



BC EAO EAC Application – Tenas Project

Section 6.0 Social Effects Assessment

Chapter 5 Community Well-being Valued Component

May 2022

VERSION 1.0

Submitted to:	BC Environmental Assessment Office
Pursuant to:	<i>Environmental Assessment Act</i> , S.B.C. 2002, c.43
Submitted by:	Telkwa Coal Limited Suite 1410 – 409 Granville Street Vancouver, BC V6C 1T2

BC EAO EAC Application – Tenas Project

Section 6.0 Social Effects Assessment Chapter 5 Community Well-being Valued Component

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ABBREVIATIONS AND ACRONYMS

Abbreviation or Acronym	Long Form of Abbreviation or Acronym
AIR	Application Information Requirements
AQMP	Air Quality Management Plan (S13.0-C2)
BAT	best available technologies
BC	British Columbia
BC EAO	British Columbia Environmental Assessment Office
BC MOH	British Columbia Ministry of Health
BC MFLNRORD	British Columbia Ministry of Forests, Lands, Natural Resource Operations and Rural Development
BMPs	best management practices
BTF	biotransfer factor
BVDH	Bulkley Valley District Hospital
C	Chapter
C&M	care and maintenance
COPC	contaminant of potential concern
CPI	Consumer Price Index
CPP	Comprehensive Community Plan
CSI	crime severity index
CWB	Community Well-being
EA	environmental assessment
EAC	Environmental Assessment Certificate
EPC	Exposure Point Concentrations
FIFO	Fly-In-Fly-Out
FMSCP	Fuel Management and Spill Control Plan (S13.0-C7)
FNHC	First Nations Health Council
HHRA	Human Health Risk Assessment
HQs	hazard quotients
HSDA	Health Service Delivery Area
IRS	Indian Residential School
ISSET	Indigenous Skills and Employment Training
LHA	Local Health Area
LNG	liquid natural gas
LSA	Local Study Area
MERP	Mine Emergency Response Plan (S13.0-C9)
ML	metal leaching

Abbreviation or Acronym	Long Form of Abbreviation or Acronym
ML/ARD	metal leaching/acid rock drainage
MTCP	Minesite Traffic Control Plan (S13.0-C10)
NGO	Non-governmental Organization
NHS	National Household Survey
NVCSI	non-violent crime severity index
OCP	Official Community Plan
OHSP	Occupational Health and Safety Program
OW	Office of Wet'suwet'en
PAMP	Public Access Management Plan (S13.0-C14)
Project	Tenas Project
PYLL	Potential Years of Life Lost
RCMP	Royal Canadian Mounted Police
RDBN	Regional District of Bulkley-Nechako
RSA	Regional Study Area
RV	recreational vehicle
S	Section
SC	subcomponent
SEMP	Socio-economic Management Plan (S13.0-C16)
TCL	Telkwa Coal Limited
TCRC	Telkwa Coalmine Recreation Camp
TEK	Traditional Ecological Knowledge
TK	Traditional Knowledge
VC	Valued Component
VCSI	Violent Crime Severity Index
WWWG	Wet'suwet'en Wellness Working Group

UNITS OF MEASURE

Abbreviation or Acronym	Long Form of Abbreviation or Acronym
\$	Canadian dollar
>	greater than
%	percent
‰	per thousand
ha	hectare
km	kilometre

Abbreviation or Acronym	Long Form of Abbreviation or Acronym
km/hr	kilometre per hour
kV	kilovolt
V	volt

EXECUTIVE SUMMARY

This chapter provides an assessment of potential interactions between the Tenas Project (Project) and the Community Well-being Valued Component (VC). Stakeholder engagement and consultation, collection of secondary census data, and available provincial, regional and local reports informed related issues scoping, selection and assessment of the Community Well-being VC. Key themes of interest identified through the consultation and review of other data included potential effects on community well-being as a result of the Project. It was recognized that evaluation of these potential changes could support and inform assessment of potential effects on the Community Well-being VC.

Spatial boundaries for the assessment of potential effects on Community Well-being include the Local Study Area (LSA) defined to include Village of Telkwa, Town of Smithers, District of Houston, and the community of Witset (formerly Moricetown); and the Regional Study Area (RSA) defined to encompass the Regional District of Bulkley Nechako (RDBN) and the community of Witset. The assessment of Project-related effects and cumulative effects was conducted according to the methods set out in **Section (S) 3.0 Assessment Methodology** of the Environmental Assessment Certificate Application (EAC) Application.

The assessment of Community Well-being VC was based on four indicators identified as change in social and economic determinants of health, namely food security, cost of living, community cohesion, and mental health. The assessment identified four potential adverse effects on Community Well-being:

- ▶ A change in land availability and access to land or resources or a change in land base during Construction and Operation has the potential to affect the supply of subsistence (country) foods and, thus, food security.
- ▶ New employment opportunities and the in-migration of the Project workforce during Construction and Operation has the potential to increase pressure on housing, induce spending and, consequently, result in a change in the affordability of housing and of goods and services (i.e., change in cost of living).
- ▶ The presence of Project workers during Construction and Operation could potentially exacerbate existing social issues and affect relationships and shared values among community individuals and groups, resulting in a change in community cohesion in the LSA and RSA.
- ▶ Workers and their families could experience a change in stress and anxiety levels due to rotational work, , increased noise and traffic levels, changes in visual aesthetics and all the above-mentioned interactions, resulting in a change in mental health.

On the other hand, positive effects of the Project such as employment, procurement and economic growth are also likely to positively influence well-being through increased access to financial resources, goods and services, housing and better lifestyle choices.

The Project will implement design features to avoid sensitive areas, when possible, and minimize Project footprint and Project Area by using existing roads, infrastructure, and cleared areas. These measures will contribute to reducing effects on land and resource use and by extension, community well-being. Potential adverse effects of the Project on food security will be mitigated through the implementation of a **Public Access Management Plan (S13.0-Chapter (C) 14) (PAMP)** and a Subsistence Food Management Plan to be developed with the Wet'suwet'en. Mitigation measures related to the protection of environmental quality (i.e., air, soil, vegetation, fish, wildlife, and water quality) will also contribute to minimize potential effects of the Project on the quality of subsistence foods and thus, on food security.

The Project plans to implement an Education, Training, and Employment Program aimed at maximizing employment of existing local residents of LSA and RSA communities. The program will contribute to manage a potential influx of workers that could affect housing availability and economic inflation (e.g. affordability of housing, food, consumer goods and other supplies) consequently affecting cost of living. The Education, Training, and Employment Program will also contribute to materialize positive effects of the Project, thus contributing to mitigate the risk of potential Project effects on community cohesion and mental health. In addition, the Project will implement a Housing and Accommodation Program to assist TCL employees to own permanent housing in the region.

The Project will implement a Procurement Program focussed on obtaining goods and services from the local/regional businesses to provide opportunities for local and regional businesses. The Procurement Program will drive positive impacts of the Project in the LSA and the RSA, contributing to the reduction of potential effects of the Project on cost of living. By strengthening local and regional businesses, the Procurement Program will also contribute to a positive image of the local and regional economy and a sense of pride in local capacity, reinforcing positive effects on community cohesion and mental health.

The Project will implement Community Engagement Programs as part of the **Socio-Economic Management Plan (S13.0-C16) (SEMP)**, that directs engagement with the community throughout the Project, including Project development. A shared understanding resulting from positive dialogue can help build strong relationships and favour cohesive communities and mentally healthy residents and workers. The Health and Wellness Program which is part of the Project's **Occupational Health and Safety Program (S13.0-C13) (OHSP)** will also target the mitigation of effects related to community cohesion and mental health on Project workers.

Finally, a Decommissioning and Reclamation, and Post-closure Program will be developed in the later years of the Operation Phase with the aim of minimizing local unemployment, consequently mitigating the effects of closure and job loss on mental health and community well-being. After the implementation of mitigation measures, residual effects were predicted for change in food security, cost of living, community cohesion, and mental health. Indigenous communities remain particularly vulnerable to adverse effects on Community Well-being, due to their high level of sensitivity and deeply rooted social and economic challenges such as poverty and a lack of social services and infrastructure.

After characterisation, residual effects of the Project were predicted to be **Not Significant**; therefore, the effect of the Project on the VC is predicted to be **Not Significant**. The residual effects were carried forward for cumulative effects assessment (CEA). The CEA considered past, present, and reasonably foreseeable future projects and activities that could interact with the Project. The assessment determined that while there is potential for present and reasonably foreseeable future projects and activities to cumulatively interact with the Project, there is uncertainty surrounding the number of potential future projects that could take place, with additional uncertainty around scope and timing of those projects. Therefore, while cumulative effects are predicted, they are rated as **Not Significant**.

1. INTRODUCTION

This chapter of the Environmental Assessment Certificate (EAC) Application provides an assessment of potential interactions between the Tenas Project (Project) and the Community Well-being Valued Component (VC). The Project includes major construction undertakings and operations that may result in local and regional adverse effects to community well-being, including changes in food security, cost of living, visual quality, sense of place, community cohesion, and community and/or mental health.

In addition to the presence of the Project itself, these potential effects relate to potential changes in population dynamics, employment and income structure, access to land and resource use, and use of infrastructure, roads and community services. Potential pathways for adverse effects also include reduced health caused by noise, vibration, visual aesthetics and/or increased dust levels.

On the other hand, positive effects of the Project such as employment, procurement and economic growth would also be likely to positively influence well-being through increased access to financial resources, goods and services, housing, and better lifestyle choices.

The Community Well-being VC was assessed in the context of potential direct and indirect effects of the Project on communities in the Local Study Area (LSA) and Regional Study Area (RSA), acknowledging for variability in potential effects on Indigenous communities. This chapter presents the indicators, and boundaries of the assessment for the Community Well-being VC, and pathways along which potential Project-related effects could occur, with cross references to other supporting VC assessment sections. These linkages are described in **3.2 Rationale for Selection of the Demographics Valued Component (VC)**. The assessment proceeds as follows:

- ▶ **Regulatory Context:** An overview of the legislative and jurisdictional extent and requirements of the Community Well-being VC assessment is provided;
- ▶ **Scope of the Assessment:** A description of the assessment scope including issues scoping, rationale for the selection of the Community Well-being VC, indicators, and definition of the assessment boundaries;
- ▶ **Existing Conditions:** Community Well-being existing conditions are based on the information compiled in the **Socio-economic Baseline Report (Appendix 5.1-A of Section (S) 5.0-Chapter (C) 1 Labour Market VC)**, the **Cultural Use Study (CUS)** presented in **Appendix 7.1-A of S7.0-C1 Heritage Resources VC)**, the **Land and Resource Use Baseline Report** presented in **Appendix 6.4-A of S6.0-4-C Land and Resource Use VC**, as well as other publicly available studies and sources. Descriptions of community health and well-being existing conditions includes comments made in interviews conducted during the socio-economic and land use baseline data collection as well as available community well-being data on affected Indigenous communities in the LSA and RSA;
- ▶ **Assessment of Project-related Effects:** Potential interactions between the Project and the Community Well-being VC are identified and evaluated to determine whether those interactions could result in potential adverse effects on the Community Well-being VC. Upon identification of these potential effects, mitigation measures are outlined, and any subsequent residual effects are described. These effects are characterised, and their significance is determined;
- ▶ **Cumulative Effects Assessment (CEA):** Potential interactions between residual effects due to the Project and other past, present, or reasonably foreseeable future projects or activities are identified and assessed to determine if cumulative effects are likely to occur. Upon identification of cumulative effects, any additional available mitigation measures are outlined, and any subsequent

residual adverse changes are described and characterised, and their significance is determined; and

- ▶ **Follow-up Strategy:** When adverse changes are identified and mitigated, a process of monitoring and follow-up strategies will be provided.

2. REGULATORY CONTEXT

This environmental assessment (EA) has considered applicable federal and provincial legislation, regulations, strategies, guidelines, plans, and best management practices (BMPs) were also reviewed in regard to Community Well-being VC, and information provided by Indigenous groups was included.

The Application Information Requirements (AIR) for the Project, approved by the British Environmental Assessment Office (BC EAO) in 2022, outlines the requirements of the EA for the Community Well-being VC to meet the provincial EA requirements under the *Environmental Assessment Act*, SBC 2002, c 43 (Government of British Columbia [GovBC] 2002a) (EAA). The assessment of the Community Well-being follows these guidelines and legislated requirements and is consistent with the requirements of the Project AIR. Legislation and management plans specific to the Community Well-being VC are presented in the following subsections.

2.1 Provincial Legislation

Table 2.1-1 provides a summary of provincial legislation related to the management of community well-being.

Table 2.1-1: Provincial Legislation Applicable to the Community Well-being Valued Component (VC)

Name	Year	Description
<i>Environmental Assessment Act</i> , SBC 2002, c. 43 (Government of British Columbia [GovBC] 2002a) (EAA)	2002	The EAA provides a mechanism for the Province of British Columbia (BC) to review all major projects proposed in BC to assess for any potentially adverse environmental, economic, social, heritage, or health effects. The Tenas Project (Project) requires an assessment of potential adverse environmental effects under the Reviewable Projects Regulation, BC Reg 243/2019 (GovBC 2019) of the EAA because the Project exceeds a production capacity of 250,000 tonnes per year.
<i>Environmental Management Act</i> , SBC 2003, c 53. (GovBC 2003)	2003	Regulates industrial and municipal waste discharge, pollution, hazardous waste and contaminated site remediation. Also enables the use of permits, regulations and codes of practice to authorize discharges to the environment and enforcement options. Further develops guidelines and objectives for water quality.
<i>Water Sustainability Act</i> , SBC 2014, c 15. (GovBC 2014)	2014	Stipulates that the Province of BC controls groundwater and surface water in the province. Includes provisions for restricting water usage during shortages. Also provides consumers certainty about their water rights, as well as transparency in the rules pertaining to water.
<i>Agricultural Land Commission Act</i> , SBC 2002, c 36. (GovBC 2002b)	2002	Sets the legislative framework for the administration and establishment of the Provincial agricultural land preservation program. ¹

¹ <https://www.alc.gov.bc.ca/alc/content/alc-act-alr-regulation#:~:text=The%20Agricultural%20Land%20Commission%20Act%2C%20S.B.C.&text=36%2C%20sets%20the%20legislativ%20framework,the%20agricultural%20land%20preservation%20program.>

2.2 Provincial and Regional Management Plans and Guidance Documents

Table 2.2-1 provides a summary of provincial and regional plans and guidance related to the management of community well-being.

Table 2.2-1: Management Plans and Guidance Documents Applicable to the Community Well-being Valued Component (VC)

Name	Year	Description
Bulkley Land and Resource Management Plan (LRMP) (Government of British Columbia [GovBC] 1998)	1998	Directs the management of 760,000 hectares (ha) of Crown land and provides general management direction related to eleven categories: biodiversity, access, timber, water quality, fish and wildlife habitat, visual quality, range, outdoor recreation and tourism, subsurface resources, cultural heritage resources, and future planning processes. The LRMP establishes six resource management zones and new protected areas. Each sub-planning unit falls into one (1) of the six (6) zones.
Bulkley Valley Sustainable Resource Management Plan (SRMP) (GovBC 2005).	2005	Provides objectives and strategies for resource management within the Bulkley Valley. The objective of the Bulkley Valley SRMP is to further break down the large Bulkley Valley into more specific areas and update them with their own objectives. There are seven resource zones within the Bulkley Landscape Unit (LU).
Health and Medical Services Plan Best Management Guide for Industrial Camps (Northern Health 2015a)	2015	Provides details on Northern Health's expectations of onsite services, describes the types of health care needs that can be anticipated, and provides information on the level of detail that should be included in an effective health and medical services Plan.
Standard Working Group Comments and Recommendations for Provincial Environmental Assessments in Northern British Columbia (Northern Health 2015b)	2015	Provides information intended for the identification, evaluation, and management of adverse effects that fall under health. Working group comments made by Northern Health are summarized in this document.
The Social Determinants of Health Impacts of Resource Extraction and Development in Rural and Northern Communities (Northern Health 2018)	2018	Explores how resource extraction and development in rural and Northern communities can influence social determinants of health. It summarizes social determinants of health related to 15 socio-cultural determinants of health, including determinants related to Indigenous self-determination and connections to the land.
Communicable Disease Control Plan Best Management Guide for Industrial Camps (Northern Health 2017)	2017	Provides guidance for the development of infection prevention and outbreak protocols, and outlines expectations for Communicable Disease Control Plans. This plan targets larger sized camps but could be modified for application in smaller camps.
Health and Safety During the Opioid Overdose Emergency: Northern Health's Recommendations for Industrial Camps (Northern Health 2018)	2018	Outlines areas where management in industrial camp sites can contribute to reducing the impact of an opioid overdose emergency among its workforce.
Social Determinants of Health Discussion Guide (First Nations Health Council [FNHC] 2017)	2017	Provides guidelines and supports discussions on the social determinants of health at Sub-regional and Regional Caucuses.

2.3 Local Regulations

The Smithers Telkwa Rural Official Community Plan (OCP) covers Regional District of Bulkley-Nechako (RDBN) Area A and contains objectives to help guide land use planning and development of a variety of topics. The Smithers Telkwa Rural OCP also provides an overview of the communities found in Area A and the general plan vision (RDBN 2014). There are eight (8) different land designations in the Telkwa OCP.

The Regional District of Bulkley-Nechako Floodplain Management By-law No.1300, 2016, defines flood plain designations, and establishes management regulations and procedures for buildings and structure in areas prone to flooding. The Bylaw was established to reduce or prevent injury or the loss of life, and to minimize property damage, during flood events (RDBN 2016).

The Village of Telkwa has a range of bylaws (Village of Telkwa 2020) that are relevant to the Project and to the Community Well-being VC, including:

- ▶ Village of Telkwa Traffic Bylaw No. 592, 2009: A bylaw to regulate traffic parking and the use of all public streets, roads, ways, trails, lanes, approaches and any other public way;
- ▶ Village of Telkwa Zoning Bylaw No. 633, 2013: A bylaw to regulate the use of land, buildings, and structures and the provision of parking, screening, and landscaping, including zoning maps and related amendments and regulations as per the Local Government Act, RSBC 2015, c 1 (GovBC 2015); and
- ▶ Village of Telkwa Official Community and Integrated Community Sustainability Plan Bylaw No. 613, 2011: A bylaw to guide long-term vision and strategic land use decisions within the Village of Telkwa in accordance with the *Local Government Act*, RSBC 2015, c 1 (GovBC 2015).

2.4 Indigenous Groups and Related Management Plans

The general Project area overlaps with portions of the traditional territory of the Wet'suwet'en (BC Treaty Commission 1995). The Wet'suwet'en are in Stage 4: Active Negotiations of the treaty process with the Governments of BC and Canada. In 2020, Wet'suwet'en Hereditary Chiefs as represented by Office of Wet'suwet'en (OW) concluded a Memorandum of Understanding on rights and title with BC and Canada.

In 2018, the Witset First Nation, a member of the Wet'suwet'en, approved a Comprehensive Community Land Use Plan (Witset First Nation 2018a), as part of a Comprehensive Community Plan, to guide future development of its reserve lands (Witset First Nation 2018b).

An assessment of current use of land and resources for traditional purposes see **S11.0 Wet'suwet'en Rights and Interests Assessment**.

The First Nations Health Council manages a Social Determinants of Health Discussion Guide that can serve to orientate differential assessment of well-being for BC First Nations (FNHC 2017). The document informs on Indigenous perspective on health and wellness, influencing factors, as well as tools and existing frameworks to support well-being assessment and address related challenges.

3. SCOPE OF THE ASSESSMENT

The Community Well-Being effects assessment, including the assessment of Project-related effects and cumulative effects was conducted in accordance with the methods set out in **S3.0 Assessment Methodology** of the **EAC Application**. The assessment is based primarily on publicly available census, indicators and other data collected by governments of Canada and BC. This information has been supplemented by Project-specific studies and socio-economic field studies. Opinions and perceptions expressed by the local population through interviews, consultations, community meetings and open-house sessions conducted since 2017 also contributed to the assessment (refer to **S12.0 Public Consultation**). When available and relevant, studies undertaken for other projects or for regional or community-specific reports have also been included. Publicly available traditional and local community knowledge has been considered, including Witset First Nation Comprehensive Community Plan (CCP) (Witset First Nation 2018b). Reports on Wet'suwet'en title and rights presented by the OW to the BC EAO and other regulatory decision makers in their review of other projects have also been considered.

Potential changes in Community Well-being are assessed by estimating the incremental change observed from existing community health and well-being conditions. Potential changes to community well-being are also linked to Project-related changes in other VCs including Labour Market (employment, income, workforce), Economic Development (economic stimulus), Demographic (driven by labour market changes), Visual Resources (visual experience), Infrastructure and Services (housing availability and local community services), Land and Resource Use (sense of place and experience, food security), Heritage Resources (change in presence, number, type and/or significance of historic and cultural sites) and Human Health (individual health and health and safety of workers and public).

Where adverse effects are anticipated, mitigation measures are proposed to eliminate or minimize the severity of effects, and some measures may increase expected positive effects. Residual effects are then characterised and evaluated for Significance per the criteria described in **5.4 Residual Effects and Significance of Residual Effects**.

3.1 Issues Scoping

Telkwa Coal Limited (TCL) has undertaken an engagement and consultation process to support the scoping of issues for the Project (please refer to **S11.0 Wet'suwet'en Rights and Interests Assessment** and **S12.0 Public Consultation** for details). The consultation and engagement process has included technical working groups established with Indigenous groups, government ministries, community meetings, one-on-one and small group meetings, regarding key themes of interest and discussion of candidate VCs to represent the themes of interest.

Key themes of interests highlighted by this engagement process and review of other information included community cohesion, potential employment opportunities, issues around demand and availability for housing and accommodation (including costs and taxes), the use of local infrastructure and community services (such as education, child care, health care, and recreation), the supply and quality of emergency services (policing, fire, and search and rescue) as well as community sense of belonging to surrounding nature (land and resource use).

Study of local and regional community health and well-being trends and characteristics was initiated in order to contextualize key themes of interests, and determine how they might be influenced by Project-induced changes. Quantitative data on community health and well-being from Provincial Health Services Authority (PHSA 2016) and the Community Well-Being (CWB) Index from Statistics Canada (Government of Canada [GovCan] 2019) were the main baseline data sources for assessment of community well-being

effects, supplemented with available provincial, regional and local reports. Key informant interviews conducted with local residents and organizations of Houston, Smithers, Terrace, Telkwa as well as with regional representatives also provided insightful information on perceived community well-being issues and trends (**Appendix 5.1-A** and **Appendix 6.4-A**).

This data was supported by Witset First Nation Comprehensive Community Plan (Witset First Nation 2018b) and Land Use Plan (Witset First Nation 2018a), information from the **CUS** and reports on Wet'suwet'en title and rights presented by the OW to the BC EAO and other regulatory decision makers. Data on Witset was supplemented in the fall 2020 through semi-structured interviews conducted by the Project with Witset administrators and key informants.

3.2 Rationale for Selection of Community Well-being Valued Component (VC)

The Community Well-being VC was selected during the pre-Application phase of the Project following the VC selection process set out in **S3.0 Assessment Methodology** and using the methodology provided in the Guideline for Selection of Valued Components and Assessment of Potential Effects (BC EAO 2013).

Community Well-being was selected as a VC as the Project has the potential to affect various social and economic determinants of community health and well-being, notably employment, food security and working conditions, income and social status, cost of living, community cohesion, mental health, and culture.

The assessment of the Community Well-being VC becomes particularly crucial in the case of Indigenous communities, as the gap between community well-being of non-Indigenous vs Indigenous communities remains substantial in Canada (GovCan 2020).

3.2.1 Valued Component (VC)

Well-being, or the ability to live a fulfilling and enjoyable life, is influenced by social, economic, and political factors, which vary according to geographic location, economy, language and culture (GovCan 2019). The concept of community well-being is typically captured through a series of components encompassing different dimensions of quality of life that are likely to influence people's experience of well-being. For example, the CWB Index first developed by Indigenous and Northern Affairs Canada (now Crown-Indigenous Relations and Northern Affairs Canada) has been using data from Statistics Canada since 1981 including education, labour force activity, income and housing data gathered through National Census and Household Surveys (GovCan 2019).

The **CUS** highlights that 'health' and 'well-being' are culturally variable concepts. Conceptualizations of health in Indigenous cultures tend to be more collectivistic and based on the well-being of, and one's connections to, external factors (i.e., community, culture, land), which contrasts with the Western notion that health is internal and individualistic. Factors that are broadly important to health and well-being in North American Indigenous cultures include cultural continuity (including traditional forms of spirituality), self-determination (political and territorial), and community and environmental well-being and connectedness. In addition to broadly fluctuating between Indigenous and Western cultures, conceptualizations of 'health' can vary between Indigenous communities. It is thus crucial that any evaluation of health in an Indigenous community takes into consideration what that specific community considers to constitute well-being.

The development of the Project could influence different factors of community well-being, for example through changes in population, employment and income, access to land and resource use, use of infrastructure, roads and community services, as well as community cohesion and sense of place. In

In addition to community well-being indicators, the assessment is supported by other socio-economic indicators capturing the various dimensions of well-being. Accordingly, the Community Well-being VC is dependent on the assessment of several VCs:

- ▶ **Labour Market VC (S5.0-C1):** Provision of employment and procurement can have implications on availability and affordability of housing and the provision of goods and services, thus affecting Community Well-being through increased cost of living. The presence of workers can also affect stress levels and community cohesion, resulting in a change in Community Well-being;
- ▶ **Economic Development VC (S5.0-C2):** Changes in economic conditions resulting from the Project could affect cost of living and the overall Community Well-being;
- ▶ **Demographics VC (S6.0-C1):** Changes in population may affect availability of housing and the provision of public services as well as stress levels and community cohesion, thus affecting Community Well-being;
- ▶ **Visual Resources VC (S6.0-C2):** Changes in the visual landscape may affect stress levels and mental health, consequently affecting Community Well-being;
- ▶ **Infrastructure and Services VC (S6.0-C3):** Changes in the housing market may affect Community Well-being through cost of living;
- ▶ **Land and Resource Use VC (S6.0-C4):** The Project could affect land access and availability, affecting the availability of subsistence foods and consequently, Community Well-being;
- ▶ **Heritage Resources VC (S7.0-C1):** The loss of cultural heritage could have implications on community well-being through effects on mental health; and
- ▶ **Human Health VC (S8.0-C1):** Changes in human health resulting from Project effects on water quality could affect the quality of subsistence foods, thus affecting Community Well-being.

Table 3.2-1 summarizes the rationale for the selection of the Community Well-being as a VC, including its linkages with other VCs. While Community Well-being depends on a number of VCs, it does not support other VCs.

Table 3.2-1: Summary of Rationale for Selection of Valued Components (VCs) and Their Linkages

VC	Rationale for Inclusion	Source of Information	VC Linkages
Community Well-being	The Project has the potential to affect various social and economic determinants of health, such as employment, food security and working conditions, income and social status, and culture. Additionally, vulnerable populations (including women and children) may be disproportionately effected by the Project, and will be specifically considered. Effects on community well-being have a link to effects on Indigenous interests.	▪ Regulatory requirements ▪ Issues scoping ▪ Key informant interviews ▪ Comparable Environmental Assessments (EAs)	Dependent on: ▪ Demographics ▪ Economic Development ▪ Labour Market ▪ Land and Resource Use ▪ Visual Resources ▪ Infrastructure and Services ▪ Heritage Resources ▪ Human Health

3.2.2 Subcomponents

No subcomponents were selected or required for the Community Well-being VC.

3.2.3 Indicators

Indicators are quantitative or qualitative measures used to describe existing VC conditions and trends, and to evaluate potential Project effects and cumulative effects on the VC. Indicators for the Community Well-being VC include social and economic determinants of health, as defined by Health Canada and include change in food security, cost of living, community cohesion, and mental health. The rationale for the selection of these indicators are provided in **Table 3.2-2**. Each indicator was assessed separately and qualitatively to determine the level or amount of Project-related change to the Community Well-being VC. Relevant quantitative information was integrated in the analysis when possible.

Table 3.2-2: Indicators for Community Well-being Valued Component (VC)

Indicator	Rationale for Selection
Change in Food Security	The Tenas Project (Project) has the potential to reduce the extent of available subsistence foods, triggering food insecurity, notably for Indigenous groups.
Change in Cost of Living	The Project has the potential to increase the costs of living (e.g., goods, services, housing) while bringing more inflation in surrounding communities.
Change in Community Cohesion	The Project has the potential to alter community cohesion through increased local tensions, conflicting opinions about the Project, and inequalities in accessing Project related opportunities.
Change in Mental Health*	The Project has the potential to alter mental health through change in stress and anxiety levels among the population. It can also trigger existing mental health issues among local community members through change in employment structure, population dynamics, infrastructure and services and other factors.

** Note: A potential change in mental health is better assessed qualitatively, as there are no sufficiently disaggregated indicators to reflect a change in community and/or mental health at the local level.*

3.2.4 Assessment Boundaries

Socio-economic VC LSAs and RSAs, respectively, were selected based on the proximity of identified communities to the proposed Project Area, and their anticipated interaction with Project activities during Construction, Operation, Decommissioning and Reclamation, and Post-closure phases. Consideration was given to the potential economic and socio-community effects of the Project, noting that Project-induced changes in population, employment, contracting, procurement and other economic conditions (e.g., labour market supply, demand, and production systems) are typically pathways to related social and economic effects. For consistency in the assessment, selection of study areas also considered administrative and technical boundaries with respect to the availability of existing conditions data and how the data was organized.

3.2.4.1 Spatial Boundaries

The Community Well-being VC has adopted an LSA and RSA (**Table 3.2-3, Figure 3.2-1**), as described in **Socio-economic Baseline Report (Appendix 5.1-A of S5.0-C1 Labour Market VC)**.

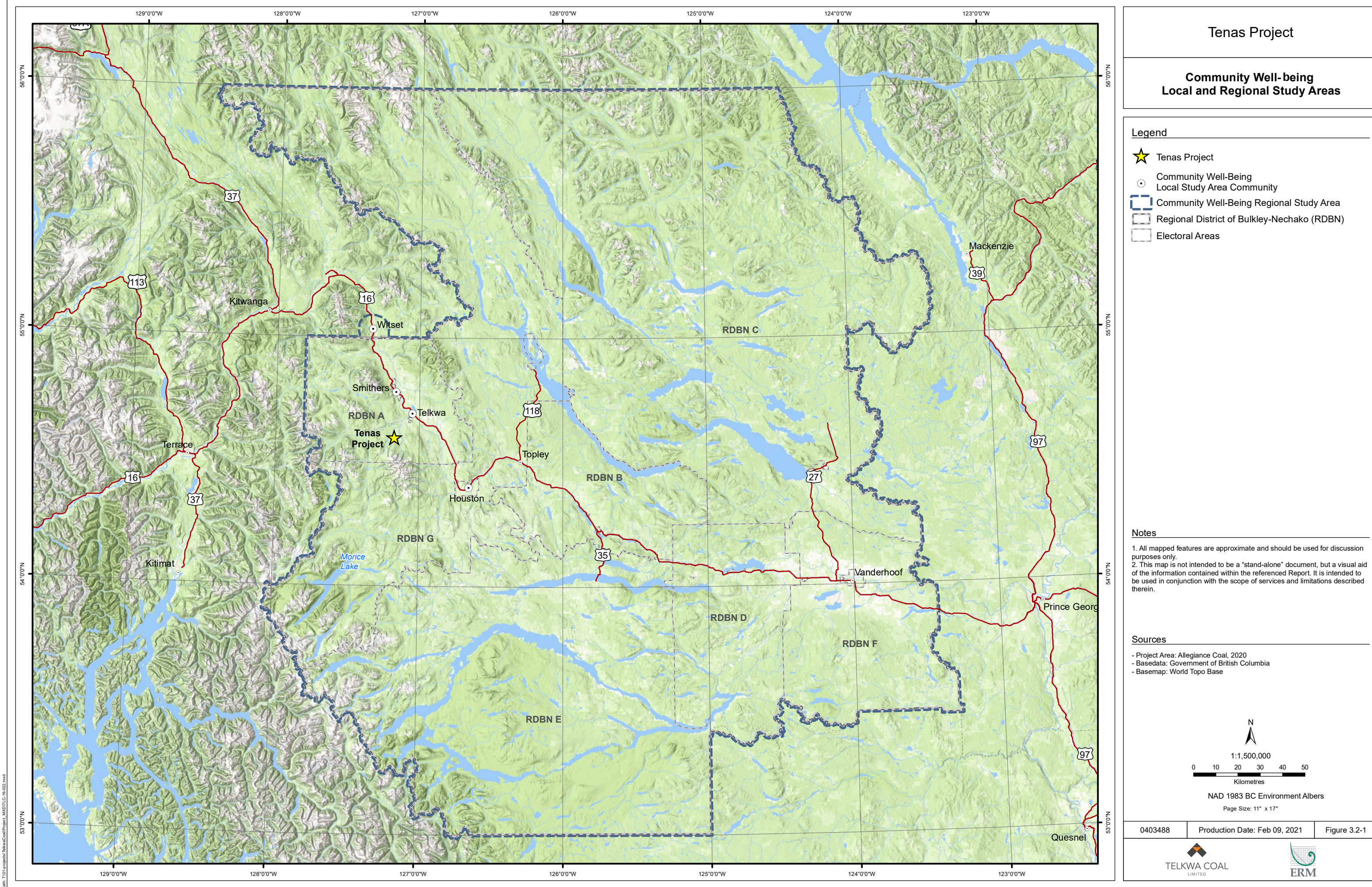
Table 3.2-3: Spatial Boundary Definitions for Community Well-being Valued Component (VC)

Spatial Boundary	Description of Study Area
Local Study Area (LSA)	Telkwa, Smithers, Houston and Witset (formerly Moricetown)
Regional Study Area (RSA)	Regional District of Bulkley Nechako (RDBN) and the community of Witset

The LSA comprises the Village of Telkwa, Town of Smithers, the District of Houston, and the community of Witset² (formerly Moricetown). Based on their relatively close proximity to the Project, it is anticipated that residents of these communities are likely to be directly influenced to varying degrees by socio-economic effects during its Construction, Operation, Decommissioning and Reclamation, and Post-closure phases. Similarly, it is anticipated that the social and economic determinants of health including changes in food security, cost of living, community cohesion, and mental health could change in the LSA.

The RSA comprises the RDBN and Witset. Within the RDBN, Project-related effects on Community Well-being are expected to be less direct, but provide regional context for the availability of human resources, supplies, and services. The RSA reflects a regional dependency on natural resources, resource development, agriculture, and tourism for employment and economic opportunities. The RSA includes LSA communities and the rural electoral areas of Smithers (Electoral Area A), and Houston (G), as well as Burns Lake (B), Fort St. James (C), Fraser Lake (D), Francois/Ootsa (E), and Vanderhoof (F). Wet'suwet'en traditional territory is also located within the RSA.

² The community of Witset is located outside the RDBN. Witset (formerly Moricetown) comprises four (4) occupied and adjacent reserves of the Witset First Nation, a member of the Wet'suwet'en Nation as represented by the Office of the Wet'suwet'en (OW). Statistical data for Witset is based on data for Moricetown 1, Coryatsaqua (Moricetown) 2, Bulkley River 19, and Babine 17 as those Indian Reserves have residences; however, the Witset First Nation also has two (2) other Indian Reserves, Oschawwinna 3 and Jean Baptiste 28, that are mostly undeveloped and forested areas, with some land used for agricultural uses (Witset 2020). The OW is identified in the Project's Section 11 Order as a Schedule A Indigenous Group requiring on-going consultation and engagement. Accordingly, Witset is included in the LSA and RSA.



3.2.4.2 Temporal Boundaries

As described in **S3.0-C1-3.2 Temporal Boundaries** of the **EAC Application**, the temporal boundaries for the assessment of Project-related effects on the Community Well-being VC encompass the time periods during which the Project is expected to interact with Community Well-being. These include the Construction, Operation, Decommissioning and Reclamation, and Post-closure phases. There is potential for Project-related effects during each of the phases as described in **Table 3.2-4**.

Table 3.2-4: Temporal Boundaries for the Tenas Project

Phase	Year	Duration (years)	Description of Activities
Construction	-0.5 to 0	1.5	Site clearing, soil salvage, open pit development, building construction, service and haul road development, Rail Infrastructure construction, bridge construction and development of onsite utilities and services. Development of mine rock, and overburden storage piles, stockpiling of reclamation material such as soil, overburden and other materials suitable for reclamation. Development of water management systems and management ponds for storage of potentially acid generating (PAG) materials.
Operation	1 to 21	21	Development of the open pit through drilling, blasting, loading, and hauling functions. Development of mine rock, and overburden storage piles, stockpiling of reclamation material such as soil, overburden and other materials suitable for reclamation. Development of water management systems and management ponds for PAG storage. Conducting coal processing, stockpiling of raw coal prior to processing, and stockpiling of processed coal prior to shipping. Progressive reclamation will be accomplished during operation including, where available, reclamation activities such as sloping, topsoil placement and revegetation.
Decommissioning and Reclamation	22 to 25	4	Tear-down of infrastructure onsite plus reclamation activities, including sloping of storage piles, backfill materials, and placement of reclamation materials including growth media, overburden and non-PAG rock for management pond covers and revegetating surfaces that are planned to be reclaimed.
Post-closure	26 to 50	10	Active: This involves the filling of the open pit with water, monitoring of vegetation growth and water quality for both groundwater and surface water and wildlife. Control and sedimentation ponds may still be needed for settling of total suspended solid levels. The management ponds are left as dry land reclamation except for portions that will be left as open water.
		15	Passive: This stage is when the control and sedimentation ponds are no longer required for settling of total suspended solid (TSS) levels and the management ponds are left as dry land reclamation except for portions that will be left as open water. Telkwa Coal Limited (TCL) is now simply monitoring the site.

3.2.4.3 Administrative Boundaries

Administrative boundaries relate to the designated political and social responsibilities and legislative authorities within designated geographic regions that constrain the availability of data. Federal census population and demographic information is mandated by the *Statistics Act*, R.S.C., 1985, c.S-19 (GovCan 1985). Provincial population and demographic information is collected by several BC government departments and regional authorities. Population projections are provided by BC Stats through the authority of the British Columbia Minister for Jobs, Economic Development and Competitiveness. Some LSA and RSA data were available for individual communities or electoral areas identified in the federal census. Particularly, population, education, income, labour force and housing data are available for 2006 and 2016 through Statistics Canada's Census Profiles for Telkwa, Smithers and Houston. A First Nation Profile was also found for Witset.

The Government of BC has created three (3) levels of administrative boundaries to deliver Socio-economic Indices across the province: Local Health Area (LHA), school districts, and/or regional districts (GovBC 2021a). For the purpose of capturing LSA communities neatly, socio-economic indices were captured via LHA. Telkwa, Smithers, Houston, and Witset all fall within the Smithers LHA (514) (GovBC 2018).

Some socio-economic trends are only discussed at the regional level, either for the RDBN, Northwest BC or Northern BC. Not all data are disaggregated at the same geographical level, and for recent years. For the purpose of this report, more recent data are presented for the RDBN, when possible. If not, relevant data are presented for Northwest BC, which is one of the four (4) regions of Northern BC. Northwest BC is also referred to as the North Coast & Nechako Development Region, which is one of the seven economic development regions of BC³. Otherwise some relevant sources discuss Northern BC as a whole, including the North Coast, Nechako, the Northeast and Cariboo economic regions.

Publicly accessible statistical data specifically pertaining to health and well-being outcomes in Wet'suwet'en communities were not available. This was determined through internet database searches, as well as consultation with employees at Northern Health and the First Nations Health Authority.

The CWB Index assesses socio-economic well-being in some Canadian communities using indicators of socio-economic well-being, including education, labour force activity, income and housing. While data are found for communities of the LSA, the CWB Index for Witset reserve communities only includes Moricetown 1.

Otherwise, data availability for LSA communities depend on key informant interviews conducted with local authorities of the Telkwa Village Council, Smithers Town Council, District of Houston, regional health authorities, and Witset First Nation Band Council. It should be noted that Witset is a member of the Office of the Wet'suwet'en Society, and some socio-economic reports can be found at this level, including OW contribution to other projects developed in the area.

3.2.4.4 Technical Boundaries

Technical boundaries for the assessment of Community Well-being are related to limitations in baseline data, data analyses, primary data collected from interviews, and other statistics and information available to characterise existing conditions and the Project workforce. Limitations in the census data from 2016 and 2011, which may affect data accuracy in smaller and Indigenous communities, is discussed in the **Socio-Economic Baseline Report (Appendix 5.1-A)**. In municipalities such as Smithers and Houston, the

³ The North Coast and Nechako Development Regions are often grouped together because of their small population size.

number of residents may be undercounted if residents live outside of the boundaries used for census data collection.

In Indigenous communities such as Witset, population information is also limited by a number of factors. Statistical population data derived from the federal census and National Household Survey (NHS) 2011 is incomplete, due to small population sizes and/or low survey participation rates.

Some socio-economic indicator values of the CWB Index details may be missing for a community because of non-participation in the census, inadequate data quality, or insufficient population size (GovCan 2019). Moreover, as the CWB Index is broad and composed of aggregated data, it does not allow for a clear understanding of the factors influencing changes in the value of the indicator for a given community.

4. EXISTING CONDITIONS

This subsection establishes the context for the assessment of effects on the Community Well-being VC based on baseline studies undertaken for the Project, Traditional Knowledge (TK), scientific and other information. It is provided at an overview level within the RSA and in detail within the LSA.

4.1 Background Information and Studies

This subsection describes the existing conditions of Community Well-being based on TK, scientific and other information, and baseline studies undertaken for the Project. The information in this section establishes the context for the assessment of effects on the VC.

Community well-being existing conditions data was collected through desktop research, a Project-specific **CUS** and socio-economic field interviews. A primary source of information was Statistics Canada 2016 Census and 2011 National Household Survey, as well as the 2019 CWB Index. Community health and well-being data were also obtained from the BC government (2012, 2015). Available provincial, regional, and local reports were also consulted such as Census Profiles (2011, 2016), supplemented by Aboriginal Affairs and Northern Development Canada (AANDC) First Nations Profiles (2011, 2016) and community plans (2018).

In Canada, community health and well-being are frequently evaluated using quantitative measures; factors such as rates of income and employment. Although these variables are considered reliable predictors of wellness in Euro-Canadian communities, they often do not equivalently translate to Indigenous communities. For example, although the CWB Index is helpful for quantitatively tracking discrepancies between urban and rural Indigenous groups (e.g., economic disparities), it does not touch upon the factors that Indigenous peoples consider to constitute 'health', as further discussed below.

As available quantitative indicators are presented for Community Well-being, it should be noted that potential change in community cohesion and mental health are better assessed qualitatively, as per the complex nature of those indicators and the lack of disaggregated data at the local level.

4.1.1 Traditional Knowledge (TK)

The **CUS** compiled a baseline inventory of cultural heritage resources pertaining to Wet'suwet'en communities by examining pre-existing cultural, social, historic, and economic data. TK referenced in the **CUS** have been included in the assessment as appropriate.

S11.0-C1 Wet'suwet'en Rights and Interests Assessment was also reviewed, as well as an OW Title and Rights Report submitted to the BC EAO in 2014 (OW 2014). The National Resource Stewardship Monitoring and Assessment Report for the Wet'suwet'en Hereditary Territory prepared by the British Columbia Ministry of Forests, Lands, Natural Resource Operations and Rural Development (BC MFLNRORD) and reviewed by the OW and Wet'suwet'en First Nation was also reviewed (BC MFLNRORD 2017).

4.1.2 Scientific and Other Information

The assessment considered various existing scientific and other information, and its applicability to the Project. It focused on provincial and federal statistical data collected through census and household survey, as well as analytical documents such as the CWB Index and First Nations Profiles. Other provincial and regional sources were also included, notably on the social determinants of health at the provincial level and

for Indigenous communities. Interviews with key representatives of Indigenous and non-Indigenous communities allowed for a more specific understanding of community dynamics and ongoing issues.

The CWB Index from Statistics Canada assesses socio-economic well-being in Canadian communities using indicators of socio-economic well-being, including education, labour force activity, income, and housing. CWB indicators are typically compared and ranked from worst-off to best-off areas and regions, providing the basis for funding of federal, provincial, regional and local programs, services, and infrastructure.

Quantitative data on community health and well-being were derived from socio-economic Indicators from the BC government which are presented at three levels: LHAs, school districts, and/or regional districts. The information for the province's health boundaries are produced and maintained by BC Stats and the British Columbia Ministry of Health (BC MOH) and were last updated in 2012 (GovBC 2021a).

Documents that were reviewed included:

- ▶ Witset First Nation Land Use Plan: Completed in 2018, the Witset Land Use Plan complements the CCP providing a framework to guide future development and land uses on Witset's seven reserves, based on current population data and projections (Witset First Nation 2018a);
- ▶ Witset First Nation Comprehensive Community Plan (CCP): Adopted by the community in 2018, the CCP is a foundational document described as a roadmap to help guide community development in Witset (Witset First Nation 2018b);
- ▶ Office of the Wet'suwet'en Title and Rights Report: This study was submitted to the BC EAO in 2014 in the context of the Costal Gas Link Project. It provides land and resource use information and traditional ecological knowledge context (OW 2014);
- ▶ Overview of the Wet'suwet'en Wellness Working Group: This document synthesizes the role of the Wet'suwet'en Wellness Working Group (WWWG) and articulates Wet'suwet'en holistic approach to wellness through a conceptual framework (OW 2020);
- ▶ Social Determinants of Health Discussion Guide: This document was prepared by the BC First Nations Health Council in 2017. The document informs on Indigenous perspective on health and wellness, influencing factors as well as tools and existing frameworks to support well-being assessment and address related challenges (FNHC 2017);
- ▶ Social Determinants of Health Impacts of Resource Extraction and Development in Rural and Northern Communities: This document was prepared by the Northern Health and Provincial Health Services Authority (PHSA) in 2018. It provides a review of the impacts of resource development on the social determinants of health for northern, rural and indigenous communities in BC (Northern Health and PHSA 2018); and
- ▶ Telkwa, Smithers, Houston and RDBN housing reports: The Housing Reports provide a snapshot of current and future housing needs in each community and are intended to support communities in understanding and responding to housing needs (Watson Projects 2020; Social Planning and Research Council of BC 2020; CDI 2020; and RDBN 2020).

4.1.3 Baseline Studies

Table 4.1-1 summarizes the existing conditions report and studies considered in the assessment of the Community Well-being VC.

Table 4.1-1: Summary of Desktop and Field Studies Related to the Community Well-being Valued Component (VC)

Study Name	Study Purpose, Duration and Spatial Boundaries
Socio-economic Baseline Report (Appendix 5.1-A of S5.0-C1 Labour Market VC)	▪ The desktop study was compiled from 2019-2020 and includes federal census and other data and information from provincial government and regional sources. The report also includes comments made by residents and key informants in the RSA and LSA during socio-economic existing conditions field study interviews. ▪ Socio-economic field studies were conducted in 2019. Key informant interviews were carried out with community leaders, administrators, and managers responsible for a range of social and economic issues, programs, and/or facilities. Notes and other information gathered during interviews were primarily used to qualitatively supplement statistical information and to contextualize understanding of existing issues and concerns in the communities.
Cultural Use Study (Appendix 7.1-B of S7.0-C1 Heritage Resources VC)	From publicly available sources, the desktop study compiles a baseline inventory of cultural heritage resources pertaining to Wet'suwet'en communities in the RSA and LSA. The study includes an examination of pre-existing cultural, social, historic and economic data.
Land and Resource Use Baseline Report (Appendix 6.4-A of S6.0-C4 Land and Resource Use VC)	The baseline report describes existing land uses, tenures and focal areas including access, provincial land and resource management plan, private land, natural resource tenures and licenses (water use, mining, forestry, oil and gas, energy, agriculture), parks, protected areas and public recreation, recreation and tourism, wildlife and fish harvesting.

4.2 Description of Existing Conditions

This subsection provides a summary of community well-being information for the RSA and LSA, as it relates to assessment of the Community Well-being VC.

This assessment combines quantitative and qualitative data. Quantitative data were derived from the CWB Index from Statistics Canada as well as socio-economic indicators from the BC government. For the purpose of capturing data for the LSA communities, socio-economic indices are presented via the Smithers LHA encompassing Telkwa, Smithers, Houston, and Witset. CWB was then assessed through the indicators identified as change in social and economic determinants of well-being, namely food security, cost of living, community cohesion, and mental health. Synthesized data are presented, with links to the respective VC sections listed in **3.2.1 Valued Components**. Further information can also be found in the **Socio-Economic Baseline Report (Appendix 5.1-A)**. This information is supplemented by qualitative data collected through additional interviews conducted in 2020.

4.2.1 Community Well-being

This subsection provides background data on Community Well-being using available indicators.

4.2.1.1 Community Well-Being (CWB) Index

Across Canada, community well-being is measured for individual communities – especially Indigenous communities – using the CWB Index which relies on indicators of socio-economic well-being, including education, labour force activity, income, and housing. These indicators are combined to give each

community a well-being "score". Data sources include the 1981, 2006, and 2016 Census of Population as well as the 2011 National Household Survey (GovCan 2019).

Table 4.2-1 details the CWB Index indicators for Telkwa, Smithers, and Houston. As previously noted, the CWB Index for Witset's reserve communities only includes Moricetown 1. Indicator values may be missing for a community because of non-participation in the census, inadequate data quality, or insufficient population size (GovCan 2019).

Table 4.2-1: Community Well-Being (CWB) Index in the Local Study Area (LSA)

Community	Income	Education	Housing	Labour Force Activity	Overall CWB Score
Telkwa	78	63	98	87	81
Smithers	79	64	96	88	82
Houston	79	56	93	83	78
Moricetown 1	58	36	68	72	59

Source: GovCan 2019

Note: CWB=Community Well-Being

Indicator values are missing for Coryatsaqua 2, Babine 17, Bulkley River 19, Jean Baptiste 28 reserve communities due to either inadequate data quality or insufficient population size.

Based on the 2016 census data, Smithers ranks highest in the LSA for income, education, housing, and labour force activity totalling an overall CWB score of 82 out of 100. Telkwa is close behind with 81, Houston at 78, and Moricetown 1 at 59. Houston's income score is consistent with Smithers and Telkwa; however, education, housing, and labour force data are lower (GovCan 2019). This data is consistent with trends presented in the **Labour Market VC (S5.0-C1)** and the **Infrastructure and Services VC (S6.0-C3)** as Houston's economy has been negatively affected as a result of industry downturns, as well as Houston's Coast Mountain Campus closing.

Witset First Nation's (Moricetown 1) CWB Index scores are lower than the rest of LSA communities, re-emphasizing socio-economic trends detailed throughout the **Socio-Economic Baseline Report (Appendix 5.1-A)**. Many Indigenous peoples and communities face deeply rooted social and economic challenges, including poverty and lacking social services and infrastructure (i.e., housing, education, mental health) (NCCAH 2017). These challenges may be connected to historic impacts of colonialism at individual, family, community, and systematic levels and may negatively impact health and well-being (Mendelson 2006, SSCAP 2011). When examining the social and economic determinants of health, CWB Index scores suggest Indigenous communities generally do not experience the same standards in terms of education, employment, and housing as the general, non-Indigenous population in Canada (First Nations Information Governance Centre 2018).

4.2.1.2 Additional Indicators of Community Health and Well-being

Well-being indicators related to food security, community cohesion, and mental health are discussed in the corresponding sections below, including human economic hardship and crime, as well as depression/anxiety prevalence rate. Other relevant community health and well-being indicators include premature mortality, children at risk, and infant mortality briefly discussed here. Further details are provided in the **Socio-Economic Baseline Report (Appendix 5.1-A)**.

BC Provincial Health Services Authority (PHSA) does not have a specific indicator for community well-being. Community health is considered as encompassing the health and well-being of communities within a geographic area. Social determinants of community health and well-being include income levels, built and natural environment, childhood development, access to health services, supportive social networks and educational opportunities. Such data are considered in the preparation of Community Health Profiles for BC communities, municipalities and LHA (PHSA 2022).

Health-related indicators are available at the level of the LHA. The LSA corresponds to the Smithers LHA, which is composed of Telkwa, Smithers, Houston, and Witset communities. Otherwise, specific publicly-accessible statistical data pertaining to health and well-being outcomes are not available for Wet'suwet'en communities. Qualitative data on health and well-being in Witset are discussed in **4.2.1.4 Community Health and Well-being in Indigenous Communities**.

4.2.1.2.1 Premature Mortality

In 2012, Smithers LHA ranked in the middle of all LHAs (36th of 77) based on indicators of health issues. The overall life expectancy in the Smithers LHA was 80.8 years old between 2011 to 2015, which is below the provincial life expectancy of 82.6 years old (**Table 4.2-2**). Life expectancy can approximate length of life, but does not account for quality of life, which is influenced by health and well-being (PHSA 2021).

Life expectancy at birth and potential years of life lost (PYLL) from natural and accidental causes, suicides, and homicide are indicators of overall community health. PYLL refers to the number of years of life lost to early death (i.e., death before an individual reaches the age of 75).

Between 2011 to 2015, the PYLL index in the Smithers LHA related to alcohol (2.14 years) and smoking (1.26 years) was above the provincial average of 1.0 years, whereas drug-induced deaths (0.76 years) are below the provincial average. The PYLL index in the Smithers LHA related to suicides (1.37 years) was above the provincial average of 1.0 years (PHSA 2021).

In addition, **S8.0-C1 Human Health** and the **Socio-Economic Baseline Report (Appendix 5.1-A)** presents further details on human health in the Project Area. Mental health indicators are discussed in **4.2.5**.⁴

4.2.1.2.2 Children and Youth at Risk

The well-being of children and youth is commonly used as an indicator of family and community well-being. The children at risk indicator is based on the infant mortality rate, the rate of children in care, the percentage of children below standard reading levels, and percentage of children receiving income assistance (**Table 4.2-3**). Smithers LHA ranked 35th (of 77) for indicators of children at risk in 2012.

Infant mortality is recognized as an indicator of population health, reflecting healthcare provision and the effectiveness of preventive health in a given area (Department of Health and Social Services 2004). Between 2011 and 2015 the infant mortality rate for the Smithers LHA was 6 per 1,000 live births, which is

⁴ The Human Health Risk Assessment Report (HHRA; **Appendix 8.1-A**) and **S8.0-C1 Human Health** focus on biophysical environment factors contributing to physical human health through biochemical linkages. Other determinants of health such as lifestyle, occupation, education and the social and economic environment are not covered in the assessment. In accordance with environmental assessment guidelines in Canada and British Columbia, the HHRA targets the toxicological effects of potential contamination in the environmental media and subsistence food.

above the provincial rate of 4 (**Table 4.2-2**). Between 2009 to 2011 the total serious juvenile crime rate was 6.7, per 1,000 population aged 12 to 17, which is higher than the provincial rate of 3.8.

Table 4.2-2: Data on Children and Youth at Risk in Smithers Local Health Area (LHA)

Local Health Area	Infant Mortality Rate 2011-2015 (‰)	Rate of Children in Care 2012 (‰)	Rate of Children Below Standard in Reading (Grade 4 and 7) 2009-2012 (%)	Rate of Children Receiving Income Assistance 2012 (%)	Rate of Total Serious Juvenile Crime 2009-2011 (‰)
Smithers LHA	6	11.2	19.4	2.6	6.7
BC	4	9.1	20.5	2.1	3.8

Source: PHSA 2021; PHSA 2022.

Note: ‰=per thousand; %=percent

More recent data on children and youth at risk were not provided by LHA

An additional indicator of children and youth at risk is the vulnerability in early childhood. The Early Development Instrument (EDI) measures healthy childhood development by measuring children in kindergarten in five core areas that are known to be good predictors of adult health, education, and social outcomes. The EDI highlights the percentage of children in kindergarten who may be considered vulnerable in one or more of these core areas. These predictors include social competence, physical health and well-being, language and cognitive development, emotional maturity, communication skills and general knowledge (see **Table 4.2-3**). Between 2013 – 2016 Smithers LHA scored higher (40%) than BC (32%) for children who may be considered vulnerable in one or more of these core areas (PHSA 2021).

Table 4.2-3: Vulnerability in Early Childhood in Smithers Local Health Area (LHA), 2013-2016

Local Health Area	Social Competence (‰)	Physical Health and Well-being (‰)	Language and Cognitive Development (%)	Emotional Maturity (%)	Communication Skills and General Knowledge (‰)
Smithers LHA	17	23	9	22	17
BC	16	15	9	16	14

Source: PHSA 2021

Note: ‰=per thousand; %=percent

4.2.1.3 Community Health and Well-being Services

Smithers is the healthcare service hub for LSA communities with one hospital, one health unit centre, two long-term care seniors' centres, and several physical therapy offices. The Smithers health unit offers a number of social services including:

- ▶ programs for the treatment of drug and alcohol addictions;
- ▶ emergency housing and shelter;
- ▶ daycare, programs related to child protection;
- ▶ programs for learning (youth, literacy, seniors, and disabled individuals);

- ▶ family support programs;
- ▶ fetal alcohol spectrum disorder services;
- ▶ programs for seniors;
- ▶ risk reduction services;
- ▶ pregnancy outreach; and
- ▶ victim services.

Smithers also relies on the Bulkley Lodge which provides long-term care to 70 residents. Assisted living to seniors and people with disabilities is also provided through The Meadows, a 14-unit supportive housing development. A senior home care assistance company located in Telkwa also offers companionship services, personal care services, and education for senior residents.

The Witset Health Centre provides general personal health for community members through education, advocacy, support, prevention, and community health programs. Witset has an Addictions and Trauma Counsellor that provides counselling to youth, families, and individuals with a focus on addictions and trauma counselling. Witset also has a Mental Health Counsellor that provides counselling services targeting high-risk kids and teens, youth, families, and couples. Services include drug, alcohol, and trauma counselling.

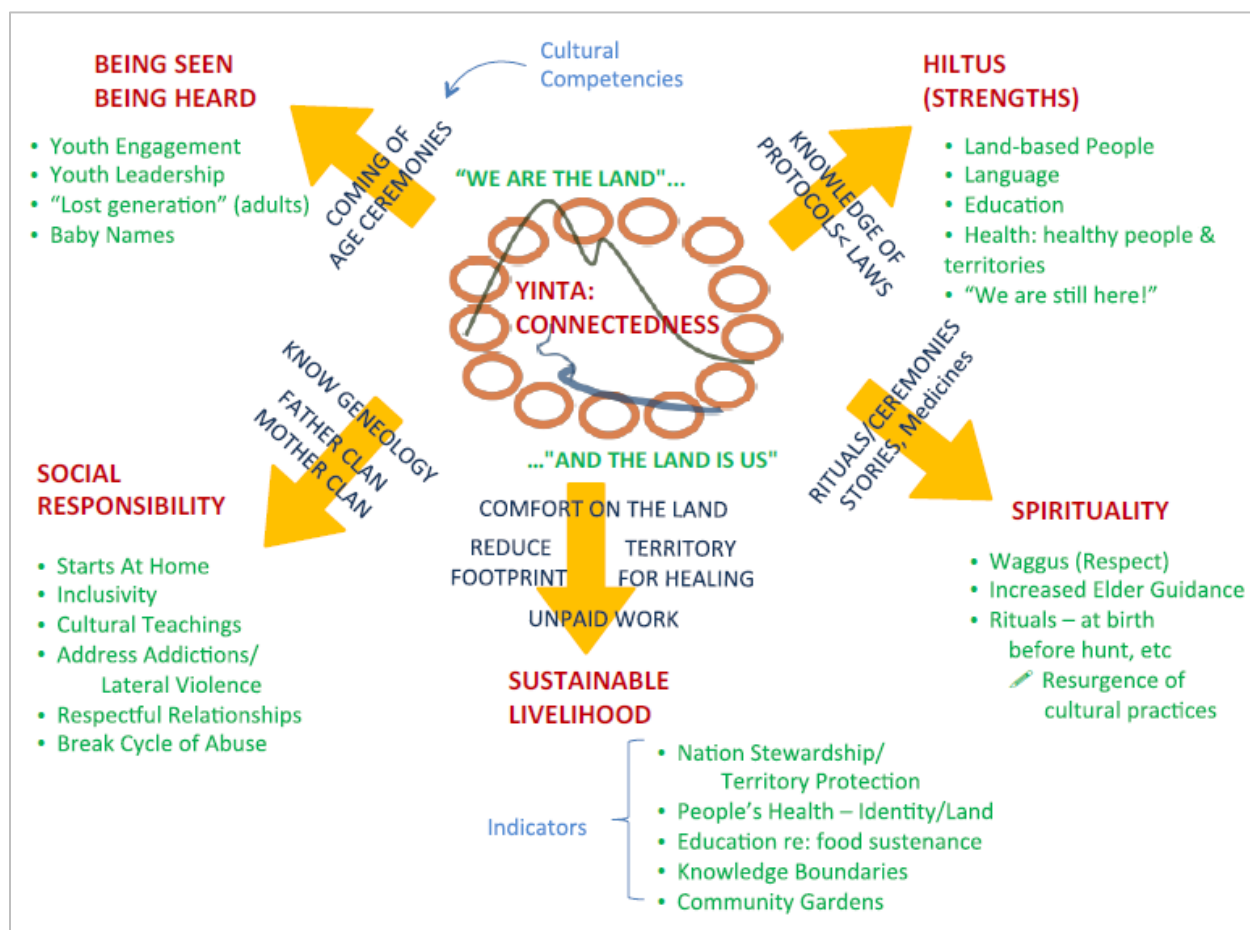
Further information about local services in the LSA and the RSA is found in **S6.0-C3 Infrastructure and Services**.

4.2.1.4 Community Well-being in Indigenous Communities

Health, in the context of Wet'suwet'en communities, is a multifaceted construct that interconnects with different aspects of indigenous realities and differs in many significant ways from 'health' as generally understood by Westerners. In North American Indigenous cultures, typical factors that are broadly important to health and well-being can include cultural continuity (including traditional forms of spirituality), self-determination (political and territorial), and community and environmental well-being and connectedness. Conceptualizations of health tend to be more collectivistic and based on the well-being of, and one's connections to, external factors (i.e., community, culture, land).

The Wet'suwet'en have a holistic conceptualization of health in which the spirit constitutes a dominant force through its capacity to "interconnect". The concept of connection to the culture, community, and traditional territory is thus paramount to the well-being of the Wet'suwet'en. Harming one of these factors—for example, impeding access to traditional territories and resource use, or disrupting traditional forms of governance—has the potential to harm the well-being of Wet'suwet'en communities. The **CUS** further discusses Wet'suwet'en connection to land.

The Wet'suwet'en Wellness Working Group (WWWG) is a coalition of Hereditary and elected Wet'suwet'en Chiefs who are collectively working to promote well-being in their communities using "a distinctly Wet'suwet'en approach to wellness" (OW 2020). This distinct approach is largely based on community members' input. In 2012 to 2013, the WWWG undertook an extensive community-based study of health conceptualizations and priorities that included over 200 Wet'suwet'en participants, providing the basis for the Wet'suwet'en Holistic Wellness Conceptual Framework (**Figure 4.2-1**). The centerpiece of the framework is *Yintah* or Yinta, meaning people connected to the land or "We are the land and the land is us" (OW 2020). The framework is notably used to help local health services become more culturally relevant.



Source: Wet'suwet'en Holistic Wellness Conceptual Framework (OW 2020).

Figure 4.2-1: Wet'suwet'en Holistic Wellness Conceptual Framework

Community and cultural connectedness and engagement are often considered to be effective indicators of wellbeing in Indigenous communities. The capacity to engage in traditional forms of governance can also be seen as necessary for Wet'suwet'en health and well-being. Other examples of engagement through community, culture and environmental connectedness include culture camps run by the OW on an annual basis, as well as cultural spaces promoting traditional knowledge, culturally-relevant health and education programs and language (for further details see the **CUS**).

4.2.2 Food Security

The availability of healthy food is considered an important determinant of health. In Northern BC, residents experience the highest rates of food insecurity in the province. Food insecurity increases risk of chronic health conditions as well as obesity, depression, anxiety, and social isolation. It also negatively impacts social and mental well-being (Northern Health and PHSA 2018).

In rural communities of Northern BC, the procurement of subsistence foods is associated with healthy eating habits and physical health. Food security is tied to the availability of subsistence foods as well as to income, housing costs and availability of nutritious bought food (Northern Health and PHSA 2018). Links between housing costs, cost of living and community well-being are discussed in **4.2.3 Cost of Living**. The question

of food security relates to reliance on land and natural resources which is discussed in **S6.0-C4 Land and Resource Use**. The **Land and Resource Use Baseline Report (Appendix 6.4-B)** discusses resource use in the LSA and RSA for non-Indigenous people. The **CUS** also discusses the availability of subsistence foods among the Wet'suwet'en. Potential effects on food security, together with other factors influencing health and well-being may contribute to Indigenous communities' food insecurity as compared to non-Indigenous communities (Northern Health and PHSA 2018).

In addition to questions of access and availability, food security also relates to the quality of subsistence foods, which is directly connected with the quality of the surrounding environment (e.g., soil, water, wildlife and vegetation). Contamination of subsistence foods through the food chain may trigger food insecurity, as people would not consume subsistence foods that contain contaminants. **S8.0-C1 Human Health** details how human health may be affected by consumption of subsistence foods that contain contaminants.

4.2.2.1 Non-Indigenous Resource Use

The following provides a brief summary on some existing land use in the RSA that is of relevance to food security and is based on **S6.0-C4 Land and Resource Use VC**. Further details regarding existing conditions related to non-Indigenous land and resource use are provided in **Appendix 6.4-A Land and Resource Use Baseline Report**.

The regional economic base supports recreational fishing and hunting and commercial guide-outfitting. The RSA is used for hunting of bears, moose and deer. Agricultural land use includes grazing of livestock.

4.2.2.1.1 Hunting

Hunting provides recreational opportunities for local residents and a supplementary food source. The province is divided into nine (9) administrative regions, having a total of 225 management units (MU). For consistency and efficient resource management, MUs used for game management and angling regions share the same boundaries. The Project is located within Region 6 - Skeena, which includes 30 MUs. The Land and Resource Use VC RSA (refer to **Figure 4.2-12 in S6.0-C4**) overlaps with MU 6-8 and 6-9 whereas the Land and Resource Use VC LSA only overlaps with MU 6-9

Most hunting RSA takes place south of the Minesite and occurs year round. Residents hunt in most green spaces throughout the Bulkley Valley. The trend of species hunted per year has stayed relatively consistent from 2007 to 2017, with moose being the most successfully hunted species followed by black bears and mule deer.

4.2.2.1.2 Fishing

The Skeena Region offers some of the best freshwater fishing in the province and lakes in the region are all accessed off Highway 16 (BC MOE 2006), and fish is an important food source in the Bulkley Valley. There are no lakes located within the LSA communities but nearby lakes that are stocked with rainbow trout, eastern brook trout and kokanee by the Freshwater Fisheries Society of BC (FFSBC) include:

- ▶ Round Lake and Tyhee Lake near Telkwa;
- ▶ Call Lake southeast of Smithers;
- ▶ Dunalter Lake, widely known as Irrigation Lake and classified as a man-made lake, and Vallee Lake, also known as Johnson Lake outside of Houston; and
- ▶ Duckbill Lake and Duckwing Lake near Witset (FFSBC 2021).

The two (2) main rivers near the LSA communities are the Bulkley River and the Telkwa River. The Bulkley River is a well-known fishing location in the RSA. Chinook, coho and steelhead have historically had strong runs in the Bulkley River, but have declined in recent years. The Telkwa River is recognized for its wild coho and steelhead runs, as well as its bull trout fishery. Spring salmon fishing has been restricted in the Telkwa River due to low populations returning to spawn. Alternatively, pink salmon are able to return to the Bulkley River, but cannot be fished from the Telkwa River.

4.2.2.2 Indigenous Resource Use

The Wet'suwet'en find the right to use land and resources for economic purposes, both traditional and contemporary, by the title holder existing under Aboriginal title. Aboriginal title is held communally by the Wet'suwet'en. Land-based resources are managed through a hereditary clan system organized by house territories. According to Wet'suwet'en Hereditary Chiefs, resources within house territories must be used in a sustainable fashion.

Many Wet'suwet'en today are concerned that declining game animal and fish populations will impede the sustainability of their traditional territory and, thus, the continuity of Wet'suwet'en traditional way of life. They are concerned that new threats, including climate change, industrial developments (e.g., gas and oil pipeline construction), and resource extraction (e.g., forestry), will exacerbate animal population declines. Wet'suwet'en believe that the combined effects of numerous factors could continue to harm subsistence animal populations and thus, negatively affect their food security, the sustainability of their house territories, and, ultimately, the continuity of their culture. Given these anxieties, many Wet'suwet'en are somewhat concerned about large-scale industrial development and resource extraction activities (though, as noted, another segment of the population welcomes such economic development).

Many traditional use activities, such as fishing, hunting, trapping, and gathering, occur on Wet'suwet'en territories as they have for millennia. The following provides a summary of traditional land use activities from the **CUS**.

4.2.2.2.1 Hunting

Large game animals harvested by the Wet'suwet'en include: black and grizzly bears, caribou, coyotes, deer, moose, mountain goats, and wolves. Some smaller game animals are: beaver, groundhogs, grouse, lynx, marmots, martens, snowshoe hares, squirrel, and weasel. The feast system is of paramount importance to Wet'suwet'en life-ways. Central to this system is the sharing of territorial foods at feasts, such as moose, bear, deer, and beaver.

4.2.2.2.2 Fishing

Many Wet'suwet'en fishing camps have been recorded along the Telkwa and Bulkley rivers. Morice sockeye salmon are the largest and most important fish to the Wet'suwet'en in the Bulkley River basin. Other anadromous fish harvested by the Wet'suwet'en include: char, chinook, coho and pink salmon, as well as steelhead, bull trout, and Pacific lamprey. Freshwater species typically gathered are burbot, chub, dace, Dolly Varden, kokanee, lake trout, mountain whitefish, northern pike minnow, rainbow trout, sculpin, suckers, and white sturgeon.

4.2.2.2.3 Plant Gathering

The Wet'suwet'en use around 60 plants species for food including berries, fruits, flowers, green vegetables, mushrooms, roots, rhizomes, and wild rice, the vast majority of which are harvested from forest and woodland settings, or along watercourses. Medicines derived from plants are often gathered from the

foliage, inner bark, leaves, and roots of various plant species. Today, substantially fewer Wet'suwet'en persons gather plants for food, medicine, and cultural goods than did so in the past, largely due to concerns over contamination from resource extraction and industrial development activities.

4.2.2.3 *Quality of Subsistence Foods*

Current exposure of Indigenous and non-Indigenous Resident Land Users and Recreational Land Users to contaminants of potential concerns (COPCs) in the Human Health LSA⁵ was assessed in the context of the **Human Health Risk Assessment Report (Appendix 8.0-A of S8.0-C1 Human Health VC of the EAC Application)**.

The objective of the HHRA was to identify incremental changes that may occur to human health between the Base Case and future Project Case conditions should the project go ahead.

There are three (3) main potential transport pathways through which COPCs may be transferred from the Project to the environment where people could come into contact with them:

- ▶ atmospheric transport of particulates and gases that can be inhaled;
- ▶ atmospheric transport and deposition of fugitive dust that can then be taken up by plants and thus ingested by people; and
- ▶ effluent discharge (to surface water) and seepage (to groundwater) that can then be ingested by people and terrestrial biota used as subsistence food.

Once COPCs enter the environment they can be taken up into the aquatic or terrestrial food chain; this was included in the HHRA as an indirect transport pathway for exposure of people through subsistence foods.

The subsistence foods identified for evaluation in the HHRA were: moose, mule deer, American black bear, snowshoe hare, grouse, rainbow trout, berries, and above-ground plants. Base Case (baseline) fish, berry, and plant tissue metal concentrations were measured during baseline studies in 2017, 2018, and 2019.

4.2.2.3.1 *Exposure Concentrations in Fish Tissue*

Fish metal concentrations were measured in rainbow trout muscle tissues from the Bulkley River, Telkwa River, Goathorn Creek, and Tenas Creek through sampling conducted in October 2017 and June 2018. Details of the baseline sampling program and results can be found in **Fish and Fish Habitat VC (S4.0-C6)** and the **Tenas 2017-2019 Baseline Report (Appendix 4.1-C)**.

Fish tissue quality guidelines exist only for selenium and mercury. No fish tissue samples exceeded the BC tissue quality guideline for selenium. Tissue mercury concentrations did not exceed BC MOE's most conservative tissue guideline or Health Canada guidelines for any of the samples tested. Analysis results and statistical summaries for tissue metals at each water quality prediction node are presented in **Appendix A of the HHRA**.

4.2.2.3.2 *Exposure Concentration in Terrestrial Wildlife Tissue*

No terrestrial wildlife species from the Human Health LSA were harvested to obtain tissue samples. Rather, COPC concentrations in moose, deer, black bear, snowshoe hare, and grouse tissue were estimated using a food chain model. Each terrestrial wildlife species was assumed to take up COPCs from the environmental

⁵ The CWB LSA and HHRA LSA differ. Telkwa is the only community in both the CWB and HHRA LSAs.

medium (soil, water, fish, and vegetation) based on information known about the species' life histories. **Appendix D** in **Appendix 8.0-A** present the modelled deer, moose, black bear, snowshoe hare, and grouse COPC concentrations in tissue for the Base Case.

4.2.2.3.3 *Exposure Concentrations in Vegetation*

Typically in subsistence foods studies, a vegetation species is selected as a subsistence food for direct human consumption. Vegetation COPC concentration data are part of the subsistence foods assessment both as direct contributions (i.e., direct ingestion of vegetation or berries) or as indirect contributors through the consumption of subsistence foods (i.e., intake of vegetation by wildlife and subsequent intake of wildlife by humans).

Vegetation samples included 23 plant species in 20 genera and were selected based on potential consumption by humans and/or wildlife, as well as frequency of occurrence in sufficient quantity to produce at least a single sample. During the 2017, 2018 and 2019 field programs, 150 samples of plant tissue (25 berry samples and 125 leaf/stem samples) were collected and analyzed for trace metals from 74 sites located in the areas of the Pit, Pipeline, Bypass Road and Rail Infrastructure.

Baseline metal concentrations in berry and leaf/stem tissues are presented in **Appendix A - Tables A-7 and A-8** in **Appendix 8.1-A**. Additional information can be found the **Vegetation VC (S4.0-C7)** and the **Vegetation and Ecosystems Baseline Report (Appendix 4.7-A)**.

There are currently no provincial or federal health-based guidelines for plant tissue metal concentrations. Screening benchmarks were back-calculated based on the most conservative oral toxicity reference value (TRV) and receptor-specific subsistence foods consumption rates and are described in **Appendix 8.0-A**.

4.2.2.3.4 *Market Food Concentration*

Contaminants of potential concern may also be present in foods in the market (retail or commercial) food system. Dose from ingestion of market foods is included in the HHRA to estimate the overall exposure to COPCs from food ingestion. The HHRA considered that COPC doses from market foods are independent of the Project as it is assumed that people will consume the same amount of market foods every year (in addition to subsistence foods).

4.2.3 **Cost of Living**

Cost of living affects the quality of life experienced by individuals and families. Well-being is then influenced by the capacity to meet these living expenses through employment wages, household income, and employment security, as well as overall regional affordability. Living expenses typically include housing (mortgage or rent), food, transport (public and private transportation), healthcare, education, travel, entertainment (including restaurants, bars), and utilities. These costs vary depending on province, region, and city as well as lifestyle and family size.

In 2017, the RDBN evaluated that the total annual cost of living in the area was \$75,567, which included average living and personal costs (44%), average housing and transportation costs (33%) and basic tax (23%). **Table 4.2-4** presents these costs for Smithers, Telkwa, and Houston. Telkwa has the highest cost of living in the region, followed by Houston, both above the RDBN average. Statistics for Witset were not available.

Table 4.2-4: Annual Cost of Living in the Regional District of Bulkley-Nechako (RDBN) 2017

Area	Average Living & Personal Costs		Average Housing & Transportation Costs		Basic Tax		Total Cost of Living (\$)
	Value (\$)	% of total	Value (\$)	% of total	Value (\$)	% of total	
Smithers	33,653	45.0	23,534	31.5	17,540	23.5	74,727
Telkwa	38,493	45.4	24,587	29.0	21,624	25.5	84,704
Houston	36,884	45.3	25,069	30.8	19,309	23.7	81,466
RDBN	33,296	44.1	24,757	32.8	17,515	23.2	75,567

Source: RDBN 2017**Notes:** %=percent; RDBN= Regional District of Bulkley-Nechako

The average cost of living is calculated based on a couple with two dependents using 2015 income data, average home size of 2,000 square feet. and transportation by car (one per household), rented or owned. Living & personal costs typically include food, child care, health care and other necessities (apparel, personal care, household supplies).

The living wage is the hourly wage rate required for a household to meet its basic needs and provide a basic economic security. Living wages were estimated in 2013 for the five (5) sub-regions of Northern BC, ranging from \$16.51 per hour in the North Central region, to \$18.17 in the Northwest region and \$18.29 in the Northeast region⁶. In 2017, wages paid in Northern BC averaged \$21.75, above the living wage for Northern BC but below the provincial average wage (\$25.71). Median wages in the Northwest region in which the RSA is located are comparable to other regions of Northern BC (Northern Development BC 2019).

4.2.3.1.1 Employment and Household Income

Smithers and Houston are business hubs among LSA communities. Smithers has a stable and diverse economy balanced between the public sector and mining, agriculture, forestry, and tourism. As the regional service center, Smithers has a range of businesses including a variety of retail stores, gas stations, restaurants, health services, and wholesale trade.

Houston is an industrial centre dependent on forestry and mining. Despite both the Endako and Huckleberry mines being recently placed in care and maintenance (C&M) and a local economy losing timber-related business, Houston is seeing direct and spin-off economic benefits from the Coastal GasLink project and associated construction of camps that accommodate 500 to 800 workers.

Telkwa is a bedroom community to Smithers. The community does not have any major industries, with some businesses specializing in natural resource contracting, tourism, accommodation, food and hospitality, health and fitness, and esthetics, with a number of those businesses being home-based. Major employers in the community include Castle Building, West Fraser Concrete, and the Village of Telkwa, with the largest employer being the forestry company Pro-Tech.

Employment in Witset is primarily in timber and wood manufacturing with 31.5% of the labour force in the community associated with those industries. Kyahwood Forest Products, a lumber re-manufacturing

⁶ Living wages are established by Living Wage Canada based on an estimation for different cities. In BC, most recent living wage per hour were calculated in 2019 for Kamloops (\$15.93), Revelstoke (\$18.90) or Metro Vancouver (\$19.50), but not for cities of Northern BC (Living Wage Canada 2021).

company located in Witset, and Kyah Resources Ltd., a forest harvesting business, provide most jobs in the community in addition to jobs available at the band office in public administration, healthcare, and education. Both Telkwa and Witset rely on businesses and services provided in Smithers and Houston. The **Economic Development VC (S5.0-C2)** and **Appendix 5.1-A Socio-Economic Baseline Report** provide further details on the economic context in the LSA communities and the RSA.

Employment and income data are presented in **Table 4.2-5** for LSA communities as well as for the RDBN. In 2015, unemployment rates were higher in all LSA communities compared to BC, particularly in Witset. Median household income was the highest in Telkwa and the lowest in Witset. Government transfers represented 19.3% of total income in Witset, higher than other communities of the LSA, the RDBN and BC.

Table 4.2-5: Employment and Income Data in the Local Study Area (LSA) Communities, Regional District of Bulkley-Nechako (RDBN) and British Columbia (BC) 2016

Area	Unemployment Rate (%)	Median Hhld Income – 2015 (\$)	Average Hhld Income - 2015 (\$)	Prevalence of Low Income – 2015 (%)	Government Transfers (%)
Smithers	8.9	74,610	84,461	11.9	11.6
Telkwa	10.2	87,936	94,834	7.2	10.3
Houston	11.5	80,477	89,908	13.7	11.8
Witset	19.3	42,528	n/a	n/a	n/a
RDBN	12.3	76,008	86,862	12.9	12.2
BC	6.7	69,995	90,354	15.5	11.1

Source: Statistics Canada 2017

Notes: \$=Canadian dollar; %=percent; BC=British Columbia; Hhld=Household; RDBN=Regional District of Bulkley-Nechako

Data for Witset is based on data for Moricetown 1, Coryatsaqua (Moricetown) 2, Bulkley River 19, and Babine 17; Government transfers were calculated based on total individual income.

Labour force data show that employment has been erratic in the RDBN between 2001-2015. Employment rates were higher than in BC, but dropped below 60% between 2012 and 2014 to rise again to 63.5% between 2014-2015 (BC Housing 2016). Employment in BC Northwest region started to recover around mid-2017, led by construction and manufacturing sectors. Further regional growth is expected due to the construction and operation of the LNG Canada terminal in Kitimat (Northern Development BC 2019).

The **Labour Market VC (S5.0-C1)** and the **S5.0-C1-Appendix 5.1-A Socio-Economic Baseline Report** provide greater details on employment characteristics in the LSA and the RSA.

4.2.3.1.2 Housing

Housing demand and resource development activities, such as mining and forestry, are intrinsically linked in Northern BC. The increased economic activity associated with the development of projects may influence economic sectors including the number employees and, hence, homes or accommodation required. At times, the mere perception of development has been linked to real changes in housing demand, which can also lead to increases in housing costs (CDI 2020).

Table 4.2-6 presents housing characteristics as well as average home prices and shelter costs for LSA communities, the RDBN and BC. As it is considered “unaffordable” to spend 30% or more of household

income on shelter costs, renters in Smithers and Houston are more likely to face affordability challenges with more than one third of them spending more than 30% of their income on housing. Although complete data are not available for Witset, the situation is likely to be similar as comparable data are found at the level of the RDBN. In general, households spending 30% of their income on housing are less able to afford healthy food and other basic living costs.

Table 4.2-6: Housing Characteristics and Shelter Costs in the Local Study Area (LSA) Communities, Regional District of Bulkley-Nechako (RDBN) and British Columbia (BC), 2016

	Housing Stock Characteristics			Shelter Costs - Owners		Shelter Costs - Tenants	
Area	Average value of dwellings	% of housing built in the pre-1980 era	% of home requiring major repairs	Average monthly shelter costs for owned dwellings	% of owner households spending >30% on shelter	Average monthly shelter costs for rented dwellings	% of tenant households spending >30% on shelter
Smithers	284,454	55.7	7.0	1,043	9.2	894	38.0
Telkwa	274,309	34.3	5.1	1,219	6.7	1,087	N.A.
Houston	186,152	60.6	11.7	874	8.4	734	30.9
Witset*	n/a	30.0	42.1	n/a	n/a	n/a	n/a
RDBN	258,767	51.8	12.5	905	8.4	812	28.7
BC	720,689	43.9	6.3	1,387	20.7	1,149	43.3

Source: RDBN 2017; Stats Canada 2011; Statistics Canada 2017

Notes: >=greater than; %=percent; BC=British Columbia; n/a=not available; RDBN=Regional District of Bulkley-Nechako

* partial data available for Moricetown 1. Note that the data shown of Witset (Moricetown 1) is from Statistics Canada 2017. The Witset First Nation Community Land Use Plan (Witset 2018a) presents slightly different values for Witset.

The Canada Mortgage and Housing Corporation (CMHC) reports on vacancy rates for some cities of BC, including Terrace, Prince George, and Prince Rupert. In 2019, the vacancy rates in these communities ranged from 2 to 3.5%, more than double that of Vancouver (1.1%) and Victoria (1.0%), which might indicate a trend of higher vacancy rates in Northern BC (CMHC 2020). However, a housing study conducted in Telkwa reports rental shortage in Smithers and Telkwa (Watson Projects 2020). A key informant interview also indicated that the vacancy rate in Smithers is about 1%, consistent over the last decade (**Appendix 5.1-A**).

Specific affordability indicators highlight the proportion of median household income needed to finance home ownership for homes purchased in a given year, including mortgage costs, taxes, and fees and utilities for an average single-family home. In 2019, affordability has slightly improved in Smithers while worsening in most Northern BC communities. Home ownership expenses represented 26.4% of median household income in Smithers compared to 27.4% in Northern BC (BC Northern Real Estate Board 2020).

According to the Town of Smithers Housing Needs Report (2020), one of the most significant challenges facing the community has been the increase in rental housing demand with a shortage of affordable rental housing. The population and mobility data from 2016 Census suggested that owners made up 1,575 households or 69% of all households, while there were 715 renter households, accounting for 31% of all households. A large proportion of the rental housing supply in Smithers is in the form of single detached homes. With the increase in ownership demand, there is pressure on the supply of rental housing. With the

value of housing increasing and demand for ownership units increasing, a number of the rental single detached homes will be sold in the ownership market. This could result in displacement and dislocation of the renter households living in this type of housing. As a result, Smithers is facing a critical shortage both in terms of the supply of purpose-built rental housing as well as housing that is affordable to households at the low and low to moderate end of the income spectrum (Town of Smithers 2020). In Telkwa, community residents believe increasing housing costs are a main concern and housing affordability should be a priority (Watson Projects 2020). Similarly, Houston has experienced changes in housing affordability as a result of demand. As a result of housing shortages in surrounding communities, there has been a recent influx of residents looking for affordable options (CDI 2020). In Witset there are more than 100 band members on a waiting list for a new house, and of those on the waitlist, approximately two-thirds live off-reserve, while the rest live on-reserve either with family or in a private rental (Witset First Nation 2018a).

In all LSA communities, there is growing senior demographics. With an aging population, there are concerns about the lack of seniors' and supportive forms of housing as well as a need for subsidized rental housing.

According to BC Housing, the economic effects of boom-and-bust cycles in Northern BC can also be an issue for housing affordability (BC Housing 2016). With the construction of the LNG Canada facility, home prices are likely to experience a sharp increase as limited housing supply struggles to respond to a higher demand, reducing the region's affordability. Higher wages and strong employment growth might help to absorb the effect of higher home prices (Northern Development BC 2019).

Key informant interviews conducted in the context of the **Socio-Economic Baseline Report (Appendix 5.1-A)** as well as community consultation (**S12.0 Public Consultation**) also report that affordable and available housing is an important issue in the area, notably in Smithers, Telkwa, and surrounding areas. In Smithers, limited rental opportunities are reported, and it is an expensive and usually lengthy process to build a new property. Many non-residents who find employment opportunities in Smithers are unable to accept positions based on the lack of available accommodations. In Telkwa, a number of logistical challenges limit the community's ability to develop more housing such as the transport of building materials, the proximity with neighbouring Agricultural Land Reserve (ALR) land and a lack of municipal water for new developments. In general, existing industry has placed pressure on rentals and there is limited capacity to accommodate growth. As a result of increasing rent rates, there has been displacement of lower-income rental households out of Telkwa (Watson Projects 2020). In Houston, housing values have increased as a result of the Coastal GasLink Project. It is assumed that an influx of new residents could change stress levels among existing residents of the LSA and the RSA, particularly due to the limited housing market (CDI 2020). According to the Witset First Nation Community Land Use Plan (Witset First Nation 2018a), between 150-240 new homes need to be built over the next 20 years in order to reduce the housing waitlist and to have uncrowded housing in good condition.

The **Labour Market VC (S5.0-C1)** and the **S5.0-C1-Appendix 5.1-A Socio-Economic Baseline Report** provide greater detail on income distribution in the LSA and the RSA, and the **Infrastructure and Services VC (S6.0-C3)** provides further information on housing.

4.2.4 Community Cohesion

Cohesive communities are strong communities that engage in positive social behaviours and high civic participation. They are also characterised by networks of trust and reciprocity which are thought to be less fertile ground for crime. The existence of community cohesion can thus be captured through elements such as the existence of supporting networks and reciprocity, shared norms and values, empowerment, capacity to participate, and safety (Bertotti et al. 2009). Residents from cohesive communities have a sense of belonging and a level of commitment and attachment to their community (Spitz and Trudinger, 2019). Community connectedness is also reflected in shared resources and systems such as community centers

and programs, transportation systems, and social safety nets (PHSA 2021). Community services in the LSA are presented in **4.2.1.4 Community Health and Well-being in Indigenous Communities**.

In 2015-2016, 78% of Northwest Health Service Delivery Area (HSDA) population (aged 12 and up) reported a somewhat strong or very strong sense of belonging to their local community (Statistics Canada 2022). The LSA communities and the RSA are found in the HSDA.

Major development projects can appear threatening to some residents, triggering this local sense of protection. This was confirmed by key informant interviews conducted in the context of the **Socio-Economic Baseline Report (Appendix 5.1-A)**, revealing that residents of the Bulkley Valley are known as highly engaged people that are protective of their homes. Residents were also reported to maintain a strong connection with the environment, and the majority of residents participated in outdoor activities that rely on the health of the natural environment.

Social relationships and collective decision-making are central to Indigenous communities. Here, traditional activities are critical to social cohesion, contributing to kinship, sharing, reciprocity, security, and a sense of collective identity (Northern Health and PHSA 2018). The relationship between well-being and connection to the land is further discussed in **4.2.1.4 Community Health and Well-being in Indigenous Communities**.

4.2.4.1.1 Crime Rates and Other Social Challenges

Crime rates speak about public safety and security, and inform community perceptions of public safety. In July 2019, Statistics Canada released a report showing that Smithers LHA had a sizable increase in its crime severity index (CSI), violent crime severity index (VCSI) and non-violent crime severity index (NVCSI). The CSI rose 31.5% between 2017 and 2018, the VCSI rose by 38% and the NVCSI grew by 28.7%. The Smithers Royal Canadian Mounted Police (RCMP) attributes the rise in crime to a change in Statistics Canada's methodology in reporting crime, as well as an increase in calls from the Bulkley Valley District Hospital. In 2018, one (1) patient during an extended stay at the hospital generated several calls daily or weekly, prompting the RCMP to support hospital staff in preventing violence (**Appendix 5.1-A**).

In 2018, 949 crimes were reported to Smithers RCMP. Most prevalent crimes reported by the Smithers RCMP include minor assault, mischief, and disturbance. In 2018, domestic violence, property crimes, and break-and-enters decreased, whereas crimes against persons and theft over \$5,000 increased in Smithers (**Appendix 5.1-A**).

A number of interview participants noted homelessness as a growing concern in Smithers (**Appendix 5.1-A**). One (1) interviewee identified homelessness as the greatest social challenge facing Smithers, in part due to the increase in social conflict that has occurred in the downtown area. In recent years there have been two (2) homeless counts, with the number being around 20 homeless people in Smithers. This number remains challenging to define as some of these people are transients and move from place to place.

Interviews completed in 2019 reveal that opioid use is an important social challenge in Smithers (**Appendix 5.1-A**). Drug-related deaths are perceived to be on the rise, partially related to the "harder" drugs being consumed. There is also a belief that the presence of "harder" drugs is linked to higher insecurity and criminality in the downtown area.

4.2.5 Mental Health

According to the World Health Organization (WHO):

“Mental health is a state of well-being in which the individual realizes his or her own potential, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to her or his own community” (Mental Health Commission of Canada 2012).

Common mental health issues include anxiety and depression, while mental health problems and illnesses encompass the full range of factors bringing a level of distress in various areas of life such as school, work, social, and family interactions (Mental Health Commission of Canada 2012).

Very little mental health data are available for the LSA communities. In the Smithers LHA, the prevalence of depression/anxiety was 27% in 2015, higher than rates in Northwest HSDA (26.2%) and BC (24.4%). In 2015-2016, 71.2% of Northwest HSDA population (aged 12 and up) reported very good or excellent mental health (Statistics Canada 2022). Available mental health data are presented in **Table 4.2-7**.

Table 4.2-7: Mental Health Data Provincially and in Local Health Regions

Area	Depression/Anxiety Incidence Rate in 2015 (‰)	Depression/Anxiety Prevalent Rate in 2015 (%)	Self-reported Positive Mental Health (12+yrs) 2015-2016 (%)		
			Male	Female	Total
BC	13.5	24.4	71.2	67.4	69.3
Northwest HSDA	14.2	26.2	71	71.4	71.2
Smithers LHA	13.3	27.0	n/a	n/a	n/a

Source: PHSA 2022; Statistics Canada 2022

Notes: %=percent; ‰=per thousand; BC=British Columbia; HSDA=Health Service Delivery Area; LHA=Local Health Area

The **Human Health VC (S8.0-C1)** and the **Appendix 8.0-A Human Health Risk Assessment (HHRA)** assess the physical component of human health and do not specifically address potential effects of the Project on mental health. In accordance with environmental assessment guidelines in Canada and BC, the HHRA targets the toxicological effects of potential contamination in the environmental media and subsistence food

Access to mental health services in the LSA communities is discussed in **4.2.1.4 Community Health and Well-being in Indigenous Communities**.

4.2.5.1.1 Mental Health and Economic Well-being

Livelihoods and self-worth are often associated with gainful employment. Issues of economic hardship as exemplified by rates of dependence on government support payments (see **4.2.4 Community Cohesion**) are often driven by the boom and bust cycles of resource-based industries in Northwest BC, especially forestry. In recent years, the forestry/timber industry has been struggling in the RSA. In Houston, Houston Forest Products closed in 2014 leading to an economic downturn and removal of 225 direct jobs and 75 indirect jobs. In 2019, mills in Fraser Lake and Smithers were temporarily shutdown, and the Houston mill experienced production cuts. Fort St. James had a closure and sale of its largest sawmill that employed 1,600 people locally. Prospects to diversify the forestry sector arose from the Mountain Pine Beetle infestation that affected forests in the RDBN, opening new opportunities in bio-energy, biomass, and value-added manufacturing. Natural resource extraction and mineral exploration are also important to the regional economy with an increase in these activities in recent years. **S5.0-C2 Economic Development VC** provides greater details on the economic health of the LSA communities and the RSA.

4.2.5.1.2 Indigenous Mental Wellness

In Indigenous cultures, a strong connection exists between mental wellness and:

“strong physical, spiritual and emotional health; a connection to language, land, beings of creation and ancestry; the support of a caring family and environment; and an interconnectedness enriched by hope, belonging, purpose and meaning” (First Nations Information Governance Centre 2018).

As seen in previous sections, Indigenous people face inequalities in the social determinants of health such as poverty, unemployment, housing, and food security, likely to play a role in mental health challenges experienced by some Indigenous peoples. Distance complexifies access to specialized resources (First Nations Information Governance Centre 2018).

Mental health issues and addictions often appear as key health concerns among Indigenous communities. Historical factors exacerbating mental health among Indigenous families include the Indian Residential School (IRS) system as well as Sixties Scoop practices in which Indigenous children were placed in non-Indigenous homes. Consequent trauma led to higher rates of suicide, mental health, and addictions issues among Indigenous populations (First Nations Information Governance Centre 2018).

More Indigenous youth with chronic health conditions reported feelings of depression and a reduced sense of mental, emotional, and spiritual balance, compared to Indigenous youth without a health condition. More than one-third (34.8%) of Indigenous youth diagnosed with anxiety disorders, one-third (33.8%) of those with mood disorders, and nearly one-third (29.7%) of those with learning disorders reported that they were receiving treatment for their conditions. In total, 17.4% of Indigenous adults reported having psychological distress, which suggests that they are likely to have a moderate to severe mental disorder (First Nations Information Governance Centre 2018).

5. ASSESSMENT OF PROJECT-RELATED EFFECTS

The assessment of Project-related effects involves the following:

- ▶ identification of potential interactions between the Project and the Community Well-being VC;
- ▶ description of potential adverse Project effects on the Community Well-being VC;
- ▶ identification of mitigation measures; and
- ▶ identification and characterisation of residual effects, including Significance determination.

5.1 Potential Project-related Interactions with Community Well-being Valued Component (VC)

The potential for interactions between Community Well-being and identified Project activities were considered, with focus on those interactions with potential to adversely affect Community Well-being. Each potential interaction is rated using the terms provided in **Table 5.1-1**. When no interaction between the Project activity and the Community Well-being VC was anticipated the interaction is not considered further in the assessment.

Table 5.1-1: Potential for an Interaction between Community Well-being Valued Component (VC) and the Project

Term	Definition
No Interaction	The Tenas Project (Project) activity will not interact with the Community Well-being Valued Component (VC), no adverse effect is expected; no further consideration is warranted.
Interaction	Interaction between the Project activity and the Community Well-being VC may have a substantive influence on the short- or long-term integrity of the VC (i.e., measurable or detectable using the identified indicator). The potential effect(s) of the interaction is considered further in the effects assessment.

Interactions between the Project and the Community Well-being VC are expected to manifest in the LSA and the RSA across all Project phases (i.e., Construction, Operation, Decommissioning and Reclamation, and Post-closure phases) rather than related to a particular Project activity. Such interactions are considered through the lens of the four indicators presented in **4.2 Description of Existing Conditions** namely change in food security, cost of living, community cohesion, and mental health. **Table 5.1-2** summarizes anticipated interactions between the Community Well-being VC and Project-related activities. Project interactions that are expected to result in potential effects on Community Well-being are discussed further in **5.2 Potential Project-related Effects**.

Food security interactions are associated with a change in land availability, access to land or resources or a change in land base, including both tenured and non-tenured land. A change in subsistence food quality associated with potential health effects of the Project could also interact with food security. Cost of living is characterised by interactions related to Project employment, labour and related spending, as well as inflation and housing availability and affordability, referred to in the “employment and labour” line of **Table 5.1-2**. While community cohesion and mental health also relate to individual or social changes stemming from employment opportunities and the presence of Project labourers, they also interact with the perceptions, views, concerns, fears, and (mis)conceptions that can be associated with any typical major development in a non-industrial area. As such, perceived Project environmental effects can also interact

with mental health as well as potential changes in noise and traffic levels or visual aesthetics. Changes in the social fabric of the community caused by diverging views about the Project can also affect community cohesion.

Project activities that generate an interaction in a single phase, but do not in subsequent phases are not carried forward for further assessment. For example, the effects of clearing and grubbing and construction of the Minesite Infrastructure is assessed only in the Construction Phase, assuming that no additional change in access or usage of land will occur in subsequent phases. Construction of the Surface Water Management Infrastructure, which involves development and maintenance of channels and ponds during the Construction Phase may also affect access and change land base use during the Operation Phase. Therefore, Surface Water Management Infrastructure interactions are assessed during both the Construction, and Operation phases of the Project.

Table 5.1-2: Interactions Between Community Well-being Valued Component (VC) and the Tenas Project

Project Activities	Community Well-being Valued Component (VC)
Construction	
Transportation of equipment, materials, and personnel	X
Site clearing (surveying, clearing, grubbing, soil salvaging)	X
Construction of Surface Water Management Infrastructure, including channels and ponds (sedimentation, control, management, storage)	X
Construction of Bypass Road and quarries from the Minesite to the Rail Infrastructure	X
Improvements to existing private road and Forest Service Roads	X
Construction of haul roads and service roads within the Minesite	X
Construction of the permanent Goathorn Bridge Crossing over Goathorn Creek	X
Construction of the Coal Processing Plant	X
Construction of fuel and lubricant storage facilities and distribution network	X
Construction of administration buildings (first aid, maintenance, mine dry, warehouse, laboratory, parking, and vehicle wash facilities)	X
Construction of a 25 kilovolt (kV) powerline and a 600 volt (V) substation adjacent to the Coal Processing Plant	X
Construction of Rail Infrastructure including Rail Loop and Loadout connecting to the existing main Canadian National Railway line	X
Installation of water supply wells, storage, and distribution system	X
Construction of the water discharge infrastructure	X
Construction of storage piles for overburden, rock separated from coal in Coal Processing Plant, and stockpiles for topsoil and vegetation management	X
Construction of material handling systems for Minesite, including run-of-mine coal, processed coal, process rock conveyors, and stockpiles	X
Construction of solid waste management systems including recycling and composting facilities	X
Construction of Explosives Magazine (storage building)	X
Employment and labour	X
Operation	
Mining the open pit (soil salvaging, drilling and blasting, excavation of material, dewatering, loading, hauling, unloading)	X

Project Activities	Community Well-being Valued Component (VC)
Operation of Surface Water Management Infrastructure including channels and ponds (sedimentation, control, management, storage)	X
Maintain and use Bypass Road and quarries from the Minesite to the Rail Infrastructure	X
Maintain improved private and Forest Service Roads	X
Maintain haul roads within the Minesite, including service roads	X
Maintain permanent bridge over Goathorn Creek	
Operate Coal Preparation Plant	X
Maintain fuel and lubricant storage facilities	
Maintain administration buildings (first aid, maintenance, mine dry, warehouse, laboratory, and vehicle wash facilities)	
Maintain 25 kV powerline and a 600 V substation adjacent to the Coal Processing Plant	
Transportation of equipment, materials, and personnel	X
Maintain and use Rail Infrastructure including Rail Loop and Loadout connecting to the existing main Canadian National Railway line	X
Operate water supply wells, storage, and distribution system	
Operate the water discharge infrastructure	
Maintain storage piles for overburden, rock separated from coal in Coal Processing Plant, and stockpiles for topsoil and vegetation management	X
Operate material handling systems for Minesite, including run-of-mine coal, processed coal, process rock conveyors, and stockpiles	X
Operate solid waste management systems including recycling and composting facilities	
Maintain Explosives Magazine (storage building)	
Progressive reclamation	X
Employment and labour	X
Decommissioning and Reclamation	
Dismantle and remove mining equipment and facilities (including powerline, Rail Infrastructure)	X
Transportation of equipment, materials, and personnel	X
Reclamation and closure activities at Minesite	X

Project Activities	Community Well-being Valued Component (VC)
Reclamation and closure of Bypass Road and haul roads, including quarries	X
Reclamation and closure of permanent bridge over Goathorn Creek	X
Reclamation and closure of powerlines	X
Reclamation and closure of Rail Infrastructure	X
Implement post-mining systems and monitoring	
Employment and labour	X
Post-closure	
Maintain post-mining systems and ongoing monitoring	
Transportation of equipment, materials, and personnel	X
Employment and labour	X

Notes:

Interaction (X): Interaction between the Project activity and the VC may have a substantive influence on the short- or long-term integrity of the VC (i.e., measurable using the identified indicator). The potential effect(s) of the interaction is considered further in the effects assessment.

No interaction (blank cell): Project activity will not interact with the VC; no adverse effect is expected; no further consideration is warranted.

5.2 Potential Project-related Effects

Potential adverse effects of the Project on the Community Well-being VC arising from potential interactions, as identified in **Table 5.1-2**, and in relation to indicators listed in **Table 3.2-2**, are identified and described in this subsection.

Food security interactions are associated with a change in land availability and access to land or resources or a change in land base, potentially affecting supply of subsistence foods.

Project interactions with cost of living are associated with new employment opportunities and migrant workers potentially affecting the demographic structure of LSA communities and the RSA. Such change may increase pressure on housing, induce spending and, consequently, affect the affordability of housing, and supply of goods and services.

Community cohesion could be affected by the presence of Project workers, potentially exacerbating existing social issues. Diverging views and opinions about the Project and its perceived effects could also aggravate social tensions, stressing existing relationships and shared values among community individuals and groups in the LSA communities and RSA.

Finally, mental health could interact with the Project through change in stress and anxiety levels associated with all the above-mentioned interactions. Workers and their families could also experience higher stress due to working shift schedules involving 12 hour days and nightshifts, and having to work between four (4) and seven (7) shifts in row. Increased levels of noise and traffic could also cause increased stress or harm, such as sleep disturbance. In the same way, a change in the environment or the visual landscape could change stress levels in the LSA and the RSA. Then, individual perceptions, concerns, fears and (mis)conceptions about the Project and related risks could also interact with mental health of community members in the LSA and RSA by causing higher levels of stress and anxiety.

Based on the timing and nature of the interactions identified in **Table 5.1-2**, the following potential Project-related effects on the Community Well-being VC have the potential to occur

- ▶ change in food security;
- ▶ change in cost of living;
- ▶ change in community cohesion; and
- ▶ change in mental health.

5.2.1 Assumptions and Conservative Approach

Potential effects of a change in cost of living are largely driven by changes in Project-related employment and regional spending, and related changes to the **Labour Market VC (S5.0-C1 Labour Market VC)** and **Demographics VC (S6.0-C1 Demographics VC)**. The Project estimates that that at least 60% of the Construction Phase workforce and at least 75% of the Operation Phase workforce will be composed of existing residents from LSA communities, which would result in a very small change in population (primarily during the Operation Phase).

The size, composition and location of the Project workforce are currently unknown and are based on estimates and modelling outputs described in **S5.0-C1 Labour Market VC**. Moreover, variance is expected in the potential availability of some specialized skillsets and workers within the LSA. **S6.0-C1 Demographics VC** provide a conservative estimate of such variance, considering two (2) local-sourcing scenarios for both the Construction Phase (30% and 90% local workforce) and the Operation Phase (60%

and 90% local workforce), in addition to the Project's modelled estimates. Assessment of a range of proportions of locally-sourced workforce, as well as indirect and induced additions to population, are intended to provide a conservative and likely an overestimation of potential effects.

5.2.2 Change in Food Security

Food security exists when all people have sufficient, safe and nutritious food for an active and healthy life. Healthy food needs to be available and accessible so people can make healthy food choices (GovBC 2021b). Because of their higher reliance on subsistence foods, Indigenous communities are particularly vulnerable to a change in food security (Northern Health and PHSA 2018).

Food security is also related to the capacity to obtain healthy foods. For some people, higher salaries mean greater reliance on store-bought costly foods or cheaper less nutritious items (Northern Health and PHSA 2018). On the other hand, higher wage income can have a positive affect on subsistence activities, enabling people to purchase equipment to assist in faster transport on the land such as snowmobiles, trucks, and all-terrain vehicles (ATVs) (Northern Health and PHSA 2018). Wage income also increases the ability to purchase food, thereby increasing food security. In sum, the potential Project effects of a change in food security can be both adverse and positive.

This subsection describes the nature of the potential effect of a change in food security that may occur as a result from:

- ▶ a change in land availability, through a change in access to land or resources, or a change in land base, potentially affecting the supply of subsistence foods for both Indigenous and non-Indigenous residents; and
- ▶ a change in subsistence food quality due to change in plants, soils, or water quality.

As discussed in the **Land and Resource Use VC (S6.0-C4)**, potential changes to the quantity and quality of resources supporting existing land use-based activities (primarily, hunting, fishing, agricultural grazing) are expected with varying degrees throughout all active Project phases. Activities initiated during the Construction Phase that continue throughout the Operation, and Decommissioning and Reclamation phases are considered together because causes, results, and mitigation of effects are not expected to change between phases. The Minesite, Bypass Road, Rail Loop and related infrastructure will remove some habitat and lands that may have supported land use-based activities. Sensory disturbance could also affect wildlife that are the focus of hunting. The Project may also affect water quality and fishing on the Telkwa and Bulkley rivers.

The quality (i.e., the metal composition) of subsistence foods, including fish and hunted wildlife species, is directly dependent on metal concentrations in environmental media that these species depend upon (i.e., surface water, soil, vegetation) and on the transfer of metals through the aquatic and terrestrial food chains. Metals occur naturally in environmental media due to local physical and geological processes, but their concentrations could potentially change due to Project activities as discussed in **S8.0-C1 Human Health VC**. Potential effects from the Project on the quality of subsistence foods may occur due to changes in water quality (e.g., due to Project-related seepage or discharge) or due to changes in soil and vegetation quality (i.e., due to deposition of dust).

5.2.2.1 All Active Phases (Construction, Operation, Decommissioning and Reclamation)

Due to the potential for public interaction and the hazards associated with active and inactive mining areas, it is critical that the public is not allowed uncontrolled access to the Project Area. Per the *Mines Act*, RSBC 1996, c 293 (GovBC 1996b), and *Land Act*, RSBC 1996, c 245 (GovBC 1996a) requirements, a "No

Unauthorized Entry, Hunting, and Fishing" boundary will be established at the outset of the Construction Phase around the Project Area to prevent unauthorized access and will be in effect throughout the Project life. The change in access is expected to remove access to the Project area for recreational users (i.e., hunters) and commercial users (i.e., guide-outfitters of provincial residents retaining meat). The change in access is not expected to affect fishing (recreational or commercial) as access to the main fishing rivers will not be impeded.

Transportation of equipment, materials and personnel during Construction or other active Project phases are not expected to affect a measurable change in the quantity and quality of resources for recreational users; nor are improvements to an existing private road and forest service roads.

During the Operation Phase, the maintenance of Minesite Infrastructure, including maintenance of haul roads, the Bypass Road, or Rail Loop are not expected to contribute appreciably to additional changes in the quantity or quality of land and resources used for recreational or subsistence purposes. Similarly, while progressive reclamation cannot be accurately quantified, it is not expected to contribute to potential effects.

During the Decommissioning and Reclamation Phase, the dismantling and removal of equipment and facilities are not expected to change the quantity or quality of land and resources, until closure activities are completed. Once reclamation is completed, the removal of gated access restrictions at the Minesite and Rail Loop ends of the reclaimed Bypass Road will mark a return of lands to alternate potential land uses. Change in access is further described in **S6.0-C4 Land and Resource Use VC**.

Potential Project-related effects on subsistence foods could occur throughout Construction, Operation, and Decommissioning and Reclamation phases, but depend on the timing of potential effects on air (dust) and surface water. While deposition of dust-associated metals on soil and vegetation is expected to be most prevalent in the Construction and Operation phases, seepage and discharge of metals to surface waters may occur predominately during Operation and Decommissioning and Reclamation phases.

5.2.2.2 Post-closure Phase

Potential Project-related effects on subsistence foods could occur throughout Post-closure Phase, but depend on the timing of potential effects on air (dust) and surface water. Deposition of dust-associated metals on soil and vegetation is expected to be most prevalent in the Construction and Operation phases. Seepage and discharge of metals to surface waters are likely to diminish at Post-closure.

Implementation of post-mining systems and monitoring is not expected to contribute to a measurable potential effects. During the Post-closure Phase, after reclamation efforts have been completed and post-mine monitoring systems have been implemented, the potential adverse effect with respect to a change in the quantity and quality of resources for subsistence users in the LSA is expected to be however the effect is expected to be negligible and is not considered further in this assessment.

5.2.3 Change in Cost of Living

This subsection describes the nature of the potential effects of the Project on Community Well-being VC through potential effects on the cost of living. These effects relate to changes in affordability and availability – notably for housing - that may occur through Project-related population change, wages and spending at the regional level. Such changes originate from Project-related effects on demographics caused by an influx of workers, as detailed in **S6.0-C1 Demographics VC**.

Resource development projects have been linked to the reduced availability and affordability of housing in communities in various settings. The in-migration of a Project workforce may increase the demand for

housing and accommodation, potentially leading to a housing shortage and a decrease in housing affordability. In northern and remote regions, this is made worse by a limited availability of construction capacity as well as high transportation, construction, and operating costs (e.g., electricity, heating, water services) (Northern Health and PHSA 2018). As mining regions struggle with volatility in housing prices and limited affordability, wage discrepancies between mining and non-mining workforce can also reduce the spending ability of lower income groups, potentially affecting access to housing if costs escalate. Higher housing spending can also influence the ability to spend on other necessities if prices rise (Organisation for Economic Co-operation and Development [OECD] 2019).

Workers spending their income earned at the Project and in supplier industries will contribute to the economic activity in the LSA communities and in the RSA through the purchase of goods and services. The Project is expected to offer higher wages compared to those generally earned by workers in non-mining industries in the LSA communities and the RSA. Higher wages in the mining sector can translate into reduced spending ability for lower income groups as prices increase (OECD 2019). In general, good economic times are also likely to drive up local living costs (Carrington et al. 2011). Literature on the social impacts of mining identifies that inflation can also be a potential effect of mining development on local communities (Bainton and Burton 2021; Mancini and Sala 2018; Rodon and Lévesque 2018; Bouchard-Bastien and Gervais 2017; Vanclay et al. 2015). As such, the presence of non-resident workers may lead to increased consumption and a rise in demand for local goods and services, possibly raising the cost of living expenses such as food and transportation.

Research suggests that the distribution of benefits and burdens of mining activities can be highly uneven at the local, regional, and national levels. Mining towns can become unaffordable for those who do not work in the resources industry or benefit directly from it. Consequently, many service providers cannot afford to live in mining towns, even though there is an increased demand for their services (Carrington et al. 2011). In Canada, resource towns can hinder the development of a diversified economy because of isolation from major markets, high wages paid by resource industries and high development costs (Baker et al. 2021).

5.2.3.1 Construction Phase

The anticipated in-migration of population during the Construction Phase of the Project will be temporary and short-term. Population growth resulting from workforce hiring during construction could increase demand on market and rental housing, potentially resulting in decreased access to housing and increased housing and rental costs. Such changes could potentially affect overall housing affordability and cost of living in the LSA communities and the RSA.

As described in **S5.0-C1 Labour Market**, at peak construction there are estimated to be 118.3 direct full time equivalents (FTEs) of contractor employment and 9.6 FTE of TCL employees, filling up to 186 jobs at peak workforce in the second year of construction. Fabrication activities will occur offsite and outside of the RSA, with complete modules and equipment already assembled and brought to the Minesite. Typically, the onsite construction workforce will be small (approximately 70 people or less), varying depending on construction requirements.

During the Construction Phase, indirect and induced employment due to Project-related spending and increased economic activity in the RSA is estimated to 43.3 FTEs or 52.9 jobs. The Project estimates that at least 60% of the Construction Phase workforce will be locally sourced. Based on a more conservative estimate that 30% workforce will be locally-sourced, that would mean that 41 of the total 137 FTEs would be taken up by 41 to 60 existing residents of LSA communities and surrounding area in Electoral Areas RDBN A and RDBN G. **S5.0-C2 Economic Development** provides discussion of potential economic development-related effects of the Project and **S5.0-C1 Labour Market**, a discussion of employment-related effects.

Although the Project is seeking to employ a local workforce, up to 110 people from outside the LSA may be required to fill positions that cannot be filled locally. The Project intends to contract blocks of short-term accommodation rooms available in the LSA communities of Smithers and Houston (25 kilometres [km] and 41 km from the Project site respectively) during the year and a half (1.5) Construction Phase, thereby eliminating the need for a Project work camp or Fly-In-Fly-Out (FIFO) arrangements. During the Construction Phase, workers are not expected to permanently relocate to the LSA, given the temporary nature of construction contracts. However, some construction workers may opt not to stay in Project-provided accommodation, and instead prefer to rent a house or apartment for the duration of their stay. With existing pressures on demand for housing and increase housing costs there is a potential for the Project to place additional stress on the demand for rental accommodations, leading to an increase in rental costs. Spin-off employment within the LSA communities and RSA is expected to be primarily filled by local residents.

In addition to the short-term temporary workforce, a smaller proportion of workers not already residing in the LSA communities, or the RSA are expected to begin to migrate into the LSA during the Construction Phase, namely those workers with specialized skillsets involved in preparing for Operation that will continue to work the into Operation Phase of the Project. The incremental ramp up to the peak longer-term operations workforce during the construction period will also limit in-migration into the LSA communities and RSA.

In 2021, a housing shortage and high rental prices currently exist in Telkwa, while Smithers has limited rental stock and the vacancy rate was reportedly about 1%. Houston experienced excess supply of housing accommodation between 2014 and 2016, when the Houston Forest Products closed and Endako Mine and Huckleberry Mine went into C&M. The more recent Coastal GasLink Project has resulted in a lack of housing options for buying or renting in Houston. While there is no information available on private rentals in Witset, given the long waiting list for new housing, it is unlikely that construction workers would seek accommodation in Witset.

During the Construction Phase of the Project, direct Project workers are expected to earn an average full-time income of \$85,000, which is at least twice as much as the median employment income in 2015 in the LSA. Workers spending their income earned at the Project and in supplier industries will contribute to the economic activity in the LSA and RSA through the purchase of goods and services. This can put pressure on local and regional businesses to increase wages to retain skilled and experienced workers, increasing labour costs, decreasing labour affordability and consequently putting some inflationary pressure to overall cost of living in the LSA and the RSA.

During the Construction Phase, the Project will also procure goods and services from local and regional businesses. These planned expenditures might increase demand for local goods and services, contributing to local or regional inflation and a rise in the price of such goods and services. This in turn could affect cost of living and reduce overall affordability. However, Construction of the Project is of very short duration (1.5 years), and while there would be up to 186 jobs created during peak activities, most of those jobs will very short-term, some lasting only a few weeks or months – as described in **Labour Market VC (S5.0-C1 5.2.1 Beneficial Effects of the Project Employment and Income)**. Moreover, as discussed in **Economic Development VC (S5.0-C2)**, the Project is relatively small compared to other similar developments. As such, it is unlikely to result in a sizable change to the makeup of the regional economy, although a decrease in economic diversity during the Project Construction Phase is expected for business hubs such as Smithers and Houston.

5.2.3.2 Operation Phase

The Project estimates that direct employment will peak at 166 FTEs (including TCL employees and contractors) in the fourth year of the Operation Phase, after a three (3)-year ramp up. In addition to

employment held by direct Project employees, there would be contractors working at the Project site mostly in coal haul and load-out with up to 17 contractors (FTEs). During the peak of the Operation Phase, indirect and induced employment due to Project-related spending and increased economic activity in the RSA is estimated to generate an additional 30 FTEs (**S5.0-C1 Labour Market Table 5.2-3**).

Similar to the Construction Phase, it is expected that a substantial portion of the workforce will be employed locally. However, due to the longer-term and specialized nature of some employment opportunities, this phase is expected to result in a larger population in-migration. Such in-migration of population related to Project activities and spending is likely to increase economic activity, demand for housing and rental accommodations, and use of community services and infrastructure in the LSA communities and the RSA. **S5.0-C1 Labour Market VC** provides additional analysis of potential employment-related effects of the Project, **S6.0-C3 Infrastructure and Services VC** discusses potential effects on housing, and **S6.0-C1 Demographics** discusses potential effects associated with in-migration.

The Project estimates that during peak Operation, at least 75% of the workforce (approximately 130 workers) will be drawn from existing labour force resident in the LSA, and 25% of the peak workforce (approximately 40 workers) will in-migrate to the LSA. Of the workers expected to in-migrate to the LSA, 80% are estimated to in-migrate with families. Using the average family size for families in the RSA (2.9), the Operation Phase workforce will account for approximately 116 new residents in the LSA, living in 40 additional households.

Based on a more conservative estimate of 60% locally sourced workers during peak Operation, approximately 102 workers will be sourced from LSA communities and the surrounding area in Electoral Areas RDBN A and RDBN G. An estimated 68 workers will in-migrate to the LSA, approximately 80% with families at a rate similar to population movements in previous census data. With a similar family size of 2.9 residents per household, that would represent an additional 197 residents to the LSA. At peak, Project spending is expected to create 30 (indirect and induced) spin-off jobs. It is assumed that the skillsets for these additional jobs will exist within the RSA and will likely be taken up by the resident RSA population. The additional employment, primarily in the retail, transportation, and service sectors and the wages typically offered in those sectors are unlikely to be sufficient inducement to migration into the RSA/LSA as this labour pool already exists in the LSA. In total, the Project is expected to account for an additional 197 residents in the LSA.

As described in **S6.0-C3 Infrastructure and Services VC** there are existing pressures on the supply of housing in the LSA. With the existing pressure on demand for housing and increased housing costs in the LSA there is a potential for Project to place additional stress on the demand for long-term rentals, leading to an increase in rental costs, and a lack of long-term supply during the Operation Phase. The capacity of these communities to absorb an influx of workers and their families in response to the labour demands of the Project is currently limited, and increased demand may drive up already escalating rental and housing costs. Within the RSA, new registered homes in the RDBN totalled 65 in 2019, 80 in 2020 and 221 between January and November 2021 (BC Housing 2022).

In the long term, however, it is expected that increased tax revenue associated with the Project and higher incomes will work to mitigate the potential adverse effects on housing availability and affordability. In addition, with respect to housing development, the private sector is expected to respond to the increase in housing demand over time by providing new housing development as determined by the market.

During the Operation Phase, direct Project workers are expected to earn an average full-time income of \$94,000. As for the Construction Phase, these higher wages may contribute to a rise in the price of local and regional goods and services, affecting cost of living and reducing overall affordability in the LSA communities and the RSA. This effect will be coupled by increased demand of local / regional goods and

services through Project expenditures. Here, the Project will have a procurement policy focussed on obtaining goods and services from local and regional businesses, if required services exist in the region, and will work with groups to ensure that barriers to entry are reduced for contracting opportunities. This positive effect of the Project on local and regional businesses needs to be taken into account when considering the potential negative effect of a rise in cost of living.

5.2.3.3 Decommissioning and Reclamation Phase

Activities associated with the Decommissioning and Reclamation Phase are anticipated to provide some short-term employment for approximately 45 workers or 38.8 FTEs over a four (4)-year period. However, the net overall effect during this phase of the Project is expected to be the loss of 85.2 Operation jobs in the previous year and an additional loss of 11 spin-off (indirect and induced) jobs as a result of the reduction in Project activities and spending. As discussed in **S6.0-C1 Demographics VC**, this potential loss of population, if any, is negligible relative to the projected population changes for this period.

An increase in labour costs is also not expected during Decommissioning and Reclamation. As such, no effect on housing availability and affordability or on cost of living is expected during this phase. The potential effect of a change in cost of living on Community Well-being during the Decommissioning and Reclamation Phase is thus negligible and not assessed further.

5.2.3.4 Post-closure Phase

As discussed in **S5.0-C1 Labour Market VC**, the Post-closure Phase can be divided into Active phase (10 years in duration) and a subsequent Passive phase (15 years in duration) for estimating economic benefits of the Project during the Post-closure Phase. The Project is expected to provide one (1) job during the Post-closure Phase (refer to **Table 5.2-6** in **S5.0-C1 Labour Market VC**). During this Post-closure Phase, most workers previously employed in the Operation, or Decommissioning and Reclamation phases are expected to seek other employment opportunities in the LSA communities or out-migrate to other RSA communities or out of the region.

There will be no additional demand for accommodations during this phase and the no Project-related effect relative to housing affordability is expected. Similarly, no effect on cost of living is expected. The potential effect of a change in cost of living on Community Well-being VC during the Post-closure Phase is not assessed further.

5.2.4 Change in Community Cohesion

Resource development projects can adversely affect relationships at both family and community levels, including relationship breakdown, poor family health and a lack of social connectedness (Northern Health and PHSA 2018). This subsection describes the nature of the potential effects of the Project on Community Well-being with respect to community cohesion. These effects relate to changes in the make-up of and relationships within communities, arising from employment opportunities, including any resulting population in-migration, the presence of workers, and social tensions associated with diverging views and perceptions about the Project.

Research suggests that a sense of environmental dispossession associated with resource development can affect the social context of communities, notably among Indigenous communities. While resource development brings more people and cash flow, it may also become increasingly difficult to maintain traditional ways of life, negatively affecting social connectedness. Cultural ties and obligations can also be eroded by such change and trust might decrease among community members (Northern Health and PHSA 2018).

Project development can bring forward different values, beliefs and preferences among community members. Amongst the varying opinions, there are shared feelings amongst Bulkley Valley residents regarding project concerns as well as project opportunities. Interviews conducted in the context of the **Socio-Economic Baseline Report (Appendix 5.1-A)** reveal that on one hand, some residents highlight different Project concerns related to the environment, vibration, noise, traffic, and light. Slow economic growth and stability were also said to be preferred to a major project that would create a mass population influx. On the other hand, some community members highlight a number of positive opportunities associated with the Project, the greatest relating to employment and economic growth. The Project is also perceived as having the potential to facilitate opportunities for partnerships with local non-governmental organizations (NGOs), educators, and government to invest in LSA communities.

Adverse effects of resource development activities on community safety and crime levels have been well-documented in Canada and throughout the world. Resource development activities can bring an influx of young men with high salaries and inadequate consideration for local community dynamics. Such change can influence gang and sex trade activities, fueling access to illegal substances. Studies also report increased levels of domestic violence, sexual assaults, and crime rates (Northern Health and PHSA 2018). Higher income associated with mining projects may also lead individuals to engage in high-risk social behaviours and make poor lifestyle choices, potentially affecting families and adding pressure on community services.

5.2.4.1 Construction

Interviews conducted in the context of the **Socio-Economic Baseline Report (Appendix 5.1-A)** reveal that some community members are concerned that an influx of new residents could threaten community cohesion, arguing that long-time residents have a greater sense of ownership of their community. An influx in new residents with potential differences in values and beliefs, means that they may not respect the community and take ownership of it.

Effects could arise from the presence of transient Project workers with high disposable income, changing the socio-economic dynamic of the LSA and the RSA. The presence of transient workers in mining communities has been associated with crime, children and youth at risk, domestic violence, alcohol abuse, drug use, prostitution and gambling. Transient workers on rotational shift can have disruptive effects on families, residents and communities (Carrington et al. 2011, Storey 2010). Such changes originate from Project-related effects on labour market and economic development caused by an influx of workers, local and regional employment and wages, as detailed in **S5.0-C1 Labour Market VC** and **S5-C2 Economic Development VC**.

People that do not permanently reside in a community have fewer reasons to engage in social or political community life, affecting civic engagement in mining regions (OECD 2019). An influx of non-resident workers could increase resentments and tension between residents and non-resident workers. Temporary workers may have no meaningful commitment to place and can impose additional burdens on local services and quality of life. Residents can perceive that they face the social costs of resource development without sharing the benefits. Long alternating shifts of non-resident workers can also disrupt how residents and families associate with each other within communities (Carrington et al. 2011; Spitz and Trudinger 2019). The construction phase of resource development projects might also be characterised by conflicting values between residents and transient workers.

Project workers may also exhibit poor lifestyle choices due to higher disposable income and potentially longer periods of down time. Higher income has been associated with increased use of drugs and alcohol, gambling, and incidence of sexually transmittable diseases (Storey 2010). Such lifestyle choices are likely to exacerbate pre-existing health issues (obesity, diabetes, heart disease, respiratory disease) leading to

decreased levels of overall health and well-being. An increase in poor lifestyle choices may also lead to increased demand on community services such as police, health, and social services.

Uneven distribution of wealth and quality of life can weaken social cohesion in mining regions (OECD 2019). Project employment might also lead to income inequalities within the LSA and the RSA, as Project workers might see their standard of living increasing while other people's income remain the same. This difference is likely to alter intra-community trust, social support, and happiness.

Changes to community cohesion may affect both Indigenous and non-Indigenous communities. Indigenous communities might experience different or additional changes as a result of existing circumstances, limited resources, and capacity constraints. Indigenous community cohesion might also be triggered by the transient workforce and increased wage disparities (Buell 2006). More complex trade-offs exist between the effects of job creation and community well-being of Indigenous communities (Haley and Magdanz 2008). Indigenous communities are particularly vulnerable to increased wages and rotational schedule, exacerbating social issues such as drinking and drug misuse.

The Construction Phase is of short duration (1.5 years, with some jobs lasting only several weeks or months). As described in **S5.0-C1 Labour Market VC**, at peak construction an estimated 186 jobs will be created. Fabrication activities will occur offsite and outside of the RSA, with complete modules and equipment already assembled and brought to the Minesite. Accordingly, the onsite construction workforce will be relatively small (approximately 70 people or less), varying depending on specific construction requirements. During Construction, indirect and induced employment due to Project-related spending and increased economic activity in the RSA is estimated to create 53 jobs. The Project expects to hire up to 60% of the Construction workforce locally. Based on a conservative 30% locally-sourced workforce, 41 to 60 existing residents of LSA communities will participate in the construction workforce. Up to 110 contract workers from outside the LSA may be required to fill positions that cannot be filled locally. As a result, Project employment occurring during the Construction Phase and any associated in-migration of workers, is predicted to adversely affect community cohesion. Project workers could interact with the local population, triggering resentment and social tensions and disturbing local community life. Poor lifestyle choices adopted by Project workers could also exacerbate existing social issues such as drugs and alcohol, gambling and incidence of sexually transmittable diseases.

5.2.4.2 Operation

During the Operation Phase, the Project would provide up to 145 FTEs for TCL employees and contractors, with an estimated 60 people working onsite at any given time due to shift rotations for all workers. Most operational works (up to 131 FTEs of the 145 total) would be hired from the LSA, RDBN A and RDBN G so that employment benefits can be realized by the local labour force, reduce the pressure on Smithers, Telkwa, Houston, and Witset, and allow people to safely get to work with a drive no longer than an hour. Overall, due to the duration of the Operation Phase (21 years), all direct employment and income impacts would be realized in the RDBN as, over time, workers from outside of the LSA/RSA are predicted to relocate to those communities to reside closer to the Project. In addition to employment held by direct Project employees, there would be contractors working at the Project site mostly in coal haul and load-out with up to 17 contractors (FTEs).

The Project estimates that, during peak Operation, at least 75% of the workforce will (approximately 130 workers) will be drawn from existing labour force resident in the LSA, and 25% of the peak workforce (approximately 40 workers) will in-migrate to the LSA. Based on a more conservative estimate of 60% locally sourced workers, that would represent approximately 102 workers from LSA communities and surrounding area in Electoral Areas RDBN A and RDBN G, and 68 workers migrant workers. Considering

that around 80% of these workers would migrate with their families, that would represent an additional 190 residents to the LSA.

The provision of Project employment during the Operation Phase would decrease local unemployment levels. As estimated, there could be up to 166 direct jobs, and up to 22 indirect and 18 induced jobs, for a peak of 206 operation-related jobs in Year 4. This positive job impact would decrease the overall unemployment in the LSA communities from 10.4% to 8.1%.

Similarly to the Construction Phase, an influx of Project workers could exacerbate social issues and tensions between families, residents and communities of the LSA and RSA. As mentioned above, this effect would lessen over time during the Operation Phase as workers would likely relocate to the area and establish themselves as part of the community.

High incomes associated with mining employment can induce poor lifestyle choices such as increased substance abuse, gambling and increased incidence of sexually transmitted diseases (Storey 2010). For some non-resident workers, separation of work and home may place pressure on family relationships, leading to family break-ups and domestic violence. Similarly to the Construction Phase, poor lifestyle choices are likely to affect both Indigenous and non-Indigenous communities within the LSA. Income inequalities associated with Project employment opportunities might also alter intra-community trust and social support.

On the other hand, it should also be noted that employment can generate positive social effects, as a higher and steadier income can lead to improved access to goods and services, housing, better lifestyle choices, and health benefits for workers and their families. This positive effect is expected to at least partially offset the adverse effect during the Operation Phase, although individuals and families within the LSA communities will be differently affected.

5.2.4.3 Decommissioning and Reclamation Phase

During Decommissioning, the Project would provide an estimated 21 FTEs for TCL employees and 10 FTEs for contractors. During Reclamation, the Project would provide 18 FTEs. Additional employment and income effects would be realized in supplier industries and through workers spending their income.

The downturn in employment would affect workers and their family, contributing to a change in stress and anxiety levels, as discussed in **5.2.5 Change in Mental Health**. Otherwise, it is difficult to judge the adverse effects of the Decommissioning and Reclamation Phase as effects to community cohesion and well-being will be linked to the overall economic situation of the RSA at the time. Adverse effects will be lessened if other employment opportunities are available.

5.2.4.4 Post-closure

The Project would provide one (1) job during Post-closure. Because of the minimal employment and related Project effects, no adverse effect is anticipated, and this phase is not assessed further.

5.2.5 Change in Mental Health

This subsection describes the nature of the potential effects of the Project on Community Well-being in relation to mental health.

Changes in mental health can occur during periods of rapid and substantial socio-economic change, in particular. According to Shandro et al. (2011a), common themes reported through boom and bust periods

affecting mining communities can include family stress, violence towards women, burn-out, and addiction issues. An influx in transient resource-based workers with high disposable income can also affect the health of mining community residents, particularly vulnerable ones. Health and social services can also be negatively affected because of a strain on human resources. Then, community health issues that can be associated with a decline in mining (or 'bust' times) include mental health issues such as depression and anxiety.

Potential changes in mental health may also be linked to increased anxiety and stress levels caused by changes in other Project-related indicators of Community Well-being namely food security, cost of living and community cohesion. Such changes originate from Project-related effects on land and resource use, demographics, labour market, and economic development caused by an influx of workers, and local and regional employment and income, as described in previous sections and detailed in **S6.0-C4 Land and Resource Use VC**, **S6.0-C1 Demographics VC**, **S5.0-C1 Labour Market VC** and **S5.0-C2 Economic Development VC**.

Conversely, Project employment can also generate positive social and mental health effects, as a higher and steadier income can lead to improved access to goods and services, housing, better lifestyle choices, and health benefits for workers and their families. This positive effect is expected to at least partially offset the adverse effect during the Operation Phase, although individuals and families within the LSA communities will be differently affected.

5.2.5.1 Construction Phase

While there can be up to 186 jobs during peak construction, the onsite construction workforce at any one time will be typically small (around 70 people or less), varying dependent on the specific scheduled construction requirements (refer to **S5.0-C1**). This increased presence of predominantly male workers in mining communities has been associated with effects on women such as increased pregnancy, sexual harassment and domestic violence, affecting mental health. Women can also perceive a lack of mining employment opportunities available to them. As employment is a social determinant of health, this imbalance in employment opportunities can also affect their well-being. Women that do work in the mining sector can face challenges such as sexual harassment in the workplace (Shandro et al. 2011a).

Compressed work-week or long shifts can be particularly stressful for parents (Shandro et al. 2011a). The interplay between higher income and work rotation could affect the mental health of mining families through increased levels of substance abuse, gambling, family instability, abandonment, divorce and child neglect. Other stressful issues include less time for families and traditional activities and child care problems. Workplace performance expectations might also be challenging for new workers. Moreover, the nature of the work could be fatiguing for some individuals, even though health and safety risks are well managed in the Canadian mining industry.

Poor lifestyle choices associated with mining employment can also generate stress and anxiety at the individual and family levels. A rise in disposable income can lead to alcohol and drug abuse, gambling, conspicuous consumption, and indebtedness (Carrington et al. 2011). These have the potential to lead to adverse effects on mental health in the LSA communities and the RSA.

Individual perceptions, concerns, fears, and misconceptions about the Project and related environmental risks could also interact with the mental health of community members in the LSA communities and the RSA through change in levels of anxiety and depression. Similarly, a change in visual/aesthetics could affect mental well-being. Changes in mental health could affect LSA and RSA residents differently, as some individuals might be more mentally fragile or vulnerable than others.

5.2.5.2 *Operation Phase*

During the Operation Phase, most operational workers (up to 131 FTEs of the 145 total) would be hired from the LSA and RSA so that employment benefits can be realized by local labour force, and to reduce the pressure on housing in Smithers, Telkwa, Houston and Witset. As the Operation Phase of the Project is 21 years, it is likely that other workers would permanently settle in the area, minimizing interactions between non-resident workers and the local population. No FIFO arrangements are proposed to take place.

Similar to the Construction Phase, effects on mental health would be related to higher income, long shifts, and stressful work environment, accentuating stress, anxiety, and mental distress among workers and their families. Mining employment has been linked to substance abuse, domestic violence, and family break-up. Such changes in family dynamics and lifestyles are likely to affect mental health and well-being (Shandro et al. 2014). Sexual harassment against women has also been reported in male-dominated mining environment, likely to affect women's mental health (Shandro et al. 2011a).

Income inequalities within the LSA communities and the RSA could also add a burden to more vulnerable households. Project environmental and visual disturbances could affect the mental well-being of community members, notably those living in close proximity to the Project. The **Visual Resources VC (S6.0-C2)** discusses effects to visual quality.

On the other hand, increased income levels can improve access to goods and services, education, housing and other resources, positively affecting the mental well-being of workers and their families. This positive effect is expected to at least partially offset the adverse effect of a change in mental health during the Operation Phase, although individuals and families within the LSA communities will be differently affected.

5.2.5.3 *Decommissioning and Reclamation Phase*

The end of the Operation Phase could lead to job loss and job insecurity, which has been shown to act as a chronic stressor, potentially increasing over time if unemployment persists after Project closure. Rates of acute cardiovascular disease, morbidity, mental disorders, and psychological distress have been shown to be high among mining communities during decline and bust times (Shandro et al. 2011a; Shandro et al. 2011b).

The effect of mine closure on the mental health of individuals, families, and communities will depend upon the choices and circumstances of each individual, the broader economic context at the time of closure, and the availability of alternative employment opportunities.

5.2.5.4 *Post-closure Phase*

Employment will be minimal during the Post-closure Phase and no effect is anticipated. Therefore, the Post-closure Phase is not assessed further.

5.3 Mitigation Measures

This subsection describes the mitigation measures to address the potential effects of the Project on the Community Well-being VC. The mitigations measures are consistent with the mitigation definition provided by the BC EAO (2013) and encompass practical means or measures taken to avoid, minimize, rehabilitate onsite, and if required, compensate, or offset, the potential adverse effects of a project. Such measures may include applicable standards, guidelines, and BMPs supported by specific guidance documents.

TCL has incorporated several mitigation measures in the Project's design and/or operational procedures to reduce the magnitude, duration, and extent of effects due to the Project. These Project mitigation measures are outlined in **S1.0 Overview of the Project Proponent Description** of the **EAC Application** and include Project design aspects such as site selection, selection of best available technologies (BAT) to-date for Project infrastructure and mining equipment, and a commitment to progressive reclamation. Project mitigation measures that are relevant to minimizing potential Project-related effects on the Community Well-being VC are described below in **5.3.1** to **5.3.8**.

Potential effects on the Community Well-being VC will be eliminated or reduced to the extent possible through Project design; however, since not all effects can be addressed through design, additional mitigation measures are planned (**5.3.9** to **5.3.20** below). Additional mitigation measures were informed by a review of mitigation measures and follow-up programs undertaken for past projects; TK, scientific or other information; as well as internal Project evaluation of technical and economic feasibility. Proposed mitigation measures also considered input and comments received from regulatory agencies, Indigenous groups, local communities, the public and other stakeholders. Mitigation measures are expected to be feasible and effective in a timely manner following implementation. No uncertainties with the feasibility or effectiveness of these mitigation measures have been identified at this time.

In addition to specific measures targeting the Community Well-being VC, mitigation measures in the following EA chapters have relevance to the Community Well-being VC because they include measures that limit effects on subcomponents that support food security, cost of living, community cohesion and mental health:

- ▶ **Labour Market VC (S5.0-C1);**
- ▶ **Economic Development VC (S5.0-C2);**
- ▶ **Demographics VC (S6.0-C1);**
- ▶ **Visual Resources VC (S6.0-C2);**
- ▶ **Infrastructure and Services VC (S6.0-C3);**
- ▶ **Land and Resource Use VC (S6.0-C4);**
- ▶ **Heritage Resources VC (S7.0);** and
- ▶ **Human Health VC (S8.0).**

Mitigation measures related to the protection of environmental quality (i.e., air, soil, vegetation, fish, wildlife and water quality) will contribute to minimizing potential effects of the Project on the quality of subsistence foods and thus, on food security and by extension, community cohesion and mental health:

- ▶ **Atmospheric Environment VC (S4.0-C1);**
- ▶ **Terrain and Soils VC (S4.0-C2);**
- ▶ **Surface Water VC (S4.0-C3);**
- ▶ **Fish and Fish Habitat VC (S4.0-C6);** and
- ▶ **Wildlife VC (S4.0-C8).**

Mitigation measures tailored to Project activities that are applicable to the Community Well-being VC have been incorporated into various management plans for the Project, such as the following:

- ▶ **Air Quality Management Plan (S13.0-C2) (AQMP);**

- ▶ **Explosives Management Plan (S13.0-C6) (EMP);**
- ▶ **Fuel Management and Spill Control Plan (S13.0-C7) (FMSCP);**
- ▶ **Mine Emergency Response Plan (S13.0-C9) (MERP);**
- ▶ **Minesite Traffic Control Plan (S13.0-C10) (MTCP);**
- ▶ **Metal Leaching (ML)/Acid Rock Drainage (ARD) Management Plan (S13.0-C12) (ML/ARDMP);**
- ▶ **Occupational Health and Safety Program (S13-C13) (OHSP);**
- ▶ **Public Access Management Plan (S13.0-C14) (PAMP);**
- ▶ **Reclamation and Closure Plan (S13.0-C15) (RCP);**
- ▶ **Socio-Economic Management Plan (S13.0-C16) (SEMP); and**
- ▶ **Visual Resources Management Plan (S13.0-C19) (VRMP).**

The management plans provide additional direction on sequencing, monitoring and adaptive management and the mitigation measures outlined in each plan are expected to be timely and effective following implementation.

Mitigation measures are commitments that TCL has applied through mine design and to the operating principles through the life cycle of the Project. Key mitigation measures for the Community Well-being VC are described in detail below and summarized in **Table 5.3-1**.

5.3.1 Limit Project Footprint and Project Area

To limit the Project footprint and Project Area the Project has been designed to:

- ▶ Cluster Project components, including the open pit, stockpiles for run-of-mine (ROM) coal, processed coal and processed rock, Coal Processing Plant (CPP), management ponds, and ancillary facilities such as the Maintenance Facility and Administration Building;
- ▶ Align linear Project features (such as powerlines, roads, water distribution) into a common right-of-way (ROW);
- ▶ Place Project features within existing or planned Project component footprints to limit the clearing of vegetation and the salvage of reclamation materials (surface soil, woody debris, and overburden). For example, the Minesite buildings will be built in areas previously cleared by forestry activity;
- ▶ Minimize the length of haul roads, access roads, and rail line where possible. Use or improve existing roads where practical;
- ▶ Utilize a loop design configuration for the rail that requires half the space and subsequent footprint compared to the standard teardrop shape seen at other operating or proposed coal mines in western Canada;
- ▶ Place reclamation material (surface soil and woody debris) stockpiles within development areas such as the open pit and haul roads to avoid disturbance, while overburden is directly placed on Project components for future reclamation activities;
- ▶ Limit the Tenas Access Corridor (TAC) to a single lane width for long distances and utilize existing Forest Service Roads (FSRs) or private roads where appropriate;
- ▶ Backfill approximately 50% of non-coal material back into the open pit; and

- ▶ Place processed rock from the CPP within the management ponds versus a separate permanent pile to avoid any potential acid rock drainage (ARD) from this material and reduce the Project footprint.

5.3.2 Reclamation Measures

The following reclamation measures have been incorporated into the mine design:

- ▶ Use progressive reclamation techniques to limit the amount of disturbance at any given time by sequencing the open pit and stockpiles to the extent feasible, backfilling of open pit where possible, directly placing reclamation materials, and placing excavated materials on previously disturbed areas;
- ▶ Salvage reclamation materials (surface soil, woody debris, and overburden), for later use, in accordance with the **RCP**;
- ▶ Vegetate all temporary surface soil and overburden stockpiles to minimize the potential for erosion and sediment generation, to prevent subsequent potential effects on water quality, and to prevent losses of surface soils;
- ▶ Implement progressive reclamation on embankments, buttresses, backfills, TAC cut and fill slopes, and other Project components where possible to minimize fugitive dust emissions and reduce erosion and sediment generation;
- ▶ The reclaimed landscape will be shaped and contoured to achieve variations of slope steepness, slope length, aspect, and form to assist in creating landform diversity suitable for the establishment of varied plant communities and to reduce visual effects;
- ▶ PAG material deposited in the management ponds will be flooded to prevent acid mine drainage but will also be covered with an engineered cover consisting of non-PAG rock, overburden, and surface soils to allow for terrestrial revegetation;
- ▶ Majority of open pit features (e.g., highwalls and footwalls) are covered/resurfaced/recontoured with non-potentially acid generating (PAG) rock and overburden; and
- ▶ Revegetate with native plant species appropriate for the target ecosystems, which will include species for merchantable timber, subsistence foods, and ceremonial purposes in consultation with the Wet'suwet'en.

5.3.3 Transport Measures

The following mitigation measures refer to transport measures:

- ▶ Build, maintain, and use the TAC for hauling processed transport to the Rail Infrastructure for the duration of all Project phases after the Construction Phase to minimize traffic on existing, residential roads;
- ▶ Build, maintain, and use the TAC for transport of personnel, goods, and services for the duration of all Project phases after the Construction Phase to minimize traffic on existing, residential roads;
- ▶ Repair and/or replace and/or upgrade existing FSRs or private roads that will be used as part of the TAC;
- ▶ Repair and replace new and existing culverts as required for all Project related transport corridors including the TAC;
- ▶ Design and build a permanent clear span bridge over Goathorn Creek and Helps Creek and its related tributaries to provide vehicular access to the Project that will be controlled by TCL;

- ▶ Use buses and/or vans for employees and contractors as much as practical to reduce the risk of traffic incidents, and to reduce noise and fugitive dust emissions generate by the Project. Bussing options to Witset and/or Houston (if requested and based on sufficient employees in these locations) to facilitate potential employees accessing employment opportunities with the Project;
- ▶ Use dust suppressing agents on the rail cars to reduce fugitive dust emissions;
- ▶ Cover super B-train trucks when hauling processed coal from the CPP to Rail Infrastructure to reduce fugitive dust emissions from trucks;
- ▶ Use water and chemical agents on the TAC to reduce fugitive dust emissions, where and when appropriate;
- ▶ Use water and chemical agents, as required, on the processed coal and ROM coal stockpiles to reduce fugitive dust emissions resulting from storage and handling;
- ▶ Use privately controlled Rail Infrastructure so that there are no train whistles generated from Rail Infrastructure;
- ▶ Utilize low train speeds (10 kilometres/hour [km/hr] within the Rail Infrastructure, and up to 20 km/hr while entering and exiting the Rail Infrastructure) to mitigate vibration and noise;
- ▶ Post a speed limit of 50 km/hr on the TAC, 70 km/hr on Minesite haul roads, and 30 km/hr on Project service roads. Mine haul trucks within the Minesite portion of the Project footprint will have a maximum operating speed of approximately 35 km/hr, given their size and weight; and
- ▶ Investigate implementing a no train whistle requirement at the existing level rail crossing in the Village of Telkwa based on consultation with and approval of the Canadian National Railway (CNR).

5.3.4 Project Component Design

The following apply to Project component design:

- ▶ Select tonal values and low chroma colours to paint buildings and related infrastructure to create low contrast to existing background conditions throughout the spring, summer, and fall months when viewers are more likely to be outdoors;
- ▶ Select tonal values best suited for the dominant building face where visible from the priority viewpoints;
- ▶ Select non-reflective building and infrastructure surfaces to eliminate glare from reflected sunlight;
- ▶ Avoid sharp and linear changes in the slope or aspect of the stockpile, pile, embankment, buttresses, and excavated surfaces;
- ▶ Contour benches within backfilled material and embankments and buttresses to prevent obvious and easily discernable linear shapes;
- ▶ Landscape (e.g., add small hills, swallows) the tops of material stockpiles to create non-linear silhouettes;
- ▶ Manage light effects using acceptable BMPs and engineering design;
- ▶ TCL will also incorporate the following mitigation measures associated with effects from lighting:
 - ▶ For areas visible to the public from sensitive viewpoints investigate eliminating night lighting of buildings and structures and block light from windows where possible considering safety requirements;

- ▶ Direct lighting shall be directed towards the ground and have appropriate covers to avoid fugitive light emissions; and
- ▶ Lighting should be sensitive to environmental conditions and automatically shut off during daylight hours.

5.3.5 Blasting Measures

The following mitigation measures apply to blasting:

- ▶ Use best management stemming techniques (e.g., type of material, size consistency, loading method, and thickness) that will minimize effects of noise and fugitive dust from blast patterns and assist in the complete detonation of drill holes to reduce the introduction of nitrogen species into the surrounding rock per the **EMP**;
- ▶ Correctly time blasts to minimize effects of noise, vibration, and fugitive dust from blast patterns;
- ▶ Keep blast patterns small to minimize effects of noise, vibration, and fugitive dust and to reduce the time that patterns need to sleep or wait until they are blasted which reduces the introduction of nitrogen species into the surrounding rock;
- ▶ Monitor actual blast results and implement improvements as required as per the adaptive management process to reduce effects of noise, vibration, fugitive dust and reduce the introduction of nitrogen species into the surrounding rock;
- ▶ Use electronic detonators to minimize effects of noise, vibration, and fugitive dust from blast patterns and manage misfires to reduce the introduction of nitrogen into the surrounding environment; and
- ▶ Use noiseless lead lines on the surface to minimize the effects of noise from blasts.

5.3.6 Management of Metal Leaching/Acid Rock Drainage (ML/ARD)

The following mitigation measures apply to preventing potential ARD:

- ▶ Identify and segregate PAG material while mining the open pit, and place PAG material in management ponds and submerge PAG material under a minimum of 1.0 metre (m) of water within an average of six (6) months after excavation but no longer than 12 months and under at least two (2) m of water once the management pond has met its PAG material storage requirements (North Management Pond is completed first, followed by the East Management Pond and finally the West Management Pond) to prevent potential ARD and subsequent effects on surface water quality;
- ▶ Place approximately a one (1) to two (2) m layer of non-PAG rock on top of the submerged PAG material below the active water level of the respective management pond, followed by approximately one (1) to three (3) m layer of overburden to create a dry landform above water, followed by an approximately 30 centimetre (cm) layer of reclamation materials (surface soil) to reduce evaporative losses from the management ponds and provide a landscape more similar to pre-Project development;
- ▶ No PAG material will be used in construction of any external piles, pads, roads, embankments, buttresses, or for backfilling the open pit, to prevent potential ARD and subsequent effects on surface water quality;
- ▶ Open pit walls will be covered by non-PAG material to limit oxygen and water ingress into the open pit walls and provide a neutralizing effect on the open pit wall material below;

- ▶ Some of the open pit walls will be flooded with water to further reduce the likelihood of ARD from the covered open pit walls;
- ▶ Establish a material geochemical testing program for future Project exploration drillholes and Operation phase blast holes as part of the blasting program to verify PAG versus non-PAG materials. Maintain a PAG geological model while the open pit is being mined to reflect any changes observed;
- ▶ Maintain a database of geochemical testing results and material placement to avoid the incorrect placement of PAG material and potential ARD with subsequent effects on surface water quality;
- ▶ Establish a material tracking system to document the location and type of material being excavated and hauled to avoid misplacement of material and/or remediate any misplacement that may occur;
- ▶ Controlled open pit wall blasting will be conducted on both the highwall and footwall to limit the amount of damage to the open pit wall to minimize the potential for particle size reduction and provide pathways for water and oxygen to enter the open walls prior to them being covered;
- ▶ Majority of material near the open pit footwall will not be blasted again to minimize the potential of water and oxygen accessing this material;
- ▶ Progressive reclamation will be undertaken to reduce the infiltration of water and oxygen into the open pit walls by placing non-PAG rock and overburden on the open pit walls once mining is completed for an open pit wall section in question and people operating equipment have moved at least 100 m away from proposed backfilling operation. Furthermore, this non-PAG material is expected to provide a permanent high neutralization potential (NP) water source to prevent ARD generation from PAG material present in the open pit walls; and
- ▶ Provide annual reports to British Columbia Ministry of Energy, Mines and Low Carbon Innovation (BC MEMLI) and BC MECCS and designated Indigenous groups summarizing the results of geochemical testing.

The following mitigation measures for minimizing potential ML:

- ▶ Progressive reclamation will be undertaken to reduce the infiltration of water and oxygen into the non-PAG backfills, buttresses, and embankments;
- ▶ Non-PAG rock will be covered with overburden as much as material constraints allow to reduce the infiltration of water and oxygen;
- ▶ Place some non-PAG rock into management ponds that are characterized as PAG because of the mine planning process using a neutralization potential ratio (NPR) value of 2NP (neutralizing potential):1AP (acid potential [AP]) to classify non-PAG material from PAG material versus the geochemistry NPR value of 1.2NP:1AP used for classifying non-PAG material from PAG material; and
- ▶ In the Post-closure Phase, approximately half of non-PAG material will be flooded with water in the open pit to prevent oxygen ingress and further oxidization of this material resulting in a reduction of metal leaching once this occurs.

5.3.7 People, Employees, Contractors, and Onsite Policies

The following applies to people, employees, and onsite policies:

- ▶ Establish and implement an onsite policy prohibiting alcohol consumption, smoking, vaping, and drug use;

- ▶ Establish and implement an onsite policy prohibiting shooting, hunting, and fishing within the Project Area;
- ▶ Establish an Indigenous Cultural Awareness Induction program for employees, visitors, and contractors in collaboration with the Wet'suwet'en; and
- ▶ Establish and implement policies to promote: no workplace harassment of any kind; environmental protection and awareness; whistle blower protection; health, safety, and security; and multicultural and multi-generational workforce considerations.

5.3.8 Housing Measures

TCL is aware of the current housing shortage and lack of housing stock and diversity within the Socio-economic RSA determined for the Project. The following measures are intended to promote local housing opportunities:

- ▶ Provide incentives and inducements to employees to move permanently to a location within the Socio-economic RSA and require the Project management team to reside in the Socio-economic RSA to benefit the local and regional economy (refer to the **SEMP**); and
- ▶ Provide incentives and inducements to developers and partner with government to encourage the development of additional housing stock/supply and diversity of housing in the Socio-economic LSA/RSA.

5.3.9 Public Access Management

Per the *Mines Act*, RSBC 1996, c 293 (GovBC 1996f), and *Land Act*, RSBC 1996, c 245 (GovBC 1996c) requirements, a "No Unauthorized Entry, Hunting, and Fishing" boundary will be established at the outset of the Construction Phase around the Project Area to prevent unauthorized access. It will be in effect throughout the Project life. It is currently envisioned that the public will be allowed access through and beyond the Project Area to reach identified cultural, subsistence foods, ceremonial, recreational and hunting areas during the Construction, Operation, Decommissioning and Reclamation, and Post-closure phases, the following will apply to the management of public access:

- ▶ Establishing a **PAMP** to mitigate potential safety issues related to public access to/through the Project Area. The **PAMP** was developed for the purpose of public, contractor, visitor, and employee safety, and Project security. The **PAMP** aims to minimize restricted areas and provide opportunities for reasonable and safe access to areas adjacent to and beyond "No Unauthorized Entry, Hunting and Fishing" boundary areas. The Wet'suwet'en will be engaged regarding the final implementation of the **PAMP**;
- ▶ The **PAMP** includes details on an access control procedure to maintain public access through the Project Area to allow access to recreational locations. Two (2) types of access will be provided:
 - ▶ Escorted Access: TCL will provide guided access via operation of a lead vehicle to escort users of the Project Area roads from either the TCL office in Telkwa, or from the Sandpit Muster Station just south of the TAC to the Telkwa Coalmine Recreation Camp (TCRC); TCL will also escort vehicles from the above two (2) locations across the bridge constructed over Goathorn Creek to a parking area on the west side of Goathorn Creek;
 - ▶ No-Escort Access: From the parking area near the TCRC, a new trail will be established along the east side of Goathorn Creek that can be used by hikers, horseback riders, bikers, and approved motorized use such as quads, trucks, cars, SUVs and motorbikes, but not including campers. This trail will allow access underneath the TAC via a dedicated public underpass to

get to the south side of the TAC. From there the public will be able to use a trail that accesses a divided two (2)-lane bridge installed over Goathorn Creek that allows them to be separated from Project vehicles. After users cross the Goathorn Creek, an existing access trail on the west side of Goathorn Creek can be used as an alternate access trail to Hunter Basin and other recreational sites. Alternately, from Parking Area 2, vehicles will be able to access this same alternate trail on the east side of the Project to recreational areas. Additional details and maps are provided in the **PAMP**;

- ▶ With the PAMP in place, the Project will improve legal access to recreational facilities via the re-establishment of a bridge over Goathorn Creek;
- ▶ Access to the Project Area by the Wet'suwet'en for land use and resource harvesting purposes, will be discussed with the Wet'suwet'en, and facilitated provided that safe access can be accommodated; and
- ▶ Tenure holders that overlap with the Project Area will continue to be consulted through the Construction and Operation phases to consider how operational plans can incorporate other land uses with the results being reported to BC FLNRORD on an annual basis.

5.3.10 Dust Suppression and Air Emissions

Dust generation and subsequent deposition on exposed soil and plants because of Project activities will be limited through dust suppression techniques and implementation of the **AQMP**. The primary approach to reducing road dust re-entrainment within the Project footprint is watering when conditions require. If required alternative and additional approaches include chemical agent application, such as calcium chloride, designed to alter the surface of the roadway, cementing loose material into a hardened surface. Air emissions will be reduced to the extent practical through implementation of the **AQMP** and the **MTCP**.

Dust suppression and air emission measures will minimize potential effects on the Community Well-being VC such as a change in food security, particularly a change in subsistence food quality (i.e., vegetation tissue), which in turn contributes to mitigating potential effects on community cohesion and mental health.

5.3.11 Subsistence Food Management Plan

The Project will be decommissioned and reclaimed to design-specifications to provide a safe and stable end-landscape that aligns with end-land use objectives in accordance with the **RCP**. A Subsistence Food Management Plan will be developed as part of the **RCP** at least three (3) years prior to the end of the Operation Phase, and in consultation with the Wet'suwet'en and relevant authorities. The plan will address potential effects of the Project on the change in access to land and the availability of subsistence foods. Details of the plan and associated monitoring to assess the actual effects and effectiveness of mitigation measures will be developed prior to the Decommissioning and Reclamation Phase (i.e., three (3) years prior to Year 21).

5.3.12 Spill Prevention and Response

Spill prevention and response measures will be implemented during vehicle and equipment travel/operations in accordance with the **FMSCP**; and any hazardous materials management will also be implemented in accordance with the **FMSCP**. This will limit potential effects to drinking water quality and vegetation quality and thus will limit potential effects on subsistence foods (vegetation tissue) quality and therefore to food security.

5.3.13 Management of Hazardous Materials and Wildlife Attractants

A series of measures will be implemented related to the management of Project emissions and discharges with the potential to affect wildlife quality to limit effects to subsistence foods (wildlife tissue) quality and therefore to food security.

- ▶ The use of harmful and hazardous substances will be limited to the extent practical; and
- ▶ Hazardous materials will be handled and stored using measures, such as those in the **FMSCP** and **Waste Management Plan for Refuse and Emissions (S13.0-C20) (WMPRE)** to avoid attracting wildlife (e.g., wildlife proof containers or exclusion fencing).
- ▶ The use of road salts within the Project Area will be minimized to reduce attractants to wildlife;
- ▶ Vegetation management will be incorporated along Project roads and adjacent to management, sedimentation, and control ponds to minimize site attractiveness to wildlife;
- ▶ Visual and auditory deterrents will be used to deter wildlife from using potentially contaminated areas such as the Soil Treatment Facility;
- ▶ A “No Littering” policy within the Project Area will be implemented;
- ▶ Any materials that could act as wildlife attractants (e.g., oils, chemicals, garbage) will be placed, stored, and stockpiled in either animal proof containers or in a manner that minimizes their potential to attract wildlife. If evidence of wildlife presence or access to waste disposal facilities or a waste disposal compliance problem is detected, use of modified systems and/or increase of offsite waste disposal frequencies will be implemented; and
- ▶ Management of waste and/or wildlife attractants will be included in the Wildlife Education Program (refer to **WMP**).

5.3.14 Education and Training Support

To enhance the potential of maximizing local resident employment, TCL will work to increase the skill capacity of the local and regional labour force and to reduce barriers to employment for Indigenous workers and other underrepresented members of the workforce, which will help manage a potential influx of workers that could affect housing availability and cost. This in turn could help manage potential economic inflation and the affordability of housing, food, consumer goods, and other supplies, consequently affecting cost of living. Mitigation measures will focus on training efforts to prepare the unemployed and underutilized labour force for employment at the Project, as well as to increase the availability of skilled workers in the region for employment at other local and regional businesses.

The following measures will be addressed through the Education, Training, and Employment Program (refer to **SEMP**) and include:

- ▶ provide training, targeting entry-level positions and on-the-job training where previous experience is not necessary;
- ▶ develop and implement of a professional training plan to support training needs for the Project that can include specialized skilled training, such as apprenticeship programs for trades positions;
- ▶ support efforts on the part of employees to upgrade their education as a means towards job advancement;
- ▶ cooperate with local educational authorities and institutions, and the industry in general to develop and implement high school and college training with mining sector content;

- ▶ support the training of Indigenous people and cooperate with programs such as Indigenous Skills and Employment Training (ISET) to improve access to funding for Indigenous individuals and support skill building of the Indigenous workforce in the RSA; and
- ▶ Cooperate with financial institutions to support financial resource needs required for training (e.g., a clear indication of workforce needs and intention to employ workers at the Project), given specific education can increase the likelihood of receiving a student loan.

The Education, Training and Employment Program will also contribute to creating positive effects from the Project, likely by contributing to a positive feedback loop of Project participation in community social activities, a sense of pride among workers, and integration of the Project into the local social fabric, thus also contributing to mitigate potential Project effects on community cohesion and mental health.

5.3.15 Health and Wellness Program

The Health and Wellness Program is part of **OHSP** and will target the mitigation of effects related to community cohesion and mental health and will include an Employee and Family Assistance Program to prevent poor lifestyle choices and mental health issues among workers and their families, and or specific measures to connect them with external community services.

The following mitigation measures will be addressed/developed through the Health and Wellness Program:

- ▶ health and well-being messaging in the context of health and safety induction such as physical activity, healthy eating, tobacco reduction, vaping reduction, cannabis consumption, alcohol and prescription medication consumption, stress prevention, family planning, and sexual health;
- ▶ indicators to monitor the well-being of workers and LSA/RSA community members and that favour early identification and management of issues;
- ▶ an annual evaluation of actions and programs implemented for worker health and wellness, as well as new or adaptive management strategies, as required;
- ▶ access to counselling, financial planning, and other resources (as part of an Employee and Family Assistance Program);
- ▶ “fit for work” policies and procedures, such as no drugs, alcohol, smoking or vaping within the Project Area;
- ▶ policies and procedures on treatment for substance abuse or other issues, including leave time and re-hiring considerations and employee work modification programs; and
- ▶ onsite/online access to readings or other resources on community well-being, mental health, and self-care.

5.3.16 Housing and Accommodation Program

To assist employees of TCL to own permanent housing in the region around the proposed Project, the following mitigation measures will be addressed through the Housing and Accommodation Program (refer to **SEMP**) and will include:

- ▶ TCL will fund the accommodation of non-local experienced personnel that the company requires during the Construction Phase:

- ▶ A Request for Proposal (RFP) will be provided to accommodation providers at least six (6) months prior to use by the Project construction workforce, and the RFP will be for a set number of rooms for a guaranteed duration of time;
- ▶ Reservations will be made at various campgrounds and recreational vehicle (RV) parks to allow the Project construction workforce to use some of these facilities;
- ▶ Discussions with groups in Telkwa, Smithers and Houston for the temporary rental of rooms for the construction workforce will be secured at least six (6) months prior to use;
- ▶ TCL will endeavour to use local companies to complete most of the construction activities for the Project to reduce the requirements for temporary accommodation;
- ▶ To accommodate the permanent workforce for the Operation Phase:
 - ▶ Grants to be used for the purchase or upgrade of permanent local housing will be provided to employees who reach designated milestones with the company;
 - ▶ TCL will work with local developers to provide guaranteed rental rates and duration to incentivize the construction of accommodation for permanent employees and communities at large; and
 - ▶ TCL will provide transportation from both Houston and Witset if at least six (6) employees reside in these locations to promote alternatives for employees to reside and still be within a reasonable driving distance (less than 90 minutes) from the Project.

5.3.17 Procurement Program

A Procurement Program will be implemented to support procurement from local and regional businesses, and to reduce barriers to entry for contracting opportunities for local and regional businesses, to maximize economic benefits to those businesses. The Procurement Program will assist local and regional business businesses in taking advantage of the opportunities to supply the Project directly and indirectly, and it will improve the understanding of procurement requirements and expectations. The Procurement Program is presented in the **SEMP**.

A Buyer role will be created for the Project to develop local opportunities, improve understanding of the local/regional market, and assess the availability of goods and services that can be sourced locally. TCL will also:

- ▶ advertise contracting opportunities well in advance of the goods or services being required, to allow local suppliers to increase capacity, meet qualifying requirements, and prepare a competitive bid. TCL internal policy is to obtain at least three (3) received quotes for each good or service request for quote (RFQ);
- ▶ provide smaller contracts to allow businesses with limited capacity to participate in the bidding process, and/or implement a multi-supplier procurement by allowing the breakdown of some larger contracts; and
- ▶ Improve the participation of Indigenous-owned businesses in the procurement process.

The Procurement Program will drive positive effects of the Project in the LSA communities and the RSA, contributing to an increase in financial resources and opportunities available to LSA community residents with respect to housing and accommodation. This will contribute to counterbalance the potential effects of the Project on the cost of living. By strengthening local and regional businesses, the Procurement Program will also contribute to a positive image of the local and regional economy and a sense of pride in local capacity, reinforcing positive effects on community cohesion and mental health.

5.3.18 Community Engagement Programs

TCL is committed to creating and maintaining opportunities for constructive dialogue and relationships with the local community and other interested parties over the course of the Project. The Project will develop and implement Community Engagement Programs as part of the **SEMP** that will involve continuous engagement with key stakeholder groups most likely to be concerned and affected by the Project, including:

- ▶ Indigenous groups, including OW, Wet'suwet'en First Nation, and the Witset First Nation;
- ▶ local and regional authorities and key representatives such as the Village of Telkwa, the Town of Smithers, and the RDBN;
- ▶ local community groups such as Tenas Mine Neighbours, and other Bulkley Valley residents;
- ▶ local recreation groups;
- ▶ local community groups;
- ▶ other local non-governmental organizations, and
- ▶ members of the local and regional workforce potentially interested in work at the Project.

Community consultation provides an opportunity for stakeholders to express their concerns, ask questions, and get a clearer understanding of Project effects and associated mitigation measures. Sustained stakeholder engagement activities are expected to contribute to positive interactions between the Project and community members from the LSA and the RSA and are likely to foster a climate of collaboration and trust. Through the implementation of Community Engagement Programs, the Project's goal is to operate as a good neighbour to residents of the LSA, well-integrated into the social fabric of the Bulkley Valley where mining was accepted activity in the past.

The Community Engagement Programs (for Construction, Operation, and Decommissioning and Reclamation phases of the Project) will include:

- ▶ open-door policy;
- ▶ general engagement meetings and presentations;
- ▶ company website;
- ▶ social media;
- ▶ Project tours;
- ▶ participation at community and industry events;
- ▶ neighbours' group(s),
- ▶ Project Access Committee,
- ▶ Project Advisory Committee, and
- ▶ sponsorship.

5.3.19 Health, Safety, and Human Resources Superintendent

- ▶ To maximize local resident Indigenous employment and reduce the effect of barriers to Indigenous employment and participation, the Project will make reasonable efforts to hire Indigenous workers and work towards reducing the barriers to employment for Indigenous people (refer to **SEMP**);

- ▶ TCL will set clear and ambitious objectives regarding Indigenous employment at the Project and create a Health, Safety, and Human Resources Superintendent role at the Project to support employment opportunities for Indigenous people;
- ▶ The Health, Safety, and Human Resources Superintendent will:
 - ▶ engage with prospective applicants and provide information about employment opportunities, qualifications, and the nature of working at the Project, as well as liaise with the Indigenous workers at the Project to help address challenges at the workplace as they arise;
 - ▶ support the workers at the Project in health and well-being;
 - ▶ develop and support an Employee and Family Assistance Program to be available to all employees and their families;
 - ▶ address specific health and well-being needs of the workers at the Project, as they arise;
 - ▶ develop (and review annually) health and well-being policies and procedures to suit the needs of the Project and the workers; and
 - ▶ provide workers with information and access to the resources this program provides and encourage their use.

The Health, Safety, and Human Resources Superintendent role is expected to have most beneficial impact preceding and during Construction, and Operation phases as hiring takes place to staff Project employment opportunities.

5.3.20 Decommissioning and Reclamation, and Post-closure Program

The closure of the Project is an event expected to occur once mineable resources for the Project are exhausted, and the Decommissioning and Reclamation Phase is completed. There are no specific mitigation measures that can be implemented by TCL to eliminate an economic slowdown during the Decommissioning and Reclamation, and Post-Closure phases; however, there are measures that can partially reduce the Magnitude of this effect.

Mitigation measures related to an economic slowdown once the Project ceases operations will focus on workforce transition to minimize local unemployment. TCL will develop a Decommissioning and Reclamation, and Post-closure Program to help employees identify and secure new employment (see **SEMP**). The program will be developed in the early stages of the Operation Phase (by the end of Year 5) to solicit feedback from stakeholders and will be refined halfway through when the actual completion of mining is better understood and defined.

The mitigation measures that will be put in place as part of this program are:

- ▶ identification of employees who are expected to be under the age of 55 at the expected end of the Operation Phase of the Project, and developing a training program for each employee to increase the number of transferrable skills and qualifications to allow for an easier job transition;
- ▶ providing a matching Registered Retirement Savings Plan (RRSP) program to promote employee's saving and getting prepared for retirement;
- ▶ providing financial education programs for employees so that they understand retirement planning and saving;

- ▶ working with other industries in the region, to gain an understanding of what skills and qualifications are lacking and provide opportunities for TCL employees to attain those skills and qualifications to facilitate employee transition to other industries after their employment ends with TCL;
- ▶ provision of a Legacy Fund to continue to provide donations, and sponsorship opportunities for educational programs to former employees, employee spouses and dependents; and
- ▶ work with Indigenous groups to determine if a community forest model is possible for reclamation to provide a lasting employment and funding source to the community.

The strategy for the Project will be based on updated workforce projections, information about economic conditions, and available community resources at the end of the Operation Phase. The Program will describe the actions and resources that will assist Project employees at the end of their employment with the Project. The planning for these measures will begin several years before the end of mining, with the mitigation measures implemented at least two (2) years before the end of operations. This will be a gradual but continuous effort to help employees understand the skill set, potential job transitions, and career choices as workforce size is gradually reduced to match lower operating activities. These mitigation measures will end once the Project enters the Post-closure Phase.

5.3.21 Summary of Mitigation Measures

A summary of the mitigation measures to avoid or reduce potential Project-related adverse effects on Community Well-Being VC, and whether or not a residual effect is anticipated, is provided in **Table 5.3-1**.

Table 5.3-1: Summary of Potential Effects and Mitigation Measures for Community Well-being Valued Component (VC)

Potential Effect	Contributing Activities within the Project Phases (C, O, D, P)	Proposed Mitigation Measure	Residual Effect (Yes/No)
Change in Food Security	All activities C, O, D	▪ Limit Project footprint and Project Area ▪ Reclamation measures (refer to RCP) ▪ Transport measures ▪ Blasting measures (refer to EMP) ▪ Management of ML/ARD (refer to ML/ARDMP) ▪ People, employees, contractors and onsite policies ▪ Public access management (refer to PAMP) ▪ Dust suppression and air emissions (refer to AQMP and MTCP) ▪ Subsistence Food Management Plan (refer to RCP) ▪ Community Engagement Programs (refer to SEMP) ▪ Spill prevention and response (refer to FMSCP) ▪ Management of hazardous materials and wildlife attractants (refer to FMSCP, WMPRE and WMP)	Yes
Change in Cost of Living	All activities (C, O)	▪ Housing measures ▪ Education and training support (refer to SEMP) ▪ Health and Wellness Program (refer to SEMP) ▪ Housing and Accommodation Program (refer to SEMP) ▪ Procurement Program (refer to SEMP)	Yes

Potential Effect	Contributing Activities within the Project Phases (C, O, D, P)	Proposed Mitigation Measure	Residual Effect (Yes/No)
		Health, Safety, and Human Resources Superintendent (refer to SEMP)	
Change in Community Cohesion	All activities (C, O)	- Health and Wellness Program (refer to SEMP) - Education and training support (refer to SEMP) - Procurement Program (refer to SEMP) - Community Engagement Programs (refer to SEMP)	Yes
	All activities (D)	- Health and Wellness Program (refer to SEMP) - Decommissioning and Reclamation, and Post-closure Program (refer to SEMP)	Yes
Change in Mental Health	All activities (C, O)	- Limit Project footprint and Project Area - Reclamation measures (refer to RCP) - Project component design - Blasting measures (refer to EMP) - Education and training support (refer to SEMP) - Health and Wellness Program (refer to SEMP) - Procurement Program (refer to SEMP) - Community Engagement Programs (refer to SEMP)	Yes
	All activities (D)	Decommissioning and Reclamation, and Post-closure Program (refer to SEMP)	Yes

Notes: C, O, D, P represent Project Phases: C=Construction, O=Operation, D=Decommissioning and Reclamation, P=Post-Closure AQMP=Air Quality Management Plan (S13.0-C2); EMP=Explosives Management Plan (S13.0-C6); FMSCP=Fuel Management and Spill Control Plan (S13.0-C7); ML/ARD=Metal Leaching/Acid Rock Drainage; ML/ARDMP=Metal Leaching/Acid Rock Drainage Management Plan; RCP=Reclamation and Closure Plan (S13.0-C15); SEMP=Socio-economic Management Plan (S13.0-C16); WMP=Wildlife Management Plan (S13.0-C21); WMPRE=Waste Management Plan for Refuse and Emissions (S13.0-C20)

*Please refer to **Table 5.1-2** for list of applicable activities for each listed Project phase, unless otherwise noted in this table.

5.4 Residual Effects and Significance of Residual Effects

This subsection describes the anticipated residual adverse effects of the Project on the Community Well-being VC. Residual effects are the adverse Project effects that remain after the implementation of all mitigation measures and management strategies and are the expected consequences of the Project on the Community Well-being VC.

The approach to assessing the residual effects of the Project on the Community Well-being VC subcomponents follows the methodology outlined in **S3.0 Assessment Methodology** of the **EAC Application**. Each residual effect is assessed in the context of the Project activities that will occur within each Project phase. Based on the potential Project-related effects listed in **5.2**, the assessment focuses on Construction, Operation, and Decommissioning and Reclamation phases. Residual effects are then characterised based on the combined predicted residual effect for these Phases. The assessment includes a determination of Likelihood, Significance and the Level of Confidence associated with the prediction.

As discussed in **5.2 Potential Project-related Effects**, the Duration of the Construction Phase is Short-term in nature. Because of a modular Minesite design many fabrication activities will occur offsite and outside of the RSA, with complete modules and equipment already assembled and brought to the Minesite.

Typically, the onsite construction workforce will be small (approximately 70 people or less), varying depending on construction requirements. With an Education, Training and Employment Program aimed at maximizing local employment it is a reasonable expectation that 60% of the construction workforce will be comprised of current residents of the LSA/RSA, although this chapter also consider a more conservative rate of 30% of local construction workforce. The remaining construction workers would be temporarily accommodated in short-term accommodations in Smithers and Houston for varying durations of time. During Operation, it is expected that workers will in-migrate with their families into the LSA/RSA to live as no FIFO arrangements or working camp is planned.

Nonetheless, the presence of transient workers as well as high-wage associated with Project employment is likely to add pressure to the housing market and increase housing availability and affordability issues in the LSA and RSA, as discussed in **S6.0-C3 Infrastructure and Services**. An increased demand in local goods and services is also anticipated, leading to an overall potential increase in cost of living. During the Reclamation and Decommissioning Phase, the reduction in Project employment and spending is expected to decrease economic activity in the LSA and RSA, but may or may not affect housing prices or rental housing demand as the Project workforce may seek other local employment rather than migrating out of the RSA.

Transient workers, local Project employment opportunities and higher wages are also likely to affect the social fabric of the community, through changes in lifestyle choices such as substance abuse, and gambling. Employment and higher wages may also affect rates of domestic violence. In addition, community tensions may be fueled by diverging views about the Project and associated environmental and social disturbances. The Health and Wellness Program, including the Employee and Family Assistance Program, will contribute to support workers and monitor community conflicts and tensions. The Community Engagement Programs will support meaningful dialogue between the Project and local stakeholders.

In the same way, the Project and the above-mentioned factors may affect the level of stress and anxiety of Project workers, their families and the communities, thus affecting their well-being through a change in mental health. The Health and Wellness Program, including the Employee and Family Assistance Program, will contribute to manage this adverse effect, yet residual effects are anticipated due to the intrinsic nature of personal choices and individual behaviors.

Indigenous communities remain particularly vulnerable to adverse effects on community well-being, due to their high level of sensitivity described in previous sections (also refer to **S11.0 Wet'suwet'en Rights and Interests Assessment**).

The following assessment details potential residual effects of the Project on the Community Well-being VC during the Construction, Operation, and Decommissioning and Reclamation phases. Given substantial reductions in Project workforce and spending, preceded by a transition period during the Operations, and Decommissioning and Reclamation phases, no adverse effects were identified during the Post-closure Phase of the Project in **5.2 Potential Project-related effects**, therefore that phase is not considered in the residual effects assessment. In addition, the Decommissioning and Reclamation Phase is not considered for the potential effect of to change in cost of living as the effect was predicted to be Negligible and not assessed any further (refer to **5.2.3 Change in Cost of Living**).

5.4.1 Description of Evaluation Criteria

5.4.1.1 Residual Effects Characteristics

Table 5.4-1 describes the characteristics considered when determining the Significance of the residual adverse effects on the indicators of Community Well-being VC.

Table 5.4-1: Effect Characteristics Considered when Determining the Significance of Residual Effects on the Community Well-being Valued Component (VC)

Residual Effect Characteristic	Definition	Rating
Magnitude	Severity of the residual effect measured in terms of the proportion of Community Well-being affected, relative to the range of historic variation	Low – differs from existing conditions but remains within the range of natural variation. Moderate – differs substantially from existing conditions and approaches the limits of natural variation. High – differs substantially from existing conditions resulting in a detectable change beyond the range of natural variation.
Geographic Extent	Spatial scale over which the residual effect is expected to occur.	Local – Effect limited to the LSA communities Regional – Effect limited to portion of RSA or all of the RSA Beyond Regional – effect occurs beyond RSA.
Duration	Length of time over which the residual effect is expected to persist before returning to existing conditions or the effect can no longer be measured.	Short-term – Up to 2 years Long-term – Between 2 and 25 years Permanent – Effect extending throughout or beyond the Project lifetime
Frequency	How often the residual effect is expected to occur.	Infrequent – Single or irregular occurrence of the effect Frequent – The effect occurs regularly Continuous – The effect occurs continuously.
Reversibility	Whether or not the residual effect can be reversed once the activity causing the residual effect ceases.	Fully Reversible – Measurable parameters of the effect fully return to existing conditions after decommissioning and reclamation. Partially Reversible – Measurable parameters of the effect partially return to existing conditions after the Decommissioning and Reclamation Phase. Irreversible – Measurable parameters of the effect fully remain after the Decommissioning and Reclamation Phase and are considered permanent.
Context	The extent to which Community Well-being has been affected by past and present environmental and socio-economic processes and conditions, its potential sensitivity to the Project-related residual effect, and its ability to recover from that effect (i.e., resilience)	Low Sensitivity – the population has a high natural resilience to imposed stresses, and will easily respond and adapt to the effect Moderate Sensitivity – the population has a neutral resilience to imposed stresses and may be able to respond and adapt to the effect High Sensitivity – the population has a low natural resilience to imposed stresses, and can respond and adapt to the effect

5.4.1.2 Likelihood

Likelihood is the probability that the predicted residual effect will occur including consideration of the likelihood that the mitigation will be successful. Likelihood is defined as:

- ▶ **Likely** Moderate-to-High probability of an effect; or

- ▶ **Unlikely** Low probability of an effect.

5.4.1.3 *Significance Definition*

Each residual effect is rated as **Not Significant**, or **Significant**, according to the following definitions. All residual effects (independent of their Significance rating) are carried forward to the CEA.

- ▶ **Significant** Residual effects are Significant if they are characterised as having High Magnitude and Long-term Duration, with Frequent or Continuous Occurrence, and/or being Irreversible; or
- ▶ **Not Significant** Residual effects are Not Significant if they are not characterised as Significant.

Limitations of existing data and uncertainty associated with the assessment were also characterised by assigning a Level of Confidence for each residual effect. Confidence, which can also be understood as the level of uncertainty/risk associated with the residual effects assessment (including Significance determination), is a measure of how well residual effects are understood and the quality of the input data. The reliability of data inputs and analytical methods used to predict Project effects, confidence regarding the effectiveness of mitigation measures and certainty of the predicted outcome are all considered. Confidence levels were considered in relation to:

- ▶ scientific certainty relative to the quantification of the effect, including the quality and or quantity of data and the understanding of effect mechanisms;
- ▶ scientific certainty relative to the effectiveness of the proposed mitigation; and
- ▶ professional judgment based on prior experience in predicting effects and the known effectiveness of proven mitigation measures.

Confidence estimates allows the decision-maker to evaluate risk associated with the residual effects of the Project. In the determination of confidence, the following is considered:

- ▶ **Low Confidence:** Cause-effect relationships between the Project and the Community Well-being VC are poorly understood. There may be a number of unknown external variables and/or data for the Project is incomplete. The effectiveness of the mitigation measures may not yet be proven. Modelling results may vary considerably given the data inputs. There is a high degree of uncertainty in the conclusions of the assessment;
- ▶ **Moderate Confidence:** The cause-effect relationships between the Project and the Community Well-being VC are not fully understood (e.g., there are a number of unknown external variables or data for the Project are incomplete). The effectiveness of mitigation measures may be moderate or high. Modelling predictions are relatively confident. Based on the above, there is a moderate confidence in the assessment conclusions; or
- ▶ **High Confidence:** There is a good understanding of the cause-effect relationship between the Project and a VC, and all necessary data are available to support the assessment. The effectiveness of the selected mitigation measures is moderate to high. There is a low degree of uncertainty associated with data inputs and/or modelling techniques, and variation from the predicted effect is expected to be low. Given the above, there is high confidence in the conclusions of the assessment.

Based on these criteria, it was determined that an additional risk analysis was not required.

5.4.2 Change in Food Security

5.4.2.1 Residual Effect Characteristics

A residual effect for the change in food security is expected because the proposed mitigation measure is not expected to mitigate the effect fully.

Minesite and associated Project infrastructure will remove land and resources used for subsistence and recreation. Construction Phase-related clearing and preparation of the Minesite are expected to result in a loss of habitat and restricted access for some tenured areas (i.e., guide-outfitting) that will continue throughout all active phases of the Project, mitigated by improvements to existing trails and replacement of the Goathorn Creek bridge. Habitat and access are predicted to be substantially restored as a result of progressive reclamation efforts.

Residual effects related to quality of subsistence foods were identified and characterised in the **Human Health VC S8.0** and are based on the evaluation of potential risks from exposure to COPCs from the **Human Health Risk Assessment**, provided in **Appendix 8.0-A**. For non-carcinogenic COPCs, residual effects from ingestion of subsistence foods (fish) are only predicted to occur, based on calculated hazard quotients (HQs), if local non-anadromous fish are consumed. No effects are expected from consumption of anadromous species, such as salmon, which are consumed most often. For carcinogenic COPCs, residual effects from ingestion of subsistence foods (fish) are only predicted to occur, based on calculated incremental lifetime cancer risk (ILCR) ⁷, if local non-anadromous fish are consumed. No effects were expected from consumption of anadromous species, such as salmon, which are consumed most often.

Construction of the Goathorn Creek Bridge may improve the quality of land and resources for public use through opening up of alternate trails to access Hunter Basin. During the Operation Phase, there will continue to be extensive areas available outside of the Project Area, and within the RSA, for hunting and fishing by the public and the incremental loss in quantity and quality of resources can be accommodated. Progressive reclamation will reduce the amount of land and resources dedicated to Mine operation. Other than open pit areas, the Decommissioning and Reclamation Phase will improve and return lands and resources to alternate recreational and subsistence uses. Reclamation measures will include revegetation with native plant species appropriate for the target ecosystems.

The Subsistence Food Management Plan will be developed with the Wet'suwet'en and will further mitigate the loss of food security through monitoring of subsistence food availability. Details of the plan and associated monitoring to assess the actual effects and effectiveness of mitigation measures will be developed prior to the Decommissioning and Reclamation Phase (i.e., three (3) years prior to Year 21).

Table 5.4-2 summarizes the analysis of the effect of the Project on food security and provides rationale for each of the ratings.

Table 5.4-2: Summary of Effect Characteristics Ratings for a Change in Food Security

Residual Effects Characteristic	Rating	Rationale for Rating
Magnitude	Moderate	Land and resource availability will change within the Project infrastructure footprint, which is relatively small compared to the LSA and RSA, which will remain viable.

⁷ Incremental lifetime cancer risk (ILCR) is defined as the increase in lifetime cancer risk above the normal risks associated with background exposures.

Residual Effects Characteristic	Rating	Rationale for Rating
		Subsistence food quality is not expected to change with the implementation of the PAMP, Subsistence Food Management Plan, and mitigation measures for soils, air, fish, wildlife and water quality.
Geographic Extent	Regional	Wildlife and fish species constituting subsistence foods travel throughout the RSA
Duration	Long-term	Effects on food security are predicted through the active phases of the Project.
Frequency	Continuous	Project effects on land and resource use and the quality of subsistence foods would be ongoing throughout all active phases.
Reversibility	Partially Reversible	Except for open pit areas where access will continue to be restricted for public health and safety, access will be largely restored in the local area during the Post-closure Phase. Moreover, effects from exposure to carcinogenic COPCs are partially reversible.
Context	Moderate	The population is likely to be resilient regarding food security as there are considerable options outside of the area affected by the Project. People have varying degrees of sensitivity and ability to adapt to stressors, depending on multiple other non-biophysical factors that also influence overall Human Health.

Notes: COPCs=contaminants of potential concern; LSA=Local Study Area; PAMP=Public Access Management Plan (S13.0-C14); Project=Tenas Project; RSA=Regional Study Area

5.4.2.2 Likelihood

The residual effect of a change in food security due to a change in quantity and quality of resources, notably the quality of subsistence foods are considered Likely. Such change is primarily driven by a residual effect linked to a change in the access and availability of land and resources (**S6.0-C4 Land and Resource Use VC**), as measurable changes to the Human Health VC are Unlikely to occur since the Project-related incremental changes in HQs and ILCRs are low, with higher contributions from market foods compared to contributions from the Project (refer to **S8.0-C1 Human Health VC**).

5.4.2.3 Significance

The Magnitude is predicted to be Moderate, considering that the Minesite and associated Project infrastructure are a measurable change in the resources in the local area. The Duration is predicted to occur over the Long-term as the residual effect is predicted through the Active Phases of the Project. The Context is predicted to be Moderate because the population is likely to be resilient regarding its capability to find subsistence food outside the Project Area.

The residual effect of a change in the quantity and quality of land and resource is predicted to be Not Significant (refer to **S6.0-C4 Land and Resource Use VC**). Project-related residual effects on the Human Health VC from metal COPCs in environmental media is predicted to be **Not Significant (see S8.0-C1 Human Health)**. Therefore, the residual effect of a change in food security based on changes in land availability and subsistence food quality is expected to be **Not Significant**.

The Level of Confidence in this Significance rating is Low, as the dynamic between land availability, subsistence foods quality, food security and Community Well-being is complex and depends on other subjective and individual factors such as household decision-making, family relations and time allocated to land-based activities. While the change in land availability is well understood and Human Health effects are also based on a quantitative assessment using regulator-provided TRV thresholds, standard HHRA models, and Project-specific and receptor-specific information, no direct causal relation can be established and there is no specific indicator on food security. This determination is based primarily on professional judgement.

5.4.3 Change in Cost of Living

5.4.3.1 Residual Effect Characteristics

A residual effect for the change in cost of living is expected because the proposed mitigation measure will not be able to fully mitigate the predicted effect. The Project's Education, Training and Employment Program is designed to maximize local resident employment during all Project phases and a potential effect on the cost of living. Given the size of the Project's workforce, even with conservatively assessed and partial success of this program, a substantial influx of workers is not expected either during the Construction or the Operation phases.

The Project intends to contract blocks of short-term accommodation rooms available in the LSA communities of Smithers and Houston (25 km and 41 km from the Project site respectively) during Construction Phase, thereby eliminating the need for a Project work camp or FIFO arrangements, and dispersing contract workers amongst a variety of short-term accommodations to avoid overloading one short-term accommodation option. During the Construction Phase, workers are not expected to permanently relocate to the LSA, given the temporary nature of construction contracts. However, some construction workers may opt not to stay in Project-provided accommodation, and instead prefer to rent a house or apartment for the duration of their stay.

S5.0-C1 Labour Market VC indicates the skillsets for the Operation Phase are likely present in the LSA/RSA and employment participation rates are adequate. During the Operation Phase, the majority of the workforce are therefore expected to be existing residents of the LSA communities, with the rest being made up of workers that are also likely to permanently settle in the LSA or the RSA.

As discussed in **S6.0-C3 Infrastructure and Services VC**, housing and accommodations in the LSA is under existing pressure, with housing shortages and escalating costs reported in Telkwa, Smithers, Houston, and Witset. Therefore, a residual effect of a change in cost or availability of housing and accommodations is expected during the Operation Phase, as proposed mitigation measures will not be able to fully mitigate the predicted effect.

Local and migrant workers with higher mining wages are also likely to increase consumption of goods and services in the LSA and the RSA, both during the Construction and Operation phases. However, given the small size of the workforce relative to the existing population, the potential contribution to an increase in the costs of such goods and services is considered to be minimal. Project procurement – through the Procurement Program (refer to **SEMP**) – will also increase local demand for local goods and services during the Construction, and Operation phases. Nonetheless, the potential effect on the cost of such goods and services would be minimal, given the small relative proportion of the demand for goods and services that would come from the Project which is relatively small. If any, a higher demand for goods which are not produced locally could mean more product importation, which could also lower the costs of such goods instead of raising them.

Overall, a residual effect for the change in cost of living is expected to be driven by a change in cost or availability of housing and accommodations in the LSA, anticipated mainly during the Operation Phase, as proposed mitigation measures will not be able to fully mitigate the predicted effect. This residual effect is predicted to be minimal for the Construction Phase because at that time, the Project will have little effect on housing and accommodations.

Table 5.4-3 provides characterisation of the residual effect and the rationale for each rating according to definitions in **5.4 Residual Effects and Significance of Residual Effects**.

Table 5.4-3: Summary of Effect Characteristics Ratings for Change in Cost of Living

Residual Effects Characteristic	Rating	Rationale for Rating
Magnitude	Low	The Project requires a moderately sized workforce. Employment of transient workers will be limited during the Construction, and the Operation phases, as the Education, Training and Employment Program will favour local employment.
Geographic Extent	Local	Housing and accommodation pressure will be experienced in the LSA as employees seek accommodation within reasonable commuting distance from the Minesite. Otherwise, overall cost of living is not expected to increase beyond the LSA.
Duration	Long-term	Effects on cost of living is mostly linked to the presence of workers in the Construction, and Operation phases. During Operation, the effect on housing availability and cost is predicted to occur primarily during the first few years as the workforce is hired and begins work at the Minesite. The private sector is expected to respond to the increase in housing demand over time by providing new housing developments, as determined by the market.
Frequency	Continuous	Local/regional employment and procurement will take place on an ongoing basis through all phases of the Project, particularly during the Construction, and Operation phases. The pressure on, and increased costs of accommodation and housing will be continuous; however, it is likely that supply will adjust to meet demand and pressure will ease.
Reversibility	Fully Reversible	Once the Project no longer contributes to the local/regional economy and demand for housing and accommodation conditions are expected to return to pre-Project cost of living conditions.
Context	High	The VC is highly sensitive to this effect, and has a low resilience to recover from this effect as there are existing pressures on accommodation and housing in the LSA, with current supply not keeping up with the demand and increasing costs associated with this effect.

Notes: LSA=Local Study Area; PAMP=Public Access Management Plan (S13.0-C14); Project=Tenas Project; VC=Valued Component

5.4.3.2 Likelihood

The Likelihood of the residual effect occurring is predicted to be Likely with housing availability and affordability already an issue in the LSA and the RSA. However, as mentioned above, the Project's contribution to a rise in prices of good and services is considered to be minimal.

5.4.3.3 *Significance*

The residual effect of a change in cost of living is estimated to be Low in Magnitude considering that in-migration of workforce during the Construction and Operation phases will be limited given the size of the Project workforce. The effect will be felt in the LSA, and will be Continuous in the Long-term, predicted to occur primarily during the first few years of Operation as the workforce is hired and begins work at the Minesite. The effect is considered Fully Reversible, given current housing shortages; however, the Context for this effect is considered high because there are existing pressures on accommodation and housing in the LSA, with current supply not keeping up with the demand and increasing costs associated with this effect. It is expected that in the long term, increased tax revenue associated with the Project and higher incomes will work to mitigate the potential adverse effect on cost of living. In addition, the private sector is likely to respond to the increase in housing demand with the provision of new housing developments. Markets are also expected to adjust to any changes in demand. Given the definition of Significance in **5.4.1.3 Significance Definition**, the effect of the Project on cost of living is predicted to be **Not Significant**.

The Level of Confidence for the assessment of this Significance rating is Low. The exact composition of locally-sourced Operation workforce cannot be predicted with full confidence as it will depend on local contextual factors and other regional employment opportunities. Also, little information on regional inflation is available as Canadian inflation is calculated at the provincial and federal levels as well as for major cities such as Vancouver. Therefore, the rise in potential costs of local goods and services associated with the Project is difficult to predict with high confidence. Although housing availability and affordability has been stated as an issue in the Bulkley Valley from various sources, including statistics and regional and municipal reports, it is difficult to estimate how a change in demand for housing would affect overall housing cost in the LSA and the RSA. This determination is based primarily on professional judgement.

5.4.4 *Change in Community Cohesion*

5.4.4.1 *Residual Effect Characteristics*

Despite mitigation measures, a residual effect for a change in community cohesion and is related to an increase in workers coming to the LSA during the Construction and Operation phases. Project work and higher income might also alter family relations through poor lifestyle choices of local Project workers. Income inequalities between high-wage Project workers and other community members might also be exacerbated by the Project. Social tensions might remain due to diverging views about the environmental and social disturbances associated with the Project.

During the Decommissioning and Reclamation Phase, the downturn in employment is expected to affect workers and their family, contributing to increased stress and anxiety and potentially affecting community cohesion in the RSA. Such effects would also depend on the overall economic situation at the time; effects would be lessened if other employment opportunities become available.

The Education, Training and Employment Program (refer to the **SEMP**) will detail TCL's support and effort to increase the capacity of the labour force during the Construction, and Operation phases. Transient construction workers will be hosted in temporary accommodation in Smithers and Houston. No FIFO arrangements will take place and a small number of workers are likely to settle in the LSA and RSA during the Operation Phase. Some Project workers are predicted to engage in poor lifestyle choices despite the Employee and Family Assistance Program to be implemented as part of the **SEMP**. Ultimately the behavior/lifestyle of workers and individuals linked to the Project through direct, indirect, or induced employment opportunities will depend on personal choice, and it is difficult to predict and control peoples' actions.

Prior to the Decommissioning and Reclamation Phase, the Decommissioning and Reclamation, and Post-closure Program (refer to the **SEMP**) will help prepare the local and regional workforce to find and transition to alternative employment, thereby reducing the potential effects of an economic downturn on community cohesion; however, the proposed measures are not expected to fully mitigate the predicted effect.

During all active Project phases, the Community Engagement Programs will aim to communicate Project information effectively and in a timely manner, address concerns, discuss issues, and contribute to finding common ground with communities of the LSA and the RSA. The Community Engagement Programs will help identify issues as they arise and encourage a dialogue among Indigenous groups and stakeholders to identify solutions to potential social issues associated with Project workers and increased wages. The Health and Wellness Program will also closely monitor the well-being of workers and LSA community members, looking for solutions for issues that could erode the social fabric of the community arise. Policies and procedures will also support the responsible use of alcohol and help workers and their families manage potential family issues. Nevertheless, the management of community issues will also depend on individual behaviors, the mobilization of local leadership, and ongoing support for the Project from employees, community members, and local authorities.

As discussed in **4.2.4 Community Cohesion**, community cohesion is linked with economic hardship which is often measured by crime statistics. The incidence of criminality can also be influenced by a number of factors acting together and varying over time, such as access to drugs, delinquency, homelessness, local services, and employment opportunities. Isolating Project effects on crime rates or more broadly on community cohesion will remain complex. Consultation and engagement activities will continue to monitor potential effects of the Project on community cohesion.

Table 5.4-4 provides characterisation of the residual effect and the rationale for each rating according to definitions in **5.4 Residual Effects and Significance of Residual Effects**.

Table 5.4-4: Summary of Effect Characteristics Ratings for Change in Community Cohesion

Residual Effects Characteristic	Rating	Rationale for Rating
Magnitude	Low	Community cohesion is an important and valuable part of social life and community well-being. As it typically stabilizes over time, the Magnitude of the residual effect is expected to be Low.
Geographic Extent	Regional	LSA and RSA communities are likely to experience a loss in community cohesion associated with the presence of transient Project workers.
Duration	Long-term	A loss in community cohesion may be experienced during the Construction Phase (transient workers) and during the start of the Operation Phase as the minor additions to local workforce are employed. At the end of Operations, the downturn in employment during the Decommissioning and Reclamation Phase could also affect community cohesion. Changes to community cohesion likely will stabilize over time as new residents form relationships within communities.
Frequency	Continuous	Changes in community cohesion are likely continuous as the make-up of communities, employment opportunities and living conditions adjust.

Residual Effects Characteristic	Rating	Rationale for Rating
Reversibility	Partially Reversible	A change in community cohesion could be reversible or not, depending on the nature of the change (tensions, conflicts, social issues)
Context	Moderate	Apart from the lack of housing availability, no major social issues were reported in communities of the LSA and the RSA, indicating that communities are likely to be somehow resilient/sensitive to potential change

Notes: LSA=Local Study Area; RSA=Regional Study Area

5.4.4.2 Likelihood

Based on the report on consultation activities conducted to date, there is no evidence that the Project would generate a change in community cohesion in the LSA or the RSA, particularly with the implementation of mitigation measures. However, a review of secondary literature and trends within the mining industry indicate a high likelihood that transient workers and local employment might lead to poor lifestyle choices and increase social issues within the LSA and the RSA; Indigenous communities are particularly vulnerable to such effect. The Likelihood is thus considered Likely.

5.4.4.3 Significance

The residual effect of the Project on community cohesion is estimated to be of Low Magnitude, considering that community cohesion is an important part of social life and tends to remain stable over time. Community resilience/sensitivity or the capacity to recover from social conflict, tensions or a lack of community cohesion is particularly hard to estimate. Based on an interpretation of available information, communities in the LSA and RSA currently appear cohesive and supportive, with some resilience, and therefore Context has been evaluated to be Moderate. However, community sensitivity and capacity to cope with social challenges including those associated with crimes and delinquency may vary over time and depends on a variety of contextual socio-economic factors out of the Project realm of influence, including local, social, and political leadership, and the quality and availability of local services. As a change in community cohesion could be affected by social tensions, including conflicts or issues within the LSA or the RSA, the resulting effect is considered to be Continuous. Such change would be Partially Reversible, depending on the specific nature of the change. Based on the definition of Significance in **5.4.1.3 Significance Definition**, the residual effect is predicted to be **Not Significant**.

The Level of Confidence for the assessment of this Significance rating is Low based on the complexity of understanding the highly qualitative, subjective and volatile nature of this effect. Community cohesion will vary based on individual factors as well as the existing strength of social institutions, family relations, and local leadership at the community, social and political levels. How a particular community will react and adapt to diverging views, conflicting opinions and community tensions is also difficult to predict. The effect on community cohesion is complex, depending on the interplay between numerous factors through Project Construction and Operation Phases. In addition, available data related to economic hardship and crime rates do not allow identification of the cause of an increase in crime rates, especially at a local community level. Although there can be linkages between Project employment, higher wages, criminality, drug abuse, delinquency, homelessness and the availability and efficiency of local services, it will remain difficult to establish a direct causal relation or measure Project-specific effects. This determination is based primarily on professional judgement.

5.4.5 Change in Mental Health

5.4.5.1 Residual Effect Characteristics

A residual effect for a change in mental health is expected because proposed mitigation measures will not be able to fully mitigate the predicted effect on the Community Well-being VC.

During the Construction, and Operation phases, TCL will implement mitigation measures to reduce worker and family stress and anxiety through the Employee and Family Assistance Program as part of the Health and Wellness Program (refer to the **SEMP**). The Health and Wellness Program will implement follow-up measures in order to monitor Community Well-being throughout the various Project phases for employees and selected contractors as well as obtaining information on the health of overall community residents from Northern Health. Discussion groups and partnerships will also be fostered with key institutions in the health and social sectors, ensuring that ongoing issues such as a potential change in mental health are jointly managed and do not escalate. Moreover, mitigation measures developed for noise, visual effects, land and resource use, and labour are likely to be successful in minimizing potential effects of the Project on related VCs, reducing stress and anxiety among communities of the LSA. Nonetheless, the success of such measures will depend on workers' willingness to participate in the programs and accept the support being offered.

Effects on mental health are also likely to extend through the Decommissioning and Reclamation Phase as the end of the Operation Phase could lead to job loss and job insecurity, generating stress and anxiety among workers and their families in search of a new household income source. The Decommissioning and Reclamation, and Post-closure Program (refer to the **SEMP**) will prepare the local and regional workforce to find and transition to alternative employment, thereby reducing the potential effect of an economic downturn on mental health of workers and their families; however, the proposed measures are not expected to fully mitigate the predicted effect.

Indigenous communities may be particularly vulnerable to effects on mental health due to the presence of health and social issues and lower levels of community well-being in these communities as described in **4.2 Description of Existing Conditions**, the **Socio-Economic Baseline Report (Appendix 5.1-A)** and in **S11.0 Wet'suwet'en Rights and Interests Assessment**.

Table 5.4-5 summarizes the characterisation of the effect of a change in mental health.

Table 5.4-5: Summary of Effect Characteristics Ratings for Change in Mental Health

Residual Effects Characteristic	Rating	Rationale for Rating
Magnitude	Low	Mental Health is an important and valuable part of social life and community well-being. Only a small portion of the population would be expected to suffer from an adverse change in mental health.
Geographic Extent	Regional	Workers and their families are likely to feel effects on their mental health in the LSA and the RSA. LSA communities are more likely to experience a change in stress and anxiety levels and overall mental health associated with the Project.
Duration	Long-term	A change in mental health could be experienced throughout the Construction, Operation, and Decommissioning and Reclamation phases, likely to be resolved over time.

Residual Effects Characteristic	Rating	Rationale for Rating
Frequency	Continuous	Project-related effects on housing availability and affordability and employment and the persistence of symptoms expressed suggest a change in mental health may be a continuous during the Construction, Operation, and Decommissioning and Reclamation phases.
Reversibility	Partially Reversible	A change in mental health could be reversible, particularly as adequate services are available and accessed.
Context	Moderate	Apart from the lack of housing availability, no major mental health issues were reported in LSA and RSA communities, indicating that communities are likely to be somewhat sensitive/resilient to potential change. Indigenous communities and some already vulnerable individuals (e.g. people with disabilities or existing mental health issues) are expected to be more sensitive/less resilient.

Notes: LSA=Local Study Area; RSA=Regional Study Area

5.4.5.2 Likelihood

Based on the review of secondary literature and trends within the mining industry, the Likelihood of the residual effect occurring is predicted to be Likely. Despite mitigation measures, it is difficult to control people's behaviors and willingness to reach for support in case of stress and anxiety.

The Likelihood of residual effects is particularly high on Indigenous communities, considering their vulnerability to social issues.

5.4.5.3 Significance

The residual effect of a change in mental health is estimated to be of Low Magnitude, as only a small portion of the population would be expected to undergo a change in mental health. Although it is expected that LSA communities would be more likely to experience such change due to greater interaction with the Project, workers and their families from the LSA and the RSA could feel the effects on mental health. A change in mental health would be Long-term, experienced throughout the Construction, Operation, and Decommissioning and Reclamation phases. The effect of a change in individual mental health would be Continuous, as mental health symptoms tend to be persistent rather than intermittent. Such change would be Partially Reversible, as individuals with mental health issues could rely on mental health services reported in the LSA and the RSA, as detailed in **S6.0-C3 Infrastructure and Services**. Context has been evaluated to be Moderate, as communities do not seem to have major mental health issues in the LSA or the RSA and may be able to respond and adapt to the effect. Positive effects of the Project such as local employment and procurement would also be likely to positively influence mental health of local employees and their families. Given the definition of Significance in **5.4.1.3 Significance Definition**, the residual effect is predicted to be **Not Significant**.

The Level of Confidence for the assessment of this Significance rating is **Low** because of the lack of quantitative data on the state of mental health and levels of stress and anxiety in the LSA and the RSA. Moreover, the workplace and environmental factors influencing mental health and well-being are multiple and interact together in a way that is not fully understood. They also depend on individual choices and family characteristics, education, employment, friendship and social support, and access to mental health services. This determination is based primarily on professional judgement.

5.5 Summary of Project-related Residual Adverse Effects and Significance

Table 5.5-1 summarizes the potential residual effects of the Project on the Community Well-being VC and provides Significance and Level of Confidence ratings. After assessing the effectiveness of the proposed mitigation measures, four (4) residual effects were predicted:

1. change in food security;
2. change in cost of living;
3. change in community cohesion; and
4. change in mental health.

Residual effects of the Project on the indicators of Community Well-being are predicted as **Not Significant** with a Low Level of Confidence in the ratings and the assessment. Therefore, the residual effects of the Project on Community Well-being VC are predicted to be **Not Significant**. Residual effects are carried forward into the CEA.

Table 5.5-1: Summary of Residual Adverse Effects for the Community Well-being Valued Component (VC)

Residual Adverse Effects	Contributing Activities within the Project Phases (C, O, D, P)	Proposed Mitigation Measures	Residual Effects Characterisation								
			Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Context	Likelihood	Significance	Level of Confidence
Change in Food Security	All Activities (C, O, D)	▪ Limit Project footprint and Project Area ▪ Reclamation measures (refer to RCP) ▪ Transport measures ▪ Blasting measures (refer to EMP) ▪ Management of ML/ARD (refer to ML/ARDMP) ▪ People, employees, contractors and onsite policies ▪ Public access management (refer to PAMP) ▪ Dust suppression and air emissions (refer to AQMP) ▪ Subsistence Food Management Plan (refer to RCP) ▪ Community Engagement Programs (refer to SEMP) ▪ Spill prevention and response (refer to FMSCP and MERP) ▪ Management of hazardous materials and wildlife attractants (refer to FMSCP, WMPRE, and WMP)	M	RSA	LT	CF	PR	M	L	NS	L
Change in Cost of Living	All activities (C, O)	▪ Housing measures ▪ Education and training support (refer to SEMP) ▪ Health and Wellness Program (refer to SEMP) ▪ Housing and Accommodation Program (refer to SEMP) ▪ Procurement Program (refer to SEMP) ▪ Health, Safety, and Human Resources Superintendent (refer to SEMP)	L	LSA	LT	CF	FR	H	L	NS	L
Change in Community Cohesion	All Activities (C, O, D)	▪ Health and Wellness Program (refer to SEMP) ▪ Education and training support (refer to SEMP) ▪ Procurement Program (refer to SEMP) ▪ Community Engagement Programs (refer to SEMP) ▪ Decommissioning and Reclamation, and Post-closure Program (refer to SEMP)	L	RSA	LT	CF	PR	M	L	NS	L

Residual Adverse Effects	Contributing Activities within the Project Phases (C, O, D, P)	Proposed Mitigation Measures	Residual Effects Characterisation								
			Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Context	Likelihood	Significance	Level of Confidence
Change in Mental Health	All Activities (C, O, D)	▪ Limit Project footprint and Project Area ▪ Reclamation measures (refer to RCP) ▪ Project component design ▪ Blasting measures (refer to EMP) ▪ Health and Wellness Program (refer to SEMP) ▪ Education and training support (refer to SEMP) ▪ Health and Wellness Program (refer to SEMP) ▪ Procurement Program (refer to SEMP) ▪ Community Engagement Programs (refer to SEMP) ▪ Decommissioning and Reclamation, and Post-closure Program (refer to SEMP)	L	RSA	LT	CF	PR	M	L	NS	L

Notes: C, O, D, P represent Project Phases: (C)onstruction, (O)peration, (D)ecommissioning and Reclamation, (P)ost-closure

AQMP=Air Quality Management Plan (S13.0-C2); EMP=Explosives Management Plan (S13.0-C6); FMSCP=Fuel Management and Spill Control Plan (S13.0-C7); RCP=Reclamation and Closure Plan (S13.0-C15); SEMP=Socio-economic Management Plan (S13.0-C16); WMP=Wildlife Management Plan (S13.0-C21); WMPRE=Waste Management Plan for Refuse and Emissions (S13.0-C20)

Magnitude: Low (L), Moderate (M), High (H)

Geographic Extent: Local (LSA), Regional (RSA), Beyond Regional (beyond RSA)

Duration: Short-term (ST), Long-term (LT), Permanent (P)

Frequency: Infrequent (IF), Frequent (FF), Continuous (CF)

Reversibility: Fully reversible (FR), Partially reversible (PR), Irreversible (IR)

Context: Low (L), Moderate (M), High (H)

Likelihood: Unlikely (UL), Likely (L)

Significance: Not Significant (NS), Significant (S)

Level of Confidence: High (H), Moderate (M), or Low (L) based on professional judgement to be defined by Discipline Lead.

Please refer to **Table 5.1-2** for list of applicable activities for each listed Project phase, unless otherwise noted in this table.

6. CUMULATIVE EFFECTS ASSESSMENT (CEA)

This subsection presents an assessment of potential cumulative effects on the Community Well-being VC. Consideration of cumulative effects is made for all residual adverse effects, whether or not they are **Significant** or **Not Significant**. The following criteria must be met:

- ▶ There must be a likely effect of the Project;
- ▶ That effect is demonstrated to act cumulatively with the effects from other projects or activities;
- ▶ It must be known that the other projects or activities have been or will be carried out and are not hypothetical; and
- ▶ The cumulative effect must be likely to occur. If cumulative interaction is considered not likely, no further analysis is completed.

A rationale is provided if a project or activity is not analyzed further than the initial consideration of each project. The Project and Activity Inclusion List is provided in the **S3.0 Assessment Methodology** of the **EAC Application** and identifies past, present and reasonably foreseeable future projects in the LSA and RSA that could have residual effects overlapping with the Project's residual effect on the Land and Resources VC. The spatial boundary of the CEA for the Community Well-being VC is defined as the RSA.

The approach used in determining cumulative effects is as follows:

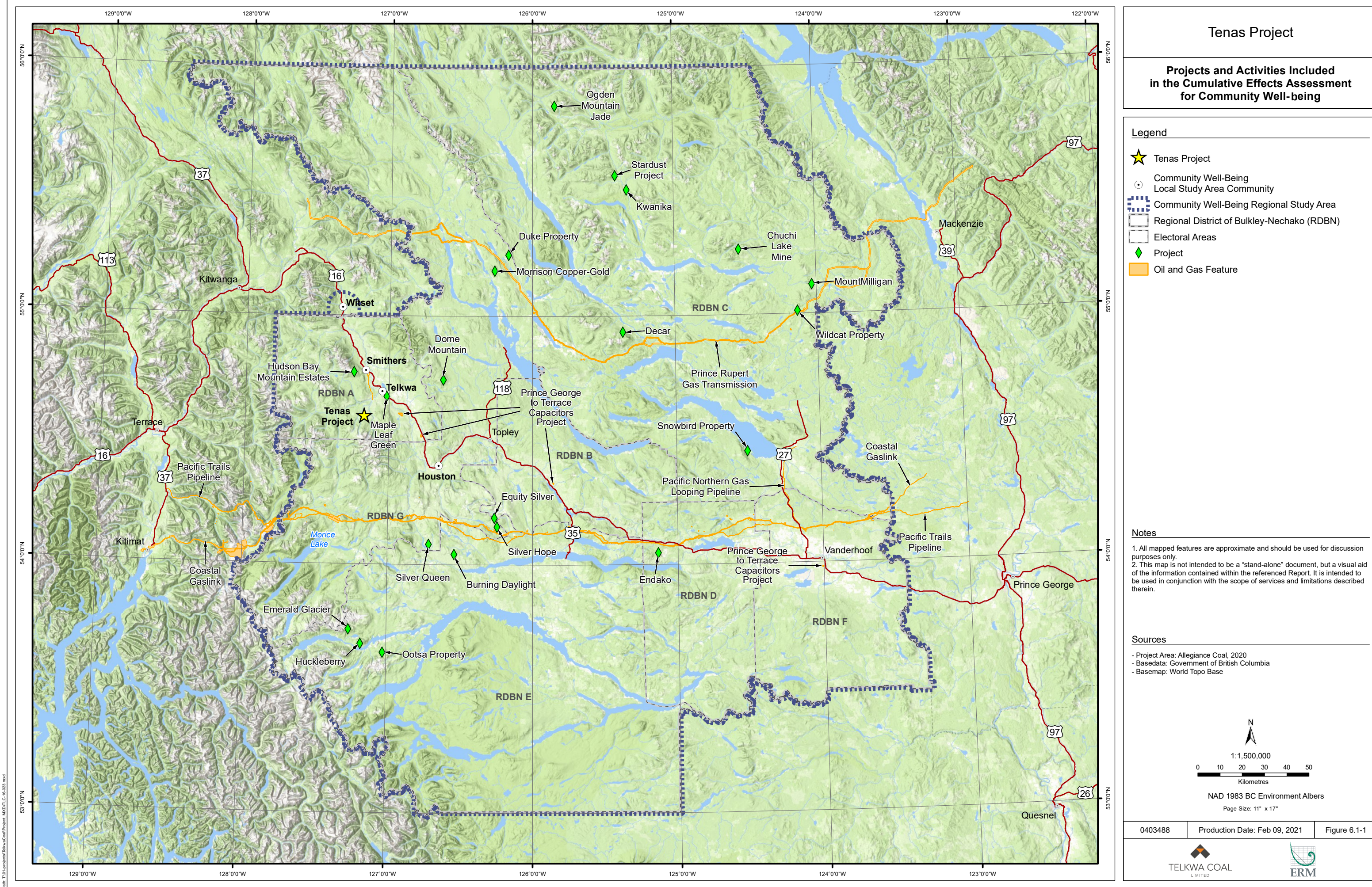
- ▶ Consider all likely residual adverse Project effects (**Table 5.5-1**);
- ▶ Assess type of project/activity and location of project/activity of identified reasonably foreseeable future projects overlaid with RSA;
- ▶ Use assumptions of spatial and temporal boundaries based on project/activity category;
- ▶ Determine which projects/activities will have an interaction with the residual effects of the Project;
- ▶ Proceed with the CEA appropriate in resolution to the detail known of the residual effects of reasonably foreseeable future projects/activities;
- ▶ Identify if additional mitigation measures to address cumulative effects (in addition to mitigation measures identified for Project-related effects in **5.3 Mitigation Measures**);
- ▶ Characterise cumulative effects; and
- ▶ Determine Significance as defined in and as carried out for residual Project effects assessment in **5.4 Residual Effects and Significance of Residual Effects**.

Table 6.1-1 provides a list of Projects included in the CEA based on their potential to interact with the Community Well-being VC, and **Figure 6-1**⁸ depicts their locations within the RSA. Projects and activities are considered to interact with the Community Well-being VC if they are expected to have past and present spatial and temporal overlap, or a future spatial and temporal overlap, or both. Projects and activities are likely to interact with the Community Well-being VC because they will provide employment and procurement opportunities to workers and businesses from the RSA.

⁸ Forestry activities are not identified on **Figure 6-1** as this would make the map difficult to read.

Table 6-1: Projects Included in the Cumulative Assessment of the Community Well-being Valued Component (VC) Based on Spatial and Temporal Interaction

Project/Activity Name	Interacts with Project-related Effects on the Valued Component (VC) as a Past, Present or Future Project/Activity	
	Past and Present	Future
Maple Leaf Cannabis production facility	Yes	No
Hudson Bay Mountain Estates	Yes	Yes
Smithers, Houston, Telkwa, Witset, Hudson's Bay Estates, and any miscellaneous developments	Yes	Yes
Burning Daylight Quarry	Yes	Yes
Chuchi Lake Mine	Yes	Yes
Decar	Yes	Yes
Dome Mountain	Yes	Yes
Duke Property	Yes	Yes
Emerald Glacier	Yes	No
Endako	Yes	No
Equity Silver	Yes	No
Huckleberry	Yes	Yes
Kwanika	Yes	Yes
Morrison Copper/Gold	Yes	Yes
Mount Milligan	Yes	Yes
Ogden Mountain Jade	Yes	No
Ootsa Property	Yes	Yes
Silver Hope	Yes	Yes
Silver Queen Property	Yes	Yes
Snowbird Property	Yes	Yes
Stardust Project	Yes	Yes
Wildcat Property	Yes	Yes
Telkwa to Smithers Bike Trail	No	Yes
Coastal Gaslink	Yes	Yes
Pacific Northern Gas Looping Pipeline	No	Yes
Pacific Trails Pipeline	No	Yes
Prince George to Terrace Capacitors Project	No	Yes
Prince Rupert Gas Transmission	No	Yes



6.1 Cumulative Effects Assessment (CEA) – Community Well-being Valued Component (VC)

As outlined in **5.5 Summary of Project-related Residual Adverse Effects**, the following Project-related residual effects were considered for their potential to interact cumulatively with the residual effects of projects and activities identified within the RSA:

- ▶ change in food security;
- ▶ change in cost of living;
- ▶ change in community cohesion; and
- ▶ change in mental health.

The spatial boundary of the CEA for the Community Well-being VC is defined as the RSA (**Figure 6-1**). The temporal boundaries within which cumulative effects were considered include past, present, and reasonably foreseeable future projects and activities, including the Construction, Operation, and Decommissioning and Reclamation, phases of the Project, for a change in food security, community cohesion and mental. No Project-related effect to a change of cost in living was identified during the Decommissioning and Reclamation Phase, thus it was not assessed any further (refer to **5.2.3 Change in Cost of Living**). The Post-closure Phases is not considered as no Project-related effects were identified, and therefore there are no residual effects to Community Well-being VC for the Post-closure Phase.

6.1.1 Potential Cumulative Effects

Present and future projects and activities could potentially interact with the Community Well-being VC through various dimensions:

- ▶ by occupying land and using land and resources, therefore likely to affect land availability for wildlife species which are hunted and fished, thus potentially affecting food security;
- ▶ by emitting contaminants to soils, water, and air, while such contaminants could cascade into the food chain, thus affecting the quality of subsistence foods and food security;
- ▶ by providing employment and contracting opportunities to workers and businesses in the LSA and RSA, contributing to a potential increase in population which would put pressure on housing availability as well as access to local goods and services, thus potentially affecting cost of living;
- ▶ by increasing the risk of social tensions between community groups with diverging views about the Project development and the different uses taking place in the Bulkley Valley (e.g., recreational, agricultural, forestry, mining, industrial);
- ▶ by increasing contacts between the local population and in-migrant / short-term workers, potentially affecting local social dynamics and community cohesion as well as stress and anxiety levels among the population of LSA and RSA communities; and
- ▶ by increasing visual and environmental disturbances in the area, potentially affecting the mental health of LSA and RSA residents.

The following provides a brief overview of the project and activities included in the cumulative effects assessment because of their potential overlapping effects with the Community Well-being VC, through one or many of the dimensions highlighted above. The activity of past projects is accounted for in assessment of existing conditions in **5.0 Assessment of Project-related Effects**. Projects that do not have a foreseeable likelihood of future activities have been excluded from the overview of projects below.

- ▶ Burning Daylight Quarry (Mining): This project is located within the RDBN, the quarry is currently operating. Ongoing future development may contribute to land use, bring additional workers and increase social tensions, stress/anxiety levels, and visual or environmental disturbances within the RSA;
- ▶ Chuchi Lake Mine (Mining exploration): This project is located in Electoral Area C of the RDBN, south of Klawdetelle Creek, approximately 6 km north of Chuchi Lake and 90 km north of the community of Fort St. James. Exploration drilling occurred in 2019. Further exploration or development may contribute to land use, employment, social tensions, stress/anxiety levels, and visual or environmental disturbances within the RSA;
- ▶ Coastal Gaslink (Utilities): Traversing Electoral Area G of the RDBN, construction of the pipeline is currently underway. Development and maintenance are likely to contribute to land use, employment, social tensions, stress/anxiety levels, and visual or environmental disturbances within the RSA;
- ▶ Decar (Mining): Located within the Electoral Area C of the RDBN, rock testing was conducted in 2019. Further exploration or development may contribute to land use, employment, social tensions, stress/anxiety levels, and visual or environmental disturbances within the RSA;
- ▶ Dome Mountain (Mining): The project is located within the Electoral Area G of the RDBN, approximately 38 km east of the town of Smithers. A past producing mine, additional infrastructure was completed 2010-2012. Further development may contribute to land use, employment, social tensions, stress/anxiety levels, and visual or environmental disturbances within the RSA;
- ▶ Duke Property (Exploration): Duke Property is a porphyry copper-molybdenum-silver-gold deposit located 80 km northeast of Smithers (RDBN), with exploration in 2017 and 2018 (Amarc Resources 2020). Further development may contribute to land use, employment, social tensions, stress/anxiety levels, and visual or environmental disturbances within the RSA;
- ▶ Emerald Glacier (Mining): This project is located inside Electoral Area E of the RDBN, near the border with Area G, adjacent to the previously operating Huckleberry and Ootsa mines. The last exploration drilling was conducted in 2012. Further development may contribute to land use, employment, social tensions, stress/anxiety levels, and visual or environmental disturbances within the RSA;
- ▶ Endako (Mining): Located near Fraser Lake, within the RDBN, the mine has been in care and maintenance since 2015. Further future operations may contribute to land use, employment, social tensions, stress/anxiety levels, and visual or environmental disturbances within the RSA;
- ▶ Equity Silver (Mining): Currently under care and maintenance, this silver, copper, and gold mine is located in the RDBN. Further development may contribute to land use, employment, social tensions, stress/anxiety levels, and visual or environmental disturbances within the RSA;
- ▶ Hudson Bay Mountain Estates (Community): Located within Electoral Area A of the RDBN, the resort development includes the addition of a chairlift, 10 runs and a 148 lot residential component to Hudson Bay Mountain. The Area Master Plan has received approval, with 35 lots released in phase 1. Further development and operations is likely to contribute to land use, employment, social tensions, stress/anxiety levels, and visual or environmental disturbances within the RSA;
- ▶ Huckleberry (Mining): Huckleberry is a previously operating mine located inside Electoral Area E of the RDBN. The project is currently in care and maintenance. Exploration drilling occurred in 2020. Further exploration and development may contribute to land use, employment, social tensions, stress/anxiety levels, and visual or environmental disturbances within the RSA;
- ▶ Kenney Dam Cold Water Release Facility (Utilities): Located within the RDBN, the project aims to protect salmon on the Nechako River through either a cold water release facility (Kenney Dam) or

other environmental enhancements. Ongoing studies and consultations are in progress. Future construction and operations may contribute to land use, employment, social tensions, stress/anxiety levels, and visual or environmental disturbances within the RSA;

- ▶ Kwanika (Mining Exploration): Located within Electoral Area C of the RDBN, the last exploration drilling occurred in September 2020, together with an agreement with Takla Nation. Further development and operations is likely to contribute to land use, employment, social tensions, stress/anxiety levels, and visual or environmental disturbances within the RSA;
- ▶ Maple Leaf Cannabis Production Facility (Commercial): Located near the Village of Telkwa, Maple Leaf has leased 37+ acres of land with the option to purchase from Woodmere Nurseries Ltd. The company is currently constructing a 27,200 square foot cannabis production facility. Further development and operations is likely to contribute to land use, employment, social tensions, stress/anxiety levels, and visual or environmental disturbances within the RSA;
- ▶ Morrison Copper/Gold (Mining): Located within Electoral Area G of the RDBN, the project was refused certification by the BC EAO in 2012. A supplemental AIR was submitted in 2019. Further development and operations may contribute to land use, employment, social tensions, stress/anxiety levels, and visual or environmental disturbances within the RSA;
- ▶ Mount Milligan (Mining): Located 155 km northwest of Prince George, between the communities of Fort St. James and Mackenzie, within RDBN, the mine has been in operation since 2013. Further development may contribute to land use, employment, social tensions, stress/anxiety levels, and visual or environmental disturbances within the RSA;
- ▶ Ogden Mountain Jade (Mining): Located within Electoral Area C of the RDBN, jade has been mined from Ogden Mountain for over 30 years. Further development may contribute incrementally to land use, employment, social tensions, stress/anxiety levels, and visual or environmental disturbances within the RSA;
- ▶ Ootsa Property (Mining exploration): Located adjacent to the Huckleberry Mine and Mill Complex within the RDBN, the last exploration occurred in 2020. Further development may contribute to land use, employment, social tensions, stress/anxiety levels, and visual or environmental disturbances within the RSA;
- ▶ Pacific Northern Gas Looping Pipeline (Utilities): Traversing Electoral Area G of the RDBN, the proposed pipeline would loop an existing natural gas transmission pipeline between Summit Lake and Kitimat. Further development may contribute to land use, employment, social tensions, stress/anxiety levels, and visual or environmental disturbances within the RSA;
- ▶ Pacific Trails Pipeline (Utilities): Traversing Electoral Area G of the RDBN, the proposed pipeline would construct a 463 km, 42-inch natural gas pipeline that will deliver natural gas from Summit Lake, B.C. to the proposed Kitimat liquid natural gas (LNG) facility site at Bish Cove near Kitimat. Further development may contribute to land use, employment, social tensions, stress/anxiety levels, and visual or environmental disturbances within the RSA;
- ▶ Prince George to Terrace Capacitors Project (Utilities): Located in Electoral Area A and G of the RDBN, the project includes constructing three new capacitor stations to increase the capacity along a 450-km, 500-kilovolt transmission line that runs between Prince George and northwestern B.C. The project includes one (1) station near Vanderhoof; one (1) station near Burns Lake; and one (1) near Telkwa. Construction of the project may contribute to land use, employment, social tensions, stress/anxiety levels and visual, or environmental disturbances in the RSA;
- ▶ Prince Rupert Gas Transmission (Utilities): Traversing Electoral Area G of the RDBN, the proposed 900-km natural gas pipeline running from Hudson's Hope to Lelu Island near Prince Rupert support an LNG export facility. The project was granted a five (5)-year EAC extension in 2019. Construction

of the project may contribute to land use, employment, social tensions, stress/anxiety levels, and visual or environmental disturbances in the RSA;

- ▶ Silver Hope Property (Mining exploration): Located in Electoral Area G and B of the RDBN, the last exploration drilling occurred in 2020. Further development may contribute to land use, employment, social tensions, stress/anxiety levels, and visual or environmental disturbances within the RSA;
- ▶ Silver Queen Property (Mining exploration): Located in Electoral Area G of the RDBN, the property is located on the road to the Huckleberry Mine at Owen Lake - 43 km south of Houston. Further development may contribute to land use, employment, social tensions, stress/anxiety levels, and visual or environmental disturbances within the RSA;
- ▶ Snowbird Property (Mining exploration): Located in Electoral Area C of the RDBN, near Fort St. James further development may contribute to land use, employment, social tensions, stress/anxiety levels, and visual or environmental disturbances within the RSA;
- ▶ Stardust Project (Mining exploration): Located in Electoral Area C of the RDBN, the last exploration drilling occurred in 2020. Further development may contribute to land use, employment, social tensions, stress/anxiety levels, and visual or environmental disturbances within the RSA;
- ▶ Telkwa to Smithers Bike Trail (Recreation): Located in Electoral Area A of the RDBN, the trail will run off of Highway 16 along the right-of-way. At Smithers, it is planned to be along the west side of the highway. At about midway, it will cross the highway via a bridge and follow the east side of the highway to Telkwa. Detailed construction plans were completed in 2020. Construction of the bike trail may contribute to employment in the RSA; and
- ▶ Wildcat Property (Mining exploration): Located in Electoral Area C of the RDBN, the last exploration drilling occurred in 2018. Further development may contribute to land use, employment, social tensions, stress/anxiety levels, and visual or environmental disturbances within the RSA.

6.1.2 Additional Mitigation Measures

Additional mitigation measures to those proposed in **5.3 Mitigation Measures** are not identified as the proposed measures are believed to be comprehensive and exhaustive, to the extent that is realistically achievable by TCL. However, it may be reasonable to expect that the Project will refine and optimize its Education, Training and Employment Program and Procurement Program during the Construction, and Operation phases in order to continue to maximize hiring of a workforce resident in the LSA as well as contracting of local and regional businesses. The Community Engagement Programs will also be reviewed and adjusted frequently to reflect arising social issues and potential changes in stakeholder concerns and preferences. Additional information on these mitigation measures is available in the **SEMP**.

It is also expected that other present and potential future projects and activities would have similar mitigation measures in place to cumulatively reduce or remove potential cumulative effects on Community Well-being.

6.1.3 Cumulative Effects and Characterisation of Significance

The interactions between the Project-related residual effects and the potential effects of other projects and activities (**Table 6-1**) were reviewed to identify anticipated cumulative effects on the Community Well-being VC. As spatial information is not available for ongoing or reasonably foreseeable future projects and activities, nor the extent of anticipated residual effects, the cumulative effects were assessed qualitatively based on available information. Cumulative effects have been characterised in terms of Magnitude, Geographic Extent, Duration, Frequency, Reversibility, and Context. Likelihood was assessed, and a Significance determination and associated Level of Confidence rating have been provided for each cumulative effect. Characterisation criteria and significance definitions for the CEA are consistent with those

presented in **5.4 Residual Effects and Significance of Residual Effects**. Table 6.1-2 below provides a summary of the cumulative effects characterisation and determination of Significance.

6.1.3.1 Change in Food Security

Multiple projects developed in the LSA and the RSA may increase the pressure on land availability as well as on subsistence food quality, and thus food security. An increase in the number of projects is more likely to interfere with recreational and subsistence activities while changing land use and access to land, consequently potentially affecting fishing, guiding, and other resource-based activities. Moreover, the development of multiple projects is likely to increase the risk of effects on environmental media, with a potential increase in non-carcinogenic and carcinogenic metal COPCs.

The Magnitude is predicted to be Moderate and occur in the RSA. The Duration would be Long-term but Partially Reversible, occurring during the Construction, and Operation phases. The effect will also continue to be mitigated during the Decommissioning and Reclamation Phase, improving and returning lands and resources to alternate recreational and subsistence uses. Context is expected to be Moderate, given that local social and political leadership would likely contribute to mobilize stakeholders and find collaborative solutions. There is also increased government mobilization around the need for resource extraction projects to develop specific plans for the management of subsistence foods and food security. The Likelihood of the effect occurring is predicted to be Likely. Given the definition of Significance in **5.4.1.3 Significance Definition** and the lack of predicted temporal overlap with other potential mining projects and activities, the cumulative effect is predicted to be **Not Significant (Table 6.1-2)**.

The Level of Confidence in this prediction is Low, as the dynamic between land availability, subsistence foods quality, food security and community well-being is complex and depends on subjective and individual factors.

6.1.3.2 Change in Cost of Living

The RSA has several exploration/drilling activities and mining projects in various stages of potential development. In addition, several residential and community construction activities have been identified. These projects may increase employment opportunities, overall skill level of the labour force, competition for labour, and associated labour cost. Moreover, potential projects would also rely on local/regional procurement of goods and services. The acceleration of economic activity in the RSA is likely to lead to an increase in cost of living, driven by the limited availability of housing and accommodations. This effect is hard to quantify given the lack of data on regional inflation and the various factors interacting together to create an increase in costs.

The presence of a transient workforce would add pressure on housing availability and affordability, contributing to rising costs. The importance of the increase in cost of living is difficult to predict and will vary based on the number of potential projects that are actually developed, notably mining projects. It is assumed that such projects would have local hiring policies, community programs or FIFO arrangements, which will serve to mitigate the adverse effects on housing availability.

The Magnitude is predicted to be Moderate and occur in the LSA. The Duration is predicted to occur over the Long-term, through the Construction, and Operation phases. It is expected that communities and private developers will respond to the increased demand for housing, minimizing the effects on housing availability and cost in the long-term. The change in cost of living is likely to be Continuous and Partially Reversible. The Context is expected to be Moderate given that wages would also increase in the LSA. The Likelihood of the effect occurring is predicted to be Likely. The cumulative effect of a change in cost of living is predicted to be **Not Significant (Table 6.1-2)**.

The Level of Confidence in this prediction is Moderate, given the Project's small contribution to the local and regional workforce and its potentially limited impact on the existing shortage of housing and rental accommodation.

6.1.3.3 *Change in Community Cohesion*

Multiple projects developed in the LSA and the RSA may raise social tensions among community groups, with an increase in divergent views about the relative benefits and costs of specific projects for the Bulkley Valley. An increase in the number of projects is also more likely to interfere with some recreational and tourism activities based on the quiet nature of the surrounding environment, also potentially changing land use and access to land, fishing, hunting and other resource-based activities.

The Magnitude of such change in community cohesion is predicted to be Moderate in the RSA. The Duration of the contribution of the Project to cumulative effects is predicted to occur over the Long-term, most likely during the Construction, and Operation phases, and be Partially Reversible. An economic downturn could also be expected at the Decommissioning and Reclamation Phase if there are coinciding closures with that of the Project, putting pressure on community cohesion. The Context is considered Moderate as LSA and RSA communities have some resilience, given that local social and political leadership are likely to contribute to mobilizing discussion with stakeholders and mediation of potential conflicts, if any. The Likelihood of the residual effect occurring is predicted to be Likely. Nonetheless, referring to the definition of Significance in **5.4.1.3 Significance Definition**, and given the lack of predicted temporal overlap with other potential mining projects and activities, the cumulative effect is predicted to be **Not Significant** (Table 6.1-2).

The Level of Confidence in this prediction is Low, based on the complexity of understanding the highly qualitative, subjective and volatile nature of this effect on the local and regional population.

6.1.3.4 *Change in Mental Health*

The development of multiple projects in the LSA and the RSA is likely to change stress and anxiety levels, negatively affecting mental health of local residents.

It is predicted that the Magnitude of the Project's contribution to such change would be of Moderate. The duration is predicted to be Long-term but Partially Reversible, occurring during the Construction, and Operation phases. If closures of other projects coincide with the Decommissioning and Reclamation Phase, it could be expected that stress and anxiety levels could cause a change in mental health among workers and their families. The Context is considered Moderate as LSA and RSA communities are expected to have some resilience, given the availability of community and health services and potential partnerships that ongoing and future projects could create with local institutions in order to foster mental health among workers and community members. Particular attention will be given to identified segments of the regional population that are over represented with health, economic, and social challenges. The Likelihood of the residual effect occurring is predicted to be Likely. Nonetheless, the cumulative effect is predicted to be **Not Significant** given the lack of temporal overlap with other potential mining projects and activities, and the qualitative nature of mental health is influenced by numerous contextual and individual factors (Table 6.1-2).

The Level of Confidence in this prediction is Low, because of the lack of quantitative data on the state of mental health and levels of stress and anxiety in the LSA and the RSA.

6.1.3.5 Summary of Cumulative Effects Characterisation and Significance

The following table provides a summary of the cumulative effects and characterisation of Significance described above in 6.1.3.1-6.1.3.4. The assessment of cumulative effects focussed on the Construction, and Operation phases. Review of past, present and reasonably foreseeable future projects and activities did not reveal any projects to have overlapping temporal boundaries for Decommissioning and Reclamation Phase.

Table 6.1-1: Summary of Cumulative Effects Characterisation for the Community Well-being Valued Component (VC)

Cumulative Effects	Contributing Activities within the Project Phases (C, O, D, P)	Cumulative Effects Characterisation								
		Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Context	Likelihood	Significance	Level of Confidence
Change in Food Security	All activities (C, O, D)	M	RSA	LT	CF	PR	H	L	NS	L
Change in Cost of Living	All activities (C,O)	M	LSA	LT	CF	PR	M	L	NS	M
Change in Community Cohesion	All activities (C, O, D)	M	RSA	LT	CF	PR	M	L	NS	L
Change in Mental Health	All activities (C, O, D)	M	RSA	LT	CF	PR	M	L	NS	L

Notes: C, O, D, P represent Project Phases: (C)onstruction, (O)peration, (D)ecommissioning and Reclamation, (P)ost-closure

Magnitude: Low (L), Moderate (M), High (H)

Geographic Extent: Local (LSA), Regional (RSA), Beyond Regional (beyond RSA)

Duration: Short-term (ST), Long-term (LT), Permanent (P)

Frequency: Infrequent (IF), Frequent (FF), Continuous (CF)

Reversibility: Fully reversible (FR), Partially reversible (PR), Irreversible (IR)

Context (resilience): Low (L), Moderate (M), High (H)

Likelihood: Unlikely (UL), Likely (L)

Significance: Not-Significant (NS), Significant (S)

Level of Confidence: High (H), Moderate (M), Low (L)

See **Table 5.1-2** for list of applicable activities for each listed Project phase, unless otherwise noted in this table. Includes all existing and reasonably foreseeable projects as outlined in **Table 6.1-1**.

6.2 Summary of Cumulative Effects Assessment (CEA)

Table 6.2-1 summarizes cumulative effects on the Community Well-being VC and provides the assessment of Significance of these cumulative effects. Four (4) residual effects were carried forward to CEA:

1. change in food security,
2. change in cost of living,
3. change in community cohesion, and
4. change in mental health.

All assessed cumulative effects are rated as **Not Significant**, and therefore cumulative effects on the Community Well-being VC are rated as **Not Significant**.

Table 6.2-1: Summary of Cumulative Effects on Community Well-being Valued Component (VC)

Potential Cumulative Effect	Contributing Activities within the Project Phases (C, O, D, P)	Cumulative Effect (Yes/No)	Significant (Yes/No)
Change in Food Security	All activities (C, O, D)	Yes	No
Change in Cost of Living	All activities (C, O)	Yes	No
Change in Community Cohesion	All activities (C, O, D)	Yes	No
Change in Mental Health	All activities (C, O, D)	Yes	No

Notes: C, O, D, P represent Project Phases: (C)onstruction, (O)peration, (D)ecommissioning and Reclamation, (P)ost-closure
See **Table 5.1-2** for list of applicable activities for each listed Project phase, unless otherwise noted in this table. Includes all existing and reasonably foreseeable projects as outlined in **Table 6.1-1**.

7. SUMMARY OF EFFECTS ASSESSMENT FOR THE COMMUNITY WELL-BEING VALUED COMPONENT (VC)

The assessment identified four potential effects on the Community Well-being VC:

1. Change in food security: A change in land availability and access to land or resources or a change in land base during active Project phases (Construction, Operation, Decommissioning and Reclamation) has the potential to affect the supply of subsistence food and, thus, food security;
2. Change in cost of living: New employment opportunities and the in-migration of the Project workforce during Construction and Operation have the potential to increase pressure on housing, induce spending and, consequently, result in a change in the affordability of housing and goods and services;
3. Change in community cohesion: The presence of Project workers during Construction and Operation could potentially exacerbate existing social issues and affect relationships and shared values among community individuals and groups, resulting in a change in community cohesion in the LSA and RSA. During the Decommissioning and Reclamation Phase, the downturn in employment could affect workers and their family, contributing to a change in stress and anxiety and potentially affecting community cohesion in the RSA; and
4. Change in mental health: Workers and their families may experience a change in levels of stress and anxiety due to rotational work, increased noise and traffic levels, as well as all the above-mentioned effects, resulting in a change in mental health during Construction, Operation, and Decommissioning and Reclamation phases.

Positive effects of the Project such as employment, procurement and economic growth are also likely to positively influence well-being through increased access to financial resources, goods and services, housing and better lifestyle choices.

The Project will implement design features to avoid sensitive areas and minimize Project footprint and Project Area, contributing to reduce effects on land availability and resource use and by extension, community well-being. Effects of the Project on food security will be mitigated through a Subsistence Food Management Plan. Mitigation measures related to the protection of environmental quality will also contribute to minimize potential effects of the Project on the quality of subsistence foods and thus, on food security. The Education, Training and Employment Program will favor local workers from LSA communities, contributing to manage effects on cost of living, community cohesion and mental health. The Procurement Program will contribute to counterbalance the potential effects of the Project on cost of living, community cohesion and mental health. The Community Engagement Program will contribute to ongoing positive relations between the Project and the local community. A Decommissioning and Reclamation, and Post-closure Program will also be developed in the later years of the Operation Phase, targeting the effect of job loss on mental health and consequently, on community well-being.

After the implementation of mitigation measures, four (4) residual effects were predicted for the Community Well-Being VC:

1. A change in food security, in relation to a change in the quantity and quality of land and resources used during the harvesting of subsistence foods during the Construction, Operation and Decommissioning and Reclamation phases;
2. Change in cost of living, associated with a change in cost or availability of housing and accommodations during the Construction, and Operation phases;

3. Change in community cohesion associated with local Project employment opportunities and higher wages likely to affect the social fabric of the community during the Construction, Operation, and Decommissioning and Reclamation phases; and
4. Change in mental health due to a change in levels of stress and anxiety among Project workers, their families and the communities during the Construction, Operation, and Decommissioning and Reclamation phases.

Indigenous communities remain particularly vulnerable to adverse effects on Community Well-being, due to their high level of sensitivity as described in this chapter.

Upon characterisation and determination of Likelihood and Significance the Project residual effects on the Community Well-being VC are **Not Significant**. The Level of Confidence for these predictions is Moderate to Low.

The CEA considered past, present and reasonably foreseeable future projects and activities that could interact with the Project. The assessment determined that while there is potential for present and reasonably foreseeable future projects and activities to cumulatively interact with the Project going forward, there is uncertainty surrounding the number of potential future projects that could take place, with additional uncertainty around scope and timing of those projects. While cumulative effects on the Community Well-being VC are predicted, they are predicted to be **Not Significant**.

8. FOLLOW-UP STRATEGY

A Subsistence Food Management Plan will be developed as part of the **RCP**, and in consultation with the Wet'suwet'en and relevant authorities. The plan will address potential effects of the Project on the change in access to land and the availability of subsistence foods. Details of the plan and associated monitoring to assess the actual effects and effectiveness of mitigation measures will be developed prior to reclamation (i.e., prior to Year 22).

No additional specific monitoring or follow-up strategies are recommended; however the **SEMP** describes the initial components and contents of the Education, Training and Employment Program, Health and Wellness Program and Community Engagement Programs. A final **SEMP** will be developed in compliance with issued Conditions of the EAC and prior to the start of the Construction Phase. The **SEMP** will describe the predicted effects of the Project and corresponding mitigation measures, detail planned monitoring to assess the actual effects and effectiveness of the monitoring measures on the socio-economic environment, as well as to describe reporting requirements and schedule.

In addition, the **PAMP** will mitigate potential safety issues related to public access to the Project Area. A monitoring program will be developed to ensure that use of the Project Area by the public is compliant with both relevant legislation and the **PAMP**. Monitoring will include regular inspections of public access trails to ensure structures are in good shape. TCL will also conduct regular monitoring to ensure that the PAMP is being followed, and to gather input from users.

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