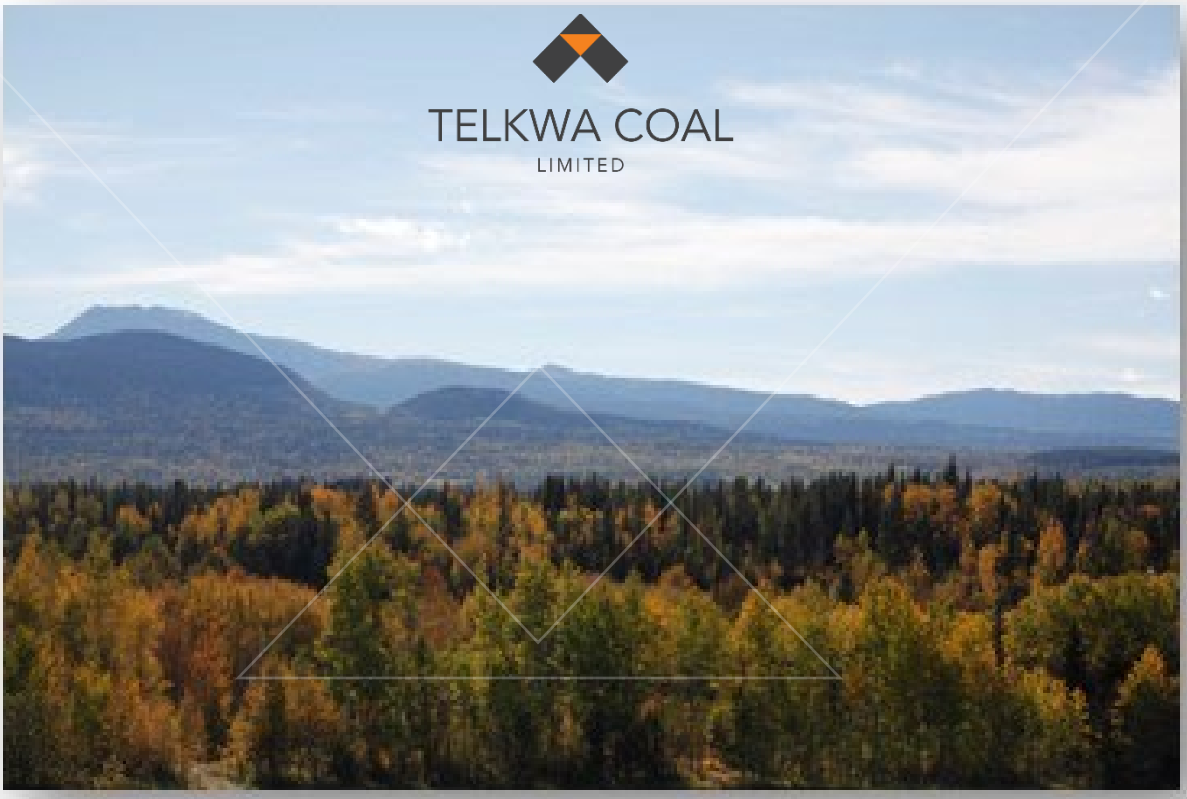

BC EAO EAC Application – Tenas Project

Section 3.0 Assessment Methodology
Chapter 1 Assessment Methodology

May 2022

VERSION 1.0

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

Tenas Project

Section 3.0 Assessment Methodology
Chapter 1 Assessment Methodology

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ABBREVIATIONS AND ACRONYMS

Abbreviation or Acronym	Long Form of Abbreviation or Acronym
AIR	Application Information Requirements
ALC	Agricultural Land Commission
BC	British Columbia
BC EAO	British Columbia Environmental Assessment Office
BC MFLNRORD	British Columbia Ministry of Forests, Lands, Natural Resource Operations and Rural Development
BC MECCS	British Columbia Ministry of Environment and Climate Change Strategy
BC MEMLI	British Columbia Ministry of Energy, Mines and Low Carbon Innovation
BC MIRR	British Columbia Ministry of Indigenous Relations and Reconciliation
BC MMAH	British Columbia Ministry of Municipal Affairs and Housing
BC MOTI	British Columbia Ministry of Transportation and Infrastructure
BMPs	best management practices
C	Chapter
C&M	care and maintenance
CEA	cumulative effects assessment
CH_4	methane
CO_2	carbon dioxide
DFO	Department of Fisheries and Oceans Canada
EA	environmental assessment
EAA	*Environmental Assessment Act,* SBC 2002, c 43 (Government of British Columbia [GovBC] 2002)
EAC	Environmental Assessment Certificate
ECCC	Environment and Climate Change Canada
EMA	*Environmental Management Act,* SBC 2003, c 53 (Government of British Columbia [GovBC] 2003)
GovBC	Government of British Columbia
Leq,day	daytime noise levels
Leq,night	nighttime noise levels
LNG	liquid natural gas
LSA	Local Study Area
N_2O	nitrous oxide
NO_2	nitrogen dioxide
OW	Office of the Wet'suwet'en
PAG	potentially acid generating
PAHs	polycyclic aromatic hydrocarbons

Abbreviation or Acronym	Long Form of Abbreviation or Acronym
PM_{10}	inhalable particulate matter
$PM_{2.5}$	respirable particulate matter
Project	Tenas Project
RDBN	Regional District of Bulkley-Nechako
ROW	right-of-way
RSA	Regional Study Area
S	Section
SO_2	sulphur dioxide
TCL	Telkwa Coal Limited
TK	Traditional Knowledge
TSP	total suspended particulate
VC	Valued Component

UNITS OF MEASURE

Abbreviation	Long Form of Abbreviation or Acronym
%	percent
%HA	percent highly annoyed
$	Canadian dollars
BCF	billion cubic feet
ft^2	square feet
ha	hectare
kV	kilovolt
km	kilometre
m	metre
m^3/s	cubic metres per second
Mt	million tonnes
MW	mega-watt
km^2	square kilometres

EXECUTIVE SUMMARY

This section presents the methodology used in the effects assessments that are presented in each chapter within **Section (S) 4.0** through **8.0** of the **Environmental Assessment Certificate (EAC) Application** for the Tenas Project (Project). The methodology follows recommended guidelines and legislated requirements, pursuant to the British Columbia (BC) *Environmental Assessment Act*, SBC 2002, c 43 (Government of British Columbia [GovBC] 2002) (*EAA*).

This assessment methodology outlines how issues were scoped and Valued Components (VCs) were selected per the British Columbia Environmental Assessment Office (BC EAO) Guideline for the Selection of Valued Components and Assessment of Potential Effects (BC EAO 2013). This includes describing the assessment boundaries for the Project and the approach taken to set the VC-specific boundaries, which are provided within each VC chapter. The framework for how the establishment of existing conditions for each VC and what is included in existing conditions within each VC chapter is provided.

The assessment of Project-related effects proceeds with the following steps, which are described in the environmental assessment (EA) methodology and carried out in each VC chapter.

- Potential Project-related interactions are presented in tabular format for each VC. The interactions table lists the Project activities during Construction, Operation, Decommissioning and Reclamation, and Post-closure phases, and indicates whether there is likely to be an interaction with each VC and with each subcomponent, where applicable;
- Potential Project-related effects are considered in the assessment based on the interactions that were identified. A description of the potential Project-related effects is provided in each VC chapter and for each subcomponent, where applicable;
- Mitigation measures to reduce or eliminate an adverse effect are described in **S1.0 Overview of Project Proponent Description** in the **EAC Application**. Mitigation measures that are specific to a VC are described in the assessment of each VC. Mitigations are described in terms of how, once applied, they lead to avoiding or lessening Project-related effects;
- Residual effects are those Project-related effects that are not eliminated through mitigation measures. These are identified and the significance of residual effects are characterised for each VC subcomponent; and
- The results of the residual effects characterisations for the subcomponents are considered together (i.e., rolled up) to inform the determination of the significance of the effect of the Project on the VC in the summary of Project-related residual effects.

Cumulative effects may occur when potential environmental, economic, social, heritage, and/or health effects resulting from Project-specific residual effects interact cumulatively with similar effects of past, present, and reasonably foreseeable future projects and activities. The EA methodology provides the approach to cumulative effects assessment (CEA) based on a list of projects and activities included in the assessment because they temporally and spatially overlap with at least one (1) VC in the EAC Application.

The overall summary of the effects assessment for each VC is provided, and then a Follow-up Strategy is presented. The Follow-up Strategy is intended to provide a description of the monitoring and follow-up programs that Telkwa Coal Limited (TCL) will implement, and the reporting structure as identified within the environmental management plans, monitoring plans, and EAC conditions. Each VC chapter describes the approach to identifying and developing a monitoring and adaptive management strategy or provides a rationale where no strategy is considered necessary.

1. INTRODUCTION

This section presents the methodology used to identify and assess the potential environmental, economic, social, heritage and health effects of the Tenas Project (Project). The methodology follows recommended guidelines and legislated requirements, pursuant to the British Columbia (BC) *Environmental Assessment Act*, SBC 2002, c 43 (Government of British Columbia [GovBC] 2002) (*EAA*).

1.1 Approach and Regulatory Context

The assessment methodology follows the steps outlined in the British Columbia Environmental Assessment Office (BC EAO) Guideline for the Selection of Valued Components and Assessment of Potential Effects (BC EAO 2013). The steps described in this document form the framework that is consistently applied to the assessment of each identified Valued Component (VC).

1.1.1 Definitions

The assessment methodology is premised on the following definitions, drawn from the Guideline for the Selection of Valued Components and Assessment of Potential Effects (BC EAO 2013).

- VC: VCs are components of the natural and human environments that are considered by Telkwa Coal Limited (TCL), the public, Indigenous Groups, scientists and other technical specialists, and government agencies involved in the environmental assessment (EA) process to have scientific, ecological, economic, social, cultural, archaeological, historical, or other importance;
- Subcomponents: For broadly defined VCs, subcomponents may be used to structure and facilitate the assessment; for example, species or species groups within the Wildlife VC;
- Indicators: Indicators are defined as metrics used to measure and inform the condition and trend of a VC and are clearly defined to focus and facilitate the analysis of interactions between the Project and a VC. Indicators are relevant, practical, measurable, responsive, accurate, and predictable;
- Issues Scoping: A process of compiling and analyzing available information to identify environmental, economic, social, heritage, and health issues that may be related to a reviewable project; and
- Effect Pathway (or Pathway of Effect): Effect pathway is the cause-effect linkage between the Project and a VC. The Project-VC interaction may comprise a direct effect, or the Project may affect the VC indirectly by causing changes in the natural or human environment on which the VC depends.

2. ISSUES SCOPING AND SELECTION OF VALUED COMPONENTS (VCS)

The scope of the assessment has been determined through the following steps:

- identifying potential environmental, economic, social, heritage, and health issues that may be related to Project activities;
- selecting VCs relevant to potential issues and representative of the values related to the natural and human environment that potentially interact with the Project; and
- selecting temporal, spatial, administrative, and technical boundaries that encompass the potential interactions and that provide context for the assessment of potential effects of the Project.

The selection of the VCs and their boundaries, representing the issues scoping, was reviewed by the Working Group, and is described in the following subsections. The Working Group for this Project was commissioned by the BC EAO and comprises representatives of government agencies, municipal and regional agencies, and Indigenous groups. The Working Group provides technical review and input that are integral to the Environmental Assessment Certificate (EAC) Application process.

The following government and regional agencies, and Indigenous groups, in addition to the public, have had the opportunity to review and comment on the issues scoping, selection of VCs, and methods of this assessment.

2.1 Provincial Agencies

- BC EAO;
- British Columbia Ministry of Agriculture;
- British Columbia Ministry of Energy, Mines and Low Carbon Innovation (BC MEMLI);
- British Columbia Ministry of Environment and Climate Change Strategy (BC MECCS);
- British Columbia Ministry of Forests, Lands, Natural Resource Operations and Rural Development (BC MFLNRORD);
- British Columbia Ministry of Indigenous Relations and Reconciliation (BC MIRR);
- British Columbia Ministry of Jobs, Economic Recovery and Innovation;
- British Columbia Ministry of Municipal Affairs and Housing (BC MMAH);
- British Columbia Ministry of Transportation and Infrastructure (BC MOTI); and
- Provincial Agricultural Land Commission (ALC).

2.2 Federal Agencies

- Department of Fisheries and Oceans Canada (DFO); and
- Environment and Climate Change Canada (ECCC).

2.3 Municipal and Regional Agencies

- Bulkley Valley Community Resources Board;
- Northern Health;

- Regional District of Bulkley-Nechako (RDBN);
- Town of Smithers; and
- Village of Telkwa.

Indigenous groups identified in the Section 11 Order issued June 25, 2019:

- Wet'suwet'en (Office of the Wet'suwet'en [OW] Hereditary Chiefs); and
- Wet'suwet'en First Nation.

2.4 Issues Scoping

During initial issues scoping, TCL compiled a list of candidate VCs that considered the five (5) pillars requiring assessment under the *EAA*: environmental, economic, social, heritage, and health. Identifying candidate VCs involved the analysis of available information to identify issues relevant to the five (5) pillars that may be related to the Project. Previous EAs in northern BC were reviewed to provide insight on potential issues/values of interest to the Indigenous groups, public and stakeholders in the region. Available information pertaining to the Project, local area and region, Indigenous groups and coal mining in BC was compiled and analyzed to identify environmental, economic, social, heritage and health issues that may be affected by the Project.

Further background on issues scoping and selection of VCs can be found in the Valued Component Scoping Document (TCL 2019), which was submitted in draft to the BC EAO on December 28, 2018. Changes were made based on BC EAO input and the revised draft was distributed to the Working Group on February 26, 2019, for review and comment and finalised on September 3, 2019. Comments received from BC EAO and the Working Group members informed the refinement of the VCs that were selected for the assessment and are presented in the Application Information Requirements (AIR) (BC EAO 2022) and this EAC Application.

2.4.1 Selection of Valued Components (VCs)

The process and methodology used to identify and select the VCs for the assessment of potential effects of the Project are summarized as follows. There are no differences in the list of VCs presented in the EAC Application compared with those listed in the final AIR.

Candidate VCs were identified and subsequently screened to exclude those that are not relevant to the Project, are not present in the region, or could be better represented by, or included in, the assessment of another VC. These candidate VCs were not carried forward in the assessment. Candidate VCs that were carried forward were further screened for their importance in one or more of the following four (4) categories, using discipline-specific context:

1. Regulatory Importance: The candidate VC is associated with regulatory requirements;
2. Indigenous group consideration: The candidate VC was identified by Indigenous groups;
3. Conservation or scientific importance: The candidate VC is currently identified in federal or provincial databases or legislation applying to species and guilds of conservation concern; and
4. Significance to other stakeholders, including local government: The candidate VC was identified based on the professional experience of the assessment team and expressed through consultation programs.

Considerations guiding the screening of candidate VCs included:

- Does the candidate VC pertain to Indigenous interests?
- Is there potential for adverse effects?
- What known stressors are already occurring in the region?
- Is the VC or the potential Project interaction of concern to the public or stakeholders?
- Is the VC particularly sensitive or vulnerable to disturbance?
- Is the candidate VC important culturally and/or economically, and likely to be found in or be important to the ecosystem or human health in the region?
- Can the potential effects of the Project on the VC be measured and monitored?
- Is the candidate VC better represented by another candidate VC?
- Can the potential effects on the candidate VC be effectively considered within the assessment of another candidate VC?
- Is information about the candidate VC needed to support the assessment of potential effects on another candidate VC?

After the comprehensive screening process, a list of final VCs was compiled. Where appropriate, candidate VCs were grouped into a broad VC category as subcomponents (e.g., Groundwater Quality and Groundwater Quantity as subcomponents of the Groundwater VC) to focus the assessment and avoid duplication.

To acknowledge the connection among effect pathways, in each VC chapter of the EAC Application, a brief description of the linkages of effect pathways among VCs is provided.

2.4.2 Selection of Indicators

Indicators are measurable variables used to quantify and report on the condition and trend of VCs. The selection of VC-specific indicators allows a clear connection to be made between the selected VC and potential Project effects.

To be effective and useful, indicators must have the following attributes (BC EAO 2013):

- Relevant: Indicators must relate directly or indirectly to the selected VC;
- Practical: There must be a practical way to evaluate the indicator, using existing or achievable data, predictive models, or other means;
- Measurable: The measurement of the selected indicator must generate useful data that inform our understanding of the potential effect on the VC;
- Responsive: Indicators must be responsive to the potential effects of the Project;
- Accurate: Indicators must be accurate in reflecting changes to the VC; and
- Predictable: Indicators must be predictable in terms of their response to the Project.

With appropriate selection of VCs and indicators, the assessment provides a focused analysis of the key Project-VC interactions, to enable a transparent, objective decision to be made regarding the potential for effects on VCs.

VCs, subcomponents, indicators, and linkages selected for the assessment are identified in **Table 2.4-1** and are further described in the relevant VC sections of the EAC Application.

Although ambient light and vibration have been screened out as subcomponents, a qualitative discussion will be included in the EAC Application as part of the Visual Resources VC.

Table 2.4-1: Valued Components (VCs), Subcomponents, Indicators, and Linkages

Valued Component	Subcomponent	Indicators	Linkages
Environmental Pillar			
Atmospheric Environment	Air Quality	Change in air quality parameters: ▪ Sulphur dioxide (SO_2) ▪ Nitrogen dioxide (NO_2) ▪ Inhalable particulate matter (PM_{10}) ▪ Respirable particulate matter ($PM_{2.5}$) ▪ Total suspended particulate (TSP)	▪ Aquatic Resources ▪ Avian Species ▪ Community Well-being ▪ Fish and Fish Habitat ▪ Human Health ▪ Land and Resource Use ▪ Surface Water ▪ Terrain and Soils ▪ Vegetation ▪ Visual Resources ▪ Wildlife
	Greenhouse Gas (GHG) Emissions	Change in GHG emissions: ▪ Carbon dioxide (CO_2) ▪ Methane (CH_4) ▪ Nitrous oxide (N_2O)	
	Noise	Change in noise levels: ▪ Daytime noise levels (Leq,day) ▪ Nighttime noise levels (Leq,night) ▪ Low frequency noise ▪ Percent highly annoyed (%HA)	
Terrain and Soils	Soil Quality	Change in physical or chemical properties of soil in context of land use capability	▪ Aquatic Resources ▪ Atmospheric Environment ▪ Avian Species ▪ Fish and Fish Habitat ▪ Groundwater ▪ Human Health ▪ Land and Resource Use ▪ Surface Water ▪ Vegetation ▪ Visual Resources ▪ Wildlife
	Terrain Stability	Change in: ▪ Terrain Stability ▪ Terrain Morphology	
Surface Water	Surface Water Quantity	Change in surface water flow rates (cubic metres per second [m^3/s])	▪ Aquatic Resources ▪ Atmospheric Environment ▪ Avian Species ▪ Fish and Fish Habitat ▪ Groundwater ▪ Human Health
	Surface Water Quality	Change in: ▪ Total and dissolved elements ▪ Anions/nutrients ▪ Alkalinity/acidity	

Valued Component	Subcomponent	Indicators	Linkages
		▪ Hardness ▪ Turbidity ▪ Total suspended solids ▪ pH ▪ Conductivity ▪ Temperature ▪ Polycyclic aromatic hydrocarbons (PAHs)	▪ Land and Resource Use ▪ Terrain and Soils ▪ Vegetation ▪ Wildlife
Groundwater	Groundwater Quantity	Change in: ▪ Groundwater discharge rates to surface water features (e.g., streams and creek) (m^3/s) ▪ Groundwater elevation (metres below ground surface)	▪ Aquatic Resources ▪ Avian Species ▪ Fish and Fish Habitat ▪ Human Health ▪ Surface Water ▪ Terrain and Soils ▪ Vegetation ▪ Wildlife
	Groundwater Quality	Change in: ▪ Dissolved elements ▪ Anions/ nutrients ▪ Alkalinity/acidity ▪ Hardness ▪ Total dissolved solids ▪ pH ▪ Conductivity ▪ Temperature	
Aquatic Resources (benthic invertebrates, periphyton, sediment quality)	n/a	Change in: ▪ Composition, abundance, diversity of periphyton and benthic invertebrates ▪ Concentrations of contaminants of potential concern in sediments relative to toxicological benchmarks	▪ Avian Species ▪ Atmospheric Environment ▪ Fish and Fish Habitat ▪ Groundwater ▪ Surface Water ▪ Terrain and Soils ▪ Vegetation ▪ Wildlife
Fish and Fish Habitat	Fish Habitat	Change in areal extent permanently altered, destroyed, or made inaccessible to fish	▪ Aquatic Resources ▪ Atmospheric Environment ▪ Avian Species ▪ Groundwater ▪ Human Health ▪ Land and Resource Use
	Fish	Change in: ▪ Fish health ▪ Abundance ▪ Condition	

Valued Component	Subcomponent	Indicators	Linkages
			▪ Surface Water ▪ Terrain and Soils ▪ Vegetation ▪ Wildlife
Vegetation	Old Growth Forest	Change in: ▪ Extent ▪ Structural stage	▪ Avian Species ▪ Aquatic Resources ▪ Atmospheric Environment ▪ Fish and Fish Habitat ▪ Groundwater ▪ Heritage Resources ▪ Human Health ▪ Land and Resource Use ▪ Surface Water ▪ Terrain and Soils ▪ Visual Resources ▪ Wildlife
	Wetlands (including biodiversity, water quantity and quality, and habitat function)	Change in extent of wetland communities	
	Listed Ecological Communities	Change in extent	
	Culturally Important Species		
	Rare Plants and Lichens	Change in extent of known occurrences	
Wildlife	Furbearers: ▪ American marten (*Martes americana*) ▪ Fisher (*Pekania pennanti*) ▪ Wolverine (*Gulo gulo*)	Change in: ▪ Habitat, including direct and indirect disturbance (including sensory disturbance) ▪ Mortality ▪ Movement (as an indicator for Grizzly Bear, Wolverine, Caribou and Western Toad; qualitative analysis for Marten, Fisher, Moose and Bats based on available information)	▪ Avian Species ▪ Aquatic Resources ▪ Atmospheric Environment ▪ Fish and Fish Habitat ▪ Groundwater ▪ Heritage Resources ▪ Human Health ▪ Land and Resource Use ▪ Surface Water ▪ Terrain and Soils ▪ Vegetation ▪ Visual Resources
	Caribou (*Rangifer tarandus*) (northern mountain population – Telkwa subpopulation)		
	Grizzly Bear (Ursus arctos) (Bulkley-Lakes and Babine Grizzly Bear Population Units)		
	Moose (*Alces americanus*)		
	Bats: ▪ Little Brown myotis (*Myotis lucifugus*)		

Valued Component	Subcomponent	Indicators	Linkages
	▪ Northern myotis (*Myotis septentrionalis*)		
	Western Toad (*Anaxyrus boreas*)		
Avian Species	Migratory Breeding Birds	Change in: ▪ Habitat, including direct and indirect disturbance (including sensory disturbance) ▪ Mortality ▪ Movement (qualitative analysis based on available information)	▪ Aquatic Resources ▪ Atmospheric Environment ▪ Fish and Fish Habitat ▪ Groundwater ▪ Land and Resource Use ▪ Surface Water ▪ Terrain and Soils ▪ Vegetation ▪ Visual Resources ▪ Wildlife
	Listed Bird Species		
	Raptors		
Economic Pillar			
Labour Market	n/a	Change in: ▪ Number of workers by occupation, industry affiliation, and region of residence ▪ Participation and unemployment rate ▪ Difference between unemployment rate and natural rate of unemployment ▪ Potential barriers to Indigenous participation in Project-related economic benefits ▪ Income levels and labour income	▪ Community Well-being ▪ Demographics ▪ Economic Development ▪ Infrastructure and Services
Economic Development	Local Business and Industry	Change in: ▪ Distribution in employment across industries (economic diversity) ▪ Capacity/supply constraints in services and goods supply and contracting (quantitative and qualitative) ▪ Compatibility/consistency of Project with existing economic development plans or strategies of government (qualitative) ▪ Forestry: marketable timber volume ▪ Tourism: services and revenue ▪ Economic contributions during Decommissioning and Reclamation and Post-Closure phases and potential downturns	▪ Community Well-being ▪ Demographics ▪ Infrastructure and Services ▪ Labour Market ▪ Visual Resources ▪ Land and Resource Use

Valued Component	Subcomponent	Indicators	Linkages
Social Pillar			
Demographics	n/a	Change in: ▪ Population ▪ Demographic factors	▪ Community Well-being ▪ Infrastructure and Services ▪ Economic Development ▪ Labour Market ▪ Land and Resource Use
Visual Resources	Visual Quality	Change in: Visual disturbance from selected receptor sites	▪ Avian Species ▪ Community Well-being ▪ Economic Development ▪ Land and Resource Use ▪ Wildlife
Infrastructure and Services	Housing and Accommodation	Change in: ▪ Demand for housing and accommodation ▪ Active residential listings ▪ Housing costs ▪ Property taxes ▪ Vacancy rates	▪ Demographics ▪ Economic Development ▪ Labour Market ▪ Community Well-being
	Community Infrastructure and Services	Change in: ▪ Supply and demand for all community services (education, childcare, health care, and recreation) and community infrastructure ▪ Supply and demand for emergency services (policing, fire, and search and rescue)	
	Transportation	Change in level of service (change in road, rail and air traffic patterns and infrastructure)	
Land and Resource Use	Commercial Land Use	Compatibility with existing land use plans; Change in: ▪ Access to land use areas ▪ Sensory disturbance to existing land and resource uses ▪ Quantity and quality of resources supporting existing land and resource uses	▪ Atmospheric Environment ▪ Avian Species ▪ Community Well-being ▪ Demographics ▪ Economic Development

Valued Component	Subcomponent	Indicators	Linkages
	Public Recreation Use	Change in: ▪ Access to land use areas ▪ Sensory disturbance ▪ Quantity and quality of resources supporting recreational activities ▪ Interference with recreational infrastructure	▪ Fish and Fish Habitat ▪ Heritage Resources ▪ Human Health ▪ Surface Water ▪ Terrain and Soils ▪ Vegetation ▪ Visual Resources ▪ Wildlife
Community Well-being	n/a	Change in social and economic determinants of health, as defined by Health Canada and including: ▪ Food security ▪ Cost of living ▪ Community cohesion ▪ Mental Health	▪ Demographics ▪ Economic Development ▪ Heritage Resources ▪ Human Health ▪ Infrastructure and Services ▪ Labour Market ▪ Land and Resource Use ▪ Visual Resources
Heritage Pillar			
Heritage Resources	Archaeological Resources	Change in presence, number, type, significance of resources	▪ Community Well-being ▪ Land and Resource Use ▪ Vegetation ▪ Wildlife
	Historic and Cultural Sites		
Health Pillar			
Human Health	n/a	Change in human health from biophysical determinants of health	▪ Atmospheric Environment ▪ Avian Species ▪ Community Well-being ▪ Fish and Fish Habitat ▪ Groundwater ▪ Land and Resource Use ▪ Surface Water ▪ Terrain and Soils ▪ Vegetation ▪ Wildlife

Note: *n/a=not applicable, where division into subcomponents is not needed/appropriate for a Valued Component (VC).*

3. ASSESSMENT OF BOUNDARIES

Assessment boundaries define the limits of the effects assessment. Boundaries encompass extent and temporal bounds that the Project is expected to interact with the VCs, as well as any constraints due to administrative, technical, political, social, and economic conditions, and limitations in predicting or measuring changes. Each VC chapter describes spatial and temporal boundaries and the rationale for their selection, as well as any applicable administrative and technical boundaries.

3.1 Spatial Boundaries

Spatial boundaries are identified for each VC and subcomponent based on the spatial extent of the potential Project-related effects (i.e., direct and indirect) on the VCs and subcomponents.

When determining the spatial boundaries, where available and applicable, the following information is considered:

- Traditional Knowledge (TK), which includes contemporary and historical knowledge from Indigenous and non-Indigenous sources;
- information on current land and resource use by Indigenous groups;
- other pertinent ecological, technical, social, and cultural considerations (e.g., biogeographical zone or commuting distances for workers); and
- input from government and the public.

The study areas for this assessment are identified for each VC and subcomponent according to the following definitions:

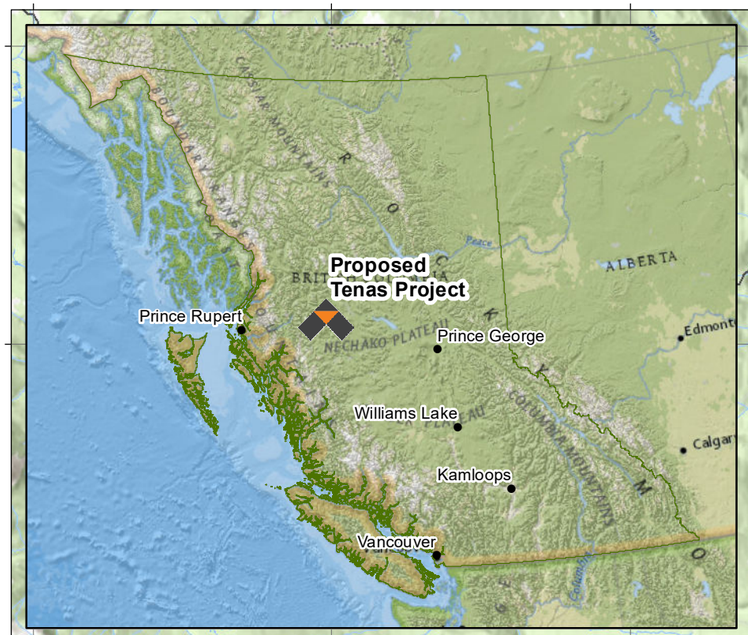
- Project Area: This encompasses the area of maximum disturbance within which Project facilities and activities will be carried out and includes a buffer around the Project features;
- Local Study Area (LSA): The LSA is the area surrounding and including the Project Area, where there is a reasonable potential for the Project or Project-related activities to interact with and potentially have an adverse effect on the VC; and
- Regional Study Area (RSA): The RSA surrounds and includes the LSA and provides the regional context for the assessment of potential Project-related effects on VCs at an appropriate scale and to assess those effects that extend beyond the LSA. Unless identified otherwise, the RSA is used as the spatial boundary for the cumulative effects assessment (CEA).

The Project Area is presented in **Figure 3.1-1** and differs from the Project Area described in the AIR due to continued improvements and design modifications that occurred during the preparation of the EAC Application. The main aspect of change that occurred during this process was the elimination of the effluent pipeline that went from the Tenas Control Pond to the Telkwa River. This has been replaced by an existing channel that connects with Goathorn Creek. This change removed approximately 10 ha of new disturbance on the landscape.

VC and subcomponent specific LSAs and RSAs are presented in their respective sections. The buffer distance of the LSAs around the Project features are at minimum as described for specific VCs in the AIR. The buffer distance is larger in locations where there was a reduction in the Project Area resulting from design refinements during the assessment process. This results in an overestimate of Project-related effects encompassed within the LSAs, for VCs where LSAs were formed as a buffer around an early version of Project features.

Tenas Project

Project Area



Legend

- Rail Line
- Highway
- Road
- Watercourse
- Wetland
- Waterbody
- Park or Protected Area
- Municipal Area
- 138 kV Transmission Line
- 500 kV Transmission Line

Project Features

- Existing 25 kV Power Line
- 25 kV Power Line
- Haul Road
- Rail Loop
- Discharge Path
- Tenas Access Corridor
- Backfill Area
- Control and Plant Sedimentation Pond
- Explosive Infrastructure
- Management Pond
- Mine Infrastructure Complex
- Open Pit
- Pit Lake
- Quarry
- Rail Infrastructure
- Topsoil Stockpile
- Tenas Coal Licenses
- Telkwa Coal Limited Private Property
- Project Area

Notes

1. All mapped features are approximate and should be used for discussion purposes only.
2. This map is not intended to be a "stand-alone" document, but a visual aid of the information contained within the referenced Report. It is intended to be used in conjunction with the scope of services and limitations described therein.
3. Project line features are for display only.

Sources

- Project Features: Allegiance Coal, April 21, 2021.
- Basedata: Government of British Columbia
- Basemap: World Topo Base

N

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0 1 2 3 4 5

Kilometres

NAD 1983 UTM Zone 9N

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TELKWA COAL LIMITED

EDI ENVIRONMENTAL DYNAMICS INC.

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3.2 Temporal Boundaries

Temporal boundaries are identified for the effects assessments and encompass periods when the Project is expected to affect VCs. These boundaries are adjusted as appropriate to reflect seasonal and annual variations or biophysical constraints related to a VC. Temporal boundaries are based on the temporal extent of the different phases of the Project, as described in **Table 3.2-1**.

Table 3.2-1: 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.

3.3 Administrative Boundaries

As appropriate, the VC sections identify the relevant administrative and technical boundaries and provide an explanation of their relevance to the assessment boundaries.

Administrative boundaries arise when political, economic, or social issues, as well as fiscal or other resourcing issues influence the assessment. Administrative boundaries do not apply to every assessment, but where identified, the nature of the administrative boundaries and their effect on the assessment is documented.

3.4 Technical Boundaries

Technical boundaries arise when there is a limit in the ability to predict the Project's effects. This may occur when sampling is constrained by legal restrictions, when large geographical settings limit the ability of proper sampling, or when modelling constraints impose limitations on the analysis. Technical boundaries do not apply to every assessment, but in cases where technical boundaries have been identified, the nature of the technical boundaries and their effect on the assessment are documented.

4. EXISTING CONDITIONS

The existing conditions heading for each VC establishes the current setting for the assessment of Project-related effects. The information is provided at an overview level for the RSA and in more detail for the LSA. The level of detail provided for each study area is sufficient to allow potential Project VC interactions to be identified and understood.

Existing conditions are described in each VC chapter based on available information and is accompanied by supporting information including:

- federal, provincial, Indigenous, and local government jurisdictions, mandates, agreements, and interests of specific relevance to the VC;
- an overview of the data sources, and desktop and baseline studies conducted for the Project;
- a brief description of the quality and reliability of the baseline data and their applicability for the purpose used, including any uncertainty or gaps;
- natural and human caused trends that are presently altering baseline conditions, including an explanation of if and how other projects and activities have or are currently affecting the VC;
- available TK of specific relevance to the VC, subject to any confidentiality constraints that may apply; and
- scientific and other information, such as published literature, databases, remote sensing imagery and data, monitoring programs, and previous EAs or associated technical reports.

Each VC chapter provides an overview of relevant regional data and historic activities to inform and provide context for the assessment. Each chapter also provides a description of the baseline studies that were conducted to inform the description of the existing conditions, including the scope and methods for the studies, guidance documents relevant to the studies, and where guidance may have been deviated from for the studies along with the rationale for the deviation.

Based on the baseline study results, each VC chapter provides a description of current conditions in the LSA and RSA. These descriptions aid in the identification of potential changes to the current conditions and inform the effects assessment.

5. ASSESSMENT OF PROJECT-RELATED EFFECTS

5.1 Potential Project-related Interactions

Expected Project interactions with each VC, that may result in an effect, are described within each VC chapter. These interactions are presented in an interactions table and matrix for ease of viewing, and to assist the adequate identification of likely Project VC interactions. The interactions table lists the various Project activities for the Construction, Operation, Decommissioning and Reclamation, and Post-closure phases, indicates whether there is likely to be an interaction with each VC. The interaction matrix applies a likelihood of interaction for the Project activities that will or are not expected to result in potential effects. To populate the interaction matrix, the following questions or criteria are considered for each VC and, if applicable, subcomponent:

- Based on the information available, is the Project activity expected to interact with the VC and subcomponents?
- What are the types of interactions between the Project's activities and the VC and subcomponents during each of the four (4) Project phases?
- Are there additional interactions of particular concern to government, Indigenous groups, public or stakeholders?

Potential interactions are ranked in an VC interactions table as follows:

- No Interaction: Project activity is not expected to interact with the VC, no adverse effect is expected; no further consideration is warranted; or
- Interaction: 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, or detectable using the identified indicator). The potential effect(s) of the interaction is considered further in the effects assessment.

Project VC interactions are ranked No Interaction when the pathway for an interaction does not occur. For example, Old Growth Forest does not occur in the spatial location of the Bypass Road and therefore, there is no interaction between this subcomponent of the Vegetation VC and the Bypass Road. Where further VC or subcomponent-specific rationale is applicable, this rationale is provided in the text of the VC chapters under **5.1 Potential Project-related Interactions with {VC}**. Project activities that are ranked No Interaction are not carried forward for further assessment.

5.2 Potential Project-related Effects

A description of the potential Project effects is provided in each VC chapter and for each subcomponent where applicable. Where an interaction was identified, a potential effect is described and considered in the assessment. Project VC interactions that were identified, but excluded from further assessment, are clearly identified and a rationale is provided to justify the exclusion. Each remaining potential Project-related effect on a VC is described related to how it affects existing conditions including the cause, type, and nature of the potential effect during each Project phase.

5.3 Mitigation Measures

The BC EAO considers mitigation to be any practical means or measures taken to avoid, minimize, restore onsite, compensate, or offset the potential adverse effects of the Project (BC EAO 2013). Mitigation measures to reduce or eliminate an adverse effect are described in **S1.0 Overview of Project Proponent Description** of the **EAC Application**. Mitigation measures that are specific to a VC are described in the assessment of each VC.

Where possible, information is provided on the anticipated time required for mitigation measures to become effective, and their effectiveness in terms of the VC indicator for the effect. Mitigation measures may include standard mitigation measures such as best management practices (BMPs), environmental management plans (see **S13.0**) and/or changes to the means in which the Project will be designed, constructed, or operated. Mitigation also considers TK, where applicable and available.

5.3.1 Mitigation Approaches

The mitigation approach is based on the hierarchy of mitigation presented in the Policy For Mitigating Impacts on Environmental Values (Environmental Mitigation Policy) (GovBC 2014) Mitigation measures presented in the VC sections are based on BMPs, guidance documents, review of mitigation for similar projects, and professional experience. Comments received through Indigenous group engagement, public consultation and agency consultation were considered. Mitigation includes design measures such as choice of alternative design and locations with least adverse effects, use of best feasible technology, BMPs, Project-specific mitigation measures, and implementation of reclamation. VC chapters also reference all applicable Project-specific environmental management and monitoring plans.

The mitigation measures were selected based on their appropriateness to address Project-related effects specific to each VC and their selection follows the hierarchy of mitigation, to avoid, minimize, rehabilitate, and offset. Offsetting is only discussed when a mitigation measure to avoid, minimize and rehabilitate do not sufficiently address a Project-related effect to the extent necessary to minimize residual Project-related effects.

5.3.2 Effectiveness and Timing of Mitigation Measures

Each effects assessment considers the effectiveness of proposed mitigation measures to determine the likelihood of residual Project effects under **5.3 Mitigation Measures** of each VC chapter. If the implementation of mitigation measures will eliminate a potential effect, and no or an unmeasurable residual effect is identified for that VC, the potential effect is not carried forward for further analysis. The rationale for the determination of a potential effect that is not carried forward as a residual effect is documented, including evidence for the efficacy of the mitigation measure and its suitability in the Project context. If a mitigation measure is not expected to eliminate a potential effect, a residual effect is identified and carried forward for further analysis.

The assessments also consider the timing of the effectiveness of the mitigation. Mitigation measures that are part of the Project design, or that rely on avoidance or prevention of an effect through BMPs or regulatory requirements, are effective immediately. Mitigation measures that are monitored will be based on the results of the monitoring program and at attaining relevant endpoints (e.g., an achieved percentage cover of vegetation).

A summary of the potential effects for each Project phase, proposed mitigation measures and the residual effects carried forward in the assessment, is provided in tabular format for each VC.

5.4 Residual Effects and Significance of Residual Effects

This heading within the assessment for each VC describes residual effects that are predicted to remain after the identified mitigation measures are implemented. The residual effects of the Project are characterised for each VC subcomponent following the definitions listed below and significance is determined. For each VC chapter, the adverse residual effects are described in the text and supported by summary tables that include the characterisation. The assessment is carried out on the VC subcomponent level (if applicable and appropriate to the VC) and presented at the VC level in the summary under **5.5 Summary of Project–related Residual Adverse Effects and Significance** within each VC chapter.

The VC-specific effect assessment methodologies are described in each VC chapter, leading to an analysis of each residual effect on each subcomponent, where subcomponents are applicable to the VC.

5.4.1 Residual Effects

Standardized criteria are used to characterise residual effects: Magnitude, Geographic Extent, Duration, Frequency, Reversibility, and Context.

The following generalized definitions are used as a guide for establishing specific effects characteristics for each VC:

- Magnitude: Refers to the degree of change in the indicator (Low, Moderate or High) – generally measured in terms of the proportion of the indicator affected within the LSA or RSA (where applicable), relative to the range of natural variation;
- Geographic Extent: Refers to the spatial scale over which the residual effect is expected to occur. The Geographic Extent of effects may be: Project Area, Local (portion of LSA or entire LSA), Regional (portion of RSA or entire RSA), or Beyond Regional (beyond RSA);
- Duration: Refers to the length of time over which the residual effect is expected to persist. Note that the definitions of these terms vary depending on the temporal characteristics of the VC. The duration of an effect may be Short-term, Medium-term, or Long-term;
- Frequency: Refers to the number of times that a residual effect is expected to occur. The frequency of an effect may be Infrequent, Frequent, or Continuous;
- Reversibility: Refers to the extent to which a residual effect can be reversed once the activity causing the residual effect ceases. Effects can be Fully Reversible, Partially Reversible, or Irreversible; and
- Context: Refers to the extent to which an Indicator 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). Context is described qualitatively (Low, Moderate, or High) in relation to the potential effect.

Where feasible, these criteria are described quantitatively in each VC chapter for each applicable subcomponent. When residual effects cannot be characterised quantitatively, the effects are characterised qualitatively. Definitions are provided for all effects criteria in each VC chapter. The characterisation of effects will inform the determination of Significance of each potential residual adverse effect (described in **5.4.4** of this chapter).

VC-specific definition of each characteristic is derived according to the following hierarchy:

1. a published regulatory or industry standard or criterion that establishes a threshold (e.g., relevant guidelines);
2. a range of values or standards that, while not regulated, are widely recognised, and accepted; and
3. professional judgment based on a review of literature, precedents, TK, scientific and other information provided by learned persons or panels.

5.4.2 Likelihood

A statement of Likelihood follows the above described characterisation. Likelihood describes the probability that the predicted residual effect will occur and includes consideration of the likelihood that the mitigation will be successful. Likelihood can be either Likely or Unlikely, with sufficient description to explain the finding.

5.4.3 Significance Determination

Each VC chapter discusses the Significance of adverse residual effects (i.e., **Significan**t or **Not Significant**).

The approach to determining Significance includes a comparison of the current state of the VC, relative to a scenario where it is assumed the Project does not proceed, with the predicted state of the VC if the Project does proceed. The assessment describes the Level of Confidence (described in **5.4.4** of this chapter) in the Significance determination and provides a clear rationale for the overall level of adverse residual effect determined, based on the criteria for characterisation of residual effects.

Where thresholds do not exist, Significance criteria are established based on an applied process, including guidance established from a review of literature, precedents, learned persons, panels, or professional judgements. The basis for Significance criteria is clearly described, including how or whether consideration of Likelihood has influenced the determination of Significance.

An adverse residual effect is rated as **Significant** or **Not Significant**, which is defined for each VC and subcomponent (where applicable) in the relevant heading. All residual effects (**Significant** and **Not Significant**) are carried forward to the CEA.

5.4.4 Level of Confidence

Each VC chapter includes a consideration of the Level of Confidence associated with the effects assessment. The Level of Confidence is based on the level of uncertainty associated with the both the Significance and Likelihood determinations (BC EAO 2013). Determining the Level of Confidence considers:

- scientific certainty regarding quantification of effect, including the quality and quantity of data and understanding of effect mechanisms;
- scientific certainty relative to effectiveness of the proposed mitigation and assumptions made; and
- professional judgment from prior experience predicting effects and the known effectiveness of proven mitigation measures.

Confidence predictions are defined as Low, Moderate or High, and may be adjusted for some VC effects assessments where quantitative data and methods are available. Definitions are provided in each VC chapter. Where a high degree of uncertainty regarding a residual adverse effect is evident, the Level of

Confidence regarding predictions may be Low. In most cases, Low or Moderate predictions are manageable through monitoring and adaptive management to confirm the absence, presence, and extent of residual adverse effects. A High Level of Confidence is assigned to predictions that have direct, site-specific quantitative data to support the predictions.

If additional risk analysis is required, the process and methodology used for this analysis and the conclusions, including the range of likely, plausible, and possible outcomes with respect to likelihood and significance, will be described within **8. Follow-up Strategy** of each VC chapter within **S4.0** to **S8.0** of the **EAC Application**.

5.5 Summary of Project-related Residual Adverse Effects and Significance

Building on the methodologies described in the preceding sections, residual effects are summarized in tabular format in each VC chapter. Residual effects are characterised for each subcomponent of each VC. The results of the residual effects characterisations for the subcomponents are considered together (i.e., rolled up) to inform the determination of the Significance of the effect of the Project on the VC. The tables in this subsection present summary information on residual effects, mitigation measures, effects characterisation, Significance determination, and Level of Confidence.

6. CUMULATIVE EFFECTS ASSESSMENT (CEA)

Cumulative effects are changes to the environmental, economic, social, heritage and/or health values and Indigenous interests caused when the Project's adverse residual effects combine with the adverse residual effects of other past, present, and reasonably foreseeable future projects and activities. Potential environmental, economic, social, heritage and health effects resulting from Project-specific residual effects, interacting cumulatively with similar effects of past, present, and future projects and activities are assessed in each VC chapter. If applicable, additional measures to mitigate the cumulative effect, in addition to Project-related mitigation measures, are proposed, cumulative effects are characterised, and the Significance of cumulative effects is determined following the methods described below.

6.1 Conducting the Cumulative Effects Assessment (CEA)

The CEA considers whether residual adverse effects of the Project will overlap in space and time with residual adverse effects of other past, present, and reasonably foreseeable projects or activities. The CEA follows standard methodology described in provincial guidance (BC EAO 2013). Effects that are considered in CEAs include those where:

- there is potential for a residual adverse effect of the Project on a VC or on a subcomponent, where applicable;
- the residual adverse effect can be demonstrated to act cumulatively with the residual adverse effects from other projects or activities on the same VC or subcomponent;
- other projects or activities, which represent a source of residual effects that may interact with Project-related residual effects, have been or will be carried out and are not hypothetical; and
- the cumulative effect is likely to occur.

The approach for assessing cumulative effects considers both the current conditions (which include changes caused by past development, projects, and activities) and the predicted future condition. The methodological steps for the CEA for each VC are as follows:

1. Consider all Project-related residual effects that were identified and determine the spatial boundaries for the CEA for each VC;
2. Identify present and reasonably foreseeable projects and activities within the spatial and temporal boundaries established for the VC. The availability (or lack) of information about the residual adverse effects of other projects and activities is also considered in the CEA;
3. Identify the potential for interaction of the Project-related residual effects with those of other projects and activities overlapping in time and space;
4. Identify the potential for cumulative effects and identify technically and economically feasible additional mitigation measures (in addition to those already identified to mitigate potential Project effects) to avoid, reduce, or otherwise mitigate those cumulative effects, if appropriate;
5. Qualitatively assess and evaluate the cumulative effects (using characterisation criteria as defined for the assessment of residual effects) with respect to the likely nature and degree of change from the existing (baseline) environment as a result of the Project's residual effects in combination with the residual effects of other relevant future projects and activities; and
6. Determine the Significance of the cumulative effect using characterisation criteria as defined for the residual Project effects assessment.

6.2 Identification of Present or Reasonably Foreseeable Projects and Activities

Projects and activities that are considered reasonably foreseeable and may be a source of residual effects that could interact with residual effects of the Project have been identified through a literature review, discussion with Indigenous groups, discussion with local communities and review by the Working Group. Sources of information include a search using Data BC for tenures that overlap with the largest RSA among the Project VCs (RDBN, social and economic assessments). Activities that are not related to a specific or single tenure are included and are grouped by activity type: agriculture, forestry, recreation, harvesting. Projects and activities are included in the CEA based on the following criteria:

- projects or activities that have already been built or conducted for which the residual effects overlap with those of the Project and are expected to continue (i.e., they are certain); and
- projects that are either proposed (public disclosure) or have been approved to be built, but are not yet built, for which the residual effects overlap with those of the Project (i.e., they are reasonably foreseeable).

Projects and activities that are included in the CEA are listed in **Table 6.2-1**. Their locations and boundaries (where available) are shown in **Figure 6.2-1**. A subset of these projects and activities are assessed for each VC, subject to their overlap with the assessment boundaries of each VC and subcomponent. The projects and activities that overlap with each VC and subcomponent are listed in the respective VC chapter. The results of the effects characterisations for the subcomponents are considered together (i.e., rolled up) to inform the determination of the Significance of the effect on the VC.

Table 6.2-1: Projects and Activities Included in the Cumulative Effects Assessment (CEA)

Land Use Type	Project Name	Proponent	Description
Agriculture	Agricultural Activities	Various	Past and present activities included in the anthropogenic disturbance layer for analysis as needed. Future additional disturbance is not known or foreseeable.
Commercial	Maple Leaf Cannabis production facility	Maple Leaf Green World Inc.	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 feet (ft^2) cannabis production facility in Telkwa, British Columbia (BC), with expansion capacity of up to 500,000 ft^2. Maple Leaf is currently in "Active Review" status and is nearing completion.
Community	Hudson Bay Mountain Estates	Various	Resort development to include the addition of a chairlift, 10 runs and a 148 lot residential component to Hudson Bay Mountain. Area master plan has received approval for 35 lots released in phase 1.
Community	Smithers, Houston, Telkwa, Witset, Hudson's Bay Estates, and any miscellaneous developments	n/a	Existing footprints of Smithers, Houston, Telkwa, Hudson's Bay Estates (these have bearing on terrestrial resources analysis) and any future foreseeable growth (i.e., municipal boundaries).
Community	Smithers Regional Airport Runway Expansion	Town of Smithers	Located in Smithers within the Regional District of Bulkley-Nechako (RDBN), the runway extension was determined not reviewable by the British Columbia Environmental Assessment Office (BC EAO). The expansion of the runway from 5,000 to 7,000 feet occurred in 2008.
Forestry	Forestry Activities	Various	Past and present activities included in the anthropogenic disturbance layer for analysis as needed. Future additional disturbance area is estimated based on timber supply forecast proportional to tenure areas that overlap the Regional Study Area (RSA) of interest (non-spatial analysis).
Mining	Berg Copper-Molybdenum Silver Mine	Thompson Creek Metals Company Inc.	Proposed molybdenum mine located 80 kilometres (km) southwest of Houston in scoping stages. Previous 42,000 metre (m) drill program has revealed a significant copper-molybdenum resource. Last drilling was conducted in 2008.
Mining	Big Onion Project	Metal Mountain Resources	The property consists of nine (9) contiguous mineral claims comprising a total area of 3,206 hectares (ha), exploration occurred from 2006 to 2009.
Mining	Blackjack Mineral	Williams Creek Exploration	Past producer, gold and lead are commodities.
Mining	Buck	San Marco Resources Inc. (now Sun Summit Minerals)	Gold/silver/zinc property in north-central BC. Drilling occurred in 2020.

Land Use Type	Project Name	Proponent	Description
Mining	Burning Daylight Quarry	Stone Ridge Quarries Ltd	Columnar basalt; dimension stone.
Mining	Chuchi Lake Mine	Kiska Metals Corp.	The Chuchi Lake occurrence is located south of Klawdetelle Creek, approximately 6 km north of Chuchi Lake and 90 km north of the community of Fort St. James. A rough estimate of the geological resource at Chuchi Lake is 50 million tonnes (Mt) with grades between 0.21 and 0.40 percent (%) copper and 0.21 and 0.44 gram per tonne gold.
Mining	Decar	First Point Minerals	Located approximately 90 km north-west of Fort St. James in BC. The Decar property comprises 60 mineral claims spread over 245 square kilometres (km²).
Mining	Dome Mountain	Gavin Mines	Mill and tailings management facility - underground gold and silver mine. The Dome Mountain Mine includes a past producing mine on tenures consisting of 42 contiguous mining claims and one (1) mining lease totaling 10,970 ha, located approximately 38 km east of the Town of Smithers in northwest BC. Mine permitting, infrastructure construction and underground development was completed on the mine between 2010 and 2012. The Dome Mountain Project holds a *Mines Act*, RSBC 1996, c 293 (Government of British Columbia [GovBC] 1996) permit and *Environmental Management Act,* SBC 2003, c 53 (GovBC 2003) (*EMA*) permit providing for up to 75,000 tonnes annually.
Mining	Duke Property	Amarc Resources Ltd.	Amarc acquired a 100% interest in the Duke deposit target and the adjacent 190 km^2 porphyry copper district. The Duke Project is located 80 km northeast of Smithers, BC.
Mining	Emerald Glacier	Lowprofile Ventures	In 2012, 26 holes in the Emerald Glacier area targeted the Miya vein, two (2) holes targeted the Marmot Zone, and two (2) holes targeted the gap between the two (2) zones. Drilling yielded elevated values in gold, silver, copper, lead, and zinc.
Mining	Endako	Centerra Gold	The mine has been in care and maintenance (C&M) since December 2015 due to continued weakness of the molybdenum market.
Mining	Equity Silver	Goldcorp Canada Ltd.	Mining took place in three open pits and a small underground mine. In addition to silver, copper and gold were extracted from this site.
Mining	Fenton Creek	Copper Mountain Mining Corp./Similco Mines Ltd.	Similco Mines Ltd. tested the Fenton Creek site, including 3,000 m of diamond drilling in nine (9) holes. The last drilling was in 2015.
Mining	Fran Property	Manto Gold Corp.	The main target on this property is high grade gold-poly metallic shear zones and veins that may be amenable to bulk tonnage mining. The original Fran Property consisted of eight (8) mineral claims covering approximately 4,000 ha in the Omineca Mining Division of BC. Additional staking to the east, south and west has expanded the property to 10,227.28 ha in area.

Land Use Type	Project Name	Proponent	Description
Mining	Hanson	Stone Ridge Exploration Corp.	The property is comprised of two (2) mineral tenures covering a total area of 3,554.80 ha. Elevated Zn, Cu and Mo in augered till samples.
Mining	Holy Cross	Phelps Dodge Corporation of Canada, Limited	Consists of 132 units in seven (7) claims. Gold concentrations of rock samples was generally low. Most contained background gold tenors. Drilling occurred in 1996/1997.
Mining	Huckleberry	Huckleberry Mines Inc. (Imperial Metals)	Main zone optimization and extension of Huckleberry mine life by 7 years will include $119 million for upgrades and $82 million for dam construction. Project has received certification under the *Environmental Assessment Act,* SBC 2002, c 43 (GovBC 2002) (*EAA*). Project is in C&M, August 2020 had exploration drilling occurring.
Mining	Kwanika	Serengeti Resources	The Kwanika claim group is 25,928 ha in size and is held entirely by Kwanika Copper Corporation. The resource estimate includes a high-grade, well defined domain within the Central Zone on the property.
Mining	Lennac Lake	Riverside Resources Inc.	A diamond drill was mobilized to the Lennac property on August 6, 2012, to begin drill testing of the Lennac Lake copper porphyry target. The last exploration was in 2013.
Mining	Lorraine-Jajay Copper Mine	Lorraine Copper Corp./Teck Cominco Ltd.	Exploration and feasibility reviews underway for a potential copper mine located 280 km northwest of Prince George, BC. The property covers 28,000 ha with the potential to develop 100-200 Mt. No indication of further development since 2005.
Mining	Morrison Copper/Gold	Pacific Booker Minerals Inc.	Proposed 25,000 tonnes/day ore production for an open pit copper/gold mine 65 km northeast of Smithers and 35 km north of the Village of Granisle. Feasibility study was completed in Feb 2009. The project was refused certification under the *EAA*, c 43 in 2012 and was issued an opportunity for further assessment under section 17 of Act. Therefore, it is still possible this project could be constructed, and it is included in the list of projects for consideration.
Mining	Mount Milligan	Centerra Gold	Mount Milligan received an environmental assessment (EA) certificate in March 2009, a *Mines Act* , RSBC 1996, c 293 (GovBC 1996) permit in September 2009 and initial *EMA* authorizations in July 2010. Construction began in September 2010, and the mine began production three (3) years later in August 2013. Today, Mount Milligan employs about 485 people.
Mining	Ogden Mountain Jade	Green Mountain Gemstones	Jade has been mined from Ogden Mountain for over 30 years, with a total production to date estimated at over 5,000 tonnes.

Land Use Type	Project Name	Proponent	Description
Mining	Ootsa Property	Surge Copper Corp.	Gold Reach has drilled 144,000 m of core on the project in over 350 holes. The Company has applied for a new five (5)-year exploration permit to support its planned 2018 exploration activities.
Mining	Silver Hope	Finlay Minerals Ltd.	The property consists of 29 mineral tenures covering 10,039 ha (100.4 km²). Exploration on the Silver Hope Property from 2010 to 2014 has seen the discovery of the Main Deep Horizon Cu-Ag-Au mineralization. Last exploration was in 2020.
Mining	Silver Queen Property	Equity Metals Corporation	The Silver Queen gold-silver property consists of 17 Crown-granted and 45 tenure claims covering 18,851.76 ha in the Omineca Mining Division, south of Houston, BC. The property is located on the road to Huckleberry mine at Owen Lake, 43 km south of Houston BC.
Mining	Snowbird Property	Au Gold Corp	The Gold deposit development logistics are excellent. The 40,000 acre property is located near the town of Fort St. James, BC.
Mining	Stardust Project	Sun Metals	Stardust hosts one of the most significant, recent high-grade copper-gold discoveries in Canada. Exploration occurred in 2020.
Mining	Wildcat Property	Terrane Metals Corp.	Proposed development of a gold-copper mine at the Mt. Milligan Project. A Feasibility Study was conducted in August 2006.
Recreation	Recreation activities	n/a	Past and present activities (disturbance) included in the anthropogenic disturbance layer for analysis as needed. Future additional disturbance is not known or foreseeable. Other activities included in this category that do not have a defined disturbance include Parks/Protected areas, sport fishing, sport hunting (and commercial guiding).
Recreation	Telkwa to Smithers Bike Trail	Smithers	The trail will be off the highway along the right-of-way (ROW). At the Smithers end, 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.
Sustenance and Traditional Land Use	Harvesting (including fishing, hunting, trapping)	n/a	Differs from recreation. Past and present harvesting and land use accounted for; future additional harvesting and land use is not known or foreseeable.
Utilities	Bulbous Toe	BC Hydro	Bulbous Toe is a slow-moving landslide with a major transmission line traversing it. One (1) of the towers requires periodic maintenance.
Utilities	Cheslatta Green Energy Project	Pristine Power Inc./Cheslatta Forest Products	Proposed 10-mega-watt (MW) power plant, located near Cheslatta Forest Products, to use gasification technology to convert wood residue into electricity for 9,500 homes. Cost of project includes transmission line to BC Hydro's power grid.

Land Use Type	Project Name	Proponent	Description
			Project requires provincial and BC Hydro approvals. Project added to the Inclusion list on request.
Utilities	Coastal Gaslink	Coastal Gaslink Pipeline	This proposed project involves the construction and operation of an approximately 650 km, 48-inch diameter natural gas pipeline running from near the community of Groundbirch (40 km west of Dawson Creek) to the proposed liquid natural gas (LNG) Canada Export Terminal near Kitimat. The project is under construction.
Utilities	Fort St. James Green Energy	Fort St. James Green Energy Limited	40-MW power plant utilizing wood residue. Plant is currently functioning.
Utilities	Kenney Dam Cold Water Release Facility	Alcan Aluminum Ltd.	Project to protect salmon on the Nechako River through either a cold-water release facility (Kenney Dam) or other environmental enhancements, as part of an Aug 1997 agreement with the BC government, which resolves issues surrounding the Kemano dam. There are ongoing studies and consultation in progress, construction is not expected to start for several years.
Utilities	Pacific Northern Gas Looping Pipeline	Pacific Northern Gas	The Pacific Northern Gas Looping Project is a proposal to loop its existing natural gas transmission pipeline between Summit Lake and Kitimat. The proposed pipeline involves the construction of approximately 525 km of new 24-inch pipe, operating in parallel with the existing pipeline. This project was intended to supply natural gas to the proponent's existing customers in the Kitimat area as well as two (2) previously proposed LNG facilities along Douglas Channel which have since been cancelled. Project added to the Project Inclusion List on request.
Utilities	Pacific Trails Pipeline	Pacific Trails Pipeline	The Pacific Trails Pipeline is a proposed 463 km, 42-inch natural gas pipeline that will deliver gas from Summit Lake, BC to the proposed Kitimat LNG facility site at Bish Cove near Kitimat.
Utilities	Prince George to Terrace Capacitors Project	BC Hydro	The project involves constructing three (3) new capacitor stations to increase the capacity along the 450 km, 500-kilovolt (kV) transmission line that runs between Prince George and northwest B.C. There is one (1) station near Vanderhoof; one (1) station near Burns Lake; and one (1) near Telkwa. These stations are fenced, outdoor facilities that need to be constructed on flat land, adjacent to or near the existing transmission line. Project added to the Project Inclusion List on request.
Utilities	Prince Rupert Gas Transmission	TC Energy	Proposed 900-km natural gas pipeline (approximately 780 km terrestrial and 120 km marine) running from Hudson's Hope to Lelu Island near Prince Rupert. The 48-inch diameter (36-inch twinned marine) pipeline's capacity is proposed at 2-3.6 billion cubic feet (BCF)/day. Three (3) compressor stations are planned initially, with up to eight (8) in total.

Tenas Project

Location of present and reasonably foreseeable projects and activities

650000 700000 750000 800000 850000 900000 950000 1000000 1050000 1100000 1150000

1250000 1200000 1150000 1100000 1050000 1000000 950000 900000

Smithers Regional Airport Runway Expansion
Davidson Property
Big Onion
Hudson Bay Mountain
Smithers
Telkwa to Smithers Bike Trail
Maple Leaf Green
Telkwa
Bulbous Toe
Prince George to Terrace Capacitors Project 3H
Prince George to Terrace Capacitors Project 3G
Houston
Ogden Mountain Jade
Lorraine-Jayjay Copper Mine
BlackJack Mineral
Stardust
Kwanika
Chuchi Lake Mine
Duke Property
Morrison Copper-Gold Mine
Mount Milligan Mine
Fran Property
Wildcat Property
Baptiste-Decar
Dome Mountain Mine
Lennac Lake
PGTC CAP3H
PGTC CAP3G
Tenas Project
Fort St James Green Energy
Snowbird Property
PGTC CAP 2
Cheslatta Green Energy Project
Hanson
Buck Mine
Equity Silver Mine
Fenton Creek
Silver Hope
Silver Queen
Burning Daylight
Endako Mine
PGTC CAP 1
Holy Cross
Kenney Dam Cold Water Release Facility
Berg Mine
Emerald Glacier
Ootsa Property
Huckleberry Mine

16 62 118 CN 39 27 35

Legend

- Municipality
- Project
- Oil and Gas Project Feature
- Highway
- Tenas Project Area
- Noise Regional Study Area
- Vegetation / Terrain and Soils Regional Study Area
- Air Quality / Human Health Regional Study Area
- Wildlife Regional Study Area
- Fish / Aquatic / Surface Water Regional Study Area
- Visual Resources Regional Study Area
- Wide-Ranging Wildlife / Non-Traditional Land Use Regional Study Area
- Caribou Regional Study Area - 2014 ECCC Critical Habitat
- Caribou Regional Study Area 2 - 2019 BC Critical Habitat Matrix
- Socio-Economic RSA
- Oil and Gas Project Feature
- Mining Leases
- Hudson Bay Mountain Resort Tenure
- Telkwa to Smithers Bike Trail
- Municipal Area
- Park or Protected Area

Notes

1. All mapped features are approximate and should be used for discussion purposes only. Some Study Area boundaries are offset for display.
2. This map is not intended to be a "stand-alone" document, but a visual aid of the information contained within the referenced Report. It is intended to be used in conjunction with the scope of services and limitations described therein.

Sources

- Project locations: Government of British Columbia (Major Projects, Mineral Inventory, Municipal Boundaries, Tenures); Oil and Gas Commission; British Columbia Geological Society
- PGTC Capacitor locations are from the Rural Agriculture Committee Agenda March 5 2020 and a Letter from BCHydro to the Mayor of Telkwa July 28, 2015
- Telkwa to Smithers Bike Trail digitized from Proposed Telkwa-Smithers Multi-Use Pathway Concept Design Report May 9, 2017
- Basedata: Government of British Columbia
- Basemap: World Topo Base

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EDI ENVIRONMENTAL DYNAMICS INC.

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7. SUMMARY OF EFFECTS ASSESSMENT FOR EACH VALUED COMPONENT (VC)

Significance determination is required at the VC level (BC EAO 2013). In the case that multiple residual effects occur under each subcomponent of a VC, it is necessary to show the characterisation of each residual effect under each subcomponent, where applicable. These results are summarised, and a Significance determination is concluded for each VC.

8. FOLLOW-UP STRATEGY

Each VC chapter describes the approach to identifying and developing a monitoring and adaptive management strategy or provides a rationale where no strategy is considered to be needed (e.g., where the Level of Confidence in the effects assessment is High or there is an existing monitoring program). If the need for an adaptive management strategy has been identified for a VC, a description that includes the following is provided:

- identification of measures to evaluate the accuracy of the original prediction of effects;
- identification of measures to evaluate the effectiveness of proposed mitigation measures; and
- an appropriate adaptive management strategy to apply if the original predictions of effects and mitigation effectiveness are not as expected.

Physical, chemical, biological, and socio-economic parameters to be monitored are identified, as appropriate, for each VC. Each proposed monitoring program includes the following descriptions:

- objectives of the program;
- proposed timing, frequency, and duration;
- implementation approach, including roles and responsibilities, potential Indigenous and community involvement, and mechanisms to compile, interpret, report, and maintain data/information;
- monitoring site locations; and
- triggers or indicators to be used to signify the need for implementation of remedial measures, and the regulators to be involved in these decisions.

9. REFERENCES

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