APPENDIX D: CPKC PROTOCOLS

CANADIAN PACIFIC RAILWAY

ENGINEERING STANDARDS

RAILWAY FLAGGING PROTOCOL

NOVEMBER 2018

ALL work which has the potential to impact the safe passage of trains at normal speed, or which requires personnel or equipment to be in close proximity to live track requires the presence and supervision of an authorized Railway Flagman. Flagging is provided at the discretion of the Railway.

1. FLAGGING PROTECTION PROTOCOL

a. Further to Canadian Pacific's Operational Constraint for Work On, Above or Below Railway Right of Way, and Minimum Safety Requirements for Contractors Working on CP Property in Canada, the following details pertaining to CP's Flagging Protection Protocol should be noted.
b. Railway Flagging protection involves the use of a CP Qualified Employee (Flagman) to assist in the protection of works on or about the railway's track and property.
c. A railway Flagman can utilize one or more forms of positive track protection including, Non-Main Track Protection (Rule 40.1) a Track Occupancy Permit (TOP), or rule 842 track protection. Due to the complexity in determining what Flagging protection is best suited for the work, Canadian Pacific, with input from the Third Party, will determine the appropriate method of Flagging protection.
d. The proponent and the contractor must provide road access into the work site for the CP Flagman.

2. PROTECTION OF WORKS BY A CP FLAGPERSON

a. Non Main Track Protection (Rule 40.1)
    i. Applicable only in yards, and on tracks designated as "Non Main" such as spurs or industrial track.
    ii. Track protection is put in effect by placing red flags between the rails at the working limits. Approaching trains must be prepared to stop in half their range of vision and must stop short of the red flag, and be governed by instructions from the flagman. Generally, where conditions permit, the flag is supplemented by locking the track out (The practice of lining the switch providing access away from the work location and securing it with a special lock)
b. Main Track Protection - Track Occupancy Permit (TOP) :
    i. Applicable on Main track, and signaled sidings.
    ii. A TOP is issued to the CP Flagman by the Rail Traffic Controller. A TOP prevents any trains or engines from directly entering the limits of the TOP without obtaining additional permission from the proper authority. Typically a TOP is granted for shorter durations and dependent entirely upon the current train traffic and other site factors. A TOP is primarily used when other forms of protection are not feasible or when the work can be completed in shorter durations.
    iii. There are two types of TOP – In CTC (Centralized Traffic Control) territory, the TOP is only valid between trains, and needs to be cancelled in order for trains to operate. In OCS (Occupancy Control System) territory, TOP's are in

effect until cancelled, and the Flagman can provide instructions to Trains to authorize them through the work site.

c. Main track Protection - Rule 842 :
    i. Rule 842 protection is issued to the Flagman by the Rail traffic Controller. It involves the use of General Bulletin Orders and colored flags in the field, to alert approaching trains and engines of work on or about the track.
    ii. Rule 842 allows for the passage of trains and engines into the work site and past the coloured flags when authorized by the Flagman that it is safe to do so. Rule 842 protection requires that the Flagman have either direct line of site of the work or other means to validate that it is safe for the passage of trains and all machinery and personnel are clear of the track. Rule 842 protection is typically used when the infrequent passage of trains can be accommodated on account of the work taking place away from the track or the work and equipment can easily be cleared from the track.
    iii. Rule 842 protection must be arranged in advance, and time must be allocated for the Flagman to install and remove the flags.

3. TRACK BLOCKS

a. Aside from Railway Flagging protection, a Track Block (also known as Work Block) may also be required when it is impossible or unsafe to operate trains through the work site.
b. Track Blocks apply to works which affect the integrity of the track, its base and/or its structure, or otherwise encroach on the clearance envelope.
c. Canadian Pacific will evaluate and approve Track Blocks based upon actual train traffic and the annual Track Block schedule for the subdivision where the work is being executed. It is essential that Track Block requirements be communicated to Canadian Pacific as far in advance as possible to allow for railway work and train schedules to be evaluated.
d. Refer to CP's Operational Constraints document for additional information.

4. FLAGGING PROTECTION REQUESTS

a. Flag Protection must be requested in writing to the Railway by Third Parties, a minimum 3 months (90 days) in advance of the proposed start date. For flagging requests exceeding 45 days in duration, one years notice is required.
b. Flagging will not be scheduled (nor will notice be accepted) until a signed agreement is in place.
c. Included within the request for flagging protection should be the required duration that the protection is required. The advanced notice will allow the Railway to coordinate manpower as required and evaluate any Track Block requirements (if deemed necessary).
d. Flagging manpower is planned on an annual basis. The plan for any given year is compiled in October of the previous year. As such, projects that are included in the annual plan are given priority for flagging resources over emergent projects.

5. FLAGGING PROTECTION HOURS

a. CP employees providing flag protection require time provisions during their shift for the following activities:
    i. Travel from headquarters to job site – at the start of each shift;
    ii. Set up on site – job briefings, installing flags, obtaining permits etc. (as applicable);
    iii. Travel from job site to headquarters – at the end of each shift.
    iv. Depending on the distance travelled and actual set up time, these activities may require up to 2 hours or more to complete. This can reduce the total work hours for activities on or in proximity to the Railway right of way. In order for the Contractor to obtain an effective work day of more than six (6) hours, two (2) flag persons may be required / requested for the project. The flag persons' hours will overlap allowing for a longer effective work day.
    v. The ability to obtain two (2) flag persons is not guaranteed, and is dependent on actual workload and availability.
b. Table 1 of this protocol outlines the possible regular hour shifts for flag protection. Due to CP's Overtime Policy, regular working hours should be allocated at all times.

OPTION	ESTIMATED NUMBER OF FLAGMEN	DAYS ON/ DAYS OFF	ESTIMATED FLAGMAN HOURS/DAY	CONTRACTOR HOURS/DAY (APPROX.)	NORMAL WORKING DAYS	NOTES
A	1	5 / 2	8	6	Mon-Fri	Typical short term arrangement. Site Closed on weekends
B	1	4/3	10	8	Mon-Thurs	Site Closed Fri-Sun. Applicable to Structures Employees.
C	1 or 2	7 / 7	11.25	9.25	Mon-Sun	Requires two flagmen on alternating 7/7 work cycle for continuous coverage. Otherwise site closed for 7 days during days off.

Table 1 – Possible Regular Hour Shifts for Flag Protection

c. Additional considerations:
    i. Contractor Hours: Time allotted to flag person for report to and from site/headquarters (varies but could exceed 1 hour estimated);
    ii. For Options A and B : Two Flagpersons may be obtained for overlapping shifts to gain longer work hours per day. However, the ability to obtain two flag persons on one job is not guaranteed and is dependent on workforce availability and scheduling;
    iii. Short term flagging assignments are restricted to Option A or B depending on the Flagmans regular shift. Track employees work Option A shifts, and have rights to everything except structures work. Structures employees work Option B shifts, and have rights to work around rail carrying structures.

iv. Long term flagging assignments (45 days or longer) are bid specifically for the project. At least two months notice is required in order for the position to be created and bulletined. The working days and shift can be specified in the bulletin and will be established based on project needs. However, shifts with irregular hours, or weekdays as days off may not receive any bids, at which point the provision of flagging will be delayed.
v. Where regular weekend work is anticipated, or more than 5 days per week is preferred, then Option C should be employed. Note that the use of overtime for weekend work in Option A or B may be used in exceptional circumstances only.
vi. Flagging availability may be subject to change without notice.

6. FLAGGING REQUESTS AND RATES

a. For current daily flagging rates including premiums for hi-Rail vehicles or automatic Rule 842 flags, consult the current THIRD PARTY FLAGGING REQUEST FORM.
b. To request railway flagging, complete and submit the THIRD PARTY FLAGGING REQUEST FORM.

ONE RAILROAD
CONNECTED

FLAGGING APPLICATION FORM
ENGINEERING SERVICES

CANADA

2025

CPKC

FORM IS VALID FOR CURRENT YEAR ONLY – revised January 10, 2025

FLAGGING APPLICATION FORM

Flagging protection is required any time a third party is conducting work on or around CPKC property and track which has the potential to pose a risk to the safe operation of trains and surrounding workers

No work will be allowed, nor will personnel be permitted on the property unless proper arrangements are made in advance. CPKC police will be dispatched to address trespassing on CPKC property.

Locates must be taken into account prior to any ground disturbance. Please contact your regional locate company, in addition to CPKC's CALLB4UDIG group at call_b4udig@cpkcr.com or 1-800-387-1833 to ensure all underground utilities in the area are protected.

NOTICE PERIOD

Flagging resources will be supplied at CPKC's discretion, when they are available.

- For flagging requests of 30 days or more in duration, 12 months' advance notice is required.
- For requests less than 30 days in duration, at least 90 days' notice should be provided.
- For requests less than 5 days in duration, at least 30 days' notice should be provided.
- Cancellations must be received no less than 48 hours prior or 1 day full charge will occur.

When requesting flagging, it is incumbent on the applicant to provide all of the required information or the application may be rejected. An agreement for cost recovery must be in place before flagging services are provided.

FLAGGING FLAT RATE

$1,930/day + taxes (up to an 8 hour shift)

Note that the shift includes booking-in time at the flagperson's headquarters and travel time to and from the job site. The actual hours on site will vary by location. In addition, the flagperson's presence on site does not guarantee working time. The company will make every effort to accommodate the planned work, but safe, unhindered railway operations are paramount and available working hours will vary.

THE FLAT RATE INCLUDES:

- Flagperson for up to 8 hours (typically 07:00 – 15:00).
- Overhead expenses
- Standard vehicle/transportation (includes vehicle rental and gas if necessary)
- Crew Radios
- Flagging expenses include when necessary: Lodging, Meals, Fringe Benefits and expenses
- Any exception to the minimum 8 hour flat rate must be approved by CPKC in advance.

THE FLAT RATE **DOES NOT** INCLUDE:

- **Overtime:** rate is: $290/hr plus taxes and request must be made to CPKC prior to project approval.
- Flagging on Weekends and/or Statutory Holidays must be pre-approved by CPKC.
- Specialty vehicles (i.e.: High Rail or non-standard vehicle or specialty equipment).

If schedules can be accommodated outside of 8 hours the following rates apply	Rate (excl. tax)
10 hour day - for flagperson on a 10 hour day, 4 days per week	$2,414 per day
11.43 hour day - for flagperson on 7/7 cycle (7 days on, 7 days off)	$3,014 per day

Please Note: all flagging shall be billed per the above UNLESS there is an existing agreement in force, in which case the terms of the agreement will be honored until such time that it is cancelled, expires or is subject to renewal.

FORM IS VALID FOR CURRENT YEAR ONLY – revised January 10, 2025

FLAGGING APPLICATION FORM

CPKC Permit/Agreement No*: Document Approval Date*:

CPKC CALLB4UDIG Ticket No*: (*please provide, if applicable)

1) Description of CP Work:

Requested Flagging Start date: Requested Flagging End date: Requested dates above are not guaranteed to be scheduled. Refer to notice period on page 1.	No. of days requested for flagging:
Meeting Point: Street Location (or nearest intersection):	
Mileage & Subdivision: (as stated in the document approval)	
Description of work/notes:	

2) Permit/Agreement holder's information – to be charged for billing (no other parties accepted in this section):

Company Name:	
Registered Office Address (in full):	
Primary Contact Name (Requestor of Work):	
Telephone:	Email:
PO or Customer Reference No. (MUST be provided as part of this request):	

3) 3rd Party Work Done By (i.e. being performed by parties other than Permit/Agreement holder):

Company Name:	
Description of 3rd Party Work/notes:	
Name (Person responsible from 3rd Party):	
Telephone:	Email:
PO or Project No.:	Dates Requested:

Overtime / Holiday Authorization Form (must be pre-approved by CPKC)

Company Name:
Dates OT flagging requested:
PO or Customer Ref #:

This flagging form must be signed by both parties if utility is being installed by group(s) other than Agreement/Permit holder. Scheduling will not proceed without applicable signatures being provided below.

Agreement / Permit Holder

Name Signature Date

3rd Party Contractor

Name Signature Date

CPKC USE ONLY: Is there parallel fibre? Details:

ONE RAILROAD
CONNECTED

UTILITY CROSSING APPLICATION

UTILITIES CANADA 2025

CPKC

FORM IS VALID FOR CURRENT YEAR ONLY – revised January 07, 2025

UTILITY CROSSING APPLICATION FORM

CPKC

Application Date:

1. Description of Utility Crossing physical location

Concession / Legal Land Description:

Nearest City/Town: Lot:

Township: County: Province:

GPS Coordinates of exact utility crossing location over/under CPKC Tracks **(latitude/longitude to be in decimal degrees only)**

Latitude: Longitude:

Name of road the utility is crossing CPKC tracks (if applicable):

Railway mileage & subdivision name (if both items are unknown, leave blank):

2. Utility Owner Information (All information below is mandatory and must be included)

Full Legal Name Of Utility Crossing Owner:

Registered/Head Office Address: Province:

City/Town: Postal Code:

Contact/Signatory:

Contact/Signatory's Phone Number:

Contact/Signatory's Email Address:

Utility Owner's 24-Hour Utility Emergency Response Number:

Estimated start date of proposed utility installation work: (Minimum flagging notice is 30 days)

Estimated number of days CPKC flagging will be required for (flagging protection required any time workers are within 50' of tracks, and any time construction is occurring over/under the tracks):

Purpose of utility installation:

Does utility owner have an existing pipeline, hydro/power/fibre line crossing over/under the railway tracks at this exact location that this application is related to?

Does utility owner have an existing active agreeent or permit with CPKC for the existing utility crossing structure? **(If YES, provide copy of document or CPKC file number with application)**

Will existing utility be removed from the railway corridor?

Who owns the property where the utility i.e. pipe/cable/conduit/hydro line etc. is crossing over/under the railway tracks? (If crossing is on CPKC-owned land, agreement fee applies. If crossing is not on CPKC-owned land, permit fee applies.)

Check off box beside property owner below. If unsure, conduct a Title search

☐ CPKC - include review fee payment for agreements. ☐ Other - include review fee payment for permits

Description of work/notes (including details for decommissioning or removal/salvage of old utility crossing):

UTILITY CROSSING APPLICATION FEES

CPKC

Utility Crossing Agreements

Over/Under railway tracks & crossing within Canadian Pacific Kansas City owned lands/Right of Way.

Payment to include with application:

- Engineering/Application review fee: $1,400.00 + taxes*
- One-time Agreement fee will be invoiced after agreement execution, and applies to a 3m wide x 30m long section across CPKC Right of Way. Additional land value assessment may be required.

Utility Crossing Permits

Over/Under railway tracks and crossing within Regional/Municipal roads or property not owned by the railway.

Payment to include with application:

- Engineering/Application review, including permit fee $2,400.00 + taxes*
- Covers OH and UG crossings ie. hydro, fibre, gas, watermain, culverts, etc.

Expedited Fees (add below amount to permit or agreement application fee if requesting this level of service)

Express Fee*: (Application reviewed within 10 business days):
ADD $2,040.00 + taxes* to Engineering/Application Review Fee above.
Check off the box to the right if requesting this level of service: ☐

Fast Track Fee*: (Application reviewed within 5 business days):
ADD $3,370.00 + taxes* to Engineering/Application Review Fee above.
Check off the box to the right if requesting this level of service: ☐

***Express / Fast Track utility applications do not apply to installations that require Geotechnical review.**

- Last day/cutoff for submissions for the year is November 28.
- Last day/cutoff for expedited requests is November 14.

Typical Utility crossing application review/processing time: **45-60 business days**

Above-mentioned fees do not apply to utility crossings within major rail yards, or running parallel within the railway Right of Way and must be discussed in detail prior to any application being submitted.

CPKC reserves the right to review these fees from time to time. CPKC does not grant easements for utility crossings over/under the railway Right of Way at any time.

ADDITIONAL FEES

(for information only; do not include any of the below fees with your application as they will be invoiced as required):

- One-Time Aerial Crossing Agreement Fees for Hydro, Fibre, Coaxial etc.: $3,370.00 + taxes*
- One-Time Agreement fee for major Hydro/Power Transmission lines 230KV and over (not including towers or poles within the railway right of way): $6,175.00 + taxes*
- One-Time Pipe Crossing Agreement Fees for Natural Gas, Oil, Watermain, Fibre Conduits etc. less than 30"(750mm) outer diameter of carrier/casing: $3,370.00 + taxes*
- 30" (750mm) to less than 96"(2400mm) outer diameter of carrier/casing: $6,175.00 + taxes*
- Poles in CPKC Right of Way: $560.00 per pole + taxes added to agreement fee
- Railway property/title searches $665.00 + taxes*
- Utility searches and or copies of agreements/permits $460.00 + taxes*/document
- Existing Agreement/Permit Drawing Revisions (Substitution of Prints) $995.00 + taxes*
- Additional Engineering review fees $665.00 + taxes*
- Assignments $840.00 + taxes*/agreement

UNDERGROUND PIPE CROSSING INFORMATION

CPKC

Does CPKC Geotechnical Protocol apply to this installation?
(Applies to any pipe 300mm or larger in outer diameter, including casing, or ream/bore size)

IF YES: Applicant to send a copy of the Geotechnical report along with a track settlement monitoring plan to CPKC Geotechnical Service Provider for review and installation oversight. All additional fees associated with this review and onsite supervision will be borne by the Applicant. Refer to CPKC Geotechnical Protocol for all requirements prior to submitting utility crossing application package.
Any geotechnical application will also require a separate $5,000.00 retainer fee to be submitted. Once construction is complete, final reports & as-built drawings are submitted, and any outstanding fees such as flagging costs or payments to CPKC Geotechnical Service Providers are cleared, retainer fee (or portion thereof) will be returned. Retainer fee will be put towards any of the above items on an as-needed basis.

Number of new underground pipes crossing CPKC tracks:
Material being carried in pipe i.e. storm, watermain, gas etc.:
Depth below base of rail to top of steel casing pipe: m carrier pipe m
Depth below bottom of ditch to top of pipe: m
Angle of crossing to the tracks: (shall not be less than 45 degrees)
Number of tracks being crossed:
Number of manholes within CPKC property:
Number of shut off valves within CPKC property:
Will existing pipe be removed or grouted in place?

Bridge Information:

Does pipe cross underneath a Railway Bridge?

Depth below grade to top of steel casing pipe: m
Distance from edge of bridge abutments to centerline of steel casing pipe: m
Distance from edge of bridge footings to centerline of steel casing pipe: m
Installation should not come within the Zone of Potential Influence or that of any part of a railway bridge structure (footings, abutments, columns, piers, etc.). A cross-section of proposed installation must be provided along with Engineer's report if encroaching into these areas.

Pipe Specifications:	Carrier Pipe (mm)	Casing Pipe (mm)
Outside Diameter		
Wall Thickness		
Pipe Material		
Specification & Grade		
Type of Joint		
Coating		
Cathodic Protection		
Specified Min. Yield Strength		
Max operating pressure		
Max operating temperature		
Max surge & test pressure		
Min. Operating Temperature		

Vents: Are Both Ends of the pipe sealed?

Types of Seals:

Distance of shut off valves to closest track centerline: m

Distance from nearest point of sending/receiving pits to the nearest rail: m

Sending pit: m Receiving pit: m
Excavation pits should be placed outside the railway corridor and not come within 10m of the nearest rail. If not practical, provide a detailed summary along with shoring/bracing design.

Method of installation:

Steel casing pipe to conform to Cooper E80 railway loading and must span the complete width of railway Right of Way. **Open cut method of installation for any below ground utility or any overhead pipe bridge proposals on active main tracks will not be considered by CPKC without prior discussion.**

WIRE CROSSING INFORMATION

CPKC

Aerial Information: **Overhead wires shall not be placed overtop of CPKC signal masts or road crossing gates. A minimum height of 2.5m above top of gate in the upright position must be maintained.**

- Number of NEW wires crossing over the tracks:
  Power/Hydro: Neutral: Fibre: Fibre count:
- Number of existing overhead cables owned by utility owner crossing over the tracks:
- Maximum voltage of proposed hydro/power crossing: Phase to Ground/Line to Ground voltage:
- Height above top of rail to proposed installation: m

No cable/wire shall be less than 7.62m / 25 ft. from top of rail to lowest wire including sag per CPKC Standards. If crossing within railway yards lowest wire with sag should not be less than 10m from top of rail.

- Number of new proposed poles being placed within CPKC property:
- Pole Owner:
- If not the Pole Owner, does your company have permission/permit to use these poles?
  (provide permission document with application)
- Number of cabinets within Railway property:
- Number of guy wires within Railway property:
- Angle of crossing to the tracks: degrees (shall not be less than 45 degrees)
- Number of tracks crossed by installation:

Underground Cable/Wire Crossing Information:

- Number of wires/cables within the conduit/casing crossing under the tracks:
- Type of wires/cable crossing underneath the tracks i.e. fiber, power etc.:
- Number of proposed manholes or cabinets on railway property:
- If fibre optic cable duct, Fibre Count:
- Provide material specification of casing pipe/conduit i.e. HDPE, PVC etc.
- Depth below base of rail to top of conduit/casing: m (must not be less than 1.52m)
- Conduit outside diameter: mm Wall thickness: mm
- Steel casing pipe outside diameter: mm Wall thickness: mm
- Distance from nearest point of sending/receiving pits to nearest rail:
  Excavation pits should be placed outside the railway corridor and not come within 10m of the nearest rail.
  Sending pit: m Receiving pit: m
- Method of installation: Jack & Bore, Directional drilling etc.:

Open cut method of installation for any below ground utility installations on active main tracks will not be considered by CPKC without prior discussion.

Bridge Information:

- Does conduit/pipe cross underneath a Railway Bridge?
- Depth below grade to top of casing pipe: m
- Distance from edge of bridge abutments to centerline of conduit/casing pipe: m
- Distance from edge of bridge footings to centerline of conduit/casing pipe: m

Installation should not come within the Zone of Potential Influence or that of any part of a railway bridge structure (footings, abutments, columns, piers, etc.) A cross-section of proposed installation must be provided along with Engineers report if encroaching into the zone.

UTILITY APPLICATION SUBMISSION CHECKLIST

CPKC

☐ 1. CPKC Utility Application Form with all applicable utility information included.

☐ 2. PDF drawing to scale and stamped by a Professional Engineer. Complete installation should be shown on 1 drawing with plan view, profile and cross-section along with an aerial image showing exact crossing location with a solid red line across the rail corridor and clearly indicating railway property boundaries. (see examples at end of this document).

☐ 3. Commercial General Liability insurance in the amount of $10,000,000 CAD for each occurrence, naming Canadian Pacific Railway Company as an additional insured against public liability, bodily/ personal injury and property damage (including loss of use) is required.

In addition to the insurance certificate, a copy of WCB/WSIB/WSB must be submitted covering all employees under or contracted by the applicant.

☐ 4. EFT or Wire Payment based on application fees above – see payment details on last page of this form. Copy of completed payment confirmation must accompany application submission, including taxes and any applicable provincial tax. Tax rate is based on physical location of the installation. Proof of payment must clearly indicate date of transaction and transaction confirmation number from the financial institution in order for CPKC Accounting to locate in their systems. **Application will not be accepted without proof of payment included with submission.**

☐ 5. Geotechnical Report if pipe outer diameter or ream/bore size is 300mm or larger or if soil conditions are not conducive to the proposed bore. Ensure items 13.4 to 13.12 within table 5 of the Geotechnical protocol checklist are addressed and the track settlement-monitoring plan is within the report being submitted in order to avoid delays.

CONFIRMATION

I have verified all required information and accurate payment are being provided with this application and understand any missing items will result in delays or rejection of my application.

APPLICATION CUTOFF DATES

Last day/cutoff for submissions for the year is November 28.

Last day/cutoff for expedited requests is November 14.

EMAIL COMPLETED APPLICATION TO:

utilities_requestscanada@cpkcr.com

CPKC BANKING INFORMATION

(GST and any provincial sales taxes must be included with all fees. Tax rate is based on physical location of the utility installation.)

1. Electronic Funds Transfer Instructions:

   Company Name: Canadian Pacific Railway Company
   Company Address: 7550 Ogden Dale Road SE, Calgary, AB T2C 4X9
   Company Transit: 00109
   Company Account #: 1967-771
   Institution #: 001
   Bank Address: Bank of Montreal, 350 7th Avenue SW, Calgary, AB T2P 0X4

2. Wire Payment Instructions:

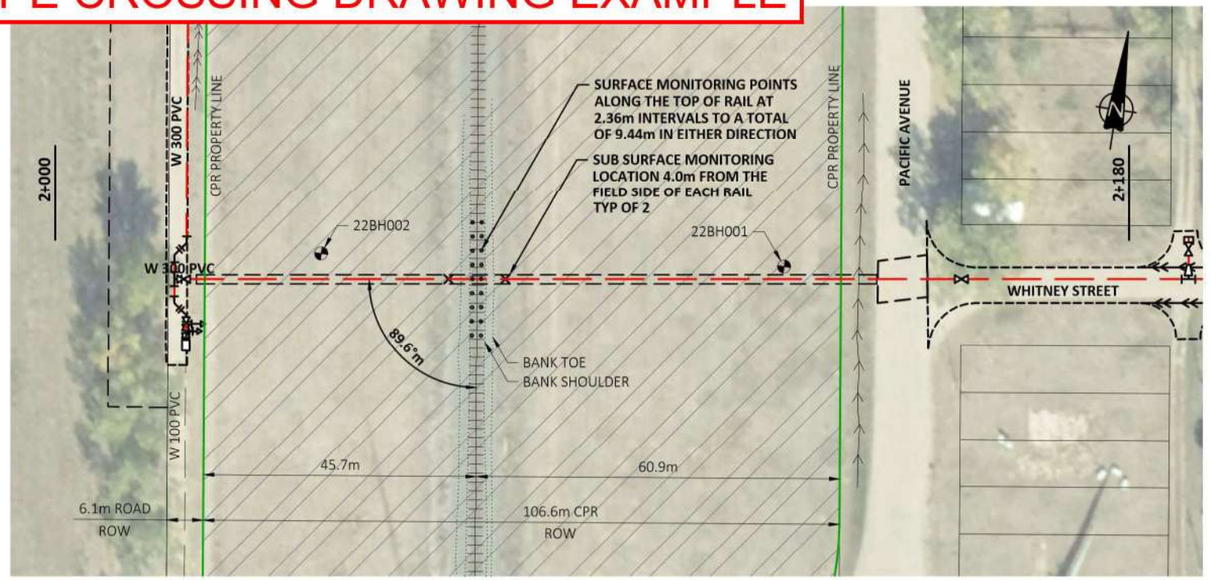
   Beneficiary Name: Canadian Pacific Railway Company
   Beneficiary Address: 7550Ogden Dale Road SE, Calgary, AB T2C 4X9
   Beneficiary Transit and Account #: 00101967771
   Bank Routing Code: 000100109
   Beneficiary Address: Bank of Montreal, 350 7th Avenue SW, Calgary, AB T2P 0X4

Bank of Montreal Swift Code: BOFMCAM2 International Banking, Head Office Montreal, QC
Bank of Montreal's USD Corresponding Bank: Wells Fargo Bank (FKA Wachovia Bank),
SWIFT CODE: PNBPUS3NNYC, ABA/Routing #: 026005092

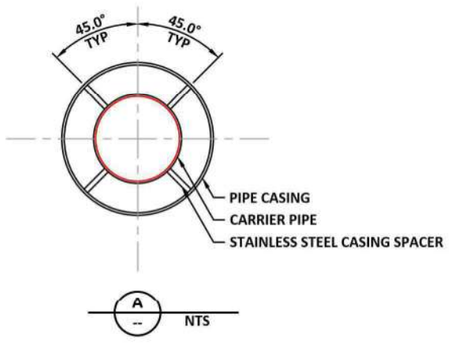
CPKC GST/HST Registration number: R100769694

PIPE CROSSING DRAWING EXAMPLE

SITE PLAN
1:5000



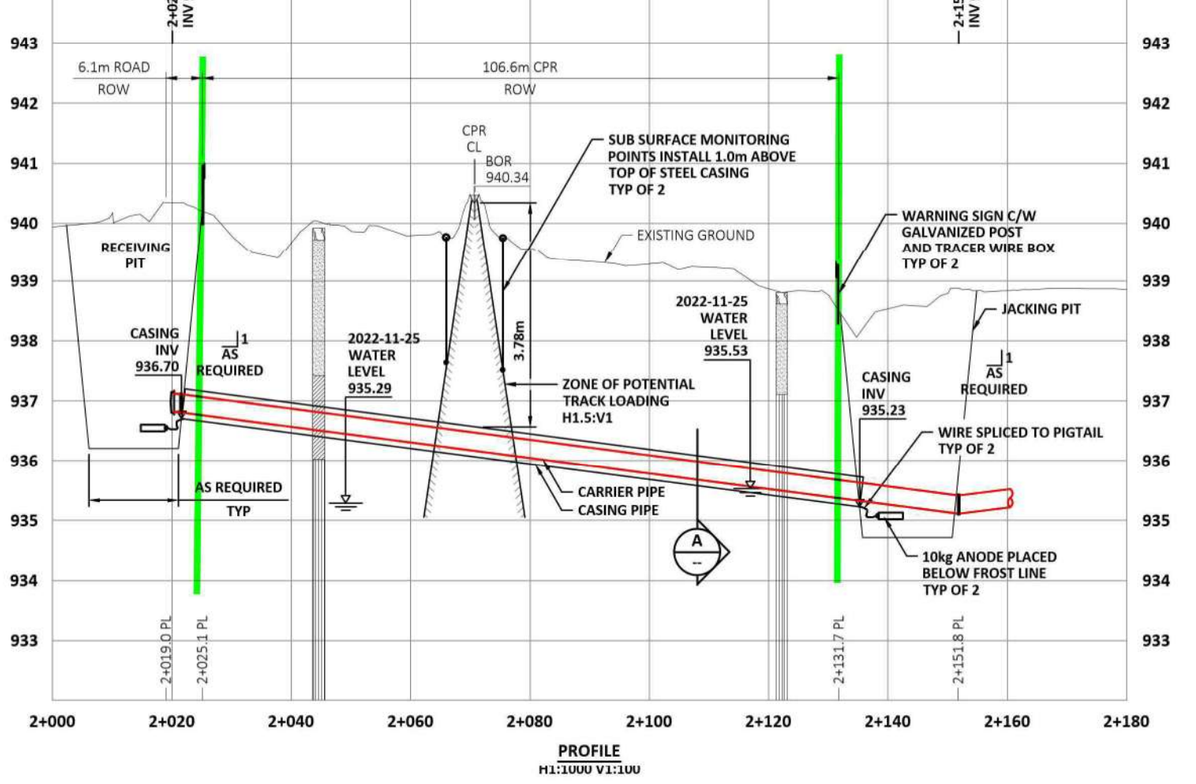
PLAN
1:1000



CASING PIPE	
SIZE	600 mm (24")
PIPE	STEEL
OUTSIDE DIAMETER	609.6 mm (24.00")
INSIDE DIAMETER	577.8 mm (22.75")
WALL THICKNESS	15.9 mm (0.625")
MINIMUM LENGTH	114.0 m (374 ft)

CARRIER PIPE	
SIZE	300mm (12")
PIPE	HDPE DR11
PRESSURE RATING	1393 kPa (202 PSI)
MAX OPERATING	448 kPa (65 PSI)
BELL DIAMETER	N/A
INSIDE DIAMETER	261.4mm (10.29")
OUTSIDE DIAMETER	320.3mm (12.61")
WALL THICKNESS	29.5mm (1.16")

BOREHOLE MATERIAL LEGEND	
TOPSOIL	
SAND	
CLAY TILL	
CLAY TILL AND SILT	



PROFILE
H1:1000 V1:100

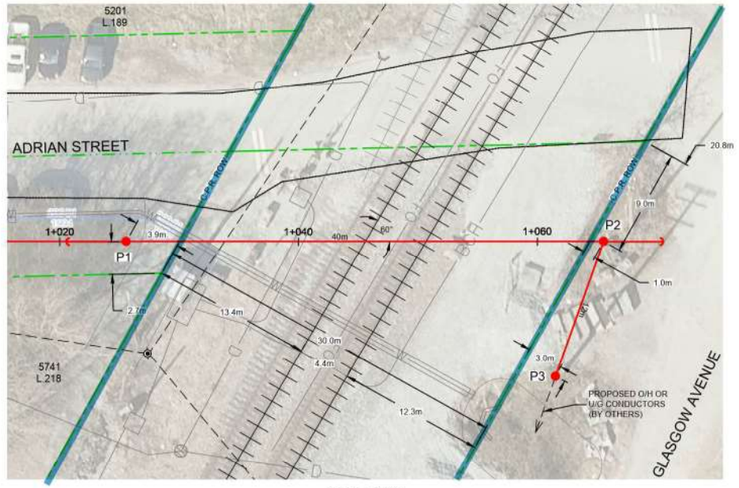
NOTES:
1. FOR INFORMATION REGARDING GENERAL NOTES, UTILITIES, SYMBOLS AND ABBREVIATIONS REFER TO THE LEGEND AND ABBREVIATIONS DRAWINGS.
2. CASING TO BE INSTALLED BY GBM METHOD. AUGER HEAD TO BE COMPLETELY INSIDE PIPE WITH A MINIMUM TWO DIAMETERS BACK FROM LEADING END OF PIPE (2 DIA SOIL PLUG). CONTRACTOR TO COORDINATE WITH ENGINEER'S REPRESENTATIVE.
3. EAST CASING INVERT = 935.25
4. WEST CASING INVERT = 936.70
5. CATHODIC PROTECTION SACRIFICIAL ZINC ANODE AT EACH END OF CASING.
6. NO GROUND DISTURBANCE WITHIN CPR RIGHT OF WAY.
7. PIPE SPACERS TO BE INSTALLED AS PER MANUFACTURER'S SPECIFICATIONS.
8. CROSSING TO BE DESIGNED, CONSTRUCTED, AND MAINTAINED IN ACCORDANCE TO TRANSPORT CANADA TC E-10 (STANDARDS RESPECTING PIPELINE CROSSINGS UNDER RAILWAY) AND CANADIAN PACIFIC SPECIFICATION SP-TS-2.39.
9. CROSSING TO BE CONSTRUCTED AND MAINTAINED IN ACCORDANCE WITH CANADIAN TRANSPORT AGENCY GENERAL ORDER E-11.

CONTACT INFORMATION:
OWNER:

ENGINEERING:

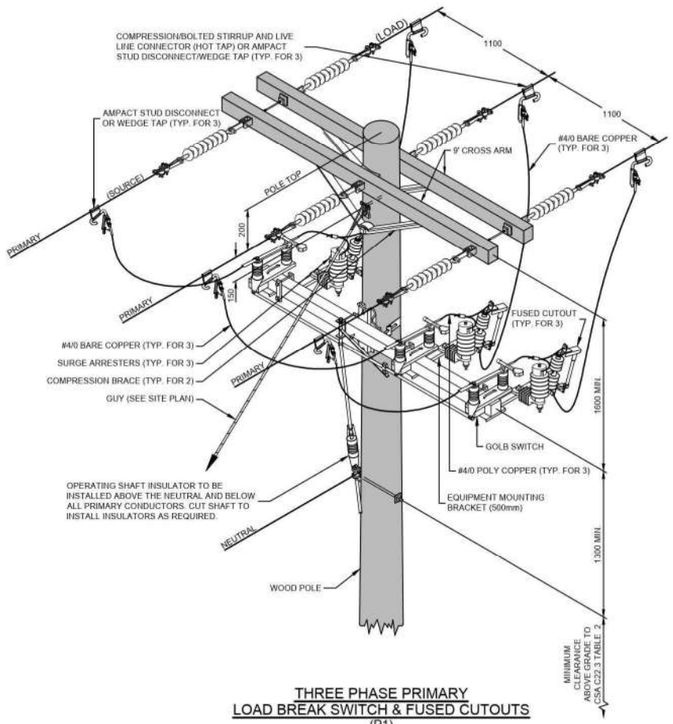
ISSUE	YY-MM-DD	REVISION

DESIGNED	JOB
DRAWN	SCALE
DATE	DRAWING

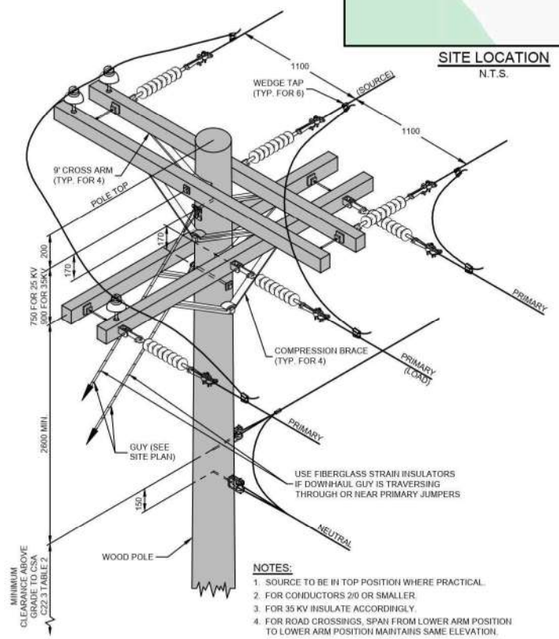


SITE PLAN
0 1:500 10

SITE LOCATION
N.T.S.

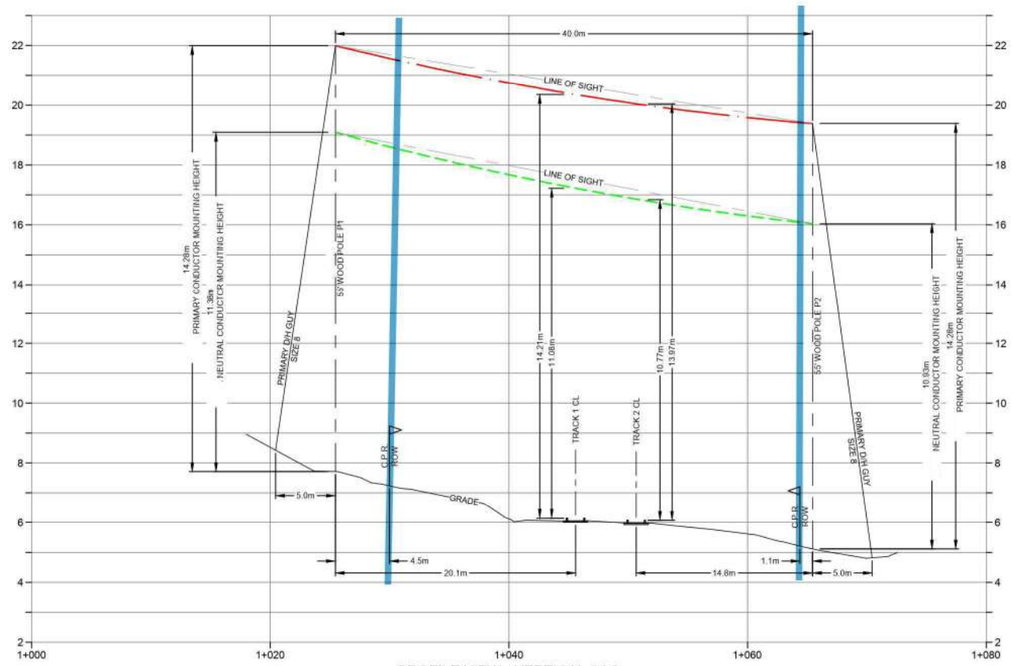


THREE PHASE PRIMARY
LOAD BREAK SWITCH & FUSED CUTOUTS
(P1)
N.T.S.



NOTES:
1. SOURCE TO BE IN TOP POSITION WHERE PRACTICAL.
2. FOR CONDUCTORS 2/0 OR SMALLER.
3. FOR 35 KV INSULATE ACCORDINGLY.
4. FOR ROAD CROSSINGS, SPAN FROM LOWER ARM POSITION TO LOWER ARM POSITION MAINTAINS SAME ELEVATION.

THREE PHASE CORNER 45° - 90°
CONDUCTORS ≤ 2/0
(P2)
N.T.S.



PROFILE VIEW - VERTICAL SAG
0 1:500 H 10
0 1:200 V 4

LEGEND
PRIMARY CONDUCTOR - #2 ACSR (CSA HEAVY LOADING)
NEUTRAL CONDUCTOR - #2 ACSR (CSA HEAVY LOADING)

MILEAGE OF CROSSING =

MINIMUM DESIGN CLEARANCE DATA CONDUCTOR SAG WITH HEAVY LOADING @ - 20° C			
OVER	PRIMARY	NEUTRAL	MINIMUM CLEARANCE REQUIRED TO TRACKS 0 TO 750V = 7.6m 751 TO 22000V = 7.9m
TRACK 1	14.21m	11.08m	
TRACK 2	13.97m	10.77m	

POLE DATA			
POLE DATA	LENGTH	CLASS	DEPTH OF SETTING (m)
P1	55FT.	2	2.3
P2	55FT.	2	2.3

CONDUCTOR DATA AT - 20°C				
CONDUCTOR DATA	QTY.	SIZE & MATERIAL	MAXIMUM TENSION (KN)	ULTIMATE TENSION STRENGTH (KN)
PRIMARY	3	No. 2 ACSR	5.2	12.4
NEUTRAL	1	No. 2 ACSR	5.2	12.4

GUYING DATA					
GUYING DATA	QTY	SIZE	GRADE	L/H RATIO	BREAKING STRENGTH (KN)
P1	1	# 8	1300	0.35	53
P2	1	# 8	1300	0.35	53

ANCHORING DATA				
POLE	TYPE	SIZE	DEPTH OF SETTING (m)	ROD STRENGTH (KN)
P1	PLATE	0.25m² PLATE	1.9	160
P2	PLATE	0.25m² PLATE	1.9	160

CROSSING TO BE CONSTRUCTED IN ACCORDANCE TO CANADIAN TRANSPORT COMMISSION GENERAL ORDER E11 & E12 AND CSA C22.3 No. 1

DESIGNED	
DRAWN	
CHECKED	
E.O.R.	
DATE	
SCALE:	
SEAL	

No.	DATE	BY	CHK'D	REVISION
1	2022-09-02	DS	WA	ISSUED FOR REVIEW

PROPOSED 25kV POWERLINE CROSSING
MILE SUBDIVISION

PROJECT No.	SHEET No.	REVISION

Contractor Safety Orientation Briefing Card - Canada

At Canadian Pacific (CP), safety is an integral part of the way we do business and is one of our foundations. We expect everyone working on behalf of CP to be unconditionally committed to safety. We are committed to providing a safe working environment for all railway and contractor employees and we welcome you. This card provides you with general safety orientation information and basic safety requirements all must adhere to when working on behalf of CP.

Full requirements are contained in the CP's Minimum Safety Requirements for Contractors Working on CP Property in Canada and must be followed at all times. Complying with these requirements will ensure yourself; your co-workers as well as our employees all go Home Safe™.

Home Safe™ is a commitment to be vigilant about personal safety and the safety of co-workers.

Safety Briefings

- Identify Local On-Site Supervisor and CP Manager-in-Charge
- Review the Site Safety Plan
- Ensure all employees know the scope & limits of the work being performed
- Identify and communicate any restricted or high hazard areas that must be avoided, including underground services and overhead power lines
- Identify and discuss with all employees any safety hazards in the immediate work place
- Always hold daily safety briefings or whenever the scope, location or hazards of the work change
- Always include any affected CP employees in Safety Briefings

Identification & Qualifications

- Ensure all contractor employees have proper identification while on CP property
- Confirm all contractor employees are qualified & trained for the work being undertaken
- Confirm contractor employees have required documents, certifications and ID cards
- Transportation of dangerous goods always requires certification, placards & regulatory documents
- Federal regulations govern inspection and maintenance of track, crossings, signal systems, & rolling stock

Personal Protection

- Hard hats, hi-vis apparel, safety glasses & safety boots are required when outside offices or vehicles
- Additional PPE must be worn when site conditions or regulations require it
- Chemicals or controlled products being used must have Manager Workforce & Engineering Support provide SDS (Safety Data Sheet) documents and be disclosed to CP
- Excavations must not be left unattended unless properly protected and CP Manager-in-Charge notified

Personal Conduct

- Use and possession of any drugs or alcoholic beverages is prohibited on CP property
- Any act or threat of violence or harassment is prohibited
- Smoking is prohibited in CP buildings, vehicles, equipment, where posted, or a risk of fire or explosion exists
- Use of cell phones and entertainment devices is prohibited unless permitted by CP policy/local CP manager

On or About Tracks

- Expect the movement of trains or on-track work equipment at any time and in any direction
- Prior to crossing a railroad track look both ways to ensure no moving railroad equipment, approach it 90 degrees to the rail, watch footing as the ties may be slippery and do not step on the rail when crossing

Issued: October 2018

Contractor Safety Orientation Briefing Card - Canada

On or About Tracks Cont.

- Leave at least 15 feet of room when walking around stationary railroad equipment.
- Ensure a minimum of 50 feet separation between stationary railroad equipment left standing on the same track if required to walk between

Track Protection

- Contact CP in advance for appropriate track protection if working closer than 25 feet to any railway tracks
- Know the type of track protection provided and comply with those limits and instructions at all times
- No work activities are permitted within 50 feet of any track centerline while trains are passing through worksite unless specifically authorized by CP.
- Do not remain in equipment that is within 50 feet of a passing train and step out on the non-live side of the track (where possible). Stand at least 20 feet back from the track(s) when trains are passing.
- In multi-track territory always exit to the non-live side and never stand on or between adjacent tracks
- Do not place or store temporary structures, material or equipment are closer than 12 feet to the nearest rail
- Handling of track switches and derails is prohibited unless specifically authorized and qualified
- Altering, obstructing or operating any track, bridge or signal components is prohibited unless authorized

Vehicles

- All vehicle and equipment operators must comply with all traffic signage and posted speed limits at all times
- Seat belts must be worn at all times unless engaged in inspections on CP property and travelling less than 15 mph
- Prior to operation of a vehicle conduct a walk around of it to identify any obstacles or clearance restrictions that may interfere with a safe vehicle movement
- All mobile equipment must be operated with functioning lights, horns, beacons & backup alarms if equipped
- Unless authorized, Contractors are not permitted to operate or ride on any CP rolling stock
- Unless authorized in writing, operating CP vehicles is prohibited

Emergency Conditions

- Identify local emergency evacuation plans & assembly locations
- Identify emergency first aid providers and the location of first aid and fire suppression equipment
- Ensure an Emergency Information Sheet with contact # is available & accessible
- Ensure emergency communication devices are available at work location
- Immediately advise CP of any accidents, injuries, spills, near miss incidents and hazards
- Initial response to any emergency situation must follow the following sequence:
    - Protect the safety & security of all individuals and communities
    - Provide environmental protection & mitigation
    - Conduct incident investigation & evidence preservation
    - Restore railway operations & resume work

Immediately report any emergency or hazardous condition including those that may affect the safe passage of trains to the CP Police Communications Centre at 1-800-716-9132.

As a minimum, always ensure that the Contractor has received a copy of CP's Minimum Safety Requirements for Contractors Working on CP Property in Canada

Issued: October 2018

DRAFT

GEOTECHNICAL PROTOCOL

FOR

PIPELINE AND UTILITY CROSSING(S) UNDER

RAILWAY TRACKS

Engineering

Geotechnical and Utilities Department

Last Updated: May 15, 2024

4	May 15, 2024	DJW /JC / GD	7.1.1 added: retainer fee is Canada only 7.2 added: clarity on excavation pit placement 7.3, 7.3.1, 7.3.2 removed reference to Appendix A 9.2.2 added: clarity for 2m offset and end points of ZPTL 9.2.4 added: reference to Class 3/4/5 tracks for remote monitoring
3	March 12, 2024	DJW /JC / GD	Multiple sections highlighted throughout
2	May 16, 2022	DJW	Fig C – Pg 39
1	Feb 25, 2020	MR	Level 2 criteria – Pg 36
No	Date	By	Revision

Table of Contents

Appendices

1.0 Limitations of the Document

The following protocol is independent of the requirements for assessing the structural components of the pipeline and pipeline crossing. The structural requirements for all pipeline crossings are included in SP-TS-2.39 - Pipeline and Cable Installations within Railway Right of Way. An agreement or permit from Canadian Pacific Kansas City Railway's Utilities Department is required before commencing with any work within the railway corridor. **Proposals for pipelines and utilities parallel to the track(s) are not covered under this protocol.**

In addition, this document does not cover review on any of the engineering design aspects of the proposed pipelines and utility crossings. Suitable engineering design is the sole responsibility of the applicant. Geotechnical approval of a proposed pipeline crossing by Canadian Pacific Kansas City (CPKC) in no way warrants the suitability of construction methods/techniques for anticipated ground conditions, nor does it warrant the suitability of existing ground and site conditions for the use proposed by the applicant of the crossing. CPKC does not take any responsibility for the suitability of the construction method or warrantee the ground and/or site conditions. CPKC geotechnical approval of a pipeline and utility installation application merely indicates that based on the provided and available information, the proposed construction and design addresses CPKC's needs at the time of review and approval. CPKC does not provide engineering recommendations, directions or minimum standards to the applicant or their contractor(s) for design and execution of their work within CPKC Right-of-Way (ROW).

Due to third party work on CPKC ROW, CPKC will not be liable for any damages or delays to the applicant and/or CPKC assets and operation because of its approval of an application. In addition, any damages incurred to CPKC due to third party pipeline and utility crossing(s) will be the responsibility of the applicant.

CPKC requires that the applicant provide adequate documentation as outlined in this protocol; clearly identify the responsible Professional Engineer of Record and the components of the project for which they are responsible.

2.0 General Terminology

Base of Rail (BOR): is the bottom surface of the rail and is frequently used as a local datum from which vertical measurements are referenced. If an external datum is utilized the elevation of the BOR will be identified.

Geotechnical Engineer of Record's onsite designate/representative: A geotechnical trained and competent person assigned by the Geotechnical Engineer of Record to act as site inspector

who will be present onsite during the full duration of the construction and installation within railway operating corridor, unless, otherwise directed by CPKC Utilities Supervisor. The site inspector must have the required training, experience and understanding of the site conditions, proposed design, and construction methodology to make sound engineering judgement and decisions, and reports during the course of the work.

Service Provider(s): include professional engineering firm(s) or individual(s) representing relevant or applicable engineering disciplines, to be retained on behalf of CPKC for engineering related review and/or oversight of fieldwork and track settlement monitoring results, for which the compensation will be paid by the applicant.

Zone of Potential Track Loading (ZPTL): is considered as the area under the track and within a 1V to 1.5H soil zone extending down from a point at the level of the BOR and 2 m (6.6 ft.) from The centerline of track as shown in Figure 3.

FRA: Federal Railroad Administration.

TC: Transport Canada.

3.0 Introduction

The purpose of this document is to ensure efficient application process and ensure safety and uninterrupted operation of Canadian Pacific Kansas City (CPKC) Railway's operations during the execution of proposed third party pipeline and utility crossing(s) within CPKC ROW. This document is intended to guide the applicant of the minimum application requirements, review and approval process for proposed pipeline and utility crossing(s) as completed by CPKC Utilities and Geotechnical groups. The goal of this protocol is to:

3.1 Provide safe track(s) conditions during and after the installation of proposed pipeline and utility crossing(s);

3.2 Establish requirements and procedures to be followed by the applicant(s) to minimize difficulties and risks to CPKC's operations and its assets during the installation and operation of pipeline and utility crossing(s) under CPKC's tracks and within its ROW;

3.3 Specify minimum criteria to be met for CPKC's review;

3.4 Ensure adequate subsurface information including geotechnical and groundwater information is available and an assessment by CPKC's geotechnical group or a CPKC approved service provider has been completed prior to providing approval; and

3.5 Allow timely processing of application for pipeline and utility crossing(s) approvals.

4.0 Emergencies

In the event of any occurrence due to construction/contractor activities that does or could pose a hazard, immediately contact CPKC Police at **1-800-716-9132**.

5.0 Winter Work Restriction within CPKC ROW

No construction and installation of pipeline and utility crossing(s) that fall under the Geotechnical Protocol will take place between December 15th and March 31st. This restriction is particularly critical to areas where frost penetrates the ground and may make it difficult to observe surface settlement and loss of soil from underneath the track substructure due to misperception of a levelled frozen surface. Such conditions pose a risk to the stability of CPKC's track and its substructure during thawing season and are not acceptable.

In areas where the applicant does not consider frost as a potential risk, the applicant is required to assure and demonstrate to CPKC as to why winter work restriction is not applicable to their proposed work. Exceptions to winter work restriction will be evaluated on case by case basis.

6.0 Application Process Identification

To identify the applicable process, complete appropriate level of assessment and allow timely processing of a pipeline and utility crossing(s) proposal, the requirement criteria have been divided into three levels as identified in Table 1, i.e. Minimum, Intermediate and Detailed. These processes are categorized based on the size, cover, location and proximity of pipeline from tracks and other structures, and construction methodology of the proposed pipeline and utility crossing(s).

Applicant is expected to consult Table 1 to identify the level of effort and detail of submission required to meet CPKC review requirements for review. Details of each process are discussed in the following sections.

Table 1 – Process Identification

		Process Levels		
		1. Minimum[1]	**2. Intermediate**	**3. Detailed**
Dimension Criteria	Outside diameter of pipe	Less than 300 mm (12 in.)	300 mm (12 inches) to 1500 mm (59 in.)	Greater than 1500 mm (59 in.)
	Cover between BOR and top of pipe	Greater than 1.5 m (5 ft.) or three pipe diameters whichever is greater.	Greater than 1.5 m (5 ft.) or two (2) pipe diameters whichever is greater.	Less than 1.5 m (5 ft.) or two (2) pipe diameters.
	Adjacent structures including switches and signals	Greater than 10 m (32.8 ft.) from centerline	Within 2.5 times, cover between BOR and top of pipe.	
	Depth of pipes outside ZPTL	Refer to SP-TS 2.39 All pipes will be at least 0.91 m (3 ft.) below ground (below sub-ballast layer) where pipes are not below the ZPTL.	Less than 0.91 m (3 ft.) burial within ZPTL.	
Excavation Criteria	Excavation close to CPKC track(s)	Jacking/access pits shall be more than 10 m (32.8 ft.) from the closest track centerline and shall not encroach on the ZPTL.	Excavations or jacking/access pits within 10 m (32.8 ft.) of the closest track centerline.	
	Crossing angle	Less than 45 degrees off perpendicular to the track.	More than 45 degrees off perpendicular to the track.	

	Process Levels		
	1. Minimum[1]	**2. Intermediate**	**3. Detailed**
Construction Method	Trenchless method[2]		All methods considered.
	Pipe bursting will only be considered where the predicted heave is less than 10% of the movement that would result in a change of the FRA or TC track class.		
Approval Process	Utility group to approve with no geotechnical submission.	Full review of design, geotechnical and construction method Applicant to pay for the review cost of CPKC approved service provider.	

[1] Move to next class if one or more criteria are not met.

[2] Trenchless methods include Auger Boring (AB), Pipe Jacking, Pipe Ramming (PR), Horizontal Directional Drilling (HDD) except high pressure fluid jetting method, Microtunnelling (MT) but exclude any type of mining techniques where any stand up time is required before the tunnel support is placed.

7.0 Minimum Information Requirements

7.1 All proposals for pipeline and utility crossing(s) approvals will be under the signature and seal of a locally registered professional Geotechnical Engineer referred to as Geotechnical Engineer of Record (GER). The objective is to ensure that a registered professional from applicant's design firm or organization is given the opportunity and responsibility to assess the site and subsurface conditions and demonstrates due diligence to assure CPKC that the proposal is appropriate for such conditions. This, however, depending on the complexity of design and proposal, may be in addition to the requirements of meeting industry standards or current regulatory requirements for structural integrity of the pipeline/utility. Such design will also require signature and seal by a professional geotechnical and/or structural engineer.

7.1.1 All applications to which the CPKC Geotechnical Protocol applies must include a separate retainer fee to cover costs incurred to the railway due to the project's activities, (such as but not limited to) resurfacing work, survey to obtain as-built drawings, site cleanup, and removal of settlement monitoring equipment. Retainer fee (or a portion thereof) is refundable if final stamped geotechnical

construction summary report and stamped as-built drawing(s) are provided within six (6) months of completion of construction and post-construction monitoring. Retainer fee only applies to applications in Canada.

7.2 The application package must include a construction plan that specifies the terms and conditions for the execution of the proposed work, including assignment of responsibility. The applicant of the crossing(s) is responsible to ensure that the work is executed in accordance with the terms of the agreement with CPKC. The drill path and installation of the jacking and receiving pits should be planned to have the least impact to railway operations. The jacking and receiving pits should be placed outside CPKC property and not be planned or excavated within the (ZPTL) - zone of potential track loading. The access pits can be closer to the tracks if the grades and soil conditions call for it and if it also reduces the chances of voids or track settlement, but will require review of the specific site. Any exceptions to the placement of the pits will require additional reviews at the applicant's expense

7.3 **Engineering Drawings:** All pipeline and utility crossing(s) application packages will be accompanied by following documents, at minimum, showing features on drawings in true scale.

7.3.1 Plan of the proposed pipe and utility crossing(s) under the track. This drawing will show the following features:

7.3.1.1 Location of the crossing(s), referencing identifiable landmarks including Mileage and Subdivision of the proposed crossing(s) as per CPKC Subdivision naming and Mileage convention. Applicant can obtain the Mileage and Subdivision information from CPKC Utilities group; The title of the plan will include the subdivision name and mileage of the location.

7.3.1.2 Pipe centerline, diameter, length, size, limits, thickness and material;

7.3.1.3 Location of any adjacent structures including but not limited to signals, switches, culverts, other existing underground/buried services including Fibre Optics Transmission Systems (FOTS) and relevant distances from the centerline of the track(s);

7.3.1.4 Location of the ditch line and any breaks in slope;

7.3.1.5 Location of drilled boreholes or test pits from geotechnical investigation;

7.3.1.6 Location of all tracks and distances from track centerline to the proposed work area location; and

7.3.1.7 Location of all access pits, size, depth and details of support of excavation, if applicable.

7.3.2 Profile of the track and proposed pipeline and utility crossing(s) along the centerline of the track. The profile will show the following features:

7.3.2.1 Location of the crossing(s), referencing identifiable landmarks including Mileage and Subdivision of the proposed crossing(s) as per CPKC Subdivision naming and Mileage convention. Applicant can obtain the Mileage and Subdivision information from CPKC Utilities Group;

7.3.2.2 Pipe centerline, diameter, length, size, limits, thickness and material;

7.3.2.3 Location of any adjacent structures including but not limited to signals, switches, culverts, other existing underground/buried services including Fibre Optics Transmission Systems (FOTS) and vertical distance from BOR;

7.3.2.4 Elevation of surface water in ditches, elevation of the ground water table in all boreholes and the date it was measured;

7.3.2.5 Test pit/borehole locations along with the stratigraphic profile as determined through the geotechnical investigation;

7.3.2.6 Depth of top of pipe to the BOR; and

7.3.2.7 Location of all jacking/access pits, size, depth and details of support of excavation, if applicable.

7.3.3 Section of the track along the centerline of the proposed pipeline and utility crossing(s). This drawing will show the following features:

7.3.3.1 Location of the crossing(s), referencing identifiable landmarks including Mileage and Subdivision of the proposed crossing(s) as per CPKC Subdivision naming and Mileage convention. Applicant can obtain the Mileage and Subdivision information from CPKC Utilities group;

7.3.3.2 Pipe centerline, diameter, length, size, limits, thickness and material;

7.3.3.3 Any adjacent structures including but not limited to signals, switches, culverts, other existing underground/buried services including FOTS and vertical distance from BOR;

7.3.3.4 Elevation of surface water in ditches, elevation of the ground water table in all boreholes and the date they were measured;

7.3.3.5 Test pit/borehole locations along with the stratigraphic profile as determined through the geotechnical investigation;

7.3.3.6 Location of jacking or access pits and proposed cut slope angles;

7.3.3.7 Location of the centerline of all tracks;

7.3.3.8 Depth of the top of pipe to the BOR; and

7.3.3.9 Any excavations that encroach on the ZPTL; Indicate ZPTL and distance from ground to the top of pipe.

7.3.3.10 Cross-Sections of perpendicular to the track shall be displayed as viewing in the direction of increasing CPKC mileage; left and right-hand being so determined.

7.4 Geotechnical Investigation Report must be signed and sealed by a locally registered professional Geotechnical Engineer;

7.5 Settlement Monitoring Plan indicating layout and types of settlement monitors to be installed, frequency of measurements, alarm thresholds i.e. “Alert” and “Critical” thresholds, reporting protocol, and immediate actions to take when required. General track movement monitoring guidelines are provided in Appendix C.

7.6 Other Information: This includes information related to additional design and requirements based on the ground conditions and proposed construction. This may include excavation support/shoring, dewatering requirements etc. If required, complete design and relevant drawings will be required.

7.7 Applicant is expected to restore the site to its original condition.

7.8 Proposals for open cut is not a preferred method of installation. This, however, will be assessed on a case by case basis, and prior written approval from CPKC is required for any exceptions.

7.9 Installations using high pressure fluid jetting will not be considered.

7.10 The cost of remediation incurred to CPKC as a result of pipeline and utility crossing(s) construction and installation and related activities will be borne by the crossing(s) applicant. Some of the issues include settlement or soil heave induced by the crossing(s) installation during and after the construction and may be partially offset by the geotechnical retainer fee.

7.11 All pipelines and utilities installed below the highest ground water level predicted will be sealed during construction.

7.12 All pipelines that will or could carry water shall be:

7.12.1 Installed with even bearing throughout its length to limit local settlement; and

7.12.2 Sloped to one end and prevent standing water. Special exemptions will be considered for inverted siphons or other applications requiring level pipes.

8.0 Process 1 – Minimum

8.1 Criteria

The general requirements included in Table 1 in conjunction with the following requirements must be met to obtain approval for a pipeline and utility crossing(s) that qualifies as a Process 1 crossing(s).

Table 2: Process 1 – Minimum

Dimension Criteria	
Outside pipe diameter	Less than 300 mm (12 in.)
Cover between BOR and top of pipe	Greater than 1.5 m (5 ft.) or three pipe diameters whichever is greater.

Adjacent structures including switches and signals	Greater than 10 m (32.8 ft.) centerline.
Depth of pipes outside ZPTL	Refer to SP-TS 2.39 All pipes will be at least 0.91 m (3 ft.) below ground where pipes are not below the ZPTL.
Excavation Criteria	
Excavation close to CPKC track(s)	Jacking/access pits shall be more than 10 m (33 ft.) from the closest track centerline and not encroach on the ZPTL.
Crossing angle	Less than 45 degrees off perpendicular to the track.
Construction Method	
1. Trenchless method[1] 2. Pipe bursting will only be considered where the predicted soil heave is less than 10% of the movement that would result in a change of the FRA or TC track class.	

[1] Trenchless methods include Auger Boring (AB), Pipe Jacking, Pipe Ramming (PR), Horizontal Directional Drilling (HDD) except high pressure fluid jetting method, Microtunnelling (MT) but exclude any type of mining techniques where any stand up time is required before the tunnel support is placed.

8.2 Application Requirements

8.2.1 The applicant will provide documents and drawings containing the information identified in Section 7.0.

8.2.2 Generally, an installation that falls under the minimum review detail level does not require a geotechnical investigation. However, in areas with poor subsurface soil conditions or where failures have occurred with similar pipe crossings, CPKC reserves the right to request a Geotechnical investigation to be conducted in order to proceed with the proposed pipe installation. In situations where a pipe is below the 300mm OD threshold, but the borehole size is 300mm or larger, a Geotechnical investigation is required. Voids between the bore and outside casing are to be filled with non-shrinkable material.

8.2.3 Even if not required by CPKC, a geotechnical investigation may be completed at the discretion of the applicant.

8.3 Application Review and Approval Process

8.3.1 Applicant submits engineering documents to CPKC Utilities.

8.3.2 CPKC Utilities reviews documents to ensure applicable and complete engineering documents are provided.

8.3.3 An assessment is completed by CPKC Utilities to provide decision/approval documentation.

9.0 Process 2 – Intermediate

The Intermediate process pertains to those proposed pipeline/track crossing(s) that exceed the minimum criteria but do not exceed the maximum criteria. The applicant will be required to submit information for review and approval by CPKC Utilities Department or a CPKC approved service provider but may be subjected to additional engineering, monitoring, and construction requirements.

9.1 Criteria

The general requirements included in Table 1 in conjunction with the following requirements must be met to obtain approval for a pipeline and utility crossing(s) that qualifies as a Process 2 crossing(s).

Table 3: Process 2 – Intermediate

Dimension Criteria	
Outside pipe diameter	300 mm (12 in.) to 1500 mm (59 in.)
Cover between BOR and top of pipe	Greater than 1.5 m (5 ft.) or two (2) pipe diameters whichever is greater.

Adjacent structures including switches and signals	Within 2.5 times, cover between BOR and top of pipe.
Depth of pipes outside ZPTL	Less than 0.91 m (3 ft.) burial within ZPTL.
Excavation Criteria	
Excavation close to CPKC track(s)	Excavations or jacking/access pits within 10 m (32.8 ft.) of the closest track centerline.
Crossing angle	More than 45 degrees off perpendicular to the track.
Construction Method	
	1. Trenchless method[1] 2. Pipe bursting will only be considered where the predicted soil heave is less than 10% of the movement that would result in a change of the FRA or TC track class.

[1] Trenchless methods include Auger Boring (AB), Pipe Jacking, Pipe Ramming (PR), Horizontal Directional Drilling (HDD) except high pressure fluid jetting method, Microtunnelling (MT) but exclude any type of mining techniques where any stand up time is required before the tunnel support is placed.

9.2 Application Requirements

9.2.1 Identification of the Geotechnical Engineer of Record (GER). The GER will be responsible for the proposed works on CPKC's ROW from project start up to project closeout including submission of construction summary report and as-built drawing.

9.2.2 Description of the subsurface soil and ground water conditions within and adjacent to CPKC embankment along the proposed pipe/track crossing alignment and to a depth no less than 1.5 times the invert depth below the BOR.

This will consider the impact of silt, fine sand or sand soil, and their relation to the water table and pipe depth. First set of deep monitoring points to be placed on either side of the outside rail at 2m distance off track centerline measured from outside of the rails. Additional deep monitoring points to be placed at the toe of slope and at end points/toes of ZPTL. Signal and fibre locates to be completed before installing any settlement monitoring equipment in the railway right of way.

9.2.3 An estimate of the expected extent and magnitude of ground movement over time based on the proposed pipe installation method will be provided.

9.2.4 A program of ground surface and subsurface (settlement plates) movement monitoring will be implemented. The program must be capable of detecting movement of no less than 50 percent of the movement that would result in a change of the track class as determined by the FRA or TC track safety rules. A real-time remote settlement monitoring system should be used, aiding in reduction of requirements for overnight railway flagging protection when work is paused, but within the ZPTL. Remote settlement monitoring is recommended for all Class 3, 4, and 5 tracks. Manual methods of gathering settlement monitoring readings (such as rod and level) will only be entertained with prior approval.

9.2.4.1 A GIMP (Geotechnical Instrumentation and Monitoring Plan) system will be required if installation is occurring within the zone of potential loading of rail bridge supporting piers or abutments. The instrumentation installed is intended to monitor short and long term embankment performance, along with settlement and stability due to the subsurface site conditions and the nature of the proposed construction activities.

9.2.5 A procedure for notification of the appropriate CPKC personnel in the event that excessive or unexpected settlement occurs. A complete 24 Hour CPKC Emergency contact list, including local personnel and OC will be compiled and in place before any work proceeds within the railway right of way.

9.2.6 A recovery plan will be provided outlining the steps to be implemented in the event of failure (excessive ground loss or settlement / collapse, heaving etc).

9.2.7 Design of de-watering control measures where applicable for the proposed construction method.

9.2.8 Temporary track support system will be required if any of the excavation is closer than 6 m (19.7 feet) from the centre of track and encroaches on the zone of

potential track loading. The length of the excavation and an estimated stand-up time of the proposed cut within these limits must be provided and demonstrated to be safe.

9.2.9 A complete description of the proposed construction method.

9.2.10 Confirmation that the proposed construction/installation technique is suited to the site conditions and performance criteria. An assessment of the influence of construction on the track structure including estimated settlement/heave and assessment of risk associated with uncontrolled loss of ground or heaving.

9.2.11 Based on CPKC's review of the conditions, CPKC Geotechnical group may elevate a proposed crossing to Process 3 if deemed necessary.

9.2.12 A qualified independent CPKC approved engineer is required to provide periodic or continuous (at the discretion of CPKC) on-site supervision and document conditions during construction.

9.3 Application Review and Approval Process

9.3.1 Applicant submits engineering documents and utility crossing application to the CPKC Utilities Department.

9.3.2 CPKC Utilities Department reviews documents to check if appropriate and accurate engineering documents have been provided.

9.3.3 CPKC approved Geotechnical service provider to review initially & sign off on behalf of CPKC at applicant's expense. CPKC Geotechnical to provide final geotechnical approval.

9.3.4 CPKC Structural Engineering Group may have to provide structural approval, if required.

9.3.5 CPKC Utilities Department – To provide final decision or approvals.

10.0 Process 3 – Detailed

Process 3 will be applicable to those crossing(s) applications that do not meet the conditions of Process 2. In this case, expert engineering submissions are required, along with additional work such as dewatering as well as monitoring by on site engineering consultants during construction.

10.1 Criteria

The general requirements included in Table 1 in conjunction with the following requirements must be met to obtain approval for a pipeline crossing(s) that qualifies as a Process 3 crossing.

Table 4: Process 3 – Detailed

Dimension Criteria	
Outside pipe diameter	Greater than 1500 mm (59 in.)
Cover between BOR and top of pipe	Less than 1.5 m (5 ft.) or two (2) pipe diameters.
Adjacent structures, switches and signals	Within 2.5 times, cover between BOR and top of pipe.
Depth of pipes outside ZPTL	Less than 0.91 m (3 ft.) burial within ZPTL.
Excavation close to CPKC track(s)	Excavations or jacking/access pits within 10 m (33 ft.) of the closest track centerline.
Excavation Criteria	
Excavation close to CPKC track(s)	Excavations or jacking/access pits within 10 m (30 ft) of the closest track centerline.
Crossing angle	More than 45 degrees off perpendicular to the track.
Construction Method	

All methods considered
Ground conditions, complex installation method, and/or the complexity of the project warrant that specialist-engineering personnel review the design and or construction of the pipe/track crossing(s).

10.2 Application Requirements

10.2.1 The applicant will meet the requirement outlined in Process 2 - Section 9.2.

10.2.2 The applicant will provide resources for CPKC to retain CPKC approved service provider(s) or experts(s) to assess and review the application and advise CPKC on the impact of the applicant's proposal on CPKC ROW.

10.3 Application Process and Approval Process

10.3.1 Applicant submits engineering documents to CPKC Utilities. All applications will be processed as per the procedure outlined in Section 9.3.

11.0 Pre-Construction Meeting Requirement

Prior to commencement of any work within CPKC property/ROW, the Geotechnical Engineer of Record (GER) or their designate shall arrange a pre-construction meeting at least thirty days before with all stakeholders to discuss project and construction details including work description, construction methods and schedule, restrictions, safety, hours/days of work, start time, Daily Reporting & other CPKC requirements and agreed upon Protocols governing Extreme Weather/Rainfall Warning Alerts issued from Local/National weather offices. This may mean that drilling operations ceases until these Alerts are no longer in effect. It is the responsibility of the GER or their designate to ensure that flagging protection has been arranged for the duration of the project, all construction oversight and track settlement monitoring review has been arranged with CPKC approved service provider and that the expectations have been clearly communicated before construction commences.

12.0 Daily Inspection & Reporting during Construction

This section is applicable to Process Levels 2 and 3 application proposals. The agreement holder or applicant will identify a Geotechnical Engineer of Record (GER) responsible for the complete work and installation of proposed crossing/excavation within CPKC ROW from start to finish. The Geotechnical Engineer of Record may assign a competent/trained person to act as Site

Inspector/Engineer who will be present onsite during the full duration of the bore or any other ground disturbance activity within railway operating corridor, unless, otherwise directed by CPKC Utilities Supervisor. Depending on the complexity of the installation and or field issues encountered during the installation that may adversely impact CPKC Infrastructure, CPKC may, at their discretion, assign a full time Geotech Monitor, of their choice, to be on site, at the Applicant's expense.

CPKC flagger or assigned representative must be present at all times when working or drilling within CPKC property or rail operating corridor. No movement of pipe within the ROW or ZPTL is permitted without the presence of a CPKC flagger unless prior written approval from CPKC for an exemption has been provided. The Site Inspector/Engineer must have the required training, experience and understanding of the site conditions, proposed design, and construction methodology to make sound engineering judgement and decisions, and reports during the course of the work.

The Site Inspector/Engineer must ensure that the work is being carried out in accordance with the approved designs, permits and procedures, and/or relevant specifications. The Site Inspector/Engineer must immediately report any issues encountered during construction work and could have an impact on CPKC assets and its operations. Some examples include instability or potential of instability of the embankment or potential ground settlements either future or immediate.

Any concerns about the imminent stability of the grade shall immediately be escalated to CPKC Flagger or representative in order to protect against train operations. In addition, refer to CPKC 24 Hour Emergency Contact list to use in case of emergency. The concerns shall also be escalated to the GER and CPKC Utilities supervisor so immediate remediation plans can be implemented.

The Site Inspector/Engineer will provide a daily report to CPKC approved service provider, copying CPKC Utilities supervisor, CPKC's Director Geotechnical Engineering and the GER, outlining the progress during the day, any deviations from the original plans, any unexpected ground conditions, or any issues that were encountered during the construction. The report shall also contain relevant information that assures CPKC that the field activities are being monitored and documented to ensure that the installation is proceeding in accordance with approved plans and no unexpected conditions/issues are expected. Some examples of relevant information examples include some of the following information:

- A quantitative estimation of amount of material removed versus theoretical material;
- Auger location - Location of both, the leading edge of the pipe and the location of the leading edge of the auger should be documented;

- A description of the progress and any observations or issues encountered during the pipe installation including geologic conditions, change in material composition, characteristics, etc.

The daily report will also include all settlement monitoring data, along with any pertinent photos. If applicable, this report will also make notes and highlight any measures taken for “out of compliance” practice or when conditions requiring attention are expected or encountered. See Appendix B for a Sample Report.

A mid-day report should also be submitted by 13:00 local time each day until installation clears the railway right of way and no further movement is occurring due to the installation activities. This requirement can be reviewed and waived if agreed upon by all parties during the preconstruction meeting.

Upon completion of the construction and installation of pipeline and utility crossing(s), the GER will provide a final sealed and stamped letter/construction report to CPKC approved service provider with a copy to CPKC Utilities supervisor confirming that the work has been completed in accordance with the approved plans and procedures. If there are any deviations from the approved plans/procedures, these must be noted in the final letter/report. As-built stamped drawings are to be submitted to the CPKC Utilities Department along with final settlement data collected and correspondence.

All costs associated with above mentioned i.e. complete geotechnical review, track settlement monitoring, flagging and construction oversight provided CPKC approved service provider will be borne by the applicant.
A contract between CPKC approved service provider(s) and the applicant must be place before proceeding with this work proposal.

13.0 Review Steps

The following is a checklist of steps that will be completed to ensure that the appropriate level of care has been taken for Process 2 and 3 pipe crossings below the track.

Table 5 – Review Steps

No.	Step	Action/Review by

No.	Step	Action/Review by
13.1	Submission of crossing(s) proposal by applicant including details of the crossing(s) specification and potential construction method(s) to CPKC Utilities.	Applicant
13.2	Review of the proposal as per this protocol to determine what level of geotechnical engineering and review is required.	CPKC Utilities
13.3	Designation of review i.e. CPKC approved service provider. (ASP)	CPKC Utilities
13.4	Identification of the Applicant's Geotechnical Engineer of Record.	CPKC Geotech Engineering/ASP
13.5	Assessment of adequacy of the geotechnical investigation and other required information.	CPKC Geotech Engineering/ASP
13.6	Applicant's geotechnical engineer determines that the proposed construction/installation method will not cause settlement of the CPKC track or structures.	CPKC Geotech Engineering/ASP
13.7	Settlement monitoring program, if required and developed by the applicant's geotechnical engineer.	CPKC Geotech Engineering/ASP
13.8	Once a contractor has been selected, the Geotechnical Engineer of Record (GER) will review the shop drawings submitted by the contractor or the sub-contractor(s) to determine if the tunnelling and dewatering (if required) method proposed could cause track settlement.	CPKC Geotech Engineering/ASP
13.9	Applicant will provide CPKC with written documentation of who will be completing the onsite review of the contractor's construction practice and the specifics of the assignment.	CPKC Geotech Engineering/ASP
13.10	Applicant will enlist the services of a Geotechnical Engineer of Record(GER) with the responsibility for inspection of the tunnelling contractor's work. They will also assure that adequate measures are in place to minimize the potential for track settlement. The intention is to assign an appropriate group with the task of assuring that actions undertaken by the contractor do not endanger the track structure because of ground loss during tunneling which may affect CPKC Train operations.	CPKC Geotech Engineering/ASP
13.11	An emergency response will be developed and posted on site and will reside with key personnel.	CPKC Geotech Engineering/ASP
13.12	A contingency plan will be prepared and submitted by Tunneling contractor prior to start of construction, identifying tasks/activities that can be completed within hours to get track back in service, if	CPKC Geotech Engineering/ASP

No.	Step	Action/Review by
	significant track settlement is experienced.	
13.13	24 Hour Emergency Contact List to be provided prior to commencement of construction.	CPKC Utilities

14.0 Abandoned Pipe/Track Crossing(s)

In the event that an existing installation is abandoned or a proposed crossing(s) is abandoned during construction, all potential hazards to CPKC property must be removed or abated. This may be achieved by removal of any buried pipes and the backfill and compaction of any excavations. Alternately, upon approval of the CPKC Geotechnical group any voids within ground may be backfilled with non-shrinkable fill, or pressured grout sufficient to prevent future sloughing or track settlement. Any buried material (wood or metal) that could increase or decrease volume over time due to chemical reaction (oxidation) or decomposition must be removed or stabilized to the satisfaction of CPKC.

Appendix A

SAMPLE DAILY REPORT AND SETTLEMENT REPORT

SAMPLE DAILY REPORT

PROJECT INFORMATION

Project Name:		**Date:**	July 11, 2019
Location:		**Contractor:**	
Client:		Site Rep:	

DAILY SUMMARY

Excavation Details: [i.e., depth, sideslopes, trench boxes, sloughing, etc.]	No additional casing installed today. No sloughing of CPR embankment noted. See attached sketch.
Construction Summary: [i.e., soil type, issues, etc.]	Contractor attaching shoes (wedges) to the casing exterior near the casing head behind the gravel plug (approx. station 0+031). One shoe on track west side of casing approx. 250 mm X 300 mm X 50 mm(deep outside of casing). One shoe on bottom of casing approx. 275 mm X 300 mm X 25 mm(deep outside of casing).
Cumulative Settlement Movement (mm):	☒ Minimal Movement (<8) ☐ Level 1 – Warning (≥8 to <16) ☐ Level 2 – Critical (≥16)
Compliance with Design:	☐ Yes ☒ No If No, discuss below
Issues with Installation:	☒ Yes ☐ No If Yes, discuss below
Other Notes, if any:	Casing was out of alignment by approximately 40 mm track west and 25 mm lower than designed location at about station 0+031. Contractor attaching shoes (wedges) to the casing exterior near the casing head behind the gravel plug (approx. station 0+031) for alignment correction.

Prepared By: Reviewed By:

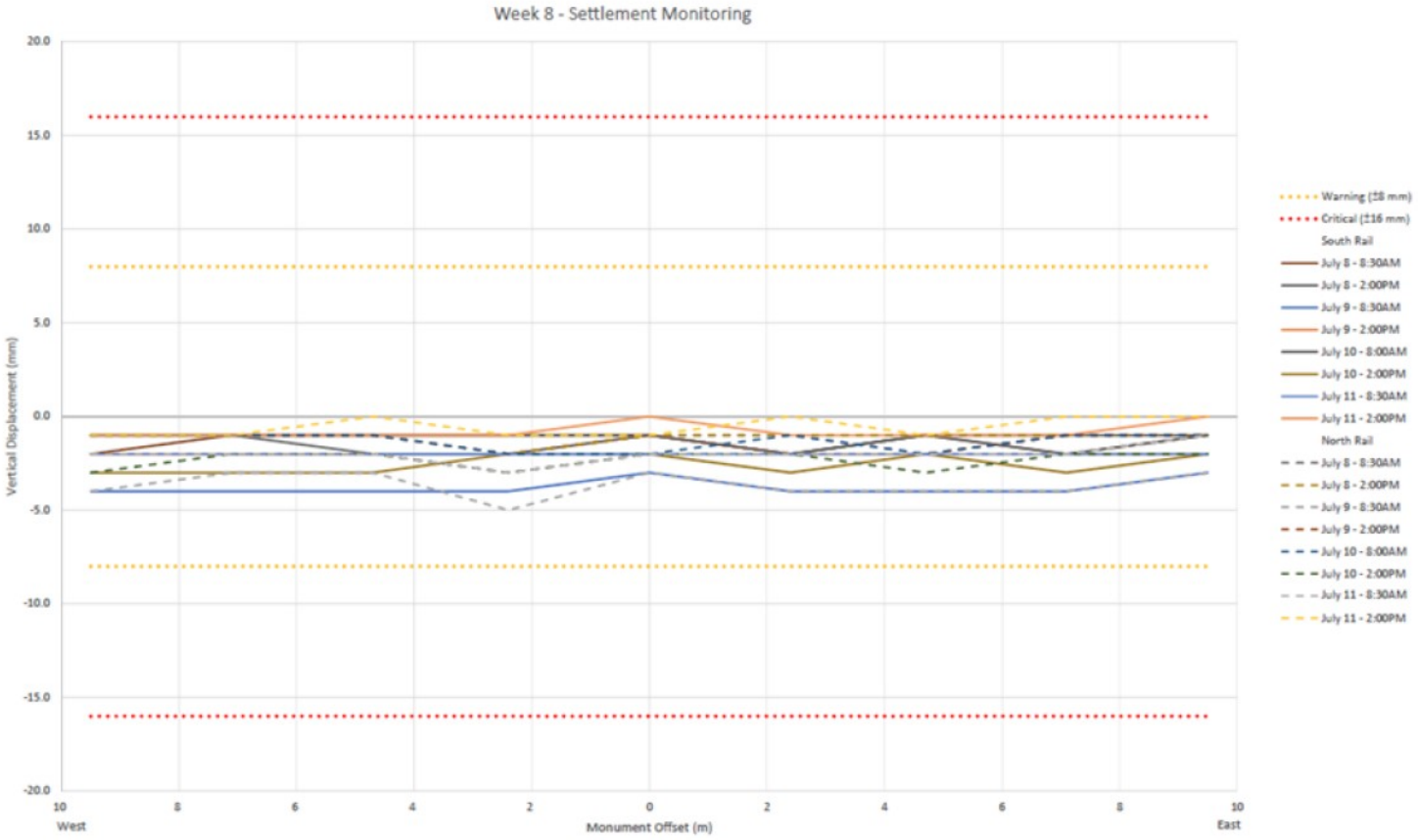
SAMPLE DAILY SETTLEMENT MONITORING REPORT

SETTLEMENT MONITORING

Surveyor: D. Makowsky (Stantec) **Date:** July 11, 2019 **CPR Flagman:** Rashpal Jaswal
Weather: Sunny **Temperature:** 16°C at 8:30 am; 27°C at 2:00 pm

*Survey locations along the top of the rails. **Baseline elevation is average of 2 surveys on June 12, 2019. ***Positive numbers correspond to heave and negative numbers correspond to settlement

Rail Location	Location Description and Monument ID*	Baseline Elevation (m)**	Reading 1			Reading 2		
			Time	Elevation (m)	Cumulative Movement (mm)***	Time	Elevation (m)	Cumulative Movement (mm)***
South Rail	9.45 m East (S9)	1034.587	8:30 am	1034.585	-2	2:00 pm	1034.587	0
	7.08 m East (S8)	1034.593		1034.591	-2		1034.592	-1
	4.72 m East (S7)	1034.597		1034.595	-2		1034.596	-1
	2.36 m East (S6)	1034.601		1034.599	-2		1034.600	-1
	Centerline (S5)	1034.605		1034.603	-2		1034.605	0
	2.36 m West (S4)	1034.612		1034.610	-2		1034.611	-1
	4.75 m West (S3)	1034.618		1034.616	-2		1034.617	-1
	7.08 m West (S2)	1034.622		1034.620	-2		1034.621	-1
	9.45 m West (S1)	1034.626		1034.624	-2		1034.625	-1
North Rail	9.45 m West (N1)	1034.624		1034.622	-2		1034.623	-1
	7.08 m West (N2)	1034.621		1034.619	-2		1034.620	-1
	4.75 m West (N3)	1034.617		1034.615	-2		1034.617	0
	2.36 m West (N4)	1034.612		1034.609	-3		1034.611	-1
	Centerline (N5)	1034.604		1034.602	-2		1034.603	-1
	2.36 m East (N6)	1034.599		1034.597	-2		1034.599	0
	4.75 m East (N7)	1034.597		1034.595	-2		1034.596	-1
	7.08 m East (N8)	1034.590		1034.588	-2		1034.590	0
	9.45 m East (N9)	1034.586		1034.585	-1		1034.586	0


Week 8 - Settlement Monitoring
Vertical Displacement (mm)
20.0
15.0
10.0
5.0
0.0
-5.0
-10.0
-15.0
-20.0
10
8
6
4
2
0
2
4
6
8
10
West
Monument Offset (m)
East
Warning (±8 mm)
Critical (±16 mm)
South Rail
July 8 - 8:30AM
July 8 - 2:00PM
July 9 - 8:30AM
July 9 - 2:00PM
July 10 - 8:00AM
July 10 - 2:00PM
July 11 - 8:30AM
July 11 - 2:00PM
North Rail
July 8 - 8:30AM
July 8 - 2:00PM
July 9 - 8:30AM
July 9 - 2:00PM
July 10 - 8:00AM
July 10 - 2:00PM
July 11 - 8:30AM
July 11 - 2:00PM

SAMPLE TRENCHLESS INSTALLATION MONITORING REPORT

TRENCHLESS INSTALLATION MONITORING

Equipment:	Air Hammer	**Operator:**	Jorden Calgary Tunneling
Casing Pipe Diameter:	750 mm	16 mm overcut on casing head	
Date:	July 11, 2019	2m plug at casing head during installation	

Date	Segment No.	Segment Length (m)	Station Interval along the Face of Installation	Length of Pipe Installed (m)	Distance of Head to CL Track (S or N) (m)	Soils Condition/Description
July 7, 2019	1	6.0	0+015	6.0	18 m N	Gravel, sandy, some silt, trace clay. Dry
July 8, 2019	2	6.0	0+021	6.0	12 m N	Gravel, sandy, some silt, trace clay. Dry
July 9, 2019	3	6.0	0+027	6.0	6 m N	Gravel, sandy, some silt. Damp
July 9, 2019	4	6.0	0+033	6.0	0 m (CL Track)	Gravel, sandy, some silt. Damp
July 10, 2019 July 11, 2019						No casing installed, contractor attaching shoes (wedges) to casing at station 0+031


N1
N2
N3
N4
N5
N6
N7
N8
N9
S1
S2
S3
S4
S5
S6
S7
S8
S9
9.45 m
7.08 m
4.72 m
2.36 m
UPDATED CL OF WATERMAIN
CL OF 450 WATERMAN (ORIGINAL)
26A STREET SE
LEGEND
SURFACE SETTLEMENT MONITORING POINT (PREVIOUS)
UPDATED SURFACE SETTLEMENT MONITORING POINT (JUNE 12)
0
20m
LOCATION OF
SETTLEMENT MONITORING MONUMENTS
PROJECT NO.
C12103500PKG-022.4
DWN
LCH
CKD
KH
REV
0
OFFICE
TT Cal
DATE
May 2019
Figure

Appendix B

TRACK MOVEMENT MONITORING GUIDELINES FOR TRENCHLESS PIPE INSTALLATION

Track Movement Monitoring Guidelines for Trenchless Pipe and Utility Crossing(s) Installation under Railway Tracks

The monitoring of track settlement should be carried out by means of surface and subsurface settlement points. The intent of subsurface settlement points is to measure voids created just in the vicinity and above the pipe during construction in order to predict the potential movement of overlying CPKC tracks.

The settlement point essentially consists of a small diameter pipe anchored at the bottom of a vertical borehole and an outer casing to isolate the pipe from down drag forces caused by settlement of soil above the anchor (see Figure B). The subsurface settlement points would be installed to 1 m above the crown of the casing profile. The total number of subsurface settlement points within CPKC Right-of-Way (ROW) along the axis of the proposed pipe crossing(s) would be installed as per the configuration shown in Figure A – Sample Surface and Subsurface Settlement Monitoring Layout.

Surface points installed directly along the base of both rails at a spacing of 9.45 m (31 ft.) over the projected settlement trough would be used to monitor differential transversal elevation between both rails. The total number of surface settlement points within CPKC ROW would be installed as per the configuration shown in Figure A – Sample Surface and Subsurface Settlement Monitoring Layout. These points shall be monitored simultaneously with the subsurface settlement points that would act as a precursor to potential surface movement during pipe installation.

Once the installation is complete, a monitoring program of all points is to be carried out in accordance with the following instructions:

1. Monitoring should start before the excavation of the pits and pipe installation begins and readings should be taken at least twice per day for no less than two days. This is required to establish a reliable methodology and demonstrate the accuracy to be achieved.

2. Monitoring should proceed through the construction period and should be completed:

    1) For branch lines/lines with low traffic - (Class 1-2 Track) - At least twice daily.

    2) For main lines and heavy traffic lines – (Class 3-5 Track) Every 2 hours and before and after each train, whichever provides the most number of readings while the boring operation is within the ZPTL (Zone of Potential Track Loading).

3. Monitoring should continue for at least 3 days after the completion of construction.

4. If there is any loss of ground during pipe installation, any reason to believe settlement may be delayed or any settlement is identified during the installation of pipe or subsequent monitoring period, the monitoring must be continued until the applicant's Geotechnical Engineer of Record deems it is safe to discontinue such monitoring. This must be approved by CPKC Geotechnical Engineering group or CPKC approved service provider reviewing the monitoring results.

Monitoring measurements should be taken with sufficient frequency (as noted above) to capture the unexpected performance at the earliest possible stage and be evaluated in a timely manner. Additional measures will be proposed should this monitoring protocol be considered insufficient based on the ground conditions or installation process. Track survey preference would be for survey shots to be taken remotely (i.e. off CPKC property) and without the requirement of a CPKC Flagger or representative presence on site.

Two alarm levels are proposed:-

Level 1:

ALERT – (Review Threshold) must be indicated on the field memo/report when a settlement of **50 (%)** of the critical monitoring threshold is obtained from the subsurface and/or surface settlement points. A survey of the surface points will then be carried out and work will be authorized to continue if no movement of the subsurface point has been measured from the previous reading. If movement of the rails is recorded, monitoring will be continued until rail movement is stopped. At this point, the drilling work will then be authorized to continue. See Figure C – Track Settlement Monitoring Review and Alert Threshold for Threshold values per Class of Track designation. Please contact CPKC Utilities Supervisor to obtain Class of Track designation pertaining to the proposed Utility Crossing location. CPKC Geotechnical Engineer/Utility Supervisor should be called to discuss these findings in order to discuss next steps.

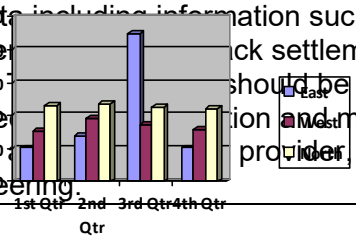
Level 2:

CRITICAL – (Stop Work) - Installation **must** come to an immediate stop if monitoring points trigger Critical levels.
Above information must be indicated on the field memo/report when a settlement of specified monitoring threshold is obtained from the subsurface settlement point. A survey of the surface points will then be carried out and work will be authorized to continue if no movement is measured for at least two (2) readings taken 12 hours apart. If movement of the rails is recorded, monitoring will be continued until movement is stopped and the applicant has submitted a new pipe installation procedure. This procedure must be reviewed and approved by CPKC Geotechnical Engineering group or CPKC approved service provider reviewing the monitoring results.

The applicant and their Geotechnical Engineer of Record are responsible for ensuring that track settlement does not occur and for notifying CPKC Roadmaster or their designate, as indicated

on the 24 Hour Emergency Contact List, should unforeseeable track settlement occur or be expected.

The above guidelines do not relieve the applicant and their engineer(s) of this responsibility. The applicant or their engineer(s) shall provide the settlement information and their interpretation of the data including information such as. no track settlement, deep settlement etc., a quantitative number ck settlement has occurred, is likely to occur and when it is likely to occur should be provided in easily understandable terms for all parties involve ion and monitoring and should be directed to local CPKC Roadmaster, CPKC provider, Supervisor – CPKC Utilities and Director of Geotechnical Engineering.



SAMPLE TRACK SETTLEMENT MONITORING DRAWING

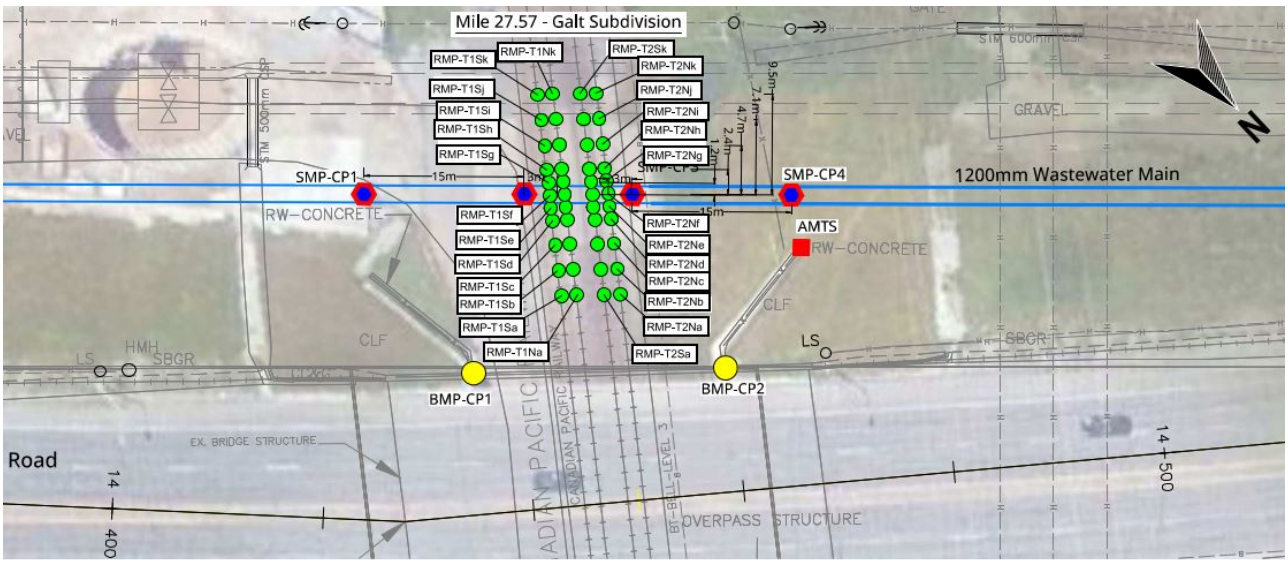


Figure A - Sample Surface and Subsurface Settlement Monitoring Layout

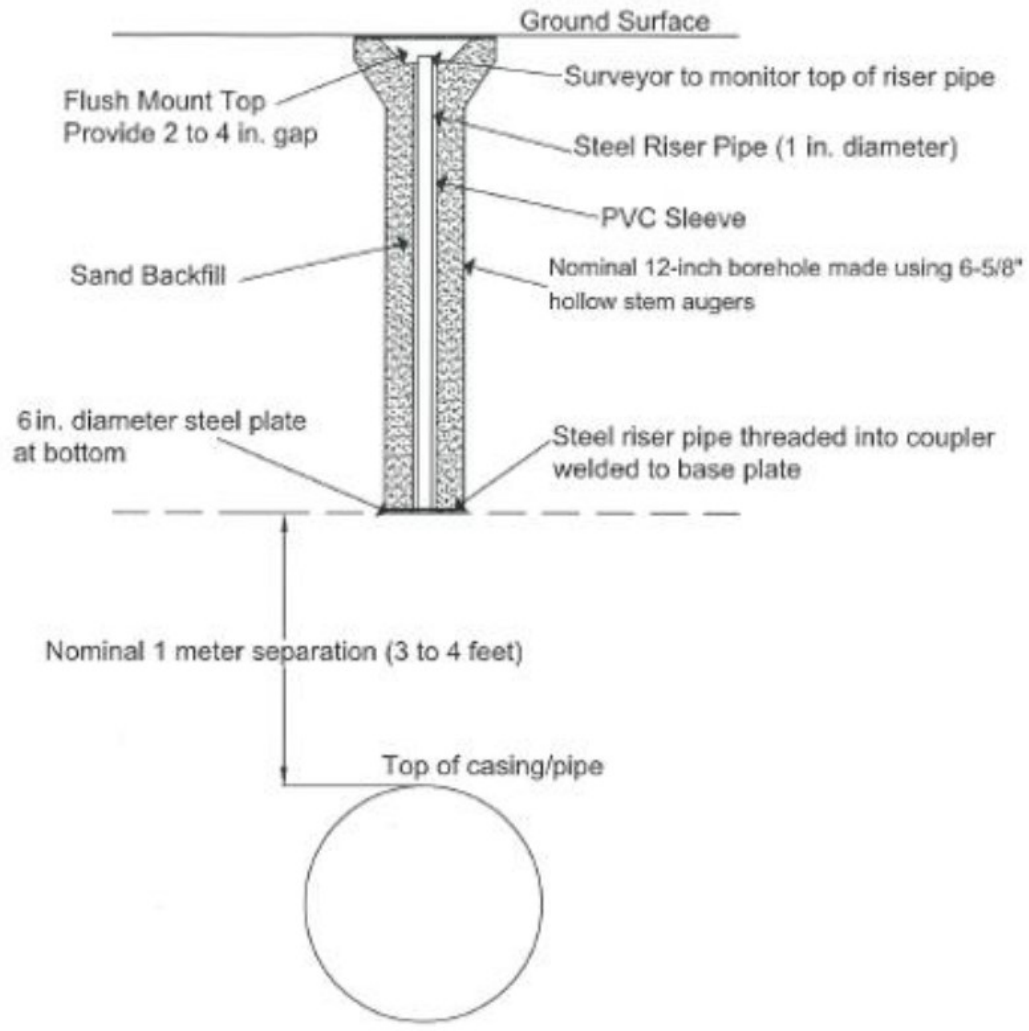


Figure B – Track Settlement Monitoring Critical and Alert Thresholds (Surface and Subsurface)

Class of track	Critical Threshold	Alert Threshold
1	22 mm	11 mm
2	22 mm	11 mm
3	19 mm	10 mm
4	16 mm	8 mm
5	13 mm	6 mm
6	10 mm	5 mm

Note – All above numbers are maximum values

Class of Track

TRACK CLASSES

Class	Freight Train Speed	Passenger Train Speed
1	10 MPH	15MPH
2	25 MPH	30 MPH
3	40 MPH	60 MPH
4	60 MPH	80 MPH
5	80 MPH	95 MPH* 90 MPH **
*Denotes for LRC trains – 100 MPH	** - Applies to US only	Note – Numbers above are maximum values

Appendix C

ADDITIONAL NOTES & INSTALLATION REQUIREMENTS

1. Many of CPKC's properties contain buried parallel fibre optic networks. CPKC will supply the appropriate 1-800 numbers to call to ensure the protection of these fibre lines when crossing. The applicant must arrange with the various fibre maintenance providers for the proper hand digging and exposure of the fibre cable prior to commencing construction. No pipelines or cable crossings are to be installed at less than 1 vertical meter above or below the fibre cables, and no buried parallel occupancies, poles or anchors are to be located within 3 horizontal meters of the fibre optic cables.

2. In absolutely no instance is the utility to be installed without receiving prior approval from CPKC and arranging with the Utilities group for track protection. Any contractors entering the property prior to making these arrangements or without the presence of a CPKC representative will be subject to immediate and lengthy work stoppages by the railway.

CASING AND INSTALLATION OF LONGITUDINAL PIPES, AND PIPES IN CLOSE PROXIMITY TO BRIDGES AND IMPORTANT STRUCTURES:

The AREMA Specifications address pipeline installation in proximity to railway bridges with the following clauses:

1. Pipelines shall be located, where practicable, to cross tracks at approximately right angles thereto but preferably at not less than 45 degrees and shall not be placed within culverts nor under railway bridges where there is a likelihood of restricting the area required for the purposes for which the bridges or culverts were built, or of endangering the foundations.

2. Pipelines laid longitudinally on railway rights-of-way shall be located as far as practicable from any tracks or other important structures. If located within 25 feet (7.62M) of the centerline of any track or where there is danger of damage from leakage to any bridge, building or other important structure, the carrier pipe shall be encased or of special design as approved by the engineer.

Whereas the AREMA specifications require that longitudinal pipelines, and those in proximity to a bridge or other important structure be encased if within 7.62 M of the track or structure, or of special design as approved by the engineer, should the pipeline be encased;

1. CPKC requires that the length of the casing pipe adjacent to a track shall be for the full length of pipe falling within the 7.62 M distance from the track, and

2. If adjacent to a bridge or structure, the casing pipe must extend to the point where the end of the casing pipe is a minimum of 7.62 M beyond the nearest points of the structure or bridge foundation.

In all cases, the design engineer must be confident that the depth, ground conditions and method of installation used will not in any way interfere with the integrity of the track bed and/or adjacent foundations and they must also provide CPKC with a stamped design plan or report, detailing the installation methodology to be used.

The following tables may be used for water, sewer, steam and non-flammable substances, and are Metric versions of the tables contained in the AREMA manual.

Minimum Wall Thickness for Steel Casing Pipe for E80 Loading:

Diameter (mm) less than or equal to	When coated or cathodically protected Nominal Thickness (mm)	When **not** coated or cathodically protected Nominal Thickness (mm)
324	4.77	4.77
356	4.77	6.35
406	5.59	7.14
457	6.35	7.92
559	7.14	8.74
610	7.92	9.53
660	8.74	10.31
711	9.53	11.13
762	10.31	11.91
813	11.13	12.70
914	11.91	13.49
965	12.70	14.27
1016	13.49	15.09
1067	14.27	15.88
1168	15.09	16.66
1219	15.88	17.48
1270	16.66	18.26
1321	17.48	19.05
1372	18.26	19.84
1473	19.05	20.62
1524	19.84	21.44
1575	20.62	22.23
1626	21.44	23.01
1727	22.23	23.83
1778	23.01	24.61
1829	23.83	25.40

Note: The length of steel casing pipe in this table and the steel carrier pipe in the following table must be as per CPKC Specification 2.39 Appendix A.

The inside diameter of the casing pipe must be at least 50.8 mm larger than the outside diameter of the carrier pipe if the carrier pipe is 152.4 mm or less. For all carrier pipes with outside diameters in excess of 152.4 mm, the inside diameter of the casing pipe must be at least 101.6 mm larger than the outside diameter of the carrier pipe.

The following Tables give the minimum thickness for steel carrier pipe for E80 loading.

Note: The length of the steel carrier pipe in these tables must be as per CPKC Specification 2.39 Appendix A. Additionally, all carrier pipes that are not provided with cathodic protection, (impressed current or sacrificial anode) must be a minimum of 1.59 mm thicker than shown in these tables.

Dia.	Minimum Yield Strength (mPa) > =					Minimum Yield Strength (mPa) > =				
(mm)	241	290	358	414	483	241	290	358	414	483
	MAOP < = 689 kPa					MAOP < = 1379 kPa				
<=457.2	4.77	4.77	4.77	4.77	4.77	4.77	4.77	4.77	4.77	4.77
508	5.56	5.56	5.56	5.56	5.56	5.56	5.56	5.56	5.56	5.56
558.8	5.74	5.74	5.74	5.74	5.74	5.74	5.74	5.74	5.74	5.74
609.6	6.35	6.35	6.35	6.35	6.35	6.35	6.35	6.35	6.35	6.35
660.4	7.14	7.14	7.14	7.14	7.14	7.14	7.14	7.14	7.14	7.14
711.2	7.14	7.14	7.14	7.14	7.14	7.14	7.14	7.14	7.14	7.14
762	7.92	7.92	7.92	7.92	7.92	7.92	7.92	7.92	7.92	7.92
812.8	8.74	8.74	8.74	8.74	8.74	8.74	8.74	8.74	8.74	8.74
863.6	8.74	8.74	8.74	8.74	8.74	8.74	8.74	8.74	8.74	8.74
914.4	9.53	9.53	9.53	9.53	9.53	I0.3I	9.53	9.53	9.53	9.53
965.2	10.31	10.31	10.31	10.31	10.31	10.31	10.31	10.31	10.31	10.31
1016	10.31	10.31	10.31	10.31	10.31	11.91	10.31	10.31	10.31	10.31
1066.8	10.31	10.31	10.31	10.31	10.31	12.7	10.31	10.31	10.31	10.31

Dia.	Minimum Yield Strength (mPa) > =					Minimum Yield Strength (mPa) > =				
(mm)	241	290	358	414	483	241	290	358	414	483
	MAOP < = 11721 kPa					MAOP < = 12411 kPa				
<= 101.6	4.78	4.78	4.78	4.78	4.78	4.78	4.78	4.78	4.78	4.78
114.3	4.78	4.78	4.78	4.78	4.78	5.16	4.78	4.78	4.78	4.78
141.3	6.55	4.78	4.78	4.78	4.78	6.55	5.56	4.78	4.78	4.78
168.3	7.11	6.35	4.78	4.78	4.78	7.92	6.35	5.56	4.78	4.78
219.1	9.53	7.92	6.35	5.56	4.78	9.53	7.92	6.35	5.56	4.78
273.I	11.13	9.27	7.92	6.5	5.56	11.91	10.31	7.92	7.09	6.35
323.9	13.49	11.13	9.53	7.92	7.14	14.27	11.91	9.53	8.74	7.I4
355.6	15.09	12.7	10.31	8.74	7.92	15.88	12.7	10.31	9.53	7.92
406.4	16.66	14.27	11.13	10.31	8.74	17.48	15.09	11.91	10.31	8.74
457.2	19.05	15.88	12.7	11.13	9.53	19.84	16.66	13.49	11.91	10.31
508	20.62	17.48	14.27	12.7	10.31	22.23	18.26	15.09	12.7	11.13
558.8	23.01	19.05	15.88	13.49	11.91	24.61	19.84	16.66	14.27	12.7
609.6	25.4	20.62	16.66	15.09	12.7	26.19	22.23	18.26	15.88	13.49
660.4	26.97	23.01	18.26	15.88	13.49	28.58	23.83	19.05	16.66	14.27
711.2	29.36	24.61	19.84	17.48	15.09	30.96	25.4	20.62	18.26	15.88
1016	36.53	30.96	25.4	22.23	19.05	38.89	32.54	26.97	23.01	19.84
1066.8	38.89	32.54	26.97	23.83	19.84	---	34.14	27.79	24.61	21.44

REQUIREMENTS FOR THE DESIGN OF STEEL CULVERTS CARRYING RAILWAY TRAFFIC

1. Design Specifications

AREMA Manual of Recommended Practice, Chapter 1: Part 4: Culverts, latest edition.

2. Type of Construction, Materials, Structural Design and Installation

Culverts may be constructed with corrugated steel pipe (CSP, shop fabricated); structural plate corrugated steel pipe (SPCSP, field fabricated) or steel pipe (bored or jacked).

CSP installations shall be in accordance with CPKC Standard Plans B-1-4950-1 (Canada) or B-1- 4950-2 (United States). These standard plans outline material, structural and installation requirements for CSP installations up to 1800 mm (6'-0") in diameter.

SPCSP installations, and installations using materials other than corrugated steel, require specific design and plans relating to material, structural and installation requirements to be prepared by a qualified professional engineer.

Steel pipe installations shall be in accordance with Table 4.9 "Least Nominal Wall Thickness for Steel Casing Pipe in Cased Crossings and Carrier Pipe in Uncased Crossings" in C.S.A. Standard Z662, latest edition, as amended by the Transport Canada "Standards Respecting Pipeline Crossings Under Railways" (originally invoked May 10, 2001); or as otherwise required by the proposed method of installation.

3. Hydraulic Design

Many culverts, based on history of the installation and experience of local officers, are replaced in- kind without need of a hydrological assessment. However, a hydrological assessment is required for new culvert installations, installations where a change in watercourse conditions has occurred, or where required by regulatory authorities. Where a hydrological assessment is performed, culvert requirements shall be determined in accordance with the following hydraulic criteria:

1. Culverts under main line tracks shall de designed for the following, whichever is greatest;

The 50-year flood with culvert pipes flowing no greater than 2/3 full (head to depth ratio less than 0.67); or

The 100-year flood with culvert pipes flowing no greater than full (head to depth ratio less than 1.00), where culvert cover is not less than 1500 mm (5'-0"). Where culvert cover is less than 1500 mm (5'-0") culverts shall be designed for the 100-year flood frequency flow with culvert pipes flowing no greater than 2/3 full (head to depth ratio less than 0.67).

2. Culverts under secondary and branch lines shall be designed for the following, whichever is greatest;

The 50-year flood with culvert pipes flowing no greater than full (head to depth ratio less than 1.00); or

The 100-year flood with culvert pipes flowing with a headwater depth no greater than 50% of the diameter of the pipes above the top of pipe (head to depth ratio less than l.50). However the headwater depth shall not be less than l metre (3 feet) below base-of-rail.

The following table lists the minimum requirements for round CMP pipes used as casing pipes for water, sewer, steam and non-flammable materials.

Culvert Size (mm) (Inside Dia.)	Corrugation Profile (mm)	Min. Depth of Cover (base of rail to top of pipe) (mm)	Max. Depth of Cover (m) (base of rail to top of pipe Specified Wall Thickness (mm)			
			1.6	2	2.8	3.5
300	68 x 13	1100	15.2	15.2		
380	68 x 13	1100	12.2	12.2		
460	68 x 13	1100	9.1	9.1	16.8	
530	68 x 13	1100	7.6	7.6	13.7	
600	68 x 13	1100	7.6	7.6	12.2	13.7
760	68 x 13	1100			9.1	10.7

In all cases where inside diameters exceed 760 mm, CMP casing pipes shall be designed as per CPKC standard plan B-1-4950-1.

Culverts must be zinc or aluminum coated. Additional coatings and couplings shall be provided as per CPKC standard plan B-1-4950-1.

Some supplementary information contained in the AREMA specification, regarding pipeline (not including Gas and Oil pipelines) and casing pipes for wire crossings of the Railway is as follows:

Calculation for Cooper E80 Loading for pipelines in pounds per square foot

T_{E80} = Total E80 Load in pounds per square foot
L_L = Live Load in pounds per square foot
I_P = Impact Loading Percentage
L_D = Dead Load in pounds per square foot
D = Lateral Live Load Distribution Length in feet
H = Depth of cover in Feet
W = Weight of overburden in pounds per cubic foot.

$T_{E80} = L_L*(1.0 + I_P) + L_D$

$L_L = 80000 / (5 * D)$

$L_D = W * H + 200 / D$

$I_P = (10 - H) * .04$ Negative results equate to zero.

$D = (8.5 + H)$

Canadian Pacific Railway
Technical Standards
Engineering Services

Guidelines for excavations on CPR property

Last updated March 8, 2012

1. Introduction

The purpose of this document is to assure the safety of rail operations and personnel, during the process of excavation on or near Canadian Pacific Railway (CPR) right of way and specifically adjacent to CPR tracks. It is intended to guide the proponent, their excavation contactor and CPR in screening, planning, designing and approving applications for geotechnical approval of proposed excavation near or on CPR property. The goal of the protocol is to:

1.1 Provide safe track conditions during and after excavation.
1.2 Set out specifications and procedures to reduce problems during excavation and the intended service life of the excavation.
1.3 Specify minimum engineering standards.
1.4 Assure adequate geotechnical investigation and engineering review has been completed to achieve the above objectives.
1.5 Allow timely processing of the excavation approvals.

The following protocol is independent of the requirements for assessing the structural components of the temporary shoring or track support. A separate approval from CPR's structural group is also required where applicable.

Geotechnical approval of a proposed excavation by CPR in no way warrants the applicability of the construction method to the expected ground conditions nor does it warrant the suitability of the ground conditions for the proposed method of excavation by the proponent. CPR requires that all designs, analysis be reviewed by a qualified geotechnical engineer. CPR does not take any responsibility for the suitability of the construction method or warrantee the ground conditions. CPR geotechnical approval of a specific design is based on available information the proposed excavation and design addresses the railway's needs. With all third party work on right of way, CPR will not attract any liability because of its approval of a specific design. As a result, CPR does not provide recommendations, direction or minimum standards to the proponent or their contractor. CPR insists that the proponent provides adequate documentation identifying the geotechnical engineer of record and the components of the project for which they are responsible.

2. Emergencies

In the event of any occurrence that does or could pose a hazard to rail traffic or the public, contact Canadian Pacific Railway at 1-800-716-9132.

3. General Terminology

3.1 The gauge of a track is the distance between the sides of the heads of opposite sides measured 5/8" below the top of the rails. The gauge of tangent and curved track up to 12° is 4' – 8½ ".
3.2 The center line of track is defined as an imaginary line dividing the gauge into two equal parts. The clearances for structures are measured parallel and at right angles to the plane of the center line of track. The minimum clearance envelope for structure is shown in Figure 1.

3.3 Base of Rail (BOR) is the bottom surface of the rail and is frequently used as a local datum from which vertical measurements are referenced. If an external datum is utilized the elevation of the BOR will be provided.

3.4 The "zone of potential train loading" (ZPTL) is defined as the area under the track and within a 1V : 1.5H zone extending down from a point at the level of the BOR and 2 m from the center line of the track as shown in Figure 1.

4. Process

To provide the appropriate level of engineering review of a specific proposal and allow timely processing of applications, the geotechnical review has been divided into two processes.

1. The crest of excavation line is more than 3 m from the nearest center line of track and more than 10 m measuring at right angles from the adjacent structures, turnout and signals and will not encroach onto the ZPTL.
2. The crest of excavation line is either within 3 m measuring from the nearest center line of track or within 10 m from the closest structures, turnout and signals and will encroach onto the ZPTL.

5. General Requirements

5.1 All proposed excavation proposal will be under the signature of a locally registered professional engineer. The objective here is to ensure a registered professional/firm or organization is given the responsibility to assess the site and take responsibility to ensure the proposal is appropriate for the site conditions. This may be in addition to the requirements for the proposal to be signed by a geotechnical and or structural engineer.

5.2 Applications to meet current regulatory and industry criteria for structural capacity, etc.

5.3 The application will include a construction plan that specifies the terms and conditions for execution of the work, including assignment of responsibility. The proponent of the excavation is responsible to the railway and must ensure the work is executed in accordance with the terms of the proposal.

An excavation proposal will be accompanied by at least the following three drawings showing the features indicated in true scale.

5.3.1. Plan of the proposed excavation under or above the track as shown in Figure 2 – This drawing will show the following features:

- 5.3.1.1 The location of the excavation referencing identifiable landmarks including the mileage and subdivision of the proposed crossing as per the CPR subdivision naming and mileage convention. The proponent can obtain the mileage and subdivision information from the CPR Real Estates Group.
- 5.3.1.2 The excavation centerline, size and limits;
- 5.3.1.3 Any adjacent structures, signals, switches;
- 5.3.1.4 The location of the ditch line and any breaks in slope;
- 5.3.1.5 The location of any boreholes or test pits; and
- 5.3.1.6 The location of all tracks.

5.3.2 Profile of the track and the proposed excavation parallel to the center line of the track as shown in Figure 2. This drawing will show the following features:

- 5.3.2.1 The location of the excavation referencing identifiable landmarks including the mileage and subdivision of the proposed crossing;
- 5.3.2.2 The excavation centerline, size and limits;
- 5.3.2.3 Any adjacent structures, signals, switches or buried services including Fibre Optics Transmission Systems (FOTS);

5.3.2.4 The elevation of the surface water in ditches, the elevation of the ground water table at all bore holes locations and the date they were measured;

5.3.2.5 The test pit and borehole location and stratigraphic logs as determined by the geotechnical investigation;

5.3.2.6 The depth of the top and base of excavation to the base of rail; and

5.3.2.7 The profile of the track.

5.3.3 Section of the track along the center line of the proposed excavation as shown in Figure 3. This drawing will show the following features:

5.3.3.1 The location of the excavation referencing identifiable landmarks including the mileage and subdivision of the proposed crossing;

5.3.3.2 The excavation center line, size and limits in relation to the center line of track and the minimum clearance envelope;

5.3.3.3 Any adjacent structures, signals, switches and buried services including FOTS;

5.3.3.4 The elevation of the surface water in ditches, the elevation of the ground water table at all bore holes locations and the date they were measured;

5.3.3.5 The test pit and borehole location and stratigraphic logs as determined by the geotechnical investigation;

5.3.3.6 The location of the top and bottom of the excavation and the proposed cut slope angles;

5.3.3.7 The location of the center line of all tracks;

5.3.3.8 The depth of the top and bottom of excavation to the base of rail; and

5.3.3.9 Any excavations that encroach on the ZPTL;

5.4 Proposals for excavation will only be considered at sites where conditions make other construction method impractical or where rail traffic is low.

5.5 Excavation proposal using water jet methods will not be considered.

5.6 The cost of remediating any settlement or heave induced by the excavation will be borne by the proponent.

5.7 Dewatering shall be provided to all excavation below the highest ground water level predicted during construction to prevent standing water in the excavation.

5.8 CPR head office is located in Calgary. As a result submissions received in English will generally be reviewed and processed more rapidly than those in French.

6. Process 1

6.1 Conditions

The general requirements included in Section 5 and the following must be met to obtain approval for excavation on railway property that qualifies Process 1 application.

6.1.1 Excavations shall be carried out in accordance with Canada Occupational Health and Safety Regulations (SOR/86-304).

6.1.2 The responsibility of all excavation and cut slopes resides with the proponent, who should take into consideration of site specific conditions regarding soil stratigraphy and ground water. All excavations shall be reviewed by a geotechnical engineer prior to personnel working within the base of the excavation.

6.1.3 There are no structures, signals or track switches within 10 m horizontal of the proposed limit of excavations.

6.1.4 The excavation limit shall not be within 10 m (30 ft) from the center line of track and not encroach on the zone of potential track loading.

6.2 Requirements

6.2.1 The proponent will provide drawings containing the information identified in Drawings 1, 2 and 3.

6.3 Process

6.3.1 Proponent submits engineering documents to CPR local Division office.

6.3.2 Local Division reviews documents to assure appropriate engineering documents have been provided.

6.3.3 Local Division is to provide approval.

7. Process 2

This process will be followed for the location of the proposed excavation limits that do not meet the criteria of Process "1". Expert engineering submissions are required, along with preliminary work such as dewatering as well as, monitoring by on site engineering consultants during construction. The applicant will be required to submit information for review and approval by CPR geotechnical engineers or their designated consultants at the applicant's expense.

CPR requires that all designs, analysis and notification protocol be reviewed by a qualified geotechnical engineer prior to submission. The applicant may be subjected to additional engineering, monitoring and construction requirements.

7.1 Conditions

7.1.1 The general requirements identified in Section 5 must be met.

7.1.2 The depth between the BOR and the bottom of proposed excavation is deeper than 1.4 m (4.6 ft).

7.1.3 The limits of excavation are within 10 m (32 ft) of the closest track center line or encroach on the ZPTL.

7.2 Requirements

7.2.1 Identification of the geotechnical engineer of records.

7.2.2 Description of the subsurface soil and ground water conditions within and adjacent to CPR embankment along the proposed excavation alignment and to a depth no less that 1.5 times the proposed excavated depth below the BOR. This will consider the impact of silt, fine sand or sand soil, and their relation to the water table and depth of excavation.

7.2.3 An estimate of the expected extent and magnitude of ground movement over time based on the proposed excavation method will be provided.

7.2.4 A program of ground surface and subsurface movement monitoring will be implemented. The program must be capable of detecting movement of no less than 50 percent of the movement that would result in a change of the track FRA or TC class as per the Transport Canada - Track Safety Rules accessible at http://www.tc.gc.ca/eng/railsafety/rules-tce31-100.htm

7.2.5 A procedure for notification of the appropriate CPR personnel in the event that excessive or unexpected settlement occurs. A complete CPR contact list, including local personnel and NMC will be compiled.

7.2.6 A recovery plan will be provided outlining the steps to be implemented in the event of failure (excessive ground loss or settlement / collapse, heaving etc).

7.2.7 Design of de-watering control measures where applicable for the proposed excavation method.

7.2.8 Temporary track support system will be required if any of the excavation is closer than 6 m (19.7 feet) from the centre of track and encroaches on the ZPTL. The length of the excavation and an estimated stand-up time of the proposed cut within these limits must be provided and demonstrated to be safe.

7.2.9 A complete description of the proposed method of excavation with confirmation that the proposed method is suitable for the site conditions and performance criteria.

7.2.10 An assessment of the influence of excavation on the track structure including estimated settlement/heave and assessment of risk associated with uncontrolled loss of ground or heaving.

7.2.11 In the event of complexities arise through the review of the conditions, CPR geotechnical group may elevate the review by referring to CP's designated consultants at the applicant's expense.

7.2.12 The proponent will provide resources for CPR to retain qualified geotechnical engineers or experts to analyses and advise CPR on the impact of the proponent's proposal to the right-of-way.

7.2.13 A qualified independent engineer is required to provide periodic or continuous (at the discretion of CPR) on-site supervision and document conditions during excavation.

7.3 Process

7.3.1 Proponent submits engineering documents to local Division office.

7.3.2 Local Division reviews documents to assure appropriate engineering documents have been provided.

7.3.3 CPR Geotechnical Group to review and provide geotechnical approval.

7.3.4 CPR Structural Engineering Group may have to provide structural approval.

7.3.5 Local Division office is to provide final approval.

8. Geotechnical Engineering check-list

The following is a check list of steps that will be completed to assure that the appropriate level of care has been taken for excavation application Process 1 and 2.

Table 2 – Check List

No.	Step	Group
8.1	Submission of excavation proposal by proponent including details of the excavation specification and potential construction method(s) to CPR Division office.	Proponent
8.2	Review of the proposal with respect to this protocol to determine what level of geotechnical engineering and review is required.	Division
8.3	Designation of review (CPR Division office, CPR Geotechnical Engineering or Independent geotechnical engineer) required.	Division
8.4	Identification of the geotechnical engineer of record.	Geotechnical Engineering
8.5	Assessment of the adequacy of the geotechnical investigation.	Geotechnical Engineering
8.6	Proponent's geotechnical engineer determines that the proposed excavation method will not cause settlement of the CPR track or structures.	Geotechnical Engineering
8.7	If there is a possibility of track settlement, a monitoring program will be developed by the proponent's geotechnical engineer, and reviewed and approved by CPR.	Geotechnical Engineering
8.8	Once a contractor has been selected, the geotechnical engineer of record will review the shop drawings submitted by the contractor or the sub-contractor(s) to determine if the proposed excavation and dewatering (if required) method proposed could cause track settlement.	Geotechnical Engineering
8.9	The proponent will provide CPR with written documentation of who will be completing the onsite review of the contractor's	Geotechnical Engineering

No.	Step	Group
	construction practice and the specifics of the assignment.	
8.10	The proponent will enlist the services of a geotechnical engineer with the responsibility for inspection of the contractor's excavation. They will also assure that adequate measures are in place to minimize the potential for track settlement. The intention is not make the geotechnical engineer responsible for the settlement of the track but to empower an appropriate group with the task of assuring that actions undertaken by the contractor do not endanger the track structure as a result of ground loss during excavation.	Geotechnical Engineering
8.11	An emergency response will be developed and posted on site and will reside with key personnel.	Geotechnical Engineering
8.12	A contingency plan will be identified that can be completed within hours if settlement or heave is experienced.	Geotechnical Engineering

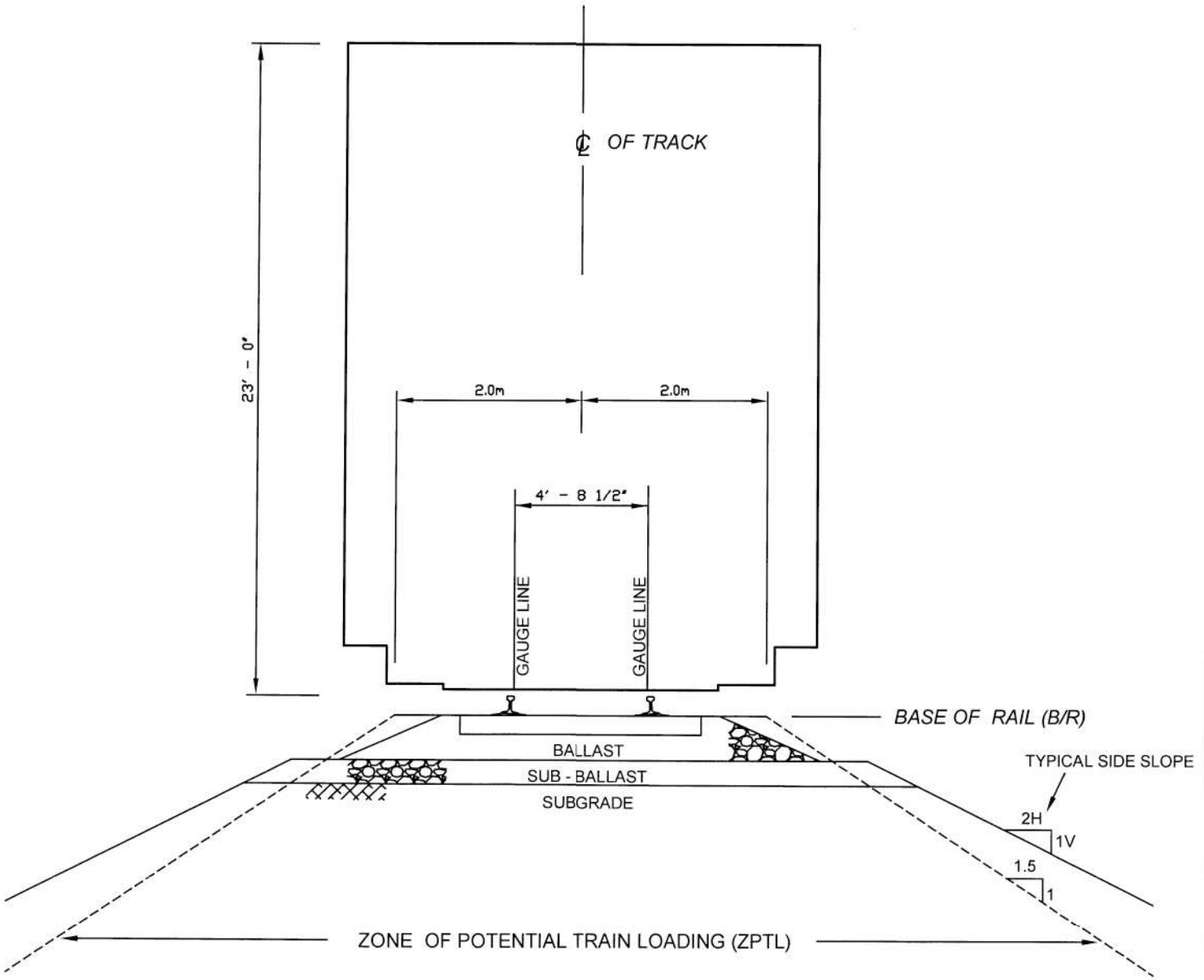


FIGURE 1 - CLEARANCES IN RELATION TO TRACK CENTER FOR STRUCTURE

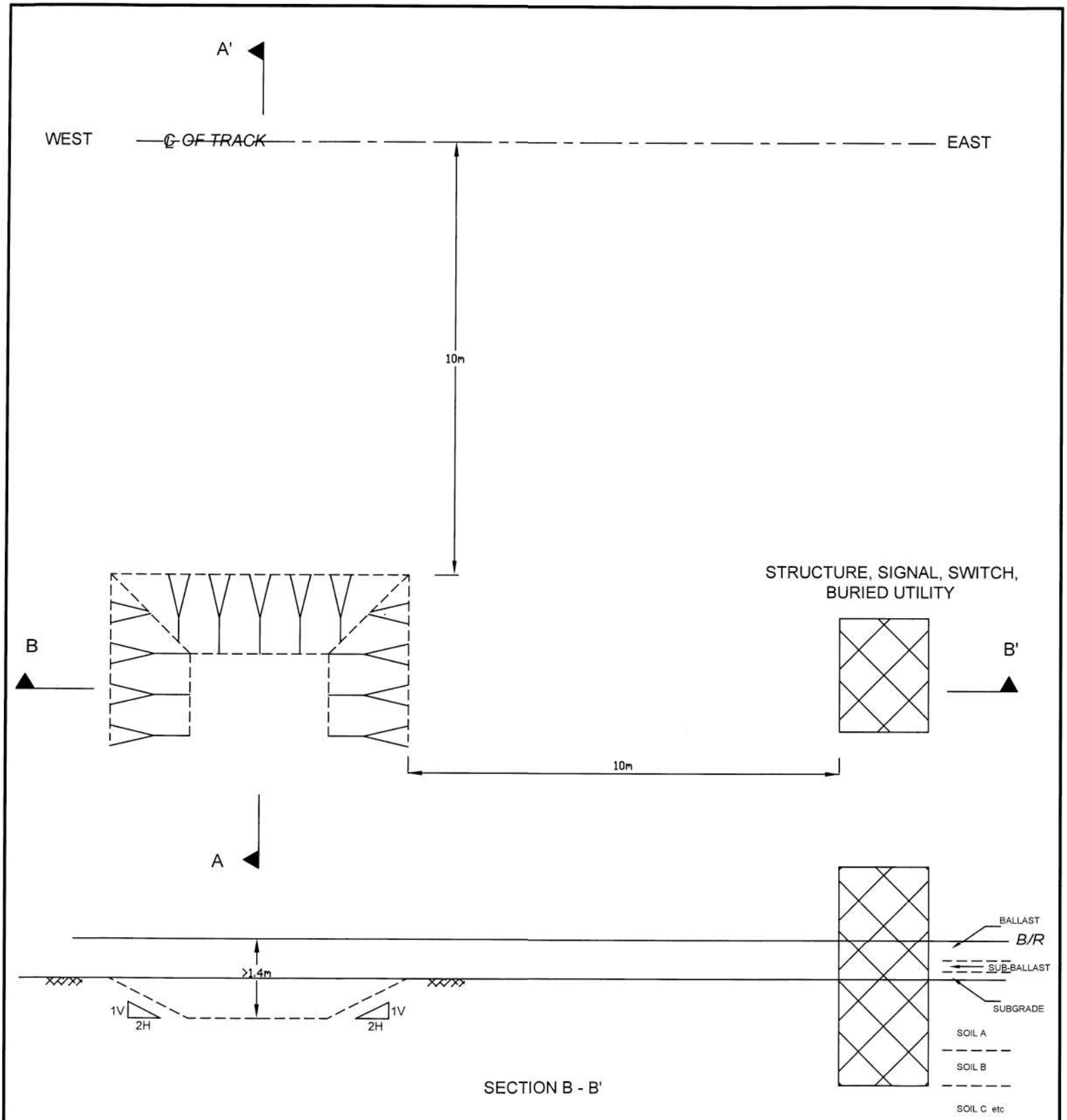
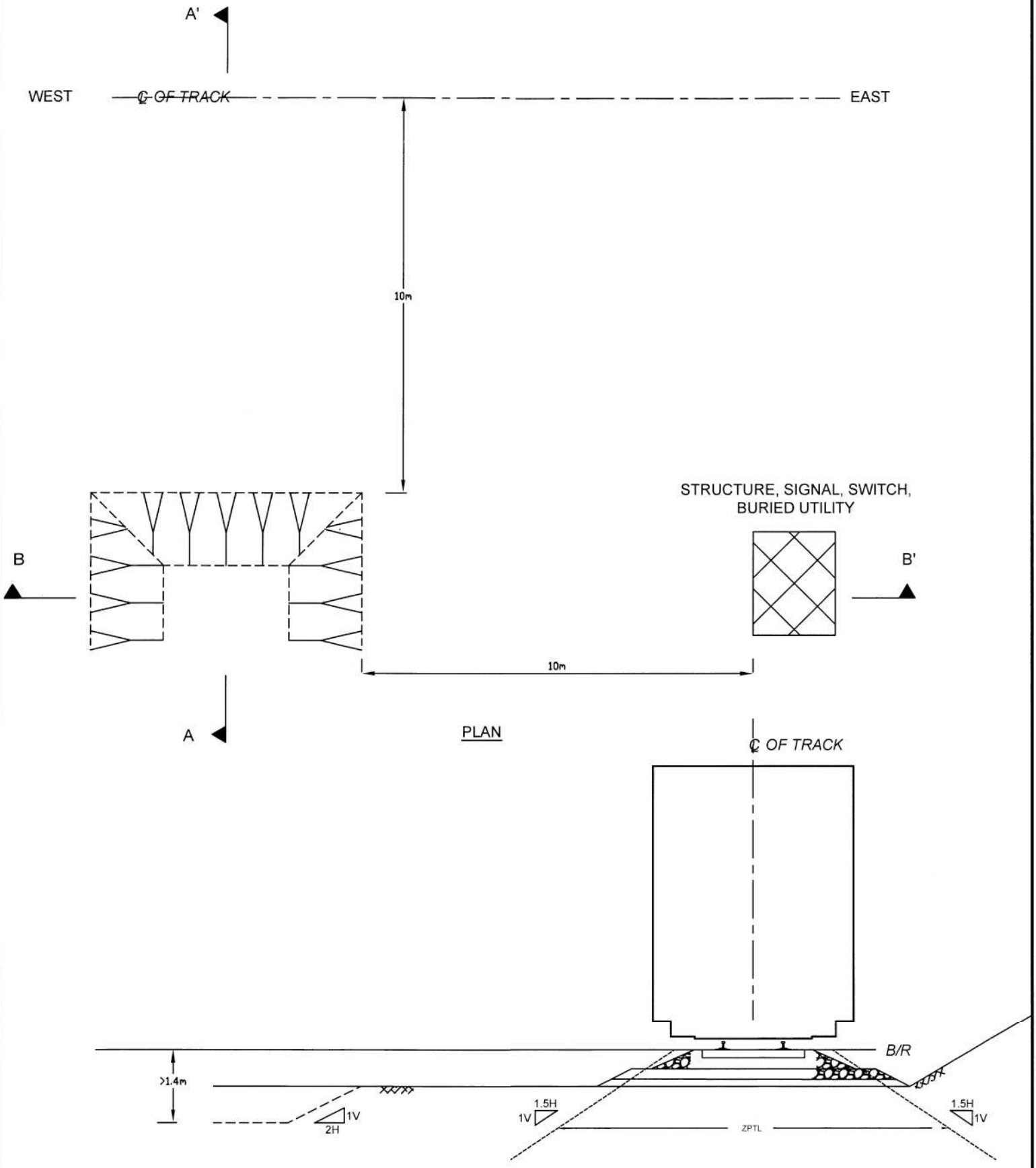


FIGURE 2 - PROFILE OF PROPOSED EXCAVATION PARALLEL TO THE CENTER LINE OF TRACK



SECTION A - A'

FIGURE 3 - SECTION OF TRACK PERPENDICULAR TO THE CENTER LINE OF PROPOSED EXCAVATION

CANADIAN PACIFIC RAILWAY

OPERATIONAL CONSTRAINT FOR WORK ON, ABOVE OR BELOW RAILWAY RIGHT OF WAY

GENERAL

1) The term Railway refers to Canadian Pacific Railway.

2) This Operational Constraint shall be read in conjunction with Canadian Pacific Railway Minimum Safety Requirements for Contractors Working on Railway Property and where applicable the more restrictive requirement shall apply.

3) The Contractor shall comply fully with all requirements of the Railway in planning, scheduling and control of the works within the Railway right of way.

4) No work shall be progressed by the Contractor on, over or below the Railway right of way until proof of liability insurance in accordance with requirements stipulated elsewhere have been complied with.

5) The Contractor shall plan and carry out the works in a manner that does not interfere with rail traffic or cause clearance restrictions and minimizes the requirement for railway flagging.

RAILWAY FLAGGING

6) The Railway will assign one Railway flagperson per project.

7) The provision of a Railway flagperson by the Railway shall not relieve the Contractor from liability for damages to Railway facilities caused by the Contractor's operations.

8) All communications with the Railway shall be done through the Road Authority or it's agent. The Railway will not deal directly with the Contractor.

9) Charges for Railway flagperson services shall be invoiced to and paid by the Road Authority.

10) The Contractor shall make the following facilities available for the flagperson’s use during the course of the project: washroom/lavatory, lunch room, fax machine, four lockers.

11) The Contractor shall have a responsible person present at all times to whom the Road Authority or it's agent will issue orders regarding work on the Railway right of way.

12) All instructions from the Railway flagperson shall be obeyed immediately by all personnel on site.

13) A Railway flagperson will be required when any personnel or equipment is working on the Railway right of way; within 15 metres of the centreline of the nearest track or on the structure or any falsework or protective devices where the work, in the opinion of the Road Authority, or it's agent, or the Railway, may be exposed to or interfere with the operation of the Railway tracks.

14) When a Railway flagperson is required, the Contractor, through the Road Authority, or it's agent, shall provide a minimum written notice of 90 days, in advance, to allow the Railway time to bulletin the position to the unionized labour force. If prior to work commencing, the Contractor, through the Road Authority, or it's agent, should receive confirmation that such Railway flagperson is not available, the Contractor, through the Road Authority, or it's agent, shall reschedule the proposed work to a date and time when such flagging protection will be available.

15) The Railway flagperson will be available a maximum of 40 hours per week inclusive of travel time, to and from assigned headquarters, and time to set up and remove track protection each day.

16) Bulletined flagging positions will be invoiced a minimum of 8 hours per day, 5 days per week, until properly cancelled.

17) Bulletined flagging positions may only be cancelled by providing the Railway with written notice a minimum of 10 business days prior to the cancellation date.

18) In the event that flagging protection is arranged for a given day and the Contractor does not show up at the site, or no work is done that day, a minimum charge of 8 hours for flagging services will be invoiced to the Road Authority.

CONSTRUCTION

19) In no case shall the Contractor or any of the Contractor's equipment or personnel work closer than 3.66 metres from the nearest rail of the nearest track without prior written consent of the Road Authority or it's agent.

20) The Contractor shall provide full details of their plans for track protection, work scaffolding, formwork construction, formwork removal, shoring, falsework and equipment placement and shall allow a minimum of six (6) weeks for review by the Road Authority and/or it's agent and the Railway. All submissions shall be stamped and signed by a Professional Engineer in good standing in the Province in which the work is to take place. A minimum of four (4) copies of plans and calculations should be forwarded for review by the Railway.

21) All scaffolding, formwork and any other protective coverings to be used on the project must be satisfactorily secured such that they will not come loose by the movement of passing high speed trains.

22) All equipment must stop working on the approach of any train when said equipment is on the Railway right of way, or within 15 metres of the centreline of the nearest track; or when said equipment is in the vicinity of the track(s) and where the work, in the opinion of the Road Authority or it's agent or the Railway, may be exposed to, or interfere with the operations of the Railway.

23) The Contractor shall not be permitted to cross any Railway tracks with equipment or vehicles. Contractor's personnel will only be permitted to cross the Railway tracks under the protection of the Railway flagperson.

24) The construction of a temporary construction crossing will only be permitted where, in the opinion of the Railway, it is safe to do so and subject to a temporary crossing agreement being executed.

25) The Contractor shall ensure that both rails of the same track are never connected with any conductor of electricity such as a steel measuring tape or metal traction equipment.

26) The Contractor shall maintain positive drainage during construction.

27) No material or debris will be permitted to be stored or stockpiled on the Railway right of way. The Railway right of way shall be restored to it's original condition at the end of the project including track ballast that has become fouled as a result of the construction. The Road Authority shall bear all costs to restore the site.

SAFETY

28) Canadian Standards Association (CSA) approved hard hats, safety footwear and safety glasses for head, foot and eye protection and safety vests for high visibility must be worn at all times while on the Railway right of way.

29) The colour red shall not be used for hard hats, safety vests or survey markers on or adjacent to the Railway right of way in order to avoid conflict with Railway operational practices. Other highly visible colours such as yellow, orange or white are acceptable.

Mississauga, May 1, 2009

CANADIAN PACIFIC

OVERTIME POLICY FOR ALL CANADIAN ENGINEERING SERVICES EMPLOYEES

Overtime hours are prohibited for all Engineering Services employees working for Canadian Pacific Railway in Canada. Engineering Services employees include members from the following unionized groups: Track Maintenance, Track Renewal, Bridges & Structures, Signals & Communications, and Engineering Services.

Regular hours are defined by the active collective agreement. Regular hours are generally represented by a forty (40) hour work week typically divided over eight (8) hour shifts, Monday through Friday. Overtime hours are defined as all hours, or part thereof, worked outside of regular hours for activities requiring special accommodations or emergency work.

Overtime hours do not equate to dedicated track time or track blocks. A separate request and appropriate approvals are required if track blocks are needed.

It is accepted by both parties of the Agreement that the need for Overtime hours will be avoided whenever possible.

In the special case where Overtime hours are unavoidable, all parties agree of the following:

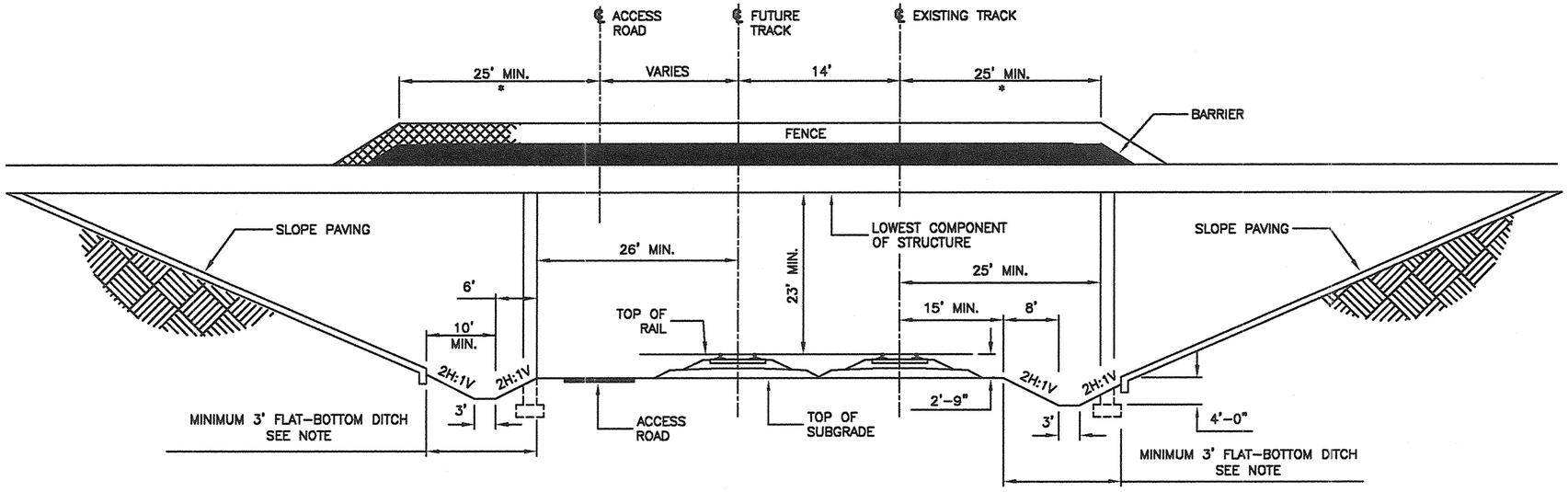
a. A formal request will be submitted by the lead representative of the Third Party to the Railway. The Railway will then provide the Overtime Request Form to the Third Party lead for completion and submission.

b. The request will be submitted a minimum of fifteen (15) business days in advance, and will be subject to review and approval by the Railway's senior management.

c. The Third Party agrees to pay the relevant premium Overtime hourly rate. This rate is calculated by the railway using a pension premium, applicable overheads, and the basic hourly rate stated in the employee's collective agreement. The rate will be applied to all Overtime hours, or part thereof. An updated average rate will be provided by the Railway to the Road Authority at the time of the request.

d. The submission of such a request does not guarantee approval for the Overtime hours. The Railway reserves the right to prioritize the work demands for all of its employees.

Mississauga, 2013



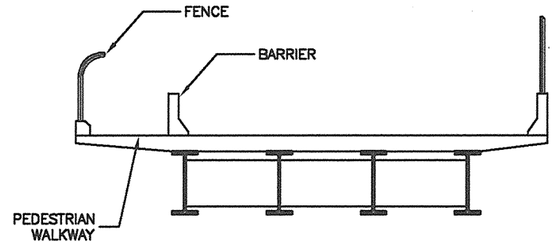
ELEVATION

PERPENDICULAR TO TRACKS

NOTE:

WIDTH AND HEIGHT SUBJECT TO HYDRAULIC REQUIREMENTS.

* THE LIMITS OF THE FENCE WITH BARRIER RAIL SHALL EXTEND TO THE LIMITS OF RAILROAD RIGHT-OF-WAY OR A MIN. OF 25 ft BEYOND THE CENTERLINE OF THE OUTERMOST EXISTING TRACK, FUTURE TRACK OR ACCESS ROADWAY, WHICHEVER IS GREATER.



OVERHEAD STRUCTURE CROSS SECTION WITH FENCE

GENERAL

FENCE SHALL BE PROVIDED AS INDICATED ON THE CROSS SECTIONS AND ELEVATION VIEW ON BOTH SIDES OF THE OVERHEAD STRUCTURE IN ALL NEW OR MODIFIED STRUCTURES.

BARRIER RAIL FOR OVERHEAD STRUCTURES, WITHOUT WALWAYS, THAT MAY BE SUBJECT TO SNOW REMOVAL SHALL BE A MINIMUM OF 42 INCHES IN HEIGHT WITH A 4 FOOT WIDE SHOULDER OR 30 INCHES IN HEIGHT WITH A 6 FOOT WIDE SHOULDER.

LIGHTS ARE TO BE INSTALLED ON THE UNDERSIDE OF THE OVERHEAD STRUCTURE WHERE SHADOWS CAST BY THE STRUCTURE WOULD INTERFERE WITH RAILROAD OPERATIONS.

SLOPE PAVING SHALL BE PROVIDED WHERE END SLOPES EXCEED 2 HORIZONTAL TO 1 VERTICAL.

FALSEWORK FOR CONSTRUCTION OF OVERHEAD STRUCTURES SHALL COMPLY WITH RAILROAD REQUIREMENTS.

TEMPORARY SHORING SHALL BE DESIGNED IN ACCORDANCE WITH RAILROAD GUIDELINES FOR TEMPORARY SHORING.

APPLICANT SHALL BE RESPONSIBLE FOR IDENTIFICATION, LOCATION AND PROTECTION OF EXISTING UTILITIES.

CALL THE FOLLOWING NUMBERS AT LEAST 48 HOURS PRIOR TO COMMENCING WORK TO DETERMINE LOCATION OF FIBER OPTICS:
CP "CALL BEFORE YOU DIG", 1-866-291-0741

CLEARANCES

MINIMUM VERTICAL CLEARANCE SHALL BE 23'-0" ABOVE THE TOP OF HIGH RAIL WITHIN 25' OF CENTERLINE OF TRACK. ADDITIONAL CLEARANCE MAY BE REQUIRED FOR CONSTRUCTION PURPOSES OR IF SAG OF VERTICAL CURVE MUST BE ADJUSTED OR IF FUTURE TRACK RAISE FOR FLOOD CONSIDERATIONS OR MAINTENANCE IS PROBABLE.

MINIMUM HORIZONTAL CLEARANCES, MEASURED AT RIGHT ANGLE FROM CENTERLINE OF TRACK, SHALL BE AS SHOWN IN ELEVATION VIEW.

PIERS

PIERS SHALL BE LOCATED OUTSIDE RAILROAD RIGHT-OF-WAY.

PIER PROTECTION WALLS SHALL BE PROVIDED IN ACCORDANCE WITH THE CP "REQUIREMENTS FOR THE DESIGN OF STEEL AND CONCRETE STRUCTURES CARRYING RAILWAY TRAFFIC".

TOP OF FOOTINGS LOCATED WITHIN 25 FEET FROM CENTERLINE OF TRACK SHALL BE A MINIMUM OF 6 FEET BELOW BASE OF RAIL AND A MINIMUM OF 1 FOOT BELOW FLOWLINE OF DITCH.

DRAINAGE

DRAINAGE FROM THE OVERHEAD STRUCTURE SHALL BE DIVERTED AWAY FROM AND NOT DISCHARGED ONTO THE TRACKS, ROADBED AND RAILROAD RIGHT-OF-WAY.

AT MINIMUM, A 3' FLAT-BOTTOM DITCH SHALL BE PROVIDED ON EACH SIDE OF THE TRACKS AS NECESSARY.

CULVERTS MAY BE INSTALLED IN LIEU OF STANDARD RAILROAD DITCHES WHEN APPROVED BY THE CHIEF ENGINEER BRIDGE. MAINTENANCE OF CULVERTS WILL BE AT APPLICANT'S EXPENSE.

FUTURE TRACKS AND ACCESS ROAD

SPACE IS TO BE PROVIDED FOR ONE OR MORE FUTURE TRACKS AS REQUIRED FOR LONG RANGE PLANNING OR OTHER OPERATING REQUIREMENTS. WHERE PROVISION IS MADE FOR MORE THAN TWO TRACKS, SPACE IS TO BE PROVIDED FOR AN ACCESS ROAD ON BOTH SIDES OF TRACKS.

CP Track & Structures

PROPOSED OVERHEAD STRUCTURE CLEARANCES FOR NEW CONSTRUCTION

CHIEF ENGINEER STRUCTURES

DRAWN BY: YYW CHK BY: JJ

CAD FILE #:

DATE: JAN. 5, 2015

DRAWING #: STDCLR-001

DRAWING 1 of 1

Minimum Safety Requirements for Contractors Working on CPKC Property - Canada

Approval Authority:	Safety Management Systems	**Effective Date:**	Nov. 8, 2023
Version:	4.0	**Next Review Date:**	Nov. 8, 2026

Table of Contents

1.0 Introduction

At CPKC, safety is an integral part of the way we do business. We expect everyone working for CPKC to be unconditionally committed to safety. Safety must be given top priority and will take precedence over deadlines, production schedules, and all other considerations.

2.0 Application

2.1 These Minimum Safety Requirements are applicable to all who work on CPKC property (except as noted in 2.3 and 2.4 below) including contractors and other persons performing work or otherwise providing services to CPKC on its property in the Canada.

2.2 These Minimum Safety Requirements cannot be waived or altered, in whole or in part, without a prior risk Assessment specific to the work being conducted, and written consent has been provided by the Manager-in-Charge.

2.3 Notwithstanding the foregoing, these Minimum Safety Requirements do not apply to other railroad companies who only operate trains on CPKC property under various trackage or interchange agreements.

2.4 Further notwithstanding the foregoing, these Minimum Safety Requirements may not apply to work or services provided in CPKC office premises.

3.0 Definitions and Interpretation

3.1 Definitions

3.1.1 In these Minimum Safety Requirements, the following capitalized terms shall have the ascribed meaning below:

Applicable Legislation - means all applicable legislation, regulations, by-laws, codes, rules, standards, policies, procedures, promulgated by any federal, provincial, and municipal governmental body, including those of its agencies, having authority over CPKC and, or a contractor in relation to the work in the matter of health and safety of the person, property and, or the environment.

Canadian Pacific Kansas City or CPKC -means Canadian Pacific Kansas City Limited, and its subsidiaries and affiliates, and includes each of their respective directors, officers, employees, agent, and representatives.

CPKC Personnel - means CPKC's employees, agents, and representatives.

CPKC Property - means any building, facility, yard, track, right of way or other property owned or controlled by CPKC.

Contractor- means the company or person, and their respective employees and authorized agents, representative and subcontractors who are providing goods or services to CPKC; or on behalf of a third party working on CPKC property.

Contractor Personnel - means the contractor's employees, and authorized agents, representative and subcontractors.

"Co-mingled Work" - means Work where contractor personnel works directly with or, in close proximity (time or space) to CPKC personnel;

Efficiency Test (eTest) - means a planned procedure to evaluate compliance with rules, instructions, and procedures, with or without the employee's knowledge.

Foul of Track- means the placement of an individual or equipment within 4 feet (1.2 m) of the outside rail of a railway track that could be struck by a moving train or on- track work equipment (e.g., hi-rail equipment).

Hazardous Materials- means any substance, which is hazardous to persons or property and includes, without limiting the generality of the foregoing:

i) radioactive, explosive, poisonous, or toxic substances.

ii) any substance that if added to any water, would degrade, or alter the quality of the water to the extent that it is detrimental to its use by man or by any animal, or plant.

iii) any solid, liquid, gas or odor or combination of any of them that, if emitted into the air, would create, or contribute to the creation of a condition of the air that endangers the health, safety, or welfare of persons, or the health of animal life, or causes damage to plant life or to property, or

iv) substances declared to be hazardous, toxic, or dangerous under any law or regulation now or hereafter enacted by any governmental authority having jurisdiction.

Manager-in-Charge- means a CPKC manager as designated or otherwise identified by CPKC as being responsible for overseeing the work to be performed, such Manager-in-Charge may include, but is not limited to local CPKC Management, Superintendents, Chief Engineers, and Project Managers, etc.

Mobile Equipment- means any motorized and self-propelled equipment, excluding railroad equipment and highway vehicles, but including, for example, forklifts, tractors, cranes, ATVs, mules, motorized scissor lifts, telescopic boom lifts, and similar equipment that are not designed to operate or move on railroad tracks.

Office Premises- means any building, facility, or portion thereof, or other premises, whether owned or controlled by CPKC, which is used solely for clerical or administrative purposes, and which does not contain heavy equipment or machinery, as designated by CPKC from time to time.

Qualified and Authorized- means a status attained by a person who has successfully completed any required training and demonstrated proficiency in the duties of a particular position or function and who has been given the right to act.

Railroad Equipment- means trains, locomotives, railcars, on track equipment (track units), hi-rail vehicles and any other equipment designed to operate or move on railroad tracks.

Site Safety Plan- means a documented plan which set out how work is to be conducted in a safe manner, as required by applicable legislation, see 6.1).

Third Party Project- means any work being performed on CPKC property that CPKC is not managing (i.e., road authority, utility company, commuter agency, or other similar entity, are on CPKC property for their own purposes, and not a project sponsored or managed by CPKC.

Work- means the provision of products and services and related activities.

Work Site- means any CPKC property where CPKC personnel or contractor personnel are present, or permitted to be present, while engaged in any Work, including any railroad equipment, mobile equipment and highway vehicles operated by or used to convey a person engaged in such Work. This applies also to work immediately adjacent to CPKC property which can pose a risk to safe railway operations (i.e., blasting, excavation next to right-of-way (ROW), etc.).

4.0 Interpretation and Application

4.1 Where legislation is referred to in these Minimum Safety Requirements, it shall include all amendments and replacements thereto as promulgated from time to time.

4.2 Where standards, such as those of the Canadian Standards Association (CSA), are referred to in these Minimum Safety Requirements, they shall include all amendments and replacements thereof from time to time.

4.3 Where there is any ambiguity, inconsistencies, or omissions between or among any agreements with CPKC, expressed or implied; any applicable legislations; any applicable CPKC policies and practices; and any applicable industrial standards and practices, contractor and contractor personnel shall adhere to that which is most stringent and current.

5.0 Contractor Compliance and Responsibilities

5.1 General Compliance

5.1.1 The contractor shall be fully and solely responsible for ensuring the health and safety of contractor personnel and for ensuring that its work and other activities do not compromise the health and safety of CPKC personnel or any other party, the protection of the environment, the protection of CPKC's property and those of any other party, and do not interfere with the safety of CPKC's railroad operations.

5.1.2 The contractor shall comply with and shall ensure all of contractor personnel are trained and qualified to safely perform the Work and that they comply with all Applicable Legislation pertaining to the protection against fire, safety, health, and environmental hazards, and with any license, permits, authorizations issued by the respective authority.

5.1.3 The contractor shall comply with and shall ensure all of contractor personnel comply with all terms and conditions of all agreements, expressed or implied, between contractor and CPKC, and all applicable CPKC policies and practices.

5.1.4 Subject to the requirements of CPKC's Access Control Procedures, the contractor shall provide CPKC eRailsafe training for each employee engaged in work on CPKC property.

Where there is no agreement between CPKC and the contractor, the contractor is responsible for meeting the additional requirements outlines within CPKC's Access Control Procedures.

5.1.5 The contractor shall provide contractor personnel, at its own expense, all safety equipment required to protect against injuries during the performance of the work and shall ensure that contractor personnel are knowledgeable of and utilize safe practices in performing the work.

5.1.6 The contractor shall always have a copy of the documents listed below at the work site, and shall produce them as and when requested by CPKC:

a) Minimum Safety Requirements for Contractors Working on CPKC Property in Canada.

b) Licenses, certifications, permits, training records or other documents required by applicable legislation or these minimum safety requirements.

c) Contractor's site safety plan.

d) Contractor's Emergency Information Sheet (see Attachment A) / Worksite Information Sheet (see Attachment B).

e) Any additional documents required by contract or by agreement with Manager-in-Charge.

f) Employee identification (eRailsafe badge or equivalent, see 11.1.1).

5.2 Compliance Assurance

5.2.1 CPKC reserves the right to observe, inspect, test and audit contractor and contractor personnel for compliance with all requirements herein, and to demand and receive all relevant records, documentation, and materials evidencing compliance, at any time, and from time to time.

5.2.2 Failure of the contractor or contractor personnel to comply with any applicable provisions herein may be considered a material breach, and in addition to all other remedies available, CPKC may without prejudice:

a) take over control of that work or activity.

b) order the work to stop, and / or

c) order contractor personnel to leave CPKC Property.

5.2.3 Upon the earlier of the completion of the work, the expiration of the applicable agreement, or the request of a Manager-in-Charge, contractor and contractor personnel shall return all identification, badges, access cards, and decals, issued or provided by CPKC to the Manager-in-Charge.

6.0 Site Safety Plans

6.1 General Requirements

6.1.1 Prior to starting any work on CPKC Property, the contractor must have a written site safety plan that identifies:

a) All applicable legislation, rules, policies, and work practices in relation to the work being performed.

b) Specific hazards that are associated with the work being performed on CPKC property for CPKC, and work being performed not for CPKC:

For example:

i) Construction, maintenance, or inspections of buildings.

ii) Working on or adjacent to railroad tracks.

iii) Maintenance or inspection or railroad tracks, crossings, or signal systems.

iv) Operating railroad equipment on CPKC tracks, or

v) When / where contractor personnel work directly with or in proximity (time or space) to CPKC personnel.

c) Methods of verifying compliance.

6.1.2 The contractor will provide Manager-In-Charge with a copy of this site safety plan on reasonable request.

6.1.3 The contractor must be able to demonstrate an awareness of applicable legislation, rules, policies, and work practices in relation to the work being performed.

7.0 Safety Training

7.1 Minimum Training & Qualifications

7.1.1 At its sole cost and expense, contractor shall ensure that all contractor personnel be fully trained and qualified for the work they will be performing. Contractors and contractor personnel shall meet, or exceed, all applicable legislation requirements relating to training and qualification, including but not limited to provide training documentation to ISNetworld for filing / record keeping as per CPKC Access Control Policy / Procedure.

7.1.2 Additionally, contractor personnel training and qualification shall meet or exceed all applicable industry standards.

7.2 Proof of Training & Qualification

7.2.1 Contractor personnel shall always have proof of such training and qualifications and shall produce them as and when requested by the Manager-in-Charge.

7.2.2 CPKC reserves the right to inspect qualification certificates, licenses, training records and / or work history records for any contractor personnel, and, or to be provided with copies thereof, on reasonable request. In addition, CPKC reserves the right to perform eTests on contractor employees, and request discipline for non-conformance.

8.0 Safety Orientation

8.1 General Requirements

8.1.1 Prior to beginning work, all contractor personnel shall participate in a CPKC authorized safety orientation, including on-site orientation presented by the Manager-in-Charge or designate.

8.1.2 Any time the scope of work, location, condition or supervision changes, contractor personnel may be required to attend additional safety orientation sessions.

8.1.3 After successful completion of such safety orientation, contractors must be able to produce company identification or an eRailsafe photo identification badge authorizing access to CPKC property unescorted for the purposes of conducting work. Managers can enter the tracking code into Compliance Management (CM). Third parties who hire subcontractors must ensure required compliance while on CPKC property. An eRailsafe identification card shall be worn or be always made visible or produced upon request and cannot be transferred under any circumstances.

9.0 Job Safety Briefing

9.1.1 Contractor personnel shall attend all job safety briefings as and when conducted. Contractor personnel shall be solely and fully responsible for understanding the content of the job safety briefing, and at a minimum shall:

a) understand the scope of work to be performed and an appreciation of the nature of the location, environment, and conditions where such work is to be performed.

b) be aware of specific or unusual hazardous condition, existing or potential and the control measures required to protect against, control, mitigate, or where possible, avoid said hazard, and

c) have an emergency response plan / evacuation procedures.

9.1.2 Where contractor personnel are working directly with or in proximity (time or space) to CPKC personnel, job safety briefings must include both CPKC personnel and contractor personnel, and any other affected third parties. The job safety briefing shall identify nature and extent of the interaction between the work being performed by contractor personnel, and those performed by CPKC personnel or other third parties. Contractor personnel shall inform CPKC personnel, and any other third parties of known or potential unsafe conditions and hazards that may be created by, resulting from, or inherent in their work and the corresponding preventative, mitigation, and / or control measures at all job briefings prior to commencing work, or as soon as contractor personnel becomes aware of such conditions.

9.1.3 In all situations, all contractor personnel are expected to:

a) continually identify hazards and assess risk of hazards and to communicate all hazards continually and clearly to the Manager-in-Charge and to all other parties that may be affected at job safety briefings, and at any other time as and when appropriate or necessary.

b) take actions that are within their assigned responsibility to eliminate or control hazards and risks, and

c) immediately notify their supervisor or the Manager-in-Charge of hazards that pose unacceptable risk that they are unable to eliminate or control.

9.1.4 Where contractor personnel are unable to eliminate or control a hazard, contractor personnel shall take interim measures to protect people, property, equipment, and the environment until the hazard can be accurately assessed and appropriate corrective actions taken.

10.0 Applicable Legislation

10.1 General Requirements

10.1.1 Contractor and contractor personnel shall be solely responsible for identifying and complying with all applicable legislation. Contractors and contractor personnel providing work to CPKC are likewise required to comply with all applicable provincial and federal legislation. At a minimum, contractor and contractor personnel shall comply with the federal legislations set out below which list is intended solely for general guidance, and not as a comprehensive list of all applicable legislation.

10.1.2 Additionally, the Railway Association of Canada (RAC) is an industry association which can provide support and guidance on matters related to railroad safety and the transportation of dangerous goods.

10.2 Transportation of Dangerous Goods

10.2.1 When work involves the handling or transportation of dangerous goods, that work must comply with Transportation of Dangerous Goods Act (TDG).

10.2.2 Contractors shall be solely responsible for ensuring that all contractor personnel who handles, offers for transport and / or transports hazmat by any transportation mode are trained and hold a valid training certificate or is working under the direct supervision of someone who is trained and holds a valid training certificate. That training must be based on the work that the person is expected to perform and the hazmat that the person is expected to handle, offer for transport or transport.

10.2.3 Transport Canada enables the Transportation of Dangerous Goods Act to publish Transportation of Dangerous Goods Regulation. The TDG Regulations divide dangerous goods into 9 classes according to the type of hazard they present.

10.3 Canada Labour Code

10.3.1 When work involves the construction, alteration, operation, inspection, and maintenance of any part work of the general railroad system of transportation, that work must comply with the Part II of the Canada Labour Code.

10.3.2 Additionally, contractor and contractor personnel shall comply with all applicable provisions of the Occupational Health and Safety Regulations (COHS) which are intended to prevent accidents and injuries to employees working for federally regulated companies. Compliance with these regulations may extend to contractors, depending on the type of Work being done and their proximity to CPKC Personnel (i.e., Co-mingled Work). Alternatively, provincial occupational health & safety regulations will govern contractors.

10.4 Railway Safety Act

10.4.1 The Railway Safety Act (RSA) governs all federally certified railways in Canada and some provincial railways through various agreements with Transport Canada.

10.4.2 The Railway Safety Act addresses all matters relating to the construction, alteration, operation, inspection, and maintenance of all railway equipment, and contains training and qualification requirements for certain types of Work. When applicable, contractor and contractor personnel shall perform Work in accordance with the Railway Safety Act, as directly bound by it.

10.5 Environmental Protection Act

10.5.1 Where work is being performed that may impact the environment, that work must comply with all applicable federal and provincial environmental acts and regulations.

10.5.2 Some examples of applicable legislations include the Canadian Environmental Protection Act, Fisheries Act, Navigable Waters Protection Act, Species at Risk Act, Migratory Birds Convention Act, and all corresponding Regulations. Provincial requirements are normally set out in a general Environmental Protection Act which is complemented by numerous regulations addressing more specific areas of concern. Canadian Environmental Protection Act: https://laws-lois.justice.gc.ca/eng/acts/c-15.31/

11.0 Security Access to CPKC Property

11.1.1 All contractor personnel must have a valid eRailsafe photo identification card (when / where required) or personal identification (as per the list below) authorizing access and in their possession at all times while on CPKC property, and present them for review to any Manager-in-Charge, other CPKC managers and employees, police officer, security guard, or regulatory officer upon request:

- Photo identification (e.g., driver's license); and
- Proof of employment, document, or card; and
- CPKC safety orientation certificate, or
- Building access pass issued by CPKC, or third-party having control over CPKC premises, or
- CPKC security photo ID card or badge, or
- Other proof of safety orientation and access authorization issued by CPKC.

11.1.2 Where any work requires contractor personnel to ride in locomotive or other non-passenger railroad equipment, the contractor must also possess a CPKC Access Pass for riding non-passenger railroad equipment, signed by the responsible operating manager. Such a signed pass must be presented to the train crew or operator when boarding the equipment. Failure to possess such a pass will result in the equipment not moving, removal from the equipment, and / or the filing of trespasser charges.

11.2 Security Awareness

11.2.1 Contractor shall conduct employee background checks as is necessary to ensure that contractor personnel do not pose a security risk to CPKC, such security risk includes the risk of the commission of terrorist activities, sabotage, vandalism, theft, and violence. CPKC reserves the right, at all times, to require that contractors undertake certain security training and / or performs background checks on contractor personnel, prior to allowing such contractor personnel to enter onto CPKC property.

11.2.2 On request CPKC can make available a copy of CPKC's Railway Security Awareness Program for use by contractor personnel.

113 Firearms & Explosives

11.3.1 Firearms (loaded or empty) are not permitted on CPKC property, except for police officers and other designated government officials when authorized to do so.

11.3.2 No explosives will be permitted on CPKC property without written approval by the Manager-in-Charge.

11.4 Reporting

Contractor personnel must report any security concern, security incident, criminal activity (known or suspected), suspicious happenings and / or suspicious persons on CPKC property to the Manager-in-Charge or to CPKC Police Services in accordance with Section 20.

12.0 Personal Conduct

12.1 Drug and Alcohol Standards

CPKC recognizes the problem of alcohol and substance abuse in today's society. This problem poses concerns to an employer who is subject to governmental regulations and seeks to promote the safety of the general public. Periodic audits to ensure compliance with these regulations may be performed and cooperation and compliance is expected upon request.

12.1.1 Contractor personnel shall comply with CPKC Alcohol and Drug Policy and Procedure while under contract to perform services for CPKC. Any contravention of these requirements will be considered a breach of contract.

12.1.2 Entry onto CPKC property when in possession of, or under the influence of alcohol, intoxicants, narcotics, or controlled substances is strictly prohibited. Controlled substances include all Schedule 1 drugs (such as marijuana and "medical marijuana") and synthetic / designer drugs and / or any intoxicants or products labeled "not intended for human consumption".

12.1.3 The sale, trade, and / or offer for sale alcohol or controlled substances are prohibited.

12.1.4 Additionally, contractor personnel shall be free of any condition which may in any way adversely affect alertness, concentration, responsiveness, or the ability react calmly and responsibly to safety hazards.

12.1.5 CPKC reserves the right to request drug and / or alcohol tests for contractor personnel as and where required or permitted by law.

12.1.6 In the event of a contract worker is directly involved in a significant work-related incident as described by CPKC Alcohol and Drug Policy and Procedure, the work may be subject to Post Incident testing under the CPKC Testing program. They may be removed from CPKC premises pending the results of the investigation, including receipt of alcohol and drug testing results.

Depending on the test results and the outcome of the investigation, a fitness for work medical assessment may also be required through the primary contractor before the contractor can return to CPKC premises or work. CPKC reserves the right not to allow a contractor back on the property or to CPKC work.

12.2 Inappropriate Behavior

12.2.1 CPKC is committed to maintaining a work environment that supports the dignity of all individuals. No person working at CPKC may be subjected to any form of discrimination or harassment, including sexual harassment.

12.2.2 Acts or threats of violence are always unacceptable on CPKC property. Uttering of threats or committing acts of violence will result in the removal of the responsible contractor personnel from CPKC property, termination of the contract, and / or criminal charges.

12.2.3 Horseplay, practical jokes, fighting or any other activity that may create a safety hazard is not permitted.

12.2.4 Inappropriate language directed at any CPKC employee or agent of CPKC, will not be tolerated.

123 Electronic Entertainment and Communication Devices

12.3.1 The use of personal cell phones, personal entertainment devices, including portable audio and video devices such as compact DVD, CD, video game players, iPads / tablets, SMART watches, and MP3 players, is prohibited:

a) while working on CPKC property.

b) while transporting CPKC personnel, whether on and off CPKC property, and

c) while operating any CPKC highway vehicle, railroad equipment or mobile equipment, whether on and off CPKC property.

12.3.2 The use of electronic communication devices, including cell phones, walkie-talkies, PDAs, iPads, tablets, GPS navigation units, portable computers, and similar devices, is prohibited:

a) while operating any highway vehicle unless it is stopped and parked in a safe location.

b) while transporting CPKC personnel, whether on and off CPKC property.

c) while operating or assisting in the operation of any railroad equipment or mobile equipment.

d) while operating power tools, equipment, or machinery.

e) when Foul of Track for any reason.

f) wherever use is prohibited by signage or by a CPKC manager, or

g) whenever use of such a device creates an unsafe condition.

12.3.3 Notwithstanding the foregoing, company cell phones, radios, walkie-talkies, GPS units, iPads / tablets, and other communication devices may be used solely for the conduct of business when authorized by the CPKC Manager-in-Charge and where not prohibited by municipal or provincial legislation. Any electronic communication device may be used when it is necessary to communicate an emergency condition.

12.4 Smoking

12.4.1 Smoking, including the use of e-cigarettes is prohibited on all CPKC property, and in or on all highway vehicles, railroad equipment, and mobile equipment, except for CPKC designated outdoor smoking areas.

13.0 Personal Protection

13.1 Work Clothing

13.1.1 The contractor must ensure that contractor personnel wear clothing that meets applicable legislation and is suitable to perform the work safely. This always includes at minimum ankle length pants and waist length shirts with a minimum quarter-length sleeves. Clothing must not interfere with vision, hearing or use of hands and feet.

13.2 Personal Protective Equipment (PPE)

13.2.1 The contractor shall ensure that contractor personnel wear personal protective equipment required by applicable legislation, regulations, codes and industry standards as necessary to protect against personal injuries while on railroad property. All personal protective equipment shall be approved by the Canadian Standards Associations (CSA) or by the American National Standards Institute (ANSI) and shall be in good condition and be properly fitted.

13.2.2 The following mandatory personal protective equipment ("PPE") shall be supplied by the contractor at its own expense, and shall be always worn by contractor personnel while on CPKC property:

- Safety hard hat, meeting CSA standard Z94.1 or ANSI 89.1 standards, except in office buildings or in enclosed vehicles or equipment.
- Safety footwear with protective toe caps and puncture resistant soles, meeting CSA standard Z195 (Green Triangle - Grade 1).
- Safety glasses with permanently attached side shields meeting CSA standard Z94.3 standards, except in office buildings or enclosed highway vehicles.
- High visibility fluorescent outerwear with retro reflective striping meeting CSA standard Z96 Class 2 Level 2 standards not covered by other clothing or equipment, except where necessary for safety reasons such as where fall protection or pole climbing equipment is being used.
- Any other PPE as required by applicable legislation, CSA / ANSI standard, or as otherwise required to protect contractor personnel from injuries.

Type of Protection	Additional Recommendations
Hard Hats	Have hi-visibility characteristics which are not obscured by markings or decals.
Safety Eyewear	Tinted safety eyewear must meet military tinting standards for red signal recognition if operating railway equipment (safety eyewear meeting this requirement is available from Grainger Canada, ask for CPKC approved tinted safety eyewear). Polarized lenses are discouraged and should be worn with caution when required to view LCD/LED screens. Transition lenses are discouraged and should be worn with caution when working in changing light conditions. Personal sunglasses are discouraged and must not be worn when operating railway equipment. Wear mesh face shields over top safety glasses when using any striking tool while performing on track maintenance work (e.g., spiking, snapping on/off anchors, etc.). If working alongside CPKC employees, you will be required to comply with this practice.
Safety Footwear	Have defined heels. Laced fully to the top and tied securely for ankle support. When required to walk or work on snow and ice wear anti-slip winter footwear.
High Visibility Apparel	Lime-green is recommended when working on, or near tracks, or when performing work in proximity to CPKC personnel.

13.2.3 Contractor and contractor personnel shall be solely and fully responsible for assessing the risks related to the work and determining whether additional PPE may be required such as:

a) Nomex or Proban fire-retardant protective gear when performing certain Transportation of Dangerous Goods (TDG) work and / or handling certain Hazardous Materials or performing specialized work.

b) Hearing protection when working in any area where noise exposure levels:

i) are consistently equal to or greater 85 dBA.

ii) exceed 115 dBA at any time.

iii) any other work areas where posted, or so notified by CPKC management.

c) Respiratory protection where contractor personnel may be exposed to occupational dusts / particulates, fumes, mists, gases and vapors, in which case, in which case contractors must have a written Respiratory Protection Program that meets or exceeds applicable legislation.

d) Additional eye and face protection meeting CSA standard Z94.3 (i.e. face shields, impact/ splash goggles, welding / cutting goggles and welding helmets).

e) Fall protection systems and equipment meeting appropriate ANSI Z359 standards as required by applicable legislation and as appropriate for the related fall hazards.

f) Fall protection when working on an unguarded surface over water, where the water is deeper than 4 feet (1.2 m), or where there is a hazard of drowning due to terrain, winter conditions, water velocity or current; contractors must use a fall protection system or a personal floatation device (PFD) meeting approved standards.

14.0 Railroad Track Protection

14.1 Contractor's Responsibilities for the Protection of Railroad Traffic and Property

14.1.1 Where the work site is in close proximity to, or is located on, above, or below railroad tracks, special attention, care and precautions shall be taken to ensure the safety of all contractor personnel, CPKC personnel, all other third parties and to protect CPKC's property and railroad operations.

14.1.2 Contractor shall ensure that contractor personnel are made aware of all unique and inherent hazards in working near, on, above or below railroad tracks and shall ensure that all contractor personnel are fully trained and equipped to work safely.

14.1.3 Contractors will not be allowed to foul a track unless:

a) They have been properly advised of the On Track Safety awareness procedures.

b) A railroad employee who is qualified to provide protection is present at the work site, or

c) The contractor has personnel present who are specifically trained, qualified, and authorized to provide that protection.

14.1.4 All work shall be organized or executed in such a manner as to ensure no interference with the regularity and safety of railroad operations. No step or sequence of any work that might directly or indirectly affect the safe movement of railroad traffic shall be started without the approval of the Manager-in-Charge.

14.1.5 No temporary structure, materials, or equipment shall be permitted closer than 12 feet (3.7 m) to the nearest rail of any track without prior approval in writing of the Manager-in-Charge.

Contractor personnel shall always remain alert to the movement of trains, rolling stock and other railroad equipment.

14.1.6 Contractor Personnel shall be especially alert in yards and terminal areas as

a) Railroad equipment that appears to be stationary may be moving.

b) Rate of movement of railroad equipment may be faster than it appears.

c) Railroad equipment change tracks often; and movements may be occurring simultaneously on adjacent tracks.

14.1.7 The contractor shall always conduct its operations in a wholly responsible manner to avoid damage to the CPKC's tracks or property.

14.2 Clearance Requirements (50 feet / 15.2 m)

14.2.1 All work shall be performed as far away from railroad tracks as possible.

14.2.2 Unless authorized by CPKC, contractor personnel, equipment, and vehicles are not permitted to be within 50 feet (15.2 m) of the closest track centerline.

14.2.3 In the event work must be carried out within 50 feet (15.2 m) of the closest track written authorization must be obtained from the Manager-in-Charge, and contractor personnel must always remain at the maximum practicable distance from all railroad tracks.

14.2.4 When crossing tracks, contractor personnel shall ensure a minimum of 50 feet (15.2 m) separation between standing railroad equipment, stay at least 15 feet (4.6 m) away from the end of the nearest equipment, and look both ways before crossing tracks, and if clear, walk at a right angle to the tracks.

14.2.5 No work activities or processes are allowed within 50 feet (15.2 m) of the track while trains are passing through the work site unless specifically authorized.

14.3 Flagging Protection

14.3.1 When the work requires contractor personnel to be within 50 feet (15.2 m) of any railroad tracks, contractor or contractor personnel shall notify and obtain the written approval of the Manager-in-Charge in advance of the intended start date, and when approved, shall only perform work strictly in accordance with all terms and conditions of that approval.

14.3.2 Unless otherwise indicated by the Manager-in-Charge, proper protection against the movement of trains, rolling stock and other railroad equipment shall be deemed always required whenever work or contractor personnel must be within 50 feet (15.2 m) of the closet track. Protection may be provided only by a qualified CPKC employee through use of a flag person.

14.3.3 Where CPKC determines that flagging is required, then work must be strictly conducted under the direction of a CPKC flag person, or such other person designated by the Manager-in-Charge.

14.3.4 Contractor personnel shall ensure that there is always clear communication between contractor personnel and any CPKC flag person. Contractor personnel shall ensure that they are aware of:

(a) flagging distance limits.

(b) time limits, and

(c) any adjacent tracks where movement of railroad equipment may still occur.

14.3.5 Contractor personnel shall not assume that a train movement is being stopped or cleared unless clear communication is received directly from the CPKC flag person.

14.3.6 A job briefing between the CPKC flag person, and all contractor personnel must occur before beginning any work on or foul of track.

14.3.7 Blue signal protection is used to indicate that CPKC or contractor personnel are working on, under or between railroad equipment and movement of trains or other railroad equipment is prohibited. Blue signals must not be tampered with or obstructed. Blue signals can only be removed by the person or group of persons who originally applied it. Application, use, and removal of blue signals, when appropriate, may only be done under the authorization and guidance of the Manager-in-Charge.

14.3.8 Red flag protection is used to indicate that CPKC or contractor personnel are working on or foul of track, or the track is out of service and movement of trains or other railroad equipment is prohibited. Red flags must not be tampered with or obstructed. Application, use, and removal of red flags, when appropriate, may only be done under the authorization and guidance of the Manager-in- Charge.

14.4 Working on or near Tracks

14.4.1 When authorized to perform work foul of track or otherwise be near railroad tracks, contractor personnel shall ensure all contractor personnel, equipment, and vehicles are kept as far away from railroad tracks as practicable, and shall at all times:

(a) be alert to train movements and shall expect the movement of trains, engines, cars, or other mobile railroad equipment at any time, on any track, and in any direction, even if they appear to be stationary or in storage.

(b) not rely on others to protect them from train movement.

(c) stay at least 15 feet (4.6 m) away from the ends of railroad equipment when crossing the track.

(d) ensure a minimum of 50 feet (15.2 m) separation prior to crossing between railroad equipment.

(e) look both ways before crossing tracks, and if clear, walk at a right angle to them.

(f) never climb on, under or between railroad equipment.

(g) be aware of the location of structures or obstructions where track clearances are close.

(h) not stand on the track in front of an approaching engine, car, or other equipment.

(i) stand at least 20 feet (6.1 m) from the track(s) when there is a passing movement of trains, engines, cars, or other mobile railroad equipment, to prevent injury from flying debris or loose rigging and shall observe the train as it passes and be prepared to take evasive action in the event of an emergency.

(j) not stand on or between adjacent tracks in multiple track territory when a train is passing.

(k) not walk, stand or sit on the rails, between rails or on the end of ties, unless necessary. As the rail surface can be extremely slippery, personnel must step over the rails when crossing tracks. Personnel shall also be aware railroad ties can also be slippery and that railroad ballast can shift while walking on top of it. Situational awareness and use of proper footwear is important.

(l) not remain in a vehicle that is within 50 feet (15.2 m) of a passing train unless specifically authorized, or where this is not possible.

(m) keep away from track switches as remotely operated switch points can move unexpectedly with enough force to crush ballast rock. Personnel shall stay away from any other railroad devices they are unsure of. Personnel shall not disturb or foul the ballast at any time.

(n) Third party work that has a potential to impact rail traffic must consider machine swing radius, vertical grade differences, overhead work, etc. to ensure it will not impact a passing train; work and equipment must maintain 50 feet (15.2 m) of a passing train.

(o) When exiting on track machinery as trains are passing; exit on the opposite side.

i) use 3-point contact when getting on / off any vehicle, equipment, or track unit.

ii) face the vehicle or equipment / track unit when getting on / off.

iii) place handheld items onto equipment / track unit or seek help prior to getting on / off.

iv) get on / off on the operators' side when possible.

14.5 Equipment on or near tracks

14.5.1 Contractor personnel shall not be Foul of Track with any piece of equipment without a CPKC flag person or other authorized track protection.

14.5.2 Contractor personnel shall not move equipment across the tracks except at established road crossings, or unless under the protection and authorization of a CPKC flag person and only if the work site has been properly prepared for such a move. Tracked equipment will require a CPKC flag person anytime railroad tracks are crossed.

14.5.3 Contractor personnel shall not move equipment across railroad bridges or through tunnels, except as expressly authorized and only under such conditions as stipulated by the Manager-in-Charge.

14.5.4 When there is passing rail traffic, contractor personnel shall move equipment away from the tracks at least 50 feet (15.2 m), or where not possible, park the equipment as far away from the tracks as possible, exit to the side away from the track where the movement is taking place, and walk to a safe a distance.

14.5.5 When there is passing rail traffic, buckets, shovels, and loads on cranes must be lowered to the ground to rest, and cranes without a load must have their load line tightened or retracted to prevent movement.

14.6 Railroad Signs, Signals, Flags, and other Communication Infrastructure

14.6.1 Signs, signals and flags shall not be obstructed, removed, relocated, disabled, or altered in any way without proper authorization and qualification.

14.6.2 Only qualified contractor personnel who are authorized by CPKC are permitted to operate switches, derails, electric track mechanisms, signal and communication systems or other track control appliances.

14.6.3 Railroad pole lines carry electric power and should be treated as any other power lines.

14.6.4 The contractor shall keep all contractor personnel informed of current weather conditions.

Personnel shall stay alert for possible high-water conditions, or flash floods. During severe weather conditions:

a) Personnel shall be prepared to take cover in the event of a tornado.

b) Personnel shall not work while lightning is occurring.

c) If storm conditions arise unexpectedly, contractor personnel shall ensure that equipment is in the clear of the tracks and secured before seeking cover. Contractor personnel shall stay away from railroad tracks when visibility is poor, such as during fog or blizzard conditions.

Any contractor personnel discovering a hazardous or potentially unsafe condition, which may affect the safe passage of railroad traffic, must advise CPKC immediately by calling:

- 1-800-716-9132 - CPKC Public Safety Communication Centre (PSCC)

14.7 Excavation

14.7.1 Before starting excavation operations, the contractor shall ascertain that there are no underground wires, fiber optic cables, pipelines or other utilities which could be damaged or, if present, that such installations are properly protected. Fiber optic cables are present on most segments of the right- of-way. Prior to commencing any excavation, the contractor shall contact the proper authority CPKC and / or public utility to obtain the necessary permit and to locate and protect such cables or other underground utilities.

14.7.2 Excavations shall not be left unattended unless they are properly protected; and the Manager-in-Charge shall be notified.

14.7.3 Contractors must obtain and maintain utility locates in accordance with applicable law.

15.0 WHMIS

15.1 General Requirements

15.1.1 If at any time contractor's work involves the use, handling, storage, or disposal of hazardous materials ("Handling of Hazardous Materials"), contractor personnel must inform the Manager-in- Charge.

15.1.2 Contractors shall ensure that all contractor personnel are fully trained in the handling of hazardous materials and that contractor and contractor personnel are in full compliance with all applicable legislation, and as directed by the Manager-in-Charge.

15.1.3 Contractor personnel shall have appropriate processes, systems and controls in place to prevent or otherwise mitigate potential environmental, health and safety risks associated with the handling of hazardous materials.

15.2 Access to Safety Data Sheets (SDS)

15.2.1 Prior to beginning any work that may expose CPKC personnel to hazardous materials, contractor or contractor personnel shall:

a) provide a copy of the respective SDS to the Manager-in-Charge, and

b) keep a copy of the SDS at the work site and ensure that it is always readily available.

15.3 Hazardous Material Incident or Spill

15.3.1 In the event of a hazardous material incident or spill, the contractor must:

(a) ensure that no contractor or CPKC personnel have or will be exposed

(b) take all reasonable actions to contain the spill

(c) respond in accordance with its emergency response plan, and

(d) notify CPKC immediately in accordance with Section 18 below.

16.0 Operation of Highway Vehicles

16.1 Highway Vehicles

161.1 The following requirements apply to all highway vehicles, when operated on CPKC property; or used to transport CPKC personnel.

16.2 Regulations and Inspection

16.2.1 Before using a highway vehicle, contractor personnel shall:

(a) complete a pre-trip inspection.

(b) maintain an inspection log.

(c) ensure periodic inspections are completed at official testing locations as required.

(d) ensure the vehicle is always maintained and in safe operating conditions, and

(e) ensure the vehicle is in compliance with applicable motor vehicle regulations and license requirements.

16.2.2 Vehicle maintenance, inspection records and logs must be made available to the Manager-in-Charge on request.

16.3 Vehicle Operator Requirements

16.3.1 Operation of highway vehicles is restricted to those contractor personnel who are licensed, qualified and authorized to do so. Such contractor personnel shall be always responsible for the safety of all passengers. For greater certainty, such contractor personnel shall:

(a) hold a valid license for the class of vehicle being operated, in accordance with applicable local, provincial, and federal requirements.

(b) strictly comply with all posted traffic signs, signals, and all shall obey all applicable legislation,

(c) maintain the required driver log, and make the log available to the Manager-in-Charge on request, and

(d) comply with the requirements on the use of electronic devices as set out in Section 12 above.

16.4 Driving on CPKC Property

16.4.1 In addition to the requirements set out above, while on CPKC property, contractor personnel shall:

(a) travel only on designated roadways unless otherwise instructed.

(b) keep daytime running lights on (if so equipped).

(c) not exceed 15 mph (25 Km/h) unless otherwise posted.

(d) come to a full stop at all blind corners, rail, and roadway crossings.

(e) yield the right of way to all mobile equipment and other non-highway equipment or service vehicles.

(f) not operate vehicles (or any internal combustion equipment) inside buildings or enclosed structures unless adequate ventilation is provided.

(g) not park foul of track unless on-track protection is provided.

(h) not leave vehicles running unnecessarily.

(i) park only in pre-determined or designated areas.

(j) always use the parking brake (or wheel chocks) when leaving an unoccupied vehicle running.

(k) prior to operation of a vehicle the driver must conduct a walk around of the vehicle to identify any obstacles, clearance restrictions, or adjacent vehicles that may interfere with executing a safe movement.

(l) where safe and practicable, pull vehicles through or back into marked parking spaces to avoid reverse collisions when exiting.

(m) If a passenger is present, in commercial vehicles or vehicles with restricted rear views, he / she must exit the vehicle prior to a reverse movement to provide guidance and direction to the driver while backing up.

16.4.2 All contractor personnel who will be operating a highway vehicle or mobile equipment in any CPKC intermodal facility must complete the local Driver Safety Orientation (DSO) program prior to first entry, and from time-to-time thereafter as directed by the Manager-in-Charge.

16.5 Seat Belts

16.5.1 Seat belts must always be worn while operating or riding in any equipped vehicle unless contractor personnel is actively engaged in inspections requiring said contractor personnel to be free of such restraint, and then only when the vehicle is operating at less than 15 mph *1* 25 Km/h.

16.6 Loads

16.6.1 Contractor personnel shall ensure vehicles are loaded according to weight and dimensional requirements as authorized by provincial regulations and permits, and properly load and secure tools, material, equipment, and freight to avoid shifting, falling, leaking or otherwise escaping from vehicles during operation.

16.7 Riding in CPKC Vehicles

16.7.1 Contractor personnel are prohibited from operating or riding in any CPKC vehicles unless authorized to do so, or in case of emergency.

17.0 Tools, Equipment and Machinery

17.1 General Safety Requirements Respecting All Tools, Equipment and Machinery

17.1.1 Contractor personnel shall ensure that all tools, equipment, and machinery used be:

(a) in compliance with all applicable legislation.

(b) in good working order, properly serviced and maintained.

(c) safe for their proposed use and used only for purposes specified by the manufacturer.

(d) operated and maintained only by persons properly trained and qualified for that duty.

(e) seat belts (if present on equipment) must be worn while operating or riding any such equipped mobile equipment.

(f) if mobile, equipped with appropriate safety devices (e.g., lights, horns, back-up alarms, safety beacons), and

(g) be prevented from moving, through use of the hand brake, wheel blocking, wheel chocking and / or a derail, where applicable.

17.1.2 The contractor shall provide adequate lighting when performing work between sunset and sunrise.

17.1.3 Use of CPKC tools, equipment and machinery by contractor personnel is prohibited unless specifically authorized by local CPKC management.

17.2 Hazardous Energy Control- Lockout /Tagout

17.2.1 Contractor personnel shall employ lockout / tagout procedures as required to eliminate the accidental or unexpected start-up, energizing, or release of stored (residual) energy during maintenance, repair and / or servicing activities.

17.2.2 All tools, equipment and machinery must be made safe and isolated from all energy sources rendering the machine, equipment, or process inoperative prior to performing maintenance, repair or servicing related tasks.

17.2.3 No contractor personnel can remove any CPKC applied lock or tag, including bad-order tags.

17.2.4 Notwithstanding the foregoing, if contractor's work may create an energy hazard to any CPKC.

Personnel, then all affected parties must follow the requirements set forth in CPKC's Lockout - Hazardous Energy Control Policy and Code of Practice.

17.2.5 If CPKC personnel and contractors are jointly performing maintenance, repair or servicing activities on the same machine, equipment or using the same energy source, then a multi-lock hasp must be applied with individual locks and tags affixed (as per CPKC's Hazardous Energy Control - Lockout Policy and Procedure.

17.3 Electrical Safety Requirements

17.3.1 In addition to the hazardous energy control lockout requirements above, all electrical work must comply with applicable legislation, National Electrical Code (NEC), and National Fire Protection Association (NFPA) requirements.

17.3.2 Contractor personnel working on electrical systems must:

(a) if in proximity to CPKC Personnel, inform them of:

(i) existing or potential electrical hazards,

(ii) any specific additional personal protective equipment that may be required,

(iii) applicable safe work practices,

(iv) applicable emergency and evacuation procedures, and

(v) apply lock out procedures as per the section above on Hazardous Energy Control- Lockout.

(b) have practices, procedures and training that comply with:

(i) Applicable sections of the NEC and NFPA electrical safety standards.

(ii) Any other applicable legislation.

(c) not operate or allow cranes or other mobile equipment to approach closer to any live electrical power line as per CSA Z150 Safety Code on Mobile Cranes.

17.4 Lifting Devices

17.4.1 All lifting devices, including but not limited to jacks, cranes, cables, slings, chains, and hooks shall:

(a) meet applicable legislation governing design, inspection, maintenance, and operation.

(b) be safety certified and labeled or tagged with load capacity limits where required.

(c) have sufficient capacity for the planned lift.

(d) have sufficient footing or support area to properly distribute the load during a lift.

17.5 Welding and Torch Cutting

17.5.1 When welding or torch cutting, contractor personnel shall:

(a) be properly trained and qualified.

(b) ensure that all closed containers have been properly purged.

(c) direct flame or sparks away from other workers, equipment and flammable material.

(d) have a fire extinguisher readily available.

(e) keep compressed gas and oxygen cylinders stored in a secure, vertical position, with regulators removed and caps applied, labeled properly, and located in vented cabinets or other designated locations.

17.6 Explosive Actuated Tools

17.6.1 Only contractor personnel who are qualified and licensed in accordance with applicable legislation, and authorized by CPKC, may use explosives or explosive actuated tools.

17.7 Unattended Equipment or Machinery

17.7.1 Tools, equipment and machinery shall not be left unattended at any time and shall not be stored on CPKC property, unless expressly permitted pursuant to a written agreement with CPKC or by the Manager-in-Charge in writing, and where so permitted, contractor shall ensure that:

(a) storage shall be restricted to the designated area, or as otherwise specified by CPKC.

(b) all such tools, equipment and machinery shall be secured in a safe position well clear of all railroad tracks to prevent accidental contact with trains and moving equipment and not restrict train crew sightlines.

(c) as much as possible, tools, equipment and machinery shall be stored in locations out of public view.

(d) Machines must be secured in accordance with on-track machinery rules.

18.0 Emergency Response

18.1 Emergency Response Plan

18.1.1 The contractor must maintain a current emergency response plan and make it available to CPKC on request. Emergency response plans must include at a minimum:

(a) contractor reporting procedures in the event of an incident or spill.

(b) emergency response contacts and phone numbers, including phone numbers for CPKC incident reporting and local CPKC managers (See Attachment A), and

(c) containment measures to be taken in the event of an incident or spill.

18.2 Initial Response

18.2.1 Initial response to any emergency condition must follow the following sequence:

(a) Protect the safety and security of all individuals and communities.

(b) Provide environmental protection and mitigation.

(c) Conduct incident investigation and evidence preservation.

(d) Restore railroad operations.

18.3 First Aid

18.3.1 Contractor personnel must have sufficient first aid qualified personnel and the required first aid kit / supplies and any other required first aid equipment at the work site, suitable for the crew size, nature of work being performed and location, all of which shall, at a minimum, comply with Part II of the Canada Labour Code and / or provincial OHS regulations.

18.4 Fire Protection

18.4.1 The contractor must have appropriate fire extinguishers suitable (i.e., type, size and quantity) for nature of the work being done, in compliance with applicable legislation, and be always readily available on:

(a) the work site, and

(b) all contractor equipment, machinery, and highway vehicles.

18.4.2 Contractor personnel shall ensure that all necessary precautions are taken to prevent fires, including the following:

(a) storing flammable material (e.g., paper, rubbish, sawdust, oily or greasy rags, etc.) in proper containers.

(b) storing and transporting fuel, gasoline, or other flammable liquids in approved containers / vented compartments as required in. Use of unapproved containers is prohibited.

(c) proper disposal of flammable material daily.

(d) preventing static electricity when dispensing or transferring flammable liquids by using proper grounding and bonding techniques.

(e) avoid using cutting or welding torches during the last one-half hour of shifts, if possible.

(f) taking special precautions with fusees, including:

(i) store and transport in approved containers.

(ii) do not allow fusees to come in contact with any combustible material, including railroad ties or wooden timbers, and

(iii) fully extinguish fusees before leaving the location where used.

(g) promptly advise CPKC management of any fire on CPKC property or in proximity to, and

(h) fully extinguish or provide protection for any fire prior to leaving the work site.

18.4.3 Contractors working on the CPKC right-of-way where a high risk of fire exists (e.g., during rail grinding, rail welding) must have:

(a) appropriate fire prevention and suppression plans (including emergency numbers for CPKC, local fire and fire control districts), and

(b) additional firefighting equipment and trained contractor personnel on site, as required by applicable legislation or the Manager-in-Charge.

19.0 Confined Space

19.1 Confined Space

19.1.1 Qualified and authorized contractor personnel must follow all required confined space entry procedures in accordance with applicable legislation and standards prior to entering into a confined space.

19.1.2 Rescue procedures and equipment must readily available when required to enter a confined space.

20.0 Reportable Accidents, Incidents, and Injuries

20.1 Reportable Injuries

20.1.1 Reportable injuries include any personal injury to:

(a) Contractor personnel.

(b) any CPKC personnel, or

(c) to any third party on CPK property.

20.2 Reportable Accidents

20.2.1 Reportable accidents include any occurrence that results in:

(a) damage to railroad tracks, right of way, buildings or other CPKC property,

(b) damage to railroad equipment,

(c) damage to CPKC highway vehicles,

(d) release of hazardous material,

(e) spill or loss of transported commodities, and

(f) any threat to the environment.

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20.3.1 Reportable incidents include:

(a) unintended movement of railroad equipment.

(b) failure to provide track protection for workers when required.

(c) movement of railroad equipment beyond authorized limits.

(d) operation of railroad equipment by an unqualified person.

(e) unauthorized handling of a track switch.

(f) damage, vandalism or tampering with any railroad signals, structures or railroad safety device.

(g) seepage, leakage, spills of, or other contamination from, hazardous materials.

(h) actual, threaten or suspected security related incidents.

(i) slides, washouts, or other on-track obstructions, or

(j) any occurrence that may disrupt the movement of trains or affect safe rail operations.

21.0 Reporting

21.1 Emergency Reporting

21.1.1 In the case of an emergency, contractor personnel must call:

(a) 911, where this emergency response system exists, or

(b) the local police, fire or emergency department in all cases, and

(c) CPKC Police Services Communication Center- 1-800-716-9132.

21.2 Accident, Incident, Injury Reporting

21.2.1 When an accident, incident or injury occurs on CPKC property, the contractor must:

(a) immediately report it to the

(i) CPKC Public Safety Communication Centre (PSCC) 1-800-716-9132, and

(ii) CPKC Manager-in-Charge.

(b) follow all instructions given to protect the scene.

21.2.2 CPKC is obligated to report contractor personnel injuries occurring on CPKC property to the required provincial or federal regulators as required. Reporting to CPKC remains the contractor's responsibility.

21.3 Information to Report

21.3.1 Information required with the initial report includes:

(a) type of incident.

(b) date and time of occurrence.

(c) location (mileage, subdivision, building, yard, or other physical description).

(d) identity of person(s) involved or injured (company & name).

(e) description of any hazardous materials involved.

(f) type & unit number of any railroad equipment or vehicle involved.

(g) description of occurrence, damage and/or injury, and cause if known.

(h) description of any emergency response.

(i) name and contact information of person making the report, and

(j) any such other information that CPKC may require.

21.4 Environmental Incidents and Spills

21.4.1 In the event of an environmental incident or spill that could have a negative impact on the environment, the contractor must immediately:

(a) Report the incident to the Public Safety Communication Centre (PSCC) 1-800-716-9132, the Manager-in-Charge, and the designated CPKC contact as per the governing agreement relating to the work.

(b) take all reasonable actions to contain the spill.

(c) respond in accordance with its emergency response plan, and

(d) provide CPKC with the following information:

(i) description of location and surrounding area, including any sensitive environmental areas nearby (e.g., rivers, parks, sewers).

(ii) type and quantity of substance released.

(iii) cause of spill or deposit, if known, and

(iv) details of any immediate action taken, or action proposed to be taken to contain spill and recover substance.

21.5 Additional Contractor Requirements

21.5.1 Contractor and contractor personnel must:

(a) ensure an appropriate emergency response is initiated.

(b) protect any evidence until released by the CPKC Manager-in-Charge.

(c) cooperate fully with any CPKC investigation.

(d) cooperate fully with any investigating government agency, and

(e) notify CPKC if information is requested by any investigating government agency.

22.0 Contractor and Contractor Personnel Acknowledgement

Acknowledgement

20.1.1 Contractor and contractor personnel who work on CPKC property shall be deemed to have read and understood the content of these Minimum Safety Requirements for Contractors While Working on CPKC property in Canada, as amended from time to time, and to agree to be bound by them.

20.1.2 These Minimum Safety Requirements for Contractors Working on CPKC property in Canada are subject to change without prior notice.

Home Safe is a commitment to be vigilant about personal safety and the safety of co-workers.

21.0 Attachment A - Emergency Information Sheet

Emergency Contact Information:		
Emergency Contacts:	**Phone:**	**Location:**
CPKC Public Safety Communication Centre (PSCC):	1-800-716-9132	
CPKC Calgary Operations Center	1-800-796-7851	
Manager-in-Charge (MIC):		
Local Emergency Services (EMS):		
Local Police Services:		
Local Fire Services:		
Hospital:		
Physician:		
Aircraft service, (if applicable):		
Watercraft service, (if applicable):		
Other Emergency Services:		
Emergency Evacuation Route: (Describe nearest evacuation assembly location or provide sketch on back)		

22.0 Attachment B - Work Site Information Sheet

Work Site Information:	Details:
Worksite Location Name:	
Worksite Location Address:	
Railroad Subdivision Name and Mileage:	
Nearest Town:	
Manager-in-Charge: (Name / Phone Number)	
Contractor Supervisor: (Name / Phone Number)	
Worksite Phone Number:	
Certified First Aid Attendant(s): (Name(s) / Phone Number(s)	
Location of First Aid Kit(s):	
Location of AED (if onsite):	
Location of Fire Extinguishing Equipment:	
Location of Safety Data Sheets (SDSs):	

Utility Information:		
Utilities Contact:	**Phone:**	**Location:**
Natural Gas:		
Water / Sewer:		
Electrical (Overhead):		
Electrical (Underground):		
Fiber Optic Line:		
Phone Lines:		
Cable Lines:		
Confined Space Entry, (if applicable)		
Equipment requirements for confined space entry / rescue, (if applicable):		
Fall Protection Plan Location, (if applicable):		
Other:		

Notes: