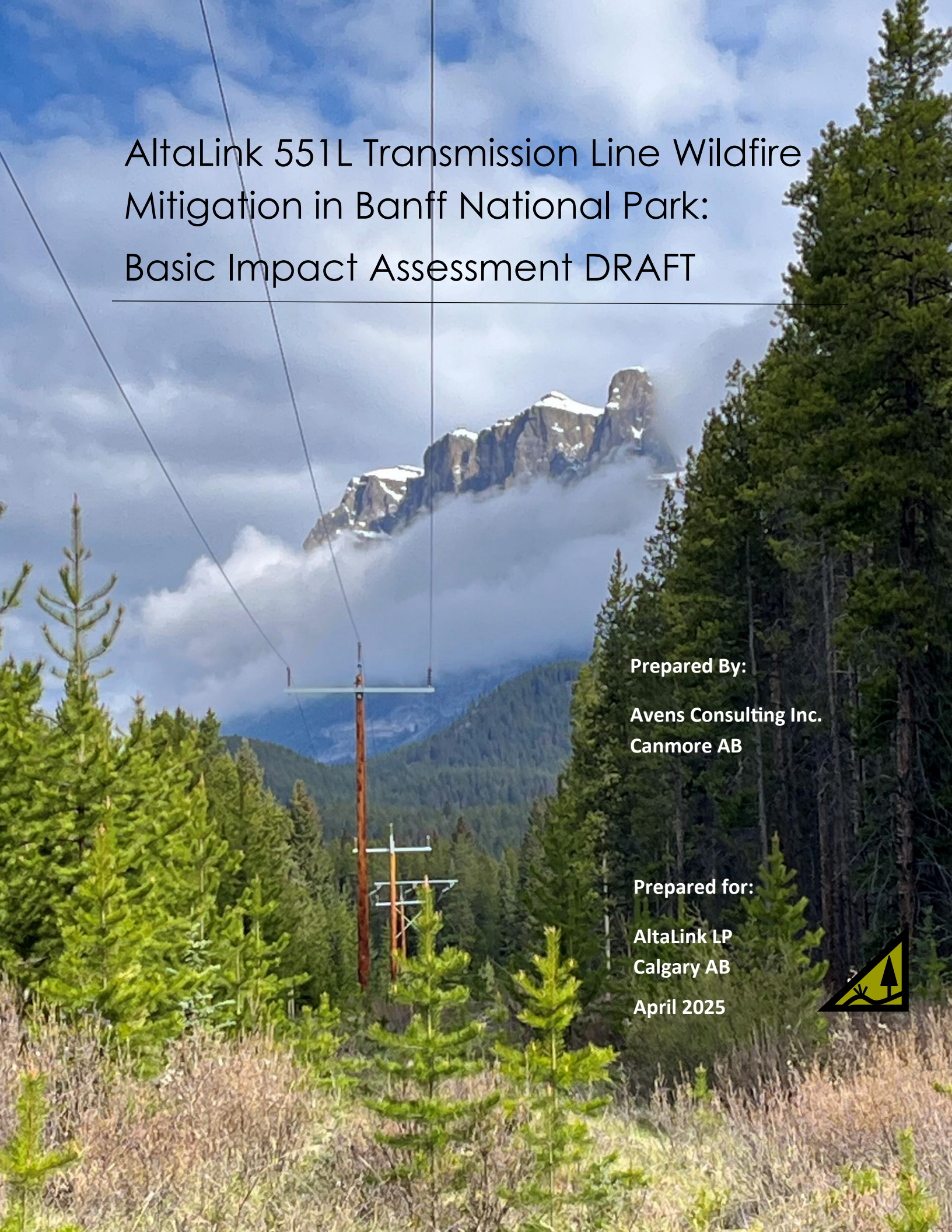
AltaLink 551L Transmission Line Wildfire Mitigation in Banff National Park: Basic Impact Assessment DRAFT



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Basic Impact Assessment

Project Name:	AltaLink 551L Transmission Line Fire Mitigation in Banff National Park
Protected Heritage Place:	Banff National Park
Parks Canada IA File #:	
Registry File # and hyperlink to CIAR posting:	
Proponent or Project Leader	Lindsay Blouin, Senior Project Manager, Capital Replacement & Upgrades, AltaLink
Impact Assessment Lead/Coordinator	

Acronyms

Archaeological Impact Assessment……..AIA

Archaeological Overview Assessment……..AOA

Basic Impact Assessment……BIA

Banff National Park……BNP

Bow Valley Parkway……BVP

Critical Habitat……..CH

Canadian Pacific Kansas City……CPKC

Diameter-At-Breast-Height……DBH

Declared Wilderness Area……DWA

Department of Fisheries and Oceans……DFO

Detailed Impact Assessment……DIA

Ecological Land Classification……ELC

Environmental Monitor……EM

Environmental Protection Plan……EPP

Erosion and Sediment Control……ESC

Environmental Surveillance Officer……ESO

Geographic Information System……GIS

High-Risk (Class 4/5) Fire Area……HRFA

High Water Mark……HWM

Impact Assessment Act……IAA

Integrated Pest Management Plan ……IPMP

Light Detection and Ranging……LIDAR

Lake Louise, Yoho, Kootenay (field unit) ……LLYK

Non-Native Vegetation ……NNV

Pileated Woodpecker……PIWO

Pre-approved Routine Impact Assessment ……PRIA

Project Study Area……PSA

Restricted Activity Permit……RAP

Right-Of-Way ……ROW

Species at Risk Act……SARA

Special Management Area ……SMA

Trans-Canada Highway……TCH

Universal Transverse Mercator……UTM

Valued Component……VC

Western Toad……WETO

Wood Frog……WOFR

Qualified Aquatic Environmental Specialist ……QAES

Definitions

Danger trees – trees with the height potential to fall within the flashover distance of the energized line.

Valued Component – Environmental, health, social, economic and potentially other element of the natural and human environment that is identified as having scientific, social, cultural, economic, historical, archaeological or aesthetic importance.

1.0 Project Description

1.1 Overview

AltaLink completed rebuilding the 551L transmission line within Banff National Park (BNP) in March 2020 with the exception of a 1.2 km portion of the line outside the Banff 123S substation. As a component of the rebuild project, AltaLink identified numerous locations with environmental constraints including riparian areas, Declared Wilderness Areas (DWAs), special management zones (wildlife), visibility screens, and the Siksika Land Claim area. To minimize adverse impacts to the environment and visitor experience in the environmental constraint areas, Danger Trees[1] were left intact.

AltaLink has advised that since the completion of the 551L rebuild project, it has conducted a Wildfire Risk Assessment of AltaLink transmission facilities which identified that a significant portion of the 551L transmission facilities occur within High-Risk (Class 4/5) Fire Areas (HRFA) (Forsite Consultants Ltd 2022). Therefore, the remaining Danger Trees along the line pose a wildfire ignition risk. AltaLink has determined the most suitable option to mitigate this risk (the Project) is through a combination of: (1) vegetation management activities; and (2) the installation of Tree Wire with an overhead shield wire within targeted sections of the 551L transmission line.

AltaLink has proposed vegetation management for approximately 23 km of line, including Danger Tree removal. However, as these Danger Trees are scattered along 47 km of the ROW, machine access will be required along the entire right-of-way (ROW). Danger Trees will be removed outside of the existing ROW and within the previously avoided environmental constraint areas. Danger Tree removal will primarily involve hand falling techniques supported by a rubber-tired processor and forwarder to get the logs to a processing area to be burned or transported to the road.

The total length of line proposed for the installation of Tree Wire is approximately 10 km. In these sections, the line will be rebuilt with insulated Tree Wire that reduces wildfire ignition risk. In these sections, Danger Tree removal will only occur around the transition structures at each end of the Tree Wire sections. The amount of tree clearing at transition structures will vary depending on the height of the trees in close proximity to the ROW but is expected to be approximately 25 m from the transition structures.

To fulfill the requirements of Section 82 under the *Impact Assessment Act* (IAA) (S.C. 2019, c. 28, s. 1) and the *Parks Canada Directive on Impact Assessment 2019* (*Parks Canada 2019a*), Parks

[1] Danger Tree – any tree, regardless of health or form, with the height potential to fall within the flashover distance of the line.

Canada has determined the Project must be assessed through a Basic Impact Assessment (BIA).

1.2 Project Purpose and Rationale

The original design for the rebuild of the 551L transmission line did not incorporate fire risk management as a primary design consideration. Since the completion of the rebuild, with the recent wildfire risk assessment and additional field review, AltaLink has identified numerous areas requiring mitigation to limit the risk of igniting a wildfire due to tree contact with the line.

The primary risk identified on the 551L transmission line is trees falling over and contacting the line or causing flashover, resulting in electricity conducted to the ground, or contact that causes sparks resulting in the ignition of a wildfire. The proposed Project seeks to reduce overall ignition risk by either removing the risk of tree fall over or through engineered solutions to minimize the risk of flashover in the event that a tree contacts the energized conductor.

AltaLink is proposing a combination of Danger Tree removal and installation of Tree Wire (Covered Conductor) in constraint areas to reduce the risk of contact, sparking, and fire ignition. The proposed Project is being planned to provide the appropriate solution for each section of the line in a manner that mitigates impacts to the environment, stakeholders, and user experience in accordance with Parks Canada and AltaLink policies.

AltaLink has advised that Fortis Alberta will be required to remove sections of underbuilt distribution line from AltaLink's facilities on existing structures 26 to 36 between the Banff Industrial Park and the Fenlands Recreation Center. This section of line will be constructed as an underground facility by Fortis Alberta. AltaLink does not anticipate any other ancillary projects as a result the 551L Fire Risk Mitigation Project.

1.3 Project Location

The Project will occur in the Banff and Lake Louise field units of Banff National Park, within the existing 551L ROW and areas adjacent to the ROW where Danger Trees exist (Appendix A). The ROW is approximately 57 km long between the Banff and Lake Louise substations. Access to the ROW will be on the off-ROW accesses established for the 551L Rebuild project and outlined on the Project maps (Appendix A).

The existing fenced AltaLink material yard at Mannix pit will be the main staging area utilized for the Project and will have a temporary office, washroom facilities and generator setup within the yard as well as laydown and equipment storage areas.

These areas make up the Project Study Area (PSA).

1.4 Alternatives Considered

AltaLink has advised that in its experience discussing transmission projects with public stakeholders, other options frequently identified include relocating the transmission line in a new ROW and placing the transmission underground. Relocation was not considered due to known regulatory constraints in establishing new easements within Banff National Park.

From AltaLink's experience, the cost of constructing a buried transmission line is estimated to have a significantly higher cost than an overhead line. Burying the line also entails significantly more and continuous ground disturbance given the steep, rocky terrain. Although maintenance requirements on an underground line are expected less frequently, if the line does fail, it requires more time to detect the location of the failure and repair it, resulting in a longer unplanned outage to Sunshine Village, Lake Louise, and surrounding areas. Additionally, if there is a wildfire in the area, the underground cables at the riser structures will be exposed, and could be damaged by the fire, resulting in an extended outage on the line. Furthermore, any repairs will require construction of a temporary overhead line to restore power and replace the damaged underground cables. Therefore, burying the line was not AltaLink's preferred option.

The two options that AltaLink considered for the Project include: (1) replacing the existing line with a line with Tree Wire; and (2) removing Danger Trees along the line. 69kV Tree Wire is a commercially available product that has been applied on other transmission line projects in Alberta. As Option 1 is higher cost and involves replacing portions of an existing transmission line, AltaLink opted for a combination of the two options to balance the overall ecological impacts, user experience and project cost.

1.5 Design Related Mitigation

AltaLink advised that in the planning phase of this Project, Tree Wire sections were placed in areas with ecological and aesthetic constraints (Appendix A). In the section from the Banff 123S substation to a location adjacent to the Juniper Hotel, Tree Wire will be used to mitigate effects to sensitive streams and wetlands including Critical Habitat (CH) for bull trout, as well as effects on visibility of the line from nearby roads. The Tree Wire section from structures 292 – 317 will mitigate effects to aesthetics as well as avoid extensive tree removal along the edge of a large wetland and a stream. The remainder of the sections have been designed to mitigate effects to aesthetics by allowing the Danger Trees to remain in place where there is a narrow buffer of trees between the ROW and nearby roads. Tree wire in these sections also improves safety by reducing human and wildlife interactions along highway 1A, as removing trees in these sections would increase wildlife visibility, which can result in safety concerns with cars pulled over along the side of the highway to view wildlife.

Through an extensive planning and engineering process, the location of all structures in Tree Wire sections have been proposed to avoid or minimize effects to sensitive sites including streams, wetlands, and unstable slopes with high ground water. Wherever possible, AltaLink will access waterbodies from both sides rather than crossing the waterbody. In addition, structure heights have been minimized to the extent possible in high visibility areas to mitigate visibility concerns.

During this Project, all construction activity will be scheduled between October and March to avoid sensitive wildlife windows including the breeding bird and spring fish spawning windows, as well as spring / early summer sensitive periods. All work involving heavy machinery use will be scheduled when the ground is frozen and there is snow cover. This will minimize ground disturbance and spread of Non-Native Vegetation (NNV) (see section 1.8 Project Schedule below).

1.6 Project Phases and Activities

The phases of the Project will include access preparation followed by either vegetation management or rebuilding the line with Tree Wire.

1.6.1 Pre-project Weed Treatment

There are pre-existing patches of invasive non-native vegetation (NNV) species on the 551L ROW. AltaLink has marked and treated NNV on the ROW every summer since 2016. The NNV will continue to be treated every year to reduce the infestations on the ROW prior to the start of the Project and each year during the construction and vegetation management phase. The full list of existing NNV on the ROW is provided in section 4.3.5 below. The NNV are being treated using the herbicides and methods outlined in the approved AltaLink Integrated Pest Management Plan (IPMP) (AltaLink 2023b).

1.6.2 Access Preparation

AltaLink will utilize the existing access trails from the recent 551L rebuild project (Appendix A). Some accesses that have been reclaimed will need to have topsoil re-stripped for the Project. For other reclaimed accesses on flatter terrain, a hard snow road will be utilized for access with the surface of the access remaining undisturbed (Table 1-1). In total, it is estimated that 9 accesses will need to have topsoil stripped or have gravel placed on the approach to facilitate machine access and 47 accesses can be driven on as is, with a hard snow road to allow logging trucks to bring logs out for transport to a sawmill.

In many areas, cut and fills that were established on the ROW to facilitate machine access down the ROW for the rebuild project were recontoured and reclaimed at the end of the project, as per Parks Canada requirements. These cut and fills will have to be recut and topsoil restripped prior

to vegetation management or Tree Wire construction (Table 1-2). In other cases, the cut and fills were reclaimed in place with the driving surface intact so these areas will only need to have this surface restripped with no effect to the vegetated cut faces. It is estimated that out of the 31 cut and fills completed for the 551L rebuild, only 8 will need to be recut and topsoil restripped and another 11 will need to have the driving surface of the cut and fill restripped. All of these sites will be evaluated by the construction team prior to accessing the ROW to finalize cut and fill requirements. Overall, the goal will be to minimize the number and length of cut and fills to minimize the reclamation required on the Project.

Table 1-1. Accesses onto the ROW to be used in the 551L Wildfire Mitigation Project (see Appendix A for maps). Reclaimed = recently reclaimed following 551L rebuild project.

Sect.	Acc #	Strs accessed	Current condition of access	Activities in section	Snow road	Strip topsoil	Gravel on approach
1	1	18-21	Dirt track	Tree wire construction	Y	N	NA
	2	22-34	CP access	Tree wire construction	Y	N	NA
	2a	22-34	Undisturbed	Tree wire construction	Y	N	NA
	2b	35-36	Grass	Tree wire construction	Y	N	NA
	3	37-41	Gravel/ old road	Tree wire construction	N	N	NA
	4	42-45	Reclaimed	Tree wire construction	Y	N	Y
	5	46-54	Reclaimed	Tree wire construction 46-48, tree removal 48-54	Y	N	N
2a	Access gate 23	55-62	Undisturbed foot access	Tree removal	NA	NA	N
2b	6	63-64	Old road/ vegetated	Tree removal	Y	Y	N
	Fireside	65-67	Reclaimed	Moderate tree removal	N	N	N
	7	68- 68.5	Reclaimed	Heavy tree removal	Y	Y	N
	8	69-73	Gravel/ dirt	Heavy tree removal in patches	Y	N	N
3	9	74-75.5	Gravel/ vegetated	Sporadic tree removal	Y	N	N
	Foot	76-77	Undisturbed	Light tree removal	NA	NA	N
4	10	78-81	Gravel/ vegetated	Sporadic tree removal	Y	N	N
	Foot	81a-83	Vegetated	Light tree removal	NA	NA	N
	11	84-88	Vegetated	Heavy tree removal	Y	N	N
	12	89-115	Reclaimed	Light tree removal	Y	N	N
6	14	116-153	CP/ gravel	Heavy tree removal in patches	NA	NA	N
7	14	153-157	CP/ gravel	Heavy tree removal in patches	NA	NA	N

Sect.	Acc #	Strs accessed	Current condition of access	Activities in section	Snow road	Strip topsoil	Gravel on approach
8	16	158-182	Reclaimed	Heavy tree removal 159-165, light tree removal 165-182	Y	N	N
	17	159-182	Gravel	Heavy tree removal 159-165, light tree removal 165-183	Y	N	N
9a	19	183-194	Reclaimed / old road	Sporadic tree removal 183-189; heavy tree removal 190- 194	Y	N	N
	20	195-208	Reclaimed	Heavy tree removal	Y	N	Y
9b	21a	209-222	CP/ gravel	Sporadic - heavy tree removal	N	N	N
9b	21	223-234	Gravel road	Heavy tree removal	NA	NA	NA
10	22	235-236a	CP/ dirt	Heavy tree removal in patches, start of Tree Wire at 236a	N	N	N
10	23	237-246	CP/ dirt	Tree wire construction	N	N	N
11a	25a	246-257	Reclaimed	Tree wire 247-252, heavy tree removal 252-257	Y	Y	Y
	25	258-278	Vegetated	Heavy tree removal	Y	N	N
11b	26	258-278	Vegetated	Heavy tree removal 258-262, Tree Wire 263-275	Y	N	N
	26a	258-278	Reclaimed	Same as access 26	Y	N	N
	27	258-278	Reclaimed	Same as access 26	Y	N	N
12a	28	279-282	Reclaimed	Light tree removal	Y	N	N
	29	284	Vegetated trail	Heavy tree removal	N	N	N
12b	30	285-291	Reclaimed	Moderate tree removal	Y	N	N
	31	292-293	Reclaimed	Tree wire construction	Y	N	N
	31a	294-299	Reclaimed	Tree wire construction	Y	N	Y
	32	300-304	Reclaimed	Tree wire construction	Y	N	N
13	33	305-306	Reclaimed	Tree wire construction	Y	N	N
	34	307-316	Reclaimed	Tree wire construction	Y	N	N
	36	317-321	Reclaimed/ vegetated	Heavy tree removal/ topping	Y	N	Y
14b	37	321-339	Gravel	Heavy tree removal/ topping	N	NA	N
14c	39	340-349	Reclaimed	Tree wire construction	Y	N	N
15	40	350-366	Vegetated	Tree wire 350-351, tree removal 351-366	Y	N	N
	41	350-366	Reclaimed	Tree wire 350-351, tree removal 351-366	Y	N	N
16a	41a	367-368	Old trail	Heavy tree removal	Y	N	N
	42	369-380	Reclaimed	Sporadic tree removal except near 369 and up slope to 368	Y	N	N
16b	43	381-395	Reclaimed	Light tree removal, Tree Wire construction 394-road	Y	N	N

Sect.	Acc #	Strs accessed	Current condition of access	Activities in section	Snow road	Strip topsoil	Gravel on approach
	44	396-421	CP/ gravel	Tree wire construction 394-403, heavy tree removal 407-409, sporadic 410-421	Y	N	N
17a	45	396-421	Reclaimed	Same as access 44	Y	Y	N
17b	47	423-435	Gravel pit rd.	Sporadic tree removal near river	NA	NA	NA
18	49	436-441	CP / dirt	Light tree removal/ topping	Y	NA	NA
	49a	442-457	Paved	Moderate tree removal/ topping	NA	NA	NA
	51	458-469	Reclaimed	Moderate tree removal/ topping	Y	Y	N
19	53	470-473	Reclaimed	Heavy tree removal	Y	N	N

Table 1-2. Cut and fills on the 551L ROW that need to be re-established and/or topsoil stripped.

Section	Span	Re-establish cut and fill	Restrip topsoil
1	43-45	N	N
1	53A-55	Y	Y
2b	71.8-73	N	Y
3	74-75	N	N
4	84-85	N	Y
6	145-146	N	Y
7	160-160A	N	Y
8	179-180	N	N
8	180-181	N	N
10	242-243	N	Y
11a	244-245	N	Y
11a	251-252	N	N
11a	253-254	N	Y
11a	255-256	Y	Y
12a	284-285	Y	Y
12b	288-289.5	N	N
12b	290-291	N	Y
12b	299-300	Y	Y
12b	301-303	Y	Y
13	304-305	Y	Y
13	315-316	N	Y
13	317-318	N	N
13	321	N	N
14a	325-326	N	N
14b	336-339	N	N
14c	340-341	Y	Y

Section	Span	Re-establish cut and fill	Restrip topsoil
15	363	N	N
16a	368-369	Y	Y
16b	384-385	N	Y
16b	385-386	N	Y
16b	386-387	N	Y

1.6.3 Waterbody crossings

There are 55 wetlands and a maximum of 21 watercourses (15 distinct watercourses) that may be crossed in order to move equipment and materials down the ROW, as vegetation management and Tree Wire construction proceeds (Appendix A). There are no alternate routes to avoid these features in these locations.

Crossing of wetlands by heavy equipment will occur between December 1st and March 31st, provided there is frozen ground and sufficient snow cover. Crossing of wetlands by UTVs may occur as early as November 1st during vegetation management activities with a hard snow road. Wetlands will be crossed using snow roads/fills as well as access mats if conditions require additional mitigation. For more detail, refer to section 1.8 Project Schedule below.

Watercourse crossings are proposed for December 1st to March 31st to limit impacts and will involve installing temporary bridges (i.e., access mats, clear span bridges, snow fills). All machinery will travel across the creek on these bridges; there will be no permanent bridge structures constructed for this Project. All temporary bridges will be installed and used according to best practices outlined in the Department of Fisheries and Oceans Canada (DFO) Operational Statements “Temporary Stream Crossings” and “Clear Span Bridges” (DFO 2013a and 2007).

The installation of crossing structures will begin when the ground is frozen and snow cover is present. In order to prepare the wet soils in riparian areas near creek crossings for heavy equipment use, access routes must be frozen in and bridges installed at least one week ahead of vegetation management and line construction work activities. Progressively heavier machines will be used to create the route (e.g., a UTV followed by light nodwells or track skid steers, followed by larger nodwells). The goal of this process is to drive the frost deeper into the ground in order to reduce surface disturbance from the heavier equipment.

Methods to cross each watercourse will follow those used for the 551L rebuild project (details on maps Appendix A). These are detailed in the following sections.

1.6.3.1 Clear span bridges (e.g. access mats, wood steel bridge)

There are 13 watercourses that will require clear span bridge installation including Whiskey Creek tributary, Whiskey Creek, Five Mile Creek, Ranger Creek tributary, Ranger Creek, Corral Creek, as well as seven unnamed watercourses. The areas will be accessed for ROW preparation, Danger Tree removal, and/or line construction. Clear span bridges will include untreated wood access mats for narrow crossings (two sizes: 8 x 20 feet and 8 x 40 feet) and a combination of steel and wood bridges for wider crossings. Clear span bridges were selected for these crossing sites because the watercourses are narrow enough to use these bridges (i.e., <12 m from bank-to-bank) and these types of crossings have the lowest impact on fish and fish habitat.

Clear span bridge installation will involve the following activities:

- Trimming and cutting of riparian shrubs and/or saplings along creek banks may be required to prepare the area for bridge installation. In this case, shrubs and saplings will be cut off at ground level so that the roots continue to provide bank stabilization and to enable the re-sprouting of the riparian shrubs. Mature trees in the riparian zone that provide bank stability and/or shading will not be removed in order to cross any of the identified watercourses; mature trees may be pruned or topped only.

- Fording of the creeks will not be required to install these types of bridges. An excavator equipped with a grapple will be used from one side of the creek (as far from bank as possible) to slowly lower the bridge into place.

- Bridges will be constructed above the high water mark (HWM) of the watercourse.

- The use of piles or excavating is not necessary for installation and use of these types of bridges.

- If approach slopes are wet or uneven, access mats will be used to protect the slopes near streams from ground disturbance.

- Access routes will approach the watercourse crossing as nearly perpendicular to the watercourse as possible to minimize bank disturbance and reduce the crossing length.

- No deleterious substances will enter the water while cleaning snow off bridge decks and when equipment and machinery is transported across the clear-span bridges. Snow will not be plowed into the water.

- Erosion control products and sediment fencing will be installed on the banks where needed to prevent erosion and to stop sediment from entering any open flow watercourses as a result of creek crossings by equipment.

- The bridges will remain in place until all work is complete on that section or until the work has moved down the ROW and access back over the creek is no longer necessary, which may require leaving the bridge in place throughout spring and summer. If a watercourse has the potential to flood over the banks during spring melt, the bridge will be removed during frozen conditions and stored on the ROW with a 30 m set-back distance from the creek.

1.6.3.2 Snow bridge/Snow fill

For creeks with high and/or steep banks, snow will be used to fill the creek bed up to, or close to, bank height, then progressively heavier equipment will travel across the creek. In areas where there is low snow coverage, AltaLink will transport clean snow to the site in a dump truck, pile the snow 30 m away from the creek, and use a skid steer to place the snow into the creek bed.

When the crossing season is over or when the ground is still frozen (whichever comes first), compacted snow will be removed from snow fills using a backhoe or minihoe. Snow fills will be removed before the spring melt to avoid creek flow blockages, bank erosion, or flooding that may occur due to the presence of compacted snow in a high flowing creek.

In ephemeral creeks that are dry in the winter (e.g., structures 112-113), heavy machinery will travel across the creek bed if doing so would not damage the creek bed and if appropriate protection for the creek banks is installed (e.g., flexible access mats). If there are any depressions on the creek bed, snow will be placed in the depressions, and then equipment will travel across the creek.

1.6.3.3 Ice Bridges

Ice bridges were challenging to construct and maintain during the 551L rebuild due to the need for consistent cold temperatures for long periods of time; therefore, they will not be constructed for the proposed Project. These areas will be foot and potentially helicopter access only.

1.6.4 Vegetation Management

AltaLink has identified 23 km of the existing ROW (spread over 47 km) where additional vegetation management will sufficiently reduce risk of wildfire ignition without requiring the intensive construction required to rebuild the line with Tree Wire. In these sections, Danger Tree management will proceed with a combination of primarily hand-falling, topping, and branch trimming.

AltaLink developed a detailed vegetation encroachment model (see constraint maps, Appendix A) that identifies areas of Danger Trees adjacent to the ROW that accounts for tree growth over 20

years. These areas have been identified with a model using 2024 LIDAR data (OGL Engineering 2024) taking into account terrain variability, height of the conductor, and slope. The model captures trees that are tall enough to fall on the line based on the conductor/ structure height at any given point along the 551L transmission line. In total, there are approximately 45.8 ha of Danger Trees along the line; 34.6 ha will be removed/mitigated primarily through hand falling or topping with some limited logging, and the remaining 11.2 ha will be retained in Tree Wire areas (Table 1-3).

Table 1-3. Areas of Danger Tree removal, topping, or retention on the 551L.

Danger Tree Categories	Danger Tree Area (ha)
0-5m Riparian areas (top or hand removal)	4.8
5-30m Riparian areas (hand removal)	8.2
Wildlife habitat constraints (top or hand removal)	2.0
Machine inaccessible areas (top)	0.8
All Danger Trees removed	18.9
Tree Wire (no Danger Tree Removal)	11.2
Total Area	**45.8**

The model indicates that there are patches of dense Danger Trees still present in the previously identified constraint areas along the ROW including Special Management Areas (SMAs), wildlife habitat, riparian areas adjacent to streams and wetlands, steep inaccessible slopes, areas of the line where visibility of the line from nearby roads and viewpoints was a concern, and the Siksika land claim area near Castle Junction (Appendix A).

All Danger Tree removal will proceed using the same equipment and methods as in the 551L rebuild project (Avens Consulting 2015), except that trees will be primarily cleared using hand falling rather than logging equipment for most sections. The main reason for this is the majority of tree removal is occurring near water bodies where machine access is restricted and on areas with slopes that are too steep for safe machine harvesting. After falling, logs will be skidded to a decking area where a processor will remove tops and cut into manageable lengths. Then the logs will either be burned on the ROW or loaded onto a forwarder for transport to an access where they will be loaded onto a logging truck. All machines will be low ground pressure with over-sized rubber tires to minimize ground disturbance.

East of Castle Junction between structures 226-236A, Danger Tree removal will be completed with a machine (e.g., feller-buncher) due to the high volume of trees to be removed (Appendix A).

Site specific mitigations may be developed for Danger Trees in areas with identified ecological and aesthetic constraints. Danger Trees within 5 m of wetlands and streams, near identified raptor

nests, within wildlife widening zones, or with bird nesting cavities and sapwells, will be assessed individually on a site-specific basis and either removed or topped. Trees will be topped by hand or by machine in accessible areas using a truck or Nodwell equipped with a bucket. All Danger Tree removal in the 0-5 m zones of wetlands and streams will be approved by the Parks Canada Environmental Surveillance Officer (ESO) in consultation with the Project Environmental Monitor (EM).

All Danger Trees within 5-30 m of wetlands and streams will be cleared using hand falling and will be designated machine-free areas. Cleared trees may be removed from these zones with a cable skidder that pulls them out of the riparian area but does not enter this zone.

Where possible, the trees will be burned in a large open forced-air burner similar to that employed on AltaLink's 551L rebuild project. The burner will be pulled along the ROW with an excavator in machine-accessible areas. In areas with limited access (e.g., steep slopes or in areas with uncrossable waterbodies including structures 155-159 and 190-194), the trees will be burned on the ground or logs may be flown to a processing area on the ROW. If trees are burned on the ground, the topsoil will be stripped if possible before the trees are burned and replaced after the burning is complete and the ground has cooled. All burning will occur in the winter (December to March) when there is snow cover and the wildfire hazard is low.

1.6.5 Tree Wire Construction

The Tree Wire sections will be rebuilt with a type of insulated conductor designed to limit electrical contact between the transmission line and trees that fall on the line. The new line will also have an overhead shield wire that will serve as an added measure of protection to reduce the force of trees falling on the conductor. The shield wire will limit damage to the conductor.

Installation of the Tree Wire will require new steel structures set at shorter spans to allow for the additional weight of the insulated conductor. The average span on the existing line is approximately 125 metres. Structure spacing on the Tree Wire will be approximately 80 metres.

The Project will utilize the methods employed during the 551L rebuild project for line construction (Avens Consulting 2015). Similar to the rebuild project, the installation of Tree Wire will require construction of a temporary bypass transmission line one meter inside the ROW to allow service to continue west of the Banff 123S substation while the new line is constructed (see AltaLink 551L DIA, Section 1.8.3.5, Avens Consulting 2015). The bypass line will be constructed using untreated wood poles, which is consistent with AltaLink's approach on the 551L rebuild.

Once the bypass line is energized, power will be disconnected from the main line which will then be removed, and a new section of line built with steel poles, Tree Wire, and overhead shield wire. Typical structure drawings are attached in Appendix B.

All structures will be installed either using an excavator or an auger as in the 551L rebuild, or using a newer technique utilizing open barrel piles. For structure installation using barrel piles, a small area of topsoil will be stripped at the structure site prior to work commencing. Then a 42" diameter (approximately 1.1 m) steel pipe with teeth on the end will be screwed into the ground. The pile will be twisted into the ground through soil and rock using a drilling attachment on an excavator (Appendix B). The pile will be installed by screwing in the pipe to a specified depth and then drilling out the material inside the pipe to be hauled away and then repeating these steps until the required depth is achieved. Fine mesh wire will be used to cover the pile opening and ratcheted around the perimeter to prevent small animals from falling into the pile; the pile will then be capped. After an unspecified amount of time, the structure will be inserted into the pile and backfilled with gravel. The depth of the pile will vary and correspond to approximately 10% of the height of the structure being installed plus 1.2 m.

On slopes or uneven ground, a level pad for the drill rig may need to be created and these could be up to 20 m x 20 m and could involve a cut and fill to access the structure site. However, using the steel piles on flat sites will result in less overall ground disturbance than excavations. There will also be more soil compaction within the pile which will prevent the structures from leaning over time and reduce required structure maintenance. The soil surrounding the pile remains undisturbed.

Any barrel piles used for temporary bypass structures, will remain in the ground permanently and the tops will be cut off 30 cm below the ground surface. These temporary piles will have topsoil stripped (e.g., 1.5 m x 1.5 m) prior to being installed and after the pile is cut off, the topsoil will be replaced and the site reclaimed. All temporary bypass anchors will also remain in the ground after the Project is complete (i.e., the wire and anchor attachment will be cut off just below the ground surface).

Structures directly embedded in the soil may be augured or excavated depending on soil and site conditions (Section 1.8.3.7, Avens Consulting 2015). For conventional installation using an excavator, the area of disturbance will vary from approximately 4 m x 4 m to 5 m x 5 m. For structures that are augured, ground disturbance will average 1 m x 1 m and for barrel piles, will average 1.5 m x 1.5 m.

Stringing the conductor on the new Tree Wire sections will proceed using the same methods as employed for the 551L rebuild (Section 1.8.3.11, Avens Consulting 2015). A helicopter will be used

to string the bypass conductor across watercourses that cannot be crossed with UTVs or on foot due to high flow, steep banks, or channel width (e.g., Section 1).

Construction of the new line segments will be conducted on a section-by-section basis to allow flexibility in seasonal construction, and management of timelines and work considering sensitive ecological timing windows.

1.6.6 Fortis Distribution Line Rebuild Operations

1.6.6.1 Length of Distribution line

From Structure 25 to structure 37 on the existing AltaLink line, the existing Fortis underbuild on the AltaLink structures will be buried prior to this section of the transmission line being rebuilt with tree wire (Figure 1-1). Directional drilling will be utilized to bury the Fortis line in this section and will be approximately 900 m long, 1.2 to 2.2 m deep, and 0.3 m wide. The distribution line will have multiple tie-in locations where electricity is distributed into the town of Banff, the CPR tracks, and the recreation center. In these locations, riser poles will be installed to facilitate the line transfer from an underground facility to an overhead facility onto existing Fortis distribution poles.

1.6.6.2 Access

Accesses 1, 2, 2a, 2b, and 3 will be used by Fortis to access the shared AltaLink/Fortis ROW (Table 1-1, Figure 1-1). The lay-down areas for material and construction equipment will be the CPR lot near pull box #2 (Figure 1-1).

1.6.6.3 Distribution line burial procedures and equipment

The new section of distribution line will be installed using directional drilling which involves drilling horizontally between pull box locations and installing the conduits and cable underground without surface ground disturbance. Drilling will be conducted in frozen conditions between November and December 2027.

In one section the area between the switching cubicle (behind the recreation center) and the riser pole will be trenched for a distance of approximately 20 m (Figure 1-1). The majority of the proposed underground alignment will be 4 m north of the south boundary of AltaLink's ROW.

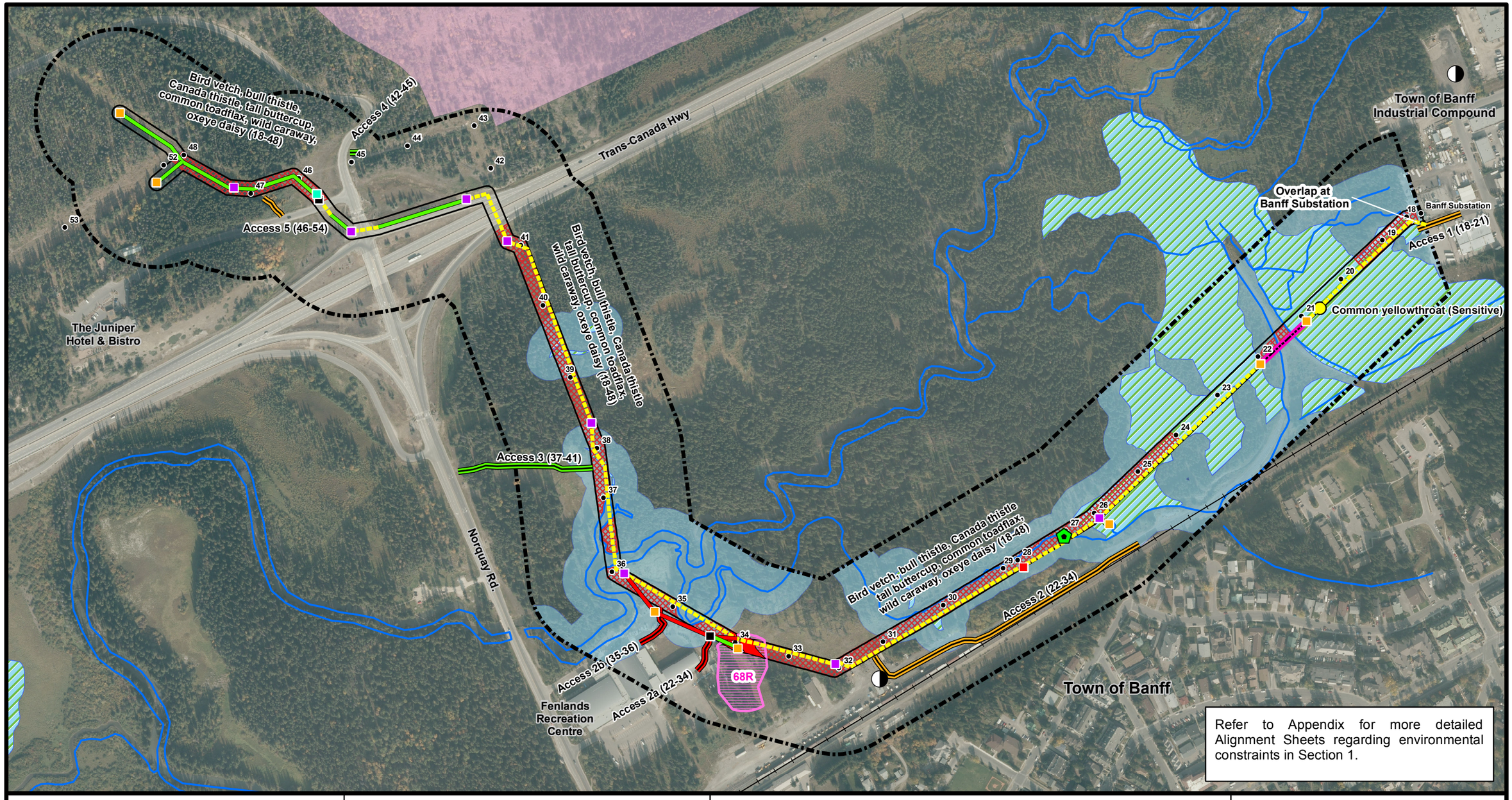


Figure 1-3:

Location of buried equipment and areas of trenching and directional drilling for the Fortis distribution line rebuild in Section 1

This map is a graphical representation of data compiled from numerous sources and is intended to provide general information only. A degree of error is inherent in all data sources and maps, therefore all locations and distances should be confirmed by site visit or field survey.

Constraints

- Wildlife Observations/Habitat
- Noxious Weeds
- Noxious Weeds
- Potential Cut&Fill
- Historical Resources
- Creeks/Rivers
- Wetland/Seepages
- Hydro Features 30m Buffer
- Declared Wilderness

1:5,000

0 50 100 200 300 Meters

N

Legend

Proposed Fortis Structures

- MVI
- Pull Box
- Pad Mount Transformer
- Riser Poles
- Switching Cubicle
- Clear Span Bridge
- Drill Path
- Trench Path
- Alternative Drill Path
- Overhead CPR Tracks
- Fortis ROW
- Local Study Area (LSA)
- Current Altalink Structures
- Railway
- Laydown Areas

Access Routes

- MSCR Access
- Non-MSCR Access
- Proposed

Prepared For: Parks Canada, Banff National Park

Prepared By: AVENS CONSULTING

Drawn By: Bruce Gleig

Date: Mar 18, 2015

2012 Base Imagery from Parks Canada

ALTALINK
A BERKSHIRE HATHAWAY ENERGY COMPANY

1.6.6.4 Power Equipment Installation

A variety of power equipment is required for the operation of the new section of underground distribution line including a switching cubicle (for opening/closing three phase cables and turning off or redirecting energy), and several pull boxes (splice boxes) every 300 m along the line (for pulling cables through conduit). Refer to Figure 1-1 for locations of each piece of equipment.

This equipment will be installed during frozen conditions between November and December to reduce surface disturbance. A backhoe will be used to dig the required holes for each power structure, and a pre-cast concrete box will be installed in each hole. The structures will be buried approximately 2 m south of the Fortis alignment to avoid intersection with AltaLink operations and will be visible 5 to 8 cm above ground. Each structure will have a 3 x 3 m disturbance footprint.

1.6.6.5 Riser Pole Installation during frozen conditions

There will be two riser poles installed during frozen conditions approximately 18 m high and buried at a depth of 2.4 m (Figure 1-1). All small trees and shrubs will be cleared from the sites by hand using chainsaws. Each riser pole will require two plate anchors buried 1.8 to 2.4 m underground using an auger or, in the case of rocky substrate, a backhoe. Equipment and materials required to install the riser poles include: a nodwell (with auger and trailer for reels and conduit), excavator, dump truck, culverts, riser poles, guy wires, plate anchors, and back-fill (7 or 15 mm jiro-rock crush). The expected disturbance footprint for each riser pole is 5 x 5 m.

A drill pit (1.2 to 2.2 m deep; see next section) will also be excavated beside each riser pole to eventually allow the cable to be pulled from the ground, installed across the riser poles, and pushed back into the ground.

1.6.6.6 Cable Installation using Horizontal Drilling

An excavator and a depth sensor will be used to dig a drill pit to a depth range of 1.2 to 2.2 m. A drilling ramp will be placed in this pit in order to install a standard horizontal drilling rig. After each section is drilled, electrical conduit (102 mm diameter) will then be pushed back through the drilled area to each pull box. Three hundred meter sections of 25 KV electrical cables will then be threaded through the plastic conduit to reach the pull boxes. The drill pit will be fenced-off and covered with plywood after each workday to keep people from inadvertently falling in and to prevent the entrapment of wildlife when workers are not present on the site. The pit will be backfilled after completion of drilling and installation of the conduit and cable. The expected surface disturbance footprint at each drilling pit is 5 x 5 m.

1.6.6.7 Energy Termination and Cut-over

Upon completion of the work the electrical load will be transferred from the existing underbuild on the AltaLink structures to the new buried line. The underbuild cable will then be salvaged from the structures to allow the new AltaLink tree wire section to be constructed in the January to March period. See Section 1.6.7 Reclamation below for detailed methods for reclamation.

1.6.7 Reclamation

All required reclamation will be initiated as soon as possible after the vegetation management or Tree Wire construction is complete in each section. Reclamation work will be carried out in the spring each year between the end of April and the end of June following winter work when soil moisture conditions are high and weather is conducive to good plant germination and establishment. Any reclamation not completed in that timeframe will be done in September to October the same year. There will be a detailed site-specific reclamation plan written each year and submitted to Parks Canada for approval prior to the initiation of reclamation activities.

Sites that will require reclamation include bypass and mainline structure sites in Tree Wire sections, cut and fills, and accesses that were stripped. Reclamation efforts will be primarily directed toward reclaiming the cut and fills as they represent most of the area of disturbance.

The goal of reclamation in this Project is to restore a functional ecosystem that is comprised of native species and is self-sustaining to the same degree as an undisturbed reference ecosystem.

The specific objectives of reclamation on this Project will be:

1. To stabilize slopes, prevent erosion of exposed soils and prevent sediment from moving off-site.
2. To re-establish pre-disturbance hydrological patterns on disturbed Project areas, including ground water and surface water movement, discharge and recharge.
3. To restore abiotic (e.g. subsoil, rock, course woody debris) and biotic components of the ecosystem (e.g. soil bacteria and other microorganisms) which are crucial to and support the establishment and growth of diverse native plant communities.
4. To re-establish a native plant community with the composition, structure and ecological function that is equivalent to or is on a trajectory toward becoming equivalent to an adjacent reference ecosystem on the ROW.
5. To control or eliminate all invasive non-native plants in the newly reclaimed ecosystem that negatively affect the composition, structure, or ecological function of the ecosystem.

Reclamation strategies on this Project may include natural recovery in wet areas, sod salvage and replacement, live staking of willows, hydromulching, and seeding and planting. For detailed methods that will be used on this Project, see the AltaLink 551L rebuild DIA (Section 1.8.4, Avens Consulting 2015) and associated annual reclamation plans (e.g., Avens Consulting 2023, 2022, 2021). Areas on previously reclaimed cut and fills and accesses that are disturbed and reclaimed a second time will likely require more inputs such as engineered topsoil products and hydromulching to compensate for the increased admixing and reduced productivity of the soil.

Reclamation on the 551L rebuild using the prescribed methods was successful and all sites made the reclamation criteria within 2-4 years.

1.6.8 Operations and Maintenance

The required maintenance of the 551L is detailed in the *Pre-approved Routine Impact Assessment: AltaLink Facilities within Banff National Park* (AltaLink 2023a). This PRIA outlines the environmental mitigation and best practices for routine operation and maintenance of the transmission line in the park.

1.7 Materials and Equipment

Access Preparation

- Snow roads and cut and fills: excavator, small, tracked machine for preparing snow road (e.g. Marooka), dump truck for bringing snow for snow roads or filling in creek crossings

Vegetation Management

- Tree clearing: chainsaws, brush saws, feller-buncher or processor (Section 10), UTVs, bucket truck or Nodwell for topping
- Tree processing: skidder, processor, forwarder, logging trucks, spider hoe, helicopter (possible limited use for inaccessible areas)
- Woody debris burning: forced air burner, excavator with grapple hook
- Fuels and fluids: diesel, gas, 2 cycle engine fuel, hydraulic fluids, chain lubricating oil, grease, and antifreeze

Tree Wire Construction

- Line construction: excavator, UTVs, Nodwells equipped with crane, radial arm, auger or bucket (for winter access), bucket trucks, digger trucks, and pickup trucks
- Stringing Tree Wire: tensioner and puller

- Fuel and fluids: see above

1.8 Project Schedule

The vegetation management and Tree Wire construction will be carried out in two phases over a four year period from January 2026 to December 2029 (Table 1-4). In May or June of each year, an annual Environmental Protection Plan (EPP) will be submitted to Parks Canada outlining detailed, site-specific construction plans and mitigation measures for the section(s) that will have vegetation management or Tree Wire construction in that year.

Table 1-4. Proposed Schedule for 551L Wildfire Mitigation Project.

Date	Project Phase
April 2025	AltaLink submits draft BIA to PCA (Parks Canada Agency)
April 2025	PCA to provide notification details to AltaLink. AltaLink submits Indigenous engagement and public consultation notification for PCA review
May 2025	PCA posts BIA notification
July 2025	Finalize BIA; submit DFO review application
August 2025	PCA issues Building Permit and Project approvals
October 2025	Set up Mannix yard; start vegetation removal survey
January - March 2026, October 2026 – March 2029	Vegetation management (late fall – winter annually)
October – December 2027	Fortis to install underground in section 1
January - March 2028, October 2028 – December 2029	Tree Wire construction (late fall – winter annually)
Spring - Fall 2026-2030	Reclamation and Access Rollback (on-going throughout Project)
Spring – Fall 2027-2033	Post construction reclamation monitoring (3 years / site)

Any access or ROW preparation (e.g., cut and fills) for both vegetation management and line construction will occur on frozen ground between November 1 and March 31 if ground conditions permit and there are no stream/wetland crossings; work on sections of the ROW with large or deep wetlands or streams will occur between January and March (Table 1-5).

Vegetation management will occur from October 1 to March 31 for manual tree clearing only with UTV access (hard snow road required for wetland crossings) and from December 1 to March 31 for logging equipment and burning as long as ground is frozen and there is snow cover.

Line construction will occur between October 1 to March 31, the construction window in each section will vary according to presence of streams and wetlands (Table 1-5). In unfrozen conditions with no snow cover in the fall, access mats will be used on the accesses and for travel down the ROW if there are weeds or sensitive riparian areas near streams as occurred for the 551L rebuild.

Table 1-5. Construction season for Tree Wire sections.

Tree Wire Span	Length (m)	Construction season	Constraints
19 - 48	2328	Jan - Mar	Streams, wetlands
236A - 252	1613	Jan - Mar	Streams, wetlands
264 - 275	1211	Oct – Mar*	Weeds
292 - 317	2730	Jan - Mar	Streams, wetlands
340 - 351	1151	Oct – Mar*	Weeds
394 - 403	968	Oct – Mar*	Dense weeds

*Construction in October/ November on unfrozen ground or no snow cover may require access mats on ROW.

Reclamation of disturbed sites and accesses will occur each year between May and October in the spring following each season of vegetation removal and/or Tree Wire construction similar to the 551L rebuild.

2.0 Indigenous and Public Engagement

This section will be updated based on feedback from Parks Canada.

3.0 Valued Components

Valued Components (VCs) are components of the natural and human environment that are considered by the proponent, government agencies, Indigenous peoples, and the public to have scientific, ecological, economic, social, cultural, archaeological, historical, or other importance (IAAC 2023). VCs have been scoped for the Project and are presented below.

3.1 Soils and Landforms

This Project has the potential to adversely affect soil resources with the ground disturbance associated with imbedding new structures in the ground and through contamination from spills of deleterious substances.

Soils are an integral part of terrestrial ecosystems and are addressed in terms of their importance to the maintenance, management, and reclamation of vegetation VCs. The VCs for soils are native soils that have the structure and composition to support vigorous native plant communities and are free from contaminants. The VC for landforms for this Project is stable slopes.

3.2 Vegetation

This fire mitigation Project has the potential to negatively affect the species composition of native plant communities through the removal of the Danger Trees on and adjacent to the ROW, ground disturbance associated with constructing parts of the transmission line with Tree Wire, and the introduction of NNV. This Project could cause loss or damage of rare plant species populations.

The primary VC for vegetation is healthy plant communities that are composed of native plant species which provide habitat and food sources for wildlife with no invasive non-native plants. Rare plants and rare plant communities are another important VC as they form an essential part of the vegetation diversity at both the local and landscape levels in the park.

3.3 Wildlife

This fire mitigation Project has the potential to negatively affect wildlife through the loss/alteration of habitat, the disruption of wildlife movement, and potential for wildlife mortality associated with vegetation removal and ground disturbance.

The VCs for wildlife are listed below (Table 3-1) and were selected because they:

- are a regional/provincial/federal conservation or management concern;
- are potentially impacted by altered use of the Project area;
- are known to be sensitive to linear development and/or sensory disturbance; and
- are indicators for a variety of wildlife due to similar biological processes or habitat requirements (i.e., keystone or umbrella species)

Table 3-1. Selected Valuable Components (VCs) and Rationale for Selection.

Wildlife species/ group selected as VCs	Rationale for Selection
Elk	Specific management strategies for BNP, high public profile; utilize linear features for movement/forage; represent grazing habitat users; elk sign observed during field surveys.
Moose	High public profile; utilize linear features for movement/forage; represent shrub habitat users; extensive moose sign observed during field surveys.
Bighorn sheep	Limited winter range occurs along the eastern portion of project (lower slopes of Mt. Norquay).
Grizzly bear	Keystone species; listed as *Threatened* under the Alberta *Wildlife Act* and federally as *Special Concern*; high public profile; known use of transmission lines for movement/forage, prone to sensory disturbance; indicator species for other large ranging carnivores; bear sign observed during field surveys; grizzly bear secure habitat where Project is proposed between structures 323-330.
Wolf	Apex predator; high profile in the park; utilize linear features for movement; prone to sensory disturbance; represent species with large home ranges that utilize corridors for movement; wolf sign observed during field surveys; den sites documented where Project is proposed.
Cougar	Apex predator; utilize corridors/linear features for movement, prone to sensory disturbance.
American Marten	Potential for Project to effect movement patterns; indicator species for mesocarnivores (including coyote (*Canis latrans*), red fox (V*ulpes vulpes*), Canadian lynx (*Lynx canadensis*), wolverine (*Gulo gulo*), fisher (*Martes pennanti)* and mature, closed canopy forested habitat.
Small mammals	Important component of prey base; sensitive to small scale habitat alteration; large linear disturbances can create a movement barrier; potential for habitat alteration and direct mortality (ground disturbance).
Bats (little brown myotis and Northern myotis)	Federally listed as *Endangered*; unique habitat requirements, including trees used for roosting/maternity roosts; potential for habitat alteration and direct mortality (e.g., tree felling in Oct).
Avian (songbirds, raptors, owls, waterfowl)	Sensitive to small scale habitat alteration; large linear disturbances can create a movement barrier for songbirds; raptors can use transmission lines for hunting, perching, nesting. Potential for habitat alteration and direct mortality (e.g., owls, tree felling Oct-Mar); active raptor nests and numerous cavity trees recorded during field surveys.
Amphibians (long-toed salamander, Columbia spotted frog, western toad, wood frog)	Sensitive to development near wetland/riparian habitat, the first two species are provincially listed as *Sensitive* and the third is federally listed as *Special Concern*; potential for habitat alteration and direct mortality (wetland/ground disturbance). Amphibians recorded in numerous wetlands within the proposed Project area.

Deer (both species), black bear, lynx, and reptiles were also considered but are not included in this BIA because effects on these species and associated mitigation measures are covered in discussions of selected VCs. Wolverine and mountain goat were also considered, but not assessed due to specific high elevation habitat requirements and therefore low potential to interact with the Project.

3.4 Aquatic and Hydrological Resources

This fire mitigation Project has the potential to negatively affect aquatic and hydrological resources through riparian Danger Tree removal on and off the ROW, crossing watercourses and wetlands with heavy machinery, as well as excavations and ground disturbance in riparian areas.

The VCs for aquatic resources are healthy populations of fish species (including listed species), high quality fish habitat (benthic invertebrates, substrate characteristics, riparian vegetation, water quality, critical habitat), natural hydrological regimes (connectivity, instream flows, discharge to downstream systems, and channel morphology) as well as healthy, functional wetlands (aquatic species and associated habitat, water storage and discharge, sediment retention, nutrient retention and export).

3.5 Cultural Resources

Cultural resources in the context of this Project will follow Parks Canada convention and both pre-contact and post-contact cultural resources are identified as “archaeological sites” or “archaeological resources”. These resources include both surface and subsurface artifacts and features. Artifacts include movable resources such as stone tools and the stone debris created during their manufacture while features include non-movable resources such as cellar depressions or hearths. Archaeological sites within the Project area may be represented by either artifacts or features or a combination of both and include pre-contact or post-contact resources.

An archaeologist conducted an Archaeological Overview Assessment (AOA) that identified 47 archaeological sites within 20 m of the Project area (Speargrass Historical Resource Consultants 2024). An archaeological impact assessment (AIA) was then conducted that included field visits to a portion of the sites identified in the AOA and also resulted in the addition of two newly recorded sites to the Parks site database. The VC for cultural resources for this Project consists of these previously and newly recorded archaeological sites associated with the AltaLink 551L ROW.

3.6 Visitor Experience

Visitor experience may be adversely affected by negative effects to the aesthetics and viewscapes of the natural park environment resulting from active work sites, tree removal, and new

infrastructure installation. Visitor facilities and services may be temporarily unavailable for use during construction. Public safety may be adversely affected during construction if the public accesses the ROW during construction when machines are working. However, it is generally expected that this Project will have a long term positive effect on public safety with reduced wildfire risk once the fire mitigation work is completed on the transmission line and the ROW.

The VC for aesthetics is the continued persistence of views and natural environments that are in keeping with a national park and the Outstanding Universal Values of the UNESCO world heritage site within the park. The VC for facilities and services are continued access to the public park facilities that are within or adjacent to the Project footprint. The VC for public safety is that the AltaLink transmission line provides reliable power in a safe manner that does not contribute to wildfire risk on the park landscape.

4.0 Baseline, Effects Analysis, and Mitigation Measures for VCs

4.1 Soils and Landform

4.1.1 Baseline

The ROW generally has undisturbed native soils except where there was ground disturbance for construction of the original transmission line in the 1960s and the 551L rebuild project between 2016 and 2023. Wetlands on the ROW have saturated organic soil overlying mineral horizons with varying depths of peat development. These soils are highly susceptible to compaction and rutting when unfrozen and many of the deeper wetlands only freeze 20-30 cm below the surface in the winter (observed during 551L rebuild project). The upland areas on the ROW have variously textured brunisols and regisols with glacial till, or glaciofluvial parent material. Depth of topsoil varies from 10-15 cm in rich valley bottom sites of fluvial origin to <2 cm on steep, rocky slopes or in gravelly till substrates. For detailed soil data in various ecosites along the line, see the AltaLink 551L Transmission Line rebuild DIA (Section 2.3, Avens Consulting 2015).

4.1.2 Effects Analysis

Impacts to soil VCs in the PSA are expected to mostly be due to the operation of heavy equipment during tree removal operations and construction in Tree Wire sections. Equipment operation in unfrozen conditions may cause soil compaction, pulverization, rutting of topsoil resulting in root restriction zones, reduced aeration and water holding capacity, reduced vegetative vigor and increased risk of erosion.

Tearing of the topsoil mat or scalping due to loss of traction or operation on steep slopes may lead to soil erosion. Erosion from Project activities near stream banks or wetlands may lead to the migration of soils into waterbodies adversely affecting aquatics VCs.

Loss or degradation of topsoil may also occur due to admixing of topsoil with subsoil if topsoil is not stripped, stored and replaced properly. Topsoil productivity can also be reduced if soil is handled during excessively wet conditions. Admixing or loss of topsoil during handling can result in reduced reclamation success and degraded habitat for wildlife.

Soils may be contaminated with fuel, oil, or lubricants due to leaks or spills from equipment or improperly handled fuels and allied products (hydraulic fluid, grease, etc.).

4.1.3 Mitigation Measures

Access preparation

- Only light UTVs will be used for ROW access for hand falling crews between September and end of November. If ground disturbance or rutting occurs, crews will walk into sites until ground conditions improve (dry or frozen).
- Hard snow roads for winter logging and line construction sections will be prepared on the ROW and accesses to prevent scalping and soil compaction. All machinery and vehicles will travel on the snow road to their work sites on the ROW.
- During plowing operations in the winter on the accesses, snow roads, and work sites a layer of snow will be left on the ground to protect the soil.
- For work during rainy conditions above zero, a wet weather protocol will be in place to preserve soils when they are saturated from precipitation. This could include temporary work shutdowns, minimizing machine movement between locations, or utilizing matting.
- Access to the ROW will occur on existing access trails (refer to mapped access routes, Appendix A). Traffic will be restricted within the PSA to vehicles and equipment essential for line replacement and tree removal operations. Non-essential vehicles will stay on the nearby paved roadways and equipment and workers will be brought into active work sites using smaller UTVs with low ground pressure where possible (e.g., ranger, argo, etc.).
- All equipment and vehicles will arrive on site clean and free of soil and weed species.

- Erosion and sediment control measures will be used to minimize erosion and sediment movement off-site on the ROW. Site specific erosion and sediment control (ESC) measures to address areas of concern will be detailed in annual ESC plans as per the 551L rebuild.

Structure Installation and Logging

- Low pressure machinery (<7 psi) will be used where possible. All tree removal with logging equipment will occur in frozen conditions between December 1 and March 31. Line construction activities will be done in the winter.

- Wherever possible, screw piles or barrel piles attached to structures will be used rather than excavating to minimize ground disturbance and required reclamation.

- For each structure installation and cut and fill, the topsoil will be stripped and stored separately from subsoil during construction and then replaced on each site before machines leave the sites in the spring. Topsoil will be handled minimally. In unfrozen conditions, topsoil will not be handled when the soil is wet to preserve soil function.

- Topsoil piles will not be covered and will be windrowed where possible (piles < 1.5 m high) to keep oxygen levels in the piles as high as possible to maintain biological activity in the stored topsoil.

- Soil piles will be stored rough and loose and will contain all rock, vegetation debris, roots, naturally found in the soil to increase the surface roughness and reduce erosion potential of the piles.

- If topsoil needs to remain off for a growing season, the topsoil piles will be seeded in the spring (stored topsoil replaced on cut and fills after 2 years with excellent reclamation success on 551L rebuild project).

General

- Erosion and sediment control measures will be used to minimize erosion and sediment movement off-site on the ROW. Site specific measures to address areas of concern will be detailed in annual ESC plans, as per the 551L rebuild.

- A Parks Canada approved spill response plan will be put in place and provided to all personnel.

- All deleterious products (fuel, oil, herbicides) will be stored in 110% leakproof containment.

- Spill response kits will be on site and all workers will be trained in their use. Spill response will happen immediately in the event of a spill, including contacting the Parks Canada ESO, and other appropriate authorities (procedures provided in the spill response plan).
- Vehicles will be checked regularly by an EM on site and any leaks will be fixed or the vehicle will be removed within 24 hours. Drip trays will be placed under vehicles and machinery when not in use on the ROW or accesses.
- Oil changes and major machinery and vehicle repairs will be conducted off-site.

4.1.4 Residual Effects

If all the mitigations described are implemented, there is still some potential that native topsoil could be adversely affected by this Project since it is very thin (3-8 cm) in most ecosites on the ROW and therefore challenging to avoid mixing with subsoil during stripping, handling, and replacement. This could lead to overall lower productivity of soil in some areas and reduced growth and vigour of vegetation in reclaimed areas. This is a particular concern for areas that were disturbed during the 551L rebuild project 2-8 years ago and need to be restripped and reclaimed a second time for this wildfire mitigation Project. This is expected to affect the accesses to the ROW and the reclaimed cut and fills that are restripped and then reclaimed a second time. The residual effects of this Project on soil are expected to be negative, low magnitude, localized, occur once, be long term, and irreversible.

4.2 Vegetation

4.2.1 Baseline

4.2.1.1 Vegetation communities

There are 22 unique ecological land classification (ELC) vegetation community types that were recorded on the ROW and accesses during the 551L rebuild project (Holland and Coen 1982; Section 2.4, Avens Consulting 2015). The majority of the ROW and the surrounding areas in the PSA that will be subject to tree removal are conifer forests dominated by lodgepole pine and spruce including C4, C6, C18, and C19 vegetation types (Holland and Coen 1982). Wetlands on the ROW and accesses are classified as either S1 or S7 shrubby fens or H11 graminoid fens.

4.2.1.2 Rare plants

An early rare plant survey was conducted on the entire 57 km ROW between June 12 and June 26, 2024 and the late survey was conducted between July 31 and August 7, 2024. There were seven rare plant species recorded on the 551L ROW during the surveys (Table 4-1, Appendix A).

Table 4-1. Population and location of rare plant species recorded on the 551L ROW.

Common Name (Latin name)	Rank	Span	Population	UTM (WGS84, Zone 11)*	
				Easting	Northing
Male Fern (*Dryopteris filix-mas)*	S1S2	155.7	59 fronds	583456	5675619
	S1S	155.7	6 fronds	583464	5675626
Smooth Cliff Brake (*Pellaea glabella ssp. simplex*)	S2	57.8	57	597055	5670902
	S2	58	10	597039	5670871
	S2	58.1	8	597016	5670883
	S2	62	12	595718	5670559
	S2	68.6	26	593173	5669792
Western Blue Flag (*Iris missouriensis*)	S2	147.5	300-350	584724	5675289
Yellow Sedge (*Carex flava*)	S2S3	121.4	25-30	586621	5673572
		121.7	40-45	586608	5673599
		123.9	20-25	586518	5673702
		129.2	15	586178	5674138
		129.8	4	586121	5674197
		130.3	12	586084	5674263
		189.2	250-275	579671	5678049
		189.7	125-150	579643	5678114
		194.3	25-30		
		194.7	20-25	579305	5678464
		208.3	2	578016	5679002
		380.5	10	563687	5690230
Western Grape Fern (*Botrychium hesperium*)	S3	402.1	3	562223	5691941
Ascending Grape Fern (*Botrychium ascendens*)	S3	175.8	22	580749	5677112
	S3	445.0	5	559381	5695470
Limber Pine (*Pinus flexilis*)	S3	55 - 56	6	597928	5671462*
	S3	56.9	7	597257	5671017*
	S3	57-58	72	597109*	5670924*
	S3	58-59	2	596911	5670860*
	S3	59	1	596676	5670823
	S3	60	2	596292	5670724*
	S3	61	2	596065	5670651*
	S3	62	1	596390	5670511

Common Name (Latin name)	Rank	Span	Population	UTM (WGS84, Zone 11)*	
				Easting	Northing
	S3	62-63	1	595711	5670577
	S3	65-66	7	594301	5670242*
	S3	66-67	6	594097	5670184*
	S3	68-69	1	593287	5669851
	S3	69	3	593023	5669746

*Centroid of population, for more precise location of limber pine clusters see mapping

All of the five needle pine recorded on the ROW were limber pine. Identification of five needle pine species was achieved by measuring cones in many locations on the ROW; average cone length was ~8 cm indicating limber pine. Fixed area plots on slopes above and below the ROW in limber pine habitat indicated that there is no CH for limber pine on or within 500 m of the ROW (using the same criteria defined for whitebark pine, Environment and Climate Change Canada 2017) (Table 4-2). Only two of ten plots had limber pine and neither of these plots had the minimum 2 m^2/ ha of limber pine. In addition, none of the limber pine recorded had any cones. CH for five needle pine species must have a minimum density of 1000 cones/ ha (Environment and Climate Change Canada 2017).

However, it appears that the open ROW is currently serving as recruitment habitat for limber pine in appropriate open habitat. Between structures 57 and 58, there were 72 limber pine seedlings and immature trees recorded. Approximately half of these trees have germinated in the past 12 years since the last rare plant survey.

Although the 551L intersects whitebark pine CH in several places along the line, the rare plant survey confirmed there is no whitebark pine on the ROW or in areas adjacent to the ROW that will be subject to tree removal.

Table 4-2. Basal area of tree species in fixed area 50 m^2 plots near the 551L ROW in limber pine habitat.

Plot Name	Basal Area (m^2/ ha)					
	Douglas fir	**Engelmann spruce**	**Limber pine**	**Lodgepole pine**	**Trembling aspen**	**Total by plot**
551-55-LP1	8.92				0.18	9.10
551-57-LP2	14.00		**1.94**			15.94
551-57-LP3	10.92	1.39				12.31
551-58-LP4	15.71	0.14				15.85
551-59-LP5	19.78		**0.008**			19.79
551-60-LP6	17.68					17.68
551-61-LP7	11.39					11.39
551-62–LP8	10.15					10.15
551-65-LP9	3.71	0.05		0.09		3.85
551-68-LP10	0.080			3.66		3.74

4.2.1.3 Non-native vegetation

In total, there were 30 species of non-native plants recorded in the PSA during spring 2024 dedicated NNV surveys and the rare plant survey. Of these species, 17 have a Parks Canada rank of 1 (Very Invasive) or 2 (Invasive) (Parks Canada 2019b, 2024) and most are rated as Noxious or Prohibited Noxious under the *Alberta Weed Control Act* (2010) (Table 4-3). The 551L ROW is in the Integrated Control Zone 3 for NNV management where the Parks Canada objectives are no net increase in spatial extent or density of Rank 1 and 2 species and no net increase in number of NNV species (Parks Canada 2019b). There were also 14 nuisance weeds (Rank 3 and 4) and agronomic species recorded on the ROW.

NNV infestations are concentrated in areas that have been previously disturbed and high use areas including the accesses onto the ROW, areas where the ROW is adjacent to the Bow Valley Parkway (BVP) and the CPKC railway line, laydown areas including the AltaLink yard in Mannix pit, and areas where there were large disturbances (i.e. cut and fills) in the rebuild project in pre-existing NNV patches (Appendix A).

Table 4-3. NNV Rank 1 and 2 plant species recorded on the 551L ROW and proposed laydown areas.

Common Name	Latin Name	Rank (Parks Canada)	Alberta Designation
Blueweed	*Echium vulgare*	1 (EDRR)	Noxious
Reed canary grass	*Phalaris arundinacea*	1 (EDRR)	Not listed
Caraway	*Carum carvi*	1	Not listed
Common tansy	*Tanacetum vulgare*	1	Noxious
Meadow hawkweed	*Pilosella caespitosa*	1	Prohibited noxious
Scentless chamomile	*Tripleurospermum inodorum*	1	Noxious
Spotted knapweed	*Centaurea stoebe ssp. micranthos*	1	Prohibited noxious
Alfalfa	*Medicago sativa*	2	Not listed
Bull Thistle	*Cirsium vulgare*	2	Not listed
Cicer Milk Vetch	*Astragalus cicer*	2	Not listed
Common toadflax	*Linaria vulgaris*	2	Noxious
Creeping thistle	*Cirsium arvense*	2	Noxious
Ox-eye daisy	*Leucanthemum vulgare*	2	Noxious
Perennial sow-thistle	*Sonchus arvensis*	2	Noxious
Tall buttercup	*Ranunculus acris*	2	Noxious
Tufted vetch	*Vicia cracca*	2	Not listed
Wormwood	*Artemesia absinthium*	2	Not listed

4.2.2 Effects Analysis

4.2.2.1 Loss or modification of native plant communities and habitat

There will be approximately 34.6 ha of Danger Tree clearing or topping adjacent to the ROW (Table 1-4), but there should be minimal disturbance to other vegetation layers (tall and short shrub, forb and graminoid). Any disturbed understory vegetation should re-establish within three years as observed on the 551L rebuild. Over time, tree seedlings are expected to establish in areas where Danger Trees are cleared adjacent to the ROW so the loss of trees is not considered permanent.

Topping conifer trees may lead to premature death of the trees particularly for pine trees which have crowns concentrated on the top third of the tree in closed stands. Spruce and Douglas fir

trees are expected to tolerate topping, as evidenced by clusters of previously topped trees along the edges of the ROW. Topping aspen trees is expected to result in copious suckering from the root systems which will create a dense stand of aspen saplings in 10 years.

There will also be up to 0.5 ha hectares of vegetation loss associated with brushing of immature trees on the ROW in Special Management Areas (SMAs). SMAs are 50 m long zones every km on the ROW where all the Danger Trees and line incompatible vegetation was originally left during the rebuild project. Clearing and leveling sites for installation of new structures and machine-accessible routes along the ROW will also result in a loss of vegetation. All of the disturbed areas with exposed soil will be reclaimed with native plant species following construction. However, the composition of the vegetation communities and associated wildlife habitat will change in the short-term with the removal of the tree and tall shrub layers and replacement by forb, grass, and smaller shrubs. Over time, additional native species from the surrounding undisturbed vegetation communities on the ROW will reinvade the disturbed areas.

There is potential for indirect loss of vegetation if the understory plants are buried by woody debris during tree clearing operations. High fuel loadings of fine and medium fuels may increase the fire hazard if the crowns (branches and foliage) are left on the ground. During Danger Tree clearing with machinery (limited areas), adjacent uncut trees could be damaged by logging machinery such as a processor or forwarder that can cause large stem wounds or remove large branches as they maneuver between trees in dense stands.

Another possible impact is soil compaction and rutting caused by repeated passes by machinery along the ROW in areas where the topsoil layer is thin and/or fine textured. Soil compaction could result in a change in the plant community composition with increased cover of preexisting agronomic species that favour compacted areas (e.g., alsike clover) or invasive species that colonize the disturbed ground. Soil compaction could also result in reduced health and vigour of plant species growing in those areas.

4.2.2.2 Rare plants and plant communities

The limber pine and other rare species on the ROW could be damaged or destroyed by machinery and equipment moving along the ROW or during tree clearing operations.

This Project will result in the loss of some large mature Douglas fir Danger Trees at the edges of the ROW. There could be some loss or damage of other species of sporadic occurrence or high conservation value in the park including rocky mountain juniper (*Juniperus scopulorum*) and rocky mountain fescue (*Festuca campestris*).

4.2.2.3 Invasive non-native plants

This project could result in an increase in the number and size of infestations of invasive NNV species along the ROW, on the accesses to the ROW, and in laydown/staging areas. Machines could spread the plants and /or seeds to other locations on the ROW by transporting seeds, roots, or other propagules on the undercarriage or tires of the equipment as they move through existing infestations. These NNV species can then establish in new areas where the native vegetation mat is removed or disturbed by machinery during tree clearing or Tree Wire construction. The machines could also bring new NNV species onto the ROW from off-site locations. These plants can also be spread by workers walking through infested areas and picking up seeds on their footwear and clothing. The cover and density of existing NNV infestations can also be increased where there is ground disturbance from equipment.

4.2.3 Mitigation Measures

- Ground disturbance and loss of vegetation will be minimized by working in frozen conditions with snow cover where possible, minimizing size of structure and cut and fill disturbance areas, and utilizing sod salvage where possible to minimize the amount of native vegetation that is lost on the ROW during construction.

- Mechanical tree removal operations will take place on frozen ground (December to March) to minimize potential for ground disturbance and vegetation loss in wet sections, steep terrain, and other sensitive areas.

- UTV access on the ROW by hand falling crews in unfrozen conditions in the late fall (i.e., October to November) will be minimized during wet weather to avoid compaction and rutting in unfrozen conditions.

- All equipment operators will be experienced and competent to minimize incidental loss of trees and shrubs during Danger Tree removal operations.

- Riparian Areas: within 5 m of the HWM of all watercourses (i.e., active drainages, streams, creeks, rivers) and wetlands, Danger Trees will be assessed individually on a site-specific basis by the Parks Canada ESO in consultation with the Project Environmental Monitor, and either removed or topped; between 5 m and 30 m of these waterbodies, Danger Trees will be removed by hand and will be designated machine-free areas. Cleared trees may be removed from these zones with a skidder that pulls them out of the riparian area but does not enter this zone. There will be no removal of shrubs, forbs, or saplings less than 3 m tall within 30 m of a watercourse or wetland.

- All tree crowns and fine woody debris resulting from Danger Tree clearing will be piled and burned in forced air open burners or on the ground to reduce the fire hazard posed by this material in the event of a wildfire initiated on or travelling through the ROW.

- If burning on the ground, topsoil will be stripped and the woody debris piles burned on subsoil. Topsoil will be replaced after burning is complete and ground has cooled.

- Large diameter Douglas fir Danger Trees (>50 cm DBH) of high ecological value will be topped where possible, rather than cleared. Rocky Mountain juniper will be flagged and avoided where possible.

- For lodgepole pine trees, up to 1/3 of the total tree height, or up to 1/2 of the live crown, will be removed to minimize tree death from topping.

- Rare plants will be flagged/ staked for avoidance prior to construction and vegetation management. Travel of machinery, vehicles, and workers within these marked areas will be prohibited. If it is logistically impossible to avoid the rare plants due to close proximity to structure sites, then sods containing these plants will be salvaged and transplanted to another similar ecosite nearby.

- Rare limber pine in sections 2a and 2b will be flagged and avoided. If limber pine are deemed to be Danger Trees, then the trees will be topped rather than cutting them down. A maximum of one third of the tree height should be cut to ensure survival.

- Continue annual NNV control program on the accesses, laydown areas, and 551L ROW prior to start of the Project using methods outlined in the AltaLink approved IPMP (AltaLink 2023b) to reduce or eliminate the NNV populations in the PSA.

- The location of existing NNV infestations along the ROW will be staked and these locations will be avoided with machinery to minimize spread of non-native plants along ROW. If avoidance is not possible, then work will proceed on hard snow cover.

- Where work is proceeding when there is no snow cover (hand falling crews on UTVs), and NNV are not avoidable, clean access mats will be laid over the weed infestations to allow machine travel. Access mats will be thoroughly washed after use and before installation on another section of the ROW.

- All equipment will arrive on site clean prior to entry to the ROW to remove all NNV fragments and seeds and avoid introducing new infestations to the ROW.

- All disturbed areas will be reclaimed as soon as possible after construction is complete using native plants. A separate comprehensive reclamation plan will be prepared detailing methods and species to be used in different areas of the ROW depending on slope, aspect, ecosite, and vegetation community. The priorities of reclamation will be erosion control, reestablishing a native plant community, and minimizing spread of invasive non-native plants.

- A post construction reclamation monitoring program will be implemented for all disturbed and reclaimed areas on the AltaLink ROW. All reclaimed areas will be assessed each spring for weeds and again in late summer to assess plant community composition and structure according to established reclamation criteria for a minimum of three years. Reclamation criteria will be the same as that applied on the 551L rebuild (Avens Consulting 2023). Where post-construction monitoring indicates that reclamation does not meet criteria (i.e., plant cover is insufficient or NNV present), additional measures will be implemented to address identified concerns. Monitoring results and associated action plans resulting from these follow up surveys will be reviewed with Parks Canada on a yearly basis.

4.2.4 Residual Effects

If all of the mitigation to reduce effects to vegetation are implemented, there is expected to be minimal long term adverse effects to vegetation. However, as with any project, there could be an overall increase in the cover of NNV species of concern on the ROW. Once established some invasive species are very difficult to eradicate completely (e.g., common toadflax). The residual effects of this Project on vegetation are therefore expected to be negative, low magnitude, localized, continuous, long term, and irreversible.

4.3 Wildlife

4.3.1 Baseline

4.3.1.1 Ungulates

Elk

Elk (*Cervus canadensis*) are secure provincially and not listed federally. Elk select habitats that provide open feeding areas and adjacent forest cover (Liley and Creel 2007; Robinson et al. 2010). Elk are the most numerous large animal in BNP and an important species as the primary herbivore and major prey species for carnivores such as wolves, grizzly bears, and cougar. The Vermilion Lakes Wetlands, south of the PSA on the Eastern end, is important to elk in the region because they provide calving grounds and mineral licks, a limited resource (Parks Canada 2022).

Elk are relatively tolerant of disturbance and have been shown to take advantage of human use areas as a refugia from predators (Hebbelwhite and Merrill 2007). Elk will forage, bed, and travel along powerlines (e.g., Bartzke et al. 2014, Tattersall et al. 2023). Elk pellets were observed frequently within the PSA.

Bighorn Sheep

Bighorn sheep (*Ovis canadensis*) are secure provincially and not listed federally. Bighorn sheep are predominantly grazers of grass and forbs and migrate seasonally between low grassy slopes and alpine meadows (PCA 2022). Rugged escape terrain (cliffs, talus slopes, etc.) and secure winter range are important habitat requirements for bighorn sheep to reduce predation risk and to provide forage opportunities, respectively. Bighorn sheep demonstrate high fidelity to traditional winter ranges (Stevens and Heuer 2020) and it is likely the single most important factor controlling sheep populations in BNP. In the PSA, bighorn sheep winter range has been identified on the lower slopes of Mt. Norquay (Stevens 2020). In addition, sheep have been observed extensively between structures 55-62 and 75-78 during annual helicopter raptor surveys and various field assessments along the 551L transmission line between 2016 and 2022.

Bighorn sheep lambing habitat occurs on the steep slopes north of the transmission line between structures 55-63 and between structures 68-77 (Macbeth pers. comm). The restricted activity period for bighorn sheep lambing within BNP is from May 1st to June 30th (Avens 2015).

Moose

Moose (*Alces alces*) are secure provincially and not listed federally. Moose browse on shrubs throughout the year, as well as aquatic vegetation in the summer months. Extensive moose sign (i.e., pellets and browsing) were observed in the PSA, particularly near to and within wetlands, along with several moose sightings.

There are no specific management strategies for moose within the park; however, they do warrant special management to address concerns related to low populations and particular habitat requirements (e.g., winter forage and cover).

4.3.1.2 Large Carnivores

Grizzly bear

Grizzly bears (*Ursus arctos*) are listed in Schedule 1 of *Species at Risk Act* as *Special Concern* (2018-current; Government of Canada 2023). Provincially, they are listed as a *Threatened* species by the

province of Alberta under the Wildlife Act (2010) and *At Risk* under the General Status evaluation (2010-current; Government of Alberta 2023).

Human activities are the primary factor impacting habitat security for bears in the region. The Banff townsite management unit has the lowest percentage of secure grizzly bear habitat of all Land Management Units in the park (Whittington 2018). Secure habitat areas are defined as areas that are below 2,500 m elevation, vegetated, *greater than 500 m from high human use* and have continuous habitat equal to or greater than the 9 km^2 average daily feeding area for a female grizzly bear (Gibeau et al. 2001). Parks Canada has classified the area on 551L between structures 323 and 330 as secure grizzly bear habitat. Maintaining secure habitat for bears and reducing potential for human-wildlife conflict are therefore key management objectives (Parks Canada 2022).

The lower elevation montane areas, where 551L occurs, provide important habitat for bears, particularly in the spring and fall, which are two highly sensitive time periods for bears (post- and pre-hibernation). Bears are attracted to the cleared ROWs of transmission lines, and other linear features, due to the presence of important bear foods at critical times of year and the proximity to protective forest cover (Gibeau and Herrero 1998, Eldegard et al. 2015).

There are no known active bear dens in the PSA and grizzlies in BNP tend to den above 2000 m elevation (Vroom et al. 1980), which is well above the highest elevation of the transmission line.

Wolf

Wolves (*Canis lupus*) are secure provincially and not listed federally. Wolves have large home ranges and movement patterns, but will avoid areas with human activity (Rogala et al. 2011). Wolves are most frequently found in areas with high prey availability (i.e., ungulates) and low human disturbance (Arjo and Pletcher 2004).

Wolves occur in low numbers in the lower Bow Valley, largely due to high levels of human-caused mortality (i.e., highway and railway mortality). Currently, the Bow Valley wolf pack with approximately 12-15 individuals, is known to use the PSA (mainly around Banff and the Bow Valley Parkway).

A study on wolves in the Bow Valley demonstrated that wolves used the transmission line as a travel route, especially when machines that serviced the line compacted the snow. Rather than being a barrier to movement, the transmission line redirected the movements of wolves (i.e., wolves followed it, particularly when snow depths were high (Paquet et al. 1996).

Wolves have been documented denning in the Bow Valley bottom, where the Project is proposed. The 551L line incorporates a portion of the annual Hillsdale Wolf Closure – a closure to restrict

human presence and provide secure habitat for wolves during the critical denning period (April 1st – July 15th; between structures 149-157).

Cougar

Cougars (*Puma concolor*) are secure provincially and not listed federally. Cougars are elusive and demonstrate shifts in activity patterns near human activity; in the absence of human disturbance, cougars are generally crepuscular (most active within 2 hours of sunset and sunrise), however near human developments, cougars are primarily nocturnal (Knopff et al. 2014).

The Bow Valley is a significant wildlife movement corridor and provides good quality habitat with a good prey base (e.g., ungulates, primarily deer) for cougars. Research on cougars and linear features is limited, however a study in Revelstoke did find that cougars would predate deer and moose in human-created seral stands (e.g., powerlines (Bird 2010)).

Similar to grizzly bears and wolves in the Bow Valley, the largest source of mortality is from highway and railway collisions (Government of Alberta 2019).

4.3.1.3 Mesocarnivores

American marten

American marten (*Martes americana*) are not listed provincially or federally; however they are sensitive to forest disturbance including activities that reduce forest patch size, remove large and dying trees, and simplify forest structure (Evans and Mortelliti 2022). Marten will generally use areas with dense overhead cover, shrub understory, and coarse woody debris for hunting, denning, resting, and travel (Jalkotzy et al. 1997).

Within BNP, marten have been associated with highly variable terrain (i.e., undulating topography with multiple drainages) and forest stand complexity, with the highest rated habitat in the Bow Valley occurring east of Castle Junction (Alexander and Gailus 2005).

Because marten avoid areas lacking overhead cover and downed woody debris (Hatler et al. 2008), transmission lines are likely barriers to movement for marten.

4.3.1.4 Small mammals

Small mammals are an important part of the prey base for numerous avian species (e.g., raptors), mesocarnivores (e.g., American marten), and large carnivores such as wolves. They typically have small home ranges and are susceptible to linear disturbances, creating barriers to movement in the form of large open areas lacking sufficient vegetation cover, leaving them exposed to predation. Similarly, linear disturbances can result in blockages of movement when machines

traveling along the corridor in winter cause compaction of the snowpack, thereby inhibiting sub-nivean (below the snow) movement by small mammals. These factors make small mammals ideal indicators of Project effects.

4.3.1.5 Bats

Six species of bats occur in BNP, with two species, the little brown myotis (*Myotis lucifugus*) and northern myotis (*Myotis septentrionalis*), listed as *Endangered* in Schedule 1 of the *Species at Risk Act* (Government of Canada 2023). Recently, two of the migratory bat species that occur in BNP have been listed as *Endangered* by COSEWIC; the hoary bat (*Lasiurus cinereus*) and the silver-haired bat (*Lasionycteris noctivagans*).

Bats will sometimes use mature trees as maternity or nursery roosts to raise their young, which are flightless and nursing for the first few weeks of life (ACBP 2019). Bats will generally select for tall, large-diameter (>25cm DBH) trees in the early to middle stages of decay (ECCC 2018). Bat maternity roosts are protected as residences under section 33 of the *Species at Risk Act (*ECCC 2018). Any alterations to habitat that impair the function of a maternity roost when needed by the species constitutes damage or destruction of the residence (ECCC 2018). The bat roosting season in the region is from approximately April 15th to October 15th.

Bat activity was observed between structures 18-21 on several occasions and was also confirmed at wetland 155-156 using an audio device. Acoustic surveys, even conducted by knowledgeable experts, are not suitable for distinguishing among all species of bats. Further, most Canadian bat species are generally similar in appearance and size, making them difficult to identify even if observed under good conditions. As a result of these factors, if bats are present, it is assumed they are one of the species listed as *Endangered*, unless a qualified biologist confirms otherwise through approved survey protocols (Parks Canada 2016). See section 4.3.1.8 for information on potential bat habitat trees along the ROW.

4.3.1.6 Birds

Bird point count surveys completed on the entire ROW for the 551L rebuild project in 2012 revealed that the total relative abundance of breeding birds within 100 m of the PSA was 494.4 birds/ 40 ha, while the most abundant species included: Townsend's warblers, yellow-rumped warblers, American robins, dark-eyed juncos and Swainson's thrushes (Avens et al. 2015). Wet shrub and riparian spruce habitats were found to have the highest species richness, while pure pine and grassland habitats exhibited some of the lowest. The regional migratory bird breeding season runs from April 11th to August 24th (ECCC 2023).

Osprey (*Pandion haliaetus)* have been nesting on the ROW annually since the initial bird surveys completed in 2012. Three additional osprey nests were observed off the ROW (≤ 300 m; two nests

at the western end of the line and one south of structure 161) and two active bald eagle nests (*Haliaeetus leucocephalus*) were identified > 400 m from the ROW in two locations (southwest of structures 76 and 269). A barred owl (*Srix varia)* pair was observed on several occasions in 2023 flying across the ROW and at wetlands surrounding structures 18-21. A saw-whet and great-horned owl were incidentally recorded calling north of structure 201.

Details on locations of raptor nests and platforms, as well as cavity trees and listed bird species observed on the ROW, are provided below in wildlife habitat (section 4.3.1.8) and listed species sections (section 4.3.1.9).

4.3.1.7 Amphibians

Three amphibian species that may occur in the PSA and are listed provincially include the long-toed salamander (*Ambystoma macodactylum; Sensitive*), the Columbia spotted frog (*Rana luteiventris; Sensitive*), and the western toad (*Anaxyrus boreas; Sensitive*) (Government of Alberta 2023). The western toad is also listed federally under schedule 1 of the Species at Risk Act (SARA) as *Special Concern* (Government of Canada 2023). The wood frog (*Lithobates sylvaticus*) also occurs in the area and is not listed provincially or federally.

Of the 47 wetlands surveyed for amphibians in 2024, amphibians were detected in 24, either through visual or auditory detection (Table 4-4; Appendix A). There were an additional four incidental observations of amphibians post-breeding season, three of these observations were in wetlands where surveyors did not detect amphibians during the breeding season (wetlands near structures 111-114, 127-128, and 209-210). Western toads were observed 16 times in various locations on the ROW. The Columbia spotted frog was recorded twice (once after the breeding season in wetland near structures 193-194) (Table 4-4).

Table 4-4. Amphibian surveys conducted in or near waterbodies during the breeding season in 2024; highlighted rows indicate amphibian detections and bold indicates Species At Risk.

Span	Amphibian Detection During Breeding Season[1]	Survey Date (2024)	
		Visual (=2)	Auditory (=3)
19-21	N	May 6, 30	May 6, 21, 30
22-26	WOFR, **WETO**[2]	May 6, 30	May 6, 30
26-31	N	May 6, 30	May 6, 21, 30
37-38	N	May 6, 30	May 6, 20, 30
39-40	WOFR	May 6, 30	May 6
84-85	**WETO**, WOFR	May 6, 30	May 6, 20
88-104	**WETO**, WOFR (high activity[3])	May 6, 30	May 6, 20 DEVICE[4]
111-114	N, WOFR[2]	May 7, 24, Jun 4	May 7, 24, Jun 4
116-118	**WETO**, WOFR (high activity[3])	May 7	May 7
119-121	N	May 7, 24, Jun 4	May 7, 24, Jun 4
122-123	**WETO**, WOFR	May 7	May 7
124-126	N, **WETO**[2]	May 7, 24, Jun 4	May 7, 24, Jun 4
127-128	N, WOFR[2]	May 7, 24, Jun 4	May 7, 24, Jun 4
129-133	WOFR (high activity[3])	May 7, 24	May 7, 24
134	N	May 7, Jun 4	DRY
143-146	WOFR	May 15	May 21
147-149	N	May 15, 27	DRY
150-153	WOFR	May 15, 27	May 27
155-156	**WETO**, WOFR	DEVICE[4]	DEVICE[4]
156-164	Hillsdale Wolf Closure April 1st- July 15th; not assessed		
189-190	**WETO**, WOFR (high activity[3])	May 14	May 14
193-194	Frog sp. (eggs)	May 14	
196-199	**WETO, CSFR** (high activity[3])	May 14	May 14
200-202	**WETO**, WOFR	May 14	May 14
203-208	**WETO**, WOFR (high activity[3])	May 14, Jun 5	May 14
209-210	Amphibian sp.[2]	-	-
220-221	**WETO** (eggs)	May 14	-
221-223	N, **WETO**[2]	May 14, Jun 4	May 14, 26, Jun 4
244-246	N	May 15, Jun 6	May 15, 26, Jun 9
248-250	**WETO**	May 15, Jun 6	May 15, 26
251-252	**WETO**, WOFR (high activity[3])	May 15, Jun 6	May 26, Jun 9
257-263	**WETO**	May 15, Jun 6	May 15, 26
278-279	**WETO**	May 26	May 26
282-284	N	May 15, 26, Jun 6	May 15, 26, Jun 9
299-300	N	May 15, 26	May 15, 26, Jun 9
307-310	WOFR	May 16, Jun 9	May 16
310-315	N	May 16, Jun 9	May 16, 27, Jun 9

Span	Amphibian Detection During Breeding Season[1]	Survey Date (2024)	
		Visual (=2)	Auditory (=3)
318-321	N	May 16, 29, Jun 9	May 16, 28, Jun 9
325-326	N	May 16, Jun 11	May 16-Jun 11 DEVICE[4]
336-337	N	May 16, Jun 11	May 16, 28, Jun 14
access 42	N	May 16, Jun 13	May 16, Jun 13
380-381	**WETO**	May 16, Jun 13	May 16, Jun 13
408-409	N	May 16, Jun 13	May 16, Jun 14 DEVICE[4]
450-456	N	May 19, Jun 12	May 19, 29, Jun 13
457-458	Amphibian sp.	May 19, Jun 12	May 19, 29, Jun 13
459-469	**WETO**, WOFR (high activity 464-465[3])	May 19, Jun 12	May 19
access 51	N	May 19, Jun 12	May 19, 29, Jun 13
access 53	N	May 19, Jun 12	May 19, Jun 13 DEVICE[4]

[1]N = no amphibians detected; WETO = western toad, WOFR = wood frog, CSFR = Columbia spotted frog
[2]Incidental observation
[3]High activity = ≥10 individuals calling
[4]A device was installed over several days to record amphibian acoustics

Parks Canada conducted amphibian surveys from 2016 to 2022 (excluding 2020) near the Banff townsite. The closest amphibian detection from these data to the 551L was approximately 150 m east of structure 42 in a ditch along the Trans-Canada Highway (TCH). The species recorded was a long-toed salamander. All other amphibian detections from the PCA dataset that occur westward from Banff are in the Vermillion wetlands, south of the TCH.

4.3.1.8 Wildlife Habitat Features

Wildlife habitat assessments were concentrated in areas with known Danger Trees between June 3 and September 30, 2024 to identify potential movement routes and unique habitat types, as well as dens, cavities, and nesting trees which have the potential to be reused annually.

Movement Corridors

Twelve wildlife movement routes and small mammal crossings were recognized along dry drainages, vegetated creeks, and forested gullies which intercept the ROW (Table 4-5, Appendix A). These areas provide important movement paths for various wildlife due to the topographical variation on the landscape and ease of travel relative to the surrounding dense spruce/pine forest. Two wildlife underpasses parallel the 551L at the TCH and are critical for landscape connectivity in the area. Animal movement routes that intercept the 551L in proximity to these underpasses occur at structure spans 55-56 and 64-65.

Additionally there are three identified Parks Canada wildlife corridors which intersect the 551L: Fenland-Indian Grounds, Norquay-Cascade, and Whitehorn.

The Fenland-Indian grounds corridor, which is already heavily impacted, narrow, and considered a pinch point for wildlife movement (Heuer 1998, Whittington and Peterson 2018), is an important route for animals to circumvent the town of Banff. Grizzly bears are more likely to be negatively affected by Project activities due to their demonstrated use of this area. Whittington and Peterson (2018) noted that much of the immediate area of Fenlands-Indian Grounds corridor contains deadfall and debris from the 2013 flood, which concentrates wildlife movement closer to town.

Similarly, Parks Canada has identified the lower slopes of Mount Norquay and Cascade within the Norquay-Cascade corridor as a regional pinch-point for wildlife movement, constrained by human use and topography. This corridor is one of three travel routes that link wildlife habitat to the east and west past the Banff townsite and has the greatest potential for use by large carnivores (Duke et al. 2001).

The AltaLink ROW parallels the southern edge of the Whitehorn Wildlife Corridor, which traverses the valley bottom along the east side of the Bow River in Lake Louise. The corridor is bisected by Whitehorn Road and encompasses a portion of the Louise Ski Area on the front side of Whitehorn Mountain. Diverse species have been documented to use this corridor including ungulates (moose, deer, elk), bear, wolves, coyote, lynx, and wolverine. Huer (1998) stated that the most important area for wildlife movement in the Whitehorn Corridor is the area between the Lake Louise Ski Area and the old gondola base, of which the AltaLink ROW is a part.

Wildlife Features

Five mammal dens were located along or near to the ROW (Table 4-5, Appendix A).

Wildlife habitat assessments identified 68 cavity tree locations (some locations with more than one tree) along the 551L ROW (Appendix A). Seven were considered pileated woodpecker nesting cavities (Table 4-6, Appendix A) as specified by the cavity characteristics detailed in Appendix C. Although the pileated woodpecker is not a protected species federally (but is *Sensitive* in Alberta), their nesting cavities are protected year-around under Schedule 1 of the *Migratory Birds Regulations* (2022), until they can be deemed abandoned, because they are reused not only by woodpeckers but are also an important resource for numerous other cavity nesters, including species at risk (ECCC 2023).

Of the other non-pileated cavities, nine were located within AltaLink structures (Table 4-5, Appendix A). Clusters of cavity trees (≥3) were recorded at six structure spans along the ROW (Table 4-5, Appendix A). The status of these cavities was not assessed as active or inactive as the goal of the survey was simply to identify the habitat.

Eight raptor platforms were recorded at or adjacent to structures along the ROW; all have been used by osprey annually between 2016 and 2024 except for the platform at structure 129 (Table 4-5, Appendix A). Two active bald eagle nests were also identified > 400 m from the ROW (Table 4-5, Appendix A).

Two stands of large (> 25 cm DBH), deciduous trees along the ROW were identified as unique habitat for cavity nesting birds and roosting bat species (Table 4-5, Appendix A). These habitat types are relatively rare in the PSA. Similarly, four large diameter (> 65 cm) conifer trees were identified along the ROW, providing important habitat for many wildlife species (Table 4-5).

Table 4-5. Habitat features identified within or adjacent to the 551L ROW.

Wildlife Feature	Structure/ Span Location(s)
Movement corridor	55-56 (TCH underpass), 64-65 (TCH underpass), 157-158, 446-447, 457-458
Small mammal crossings	69-70, 70-71, 136, 140-141, 181-182, 285, 288-289
Den	Active coyote 34-35, unknown N of 36, black bear/wolf 157-158, two canid 203-204
Cavity within structures	21, 22, 26, 53, 70, 133, 404, 459
Clusters of cavity trees	25-30, 42-45, 59, 118-121, 133, 335
Active osprey nest/platform	43, 114-116, 116, 153, 160A, 366, 438
Inactive raptor platform	SW of 129
Bald eagle nest	430 m SW of 76, 660 m SW of 269 (~250 m N of Mannix pit)
Unique habitat aspen stands	84-86, 152-154
Large diameter wildlife trees	53A-54, 59-60, 64-65, 157-158

Numerous trees, or clusters of trees, along the ROW provide moderate-to-high bat roost potential as specified by the roost characteristics detailed in Appendix D. There were 175 potential bat roosting tree locations (some locations with more than one tree) and ten notable areas where clusters of bat trees occur: between structures 42-45, northeast and northwest of structure 64, 86-87, west of large wetland at structures 103-107, near structure 110, Ranger Creek tributary at structures 119-121, along Ranger Creek at structures 133-134, western side of Baker Creek near structure 367, southern end of wetland at structures 408-409, and near structure 472.

4.3.1.9 Species At Risk

Ten provincially listed and five federally listed species were recorded either during field surveys or observed incidentally (Table 4-6, Appendix A).

Table 4-6. Listed species recorded during field surveys or observed incidentally in 2024.

Listed Species	Structure Spans	Provincial Rank	Federal Rank	Habitat
Western toad (*Anaxyrus boreas*)	22-26, 84, 85, 88-104, 116-118, 122-123, 124-126, 155-156, 189-190, 196-199, 200-202, 203-208, 220-221, 221-223, 248-250, 251-252, 257-263, 278-279, 380-381, 464-465	Sensitive	Special concern	Wetland
Pileated woodpecker (*Dryocopus pileatus;* nest cavity)	43-44, 53-53A, 55-56, 69-70, 109-110, 153-154, 265-266	Sensitive	Nest protected year-around	Mature conifer
Common yellowthroat (*Geothlyois trichas)*	130-131	Sensitive	-	Mature conifer
Bats (*Myotis lucifugus*; e.g., little brown myotis)	18-21, 155-156	MBAR[1]	Endangered	Mature conifer
Olive-sided flycatcher (*Contopus cooperi)*	56, 193-194	MBAR[1]	Special concern	Mature conifer
Columbia spotted frog (*Rana luteiventris)*	194-195, 196-199	Sensitive	-	Wetland
Sora (*Porzana carolina)*	19-20	Sensitive	-	Wetland
Bank swallow (*Riparia riparia;* nest site)	66-67	Sensitive	Threatened	Five Mile Creek banks
Barred owl (*Strix varia;* pair)	18-21	Sensitive	-	Wetland/ Mature conifer

[1]MBAR: May Be At Risk; any species that "May Be At Risk" of extinction or extirpation; [2]Bats are assumed to be species of conservation concern due to potential inaccuracies with in-field ID.

4.3.2 Effects Analysis

4.3.2.1 Habitat Availability

Direct loss and alteration of available habitat

Work activities associated with the proposed Project can directly influence wildlife habitat availability through vegetation loss and terrain alteration. Approximately 34.6 ha of mature Danger Trees will be mostly hand fallen or topped and ~10 km of transmission line will require the installation of 168 new bypass structures, 37 bypass anchors, 132 new mainline structures, and 89 new mainline anchors, as well as the removal of 106 existing structures through excavations.

Although trees are expected to re-establish in areas where Danger Trees are cleared adjacent to the ROW, there will be long-term habitat loss for wildlife that rely on this habitat type. In particular, bats use mature trees as maternity or nursery roosts to raise their young, with female little brown myotis demonstrating a high degree of philopatry (ECCC 2018). Bats have a low reproductive rate, producing one pup annually, with low first year survival rates (ECCC 2018); therefore, bat populations are sensitive to activities that would have a negative impact on reproductive success and survival. Little Brown Myotis may abandon roosting areas after being excluded from roost sites. However, depending on habitat availability, bats may use another tree for roosting if a previous roosting tree is removed (Silvis et al. 2015, ECCC 2018).

Of the 175 potential bat roosting tree locations observed within the PSA, there are 45 structure spans where potential bat habitat trees overlap with areas proposed for Danger Tree removal. These locations will be described in the annual EPPs for any tree removal occurring between April 15th and October 15th. Of the 10 areas identified with clusters of potential bat trees on the ROW (two or more adjacent zones with ≥3 bat habitat trees per zone), all are proposed for Danger Tree removal (i.e., structures 64, 86-87, 103-107, 110, 119-121, 133-134, 367, 408-409, and 472), except for one area between structures 42 and 45, which is proposed for Tree Wire installation.

The removal of rare cavity trees would have a negative effect on bird, bat and mammal species that use these trees for foraging, nesting and/or roosting (e.g., listed pileated woodpecker). Other listed wildlife, such as the Northern pygmy owl and bats, can use these cavities as nesting or roosting sites. Three pileated woodpecker nesting cavities (i.e., between strs 53-53A, 109-110, 153-154) and a further 13 non-pileated cavity trees occur in proposed Danger Tree removal areas (locations in Appendix A). Of the nine cavities located in AltaLink structures, three will be removed from the landscape during Tree Wire installation (structures 21, 22, 26).

The loss of stands of large diameter aspen trees along the ROW (i.e., structures 84-88 and 153-154) would also have a negative effect because aspen is a preferred tree species for cavity nesters, sheltering a large variety and abundance of species. A study in British Columbia revealed that 95% of woodpecker drills occurred in aspen trees compared to 5% in conifers (Martin 2015). Maintaining these aspen stands, that are limited on the landscape both locally and regionally, will contribute to providing vital future habitat for cavity nesters, including species at risk, as the stands age. Aspen trees also provide food for various species including bears, and ungulates who depend on the nutrients contained in its bark during winter.

Similarly, large-diameter conifer trees can contribute to diverse forest bird communities through foraging and nesting opportunities (e.g., large branches for platform nesting birds) as well as the provision of refugia for various species due to their ability to resist and buffer heavy winds and snow (Govt of BC 2024). All of the identified four large diameter (> 64 cm) conifers occur within proposed Danger Tree removal areas (i.e., between spans 53A-54, 59-60, 64-65, and 157-158).

The loss of shrub communities, grass, and saplings through clearing workspaces for structure removal and installation, would result in an immediate loss of important vegetation habitat for various wildlife, such as marten, ungulates, birds and small mammals. This effect is expected to be short term as the vegetation will recover over a period of 2- 5years.

Further, machine travel and site excavation may reduce or destroy habitat for over-wintering amphibians in wetlands along the ROW and/or denning animals through the destruction of dens/burrows, which are crucial for nesting, raising young, escaping predators, and regulating body temperature (Davidson et al. 2012). Ground disturbance can also alter soil structure and moisture content which can impact den integrity (Davidson et al. 2012). Of the five dens that were identified, the active coyote den (between structures 34-35), is at risk of alteration due to the proposed bypass, anchor and mainline structure installation 15 m from the den site. Coyote denning season in Alberta is from February to May (pups generally born in April), so there is a risk of vital habitat loss, either directly or indirectly by den abandonment, during work activities between December through March.

Four raptor platforms occur within Danger Tree removal areas (structures 114-116, 116, 160A, 366); removing trees around these platforms has the potential to reduce the availability of perching habitat and/or change predator/prey relationships by opening up line of sight for raptors to hunt prey species which can negatively skew small mammal populations in the short term. Additionally, one raptor platform occurs within 2 m of a proposed bypass installation (structure 43); raptors, particularly osprey and bald eagles, can exhibit nest site fidelity, returning to the same nest site annually and adding new material to the nest each year (Govt of BC 2013); therefore, removing the platform would result in important habitat loss.

If vegetation debris piles are left on the landscape for a few seasons prior to burning, small mammals could get accustomed to denning in these piles (as observed in some burn piles on the 551L rebuild project). The loss of this habitat after the piles are burned would affect small mammals.

A positive effect resulting from the removal of Danger Trees outside of the cleared ROW includes increased sunlight reaching the lower vegetation layers and forest floor which will increase habitat diversity for wildlife by increasing the open, shrub, grass, and sapling habitat throughout the local area, which is dominated by mature spruce and pine. This will vary by area depending on the vegetation species and density of undergrowth. Ungulates and grizzly bears will directly benefit through improved forage, small mammals will have increased cover and forage opportunities, and wolves and mesocarnivores will have increased prey availability.

Indirect loss of available habitat through sensory disturbance

Wildlife habitat use may also be influenced by noise and other sensory disturbances (e.g. light, visual human presence) associated with Project-related activities, such as tree removal and line construction whereby wildlife avoid or abandon otherwise suitable or functional habitat (Weaver et al. 1987, Gibeau et al. 1996). Also, repeated short- and long-term disturbances can result in behavioural changes and elevated stress levels in wildlife, which can ultimately affect reproduction and survival (Weaver et al. 1987, Gibeau et al. 1996). Reaction to stimuli will vary between species (e.g., elk and moose are relatively tolerant, grizzly bears are very sensitive), seasons (e.g., bighorn sheep more sensitive during lambing, grizzly bears during spring and late summer-fall), type of stimuli (e.g., light pollution for bats), habitat, topography and previous exposures to similar stimuli.

Wildlife currently utilizing the ROW will likely be accustomed to somewhat elevated levels of sensory disturbance due to high human activity in the area (i.e., Banff and Lake Louise townsites, TCH, BVP, CPKC railway, Castle Junction, Protection Mountain Campground, and various recreation trails). In these areas of regular disturbance, wildlife sensory disturbance from the Project is less significant than more remote areas. Three locations along the ROW are considered more 'remote' as they occur further away from human use areas (i.e., structures 54-81, 323-330 (identified as secure grizzly bear habitat by PCA), and 444-465); wildlife may be less habituated to sensory disturbance and, thus, the sensory impact from Project activities would be greater in these areas.

4.3.2.2 Wildlife Movement

Considering the PSA is located within or adjacent to three regional wildlife corridors, contains two wildlife underpasses that parallel the 551L at the TCH, and many species use the ROW as a movement corridor, vegetation clearing and construction activities may temporarily displace wildlife by obstructing their seasonal or daily movement routes (especially those sensitive to disturbance). Disturbance in locations like the Fenlands-Indian Grounds Wildlife Corridor, which has already been identified as a pinch point for movement (Whittington and Petersen 2018), and the Norquay-Cascade Corridor, a travel route that links wildlife habitat to the east and west past the Banff townsite (and has the greatest potential for use by large carnivores; Duke et al. 2001), will have a significant impact on wildlife attempting to navigate through the area.

In addition to the above regional wildlife corridors, there are also several sections of the ROW that were identified as localized potential movement routes (section 4.3.1.8). The loss of treed or vegetated habitat will effectively widen the "tree-free" area, which may decrease the connectivity of these travel corridors, particularly for larger mammals and wary carnivores, especially if the ROW vegetation is cleared in addition to the Danger Trees in these areas. Depending upon the

vegetation community, number of trees removed, and the wildlife species present, the increased distance between habitat patches may deter movement across the ROW for smaller animals as well. Marten, for example, will likely be hindered by an increased tree-free area, as they prefer overhead cover and significant coarse woody debris for protection. Several studies have also shown that birds will travel extensive distances through forest cover to avoid crossing canopy gaps of greater than 50 m (St. Clair et al. 1998, Bélisle and Desrochers 2002, Tremblay and St. Clair 2009, 2001).

For these reasons, impacts to wildlife movement can increase where additional linear disturbances (i.e., BVP and/or the CPKC railway) parallel the transmission line potentially leading to very wide openings (i.e., up to 100 m wide) if the tree buffers between these open linear features are removed (i.e., eight locations have been identified as "widening concern areas" between structures 68-70, 71-74, 169-172, 177-193, 226-236, 252-257, 316-317, 406-409; see Maps Appendix A).

4.3.2.3 Wildlife Survival

Direct Mortality

Direct mortality can result from the destruction of bat roosts, bird nests, and/or dens during vegetation removal/burning and excavation activities as well as from machine/vehicle collisions, and entrapment of small mammals and amphibians during line construction.

Tree removal is proposed to be conducted from October through March to avoid peak sensitive time periods for bats and birds (Table 1-4; Mitigation section 4.3.3). This will ensure that active bird nests are not destroyed and that compliance with the *Migratory Birds Convention Act* (2010) is maintained. However, there is still a direct mortality risk from vegetation removal (including ground impacts from felled trees) at this time of year for fall-migrating amphibians, small mammals and for bats that can still be occupying trees with their young into October.

There is also potential for direct mortality of migrating and/or over-wintering amphibians and small mammals associated with crossing wetlands with heavy machinery and excavating new structures/anchors in wetlands (i.e., ~27 excavations or barrel piles) and/or working in riparian areas of waterbodies, including tree felling. Amphibian survival can also be impacted indirectly by the introduction of non-native species of vegetation, along with aquatic organisms and pathogens attached to equipment and/or vehicles, and sediment released into the wetland from excavations. Rust from barrel piles can leech into the water in wetlands up to a 3m radius from the pile (as observed during the first three years after installation of culverts in wetlands during the 551L rebuild).

Fuel or other hydrocarbon spills or leaks from equipment operating in or adjacent to a wetland can negatively affect the water quality of the wetland and change amphibian habitat and amphibian community composition (population, species richness). These contaminants can enter an aquatic system in a wetland through soil, sediment or water and many of these substances have acute or chronic toxicity to amphibians.

Of the 10 wetlands that will have excavations or barrel piles directly in them or within 5 m, amphibians were detected in four (spans 22-26, 39-40, 248-251, 307-310; Appendix A). Of the 34 wetlands that are proposed for Danger Tree removal, amphibians were detected in 23 (Appendix A).

Mortality can also occur when birds collide with transmission lines. The new transmission structures will be an average of 1 to 3 m higher than the current structures and have an OHSW. Overhead shield wires have been found to increase collision rates (Rious et. al. 2013) but will still be below the average tree canopy height by approximately 3 meters. Maintaining powerlines below average tree canopy height is a recognized method of reducing collision risk (APLIC 2012). For transmission line sections where Tree Wire is proposed, the risk of bird collisions is not expected to change.

During the 551L rebuild project in 2016, amphibians and small mammals (e.g., marten, mice, ground squirrels) were found trapped and/or dead inside standing pipes that were installed prior to structure replacement, despite the fact the pipes were capped. A few pipes contained up to 25 long-toed salamanders. Similarly, there is potential for entrapment and mortality during this Project after the barrel piles are installed prior to structure installation.

Indirect Mortality

Indirect effects to wildlife survival may be caused by development disturbance resulting in increased energy expenditures. This typically occurs during winter or other sensitive activity periods (e.g., elk rut, bighorn sheep lambing, grizzly bear hyper/hypophagia, wolf denning, bat hibernation, etc.). For instance, if bighorn sheep alter foraging or lambing activities due to disturbance, either spatially or temporally, they can increase their exposure to predators, decrease the quality and quantity of food available to them, and increase their energy loss (Olliff et al. 1999).

Other effects include increased human-wildlife conflict or wildlife habituation because of inappropriate storage and disposal of garbage and wildlife attractants during all stages of the Project, as well as increased exposure to the BVP from Danger Tree removal in certain areas. Habituated wildlife may require relocation or euthanization because they have become a public safety hazard. In 2020, wolves were euthanized in BNP because they repeatedly accessed garbage

from bins and became increasingly aggressive towards people. Of additional concern is the transmission line's proximity to the BVP and CPKC rail. If wildlife are attracted to human food sources/garbage, the probability of wildlife/vehicle/rail collisions increases. The loss of an individual grizzly bear has the potential to significantly affect genetic diversity and the local population structure.

Indirect mortality of small mammals, amphibians, and prey species may also occur as line-of-sight improves from Danger Tree removal, altering predator-prey balances.

4.3.3 Mitigation Measures

- Work activities should be avoided during specific Restricted Activity Periods (RAPs) which are listed in the DIA for 551L (Avens et al. 2015). Work activities have been scheduled to occur between October 1st and March 31st which avoids most sensitive periods, except for:
    - Bighorn sheep winter foraging (January 1st-April 30th);
    - Wolf Denning/Hillsdale wolf closure from March 15th-July 15th in sections 6 and 7;
    - Bat maternity roosting (April 15th-October 15th);
    - Raptor breeding/nesting (March 1st-August 31st);
    - Owl breeding/nesting (February 15th-May 15th);
    - Amphibian migration/over-wintering (September/October, November-April 1st).

- Annual EPPs will address additional mitigations required to work within the RAPs; at a minimum, the following measures must be followed:
    - In general, construction traffic on the BVP from Fireside to Johnsons Creek (structures 67-166) will be avoided between 8 pm and 8 am as per the annual road closure from March 1st to June 25th to prevent disturbance to wildlife.
    - If helicopter flights are required during the bighorn sheep winter foraging period (Jan 1st-Apr 30th) and flight path occurs over sheep habitat, Parks Canada will be contacted to confirm recent sheep activity in the area. If sheep are in the area, work will stop and Parks Canada contacted on how to proceed. Helicopter activity will be avoided during the lambing season (May through June).
    - Work activities between structures 149 and 157 (section 6 and 7) will be completed prior to the start of the wolf denning closure (March 15th); exact extent changes annually, see PC online maps.
    - In areas where tree removal is proposed within the bat roosting season (i.e., October 1st-15th), an ultrasonic bat survey using recording devices and visual

emergence survey will be conducted. If bats are detected, tree removal will be postponed until after the bat window.

- If work is required during the owl or raptor breeding/nesting season, a survey will be conducted to identify nest sites; if nests are located, buffers will be established in which no or limited work activity can occur; buffers will be kept in place until the young have fledged.
- Travel across wetlands or close to creeks with heavy machinery will only occur in frozen conditions and snow cover to protect amphibians.
- Existing mainline structures within 5 m of wetlands will be cut off at the base (just below ground surface) and reclaimed, rather than excavated out of the ground.

- If topping or removing any known Pileated Woodpecker nesting cavities is required (three identified in Danger Tree removal areas, Appendix A), a permit to destroy or relocate the cavities will be required before work can proceed.
- If additional Pileated Woodpecker cavities are found during work activities, work will stop in the area until the required work permits are obtained.
- Any raptor platforms that have the potential to be impacted by line construction or Danger Tree removal activities (e.g., at structures 43, 114-116, 116, 160A, 366) will be considered for relocation outside of the nesting period, in consultation with a professional biologist and the Parks Canada ESO, to more suitable locations; details to be provided in annual EPPs.
- If a new raptor stick nest is observed, Parks Canada must be contacted on how to proceed.
- Within 5 m of the riparian areas, individual Danger Trees will be topped or removed by hand (site-specific); within 5-30 m, all Danger Trees will be hand-felled. This will limit impacts to sensitive riparian habitats, specifically harlequin duck, waterfowl, shorebird, songbird and amphibian breeding habitat and will assist in maintaining ROW crossing opportunities for birds, small mammals, and mesocarnivores.
- Danger Trees will be topped for: trees containing cavities (pileated woodpecker nesting cavities are not permitted to be modified in any way, see above); deciduous aspen trees in the two identified unique habitat zones (structures 84-88 and 153-154), and trees within widening concern areas (between structures 169-172, 177-193, 224-236A, 238-256A, BVP-406, 407-409, 410-421). This will maintain nesting habitat and limit impacts to wildlife whose movements may be inhibited by wide linear disturbances.
- Any wildlife features that will be topped or retained will be clearly flagged and/or staked prior to construction (e.g., all cavity trees, unique habitat zones, 5 m and 30 m riparian zones).

- Within wildlife movement features, small mammal crossings, and secure grizzly bear habitat, the shrub/forb layer should be preserved during all work activities (Appendix A).
- Danger Trees will be hand-felled and construction traffic limited within wildlife movement features and secure grizzly habitat.
- Construction activities within the Fenlands-Indian Grounds corridor should occur within the shortest feasible time-frame to reduce sensory and habitat avoidance effects (i.e., mobilize additional crews to work on section 1 simultaneously to avoid spreading work into two years/seasons).
- ROW vegetation will be retained as much as possible within the Fenlands-Indian Grounds and Norquay-Cascade Wildlife Corridors to maintain connectivity of these corridors as well as between structures 64-65 where the 551L intercepts a travel route to a wildlife underpass.
- Work activities in section 1 will be confined to hours set out in the town of Banff Community Standards Bylaw 260 to avoid disturbing wildlife at night; and to crepuscular hours (i.e., 1 hour after sunrise to 1 hour before sunset) outside the town of Banff.
- Wildlife encountered on or near the Project footprint during construction will be allowed to passively disperse from the site to limit the effects of disturbance on wildlife movement and energetics.
- Parks Canada non-emergency dispatch will be contacted with any carnivore sightings within the PSA (403-762-1470).
- Vegetation debris piles will be burned as soon as is feasible to reduce the risk of small mammals denning in the piles; prior to burning, the piles should be disturbed with a stick or excavator bucket to chase away any denning mammals.
- Reclamation using native vegetation will occur as soon as construction has been completed in each section of the line.
- Equipment should stay as far back as possible from the coyote den between structures 34-35 and other known dens and work scheduled to avoid the denning periods (i.e., starting Feb 1 for coyotes).
- Where work is required within creek/wetland habitats, the disturbance footprint will be minimized to the maximum extent possible, all vehicles and machinery will be clean and in good operating condition prior to entering, all machinery will carry spill containment kits and operators will be trained in appropriate use and spill reporting. This will limit direct and indirect mortality of amphibians, prevent unwanted spread of invasive species, and encourage appropriate response time and actions in the event of a spill.

- Driving speeds will be reduced while travelling on the ROW to avoid driving over wildlife, particularly in sections where work will occur in October.
- All excavations will be securely fenced and covered to prevent access by wildlife.
- To prevent wildlife entrapment and mortality in the barrel piles, the following must be adhered to:
    - All barrel pile openings must be completely sealed (with no small openings) immediately after installation; the method should be tested and monitored prior to using in all sections to ensure effectiveness;
    - Minimize time between installing the barrel piles and installing structures into the barrel piles;
    - Barrel piles must be checked by the project EM or ESO for trapped animals prior to structure installation and if animals are trapped, they must be removed and relocated by a qualified biologist prior to installing the structure;
    - Using textured surface on the inner lining of the barrel should be considered to allow animals to escape.
- Litter will be removed from the site daily and food, garbage and other wildlife attractants will be stored in vehicles and/or disposed of in secure facilities.

4.3.4 Residual Effects

If all the mitigation measures outlined above are implemented, there should be minimal residual effects to wildlife VCs from the proposed line construction and vegetation management.

The loss of mature trees will remove habitat for various species (e.g., birds, bats, prey species, carnivores); however, the understory species are expected to thrive in the absence of the canopy cover over the long-term (5-10 years) and bat habitat trees occur in alternate locations along the ROW. This impact is, therefore, considered to be both negative (removing overstory habitat) and positive (increasing understory habitat), low in magnitude, localized, long-term, occurs once, and reversible.

Pileated woodpecker (PIWO) nesting cavities will either be preserved, or destroyed/relocated with the appropriate federal permits. In all cases, there is potential for residual effects to this protected habitat feature. If the cavities are preserved in their original locations, the Danger Trees surrounding these cavities will be removed (i.e., in 3 out of 7 known nesting cavities along the line) and it is unknown if the removal of neighbouring trees may lessen the likelihood of cavity reuse due to the lack of surrounding protective cover. If the cavities are destroyed with the required permit, pileated woodpeckers and other species that rely on these cavities will have

permanent habitat loss. If the cavities are relocated off the line, it is not guaranteed the cavity will be reused.

Danger trees removed near platforms may have a similar effect for raptors by eliminating perch habitat near the stick nests and making them less attractive nesting habitat. Residual effects are expected to be negative, low in magnitude, localized, long-term, occur once, and reversible (irreversible if destroying or relocating the PIWO cavities). Relocated platforms may not be re-used by raptors.

Topping cavity trees and the two unique aspen stands, rather than removal, will preserve these important habitat features on the landscape in the short-term; however, it is expected that the decay process will accelerate once the trees are topped, ultimately shortening the lifespan of the trees/cavities. Topping aspen trees is expected to lead to abundant suckering from the root systems, which will lead to dense thickets of aspen saplings in the short term and more cavity trees in the long-term. Residual effects are expected to be negative, low in magnitude, localized, long-term, occur once, and irreversible (for existing cavity trees)/reversible (for the unique aspen stands).

Removal of the three wooden transmission structures in section 1 that contain cavities will result in a low magnitude, long-term, and irreversible residual effect.

Excavations in or near wetlands, as well as use of barrel piles, may result in residual effects to amphibian and small mammal survival. Mortality of amphibians is expected to be low in magnitude given winter/frozen work conditions (mitigation section 4.3.3). If the capping method on the barrel piles does not work effectively, as observed during the 551L rebuild, there will be moderate magnitude residual effects due to entrapment. Furthermore, if barrel piles are left permanently in wetlands, there is potential for rust from the piles to leach into the water, which could adversely effect growth and survival for amphibian and fish species leading to moderate effects. These effects are expected to be localized, short-to-medium-term, occur once, and irreversible.

4.4 Aquatic and Hydrological Resources

4.4.1 Baseline

4.4.1.1 Hydrology

Tributary streams to the Bow River within the PSA which have the potential to be disturbed by Project activities, range from narrow, ephemeral watercourses to wide streams with high habitat complexity. These include Baker Creek, Ranger Creek, Silverton Creek, Corral Creek, Five Mile

Creek, Forty Mile Creek, Whiskey Creek, and Johnson's Creek, as well as many unnamed streams (Appendix A). Some of these watercourses exhibit groundwater upwelling and have year-round flow and provide suitable rearing, feeding, spawning, migrating, and over-wintering habitat for fish. Some tributary streams only provide seasonal habitat (i.e., rearing or spring spawning habitat during spring and/or summer flows).

4.4.1.2 Fish Species

Most of the watercourses reviewed for the Project cross the AltaLink ROW and drain into culverts that pass under the CPR tracks and/or the BVP and into the Bow River, allowing fish from the Bow River to potentially migrate upstream into these watercourses and possibly connecting wetlands. Where no recent data exists, all watercourses that have connection to the Bow River are assumed to contain fish species found in the Bow River.

The fish species native to the Bow River system include the Westslope cutthroat trout, bull trout (*Salvelinus confluentus*), mountain whitefish (*Prosopium williamsoni*), longnose sucker (*Catostomus catostomus*), brook stickleback (*Culaes inconstans*), and lake chub (*Couesius plumbeus*) (Banff Bow Valley Study 1996). Non-native species introduced from stocking the Bow River system include brown trout (*Salmo trutta*), rainbow trout (*Oncorhynchus mykiss*), brook trout (*Salvelinus fontinalis*), lake trout (*Salvelinus namaycush*), white sucker (*Catostomus commersoni*), longnose dace *(Rhinichthys cataractae)* and Yellowstone cutthroat trout (Highwood Environmental Management and AltaLink 2003 and 2009).

Based on electrofishing surveys in 2013 in the PSA, the majority of fish captured were non-native brook trout; there were a few observations of brown stickleback, mountain whitefish, long-nose sucker, bull trout and westslope cutthroat trout (see Species At Risk below; Avens 2015). Refer to Appendix H in Avens (2015) for a detailed species list observed in each watercourse in the PSA, summarizing 2013 electrofishing data as well as historical data.

Species at Risk

Bull trout and Westslope cutthroat trout are listed as *Threatened* under Schedule 1 of SARA (2013). The Bow River tributaries within the PSA contain very low sediment concentrations (the water is clear for most of the year), have a slightly alkaline pH, and are limited in nutrient concentrations (Highwood Environmental Management and AltaLink 2003), and therefore have the potential to provide quality bull trout and cutthroat trout spawning and rearing habitat.

Based on historical documentation and electrofishing results in 2013, the following watercourses contained bull trout:

- Whiskey Creek (structure 27-28), Ranger Creek Tributary (structures 130-131), Silverton Creek (structures 234-235) and one unnamed creek near Protection Mountain Campground (structures 334-335) (Avens et al. 2015);
- Muleshoe Oxbow (structures 82-84) (Highwood Environmental Management and AltaLink 2003).

Based on historical documentation and electrofishing results in 2013, the following watercourses contained Westslope cutthroat trout:

- Silverton Creek (structures 234-235) (Avens et al. 2015);
- Muleshoe Oxbow (structures 82-84), Corral Creek (structures 438-443; potential spawning) (Highwood Environmental Management and AltaLink 2003).

4.4.1.3 Fish Habitat

Fish habitat surveys were conducted in 2024 along a 300 m reach for any watercourse that may be impacted by vegetation management or line construction activities. Parameters recorded included water quality, average channel gradient, mean bank-full and wetted widths, mean water depth, maximum water depth, average velocity, average channel gradient, habitat types, substrate composition, instream/overhead cover types, and barriers to fish movement.

Where hydrological connectivity was unknown, channels were followed to identify any distinct hydrological linkages with the Bow River. Potential upstream and downstream concerns (e.g., sedimentation, erosion, evidence of flooding) were also identified.

Detailed summary data are available upon request.

Spawning Surveys

Spring spawning surveys were conducted between June 18th and 27th 2024, followed by fall spawning surveys between October 8th and 18th 2024 in the following watercourses: Whiskey Creek, Forty Mile Creek, Five Mile Creek, Ranger Creek Tributary, Ranger Creek, Johnston Creek, Borrow Pit Springs, Silverton Creek, Baker Creek, Corral Creek, and several unnamed creeks.

Over 30 spawning sites were observed in six watercourses in the PSA including five in Whiskey Creek, two in Ranger Creek Tributary (DS (downstream) of structure 122, adjacent to identified Danger Trees), >10 in Borrow Pit Springs (DS of the culvert and ROW between structures 189 and 190 as well as US (upstream) and DS of ROW between structures 194 and 195), seven in Silverton Creek (US and immediately DS of ROW between structures 234 and 235, possible bull trout redd),

one in the unnamed creek near Protection Mountain Campground, and one in the unnamed creek between structures 349 and 350 DS of ROW (Table 4-7).

Spawning sites were also recorded in 2013 in Whiskey Creek, Borrow Pit Springs, and Ranger Creek tributary (Avens et al. 2015).

Table 4-7. Locations of spawning sites along 551L (field assessments Spring and Fall 2024).

Watercourse Name	Structure Span	Redd Location		Date Observed (2024)
		Easting	Northing	
Whiskey Creek	25-26	599967	5671344	18-Jun
	25-26	599956	5671347	18-Jun
	26-29	599940	5671343	08-Oct
	26-29	599909	5671345	08-Oct
Ranger Tributary	121-122	586722	5673506	10-Oct
	121-122	586724	5673503	10-Oct
Unnamed Creek: Borrow Pit Springs	189-190	579619	5678040	11-Oct
	189-190	579665	5677958	21-Jun
	189-190	579664	5677941	21-Jun
	189-190	579665	5677937	21-Jun
	189-190	579680	5677922	11-Oct
	189-190	579684	5677899	11-Oct
	189-190	579687	5677886	11-Oct
	194-195	579352	5678460	11-Oct
	194-195	579308	5678434	11-Oct
Silverton Creek	234-235	575615	5680106	11-Oct
	234-235	575503	5680023	11-Oct
	234-235	575428	5679900	21-Jun
	234-235	575439	5679898	21-Jun
	234-235	575442	5679898	21-Jun
	234-235	575456	5679884	11-Oct
	234-235	575470	5679885	11-Oct
Unnamed Creek	334-336	567207	5686504	15-Oct
	349-350	565932	5687729	18-Oct

Water Quality

Water quality was measured in June and October 2024 using a YSI multi-probe meter to collect data on temperature, pH, conductivity, dissolved oxygen, and turbidity. Parameters were calibrated one time at the beginning of each field season. Results were consistent with high water quality and ranged from 1.8 to 12.5°C (avg. 5°C) Water Temperature; 7.3 to 8.5 pH, 148 to 462 µs/cm (avg. 302 µs/cm) Conductivity, 5 to 12mg/L Dissolved Oxygen (avg. 10 mg/L), and 0 to 9 NTU turbidity (high end at Five Mile and an unnamed tributary; avg. 1.3 NTU).

Habitat Suitability

Using the data from the habitat assessments (water quality, physical and biological parameters, and presence of spawning sites), habitat suitability ratings were developed and provided in Table 4-8. The sensitivity of each watercourse to crossing construction/operation was also evaluated by the criteria described in Appendix E (adapted from Golder Associates Ltd. 2004). All proposed crossings in the table will be by clear span bridge (access mat or steel/wood bridge) except for spans 69-70, 111-112, 118-119, 133-134, 328-330, which will be by snow fill/bridge.

Table 4-8. Habitat Suitability and sensitivity of watercourses to crossing construction and operation ratings for all watercourses that have the potential to be affected by Project activities.

Disturbance Type[1]	Structure Span	Watercourse Name	Habitat Suitability[2]				Sensitivity to Construction[2]
			Spring Spawning	Fall Spawning	Over-Wintering	Rearing	
C,E 20-21; E 20-22	20-22	Whiskey Creek Tributary	N-L	L	L(DS)-H (ROW,US)	L	M
C, E	25-26		N(US, ROW); H(DS)	N(US, ROW); H(DS)	L	H	H
C, E	26-29	Whiskey Creek	M(DS)-H(ROW, US)	M(DS)-H(ROW, US)	H	H	H
E	34-35		N	N	M	M	M-H
E	36-37	Forty Mile	N	N	M	M	L-M
C, R	66-67	Five Mile	L	L	L	L	L
C, R	69-70	Unnamed	N	N	N	N	N
	111-112	Unnamed floodplain	N	N	N	N	N
C, R	118-119	Ranger Creek Tributary	N	N	M	M	L-M
R	119-121		L	L	M	M	L-M
C, R	121-122		L	L	L(ROW,US)-M(DS)	M	M-H
C, R	130-131		N	N	H	H	M-H

Disturbance Type[1]	Structure Span	Watercourse Name	Habitat Suitability[2]				Sensitivity to Construction[2]
			Spring Spawning	Fall Spawning	Over-Wintering	Rearing	
C, R	133-134	Ranger Creek	M(ROW,US)-H(DS)	M(ROW,US)-H(DS)	L	L	M
R	182-183	Johnston Creek	N	N	L	L	L
R	189-190	Borrow Pit Springs	N(ROW,US)-M(DS)	N(ROW,US)-M(DS)	M(ROW,US)-H(DS)	M(ROW,US)-H(DS)	H
	194-195		H	H	H	H	H
R	208-209		N	N	L	L	M
R	234-235	Silverton Creek	M(ROW,US)-H(DS)	M(ROW,US)-H(DS)	H	H	H
C, R	255-256	Unnamed	N	N	N	N	N
R	278-279	Unnamed	N	N	M	H	M
R	282-284	Unnamed	M	M	M	L	M
E	293-294	Unnamed	N	N	N	N	N
E	304-305	Unnamed	N	N	N	N	N
C, R	318-319	Unnamed	N	N	L	L	L
C, R	328-330	Unnamed	N(ROW,US)-L(DS)	N(ROW,US)-L(DS)	N(ROW,US)-L(DS)	N(ROW,US)-L(DS)	L-M
C, R	334-336	Unnamed PMC East	M	M	L	L(US)-M(ROW,DS)	M
C, R		Unnamed PMC Middle	N	N	N	N	M
C, R		Unnamed PMC West	N	N	L	L	L
E	349-350	Unnamed	L(US)-H(ROW,DS)	L(US)-H(ROW,DS)	L(US)-H(ROW,DS)	L(US)-H(ROW,DS)	H
R	366-367	Baker Creek	N	N	N	N	N
R	408-409	Unnamed	N	N	L	L	L-M
R	421-423	Bow River	U	U	U	U	U
R	435-436						
C, R	438-439	Corral Creek	N	N	L	L	L-M
C, R	442-443		N	N	L	L	L-M
C, R	446-447	Unnamed	M	M	L	M	L-M
R	457-458	Unnamed	N	N	H	L	L-M

[1]C = Crossing watercourse; R= Riparian vegetation removal within 30 m of HWM; E=Excavations or barrel pile installations within 30 m.

[2]N=Nil; L=Low; M=Moderate; H=High; U=Unknown; US=Upstream; DS=Downstream; ROW=Right-Of-Way

Riparian Assessments

Riparian assessments were conducted in July 2024 in Danger Trees areas to determine density and vegetation type of existing understory in the riparian areas along watercourses that intersect the transmission line. Two vegetation plots were established for each watercourse: one within 1-2 m of the HWM and one within 30 m, under the mature tree cover. This information assisted in determining the effects of removing the overstory (Danger Trees) from riparian areas.

Based on results of this study, for the majority of watercourses where Danger Tree removal is proposed in the riparian area, existing canopy closure is less than 10% within 2 m of the HWM; therefore, removal of Danger Trees in these areas should have very little effect on fish and fish habitat. Eight out of 27 watercourses have greater than 10% existing canopy cover (Five Mile, Ranger Creek Tributary, Borrow Pit Springs, Silverton Creek, and four unnamed streams); therefore, these riparian areas have the potential to be affected the greatest and are carried forward to the effects analysis in section 4.4.2.

Species At Risk Critical Habitat

A number of the watercourses in the PSA have been classified as CH for SARA-listed bull trout (*Threatened*) and Westslope cutthroat trout, Alberta population (*Threatened*); and therefore require DFO review prior to any disturbance within 30 m of the HWM (e.g., temporary bridge installation, vegetation removal, excavations). Depending on the outcome of the review process, DFO authorization may be required prior to Project commencement.

For bull trout, CH includes all named watercourses, one unnamed stream between structures 69-70, as well as some additional areas that have no detectable channel (e.g., between structures 58-59, 107-108), and some wetlands with no connectivity to flowing water (Appendix A). The other 13 unnamed streams that cross the ROW are not considered CH for bull trout.

For Westslope cutthroat trout, CH watercourses include Whiskey Creek, Whiskey Creek tributary, and Forty Mile (Appendix A).

It is in contravention of SARA to affect individuals, residences, or critical habitat of Schedule 1 listed species. A SARA permit may be issued, authorizing a person to engage in an activity that may incidentally affect a listed species, provided that all other reasonable alternatives have been exhausted. DFO and/or Parks Canada are responsible for administering permits under SARA for projects that may affect aquatic species at risk within the Federal Parks.

Wetlands

All wetlands on the 551L ROW were mapped for the rebuild project and detailed in the DIA (Appendix H, Avens Consulting 2015). In total there are 55 wetlands that intersect or occur wholly on the ROW and two wetlands on the accesses (for details see maps, Appendix A; Appendix H AltaLink 551L DIA, Avens Consulting 2015). These wetlands are either fens (>40 cm of peat) occurring in basins near the valley bottom or seepages (<40 cm peat) on flatter terraces on slopes in the Bow Valley.

4.4.2 Effects Analysis

4.4.2.1 Hydrology

Effects on the hydrological regime resulting from vegetation management and line activities include possible changes to surface water runoff volumes, drainage patterns, hydrological connectivity to aquatic habitat, instream flow levels, and discharge to downstream systems, and channel morphology.

Manual tree removal along riparian areas can cause bank erosion if the trees supported the soil in place on the banks as well as impact the ground and surface hydrology of the area. If there's inadequate understory to absorb influxes of precipitation, water retention will decrease and possible runoff, erosion, and siltation will occur in the first few years after tree removal. Higher ground water levels could result in higher flows in the streams and higher water levels in the wetlands in the first few years after overstory tree removal.

The construction of snow bridges and snow fills can cause debris blockage and flooding if there is delayed melting as well as a decrease in water velocity.

4.4.2.2 Fish and Fish Habitat

Sediment Loading

Construction activities associated with this Project have the potential to increase sediment loading in a watercourse; activities include riparian vegetation removal, excavations to install or remove structures near watercourses, and erosion from steep approach slopes and exposed areas on the ROW from excavations and ground disturbance.

Sediments, which contain nutrifying elements and can capture or absorb contaminants, are suspended or are deposited in waterways. Elevated concentrations of suspended sediment can reduce light penetration for aquatic plant growth, increase drift of benthic invertebrates, alter habitat use by fish, reduce visibility for fish foraging ability, increase physiological stress

responses, damage gills and erode fins, and increase fish mortality. Increased sediment deposition can change habitat suitability for benthic invertebrate and fish species, reduce productivity of benthic invertebrate communities, cause pool habitat infilling, reduce availability of over-wintering habitat, smother aquatic vegetation, and cover spawning substrate, decrease water flow and oxygenation through gravels, and cover developing fish eggs. Siltation in creeks with lower flow and finer substrates is expected to have a greater impact on fish and fish habitat.

Many areas along the ROW have steep slopes; cut-and-fills will be used to create machinery access along the ROW and to create a flat work area around each new structure site on sloped sites. In addition, there are 23 new mainline and bypass structures as well as 7 anchors proposed to be installed within 30 m of creek banks; nine of these disturbances are within 5 m of bull trout CH. There are also five mainline structures that need to be removed from the banks of CH (Appendix A). Erosion during high precipitation events may cause sediment entrainment and subsequent loading in watercourses down-slope of the steep banks or disturbed approach slopes as a result of these activities. Sediment loading may also be caused by cleaning snow off of a temporary clear-span bridge to transport machinery across the structure, or water drainage off a clear-span bridge.

The maintenance requirements of the transmission line following Tree Wire installation and vegetation management are expected to decrease as a result of the Project, therefore effectively reducing effects to the aquatic environment during the long-term operation of the transmission line.

Alteration of Fish Habitat including riparian vegetation

Removing or topping Danger Trees within 5 m of the HWM of creeks may have negative effects on fish and fish habitat. A total of ~4.8 ha of Danger Trees within 5 m of waterbodies will be topped or removed and a total of 8.1 ha will be removed within 5-30 m of waterbodies during this Project (Table 1-3). Riparian vegetation is an important habitat feature because it provides leaf litter and terrestrial insects which fall into the watercourse and provide food for fish and the organisms that fish prey on. Removal of this vegetation can reduce cover and protection from predators and physical disturbances.

The removal of riparian vegetation can also increase siltation, reduce shading, and increase water temperatures. When temperatures are elevated as a result of loss of shading, many fish (e.g., trout) could experience reduced reproductive activity, shifts in the timing of reproduction, or direct mortality (including egg mortality). For example, bull trout eggs require a constant temperature throughout the winter during their incubation period. Streams with over-wintering potential and known bull trout presence could be impacted by the removal of vegetation. Higher

water temperatures also encourage the microbial breakdown of organic matter, leading to a depletion of dissolved oxygen in the water body, thereby creating a stressful environment for fish.

Based on results of the riparian assessments within 2 m of watercourses, the majority of the plots with existing canopy cover in the immediate riparian area also have high shrubs and forbs in the undergrowth; therefore, affects from Danger Tree removal will be low. However, out of the eight watercourses that currently have at least 10% of existing canopy cover within 2 m of the HWM, only one (i.e., Silverton Creek) has less than 35% cover of undergrowth in the form of shrubs and forbs (>30 cm tall). Silverton Creek has 5% tall-growing shrub cover (plot established on the east side of the creek where Danger Tree removal is proposed).

Flow Disruption or Blockage of Fish Passage

Fish migration can potentially be blocked through the use of snow fills that remain in the watercourse during spring freshet due to delayed melting. Spawning and other seasonal movements are affected by blockages. If a pond forms behind a dam (e.g., snow dam), the water in it may become warm due to the increased surface area which can displace or harm fish.

Deleterious Substances

There is potential for releasing deleterious substances into the watercourse during construction, thereby contaminating the water in the stream, wetland or river and affecting habitat for spawning, rearing, and foraging. This generally includes hydrocarbons (grease, oil and gas) entering the stream or river as a result of spills, and improper handling and/or containment techniques. Spills or leaks have the potential to physically harm or kill stream invertebrates, waterfowl and aquatic mammals.

Non-native aquatic organisms, seeds and pathogens can attach to equipment and or vehicles and change the health, populations and dynamics of the aquatic community. Weed control using herbicides is another activity that may introduce toxic substances into streams, either directly or through runoff. Depending on the product used, these substances may kill or harm fish directly, inhibit them from reproducing, adversely affect the development of eggs and young, or reduce the amount of food available for fish (Watts 2009).

Direct or Indirect Mortality or Harm

Riparian vegetation removal has the potential to increase predation from raptors, mustelids and other predators (DFO 2012).

4.4.2.3 Wetlands

Tree removal in the vicinity of wetlands has the potential to effect aquatic species including species at risk (see section 2.5.6 Wildlife), aquatic species habitat, hydrological regimes (storage, discharge, recharge, infiltration, and filtration), nutrient retention, and assimilation.

Removal of riparian vegetation around wetlands can negatively affect the hydrological function of these waterbodies resulting in effects to water storage capacity and water quality, which in turn can negatively affect plants and wildlife in the wetlands. Tree removal or topping along the edges of wetlands may increase or decrease water levels in the wetland, as well as increase erosion, sedimentation and increased water temperatures, which can negatively affect amphibian reproduction and survival. For details on impacts to amphibians, refer to section 3.6.2 (Wildlife).

Wetlands can be compacted and rutted by machines moving through them in unfrozen conditions due to the presence of saturated soil. In the winter, the wetlands on the ROW with deep peat do not freeze below 15-20 cm so can still be rutted if driven on by machines when there is no hard snow road. These soil and vegetation effects are discussed generally in the soil and vegetation sections above.

Wetlands can be negatively affected by spills of deleterious substances similar to streams. Spills in wetlands can result in mortality of wetland plants, invertebrates, and amphibians (see Wildlife above). Surface water, ground water and soils can also be contaminated by these deleterious substances which then migrate to adjacent wetlands.

There will also be a small loss of habitat in wetlands where additional permanent and temporary structures are being installed in Tree Wire sections.

4.4.3 Mitigation Measures

General

- AltaLink will request a Project Review from DFO prior to any work within 30 m of a watercourse that has been classified as CH for bull trout or Westslope cutthroat trout; this includes all work associated with ROW preparation, vegetation management, and line construction. Depending on the outcome of the review process, DFO authorization may be required prior to Project commencement; all mitigations resulting from the review process must be adhered to.
- All activities will be completed near waterbodies or in wetlands in frozen conditions to avoid compaction and protect riparian vegetation.

Crossing Waterbodies

- Annual site-specific access plans and watercourse crossing plans will be developed and submitted to Parks Canada for approval as part of the annual EPP.
- Crossing sites that were used during the 2016 rebuild will be used for this Project; therefore, no additional tree clearing will be required to install bridges.
- A Qualified Aquatic Environmental Specialist (QAES) will be on-site during installation, initial operation and removal of a watercourse crossing. The QAES will monitor during installation of crossing structures to assess immediate effects on the aquatic environment, as well as during operation and removal to assess the condition of the crossing structure and site and effectiveness of mitigation measures, which will be described in the annual EPPs. Assessments and monitoring completed by the QAES will follow the guidelines provided in Schedules 2 and 4 of the Code of Practice for Watercourse Crossings (Alberta Government 2013).
- Snow bridges/fills should be constructed using clean, compacted snow to a sufficient depth to protect the banks of the waterbody or watercourse. Machinery used to transport snow must be thoroughly washed and clean prior to transporting any snow for snow bridges/fills.
- Temporary crossing structures must not impede water flow at any time of the year.
- No deleterious substances should enter the water while cleaning off bridge decks and when equipment and machinery is transported across the clear-span bridges.
- Compacted snow will be removed from snow fills prior to the spring freshet and as soon as the work is completed in the area.
- Temporary clear span bridges will be removed from the stream within six months of construction or prior to spring break up, whichever comes first (AENV 2000). If work in a section is not complete within six months, a request can be made to Parks Canada to extend the six-month duration.
- Hard snow roads must be prepared for machine access through wetlands to stabilize approaches and prevent rutting. All wetlands will be assessed by an EM prior to snow road preparation to determine their condition as this varies from year to year (i.e., depth of freezing, snow cover, ice formation, ice flows, etc.). If a wetland is not frozen completely and snow road is not sufficient to avoid rutting, then access mats will be used to cross the wetland.

- For large, deep wetlands at structures 18-26, 258-262, 307-310, and 319-321, hard snow roads must be prepared and/or access mats installed along both edges of the wetland on the ROW to facilitate access for tree removal (e.g., skidder) or in the middle of the ROW for Tree Wire construction.

Vegetation Removal

- Riparian Areas: within 5 m of the HWM of all watercourses (i.e., active drainages, streams, creeks, rivers) and wetlands, Danger Trees will be assessed individually on a site-specific basis by the Parks Canada ESO in consultation with the Project EM, and either removed or topped; between 5 m and 30 m of these waterbodies, Danger Trees will be removed by hand and will be designated machine-free areas. Cleared trees may be removed from these zones with a skidder that pulls them out of the riparian area but does not enter this zone. There will be no removal of shrubs, forbs, or saplings less than 3 m tall within 30 m of a watercourse or wetland. Details will be provided in the annual EPPs.

- The 5 m and 30 m riparian areas will be marked with flagging and/or staked prior to vegetation removal or construction.

- In riparian areas where Danger Trees will be removed or topped, and there is a lack of existing over-hanging and undergrowth vegetation (i.e., Silverton Creek), line-compatible vegetation such as willow *sp.* must be planted to provide shade habitat and food resources for fish and their eggs/fry. These locations will be provided in the annual EPPs.

- Debris from topped or pruned vegetation will be piled (and if required, burned) at least 30 m away from the waterbody on flat ground. Any trees, debris, or soil inadvertently deposited within the high-water mark of any waterbody must be removed immediately in a manner that minimizes disturbance of the bed and banks.

- All measures should be taken to protect sensitive riparian vegetation (e.g., limit vegetation removal, access mats, sod salvage in wetlands, winter construction, keep equipment as far back from the HWM as possible).

Sediment and Erosion Control

- Site specific erosion and sediment control measures will be designed on a yearly basis as part of the annual EPP.

- The width of the area required for the approach road construction at waterbody crossing sites should be minimized.

- Clearing of vegetation on unstable or erodible banks (i.e., Whiskey Creek) will be completed by hand; blading, grubbing, or rooting on the banks of a waterbody must be avoided.

- Biodegradable erosion and sediment control (ESC) measures will be installed on disturbed slopes above waterbodies before work begins or immediately in the spring following construction (first priority in reclamation); they must be inspected and repaired regularly.

- Topsoil or excess material from excavations should be stockpiled outside of the active floodplain of any creek, in a level area, or one with low slope angle. If required, ESC measures such as sediment fences will be used to prevent stockpile runoff from entering the watercourse. Any runoff containing sediment must be directed away from the stream into a vegetated area.

- If an existing structure within 5 m of a watercourse needs to be removed and the banks are erodible (e.g., six structures along the Whiskey Creek and Whiskey Creek tributary in section 1), the structure should be cut off at the butt, rather than pulled out of the ground to prevent erosion and siltation of the watercourse.

- If a watercourse crossing site is disturbed and reclaimed, the crossing site will be monitored during the snow free season especially after high flow events until establishment of permanent erosion control measures (i.e., vegetation regeneration). Slope/bank stability at and adjacent to the crossing, including vegetation on access road approaches will be assessed and monitored post-construction.

Deleterious Substances

- Equipment and machinery must not enter the watercourse at any time during structure replacement or vegetation management.

- Machinery and equipment will arrive on site in a clean condition and is to be inspected and repaired throughout work activities to prevent and stop leaks; containment trays will be placed under machinery overnight.

- All fuelling, routine machinery maintenance (e.g., washing), fuel storage areas, staging areas, and other activities involving hazardous or deleterious substances to aquatic organisms (e.g., gas, oil, chainsaw fuel, hydraulic fluid, etc.) will occur at least 30 m away from all surface water to prevent any deleterious substance from entering surface water; fuel and generators will be stored in 110% secondary containment.

- Staging areas must be kept clean and garbage-free to prevent contamination of the soil, groundwater or surface water drainage.

- A Project-specific spill response plan will be prepared; in the event of a spill, Parks Canada and other regulatory agencies will be notified in accordance with standard reporting requirements.

- A Parks Canada approved spill kit for ground spills, and floating sorbent pads and booms for spills in open water, will be on site during construction and all workers must be trained in their use.

- Herbicide labels will be followed for required setbacks from waterbodies for spraying or as per Project-specific NNV annual control plan and the approved AltaLink IPMP in the Banff and Lake Louise Yoho Kootenay (LLYK) field units (AltaLink 2024).

4.4.4 Residual Effects

Provided that all the mitigations described in this document are employed, residual effects of the proposed line construction and vegetation management on aquatic and hydrology VCs are anticipated to be low.

Due to the large scope of this Project, and the high number of machine crossings per crossing structure anticipated over the two-to-three year period, as well as the nine structures and anchors installed within 5 m of creek banks of CH, it is conceivable despite all the mitigation measures implemented, that there could be introductions of small amounts of sediment and/or vegetation debris into watercourses as well as potential fuel spills and/or leaks.

In addition, the immediate loss of large over-story vegetation (through topping or hand-removal of Danger Trees) will temporarily affect fish including eggs and habitat until the reclaimed line-compatible vegetation is fully grown (i.e., up to 10 years from the time of reclamation). Fall spawning bull trout are found in low numbers throughout the park; therefore, impacts to their eggs or fry in streams that contain spawning sites may be detrimental to this sensitive species. These potential residual effects to fish and fish habitat are expected to be localized (confined to Danger Tree areas and a short distance downstream), medium-to-long-term (~10 years after construction), low in magnitude and reversible.

Another potential residual effect is a low probability of bank destabilization due to heavy machinery crossing waterbodies along the transmission line. If this occurs, appropriate reclamation and compensation measures must be adhered to as outlined in the *Fish and Fish*

Habitat Manual (Government of Alberta 2001). Monitoring initiatives must follow the guidelines described in the Alberta Code of Practices for Watercourse Crossings (AENV 2000; pg. 26).

Removal or topping trees along the edges of wetlands may result in a negative effect to the water table (potential to increase or decrease depending on how much water the trees at the edge of the wetland take up), and/or habitat in the wetland (loss of shade, drawdown of water, over-wintering upland amphibian habitat). These effects are expected to gradually lessen over time as trees re-establish in riparian areas at the edge of the wetlands. This effect is expected to be negative, low in magnitude, continuous, long-term, and reversible.

In addition, installing additional structures in wetlands for the Tree Wire (i.e., 27 new excavations or barrel piles) will reduce available habitat for amphibians, may cause amphibian mortality, and cause sedimentation during winter construction. This effect is expected to be negative, low in magnitude, continuous, long-term, and irreversible.

4.5 Cultural Resources

4.5.1 Baseline

Parks Canada maintains a database of previously recorded archaeological sites and any newly recorded sites are added as they are reported. The portion of this site database in proximity to this Project was provided by staff in Terrestrial Archaeology at Parks Canada and the information was reviewed and assessed by the contract archaeologist employed by Avens Consulting. The results of this review were incorporated into the AOA (Speargrass Historical Resource Consultants 2024). Large numbers of archaeological sites have been identified by projects focusing on existing surface disturbances, monitoring large surface disturbances during construction and assessments conducted in association with large linear projects. Much of the archaeological assessment conducted within the park is associated with known sites and the opportunity for large scale assessments covering un-assessed land is infrequent.

For this Project, the primary goals of the field level archaeological assessment were to: 1) determine whether any intact portion of previously recorded archaeological resources are in conflict with the Project; and 2) assess all areas identified in the AOA as having a high potential for the presence of unrecorded archaeological resources. Archaeologists from Speargrass Historical conducted an AIA in August 2024 that included field visits to all 11 previously recorded sites and 2 newly identified sites within the limits of the defined project footprint (Speargrass Historical Resource Consultants 2024) (Table 4-9). Some of the previously recorded sites have been well defined and documented while others are based on incomplete or very limited information. In

some cases, the site may have been previously destroyed, but a buffered boundary of the site persists within the Parks site database.

Table 4-9. Archaeological sites identified within 20 m of the Project footprint.

Structure #	Site #	Within Project Area?	Potential for Impact by Project Activities
34	68R	yes	68R is located within the AltaLink ROW and potential impact to intact archaeological resources is low to moderate.
41-42	156R	yes	156R is located within the AltaLink ROW but all subsurface tests encountered disturbed sediments in site area. Potential impact to intact archaeological resources is low.
53	2390R	yes	2390R is located within the AltaLink ROW but not in direct conflict with any Project components and potential impact to intact archaeological resources is low.
53-53A	99R	no	99R is located outside the AltaLink ROW and potential impact to intact archaeological resources is very low.
86-88	24R	yes	24R is located within the AltaLink ROW but not in conflict with Project components involving subsurface disturbance. Potential impact to intact archaeological resources is low but impact associated with any subsurface disturbance activity is high.
167	2391R	yes	2391R is located within the AltaLink ROW but not in direct conflict with any Project components and potential impact to intact archaeological resources is moderate (vehicle travel within ROW).
225-226	82R	yes	82R is located within the AltaLink ROW but potential impact to intact archaeological resources is low.
226-227	70R	yes	70R is located within the AltaLink ROW but potential impact to intact archaeological resources is low.
227-228	71R	yes	71R is located within the AltaLink ROW but potential impact to intact archaeological resources is low.
228-230	72R	yes	72R is located within the AltaLink ROW but potential impact to intact archaeological resources is low.
244-246	74R	yes	74R is located within the AltaLink ROW but potential impact to intact archaeological resources is low.
244-246	1245R	no	1245R is located outside the AltaLink ROW and potential impact to intact archaeological resources is low.

Structure #	Site #	Within Project Area?	Potential for Impact by Project Activities
380-381	120R	yes	120R is located within the AltaLink ROW and potential impact to archaeological features is high.

4.5.2 Effects Analysis

Effects to cultural resources in association with the Project can be either surface or subsurface effects. Anticipated surface effects include vehicular travel along the existing ROW, vegetation removal, or storage of materials associated with installation or removal of structures within the ROW. Vehicle travel may impact surface archaeological features if the vehicle comes into direct contact with features such as cellar depressions or structural remains. Vegetation removal by hand felling represents limited surface impact to archaeological sites and would only represent significant impact to very fragile resources such as standing structural remains, especially wooden remains. Storage of materials represents potential surface impact to standing structural remains either through impact by the stored materials or the vehicles manipulating the materials within the ROW.

Anticipated subsurface effects include vehicle travel along the existing ROW, excavation associated with structure installation or removal, and excavation of cut and fills. Vehicle travel may result in rutting, pulverisation or compaction of soils overlying or containing archaeological resources which may result in destroying or modifying the archaeological context of those resources. Other excavation activity associated with structure installation/removal or cut and fills represent potential modification or destruction of the context of archaeological sites or destruction of artifacts and features themselves.

4.5.3 Mitigation Measures

- Vehicular surface or subsurface effects can be prevented by temporary flagging of archaeological resources at risk. Surface features in potential conflict will be fenced for avoidance during the Tree Wire construction or tree removal season. Fencing will be removed once work in that section is complete.

- Vehicular subsurface effects can be prevented through the same access preparation mitigation outlined in for soils in section 4.1.3, specifically the construction of hard snow

roads, retention of a protective snow layer during plowing operations and restricting access to designated existing trails.

- Subsurface effects by excavation associated with structure installation/removal or cut and fills will be mitigated either by: 1) controlled archaeological excavation of a portion of the archaeological site (subject to requirements and approval by Parks Canada); or, 2) archaeological monitoring during excavation activities within or adjacent to the site area.

- Surface impact by vegetation removal can be limited by the use of hand-felling techniques during frozen and snow-covered conditions. Vehicle use for vegetation removal will be restricted to the existing ROW and/or subject to the general vehicle conditions discussed above.

- The Parks Canada Accidental Finds Protocol and Change of Scope Protocol are in force throughout the project duration. The Accidental Finds Protocol stipulates that if any significant archaeological resources are encountered by any worker, they should STOP WORK in the immediate area and contact the project manager and Historical Resources Advisor, or a Parks Canada archaeologist, to discuss any protective measures needed and ensure the find is communicated. The Change of Scope Protocol stipulates that any changes to the proposed scope of work must be submitted to Parks Canada, Terrestrial Archaeology for review.

- During AIA fieldwork, Speargrass Historical identified five areas of potential conflict with intact archaeological resources that require site-specific mitigation (Table 4-10). For all other identified archaeological resources the potential for Project activities to impact these resources is low and no further mitigation is required.

Table 4 – 10. Site-specific mitigation to protect archaeological resources that could potentially be affected by Project activities.

Structure #	Site #	Potential for Impact by Project Activities
34	68R	It is unlikely that excavations associated with structure installation will encounter intact archaeological resources. However, a significant quantity of artifacts were recovered within approximately 10 m on the same landform and the potential impact to intact archaeological resources cannot be ruled out. **It is recommended that archaeological monitoring be conducted for any excavations on the dune landform within the boundary of 68R**.
53	2390R	Two positive shovel tests are located within the ROW, but not in conflict with proposed activity areas. The site has largely been mitigated through the excavation of the two shovel tests, but it is possible that additional material is present within the site boundary. No additional work is recommended at 2390R in association with the currently proposed AltaLink 551L Fire Risk Management Project as long as vehicle access is restricted to frozen and snow-covered conditions. **It is recommended that archaeological monitoring be conducted for any excavations proposed within or adjacent to the ALtALink ROW in proximity to 2390R. Temporary fencing should be installed around the site during the construction season to prevent impact by vehicle traffic.**
86-88	24R	There are no proposed activities currently associated with the Project threatening subsurface disturbance to intact archaeological resources. As such, the potential for activities associated with the Altalink Project to impact intact archaeological resources is low. Therefore, additional archaeological investigations at 24R are not recommended in association with the currently proposed project as long as vehicle access is restricted to frozen and snow-covered conditions. However**, it is recommended that archaeological monitoring be conducted for any future excavations proposed within or adjacent to the ROW in proximity to 24R.**
167	2391R	The site is not in direct conflict with any components of the currently proposed Project. It is recommended that archaeological monitoring should be conducted for any excavations proposed within or adjacent to the boundary of 2391R. **Temporary fencing should be installed around the site during the construction season to prevent impact by vehicle traffic.**
380-381	120R	The Project footprint is in conflict with the 120R site boundary in terms of Danger Tree removal. Tree removal represents a potential impact to a site feature as it is a wooden surface feature located within the Danger Tree footprint**. It is recommended that Feature 3 at 120R is temporarily fenced for avoidance during tree removal and that vehicle/machine use is not permitted within the site area. All tree removal activity should be conducted under frozen and snow covered conditions.**

4.5.4 Residual Effects

If the mitigation measures above are followed there is low potential for negative effects to cultural resources. However, archaeological resources are non-renewable and in the unlikely event that an archaeological site is damaged or destroyed, those resources may be permanently diminished or lost entirely. In the event that an archaeological resource is damaged or destroyed, this effect would be negative, moderate in magnitude, continuous, long term, and irreversible.

4.6 Visitor experience

4.6.1 Aesthetics

4.6.1.1 Baseline

Visibility

The 551L transmission line and ROW have been in place since 1962. The 551L transmission line was rebuilt between 2016-2020 during which structures were replaced and identified danger trees were removed from some sections. The potential visibility impacts of the rebuild were primarily mitigated through a design that minimized structure heights, and by the retention of trees and vegetation to obscure views.

The current status and potential future visibility impacts of the proposed Project were assessed by a combination of site visits, viewshed analysis using GIS, and photo simulations for selected viewpoints (Power Engineers 2025). The TCH and BVP between the Town of Banff and Lake Louise are the primary viewsheds assessed for this BIA. Associated connector roads, day use areas, and facilities along these routes are also considered in the potential visibility impacts.

Along the TCH, from Banff to the Sunshine interchange, the 551L line and structures are frequently visible on the slopes above. From the Castle Viewpoint to Lake Louise, the 551L is generally well obscured from view. In total, approximately 12.3 km of the line and 66 structures are currently visible from the TCH.

At the eastern end of the BVP (Fireside to Sawback day use area), there are views of the 551L where it is high on the slopes and cliffs above the road. After that, the 551L line is occasionally visible through gaps in the forest, and at road crossings. Glimpses of the 551 line and structures are also possible through the roadside trees and shrubs from the BVP (totalling approximately 115 structures over 13 km in various sections). This partial visibility 'through the trees' is largely a function of the width of the adjacent roadside trees, with thicker buffers providing better visual

screening (generally 20-50 m wide). Overall, the 551 line is not obvious through these sections for the casual viewer.

The following areas were identified as key areas of interest for the visibility analysis (Table 4-11). The current baseline visibility of these areas and anticipated future effects after the Project are detailed in a series of maps and photo simulations (Appendices F and G).

Table 4-11. Areas of interest for the 551L visibility analysis (Appendix F).

Area of Interest	Photo Simulation Viewpoint and Map Number
Mt Norquay Road	1
Muleshoe	2
Hillsdale Meadows	3
Castle Viewpoint	4
Johnston Canyon Campground (Including backcountry campsite Bo1c)	5
Moose Meadows	6
Castle Junction	7
Lake Louise Dr.	8

Tree Topping

The forests adjacent to the ROW are currently in a natural, or near natural, state with a variety of species and multi-age stands of trees. There are few topped trees visible along the edges of the ROW, but currently they are obscured from view when travelling on the BVP except where the ROW crosses the road.

4.6.1.2 Effects Analysis

Visibility

Overall, there will be an incremental increase in the length of line and number of structures visible as a result of the Project. The visibility analysis showed that future increases in visibility are primarily due to vegetation management, not increases in structure height, in the Tree Wire sections. The increased number of visible structures in the Tree Wire sections is due to the design requirements for shorter spans and more structures to accommodate the increased weight of the Tree Wire.

The total increases in visible line and visible structures are spread across various sections of the 57 km long 551L transmission line. For the TCH, the visible sections of the 551L will increase by

455 m of line and 7 structures across the Tree Wire and vegetation management sections (Table 4-12).

For the BVP, the total visibility will increase by 630 m and 7 structures across the Tree Wire and vegetation management sections (Table 4-13). It is important to note that for both the TCH and BVP, the exact visibility impacts can be highly dependant on the exact viewer position. Moving to a new location along the road can result in different angles and viewsheds.

Table 4-12. Changes in visibility of the 551L from the TCH as a result of the Project.

551L TCH Visibility Results – Summary	Tree Wire Sections	Vegetation Management Sections
Total Length of Sections (m)	9,984	46,665
Current Visibility of the line (m)	795	12,250
Future Visibility of the line (m)	795	12,705
Change (m)	0	455
Current Visibility (%)	8.0%	26.3%
Future Visibility (%)	8.0%	27.2%
Current Visibility of structures (#)	9	53
Future Visibility of structures (#)	12	57
*Based on the January 25, 2025 Tree Wire design and 2024 fall over analysis		

Table 4-13. Changes in visibility of the 551L from the BVP as a result of the Project.

551L BVP Visibility Results - Summary	Tree Wire Sections	Vegetation Management Sections
Total Length of Sections (m)	9,984	46,665
Current Visibility of line (m)	1,025	7,270
Future Visibility of line (m)	1,135	7,790
Change (m)	110	520
Current Visibility (%)	10.3%	15.6%
Future Visibility (%)	11.4%	16.7%
Current Visibility of structures (#)	13	54
Future Visibility of structures (#)	19	55
*Based on the January 25, 2025 Tree Wire design and 2024 fall over analysis		

In Tree Wire sections, Danger Trees will mostly be retained. Tree clearing will be required at the ends of each Tree Wire section for approximately ~25 m where there is bare wire. In general, this does not create any new visibility from the TCH or BVP with a few exceptions. The predicted

visibility effects of vegetation management or Tree Wire construction for key locations have been summarized in a table, maps, and photo simulations (Table 4-14, Appendix F, Appendix G).

Table 4-14. Effects of Project on visibility of sections with thin tree cover (for map and photo simulation references see Appendices F and G).

Span	Project Activities	Comments
42-45	Tree Wire	See Map 1, Viewpoint 1 (Appendices F and G) for full discussion of effects.
46-47	Tree Wire	See Map 1, Viewpoint 1.
52-53A	Vegetation Management	Juniper Hotel. A 50-60 m buffer of trees between the ROW and the hotel parking lot will remain after danger tree removal.
68-70	Vegetation Management	Thin buffer with few danger trees to remove.
71-73	Vegetation Management	Sunshine substation. Limited visibility from the BVP on cliffs overhead. Section is already mostly visible from the TCH.
84-88	Vegetation Management	Muleshoe. See Map 2, Viewpoint 2.
145-147	Vegetation Management	Hillsdale Meadows. See Map 3, Viewpoint 3.
159-161	Vegetation Management	Castle Viewpoint. See Map 4, Viewpoint 4.
175-181	Vegetation Management	Johnston Canyon Campground. See Map 5, Viewpoint 5.
191-193	Vegetation Management	Moose Meadows. See Map 6, Viewpoint 6.
194-197	Vegetation Management	Moose Meadows. See Map 6, Viewpoint 6.
221-222	Vegetation Management	Silver City. Some increased visibility at the edge of the shrubby meadows from tree removal.
234-235	Vegetation Management	Castle Mtn Hostel. See Map 7, Viewpoint 7.
236-238	Tree Wire	Castle Mtn Chalets. See Map 7.
235-236A	Vegetation Management	Castle Junction (heading NE from the Bow River). See Map 7, Viewpoint 7.
236A-239	Tree Wire	Castle Junction (heading NE from the Bow River). See Map 7, Viewpoint 7.
241-252	Tree Wire	Sections of the treed buffer are quite thin. Trees will be retained.

Span	Project Activities	Comments
264-276	Tree Wire	Sections of the treed buffer are quite thin. Trees will be retained.
282-284	Vegetation Management	Castle Lookout trail day use area. Not visible from the BVP. Trees at the back end of the parking lot will be removed with an open view to the ROW.
293-316	Tree Wire	Sections with thin tree buffers, open spans (300-301). Trees will be retained with Tree Wire design. Tree wire will be visible at 301-302 and road crossing at 306-307. Tree clearing required at end structure 316F (will open ~25 m gap).
332-334	Vegetation Management	Protection Mountain Campground. Tree removal at the far end of the campground will create new visibility of the line and structures 333-334.
336A-340	Fire Guard	Protection Mtn Fire Guard (PCA). Cleared area. ~400 m of line and 4 structures visible from BVP. No vegetation management required.
340-352	Tree Wire	Thin tree buffer. Trees will be retained with the Tree Wire design. Tree clearing at end structure 351D will increase visibility at the edge of the open meadow from 351-355.
366-369	Vegetation Management	Baker Creek by Basecamp. Not currently visible from the property. Limited visibility of the line from the SE on the BVP. Danger tree removal may increase visibility slightly including from 2nd story windows in certain buildings.
379-381	Vegetation Management	551L crosses open wetland. Some increase in visibility at edges of wetland due to tree clearing.
394-403	Tree Wire	Very thin tree buffer. Some open gaps. Trees will be retained with Tree Wire design.
406-408	Vegetation Management	Open meadow. Slightly increased views from tree removal.
Whitehorn Rd to Lake Louise Substation	Vegetation Management	Ridge above Lake Louise. See Map 8 , Viewpoint 8.

The 551L crosses the TCH or BVP in 10 locations. A Tree Wire design is proposed for five of these locations. Clearing trees adjacent to the ROW will not be required in Tree Wire sections; however the conductor and structures will remain visible where the line crosses the road.

For the other five locations, identified Danger Trees will be removed at the road/ROW crossing. In general, this will lead to a wider viewer window down the cleared ROW for passing traffic (brief views only). The future visibility of the line at these locations is varies with vegetation cover and topography (Table 4-15).

Table 4-15. Effects of Project on visibility of the line at road crossings.

Structures	Proposed	Road Crossed	Comments
41-42	Tree Wire	TCH	Tree wire. Tree clearing not required.
45-47	Tree Wire	Mt Norquay Rd.	Tree wire. Tree clearing not required. Additional structure to be added in meadow west of Norquay Rd. (Map 1, Viewpoint 1).
BVP-73/73A	Vegetation Management	BVP	Overhead cliffs on uphill side. Tree clearing will not significantly impact visibility. Steep slope on Bow River side, increased views of ROW (limited by slopes).
81-82	Vegetation Management	BVP	Increased views of ROW.
236-237	Tree Wire	Township Rd 265B (Castle Junction)	Tree wire. Some tree clearing required on the SE side at 236A and at structure 238 (air break). Increased views to the SE side of road crossing (Map 7, Viewpoint 7).
257-258	Vegetation Management	BVP	Increased views of ROW.
291-292	Vegetation Management	BVP	Increased views of ROW.
306-306	Tree Wire	BVP	Tree wire. Tree clearing not required.
395-396	Tree Wire	BVP	Tree wire. Tree clearing not required.
469-470	Vegetation Management	Whitehorn Rd.	Limited tree clearing required at road crossing (Map 8, Viewpoint 8).

Tree topping

Aesthetics of the forest at the edge of the ROW seen from near and distant viewpoints may be negatively affected by tree topping. Topping of trees could lead to tree death if too much of the live crown is removed or could lead to an unnatural look of the forests if large clusters of trees are topped. This is particularly true if large patches of conifers are all topped to the same height. Pine

trees may be more prone to dying from topping than spruce or Douglas fir, as their crowns are concentrated toward the top half of the trees in closed forest stands. In aspen, topping will likely lead to copious suckering from the root system, which could improve aesthetics of views toward the ROW at ground level with the dense thickets of aspen seedlings providing visual screening of structures.

4.6.1.3 Mitigation measures

- The proposed Tree Wire has been designed to minimize height increases of the structures (within required engineering parameters). For structures that will be visible from the BVP or TCH, the structure height change (compared to the as-built) ranges from a decrease of -1.5 m to an increase of +2.7 m (mean of +0.95 m). These structure height changes are modest and will not create new visibility of the line at these locations.

- The Tree Wire sections were, in part, placed to reduce visibility impacts in several areas with thin buffers of roadside trees. If Tree Wire was not installed in these sections, then vegetation management would create approximately 2.6 km of new visibility of the line alongside the BVP, and an additional 1.1 km would have a tree buffer of ~15 m or less in width. With the careful siting of the Tree Wire sections, the most visible and widespread impacts of vegetation management and tree clearing will be minimized.

- For lodgepole pine trees, remove up to 1/3 of the total tree height or up to 1/2 of the live crown, whichever is greater to minimize tree death from topping. For Douglas fir or spruce with live crowns to the ground, topping will not generally cause tree death.

- Where possible, top individual trees, rather than large patches of trees, to maintain the natural aesthetic of the forests adjacent to the edge of the ROW.

- In areas of high visibility concern, vary the final height of patches of topped trees to maintain a more natural look in the forests adjacent to the ROW from a distance.

4.6.2 Public Facilities and Services

4.6.2.1 Baseline

The 551L is a service to the public as the only transmission line providing electricity for all locations and users west of Banff to Lake Louise. Access to the ROW for Project activities will require the use of roads and highways including Mount Norquay road, Juniper road, TCH, BVP, and Whitehorn Rd., and BVP. The 551L crosses the TCH and the majority of the line parallels the BVP and intersects the parkway in a few locations.

There are many public facilities along the BVP that have the potential to be impacted by this Project including: day use areas, pull-outs, campgrounds, hotels, resorts, and summer/winter recreational trails (Table 4-16). The 551L ROW intersects eight summer and winter recreational trails between Banff and Lake Louise that could be affected by Project activities (Table 4-17).

Table 4-16. Public facilities along the TCH and BVP that have the potential to be impacted by the AltaLink 551L Fire Risk Mitigation Project (locations are listed from east to west along the AltaLink 551L ROW).

Facility	Work Activities During Project	
	Installation of Tree Wire	Danger Tree removal at edge of ROW
Fenlands Recreation Centre	x	
Juniper Hotel	x	x
Fireside day use area [a]		x
Muleshoe day use area [a]		x
Hillsdale Meadows pullout/ exhibit		x
Johnston Canyon campground [a]		x
Castle Mountain Hostel		x
Castle Mountain Resort	x	
Castle Lookout day use area		x
Protection Mountain Campground [a]		x
Baker Creek by Basecamp		x
Corral Creek day use area [a]		x

a. Closed in winter

Table 4-17. Recreational trails that intersect and/or follow the AltaLink 551L ROW between Banff and Lake Louise (Locations are ordered from east to west along the BVP).

Trail Name	Trail Location (Str Spans)	Primary Season of Use	Length of Trail within PSA (m)
Edith Pass hiking trail	64-67	Summer	78
Lake Louise Loppet ski trail (East - Banff to Castle Jct.)	81-81A, 183-188	Winter	552
Lake Louise Loppet ski trail (West - Castle Jct. to Lake Louise)	395-410, 443-444	Winter	1318
Castle Junction Cross Country ski trail 3	225-236a	Winter	1109
Castle Junction Cross Country ski trail 1	258-284	Winter	2641
Castle Lookout hiking trail	282-284	Summer	60
Baker Creek ski trail	339-364	Winter	2558

4.6.2.2 Effects Analysis

The Project will have a positive effect on the reliability of the transmission line and reduce wildfire risk associated with trees falling on the conductor.

There will be temporary closures on the TCH, Mount Norquay road, and the BVP where they intersect the 551L during the Project. There may be limited single lane short term closures of up to 30 minutes on the BVP and Mount Norquay road to unload machinery at the accesses or to load trees onto logging trucks. There will be full closures for up to 15 minutes required on the BVP to string the conductor across the road and up to a 30 minute closure required on the TCH.

The public facilities could be adversely affected by logging equipment noise and the presence of machinery in close proximity during tree removal and installation of Tree Wire sections (Table 1x). This effect is negated for facilities that are not open in the winter. The Project could have a negative effect on aesthetics if there is increased visibility of the transmission line from the facilities; see Section 4.6.1 above for full analysis of effects to Visibility.

There will be closures on the trails where line construction or tree removal is occurring within 100 m. Trail closures will occur in the winter and therefore would affect the cross-country ski trails including the Baker Creek, Castle Junction, Corral Creek and the Lake Louise to Banff Loppet trail. Closures are expected to be short term (1-3 weeks) and winter recreational activities on the trails that intersect the ROW are expected to resume following the required work in each section of the line.

4.6.2.3 Mitigation Measures

- Tree clearing and line rebuild activities will occur in the fall through winter when use of public facilities on or adjacent to the ROW is lower.
- A Traffic Accommodation strategy will be created for the Project detailing required road closures and single lane traffic requirements to minimize traffic disruptions in consultation with Parks Canada Highway services. Keep road closures under 30 minutes in duration.
- Parks Canada and the public will be notified of anticipated trail closures and power outages as per AltaLink standards.
- Work on the ROW will be planned to minimize disruptions to trail users including the Lake Louise to Banff Loppet race held annually in late January.

4.6.2.4 Residual Effects

There is expected to be negligible residual effects to facilities and trails if all of the mitigation is implemented.

4.6.3 Public Safety

4.6.3.1 Baseline

A 2019 fire risk study on the 551L ROW indicated that most of the ROW is situated in HRFAs (Forsite 2019). HFRAs are areas that are more likely to have unmitigated fire risk conditions resulting from high intensity and/or fast spreading wildfire that could overwhelm initial fire suppression resources in the case of an ignition. Currently, the 551L poses a risk to the public in terms of being a source of wildfire ignitions and spread due to the high numbers of Danger Trees at the edges of the ROW that can ignite a wildfire if they fall and contact the bare wire on the transmission line.

4.6.3.2 Effects Analysis

The Project will have a positive effect on public safety by reducing wildfire ignition hazard posed by the AltaLink 551L transmission line.

4.6.3.3 Mitigation Measures

No mitigation required.

4.6.3.4 Residual Effects

There are no negative residual effects of this Project to public safety.

4.7 Indirect Effects

The Project will result in some ground disturbance, vegetation removal, and closures resulting in in short term loss of access to these lands by Indigenous people during construction. This Project has some potential to affect identified and unidentified Indigenous cultural sites and objects given the expected ground disturbance and use of machinery. Project activities will avoid or mitigate for sites identified during indigenous consultation during the 551L rebuild Project. Need direction from PCA to complete this section on indirect effects to Indigenous peoples.

Given the relatively short duration, fall/winter timing of the work, and the low public use on most of the ROW, this Project is likely to have very low magnitude short term negative effects to users of the park and related tourist businesses during tree removal or Tree Wire construction activities.

This Project will, however, have a long term positive effect on the reliability of the transmission line, which is the sole source of electricity in the park west of Banff and supports the existing approved visitor experience and use of the park. This Project will also reduce the risk of wildfire ignitions which in turn will make the park a safer environment for visitors, residents, and commercial businesses operating in the park.

With the current minimal use of the ROW by visitors and full reclamation of disturbed areas back to a natural vegetation community, this Project is expected to have a negligible effect on the viewscapes, long term access and use of public facilities, and natural aesthetic of the park.

5.0 Surveillance Requirements

A designated Parks Canada ESO will be on-site at the start-up of this Project and on a regular basis as the Project proceeds to ensure that mitigation measures are being followed. In addition, AltaLink will have an independent environmental monitor on site, as required, during construction who will monitor the activities and provide a brief written summary report of all monitoring activities and required remedial action to AltaLink and Parks Canada on a weekly basis. The EM will work with equipment operators and fallers at the start of this Project to ensure that best practices are used to prevent deleterious substances from entering the soil or water, minimize ground disturbance, and loss or damage to remaining vegetation. Surveillance will be crucial in those areas that are deemed to be sensitive due to the presence of identified vegetation, wildlife, and/or aquatic VCs.

In general, a QAES is required on-site during installation, operation, and removal of a watercourse crossing to assess effects on the aquatic environment at the time of installation, the condition of the crossing structure and site, and effectiveness of mitigation measures associated with each crossing. Assessments and monitoring completed by the QAES will follow the guidelines provided in Schedules 2 and 4 of the Code of Practice for Watercourse Crossings unless otherwise directed by Parks Canada (Government of Alberta 2019b).

6.0 Monitoring Requirements

A post-construction reclamation monitoring program will be implemented for all disturbed and reclaimed areas on the AltaLink ROW following construction and tree clearing. Reclaimed sites will be monitored for a minimum of three years until sites meet the established reclamation criteria. The reclaimed areas will have an NNV survey in the spring and a reclamation survey in late summer to assess plant community composition and structure according to established reclamation criteria over a three-year period. The criteria used to determine reclamation success will include landscape assessment (drainage, soil erosion and soil stability), vegetation assessment (desirable species cover, plant community structure and layers, cover of weeds/undesirable plants, and quantity of litter) compared to an undisturbed reference site or number of sites on the ROW that capture the variability of the ROW plan communities.

Where post-construction monitoring indicates that reclaimed areas do not meet reclamation criteria (i.e., plant cover is insufficient or NNV present), additional measures will be implemented to address identified concerns. Monitoring results and associated action plans resulting from these follow up surveys will be summarized in annual monitoring reports and submitted to Parks Canada for review on a yearly basis. This could include ESC measures, NNV control, ripping compacted areas with a machine, reseeding areas, and planting additional plants or different species if initial survival is low.

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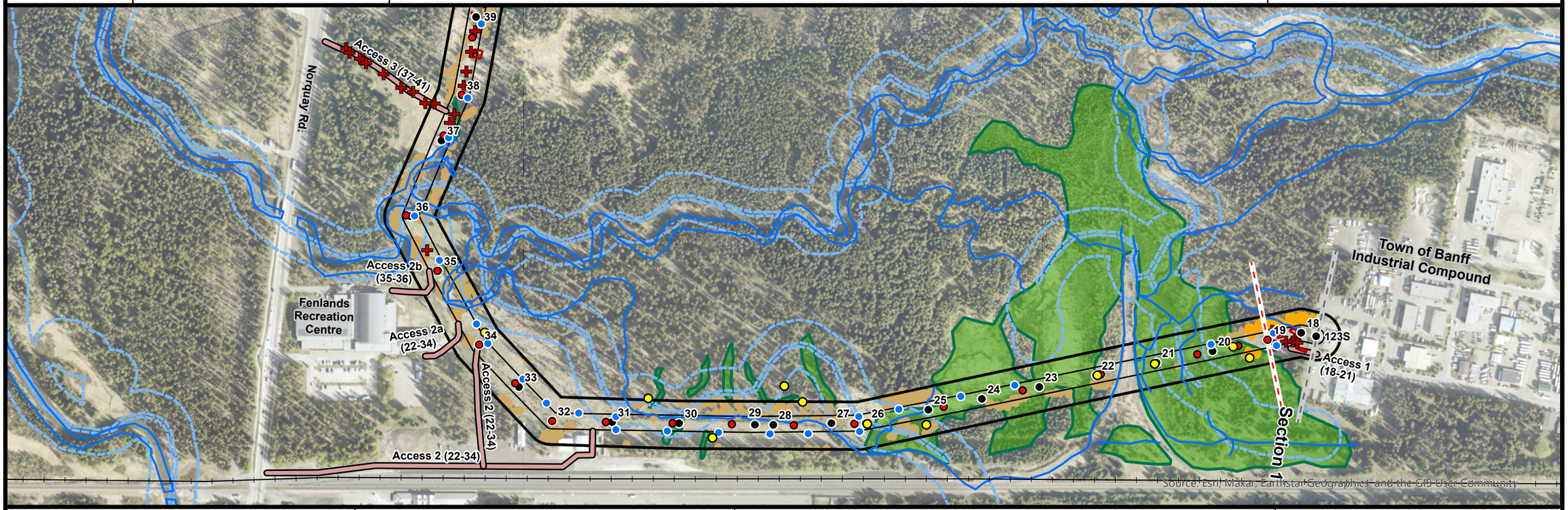
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Appendix A

Access and ROW Constraint Maps

VEGETATION	Noxious weeds: oxeye daisy, tall buttercup (35-36) Canada thistle, bird vetch, cicer vetch, oxeye daisy, common toadflax, tall buttercup (Access 3, 37-39)							Noxious weeds: Common toadflax, Reed canary grass, Oxeye daisy, bird vetch, tall buttercup (18-19)		
WILDLIFE	Canid den (34) Fenlands-Indian Grounds Wildlife Corridor (18-TCH) Cavities (25-31) Cavities (in structures 21, 22, 26)							Barred owl (pair) and Sora (Sensitive) (19-20) Bats observed (both sides of ROW) (18-21)		
AQUATICS	Forty Mile Creek: BLTR, WSCT, BKTR, MTWH. Spawning 2013. No machine crossing (36-37)		Whiskey Creek: BLTR, WSCT, BKTR. Spawning 2013. No machine crossing (34-35)			Whiskey Creek: BLTR, WSCT, BKTR. Spawning 2013, 2024. Machine crossing (clear span bridge) (26-29)		Whiskey Creek tributary: BLTR, WSCT, BKTR. Spawning 2013. No machine crossing (21-22)		Whiskey Creek tributary: BLTR, WSCT, BKTR. Spawning 2013. Machine crossing (clear span) (20-21)
WETLANDS		Graminoid fen connected to 40 Mile Creek. Machine crossing (snow road). (37-38)		Seepage. Machine crossing (30-31)			Graminoid/shrubby fen complex. WETO, WOFR. Machine crossing (snow road). (18-27)			
CRITICAL HABITAT			Westslope Cutthroat trout and Bull trout Critical Habitat within 30m of creeks and waterbodies (20-21, 25-29, 29-31, 34-37)							
CULTURAL	Areas of Cultural Sensitivity (Access 2 & 33-35)									
OTHER										
SEASON			Tree wire construction season: Jan-Mar (19-48)							



AltaLink 551L Fire Mitigation

Vegetation Encroachment and Constraints

Section 1

This map is a graphical representation of data compiled from numerous sources and is intended to provide general information only. A degree of error is inherent in all data sources and maps, therefore all locations and distances should be confirmed by site visit or field survey.

Legend

- 551L As-Built Structures
- Proposed Tree Wire Structure
- Temporary Bypass Structures
- Proposed Tree Wire Sections
- Construction Sections
- Access
- Highway Access Gates
- Railway
- 551L 20m ROW
- Project Study Area (PSA)

Fall Over Analysis

- Tree Wire - Retain Trees
- Vegetation Management - Cut or Top Trees

Constraints

- Rare Plants
- Rare Plants
- PIWO Nesting Cavity
- Wildlife/Habitat Feature
- Wildlife/Habitat Feature
- Noxious Weeds
- Noxious Weeds
- Summer Trail
- Winter Trail
- Annual Hillsdale Closure
- Creeks
- Wetlands
- Floodplain
- Critical Habitat (Bull or Westslope Cutthroat Trout)

Scale: 1:5,000

0 25 50 100 150 200 250 300 M

N

Prepared For: Parks Canada, Banff National Park

Prepared By: AVENS CONSULTING

Drawn By: Bruce Gleig

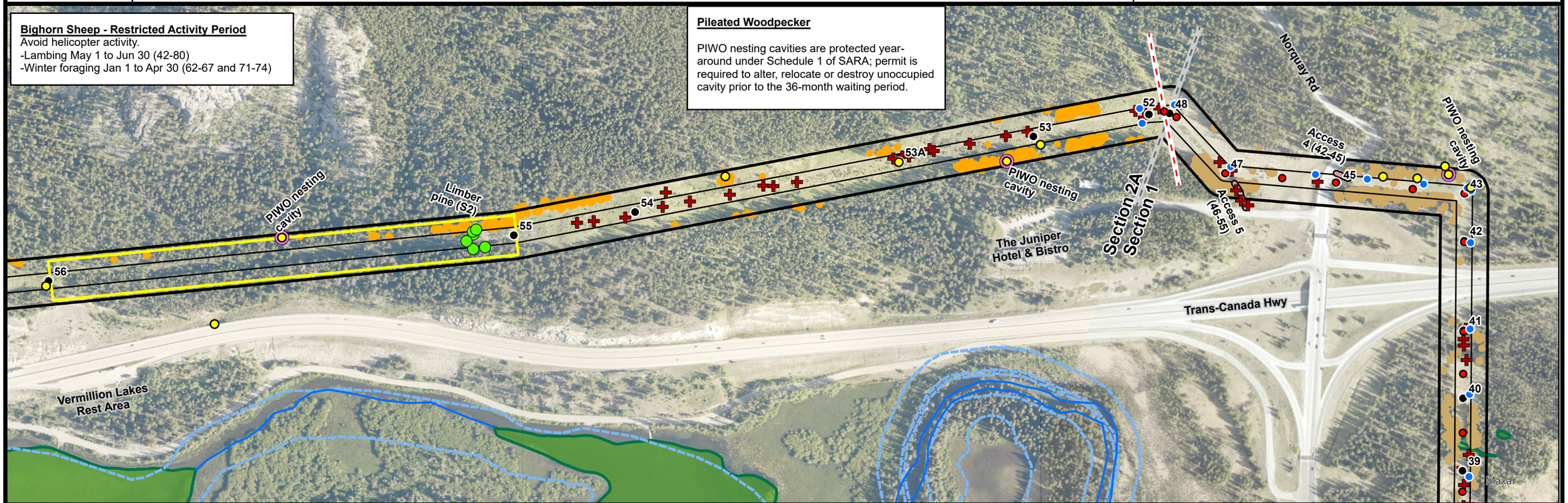
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2022 Base Imagery

ALTALINK
A BERKSHIRE HATHAWAY ENERGY COMPANY

Map 1

VEGETATION		Rare: limber pine (S2) (55-56)	Weeds: oxeye daisy, bird vetch, Canada thistle, tall buttercup (45-55)			Weeds: common toadflax, perennial sow thistle (40-41)
WILDLIFE	Movement corridor (open forested gully), TCH wildlife underpass (55-56). PIWO nesting cavity (Schedule 1 SARA) (55-56). Olive-sided flycatcher (MBAR) (56)		Veteran Douglas-fir (unique habitat feature) (53A-54)	PIWO nesting cavity (Schedule 1 SARA) (53-53A)	Norquay-Cascade Wildlife Corridor (TCH-69) (18-TCH) Cavities (43-53A)	Active osprey nest platform. PIWO nesting cavity (Schedule 1 SARA) (43)
AQUATICS						
WETLANDS						2 graminoid fens. WETO. Machine crossing (snow road). (39-40)
CRITICAL HABITAT						
CULTURAL	Areas of Cultural Sensitivity (41-43, 43-45, 53-53A)					
OTHER						
SEASON					Tree wire construction season: Jan-Mar (19-48)	



AltaLink 551L Fire Mitigation

Vegetation Encroachment and Constraints

Section 1/2A

Legend

- 551L As-Built Structures
- Proposed Tree Wire Structure
- Temporary Bypass Structures
- Proposed Tree Wire Sections
- Construction Sections
- Access
- Highway Access Gates
- Railway
- 551L 20m ROW
- Project Study Area (PSA)

Fall Over Analysis

- Tree Wire - Retain Trees
- Vegetation Management - Cut or Top Trees

Constraints

- Rare Plants
- Rare Plants
- PIWO Nesting Cavity
- Wildlife/Habitat Feature
- Wildlife/Habitat Feature
- Noxious Weeds
- Noxious Weeds
- Summer Trail
- Winter Trail
- Annual Hillsdale Closure
- Creeks
- Wetlands
- Floodplain
- Critical Habitat (Bull or Westslope Cutthroat Trout)

Scale: 1:5,000

0 25 50 100 150 200 250 300 M

N

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Prepared For: Parks Canada, Banff National Park

Prepared By: AVENS CONSULTING

Drawn By: Bruce Gleig

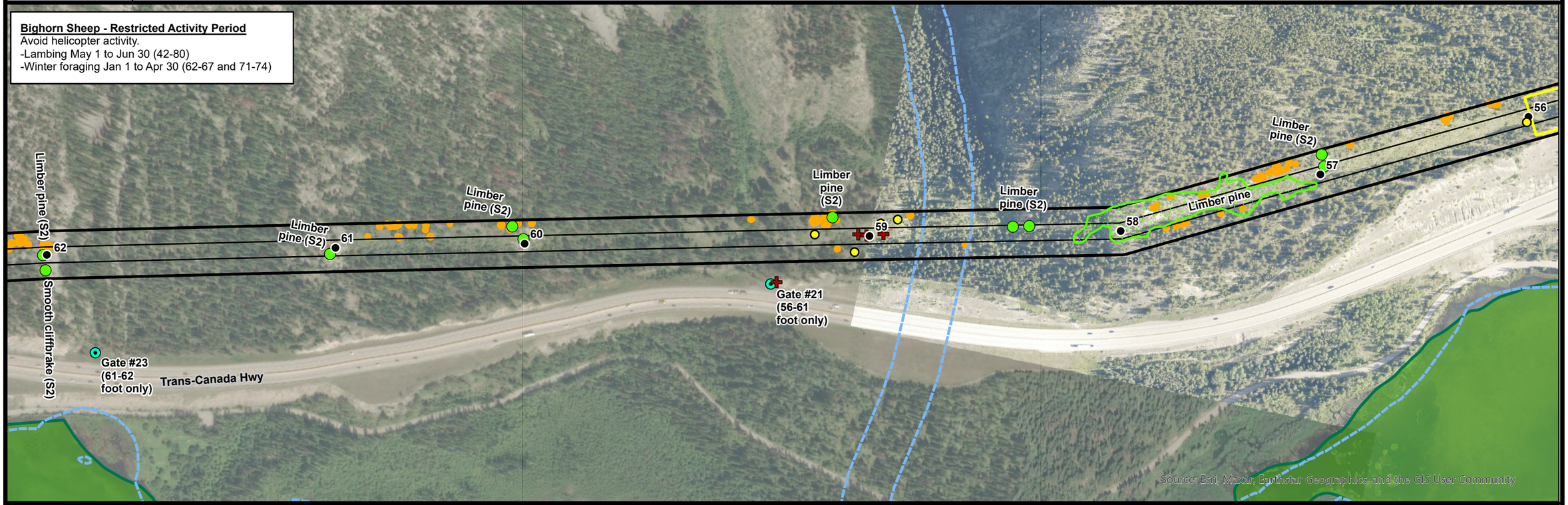
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2021/2022 Base Imagery

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Map 2

VEGETATION	Rare: simple cliffbrake (62)	Weeds: Spotted knapweed, perennial sow thistle (58-59)	Rare: limber pine (S2) (57-62)	
WILDLIFE	Norquay-Cascade Wildlife Corridor (TCH-69)	Veteran Douglas Fir (59-60) Cavities (59)	Norquay-Cascade Wildlife Corridor (TCH-69)	
AQUATICS				
WETLANDS				
CRITICAL HABITAT		Bull trout Critical Habitat within 30m of creeks and waterbodies (58-59)		
CULTURAL				
OTHER				
SEASON				



AltaLink 551L Fire Mitigation

Vegetation Encroachment and Constraints

Section 2A

This map is a graphical representation of data compiled from numerous sources and is intended to provide general information only. A degree of error is inherent in all data sources and maps, therefore all locations and distances should be confirmed by site visit or field survey.

Legend

- 551L As-Built Structures
- Proposed Tree Wire Structure
- Temporary Bypass Structures
- Proposed Tree Wire Sections
- Construction Sections
- Access
- Highway Access Gates
- Railway
- 551L 20m ROW
- Project Study Area (PSA)

Fall Over Analysis

- Tree Wire - Retain Trees
- Vegetation Management - Cut or Top Trees

Constraints

- Rare Plants
- Rare Plants
- PIWO Nesting Cavity
- Wildlife/Habitat Feature
- Wildlife/Habitat Feature
- Noxious Weeds
- Noxious Weeds
- Summer Trail
- Winter Trail
- Annual Hillsdale Closure
- Creeks
- Wetlands
- Floodplain
- Critical Habitat (Bull or Westslope Cutthroat Trout)

Scale: 1:5,000

0 25 50 100 150 200 250 300 M

N

Prepared For: Parks Canada, Banff National Park

Prepared By: AVENS CONSULTING

Drawn By: Bruce Gleig

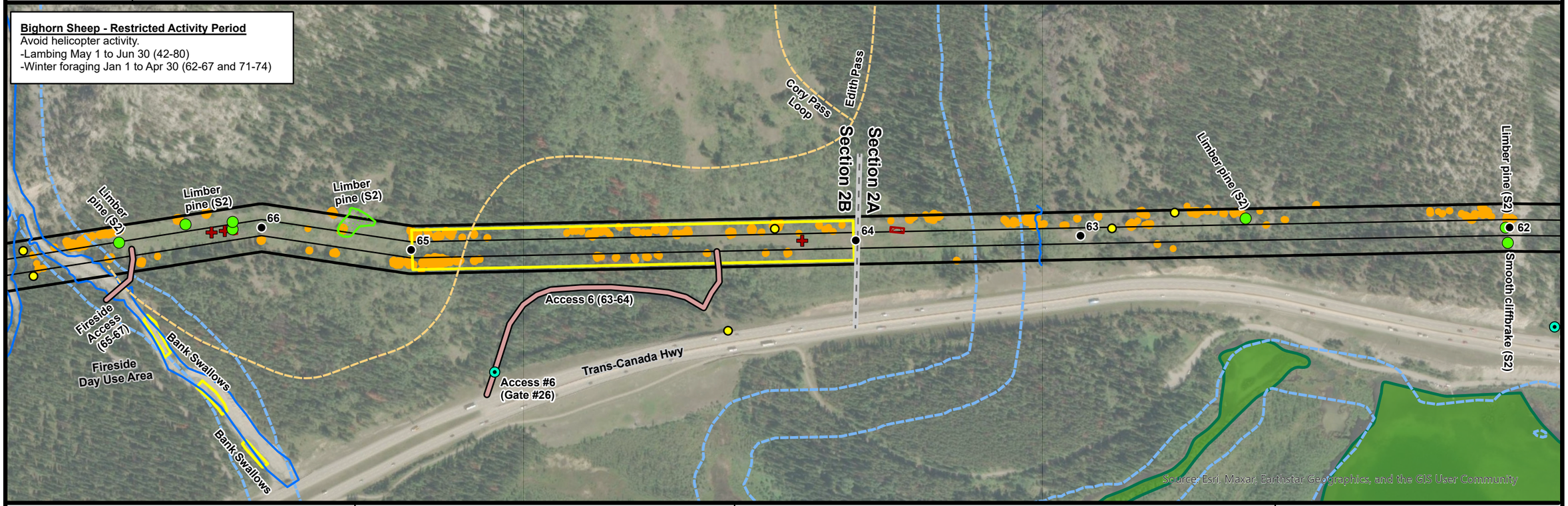
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2021/2023 Base Imagery

ALTALINK
A BERKSHIRE HATHAWAY ENERGY COMPANY

Map 3

VEGETATION	Rare: limber pine (S2) (65-67)	Weeds: Canada thistle, perennial sow thistle (63-67)				Rare: simple cliffbrake (62) Rare: limber pine (S2) (62-63)
WILDLIFE	Bank swallows (SARA-listed Threatened) (65-67 Five Mile Creek)		Movement corridor (open aspen forested gully). Veteran spruce. TCH wildlife underpass (64-65)		Cavities (62-63)	Norquay-Cascade Wildlife Corridor (TCH-69)
AQUATICS	Five Mile Creek. Not fish bearing. Machine crossing (clear span). (66-67)			Unnamed creek to Vermillion Wetlands (ephemeral). No machine crossing. (63-64)		
WETLANDS						
CRITICAL HABITAT	Bull trout Critical Habitat within 30m of creeks and waterbodies (66-67)		Bull trout Critical Habitat within 30m of creeks and waterbodies (58-59)			
CULTURAL						
OTHER						
SEASON						



AltaLink 551L Fire Mitigation

Vegetation Encroachment and Constraints

Section 2A/2B

This map is a graphical representation of data compiled from numerous sources and is intended to provide general information only. A degree of error is inherent in all data sources and maps, therefore all locations and distances should be confirmed by site visit or field survey.

Legend

- 551L As-Built Structures
- Proposed Tree Wire Structure
- Temporary Bypass Structures
- Proposed Tree Wire Sections
- Construction Sections
- Access
- Highway Access Gates
- Railway
- 551L 20m ROW
- Project Study Area (PSA)

Fall Over Analysis

- Tree Wire - Retain Trees
- Vegetation Management - Cut or Top Trees

Scale: 1:5,000

0 25 50 100 150 200 250 300 M

N

Constraints

- Rare Plants
- Rare Plants
- PIWO Nesting Cavity
- Wildlife/Habitat Feature
- Wildlife/Habitat Feature
- Noxious Weeds
- Noxious Weeds
- Summer Trail
- Winter Trail
- Annual Hillsdale Closure
- Creeks
- Wetlands
- Floodplain
- Critical Habitat (Bull or Westslope Cutthroat Trout)

Prepared For: Parks Canada, Banff National Park

Prepared By: AVENS CONSULTING

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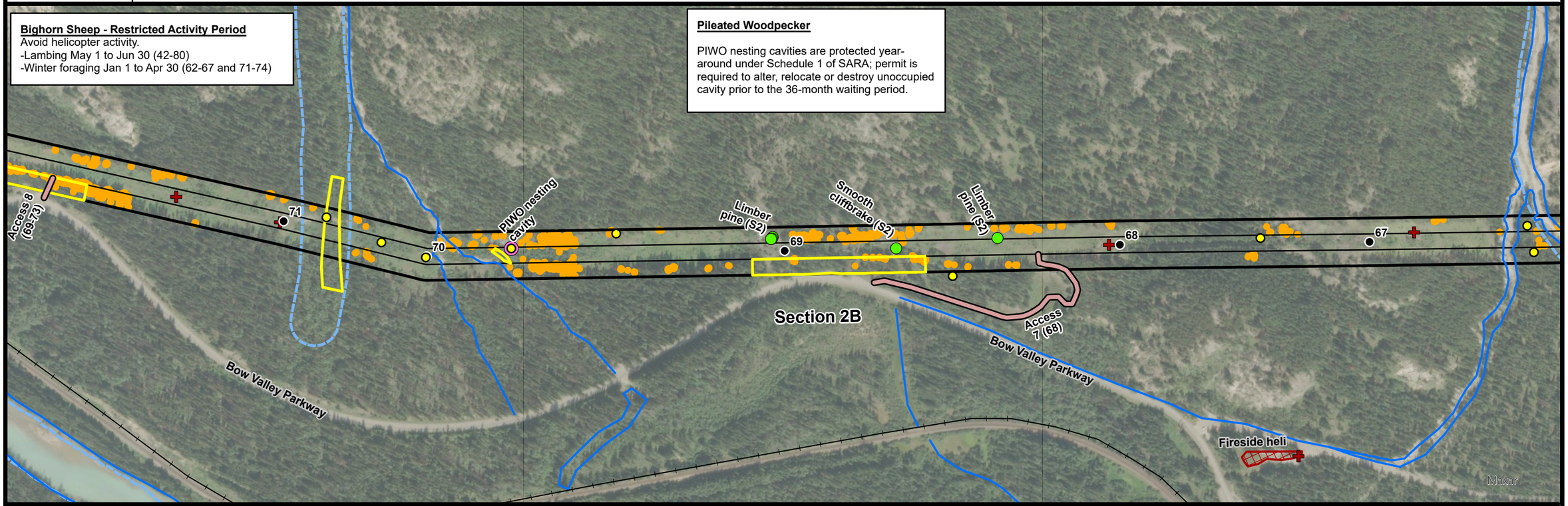
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2023 Base Imagery

ALTALINK
A BERKSHIRE HATHAWAY ENERGY COMPANY

Map 4

VEGETATION	Weeds: Canada thistle (71-72)			Rare: smooth cliffbrake Rare: limber pine (S2) (68-69)		Weeds: Canada thistle, perennial sow thistle (66-68) Weeds: oxeye daisy, common toadflax, absinthe wormwood (Fireside heli)	
WILDLIFE		Old/dry drainage, small mammal crossing (70-71)	Ephemeral drainage & small mammal crossing. PIWO nesting cavity (Schedule 1 SARA) (69-70)	Cavities (68-71)	Widening concern (68-70)	Norquay-Cascade Wildlife Corridor (TCH-69)	Cavities (66-68)
AQUATICS			Unnamed Bow River Tributary (ephemeral). Not fish bearing. Machine crossing (snow fill, access mat) (69-70)				
WETLANDS							
CRITICAL HABITAT		Bull trout Critical Habitat within 30m of creeks and waterbodies (69-71)					Bull trout Critical Habitat within 30m of creeks and waterbodies (66-67)
CULTURAL							
OTHER	Nightly closure: BVP east of Castle Junction Mar 1 to Jun 1 - 8pm to 8am (67-236a)						
SEASON							



AltaLink 551L Fire Mitigation

Vegetation Encroachment and Constraints

Section 2B

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Legend

- 551L As-Built Structures
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- Temporary Bypass Structures
- Proposed Tree Wire Sections
- Construction Sections
- Access
- Highway Access Gates
- Railway
- 551L 20m ROW
- Project Study Area (PSA)

Fall Over Analysis

- Tree Wire - Retain Trees
- Vegetation Management - Cut or Top Trees

Scale: 1:5,000

0 25 50 100 150 200 250 300 M

N

Constraints

- Rare Plants
- Rare Plants
- PIWO Nesting Cavity
- Wildlife/Habitat Feature
- Wildlife/Habitat Feature
- Noxious Weeds
- Noxious Weeds
- Summer Trail
- Winter Trail
- Annual Hillsdale Closure
- Creeks
- Wetlands
- Floodplain
- Critical Habitat (Bull or Westslope Cutthroat Trout)

Prepared For: Parks Canada, Banff National Park

Prepared By: AVENS CONSULTING

Drawn By: Bruce Gleig

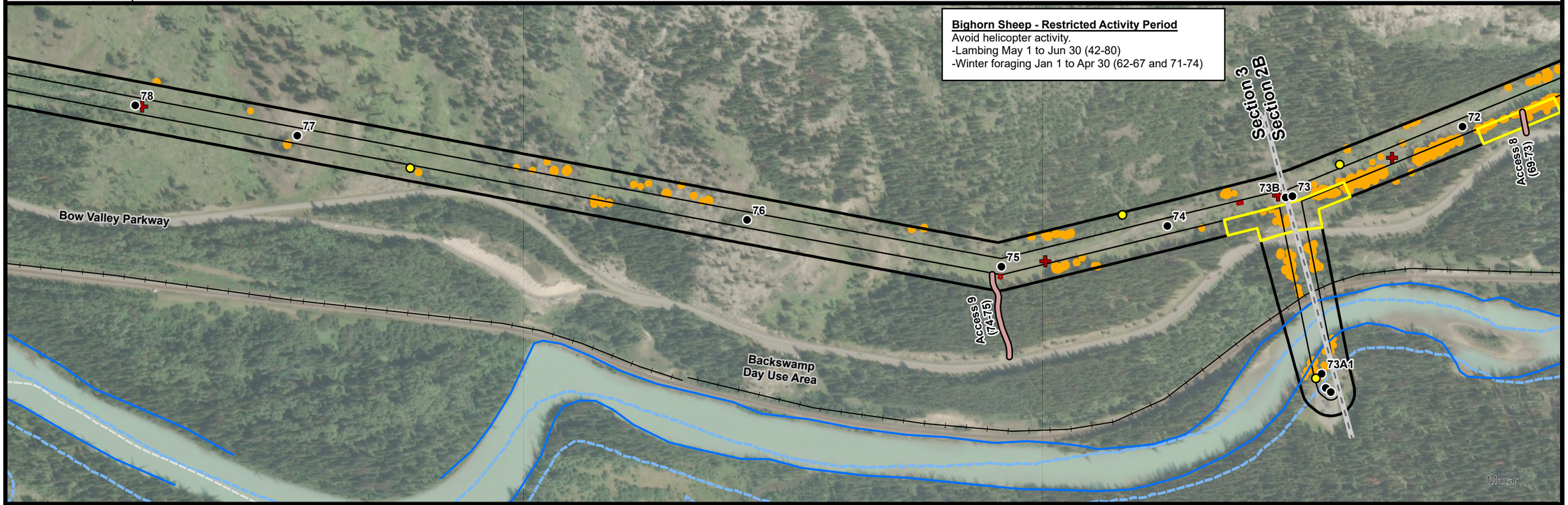
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2023 Base Imagery

ALTALINK
A BERKSHIRE HATHAWAY ENERGY COMPANY

Map 5

VEGETATION	Weeds: oxeye daisy (78)					Weeds: Canada thistle, perennial sow thistle, oxeye daisy (72-75)		
WILDLIFE		Cavity (76-77)		Active bald eagle nest (430m SW of #76, off of map)		Cavities (72-75)	Active osprey nest platform (73A1)	Widening concern (71-72, 72-74)
AQUATICS								
WETLANDS								
CRITICAL HABITAT						Bull trout Critical Habitat within 30m of creeks and waterbodies (73-73A)		
CULTURAL								
OTHER	Nightly closure: BVP east of Castle Junction Mar 1 to Jun 1 - 8pm to 8am (67-236a)							
SEASON								



AltaLink 551L Fire Mitigation

Vegetation Encroachment and Constraints

Section 2A/2B

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Fall Over Analysis

- Tree Wire - Retain Trees
- Vegetation Management - Cut or Top Trees

Scale: 1:5,000

0 25 50 100 150 200 250 300 M

N

Constraints

- Rare Plants
- Rare Plants
- PIWO Nesting Cavity
- Wildlife/Habitat Feature
- Wildlife/Habitat Feature
- Noxious Weeds
- Noxious Weeds
- Summer Trail
- Winter Trail
- Annual Hillsdale Closure
- Creeks
- Wetlands
- Floodplain
- Critical Habitat (Bull or Westslope Cutthroat Trout)

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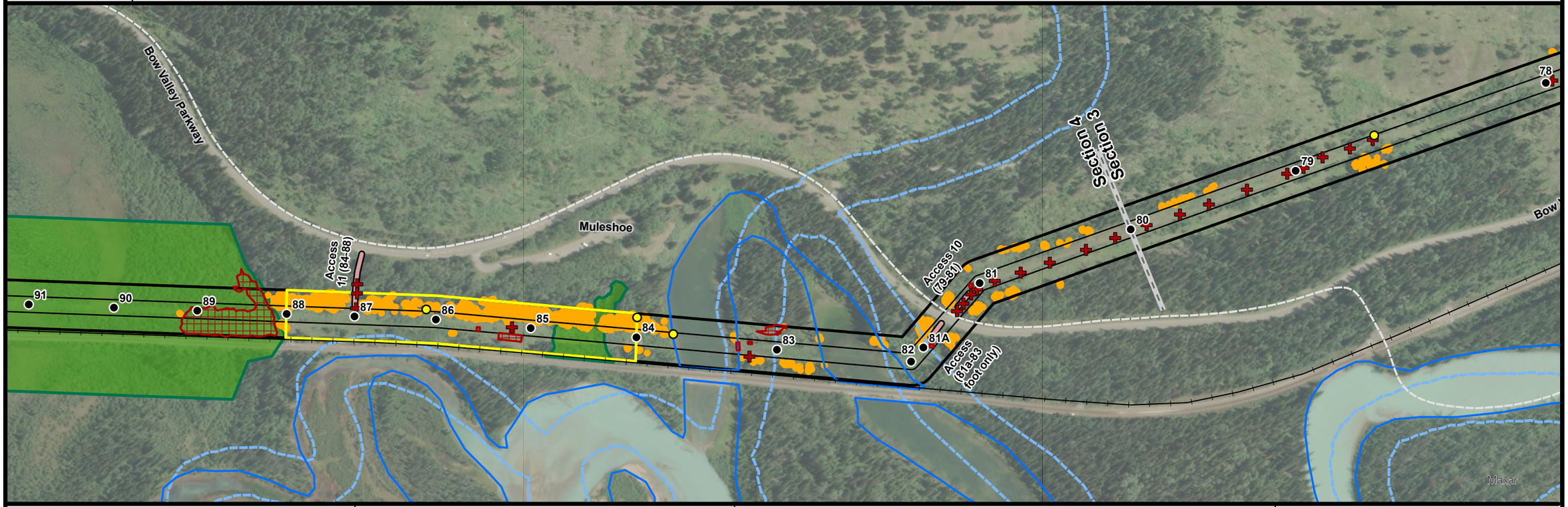
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2023 Base Imagery

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Map 6

VEGETATION	Weeds: reed canary grass (88-89)		Weeds: Canada thistle, perennial sow thistle, oxeye daisy, tall buttercup (BVP-88) Weeds: oxeye daisy (Access 11)			Weeds: oxeye daisy (78-BVP)		
WILDLIFE		Unique wildlife habitat area (84-88)	Cavities (84-86)	Muskrat burrow (83-84)			Cavity (78-79)	
AQUATICS				Muleshoe oxbow: BLTR, WSCT, RBTR, BKTR, MTWH, LATR. WETO, WOFR. No machine crossing. (82-84)				
WETLANDS	Graminoid/shrubby/treed fen complex. WETO, WOFR. Machine crossing (snow road). (88-104)		Shrubby fen. WETO, WOFR. Machine crossing (snow road) (84-85)					
CRITICAL HABITAT		Bull trout Critical Habitat within 30m of creeks and waterbodies (BVP/81A-84, 86-88)						
CULTURAL	Area of Cultural Sensitivity (86-88)							
OTHER	Nightly closure: BVP east of Castle Junction Mar 1 to Jun 1 - 8pm to 8am (67-236a)							
SEASON								



AltaLink 551L Fire Mitigation

Vegetation Encroachment and Constraints

Section 3/4

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- 551L 20m ROW
- Project Study Area (PSA)

Fall Over Analysis

- Tree Wire - Retain Trees
- Vegetation Management - Cut or Top Trees

Constraints

- Rare Plants
- Rare Plants
- PIWO Nesting Cavity
- Wildlife/Habitat Feature
- Wildlife/Habitat Feature
- Noxious Weeds
- Noxious Weeds
- Summer Trail
- Winter Trail
- Annual Hillsdale Closure
- Creeks
- Wetlands
- Floodplain
- Critical Habitat (Bull or Westslope Cutthroat Trout)

Scale: 1:5,000

0 25 50 100 150 200 250 300 M

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Prepared By: AVENS CONSULTING

Drawn By: Bruce Gleig

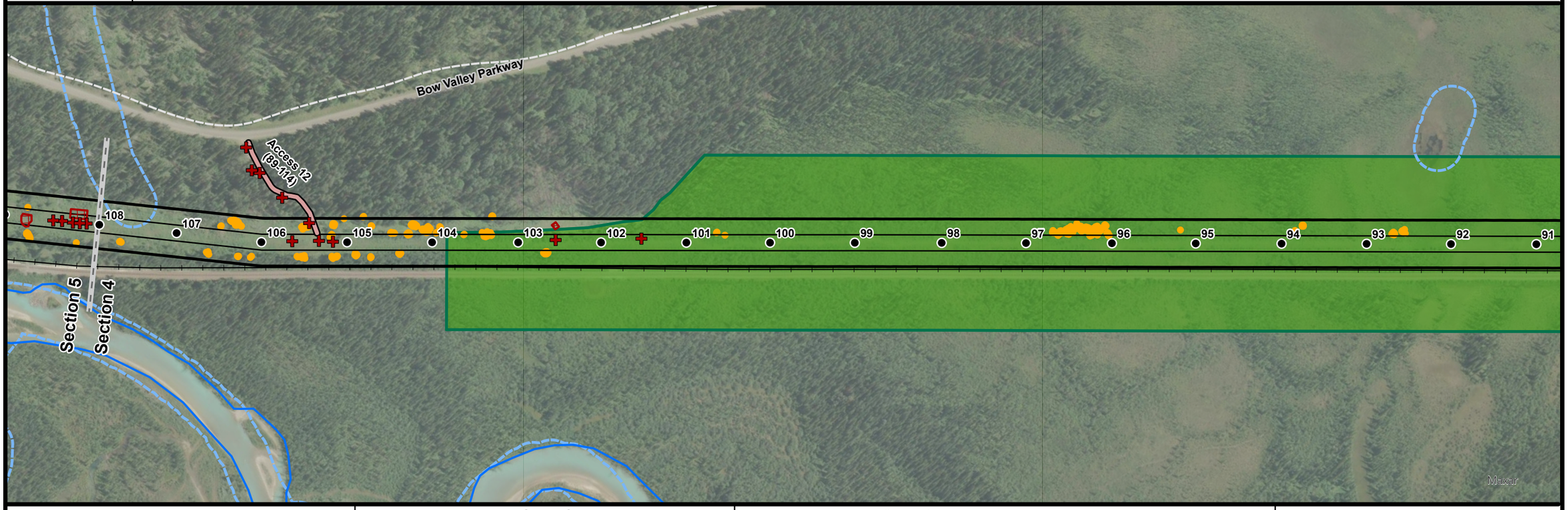
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Map 7

VEGETATION		Weeds: Canada thistle, perennial sow thistle, oxeye daisy, common toadflax (101-108). Oxeye daisy (Access 12)	
WILDLIFE			
AQUATICS			
WETLANDS			Graminoid/shrubby/treed fen complex. WETO, WOFR. Machine crossing (snow road). (88-104)
CRITICAL HABITAT	Bull trout Critical Habitat within 30m of creeks and waterbodies (107-108)		
CULTURAL			
OTHER	Nightly closure: BVP east of Castle Junction Mar 1 to Jun 1 - 8pm to 8am (67-236a)		
SEASON			



AltaLink 551L Fire Mitigation

Vegetation Encroachment and Constraints

Section 4

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- Project Study Area (PSA)

Fall Over Analysis

- Tree Wire - Retain Trees
- Vegetation Management - Cut or Top Trees

Scale: 1:5,000

0 25 50 100 150 200 250 300 M

Constraints

- Rare Plants
- Rare Plants
- PIWO Nesting Cavity
- Wildlife/Habitat Feature
- Wildlife/Habitat Feature
- Noxious Weeds
- Noxious Weeds
- Summer Trail
- Winter Trail
- Annual Hillsdale Closure
- Creeks
- Wetlands
- Floodplain
- Critical Habitat (Bull or Westslope Cutthroat Trout)

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Drawn By: Bruce Gleig

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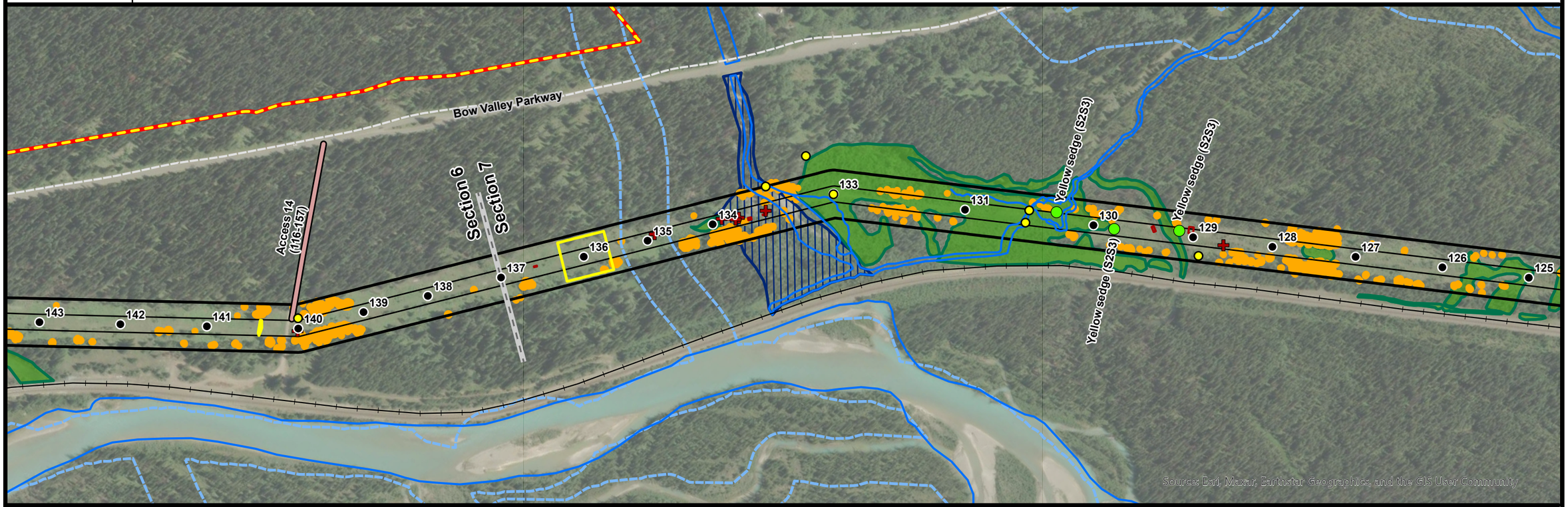
2023 Base Imagery

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A BERKSHIRE HATHAWAY ENERGY COMPANY

Map 8

| | | |

VEGETATION			Weeds: Canada thistle, perennial sow thistle, oxeye daisy, common toadflax, meadow hawkweed, bull thistle (133-140)				Rare: Yellow sedge (S2S3) (129-131)		Weeds: wild caraway, common toadflax (128-130)		
WILDLIFE		Old drainage, small mammal crossing (140-141) Cavity (140)		Wildlife movement/ old drainage (136)		Cavities (133-134) Cavity structure (133)		Beaver dam, muskrat lodge (130-131)		Raptor nest platform (129)	
AQUATICS			Ranger Creek (ephemeral)/Flood plain. BLTR, WSCT. Spawning 2013. Machine crossing (snow fill, access mat). (133-134)			Ranger Creek (ephemeral). BLTR, WSCT. Spawning 2013. Machine crossing (snow fill/rig mats). (131-133)		Ranger Creek tributary. BLTR, BKTR. Spawning 2013. WOFR. Clear span bridge. (130-131)		
WETLANDS					Shrubby fen and creek complex. WOFR. Machine crossing (snow road/ rig mats). (129-135)				Shrubby fen. Machine crossing (snow road). (127-128)		Shrubby fen. WETO. Machine crossing (snow road). (124-126)
CRITICAL HABITAT				Bull trout Critical Habitat within 30m of creeks and waterbodies (133-136)							
CULTURAL											
OTHER	Nightly closure: BVP east of Castle Junction Mar 1 to Jun 1 - 8pm to 8am (67-236a)										
SEASON											



AltaLink 551L Fire Mitigation

Vegetation Encroachment and Constraints

Section 5/6

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- Construction Sections
- Access
- Highway Access Gates
- Railway
- 551L 20m ROW
- Project Study Area (PSA)

Fall Over Analysis

- Tree Wire - Retain Trees
- Vegetation Management - Cut or Top Trees

Constraints

- Rare Plants
- Rare Plants
- PIWO Nesting Cavity
- Wildlife/Habitat Feature
- Wildlife/Habitat Feature
- Noxious Weeds
- Noxious Weeds
- Summer Trail
- Winter Trail
- Annual Hillsdale Closure
- Creeks
- Wetlands
- Floodplain
- Critical Habitat (Bull or Westslope Cutthroat Trout)

Scale: 1:5,000

0 25 50 100 150 200 250 300 M

N

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Drawn By: Bruce Gleig

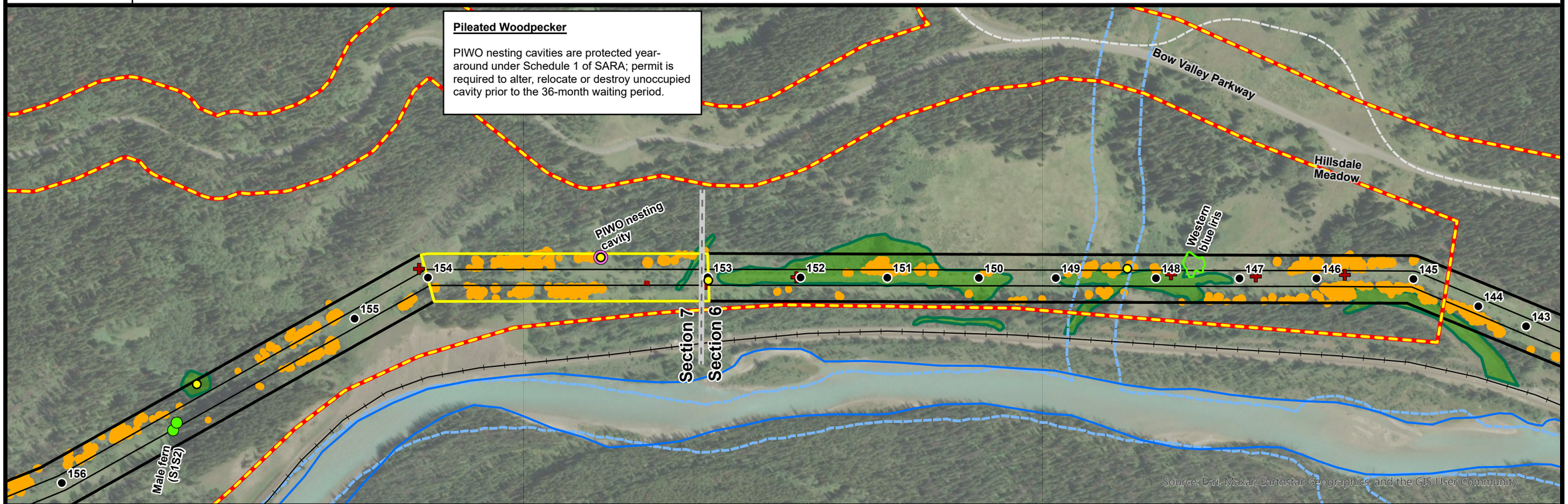
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Map 10

VEGETATION	Rare: male fern (S1S2) (155-156)		Weeds: Canada thistle, perennial sow thistle, oxeye daisy, common toadflax, tall buttercup (145-154)				Rare plant community: blueflag iris (Endangered - SARA) (147-148) (exact boundaries from GPS - maintain a 5m buffer).			
WILDLIFE	Bats recorded (wetland) (155-156)		Unique wildlife habitat area. PIWO nesting cavity (Schedule 1 SARA) (153-154)		Active osprey nest platform (153)		Cavity (148-149)			
AQUATICS										
WETLANDS		Pond. WETO, WOFR. No machine crossing. (155-156)			Shrubby fen. WOFR. Machine crossing (rig mats) (149-153)		Shrubby fen. Machine crossing (snow road) (147-149)		Graminoid fen. WOFR. No machine crossing (143-146)	
CRITICAL HABITAT							Bull trout Critical Habitat within 30m of creeks and waterbodies (148-149)			
CULTURAL										
OTHER	Hillsdale area closure (145-166). April 1 to July 15 for wildlife. Extent and timing may change annually. See parks.canada.ca for updates.						Nightly closure: BVP east of Castle Junction Mar 1 to Jun 1 - 8pm to 8am (67-236a)			
SEASON										



AltaLink 551L Fire Mitigation

Vegetation Encroachment and Constraints

Section 6/7

Legend

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- Highway Access Gates
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- 551L 20m ROW
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Fall Over Analysis

- Tree Wire - Retain Trees
- Vegetation Management - Cut or Top Trees

Constraints

- Rare Plants
- Rare Plants
- PIWO Nesting Cavity
- Wildlife/Habitat Feature
- Wildlife/Habitat Feature
- Noxious Weeds
- Noxious Weeds
- Summer Trail
- Winter Trail
- Annual Hillsdale Closure
- Creeks
- Wetlands
- Floodplain
- Critical Habitat (Bull or Westslope Cutthroat Trout)

Scale: 1:5,000

0 25 50 100 150 200 250 300 M

N

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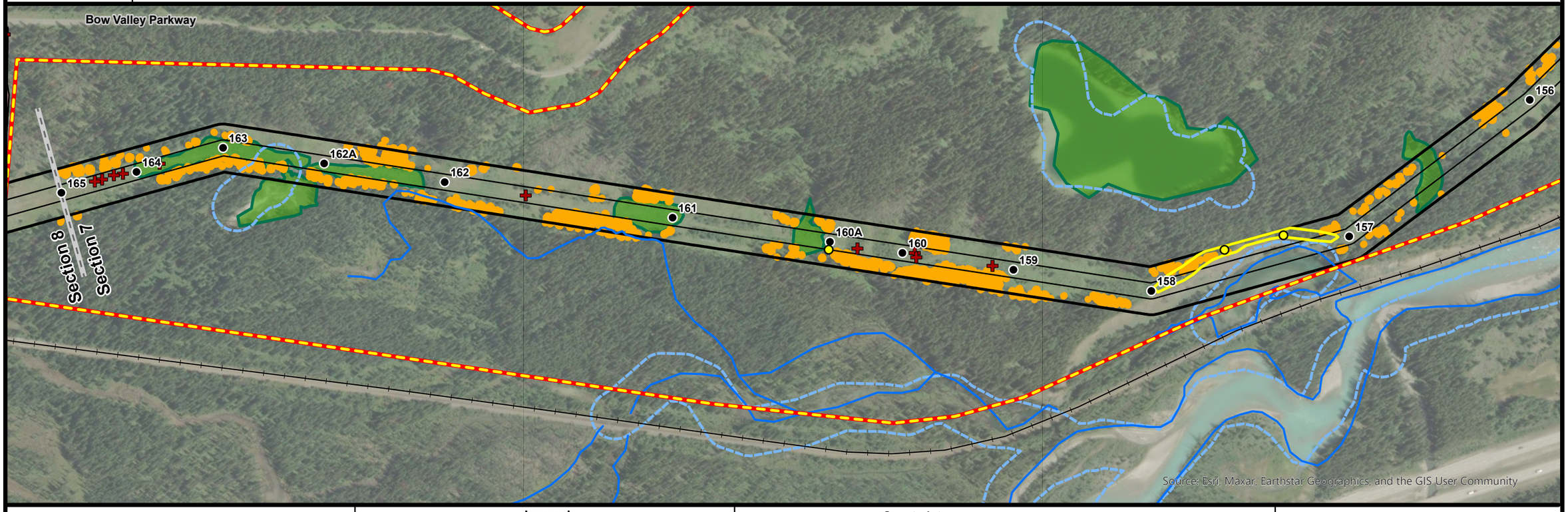
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2023 Base Imagery

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A BERKSHIRE HATHAWAY ENERGY COMPANY

Map 11

VEGETATION	Weeds: oxeye daisy, tall buttercup (163-165)		Weeds: Canada thistle (161-162)		Weeds: oxeye daisy (159-160A)		Rare: Yellow sedge (S2S3) (129-131)				
WILDLIFE		Potential raptor nest (RTHA) (162A-163)		Active osprey nest platform (160A)		Movement corridor, veteran Douglas-fir & den site (157-158)					
AQUATICS							Bow River oxbow. BLTR, WSCT. RBTR, BKTR, MTWH, LATR. No machine crossing. (157-158)				
WETLANDS		Graminoid/ shrubby fen complex, deep peat (snow road/ access mats) (162-164)		Graminoid fen. Machine Crossing (snow road). (161-162)		Shrubby fen. Machine crossing (snow road/ access mats). (160A-161)				Pond. No machine crossing. (156-157)	
CRITICAL HABITAT							Bull trout Critical Habitat within 30m of creeks and waterbodies (157-158)				
CULTURAL											
OTHER	Hillsdale area closure (145-166). April 1 to July 15 for wildlife. Extent and timing may change annually. See parks.canada.ca for updates.						Nightly closure: BVP east of Castle Junction Mar 1 to Jun 1 - 8pm to 8am (67-236a)				
SEASON											



AltaLink 551L Fire Mitigation

Vegetation Encroachment and Constraints

Section 7

Legend

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- 551L 20m ROW
- Project Study Area (PSA)

Fall Over Analysis

- Tree Wire - Retain Trees
- Vegetation Management - Cut or Top Trees

Constraints

- Rare Plants
- Rare Plants
- PIWO Nesting Cavity
- Wildlife/Habitat Feature
- Wildlife/Habitat Feature
- Noxious Weeds
- Noxious Weeds
- Summer Trail
- Winter Trail
- Annual Hillsdale Closure
- Creeks
- Wetlands
- Floodplain
- Critical Habitat (Bull or Westslope Cutthroat Trout)

Scale: 1:5,000

0 25 50 100 150 200 250 300 M

N

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Drawn By: Bruce Gleig

Date: Feb 18, 2025

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ALTALINK
A BERKSHIRE HATHAWAY ENERGY COMPANY

Map 12

VEGETATION	Weeds: Cicer vetch (182)		Rare: ascending moonwort (S3) (175-176)				
WILDLIFE	Old drainage/small mammal crossing (181-182)	Widening concern (177-193)			Widening concern (169-172)		
AQUATICS	Johnston Creek. BLTR, WSCT, BKTR. No machine crossing. (182-183)						
WETLANDS							
CRITICAL HABITAT	Bull trout Critical Habitat within 30m of creeks and waterbodies (182-183)						
CULTURAL						Areas of Cultural Sensitivity (166-167)	
OTHER	Nightly closure: BVP east of Castle Junction Mar 1 to Jun 1 - 8pm to 8am (67-236a)					Hillsdale area closure (145-166). April 1 to July 15 for wildlife extent and timing may change annually. See parks.canada.ca for updates.	
SEASON							



AltaLink 551L Fire Mitigation

Vegetation Encroachment and Constraints

Section 8

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Fall Over Analysis

- Tree Wire - Retain Trees
- Vegetation Management - Cut or Top Trees

Scale: 1:5,000

0 25 50 100 150 200 250 300 M

N

Constraints

- Rare Plants
- Rare Plants
- PIWO Nesting Cavity
- Wildlife/Habitat Feature
- Wildlife/Habitat Feature
- Noxious Weeds
- Noxious Weeds
- Summer Trail
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- Annual Hillsdale Closure
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- Wetlands
- Floodplain
- Critical Habitat (Bull or Westslope Cutthroat Trout)

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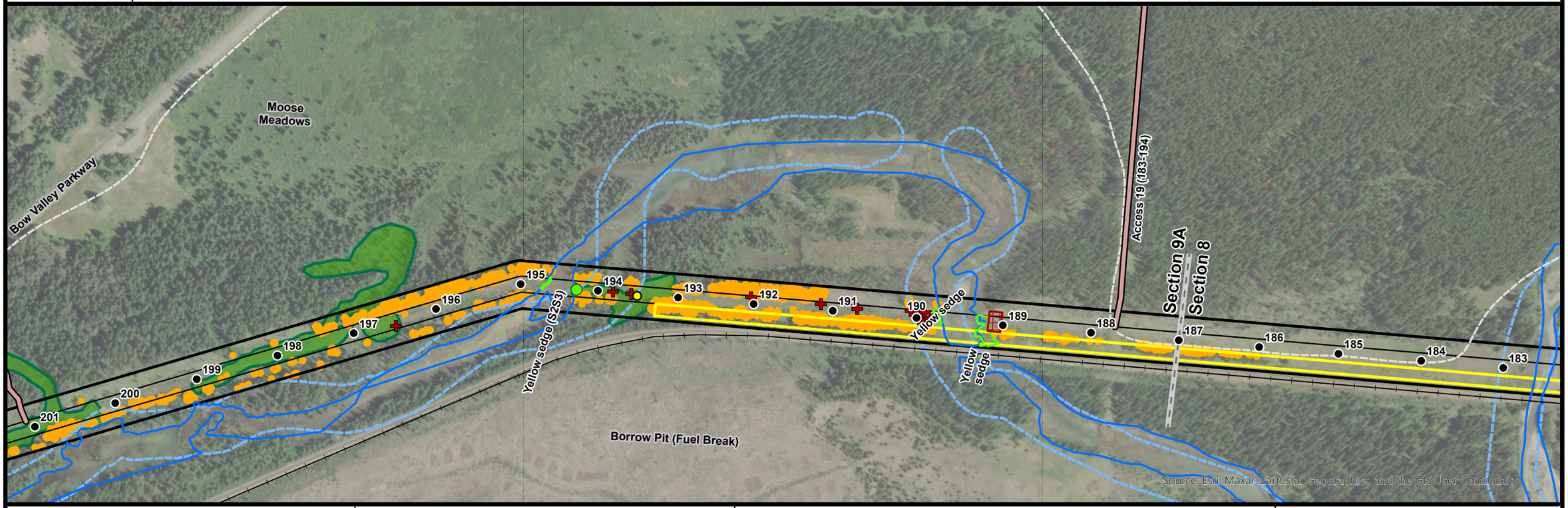
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A BERKSHIRE HATHAWAY ENERGY COMPANY

Map 13

VEGETATION		Weeds: cicer vetch (196-197)	Rare: yellow sedge (S2S3) (194-195)	Weeds: Canada thistle, bull thistle, common toadflax (190-194)	Rare: yellow sedge (S2S3) (189-190)	
WILDLIFE			Olive-sided fly catcher (MBAR) (193-194)	Widening concern (177-193)		
AQUATICS		Unnamed creek: Borrow Pit Springs. BKTR. Spawning 2024. CSFR, WETO. No machine crossing. (194-195)		Unnamed creek: Borrow Pit Springs. BKTR. Spawning 2024. WETO, WOFR. No machine crossing. (189-190)		
WETLANDS	Standing water in graminoid fen. Machine crossing (snow road/rig mats). (200-202)	Shrubby fens. WETO, CSFR. Machine crossing (snow road). (196-199)		Shrubby fen. Frog sp. (eggs). Machine crossing (snow road). (193-creek)		
CRITICAL HABITAT	Bull trout Critical Habitat within 30m of creeks and waterbodies (189-190, 193-196, 198-201)					
CULTURAL						
OTHER	Nightly closure: BVP east of Castle Junction Mar 1 to Jun 1 - 8pm to 8am (67-236a)					
SEASON						



AltaLink 551L Fire Mitigation

Vegetation Encroachment and Constraints

Section 8/9A

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Fall Over Analysis

- Tree Wire - Retain Trees
- Vegetation Management - Cut or Top Trees

Constraints

- Rare Plants
- Rare Plants
- PIWO Nesting Cavity
- Wildlife/Habitat Feature
- Wildlife/Habitat Feature
- Noxious Weeds
- Noxious Weeds
- Summer Trail
- Winter Trail
- Annual Hillsdale Closure
- Creeks
- Wetlands
- Floodplain
- Critical Habitat (Bull or Westslope Cutthroat Trout)

Scale: 1:5,000

0 25 50 100 150 200 250 300 M

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Drawn By: Bruce Gleig

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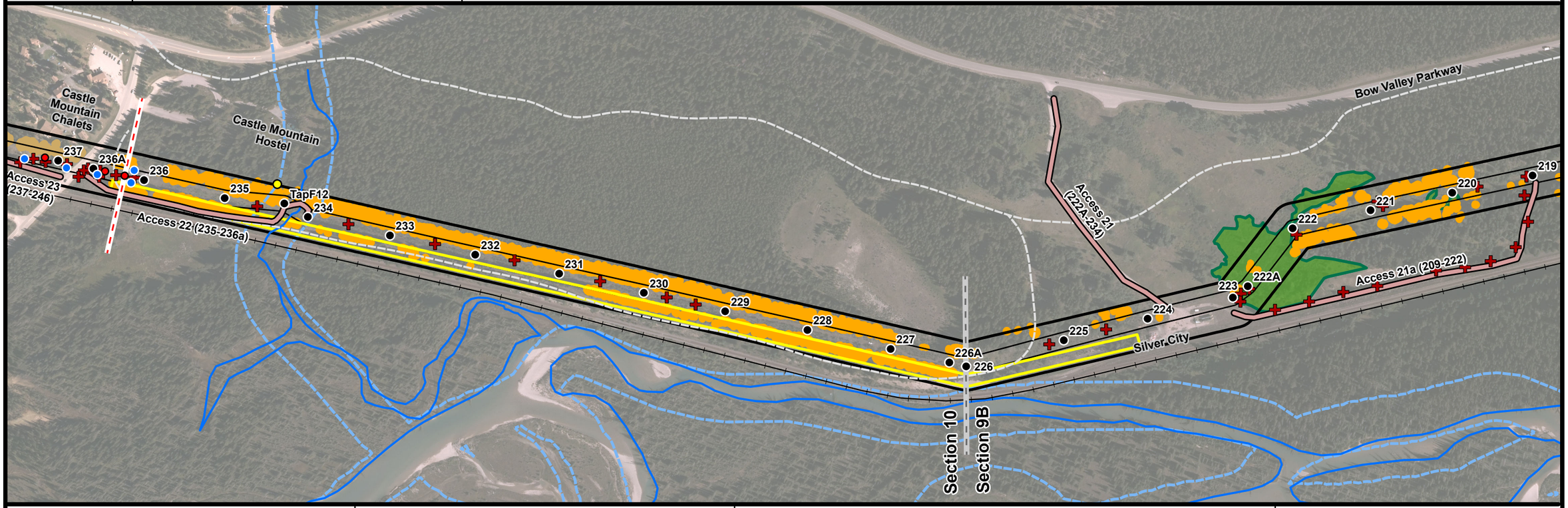
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ALTALINK A BERKSHIRE HATHAWAY ENERGY COMPANY

Map 14

| | | |

VEGETATION	Weeds: meadow hawkweed (229-230). Oxeye daisy (229-236A)				Weeds: tall buttercup, Canada thistle, meadow hawkweed, oxeye daisy (219-225) Weeds: tall buttercup, common toadflax, oxeye daisy (Access 21A)		
WILDLIFE		Cavities (234-235)	Widening concern (224-236A)			Common nighthawk (sensitive) (222)	
AQUATICS		Silverton Creek. BLTR, WSCT, MTWH. Spawning 2024. Potential bull trout redd. No machine crossing. (234-235)					
WETLANDS					Shrubby fen. Amphibian sp. No machine crossing. (222-223)	Graminoid fen and shrubby fen. WETO. Machine crossing (snow road) (220-221)	
CRITICAL HABITAT		Bull trout Critical Habitat within 30m of creeks and waterbodies (234-235)					
CULTURAL	Areas of Cultural Sensitivity (225-230)						
OTHER	Siksika Claim Boundary (225-263)				Nightly closure: BVP east of Castle Junction Mar 1 to Jun 1 - 8pm to 8am (67-236a)		
SEASON	Tree wire construction season: Jan-Mar (236A-252)						



AltaLink 551L Fire Mitigation

Vegetation Encroachment and Constraints

Section 9A/9B

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Fall Over Analysis

- Tree Wire - Retain Trees
- Vegetation Management - Cut or Top Trees

Scale: 1:5,000

0 25 50 100 150 200 250 300 M

Constraints

- Rare Plants
- Rare Plants
- PIWO Nesting Cavity
- Wildlife/Habitat Feature
- Wildlife/Habitat Feature
- Noxious Weeds
- Noxious Weeds
- Summer Trail
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- Annual Hillsdale Closure
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- Floodplain
- Critical Habitat (Bull or Westslope Cutthroat Trout)

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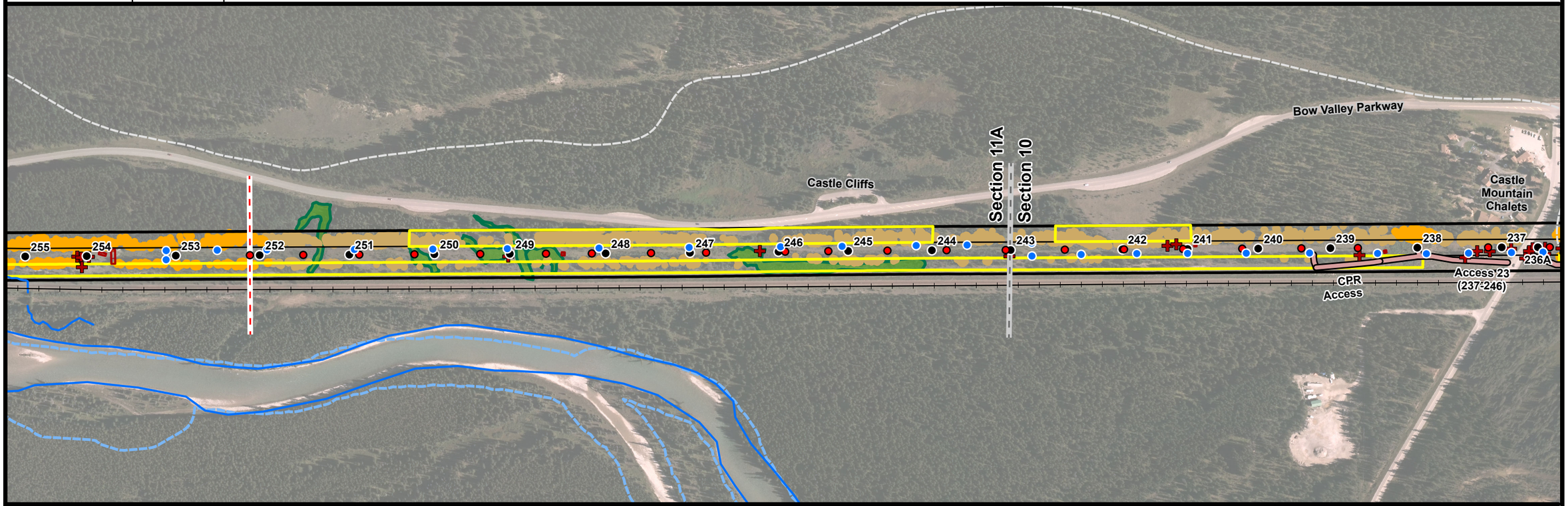
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ALTALINK A BERKSHIRE HATHAWAY ENERGY COMPANY

Map 16

VEGETATION	Weeds: meadow hawkweed, oxeye daisy (253-254)		Weeds: Canada thistle, oxeye daisy (243-249)		Weeds: common toadflax, Canada thistle, oxeye daisy (237-242)	
WILDLIFE	Widening concern (238-257)					
AQUATICS						
WETLANDS	Graminoid fen. WETO, WOFR. Machine crossing (snow road). (251-252)	Shrubby fen. Machine crossing (snow road). (250-251)	Graminoid/shrubby fen complex. WETO. Machine crossing (snow road/ snow fill). (248-250)	Shrubby fen. No machine crossing. (246-247)		
CRITICAL HABITAT						
CULTURAL	Areas of Cultural Sensitivity (244-246)					
OTHER	Siksika Claim Boundary (225-263)					
SEASON		Tree wire construction season: Jan-Mar (236A-252)				



AltaLink 551L Fire Mitigation

Vegetation Encroachment and Constraints

Section 11A

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Legend

- 551L As-Built Structures
- Proposed Tree Wire Structure
- Temporary Bypass Structures
- Proposed Tree Wire Sections
- Construction Sections
- Access
- Highway Access Gates
- Railway
- 551L 20m ROW
- Project Study Area (PSA)

Fall Over Analysis

- Tree Wire - Retain Trees
- Vegetation Management - Cut or Top Trees

Scale: 1:5,000

0 25 50 100 150 200 250 300 M

Constraints

- Rare Plants
- Rare Plants
- PIWO Nesting Cavity
- Wildlife/Habitat Feature
- Wildlife/Habitat Feature
- Noxious Weeds
- Noxious Weeds
- Summer Trail
- Winter Trail
- Annual Hillsdale Closure
- Creeks
- Wetlands
- Floodplain
- Critical Habitat (Bull or Westslope Cutthroat Trout)

Prepared For: Parks Canada, Banff National Park

Prepared By: AVENS CONSULTING

Drawn By: Bruce Gleig

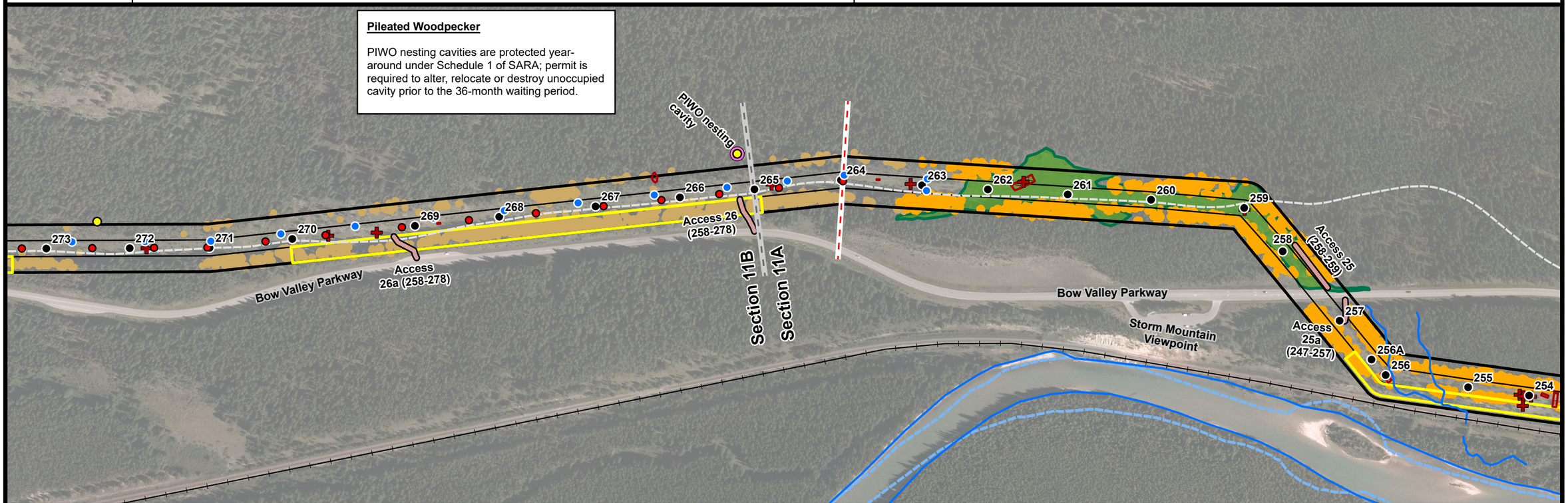
Date: Feb 18, 2025

2014 Base Imagery from Parks Canada

ALTALINK A BERKSHIRE HATHAWAY ENERGY COMPANY

Map 17

VEGETATION	Weeds: Canada thistle, oxeye daisy, perennial sow thistle (259-272)								Weeds: meadow hawkweed, oxeye daisy (253-254)
WILDLIFE	Cavity (272-273)		Widening concern (265-270)		PIWO nesting cavity (Schedule 1 SARA) (265-266)				Widening concern (238-257)
AQUATICS								Unnamed creeks. Not fish bearing. Machine crossing (rig mat/snow fill). (255-256)	
WETLANDS						Graminoid fen. WETO. Machine crossing (snow road/ access mats, both sides). (BVP-263)			
CRITICAL HABITAT									
CULTURAL									
OTHER							Siksika Claim Boundary (225-263)		
SEASON	Tree wire construction season: Oct – Mar (264-275)								



AltaLink 551L Fire Mitigation

Vegetation Encroachment and Constraints

Section 11A/11B

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Legend

- 551L As-Built Structures
- Proposed Tree Wire Structure
- Temporary Bypass Structures
- Proposed Tree Wire Sections
- Construction Sections
- Access
- Highway Access Gates
- Railway
- 551L 20m ROW
- Project Study Area (PSA)

Fall Over Analysis

- Tree Wire - Retain Trees
- Vegetation Management - Cut or Top Trees

Scale: 1:5,000

0 25 50 100 150 200 250 300 M

Constraints

- Rare Plants
- Rare Plants
- PIWO Nesting Cavity
- Wildlife/Habitat Feature
- Wildlife/Habitat Feature
- Noxious Weeds
- Noxious Weeds
- Summer Trail
- Winter Trail
- Annual Hillsdale Closure
- Creeks
- Wetlands
- Floodplain
- Critical Habitat (Bull or Westslope Cutthroat Trout)

Prepared For: Parks Canada, Banff National Park

Prepared By: AVENS CONSULTING

Drawn By: Bruce Gleig

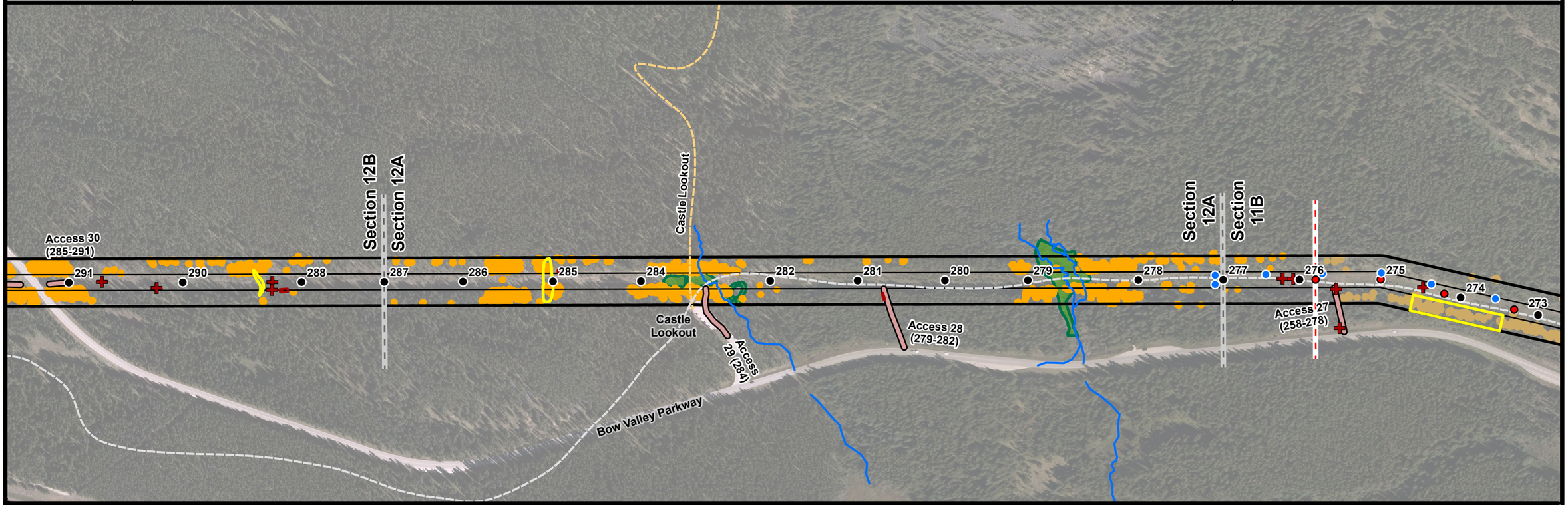
Date: Feb 18, 2025

2014 Base Imagery from Parks Canada

ALTALINK
A BERKSHIRE HATHAWAY ENERGY COMPANY

Map 18

VEGETATION		Weeds: oxeye daisy, Canada thistle, meadow hawkweed (285-291)			Weeds: oxeye daisy (Access 28)			Weeds: oxeye daisy, common toadflax (274-277). Oxeye daisy (Access 27)		
WILDLIFE		Old vegetated drainage/small mammal crossing (288-290)		Old vegetated drainage/ small mammal crossing (285)						Widening concern (273-276)
AQUATICS					Unnamed creek. No machine crossing. (282-284)		Unnamed creeks. WETO. No machine crossing. (278-279)			
WETLANDS			Shrubby fen. Machine crossing west end only (snow road). (282-284)		Graminoid fen. No machine crossing. (282-284)		Shrubby fen and creek. WETO. No machine crossing. (278-279)			
CRITICAL HABITAT										
CULTURAL										
OTHER										
SEASON									Tree wire construction season: Jan-Mar (264-275)	



AltaLink 551L Fire Mitigation

Vegetation Encroachment and Constraints

Section 11B/12A/12B

This map is a graphical representation of data compiled from numerous sources and is intended to provide general information only. A degree of error is inherent in all data sources and maps, therefore all locations and distances should be confirmed by site visit or field survey.

Legend

- 551L As-Built Structures
- Proposed Tree Wire Structure
- Temporary Bypass Structures
- Proposed Tree Wire Sections
- Construction Sections
- Access
- Highway Access Gates
- Railway
- 551L 20m ROW
- Project Study Area (PSA)

Fall Over Analysis

- Tree Wire - Retain Trees
- Vegetation Management - Cut or Top Trees

Scale: 1:5,000

0 25 50 100 150 200 250 300 M

N

Constraints

- Rare Plants
- Rare Plants
- PIWO Nesting Cavity
- Wildlife/Habitat Feature
- Wildlife/Habitat Feature
- Noxious Weeds
- Noxious Weeds
- Summer Trail
- Winter Trail
- Annual Hillsdale Closure
- Creeks
- Wetlands
- Floodplain
- Critical Habitat (Bull or Westslope Cutthroat Trout)

Prepared For: Parks Canada, Banff National Park

Prepared By: AVENS CONSULTING

Drawn By: Bruce Gleig

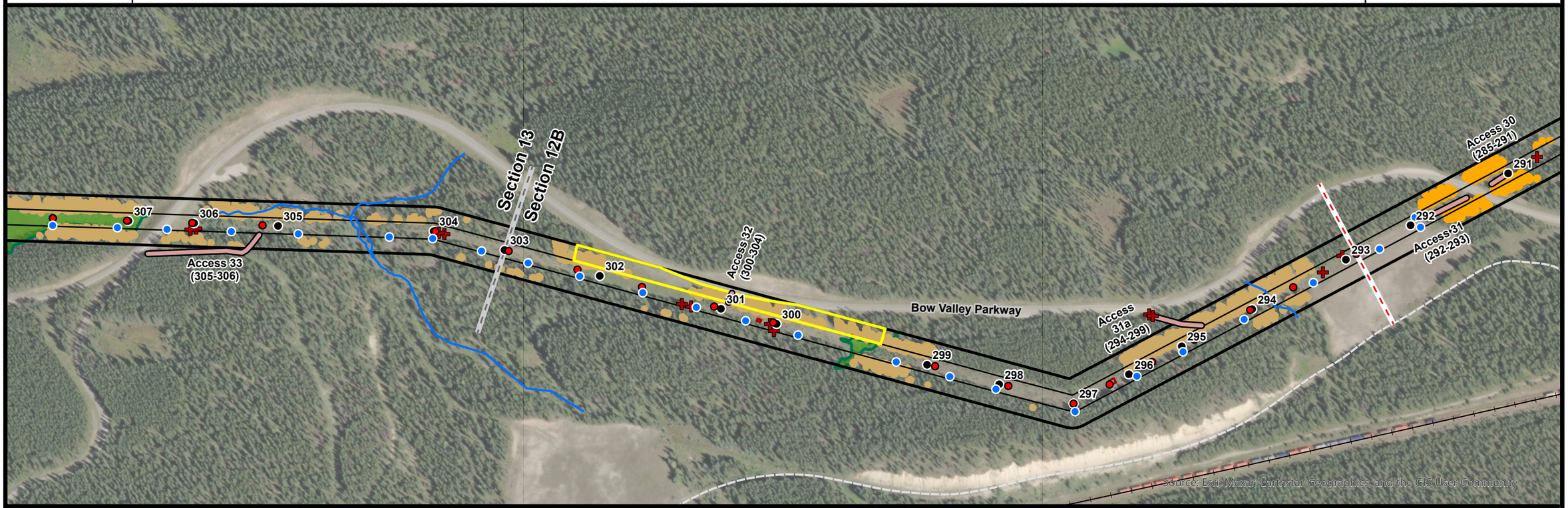
Date: Feb 18, 2025

2014 Base Imagery from Parks Canada

ALTALINK
A BERKSHIRE HATHAWAY ENERGY COMPANY

Map 19

VEGETATION		Weeds: oxeye daisy, common toadflax (304-306)			Weeds: oxeye daisy, Canada thistle, bird vetch (300-302)			Weeds: oxeye daisy, Canada thistle, common toadflax, bird vetch (293-297). Canada thistle (Access 31a)		
WILDLIFE				Widening concern (299-303)						
AQUATICS			Unnamed creek. No machine crossing. (304-305)						Unnamed creek. No machine crossing. (293-294)	
WETLANDS						Shrubby fen. Machine crossing. (299-300).				
CRITICAL HABITAT										
CULTURAL										
OTHER										
SEASON					Tree wire construction season: Jan-Mar (292-317)					



AltaLink 551L Fire Mitigation

Vegetation Encroachment and Constraints

Section 12B/13

This map is a graphical representation of data compiled from numerous sources and is intended to provide general information only. A degree of error is inherent in all data sources and maps, therefore all locations and distances should be confirmed by site visit or field survey.

Legend

- 551L As-Built Structures
- Proposed Tree Wire Structure
- Temporary Bypass Structures
- Proposed Tree Wire Sections
- Construction Sections
- Access
- Highway Access Gates
- Railway
- 551L 20m ROW
- Project Study Area (PSA)

Fall Over Analysis

- Tree Wire - Retain Trees
- Vegetation Management - Cut or Top Trees

Constraints

- Rare Plants
- Rare Plants
- PIWO Nesting Cavity
- Wildlife/Habitat Feature
- Wildlife/Habitat Feature
- Noxious Weeds
- Noxious Weeds
- Summer Trail
- Winter Trail
- Annual Hillsdale Closure
- Creeks
- Wetlands
- Floodplain
- Critical Habitat (Bull or Westslope Cutthroat Trout)

Scale: 1:5,000

0 25 50 100 150 200 250 300 M

N

Prepared For: Parks Canada, Banff National Park

Prepared By: AVENS CONSULTING

Drawn By: Bruce Gleig

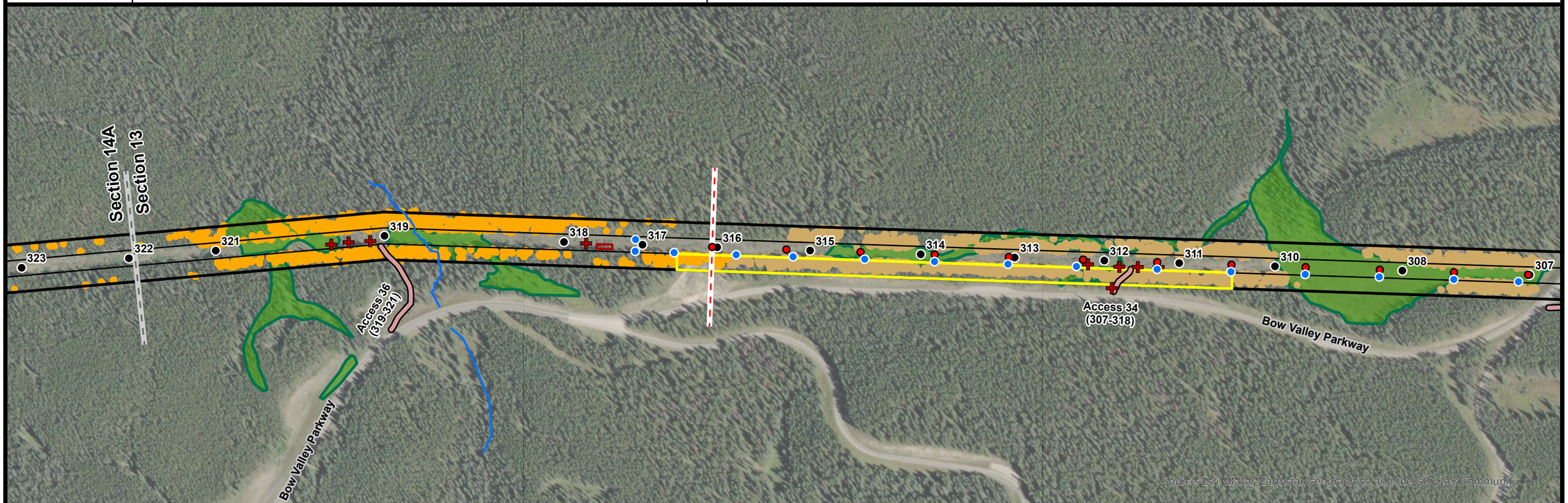
Date: Feb 18, 2025

2012 Base Imagery

ALTALINK
A BERKSHIRE HATHAWAY ENERGY COMPANY

Map 20

VEGETATION		Weeds: meadow hawkweed (319-321)		Weeds: oxeye daisy, reed canary grass (317-318)		Weeds: oxeye daisy (311-312, Access 34)	
WILDLIFE				Widening concern (310-317)			
AQUATICS		Unnamed creek. Machine crossing (snow fill, access mat). (318-319)					
WETLANDS	Shrubby fen. Amphibian sp. Machine crossing (snow road/ access mats, both sides). (319-321)		Shrubby fen/creek complex. Machine crossing (snow road/access mat). (318-319)		Shrubby fen and seepage. Machine crossing (snow road). (311-315)		Shrubby fen. WOFR. Machine crossing from west end (snow road). (307-310)
CRITICAL HABITAT							
CULTURAL							
OTHER							
SEASON				Tree wire construction season: Jan-Mar (293-316)			



AltaLink 551L Fire Mitigation

Vegetation Encroachment and Constraints

Section 13/14A

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Legend

- 551L As-Built Structures
- Proposed Tree Wire Structure
- Temporary Bypass Structures
- Proposed Tree Wire Sections
- Construction Sections
- Access
- Highway Access Gates
- Railway
- 551L 20m ROW
- Project Study Area (PSA)

Fall Over Analysis

- Tree Wire - Retain Trees
- Vegetation Management - Cut or Top Trees

Scale: 1:5,000

0 25 50 100 150 200 250 300 M

Constraints

- Rare Plants
- Rare Plants
- PIWO Nesting Cavity
- Wildlife/Habitat Feature
- Wildlife/Habitat Feature
- Noxious Weeds
- Noxious Weeds
- Summer Trail
- Winter Trail
- Annual Hillsdale Closure
- Creeks
- Wetlands
- Floodplain
- Critical Habitat (Bull or Westslope Cutthroat Trout)

Prepared For: Parks Canada, Banff National Park

Prepared By: AVENS CONSULTING

Drawn By: Bruce Gleig

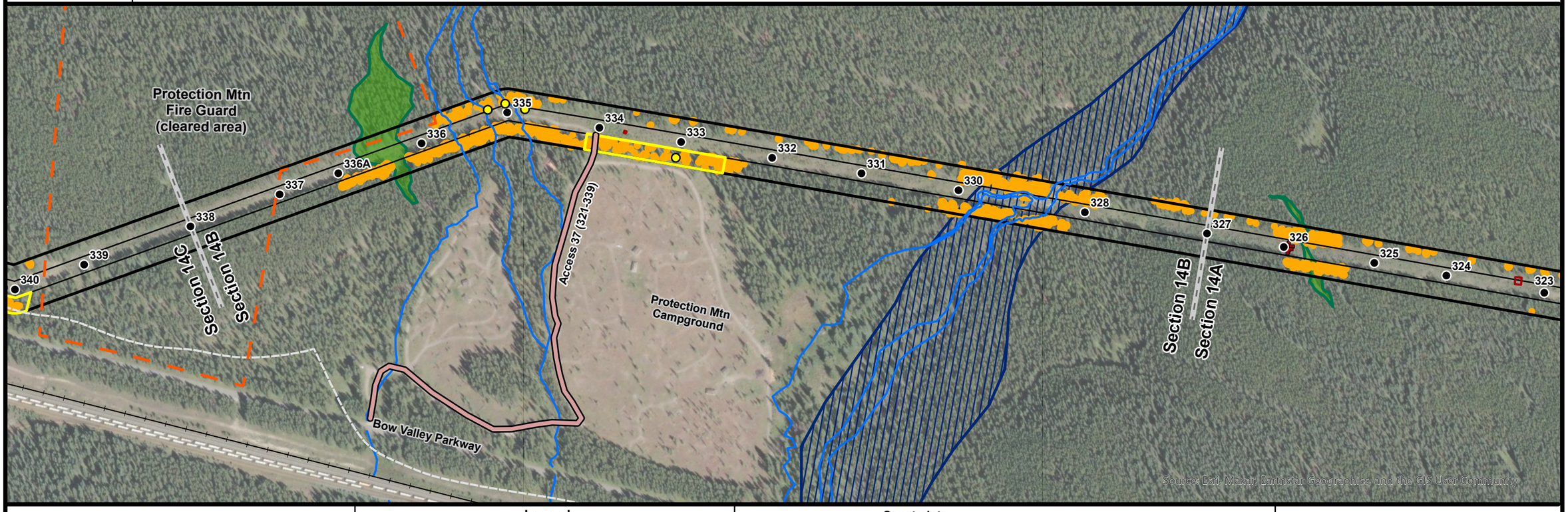
Date: Feb 18, 2025

2012 Base Imagery

ALTALINK
A BERKSHIRE HATHAWAY ENERGY COMPANY

Map 21

VEGETATION			Weeds: oxeye daisy (333-334)					Weeds: Canada thistle (323-324)
WILDLIFE		Cavities (Fortis Poles near 335)	Widening concern (332-334)	Cavity (333)		Grizzly Bear Secure Habitat Area (323-330)		
AQUATICS		Unnamed creeks. Machine crossing (access mats). (335-336)	Unnamed creek. BLTR. Spawning 2024. Machine crossing (existing bridge). (334-335)			Unnamed creek and flood plain. BKTR. Machine crossing (snow fill/access mats). (328-330)		
WETLANDS		Seepage. Machine crossing (snow road). (336-336A)					Seepage. Machine crossing (snow road). (325-326)	
CRITICAL HABITAT								
CULTURAL								
OTHER	Protection Mtn Fire Guard (336-340 (cleared area not visible on air photo)							
SEASON								



AltaLink 551L Fire Mitigation

Vegetation Encroachment and Constraints

Section 14A/14B/14C

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Legend

- 551L As-Built Structures
- Proposed Tree Wire Structure
- Temporary Bypass Structures
- Proposed Tree Wire Sections
- Construction Sections
- Access
- Highway Access Gates
- Railway
- 551L 20m ROW
- Project Study Area (PSA)

Fall Over Analysis

- Tree Wire - Retain Trees
- Vegetation Management - Cut or Top Trees

Scale: 1:5,000

0 25 50 100 150 200 250 300 M

Constraints

- Rare Plants
- Rare Plants
- PIWO Nesting Cavity
- Wildlife/Habitat Feature
- Wildlife/Habitat Feature
- Noxious Weeds
- Noxious Weeds
- Summer Trail
- Winter Trail
- Annual Hillsdale Closure
- Creeks
- Wetlands
- Floodplain
- Critical Habitat (Bull or Westslope Cutthroat Trout)

Prepared For: Parks Canada, Banff National Park

Prepared By: AVENS CONSULTING

Drawn By: Bruce Gleig

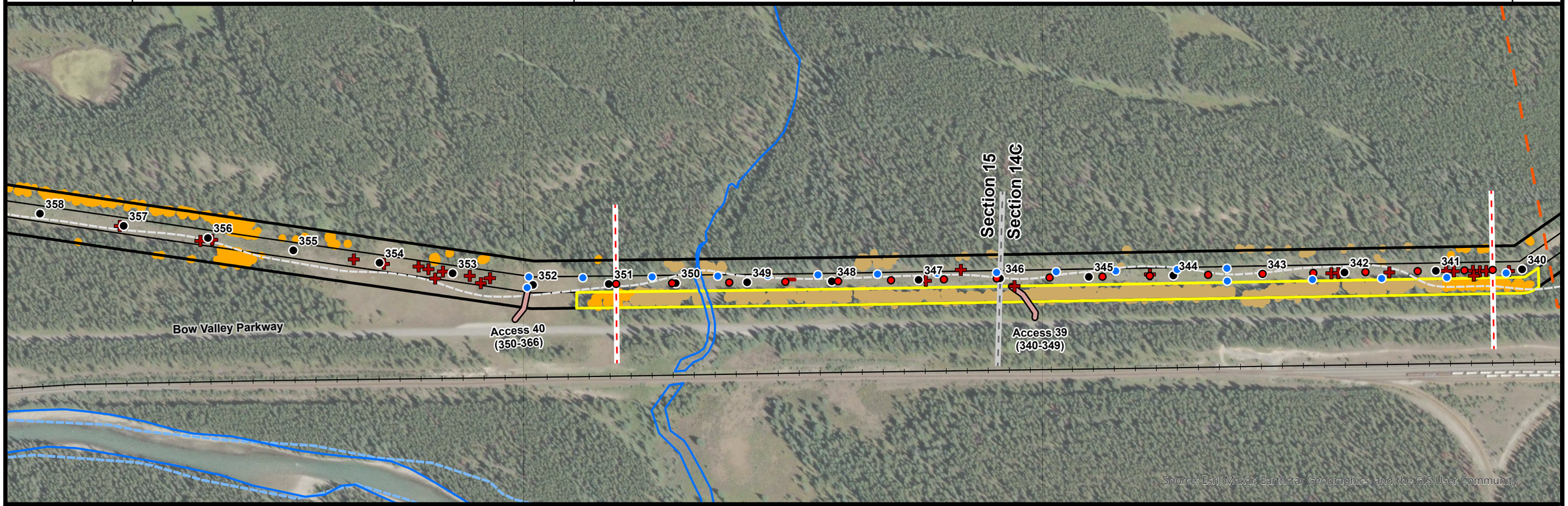
Date: Feb 18, 2025

2012 Base Imagery

ALTALINK A BERKSHIRE HATHAWAY ENERGY COMPANY

Map 22

VEGETATION		Weeds: oxeye daisy, common toadflax, meadow hawkweed (352-357)		Weeds: oxeye daisy, bird vetch (344-349)		Weeds: meadow hawkweed, oxeye daisy, common toadflax (340-343)
WILDLIFE			Widening concern (340-352)			
AQUATICS			Unnamed creek. BKTR. Spawning 2024. No machine crossing. (349-350)			
WETLANDS						
CRITICAL HABITAT						
CULTURAL						
OTHER						Protection Mtn Fire Guard (336-340 (cleared area not visible on air photo)
SEASON			Tree wire construction season: Jan-Mar (340-351)			



AltaLink 551L Fire Mitigation

Vegetation Encroachment and Constraints

Section 14A/14B/14C

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Legend

- 551L As-Built Structures
- Proposed Tree Wire Structure
- Temporary Bypass Structures
- Proposed Tree Wire Sections
- Construction Sections
- Access
- Highway Access Gates
- Railway
- 551L 20m ROW
- Project Study Area (PSA)

Fall Over Analysis

- Tree Wire - Retain Trees
- Vegetation Management - Cut or Top Trees

Constraints

- Rare Plants
- Rare Plants
- PIWO Nesting Cavity
- Wildlife/Habitat Feature
- Wildlife/Habitat Feature
- Noxious Weeds
- Noxious Weeds
- Summer Trail
- Winter Trail
- Annual Hillsdale Closure
- Creeks
- Wetlands
- Floodplain
- Critical Habitat (Bull or Westslope Cutthroat Trout)

Scale: 1:5,000

0 25 50 100 150 200 250 300 M

Prepared For: Parks Canada, Banff National Park

Prepared By: AVENS CONSULTING

Drawn By: Bruce Gleig

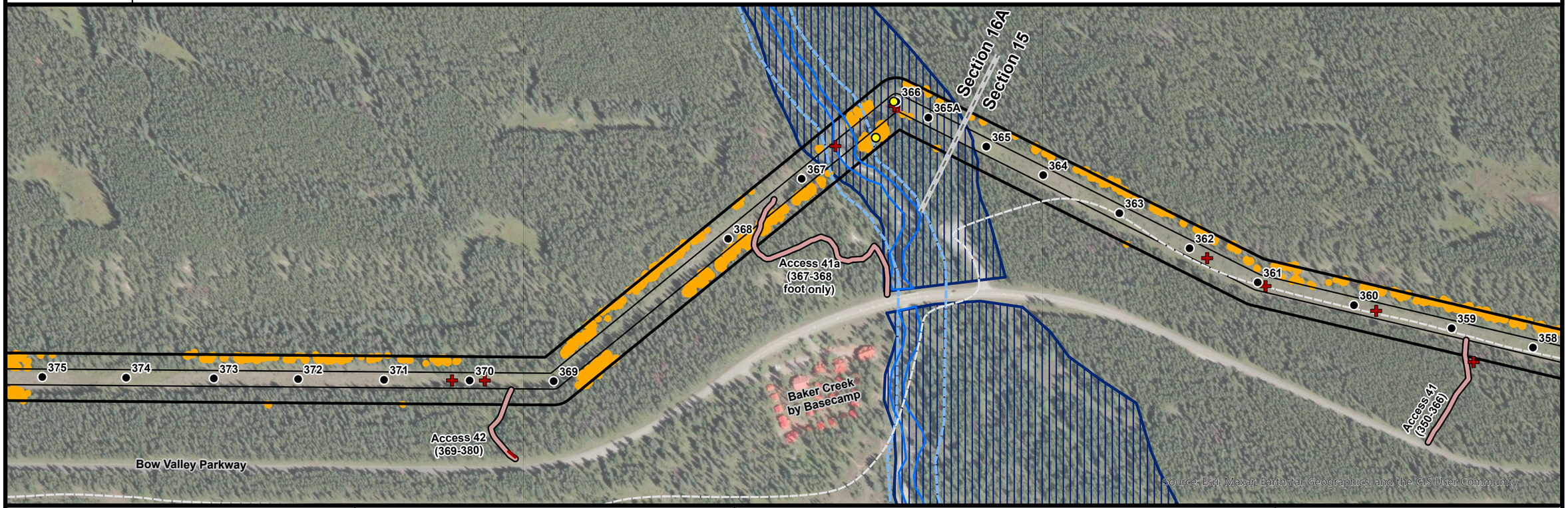
Date: Feb 18, 2025

2012 Base Imagery

ALTALINK
A BERKSHIRE HATHAWAY ENERGY COMPANY

Map 23

VEGETATION		Weeds: oxeye daisy (369-371)		Weeds: oxeye daisy, Canada thistle, meadow hawkweed (366-367)		Weeds: meadow hawkweed, oxeye daisy, tall buttercup (358-362)
WILDLIFE			Active raptor platform (366) Cavity (366-367)			
AQUATICS			Baker Creek (366-367)/flood plain (365-367). BLTR, WSCT, BKTR, MTWH. No machine crossing. (365-367)			
WETLANDS		Shrubby fen. Machine crossing (snow road). (Access 42)				
CRITICAL HABITAT			Bull trout Critical Habitat within 30m of creeks and waterbodies (366-367)			
CULTURAL						
OTHER						
SEASON						



AltaLink 551L Fire Mitigation

Vegetation Encroachment and Constraints

Section 15/16A

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Legend

- 551L As-Built Structures
- Proposed Tree Wire Structure
- Temporary Bypass Structures
- Proposed Tree Wire Sections
- Construction Sections
- Access
- Highway Access Gates
- Railway
- 551L 20m ROW
- Project Study Area (PSA)

Fall Over Analysis

- Tree Wire - Retain Trees
- Vegetation Management - Cut or Top Trees

Scale: 1:5,000

0 25 50 100 150 200 250 300 M

Constraints

- Rare Plants
- Rare Plants
- PIWO Nesting Cavity
- Wildlife/Habitat Feature
- Wildlife/Habitat Feature
- Noxious Weeds
- Noxious Weeds
- Summer Trail
- Winter Trail
- Annual Hillsdale Closure
- Creeks
- Wetlands
- Floodplain
- Critical Habitat (Bull or Westslope Cutthroat Trout)

Prepared For: Parks Canada, Banff National Park

Prepared By: AVENS CONSULTING

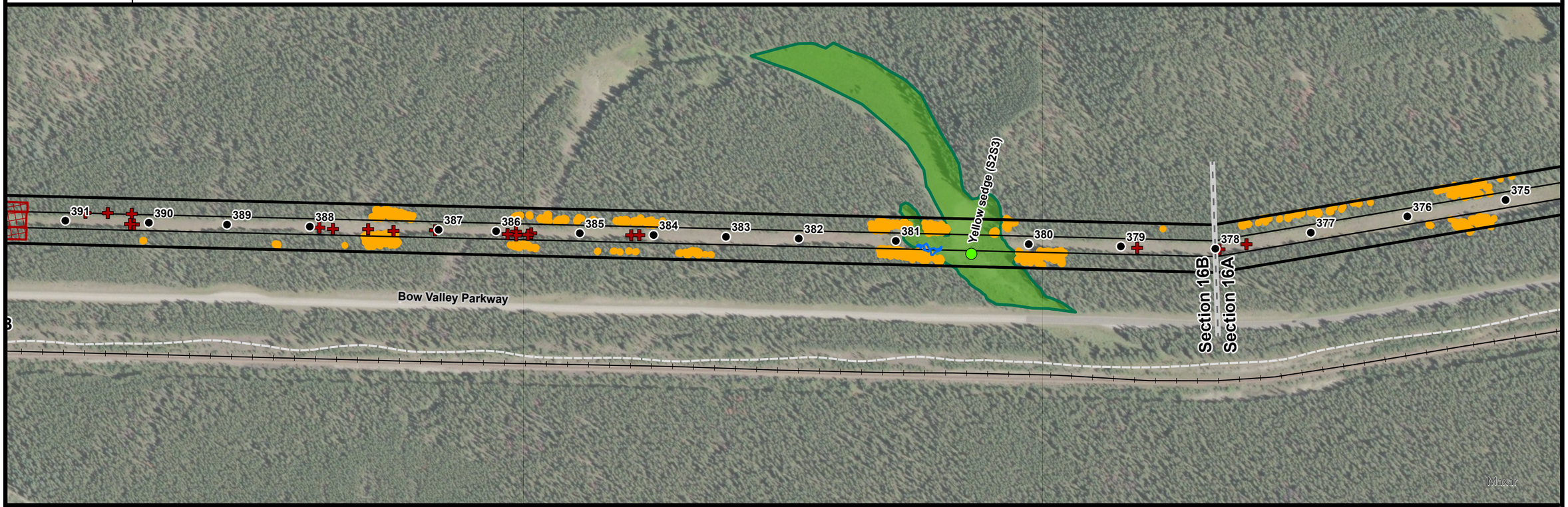
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Date: Feb 18, 2025

2012 Base Imagery

ALTALINK
A BERKSHIRE HATHAWAY ENERGY COMPANY

VEGETATION	Weeds: oxeye daisy, common toadflax, bird vetch (391-394)	Weeds: oxeye daisy, meadow hawkweed, common toadflax, bird vetch (384-388)		Weeds: oxeye daisy, meadow hawkweed (377-379)	
WILDLIFE					
AQUATICS			Spring. No machine crossing. (380-381)		
WETLANDS			Spring and graminoid/shrubby fen. WETO. No machine crossing. (380-381)		
CRITICAL HABITAT					
CULTURAL	Area of Cultural Sensitivity (380-381)				
OTHER					
SEASON					



AltaLink 551L Fire Mitigation

Vegetation Encroachment and Constraints

Section 16A/16B

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Legend

- 551L As-Built Structures
- Proposed Tree Wire Structure
- Temporary Bypass Structures
- Proposed Tree Wire Sections
- Construction Sections
- Access
- Highway Access Gates
- Railway
- 551L 20m ROW
- Project Study Area (PSA)

Fall Over Analysis

- Tree Wire - Retain Trees
- Vegetation Management - Cut or Top Trees

Constraints

- Rare Plants
- Rare Plants
- PIWO Nesting Cavity
- Wildlife/Habitat Feature
- Wildlife/Habitat Feature
- Noxious Weeds
- Noxious Weeds
- Summer Trail
- Winter Trail
- Annual Hillsdale Closure
- Creeks
- Wetlands
- Floodplain
- Critical Habitat (Bull or Westslope Cutthroat Trout)

Scale: 1:5,000

0 25 50 100 150 200 250 300 M

N

Prepared For: Parks Canada, Banff National Park

Prepared By: AVENS CONSULTING

Drawn By: Bruce Gleig

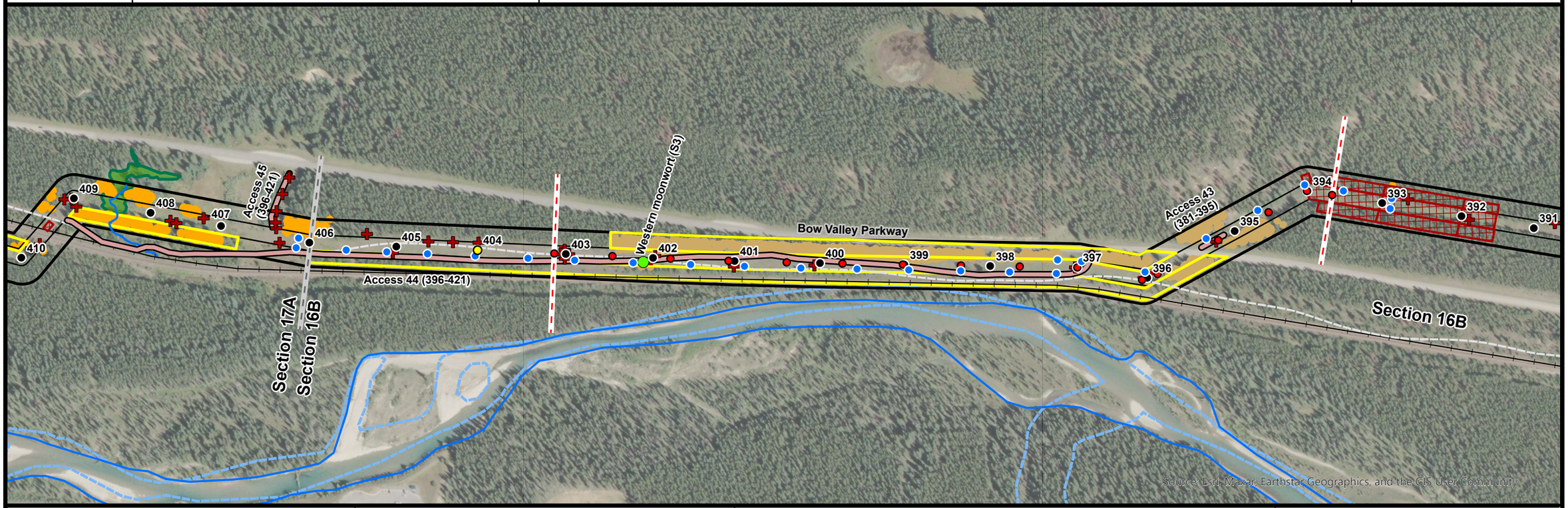
Date: Feb 18, 2025

2012 Base Imagery

ALTALINK
A BERKSHIRE HATHAWAY ENERGY COMPANY

Map 25

VEGETATION	Weeds: oxeye daisy, common toadflax, meadow hawkweed, Canada thistle (402-410). Oxeye daisy (Access 45)	Rare: western moonwort (S3) (402)	Weeds: oxeye daisy, common toadflax (396-401)	Weeds: reed canary grass (395-BVP)	Weeds: oxeye daisy, common toadflax, bird vetch (391-392)	
WILDLIFE	Widening concern (406-409)	Cavity (structure 404)	Widening concern (BVP-406)			
AQUATICS	Unnamed creek. No machine crossing. (408-409)					
WETLANDS	Shrubby fen/creek complex. No machine crossing. (408-409)					
CRITICAL HABITAT		Bull trout Critical Habitat within 30m of creeks and waterbodies (398-401)				
CULTURAL						
OTHER						
SEASON		Tree wire construction season: Oct – Mar (394-403)				



AltaLink 551L Fire Mitigation

Vegetation Encroachment and Constraints

Section 16B/17A

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Legend

- 551L As-Built Structures
- Proposed Tree Wire Structure
- Temporary Bypass Structures
- Proposed Tree Wire Sections
- Construction Sections
- Access
- Highway Access Gates
- Railway
- 551L 20m ROW
- Project Study Area (PSA)

Fall Over Analysis

- Tree Wire - Retain Trees
- Vegetation Management - Cut or Top Trees

Constraints

- Rare Plants
- Rare Plants
- PIWO Nesting Cavity
- Wildlife/Habitat Feature
- Wildlife/Habitat Feature
- Noxious Weeds
- Noxious Weeds
- Summer Trail
- Winter Trail
- Annual Hillsdale Closure
- Creeks
- Wetlands
- Floodplain
- Critical Habitat (Bull or Westslope Cutthroat Trout)

Scale: 1:5,000

0 25 50 100 150 200 250 300 M

N

Prepared For: Parks Canada, Banff National Park

Prepared By: AVENS CONSULTING

Drawn By: Bruce Gleig

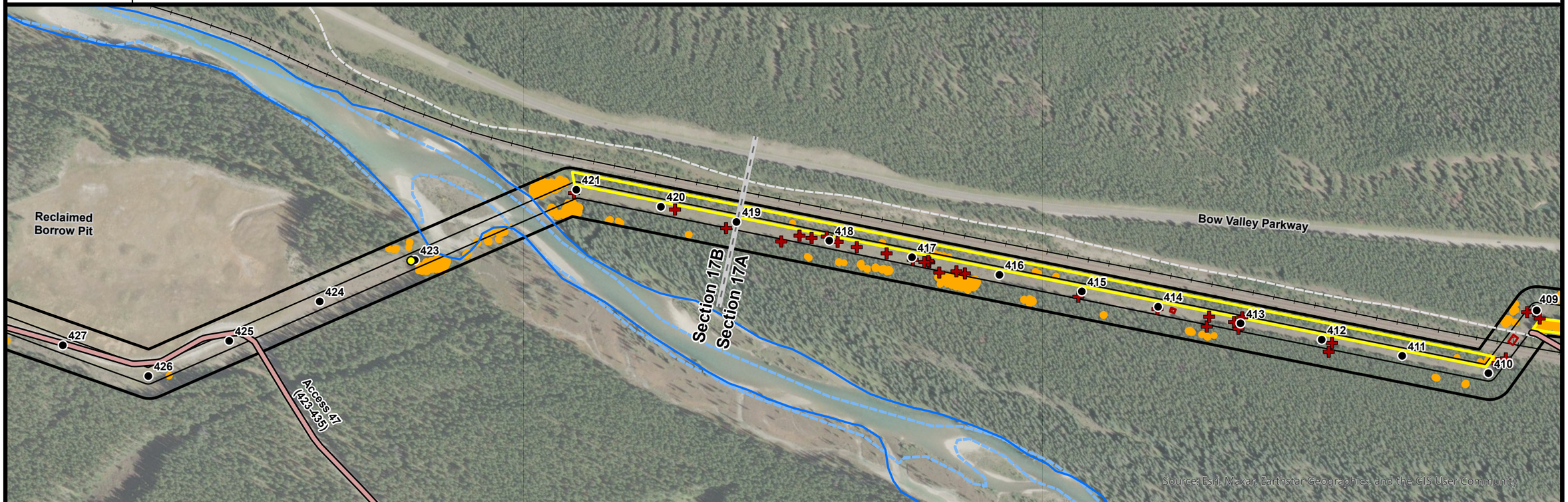
Date: Feb 18, 2025

2012 Base Imagery

ALTALINK
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Map 26

VEGETATION				Weeds: oxeye daisy, meadow hawkweed (410-421)		Weeds: oxeye daisy, common toadflax, Canada thistle (409-410)	
WILDLIFE		Grizzly bear rub (structure 423)		Widening concern (410-421)			
AQUATICS		Bow River. WSCT, BLTR, RBTR, LATR, MTWH. No machine crossing. (421-423)					
WETLANDS							
CRITICAL HABITAT		Bull trout Critical Habitat within 30m of creeks and waterbodies (421-423)					
CULTURAL							
OTHER	Reclaimed borrow pit (424-428)						
SEASON							



AltaLink 551L Fire Mitigation

Vegetation Encroachment and Constraints

Section 17A/17B

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Legend

- 551L As-Built Structures
- Proposed Tree Wire Structure
- Temporary Bypass Structures
- Proposed Tree Wire Sections
- Construction Sections
- Access
- Highway Access Gates
- Railway
- 551L 20m ROW
- Project Study Area (PSA)

Fall Over Analysis

- Tree Wire - Retain Trees
- Vegetation Management - Cut or Top Trees

Scale: 1:5,000

0 25 50 100 150 200 250 300 M

Constraints

- Rare Plants
- Rare Plants
- PIWO Nesting Cavity
- Wildlife/Habitat Feature
- Wildlife/Habitat Feature
- Noxious Weeds
- Noxious Weeds
- Summer Trail
- Winter Trail
- Annual Hillsdale Closure
- Creeks
- Wetlands
- Floodplain
- Critical Habitat (Bull or Westslope Cutthroat Trout)

Prepared For: Parks Canada, Banff National Park

Prepared By: AVENS CONSULTING

Drawn By: Bruce Gleig

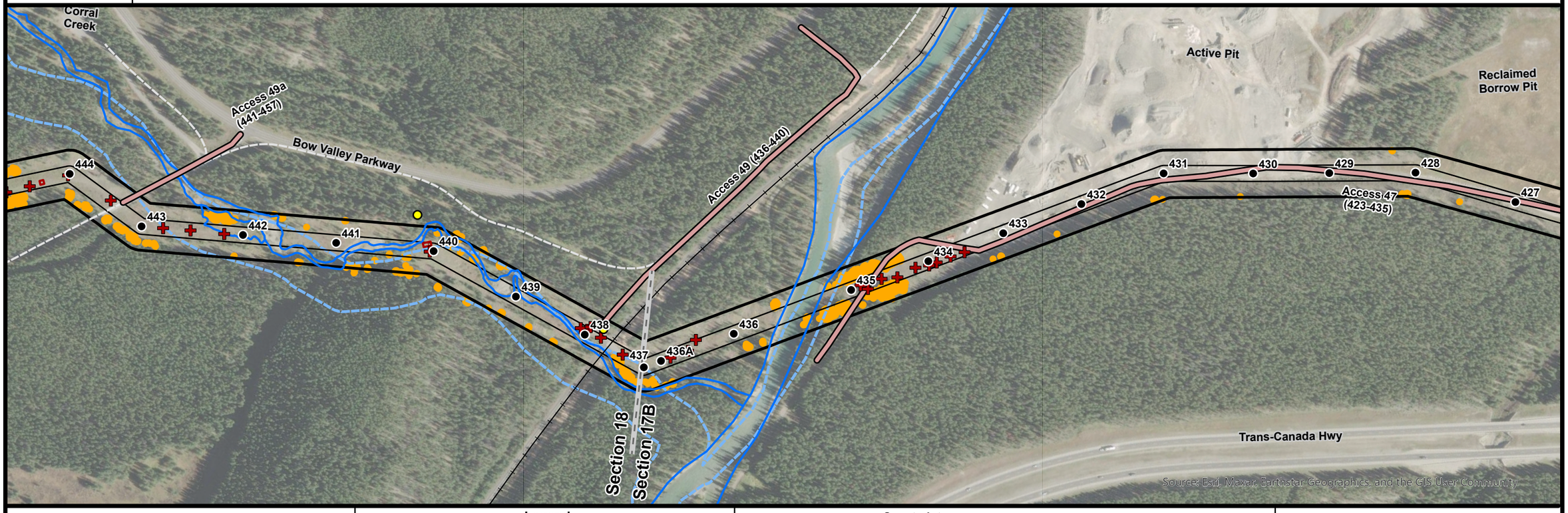
Date: Feb 18, 2025

2012 Base Imagery

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Map 27

VEGETATION	Weeds: oxeye daisy, meadow hawkweed, bird vetch (440-444)			Weeds: oxeye daisy, meadow hawkweed, Canada thistle, perennial sow thistle (436-438)		Weeds: oxeye daisy, meadow hawkweed (433-435)			
WILDLIFE			Cavity (440-441)		Active osprey nest platform (438)				
AQUATICS		Corral Creek. WSCT, BKTR. Machine crossing (snow fills, access mats). (438-439, 439-440, 441-442, 442-443) No machine crossing (440-441)				Bow River. WSCT, BLTR, RBTR, LATR, MTWH. No machine crossing. (435-436)			
WETLANDS									
CRITICAL HABITAT		Bull trout Critical Habitat within 30m of creeks and waterbodies (435-443)							
CULTURAL									
OTHER							Active pit (429-434)		Reclaimed borrow pit (424-428)
SEASON									



AltaLink 551L Fire Mitigation

Vegetation Encroachment and Constraints

Section 17A/17B

This map is a graphical representation of data compiled from numerous sources and is intended to provide general information only. A degree of error is inherent in all data sources and maps, therefore all locations and distances should be confirmed by site visit or field survey.

Legend

- 551L As-Built Structures
- Proposed Tree Wire Structure
- Temporary Bypass Structures
- Proposed Tree Wire Sections
- Construction Sections
- Access
- Highway Access Gates
- Railway
- 551L 20m ROW
- Project Study Area (PSA)

Fall Over Analysis

- Tree Wire - Retain Trees
- Vegetation Management - Cut or Top Trees

Scale: 1:5,000

0 25 50 100 150 200 250 300 M

Constraints

- Rare Plants
- Rare Plants
- PIWO Nesting Cavity
- Wildlife/Habitat Feature
- Wildlife/Habitat Feature
- Noxious Weeds
- Noxious Weeds
- Summer Trail
- Winter Trail
- Annual Hillsdale Closure
- Creeks
- Wetlands
- Floodplain
- Critical Habitat (Bull or Westslope Cutthroat Trout)

Prepared For: Parks Canada, Banff National Park

Prepared By: AVENS CONSULTING

Drawn By: Bruce Gleig

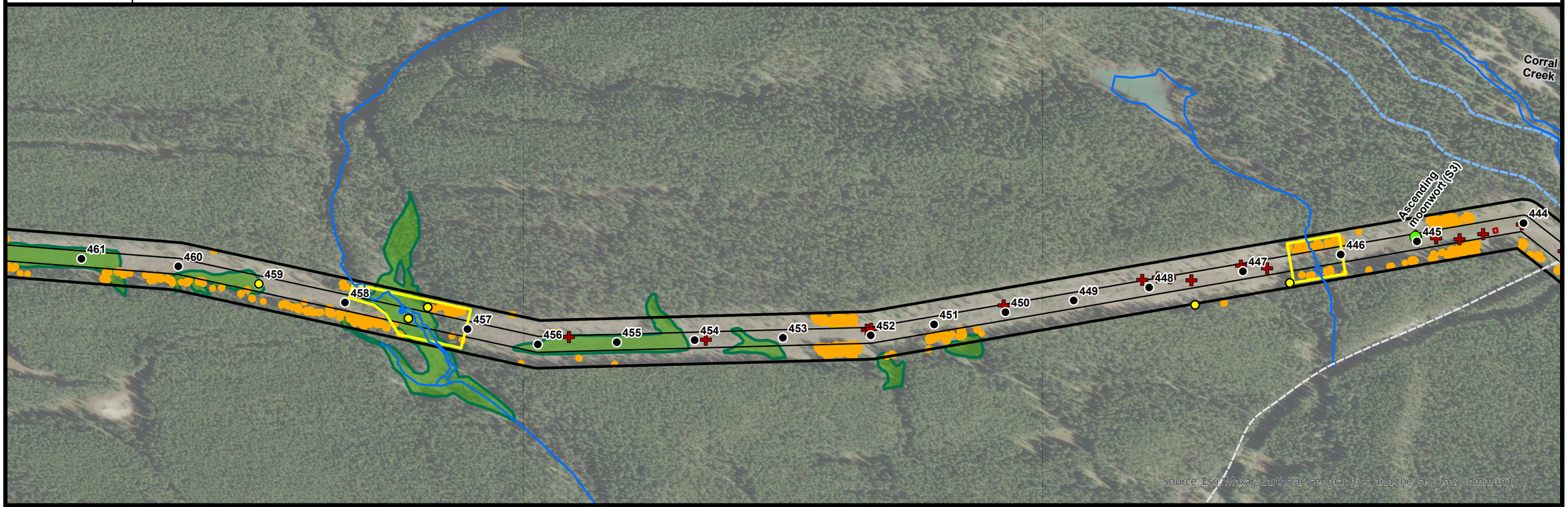
Date: Feb 18, 2025

2020 Base Imagery

ALTALINK A BERKSHIRE HATHAWAY ENERGY COMPANY

Map 28

VEGETATION			Weeds: oxeye daisy, meadow hawkweed, Canada thistle (452-456)		Weeds: oxeye daisy, meadow hawkweed, Canada thistle, common toadflax (444-448)	
WILDLIFE		Cavity (structure 459)	Movement corridor. Beaver lodge. Cavity (457-458)		Cavities (446-448) Movement corridor (446-447)	
AQUATICS			Unnamed creek. BLTR. No machine crossing. (457-458)		Unnamed creek. Machine crossing (snow fill/rig mat). (446-447)	
WETLANDS	Graminoid/shrubby fen complex. No machine crossing of open water phase, snow road through shrubby fen. (459-460)	Creek and graminoid/shrubby fen complex. Amphibian sp. No machine crossing. (457-458)	Shrubby fens. Machine crossing (snow road). (453-456)	Shrubby fens. S side of ROW. No machine crossing. (450-452)		
CRITICAL HABITAT						
CULTURAL						
OTHER						
SEASON						



AltaLink 551L Fire Mitigation

Vegetation Encroachment and Constraints

Section 17A/17B

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Legend

- 551L As-Built Structures
- Proposed Tree Wire Structure
- Temporary Bypass Structures
- Proposed Tree Wire Sections
- Construction Sections
- Access
- Highway Access Gates
- Railway
- 551L 20m ROW
- Project Study Area (PSA)

Fall Over Analysis

- Tree Wire - Retain Trees
- Vegetation Management - Cut or Top Trees

Scale: 1:5,000

0 25 50 100 150 200 250 300 M

Constraints

- Rare Plants
- Rare Plants
- PIWO Nesting Cavity
- Wildlife/Habitat Feature
- Wildlife/Habitat Feature
- Noxious Weeds
- Noxious Weeds
- Summer Trail
- Winter Trail
- Annual Hillsdale Closure
- Creeks
- Wetlands
- Floodplain
- Critical Habitat (Bull or Westslope Cutthroat Trout)

Prepared For: Parks Canada, Banff National Park

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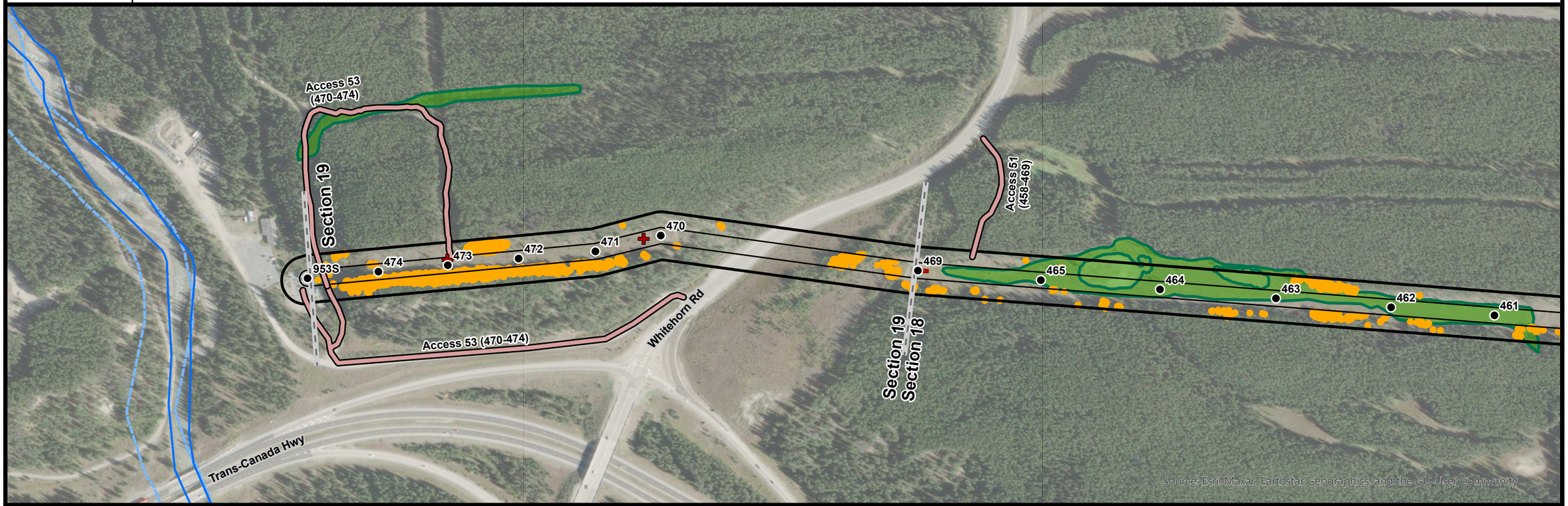
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Map 29

VEGETATION		Weeds: oxeye daisy, meadow hawkweed (469-473)		
WILDLIFE				
AQUATICS			Unnamed creek. Machine crossing (snow fill/rig mat). (446-447)	
WETLANDS		Seepage. Amphibian sp. Machine crossing (snow road). (Access 53)		Graminoid/shrubby fen complex. WETO, WOFR. No machine crossing of open water phase, snow road through shrubby fen. (459-469)
CRITICAL HABITAT				
CULTURAL				
OTHER				
SEASON				



AltaLink 551L Fire Mitigation

Vegetation Encroachment and Constraints

Section 18/19

This map is a graphical representation of data compiled from numerous sources and is intended to provide general information only. A degree of error is inherent in all data sources and maps, therefore all locations and distances should be confirmed by site visit or field survey.

Legend

- 551L As-Built Structures
- Proposed Tree Wire Structure
- Temporary Bypass Structures
- Proposed Tree Wire Sections
- Construction Sections
- Access
- Highway Access Gates
- Railway
- 551L 20m ROW
- Project Study Area (PSA)

Fall Over Analysis

- Tree Wire - Retain Trees
- Vegetation Management - Cut or Top Trees

Scale: 1:5,000

0 25 50 100 150 200 250 300 M

Constraints

- Rare Plants
- Rare Plants
- PIWO Nesting Cavity
- Wildlife/Habitat Feature
- Wildlife/Habitat Feature
- Noxious Weeds
- Noxious Weeds
- Summer Trail
- Winter Trail
- Annual Hillsdale Closure
- Creeks
- Wetlands
- Floodplain
- Critical Habitat (Bull or Westslope Cutthroat Trout)

Prepared For: Parks Canada, Banff National Park

Prepared By: AVENS CONSULTING

Drawn By: Bruce Gleig

Date: Feb 18, 2025

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Map 30

Appendix B

Photos and designs of structures



Image of barrel piles being installed on an AltaLink transmission line.



Image of installed barrel pile.

Appendix C. A comparison of pileated woodpecker cavity characteristics (ECCC 2023).

Summary of key differences among cavity types			
Characteristics	**Cavity type: nesting**	**Cavity type: roosting**	**Cavity type: feeding**
Number of holes	1	> 1	> 1
Edge texture	smooth	smooth	rough
Hole shape	round or teardrop	oval	irregular
Hole size	~12 cm high ~9 cm wide	7.5 – 10 cm wide 10 - 12.5 cm high	variable
Cavity depth	0.75 m	4.3 m	0.05 to 0.2 m
Tree type	solid, with heart rot	hollow	dead and decaying

Appendix D. Characteristics of bat habitat trees (PCA 2016).

Roost Potential	Criteria
Negligible	-Trees < 25 cm DBH
Low	-Trees > 25 cm DBH -No cracks or crevices. -No deadwood in canopy or stem -No decay cavities or hollow stem
Medium	-Trees > 25 cm DBH -Some small cracks or crevices -Deadwood in canopy or stem
High	-Trees > 25 cm DBH -Woodpecker holes -Fractured limbs and/or hazard beam cracks -Large sections of loose or flaking bark -Cavities, cracks, crevices -A hollow trunk, stem or branches

Appendix E. Watercourse sensitivity criteria.

The sensitivity of each watercourse to crossing construction was evaluated at four levels including nil, low, moderate or high as described below (adapted from Golder 2004):

Nil

- Dry/frozen to substrate during construction activities (i.e. Jan-Mar for most creeks);
- no suitable habitat for overwintering, spawning, or rearing, or for use as a migratory corridor.

Low

- stable banks;
- low scour potential;
- a lack of deep pools, no evidence of groundwater seepage or suitable flows for overwintering;
- size of substrate, flows or water depth completely unsuitable for spawning;
- water depths, flows, size of substrate, and instream or overhead cover completely unsuitable for rearing; and
- presence of barriers to upstream movement such as low seasonal flow, beaver dams, waterfalls, and perched culverts in the immediate vicinity of the crossing.

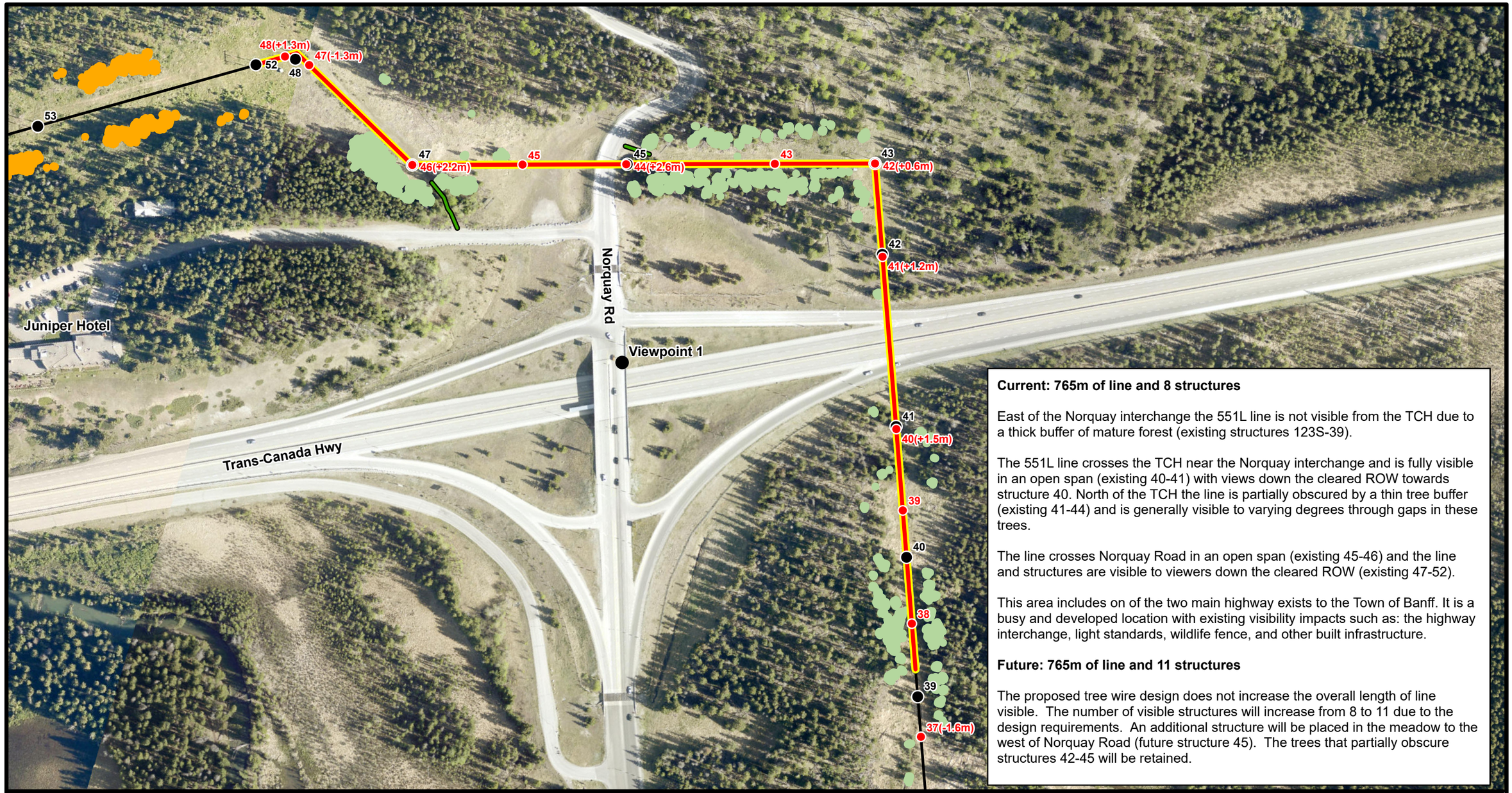
Moderate

- unstable banks present, but not abundant;
- moderate scour potential;
- deep pools, evidence of groundwater seepage for overwintering present but not abundant; flow and depths suitable for overwintering;
- substrate suitable for spawning present but not abundant; flows or water depth suitable for spawning;
- size of substrate and instream or overhead cover suitable for rearing present, but not abundant; flow and depths suitable for rearing;
- flows, water depth, and instream or overhead cover suitable for adult holding or feeding;
- barriers to upstream movement such as seasonal flow, beaver dams, waterfalls, and perched culverts more than 3 km from the crossing.

High

- unstable banks abundant;
- high scour potential;
- deep pools, evidence of groundwater seepage for overwintering abundant; flow and depths suitable for overwintering;
- size of substrate or macrophytes suitable for spawning abundant; flows or water depth suitable for spawning;
- size of substrate and instream or overhead cover suitable for rearing abundant; flows and depths suitable for rearing;
- flows, water depth, and instream or overhead cover suitable for adult holding or feeding;
- no barriers to upstream movement.

Appendix F. Visibility analysis maps.



Current: 765m of line and 8 structures

East of the Norquay interchange the 551L line is not visible from the TCH due to a thick buffer of mature forest (existing structures 123S-39).

The 551L line crosses the TCH near the Norquay interchange and is fully visible in an open span (existing 40-41) with views down the cleared ROW towards structure 40. North of the TCH the line is partially obscured by a thin tree buffer (existing 41-44) and is generally visible to varying degrees through gaps in these trees.

The line crosses Norquay Road in an open span (existing 45-46) and the line and structures are visible to viewers down the cleared ROW (existing 47-52).

This area includes on of the two main highway exists to the Town of Banff. It is a busy and developed location with existing visibility impacts such as: the highway interchange, light standards, wildlife fence, and other built infrastructure.

Future: 765m of line and 11 structures

The proposed tree wire design does not increase the overall length of line visible. The number of visible structures will increase from 8 to 11 due to the design requirements. An additional structure will be placed in the meadow to the west of Norquay Road (future structure 45). The trees that partially obscure structures 42-45 will be retained.

AltaLink 551L Visibility Analysis

Structures 39-48

Viewpoint 1

Notes

Please see photo simulation Viewpoint 1 for more information.

Legend

- Existing 551L Structures
- Proposed Tree Wire Structure
- Existing Visibility
- Future Visibility
- Altalink 551L Transmission Line
- Access Route

Fall Over Analysis

- Tree Wire - Retain Trees
- Vegetation Management - Cut or Top Trees

Scale: 1:2,500

0 25 50 100 150 M

N

Prepared For: Parks Canada, Banff National Park

Prepared By: AVENS CONSULTING

Drawn By: Bruce Gleig

Date: Feb 12, 2025

2022 Base Imagery

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Map 1

This map is a graphical representation of data compiled from numerous sources and is intended to provide general information only. A degree of error is inherent in all data sources and maps, therefore all locations and distances should be confirmed by site visit or field survey.

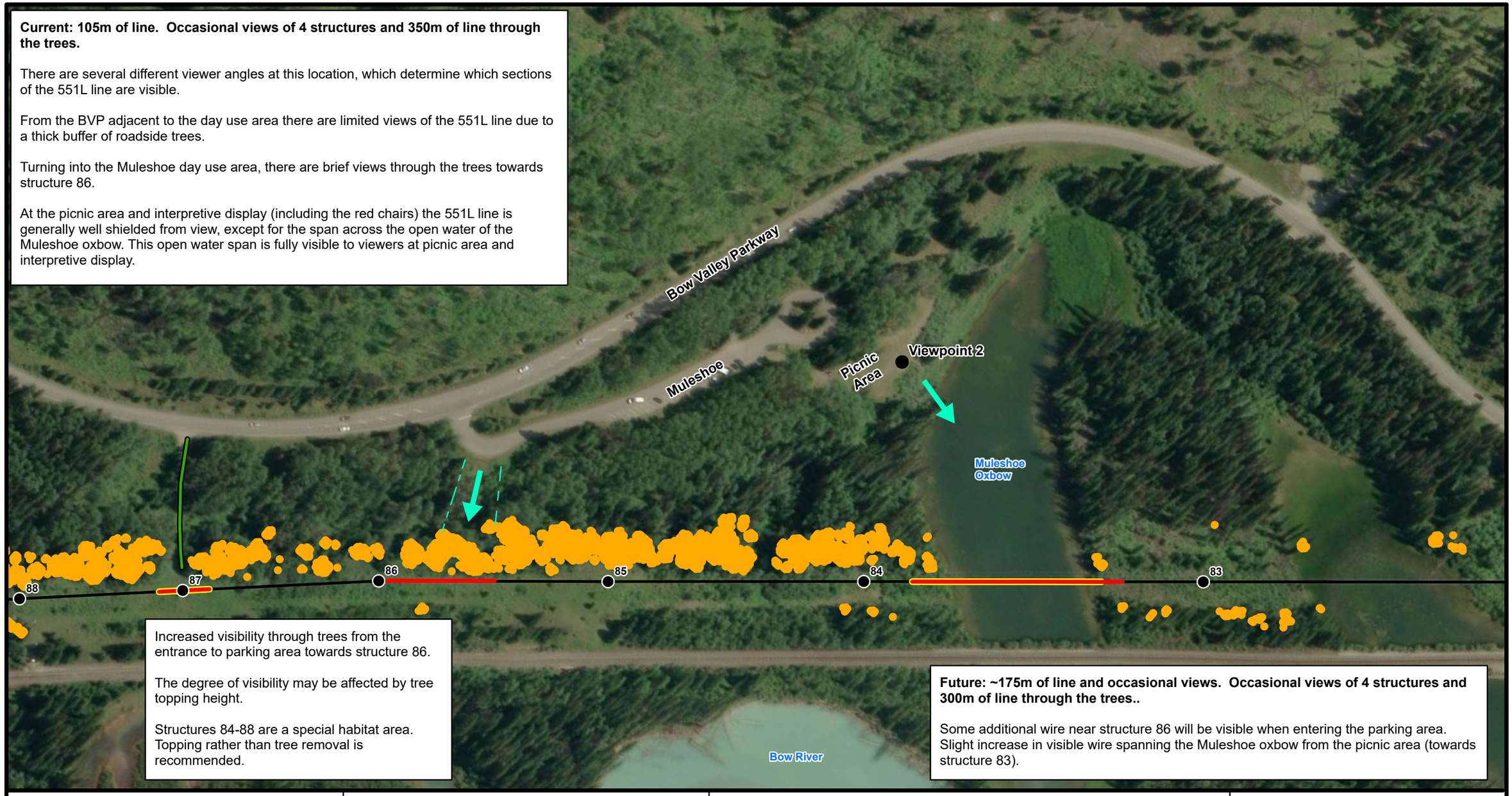
Current: 105m of line. Occasional views of 4 structures and 350m of line through the trees.

There are several different viewer angles at this location, which determine which sections of the 551L line are visible.

From the BVP adjacent to the day use area there are limited views of the 551L line due to a thick buffer of roadside trees.

Turning into the Muleshoe day use area, there are brief views through the trees towards structure 86.

At the picnic area and interpretive display (including the red chairs) the 551L line is generally well shielded from view, except for the span across the open water of the Muleshoe oxbow. This open water span is fully visible to viewers at picnic area and interpretive display.



Increased visibility through trees from the entrance to parking area towards structure 86.

The degree of visibility may be affected by tree topping height.

Structures 84-88 are a special habitat area. Topping rather than tree removal is recommended.

Future: ~175m of line and occasional views. Occasional views of 4 structures and 300m of line through the trees..

Some additional wire near structure 86 will be visible when entering the parking area. Slight increase in visible wire spanning the Muleshoe oxbow from the picnic area (towards structure 83).

AltaLink 551L Visibility Analysis

Muleshoe

Viewpoint 2

Notes

Please see photo simulation Viewpoint 2 for more information.

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Scale: 1:2,000

0 12.5 25 50 75 100 125 M

Legend

- Existing 551L Structures
- Proposed Tree Wire Structure
- Future Visibility
- Existing Visiblity
- Viewer Window
- Altalink 551L Transmission Line
- Access Route

Fall Over Analysis

- Tree Wire - Retain Trees
- Vegetation Management - Cut or Top Trees
- Partially visible through the trees (from campground)

Prepared For: Parks Canada, Banff National Park

Prepared By: AVENS CONSULTING

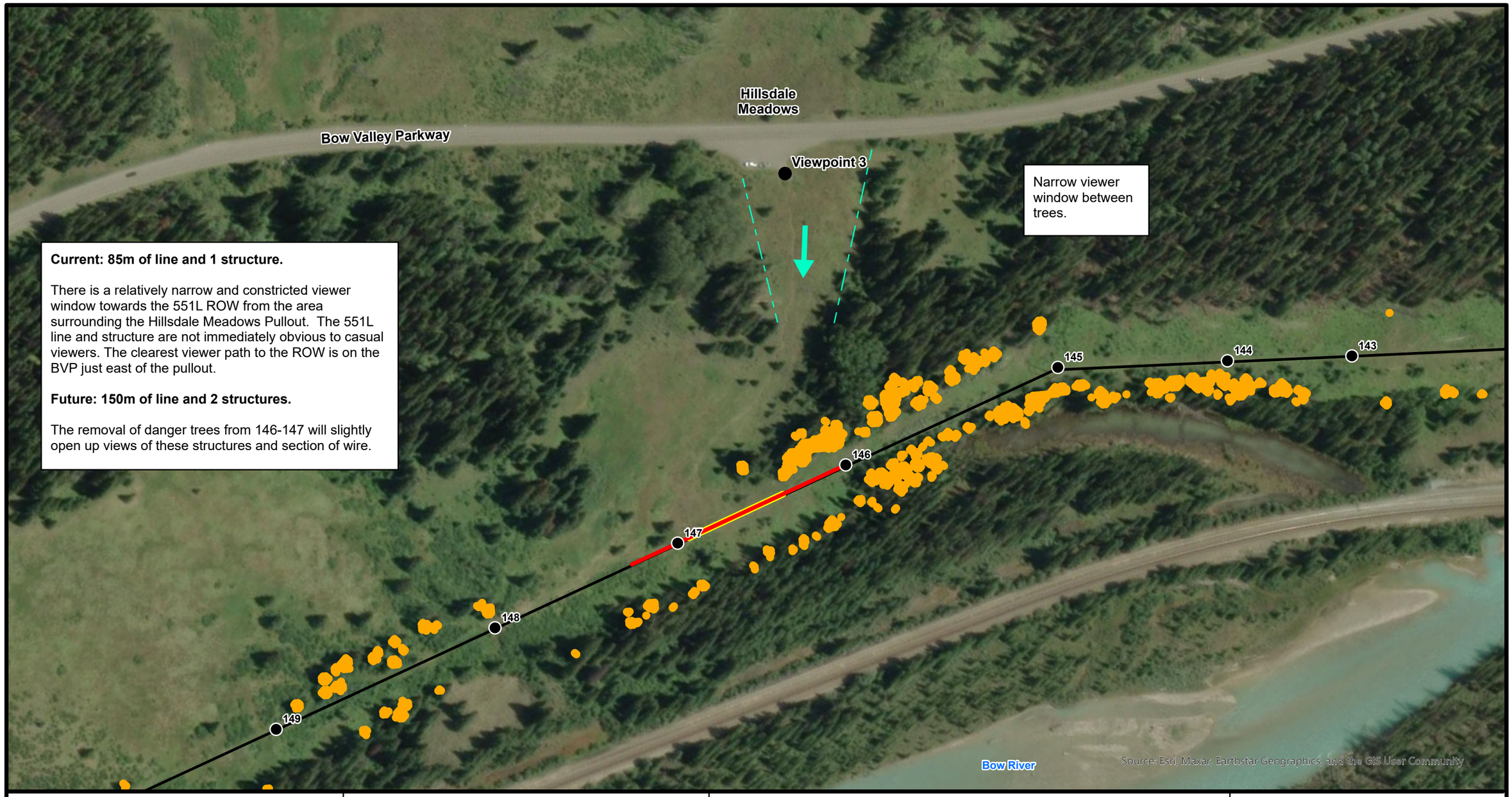
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Map 2



Current: 85m of line and 1 structure.

There is a relatively narrow and constricted viewer window towards the 551L ROW from the area surrounding the Hillsdale Meadows Pullout. The 551L line and structure are not immediately obvious to casual viewers. The clearest viewer path to the ROW is on the BVP just east of the pullout.

Future: 150m of line and 2 structures.

The removal of danger trees from 146-147 will slightly open up views of these structures and section of wire.

AltaLink 551L Visibility Analysis

Hillsdale Meadows

Viewpoint 3

This map is a graphical representation of data compiled from numerous sources and is intended to provide general information only. A degree of error is inherent in all data sources and maps, therefore all locations and distances should be confirmed by site visit or field survey.

Notes

Please see photo simulation Viewpoint 3 for more information.

Scale: 1:2,000

0 25 50 100 M

Legend

- Existing 551L Structures
- Proposed Tree Wire Structure
- Future Visibility
- Existing Visiblity
- Viewer Window
- Altalink 551L Transmission Line
- Access Route

Fall Over Analysis

- Tree Wire - Retain Trees
- Vegetation Management - Cut or Top Trees
- Partially visible through the trees (from campground)

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Prepared By: AVENS CONSULTING

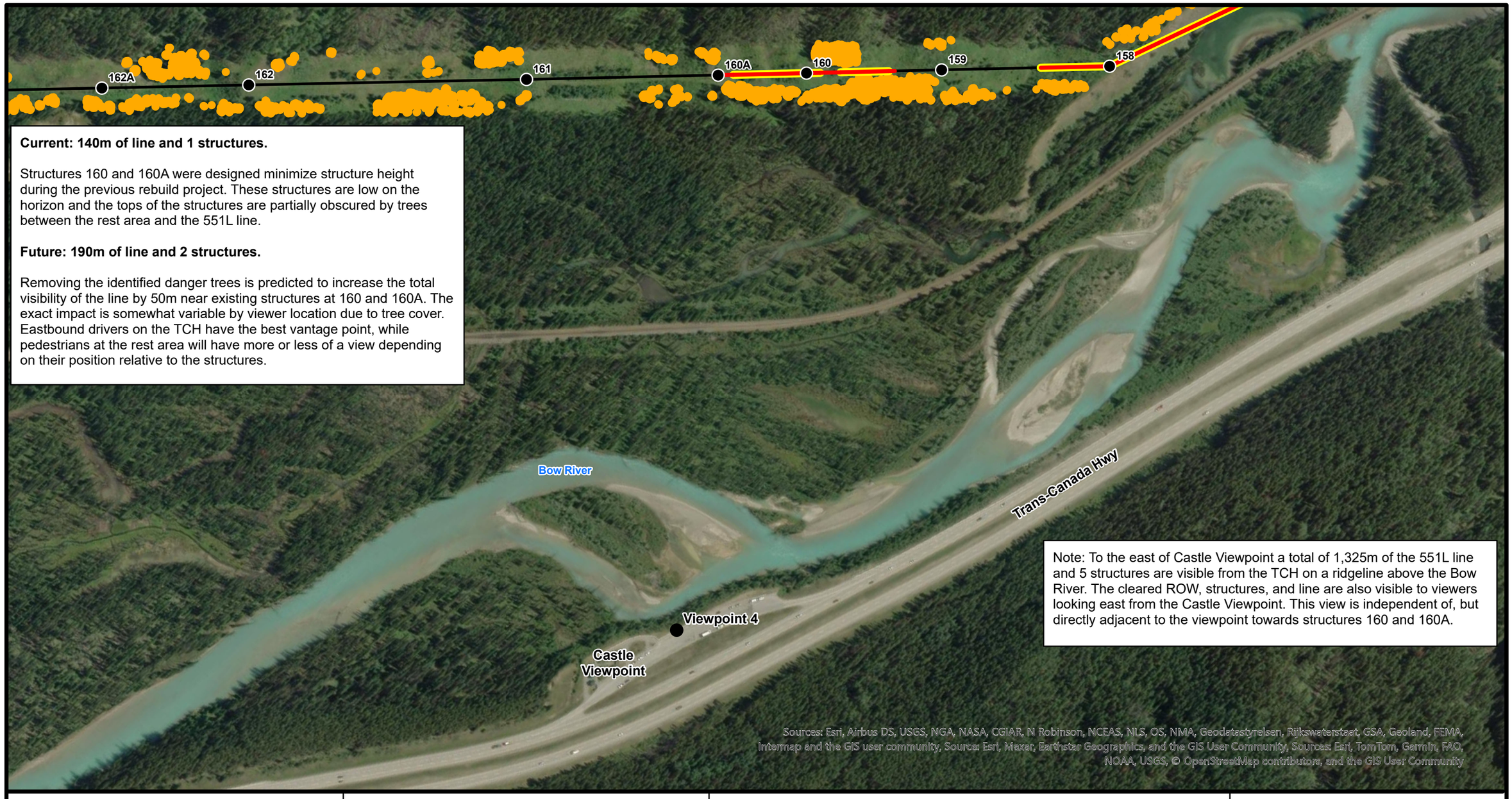
Drawn By: Bruce Gleig

Date: Feb 12, 2025

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Map 3



Current: 140m of line and 1 structures.

Structures 160 and 160A were designed minimize structure height during the previous rebuild project. These structures are low on the horizon and the tops of the structures are partially obscured by trees between the rest area and the 551L line.

Future: 190m of line and 2 structures.

Removing the identified danger trees is predicted to increase the total visibility of the line by 50m near existing structures at 160 and 160A. The exact impact is somewhat variable by viewer location due to tree cover. Eastbound drivers on the TCH have the best vantage point, while pedestrians at the rest area will have more or less of a view depending on their position relative to the structures.

Note: To the east of Castle Viewpoint a total of 1,325m of the 551L line and 5 structures are visible from the TCH on a ridgeline above the Bow River. The cleared ROW, structures, and line are also visible to viewers looking east from the Castle Viewpoint. This view is independent of, but directly adjacent to the viewpoint towards structures 160 and 160A.

AltaLink 551L Visibility Analysis

Castle Viewpoint

Viewpoint 4

Notes

Please see photo simulation Viewpoint 4 for more information.

This map is a graphical representation of data compiled from numerous sources and is intended to provide general information only. A degree of error is inherent in all data sources and maps, therefore all locations and distances should be confirmed by site visit or field survey.

Scale: 1:0

0 25 50 100 150 200 250 M

N

Legend

- Existing 551L Structures
- Existing Visibility
- Future Visibility
- Altalink 551L Transmission Line
- Access Route

Fall Over Analysis

- Tree Wire - Retain Trees
- Vegetation Management - Cut or Top Trees

Prepared For: Parks Canada, Banff National Park

Prepared By: AVENS CONSULTING

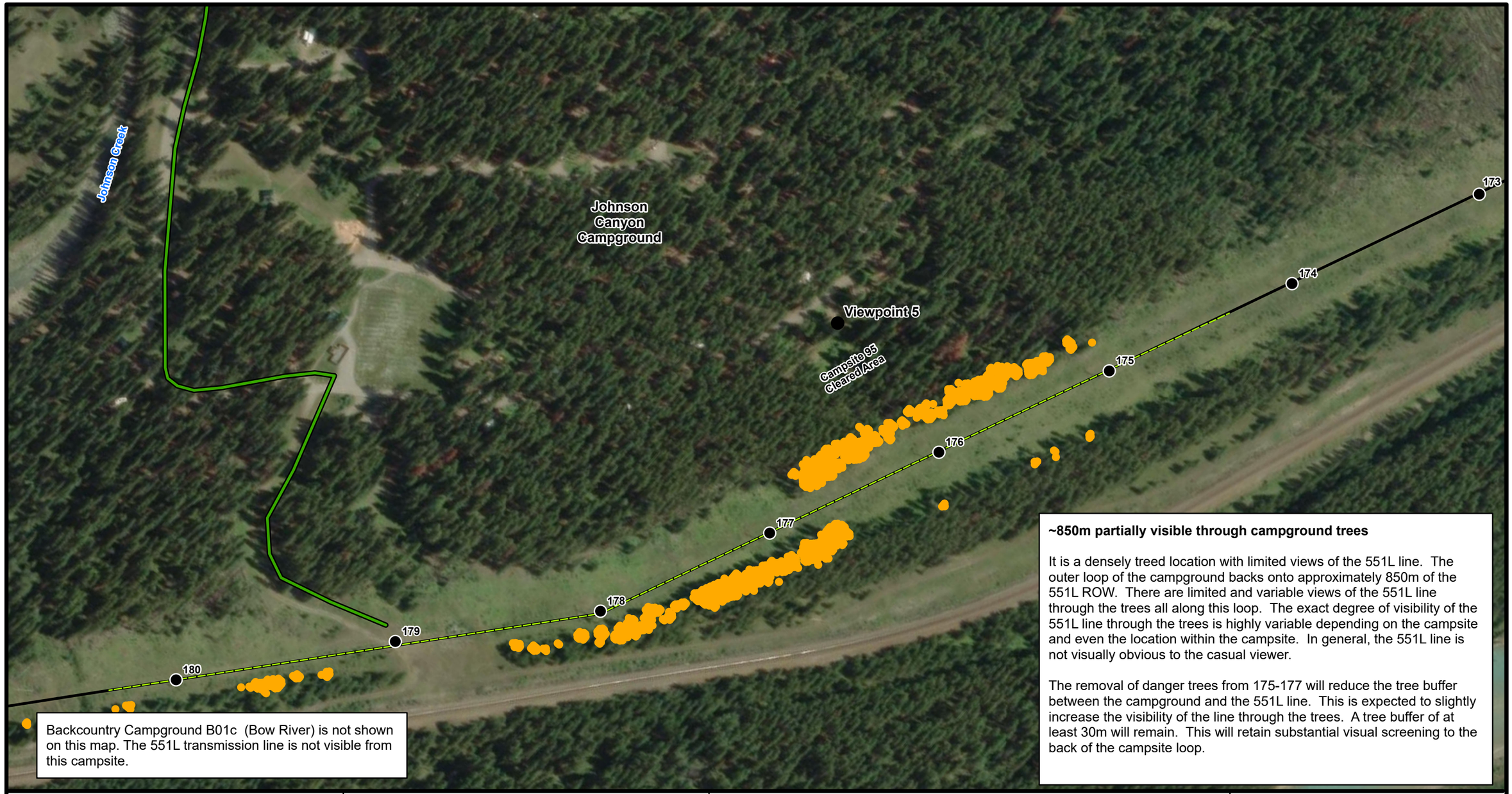
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Map 4



Backcountry Campground B01c (Bow River) is not shown on this map. The 551L transmission line is not visible from this campsite.

~850m partially visible through campground trees

It is a densely treed location with limited views of the 551L line. The outer loop of the campground backs onto approximately 850m of the 551L ROW. There are limited and variable views of the 551L line through the trees all along this loop. The exact degree of visibility of the 551L line through the trees is highly variable depending on the campsite and even the location within the campsite. In general, the 551L line is not visually obvious to the casual viewer.

The removal of danger trees from 175-177 will reduce the tree buffer between the campground and the 551L line. This is expected to slightly increase the visibility of the line through the trees. A tree buffer of at least 30m will remain. This will retain substantial visual screening to the back of the campsite loop.

AltaLink 551L Visibility Analysis

Johnston Canyon Campground

Viewpoint 5

This map is a graphical representation of data compiled from numerous sources and is intended to provide general information only. A degree of error is inherent in all data sources and maps, therefore all locations and distances should be confirmed by site visit or field survey.

Notes

Please see photo simulation Viewpoint 5 for more information.

Scale: 1:2,000

0 12.5 25 50 75 100 125 M

Legend

- Existing 551L Structures
- Future Visibility
- Existing Visiblity
- Altalink 551L Transmission Line
- Access Route
- Partially visible through the trees (from campground)

Fall Over Analysis

- Tree Wire - Retain Trees
- Vegetation Management - Cut or Top Trees

Prepared For: Parks Canada, Banff National Park

Prepared By: AVENS CONSULTING

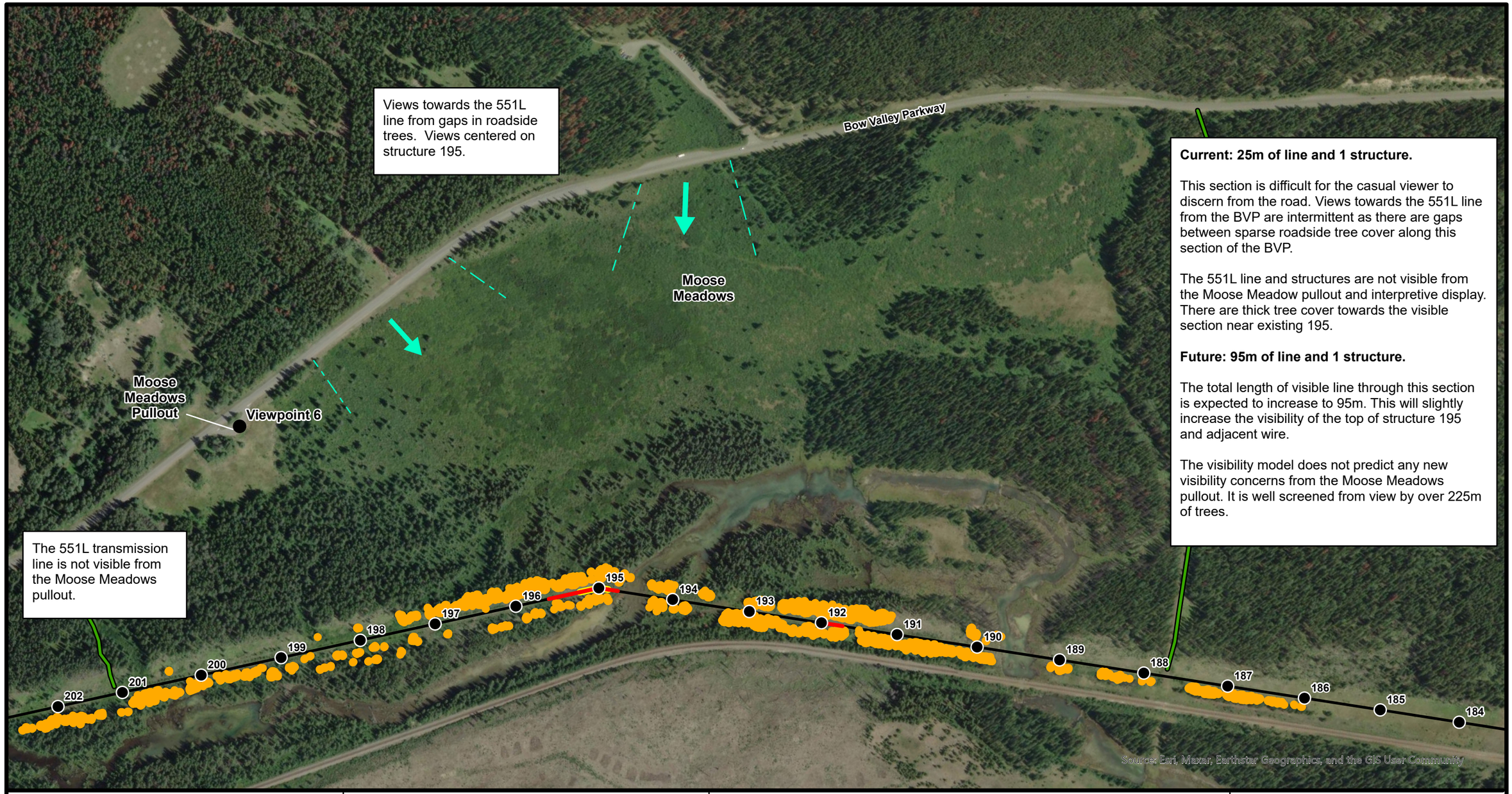
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Map 5



Current: 25m of line and 1 structure.

This section is difficult for the casual viewer to discern from the road. Views towards the 551L line from the BVP are intermittent as there are gaps between sparse roadside tree cover along this section of the BVP.

The 551L line and structures are not visible from the Moose Meadow pullout and interpretive display. There are thick tree cover towards the visible section near existing 195.

Future: 95m of line and 1 structure.

The total length of visible line through this section is expected to increase to 95m. This will slightly increase the visibility of the top of structure 195 and adjacent wire.

The visibility model does not predict any new visibility concerns from the Moose Meadows pullout. It is well screened from view by over 225m of trees.

AltaLink 551L Visibility Analysis

Moose Meadows

Viewpoint 6

Notes

Please see photo simulation Viewpoint 6 for more information.

Scale: 1:5,000

0 25 50 100 150 200 250 300 M

Legend

- Existing 551L Structures
- Future Visibility
- Partially Visible Through Trees
- Existing Visiblity
- Viewer Window
- Altalink 551L Transmission Line
- Access Route

Fall Over Analysis

- Tree Wire - Retain Trees
- Vegetation Management - Cut or Top Trees

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Prepared By: AVENS CONSULTING

Drawn By: Bruce Gleig

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Map 6

This map is a graphical representation of data compiled from numerous sources and is intended to provide general information only. A degree of error is inherent in all data sources and maps, therefore all locations and distances should be confirmed by site visit or field survey.

Castle Junction

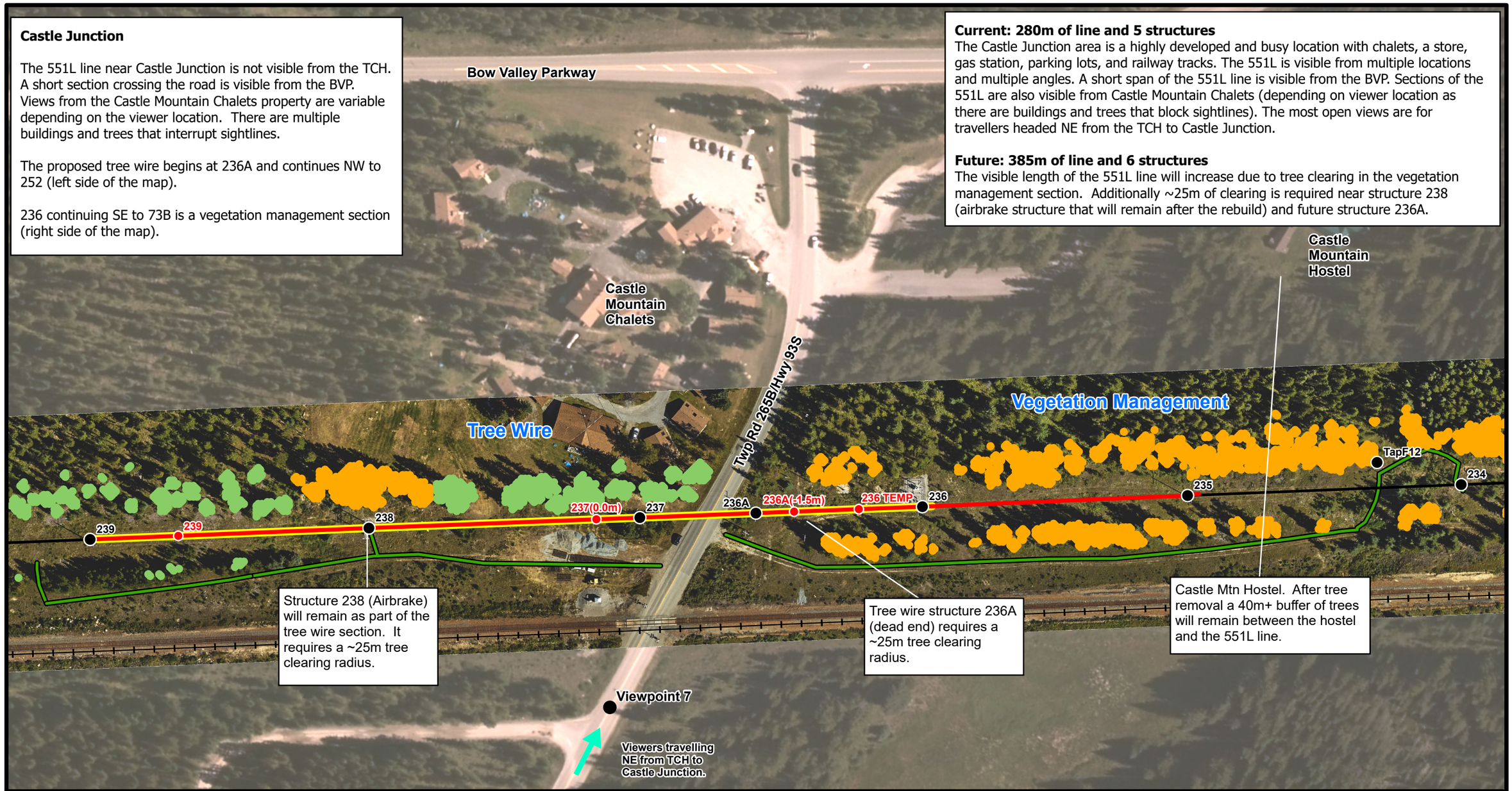
The 551L line near Castle Junction is not visible from the TCH. A short section crossing the road is visible from the BVP. Views from the Castle Mountain Chalets property are variable depending on the viewer location. There are multiple buildings and trees that interrupt sightlines.

The proposed tree wire begins at 236A and continues NW to 252 (left side of the map).

236 continuing SE to 73B is a vegetation management section (right side of the map).

Current: 280m of line and 5 structures
The Castle Junction area is a highly developed and busy location with chalets, a store, gas station, parking lots, and railway tracks. The 551L is visible from multiple locations and multiple angles. A short span of the 551L line is visible from the BVP. Sections of the 551L are also visible from Castle Mountain Chalets (depending on viewer location as there are buildings and trees that block sightlines). The most open views are for travellers headed NE from the TCH to Castle Junction.

Future: 385m of line and 6 structures
The visible length of the 551L line will increase due to tree clearing in the vegetation management section. Additionally ~25m of clearing is required near structure 238 (airbrake structure that will remain after the rebuild) and future structure 236A.



AltaLink 551L Visibility Analysis

Castle Junction (NE Viewers)

Viewpoint 7

Notes

Please see photo simulation Viewpoint 7 for more information.

Limited visibility from the BVP along the road corridor. Variable visibility from Castle Mountain Chalets due to trees and buildings.

This map is a graphical representation of data compiled from numerous sources and is intended to provide general information only. A degree of error is inherent in all data sources and maps, therefore all locations and distances should be confirmed by site visit or field survey.

Scale: 1:1,500

0 25 50 100 M

Legend

- Existing 551L Structures
- Proposed Tree Wire Structure
- Future Visibility
- Existing Visibility
- Altalink 551L Transmission Line
- CPR
- Access Route

Fall Over Analysis

- Tree Wire - Retain Trees
- Vegetation Management - Cut or Top Trees

Prepared For: Parks Canada, Banff National Park

Prepared By: AVENS CONSULTING

Drawn By: Bruce Gleig

Date: Feb 12, 2025

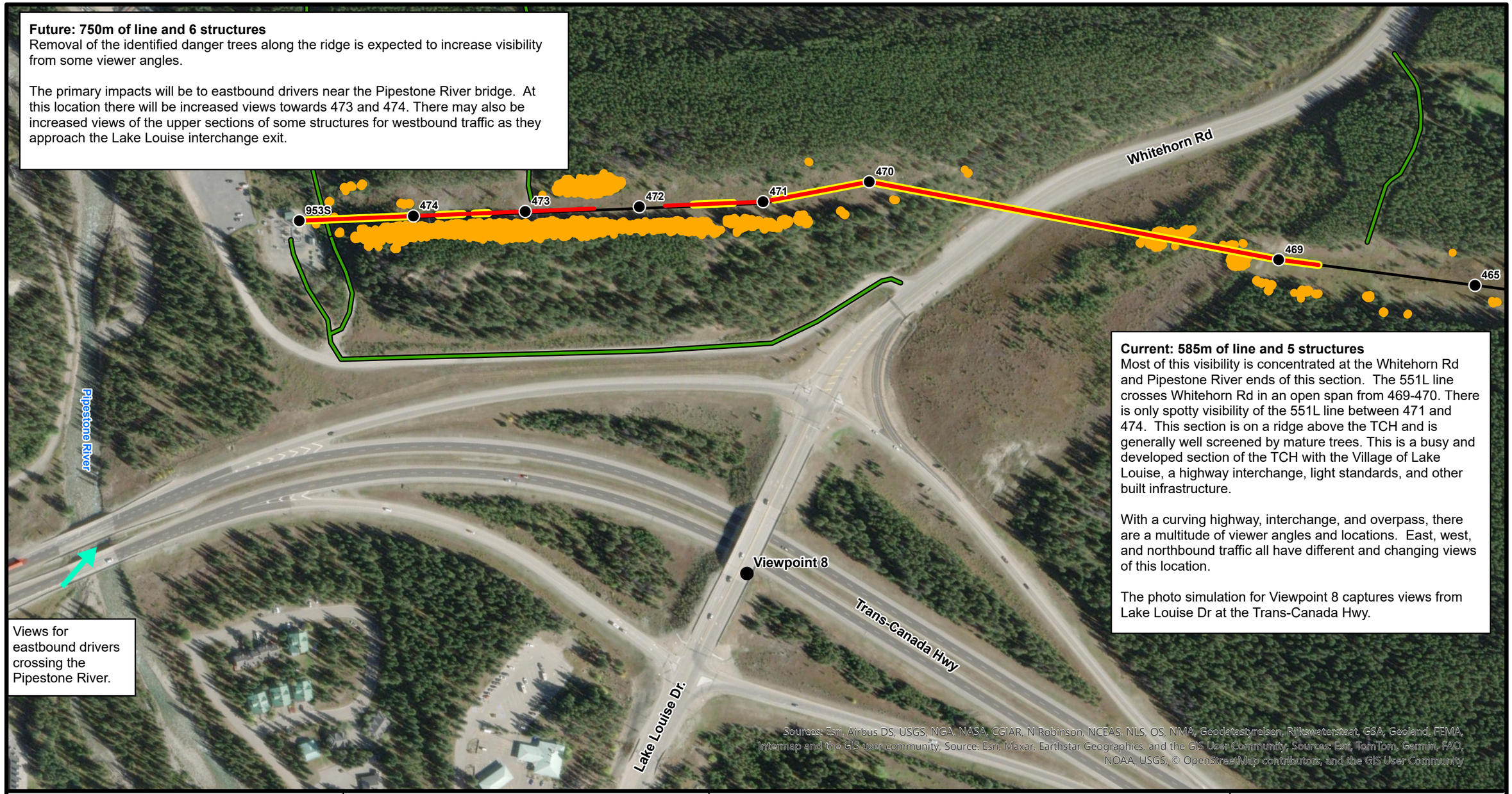
2014 Base Imagery from Parks Canada
2014 ROW Imagery from Altalink

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Map 7

Future: 750m of line and 6 structures
Removal of the identified danger trees along the ridge is expected to increase visibility from some viewer angles.

The primary impacts will be to eastbound drivers near the Pipestone River bridge. At this location there will be increased views towards 473 and 474. There may also be increased views of the upper sections of some structures for westbound traffic as they approach the Lake Louise interchange exit.



Current: 585m of line and 5 structures
Most of this visibility is concentrated at the Whitehorn Rd and Pipestone River ends of this section. The 551L line crosses Whitehorn Rd in an open span from 469-470. There is only spotty visibility of the 551L line between 471 and 474. This section is on a ridge above the TCH and is generally well screened by mature trees. This is a busy and developed section of the TCH with the Village of Lake Louise, a highway interchange, light standards, and other built infrastructure.

With a curving highway, interchange, and overpass, there are a multitude of viewer angles and locations. East, west, and northbound traffic all have different and changing views of this location.

The photo simulation for Viewpoint 8 captures views from Lake Louise Dr at the Trans-Canada Hwy.

AltaLink 551L Visibility Analysis

Lake Louise

Viewpoint 8 (Lake Louise Dr.)

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Notes

Please see photo simulation Viewpoint 8 for more information.

Views are highly variable depending on viewer location on the various road and highway segments.

Scale: 1:3,000

0 25 50 100 150 200 M

N

Legend

- Existing 551L Structures
- Existing Visibility
- Future Visibility
- Altalink 551L Transmission Line
- Access Route

Fall Over Analysis

- Tree Wire - Retain Trees
- Vegetation Management - Cut or Top Trees

Prepared For: Parks Canada, Banff National Park

Prepared By: AVENS CONSULTING

Drawn By: Bruce Gleig

Date: Feb 12, 2025

2020 Base Imagery

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Map 8

Appendix F. Photo simulations of tree removal or tree wire at key viewpoints along the AltaLink 551L.



ALTALINK
A BERKSHIRE HATHAWAY ENERGY COMPANY

551L PROJECT

TRANSMISSION LINE UPGRADE/REBUILD

Viewpoint Location Map

① Photo Location

Transmission Line

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EXISTING CONDITIONS

PROPOSED CONDITIONS | TREE WIRE OPTION

ALTALINK
A BERKSHIRE HATHAWAY ENERGY COMPANY

551L PROJECT

TRANSMISSION LINE UPGRADE/REBUILD

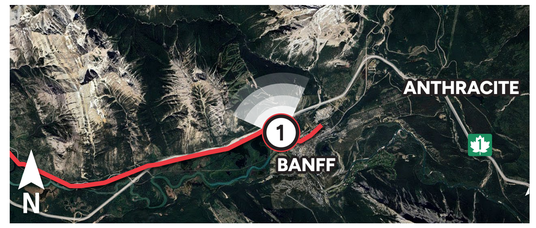
Mt. Norquay Road

Viewpoint 1

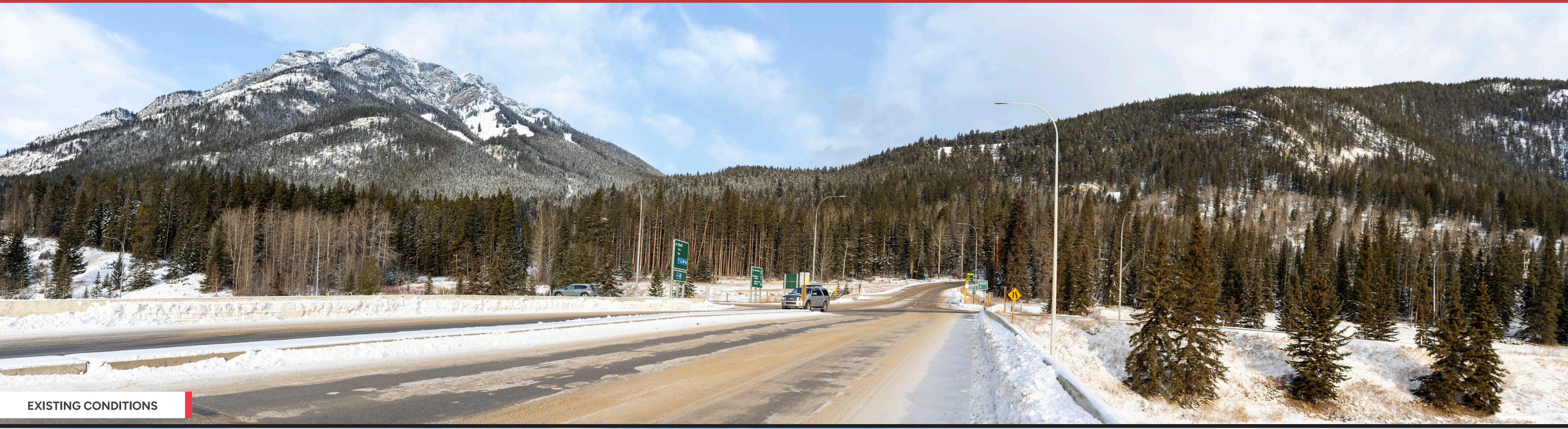
Date: 11/29/2024 **Time:** 12:38 pm **Viewing Direction:** Northwest

① Photo Location — Transmission Line

Photo simulations are for demonstration purposes only. Final design is subject to change pending public, utility, and regulatory review.



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ALTALINK
A BERKSHIRE HATHAWAY ENERGY COMPANY

551L PROJECT

TRANSMISSION LINE UPGRADE/REBUILD

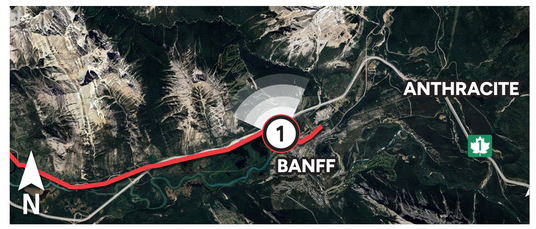
Mt. Norquay Road

Viewpoint 1

Date: 11/29/2024 **Time:** 12:38 pm **Viewing Direction:** Northwest

① Photo Location — Transmission Line

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ALTALINK
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551L PROJECT

TRANSMISSION LINE UPGRADE/REBUILD

Muleshoe

Viewpoint 2

Date: 11/29/2024 **Time:** 12:58 pm **Viewing Direction:** Southwest

② Photo Location — Transmission Line

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551L PROJECT

TRANSMISSION LINE UPGRADE/REBUILD

Hillsdale Meadows

Viewpoint 3

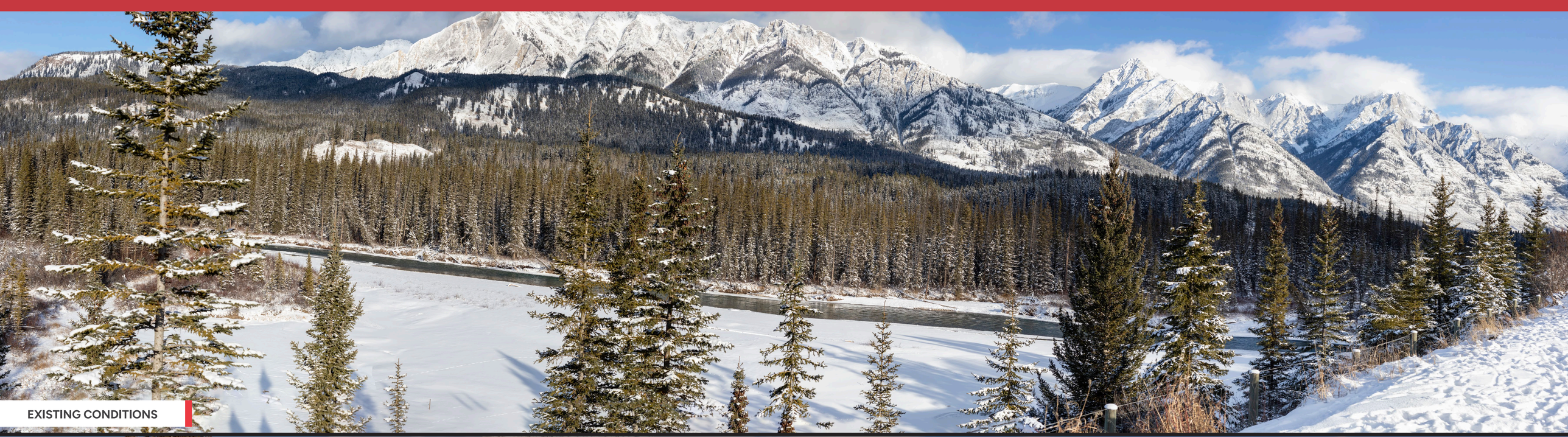
Date: 11/29/2024 **Time:** 1:13 pm **Viewing Direction:** Southwest

③ Photo Location — Transmission Line

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ALTALINK
A BERKSHIRE HATHAWAY ENERGY COMPANY

551L PROJECT

TRANSMISSION LINE UPGRADE/REBUILD

Castle Viewpoint

Viewpoint 4

Date: 11/29/2024 **Time:** 4:42 pm **Viewing Direction:** Northeast

④ Photo Location — Transmission Line

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EXISTING CONDITIONS

PROPOSED CONDITIONS | TREE REMOVAL OPTION

ALTALINK
A BERKSHIRE HATHAWAY ENERGY COMPANY

551L PROJECT

TRANSMISSION LINE UPGRADE/REBUILD

Johnston Canyon Campground

Viewpoint 5

Date: 11/29/2024 **Time:** 1:32 pm **Viewing Direction:** Southwest

(5) Photo Location — Transmission Line

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ALTALINK
A BERKSHIRE HATHAWAY ENERGY COMPANY

551L PROJECT

TRANSMISSION LINE UPGRADE/REBUILD

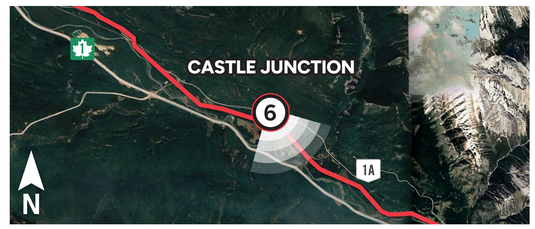
Moose Meadows

Viewpoint 6

Date: 11/29/2024 **Time:** 1:46 pm **Viewing Direction:** Southeast

⑥ Photo Location — Transmission Line

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ALTALINK
A BERKSHIRE HATHAWAY ENERGY COMPANY

551L PROJECT

TRANSMISSION LINE UPGRADE/REBUILD

Castle Junction

Viewpoint 7

Date: 11/29/2024 **Time:** 2:04 pm **Viewing Direction:** Northeast

⑦ Photo Location — Transmission Line

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EXISTING CONDITIONS

PROPOSED CONDITIONS | TREE REMOVAL OPTION

ALTALINK
A BERKSHIRE HATHAWAY ENERGY COMPANY

551L PROJECT

TRANSMISSION LINE UPGRADE/REBUILD

Castle Junction

Viewpoint 7

Date: 11/29/2024 **Time:** 2:04 pm **Viewing Direction:** Northeast

⑦ Photo Location — Transmission Line

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EXISTING CONDITIONS



PROPOSED CONDITIONS | TREE REMOVAL OPTION

ALTALINK
A BERKSHIRE HATHAWAY ENERGY COMPANY

551L PROJECT

TRANSMISSION LINE UPGRADE/REBUILD

Lake Louise Dr.

Viewpoint 8

Date: 11/29/2024 **Time:** 3:18 pm **Viewing Direction:** Northeast

(8) Photo Location — Transmission Line

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