

24 Visual and Aesthetic Resources

This chapter assesses the effects of the KSM Project (the Project) on the visual and aesthetic resources of the local study area (LSA). The LSA includes a radius of 8 km around the proposed Project infrastructure.

Visual quality depends on many factors, such as the current shape (i.e., relief and terrain) and nature of the landscape, observation points, and existing natural and non-natural disturbances. Natural processes modify the landscape gradually over time; activities associated with mine construction and operation can change the landscape's appearance or accelerate and alter natural processes (e.g., vegetation composition and maturity).

24.1 Project Setting

The Project is located in the Coast Mountains of northwestern British Columbia (BC), located approximately 950 km northwest of Vancouver and 65 km northwest of Stewart, within 30 km of the BC-Alaska border. The greater region is suited to backcountry tourism with lakes, rivers, mountains, and alpine country that provide spectacular scenery. To the north, Mount Edziza Provincial Park is renowned for its geologic formations and Spatsizi Plateau Wilderness Provincial Park is a remote wilderness. Scenery and visual quality along travel corridors, such as roadways and rivers, is highly valued. Road-based tourism along the Highway 37 corridor attracts a high number of visitors (BC ILMB 2000). To the south there is tourism value associated with the Bear and Salmon glaciers near Stewart.

The Project is located in two geographical areas. The Mine Site is located within the Mitchell, McTagg, and Sulphurets Creek valleys. Sulphurets Creek is a main tributary of the Unuk River, which flows to the Pacific Ocean. The Processing and Tailing Management Area (PTMA) is located in the upper tributaries of the Bell-Irving River.

The LSA is not heavily visited by recreational users. However, a number of recreational tenure holders rely upon the undeveloped landscape around the LSA and its remoteness to attract business.

24.1.1 Legislation and Policy Guidance

There is no legislation that requires visual and aesthetic resource studies for this Project. However, the Cassiar Iskut-Stikine Land and Resource Management Plan (CIS LRMP) includes visual quality as a resource value in the General Management Direction (GMD; BC ILMB 2000). The Nass South Sustainable Resource Management Plan (SRMP) includes visual quality objectives (BC MFLNRO 2102). The Application Information Requirements (AIR) document, approved by the British Columbia Environmental Assessment Office (BC EAO), also identified an assessment of visual and aesthetic resources as a requirement for the KSM Project.

24.1.2 Baseline Studies

24.1.2.1 Local Study Area

The LSA is consistent with Section 14.3.3 of the AIR. The LSA boundary includes a radius of 8 km around the proposed Project infrastructure, which will encompass the foreground and mid-ground view of the landscape (BC MOF 2001). Beyond 8 km, the viewer will “see outlines of general shape and patterns with little discernible texture and color, and sense of overall perspective” (BC MOF 2001).

24.1.2.2 Data Sources and Methods

A review of the CIS LRMP, the Nass South SRMP, land use information, the British Columbia Ministry of Forest and Range’s (BC MOFR) Recreational Features Inventory (RFI) data, and parks and protected areas data was performed to identify potential visually sensitive areas. The western part of the study area lies within the CIS LRMP boundaries. The LRMP includes visual quality as a resource value and identifies and describes areas that are visually sensitive (BC ILMB 2000). A small part of the proposed Project, near the tunnel portals approaching the divide between the Unuk River and Treaty Creek drainages, lies within the area defined by the Nass South SRMP. The SRMP addresses visual quality in its GMD (BC MFLNRO 2012). The RFI delineates the provincial land base into recreation feature polygons (RFPs) based on recreation features and the activities those features support. It then classifies those polygons in terms of their local significance for providing or supporting recreation opportunities and their sensitivity to alteration (BC MOF 1998). Geographic Information System (GIS) data layers were collected from the provincial government’s Land and Resource Data Warehouse (BC ILMB 2011). No parks or protected areas are within the study area.

An initial viewshed¹ analysis of the Project footprint was performed using proposed Project infrastructure and digital elevation data to define locations from where the proposed Project will be potentially visible. The analysis only used topography as the limiting factor in the view to the Project. Therefore, the analysis will give a result that will contain a larger area with a potential view. The areas from the literature review and the viewshed analysis were compared to select locations for visual quality field data collection (Figure 24.1-1). Baseline viewpoints were first selected in areas where a sensitive area overlapped with the viewshed result. However, if a sensitive area did not overlap with the viewshed, and therefore was not likely have a view of the infrastructure, a viewpoint location was selected to confirm that the proposed infrastructure locations were not visible.

A visit to the potential viewpoint sites allowed a review and update of each location. Some potential viewpoint sites were adjusted to be as close as possible to human activity and to gain a typical view. Photographs were taken from the viewpoints within each of the areas identified to create a photographic inventory of the visually sensitive landscapes within the LSA.

¹ A viewshed is the area that is visible from a specific location (or viewpoint).

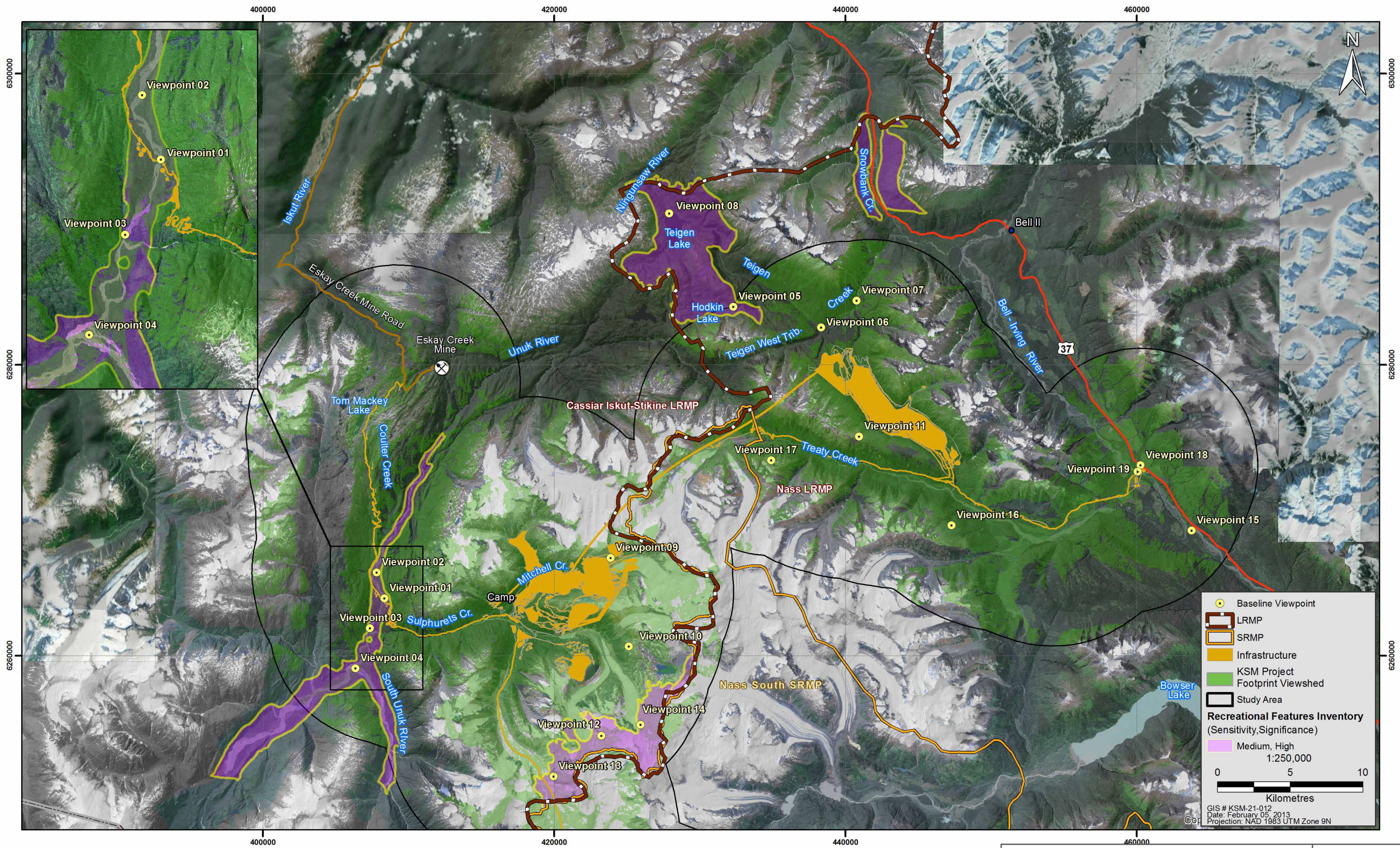


Figure 24.1-1

For context of the assessment in later stages, it is important to be aware of a difference between two viewshed analyses. Using the initial viewshed analysis, as described above, baseline viewpoints were defined. Next, as described in more detail in Section 24.7, during the effects assessment, a second viewshed analysis was performed. This second analysis started from each of the selected baseline viewpoints. Baseline viewpoints were selected as they represented key areas to assess alteration of visual quality on valued components (VCs). The modelling used Digital Elevation Model (DEM) data and Vegetation Resource Information (VRI) from the British Columbia Integrated Land Management Bureau (BC ILMB). These viewsheds were integrated with infrastructure data to calculate how much of the infrastructure will be seen from baseline viewpoints; the resulting data represent the area that an individual can see from these viewpoints. The analysis accounts for areas blocked by obstacles such as terrain, vegetation, or other features (Figure 24.1-2).

Each view from the selected baseline viewpoint locations was re-created as a three-dimensional (3-D) visualization in Visual Nature Studio 3 to model what the view could look like when the infrastructure is built. The visualizations are used in the effects assessment to measure how much of the infrastructure could be seen as a proportion of the view and to measure what percent of visual modification occurs when compared to an original photograph.

24.1.3 Resource Characterization

Although relatively low numbers of people use the LSA, the region has identified recreational value. Local activities include commercial heli-skiing, guided backcountry expeditions, angling tours, and rafting trips. Given the CIS LRMP objective to encourage recreation and tourism activities that have a minimal impact on the environment (BC ILMB 2000), it is expected that the area will continue to be used occasionally in summer and winter for recreational purposes.

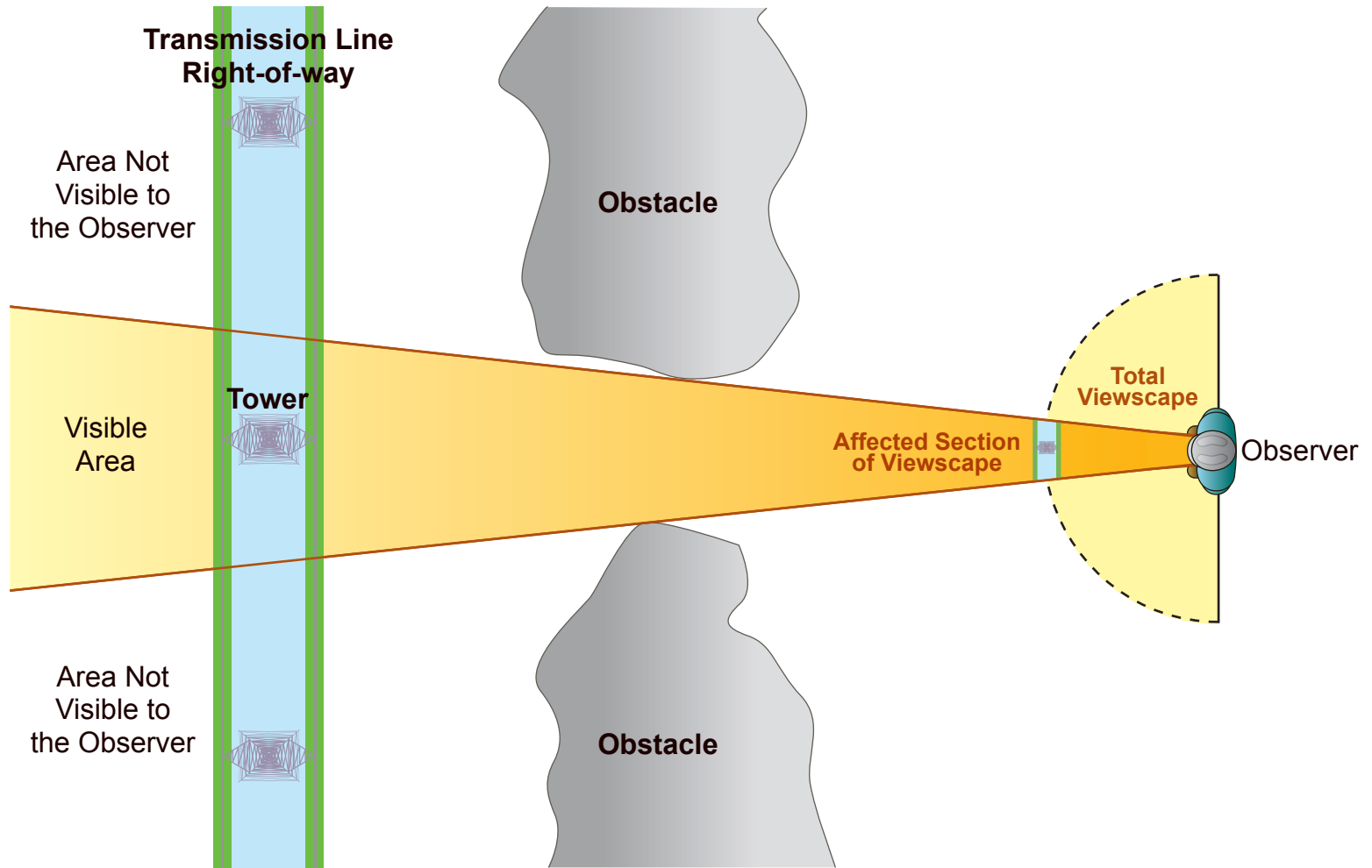
The natural landscape is an aspect of local recreational use. The LSA has a rating of *unmodified landscape/natural*, meaning there are minimal to no effects from anthropogenic sources. This rating description is derived from the HASSELL Matrix system developed for assessing visual effects, which is further explained in Section 24.7.1.

There are four key areas where the Project may influence the visual quality of the landscape. The first three areas were identified via the initial viewshed analysis of the Project footprint. From some points in these four areas, a person could have a direct view of Project infrastructure: 1) the Unuk River, 2) Teigen Lake and Teigen Creek, 3) the Mitchell Creek and Sulphurets Creek valleys, and the 4) Treaty Creek Valley.

Figure 24.1-1 shows the overall LSA, including valued recreational areas and viewpoints where data were collected. Existing baseline visual quality conditions are described in the *KSM Project: 2009 and 2010 Visual Quality Baseline Report* and the addendum to the baseline ([Appendices 24-A](#) and [24-B](#)). The results of the data collected from viewpoints in all four key areas are summarized in the following sections.

24.1.4 Unuk River

The Unuk River is a large river flowing from the BC Coast Mountains southwest into Alaska. The lower elevations of the valley walls surrounding the river are heavily forested. On both sides of the river, slopes rise steeply from the valley floor (Plates 24.1-1a to 24.1-1f).



Visual and Aesthetic Resources



Plate 24.1-1a. View 3 – Viewpoint 1 - Looking north from Unuk River (August 3, 2009).

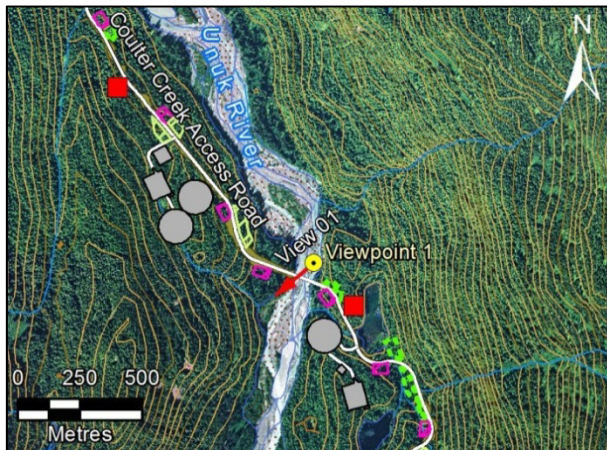


Plate 24.1-1b. Viewpoint 1 - Location and bearings, Unuk River in relation to proposed infrastructure.



Plate 24.1-1c. View 5 – Viewpoint 2 - Looking south from Unuk River (August 3, 2009).



Plate 24.1-1d. Viewpoint 2 - Location and bearings, Unuk River in relation to proposed infrastructure.



Plate 24.1-1e. View 6 – Viewpoint 3 - Looking north from Unuk River (August 3, 2009).

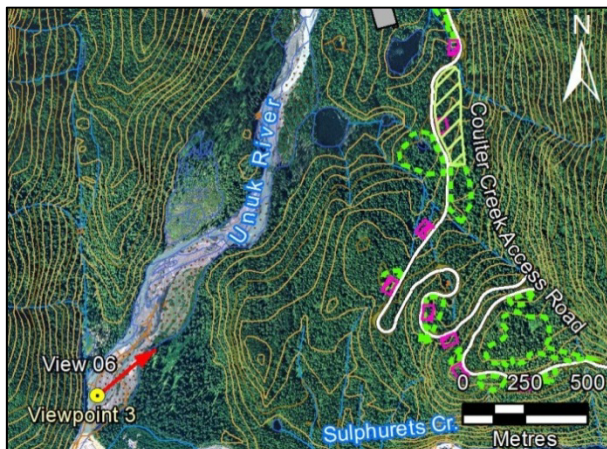


Plate 24.1-1f. Viewpoint 3 - Location and bearings, Unuk River in relation to proposed infrastructure.

The proposed Coulter Creek access road (CCAR) will commence from the closed Eskay Creek Mine road, passing Tom Mackay Lake and then descending generally parallel to Coulter Creek toward the Unuk River. As it approaches the valley bottom, the proposed alignment will turn and descend at a gentle angle, running almost parallel to the Unuk River. The road will cross the river at a single location over an 88-m-long, three-span bridge before climbing through a series of switchbacks into Sulphurets Canyon and running onward to Mitchell Creek (Chapter 4, Section 4.5.4).

24.1.5 Teigen Lake and Teigen Creek

Teigen Creek flows southeast from Teigen Lake to a point approximately 9 km south of Highway 37, and then turns northeast and flows toward the Bell-Irving River. Tall shrubs and forest (Plates 24.1-2a to 24.1-2c) surround the northern shore of Teigen Lake.



Plate 24.1-2a. View 13 - Viewpoint 8 - Looking south from a point on Teigen Lake (August 14, 2010).



Plate 24.1-2b. View 14 – Viewpoint 8 – Looking southeast from a point on Teigen Lake (August 14, 2010).



Plate 24.1-2c. Viewpoint 8 - Location and bearings from a point on Teigen Lake in relation to proposed infrastructure.

The area approximately 150 m north of the eastern end of Hodkin Lake and 2 km away from Teigen Creek is characterized by areas of low alpine vegetation (Plates 24.1-3a and 24.1-3b). South along Teigen Creek, near the confluence of Teigen Creek and West Teigen tributary and the South Teigen tributary, tall shrubs and forest cover the creek banks (Plate 24.1-4a to 24.1-4c).

Visual and Aesthetic Resources



Plate 24.1-3a. View 8 – Viewpoint 5 – Looking east from a point north of Hodkin Lake (August 3, 2009).

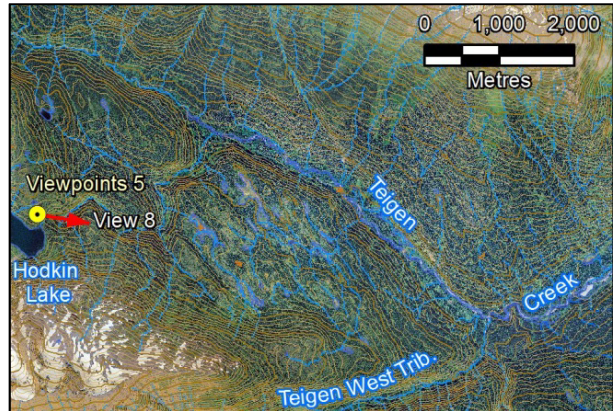


Plate 24.1-3b. Viewpoint 5 - Location and bearings from a point on Teigen Creek in relation to proposed infrastructure.



Plate 24.1-4a. View 9 - Viewpoint 6 – Looking southeast from a point on Teigen Creek (August 3, 2009).



Plate 24.1-4b. View 10 – Viewpoint 6 – Looking south from a point on Teigen Creek (August 3, 2009).

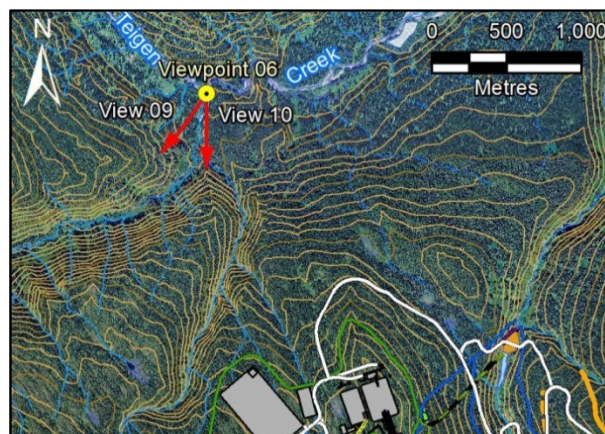


Plate 24.1-4c. Viewpoint 6 - Location and bearings from a point on Teigen Creek in relation to proposed infrastructure.

The upstream portions of Teigen Creek and adjacent north-facing slope are about 7 km from the proposed Tailing Management Facility (TMF). Bear Enterprises and 11434 Yukon Ltd. commercial tenures may operate in the area, and Last Frontier Heliskiing has used some of the adjacent slopes ([Appendix 23-A](#)).

24.1.6 Mitchell Creek Valley and Sulphurets Creek Valley

The Mitchell Creek and Sulphurets Creek valleys are steep valleys carved by recently receded glaciers. At the lowest elevations, Mitchell Creek, generated by glacier melt water, flows west into Sulphurets Creek and then into the Unuk River. At high elevations there is very little low-lying alpine vegetation (Plates 24.1-5a and 24.1-5b and 24.1-6a and 24.1-6b).



Plate 24.1-5a. View 20 - Viewpoint 12 - Looking north-northwest from a point above the Sulphurets Glacier (September 29, 2010).



Plate 24.1-5b. Viewpoint 12 - Location and bearings from a point above the Sulphurets Glacier in relation to proposed infrastructure.

Project-related development proposed for the valleys includes three open pits, Rock Storage Facilities (RSFs), a Water Storage Facility (WSF), the Mitchell Ore Preparation Complex, diversion tunnels, and access roads. Mine Site infrastructure will likely extend from the toe of the glacier to the confluence of Mitchell and Sulphurets creeks. The CCAR will be used to transport personnel, heavy mining equipment, mining supplies, and explosives (Tetra Tech-Wardrop 2012).

24.1.7 Treaty Creek Valley

Treaty Creek is a tributary of the Bell-Irving River. The Treaty Creek Valley is a broad, steep-sided basin with partially forested lower valley slopes. The crest of the ridge between Treaty

Visual and Aesthetic Resources

Creek and Teigen Creek is rocky and clear of vegetation (Plates 24.1-7a and 2.1-7b). The hillsides overlooking the Treaty Creek Valley are vegetated and the higher elevations have sparse vegetation (Plates 24.1-8a to 24.1-8c).



Plate 24.1-6a. View 18 - Viewpoint 10 - Looking east from a helicopter up Mitchell Creek Valley (August 2009).

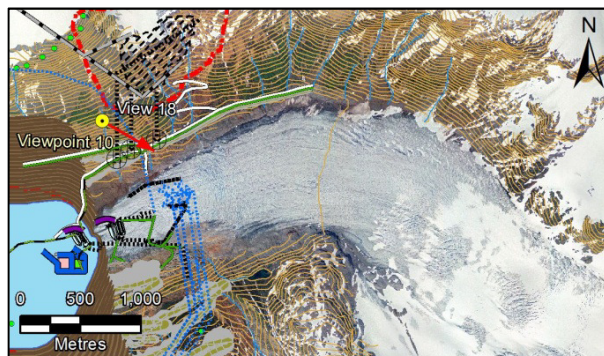


Plate 24.1-6b. Viewpoint 10 - Location and bearing from a helicopter up Mitchell Creek Valley in relation to proposed infrastructure.

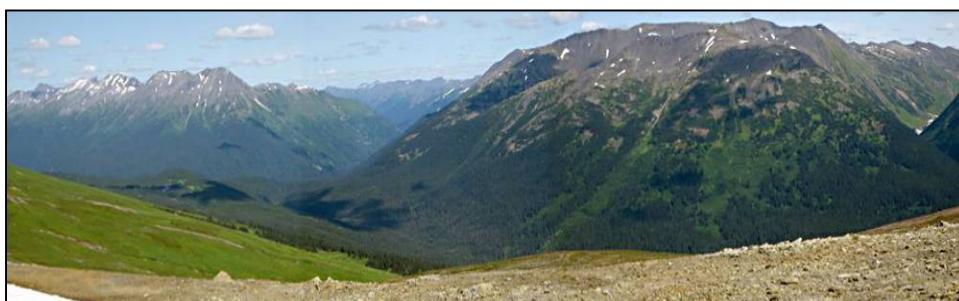


Plate 24.1-7a. View 19 - Viewpoint 11 - Looking north from the ridge between Treaty Creek and the south and west Teigen tributaries (August 2009).

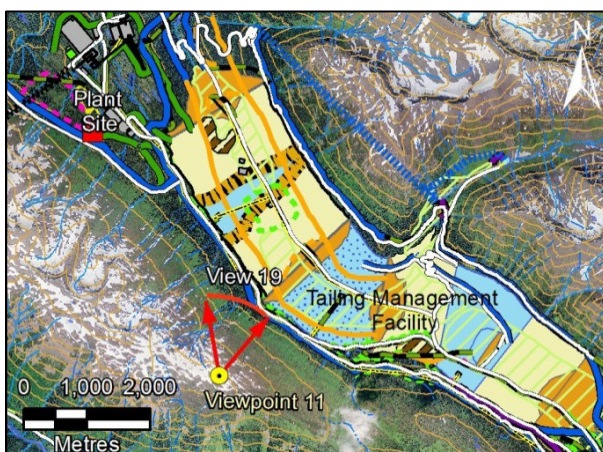


Plate 24.1-7b. Viewpoint 11 - Location and bearing from the ridge between Treaty Creek and the south and west Teigen tributaries in relation to proposed infrastructure.



Plate 24.1-8a. Viewpoint 16 - Looking north from a point on a mountain overlooking Treaty Creek (July 2, 2012).



Plate 24.1-8b. Viewpoint 17 - Looking north from a point on a mountain overlooking Treaty Creek (July 2, 2012).

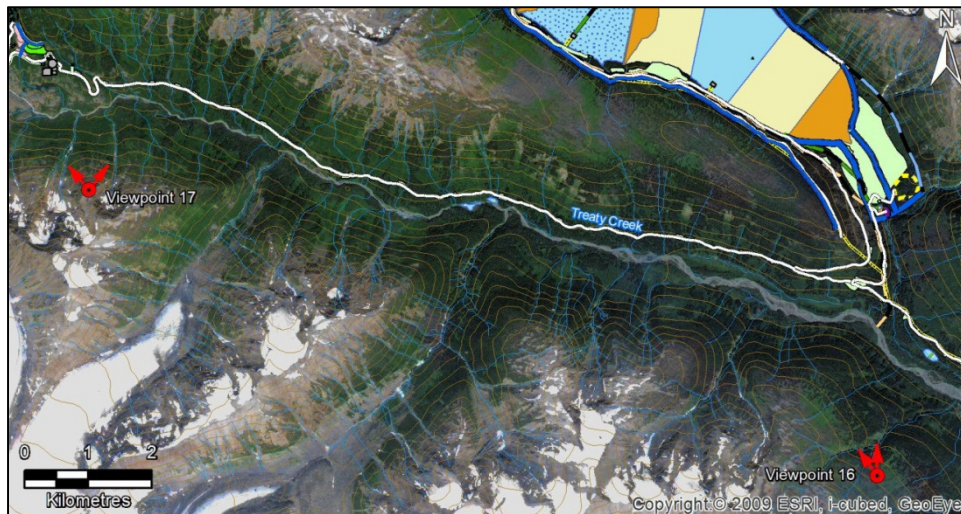


Plate 24.1-8c. Viewpoints 16 and 17 - Location and bearings from points on two mountains overlooking Treaty Creek in relation to proposed infrastructure.

The proposed route for the Treaty Creek access road (TCAR) will be the length of the Treaty Creek Valley, paralleling the Treaty Creek. A 118-m bridge will be built at the location where the TCAR will cross the Bell-Irving River. The proposed TMF and the North Treaty access road alignment are situated at the upper Teigen and Treaty creeks.

24.2 Historical Activities

The proposed Project is in an area of northwestern BC that has been used for mining and mineral exploration activity throughout the past century. Exploration projects were historically focused in the areas between the Knipple Glacier and the Eskay Creek area. The Eskay Creek Mine, located within 3 km of the Unuk River, was active between 1994 and 2008. An access road connects the mine to Highway 37. The Sulphurets Project test mine closed in 1993. Exploration is still ongoing at both the Eskay and Brucejack sites. An exploration camp exists near the confluence of the Unuk River and Sulphurets Creek. The abandoned Granduc Mine is located 30 km to the south. Numerous cut blocks exist within the study area along the Bell-Irving River and Highway 37. A series of forest service roads were built in the area to access the cut blocks.

24.3 Land Use Planning Objectives

The CIS LRMP is a sub-regional land use plan covering approximately 5.2 million hectares of northwestern BC. Recommendations in this plan direct the management of public lands and resources for the Canadian portions of the Stikine River and Unuk River watersheds. The LRMP includes management guidelines for mining activities within its boundaries and management direction statements related to visual quality (BC ILMB 2000).

The LRMP's GMD guides resource activities on all Crown land outside of protected areas. Area-specific management refers to Resource Management Zones (RMZs) with distinct biophysical characteristics and resource issues. The GMD is to be applied in these RMZs, except where area-specific objectives and strategies have been developed to address certain resource values or activities for the RMZ (BC MOF 2001). Visual quality is one resource value addressed in the GMD (BC ILMB 2000). The visual quality objectives were designed for forestry activities, and would not be a reasonable standard for some non-forestry activities, such as mining. However, those performing non-forestry activities are to be aware of, and try to follow, the visual quality objectives.

The Unuk River RMZ described in the CIS LRMP overlaps the visual and aesthetic resources study area (Figure 24.1-1). One of the area-specific objectives for this RMZ is to maintain visual quality from the Unuk River while allowing commercial timber harvesting and mineral exploration and development to occur. The strategy for visual quality in this area designates views from the Unuk River as a known scenic area and states that "wherever possible, design logging and road building to mimic natural landscape line, form, colour, and texture" (BC ILMB 2000).

The Nass South SRMP was produced to help promote sustainable economic development while maintaining cultural, environmental, and economic values in the area (BC MFLNRO 2012). The SRMP affirms resource use and development activity for a number of activities outside of protected areas. Protected areas include parks, ecological reserves, and areas set aside to protect natural and cultural heritage. The SRMP affirms that mineral exploration and development is permitted in zones outside of protected areas. The SRMP recognized the need for development of activities such as commercial recreation and tourism, guide outfitting, hunting, fishing, trapping, and cultural heritage resources. Visual quality objectives are only referred to as one of many variables in the plan's timber supply analysis. The analysis was completed to help inform timber harvesting management in the SRMP.

24.4 Spatial and Temporal Boundaries

24.4.1 Spatial Boundaries

The study area, for the baseline study and for this assessment, comprises an 8-km wide perimeter around the proposed Project infrastructure, encompassing the foreground and mid-ground view of the landscape, as well as areas that could potentially be used for recreation, as determined during early consultation efforts and development of the AIR.

Spatial boundaries were selected by conducting a review of existing literature and Geographic Information System (GIS) data, including relevant BC MFLNRO sources, the CIS LRMP (BC ILMB 2000), the Nass South SRMP (BC MFLNRO 2012), and recreational features inventory data (BC MFLNRO 2004). Spatial data layers considered included recreation use areas, parks and protected areas, and road or highway corridors.

An initial viewshed analysis during the baseline study identified key areas within the study area where Project infrastructure could potentially be seen² (Figure 24.4-1). Data used for the analysis included:

- the height of proposed infrastructure including roads, the TMF, the mine pits, the RSFs, and the Treaty Process Plant; and
- a DEM created by the Base Mapping and Geomatic Services Branch of the British Columbia Ministry of Sustainable Resource Management (BC MSRM 1996) with an approximate resolution of 20 m.

24.4.2 Temporal Boundaries

The timeframes of the four Project phases was used to derive temporal boundaries for this assessment:

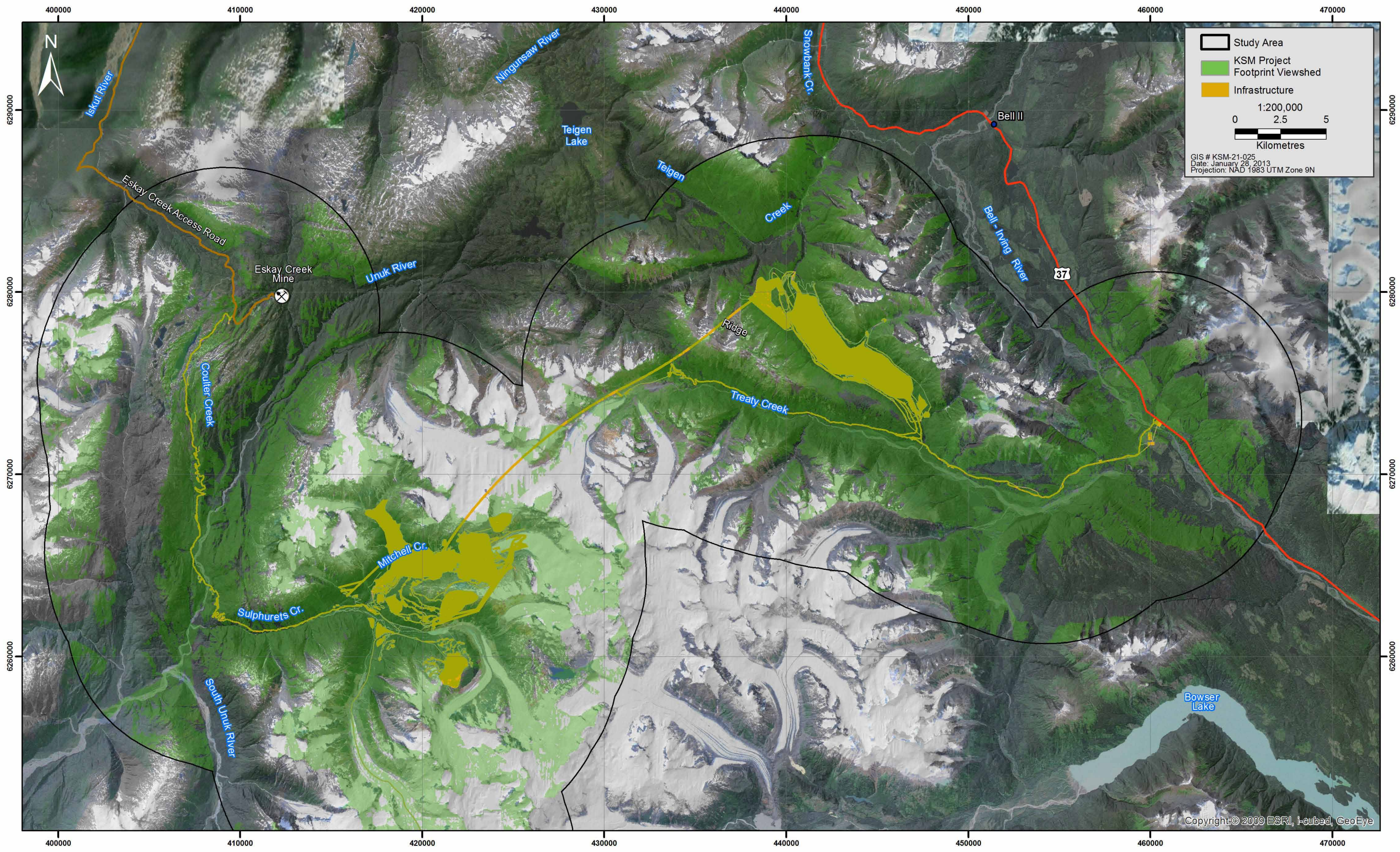
- construction phase (5 years);
- operation phase (51.5 years);
- closure phase (3 years); and
- post-closure phase (Mine Site reclamation and post-closure monitoring, 250 years).

24.5 Valued Component Selection

The determination of the VCs for visual and aesthetic resources involved several steps, including:

- review of the AIR;

² ArcGIS Viewshed analysis tools are used to assess which objects might be visible from different significant and/or sensitive locations. For this study, analyses were performed in ESRI ArcView 10 Spatial Analyst using the viewshed analysis tool.



[Symbol] Study Area
 [Green Box] KSM Project Footprint Viewshed
 [Yellow Box] Infrastructure
 1:200,000
 0 2.5 5
 Kilometres
 GIS # KSM-21-025
 Date: January 28, 2013
 Projection: NAD 1983 UTM Zone 9N

Visual and Aesthetic Resources

- review of issues identified during consultation with the Environmental Assessment (EA) Working Group;
- land use interviews; and
- consideration of information from Aboriginal groups.

VCs for visual quality are based on specific land uses referred to in the *KSM Project: 2008 to 2010 Non-traditional Land Use Baseline Report (Appendix 23-A)* and the *KSM Project: Archaeological Impact Assessment, Final Report – Heritage Inspection Permit 2008-0128 (Appendix 21-A)*. The VCs cover the various types of land use by recreational and traditional users. The VCs were chosen by analyzing the potential for change in visual quality due to the Project for each land user. The study measures the amount of change that a person could encounter. There is no measure for a typical person’s experience or their sensitivity to change as this is a subjective experience; therefore, it is not addressed in this chapter.

24.5.1 Valued Components Included in Assessment

The six VCs selected for inclusion in this assessment are:

- visual quality for river rafting tours;
- visual quality for heli-skiing tours;
- visual quality for guided backcountry expeditions;
- visual quality for guided angling trips;
- visual quality for visitors to the Treaty Creek Site (*Nisga’a Final Agreement Act* [1999]); and
- visual quality for Highway 37 users.

Table 24.5-1 lists these VCs and the rationale for their inclusion.

Table 24.5-1. Identification and Rationale for Visual and Aesthetic Resources Valued Component Selection

Valued Component	Identified by*				Rationale for Inclusion
	AG	G	P/S	O	
Visual quality for river rafting tours	-	X	X	-	Maintaining visual quality from the Unuk River is an objective of the CIS LRMP (BC ILMB 2000). The Unuk River Valley is identified as a potential scenic area in the CIS LRMP, with the end goal being to have it officially designated as a known scenic area under the <i>Forest Practices Code of British Columbia Act</i> (1996).
Visual quality for heli-skiing tours	-	-	X	-	Heli-skiing touring is a regional tourist activity that focuses on the remote wilderness in the area.
Visual quality for guided backcountry expeditions	-	-	X	-	Guided backcountry expeditions are a regional tourist activity that focuses on the remote wilderness in the area.

(continued)

Table 24.5-1. Identification and Rationale for Visual and Aesthetic Resources Valued Component Selection (completed)

Valued Component	Identified by*				Rationale for Inclusion
	AG	G	P/S	O	
Visual quality for angling trips	-	-	X	-	Angling is a regional tourist activity that may use the remote wilderness in the area.
Visual quality for visitors to the Treaty Creek Site	X	-	-	-	The Treaty Creek Site is a point of cultural importance.
Visual quality for Highway 37 users	-	-	-	-	Highway 37 attracts a high number of visitors for road-based tourism.

*AG = Aboriginal Group; G = Government; P/S = Public/Stakeholder; O = Other.

24.5.2 Valued Components Excluded from Further Assessment

An Aboriginal cultural site (Spruce Creek, site 7024) near the Project was considered and excluded since it was outside of the LSA and will not be visible from the LSA. Specific location data were not publically available; however, the approximate location was digitized from information in *Northwest Transmission Line Project: Skii km Lax Ha Traditional Knowledge and Use Study* (Rescan 2009).

Table 24.5-2 lists the one VC excluded from this assessment and the rationale for its exclusion (Figure 24.5-1).

Table 24.5-2. Rationale for Visual and Aesthetic Resources Valued Components Considered and Excluded from Further Analysis

VC	Identified by*				Rationale for Exclusion
	AG	G	P/S	O	
Visual quality at Aboriginal Cultural Site (Spruce Creek, site 7024)	-	-	-	X	Site was outside visual quality study area and Project infrastructure viewshed.

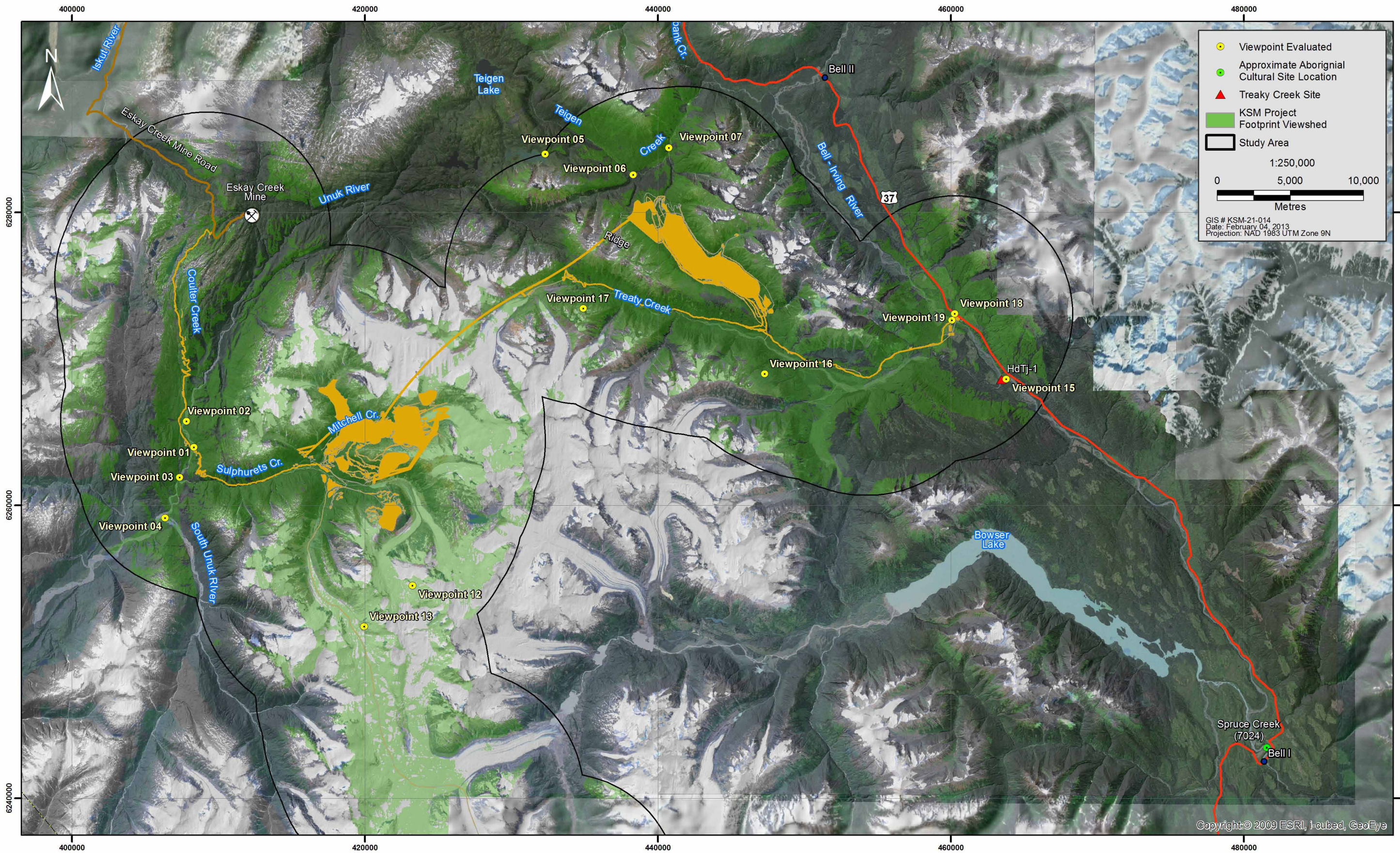
*AG = Aboriginal Group; G = Government; P/S = Public/Stakeholder; O = Other.

24.6 Scoping of Potential Effects for Visual and Aesthetic Resources

[Appendix 24-C](#) provides an analysis of the potential effects of the Project components on visual quality during each Project phase, and Table 24.6-1 summarizes the interaction of potential effects with Project areas. The following sections present a summary of the information contained in [Appendix 24-C](#) and Table 24.6-1.

24.6.1 Construction

The construction of most of the proposed infrastructure will involve stripping, clearing, and foundation preparation. During construction, development of the access roads, TMF, mine pits, and RSFs could potentially affect the six VCs (i.e., visual quality for river rafting tours, heli-skiing tours, guided backcountry expeditions, guided angling trips, visitors to the Treaty Creek Site, and users of Highway 37; [Appendix 24-C](#)).



- Viewpoint Evaluated
- Approximate Aboriginal Cultural Site Location
- ▲ Treacy Creek Site
- KSM Project Footprint Viewshed
- Study Area

1:250,000

0 5,000 10,000

Metres

GIS # KSM-21-014
Date: February 04, 2013
Projection: NAD 1983 UTM Zone 9N

Copyright © 2009 ESRI, i-cubed, GeoEye

Table 24.6-1. Potential Effects from Project on Visual and Aesthetic Resources

Project Region	Project Area	Project infrastructure altering of visual quality for heli-skiers	Project infrastructure altering of visual quality for river rafting tours	Project infrastructure altering of visual quality for backcountry expedition tours	Project infrastructure altering of visual quality for guided angling trips	Project infrastructure altering of visual quality for visitors of the Treaty Creek Site	Project infrastructure altering of visual quality for users of Highway 37
Mine Site	Camp 3: Eskay Staging Camp						
	Camp 7: Unuk North Camp						
	Camp 8: Unuk South Camp						
	Coulter Creek Access Corridor	X	X				
	Mitchell Operating Camp						
	McTagg Rock Storage Facility	X		X			
	McTagg Twinned Diversion Tunnels						
	McTagg Power Plant						
	Mitchell Rock Storage Facility						
	Camp 4: Mitchell North Camp (for MTT construction)						
	Mitchell Ore Preparation Complex						
	Mine Site Avalanche Control	X		X			
	Iron Cap Block Cave Mine	X					
	Mitchell Pit	X		X			
	Mitchell Block Cave Mine						
	Mitchell Diversion Tunnels						
	Upper Sulphurets Power Plant						
	Mitchell Truck Shop						
	Water Storage Facility						
	Camp 9: Mitchell Initial Camp						
	Camp 10: Mitchell Secondary Camp						
	Water Treatment and Energy Recovery Area						
	Sludge Management Facilities						
	Sulphurets Laydown Area						
	Sulphurets-Mitchell Conveyor Tunnel						
	Sulphurets Pit	X		X			
	Kerr rope conveyor						
	Kerr Pit	X		X			
	Camp 2: Ted Morris Camp						
	Explosives Manufacturing Facility						
	Temporary Frank Mackie Glacier Access Route	X		X			
	Camp 1: Granduc Staging Camp						
Processing and Tailing Management Area	Mitchell-Treaty Twinned Tunnels construction access adit						
	Mitchell-Treaty Saddle Area	X					
	Camp 6: Treaty Saddle Camp						
	Camp 5: Treaty Plant Camp						
	Treaty Operating Camp						
	Treaty Ore Preparation Complex						
	Concentrate Storage and Loadout						
	North Cell Tailing Management Facility	X			X		
	East Catchment Diversion						
	Centre Cell Tailing Management Facility	X					
	South Cell Tailing Management Facility	X					
	Treaty Creek Access Corridor	X			X		X
	Camp 11: Treaty Marshalling Yard Camp						
Camp 12: Highway 37 Construction Camp						X	
Off-site	Highway 37 and 37A						

X = interaction between component and effect.

24.6.2 Operation

The altered land cover along the proposed roads, at the proposed Mine Site and at the TMF will persist during operation. Other construction sites no longer in use will be reclaimed and re-vegetated. The log landings and waste areas along the proposed roads and around the Project will be re-vegetated.

During operation, the ongoing presence of the cleared access roads, transmission lines, TMF, mine pits, and RSFs will have the potential to affect the six VCs (i.e., visual quality for river rafting tours, heli-skiing tours, guided backcountry expeditions, guided angling trips, visitors of the Treaty Creek Site, and users of Highway 37).

The proposed TMF will affect the landscape. The TMF dams may be visible from some locations on the slopes of the hills surrounding the TMF. On the hills above the TMF, part or all of the TMF may be visible. However, since use of these hills by heli-skiing tours will not be likely from the construction phase to the closure phase, the assessment of potential effects on visual quality from these specific locations is more relevant to the post-closure phase. The TMF will be built gradually. The North and the Splitter dams will reach their maximum elevation of 1,068 m above sea level (masl) during construction. The Southeast dam and the Saddle dam will reach their maximum elevation of 1,068 masl during closure ([Appendix 24-C](#)).

Although the proposed mine pits are in a remote location, the pits could have a potential effect on visual quality for several slopes used as heli-skiing runs. These runs begin in alpine areas above the treeline. However, since use of these slopes will not be possible when the Project is constructed, the assessment of potential effects on visual quality from these specific locations is more relevant to the post-closure phase. The potential effect of the loss of access is discussed in Chapter 23, Land Use.

24.6.3 Closure

During the closure phase, some Project-related effects will be mitigated; however, some potential effects to the following three VCs could persist during this phase:

- visual quality for heli-skiing tours;
- visual quality for guided backcountry expeditions; and
- visual quality for angling tours.

The proposed CCAR and associated borrow pits, log landings, and waste areas will be reclaimed. The TCAR will not be closed; however, the laydown areas around the road will be re-vegetated. The Treaty Creek transmission line from the Northern Transmission Line (NTL) to the Treaty Ore Preparation Complex (OPC) will remain. The alteration to visual quality will diminish over time as vegetation re-establishes.

The proposed TMF could affect visual quality for recreational users during closure. The TMF North dam could remain visible from some locations on the slopes of the hills surrounding the TMF. The TMF will be closed as a dry surface with an open pond and channel. The TMF

beaches will be capped by till and re-vegetated. The dam faces will be covered either with an erosion protection layer or with till and re-vegetated using soil stockpiled during construction of the dams (Tetra Tech-Wardrop 2012; Chapter 24, Section 27.4.5). These measures will minimize visual quality effects.

The mine pits and RSFs will have the potential to affect visual quality for recreational users. During closure, the Mitchell pit will be filled with water to 810 masl. At closure, the Sulphurets Pit will be filled with waste rock from the Kerr Pit to 1,500 masl, which will reduce the visual effect of the pit.

24.6.4 Post-closure

During the post-closure phase, some Project-related effects will be mitigated; however, some potential effects to the following three VCs could persist during this phase:

- visual quality for heli-skiing tours;
- visual quality for guided backcountry expeditions; and
- visual quality for angling tours.

The Mitchell RSF will rise to a final elevation of 1,200 masl and will have a till cover applied to promote plant growth and the surface will be re-vegetated, where possible, which will reduce the effect on visual quality. The McTagg RSF will rise to 1,020 masl and will be partially re-vegetated.

The TCAR and Treaty operating camp will remain post-closure.

24.7 Potential for Residual Effects for Visual and Aesthetic Resources

The potential effects of the Project on each of the six visual quality and aesthetic resources VCs are presented in the following sections (Sections 24.7.1 to 24.7.6). Table 24.7-1 provides a general overview of the anticipated interactions between the Project components and visual quality on the six VCs.

Table 24.7-1. Existing Landscape Visual Character

Description	Value	Typical Character/Modification
Unmodified landscape/natural	5	None or minimal effect from anthropogenic sources (e.g., national parks, coastlines, native forest areas)
Natural transition landscape	4	Changing landscape character associated with the interface between natural areas and modified rural, pastoral, or agricultural zones
Modified rural landscape, agricultural, pastoral areas	3	Rural landscape defined by field patterns, forestry plantations, and agricultural areas, and associated small roads and buildings
Rural transition landscape	2	Landscape associated with the interface between rural, agricultural areas, and more developed suburban or urban zones
Highly modified landscape, urban/industrial	1	Substantially developed landscape with a high level of visual effects associated with buildings, factories, roads, and other related infrastructure

Source: HASSELL (2005).

24.7.1 Visual and Aesthetic Resources Assessment Methodology

This section contains a description of the methods used to determine where there is the potential for effects to visual quality for each VC.

Existing baseline visual quality conditions are described in the *KSM Project: 2009 and 2010 Visual Quality Baseline Report* and its addendum ([Appendices 24-A](#) and [24-B](#)). A viewshed analysis was conducted using data on the proposed infrastructure. This analysis identified areas with a potential view of the infrastructure. These areas were overlain on potential visually sensitive areas to identify baseline viewpoint locations.

A second viewshed analysis used a set of baseline viewpoints identified as key to specific VCs to quantify the amount of visual disturbance due to Project infrastructure (Figures 24.7-1 to 24.7-5). Thirteen of the baseline viewpoints were selected for assessment. Viewshed modelling included the same DEM from the BC Terrain Resource Information Mapping (TRIM) program used in the baseline viewshed analysis. The modelling also included VRI from the British Columbia Integrated Land Management Bureau. The DEM was used to provide topographic information, and the VRI was used to add tree height data to the modelled landscape.

A 3-D visualization was created using Visual Nature Studio 3 to model the changes in visual quality for photographs taken during the baseline study at the selected viewpoints. The surrounding ecosystems were recreated based on a TRIM DEM and GIS shapefiles containing spatial data of water and vegetation features. Proposed Project features were added to the Visual Nature Studio 3 program to model the view with potential changes caused by the infrastructure.

The potential visual effects for each of the 13 key viewpoints were rated using the HASSELL Matrix (Figure 24.4-1). The HASSELL Matrix is a system developed by HASSELL Pty Ltd. (HASSELL 2005) based on the standard visual management system for assessing visual effects. The standard visual management system was based on models for quantifying potential changes to landscape composition (Litton 1968). The HASSELL Matrix measures the following aspects of visual quality to assess a development's total visual effect on the landscape:

- existing landscape visual character;
- degree of visual modification;
- horizontal visual effect;
- vertical visual effect; and
- distance of visual effect.

The baseline photographs were used to rate the existing landscape visual character. The 3-D visualizations were used to measure the degree of visual modification and the vertical visual effect. The viewshed analysis from specific viewpoints and the 3-D visualizations were used to calculate the horizontal visual effect. These visual aspects are described further below.

HASSELL Matrix System (adapted from HASSELL 2005)

The existing landscape visual character aspect is assigned a value from 1 to 5, as shown in Table 24.7-1. The degree of visual modification aspect of visual quality is measured by assessing

the degree of visual change to the existing landscape that would result from a project, balanced with consideration of the landscape's capacity to absorb or mitigate visual effects, and assigning that a value from 1 to 5, as shown in Table 24.7-2.

Table 24.7-2. Degree of Visual Modification

Degree of Visual Modification (expressed as percentage of change)	Value	Description of Visual Modification
80 to 100	5	Substantial visual effects: the existing landscape character is completely changed or modified to accommodate the development
60 to 79	4	Increasing visual effects: the landscape is seen as changed permanently with the development dominating the existing landscape
40 to 59	3	Moderate visual effects: medium level of change to the landscape character; the landscape is less able to absorb change because of the scale, frequency, or extent of the development
20 to 39	2	Limited effects: the development is noticeable within the landscape, but the capacity for the landscape to absorb the development through vegetation growth or landforms is high
0 to 19	1	No or minor visual effects within the landscape: the development is considered in keeping with the existing landscape character

Source: HASSELL (2005).

The horizontal visual effect aspect of visual quality concerns the human field of vision. This field is described as an angle of 200° horizontally. Using this fixed visual reference, an assessment is made of the possible effect of a project within this measurable area. The centre of a proposed development is established, and an angle of 100° on each side is defined. The extent of visual effect within this zone is then measured. The overall assessment made is for an entire development, rather than of individual infrastructure. This measurement of effect is then described as a percentage of the panorama and is assigned a value from 1 to 5, as shown in Table 24.7-3.

Table 24.7-3. Horizontal Visual Effect

Degree of Horizontal Visual Effect of the Panorama Measured at 200° Field of Vision (expressed as percentage of change)	Value	Description of Visual Modification
80 to 100	5	Substantial visual effects throughout the whole panorama
60 to 79	4	Increasing visual effects
40 to 59	3	Moderate visual effects
20 to 39	2	Limited visual effects
0 to 19	1	No or minor visual effects

Source: HASSELL (2005).

The vertical visual effect aspect of visual quality is measured in a similar way to horizontal visual effect, but the field of view is described as 150°. This assessment ensures that the visual

effect in relation to proximity is considered. This aspect is assigned a value from 1 to 5, as shown in Table 24.7-4.

Table 24.7-4. Vertical Visual Effect

Degree of Vertical Visual Impact of the Panorama Measured at a 150° Field of Vision (expressed as percentage of change)	Value	Description of Visual Modification
80 to 100	5	Substantial visual effects
60 to 79	4	Increasing visual effects
40 to 59	3	Moderate visual effects
20 to 39	2	Limited visual effects
0 to 19	1	No or minor visual effects

Source: HASSELL (2005).

The distance of visual effect aspect of visual quality is a measurement of how visual effect is modified by distance. The effect of scale, topography, vegetation, and weather changes with distance, and, in turn, changes the degree of visual effect. This aspect is assigned a value from 1 to 5, as shown in Table 24.7-5.

Table 24.7-5. Distance of Visual Effect

Distance to Development (km)	Value	Description
0 to 0.5	5	Adjacent
0.5 to 1	4	Foreground
1 to 3	3	Middle ground
3 to 5	2	Distant middle ground
Over 5	1	Background

Source: HASSELL (2005).

The values of all five visual aspects are then added together, and the resulting number is the final visual effect value, which is used to determine the degree of visual effect, as shown in Table 24.7-6.

Table 24.7-6. Final Visual Effect Rating

Degree of Visual Effect	Value
Severe	21 to 25
Substantial	17 to 20
Moderate	13 to 16
Slight	9 to 12
Negligible	5 to 8

Source: HASSELL (2005).

HASSELL Matrix evaluation results for the 19 viewpoints were used to determine where potential for effects to visual and aesthetic resources may exist. These results are described within their relevant VC sections (Sections 24.7.2 to 24.7.5).

24.7.2 Alteration of Visual Quality for River Rafting Tours

The Explorer's League has offered one seven-day trip per year down the Unuk River, from near its confluence with Storie Creek into Alaska. The 35-km long CCAR will be constructed during the construction phase. During both construction and operation, the single-lane road will provide access to the Mine Site and will support mine development. The road will run along a hill within a valley used for river rafting and will cross a bridge built across the Unuk River. River rafting tours travelling down the Unuk River will pass under this bridge. The road will be maintained for the operating life of the mine. In the closure and post-closure phases, the road and bridge will be removed and vegetation will be restored.

Visual Nature Studio 3 visualizations were created for four viewpoints along Unuk River. Viewpoint 2 is downslope of the proposed CCAR. Viewpoint 1 is located near the point where the CCAR is proposed to cross the Unuk River via the Unuk River bridge, and Viewpoints 3 and 4 are south of the Unuk River crossing location (Figure 24.7-1).

Approximately 3.3 km of the proposed CCAR is predicted be visible from at least one point along the river. The Visual Nature Studio 3 renderings in Plates 24.7-1 to 24.7-3 provide a simulation of what the visual effect of the road and other proposed infrastructure will be from Viewpoints 1, 2, and 3 on the Unuk River, near the road. Project infrastructure will not be visible from Viewpoint 4 (Figure 24.7-1).

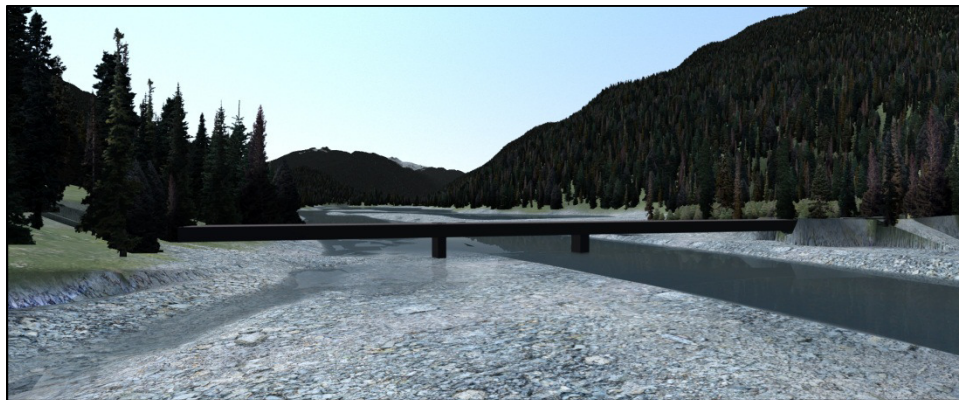


Plate 24.7-1. Viewpoint 1 - Visual rendering of the proposed Unuk River bridge.

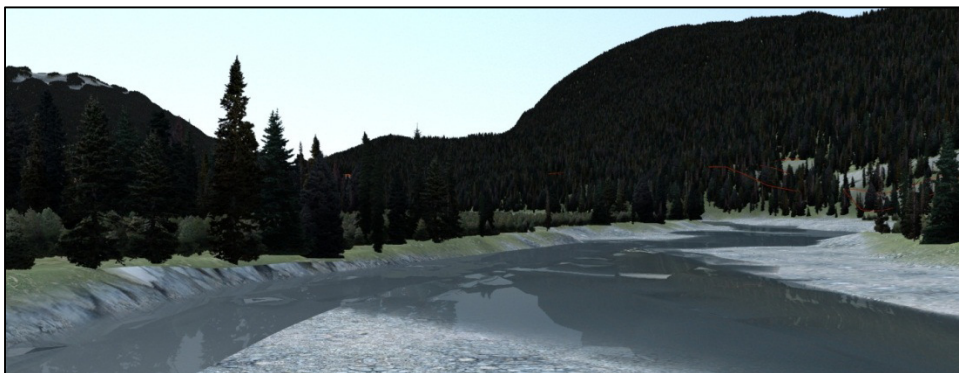
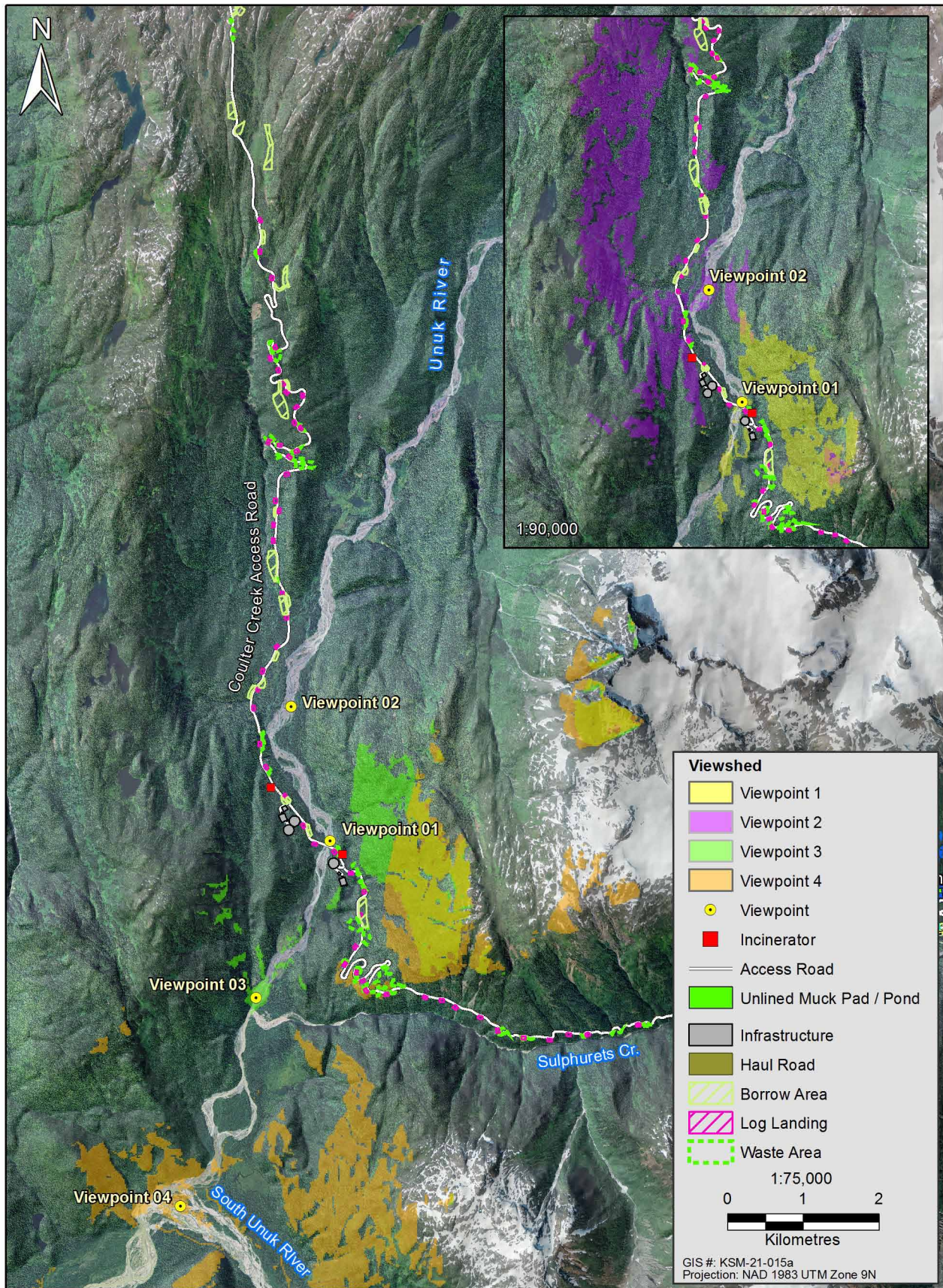


Plate 24.7-2. Viewpoint 2 - Visual rendering of view toward the proposed Coulter Creek access road.



Viewpoints Used to Assess Potential Alteration of Visual Quality for River Rafting Tours

Figure 24.7-1



Plate 24.7-3. Viewpoint 3 - Visual rendering of the view toward the proposed Coulter Creek access road.

24.7.2.1 Mitigation for Alteration of Visual Quality for River Rafting Tours

The CCAR will follow the area-specific objective to maintain visual quality from the Unuk River as set out in the CIS LRMP. The design of the road will reduce effects on the appearance of natural landscape wherever practical. During construction, trees will be removed within the road right-of-way. Tree buffers will be maintained on either side of the road, where possible. This mitigation will reduce the degree of visual effect at Viewpoints 2 and 3.

The selected location of the bridge built across the Unuk River is at a point where the river bends. The location will minimize the visibility of the bridge at most locations, and thereby reduce the magnitude of any visual effects. The mitigation will reduce the degree of visual effect at Viewpoint 1.

At closure, the road will be decommissioned and the bridge will be removed. The road will be reclaimed and the land re-vegetated. The mitigation will gradually remove the effect of the road on visual quality at all locations along the river.

24.7.2.2 Potential for Residual Effects

The four key viewpoints along the Unuk River assessed for river rafting tours will be affected differently by the Project. The rating for the existing landscape is unmodified landscape/natural at all four viewpoints. The lower elevations of the valley walls surrounding the river are heavily forested. An exploration camp exists 200 m southwest of Viewpoint 3, near the confluence of Sulphurets Creek and Unuk River. However, it could not be seen from the viewpoint. The degree of visual modification on Viewpoint 1 is rated as *increasing*. The horizontal effect is rated as *increasing*, and the vertical effect is rated as *no* or *minor effect*. The distance to the bridge is rated as *adjacent*. The degree of visual effect is *substantial*. The degree of visual modification at Viewpoint 2 is rated as *limited*. The horizontal effect is rated as *limited*, the vertical effect is rated as *no* or *minor visual effect*, and the distance of visual effect is rated as *adjacent*. The degree of visual effect is rated as *moderate*. The degree of visual modification at Viewpoint 3 was rated as *increasing*. The horizontal and vertical effects were rated as *minor*, and the distance of visual effect

was rated as *middle ground*. The degree of visual effect was rated as *moderate*. The degree of visual modification at Viewpoint 4 was rated as *no* or *minor visual effect*. The horizontal and vertical effects were rated as *no* or *minor visual effect*, and the distance of the visual effect was rated as *limited*. The degree of visual effect on river rafting tours is rated as *slight*.

The Project is likely to incur a small residual effect on river rafting. The visual modifications of the Unuk Bridge and CCAR will be visible for a short period of time but the overall effect will be reduced by the capacity of the landscape to diminish the effect via vegetation screening, vegetation growth, and diverse local landforms. Viewpoint 1 has the highest rating for degree of visual effect due to the contribution of the Unuk Bridge, causing the *substantial* degree of visual effect. This localized effect is higher than other areas along river; the total effect of the CCAR and Unuk River bridge will be substantially lower for the length of the river. The horizontal and vertical effects were judged as having a *limited* visual impact. The degree of visual effect is *slight* for river rafting (Table 24.7-7).

During construction and operation, the CCAR may be visible from the Unuk River and could have an effect on visual quality for recreational users.

If the mitigation measures are implemented as planned (Section 24.7.2.2), the road is expected to have residual effects. At the small section of the river where the bridge will be visible, residual effects are expected. The location of the bridge near a bend in the river will minimize its effects on visual quality. However, a residual effect on river users is still expected (Table 24.7-8). Determination of residual effect significance for river rafting tours is discussed in Section 24.8-2.

24.7.3 Alteration of Visual Quality for Heli-skiing Tours

Last Frontier Heliskiing holds the only recreation licence for heli-skiing in the area, encompassing approximately 9,500 km. The heli-skiing tours take clients for a number of trips, over a wide range of mountains and slopes. A small number of the runs used for heli-skiing are within the LSA. Runs in the LSA that intersect the TMF are used more when visibility is limited. When the TMF is operating, these runs cannot be used. There are several other runs between 5 and 8 km away from the TMF. There are runs in the LSA that intersect the Mitchell and Kerr pits. Several other nearby runs are from 3 km to 5 km from the mine pits. The TMF has the potential to alter visual quality for heli-skiing tours in the area. During construction, the TMF will consist of lower starter dams, which will rise to a height of 100 m at an elevation of 930 masl. From construction through operation, the dams at the north and south ends will rise to an ultimate crest height of 239 m at an elevation of approximately 1,068 masl. The footprint viewshed analysis results indicate that the TMF will be visible from several of the surrounding slopes (Figure 24.4-1). The slopes include those on the ridge between Treaty Creek and Teigen Creek, some hills to the south of Treaty Creek, and the hills to the north and south of Teigen Creek (Figure 24.7-2).

The ridge between Teigen Creek and Treaty Creek is in an area where 11 possible heli-skiing runs used by Last Frontier Heliskiing will intersect with the proposed TMF (Viewpoint 11, Figure 24.1-1). Since the TMF is not likely to be accessed for safety reasons as construction progresses, the potential effects on visual quality for heli-skiing tours are not considered further. Refer to the Land Use Effects Assessment regarding restrictions on access to the heli-ski runs in the TMF area (Chapter 23, Section 23.7.2).

Table 24.7-7. HASSELL Matrix Results for Viewpoints Used to Assess Potential Alteration of Visual Quality for River Rafting Tours

Viewpoint	Area	Valued Component	Existing Landscape Visual Character	Degree of Visual Modification	Horizontal Visual Effect	Vertical Visual Effect	Distance of Visual Effect	Final Visual Effect Rating	Degree of Visual Effect
1	Unuk	Visual quality for river rafting tours	5	4	4	1	5	19	Substantial
2	Unuk	Visual quality for river rafting tours	5	2	2	1	5	15	Moderate
3	Unuk	Visual quality for river rafting tours	5	4	1	1	3	14	Moderate
4	Unuk	Visual quality for river rafting tours	5	1	1	1	2	10	Slight

Table 24.7-8. Potential Residual Effects on Visual and Aesthetic Resources for River Rafting Tours due to Project Infrastructure

Valued Component	Timing Start	Component(s)	Description of Effect due to Component(s)	Type of Project Mitigation	Project Mitigation Description	Potential Residual Effect	Description of Residuals
Altering of visual quality for river rafting tours	Construction	Coulter Creek access road and Unuk River bridge	Road could have adverse effect on visual quality for rafters; bridge could have adverse effect on visual quality for rafters	Alternative, design change, management practices	Road to mimic natural landscape as practical and leave tree buffer.	Yes	The bridge and road will continue to have an effect on visual quality for river rafting tours
Altering of visual quality for river rafting tours	Closure	Coulter Creek access road and Unuk River bridge	Road could have adverse effect on visual quality for rafters	Management practices	Road decommissioned and re-vegetated, Unuk River bridge will be removed	Yes	The road will continue to have an effect on visual quality for river rafting tours

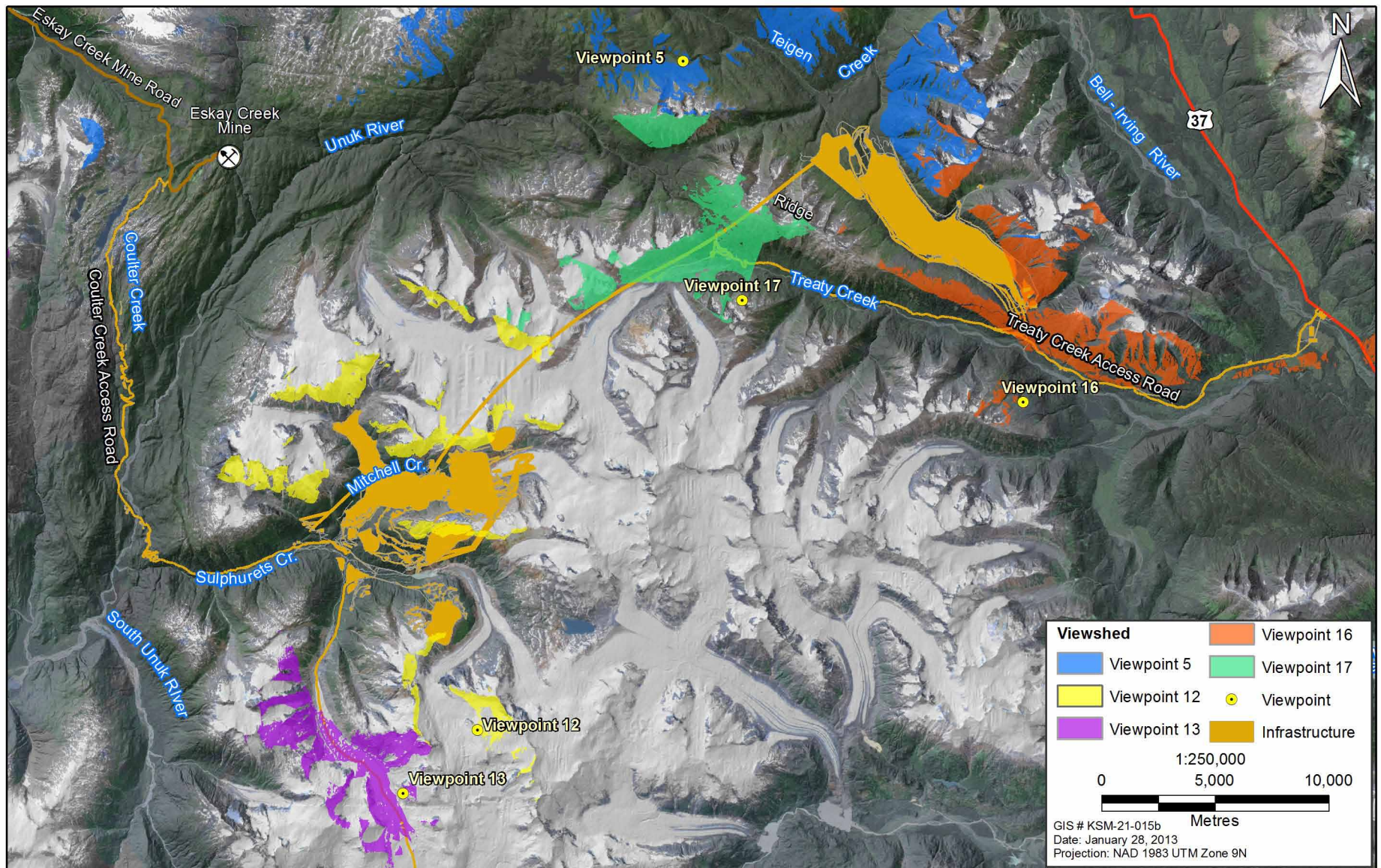


Figure 24.7-2

The TCAR has the potential to alter visual quality for heli-skiing tours in the area. The TCAR will provide permanent access from Highway 37, starting approximately 19 km south of Bell II, to the eastern part of the Project footprint. The first part of the route will follow a former forestry access road across gentle till-blanketed terrain. The road will then follow and significantly upgrade an existing forestry access trail for approximately 4 km. A junction will occur at approximately 17 km along the road. The North Treaty lower road will turn north and follow the west side of the North Treaty Creek/Teigen Creek Valley to the Treaty OPC. The TCAR will transition into the Treaty Saddle road and head east to provide access to the east portal of the Mitchell-Treaty Saddle Area. A 28.5-km transmission line will be constructed from the NTL and follow the TCAR to the Treaty OPC. The line will generally run along the TCAR from the Bell-Irving River to a deviation point where it will transition between roads as it travels to the Treaty OPC.

Four key viewpoints are used to quantitatively assess potential effects on visual quality of heli-skiing tours (Viewpoints 5, 12, 16, and 17). The viewshed analysis of Viewpoint 5 indicated the TMF would not be visible. The photo rendering in Plate 24.7-4 provides a simulation of the view looking south from the viewpoint toward the TMF.

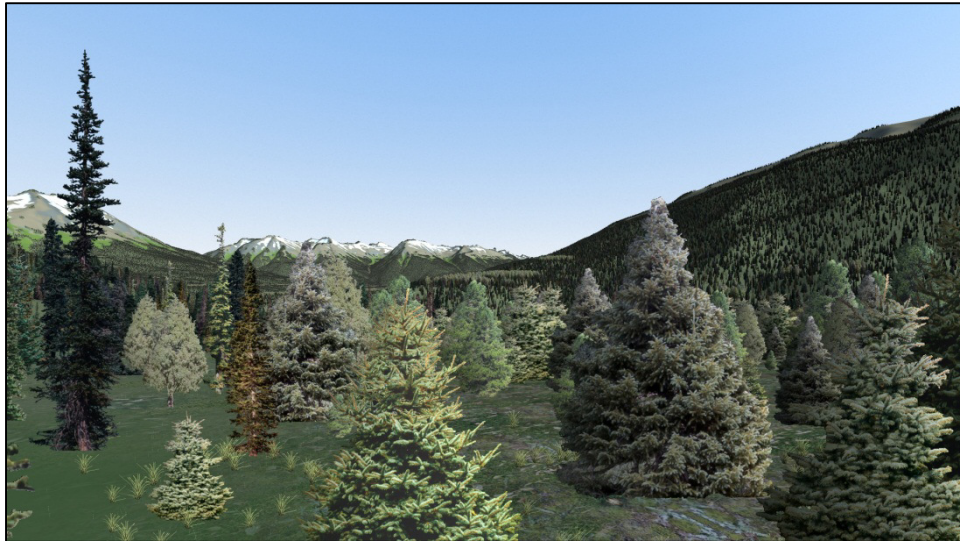


Plate 24.7-4. Viewpoint 5 - Visual rendering looking toward the proposed Tailing Management Facility.

The viewshed analysis of Viewpoint 16 indicated that about 500 m of the TMF and 2 km of the TCAR would be visible. The photo rendering in Plate 24.7-5 provides a simulation of what the visual effect of the TMF could be at this site when looking north from a slope above Treaty Creek.

The mine pits could have an effect on visual quality for heli-skiing tours in the area. During the construction phase, the pits will be expanded in stages and will not be widely visible. By the end of construction and throughout operation, the pits will grow to their maximum extent. The viewshed analysis results indicate that the pits could be visible from sections of the surrounding alpine area (Figure 24.7-2). If the pits are built as proposed, several runs will be inaccessible; however, the pits lie within an area where a variety of runs will still be available ([Appendix 23-A](#)). Refer to Chapter 23, Land Use for effects and mitigation of reduction of access.

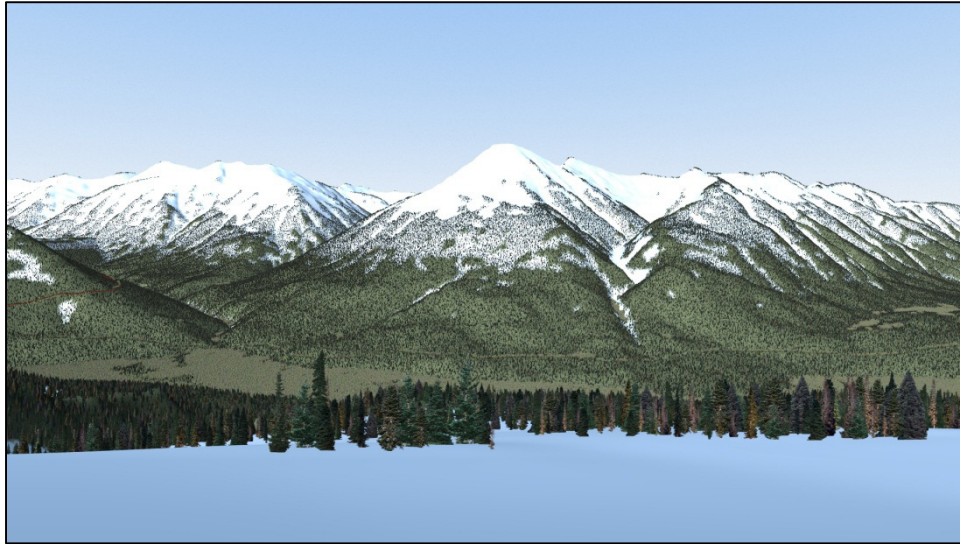


Plate 24.7-5. Viewpoint 16 - Visual rendering looking toward the proposed Tailing Management Facility post closure.

The viewshed analysis of Viewpoint 12 indicated that an approximately 1.2 km section of the Sulphurets Pit would be visible. The photo rendering in Plate 24.7-6 provides a simulation of what the visual effect of the pits could be at this site when looking east from a slope above the top of the West Sulphurets Glacier.

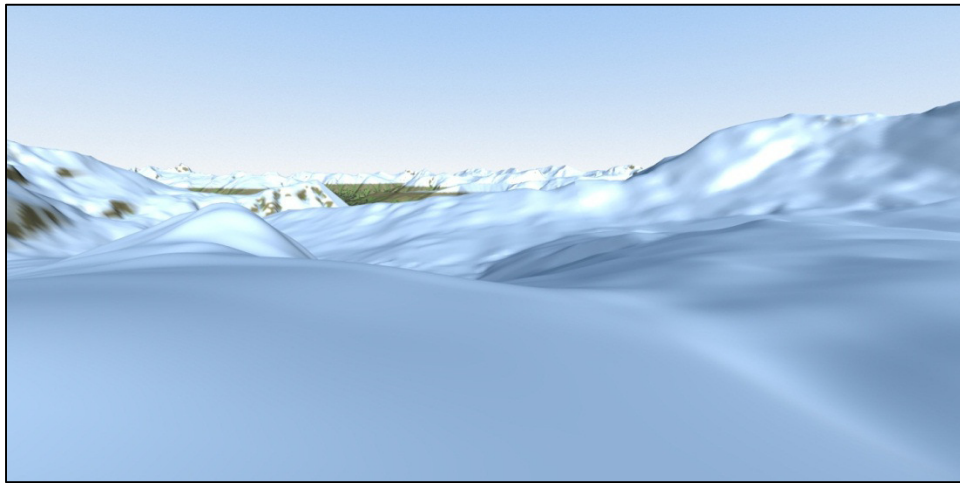


Plate 24.7-6. Viewpoint 12 - Visual rendering looking toward the proposed Sulphurets Pit.

24.7.3.1 Mitigation for Alteration of Visual Quality for Heli-skiing Tours

The hills that will be accessible for heli-skiing in the area, from which the TMF could potentially be seen, are over 5 km away from the TMF southeast dam. The view from these hills will be reduced by foliage on the runs and the amount of snow covering the ground. The addition of vegetation to the TMF dams and beaches will mitigate the TMF's effect on visual quality. Chapter 27, Closure and Reclamation, describes how the TMF will be reclaimed.

The viewpoints from ski runs are over 1.5 km from the TCAR and Treaty Creek transmission line. Additional management practices that will be used during the construction, operation, and closure phases to reduce the visual quality effects of the road include the following.

- The design of the TCAR will reduce effects on appearance of natural landscape where practical. A tree buffer will be left around the road when possible.
- Tree buffers will be maintained around roads, where possible, with consideration to the safety of road users.
- Tree buffers will be maintained around major infrastructure, where possible, when infrastructure is potentially in view of heli-ski areas.
- During closure, non-essential roads will be reclaimed and re-vegetated.

The location of the pits will intersect two heli-skiing runs, which will no longer be accessible in all phases of the Project. The slopes that will remain accessible for heli-skiing in the area are 3 to 5 km away. During the construction and operation phases, Project components will be built to lessen visual alteration of natural landscapes, where practicable

24.7.3.2 Potential for Residual Effects

Each of the four key viewpoints related to the heli-skiing HASSELL Matrix will be affected differently by the Project. The existing landscape at Viewpoint 5 is rated as *unmodified landscape/natural*. The lower elevations of the valley walls are heavily forested, while at elevations above 1,300 masl the land is covered with sparse vegetation or rock. The degree of visual modification predicted to occur due to the proposed Project was rated as *no* or *minor visual effect* because the development is not noticeable within the landscape. The horizontal and vertical effects were also rated as *no* or *minor visual effect*, and the distance of the visual effect was judged to be *background*. The degree of visual effect for Viewpoint 5 would be *slight* (Table 24.7-9).

The existing landscape around the TMF was rated as *unmodified landscape/natural*. Alpine areas above the TMF, where runs begin, generally have minimal forest cover. From these locations, the Project could have a *substantial* to *severe* effect. Many of these locations would no longer be accessible for the life of the mine; for those sites that are still accessible, the degree of visual effect would be *moderate* (Table 24.7-9).

Viewpoint 16 is on a possible heli-skiing run, located on a hill to the south of Treaty Creek. The viewpoint overlooks the TCAR and TMF. The existing landscape is rated as *unmodified landscape/natural*. The lower elevations of the valley are heavily forested, while at elevations above 1,300 m, the land tends to be covered with grass or rock. The degree of visual modification predicted to occur because of the proposed Project was rated as *limited* because the development would be noticeable within the landscape, but the capacity for the landscape to absorb the development through vegetation growth or landforms is high. The horizontal effect was rated as *moderate*, and vertical effect was rated as *no* or *minor visual effect*. The viewpoint is over 2 km away from the access road and transmission line, which puts it into the distance category of *middle ground*. Based on this rating, the degree of visual effect would be *moderate*.

Table 24.7-9. HASSELL Matrix Results for Viewpoints Used to Assess Potential Alteration of Visual Quality for Heli-skiing Tours

Viewpoint	Area	Valued Component	A Visual Character of Existing Landscape	B Degree of Visual Modification	C Horizontal Visual Effect	D Vertical Visual Effect	E Distance of Visual Effect	Total Final Visual Effect Rating	Degree of Visual Effect
Viewpoint 5	Teigen	Visual quality for heli-skiing tours	5	1	1	1	1	10	Slight
Viewpoint 12	Glacier	Visual quality for heli-skiing tours	5	1	1	1	1	9	Slight
Viewpoint 16	Treaty	Visual quality for heli-skiing tours	5	2	3	1	3	13	Moderate
Viewpoint 17	Treaty	Visual Quality for heli-skiing tours	5	2	3	1	3	13	Moderate

Visual and Aesthetic Resources

Viewpoint 17 is on a possible heli-skiing run, located on a hill to the south of the Mitchell-Treaty Saddle Area. The viewpoint overlooks the TCAR and the Mitchell-Treaty Saddle Area. The existing landscape is rated as *unmodified landscape/natural*. The lower elevations of the valley are heavily forested, though sections of the valley's western portion are covered with rock, exposed by the receding glacier. The slope below the viewpoint is steep, and at elevations above 1,300 masl, the land tends to be covered with grass or rock. The degree of visual modification predicted to occur because of the proposed Project was rated as a *limited effect* because the development would be noticeable within the landscape, but the capacity for the landscape to absorb the development through vegetation growth or landforms is high. The horizontal effect was rated as *moderate*, and vertical effect was rated as *no* or *minor visual effect*. The site is approximately 1.5 km away from the TCAR and less than 2 km from the Mitchell-Treaty Saddle Area, which puts it into the distance category of middle ground. Based on this rating, the degree of visual effect would be *moderate*.

A person standing at Viewpoint 12, south of the pits, could potentially see the pits. The existing landscape has been rated as *unmodified landscape/natural*. The area is alpine, and the land is covered with grass or rock. Glaciers exist in the area and there is a great deal of continual ice cover. The ski runs in the LSA are used in the winter season when the area will be covered with snow. Using the HASSELL Matrix, the degree of visual modification predicted to occur because of the proposed Project was rated as *limited effect* because the development is noticeable within the landscape but the capacity for the landscape to absorb the development through snow cover is high. The horizontal and vertical effects were rated *no* or *minor visual impact*. The distance to the pits could be described as *background*. Based on these ratings, the accumulative rating was *slight* (Table 24.7-9).

If the mitigation measures are implemented as planned, the TMF is expected to have residual effects. During the construction phase, the TMF could begin to have an effect on the visual quality for heli-skiing tours on the nearby hills. The TMF will continue to grow to its maximum footprint during the operation phase. The runs on the ridge between Teigen Creek and Treaty Creek will no longer be accessible for skiers. Other nearby ski hills, which are over 5 km away, could have a view of the TMF (Table 24.7-10).

If the mitigation measures are implemented as planned, the pits are expected to have residual effects. During the construction phase, the pits could begin to have an effect on visual quality for heli-skiing tours on the nearby hills. The pits will continue to grow to their maximum footprint during the operation phase. Two nearby runs will no longer be accessible for skiers. Other nearby ski runs could have a view of the pits. The remaining runs will be 3 to 5 km away (Table 24.7-10). At closure, the Sulphurets Pit will be filled with waste rock from the Kerr Pit to 1,500 masl, which will reduce the visual disturbance effect of the pit.

Determination of residual effect significance for heli-skiing tours is discussed in Section 24.8-3.

Table 24.7-10. Potential Residual Effects on Visual and Aesthetic Resources for Heli-skiers due to Project Infrastructure

Valued Component	Timing Start	Component(s)	Description of Effect due to Component(s)	Type of Project Mitigation	Project Mitigation Description	Potential Residual Effect	Description of Residuals
Altering of visual quality for heli-skiers	Operation	TMF	TMF could have adverse effect on visual quality for heli-skiers	Management practices	Tree buffers around major infrastructure will be maintained where possible, when potentially in view of heli-ski areas.	Yes	In the alpine area, the KSM Project will continue to have an effect on visual quality for heli-skiers
Altering of visual quality for heli-skiers	Closure	TMF	TMF could have adverse effect on visual quality for heli-skiers	Management practices	Tree buffers around major infrastructure will be maintained where possible, when potentially in view of heli-ski areas.	No	-
Altering of visual quality for heli-skiers	Operation	Pits and RSF	Pits should have an effect on visual quality for heli-skiers	Design change	Tree buffers around major infrastructure will be maintained where possible, when potentially in view of heli-ski areas.	Yes	In the alpine area, the KSM Project will continue to have an effect on visual quality for heli-skiers
Altering of visual quality for heli-skiers	Construction	Treaty Creek access road and transmission line	Road and transmission line could have adverse effect on visual quality for heli-skiers.	Alternative, design change, management practices	Road to mimic natural landscape as practical and tree buffers around major infrastructure will be maintained where possible, when potentially in view of heli-ski areas. Transmission line will generally follow road right-of-way	Yes	In the alpine area, the KSM Project will continue to have an effect on visual quality for heli-skiers
Altering of visual quality for heli-skiers	Closure	Treaty Creek Road and transmission line	Road and transmission line could have adverse effect on visual quality for heli-skiers.	Alternative, design change, management practices	Road to mimic natural landscape as practical and tree buffers around major infrastructure will be maintained where possible, when potentially in view of heli-ski areas. Transmission line will generally follow road right-of-way	No	

24.7.4 Alteration of Visual Quality for Guided Backcountry Expeditions

Although guided backcountry expeditions are infrequent, the Project could have an effect on visual quality for expedition users. In an interview, the owner of Bear Enterprises, which runs guided backcountry expeditions, stated that the company offered expeditions along routes that included parts of the Knipple Glacier, Teigen Creek, and Hodkin Lake, depending on the chosen route. The licence area has historically operated in this area for approximately one trip per season used, and for one expedition in the late winter once every five years ([Appendix 23-A](#)).

During construction the TMF will consist of starter dams, which will rise to 930 masl. By the end of construction and throughout operation, the dams at the north and south ends will have an ultimate crest elevation of approximately 1,068 masl. The viewshed analysis results indicate that the TMF could be visible from several locations used for backcountry expeditions, as detailed on Figure 24.7-3. The viewshed analysis of Viewpoint 6 indicated that the TMF would not be visible.

During construction, the pits will be expanded in stages, and the likelihood of the pits' visibility will increase. By the end of construction and throughout operation, the pits will grow to their maximum extent. The viewshed analysis results indicate that the pits could be visible from several locations (Figure 24.7-3).

24.7.4.1 Mitigation for Alteration of Visual Quality for Guided Backcountry Expeditions

If the TMF is visible from any location, mitigation will reduce the Project's effect on visual quality for guided backcountry expeditions. During closure and post-closure, the dam faces will be covered either with an erosion protection layer or with till, and re-vegetated using soil stockpiled during dam construction. The closure plan will reduce the effect on visual quality from the TMF.

24.7.4.2 Potential for Residual Effects

Viewpoint 6 is located at the confluence of Teigen Creek and South Teigen Tributary. Viewpoint 7 is located at the confluence of Teigen Creek and West Teigen Tributary. For both locations the existing landscape is rated as *unmodified landscape/natural*. The land near the riverbanks is heavily forested. The degree of visual modification predicted to occur because of the TMF was rated as having a *no* or *minor visual effect* within the landscape because the development is considered in keeping with the existing landscape character. The horizontal and vertical effects were rated as having *no visual effect*. The distance to the TMF could be described as *distant middle ground*; the accumulative rating was *slight*, based on the definitions in Tables 24.7-1 to 24.7-6 and as shown in Table 24.7-11.

During construction and through operation, the TMF could have an effect on the visual quality for guided backcountry expeditions in the area. The expeditions would travel along routes throughout the area, including along Teigen Creek. Even with proposed mitigation and considering that guided backcountry expeditions use routes throughout the area, there is a potential for residual effects on this VC (Table 24.7-12).

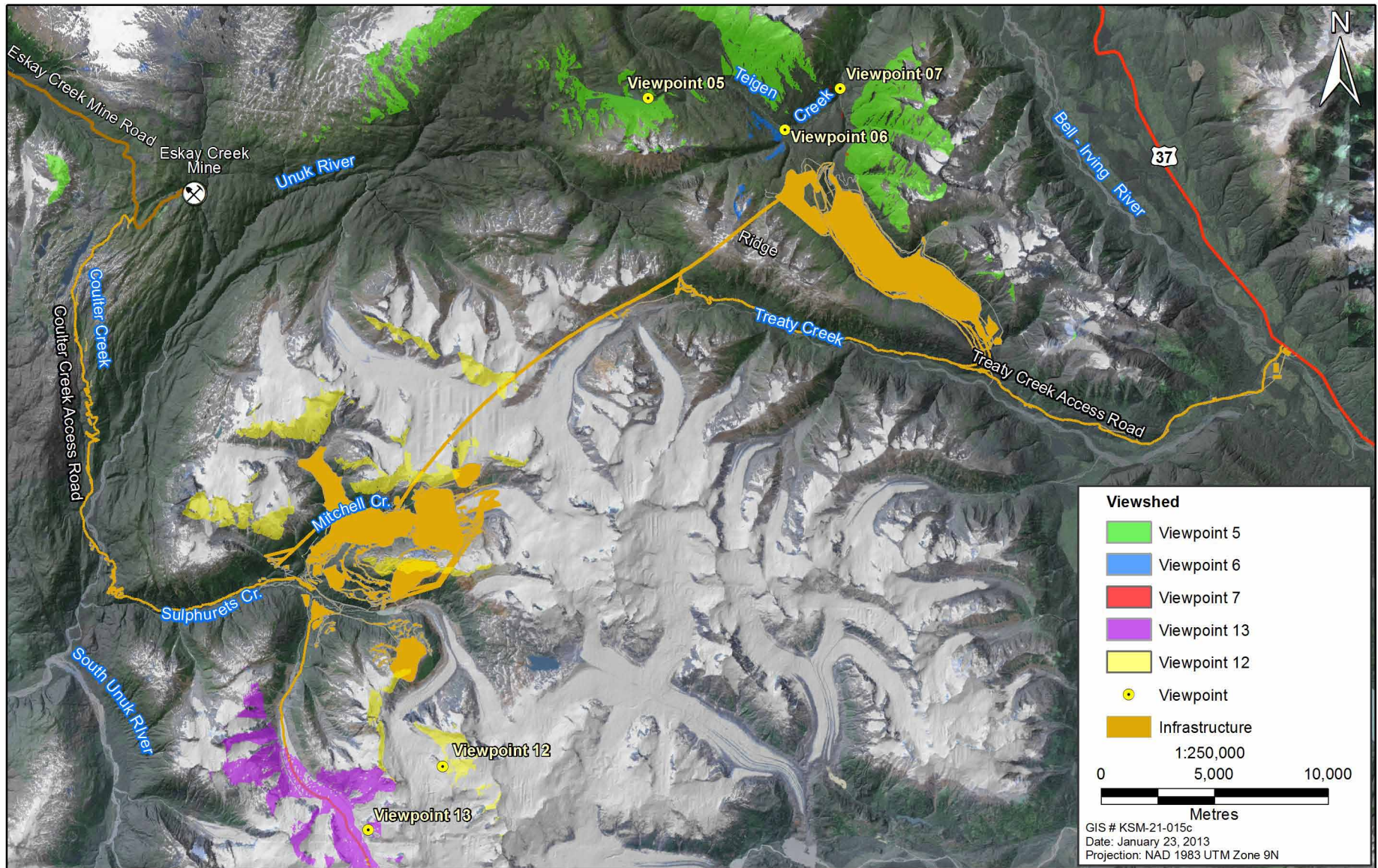


Figure 24.7-3

Figure 24.7-3

Table 24.7-11. HASSELL Matrix Results for Viewpoints Used to Assess Potential Alteration of Visual Quality for Guided Backcountry Expeditions

Viewpoint	Area	Valued Component	A Visual Character of Existing Landscape	B Degree of Visual Modification	C Horizontal Visual Effect	D Vertical Visual Effect	E Distance of Visual Effect	Total Final Visual Effect Rating	Degree of Visual Effect
Viewpoint 6	Teigen	Visual quality for guided backcountry expeditions	5	1	1	1	1	9	Slight
Viewpoint 7	Teigen	Visual quality for guided backcountry expeditions	5	1	1	1	2	10	Slight
Viewpoint 12	Glacier	Visual quality for guided backcountry expeditions	5	1	1	1	1	9	Slight

Table 24.7-12. Potential Residual Effects on Visual and Aesthetic Resources for Guided Backcountry Expeditions due to Project Infrastructure

Valued Component	Timing Start	Component(s)	Description of Effect due to Component(s)	Type of Project Mitigation	Project Mitigation Description	Potential Residual Effect	Description of Residuals
Altering of visual quality on guided backcountry expeditions	Construction	Pits and RSF	The Pits could create adverse effect on visual quality for backcountry users	Management practices	Leave tree buffer	Yes	In the alpine area, the KSM Project will continue to have an effect on guided backcountry expeditions
Altering of visual quality on guided backcountry expeditions	Construction	TMF	TMF could create adverse effect on visual quality for backcountry users	Management practices	Leave tree buffer	Yes	In the alpine area, the KSM Project will continue to have an effect on guided backcountry expeditions

The guided backcountry expeditions sometimes use the Knipple Glacier area. From this location there is a potential for the pits to be seen. The analysis of Viewpoint 12, which is located at the top of the Sulphurets Glacier near Knipple Glacier is found in Section 24.7.2.2. Visits will be in the winter season, when the area will be covered with snow. The degree of the visual effect was *slight* (Table 24.7-11), and the photo rendering in Plate 24.7-6 provides a simulation of what the visual effect of the pits could be at this site when looking east from Viewpoint 12.

During the operation phase, the pits will grow to their maximum extent and could have an effect on the visual quality of guided backcountry expeditions. The effect would only be if the expedition is on a point at the very top of the Knipple Glacier. The top of the glacier is 6 to 8 km away from the pits. At closure, there will be a reduced effect on visual quality from the pits. Even with proposed mitigation and considering that guided backcountry expeditions use routes throughout the area in winter when snow will cover the area, there is a potential for residual effects on this VC (Table 24.7-12).

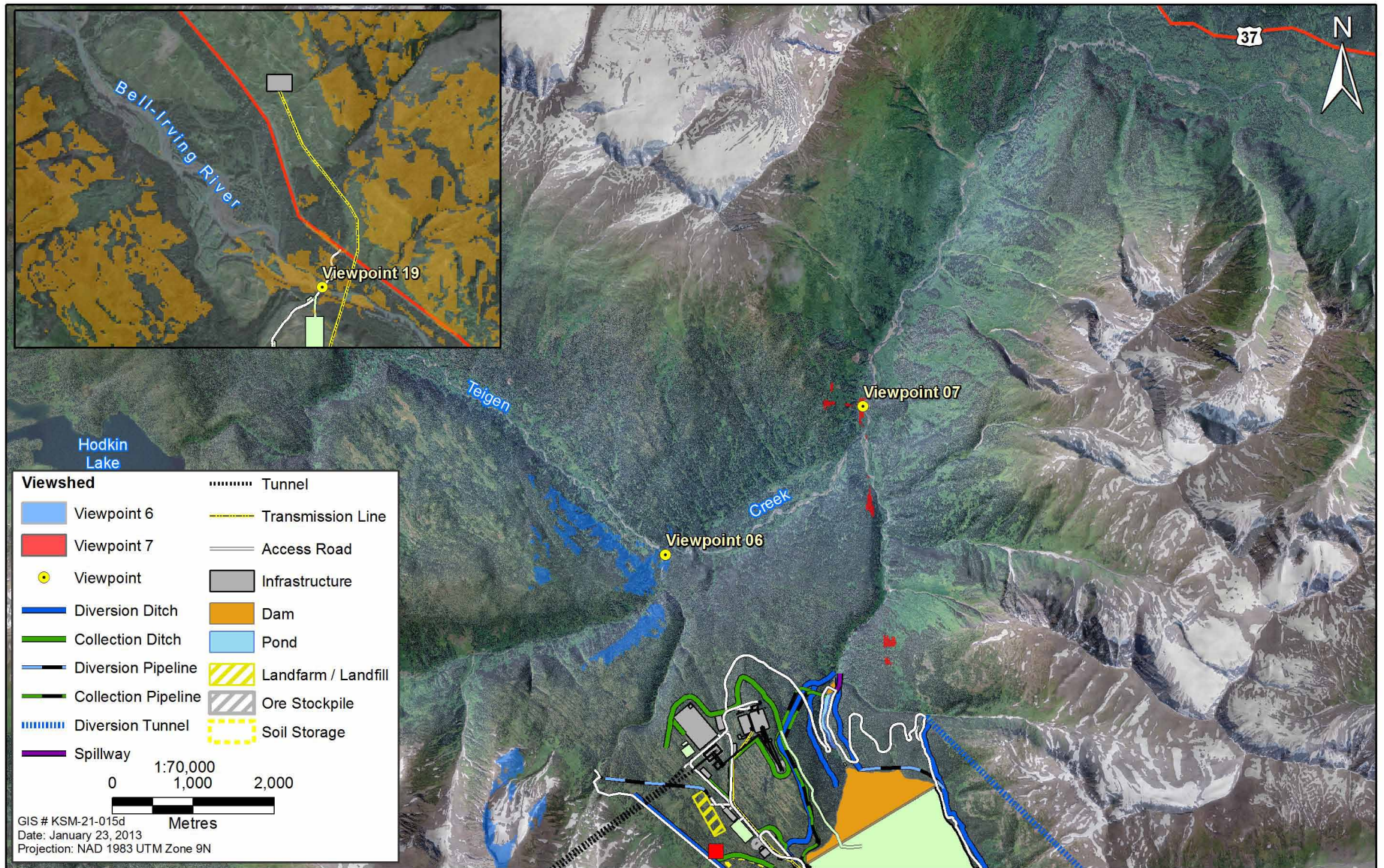
Determination of residual effect significance for guided backcountry expeditions is discussed in Section 24.8.4.

24.7.5 Alteration of Visual Quality for Guided Angling Trips

The Project could have an effect on the visual quality for guided angling trips in the area. Fly-fishing expeditions are run from Boundary Lodge on the Bell-Irving River, south of Bell II and west of Highway 37. Boat launches are used near Glacier Creek and Bell 2 Lodge. Independent angling trips run out of Bell 2 Lodge along the Bell-Irving River, including tributaries, such as Teigen Creek. A tent camp is used along Bell-Irving River, just above Treaty Creek for overnight trips. The angling tours in the area operate daily over eight weeks starting in September ([Appendix 23-A](#)). During construction, the TMF will consist of a starter dam. By the end of construction and throughout operation, the dams at the north and south ends will have an ultimate crest elevation of approximately 1,068 masl. The viewshed analysis results indicate that the TMF would not be visible from the Teigen Creek (Figure 24.7-4). Viewpoint 6 is at a location at the confluence of Teigen Creek and West Teigen Tributary. Viewpoint 7 is at a location at the confluence of Teigen Creek and South Teigen Tributary. The viewshed analysis of Viewpoint 7 indicates that the TMF would not be visible from this location.

The TCAR has the potential to alter visual quality for angling trips on the Bell-Irving River. The TCAR will provide permanent access to the eastern part of the Project footprint from Highway 37, starting approximately 19 km south of Bell II. The first part of the route will follow a former forestry access road across gentle till-blanketed terrain. The road will then follow and significantly upgrade an existing forestry access trail for approximately 4 km. A 118-m three-span bridge will be built across the Bell-Irving River. The boat launch at Glacier Creek is at the location of the proposed bridge and may not be available to the anglers.

Anglers could pass by the bridge across the Bell-Irving River. Viewpoint 19 is at a location anglers use as a boat launch on the Bell-Irving River near the TCAR. A viewshed analysis was done for a nearby point on the Bell-Irving River, over 100 m northwest of the proposed bridge over the river. The analysis showed that a person on the river could see the TCAR and bridge. The photo rendering in Plate 24.7-7 provides a simulation of the view looking south from a point along the Bell-Irving River.



Viewpoints Used to Assess Potential Alteration of Visual Quality for Guided Angling Trips

Figure 24.7-4

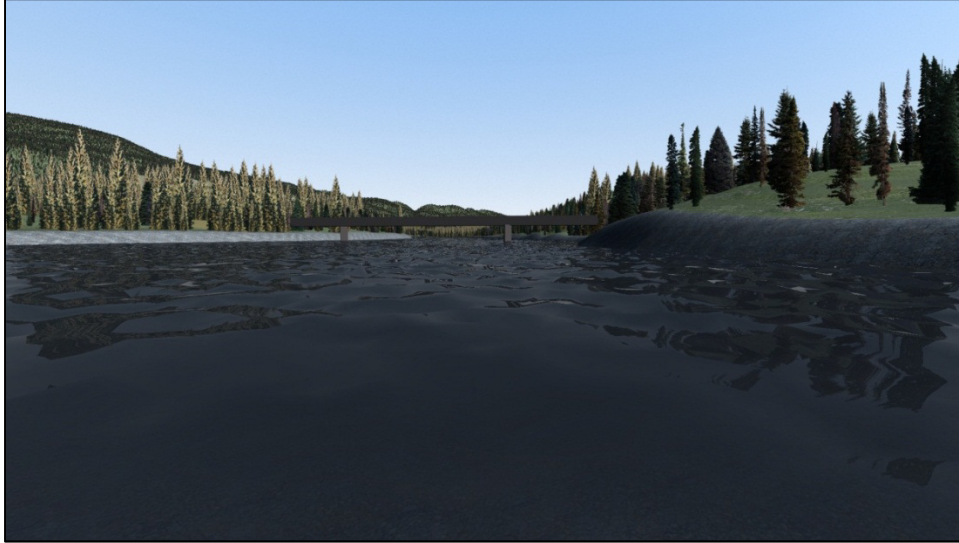


Plate 24.7-7. Visual rendering on Bell-Irving River looking toward the proposed bridge.

24.7.5.1 Mitigation for Alteration of Visual Quality for Guided Angling Trips

If the TMF is visible from any location, mitigation will reduce the effect of the Project on visual quality for the angling tours. During closure and post-closure, the dam faces will be covered either with an erosion protection layer or with till and re-vegetated using soil stockpiled during dam construction. The closure plan will reduce the effect on visual quality from the TMF.

The views from the Bell-Irving River would be within 500 m of the TCAR and the bridge. Additional management practices that will be used during the construction, operation, and closure phases to reduce the visual quality effects of the road include the following.

- The design of the TCAR will reduce effects on appearance of natural landscape, as practicable. A tree buffer will be left around the road when possible.
- Tree buffers will be maintained around roads, where possible, with consideration to the safety of road users.

24.7.5.2 Potential for Residual Effects

A description of the results of the effect on Viewpoints 6 and 7 from the TMF can be seen in Section 24.7.3.2. The degree of visual effect was *slight*. The results are summarized for guided angling trips in Table 24.7-13. The photo rendering in Plate 24.7-7 provides a simulation of what the visual effect of the TMF could be at this site when looking south from the Bell-Irving River.

During construction, the TMF will begin to have an effect on the visual quality for angling tours in Teigen Creek. The TMF will continue to grow to its maximum footprint during the operation phase. People standing on the banks of Teigen Creek may have a view of the TMF. The effect on the visual quality of the area would be blocked by treelines, thus residual effects are not expected (Table 24.7-14).

Table 24.7-13. HASSELL Matrix Results for Viewpoints Used to Assess Potential Alteration of Visual Quality for Guided Angling Trips

Viewpoint	Area	Valued Component	A Visual Character of Existing Landscape	B Degree of Visual Modification	C Horizontal Visual Effect	D Vertical Visual Effect	E Distance of Visual Effect	Total Final Visual Effect Rating	Degree of Visual Effect
Viewpoint 6	Teigen	Visual quality for guided angling trips	5	1	1	1	1	9	Slight
Viewpoint 7	Teigen	Visual quality for guided angling trips	5	1	1	1	2	10	Slight
Viewpoint 19	Bell- Irving	Visual quality for anglers on the Bell-Irving River	3	4	2	1	5	15	Moderate

Table 24.7-14. Potential Residual Effects on Visual and Aesthetic Resources for Guided Angling Trips due to Project Infrastructure

Valued Component	Timing Start	Component(s)	Description of Effect due to Component(s)	Type of Project Mitigation	Project Mitigation Description	Potential Residual Effect	Description of Residuals
Altering of visual quality for guided angling trips	Construction	TMF	TMF could create adverse effect on visual quality for anglers	Management practices	Leave tree buffer	No	-
Altering of visual quality for guided angling trips	Construction	Bell-Irving	TCAR and bridge could create adverse effect on visual quality for anglers	Management practices	Leave tree buffer	Yes	The bridge and road will continue to have an effect on visual quality for river rafting tours

The existing landscape around the Bell-Irving River bridge where the TCAR extends over the Bell-Irving River was rated as *modified*. The location of the TCAR road is on an existing forest service road, and clear-cuts can be seen on nearby slopes. The area along the Bell-Irving River generally has thick forest cover. The visualization from the Bell-Irving River is 100 m from the bridge over the Bell-Irving River. The effect of the TCAR and the transmission line will be greatest during construction, when the laydown areas will be in use. The degree of visual modification predicted to occur because of the proposed Project was rated as *increasing*. The horizontal effect was rated as *limited* and the vertical effect was rated as *no* or *minimal effect*. Based on these ratings, the degree of visual effect was *moderate* (Table 24.7-14).

During construction, the bridge over the Bell-Irving River will begin to have an effect on the visual quality for angling tours along the Bell-Irving River. Angling tours could travel past the Bell-Irving River bridge as they travel along the river. The TCAR bridge will remain post-closure.

Determination of residual effect significance for guided angling trips is discussed in Section 24.8.5.

24.7.6 Alteration of Visual Quality for Visitors to the Treaty Creek Site

The Treaty Creek Site is a Provincial Heritage Site designated under the terms of the *Nisga'a Final Agreement Act* (1999). It is the location of a historically significant battle and a subsequent peace treaty between Nisga'a Nation and Tahltan Nation ([Appendix 21-A](#)). The location is on the southern side of the confluence of the Bell-Irving River and Treaty Creek. The TCAR has the potential to alter visual quality for visitors to the Treaty Creek Site. The TCAR will provide permanent access from Highway 37, starting approximately 19 km south of Bell II, to the eastern part of the Project footprint. The first part of the route will follow a former forestry access road across gentle till-blanketed terrain. The road will then follow and significantly upgrade an existing forestry access trail for approximately 4 km.

The viewshed analysis of Viewpoint 15 indicated that the TCAR would not be visible from the Treaty Creek Site (Figure 24.7-5).

24.7.6.1 Mitigation for Alteration of Visual Quality for Visitors to the Treaty Creek Site

Viewpoint 15 is near the river bank, over 4.5 km away for the TCAR. The view will be reduced by foliage. The road should not alter visual quality. The proposed distance and position of the road will not need additional mitigation.

24.7.6.2 Potential for Residual Effects

The existing landscape around the TCAR was rated as *unmodified landscape/natural*. The Bell-Irving area generally has thick forest cover. Viewpoint 15 is near the confluence of the Bell-Irving River and Treaty Creek. The Treaty Creek Site is in an area that is difficult to access because of its position in the woods, across the Bell-Irving River on the other side of Highway 37.

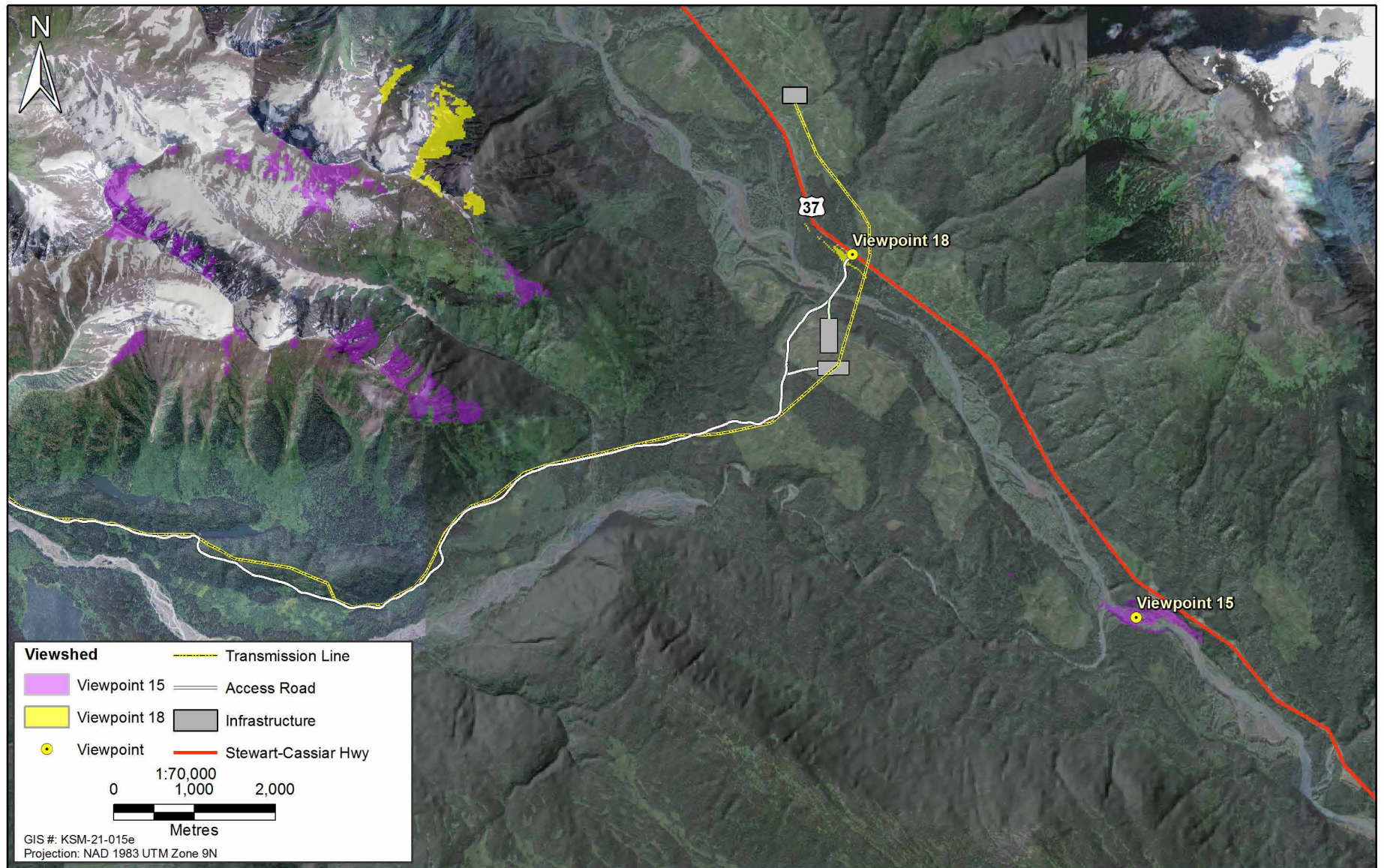


Figure 24.7-5

Viewpoints Used to Assess Potential Alteration of Visual Quality for Visitors to the Treaty Creek Site and Users of Highway 37

Figure 24.7-5

The effect of the TCAR will be greatest during construction when the laydown areas will be used to their fullest extent. The degree of visual modification predicted to occur because of the proposed Project was rated as *no to minor visual effect*. The horizontal and vertical effects were rated as *no* or *minimal effect*. The site is approximately 5 km away from the TCAR infrastructure and buildings, which puts it into the distance category of *distant middle ground*. Although the TCAR will not be visible, the high rating visual character of the existing landscape raises the final rating. Based on these ratings, the degree of visual effect was *slight* (Table 24.7-15).

The TCAR will have no residual effects on visitors to the Treaty Creek Site, even at its maximum footprint during the construction phase (Table 24.7-16).

24.7.7 Alteration of Visual Quality for users of Highway 37

Highway 37 runs north-south through northwestern BC for a total distance of 724 km. It is one of only two overland routes to Alaska. The Highway 37 corridor attracts a high number of visitors for road-based tourism. However, unlike stretches such as those in the Iskut Lake LRMP zone, the stretches in the LSA are not noted as a specific area that is a highlight for travellers (BC ILMB 2000). The TCAR and the Treaty Creek transmission line have the potential to alter visual quality for users of Highway 37. The TCAR will provide permanent access from Highway 37, starting approximately 19 km south of Bell II, to the eastern part of the Project footprint. The first part of the route will follow a former forestry access road across gentle till-blanketed terrain. The road will then follow and significantly upgrade an existing forestry access trail for approximately 5 km. A 28.5 km transmission line will be constructed from the NTL, following the TCAR to the Treaty OPC. The line will follow the Treaty Creek Access Road from the Bell-Irving River. Camp 12, the Highway 37 construction camp, will be built during the construction phase for the construction of the TCAR. The building will be reclaimed by the end of the construction phase.

The viewshed analysis of Viewpoint 18 indicated that the TCAR and the Treaty Creek transmission line would be visible. The photo rendering in Plate 24.7-8 provides a simulation of the view looking southwest from the viewpoint toward the TCAR. The viewpoint is at a location beside the highway. However, users of Highway 37 will be travelling past the location, not stopping.

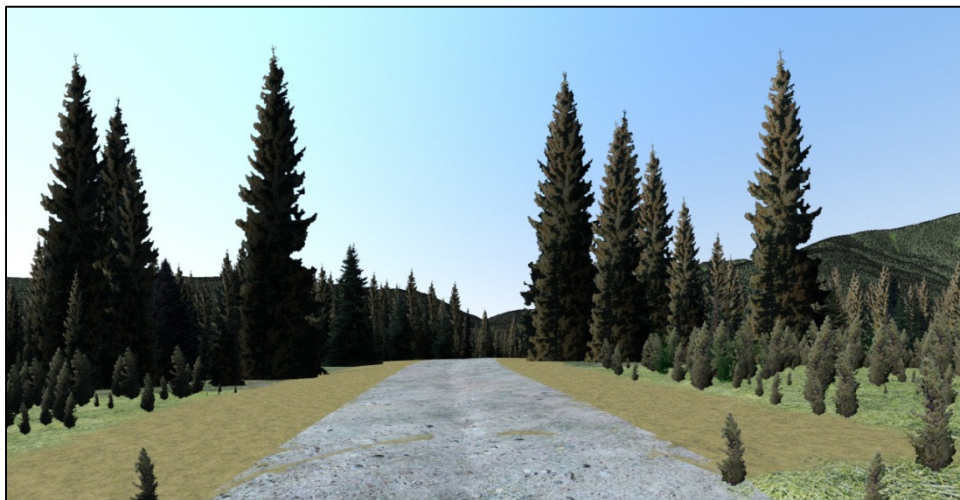


Plate 24.7-8. Viewpoint 18 - Visual rendering on Highway 37 looking toward the proposed Treaty Creek access road.

Table 24.7-15. HASSELL Matrix Results for Viewpoints Used to Assess Potential Alteration of Visual Quality for Visitors to the Treaty Creek Site

Viewpoint	Area	Valued Component	A Visual Character of Existing Landscape	B Degree of Visual Modification	C Horizontal Visual Effect	D Vertical Visual Effect	E Distance of Visual Effect	Total Final Visual Effect Rating	Degree of Visual Effect
Viewpoint 15	Bell-Irving	Visual quality for visitors of the Treaty Creek Site	5	1	1	1	2	10	Slight

Table 24.7-16. Potential Residual Effects on Visual and Aesthetic Resources for Visitors of the Treaty Creek Site due to Project Infrastructure

Valued Component	Timing Start	Component(s)	Description of Effect due to Component(s)	Type of Project Mitigation	Project Mitigation Description	Potential Residual Effect	Description of Residuals
Altering of visual quality for visitors of the Treaty Creek Site	Construction	Treaty Creek access road	Road could create adverse effect on visual quality visitors of the Treaty Creek Site	Management practices	Road to mimic natural landscape as practical and leave tree buffer	No	-

24.7.7.1 Mitigation for Alteration of Visual Quality for Highway 37 Users

The viewpoint is near the river bank and is adjacent to the TCAR and the Treaty Creak transmission line. The road will be built on a smaller existing forestry road, and the view will be reduced by foliage. The beginning of the transmission line will run nearby before it begins to follow the road right-of-way. It will travel through existing clear-cuts. The road and the transmission lines should cause some alteration to the visual quality. The proposed distance and position of the infrastructure will not need additional mitigation. Camp 12 is within 25 m of the highway. There will be a tree break between the camp and the road. A view of the access road and the transmission line will only be seen for a short duration, as it will only be seen by highway users as they drive past.

24.7.7.2 Potential for Residual Effects

The existing landscape around the TCAR was rated as *natural transition landscape*. The highway can be seen for several hundred metres in either direction. The portion of the TCAR that crosses the Bell-Irving River runs along an existing forest service road. The area along the highway beside the Bell-Irving River generally has thick forest cover. The Camp 12, Highway 37 construction camp, will be built in an existing cut-block and used during the first year of construction. Viewpoint 18 is over 400 m from the Bell-Irving River. The TCAR, transmission line, and Camp 12 will be greatest during construction, when the camp and the laydown areas will be in use. The degree of visual modification predicted to occur because of the proposed Project was rated as *no to minor visual effect*. The horizontal and vertical effects were rated as *no or minimal effect*. The viewpoint is adjacent to the TCAR, borrow areas, log landings, and Camp 12 buildings. Based on these ratings, the degree of visual effect was *slight* (Table 24.7-17).

The TCAR, transmission line, and the camp will have some residual effects on visual quality for Highway 37 users starting during the construction phase. The TCAR will not be closed and will have an effect through the post-closure phase (Table 24.7-18).

Determination of residual effect significance for users of Highway 37 is discussed in Section 24.8.6.

24.8 Significance of Residual Effects for Visual and Aesthetic Resources

Alteration of visual quality associated with the development of the KSM Project will result in a possible residual effect on five VCs. A summary of residual effects on visual quality is provided in Table 24.8-1.

24.8.1 Residual Effect Descriptors for Visual and Aesthetic Resources

The significance of the possible residual effects was determined using the methodology described in Chapter 5. Definitions of the evaluation criteria used in the assessment of visual quality are generally consistent with those presented in Section 5.2.12. Where evaluation criteria definitions were altered to be more appropriate for the assessment of visual quality, the altered definition is provided in the following paragraphs.

Table 24.7-17. HASSELL Matrix Results for Viewpoints Used to Assess Potential Alteration of Visual Quality for Users of Highway 37

Viewpoint	Area	Valued Component	A Visual Character of Existing Landscape	B Degree of Visual Modification	C Horizontal Visual Effect	D Vertical Visual Effect	E Distance of Visual Effect	Total Final Visual Effect Rating	Degree of Visual Effect
Viewpoint 18	Bell- Irving	Visual quality for users of Highway 37	4	1	1	1	5	12	Slight

Table 24.7-18. Potential Residual Effects on Visual and Aesthetic Resources for Users of Highway 37 due to Project Infrastructure

Valued Component	Timing Start	Component(s)	Description of Effect due to Component(s)	Type of Project Mitigation	Project Mitigation Description	Potential Residual Effect	Description of Residuals
Altering of visual quality for users of Highway 37	Construction	Treaty Creek access road, transmission line, and Highway 37 Construction Camp	Road, transmission line, and buildings could create adverse effect on visual quality for users of Highway 37	Management practices	Road to mimic natural landscape as practical and leave tree buffer. During closure roads will be re-vegetated	Yes	The road will continue to have an effect on visual quality for Highway 37

The **magnitude** categories are presented in Table 24.8-2. The magnitude values are taken from the final Degree of Visual Effect rating from the HASSELL Matrix. The magnitude measures the amount of change that a person would encounter.

The **geographic extent** ratings were redefined according to the distance of key areas from the Project, as shown in Table 24.8-3. The extent measurements were calculated during the HASSELL Matrix evaluation process for the distance of visual effect rating.

The **duration** of possible residual effects on visual quality will depend on the perception of the people living in and travelling through the area. The duration would be short-term for one-time visitors to the area, whereas for residents, duration will extend into the far future.

The **frequency** of possible residual effects on visual quality depends on the observer. The frequency would be a one-time event for visitors to the area, whereas residents may find the residual effect to be continuous.

The **reversibility** of possible residual effects on visual quality depends on the location of the residual effect. For example, the viewpoints along the Unuk River are in areas where the proposed CCAR would cross the river or where the road is close to the river. Because of the river location and the limited life of the road and bridge, the potential effects are most likely reversible. In contrast, the inspection sites along the Bell-Irving River are within a forested area, and the low forest areas could grow over time; therefore, the potential effects are considered reversible over the long term.

The **context or resilience** of potential residual effects depends on the perception of the people living in and travelling through the area. There is no measure for a typical person's perception of an experience, opinion about change, or the particular level of sensitivity; it cannot be applied to a visual quality model, and therefore was not assessed. Specific comments from the tenure holders regarding potential changes in their use of the LSA are found in [Appendix 24-A](#).

The **probability** of potential residual effects on visual quality for any given inspection site depends on the topography and vegetation cover present and the public perception of the disturbance.

Various methods of visual modelling were used in this effects assessment to consider the potential effects of the Project on visual quality including: viewshed analysis, ratings based on the HASSELL Matrix, and photo rendering. However, each of these modelling methods has some uncertainties. The viewshed analysis depends on topography and the projected tree height information taken from the British Columbia Integrated Land Management Bureau's VRI data (BC MOF 2001). The tree height information in the VRI is provided over fairly broad areas, and local variation in tree heights could affect the results of the viewshed analysis. The HASSELL Matrix results are subjective ratings based on field observations. All of these factors affect the confidence rating for this assessment.

Table 24.8-1. Definitions of Significance Criteria for Visual and Aesthetic Resources Residual Effects

Timing What phase of the Project is the effect associated with?	Magnitude (negligible, low, medium, high)	Geographic Extent (local, landscape, regional, beyond regional)	Duration (short-term, medium-term, long-term, far future)	Frequency (once, sporadic, regular, continuous)	Reversibility (reversible short-term, reversible long-term, or irreversible)	Probability (low, medium, high)	Confidence (low, medium, high)	Significance (Not significant: minor, moderate; Significant: major)	Follow-up Monitoring (Not required, required)
Construction	Negligible. There is no detectable change from baseline conditions.	Local. The effect is limited to the Project footprint.	Short-term. The effect lasts approximately 1 year or less.	Once. The effect occurs once during any phase of the Project.	Reversible short-term: An effect that can be reversed relatively quickly.	Low. An effect is unlikely but could occur.	Low (< 50% confidence). The cause-effect relationship between the Project and its interaction with the environment is poorly understood; data for the Project area may be incomplete; uncertainty associated with synergistic and/or additive interactions between environmental effects may exist. High degree of uncertainty.	Not significant (minor). Residual effects have no or low magnitude, local geographical extent, short- or medium-term duration, and occur intermittently, if at all. There is a high level of confidence in the conclusions. The effects on the VC (at a population or species level) are indistinguishable from background conditions (i.e., occur within the range of natural variation as influenced by physical, chemical, and biological processes). Land use management objectives will be met. Follow-up monitoring is optional.	Not required
Operation	Low. The magnitude of effect differs from the average value for baseline conditions, but is within the range of natural variation and well below a guideline or threshold value.	Landscape. An effect extends beyond the Project footprint to a broader watershed area.	Medium-term. The effect lasts from 1 – 11 years.	Sporadic. The effect occurs at sporadic or intermittent intervals during any phase of the Project.	Reversible long-term: An effect that can be reversed after many years.	Medium. An effect is likely but may not occur.	Medium. (50 – 80% confidence): The cause-effect relationship between the Project and its interaction with the environment is not fully understood, or data for the Project area is incomplete: moderate degree of uncertainty.	Not significant (moderate). Residual effects have medium magnitude, local, landscape or regional geographic extent, are short-term to chronic (i.e., may persist into the far future), and occur at all frequencies. Residual effects on VCs are distinguishable at the population, community, and/or ecosystem level. Ability of meeting land use management objectives may be impaired. Confidence in the conclusions is medium or low. The probability of the effect occurring is low or medium. Follow-up monitoring of these effects may be required.	Required
Closure	Medium. The magnitude of effect differs from the average value for baseline conditions and approaches the limits of natural variation, but below or equal to a guideline or threshold value.	Regional. The effect extends across the regional study area.	Long-term. The effect lasts between 12 and 70 years.	Regular. The effect occurs on a regular basis during, any phase of the Project.	Irreversible. The effect cannot be reversed.	High. An effect is highly likely to occur.	High. There is greater than 80% confidence in understanding the cause-effect relationship between the Project and its interaction with the environment, and all necessary data are available for the Project area. There is a low degree of uncertainty.	Significant (major). Residual effects have high magnitude, regional or beyond regional geographic extent, are chronic (i.e., persist into the far future), and occur at all frequencies. Residual effects on VCs are consequential (i.e., structural and functional changes in populations, communities, and ecosystems are predicted). Ability to meet land use management objectives is impaired. Probability of the effect occurring is medium or high. Confidence in the conclusions can be high, medium, or low. Follow-up monitoring is required.	
Post-closure	High. The magnitude of effect is predicted to differ from baseline conditions and exceed guideline or threshold values so that there will be a detectable change beyond the range of natural variation (i.e., change of state from baseline conditions).	Beyond Regional: The effect extends possibly across or beyond the province.	Far Future: The effect lasts more than 70 years.	Continuous. An effect occurs constantly during any phase of the Project.					

Table 24.8-2. Magnitude Definitions Used for Visual Quality Residual Effects Assessment

Magnitude	Definition
Negligible	The development is considered in keeping with the existing landscape character.
Low	Differs from the average value for baseline conditions to a small degree (e.g., within the range of natural variation and well below a guideline or threshold value.)
Medium	Medium level of change to the landscape character; the landscape is less able to absorb change because of the scale, frequency, or extent of the development.
High	The landscape is considered permanently changed with the development dominating the existing landscape or the existing landscape character is completely changed or modified to accommodate the development.

Table 24.8-3. Extent Definitions Used for Visual Quality Residual Effects Assessment

Extent	Definition
Local	Distance to development = 0 to 1 km
Landscape	Distance to development = 1 to 5 km
Regional	Distance to development = > 5 km
Beyond Regional	n/a ¹

¹ Because of the localized nature of visual quality effects, “Beyond Regional” was not used as a descriptor for this assessment.

24.8.2 Residual Effects Assessment for Visual Quality for River Rafting Tours

Despite mitigation, the CCAR (built during construction) could have a residual effect on river rafting tours on the Unuk River. Trees will be cut to create room for the road. According to the Visual Nature Studio 3 model, the area cut for the road will be seen from points along the river. The road will primarily be seen by rafters on the Unuk River only near or between Viewpoints 1 and 2. The magnitude of the effect is rated as *low*. The duration is rated to be long-term, although the road will be reclaimed and re-vegetated during closure.

Rafting trips occur sporadically (typically one seven-day trip per year, comprising up to 20 individuals). The likelihood that there would be an effect is *high*. The confidence level of the assessment is *medium* (Table 24.8-4). Tour participants will only see the bridge for a short period during a trip down the river. The residual effect is determined to be *not significant (minor)*.

24.8.3 Residual Effects Assessment for Visual Quality for Heli-skiing Tours

The TMF has the potential to cause a residual effect on heli-skiing tours. During operation, when the TMF grows to its maximum footprint, the magnitude of the effect to the runs is rated as *low*. The distance to the TMF would be over 5 km, and the extent of the effect is at a *regional* level. The duration is into the far future and only reversible over the long term. The frequency of the effect is sporadic; the heli-skiing company works part of the year and has a variety of runs in different areas. The probability of the effect is *high*, and the confidence level is *medium*. The effect of the TMF on heli-skiing tours is rated as *not significant (minor)* for the assessed runs.

Table 24.8-4. Summary of Residual Effects on Alteration of Visual Quality for River Rafting Tours

Description of Residual Effect	Component(s)	Timing of Effect	Magnitude	Extent	Duration	Frequency	Reversibility	Likelihood of Effects		Significance Determination	Follow-up Monitoring
								Probability	Confidence Level		
The CCAR could create adverse an effect on visual quality for rafters; bridge could create adverse effect on visual quality for rafters	Coulter Creek access road	Construction	Low	Landscape	Long	Sporadic	Reversible long-term	High	Medium	Not significant (minor)	Not required
Overall residual effect		Post-closure	Low	Local	Short	Sporadic	Reversible short-term	Low	Medium	Not significant (minor)	Not required

The TCAR has the potential to cause a residual effect of heli-skiing tours. During construction, when the road grows to its maximum footprint, the magnitude of the effect to the runs is rated as *low*. The distance to the road would be over 2 km, and the extent of the effect is at a *landscape* level. The duration is long-term, and it is only reversible over the long term. The frequency of the effect is *sporadic*. The probability of the effect is *medium*, and the confidence level is *medium*. The effect of the TCAR on heli-skiing tours is rated as *not significant (minor)* for the assessed runs (Table 24.8-5).

In the Mine Site, the mine pits have the potential to cause a residual effect on heli-skiing tours. During construction, the pits' effect will have a *medium* magnitude, while during operation, when the pits reach their maximum footprint, the magnitude of effect to the runs will be *medium*. Based on the distance to the mine pits, the effect is rated as *landscape*. The duration of the effect is into the far future, and it is only reversible over the long term. The frequency of the effect is *sporadic*; the heli-skiing company works part of the year and has a variety of runs in different areas. The probability of the effect is *low*, and the confidence level is *medium*. The effect of the mine pits on heli-skiing tours is rated as *not significant (minor)* for the assessed runs (Table 24.8-5).

24.8.4 Residual Effects Assessment for Visual Quality for Guided Backcountry Expeditions

The TMF could create a residual effect on visual quality for guided backcountry expeditions. The height of the nearby surrounding trees will be the main factor in keeping the TMF from causing an effect. The magnitude is rated as *low*. The TMF will have a *landscape* extent, with duration into the far future. The frequency of effect is *sporadic*. The effect could be reversible over the long term. The probability of an effect is *medium* and the confidence level of the study is *medium*. The effect of the TMF on guided backcountry expeditions is rated as *not significant (minor)*; Table 24.8-6).

In the Mine Site, the mine pits could have a residual effect on guided backcountry expeditions. The expeditions have used parts of the Knipple Glacier. The effect will only be felt if an expedition travels to the extreme northwest section of the top of the Knipple Glacier. The magnitude of this effect during construction is rated as *medium*, and it is rated *medium* during operation when the mine pit is at its maximum footprint. The top of the glacier is 6 to 8 km away from the mine pits, and the extent of the effect is *landscape*. The duration is far future, and it is only reversible over the long term. The frequency of the effect is *sporadic*. The probability of the effect is *high* and the confidence level is *high*. The effect of the mine pits on guided backcountry expeditions is rated as *not significant (minor)*; Table 24.8-6).

24.8.5 Residual Effects Assessment for Visual Quality for Guided Angling Trips

The TMF could create a residual effect on visual quality for angling tours. The height of the nearby surrounding trees will be the main factor in keeping the TMF from causing an effect. The magnitude is defined as *low*. The TMF has a *landscape* extent. The duration of the effect is medium term. The frequency of effect is *sporadic*. The effect is reversible over the long term. The probability of an effect is *low*, and the confidence level of the study is *low*. The effect of the TMF on angling tours is rated as *not significant (minor)*; Table 24.8-7).

Table 24.8-5. Summary of Residual Effects on Alteration of Visual Quality for Heli-skiing Tours

Description of Residual Effect	Component(s)	Timing of Effect	Magnitude	Extent	Duration	Frequency	Reversibility	Likelihood of Effects		Significance Determination	Follow-up Monitoring
								Probability	Confidence Level		
TMF could create adverse effect for heli-skiers	TMF	Construction	Low	Regional	Far future	Sporadic	Reversible long term	High	Medium	Not significant (minor)	Not required
Treaty Creek access road and transmission line could have an effect on visual quality for heli-skiers	Treaty Creek access road	Construction	Low	Landscape	Long	Sporadic	Reversible long term	Medium	Medium	Not significant (minor)	Not required
Pits could have an effect on visual quality for heli-skiers	Mine Site	Construction	Medium	Landscape	Far future	Sporadic	Reversible long term	Low	Medium	Not significant (minor)	Not required
Overall residual effect		Post-closure	Medium	Landscape	Far future	Sporadic	Reversible long term	Medium	Medium	Not significant (minor)	Not required

Table 24.8-6. Summary of Residual Effects on Alteration of Visual Quality for Backcountry Users

Description of Residual Effect	Component(s)	Timing of Effect	Magnitude	Extent	Duration	Frequency	Reversibility	Likelihood of Effects		Significance Determination	Follow-up Monitoring
								Probability	Confidence Level		
TMF could create adverse effect for guided backcountry expeditions	TMF	Construction	Low	Landscape	Far future	Sporadic	Reversible long term	Medium	Medium	Not significant (minor)	Not required
Pits could have an effect on visual quality for guided backcountry expedition	Mine Site	Construction	Medium	Landscape	Far future	Sporadic	Reversible long term	High	High	Not significant (minor)	Not required
Overall residual effect		Post-closure	Low	Landscape	Far future	Sporadic	Reversible long term	Medium	Medium	Not significant (minor)	Not required

Table 24.8-7. Summary of Residual Effects on Alteration of Visual Quality for Anglers

Description of Residual Effect	Component(s)	Timing of Effect	Magnitude	Extent	Duration	Frequency	Reversibility	Likelihood of Effects		Significance Determination	Follow-up Monitoring
								Probability	Confidence Level		
TMF could create adverse effect for guided angling trips	TMF	Construction	Low	Landscape	Medium	Sporadic	Reversible long term	Low	Low	Not significant (minor)	Not required
Treaty Creek access road and Bell-Irvin River bridge could create adverse effect for guided angling trips	Treaty Creek access road and Bell-Irvin River bridge	Construction	Medium	Local	Long	Sporadic	Reversible long term	Medium	Low	Not significant (minor)	Not required
Overall residual effect		Post-closure	Medium	Local	Long	Sporadic	Reversible long term	Medium	Low	Not significant (minor)	Not required

Despite mitigation, the TCAR (built during construction) could have a residual effect on angling tours on the Bell-Irving River. The portion of the TCAR that crosses the Bell-Irving River will be built on an existing forest service road; however, trees will be cut to create room for the wider road. A bridge will be built across the river. The bridge will primarily be seen by anglers on the Bell-Irving River for no more than a 1 km stretch of the river. The magnitude of the effect is rated as *medium*. The duration is rated to be long-term. Angling trips occur sporadically. The likelihood that there would be an effect is *medium*. The confidence level of the assessment is *low*. The tour will only see the bridge for a short period during a trip down the river. The residual effect is determined to be *not significant (minor)*; Table 24.8-7).

24.8.6 Residual Effects Assessment for Visual Quality for Users of Highway 37

The TCAR, transmission line, and Camp 12 could create a residual effect on visual quality for users of Highway 37. The height of the nearby surrounding trees will be the main factor in keeping the TCAR and Camp 12 from causing an effect. The magnitude is defined as *low*. The TCAR, transmission line, and Camp 12 have a *local* extent. The duration of the effect for the TCAR and transmission line is long-term. The frequency of effect is sporadic. The effect is reversible over the long term. The probability of an effect is *high*, and the confidence level of the study is *medium*. The effect of the TCAR, transmission line, and Camp 12 on users of Highway 37 is rated as *not significant (minor)*; Table 24.8-8).

24.9 Potential Cumulative Effects for Visual and Aesthetic Resources

In general, effects to visual and aesthetic resources can be the result of Project activities like stripping and clearing and foundation preparation for proposed mine infrastructure. The alteration of land cover begins in the Project construction phase and may persist into the operation phase due to the ongoing presence of the cleared areas. During closure, potential long-term effects may be reduced through reclamation re-vegetation.

24.9.1 Scoping of Cumulative Effects

24.9.1.1 Spatial Linkages with other Projects and Human Actions

The following projects are within the study area:

- proposed Brucejack Mine;
- Sulphurets Project;
- Eskay Creek Mine;
- NTL;
- Snowfield Project;
- past timber harvesting; and
- Highway 37 (traffic from variety of projects and activities).

Table 24.8-8. Summary of Residual Effects on Alteration of Visual Quality for Users of Highway 37

Description of Residual Effect	Component(s)	Timing of Effect	Magnitude	Extent	Duration	Frequency	Reversibility	Likelihood of Effects		Significance Determination	Follow-up Monitoring
								Probability	Confidence Level		
Treaty Creek access road and transmission line could have an effect on visually quality for users for Highway 37	Treaty Creek access road and temporary camp (Camp 12)	Construction	Low	Local	Long	Sporadic	Reversible long term	High	Medium	Not significant (minor)	Not required
Overall residual effect		Post-closure	Low	Local	Long	Sporadic	Reversible long term	Low	Medium	Not significant (minor)	Not Required

A third viewshed analysis was performed using infrastructure from projects with potential spatial linkages. Each project viewshed analysis result was then compared to the baseline KSM Project infrastructure viewshed to identify overlap where the KSM Project and other projects could be seen from the same position. The cumulative viewshed analysis identified several other projects and activities that may be visible at locations within the visual quality study area where KSM Project infrastructure is also visible (Figure 24.9-1).

Six projects and Highway 37 may be visible from locations when KSM Project infrastructure is also visible:

- proposed Brucejack Mine;
- closed Eskay Creek Mine;
- Treaty Creek Hydroelectric;
- NTL;
- past timber harvesting; and
- Highway 37 (traffic from variety of projects and activities).

24.9.1.2 Temporal Linkages with other Projects and Human Actions

Views of all of the six projects and Highway 37 will overlap temporally with the KSM Project. Each project will have the potential to be seen at the same time as the KSM Project at some point at each phase of the Project.

Table 24.9-1 summarizes the potential linkages between the KSM Project and other projects and human actions with regard to visual and aesthetic resources.

24.9.2 Cumulative Effects Assessment for River Rafting Tours

The cumulative viewshed areas where the KSM Project and other projects could potentially be seen at the same time were compared to the locations where river rafting tours travel. The comparison showed that other projects will not have influence on rafters within the study area.

24.9.2.1 Project-specific Residual Effects on River Rafting Tours that Are Not Likely to Result in Cumulative Effects

No other projects are planned in areas where they could be viewed by river rafting tours (Table 24.9-2).

24.9.3 Cumulative Effects Assessment for Heli-skiing Tours

The cumulative viewshed areas where the KSM Project and other projects could potentially be seen at the same time were compared to the locations where heli-skiing tours travel. The comparison showed that the proposed Brucejack Mine could influence the cumulative effects of visual quality for heli-skiing tours in the study area (Table 24.9-3).

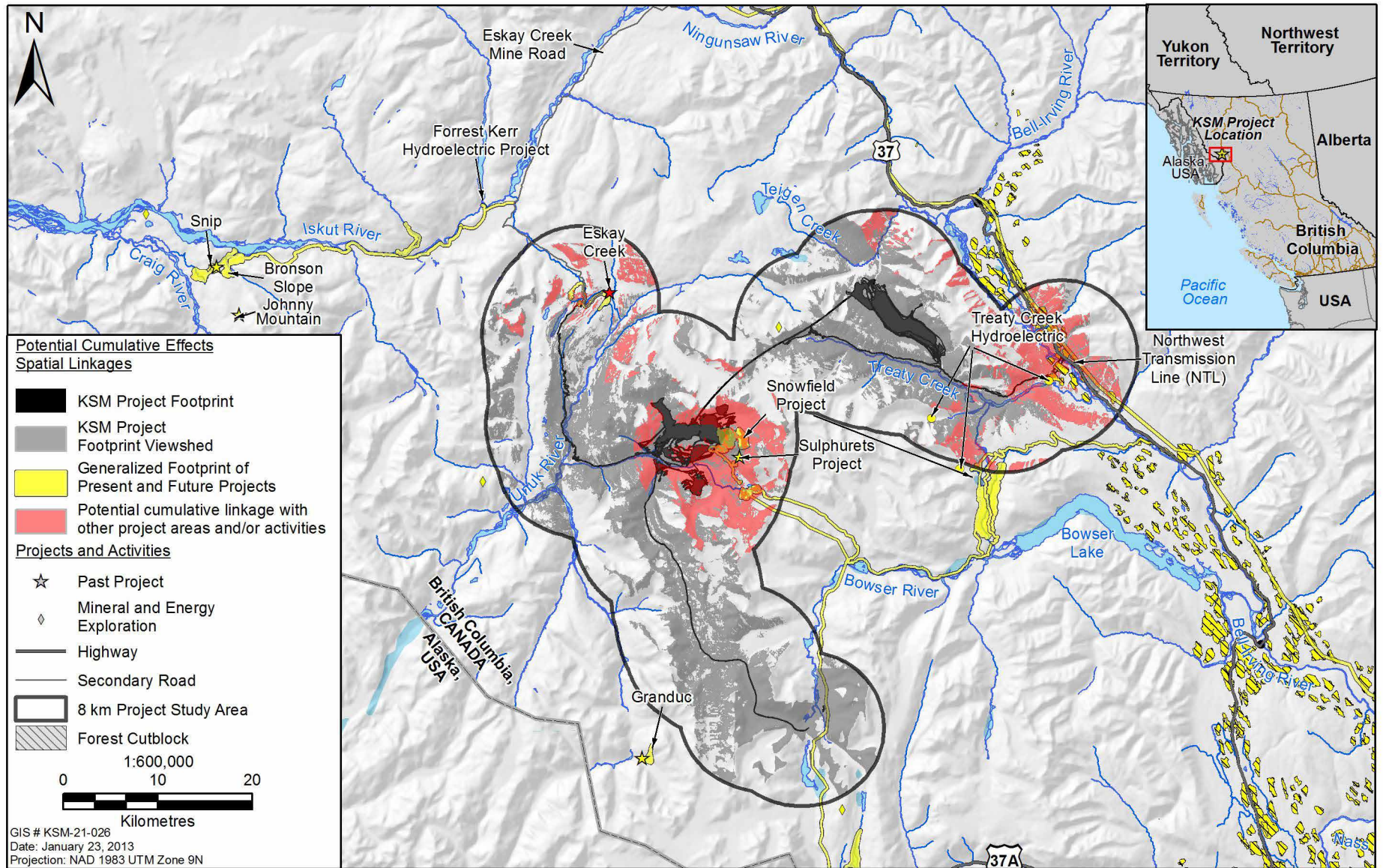


Table 24.9-1. Summary of Potential Linkages between KSM Project and Other Human Actions in regards to Visual and Aesthetic Resources

Action/Project		Past	Present	Future
Past Projects	Eskay Creek Mine	X	NL	NL
	Granduc Mine	NL	NL	NL
	Johnny Mountain Mine	NL	NL	NL
	Kitsault Mine (Closed)	NL	NL	NL
	Snip Mine	NL	NL	NL
	Sulphurets Project	NL	NL	NL
	Swamp Point Aggregate Mine	NL	NL	NL
Present Projects	Forrest Kerr Hydroelectric	NL	NL	NL
	Long Lake Hydroelectric	NL	NL	NL
	NTL	NL	NL	X
	Red Chris Mine	NL	NL	NL
	Wolverine Mine	NL	NL	NL
Reasonably Foreseeable Future Projects	Bear River Gravel	NL	NL	NL
	Bronson Slope Mine	NL	NL	NL
	Brucejack Mine	NL	X	X
	Galore Creek Mine	NL	NL	NL
	Granduc Copper Mine	NL	NL	NL
	Kitsault Mine	NL	NL	NL
	Kutcho Mine	NL	NL	NL
	McLymont Creek Hydroelectric	NL	NL	NL
	Arctos Anthracite Coal Mine	NL	NL	NL
	Schaft Creek Mine	NL	NL	NL
	Snowfield Project	NL	NL	X
	Storie Moly Mine	NL	NL	NL
	Turnagain Mine	NL	NL	NL
Treaty Creek Hydroelectric	NL	NL	X	
Land Use Activities	Agricultural Resources	NL	NL	NL
	Fishing	NL	NL	NL
	Guide Outfitting	NL	NL	NL
	Resident and Aboriginal Harvest	NL	NL	NL
	Mineral and Energy Resource Exploration	NL	NL	NL
	Recreation and Tourism	NL	NL	NL
	Timber Harvesting	X	NL	NL
	Traffic and Roads	X	X	X

NL = No Linkage (no spatial and temporal overlap, or potential effects do not act in combination).

X = Potential spatial and temporal linkage with project or action.

24.9.3.1 Project-specific Residual Effects on Heli-skiing Tours that Are Not Likely to Result in Cumulative Effects

No other projects are planned in areas where they could be viewed by heli-skiing tours at the same time as the TMF or TCAR.

24.9.3.2 Cumulative Effect of Altering the Visual Quality for Heli-skiing Tours

The proposed Brucejack Mine could influence the visual quality of the viewpoint also affected by the alteration of the landscape due to the pits.

24.9.3.3 Project-specific Cumulative Effects Mitigations for Altering the Visual Quality for Heli-skiing Tours

No additional mitigation will be used to reduce the potential cumulative effects of the proposed Brucejack Mine on visual quality.

24.9.3.3.1 Other Project/Activity Mitigations to Address Altering the Visual Quality for Heli-skiing

It is expected that other projects will adhere to the same regulations and conform to similar mitigation methods as the KSM Project.

24.9.3.3.2 Determination of Potential for Residual Cumulative Effects and Significance

The proposed Brucejack Mine could increase the magnitude, extent, and duration of effect on visual quality for heli-skiing. The location and horizontal data available for both projects were assessed. The location of the proposed Brucejack Mine can help provide an understanding of where it would be in a viewscape for each viewpoint where the KSM Project could also potentially be visible. The proposed Brucejack Mine will not create significant residual at any of the assessed viewpoints. This effect is assessed as *not significant (minor)*; Table 24.9-3).

24.9.3.4 Overall Cumulative Effect on Heli-skiing Tours

The cumulative effect on the visual quality for heli-skiing tours will be *not significant (minor)* as the combined effect of the KSM and Brucejack projects will have a low level of alteration (Table 24.9-3).

24.9.4 Cumulative Effects Assessment for Guided Backcountry Expeditions

The cumulative viewshed areas where the KSM Project and other projects could potentially be seen at the same time were compared to the locations where guided backcountry expeditions travel. The comparison showed that the proposed Brucejack Mine and the NTL Project could have an influence on the cumulative effects of visual quality for guided backcountry expeditions in the study area (Table 24.9-4).

24.9.4.1 Project-specific Residual Effects on Guided Backcountry Expeditions that Are Not Likely to Result in Cumulative Effects

The Eskay Creek Mine, Highway 37, and Treaty Creek Hydroelectric projects are not in locations where they could be viewed by guided backcountry expeditions at the same time as the KSM Project.

Table 24.9-2. Summary of Cumulative Residual Effects on Alteration of Visual Quality for River Rafting Tours

Description of Residual Effect	Other Project(s)/ Activity(ies)	Timing of Effect	Magnitude	Magnitude Adjusted for CE	Extent	Extent Adjusted for CE	Duration	Duration Adjusted for CE	Frequency	Frequency Adjusted for CE	Reversibility	Reversibility Adjusted for CE	Likelihood of Effects				Significance Determination	Significance Determination Adjusted for CE	Follow-up Monitoring	Follow-up Monitoring Adjusted for CE
													Probability	Probability Adjusted for CE	Confidence Level	Conf. Level Adjusted for CE				
Coulter Creek access road could create adverse effect to visual quality for rafters; bridge could create adverse effect to visual quality for rafters		Construction	Low	NA	Landscape	NA	Long	NA	Sporadic	NA	Reversible long term	NA	High	NA	Medium	NA	Not significant (minor)	NA	Not required	NA
Overall effect	All	Post-closure	Low	NA	Local	NA	Short	NA	Sporadic	NA	Reversible short term	NA	Low	NA	Medium	NA	Not significant (minor)	NA	Not required	NA

Note: CE = Cumulative Effect.

Table 24.9-3. Summary of Cumulative Residual Effects on Alteration of Visual Quality for Heli-skiing Tours

Description of Residual Effect	Other Project(s)/ Activity(ies)	Timing of Effect	Magnitude	Magnitude Adjusted for CE	Extent	Extent Adjusted for CE	Duration	Duration Adjusted for CE	Frequency	Frequency Adjusted for CE	Reversibility	Reversibility Adjusted for CE	Likelihood of Effects				Significance Determination	Significance Determination Adjusted for CE	Follow-up Monitoring	Follow-up Monitoring Adjusted for CE
													Probability	Probability Adjusted for CE	Confidence Level	Conf. Level Adjusted for CE				
TMF could create adverse effect for heli-skiers	Brucejack Mine	Construction	Low	Low	Regional	Regional	Far future	Far future	Sporadic	Sporadic	Reversible long term	Reversible long term	High	High	Medium	Medium	Not significant (minor)	Not significant (minor)	Not required	Not required
Treaty Creek access road and transmission line could have an effect on visual quality for heli-skiers		Construction	Low	Low	Landscape	Landscape	Long	Long	Sporadic	Sporadic	Reversible long term	Reversible long term	Medium	Medium	Medium	Medium	Not significant (minor)	Not significant (minor)	Not required	Not required
Pits could have an effect on visual quality for heli-skiers	Brucejack Mine	Construction	Low	Low	Landscape	Landscape	Far future	Far future	Sporadic	Sporadic	Reversible long term	Reversible long term	Low	Low	Medium	Medium	Not significant (minor)	Not significant (minor)	Not required	Not required
Overall effect	All	Construction	Low	Low	Landscape	Landscape	Far future	Far future	Sporadic	Sporadic	Reversible long term	Reversible long term	Medium	Medium	Medium	Medium	Not significant (minor)	Not significant (minor)	Not required	Not required

Note: CE = Cumulative Effect.

Table 24.9-4. Summary of Cumulative Residual Effects on Alteration of Visual Quality for Guided Backcountry Expeditions

Description of Residual Effect	Other Project(s)/ Activity(ies)	Timing of Effect	Magnitude	Magnitude Adjusted for CE	Extent	Extent Adjusted for CE	Duration	Duration Adjusted for CE	Frequency	Frequency Adjusted for CE	Reversibility	Reversibility Adjusted for CE	Likelihood of Effects				Significance Determination	Significance Determination Adjusted for CE	Follow-up Monitoring	Follow-up Monitoring Adjusted for CE
													Probability	Probability Adjusted for CE	Confidence Level	Conf. Level Adjusted for CE				
TMF could create adverse effect for guided backcountry expeditions	NTL Project	Construction	Low	Low	Landscape	Landscape	Far future	Long	Sporadic	Sporadic	Reversible long term	Reversible long term	Medium	Medium	Medium	Medium	Not significant (minor)	Not significant (minor)	Not required	Not required
Pits could have an effect on visual quality for guided backcountry expedition	Brucejack Mine	Construction	Low	Low	Landscape	Landscape	Far future	Long	Sporadic	Sporadic	Reversible long term	Reversible long term	High	High	High	High	Not significant (minor)	Not significant (minor)	Not required	Not required
Overall effect	All	Post-closure	Low	Low	Landscape	Landscape	Far future	Long	Sporadic	Sporadic	Reversible long term	Reversible long term	Medium	Medium	Medium	Medium	Not significant (minor)	Not significant (minor)	Not required	Not required

Note: CE = Cumulative Effect.

24.9.4.2 Cumulative Effect of Altering the Visual Quality for Guided Backcountry Expeditions

The proposed Brucejack Mine is near a location visited by guided backcountry expeditions that could have the visual quality affected by alteration of landscape by the Project pits.

24.9.4.2.1 Project-specific Cumulative Effects Mitigations for Altering the Visual Quality for Guided Backcountry Expeditions

No additional mitigation will be used to reduce the potential cumulative effects of the proposed Brucejack Mine or the NTL Project on visual quality.

24.9.4.2.2 Other Project/Activity Mitigations to Address Altering the Visual Quality for Guided Backcountry Expeditions

It is expected that other projects will adhere to the same regulations and conform to similar mitigation methods as the KSM Project.

24.9.4.2.3 Determination of Potential for Residual Cumulative Effect and Significance

The proposed Brucejack Mine could increase the magnitude, extent, and duration of effect on visual quality for guided backcountry expeditions. The location and horizontal data available for both projects were assessed. The location of the proposed Brucejack Mine can help to give an understanding of where it would be in a viewscape for each viewpoint where the KSM Project could also potentially be visible. The proposed Brucejack Mine will not create a significant cumulative residual effect with the KSM Project **at any of the assessed viewpoints**. This effect is assessed as *not significant (minor)*; Table 24.9-4).

24.9.4.3 Overall Cumulative Effect on Guided Backcountry Expeditions

The cumulative effect on the visual quality for guided backcountry expeditions will be *not significant (minor)*, as the combined effect of KSM and Brucejack projects will have a low level of alteration (Table 24.9-4).

24.9.5 Cumulative Effects Assessment for Guided Angling Trips

The cumulative viewshed areas where the KSM Project and other projects could potentially be seen at the same time were compared to the locations where guided angling trips travel. The comparison showed that past timber harvesting will have influence on guided angling trips within the study area (Table 24.9-5).

24.9.5.1 Project-specific Residual Effects on Guided Angling Trips that Are Not Likely to Result in Cumulative Effects

No other projects are planned in areas where they could be viewed by guided angling trips at the same time as KSM Project infrastructure.

24.9.5.2 Cumulative Effect of Altering the Visual Quality for Guided Angling Trips

The timber harvesting cut blocks are near a location visited by angling tours that could have the visual quality affected by alteration of landscape by the TCAR and bridge over the Bell-Irving River.

24.9.5.2.1 Project-specific Cumulative Effects Mitigations for Altering the Visual Quality for Guided Angling Trips

No additional mitigation will be used to reduce the potential cumulative effects of the cut blocks on visual quality.

24.9.5.2.2 Other Project/Activity Mitigations to Address Altering the Visual Quality for Guided Angling Trips

The cut blocks are currently not active and are in the stage of re-vegetation as part of the current mitigation process.

24.9.5.2.3 Determination of Potential for Residual Cumulative Effect and Significance

Past timber harvesting could increase the magnitude, extent, and duration of effect on visual quality for angling trips, but does not change the rating. The timber harvesting will not create significant cumulative residual effect with the KSM Project at any of the assessed viewpoints. This effect is assessed as *not significant (minor)*; Table 24.9-5).

24.9.6 Cumulative Effects Assessment for Users of Highway 37

Other projects will not have influence on users of Highway 37 within the study area.

24.9.6.1 Project-specific Residual Effects on Users of Highway 37 that Are Not Likely to Result in Cumulative Effects

No other projects are planned in areas where they could be viewed at the same time as the Project infrastructure by users of Highway 37 (Table 24.9-6).

24.10 Summary of Assessment of Potential Environmental Effects on Visual and Aesthetic Resources

Table 24.10-1 summarizes the assessment of the possible environmental effects of the KSM Project on visual and aesthetic resources.

24.11 Visual and Aesthetic Resources Conclusions

The LSA is used by various recreational users. Construction of infrastructure could have an effect on visual quality for recreational users. A heli-skiing company uses several hills in the study area as a part of a larger range of recreation sites. The infrequent guided tours in the backcountry may be affected with regard to visual quality, but the potential severity of effects may be limited by the current choice of locations to tour, including areas that will not be affected at all. The visual quality for some of the ski runs in the LSA could be affected by the pits at the Mine Site. Even though the pits will be a long distance away from the ski runs, the size of the pits will result in greater visibility. The ski runs in the Teigen Creek area will be too far away to be substantively affected by the TMF. Angling tours on the Bell-Irving River could be effected for a short time by the TCAR and the Bell-Irving River bridge. These effects on river rafting users will be minimized by the maintenance of tree buffers along the road. Rafting tours down the Unuk River could be affected to a small degree by the CCAR and the Unuk River bridge. These effects on river rafting users will be minimized by the maintenance of tree buffers along the road. Also, the Unuk River bridge will be located at a point where it is least visible from the surrounding area. The Unuk River bridge and the CCAR and will be decommissioned and/or re-vegetated after closure. Overall, there will be no significant effect on visual quality due to the Project.

Table 24.9-5. Summary of Cumulative Residual Effects on Alteration of Visual Quality for Anglers

Description of Residual Effect	Other Project(s)/ Activity(ies)	Timing of Effect	Magnitude	Magnitude Adjusted for CE	Extent	Extent Adjusted for CE	Duration	Duration Adjusted for CE	Frequency	Frequency Adjusted for CE	Reversibility	Reversibility Adjusted for CE	Likelihood of Effects				Significance Determination	Significance Determination Adjusted for CE	Follow-up Monitoring	Follow-up Monitoring Adjusted for CE
													Probability	Probability Adjusted for CE	Confidence Level	Conf. Level Adjusted for CE				
Treaty Creek access road and Bell-Irving River bridge could create adverse effect for guided angling trips	Timber Harvesting	Construction	Medium	Medium	Local	Local	Long	Long	Sporadic	Sporadic	Reversible long term	Reversible long term	Medium	Medium	Low	Low	Not significant (minor)	Not significant (minor)	Not required	Not required
Overall effect	All	Post-closure	Medium	Medium	Local	Local	Long	Long	Sporadic	Sporadic	Reversible long term	Reversible long term	Medium	Medium	Low	Low	Not significant (minor)	Not significant (minor)	Not required	Not required

Note: CE = Cumulative Effect.

Table 24.9-6. Summary of Cumulative Residual Effects on Alteration of Visual Quality for Users of Highway 37

Description of Residual Effect	Other Project(s)/ Activity(ies)	Timing of Effect	Magnitude	Magnitude Adjusted for CE	Extent	Extent Adjusted for CE	Duration	Duration Adjusted for CE	Frequency	Frequency Adjusted for CE	Reversibility	Reversibility Adjusted for CE	Likelihood of Effects				Significance Determination	Significance Determination Adjusted for CE	Follow-up Monitoring	Follow-up Monitoring Adjusted for CE
													Probability	Probability Adjusted for CE	Confidence Level	Conf. Level Adjusted for CE				
Treaty Creek access road could have an effect on visual quality for users of Highway 37		Construction	Low	NA	Local	NA	Long	NA	Sporadic	NA	Reversible long term	NA	High	NA	Medium	NA	Not significant (minor)	NA	Optional	NA
Overall effect	All	Post-closure	Low	NA	Local	NA	Long	NA	Sporadic	NA	Reversible long term	NA	Low	NA	Medium	NA	Not significant (minor)	NA	NA	NA

Note: CE = Cumulative Effect.

Table 24.10-1. Summary of Assessment of Potential Environmental Effects: Visual and Aesthetic Resources

Valued Component	Component(s)	Phase of Project	Potential Effect	Key Mitigation Measures	Significance Analysis of Residual Effects	Significance Analysis of Cumulative Residual Effects
Altering of visual quality for river rafting tours	CCAR	Construction	Road and bridge could create adverse effect to visual quality for river rafting tours	Road to mimic natural landscape as practical and leave tree buffer	Not significant (minor)	N/A
Altering of visual quality for heli-skiers	TMF, Pits, TCAR, and transmission line	Construction	TMF, pits, TCAR, and transmission line could have effect on visual quality for heli-skiers	Road to mimic natural landscape as practical, and tree buffers around major infrastructure will be maintained where possible, when potentially in view of heli-ski areas	Not significant (minor)	Not significant (minor)
Altering of visual quality for guided backcountry expeditions	TMF, pits, and RSF	Construction	TMF, pits, and RSF could create adverse effect on visual quality for guided backcountry expeditions	Leave tree buffer	Not significant (minor)	Not significant (minor)
Altering of visual quality for guided angling trips	TMF and TCAR	Construction	TMF and TCAR could create adverse effect on visual quality for guided angling trips	Leave tree buffer	Not significant (minor)	Not significant (minor)
Altering of visual quality for visitors of Treaty Creek Site	TCAR and transmission line	Construction	TCAR and transmission line would not have an effect on visual quality visitors of Treaty Creek Site	Road to mimic natural landscape as practical and leave tree buffer	N/A	N/A
Altering of visual quality for users of Highway 37	TCAR and Highway 37 Construction Camp	Construction	TCAR, transmission line, and Temporary Highway 37 Construction Camp could have an effect on visual quality for users of Highway 37	Road to mimic natural landscape as practical and leave tree buffer; during closure roads will be re-vegetated	Not significant (minor)	N/A

References

1996. *Forest Practices Code of British Columbia Act*, RSBC. C. 159.
1999. *Nisga'a Final Agreement Act*, SBC. C. 7
2002. *Forest and Range Practices Act*, SBC. C. 69.
- BC MFLNRO. 2012. *Nass South - Sustainable Resource Management Plan*. Ministry of Forests, Lands and Natural Resource Operations: Smithers, BC. <http://www.ilmb.gov.bc.ca/slrp/srmp/south/nass/index.html> (accessed October 2012).
- BC MFLNRO. 2004. *Recreational Features Inventory*. <https://apps.gov.bc.ca/pub/geometadata/metadataDetail.do?recordUID=4011&recordSet=ISO19115> (accessed November 2012).
- BC MOF. 1998. *Recreation Features Inventory Procedures and Standards Manual. Version 3.0*. Prepared by the Ministry of Forests, Forest Practices Branch for the Resource Inventory Committee: Vancouver, BC.
- BC MOF. 2001. *Visual Impact Assessment Guidebook*. 2nd ed. Forest Practices Branch, Ministry of Forests: Victoria, BC.
- BC ILMB. 2000. *Cassiar Iskut-Stikine Land and Resource Management Plan*. <http://ilmbwww.gov.bc.ca/slrp/lrmp/smithers/cassiar/index.html> (accessed June 2010).
- BC ILMB. 2011. *Land and Resource Data Warehouse*. <http://archive.ilmb.gov.bc.ca/lrdw/> (accessed November 2012).
- HASSELL. 2005. *Taralga Wind Farm Landscape Visual Assessment*. http://www.planning.nsw.gov.au/asp/pdf/taralga_app_d_hassell_report-01.pdf (accessed October 2012).
- Litton, R. B., Jr. 1968. *Forest Landscape Description and Inventories: A Basis for Land Planning and Design*. USDA Forest Service. Research paper PSW-RP-049. USDA Pacific Southwest Research Station: Albany, CA.
- BC MSRM. 1996. *Gridded DEM Specification Release 1.1*. Base Mapping and Geomatic Services Branch, Ministry of Sustainable Resource Management, Province of British Columbia. http://archive.ilmb.gov.bc.ca/crgb/pba/trim/specs/Gridded_DEM_Specificationc_ver1_1.pdf (accessed 2009).
- Rescan. 2009. *Northwest Transmission Line Project: Skii km Lax Ha Traditional Knowledge and Use Study*. Prepared for BC Transmission Corporation by Rescan Environmental Services: Vancouver, BC.
- Seabridge. 2011. *Application Information Requirements: As Approved by the Environmental Assessment Office On January 31, 2011 for Seabridge Gold Inc.'s Application for an Environmental Assessment Certificate*. January 31, 2011. Prepared by Seabridge Gold Inc.: Toronto, ON.
- Tetra Tech-Wardrop. 2012. *2012 KSM (Kerr-Sulphurets-Mitchell) Prefeasibility Study*. Prepared for Seabridge Gold Inc. by Tetra Tech-Wardrop: Vancouver, BC.