



## Proposed Prairie Creek Mine Access Road

# Information Requests, Round 2

Response to Parks Canada (4-6) and MVEIRB Information Requests (1 and 8) dated September 23, 2016

October 21, 2016

**Prepared For:**

Canadian Zinc Corporation

**Submitted By:**

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## DOCUMENT INFORMATION

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## 1 BACKGROUND

Canadian Zinc Corporation (CZN) has applied to build an “all season” access road connecting the Prairie Creek Mine to Highway 7. As part of the environmental assessment (EA) process, Allnorth completed an evaluation and submitted a report titled “Proposed Prairie Creek Mine Access Road” on February 27, 2015. Following comments from the Mackenzie Valley Environmental Impact Review Board (MVEIRB) on April 23, 2015, Allnorth submitted a supplementary report in September, 2015.

After responses to information requests, a Technical Session was completed in Yellowknife, Northwest Territories from June 13 to 16, 2016 involving various government agencies supported by their designated consultants and Canadian Zinc supported by their consultants. The session produced a number of “undertakings”. On September 23, 2016 additional information requests (IR2) were received to be followed up by Canadian Zinc.

This document provides Allnorth’s responses to some of those information requests on behalf of Canadian Zinc.

## 2 INFORMATION REQUEST RESPONSE

### 2.1 Parks Canada IR 3A. Borrow Sources Number and Type

**Recommendation** 1. Identify which proposed borrow sources may be excavated below grade or ditch elevation and if there will be free draining pits or ponds. 2. Describe the estimated depth of excavation to the road/ditch grade. 3. Provide a detailed borrowpit management and reclamation plan. This plan must include a commitment to managing and reclaiming borrow sources excavated below grade to prevent the accumulation of water.

#### 2.1.1 Response:

**Item 1:** Reference “Allnorth Response to Information Request”, May 3, 2016 Section 3.2, Appendix B, Table 14. Table 14 identifies all proposed borrow sources outside the prescribed right of way clearing. CZN has committed to completing a “Detailed “Borrow Site Plan and Design” (DBSPD) for each selected borrow location prior to construction. This site specific, detailed design would provide any unique directions in regards to development, extraction, and reclamation on a site by site basis, reflecting the following:

- Buffer strips or zones between borrow and riparian zones of water bodies.
- Surface water runoff from the borrow site cannot directly enter a natural water body. Water will be directed away and be allowed to naturally filter through forested areas or bogs to minimize soil erosion. For surface water which cannot be directed away from the water body, appropriate water settling structures, capable of handling the water quantity, must be installed to allow natural settling and filtering of the water.





- Re-direct all surface water away from the borrow location to prevent surface water entering, and ponding, in the borrow area.
- Slope stability, with final contouring and shaping.
- The presence, quantity, and extent of permafrost and/or ice rich soils.
- Nature and location of any required access roads.

Overall, the potential area proposed for borrow extraction located in old/historic floodplain is only a small proportion of the total borrow volume and area for the project. CZN is committed to avoiding and minimizing exposing water tables to the surface. All borrow sources located in floodplains will not be excavated below the water table. This approach will be applied to proposed borrow pits, borrow extracted within the right of way, and establishing ditches. In these locations, excavations will go wider rather than deeper. This approach was reflected in the original net area or footprints of the proposed borrow sources. Table 1 (next page) is a summary of identified borrow pits located on floodplains (old and/or historic) which may be subject to ground water table influenced by stream floodplain.

**Item 2:** Along with the DBSPD, the full detailed road design will be completed. Road designs completed within potential floodplains will reflect the approach stated in the Item 1 response above. This approach will avoid extracting or excavating ditch depths below normal flood plain level.

**Item 3:** A "Borrow Pit Management and Reclamation Plan" was submitted in Appendix C of our "Supplement to Original Submission", Appendix A of the DAR Addendum, completed in September, 2015. This plan provides the procedures and approaches which will be followed in the development, extraction, and reclamation of borrow sources. Borrow source investigation will be completed during the detailed design stage which would determine water table levels. A DBSPD will be completed on every selected borrow source which would include detailed, site specific extraction and reclamation plans, including borrow extraction within floodplains subject to water table influence.

**Table 1: Borrow Pits within Floodplain Summary**

Label	Road KP	Potential Volume (m <sup>3</sup> )	Demand Volume (m <sup>3</sup> )	Gross Area (ha)	Net Area (ha)	Comments
BP 39	39.2	144,000	10,000	8.27	0.63	Old historic floodplain adjacent to the road. The selected location would be located on portions of the old floodplain naturally elevated above the surrounding floodplain. The presence of well-established vegetation suggests it has not been influenced by surface water flows for many years. Based on the proposed volume to be extracted and net disturbed area, the average depth of the excavation would not exceed 2m below natural ground levels and would safely remain above water table. BP 40 below would provide an alternative if volume estimations are not available.
BP 40	40.0	50,000	10,000	2.05	0.45	Old historic floodplain adjacent to the road, similar to BP 39 but provides greater buffer from the active floodplain of Sundog Creek. Similar material to BP 39 but heavier vegetated, including 10 to 20 cm diameter black spruce, suggesting this portion of the floodplain has not received surface water flows for perhaps decades. Additional stripping of overburden compared to BP 39.
BP 47B	47.0	49,000	20,000	3.37	0.76	Old historical floodplain. Based on the proposed volume to be extracted and net disturbed area, the average depth of the excavation would not exceed 2.7m below natural ground levels and would safely remain above water table.
BP 87	87.5	120,000	60,000	5.98	3.99	Old historic flood plain with well-established mature forest cover suggesting a stable environment which has not received surface water flows for decades. Based on the proposed volume to be extracted and net disturbed area, the average depth of the excavation would not exceed 1.5m below natural ground levels and would safely remain above water table.
BP 123A	123.7	214,000	50,000	10.87	2.79	Large fan with excellent gravel material. Stream channel remains dry for majority of the year. Based on the proposed volume to be extracted and net disturbed area, the average depth of the excavation would not exceed 2.7m below natural ground levels and would safely remain above water table.
BP 139	139.7	250,000	24,000	18.05	1.0	Large fan with excellent gravel material. Stream channel remains dry for majority of the year. Based on the proposed volume to be extracted and net disturbed area, the average depth of the excavation would not exceed 2.4m below natural ground levels and would safely remain above water table



BP 151A BP 151B	151.5	250,000	25,000	15.8	2.5	Large fan part of the old, historic floodplain covered with mature spruce and aspen. Based on the proposed volume to be extracted and net disturbed area, the average depth of the excavation would not exceed 2.4m below natural ground levels and would safely remain above water table. A potential S3 seasonal stream divides the two defined patches.
<b>Preferred Alternative Alignment</b>						
BP 112.3	112.3	100,000	36,000	4.47	1.20	Large fan with excellent gravel material. Stream channel remains dry for majority of the year. Based on the proposed volume to be extracted and net disturbed area, the average depth of the excavation would not exceed 3.0 m below natural ground levels and would safely remain above water table.
BP 119	119.2	100,000	7,500	5.30	0.25	Large fan with excellent gravel material. Stream channel remains dry for majority of the year. Based on the proposed volume to be extracted and net disturbed area, the average depth of the excavation would not exceed 3.0 m below natural ground levels and would safely remain above water table.
BP 124	124.4	30,000	30,000	1.48	1.48	Old historic floodplain adjacent to the road. The presence of well-established vegetation suggests it has not been influenced by surface water flows for many years. Based on the proposed volume to be extracted and net disturbed area, the average depth of the excavation would not exceed 2.0m below natural ground levels and would safely remain above water table.



## 2.2 Parks Canada IR #3B. Borrow Sources Number and Type

**Recommendation 4.** For proposed borrow sources located in or near water courses describe: • which borrow sources are in the floodplain (active, inactive, historic) or the distance to the floodplain • the proposed depth of excavation relative to the adjacent watercourse including the high water mark • the depth of the excavation relative to the water table • the horizontal setback proposed for the site and any natural or constructed buffer characteristics

### 2.2.1 Response:

**Item 4.** Reference to the IR4 reply above, Item 1 and Table 1. All proposed borrow sources will extract volume only within stable, old, historic portions of the floodplain and not below the water table. Water table levels will be determined by field testing during the detailed design stage and will be incorporated into the "Detailed Borrow Site Plan and Design" (DBSPD).

A minimum 50 m buffer will remain between the active portion of the floodplain (Q2) and the borrow source. During the detailed design stage, borrow sources which may be impacted by high water flows (Q100) will be guarded, if deemed necessary, by a berm elevated 1 m above the determined Q100 elevation,.

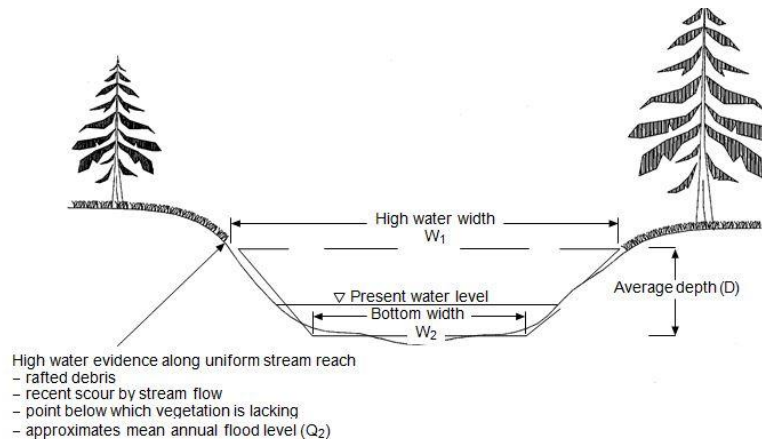
## 2.3 Parks Canada IR #3C. Borrow Sources Number and Type

**Recommendation 5.** Specifically related to KP 39.8: In response to GNWT's IR 18 CZN indicated that the borrow source at KP 39.8 is located on part of the old floodplain that is now stabilized and above the HWM and that a buffer would be maintained between the borrow and the channel, and precautions taken to limit sediment release from the borrow.

- Parks Canada would like CZN to further describe the HWM? Is this an annual mean level?
- What flood return event would result in the water level to interact with the borrow source?
- Has hydro-technical analysis been completed?

### 2.3.2 Response:

**Item 5:** Reference to the IR4 reply above, Item 1 and Table 1. High Water Mark (HWM) or High Water Width has been defined as per the BC Ministry of Forests, Forest Road Engineering Guidebook with the figure below:



Borrow sources within floodplains will not be excavated below the water table level. The approach described in the Borrow Pit Management and Reclamation Plan protects against the interaction of water accumulated in borrow pits with natural bodies of water.

As stated in Item 4 above, high water flows ( $Q_{100}$ ) will be guarded by a berm elevated 1 m above the determined  $Q_{100}$  elevation where deemed necessary. A hydro-technical analysis was completed just upstream in similar terrain, and by extrapolation, we are confident that the proposed borrow pit is well outside the HMW as indicated by  $Q_2$  levels. Certainly, the pit area including old channels was dry during recent investigations, with no evidence of recent flows. During the detailed design stage, borrow pit stability, potential risk from active stream channel, and potential risk from high water flows will be reviewed and appropriate protection measures such as berms will be included in the DBSPD.



## 2.4 MVEIRB IR #1 Scope of Development Update

### Recommendation

1. Please update maps: Remove locations that are no longer part of the scope, such as the Tetcela Transfer Facility and the airstrips within NNPR, and add any additional known locations of project facilities (e.g., known camps, borrow pits, etc). This is particularly requested for the following figures:
  - PR#102 DAR Addendum Appendix E Figures 1 and 2.
  - PR#121 DAR Appendix 7 Figures 1 and 2; and
  - PR# 55 Figures 1-2;
2. Please update scope of development: Submit a written updated scope of development (suggest table format) that includes all structures and project components along the final road route re-alignment, including updated kilometre post. Please also include any known locations of:
  - any other proposed facilities or structures during construction or operations phase.
  - any planned airstrip outside NNPR; and
  - watercourse crossings, creek re-alignments, bridges and culverts;
  - updated borrow pit locations (exclude sites already identified to be removed to mitigate adverse impacts);
  - camps during road construction;

### 2.4.1 Response

**Item 1:** Updated 1:10,000 road maps are located in Appendix A. On these maps, we are only showing the road alignment proposed to be built, with updated KP markers, along with camps, borrow pits and laydown areas. The airstrips and TTF have been removed.

**Item 2:** An updated “all inclusive” Scope of Development table can be found in Appendix B. This table summarizes, in numerical order, (i) all identified structures to be installed and constructed within the road right of way; and (ii) all required features outside the right of way to support the construction or long term operation of the access road. These include:

- Minor stream crossings (basic structure type)
- Major stream crossings (structure type and size)
- Borrow pits (defined by preferred vs. back up, if long term, if access road required)
- Camp/laydown locations (if considered for long term)
- Liard Transfer Facility
- Waste areas





## 2.5 MVEIRB ID #8 Stream Crossing Monitoring

### Recommendation

1. Would CanZinc commit to developing a monitoring plan for crossings and describe what parameters will be monitored prior to construction? This plan should include the following:
  - assessment of impacts to channel morphology and fish habitat, as well as risk to road structures;
  - Table 3 ranks the crossings from highest to lowest risk - it is expected that the monitoring plan would reflect this ranking, with a higher level of effort directed at the higher risk crossings;
  - and potential adaptive management options.

### 2.5.1 Response:

CZN has previously committed to the development and implementation of an inspection and monitoring program for all stream crossing structures. This commitment has been made in the Road Construction and Maintenance Plan and the Sediment and Erosion Control Plan. Parameters to be monitored shall be consistent with Section 4.0 of the Sediment and Erosion Control Plan to ensure there are no adverse impacts to watercourses prior to construction or site disturbance and would address each of the bullet points identified above. The inspection and monitoring program would indeed reflect the crossing rankings in the aforementioned Table 3. Key to the monitoring would be the detection of any changes to channel positions and the potential for erosion with respect to the crossing structures, and consideration of required adaptive management. Fish habitat is defined by the high water mark which is approximated by Q2 flows. Major stream crossing structures will be outside Q2 levels so there should be no impact on fish habitat

We trust this report satisfies your requirements at this time and thank you for the opportunity to work with you on the project. If you have questions or concerns do not hesitate to contact our office.

Yours truly,

### ALLNORTH CONSULTANTS LIMITED

Prepared By:

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Reviewed By:

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Division Manager



## **Appendix A Proposed Prairie Creek Mine Location Maps 1:100,000 and 1:250,000 Key Map**



420000

440000



## Prairie Creek Mine

### Access Road Overview

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#### Legend

- Km Marker
- Camp / Laydown
- Access Road (161020)
- National Park

6840000

400000

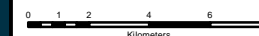
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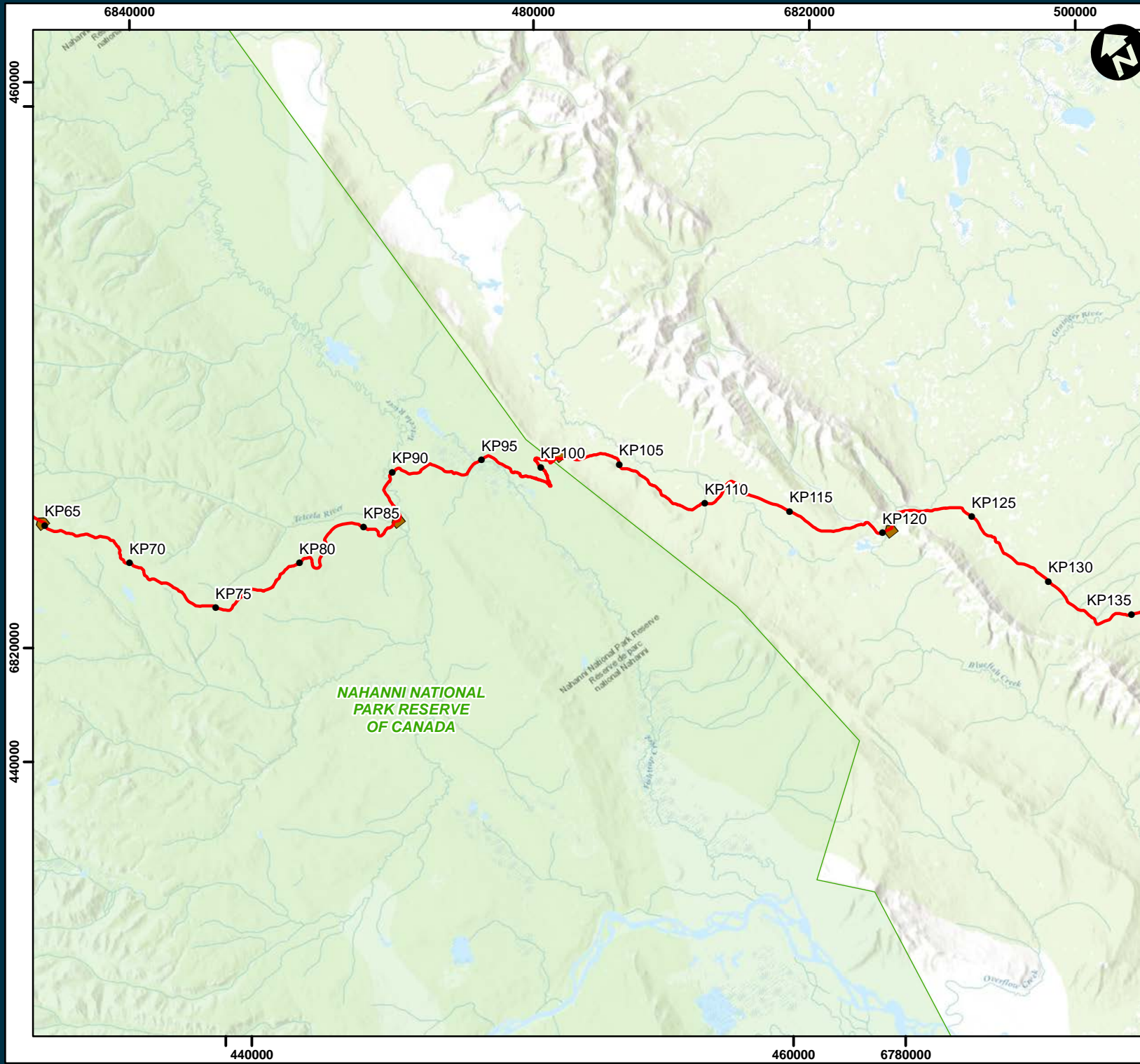
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Sources: Esri, HERE, DeLorme,





# Prairie Creek Mine

## Access Road Overview

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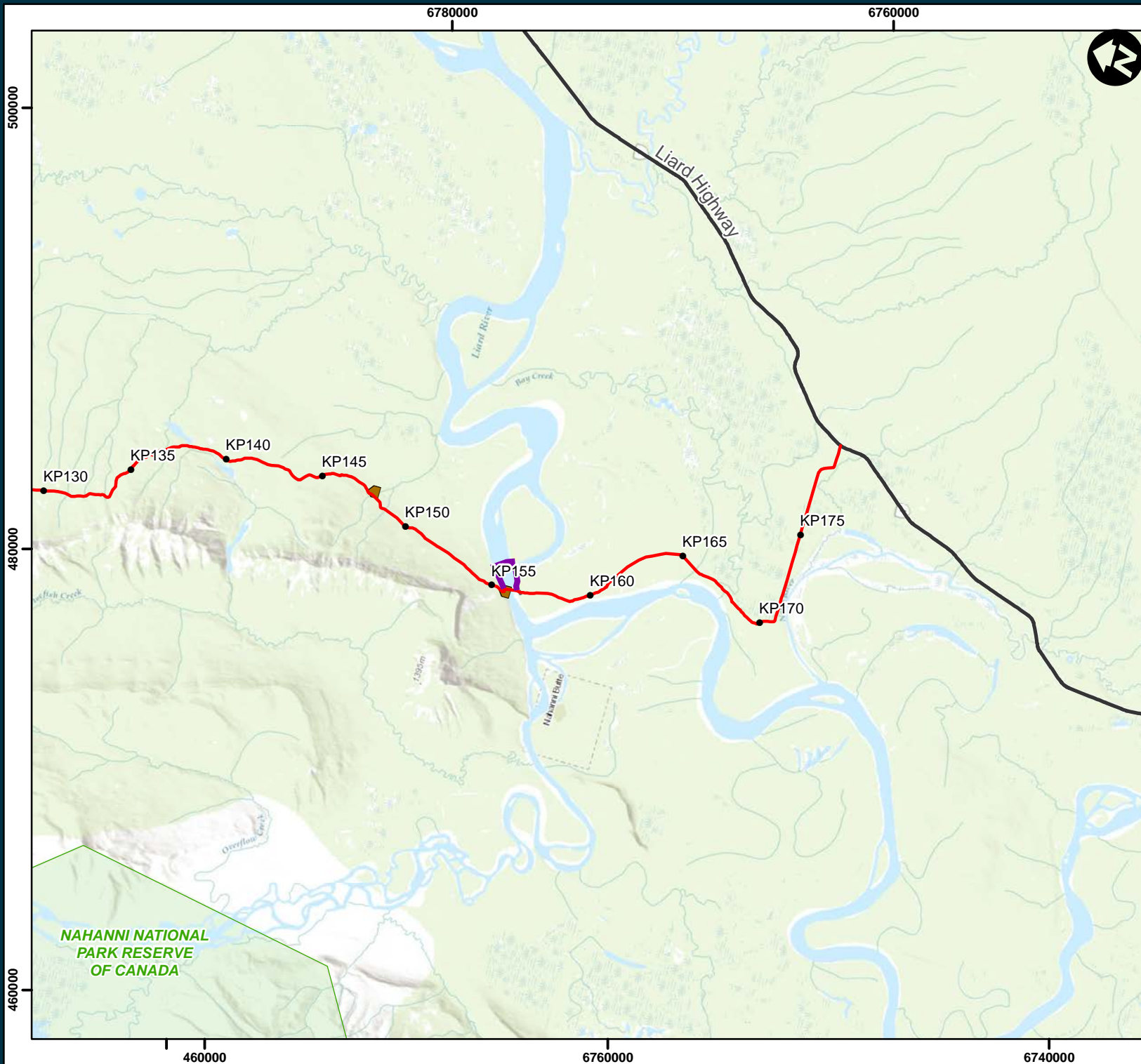
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- Km Marker
- Camp / Laydown
- Access Road (161020)
- National Park

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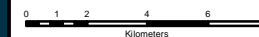
### Access Road Overview

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#### Legend

- Km Marker
- Camp / Laydown
- Liard Winter Crossing
- Access Road (161020)
- Highway
- Liard Landing
- National Park

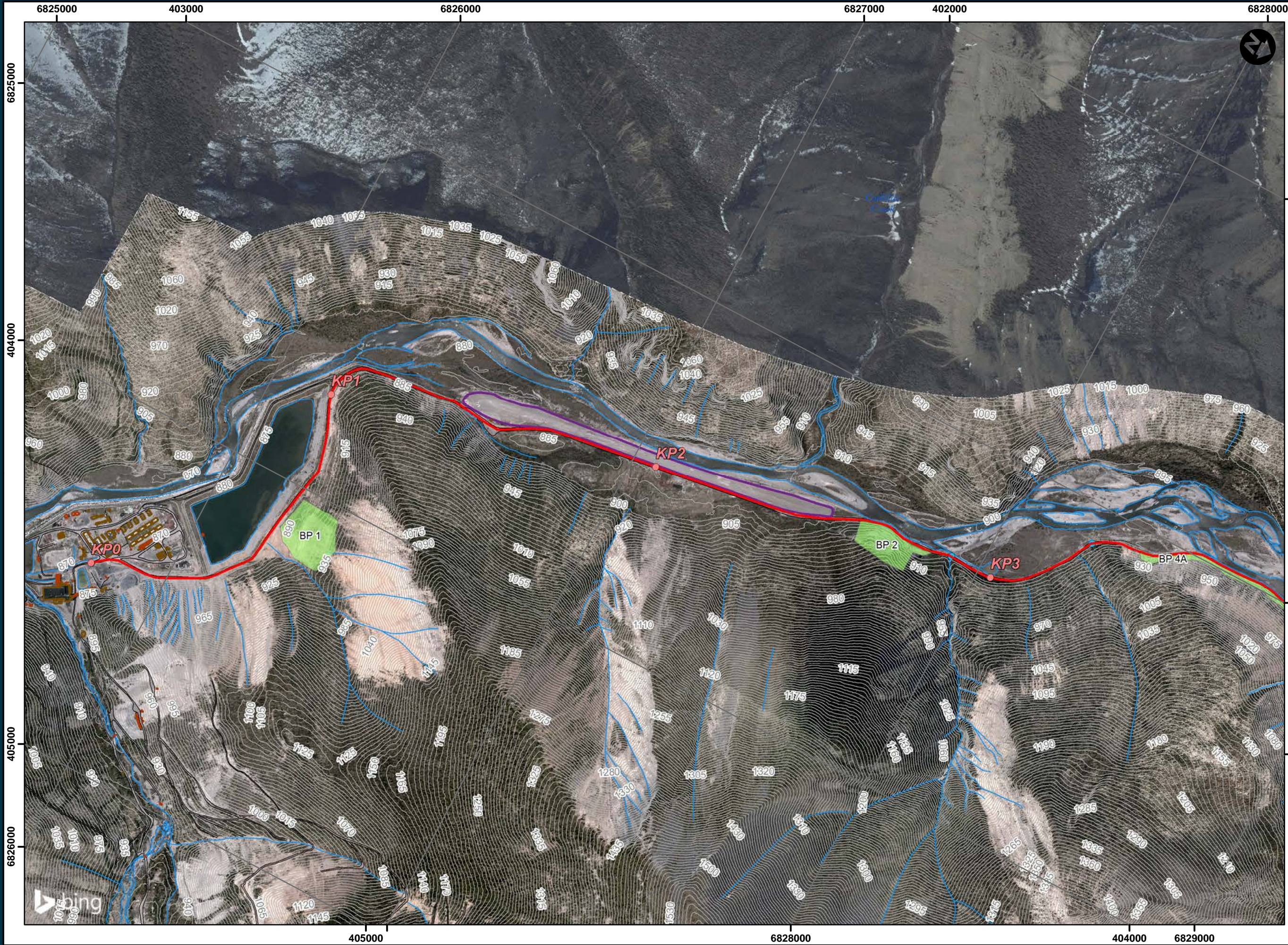
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Sources: Esri, HERE, DeLorme







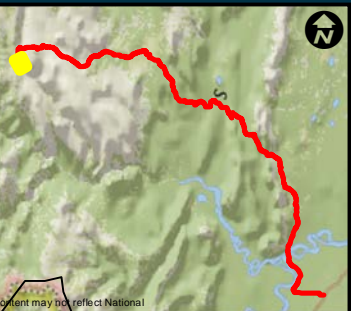
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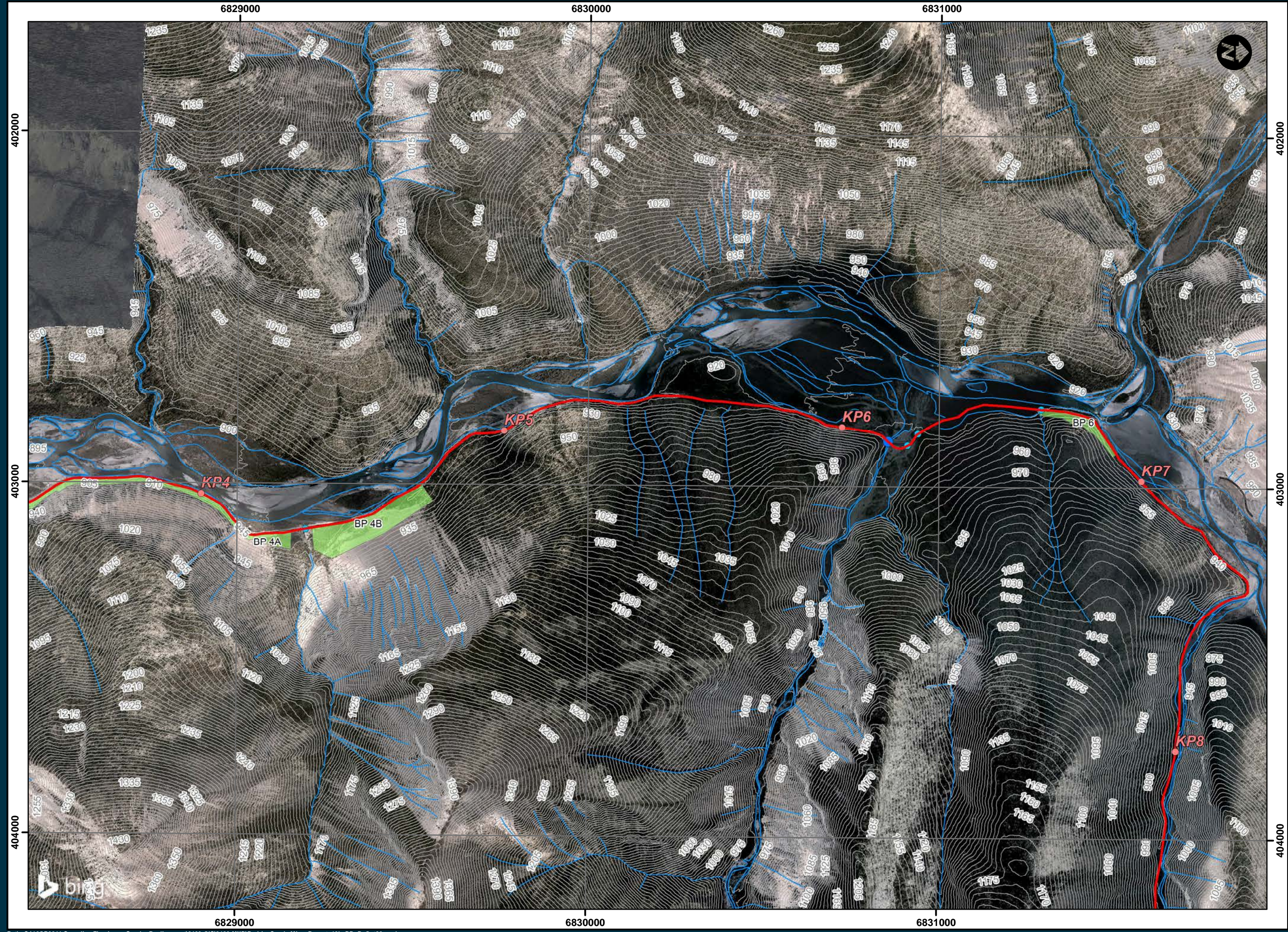
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  - Access Road Updated (161020)
  - Minor Crossing
  - Pipeline
  - Power Pole
  - Building
  - Airport Runway - Loose
  - Structure
  - Roads
  - Water Feature
  - Contours
  - Potential Borrow Pit (161019)

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**Legend**

- Access Road KPs Updated (161020)
- Access Road Updated (161020)
- Major Crossing
- Minor Crossing
- Structure
- Roads
- Water Feature
- Contours
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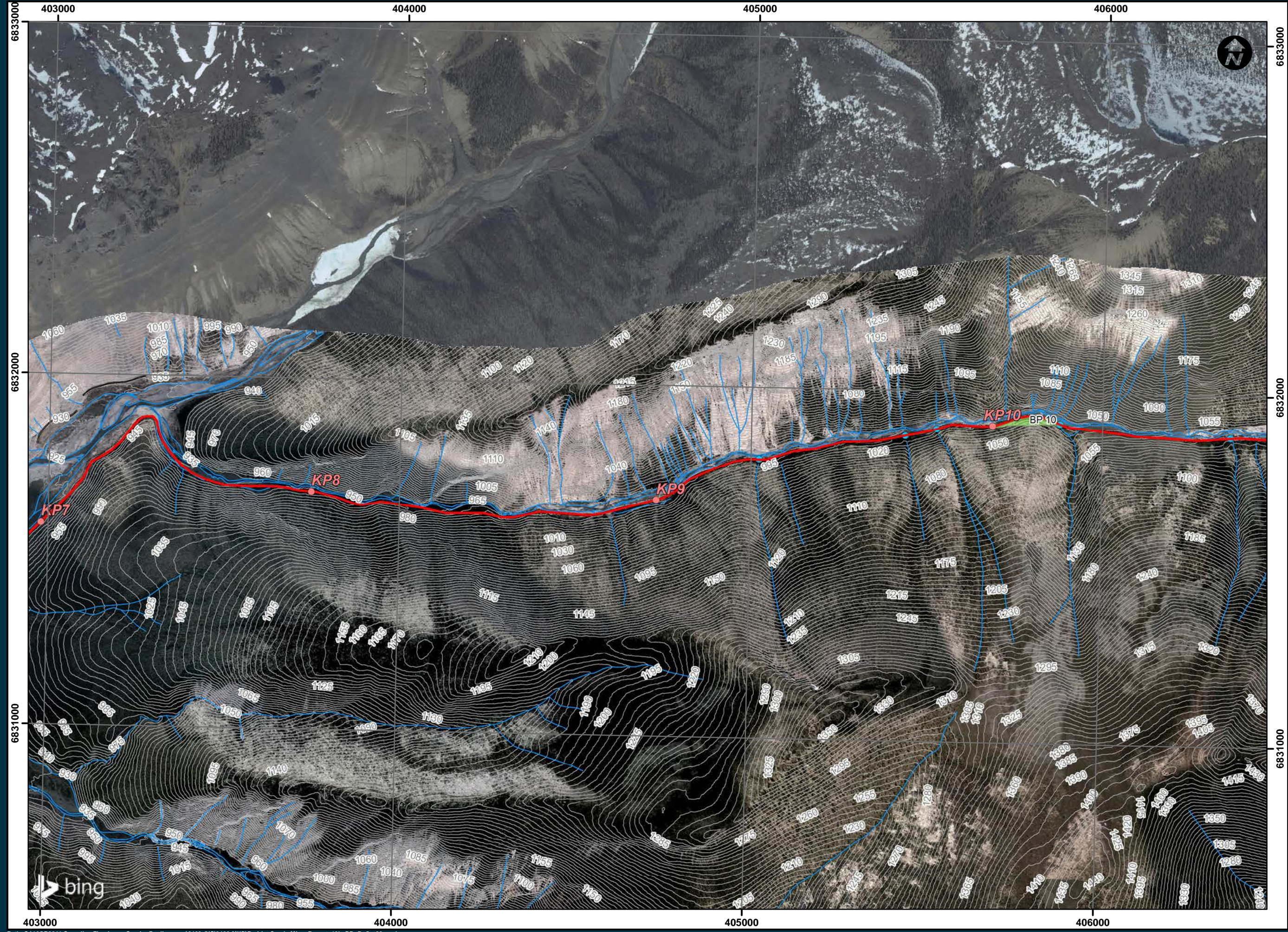
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- Access Road KPs Updated (161020)
- Access Road Updated (161020)
- Minor Crossing
- Roads
- Water Feature
- Contours
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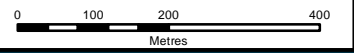




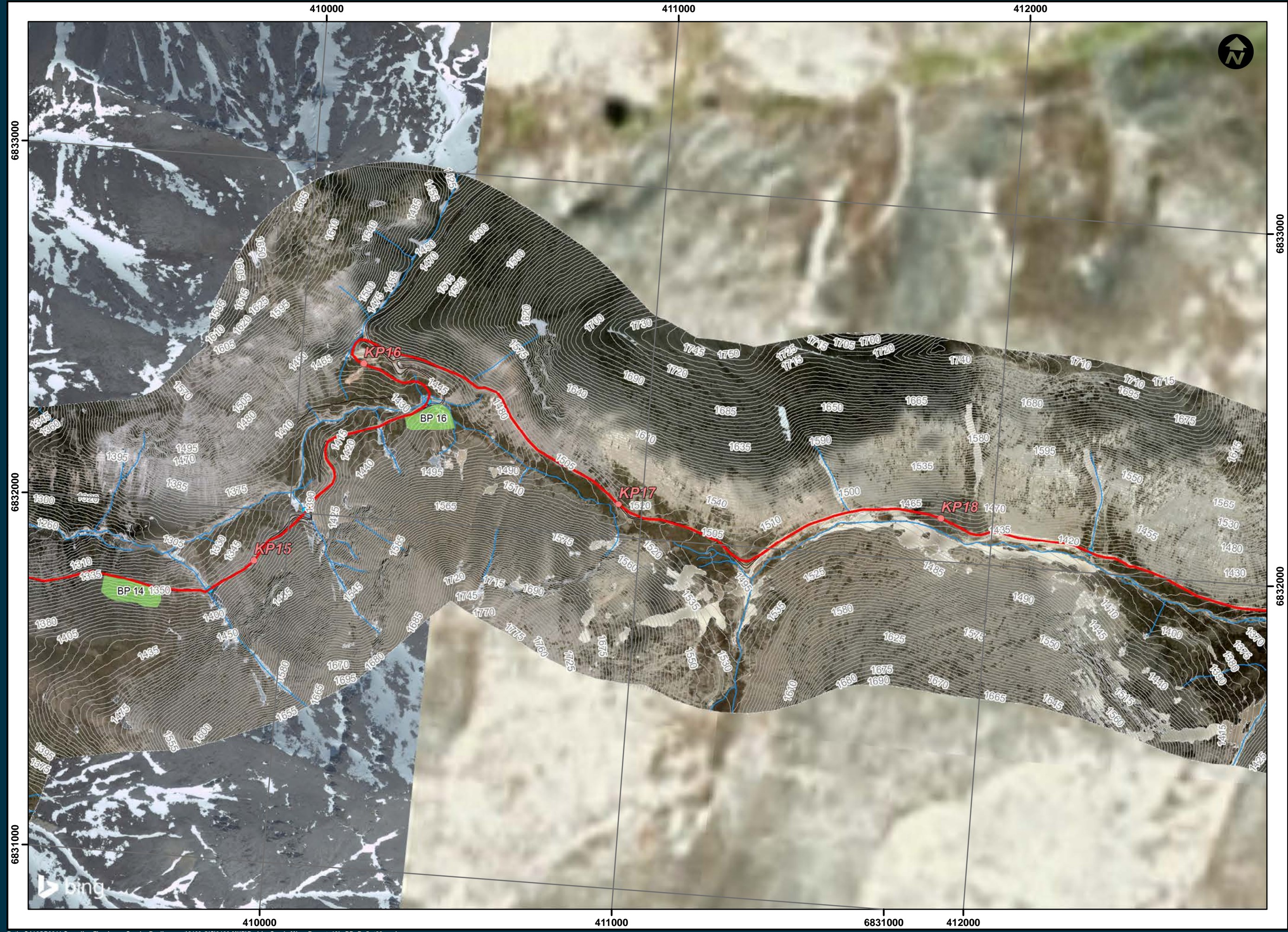


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  - Access Road Updated (161020)
  - Major Crossing
  - Minor Crossing
  - Waste Area
  - Roads
  - Water Feature
  - Contours
  - Potential Borrow Pit (161019)

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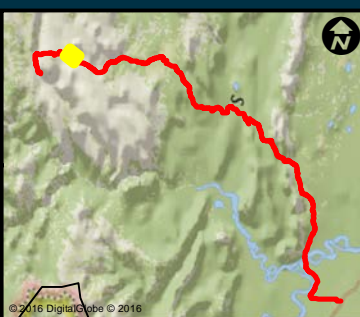
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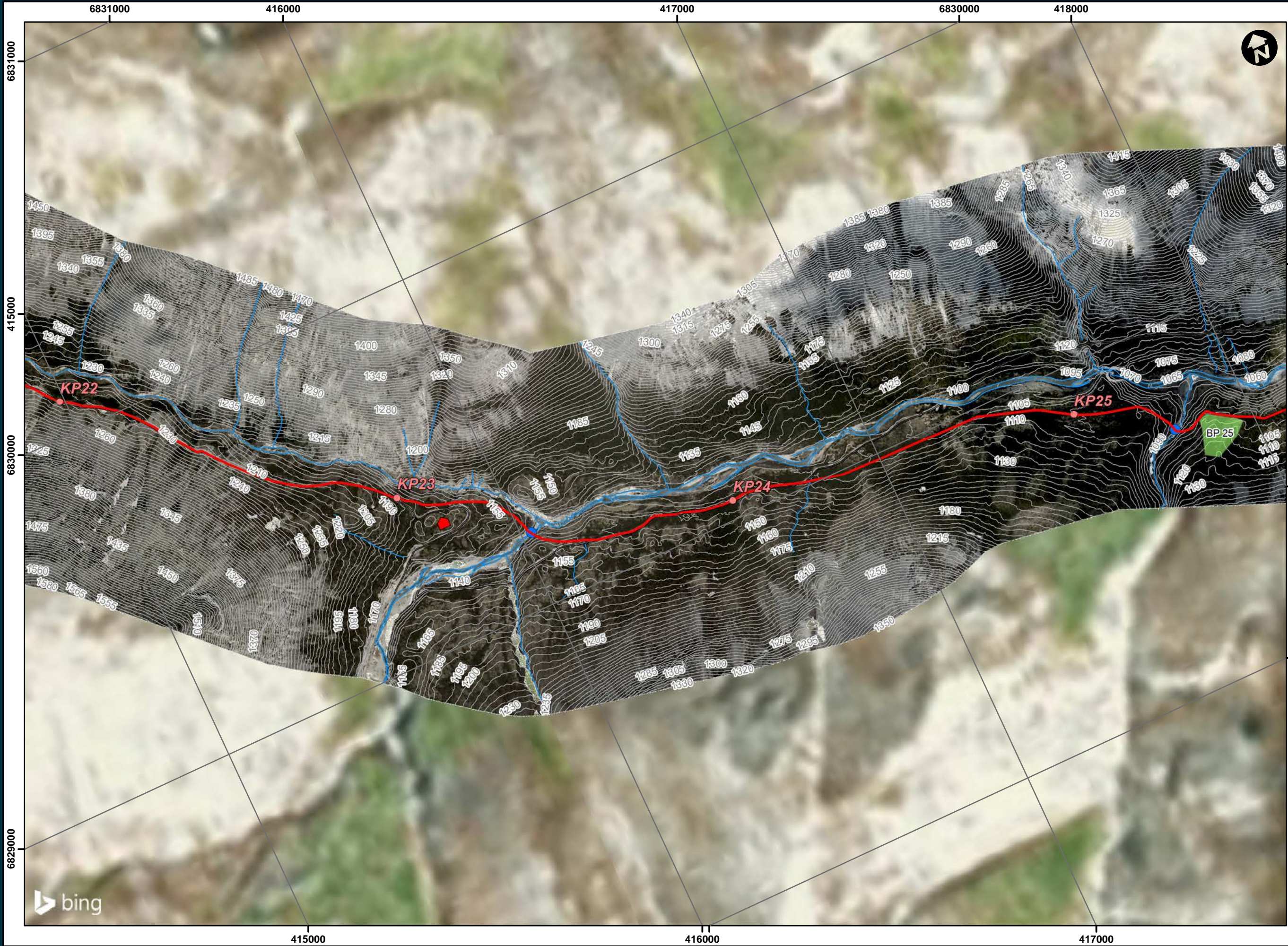
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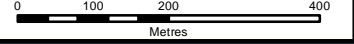


# Prairie Creek Mine

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- Legend**
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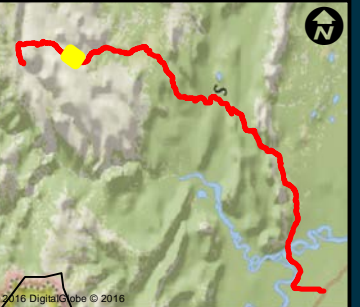




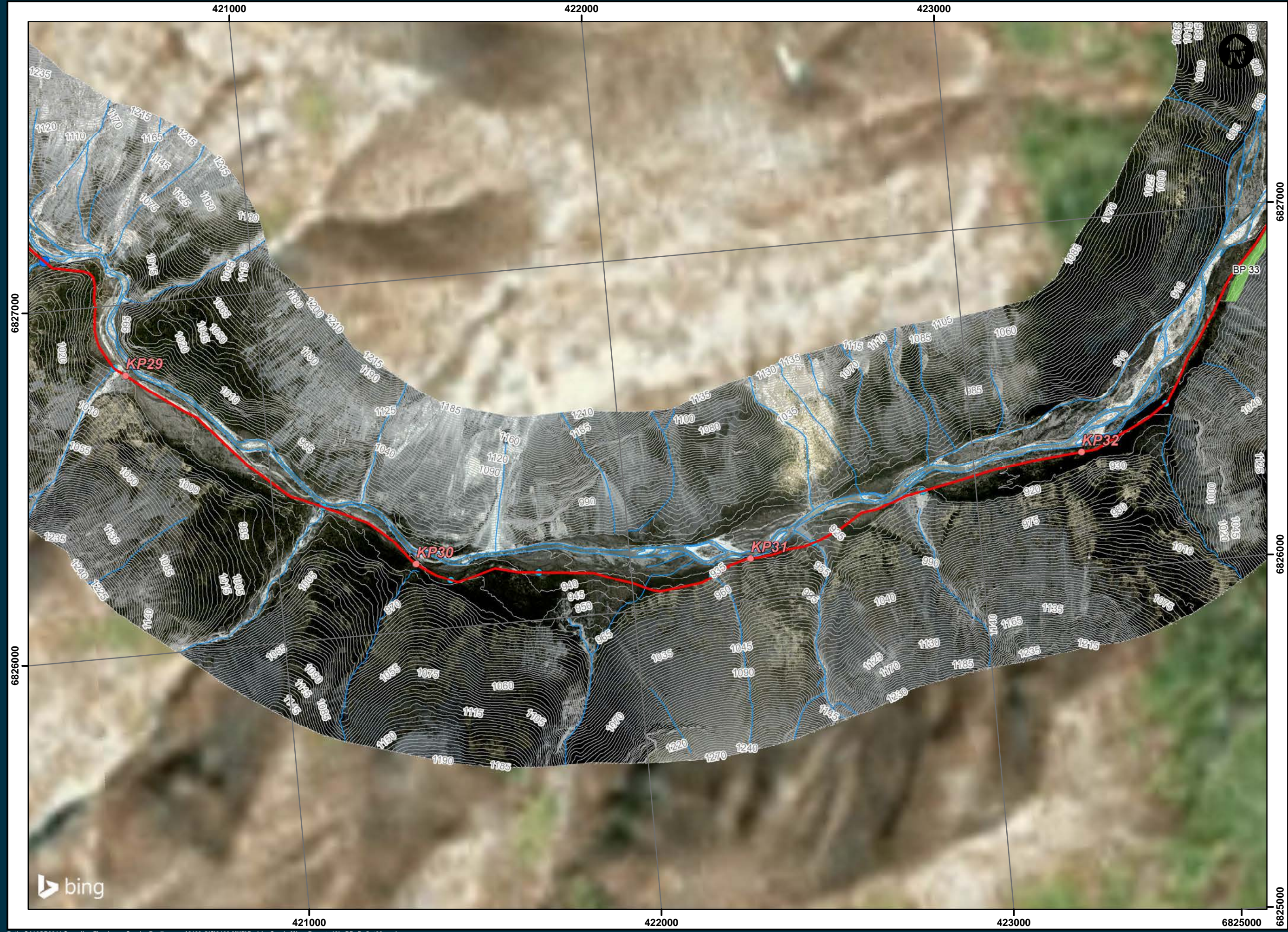
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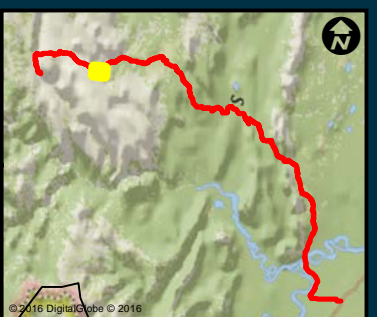


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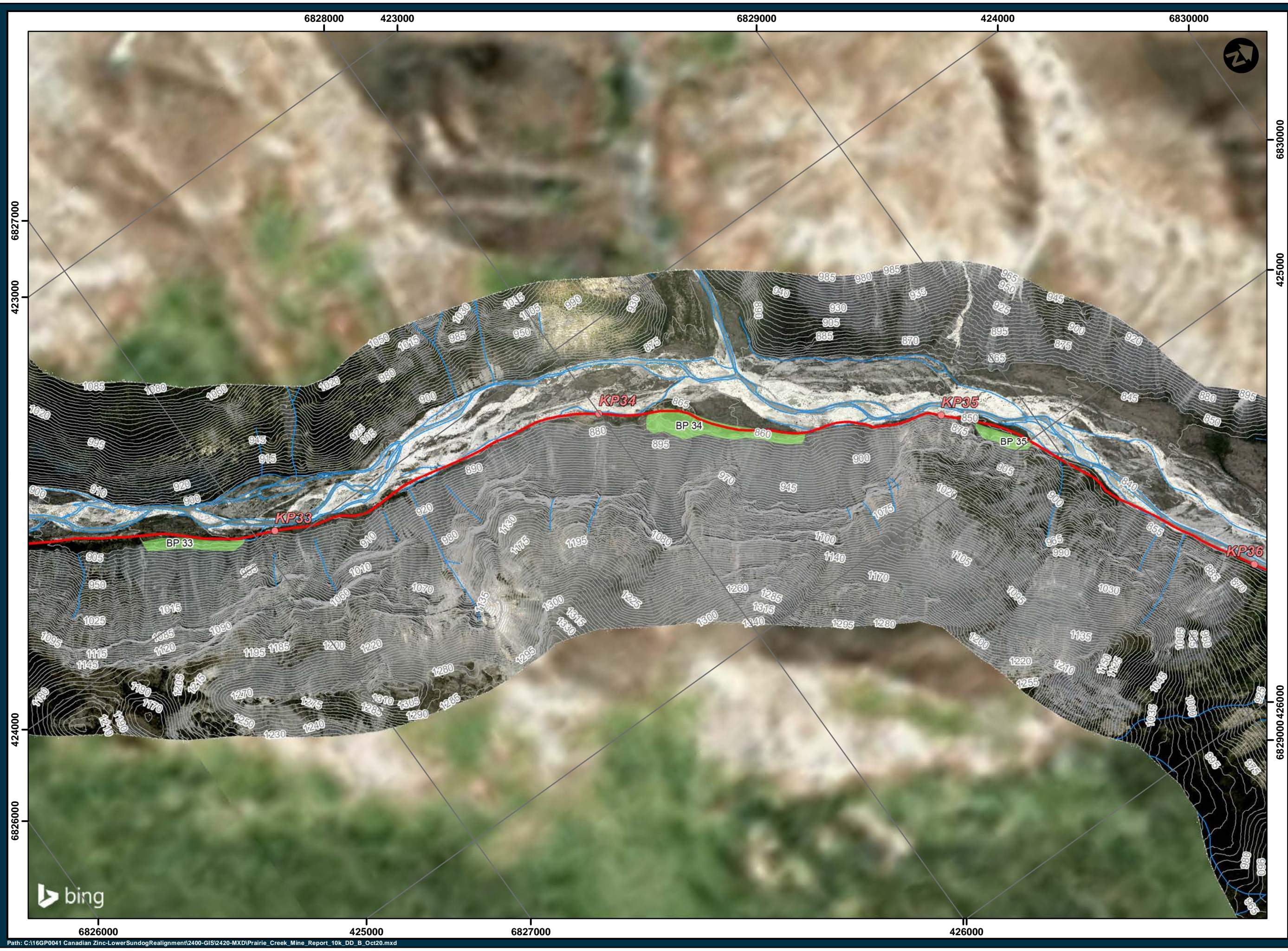
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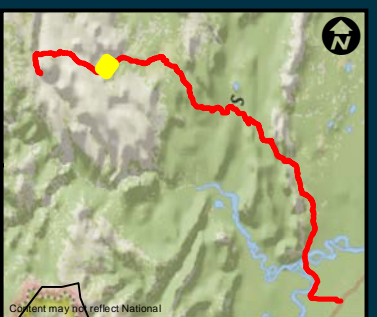
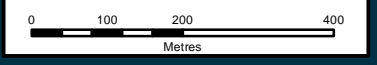




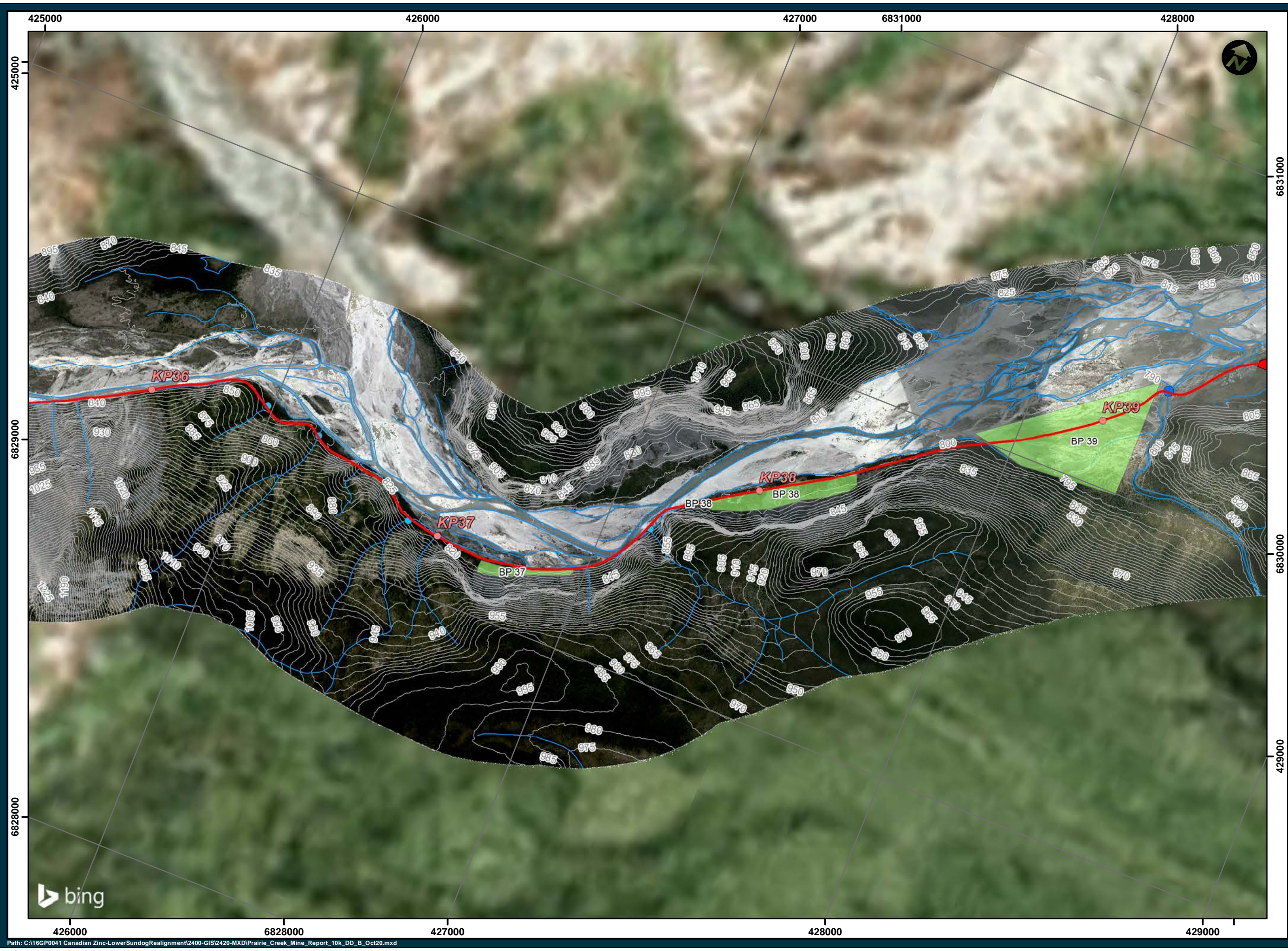


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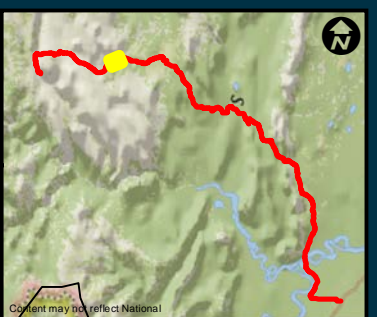




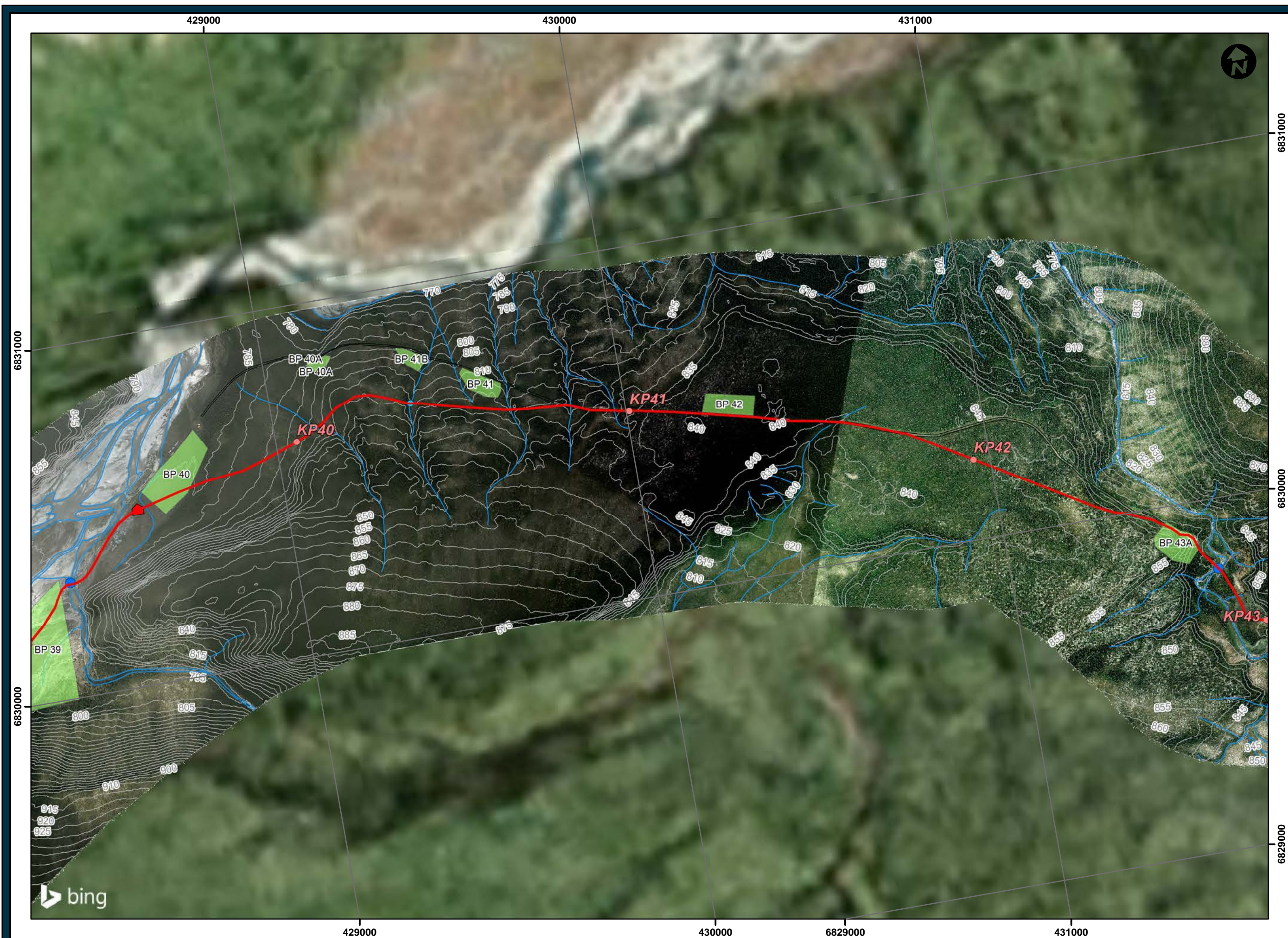
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**Legend**

- Access Road KPs Updated (161020)
- Access Road Updated (161020)
- Major Crossing
- Minor Crossing
- Camp / Laydown
- Roads
- Water Feature
- Contours
- Potential Borrow Pit (161019)


Date: 10-21-2016  
Projection: NAD 1983 UTM Zone 10N  
Scale: 1:10,000  
Author: ainglis  
Last Modified By: tkwitkoski  
Checked By: EK  
Revision #:



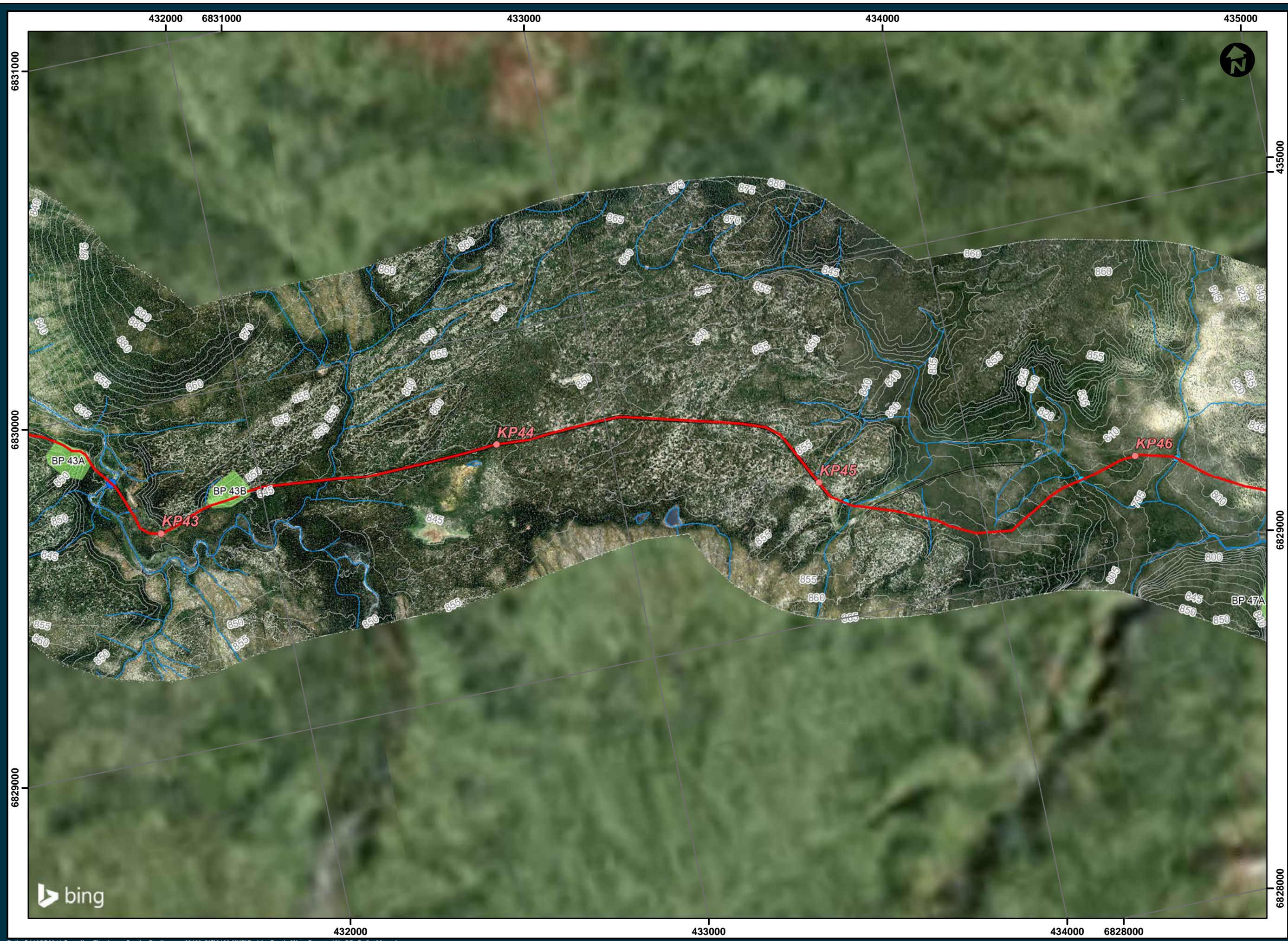
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Consent may not reflect National



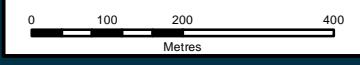




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Scale: 1:10,000  
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Last Modified By: tkwitkoski  
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Revision #:







**Legend**

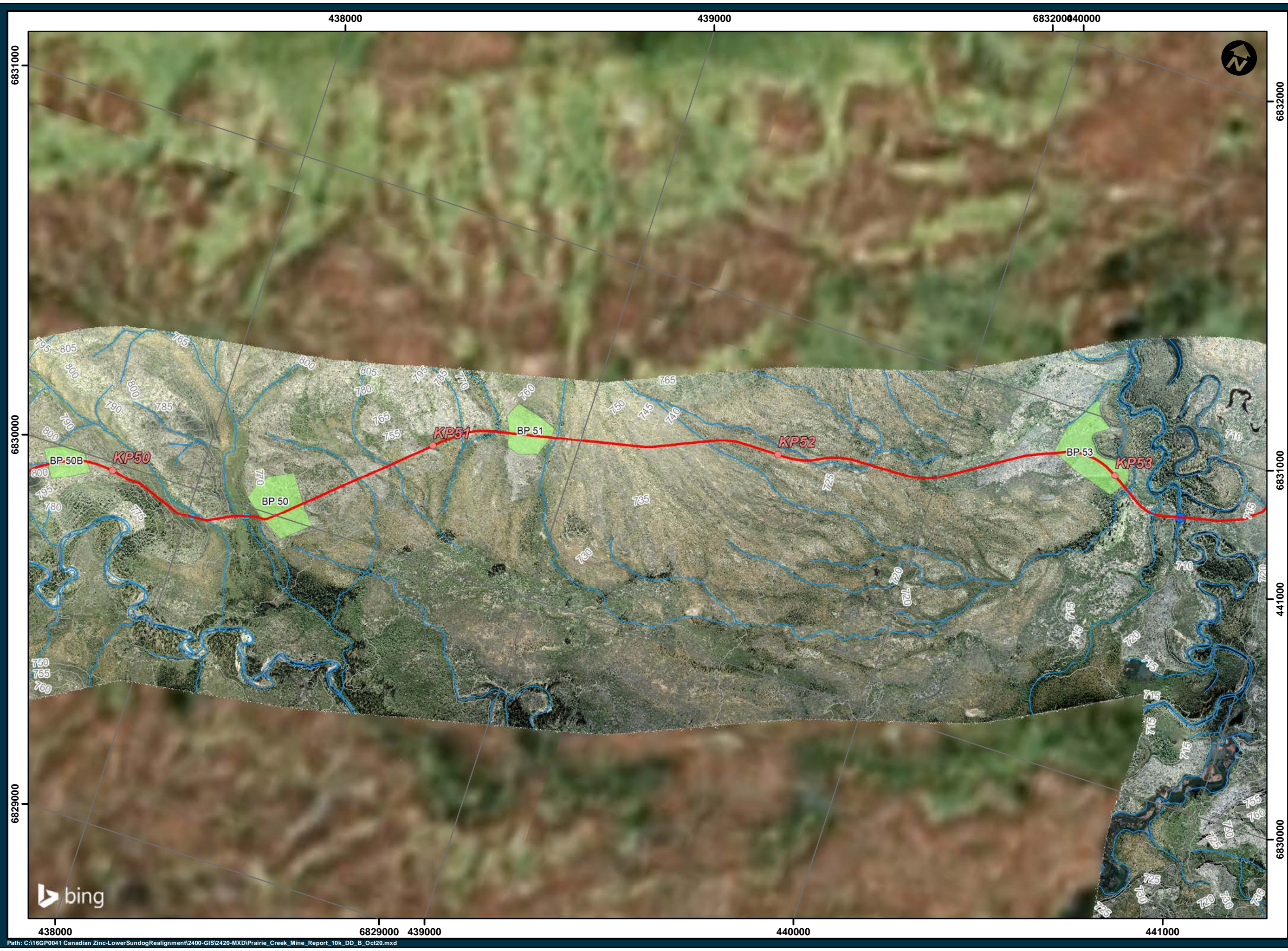
- Access Road KPs Updated (161020)
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Date: 10-21-2016  
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Metres



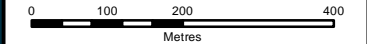




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- Access Road KPs Updated (161020)
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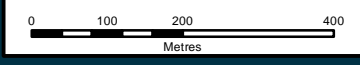




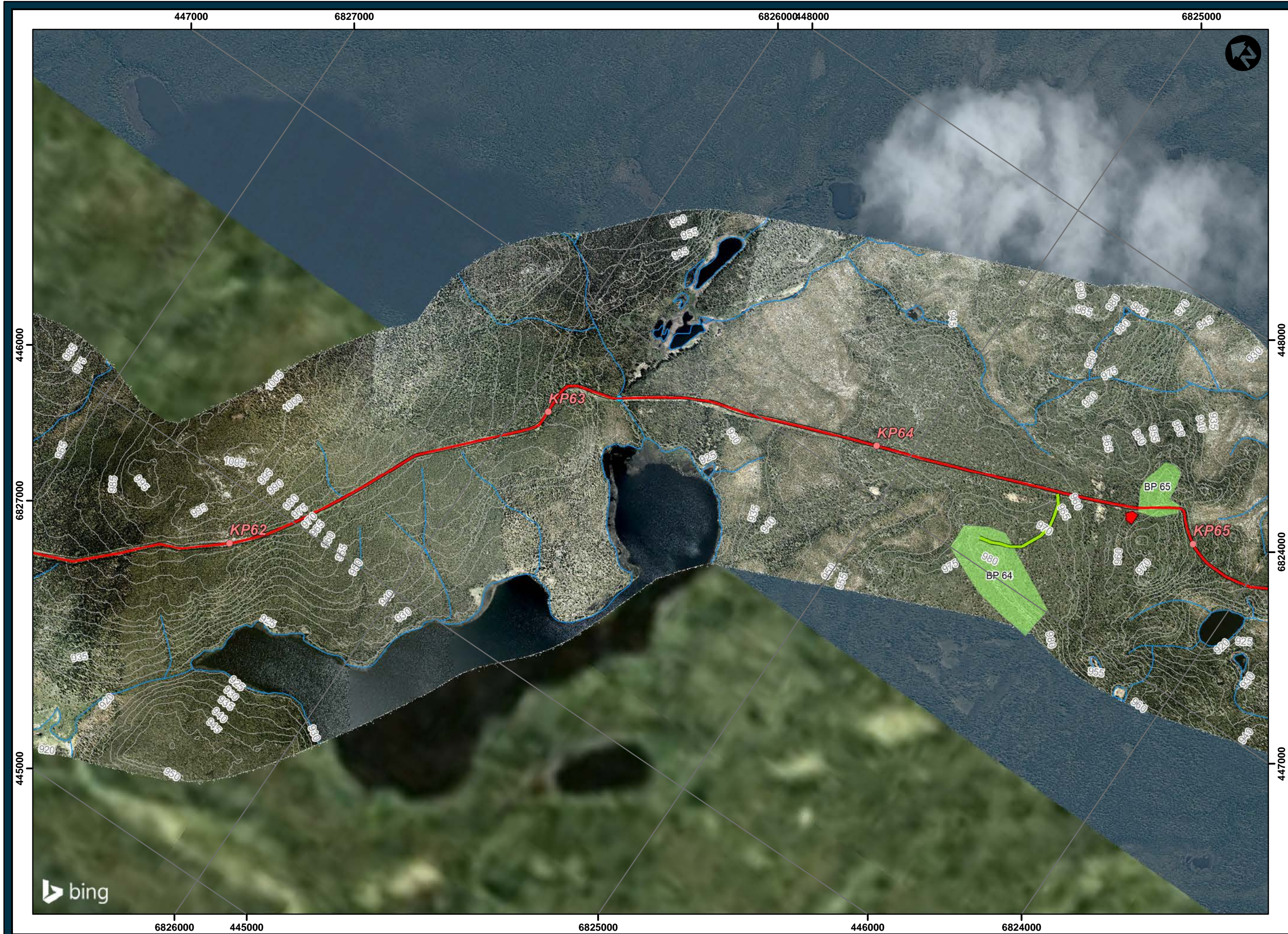


- Legend**
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Author: ainglis  
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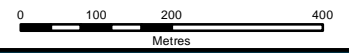




Prairie Creek Mine  
Access Road  
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- Legend**
- Access Road KPs Updated (161020)
  - Access Road Updated (161020)
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Date: 10-21-2016  
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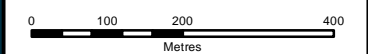




**Legend**

- Access Road KPs Updated (161020)
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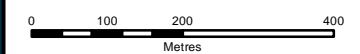




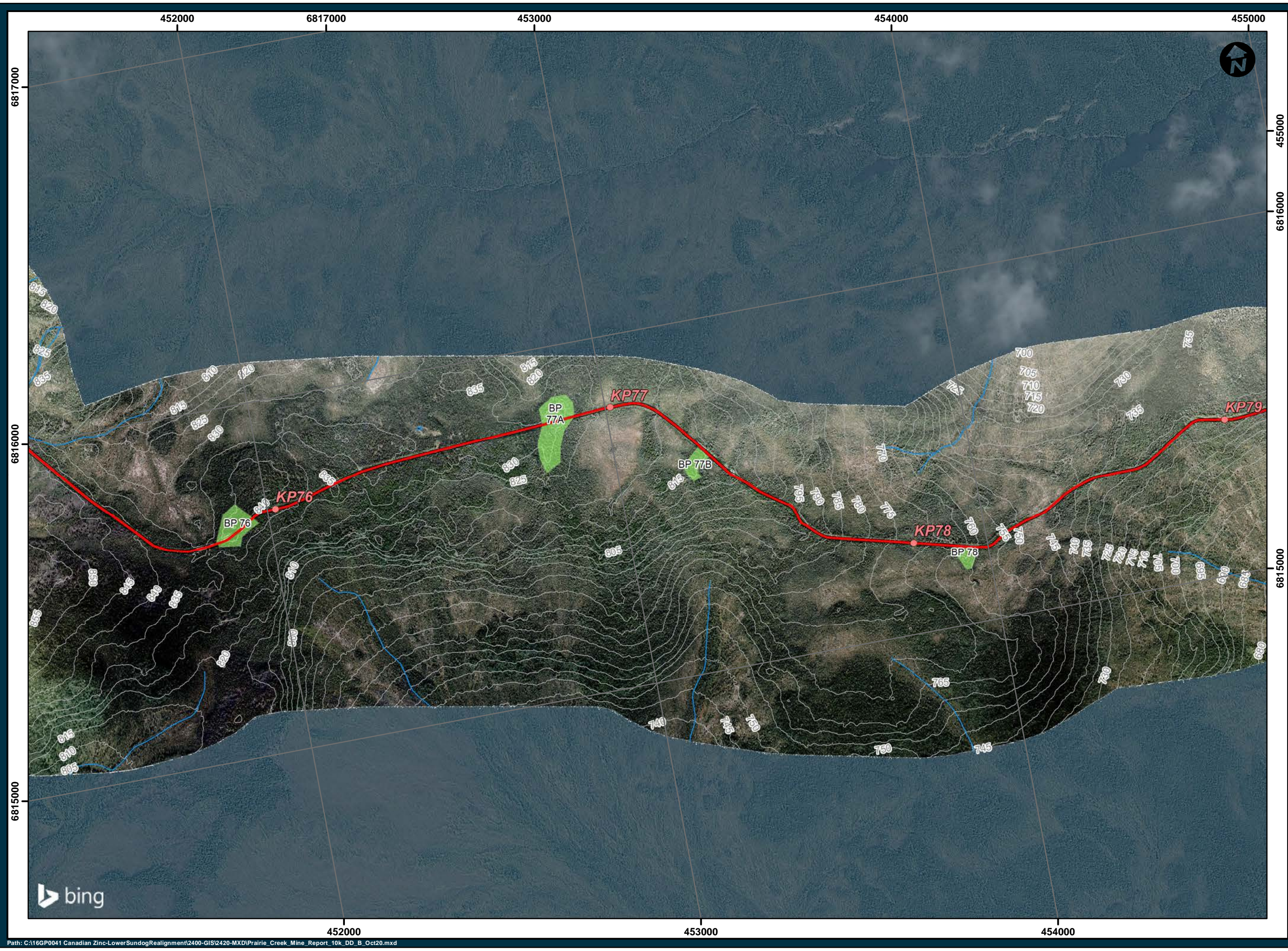


- Legend**
- Access Road KPs Updated (161020)
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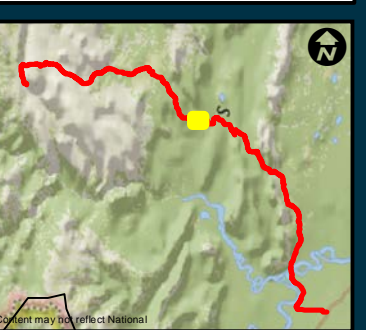




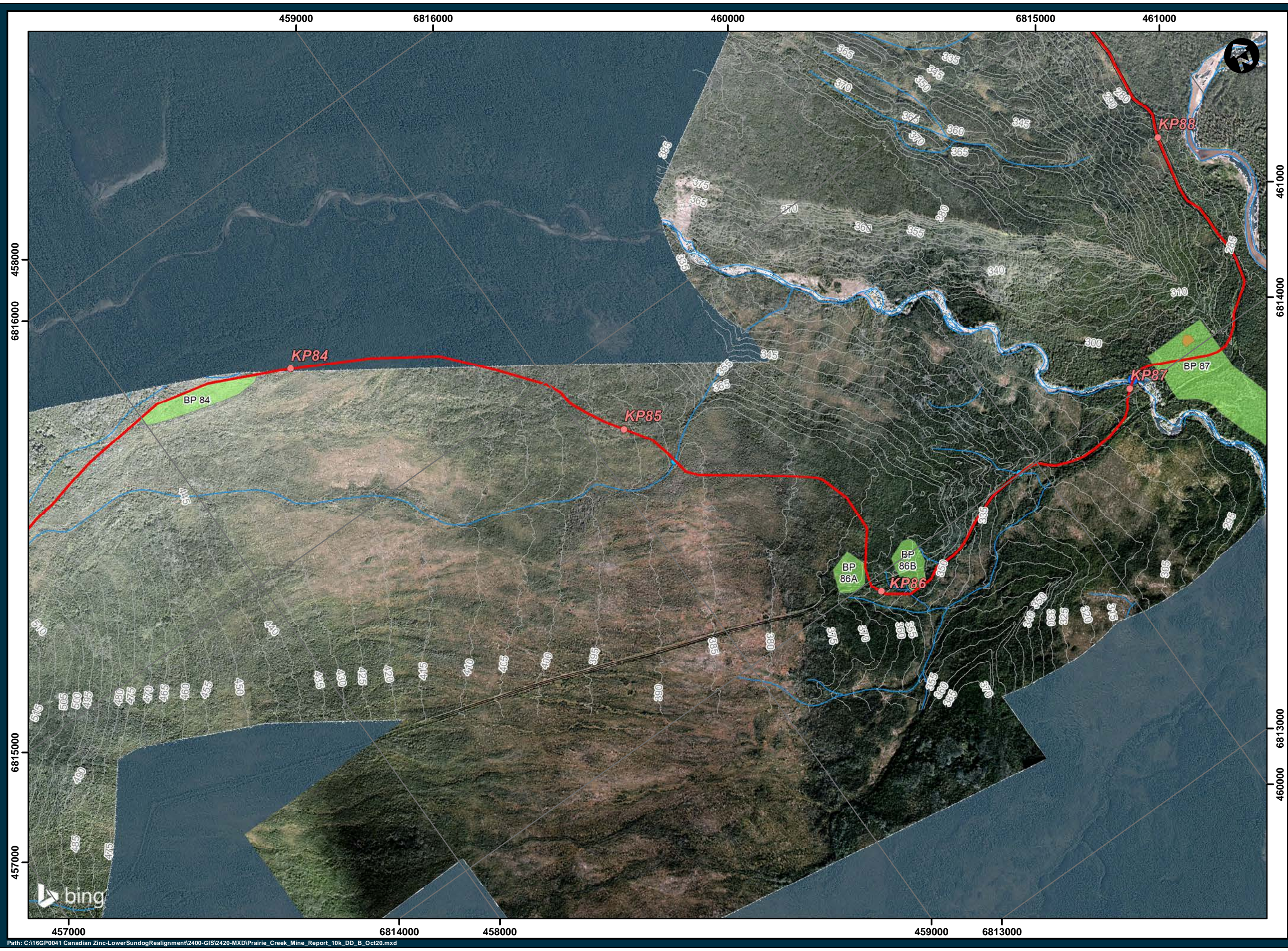
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  - Camp / Laydown
  - Roads
  - Water Feature
  - Contours
  - Potential Borrow Pit (161019)
  - Potential Borrow Pit Access

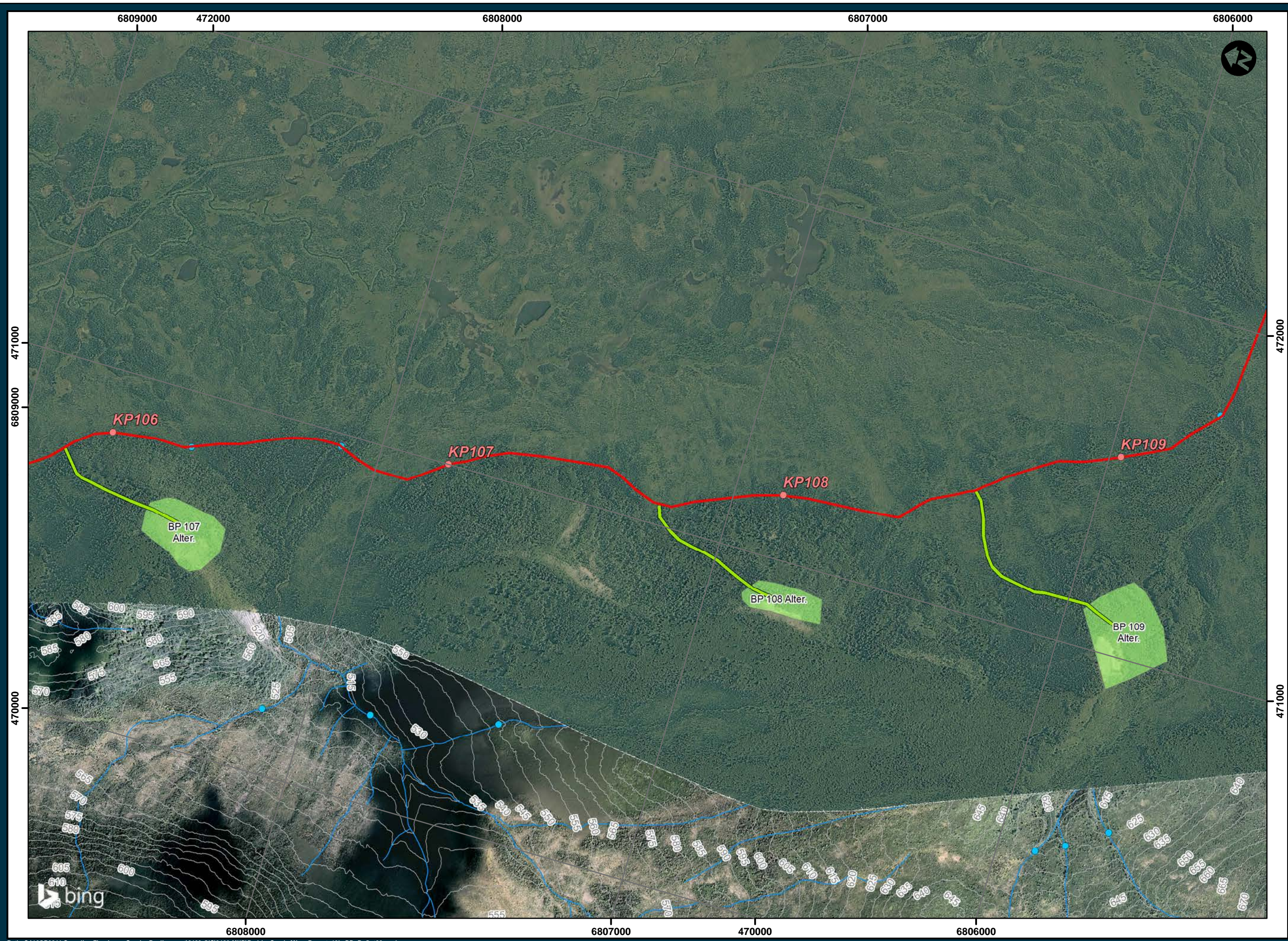
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Last Modified By: tkwitkoski  
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Revision #:











**Legend**

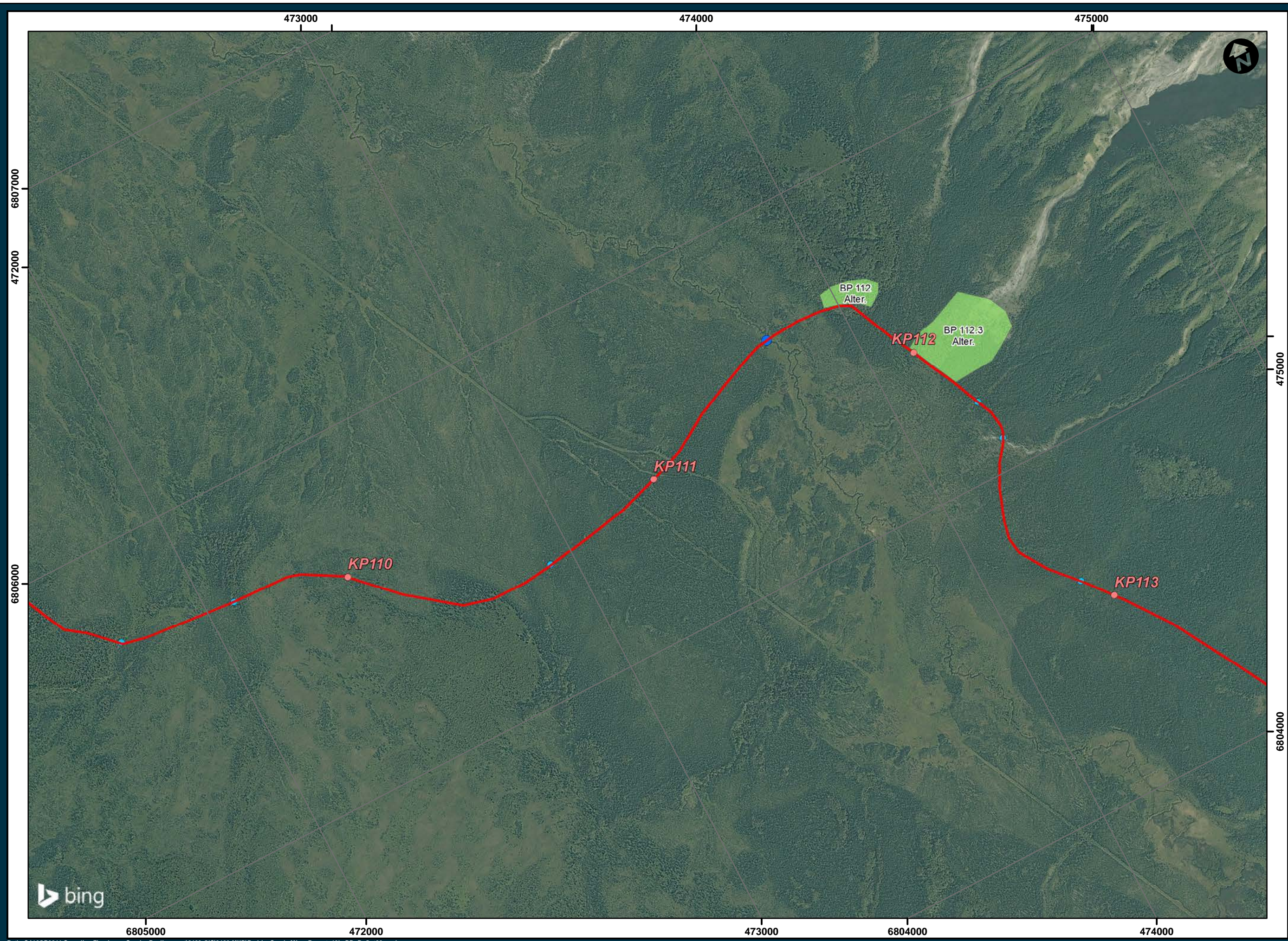
- Access Road KPs Updated (161020)
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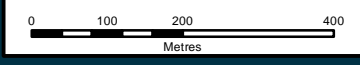




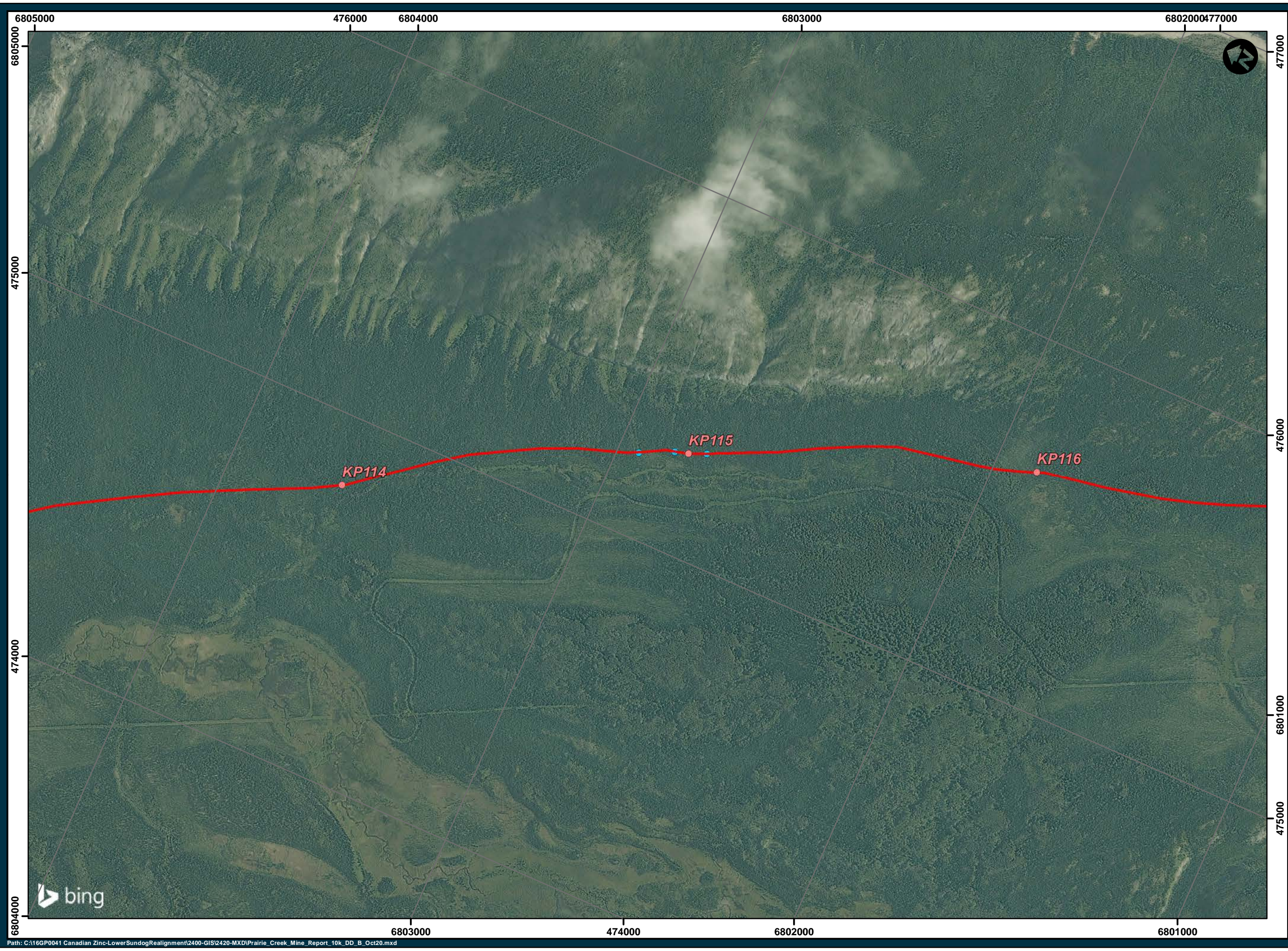
**Legend**

-  Access Road KPs Updated (161020)
-  Access Road Updated (161020)
-  Major Crossing
-  Minor Crossing
-  Potential Borrow Pit (161019)

Date: 10-21-2016  
Projection: NAD 1983 UTM Zone 10N  
Scale: 1:10,000  
Author: ainglis  
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Checked By: EK  
Revision #:







Prairie Creek Mine  
Access Road  
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- Legend**
- Access Road KPs Updated (161020)
  - Access Road Updated (161020)
  - Minor Crossing

Date: 10-21-2016  
Projection: NAD 1983 UTM Zone 10N  
Scale: 1:10,000  
Author: ainglis  
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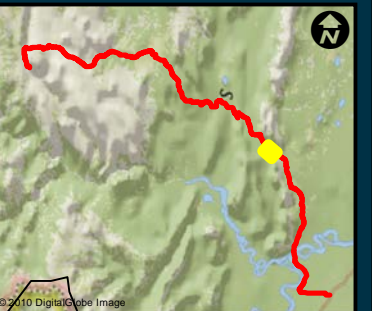




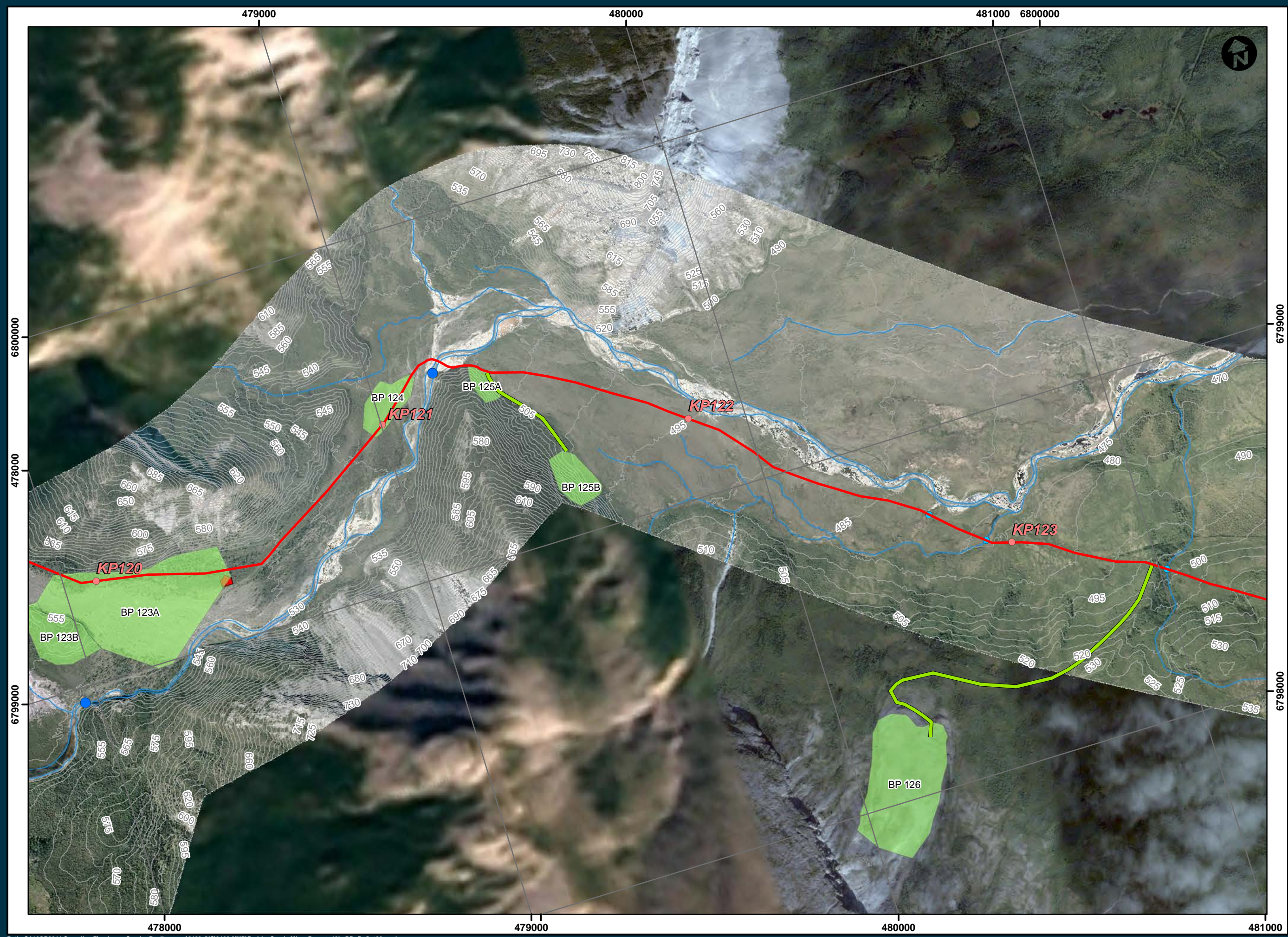


- Legend**
- Access Road KPs Updated (161020)
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  - Minor Crossing
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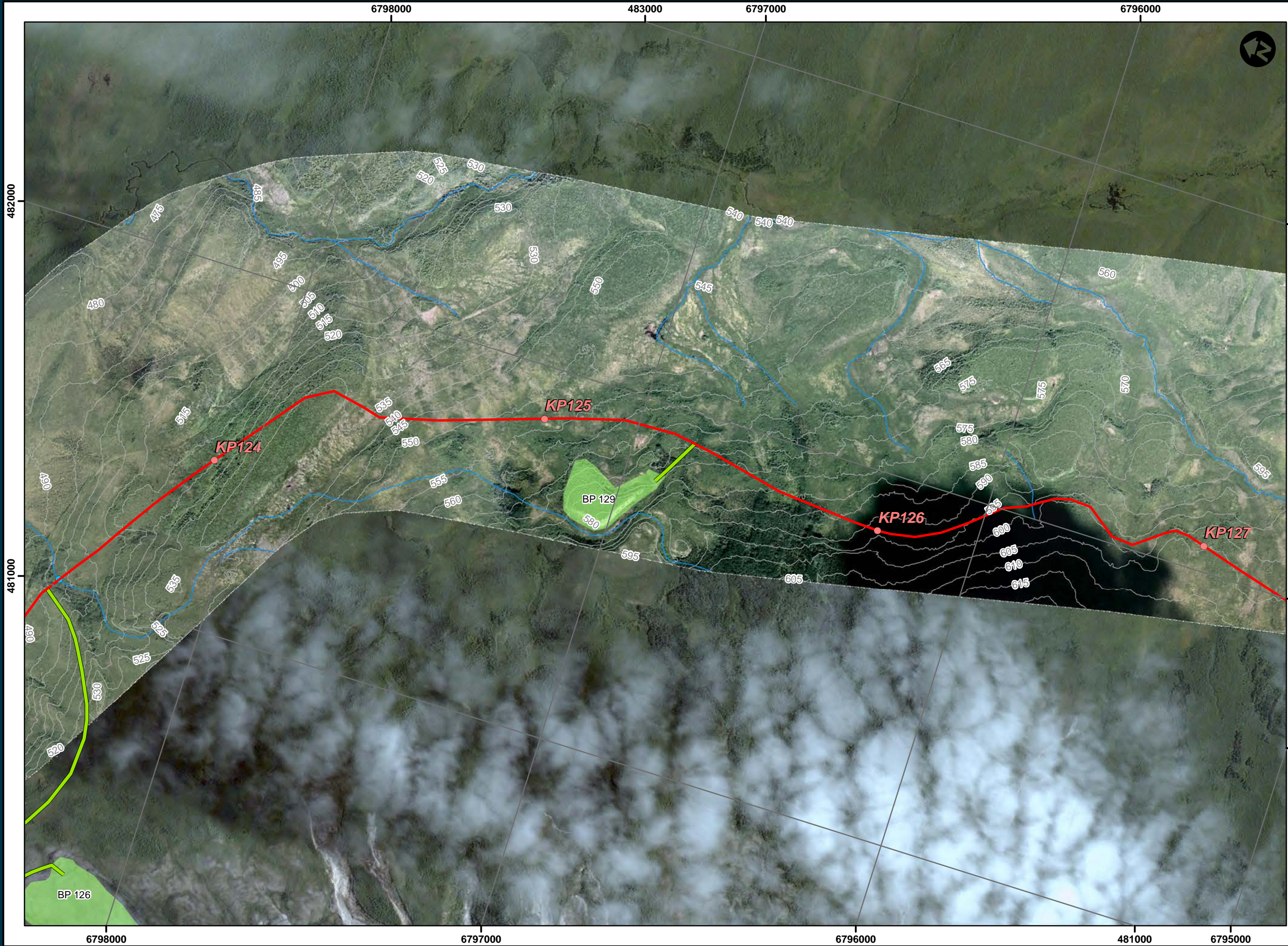
- Legend**
- Access Road KPs Updated (161020)
  - Access Road Updated (161020)
  - Major Crossing
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  - Contours
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Scale: 1:10,000  
Author: ainglis  
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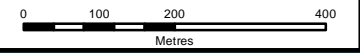




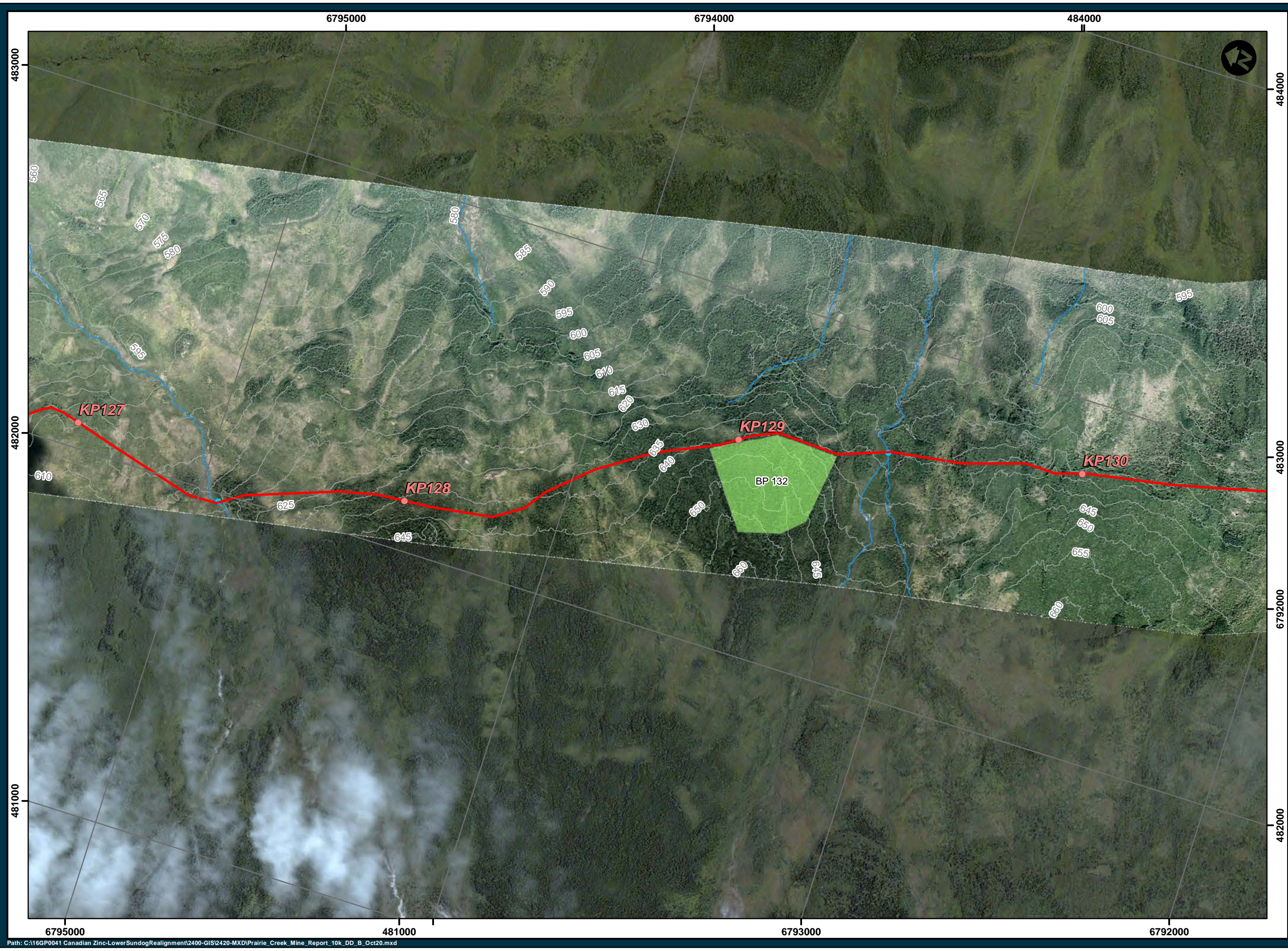
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- Access Road KPs Updated (161020)
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- Contours
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Author: ainglis  
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Revision #:

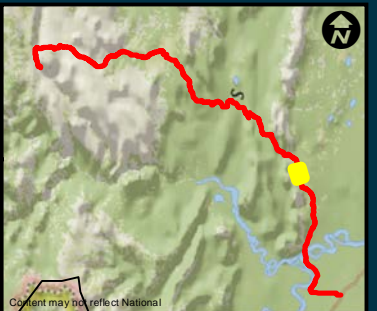
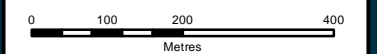




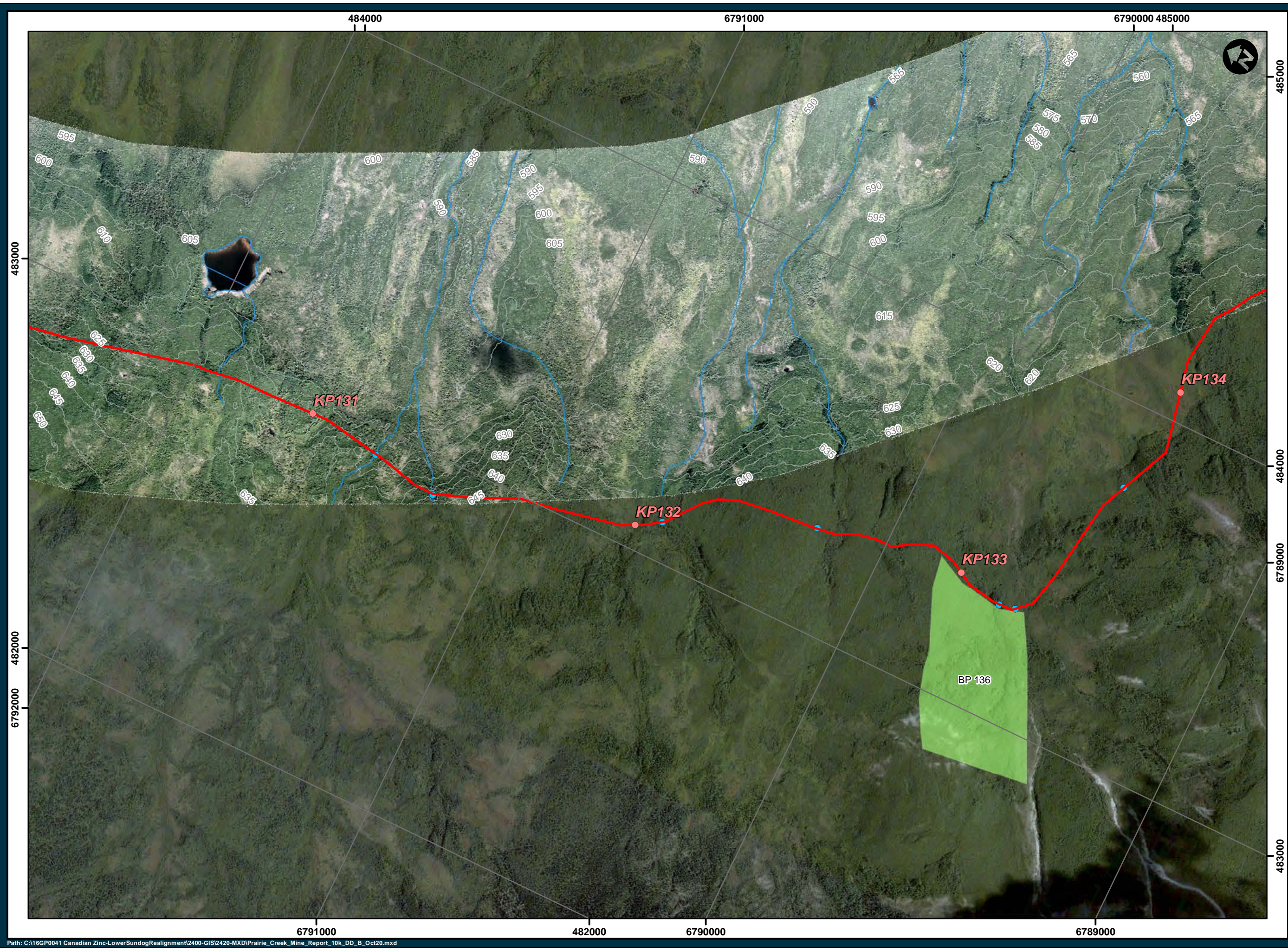


- Legend**
- Access Road KPs Updated (161020)
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  - Minor Crossing
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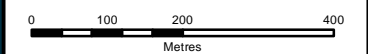




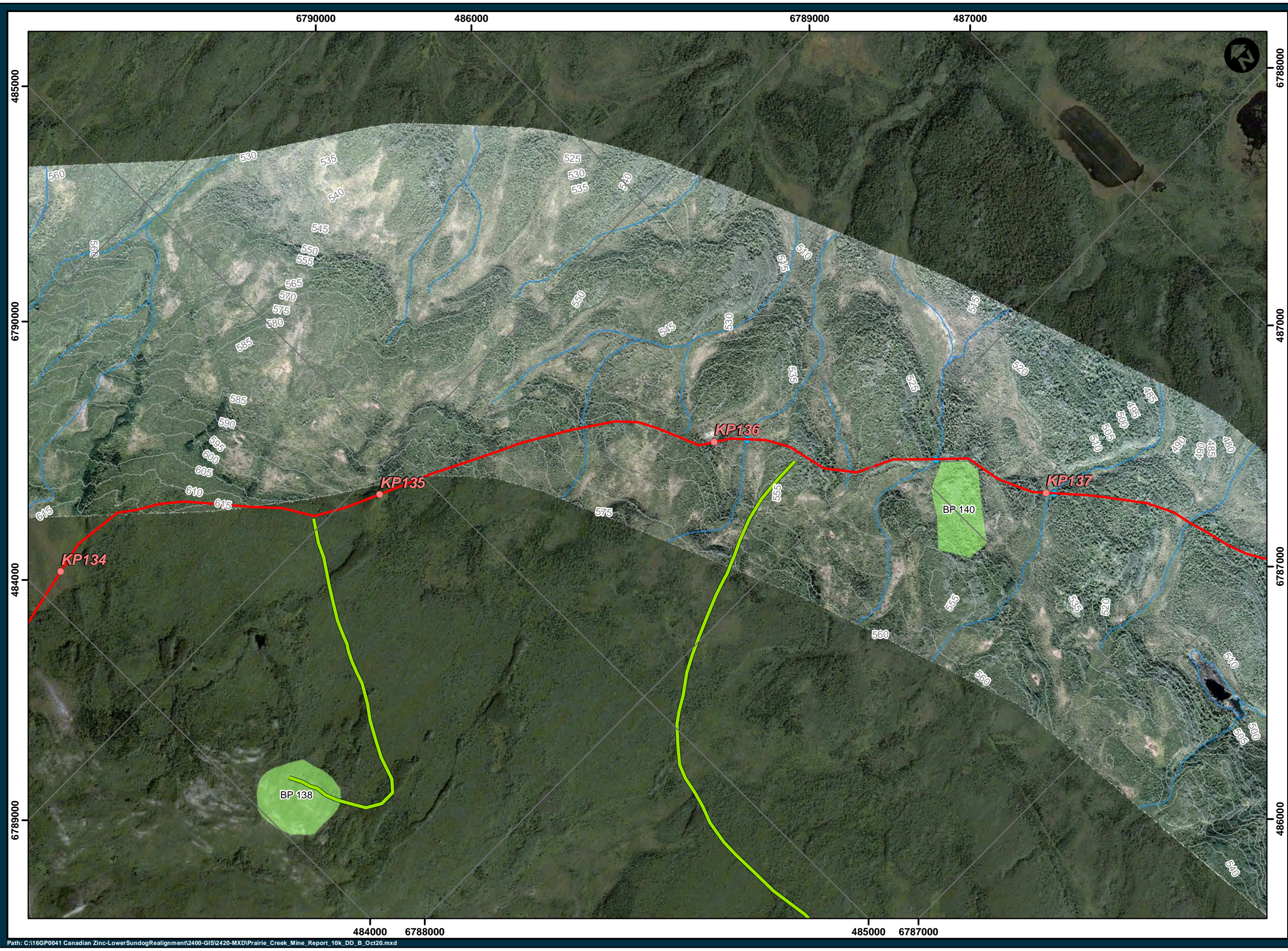


- Legend**
- Access Road KPs Updated (161020)
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  - Contours
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Revision #:







# Prairie Creek Mine

Access Road  
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- Legend**
- Access Road KPs Updated (161020)
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  - Water Feature
  - Contours
  - Potential Borrow Pit (161019)
  - Potential Borrow Pit Access

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# Prairie Creek Mine

Access Road  
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- Legend**
- Access Road KPs Updated (161020)
  - Access Road Updated (161020)
  - Minor Crossing
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  - Potential Borrow Pit (161019)

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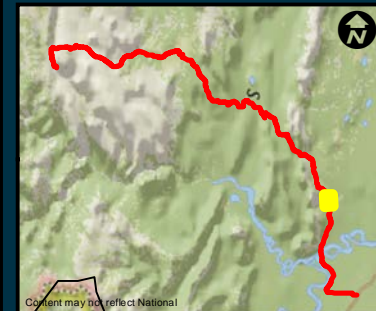
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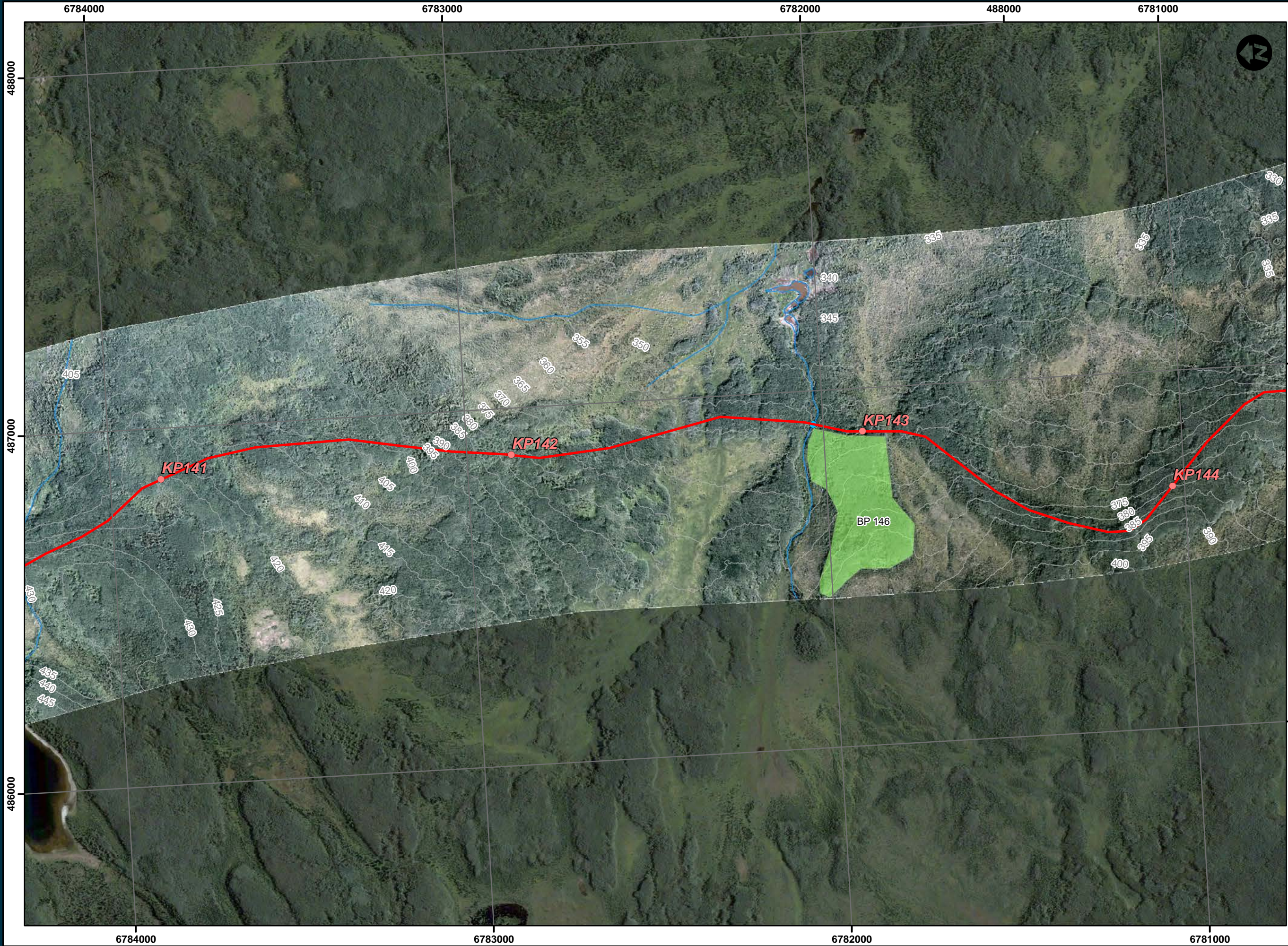
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Date: 10-21-2016  
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Revision #:

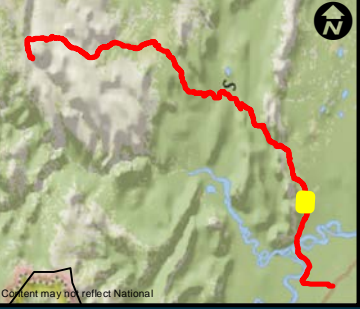
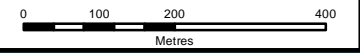




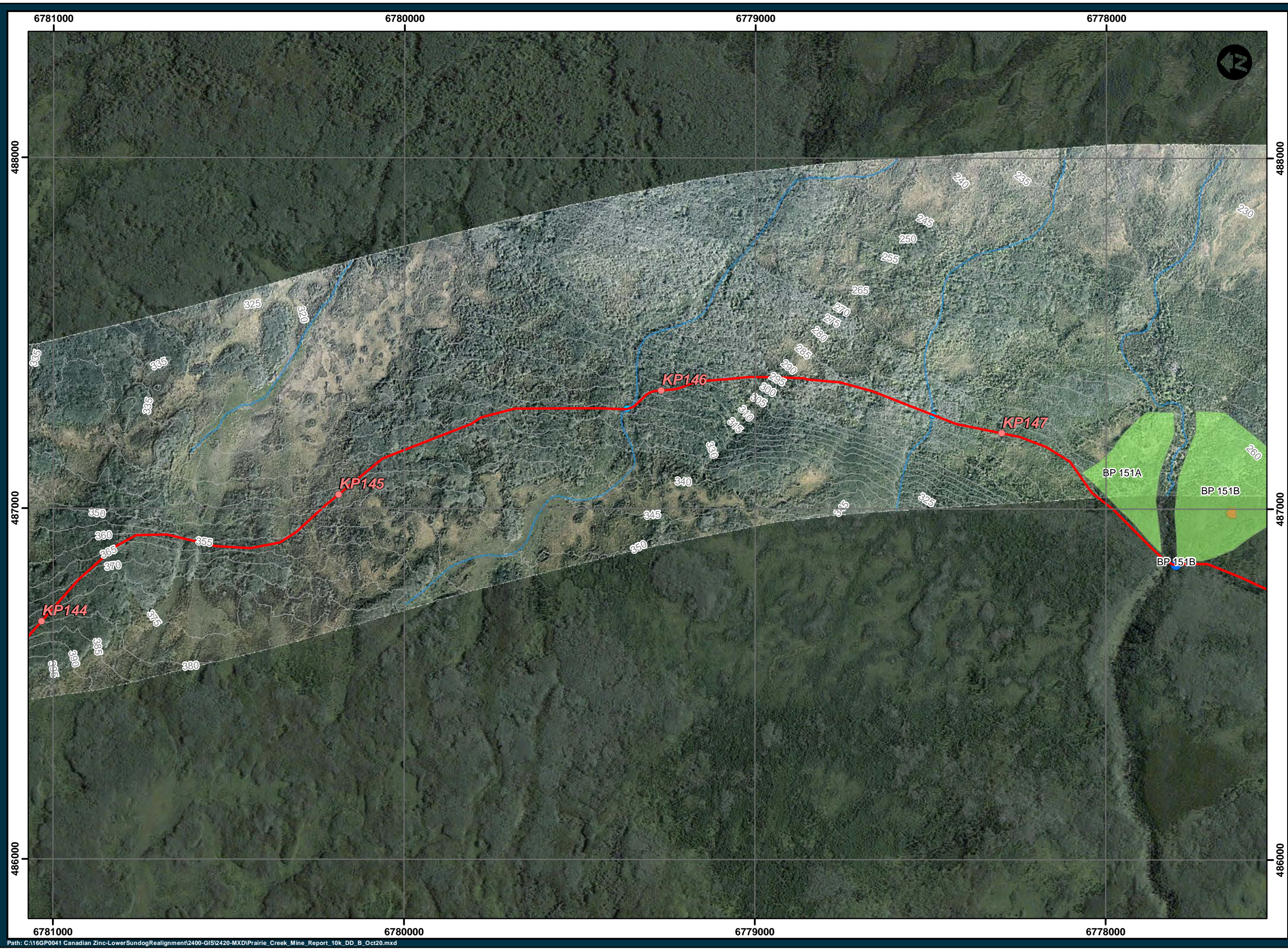


- Legend**
- Access Road KPs Updated (161020)
  - Access Road Updated (161020)
  - Minor Crossing
  - Water Feature
  - Contours
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Author: ainglis  
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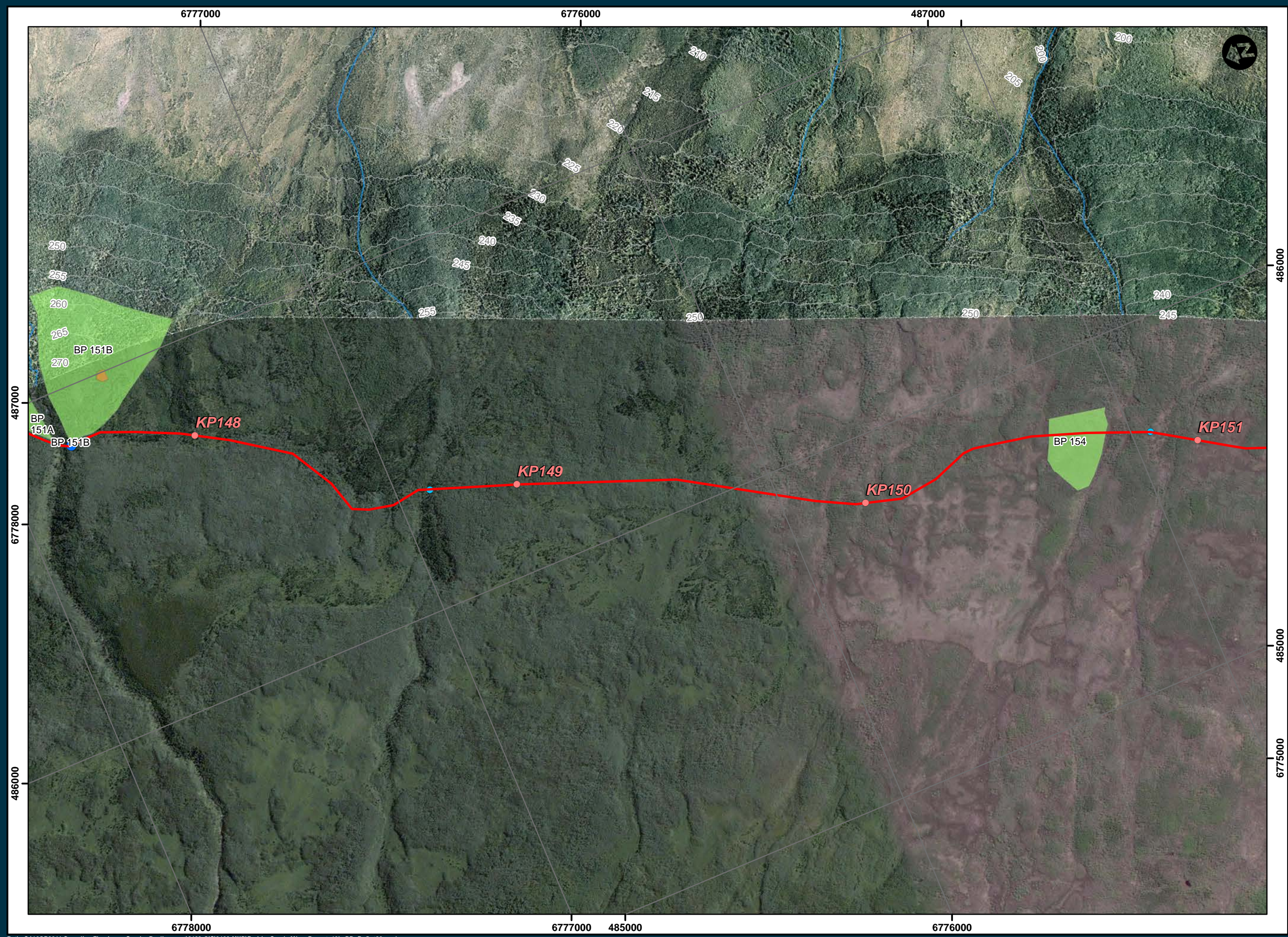
- Access Road KPs Updated (161020)
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- Water Feature
- Contours
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Scale: 1:10,000  
Author: ainglis  
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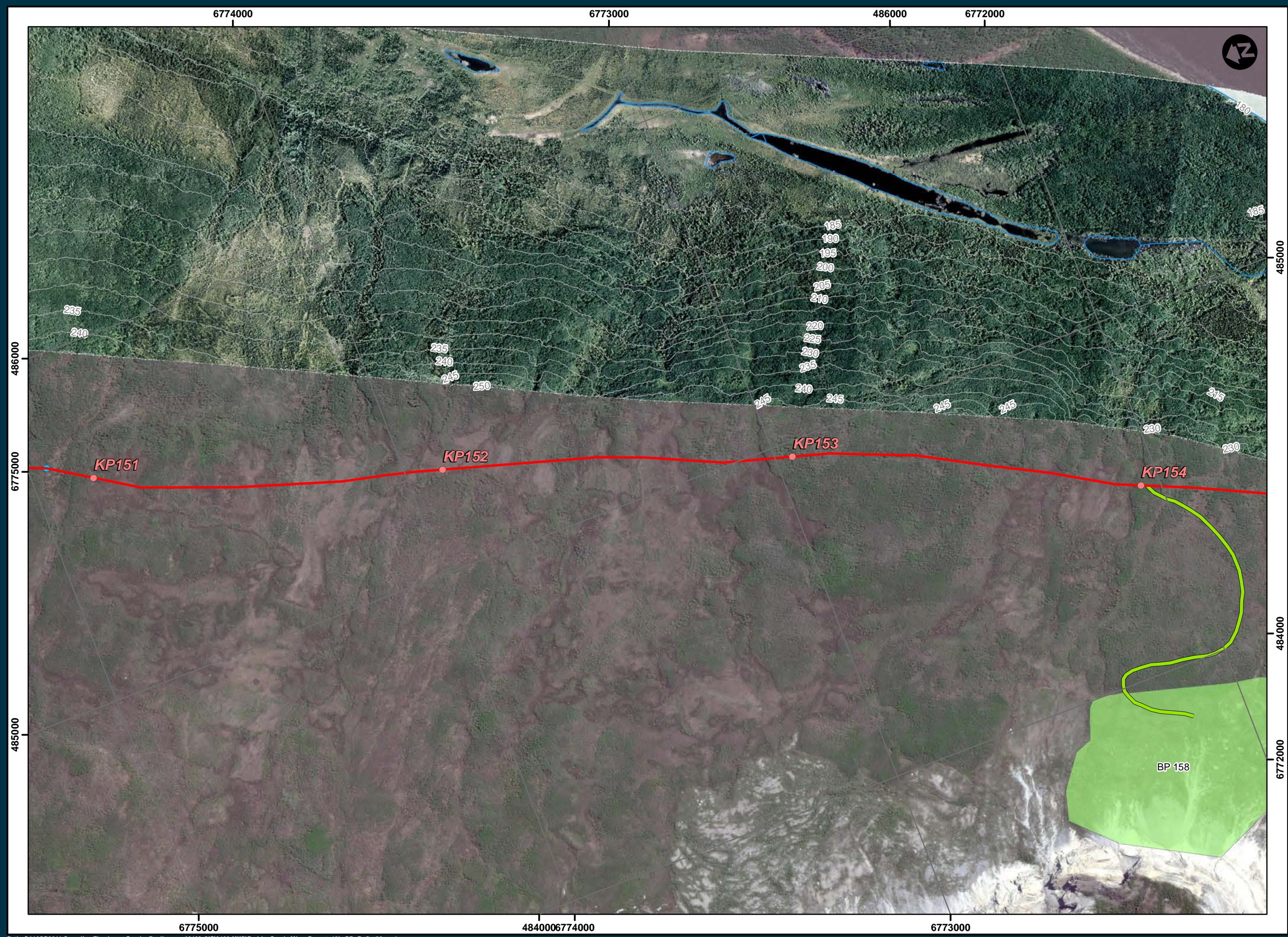
- Legend**
- Access Road KPs Updated (161020)
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  - Minor Crossing
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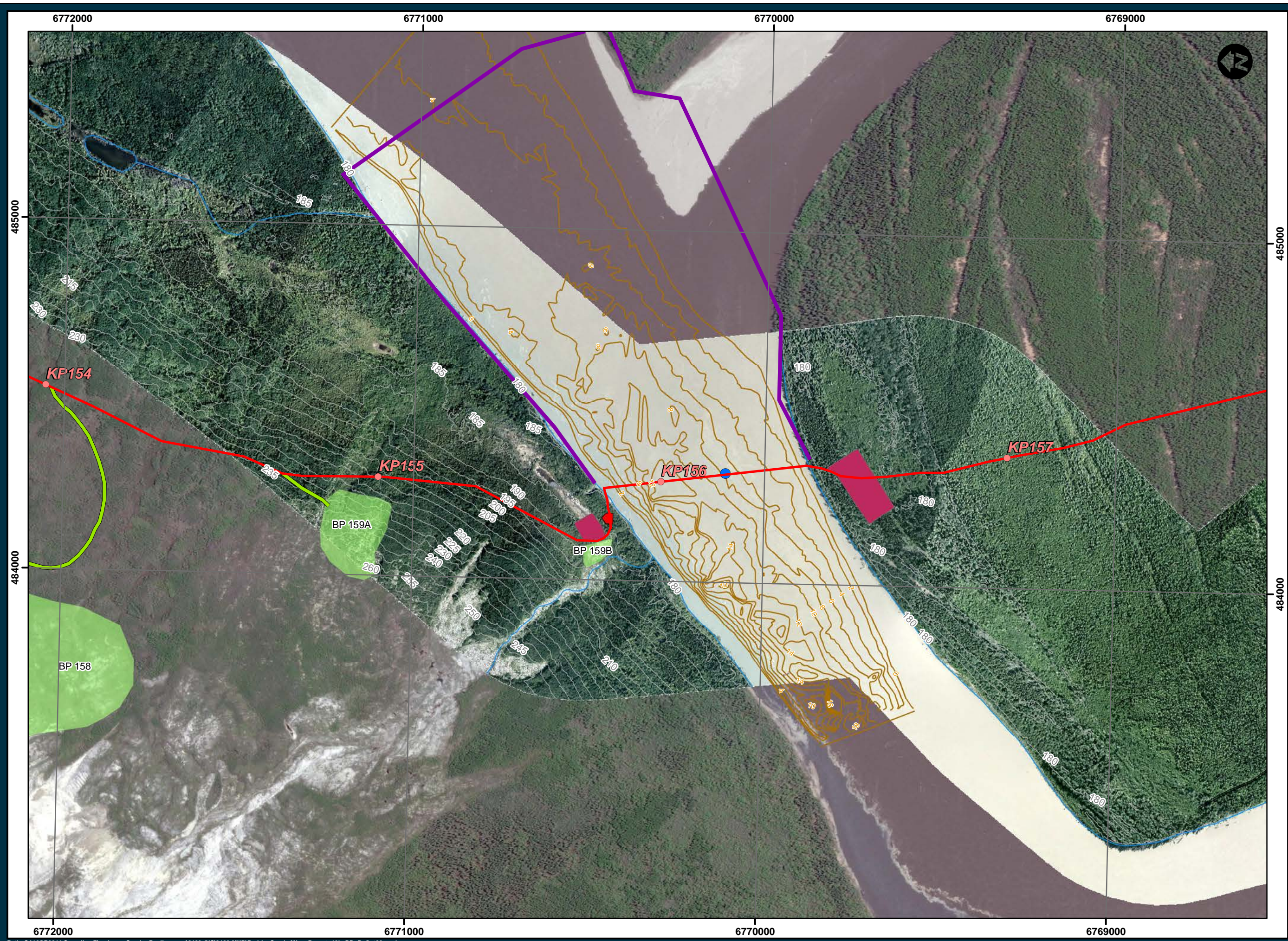
- Access Road KPs Updated (161020)
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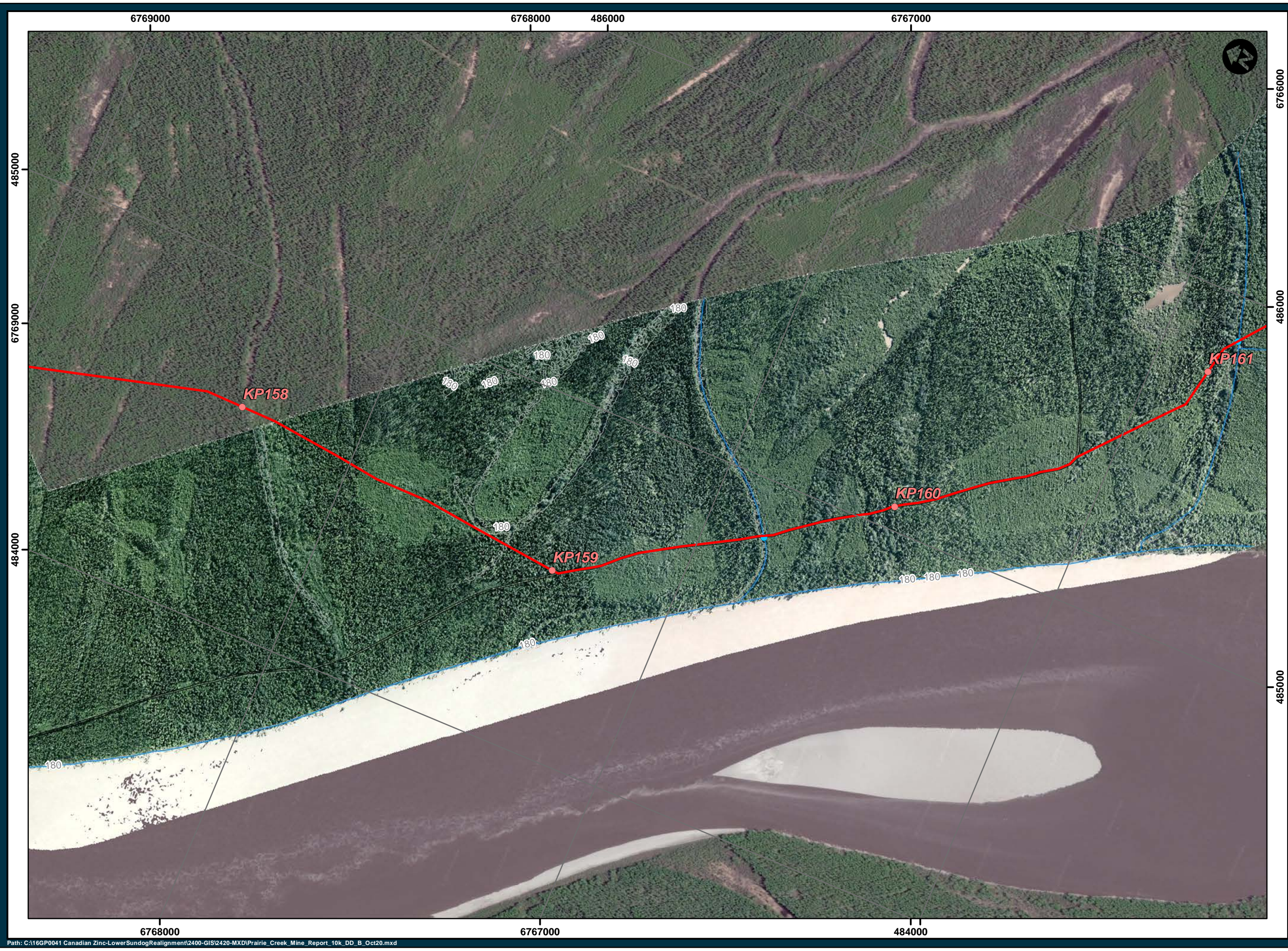


- Legend**
- Access Road KPs Updated (161020)
  - Access Road Updated (161020)
  - Liard Winter Crossing
  - Major Crossing
  - Camp / Laydown
  - Wavelines
  - Roads
  - Water Feature
  - Liard River Contour
  - Contours
  - Liard Landing
  - Potential Borrow Pit (161019)
  - Potential Borrow Pit Access

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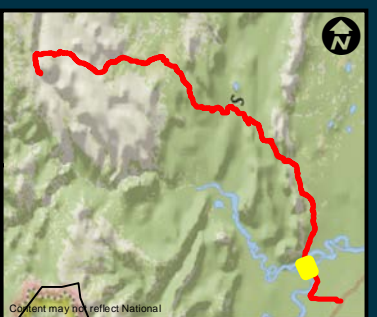




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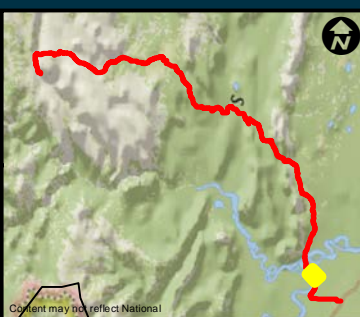
# Prairie Creek Mine

Access Road  
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- Legend**
- Access Road KPs Updated (161020)
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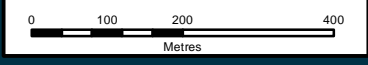




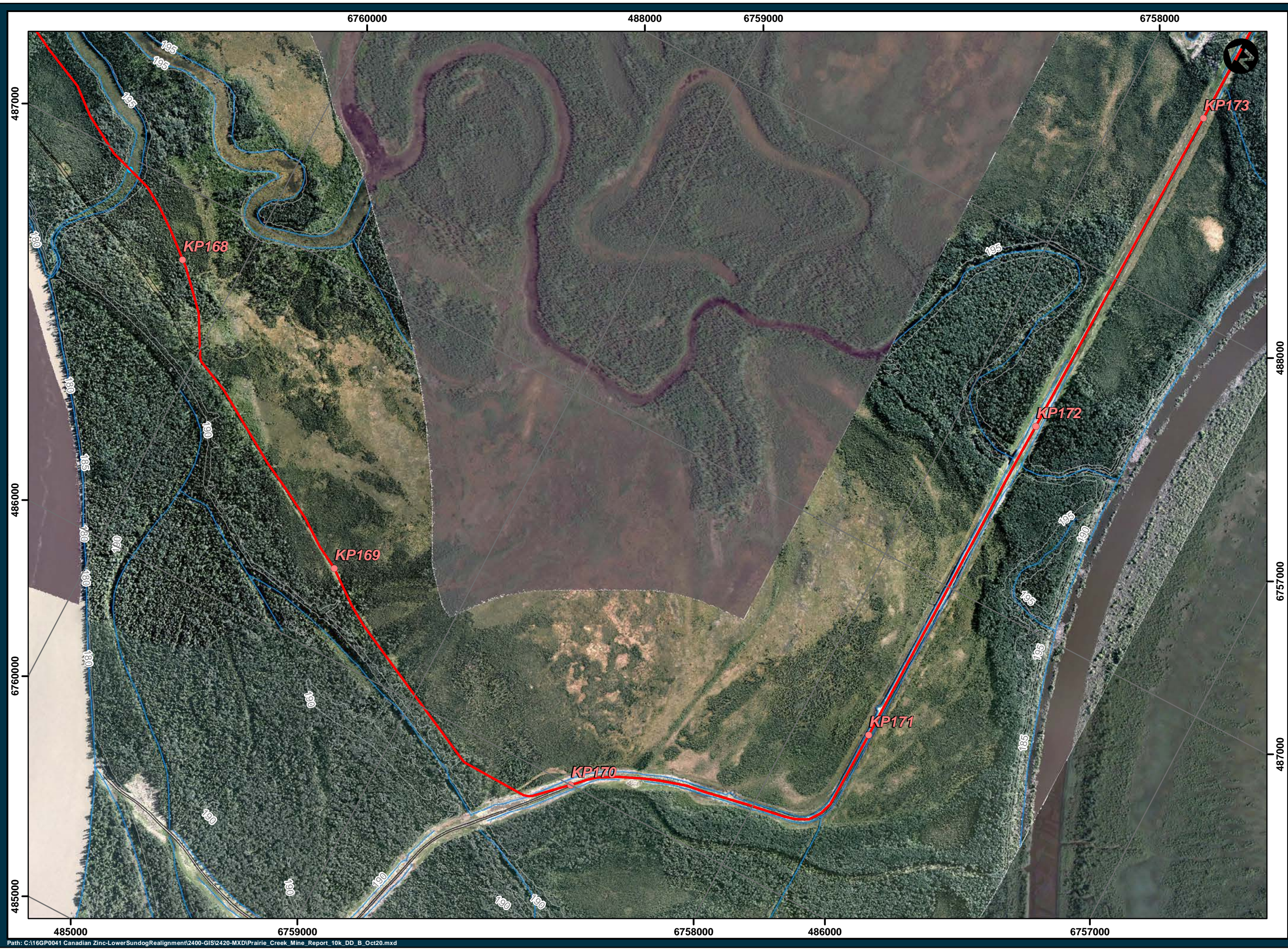
Prairie Creek Mine  
Access Road  
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- Legend**
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Revision #:



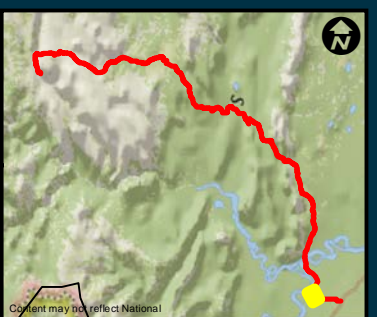




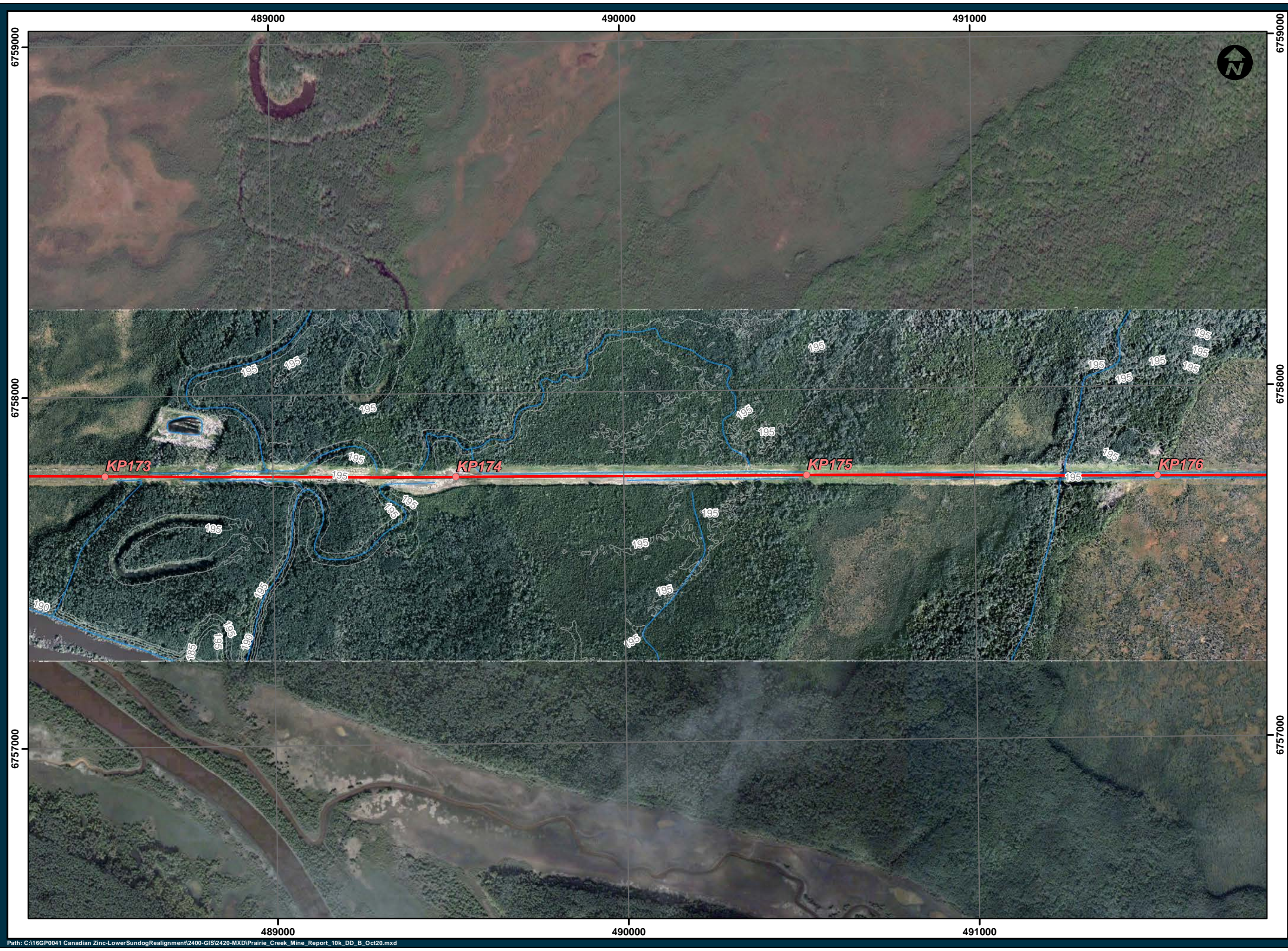
- Legend**
- Access Road KPs Updated (161020)
  - Access Road Updated (161020)
  - Minor Crossing
  - Roads
  - Water Feature
  - Contours

Date: 10-21-2016  
Projection: NAD 1983 UTM Zone 10N  
Scale: 1:10,000  
Author: ainglis  
Last Modified By: tkwitkoski  
Checked By: EK  
Revision #:






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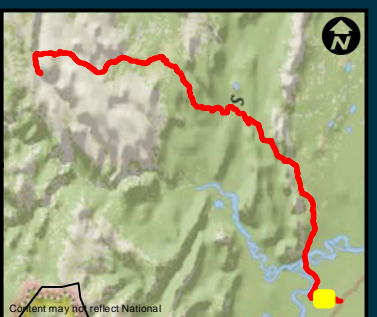


**Legend**

-  Access Road KPs Updated (161020)
-  Access Road Updated (161020)
-  Roads
-  Water Feature
-  Contours

Date: 10-21-2016  
Projection: NAD 1983 UTM Zone 10N  
Scale: 1:10,000  
Author: ainglis  
Last Modified By: tkwitkoski  
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Revision #:







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**Legend**

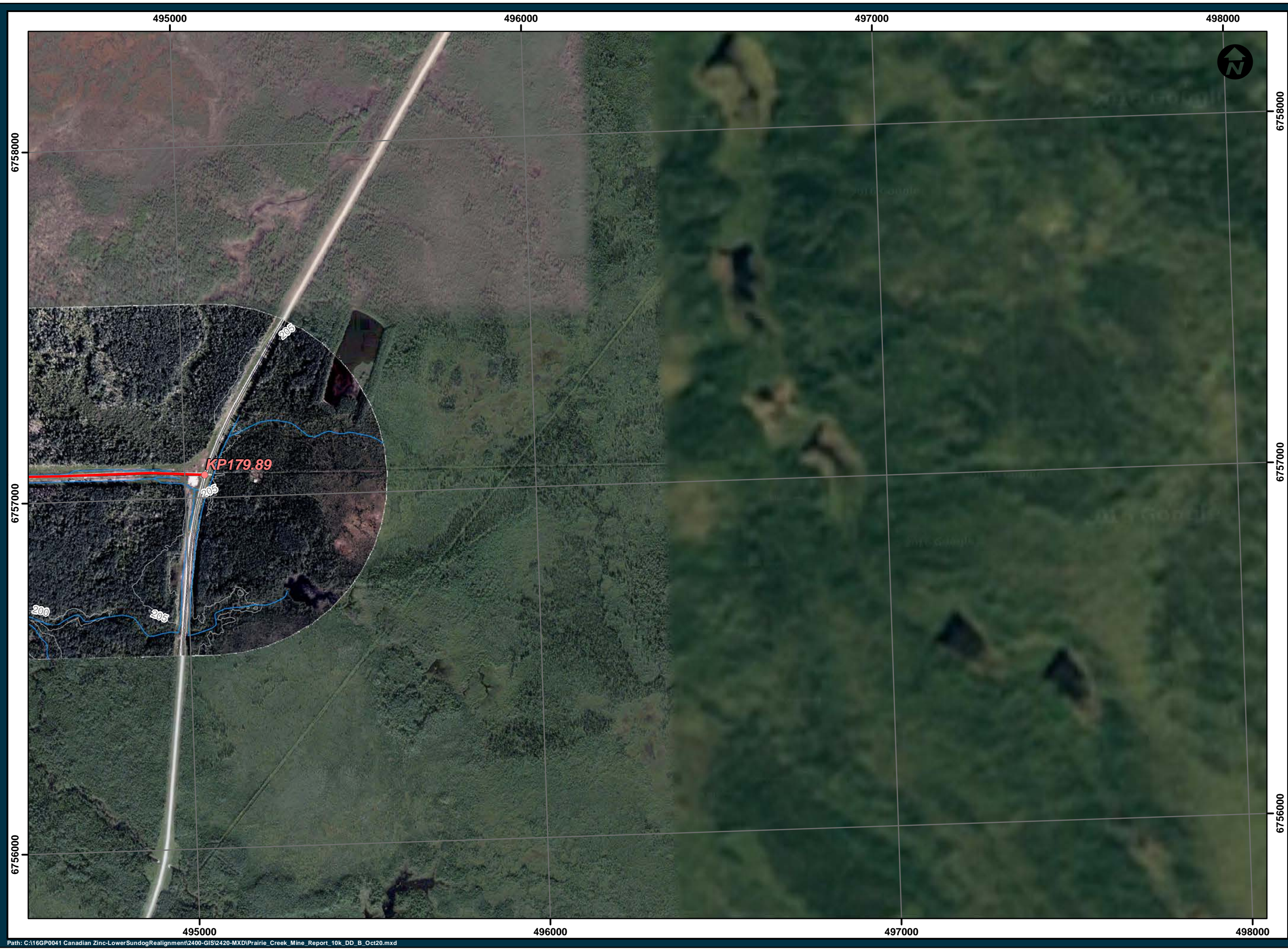
-  Access Road KPs Updated (161020)
-  Access Road Updated (161020)
-  Roads
-  Water Feature
-  Contours
-  LTF Boundary

Date: 10-21-2016  
Projection: NAD 1983 UTM Zone 10N  
Scale: 1:10,000  
Author: ainglis  
Last Modified By: tkwitkoski  
Checked By: EK  
Revision #:

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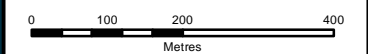




Prairie Creek Mine  
Access Road  
Page 50 of 50

- Legend**
- Access Road KPs Updated (161020)
  - Access Road Updated (161020)
  - Roads
  - Water Feature
  - Contours

Date: 10-21-2016  
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Scale: 1:10,000  
Author: ainglis  
Last Modified By: tkwitkoski  
Checked By: EK  
Revision #:







## **Appendix B Scope of Development Table**



# Summary Scope of Development

All Inclusive Summary  
Prairie Creek Mine Access Road  
20-Oct-16

Feature	Original	Updated	Comments:
Borrow Pit 1	KP 0.5	KP 0.5	Existing pit. Back-up
Borrow Pit 2	KP 2.7	KP 2.7	Existing pit.
Minor Stream	KP 2.9	KP 2.9	Culvert.
Minor Stream	KP 3.3	KP 3.3	Culvert.
Borrow Pit 4A	KP 4.0	KP 4.0	Back up.
Minor Stream	KP 4.4	KP 4.35	Culvert.
Borrow Pit 4B	KP 4.1	KP 4.1	Existing pit. Back up.
Major Stream	KP 6.2	KP 6.15	15.3 m Clear span bridge
Minor Stream	KP 6.1	KP 6.2	Culvert.
Minor Stream	KP 6.15	KP 6.25	Culvert.
Minor Stream	KP 6.6	KP 6.6	Culvert.
Borrow Pit 6	KP 6.8	KP 6.8	Back up.
Minor Stream	KP 9.3	KP 9.3	Culvert.
Minor Stream	KP 9.75	KP 9.75	Culvert.
Minor Stream	KP 9.85	KP 9.85	Culvert.
Borrow Pit 10	KP 10.2	KP 10.0	Back-up
Minor Stream	KP 10.2	KP 10.2	Culvert.
Minor Stream	KP 10.7	KP 10.7	Culvert.
Minor Stream	KP 10.95	KP 10.95	Culvert.
Minor Stream	KP 11.05	KP 11.05	Culvert.
Minor Stream	KP 11.7	KP 11.7	Culvert.
Waste Area	KP 12.6	KP 12.6	Area for excess waste.
Minor Stream	KP 13.3	KP 13.3	Culvert.
Major Stream	KP 13.4	KP 13.4	Multi large diameter culverts
Borrow Pit 14	KP 14.9	KP 14.5	Preferred.
Minor Stream	KP 14.85	KP 14.85	Culvert.
Minor Stream	KP 15.2	KP 15.2	Culvert.
Borrow Pit 16	KP 15.8	KP 15.7	Preferred
Minor Stream	KP 15.8	KP 15.8	Culvert.
Minor Stream	KP 18.45	KP 18.45	Culvert.
Major Stream	KP 20.5	KP 20.5	Upper Sundog Creek. Multi large diameter culverts.
Drum Camp/Laydown	KP 23.2	KP 23.1	Potential location.
Major Stream	KP 23.4	KP 23.4	58.0 m Multi span bridge
Major Stream	KP 25.3	KP 25.3	63.1 m Multi span bridge
Borrow Pit 25	KP 25.5	KP 25.5	Preferred.
Minor Stream	KP 26.6	KP 26.6	Culvert.



Feature	Original	Updated	Comments:
Minor Stream	KP 27.3	KP 27.3	Culvert.
Major Stream	N/A	KP 28.6	24.4 m Clear multi span bridge
Minor Stream	KP 29.1	KP 29.0	Culvert.
Minor Stream	KP 29.9	KP 29.7	Multi large diameter culverts
Minor Stream	KP 30.2	KP 30.1	Culvert.
Minor Stream	KP 30.5	KP 30.3	Culvert.
Minor Stream	KP 31.0	KP 30.85	Culvert.
Minor Stream	KP 31.3	KP 31.2	Multi large diameter culverts
Minor Stream	KP 31.7	KP 31.5	Culvert.
Minor Stream	KP 32.4	KP 32.3	Culvert.
Borrow Pit 33	KP 33.5	KP 32.8	Talus rock deposit.
Borrow Pit 34	KP 34.5	KP 34.2	Talus rock deposit.
Borrow Pit 35	KP 35.5	KP 35.2	Talus rock deposit.
Minor Stream	KP 36.5	KP 36.4	Culvert.
Minor Stream	KP 36.8	KP 34.6	Culvert.
Minor Stream	KP 37.1	KP 36.9	Culvert.
Borrow Pit 37	KP 37.5	KP 37.2	Talus rock deposit.
Minor Stream	KP 37.9	KP 37.7	Culvert.
Borrow Pit 38	KP 38.3	KP 38.0	Talus rock deposit.
Borrow Pit 39	KP 39.2	KP 38.7	Old historic floodplain.
Major Stream	KP 39.4	KP 39.2	42.7 m Clear span bridge
Cat Camp/Laydown	KP 40	KP 39.5	Existing/historic camp. . May be utilized as temporary shelter for truck operators. Long term
Borrow Pit 40	KP 40.0	KP 39.6	Old historic floodplain.
Minor Stream	N/A	KP 40.1	Culvert.
Borrow Pit 40A	KP 40.5	KP 40.1	Back up. Use winter access road.
Borrow Pit 41B	KP 40.9	KP 40.4	Back up. Use winter access road.
Minor Stream	N/A	KP 40.3	Culvert.
Borrow Pit 41	KP 41.0	KP 40.6	Back up. Use winter access road.
Borrow Pit 42	KP 41.3	KP 41.3	Back up.
Borrow Pit 43A	KP 43.1	KP 42.6	Preferred. Long Term.
Major Stream	KP 43.15	KP 42.8	Multi large diameter culverts
Borrow Pit 43B	KP 43.7	KP 43.2	Preferred.
Minor Stream	KP 45.5	KP 45.1	Culvert. Fish stream, oversize culvert.
Minor Stream	N/A	KP 45.8	Culvert.
Minor Stream	KP 46.5	KP 46.1	Culvert.
Borrow Pit 47A	KP 47.0	KP 46.6	Back up. Access road required.
Borrow Pit 47B	KP 47.0	KP 46.6	Preferred. Access road required.
Minor Stream	KP 47.2	KP 46.9	Culvert.
Borrow Pit 47C	KP 47.7	KP 47.3	Preferred.
Minor Stream	KP 48.05	KP 47.7	Culvert.
Minor Stream	KP 48.6	KP 48.2	Culvert.



Feature	Original	Updated	Comments:
Minor Stream	KP 49.6	KP 49.2	Culvert.
Borrow Pit 50B	KP 50.2	KP 49.8	Preferred.
Minor Stream	KP 50.7	KP 50.3	Culvert.
Minor Stream	KP 50.8	KP 50.4	Culvert.
Borrow Pit 50	KP 50.9	KP 50.5	Preferred.
Borrow Pit 51	KP 51.7	Kp 51.2	Preferred.
Borrow Pit 53	KP 53.4	KP 52.8	Preferred. Long term.
Minor Stream	KP 53.4	KP 53.0	Culvert.
Minor Stream	KP 53.5	KP 53.2	Culvert. Fish stream, oversize culvert.
Major Stream	KP 53.55	KP 53.2	Poljie Creek. 42.7 m clear span bridge.
Borrow Pit 54	KP 54.6	KP 54.2	Back up.
Borrow Pit 55	KP 55.3	KP 54.8	Preferred.
Borrow Pit 56	KP 55.9	KP 55.6	Preferred.
Minor Stream	KP 56.35	KP 56.0	Culvert.
Minor Stream	KP 56.45	KP 56.1	Culvert.
Borrow Pit 56B	KP 56.6	KP 56.2	Preferred.
Borrow Pit 59	KP 59.4	KP 58.9	Preferred. Long term.
Minor Stream	KP 60.4	KP 60.1	Culvert.
Borrow Pit 61	KP 61.4	KP 61.0	Preferred.
Minor Stream	KP 61.5	KP 61.1	Culvert.
Minor Stream	KP 63.6	KP 63.2	Culvert.
Borrow Pit 64	KP 64.9	KP 64.4	Preferred. Access road required. Possible long term.
Camp	KP 65	KP 64.6	Try to utilize BP 64 or 65.
Borrow Pit 65	KP 65.2	KP 64.8	Preferred. Long term.
Minor Stream	KP 67.1	KP 66.8	Culvert.
Borrow Pit 67	KP 67.5	KP 67.0	Preferred.
Borrow Pit 70	KP 70.9	KP 70.5	Preferred.
Minor Stream	KP 71.05	KP 70.7	Culvert.
Borrow Pit 72	KP 72.9	KP 72.4	Preferred.
Borrow Pit 76	KP 76.2	KP 75.8	Preferred.
Borrow Pit 77A	KP 77.2	KP 76.8	Back up.
Borrow Pit 77B	KP 77.5	KP 77.3	Back up.
Borrow Pit 78	KP 78.5	KP 78.1	Preferred.
Borrow Pit 84	KP 84.2	KP 83.6	Back up.
Minor Stream	KP 85.45	KP 85.2	Culvert.
Borrow Pit 86A	KP 86.4	KP 85.9	Preferred.
Borrow Pit 86B	KP 86.5	KP 86.1	Preferred. Long term.
Minor Stream	KP 86.9	KP 86.6	Culvert.
Major Stream	KP 87.25	KP 87.0	Tetcela River 1. 30.5 m clear span bridge
Borrow Pit 87	KP 87.5	KP 87.3	Preferred. Long term.



Feature	Original	Updated	Comments:
Tetcela Camp/Laydown	KP 87	KP 87.3	Utilize BP 87. Long term. Culvert.
Minor Stream	KP 89.0	KP 88.7	
Major Stream	KP 89.8	KP 89.4	Tetcela River 2. 42.7 m clear span bridge
Borrow Pit 90	KP 90.5	KP 90.0	Preferred.
Minor Stream	KP 91.3	KP 90.8	Culvert.
Borrow Pit 92	KP 91.5	KP 91.1	Preferred.
Minor Stream	KP 92.1	KP 91.8	Culvert.
Minor Stream	KP 92.4	KP 92.2	Culvert.
Borrow Pit 93A	KP 93.0	KP 92.5	Preferred. A and B split by stream.
Minor Stream	KP 93.0	KP 92.6	Culvert.
Borrow Pit 93B	KP 93.0	KP 92.7	Preferred. A and B split by stream.
Borrow Pit 93C	KP 93.6	KP 93.2	Back up.
Minor Stream	KP 93.5	KP 93.35	Culvert.
Minor Stream	KP 93.9	KP 93.7	Culvert.
Borrow Pit 94	KP 94.2	KP 93.8	Preferred.
Minor Stream	KP 94.2	KP 93.9	Culvert.
Major Stream	KP 95.0	KP 94.6	Fishtrap Creek. Large diameter culverts
Borrow Pit 96	KP 96.0	KP 95.6	Preferred.
Minor Stream	KP 96.9	KP 96.6	Culvert.
Borrow Pit 97	KP 97.2	KP 96.8	Preferred.
Minor Stream	KP 97.5	KP 97.2	Culvert.
Minor Stream	KP 98.3	KP 98.1	Culvert.
Minor Stream	KP 98.6	KP 98.4	Culvert.
Borrow Pit 102	KP 102.0	KP 101.3	Preferred.
Wolverine Camp/Laydown	KP 102	KP 101.8	May utilize BP 102 or 102B.
Borrow Pit 102B	KP 102.0	KP 101.8	Back up. Access road required
Minor Stream	KP 103.4	KP 103.1	Culvert.
Borrow Pit 103	KP 103.7	KP 103.1	Preferred. Access road required.
Minor Stream	KP 104.0	KP 103.8	Culvert.
Minor Stream	KP 105.3	KP 105.1	Culvert.
Minor Stream	KP 105.4	KP 105.2	Culvert.
Minor Stream	KP 105.6	KP 105.4	Culvert.
Borrow Pit 107 Alter.	KP 106.2	KP 106.2	Back up. Requires access road.
Minor Stream	KP 106.4	KP 106.2	Culvert.
Minor Stream	KP 106.9	KP 106.75	Culvert.
Borrow Pit 108 Alter.	KP 107.8	KP 107.9	Preferred. Requires access road.
Borrow Pit 109 Alter.	KP 108.8	KP 109.0	Back up. Requires access road.
Minor Stream	KP 109.5	KP 109.3	Culvert.
Minor Stream	KP 109.9	KP 109.8	Culvert.
Minor Stream	KP 110.7	KP 110.7	Culvert.
Major Stream	KP 111.7	KP 11.5	Large diameter culvert.
Borrow Pit 112 Alter.	KP 112.0	KP 111.8	Preferred.



Feature	Original	Updated	Comments:
Minor Stream	KP 112.3	KP 111.95	Culvert.
Borrow Pit 112.3 Alter.	KP 112.3	KP 112.0	Preferred. Long term.
Minor Stream	KP 112.5	KP 112.4	Culvert.
Minor Stream	KP 112.7	KP 112.5	Culvert.
Minor Stream	KP 112.95	KP 112.95	Culvert.
Minor Stream	KP 114.9	KP 114.8	Culvert.
Minor Stream	KP 115.1	KP 115.0	Culvert.
Minor Stream	KP 115.2	KP 115.1	Culvert.
Minor Stream	KP 117.1	KP 117.0	Culvert.
Major Stream	KP 118.1	KP 118.9	Large diameter culverts.
Borrow Pit 119 Alter.	KP 119.20	KP 119.0	Preferred. Long term.
Minor Stream	KP 119.3	KP 119.1	Culvert.
Minor Stream	KP 119.6	KP 119.2	Culvert.
Borrow Pit 123 A	KP 123.7	KP 119.9	Back up.
Borrow Pit 123 B	KP 123.7	KP 119.9	Preferred.
Grainger Camp/Laydown	KP 124	KP 120.4	Utilize BP 123A or 124. May be utilized as temporary shelter for truck operators. Long term.
Borrow Pit 124	KP 124.4	KP 121.0	Preferred. Possible long term.
Major Stream	KP 124.8	KP 121.2	Grainger River. 24.4 m clear span bridge.
Borrow Pit 125 A & B	KP 125.0	KP 121.5	Back up. Requires access road.
Minor Stream	KP 126.2	KP 122.6	Possible fish stream. Oversize culvert.
Minor Stream	KP 126.7	KP 122.9	Culvert
Borrow Pit 126.	KP 126.4	KP 123.4	Back up. Requires access road..
Minor Stream	KP 127.1	KP 123.5	Culvert
Borrow Pit 129	KP 129.0	KP 125.1	KP 120.4
Minor Stream	KP 130.7	KP 127.5	Possible fish stream. Oversize culvert.
Borrow Pit 132	KP 132.2	KP 129.0	Back up.
Minor Stream	KP 132.7	KP 129.4	Possible fish stream. Oversize culvert.
Minor Stream	KP 134.5	KP 131.2	Possible fish stream. Oversize culvert.
Minor Stream	KP 134.8	KP 131.4	Possible fish stream. Oversize culvert.
Minor Stream	KP 135.5	KP 132.1	Possible fish stream. Oversize culvert.
Minor Stream	KP 135.95	KP 132.6	Possible fish stream. Oversize culvert.
Borrow Pit 136	KP 136.2	KP 133.2	Back up.
Minor Stream	KP 136.5	KP 133.2	Possible fish stream. Oversize culvert.



Feature	Original	Updated	Comments:
Minor Stream	KP 137.2	KP 133.3	Possible fish stream. Oversize culvert.
Borrow Pit 138.	KP 138.2	KP 134.8	Back up. Requires access road.
Minor Stream	KP 139.6	KP 136.1	Culvert.
Borrow Pit 139.	KP 139.6	KP 136.3	Preferred. Long term. Requires access road.
Minor Stream	KP 140.1	KP 136.7	Culvert.
Borrow Pit 140	KP 140.2	KP 136.8	Back up.
Minor Stream	KP 140.5	KP 137.0	Culvert.
Minor Stream	KP 141.8	KP 138.3	Culvert.
Borrow Pit 143.	KP 143.8	KP 140.2	Back up
Minor Stream	KP 144.0	KP 140.4	Culvert.
Minor Stream	KP 146.3	KP 142.8	Culvert.
Borrow Pit 146	KP 146.5	KP 142.9	Back up.
Minor Stream	KP 149.3	KP 144.5	Culvert.
Minor Stream	KP 150.3	KP 145.9	Culvert.
Minor Stream	KP 151.1	KP 146.8	Culvert.
Borrow Pit 151 A & B	KP 151.5	KP 147.6	Preferred. Long term
Camp	KP 151	KP 147.5	Utilize BP 151A or B. Alternative to Liard Camp.
Major Stream	KP 151.1	KP 147.6	Large diameter culvert.
Minor Stream	KP 152.2	KP 148.65	Culvert.
Borrow Pit 154.	KP 154.0	KP 150.6	Back up.
Minor Stream	KP 154.4	KP 150.8	Culvert.
Borrow Pit 158	KP 158.2	KP 154.4	Preferred. Long term. Requires access road.
Borrow Pit 159A & B.	KP 159.3	KP 154.9 KP 155.6	Back up. Requires access road.
Liard Camp	KP 159	KP 156.0	Utilize BP 158 or 159 A or B, or North Side Landing. Support for truck operators and barge operations. Long term
Liard North Side Landing	KP 159.3	KP 156.2	Barge landing and loading site.
Winter Ice Bridge Access	KP 159.3		3.5 km combination winter snow/ice road and bridge.
Liard South Side Landing	KP 159.8	KP 156.7	Barge landing and loading site.
Minor Stream	KP 163.95	KP 159.7	Culvert.
Minor Stream	KP 165.4	KP 161.1	Culvert.
Minor Stream	KP 172..0	KP 167.7	Culvert.
Liard Transfer Facility		KP 177.1	Laydown and switch yard.