# Phase 1 Preliminary Design Report

## Village of Telkwa & Cycle 16 Trail Society

## Telkwa-Smithers Pathway Project

**March 15, 2019 | Our File: 2321-01795-00**


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March 15, 2019

Village of Telkwa & Cycle 16 Trail Society
Smithers, BC
Attention: Jeremy Shriber

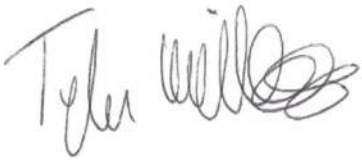
## PHASE 1 PRELIMINARY DESIGN – TELKWA-SMITHERS PATHWAY PROJECT

On behalf of McElhanney Consulting Services Ltd, I am pleased to submit this preliminary design report for Phase 1 of the proposed Telkwa-Smithers Pathway project. We are grateful for the opportunity to work with your team to improve the active transportation, recreation, and tourism opportunities for the region. We trust this report will help assist Cycle 16 in continuing to pursue funding, approval, and ownership of this project to help promote healthy lifestyles and create positive experiences for residents.

This proposed project would not be where it is today without the countless volunteer hours contributed by Cycle 16, its members, and community partners. McElhanney's work on this preliminary design would not have been possible without the hard work of the Cycle 16 board members and we truly appreciate your efforts.

We look forward to any opportunities to continue to support your team in the future with the Telkwa-Smithers Pathway project.

Yours truly,
McELHANNEY CONSULTING SERVICES LTD.



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## APPENDICES

# 1. INTRODUCTION

## 1.1. BACKGROUND

The proposed Telkwa-Smithers Pathway project is located along a 12 kilometer stretch of the Highway 16 Right-of-Way corridor connection between the Village of Telkwa and the Town of Smithers. Figure 1 shows the approximate overall pathway route with key landmarks at the start and end of the proposed alignment.

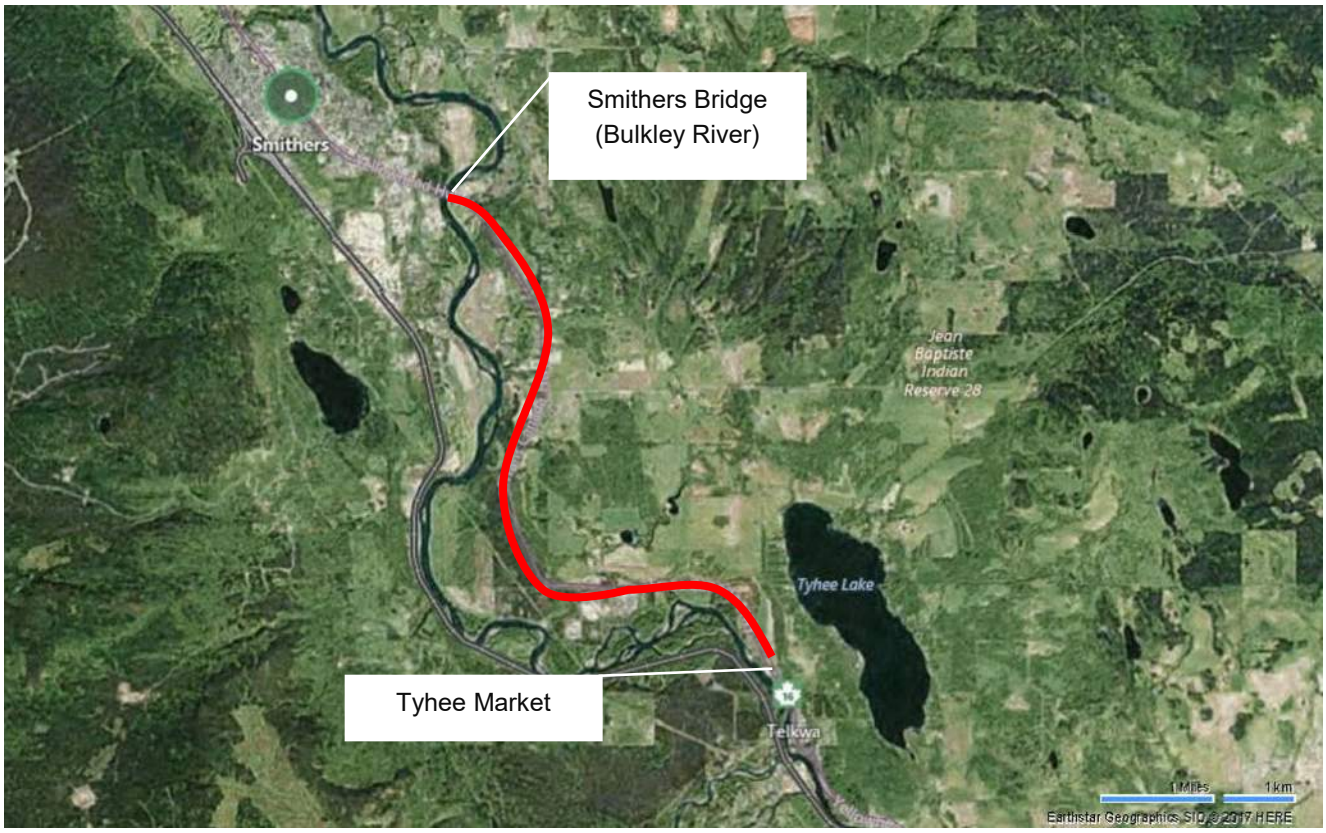


*Figure 1. Proposed Telkwa-Smithers Pathway alignment overview*

Cycle 16 Trail Society (Cycle 16) retained McElhanney to conduct a Concept Design Report completed in May 2017 (McElhanney Project No. 2331-00795-00). The concept design report presented three alignment options for the pathway, defined the overall design criteria and typical section for the pathway, and identified the key challenge areas for the alignment such as private property, highway clear zone infringements, critical alignment areas, and fence relocation. Readers of this report are encouraged to review the Concept Design Report for additional background and basis for the current scope of work.

Since completion of the Concept Design Report, Cycle 16 has collaborated with local governments, regulatory bodies, utility operators, and private land owners to work through potential solutions for the identified challenge areas and overall alignment. To assist with this process, Cycle 16 partnered with the Village of Telkwa to acquire funding through

the BC Alliance for Healthy Living and the Rural Dividend Fund to conduct a preliminary design of Phase 1 of the project, which includes approximately 4 km of the proposed trail from the Smithers Bridge to the Babine Lake Road/Highway 16 intersection.

## 1.2. STUDY AREA

The study area for the Phase 1 Preliminary Design project was an approximately 3.5 km long segment of the proposed Telkwa-Smithers\ Pathway starting at the Smithers Bridge and ending on Laidlaw Frontage Road near the intersection of Babine Lake Road and Highway 16 (Station 0+000 to 3+588 on the drawings in Appendix A). The study area was selected by Cycle 16 as it is the common portion of all alignment options for the proposed pathway and it contains two of the main portions of the proposed alignment that require use of private property.

## 1.3. SCOPE OF WORK

The scope of work included refinement of the 2017 concept design through preliminary design of Phase 1 of the proposed Telkwa-Smithers Pathway. Stakeholder and private landowner engagement/consultation was not included in McElhanney's scope; however, information provided by Cycle 16 and heard at several project meetings were considered in the design. The overall goal of the project was to design Phase 1 of the proposed pathway to a level of detail ready for further regulatory and stakeholder review and input with the hopes of achieving "approval in principal" from the key stakeholders following completion of the work.


*Figure 2. Study area for Phase 1 Preliminary Design*

# 2. METHODOLOGY

The following sections outline the methodology and rationale used in the development of the preliminary design of the Telkwa-Smithers Pathway Phase 1 project.

## 2.1. BACKGROUND DATA

McElhanney utilized the following background information to complete the preliminary pathway design:

- Telkwa-Smithers Pathway Concept Design Report by McElhanney (2017);
- LiDAR flown by McElhanney in 2012;
- Aerial imagery flown by McElhanney in 2012 for portions of the alignment;
- Topographic survey data by McElhanney from a 2007 Highway 16 project, used with permission of BC Ministry of Transportation and Infrastructure (MoTI);
- Legal boundaries as of December 2018 based on the most recently available land title and cadastre files from the Land Title and Survey Authority of British Columbia.

The 2007 survey data, the concept alignment from the 2017 Concept Design Report, and direction from Cycle 16 were utilized as the basis for the preliminary design. Since the 2007 ground survey, it is understood that MoTI completed widening of the shoulder of Highway 16 by approximately 1 m; however, this was not considered a significant issue for the current scope of work as the pathway alignment is generally greater than 1 m away from the highway shoulder. Additionally, new driveways, subdivisions, utilities, etc. may have been added or moved near the highway corridor which were not shown in the background data; however, it was assumed that the data was adequately representative of existing conditions for preliminary design purposes.

## 2.2. FIELD RECONNASISSANCE

Various portions of the Phase 1 alignment were reviewed in the field by staff of McElhanney on October 15, November 13, November 16, and November 20 in 2018. The field reconnaissance days were focused on determining alignment through the private property areas, verifying the topographic survey from 2007, and documenting existing conditions along the alignment as input to the design.

## 2.3. STANDARDS AND GUIDELINES

Geometric design criteria and alignment selection was based on McElhanney's experience on similar projects and the following documents:

- Geometric Design Guidelines for Canadian Roads by the Transportation Association of Canada (TAC, 2017);
- BC Ministry of Transportation Supplement to TAC Geometric Design Guide by MoTI (MoTI, 2007); and,
- Trails in Alberta Highway Rights-of-Way Policies, Guidelines, and Standards by Alberta Transportation (Alberta Transportation, 2015).

## 2.4. STAKEHOLDERS

Stakeholder liaising has been largely completed by Cycle 16 since project inception, though no formalized consultation or engagement processes have been conducted. For the current scope of work, regulatory and government stakeholders involved in Phase 1 of the project met for the project kickoff meeting to discuss the scope of work and items to be included or addressed in the preliminary design. The group meeting included representatives from Cycle 16, Village of Telkwa (Telkwa), Town of Smithers (Smithers), BC Ministry of Transportation and Infrastructure (MoTI), and Regional District of Bulkley-Nechako (RDBN). The meeting minutes from the project kickoff meeting on July 11, 2018 are included in Appendix D.

Cycle 16 also worked with two private landowners and BC Hydro prior to and/or during the preliminary design process. Though not directly involved in the discussions, McElhanney considered information and documentation provided by Cycle 16 relating to private landowner and BC Hydro discussions.

## 2.5. TRAIL MANAGEMENT AND USER OBJECTIVES

Trail and pathway design is not simply an engineering exercise and requires careful consideration of the user and management objectives. To create a sustainable infrastructure asset, not only must geometric and safety design regulatory requirements be met, but the trail or pathway must also provide a positive user experience to encourage usership while fitting within the management and maintenance directives of the Trail Operator. The US Bureau of Land Management *Guidelines for a Quality Trail Experience* summarizes this guiding principle with the following quote:

*Quality trail experiences are realized when a trail design merges with the desired outcomes and difficulty that a user seeks in the setting in which the outcomes are realized. These variables ultimately equate to an overall level of sustainability that protect resources while simultaneously providing a user with the outcomes they seek. – Bureau of Land Management, 2017.*

Trail Management Objectives (TMOs) are documentation of the intended purpose and management strategies for a trail and provide the overall decision-making framework for assessment, management, and design as described in the US Forest Service *Trail Fundamentals and Trail Management Objectives* (USFS, 2016). They are critical to the successful planning, design, management, operation, and maintenance of any trail, pathway, and/or network. TMOs are intended to answer the following three questions, which provide the basis for any trail design:

- What is the purpose of the trail?
- What is the intended level of development?
- What are the intended uses of the trail?

Further to the above, TMOs also help specify the physical design criteria for a trail, such as the tread width, surfacing type, grades, turning radii, clearing width, etc., based on the desired management objectives and uses. They also help limit liability for Trail Operators by defining the intended frequency and type of reviews and maintenance and the level of service provided. Trail User Objectives (TUOs) describe the various factors that drive users to utilize a specific trail or pathway or outcomes they seek from the trail experience. TUOs as described by the US Bureau of Land Management (USBLM, 2016) are shown below in Figure 3.

| Trail User Objectives | Description |
|---|---|
| Nature | Connection to nature. This can be anything from being among a few trees in the middle of the city to remote backcountry. Nature is an important factor for many riders. |
| Escape | Something that takes you away from your daily grind, allows you to get lost in the experience of riding. Often means getting away from the urban environment, but a bike park, even indoors, can provide this as well. |
| Solitude | Getting away from the urban environment and people; being active, alone, and quiet in the outdoors. |
| Challenge | Seeking to improve technical abilities, to solve a difficult problem, "clean" a trail feature or segment; sense of accomplishment. |
| Risk | Exposure to danger, harm, or loss; intentional interaction with uncertainty. The perception of risk creates a thrill for many trail users. It can be a positive or negative part of the trail experience, depending on user expectations and risk tolerance. |
| Fun | Amusing or enjoyable experience. When you are trying to build fitness and/or skill, you may do many rides without "fun" being a primary objective. Ideally, one doesn't have to sacrifice fun for challenge or exercise. |
| Play/Playfulness | Engaging in the activity purely for the enjoyment, bringing a childlike wonder to the pursuit, no destination. On a trail, this often means seeking features to enhance, alter the experience, rather than simply riding from point to point. Playfulness is a hugely important characteristic in mountain bike trails, and distinguishes trail experiences from many other trail user goals (hikers, equestrians). |
| Exercise | Health and fitness are part of the sport. For some this is a primary goal, for others a bonus, for some an obstacle. Defining the physical fitness needed for a particular ride is important in setting user expectations appropriately. Recognition that some riders have high skill and low fitness (and vice versa) plays a role in trail planning. |
| Variety | Multiple trail options, diversity of experience within a trail or trail system. Variety should be in several forms, where possible: skill, features, surface, setting, grade, etc. While all the trails within a system may have a particular feel based on its environmental factors, it can still have variety within those constraints. Also possible at the regional level to provide variety of experiences if limited opportunities exist within a particular system. |
| Connectivity | Series of loops and/or trail segments linked by other trails or transportation routes. Allows for a customized experience, change of plans, adding on to a ride. Also allows for riders of different fitness or skill level to begin rides together. |
| Socializing | Provides a shared experience and enhances safety for riders. Mountain biking is often a social activity. |
| Safety/Security | This could range from trailhead security for parking to personal safety unrelated to recreational use. |
| Efficiency | Getting to a destination or accomplishing a task with the least amount of time or effort expended. Road climbs are very efficient, as are trails that ascend directly to a destination. Efficiency sometimes means compromising sustainability and fun/play. Hiking trails tend to be much more efficient than biking trails. |

*Figure 3. Trail User Objectives Summary [Source: Bureau of Land Management (2016)]*

TMOs and TUOs were considered at a high level based on input provided by Cycle 16, the Regional District of Bulkley-Nechako, MoTI, and the Village of Telkwa during the project kickoff meeting and throughout the preliminary design process. The draft Trail Management Objective Form for Phase 1 of the Telkwa-Smithers Pathway is provided in Appendix C. The intended uses, design parameters, target frequencies, and managed uses described on the TMO Form provided guidance for the preliminary design and information provided in this report. In summary, the TUOs and TMOs can be summarized as follows to define the overall design characteristics of the proposed pathway:

- Summer-use cycling (including Class 1 and 2 E-Bikes) and pedestrian primary multi-use pathway;
- Primary function is an active transportation corridor to provide a highway-separated connection between Telkwa and Smithers;
- Easy challenge rating, accessible to users of all abilities; and,
- Maintain rural setting with minimal development of amenities, furnishings, landscaping, etc.

# 3. DESIGN CONSTRAINTS

The following sections outline the constraints from various sources that were considered in development of the preliminary design of the pathway and content of this report. It is noted that this compilation of constraints, concerns, and interests may not be comprehensive and is based primarily upon the discussions and work of Cycle 16 outside the scope of work of this project. During future design stages, a formalized stakeholder and public engagement is recommended to fully understand and document the input of the interested parties.

## 3.1. DESIGN CRITERIA

### Geometric Layout

The following geometric layout criteria were employed for the preliminary design wherever possible:

- Design speed 30 km/hr
- Trail width 3.0 m paved surface;
- Minimum horizontal clearance 1.0 m (from vegetation or other fixed objects near the pathway);
- Minimum horizontal clearance from BC Hydro poles 3.0 m;
- Minimum horizontal curve 25 m centerline radius;
- K-Value 2.5;
- Vertical crest curve minimum 30 m;
- Vertical clearance 2.5 m;
- Cut slopes 2H:1V, fill slopes 1.5H:1V;
- Average grade <8%, maximum grade 10% for short pitches only if required.

### Highway Clear Zone

Further to the design criteria above, the pathway was specified to be aligned outside of the existing highway 16 Clear Zone wherever possible. The Clear Zone concept as described by TAC (2017) and the MoTI Supplement to TAC (2007) is generally intended to serve as recovery zone free of obstacles that allows a motor vehicle to recover if it runs off the road. As per Table 620.08 of the BC MoTI TAC Supplement, the Clear Zone distance varies with traffic volume, curve radius, design speed, and fill/cut slope angle at a specific location; however, a consistent Clear Zone size of 9 m may also be used for practicality. The following fixed Clear Zone limits were used for the conceptual design based on Table 620.08 of the BC MoTI TAC Supplement:

- 9.0 m wherever possible in 90 km/hr posted speed limit areas (as per direction by MoTI);
- 7.5 m wherever 9.0 m was not possible due to land or physical feature conflict and the highway was in a minimum 6H:1V cut slope; and,
- 5.5 m wherever possible in the 60 km/hr posted speed limit areas.

## 3.2. STAKEHOLDER CONSIDERATIONS

### 3.2.1. Private Landowners

#### Remainder of Lot A, Plan PRP14858 (Smithers Par 3 & RV)

The Remainder of Lot A, Plan PRP14858 (shown on Drawings No. C-101 and C-102) is currently the Smithers Par 3 & RV property. Prior to the start of the preliminary design project, Cycle 16 had negotiated a preliminary Right-of-Way (RoW) with the owners of the Par 3 golf course as shown on Drawing No. C-102. The purpose for this proposed RoW was to avoid aligning the pathway across the golf course driveway access at Highway 16 which has poor sight lines and to avoid aligning the pathway straight up the steep slope to the southeast of the driveway. Based on these factors, a design constraint was to maintain the alignment within the proposed RoW and otherwise keep the alignment outside the property boundaries of the lot.

#### Lot 1 Plan BCP18208 (Private Residence)

Lot 1 Plan BCP18208 is located adjacent to the Par 3 & RV property to the east. Another alignment constraint proposed by Cycle 16 based on discussion in the Concept Design Report was to align the pathway through the private lot so as to reduce pathway grades, avoid fall-line alignment along the narrow Highway 16 RoW available, and avoid crossing the two private driveways adjacent to Highway 16.

Cycle 16 discussed the pathway alignment on this lot with the property owner before and during the preliminary design process. Cycle 16 relayed the property owner's interests and concerns to McElhanney for consideration in the preliminary design. The key items relating to the pathway alignment design included:

- Pathway user safety on the private property and liability;
- Security/privacy of the property;
- Visual impacts of the pathway on the property, particularly the new house location; and,
- Functional impacts to property access.

#### Lot 3 Plan BCP25354 (Cattle Crossing)

The property owner of Lot 3 Plan BCP25354 (shown on Drawing No. C-103) operates a culvert cattle crossing under Highway 16 that the proposed pathway must cross. McElhanney and Cycle 16 met with the property owner of this lot, Mr. Jim Hinchliffe, on November 16, 2018 to discuss options for the operation of the existing cattle culvert crossing and to document interests and concerns for consideration in the preliminary design. The main constraints and concerns identified by Mr. Hinchliffe were:

- Snow-clearing access for a tractor to the edge of the culvert is required to clear snow during spring/fall/winter months as the highway snow plowing deposits at the toe of the highway embankment and blocks cattle access through the crossing;
- Cattle must have unimpeded access throughout most of the year to the crossing for water access;
- Fencing must be in place to prevent outside access to the property and to prevent cattle access off the property;
- Measures should be in place to prevent unauthorized access to the private property, particularly for dogs on the pathway that could cross through the existing post and wire fence.

### 3.2.2. BC Hydro

Much of the proposed pathway alignment occurs alongside existing BC Hydro powerlines. Cycle 16 provided to McElhanney documentation from BC Hydro regarding initial review of the Concept Design Drawings from 2017. The

response form BC Hydro indicated that the proposed pathway may be feasible from their perspective given the following aspects are implemented in the design:

- Unfettered access to all BC Hydro assets;
- Pathway must accommodate bucket truck access if developed on areas where access currently exists;
- Minimum construction setbacks are defined (approximately 3 m setback from poles);
- Drainage structures will need to be reviewed by BC Hydro to ensure adequacy for BC Hydro use; and,
- Pathway structure should be designed to support the load of bucket truck and line truck.

BC Hydro's approval in principal letter is included in Appendix D.

### 3.2.3. Regional District of Bulkley-Nechako

As discussed at the project kickoff meeting, the interest in the project by RDBN relates to the long-term maintenance and capital replacement costs associated with the proposed project. RDBN requested that this report address these items for further considering of future involvement and/or ownership of the project by the RDBN Board of Directors.

Additionally, the RDBN and Cycle 16 specified that alignment of the pathway starting at the Smithers Bridge must not route around the Par 3 golf course property along the Bulkley River due to flooding concerns.

### 3.2.4. BC Ministry of Transportation and Infrastructure

During the project kickoff meeting and through the 2017 Concept Design Report, MoTI indicated that given the trail proposed to primarily occur with MoTI RoW along Highway 16, MoTI and TAC design standards must be met. BC MoTI Standard Specifications for Highway Construction were assumed to apply for all pathway design and construction occurring within MoTI RoW.

## 3.3. SELECTION CRITERIA

A workshop was conducted November 16, 2018 with key team members from Cycle 16 to review several options for the preliminary design and determine the most suitable options. A brainstorming session was conducted to develop a prioritized list of selection criteria to assist in decision making. The group established the selection criteria to be applied for determining preferred alignment options, in order of importance, was as follows:

1. Meeting physical alignment constraints of stakeholders and private land owners (e.g. as described in above sections);
2. Pathway quality (user experience, function, accessibility, safety);
3. Technical feasibility (cost, constructability); and,
4. Minimal impacts to landowners (visual and functional).

# 4. PRELIMINARY DESIGN

The preliminary design is shown on the drawings included in Appendix A. The drawing package includes the following series:

- 100 Series – plan sheets;
- 200 Series – profiles;
- 300 Series – details; and,
- G-Series – plan and detail sheets specifically prepared for Lot 1 Plan BCP18208.

## 4.1. PATHWAY DESIGN

### 4.1.1. Typical Section

Typical sections of the proposed pathway are provided on Drawing No. C-301. For Phase 1 of the project, three typical sections were considered:

- Fill section – to be applied where pathway prism will be constructed above existing grade; and,
- Cut or at-grade section – to be applied for most of the pathway to blend the pathway surface into the existing ground without interrupting the existing drainage pattern.

The cut/at-grade and cross-slope sections are preferred wherever possible to minimize changes to the existing drainage pattern, thus minimizing cost and construction effort. To implement these two sections as much as possible, the alignment was designed to tie into existing cross-slopes or at height-of-land points wherever possible. The fill section was only applied where required due to reduce grade of steep existing slopes that could not be avoided through alignment or at key alignment or infrastructure points.

### 4.1.2. Pavement Structure

The pathway structure included minimum 300 mm Well-Graded Base (WGB) material and 65 mm of asphalt. Fill materials required below the WGB course were assumed to comprise Select Granular Sub-Base (SGSB). The pathway structure assumed the subgrade comprises primarily unsaturated granular soils suitable for subgrade support of the pathway. For the cost estimate, it was assumed that 10% of the pathway length would require subgrade repair or improvement with non-woven geotextile and additional SGSB.

Given these assumptions, the proposed pathway structure and typical section are expected to be suitable for the expected infrequent use by BC Hydro and other utility service vehicles where access to these utilities currently exists.

## 4.2. KEY ALIGNMENT AREAS

### 4.2.1. Smithers Bridge

Preliminary design of the Smithers Bridge area is shown on Drawings No. C-101 and C-302. The challenge with this area was that the existing highway embankment height is approximately 5 m with steep slopes (approximately 2H:1V). From the existing sidewalk on the Smithers Bridge, a large fill is required to create the pathway prism down from the highway shoulder to the toe of the embankment at the design grade. As shown on Drawing No. C-101, the fill slope is

designed to minimize drainage changes to the area by extending an existing 400 mm culvert to provide pre-construction drainage conditions for the Par 3 golf course property and the highway.

*Figure 4. Existing conditions at approximately 0+100 looking towards 0+000*

### 4.2.2. Par 3 Golf Course (Remainder of Lot A, Plan PRP14858)

Alignment on Drawings C-101 and C-102 adjacent to the Smithers Par 3 & RV property (Remainder of Lot A, Plan PRP14858) was constrained by the following:

- Maintain the pathway alignment outside of flooding hazard area along the Bulkley River as per RBDN (see Section 3.2.1);
- Utilize only the RoW provided by Cycle 16 on Remainder of Lot A, Plan PRP14858 private property; and,
- Cross driveway well away from Highway 16 where sightlines are greatest, trail grades are appropriate for an intersection, and vehicle speeds are lowest.

Based on this, the alignment was routed along the existing utility access road near the toe of the slope of Highway 16. As shown on Drawings No. C-101 and C-102, the alignment is situated so as to maintain the existing drainage pattern by generally using the existing traveled surface and extending the existing drainage features across the trail as required. Minimum 3.0 m offset is maintained from all BC Hydro piles in this area; however, only a minimum of 1.0 m

offset was possible from guy anchor locations. From the pathway perspective, these offsets meet the design criteria and are considered suitable for pathway users. In terms of meeting BC Hydro's requirements outlined in Section 3.2.2, the pathway location utilizes the existing access road and does not change or hinder access to assets (e.g. pathway will utilize the existing setback of the access road from guy anchors) and therefore is considered to meet the objectives of BC Hydro.

*Figure 5. Existing BC Hydro access road along Highway 16 and the Smithers Par 3 & RV property*

Along this portion of the proposed pathway (0+000 to 0+580), the pathway occurs within the highway Clear Zone as per Table 620.A of the BC MoTI Supplement to TAC Geometric Design Guidelines. As per the table, fixed objects should not be placed in the vicinity of the toe of this type of highway embankment fill slope. Given that the pathway is aligned on an existing BC hydro access with little to no change to the ground profile and no new fixed objects are proposed, a vehicle's ability to recover in this area is expected to remain unchanged from existing conditions and therefore alignment at this location is considered suitable from a vehicle safety perspective. From a pathway user safety perspective, the accident frequency and pathway user frequency are expected to be low enough that warning signs may be employed to warn pathway users of proximity to the highway and to avoid stopping in this area. Further detailed design in this area should consider that any signage, pathway fixtures, and/or landscaping in this area must not create a fixed object hazard to a recovering vehicle and that rest nodes or other natural stopping points are not included in this area.

### 4.2.3. Lot 1 Plan BCP18208 (Private Residence)

Significant effort was spent during the preliminary design work to develop a technically feasible alignment option through Lot 1 Plan BCP18208. The main challenges in this area included aligning the pathway up the natural slope to the east out of Smithers, crossing the private driveway, and addressing the landowners' concerns outlined in Section 3.2.1. Through an iterative process looking at several potential alignment options, Cycle 16 and McElhanney determined that the alignment proposed on Drawing No. C-102 was the preferred option considering the landowner's concerns outlined in Section 3.2.1 and the selection criteria described in Section 3.3 (see November 16, 2018 Decision-making Workshop meeting minutes in Appendix D).

The preliminary design features the following items to address the landowner's concerns identified by Cycle 16:

- The trail parallels the driveway crossing for approximately 15 m on either side before the level crossing to provide extended sightlines and stopping distance for both pathway users and vehicles on the driveway. Trail grades on the parallel approaches are <3% to allow for pathway users to have a safe stopping area.
- Trail grades are generally maintained to 10% or less, except for a short approximately 40 m segment from 0+810 to 0+850. Based on field reconnaissance, the grades in this area are expected to be less than shown by the LiDAR model used for the design and likely will be less than 10% once constructed.

- The curved pathway alignment before the driveway crossing will require users to slow down before approaching the driveway crossing intended to prevent high-speed crossing.
- Stop signs for pathway users may be installed at this crossing, if desired by the landowner, to ensure that pathway users yield to driveway users.
- Alignment was placed to leave a buffer of vegetation between the pathway and line-of-sight to the house. If desired, additional landscaping may be included on the open area to the south of the proposed pathway (infilled lagoon).
- Adjustments to fencing, access gate on the driveway, regulatory signage, can be included, but should be determined through detailed consultation and negotiation with the property owners.

*Figure 6. Proposed private driveway crossing location on Lot 1 Plan BCP18208 private property*

### 4.2.4. Cattle Crossing

Three basic crossing methods were conceptually reviewed with Cycle 16 and the landowner of Lot 3 Plan BCP25354:

- Level crossing using gates, cattle guards, and fence relocation will control cattle access and allow uninterrupted pathway access across the cattle crossing;
- Independent crossing structure (e.g. free-standing culvert or bridge structure over the existing cattle crossing); or,
- Extension of the existing culvert under Highway 16 and route the pathway over the extension adjacent to the highway.

*Figure 7. Existing cattle guard and fencing conditions*

Based on the constraints described in Section 3.2.1 and through the site meeting with the property owner (see Appendix D), the third option of extending the existing culvert and routing the pathway adjacent to highway 16 was selected. Though a level crossing would be most favourable in terms of cost, constructability, and maintenance, this option was not considered acceptable by the land owner. By utilizing the culvert extension option as detailed on Drawing No. C-303, cattle fencing will be maintained, snow-clearing access to the inlet of the culvert crossing will be maintained, and less opportunity for unauthorized access to the private property through the fencing will exist. Preliminary review of the culvert revealed that it appeared to be in reasonable condition and likely would not require significant repair under the highway embankment to install the extension; however, a detailed review will be required during detailed design.

Given that the proposed alignment creates a new embankment within the highway clear zone, a barrier treatment was included to address vehicle safety in this area. This also adds safety for pathway users for the short area where they will be aligned within 3 m of the travel lane. Barrier types should be determined during detailed design with input from MoTI and the road maintenance contractor based on their specific requirements.

## 4.3. INTERSECTIONS & CROSSINGS

Preliminary intersection and crossing design was completed at key locations along the proposed Phase 1 alignment. The purpose of the preliminary design was to determine technically feasible and suitable intersection and crossing types that could be used at each location and to identify key components required for the crossings (e.g. signage, paint markings). Though the Trails in Alberta Highway Rights-of-Way document (Alberta Transportation, 2015) was developed for a different jurisdiction, it contains some of the most recent and comprehensive recommendations for pathway road and driveway crossings similar to those encountered on this project and was utilized in determining crossing typology for the preliminary design in conjunction with TAC (2017) and other best practices based on the constrained existing conditions.

### 4.3.1. Crossing Controls

Transportation Association of Canada (TAC) 2017, recommends that road design at intersections with pathways incorporate awareness of the potential for conflict, consider the visibility of cyclists to motorists, isolate and manage conflicts upstream of the intersection area, and clearly assign yield priority. The potential for conflict may arise in identifying who has the right-of-way. Trails in Alberta Highway (TAH) defines right-of-way between a trail and roadway

as being dependent on the type of roadway being crossed and the location of the crossing (i.e., at the edge of the right-of-way or close to the highway).

Conflicts within the intersection area must be controlled with the least restriction as possible to maintain effectiveness. The type of control implemented will depend on the type of roadway being crossed and where the crossing is located. In the case of a trail that parallels a highway and has the potential to cross roads or other vehicle accesses, Alberta Transportation (2015) recommends the following controls as shown in the following tables.

*Table 1. Typical Signing and Marking of Side Road Crossing (Trail located outside the highway clear zone)*

| Access Road Type | Anticipated Volume | Trail Control | | Access Road Control | |
|---|---|---|---|---|---|
| | | Sign Control | Paint Marking | Sign Control | Paint Marking |
| Private Driveway | Low | Yield or Uncontrolled | n/a | Yield or Uncontrolled | n/a |
| Minor Local Road | Medium | Yield or Stop | Stop Bar (optional) | n/a | Zebra Crossing (optional) |
| Major Local Road | High | Stop | Stop Bar | n/a | Zebra Crossing |

*Table 2. Typical Signing and Marking of Side Road Crossing (Trail located inside the highway clear zone)*

| Access Road Type | Anticipated Volume | Trail Control | | Access Road Control | |
|---|---|---|---|---|---|
| | | Sign Control | Paint Marking | Sign Control | Paint Marking |
| Private Driveway | Low | Yield or Uncontrolled | n/a | n/a | n/a |
| Minor Local Road | Medium | Yield or Stop | Stop Bar (optional) | Stop | Zebra Crossing and Stop Bar (if paved) |
| Major Local Road | High | Stop | Stop Bar | Stop | Zebra Crossing and Stop Bar |

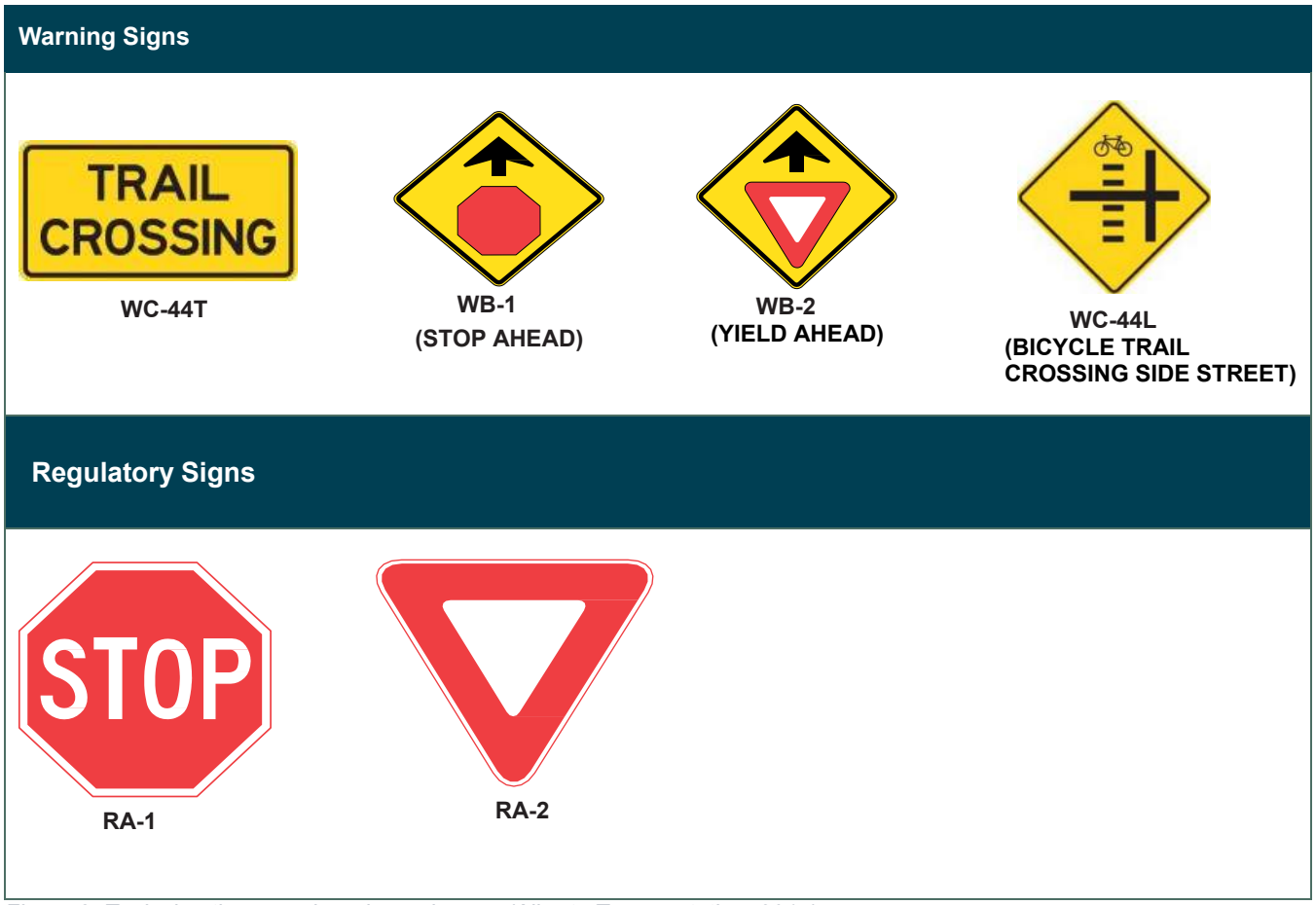


*Figure 8. Typical pathway and roadway signage (Alberta Transportation, 2015)*

### 4.3.2. Private Driveways

The proposed Phase 1 alignment crosses several un-paved private driveways. Based on Table 1 and Table 2, private driveways may be crossed with no controls for both the pathway and the driveway or with yield signs for the pathway and/or the roadway. This preliminary design recommends that yield signage be placed on the pathway on either side of the private driveways to indicate the crossing location and to alert pathway users to yield to the private driveway traffic, which likely will be the preferred arrangement for driveway owners. However, alternative arrangements may be made depending on owner-specific requests that will be determined through the detailed design and permitting process. The least-restrictive signage and marking arrangement acceptable to the property owners is recommended to maintain effectiveness. A typical detail for private driveway crossings is provided on Drawing No. C-301.

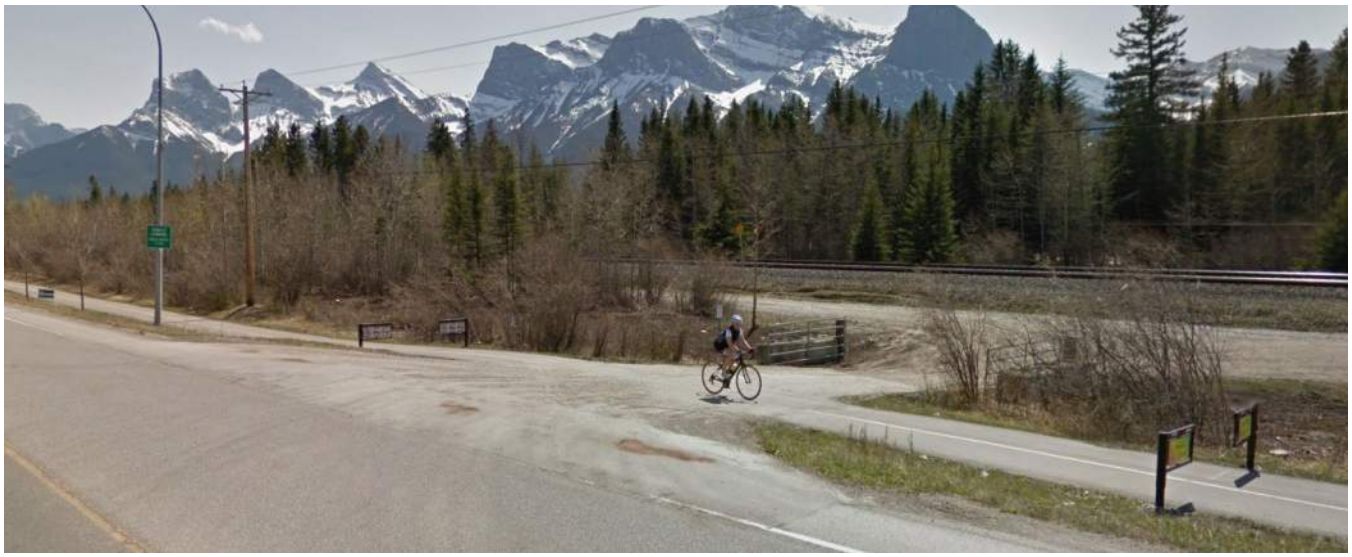

*Figure 9. Example of private driveway crossing on the Rocky Mountain Legacy Trail near Canmore, AB*

### 4.3.3. Weme Road Intersection

Weme Road is un-paved and was considered a minor local road. Given the spatial constraints of existing culverts near the crossing location and the proximity of the existing Weme Road stop bar near the edge of Highway 16, it was recommended for the pathway to cross outside the highway clear zone with an arrangement similar to that shown in Figure 10.

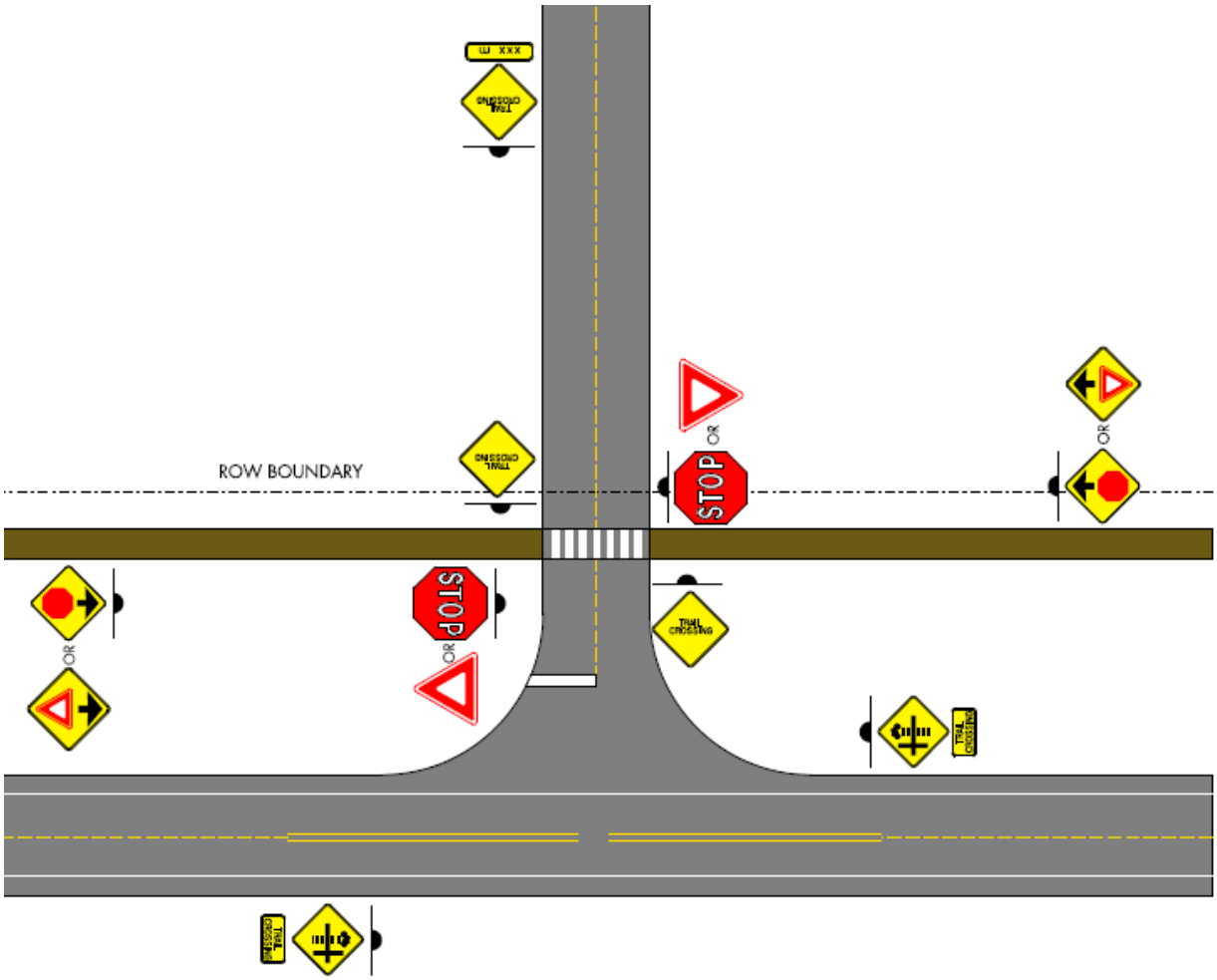


*Figure 10. Typical arrangement for trail crossing of minor local road outside of the Clear Zone (Alberta Transportation, 2015)*

The preliminary design for the Weme Road crossing is shown on Drawing No. C-304. In this case, stop signs were recommended for the pathway to indicate that pathway users must stop and yield right-of-way to vehicles on Weme Road, especially in the case when vehicles are stopped and waiting at the existing stop bar. Crosswalk paint markings are not included given that Weme Road is not paved at the proposed crossing location.

### 4.3.4. Laidlaw Road Intersection

The proposed Laidlaw road crossing location lies within the highway Clear Zone and has the added challenge of crossing both the main Laidlaw road as well as the right turn lane off Highway 16. Typical configuration and signage for this type of intersection is illustrated in Figure 11. Stop signs are recommended for pathway users to indicate the requirement to yield to vehicle traffic. Though not detailed on the preliminary design drawings, detailed design should determine if traffic volumes warrant Trail Crossing signs should be placed on the roadway edge within stopping sight distance of the trail. This notifies motorists that a trail lies ahead to warn of a potential conflict.

The preliminary design for the Laidlaw Road crossing is shown on Drawing No. C-304. The following should be noted regarding the arrangement shown on C-304:

- Due to the right turn lane for eastbound traffic on Highway 16, two crossings will be required by using the existing island. Curb drops will be required to allow for pathway user access across the island.
- New drainage culverts will be required on both sides of the crossing to maintain the existing drainage pattern.

- The offset from the BC Hydro pole on the north side of the crossing will be between 1 m and 2 m depending upon field fit, which meets the pathway design criteria but does not meet the pole offset criteria for BC Hydro. In this location, it is recommended that the offset be relaxed as there is currently no existing maintenance access to this pole and it is in close proximity to the roadway, so access remains unchanged.
- The existing stop bar for Laidlaw Road traffic approaching Highway 16 may require slight relocation to fit crosswalk paint marks, pending detailed design.

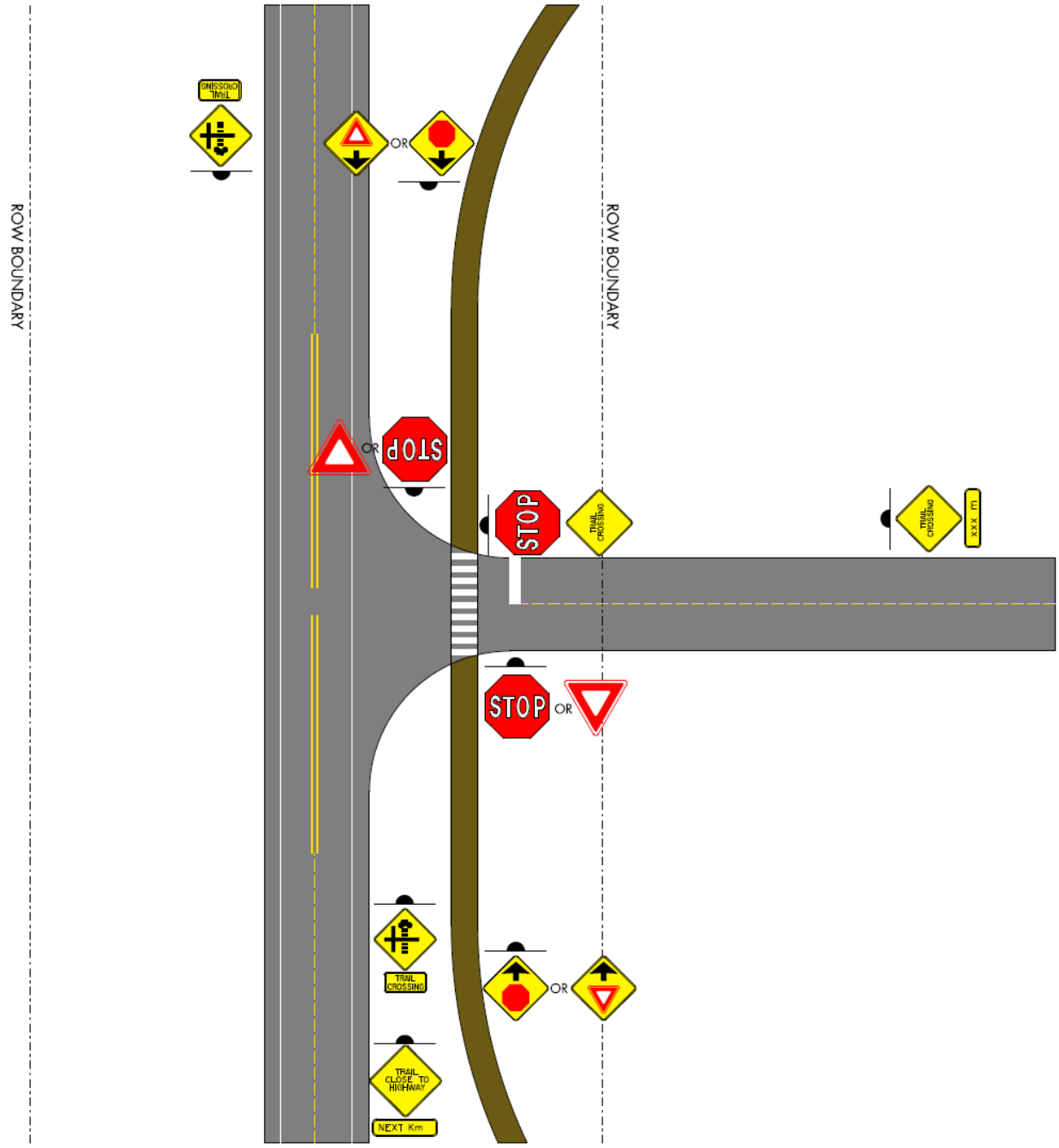


*Figure 11. Typical arrangement for trail crossing of minor local road inside the Clear Zone (Alberta Transportation, 2015)*

## 4.4. COST ESTIMATE

A Class C construction cost estimate was prepared for preliminary design. The detailed cost estimate spreadsheets are provided in Appendix B. The cost estimates include estimated construction costs, detailed design/construction engineering costs (estimated at 10%), construction surveying/layout, and construction contingency (15%). The estimates do not include the cost of property/land acquisition, public or private landowner consultations and engagement, and/or legal surveying all of which may be required but are beyond the scope of this project. Based on the above, the total estimated cost for Phase 1 of the Telkwa-Smithers Pathway project is $1,521,901.24.

# 5. OPERATIONS AND MANAGEMENT

Ongoing operations and management by trail operators is important to the long-term success of any trail, pathway, or network. Trail operators must maintain the trails, manage risks and liability, plan for emergencies, respond to user feedback, and potentially manage changing conditions. Trail networks are analogous to other civic facilities and should be considered to require a similar level of asset management as a sports field or park. The following sections provide commentary around these issues and recommendations for the potential owner and/or operator of the proposed Telkwa-Smithers Pathway project to incorporate into plans.

## 5.1. MANAGEMENT OF RISK & LIABILITY

Liability is typically a significant concern for infrastructure owners. The best way to manage risk for trails and pathways is similar to that of any other civic infrastructure, that is by demonstrating a standard duty of care by implementing industry best practices through the planning, design, construction, operation, management, and maintenance phases of pathway development. The concepts and recommendations presented in this report are based on McElhanney's experience with similar projects in similar jurisdictions across Canada, as well as intended to meet or exceed current industry best practices and should be implemented throughout the pathway development process.

The following sections provide practical strategies and requirements for managing liability during operation of trail or pathway network from a trail operations perspective.

### 5.1.1. Public Safety

Public safety may be the greatest concern during trail design, construction, and maintenance. A safe trail network maintains popularity and functionality while it is negligence that will cause the network to fail. Keeping the trail design reasonable and the trails well maintained will save time and money in the long-term while also keeping riders and land owners satisfied.

It is important to implement a risk management program that prevents injuries and potential lawsuits by planning ahead and identifying and correcting unreasonable hazards before they cause incidents. Educating the users before and while they are on the trail is also important. In addition, policies focused on design, construction, maintenance of trails in accordance with industry best practices need to be established.

### 5.1.2. Level of Service

Level of service is a term used by Parks Canada for management of trails that can be adopted as a liability management strategy. The level of service determines the inspection and maintenance frequency and defines certain activities and requirements for different trails. The idea recognizes that not all trails and pathways require the same level of service – for example, a low traffic backcountry trail in a remote area needs less intensive management than a pathway in a busy urban park.

It is recommended that the future owner or proponent of the Telkwa-Smithers Pathway project incorporate the level of service concept into pathway management plans and clearly specify the level of service intended to be provided. Once defined, it is important to follow up with routine maintenance and inspections consistent with the intended level of service. Documentation from trail operators showing consistent compliance with the intended level of service generally is a good demonstration that an adequate duty of care has been provided if an incident arises.

| Level of Service, Visitor Safety and Visitor Experience Tools | | | | | |
|---|---|---|---|---|---|
| | Element / Trail Type | TYPE 1 | TYPE 2 | TYPE 3 | TYPE 4 |
| Level of Service | Level of Service | High | Moderate | Low | N/A |
| | Inspection | Weekly/monthly or upon visitor comment | Seasonal or as required upon visitor comment | Yearly or as required upon visitor comment | N/A |
| | Deadfall Clearing | As required | As required / seasonal | Yearly | N/A |
| | Infrastructure | Major (bridge, boardwalk, viewing platform) | Moderate (bridge, boardwalk, viewing platform) | Low or none (bridge, boardwalk) | N/A |
| | Trail Materials and Surface Preparation | Asphalt, concrete or crushed rock<br>• Repair cracks, fill holes, repack surface, create drainage, clear corridor | Crushed rock or natural mineral soil and rock<br>• Fill holes, repack surface, create drainage, clear corridor | Natural mineral soil and rock or natural ground cover<br>• Create drainage, clear corridor | N/A |
| | Equipment | ATV, mechanized equipment, horse, hand or bicycle | ATV, mechanized equipment, horse, hand or bicycle | Non-motorized, horse, hand or bicycle | N/A |
| Visitor Safety | Visitors Definition | Visitor may not understand all risks and may not be self-reliant in the event of an incident. | Visitor may have a general understanding of some risks and may be partially self-reliant in the event of an incident | Visitor has an understanding of most risks and may be self-reliant in the event of an incident | Visitor has an understanding of risks and will be self-reliant in the event of an incident |
| | Risk Mitigation | Maximum effort made to mitigate risk. | Moderate effort made to mitigate risk. | Low effort made to mitigate risk. | Low too little effort made to mitigate risk. |
| | Risk Identification *(Cautions and Warnings)* | High detailed explanation of risk – typically provided at trailhead, on maps and at areas of risk along the trail. | Moderate detailed explanation of risk – only significant risks identified. Information typically provided at trailhead and at areas along the trail | Low detailed explanation of risk – only site-specific or unusual risks. Information typically provided at trailhead. | Low detailed explanation of risk – only site-specific or unusual risks. Information typically provided at trailhead. |
| | Risk Inspection | Weekly/monthly or upon visitor comment. *Risk inspection can occur during level of service inspection* | Seasonal or as required upon visitor comment. *Risk inspection can occur during level of service inspection.* | Yearly or as required upon visitor comment. *Risk inspection can occur during level of service inspection.* | N/A |
| Describing the Trail | Targeted Visitor | Family-friendly, suitable for all visitors looking for an easy trail experience. | Suitable for most visitors who are generally active and have some basic trail experience. | Suitable for visitors who have trail experience and are active. | Suitable for visitors who have exceptional trail experience and are very active. |
| | Trail Highlights | The purpose of this section is to give visitors a sense of what they can expect along this trail, but to describe it in a non-technical way.<br>This section should provide the highlights of the trail, a sense of what the visitors will see. It helps to inform visitors about why they might want to choose to hike this particular trail. | | | |
| | | Example: *This trail is an easy walk through a conifer forest and will bring you to a beautiful sand beach along Lake Superior.* | Example: *An enjoyable hike that will allow you to discover the animals of the boreal forest. Observe a beaver lodge, be on the lookout for a wide variety of songbirds and if you are lucky, you might catch a glimpse of some moose.* | Example: *A challenging trail that winds through a variety of terrain from valley bottoms to scenic hill top views. Enjoy lunch while taking in some scenic ocean views; be on the lookout for whales and seals.* | Example: *A challenging and spectacular route that the park recommends for experienced backcountry travelers. Route finding skills are essential since there are no trails or route markers to show the way. Weather in the mountains can also quickly reduce visibility.* |

*Figure 12. Example table for level of service for various types of trails (Source: Parks Canada)*

### 5.1.3. Maintenance

Consistent and responsible maintenance may be the most important aspect to keeping trail users safe from injury and protecting trail operators from incidents and lawsuits. It is important to note that poor property management is the most common lawsuit due to the trail user's claims of improper design, construction, or maintenance. Therefore, it is essential to develop specific policies that fit into local situations since infrastructure maintenance requirements depend on many unpredictable factors. These policies should include thorough documentation of the inspection and maintenance of the pathway. Included in the maintenance policy are achievable goals set with reasonable deadlines and complexity that should be flexible to account for the potential growth in user numbers or changing conditions over time.

Cycle 16 has approached the RDBN for their involvement in the ownership, operation, and maintenance of the proposed pathway. To aid RDBN in assessing the feasibility of this project, a preliminary annual maintenance frequency and ownership cost estimate was developed as shown in Table 3. The cost estimate is based on the following assumptions:

- Equipment capital and ownership costs are not included (e.g. equipment is already owned or an external contractor us utilized);
- No trail amenities or fixtures such as garbage cans, lighting, benches, bike racks, etc. will be provided; and,
- The pathway is used only in the summer months and snow plowing is not conducted

*Table 3. Estimated maintenance and replacement costs for Phase 1*

| DESCRIPTION | ESTIMATED FREQUENCY | UNIT PRICE / FREQUENCY | ANNUAL AMOUNT |
|---|---|---|---|
| **Annual Maintenance** | | | |
| Sweeping | Once per year | $1.30 / m [a] | $ 4,624 |
| Mowing/Vegetation | Every 2 weeks during summer | | |
| Asphalt Repair | Every 5 years | | |
| Line Painting | Every 5 years | | |
| Drainage maintenance | Once per year | | |
| Signage Maintenance | Once per year | | |
| Condition Review, Management, and Administration | Ongoing | $ 2,500[b] | $ 2,500 |
| Insurance | Once per year | $ 1,700[c] | $ 1,700 |
| | | **Annual Maintenance Subtotal** | **$ 8,824** |
| | | **Contingency (10%)** | **$ 882** |
| | | **Annual Maintenance Total** | **$9,706** |
| **Capital Repair and Replacement** | | | |
| Re-paving and major capital repair costs reserve (35-year replacement) | n/a | $ 14,000[d] | $ 14,000 |
| | | **Capital Repair and Replacement Total** | **$ 14,000** |
| | | **Annual Total** | **$ 23,706** |

[a]Based on average paved trail maintenance costs from *Maintenance Practices and Costs of Rail-Trails* (Rails-to-Trails Conservancy, 2015).
[b]Approximately 10% of annual costs
[c]Insurance cost is estimated based on values provided the RDBN's memorandum titled *Highway 16 Trail Society* dated April 24th, 2018 scaled to the length of Phase 1 of the project (see Appendix D)
[d]Based on annualized $500,000 re-paving and major replacement cost over 35-years.

Many execution and funding models exist for trail maintenance programs across North America. Maintenance activities can be performed by government/regional district staff, volunteer/community groups, local businesses or residents through engagement programs, and/or maintenance contractors. Funding for maintenance can come from many sources, including all levels of government, grants, endowment funds, donations, and others. It is recommended that Cycle 16 and the stakeholders and land managers for the project continue to review potential ownership models considering the many options available to conduct annual maintenance.

### 5.1.4. Reporting and Planning Systems

As with any other piece of civil infrastructure, ongoing documentation of all inspections, injuries, hazards, risks, and other related aspects of the trail network is essential. Having these records is the best method to prove a duty of care has been provided to trail users and to defend against allegations of negligence. Keeping documents consistent and organized on a routine basis is a great way to prevent lawsuits but also maintains a good relationship with partnered organizations. Documenting trail inspection and maintenance work will also help prioritize projects and helps with the

overall flow of operations. Reporting and planning systems management may be a shared duty between interested parties such as the trail operator, maintenance contractor, and/or interested not-for-profit groups.

Three main reporting systems should be developed and implemented by the pathway owner/operator or incorporated into existing asset management systems: an incident reporting system, inspection system, and maintenance system. The incident reporting system should document reported or observed incidents and should include a root-cause analysis to determine potential patterns in incident occurrence. The inspection system should include a plan for appropriately-timed inspections by a person or persons familiar with pathway maintenance and operation best practices. The frequency of inspections should be specified in consideration of the Trail Management Objectives, Level of Service intended, and usership numbers. Inspections must be thoroughly documented and should include reviews of the infrastructure condition in comparison with the TMO and design documents to verify that all objectives are still met. Where deficiencies are noted, a prioritized maintenance plan should be developed and managed on a continuous basis.

It is imperative that the reporting and planning systems developed and implemented by the future owner/operator of the Telkwa-Smithers Pathway are followed on a continuous basis. Case law in Canada has shown that operators and land managers are rarely found liable for incidents on trails, except where inspection and maintenance regimes were in place but not followed (Lau, 2018).

# 6. CONCLUSION

## 6.1. LIMITATIONS

McElhanney has conducted a preliminary design for Phase 1 of the proposed Telkwa-Smithers Pathway project for the Cycle 16 Trail Society and the Village of Telkwa. The alignment and design characteristics were based on the physical constraints, documented stakeholder input, and additional stakeholder input provided by Cycle 16. This report did not include a detailed or comprehensive stakeholder or public engagement and does not purport to fully consider the input of all stakeholders. Rather, the focus was to complete preliminary design to determine technical feasible alignment options for the proposed pathway.

## 6.2. NEXT STEPS

This report should be considered another step in the project lifecycle – significant steps must still be made to move the project to construction. Further work on the project should focus on utilizing a formalized consultation process to document all stakeholder input for incorporation into the detailed design. The following project components are discrete and require expertise from different disciplines, but may occur simultaneously for efficiency and continuity.

- *Stakeholder and Public Engagement* – formalized engagement of stakeholders and the public may help garner public and government support for the project. To date, there is limited existing local or regional government policy to drive support for the project.

- *Detailed Design* – Detailed design of pathway features, crossings, and alignments must be completed based on stakeholder input to the preliminary design.

- *Permitting & Land Acquisition* - Stakeholders such as regulatory agencies, local governments, and utility owners must be consulted through formal review and permitting processes. Land acquisition may be required from private landowners.

## 6.3. CLOSURE

This report has been prepared by McElhanney Consulting Services Ltd. for the benefit of Cycle 16 Trail Society and the Village of Telkwa. The information and data contained herein represent McElhanney's best professional judgment considering the knowledge and information available to MCSL at the time of preparation. Except as required by law, this report and the information and data contained herein are to be treated as confidential and may be used and relied upon only by the client, its officers, and employees.

McElhanney Consulting Services Ltd. denies any liability whatsoever to other parties who may obtain access to this report for any injury, loss or damage suffered by such parties arising from their use of, or reliance upon, this document or any of its contents without the express written consent of McElhanney, Cycle 16, and the Village of Telkwa.

We trust this report submission meets your requirements for the project. Should you have any queries, please do not hesitate to contact the undersigned at 250.631.4068 or twilkes@mcelhanney.com.

Respectfully submitted,

McElhanney Consulting Services Ltd.

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# 7. REFERENCES


Alberta Transportation, 2015. *Trails in Alberta Highway Rights-of-Way Policies, Guidelines, and Standards*.

BC Ministry of Transportation, 2007. *Supplement to TAC Geometric Design Guide*.

Lau, Lee, March 26, 2018. *The Liability for Non-Commercial Trailwork in British Columbia (and some parts of Canada)*. Retrieved from: http://www.leelau.net/sharonandlee/liability-for-non-commercial-trailwork-in-british-columbia-and-some-parts-of-canada/

Rails-to-Trails Conservancy, 2015. *Maintenance Practices and Costs of Rail Trails*.

Transportation Association of Canada (TAC), 2017. *Geometric Design Guidelines for Canadian Roads.*

US Bureau of Land Management (USBLM), 2017. *Guidelines for a Quality Trail Experience*.

US Forest Service (USFS), 2016. *Trail Fundamentals and Trail Management Objectives*.

# APPENDIX A
# PRELIMINARY DESIGN DRAWINGS

# APPENDIX B
# COST ESTIMATE

**Project Cost Summary**
**Client: Cycle 16**
**Project: Telkwa-Smithers Multi-use Pathway**
**Updated: December 14, 2018**
**Project No: 2321-01795-00**

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| Item No. | Specification Reference | Description | Measurement Unit | Quantity | Unit Price | Total |
|---|---|---|---|---|---|---|
| 1 | n/a | **Bulkley Bridge Section (100 m)** | | | | |
| | | Clearing, Grubbing & Stripping | $m^2$ | 300 | $ 4.00 | $ 1,200.00 |
| | | Stripping & Common Excavation | $m^3$ | 55 | $ 15.00 | $ 825.00 |
| | | Geotextile Fabric | $m^2$ | 10 | $ 6.00 | $ 60.24 |
| | | SGSB Granular Fill | $m^3$ | 300 | $ 40.00 | $ 12,000.00 |
| | | WGB Granular Fill | $m^3$ | 90 | $ 48.00 | $ 4,320.00 |
| | | Asphalt | $m^3$ | 20 | $ 750.00 | $ 14,625.00 |
| | | Paintlines | lm | 100 | $ 2.00 | $ 200.00 |
| 2 | n/a | **Private Property Section (280 m)** | | | | |
| | | Clearing, Grubbing & Stripping | $m^2$ | 840 | $ 4.00 | $ 3,360.00 |
| | | Stripping & Common Excavation | $m^3$ | 120 | $ 15.00 | $ 1,800.00 |
| | | Geotextile Fabric | $m^2$ | 112 | $ 6.00 | $ 672.00 |
| | | SGSB Granular Fill | $m^3$ | 58 | $ 40.00 | $ 2,320.00 |
| | | WGB Granular Fill | $m^3$ | 252 | $ 48.00 | $ 12,096.00 |
| | | Asphalt | $m^3$ | 55 | $ 750.00 | $ 40,950.00 |
| | | Paintlines | lm | 280 | $ 2.00 | $ 560.00 |
| | | Signage | each | 2 | $ 600.00 | $ 1,200.00 |
| 3 | n/a | **Cattle Crossing Section (120 m)** | | | | |
| | | Clearing, Grubbing & Stripping | $m^2$ | 360 | $ 4.00 | $ 1,440.00 |
| | | Stripping & Common Excavation | $m^3$ | 55 | $ 15.00 | $ 825.00 |
| | | Geotextile Fabric | $m^2$ | 48 | $ 6.00 | $ 288.00 |
| | | SGSB Granular Fill | $m^3$ | 217 | $ 40.00 | $ 8,680.00 |
| | | WGB Granular Fill | $m^3$ | 108 | $ 48.00 | $ 5,184.00 |
| | | Asphalt | $m^3$ | 34 | $ 750.00 | $ 25,545.00 |
| | | Paintlines | lm | 120 | $ 2.00 | $ 240.00 |
| | | 2200 dia Culvert Extension | lm | 7 | $ 8,000.00 | $ 56,000.00 |
| | | 600 dia Culvert Extension | lm | 2 | $ 550.00 | $ 1,100.00 |
| | | Concrete Barrier | lm | 100 | $ 200.00 | $ 20,000.00 |
| 4 | n/a | **Remainder of Path (3060 m)** | | | | |
| | | Clearing & Grubbing | $m^2$ | 9,180 | $ 4.00 | $ 36,720.00 |
| | | Stripping & Common Excavation | $m^3$ | 2,754 | $ 15.00 | $ 41,310.00 |
| | | Geotextile Fabric | $m^2$ | 1,224 | $ 6.00 | $ 7,344.00 |
| | | SGSB Granular Fill | $m^3$ | 275 | $ 40.00 | $ 11,016.00 |
| | | WGB Granular Fill | $m^3$ | 2,754 | $ 48.00 | $ 132,192.00 |
| | | Asphalt | $m^3$ | 597 | $ 750.00 | $ 447,525.00 |
| | | Paintlines | lm | 3,102 | $ 2.00 | $ 6,204.00 |
| | | 400 dia Culvert Extension | lm | 4 | $ 400.00 | $ 1,600.00 |
| | | 600 dia Culvert | lm | 30 | $ 550.00 | $ 16,500.00 |
| | | Signage | each | 10 | $ 600.00 | $ 6,000.00 |
| | | **UNIT PRICE TOTAL** | | | | **$ 921,901.24** |
| 1 | n/a | **General** | | | | |
| | | Construction Supervision | L.S. | 1 | $ 56,000.00 | $ 56,000.00 |
| | | Traffic Control | L.S. | 1 | $ 47,000.00 | $ 47,000.00 |
| | | Mobilization / Demobilization | L.S. | 1 | $ 93,000.00 | $ 93,000.00 |
| 2 | n/a | **Engineering** | | | | |
| | | Detailed Design | L.S. | 1 | $ 93,000.00 | $ 93,000.00 |
| | | Survey | L.S. | 1 | $ 56,000.00 | $ 56,000.00 |
| | | Quality Assurance | L.S. | 1 | $ 56,000.00 | $ 56,000.00 |
| 3 | n/a | **Contingency 15%** | L.S. | 1 | $ 199,000.00 | $ 199,000.00 |
| | | **TOTAL LUMP SUM AMOUNT** | | | | **$ 600,000.00** |
| | | **TOTAL ESTIMATE** | | | | **$ 1,521,901.24** |

# APPENDIX C

# TRAIL MANAGEMENT OBJECTIVE FORM

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# Trail Management Objectives

**Region:** n/a **Trail Manager** TBD **Land Manager** Ministry of Transportation & Infrastructure

**Trail Name:** Smithers-Telkwa Pathway **Trail Number:** n/a

**Trail Beginning:** Smithers Bridge **Beg. Milepost:** 0+000

**Trail Ending:** Tyhee Market **End. Milepost:** 12+000 (approx.)

**Trail Inventory Length:** 12 km **Trail Mileage Source:** [ ] Wheel [ ] GPS [x] Map [ ] Unknown

## TMO Trail Section

**Sec.#** 1

**Section Begginning:** Smithers Bridge **Beg. Milepost:** 0+000

**Section End:** Laidlaw Frontage Road **End. Milepost:** 3+558

## Trail Classification

(Check any that apply)

**Trail Type**

- [x] Summer
- [ ] Winter
- [ ] Water
- [ ] Vertical

**Level of Development**

- [ ] Developed
- [ ] Moderately Developed
- [x] Minimally Developed

(Check one in each category)

**Enthusiast Group**

- [x] Non-Motorized
- [x] Mechanized
- [ ] Motorized
- [ ] Mixed Use

**Use Type**

- [ ] Single-Use
- [x] Multi-Use

**Degree of Challenege**

- [x] Easy
- [ ] Moderate
- [ ] Difficult
- [ ] Most Difficult

## Design Activity Types

(Check all that apply)

- [x] Pedestrian
- [ ] Equestrian
- [ ] X-Country Ski
- [ ] Snowshoe
- [x] Cycling
- [ ] Two-Wheel Motorized
- [ ] Motorized (<1.5 m wide)
- [ ] Motorized (1.5-1.83 m wide)
- [ ] Motorized (>1.83 m wide)
- [ ] Snow Vehicle (<1.5 m wide)
- [ ] Snow Vehicle (>1.5 m wide)
- [x] Electric Bike (Class 1 & 2)
- [ ] _____
- [ ] _____

## Design Parameters

(Fill in all that apply)

| | |
|---|---|
| 3.0 | Tread Width (m) |
| <8 | Target Grade (%) |
| 10 / 50 | Maximum Grade (%) / Length (m) |
| 2 | Target Cross-Slope (%) |
| 5 / 5 | Clearing Width / Height (m) |
| 25 | Turning Radius (m) |
| None | Tread Protrusions |

**Trail Surfacing**

- [ ] Natural
- [ ] Imported
- [ ] Stabilized
- [x] Paved
- [ ] Snow

## Target Frequency

**Per Year**

(Fill in all that apply)

| | |
|---|---|
| 1 | Trail Opening |
| 0.1 | Tread Repair |
| 0.1 | Drainage Cleanout |
| 1 | Sweeping |
| 4 | Brushing/Mowing |
| n/a | Snow Clearing |
| 2 | Condition Survey |
| | _____ |

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# Trail Management Objectives

**Trail Name:** Smithers-Telkwa Pathway - Phase 1 **Trail Number:** 1

## Travel Management Strategies

### Managed Use

(Fill in all that apply)*

| | | From Date (mm/dd) | To Date (mm/dd) |
|---|---|---|---|
| | Hiker / Pedestrian | | |
| | Equestrian | | |
| | X-Country Ski | | |
| | Snowshoe | | |
| | Mountain Bike | | |
| X | Motorized (>1.83 m wide) | Maintenance Staff and Utilities Vehicles (BC Hydro, PNG, etc.) only | |
| | | | |
| | | | |
| | Cross-Country Ski | | |
| | Snowshoe | | |
| | Snowmobile | | |
| | | | |
| | Watercraft-NonMotorized | | |
| | Watercraft - Motorized | | |

### Prohibited Use

(Check if applicable)

| | | From Date (mm/dd) | To Date (mm/dd) |
|---|---|---|---|
| X | All Public Motorized Use | Year-round | |

(Or, fill in all that apply)

| | | | |
|---|---|---|---|
| | Hiker / Pedestrian | | |
| X | Equestrian | Year-round | |
| | X-Country Ski | | |
| | Snowshoe | | |
| | Mountain Bike | | |
| | Motorized (>1.83 m wide) | | |
| | | | |
| | | | |
| | Cross-Country Ski | | |
| | Snowshoe | | |
| | Snowmobile | | |
| | | | |
| | Watercraft - NonMotorized | | |
| | Watercraft - Motorized | | |

### Other Uses

(Optional: Check any that apply)*

| | | Accept | Discourage | Eliminate |
|---|---|---|---|---|
| X | Winter Cycling | X | | |
| X | Winter Pedestrian | X | | |
| X | Small-Wheeled Users | X | | |
| X | Snowshoe | X | | |
| | Equestrian | | | X |
| | | | | |
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### Trail User Objectives

| | |
|---|---|
| | Escape |
| | Solitude |
| | Challenge |
| | Play |
| | Nature |
| | Risk |
| X | Exercise |
| X | Socializing |
| X | Effeciency |
| X | Connectivity |

### Remarks / Reference Information

Pathway primarily intended as active transportation corridor separated from Highway 16 between Smithers and Telkwa. Pathway design to consider primarily summer-use (snow free) cycling and pedestrian use, but must allow access for utilities maintenance vehicles where utilities exist. Other uses as indicated to be accepted, provided users comply with road safety regulations and laws.

**Trail Designer or Manager**

Name: McElhanney

Title: TTRP Team

Signature: n/a

Date: 2018/12/18

# APPENDIX D
# MEETING MINUTES & SUPPORTING DOCUMENTS

**Date:** July 11, 2018
**Location:** McElhanney Smithers

**Time:** 2:00 pm to 3:30 pm

**Subject:** Smithers-Telkwa Pathway Phase 1 Concept Refinement – Project Kickoff Meeting

**Minutes by:** Tyler Wilkes (McElhanney)

| Subject | | Action by | Status |
|---|---|---|---|
| **1. Introductions** | | | |
| McElhanney<br>• Tyler Wilkes – Project Manager and Trail Designer (primary contact)<br>• Justin Ellis – Planner<br>• Darin Langhorst – Senior Technical Reviewer<br>• Chris Houston – Civil Engineer<br>Cycle 16<br>• Jeremy Schriber – VP and project manager<br>• Tony Harris – President<br>Village of Telkwa<br>• Gordon Davies<br>• Darcy Repen (mayor)<br>RDBN<br>• Mark Fisher (phone)<br>• Jason Illewellyn (director of planning)<br>MoTI<br>• Cailey Brown – development technician<br>• Rosemary Barnwell (filling in for Carl)<br>• Matthew Foley – area manager | | | |
| n/a | Information only | | |

| Subject | Action by | Status |
|---|---|---|
| **2. Project Background and Objectives** | | |
| • Why: provide recreational opportunities, commuting, safety, active transportation, ebikes making active transportation easier and more accessible<br>• Goal is to reach a level of detail in alignment design to provide to stakeholders for consideration<br>• Engage MoTI and RDBN early in process<br>• From RDBN: need to present this plan to board to determine if RDBN should be involved in the project. Role of RDBN is to advise cycle 16 on things to include to increase chances of approval by RDBN Board. RDBN primary concerns safety and financial risk (maintenance costs and other annual operational costs). Construction cost will not be main concern – long term ownership costs. Land ownership also a significant concern (RoW creation or purchasing land). | | |
| MoTI and RDBN to review land ownership models that might work. | Rosemary, Jason | |
| **3. Project Reporting and Communications** | | |
| • MoTI Team – working within RoW for permitting, ensure it meets standard, Bike BC funding for construction costs. Primarily interested in technical details to verify meets standards within RoW areas. Cailey and Matt will be primary contacts.<br>• Village of Telkwa Team – Debbie/Gordon primary contacts. CC on daily communications. Darcy – liked ebike idea and interested in provided alternatives transportation methods for future. This is a transportation AND recreation project. Path should be of a quality that works for commuters and consider ease of use and safety into the future.<br>• RDBN – Jason will be main contact | | |
| Tyler and Cycle 16 to review Bike BC requirements – potentially tailor deliverables to meet this. | Tyler, Jeremy | |
| **4. Work Plan** | | |
| Overview of proposed work plan:<br>• Group briefly discussed proposed work plan steps, but deferred details of work plan develop to an offline discussion between Cycle 16 and McElhanney.<br>• Work plan to address Priority Segment first, then Secondary segment. | | |
| Develop detailed work plan to meet requirements of stakeholders and project objectives described in this meeting | Tyler, Jeremy | |
| **5. Background literature, policy, data, and mapping** | | |
| • RDBN – no current parks/rec documentation or functions and no planning. OCP contains standard language.<br>• Telkwa – trails and transportation study available. Encompasses within the village, but not wider region.<br>• Smithers doing active transportation plan this summer (within boundaries of town), but meant to consider connections | | |
| n/a | For information only. | | |

| Subject | | Action by | Status |
|---|---|---|---|
| **6. Stakeholder Engagement Strategy and Input** | | | |
| Discussion of engagement details and strategies:<br>• RDBN – interested in some discussions around maintenance, ownership, public engagement, messaging/media relating to RDBN involvement in the project, items related to private property owners. Concerned with Cycle 16 representing RDBN.<br>• From Greg: Good time for a workshop or presentation would be upon completion of technical design. Have McElhanney develop costs for maintenance, ownership, replacement cost, etc. and present to<br>• McElhanney | | | |
| n/a | For information only. | | |

McElhanney | CANADA'S BEST MANAGED COMPANIES

| Name | Title/Role | Organization | Email |
|---|---|---|---|
| Tyler Wilkes | Project Manager | McElhanney Consulting Services Ltd. | twilkes@mcelhanney.com |
| TONY HARRIS | PRESIDENT | Cycle 16. | TONY @ BULKLEYRIVER.COM |
| GORDON DAVIES. | DIR. OF OPERATIONS. | VILLAGE OF TELKWA. | directorops@telkwa.ca |
| Rosemary Barrewall | Program Manager | MoTI | rosemary.barrewall@gov.bc.ca |
| Cailey Brown | DA Tech | MoTI | Cailey.Brown@gov.bc.ca |
| Matthew Foley | Area Manager A/Ops Manager | MoTI | Matthew.Foley@gov.bc.ca. |
| Greg Brown | | Cycle 16 / Town of Smithers. | gregbrwn@gmail.com |
| Jeremy Shriber | V/P Cycle 16 project manager | Cycle 16 | jeremy shriber@gmail.com |
| Mark Fisher (via phone) | Representative | RDBN | |
| Darcy Repen (via phone) | Mayor | Village of Telkwa | |
| Jason Llewellyn | Director of Planning RDBN | RDBN | Jason.Llewellyn@rdbn.bc.ca |

**Project:** Smithers-Telkwa Pathway Concept Alignment Refinement

**File No.:** 2321-01795-00

**Date:** November 16, 2018

**Location:** McElhanney Smithers Office, Hinchcliffe Cattle Crossing, and Tersago/Par 3 property

**Subject:** Decision-making workshop, field reconnaissance

**Notes By:** Tyler Wilkes

## PRIORITY SEGMENT REVIEW WORKSHOP

An informal workshop was facilitated by McElhanney to summarize/prioritize the selection criteria for alignment options through the Priority Segment. Tyler presented an overview of the three main alignment options on Drawing No. SK-102 (November 13, 2018) and discussed the rationale for each alignment, the grades, turning radii, and safety/user experience considerations for each alignment.

The group was then asked to brainstorm constraints and items for consideration in the designs to create a prioritized selection criteria list. The prioritized selection criteria, in order of importance, were:

1. Physical Alignment Constraints (eg. no crossing at Par 3 driveway entrance, stay within proposed Par 3 RoW, stay out of flood plain around Par 3 golf course, and cross Tersago's driveway).

2. Pathway quality (eg. user experience, function, accessibility, safety)

3. Feasibility (cost, technical feasibility, constructability)

4. Minimize landowner impacts (eg. visual and functional impacts)

Each alignment option on Drawing No. SK-102 was reviewed and pro/con analysis was completed. Each option was then ranked 1 to 3 for each of the selection criteria above based on the pro-con analysis. The results of the exercise determined that the Option 2 was the most preferred alignment followed by Option 3 and then Option 1. The results of the brainstorming session are shown below in Figure 1.

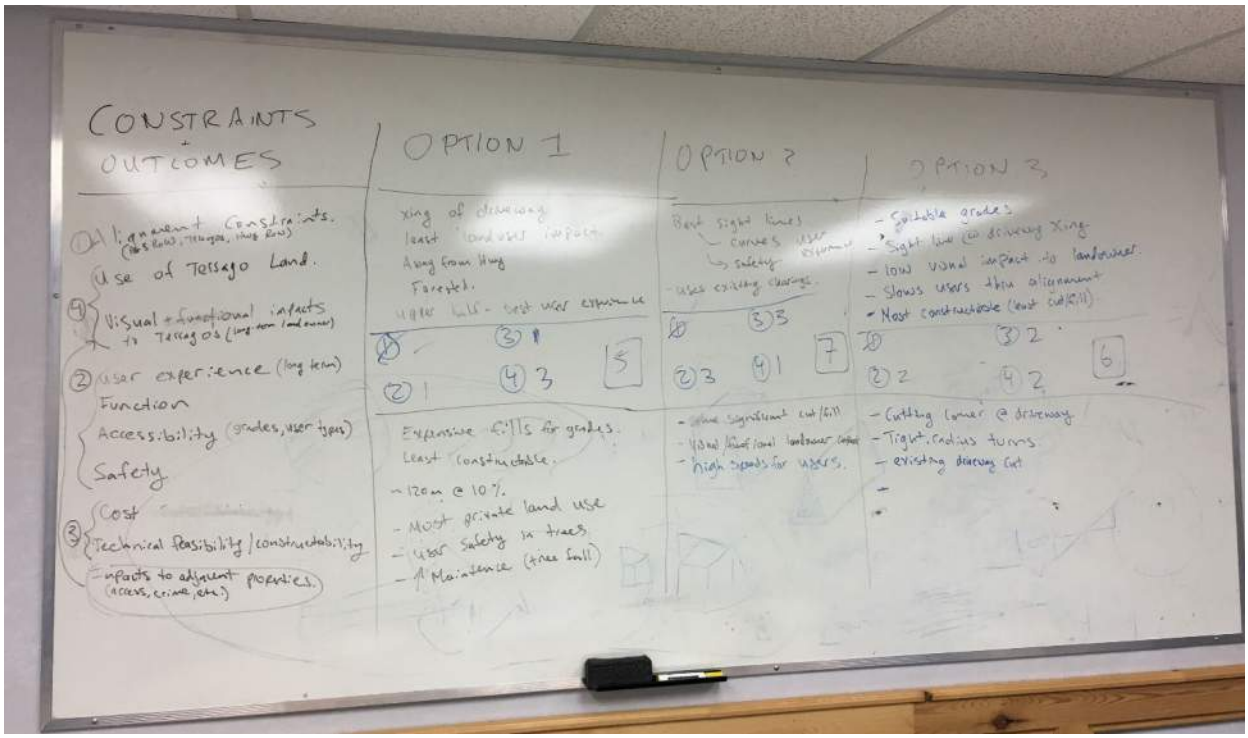



*Figure 1. Priority Segment Options Analysis Brainstorming Results*

## CATTLE CROSSING – SITE MEETING

Jeremy, Tyler, Tony, and Dan met with Jim Hinchliffe who is the owner of the property associated with the culvert cattle crossing under highway 16 at approximately station 1+700. The group reviewed the area and discussed the function of the cattle crossing with Mr. Hinchliffe. He explained his main constraints and concerns with the pathway crossing as follows:

- Snow-clearing access for a tractor to the edge of the culvert is required to clear snow during spring/fall/winter months as the highway snow plowing deposits at the toe of the highway embankment and blocks cattle access through the crossing.
- Cattle must have unimpeded access throughout most of the year to the crossing for water access.
- Fencing must be in place to prevent outside access to the property and to stop cattle access off the property.

Tyler explained to the group the technical options available for crossing the area: culvert extension, free-standing crossing (culvert or bridge), or a level-crossing using a combination of gates and cattle guards. Mr. Hinchliffe explained that the only acceptable option to him based on the above constraints would be an extension of the culvert that allows unimpeded snow-clearing access and reinstates the fencing to existing conditions or better. He advised that a level crossing would not be accepted.

In addition to the above, the group reviewed the area and noted the following items:

- There is significant water flow across the highway in the existing culverts located to the east of the cattle crossing and this must be considered in the design of any crossing structures.
- Mr. Hinchliffe was concerned about increased unauthorized access to his property if the pathway parallels his fence for a significant length. Particularly, he was concerned about pathway users' dogs crossing the fence and harassing cattle.

- There is a large winter tire highway sign located just to the west of Mr. Hinchliffe's driveway that is not on the current survey data. The sign blocks sightlines for vehicles looking to the west while existing the driveway and could block view of pathway users if approaching from the west and turning into the driveway.

## PRIORITY SEGMENT FIELD REVIEW

The group reviewed the priority segment in the field for approximately 1.5 hours. Based on the field review and considering the options analysis conducted in the morning, it was determined that Option 3 (shown in detail on SK-103) was considered the preferred option that should be carried forward for design with some minor adjustments. It was noted that Option 2 did not appear feasible where it crosses to the powerline area on the uphill side due to a short/steep slope approximately 8 m high that is not shown well on the LiDAR data.

Another alignment option was reviewed in the field now yet shown on any drawings. This option crosses the Tersago's driveway near the existing entrance gate and descends parallel to the Par 3 driveway. This option would require significantly more difficult construction and imported fill, however, may be more favourable to the land owners. Cycle 16 requested McElhanney review this option conceptually and give approximate cost estimates for this option as a backup plan for the future. This drawing will not be included in the main project deliverables, but will be completed as a sketch drawing for Cycle 16's future use with negotiations for information only.

McElhanney will continue with design work using Option 3 with adjustments to the curves and driveway crossing location as decided during the field review.

## DELIVERABLES

Jeremy and Tyler discussed the project deliverables following the site review. The following were discussed for inclusion in the final drawings/report for the project:

- Main plan sheet (SK-102) to include the following:
    - Slope arrow and curve radii
    - Proposed property boundary for purchase (include size), include fencing along it
    - Propose relocated gate to new property line
    - Contours
- Drawings in the Tersago drawing package should include:
    - Overview plan with scale to show the river and back through Par 3 to the bridge if possible.
    - Detailed plan sheet at current scale of existing SK-103
    - Profile
- Develop "Option 4" alignment (Tersago's area):
    - This alignment will go cross near the gate, drop down alongside the par 3 driveway and traverse the steep slope. Include preliminary estimate of cut/fill. Include new property area difference.
- Overall Concept Design drawing package:
    - Plan/profiles for entire alignment

    - Details for bridge downramp, tersago area, cattle crossing, 2 x intersections, driveway crossing (typical).

- Stakeholder Drawing Packages:

    - Make sure overall drawing package will meet needs of each stakeholder to show infrastructure. If not, prepare specific drawing for stakeholders for an area.

    - Where design does not meet utility or stakeholder criteria (eg. BC Hydro), include explanation is design report and note on drawing for justification or mitigation methods.

## OTHER ITEMS

Jeremy to follow up with Cycle 16 regarding meeting with Justin Ellis for advise regarding landowner consultations.

Work Plan Adjustments:

- MoTI meeting proposed to be moved to 2019, otherwise cancel stakeholder engagements section.

- See markup attached for proposed changes to the work plan based on time constraints for project completion.

Possible additional tasks with leftover budget:

- Vertisee site with final alignment for future use during consultations

- Setup Civil 3D model for full 12 km alignment

- 3D rendering of some key areas: typical pathway alignment along highway, driveway, intersection

Tyler to send cost estimates and links to examples of each of these items for consideration by Cycle 16. Plan would be to utilize leftover budget from cancelled tasks and/or unused funds to do these in 2018 before grant deadline of December 31st.

**ATTACHMENTS:**

Project Work Plan – Tyler & Jeremy Markup

**Full Project Scope**
**Smithers-Telkwa Pathway Phase 1**
**Full Project Scope**
Updated: July 9, 2018

McElhanney

| | | Eng II | Eng IV | Eng Tech III | Eng III | Eng III | Planner | Sur Tech VI | Sur Tech II | GIS | Admin IV | **Labour Line Cost** | **Task Sub-Total Labour Only** | Total Station | GPS RTK | Vehicle | Travel | **Expense Line Cost** | **Task Sub-Total Expense Only** | Misc Office & Comm | **Task Sub Total** | **Total** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | THW | Chris H/Shiloh | Jason H. | Darin L. | PG Geotech | JE | | | | | | | | | | | | | | | |
| | 2018 Rates: | $ 133.00 | $ 179.00 | Reg $ 128.00 | $ 150.00 | $ 158.00 | $ 150.00 | $ 143.00 | Reg $ 107.00 | Reg $ 97.00 | Reg $ 97.00 | | | /day $ 120.00 | /day $ 600.00 | /day $ 184.00 | lump sum | | | 6% labour | | |
| 1 | **Project Setup & Management** | | | | | | | | | | | | | | | | | | | | | |
| 1.1 | Project Setup & Financial Management | 8 | | | | | | | | | 5 | $ 1,549 | | | | | | $ - | | | | |
| 1.2 | Work Plan Revisions | 8 | | | | | | | | | | $ 1,064 | | | | | | | | | | |
| 1.3 | QMS/Safety | 2 | | | | | | | | | | $ 266 | | | | | | $ - | | | | |
| 1.4 | Bi-Weekly client updates | 16 | | | | | | | | | | $ 2,128 | | | | | | $ - | | | | |
| 1.5 | Project Kickoff Meeting | 8 | 2 | | 2 | | 2 | | | | | $ 2,022 | | | | 1 | | $ 184.00 | | | | |
| | | | | | | | | | | | | | $ 7,029 | | | | | | $ 184 | $ 422 | **$ 7,635** | |
| 2 | **Priority Segment Concept Refinement** | | | | | | | | | | | | | | | | | | | | | |
| 2.1 | Survey - Par 3 intersection, Smithers bridge area | 1 | | 1 | | | | 8 | 8 | | | $ 2,261 | | | 1 | 1 | | $ 784.00 | | | | |
| 2.2 | LiDAR & Orthophoto | 1 | | | | | | | | 9 | | $ 1,006 | | | | | | $ - | | | | |
| 2.3 | Concept Design Drawings (2x plan/profile w/ 2 alignment options and 2 | 6 | 4 | 40 | | | | | | | | $ 7,234 | | | | | | $ - | | | | |
| 2.4 | Cost Estimates | 2 | 1 | 4 | | | | | | | | $ 957 | | | | | | | | | | |
| 2.5 | Design Brief | 6 | | | 1 | | 2 | | | | | $ 1,248 | | | | | | | | | | |
| 2.6 | ~~RDBN/MoTI Workshop (OPTIONAL) - See optional spreadsheet~~ | | | | | | | | | | | - | | | | | | - | | | | |
| 2.7 | Concept Alignment Design Report - Priority Segment | 16 | | | 2 | | 6 | | | 4 | | $ 3,716 | | | | | | $ - | | | | |
| 2.8 | Site Visit with 2 x private land owners | 8 | | | | | | | | | | $ 1,064 | | | | 1 | | $ 184.00 | | | | |
| 2.9 | ~~Misc. Engagement/Consultation Support (Justin Ellis hourly time)~~ | | | | | | 8 | | | | | $ 1,200 | | | | | | | | | | |
| 2.10 | 1 set of revisions | 3 | 1 | 8 | 1 | | | | | | | $ 1,752 | | | | | | $ - | | | | |
| | | | | | | | | | | | | | $ 20,438 | | | | | | $ 968 | $ 1,226 | **$ 22,632** | |
| 3 | **~~Geotechnical Assessment (OPTIONAL)~~** | | | | | | | | | | | | | | | | | | | | | |
| | ~~See optional scope spreadsheet~~ | | | | | | | | | | | | | | | | | | | | | |
| 4 | **Secondary Segment Concept Refinement** | | | | | | | | | | | | | | | | | | | | | |
| 4.1 | Survey - cattle xing, 3+000 xing, Laidlaw road xing | 1 | | 2 | | | | 12 | 12 | | | $ 3,389 | | | 1.5 | 1.5 | | $ 1,176.00 | | | | |
| 4.2 | Concept Design Drawings (3 plan/profile, 3 details) | 8 | 6 | 65 | 6 | | | | | | | $ 11,358 | | | | | | $ - | | | | |
| 4.3 | Cost Estimates | 2 | 1 | 4 | | | | | | | | $ 957 | | | | | | $ - | | | | |
| 4.4 | ~~Misc. Engagement/Consultation Support (Justin Ellis hourly time)~~ | | | | | | 8 | | | | | $ 1,200 | | | | | | $ - | | | | |
| 4.5 | 1 set of revisions | 5 | 2 | 12 | 1 | | | | | | | $ 2,709 | | | | | | $ - | | | | |
| | | | | | | | | | | | | | $ 19,613 | | | | | | $ 1,176 | $ 1,177 | **$ 21,966** | |
| 5 | **~~Stakeholder Consultation~~** | | | | | | | | | | | | | | | | | | | | | |
| 5.1 | ~~Utilities - FNG, BCH~~ | 12 | 1 | | 1 | | | | | | | $ 1,925 | | | | 1 | | $ 184.00 | | | | |
| 5.2 | MoTI | | | | | | | | | | | $ 1,925 | | | | 1 | | $ 184.00 | | | | |
| 5.3 | ~~Local governments (Telkwa, RDBN, Smithe~~ | | | | | | | | | | | $ 1,925 | | | | 1 | | $ 184.00 | | | | |
| | | | | | | | | | | | | | $ 5,775 | | | | | | $ 552 | $ 347 | **$ 6,674** | |
| 6 | **Summary Report** | | | | | | | | | | | | | | | | | | | | | |
| 6.1 | Prepare Final Concept Design Report | 16 | 3 | | 1 | | | | | | | $ 2,815 | | | | | | | | | | |
| | | | | | | | | | | | | | $ 2,815 | | | | | | $ - | $ 169 | **$ 2,984** | |
| | | **153** | **23** | **136** | **21** | **0** | **26** | **20** | **20** | **13** | **5** | | | **0** | **2.5** | **7.5** | | | | $ 3,340 | | **$ 61,890** |

| | | | | | |
|---|---|---|---|---|---|
| Labour Estimate | **$ 55,670** | Expense Estimate | **$ 2,880** | Misc Office & Comm | $ 3,340 |
| | | | | Total Estimate | **$ 61,890** |

ground truthing

combine to final report

ground truthing

Possibly pre-invoice for a meeting with MoTI.

Notes:
1. This is a budget, not a lump sum fee. Actual fees will be charged on a time and materials basis and may be more or less than this budget
2. Total estimate is before applicable taxes

BC Hydro
Power smart

**Properties**
Property Rights Services
Phone: 250-561-4844
Email: Kristi.Morin@bchydro.com

April 6, 2018

Assignment: 1175236

**VIA EMAIL:** jeremyshriber@gmail.com

Dear Jeremy Shriber:

| | |
|---|---|
| **Proposal:** | Preliminary Trail Application |
| **Location:** | Smithers |
| **Drawings:** | Schedule A |

Thank you for your letter of March 28, 2018. BC Hydro's initial review indicates that your proposal may be feasible from our perspective.

- BCH must have unfettered access to all of its assets – no barriers, gates, ditches, etc. without prior PA approval
- Pathways must be able to allow bucket truck access if developed on areas where access currently exists
- Minimum construction setbacks will need to be defined in the PA i.e.: 10 m from guy wires, poles, etc.
- BCH will not be responsible for damages to trails or trail infrastructure as a result of our maintenance activities
- Any drainage structures (culverts, bridges, etc.) installed will need to be reviewed by BCH to ensure they are adequate for BCH use
- If any works are planned on BCH SRW, a more thorough PA review will be required
- To prevent damage to the proposed path it should be engineered to handle the weight of a bucket and line truck

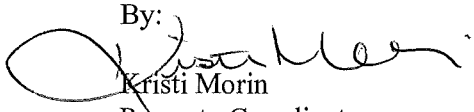
However, BC Hydro cannot offer further comment or confirm that it has no objection to your proposal until we receive and review the following:

1. final detailed plans showing your proposal in relation to BC Hydro's structures, including vertical and horizontal distances from those structures

Please submit the above noted items to this office for review. Should BC Hydro find no objection to your proposal after receipt of all required information, we will issue you a letter confirming this and containing terms and conditions applicable to your proposal. Do not commence any work within BC Hydro's right of way area until you have received, signed and returned BC Hydro's letter in this regard.

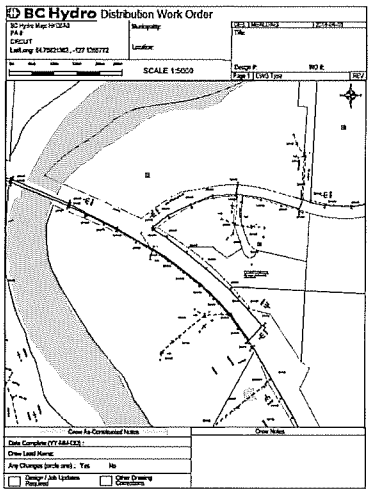
Please contact Kristi Morin by telephone at 250-561-4844 or email at Kristi.Morin@bchydro.com, if you have any questions.

Yours truly,
British Columbia Hydro and Power Authority
By:



Kristi Morin
Property Coordinator
Property Rights Services

Schedule A


BC Hydro Distribution Work Order
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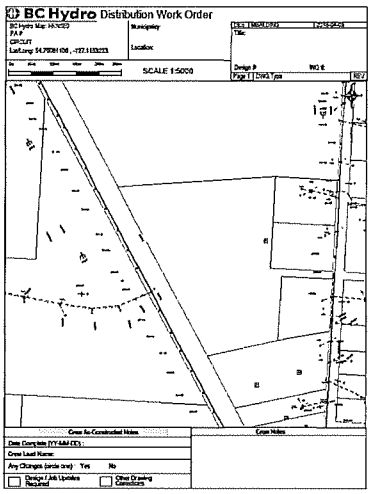
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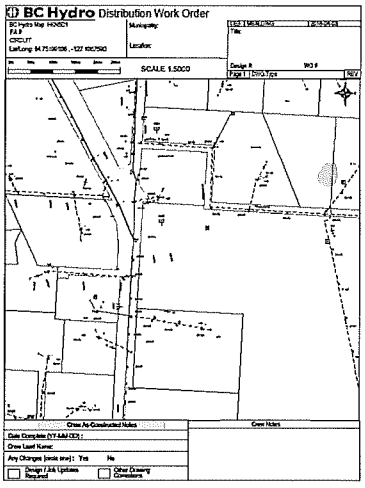
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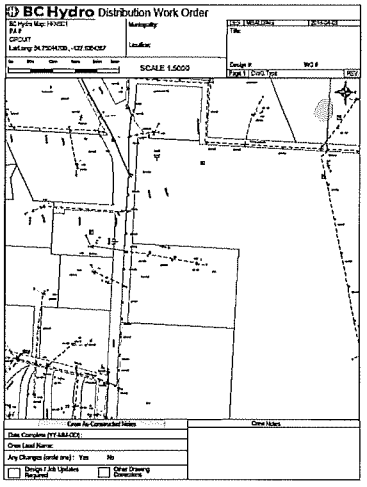
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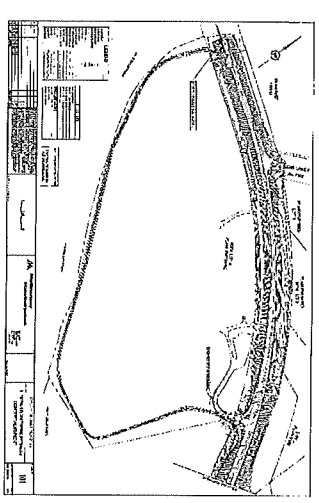

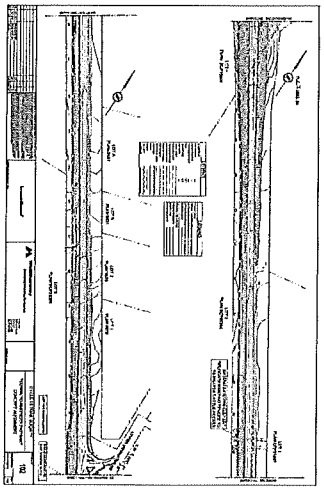

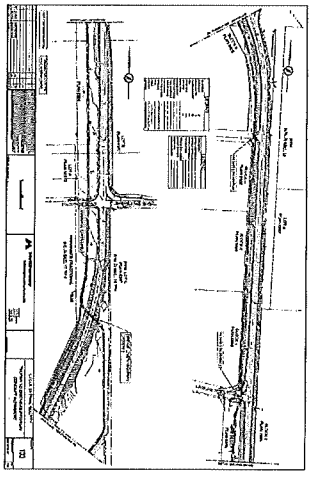

# MEMORANDUM

To: Board of Directors
From: Jason Llewellyn, Director of Planning
Date: April 24th, 2018
Re: Highway 16 Trail Society

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## INTRODUCTION

The Highway 16 Trail Society has approached staff with a request relating to the RDBN's involvement in the construction and operation of a portion of the Highway 16 Trail between Smithers and Telkwa. This report seeks the Board's direction regarding the RDBN's future involvement with the project.

As the issue was raised with staff on April 23rd a number of associated details were not available at the time of the writing of this report. Additional information is expected on the supplemental agenda.

## BACKGROUND:

The Highway 16 Trail Society is a community group working on establishing a commuter trail between Smithers and Telkwa. The trail is proposed to be adjacent to the Highway within the Highway right of way. A Concept Design Report prepared for the Society is attached for the Board's information.

The proposed commuter trail involves the following.

- The majority of the trail is proposed to be within the Highway right of way.
- The trail is proposed to be approximately 3 metres wide and be either paved or have a gravel surface.
- The preferred route would involve an elevated bridge crossing of the highway or an underpass.
- A minimum of 10 crossings over private property (the registration of right of ways, or the subdivision and purchase of those lands would be required).
- Preliminary construction costs (not including land acquisition costs) are between $4,094,752 and $5,331,443.

As noted, the proposed trail is within the Highway right of way, which is under the jurisdiction of the Ministry of Transportation and Infrastructure (MoTI). The MoTI has clearly indicated that they will only allow the development of the trail within their right of

way if the RDBN enters into an agreement with the MoTI to their satisfaction. This agreement would involve the following.

- The RDBN being responsible for the trail including all maintenance, liability, and management.
- The RDBN being responsible for capital replacement costs.
- The RDBN being responsible for the removal of trail infrastructure should the RDBN wish to no longer operate the trail.

The following is a very preliminary estimate of the minimum annual costs associated with the RDBN's operation of the entire trail. These costs are extremely preliminary and are based on the following assumptions.

- The RDBN would enter into an agreement with a 3rd party who would provide maintenance for the RDBN under contract.
- No furniture such as garbage cans, benches, bike racks, etc. will be provided.
- The trail is for summer use only and is closed during winter.
- The below costs do not consider the highway crossing required in options 1 or 2.
- Option 3 would require higher maintenance costs.

**Estimated Operating Costs**

| | |
|---|---|
| Staff time | $5,000 - $10,000 |
| Shoulder and trail maintenance and repair for a gravel trail. | $15,000 ($7,000 if paved) |
| Sign maintenance (10% replacement per year) | $5,000 |
| Road crossing line painting | $5,000 |
| Insurance (easements on private land) | $5,000 |
| Legal fee reserve | $5,000 |

**Estimated Repair and Replacement Costs**

| | |
|---|---|
| Re-paving and major repair capital reserve (25 year replacement) | $50,000 |
| Major repair capital reserve for gravel trail | $15,000 |

**Annual Paved Trail = $82,000 plus 10% contingency = $90,200**
**Annual Gravel Trail = $55,000 plus 10% contingency = 60,500**

These figures do not include the costs associated with planning and developing the trail. These costs include:

| | | |
|---|---|---|
| Detailed design | = | ? |
| Construction cost | = | $4,094,752 and $5,331,443 |

| | | |
|---|---|---|
| Private land acquisition | = | ?? |
| Legal / surveying fees | = | ? |

**Board Consideration of RDBN Involvement in June 2017**

The Highway 16 Trail Society has expended much effort and resources based on the hope that the RDBN will agree to take responsibility for the trail to the satisfaction of the MoTI. It appears that the project will not be able to occur unless it becomes an RDBN project. In July of 2017 staff provided the above information to the Board and asked the Board if:

1. staff should continue working on the Highway 16 Trail project on the understanding that the project is contingent on the RDBN taking full responsibility for the Highway 16 Trail; and
2. staff should develop a Highway 16 Trail implementation strategy, for the Board's consideration, should the Board wish to consider developing the Highway 16 trail.

The July 2017 report also provided options regarding the development of a parks and recreation function for Electoral Area A.

The Regional District Board passed the following motion at the July 20th, 2017 Board meeting that "

> "...the Cycle 16 Society develop a Trail Implementation Strategy in regard to the Cycle 16 Trail Project for the RDBN Board of Directors consideration at a future date; and further that staff continue to be a resource for information in regard to the Cycle 16 Trail Project."

**THE CURRENT SITUATION**

The Highway 16 Trail Society have not provided a Trail Implementation Strategy for the Board's consideration. However, on April 23rd, 2018 the Society informed staff that they have received grant funding to develop a detailed trail design for an area on road right of way between the Town of Smithers and Laidlaw Road. This detailed design and costing is planned to be used in making application to Cycle BC for funding to construct the trail from the Town of Smithers to Laidlaw Road.

The Society is asking the RDBN to comment on the RFP document. The Society is also asking the RDBN to make the future application to Cycle BC for construction funding with the acknowledgement that the RDBN will take responsibility for construction and long term trail maintenance.

Staff are raising the following issues for the Board's consideration.

1. The Highway 16 Trail Society is expending great effort and financial resources with no indication that the RDBN will agree to construct and maintain the trail.

2. The project is being moved forward without an implementation strategy that includes RDBN input and approval. The immediate concern relates to the proposed RFP are trail development standards. If the RDBN is to be responsible for long term maintenance the RDBN has an interest in ensuring that the trail is designed and built to an appropriate standard.
3. A Service Establishment Bylaw establishing the necessary taxation area and taxation limits for the project should be created; otherwise the RDBN's staff, and other, costs associated with the project will continue to be paid for by tax payers outside of Electoral Area A.

**STAFF RECOMMENDATIONS**

It is recommended that the Board determine whether staff should take a lead role in working with the Highway 16 Trail Society to ensure the development of a trail implementation strategy and associated budget, based on the understanding that the project is contingent on the RDBN taking full responsibility for the Highway 16 Trail.

Should the Board wish to be involved with moving the Highway 16 trail project forward it is recommended that the RDBN Board direct staff to initiate the process to create a Service Establishment Bylaw creating the necessary taxation area and taxation limits.

Also, should the Board wish to be involved with moving the Highway 16 trail project forward it is recommended that the RDBN Board Direct staff to review the proposed RFP for trail design to ensure that appropriate consideration is given to safety, maintenance, and other potential issues of concern to the RDBN.

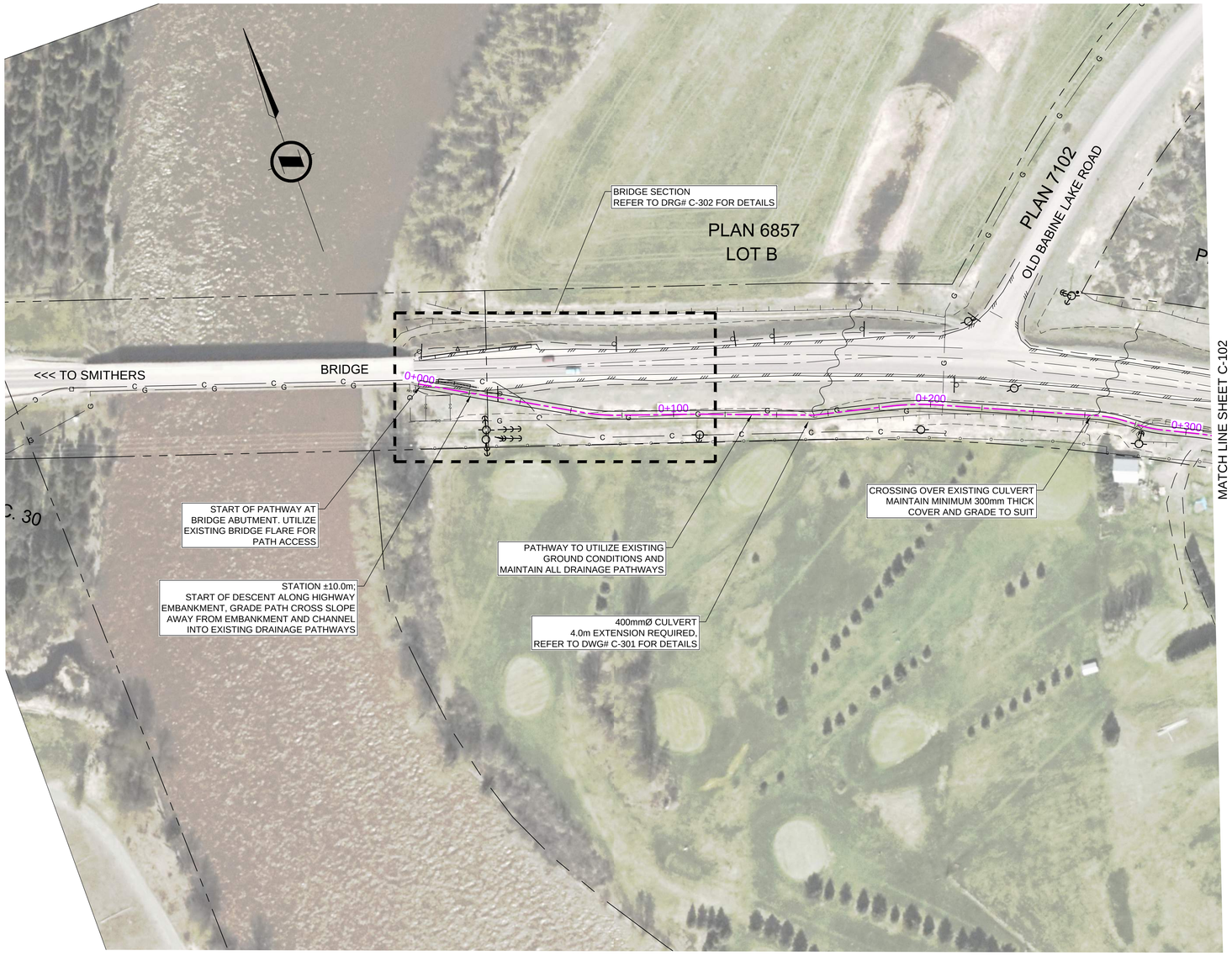
**Recommendations:**

That the RDBN Board of Directors provide direction regarding the following tasks.

1. Taking a lead role in working with the Highway 16 Trail Society on developing a trail implementation strategy and budget, based on the understanding that the project is contingent on the RDBN taking full responsibility for the Highway 16 Trail.
2. Initiating the process to create a Service Establishment Bylaw creating the necessary taxation area and taxation limits.
3. And reviewing the RFP for trail design to ensure that appropriate consideration is given to safety and maintenance issues.

Written by:

Jason Llewellyn
Director of Planning




## LEGEND

EXISTING

- SURVEY HUB
- FOUND IRON PIN
- FOUND MONUMENT
- SIGN
- HYDRO POLE
- GUY WIRE
- LEGAL LINES
- EASEMENT LINE
- ROAD CENTERLINE
- EDGE OF ASPHALT
- EDGE OF GRAVEL
- TOP OF BANK
- BOTTOM OF BANK
- TREE LINE
- FENCE
- SWALE
- CULVERT
- BARRIERS

| Rev | Date | Description | Drawn | Design | App'd |
|---|---|---|---|---|---|
| PA | 2019-03-15 | ISSED FOR REPORT | RJH | TW | CJH |



0 1:1,000 50

ORIGINAL DWG SIZE: A1 (594 x 841mm)

McElhanney
McElhanney Consulting Services Ltd.
Suite 1
5008 Pohle Avenue
Terrace BC
Canada V8G 4S8
Tel 250 635 7163

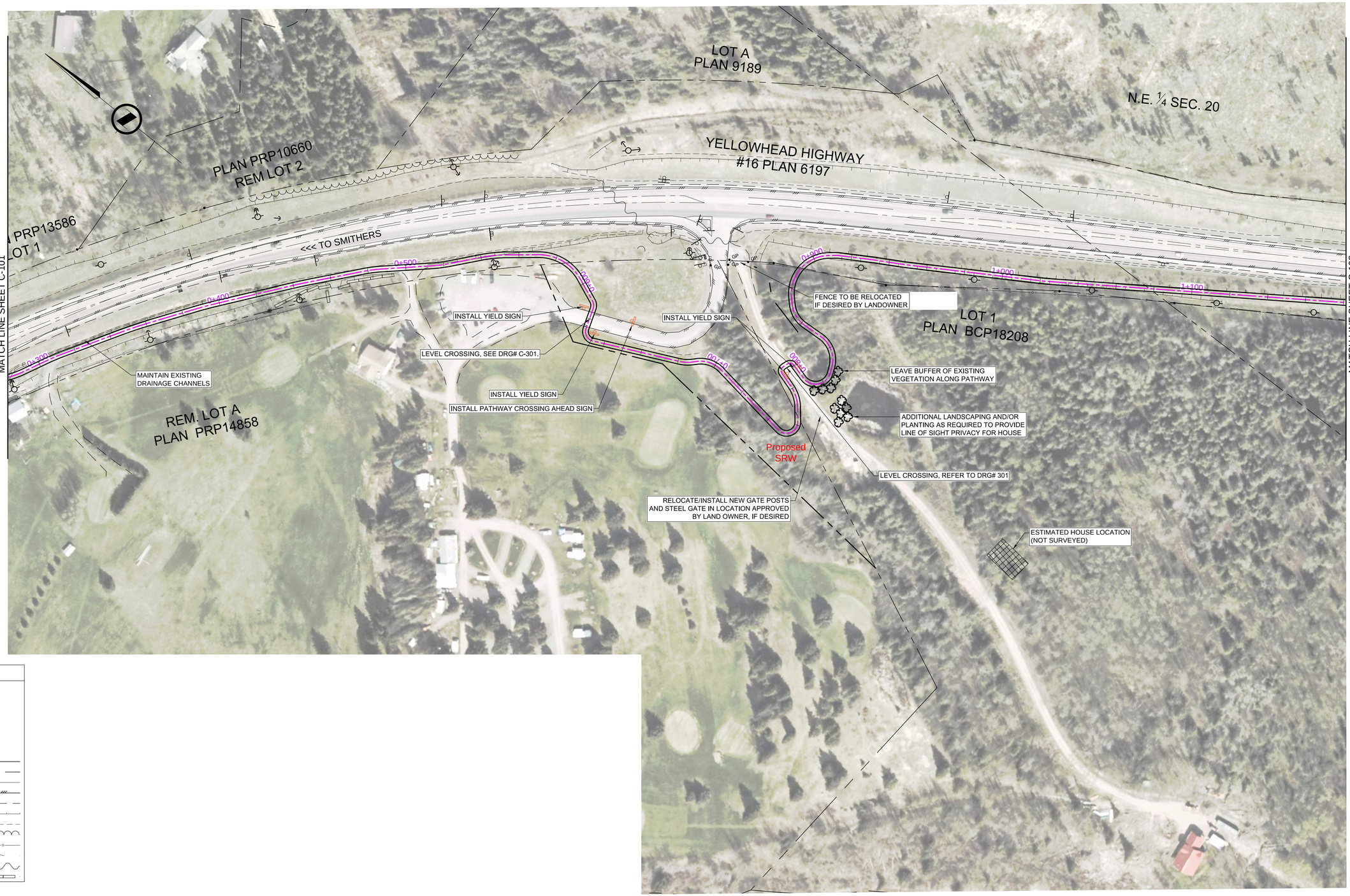
Approved Sealed

VILLAGE OF TELKWA AND CYCLE 16

TELKWA-SMITHERS PATHWAY
PHASE 1 PRELIMINARY DESIGN
PLAN SHEET 1

Drawing No.
C-101

| Project Number | Rev. |
|---|---|
| 2321-01795-00 | PA |




## LEGEND

EXISTING

- SURVEY HUB
- FOUND IRON PIN
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- HYDRO POLE
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- LEGAL LINES
- EASEMENT LINE
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| Rev | Date | Description | Drawn | Design | App'd |
|---|---|---|---|---|---|
| PA | 2019-03-15 | ISSED FOR REPORT | RJH | TW | CJH |



0 1:1,000 50

ORIGINAL DWG SIZE: ANSI D (22" x 34")

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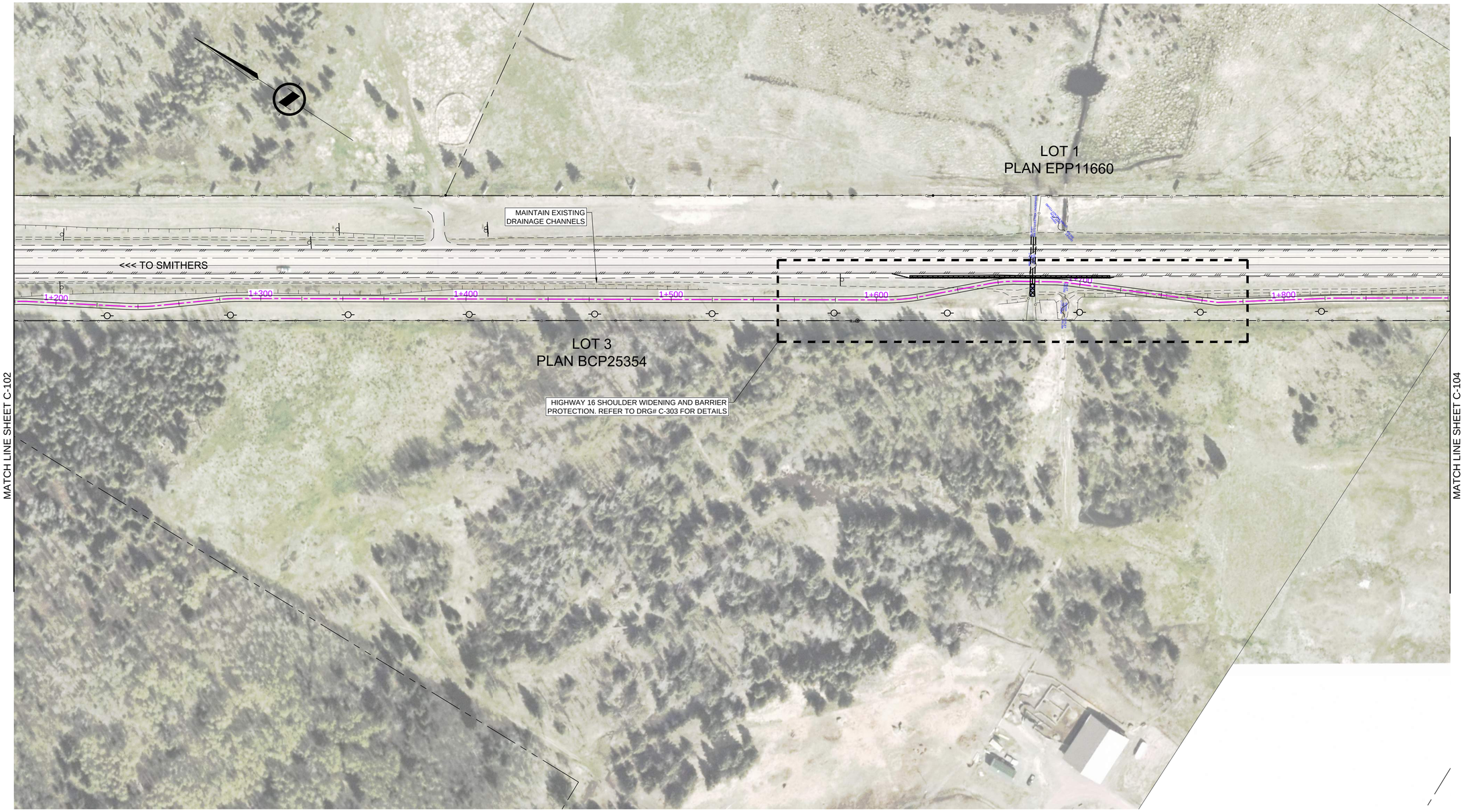
VILLAGE OF TELKWA AND CYCLE 16

TELKWA-SMITHERS PATHWAY
PHASE 1 PRELIMINARY DESIGN
PLAN SHEET 2

Drawing No.
C-102

| Project Number | Rev. |
|---|---|
| 2321-01795-00 | PA |

DESTROY ALL PRINTS BEARING PREVIOUS REVISION




## LEGEND

EXISTING

- SURVEY HUB
- FOUND IRON PIN
- FOUND MONUMENT
- SIGN
- HYDRO POLE
- GUY WIRE
- LEGAL LINES
- EASEMENT LINE
- ROAD CENTERLINE
- EDGE OF ASPHALT
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- TREE LINE
- FENCE
- SWALE
- CULVERT
- BARRIERS

| Rev | Date | Description | Drawn | Design | App'd |
|---|---|---|---|---|---|
| PA | 2019-03-15 | ISSED FOR REPORT | RJH | TW | CJH |



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ORIGINAL DWG SIZE: A1 (594 x 841mm)

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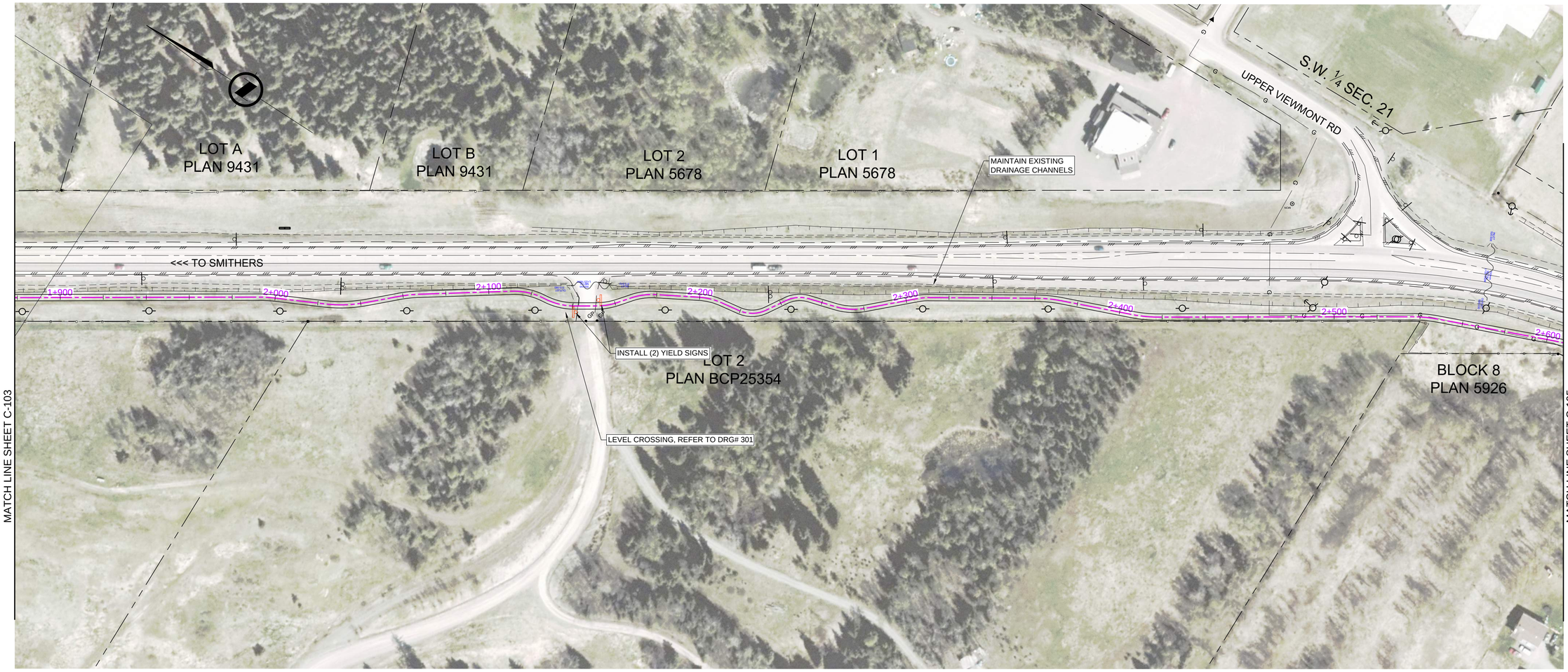
VILLAGE OF TELKWA AND CYCLE 16

TELKWA-SMITHERS PATHWAY
PHASE 1 PRELIMINARY DESIGN
PLAN SHEET 3

Drawing No.
C-103

| Project Number | Rev. |
|---|---|
| 2321-01795-00 | PA |




## LEGEND

EXISTING

- SURVEY HUB
- FOUND IRON PIN
- FOUND MONUMENT
- SIGN
- HYDRO POLE
- GUY WIRE
- LEGAL LINES
- EASEMENT LINE
- ROAD CENTERLINE
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- FENCE
- SWALE
- CULVERT
- BARRIERS

| Rev | Date | Description | Drawn | Design | App'd |
|---|---|---|---|---|---|
| PA | 2019-03-15 | ISSED FOR REPORT | RJH | TW | CJH |



0 1:1,000 50

ORIGINAL DWG SIZE: A1 (594 x 841mm)

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VILLAGE OF TELKWA AND CYCLE 16

TELKWA-SMITHERS PATHWAY
PHASE 1 PRELIMINARY DESIGN
PLAN SHEET 4

Drawing No. C-104

| Project Number | Rev. |
|---|---|
| 2321-01795-00 | PA |


## LEGEND

EXISTING

- SURVEY HUB
- FOUND IRON PIN
- FOUND MONUMENT
- SIGN
- HYDRO POLE
- GUY WIRE
- LEGAL LINES
- EASEMENT LINE
- ROAD CENTERLINE
- EDGE OF ASPHALT
- EDGE OF GRAVEL
- TOP OF BANK
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- FENCE
- SWALE
- CULVERT
- BARRIERS

| Rev | Date | Description | Drawn | Design | App'd |
|---|---|---|---|---|---|
| PA | 2019-03-15 | ISSED FOR REPORT | RJH | TW | CJH |



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ORIGINAL DWG SIZE: A1 (594 x 841mm)

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VILLAGE OF TELKWA AND CYCLE 16

TELKWA-SMITHERS PATHWAY
PHASE 1 PRELIMINARY DESIGN
PLAN SHEET 5

Drawing No. C-105

Project Number 2321-01795-00

Rev. PA


## LEGEND

EXISTING

- SURVEY HUB
- FOUND IRON PIN
- FOUND MONUMENT
- SIGN
- HYDRO POLE
- GUY WIRE
- LEGAL LINES
- EASEMENT LINE
- ROAD CENTERLINE
- EDGE OF ASPHALT
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- CULVERT
- BARRIERS

| Rev | Date | Description | Drawn | Design | App'd |
|---|---|---|---|---|---|
| PA | 2019-03-15 | ISSED FOR REPORT | RJH | TW | CJH |



0 1:1,000 50

ORIGINAL DWG SIZE: A1 (594 x 841mm)

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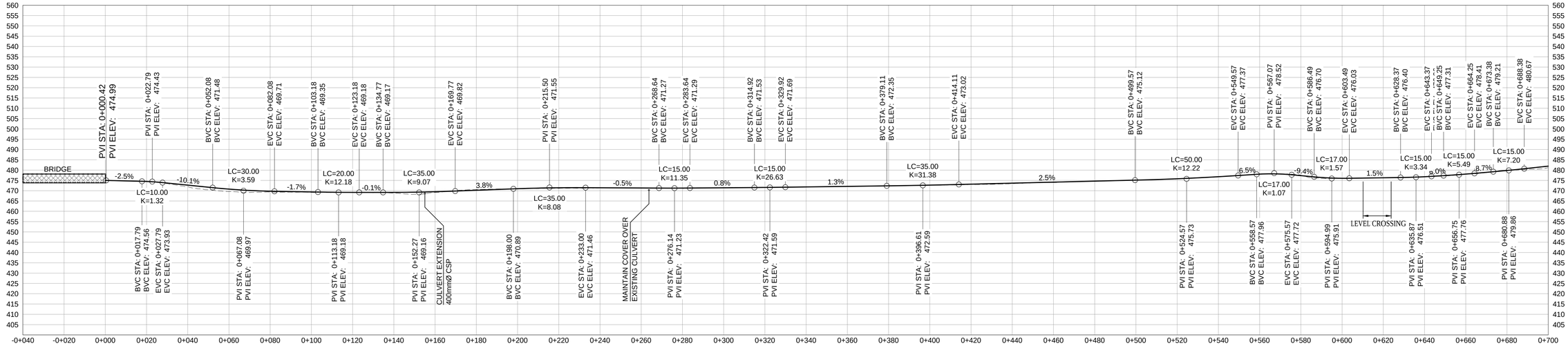
# VILLAGE OF TELKWA AND CYCLE 16

## TELKWA-SMITHERS PATHWAY
## PHASE 1 PRELIMINARY DESIGN
## PLAN SHEET 6

Drawing No.
C-106

| Project Number | Rev. |
|---|---|
| 2321-01795-00 | PA |

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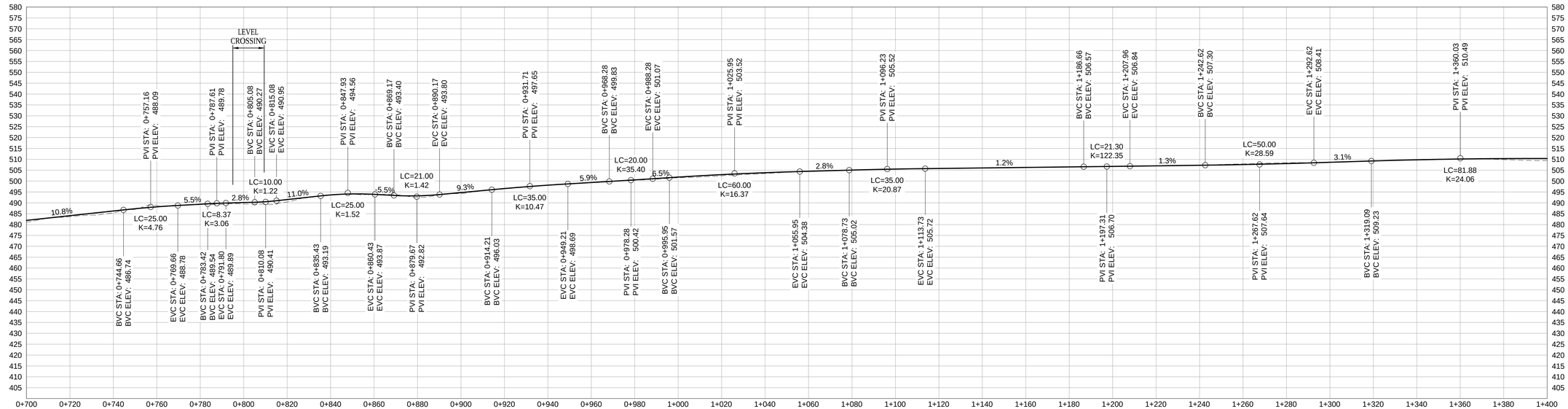
V 1:1000




## DESIGN ALIGNMENT

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V 1:1000

| Rev | Date | Description | Drawn | Design | App'd |
|---|---|---|---|---|---|
| PA | 2019-03-15 | ISSUED FOR REPORT | RJH | TW | CJH |



0 1:500 25

ORIGINAL DWG SIZE: ANSI D (22" x 34")

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VILLAGE OF TELKWA AND CYCLE 16

TELKWA-SMITHERS PATHWAY
PHASE 1 PRELIMINARY DESIGN
PROFILE SHEET 1

Drawing No. C-201

| Project Number | Rev. |
|---|---|
| 2321-01795-00 | PA |

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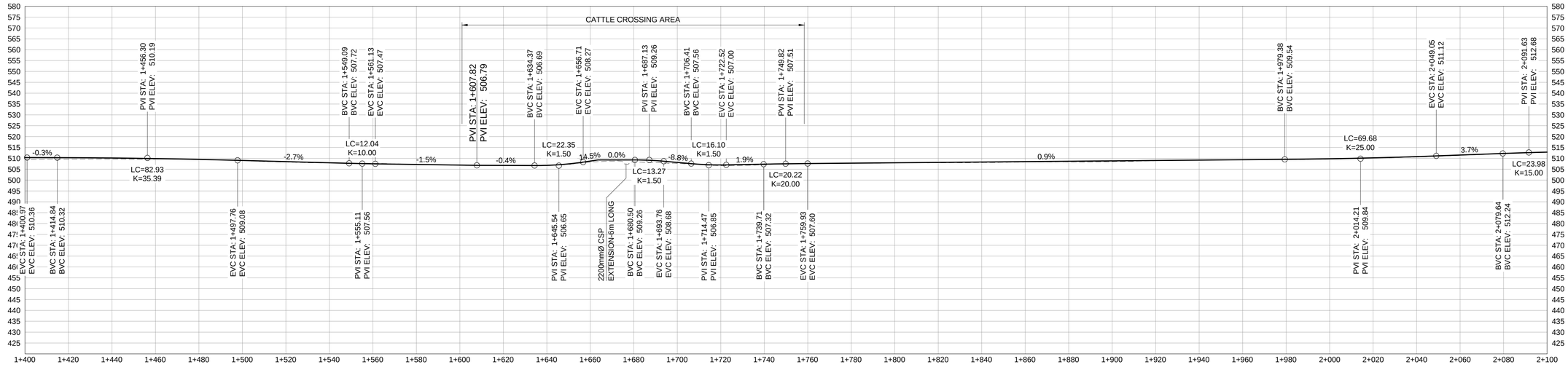


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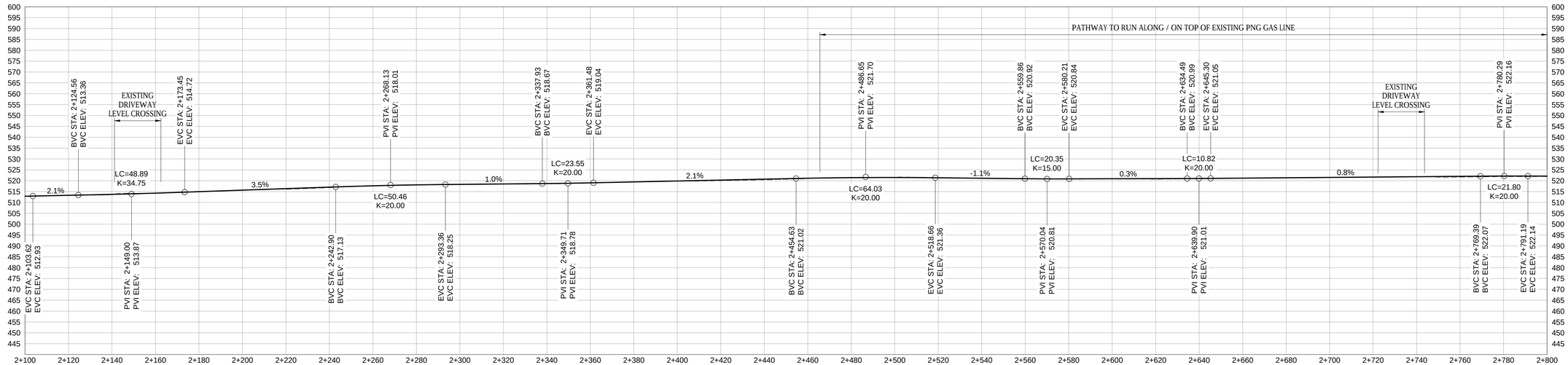


DESIGN ALIGNMENT

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| Rev | Date | Description | Drawn | Design | App'd |
|---|---|---|---|---|---|
| PA | 2019-03-15 | ISSUED FOR REPORT | RJH | TW | CJH |



0 1:500 25

ORIGINAL DWG SIZE: ANSI D (22" x 34")

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Canada V8G 4S8
Tel 250 635 7163

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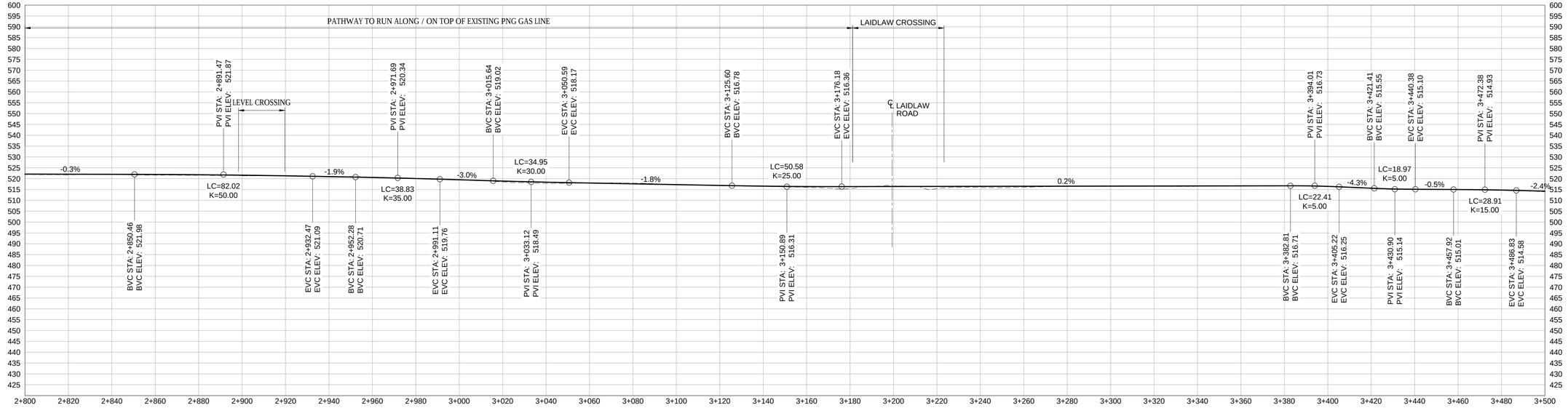
# VILLAGE OF TELKWA AND CYCLE 16

## TELKWA-SMITHERS PATHWAY
## PHASE 1 PRELIMINARY DESIGN
## PROFILE SHEET 2

Drawing No.
C-202

Project Number
2321-01795-00

Rev.
PA




## DESIGN ALIGNMENT

H 1:1000
V 1:1000


## DESIGN ALIGNMENT

H 1:1000
V 1:1000

| Rev | Date | Description | Drawn | Design | App'd |
|---|---|---|---|---|---|
| PA | 2019-03-15 | ISSUED FOR REPORT | RJH | TW | CJH |



0 1:500 25

ORIGINAL DWG SIZE: ANSI D (22" x 34")

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5008 Pohle Avenue
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Canada V8G 4S8
Tel 250 635 7163

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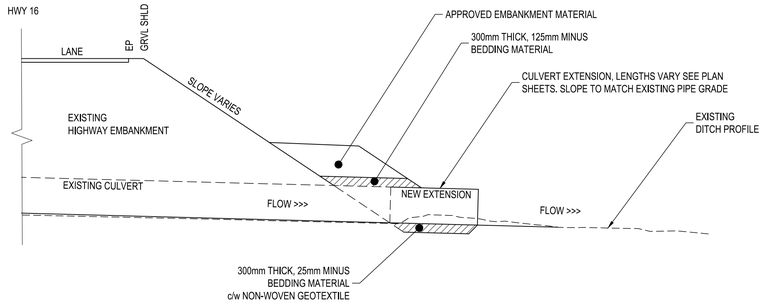
VILLAGE OF TELKWA AND CYCLE 16

TELKWA-SMITHERS PATHWAY
PHASE 1 PRELIMINARY DESIGN
PROFILE SHEET 3

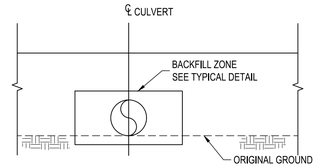
Drawing No.
C-203

| Project Number | Rev. |
|---|---|
| 2321-01795-00 | PA |

DESTROY ALL PRINTS BEARING PREVIOUS REVISION

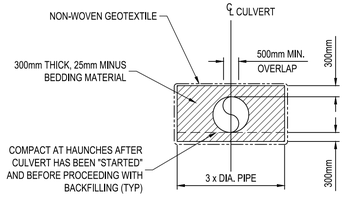



PROFILE

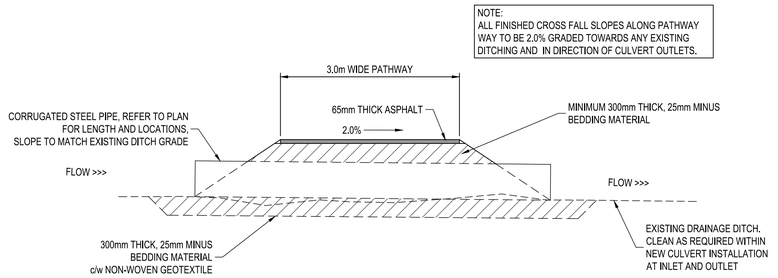



SECTION

## TYPICAL EXISTING CULVERT EXTENSION DETAIL

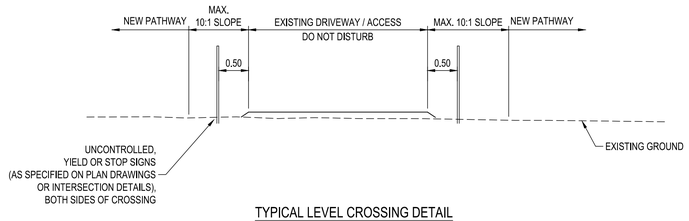



TYPICAL BACKFILL ZONE DETAIL @ C/L OF CULVERT



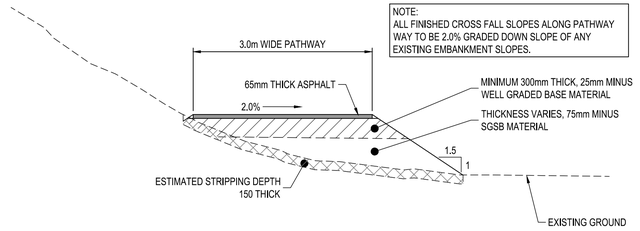

## TYPICAL NEW CULVERT DETAIL

SCALE 1:100



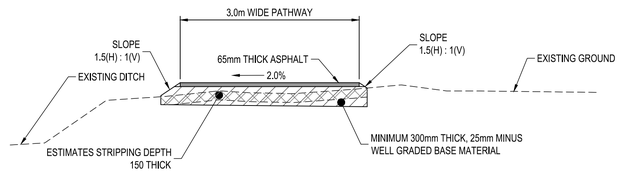

## TYPICAL LEVEL CROSSING DETAIL

SCALE 1:50




## TYPICAL PATHWAY DETAIL - FILL

SCALE 1:50




NOTE:
ALL FINISHED CROSS FALL SLOPES ALONG PATHWAY
WAY TO BE 2.0% GRADED TOWARDS ANY EXISTING
DITCHING AND IN DIRECTION OF CULVERT OUTLETS.

PATHWAY STRUCTURE TO BE CONFIRMED
BY GEOTECHNICAL ENGINEER

## TYPICAL PATHWAY DETAIL - CUT (AT GRADE)

SCALE 1:50

## GENERAL NOTES

1. CHECK AND VERIFY ALL DIMENSIONS BEFORE COMMENCING ANY WORK.
2. NOTIFY THE DESIGNER OF ANY ERRORS OR OMISSIONS.
3. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE STATED.
4. DRAWINGS SHALL NOT BE USED FOR CONSTRUCTION UNLESS MARKED "ISSUED FOR CONSTRUCTION" AND SEALED BY A PROFESSIONAL ENGINEER.
5. ALL WORK TO BE DONE IN ACCORDANCE WITH MoTI SPECIFICATIONS AND STANDARD DETAIL DRAWINGS UNLESS SHOWN OTHERWISE.
6. EXCAVATE ALL FROST SUSCEPTIBLE MATERIALS BEFORE PLACING GENERAL EMBANKMENT OR GRANULAR SUB BASE.
   BACK FILL AND COMPACT GRANULAR SUBBASE TO U/S OF GRANULAR BASE.
   BACK FILL AND COMPACT WELL GRADED BASE MINIMUM 150mm THICK.
7. LOCATIONS OF UNDER GROUND UTILITIES SHOWN ON PLAN ARE APPROXIMATE ONLY. INFORMATION MAY NOT BE COMPLETE OR ACCURATE. CONTRACTOR SHALL EXPOSE LOCATIONS OF ALL EXISTING UTILITIES AND ADVISE THE ENGINEER OF POTENTIAL CONFLICTS.
8. NOTIFY THE ENGINEER 24 HOURS IN ADVANCE FOR INSPECTION AND APPROVAL OF THE FOLLOWING
   A. PLACEMENT OF SUB-BASE MATERIALS.
   B. PLACEMENT OF BASE MATERIALS.

## UTILITIES NOTES

1. PNG GAS MAIN:
   DEPTH OF ACTUAL MAIN IS UNKNOWN AND THE HORIZONTAL LOCATION OF THE MAIN SHOWN ON PLAN DRAWINGS ARE APPROXIMATE ONLY. LINE LOCATES ARE REQUIRED WHERE THE PROPOSED PATHWAY CROSS'S, RUNS PARALLEL AND OR ON TOP OF TO ENSURE COVER IS NOT REDUCED.
2. HYDRO POLES AND ANCHORS:
   NO FIXED OBJECTS AND OR STRUCTURES/SIGNS WITH REGARDS TO THE PATHWAY SHALL BE LOCATED WITHIN 3.0m OF ANY EXISTING HYDRO POLES OR ANCHORS.

## ENVIRONMENTAL

1. SEDIMENT MUST BE PREVENTED FROM ENTERING THE NEARBY WATERCOURSES.
2. ALL WORK SHALL BE DONE IN A MANNER THAT WILL NOT RESULT IN DEPOSITION OF LOGGING DEBRIS, SOIL, OR OTHER MATERIAL DELETERIOUS TO FISH, IN ANY WATERCOURSE.
3. ENSURE ANY RIPRAP TO BE USED IS CLEAN AND WASHED OFF SITE, IS OF SUITABLE QUALITY, PLACED INTO THE BANK SUCH THAT IT DOES NOT CONSTRICT THE CHANNEL BY EXTENDING INSIDE THE EXISTING BANK CONFIGURATION.
4. DISTURBANCE TO THE SLOPES MUST BE MINIMIZED. SLOPE STABILITY AND EROSION PREVENTION IS CRITICAL. RECONSTRUCT AND REVEGETATE DISTURBED SLOPES TO THEIR ORIGINAL CONDITION AS SOON AS ACTIVITY IS COMPLETED.

## BACKFILL AND COMPACTION

1. THE ZONE OF COMPACTION SHALL BE AS SHOWN ON THE DRAWING AND COMPACTED TO 95% OF MODIFIED PROCTOR DENSITY, AT OPTIMUM MOISTURE CONTENT. MATERIAL COMPACTION TESTING MAY BE REQUIRED BY THE ENGINEER'S REPRESENTATIVE.
2. BACKFILLING MATERIAL TO BE FREE DRAINING GRANULAR MATERIAL THAT IS APPROVED BY THE ENGINEER'S REPRESENTATIVE PRIOR TO ALL BACKFILLING OPERATIONS.
3. BACKFILLING TO BE COMPLETED IN LEVEL LIFTS OF APPROVED MATERIAL, 150mm TO 300mm THICK AND COMPACTED AS SPECIFIED ON DRAWINGS.
4. MINIMUM 300mm THICK COVER REQUIRED OVER CULVERT PRIOR TO ANY CONSTRUCTION TRAFFIC.
5. STRUCTURAL FOOTING PAD CONSTRUCTION TO BE REVIEWED BY FIELD ENGINEER BEFORE PROCEEDING WITH CULVERT INSTALLATION

## NON-WOVEN GEOTEXTILE

1. SPECIFICATIONS

| | | |
|---|---|---|
| GRAB TENSILE STRENGTH | 912 N | ASTM-D4632 |
| ELONGATION | 50 % | ASTM-D4632 |
| CBR PUNCTURE | 2336 N | ASTM-D6241 |
| TRAPEZOIDAL TEAR | 356 N | ASTM-D4533 |

2. GEOTEXTILE FABRIC SHOULD HAVE A MINIMUM OF 800mm SIDE OVERLAPS. END OVERLAPS FOR BOTH LAYERS OF GEOGRID AND THE FILTER FABRIC SHOULD BE A MINIMUM OF 1.0m.

## CULVERTS

1. SECTIONS ARE TO BE LIFTED, NOT DRAGGED, FOR HANDLING. THEY SHALL NOT BE HANDLED IN A MANNER THAT MAY CAUSE DAMAGE TO THE GALVANIZED COATING OR RESULT IN OTHER PHYSICAL DAMAGE. ANY SUCH DAMAGE SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE TO THE SATISFACTION OF THE ENGINEER'S REPRESENTATIVE.
2. REFERENCE STANDARD INSTALLATION INSTRUCTIONS PROVIDED BY THE MANUFACTURER.
3. SHAPE CHECKS ARE TO BE CARRIED OUT DURING AND AFTER ERECTION TO ENSURE THAT THE ERECTED SHAPE IS AS INTENDED.
4. CULVERT LOCATIONS SHOWN ON PLAN DRAWINGS ARE APPROXIMATE AND MAY REQUIRE FIELD ADJUSTMENTS TO PROPERLY PLACE ALONG EXISTING DITCH GRADES AND ELEVATIONS.

| Rev | Date | Description | Drawn | Design | App'd |
|---|---|---|---|---|---|
| PA | 2019-03-15 | ISSUED FOR REPORT | RJH | TW | CJH |



0 1:100 5

ORIGINAL DWG SIZE: ANSI D (22" x 34")

McElhanney
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Approved Sealed

VILLAGE OF TELKWA AND CYCLE 16

TELKWA-SMITHERS PATHWAY
PRIORITY SEGMENT CONCEPT DESIGN
DETAIL SHEET 1

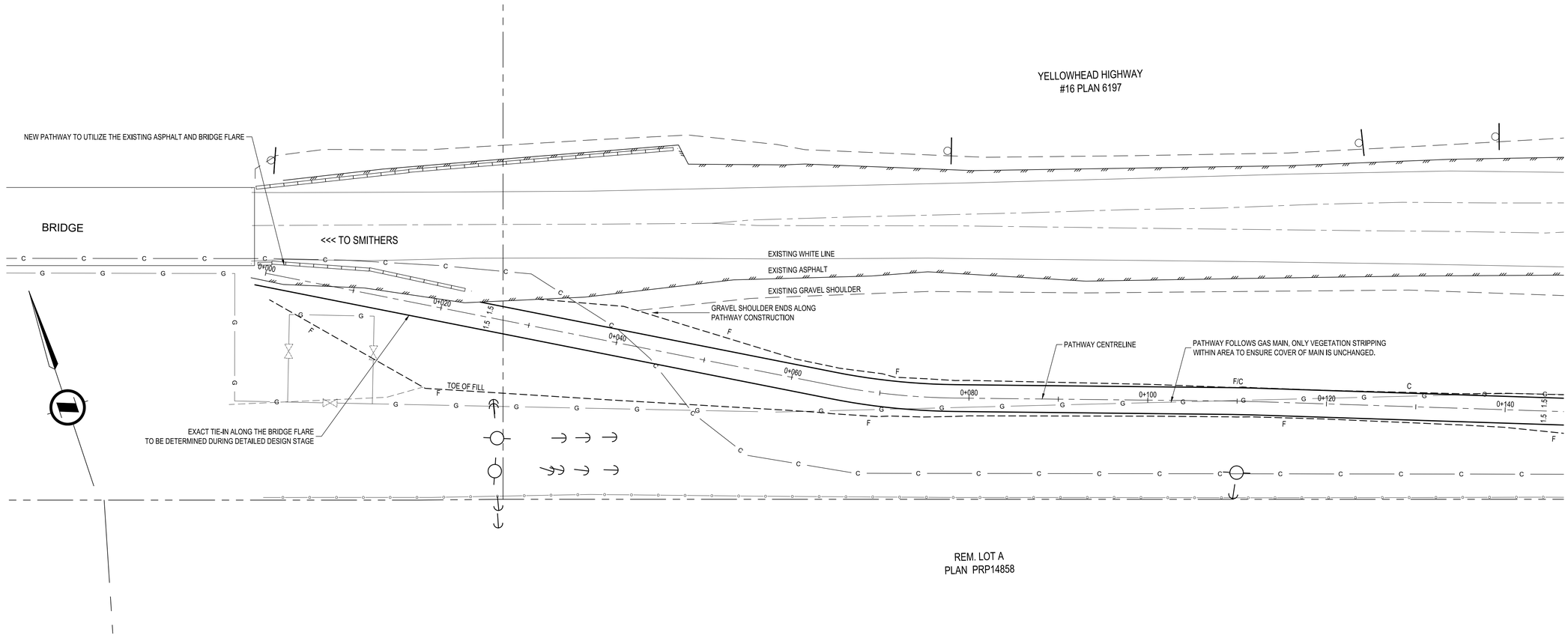
Drawing No. C-301

Project Number 2321-01795-00

Rev. PA

DESTROY ALL PRINTS BEARING PREVIOUS REVISION

DATE: 2019-03-18, 10:12 FILE: X:\2021\01700\01795-00 Telkwa Multi-Use Pathway\10.0 Drawings\10.3 Engineering\10.3.1 Sheets\01795-00-C-300 SERIES_Details.dwg

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ORIGINAL DWG SIZE: ANSI D (22" x 34")

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VILLAGE OF TELKWA AND CYCLE 16

TELKWA-SMITHERS PATHWAY
PHASE 1 PRELIMINARY DESIGN
BRIDGE SECTION DETAIL

Drawing No.
C-302

| Project Number | Rev. |
|---|---|
| 2321-01795-00 | PA |

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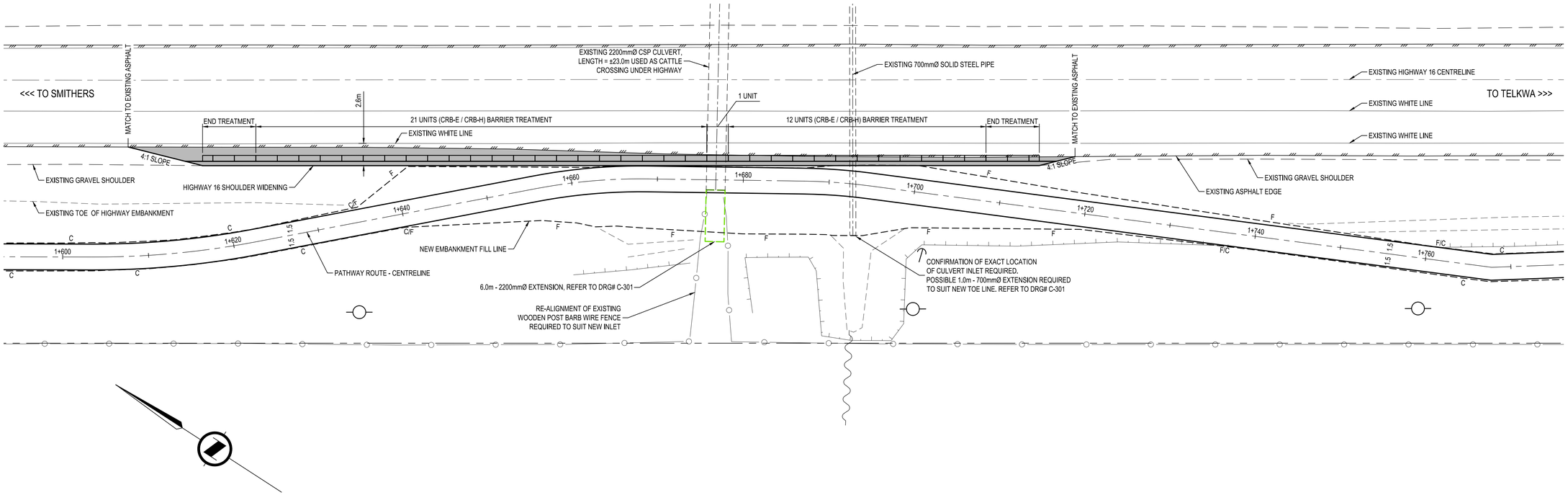


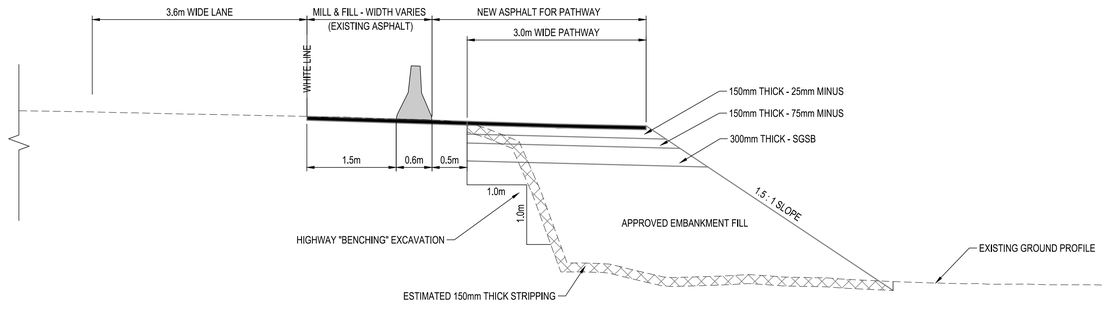


TYPICAL HIGHWAY 16 SHOULDER WIDENING WITH PATHWAY DETAIL

SCALE 1:50

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VILLAGE OF TELKWA AND CYCLE 16

TELKWA-SMITHERS PATHWAY
PHASE 1 PRELIMINARY DESIGN
CATTLE CROSSING DETAIL

Drawing No. C-303

Project Number 2321-01795-00

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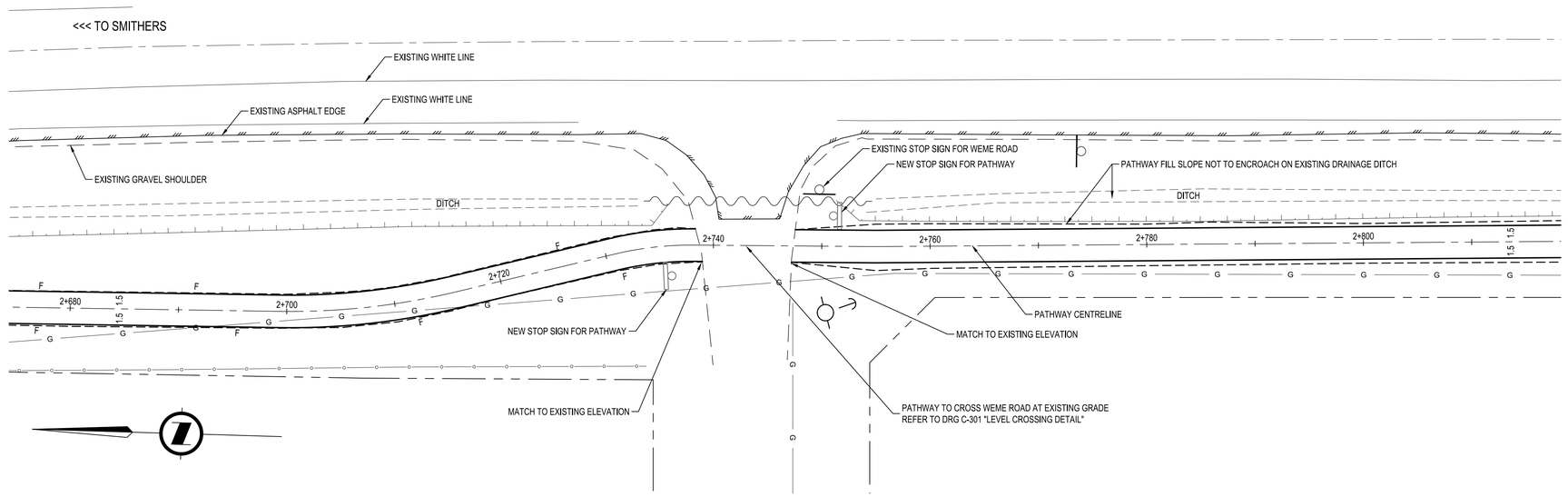
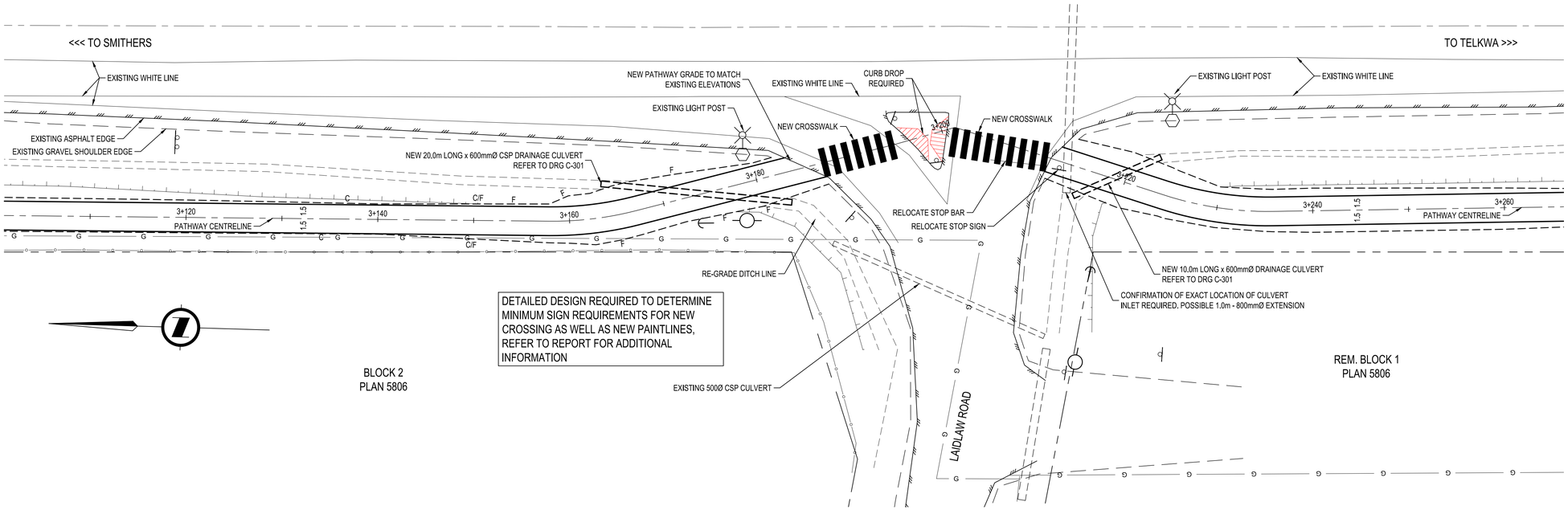
DATE: 2019-03-18, 10:12 FILE: X:\2321\01795\00\1795-00 Telkwa Multi-Use Pathway\10.0 Drawings\10.3 Engineering\10.3.1 Sheets\01795-00-C-300 SERIES_Details.dwg




WEME ROAD CROSSING
SCALE 1:250




LAIDLAW INTERSECTION CROSSING
SCALE 1:250

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ORIGINAL DWG SIZE: ANSI D (22" x 34")

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VILLAGE OF TELKWA AND CYCLE 16

TELKWA-SMITHERS PATHWAY
PRIORITY SEGMENT CONCEPT DESIGN
WEME & LAIDLAW CROSSING DETAILS

Drawing No. C-304

Project Number 2321-01795-00

Rev. PA

DESTROY ALL PRINTS BEARING PREVIOUS REVISION