

GEOHAZARD RISK MANAGEMENT PROGRAM

North Central Region – Edson / Stony Plain Area

2018 Inspection Report

Site Number	Site Name	Hwy	km
NC75	Frost Heave near Robb	47:06	0.4
Legal Land Description	SW 33-48-21-W5M		
UTM Coordinates (NAD 83)	Zone 11U	N5892678	E499010
Operational Site Instrumentation	Slope Inclinometers	0	
	Pneumatic Piezometers	0	
	Vibrating Wire Piezometers	0	
	Standpipe Piezometers	0	
Date of Last Instrumentation Readings	n/a		

Risk Assessment	Date	PF	CF	Risk Ranking
Current Inspection	March 9, 2018	7	2	14
Previous Inspection	July 13, 2017	7	2	14
Report Attachments	<input checked="" type="checkbox"/> Photographs (4 Photos)		<input checked="" type="checkbox"/> Site Plan (1 Page)	

	Stantec	Alberta Transportation
Inspected By	Junwen Yang and Leslie Cho	Howard Hawley & Dave Farr

Date of Remediation	2017 Summer – fill was placed on the west abutment over exposed H-Piles. Two 100 mm subdrains were installed in the fill placed. September 2014 – 130 m long trench drain installed in the north ditch of the highway		
Recent Maintenance	Guard rail extended on the north side of the highway beyond the access road. Milled and filled in 2015. Highway patched end of May 2016.		
Primary Site Issue	Water seepage through coal outcrop causing frost heave and pavement distresses.		
Observations	Description and Location	Change from Previous Inspection	
<input checked="" type="checkbox"/> Pavement Distress	Previously sealed crack approximately 70 m west of bridge abutment re-opened. Slight heaving at previously observed heave location.	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
<input type="checkbox"/> Culvert Distress		<input type="checkbox"/> Yes	<input type="checkbox"/> No
<input type="checkbox"/> Bridge Distress	New fill was placed for cover at exposed H-piles at west abutment in summer 2017.	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
<input type="checkbox"/> Slope Movement		<input type="checkbox"/> Yes	<input type="checkbox"/> No
<input checked="" type="checkbox"/> Erosion	2017 inspection observed scour hole north of concrete trough drain on west abutment. Not observed during 2018 inspection due to snow cover.	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
<input type="checkbox"/> Seepage	Water seepage north of coal outcrop observed in 2013. Not observed during winter 2018 site visit.	<input type="checkbox"/> Yes	<input type="checkbox"/> No
<input checked="" type="checkbox"/> Other	Water in north ditch observed in 2017 inspection was not observed in 2018 inspection due to snow cover. Water was observed from subdrain pipe outlet north of the west abutment.	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No

Discussion	<p>The current inspection is Stantec's first winter inspection at NC75. The previously sealed transverse crack approximately 70 m west of the bridge abutment has re-opened as shown in Photo 1. This crack appears wider up to about 40 mm wide and coincides with the location of the previously observed frost heave. Slight heaving at the crack up to 20 to 25 mm was observed. It is understood that the frost heave previously reached up to 200 mm in 2013. Frost heave in 2014 was observed to be up to 50 mm. No frost heaving was observed during winter 2015 or 2016 by MCI.</p> <p>Due to snow cover, water was not observed in the north ditch. The scour hole at the base of the trough drain on the northside of the west abutment was also not observed due to snow cover.</p> <p>The trench drain installed in 2014 appeared to be functional with water flowing out of the drain as shown in Photo 2.</p> <p>It appears that fill was placed in summer 2017 to provide cover for the exposed H-piles that were observed during earlier inspections as shown in Photo 3. Two 100mm diameter subdrains pipes were installed in the new fill and shown in Photo 4. A small amount of water was observed running through the new subdrains.</p> <p>The springs and ponded water previously observed by others could not be confirmed during this inspection due to snow cover.</p>
Assessment	<p>Water is believed to infiltrate into and through the coal seam. Water is then able to infiltrate under the highway causing frost heave in the winter months. It is also possible that frost susceptible soils lie beneath the highway.</p> <p>The reduction in frost heave since the trench drain installation suggests that the trench drain is functioning well and as intended. However, the reduction in frost heave in 2014 may have been due to a milder winter compared to 2013. Furthermore, the winter of 2015 saw even milder temperatures and may have contributed to the frost heave reduction. The widening of the crack and slight heaving observed confirmed that the frost heave is still on-going but less than that observed prior to 2014. However, the winter of 2017/2018 was relatively colder than 2016 and may partially explain the crack widening.</p>

Recommendations	<p>Short term recommendations include sealing open pavement cracks to reduce surface water infiltration. The pavement surface should also be monitored regularly for vertical differential settlement to assess the effectiveness of the drain.</p> <p>Consideration to placing riprap at the abutment trough drain and repairing the erosion is recommended. Reseeding the north ditch may also be considered given that very little vegetation has grown since the drain construction. These recommendations may have already been undertaken, however, Stantec was unable to confirm due to snow cover.</p> <p>The frequency of inspection at this site should be reduced to every other year (i.e. next visit 2020). Monitoring of the frost heave should continue in winter to assess the trench drain performance.</p>
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Reference: 2018 Annual Inspection Photographs at NC75 – Frost Heave near Robb
File Number: 123312435



Photo 1: Crack sealed in May 2016 re-opened in 2017. Slight heaving observed. Crack up to 40 mm wide. Looking north



Photo 2: Water flowing out of trench drain outlet on north side of west abutment.

Reference: 2018 Annual Inspection Photographs at NC75 – Frost Heave near Robb
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Photo 3: Fill placed over previously observed fill settlement location. Exposed H-piles backfilled. Looking west.



Photo 4: Two new subdrains installed in west abutment. Looking west.