Court File No. CV-23-00001165-0000 (Chatham)

ONTARIO
SUPERIOR COURT OF JUSTICE
IN THE COURT OF THE DRAINAGE REFEREE

IN THE MATTER of the *Drainage Act*, R.S.O. 1990, Chapter D.17

AND IN THE MATTER OF an application by the Corporation of the Municipality of Chatham-Kent for certain orders of the Drainage Referee with respect to construction of the Shaw Branch of the East Branch Facey Drain and By-law No. 93-2021

BETWEEN:

CORPORATION OF THE MUNICIPALITY OF CHATHAM-KENT

Applicant

AND:

CANADIAN PACIFIC RAILWAY COMPANY

Respondent

AND:

ATTORNEY GENERAL OF ONTARIO, CANADIAN NATIONAL RAILWAY COMPANY, ONTARIO FEDERATION OF AGRICULTURE, and the RURAL ONTARIO MUNICIPAL ASSOCIATION

Intervenor Respondents

Application pursuant to Section 106 of the *Drainage Act*, R.S.O. 1990, c. D.17

AFFIDAVIT OF TREVOR EVANS
(Sworn February 21, 2025)

February 21, 2025

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AFFIDAVIT OF TREVOR EVANS
(Sworn February 21, 2025)

I, Trevor Evans, P. Eng., of the City of Kamloops, in the Province of British Columbia, Canada, **MAKE OATH AND SAY AS FOLLOWS**:

A. My Background and Expertise

1. I am the Senior Manager – Geotechnical for the intervenor, Canadian National Railway Company ("**CN**"). I am responsible for the oversight and management of CN's geotechnical

department, including items related to track stability and railway ground hazards for CN's North American rail network. I provide geotechnical engineering expertise in all aspects at CN, including the inspection, identification, and mitigation of geohazards (such as landslides, debris flows, rockfalls, floods, and washouts). I have personal knowledge of the matters described in this affidavit. Where I do not have personal knowledge, I have stated the source of that information and believe it to be true.

B. CN's Track and Drainage Infrastructure

2. CN is a federal undertaking that operates a railway across North America, with over 32,000 kilometres of track connected to ports on three coasts on the Pacific and Atlantic Oceans as well as the Gulf of Mexico. Within Canada, CN's railway operations span across British Columbia, Alberta, Saskatchewan, Manitoba, Ontario, Quebec, New Brunswick, and Nova Scotia, and 122 kilometres to Hay River in the Northwest Territories.

3. CN's drainage operations are equally expansive, and are an integral part of CN's railway maintenance infrastructure.

4. System-wide, CN has approximately 50,000 culverts within its inventory: approximately 15,000 culverts in the Eastern Region (*i.e.*, CN's Canadian operations to the east of Winnipeg, including the province of Ontario), 10,000 culverts in the Southern Region (*i.e.*, CN's American operations), and 25,000 culverts in the Western Region (*i.e.*, CN's Canadian operations to the west of Winnipeg).

5. As well, system-wide CN has more than 8,000 active bridges spanning a length of over 1,000,000 feet in its network: approximately 2,000 bridges in the Eastern Region, 4,600 bridges in the Southern Region, and 1,800 bridges in the Western Region.

6. In addition to bridges and culverts, CN has hundreds of subdrain and horizontal drain systems, as well as closed pumping systems. It is estimated (but not specifically tracked) that CN has thousands of miles of open channel ditches.

C. The Regulatory Framework and CN's Standards for Drainage

7. Drainage is a critically important matter to the safety and resiliency of railway operations and is therefore addressed under the federal *Railway Safety Act* scheme.

8. Transport Canada publishes the *Rules Respecting Track Safety* ("*Track Safety Rules*"), which apply to all federally-regulated railway companies under the *Railway Safety Act* operating on standard gauge track and prescribe minimum safety requirements for such railways. The *Track Safety Rules* specify that drainage must be maintained and kept free of obstruction, and that the ballast must provide adequate drainage for the track.

9. Attached as **Exhibit "A"** is a copy of the Transport Canada *Track Safety Rules*.

10. Because drainage is a critically important matter, it is also a component of CN's internal Engineering Track Standards. These Standards set out maintenance standards that apply to all of CN's trackage and rights-of-way. These Standards contain a section on railway roadbed and drainage, which sets out construction and maintenance standards to ensure proper drainage.

11. Attached as **Exhibit "B"** is an excerpt of the Roadbed and Drainage section of CN's Engineering Track Standards.

D. Drainage is Integral to CN's Railway Operations

12. As detailed below, proper drainage is critical to, and drainage structures are an integral part of, CN's operations.

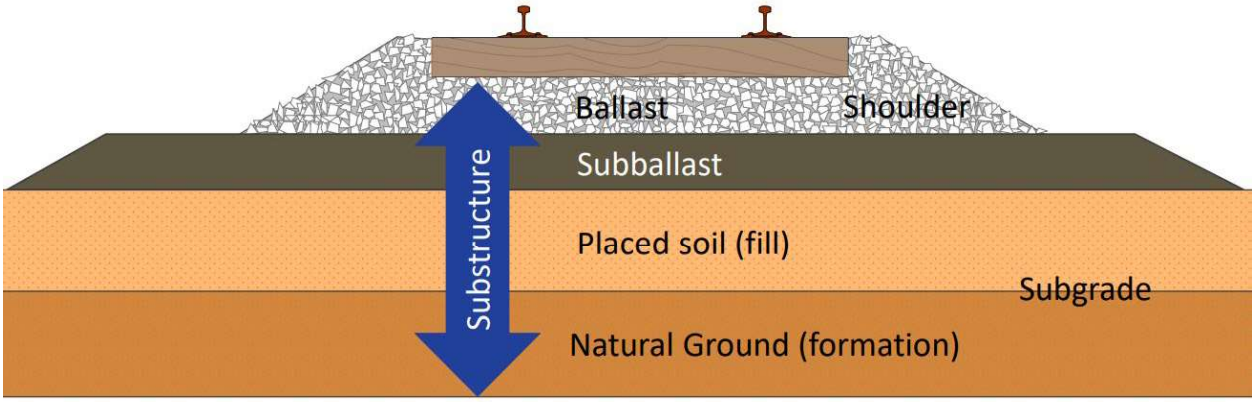
i) Railway Foundation and Track Structure

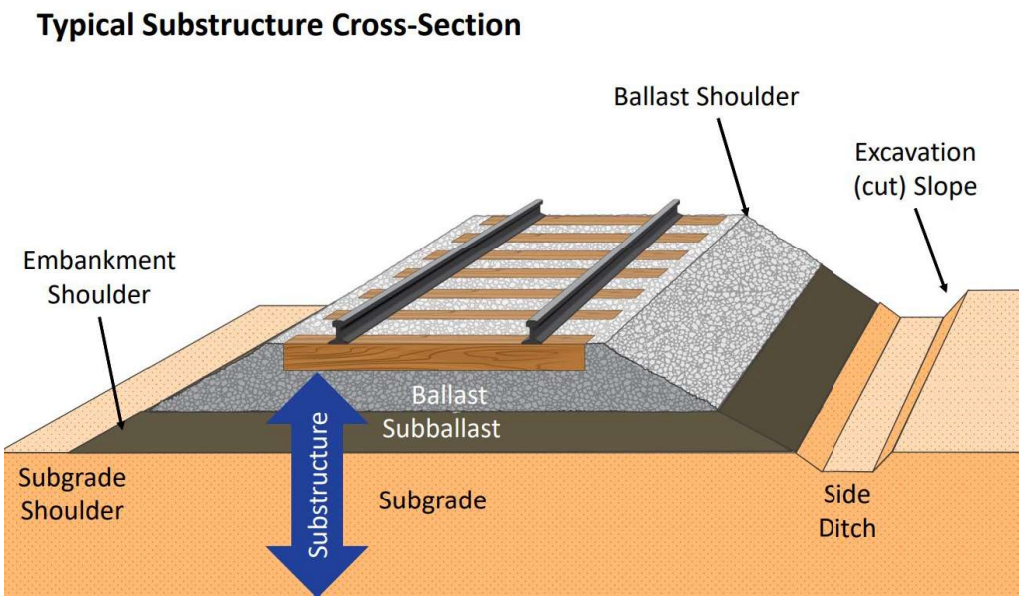
13. A railway is more than simply the railway line, but rather is comprised of a multitude of components. A railway includes: core mainlines as well as branch lines, spurs, extensions, sidings, railway bridges, tunnels, stations, depots, wharfs, rolling stock, equipment, stores or other things connected with a railway, as well as communications or signaling systems and related facilities and equipment used for railway purposes.

14. A railway track is comprised of two primary train loading distribution systems, the track superstructure and the track substructure.

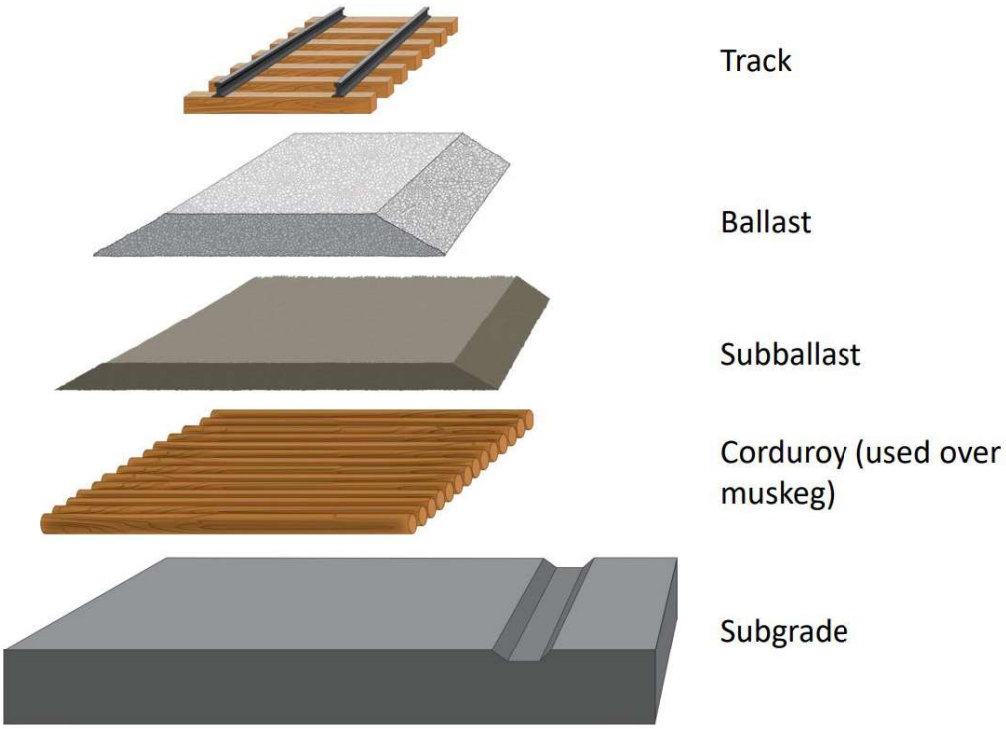
15. Track superstructure is the primary load supporting element and further transfers load into the substructure. The superstructure consists of the rail, the ties (softwood, hardwood, or concrete), and the fastening systems (plates, spikes, and clips).

16. Track substructure is comprised of the foundational layers that support the track superstructure and its underlying drainage mechanisms. Railway substructure consists of multiple components, including the ballast, subballast, and subgrade. The **ballast** is a 6- to 12-inch thick layer of 2 inch and smaller processed, well-draining crushed hard stone. The **subballast** is a 12-inch thick compacted, graded sand and crushed gravel granular layer. The subballast is located between the ballast and the subgrade. It acts as a transition zone and performs three primary tasks: (a) provides further load distribution into the subgrade imparted from the ballast; (b) prevents the subgrade from migrating into and contaminating the ballast; and (c) provides a lateral drainage path for surface water (rainfall, snowmelt) infiltrating the ballast from above, as well as a lateral drainage path for potential upward migration of subsurface water from below. The **subgrade** is the soil below the subballast and acts as the track foundation supporting the track superstructure. It may be comprised of rock or soil or mixtures of both. It includes both placed soil (fill) and the natural ground. Copied below are two CN diagrams showing a cross-section of typical railway substructure.





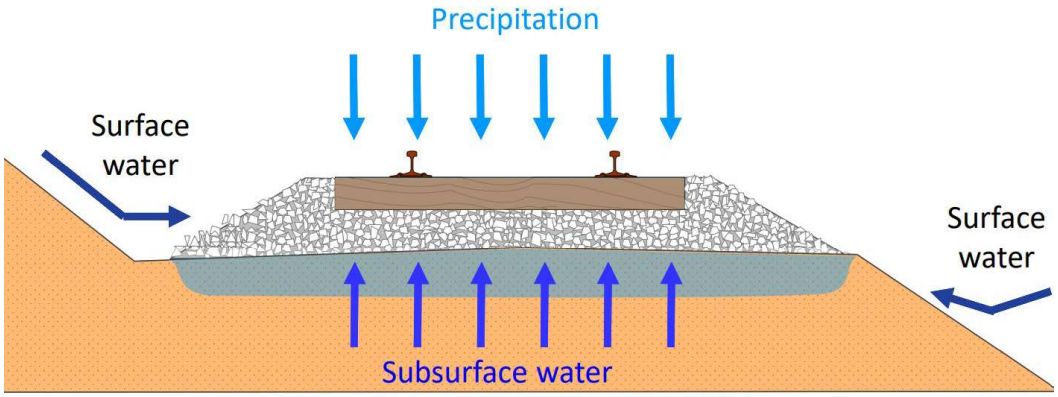
17. A railway's track structure is composed of the track, the ballast, the subballast, corduroy (if the railway track runs over muskeg), and the subgrade. Copied below is a CN diagram showing the components of track structure.



ii) Drainage Systems Form a Critical Part of the Railway Structure

18. Water management is of critical importance to all railways, including CN. Accordingly, a railway track also involves drainage systems. In fact, because the presence of water has a significant impact on all aspects of railway maintenance and its components, drainage is one of the most important considerations in track maintenance and design. The purpose of railway track drainage is to keep the substructure as free of moisture as possible, which promotes improved soil strengths and a stiffer track structure.

19. There are three main sources of water which can enter the track structure: (1) precipitation, including rain and snow; (2) surface water, including water from slope runoff and blocked ditches and culverts; and (3) subsurface water, which seeps through the ground. Copied below is a CN diagram showing these three sources of water.



20. CN's rail tracks have internal drainage systems, which remove water from the ballast and subballast layers to external drainage systems. Internal drainage mechanisms include the free draining ballast and subballast (which are constructed to permit water to drain out), sloping surfaces away from the track, lateral drainage of subgrade water absorption, and trench drains which absorb and discharge water in the subgrade. Ballast drainage is important as it helps maintain higher strength for the substructure, maintains a dry roadbed, reduces ballast abrasion, and limits frost heave action.

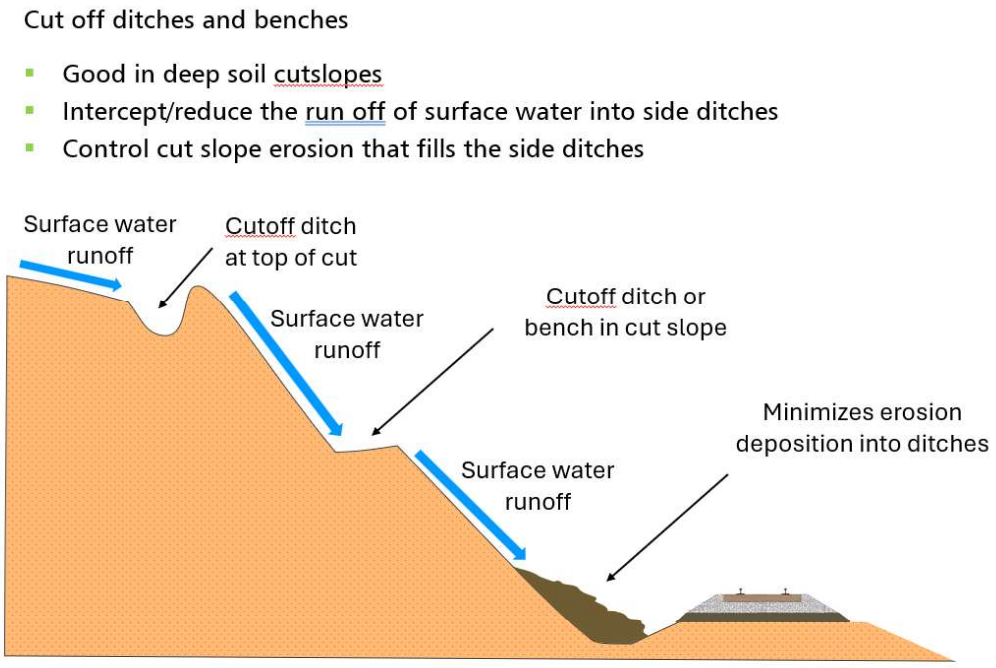
21. CN's rail tracks also have external drainage systems, which are critical to railway operations. The primary purpose of these systems is to prevent water from entering the track

structure, keep the railway roadbed free of moisture, and remove water from the railway right-of-way as rapidly as possible. There are multiple examples of external drainage systems, including drainage ditches, culverts, subdrains, horizontal drains and bridges. Below I explain each of these external drainage systems and provide diagrams or photographs to illustrate them.

22. **Drainage ditches** can include side ditches as well as cut off ditches and benches. **Side ditches** run alongside the railway structure. They intercept and divert water outside of the track structure, permit water to drain out of the ballast and subballast, and lower the water table to allow drainage from the subgrade.

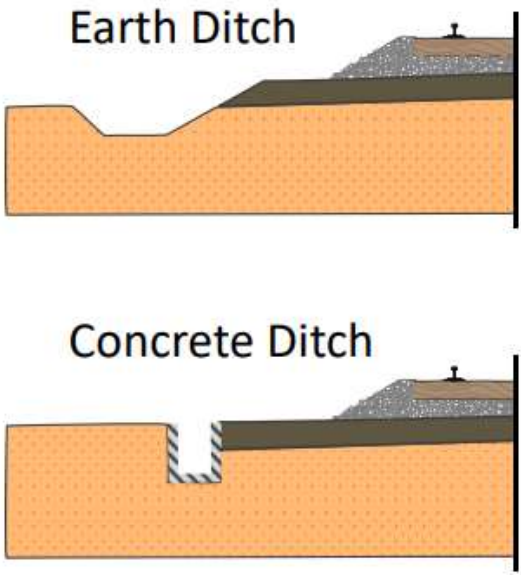
23. CN has developed construction standards for typical embankments and excavations of roadbeds on main track lines, which set out recommended dimensions for side ditches alongside railway tracks. Attached as **Exhibit "C"** is a diagram showing an example of CN roadbed standard construction with recommended side ditch dimensions.

24. **Cut off ditches and benches** redirect and reduce the run-off surface water into side ditches, as well as control cutslope erosion which can fill side ditches. Cut off ditches are particularly important on high cutslopes comprised of erodible soils. Copied below is a CN diagram depicting cut off ditches and benches, and explaining how they work.



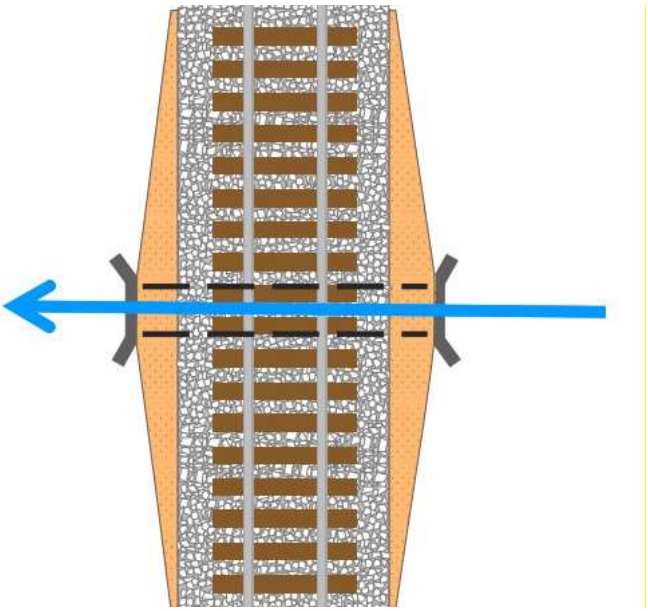
25. Copied below is a CN photograph showing a cut off ditch, which contains water, running above and parallel to one of CN's railway lines.

26. Drainage ditches permit lateral ballast and surface water drainage to flow out and away from the subgrade. They maintain a lower trackside water table by permitting drainage from the subgrade. As a result, ditches extend the effective life of the ballast by allowing free-flow of water from the ballast and subballast section, preserve the subgrade, and extend the effective life of track components by providing a stiffer track bed. Drainage ditches are typically earthen flow paths but may also be made of other materials, such as concrete, which are more typical in urban environments. Copied below is a CN diagram showing an earth ditch and a concrete ditch.



27. Copied below is a CN photograph showing an earthen ditch collecting water that runs alongside CN's railway line.

28. **Railway culverts** are typically transverse drainage structures that provide passage of water through the embankment. In some cases, culverts may be longitudinal to the track, enclosing part of a drainage ditch, such as to accommodate a road crossing or earthworks used for slope stabilization. Culverts may be constructed of metal, concrete, stone and mortar, timber or any other material that is suitable for the intended purpose. Copied below is a CN diagram showing a culvert running underneath railway tracks.



29. CN has developed standard construction drawings for corrugated steel pipe and structural plate corrugated steel pipe culverts, which set out various requirements for culvert installation. Attached as **Exhibit "D"** is a diagram showing an example of CN's standard drawings for culvert installation.

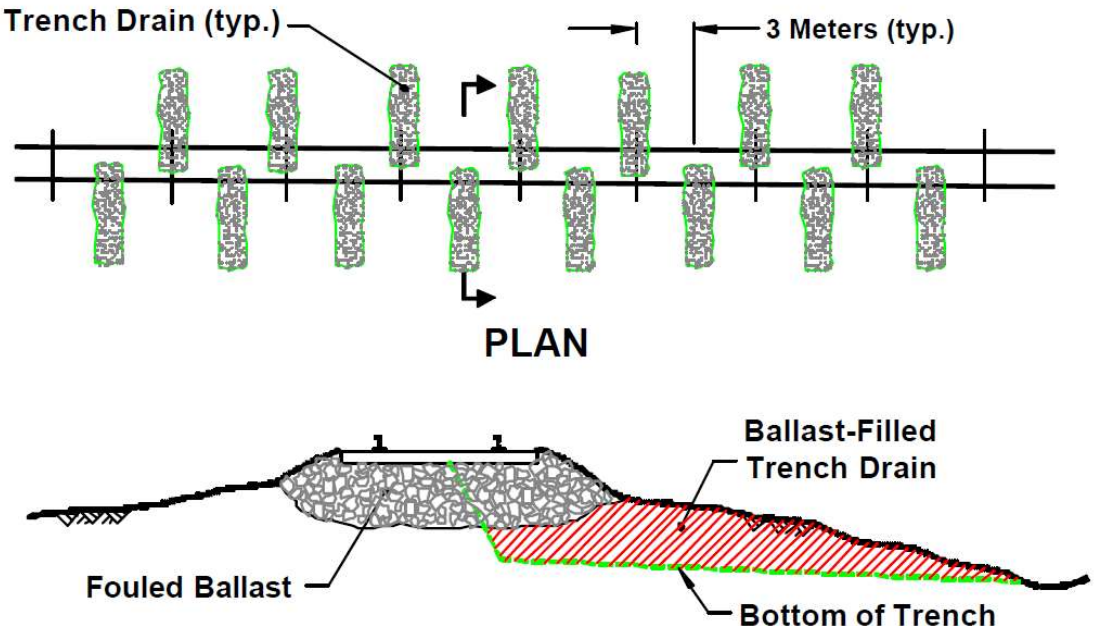
30. Copied below are two CN photographs showing culverts that run underneath CN's railway line.

31. **Railway bridges** are generally structures greater than 3 metres in length constructed for the primary purpose of supporting railroad traffic across an obstruction. Common examples of bridge forms include viaducts, trestles, single span and multi span steel or concrete box girders

and moveable bridges. The obstruction may range from water bodies such as ponds, lakes, streams, rivers, sea water and ocean deltas, to roadways or other complex terrain. Bridges are sometimes considered part of CN's drainage works, as they can be used to avoid water and as an alternative to other drainage structures.

32. Copied below are two CN photographs showing bridges that are used to avoid water obstructions.

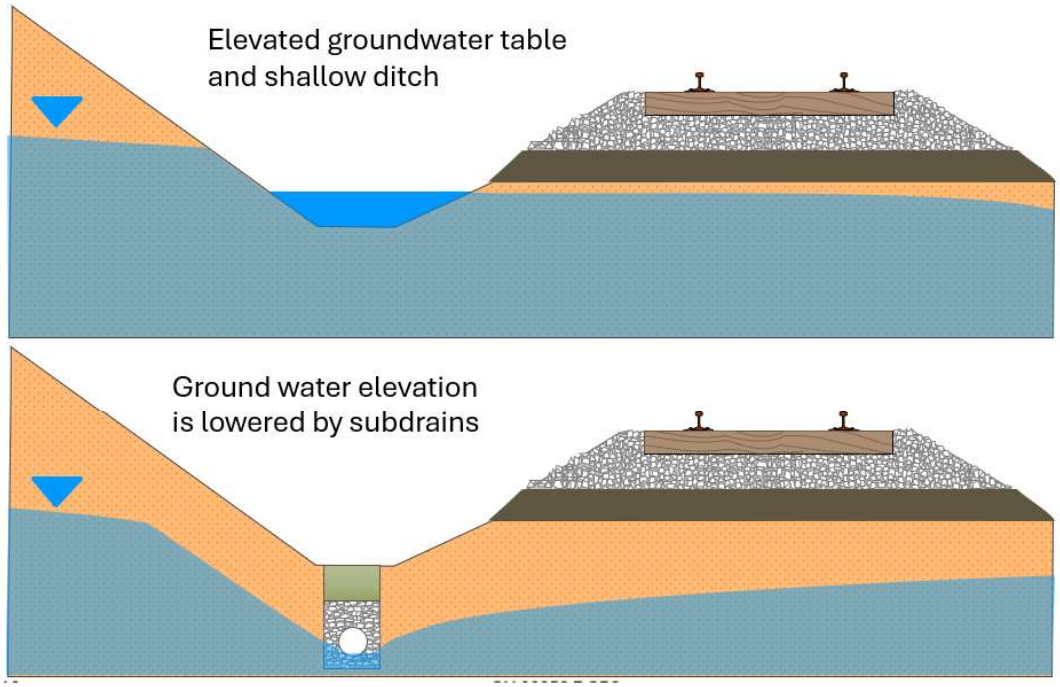
33. **Trench drains** are a simple method for railways to address shallow bearing capacity issues in their subgrades – commonly in lower embankments. They are a direct means to target ballast pockets and intercept and drain near surface groundwater by providing positive drainage away from within the track substructure. Accordingly, they are a remediation method for draining confined water that has entered the ballast and cannot freely drain as a result of a ballast pocket. Trench drains primarily consist of narrow excavations perpendicular to the track and at a desired depth required to intercept the ballast trough. The trenches are backfilled with clean drain rock or railway ballast to increase permeability and provide long-term positive drainage away from the track. Some trench drains may use pipes or geosynthetics. Trench drains are often discharged into adjacent railway drainage ditches. The advantage of trench drains is that they can be installed without removing the track from service. Copied below is a CN diagram showing trench drains.



34. Copied below is a CN photograph showing an installation of a trench drain: the photo shows the excavation process (with ballast falling into the hole and water draining out as the excavation occurs) and the trench will be backfilled once excavation is complete.

35. **Subdrains** are another means used to lower a shallow groundwater table. Subdrains are longitudinal trenches, typically at or near shallow ditch bottoms that are backfilled with free draining gravel and perforated pipes. This provides a preferential flow path into the trenches

whereby the water will travel through the system and drain to an outlet. Copied below is a CN diagram showing how a subdrain lowers the ground water table.



36. Copied below is a CN photograph showing a subdrain that drains into a side ditch running alongside CN's railway line.

37. **Horizontal drains** are another means of lowering the water table or relieving water pressure within embankments or slopes. They consist of holes drilled into an embankment or cutslope and cased with a perforated metal or plastic drainpipe. The drain holes may commonly be drilled up to 300 feet into the ground. The pipes provide a preferential flow path for trapped water to flow by gravity. Horizontal drains are expensive and specialized, and typically CN only has to install this type of drain every other year.

38. Copied below is a CN photograph showing horizontal drains – the drainpipes are shown providing a flow path for water.

iii) Drainage Management is Critical to Safe and Efficient Railway Operations

39. Drainage management is also of critical importance to CN because a drier substructure is essential for a stable railway track. Poor drainage results in the accumulation of water and water saturation. In the presence of penetrating surface water, subgrade soils can undergo a reduction in load-bearing capacity and subsequently result in a loss of strength. The accumulation of water can also lead to an acceleration of ballast degradation leading to reductions in the strength of the ballast, subballast, and subgrade.

40. Poor drainage can result in costly consequences. Water saturation softens the track grade, which leads to track settlement and can cause irregular track geometry, deflections, bearing capacity failures, broken rails, and accelerated deterioration of rail and ballast. Track profile and alignment will deteriorate, which can increase the frequency of surfacing operations by up to a factor of ten. The risk of track buckling can also increase significantly. The risk of track buckling is heightened because water in the track structure, accompanied with the cyclic loading of the heavy axle trains, can create a fouled ballast section which results in a weaker track structure. This causes lateral strength reduction in the track shoulders. In warmer weather, the continuous welded rail will heat up and expand, and there will be a risk of buckling at this weaker section of the track. Track buckling poses a very high risk to derailment prevention. Furthermore, the railway must often treat these areas with temporary slow orders, before, during, and after track surfacing works. Aside from the maintenance costs to undertake this, freight service levels and customer commitments are adversely impacted.

41. Poor drainage can also result in serious consequences. As mentioned above, poor drainage can result in an elevated risk of derailment. Water saturation weakens slopes and embankments, which can trigger landslides or surficial soil sloughing, leading to possible service interruptions and derailments. Proper drainage is necessary to protect the public, the environment, and CN's own people and its operations.

42. For example, if there are ditches alongside a railway track that drain poorly, water will infiltrate the subgrade. The subgrade will become saturated, weakening the underlying soils and this will cause a soft track. Soft tracks require frequent maintenance in order to maintain the track geometry. There is a risk of ballast failure, which can cause the subgrade to deform, causing a rough track or worse – broken rails or thermal rail misalignments (track buckle).

43. As another example, without efficient trackside drainage, precipitation and snow melt can cause surface water flooding, saturating the grade which can promote track instability. Where surface water flooding completely inundates the track and the surface water rises above the top of the tie or in extreme conditions above the head of the rail, train operations need to stop because it is difficult to inspect the track, the grade is saturated and there is uncertainty as to how it will respond to the train load, and water may get into the traction motors in the locomotives. Even if

surface water flooding does not completely inundate the tracks, the flooding will cause slower rail service and increase derailment risk.

44. Drainage that is adjacent to railway tracks (*i.e.*, ditches) must be built or designed in such a way that it does not adversely impact track stability. Drainage ditches can, in some circumstances, cause slope instability for the track which disrupts train services and creates safety risks. These circumstances might include where the drainage ditch has a high velocity of water that erodes the toe of the embankment, resulting in an oversteepened slope which reduces stability and promotes unintended movement in the embankment. Other circumstances are where existing ditches are inadvertently or unknowingly deepened during maintenance operations, which may cause instabilities to the embankment side slopes. At times, stabilization measures such as counterbalancing toe berms may be required to infill the drainage ditch and improve the overall embankment geometry and corresponding stability. In most toe berm cases, the use of longitudinal culverts alongside the track are required in order to maintain pre-existing ditch drainage.

iv) Drainage Maintenance is a Key Part of Track Maintenance and Safe Railway Operations

45. CN's drainage systems require regular maintenance, which is a part of CN's general operations to maintain its track infrastructure. For example, regular inspection of drainage ditches and culverts is necessary to ensure they remain clear of debris and water can flow as intended.

46. CN maintains an Engineering Plant Inventory database (which records, among other things, drainage information) as the main depository of culvert inventory information. Culverts are inspected using one or more of the five types of inspections: General, Visual, Detailed, Special and Underwater. General inspections of all culverts, regardless of size, along with associated drainage ways, must be performed and recorded in CN's Track Inspection System at least annually. General and annual inspections are conducted by railway personnel and occur every calendar year at an interval of not less than 6 months not to exceed 400 days.

47. Track remediation trouble spots at culvert locations, such as spots requiring resurfacing more than once over three months, justify increased inspection frequencies and formal escalation.

48. Culverts between 48 inches and 120 inches diameter or width must undergo a detailed inspection not exceeding three calendar years. Bridge spans (> than 120 inches) require an annual visual inspection.

49. All inspections are recorded in CN's inspection databases, and conditions or findings requiring attention are noted. Immediate concerns are to be escalated to the Railway Culvert Engineer's immediate attention for assessment.

50. Ditches, culverts or any other drainage facility under or immediately adjacent to the roadbed must be maintained so as to allow the free flow of water. Working with reports from these inspections, the Railway Culvert Engineer schedules repairs or replacements of culverts as necessary to maintain structural integrity and hydraulic capacity on the inspection reports.

51. As set out in CN's internal Engineering Track Standards attached as Exhibit "B", CN's regular ongoing drainage maintenance conducted to ensure adequate support for the safe passage of trains includes:

a. Inspecting waterways, ditches, and other drainage to ensure they are operating as intended;

b. Maintaining waterways, ditches, and other drainage free of vegetation and debris so that drainage is not impeded;

c. Confirming ballast or waste from ditching, shoulder cleaning or undercutting is not blocking waterways, ditches, or other drainage;

d. Ensuring no alterations, adjustments, reroutes or constrictions of waterways, ditches or other drainage without approval through a hydraulic study and permit process;

e. Monitoring for plugged or frozen conditions, indicated by high water on one side of the track or embankment, which can weaken the subgrade and cause rapid failure;

f. Monitoring adjacent properties to ensure there are no changes diverting water into the railroad right-of-way; and

g. Assessing beaver activity for impacts to drainage including culverts.

52. I note that items (d) and (f) in the list above focus on third party changes: whether persons other than CN have made changes that would impact drainage flows, and therefore impact CN's operations.

E. Examples of Drainage Issues

53. As set out above, poor drainage can cause significant problems for CN's operations nationwide. Below I provide some concrete examples of safety and operational issues caused by poor drainage across the country.

i) Track Flooding in Dartmouth, Nova Scotia

54. In Dartmouth, Nova Scotia, CN has been experiencing an ongoing drainage issue with Halifax Water's culvert located at mile point 11.14 of CN's Dartmouth Subdivision. Excess water is being discharged from the culvert onto CN's trackage, continuously flooding CN's property and trackage. This flooding severely impacts CN's operations and causes safety issues requiring CN to close its tracks when the flooding occurs.

55. Copied below are two CN photographs showing the excess water being discharged from Halifax Water's culvert and flooding of CN's trackage.

ii) Derailment on Clearwater Subdivision, in British Columbia

56. In April 2015, a derailment occurred on the Clearwater Subdivision in British Columbia, at mile point 118.5, after a cutslope uphill of CN's railway trackage failed, causing a landslide onto CN's railway trackage. The cutslope failed because of a high water table in the cutslope. Copied below is a CN photograph showing the train derailment.

57. Ultimately CN installed a subdrain in the slope (off of CN's property) to cut off the groundwater flow, and installed horizontal drains to relieve the water pressure in the cutslope. Copied below is a CN photograph showing drilling into the side of the embankment to install the horizontal drains to draw down the water table in the embankment.

iii) Embankment Failures near Ashcroft Subdivision in British Columbia

58. On November 14, 2021, CN experienced two embankment failures on the Ashcroft Subdivision in British Columbia, resulting from drainage issues caused by a nearby highway's culverts plugging following a rain event.

59. At mile point 110.5, the nearby highway experienced a plugged culvert, which in turn caused the highway embankment to fail. This caused CN's culvert to plug and CN's embankment to fail. Copied below is a CN photograph showing the failed highway embankment (towards the top left of the photograph) and CN's failed embankment and the now exposed concrete culvert (towards the middle of the photograph).

60. As a result of the embankment failure, this track was out of service for three weeks, causing significant impacts to CN's operations. Since this failure, CN has installed a bridge at this location.

61. On the same day, CN experienced another embankment failure just a mile down the track, at mile point 111.15, after the nearby highway experienced a plugged culvert. This caused water to be redirected over and across the highway, and then overland down towards CN's trackage, which caused a complete washout of the slope and caused CN's embankment to fail. As a result, there was significant erosion under CN's tracks, which were left hanging roughly 50 feet in the air. Copied below is a CN photograph showing the water redirecting from the highway and running towards the failed embankment, and showing the resulting erosion under CN's tracks.

62. The site required a track realignment and infilling of the hole. CN completed this work within a week of the initial impact.

iv) Mudslide on Yale Subdivision in British Columbia

63. At mile point 55.9 on the Yale Subdivision in British Columbia, a mudslide occurred over CN's trackage on December 5, 2024. The slide was caused by a plugged culvert located in a neighbouring quarry. Because the culvert was plugged, during a heavy rain event water was redirected over a steep slope, triggering a mudslide overtop of CN's trackage. Copied below are two CN photographs showing the failed slope and mudslide.

64. The mudslide destroyed CN's intermediate signal, mercury switch hazard detectors, and underground power. Approximately 150 feet of the trackage was buried, with the debris reaching 3 to 4 feet above the rails. Copied below is a CN photograph showing the mud and debris covering CN's trackage as a result of the mudslide.

65. As a result of the mudslide, the track was out of service for approximately 8 hours while the debris was cleaned off the track. Luckily, the mudslide did not push the track out of alignment, and at the time of the mudslide this area of CN's track happened to be out of service so there was no risk of derailment. However, ordinarily mudslides do create a risk of derailment.

66. As these examples amply demonstrate, drainage is critical to the safe operation of CN's railway. When drainage issues arise, they can and do cause real damage and operations and safety concerns.

F. CN's Pipe Crossing Agreements with Municipalities

67. From time to time, CN enters into "pipe crossing agreements" with municipalities in which CN and the municipality agree on the terms for the construction, operation, and maintenance of a utility crossing. Attached as **Exhibit "E"** to my affidavit is one such crossing agreement, dated 2

October 2009, between CN and the Township of Warwick respecting a portion of the Harrower Drain sewer pipe within CN's right-of-way.

68. I make this affidavit in support of CN's intervention in the application brought by the Corporation of the Municipality of Chatham-Kent, Court File No. CV-23-00001165-0000, and for no other purpose.

SWORN REMOTELY by Trevor Evans at the City of Saskatoon, in the Province of Saskatchewan, before me at the Town of Ajax, in the Province of Ontario on February 21, 2025, in accordance with O. Reg. 431/20, *Administering Oath or Declaration Remotely.*

Laura Herd

A Commissioner, etc.
Laura Herd

Laura Lilian Herd, a Commissioner, etc.
Province of Ontario, for Borden Ladner Gervais LLP,
Barristers and Solicitors.
Expires January 21, 2026

Trevor Evans

TREVOR EVANS

This is **Exhibit "A"** to the Affidavit of Trevor Evans, at the City of Saskatoon, in the Province of Saskatchewan, sworn remotely before me at the Town of Ajax, in the Province of Ontario, this 21st day of February, 2025, in accordance with O. Reg. 431/20, *Administering Oath or Declaration Remotely*.

Laura Herd

A Commissioner, etc.
Laura Herd

Laura Lilian Herd, a Commissioner, etc.
Province of Ontario, for Borden Ladner Gervais LLP,
Barristers and Solicitors.
Expires January 21, 2026

RULES RESPECTING TRACK SAFETY

May 31, 2022

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PART I – GENERAL

1. SHORT TITLE

These Rules may be cited as the *Track Safety Rules* (TSR).

2. INTERPRETATION

In these Rules:

"continuous welded rail" (CWR) is rail welded into lengths of 400 ft (121.920 m) or more; *(long rail soudé),*

"crossover" means a track joining adjacent main tracks, or a main track and another track; (*liaison*)

"deviation requiring a one class speed reduction" means any measured deviation that exceeds the limits of the current class of track but does not exceed the limits of the class of track that is one class below the current class of track; *(écart nécessitant une limitation de vitesse correspondant à une catégorie de voie inférieure)*

"deviation requiring a two class speed reduction" means any measured deviation that exceeds both the limits of the current class of track and the limits of the class of track that is one class below the current class of track; *(écart nécessitant une limitation de vitesse correspondant à deux catégories de voie inférieures)*

"inactive track" means a track used less than once per month and secured in a manner that will prevent use by train or movements; (*voie inactive*)

"key route" is as defined in the *Rules Respecting Key Trains and Key Routes;* (*itinéraire clé*)

"line of track" or "track" means a railway of any length including yard tracks, sidings, spurs and other tracks auxiliary thereto, and including the right-of-way and the structures supporting or protecting the track or facilitating drainage from the track; (*voie*)"

"movement(s)" the term used in these Rules to indicate that the rule is applicable to trains, equipment, transfers or engines in yard service; (*mouvement(s)*)

"occupied passenger train" means a train consisting of one or more passenger cars that is transporting passenger(s) in revenue service *(train transportant des voyageurs)*

"quality assurance (QA)" means a systemic set of activities carried out by QA personnel to verify that the work is done in accordance with the

railway company's standards and procedures, and in compliance with the TSR; (*assurance de la qualité*).

"QA personnel" is a track inspector, track supervisor or a professional engineer, who is not directly involved in performing the maintenance and repair work; (*member du personnel responsible de l'AQ*);

"railway company" means a railway company that is under the jurisdiction of the *Railway Safety Act*; (*compagnie de chemin de fer)*

"railway company track standards" means technical documents developed by a railway company relevant to the inspection, maintenance and repair work of railway track to ensure safe train operations *(normes de la voie de la compagnie)*

"railway crossing" means the crossing of two tracks; (*traversée*)

"repeat geometry defect" means the occurrence of a geometry-related defect, identified by a Heavy Geometry Inspection Vehicle, that is located within 0.01 mile of the same type of geometry-related defect identified during last inspection by a Heavy Geometry Inspection Vehicle. Geometry-related defect means track condition exceeding the thresholds under Part II Subpart C. (*défaut de géométrie de voie répété)*

"siding," means a track adjacent and connected to the main track, which is so designated in the timetable, GBO or operating bulletin; (*voie d'évitement*)

"track inspector" means a person certified in this capacity in accordance with Part I, subsections 7.1 to 7.5; (*inspecteur de la voie*)

"track supervisor" means a person certified in this capacity in accordance with Part I, subsections 7.1 to 7.5; (*superviseur de la voie*)

"yard" means a system of non-main tracks, utilized to switch equipment and for other purposes over which movements may operate subject to prescribed signals, rules and special instructions; (*triage*)

"yard track" means a track unclassified or classified as category 1, 2, 3 or 4 for inspection purposes (*voie de triage*).

3. SCOPE

3.1 These Rules prescribe minimum safety requirements for federally regulated standard gauge railway track.

3.2 The Rules specify the limits of certain track conditions existing in isolation. A combination of track conditions, none of which individually amounts to a deviation from the requirements in these Rules may require remedial action to provide for safe operations over the track.

3.3 A railway may adopt additional or more stringent requirements than those contained in these Rules.

4. APPLICATION

4.1 These Rules apply to all federally regulated railway companies operating on standard gauge track.

4.2 The purpose of these Rules is to ensure the safe operation of movements on standard gauge track owned by, operated on or used by a railway company.

4.3 A railway company wishing to operate movements at speeds greater than Class 5 track must have a plan approved by the Minister.

5. EXCEPTED TRACK

5.1 A railway company may designate a segment of track as Excepted Track provided that:

(a) The segment is identified in the timetable, special instructions, general order, or other appropriate records that are available for inspection during regular business hours;

(b) The identified segment is not located within 30 feet (9.144 m) of an adjacent track which can be subjected to simultaneous use at speeds in excess of 10 miles per hour;

(c) The identified segment is inspected in accordance with the frequency specified for Class 1 track;

(d) The identified segment of track is not located on a bridge including the track approaching the bridge for 100 feet (30.480 m) on either side, or located on a public street or highway;

(e) The railway conducts operations on the identified segment under the following conditions:

(i) no movements shall be operated at speeds in excess of 10 miles per hour, and
(ii) no occupied passenger train nor movements carrying dangerous goods shall be operated, and
(iii) the railway company shall advise Transport Canada within 10 days of designating a segment of track as “excepted

track".

(iv) The gauge on excepted track shall not be more than 58 1/4".

(v) When a railway company designates a segment of track as "excepted track", operations may continue over that segment of track without complying with the provisions of Subparts B, C, and D of Part II of the TSR.

(vi) The railway company shall advise Transport Canada prior to removing the status of "excepted track."

(vii) On an annual basis, track designated as "excepted track" must be re-evaluated by the railway company and a risk assessment report indicating that the track is safe for operations shall be provided to Transport Canada. The status of the track must also be confirmed in the report.

6. RESPONSIBILITY OF THE RAILWAY COMPANY

6.1 The railway company shall ensure that track inspections are undertaken at such frequency and by such a method as to ensure the line of track is compliant with the TSR and is safe for all movements at the authorized speed.

6.2 Where a line of track is not in compliance with the requirements of these Rules, the railway company shall immediately:

(a) Bring the line of track into compliance; or
(b) Halt operations over that line of track.

6.3 Notwithstanding subsection 6.2, in the case of Class 1 track that is not in compliance with these Rules, the railway company may operate on that line of track under the authority of a track supervisor for not more than 30 days. Subsection 6.3 does not apply where defective rails are involved. Part II, Subpart D section III (Defective Rails) of the TSR exclusively governs further operations over defective rails.

6.4 When any person, including a contractor for a railway company, performs any function required by these Rules, that person is required to perform that function in accordance with these Rules.

7. KNOWLEDGE, QUALIFICATIONS AND CERTIFICATION

A. Track Inspectors and Track Supervisors

7.1 Each railway company shall ensure that track inspectors and track supervisors are qualified and certified to inspect track for defects or

supervise restoration or renewal of track under traffic conditions; and must develop and adhere to a documented certification process that demonstrates such qualification and certification. This certification process shall be made available upon request to Transport Canada.

7.2 Each railway company shall ensure that the certification process for track inspectors and track supervisors contains:

(a) minimum training requirements;
(b) requirements for minimum experience in railway track inspection and maintenance; and
(c) a process for demonstrating competency.

7.3 Each railway company shall ensure that track inspectors and track supervisors:

(a) know and understand the requirements of the TSR;
(b) know and understand the railway company's requirements, including procedures, and standards for track inspection and maintenance;
(c) can detect deviations from those requirements; and
(d) can prescribe appropriate remedial action to correct or safely compensate for those deviations.

7.4 Recertification of track inspectors and track supervisors must be completed at intervals not exceeding three years.

7.5 For each certified track inspector and each certified track supervisor, the railway company shall issue a certificate demonstrating that it is satisfied that each track inspector and track supervisor is qualified and certified.

7.6 A railway company shall maintain a record of each certificate issued and of each person who has been certified as track inspector or track supervisor. Records shall be made available, upon request, to Transport Canada.

7.7 If during a period of restoration or renewal, track is under traffic conditions and does not meet all of the requirements prescribed in these Rules, the work on the track shall be under the continuous supervision of a person certified as a track supervisor and subject to any limiting conditions specified by such a person.

(a) The term "continuous supervision" as used in this section means the physical presence of that person at a job site. However, since the work may be performed over a large area and it may not be possible for that person to visually supervise each segment of the work, in this case the person must be present at the job site, in direct control of the work and have direct knowledge of the

condition of the track over which they permit movements to pass.

(b) When the designated person leaves the work site and before movements are authorized to operate over the affected segment, the track must be in compliance with the TSR.

B. Track Maintenance and Repair Work

7.8 Each railway company shall ensure that persons performing maintenance and repair work have:

a) knowledge of the relevant company standards and procedures for the work they are performing; and
b) skills and abilities to perform the work.

C. A Person Authorizing Movements to Pass Over a Broken Rail

7.9 Each railway company shall ensure that a person authorizing movements to pass over a broken rail is qualified and certified:

(a) to identify rail end mismatch, rail defects, condition of track ties, track surface, gauge and alignment defects; and
(b) on the requirements of Part II, Subpart D section III (a) (2) of the TSR.

7.10 Each railway company must develop and adhere to a documented certification process that demonstrates such qualification and certification that contains:

(a) minimum training requirements;
(b) requirements for minimum experience in railway track maintenance, signal or train operations experience; and
(c) a process for demonstrating competency.

This certification process shall be made available, upon request, to Transport Canada.

7.11 Recertification must be completed at intervals not exceeding three years.

7.12 For each person certified to authorize movements to pass over a broken rail, the railway company shall:

(a) issue a certificate demonstrating that it is satisfied that each person is qualified and certified; and
(b) maintain a record of each certificate issued and of each person who has been certified. Records shall be made available, upon request, to Transport

Canada.

8. MEASURING TRACK NOT UNDER LOAD

8.1 When unloaded track is measured to determine compliance with requirements of these Rules, the amount of rail movement which occurs while the track is loaded must be added to the measurements of the unloaded track.

9. TRACK MAINTENANCE AND REPAIR WORK

9.1 Track maintenance and repair work must be performed in accordance with the railway company's standards and procedures. Track must be compliant with the TSR after the work is performed.

9.2 Each railway company must identify and maintain a list of safety critical maintenance and repair activities. Railway companies must consider, as a minimum, the following in determining what constitutes a safety critical maintenance and repair activity:

i. derailment risk, if the work is not performed in accordance with railway company standards and procedures, and
ii. track related derailment occurrences.

Such list shall be made available to Transport Canada upon request.

9.3 For railway companies with a key route or track over which trains operate at Class 3 speed or higher, the list of safety critical maintenance and repair activities under item 9.2 and any subsequent revision to the list must be approved by a professional engineer.

9.4 QA must be conducted by QA personnel for safety critical maintenance and repair activities.

9.5 Railway companies must establish and adhere to time limits for performing and documenting the QA. Such time limits shall be made available to Transport Canada upon request. For railway companies with a key route or track over which trains operate at Class 3 speed or higher, such time limits must be approved by a professional engineer.

9.6 Railway companies must maintain records, for a minimum of 1 year, to demonstrate that the requirements of items 9.4 and 9.5 above are being adhered to.

10. RAILWAY COMPANY TRACK STANDARDS FOR INSPECTION, MAINTENANCE AND REPAIR WORK

10.1 Each railway company must have documented railway company track standards.

10.2 Upon request, a railway company must file its railway company track standards with Transport Canada in an electronic searchable format.

11. KEY TRACK PERFORMANCE INDICATORS

11.1 A railway company must calculate, for each subdivision with key routes, the following key track performance indicators:

(a) Repeat geometry defect: number of repeat geometry defects per mile for each calendar year;

(b) Multi class drop geometry defects: number of deviations requiring a two-class speed reduction per mile, identified by a Heavy Geometry Inspection Vehicle, in each calendar year.

11.2 The key track performance indicators referenced in 11.1 above, for each calendar year, must be reported to Transport Canada by January 30th of the subsequent calendar year.

PART II - TRACK SAFETY RULES

A. CLASSES OF TRACK: Operating Speed Limits

The following maximum allowable operating speeds apply: (in miles per hour)

Maximum allowable operating speeds

Over track that meets all of the requirements prescribed in this part for-	The maximum allowable operating speed for freight trains is -	The maximum allowable operating speed for passenger trains is -
Class 1 track	10	15
Class 2 track	25	30
Class 3 track	40	60
Class 4 track	60	80
Class 5 track	80	95*

* For LRC Trains, 100 mph

B. ROADBED

I. Drainage

Each drainage or other water carrying facility under or immediately adjacent to the roadbed must be maintained and kept free of obstruction, to accommodate expected water flow for the area concerned.

II. Vegetation

Vegetation on railway property which is on or immediately adjacent to roadbed must be controlled so that it does not:

(a) become a fire hazard to track-carrying structures;
(b) obstruct visibility of railway signs and signals;
(c) interfere with railway employees performing normal track side duties;
(d) prevent proper functioning of signal and communication lines; or
(e) prevent railway employees from visually inspecting moving equipment from their normal duty stations.

C. TRACK GEOMETRY

1. Scope

This subpart prescribes minimum requirements for the gauge, alignment, and surface of track and the elevation of the outer rails and speed limitations for curved track.

2. Gauge

2.1 Gauge is measured between the heads of the rails at right angles to the rails in a plane 5/8 inch below the top of the rail head.

2.2 Standard gauge is 56 ½ inches.

2.3 Gauge must be within the limits prescribed in the following table:

Class of track	The gauge must be at least	But not more than
Excepted track	N/A	58 1/4"
1	55 3/4"	58"
2	55 3/4"	57 ¾"
3	56"	57 ¾"
4 and 5	56"	57 ½"
Yard Track Category 1 & Category 2	55 ¾"	57 ¾"
Yard Track Category 3 & Category 4	55 ¾"	58"

2.4 Variation in Gauge

When the gauge is less than 56 inches and the change in gauge over a distance of 20 feet (6.096 m) or less on either side of the defective location exceeds 1 ½ inches, train speed must be reduced according to Class 1 track speed.

3. Track Alignment

Alignment may not deviate from uniformity more than the amount prescribed in the following table:

Class of Track	Tangent Track	Curved Track	
	The deviation of the mid-offset from a 62-foot line[1] may not be more than-	The deviation of the mid-ordinate from a 31-foot chord[2] may not be more than-	The deviation of the mid-ordinate from a 62-foot chord[2] may not be more than-
1	5"	N/A[3]	5"
2	3"	N/A[3]	3"
3	1 3/4"	1 1/4"	1 3/4"
4	1 1/2"	1"	1 1/2"
5	3/4"	1/2"	5/8"

[1] The ends of the line must be at points on the gauge side of the line rail, 5/8 inch below the top of the railhead. Either rail may be used as the line rail; however, the same rail must be used for the full length of that tangential segment of track.

[2] The ends of the chord must be at points on the gauge side of the outer rail, 5/8 inch below the top of the railhead.

[3] N/A – Not Applicable

4. Curves: Elevation and Speed Limitations

4.1 The maximum cross level on the outside rail of a curve may not be more than 7 inches on any track. Curves exceeding 6 inches cross level must be monitored and have a remedial action plan to bring it back to 6 inches or less cross level. The outside rail of a curve may not be lower than the inside rail, except as per table in Part II, Subpart C section 6 Track Surface.

4.2 The maximum allowable operating speed for each curve is determined by the following formula:

$$V\,max = \sqrt{(Ea + 3)/0.0007d}$$

where:

Vmax = Maximum allowable operating speed (miles per hour)

Ea = Actual elevation of the outside rail (inches)[1]

d = Degree of curvature (degrees)[2]

a) For the purpose of calculating Vmax only, actual elevation for each 155 foot track segment in the body of the curve is determined by averaging the elevation for 10 points through the segment at 15.5-foot spacing. If the curve length is less than 155 ft, average the points through the full length of the body of the curve.
b) Degree of curvature is determined by averaging the degree of curvature over the same track segment as the elevation.

Below is a table of maximum allowable operating speed computed in accordance with this formula for various elevations and degrees of curvature.

Degree of Curvature	Three-Inch Unbalance												
	Elevation in Inches												
	0	1/2	1	1 ½	2	2 ½	3	3 ½	4	4 ½	5	5 ½	6
	Maximum allowable operating speed (m.p.h.)												
0° 30'	93	100	107	113	120	125	131	136	141	146	151	156	160
1° 00'	66	71	76	80	85	89	93	96	100	104	107	110	113
1° 15'	59	63	68	72	76	79	83	86	89	93	96	99	101
1° 30'	54	58	62	66	69	72	76	79	82	85	87	90	93
1° 45'	50	54	57	61	64	67	70	73	76	78	81	83	86
2° 00'	46	50	54	57	60	63	66	68	71	73	76	78	80
2° 15'	44	47	50	54	56	59	62	64	67	69	71	74	76
2° 30'	41	45	48	51	54	56	59	61	63	66	68	70	72
2° 45'	40	43	46	48	51	54	56	58	60	62	65	66	68
3° 00'	38	41	44	46	49	51	54	56	58	60	62	64	66
3° 15'	36	39	42	45	47	49	51	54	56	57	59	61	63
3° 30'	35	38	40	43	45	47	50	52	54	55	57	59	61
3° 45'	34	37	39	41	44	46	48	50	52	54	55	57	59
4° 00'	33	35	38	40	42	44	46	48	50	52	54	55	57
4° 30'	31	33	36	38	40	42	44	45	47	49	50	52	54
5° 00'	29	32	34	36	38	40	41	43	45	46	48	49	51
5° 30'	28	30	32	34	36	38	40	41	43	44	46	47	48
6° 00'	27	29	31	33	35	36	38	39	41	42	44	45	46
6° 30'	26	28	30	31	33	35	36	38	39	41	42	43	45
7° 00'	25	27	29	30	32	34	35	36	38	39	40	42	43
8° 00'	23	25	27	28	30	31	33	34	35	37	38	39	40
9° 00'	22	24	25	27	28	30	31	32	33	35	36	37	38
10° 00'	21	22	24	25	27	28	29	31	32	33	34	35	36
11° 00'	20	21	23	24	26	27	28	29	30	31	32	33	34
12° 00'	19	20	22	23	24	26	27	28	29	30	31	32	33

4.3 A track owner or a railway company may request approval from Transport Canada to operate specified railway equipment at a level of cant deficiency greater than 3 inches.

5. Elevation of Curved Track: Runoff

5.1 If a curve is elevated, the full elevation must be provided throughout the curve, unless physical conditions do not permit. If elevation runoff occurs in a curve, the actual minimum elevation must be used in computing the maximum allowable operating speed for that curve under 4.2.

5.2 Elevation runoff must be at a uniform rate, within the limits of track surface deviation prescribed in Part II, Subpart C section 6 and it must extend at least the full length of the spirals. If physical conditions do not permit a spiral long enough to accommodate the minimum length of runoff, part of the runoff may be on tangent track.

6. Track Surface

6.1 Each owner of the track to which this part applies shall maintain the surface of its track within the limits prescribed in the following table:

Track Surface	Class of Track				
	1	**2**	**3**	**4**	**5**
The runoff in any 31 ft of rail at the end of the raise may not be more than	3 ½"	3"	2"	1 ½"	1"
The deviation from uniform profile on either rail at the mid-ordinate of a 62 foot chord may not be more than	3"	2 ¾"	2 ¼"	2"	1 ¼"
The difference in cross level between any two points less than 31 ft apart on spirals may not be more than	2"	1 ¾"	1 ¼"	1"	¾"
The deviation from zero cross level at any point on tangent track or reverse cross level elevation on non tangent track may not be more than	3"	2"	1 ¾"	1 ¼"	1"
The difference in cross level between any two points less than 62 ft apart may not be more than	3"	2 ¼"	2"	1 ¾	1 ½"

6.2 To control harmonics on Class 2 through 5 jointed track with staggered joints, the cross level differences shall not exceed 1 ¼ inches in all of six consecutive pairs of joints, as created by 7 low joints. Track with joints staggered less than 10 feet (3.048 m) shall not be considered as having staggered joints. Joints within the 7 low joints outside of the regular joint spacing shall not be considered as joints for purposes of this subsection. For 79 or 80 foot long rails, this subsection is not applicable.

7. Remedial Action for Measurements by Electronic Geometry Inspection Vehicle

7.1 When a track geometry-related defect is detected during an electronic geometry inspection and communicated to the track supervisor prior to the next train movement:

a) For any deviation requiring a two class speed reduction, the railway company must immediately, upon notification to the track supervisor, comply with Part I, Subsection 6.2.

b) For any deviation requiring a one class speed reduction, the railway company may, for a period of seventy-two (72) hours after the inspection, use linear interpolation to determine the speed of the temporary slow order initiated to protect the defect. Records of slow orders imposed or reason for not imposing one must be maintained. Upon the expiration of the seventy-two (72) hours period, if the track defect has not been repaired, the slow order speed(s) must be revised to those of the next lower track Class.

7.2 When a track geometry-related defect is detected during an electronic geometry inspection and not communicated to the track supervisor prior to the next train movement:

a) Notwithstanding Part I Subsection 6.2, the railway company must ensure that the track supervisor is notified of track geometry-related defect, within 48 hours of the electronic geometry inspection vehicle inspecting the track.

b) For any deviation requiring a two class speed reduction, the railway company must immediately, upon notification to the track supervisor, comply with Part I, Subsection 6.2.

c) Notwithstanding Part I Subsection 6.2, for any deviation requiring a one class speed reduction, the railway company must within twenty-four (24) hours of notification to the track supervisor, bring the line of track into compliance.

8. Track Geometry Management Plan

8.1 Each railway company must develop and adhere to a Track Geometry Management Plan that:

a) defines a combination of track geometry conditions including:

(i) Maximum spacing;
(ii) Combinations of track geometry conditions, which should include as a minimum:
    1) For railway companies transporting covered hopper cars: Lateral alignment and deviation from uniform profile
    2) For railway companies transporting tank cars: Lateral alignment and rate of change for cross level
(iii) Thresholds for the combinations of track geometry conditions, which must be lower than single defect thresholds as defined in Subpart C – Track Geometry; and
(iv) Requirements for remedial action(s) to be taken if the combination(s) of track geometry conditions exceeds thresholds as defined in the Track Geometry Management Plan.

b) Includes instructions for monitoring and taking appropriate measures for track geometry conditions approaching the limits prescribed under Part II Subpart C Sections 2, 3, and 6, at a minimum for key routes or tracks over which trains operate at Class 3 speed or higher.

8.2 Each railway company with a key route or track over which trains operate at Class 3 speed or higher must have the Track Geometry Management Plan approved by a professional engineer.

8.3 Each railway company must file a copy of their Track Geometry Management Plan with Transport Canada. Any subsequent revisions to the plan must be filed with Transport Canada before the revisions become effective.

8.4 Each railway company must maintain records, for a minimum of 1 year, to demonstrate that the requirements of the Track Geometry Management Plan are being adhered to.

D. TRACK STRUCTURE

Scope: This subpart prescribes minimum requirements for ballast, crosstie, track assembly fittings, and the physical condition of rails.

I. Ballast: General

Unless it is otherwise structurally supported, all track must be supported by material which will:

(a) transmit and distribute the load of the track and railroad rolling equipment to the subgrade;

(b) restrain the track laterally, longitudinally, and vertically under dynamic loads imposed by railway rolling equipment and thermal stress exerted by the rails;

(c) provide adequate drainage for the track; and

(d) maintain proper track cross-level, surface, and alignment.

II. Crossties

(a) Crossties shall be made of a material to which rail can be securely fastened.

(b) Each 39 foot segment of track shall have:

(1) a sufficient number of crossties which in combination provide effective support that will:

(i) hold gauge within the limits prescribed in C. 2.3;
(ii) maintain surface within the limits prescribed in C. 6; and
(iii) maintain alignment within the limits prescribed in C. 3.

(2) the minimum number and type of crossties specified in paragraph(c) of this section effectively distributed to support the entire segment; and

(3) At least one crosstie of the type specified in paragraph (c) of this section that is located at a joint location as specified in paragraph(d) of this section.

(c) Each 39 foot segment of track shall have the minimum number of crossties as indicated in the following table:

Track Class	Tangent track, turnouts and curves	
	Tangent track and curved track less than or equal to 2 degrees	Turnouts and curved track greater than 2 degrees
Class 1	5	6
Class 2	8	9
Class 3	8	10
Class 4 and 5	12	14

(c.1) Notwithstanding (c) above, until May 31, 2024, for crossties other than concrete, each 39 foot segment of:

1) Class 1 track shall have five crossties;
2) Class 2 track shall have eight crossties;
3) Class 3 track shall have 10 crossties; and
4) Classes 4 and 5 track shall have 12 crossties

(d) Crossties, other than concrete, counted to satisfy the requirements of item (c) of this section shall not be:

(1) broken through;

(2) split or otherwise impaired to the extent the crossties will allow the ballast to work through, or will not hold spikes or rail fasteners;

(3) so deteriorated that the tie plate or base of rail can move laterally more than 1/2 inch relative to the crossties; or

(4) cut by the tie plate through more than 40 percent of a tie's thickness.

(e) Concrete crossties counted to satisfy the requirements of item (c) of this section shall not be:

(1) Broken through or deteriorated to the extent that the stressing tendon material is visible;

(2) So deteriorated or broken off in the vicinity of the shoulder or insert so that the fastener assembly can either pull out or move laterally more than 3/8 inch relative to the crosstie;

(3) So deteriorated that the base of either rail can move laterally more than 3/8 inch relative to the crosstie on curves of 2 degrees or

greater; or can move laterally more than 1/2 inch relative to the crosstie on tangent track or curves of less than 2 degrees;

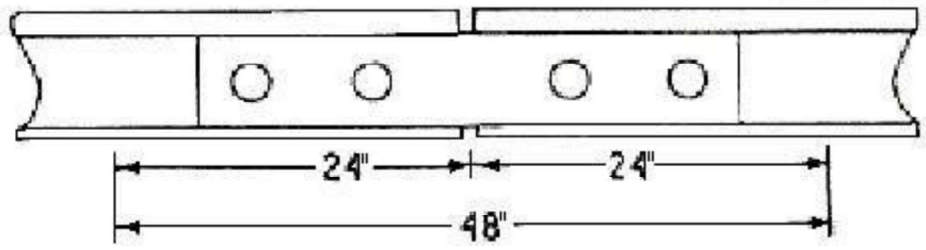
(4) So deteriorated or abraded at any point under the rail seat to a depth of 1/2 inch or more;

(5) So deteriorated such that the crosstie's fastening or anchoring system, including rail anchors is unable to maintain longitudinal rail restraint, or maintain rail hold down, or maintain gauge due to insufficient fastener toeload; or

(6) Configured with less than two fasteners on the same rail except where fastener placement impedes insulated joints from performing as intended, the fastener may be modified or removed, provided that the crosstie supports the rail.

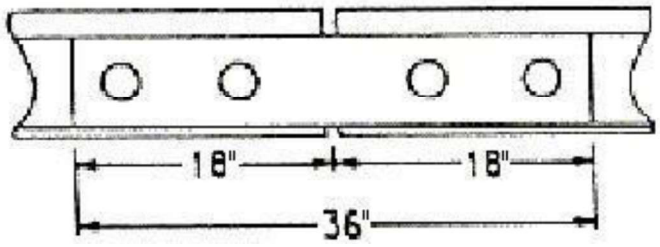
(f) Class 1 and Class 2 track shall have one crosstie whose centerline is within 24 inches of the rail joint location, and Classes 3 through 5 track shall have one crosstie whose centerline is within 18 inches of the rail joint location. The relative position of these ties is described in the following diagram:

Classes 1 through 2



Each rail joint in Classes 1 and 2 track shall be supported by at least one crosstie in paragraph (c) of this section whose centerline is within the 48 inches shown above.

Classes 3 through 5



Each rail joint in Class 3 through 5 track shall be supported by at least one crosstie specified in paragraph (c) of this section whose centerline is within 36 inches shown above.

III. Defective Rails

(a) When a rail in track contains any of the defects listed in the following table, operation over the defective rail is not permitted until:

(1) the rail is replaced or repaired; or

(2) the remedial action prescribed in the table is initiated:

REMEDIAL ACTION

Defect	Length of Defect (inch)		Percent of Rail Head Cross-Sectional Area Weakened by Defect		If Defective Rail is not Replaced, Take this Remedial Action Prescribed in Note
	More than	But not more than	Less than	But not less than	
Transverse fissure			20		B
			100	20	B
				100	A
Compound fissure			20		B
			100	20	B
				100	A
Detail fracture Engine burn fracture Defective weld			20		C
			100	20	D
				100	A or E and H
Horizontal split head Vertical split head	0	2			H and F
	2	4			I and G
	4				B
	([1])	([1])			A
Split web Piped rail Head web separation	0	½			H and F
	½	3			I and G
	3				B
	([1])	([1])			A
Bolt hole crack	0	½			H and F
	½	1½			G
	1½				B
	([1])	([1])			A
Broken base	0	6			E
	6				A or E and I
Ordinary break					A or E
Damaged rail					C

(1) Break out in rail head.

Notes:

A.* Assigned person to visually supervise each operation over defective rail.

B. Limit operating speed over defective rail to that as authorized by the track supervisor or other supervisory personnel.

C. Apply joint bars bolted only through the outermost holes to defect within 20 days after it is determined to continue the track in use. In the case of Classes 3 through 5 track, limit operating speed over the defective rail to 30 mph until angle bars are applied; thereafter limit speed to 60 mph or the maximum allowable speed under Subpart A Classes of Track: Operating Speed Limits for the class of track concerned, whichever is lower.

D. Apply joint bars bolted only through the outermost holes to defect within 10 days after it is determined to continue the track in use. In the case of Classes 3 through 5 track, limit operating speed over the defective rail to 30 mph or less as authorized by a track supervisor or other supervisory personnel until angle bars are applied; thereafter limit speed to 60 mph or the maximum allowable speed under Subpart A Classes of Track: Operating Speed Limits for the class of track concerned, whichever is lower.

E. Apply joint bars to defect and bolt in accordance with V (d) and (e).

F. Inspect rail 90 days after it is determined to continue the track in use.

G. Inspect rail 30 days after it is determined to continue the track in use.

H. Limit operating speed over defective rail to 60 mph or the maximum allowable speed under Subpart A, Classes of Track: Operating Speed Limits for the class of track concerned, whichever is lower.

I. Limit operating speed over defective rail to 30 mph or the maximum allowable speed under Subpart A, Class of Track: Operating Speed Limits, for the class of track concerned, whichever is lower.

* Where there is an ordinary break; or a complete break in which there is a sign of a transverse fissure or compound fissure or defective weld, movements over these rail breaks may take place under the following conditions:

(1) All persons performing these duties have been properly trained.

(2) Unsupervised movement over a rail break can only be performed where the rail break is at a significant distance from a location where a person's vehicle can be stored, for example, where there is no other track, grade crossings or other road nearby, or access on foot is impeded by adverse weather conditions such as snow, ice or cold temperatures. In addition, unsupervised movement over rail break must also comply with the requirements of following items: (1) and (3) to (9).

(3) Movements must not be permitted to operate over the rail break when any of the following conditions exist:

(a) the rail break is in a tunnel or on an open deck bridge;

(b) the rail break is within 150 m of an unanchored open deck bridge;

(c) the ties on either side of the break are defective, crushed, or split in the tie plate area;

(d) cracks are observed radiating from the broken rail ends;

(e) the rail break occurs in an area of unstable grade;

(f) the offset (overhang) is greater than 2 inches (50 mm);

(g) the gap is greater than 3½ inches (89) mm;

(h) in the case of a joint area, the break extends beyond the limits of the joint bar; or

(i) the rail break occurs in an area in which the engineer in charge has specified that movements over rail breaks are not permitted.

(4) Where joint bars are installed with at least one bolt through the centre of the rail break, movements may operate over the rail break at a speed not exceeding 10 miles per hour.

(5) Where the rail break is not on a ballast deck bridge and the gap size is too small to allow for the installation of joint bars with one bolt through the centre of the rail break (i.e. less than 1 1/8 inches), movements may operate over the rail break at a speed not exceeding 5 miles per hour.

(6) The condition of the rail break, splice bars, and supporting ties, must be inspected prior to each movement over the break.

(7) Speed restrictions must be applied in accordance with the applicable operating rules.

(8) Records of these rail breaks must be kept for a period of at least 1 year including:

(a) the mileage and subdivision where each rail break occurred;

(b) the measured gap and offset at the rail break; and

(c) the type of rail defect.

(9) Repairs must be completed within 24 hours from the time that the defect is first inspected.

(b) As used in this section:

(1) "Transverse Fissure" means a progressive crosswise fracture starting from a crystalline centre or nucleus inside the head from which it spreads outward as a smooth, bright, or dark, round or oval surface substantially at a right angle to the length of the rail. The distinguishing features of a transverse fissure from other types of fractures or defects are the crystalline centre or nucleus and the nearly smooth surface of the development which surrounds it.

(2) "Compound Fissure" means a progressive fracture originating in a horizontal split head which turns up or down in the head of the rail as a smooth, bright, or dark surface progressing until substantially at a right angle to the length of the rail. Compound fissures require examination of both faces of the fracture to locate the horizontal split head from which they originate.

(3) "Horizontal Split Head" means a horizontal progressive defect originating inside of the rail head, usually one quarter inch or more below the running surface and progressing horizontally in all directions, and generally accompanied by a flat spot on the running surface. The defect appears as a crack lengthwise of the rail when it reaches the side of the rail head.

(4) "Vertical Split Head" means a vertical split through or near the middle of the head, and extending into or through it. A crack or rust streak may show under the head close to the web or pieces may be split off the side of the head.

(5) "Split Web" means a lengthwise crack along the side of the web and extending into or through it.

(6) “Piped Rail" means a vertical split in a rail, usually in the web, due to failure of the shrinkage cavity in the ingot to unite in rolling.

(7) "Broken Base" means any break in the base of a rail.

(8) " Detail Fracture" means a progressive fracture originating at or near the surface of the rail head. These fractures should not be confused with transverse fissures, compound fissures, or other defects which have internal origins. Detail fractures may arise from shelly spots, head checks, or flaking.

(9) " Engine Burn Fracture" means a progressive fracture originating inspots where driving wheels have slipped on top of the rail head. In developing downward they frequently resemble the compound or even transverse fissures with which they should not be confused or classified.

(10) "Ordinary Break" means a partial or complete break in which there is no sign of a fissure, and in which none of the other defects described in this paragraph are found.

(11) "Damaged Rail" means any rail broken or injured by wrecks, broken, flat, or unbalanced wheels, slipping, or similar causes.

IV. Rail Surface Management

a) Rail Surface Management

i) Each railway company must develop and adhere to a Rail Surface Management Plan that:

1) Defines, as a minimum, the following rail surface conditions: crushed heads, flattened rail, corrugation, and rail end batter for which companies must inspect; and
2) Establishes acceptable limits for these conditions; methods to measure conditions and corrective action(s) to be taken when conditions approach and exceed the acceptable limits.

ii) Each railway company with a key route or track over which trains operate at Class 3 speed or higher must have the Rail Surface Management Plan approved by a professional engineer.

iii) Each railway company must file a copy of their Rail Surface Management Plan with Transport Canada. Any subsequent revisions to the plan must be filed with Transport Canada before the revisions become effective.

iv) Each railway company must maintain records, for a minimum of 1 year, to demonstrate that the requirements of the Rail Surface Management Plan are being adhered to.

b) Rail End Mismatch

Any mismatch of rails at joints may not be more than that prescribed by the following table:

Class of Track	On the top of the rail ends (inch)	On the gauge side of the rail ends (inch)
1	¼	¼
2	¼	3/16
3	3/16	3/16
4,5	1/8	1/8

V. Rail Joints

(a) Each rail joint, insulated joint, and compromise joint must be of the proper design and dimensions for the rail on which it is applied.

(b) If a joint bar on Classes 3 through 5 track is cracked, broken, or because of wear allows vertical movement of either rail when all bolts are tight, it must be replaced.

(c) If a joint bar is cracked or broken between the middle two bolt holes it must be replaced.

(d) In the case of conventional jointed track, each rail must be bolted with at least two bolts at each joint in Classes 2 through 5 track, and with at least one bolt in Class 1 track.

(e) In the case of continuous welded rail track, each rail must be bolted with at least two bolts at each joint.

(f) Each joint bar must be held in position by track bolts tightened to allow the joint bar to firmly support the abutting rail ends and to allow longitudinal movement of the rail in the joint to accommodate expansion and contraction due to temperature variations. When out-of-face, no-slip, joint-to-rail contact exists by design, the requirements of this paragraph do not apply. Those locations are considered to be continuous welded rail track and must meet all the requirements for C continuous welded rail track prescribed in this part.

(g) No rail or angle bar having a torch cut or burned bolt hole may be used.

VI. Tie Plates

In Classes 3 through 5 track where timber crossties are in use there must be tie plates under the running rails on at least eight of any 10 consecutive ties.

VII. Rail Anchoring

A sufficient number of anchoring devices will be applied to provide adequate longitudinal restraint.

VIII. Rail Fastenings

Each 39 foot segment of rail shall have a sufficient number of fastenings to effectively maintain gauge within the limits prescribed in C. 2.

IX. Continuous Welded Rail (CWR)

a) Each railway company must develop and adhere to a CWR Management Plan that includes comprehensive installation, inspection and maintenance requirements;
b) Each railway company with CWR track on a key route or over which trains operate at Class 3 speed or higher must have the CWR Management Plan approved by a professional engineer.
c) Each railway company must file a copy of their CWR Management Plan with Transport Canada. Any subsequent revisions to the plan must be filed with Transport Canada before the revisions become effective.
d) Each railway company must maintain records, for a minimum of 1 year, to demonstrate that the requirements of the CWR Management Plan are being adhered to.

X. Rail Wear

a) Railway companies must develop and adhere to a Rail Wear Management Plan that includes rail wear limits for each section (weight) of rail in service and prescribes the action(s) to be taken when rail approaches or exceeds limits; and
b) Railway companies with a key route or track over which trains operate at Class 3 speed or higher must have the Rail Wear Management Plan approved by a professional engineer.
c) Railway companies must file a copy of the Rail Wear Management Plan with Transport Canada. Any subsequent revisions to the plan must be filed with Transport Canada before the revisions become effective.
d) Railway companies must maintain records, for a minimum of 1 year, to demonstrate that the requirements of the Rail Wear Management Plan are being adhered to.

XI. Turnouts and Track Crossings Generally

a) In turnouts and track crossings, the fastenings must be intact and maintained so as to keep the components securely in place. Also, each switch, frog, and guard rail must be kept free of obstructions that may interfere with the passage of wheels.

b) Classes 4 through 5 track must be equipped with rail anchors through and on each side of track crossings and turnouts, to restrain rail movements affecting the position of switch points and frogs.

c) Each flange way at turnouts and track crossings must be at least 1 ½ inches wide.

XII. Switches

(a) Each stock rail must be securely seated in switch plates, but care must be used to avoid canting the rail by over tightening the rail braces.

(b) Each switch point must fit its stock rail properly, with the switch stand in either of its closed positions to allow wheels to pass the switch point. Lateral and vertical movement of a stock rail in the switch plates or of a switch plate on a tie must not adversely affect the fit of the switch point to the stock rail.

(c) Each switch point be maintained so that the outer edge of the wheel tread cannot contact the gauge side of the stock rail.

(d) The heel of each switch rail must be secure and the bolts in each heel must be kept tight.

(e) Each switch stand and connecting rod must be securely fastened and operable without excessive lost motion.

(f) Each throw lever must be maintained so that it cannot be operated with the lock or keeper in place.

(g) Each switch position indicator must be clearly visible at all times.

(h) Unusually chipped or worn switch points must be repaired or replaced. Metal flow must be removed to insure proper closure.

XIII. Frogs

(a) The flange way depth measured from a plane across the wheel-bearing area of a frog on Class 1 track may not be less than 1 3/8 inches, or less than 1½ inches on Classes 2 through 5 track.

(b) If a frog point is chipped, broken, or worn more than five-eighths inch down and 6 inches back, operating speed over the frog may not be more than 10 miles per hour.

(c) If the tread portion of a frog casting is worn down more than three-eighths inch below the original contour, operating speed over that frog may not be more than 10 miles per hour.

(d) Where frogs are designed as flange-bearing, flange way depth may be less than that shown for Class 1 if operated at Class 1 speed.

XIV. Spring Rail Frogs

(a) The outer edge of a wheel tread may not contact the gauge side of a spring wing rail.

(b) The toe of each wing rail must be solidly tamped and fully and tightly bolted.

(c) Each frog with a bolt hole defect or head-web separation must be replaced.

(d) Each spring must have a tension sufficient to hold the wing rail against the point rail.

(e) The clearance between the hold-down housing and the horn may not be more than one-fourth of an inch.

XV. Self-Guarded Frogs

(a) The raised guard on a self-guarded frog may not be worn more than three-eighths of an inch.

(b) If repairs are made to a self-guarded frog without removing it from service, the guarding face must be restored before rebuilding the point.

XVI. Frog Guard Rails

The guard check in frogs must be within the limits prescribed in the

following table:

Class of Track	Guard check gauge - The distance between the gauge line of a frog to the guard line[1] of its guard rail or guarding face, measured across the track at right angles to the gauge line,[2] may not be less than -
1	4 feet 6 1/8 inches
2	4 feet 6 1/4 inches
3, 4	4 feet 6 3/8 inches
5	4 feet 6 1/2 inches [3]

Note:

[1] Line along that side of the flange way which is nearer to the centre of the track and at the same elevation as the gauge line.

[2] Line 5/8 inch below the top of the centerline of the head of the running rail, or corresponding location of the tread portion of the track structure.

[3] At points of heavy point frogs equipped with through gauge plates, 4' 6 3/8".

E. TRACK APPLIANCES AND TRACK-RELATED DEVICES

I. Scope

This Subpart prescribes minimum requirements for certain track appliances and track-related devices.

II. Derails

Each derail must be clearly visible. When in a locked position a derail must be free of any lost motion which would allow it to be operated without removing the lock.

Derails must be installed when there is any possibility of equipment that has been left standing on tracks other than main tracks or sidings being moved by gravity so as to obstruct a main track or siding.

F. INSPECTION

1. Scope

This subpart prescribes minimum requirements for the frequency and manner of inspecting track to detect deviations from the TSR.

1.1 All tracks Classes 1 through 5 must be inspected in accordance with the requirements as prescribed herein.

1.2 The minimum requirements for the frequency and manner of inspecting track over which movements are operated at speeds in excess of those permitted over Class 5 track must be filed with and approved by the Minister.

1.3 If the person making the inspection finds a deviation from the requirements of the TSR, that individual must immediately initiate remedial action.

1.4 Unless otherwise specified, the interpretation of designated minimum inspection frequency intervals are as follows:

Designated Inspection Frequency	Designated Inspection Frequency means
Twice weekly	A minimum of two inspections each week (Sunday to Saturday) and: • with no more than 3 days between days of inspection in a week, and • with no more than 3 days between the day of inspection in one week and the next day of inspection in the following week.
Weekly	A minimum of one inspection each week (Sunday to Saturday) and: • with no more than 10 days between days of inspection.
Twice monthly	A minimum of two inspections each month (between the 1st and last day of each month) and: • with no more than 20 days between days of inspection in a month, and • with no more than 20 days between the day of inspection in one month and the next day of inspection in the following month.
Monthly	A minimum of one inspection each month (between the 1st and the last day of each month) and: • with no more than 40 days between days of inspection.
Quarterly	A minimum of one inspection each quarter (January 1st to March 31st , April 1st to June 30th, July 1st to September 30th, October 1st to December 31st) and: • with no more than 100 days between days of inspection.
Three times annually	A minimum of one inspection each 4 months (January 1st to April 30th, May 1st to August 31st September 1st to December 31st) and: • with no more than 180 days between days of inspection .
Twice annually	A minimum of one inspection each 6 months (January 1st to June 30th, July 1st to December 31st) and: • with no more than 225 days between days of inspection.
Annually	One inspection each year (January 1st to December 31st) and: • with no more than 400 days between days of inspections.

2. Track – Inspections

2.1 General

A track inspector or track supervisor must undertake track inspections at such frequency and by such a method as to ensure the track is compliant with the TSR and is safe for all movements at the authorized speed.

2.2 Special Track Inspections

In the event of a fire, flood, severe storm or any other occurrence that may have damaged the track structure, a Special Track Inspection must be made of the track involved as soon as possible after the occurrence and, if possible, before the operation of any train and equipment movements.

2.3 Inactive Track Inspections

Inactive tracks must be secured in a manner that must prevent use by movements and must be inspected before being used to ensure the track is compliant and safe for all movements at the authorized speed.

2.4 Visual Track Inspections

(a) Unless otherwise specified, each Visual Track Inspection must be made on foot or by riding over the track in a vehicle at a speed that allows the person making the inspection to visually inspect and evaluate the track for compliance to the TSR.

(b) The speed of the vehicle must not be more than 5 mph when traversing railway crossings, turnouts or special trackwork.

(c) Mechanical, electrical and other track inspection devices may be used to supplement Visual Track Inspections.

(d) When inspecting track, an inspector may inspect up to two tracks at one time provided that:

(i) The inspector's visibility remains unobstructed by any cause and that the second track is not centered more than 30 ft (9.144m) from the track upon which the inspector is traversing.

(ii) Each track that requires weekly or more frequent inspection must be traversed by the vehicle or inspected on foot at least once every two weeks, and each siding and crossover must be traversed by the vehicle or inspected on foot at least once every month.

(e) All track except yard track and inactive track must be visually inspected at the minimum frequency specified in the following table:

Track

Designated Minimum Visual Track Inspection Frequency Table

Class of Track	Annual Tonnage (MGT)		
	< 5	**5 – 15**	**> 15**
Class 1	Monthly	Twice Monthly	Weekly
Class 2	Weekly	Twice Weekly	Twice Weekly
Class 3	Weekly	Twice Weekly	Twice Weekly
Class 4 & 5	Twice Weekly	Twice Weekly	Twice Weekly

And,

(i) In the case of Class 1 track where occupied passenger trains are operated, track must be inspected weekly or before the operation of an occupied passenger train if the track is used less than once per week.

(ii) In the case of Class 2 and 3 track~~,~~ where occupied passenger trains are operated, track must be inspected at least twice weekly or before the operation of an occupied passenger train.

2.5 Walking Track Inspection – General

(a) A Walking Track Inspection must allow the inspector a clear view of all track components including rail, ties, fasteners and ballast.

(b) Each railway company must develop and adhere to a process to:

(i) Assess and identify lines of track that require walking track inspection, and

(ii) Establish and adhere to the walking track inspection requirement for the identified lines of track.

(c) The railway company must provide the process referenced in paragraph (b) to Transport Canada upon request.

2.6 Walking Track Inspection – Jointed Tracks

(a) A Walking Track Inspection must be completed on all jointed tracks and must be capable of identifying the following defects:

(i) Cracked or broken joint bars; and

(ii) Loose, broken and missing bolts.

(b) If joint bars are inspected electronically, a Walking Track Inspection in jointed track territory is not required. The technology must be capable of identifying the defects listed in (a) above.

(c) A Walking Track Inspection for jointed track must be completed at the minimum frequency specified in the following table:

Track

Designated Minimum Walking Track Inspection Frequency for Jointed Tracks Table

Class of Track	**Annual Tonnage (MGT)**				
	< 5	**5 – 15**	**>15 – 35**	**>35 – 80**	**> 80**
Class 1	N/A	N/A	N/A	N/A	N/A
Class 2	Every 2nd year	Every 2nd year	Annually	Annually	Twice Annually
Class 3	Annually	Annually	Annually	Twice Annually	Three times annually
Class 4 & 5	Annually	Twice Annually	Twice Annually	Twice Annually	Three times annually

3. Track - Turnouts and Special Trackwork Inspections

3.1 General

A Special Trackwork includes railway crossings at grade, sliding joints, moveable point frogs, lift rail assemblies and other transition devices on moveable span bridges. Types of Turnout and Special Trackwork Inspections are as described below:

3.2 Routine Turnout and Special Trackwork Inspection

A Routine Turnout and Special Trackwork Inspection is an inspection to

assess general condition and identify defects on a Turnout or Special Trackwork each time they are traversed during a Visual Track Inspection.

3.3 Walking Turnout and Special Trackwork Inspection

A Walking Turnout and Special Trackwork Inspection is an inspection performed on foot to assess the general condition of a Turnout or Special Trackwork and must meet the minimum frequency shown in the following table except that a monthly Walking Turnout and Special Trackwork Inspection is not required in any month that a Detailed Turnout and Special Trackwork Inspection is completed.

Track

Designated Minimum Walking Turnout and Special Trackwork Inspection Frequency Table

Class of Track	**Annual Tonnage (MGT)**			
	< 5	**5 – 15**	**> 15 – 35**	**> 35**
Class 1	Quarterly	Monthly	Monthly	Monthly
Class 2	Monthly	Monthly	Monthly	Monthly
Class 3	Monthly	Monthly	Monthly	Monthly
Class 4 & 5	Monthly	Monthly	Monthly	Twice Monthly

3.4 Detailed Turnout and Special Trackwork Inspections

(a) A Detailed Turnout and Special Trackwork Inspection is an inspection performed on foot to assess the condition of turnout or special trackwork. Hand operated turnouts must be operated to all positions during this inspection. A Detailed Turnout and Special Trackwork Inspection must include the measuring and recording of the following specified items:

(i) Track gauge measurements 5 to 10 feet ahead of switch points, at the heel block, at the mid point of curved closure rail and at intervals throughout the diverging route behind the frog. *

(ii) Guard check gauge measurement.

(iii) Guard face gauge measurement.

(iv) Switch Point Rise where contact is evident (Vertical clearance between the Switch Point and Stock Rail).

(v) Heel Block assembly for surface and check bolts to confirm they are tight.

(vi) Cross level measurements at locations 15.5 feet apart on both routes throughout the turnout. *

* Measurements obtained at required locations with Track Geometry vehicles meet the requirement i.) and vi.).

(b) Each Turnout and Special Trackwork must receive a Detailed Turnout and Special Trackwork Inspection annually.

4. Track - Electronic Geometry Inspections

4.1 General

An Electronic Geometry Inspection Vehicle is an automated track inspection vehicle used to measure, calculate and record geometric parameters of the track. Two types of track geometry inspection vehicles defined below can be used to measure and evaluate track geometry.

(a) Light Geometry Inspection Vehicle (LGIV)

(i) A Light Geometry Inspection Vehicle (LGIV) must be capable of measuring:

1. Alignment / Curvature
2. Super elevation / Cross level
3. Gauge
4. Railway Track Safety Rule parameters calculated from these measurements

(ii) Track measurements obtained with these vehicles are considered static geometry measurements, as the vertical load applied to the track is limited to the weight of the vehicle. Allowances must be made for any condition that could result in a greater measurement when the track is under load.

(b) Heavy Geometry Inspection Vehicle (HGIV)

(i) A Heavy Geometry Inspection Vehicle (HGIV) must have a vertical wheel load of 10,000 pounds and be capable of measuring:

1. Surface / Longitudinal Profile
2. Alignment / Curvature
3. Super elevation / Cross level
4. Gauge
5. Railway Track Safety Rule parameters calculated from these measurements

(ii) Track measurements obtained with these vehicles are considered dynamic geometry measurements representative of the track in a loaded condition.

4.2 An Electronic Geometry Inspection of all track, except yard track and inactive track, must meet the minimum frequency shown in the following table:

Track

Designated Minimum Electronic Geometry Inspection Frequency Table

Class of Track	Annual Tonnage (MGT)				
	< 5	**5 – 15**	**> 15 – 35**	**> 35 – 80**	**> 80**
Class 1	N/A	LGIV – Twice Annually or HGIV – Annually	LGIV – Three times Annually or HGIV – Annually	LGIV – Three times Annually or HGIV – Annually	LGIV – Quarterly or HGIV Twice Annually
Class 2	LGIV – Twice Annually or HGIV – Annually	LGIV – Three times Annually or HGIV – Annually	LGIV – Three times Annually or HGIV Twice Annually	LGIV – Quarterly or HGIV Twice Annually	LGIV – Quarterly or HGIV Twice Annually
Class 3	HGIV – Annually	HGIV – Annually	HGIV – Twice Annually	HGIV – Three Times Annually	HGIV – Three Times Annually
Class 4	HGIV – Twice Annually	HGIV – Twice Annually	HGIV – Twice Annually	HGIV – Three Times Annually	HGIV – Three Times Annually
Class 5	HGIV – Twice Annually	HGIV – Twice Annually	HGIV – Twice Annually	HGIV – Three Times Annually	HGIV – Quarterly
Crossovers *	LGIV – Twice Annually or HGIV – Annually	LGIV – Twice Annually or HGIV – Annually	LGIV – Twice Annually or HGIV – Annually	LGIV – Twice Annually or HGIV – Annually	LGIV – Twice Annually or HGIV – Annually

* Track geometry inspection is not required on crossovers where track speed is 30 mph or less.

4.3 Missed Segment of Electronic Geometry Inspection

(a) If a portion of track cannot be inspected at the required interval, the railway must, before the expiration of time or tonnage limits:

(i) Inspect that segment of track with a light geometry inspection

vehicle and be governed by the results of that inspection or perform an additional visual inspection per week until the required track geometry inspection frequency can be met and, in the case of Class 3 to Class 5 track the next required track geometry inspection must be completed with a heavy geometry inspection vehicle, or

(ii) Reduce class of track to bring the track into compliance until such time as a valid track geometry inspection can be made.

(b) If a portion of a crossover cannot be inspected at the required interval, the railway company must, before the expiration of time or tonnage limits perform a detailed inspection of both turnouts and the track between.

4.4 Upon request by a Railway Safety Inspector, for the lines of track specified in the request, a railway company must provide, within 14 days, a report that summarizes and highlights the following information:

(a) the number of times the electronic geometry inspection vehicles have inspected the lines of track in the last 365 days or a lesser period of time specified in the request;

(b) the dates and corresponding electronic geometry inspection vehicle identifications for the inspections in the last 365 days or a lesser period of time specified in the request; and

(c) for each specific inspection date, the beginning and end mileages for any segments tested within the specified line of track.

5. Track - Rail Flaw Inspections

5.1 General

A Rail Flaw Inspection is a continuous search for internal rail defects.

5.2 (a) A Rail Flaw Inspection must be made of all rails at the minimum frequency shown in the following table except for yard track, inactive track or, in the case of new rail, if within 6 months of installation, it is ultrasonically inspected over its entire length and all defects are removed, the next continuous search for internal defects need not be made until the passage of 100 mgt or three years after the inspection, whichever occurs first.

Track

Designated Minimum Rail Flaw Inspection (RFI) Frequency Table

Class of Track	**Annual Tonnage (MGT)**				
	< 5	**5 – 15**	**>15 – 35**	**>35 - 80**	**>80**
Class 1	N/A	N/A	N/A	N/A	N/A
Class 2	Once every 2 years	Annually	Annually	Twice Annually	Three Times Annually
Class 3	Annually	Annually	Annually	Three Times Annually	Four Times Annually
Class 4	Annually	Twice Annually	Three times Annually	Four times Annually	Five Times Annually
Class 5	Annually	Twice Annually	Three times Annually	Five Times Annually	Five Times Annually

(b) In the case of Class 2 track where Passenger trains are operated, track must be inspected at least annually with a Rail Flaw detector.

(c) The maximum interval of days following the previous Rail Flaw Inspections is as follows:

Frequency	**Maximum number of days between inspections**	**Minimum number of rail flaw inspections in a calendar year**	**Minimum number of rail flaw inspections in winter period[1]**
Annually	500	1	N/A
Twice Annually	300	2	N/A
Three times Annually	250	3	1
Four times Annually	200	4	1
Five times Annually	175	5	2

[1] Winter period means November 15 to March 31.

5.3 For Class 2 track carrying 3 to 5 MGT annually, with less than 100 lbs rail weight and authorized car loading 263,000 lbs or greater, the rail must be tested at least annually with a rail flaw detector.

5.4 For Class 4 or 5 track, with 100 lbs rail weight and authorized car loading 286,000 lbs or greater, the rail must be tested twice annually with a rail flaw detector.

5.5 Rail in sidings and crossovers, where track speed is 25 mph or greater, the rail must be inspected annually.

5.6 Inspection equipment must be capable of detecting defects between joint bars in the area enclosed by joint bars.

5.7 Each defective rail must be marked and highly visible.

5.8 Missed Segment of Rail Flaw Inspection

(a) If the operator assigned to operate the rail defect detection equipment determines that, due to rail surface condition and or other reasons, a valid search for internal defects could not be made over a particular length of track, the test on that particular length of track cannot be considered as a search for internal defects under this section.

(b) If a valid search for internal defects cannot be conducted for reasons described in a), the railway company must, before the

expiration of time or tonnage limits

(i) Conduct a valid search for internal defects, or

(ii) Reduce class of track to bring the track into compliance until such time as a valid search for internal defects can be made, or

(iii) Remove the rail from service.

6. Yard Track - Inspections

6.1 General

(a) Maximum track speed on a yard track is 15 mph.

(b) A yard must be designated as classified or unclassified.

(c) Classified yard must be classified into one of the four categories. These categories must be based on frequency of track use, volume of traffic and risk associated with the movement of trains and equipment. Railway companies must classify the category for each track and when requested, must provide a copy to a Railway Safety Inspector. Categories for yard track must be based on the following criteria:

(i) Category 1
Heavily used tracks including:

- Through, bypass tracks and core routes.
- Lead tracks where movements are entering, leaving or travelling through a yard carrying more than 500 cars daily.

(ii) Category 2

- Locomotive main shop lead tracks
- Main hump lead tracks
- Switching yard leads

(iii) Category 3

Moderately used tracks including:

- Industrial leads
- Switching yard tracks and receiving and departure tracks which are used to yard or depart trains.
- Tracks carrying more than 100 cars daily.

(iv) Category 4

Lightly used tracks including:

- Storage Tracks
- Shop Tracks
- Service Tracks
- Industrial Tracks.

6.2 Visual Inspections

(a) Unclassified yard track must be inspected monthly

(b) All classified yard track must be visually inspected at the minimum frequency specified in the following table:

Yard Track

Designated Minimum Visual Inspection Frequency Table

Category	Type	Frequency
Category 1	Track	Twice monthly
Category 2	Track	Monthly
Category 3	Track	Quarterly
Category 4	Track	Twice annually

(c) Unclassified or classified yard track where occupied passenger trains are operated must be inspected weekly or before the operation of an occupied passenger train.

(d) In instances where a yard track cannot be physically traversed, a single track in Category 2, Category 3 or Category 4 may be inspected from a vehicle operated on an adjacent roadway provided the following conditions are met:

(i) The vehicle is operated by a person other than the inspector.

(ii) The operating speed must allow the inspector to identify defects.

(iii) The inspector's visibility remains unobstructed.

(iv) Any portion of track obstructed by equipment must be inspected on foot.

(v) The track being inspected is located within 30 feet (9.144

m) from the roadway.

(vi) If a track is inspected from an adjacent roadway, next required track inspection must be completed by operating the vehicle on track or by walking**.**

(e) A vehicle, such as an All Terrain Vehicle, straddling the track may be used to inspect yard tracks. This vehicle must be operated on the track being inspected at a speed that allows the inspector to identify defects.

7. Yard Track - Turnout Inspections

Walking Inspections

7.1 Walking yard turnouts inspection must meet the minimum frequency shown in the following table:

Yard Track

Designated Minimum Turnout Inspection Frequency Table

Category	Type	Frequency
Category 1	Turnouts	Twice Monthly
Category 2	Turnouts	Monthly
Category 3	Turnouts	Monthly
Category 4	Turnouts	Quarterly

And,

7.2 Detailed inspection of all yard track turnouts in yard track of Category 1 must be completed annually.

8. Yard Track - Electronic Geometry Inspections

8.1 All tracks in Category 1 must be inspected annually for deviation in gauge and crosslevel using a Light Track Geometry Inspection Vehicle or other such device capable of measuring recording and evaluating these geometry parameters. Track measurements obtained with these vehicles are considered static geometry measurements. Allowances must be made for any condition that could result in a greater measurement when the

track is under load.

9. Yard Track - Rail Flaw Inspections

9.1 A continuous search for internal rail defects must be completed annually in all rails of Category 1 yard track.

9.2 A continuous search for internal rail defects must be completed annually in rail lighter than 100 lbs in leads of Category 2 yard track.

9.3 If an inspection cannot be performed, the maximum speed must be limited to 10 mph.

10. Inspection Records

10.1 Each railway company to which these rules apply must keep a record of each inspection required to be performed under this subpart for one year after the inspection. Each railway must keep record of annual tonnage for each subdivision and when requested, provide the previous year's annual tonnage to a Railway Safety Inspector. These records must also be available at the local geographic engineering office in Canada.

10.2 Each record of an inspection under Part II, Subpart F sections 2, 3, 6 and 7 must be prepared on the day the inspection is made and signed by the person making the inspection. Records must specify the track or tracks inspected, the date of inspection, location and nature of any deviation from the requirements of TSR, and the remedial action taken by the person making the inspection. In the case of more than one track, track inspection records must indicate all track(s) included in the inspection and indicate which track(s) were traversed by the vehicle or inspected on foot.

10.3 Each record of an Inspection under Part II, Subpart F sections 4, 5, 8 and 9 must specify the date of inspection, the location and nature of any defects found, the remedial action taken and the date thereof, and the location of any segments of track not tested per Part II, Subpart F sections 4 and 5. The railway company must retain a rail inspection record for at least two years after the inspection and for one year after the defect is removed.

10.4 Notwithstanding TSR Part II Subpart F Subsection 10.2, where a railway company chooses to use electronic joint bar inspection to fulfill the requirements under TSR Part II Subpart F Subsection 2.6, each record of an Inspection must specify the date of inspection, the location and nature of any defects found, the remedial action taken and the date thereof.

10.5 For purposes of compliance with the requirements set out in subsections 10.1, 10.2, 10.3 and 10.4 above, the railway company may retain records in an electronic system provided that:

(a) The electronic system is designed so that the integrity of each electronic record is maintained through the application of security measures, including means, to uniquely identify the person who made the inspection as the author of that record. No two persons must have the same electronic identity;

(b) The electronic storage of each record must be initiated by the person making the inspection by the end of the next day following the completion of that inspection;

(c) The electronic system must ensure that no electronic record can be modified in any way, or replaced, after the record has been transmitted and stored in the electronic system;

(d) Any correction or amendment to an electronic record must be electronically stored and retained apart from the electronic record it corrects or amends. Such correction must only be used to correct a data entry error in the original electronic record. The electronic system must uniquely identify the person who made the correction;

(e) The electronic system must provide for the maintenance of inspection records as originally submitted without corruption or loss of data;

(f) All electronic records must be kept available to the persons who performed the inspections and to persons performing subsequent inspections.

10.6 Each railway company required to retain inspection records under this section, when requested by a Railway Safety Inspector, must produce and provide copies of requested inspection records in the format specified, including corrections or amendments to those records as deemed necessary to monitor compliance. Where a railway company receiving such request is unable to provide the records immediately, the railway company must, without delay, take all reasonable measures to provide the records.

11. Inspection Equipment

11.1 Each railway company must develop and adhere to procedures ensuring the quality of the measurements collected electronically by inspection systems used to meet the requirements of TSR Part II Subpart F. For each applicable inspection system, the railway company shall at a minimum:

(a) Adhere to documented calibration procedures which specify instrument verification procedures and the required frequency at which they must be performed; and

(b) Maintain the inspection system such that measurements accurately represent field conditions.

11.2 The railway company must provide the procedures referenced in Part II subpart F Subsection 11.1 above to Transport Canada upon request.

This is **Exhibit "B"** to the Affidavit of Trevor Evans, at the City of Saskatoon, in the Province of Saskatchewan, sworn remotely before me at the Town of Ajax, in the Province of Ontario, this 21st day of February, 2025, in accordance with O. Reg. 431/20, *Administering Oath or Declaration Remotely*.

Laura Herd

A Commissioner, etc.
Laura Herd

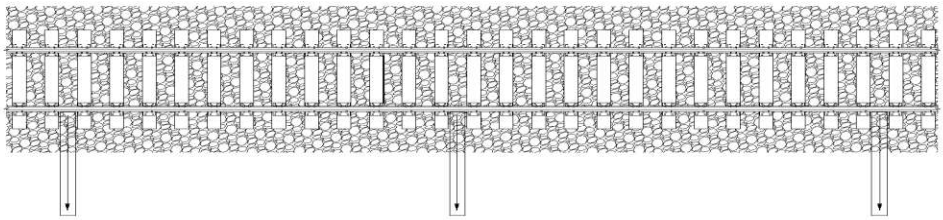
Laura Lilian Herd, a Commissioner, etc.
Province of Ontario, for Borden Ladner Gervais LLP,
Barristers and Solicitors.
Expires January 21, 2026

ENGINEERING

TRACK STANDARDS

T.S. 9.1 ROADBED AND DRAINAGE

1. The roadbed (subgrade) shall be constructed per TS Drawings 2204 and 2205.
2. Roadbed surfaces should slope away from the track to ensure proper drainage.
3. Chronic subgrade soft spots, frost or mud boils and heaves should be improved by:
    a. Providing ditches which are draining the track structure and flow freely.
    b. Installing cross (lateral) sub-surface drainage along the track or below the road bed.
    c. Evaluation by a CN Geotechnical Engineer if required.
4. When installing lateral drains:
    a. Cut to a depth below the granular layer or water pocket and slope to the toe of subgrade or ditch line.
    b. Fill the lateral drain with clean coarse ballast wrapped in filter fabric.
    c. Locate the lateral drains every 20 to 50 feet along the track for the length of the soft track or poorly drained condition.



LATERAL ROCK DRAINS SPACED 20'-50' APART

5. Do not allow rip rap or other fill materials to remain on the top of embankments where it could be hit by on-track equipment or lead to overloading the subgrade.
6. Vegetation along and on the embankment should be maintained so that stability of the track structure is not degraded.
7. Waterways, ditches and drainage must:
    a. Be maintained to ensure adequate support for safe passage of trains.
    b. Be regularly inspected to ensure they are operating as designed.
    c. Be maintained free of vegetation and debris so that drainage is not impeded.
    d. Not be filled with ballast or with waste from ditching, shoulder cleaning or undercutting.
    e. Not be altering, adjusted, rerouted or constricted unless approved by a hydrology study and all required regulatory permits have been acquired.
    f. Be monitored for plugged or frozen conditions which can result high water on one side of the track (differential water level) which can weaken the subgrade and cause rapid failure.

8. Adjacent landowners, buildings and overhead structures are not allowed to drain or modify existing drainage ways to divert water onto Railway property without approval of the CN.
9. Beaver activity can affect drainage causing unstable subgrade, plugged culverts and washouts. Beaver activity outside the right of way may not be visible from the track. Employees must look for rising water along the subgrade, new dams, evidence of tree cuttings and changes of outflow from culverts.
10. Downstream beaver dam failure can result in sudden drawdown of water along the track. This drawdown can result in sudden subgrade failure.
11. Employees should determine the existence of beaver dams or retention ponds located upstream of the track which could pose a significant threat in the event of failure. These can hold large volumes of water which could suddenly discharge toward the track causing washouts.
12. ~~Culverts will be:~~
    a. ~~Installed per Recommended Method 9-1-0, with a size determined by hydrologic study.~~
        i. ~~If installed by open cutting in CWR the rail must be destressed prior to the rail temperature reaching the PRLT or a 25 MPH TSO must be placed.~~
    b. ~~Given a general inspection, along with associated drainage ways, by track inspectors during routine track inspections.~~
    c. ~~Inspected annually for general condition, and a detailed inspection and evaluation will be performed on a scheduled basis.~~

Track Standards Bulletin
TSB 9-1-0
Culvert Inspection

Effective Aug 6, 2018

Engineering Track Standards (ETS) 9.1 “Roadbed & Drainage” dated Sept 12th 2016.

Item 12, in its entirety, to be replaced with:

12. *Culverts will be installed per Recommended Method 9-1-0, with a size determined by hydrologic study.*

    If installed by open cutting in CWR, the rail must be destressed prior to the rail temperature reaching the PRLT or a 25 MPH TSO must be placed.

13. *Culvert Inspections:*

    a. *During routine track inspections, track inspectors are to be on the look out for signs of obstructed or poor performing culverts or drainage ways.*

    b. *All culverts, regardless of size, are to be given a general inspection by track inspectors annually. A general inspection may be performed from track level and will identify any signs of malfunction. The inspection and any defects found must be recorded.*

    c. *All culverts, 48” or less in diameter or width, are to have a visual inspection completed at culvert level by track inspectors every 5 years or more frequently if conditions warrant. The inspection as well as the condition of the culvert and its components will be recorded in TIS within 7 days of inspection.*

    d. *All culverts, greater than 48” in diameter or width, are to have a detailed inspection completed by B&S inspectors every 3 years or more frequently if conditions warrant. The inspection will be recorded in BCS.*

    e. *Any culverts found to be blocked greater than 75% of the cross section must be reported to both the responsible Manager of Engineering and Manager of Bridges & Structures.*

David Lilley
Sr. Manager Track Standards

This is **Exhibit "C"** to the Affidavit of Trevor Evans, at the City of Saskatoon, in the Province of Saskatchewan, sworn remotely before me at the Town of Ajax, in the Province of Ontario, this 21st day of February, 2025, in accordance with O. Reg. 431/20, *Administering Oath or Declaration Remotely*.

Laura Herd

A Commissioner, etc.
Laura Herd

Laura Lilian Herd, a Commissioner, etc.
Province of Ontario, for Borden Ladner Gervais LLP,
Barristers and Solicitors.
Expires January 21, 2026

DIMENSIONS IN BRACKETS ARE METRIC (METERS)
THE VALUES STATED IN BRITISH CUSTOMARY UNITS ARE TO BE REGARDED AS STANDARD

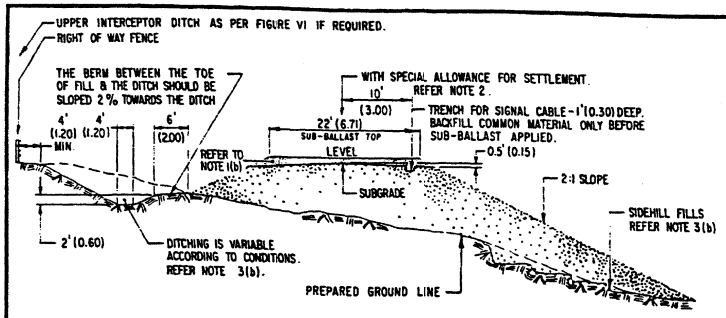


FIGURE I

COMMON MATERIAL EMBANKMENT

UP TO 10 FOOT (3.00) FILL

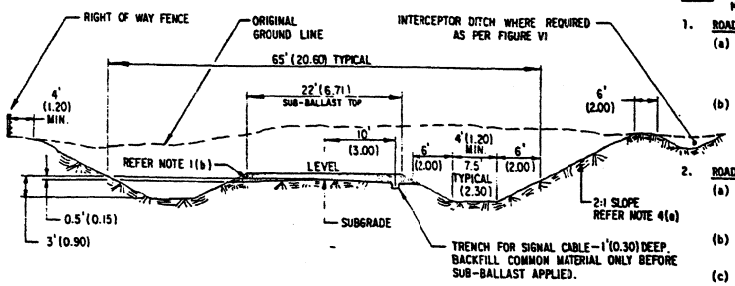


FIGURE IV

COMMON MATERIAL EXCAVATION

UP TO 10 FOOT (3.00) CUT

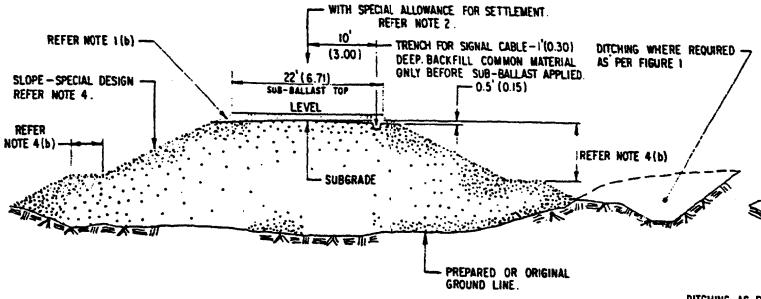


FIGURE II

COMMON MATERIAL EMBANKMENT

OVER 10 FOOT (3.00) FILL - SPECIAL DESIGN

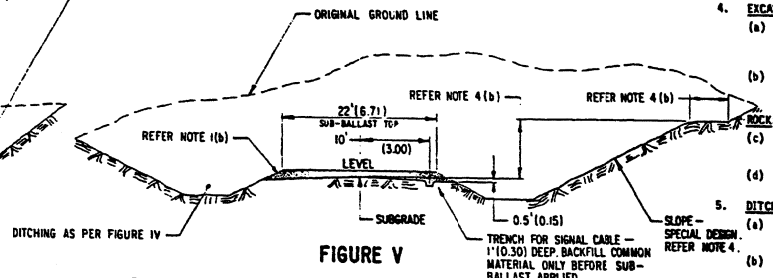


FIGURE V

COMMON MATERIAL EXCAVATION

OVER 10 FOOT (3.00) CUT - SPECIAL DESIGN

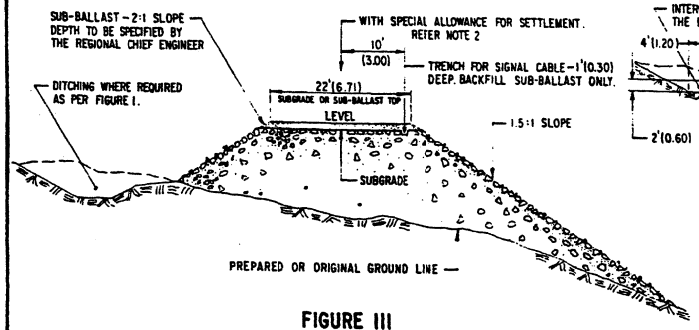


FIGURE III

ROCK EMBANKMENT

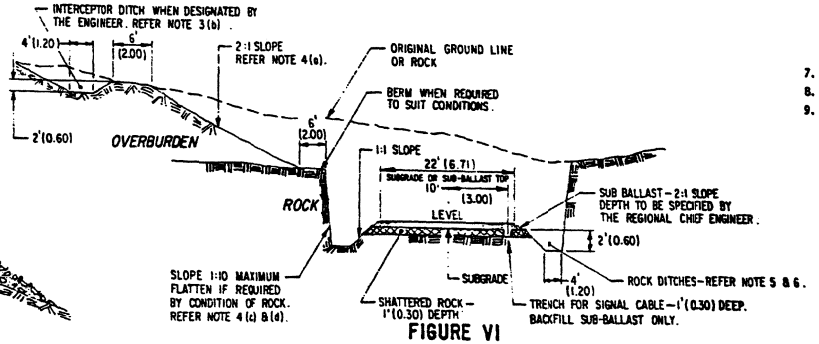


FIGURE VI

ROCK EXCAVATION

NOTES: THIS PLAN COVERS ROADBEDS FOR MAIN LINE TRACK ONLY HAVING S.T.R. OVER 7 AND FREQUENT MOVEMENT OF 263,000 LB. CARS ON 4 AXLES. FOR BRANCH LINE TRACK SEE TS-2203.

1. ROADBED:
   (a) TO ENSURE THE SATISFACTORY PERFORMANCE OF ROADBED SOILS IT MAY BE NECESSARY:-
      1. IN FILLS TO SELECT OR STABILIZE SOILS IN THE TOP OF SUBGRADE.
      2. IN CUTS TO STABILIZE INFERIOR SOILS IN PLACE OR EXCAVATE AND REPLACE THEM.
      3. IN ANY CASE TO PROVIDE A LEVEL GRADED FILTER LAYER OF SUB-BALLAST TO AVOID PUMPING OF SUBGRADE MATERIALS INTO BALLAST.
   (b) TO GIVE PROPER SUPPORT TO TIES IN A MAIN LINE TRACK SUB-BALLAST, MINIMUM OF 12 INCHES (0.30) BESIDES THE BALLAST MAY BE NEEDED DEPENDING ON THE STRENGTH OF THE SUBGRADE SOIL. THIS REQUIRED THICKNESS MAY VARY OVER THE LENGTH OF A RAILWAY LINE, DEPENDING ON VARIATIONS IN THE SUBGRADE STRENGTH. THE THICKNESS OF SUB-BALLAST TO BE DETERMINED BY REGIONAL CHIEF ENGINEER.
2. ROADBED DIMENSIONS:
   (a) ALTHOUGH THE WIDTH OF ROADBED CAN BE STANDARDIZED OVER THE LENGTH OF A NEW LINE, TRACK SHOULDERS SHOULD BE WIDER ON FILLS RESTING ON FOUNDATIONS THAT WILL SETTLE. THE WIDTH CHOSEN SHOULD BE BASED ON THE ESTIMATE OF THE ULTIMATE SETTLEMENT OF BOTH FOUNDATION AND FILL.
   (b) SUB-BALLAST WIDTH OF 22'(6.71) IS AN ABSOLUTE DIMENSION MEASURED AT 1'-6"(0.46) BELOW BASE OF RAIL. IF THE 1'-6" DIMENSION VARIES (±) THE SUB-BALLAST WIDTH SHOULD BE ADJUSTED (±) ACCORDINGLY.
   (c) FOR MULTIPLE TRACKS THE WIDTH OF THE ROADBED WILL BE INCREASED BY THE AMOUNT EQUAL TO THE DISTANCE BETWEEN CENTRES OF TRACKS. (TRACK CENTRES SHALL BE IN ACCORDANCE WITH STANDARD CLEARANCE AND REGULATIONS PLAN R10-1.1 & 1.2). SEE ILLUSTRATION ON REVERSE SIDE.
   (d) ON CURVED SUPERELEVATED TRACK, ROADBED TO BE WIDENED TO MAINTAIN SHOULDER WIDTH. SEE ILLUSTRATION ON REVERSE SIDE.
3. EMBANKMENTS - COMMON MATERIAL:
   (a) MINIMUM SLOPES WITH COMMON MATERIAL TO BE 2:1 FOR FILL UP TO 10'(3.00); AND 2:1 OR SPECIAL DESIGN SLOPE, WITH BERMS, IF REQUIRED, FOR FILL OVER 10'(3.00).
   (b) SIDEHILL FILLS:
   THE CONSTRUCTION OF SIDEHILL FILLS INVOLVES THE STABILITY OF THE NATURAL SLOPES:
      1. THE OLD SURFACE SHOULD BE THOROUGHLY STRIPPED, ROUGHED OR STEPPED; AND
      2. DRAINAGE PROVIDED TO INTERCEPT WATER ON THE UPHILL SIDE FROM SEEPING ALONG THE FILL-SLOPE INTERFACE.
      3. WHERE IT IS NOT POSSIBLE ECONOMICALLY TO PROVIDE AN ADEQUATE FACTOR OF SAFETY FOR THE UPHILL SLOPE, AN ADDED WIDTH OF DITCH OR OTHER PROTECTION SHOULD BE PROVIDED ON THE UPHILL SIDE OF THE FILL.
4. EXCAVATIONS COMMON MATERIAL:
   (a) IN EVERY SOIL TYPE THE CONTROL NECESSARY TO MAINTAIN THE CUT SECTION AND TO REDUCE REQUIREMENTS FOR SLOPE RESTORATION AND DITCH CLEANING SHOULD BE A CONSIDERATION IN DESIGN. BERMS, DRAINAGE, EROSION PROTECTION, FILTER-LAYERS, VEGETATION AND SLOPE ANGLE SELECTION MAY BE USED.
   (b) AS A GENERAL RULE THE WIDTH OF BERM, IF BERMS ARE REQUIRED, SHOULD NOT BE LESS THAN ONE HALF OF THE VERTICAL RISE, IN DEEPER CUTS BERMS SHOULD BE AT LEAST 10 FEET (3.00) WIDE IF REQUIRED FOR ACCESS.

   ROCK:
   (c) STABILITY OF ROCK SLOPES ARE GOVERNED BY MATERIALS IN THE SLOPE, AND SLOPE ANGLES SHOULD BE CHOSEN INDEPENDENTLY EVEN IN THE SAME CUT FOR SOUND ROCK, WEATHERED OR SHATTERED ROCK, AND OVERBURDEN.
   (d) WHERE PERMANENT BENCHES ARE USED TO INTERCEPT FALLING ROCK, ACCESS SHOULD BE PROVIDED FOR PERIODIC REMOVAL OF DEBRIS.
5. DITCHES:
   (a) IN EXCAVATION, WIDE DITCHES ARE DESIRABLE WHERE SLOUGHED MATERIAL TENDS TO ACCUMULATE. WIDE DITCHES IN ADDITION PROVIDE STORAGE SPACE, ALSO PROVIDE WORKING SPACE FOR EQUIPMENT.
   (b) IN ROCK EXCAVATIONS, DITCHES SHOULD BE DESIGNED WITH AMPLE WIDTH TO COLLECT ROCKFALL MATERIAL, KEEP IT OUT OF THE TRACK AREA AND PERMIT ECONOMICAL REMOVAL OF DEBRIS.
6. SURFACE DRAINAGE:
   (a) THE DITCH GRADE WILL NORMALLY BE GOVERNED BY THE TRACK GRADE, PARTICULARLY IN LONG CUTS. WHEN DITCH IS CONSTRUCTED IN EARTH MATERIALS THE MINIMUM GRADE SHOULD NOT BE LESS THAN 0.3% TO MINIMIZE SEDIMENTATION. LIKEWISE TO PREVENT EROSION THE MAXIMUM GRADE SHOULD BE DETERMINED BY THE REGIONAL CHIEF ENGINEER.
   (b) SEEPAGE WATER OCCURRING ON THE FACE OF A SLOPE MAY BE INTERCEPTED AND CONDUCTED AWAY ON BENCHES, THESE BENCHES SHOULD BE SLOPED BACK FROM THE FACE AND THENCE LATERALLY AND LINED IF IT IS IMPORTANT TO PREVENT INFILTRATION.
7. ALL DITCH DIMENSIONS SHOWN ARE MINIMUM DIMENSIONS.
8. ROADBEDS ARE TO BE CONSTRUCTED OR UPGRADED IN ACCORDANCE WITH SPEC-1301, LATEST ISSUE.
9. THIS PLAN SUPERSEDES PLAN R2C-2.1 DATED 15 NOVEMBER 1962.

No	Date	Révision

Standard / Norme

TYPICAL EMBANKMENTS & EXCAVATIONS

ROADBEDS FOR MAIN LINE TRACK

Drawn / Dessin G.E.K. Checked / Vérification G.W.M. Approved / Approbation Chief Engineer

Office of Chief Engineer
Bureau de l'Ingénieur en chef

CN

Date SEPT. 1977 Drawing Number / Dessin numéro TS-2204

This is **Exhibit "D"** to the Affidavit of Trevor Evans, at the City of Saskatoon, in the Province of Saskatchewan, sworn remotely before me at the Town of Ajax, in the Province of Ontario, this 21st day of February, 2025, in accordance with O. Reg. 431/20, *Administering Oath or Declaration Remotely*.

Laura Herd

A Commissioner, etc.
Laura Herd

Laura Lilian Herd, a Commissioner, etc.
Province of Ontario, for Borden Ladner Gervais LLP,
Barristers and Solicitors.
Expires January 21, 2026

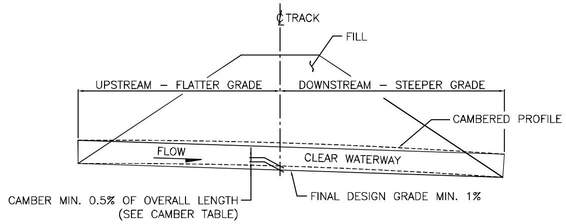
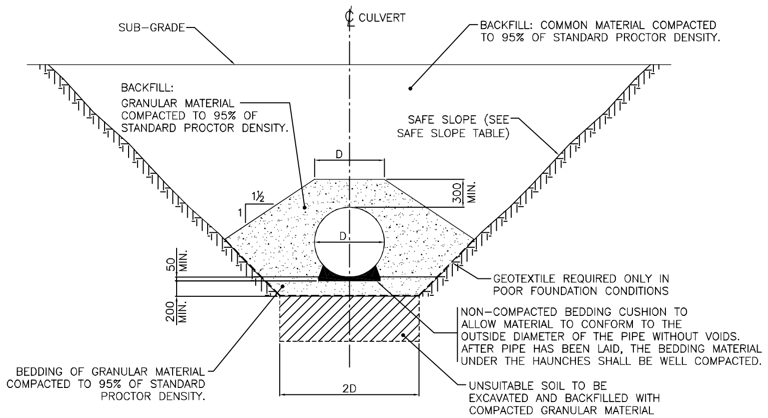


TABLE 1: CAMBER TABLE

LENGTH (m)	CAMBER (mm)
6.0	30
9.0	45
12.0	60
15.0	75
18.5	90
21.5	105
24.5	120
27.5	135
30.5	150

MINIMUM GRADE AND CAMBERING REQUIREMENTS FOR CULVERT INSTALLATION



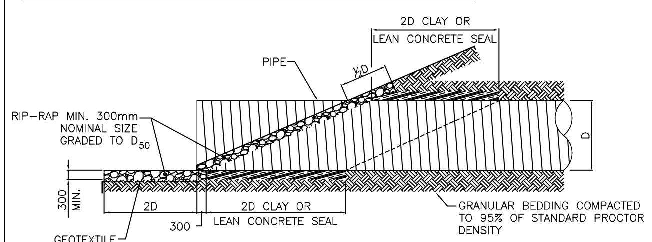
GRANULAR MATERIAL FOR BEDDING AND BACKFILLING TO BE APPROVED BY THE ENGINEER. IN GENERAL, PIT-RUN SAND AND GRAVEL, REASONABLY WELL GRADED FROM MAXIMUM SIZE 100mm TO NOT MORE THAN 8% FINER THAN SIEVE No. 200.

CULVERT INSTALLATION

TABLE 2: SAFE SLOPE TABLE

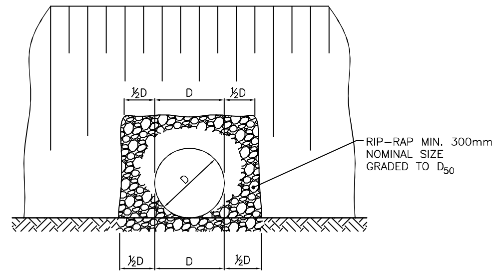
TYPE	SOIL CONDITION	SAFE SLOPE
A	HARD, DENSE AND STIFF SOILS WITH A LOW MOISTURE CONTENT	1 HORIZ: 1 VERT
B	MEDIUM DENSITY SOILS WHICH ARE OF LOOSECONSISTENCY, HAVE BEEN PREVIOUSLY EXCAVATED OR EXHIBIT SIGNS OF WATER SEEPAGE	1.5 HORIZ: 1 VERT
C	SOFT, VERY LOOSE, WET AND MUDDY SOILS	3 HORIZ: 1 VERT

THE SAFE SLOPE SHALL BE REDUCED WHEN THE FOLLOWING CONDITIONS OCCUR:
- SIGNS OF DISTRESS APPEAR AT THE FACE OF THE CUT OR AT THE GROUND ADJACENT TO THE OPEN EXCAVATION
- SURCHARGE LOADS FROM STORED MATERIAL OR EQUIPMENT OPERATE AT TOP OF CUT
- HIGH WATER TABLE
- INADEQUATE OR UNCERTAIN SOIL PROPERTIES DATA.



INORGANIC CLAY OR LEAN CONCRETE SEAL TO BE PLACED AT BOTH ENDS OF CULVERTS FOR A LENGTH OF TWICE THE DIAMETER (2D). THE CLAY OR LEAN CONCRETE SEAL SHALL EXTEND FROM THE BOTTOM OF THE EXCAVATION TO 300mm ABOVE THE CROWN OF THE PIPE AND FOR THE FULL WIDTH OF THE EXCAVATION.

SEEPAGE CUT-OFF DETAIL



RIP-RAP PROTECTION

TABLE 3: STEEL ROUND CORRUGATED PIPE (CSP)
MINIMUM AND MAXIMUM HEIGHT OF COVER
ASSUMED NORMAL SITE CONDITION
PH > 6–8, MINIMUM RESISTIVITY > 2000 ohm–cm

CULVERT SIZE ID (mm)	MIN COVER (mm)	MAXIMUM COVER (m) CORRUGATION PROFILE								
		68 x 12				125 x 25				
		1.6mm	2.0mm	2.8mm	3.5mm	1.6mm	2.0mm	2.8mm	3.5mm	4.2mm
600	1200	7.0	9.0	14.0	15.0					
700	1200	5.5	7.0	12.0	13.0					
800	1200	5.0	6.5	10.0	11.0					
900	1200	4.0	6.0	9.0	10.0					
1000	1200		5.0	8.0	9.0					
1200	1200			13.0		5.5	8.0	16.0	20.0	23.0
1400	1600			12.0		5.0	7.0	13.0	17.0	20.0
1600	1600					4.0	6.0	11.0	15.0	17.0
1800	2400						5.5	10.0	13.0	15.0
2000	2400						5.0	9.0	12.0	14.0
2200	2400							7.0	10.5	12.0
2400	2400							5.5	10.0	11.0

NOTES: MINIMUM SIZE OF CSP CULVERTS TO BE 900mm DIA.
60mm AND 750mm DIA. CSP CULVERTS ARE TO BE USED WHERE EXISTING COVER DOES NOT PERMIT A 900mm DIA. SIZE CULVERT.
SELECTION OF CULVERTS SHALL BE BASED ON MINIMUM WALL THICKNESS FOR ANY GIVEN DIAMETER.
IN POOR GROUND CONDITIONS, IT IS RECOMMENDED THAT RIVETED PIPES BE USED.

TABLE 4: STRUCTURAL PLATE PIPE (MULTI PLATE/SPCSP)
MINIMUM AND MAXIMUM HEIGHT OF COVER
ASSUMED NORMAL SITE CONDITION
PH > 6–8, MINIMUM RESISTIVITY > 2000 ohm–cm

CULVERT SIZE ID (mm)	MIN COVER (mm)	CORRUGATION PROFILE 152x51 MAXIMUM COVER (m)			
		3mm	4mm	5mm	6mm
2120	2430	7.0	12.0	18.0	26.0
2280	2430	6.0	11.5	17.0	24.0
2430	2430	5.5	11.0	16.0	23.0
2590	2430	5.0	10.0	15.0	21.0
2740	2430		9.5	14.0	20.0
3050	2430		9.0	13.0	18.0
3360	2430		8.0	12.0	16.0
3670	2430		7.0	11.0	15.0
3990	2430			10.0	13.5
4300	2430			9.0	13.0
4610	2430			8.0	12.0

TABLE 5: CULVERTS IN CORROSIVE CONDITIONS

SOIL TYPE	DESCRIPTION	DEGREE OF CORROSIVENESS	UPGRADES	
			WALL THICKNESS	COATINGS
1	SANDY SILT	LOW	NONE	NONE
2	CLAYEY SOIL	MODERATE	INCREASE IN WALL THICK.	ALUMINIZED/POLYMER/INCREASE GALVANIZING THICKNESS 910/1220 g/m^2 (ONLY SPCSP)
3	MARSH AND PEATY SOIL	SEVERE	INCREASE IN WALL THICK.	ALUMINIZED/POLYMER/INCREASE GALVANIZING THICKNESS 1220 g/m^2 (ONLY SPCSP)

NOTE:
1. RECOMMENDED ALTERNATIVE COATINGS ARE:
   - ALUMINIZED STEEL TYPE 2 IN ACCORDANCE WITH ASTM A929 AND AASHTO M–274 WITH 305 g/m^2
   - POLYMER COATING SUCH AS TRENCHCOAT OR EQUIVALENT IN ACCORDANCE WITH ASTM A742 AND AASHTO M525 WITH 10/10 FINISH.
2. ABRASION IS A COMBINATION OF STREAM VELOCITY AND BED LOAD. IN GEOGRAPHIC AREAS WHERE HEAVY LOADS OF SAND AND SMALL GRAVEL POSE AN ABRASION PROBLEM, AND FLOW VELOCITY IS HIGH, INCREASE RECOMMENDED THICKNESS BY ONE SIZE WALL THICKNESS.
3. SELECTION OF UPGRADES OR COMBINATION OF UPGRADES SHALL BE DETERMINED BY THE SEVERITY OF SITE CONDITIONS.

GENERAL NOTES:

SCOPE:
CULVERT SIZES IN TABLE 3 AND 4 HAVE BEEN DEVELOPED BASED ON STRENGTH AND DURABILITY REQUIREMENTS FOR NORMAL SITE CULVERT INSTALLATIONS.

DESIGN LOAD: E80 + IMPACT

DURABILITY BASED ON 75 YEAR SERVICE LIFE.

CULVERT DURABILITY:
SITE SPECIFIC DESIGN IS REQUIRED WHERE WATER AND/OR SOIL IS CORROSIVE OR ABRASIVE.
WATER AND/OR IN CLAY, CLAY LOAM, PEAT AND ORGANIC SOILS SHOULD BE TESTED FOR WATER AND SOIL CORROSIVENESS. TESTS TO BE CARRIED OUT ARE RESISITIVITY AND PH TESTING IN ACCORDANCE WITH CALIFORNIA TEST METHOD 6438 AND SHALL BE PERFORMED BY A QUALIFIED MATERIALS TESTING COMPANY.

INSTALLATION:
PIPE SHALL BE INSTALLED IN ACCORDANCE WITH CN ENGINEERING RECOMMENDED METHOD OF INSTALLATION OF CULVERTS RM4402.

FOR MULTIPLE PIPE INSTALLATIONS, THE CLEARANCE BETWEEN CULVERTS SHALL NOT BE LESS THAN ½ THE PIPE DIAMETER, BUT NEED NOT BE GREATER THAN 1.0m UNLESS REQUIRED FOR SPECIFIC CONSTRUCTION COMPACTION METHODS AND EQUIPMENT.

FOR PIPES SIZES GREATER THAN 1.5m, TEMPORARY STRUTTING SPACED AT MAX. 3.0m SPACING SHALL BE PROVIDED.

FOR VERTICAL FACE CUTS, SHORING TO BE PROVIDED AND SHALL BE ENGINEERED TO SUIT HEIGHT OF EMBANKMENT AND VERTICAL FACES.

COVER:
THE MINIMUM HEIGHT AND MAXIMUM HEIGHT OF COVER FOR VARIOUS CULVERT SIZES AND SPECIFIED WALL THICKNESS ARE GIVEN IN TABLES 3 AND 4.

END TREATMENT:
WHERE REQUIRED TO PREVENT, EROSION, UNDERMINING, DRIFT AND DEBRIS DETENTION AT THE INLET AND/OR OUTLET, OR WHERE REQUIRED TO INCREASE HYDRAULIC CAPACITY, THE ENGINEER SHALL SPECIFY AN APPROPRIATE CULVERT PIPE END TREATMENT. END TREATMENT MAY CONSIST OF SLOPE RIP–RAP, GABIONS, STANDARD STEEL CULVERT APRONS, BEVELLED PIPE ENDS OR CONCRETE HEADWALLS WITH RIP–RAP APRONS.

SPECIFICATIONS:

CULVERTS:
CSP SHALL BE PLAIN GALVANIZED CORRUGATED STEEL PIPE IN ACCORDANCE WITH CSA STANDARD CAN3–G401, AASHTO M–218 OR ASTM A929.

SPCSP SHALL BE PLAIN GALVANIZED STRUCTURAL PLATE PIPE IN ACCORDANCE WITH CSA STANDARD CAN3–G401, AASTHO M–167 OR ASTM A761.

GALVANIZING SHALL BE NOT LESS THAN 610 g/m^2 OF SURFACE (TOTAL BOTH SIDES)

ALTERNATIVE COATINGS:
ALUMINIZE STEEL TYPE 2 – ASTM A929 AND AASHTO M–274 WITH 305 g/m^2 COATING WEIGHT.
POLYMER COATING SUCH AS TRENCHCOAT OR EQUIVALENT – ASTM A742 OR AASHTO M–525 WITH 10/10 GRADE FINISH.

GEOTEXTILE FILTER FABRIC:
WHEN IN THE OPINION OF THE ENGINEER, FOUNDATION CONDITIONS ARE CONSIDERED SOFT AND UNSTABLE, WOVEN GEOTEXTILE FILTER FABRIC SHALL BE INSTALLED AT THE BASE OF THE EXCAVATION AND SHALL CONFORM WITH THE FOLLOWING:
- GRAB STRENGTH ____ 1275 N
- ELONGATION (FAILURE) ____ 15%
- PUNCTURE STRENGTH ____ 275 N
- BURST STRENGTH ____ 3.6 MPa
- TRAPEZOIDAL TEAR ____ 475 N
- MINIMUM FABRIC LAP TO BE 1 m

Original Drawing Signed by George Nowak Sept. 29/2003
SENIOR STRUCTURAL ENGINEER

No.	Date	Revision	By/Par

Division | Sub-division | Mile Mille

CORRUGATED STEEL PIPE (CSP) AND STRUCTURAL PLATE CORRUGATED STEEL PIPE (SPCSP) CULVERTS CANADA

Drawn Dessin JC | Checked Verification | Approved Approbation | Scale Echelle NONE | Date 03/09/29

Office of Chief Engineer
Bureau de l'Ingénieur en Chef

CN

File Reference | Drawing Number Dessin Numero R7A-80.2

This is **Exhibit "E"** to the Affidavit of Trevor Evans, at the City of Saskatoon, in the Province of Saskatchewan, sworn remotely before me at the Town of Ajax, in the Province of Ontario, this 21st day of February, 2025, in accordance with O. Reg. 431/20, *Administering Oath or Declaration Remotely*.

Laura Herd

A Commissioner, etc.

Laura Lilian Herd, a Commissioner, etc.
Province of Ontario, for Borden Ladner Gervais LLP,
Barristers and Solicitors.
Expires January 21, 2026

SCHEDULE "A" to By-law No. 92 of 2009 2009/10/05

STANDARD PIPE CROSSING AGREEMENT
Y/F: 80103
O/F: GLD-09-206/UGP-STY-33.01
AGREEMENT NO. 3066206

This Agreement entered into at Toronto, Province of Ontario, this 2nd day of October, 2009.

BETWEEN:

CANADIAN NATIONAL RAILWAY COMPANY, a corporation having its head office at 935 de la Gauchetière Street West, Montreal, Quebec H3B 2M9

(hereinafter called the "Railway")

AND:

TOWNSHIP OF WARWICK
6332 Nauvoo Rd., RR #8
Watford, ON, N0M 2S0

(hereinafter called the "Applicant")

WHEREAS the Railway hereby grants the Applicant the right and privilege to install, use and maintain a portion of the Harrower Drain - 200mm diameter tile and 450mm extra strength concrete sewer pipe, to be installed parallel to the CN tracks, within the Railway's right-of-way, at mile 33.01 of the Strathroy Subdivision (hereinafter the "works"), in the Township of Warwick, Province of Ontario, as shown on Plan No. Drawing 1 of 2 and 2 of 2, dated/revised July 10th, 1987 (hereinafter the "Plan"), attached hereto and forming part hereof.

NOW THEREFORE THIS AGREEMENT WITNESSES THAT, in consideration of the mutual covenants and agreements herein and subject to the terms and conditions set out in this Agreement, the parties agree as follows:

1. The Applicant will carry out the work as shown on the attached Plan (Appendix A), and in accordance with Railway requirements respecting safe railway operations, and no works shall proceed until the Agreement has been signed and the plan has been approved by the Railway.

2. The works shall be constructed and at all times maintained in accordance with the *Railway Safety Act* and regulations, plans or specifications in force, adopted or approved by Transport Canada respecting pipe crossings under Railways, including *Standards Respecting Pipeline Crossings Under Railways*, TC E-10, effective May 10, 2001 (Appendix B), as amended from time to time, and any subsequent replacement document, according to the plans and specifications approved by the Railway.

3. No maintenance work shall be done without first obtaining the Railway's consent.

4. Under certain circumstances, before giving its permission to proceed to any work, the Railway may, at its discretion, assign an inspector to supervise the work to take place on its property. While so engaged, the inspector's wages and expenses will be chargeable to the Applicant and shall be paid by the Applicant immediately upon request by the Railway.

5. All costs associated with the construction, the replacement, the use and the maintenance of the works, including flagging, location of underground cables and engineering fees, shall be paid by the Applicant.

6. Should it become necessary or expedient for the purposes of repair or improvement on the said Railway that the works be removed, relocated or modified, the Applicant shall, at its risk and expense, comply with the request of the Railway, failing which the Railway shall have the right to execute or have executed, at the risk and expense of the Applicant, any work required to remove, relocate or modify the said works.

~~7. In addition to any other amounts payable by the Applicant pursuant to this Agreement, as compensation for the rights and privileges herein granted and until Clause 13 is invoked, the Applicant shall immediately pay a non-refundable one-time lump sum of $1,850, plus the applicable G.S.T. All sums payable pursuant to this clause shall be payable to the order of the Railway, care of its authorized representative, at such address as the authorized representative shall provide.~~

~~The Applicant shall also pay all taxes, rates and assessments of any other nature that may be levied from time to time during the course of this Agreement against the Railway's property as a result of the works constructed by the Applicant. The Railway's G.S.T. Registration Number is R100768779.~~

8. The Applicant shall indemnify and save harmless the Railway from and against all actions, causes of action, proceedings, claims and demands (hereinafter referred to as "Liability") for any direct losses, costs, damages or expenses suffered or incurred by the Railway, by reason of any damage of whatsoever nature including damages to property or to any persons caused by, resulting from or attributable to any action or omission by the Applicant, its employees, servants, agents, licensees, invitees or generally by those for whom it is by law responsible or to the existence, construction, operation, maintenance, relocation, modification or removal of any crossing, or injury, including injury resulting in death, to the employees, servants, agents, licensees or invitees of the Company while on Railway property, except to the extent that such liability, damage or injury is contributed to, caused by, results from or is attributable to the negligence or misconduct of the Railway or of those for whom it is by law responsible.

9. The Applicant shall immediately carry out all measures which the Railway, in its sole discretion, considers necessary to keep the works free and clear of all environmental contaminants or residue (hereinafter referred to as "Environmental Contamination") resulting from the Applicant's occupation or use of the Railway's premises (hereinafter the "Premises"), such condition to be confirmed (at the option of the Railway and at the sole expense of the Applicant) by a post-termination environmental inspection/audit of the Premises to be carried out by the Railway. The Applicant shall be solely responsible for the cost of all work carried out to correct any Environmental Contamination which occurs on the Premises, or which occurs on other lands as a result of the Applicant's occupation or use of the Premises.

9.1 a) Notwithstanding the foregoing, in the event that the Railway, at any time, suspects that a potential source of Environmental Contamination may be either present on the Premises or at risk of escaping from or onto the Premises to or from the adjoining lands, the Railway shall have the right to enter upon the Premises, at all reasonable times and from time to time, in order to inspect the Premises and conduct or require the Applicant to conduct, at the Applicant's expense, such tests as may be required to verify the condition of the Premises. The Applicant shall, at its expense, take any and all action as shall be required to prevent such Environmental Contamination from occurring or escaping from or onto the Premises.

b) The Applicant shall be responsible to notify the Railway of all Environmental Contamination that the Applicant suspects is occurring on or escaping onto the Premises from adjacent lands or resulting from third party occupation.

9.2 If the Applicant fails to correct any Environmental Contamination to the satisfaction of the Railway and any public authority having jurisdiction, the Railway may perform such work by its employees or agents. The Railway may charge the Applicant from time to time for all the costs incurred by the Railway in correcting such Environmental Contamination, plus fifteen per cent (15%) for overhead, and the Applicant shall pay the Railway's invoice or invoices for such costs within ten (10) days of receipt of each invoice. In the event such remedial work is carried out by any public authority, the cost of such work shall be borne by the Applicant.

9.3 The Applicant shall comply with the provisions of any federal, provincial or municipal laws applicable to the Premises with respect to maintaining a clean environment. If any public authority having jurisdiction with respect to environmental protection or fire protection requires the installation of equipment or apparatus on the Premises to improve the environment or to improve fire protection facilities, then the Applicant shall promptly install such equipment or apparatus or take such measures as may be required by such public authority. The Applicant shall be solely responsible for the cost of all work carried out to comply with the requirements of a public authority.

9.4 Upon the termination of this Agreement, the Applicant shall leave the Premises in a clean and tidy condition, free of any Environmental Contamination resulting from or occurring during the Applicant's occupation or use of the Premises. If the Applicant has installed any facility on or under the Premises, the Applicant shall remove such facility, subject to the provisions of Clause 15. The Applicant shall have the burden of proving that any Environmental Contamination has not resulted from or occurred during its occupation or use of the Premises.

9.5 The responsibility of the Applicant to the Railway with respect to the environmental obligations contained herein shall continue to be enforceable by the Railway notwithstanding the termination of this Agreement.

10. The Applicant shall, at its sole expense, provide and maintain in full force and effect during the term of this Agreement, insurance coverage as follows:

10.1 Commercial General Liability, in the amount of no less than ten million dollars ($10,000,000) per occurrence, combined single limit for bodily/personal injury (including death), or for damage to or destruction of property (including loss of use) caused by accident or occurrence. This policy shall name the Railway as an additional insured and shall contain a cross-liability clause.

10.2 The Applicant shall provide the Railway with proof of insurance in the form of an insurance certificate, which certificate shall detail the coverage requirements and shall obligate the insurers to give the Railway a thirty (30) day prior written notice of cancellation or non-renewal, or of any material change affecting the coverage provided therein.

11. The Applicant's property, and any other person's property, shall, while located on the Railway's premises to fulfill any obligation covered by the present Agreement, be deemed to be there at the risk of the Applicant as to damages, loss or theft attributable to any cause whatsoever.

12. This Agreement is binding upon the respective employees, agents, successors and representatives of the Railway and the Applicant; however, the Applicant may not assign or transfer this Agreement, in whole or in part, or any of the rights and privileges resulting there from, without the prior written consent of the Railway. Said consent may not be unreasonably withheld.

13. This Agreement will continue in force from the date hereof to its termination, at any time, by giving

a written notice to the other party at least thirty (30) days from the date of expiration. In the event of any failure by the Applicant to comply with any provisions of this Agreement, and upon the Applicant being notified in writing by the Railway alleging such failure and failing to remedy the failure within (thirty) 30 days of receiving such notice, the Agreement will be forthwith terminated upon receipt of written notice of termination. In either case, it is understood that the Railway will not reimburse the Applicant for any monies paid in advance under the provisions of this Agreement.

14. Unless otherwise specified, all notices, accounts, statements, reports, documents or instructions to be given by any party under the terms of this Agreement must be given in writing at the following address:

FOR THE RAILWAY:

1 Administration Road, Floor 1
Concord, Ontario L4K 1B9

Attention: Contracts Department
Facsimile: (905) 760-5010

FOR THE APPLICANT:

TOWNSHIP OF WARWICK
6332 Nauvoo Rd., RR #8
Watford, ON, N0M 2S0

Attention: Don Bruder, Administrator - Treasurer
Facsimile: 519-849-6136

Notice shall be sufficiently given if delivered by courier or facsimile, or if mailed by prepaid registered mail to the above address or to such other place as may be specified in writing. Any notice or other document, if delivered by courier or facsimile, shall be deemed to have been given or made on the date delivered or the date that a confirmation of receipt of the facsimile was recorded by the sender, and if mailed, on the third business day following the date on which it was mailed. In the event of an actual or imminent disruption of postal service in Canada, the notice shall be delivered by courier.

15. Prior to the expiry of the present Agreement or, in the cancellation of the Agreement within a period determined in writing by the Railway, the Applicant will, at its risk and expense, remove from the Railway's property all works constructed under this Agreement, as well as all material not belonging to the Railway, except for the metal casing which will remain in place in perpetuity. As for the pipe installed inside the metal casing, the Applicant will at its discretion have the option of either leaving the pipe or removing it. The Applicant will be required to fill the casing and any pipes left within with cement and restore the Railway's property to the satisfaction of the Railway. Should the Applicant fail to comply with the requirements of this Clause, the Railway reserves the right, at its discretion, to do the work that the Applicant should have done in accordance with this Clause, or to have the work done, at the risk and expense of the Applicant. Under such circumstances, all the material located on the Railway's property shall become the property of the Railway, without compensation to the Applicant and without prejudice to the Railway's right to recourse against the Applicant for compensation for any costs or damages incurred by the Railway as a result of the Applicant's default.

16. The Applicant shall not, at any time and in any way, impede the operation, the maintenance or the enjoyment of the Railway's property by the Railway and its representatives. If the Railway deems, at its discretion, that the work being undertaken or the method used to undertake the work will impede the Railway in any way, the Railway may order the work stopped, recommend a different methodology, require that adequate protective measures be taken and generally impose any measures or any combination of measures that the Railway may deem necessary under the circumstances. The Applicant will comply with the requirement of this clause, at its risk and expense and without recourse against the Railway except for damages, if justified.

17. The Applicant agrees not to register this Agreement or to file or register any caveat or other encumbrance based on this Agreement against the title for the said Works without first obtaining the written consent of the Railway.

18. This Agreement shall be governed by and construed in accordance with the laws of the Province in which the works are located, and all applicable federal laws and regulations.

19. Any dispute relating to the wording and interpretation of the clauses in this Agreement will be resolved in accordance with the Arbitration Act of the Province in which the works are located.

20. The preamble to this Agreement and all its Appendices form an integral part hereof.

IN WITNESS WHEREOF the parties hereto have executed these presents as of the day and year first above written.

CANADIAN NATIONAL RAILWAY COMPANY

Witness for the Railway

Name: Richard K. Paton
Title: Regional Manager – Eastern Canada
I am authorized to bind the Company

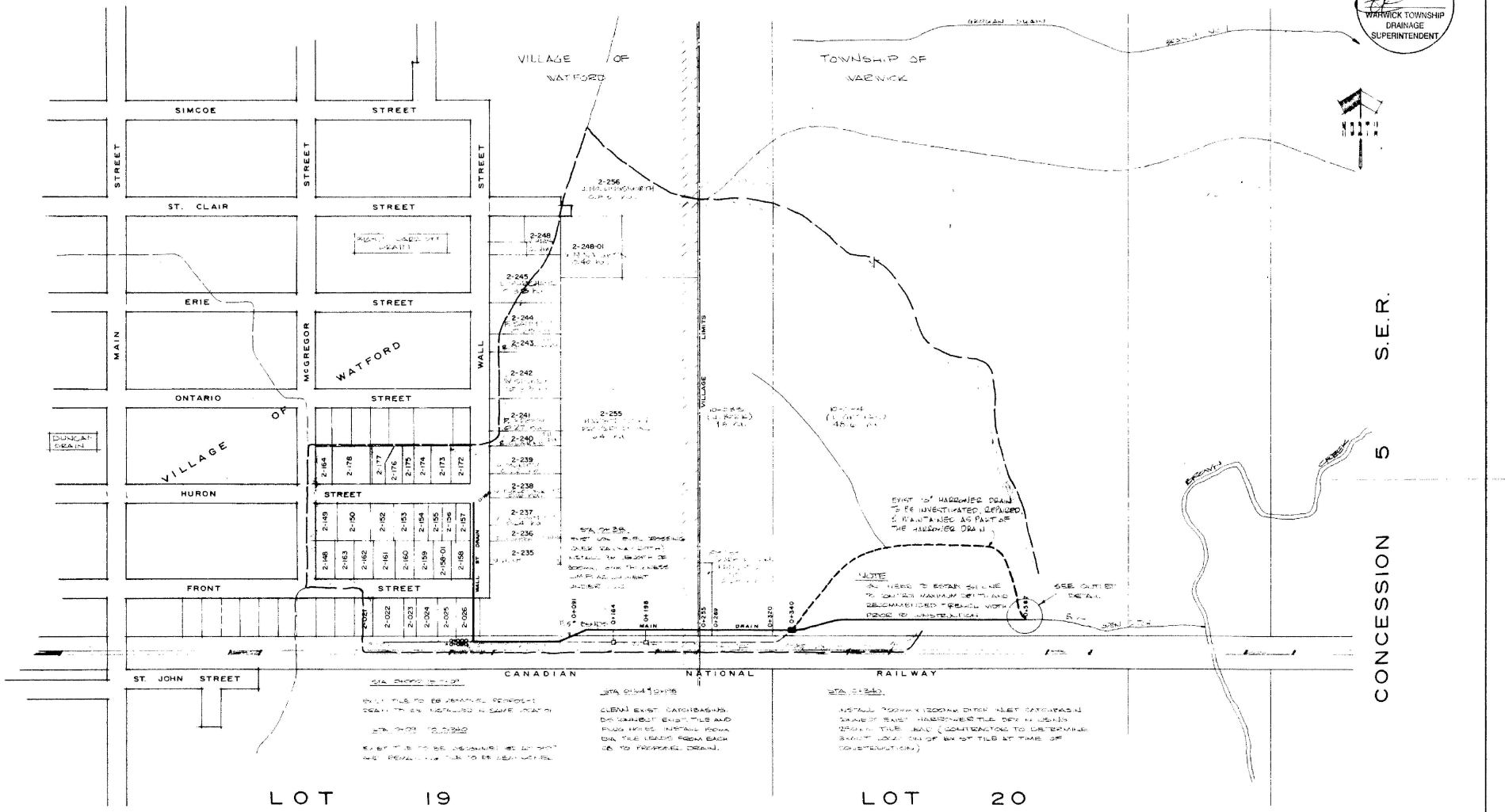
TOWNSHIP OF WARWICK

Frances Woods
Witness for the Applicant

Name: TODD CASE
Title: MAYOR
I am authorized to bind the Company

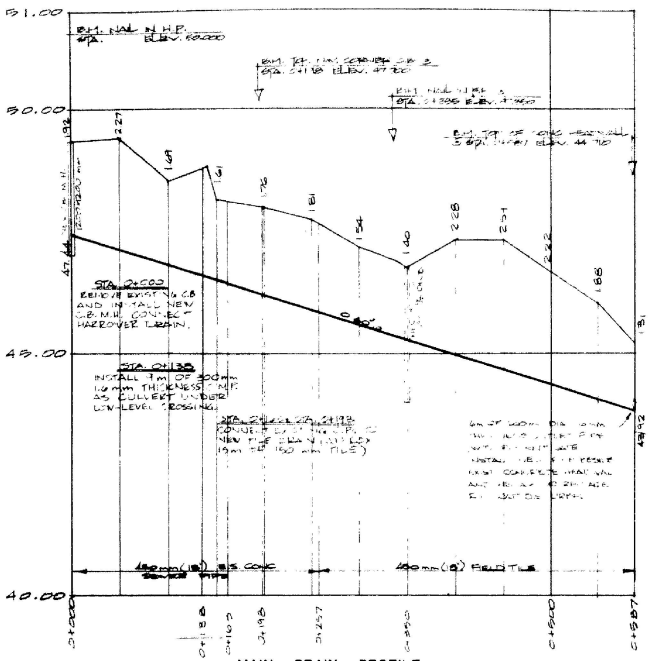
Frances Woods
Witness for the Applicant

Name: DON BRUDER
Title: ADMINISTRATOR / TREASURER
I am authorized to bind the Company

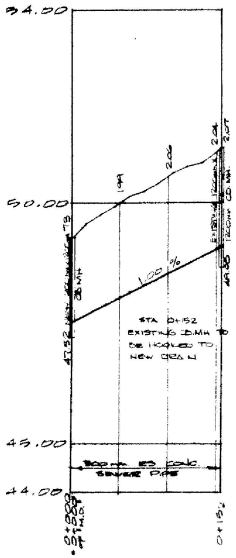


PLAN
SCALE: 1 mm = 2,000 mm

HARROWER DRAIN			
TOWNSHIP OF WARWICK			
Scale AS SHOWN	Approved By F.B. D-135	JOB NO. 86103	Drawn By
Date			Revised
PLAN			
SPRIET ASSOCIATES CONSULTING ENGINEERS	LONDON SUDBURY	Drawing Number 1 OF 2	



MAIN DRAIN PROFILE
SCALE: HOR 1 mm = 2,500 mm
VERT. 1 mm = 50 mm



WALL ST DRAIN

GENERAL NOTES

1) OUR SPECIFICATIONS DATED JANUARY 1983 APPLY TO THIS CONTRACT.

2) ALL WORKS OR MATERIALS NOT SPECIFICALLY TO BE SUPPLIED OR CONSTRUCTED UNDER THIS CONTRACT BUT WHICH ARE NECESSARY FOR THE PROPER AND EFFICIENT CARRYING OUT OF THE WORKS SHALL BE SUPPLIED AND CONSTRUCTED BY THE CONTRACTOR AS IF SPECIFICALLY SHOWN AND DESCRIBED HEREIN.

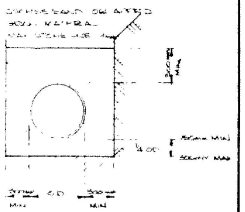
3) THE WORKS WITHIN THE LIMITS OF THE ROAD ALLOWANCE TO BE CONSTRUCTED UNDER THIS CONTRACT SHALL CONSIST OF TRENCH EXCAVATION, INSTALLATION AND BACKFILLING OF THE DRAIN, AND APPURTENANCES THERETO, AND SHALL NOT EXCEED AN AVERAGE WIDTH OF 5 METRES.

4) EXACT LOCATION OF NEW DRAIN TO BE SPECIFIED IN FIELD BY ENGINEER OR DRAINAGE SUPERINTENDENT PRIOR TO CONSTRUCTION.

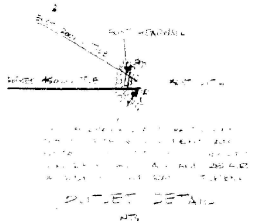
5) CONTRACTOR TO NOTIFY UTILITIES OF ALL UNDERGROUND SERVICES PRIOR TO COMMENCEMENT OF WORK (HYDRO, GAS, WATER, ETC.)

6) ADJACENT OR EXISTING CATCH BASIN OR MANHOLE WHICH IS TO BE REMOVED SHALL BE BACKFILLED IN ACCORDANCE WITH SPECIFICATIONS FOR OPEN DRAIN.

DETAIL "A" SCALE: 1 mm = 500 mm



CLASS 'C' BEDDING FOR RIGID PIPE



OUTLET DETAIL

HARROWER DRAIN			
TOWNSHIP OF WARWICK			
Scale AS SHOWN	Approved By FB D-135	JOB NO. 86103	Drawn By
Date			Revised
PROFILES AND DETAIL			
SPRIET ASSOCIATES LONDON			Drawing Number

Court File No. CV-23-00001165-0000 (Chatham)

CORPORATION OF THE MUNICIPALITY OF CHATHAM-KENT	- and -	CANADIAN PACIFIC RAILWAY COMPANY	- and -	ATTORNEY GENERAL OF ONTARIO, ET AL.
Applicant		Respondent		Intervenor Respondents

ONTARIO
SUPERIOR COURT OF JUSTICE
IN THE COURT OF THE DRAINAGE REFEREE

Proceedings commenced at Chatham

AFFIDAVIT OF TREVOR EVANS
(Sworn February 21, 2025)

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Canadian National Railway Company