of the locations comprising the LAA, average incomes in Census tract 200.06 were the greatest (median income 1.3 times greater and mean income 2.5 times greater than the LAA averages), while those in Tsuut'ina Nation 145 (Sarcee 145) were the lowest (median income was 50% and mean income was 40% of the LAA average). Employment income by location in the LAA followed similar trends as that of total income.

In 2011, market income[3] comprised 95% of LAA income with government transfer payments[4] comprising the remaining 5%. Considering wages and salaries accounted for 74% of market income and 97% of employment income, the vast percentage of individual income earned in 2010 was through active participation in the labour force. Provincially, wages and salaries comprised 78% of market income and 96% of employment income.

Table 17-11 2010 Individual Income, LAA

Location	Total Income ($)		Employment Income ($)	
	Median Income	Mean Income	Median Income	Mean Income
Calgary	37,697	55,203	57,468	76,134
Tsuut'ina Nation 145 (Sarcee 145)	22,043	33,410	43,102	47,556
8250200.03	52,921	86,476	80,091	109,630
8250200.05	43,742	120,560	96,832	191,322
8250200.06	58,454	223,905	119,076	433,304
8250201.01	44,357	131,795	71,868	155,760
8250205.01	44,770	54,699	68,364	77,078
8250205.02	36,081	49,619	64,985	75,799
8250205.03	43,143	57,361	65,593	79,678
LAA	**43,742**	**90,336**	**68,364**	**138,473**
Alberta	36,306	50,956	55,507	69,438
SOURCE: (Statistics Canada 2013)				

[3] The combination of employment income, investment income, retirement pensions, superannuation and annuities and other money income.
[4] The combination of Canada Pension Plan benefits, Old Age Security pensions and Guaranteed Income Supplement, employment insurance benefits, child benefits and other income from government sources.

17.2.2.6 Educational Attainment

In 2011, approximately 15% (136,225 persons) of the LAA population aged 15 years or older held no certificate, diploma or degree (see Table 17-12). Approximately 8.0% (73,080 persons) held an apprenticeship, trades certificate or diploma and 20.4% (186,705 persons) had attained a bachelor degree.

Table 17-12 2011 Educational Attainment (15 Years and Older), LAA

Characteristic	Total	Percent (%) of LAA Population
No certificate, diploma or degree	136,225	14.9
High school diploma or equivalent	225,555	24.6
Apprenticeship or trades certificate or diploma	73,080	8.0
College, CEGEP or other non-university certificate or diploma	160,210	17.5
University certificate or diploma below bachelor level	48,175	5.3
Bachelor degree	186,705	20.4
University certificate, diploma or degree above bachelor level	85,125	9.3
LAA total	**915,075**	**100.0**
SOURCE: (Statistics Canada 2013)		

17.2.2.7 Local and Regional Businesses

Between 1998 and 2015, the number of small businesses (i.e., less than 50 employees) in Calgary increased 40% (from 34,430 to 48,055 businesses) based on information for 20 industries identified by the Alberta Ministry of Economic Development and Trade. Most of these small businesses involved professional, scientific and technical services, followed by construction, then retail trade (Government of Alberta 2016b). Within the same period (1998 to 2015), the number of medium-sized businesses (i.e., 50 to199 employees) in Calgary increased 41%, most falling under accommodation and food services, retail trade, construction, and manufacturing. The number of large businesses (i.e., more than 200 employees) in Calgary increased 89% from 1998 to 2015, the largest portion operating in the mining, quarrying, and oil and gas extraction sectors as well as management of companies and enterprises, retail trade, and professional, scientific, and technical services.

Between 1998 and 2015, the number of small businesses in Cochrane increased from 14 to 867 businesses. Most of these small businesses involved professional, scientific, and technical services, construction, retail trade, administrative support, and waste management and remediation services (Government of Alberta 2016b). Between 2000 and 2015, the number of medium-sized businesses in Cochrane increased from two to 20 businesses), most falling under retail trade,

accommodation and food services, and mining, quarrying, and oil and gas extraction. Between 1998 and 2015, the number of large businesses in Cochrane increased from one business in 1998 [manufacturing] to three businesses in 2015 [in manufacturing, public administration, and retail trade).

Between 1998 and 2015, the number of small businesses in Tsuut'ina Nation 145 (Sarcee 145) from 42 to 51 businesses. Most of these small businesses involved professional, scientific, and technical services, followed by construction, then health care and social assistance (Government of Alberta 2016b). The number of medium-sized businesses in Tsuut'ina Nation 145 (Sarcee 145) decreased from 2 businesses in 1998 (in public administration and agriculture, forestry, fishing, and hunting) to 1 business in 2015 (in public administration). The first large business was developed in Tsuut'ina Nation 145 (Sarcee 145) in 2007 (in public administration). As of 2015, a second large business has been developed within the arts, entertainment, and recreation industry (Government of Alberta 2016b).

17.2.2.8 Provincial Economy

As a result of the decline in oil and gas prices, Alberta's gross domestic product (GDP) decreased by 3.6% in 2015, the first decline since the global financial crisis of 2009 (Government of Alberta 2016c, d). Despite this decline, over the past 20 years, Alberta has led Canada in economic growth with an average growth in GDP of 3.2% annually (Government of Alberta 2016c, d). Between 1985 and 2015, Alberta's total GDP increased from $67.6 billion to $326.4 billion (Government of Alberta 2016d). Despite a decline in its share of provincial GDP from 36.1% in 1985 to 19.4% in 2015, oil and gas remains the largest economic sector in Alberta (Government of Alberta 2016d). From 1985 to 2015, the highest-growing sectors (based on share of GDP (Government of Alberta 2016d) were:

- business and commercial services, growing from 5.5% to 11.6%
- construction, from 6.7% to 11.4%
- health care, from 3.6% to 5.7%
- finance and real estate from 11.0% to 14.8%
- retail and wholesale from 8.1% to 9.2%

Decreases in percent share of GDP between 1985 and 2015 were seen in the agriculture and forestry sector (from 3.0% to 1.5%), the oil and gas sector (from 36.1% to 19.4%), and the transportation and utilities sector (from 7.7% to 6.2%) (Government of Alberta 2016d).

Alberta tax revenue for 2016–2017 is forecasted at $21.8 billion, a 1% increase of $172 million from 2015–2016 (Government of Alberta 2016a). Without $274 million in additional revenue from the Climate Leadership Plan carbon levy and $161 million in additional revenue from an increase in the tax on insurance premiums, revenue would be lower in 2016–2017 than in both 2015-2016 and 2014–2015, at $21.3 billion (Government of Alberta 2016a). Effective January 1, 2017, the

small business corporate income tax rate would decrease from 3% to 2% due to an offset from a portion of revenue raised under the Climate Leadership Plan (Government of Alberta 2016a). For 2016–2017, personal income tax revenue is forecasted at $11.4 billion and is expected to increase by 4.1% annually over the next two years (Government of Alberta 2016a). In 2016-2017, corporate income tax revenue is expected to decrease by 13% from 2015–2016 to $4.3 billion, but is expected to increase to $4.8 billion in 2018–2019 (Government of Alberta 2016a). Education property tax revenue is expected to increase by 6.8% from 2015–2016 to $2.4 billion in 2016–2017, primarily due to increases in education system operating expense targets (Government of Alberta 2016a). Other tax revenue is expected to increase by 34% from 2014-2015 to $3.3 billion in 2016–2017, primarily due to increases in tobacco and fuel tax rates (Government of Alberta 2016a).

17.2.2.9 Alberta Transportation Infrastructure and Service Planning and Investment

As outlined in the *Transportation Business Plan 2016–19*, Alberta Transportation aims to provide a safe, efficient, innovative, and sustainable transportation system that supports Alberta's growing population, quality of life, and economic diversification by investing in four key activities:

- Maintaining, and developing the provincial highway system
- Managing transportation safety
- Providing support for municipal transit and water/wastewater facilities
- Developing a reliable, multi-modal transportation network (Alberta Transportation 2016b).

These investment activities (i.e., outcomes) and the key strategies for obtaining these outcomes (see Alberta Transportation 2016b) are aligned with the strategic investment plan of the Government of Alberta and fit within the three pillars of the *Budget 2016* Capital Plan, namely, key social programs and services, economic development in communities, and the environment (Government of Alberta 2016b). The Government of Alberta is in the process of finalizing the transportation strategy for the province, inclusive of information obtained through engagement with the public and key stakeholders (Alberta Transportation 2016b).

The Alberta *Budget 2016* Capital Plan consists of an investment of $9 billion over the next five years for municipal infrastructure support across Alberta, including $1.4 billion in funding for transit and other transportation related projects, $4.6 billion for building and repairing roads and bridges, $595 million in municipal grants for water and wastewater projects, and $112 million for water management infrastructure, including dams (Government of Alberta 2016a).

In September 2016, it was announced that, in addition to funding from the Government of Alberta and municipalities, the Government of Canada has committed $347 million in funding through the Public Transit Infrastructure Fund and nearly $197 million in funding through the Clean Water and Wastewater Fund for the province of Alberta (Alberta Transportation 2016c).

Working in partnership with cities, towns, villages, rural municipalities, and Métis Settlements, Alberta Transportation currently provides funding for transit and water/wastewater infrastructure through five capital grant programs (Alberta Transportation 2016c):

- Green Transit Incentives Program (or GreenTRIP) – Supports capital projects that aim to lower greenhouse gas emissions by reducing reliance on single-occupancy vehicles. Since 2008, the program has provided $2 billion in funding for 133 approved transit projects in Alberta. On September 1, 2016, the Government of Alberta announced its $106.2 million contribution to the program. On December 3, 2016, the final round of projects to be approved through the program were announced, with more than $236 million in funding from the Government of Alberta. This latest announcement marks the end of the program (Alberta Transportation 2016d).
- Strategic Transportation Infrastructure Program (or STIP) – Provides financial assistance to municipalities for projects that sustain local transportation infrastructure, including development and maintenance of important roads and bridges, and rehabilitation and pavement overlays of runways at community airports. Funding is provided on a cost-share basis for eligible projects that align with STIPs components and initiatives and that are approved by the Alberta Ministry of Transportation (Alberta Transportation 2016e).
- Alberta Municipal Infrastructure Program (AMIP) – Provides funding that supports the development and rehabilitation of core municipal infrastructure projects, including municipal roads and bridges, public transit and emergency service vehicles and facilities, and water, wastewater, and storm drainage systems and facilities. Grants are paid annually to eligible municipalities over a period of five years, following which municipalities are required to complete the project within an additional five years (Alberta Transportation 2016f).
- Alberta Water for Life program and Alberta Municipal Water/Wastewater Partnership – Provide funding on a cost-share basis to eligible municipalities for the construction of municipal water supply and treatment facilities, and wastewater treatment and disposal facilities. Funding is provided to municipalities and communities with a population less than 45,000, as a percentage of approved project costs based on population size (Alberta Transportation 2016g).

17.3 PROJECT INTERACTIONS WITH EMPLOYMENT AND ECONOMY

Table 17-13 identifies for each potential effect, the project components and physical activities that might interact with employment and economy during construction and dry operations and result in the identified environmental effect. These interactions are identified by check marks, and are discussed in detail in Section 17.4 in the context of effects pathways, standard and project-specific mitigation measures and residual effects. A justification for no effect is provided following the table.

Table 17-13 Project-Environment Interactions with Employment and Economy during Construction and Dry Operations

Project Components and Physical Activities	Environmental Effects		
	Change in Regional Labour Force	Change in Regional Economy	Change in Provincial Economy
Construction			
Clearing	✓	✓	✓
Channel excavation	✓	✓	✓
Water diversion construction	✓	✓	✓
Dam and berm construction	✓	✓	✓
Low-level outlet works construction	✓	✓	✓
Road construction	✓	✓	✓
Bridge construction	✓	✓	✓
Lay down areas	✓	✓	✓
Borrow extraction	✓	✓	✓
Reclamation	✓	✓	✓
Dry Operations			
Maintenance	–	–	–

NOTES:
✓ = Potential interaction
– = No interaction

All Project components and physical activities associated with project construction involve employment and expenditures. Estimated employment and expenditures, based on the project design, are of sufficient magnitude (in consideration of the context of the LAA) to be considered mechanisms (see Section 17.1.3) that could affect change in the regional labour force, regional businesses and the provincial economy.

During dry operations, annual employment and expenditures (estimated at 6 person years [PYs] and $1.8 million/year) are not of sufficient magnitude (in consideration of the context of the LAA) to be considered mechanisms that could affect change in the regional labour force, regional businesses and provincial economy. Non-interactions are not assessed further. Project components and physical activities associated with construction and dry operations do not relate to floods and, therefore, do not interact with the potential effect 'financial cost of flood events'; these interactions are assessed in Volume 3B, Section 17. Non-interactions with project components and physical activities listed under construction and dry operations are not assessed further with respect to the potential effect 'financial cost of flood events'.

17.4 ASSESSMENT OF RESIDUAL ENVIRONMENTAL EFFECTS ON EMPLOYMENT AND ECONOMY

The assessment of potential effects on employment and economy during project construction and operations considers changes in the provincial economy, regional labour force, and regional business. This section describes the analytical methods and assumptions used to assess potential effects of the Project, identifies project components, physical activities and mechanisms that might contribute to these effects and applicable mitigation measures, and characterizes residual effects using the criteria outlined in Table 17-5.

17.4.1 Change in Provincial Economy

17.4.1.1 Analytical Assessment Techniques

Project effects on the economy of Canada and Alberta are estimated using national and provincial multipliers taken from the Statistics Canada Interprovincial Input-Output Model (SCIPIOM). These multipliers are used to:

- estimate changes in economic output due to Project expenditures (capital expenditures [CAPEX] and operational expenditures [OPEX])
- predict changes in government revenues.

To estimate economic output and government revenue during construction, cost estimates for the Project were reviewed and categorized based on an Input-Output Industry Classification (IOIC) as per detailed listings provided by Statistics Canada. The costs, as categorized, were then applied against SCIPIOM national and provincial multipliers, and summed to estimate total

(for the duration of construction) GDP and government revenue. IOICs used in the analysis include:

- BS23C100 – Transportation engineering construction
- BS23E000 – Other activities of the construction industry
- BS23C500 – Other engineering construction
- BS23B000 – Non-residential building construction
- BS541300 – Architectural, engineering and related services
- BS212310 – Stone mining and quarrying
- BS327300 – Cement and concrete product manufacturing
- BS3A0 – Manufacturing
- MS333900 – Other general-purpose machinery manufacturing
- BS335300 – Electrical equipment manufacturing

Annual estimates of GDP and government revenue during dry operations were derived by applying total OPEX estimates against the IOIC BS221300 – Water, Sewage and Other Systems, which concords with NAICS 22131 [2012] – Water Supply and Irrigation Systems.

17.4.1.2 Assumptions

The following assumptions were used in assessing a change in the provincial economy:

- All dollar figures are expressed in nominal 2017 Canadian dollars ($).
- Cost estimates considered the conceptual designs presented in Stantec (2017). Additional topographical data, subsurface soils investigations, and hydrological assessments are required to better establish conceptual designs.
- Expenditure data does not include escalation, contingency, or allowance for funds used during construction.
- The spending breakdown assumes availability of Alberta goods and services providers, and successful award of project-related contracts.
- Cost estimates are considered Class D (accurate to within ±50%).

17.4.1.3 Project Mechanisms

Project spending would affect local and regional labour forces (see Section 17.4.3), populations (see Section 17.4.4) and businesses (see Section 17.4.5) and contribute to municipal, provincial and federal tax revenue. Provincial and federal GDP would also be affected.

17.4.1.4 Mitigation

Project effects on the provincial economy are expected to be positive in direction with the addition of direct, indirect, and induced employment income and GDP. As such, no mitigation measures are proposed to address adverse effects. Alberta transportation will adhere to government procurement policies and procedure with respect to labour, and goods and services.

17.4.1.5 Residual Effects

Construction

Project construction is estimated at $249 million, of which 80% ($199 million) is expected to occur in the LAA. This estimate does not include the cost of land required for the Project or contingency. Remaining expenditures ($50 million) are expected to occur in the rest of Alberta. Table 17-14 shows estimated total capital costs for the Project. Of total capital expenditures, direct labour is estimated at 23% (approximately $47 million).

Table 17-14 Estimated Construction Spending in Alberta and Canada

Location	Estimate (Millions $)	Percent of Total (%)
LAA	199	80
Other parts of Alberta	50	20
Total	**249**	**100**
SOURCE: Data provided by Alberta Transportation.		

The estimated capital construction costs, including a breakdown by major types of goods and services that would be procured during construction, and the distribution of costs between the LAA and other parts of Alberta are listed in Table 17-15. Effects of Project spending on regional labour force and regional businesses in the LAA are assessed in Section 17.4.3 and Section 17.4.4.

Table 17-15 Estimated Construction Spending Breakdown

Construction Costs		Sourced Within Canada		Total Project Expenditures (Canada)
		LAA	Other Alberta	
		Estimate (Millions $)	Estimate (Millions $)	
Goods	Concrete or aggregate	71	18	89
	Machinery or equipment	8	2	10
	Other goods	12	3	14
Services	Construction services	85	21	106
	Professional or engineering services	23	6	29
Total		**199**	**50**	**249**

NOTE:
Totals may not sum due to rounding
Expenditures do not include provisions for escalation, contingency, or allowance for funds used during construction.

SOURCE: Data from Alberta Transportation.

Estimated construction employment (direct, indirect and induced) is summarized in Table 17-16. Within Canada direct employment is estimated at 775 PYs (500 PYs through direct construction employment and 275 PYs through other direct employment [e.g., contractors]) with indirect and induced employment at 575 PYs and 375 PYs respectively. The Project's direct workforce is estimated to peak at 450 persons during construction. All direct employment would occur in the LAA. Approximately 62% of indirect employment and 57% of induced employment is estimated to occur within Alberta. Remaining indirect and induced employment is expected to occur in other parts of Canada.

Table 17-16 Estimated Construction Employment in Alberta and Canada

Category	Alberta	Other Canada	Total Canada
	Estimate (PYs)	Estimate (PYs)	Estimate (PYs)
Direct construction employment	500	0	500
Other direct employment	275	0	275
Indirect employment	355	220	575
Induced employment	215	160	375
Total employment	**1,345**	**380**	**1,725**
SOURCE: Estimate based on SCIPIOM–IOIC provincial multiplier analysis and Alberta Transportation construction cost estimates.			

Total annual labour income in Canada associated with Project employment is estimated at $119 million (see Table 17-17).

Table 17-17 Estimated Annual Labour Income in Alberta and Canada, Construction

Category	Alberta	Other Canada	Total Canada
	Estimate (millions $)	Estimate (millions $)	Estimate (millions $)
Direct	57	0	57
Indirect	27	14	41
Induced	12	8	21
SOURCE: Estimate based on SCIPIOM–OIC provincial multiplier analysis and Alberta Transportation construction cost estimates.			

Direct construction labour costs represent the largest Canadian expenditure item, accounting for 20% of total estimated expenditures in Canada. In addition, all the expenditure items identified as “services” in Table 17-15 also include a large labour content, considered “indirect” labour (i.e., the labour component of supplied goods and services). Expenditures on goods and services would account for 60% of total estimated Canadian expenditures, with overhead costs and miscellaneous expenditures accounting for the remaining 20% of estimated Canadian expenditures.

Project construction would generate an estimated $393 million in economic output in Alberta, and $81 million in economic output in other parts of Canada. Project construction is predicted to contribute an estimated $218 million to Alberta’s GDP, with an additional $42 million in GDP accruing to other parts of Canada (see Table 17-18).

Table 17-18 Gross Domestic Product, Canada

Category	Alberta	Other Canada	Total Canada
	Estimate (Millions $)	Estimate (Millions $)	Estimate (Millions $)
Direct	138	0	138
Indirect	51	26	77
Induced	29	16	45
SOURCE: Estimate based on SCIPIOM–IOIC provincial multiplier analysis and Alberta Transportation construction cost estimates.			

Dry Operations

The Project would have a negligible effect on the provincial economy given the relatively small annual expenditure ($1.8 million) and workforce involved (6 persons). A similar magnitude of spin-off benefits (i.e., indirect and induced economic effects) would also occur. The Alberta Government expects to bear the cost of dry operations of the facility (subject to available federal funding). Because the facility would become the property of the Government of Alberta, it would be exempt from paying property taxes. However, the local government can apply for a grant in place of property tax. Therefore, the Project would either directly or indirectly pay for potential local infrastructure costs (e.g., local road maintenance) associated with the Project.

Summary

Project residual effects on the provincial economy are expected to be positive in direction with the addition of direct, indirect, and induced employment income and GDP, but low in magnitude relative to the LAA's economy. Project effects are expected throughout the LAA and would be associated with project construction. Therefore, effects are expected to be short-term in duration and occur as a regular event. Effects on the provincial economy would be substantially reduced once project construction is complete and dry operations begin. The economy in the LAA, though still recovering from effects of lowered oil prices, is considered resilient. Timing is not applicable because effects from project activities would be similar regardless of season or other timing considerations.

17.4.2 Change in Regional Labour Force

17.4.2.1 Analytical Assessment Techniques

Direct employment estimates for Alberta and the LAA were provided by Alberta Transportation. Indirect and induced employment within Alberta was calculated using provincial multipliers for select IOICs from the SCIPIOM (see Section 17.4.2). Using existing labour force characteristics, indirect and induced employment for the LAA were calculated by multiplying provincial employment estimates by SCIPIOM IOIC provincial multipliers and derived adjustment factors (calculated by dividing the LAA basic to non-basic industry ratio by the Alberta basic to non-basic ratio). Adjustment factors are summarized in Table 17-19.

Table 17-19 Adjustment Factors, Indirect and Induced

Location	Basic to Non-Basic Ratio	Adjustment Factor (% of Alberta Ratio)
LAA	0.68	82%
Alberta	0.83	100%
SOURCE: Estimate based on existing characteristics from Statistics Canada (see Section 17.2.2.3) using methods described above.		

To determine the number of project positions that could be filled by LAA residents during construction and dry operations (i.e., available labour force), existing LAA characteristics were compared with labour requirements for the Project. To calculate the available labour force, the existing LAA unemployment rate is multiplied by the labour force size for relevant occupations (e.g., trades, transport and equipment operation). Because unemployment rates are likely to vary by occupation, this is considered an approximation of the available labour force in the LAA.

17.4.2.2 Assumptions

The following assumptions were used in assessing the change in regional labour force:

- 80% of the construction workforce would be hired from the LAA with the remaining 20% hired from other parts of Alberta
- 100% of the dry operations workforce would be hired from the LAA

To facilitate a conservative approach, peak workforce estimates and conservative (i.e., understated) local hire estimates were used. Peak workforce estimates were assumed to apply at the start of each Project phase (e.g., construction and dry operations) and be sustained for the duration of that phase regardless of actual fluctuations in project employment.

Together, these estimates understate local hiring, reducing the likelihood that beneficial effects of the Project are overstated.

17.4.2.3 Project Mechanisms

The Project's workforce is estimated to peak at 360 persons during construction with an additional 155 persons directly employed through contractors retained by the Project. A peak dry operations workforce of 6 persons is estimated. Based on these estimates, project construction, ramp-up and ramp-down (both representing periods of pronounced changes in demand for labour), would have the greatest effect on the regional labour force. During ramp-up, Project demand for qualified labour from the LAA could decrease the number of unemployed persons in the LAA, but also contribute to labour shortages, increase costs for regional businesses (assessed in Section 17.4.3) and stimulate in-migration.

During ramp-down, Project demand for qualified labour would decrease as the Project transitions to dry operations. To the extent that construction workers are unable to secure further employment, ramp-down could result in an increase in the number of unemployed persons in the LAA. Effects would be less pronounced during dry operations as the relatively small peak workforce of six persons would be met and sustained for the duration of dry operations, resulting in little fluctuation in labour demand. Project mechanisms for change in regional labour force by phase are summarized in Table 17-20.

Table 17-20 Project Mechanisms, Change in Regional Labour Force

Phase	Mechanism
Construction	• Project contractors and sub-contractors would hire construction trades and related workers from within the LAA, and would also bring in workers from outside the LAA to meet labour requirements. • Local suppliers to the Project would create additional indirect jobs, and spending by the direct and indirect workforce would result in induced employment. • Project labour demands may cause shortages of skilled workers and competition with current employers in other sectors such as services, rural industries, and local government.
Dry operations	• Alberta Environment and Parks would hire workers to operate the Project. • Local suppliers to the Project would create additional indirect jobs, and spending by the direct and indirect workforce would result in induced employment.

17.4.2.4 Mitigation

Project effects on the regional labour force during are expected to be positive in direction with the addition of direct, indirect and induced employment. As such, no mitigation measures are proposed to address adverse effects. Alberta transportation will adhere to government procurement policies and procedure with respect to labour, and goods and services.

17.4.2.5 Residual Effects

Construction

Project construction would require a direct workforce of 360 persons (360 PYs) with an additional 155 persons (155 PYs) directly employed through contractors retained by the Project. Alberta Transportation estimates that approximately 80% of direct employment (412 persons, 412 PYs) would be satisfied by current LAA residents with the remaining 20% (103 persons, 103 PYs) hired from elsewhere in Alberta. Based on the Project's design, demand for skilled labour would be greatest among occupations in trades, transport and equipment operators.

In 2011, there were approximately 91,125 persons employed in trades, transport and equipment operation and related occupations in the LAA. Assuming a similar number of persons are employed in these occupations at the onset of construction and that 6% (the unemployment rate of the LAA in 2011) of these persons are unemployed, approximately 5,467 persons could be available to work on the Project. As the estimated available supply of skilled labour in these occupations exceeds the project demand, direct employment with the Project is not expected to contribute to labour shortages in the LAA.

In addition to direct employment, local suppliers to the Project would create indirect jobs, while spending by the direct and indirect workforce would result in induced employment. Applying adjustment factors listed in Table 17-19, it is estimated at 220 indirect and 125 induced jobs (220 PYs and 125 PYs, respectively) would be created in the LAA from the Project. Table 17-21 summarizes estimated direct, indirect, and induced employment in the LAA during construction.

Once construction of the Project is complete, a loss of direct employment is expected. Skill sets required for dry operations would differ from those required during construction. Although construction workers are not expected to transition to dry operations, the contractual, short-term nature of their employment is known and would be anticipated (this type of employment aligns with current conditions and trends among construction-related occupations). Skills, experience and labour income gained by construction workers during their employment with the Project would further offset adverse effects as these benefits could improve qualifications and reduce financial barriers to employment on future projects in the LAA.

Table 17-21 Project Construction Employment Effects, LAA

Employment	Employment Effects in the LAA	
	Jobs	Person Years
Direct	360	360
Direct – Contract	155	155
Indirect	220	220
Induced	125	125
Total	**860**	**860**
SOURCE: Estimate based on SCIPIOM–IOIC provincial multiplier analysis and Alberta Transportation construction cost estimates.		

Summary

Project residual effects on the regional labour force are expected to be positive during construction with the addition of direct, indirect, and induced employment, but low in magnitude relative to the LAA labour force. Project effects are expected throughout the LAA, and because they are associated with Project construction, would be short-term in duration and occur as a regular event (albeit with fluctuations in demand for labour). Effects are reversible once construction is complete. Within the context of the LAA (an available labour force of 5,467 persons with construction-related skills and training), project effects (i.e., increased demand for labour) occur within a resilient context. Timing is not applicable because effects from project activities would be similar regardless of season or other timing considerations.

Dry Operations

Dry operations would require a direct workforce of 6 persons (6 PYs). Alberta Environment and Parks estimates that 100% of direct employment would be satisfied by current LAA residents. Based on the Project's design, demand for skilled labour would be greatest among occupations in management, business, and natural and applied science.

Similar to the analysis completed for project construction, in 2011, there were approximately 282,390 persons within the LAA employed in occupations related to management, business, finance, administration, and natural and applied sciences. This translates to a labour force of 19,943 persons available to work on the Project assuming a 6% unemployment rate. As the estimated available supply of skilled labour in the LAA exceeds project demand, direct employment with the Project is not expected to contribute to labour shortages in the LAA.

In addition to direct employment, local suppliers to the Project would create indirect jobs, and spending by the direct and indirect workforce would result in induced employment. Applying adjustment factors identified in Table 17-19, it is estimated at three indirect and two induced jobs (three PYs and two PYs respectively) would be created in the LAA due to the Project. Table 17-22 summarizes estimated direct, indirect, and induced employment in the LAA during dry operations.

Table 17-22 Project Dry Operations Employment Effects, LAA

Employment	Employment Effects in the LAA	
	Jobs	Person Years
Direct	6	6
Direct – Contract	-	-
Indirect	3	3
Induced	2	2
Total	**11**	**11**
SOURCE: Estimate based on SCIPIOM–IOIC provincial multiplier analysis and Alberta Transportation construction cost estimates.		

Summary

Project residual effects on the regional labour force during dry operations are expected to be positive in direction with the addition of direct, indirect and induced employment, but low in magnitude relative to the LAA labour force. Project effects are expected throughout the LAA, and be long-term in duration (during dry operations) and occur as a regular event. Effects are reversible following decommissioning. Within the context of the LAA (an available labour force of 19,943 persons with operation-relevant skills and training), Project effects (i.e., increased demand for labour) occur within a resilient context. Timing is not applicable because effects from project activities would be similar regardless of season or other timing considerations.

17.4.3 Change in Regional Economy

17.4.3.1 Analytical Assessment Techniques

Project expenditures during construction and dry operations were provided by Alberta Transportation. For construction-related expenditures, a detailed, project-specific cost estimate was applied against ten IOICs to determine direct employment and labour income. Direct employment and labour income (direct, indirect and induced) during dry operations was estimated by multiplying total expenditures against IOIC BS221300 – Water, Sewage and Other Systems. Indirect and induced employment was estimated using the same methods as that of direct employment, but with a local adjustment factor (see Table 17-19).

17.4.3.2 Assumptions

The following assumptions were used in assessing a change in the regional economy:

- Capital expenditures are estimated at $249 million (total).
- Operational expenditures (dry operations) are estimated at $1.8 million annually.
- Cost estimates (construction and dry operations) are considered Class D (accurate to within ±50%).
- 80% of construction expenditures would occur in the LAA with the remaining 20% occurring within the rest of Alberta.
- 100% of operational expenditures would occur in the LAA.

17.4.3.3 Project Mechanisms

Project spending can benefit and adversely affect regional businesses. Benefits typically relate to increased revenues, which can increase the capacity of local businesses by supporting capital investment and hiring. Adverse effects relate to increased demand for labour, goods, and services, which can increase operational costs (and therefore decrease revenues) through wage inflation and employee turnover. Increased competition for labour can also decrease the capacity of local businesses through labour shortages. Project spending can also adversely affect the affordability of accommodations through the in-migration of workers to the LAA in search of Project employment. Project mechanisms for change in regional economy by phase are summarized in Table 17-23.

Table 17-23 Project Mechanisms, Change in Regional Economy

Phase	Mechanism
Construction	• 83% of Project expenditures on goods and services would occur in the LAA with the remaining 17% occurring within the rest of Alberta. • The direct and indirect workforce would spend a proportion of their earnings in LAA. • Competition for the local labour force may drive wage costs up or make it difficult for some businesses to maintain the desired workforce level. • Effects on regional businesses would likely be felt most during ramp-up to peak construction and ramp-down to dry operations. During ramp-up, increased Project spending and employment would occur. Once construction is complete and the Project transitions to dry operations (i.e., ramp-down), Project spending would decrease and loss of direct employment is expected.
Dry operations	• During dry operations, local businesses would benefit from project-related spending (i.e., direct spending and spending associated with indirect and induced economic activity).

17.4.3.4 Mitigation

See Table 17-24 for proposed mitigation measures to address adverse effects on change in regional labour force.

Table 17-24 Mitigation Proposed for Changes in Regional Businesses

Mitigation/Mitigation Mechanism	Rationale for Selection	Expected Success/Risks and Uncertainty	Timing	Management or Compensation Plans
Mitigation Measure Alberta transportation will adhere to government procurement policies and procedure with respect to labour, and goods and services. Mitigation Mechanism Reduces the possibility that the Project would contribute to wage inflation in the LAA.	Economic theory regarding labour shortages and surpluses is well understood. Wages would increase in labour markets with excess demand (shortage) and decrease in labour markets with excess supply (surplus). The mitigation measure represents the extent to which Alberta Transportation and construction contractors can manage the Project's contribution to wage inflation due to increased demand for labour.	Expected Success Unknown. Alberta Transportation and construction contractors can control wages paid to workers directly employed by the Project, but the degree to which the mitigation reduces competition among local employers for labour and to what extent project contributions to wage inflation are reduced is unknown (as wage inflation is subject to numerous other macroeconomic factors). Risk and Uncertainty Moderate risk that this measure would not be successful because fair wage rates for construction workers within Western Canada would likely exceed average labour rates in the LAA.	Project Phase All phases. Effectiveness Immediately.	Part of project planning and procurement processes.

17.4.3.5 Residual Effects

Construction

Alberta Transportation estimates LAA capital expenditures (CAPEX) at $199 million (see Table 17-25) with labour representing approximately 20% ($39 million). LAA expenditures accounts for approximately 80% of total Project CAPEX of $249 million. In addition to direct CAPEX, indirect and induced economic activity would result in increased spending in the LAA (indirect and induced spending is not quantified in this assessment).

Given existing conditions and the breakdown of CAPEX by goods and services, LAA businesses are well positioned to benefit from project spending. Of CAPEX occurring in the LAA, construction services account for the greatest percentage (43%) of CAPEX with purchases of concrete/aggregate (goods) accounting for the second-greatest percentage (36%).

In 2011, the LAA labour force employment in construction (56,575 persons) was second only to health care and social assistance, accounting for 9% of employment among basic industries. The high degree of existing employment in construction-based industries suggests that this industry is well developed and that demand for construction-related goods and services by the Project can be accommodated by LAA businesses. Similar comparisons can be made between CAPEX in machinery/equipment and professional/engineering services and the LAA's manufacturing and professional, scientific, and technical services industries.

The degree to which local and regional businesses would benefit from local CAPEX depends on their capability and capacity to satisfy project work orders, and where applicable, their willingness to secure additional workers and resources or undertake capital investment (e.g., acquire new equipment or modify existing equipment to fulfill work requirements). Alberta Transportation's purchasing and contracting policies would also determine the extent to which local businesses would benefit for CAPEX. Currently, Alberta Transportation contracts prequalified engineering construction companies to construct major developments.

Table 17-25 Estimated CAPEX of Goods and Services, LAA

Cost Item		Expenditure ($ millions)	Percent (%) of LAA CAPEX
Goods	Concrete and aggregate	71	36
	Machinery and equipment	8	4
	Other goods	11	6
Services	Construction services	85	43
	Professional and engineering services	23	11
Total		**199**	**100**
SOURCE: Data provided by Alberta Transportation			

Adverse effects of Project spending relate to increased operational costs due to wage inflation and employee turnover. Increased competition for labour, leading to wage inflation, could also decrease the capacity of local businesses through labour shortages. During construction the average annual wage of direct full-time workers is estimated at $73,000/PY. When compared to existing conditions (see Section 17.2.2.5), project construction wages are less than mean employment income ($138,473). Recognizing that wages and salaries represent 97% of employment income, average direct full-time construction wages are roughly 60% that of mean LAA wages. Compared to provincial averages, direct full-time construction wages (average) are roughly 1.1 times that of mean provincial wages ($66,661).

Since the average direct project construction wage is a measure of mean (and therefore accounts for wages less than and greater than $73,000/PY), its comparison with mean LAA wages is more appropriate and, in this case, less than existing conditions. This combined with proposed mitigation to pay construction workers wages that are consistent with the western Canadian labour market (see Table 17-24) means that minor wage differences between direct project construction wages (average) and existing conditions are not expected to place upward pressure on LAA wages. As such, project-influenced employee turnover (due to workers seeking higher paying wages with the Project) is expected to be negligible during construction. Given the existing labour force characteristics (i.e., a LAA labour force of 677,560 persons with an estimated 91,125 persons available to work on the Project), negligible effects are expected in terms of increased competition for labour.

Wages earned by indirect and induced workers are estimated at $75,000 and $57,000 respectively. As estimated direct and indirect wages are very similar, the conclusions provided for direct project wages also apply to indirect wages. One exception is that the potential labour force available for indirect employment is larger than that for direct employment, and it includes additional occupations such as manufacturing and utilities (see Table 17-10). Having a larger available labour force further reduces potential adverse effects on regional businesses resulting from indirect economic activity. Estimated induced wages are less than median and mean LAA wages and therefore, are not expected to contribute to wage inflation, employee turnover or increased competition for labour.

Summary

CAPEX as well as indirect and induced economic activity are predicted to have beneficial and adverse effects. Given mitigation measures, existing labour force characteristics (e.g., size and the available labour force for direct and indirect employment), and estimated wages to be paid to direct, indirect and induced workers, effects (positive and adverse) are expected to be low in magnitude, extend to the LAA, and occur within a resilient socio-economic context. Effects are considered short-term because they would occur for the duration of construction, and be reversible one construction is complete. Effects would occur as a regular event (albeit with fluctuation based on the timing of Project expenditures). Timing is not applicable because

effects from Project activities would be similar regardless of season or other timing considerations.

Dry Operations

During dry operations, annual Project expenditures (OPEX) are estimated at $1.8 million with labour representing roughly 24% ($440,000) of total expenditures (see Table 17-26). Alberta Transportation expects that 100% of OPEX expenditures would occur in the LAA. Based on this cost estimate and the composition of OPEX expenditures for the water, sewage, and other systems IOIC industry (IOIC 2009 concordance with NAICS 22131 [2012] – Water Supply and Irrigation Systems), approximately $600,000 annually (32% of OPEX) would be spent on petroleum and petroleum products and $600,000 annually (32% of OPEX) on management-related activities (i.e., overhead). Another $600,000 is estimated to be spent annually on repair and maintenance services and other goods and services.

Table 17-26 Estimated OPEX of Goods and Services, LAA

Cost Item	Expenditure ($ millions)	Percent (%) of LAA OPEX
Petroleum and petroleum products	0.6	34
Other purchased goods	0.4	20
Repair and maintenance	0.1	7
Other purchased services	0.1	7
Overhead	0.6	32
Total	**1.8**	**100**
SOURCE: Total OPEX ($) provided by Alberta Transportation with percent of OPEX (%) modified from CANSIM Table 381-0033 Supply and use tables, detail level, provincial and territorial. Alberta – Water, Sewage and Other Systems [BS221300] (Statistics Canada 2016).		

Similar to the assessment of project construction, LAA businesses are well positioned to benefit from project spending during dry operations with non-basic industries accounting for roughly 60% of the employed LAA labour force. Several LAA businesses operate in industries likely to provide goods and services to the Project such as wholesale and retail trade, other services (e.g., those providing repair and maintenance services or professional, scientific and technical services). These businesses are well established and positioned to benefit from OPEX (see Table 17-10 and Section 17.2.2.7).

As with construction, the degree to which local and regional businesses would benefit from local OPEX depends on the capability and capacity of local businesses to satisfy project work orders and, where applicable, their willingness to secure additional workers and resources, or undertake capital investment (e.g., acquire new or modify existing equipment needed to fulfill

work-order requirements). It would also depend on Alberta Transportation's purchasing and contracting policies.

Direct employment during dry operations is estimated at 6 PYs, each with an annual wage of $72,245. This wage is less than the LAA mean existing wage of $138,473. Based on this level of employment and compensation, and given existing conditions (an existing labour force of 677,460 persons with 19,943 persons available to work on the Project), the Project is expected to negligibly affect wage inflation, employee turnover and increased completion for labour. Similarly, indirect and induced employment is estimated at 3 PYs and 2 PYs regardless of estimated wages (indirect: $77,387, induced $59,375). Given existing conditions and the available indirect and induced labour force (see above), indirect and induced business economic activity is expected to negligibly affect wage inflation, employee turnover and increased completion for labour.

Summary

OPEX as well as indirect and induced economic activity are predicted to have beneficial and adverse effects. Given proposed mitigation, existing labour force characteristics (e.g., labour force size, and the available labour force for direct and indirect employment), and estimated wages to be paid to direct, indirect and induced workers, effects (positive and adverse) are expected to be negligible to low in magnitude and extend to the LAA. Effects would occur within a resilient socio-economic context, last for the duration of dry operations (long-term), and be reversible following decommissioning. Effects would occur as a regular event. Timing is not applicable because effects from project activities would be similar regardless of season or other timing considerations.

17.4.4 Summary of Project Residual Effects

Table 17-27 summarizes the residual environmental effects on employment and economy during construction and dry operations.

Table 17-27 Project Residual Effects on Employment and Economy during Construction and Dry Operations

Residual Effect	Residual Effects Characterization								
	Project Phase	Timing	Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Ecological and Socio-economic Context
Change in provincial economy	C	N/A	P	L	LAA	ST	C	R	R
	D	N/A	P	L	LAA	LT	C	R	R
Change in regional labour force	C	N/A	P	L	LAA	ST	R	R	R
	D	N/A	P	L	LAA	LT	R	R	R
Change in regional economy	C	N/A	P/A	L	LAA	ST	R	R	R
	D	N/A	P/A	N-L	LAA	LT	R	R	R

KEY

See Table 17-5 for detailed definitions

Project Phase

C: Construction

D: Dry Operations

Timing Consideration

S: Seasonality

T: Time of day

R: Regulatory

Direction:

P: Positive

A: Adverse

N: Neutral

Magnitude:

N: Negligible

L: Low

M: Moderate

H: High

Geographic Extent:

PDA: Project Development Area

LAA: Local Assessment Area

Duration:

ST: Short-term;

MT: Medium-term

LT: Long-term

N/A: Not applicable

Frequency:

S: Single event

IR: Irregular event

R: Regular event

C: Continuous

Reversibility:

R: Reversible

I: Irreversible

Ecological/Socio-Economic Context:

R: Resilient

NR: Not Resilient

17.5 DETERMINATION OF SIGNIFICANCE

Construction and dry operation of the Project is predicted to have a generally positive effect on employment and economy in the LAA and Alberta. Though there is potential that local businesses could be adversely affected through competition for, and cost of, labour, the workforce requirements during construction and dry operations can easily be met by the available workforce of LAA communities. The Project represents only a small fraction of the GDP generated in the LAA, and therefore, is not expected to result in adverse effects that are distinguishable from current trends and conditions. In consideration of proposed mitigation measures, adverse residual effects on employment and economy due to construction and dry operations are predicted to be not significant.

17.6 PREDICTION CONFIDENCE

There is a moderate degree of confidence in the assessment of adverse effects on labour and economy. Statistics Canada's Census of Population (Census) data, which is collected every five years, is the most comprehensive demographic information on LAA/RAA communities. With the exception of 2016 Census population counts, the 2011 Census and 2011 National Household Survey (NHS) are the most recent surveys of the Canadian population with published data (labour and Indigenous-specific information gathered during the 2016 Census is expected to become available November 29, 2017). Because Census information presented in this section is approximately five years old, it would not reflect the most recent changes in the demographic composition of communities within the LAA/RAA.

Regarding the analysis of economic impacts, the assessment is based on preliminary estimates of the Project's cost and labour requirements (these estimates are accurate to within ±50%); however, because of the relatively modest size of the Project relative to the overall economy and labour force in the LAA, conclusions would be applicable regardless of actual Project cost. Inherent uncertainties associated with the availability of information, data analyses, and interpretation of data and information are addressed by taking a conservative approach that reduces the potential to underestimate the significance of an effect. By applying a conservative approach, assumptions err on the side of overstating an effect.

17.7 CONCLUSIONS

In determining effects of the Project on employment and economy, the assessment considers expected change in labour supply and demand, effects on commercial businesses from project spending (i.e., regional economy), and changes to the provincial economy. The Project would not materially affect labour supply and demand in the LAA during construction or dry operations because the available labour force greatly exceeds the workforce requirements. The Project is expected to have a largely beneficial effect on commercial businesses operating in the LAA because of opportunities associated with project spending. While there is potential for adverse

effects due to competition for available labour and cost of labour supply, because of the large available workforce in the LAA, this effect is predicted to be negligible. The Project is predicted to have a beneficial effect on the provincial economy as a result of increased GDP and government revenue associated with construction expenditure.

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17.9 GLOSSARY

Basic industries	As identified in the North American Industry Classification System (NAICS), these include: agriculture, forestry, fishing and hunting; mining, quarrying, and oil and gas extraction; utilities; construction; manufacturing; health care and social assistance; and educational services. Basic industries generate much of their revenue from sales to customers located outside of the region and are therefore primary economic generators (because they bring in income from outside of the region). Components of the public sector funded from provincial and federal sources also have some characteristics of basic sectors because they involve currency inflow from outside the region.
Capital expenditures (CAPEX)	Funds used to undertake new projects or investments and to acquire or upgrade physical assets (e.g., property, buildings or equipment).
Gross domestic product (GDP)	The total value of the goods and services produced in a given area (e.g., country) over a specified time (typically reported annually). GDP can be measured in three ways: production approach, income approach and expenditure approach.
Input-Output Industry Classification (IOIC)	A variant of the North American Industry Classification System (NAICS), it is a system used by Statistics Canada that includes input-out tables, national and provincial multipliers and the Statistics Canada Interprovincial Input-Output Model, among others.

National and provincial multipliers	Factors derived from input-output tables that are used to assess effects on the economy of an exogenous change in final demand for the output of a given industry. Multipliers provide a measure of the interdependence between an industry and the rest of the economy. Multipliers show the direct, indirect, and induced effects on gross output, the detailed components of GDP, jobs, and imports. Provincial multipliers show direct and indirect effects.
Non-basic industries	As identified in the following North American Industry Classification System (NAICS): wholesale trade; retail trade; transportation and warehousing; information and cultural industries; finance and insurance; real estate and rental leasing; professional, scientific and technical services; management of companies and enterprises; administrative and support; waste management and remediation services; arts, entertainment and recreation, accommodation and food services; other services (except public administration); public administration. Non-basic industries are broadly characterized as the 'service sector' as they generally sell services within a region. Non-basic industries are not considered primary economic generators.
North American Industry Classification System (NAICS)	A system formally adopted in 1997 by Canada, Mexico and the United States that provides a common statistical framework and definition of the industrial structure of these countries. The Canadian version of NAICS is managed by Statistics Canada and identifies sectors, subsectors, industry groups, and industries.
Operational expenditures (OPEX)	Funds used to sustain ongoing, day-to-day operations of a business or system.
Person years (PYs)	A unit of measurement that describes the amount of work done by an individual over one year (based on an ideal amount of work per day).
Standard geographical classification	A Statistics Canada classification system that provides standard names and codes for geographical regions of Canada including provinces and territories, census divisions (counties, regional municipalities) and census subdivisions (municipalities).

Statistics Canada Interprovincial Input-Output Model (SCIPIOM)	Model based on input-out tables that is used to simulate the economic impact on the business sector of an expenditure ('shock') on a given set of goods and services or the output of one of several industries. The model simulates direct and indirect impacts, including the number of jobs created, indirect taxes and subsidies generated and gross domestic product (among others).