

SITE C CLEAN ENERGY PROJECT

Component Application Package – Halfway River Temporary Access Bridge Crossings 19.2F, G, H & I

Notification of Work (Public Resolution)

For Canadian Navigable Waters Act

November 10, 2020

Submitted to:

Transport Canada
Navigation Protection Program
Suite 1100 - 1166 W Pender Street
Vancouver, BC V6E 2R9

Submitted by:

BC Hydro and Power Authority
Site C Clean Energy Project
9th Floor – 1111 West Georgia Street.
Vancouver BC V6E 4M3

**Site C Clean Energy Project – Halfway River Temporary Access Bridges
Design for Crossings 19.2F, G, H & I**

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1 INTRODUCTION

The Canadian Navigable Waters Act (CNWA) came into force on August 28, 2019. The CNWA includes a Schedule of navigable waters requiring regulatory approval for works that risk a substantial interference with navigation. Works required for construction and operation of the Site C Clean Energy Project (the Project) that occur on, over, under or through navigable waterways, as defined by the CNWA, must be permitted.

The Halfway River is a Peace River tributary between Fort St John and Hudson's Hope, BC and is not named in the CNWA Schedule of navigable waters. However, once the Site C reservoir is filled, the Halfway River lower reaches will become part of the Peace River, a Schedule waterbody under the CNWA.

This application is being submitted as a Notification of Work (Public Resolution) for the construction of four (4) temporary bridge and causeway crossings over the Halfway River.

2 HALFWAY RIVER TEMPORARY CROSSINGS – RESERVOIR CLEARING

Site C Reservoir clearing in the lower Halfway River drainage requires machine access to both banks of the river and the construction of new access roads. There are seven bridge/causeway crossings that cross the mainstem of the Halfway River, with four back channel crossings, that are part of the new access road development. BC Hydro has submitted the following Notifications of Work for the mainstem bridge/causeway crossings: Registry #1493, #1846, #1851, #1852, #1853, #1855, #1846, #1851, #1852, #1853 and #1855.

This Notification of Work request is for two mainstem and two backchannel crossings over the Halfway River, labelled as 19.2F, 19.2G, 19.2 H and 19.2I, as shown in Attachment A maps. These four crossing replace the 19.7A multi-crossing design, previously submitted under Registry #1846, #1851, #1852, #1853 and #1855. The redesign is required due to changes in the slope of the north bank of the Halfway River caused by a recent high rain fall event.

The crossings span portions of the Halfway River that are Crown Land and are within the Occupant Licence to Cut (OLTC 19) area held by BC Hydro. The dimensions and approximate location of each crossing at site 19.2 are provided in Table 1.

Site C Clean Energy Project – Halfway River Temporary Access Bridges Design for Crossings 19.2F to 19.2I

Table 1. Location, dimensions and land descriptions for revised Halfway River crossings at 19.2F, 19.2G, 19.2H & 19.2I.

| Halfway River Crossing ID | Bridge Length (m) | North Causeway Length (m) | South Causeway Length (m) | Latitude | Longitude | Land Description of Halfway River Crossing |
|---------------------------|--------------------------|---------------------------|---------------------------|-----------|-------------|--|
| 19.2F | 60.96 (2 x 30.480 m) | 10 | 206 | 56.245644 | -121.543624 | Crown Foreshore, bed of the Halfway River and the Halfway River located within the North 1/2 of Section 34 Township 83 Range 23 West of The 6th Meridian Peace River District. |
| 19.2G | 1 x 36.576 | 10 | 19 | 56.243827 | -121.541807 | |
| 19.2H | 1 x 36.576 | 45 | 27 | 56.242464 | -121.542580 | |
| 19.2I | 73.152 (2 x 36.576 m) | 56 | 15 | 56.236174 | -121.553038 | |

2.1 DESIGN OF CROSSING 19.2F, G, H & I

The general arrangement, dimensions and specifications for crossing 19.2F to 19.2I are provided in the drawing package in Attachment B. Each bridge will be designed by an engineering professional. Each crossing will have the capacity to pass the daily average flow estimated for the seasonal (September - April), 1 in 10-year return period (124 m³/s).

The causeways and bridge approaches would be constructed from local river bed materials and supplemented with imported granular material and riprap rock. Alternatively, snow or a combination of snow and granular material, may be used to develop the approaches and causeways. This option is likely due to construction occurring during winter conditions. Due to the timing of the construction, riprap will be placed only where required during final field fit.

A centre pier to support the bridge over the widest section of the channel, would be constructed out of concrete lock blocks placed on a riprap base to provide a platform, outside of the river flow, for the lock blocks. The riprap base will be capped with granular material to ensure the platform is level and can be compacted to provide stability for the structures.

2.2 CONSTRUCTION SEQUENCE AND SCHEDULE

Construction of the Halfway River temporary access crossings began in October 2020 at the downstream end (Site ID 19.3A) and is progresses upstream as each crossing is built. Construction of the bridge/causeway crossings at 19.2F to 19.2I is planned to begin mid-December 2020.

Minor changes to location and bridge sizing may be required in order to field fit each crossing to site conditions that exist during construction. These changes may be required due to the dynamic changes in gravel bar and channel locations that occur frequently in this drainage.

Decommission of the crossings will involve bridge deck, abutment and pier removal such that navigation access can be reinstated by May 1, 2021. Causeway materials will remain in place, unless minor openings are required for fish migration. The future Site C reservoir would cover the causeway materials after reservoir filling is completed in 2024, and each causeway would be shown in future reservoir maps.

Site C Clean Energy Project – Halfway River Temporary Access Bridges Design for Crossings 19.2F to 19.2I

3 PUBLIC BOATER ACCESS

Construction of temporary crossings in the Halfway River channel is expected to block boater access to lower portions of the Halfway River between September 1, 2020 and April 30, 2021. A map showing the river blockage extent has been included in Attachment A.

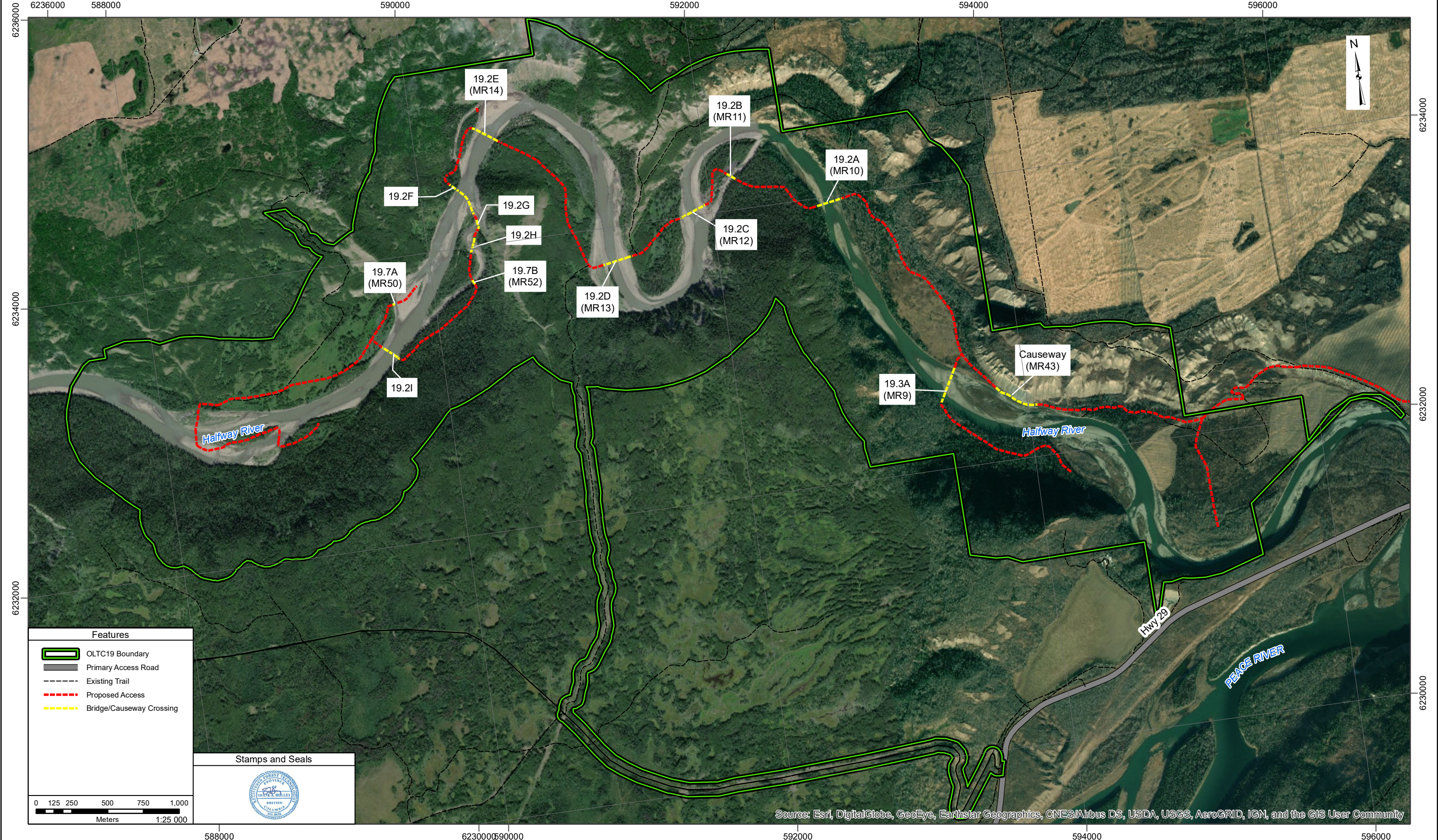
Crossings would be removed in April 2021 and boating access would be reinstated on or before May 1, 2021. The Halfway River boat launch would remain open during this period.

Communication to boaters ahead of river closures has been done in accordance with the Site C Boater Communication Protocol (Site C [Construction Safety Management Plan](#), Section 5.3.4.2). Signs that are visible to boaters are installed in various locations along the Halfway River alerting them to the upcoming blockage and potential hazard.

Attachment A – Maps

**Overview Map of Halfway River Temporary Access Crossings
Map of Halfway River Blockage Extent**

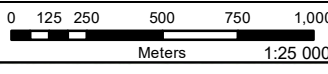
| No. | Revisions | Made | Chkd | Appd | Date |
|-----|-----------|------|------|------|------|
| | | | | | |



Features

- OLTC19 Boundary
- Primary Access Road
- Existing Trail
- Proposed Access
- Bridge/Causeway Crossing

Stamps and Seals





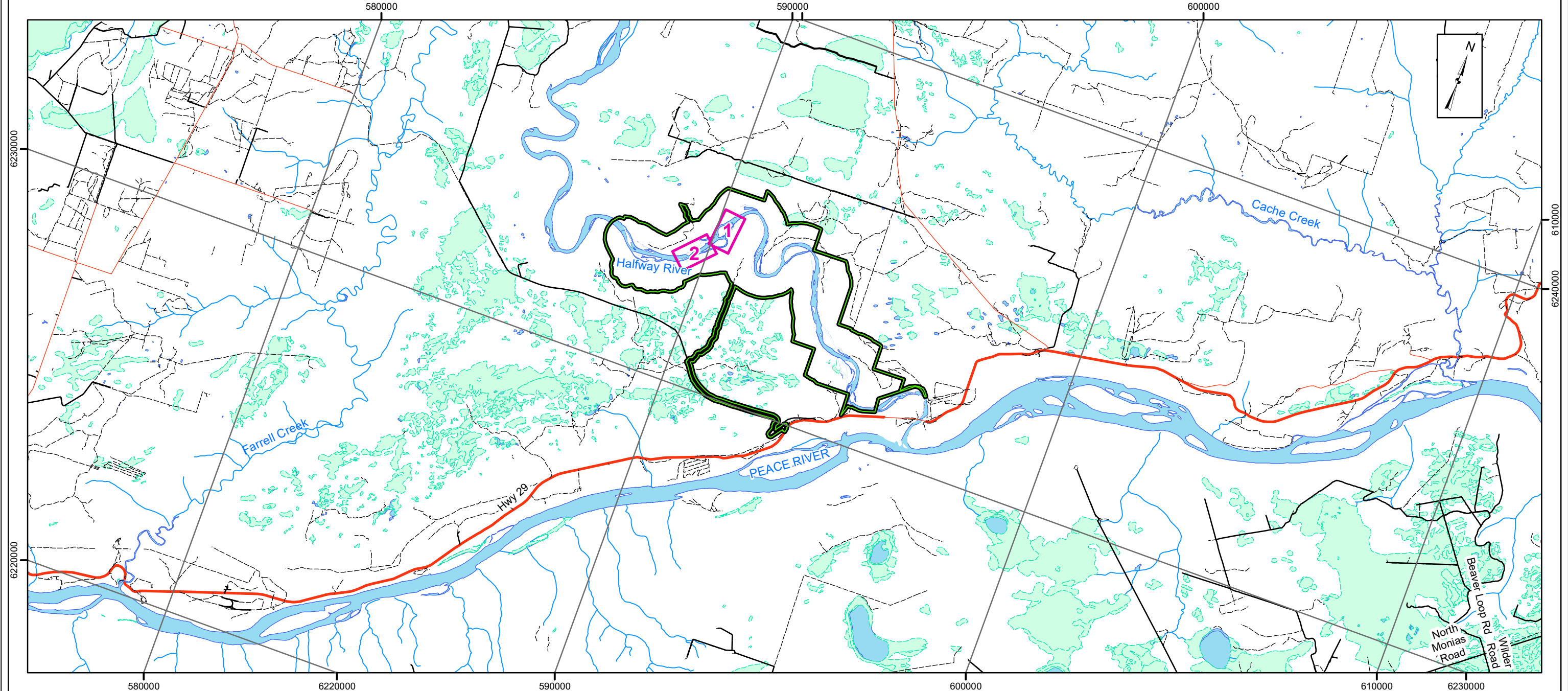
Projection: UTM Zone 10, NAD83
 Geographic Center of Map:
 E: 592,703 Longitude: 121°30'17.73"W
 N: 6,231,905 Latitude: 56°13'22.81"N

| No. | Revisions | Made | Chkd | Appd |
|-----|-----------|------|------|------|
| | | | | |

Mapsheet Ref.: 94A.023
 Location: Halfway River
 Resource District: Peace

Drawing No.: OLTC19-N11-000011B
 Revision: 1
 Date: 21 Oct 20

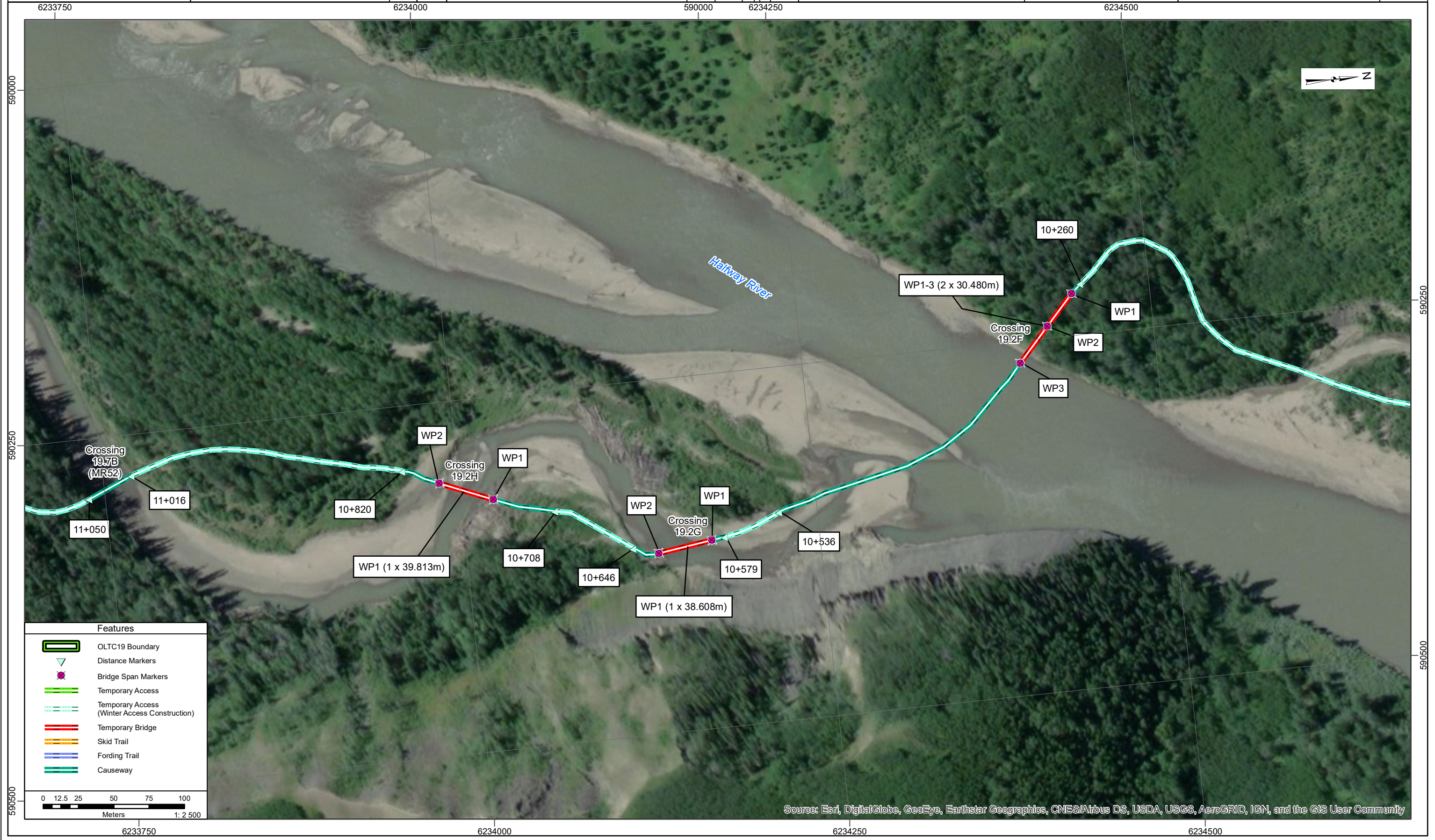
Site C Clean Energy Project
 Middle Reservoir
 OLTC19 - Halfway River
 Crossing ID: 19.2F, G, H, I; 19.7B Location
 Index Map



| Strip Maps / Clearing Limit | Roads | Water |
|-----------------------------|----------------------|--------------|
| OLTC19 Boundary | Highway | Stream/Creek |
| 1: 2500 Map Sheets | Paved road | River/Lake |
| | Road Permit / Tenure | Wetland |
| | Gravel or non-status | |

0 1 2 4 6 8
 Kilometers 1:100 000

| No. | Revisions | Made | Chkd | Appd | Date |
|-----|-----------|------|------|------|------|
| | | | | | |



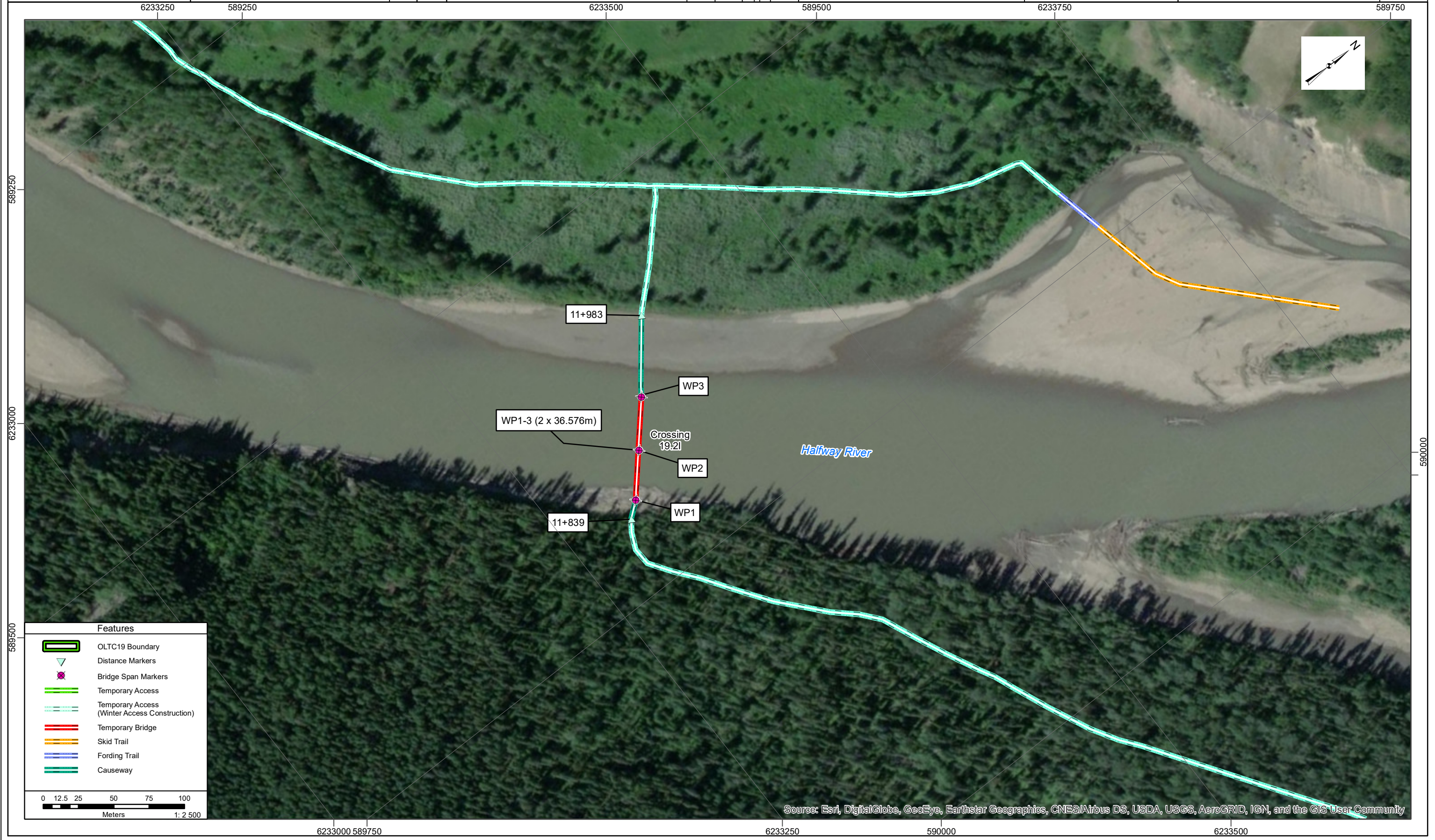
Features

- OLTC19 Boundary
- Distance Markers
- Bridge Span Markers
- Temporary Access
- Temporary Access (Winter Access Construction)
- Temporary Bridge
- Skid Trail
- Fording Trail
- Causeway










0 12.5 25 50 75 100
 Meters 1: 2 500

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

| No. | Revisions | Made | Chkd | Appd | Date |
|-----|-----------|------|------|------|------|
| | | | | | |

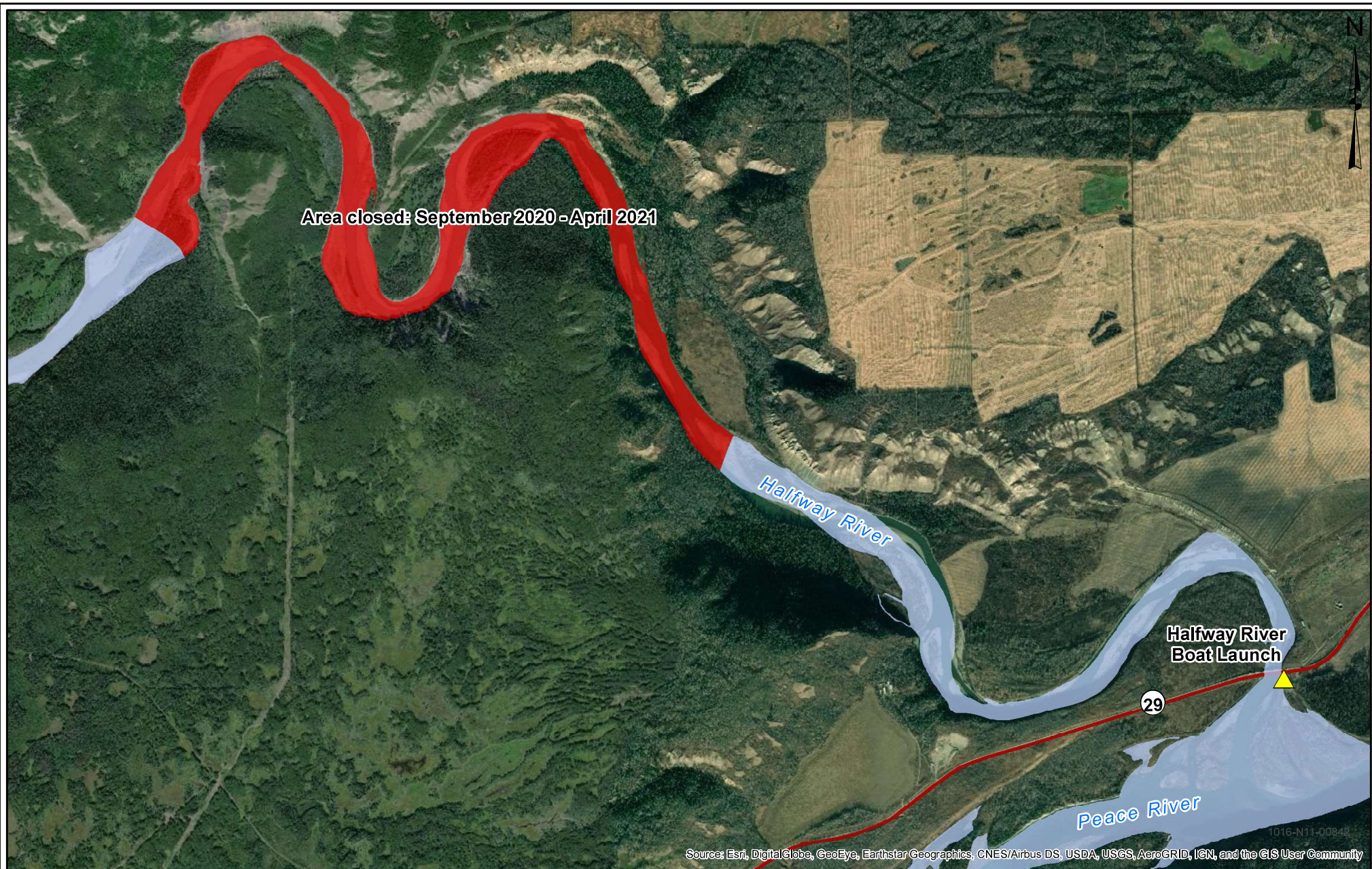


Features

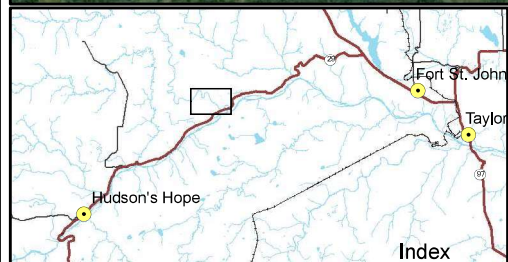
-  OLTC19 Boundary
-  Distance Markers
-  Bridge Span Markers
-  Temporary Access
-  Temporary Access (Winter Access Construction)
-  Temporary Bridge
-  Skid Trail
-  Fording Trail
-  Causeway

0 12.5 25 50 75 100
 Meters 1: 2,500

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



Map Notes:
 1. Datum: NAD83
 2. Projection: UTM Zone 10N
 3. Base Data: Province of B.C.
 4. Imagery: ESRI Online Basemapping

Legend

- Area closed: September 2020 - April 2021
- ▲ Halfway River Boat Launch
- Highway

1:30,000 0 1 km



Halfway River Closure Area

| | | | |
|------|--------------|----------------|-----|
| DATE | May 14, 2020 | 1016-N11-00842 | R 0 |
|------|--------------|----------------|-----|

X:\ArcGIS\Projects\Public Affairs\Halfway River Closure - 1016-N11-00842.mxd

Attachment B

**Design Drawings, Plan and Profile Views of Revised Temporary Access Crossings at
19.2F, 19.2G, 19.2H and 19.2I over Halfway River**

HALFWAY RIVER OLTC 19 - 2 F

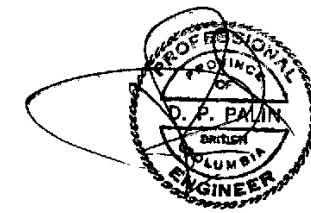


(2- 36.576 m) TEMPORARY TWIN STEEL GIRDER/TIMBER DECK BRIDGE (MIN. CL625)

BRIDGE DETAILS

COORDINATES:
LATITUDE: 56.246446°
LONGITUDE: -121.543624°

| DESCRIPTION | SHEET NUMBER |
|--------------------------------|--------------|
| EXISTING SITE PHOTOS | 01 |
| EXISTING PLAN VIEW | 02 |
| EXISTING PROFILES AND SECTIONS | 03 |
| GENERAL ARRANGEMENT | 04 |
| BRIDGE PROFILES AND SECTIONS | 05 |



PREPARED BY:

DESCRIPTION: ISSUED FOR CONSTRUCTION
ISSUE DATE: 20/11/08



UNIT 315
7326 10TH STREET NE
CALGARY, AB
T2E 8W1

HIGH-CHAIN BANK LOOKING ACROSS RIVER



LOOKING DOWNSTREAM FROM HIGH-CHAIN BANK

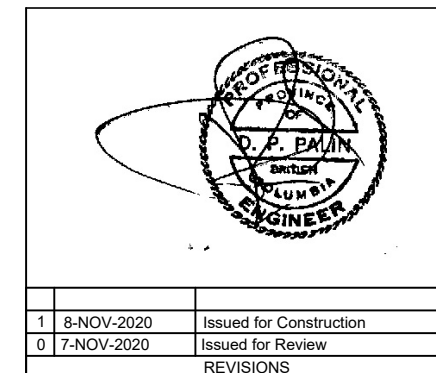




LOOKING UPSTREAM FROM HIGH-CHAIN BANK



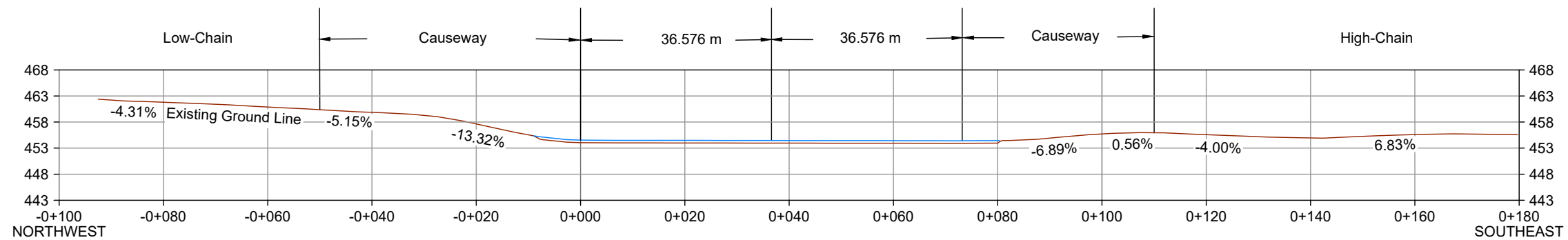
GENERAL NOTES:

1. SITE PHOTOGRAPHS WERE TAKEN BY OTHERS IN 2018 AND REPRODUCED HERE FOR REFERENCE.
2. TRILOGY CROSSING CORP. HAS NOT BEEN TO SITE AND THEREFORE IS UNABLE TO VERIFY GRAVEL BAR LOCATIONS AND CREEK BOTTOM LOCATIONS. ALL DETAILS HAVE BEEN BASED OFF IMAGERY AND TECHNICAL INFORMATION PREPARED BY OTHERS.

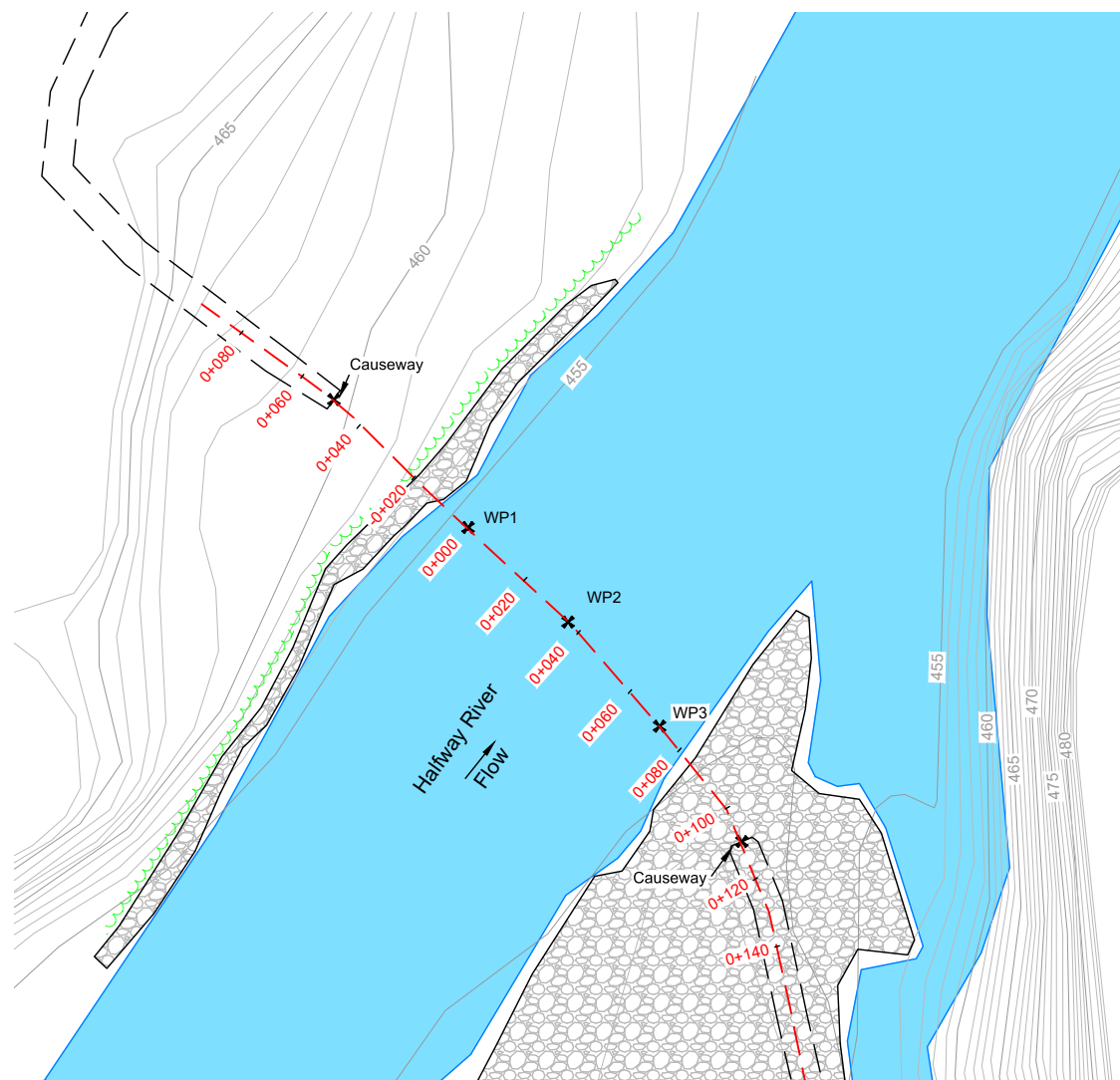


| | | | |
|---|------------|-------------------------|-------------|
|  ENGINEERING, ENVIRONMENTAL, INSPECTION | | | |
| CROSSING 19.2F HALFWAY RIVER | | | |
| EXISTING SITE PHOTOS | | | |
|  Power smart | | | |
| DESIGN | DRAWN | CHECKED | FILE |
| | M.Meilleur | CD | |
| DATE | DATE | DATE | PLAN |
| | 7-NOV-20 | 7-NOV-2020 | TCC-HY19.2F |
| REVISIONS | | | |
| 1 | 8-NOV-2020 | Issued for Construction | |
| 0 | 7-NOV-2020 | Issued for Review | |
| Sheet 01 of 05 | | | |

LAST DATE REVISED: 7-NOV-2020 4:35 PM



Profile
SCALE 1:1000



PLAN
SCALE: 1:2000

BENCHMARK SURVEY TABLE

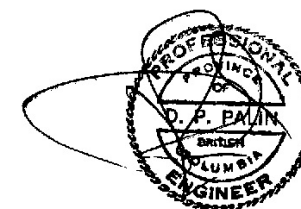
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|-------|-----------|------------|-----------|
| ✕ WP1 | 454.55 | 6234417.97 | 590249.36 |
| ✕ WP2 | 454.47 | 6234392.86 | 590275.89 |
| ✕ WP3 | 454.42 | 6234365.17 | 590300.20 |

NOTE: ELEV. IS AT BOTTOM OF GIRDERS

| LEGEND | |
|--------|----------------|
| | CREEK |
| | ROAD |
| | BRIDGE |
| | CAUSEWAY |
| | ROAD ALIGNMENT |
| | RIPARIAN ROCK |
| | TREE LINE |
| | SECTION LINE |

GENERAL NOTES:

1. TOPOGRAPHIC SURVEY DEVELOPED BASED OFF LIDAR DATA PROVIDED BY MAPLE LEAF FORESTRY.
2. COORDINATE SYSTEM NAD83, GEOID CGG2013.
3. NO GEOTECHNICAL INFORMATION HAS BEEN PROVIDED OR GATHERED TO DATE.
4. HALFWAY RIVER DEPTH ESTIMATED AT 0.5m AT CROSSING LOCATION. TRUE RIVER DEPTH UNKNOWN AND HAS BEEN ASSUMED FOR BRIDGE CONFIGURATION PURPOSES.
5. HYDROLOGICAL INFORMATION ACQUIRED BASED ON NEARBY CROSSINGS AND HYDROTECHNICAL REPORTS PREPARED BY OTHERS. A SEASON FLOW (Q10 SEASONAL PERIOD FROM OCTOBER TO APRIL) VOLUME OF 37m³/s HAS BEEN DETERMINED FOR THIS CHANNEL.
6. FLOW VELOCITY AT BRIDGES DETERMINED TO BE 1.9m/s FOR Q10 SEASONAL FLOW.
7. BRIDGE CONFIGURATION HAS BEEN CHOSEN TO SPAN DEEPEST PARTS OF CHANNELS TO CAUSE THE LEAST FLOW OBSTRUCTION POSSIBLE.
8. UNLESS OTHERWISE NOTED, ALL DIMENSIONS ARE IN MILLIMETERS AND ALL ELEVATIONS AND STATIONS ARE IN METERS.



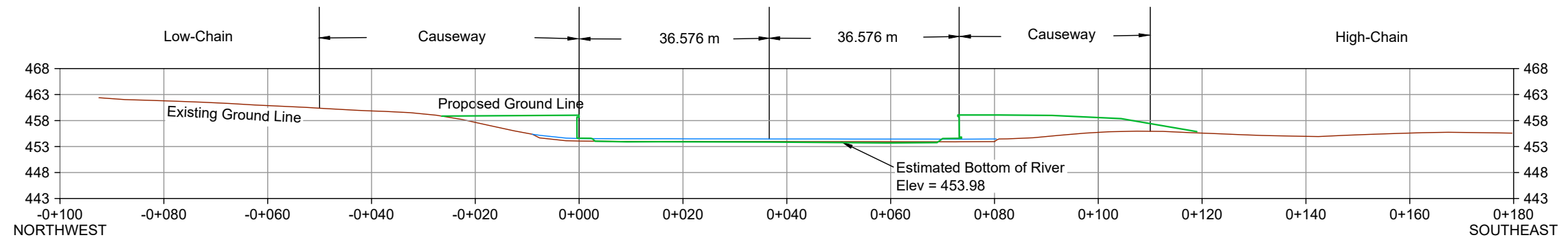
Trilogy Crossing Corp.
ENGINEERING, ENVIRONMENTAL, INSPECTION

Crossing 19.2F Halfway River

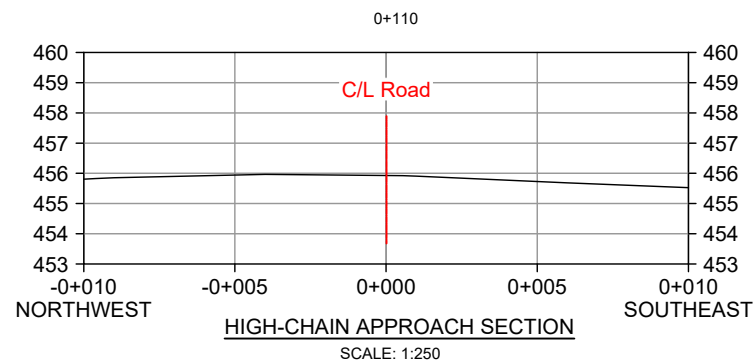
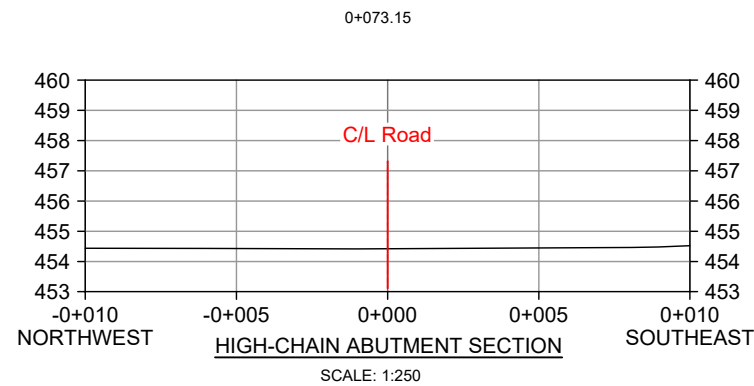
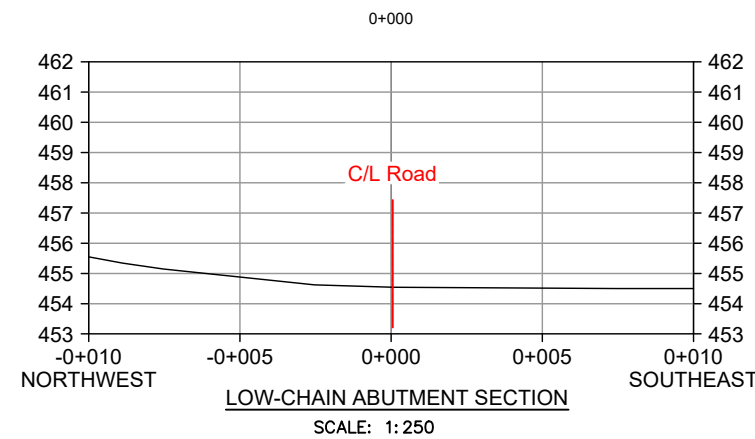
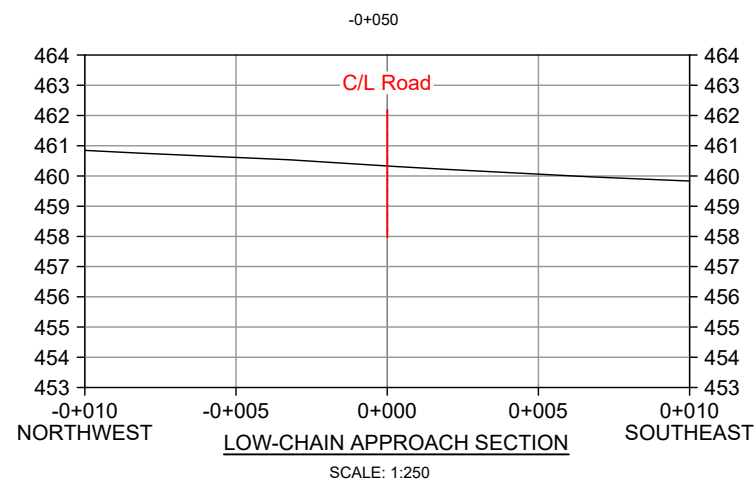
EXISTING PLAN VIEW

BC Hydro
Power smart

| NO. | DATE | DESCRIPTION | DESIGN | DRAWN | CHECKED | FILE |
|-----|------------|-------------------------|--------|------------|------------|-------------|
| 1 | 8-NOV-2020 | Issued for Construction | | M.Meilleur | CD | |
| 0 | 7-NOV-2020 | Issued for Review | | 7-NOV-2020 | 7-NOV-2020 | TCC-HY19.2F |



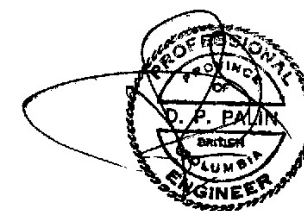
Profile
SCALE 1:1000



| LEGEND | |
|--------|----------------|
| | CREEK |
| | ROAD |
| | BRIDGE |
| | CAUSEWAY |
| | ROAD ALIGNMENT |
| | RIPARIAN ROCK |
| | TREE LINE |
| | SECTION LINE |

GENERAL NOTES:

1. TOPOGRAPHIC SURVEY DEVELOPED BASED OFF LIDAR DATA PROVIDED BY MAPLE LEAF FORESTRY.
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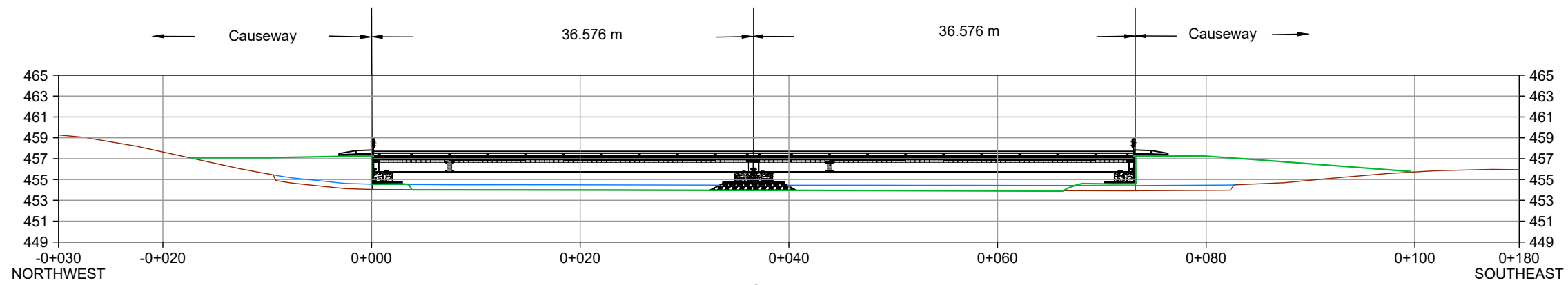
Trilogy Crossing Corp.
ENGINEERING, ENVIRONMENTAL, INSPECTION

Crossing 19.2F Halfway River

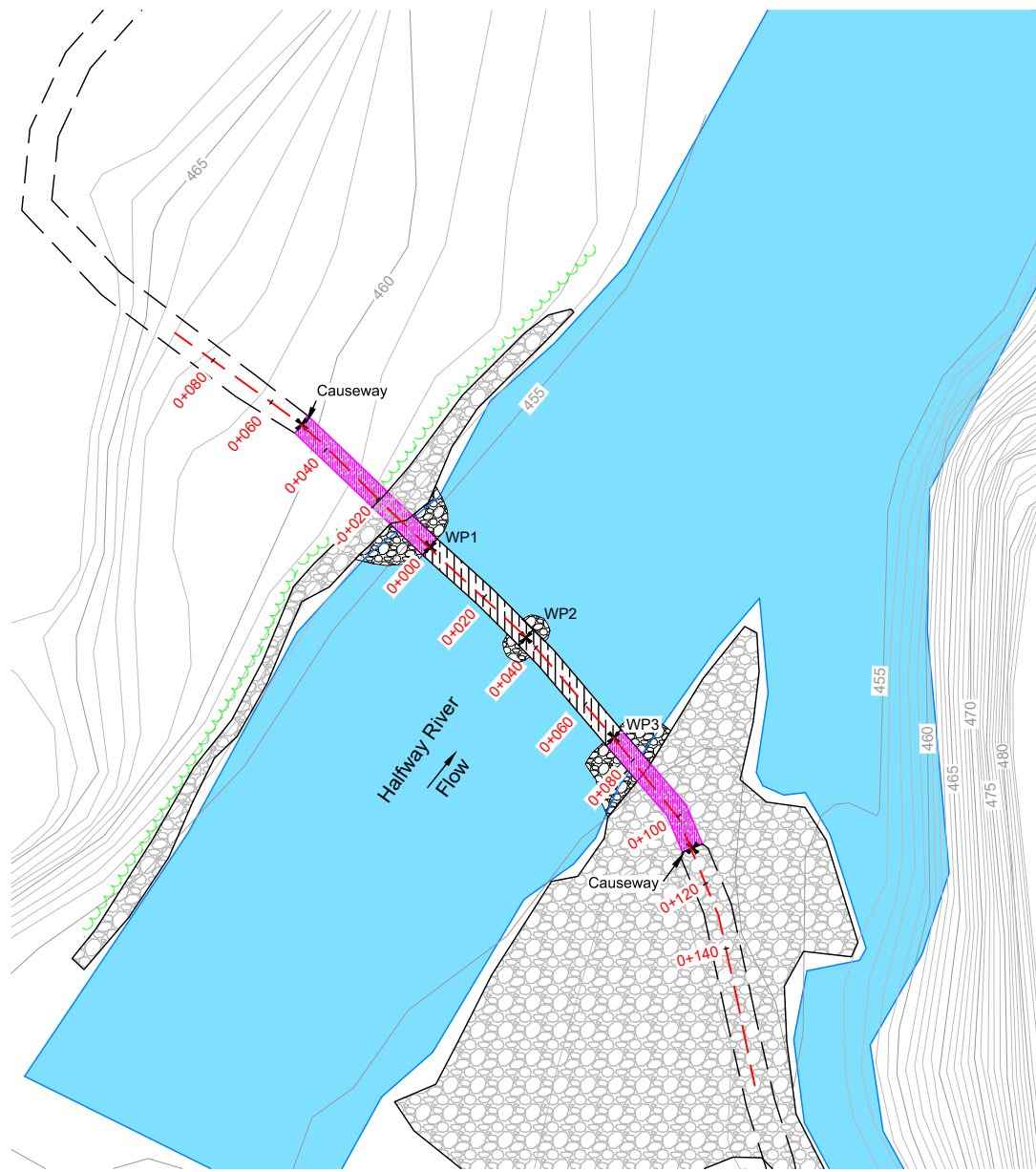
EXISTING PROFILES AND SECTIONS

BC Hydro
Power smart

| REVISIONS | | DESIGN | DRAWN | CHECKED | FILE |
|-----------|------------|-------------------------|------------|---------|-------------|
| 1 | 8-NOV-2020 | Issued for Construction | M.Meilleur | CD | |
| 0 | 7-NOV-2020 | Issue for Review | | | TCC-HY19.2F |

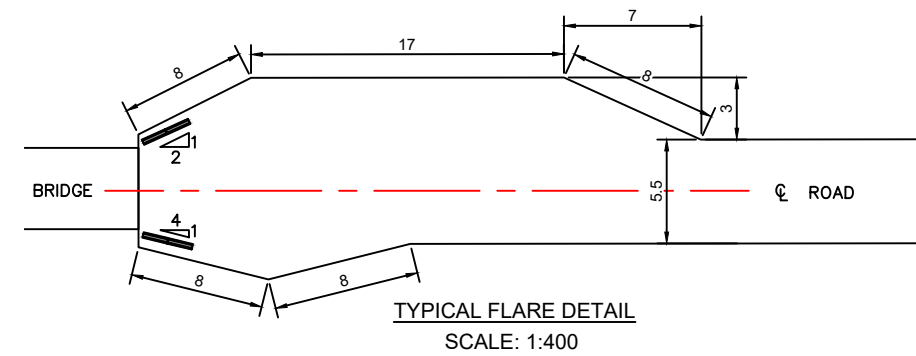


PROFILE
SCALE 1:500



PLAN
SCALE: 1:2000

| LEGEND | |
|--------|----------------|
| | CREEK |
| | ROAD |
| | BRIDGE |
| | CAUSEWAY |
| | ROAD ALIGNMENT |
| | RIPARIAN ROCK |
| | TREE LINE |
| | SECTION LINE |



BENCHMARK SURVEY TABLE

| MARK | ELEV. (m) | NORTHING | EASTING |
|-------|-----------|------------|-----------|
| ✕ WP1 | 454.55 | 6234417.97 | 590249.36 |
| ✕ WP2 | 454.47 | 6234392.86 | 590275.89 |
| ✕ WP3 | 454.42 | 6234365.17 | 590300.20 |

NOTE: ELEV. IS AT BOTTOM OF GIRDERS

GENERAL NOTES:

- BRIDGE SUPERSTRUCTURE AND SUBSTRUCTURE TO BE CERTIFIED AT A MINIMUM CL-625 LOADING.
- INITIAL BRIDGE LENGTHS DETERMINED USING LIDAR IMAGERY IN COMBINATION WITH GOOGLE EARTH IMAGERY; BRIDGE LENGTH AND FINAL LOCATION TO BE VERIFIED BY MEASUREMENT PRIOR TO INSTALLATION.
- BRIDGES DESIGNED FOR A MINIMUM Q10 SEASONAL FLOW +0.5m OF WATER CLEARANCE.
- BRIDGE SUPERSTRUCTURE AND SUBSTRUCTURE TO BE CERTIFIED AT A MINIMUM CL-625 LOADING.
- BRIDGE SUPERSTRUCTURE AND SUBSTRUCTURE TO BE CERTIFIED BY A PROFESSIONAL ENGINEER AND AN AS-BUILT PLAN PRODUCED AFTER CONSTRUCTION.
- PERMITS: OBTAINING, SUBMITTING, AND RECEIVING APPROVAL SHALL BE THE RESPONSIBILITY OF THE OWNER PRIOR TO COMMENCEMENT OF CONSTRUCTION ACTIVITIES.
- UNLESS OTHERWISE NOTED, ALL DIMENSIONS ARE IN MILLIMETERS AND ALL ELEVATIONS AND STATIONS ARE IN METERS.
- THIS IS AN ENVIRONMENTALLY SENSITIVE LOCATION DUE TO STREAM PROXIMITY; ALL FILTER CLOTH, LOCK BLOCKS, ROAD ACCESS MATS, FENDER SYSTEMS AND DECKING TO BE FREE OF SOIL AND FOREIGN MATERIAL PRIOR TO TRANSPORT TO SITE. SPILL KITS AND TRAYS HIGHLY RECOMMENDED.

VOLUME NOTES:

- RIPRAP SHALL BE HARD, DURABLE, ANGULAR ROCK AND IN ACCORDANCE TO THE MINISTRY OF FORESTS, LANDS AND NATURAL RESOURCE OPERATIONS "ENGINEERING MANUAL", APRIL 7, 2016.

CLASS 250 kg AVERAGE SIZE ROCK RIPRAP, 500 THICK WITH THE FOLLOWING ROCK GRADATION:

| | | MASSDIAMETER | |
|-----|-------------|--------------|-----|
| 85% | LARGER THAN | 25 kg | 300 |
| 50% | LARGER THAN | 250 kg | 600 |
| 15% | LARGER THAN | 750 kg | 900 |

MINIMUM RIPRAP VOLUME: 21 m³

- LINE EXCAVATION WITH NON-WOVEN GEO-TEXTILE, MINIMUM MULLEN BURST STRENGTH OF 2619 KPA (Armtec 250/ProPex 4553 OR APPROVED EQUIVALENT).

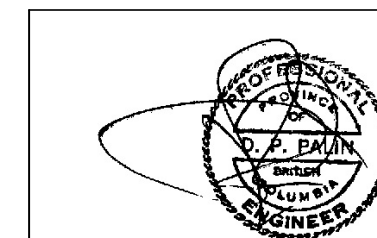
TOTAL GEOTEXTILE: 400 m²

- ESTIMATED CUT AND FILL VOLUMES:

| | |
|---------------------|---------------------|
| COMPACTED BACKFILL: | 1001 m ³ |
| EXCAVATION: | 125 m ³ |
| NET FILL: | 876 m ³ |

- ESTIMATED GRANULAR BASE FILL: 6 m³

- BACKFILL AND GRANULAR FILL SHALL BE PLACED IN LAYERS NOT EXCEEDING 300mm IN LOOSE THICKNESS AND EACH LAYER SHALL BE COMPACTED TO THE CLIENTS ROAD SPECIFICATIONS WITH A PLATE TAMPER EVENLY ACROSS THE ENTIRE SURFACE TO THE DESIRED ELEVATION.



| NO. | DATE | DESCRIPTION |
|-----|------------|-------------------------|
| 1 | 8-NOV-2020 | Issued for Construction |
| 0 | 7-NOV-20 | Issued for Review |

ENGINEERING, ENVIRONMENTAL, INSPECTION

CROSSING OF 19.2F HALFWAY RIVER

GENERAL ARRANGEMENT

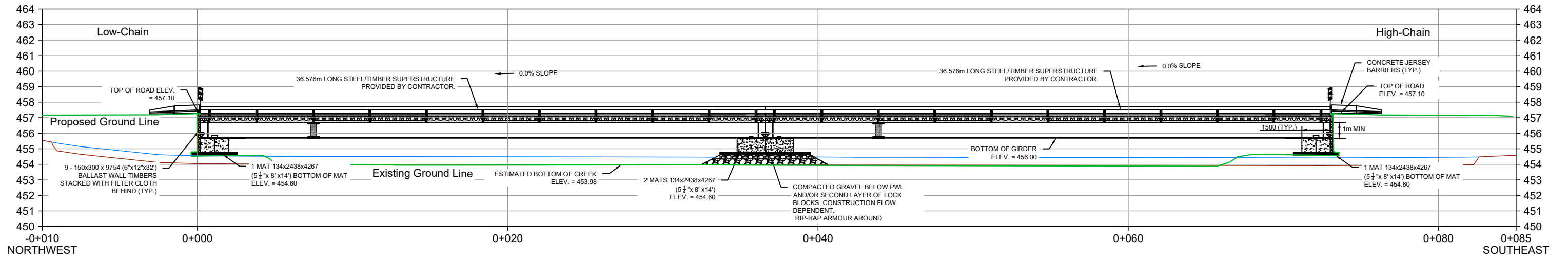
Power smart

| DESIGN | DRAWN | CHECKED | FILE |
|--------|------------|---------|------|
| | M.Meilleur | CD | |

| DATE | DATE | DATE | PLAN |
|----------|----------|------|-------------|
| 7-NOV-20 | 7-NOV-20 | | TCC-HY19.2F |

Sheet 04 of 05

LAST DATE REVISED: 7-Nov-2020 4:35 PM



PROFILE
SCALE 1:250

GENERAL NOTES:

- BRIDGE SUPERSTRUCTURE AND SUBSTRUCTURE TO BE CERTIFIED AT A MINIMUM CL-625 LOADING.
- INITIAL BRIDGE LENGTHS DETERMINED USING LIDAR IMAGERY IN COMBINATION WITH GOOGLE EARTH IMAGERY; BRIDGE LENGTH AND FINAL LOCATION TO BE VERIFIED BY MEASUREMENT PRIOR TO INSTALLATION.
- BRIDGES DESIGNED FOR A MINIMUM Q10 SEASONAL FLOW +0.5m OF WATER CLEARANCE.
- BRIDGE SUPERSTRUCTURE AND SUBSTRUCTURE TO BE CERTIFIED AT A MINIMUM CL-625 LOADING.
- BRIDGE SUPERSTRUCTURE AND SUBSTRUCTURE TO BE CERTIFIED BY A PROFESSIONAL ENGINEER AND AN AS-BUILT PLAN PRODUCED AFTER CONSTRUCTION.
- PERMITS: OBTAINING, SUBMITTING, AND RECEIVING APPROVAL SHALL BE THE RESPONSIBILITY OF THE OWNER PRIOR TO COMMENCEMENT OF CONSTRUCTION ACTIVITIES.
- UNLESS OTHERWISE NOTED, ALL DIMENSIONS ARE IN MILLIMETERS AND ALL ELEVATIONS AND STATIONS ARE IN METERS.
- THIS IS AN ENVIRONMENTALLY SENSITIVE LOCATION DUE TO STREAM PROXIMITY; ALL FILTER CLOTH, LOCK BLOCKS, ROAD ACCESS MATS, FENDER SYSTEMS AND DECKING TO BE FREE OF SOIL AND FOREIGN MATERIAL PRIOR TO TRANSPORT TO SITE. SPILL KITS AND TRAYS HIGHLY RECOMMENDED.

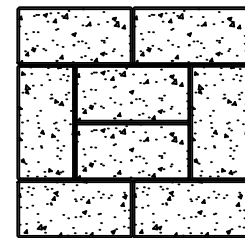
VOLUME NOTES:

- RIPRAP SHALL BE HARD, DURABLE, ANGULAR ROCK AND IN ACCORDANCE TO THE MINISTRY OF FORESTS, LANDS AND NATURAL RESOURCE OPERATIONS "ENGINEERING MANUAL", APRIL 7, 2016.

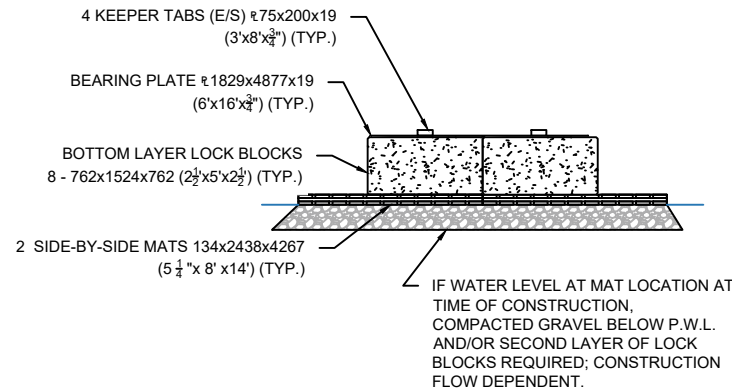
CLASS 250 kg AVERAGE SIZE ROCK RIPRAP, 500 THICK WITH THE FOLLOWING ROCK GRADATION:

| | | MASSDIAMETER | |
|-----|-------------|--------------|-----|
| 85% | LARGER THAN | 25 kg | 300 |
| 50% | LARGER THAN | 250 kg | 600 |
| 15% | LARGER THAN | 750 kg | 900 |

MINIMUM RIPRAP VOLUME: 21 m³



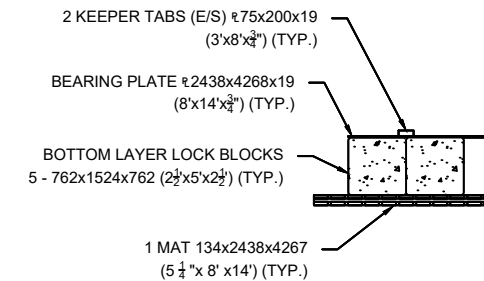
PIER BOTTOM LAYER PLAN
SCALE: 1:100



PIER PROFILE
SCALE: 1:100

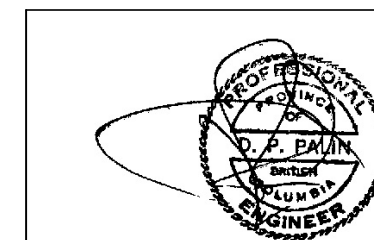


ABUTMENT BOTTOM LAYER PLAN
SCALE: 1:100



ABUTMENT PROFILE
SCALE: 1:100

| LEGEND | |
|--------|----------------|
| | CREEK |
| | ROAD |
| | BRIDGE |
| | CAUSEWAY |
| | ROAD ALIGNMENT |
| | RIPARIAN ROCK |
| | TREE LINE |
| | SECTION LINE |



| NO. | DATE | DESCRIPTION |
|-----|------------|-------------------------|
| 1 | 8-NOV-2020 | Issued for Construction |
| 0 | 7-NOV-20 | Issued for Review |

| | | | |
|---|----------|---------|------|
| <p>ENGINEERING, ENVIRONMENTAL, INSPECTION</p> | | | |
| CROSSING OF 19.2F HALFWAY RIVER | | | |
| BRIDGE 1 PROFILES AND SECTIONS | | | |
| <p>Power smart</p> | | | |
| DESIGN | DATE | CHECKED | FILE |
| M.Meilleur | 7-NOV-20 | CD | |
| DATE | DATE | DATE | DATE |
| 7-NOV-20 | 7-NOV-20 | | |
| TCC-HY19.2F | | | |
| Sheet 04 of 05 | | | |

LAST DATE REVISED: 7-NOV-2020 4:35 PM

HALFWAY RIVER OLTC 19 - 2 G

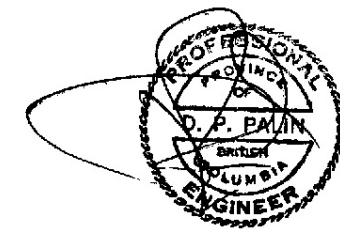


(1- 36.576 m) TEMPORARY TWIN STEEL GIRDER/TIMBER DECK BRIDGE OR CULVERT (MIN. CL625)

BRIDGE DETAILS

COORDINATES:
LATITUDE: 56.243827°
LONGITUDE: -121.541807°

| DESCRIPTION | SHEET NUMBER |
|--------------------------------|--------------|
| EXISTING SITE PHOTOS | 01 |
| EXISTING PLAN VIEW | 02 |
| EXISTING PROFILES AND SECTIONS | 03 |
| GENERAL ARRANGEMENT | 04 |
| BRIDGE PROFILES AND SECTIONS | 05 |



PREPARED BY:

DESCRIPTION: ISSUED FOR CONSTRUCTION
ISSUE DATE: 20/11/08

 Trilogy Crossing Corp.
ENGINEERING, ENVIRONMENTAL, INSPECTION

UNIT 315
7326 10TH STREET NE
CALGARY, AB
T2E 8W1

HIGH-CHAIN FROM 19.2-G LOOKING TOWARDS 19.2-F FOR ROAD REALIGNMENT

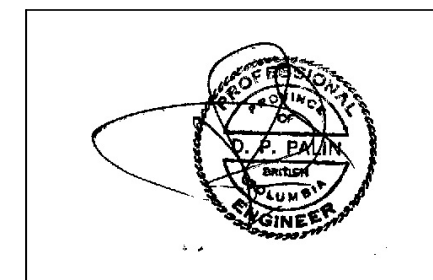


HIGH-CHAIN BANK LOOKING TOWARDS RIVER TOWARDS LOW-CHAIN BANK



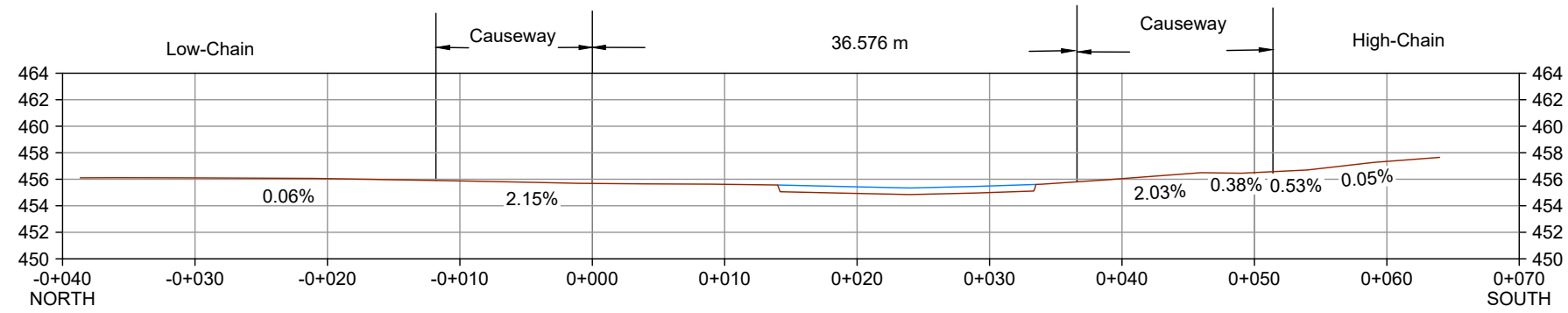
GENERAL NOTES:

1. SITE PHOTOGRAPHS WERE TAKEN BY OTHERS IN 2018 AND REPRODUCED HERE FOR REFERENCE.
2. TRILOGY CROSSING CORP. HAS NOT BEEN TO SITE AND THEREFORE IS UNABLE TO VERIFY GRAVEL BAR LOCATIONS AND CREEK BOTTOM LOCATIONS. ALL DETAILS HAVE BEEN BASED OFF IMAGERY AND TECHNICAL INFORMATION PREPARED BY OTHERS.

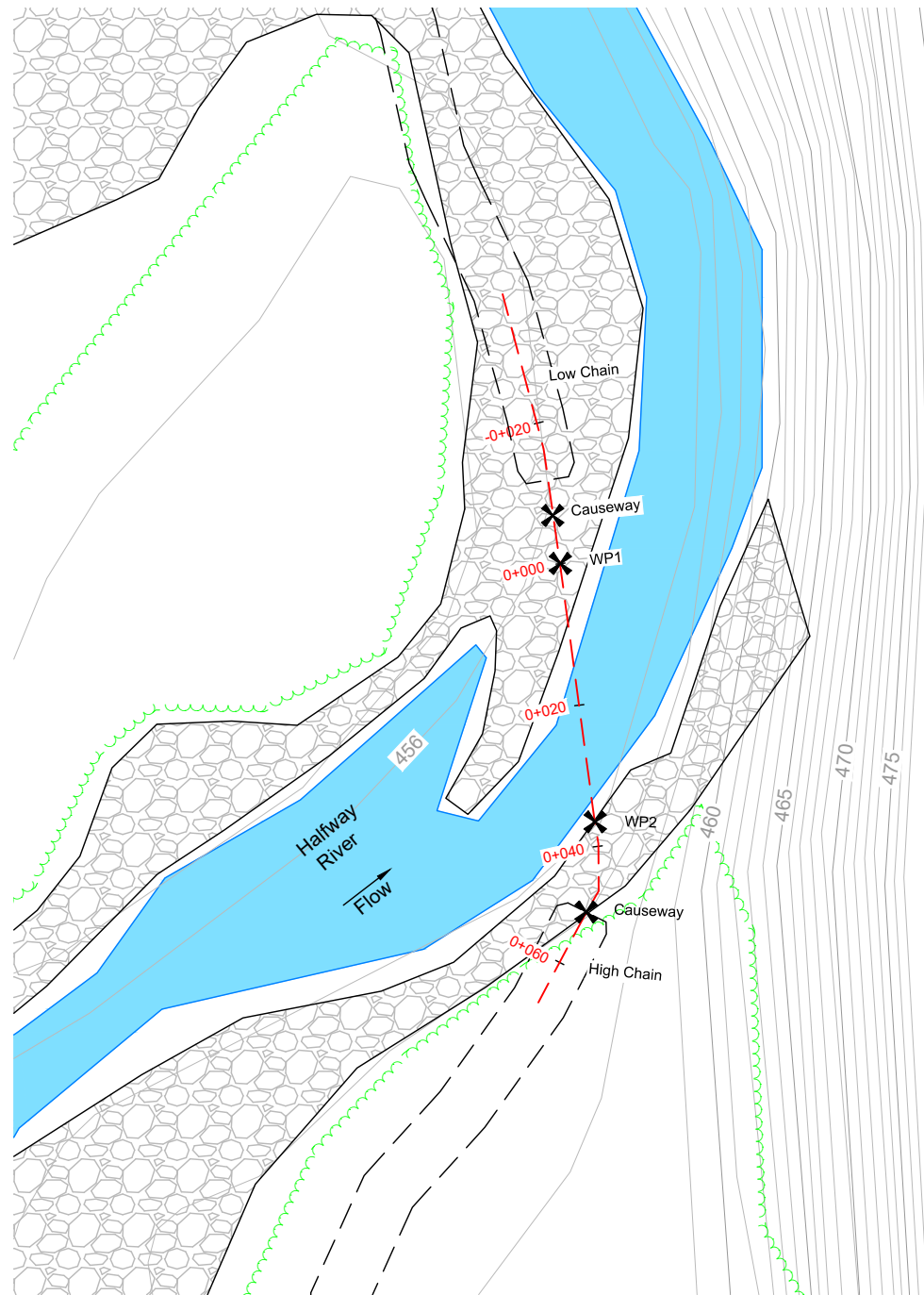


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| 0 | 8-NOV-2020 | Issued for Review |

| | | | |
|---|------------|----------|----------------|
| <p>ENGINEERING, ENVIRONMENTAL, INSPECTION</p> | | | |
| CROSSING 19.2G HALFWAY RIVER | | | |
| EXISTING SITE PHOTOS | | | |
| <p>Power smart</p> | | | |
| DESIGN | DRAWN | CHECKED | FILE |
| | M.Meilleur | C.Dalke | |
| DATE | DATE | DATE | PLAN |
| | 8-NOV-20 | 8-NOV-20 | TCC-HY19.2G |
| REVISIONS | | | Sheet 01 of 05 |



PROFILE
SCALE 1:500



PLAN
SCALE: 1:1000

BENCHMARK SURVEY TABLE

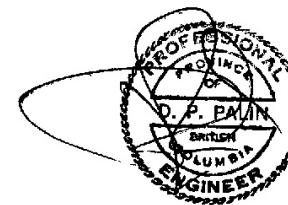
| MARK | ELEV. (m) | NORTHING | EASTING |
|-------|-----------|------------|-----------|
| ✕ WP1 | 455.84 | 6234171.90 | 590367.57 |
| ✕ WP2 | 455.78 | 6234135.69 | 590372.46 |

NOTE: ELEV. IS AT BOTTOM OF GIRDERS

| LEGEND | |
|--------|----------------|
| | CREEK |
| | ROAD |
| | BRIDGE |
| | CAUSEWAY |
| | ROAD ALIGNMENT |
| | RIPARIAN ROCK |
| | TREE LINE |
| | SECTION LINE |

GENERAL NOTES:

1. TOPOGRAPHIC SURVEY DEVELOPED BASED OFF LIDAR DATA PROVIDED BY MAPLE LEAF FORESTRY.
2. COORDINATE SYSTEM NAD83, GEOID CGG2013.
3. NO GEOTECHNICAL INFORMATION HAS BEEN PROVIDED OR GATHERED TO DATE.
4. HALFWAY RIVER DEPTH ESTIMATED AT 0.5m AT CROSSING LOCATION. TRUE RIVER DEPTH UNKNOWN AND HAS BEEN ASSUMED FOR BRIDGE CONFIGURATION PURPOSES.
5. HYDROLOGICAL INFORMATION ACQUIRED BASED ON NEARBY CROSSINGS AND HYDROTECHNICAL REPORTS PREPARED BY OTHERS. A SEASON FLOW (Q10 SEASONAL PERIOD FROM OCTOBER TO APRIL) VOLUME OF 37m³/s HAS BEEN DETERMINED FOR THIS CHANNEL.
6. FLOW VELOCITY AT BRIDGES DETERMINED TO BE 1.9m/s FOR Q10 SEASONAL FLOW.
7. BRIDGE CONFIGURATION HAS BEEN CHOSEN TO SPAN DEEPEST PARTS OF CHANNELS TO CAUSE THE LEAST FLOW OBSTRUCTION POSSIBLE.
8. UNLESS OTHERWISE NOTED, ALL DIMENSIONS ARE IN MILLIMETERS AND ALL ELEVATIONS AND STATIONS ARE IN METERS.



Trilogy Crossing Corp.
ENGINEERING, ENVIRONMENTAL, INSPECTION

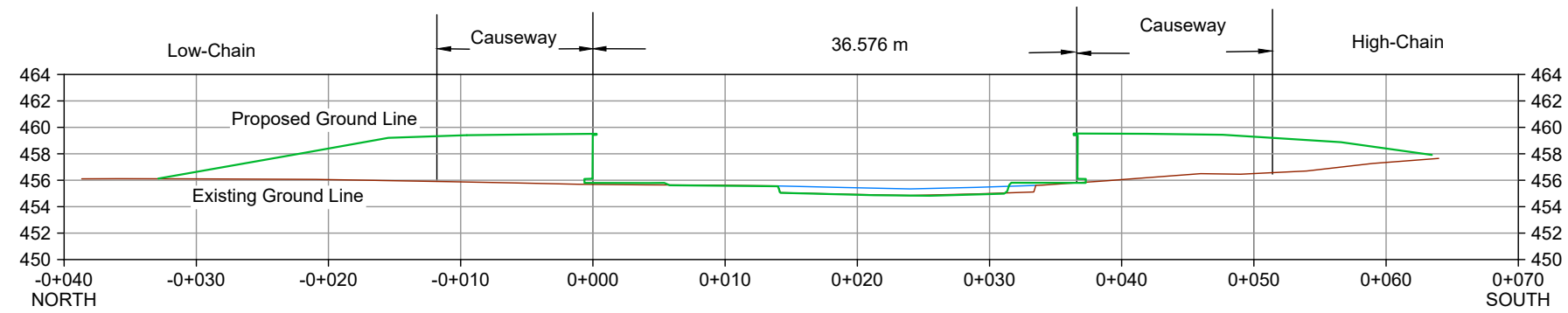
Crossing 19.2G Halfway River

EXISTING PLAN VIEW

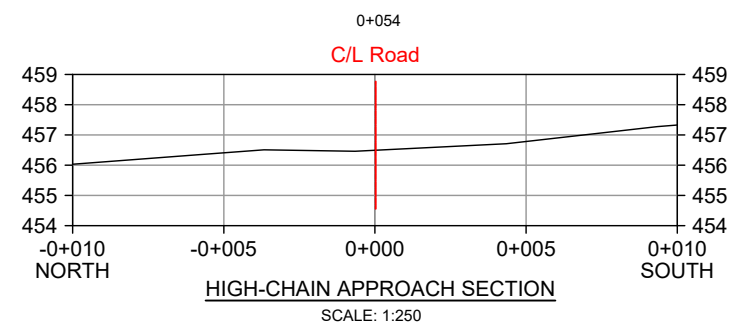
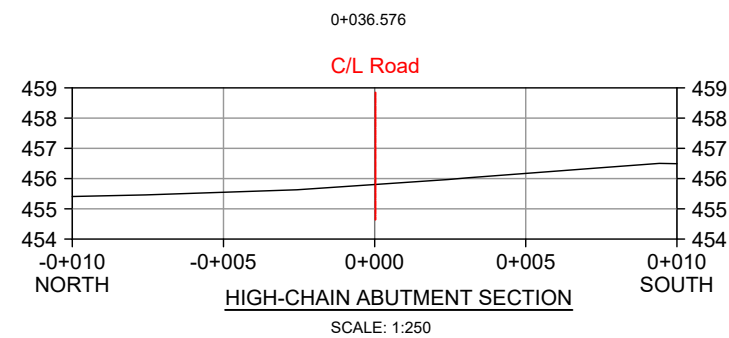
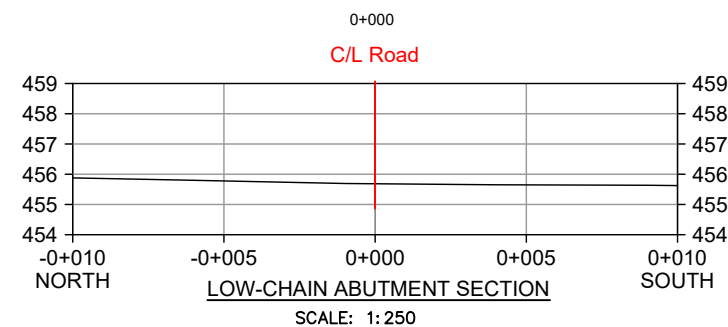
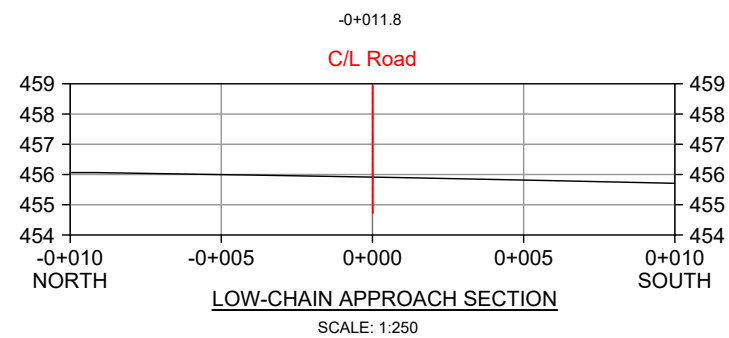
BC Hydro
Power smart

| NO. | DATE | DESCRIPTION | DESIGN | DRAWN | CHECKED | FILE |
|-----|------------|-------------------------|--------|------------|---------|-------------|
| 1 | 8-NOV-2020 | Issued for Construction | | M.Meilleur | C.Dalke | |
| 0 | 8-NOV-2020 | Issued for Review | | | | TCC-HY19.2G |

REVISIONS



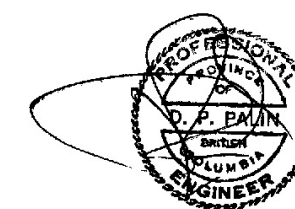
PROFILE
SCALE 1:500



| LEGEND | |
|--------|----------------|
| | CREEK |
| | ROAD |
| | BRIDGE |
| | CAUSEWAY |
| | ROAD ALIGNMENT |
| | RIPARIAN ROCK |
| | TREE LINE |
| | SECTION LINE |

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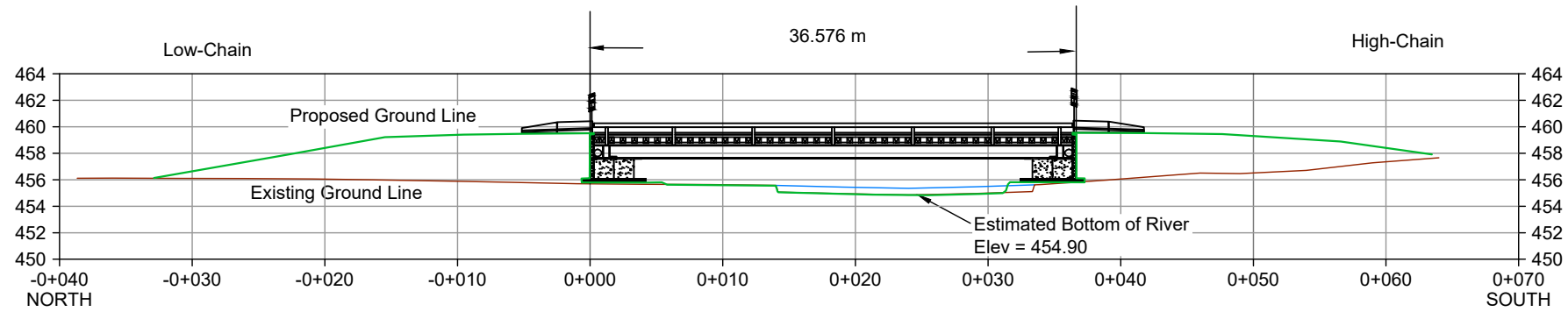
Trilogy Crossing Corp.
ENGINEERING, ENVIRONMENTAL, INSPECTION

Crossing 19.2G Halfway River

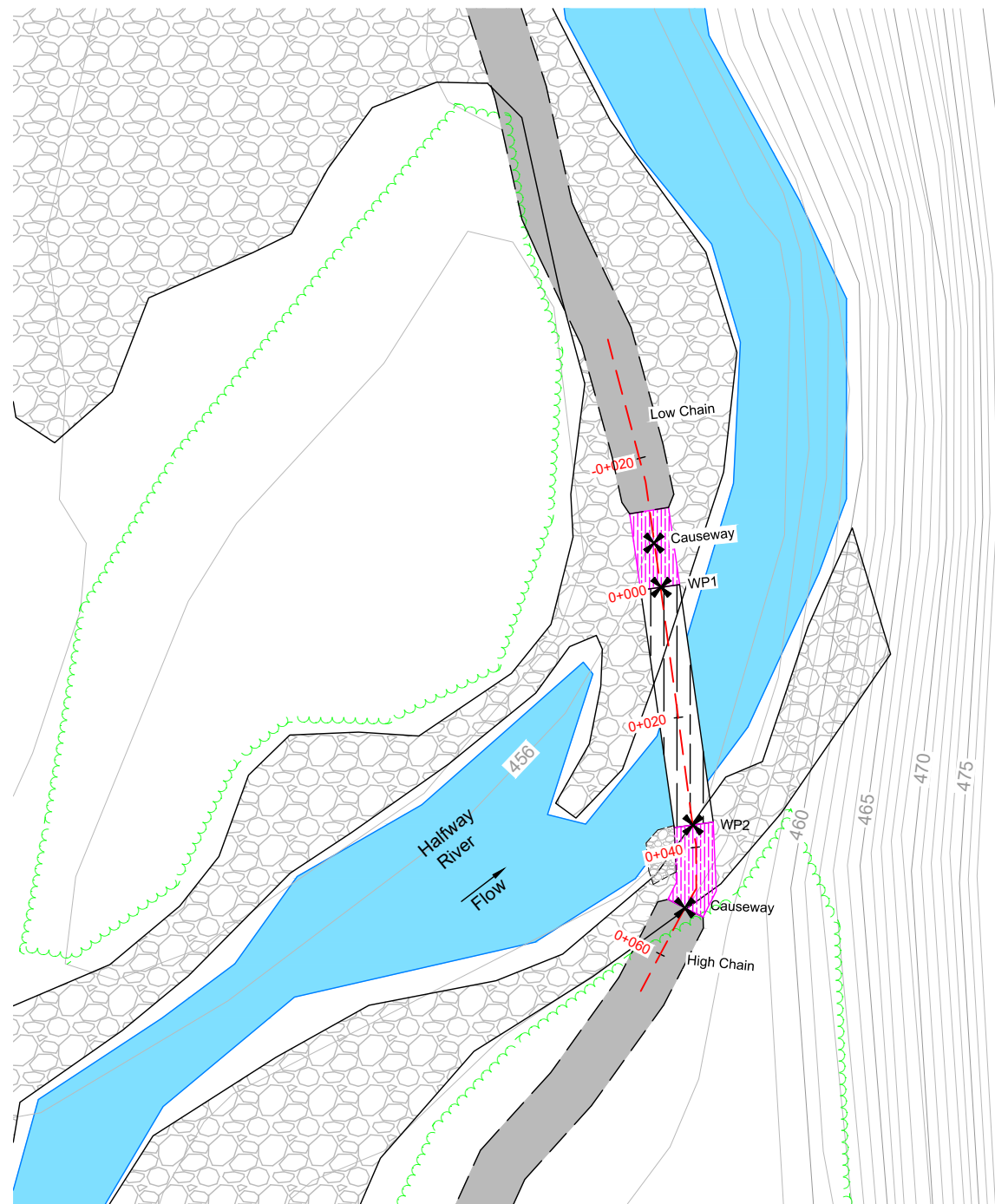
EXISTING PROFILES AND SECTIONS

BC Hydro
Power smart

| REVISIONS | | DESIGN | DRAWN | CHECKED | FILE |
|-----------|------------|-------------------------|------------|---------|------|
| 1 | 8-NOV-2020 | Issued for Construction | M.Meilleur | C.Dalke | |
| 0 | 8-NOV-2020 | Issue for Review | | | |



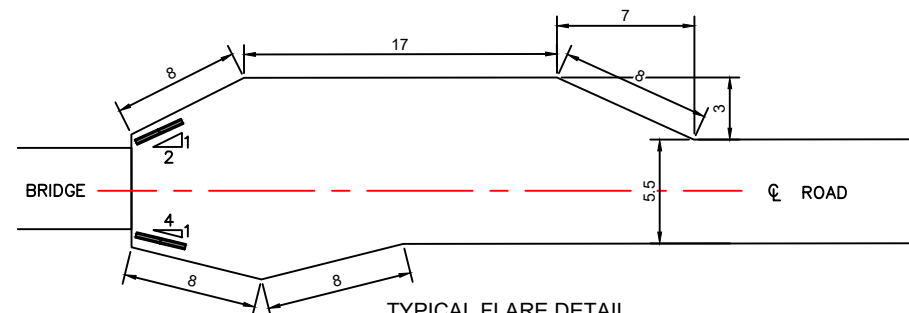
PROFILE
SCALE 1:500



PLAN
SCALE: 1:1000

NO FLOW PRESENT IN CHANNEL:

- BRIDGE MAY BE SUBSTITUTED FOR FOUR 600Ø STEEL PIPE CULVERTS IF NO FLOW IS PRESENT IN CHANNEL AT TIME OF CONSTRUCTION AND NO MAJOR PRECIPITATION OR SNOW MELT IS FORESEEABLE UNTIL APRIL 2021.



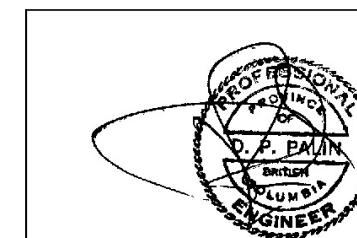
TYPICAL FLARE DETAIL
SCALE: 1:400

BENCHMARK SURVEY TABLE

| MARK | ELEV. (m) | NORTHING | EASTING |
|-------|-----------|------------|-----------|
| ✕ WP1 | 455.84 | 6234171.90 | 590367.57 |
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NOTE: ELEV. IS AT BOTTOM OF GIRDERS

| LEGEND | |
|--------|----------------|
| | CREEK |
| | ROAD |
| | BRIDGE |
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| | ROAD ALIGNMENT |
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| | TREE LINE |
| | SECTION LINE |



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GENERAL NOTES:

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VOLUME NOTES:

- RIPRAP SHALL BE HARD, DURABLE, ANGULAR ROCK AND IN ACCORDANCE TO THE MINISTRY OF FORESTS, LANDS AND NATURAL RESOURCE OPERATIONS "ENGINEERING MANUAL", APRIL 7, 2016.

CLASS 250 kg AVERAGE SIZE ROCK RIPRAP, 500 THICK WITH THE FOLLOWING ROCK GRADATION:

| | | MASSDIAMETER | |
|-----|-------------|--------------|-----|
| 85% | LARGER THAN | 25 kg | 300 |
| 50% | LARGER THAN | 250 kg | 600 |
| 15% | LARGER THAN | 750 kg | 900 |

MINIMUM RIPRAP VOLUME: 21 m³

- LINE EXCAVATION WITH NON-WOVEN GEO-TEXTILE, MINIMUM MULLEN BURST STRENGTH OF 2619 KPA (Armtec 250/ProPex 4553 OR APPROVED EQUIVALENT).

TOTAL GEOTEXTILE: 400 m²

- ESTIMATED CUT AND FILL VOLUMES:

| | |
|---------------------|---------------------|
| COMPACTED BACKFILL: | 1001 m ³ |
| EXCAVATION: | 125 m ³ |
| NET FILL: | 876 m ³ |

- ESTIMATED GRANULAR BASE FILL: 6 m³

- BACKFILL AND GRANULAR FILL SHALL BE PLACED IN LAYERS NOT EXCEEDING 300mm IN LOOSE THICKNESS AND EACH LAYER SHALL BE COMPACTED TO THE CLIENTS ROAD SPECIFICATIONS WITH A PLATE TAMPER EVENLY ACROSS THE ENTIRE SURFACE TO THE DESIRED ELEVATION.

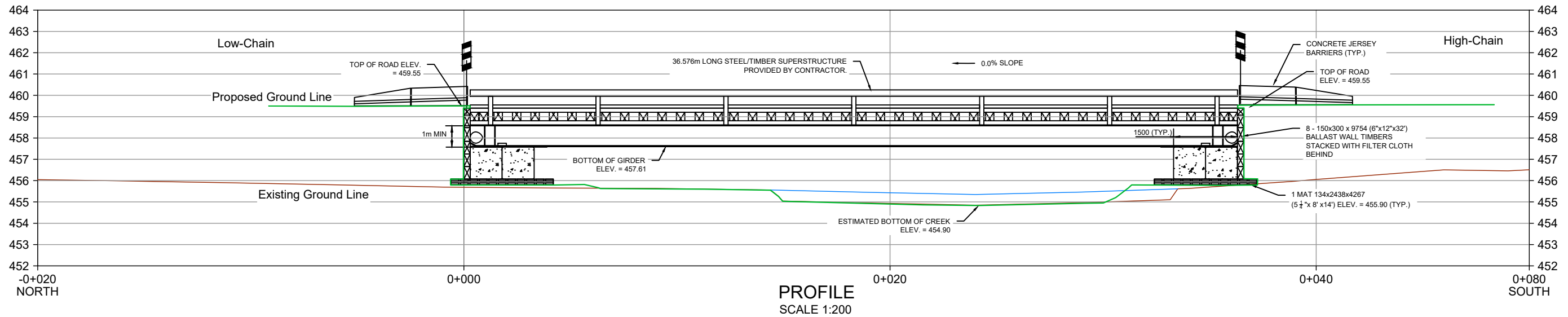


CROSSING OF 19.2G HALFWAY RIVER

GENERAL ARRANGEMENT



| DESIGN | DRAWN | CHECKED | FILE |
|--------|------------|----------|-------------|
| | M.Meilleur | C.Dalke | |
| DATE | DATE | DATE | PLAN |
| | 8-NOV-20 | 8-NOV-20 | TCC-HY19.2G |



PROFILE
SCALE 1:200

GENERAL NOTES:

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NO FLOW PRESENT IN CHANNEL:

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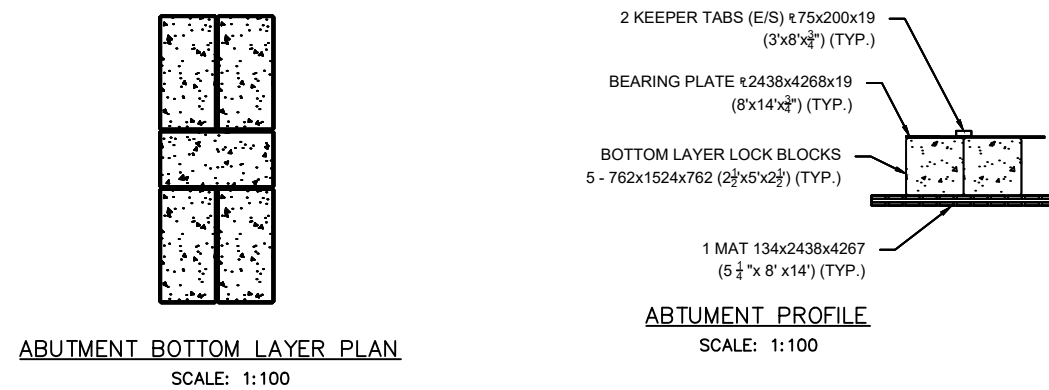
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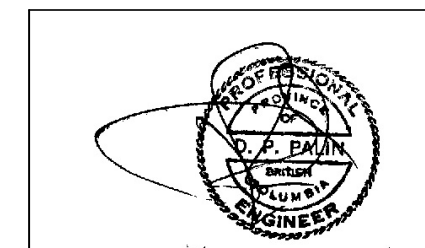
MINIMUM RIPRAP VOLUME: 21 m³



ABUTMENT BOTTOM LAYER PLAN
SCALE: 1:100

ABUTMENT PROFILE
SCALE: 1:100

| LEGEND | |
|--------|----------------|
| | CREEK |
| | ROAD |
| | BRIDGE |
| | CAUSEWAY |
| | ROAD ALIGNMENT |
| | RIPARIAN ROCK |
| | TREE LINE |
| | SECTION LINE |



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Trilogy Crossing Corp.
ENGINEERING, ENVIRONMENTAL, INSPECTION

CROSSING OF 19.2G HALFWAY RIVER

BRIDGE PROFILES AND SECTIONS

BC Hydro
Power smart

| DESIGN | DRAWN | CHECKED | FILE |
|--------|------------|---------|------|
| | M.Meilleur | C.Dalke | |

| DATE | DATE | DATE | DATE |
|----------|----------|----------|-------------|
| 8-NOV-20 | 8-NOV-20 | 8-NOV-20 | TCC-HY19.2G |

Sheet 05 of 05

LAST DATE REVISED: 8-NOV-2020 9:05 AM

HALFWAY RIVER OLTC 19 - 2 H

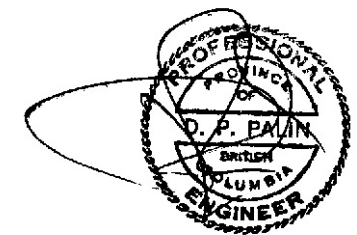


(1- 36.576 m) TEMPORARY TWIN STEEL GIRDER/TIMBER DECK BRIDGE OR CULVERT (MIN. CL625)

BRIDGE DETAILS

COORDINATES:
LATITUDE: 56.242464°
LONGITUDE: -121.542580°

| DESCRIPTION | SHEET NUMBER |
|--------------------------------|--------------|
| EXISTING SITE PHOTOS | 01 |
| EXISTING PLAN VIEW | 02 |
| EXISTING PROFILES AND SECTIONS | 03 |
| GENERAL ARRANGEMENT | 04 |
| BRIDGE PROFILES AND SECTIONS | 05 |



PREPARED BY:

DESCRIPTION: ISSUED FOR CONSTRUCTION
ISSUE DATE: 20/11/08



UNIT 315
7326 10TH STREET NE
CALGARY, AB
T2E 8W1

HIGH-CHAIN BANK LOOKING TOWARDS RIVER



HIGH-CHAIN BANK LOOKING TOWARDS RIVER



LOOKING UPSTREAM FROM HIGH-CHAIN BANK



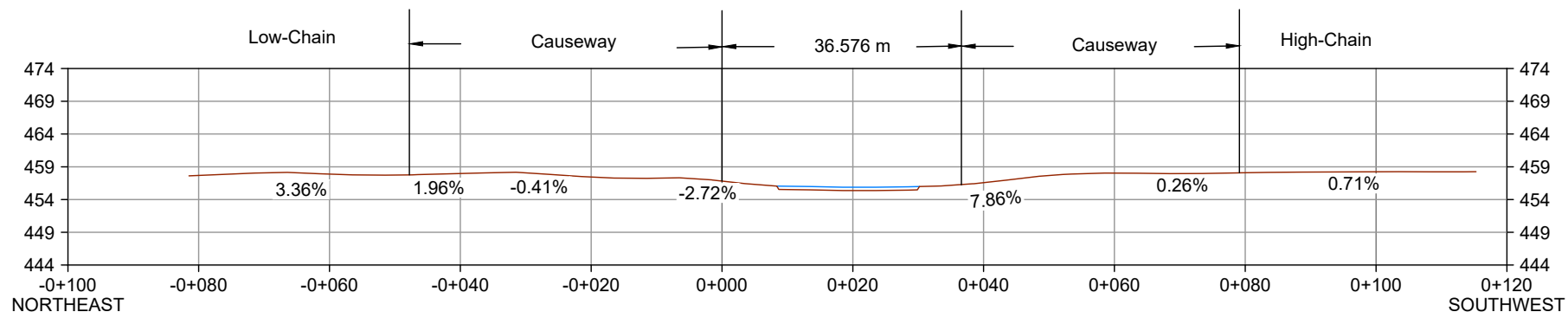
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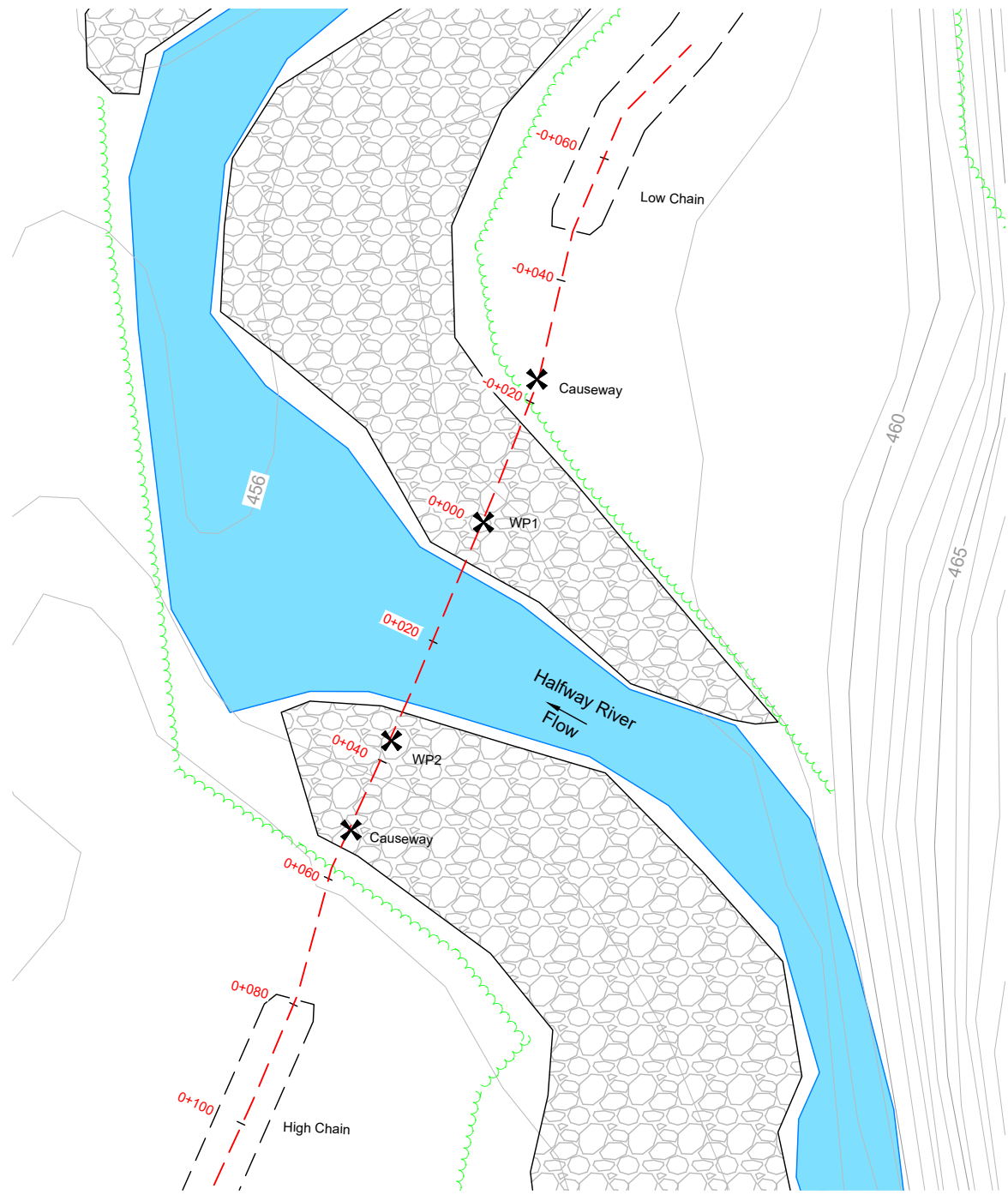
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|-----------|------------|-------------------------|-------|---------|------|
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| | | DATE | DATE | DATE | PLAN |
| 1 | 8-NOV-2020 | Issued for Construction | | | |
| 0 | 8-NOV-2020 | Issued for Review | | | |
| REVISIONS | | | | | |

| | | | |
|---|------------|----------|-------------|
| <p>ENGINEERING, ENVIRONMENTAL, INSPECTION</p> | | | |
| CROSSING 19.2H HALFWAY RIVER | | | |
| EXISTING SITE PHOTOS | | | |
| <p>Power smart</p> | | | |
| DESIGN | DRAWN | CHECKED | FILE |
| | M.Meilleur | C.Dalke | |
| DATE | DATE | DATE | PLAN |
| | 8-NOV-20 | 8-NOV-20 | TCC-HY19.2H |
| Sheet 01 of 05 | | | |

LAST DATE REVISED: 8-NOV-2020 10:47 AM



PROFILE
SCALE 1:1000



PLAN
SCALE: 1:1000

BENCHMARK SURVEY TABLE

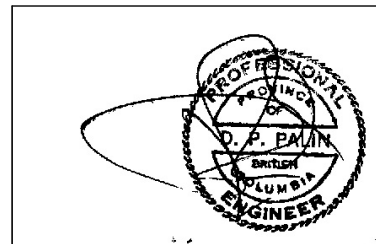
| MARK | ELEV. (m) | NORTHING | EASTING |
|-------|-----------|------------|-----------|
| ✕ WP1 | 457.05 | 6234021.17 | 590321.91 |
| ✕ WP2 | 456.40 | 6233987.47 | 590307.72 |

NOTE: ELEV. IS AT BOTTOM OF GIRDERS

| LEGEND | |
|--------|----------------|
| | CREEK |
| | ROAD |
| | BRIDGE |
| | CAUSEWAY |
| | ROAD ALIGNMENT |
| | RIPARIAN ROCK |
| | TREE LINE |
| | SECTION LINE |

GENERAL NOTES:

1. TOPOGRAPHIC SURVEY DEVELOPED BASED OFF LIDAR DATA PROVIDED BY MAPLE LEAF FORESTRY.
2. COORDINATE SYSTEM NAD83, GEOID CGG2013.
3. NO GEOTECHNICAL INFORMATION HAS BEEN PROVIDED OR GATHERED TO DATE.
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8. UNLESS OTHERWISE NOTED, ALL DIMENSIONS ARE IN MILLIMETERS AND ALL ELEVATIONS AND STATIONS ARE IN METERS.



Trilogy Crossing Corp.
ENGINEERING, ENVIRONMENTAL, INSPECTION

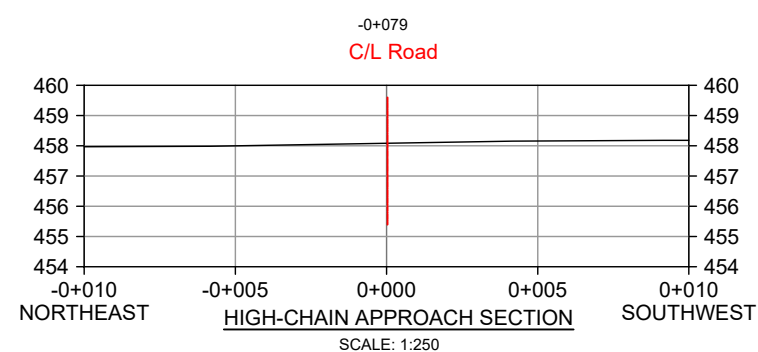
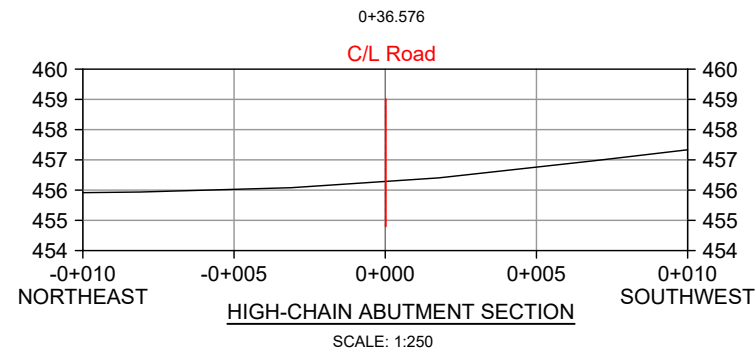
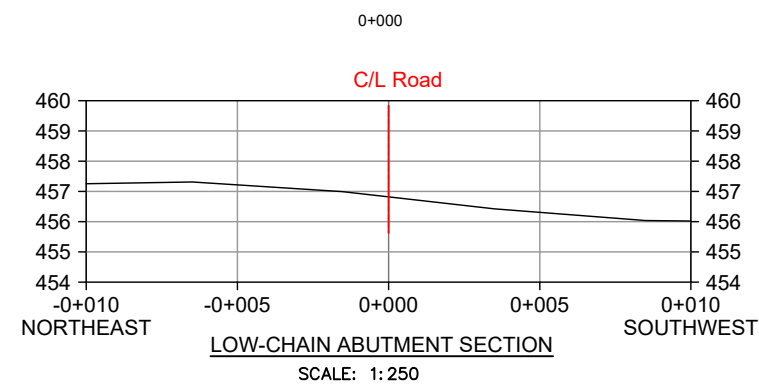
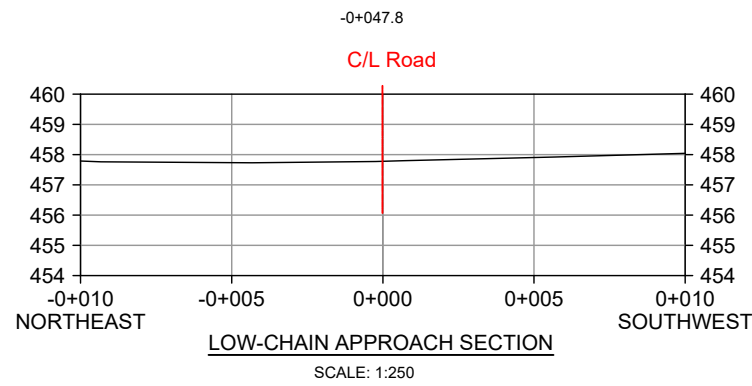
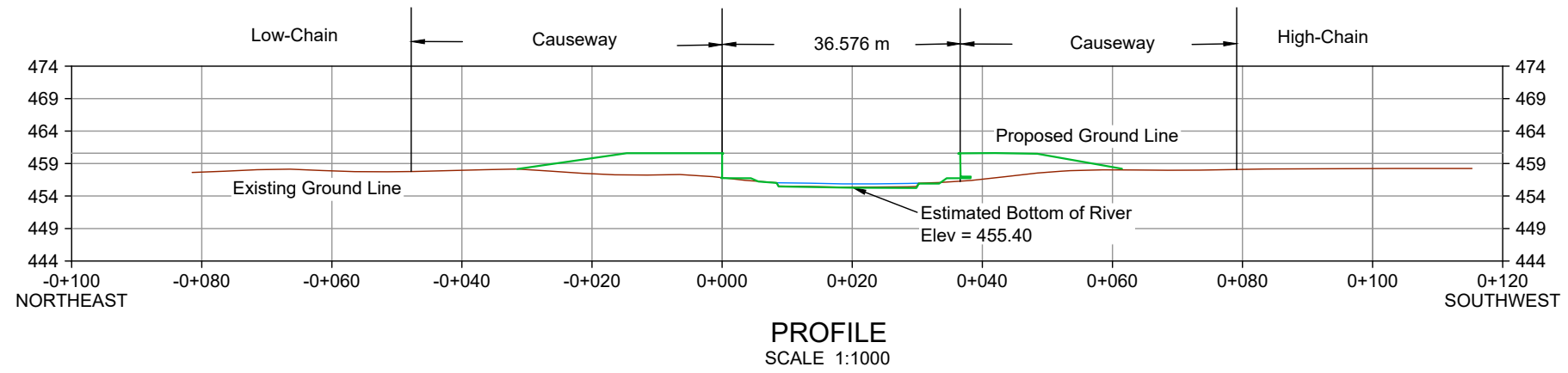
Crossing 19.2H Halfway River

EXISTING PLAN VIEW

BC Hydro
Power smart

| NO. | DATE | DESCRIPTION |
|-----|------------|-------------------------|
| 1 | 8-NOV-2020 | Issued for Construction |
| 0 | 8-NOV-2020 | Issued for Review |

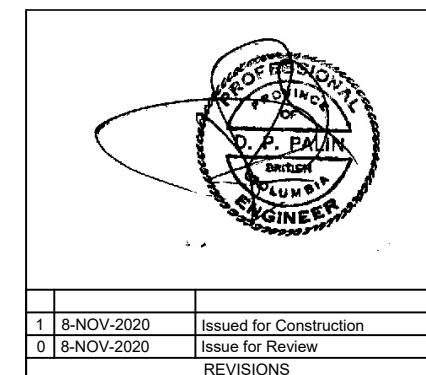
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|--------|------------|------------|-------------|
| | M.Meilleur | C.Dalke | |
| DATE | DATE | DATE | PLAN |
| | 8-NOV-2020 | 8-NOV-2020 | TCC-HY19.2H |



| LEGEND | |
|--------|----------------|
| | CREEK |
| | ROAD |
| | BRIDGE |
| | CAUSEWAY |
| | ROAD ALIGNMENT |
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Crossing 19.2H Halfway River

EXISTING PROFILES AND SECTIONS



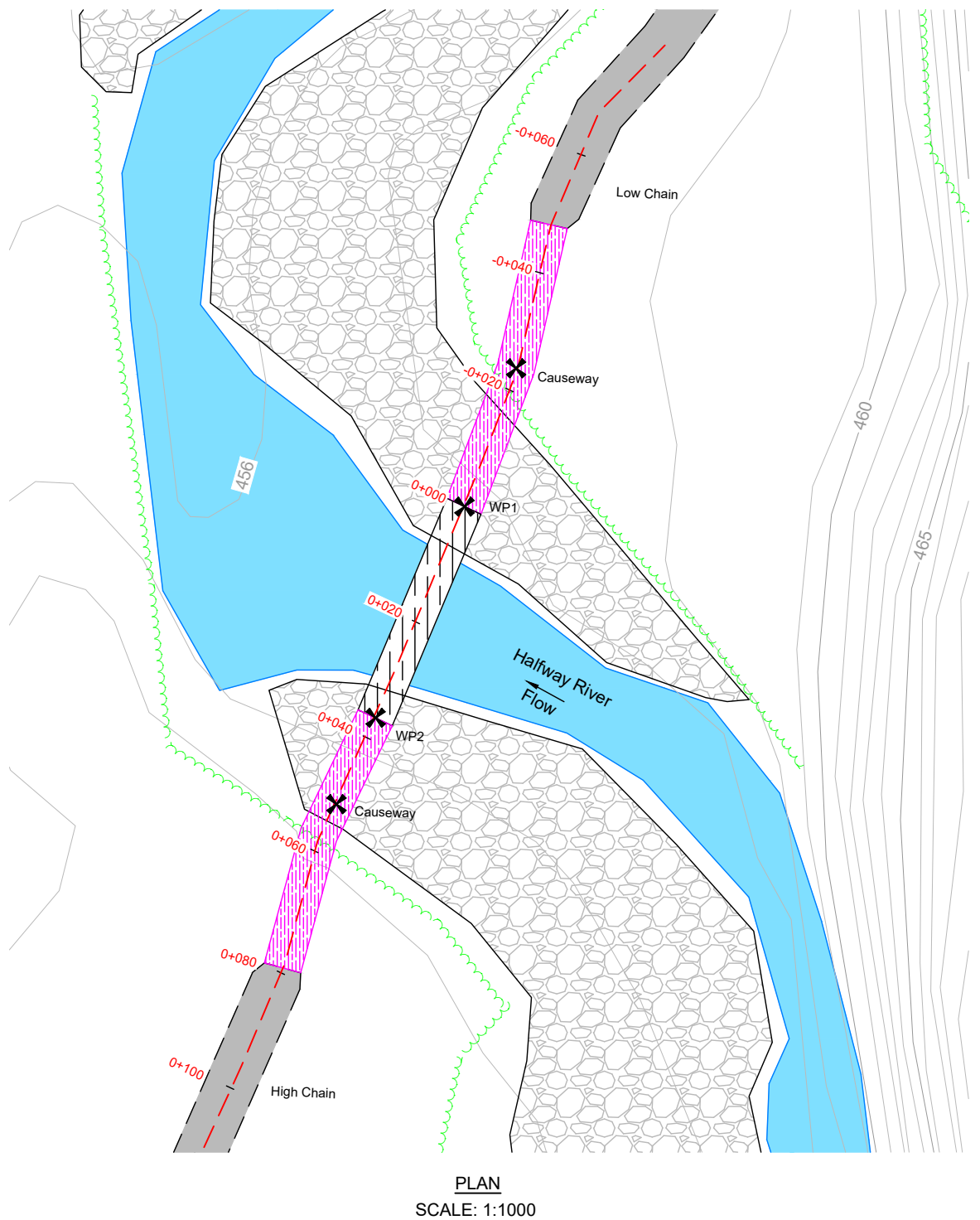
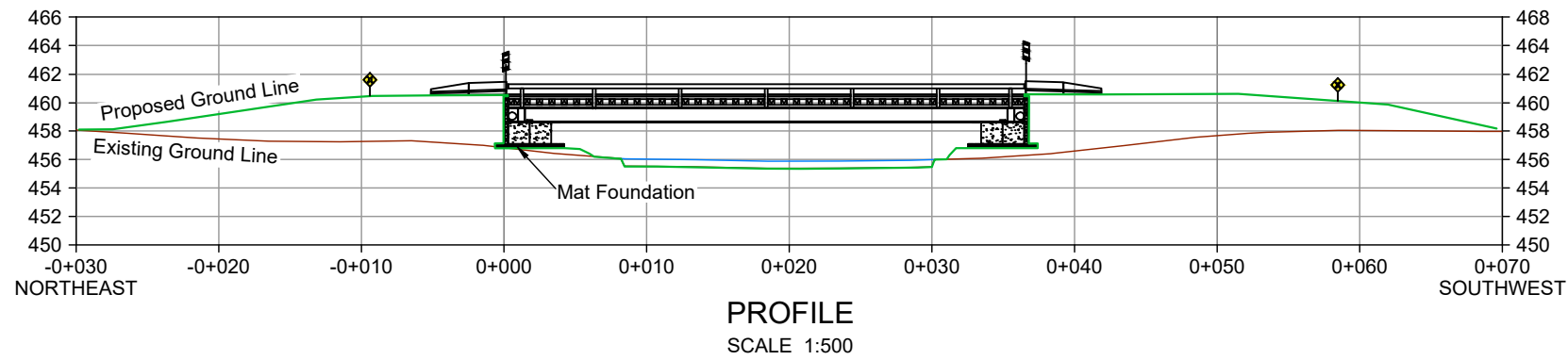
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REVISIONS

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|--------|------------|------------|-------------|
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| DATE | DATE | DATE | PLAN |
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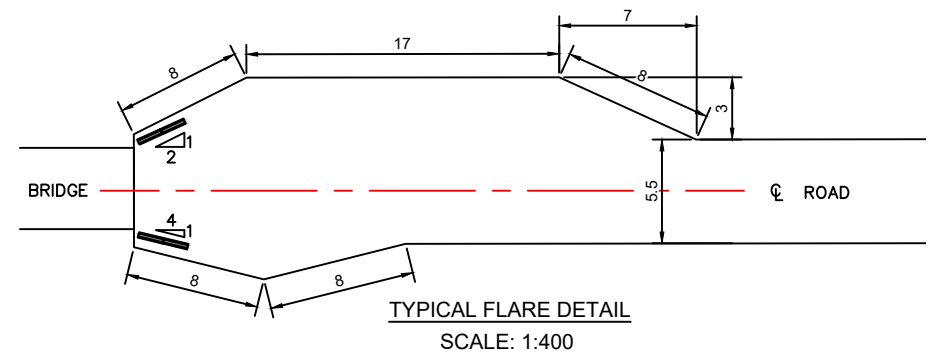
Sheet 03 of 05

LAST DATE REVISED: 8-Nov-2020 10:47 AM



NO FLOW PRESENT IN CHANNEL:

- BRIDGE MAY BE SUBSTITUTED FOR FOUR 600Ø STEEL PIPE CULVERTS IF NO FLOW IS PRESENT IN CHANNEL AT TIME OF CONSTRUCTION AND NO MAJOR PRECIPITATION OR SNOW MELT IS FORESEEABLE UNTIL APRIL 2021.



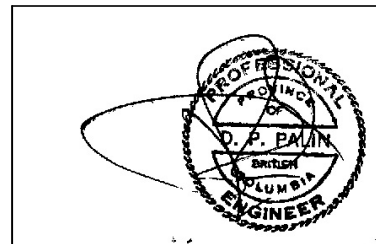
BENCHMARK SURVEY TABLE

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NOTE: ELEV. IS AT BOTTOM OF GIRDERS

LEGEND

| | |
|--|----------------|
| | CREEK |
| | ROAD |
| | BRIDGE |
| | CAUSEWAY |
| | ROAD ALIGNMENT |
| | RIPARIAN ROCK |
| | TREE LINE |
| | SECTION LINE |



REVISIONS

| NO. | DATE | DESCRIPTION |
|-----|------------|-------------------------|
| 1 | 8-NOV-2020 | Issued for Construction |
| 0 | 5-NOV-20 | Issued for Review |

- GENERAL NOTES:**
- BRIDGE SUPERSTRUCTURE AND SUBSTRUCTURE TO BE CERTIFIED AT A MINIMUM CL-625 LOADING.
 - INITIAL BRIDGE LENGTHS DETERMINED USING LIDAR IMAGERY IN COMBINATION WITH GOOGLE EARTH IMAGERY; BRIDGE LENGTH AND FINAL LOCATION TO BE VERIFIED BY MEASUREMENT PRIOR TO INSTALLATION.
 - BRIDGES DESIGNED FOR A MINIMUM Q10 SEASONAL FLOW +0.5m OF WATER CLEARANCE.
 - BRIDGE SUPERSTRUCTURE AND SUBSTRUCTURE TO BE CERTIFIED AT A MINIMUM CL-625 LOADING.
 - BRIDGE SUPERSTRUCTURE AND SUBSTRUCTURE TO BE CERTIFIED BY A PROFESSIONAL ENGINEER AND AN AS-BUILT PLAN PRODUCED AFTER CONSTRUCTION.
 - PERMITS: OBTAINING, SUBMITTING, AND RECEIVING APPROVAL SHALL BE THE RESPONSIBILITY OF THE OWNER PRIOR TO COMMENCEMENT OF CONSTRUCTION ACTIVITIES.
 - UNLESS OTHERWISE NOTED, ALL DIMENSIONS ARE IN MILLIMETERS AND ALL ELEVATIONS AND STATIONS ARE IN METERS.
 - THIS IS AN ENVIRONMENTALLY SENSITIVE LOCATION DUE TO STREAM PROXIMITY; ALL FILTER CLOTH, LOCK BLOCKS, ROAD ACCESS MATS, FENDER SYSTEMS AND DECKING TO BE FREE OF SOIL AND FOREIGN MATERIAL PRIOR TO TRANSPORT TO SITE. SPILL KITS AND TRAYS HIGHLY RECOMMENDED.

- VOLUME NOTES:**
- RIPRAP SHALL BE HARD, DURABLE, ANGULAR ROCK AND IN ACCORDANCE TO THE MINISTRY OF FORESTS, LANDS AND NATURAL RESOURCE OPERATIONS "ENGINEERING MANUAL", APRIL 7, 2016.

CLASS 250 kg AVERAGE SIZE ROCK RIPRAP, 500 THICK WITH THE FOLLOWING ROCK GRADATION:

| | | MASSDIAMETER | |
|-----|-------------|--------------|-----|
| 85% | LARGER THAN | 25 kg | 300 |
| 50% | LARGER THAN | 250 kg | 600 |
| 15% | LARGER THAN | 750 kg | 900 |

MINIMUM RIPRAP VOLUME: 21 m³

- LINE EXCAVATION WITH NON-WOVEN GEO-TEXTILE, MINIMUM MULLEN BURST STRENGTH OF 2619 KPA (Armtec 250/ProPex 4553 OR APPROVED EQUIVALENT).

TOTAL GEOTEXTILE: 400 m²

- ESTIMATED CUT AND FILL VOLUMES:

| | |
|---------------------|---------------------|
| COMPACTED BACKFILL: | 1001 m ³ |
| EXCAVATION: | 125 m ³ |
| NET FILL: | 876 m ³ |

- ESTIMATED GRANULAR BASE FILL: 6 m³
- BACKFILL AND GRANULAR FILL SHALL BE PLACED IN LAYERS NOT EXCEEDING 300mm IN LOOSE THICKNESS AND EACH LAYER SHALL BE COMPACTED TO THE CLIENTS ROAD SPECIFICATIONS WITH A PLATE TAMPER EVENLY ACROSS THE ENTIRE SURFACE TO THE DESIRED ELEVATION.

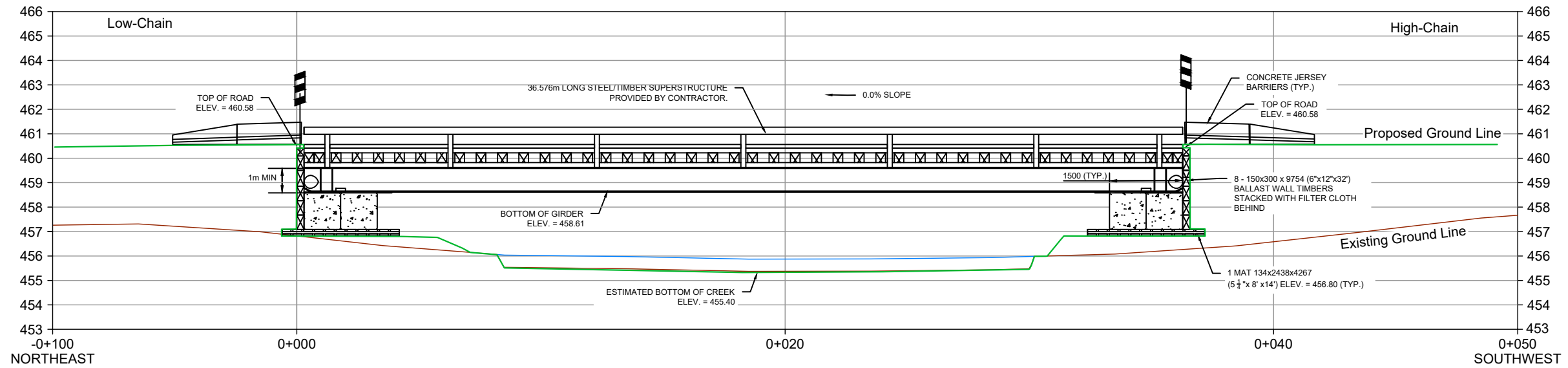


CROSSING OF 19.2H HALFWAY RIVER

GENERAL ARRANGEMENT



| DESIGN | DRAWN | CHECKED | FILE |
|--------|------------|----------|-------------|
| | M.Meilleur | C.Dalke | |
| DATE | DATE | DATE | PLAN |
| | 5-NOV-20 | 8-NOV-20 | TCC-HY19.2H |



PROFILE
SCALE 1:200

GENERAL NOTES:

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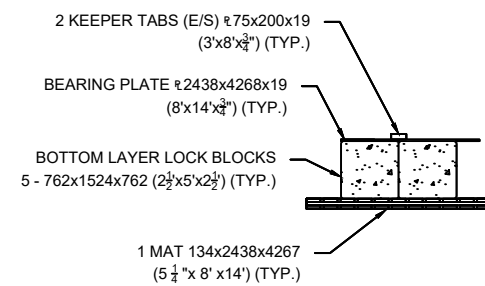
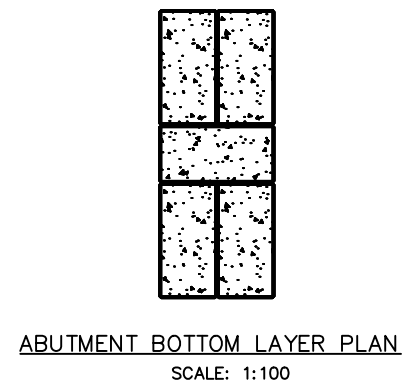
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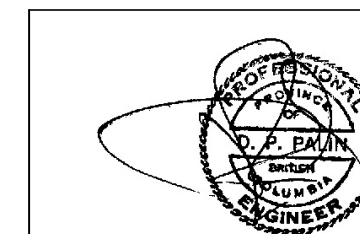
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MINIMUM RIPRAP VOLUME: 21 m³



| LEGEND | |
|--------|----------------|
| | CREEK |
| | ROAD |
| | BRIDGE |
| | CAUSEWAY |
| | ROAD ALIGNMENT |
| | RIPARIAN ROCK |
| | TREE LINE |
| | SECTION LINE |



| NO. | DATE | DESCRIPTION |
|-----|------------|-------------------------|
| 1 | 8-NOV-2020 | Issued for Construction |
| 0 | 8-NOV-20 | Issued for Review |

CROSSING OF 19.2H HALFWAY RIVER
 BRIDGE 1 PROFILES AND SECTIONS

 Power smart

| | | | |
|--------|-------------|------------|-------------|
| DESIGN | DESIGNED BY | CHECKED BY | FILE |
| | M.Meilleur | C.Dalke | |
| DATE | DATE | DATE | PLAN |
| | 8-NOV-20 | 8-NOV-20 | TCC-HY19.2H |

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HALFWAY RIVER OLTC 19 - 2 I

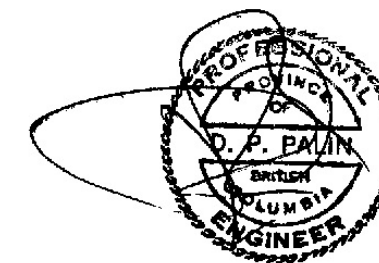


(2- 36.576 m) TEMPORARY TWIN STEEL GIRDER/TIMBER DECK BRIDGE (MIN. CL625)

BRIDGE DETAILS

COORDINATES:
LATITUDE: 56.236174°
LONGITUDE: -121.553038°

| DESCRIPTION | SHEET NUMBER |
|--------------------------------|--------------|
| EXISTING SITE PHOTOS | 01 |
| EXISTING PLAN VIEW | 02 |
| EXISTING PROFILES AND SECTIONS | 03 |
| GENERAL ARRANGEMENT | 04 |
| BRIDGE PROFILES AND SECTIONS | 05 |



PREPARED BY:



UNIT 315
7326 10TH STREET NE
CALGARY, AB
T2E 8W1

DESCRIPTION: ISSUED FOR CONSTRUCTION
ISSUE DATE: 20/11/07

INTENDED TO BE PLOTTED ON 11" X 17". ANY
COPIES OR PDF'S MAY NOT BE TO SCALE.

HIGH-CHAIN BANK LOOKING TOWARDS RIVER



LOW-CHAIN SIDE LOOKING TOWARDS RIVER



LOOKING UPSTREAM FROM LOW-CHAIN BANK



LOOKING DOWNSTREAM FROM LOW-CHAIN BANK



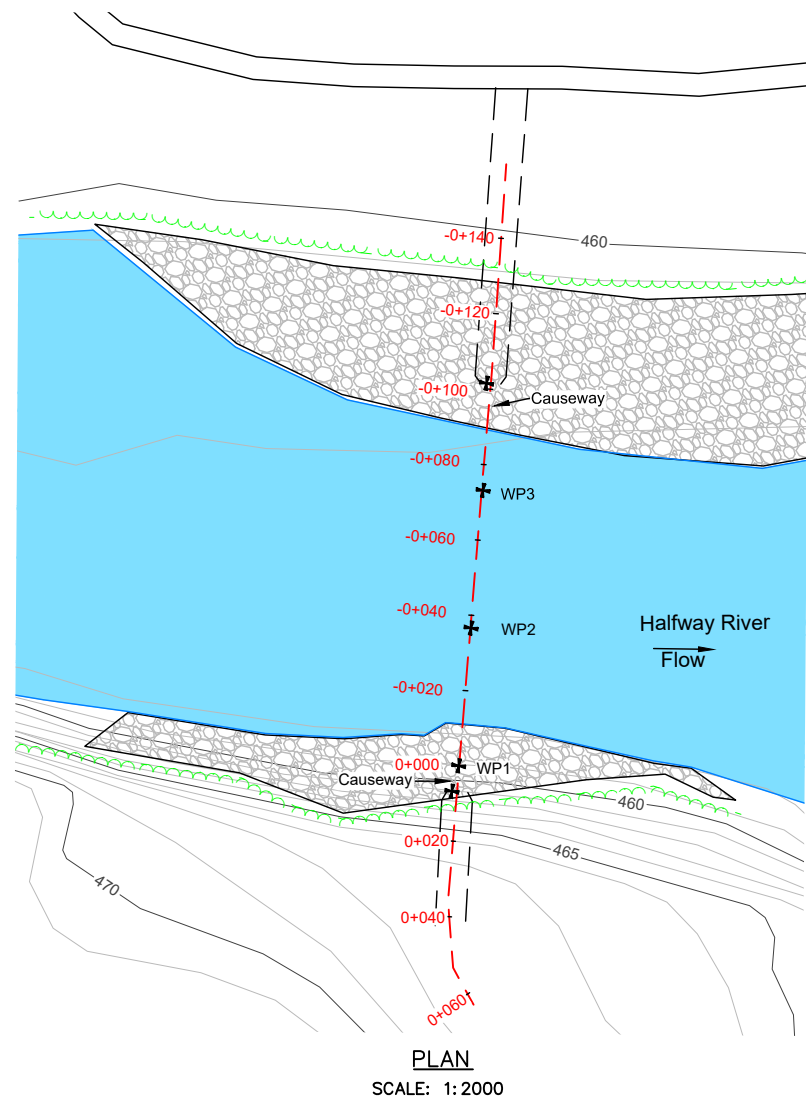
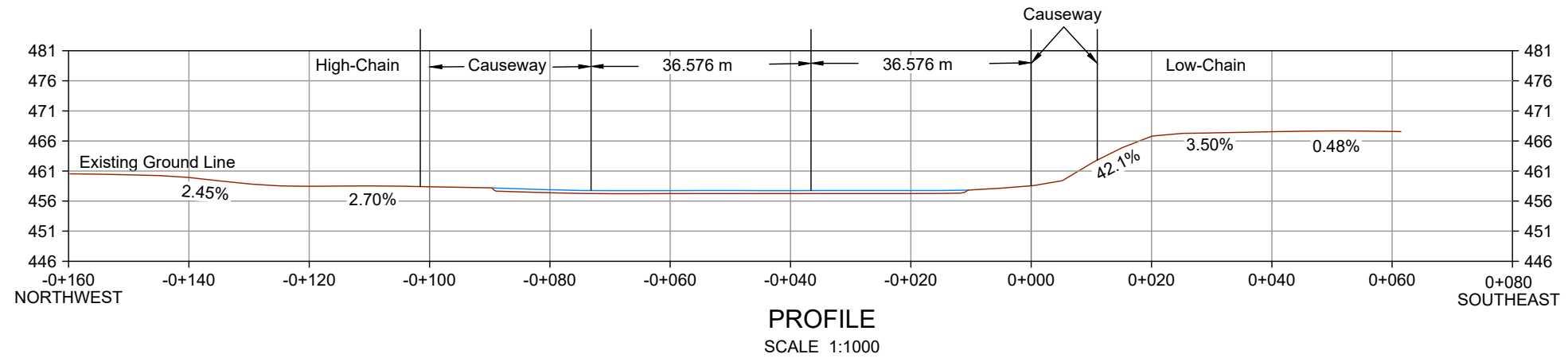
GENERAL NOTES:

1. SITE PHOTOGRAPHS WERE TAKEN BY OTHERS IN 2018 AND REPRODUCED HERE FOR REFERENCE.
2. TRILOGY CROSSING CORP. HAS NOT BEEN TO SITE AND THEREFORE IS UNABLE TO VERIFY GRAVEL BAR LOCATIONS AND CREEK BOTTOM LOCATIONS. ALL DETAILS HAVE BEEN BASED OFF IMAGERY AND TECHNICAL INFORMATION PREPARED BY OTHERS.

| | | | |
|-----------|------------|------------|-------------|
| DESIGN | DRAWN | CHECKED | FILE |
| 1 | M.Meilleur | CD | |
| DATE | DATE | DATE | PLAN |
| 0 | 3-NOV-20 | 7-NOV-2020 | TCC-HY19.21 |
| REVISIONS | | | |

| | | | |
|---|--|--|--|
| <p>ENGINEERING, ENVIRONMENTAL, INSPECTION</p> | | | |
| CROSSING 19.21 HALFWAY RIVER | | | |
| EXISTING SITE PHOTOS | | | |
| <p>Power smart</p> | | | |
| Sheet 01 of 05 | | | |

LAST DATE REVISED: 5-NOV-2020 3:12 PM



BENCHMARK SURVEY TABLE

| MARK | ELEV. (m) | NORTHING | EASTING |
|-------|-----------|------------|-----------|
| ✕ WP1 | 458.33 | 6233307.17 | 589689.13 |
| ✕ WP2 | 457.73 | 6233331.28 | 589661.67 |
| ✕ WP3 | 458.36 | 6233353.79 | 589634.80 |

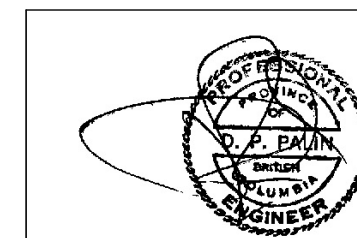
NOTE: ELEV. IS AT BOTTOM OF GIRDERS



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Trilogy Crossing Corp.
ENGINEERING, ENVIRONMENTAL, INSPECTION

Crossing 19.21 Halfway River

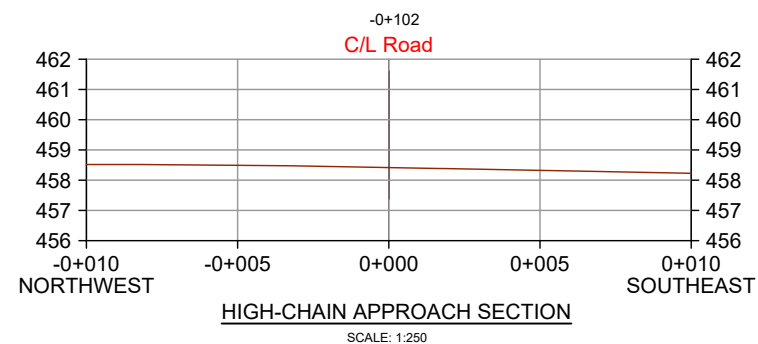
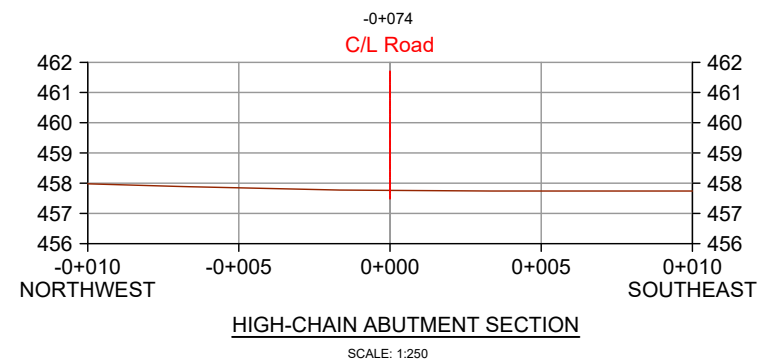
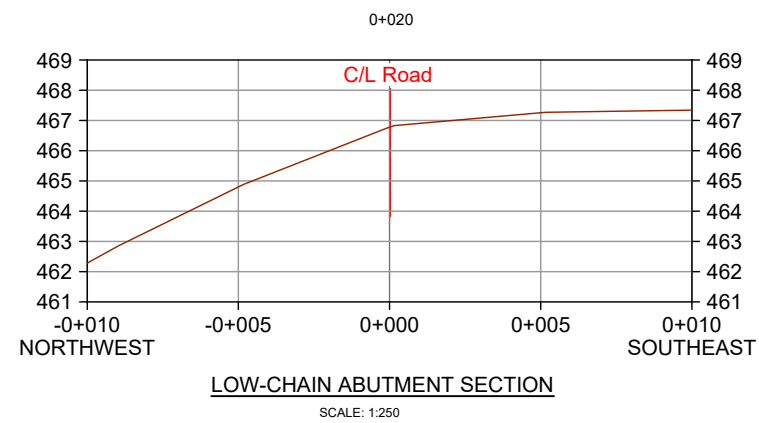
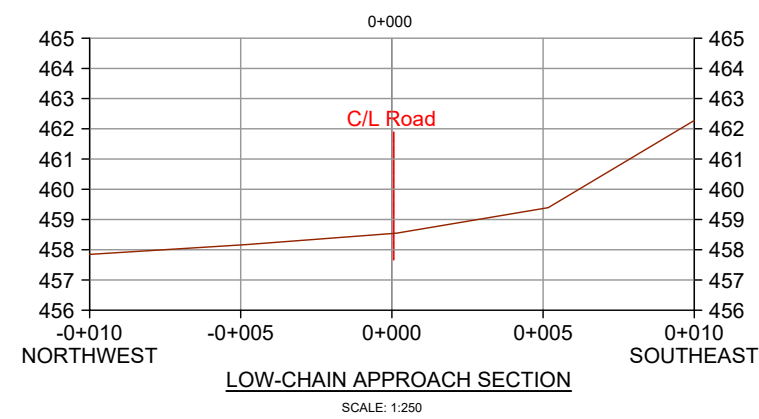
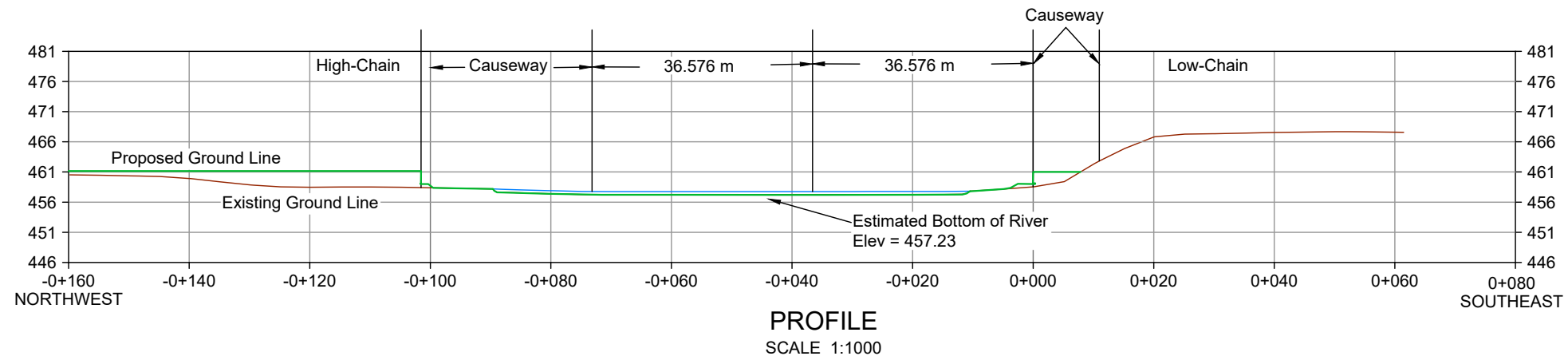
EXISTING PLAN VIEW

BC Hydro
Power smart

| DESIGN | DRAWN | CHECKED | FILE |
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| 1 | 7-NOV-2020 | Issued for Construction | M.Meilleur CD |
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| 0 | 1-NOV-2020 | Issued for Review | TCC-HY19.21 |
| REVISIONS | | | |

Sheet 02 of 05

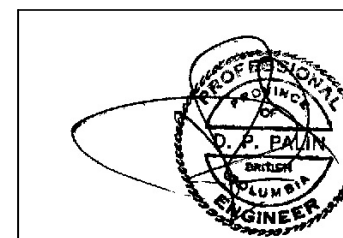
LAST DATE REVISED: 5-NOV-2020 3:12 PM



| LEGEND | |
|--------|----------------|
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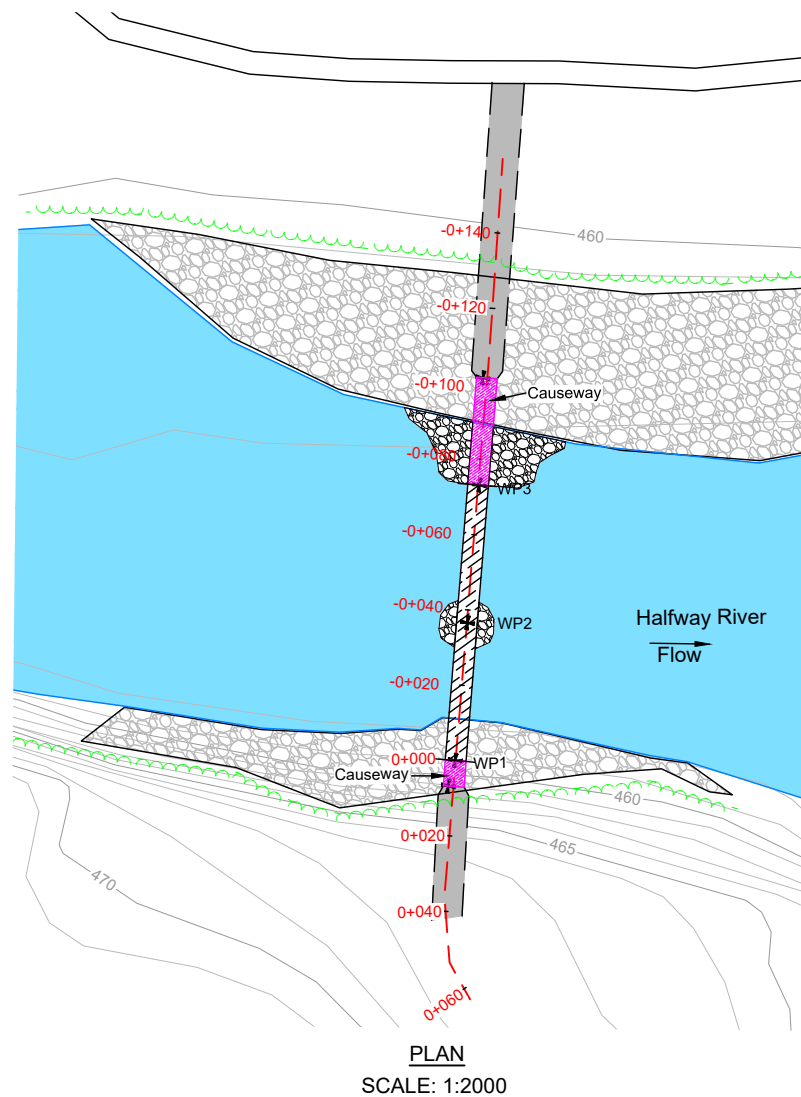
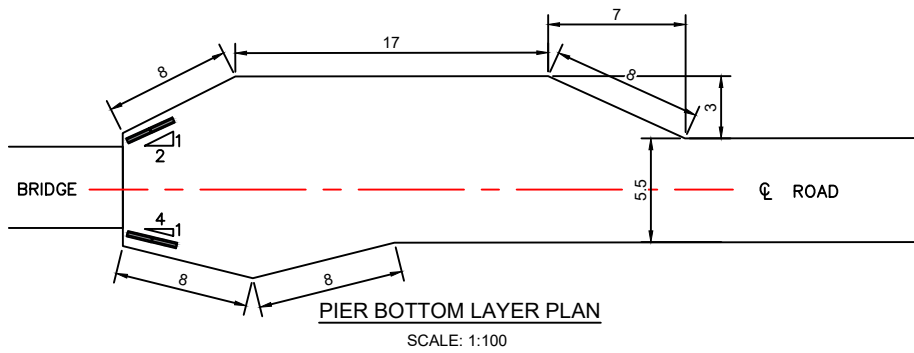
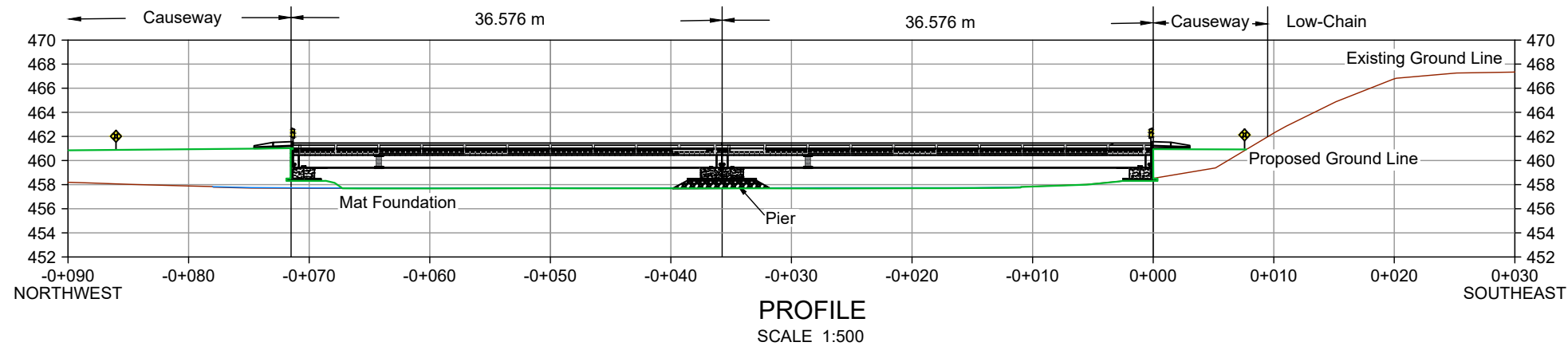
Crossing 19.21 Halfway River

EXISTING PROFILES AND SECTIONS



| REVISIONS | | DESIGN | DRAWN | CHECKED | FILE |
|-----------|------------|-------------------------|-------|-------------|------------|
| 1 | 7-NOV-2020 | Issued for Construction | | M.Meilleur | CD |
| 0 | 3-NOV-2020 | Issue for Review | | 3-NOV-2020 | 7-NOV-2020 |
| | | DATE | | PLAN | |
| | | | | TCC-HY19.21 | |

Sheet 03 of 05



NO FLOW PRESENT IN CHANNEL:

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| ✕ WP2 | 457.73 | 6233331.28 | 589661.67 |
| ✕ WP3 | 458.36 | 6233353.79 | 589634.80 |

NOTE: ELEV. IS AT BOTTOM OF GIRDERS

| LEGEND | |
|--------|----------------|
| | CREEK |
| | ROAD |
| | BRIDGE |
| | CAUSEWAY |
| | ROAD ALIGNMENT |
| | RIPARIAN ROCK |
| | TREE LINE |
| | SECTION LINE |

GENERAL NOTES:

- BRIDGE SUPERSTRUCTURE AND SUBSTRUCTURE TO BE CERTIFIED AT A MINIMUM CL-625 LOADING.
- INITIAL BRIDGE LENGTHS DETERMINED USING LIDAR IMAGERY IN COMBINATION WITH GOOGLE EARTH IMAGERY; BRIDGE LENGTH AND FINAL LOCATION TO BE VERIFIED BY MEASUREMENT PRIOR TO INSTALLATION.
- BRIDGES DESIGNED FOR A MINIMUM Q10 SEASONAL FLOW +0.5m OF WATER CLEARANCE.
- BRIDGE SUPERSTRUCTURE AND SUBSTRUCTURE TO BE CERTIFIED AT A MINIMUM CL-625 LOADING.
- BRIDGE SUPERSTRUCTURE AND SUBSTRUCTURE TO BE CERTIFIED BY A PROFESSIONAL ENGINEER AND AN AS-BUILT PLAN PRODUCED AFTER CONSTRUCTION.
- PERMITS: OBTAINING, SUBMITTING, AND RECEIVING APPROVAL SHALL BE THE RESPONSIBILITY OF THE OWNER PRIOR TO COMMENCEMENT OF CONSTRUCTION ACTIVITIES.
- UNLESS OTHERWISE NOTED, ALL DIMENSIONS ARE IN MILLIMETERS AND ALL ELEVATIONS AND STATIONS ARE IN METERS.
- THIS IS AN ENVIRONMENTALLY SENSITIVE LOCATION DUE TO STREAM PROXIMITY; ALL FILTER CLOTH, LOCK BLOCKS, ROAD ACCESS MATS, FENDER SYSTEMS AND DECKING TO BE FREE OF SOIL AND FOREIGN MATERIAL PRIOR TO TRANSPORT TO SITE. SPILL KITS AND TRAYS HIGHLY RECOMMENDED.

VOLUME NOTES:

- RIPRAP SHALL BE HARD, DURABLE, ANGULAR ROCK AND IN ACCORDANCE TO THE MINISTRY OF FORESTS, LANDS AND NATURAL RESOURCE OPERATIONS "ENGINEERING MANUAL", APRIL 7, 2016.

CLASS 250 kg AVERAGE SIZE ROCK RIPRAP, 500 THICK WITH THE FOLLOWING ROCK GRADATION:

| | | MASS | DIAMETER |
|-----|-------------|--------|----------|
| 85% | LARGER THAN | 25 kg | 300 |
| 50% | LARGER THAN | 250 kg | 600 |
| 15% | LARGER THAN | 750 kg | 900 |

MINIMUM RIPRAP VOLUME: 50 m³

- LINE EXCAVATION WITH NON-WOVEN GEO-TEXTILE, MINIMUM MULLEN BURST STRENGTH OF 2619 KPA (Armtex 250/ProPex 4553 OR APPROVED EQUIVALENT).

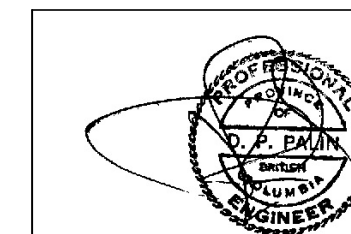
TOTAL GEOTEXTILE: 400 m²

- ESTIMATED CUT AND FILL VOLUMES:

| | |
|---------------------|---------------------|
| COMPACTED BACKFILL: | 1001 m ³ |
| EXCAVATION: | 125 m ³ |
| NET FILL: | 876 m ³ |

- ESTIMATED GRANULAR BASE FILL: 6 m³

- BACKFILL AND GRANULAR FILL SHALL BE PLACED IN LAYERS NOT EXCEEDING 300mm IN LOOSE THICKNESS AND EACH LAYER SHALL BE COMPACTED TO THE CLIENTS ROAD SPECIFICATIONS WITH A PLATE TAMPER EVENLY ACROSS THE ENTIRE SURFACE TO THE DESIRED ELEVATION.



| REVISIONS | | |
|-----------|------------|-------------------------|
| 1 | 7-NOV-2020 | Issued for Construction |
| 0 | 3-NOV-20 | Issued for Review |

Trilogy Crossing Corp.
ENGINEERING, ENVIRONMENTAL, INSPECTION

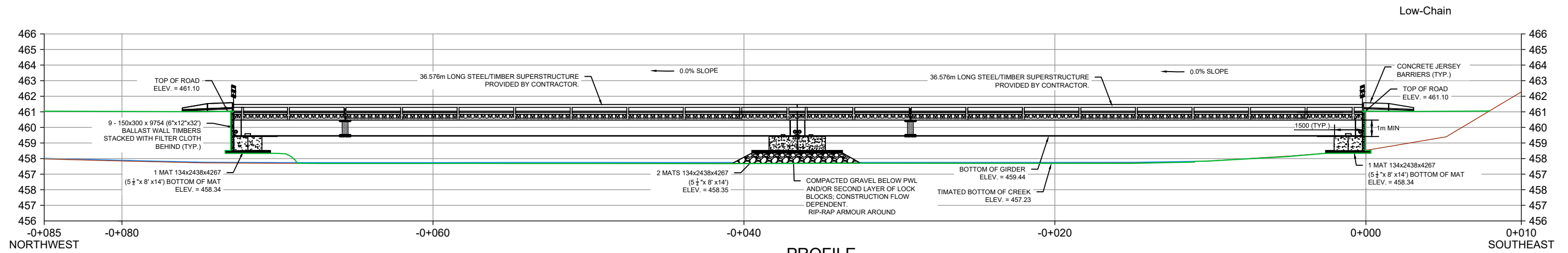
CROSSING OF 19.2I HALFWAY RIVER

GENERAL ARRANGEMENT

BC Hydro
Power smart

| DESIGN | DRAWN | CHECKED | FILE |
|--------|------------|------------|-------------|
| | M.Meilleur | CD | |
| DATE | DATE | DATE | PLAN |
| | 3-NOV-20 | 7-NOV-2020 | TCC-HY19.2I |

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PROFILE
SCALE 1:250

GENERAL NOTES:

- BRIDGE SUPERSTRUCTURE AND SUBSTRUCTURE TO BE CERTIFIED AT A MINIMUM CL-625 LOADING.
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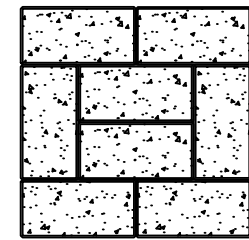
VOLUME NOTES:

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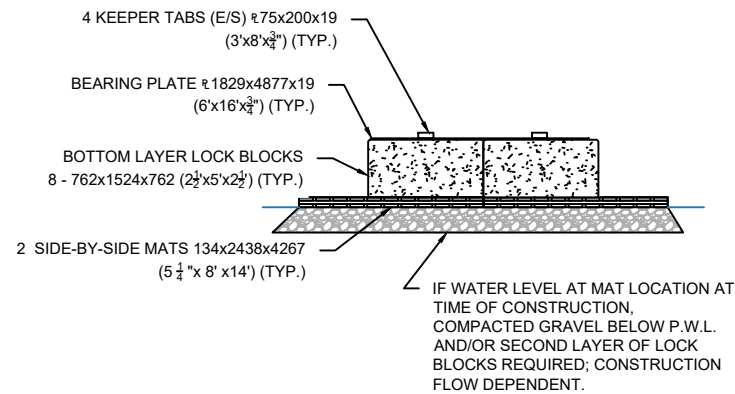
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| | | MASS | DIAMETER |
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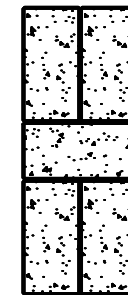
MINIMUM RIPRAP VOLUME: 50 m³



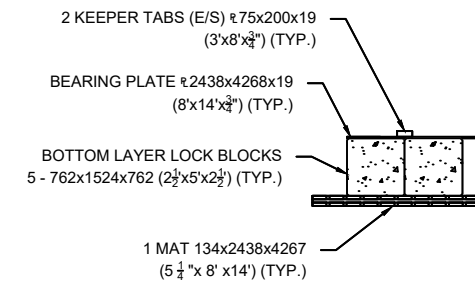
PIER BOTTOM LAYER PLAN
SCALE: 1:100



PIER PROFILE
SCALE: 1:100



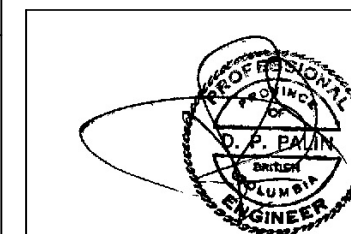
ABUTMENT BOTTOM LAYER PLAN
SCALE: 1:100



ABUTMENT PROFILE
SCALE: 1:100

LEGEND

| | |
|--|----------------|
| | CREEK |
| | ROAD |
| | BRIDGE |
| | CAUSEWAY |
| | ROAD ALIGNMENT |
| | RIPARIAN ROCK |
| | TREE LINE |
| | SECTION LINE |



| NO. | DATE | DESCRIPTION |
|-----|------------|-------------------------|
| 1 | 7-NOV-2020 | Issued for Construction |
| 0 | 3-NOV-20 | Issued for Review |

Trilogy Crossing Corp.
ENGINEERING, ENVIRONMENTAL, INSPECTION

CROSSING OF 19.21 HALFWAY RIVER

GENERAL ARRANGEMENT

BC Hydro
Power smart

| | | | |
|--------|------------|------------|-------------|
| DESIGN | DRAWN | CHECKED | FILE |
| | M.Meilleur | CD | |
| DATE | DATE | DATE | PLAN |
| | 3-NOV-20 | 7-NOV-2020 | TCC-HY19.21 |

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LAST DATE REVISED: 5-Nov-2020 3:12 PM