

# *Appendix 19-A*

## *Visual Impact Assessment*

HARPER CREEK PROJECT

**Application for an Environmental Assessment Certificate /  
Environmental Impact Statement**

# *Harper Creek Mine*

## Visual Impact Assessment



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## INTRODUCTION

Yellowhead Mining Incorporated's Harper Creek Mine is a proposed open pit Copper-Silver-Gold facility. Once in operation the proposed Harper Creek Mine would have an estimated mill throughput of 70,000 tonnes per day and an estimated life (operation) of 28 years. It is estimated that 25 million tonnes of ore will be removed from the pit annually.

The Harper Creek Project includes the construction, operation and maintenance of the following facilities:

- Open Pit Mine
- Mine Site Infrastructure
- Tailings Management Facility
- Waste Rock Disposal Area
- 138kV Transmission Line
- Access Road Upgrades
- Storage and Shipping Facility

The major project phases are:

- Construction phase - 2 years (-2 to 0).
- Operation phase - 28 years (0 to end of 28).
- Closure phase - 31 years (start of 29 to end of 59).
- Post-closure phase - starts at 60 years with no end date.
- Active closure phase - 3 years (29 to 31).

At the peak of its life cycle at year 28 of operations, the mine site could occupy an approximated 2300 hectares and will have its largest footprint. This report presents an analysis of the expected visual impact of the project infrastructure on the landscape during year 28 of operations. No other project phases were considered for this report.

## LOCATION OF THE PROJECT

Located at approximately 51°33'N Latitude and 119°42'W Longitude, the Harper Creek Mine site is approximately 100 kilometers north-northwest of Kamloops, BC and approximately 9 kilometers south of the community of Vavenby, BC. Vavenby is 148 km from Kamloops via Highway #5 (Yellowhead Highway) and 21 km east of Clearwater. Vavenby and Clearwater are located in the North Thompson River Valley. The Yellowhead Highway, the Canadian National Railway mainline, and BC Hydro transmission lines, all follow this North Thompson River Valley corridor.

The proposed project facilities are located on a plateau just north of Harp Mountain at approximately 1800m elevation and straddle the boundary between the Headwaters and Kamloops Forest Districts. The proposed transmission line, off site facilities and part of the proposed open pit are within the Headwaters Forest District, while all other facilities are within the Kamloops Forest District.

There are 3 nearby provincial parks; Dunn Peak Park, Wells Gray Park, and Caligata Lake Park. The proposed facilities are also adjacent to a series of designated recreational trails known as the Foghorn-Harp Snowmobile Trail network.

Current access to the mine site is via the Jones Creek Forest Service Road and/or the Vavenby Mountain Forest Service Road. *Please refer to Appendix 1 for a Project Overview Map.*

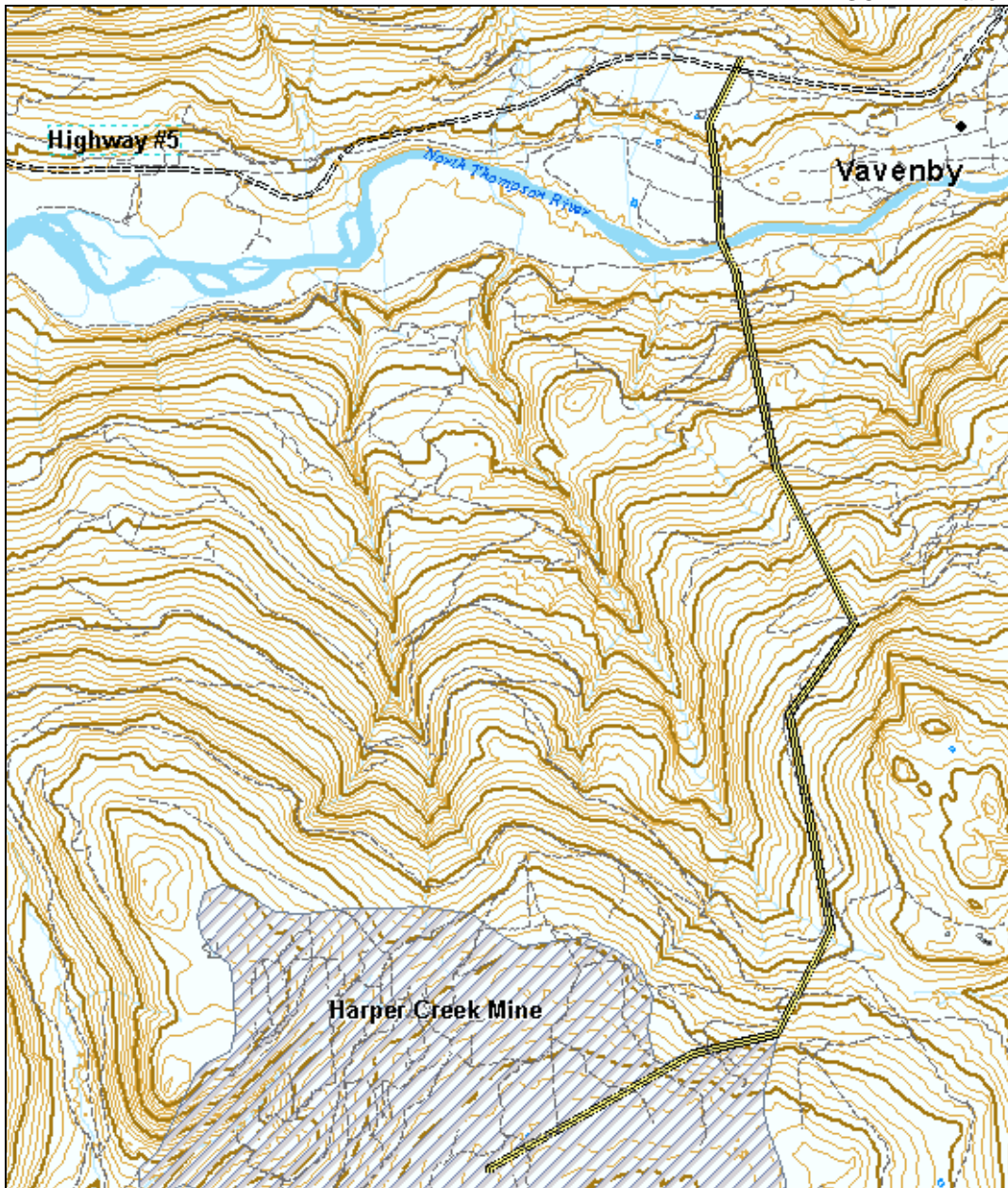
## TRANSMISSION LINE ROUTE

A new private 138kV transmission line will be required to deliver power to the mine site. Power to this transmission line will be supplied via a new BC Hydro 138kV switchyard located at the project's rail load out facility.

This proposed 12.1km long - 138kV transmission line will cross the North Thompson River near the off site project facilities and climb perpendicular to contours on the east side of Jones Creek. In the first 3.1km from the south side of the river, the line climbs 820 meters in elevation. The transmission right of way clearing width for the purposes of this report is 30m.

The proposed transmission line route is shown in *Figure 1*.

FIGURE 1. Transmission line route



## VISUAL IMPACT ASSESSMENT BACKGROUND

Scenic viewing is an important component of most recreation and tourism activities in British Columbia. It is important to understand that the landscape is used in many different ways and that public opinion as to how a landscape should be managed is wide ranging. People who live and work in the subject area will likely have different opinions about resulting landscapes than those from a recreational user. The challenge that government and industry face is how to best manage the visual landscape and maintain a range of social and environmental values while still being able to conduct viable economical activities.

The objective of visual resource management is to guide development activities in a manner that minimizes impacts to visually sensitive areas and be consistent with established Visual Quality Objectives (VQO). Managing the visual landscape is an essential part of the principles of integrated resource management and a Visual Impact Assessment (VIA) is used to estimate the potential impact proposed operations have on visually sensitive and scenic landscapes.

Visually sensitive or scenic areas are the landscapes that are visible from communities, public use areas, and travel corridors. Scenic areas are managed by setting Visual Quality Objectives that indicate the desired visual condition based on social concerns and the physical characteristics of the landscape. Visual design principles can be applied to mitigate the visual impact of development activities.

The Ministry of Forests, Lands, and Natural Resource Operations (MFLNRO) has completed extensive Visual Landscape Inventories (VLI) for most areas of the province. The role of the Visual Landscape Inventory is to identify and classify those areas and corridors throughout the province that are visually sensitive. The primary use of the VLI is to identify those landscapes that are visually sensitive and warrant *Scenic Area* designation. Once *Scenic Areas* have been identified through the VLI, the level of management is defined by establishing a Visual Quality Objective. Where this has been done, licensees must prepare results and strategies that are consistent with the VQO. Visual Quality Objectives and Scenic Areas have been established in many areas of the province under the Forest and Range Practices Act (FRPA).

The VQO's identify standards for visual design and perspective alteration limits that apply to forest harvesting. It is a resource management objective that reflects the desired level of visual quality based on the physical characteristics and social concern for an area. Five categories of VQO's are used: preservation, retention, partial retention, modification, and maximum modification.

Although Scenic Areas and VQO's under FRPA were established to manage forest harvesting activities, and other types of resource development are not required by law to be consistent with visual quality objectives, these resource sectors are encouraged to apply visual design principles to minimize the impact of their activities. In the case of this project, section 6.2.3 of the *Application Information Requirements As Approved by the Environmental Assessment Office* states that the assessment of potential social effects will “consider potential visual impacts of the Project on the North Thompson River valley near Vavenby and the surrounding recreational areas such as Dunn Peak” and “Visual Quality Assessments will be conducted for this purpose from strategic viewpoints”.

This visual impact assessment will be based, in part, on the Ministry of Forests' Visual Impact Assessment Procedure. This procedure provides a means to quantify the amount of disturbance or alteration that may be created by a proposed development.

Although Visual Impact Assessments (VIA) are no longer a legal requirement under the Forest and Range Practices Act, FRPA does rely on the Association of British Columbia Forest Professionals (ABCFP) Standards of Professional Practice. This requires professional foresters (RPF) and registered forest technologists (RFT) to carry out due diligence in completing their work. Although many aspects of this mine project do not fall under the umbrella of professional forestry, the projects facilities and infrastructure will

affect the visual quality of the landscape and the importance of this value to communities and recreational users should not be discounted.

The level and detail of the assessment that would be reasonable depends on a number of factors. A significant factor is the established VQO. Other considerations include the visual sensitivity of the landscape, the numbers of viewers and their level of concern, and the number of viewing opportunities and viewing time.

This Visual Impact Assessment includes:

- Viewshed Analysis (topography only)
- Digital terrain modeling and development simulation
- Photographic panorama comparison
- Relevant planimetric map products

The goal of this Visual Impact Assessment is to verify whether the planned Harper Creek Mine will meet the established visual quality objectives from the Highway #5 corridor, and demonstrate the potential visual impacts from other significant viewpoints as identified by the proponent through consultation and review of input from stakeholders, including First Nations, government agencies and the general public.

*FIGURE 2. View from Vavenby looking south across the North Thompson River*



## SCENIC AREAS AND VISUAL QUALITY OBJECTIVES (VQO)

There are 5 visual quality objectives; *Preservation, Retention, Partial Retention, Modification, and Maximum Modification*. Each VQO has a 'definition' associated with it. Referred to as "*Categories of visually altered forest landscape*", *Figure 3* shows the definitions described under the Forest Planning and Practices Regulation (FPPR), Section 1.1.

*FIGURE 3. Categories of visually altered forest landscape under FRPA*

- 1.1 For the purposes of paragraph (c) of the definition of "altered forest landscape" in section 1, the following categories are prescribed, each according to the extent of alteration resulting from the size, shape and location of cutblocks and roads:
- (a) *Preservation (P)*: consisting of an altered forest landscape in which the alteration, when assessed from a significant public viewpoint, is
    - (i) very small in scale, and
    - (ii) not easily distinguishable from the pre-harvest landscape;
  - (b) *Retention (R)*: consisting of an altered forest landscape in which the alteration, when assessed from a significant public viewpoint, is
    - (i) difficult to see,
    - (ii) small in scale, and
    - (iii) natural in appearance;
  - (c) *partial retention (PR)*: consisting of an altered forest landscape in which the alteration, when assessed from a significant viewpoint, is
    - (i) easy to see,
    - (ii) small to medium in scale, and
    - (iii) natural and not rectilinear or geometric in shape;
  - (d) *Modification (M)*: consisting of an altered forest landscape in which the alteration, when assessed from a significant public viewpoint,
    - (i) is very easy to see, and
    - (ii) is
      - (A) large in scale and natural in its appearance, or
      - (B) small to medium in scale but with some angular characteristics;
  - (e) *maximum modification (MM)*: consisting of an altered forest landscape in which the alteration, when assessed from a significant public viewpoint,
    - (i) is very easy to see, and
    - (ii) is
      - (A) very large in scale,
      - (B) rectilinear and geometric in shape, or
      - (C) both.

The majority of the mine site facilities are not within a designated Scenic Area according to the provincial Visual Landscape Inventory (VLI), therefore, there are no VQO's identified. Viewpoints that were identified in these areas that were based on stakeholder feedback will still be modelled to assess visual impact on the landscape. These viewpoints are not required to meet a *category of visually altered forest landscape*. However, the results of these models can be used as a guide to assess potential mitigation and visual design activities.

The Highway #5 corridor has the highest numbers of potential viewers and the highest number of viewing opportunities. The Visual Landscape Inventory reflects this with established Visual Quality Objectives within this corridor. These VQO polygons were established with the Highway #5 corridor in mind and any assessment of the impacts on these polygons will be carried out from significant public viewpoints within this corridor. These viewpoints are VP#3, 4, 5, 6 and 13. Only these viewpoints will be evaluated under FRPA guidelines.

## RECREATIONAL USE

The areas within and adjacent to the proposed mine site are used by the public for recreational activities. These activities may include fishing, hunting, snowmobiling, cross-country skiing and hiking.

The Ministry of Forests, Lands and Natural Resource Operations is responsible for managing outdoor recreation (including the scenic landscape) for most of the Crown land outside of parks. As part of this management, the MFLNRO maintains a Recreation Resource Inventory.

The recreation inventory identifies and maps recreation features, activities, and facilities. The recreation features are rated on their significance and sensitivity to alteration.

The significance of a feature is rated in the inventory as:

- very high (provincially or nationally significant)
- high (regionally significant)
- moderate (locally significant)
- low (locally common).

The sensitivity of a feature is rated in the inventory as:

- high (areas of outstanding value most appropriately managed exclusively for recreation)
- moderate (areas that require special management consideration to protect recreation values)
- low (areas where normal forest management practices are adequate to maintain recreation values)

*Please refer to Appendix 3 for a Recreation Use Overview Map*

The majority of the Harper Creek Mine facilities are located within a *Moderate* significance and sensitivity class. The area is considered locally significant and requires management considerations to protect recreational values.

The mine is adjacent to Harp Mountain directly to its south. Harp Mountain is a well known and popular snowmobile area and is classified as High significance and sensitivity.

Approximately 2 km west of the mine facility is Dunn Peak Protected Area. This area is within a very high significance class (provincially/nationally significant) and a High sensitivity class. Dunn Peak is known for its natural beauty and hiking/mountaineering opportunities. Dunn Peak Trail is a popular 7.5km long hiking trail that leads to the base of Dunn Peak. Dunn (Matterhorn) Peak, rises to 2,636 metres (8,648 ft), making it the highest point in the Shuswap Highlands.

Across the North Thompson River Valley to the north is Raft Mountain and Wells Gray Provincial Park. The Raft Mountain area is a Recreational Reserve and is a known snowmobile and cross country skiing area. It is classified as High significance and sensitivity in the recreational inventory. Trophy Meadows is within Wells Gray Provincial Park and is a popular hiking area.

The proposed Harper Creek Mine facilities are visible to varying extents from all of the above recreational use areas.

## CURRENT INDUSTRIAL USE

The area surrounding the proposed mine site is an area of active forestry. The visual landscape has been impacted by these activities. Large areas of regenerating forests surround the proposed mine site. Clear cut harvesting is common in the area. Throughout the life cycle of this mine, the visual landscape will continually evolve and change with regenerating forests and new harvesting.

## VIEWPOINT SELECTION

The Forest Planning and Practices Regulation refer to the alteration definitions being assessed from "a significant public viewpoint". For this Visual Impact Assessment, these *significant public viewpoints* were selected mainly from the Highway #5 corridor and known recreation use areas.

The Highway #5 corridor viewpoints were selected based on established provincial Visual Quality Objectives.

Many of the areas evaluated in this report are not officially designated as Scenic Areas by the MoFLNRO and do not have established VQO polygons. They were chosen based on the importance placed on these landscapes by user groups. The sites were recognized for their exceptional scenic quality and/or for potential effects on the aesthetic and recreational interest of the area.

For this project, 14 viewpoints were selected. Of the 14 viewpoints, 5 were based on established VQO polygons and Scenic Area designation and were assessed using FRPA guidelines. The 5 viewpoints based on an Established Visual Quality Objective are VP#3, 4, 5, 6 and 13.

The remaining 9 views were chosen based on consultation with BC Parks and recreation user groups. The 9 viewpoints that were established based on discussion with stakeholder groups include VP 1, 2, 7, 8, 9, 10, 11, 12, and 14. These viewpoints were not assessed using the FRPA guidelines as they do not have EVQO's.

Viewpoint locations were selected based on a "worst case scenario" basis. The locations were selected where it was believed the visual impact of the development would be the most noticeable from a viewer.

At least one viewpoint was selected from each area of concern. Areas that were considered include the following:

- Highway #5
- Vavenby
- Trophy Meadows (Wells Gray Provincial Park)
- Raft Mountain Recreational Reserve / Willis Snowmobile Cabin
- Granite Mountain
- Vavenby Lookout Cabin
- Harp Mountain
- Dunn Peak Protected Area

*Please see Table 1 below for a list of selected viewpoints.*

TABLE 1. List of Viewpoints (For a detailed list of viewpoints, please refer to Appendix 4)

Viewpoint Name	VP #	Significance*	Latitude	Longitude	Field of View (FOV)	Direction	EVQO**
Trophy Meadows	1	NA	51° 46' 33.760" N	119° 55' 59.088" W	38.6	165	NA
Raft Mountain	2	NA	51° 43' 30.813" N	119° 49' 37.076" W	38.6	176	NA
Highway #5-1a	3	2	51° 35' 20.279" N	119° 51' 16.294" W	44	111	PR
Highway #5-1b	3	2	51° 35' 20.279" N	119° 51' 16.294" W	71	169	M
Highway #5-2	4	2	51° 35' 32.898" N	119° 46' 11.073" W	95	158	PR
Highway #5-3	5	3	51° 36' 23.432" N	119 41 53.078" W	56	209	PR
Vavenby	6	5	51° 35' 18.028" N	119° 43' 36.911" W	90	182	PR
Granite Mountain	7	NA	51° 30' 4.778" N	119° 55' 53.856" W	60	086	NA
Vavenby Lookout Cabin	8	NA	51° 31' 1.693" N	119° 41' 11.092" W	45	278	NA
Harp Mountain	9	NA	51° 27' 20.216" N	119° 47' 49.705" W	41	341	NA
Harp Mountain Trail #1	10	NA	51° 26' 59.894" N	119° 48' 3.692" W	60	354	NA
Harp Mountain Trail #2	11	NA	51° 25' 3.971" N	119° 47' 11.649" W	56	346	NA
Dunn Peak Summit	12	NA	51° 26' 14.334" N	119° 57' 15.807" W	45	55	NA
Highway #5-2 Alt	13	2	51° 35' 17.674" N	119° 48' 5.63" W	65	176	M
Dunn Peak Trailhead	14	NA	51° 29' 22.133" N	119° 54' 43.984" W	25	80	NA

\*Significance is based on the "Effectiveness Evaluation of Visual Impacts" (MOF, 2005). Significance of the viewpoint is determined using a five-point scale from Low (1) to High (5). The scale is calibrated to the viewing duration: (1) *Low* - glimpse view, less than 10 seconds, (2) sustained side view, (3) *Moderate* - sustained focal view, traveling toward the alteration for more than one minute, (4) viewpoint is at a rest stop, campsite, or other static short-term view location, (5) *High* - viewpoint is the location of a community, commercial tourist-related enterprise, or other static long-term view location.

\*\*Refer to Figure 3 above for the corresponding EVQO definitions.

Please refer to Appendix 5 for detailed Viewpoint Maps showing located viewpoints.

## PANORAMA PHOTOGRAPHY

Panorama photography was taken from the selected viewpoints, with the exception of Dunn Peak and Dunn Peak Trail head. The role of the panorama photography is to confirm Existing Visual Conditions (EVC), confirm impact of viewing distances, and to confirm that the computer generated models are spatially accurate and reasonably replicate the real world.

Photography was taken in October 2011.

FIGURE 4. Panorama taken from Raft Mountain looking south – October 2011



## CURRENT PROJECT STATUS AND PROJECT DESIGN ASSUMPTIONS

At the time of this report, the current status of the design and planning of Harper Creek Mine is preliminary. It can be assumed that many design parameters of this project may change over time. Final locations and arrangements of the infrastructure for the project is still being investigated the final location of the transmission line corridor, access roads, and on site facilities may change.

The computer modelling was based on the current (September 2012) project design at *year 23 of development*. Year 23 is when mining ceases from the open pit and project facilities will have the largest impact on the visual landscape (worst case scenario).

It was assumed that:

- Project design may change over time
- 138kV transmission line will have a 30m clearing width
- Average distance between transmission poles is 100m
- Project design extents, dimensions, and elevations are approximate

## VISUAL IMPACT ASSESSMENT PROCEDURE

To model what the proposed project infrastructure will look like post development, a series of computer generated renderings were created that represented the view from each selected viewpoint.

When required, these visual simulations permit measurement of the proposed visual impact in perspective view. Where a viewpoint has an established VQO, the MoFLNRO Visual Impact Assessment Procedures were used to quantify the amount of disturbance or alteration that may be created by the proposed development. The Visual Impact Assessment Procedures describe three steps in assessing visual simulations to verify whether scenic goals and definitions have been met.

1. **Basic VQO definition:** Does a proposed operation meet the basic visual quality objective definition?
2. **Visual design:** Does a proposed operation exhibit elements of good visual design?
3. **Scale (Numerical assessment):** In perspective view, what proportions of the landform or unit are represented by existing non-visually effective green-up alterations and proposed development?

Steps 1 and 2 are qualitative assessments. Step 3 is a numerical assessment that quantifies the amount of scenic alteration. This step provides a measure of the proposed development to achieve the numerical standards of the Visual Quality Objective.

Table 2 shows the percent alteration limits for each VQO. These percentages apply to only the visible green portion of the landscape. It does not include features like rock, glaciers, or water. Numerical information, such as *percent alteration*, continues to exist in policy under FRPA. Since the numerical data was derived through research, this information remains relevant to each VQO class but is not part of the legal definition under FRPA. It can, however, be used as a tool to help assess whether or not a development has met the VQO definition.

TABLE 2. VQO Definition and Perspective View Alteration Limits

Visual Quality Objective (VQO)	Perspective View Alteration Percentage (%)	Definition
Preservation	0	very small in scale, and not easily distinguishable from the pre-harvest landscape
Retention	0 - 1.5	difficult to see, small in scale, and natural in appearance
Partial Retention	1.6 - 7.0	easy to see, small to medium in scale, and natural and not rectilinear or geometric in shape
Modification	7.1 - 18.0	is very easy to see, and is large in scale and natural in its appearance, or small to medium in scale but with some angular characteristics

The visual simulation models employ reasonably accurate elevations, forest density and tree heights. Elevation information is based on 1:50,000 Canadian Digital Elevation Data. Forest stand information is based on the Provinces Vegetation Resources Inventory (VRI).

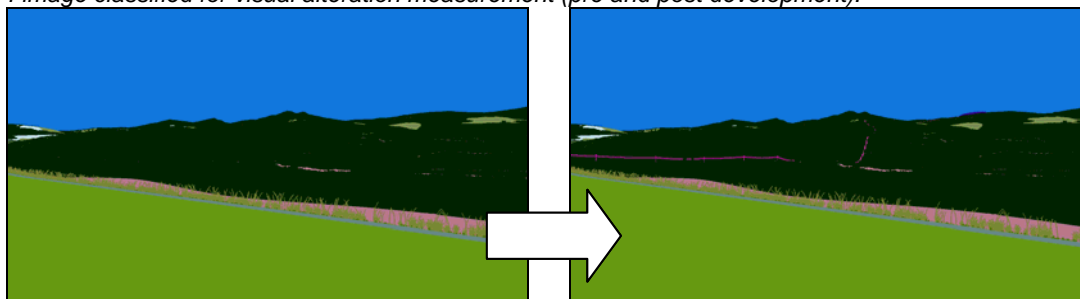
Pre-development and post-development models are created and images are rendered from each viewpoint. This creates a realistic image of how the project may look after development and also provides a baseline for analysis.

FIGURE 5. VP 4 post development rendering.



The image is then broken down into components. Each feature that makes up the image is separated into its own component (each colour represents a separate component of the image). By comparing the number of image pixels assigned to each component, precise percentages of alteration can be determined. Foreground and background components are not included in any calculations. These may include any foreground vegetation and water features.

FIGURE 6. VP4 image classified for visual alteration measurement (pre and post development).



The alteration calculations described above are used as a tool to help judge whether or not the VQO has been met. It is a replicable, empirical method that assigns a numeric value to the viewscape alteration. This is, however, only a tool to help the decision making process.

## VISUAL IMPACT ASSESSMENT RESULTS

Below are the results of the visual impact assessment on each viewpoint. Only Viewpoints 3, 4, 5, 6, and 13 were evaluated based on the Visual Impact Assessment Guidelines as they have Established Visual Quality Objectives. The other viewpoints have been modelled and are discussed, but are not in a designated Scenic Area and do not have established EVQO's.

Refer to Appendix #7 for Viewpoint Projections

### Viewpoint Summaries and Results

Viewpoint Name				EVQO
VP 1 – Trophy Meadows				NA
Latitude	Longitude	Elevation (m)	Viewing Distance	EVC
51° 46' 33.760" N	119° 55' 59.088" W	1968	29km	NA
General Location / Considerations				Significance
This viewpoint is from Trophy Meadows in Wells Gray Provincial Park. This is a popular hiking area as the Trophy Meadows are one of the most easily accessible sub-alpine meadows in BC.				NA
Discussion				
The Harper Creek Mine stockpiles will be visible from these meadows. Specifically the PAG Low Grade Stockpile and the North Non-PAG Stockpile. Viewing distance is a mitigating factor as the project site is 29 kilometers from this viewpoint. Spahats Creek, the western slopes of Raft Mountain, the Raft River Valley, Mount McClennan, and the North Thompson River Valley all separate the mine facilities from this viewpoint. Project facilities will only be visible on clear days free of haze and low cloud. From this viewpoint, the mine facilities are in the background and will not create an environment of focused viewing on the site.				
Result				
No Established Visual Quality Objective				

Viewpoint Name				EVQO
VP 2 – Raft Mountain / Willis Snowmobile Cabin				NA
Latitude	Longitude	Elevation (m)	Viewing Distance	EVC
51° 43' 30.813"N	119° 49' 37.076"W	2189	22km	NA
General Location / Considerations				Significance
This viewpoint is from the south slopes of Raft Mountain and is near the Willis Snowmobile Cabin. Networks of cross-country ski and snowmobile trails are maintained on these slopes by local recreation groups. This viewpoint is 1km upslope to the northeast (32 degrees azimuth) of the cabin site.				NA
Discussion				
The proposed mine facilities will be visible from this viewpoint including the Open Pit. The viewing distance is long at 22km; however the large project scale will allow the facilities to be easily visible on moderately clear days. The Raft River Valley, Mount McClennan, and the North Thompson River Valley all separate the mine facilities from this viewpoint. The large scale of the facilities in relation to Harp Mountain will have a high impact on the visual landscape and create focused viewing from the southern slope of Raft Mountain.				
Result				
No Established Visual Quality Objective				

Viewpoint Name				EVQO
VP 3 – Highway 5–1a				PR
Latitude	Longitude	Elevation (m)	Viewing Distance	EVC
51° 35' 20.279" N	119° 51' 16.294" W	477.5	7.3km	NA
General Location / Considerations				Significance
This viewpoint is from Highway #5 approximately 9.5km west of Vavenby. The Highway #5 corridor provides for sustained side viewing to the south across the North Thompson River Valley. This view has an established VQO of Partial Retention.				2 - Low
Discussion				
Portions of the transmission right of way are visible from this viewpoint. The transmission line right of way accounts for no measurable additional alteration to the landscape. The proposed transmission line route has straight tangents and climbs perpendicular to contours. This is generally not good visual design. However the undulating terrain, variable vegetation age and height across the landscape, and the narrow clearing width hides the clearing from sight and only short stretches of the clearing become visible on the mid and upper slopes.				
Result				
Meets the definition of Partial Retention				

Viewpoint Name				EVQO
VP 3 – Highway 5-1b				M
Latitude	Longitude	Elevation (m)	Viewing Distance	EVC
51° 35' 20.279" N	119° 51' 16.294" W	477.5	7.4km	NA
General Location / Considerations				Significance
This viewpoint is from Highway #5 approximately 9.5 km west of Vavenby. The Highway #5 corridor provides for sustained side viewing to the south across the North Thompson River Valley. This view has an established VQO of Modification.				NA
Discussion				
Portions of the Transmission Right of Way and the East Overburden Stockpile are visible from this viewpoint. The alteration to the landscape accounts for less than a 1% addition. Existing forest activity disturbance accounts for 1.3%. The proposed transmission line route is visible along a stretch on the upper slope where it parallels the contours. The top of the East Overburden Stockpile is visible above a mature stand of Balsam with a projected height of 22m. This stand is not likely to provide further screening over the life cycle of the project.				
Result				
Meets the definition of Modification				

Viewpoint Name				EVQO
VP 4 – Highway 5-2				PR
Latitude	Longitude	Elevation (m)	Viewing Distance	EVC
51° 35' 32.898" N	119° 46' 11.073" W	555	2.0 – 7.9km	NA
General Location / Considerations				Significance
This viewpoint is from Highway #5 approximately 3.3km west of Vavenby. The Highway #5 corridor provides for sustained side viewing to the south across the North Thompson River Valley. This view has an established VQO of Partial Retention.				NA
Discussion				
Portions of the Transmission Right of Way and the East Overburden Stockpile are visible from this viewpoint. The alteration to the landscape accounts for less than a 1% addition. Existing disturbances account for less than 1% as well. The proposed transmission line route has straight tangents and climbs perpendicular to contours. This is poor visual design. The proposed transmission line route is visible as it climbs across contours on the lower and mid-slopes. The mitigating factor here is the variability that already exists on the landscape. Variable stands of conifer and deciduous with varying ages and undulating terrain help this straight tangent look more natural. The top of the East Overburden Stockpile is visible above a mature stand of Balsam with a projected height of 22m. This stand is not likely to provide further screening over the life cycle of the project.				

Result
Meets the definition of Partial Retention

Viewpoint Name				EVQO
VP 5 – Highway 5-3				PR
Latitude	Longitude	Elevation (m)	Viewing Distance	EVC
51° 36' 23.432" N	119 41 53.078" W	575	7.0 – 11.2km	NA
General Location / Considerations				Significance
This viewpoint is from Highway #5 approximately 2.5km east of Vavenby. This stretch along the Highway #5 corridor provides for sustained (> 1 minute) focal viewing to the south across the North Thompson River Valley. This view has an established VQO of Partial Retention.				3 - Moderate
Discussion				
The top of the East Overburden Stockpile is visible from this viewpoint. Existing disturbance on the landscape is 1.3%, mostly from forestry activities. An additional 1.1% of disturbance is created by this stockpile. This stretch of highway will have a period of over 1 minute of focused viewing to the south side of the river valley and this feature could be prominent in the viewscape. A mitigating factor is that the stockpile is in the background. The mature stand of Balsam in front of the stockpile will not likely provide further screening over the life cycle of the project.				
Result				
Meets the definition of Partial Retention				

Viewpoint Name				EVQO
VP 6 - Vavenby				PR
Latitude	Longitude	Elevation (m)	Viewing Distance	EVC
51° 35' 18.028" N	119° 43' 36.911" W	484	2.8 - 8.5km	NA
General Location / Considerations				Significance
This viewpoint is from a popular recreational area in Vavenby near the intersection of Vavenby Bridge Road and Allingham Way. This view has an established VQO of Partial Retention. This viewpoint is meant to simulate the views from the community of Vavenby and therefore has a High Significance rating.				5 - High
Discussion				
The East Overburden Stockpile is visible on the horizon from this viewpoint. The stockpile adds less than 1% of alteration to the landscape. A mitigating factor is that the stockpile is in the background on an upper slope. The mature stand of Balsam in front of the stockpile will not likely provide further screening over the life cycle of the project.				

Result
No Established Visual Quality Objective

Viewpoint Name				EVQO
VP 7 – Granite Mountain				NA
Latitude	Longitude	Elevation (m)	Viewing Distance	EVC
51° 30' 4.778" N	119° 55' 53.856" W	2250	7km	NA
General Location / Considerations				Significance
Granite Mountain is part of the Foghorn-Harp Snowmobile Trail network maintained by the Clearwater Sno-Drifters. There is a maintained shelter in Foghorn Meadows between Foghorn Mountain and Granite Mountain. There is also a cabin located near the tree line on Granite Mountain. The Granite Mountain viewpoint is located near the summit of Granite Mountain approximately 2.1km at 165 degrees (azimuth) from the shelter site and 2.4km at 255 degrees from the cabin. The Foghorn-Harp Snowmobile Trails are designated active recreation trails by the provincial recreation inventory.				NA
Discussion				
Most proposed project facilities are visible from the Granite Mountain summit. This includes all major Stockpiles, the Tailings Management Facility, the Open Pit, and the Plant Facilities. There will be a high impact on the visual landscape from this viewpoint based on its moderate viewing distance of 7km and the scale of the proposed project facilities. It is important to note that this viewpoint is from the Granite Mountain summit and the facilities are not visible from the Foghorn Mountain Meadows (shelter site) or the designated trail network in the area.				
Result				
No Established Visual Quality Objective				

Viewpoint Name				EVQO
VP 8 – Vavenby Mountain Lookout Cabin				NA
Latitude	Longitude	Elevation (m)	Viewing Distance	EVC
51° 31' 1.693" N	119° 41' 11.092" W	1795	6km	NA
General Location / Considerations				Significance
The Vavenby Mountain Lookout Cabin is maintained by the Clearwater Sno-Drifters. At the time of photography, the site could not be accessed due to topography and vegetation. The viewpoint was moved 1380m at 155 degrees (azimuth) to a road landing in an area of recent harvesting. This site was chosen because it will be a good representation of potential viewing windows created by future harvesting activities.				NA

Discussion
<p>From this viewpoint the East Overburden Stockpile, Transmission Line Right-of-Way, Northwest Topsoil Stockpile, and a small portion of the Open Pit are visible. This is an area of regenerating forests and viewing windows to the proposed mine site are limited. Over time as the mine site is developed, these viewing windows will change as regenerating forests grow and continue to add to vegetative screening and new harvesting activities open up new viewing windows.</p>
Result
<p>No Established Visual Quality Objective</p>

Viewpoint Name				EVQO
VP 9 – Harp Mountain				NA
Latitude	Longitude	Elevation (m)	Viewing Distance	EVC
51° 27' 20.216" N	119° 47' 49.705" W	2108	1.5km	NA
General Location / Considerations				Significance
<p>Harp Mountain is a well known and popular managed snowmobile area (managed by the Clearwater Sno-Drifters). It is also a popular hiking and cross country skiing area. The Foghorn-Harp Snowmobile Trails are designated as active recreation trails by the provincial recreation inventory. This viewpoint is 400m at 283 degrees (azimuth) from the Harp Mountain Cabin.</p>				NA
Discussion				
<p>This viewpoint has views north to the proposed Tailings Management Facility (including the Dam Embankment) and the PAG Low Grade Stockpile. This viewpoint has a short viewing distance of approximately only 1.5km. The project facilities are not visible directly from the Harp Mountain Cabin site.</p>				
Result				
<p>No Established Visual Quality Objective</p>				

Viewpoint Name				EVQO
VP 10 – Harp Mountain Trail #1				NA
Latitude	Longitude	Elevation (m)	Viewing Distance	EVC
51° 26' 59.894" N	119° 48' 3.692" W	2208	2.5km	NA
General Location / Considerations				Significance
<p>Harp Mountain is a well known and popular managed snowmobile area (managed by the Clearwater Sno-Drifters). It is also a popular hiking and cross country skiing area. The Foghorn-Harp Snowmobile Trails are designated as active recreation trails by the provincial recreation inventory. This viewpoint is from a designated trail.</p>				NA

Discussion				
This viewpoint has unobstructed views north to the proposed mine facilities and a short viewing distance of approximately only 2.5 km. Most project facilities are visible from this view including the plant site buildings and infrastructure.				
Result				
No Established Visual Quality Objective				

Viewpoint Name				EVQO
VP 11 – Harp Mountain Trail #2				NA
Latitude	Longitude	Elevation (m)	Viewing Distance	EVC
51° 25' 3.971" N	119° 47' 11.649" W	2152	7km	NA
General Location / Considerations				Significance
Harp Mountain is a well known and popular managed snowmobile area (managed by the Clearwater Sno-Drifters). It is also a popular hiking and cross country skiing area. The Foghorn-Harp Snowmobile Trails are designated as active recreation trails by the provincial recreation inventory. This viewpoint is from a designated trail.				NA
Discussion				
The peak of Harp Mountain stands between this viewpoint and the mine facilities and dominates the foreground of this view. Directly east of Harp Mountain, a small portion of the Tailings Management Facility is visible at a viewing distance of approximately 7km.				
Result				
No Established Visual Quality Objective				

Viewpoint Name				EVQO
VP 12 – Dunn Peak Summit				NA
Latitude	Longitude	Elevation (m)	Viewing Distance	EVC
51° 26' 14.334" N	119° 57' 15.807" W	2638	10km	NA
General Location / Considerations				Significance
This viewpoint is from the summit of Dunn Peak. The Dunn Peak summit is accessed via the Dunn Peak Trail. This is the highest point in the Shuswap Highlands and it provides 360 degree panoramic views.				NA
Discussion				
All project facilities will be visible from this peak. However, this viewpoint is not as accessible to the average recreational user. The number of viewers will be low relative to the Highway #5 corridor and the more accessible hiking/snowmobile trails in the area. At 10km viewing distance, the mine will be well beyond the immediate foreground, mitigating its visual impact.				

<b>Result</b>
No Established Visual Quality Objective

<b>Viewpoint Name</b>				<b>EVQO</b>
VP 13 – Highway 5-2 Alt				M
<b>Latitude</b>	<b>Longitude</b>	<b>Elevation (m)</b>	<b>Viewing Distance</b>	<b>EVC</b>
51° 35' 17.674" N	119° 48' 5.63" W	505	7.0km	NA
<b>General Location / Considerations</b>				<b>Significance</b>
This viewpoint is approximately 5.6km west of Vavenby along Highway #5. The Highway #5 corridor provides for sustained side viewing to the south across the North Thompson River Valley. This view has an established VQO of Modification.				2 - Low
<b>Discussion</b>				
The East Overburden Stockpile is visible on the horizon from this viewpoint. The stockpile adds less than 1% of alteration to the landscape. The stockpile is at the very top of the slope and is above an area with a lot of stand variability. This variability in stand age, stocking, and height will continue through the life cycle of the project as this area is an active harvesting area.				
<b>Result</b>				
Meets the definition of Modification				

<b>Viewpoint Name</b>				<b>EVQO</b>
VP 14 – Dunn Peak Trailhead / Parking				NA
<b>Latitude</b>	<b>Longitude</b>	<b>Elevation (m)</b>	<b>Viewing Distance</b>	<b>EVC</b>
51° 29' 22.133" N	119° 54' 43.984" W	1548	5.5km	NA
<b>General Location / Considerations</b>				<b>Significance</b>
This viewpoint is from the head of the Dunn Peak Trail and parking area. This trail is a moderately popular day/overnight hiking destination and leads to the base of Dunn Peak.				NA
<b>Discussion</b>				
Looking east from the parking area, and potential glimpse views while traveling along the access road, the Non-PAG and PAG Stockpiles, and the West Topsoil Stockpile are visible. No other mine facilities will be visible from this viewpoint. This area is sparsely vegetated and views of the mine facilities are expected to be short in duration. It should be noted that the project facilities are not expected to be visible from the Dunn Peak Trail itself as it is more heavily vegetated and quickly turns to the south behind a large ridge.				
<b>Result</b>				
No Established Visual Quality Objective				

## VISUAL DESIGN CONSIDERATIONS

Visual design is a creative process that involves working with the visual patterns and lines of force to guide changes to the development in ways that meet the needs of society. Good visual design of developments are done in a manner that considers many resource values. Visual design is not just about using visual resource management guidelines in order to mitigate negative visual impacts and meet VQO's, but it should also assist in the management of economic, ecological and social values as well.

Visual design principles that could be taken into consideration during final project design include:

- Utilizing variable clearing widths - keeping right-of-way clearing as narrow as possible when safe to do so will create a variable width that makes the corridor more natural in appearance. This also fits well with hazard tree abatement procedures along the transmission line corridors.
- Utilizing benches in topography and less visually sensitive terrain
- Utilizing screens created from vegetation
- Exploiting visual shadows (hidden areas)
- Avoiding straight edges when possible
- Feathering forest edges along cleared areas and Right of Ways - Feathered edges look more natural in appearance.
- Revegetation of exposed soil and rock
- Rehabilitating road and RoW with grasses/vegetation following construction
- Considering infrastructure aesthetics (Using non-reflective material and natural colours)
- Engineering road clearing widths as narrow as possible where safe to do so and feasible for construction. Standard clearing widths can be reduced whenever side slopes and road prisms allow.

## SUMMARY

The viewpoints with the highest sensitivity are the viewpoints located along the Highway #5 corridor and for Vavenby. This is due to the high number of viewers and the sustained viewing opportunities. The visual impacts from the development of the Harper Creek Mine will be minimal in relation to current and future forest harvesting activities in the area. However, impacts caused by the development of the mine are permanent over the course of the mine life cycle.

There are two main features that impact the viewshed from the Highway #5 corridor; the proposed 138kV Transmission Line and the East Overburden Stockpile. The main theme from the Highway 5 corridor viewpoints is that based on the current project design, the East Overburden Stockpile will become visible as it grows over the life cycle of the project. Once the elevation of the stockpile reaches a height that impacts the horizon of viewshed, mitigation activities could be considered.

The viewpoints that are not within the Highway #5 corridor have varying degrees of impact, from low to very high. These viewpoints were located in known recreational areas. The areas where the proposed mine has the highest impact on the visual landscape is from viewpoints at a higher elevation than the mine site itself. This allows for unobstructed views of the project facilities including the open pit and tailings facility. Mitigation activities like re-vegetating the Tailings Management Facility banks and the dam embankments could create a more natural looking water feature.

At year 28 of development, the proposed Harper Creek Mine's footprint could be as large as 2300 hectares and will have very large stockpiles and tailings facility. This development will have a high visual impact from surrounding mountain peaks and backcountry recreation areas, but will have a very low impact from the Highway #5 corridor and the community of Vavenby.

## MODEL LIMITATIONS

The computer generated 3D renderings used for this assessment are created based on the best available data at the time of creation. The models are only as good as the data used to create them and the set of assumptions that were stated above.

These renderings are intended to be used as a guide to assist in the assessment and mitigation of impacts to the visual quality from the proposed mine site and associated infrastructure. They are not meant to be exact representations of the proposed development after 28 years of operations.

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## GLOSSARY OF TERMS

**VLI - Visual Landscape Inventory** - The role of the visual landscape inventory (VLI) is to identify and classify those areas and corridors throughout the province that are visually sensitive. The primary use of the VLI is to identify those landscapes that are visually sensitive and warrant *Scenic Area* designation.

**Scenic Area** - The most visually sensitive landscapes, identified through a visual landscape inventory (VLI), are made known as “*Scenic Areas*” under the *Forest and Range Practices Act* to enable management.

**FRPA - Forest and Range Practices Act** - In 2004, the government of British Columbia brought in FRPA to replace the 1995 Forest Practices Code.

**VQO - Visual Quality Objective** – Once *Scenic Areas* have been identified, the level of management is defined by establishing a Visual Quality Objective. Where this has been done, licensees must prepare results and strategies that are consistent with the Visual Quality Objective (VQO). A VQO is a resource management objective that reflects the desired level of visual quality based on the physical characteristics and social concern for the area.

**VIA - Visual Impact Assessment** - VIA's are used to estimate the potential visual impact of proposed operations on scenic resources and to assess whether the VQOs would be achieved. A VIA simulates, in perspective view, the visual effects of proposed timber harvesting, road construction or other modification operations on the scenic landscape. This simulation is used to assess whether or not the VQOs would be achieved.

**EVC - Existing Visual Condition** - is a component of the visual landscape inventory that represents the level of human-made landscape alteration caused by resource development activities in a VLI Polygon.

**VAC - Visual Absorption Capability** - is a component of the visual landscape inventory that rates the relative capacity of a landscape to absorb visual alterations and still maintain its visual integrity.

**VSC - Visual Sensitivity Class** - is a component of the visual landscape inventory that rates the sensitivity of the landscape to visual alteration based on biophysical characteristics, as well as viewing and viewer-related factors.

**Visually Effective Green-Up** - is the stage at which regeneration on a cutblock is perceived by the public as a newly established forest; forest cover on the cutblock should be of sufficient height to block stumps, logging debris, and bare ground from view.

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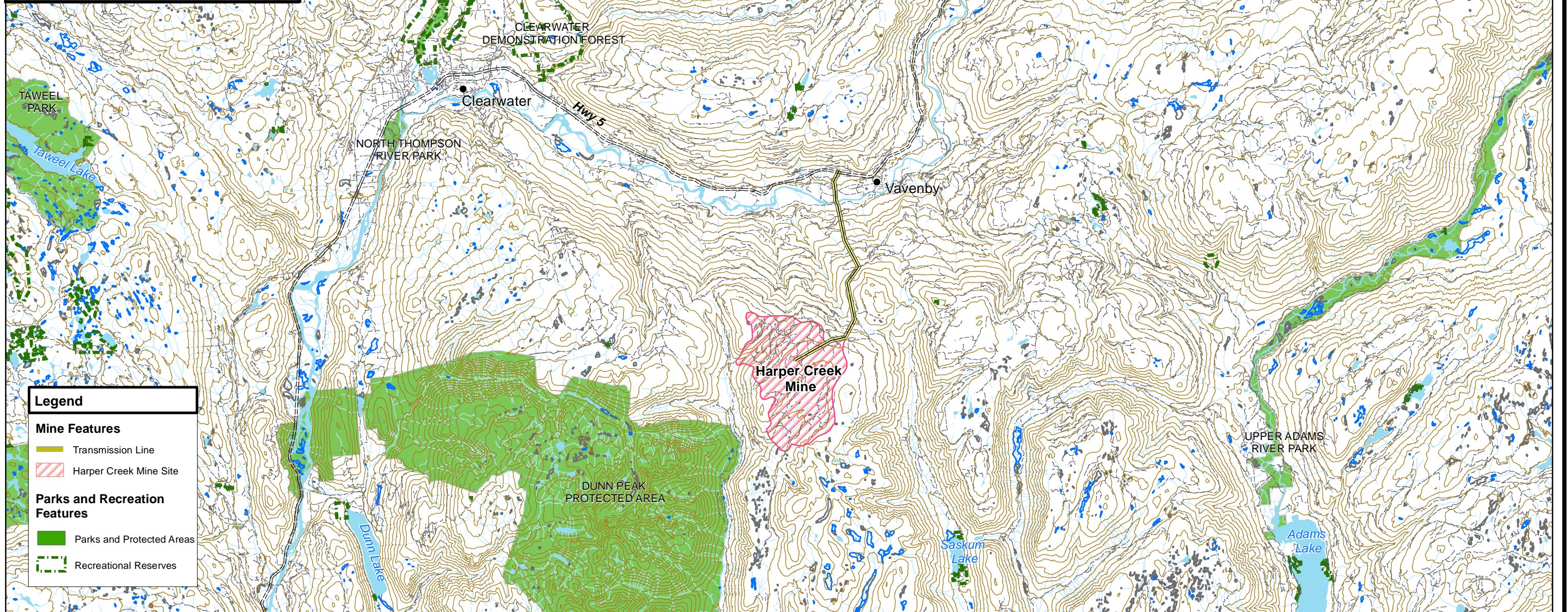
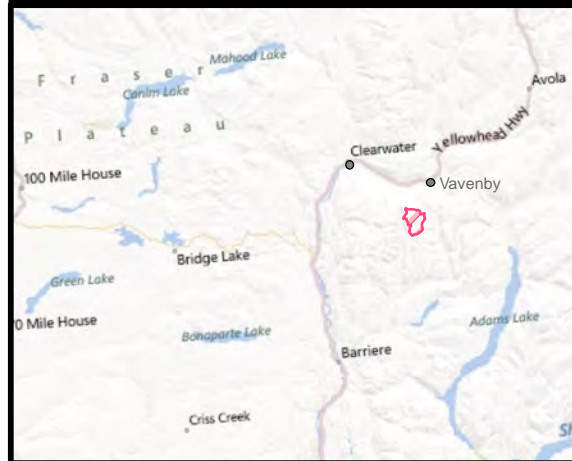
## APPENDIX 1

# Visual Impact Assessment - Overview Map - Harper Creek

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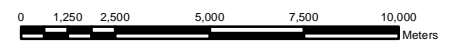
**Legend**

**Mine Features**

- Transmission Line
- Harper Creek Mine Site

**Parks and Recreation Features**

- Parks and Protected Areas
- Recreational Reserves



1:200,000

Viewpoints were chosen based on worst case scenarios ensuring that the entire Visual Quality Objective (VQO) polygon that each block falls within is contained within the Field of View (FOV). If blocks fall outside more than one VQO polygon the FOV encompasses all VQO polygons that are touched. FOVs are kept within reason, not exceeding what would be considered a natural viewscape.

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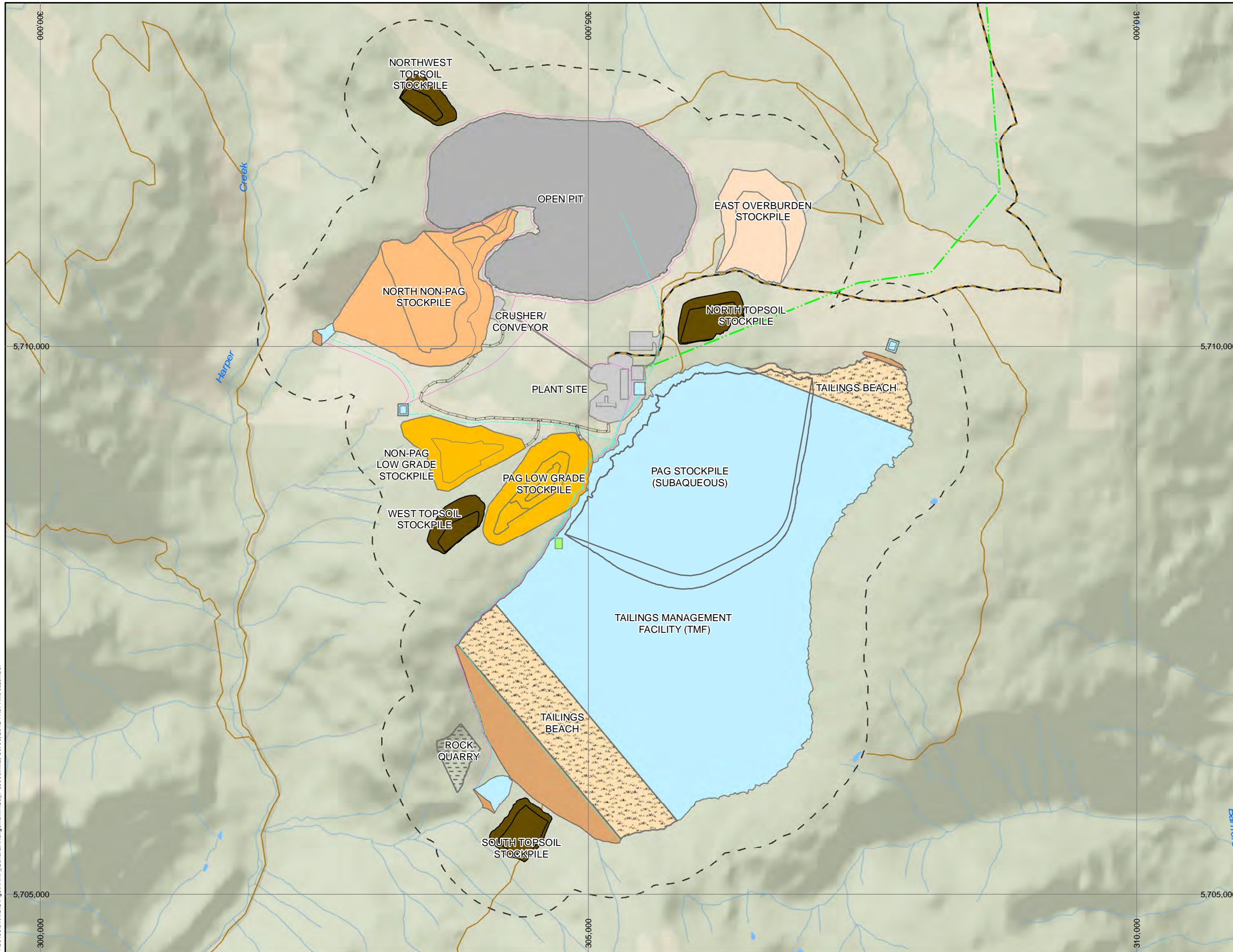




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## APPENDIX 2



**LEGEND:**

**GENERAL**

- MINE ACCESS ROAD
- RESOURCE ROAD
- CREEK/RIVER
- LAKE

**PROPOSED FACILITIES**

- HAUL ROAD
- OVERHEAD POWERLINE
- PIPELINE
- TRANSMISSION LINE
- POND
- BEACH
- EMBANKMENT
- QUARRY
- TOPSOIL STOCKPILE
- OVERBURDEN STOCKPILE
- LOW GRADE STOCKPILE
- NON-PAG WASTE ROCK STOCKPILE
- PIT
- PLANT FACILITIES
- RECLAIM BARGE
- MINE SITE AREA

**PROGRESS PRINT  
OCT 09, 2012 (11:57 AM)**

**NOTES:**

1. BASE MAP: BC TRIM AND ARCGIS ESRI ONLINE BASEMAPS.
2. COORDINATE GRID IS IN METRES.  
COORDINATE SYSTEM: NAD 1983 UTM ZONE 11N.
3. THIS FIGURE IS PRODUCED AT A NOMINAL SCALE OF 1:35,000 FOR 11x17 (TABLOID) PAPER. ACTUAL SCALE MAY DIFFER ACCORDING TO CHANGES IN PRINTER SETTINGS OR PRINTED PAPER SIZE.
4. PROJECT INFRASTRUCTURE IS FROM FIGURE 101-458/4/B42.DWG.



HARPER CREEK MINING CORP.

HARPER CREEK PROJECT

**WASRE AND WATER MANAGEMENT FACILITIES  
GENERAL ARRANGEMENT (YEAR 23)**

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PIA NO. VA101-458/4  
REF NO. -  
**FIGURE 4.F**  
REV A

**DRAFT**

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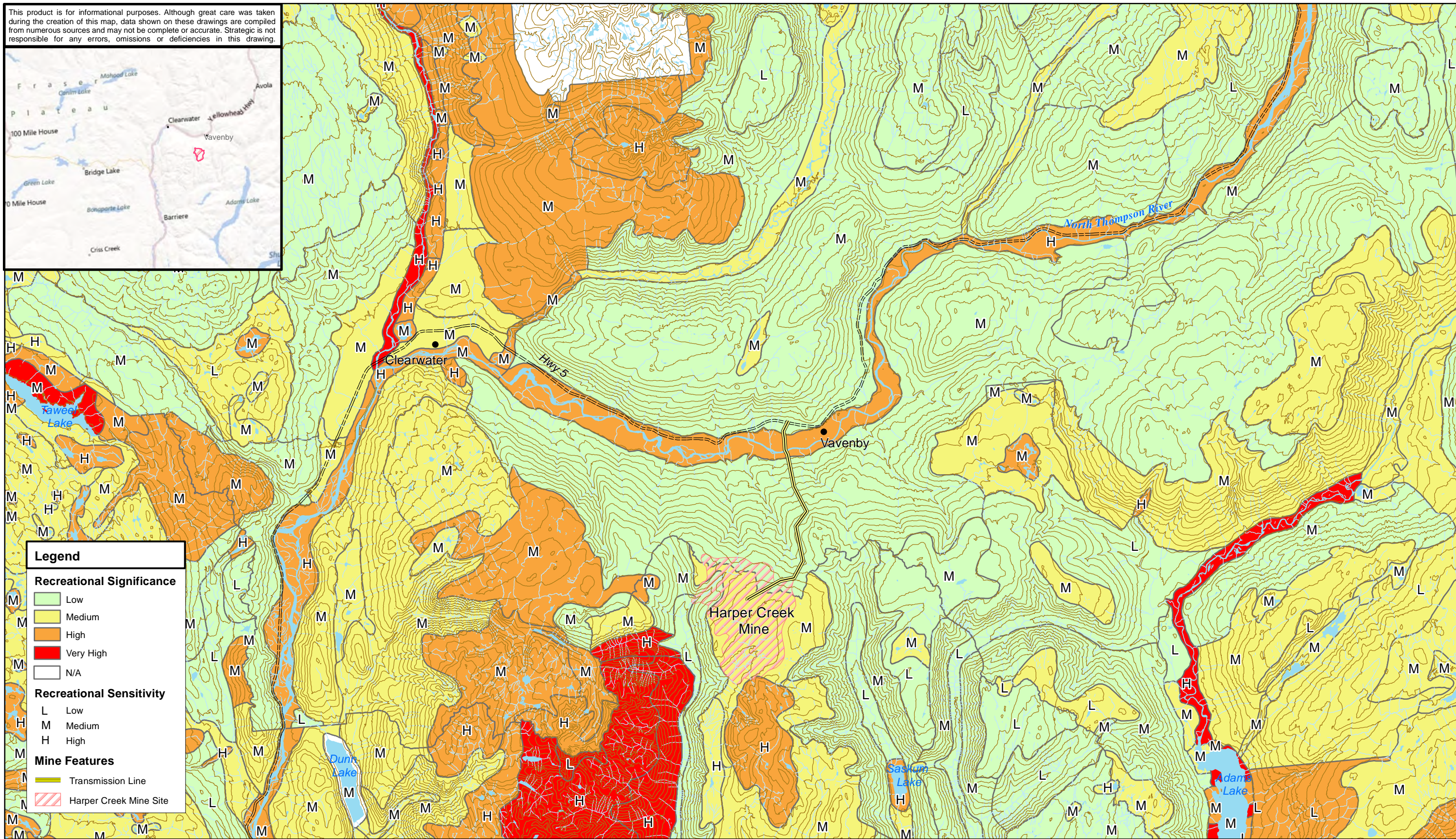
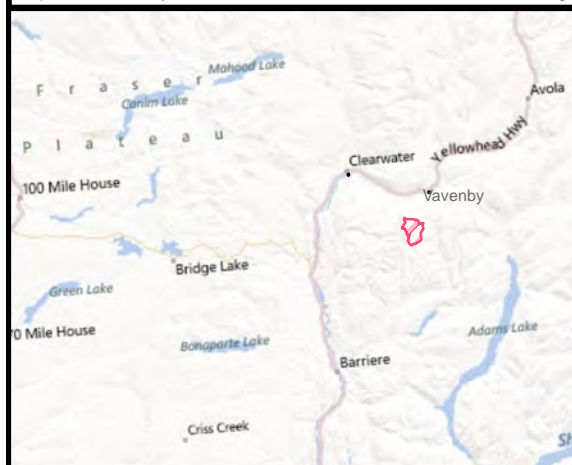
### APPENDIX 3

# Visual Impact Assessment - Harper Creek Recreational Use Map

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**Legend**

**Recreational Significance**

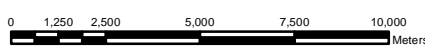
- Low
- Medium
- High
- Very High
- N/A

**Recreational Sensitivity**

- L Low
- M Medium
- H High

**Mine Features**

- Transmission Line
- Harper Creek Mine Site



1:200,000

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## APPENDIX 4

**Harper Creek Mine Visual Impact Assessment  
Viewpoint Table**

VP#	VP Name	Lat	Long	Elev	Direction	Pitch	Bank	FOV	F-Length	F-Distance	F-Stop	Film Size	EVQO
VP 1	Trophy Meadows	51° 46' 33.760" N	119° 55' 59.088" W	1,968	165	2	0	38.6	50.0	100	5.6	35	N/A
VP 2	Willis Snowmobile Cabin	51° 43' 30.813" N	119° 49' 37.076" W	2,189	176	2	0	38.6	50.0	100	5.6	35	N/A
VP 3	Hwy 5-1a	51° 35' 20.279" N	119° 51' 16.294" W	478	111	0	0	44.0	43.3	100	5.6	35	PR
VP 3	Hwy 5-1b	51° 35' 20.279" N	119° 51' 16.294" W	478	169	0	0	71.0	24.5	100	5.6	35	M
VP 4	Hwy 5-2	51° 35' 32.898" N	119° 46' 11.073" W	555	158	0	0	95.4	15.9	100	5.6	35	PR
VP 5	Hwy 5-3	51° 36' 23.432" N	119 41 53.078" W	575	209	0	0	56.0	32.9	100	5.6	35	PR
VP 6	Vavenby	51° 35' 18.028" N	119° 43' 36.911" W	484	182	0	0	90.0	17.5	100	5.6	35	PR
VP 7	Granite Mountain	51° 30' 4.778" N	119° 55' 53.856" W	2,250	86	2	0	60.0	30.3	100	5.6	35	N/A
VP 8	Vavenby Lookout Cabin	51° 31' 1.693" N	119° 41' 11.092" W	1,795	278	2	0	45.0	42.5	100	5.6	35	N/A
VP 9	Harp Mountain	51° 27' 20.216" N	119° 47' 49.705" W	2,108	341	2	0	60.0	30.3	100	5.6	35	N/A
VP 10	Harp Mountain Trail #1	51° 26' 59.894" N	119° 48' 3.692" W	2,208	354	4	0	45.0	42.5	100	5.6	35	N/A
VP 11	Harp Mountain Trail #2	51° 25' 3.971" N	119° 47' 11.649" W	2,152	346	0	0	41.0	46.8	100	5.6	35	N/A
VP 12	Dunn Peak Summit	51° 26' 14.334" N	119° 57' 15.807" W	2,638	55	3	0	60.0	30.3	100	5.6	35	N/A
VP 13	Hwy 5-2 Alt	51° 35' 17.674" N	119° 48' 5.63" W	505	176	0	0	56.0	32.9	100	5.6	35	M
VP 14	Dunn Peak Trailhead	51° 29' 22.133" N	119° 54' 43.984" W	1,548	80	-2	0	45.0	42.5	100	5.6	35	N/A
Oblique 1	Oblique 1	51° 31' 15.002" N	119° 44' 14.407" W	3,000	244	12	0	65.0	27.5	100	5.6	35	N/A
Oblique 2	Oblique 2	51° 27' 41.165" N	119° 48' 14.909" W	3,000	354	14	0	25.0	78.9	100	5.6	35	N/A

**Established Visual Quality Objective**



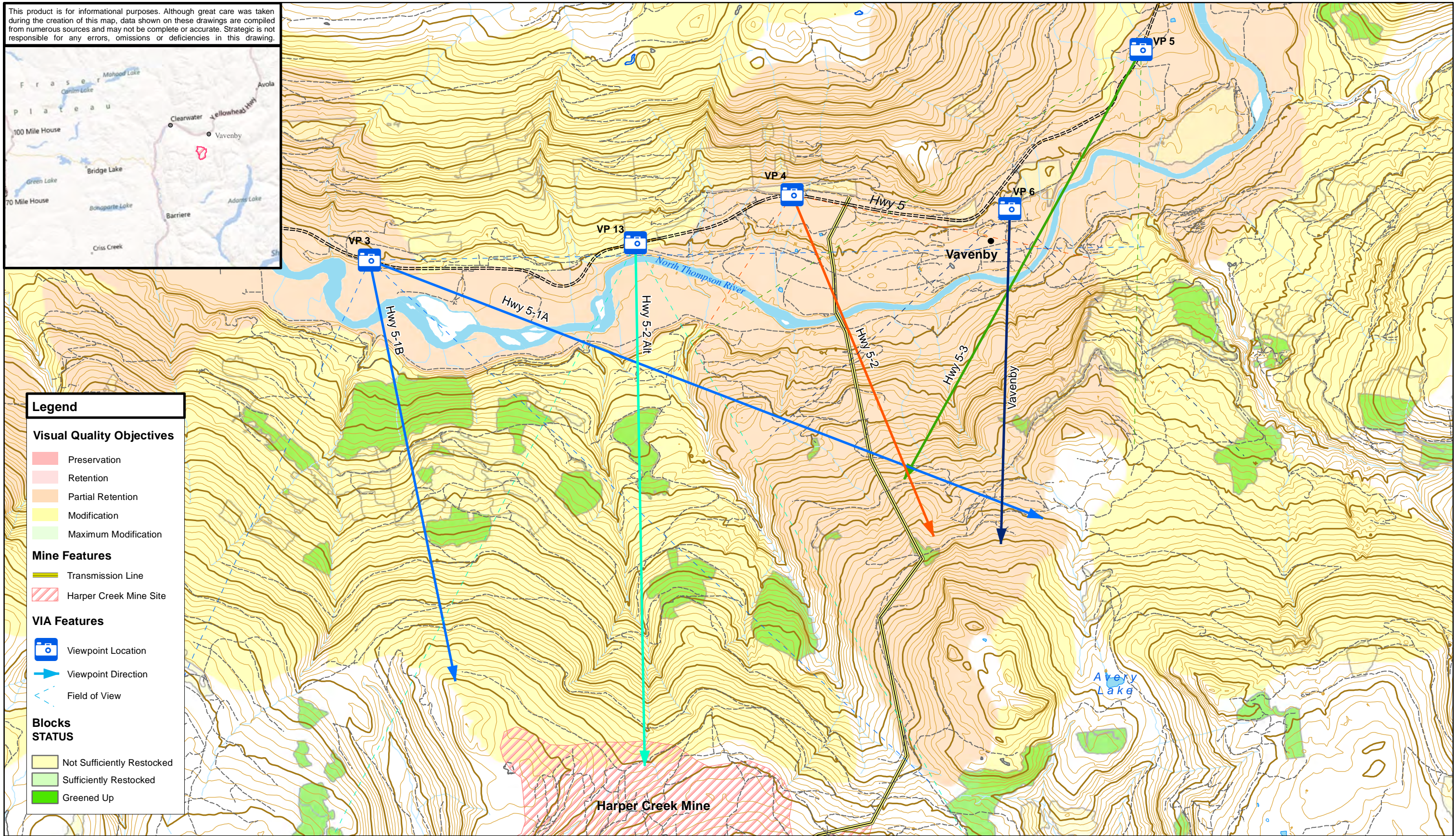
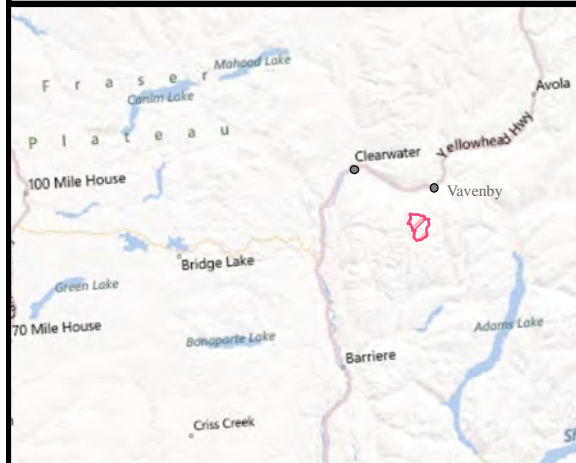
## APPENDIX 5

# Visual Impact Assessment - Harper Creek Viewpoint Location Map - Viewpoints 3, 4, 5, 6, 13

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### Legend

#### Visual Quality Objectives

- Preservation
- Retention
- Partial Retention
- Modification
- Maximum Modification

#### Mine Features

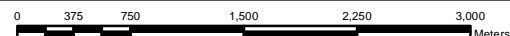
- Transmission Line
- Harper Creek Mine Site

#### VIA Features

- o Viewpoint Location
- Viewpoint Direction
- Field of View

#### Blocks STATUS

- Not Sufficiently Restocked
- Sufficiently Restocked
- Greened Up



Map 1 of 3

1:50,000

Viewpoints were chosen based on worst case scenarios ensuring that the entire Visual Quality Objective (VQO) polygon that each block falls within is contained within the Field of View (FOV). If blocks fall outside more than one VQO polygon the FOV encompasses all VQO polygons that are touched. FOVs are kept within reason, not exceeding what would be considered a natural viewscape.

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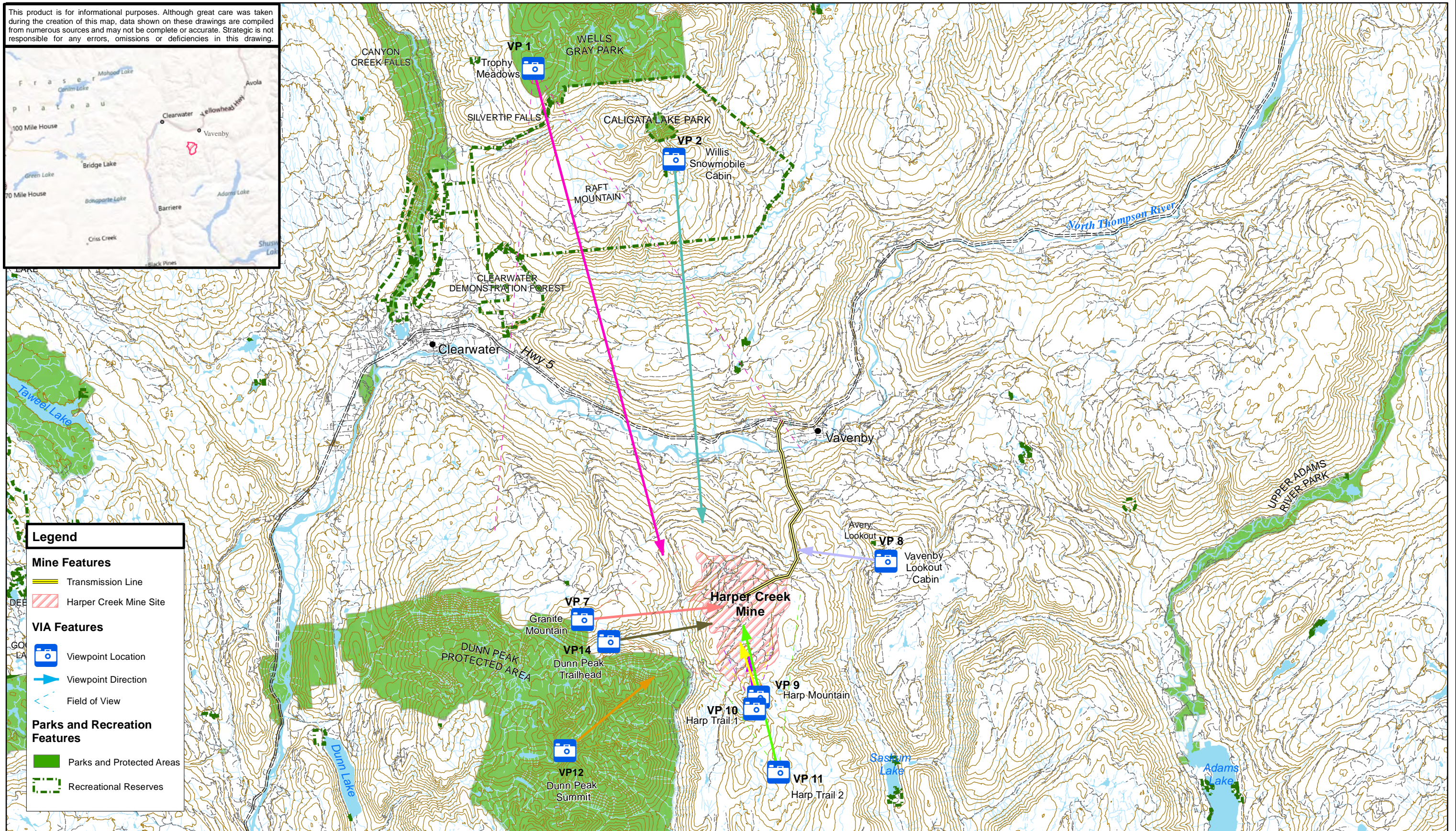
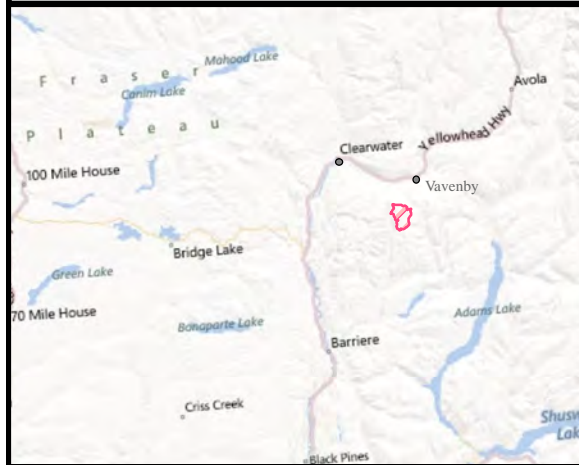


# Visual Impact Assessment - Harper Creek Viewpoint Location Map - Viewpoints 1, 2, 7, 8, 9, 10, 11, 12, 14

**Knight Piésold**

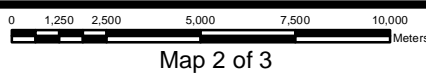
**Knight Piésold**  
CONSULTING

This product is for informational purposes. Although great care was taken during the creation of this map, data shown on these drawings are compiled from numerous sources and may not be complete or accurate. Strategic is not responsible for any errors, omissions or deficiencies in this drawing.



### Legend

- Mine Features**
  - Transmission Line
  - Harper Creek Mine Site
- VIA Features**
  - Viewpoint Location
  - Viewpoint Direction
  - Field of View
- Parks and Recreation Features**
  - Parks and Protected Areas
  - Recreational Reserves



1:200,000

Viewpoints were chosen based on worst case scenarios ensuring that the entire Visual Quality Objective (VQO) polygon that each block falls within is contained within the Field of View (FOV). If blocks fall outside more than one VQO polygon the FOV encompasses all VQO polygons that are touched. FOVs are kept within reason, not exceeding what would be considered a natural viewscape.

**Campbell River Operation**  
321 - 1180 Ironwood Road  
p: 250.287.2246  
f: 250.287.2247

**Port McNeill Operation**  
5G-1705 Campbell Way  
p: 250.956.2260  
f: 250.956.4523

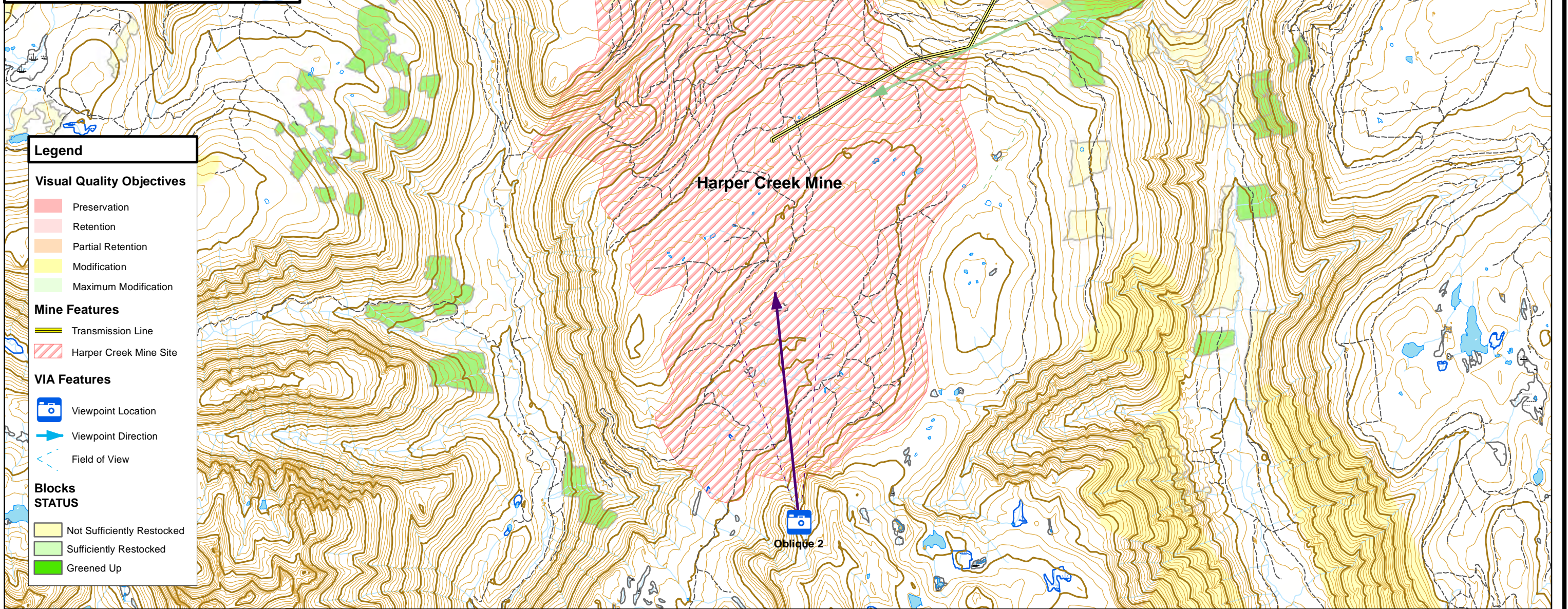
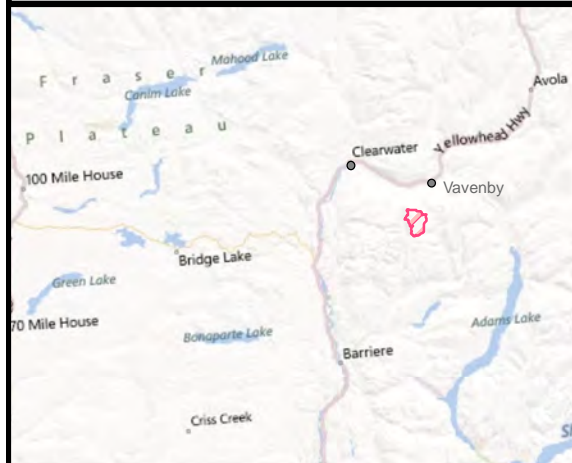


# Visual Impact Assessment - Harper Creek Viewpoint Location Map - Viewpoints Oblique 1, 2

**Knight Piésold**

**Knight Piésold**  
CONSULTING

This product is for informational purposes. Although great care was taken during the creation of this map, data shown on these drawings are compiled from numerous sources and may not be complete or accurate. Strategic is not responsible for any errors, omissions or deficiencies in this drawing.



### Legend

#### Visual Quality Objectives

- Preservation
- Retention
- Partial Retention
- Modification
- Maximum Modification

#### Mine Features

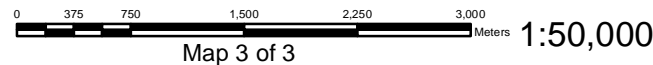
- Transmission Line
- Harper Creek Mine Site

#### VIA Features

- Viewpoint Location
- Viewpoint Direction
- Field of View

#### Blocks STATUS

- Not Sufficiently Restocked
- Sufficiently Restocked
- Greened Up



Viewpoints were chosen based on worst case scenarios ensuring that the entire Visual Quality Objective (VQO) polygon that each block falls within is contained within the Field of View (FOV). If blocks fall outside more than one VQO polygon the FOV encompasses all VQO polygons that are touched. FOVs are kept within reason, not exceeding what would be considered a natural viewscape.

**Campbell River Operation**  
321 - 1180 Ironwood Road  
p: 250.287.2246  
f: 250.287.2247

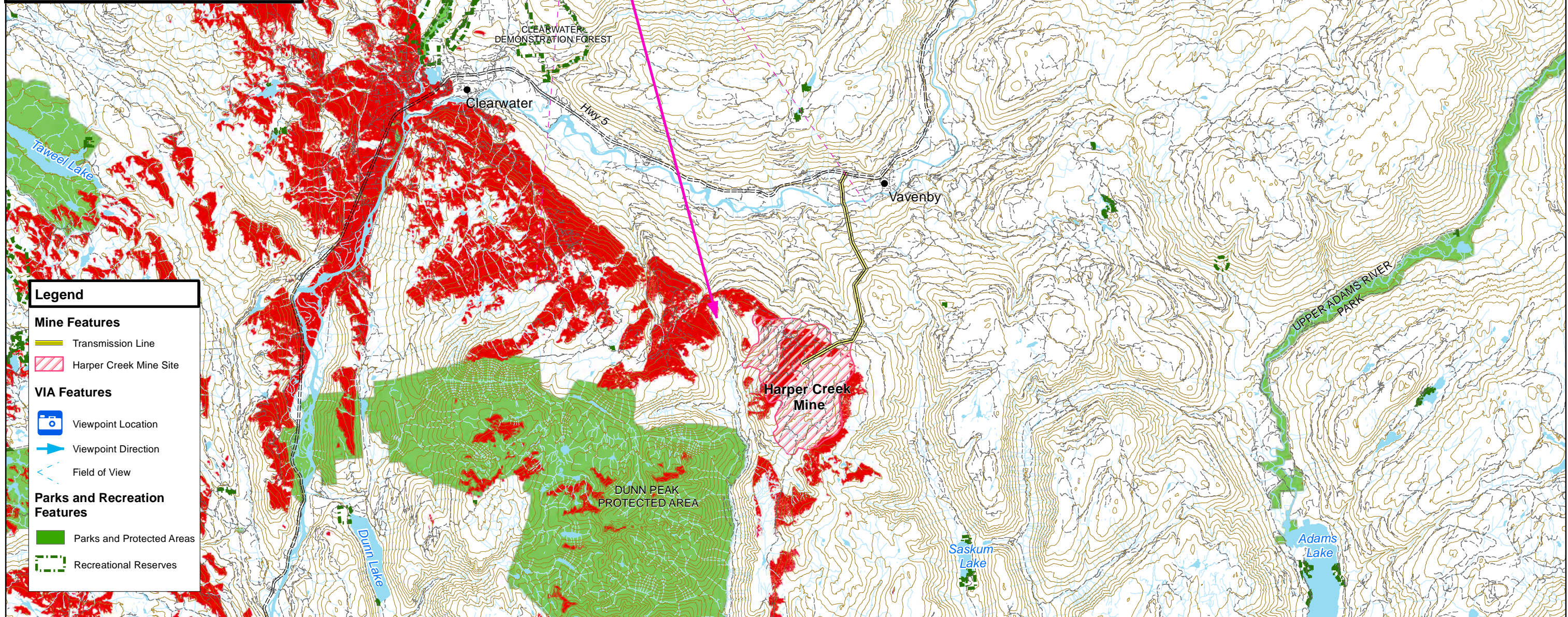
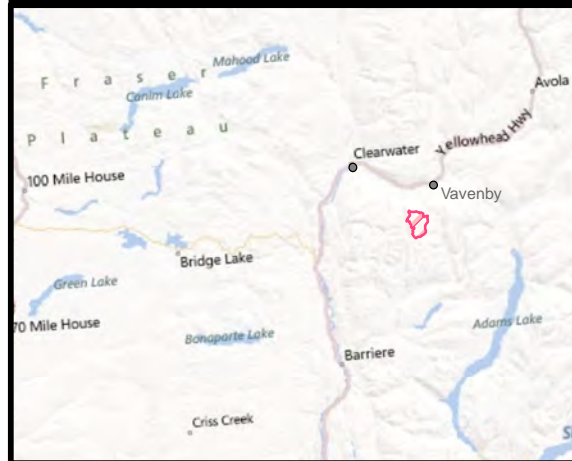
**Port McNeill Operation**  
56-1705 Campbell Way  
p: 250.956.2260  
f: 250.956.4523

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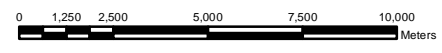
## APPENDIX 6

This product is for informational purposes. Although great care was taken during the creation of this map, data shown on these drawings are compiled from numerous sources and may not be complete or accurate. Strategic is not responsible for any errors, omissions or deficiencies in this drawing.



**Legend**

- Mine Features**
  - Transmission Line
  - Harper Creek Mine Site
- VIA Features**
  - Viewpoint Location
  - Viewpoint Direction
  - Field of View
- Parks and Recreation Features**
  - Parks and Protected Areas
  - Recreational Reserves



1:200,000

Viewpoints were chosen based on worst case scenarios ensuring that the entire Visual Quality Objective (VQO) polygon that each block falls within is contained within the Field of View (FOV). If blocks fall outside more than one VQO polygon the FOV encompasses all VQO polygons that are touched. FOVs are kept within reason, not exceeding what would be considered a natural viewscape.

Campbell River Operation  
 321 - 1180 Ironwood Road  
 p: 250.287.2246  
 f: 250.287.2247

Port McNeill Operation  
 5G-1705 Campbell Way  
 p: 250.956.2260  
 f: 250.956.4523

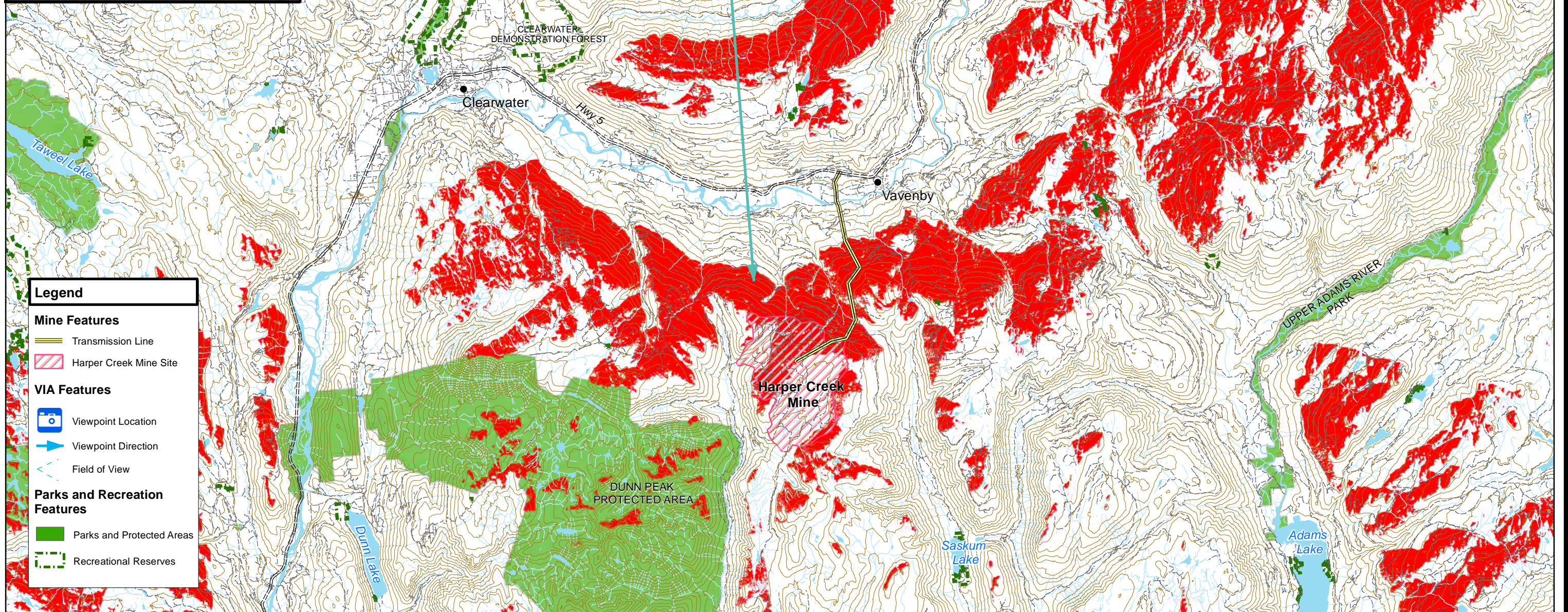
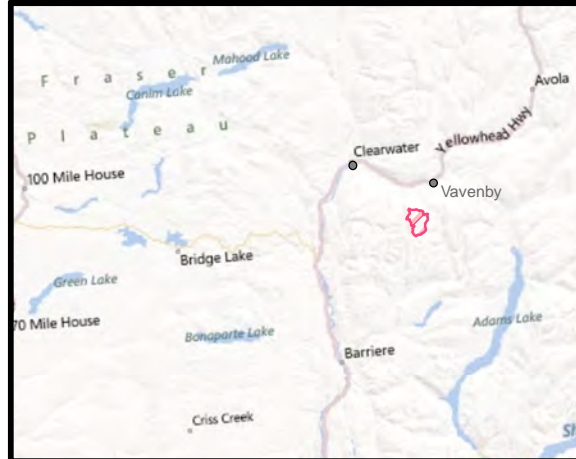


# Visual Impact Assessment - Visibility Map - Harper Creek

**Knicht Piésold**

Viewpoint - VP 2 **Knicht Piésold**  
CONSULTING

This product is for informational purposes. Although great care was taken during the creation of this map, data shown on these drawings are compiled from numerous sources and may not be complete or accurate. Strategic is not responsible for any errors, omissions or deficiencies in this drawing.



### Legend

#### Mine Features

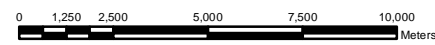
- Transmission Line
- Harper Creek Mine Site

#### VIA Features

- Viewpoint Location
- Viewpoint Direction
- Field of View

#### Parks and Recreation Features

- Parks and Protected Areas
- Recreational Reserves



1:200,000

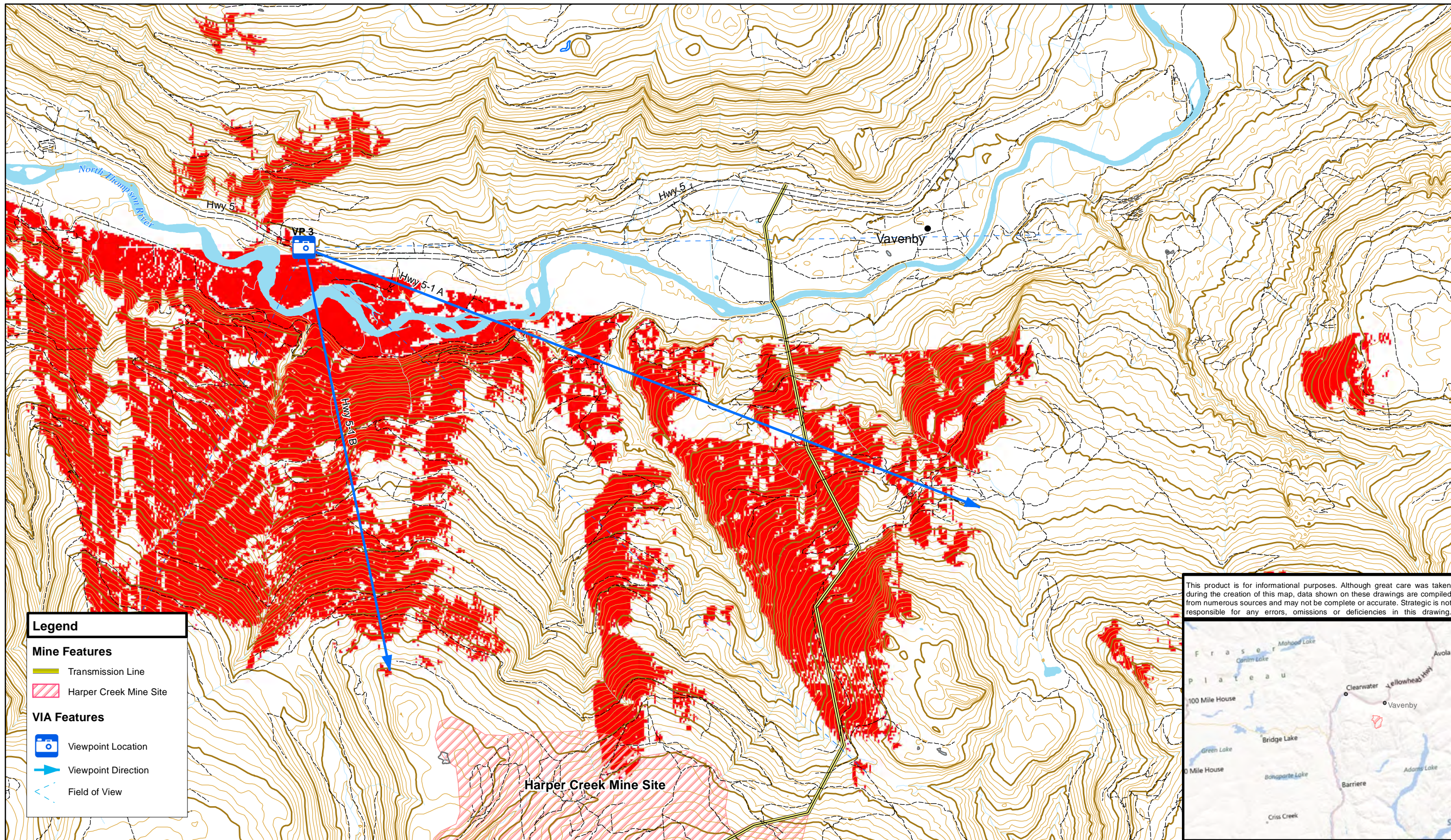
Viewpoints were chosen based on worst case scenarios ensuring that the entire Visual Quality Objective (VQO) polygon that each block falls within is contained within the Field of View (FOV). If blocks fall outside more than one VQO polygon the FOV encompasses all VQO polygons that are touched. FOVs are kept within reason, not exceeding what would be considered a natural viewscape.

**Campbell River Operation**  
321 - 1180 Ironwood Road  
p: 250.287.2246  
f: 250.287.2247

**Port McNeill Operation**  
5G-1705 Campbell Way  
p: 250.956.2260  
f: 250.956.4523

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**Legend**

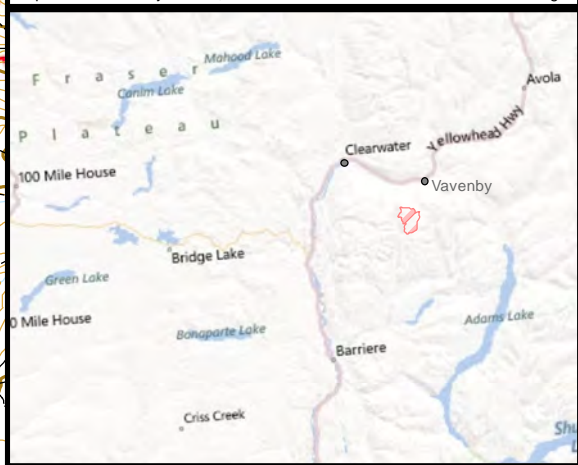
**Mine Features**

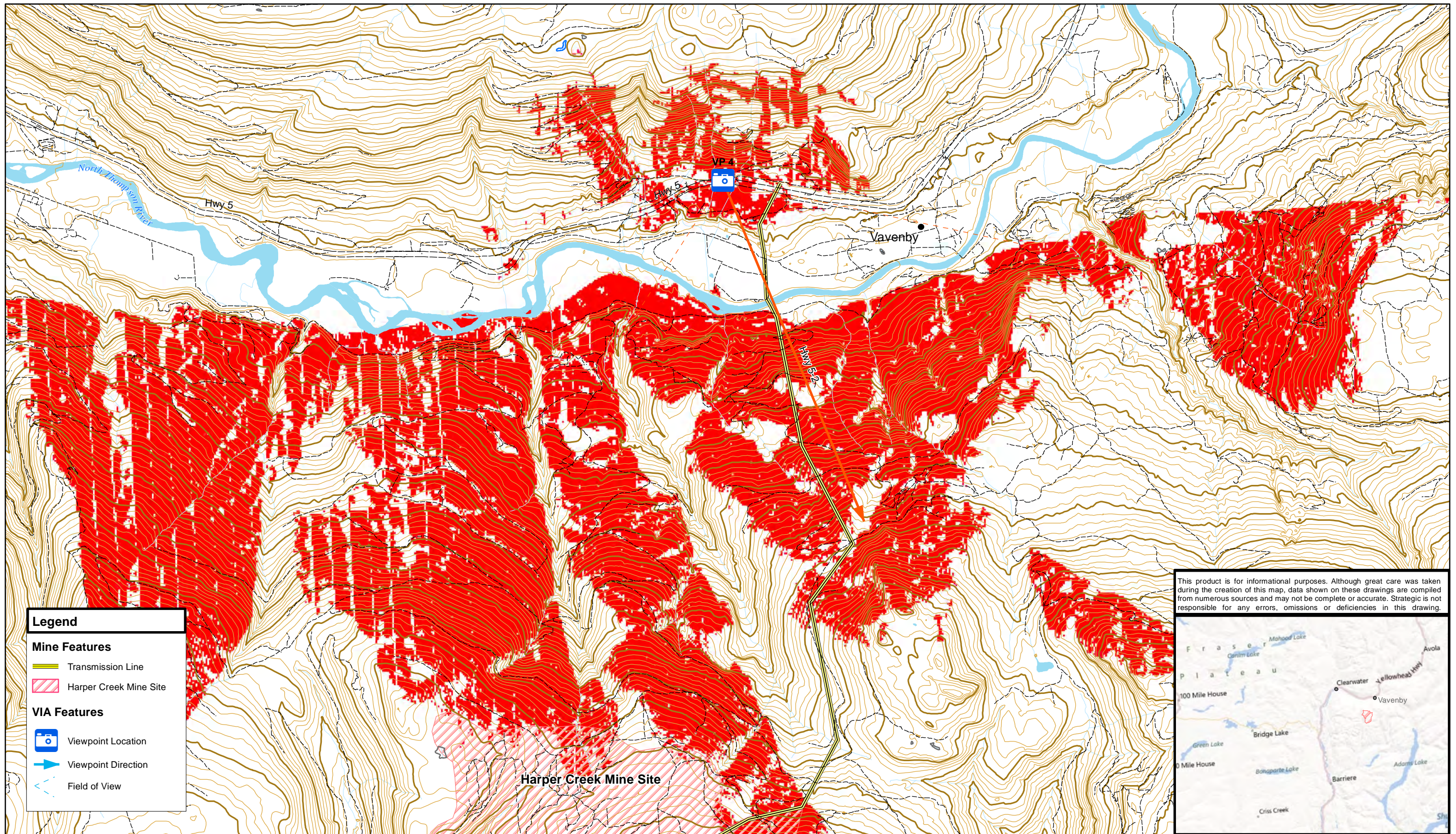
- Transmission Line
- Harper Creek Mine Site

**VIA Features**

- Viewpoint Location
- Viewpoint Direction
- Field of View

This product is for informational purposes. Although great care was taken during the creation of this map, data shown on these drawings are compiled from numerous sources and may not be complete or accurate. Strategic is not responsible for any errors, omissions or deficiencies in this drawing.





**Legend**

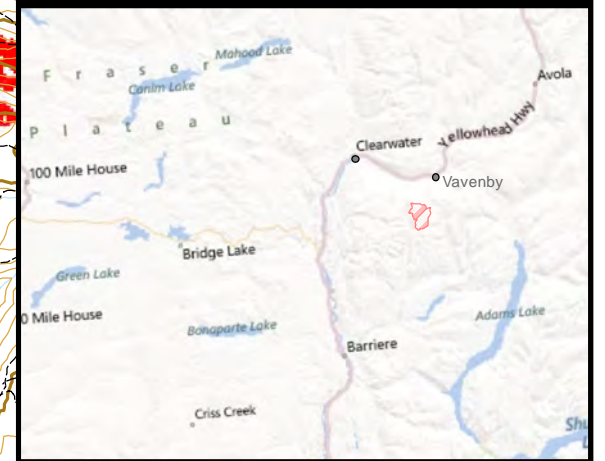
**Mine Features**

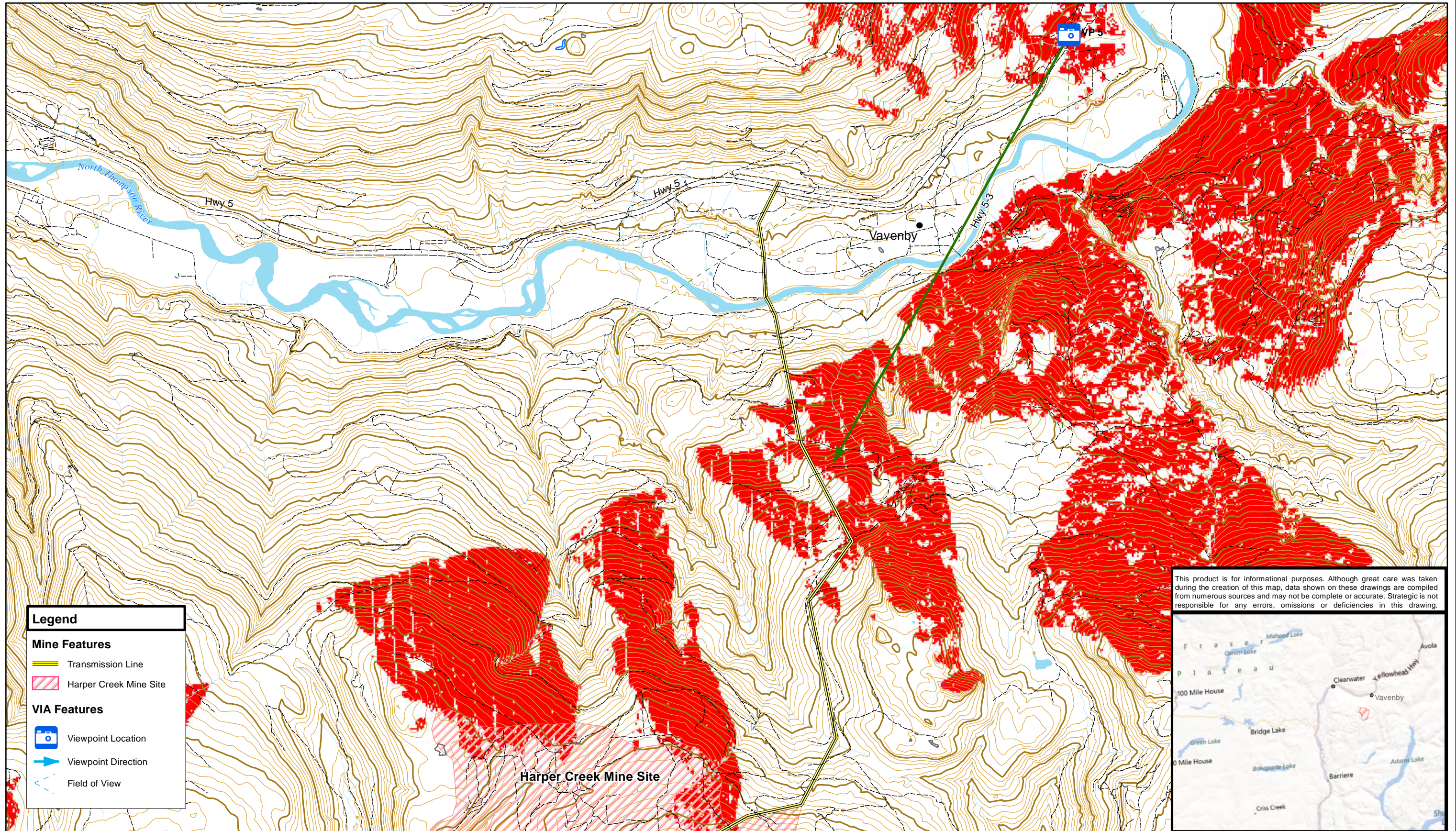
- Transmission Line
- Harper Creek Mine Site

**VIA Features**

- Viewpoint Location
- Viewpoint Direction
- Field of View

This product is for informational purposes. Although great care was taken during the creation of this map, data shown on these drawings are compiled from numerous sources and may not be complete or accurate. Strategic is not responsible for any errors, omissions or deficiencies in this drawing.





**Legend**

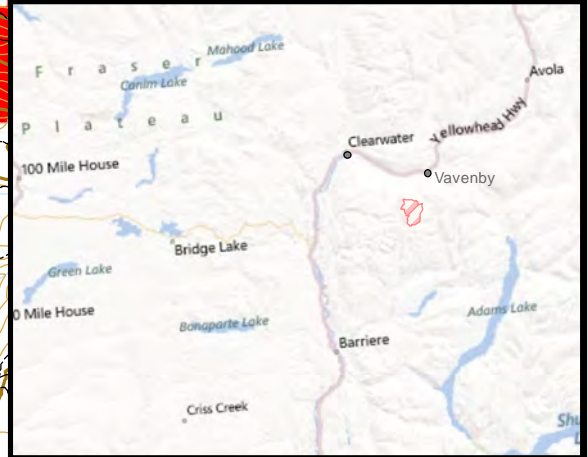
**Mine Features**

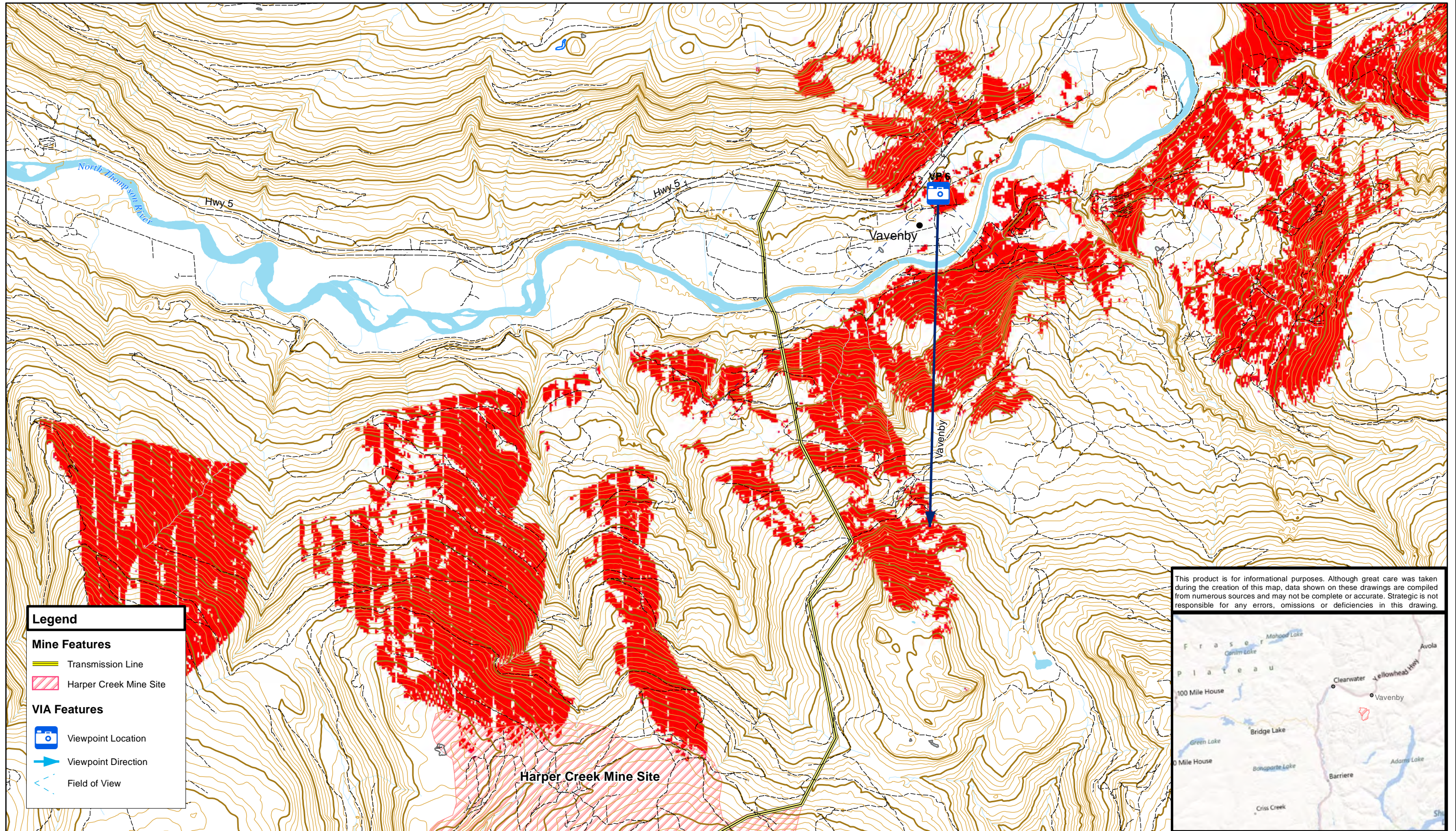
- Transmission Line
- Harper Creek Mine Site

**VIA Features**

- Viewpoint Location
- Viewpoint Direction
- Field of View

This product is for informational purposes. Although great care was taken during the creation of this map, data shown on these drawings are compiled from numerous sources and may not be complete or accurate. Strategic is not responsible for any errors, omissions or deficiencies in this drawing.





**Legend**

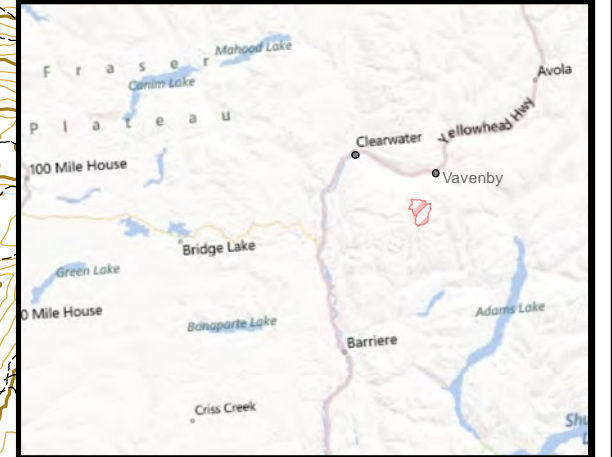
**Mine Features**

- Transmission Line
- Harper Creek Mine Site

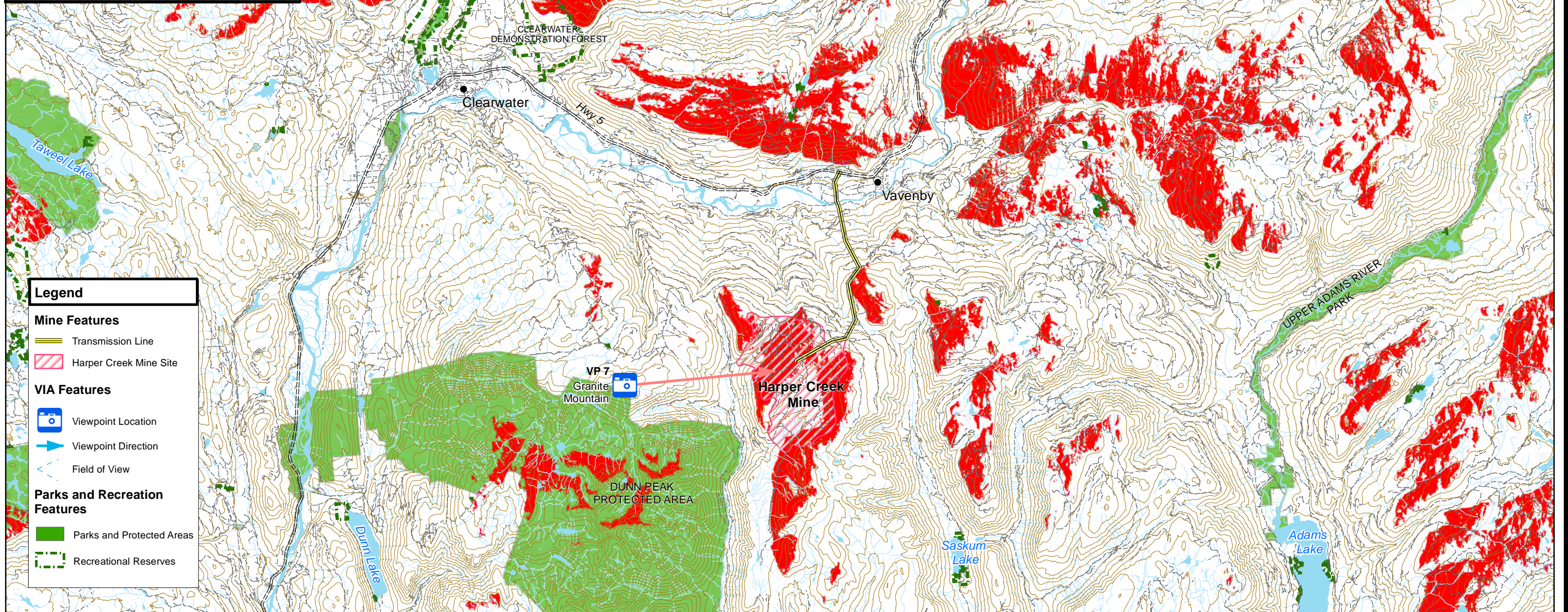
**VIA Features**

- Viewpoint Location
- Viewpoint Direction
- Field of View

This product is for informational purposes. Although great care was taken during the creation of this map, data shown on these drawings are compiled from numerous sources and may not be complete or accurate. Strategic is not responsible for any errors, omissions or deficiencies in this drawing.



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**Legend**

**Mine Features**

- Transmission Line
- Harper Creek Mine Site

**VIA Features**

- Viewpoint Location
- Viewpoint Direction
- Field of View

**Parks and Recreation Features**

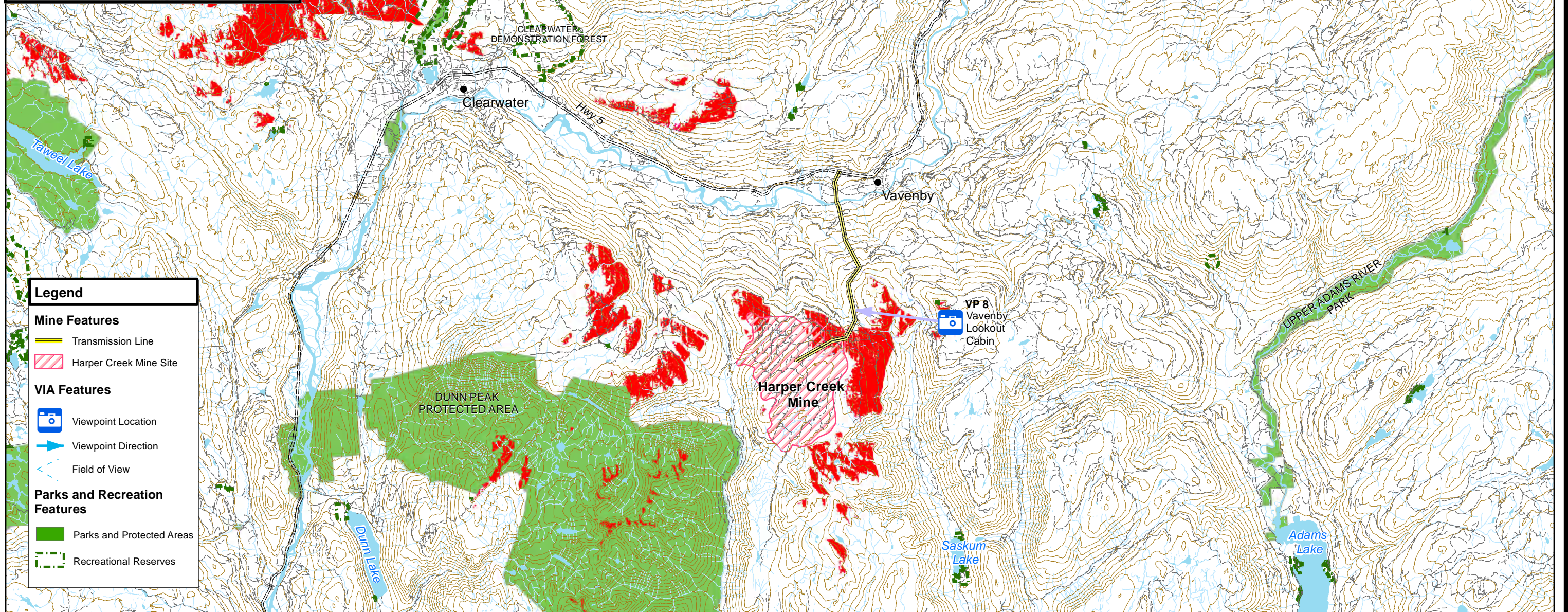
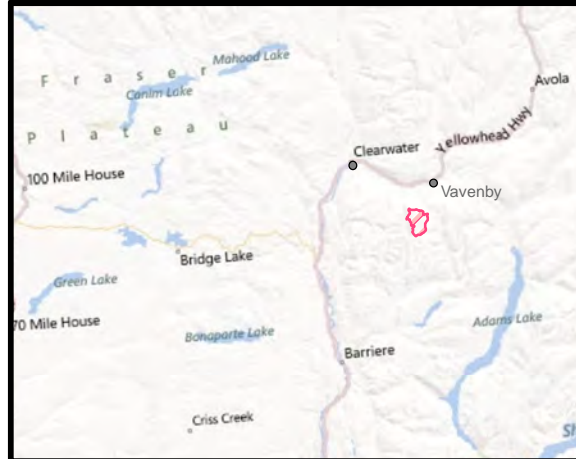
- Parks and Protected Areas
- Recreational Reserves

# Visual Impact Assessment - Visibility Map - Harper Creek

**Knight Piésold**

Viewpoint - VP 8 **Knight Piésold**  
CONSULTING

This product is for informational purposes. Although great care was taken during the creation of this map, data shown on these drawings are compiled from numerous sources and may not be complete or accurate. Strategic is not responsible for any errors, omissions or deficiencies in this drawing.



**Legend**

**Mine Features**

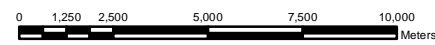
- Transmission Line
- Harper Creek Mine Site

**VIA Features**

- Viewpoint Location
- Viewpoint Direction
- Field of View

**Parks and Recreation Features**

- Parks and Protected Areas
- Recreational Reserves



1:200,000

Viewpoints were chosen based on worst case scenarios ensuring that the entire Visual Quality Objective (VQO) polygon that each block falls within is contained within the Field of View (FOV). If blocks fall outside more than one VQO polygon the FOV encompasses all VQO polygons that are touched. FOVs are kept within reason, not exceeding what would be considered a natural viewscape.

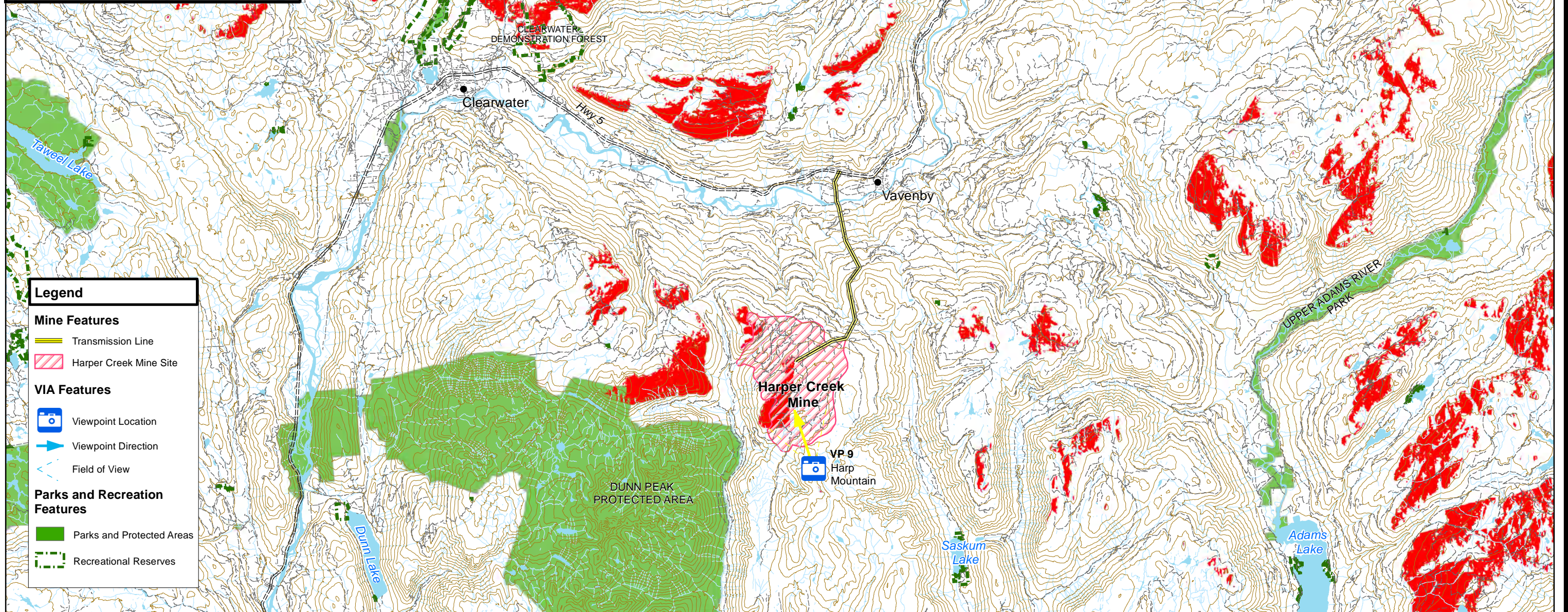
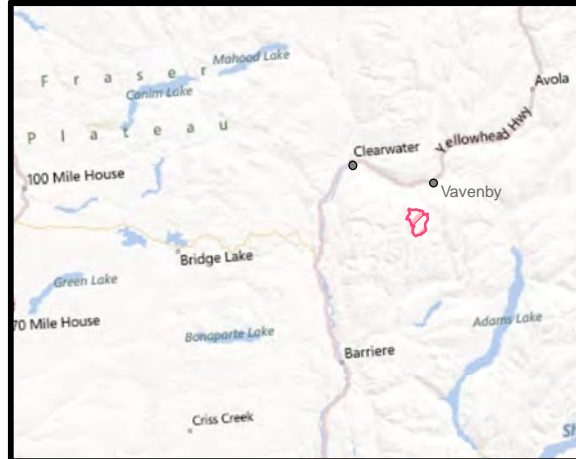
**Campbell River Operation**  
321 - 1180 Ironwood Road  
p: 250.287.2246  
f: 250.287.2247

**Port McNeill Operation**  
5G-1705 Campbell Way  
p: 250.956.2260  
f: 250.956.4523

www.sfmi.ca



This product is for informational purposes. Although great care was taken during the creation of this map, data shown on these drawings are compiled from numerous sources and may not be complete or accurate. Strategic is not responsible for any errors, omissions or deficiencies in this drawing.



**Legend**

**Mine Features**

- Transmission Line
- Harper Creek Mine Site

**VIA Features**

- Viewpoint Location
- Viewpoint Direction
- Field of View

**Parks and Recreation Features**

- Parks and Protected Areas
- Recreational Reserves

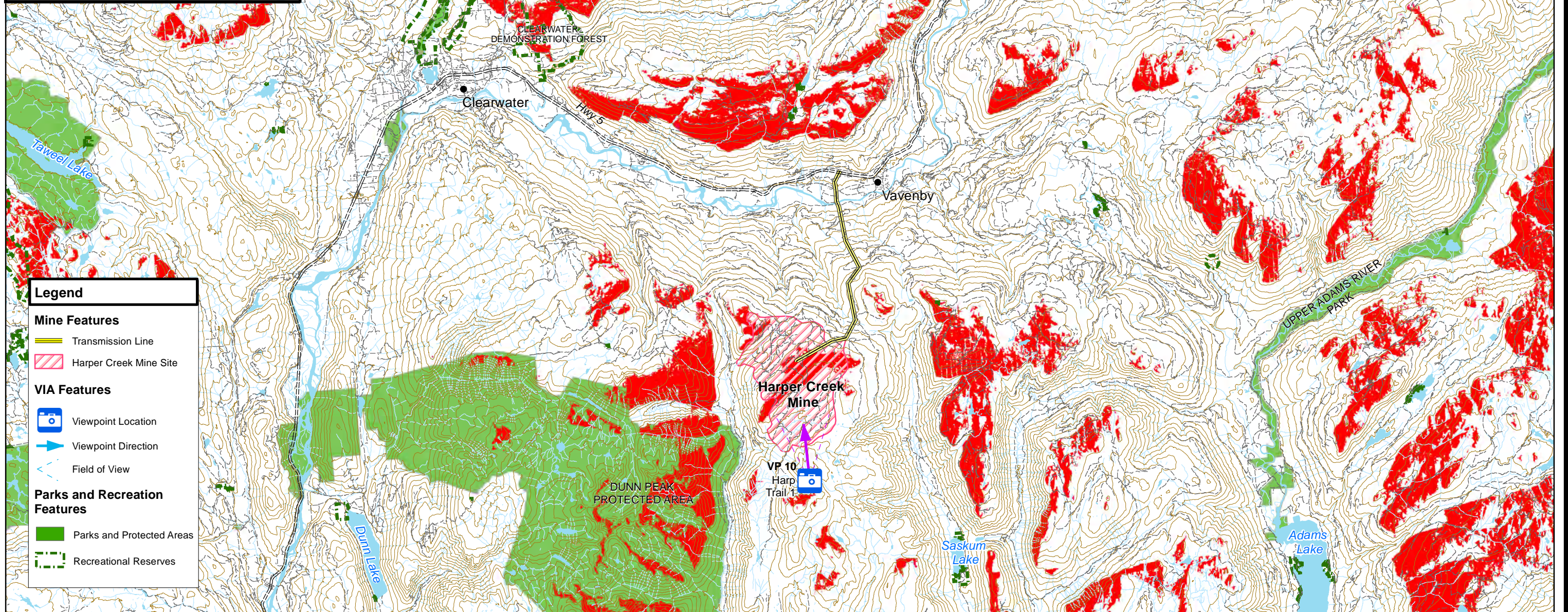
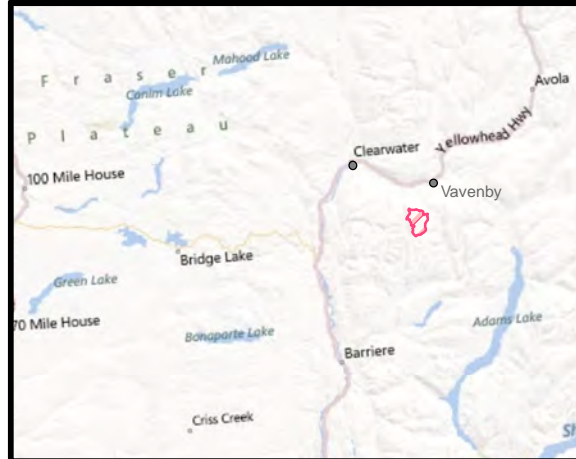


# Visual Impact Assessment - Visibility Map - Harper Creek

**Knicht Piésold**

Viewpoint - VP 10 **Knicht Piésold**  
CONSULTING

This product is for informational purposes. Although great care was taken during the creation of this map, data shown on these drawings are compiled from numerous sources and may not be complete or accurate. Strategic is not responsible for any errors, omissions or deficiencies in this drawing.



### Legend

#### Mine Features

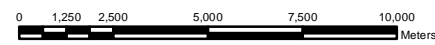
- Transmission Line
- Harper Creek Mine Site

#### VIA Features

- Viewpoint Location
- Viewpoint Direction
- Field of View

#### Parks and Recreation Features

- Parks and Protected Areas
- Recreational Reserves



1:200,000

Viewpoints were chosen based on worst case scenarios ensuring that the entire Visual Quality Objective (VQO) polygon that each block falls within is contained within the Field of View (FOV). If blocks fall outside more than one VQO polygon the FOV encompasses all VQO polygons that are touched. FOVs are kept within reason, not exceeding what would be considered a natural viewscape.

**Campbell River Operation**  
321 - 1180 Ironwood Road  
p: 250.287.2246  
f: 250.287.2247

**Port McNeill Operation**  
5G-1705 Campbell Way  
p: 250.956.2260  
f: 250.956.4523

www.sfmi.ca

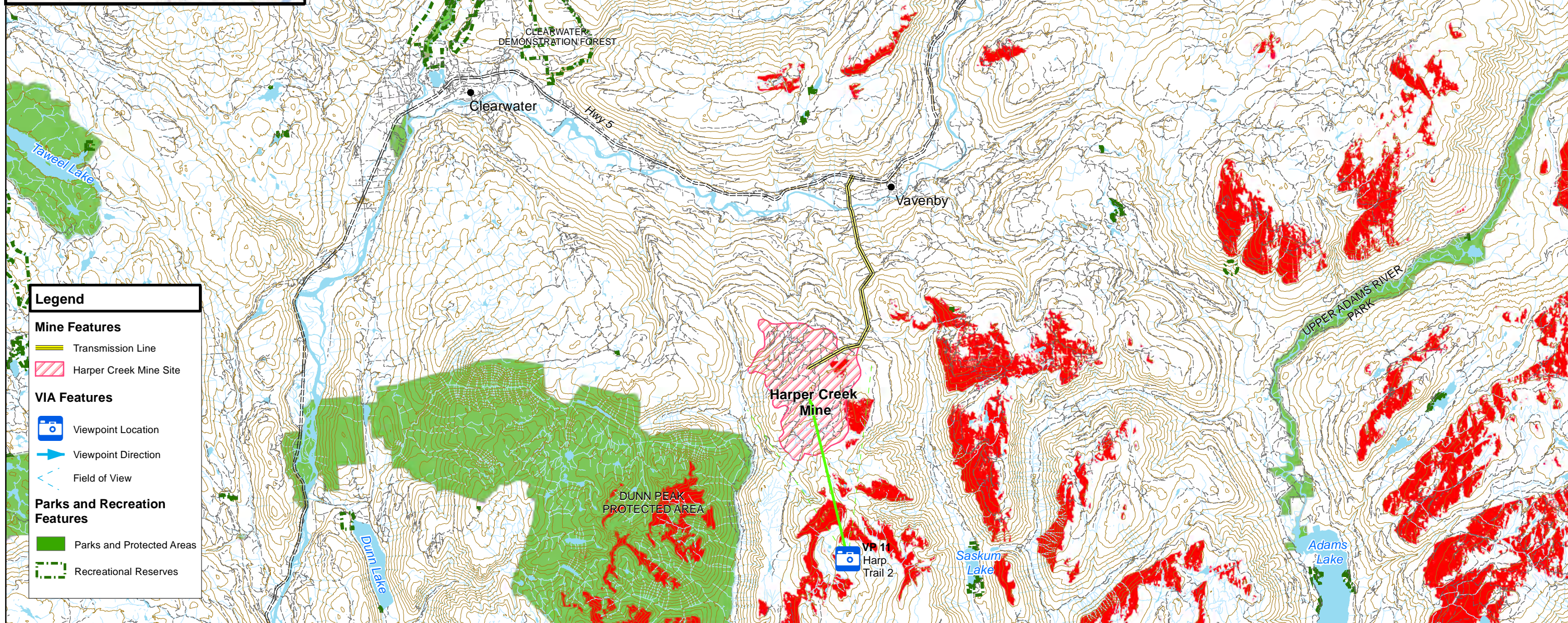
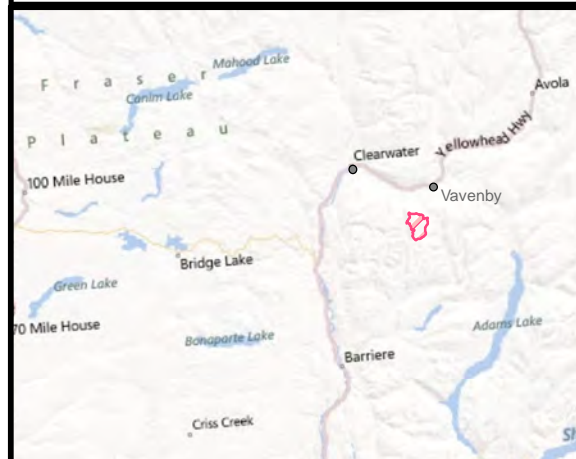


# Visual Impact Assessment - Visibility Map - Harper Creek

**Knicht Piésold**

Viewpoint - VP 11 **Knicht Piésold**  
CONSULTING

This product is for informational purposes. Although great care was taken during the creation of this map, data shown on these drawings are compiled from numerous sources and may not be complete or accurate. Strategic is not responsible for any errors, omissions or deficiencies in this drawing.



**Legend**

**Mine Features**

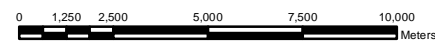
- Transmission Line
- Harper Creek Mine Site

**VIA Features**

- Viewpoint Location
- Viewpoint Direction
- Field of View

**Parks and Recreation Features**

- Parks and Protected Areas
- Recreational Reserves



1:200,000

Viewpoints were chosen based on worst case scenarios ensuring that the entire Visual Quality Objective (VQO) polygon that each block falls within is contained within the Field of View (FOV). If blocks fall outside more than one VQO polygon the FOV encompasses all VQO polygons that are touched. FOVs are kept within reason, not exceeding what would be considered a natural viewscape.

**Campbell River Operation**  
321 - 1180 Ironwood Road  
p: 250.287.2246  
f: 250.287.2247

**Port McNeill Operation**  
5G-1705 Campbell Way  
p: 250.956.2260  
f: 250.956.4523

www.sfmi.ca

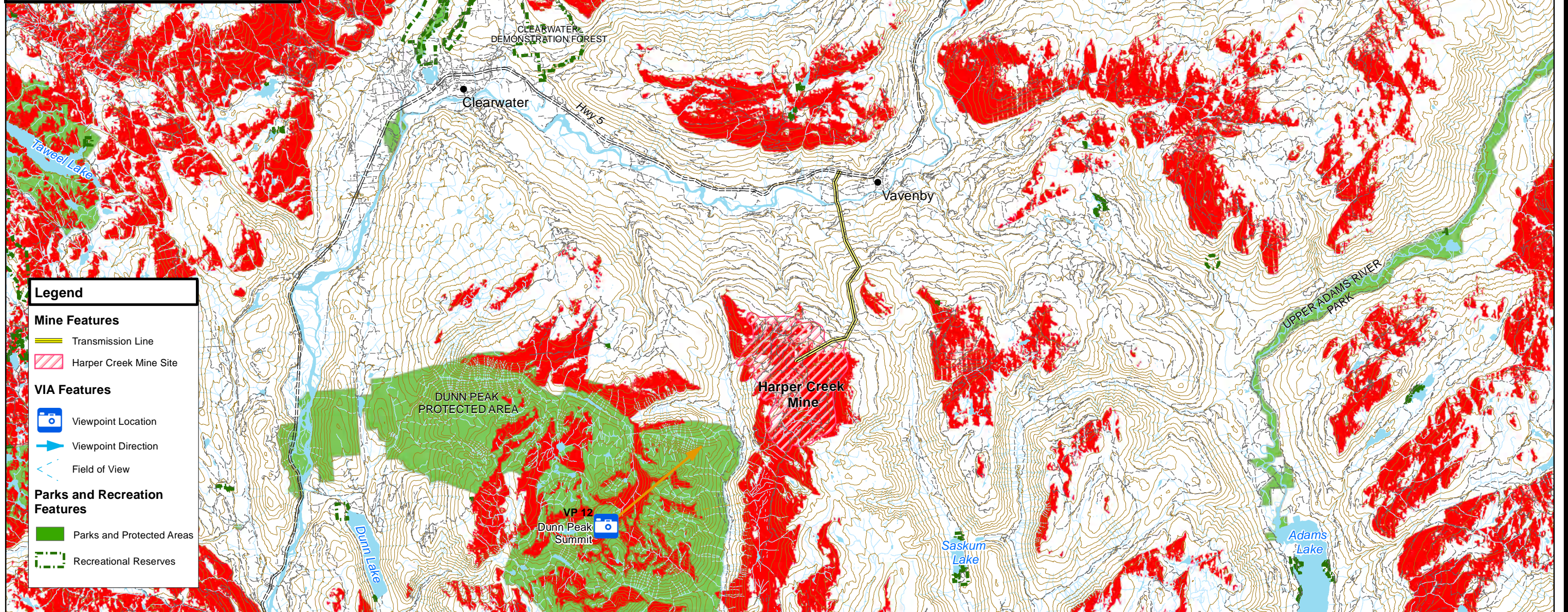
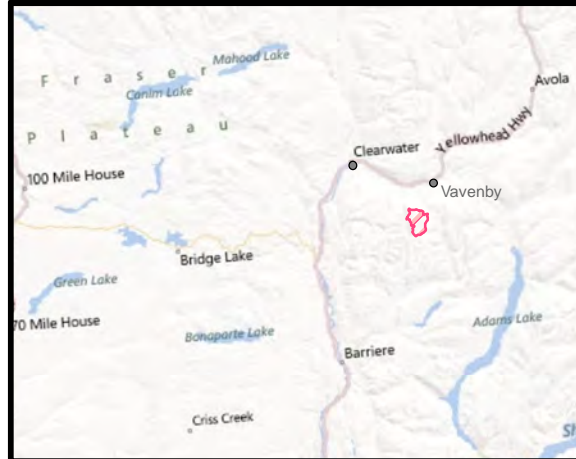


# Visual Impact Assessment - Visibility Map - Harper Creek

**Knicht Piésold**

Viewpoint - VP 12 **Knicht Piésold**  
CONSULTING

This product is for informational purposes. Although great care was taken during the creation of this map, data shown on these drawings are compiled from numerous sources and may not be complete or accurate. Strategic is not responsible for any errors, omissions or deficiencies in this drawing.



### Legend

#### Mine Features

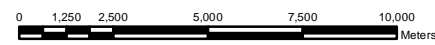
- Transmission Line
- Harper Creek Mine Site

#### VIA Features

- Viewpoint Location
- Viewpoint Direction
- Field of View

#### Parks and Recreation Features

- Parks and Protected Areas
- Recreational Reserves



1:200,000

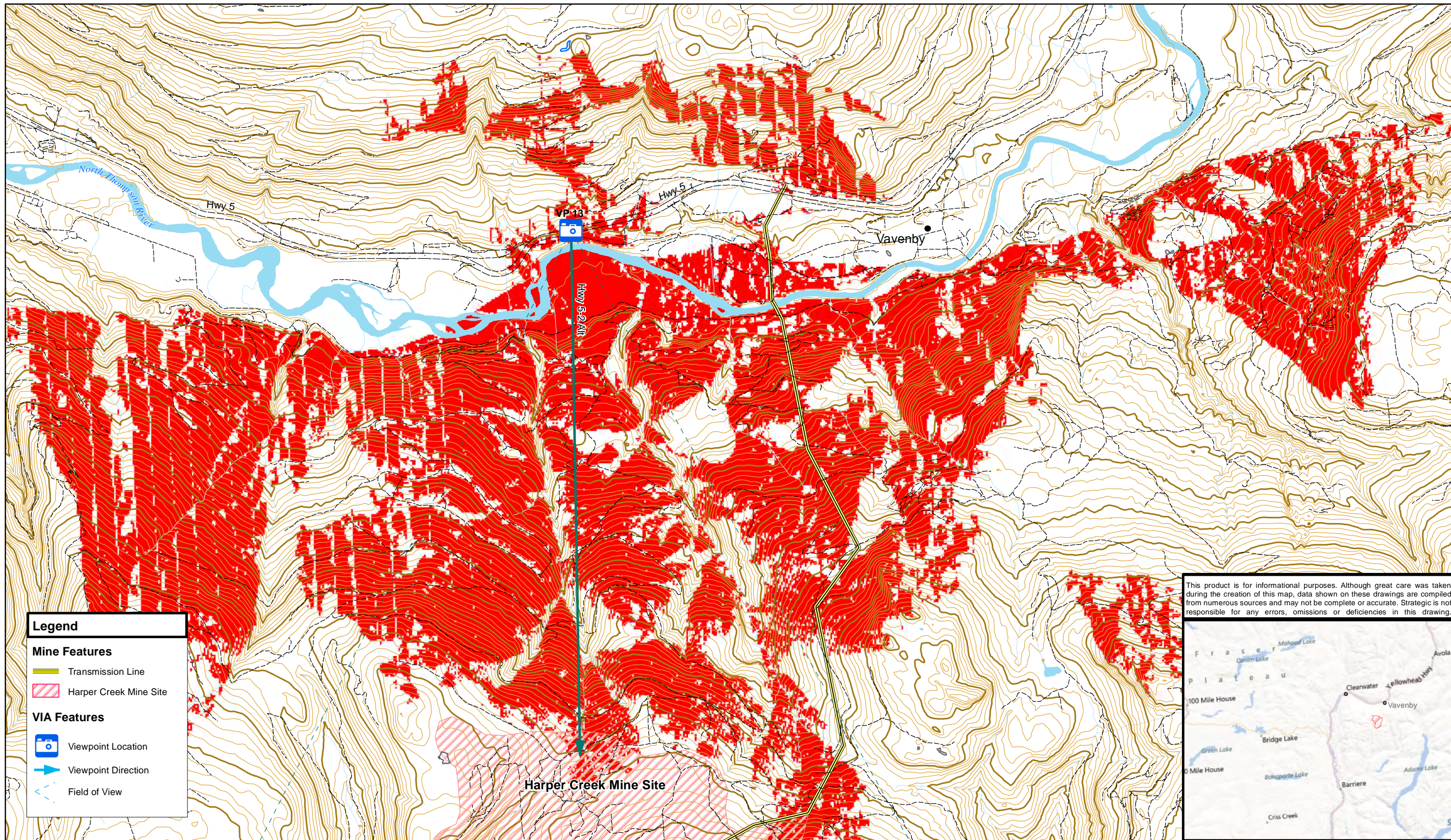
Viewpoints were chosen based on worst case scenarios ensuring that the entire Visual Quality Objective (VQO) polygon that each block falls within is contained within the Field of View (FOV). If blocks fall outside more than one VQO polygon the FOV encompasses all VQO polygons that are touched. FOVs are kept within reason, not exceeding what would be considered a natural viewscape.

**Campbell River Operation**  
321 - 1180 Ironwood Road  
p: 250.287.2246  
f: 250.287.2247

**Port McNeill Operation**  
5G-1705 Campbell Way  
p: 250.956.2260  
f: 250.956.4523

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**Legend**

**Mine Features**

- Transmission Line
- Harper Creek Mine Site

**VIA Features**

- Viewpoint Location
- Viewpoint Direction
- Field of View

This product is for informational purposes. Although great care was taken during the creation of this map, data shown on these drawings are compiled from numerous sources and may not be complete or accurate. Strategic is not responsible for any errors, omissions or deficiencies in this drawing.

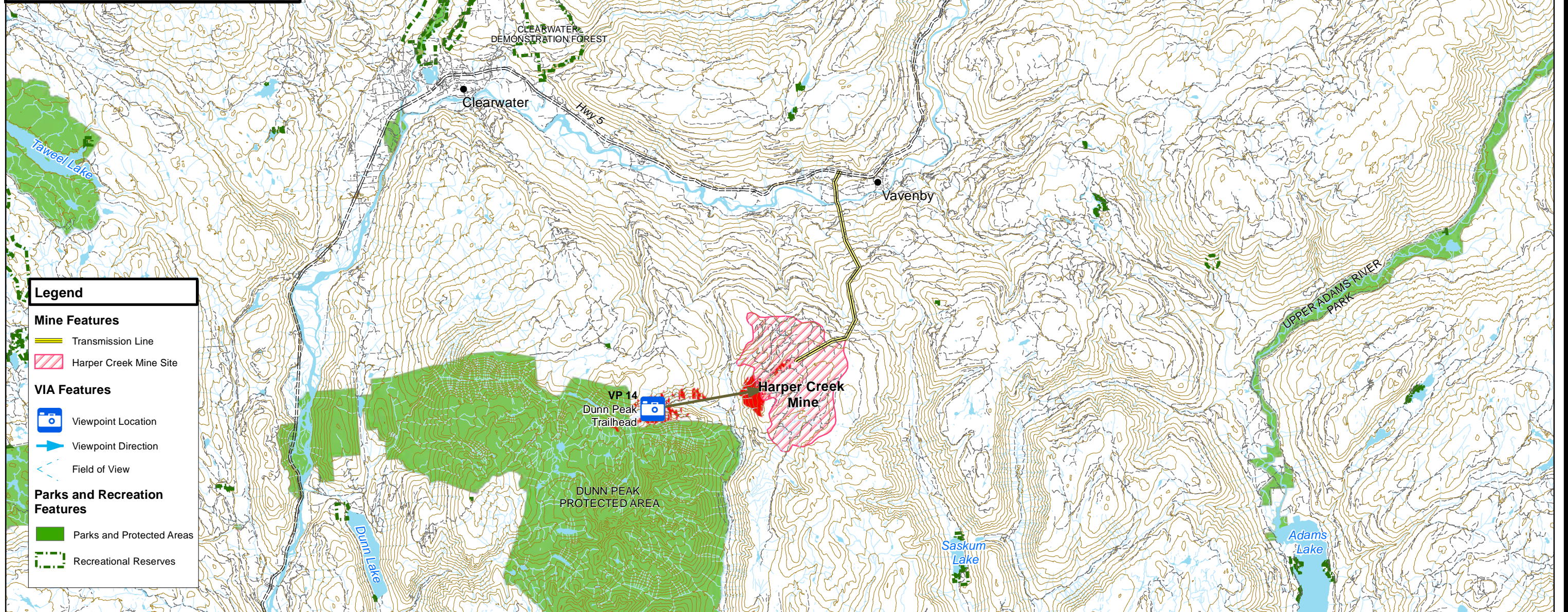


# Visual Impact Assessment - Visibility Map - Harper Creek

**Knicht Piésold**

Viewpoint - VP 14 **Knicht Piésold**  
CONSULTING

This product is for informational purposes. Although great care was taken during the creation of this map, data shown on these drawings are compiled from numerous sources and may not be complete or accurate. Strategic is not responsible for any errors, omissions or deficiencies in this drawing.



**Legend**

**Mine Features**

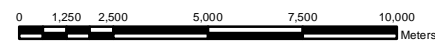
- Transmission Line
- Harper Creek Mine Site

**VIA Features**

- Viewpoint Location
- Viewpoint Direction
- Field of View

**Parks and Recreation Features**

- Parks and Protected Areas
- Recreational Reserves



1:200,000

Viewpoints were chosen based on worst case scenarios ensuring that the entire Visual Quality Objective (VQO) polygon that each block falls within is contained within the Field of View (FOV). If blocks fall outside more than one VQO polygon the FOV encompasses all VQO polygons that are touched. FOVs are kept within reason, not exceeding what would be considered a natural viewscape.

Campbell River Operation  
321 - 1180 Ironwood Road  
p: 250.287.2246  
f: 250.287.2247

Port McNeill Operation  
5G-1705 Campbell Way  
p: 250.956.2260  
f: 250.956.4523

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Group

321-1180 Ironwood Street • Campbell River, BC • V9W 5P7 • Ph: (250) 287-2246 • Fx: (250) 287-2247 • www.sfmi.ca

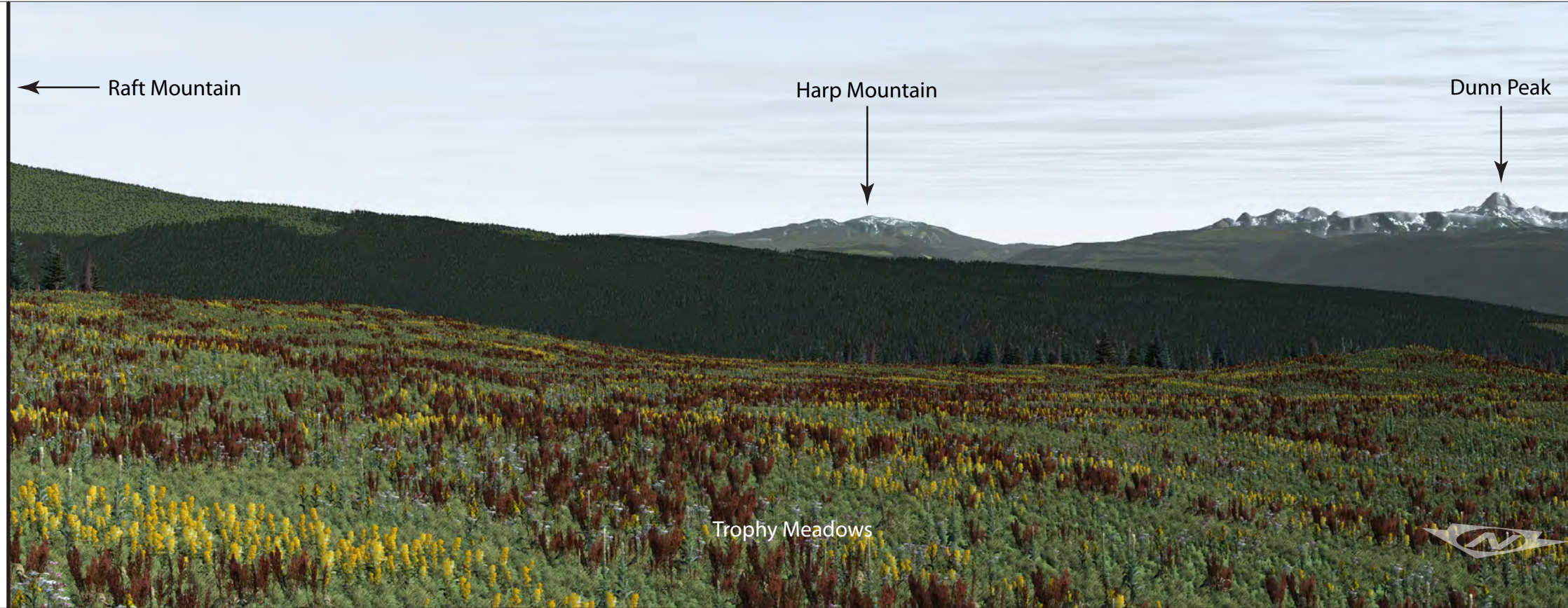
## APPENDIX 7

Camera Information  
Horizontal Field of View: 39°  
Focal Length: 50.0mm  
F Stop: 5,6  
Film Size: 35mm  
Focal Distance: 100m

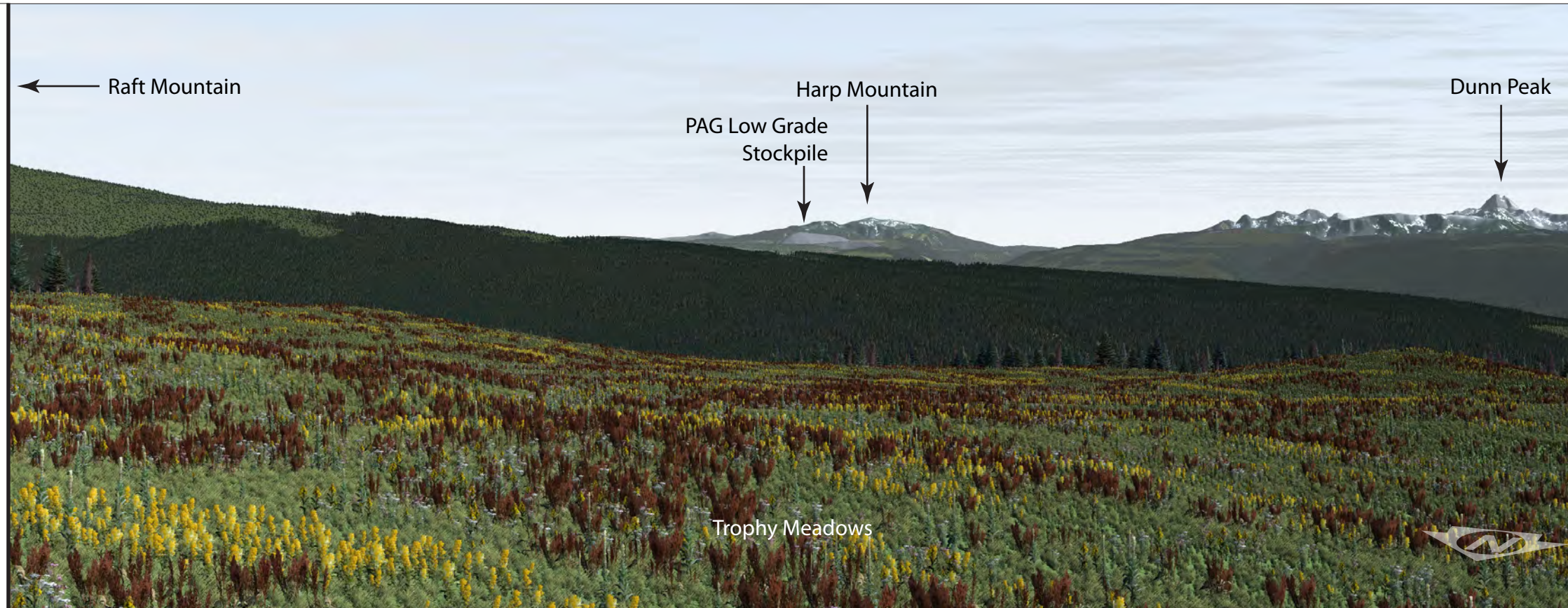
Positional Information  
Latitude: 51°46'34"  
Longitude: 119°55'59"  
Elevation: 1968m  
Heading: 165°  
Pitch: 2°  
Bank: 0°

Viewpoint: VP 1

Before Development



After Development

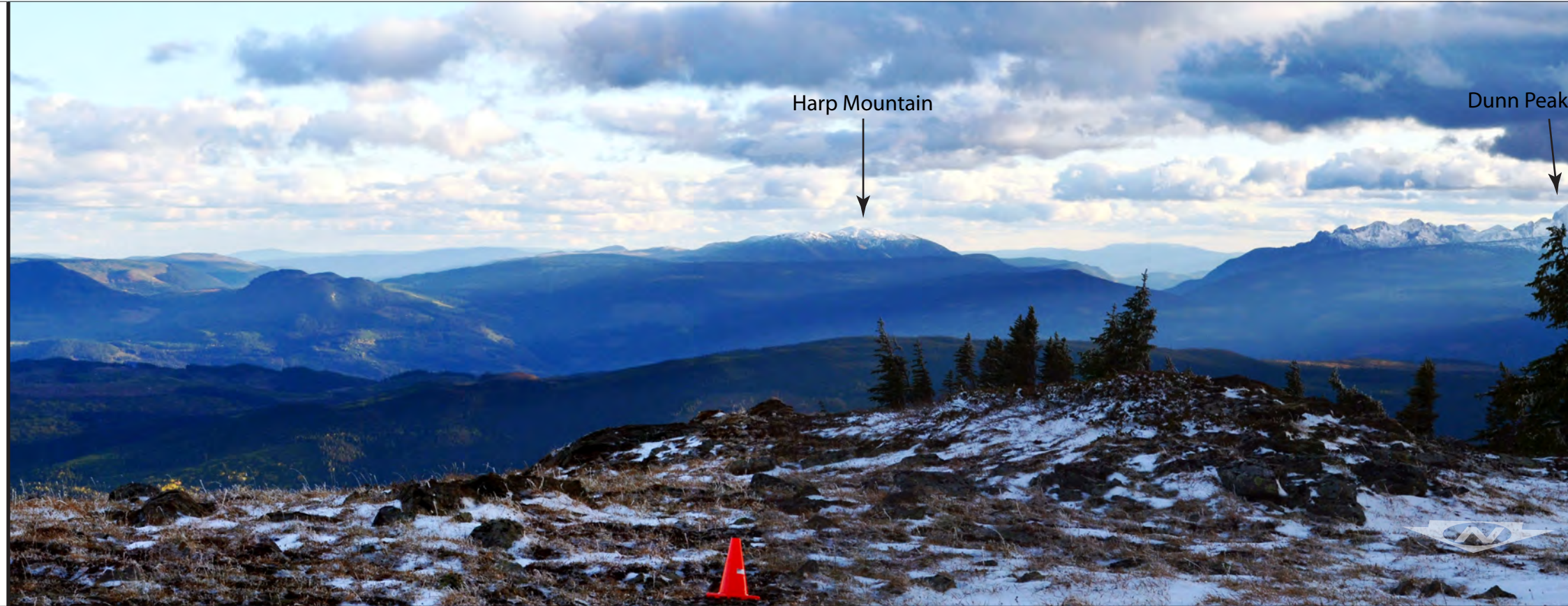


Camera Information  
Horizontal Field of View: 39°  
Focal Distance: 100m  
F Stop: 5,6  
Film Size: 35mm

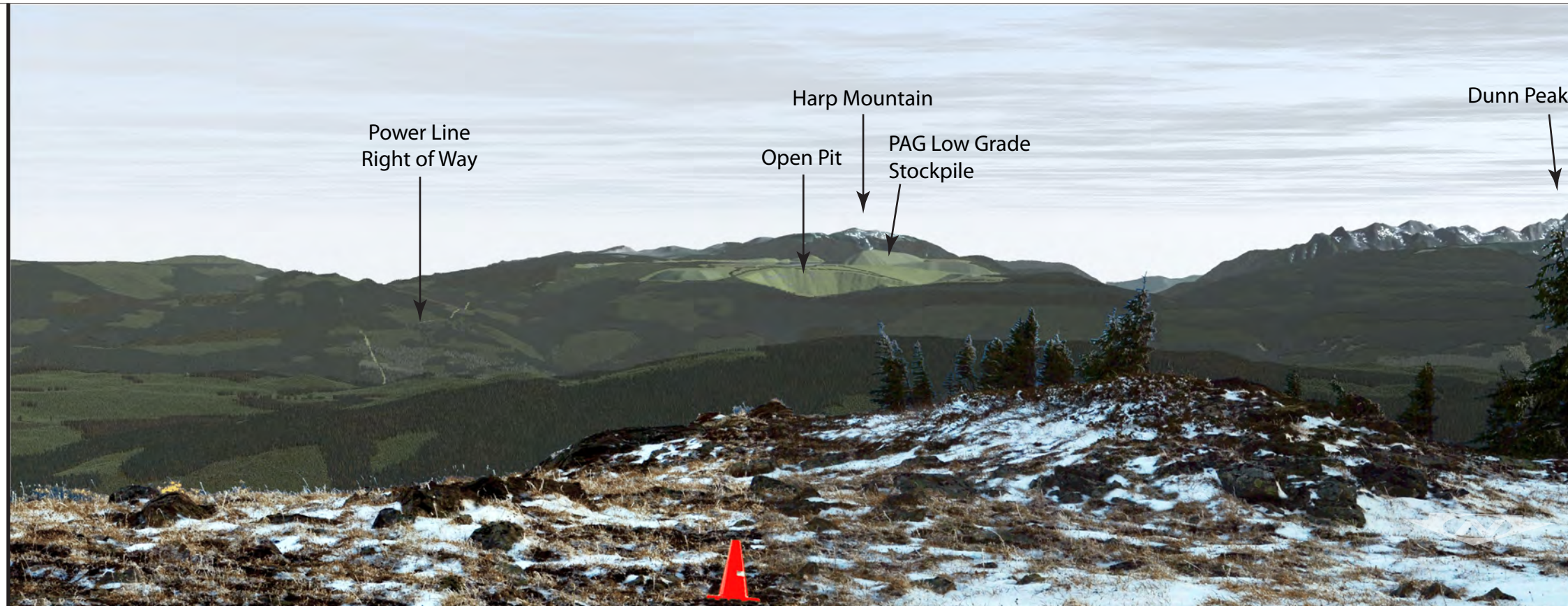
Positional Information  
Latitude: 51°43'31"  
Longitude: 119°49'37"  
Elevation: 2189m  
Heading: 176°  
Pitch: 2°  
Bank: 0°

Viewpoint: VP 2

Before Development



After Development



Camera Information  
Horizontal Field of View: 39°  
Focal Length: 50.0mm  
Focal Distance: 100m  
F Stop: 5.6  
Film Size: 35mm

Positional Information  
Elevation: 3189m  
Pitch: 2°  
Bank: 0°  
Heading: 176°  
Longitude: 119°51'16"

Viewpoint: VP 3  
Latitude: 51°35'20"

Before Development



After Development



Camera Information  
Horizontal Field of View: 71°  
Focal Distance: 100m  
Film Size: 35mm  
F Stop: 5,6

Positional Information  
Latitude: 51°35'20"  
Longitude: 119°51'16"

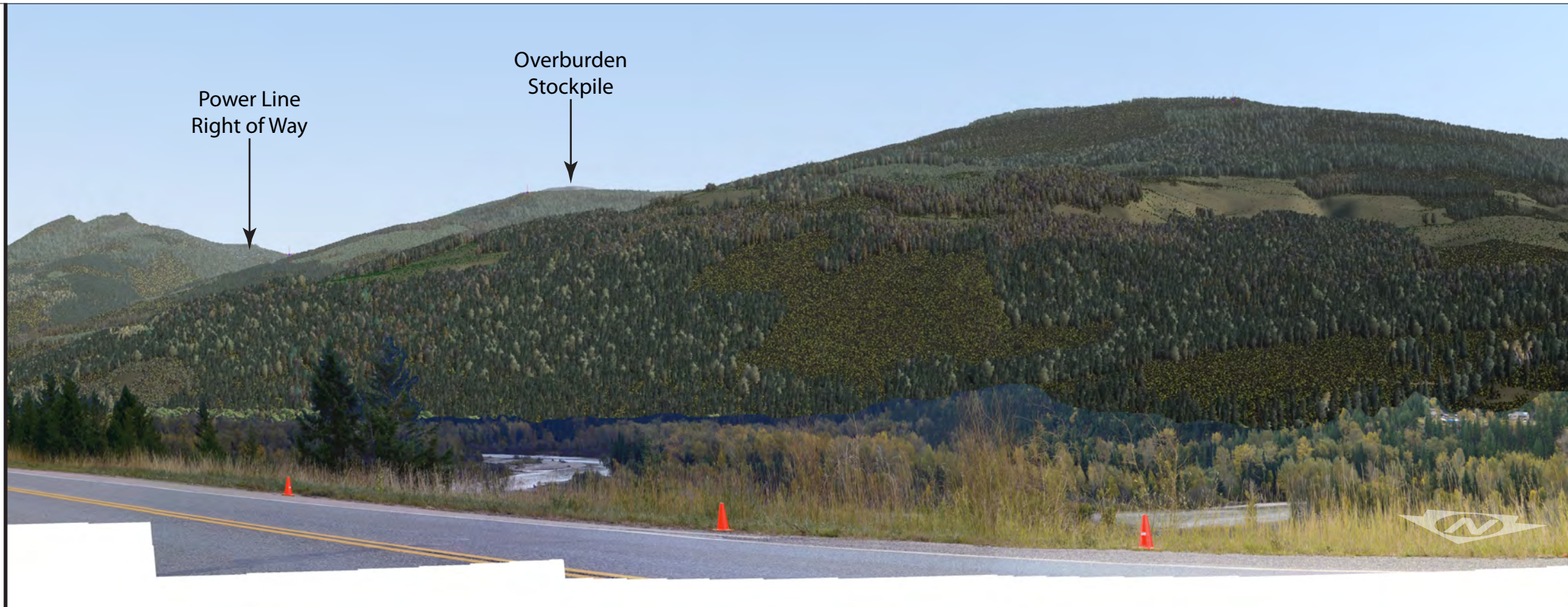
Elevation: 477.5m  
Pitch: 0°  
Bank: 0°  
Heading: 168.5°

Viewpoint: VP 3

Before Development



After Development



Camera Information  
Horizontal Field of View: 95.4°  
Focal Length: 15.9mm  
Focal Distance: 100m  
F Stop: 5.6  
Film Size: 35mm

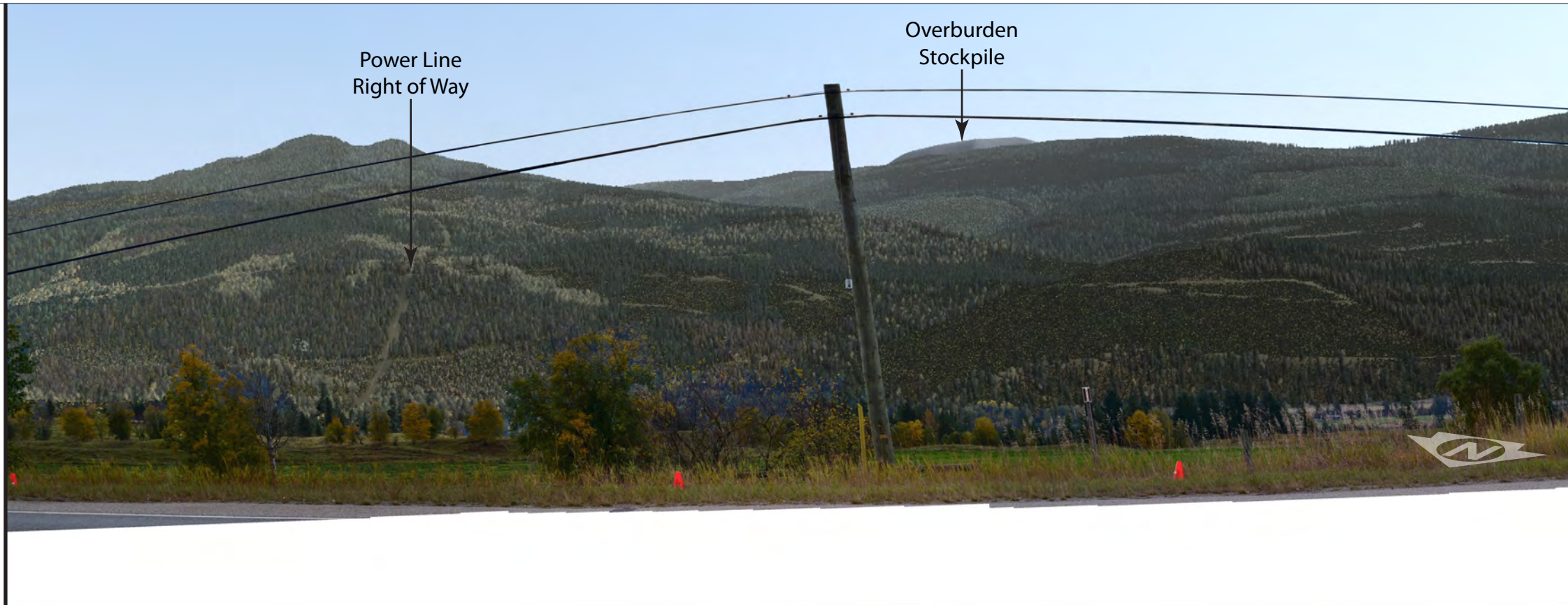
Positional Information  
Latitude: 51°35'33"  
Longitude: 119°46'11"  
Elevation: 555m  
Heading: 157.5°  
Pitch: 0°  
Bank: 0°

Viewpoint: VP 4

Before Development



After Development



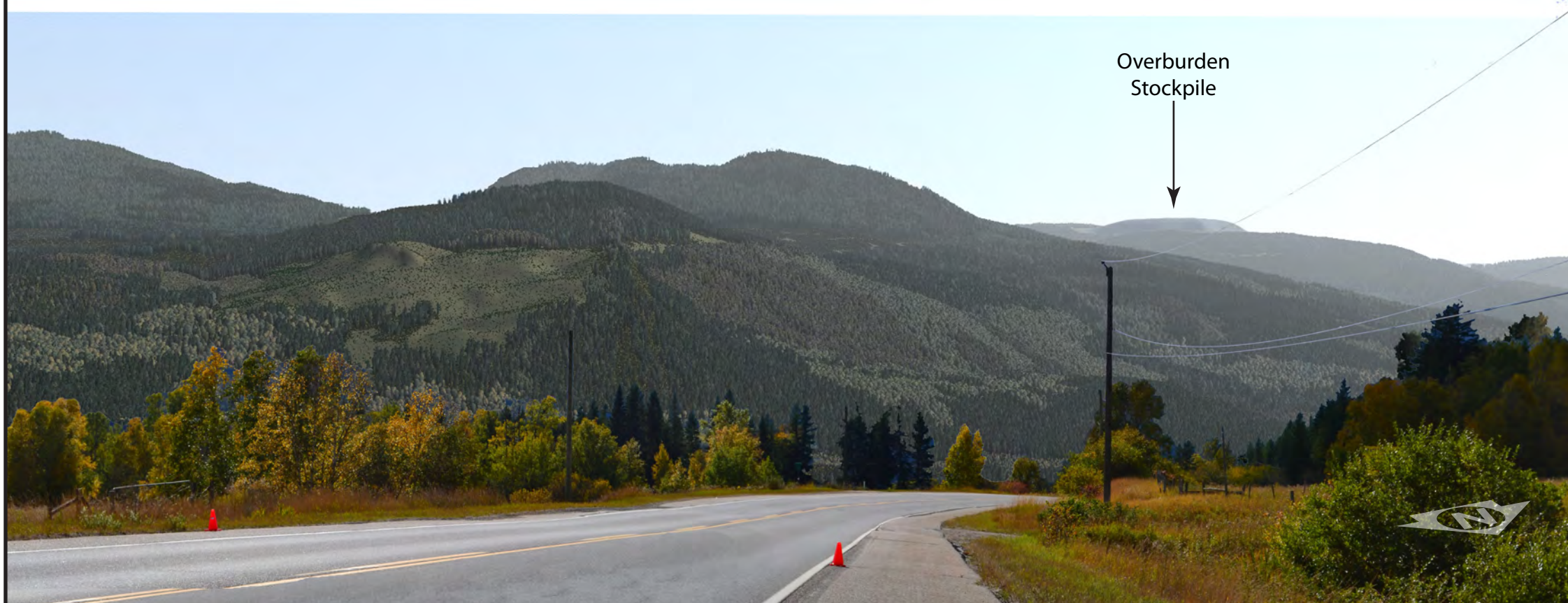
Camera Information  
Horizontal Field of View: 56°  
Focal Distance: 100m  
F Stop: 5,6  
Pitch: 0°  
Bank: 0°  
Elevation: 575m  
Heading: 209°

Positional Information  
Latitude: 51°36'23"  
Longitude: 119°41'53"

Before Development



After Development



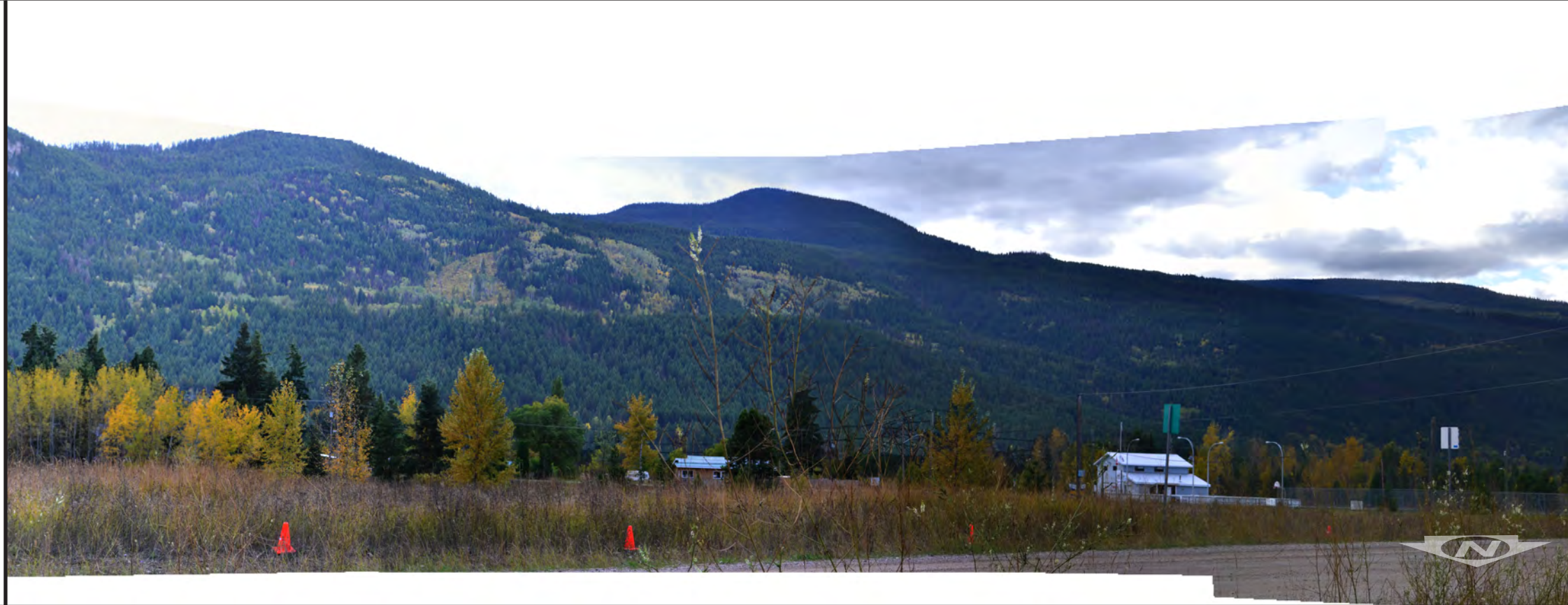
Overburden  
Stockpile

Camera Information  
Horizontal Field of View: 90°  
Focal Distance: 100m  
F Stop: 5,6  
Pitch: 0°  
Bank: 0°  
Elevation: 484m  
Heading: 181,5°

Positional Information  
Latitude: 51°35'18"  
Longitude: 119°43'37"

Viewpoint: VP 6

Before Development



After Development



Camera Information  
Horizontal Field of View: 60°  
Focal Length: 30.3mm  
Focal Distance: 100m  
Film Size: 35mm  
F Stop: 5,6

Positional Information  
Latitude: 51°30'05"  
Longitude: 119°55'54"  
Elevation: 2250m  
Heading: 86°  
Pitch: 2°  
Bank: 0°

Viewpoint: VP 7

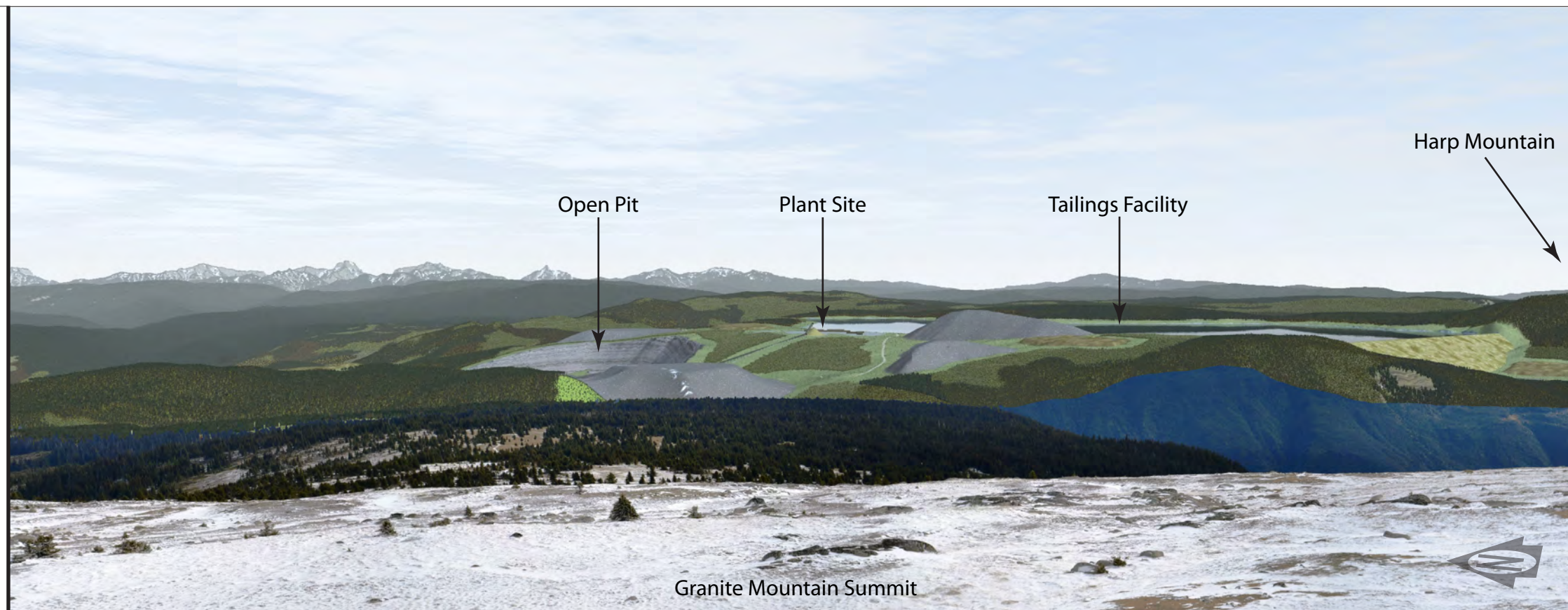
Before Development



Granite Mountain Summit

Harp Mountain

After Development



Granite Mountain Summit

Harp Mountain

Open Pit

Plant Site

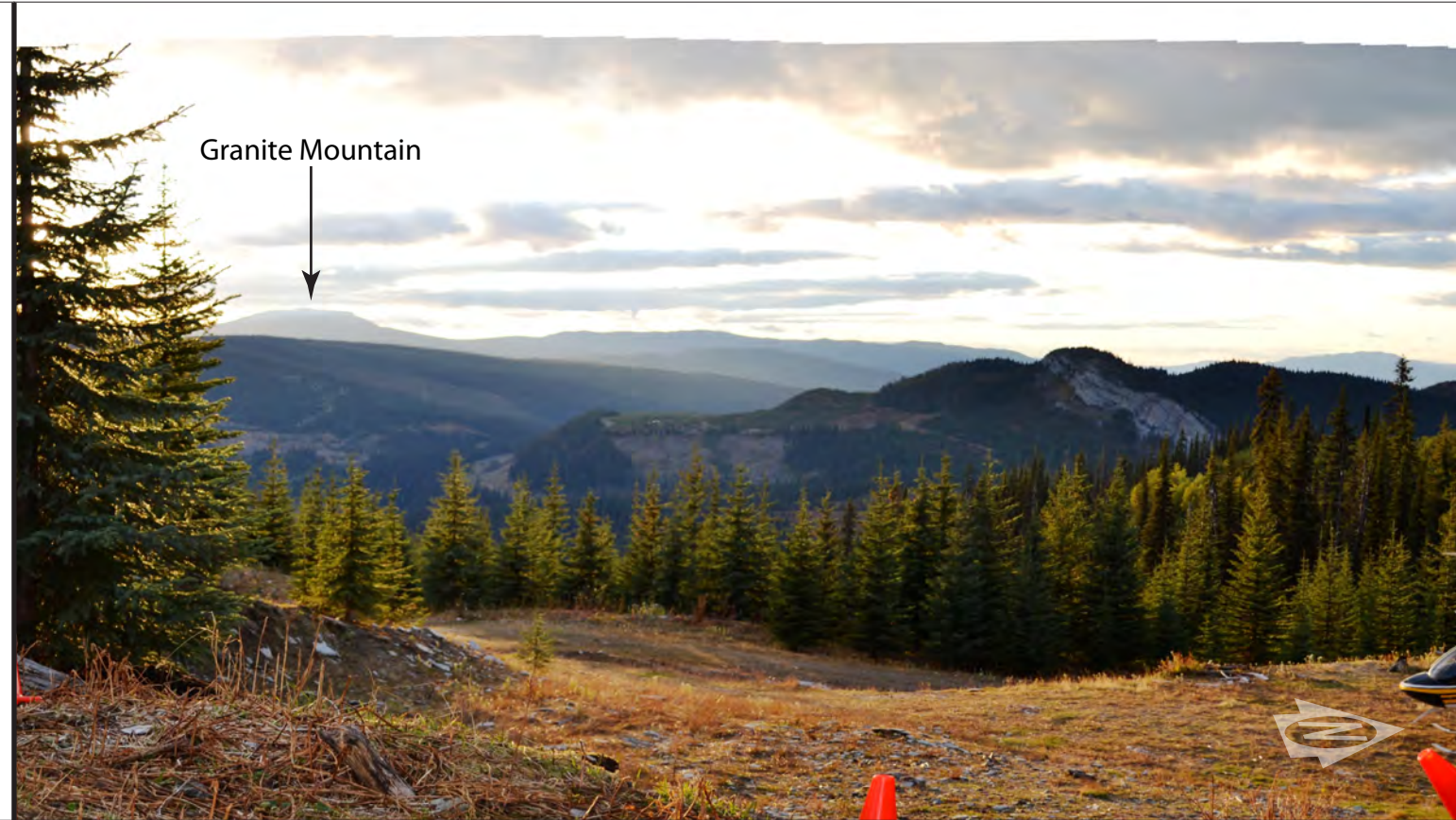
Tailings Facility

Camera Information  
Horizontal Field of View: 45°  
Focal Length: 42.5mm  
F Stop: 5,6  
Focal Distance: 100m  
Film Size: 35mm

Positional Information  
Latitude: 51°31'02"  
Longitude: 119°41'11"  
Elevation: 1795m  
Heading: 278°  
Pitch: 2°  
Bank: 0°

Viewpoint: VP 8

Before Development



After Development

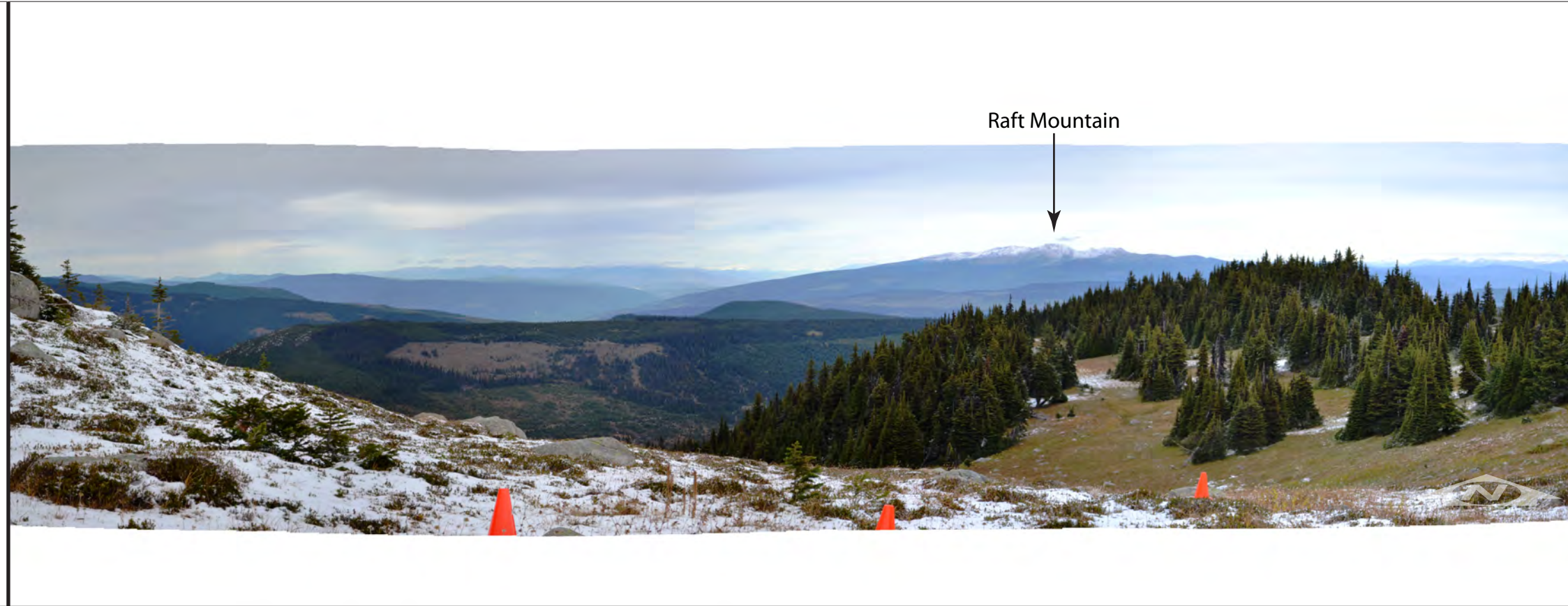


Positional Information  
Latitude: 51°27'20" Elevation: 2108m Pitch: 2°  
Longitude: 119°47'50" Heading: 341° Bank: 0°

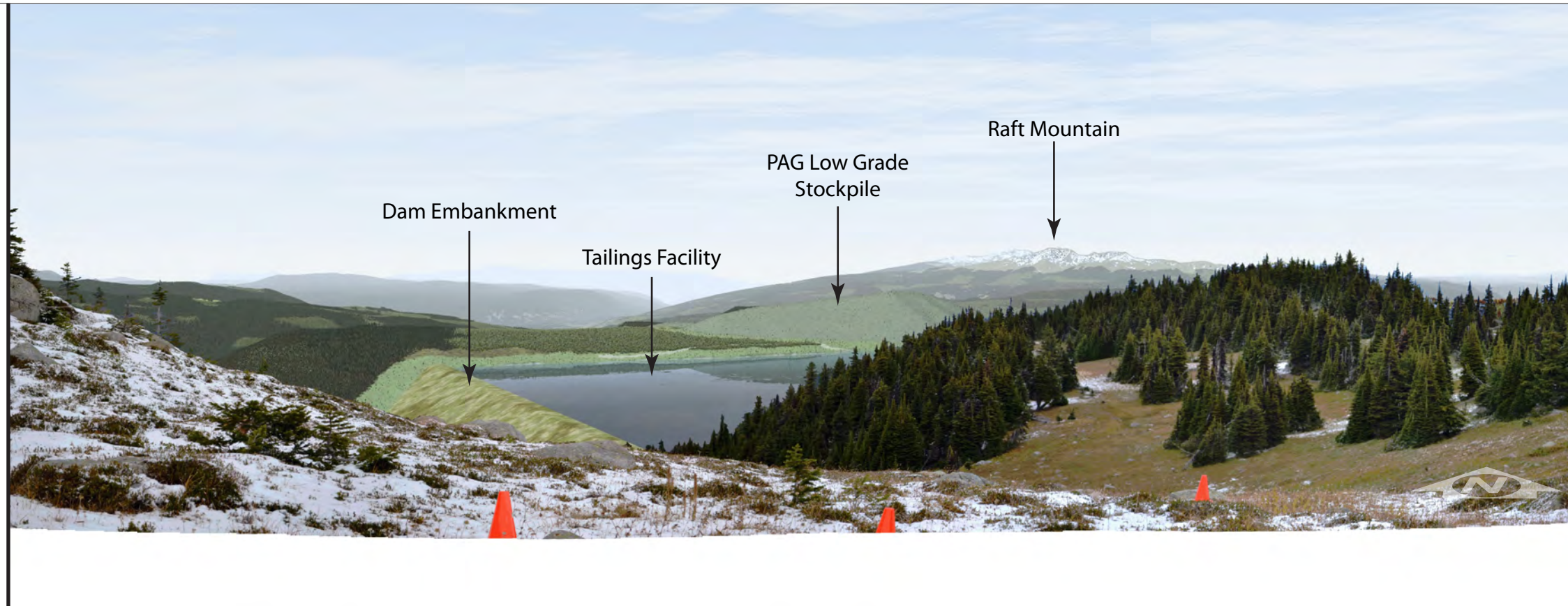
Camera Information  
Horizontal Field of View: 60° Focal Distance: 100m Film Size: 35mm  
Focal Length: 30.3mm F Stop: 5,6

Viewpoint: VP 9

Before Development

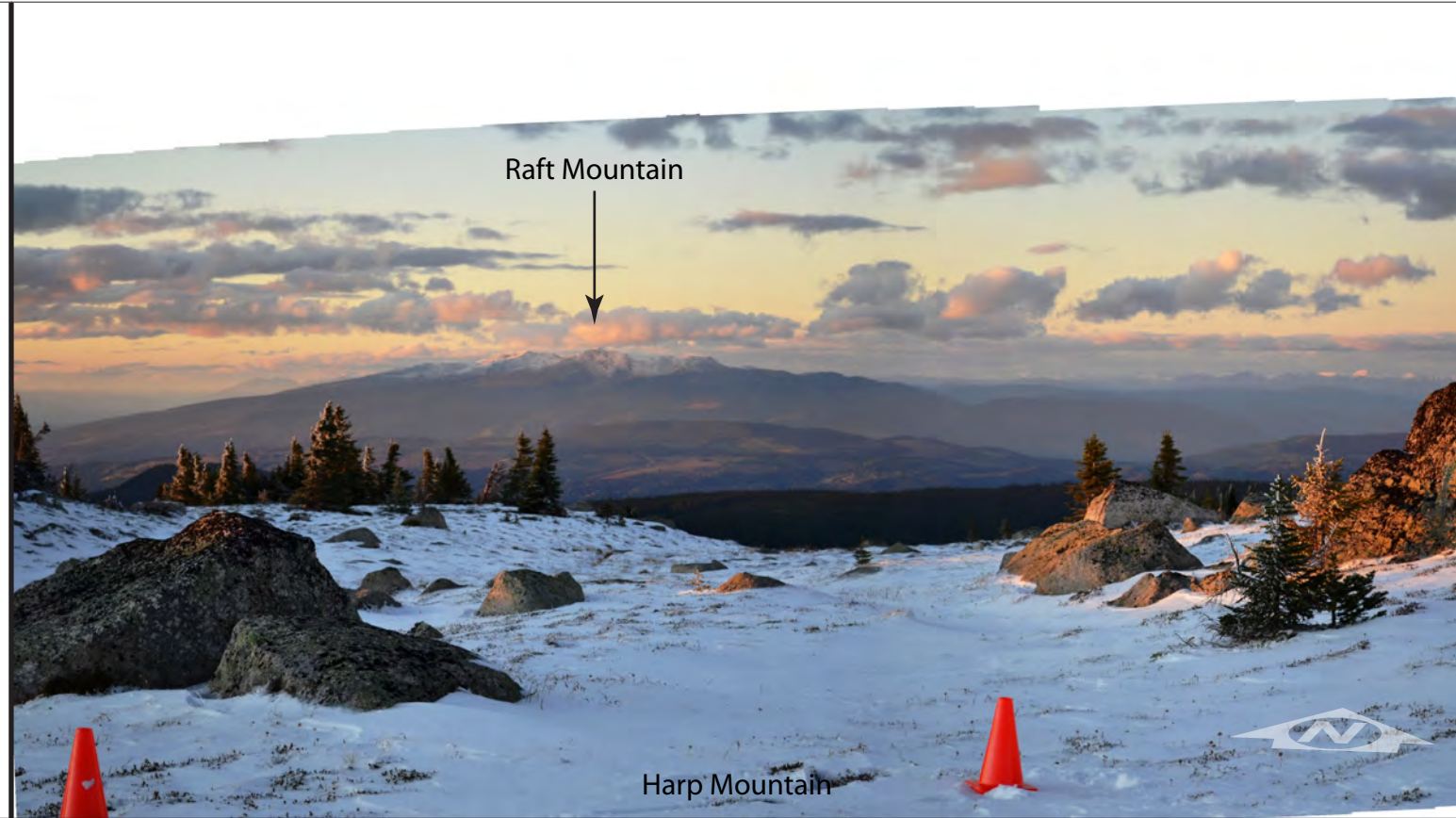


After Development

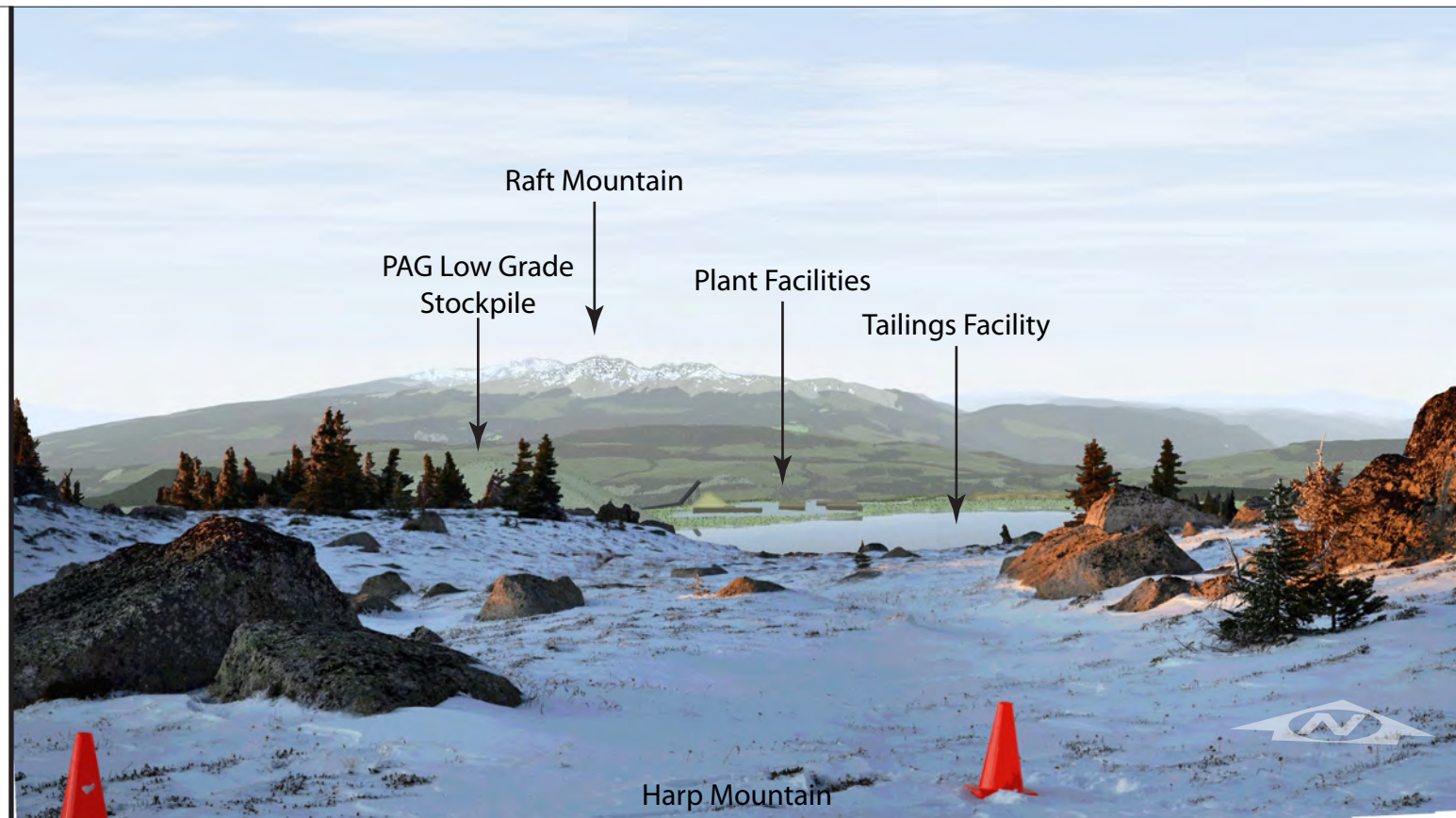


Positional Information  
Latitude: 51°27'00" Elevation: 2208m Pitch: 4° Horizontal Field of View: 45° Film Size: 35mm  
Longitude: 119°48'04" Heading: 354° Bank: 0° Focal Distance: 100m F Stop: 5,6  
Camera Information  
Focal Length: 42,5mm

Before Development



After Development



Camera Information  
Horizontal Field of View: 41°  
Focal Distance: 100m  
F Stop: 5,6  
Film Size: 35mm

Positional Information  
Latitude: 51°25'04"  
Longitude: 119°47'12"  
Elevation: 2152m  
Heading: 346°  
Pitch: 0°  
Bank: 0°

Viewpoint: VP 11

Before Development



After Development



Camera Information  
Horizontal Field of View: 60°  
Focal Length: 30.3mm  
Focal Distance: 100m  
F Stop: 5,6  
Film Size: 35mm

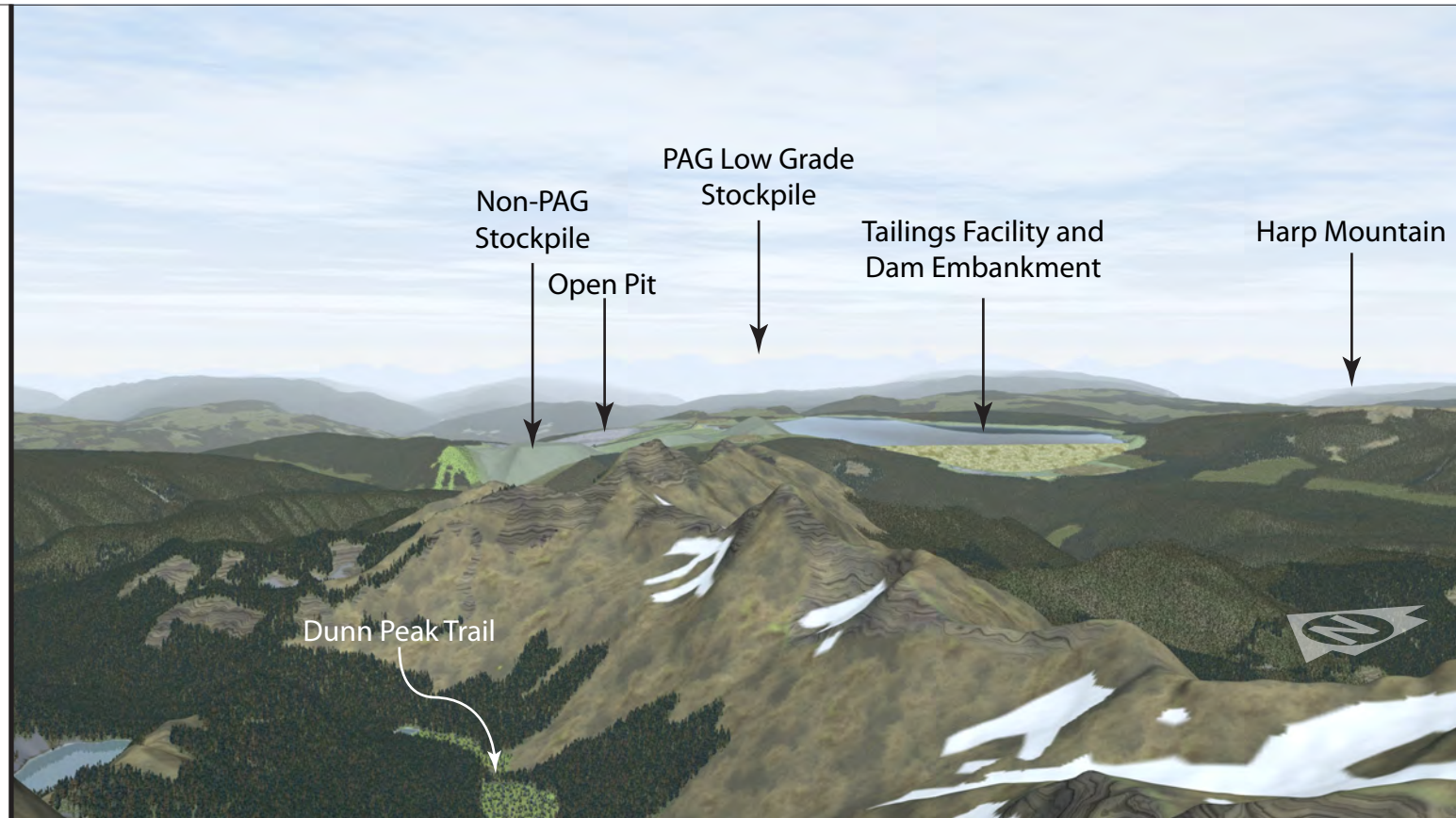
Positional Information  
Latitude: 51°26'14"  
Longitude: 119°57'16"  
Elevation: 2638m  
Heading: 55°  
Pitch: 3°  
Bank: 0°

Viewpoint: VP 12

Before Development



After Development



Camera Information  
Horizontal Field of View: 56°  
Focal Distance: 100m  
F Stop: 5,6  
Pitch: 0°  
Bank: 0°

Positional Information  
Latitude: 51°35'18"  
Longitude: 119°48'06"  
Elevation: 505m  
Heading: 176°

Viewpoint: VP 13

Before Development



After Development



Camera Information  
Focal Distance: 100m  
Film Size: 35mm  
F Stop: 5,6

Horizontal Field of View: 45°  
Focal Length: 42,5mm

Pitch: -2°  
Bank: 0°

Elevation: 1548m  
Heading: 80°

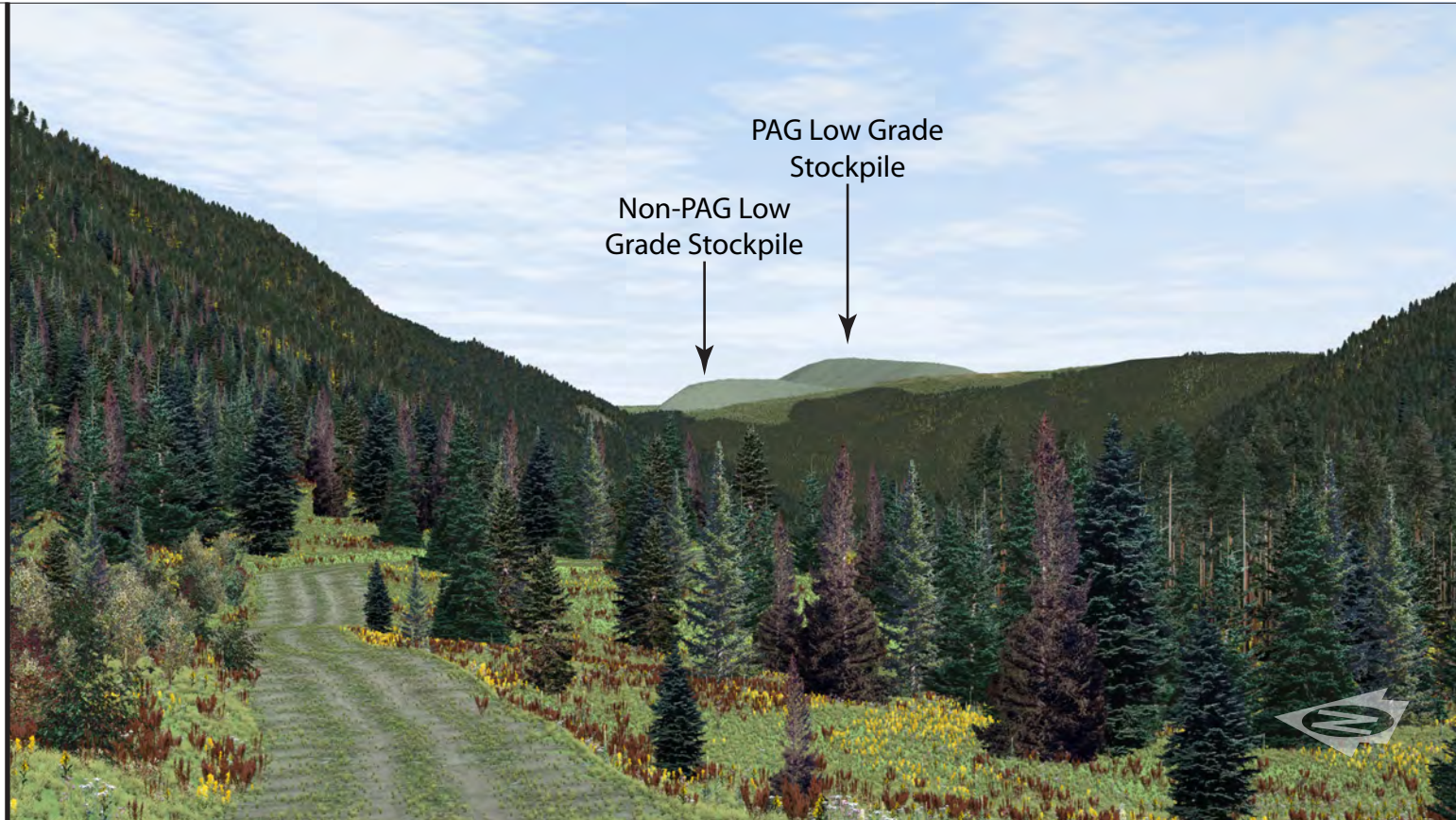
Positional Information  
Latitude: 51°29'22"  
Longitude: 119°54'44"

Viewpoint: VP 14

Before Development



After Development



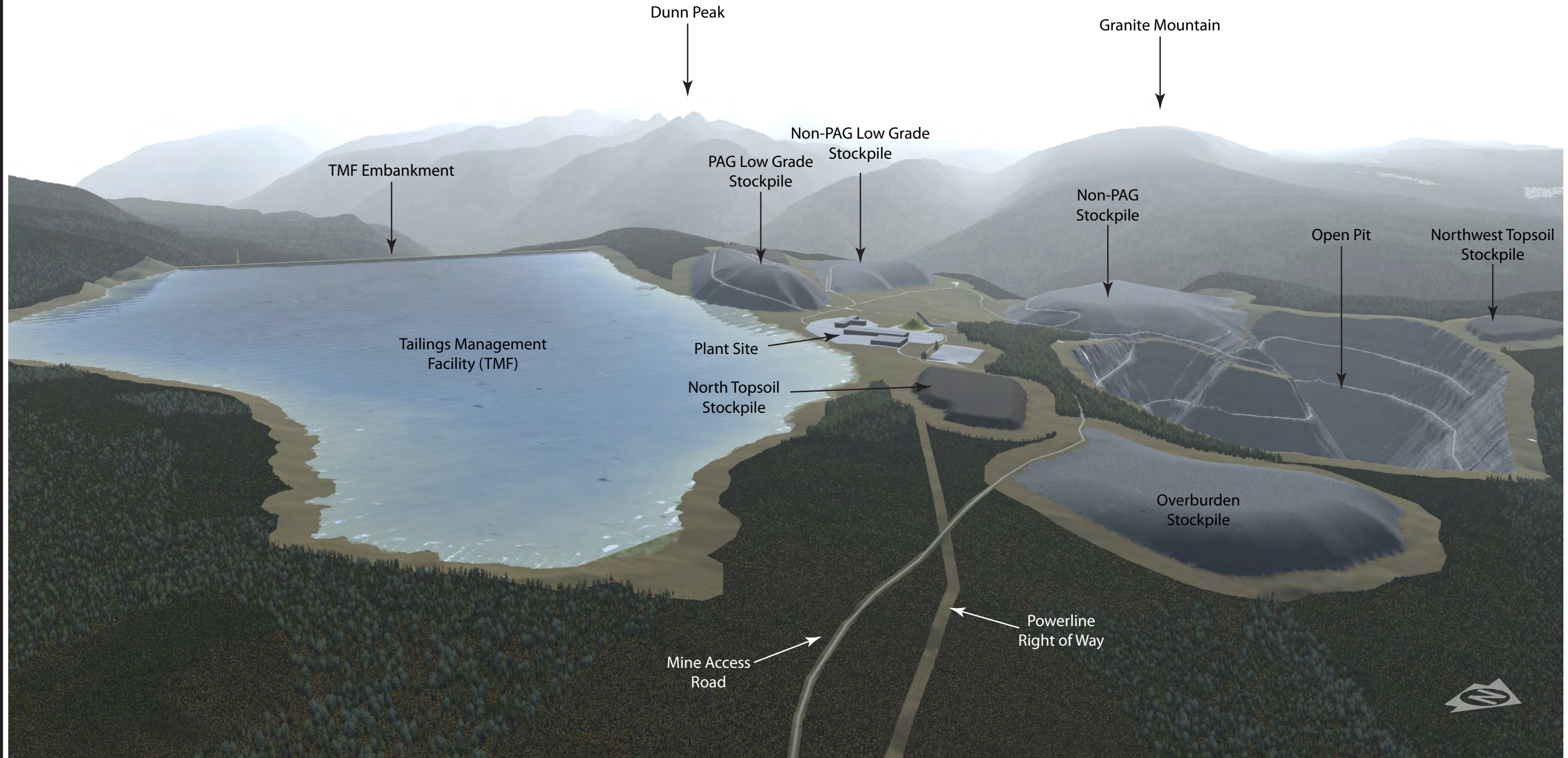
Viewpoint: Oblique 1

Positional Information

Latitude: 51°31'15" Elevation: 3000m Pitch: 12°  
Longitude: 119°44'14" Heading: 244° Bank: 0°

Camera Information

Horizontal Field of View: 65° Focal Distance: 100m Film Size: 35mm  
Focal Length: 27.5mm F Stop: 5.6



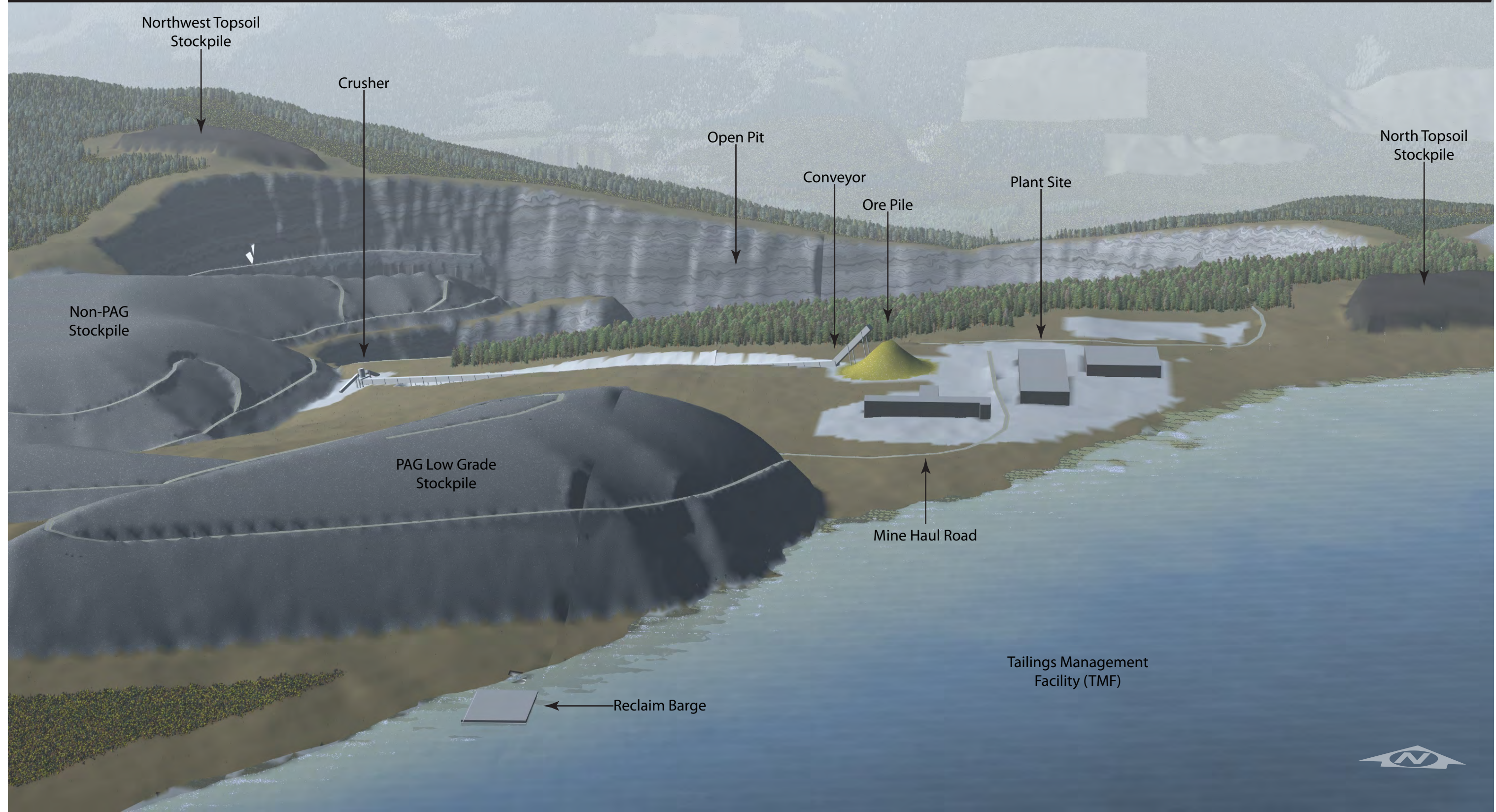
Viewpoint: Oblique 2

Positional Information

Latitude: 51°27'41" Elevation: 3000m Pitch: 14°  
Longitude: 119°48'15" Heading: 354° Bank: 0°

Camera Information

Horizontal Field of View: 25° Focal Distance: 100m Film Size: 35mm  
Focal Length: 78.9mm F Stop: 5.6





Group

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## APPENDIX 8

Camera Information  
Horizontal Field of View: 39°  
Focal Distance: 100m  
Film Size: 35mm  
F Stop: 5.6

Positional Information  
Latitude: 51°35'20"  
Longitude: 119°51'16"  
Elevation: 3189m  
Heading: 176°  
Pitch: 2°  
Bank: 0°

Viewpoint: VP 3

Disturbance Calculation



After Development



**VP3 - Hwy 5-1a**

Feature	Before Dev	After Dev	Difference	Existing	Introduced	Disturbance
foliage ecosystem	486823	489783	2960			
greened up	2044	2044	0			
Road	326619	326627	8	0.0%	0.0%	0.00%
road shoulder	332744	329707	-3037	-0.3%	-0.3%	-0.26%
RofW	5792	5716	-76	0.0%	0.0%	-0.01%
ground	3230	3066	-164	0.0%	0.0%	-0.01%
NSR	863	862	-1	0.1%	0.1%	0.07%
Powerline Model		312	312	0.00%	0.03%	0.03%
Sky	555475	555473	-2	0.00%	0.00%	0.00%
Subtotal (not incl. sky)	1158115	1158115	0			
water (not in calculation)						
<b>Total</b>	<b>1713590</b>	<b>1713590</b>		<b>0.1%</b>	<b>-0.2%</b>	<b>0.1%</b>

Negative values are due to terrain model differences. The original DEM was modified with the Mine features, including roads. This was a global effect although not easily seen within the calculation images, the difference can be seen in the pixel count.

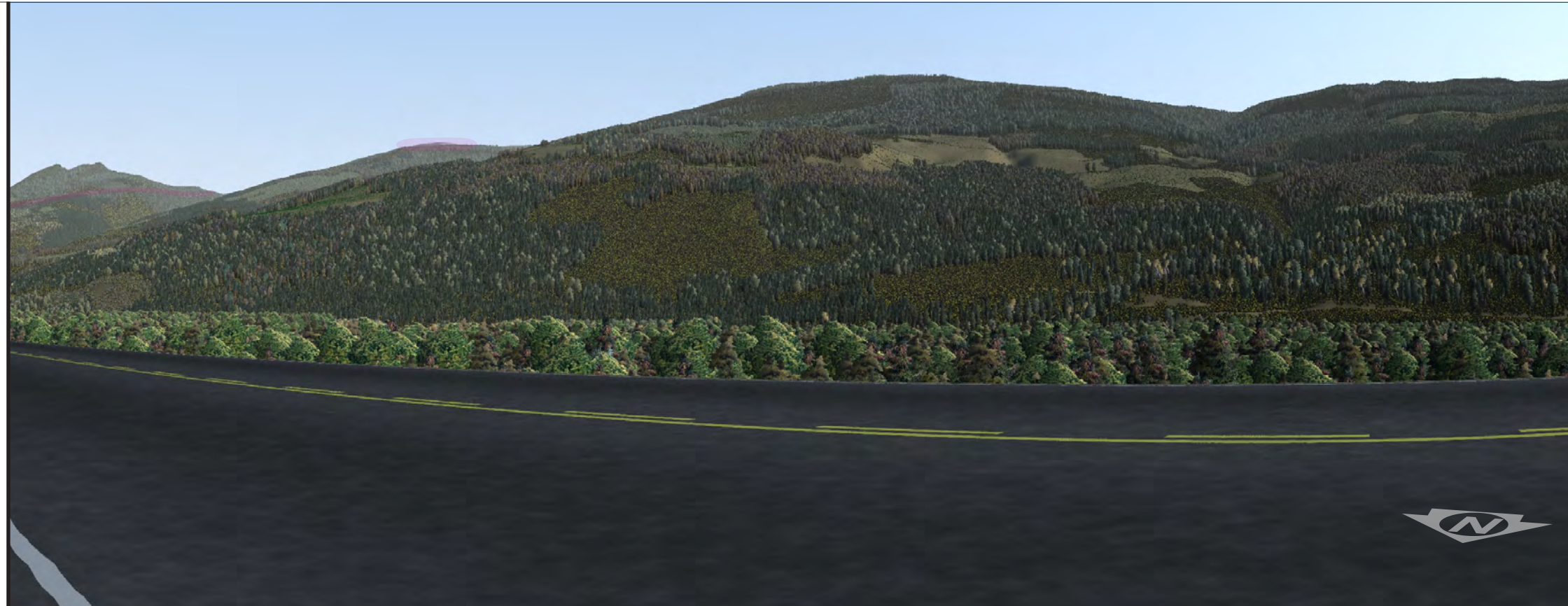
Visual Disturbance	
Existing:	0.1%
Introduced:	0.0%
<b>Total:</b>	<b>0.1%</b>

Camera Information  
Horizontal Field of View: 71° Focal Distance: 100m Film Size: 35mm  
Focal Length: 24.5mm F Stop: 5.6

Positional Information  
Latitude: 51°35'20" Elevation: 477.5m Pitch: 0°  
Longitude: 119°51'16" Heading: 168.5° Bank: 0°

Viewpoint: VP 3

Disturbance Calculation



VP3 - Hwy 5-1b

Feature	Pixel Count		Difference	Existing	Introduced	Disturbance
	Before Dev	After Dev				
foliage ecosystem	442941	440328	-2613			
greened up	4479	4478	-1			
Road	720310	720327	17		0.0%	0.00%
road shoulder	31672	33770	2098		0.2%	0.17%
RoFW	414	756	342		0.0%	0.03%
ground	50	55	5		0.0%	0.00%
NSR	13317	13310	-7	1.1%	0.0%	1.10%
Powerline Model		62	62	0.00%	0.01%	0.00%
Overburden Stockpile		111	111	0.01%	0.01%	0.01%
Clearing Extent		1	1	0.00%	0.00%	0.00%
Sky	490277	490262	-15	*	0.00%	0.00%
Subtotal (not incl. sky)	1213183	1213183	0			
water (not in calculation)						
<b>Total</b>	<b>1703460</b>	<b>1703460</b>		<b>1.1%</b>	<b>0.2%</b>	<b>1.3%</b>

Negative values are due to terrain model differences. The original DEM was modified with the Mine features, including roads. This was a global effect although not easily seen within the calculation images, the difference can be seen in the pixel count.

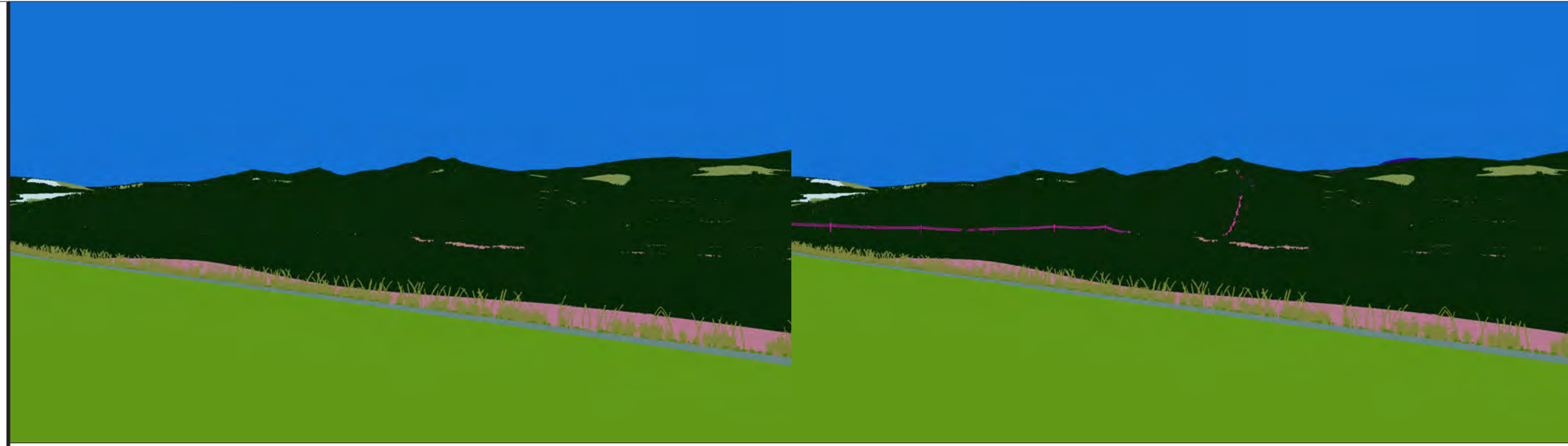
Visual Disturbance	
Existing:	1.1%
Introduced:	0.2%
<b>Total:</b>	<b>1.3%</b>

Camera Information  
Horizontal Field of View: 95.4°  
Focal Distance: 100m  
Film Size: 35mm  
Focal Length: 15.9mm  
F Stop: 5.6

Positional Information  
Latitude: 51°35'33"  
Longitude: 119°46'11"  
Elevation: 555m  
Heading: 157.5°  
Pitch: 0°  
Bank: 0°

Viewpoint: VP 4

**Disturbance Calculation**



**VP4 - Hwy 5-2**

Feature	Pixel Count		Difference	Existing	Introduced	Disturbance
	Before Dev	After Dev				
foliage ecosystem	446553	444360	-2193			
greened up	5893	5898	5			
Road	515432	515432	0		0.0%	0.00%
road shoulder	61324	61323	-1		0.0%	0.00%
RoW	28244	27472	-772		-0.1%	-0.07%
ground			0		0.0%	0.00%
NSR	1901	1900	-1	0.2%	0.0%	0.18%
Powerline Model		2636	2636	0.00%	0.25%	0.25%
Overburden Stockpile		459	459		0.04%	0.04%
Clearing Extent			0		0.00%	0.00%
Sky	647813	647880	-133	*	0.01%	0.01%
Subtotal (not incl. sky)	1059347	1059347	0			
water (not in calculation)						
<b>Total</b>	<b>1707160</b>	<b>1707160</b>		<b>0.2%</b>	<b>0.3%</b>	<b>0.5%</b>

Negative values are due to terrain model differences. The original DEM was modified with the Mine features, including roads. This was a global effect although not easily seen within the calculation images, the difference can be seen in the pixel count.

Visual Disturbance	
Existing:	0.2%
Introduced:	0.3%
<b>Total:</b>	<b>0.5%</b>

Camera Information  
Horizontal Field of View: 56° Focal Distance: 100m Film Size: 35mm  
Focal Length: 32.9mm F Stop: 5.6

Positional Information  
Latitude: 51°36'23" Elevation: 575m Pitch: 0°  
Longitude: 119°41'53" Heading: 209° Bank: 0°

Viewpoint: VP 5

Disturbance Calculation



After Development



**VP5 - Hwy 5-3**

Feature	Before Dev	After Dev	Difference	Existing	Introduced	Disturbance
foliage ecosystem	588045	576892	-11353			
greened up	3006	3004	-2			
Road	352326	352326	0		0.0%	0.00%
road shoulder	203662	203666	4		0.0%	0.00%
RoTW	3509	13828	10319		0.9%	0.88%
ground			0		0.0%	0.00%
NSR	15607	15607	0	1.3%	0.0%	1.34%
Powerline Model		45	45	0.00%	0.00%	0.00%
Overburden Stockpile		1111	1111	0.10%	0.10%	0.10%
Topsoli Stockpile		263	263	0.02%	0.02%	0.02%
Clearing Extent		72	72	0.01%	0.01%	0.01%
Sky	544709	544250	-459		0.04%	0.04%
Subtotal (not incl. sky)	1166155	1166155	0			
water (not in calculation)				1.3%	1.1%	2.4%
<b>Total</b>	<b>1710864</b>	<b>1710864</b>				

Negative values are due to terrain model differences. The original DEM was modified with the Mine features, including roads. This was a global effect although not easily seen within the calculation images, the difference can be seen in the pixel count.

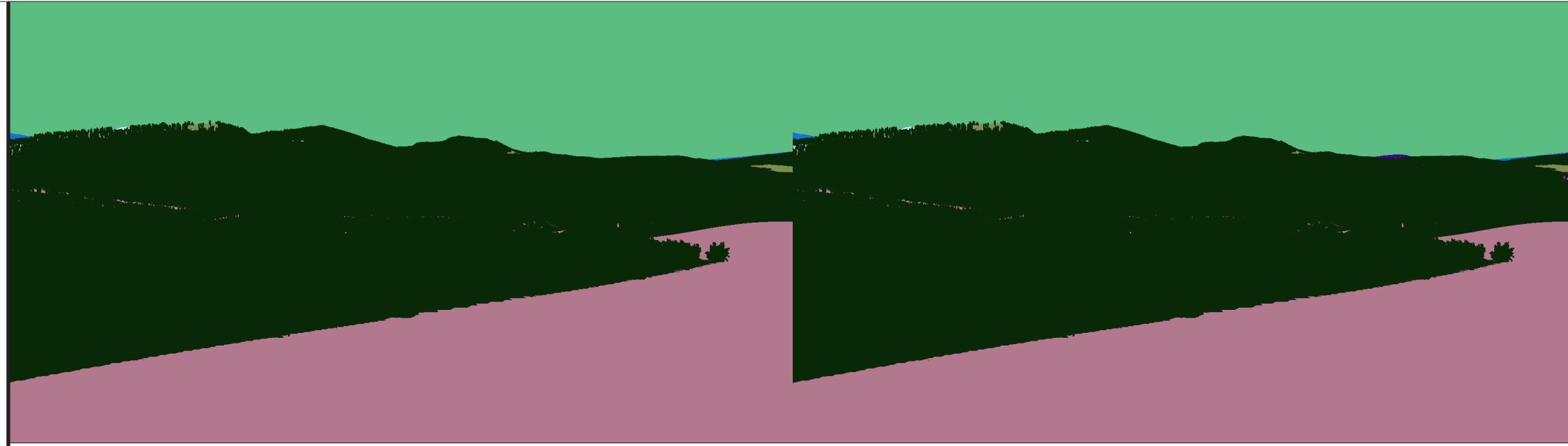
Visual Disturbance	
Existing:	1.3%
Introduced:	1.1%
<b>Total:</b>	<b>2.4%</b>

Camera Information  
Horizontal Field of View: 90°  
Focal Distance: 100m  
Film Size: 35mm  
Focal Length: 17.5mm  
F Stop: 5.6

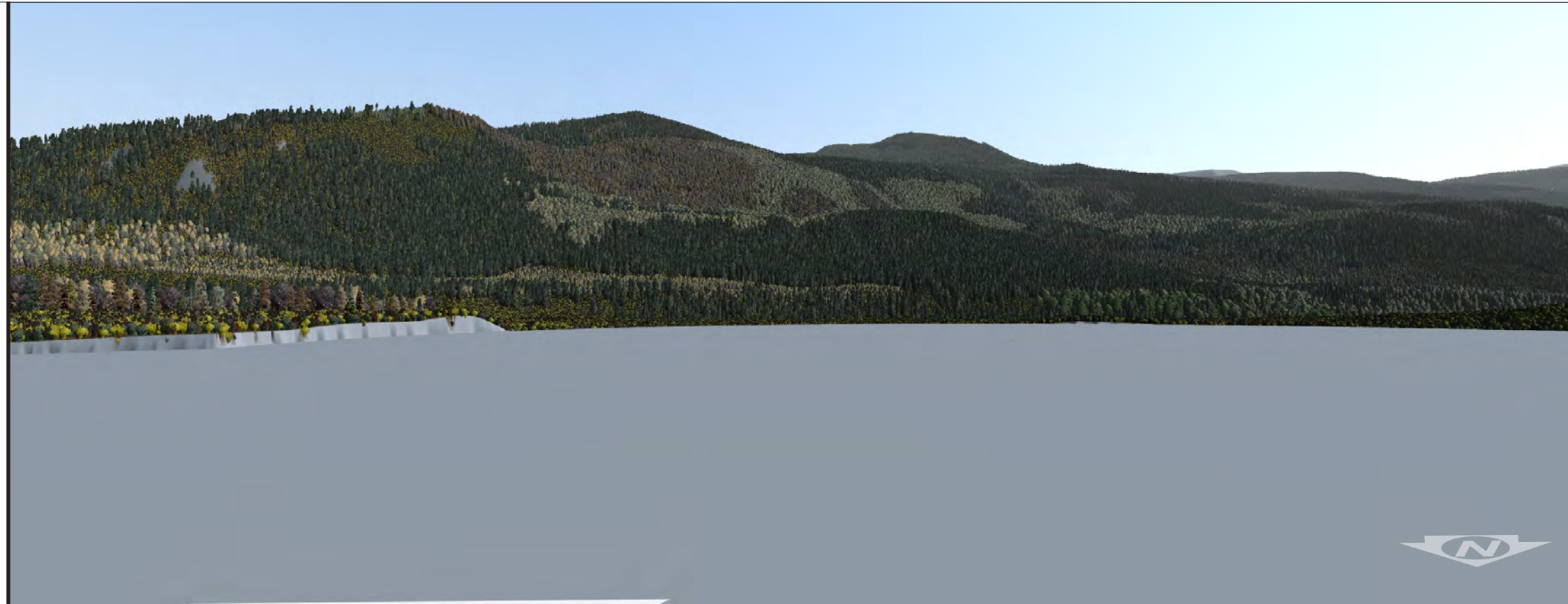
Positional Information  
Latitude: 51°35'18"  
Longitude: 119°43'37"  
Elevation: 484m  
Heading: 0°  
Pitch: 0°  
Bank: 0°

Viewpoint: VP 6

Disturbance Calculation



After Development



**VP6 - Vavenby Pixel Count**

Feature	Before Dev	After Dev	Difference	Existing	Introduced	Disturbance
foliage ecosystem	664333	664125	-208			
greened up	1800	1800	0			
Road			0	0	0.0%	0.00%
road shoulder			0	0	0.0%	0.00%
RoW	504933	504942	9	0	0.0%	0.00%
ground			0	0	0.0%	0.00%
NSR	179	179	0	0.0%	0.0%	0.02%
Powerline Model			54	0.00%	0.00%	0.00%
Overburden Stockpile			420	0.04%	0.04%	0.04%
Topsoli Stockpile			67	0.01%	0.01%	0.01%
Clearing Extent			3	0.00%	0.00%	0.00%
Sky	539619	539274	-345		0.03%	0.03%
Subtotal (not incl. sky)	1171245	1171245	0			
water (not in calculation)						
<b>Total</b>	<b>1710864</b>	<b>1710864</b>		<b>0.0%</b>	<b>0.1%</b>	<b>0.1%</b>

Negative values are due to terrain model differences. The original DEM was modified with the Mine features, including roads. This was a global effect although not easily seen within the calculation images, the difference can be seen in the pixel count.

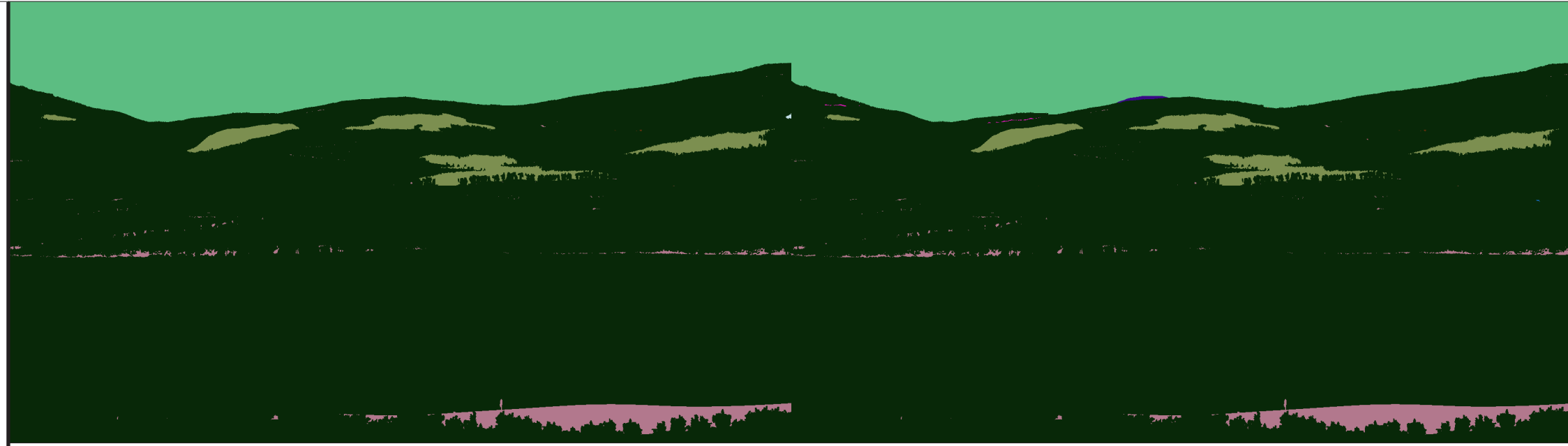
Visual Disturbance	
Existing:	0.0%
Introduced:	0.1%
<b>Total:</b>	<b>0.1%</b>

Camera Information  
Horizontal Field of View: 56° Focal Distance: 100m Film Size: 35mm  
Focal Length: 32.9mm F Stop: 5.6

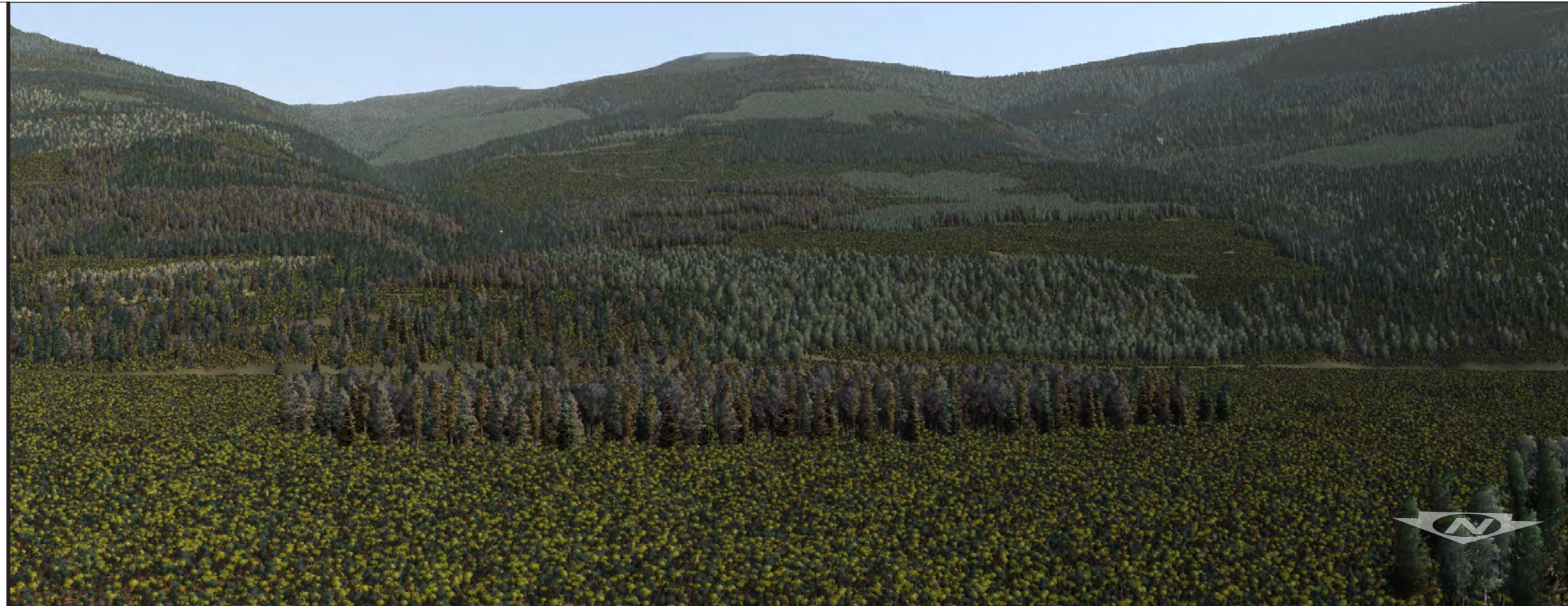
Positional Information  
Latitude: 51°35'18" Elevation: 505m Pitch: 0°  
Longitude: 119°48'06" Heading: 176° Bank: 0°

Viewpoint: VP 13

Disturbance Calculation



After Development



VP13 - Hwy 5-2 Alt

Feature	Pixel Count		Difference	Existing	Introduced	Disturbance
	Before Dev	After Dev				
foliage ecosystem	1276249	1275497	-752			
greened up	31123	31099	-24			
Road			0		0.0%	0.00%
road shoulder			0		0.0%	0.00%
Ro/W	28160	28159	-1		0.0%	0.00%
ground	20	21	1		0.0%	0.00%
NSR	118	118	0	0.0%	0.0%	0.01%
Powerline Model		182	182	0.00%	0.01%	0.00%
Overburden Stockpile		610	610	0.00%	0.05%	0.01%
Topsoil Stockpile			0		0.00%	0.00%
Clearing Extent		3	3		0.00%	0.00%
Sky	375194	375175	-19		0.00%	0.00%
Subtotal (not incl. sky)	1335670	1335670	0		0.0%	0.00%
water (not in calculation)						
<b>Total</b>	<b>1710864</b>	<b>1710864</b>		<b>0.0%</b>	<b>0.1%</b>	<b>0.1%</b>

Negative values are due to terrain model differences. The original DEM was modified with the Mine features, including roads. This was a global effect although not easily seen within the calculation images, the difference can be seen in the pixel count.

Visual Disturbance	
Existing:	0.0%
Introduced:	0.1%
<b>Total:</b>	<b>0.1%</b>