Environmental Assessment Certificate Application

LNG Canada Export Terminal

Section 6 – Economic Conditions

October 2014

LNG CANADA

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Joint venture companies

Mitsubishi Corporation

6 ASSESSMENT OF POTENTIAL ECONOMIC EFFECTS

6.1 Economic Background

The Project is expected to generate positive economic effects through Aboriginal and local employment and procurement opportunities, employment income, and increased government revenue (see Section 2.5). However, there is also potential for adverse economic effects related to increased demand for labour, goods, and services, as well as potential effects on other economic sectors. Positive and adverse economic effects of the Project are expected to extend beyond the Kitimat area and affect labour markets and businesses in communities elsewhere in northwest BC, while also affecting the economy of the Province overall.

Economic growth in northwest BC has historically been tied to resource and industrial development, and the region has experienced economic changes related to the development, construction, operation, and closure of primary sector employers. Over the last 20 years, northwest BC has experienced economic decline and a drop in population, attributable mainly to the closure of large industrial operations, including pulp mills in Kitimat and Port Edward, fish processing facilities in Prince Rupert, sawmills in Terrace, and the Methanex methanol facility in Kitimat. Recent industrial and infrastructure projects, including BC Hydro's Northwest Transmission Line, the RTA Kitimat Modenization Project, and port expansions in Prince Rupert, have been sources of employment and economic spinoffs, but have also affected local and regional labour supplies while also contributing to increased cost of living. Northwest BC is poised for substantial economic growth as a result of recent, ongoing, and proposed infrastructure, industrial, and resource projects, and the development of the LNG sector is expected to be a major driver of economic development in the region. More details on the existing economic conditions are provided in Section 6.2.3.

6.2 Economic Conditions

6.2.1 Introduction

The economic conditions VC is included in the assessment because of potential interactions between the Project and the local, regional, and provincial economies. This assessment describes how the Project will affect these economies during construction, operation, and decommissioning. Municipal, provincial, and federal governments are interested in economic effects from major projects, and initial engagement efforts have shown that local and regional communities and Aboriginal Groups are also interested in the economic effects of the Project, including potential adverse effects.

The development of an LNG export sector in BC is a major economic goal for the Province and for the Canadian natural gas industry (BCMEM 2012). The government of BC is anticipating the development of several LNG facilities in northern BC to access markets in the Asia-Pacific region. Introduced by the Ministry of Energy and Mines (MEM) in 2011, the BC Jobs Plan set targets for the development of LNG facilities. Through the plan, the provincial government has committed to working with LNG export proponents to bring at least one LNG pipeline and terminal online by 2015 and to have three facilities operating by 2020, assuming all environmental and permitting applications are granted (Government of BC 2011).

BC has promoted this economic strategy with support from the federal government. In 2011, Canada's federal, provincial, and territorial ministers agreed on a federal energy framework with the aim of establishing Canada as a global leader in energy supply, use, and innovation (BCMEM 2012). Relating to BC's Natural Gas Strategy, diversifying international export markets is a key initiative of this national framework.

Planning for LNG-related development in northwest BC has also been conducted at the regional level (e.g., Northwest Regional Workforce Table Regional Skills Training Plan [NWRWT 2012] and Labour Market Supply Side Scan for BC's Natural Gas Sector [Ingenia Consulting 2012]). Recognizing that labour supply and demand issues must be addressed to enhance the economic and social benefits of LNG-related development, the BC Natural Gas Workforce Strategy Committee released a workforce action plan (BC Natural Gas Workforce Strategy Committee 2013). The plan provides multiple strategies on the local, regional, national, and international level to build an appropriately skilled workforce to support LNG development in northern BC. As documented in the plan, there are known labour supply and demand challenges that must be addressed in order to enhance regional economic and social benefits from development of BC's LNG export sector. Recommended strategies—such as working to increase regional labour force participation—involve cooperation and action by industry, government, Aboriginal Groups, and provincial and regional stakeholders.

For this assessment, economic conditions refer to supply and demand for skilled and unskilled labour, labour wages and cost of living (e.g., housing cost), the availability of goods and services, and measures of economic activity in key economic sectors.

Other sections of the Application closely linked to the assessment of economic conditions are:

- infrastructure and services (Section 7.2)
- visual quality (Section 7.3)
- marine transportation and use (Section 7.4)
- community health and wellbeing (Section 7.5)

- Aboriginal Interests (Section 14), and
- other matters of concern to Aboriginal Groups (Section 16).

6.2.2 Scope of Assessment

6.2.2.1 Regulatory and Policy Setting

Potential adverse economic effects of projects are required to be assessed under BCEAA if they have been identified as being of importance to the public, Aboriginal Groups, scientists and other technical specialists, and government agencies. Environmentally linked economic effects are also required to be assessed under CEAA 2012. In addition to this regulatory framework, several provincial and regional policies and plans are relevant to the assessment of effects on economic conditions:

- *Canada Starts Here: The BC Jobs Plan* (2011) is the provincial government's plan for job creation and investment in the BC economy. Natural gas is noted as one of eight key industry sectors for provincial economic development. Through the plan, the government has committed to working with the LNG industry to bring at least one pipeline and terminal online by 2015 and to have three in operation by 2020.
- *BC's Natural Gas Strategy: Fueling BC's Economy for the Next Decade and Beyond* (2012) is the provincial government's strategy for the natural gas sector, which builds on the foundation of the BC Jobs Plan. The objective of the strategy is to establish BC as a global leader in natural gas investment, development and export.
- *Liquefied Natural Gas: A Strategy for BC's Newest Industry* (2012) is a complementary document to the province's Natural Gas Strategy. The strategy provides details on the government's plan for development of the LNG sector, based on accessing the province's untapped reserves of natural gas and developing export capacity to reach growing LNG markets in Asia.
- *Labour Market Supply Side Environmental Scan – BC's Natural Gas Sector* (2012) was produced by Ingenia Consulting under contract to the Resource Training Organization (RTO) BC. The report addresses issues related to the supply of labour to the natural gas industry in BC. Based on projected capital investment in BC and the current and expected supply of labour, the report concludes that there will be labour shortages of construction workers, advising a collaborative approach between industry and interested parties to address labour challenges.
- *Labour Demand Outlook for BC's Natural Gas Industry* (2013) was produced by the Petroleum Human Resources Council of Canada on behalf of the BC Natural Gas Workforce Strategy Committee. The Committee was formed in 2012 to understand workforce supply and demand issues for the LNG sector and to develop strategy and action plan. The report provides information on the current state of BC's natural gas workforce and estimates future labour demand requirements for two potential LNG scenarios.

- *BC Natural Gas Workforce Strategy and Action Plan* (2013) was produced by the Petroleum Human Resources Council of Canada and the Resource Training Organization (RTO) BC on behalf of the BC Natural Gas Workforce Strategy Committee. The plan notes that northern BC's labour force will not be able to meet the expected demand related to development of the province's natural gas industry. It includes strategies and actions to develop the capacity of the local labour force and to attract skilled workers from other regions.
- *Northwest Regional Workforce Table Regional Skills Training Plan 2013–2018* (2013) was produced by the Northwest Regional Workforce Table, established through the BC Jobs Plan to bring together industry and interested parties to identify key opportunities in northwest BC and the training needed to address them. The report identifies occupations that are expected to be in high demand, identifies challenges and issues related to local participation, and provides training plan principles, goals, and actions to address these challenges and issues.
- *BC's Skills for Jobs Blueprint: Re-engineering Education and Training* (2014) is the provincial government's comprehensive strategy to align BC's education and apprenticeship systems with the skills and qualifications required for anticipated job openings, particularly those positions requiring trades or technical training. A key component of the strategy includes actions to address the provincial LNG industry's workforce challenges, involving collaboration between government, labour, industry, and Aboriginal Groups. Objectives are to increase the participation of Aboriginal people in the benefits of economic and labour market opportunities, as well as changes to make the education and apprenticeship systems more responsive to labour market demand.

6.2.2.2 Consultations' Influence on the Identification of Issues and the Assessment Process

Consultation with potentially affected Aboriginal Groups, local communities, representatives of economic development agencies and governments, and the general public identified the following key issues related to potential adverse Project effects on economic conditions:

- capacity of the existing labour market to meet Project demand
- potential for Project employment to contribute to wage inflation and a competitive labour market
- potential increases in housing cost and reduced availability of housing due to increased demand related to Project employment
- potential for Project procurement of goods and services to lead to reduced availability and rises in the cost of living
- potential adverse effects on other economic sectors (e.g., tourism), and
- potential adverse effects on ecosystem services.

Potential economic effects on fisheries have been identified as a concern of Aboriginal Groups (e.g., Powell 2013; Ritchie and Gill 2014; Crossroads CRM 2014; DMCS and Metlakatla First Nation 2014). Reports provided by the Haisla Nation, Gitga'at First Nation, Gitxaala Nation, Kitsumkalum First Nation, and Metlakatla First Nation indicate that Aboriginal Groups are concerned with the potential for the Project to affect commercial fisheries. Aboriginal Groups have noted the potential for increased marine traffic to affect commercial fisheries as well as to interfere with marine transportation and the harvesting of marine resources for both cultural and economic purposes. Other potential effects identified include vessel wake affecting fishing grounds and shorelines, or potentially damaging boats (e.g., Crossroads 2014).

Interference with recreational and tourism-related activities has been identified as a potential issue for Aboriginal Groups. A study conducted by Gitga'at First Nation (Ritchie and Gill 2014), for example, indicated that a large proportion of Gitga'at First Nation members anticipated some or high loss in commercial fishing and tourism activities as a result of the Project. Members of Gitxaala Nation have noted recent increases in marine traffic and expressed concern that the Project will lead to further increases (Calliou Group 2014a).

Key issues identified through consultation have been addressed throughout this assessment. For example, the results of consultation informed the selection of economic conditions as a VC, the selection and definition of potential economic effects and measurable parameters, the assessment of potential Project interactions with baseline economic conditions, and the assessment of Project and cumulative economic effects. In addition, specific concerns identified by Aboriginal Groups are also assessed in Section 16.

6.2.2.3 Traditional Knowledge and Traditional Use Incorporation

Socio-economic information provided by Aboriginal Groups has been incorporated where applicable, including baseline information and information on potential economic effects (e.g., potential effects on fisheries) collected from the documents shown in Table 6.2-1.

As part of LNG Canada's assessment of potential socio-economic effects of the Project, a community-based research program was conducted with Haisla Nation and Kitselas First Nation. The program included one-on-one interviews with band office administration staff and other Aboriginal community members through the facilitation of an Aboriginal community researcher, one from the Haisla Nation and one from Kitselas First Nation. The results of these interviews were also used to help inform baseline information, potential effects mechanisms, and the assessment of residual effects.

Table 6.2-1: Information Provided by Aboriginal Groups

Aboriginal Group	Document Title	Reference
Haisla Nation	*The LNG Canada Proposed Terminal Site and Tanker Route within Haisla Traditional Territory.* Haisla TLUS and Socio-economic Profile	Powell (2013)
Gitga'at First Nation	*Preliminary Summary of Findings. Social Impact Assessment of Liquefied Natural Gas (LNG) Development Activities and the LNG Canada Project on the Gitga'at First Nation*	Ritchie and Gill (2014)
Gitxaala Nation	*Gitxaala Valued Components Report*. LNG Canada Development Inc. Application.	Calliou Group (2014a)
	Gitxaala Use Study. LNG Canada Export Terminal Project.	Calliou Group (2014b)
	Gitxaala Nation Socioeconomic Baseline for LNG Canada's Export Terminal Project. Final Report.	The Firelight Group and Gitxaala Nation (2014)
Lax Kw'alaams First Nation	*Interim Land and Marine Resources Plan of the Allied Tsimshian Tribes of Lax Kw'alaams*	Lax Kw'alaams First Nation (2004)
Kitsumkalum First Nation	*Interim Letter Report for LNG Canada's Environmental Assessment Application Submission – Kitsumkalum First Nation TUS and SIA Preliminary Information*	Crossroads CRM (2014)
Metlakatla First Nation	*Metlakatla First Nation Traditional Land Use and Ecological Knowledge of LNG Canada Export Terminal Project*. Interim Report #1	DMCS and Metlakatla First Nation (2014)

6.2.2.4 Selection of Effects

The local and regional economic effects of industrial developments are related to employment opportunities, population growth, and increased expenditures on goods and services. These changes to the economy can result in both positive and adverse effects, with potential for some residents to be in an advantageous position to receive economic benefits, while others may experience adverse effects. For example, rising wages may benefit workers who are qualified for in-demand positions, while potentially contributing to rising business costs and difficultly recruiting workers for businesses in other sectors. As required by the AIR, this section focuses on potential adverse economic effects. Benefits of the Project, including Aboriginal and local employment and procurement opportunities, employment income, and increased government revenue are discussed in Section 2.5 of this Application.

Adverse economic effects may occur when the labour, goods, and services required for a project exceeds the existing capacity, potentially leading to supply issues and cost increases (e.g., wage and price inflation). The potential adverse effect of increased employment is labour supply issues and rising labour costs for other businesses. As a result of increased expenditures on goods and services, there is potential to cause increases in the cost of living and reduced availability of goods and services. All of these potential adverse economic effects have implications for businesses in other sectors. Potential

adverse effects related to Project employment and expenditures were addressed by the selection of two separate effects: change in labour supply and demand, and change in the economic activity of other sectors.

6.2.2.4.1 Change in Labour Supply and Demand

The Project will create direct employment during construction, operation, and decommissioning. It will also create indirect employment locally and regionally due to procurement of goods and services. Induced employment will be generated as wage, and other income is spent in local, regional, provincial, and national economies.

Because Project employment will increase demand for skilled and unskilled labour, there is potential for adverse effects on the local supply of labour. If the Project were to contribute to a competitive labour market, there could be fewer workers available for other projects. Additionally, wage inflation in a competitive labour market could potentially lead to adverse effects on labour conditions.

6.2.2.4.2 Change in Economic Activity of Other Sectors

Project demand for goods and services has potential to contribute to adverse economic effects if the availability of goods and services is reduced, leading to increases in the cost of living. Other economic sectors may be affected due to higher prices and reduced availability of goods and services. The Project might also affect the revenue production of other sectors, such as tourism and fisheries. Other sectors might be affected by increased business costs as a result of higher wages and rents, for example. Potential also exists for overlapping use of lands and coastal waters that could interfere with tourism and fishing activities. For example, tourism business owners have expressed concerns regarding visual quality and other aesthetic effects that could deter tourists from visiting the region. Increased demand for accommodations could also contribute to adverse effects for tourism because there will be fewer accommodations available for tourists. For fisheries, shipping activities might have adverse economic effects if shipping overlaps with fishing grounds.

6.2.2.5 Selection of Measurable Parameters

Measurable parameters (Table 6.2-2) facilitate qualitative and quantitative measurement of potential adverse effects.

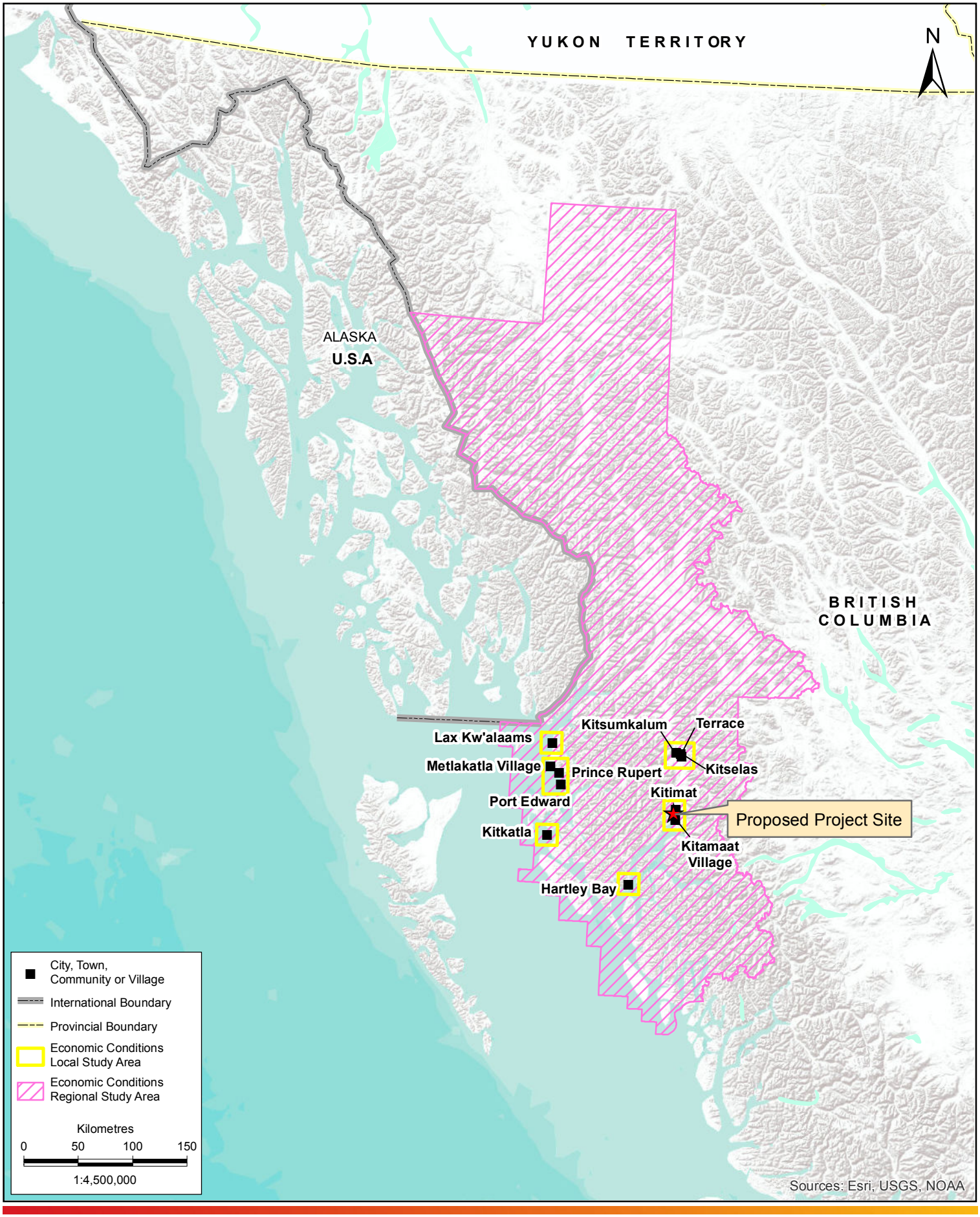
Table 6.2-2 Potential Project Effects on Economic Conditions and Measurable Parameters

Potential Adverse Project Effects	Measurable Parameters	Rationale for Selection of Measurable Parameter
Change in labour supply and demand	▪ Labour availability (persons) ▪ Labour force skill levels ▪ Supply of local and regional training programs related to skills required for the Project	▪ Measures the supply of workers by skill level that could potentially be hired to meet Project demand for labour and the availability of workers for businesses in other sectors
	▪ Labour wages	▪ Measures current wages to compare with Project wages in order to understand potential effects on wage increases
Change in economic activity of other sectors	▪ Cost of living (e.g., housing cost)	▪ Measures adverse effects of increased expenditures and increased demand for goods and services
	▪ Change in availability of goods and services	▪ Measures potential effects on the availability of goods and services as a result of Project-related expenditures
	▪ Measurements of economic activity (i.e., revenue production)	▪ Provides reference point to assess potential Project effects on revenue for other sectors

6.2.2.6 Boundaries

6.2.2.6.1 Spatial Boundaries

The LSA for the assessment of economic effects encompasses the communities that will potentially experience adverse economic effects related to Project requirements for labour, goods, and services (see Figure 6.2-1). The extent of potential adverse effects is determined through consideration of the Project's location near Kitimat and potential to interact with economic interests of other communities in northwest BC. The LSA includes the Kitimat-Terrace region, extending to the Prince Rupert–Port Edward area and encompassing communities and lands of the following Aboriginal Groups: Haisla Nation, Gitga'at First Nation, Gitxaala Nation, Kitselas First Nation, Kitsumkalum First Nation, Lax Kw'alaams First Nation, and Metlakatla First Nation. This area corresponds to the following census divisions and subdivisions, as defined by Statistics Canada: Kitamaat Village, Kitimat District Municipality (DM), Terrace Census Agglomeration Area (CA) (this includes the City of Terrace, Kitimat-Stikine E [Thornhill] and the Kulpsai Indian Reserve 6), Kitselas, Kitsumkalum, Prince Rupert, Port Edward, Kitkatla, Hartley Bay, Metlakatla, and Lax Kw'alaams.



Stantec

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ECONOMIC CONDITIONS
ENVIRONMENTAL EFFECTS ASSESSMENT
ECONOMIC CONDITIONS
LOCAL AND REGIONAL STUDY AREAS
LNG CANADA EXPORT TERMINAL
KITIMAT, BRITISH COLUMBIA

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Beyond the LSA, the potential for Project employment and expenditures resulting in adverse economic effects is low for several reasons. Northwest BC is relatively isolated from other parts of BC; Smithers, the nearest community outside the LSA, is 200 km away by road. Suppliers and service providers in such distant communities are less likely to be affected by change in demand for labour, goods, and services associated directly and indirectly with the Project. Although individuals from communities outside the LSA might want to obtain jobs or otherwise participate economically in the Project, they will likely need to move to an LSA community or commute on a fly-in fly-out (FIFO) basis because the Project will likely be outside of commuting range by road. Because individuals from many communities in BC (as well as individuals from outside of BC) might want to participate economically in the Project, the effect on any one community is expected to be low.

The RSA is the area within which adverse economic interactions between the Project and past, present, and reasonably foreseeable projects could occur. The RSA encompasses the RDKS and the SQCRD (including only the Regional District areas (RDA) A and C) (see Figure 6.2-1:).

6.2.2.6.2 Temporal Boundaries

The temporal boundaries of the assessment are defined by the timing and duration of Project activities that could result in effects on the biophysical and human environment. Temporal boundaries identify when an effect may occur in relation to specific Project phases and activities.

Based on the current Project schedule, the temporal boundaries are:

- construction, Phase 1 (trains 1 and 2) to be completed approximately five to six years following issuance of permits, the subsequent phase(s) (trains 3, 4) to be determined based on market demand
- operation, minimum of 25 years after commissioning, and
- decommissioning, approximately two years at the end of the Project life.

Because the life of the LNG facility is expected to exceed 25 years, timing for decommissioning and abandonment is preliminary.

6.2.2.6.3 Administrative and Technical Boundaries

Statistics Canada and BC Stats provide comprehensive information such as community demographics, labour-market information, and educational and occupational characteristics. Much of the baseline data on economic conditions in the LSA and RSA were collected from census and national household survey (NHS) statistics using corresponding geographic units as defined by these agencies (e.g., Census subdivisions).

Because of limited availability of Statistics Canada data for smaller census subdivisions, including some Aboriginal communities, data for the following Statistics Canada geographic areas are included in the LSA for economic conditions to account for the communities identified in the AIR:

- Kitamaat Village: Kitamaat 2 IR (Indian Reserve) (primary reserve community of Haisla Nation)
- Kitselas: Kitselas 1 IR and Kulspai 6 IR (includes Kitselas First Nation's communities of Gitaus and Kulspai)
- Kitsumkalum: Kitsumkaylum 1 IR (includes Kalum, the primary reserve community of Kitsumkalum First Nation)
- Hartley Bay: Kulkayu 4 IR (primary reserve community of Gitga'at First Nation)
- Lax Kw'alaams: Lax Kw'alaams 1 IR (also referred to as Port Simpson and is the primary reserve community of Lax Kw'alaams First Nation)
- Kitkatla: Dolphin Island 1 IR (primary reserve community of Gitxaala Nation)
- Metlakatla: s1/2 Tsimpsean 2 IR (also referred to as Metlakatla Village and is the primary reserve community of Metlakatla First Nation), and
- Port Edward: Prince Rupert Census Agglomeration area (CA) (includes the census subdivision or Port Edward and the City of Prince Rupert.

Additional socio-economic baseline information provided by Aboriginal Groups was used to supplement census and NHS data and to address Statistics Canada data gaps, where possible (see Table 6.2-1 for a list of reports provided by Aboriginal Groups).

Limitations in Economic Information

Data limitations are related to the timeliness of available economic information, as well as the administrative boundaries used by agencies such as Statistics Canada. The most recently available data from the 2011 Census and NHS are used.

Some employment and economic data are not available for communities with small populations because Statistics Canada and other agencies suppress data to protect confidentiality. Data from the 2011 NHS were suppressed by Statistics Canada or were not available for the following Aboriginal Groups or communities: Kitsumkaylum[1] 1 IR (Kitsumkalum/Kalum); Kulkayu 4 IR (Gitga'at/Hartley Bay); Lax

[1] "Kitsumkaylum 1 IR" refers to the primary reserve community of the Kitsumkalum First Nation. Data from Statistics Canada does not follow normal or preferred Aboriginal Group naming conventions. Therefore, where data is being referenced from the NHS or Census in the discussion of the Kitsumkalum First Nation "Kitsumkaylum 1 IR" (Indian Reserve) is used. Where other socio–economic data is being discussed or in reference to Aboriginal Groups the proper naming convention of "Kitsumkalum First Nation" (alt. "Kitsumkalum") is used.

Kw'alaams 1 IR (Lax Kw'alaams/Port Simpson); and s1/2 Tsimpsean 2 IR (Metlakatla/Metlakatla Village) and Port Edward. Therefore, the LSA totals reported for some data (e.g., total labour force in the LSA) may be lower than the actual totals. Data for Port Edward and the City of Prince Rupert are included in Prince Rupert CA.

For the RSA, separate census and NHS data are not available for the SQCRD Areas A and C. Instead, data were collected and reported for the entire district. As a result, some combined data for the RSA are above the actual total.

Census and NHS data provided by Statistics Canada are rounded; as a result, totals may not sum to 100%.

6.2.2.7 Residual Effects Description Criteria

Residual effects are those that remain after the application of mitigation measures. These residual effects are characterized using the criteria described in Table 6.2-3.

Table 6.2-3: Characterization of Residual Effects on Economic Conditions

Characterization	Description	Quantitative Measure or Definition of Qualitative Categories
Characterization of Residual Effects		
Magnitude	The expected size or severity of effect. Low magnitude effects may have negligible to little effect, while high magnitude effects may have a substantial effect.	**Low**—effect cannot be distinguished from baseline conditions; within normal range of variability **Moderate**—measurable change but unlikely to pose a serious risk to the VC or to represent a management challenge **High**—measurable change that is likely to pose a serious risk to the selected VC and, if negative, represents a management challenge
Geographic Extent	The spatial scale over which the residual effects of the project are expected to occur. The geographic extent of effects can be local or regional. Local effects may have a lower effect than regional effects.	**Local**—expected measurable changes are limited to the LSA **Regional**—expected measurable changes are limited to the RSA **Provincial**—expected measurable changes extend beyond the RSA to the provincial level
Duration	The length of time the residual effect persists. The duration of an effect can be short term or longer term.	**Short-term**—residual effect is restricted to the duration of the construction period or less **Medium-term**—residual effect extends to after the duration of the construction period but less than the life of the Project **Long-term**—residual effect is extends to the life of the Project **Permanent**—measurable parameter unlikely to recover from the baseline

Characterization	Description	Quantitative Measure or Definition of Qualitative Categories
Frequency	How often the effect occurs. The frequency of an effect can be frequent or infrequent. Short term and/or infrequent effects may have a lower effect than long term and/or infrequent effects.	**Single event**—occurs once **Multiple irregular event (no set schedule)**—occurs sporadically at irregular intervals throughout construction, operation or decommissioning and abandonment phases **Multiple regular event**—occurs on a regular basis and at regular intervals throughout construction, operation, or decommissioning and abandonment phases **Continuous**—occurs continuously throughout the life of the Project
Reversibility	Whether or not the residual effect on the VC can be reversed once the physical work or activity causing the disturbance ceases. Effects can be reversible or permanent. Reversible effects may have lower effect than irreversible or permanent effects.	**Reversible**—will recover after Project decommissioning and abandonment **Irreversible**—permanent
Context	Refers primarily to the sensitivity and resilience of the VC. Consideration of context draws heavily on the description of existing conditions of the VC, which reflect cumulative effects of other projects and activities that have been carried out, and information about the impact of natural and human-caused trends on the condition of the VC. Project effects may have a higher effect if they occur in areas or regions that: ▪ Have already been adversely affected by human activities ▪ Have little resilience to imposed stresses	**Low resilience**—low capacity for economic conditions to recover from a perturbation with consideration of the baseline conditions **Moderate resilience**—moderate capacity for economic conditions to recover from a perturbation, with consideration of baseline conditions **High resilience**—high capacity for economic conditions to recover from a perturbation, with consideration of baseline conditions
Likelihood of Residual Effects		
Likelihood	Whether or not a residual effect is likely to occur	**Low –** low likelihood that there will be a residual effect. **Medium –** moderate likelihood that there will be a residual effect. **High –** high likelihood that there will be a residual effect.

6.2.2.8 Significance Thresholds for Residual Effects

The context for assessing residual effects is whether Project-related changes are consistent with reasonably expected changes in future economic conditions that are anticipated or planned for by municipal, regional, and provincial governments; Aboriginal Groups; private businesses; or households; and, if not, the extent to which they will be able to cope with adverse effects associated with the Project. The following criteria are used to determine significance thresholds for residual effects on economic conditions:

- A significant residual effect is one that is adverse, of high magnitude, is distinguishable from normal variability, and cannot be managed with current or anticipated programs, policies, or mitigation measures.

A key consideration in the significance conclusion is that economic effects can be both adverse and positive, depending on the specific economic interests being affected. For example, a reduction in the local employment rate may be negative for some businesses because it could lead to labour shortages and or increases in labour costs. However, a higher rate of employment is positive for households and will also be beneficial to some businesses because of the related higher levels of disposable income.

6.2.3 Baseline Conditions

6.2.3.1 Baseline Data Sources

Information on baseline economic conditions in the LSA was obtained primarily from statistical information, published reports, and non-structured interviews with representatives from appropriate government departments and agencies, and other organizations (e.g., service providers and business organizations), as well as two phone surveys with local business owners. Several Aboriginal Groups provided information about their respective communities through interviews and other engagement activities, as well as through independent socio-economic reports. Principal sources of statistical data included BC Stats, Statistics Canada (Census 2006, Census 2011 and National Household Survey 2011), and the BC Ministry of Finance.

Additional and more recent baseline information was collected from a review of recent community and regional reports from government agencies, community profiles produced by municipalities, community and regional websites, and various socio-economic community profiles.

6.2.3.2 Baseline Overview

The baseline overview is focused on the LSA, with some discussion of regional and provincial economic conditions for context. Additional information on existing economic conditions is provided in the *Socio-Economic Baseline Report* (Stantec 2014).

6.2.3.2.1 Labour Availability

Labour Force Activity

In 2011, 30,665 people aged 15 years and older were living in the LSA. The labour force in the LSA was 19,695. At 64.2%, the local participation rate was comparable to the provincial rate (64.6%). In the RSA, there were 44,670 people aged 15 and older. With a participation rate of 62.4%, the regional labour force was 27,870 people. The unemployment rate was higher in the LSA (11.6%) and the RSA (13.4%) than in BC as a whole (7.8%). Within the LSA, there was considerable variation in participation and unemployment rates, especially between Aboriginal and non-Aboriginal communities (Table 6.2-4).

Table 6.2-4: Labour Force Activity, LSA and RSA for 2011

Location	Population Aged 15+	Participation Rate (%)	Labour Force	Employed	Unemployed	Unemployment Rate (%)
BC	3,646,840	64.6	2,345,245	2,171,465	182,775	7.8
LSA						
Kitamaat 2 IR (Kitamaat Village)	420	47.6	200	135	60	30
Kitselas I IR (Kitselas)	155	45.2	70	50	25	35.7
Kulspai 6 IR (Kitselas)	60	50	30	25	10	33.3
Kitsumkaylum 1 IR (Kitsumkalum)	NA	NA	NA	NA	NA	NA
Kulkayu 4 IR (Hartley Bay)	NA	NA	NA	NA	NA	NA
Lax Kw'alaams 1 IR	NA	NA	NA	NA	NA	NA
Dolphin Island 1 IR (Kitkatla)	335	35.8	120	75	45	37.5
s1/2 Tsimpsean 2 IR (Metlakatla)	NA	NA	NA	NA	NA	NA
Kitimat DM	6,965	61.3	4,270	3,765	505	11.8
Terrace CA	12,320	66.1	8,145	7,495	650	8
Port Edward	NA	NA	NA	NA	NA	NA
Prince Rupert CA	10,410	65.9	6,860	5,865	995	14.5
LSA Total	***30,665***	***64.2***	***19,695***	***17,410***	***2290***	***11.6***
RSA						
RDKS	29,795	62.2	18,530	16,135	2,395	12.9
SQCRD	14,875	62.8	9,340	8,010	1,330	14.2
RSA Total	***44,670***	***62.4***	***27,870***	***24,145***	***3,725***	***13.4***

NOTES:
NA – data not available
RDKS – Regional District of Kitimat-Stikine
SQCRD – Skeena-Queen Charlotte Regional District
SOURCE: Statistics Canada (2013a, 2013b, 2013c, 2013d, 2013e, 2013f, 2013g, 2013h, 2013i)

As shown in Table 6.2-4, the Terrace CA had the largest labour force (8,145) among communities in the LSA in 2011. The remainder of the local labour force mainly consisted of individuals living in the Kitimat DM and Prince Rupert CA. The total labour force in the RSA was composed of a greater proportion of people living in the RDKS (62.0%) compared to the SQCRD (38.0%).

2011 labour force activity in the LSA and RSA is shown by gender in Table 6.2-5. The male participation rate in the LSA was lower than that for the province, while female participation in the local labour force was higher than the provincial rate. The RSA had lower participation rates for both males and females than the local and provincial rates. In the LSA, the labour force was composed of 52% male workers and 48% female workers. The male unemployment rate in the LSA (12.7%) was higher than the female unemployment rate (10.4%), with both rates being higher than unemployment rates by gender for the province overall. Male unemployment in the RSA was 15.3% and female unemployment was 11.3%.

Table 6.2-5: Labour Force Activity by Gender, LSA and RSA for 2011

Location	Population Aged 15+		Participation Rate (%)		Labour Force		Unemployed		Unemployment Rate (%)	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
BC	1,755,440	1,871,395	68.9	60.4	1,223,375	1,130,870	98,785	83,990	8.1	7.4
LSA Total	**15,285**	**15,365**	**66.9**	**61.7**	**10,220**	**9,480**	**1,297**	**985**	**12.7**	**10.4**
RSA Total	**22,700**	**21,965**	**64.5**	**60.1**	**14,650**	**13,205**	**2,240**	**1,490**	**15.3**	**11.3**

NOTES:
LSA totals for population and labour force are lower than actual totals because data for some communities are suppressed by Statistics Canada.
SOURCE: Statistics Canada (2013a, 2013b, 2013c, 2013d, 2013e, 2013f, 2013g, 2013h, 2013i)

Aboriginal labour force statistics in the LSA and RSA are summarized in Table 6.2-6. The percentage of the Aboriginal population in the LSA that participated in the workforce (59.5%) was lower than the LSA as a whole (64.2%). The total Aboriginal population aged 15 and older for the RSA was 15,245 people, of which 7,575 were residents of communities in the LSA. The Aboriginal labour force in both the LSA and RSA had higher unemployment rates than the total labour force numbers (Table 6.2-6). Dolphin Island IR 1 (Kitkatla) had the highest unemployment rate among communities in the LSA (30.1 percent). Overall, the unemployment rate for Aboriginal workers was 24.3% in the LSA and 25.7% in the RSA.

Table 6.2-6: Aboriginal Labour Force Activity, LSA and RSA for 2011

Location	Population Aged 15+	Participation Rate (%)	Labour Force	Employed	Unemployed	Unemployment Rate (%)
LSA						
Kitamaat 2, (Haisla/Kitamaat Village)	415	47	195	135	55	28.2
Kitselas I IR (Kitselas/Gitaus)	205	48.8	100	70	30	30
Kulspai 6 (Kitselas/Kulspai)	60	50	30	25	10	33.3
Kitsumkaylum 1 IR (Kitsumkalum/Kalum)	NA	NA	NA	NA	NA	NA
Kulkayu 4 IR (Gitga'at/Hartley Bay)	NA	NA	NA	NA	NA	NA
Lax Kw'alaams 1 IR (Lax Kw'alaams/Port Simpson)	NA	NA	NA	NA	NA	NA
Dolphin Island 1 IR (Gitxaala/Kitkatla)	330	34.8	115	70	45	39.1
s1/2 Tsimpsean 2 IR (Metlakatla/Metlakatla Village)	NA	NA	NA	NA	NA	NA
Kitimat DM	610	65.6	400	270	125	31.2
Terrace CA	2,205	66.4	1,465	1,170	305	20.8
Port Edward	NA	NA	NA	NA	NA	NA
Prince Rupert CA	3,750	58.7	2,200	1,675	525	23.9
LSA Total	***7,575***	***59.5***	***4,505***	***3,415***	***1,095***	***24.3***
RSA						
RDKS	9,200	56.7	5,220	3,775	1,445	27.7
SQCRD	6,045	52.9	3,200	2,480	720	22.5
RSA Total	***15,245***	***55.2***	***8,420***	***6,255***	***2,165***	***25.7***

NOTES:
NA – data not available
SOURCE: Statistics Canada (2013j, 2013k, 2013l, 2013m, 2013n, 2013o, 2013p, 2013q)

Compared to the Aboriginal labour force for the province overall, Aboriginal labour force activity in the LSA and RSA was characterized by lower participation and higher unemployment. Aboriginal labour force participation rates for males and females in the LSA and RSA were lower than the provincial participation rates by gender in 2011 (Table 6.2-7). For the Aboriginal labour force in the LSA, the male unemployment rate was 28.5% and the female unemployment rate was 19.1%. For the RSA, unemployment rates were 30.7% for males and 20.0% for females.

Table 6.2-7: Aboriginal Labour Force Activity by Gender, LSA and RSA for 2011

Location	Population Aged 15+		Participation Rate (%)		Labour Force		Unemployed		Unemployment Rate (%)	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
BC	81,770	89,840	65.3	59.7	53,405	53,635	10,005	7,500	18.7	14
LSA Total	**3,495**	**3,820**	**63.8**	**56.2**	**2,230**	**2,145**	**635**	**410**	**28.5**	**19.1**
RSA Total	**7,755**	**7,495**	**58.0**	**52.3**	**4,495**	**3,920**	**1,380**	**785**	**30.7**	**20.0**

NOTES:
LSA totals for population and labour force are lower than actual totals because data for some communities are suppressed by Statistics Canada.
SOURCE: Statistics Canada (2013a, 2013b, 2013c, 2013d, 2013e, 2013f, 2013g, 2013h, 2013i)

Changes in labour force statistics for the LSA and RSA during 2006—2011 are shown in Table 6.2-8. The labour force in both the LSA and RSA decreased, by 11.1% locally and 11.5% regionally. The overall unemployment rate in the LSA decreased slightly from 11.7% to 11.6%. Among communities in the LSA, the Kitimat DM had the largest increase in unemployment, with the unemployment rate rising from 9.5% to 11.8%. Unemployment in the Terrace CA, however, dropped from 10.6% to 8.0%. Regionally, unemployment decreased slightly, from 14.4% to 14.0%.

In a survey of local business owners in the Kitimat-Terrace area (QRG 2014), worker recruitment and retention challenges were identified as one of the main adverse effects from recent economic development. Sixty-two percent of those surveyed indicated that it had become more difficult to hire staff for local businesses over the past several years. Wage increases were also identified as an effect of recent economic development, with 78% of the survey respondents indicating that their company has had to increase employee wages between 10% —20% over the past two years.

Table 6.2-8: Changes in Labour Force Activity, LSA and RSA, 2006—2011

Location	Labour Force			Unemployed			Unemployment Rate	
	2006	2011	Change (%)	2006	2011	Change (%)	2006	2011
Kitamaat 2, (Haisla/Kitamaat Village)	NA	200	NA	NA	60	NA	NA	30
Kitselas I IR (Kitselas/Gitaus)	NA	70	NA	NA	25	NA	NA	35.7
Kulspai 6 (Kitselas/Kulspai)	20	30	33.3	10	10	0	25	33.3
Kitsumkaylum 1 IR (Kitsumkalum/Kalum)	125	NA	NA	35	NA	NA	40	NA
Kulkayu 4 IR (Gitga'at/Hartley Bay)	55	NA	NA	10	NA	NA	18.2	NA
Lax Kw'alaams 1 IR (Lax Kw'alaams/Port Simpson)	NA	NA	NA	NA	NA	NA	NA	NA
Dolphin Island 1 IR (Gitxaala/Kitkatla)	120	120	0	75	45	40	62.5	37.5
s1/2 Tsimpsean 2 IR (Metlakatla/Metlakatla Village)	55	NA	NA	25	NA	NA	45.5	NA
Kitimat DM	4,740	4,270	-9.9	450	505	12.2	9.5	11.8
Terrace CA	9,805	8,145	-16.9	1,040	650	-1.8	10.6	8
Port Edward	NA	NA	NA	NA	NA	NA	NA	NA
Prince Rupert CA	7,230	6,860	-5.1	950	995	4.7	13.1	14.5
LSA Total	**22,150**	**19,695**	**-11.1**	**2,595**	**2290**	**-11.**	**11.7**	**11.6**
RDKS	19,340	18,530	-4.2	2,735	2,395	-12.4	14.1	12.9
SQCRD	10,665	8,010	-24.9	1,600	1,330	-16.9	15	14.2
RSA Total	**30,005**	**26,540**	**-11.5**	**4,335**	**3,725**	**-14.1**	**14.4**	**14.0**

NOTES:
NA – data not available
SOURCE: Statistics Canada (2013a, 2013b, 2013c, 2013d, 2013e, 2013f, 2013g, 2013h, 2013i); Statistics Canada (2007a, 2007b, 2007c, 2007d, 2007e, 2007f, 2007g, 2007h, 2007i, 2007j).

The NWRWT reports estimates for job creation in northwest BC (i.e., the North Coast and Nechako economic regions) during the 2010—2020 period. Conservative estimates provided in this report suggest that the region will gain up to 6,000 jobs during this time. Optimistic estimates—assuming increased investment in mining, LNG projects, and pipelines—forecast 13,000 jobs created in the region during the same period (NWRWT 2012). Even in the conservative development scenario, it is expected that job growth will outpace labour supply in northwest BC. A labour supply shortfall (trades, labourers, semi-skilled workers, truck and equipment operators, manager and supervisors, and technologists and technicians) is expected to occur as early as 2013 (NWRWT 2012).

Assuming three LNG facilities are operational in BC by 2020, labour demand estimates prepared for the Natural Gas Committee indicate that the related construction workforce will peak at approximately 10,000 workers in 2016/17 (Ingenia Consulting 2012). Skilled trades workers are expected to account for the greatest proportion (43%) of this peak workforce, followed by trades helpers and labourers (38%). Based on the existing labour availability and skill levels in northern BC, labour supply shortfalls are expected for both construction and operation positions. The Natural Gas Workforce Committee provides recommended strategies to address these shortfalls, including collaborative efforts by the natural gas industry working with governments, educational institutions, and under-represented groups (Ingenia Consulting 2012).

Current Employers

Major employers in the LSA are typically located in the larger population centres of Kitimat, Terrace, and Prince Rupert. In the Kitimat-Terrace area, major employers include Rio Tinto Alcan and other manufacturing businesses. Public sector employers in the LSA include education and health services: School Districts 82 (Kitimat-Terrace) and 52 (Prince Rupert), Northwest Community College, and Northern Health. Regional and municipal governments such as the District of Kitimat and the City of Prince Rupert are also large public sector employers in the LSA. Fisheries and agriculture-based businesses are top employers in the Prince Rupert area, as well as transportation and distribution activities associated with marine terminals. There is a wide range of businesses providing employment in the retail trade sector within Kitimat, Terrace and Prince Rupert (Table 6.2-9) (Welcome BC 2013a, 2013b, 2013c).

Table 6.2-9: Current Employers in the LSA

Industry	Major Employers
Kitimat	
Manufacturing	Rio Tinto Alcan
	Zanron Fabrication
	Lapointe Engineering
Public Sector	School District #82
	Northern Health
	District of Kitimat
Retail	Overwaitea Foods
	Tim Hortons

Industry	Major Employers
Terrace	
Manufacturing	Rio Tinto Alcan
Public Sector	School District #82
	Northern Health
	Northwest Community College
Retail	Walmart
	Canada Safeway
	Canadian Tire
Engineering/Environmental	Allnorth Consultants
	McElhanney
	Silverwood Consulting
Forestry	Skeena Sawmills
Construction	Valard Construction
Prince Rupert	
Agriculture/Resource-Based	Canadian Fishing Company
	JS McMillan
	Prince Rupert Grain, Ltd.
Public Sector	School District #52
	Northwest Community College
	Northern Health
	City of Prince Rupert
Transportation/Distribution	Ridley Terminals
	Maher Terminals Holding Corporation
	Quickload

SOURCE: Welcome BC 2013a, 2013b, 2013c

6.2.3.2.2 Labour Force Skill Levels

Educational Attainment

The highest level of education for people aged 25 to 64 years, as of 2011, is summarized in Table 6.2-10 for the LSA and the RSA. For the LSA, 20.6% of people in this age category had not completed high school. This compared to 21.0% for the RSA and 16.6% for the province overall. Aboriginal communities had higher percentages of people who had not completed high school than the other communities in the LSA.

Table 6.2-10: Highest Level of Educational Attainment, Population Aged 25 to 64 for 2011

Location	No Certificate, Diploma or Degree (%)	High School Diploma or Equivalent (%)	Apprenticeship or Trades Certificate or Diploma (%)	College or other non-University Certificate or Diploma (%)	University Certificate or Diploma Below Bachelor Level (%)	University Certificate, Diploma or Degree at Bachelor Level or Above (%)
Kitamaat 2, (Haisla/Kitamaat Village)	37.1	23.4	19.5	17.6	3.9	0
Kitselas I IR (Kitselas/Gitaus)	38.1	19.0	19.0	19.0	0	0
Kulspai 6 (Kitselas/Kulspai)	37.5	25.0	25.0	0	0	0
Kitsumkaylum 1 IR (Kitsumkalum/Kalum)	NA	NA	NA	NA	NA	NA
Kulkayu 4 IR (Gitga'at/Hartley Bay)	NA	NA	NA	NA	NA	NA
Lax Kw'alaams 1 IR (Lax Kw'alaams/Port Simpson)	NA	NA	NA	NA	NA	NA
Dolphin Island 1 IR (Gitxaala/Kitkatla)	70.1	20.9	3.0	4.5	0	0
s1/2 Tsimpsean 2 IR (Metlakatla/Metlakatla Village)	NA	NA	NA	NA	NA	NA
Kitimat DM	17.3	30.7	17.2	19.1	2.8	12.8
Terrace CA	16.0	26.2	15.2	23.9	4.2	14.6
Port Edward	NA	NA	NA	NA	NA	NA
Prince Rupert CA	20.7	27.3	12.7	17.0	5.7	16.8
LSA Total	**20.6**	**28.5**	**15.2**	**17.5**	**4.1**	**14.2**
RDKS	20.1	27.1	15.4	20.2	3.7	13.7
SQCRD	22.9	26.5	12.9	16.1	4.9	16.7
RSA Total	**21.0**	**26.9**	**14.5**	**18.8**	**4.1**	**14.7**

SOURCE: Statistics Canada (2013a, 2013b, 2013c, 2013d, 2013e, 2013f, 2013g, 2013h, 2013i)
NOTES: NA – data not available

The LSA and RSA had comparable percentages of residents who had attained an apprenticeship or trades certificate or diploma (15.2% and 14.5%, respectively). There was some variation in education levels among residents of the communities in the LSA. The Prince Rupert CA had the highest percentage of university graduates (16.8%). Aboriginal communities had higher percentages of people who had completed apprenticeship or trades certificates compared to other communities in the LSA (e.g., Kulspai 6, Kitselas 1 IR and Kitamaat 2).

Higher education and skills training programs are offered to residents of the LSA and RSA through post-secondary institutions (e.g., University of Northern BC [UNBC] – Northwest Campus, Northwest Community College [NWCC]) and skills training centres (e.g., Kitimat Valley Institute {KVI], Northcoast

Distance Education School [NDES]), and the Piping Industry of College of BC [PIC]), in-addition to local workplace and skills training programs offered through government and community led organizations. These institutions provide academic and professional training programs, as well as industry-specific training in trades, workplace skills (e.g., environmental sampling, monitoring and reporting) and safety.

Enrolment rates at UNBC and NWCC were both below their target for 2013/2014. In 2013/2014 UNBC enrolment rates were 16% below the target of 3,455 Full-time Equivalent (FTE) students, and NWCC enrolment rates were 41% below the target of 1,696 FTE students (Table 6.2-11) (Ministry of Advanced Education 2014a, 2014b). Demand for industry-specific skills training dramatically increased in 2013 as a result of the RTA KMP (Pope 2013. pers. comm.; Hammi 2014. pers. comm.). However, local skills-training institutions, such as KVI have been able to respond to industry-related demand by directly working with proponents to determine the types of course needed for individuals to gain the training required for job opportunities. KVI anticipates that it would be able to respond to demand created by one or two LNG facilities starting construction concurrently, but if more facilities were to start construction at the same time, then capacity would become an issue (Hammi 2014. pers. comm.).

Table 6.2-11: Highest Post-Secondary Enrollment Targets and Actual Enrollments 2008/2009 to 2013/2014

Northwest Community College						
	2008/09	**2009/10**	**2010/11**	**2011/12**	**2012/13**	**2013/14**
Student Full-Time Equivalent Enrolment Targets	1,761	1,761	1,728	1,696	1,664	1,696
Actual Student Full-Time Equivalent Enrolment	1,468	1,486	1,689	1,508	1,271	1,009
Difference	293	275	39	188	393	687
% of positions remaining	17%	16%	2%	11%	24%	41%
University of Northern BC						
	008/09	**2009/10**	**2010/11**	**2011/12**	**2012/13**	**2013/14**
Student Full-Time Equivalent Enrolment Targets	3,354	3,396	3,431	3,455	3,455	3,455
Actual Student Full-Time Equivalent Enrolment	2,976	3,054	3,005	2,934	2,884	2,888
Difference	378	342	426	521	571	567
% of positions remaining	11%	10%	12%	15%	17%	16%

SOURCES: Ministry of Advanced Education 2014a, 2014b.

It has been noted by some Haisla Nation and Kitselas First Nation community members' that education and job-skills training are seen both as an opportunity and a barrier in accessing industry-related job opportunities (Grant 2013, pers. comm.; Kitselas Community Meeting 2013, pers. comm.). Reports from Haisla Nation community members reflect that the majority of job opportunities are in general labour, however there is room to move up/within some of the larger contractors companies (e.g., Bechtel), and more opportunities are opening with respect to skilled trades (Grant 2013, pers. comm.). Kitselas First Nation community members have noted that the resource development projects create short-term positions only, and that the lack of local training and education opportunities is a challenge to securing long-term, permanent positions (Kitselas Community Meeting 2013. pers. comm.).

Industry Experience

Table 6.2-12 summarizes 2011 employment data for the LSA and RSA by industry. In the LSA, a large percentage of workers were employed or had been employed in service-based industries. Among service industries, high percentages of workers in the LSA had experience in "other services" (e.g., public administration) (21.0%) and business services (17.2%). For basic (goods-producing) industries, the highest percentage of workers were employed or had been employed in manufacturing (9.8%). There were 1,200 workers with construction industry experience in the LSA, accounting for 64.5% of the total number of workers who had construction industry experience in the RSA (1,860 people).

The RSA had similar proportions of employment in basic and non-basic industries compared to the LSA in 2011. Of the 27,005 people in the RSA who were employed or had been employed in 2011, the highest percentage of workers had experience in "other services" (24.2%).

Employment in the LSA and RSA is shown by occupation type in Table 6.2-13. The number of workers employed in occupations related to trade, transport, and equipment operation gives an indication of the local and regional supply of workers with appropriate skills for construction employment. In the LSA, there were 3,580 people employed in this occupation category in 2011, accounting for approximately 19% of total employment in the LSA. There were 5,095 workers employed in trades, transport, equipment operations, and related occupations in the RSA.

Table 6.2-12: Employment by Industry, LSA and RSA for 2011

Location	Basic Industries							Non-Basic Industries					Total
	Agriculture, Forestry, Fishing & Hunting	Mining, Quarrying & Oil and Gas Extraction	Utilities	Construction	Manufacturing	Health Care & Social Services	Education-al Services	Whole-sale Trade	Retail Trade	Finance & Real Estate	Business Services	Other Services	
Kitamaat 2, (Haisla/Kitamaat Village)	10	0	0	15	20	20	15	0	15	0	25	50	170
Kitselas I IR (Kitselas/Gitaus)	0	0	0	0	0	10	0	0	0	0	0	25	35
Kulspai 6 (Kitselas/Kulspai)	0	0	0	0	0	0	0	0	0	0	0	0	30
Kitsumkaylum 1 IR (Kitsumkalum/Kalum)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Kulkayu 4 IR (Gitga'at/Hartley Bay)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lax Kw'alaams 1 IR (Lax Kw'alaams/Port Simpson)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dolphin Island 1 IR (Gitxaala/Kitkatla)	10	0	0	20	0	10	10	0	0	0	0	60	115
s1/2 Tsimpsean 2 IR (Metlakatla/Metlakatla Village)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Kitimat DM	45	40	0	420	1,205	335	240	80	345	140	530	725	4,105
Terrace CA	365	90	65	435	370	1,050	785	260	1215	300	1,195	1,825	7955
Port Edward	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Prince Rupert CA	490	0	35	310	270	685	550	120	875	330	1525	1330	6,685
LSA Total	**920**	**130**	**100**	**1,200**	**1,865**	**2,110**	**1,600**	**460**	**2,450**	**770**	**3,275**	**4,015**	**19,095**
RDKS	865	420	95	1,275	1,755	2,105	1,740	380	1,955	505	2,445	4,310	17,850
SQCRD	780	15	55	585	425	880	720	125	1,120	405	1,825	2,220	9,155
RSA Total	**1,645**	**435**	**150**	**1,860**	**2,180**	**2,985**	**2,460**	**505**	**3,075**	**910**	**4,270**	**6,530**	**27,005**

NOTES:
Data suppressed for Kulspai 6, however total in all labour forces are reported and included
SOURCES: Statistics Canada (2013a, 2013b, 2013c, 2013d, 2013e, 2013f, 2013g, 2013h, 2013i);

Table 6.2-13: Employment by Occupation, LSA and RSA for 2011

Location	Management	Business, Finance and Administration	Natural and Applied Sciences	Health	Education, Law, and Social, Community and Government Services	Art, Culture, Recreation and Sport	Sales and Service	Trades, Transport and Equipment Operators	Natural Resources, Agriculture and Production	Manufacturing and Utilities	Total
Kitamaat 2, (Haisla/Kitamaat Village)	20	20	0	0	25	0	35	45	15	10	170
Kitselas I IR (Kitselas/Gitaus)	0	10	0	0	0	0	15	20	0	0	45
Kulspai 6 (Kitselas/Kulspai)	0	0	0	0	0	0	10	10	0	0	20
Kitsumkaylum 1 IR (Kitsumkalum/Kalum)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Kulkayu 4 IR (Gitga'at/Hartley Bay)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lax Kw'alaams 1 IR (Lax Kw'alaams/Port Simpson)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dolphin Island 1 IR (Gitxaala/Kitkatla)	10	20	0	0	25	0	20	30	10	0	115
s1/2 Tsimpsean 2 IR (Metlakatla/Metlakatla Village)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Kitimat DM	335	495	195	210	415	85	800	1,010	45	540	4,130
Terrace CA	380	1,035	510	465	1,295	145	2,120	1,215	280	215	7,660
Port Edward	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Prince Rupert CA	705	910	340	275	945	130	1,530	1,250	325	270	6,680
LSA Total	**1,450**	**2,490**	**1,045**	**950**	**2,705**	**360**	**4,530**	**3,580**	**675**	**1,035**	**18,820**
RDKS	1,470	2,175	960	1,005	2,805	355	3,925	3,415	845	915	17,870
SQCRD	1,080	1,145	460	410	1,165	185	2,055	1,680	605	360	9,145
RSA Total	**2,550**	**3,320**	**1,420**	**1,415**	**3,970**	**540**	**5,980**	**5,095**	**1,450**	**1,275**	**27,015**

NOTES:

Data suppressed for Kulspai 6, however total in all labour forces are reported and included

SOURCES: Statistics Canada (2013a, 2013b, 2013c, 2013d, 2013e, 2013f, 2013g, 2013h, 2013i);

6.2.3.2.3 Labour Incomes

Incomes and Earnings

Among communities in the LSA, there was variation in income, defined as total monetary receipts from all sources, including employment, government sources, pensions, and investments, as well as in earnings, or employment income (see Table 6.2-14). Income and earnings disparities were greatest between Aboriginal and non-Aboriginal communities. For example, the median and average incomes for Kitimat DM were higher than for the province as a whole; the median income for BC was $28,765 and the average income was $39,415. In comparison, median and average incomes in Kitamaat Village (Kitamaat 2 IR) were below provincial figures. Kitamaat Village (Kitamaat 2 IR) also had a much higher reliance on government transfers (32.3% of total income) compared to non-Aboriginal communities in the LSA. The highest average earnings (income from full-time employment) were for residents of the Kitimat DM ($70,377). This was higher than average earnings for BC, which was $58,016.

Table 6.2-14: Incomes and Earnings in the LSA and RSA for 2010

Location	Median Income ($)	Average Income ($)	Average Earnings ($)	Composition of Total Income			
				Wages & Salaries (%)	Self-Employment (%)	Other Income (%)	Government Transfers (%)
Kitamaat 2, (Haisla/Kitamaat Village)	$15,441	$20,751	$42,735	53.9	0	11	32.3
Kitselas I IR (Kitselas/Gitaus)	NA	NA	NA	NA	NA	NA	NA
Kulspai 6 (Kitselas/Kulspai)	NA	NA	NA	NA	NA	NA	NA
Kitsumkaylum 1 IR (Kitsumkalum/Kalum)	NA	NA	NA	NA	NA	NA	NA
Kulkayu 4 IR (Gitga'at/Hartley Bay)	NA	NA	NA	NA	NA	NA	NA
Lax Kw'alaams 1 IR (Lax Kw'alaams/Port Simpson)	NA	NA	NA	NA	NA	NA	NA
Dolphin Island 1 IR (Gitxaala/Kitkatla)	$10,241	$13,327	$29,441	55.4	0.3	0	41
s1/2 Tsimpsean 2 IR (Metlakatla/Metlakatla Village)	NA	NA	NA	NA	NA	NA	NA
Kitimat DM	$34,038	$44,316	$70,377	71.9	0.7	15.4	11.9
Terrace CA	$29,433	$36,985	$53,028	72	2.6	10.6	14.8
Port Edward	NA	NA	NA	NA	NA	NA	NA
Prince Rupert CA	$28,256	$36,291	$55,043	71.8	3.6	1.4	15.3

Location	Median Income ($)	Average Income ($)	Average Earnings ($)	Composition of Total Income			
				Wages & Salaries (%)	Self-Employment (%)	Other Income (%)	Government Transfers (%)
LSA Total	**$23,482**	**$ 30,334**	**$50,124**	**NA**	**NA**	**NA**	**NA**
RDKS	$26,752	$35,795	$55,590	70.7	2.7	11.4	15.3
SQCRD	$25,971	$34,256	$53,018	70.8	4	9.3	16
RSA Total	**$26,362**	**$35,026**	**$54,304**	**NA**	**NA**	**NA**	**NA**

NOTES:
LSA and RSA totals are averages and are not true calculations of median income, average income, and average earnings
SOURCES: Statistics Canada (2013a, 2013b, 2013c, 2013d, 2013e, 2013f, 2013g, 2013h, 2013i)

6.2.3.2.4 Cost of Living

Total Cost of Living

Table 6.2-15 presents cost of living estimates based on the BC Cost of Living Calculator for a family or three with an annual household income of $75,000 and owning an average size house in Kitimat, Terrace and Prince Rupert (in the LSA); and, for comparison, Fort St. John and Dawson Creek (two other northern BC communities that have undergone several years of resource development expansion) and Prince George, the largest city in north-central BC.

Table 6.2-15: Annual Cost of Living, Selected Communities for 2013

	Kitimat	Terrace	Prince Rupert	Dawson Creek	Fort St. John	Prince George
Consumables	$24,393	$24,608	$24,577	$25,097	$25,061	$24,259
Transportation	$2,955	$2,960	$2,996	$2,877	$2,759	$2,948
Health care	$1,741	$1,738	$1,739	$1,733	$1,732	$1,742
Housing	$15,576	$19,364	$19,436	$29,277	$26,756	$23,365
Taxes	$-759	$-759	$-759	$-759	$-759	$-759
Total cost of living	$43,906	$47,911	$47,969	$58,225	$55,549	$51,555
Cost of living differential compared to Kitimat	$0	$4,005	$4,063	$14,319	$11,643	$7,649
Cost of Living Index (Kitimat =100)	100.0	109.1	109.3	132.6	126.5	117.4

SOURCE: Welcome BC 2014

These data indicate that the cost of living in Kitimat, Terrace, Prince Rupert and Prince George are very similar but that the overall cost of living in Dawson Creek is 32.6% and in Fort St. John 26.5% higher than in Kitimat. From these data, housing costs are the primary cause of the cost of living differences among the communities.

The cost of living tends to be positively correlated with income. For example, in Kitimat, a family of three earning $75,000 per year and owning a small condo, is estimated to incur costs of $36,791; compared to $43,460 in annual expenses for a similar sized household with income of $100,000; and $57,989 for a household earning $150,000 per year (Table 6.2-16). Similar increases in expenses are shown for Terrace and Prince Rupert (Welcome BC 2014).

Table 6.2-16: Annual Cost of Living Compared to Income

	Annual Cost of Living					
	Kitimat		Terrace		Prince Rupert	
	$ Value	% of Income	$ Value	% of Income	$ Value	% of Income
Family of three earning $75,000 annually	36,791	49.1	39,347	52.5	37,929	50.6
Family of three earning $100,000 annually	43,460	43.5	46,068	46.0	44,600	44.6
Family of three earning $150,000 annually	57,989	38.7	60,707	40.5	59,144	39.4

SOURCE: Welcome BC 2014

As shown in Table 6.2-16, the proportion of income that is spent on expenses decreases with rising income. Since lower income families spend higher proportions of total income on cost of living expenses, they are more vulnerable to adverse economic effects related to increased prices for goods and services.

Housing is one of largest expenses facing BC households. Table 6.2-17 shows recent real estate sales and price data for several communities in northern BC. Among the northern BC communities for which data are available, communities in the LSA (Kitimat, Terrace and Prince Rupert) had the largest increase in median sales price between 2013 and 2014 (CREA 2014). The median sales price in Kitimat grew by 86.4%, while median sales prices in Terrace and Prince Rupert increased by 29.8% and 20.6%, respectively. These growth rates were higher than those of communities outside the LSA. For example, median sales prices in Fort St. John, which is comparable in size to the communities discussed above, increased by 2.1% during the same period.

Table 6.2-17: Real Estate Sales and Prices for Selected Communities

By Area	Unit Sales			Median Sale Price ($)		
	Q1-2014	Q1-2013	% Change	Q1-2014	Q1-2013	% Change
100 Mile House	40	27	48.1	$228,000	$260,000	-12.3
Williams Lake	40	44	-9.1	$243,250	$247,000	-1.5
Quesnel	25	20	25.0	$158,000	$162,600	-2.8
Prince Rupert	60	48	25.0	$197,500	$163,750	20.6
Smithers & Area	38	19	100.0	$255,000	$255,000	0.0
Fort St. John	87	87	0.0	$388,000	$380,000	2.1
Terrace	52	38	36.8	$291,950	$225,000	29.8
Kitimat	23	36	-36.1	$330,000	$177,000	86.4
Prince George	177	181	-2.2	$247,000	$220,000	12.3

SOURCE: CREA 2014

Housing Affordability

If a household spends more than 30% of its gross total income on shelter (including utilities for renters and related taxes and fees for owners), it is considered susceptible to housing unaffordability (CMHC 2013 and Statistics Canada 2014). In 2006 and 2011, Terrace and Kitimat had a lower proportion of households with a shelter to income ratio (STIR) of more than 30% compared to BC overall (Table 6.2-18). However, recent industrial development has increased demand and thus house prices and rents, resulting in a high proportion of households with a STIR of more than 30% (see Section 7.2, Figure 7.2–10 and Figure 7.2–11).

Renters are typically more vulnerable to changes in the housing market because they may be susceptible to short-term fluctuations in rental prices. Based on data from the 2011 census, the average family would have been able to afford a one- or two-bedroom apartment in either Kitimat or Terrace in 2011, while female single-parent families were at severe risk of being unable to afford housing in either community. Additional data from 2014 indicate that single-parent households with median earnings might face difficulty in renting a two-bedroom unit in Terrace, owing to the gap between affordable housing ($772 per month) and average rents ($1,210 per month) (Thomson M. Consulting 2014). Single persons not in census families and earning a median income would also face challenges renting a one-bedroom apartment in Terrace.

Table 6.2-18: Households Spending Greater Than 30% of Income on Shelter Costs

	Census year	Total number of non-farm, non-reserve private dwellings occupied by usual residents	Number of owner households in non-farm, non-reserve private dwellings	Percent of owner households spending 30% or more of household total income on shelter costs	Number of tenant households in non-farm, non-reserve private dwellings	Percent of tenant households spending 30% or more of household total income on shelter costs
Kitimat DM	2006	3,630	2,925	5.0	700	32.9
	2011	3,630	2,805	10.9	835	33.5
Terrace CA	2006	7,035	5,285	13.5	1,745	40.7
	2011	6,195	4,410	10.7	1,790	45.3
RDKS	2006	12,025	9,200	11.5	2,825	37.7
	2011	12,355	9,190	11	3,190	38.9
SQCRD	2006	6,815	4,350	17	2,465	31
	2011	6,610	4,325	16.1	2,295	34.8
BC	2006	1,606,875	1,118,160	22.7	488,720	43.4
	2011	1,717,195	1,202,000	23.8	519,855	45.3

SOURCES: Statistics Canada (2007d, 2007e, 2007, 2007g, 2007h, 2013c, 2013d, 2013e, 2013f)

Aboriginal Communities

The federal government and Aboriginal Groups in the LSA share responsibility in managing housing for each respective First Nation reserve. Each Aboriginal Group has a housing department or a housing coordinator who is responsible for accessing funding for new housing, funding repairs for renovation, managing construction, and reporting on funding use (Kitselas First Nation 2013b; Kitsumkalum First Nation 2013).

In 2011, Kitsumkalum First Nation and Kitamaat Village each had a higher proportion of homes needing major repair compared to other communities in the LSA. The housing stock at Kitselas First Nation was in comparatively good repair, with 14.3% of dwellings being in need of major repair, likely reflecting that much of Kitselas First Nation have a higher proportion of people living in newer homes than other LSA communities.

Housing challenges associated with increased rents and eviction notices in Kitimat and Terrace have led to a number of housing issues for Aboriginal communities in the LSA. Increases in homelessness were reported to have started several years ago in Kitamaat Village (Light 2013, pers. comm.). Multiple families from Haisla Nation are living under one roof in Kitamaat Village (Terra 2012; Light 2013, pers. comm.). Kitselas First Nation has a waiting list of 80 individuals for on-reserve housing (Venegas 2013, pers.

comm.). Squeezed between high market rents and limited band-owned housing, people are finding shelter by "couch surfing" and staying with friends and family (Venegas 2013, pers. comm.). Other housing challenges associated with Aboriginal reserve communities include limited developable land and overcrowding (Terra 2012).

Census data for 2006 and 2011 show rising average shelter costs and home values for communities in the LSA (Table 6.2-19). Between 2006 and 2011, the average value of owned dwellings grew at a much greater rate in the RDKS (52.1%) compared to the province as a whole (29.8%). In Kitimat, the average value of owned dwellings increased by 33.7, while there was a 36.3% increase recorded for Terrace.

Table 6.2-19: 2006 to 2011 Shelter Costs and Average Home Values

Location	Census year	Median monthly payments for rented dwellings ($)	Average owner major payments ($)	Median monthly payments for owner-occupied dwellings ($)	Average value of owned dwelling ($)	Change of the average value of owned dwellings (%)
Kitimat DM	2006	551	771	624	115,171	33.7%
	2011	600	775	608	154,022	
Terrace CA	2006	599	756	667	146,952	36.3%
	2011	706	841	633	200,362	
Prince Rupert CA	2006	550	871	784	162,017	30.2%
	2011	670	940	980	210,968	
RDKS	2006	584	715	620	132,285	52.1%
	2011	665	790	612	201,200	
SQCRD	2006	551	830	671	155,755	26.4%
	2011	662	905	829	196,886	
BC	2006	752	1119	876	418,703	29.8%
	2011	903	1228	1023	543,635	

NOTES:
Data from 2006 does not account for IRs and therefore shelter costs and average home values are not represented for Aboriginal groups in the LSA.
SOURCES: Statistics Canada (2013m, 2013n, 2013o, 2013p, 2013q); Statistics Canada (2007f, 2007g, 2007h, 2007i, 2007j)

Local rental market information for 2007 to 2013 is shown in Table 6.2-20. The average apartment vacancy rate in Kitimat decreased from 44.4% in 2007 to 5.5% in 2013. During the same period, the average cost to rent a one bedroom in Kitimat increased by 45.3%, while the average cost of renting a two-bedroom unit increased by 38%. The average costs of renting a one or two bedroom unit also increased in Terrace between 2007 and 2013.

Table 6.2-20: 2007 to 2013 Vacancy Rates and Rental Market Survey Results

Year	Terrace			Kitimat		
	Average Apartment Vacancy Rate (%)	Average Monthly Rent		Average Apartment Vacancy Rate (%)	Average Monthly Rent	
		One Bed	Two Bed		One Bed	Two Bed
2007	N/A	$486	$546	44.4	$429	$524
2008	3.1	$504	$561	23.2	$428	$500
2009	7.1	$544	$612	16.9	$441	$520
2010	13.7	$569	$641	22.4	$453	$513
2011	6.9	$563	$632	12.8	$540	$608
2012	3.6	$566	$662	21.9	$687	$792
2013	4.1	$589	$714	5.5	$784	$841

SOURCE: CMHC 2013

6.2.3.2.5 Availability of Goods and Services

Local business owners in the Kitimat and Terrace region have noted an increase in business costs as a result of recent economic development. In a survey of local businesses, 60% indicated that the cost to operate a business had increased over the past several years, due to increases in utilities such as gas and hydro, as well as a wide range of other costs such as increased cost of living, wages, and rents (QRG 2014). However, while the survey results indicate that the cost of doing business has increased, the majority of survey respondents (54%) indicated that there had not been changes in the availability of goods and services required for business activities.

6.2.3.2.6 Commercial Fishing and Marine-based Recreation

As discussed in Section 7.4.3, commercial fisheries and recreational tourism activities are economically important to communities in the LSA, particularly for members of Aboriginal Groups. In addition its importance as part of traditional life, harvesting marine resources is heavily relied on to sustain Aboriginal economies (Gregory et al. 2011). There are ten major commercial fisheries that occur in the Marine Transportation and Use RSA, which overlaps with Fisheries Management Areas (FMAs) 4, 5, and 6, while many more marine species are harvested by local Aboriginal Groups (see Section 7.4, Table 7.4-6).

A survey conducted with local business owners in the tourism and recreation sector highlights the importance of coastal areas to local economy and employment, particularly of Aboriginal people (QRG 2013). Fifty marine recreation and eco-tourism businesses were identified and selected for interviews based on their operations or headquarters being in the LSA. Twenty (40%) responded. The study also indicated substantial variability in the areas of the ocean and marine access route in which the businesses operate. For example, many of the tourism operations in the Kitimat and Prince Rupert area also use the areas in Haida Gwaii, Bella Bella and other parts of the Northwest coast of BC. Meanwhile, those businesses located on Vancouver Island and the lower mainland access water routes from Campbell River to Prince Rupert, and up to the Great Bear Rain Forest.

Most of the companies that participated in the survey operate seasonally and tend to have few full-time staff. Aboriginal staff members are employed at approximately half (55%) of all surveyed businesses. Gitga'at First Nation has the largest proportion of its labour force employed in the tourism industry, while Gitxaala Nation has the highest proportion of its labour force employed in the fisheries industry. Metlakatla First Nation and Kitsumkalum First Nation also have a large proportion of their work force employed in fisheries operations (Table 6.2-21). Meetings with Metlakatla First Nation and Kitselas First Nation confirm their interests in continuing to develop commercial eco-tourism operations in their territories (Metlakatla and Kitselas Community Engagements 2014, pers. comm.). Gitga'at First Nation also identified this sector as an area of potential growth and has worked to develop this sector for over 10 years (Gitga'at Nation 2003; Hartley Bay Council 2011). Lax Kw'alaams First Nation is also interested in becoming more involved in the tourism industry, particularly fishing lodges and charters operations (Lax Kw'alaams 2004).

Table 6.2-21: Aboriginal Labour Force Employment by Industry

	Haisla Nation	Gitxaala Nation	Gitga'at First Nation	Kitsumkalum First Nation	Kitselas First Nation	Lax Kw'alaams First Nation	Metlakatla First Nation
In the labour force	354	242	79	119	100	NA	55
Fisheries	2% (71)	28% (68)	3% (3)	11% (13)	NA	NA	17% (9)
Tourism	NA	2% (5)	16% (12)	NA	2% (2)	NA	10% (6)
Other	47% (166)	5% (12)	2% (2)	29%(35)	21% (21)	NA	20% (11)

NOTES:
Numbers in brackets indicate the number of people employed.
NA – data not available
SOURCE: Reproduced from Ference Weicker & Company Ltd. (2009)

Business owners reported that the main reason customers use their services are for saltwater fishing, wildlife tours, and experiencing the outdoors in a rain forest or pristine setting. These findings are consistent with recent reports by Ference Weicker and Company (2009) and Gregory et al. (2011), which agree that saltwater fishing, wildlife tour, and experiencing the outdoors are the main reasons tourists visit the region.

Additional details on marine fisheries and recreation and tourism businesses are provided in Section 7.4.3.

6.2.4 Project Interactions

Table 4.4–1 (Section 4) identifies potential interactions of concern between Project activities and each of the selected VCs that are assessed. The potential effects identified in Section 6.2.2.4 that may result in an adverse effect as a result of interactions with Project activities are assessed. The extents to which the interactions will be considered are ranked in Table 6.2-22.

A conservative approach is taken in assigning a Rank of 1, whereby interactions with a meaningful degree of uncertainty are assigned Rank 2 so that a detailed effects assessment is conducted.

Table 6.2-22: Potential Project Effects on Economic Conditions

Project Activities and Physical Works	Potential Effects	
	Change in Labour Supply and Demand	Change in Economic Activity of Other Sectors
Facility Activities and Works		
Construction		
Site preparation (clearing, grubbing, grading, levelling, and set-up of temporary facilities)	2	2
Onshore construction (installation of LNG facility, utilities, ancillary support facilities and access roads) and includes hydrotesting	2	2
Dredging (includes disposal)	1	2
Marine terminal construction (modifications to existing wharf, installation of sheet piling, material offloading and laydown areas, transfer piping and electrical installations)	2	2
Waste management (waste collection and treatment)	2	2
Vehicle and rail traffic (haul road upgrades, road use, vehicle traffic)	2	2
Commissioning and start-up	2	2
Operation		
LNG production (including natural gas treatment, condensate extraction, storage, and transfer), storage, and loading	2	2
Waste management (solid and liquid waste collection and disposal, wastewater effluent collection and treatment, site stormwater management)	2	2
Vehicle and rail traffic (haul road upgrades, road use, vehicle traffic)	2	2

Project Activities and Physical Works	Potential Effects	
	Change in Labour Supply and Demand	Change in Economic Activity of Other Sectors
Decommissioning		
Dismantling of land-based and marine infrastructure	2	2
Remediation and reclamation of the site	2	2
Waste management	1	1
Post-closure monitoring and follow-up	1	1
Shipping		
Construction		
Shipping equipment and materials	0	2
Operation		
LNG shipping	0	2
Decommissioning		
Shipping equipment and materials	0	2

KEY:

0 = No interaction.

1 = Potential adverse effect requiring mitigation, but further consideration determines that any residual adverse effects will be eliminated or reduced to negligible levels by existing codified practices, proven effective mitigation measures, or BMPs.

2 = Interaction may occur and the resulting effect may exceed negligible or acceptable levels without implementation of Project-specific mitigation. Further assessment is warranted.

NOTE: Only activities with an interaction of 1 or 2 for at least one effect are shown.

6.2.4.1 Justification of Interaction Rankings

Interactions ranked 0 or 1 are discussed below. Interactions ranked 2 are assessed in further detail in the Sections 6.2.5 and 6.2.6.

6.2.4.1.1 Interactions Ranked as 0

For change in labour supply and demand, there will be a negligible interaction between labour and shipping activities. Construction and decommissioning and abandonment will involve shipping structures, materials and equipment by barge, while during operation approximately 170 to 350 LNG carrier visits to the marine terminal will occur annually. It is not expected that shipping activities will require hiring workers from the LSA to an extent that will have potential for adverse effects on the local labour supply. While employment of some qualified local residents is possible, it is likely that shipping operations will be run with existing crews, with vacant positions being filled by workers with appropriate qualifications and experience, regardless of their usual place of residence. Interactions between shipping activities and labour conditions in the LSA are ranked 0 for construction, operation, and decommissioning and abandonment with no further assessment required.

6.2.4.1.2 Interactions Ranked as 1

Potential effects from waste management and post-closure monitoring and follow-up during decommissioning and abandonment are ranked as 1 because these activities and works do not require substantial labour or goods and services.

6.2.5 Assessment of Residual Effects from the LNG Facility

6.2.5.1 Analytical Methods

6.2.5.1.1 Analytical Assessment Techniques

Change in Labour Supply and Demand

The number of positions, by skill category, required for the Project is compared with current labour market characteristics in the LSA in order to determine the extent to which Project positions are likely to be filled by the resident labour force. The labour force is characterized based on analysis of statistical information available from Statistics Canada, Service Canada, and BC Stats, supplemented with information interviews with public and private sector organizations involved in labour placement in the LSA.

Project-related employment and income effects during the construction, operation, and decommissioning and abandonment phases are estimated using the Statistics Canada Interprovincial Input/Output Model (SCIPIOM), employment ratios published by BC Stats, and workforce requirement information provided by LNG Canada. For the SCIPIOM, standard input-output methods are followed, whereby Project expenditure estimates provided by LNG Canada are used to model direct, indirect, and induced employment effects throughout various sectors of regional, provincial and national economies (see Section 2.5).

Change in Economic Activity of Other Sectors

The analysis of Project effects on the economic activity of other sectors considers several aspects, such as how the Project may affect the availability of goods and services or contribute to increases in the cost of living.

Measuring cost of living requires estimating prices for goods and services in a community. The Government of BC estimates cost of living in communities through the use of the Cost of Living Calculator available on its website. The data for the cost of living calculator were developed by the Economic Research Institute of Redmond, Washington. Current data are for Q1 2013 and show the costs of consumables, transportation, health care, housing, and taxes.

The analysis of potential changes to cost of living focuses on housing effects as the primary indicator. Housing cost generally accounts for a large portion cost of living and, unlike consumer goods and

services, the supply of housing cannot quickly adjust in response to any increased demand as a result of the Project.

Information was collected through two telephone surveys to understand the current and potential future effects from economic development on businesses in the Kitimat and Terrace area. One survey was conducted with tourism and recreation representatives to understand how Project-related shipping activity may affect recreation and tourism activities along the marine access route. This survey was designed to gather information from a selected sample of 50 local recreation and tourism business operators based on available businesses that could participate in the study. After three separate follow-up attempts, a total response rate of 40% (n=20) was achieved for this study. The survey was conducted in December 2013 using a semi-structured questionnaire. The topic areas were divided into five sections which ranged from basic demographics to business location, types of services, gross year revenue and the respondents' thoughts about increases in local shipping traffic and effects on their business operations. Twenty-three questions were asked to the respondents, and the interview length was approximately 15 minutes (QRG Inc. 2013).

The second survey was conducted with local business operators, focusing on the effects that increased economic development is having, or is expected to have, on the local economy. This survey was conducted with representatives of 50 businesses in Kitimat and Terrace during February and March 2014 using a semi-structured questionnaire. The topic areas ranged from basic demographics to number of people employed in the business, types of products and services offered by the business, gross annual revenue and questions geared towards understanding the respondent's opinions as to whether economic development in the Terrace and Kitimat area may be affecting their business operations and activities. Twenty questions were asked to the respondents and the interview length was approximately 15 minutes (Stantec 2014).

The analysis of potential changes in the economic activity of other sectors was also based on information provided by Aboriginal Groups, through key informant interviews with members of potentially affected Aboriginal Groups and stakeholders, and information gathered through LNG Canada's consultation activities.

6.2.5.1.2 Assumptions and the Conservative Approach

While the Project is expected to generate positive economic effects related to employment and expenditure within the LSA and RSA and provincially (see Section 2.5), this section focuses on the assessment of potential adverse economic effects. In reality, economic effects may be both positive and negative. Where workforce and expenditure estimates have been provided from LNG Canada in a range, the higher number is assumed for the assessment of Project effects,

The ranking of potential interactions (Table 6.2-22) conservatively assumes a high potential for interaction between Project activities and existing economic conditions, with the majority of Project activities being ranked as 2. Wherever there is some uncertainty as to the characterization of residual effects, the assessment has been conducted assuming the greater option (e.g., conservatively estimating a moderate, rather than low, magnitude effect, if there is any uncertainty).

6.2.5.2 Assessment of Change in Labour Supply and Demand

6.2.5.2.1 Description of Project Effect Mechanisms for Change in Labour Supply and Demand

Demand for direct, indirect, and induced labour associated with the Project will affect the labour market within LSA and RSA (see Section 2.5). Particularly during construction, when the Project's labour requirements will be substantial, relative to the total available labour pool, there is potential for substantial effects on the labour supply and demand balance within local communities.

Cycles of labour supply and demand associated with resource development have been the subject of much study. Drawing on Lucas' (1971) model of boom and bust cycles in single-industry towns and incorporating subsequent developments in the understanding of labour market dynamics (e.g., Bradbury and St-Martin 1983; Halseth 1999), Tonts (2012) provides a five-stage model of employment demand for resource dependent communities:

- Investment involves a general increase in employment as the resource development is established.
- Construction typically sees rapid gains in construction employment with high numbers of mobile workers moving into the area for relatively short-term periods. As construction employment winds down, there are gradual increases in the operations and service sector employment.
- Transition involves a stabilization of the workforce as construction ends and a resident operations workforce is established (with the exception of fly-in/fly-out operations).
- Maturity represents labour force stability and an established service sector.
- Alternative futures may involve a range of potential economic effects, including winding down, closure, stability or inertia, or economic renewal as a result of new industries or the revitalization of the local resource industry.

This generalized conceptual model provides a framework for understanding potential Project effects on the supply and demand of labour during construction, operation, and decommissioning, discussed below. Changes in Project employment requirements are also likely to be a main driver for change in economic activity of other sectors, as population and spending increases will result in greater demand for local goods and services.

Construction

The Project will require a range of skilled and unskilled labour during construction. Direct construction employment will occur in Kitimat, where the LNG facility and marine terminal will be constructed. Local employment will also increase indirectly through subcontractor businesses opportunities during this phase. Induced employment effects will occur as local employment and the associated rise in income will likely result in increased consumer spending, supporting increased employment in goods and services sectors.

Aside from the socio-economic benefits associated with employment, there is potential for adverse effects as a result of changes in labour supply and demand. This can include reduced availability of skilled and unskilled labour, which may contribute to increased wages, both of which can make recruitment and retention of workers difficult for other businesses.

The experience of comparable jurisdictions, such as the Peace River Region, shows that industrial development can adversely affect labour conditions; for example, leading to a shortage of skilled workers and competition amongst employers (KTIDS Northwest 2012). This has also been seen in Gladstone, Australia, where economic development related to the LNG sector has contributed to increasing competition for skilled workers (Bahn and Cameron 2012). Researching the economic effects of a coal boom in the Bowen Basin region of Australia, Rolfe et al. (2007) indicate that rapid development can result in skills shortages in the local labour force, particularly in trades. In this region, businesses in other sectors such as services, rural industries, and local government found it difficult to recruit skilled workers. Results of an informal survey undertaken amongst small business owners in the LSA suggests that business owners have already begun experiencing difficulties related to labour supply as a result of recent economic development (Stantec 2014).

There is also potential for adverse economic effects as construction ends and there is a sharp decrease in employment and business associated with the Project. Adverse effects could occur as a result of the local economy adjusting to meet the reduced demands for Project labour, goods, and services for the short period of construction, followed by a reduction in local employment and businesses as the Project transitions to operation.

Operation

During operation the Project's effects on the local labour market will stabilize, as direct, indirect and induced employment associated with this stage are established for a long duration. Compared to construction, employment will be reduced during operation and will require a relatively higher level of skilled workers. While the mitigation measures will enhance the employment of local and Aboriginal workers, it is expected that skilled workers will also be recruited from outside the LSA. However, as with

construction, Project demand for labour in the LSA will contribute to competition for workers and reduced availability of labour.

Decommissioning

Project effect mechanisms on labour supply and demand during decommissioning will be similar to those described above for construction, though in comparison to construction potential for adverse economic effects will be reduced as a result of lower employment and expenditures. Project activities during decommissioning will result in a short-term demand for workers. As with construction and operation, qualified local workers will be hired during this phase where possible, supplemented by workers from outside the LSA. Similar to the construction phase, increased demand for labour has potential to result in a reduced pool of available labour, competition for skilled workers, and wage inflation.

As the Project comes to a close, there will be a wind down in direct Project employment, as well as potential reduction in indirect and induced employment. This decrease in labour demand has potential to lower employment and earnings not only in the LNG manufacturing sector, but also in goods and services sectors that have been developed partly in response to economic development related to the Project.

There are varying potential economic outcomes as resource development activity comes to a close (Tonts 2012) and estimating the labour market effects of boom and bust periods can be difficult (Marchand 2011). In some cases, as seen with single industry mining boomtowns in the 1970s and 1980s, closure of a resource development project can cause major disruptions in the local economy. Researching the effects of economic downturns in energy sector dependent areas in western Canada, Marchand (2011) found that bust periods were associated with economic stagnation, but did not find evidence of significant negative changes in employment and earnings during these periods. In more economically diverse areas or in areas with potential for multiple long-term developments, there can be alternating periods of economic growth and decline. For example, in the Peace River Region of BC, Ryser et al. (2014) characterized the economic development associated with natural resources not as boom and bust, but as regional economic waves, where the main challenge for communities is to remain in a permanent state of readiness for both scenarios.

6.2.5.2.2 Mitigation for Change in Labour Supply and Demand

The following are mitigation measures for potential adverse effects on the supply of labour:

- Local residents will be informed of job and procurement opportunities during the Project phases. LNG Canada will encourage a hire-local first approach for all phases (Mitigation 6.2-1).
- Develop work packages that will consider the capabilities of local and regional businesses to enhance local procurement opportunities (Mitigation 6.2-2).

- Potential shortages of workers with specific skill requirements will be identified and training and educational facilities will be engaged so that regional residents have the opportunity to upgrade their skills (Mitigation 6.2-3).
- Identify training and capacity building partnerships or other arrangements for potentially affected Aboriginal Groups and local communities that will increase opportunities for participation (Mitigation 6.2-4).

Mitigation measures to avoid or reduce adverse effects on labour in the LSA are designed to address shortages of available skilled labour required for the Project. LNG Canada is committed to providing local benefits associated with the Project and it will continue to work proactively with interested Aboriginal Groups and the local community to enhance Aboriginal and local employment. Mitigation measures will work to expand the potential pool of local labour by opening up opportunities for workers who might not otherwise be able to participate in the Project, thereby reducing Project-related pressure on the current local supply of skilled labour.

These include measures to improve the availability of applicable training and education opportunities and addressing potential barriers to employment for groups such as Aboriginal people. Such measures have been advocated and advanced by the provincial government because skilled labour shortages are a known issue for the planned development of the LNG sector in BC. The province has several initiatives to begin addressing this issue, including the BC Natural Workforce Strategy and Action Plan (BC Natural Gas Workforce Strategy Committee 2013), the Northwest Regional Skills Training Plan (NWRWT 2012), and the BC Skills for Jobs Blueprint (Province of BC 2014).

Most of the employment and contracting opportunities during the construction phase will be through CFSW LNG Constructors (CFSW), a partnership of Chiyoda, Foster Wheeler, SAIPEM and WorleyParsons. LNG Canada and CFSW have committed to work together to help local residents and business become qualified for opportunities related to LNG, including: investing in skills training and capacity building initiatives; developing long-term partnerships with local education and training facilities in the region to develop and maintain a skilled workforce to support LNG development; and hosting contracting networking sessions with local businesses and CFSW to profile the expertise and capacity of businesses in the northwest.

By taking measures to increase participation of local workers who may not otherwise be qualified for Project employment, LNG Canada will effectively increase the capacity of the local labour pool. This will reduce pressure on the existing labour market, while also enhancing local economic benefits related to increased employment and income. These education and training initiatives are consistent with and will support the objectives of government-led labour force development plans (e.g., NWRWT 2012, BC

Natural Gas Workforce Strategy Committee 2013, Province of BC 2014), which are designed to improve the qualifications of local workers and increase the labour pool for natural gas sector employment.

The mitigation measures discussed above will be implemented prior to construction and will continue throughout all Project phases. LNG Canada's confidence in the proposed mitigation measure is low to moderate during construction phase and moderate to high during the operation phase. As the Project is scheduled to begin construction in 2015/2016, and given that it may take several years for individuals to master the skills needed for construction or operations occupations, it is anticipated that the mitigation measures will be less effective at addressing LSA labour supply at the start of construction, and more effective at addressing supply later in the construction phase, and in the operation phase. The mitigation measures will require participation of third party organizations, such as education and training institutions, to deliver the training needed for individuals to assume apprentice-level positions in the area of their interest. Finally, it is difficult to determine whether individuals in the LSA labour pool will choose to participate in initiatives, such as skills upgrading.

6.2.5.2.3 Characterization of Change in Labour Supply and Demand

Construction

Current planning is for a phased construction approach, which includes early works, such as ground preparation, preparation of the MOF, and workforce accommodation centre(s); installation of trains 1 and 2; and marine terminal construction. During this phase, the estimated workforce will peak at approximately 7,500 persons, with the average labour force over the five-year construction period of approximately 3,470 persons. Subsequent phases will consist of installation of trains 3 and 4, and ancillary equipment, at the LNG facility and the marine terminal. Employment for this subsequent development is estimated to average 1,080 persons over the four-year construction period, with peak employment reaching approximately 3,700 persons. LNG Canada is committed to an approach that will see the local communities in the northwest realize economic benefits from the Project. These benefits may come in the form of direct employment opportunities for qualified workers and potential contract opportunities for competitive businesses.

Direct construction employment will occur in Kitimat, where the Project will be constructed. Direct employment during construction is estimated at 36,500 PYs, of which an estimated 26,300 PYs will be required to construct trains 1 and 2, and 10,200 PYs will be required to construct trains 3 and 4.

LNG Canada's preference is to attract a sufficient amount of qualified labour from BC and Canada to construct the Project. LNG Canada is committed to hiring as many local people as possible that qualify for employment with the Project, focusing first on the northwest, expanding to across BC and then to the rest of Canada.

Despite LNG Canada's "hire local first" commitment, LNG Canada expects a gap will still remain that will necessitate hiring additional labour from outside Canada to complete the Project, particularly specialized skilled workers with specific experience in constructing LNG facilities.

LNG Canada estimates that 10% of the direct construction workforce will be hired locally, 20% from other parts of BC, 50% from other parts of Canada, and 20% from abroad (Table 6.2-23). Based on LNG Canada's experience, the proportion of local content will vary throughout the construction phase, typically being higher during civil works activities, such as site preparation and building construction, and lower during mechanical construction, when more specialized labour is needed.

Direct construction will account for between 42% and 63% of the Project's total employment in Canada. Other workers will be employed at the workforce accommodation centre(s), involved in the transportation of materials, equipment, and personnel, provide professional services, or involved in the fabrication and supply of materials and equipment used during construction. The Project is expected to provide between 20,900 PYs and 30,300 PYs of employment for residents of BC, with direct construction employment accounting for between 36% and 52% of the total.

Table 6.2-23: Estimated/Modelled Direct Construction Employment

Jobs (FTE)	BC (Range)		Other Canada (Range)		Total Canada (Range)	
	Low (P/Y)	High (P/Y)	Low (P/Y)	High (P/Y)	Low (P/Y)	High (P/Y)
Construction workforce	10,950		18,250		29,200	
Other direct	9,950	19,350	7,550	16,050	17,500	35,400
Total direct	**20,900**	**30,300**	**25,800**	**34,300**	**46,700**	**64,600**

SOURCE: LNG Canada; custom runs of SCIPIOM 2014

Because demand for labour during construction exceeds the estimated supply of local and regional construction workers, additional workers, including individuals skilled in LNG construction, will be sourced from other parts of BC and elsewhere. While LNG Canada will seek to enhance participation of Aboriginal and local workers from the RSA, specialized skills required for LNG facility construction will be sourced from LNG-experienced labour markets outside the region. With a potential peak construction workforce of 7,500 persons, potential local employment is estimated to be approximately 750 workers. This number includes individuals currently residing in the LSA as well as those who may move to the area in search of employment. It is assumed that 50% of locally hired individuals will be current residents, and 50% will be individuals who migrate into the LSA in search of employment (see Section 7.2.5.1 for further discussion of this assumption).

In 2011, there were approximately 3,580 people who had been employed in trades, transport, equipment operations, and related occupations in the LSA. In the RSA, there were approximately 5,095 workers employed in such occupations. These numbers provide an indication of the supply of workers in the LSA and RSA who have appropriate skills for construction employment. Based on potential employment of 375 LSA resident workers, Project hiring will account for approximately 10% of workforce with construction-related occupations in the LSA and 7% of the construction-related workforce in the RSA. The actual amount of workers that will be hired from the communities in the LSA during construction phase, including Aboriginal employment, will depend on the number of workers who have construction experience and skills that are directly applicable to Project construction, the demands of other projects that are underway at the same time, and to the degree to which local workers are interested in seeking employment opportunities on the Project.

In 2011, there were 2,290 unemployed people in the LSA, with a relatively high unemployment rate of 11.6% compared to 7.8% provincially. The number of local workers employed by construction could be increased by providing training to people who are currently unemployed or to youth who will soon be entering the labour force.

In addition to direct on-site employment, Project construction expenditures will result in indirect and induced employment. Indirect employment will result from inter-industry purchases farther up the supply chain. This will create additional pressure on the local supply of labour because the SCIPIOM results indicate that the purchases of goods and services will create from 10,600 PYs to 17,100 PYs of employment in BC, some of which will represent workers in the LSA.

Induced economic activity will occur due to spending on goods and services by individuals directly or indirectly employed by the Project. Such induced spending will follow expenditure patterns by households, which varies between different regions. In BC, in 2012, shelter, transportation, food, recreation, household operations, and clothing and accessories accounted for 80% of total household spending (Statistics Canada 2014). Based on the SCIPIOM results, induced economic activity will create 9,300 PYs to 15,000 PYs of employment in BC.

Based on the baseline conditions of the labour force in the LSA (Section 6.2.3.2), the available supply of skilled labour will not be sufficient to meet employment requirements during Project construction; construction workers will need to be hired from outside the region. While it is not expected that the local economy will experience the full extent of pressures on labour supply, this peak in potential local employment represents approximately 10% of the LSA workforce with experience in relevant occupations. While the mitigation measures will reduce pressures on the local supply of labour by improving accessibility to training and education and expand recruitment for historically under-represented groups such as Aboriginal people, the labour requirements for Project construction will still

contribute to competition for labour in the LSA. Therefore, adverse residual effects on the supply of labour in the LSA are anticipated to be high magnitude.

As construction winds down, there will be reduced employment and reduced pressure on the local labour force. While there is potential for adverse economic effects due to decreased employment, the short-term nature of construction is known and will be anticipated by workers who are employed by the Project. Adverse effects on local workers who are employed during construction will be offset by benefits of increased income and employment experience, which will improve qualifications for positions on future projects. There is also potential for appropriately skilled local workers to transition to operations occupations, where appropriate. Through LNG Canada's initiatives to improve local employment through training and collaboration with Aboriginal Groups and local stakeholders, the number of local people hired during operation will be increased, further offsetting the adverse effect of reduced construction employment.

Adverse effects on labour supply and demand during construction will be short-term, occurring continuously through construction and reversible upon completion of construction. Because the Project will require skilled workers from the RSA and elsewhere in the province, the effects on labour supply and demand could contribute to a general shortage of certain types of skilled labour in the provincial workforce. The economic context is of medium resilience, based on the level of regional and local planning that has been conducted in support of developing the LNG industry.

Operation

The Project is estimated to employ between 350 to 450 people to operate trains 1 and 2, and this is estimated to increase to between 450 to 800 people when trains 3 and 4 become operational. An additional 5% to 30% operation staff will be needed during the commissioning, start-up, and initial operation periods, which will commence approximately one year prior to the start-up of each phase and extend for approximately four years after start-up. The LNG trains will undergo periodic maintenance turnarounds every few years. This will consist of a minor turnaround cycle every three years and a major turnaround cycle every six years. The minor turnarounds will involve approximately 500 additional persons at the Project site for several weeks, whereas the major turnarounds will involve approximately 1,000 additional persons for several weeks.

Approximately 50% to 70% of the operation staff will be full time LNG Canada employees, with the balance provided by contractors. LNG Canada anticipates that the majority of operational workforce will be Canadian residents and will reside in the local communities.

In addition to operation staff and contractors working at the Project site, some additional direct employment will be created from operational expenditures on goods and services consumed directly by

the Project. Indirect and induced employment associated with the Project is estimated from the results of the SCIPIOM run, based on Project operational spending in Canada. Table 6.2-24 summarizes the total direct, indirect and induced employment associated with operation. Annual employment associated with the Project is estimated at 21,700 PYs to 50,500 PYs, of which 55% will be residents of BC. Of the total employment effects, 58% will be associated with natural gas exploration, production, and transportation in Canada. Over the Project's 25 year operating life it is expected to create from 0.5 million FTEs to 1.3 million FTEs of employment.

Table 6.2-24: Modelled Operational Employment in BC and Canada

	BC		Other Canada		Total Canada	
	Low (FTE Jobs)	**High (FTE Jobs)**	**Low (FTE Jobs)**	**High (FTE Jobs)**	**Low (FTE Jobs)**	**High (FTE Jobs)**
Direct employment	500	1,200	100	300	600	1,500
Indirect employment	8,500	19,700	6,600	15,400	15,100	35,100
Induced employment	2,800	6,600	3,200	7,400	6,000	13,900
Total employment	**11,800**	**27,500**	**9,900**	**23,000**	**21,700**	**50,500**

SOURCES: Custom runs of SCIPIOM 2014

Based on estimated direct operation workforce of 350 to 800 FTEs, plus additional workers hired locally for positions created indirectly or induced by the Project it is expected that the change in labour supply and demand in the LSA will be of moderate magnitude. The effect will be long-term and continuous through the operation phase, extending to provincial and national levels.

Decommissioning

Table 6.2-25 summarizes the total direct, indirect and induced employment associated with decommissioning. Total employment is estimated at 10,200 PYs to 15,700 PYs, of which 70% will involve residents of BC. Of the total employment, 47% will be associated with direct employment, 32% will be indirect employment associated with the purchases of goods and services, and 21% will be induced employment.

Table 6.2-25: Modelled Decommissioning Employment in BC and Canada

	BC		Other Canada		Total Canada	
	Low (PYs)	High (PYs)	Low (PYs)	High (PYs)	Low (PYs)	High (PYs)
Direct employment	4,300	6,700	500	700	4,800	7,400
Indirect employment	1,600	2,300	1,700	2,700	3,300	5,000
Induced employment	1,300	2,000	800	1,300	2,100	3,300
Total employment	**7,200**	**11,000**	**3,000**	**4,700**	**10,200**	**15,700**

SOURCES: Custom runs of SCIPIOM 2014

While the employment effects of decommissioning will be reduced compared to construction, there will be a similar effect of short-term demand for labour, which could have temporary effects on the availability of workers and upward pressure on local wage rates.

6.2.5.2.4 Determination of Significance for Change in Labour Supply and Demand

Project demand for skilled and unskilled labour will require resources beyond the LSA and will contribute to competition for local labour, affecting the supply of labour in the LSA through construction, operation, and decommissioning. LNG Canada will enhance the employment of Aboriginal people and other residents of the LSA through measures discussed in Section 6.2.5.2.2, which will increase the potential pool of local labour and mitigate pressure on the local skilled labour force. LNG Canada does not intend to set local hire quotas that would contribute to a highly competitive local labour market. Predicted effects are long term, and are of moderate to high magnitude, with the high-magnitude effects expected during the short-term construction phase.

Increased demand for labour to support LNG projects in the LSA and the RSA is an expected economic condition, which is being addressed by regional and provincial economic plans (e.g., NWRWT 2012; BC Natural Gas Workforce Strategy Committee 2013). The mitigation measures are consistent with and will support initiatives undertaken by the province, such as the BC Natural Workforce Strategy and Action Plan (BC Natural Gas Workforce Strategy Committee 2013) and the Northwest Regional Skills Training Plan (NWRWT 2012). In combination with initiatives undertaken by the province, the application of Project-specific mitigation measures is expected to mitigate adverse effects on the local labour supply. As a result the change in labour supply and demand is assessed as not significant.

Prediction confidence is moderate because there is uncertainty regarding several determining factors, including interest among local workers to seek employment on the Project or to undertake the available skills development and training opportunities. There is also uncertainty regarding the timing and effectiveness of government-led initiatives that would further increase the availability of skilled workers for Project employment.

6.2.5.3 Assessment of Change in Economic Activity of Other Sectors

6.2.5.3.1 Description of Project Effect Mechanisms for Change in Economic Activity of Other Sectors

Project employment and expenditures have potential to affect the economic activity of other sectors, primarily as a result of increased demand for local goods and services. For example, demand for housing and accommodations will increase due to Project-associated employment, and subsequent population increases in the LSA will result in increasing demand for housing and accommodations, potentially resulting in increased cost of accommodations. As discussed in Section 6.2.5.4, competition for local

labour has potential to drive up wages, increasing business costs. Increased rents and labour costs could result in a need for businesses to increase prices, resulting in further increases in the cost of living in the LSA.

Studies on industrial development in other areas of BC, such as the Peace River region (KTIDS Northwest 2012) has shown that economic development can contribute to pressures on housing availability and affordability. Additionally, businesses in other economic sectors (e.g., service sector) may experience difficulty in recruiting and retaining employees because demand from rapidly growing economic sectors can increase the level for results in competitive wages.

Potential effects mechanisms related to cost of living increases have been documented through research on boom towns in rural North America, as summarized by Jacquet (2009). While the socio-economic context of Kitimat, Terrace and the LSA cannot be typified as rural, the effects discussed are relevant based on experience in communities such as Fort St. John and Dawson Creek in BC and Fort McMurray in Alberta. Key findings are:

- Employment, retail, and population effects can vary between communities, with the larger communities of a region attracting the largest in-migration.
- Rapid job growth and increased retail trade can lead to high inflation rates and worker shortages and may require businesses to change their usual ways of doing business in order to adapt to this economic transition. Adverse effects related to these changes can include a greater turnover rate, with research showing that the failure rate among small businesses in boom towns is above the national average.
- Reduction in housing availability is often a critical problem as demand for housing increases. New housing construction is often delayed by factors such as high labour and supply costs and shortages in the supply of workers, goods, and services.
- High demand for housing leads to inflationary housing prices.

Evidence from the mining boom that has occurred in Australia since 2002 indicate that increased workforce and population can have adverse effects on housing and accommodation in resource towns. Housing costs increases can indirectly affect other businesses by making it more difficult for people on lower incomes to afford living in communities, reducing the ability of other industries to attract and retain employees (Rolfe et al. 2007). Adverse effects on cost of living as a result of rapid economic growth have also been documented for Gladstone, Australia (Akbar et al. 2013), where developments in the coal and coal seam gas industries has resulted in critical housing issues. In Gladstone, labour demands have affected property markets and contributed to increased housing prices. Continued economic expansion related to major LNG projects is expected to drive this trend further (Akbar et al. 2013).

Drawing on experience with the Australian mining industry, McKenzie et al. (2009) identify several pathways through which local housing markets are affected during boom times. These relate to population increases related to workforce demand, as well as an increase in the demand for rental units as opposed to home-ownership, due to the more transient and temporary nature of worker populations. High housing costs can result from shortages in labour and materials, particularly in more remote locations, and there may be difficulties in aligning the housing supply with the timing of increased demand. Case study evidence from Australian boom towns illustrates that successful housing strategies require coordination between all levels of government, along with the proponents of resource development and the local residential property industry (McKenzie et al. 2009).

As discussed in Section 6.2.3.2, housing affordability in Kitimat and Terrace has already been affected by increased economic development. Increased demand for rental units has resulted in displacement of low-income tenants (Monaghan 2013, pers. comm.; Poole 2013, pers. comm.), contributing to overcrowding and increased potential for homelessness (Grant 2013, pers. Comm.). Housing issues are also persistent in local First Nation communities, where common challenges include high-market rents and overcrowding, exacerbated by limited developable land.

Aboriginal Groups in the LSA have expressed concerns related to housing affordability and availability. Haisla Nation, for example, indicates that there is a lack of available reserve housing and has expressed concern for potential housing effects from the Project. Haisla Nation indicates potential for off-reserve members to seek housing on the reserve if the Project resulted in additional employment and income for Haisla Nation families (Powell 2013).

Additional demand and supply constraints could result in higher prices. As discussed in Section 7.2, the construction phase is unlikely to affect local housing markets due to the use of the workforce accommodation centre(s). However, construction will increase demand for temporary accommodations and the operation workforce, along with spouses and children, will require accommodation in the LSA for the duration of the minimum 25-year operation phase.

In addition to cost of living effects, the Project has potential to cause adverse effects on other sectors as a result of increased wages and demand for goods and services. As discussed in Section 6.2.5.2, existing labour supply issues have been a problem for local businesses. Increased wages as a result of the Project could increase competition, reducing the ability of businesses in other sectors to recruit and retain employees. Another example of a potential indirect adverse effect of the Project on another sector is on tourism businesses in the tourism sector. These businesses could be indirectly affected by increased demand for accommodations, particularly during construction, which will reduce the availability of accommodations for tourists. While there is potential for increased spending to benefit tourism-related businesses in the LSA, competition for hotels and accommodations could reduce tourism in the area.

6.2.5.3.2 Mitigation for Change in Economic Activity of Other Sectors

The following mitigation measure will be implemented to reduce the Project effects on other sectors:

- Construct and operate workforce accommodation centre(s) for non-resident workforce during the pre-construction and construction phase to manage effects of temporary workforce on communities (Mitigation 6.2-5).
- LNG Canada will work to manage demands on local housing (e.g., apartments and single-family houses) due to the anticipated requirements of the construction management and operational workforce, and will also include, in periodic reassessments of the housing market, the consideration of the risk posed by oversupply of accommodations (Mitigation 7.2-22).
- LNG Canada and its contractors will offer fair labour wages, consistent with the Western Canadian labour market (Mitigation 6.2-6).
- Participate in initiatives and recommended measures identified in the Northwest Communities Housing Action Plan to address the availability of affordable housing within northwest communities (Mitigation 7.2-25).

Because non-resident workers will be provided with a workforce accommodation centre(s), temporary population increases during construction will not lead to a high demand for local accommodations that could affect the tourism industry. The use of a workforce accommodation centre(s) will also reduce consumer spending by construction workers in local communities because many goods and services are likely to be provided by the accommodation centre(s). This will reduce the potential for a rapid, large-scale increase in demand for goods and services that could result in reduced availability or increased prices during construction. Reducing demand on local housing and accommodations will also limit the extent to which the Project contributes to an overall increase in the cost of living, particularly increased rents.

As assessed in Section 6.2.5.2, demand for labour, which could affect other sectors by driving up labour costs, will be mitigated by local hiring initiatives that expand the potential pool of local labour through skills development and addressing barriers to employment for members of Aboriginal Groups and other residents of the LSA. This will mitigate the potential for a highly competitive local labour market developing as a result of Project construction. LNG Canada will not set local hiring targets, which in a tight labour market could inflate wages, beyond what would be reasonably expected of the broader labour pool. Rather, fair wages will be offered, based on prevailing wage rates in the western Canadian labour market.

Measures to actively recruit from the local labour force, including initiatives to increase participation of residents who may not currently possess appropriate skills and qualifications, or who face barriers to employment in the LNG industry, are consistent with LNG Canada's commitment to provide local benefits

associated with the Project. LNG Canada will continue to work proactively with interested Aboriginal Groups and the local community to enhance Aboriginal and local employment.

The mitigation measure discussed above will be implemented prior to Project construction. The workforce accommodations centre(s) will mitigate adverse effects on other sectors throughout construction, while local hiring initiatives will continue to mitigate effects through the life of the Project. As the Project is scheduled to begin construction in 2015, and given that it may take several years for individuals to master the skills needed for construction or operations occupations, it is anticipated that the mitigation measures will be less effective at addressing labour-related effects on other sectors at the start of construction, and more effective at addressing supply later in the construction phase, and in the operation phase.

Other measures aimed at addressing the availability of accommodations in the LSA (see Section 7.2.5.4) are expected to alleviate upward pressure on the cost of accommodations, and therefore cost of living overall. Such measures include, for example, providing accommodations, such as apartments and single-family houses to address the anticipated requirements of the operational workforce and developing a workforce accommodation plan that addresses worker accommodations throughout the Project lifecycle. While LNG Canada has high confidence that its proposed measures to address the direct Project demand for accommodations, and thus demand driven increases in accommodations costs, the overall effects on other sectors will also depend on factors beyond the Project's control, including the extent of in-migration associated with the Project, the nature, extent, and timing of market response to changes in supply/demand of accommodations and other goods and services, and the extent and effectiveness of government led initiatives, such as the Northwest Communities Housing Action Plan.

6.2.5.3.3 Characterization of Change in Economic Activity of Other Sectors

Construction

Wages earned by construction workers, particularly by experienced trades persons, are likely to be higher than average wages in the LSA due to relatively high base wage. Thornton (2013) reports an average annual compensation of $140,200 for workers directly employed by oil and gas facility construction. This is higher than typical incomes in the LSA and RSA. In 2010, average earnings for RDKS was $55,590, while in the SQCRD, it was $53,018.

The large differential between average wages in the LSA and expected construction wages could result in upward pressure on wages in the LSA. As a result of increased wages, it may be difficult for businesses in other sectors to recruit or retain workers. With increased wages there will also likely be increased labour costs, potentially driving up prices of local goods and services. As discussed in Section 6.2.5.2, education and training initiatives developed by LNG Canada in cooperation with Aboriginal Groups and

local stakeholders will support government-led plans to increase the pool of qualified workers. This will reduce the pressure on the local skilled labour force.

While LNG Canada will seek to hire local labour first, it will recruit from other parts of BC, Canada, and potentially abroad, to secure the workers it needs to construct the Project. LNG Canada anticipates that because it will be able to draw construction labour from a broad labour pool, and negotiate wage rates consistent with oil and gas construction projects in Western Canada, that the Project will not induce high levels of wage inflation.

As shown in Section 6.2.3.2, cost of living baseline information for Kitimat, Terrace and Prince Rupert indicate there is increased spending on consumer items as household incomes increase (Welcome BC 2014.) It is, therefore, reasonable to expect that higher incomes among Project workers will result in some increased consumer spending. However, because workers will be accommodated in a self-contained workforce accommodation centre(s), which will provide accommodations, meals, and recreational amenities, most consumer spending by Project workers housed in the accommodation centre(s) is likely to occur in their home communities, reducing potential effects on the availability of goods and services in the LSA.

The effects from the Project on housing availability are assessed in Section 7.2 (Infrastructure and Services). While it is expected that the Project will increase demand for housing in the LSA beginning with construction and lasting throughout the life of the Project, during construction most of the workforce will be housed in the workforce accommodation centre(s). As LNG Canada will supply sufficient housing to accommodate its direct construction workforce, the Project's direct effects on the supply and demand balance of housing in the LSA is expected to be low. These measures will work to reduce potential effects on tourism-related businesses by decreasing the use of local accommodations by Project workers.

Operation

As a result of employment during operation, by 2025 the permanent population of the LSA will increase by approximately 2,370 people as in-migrant workers and their families relocate to the area (see Section 7.2). LNG Canada will add housing units in Kitimat sufficient to accommodate Project operations staff and their families who will permanently relocate to Kitimat. This mitigation measure will partially offset the effect of operation-related demand for housing and subsequent cost of living effects, though additional demand will occur due to migration associated with indirect and induced employment.

The increased level of economic activity associated with the Project will endure over the operational period, both due to direct spending by the Project on local goods and services, as well as household spending resulting from the Project-associated workforce. The Project will not affect supply channels, and local vendors and service providers could be expected to adjust their market offerings in response to the

change in demand. While it is possible that the increased economic activity associated with Project operation will contribute some localized inflation, over the longer term inflationary (or deflationary) pressures will also result from macro-economic factors, such as changes in commodity supply, import prices, money supply, and other factors.

Decommissioning

During decommissioning, the LSA will experience both a short-term increase in employment, and associated goods and services demand from the work force brought in to decommission the facility, and a longer term decrease in regional employment. Over the course of the decommissioning period, local economic effects may be similar to that during the construction phase, with higher demand for labour, accommodations, and goods and services, resulting in some localized inflation within the LSA.

Historically, the closure of major employers in the LSA (i.e., Methanex and Eurocan in Kitimat) has resulted in a decline in population, reduced demand for local goods and services, and reduced real estate prices. The long-term effects of closure of the LNG facility will depend on a number of factors, including changes in economic diversification that may have occurred in the LSA, the availability of alternative employment for those whose jobs depended directly or indirectly on the Project, and changes in population levels within the LSA. The nature and extent of economic effects will also be influenced by the ability of individuals and local businesses to leverage the skills, capacity, and capabilities acquired over the course of employment or business association with the Project.

Residual Effects for All Phases

Project related increases in population are anticipated to contribute to increased demand for housing, goods, and services within the LSA, potentially leading to increased prices. Potential effects on the cost of housing will be mitigated during Project construction by the use of a workforce accommodation centre(s). LNG Canada will work to offset the demands on local housing (e.g., apartments and single-family houses) due to the anticipated requirements of the construction management and operational workforce. However, as discussed in Section 7.2.5.4, indirect and induced housing demands associated with the Project are expected to contribute to higher housing costs, potentially increasing the number of households unable to afford adequate housing. Potential effects on cost of living within the LSA, especially related to increased housing costs, are anticipated to be adverse, of moderate to high magnitude, occur during Project construction and may persist through operation. Over the longer term, residual effects will be moderated by market forces, as suppliers and developers responding to opportunities created by changes in demand. Residual effects will occur sporadically as the supply and demand of housing changes with market conditions and will be reversible after decommissioning. Because of current limited availability of housing in the LSA and demands on affordable housing, the

context is considered low resilience during construction phase, but it is expected that over the course of operation the context will change to that of moderate resilience as the supply/demand balance for accommodations stabilizes.

6.2.5.3.4 Determination of Significance for Change in Economic Activity of Other Sectors

Increased economic activity as a result of LNG projects in the LSA is expected, which is being addressed by regional and provincial economic plans (e.g., BC Natural Gas Workforce Strategy Committee 2013; NWRWT 2012). These government-led plans will work to alleviate upward pressure on labour costs by increasing the pool of workers who are qualified for employment in the LNG sector, thus reducing the effects of increased labour demand by increasing supply. While government initiatives can be effective in reducing labour-related issues, some adverse effects, including cost of living effects, particularly housing and accommodation price increases, are driven by market forces. Mitigation measures, such as housing construction workers in a workforce accommodation centre(s) and adding housing units to accommodate resident operations workers, will reduce Project-related demand on the local housing market.

Residual effects on other economic sectors are expected to be of moderate magnitude. During Project construction, temporary workers will be accommodated in a worker accommodation centre(s), which will reduce Project-related demand for temporary accommodations, therefore avoiding effects on the tourism sector. Project demand for labour and locally sourced goods and services could lead to increase costs, which could affect other business sectors. However, such sectors will also benefit by increased spending associated with the Project directly and by Project workers and their families. As well, channels for supplying goods into the LSA would be expected to adjust to changing demand, therefore moderating scarcity-based price changes. In consideration of market mechanisms, government-led initiatives to address the limited labour pool and housing availability in northwest BC, and Project-led mitigation measures, residual effects are assessed as not significant.

Prediction confidence for construction is low because of the difficulty in predicting the nature and extent by which the Project will influence other economic sectors in the LSA. For example, it is not known how many people will move to the LSA as a result of the Project or how the housing market will respond to the change in demand. While LNG Canada predicts that local procurement on goods and services will stimulate economic activity, the extent by which such activity will result in localized inflation is difficult to predict because pricing is related to many factors, including labour costs, rents, energy costs, import prices, transportation costs, exchange rates, the cost of money, and the overall rate of inflation. The nature and extent of effects on labour costs is also difficult to predict because these will be substantially influenced by future labour market conditions, which in turn will be affected by the extent of large industrial and infrastructure development occurring within the Project's construction period.

Prediction confidence for operation is moderate because the size of the workforce is expected to stabilize once the Project has reached full build-out, and over time the labour market, as well as the supply of goods and services in the LSA, including accommodations, would be expected to adjust to the change in demand. There is, however, uncertainty in predicting how the local economy will transition from the relatively rapid, short-term expansion expected during construction into the more stable economic conditions expected for the operation phase, as well as how local economic conditions will be affected by Project closure after decommissioning.

6.2.5.4 Summary of Residual Effects from the LNG Facility

While the Project will result in substantial economic benefits during construction, operation and decommissioning (see Section 2.5), employment and expenditures will also create temporary pressure on labour supply and the availability of goods and services during construction. LNG Canada is committed to enhancing local employment and contracting, however this approach is not expected to increase pressure on the local economy because the Project will require substantial specialized labour, goods and services from outside the LSA, extending to provincial, national, and international labour markets and businesses. In addition, rather than setting local-hire targets, LNG Canada will focus on education and training programs that will promote the employment of local workers who may not otherwise be qualified for Project employment, thereby increasing the supply of potential local workers and reducing pressure on the existing supply of skilled labour. LNG Canada's participation in education and training will support provincial training initiatives to enhance the qualifications of the local labour supply for employment in the LNG Sector.

Demands on the local labour force will change as the Project transitions to operation, both because operation involves a small workforce relative to construction, and because the skills needed to operate the LNG facility will differ from those needed to construct it. Because LNG Canada will locally operate the Project it will look to hire or retain local staff where available to help fulfill its operational workforce requirement. Those construction workers not retained for operational employment will need to seek employment elsewhere once the Project is constructed. Skills, training, and experience acquired over the course of Project-employment will strengthen such individual's abilities to compete in the labour market and secure employment with other employers or on other projects.

The sustained demand for labour and local Project procurement over the operation phase is expected to bring substantial economic benefits, including higher economic stability, capital injection, higher average levels of household income, and enhanced local government revenue. While the enhanced levels of economic activity could lead to workforce scarcity and increased costs of goods and services, market forces and labour mobility will also balance such effects over the longer term.

A key component of the Province's economic strategy is the construction and operation of LNG facilities (Government of BC 2011). Such activities, and their associated demands, are being addressed through a variety of government-led economic development and labour market planning initiatives. As a result, adverse effects related to labour supply and demand, potential increases in cost of living, and interaction with the economic activity of other sectors while falling outside the range of normal variation in the LSA, are being anticipated and planned for. Mitigation measures committed to by LNG Canada will reduce the adverse economic effects from the Project and will complement the government-led plans and actions that are being taken to facilitate development of the LNG sector in northern BC.

Considering baseline economic conditions, the Project is anticipated to have a high magnitude effect on the LSA labour supply during the Project construction period, and a low to moderate effect over operation and decommissioning. As the baseline housing situation in the LSA continues to be characterized by declining affordability and availability, it is conservatively estimated that, despite Project mitigation measures, this trend will continue over the course of construction and operation due to demand caused by induced population change, resulting in a high magnitude effect on other economic sectors during the construction phase. Over the longer term, however, market forces could be expected to address higher accommodations costs and other supply/demand imbalances, so effects on the economic activities of other sectors are anticipated to be moderate in magnitude.

In summary, adverse residual effects from the LNG facility are assessed as not significant because:

- Mitigation measures applied by LNG Canada will be consistent with and will support the objectives of government-led economic development plans and labour force skills training plans, which are designed to increase the pool of skilled labour for LNG sector employment as it is currently planned to 2020.
- Effects on labour supply and demand and economic activity of other sectors will be mitigated during the construction phase by the use of outside workers and the workforce accommodations centre(s), which will limit the construction-phase demand for local goods and services, including accommodations. This will also reduce the likelihood of indirect adverse effects on tourism and related service-based businesses as there will be less likelihood of local accommodations being filled by Project workers.
- Economic effects during operation will be reduced to moderate magnitude as direct employment is anticipated to be 350 to 800 jobs, a substantial proportion of which will require skilled labour from outside the LSA. LNG Canada will mitigate potential effects on cost of living by providing housing for its non-resident workforce. Temporary accommodations are not likely to be affected by this phase as the labour force is expected to stabilize for long-term employment, with workers taking residence in the LSA.

6.2.6 Assessment of Residual Effects from Shipping

Potential effects of LNG shipping on other sectors has been identified as a key concern of Aboriginal Groups in the LSA (e.g., Powell 2013; Ritchie and Gill 2014; Crossroads CRM 2014; DMCS and Metlakatla First Nation 2014). Concerns identified included potential that increased marine traffic will affect commercial fisheries and will interfere with marine transportation and the harvesting of marine resources for both cultural and economic purposes.

Interference with recreational and tourism-related activities has been identified as a potential issue for both Aboriginal Groups and non-Aboriginal recreational interests. For example, a study conducted by Gitga'at First Nation, indicated that a large proportion of Gitga'at First Nation community members anticipated some loss or high loss in commercial fishing and tourism activities as a result of the Project (Ritchie and Gill 2014). Members of Gitxaala Nation have noted recent increases in marine traffic and expressed concern that the Project will lead to further increases (The Firelight Group and Gitxaala Nation 2014).

6.2.6.1 Analytical Methods

6.2.6.1.1 Analytical Assessment Techniques

Economic Activity of Other Sectors

The analysis of residual effects from shipping on the economic activity of other sectors considers how the Project may affect key coastal industries in the LSA, including fisheries and tourism.

6.2.6.1.2 Assumptions and the Conservative Approach

The ranking of potential interactions (Table 6.2-22) conservatively assumes a high potential for interaction between the Project and the economic activity of other sectors, with the majority of Project activities being ranked as 2. Wherever there is some uncertainty as to the characterization of residual effects, the assessment has been conducted assuming the greater option (i.e., anticipating a moderate-magnitude effect rather than a low-magnitude effect if there is any uncertainty).

6.2.6.2 Assessment of Change in Economic Activity of Other Sectors

6.2.6.2.1 Description of Project Effect Mechanisms for Change in Economic Activity of Other Sectors

During construction, the Project will result in increased shipping as construction materials are shipped by barge and other vessels. For operation, it is estimated that at full build-out there will be approximately 170 to 350 LNG carrier visits to the marine terminal annually. Increased shipping activity due to the Project has potential to affect the revenue of other commercial enterprises.

Potential economic effects on commercial fisheries will result primarily from any physical interference with fishing activities that will lead to reduced harvesting and related revenue (see Section 14 for a discussion of effects related to Aboriginal Interests). As discussed in Section 7.4, interference with marine fisheries or shoreline harvesting could occur either through direct LNG carrier interference with fishing vessels or their gear, or through wake waves generated by LNG carriers and their escort tugs. These mechanisms are summarized as follows:

- displacement of fishing vessels due to shipping traffic presence
- displacement of fishing vessels and shoreline harvesters due to vessel wake
- damage from physical interactions with shipping traffic, and
- interference from vessel wake.

As commercial fishing openings are limited, any reduction in the ability to access preferred locations during such openings, or deploy and retrieve gear, could reduce catch sizes and overall returns from the fishing effort.

For tourism businesses (including outdoor recreation ventures, boat tours), there is potential that increased shipping traffic will affect the perceived aesthetic value of coastal and marine tourism experiences, which could lead to a decrease in the number of tourists to the LSA and a related drop in tourism revenue. Potential effects on the marine environment could also have an economic component for tourism, with potential for loss of revenue if there are any adverse effects on coastal and marine tourism resources.

Such effects have been identified as a concern by local recreation and tourism business owners (QRG 2013). A large proportion of interviewed business owners (72%) indicated concern that the effects from increased shipping to Kitimat will have an adverse effect on their business. The most frequently identified reason for this concern was the potential for marine traffic to alter the aesthetic quality of the local area to tourists. Survey respondents were also concerned about potential effects on the marine environment and the subsequent effects on aesthetic value and public perceptions regarding industrialization of the area.

Section 5.8 provides an assessment of potential effects from shipping on marine resources. Potential effects on visual quality resulting from shipping activities are assessed in Section 7.3, while potential effects on marine transportation and use are assessed in Section 7.4.

6.2.6.2.2 Mitigation for Change in Economic Activity of Other Sectors

The following mitigation measures will be implemented to reduce the Project effects on marine-related economic sectors:

- Regular communication on Project activities will occur with marine users, including recreationalists, commercial tourism operators, CRA fishers, Transport Canada, DFO, and relevant stakeholders (Mitigation 6.2-7).

These measures will reduce the effects of Project shipping on tourism and fisheries through continued collaboration and cooperation between LNG Canada, representatives of these sectors, and applicable regulatory authorities. This will allow LNG Canada to understand and address shipping-related concerns of businesses in other sectors, and to work with relevant parties to address these concerns. Communication of Project shipping schedules, safety measures, and other Project information will address concerns related to physical interference with fishing and tourism activities. Additional mitigation measures that will be applied to reduce or avoid potential adverse effects on marine fishing and shoreline harvesting are identified in Section 7.4.6.2, measures that will be applied to mitigate interference with marine recreation and tourism are identified in Section 7.4.6.3.

Consultation with local business representatives, Aboriginal Groups, and local and regional stakeholders will continue throughout all Project phases. Based on the extent of shipping expected during construction, operation, and decommissioning, the proposed shipping route and baseline economic activity in this area, the very low potential for physical interference with other activities as a result of shipping, and planned safety measures (see Section 7.4), LNG Canada has high confidence that its participation in regional tourism and fisheries initiatives will address concerns related to the effects of shipping on other marine-related economic sectors.

6.2.6.2.3 Characterization of Change in Economic Activity of Other Sectors

During construction, intermittent delivery of construction materials—including LNG processing modules, supplies, and other equipment, by barge or other vessels—will result in a short-term, low magnitude, temporary and reversible effect on fisheries and other marine-related businesses that use the local shipping area. During operation, the volume of shipping traffic associated with the Project is anticipated to have a negligible to low effect on marine fisheries, shoreline harvesting, marine recreation or tourism (see Section 7.4.6.2 and Section 7.4.6.3 for explanation).

6.2.6.2.4 Determination of Significance for Change in Economic Activity of Other Sectors

Project shipping will occur using a well-established marine access route that is not heavily fished (see Section 7.4.3). There is expected to be limited, if any, interaction between shipping and many local fisheries as a result of either the fishing grounds not being located in the shipping corridor or the use of

fishing gear or practices that preclude potential interactions with the Project. As discussed in Section 7.4.6.2, residual effects on fisheries and shoreline harvesting are expected to be at negligible levels with the implementation of mitigation measures. It is therefore unlikely that Project shipping will contribute to a reduction in landings and landed value that would have an adverse economic effect on fisheries.

Because Project shipping will occur in a well-established shipping corridor, it is not expected to interfere with marine recreation and tourism activities (see Section 7.4.6.4). Many areas used for recreational activities or by tour operators do not overlap with the marine access route and will not be affected by the Project. The local eco-tourism sector has developed and operated alongside commercial shipping traffic, as industrial shipping has consistently been an important component of the local economy. This suggests that increased shipping along a well-established route will not be outside of normal variation of industrial activity seen by local tourism operators. Based on the limited interaction between Project shipping and tourism activities, it is unlikely that the Project shipping will contribute to an adverse economic effect on businesses in the tourism sector.

With the mitigation and protection measures, the change in economic activity of other marine-related economic sectors due to shipping is assessed as not significant (see Section 7.4.6.2 and Section 7.4.6.3). Prediction confidence is high based on the limited interaction between Project shipping and fisheries and tourism activities, resulting in a low likelihood for potential adverse economic effects.

6.2.6.3 Summary of Residual Effects from Shipping

With the application of mitigation measures residual effects are assessed as not significant.

6.2.7 Summary of Project Residual Effects

Table 6.2-26 summarizes residual effects on economic conditions.

Table 6.2-26: Summary of Project Residual Effects: Economic Conditions

Project Phase	Mitigation Measures	Residual Effects Rating Criteria						Likelihood of Residual Effects	Significance	Prediction Confidence	Follow-up and Monitoring
		Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Context				
Facility Works and Activities											
Change in Labour Supply and Demand: Project employment will increase demand for skilled labour in the LSA											
Construction	Mitigation 6.2-1 Mitigation 6.2-2 Mitigation 6.2-3 Mitigation 6.2-4	H	P	ST	C	R	L	H	N	L	N/A
Operation		M	LSA	LT	C	R	M	M	N	M	N/A
Decommissioning		M	LSA	ST	C	R	M	M	N	M	N/A
Residual effects for all phases		M	RSA	LT	C	R	M	H	N	M	N/A
Change in Economic Activity of Other Sectors: Project-related demand for goods and services may lead to increases in cost of living (e.g., housing cost) in the LSA											
Construction	Mitigation 6.2-5 Mitigation 6.2-6 Mitigation 7.2-22 Mitigation 7.2-25	H	LSA	ST	C	R	L	H	N	L	N/A
Operation		M	LSA	LT	C	R	M	M	N	M	N/A
Decommissioning		M	LSA	ST	C	R	M	M	N	M	N/A
Residual effects for all phases		M	LSA	LT	C	R	M	H	N	M	N/A
Shipping Activities											
Change in Economic Activity of Other Sectors: Project shipping activities may affect revenue production for other economic sectors such as fisheries and tourism											
Construction	Mitigation 6.2-7	L	LSA	ST	MI	R	M	M	N	H	N/A
Operation		L	LSA	LT	MI	R	M	M	N	H	N/A
Decommissioning		L	LSA	ST	MI	R	M	M	N	H	N/A
Residual effects for all phases		L	LSA	LT	C	R	M	M	N	H	N/A

KEY

MAGNITUDE:

L = Low—effect cannot be distinguished from baseline conditions; within normal range of variability

M = Moderate—measurable change but unlikely to pose a serious risk to the VC or to represent a management challenge

H = High —measurable change that is likely to pose a serious risk to the selected VC and, if negative, represents a management challenge

GEOGRAPHIC EXTENT:

LSA—expected measurable changes are limited to the LSA

RSA—expected measurable changes are limited to the RSA

P = Provincial—expected measurable changes extend beyond the RSA to the provincial level

DURATION:

ST = Short-term—residual effect is restricted to the duration of the construction period or less

MT = Medium-term—residual effect extends to after the duration of the construction period but less than the life of the Project

LT = Long-term—residual effect is extends to the life of the Project

P = Permanent—measurable parameter unlikely to recover from the baseline

FREQUENCY:

S = Single event—occurs once

MI = Multiple irregular event (no set schedule)—occurs sporadically at irregular intervals throughout construction, operation or decommissioning and abandonment phases

MR = Multiple regular event—occurs on a regular basis and at regular intervals throughout construction, operation, or decommissioning and abandonment phases

C = Continuous—occurs continuously throughout the life of the Project

REVERSIBILITY:

R = Reversible—will recover after Project decommissioning and abandonment

I = Irreversible—permanent

CONTEXT:

L = Low resilience—low capacity for economic conditions to recover from a perturbation with consideration of the baseline conditions

M = Moderate resilience—moderate capacity for economic conditions to recover from a perturbation, with consideration of baseline conditions

H = High resilience—high capacity for economic conditions to recover from a perturbation, with consideration of baseline conditions

SIGNIFICANCE:

S = Significant

N = Not Significant

PREDICTION CONFIDENCE:

Based on scientific information and statistical analysis, professional judgment and effectiveness of mitigation, and assumptions made.

L = Low level of confidence

M = Moderate level of confidence

H = High level of confidence

LIKELIHOOD OF RESIDUAL EFFECT OCCURRING:

Based on professional judgment

L = Low likelihood that there will be a residual effect

M = Moderate likelihood that there will be a residual effect

H = High likelihood that there will be a residual effect

N/A = Not Applicable

6.2.8 Assessment of Cumulative Effects

Cumulative effects are considered for each Project-specific residual effect. Three stages are involved: (1) establishing context by providing an overview of the cumulative effects of other projects and activities on economic conditions; (2) determining the potential for Project-specific residual effects to interact with the effects of other projects and activities; and (3) if the Project does interact cumulatively with other projects or activities, assessing the significance of the resulting overall cumulative effect, and characterizing the Project's contribution to the change in cumulative effects.

6.2.8.1 Stage 1, Cumulative Effects Context

Northwest BC is poised for substantial economic growth as a result of recent, ongoing, and proposed infrastructure, industrial, and resource projects. As of December 2013, there were 13 major projects (i.e., projects valued at $15 million and above) under construction in the North Coast Economic Region, which comprises the RDKS and the SQCRD (BC MJTST 2013). Major projects recently constructed or under construction in the Kitimat-Terrace area include the Northwest Transmission Line, the Forest Kerr Hydroelectric project, and RTA's Kitimat Modernization Project. Major port developments underway in the Prince Rupert area are the Fairview Container Terminal Projects, the Ridley Terminals Inc. expansion, and the Pinnacle Pellet Inc. terminal.

The development of LNG export facilities and related infrastructure is the major driver of economic development in the LSA and RSA. In addition to LNG Canada, there are four LNG projects in the RSA at various stages of regulatory review or development: Kitimat LNG, Douglas Channel LNG, Pacific Northwest LNG, and Prince Rupert LNG. Other LNG projects have also been proposed, but have not yet commenced a regulatory review process. Because the proposed LNG projects are located near population centres (Prince Rupert, Port Edward, Terrace, and Kitimat) and require a relatively large amount of labour for both construction and operation (including the associated natural gas pipelines), if built, they could substantially affect economic conditions in the RSA.

In total, there are 43 proposed major projects in the North Coast Economic Region (ER), which comprises the RDKS and SQCRD. The total combined value of these proposed projects is over $100 billion. In addition to the LNG projects, major projects proposed for the Kitimat-Terrace area include the Kitimat Clean Oil Refinery and Pipeline, with an estimated cost of $27 billion, as well as several pipeline and utilities projects (BC MJTST 2013). While it is unlikely that all 43 projects will proceed as proposed and there will be some variation in temporal overlap with the Project, the assessment of cumulative effects takes a conservative approach and assumes that there will be high cumulative demand for labour, goods, and services as a result of major project employment and expenditures. Table 6.2-27 summarizes past,

present, and reasonably foreseeable projects in the RSA, and the approximate peak workforce and proposed life for past, present, and future projects.

Table 6.2-27: Past, Present, and Reasonably Foreseeable Projects

Project	Location	Project Type	Status [c]	Approximate Peak Worker Size and Project Life	
				Construction	Operation
Kitimat Area Project/Facility					
Coastal GasLink Pipeline Project	Dawson Creek to Kitimat	Natural Gas Pipeline	Proposed	2015–2018 2,500 workers	2018–2048 20 workers
Douglas Channel LNG Terminal (also known as BC LNG)	Moon Bay (near Kitimat)	LNG Facility and Terminal	Proposed	NA	NA
Enbridge Northern Gateway Project	Edmonton to Kitimat	Oil Pipeline	Proposed	2015–2018 600 workers	2018–2048 100 workers
Kitimat Clean Oil Refinery and Pipeline	Kitimat (25 km north)	Oil Refinery and Pipeline	Proposed	2014–2020 6,000	2020 3,000
Kitimat LNG Terminal Project	Kitimat (18 km south)	LNG Facility and Terminal	Proposed	2013–2016 3,000 (400 current) workers	2016–2036
Pacific Northern Gas Pipeline (includes proposed looping)	Summit Lake to Kitimat	Natural Gas Pipeline	Proposed	2015–2016 2,400	2016
Pacific Trail Pipelines Project	Summit Lake to Kitimat	Natural Gas Pipeline	Proposed	2013–2018	2018
Rio Tinto Alcan Facility and Modernization Project	Kitimat	Aluminum Facility	Ongoing	2011–2015 2,500 workers	2015–2055 1,000 workers
Sandhill Materials – Aggregate Processing	Kitimat	Aggregate Processing	Ongoing	NA	NA
Prince Rupert Areas Project/Facility					
BG Group – Prince Rupert LNG Project	Ridley Island	LNG Facility and Terminal	Proposed	2016–2021 3,500 workers	2021–2051 600 workers
Canpotex – Potash Export Terminal	Ridley Island	Potash Terminal	Proposed	2012–2016	2016–2067
Maher Terminals – Fairview Terminal Phase 2 Expansion Project	Prince Rupert	Container Terminal	Ongoing	Phase 1: 2012 1,030 workers Phase 2: 2015	Phase 1: 2012–2015 Phase 2: 2019–2070
Pinnacle Renewable Resources – Pellet Export Terminal	Prince Rupert	Pellet Export Terminal	Ongoing	2012–2015 15 Workers	2015 10 Workers
Prince Rupert Grain Terminal	Prince Rupert	Grain Terminal	Completed	NA	NA
Prince Rupert Port Authority – Ridley Island Road, Rail Utility Corridor	Prince Rupert	Container Terminal	Ongoing	2013–2014	2014

Project	Location	Project Type	Status [c]	Approximate Peak Worker Size and Project Life	
				Construction	Operation
Progress Energy – Pacific Northwest LNG Project	Lelu Island (south of Prince Rupert)	LNG Facility and Terminal	Proposed	2015–2018 3,500 workers	2018–2048 200–300 workers
Ridley Terminal Inc.	Ridley Island	Coal Terminal	Ongoing	2012-2015	2015
Spectra Energy – Natural Gas Pipeline	Northeast BC – Prince Rupert	Natural Gas Pipeline	Proposed	2016–2020 900 workers[a1]	2020 50–60 Workers
TransCanada Corporation – Prince Rupert Gas Transmission Project	Hudson Hope – Prince Rupert	Natural Gas Pipeline	Proposed	2012–2017 1,100 workers[a1]	2017 30–40 workers
Watco – Watson Island Re-Development	Watco Island	Industrial Port	Proposed	2013–2015	NA
Terrace Area Project/Facility					
Galore Creek Copper-Gold-Silver Project	Wrangell, Alaska (transported through Stewart, BC)	Mine	On Hold	2018-	NA
KSM (Kerr-Sulphurets-Mitchell) Project	Steward (65 km north)	Mine	Proposed	NA	NA
Brucejack Gold Mine Project	Steward (65 km north)	Mine	Proposed	2013–2016 500 workers	2016–2038
Kitsault Mine Project	Prince Rupert (145 km northeast)	Mine	Proposed	2013–2015 700 workers	2013 300 workers
Altagas Hydro Projects (Forest Kerr, McLymont Creek, Volcano Creek)	Northeastern BC	Hydroelectric Projects	Proposed /Ongoing	Forest Kerr: 2011–2014 400 workers	NA
Kinskuch Hydro Project	Connects along Highway 37	Transmission Line	Proposed	NA	NA
Northwest Transmission Line	Skeena Substation (near Terrace) to Bob Quinn Lake	Transmission Line	Ongoing	2012–2014 840 workers	2014–2024
Activity					
Forestry Activities	N/A	N/A	Ongoing	N/A	N/A

NOTES:

NA - data not available; N/A -not applicable.[a1]Peak person years of employment/construction years

Projects/activities listed here only reflect that that have the potential to interact temporally or spatially with those identified in Table 6.2-28.

Estimates as of June 2014

SOURCE: Coastal GasLink 2012; Province of BC 2013 ; DCEP 2014a; Enbridge Northern Gateway Pipeline 2010; District of Kitimat 2014d; District of Kitimat 2014e; Chevron 2014; PNW 2012; District of Kitimat 2014f ; RTA 2014; Prince Rupert LNG 2014a; Prince Rupert LNG 2014b; Stantec 2011; BCEAO 2012; Golder Associates 2012 ;PNW 2013; NDIT 2014a; PRGT 2013; NDIT 2014b;NDIT 2014c ;NDIT 2014d; NDIT 2014e.

Beneficial aspects of economic development will include regional economic growth and diversification, reversal of population decline, lowering of unemployment rates, increased opportunities for Aboriginal and local businesses, and enhanced development of human capital. Potential cumulative adverse effects on economic conditions relate to cumulative demand and resulting shortage for labour as a result of workforce requirements, as well as increased demand for goods and services as a result of increased consumer spending and development-related population increases. As more of the proposed major projects in the RSA progress beyond their construction and development stages, there is also potential for a rapid decline in the demand for regional workers following a period of high demand related to multiple major construction projects. This is a common potential economic condition for resource boomtowns, through which rapid construction-related development can result in over-building of housing, retail, and government services and adverse economic effects related to declining employment and outmigration of workers (Jaquet 2009).

The Project residual effects on the supply and demand of labour in the LSA and the economic activity of other sectors have potential to interact with other projects that will have a concurrent demand for labour, goods, and services.

6.2.8.2 Stage 2, Determination of Potential Cumulative Interactions

Projects and activities that have potential to interact with Project residual effects to cause cumulative effects on economic conditions in the RSA are identified in Table 6.2-28. Projects that do not have a predicted or known effect on economic conditions in the RSA are not included.

Table 6.2-28: Potential Cumulative Effects on Economic Conditions

Other Projects and Activities with Potential for Cumulative Effects	Potential Cumulative Effects		
	Change in Labour Supply and Demand from the LNG facility	Change in Economic Activity of Other Sectors from the LNG facility	Change in Economic Activity of Other Sectors from Shipping
Kitimat Area Project/Facility			
Coastal Gas Link Pipeline Project	✓	✓	
Douglas Channel LNG Project (also known as BC LNG)	✓	✓	✓
Enbridge Northern Gateway Project	✓	✓	✓
Kitimat LNG Terminal Project	✓	✓	✓
Pacific Northern Gas Pipeline (includes proposed looping)	✓	✓	
Pacific Trail Pipelines Project	✓	✓	
Rio Tinto Alcan Facility and Modernization Project	✓	✓	✓
Sandhill Materials – Aggregate Processing	✓	✓	

Other Projects and Activities with Potential for Cumulative Effects	Potential Cumulative Effects		
	Change in Labour Supply and Demand from the LNG facility	Change in Economic Activity of Other Sectors from the LNG facility	Change in Economic Activity of Other Sectors from Shipping
Prince Rupert Area Project/Facility			
BG Group – Prince Rupert LNG Project	✓	✓	✓
Canpotex – Potash Export Terminal	✓	✓	✓
Maher Terminals – Fairview Terminal Phase 2 Expansion Project	✓	✓	✓
Pinnacle Renewable Resources – Pellet Export Terminal	✓	✓	✓
Progress Energy – Pacific Northwest LNG Project	✓	✓	✓
Spectra Energy – Natural Gas Pipeline	✓	✓	
TransCanada Corporation – Prince Rupert Gas Transmission Project	✓	✓	
Watco – Watson Island Re-Development	✓	✓	✓
Terrace Area Project/Facility			
Altagas Hydro projects (Forest Kerr, McLymont Creek, Volcano Creek)	✓	✓	
Galore Creek Copper-Gold-Silver Project	✓	✓	
KSM (Kerr-Sulphurets-Mitchell) Project	✓	✓	
Brucejack Gold Mine Project	✓	✓	
Kitsault Mine Project	✓	✓	
Kinskuch Hydro Project	✓	✓	
Activities			
Forestry Activities		✓	

NOTES:
✓ = those 'other projects and activities' whose effects have potential to interact cumulatively with the Project's residual effects.

6.2.8.3 Stage 3, Determining Significance of Cumulative Effects

6.2.8.3.1 Change in Cumulative Labour Supply and Demand from the LNG Facility

Cumulative economic effects related to industrial development in the RSA will increase employment, income and government revenue in the region and the province, along with the economic benefits generated by the Project (see Section 2.5). However, cumulative demand for labour will also add to the effect mechanisms discussed for the Project's effects on labour supply and demand. Because employment related to construction and operation of major projects draws more skilled labour from the RSA, there will be less available workers for businesses in other sectors. Additionally, the high wages typically associated with construction and operation positions in the oil and gas sector could make it difficult for other businesses to recruit and retain workers. Issues related to labour availability and wages are associated with rapid economic development, especially when related to resource development booms. In the Bowen Basin region of Australia, for example, non-mining businesses in communities affected by a recent coal mining boom reported difficulties attracting and retaining staff (Petkova et al. 2009).

Plans for economic development in the RSA indicate that there will be a substantial increase in labour demands. Based on known workforce estimates for major projects in the RSA, cumulative labour demand is estimated for the period of 2013 – 2051. It is estimated that the cumulative workforce for projects in the RSA could peak as high as 14,500 individuals in 2017, while the Project is still under construction. Given that this is over half of the total labour force in the RSA, it is very likely that cumulative labour demands will exceed the supply of appropriately skilled workers in the region. During construction, the Project is likely to act cumulatively with concurrent major projects that will also employ large workforces from the heavy engineering construction industry. While there is some uncertainty regarding how many proposed major projects will be built and the potential for temporal overlap with the Project, there is a high likelihood that the labour force requirements for the projects identified in Table 6.2-27 will exceed the capacity of the RSA construction labour force. As has been discussed through regional economic plans (e.g., Ingenia Consulting 2012), there is an expected labour shortage in northwest BC, which can also be expected in the RSA.

Based on the availability of construction workers in the RSA and the anticipated demand for skilled labour for infrastructure, resource, and industrial projects, it is expected that cumulative labour requirements will need to be filled with workers from outside the RSA, with RSA residents accounting for a relatively small portion for the Project construction workforce. Because peak cumulative labour demand is expected to occur during Project construction, there will be substantial increased demand for construction workers in the RSA. However, other projects will face the same labour constraints in the regional supply of labour

and will generally need to recruit workers from the skilled labour pool in BC and elsewhere in North America.

Project operation labour requirements will continue to act cumulatively with labour demand of other projects requiring workers with similar skills. This will result in continued increased demand for labour in the RSA. As with construction, skill shortages in the regional labour market will necessitate hiring policies that recruit skilled workers from a much wider labour pool, including workers from elsewhere in BC and North America in general.

Competitive wages offered by projects throughout the Project construction and operation phase have potential to contribute to labour issues, making it more difficult for businesses in other sectors to recruit and retain workers. Estimated annual earnings for oil and gas related construction and operation are $140,200 and $127,200, respectively (Thornton 2013), which exceed the average employment earnings in the RSA (approximately $54,000). However, considering that the RSA currently has a large number of unemployed workers (3,725 in 2011 with a 13.4% unemployment rate), the cumulative effects on labour demand during construction and operation will benefit the sustainability of the regional economy by providing residents with employment opportunities in their home communities.

LNG Canada will reduce the contribution from the Project to the overall cumulative effect on labour through mitigation measures related to training and education:

- Potential shortages of workers with specific skill requirements will be identified and training and educational facilities will be engaged so that regional residents have the opportunity to upgrade their skills (Mitigation 6.2-3).
- Identify training and capacity building partnerships or other arrangements for potentially affected Aboriginal Groups and local communities that will increase opportunities for participation (Mitigation 6.2-4).

Although the nature and extent to which proponents of other projects will address labour challenges is not known, it is reasonably expected that proponents will implement measures to address the availability of skilled labour for their projects. Such measures will support government-led planning for the anticipated increased demand on labour and training facilities (e.g., NWRWT 2012, BC Natural Gas Workforce Strategy Committee 2013, Province of BC 2014), also designed to increase the capacity of local and regional labour.

The cumulative effect on labour supply and demand is assessed as not significant based on the factors discussed above, including:

- Skill shortages in the regional labour force mean that the proponents of major projects will need to recruit substantial proportions of project workforces from elsewhere in BC and North America in general.

- Adverse effects related to increased demand for labour in the RSA will be offset by economic benefits, including increased employment and incomes.
- The Project's contribution to cumulative demand for labour will be reduced through training and education-related mitigation measures that will expand the potential supply of qualified local workers. Other proponents may adopt similar measures to address labour supply issues.
- Anticipated increased demand for labour and related demand increases on training and education facilities is being addressed by government at the provincial and regional level.

6.2.8.3.2 Change in Cumulative Economic Activity of Other Sectors from the LNG Facility

During construction and operation, it is expected that the Project will contribute to an increase in economic activity as a result of the procurement of goods and services from businesses in the RSA, as well as increased consumer spending by RSA residents employed by the Project and by non-RSA residents housed in camps or communities. While Project employment and expenditures will result in local and regional economic benefits (see Section 2.5), there is also potential for adverse economic effects on other businesses. The Project's contribution to cumulative effects on economic activity will be related to cost of living increases as a result of increased demand for housing and accommodations. Cost of living effects such as decreased housing availability and affordability as a result of rapid economic growth have been noted for comparable areas such as the Peace River Region (KTIDS 2012) and Gladstone, Australia (Akbar et al. 2013). For businesses in other sectors, there is potential that increased demand for labour and retail space will drive costs up, resulting in higher prices for consumer goods, and decreased profitability for businesses. However, in addition to government planning initiatives to address labour supply, training, and housing affordability, increased business opportunities and revenue associated with multiple large projects and the associated increased household spending will offset adverse effects, so cumulative effects on other economic sectors are assessed as not significant.

6.2.8.3.3 Change in Economic Activity of Other Sectors from Shipping Activities

As discussed in Section 7.4, cumulative effects on marine fisheries and shoreline harvesting, and on recreation and tourism are possible since Project shipping activities will occur along the same marine access route at the same time as other projects. There is potential for interactions between Project shipping and other vessels on Kitimat Arm shipping routes. There is less likelihood of interaction with vessels traveling to Prince Rupert because these vessels would use a different route.

As discussed in Section 7.4, marine transportation-related cumulative effects on marine fisheries and shoreline harvesting, and on marine recreation and tourism are anticipated to be not significant. The Project's contribution will consist of two brief, scheduled transits per day along a route that has moderate resilience to increased traffic. With implementation of the mitigation measures (Section 7.4.6.3), residual

effects will be reduced to negligible levels and will be reversible when the Project is decommissioned. Based on the negligible level of residual Project effects and the low potential for cumulative effects from shipping on these industries, there will be no significant adverse cumulative effects of shipping on the economic activity of other sectors.

6.2.8.4 Summary of Cumulative Effects

Based on proposed major projects, especially those related to the development of BC's LNG sector, substantial economic expansion is expected in the RSA through 2020. Project residual effects on labour and economic activity will act cumulatively with the economic effects of concurrent projects (Table 6.2-29). While there is uncertainty regarding the number of projects that will be completed, which depends on a complex range of economic factors based on the anticipated level of development, it is likely that the cumulative demand of these projects will exceed the capabilities of the labour force and businesses in the RSA during construction and operation. Because labour demand for development in northern BC will draw workers from beyond the RSA, effects on labour supply and demand will extend to the provincial economy. Based on the operational timelines for foreseeable projects, cumulative effects on labour will be long term. Effects will be continuous, with varying degrees of magnitude depending on the timing of project schedules and the number of projects that proceed through development stages of pre-construction, construction, operation, and closure. Potential adverse effects on labour will be reversible during periods of economic stagnation or decline; however, economic benefits associated with cumulative employment and expenditures would also be affected.

While the collective demands of these projects represent important opportunities for RSA residents to benefit, especially those who choose to upgrade their skills so that they can participate in construction activities, some adverse effects are possible. Project residual effects on the economic activity of other sectors will act cumulatively with those of other projects, potentially resulting in reduced availability of local goods and services, particularly housing and accommodations. The discussion of significance with respect to housing affordability is in Section 7.2.5.4.

Table 6.2-29: Summary of Cumulative Effects on Economic Conditions

Effect	Other Projects, Activities and Actions	Cumulative Effects Characterization					
		Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Context
Facility Works and Activities							
Cumulative Change in Labour Supply and Demand							
Cumulative effect with the Project and other projects, activities and actions ▪ Demand for labour may contribute to a shortage of skilled labour, competitive labour wages, and reduced availability of workers for other businesses.	▪ Coastal Gas Link Pipeline Project ▪ Douglas Channel LNG Project (also known as BC LNG) ▪ Enbridge Northern Gateway Project ▪ Kitimat LNG Terminal Project	H	P	LT	C	R	M
Contribution from the Project to the overall cumulative effect ▪ Project demand for labour will contribute to cumulative demand on the regional supply of labour. Competitive wages offered by the Project could contribute to regional wage inflation.	▪ Pacific Northern Gas Pipeline (includes proposed looping) ▪ Pacific Trail Pipelines Project ▪ Rio Tinto Alcan Facility and Modernization Project ▪ Sandhill Materials – Aggregate Processing ▪ BG Group – Prince Rupert LNG Project ▪ Canpotex – Potash Export Terminal ▪ Maher Terminals – Fairview Terminal Phase 2 Expansion Project ▪ Pinnacle Renewable Resources – Pellet Export Terminal ▪ Progress Energy – Pacific Northwest LNG Project ▪ Spectra Energy – Natural Gas Pipeline ▪ TransCanada Corporation – Prince Rupert Gas Transmission Project ▪ Watco – Watson Island Re-Development ▪ Altagas Hydro projects (Forest Kerr, McLymont Creek, Volcano Creek) ▪ Galore Creek Copper-Gold-Silver Project	M	RSA	LT	C	R	M

Effect	Other Projects, Activities and Actions	Cumulative Effects Characterization					
		Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Context
	▪ KSM (Kerr-Sulphurets-Mitchell) Project ▪ Brucejack Gold Mine Project ▪ Kitsault Mine Project ▪ Kinskuch Hydro Project						
Cumulative Change in Economic Activity of Other Sectors							
Cumulative effect with the Project and other projects, activities and actions ▪ Increased economic development may result in decreased availability and/or increased cost of some goods and services, including housing and accommodations ▪ This could lead to increased costs to businesses in other sectors and increased cost of living to households. ▪ Enhanced economic activity in the RSA will offset some of the adverse effects of rapid economic growth by raising business revenue and average household incomes.	▪ Coastal Gas Link Pipeline Project ▪ Douglas Channel LNG Project (also known as BC LNG) ▪ Enbridge Northern Gateway Project ▪ Kitimat LNG Terminal Project ▪ Pacific Northern Gas Pipeline (includes proposed looping) ▪ Pacific Trail Pipelines Project ▪ Rio Tinto Alcan Facility and Modernization Project ▪ Sandhill Materials – Aggregate Processing ▪ BG Group – Prince Rupert LNG Project ▪ Canpotex – Potash Export Terminal ▪ Maher Terminals – Fairview Terminal Phase 2 Expansion Project ▪ Pinnacle Renewable Resources – Pellet Export Terminal ▪ Progress Energy – Pacific Northwest LNG Project ▪ Spectra Energy – Natural Gas Pipeline ▪ TransCanada Corporation – Prince Rupert Gas Transmission Project ▪ Watco – Watson Island Re-Development ▪ Altagas Hydro projects (Forest Kerr, McLymont Creek, Volcano Creek)	H	P	LT	C	R	M
Contribution from the Project to the cumulative effect ▪ Project demand for labour and locally sourced goods and services could contribute to increase prices, which could affect other business sectors. ▪ Increased demand for housing and accommodations will contribute to decreased availability and potential increases in cost of living.		M	LSA	LT	C	R	M

Effect	Other Projects, Activities and Actions	Cumulative Effects Characterization					
		Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Context
	▪ Galore Creek Copper-Gold-Silver Project ▪ KSM (Kerr-Sulphurets-Mitchell) Project ▪ Brucejack Gold Mine Project ▪ Kitsault Mine Project ▪ Kinskuch Hydro Project ▪ Forestry Activities						
Shipping Activities							
Cumulative Change in Economic Activity of Other Sectors							
Cumulative effect with the Project and other projects, activities and actions ▪ Other sectors, including fisheries and tourism, could be affected by physical interference with shipping. ▪ Tourism could be affected by aesthetic changes as a result of shipping.	▪ Douglas Channel LNG Project (also known as BC LNG) ▪ Enbridge Northern Gateway Project ▪ Kitimat LNG Terminal Project ▪ Rio Tinto Alcan Facility and Modernization Project ▪ BG Group – Prince Rupert LNG Project	L/M	RSA	LT	C	R	M
Contribution from the Project to the cumulative effect ▪ Limited interaction between Project shipping and economic activity of other sectors, including fishing and tourism. ▪ Tourism could be affected by aesthetic changes as a result of shipping.	▪ Canpotex – Potash Export Terminal ▪ Maher Terminals – Fairview Terminal Phase 2 Expansion Project ▪ Pinnacle Renewable Resources – Pellet Export Terminal ▪ Progress Energy – Pacific Northwest LNG Project Watco – Watson Island Re-Development	L	LSA	LT	C	R	M

KEY

MAGNITUDE:

L = Low—effect cannot be distinguished from baseline conditions; within normal range of variability

M = Moderate—measurable change but unlikely to pose a serious risk to the VC or to represent a management challenge

H = High —measurable change that is likely to pose a serious risk to the selected VC and, if negative, represents a management challenge

GEOGRAPHIC EXTENT:

LSA—expected measurable changes are limited to the LSA

RSA—expected measurable changes are limited to the RSA

P = Provincial—expected measurable changes extend beyond the RSA to the provincial level

DURATION:

ST = Short-term—residual effect is restricted to the duration of the construction period or less

MT = Medium-term—residual effect extends to after the duration of the construction period but less than the life of the Project

LT = Long-term—residual effect is extends to the life of the Project

P = Permanent—measurable parameter unlikely to recover from the baseline

FREQUENCY:

S = Single event—occurs once

MI = Multiple irregular event (no set schedule)—occurs sporadically at irregular intervals throughout construction, operation or decommissioning and abandonment phases

MR = Multiple regular event—occurs on a regular basis and at regular intervals throughout construction, operation, or decommissioning and abandonment phases

C = Continuous—occurs continuously throughout the life of the Project

REVERSIBILITY:

R = Reversible—will recover after Project decommissioning and abandonment

I = Irreversible—permanent

CONTEXT:

L = Low resilience—low capacity for economic conditions to recover from a perturbation with consideration of the baseline conditions

M = Moderate resilience—moderate capacity for economic conditions to recover from a perturbation, with consideration of baseline conditions

H = High resilience—high capacity for economic conditions to recover from a perturbation, with consideration of baseline conditions

SIGNIFICANCE:

S = Significant

N = Not Significant

PREDICTION CONFIDENCE:

Based on scientific information and statistical analysis, professional judgment and effectiveness of mitigation, and assumptions made.

L = Low level of confidence

M = Moderate level of confidence

H = High level of confidence

LIKELIHOOD OF RESIDUAL EFFECT OCCURRING:

Based on professional judgment

L = Low likelihood that there will be a residual effect

M = Moderate likelihood that there will be a residual effect

H = High likelihood that there will be a residual effect

N/A = Not Applicable

Development of all proposed projects could adversely affect labour force supply and demand, the cost of living, economic activity, and municipal government finances. These cumulative effects have potential to be high in magnitude, depending on the capacity of local and regional businesses and households to respond to changes in the economy, as well as the effectiveness of mitigation measures and government-led initiatives to address challenges such as skilled labour shortages. The geographic extent of the cumulative adverse effect on economic activity of other sectors is regional, the duration is long term, the frequency is continuous, and effects are reversible during periods of economic stagnation or decline. Potential adverse cumulative economic effects are being anticipated by governments based on the planned growth of the LNG sector in northern BC, and planning initiatives are underway to address such issues as labour availability, training, and affordable housing. Enhanced economic activity in the RSA will offset some of the adverse effects of rapid economic growth by raising business revenue and average household incomes.

Cumulative economic effects are predicted persist at least through the short term, particularly with several overlapping construction schedules for major projects. There is uncertainty related to the duration and magnitude of adverse effects because this will depend on the number of workers who choose to permanently relocate to the RSA, the capacity of local markets to respond to increased demand for housing and accommodations, and the effectiveness of proponent and government-led measures to increase capacity and reduce adverse effects.

While some cumulative adverse effects in the short term could be high magnitude, proponent-led and government-led measures, as well beneficial aspects of economic development, will result in cumulative economic effects being not significant.

6.2.9 Prediction Confidence and Risk

6.2.9.1 Change in Labour Supply and Demand

There is a low to moderate degree of confidence in determining potential adverse effects on labour supply and demand because of uncertainty about future economic conditions in the LSA and RSA. The extent to which residents of the LSA and RSA choose to be involved in construction and operation will depend on job opportunities for other projects. Employment of local and regional workers will also depend on how many workers choose to respond to offers of training and recruitment activities. The potential for large increases in cumulative labour demand and the shortage of appropriately skilled workers in the region is well understood and is being addressed by plans at the provincial and regional level. However, there is considerable uncertainty associated with labour demand because they depend on the nature and magnitude of major projects and associated economic development that will occur in the LSA and RSA.

6.2.9.2 Change in Economic Activity of Other Sectors

There is a low to moderate degree of confidence in estimating changes in economic activity of other sectors. Potential effects on other economic sectors are expected to be managed and mitigated through cooperation with representatives of other sectors, including fisheries and tourism. Related effects analyses conducted for visual quality (Section 7.3) and marine transportation and use (Section 7.4) indicate that key issues related to tourism (e.g., aesthetic effects) and commercial fishing (e.g., interference with fishing activities) are unlikely to cause substantial adverse effects. Effects related to changes in cost and availability of goods and services depends on numerous factors, which are difficult to estimate, including inflation, foreign exchange rates, and business practices. It is therefore difficult to isolate the effects from Project-related changes from these other factors. For cost of living effects related to housing demand, there is considerable uncertainty associated with population forecasts because they depend on the nature and magnitude of major projects and associated economic development that will occur in the LSA and RSA, as well as on numerous factors that will influence the extent to which individuals and households will migrate into the region in response to economic opportunities.

6.2.10 Follow-up Program and Compliance Monitoring

Follow-up programs and compliance reporting are not required for economic effects.

6.2.11 Summary of Mitigation Measures

LNG Canada commits to the following mitigation measures related to economic conditions:

- Local residents will be informed of job and procurement opportunities during the Project phases. LNG Canada will encourage a hire-local first approach for all phases (Mitigation 6.2-1).
- Develop work packages that will consider the capabilities of local and regional businesses to enhance local procurement opportunities. (Mitigation 6.2-2).
- Potential shortages of workers with specific skill requirements will be identified and training and educational facilities will be engaged so that regional residents have the opportunity to upgrade their skills (Mitigation 6.2-3).
- Identify training and capacity building partnerships or other arrangements for potentially affected Aboriginal Groups and local communities that will increase opportunities for participation (Mitigation 6.2-4).
- Construct and operate workforce accommodation centre(s) for non-resident workforce during the pre-construction and construction phase to manage effects of temporary workforce on communities (Mitigation 6.2-5).
- LNG Canada and its contractors will offer fair labour wages, consistent with the Western Canadian labour market (Mitigation 6.2-6).

- Regular communication on Project activities will occur with marine users, including recreationalists, commercial tourism operators, CRA fishers, Transport Canada, DFO, and relevant stakeholders (Mitigation 6.2-7).
- LNG Canada will work to manage demands on local housing (e.g., apartments and single-family houses) due to the anticipated requirements of the construction management and operational workforce, and will also include, in periodic reassessments of the housing market, the consideration of the risk posed by oversupply of accommodations (Mitigation 7.2-22).
- Participate in initiatives and recommended measures identified in the Northwest Communities Housing Action Plan to address the availability of affordable housing within northwest communities (Mitigation 7.2-25).

In addition to these commitments, LNG Canada will continue to make contributions towards education and training and community development (see Section 2.5), which will provide measureable benefits to local communities and mitigate potential adverse effects by building the capacity of the local labour force.

6.2.12 Conclusion

The assessment of Project effects on economic conditions is based on the expected change in labour supply and demand, as well as the anticipated change in cost of living and economic activity of other sectors. Project demand for labour, goods, and services has potential to affect this VC during construction and operation, mainly through increasing demand for labour and increased spending on goods and services (especially housing) by workers employed as a result of Project expenditures. The assessment also considers possible economic effects on other sectors, including fisheries and tourism.

LNG Canada will implement mitigation measures to avoid and reduce potential effects on local and regional economic conditions. With the application of these mitigation measures, there will be no significant adverse effects on economic conditions. Predicted effects will be of moderate to high magnitude and the Project will continue to contribute to residual and cumulative adverse economic effects throughout operation. Because the Project demand for labour, goods, and services will require resources beyond the LSA, there will be limited effects from employment and expenditures in the LSA compared with totals for each Project phase. However, based on the current economic conditions of the LSA, in which there are known labour availability issues and cost of living issues related to recent economic expansion, the effects from local employment and expenditures are likely to cause adverse economic effects on labour supply and demand in the LSA and on the economic activity of other sectors. Overall, effects are expected to be moderate and long term in duration and temporary and reversible upon decommissioning of the Project. With the application of Project-led mitigation measures, and government initiatives addressing such issues as labour availability, training, and housing affordability, and considering that beneficial economic contribution of the Project to the local and regional economy will offset some adverse effects, Project effects on the economic conditions are assessed as not significant.

Potential adverse cumulative economic effects are being anticipated by governments based on the planned growth of the LNG sector in northern BC, and planning initiatives are underway to address such issues as labour availability, training, and affordable housing. Enhanced economic activity in the RSA will offset some of the adverse effects of rapid economic growth by raising business revenue and average household incomes.

6.3 Summary of Assessment of Potential Economic Effects

6.3.1 Summary of Project Residual Economic Effects

The Project residual effects on the economic conditions are change in labour supply and demand, and change in economic activity of other sectors. Table 6.3-1 summarizes Project residual effects on the economic environment.

Table 6.3-1: Summary of Project Residual Effects on Economic Conditions

Valued Component[a]	Potential Effects	Key Mitigation Measures[b]	Significance Analysis of Residual Effects
Facility Activities and Works			
Economic conditions (C, O, D)	Change in labour supply and demand	▪ Local residents will be informed of job and procurement opportunities during the Project phases. LNG Canada will encourage a hire-local first approach for all phases (Mitigation 6.2-1). ▪ Develop work packages that will consider the capabilities of local and regional businesses to enhance local procurement opportunities (Mitigation 6.2-2). ▪ Potential shortages of workers with specific skill requirements will be identified and training and educational facilities will be engaged so that regional residents have the opportunity to upgrade their skills (Mitigation 6.2-3). ▪ Identify training and capacity building partnerships or other arrangements for potentially affected Aboriginal Groups and local communities that will increase opportunities for participation (Mitigation 6.2-4).	Not significant. In combination with initiatives undertaken by the province, the application of Project-specific mitigation measures is expected to mitigate adverse effects on the local labour supply. As a result, the change in labour supply and demand is assessed as not significant.
Economic conditions (C, O, D)	Change in economic activity of other sectors	▪ Construct and operate workforce accommodation centre(s) for non-resident workforce during the pre-construction and construction phase to manage effects of temporary workforce on communities (Mitigation 6.2-5). ▪ LNG Canada will work to manage demands on local housing (e.g., apartments and single-family houses) due to the anticipated requirements of the construction management and operational workforce, and will also include, in periodic reassessments of the housing market, the consideration of the risk posed by oversupply of accommodations (Mitigation 7.2-22).	Not significant. In consideration of market mechanisms, government-led initiatives to address the limited labour pool and housing availability in northwest BC, and Project-led mitigation measures, residual effects are assessed as not significant.

Valued Component[a]	Potential Effects	Key Mitigation Measures[b]	Significance Analysis of Residual Effects
		▪ LNG Canada and its contractors will offer fair labour wages, consistent with the Western Canadian labour market (Mitigation 6.2-6). ▪ Participate in initiatives and recommended measures identified in the Northwest Communities Housing Action Plan to address the availability of affordable housing within northwest communities (Mitigation 7.2-25).	
Shipping Activities			
Economic conditions (C, O, D)	Change in economic activity of other sectors	▪ Regular communication on Project activities will occur with marine users, including recreationalists, commercial tourism operators, CRA fishers, Transport Canada, DFO, and relevant stakeholders (Mitigation 6.2-7).	Not significant. With the application of mitigation measures, residual effects are assessed as not significant.

NOTES:
[a] Construction Phase = C; Operation Phase = O; Decommissioning Phase = D
[b] See Section 20 (Summary of Mitigation Measures) for a full list of mitigation measures.

6.3.2 Summary of Cumulative Economic Effects

Cumulative economic effects are predicted persist at least through the short term, particularly with several overlapping construction schedules for major projects. There is uncertainty related to the duration and magnitude of adverse effects because this will depend on the number of workers who choose to permanently relocate to the RSA, the capacity of local markets to respond to increased demand for housing and accommodations, and the effectiveness of proponent and government-led measures to increase capacity and reduce adverse effects.

While some cumulative adverse effects in the short term could be high magnitude, proponent-led and government-led measures, as well beneficial aspects of economic development, will result in cumulative economic effects being not significant.