

Utility Crossing/Encroachment Application Packet

Revised: 11/15/2024

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The Applicant shall submit a completed application for utility crossing engineering review to the appropriate contact shown in the "Pipeline/Wireline Utility Occupancy Contacts" Section on the subsequent page. The application can be downloaded from Railroad's website, then the completed packet should be emailed to CNutilities US@cn.ca. Email submission is the only acceptable method of submittal. Once a CN File number has been assigned, EFT payment should be made referencing CN File number, no paper checks will be accepted. Any application transmitted to Railroad that does not include all requested information or required documentation will be considered incomplete. Railroad shall notify the applicant when Railroad receives an incomplete application but under no circumstances shall Railroad review an incomplete application. Repeat: no application will be reviewed until the application is complete. Any application which remains incomplete one (1) year after the date of the first notification of an incomplete submittal from Railroad will be cancelled and a new application must be submitted, including a new application fee. All information and documentation contained in any application must meet the approval of the Railroad, in its sole discretion. Unless otherwise required by law, Railroad will respond to all applications in the order in which they are received. Note: In no event shall any construction related activities be scheduled or conducted on Railroad's property until Railroad has issued its final approval of the application, a written agreement outlining the legal terms of the installation has been signed and flaggers have been secured.

An application shall include the following documents:

- LI A cover letter which includes a project description.
- LI A completed and signed application form also known as Initial Notification of Intent Form.
- LI A map with an aerial image of the location of where work will be performed, showing the work site as well as nearby streets or other landmarks close to the work location(s).
- LI A certificate of insurance meeting the requirements set forth in this packet (unless lower coverage requirements are prescribed by local law and signed off by CN Legal Department).
- LI One (1) copy of complete <u>stamped</u> engineering plans which shall conform to the guidelines established by the American Railway Engineering and Maintenance of Way Association (AREMA), all applicable federal, state and local legal and professional requirements, CN standards and any additional requirements set forth in this packet. In the event of any conflict or inconsistency between the aforesaid guidelines, requirements and standards, the most stringent shall apply.
- LI All applications submitted should list the correct CN subsidiary throughout the application. Please refer to the attached System Map (page 32) to identify the subsidiary to refer to.
- LI The non-refundable application fee. Unless otherwise specified by law, the non-refundable application fee shall be \$1,350.00, which is intended to cover the cost of Railroad's review of the application and all required documentation and information. The Applicant will be charged an additional fee of \$200 for each review after the initial review of the completed application due to inadequate or missing information or other failure by the Applicant to meet the requirements of Railroad. This fee shall be included with any revision sent. Any revision sent without the accompanying fee will be considered incomplete and will not be reviewed.
- LI If the project is for maintenance to an existing utility, please include a copy of the existing agreement.

I. Pipeline/Wireline Utility Occupancy Contacts

UTILITIES

Address: CN Utilities – US

17641 South Ashland Avenue

Homewood, IL 60430

Email: CNUtilities US@cn.ca

FLAGGING AND/OR CABLE LOCATES

Address: CN Flagging - US

17641 South Ashland Avenue

Homewood, IL 60430

Email: US Flagging@cn.ca

Utility Submittal Process

- -Email completed packet to <u>CNUtilitities_US@cn.ca</u>
- -Once entered into the CN System, you will receive an email with the CN File number
- -Once CN File number is received proceed to make EFT payment referencing the CN File number
- -Send a snip of the EFT Confirmation of payment to CNUtilitites_US@cn.ca so it can be added to your file.
- -If revisions are required, you will receive an email. Reply to that email with the requested revisions highlighted on the plans and the file saved as CN file number and the date of the revision.
- -Once review is complete, you will be emailed final documents and can proceed to flagging.

II. Scope

- 1. These specifications cover minimum requirements for utilities installed within or adjacent to railway rights-of-way. Railroad reserves the right to increase the specifications based on physical conditions or other factors specific to the installation point, including but not limited to:
 - a. Track speed
 - b. Traffic density
 - c. Traffic sensitivity
 - d. Terrain conditions
 - e. Curvature and grade
 - f. Bridges and other structures
 - g. Pipe size, capacity and material carried
 - h. Environmental risks/damages

III. Engineering Plan Requirements

- 1. A cover page including:
 - a. Include caption stating "Construction and maintenance to be in accordance with all applicable regulatory requirements and standards"
 - b. Contact name, address and phone number of Utility Owner
 - c. Professional Engineer's stamp, signature, and date
- 2. A plan view or site plan displaying:
 - a. A north arrow
 - b. Any tracks and railroad facilities
 - c. Railroad/roadway crossings
 - d. Distance from Railroad Mile Post [no decimal] plus the feet beyond the Mile Post (EX. MP 2 + 1,200 ft.).
 - e. Proposed utility crossing location
 - f. Location of proposed utility crossing in relation to a legal description or road allowance
 - g. Public Land Survey System (PLSS) Information (sections, quarter sections, etc.)
 - h. Right of way lines of railroad and labeled street or highway, if involved
 - i. Warning, utility markers that are proposed for the site in accordance with this document.
 - j. Indicate direction of flow and location of nearest shut off valves, if shutoff valves are required.
 - k. Indicate location and distance of nearest excavation from centerline of nearest track.
 - I. Location and methods of storage and disposal of excavated material. Excavated material should be stored to the back side of excavation with respect to the tracks unless this position creates an unsafe condition or a better location can be justified. All excavated material should be treated as contaminated with details provided for review unless known otherwise.
 - m. Excavation protection methods shall be shown for review. All excavations must be protected at all times and fenced in with reflective material or illuminated if left unattended.
- 3. A profile along the proposed crossing of actual situations showing:
 - a. Any tracks
 - b. The existing ground surface
 - c. The proposed utility
 - d. *Exact* depth of burial below base of rail, roadway surface, ditch bottom, and other points of interest to the top of utility (depth measured to casing pipe, if used). Please do not use min/minimum when referring to the depth.
 - e. Method of installation (i.e. boring, dry jack and bore, dry directional bore, etc.)
 - f. Indicate type and details of utility protection.
- 4. Show a detailed spec and cross-section of the pipe including:
 - a. Note and show if carrier pipe will be held clear of the casing pipe by supports. CN requires carrier & casing to be designed for cooper E-80 loading.
 - b. The type, wall thickness, and maximum test pressures of carrier and casing pipes must be listed on the plans. CN requires the AREMA standard listed in *Table 1-5-1*. Minimum Wall Thickness for Steel Casing Pipe for E80 Loading also found in Section A-2 of this document.
 - c. Indicate type of cathodic protection, if required for the type of construction. (See AREMA Section *5.2.3.3 Cathodic Protection* for more information)
 - d. The ends of the casing shall be suitably sealed to the outside of the carrier pipe or casing vents shall be required.

- e. Provide hoop stress calculation. See AREMA Sections 5.2.3 Carrier Pipe for more information.
- f. Cross sections of the utility shall be perpendicular to the center line of the railroads tracks.
- g. The location of the cross sections will be at:
 - i. Bore pit
 - ii. Receiving pit
 - iii. Intersection of utility and center line of any tracks
 - iv. Any other points of interest along the utility line
- 5. A detail of the proposed utility marker to be used on site showing all information to be displayed as well as all dimensions and materials.
- 6. Drawings must be to scale and have all dimensions shown. This includes but is not limited to:
 - a. Distance from each utility (encroachment) to the centerline of track, nearest road, crossing, bridge or other Railroad structures
 - b. Dimension width of CN right-of-way
 - c. Number of tracks proposed utility crossing will cross
 - d. Angle of proposed utility crossing
 - e. All existing and proposed signals and facilities with dimensions showing horizontal distance and depth to the proposed utility
- 7. All information regarding all seeding/surface restoration work shall be provided with the plans and conform to the local DOT specs.
- 8. Revised drawings shall be marked as revised (with revision date included) and state reason for revision. Each individual revision shall be called out in this manner. In addition, each page shall have a section near the title block with a list of revisions, where the revision version and date shall be marked in for any revision to that page.
- 9. Professional Engineer's stamp, signature and date is required on all plans and submittals.
- 10. Attachments to the plans as required in the following sections of this document may include but are not limited to:
 - a. Soil Boring Logs
 - b. Geotechnical Report
 - c. De-Watering Plan
 - d. Induction Interference Study
 - e. Vibration Monitoring Plan
 - f. Shoring Plan
 - g. Site Safety Action Plan
 - h. Emergency Action Plan
 - i. An estimated construction schedule and Gantt chart with field contact name and phone number.
 - j. Detailed Work Plan
 - k. Settlement Monitoring Plan
 - I. Construction Monitoring Plan

IV. Above Ground Utility Requirements

1. General Above Ground Utility Requirements

- a. CN's operations are not to be impaired or affected by any utility work.
 - i. Flagging protection during construction will be required and may be expanded by local supervisors to include any work on, under, over, or near Railroad property.
- b. All employees of contractors not hired by CN that will work on, over, under or near CN property are required to have, at a minimum, safety certification with www.contractororientation.com or an eRailsafe badge which has the CN logo on it. The railroad representative will be responsible for verifying and documenting said certifications.
 - Applicant must compile an Emergency Action Plan per OSHA which incorporates the proper Railroad contact information. Identify and list an adequate amount of properly trained employees to be able to enter CN property to respond to an emergency situation.
- c. On projects which have the potential to encroach or effect the operations to CN's property, it is required of the contractor to post informational documents at the jobsite for the benefit of the construction workers, CN personal, and the general public. The following required information is to be posted on a bulletin board. The bulletin board shall be weatherproof and watertight and be located in an area readily accessible to both CN and the general public.
 - i. Project overview: Including a general work description, job site location address, and approximate duration of the project
 - ii. Owner / Applicants Information
 - iii. Contractor's Designated points of contact: Including the Safety Officer, Superintendent, and 24-hour contact number
 - iv. Copies of reviewed drawings by CN
 - v. Copies of the Safety Action Plan
 - vi. Copies of approved permits
- d. All utilities must be a minimum of 15 ft horizontally away from any existing or planned CN signals and facilities, when practicable. Minimum distance in any direction from a vertical road crossing gate shall be no less than 4 ft.
- e. Utilities shall not be placed within a culvert, under railroad bridges, nor closer than 300 feet to any portion of any railroad bridge, building, or other structure, except in special cases and be of special design as approved by the CN Chief Engineer or the designated representative.
- f. Must not be attached to a CN pole line or pole lines licensed to others except where specifically authorized.
- g. All poles extending in height above ground equal to or greater than the distance from pole to the edge of ties on the nearest track will be anchored and guyed against tipping toward track.
 - i. Guys will be guarded to a distance of 8 ft above ground line and the guards shall be orange in color.
- h. All clearances and safety provisions are subject to the National Electric Safety Code (American National Standard Institute) as well as any applicable National, State, and local codes, whichever is more restrictive.
- i. All overhead electrical utilities will require an induction interference study.
- j. During construction, the Applicant shall maintain positive drainage of Railroad property. After construction is completed, the Railroad's right-of-way shall be restored to its original condition

and to the satisfaction of the Railroad. Any fencing removed to facilitate construction shall be restored.

- k. All piers or poles shall be located off of CN right-of-way.
- I. Warning, utility markers shall be installed at any intersection of any utility and CN right-of-way, and on any pole on CN right-of-way.

2. Above Ground Utility Crossing Requirements

- a. Utilities crossing over any railroad track must have a minimum height measured at the lowest point of the utility to the top of rail:
 - i. Pipe/Pipe Bridge = 25 ft. Min
 - a. Cable Supported Pipe Bridge = 50 ft.
 - ii. Conveyors = 25 ft. Min
 - iii. Fiber/Coaxial Cable = See Section A-3
 - iv. Electric Wire = See Section A-3
- b. Utilities shall be located, where practicable, to cross tracks at approximately right angles but must not cross at an angle less than 45 degrees.
 - Any utility crossing that is less than 45 degrees will be considered a longitudinal utility and may be subject to higher requirements as required by the CN Chief Engineer or the designated representative.
- c. If any new utilities are attached onto an existing structure, the existing structure must be analyzed to ensure it can withstand the new loading. If a re-design of the existing structure is required, this must be included with the plans.

3. Above Ground Longitudinal Utility Requirements

a. All longitudinal utilities shall be placed towards the outer edge of the railroad right-of-way, except in special cases and be of special design as approved by the CN Chief Engineer or the designated representative.

V. Underground Utility Requirements

If underground utility is greater in diameter than 10" including any casing protection, the requirements in the Section VI (immediately following this section) are required.

1. General Underground Utilities Requirements

- a. CN's operations are not to be impaired or affected by any utility work.
 - i. Flagging protection during construction will be required and may be expanded by local supervisors to include any work on, under, over, or near Railroad property.
- b. All employees of contractors not hired by CN that will work on, over, under or near CN property are required to have, at a minimum, safety certification with www.contractororientation.com or an eRailsafe badge which has the CN logo on it. The railroad representative will be responsible for verifying and documenting said certifications.
 - i. Applicant must compile an Emergency Action Plan per OSHA which incorporates the proper Railroad contact information. Identify and list an adequate amount of properly trained employees to be able to enter CN property to respond to an emergency situation.
- c. On projects which have the potential to encroach or effect the operations to CN's property, it is required of the contractor to post informational documents at the jobsite for the benefit of the construction workers, CN personal, and the general public. The following required information is to be posted on a bulletin board. The bulletin board shall be weatherproof and watertight and be located in an area readily accessible to both CN and the general public.
 - i. Project overview: Including a general work description, job site location address, and approximate duration of the project
 - ii. Owner / Applicants Information
 - iii. Contractor's Designated points of contact: Including the Safety Officer, Superintendent, and 24-hour contact number
 - iv. Copies of reviewed drawings by CN
 - v. Copies of the Safety Action Plan
 - vi. Copies of approved permits
- d. Jacking or boring of corrugated metal pipe, cast iron pipe or pipe with flanges, bells or couplings will not be permitted.
- e. Casing may need to be extended to accommodate any proposed projects for Railroad as required by CN Chief Engineer or the designated representative.
- f. Soils investigation and a geotechnical report may be required.
- g. All underground utilities shall have an adequate casing for protection.
- h. Utilities shall not be placed within a culvert, under railroad bridges, nor closer than 100 feet to any portion of any railroad bridge, building, or other structure, except in special cases and be of special design as approved by the CN Chief Engineer or the designated representative.
- Restoration and backfill compaction should conform to a 95% Proctor test suitable for the soil type at the site and commence in lifts specified by the CN Chief Engineer or the designated representative.
- j. No excavation can be closer than 25 ft. from the centerline of the nearest track.
- k. All utilities must be a minimum of 15 ft. horizontally away from any existing or planned CN signals and facilities, when practicable.

- I. The zone of influence is as follows: Starting 15 feet from the centerline of nearest track at the base of rail, measured perpendicular to the track centerline, calculate a slope to the bottom of the proposed pipe at a 2H:1V slope. (See Section A-6)
 - i. If a 2H: 1V slope cannot be maintained or more restrictive conditions occur, approved shoring will be required. (See Section A-7)
 - ii. If shoring is required as stated above, a shoring plan designed to withstand E-80 loading shall be created, **stamped by a Professional Engineer**, and submitted to CN.
 - iii. If the excavation is outside the zone of influence, then the excavation shall follow OSHA requirements.
- m. A dewatering plan shall be created, <u>stamped by a Professional Engineer</u>, and submitted to CN as required by the CN Chief Engineer or the designated representative.
- n. Dry Horizontal Directional Drilling (HDD) is only allowed.
 - i. Mud slurry directional bore will be allowed only with the use of vents.
 - ii. No wet directional drilling is allowed.
- o. Vibrations Requirements
 - If there are fiber optic cables buried within the ROW, the Contractor shall submit details on the type of equipment to be used for pile driving and estimate the vibrations that will be induced at ground level during operation.
 - ii. The Contractor may be required to monitor vibrations levels during pile driving operations, for which the Contractor shall submit a procedure and the type of monitoring equipment to be used.
 - Induced vibrations shall be limited to a maximum peak particle velocity (PPV) of less than 3.5"/sec (measured in 3 mutually perpendicular directions taken at tie level / ground surface). And induced amplitude of movement shall be less than 1/128"
 - Vibrations undertaken within 150 ft. of fiber optic cables, induced vibrations shall be limited to a maximum of PPV of less than 1.5"/sec
- p. During construction, the Applicant shall maintain positive drainage of Railroad property. After construction is completed, the Railroad's right-of-way shall be restored to its original condition and to the satisfaction of the Railroad. Any fencing removed to facilitate construction shall be restored.
- q. Additional Resources for Underground Utilities:

http://www.undergroundfocus.com/onecalldir.php Provides links and information on state calls for cable locates http://www.ntdpc.com/ National Telecommunications Damage Prevention Council Common Ground Alliance

2. Underground Utility Crossing Requirements

- a. Utilities shall be located, where practicable, to cross tracks at approximately right angles but must not cross at an angle less than 45 degrees.
 - Any utility crossing that is less than 45 degrees will be considered a longitudinal utility and may be subject to higher requirements as required by the CN Chief Engineer or the designated representative.

- b. For all utility crossings the utility must be protected by a casing for the full width of CN's right-of-way or 50 ft. whichever is greater.
 - i. All casing pipes shall be sloped not less than 0.3%.
 - ii. Pipelines carrying commodities in a gaseous state are not required to have a steel casing as long as the top of the utility is at least 10 ft. below base of rail.
 - iii. Fiber optic utilities do not need a steel casing if the depth is 15 ft. or greater below the base of rail.
- c. Directional boring will be allowed at the discretion of the Railroad.
 - i. If practicable, boring excavation must not exceed the outside diameter of the pipe.
 - Bore shall not be greater than 1" larger than the utility diameter. Any over-cut by the cutting head should be minimized to match the pipe being installed. Any overcut shall be no more than 2" larger than the installed pipeline. If voids should develop or if the bored hole diameter is greater than the outside diameter of the pipe (plus coating) by more than approximately 1 inch then grouting or other methods will be employed as approved by CN.
- d. Minimum depth of burial below:
 - i. Dry jack and Bore
 - Main Tracks Base of Rail = 6 ft.
 - Industrial Tracks Base of Rail = 6 ft.
 - Road Surface = 5 ft.
 - Ditch Bottom = 5 ft.
 - ii. Uncased Utility
 - Main Tracks Base of Rail = 10 ft.
 - Industrial Tracks Base of Rail = 10 ft.
 - Road Surface = 6 ft.
 - Ditch Bottom = 6 ft.
 - iii. Directional Bore
 - Main Tracks Base of Rail = 15 ft.
 - Industrial Tracks Base of Rail = 15 ft.
 - Road Surface = 6 ft.
 - Ditch Bottom = 6 ft.
- e. Multiple Crossings Refer to AREMA Standard 4.19.8 multiple installations. Each crossing should be permitted separately.
- f. Any excavation must not be located on CN right-of-way or within a minimum of 50 ft. from the centerline of track, whichever is greater.
- g. Warning, utility markers shall be installed at any intersection of any utility and CN right-of-way.
 - i. Marker should show accurate owner, contact, and CN Agreement Number.

3. Longitudinal Underground Utility Requirements

- a. Underground utilities laid longitudinally in railroad right-of-way shall be located as far as practicable from any tracks or other important structures.
- b. Longitudinal lines must be a minimum of 25 ft. from the center line of track, or outside the track embankment section, whichever is greater.

- c. Uncased steel carrier pipe utilities laid longitudinally on the railroad right-of-way, 25 ft. to 50 ft. from the center line of the nearest rail shall be buried not less than 6 ft. from the natural ground surface to the top of pipe. If distance is more than 50 ft. from centerline of track, minimum cover shall be 5 ft.
 - i. At all locations on the right-of-way farther than 25 ft. away from the centerline of the nearest track, the minimum natural ground cover for uncased steel natural gas pipes must be 6 ft.
- d. Plastic carrier pipes are not allowed for longitudinal utilities on CN right-of-way.
- e. Longitudinal underground utilities must be marked by a sign approved by the CN Chief Engineer or the designated representative every 500 ft., at every road crossing, streambed, other utility crossing, and at locations of major change in direction of the line.
 - i. Marker should show accurate owner, contact, and CN Agreement Number.

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VI. Additional Requirements for <u>Underground</u> Utilities with Diameter of <u>10 Inches or Greater</u> (Including Casing)

- Drawings shall be <u>stamped, signed, and dated</u> by a Professional Engineer licensed in the State where
 the work is being performed. CN reserves the right to prohibit a certain construction methodology, at its
 own discretion; however, CN shall not assume any responsibility for the suitability of the accepted
 method. Open cut methodology shall only be considered where other installation techniques are
 deemed impractical and where rail traffic volumes are low. Installations using water jet methods shall
 not be permitted.
- 2. Complete Subsurface Investigation
 - a. Boreholes are required at each end of the crossing and at each entry/exit pit with a maximum spacing between boreholes of 150 ft.
 - b. The boreholes shall be drilled to a depth of 20 ft. below the proposed crossing depth or to 20 ft. below the maximum feasible crossing depth if the proposed crossing depth has not yet been determined.
 - c. Soils samples shall be obtained at 3 ft. intervals to a depth of 15 ft. and also within the proposed utility horizon (i.e., from at least 7 ft. or one pipe/casing diameter above the proposed utility obvert to at least 7 ft. or one pipe/casing diameter below the proposed utility invert). At other depths, soil samples may be obtained at 5 ft. intervals; No boreholes will be completed between ties or tracks in double track territory.
 - d. If bedrock is encountered at the proposed location, the bedrock will be cored to establish the competency and engineering characteristics of the bedrock. The bedrock shall be cored to at least 5 ft. below the invert of the proposed crossing.
 - e. Soil classification testing (i.e., water content determination, Atterberg Limits testing and grain size distributions) shall be carried out on soil samples obtained from all major soil strata and on soil samples obtained from every layer that the proposed tunnel would intersect.
 - f. The stabilized groundwater elevation must be established by installation of piezometer/monitoring well(s); at least one piezometer/monitoring well must be maintained in operation and checked prior to construction to confirm the groundwater elevation.
- 3. Submit a <u>stamped</u> Geotechnical Report prepared by a Licensed Geotechnical Engineer with experience in trenchless technology. The Report shall include:
 - a. Comments and recommendations with respect to construction methodology
 - b. An estimate of the expected extent and magnitude of ground movement over time
 - c. Measures to be undertaken to preserve the safety of rail operations and the structural integrity of the track structure
 - d. A detailed proposal for ground surface and subsurface monitoring
 - e. Factual subsurface information with all field and laboratory test data
 - f. A description of the site and soil stratigraphy including results of soil classification testing
 - g. A plan of the proposed crossing with borehole/testing/installation locations
 - h. A summary of groundwater conditions encountered during the investigation including the observed groundwater levels within the boreholes and the presence of any perched water levels at the borehole locations
 - Anticipated settlements as well as an assessment of the anticipated settlement through configurations

- j. A detailed monitoring plan to monitor any ground surface and subsurface movements during construction shall be provided. The Review and Alert (work stoppage) levels shall be provided
- k. Submit a contingency plan and notification procedure to be implemented in the event of excessive/unexpected settlement or heave, and unforeseen changes in subsurface conditions, i.e. cobbles and boulders, raveling /flowing ground

4. Submit a Detailed Work Plan

- a. Details of the proposed methodology the installation operations, methods of maintaining and adjusting line and grade, drilled/bored diameter, drill hole stabilization procedures, temporary dewatering measures and any mitigation procedures if sinkholes/settlement above the pipe occurs or excessive movement of the settlement monitors is observed.
- b. The design of the crossing length, diameter and thickness of the casing, elevations of the crossing invert at both ends, excavation shoring details and methods of dealing with cobbles/boulders and obstructions.
- c. Provide additional details for specific installation methodologies as follows:
 - i. Jack and Bore: size and location of the auger head relative to the casing, estimated jacking thrust required, method of monitoring casing elevation, thrust block design calculations, record keeping system to document casing advance and jacking pressures, bulk heading, and grouting procedures. Bore head should not extend more than 1" ahead of the casing.
 - ii. HDD: slurry pressure and mitigation measures for frac-out if applicable. Vents shall be installed on each side of the track(s) to prevent frac-outs.
 - iii. TBM: type of machine, methods of primary ground support, grouting between the casing, ribs and lagging (primary support) and the surrounding soil/rock

5. Submit a Settlement Monitoring Plan including:

- a. Summary of Proposed Settlement Monitoring
 - i. Geographical Location
 - ii. Number of Settlement Monitoring Probes
 - iii. Type of Probe & installation Method
 - iv. Expected Amount of Settlement (in)
 - v. Frequency of Monitoring
 - vi. Duration of Monitoring

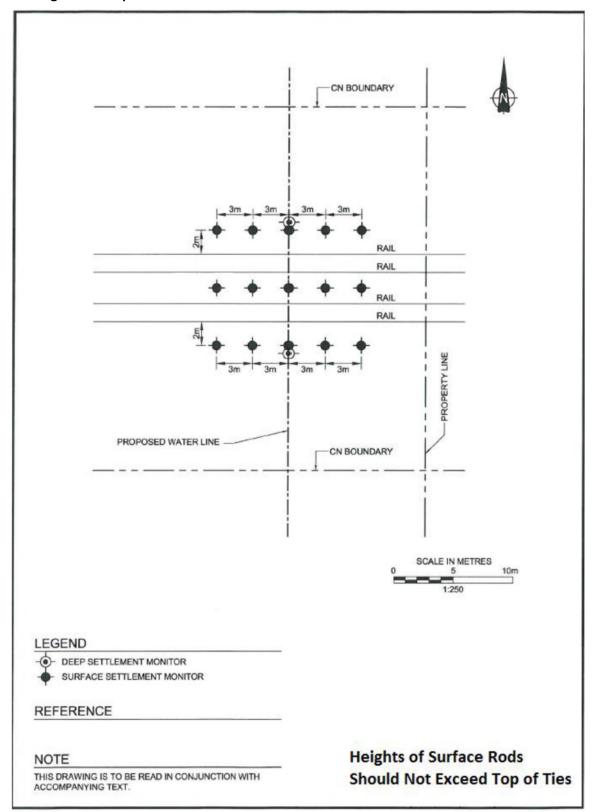
b. Site Plan:

- i. Site Plan
- ii. Identify Probe Locations and Offset Distances to Nearest Rails
- iii. Elevation of Top-of-Probes
- c. Probe Detail Drawing:
 - i. Show section through Railroad Track Roadbed
 - ii. Existing Ground Line
 - iii. Depth of Bore
 - iv. Distance to Bottom-of-Probe to Top of Casing Pipe
 - v. Submit a dewatering plan.

- 6. Monitoring During Construction
 - a. Monitoring by a qualified geotechnical personnel and report to CN daily.
 - b. Installation in accordance with the Contractor's detailed work plan.
 - c. Over-excavation does not occur, and the liner / casing is installed tight to the excavation.
 - d. Report theoretical vs. actual volumes of spoils removed on per meter and total bases.
 - e. The excavation is fully supported until the liner / pipe installation is complete.
 - f. The bulkhead is installed at the end of every work shift or during any prolonged stoppage of work.
 - g. Voids are fully grouted to refusal immediately after the completion of liner / pipe installation. Report theoretical vs. actual volumes of grout pumped.
- 7. Reporting to CN during/post Construction
 - a. Progress of the contractor and pipe installation and what work was completed on that day,
 - b. A summary of the daily ground surface and subsurface movements showing a comparison to a baseline reading taken before the start of construction, settlements of greater than 3/8" shall be reported to CN immediately.
 - c. Any other geotechnical issues that may be of concern to CN.
 - d. Log of settlement survey results showing
 - i. Station
 - ii. Date and Elevation of Initial Readings
 - iii. Date and Elevation of Subsequent Readings
 - iv. Difference in Elevation
 - e. Submit ground surface and subsurface monitoring reports to CN daily, showing a comparison to baseline readings taken prior to the commencement of construction. Settlement of 3/16" is to be reported to CN immediately, and a settlement of 3/8" or greater the work is stopped until a resolution is achieved.
- 8. Provide, in writing, the name and phone number of the Applicant's qualified site inspector who will be on the job site on a full-time basis for the duration of construction. Update prior to work beginning if there are any changes.

NO CONSTRUCTION OR ACCESS TO CN ROW WILL COMMENCE UNTIL AN AGREEMENT HAS BEEN ENTERED INTO BETWEEN CN AND THE UTILITY OWNER

A-1. Monitoring Points Requirements



A-2. Minimum Wall Thickness for Steel Casing Pipe for E80 Loading

Table 1-5-1. Minimum Wall Thickness for Steel Casing Pipe for E80 Loading

Nominal Diameter (inches)	When coated or cathodically protected Nominal Thickness (inches)	When not coated or cathodically protected Nominal Thickness (inches)
12-3/4 and under	0.188	0.188
14	0.188	0.250
16	0.219	0.281
18	0.250	0.312
20 and 22	0.281	0.344
24	0.312	0.375
26	0.344	0.406
28	0.375	0.438
30	0.406	0.469
32	0.438	0.500
34 and 36	0.469	0.531
38	0.500	0.562
40	0.531	0.594
42	0.562	0.625
44 and 46	0.594	0.656
48	0.625	0.688
50	0.656	0.719
52	0.688	0.750
54	0.719	0.781
56 and 58	0.750	0.812
60	0.781	0.844
62	0.812	0.875
64	0.844	0.906
66 and 68	0.875	0.938
70	0.906	0.969
72	0.938	1.000

A-3. Overhead Wireline Clearance Chart

FORMULA: .5" increase for every 1,000 volts in excess of 50 KV

6" increase for every 12,000 volts in excess of 50 KV

Voltage (to ground)	Minimum Clearance Required above top Of rail	Minimum Clearance (Including Static Wires) Required above Communication and Signa Lines
0 to 750	27′0″	4'0"
8,700	28′0″	4′0″
15,000	28'0"	6′0″
50,000	30′0″	6′0″
74,000	31′0″	7′0″
98,000	32′0″	8'0"
122,000	33′0″	9'0"
146,000	34'0"	10′0″
170,000	35′0″	11'0"
194,000	36′0″	12′0″
218,000	37′0″	13′0″
242,000	38′0″	14′0″
266,000	39′0″	15′0″
290,000	40′0″	16'0"

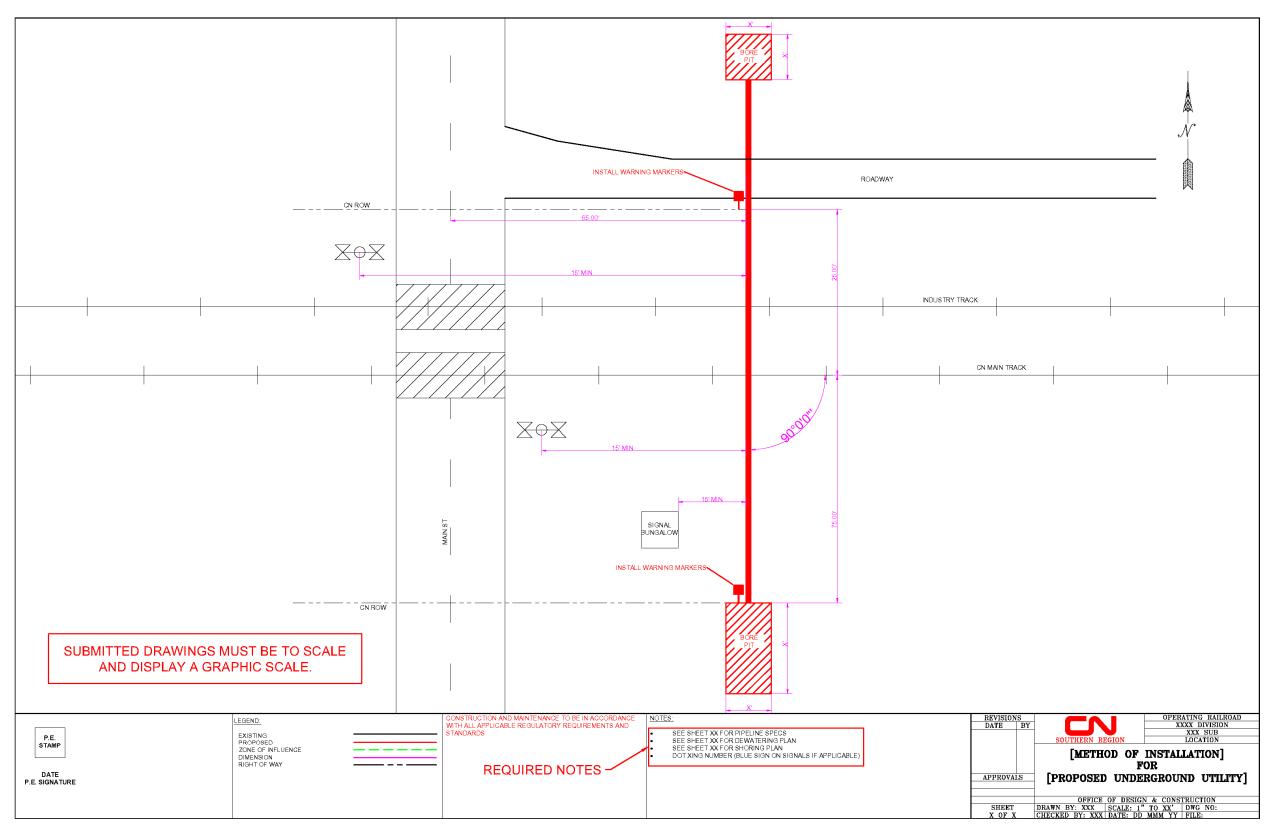
THESE CLEARANCES ARE TO INCLUDE ALL TRACKS OPERATED AS MAIN TRACKS, SIDINGS, AND OTHER AUXILIARY TRACKAGE.

A-4. Marking of Utilities on Railroad Right-of-Way

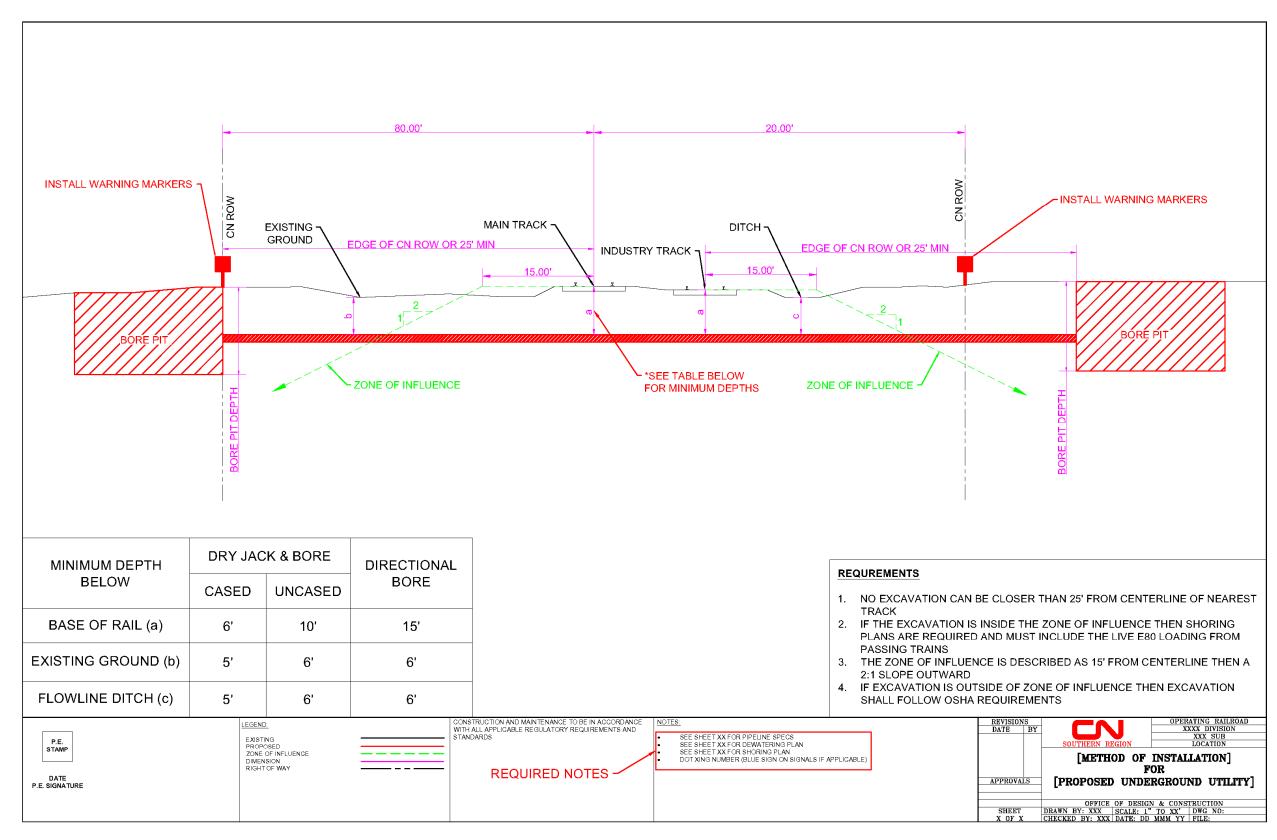
CABLE ROUTE MUST BE MARKED AT EDGE OF RIGHT OF WAY WHERE CABLE ENTERS OR LEAVES RAILROAD PROPERTY. IN CASES OF PARALLEL CABLE ROUTE, SIGNS AS INDICATED IN FIGURE 1 ON THIS EXHIBIT WILL BE PLACED APPROXIMATELY EVERY 200 FEET. SIGNS TO BE OF A PERMANENT VERTICAL TYPE, NOT SMALLER THAN 5 INCHES WIDE BY 12 INCHES HEIGHT. YELLOW BACKGROUND WITH BOLD BLACK LETTERING, SIGNS TO BE MOUNTED ON METAL POSTS OR AS OTHERWISE AGREED TO AT A HEIGHT OF 3 FEET ABOVE GROUND LEVEL.



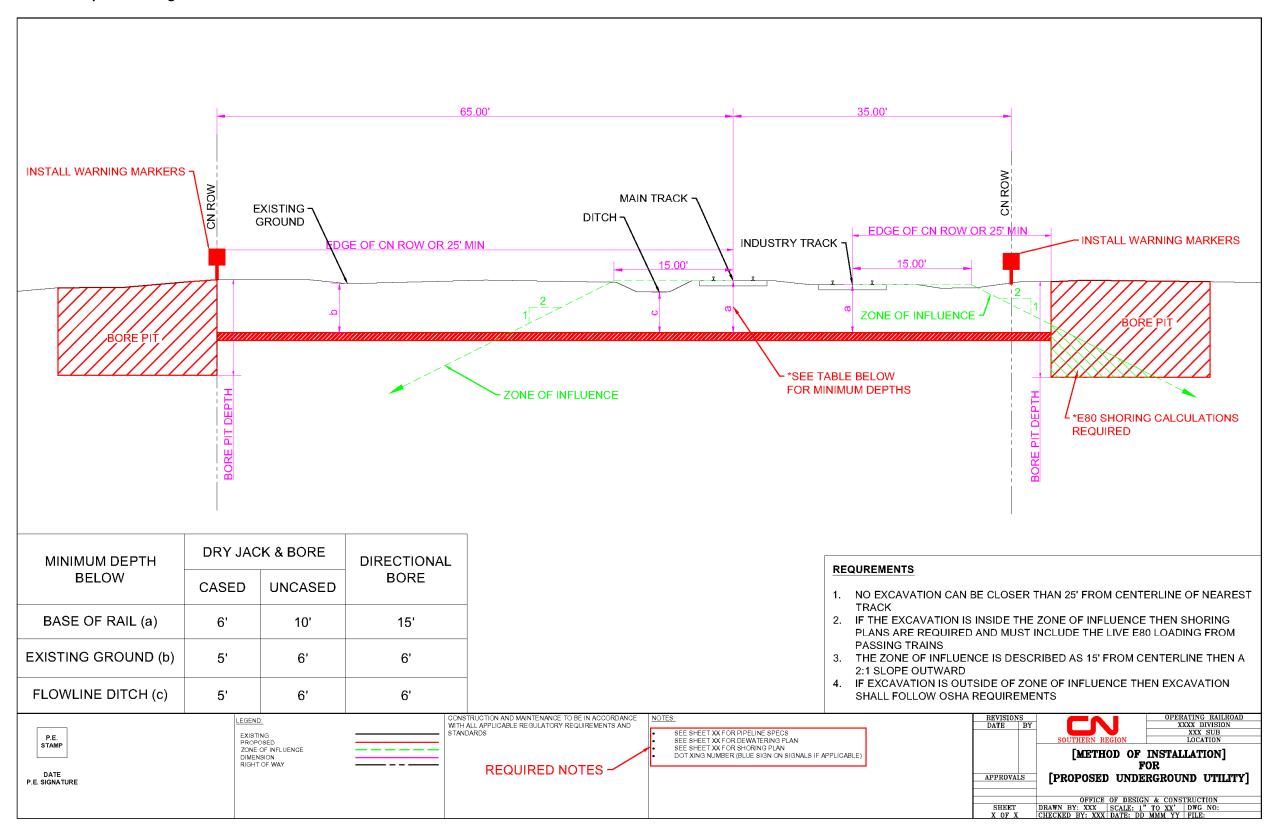
A-5. Example Plan View



A-6. Example Profile 1



A-7. Example Profile 2 – Requires Shoring



APPLICATION FOR UTILITY OCCUPANCY

 $Complete \ this form \ and \ return \ it \ along \ with \ a \ non-refundable \ preparation \ fee \ of \ \$1350 \ made \ out \ to \ CN.$

O	Company's Legal Name:			
	Street:			
	City:	State:		Zip:
	Contact Name and Title:			
	Phone Number:		Owner/Sponsor's Pro	oject #:
	Email Address:			
Co	onsultant's Information Company's Legal Name:			
	Street:			
	City:	State:		Zip:
	Contact Name and Title:			
	Phone Number:		Consultant's Project	#:
	Email Address:			
	Other Emails to include on	correspondence:		
Lo	cation Information (Attach a Nearest Public Road Crossi	• •	ng Location)	
	Nearest Public Road Crossi	ng DOT #:	(# on Blue Sign c	at Crossing, e.g. 123456
			County:	State:
		Mile Post: [no decimal] plus the feet	plus t beyond the Mile Post)	ft.
	•		plus	ft.
	(End Railroad Mile Post o	of Segment if longitudinal;	if crossing please leave blank)
	Please provide the coording of it is a longitudinal to the	· ·	n the utility will cross over or urt and end coordinates.	inder the track(s).
	Latitude:	°, Lo	ngitude:	·
	Latitude:	°, Lo	ngitude:	0
			ngitude:	
ıme	of Submitter	Signature	Telephone #	Date

APPLICATION FOR UTILITY OCCUPANCY WIRE/FIBER/CABLE CONSTRUCTION INFORMATION

E.	Distance and Direction from Bri	iage Ab	utment,	cuivert, Swi	tcn, Koad Cros	sing, etc.	ft.		
D.	Side Clearance from Railroad Co	•	•				ft.		
C.	Distance From Each Facility (En					ıtırack	ft.		
В.	Distance From Each Facility (En		-				ft.		
Α.	Width of Public Road (crossing						ft.		
Loc	cation References and Clearance		cility (En	croachment)		_		
R.	Length of Span Crossing Tracks	(unsup	ported le	ength if abov	e tracks)		ft.		
Q.	Angle of Crossing	,		.1 .6 .					
P.	Solid								
0.	Stranded								
N.	Bare/Open Wire								
	Insulated								
L.	Size and Type of Wire/Cable								
	(dry bore & jack, directional, tu	nnel, o	ther – sp	ecify)					
K.	Method: How is Pipe or Duct to				<				
J.	Size & Kind of Pipe or Duct								
I.	Casing Length (Property Line to Property Line)								
Н.									
G.	Clearance Over Railroad Compa	_					r.		
F.	Depth of Top of Wire/Cable/Ca		••				_		
E.	Number of Wires/Cables/Pairs/	Strand	s (please	specify # an	d type)				
D.	Maximum Voltage								
C.	Cross arm Overhang	. ,							
В.	Number of Guys/Anchors on Pr			- <i>-</i> -					
	□ New: □ Steel	or	□ Woo						
А.	☐ Existing: ☐ Steel	or	□ Woo	nd					
Wi	re/Cable Data Number of Poles/Towers on Pro	onerty							
	☐ Other (please specify):								
	□ Overhead				Longitudinal				
	□ Underground				Crossing				
						# of Wires)			
	•				, ,				
Тур		apply –	minimu	m of three):					
Т	ΊΥ	ype of Occupancy (check all that a ☐ Telephone ☐ Cable TV ☐ Coaxial	☐ Telephone ☐ Cable TV	☐ Telephone ☐ Cable TV	□ Cable TV □	☐ Telephone ☐ Fiber Optic (# ☐ Cable TV ☐ Copper Pair (#	☐ Telephone ☐ Fiber Optic (# of Strands) ☐ Cable TV ☐ Copper Pair (# of Wires)		

APPLICATION FOR UTILITY OCCUPANCY PIPE/CONDUIT INFORMATION

7. Type of Occupancy (check all that apply – minimum of three): □ Sewer (specify type): _____ □ Natural Gas □ Steam □ Petroleum Products □ Air ☐ Chemical (specify type): _____ □ Water (specify type): _____ ☐ Other (please specify): _____ □ Underground □ Crossing □ Overhead □ Longitudinal **Pipe Data** CARRIER PIPE **CASING PIPE** A. Inside Diameter: B. Outside Diameter: C. Wall Thickness: D. Pipe Material: E. Specification/Grade or class: F. Min. Yield Point of Material G. Process of Manufacture H. Name of Manufacturer Type of Joint ١. **Working Pressure** K. Maximum operating pressure (by gauge) ____psi Length of Casing pipe: Y/NM. Casing pipe/uncased carrier pipe cathodically protected? N. Hydrostatic pressure carrier pipe test pressure __psi Y/NO. Will casing pipe be vented? P. Pipe Vent Size: Q. Will casing pipe/uncased carrier pipe have a protective coating? Y/NR. Protective Coating Type Depth of top of casing or uncased carrier pipe below base of rail or top of ground. _____ft. (Closest point of utility to any base of rail or ground) T. Method of installing casing pipe /uncased carrier pipe (Dry bore & jack, directional, tunnel, other – specify) _____ft. U. Depth of pipe below the ground. (not beneath tracks) V. Depth of pipe below ditches. W. Distance from centerline of track to face of jacking/receiving pits. X. Depth from base of rail to bottom of jacking /receiving pits. ft. Name of Submitter Signature Telephone # Date

INSURANCE REQUIREMENTS

1. By Licensee

Before commencing work, and until this Agreement shall be terminated or the FACILITY shall be removed (whichever date is later), the LICENSEE shall provide and maintain the following insurance in form and amount with companies satisfactory to and as approved by the RAILROAD.

- a. Statutory Workers Compensation and Employer's Liability insurance.
- b. Automobile Liability in an amount not less than \$1,000,000 dollars combined single limit.
- c. Comprehensive General Liability (Occurrence Form) in an amount not less than \$5,000,000 dollars combined single limit, with an aggregate of at least \$10,000,000 dollars. The Policy must name the appropriate RAILROAD as an Additional Insured and must not contain any exclusions related to:
 - 1. Doing business on, near, or adjacent to railroad facilities.
 - 2. Loss or damage resulting from surface, subsurface pollution contamination or seepage, or handling, treatment, disposal, or dumping of waste materials or substances.

Before commencing work, the LICENSEE shall deliver to the RAILROAD a certificate of insurance evidencing the foregoing coverage and upon request the LICENSEE shall deliver a certified, true and complete copy of the policy or policies. The policies shall provide for not less than ten (10) days prior written notice to the RAILROAD of cancellation of or any material change in, the policies; and shall contain the waiver of right of subrogation.

It is understood and agreed that the foregoing insurance coverage is not intended to, and shall not, relieve the LICENSEE from or serve to limit LICENSEE's liability under the indemnity provisions of any applicable agreement.

It is further understood and agreed that, so long as the Agreement shall remain in force or the FACILITY shall have been removed (whichever shall be later), the RAILROAD shall have the right, from time to time, to revise the amount or form of insurance coverage provided as circumstances or changing economic conditions may require. The RAILROAD shall give the LICENSEE written notice of any such requested change at least thirty (30) days prior to the date of expiration of the then existing policy or policies; and the LICENSEE agrees to, and shall, thereupon provide the RAILROAD with such revised policy or policies thereof.

INSURANCE REQUIREMENTS

2. By the Licensee's Contractor

If a contractor is to be employed by the Licensee for the installation of the FACILITY, then, before commencing work, the contractor shall provide and maintain the following insurance, in form and amount and with companies satisfactory to, and as approved by, the RAILROAD.

- d. Statutory Workers' Compensation and Employer's Liability insurance.
- e. Automobile Liability in an amount not less than \$1,000,000 dollars combined single limit.
- f. An Occurrence Form Railroad Protective Policy with limits of not less than \$5,000,000 dollars per occurrence for Bodily Injury Liability, Property Damage Liability and Physical Damage to Property with \$10,000,000 dollars aggregate for the term of the policy with respect of Bodily Injury Liability, Property Damage Liability and Physical Damage to Property. The policy must name the appropriate RAILROAD as the insured, and shall provide for not less than ten (10) days prior written notice to the RAILROAD'S as cancellation of, or any material change, in the policy.

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY)

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER	CONTACT NAME:		
	PHONE (A/C, No, Ext):	FAX (A/C, No):	
	E-MÁIL ADDRESS	, , ,	
		INSURER(S) AFFORDING COVERAGE	NAIC #
	INSURER A:		
INSURED	INSURER B:		
	INSURER C:		
	INSURER D:		
	INSURER E:		
	INSURER F:		

COVERAGES CERTIFICATE NUMBER: REVISION NUMBER: 1

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

R TYPE OF INSURANCE				A L	ADD -	SUB R	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMIT	rs .		
X		CENERAL LIABIL COMMERCIAI		L LIA	ABILITY	١	<u> </u>	Y		EFF DATE	EXP DATE	EACH OCCURRENCE DAMAGE TO RENTED PREMISES (Ea occurrence)	\$5,000,000 \$
			S-MADE	_ [OCCUR					DATE	DAIL	MED EXP (Any one person)	\$
												PERSONAL & ADV INJURY	\$
				-								GENERAL AGGREGATE	\$10,000,000
Œ	<u>N</u> L	AGGREGATE	LMTAPPLE	S	PER:							PRODUCTS - COMP/OP AGG	\$
		POLICY	PRO- JECT		LOC								\$
	ľ	AUTOMOBILE LIA	BLITY			<u> \</u>	/	Y		EFF	EXP	COMBINED SINGLE	\$1,000,000
										DATE	DATE	BODILY INJURY (Per person)	\$
X	. !	ANY AUTO ALL OWNED			CHEDULE							BODILY INJURY (Per accident)	\$
			NUTO		WNED JTOS							PROPERTY DAMAGE (Per accident)	\$
		3											\$
X		UMBRELLA	LIAB	X	OCCUR	Y	<u> </u>	Y		EFF	EXP	EACH OCCURRENCE	\$5,000,000
		EXCESS LIA	В		CLAIMS-M	ADE				DATE	DATE	AGGREGATE	\$10,000,000
		DED	RETENTION	\$ NC									\$
		KERS COMPE				<mark>}</mark>	/	Y		EFF	EXP	OTH- ER	MIN STATUTORY
ΑN	IY F	PROPRIETOR/ CER/MEMBER	PARTNER	/EXE	CUTIVE	//N				DATE	DATE		
(M	and	datory in NH)		.0:		IN				27112	27 () 2		
		, describe unde CRIPTION OF		ONS I	below								
T													

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (Attach ACORD 101, Additional Remarks Schedule, if more space is required) Certificate holder is an additional insured under all polices on this certificate including Commercial General Liability and Umbrella Liability.

A Waiver of Subrogation applies in favor of the Certificate Holder for all policies on this certificate including Commercial General Liability and Umbrella Liability.

50 foot railroad exclusion is removed through CG 2417 10 01

CERTIFICATE HOLDER

(Appropriate Railroad Company Subsidiary for work location)

Example: Wisconsin Central Ltd. and its Parents

Attn: CN Flagging - US 17641 South Ashland Avenue Homewood, IL 60430

CANCELLATION

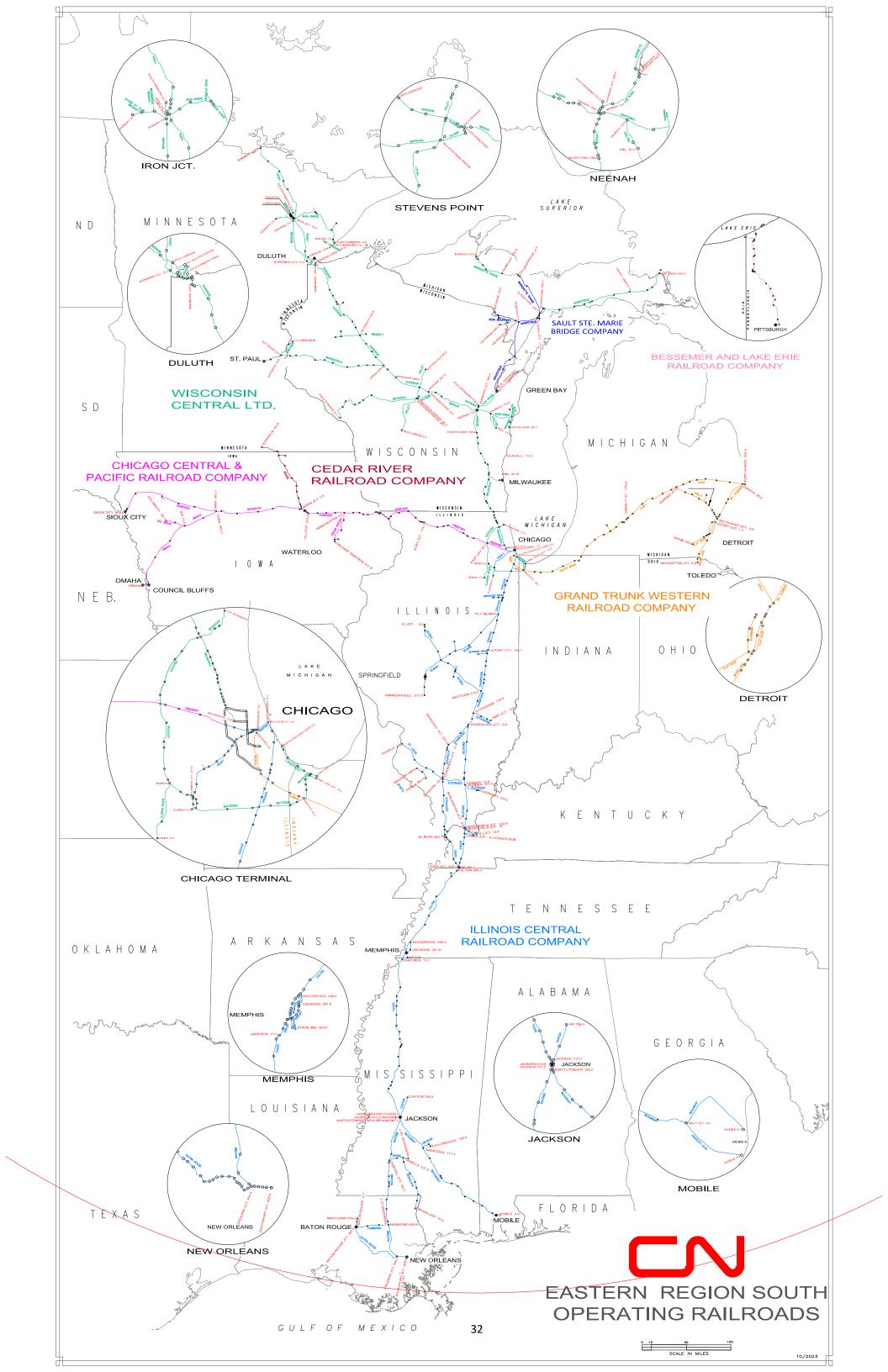
SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

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ACORD 25 (2010/05)

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CN Request for Flagging Services and Cable Location

Project Information:							
Please fill in each cell for processing							
Is this a new project?							
List CN Project # (Example SO# 123456, Network# R1234, PSC-132):							
Contractor's Right of Entry (ROE), License, Permit	t #:						
Date of Agreement for ROE, License or Permit:							
Termination Date of Agreement for ROE, License of							
Does the scope of work include underground, piledriving, excavation or other activities which would require a Railroad Cable Locate? Note: railroad cables and fibers are not part of any state utility locate programs. If a contractor shows up on site to perform work that requires a cable locate and it was not requested, the flagger will shut down the project Does your project require vehicular traffic to be shifted out of its intended lane against							
the current of traffic at a railroad grade crossing? Railroad Subsidiary (listed on your agreement):							
Licensee and/or their contractor shall request, prepay, and secure Railroad Company signal facility locates by written notice to Railroad Company along with submission of CN's "Request for Flagging Services" form at least, 10 business days in advance of proposed performance of any work or access to Railroad Company property. Notice to Railroad Company does not fulfill or satisfy any other notification requirements for utility locates for non-railroad facilities. You must have an agreement with a CN railroad subsidiary, such as a Right of Entry, Permit, License or Formal Agreement in addition to any necessary flagging before you may enter CN property.							
Flagging Protection Schedule:							
Requested Dates for Flagger Protection: Dates requested are subject to Flagging Co. available project needing a cable locate will need 10 days min notice. This should be considered when requesting of flagging.	nimum advance						
Estimated Duration (in days) for Flagger:							
Estimated Work Schedule (example Mon. – Sat.) Daily Start Time / End Time (example 0700 to 1700 (Flagger start and end time may vary based on type of pro	·						
Flagging Protection Location:							
Railroad Mile Post (MP):							
Railroad Subdivision:							
Project's Location (Street location/intersection):							
Project - City / State:							
Project Description (example HDD, Jack and Bore, Encroachment, Underground or Overhead Pipeline / Wireline crossing, etc.):							
Location for flagger to report:							
Field Contact Person(s):	1 _{st} Alternate						
Mobile Phone Number(s):	1st Alternate						
Email Address(s):							

	CN REQUEST FOR FL	AGGING SERVICES AND CABLE LOCA	ATION
Billing Information	ı:		
Company Name:			
Contact Name:			
E-Mail:			
Billing Address:			
City/State:			
ZIP Code:			
Company Phone:			
Electronic Payme	ent Instructions	Payment Information	
Financial Institution	HARRIS TRUST AND	Customer Number (if available)	
	SAVINGS BANK		
	311 WEST MONROE, CHICAGO, IL		
Account Name	Grand Trunk Western	CN Contact	
Account	274-733-5	Service Requested (Flagging MP, Request Date)	
US ROUTING (ABA)	071 000 288	-	
Remittance Details	nfcashmanagement@cn.ca	Prepayment Amount	
Please send payment remit	tance details and copy of this f	lagging request to nfcashmanagement@cn.ca	
CN required online train		ore Flagging Protection will be scheduled.	
	ceived before Flagging Prote		
eeds to be prepaid. Railr	oad Cable Locate must be p) (\$3,300 on Weekends and Holidays) for flaggir prepaid at \$1,025. Fixed fees prepaid for full unu or 5 flagging days and used 3 days, CN will refur	sed days will be

This completed form must be sent with a map, confirmation of electronic prepayment, and proof of insurance to $\underline{\text{US_Flagging@cn.ca}}$

Any full day prepayment not used can be refunded.

Railroad Cable Location must be prepaid, the cost is \$1025.00 per locate.

US Flagging T: 248-914-9695 17641 South Ashland Ave. Homewood, IL 60430 <u>US Flagging@cn.ca</u>				
I,	Print Name	_, agree to pay for flagging and/or cable locate services as requested	Signature	
				2 P a g e