

GEOHAZARD RISK MANAGEMENT PROGRAM

North Central Region – Edson / Stony Plain Area

2018 Inspection Report

Site Number	Site Name		Hwy	km
NC36	Lazy 'S' Slide		22:32	30.2
Legal Land Description	SW28-56-8-W5M			
UTM Coordinates (NAD 83)	Zone 11U	N5969791	E622172	
Operational Site Instrumentation	Slope Inclinometers		0	
	Pneumatic Piezometers		0	
	Vibrating Wire Piezometers		0	
	Standpipe Piezometers		1	
Date of Last Instrumentation Readings	May 8, 2018			

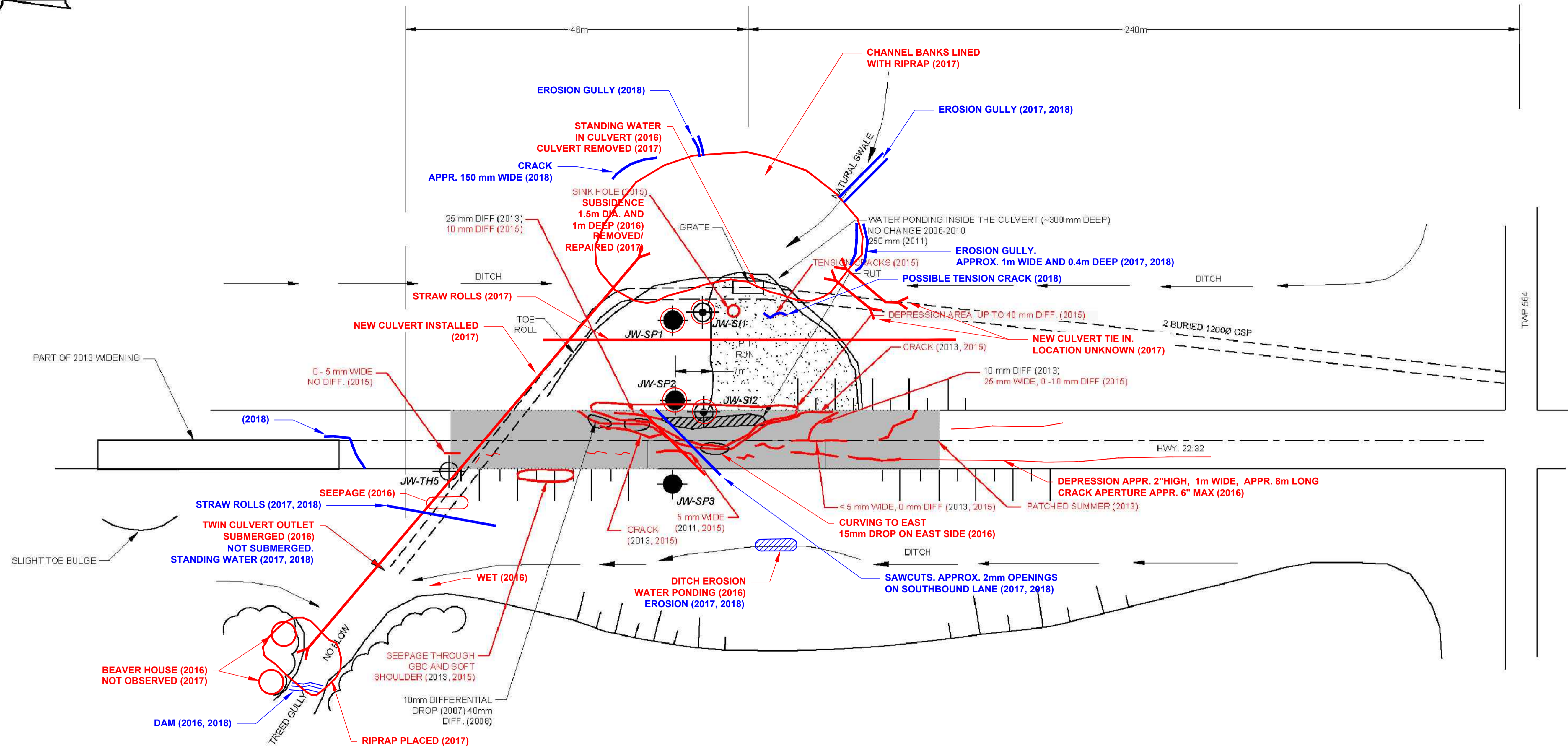
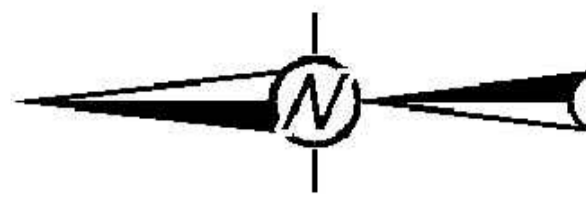
Risk Assessment	Date	PF	CF	Risk Ranking
Current Inspection	June 12, 2017	9	4	36
Previous Inspection	June 12, 2017	8	4	32
Report Attachments	<input checked="" type="checkbox"/> Photographs (9 photos)		<input checked="" type="checkbox"/> Site Plans (1 page)	


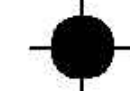
	Stantec	Alberta Transportation
Inspected By	Junwen Yang and Leslie Cho	Rishi Adhikari, Kathleen Davis, Ali Khalid, and Paul Macaraeg
Date of Remediation	2016 – twin culverts replaced with 2120 mm diameter culvert at outlet. Rip rap lined drainage channel constructed to replace	

	previous twin culvert.		
Recent Maintenance	Asphalt patch in 2010 and 2013.		
Primary Site Issue	High groundwater table, slope instability		
Observations	Description and Location	Change from Previous Inspection	
<input checked="" type="checkbox"/> Pavement Distress	<ul style="list-style-type: none"> - Cracks on both northbound and southbound lane. New cracks extended pass 2013 patch. - Depression on southbound lane 	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
<input checked="" type="checkbox"/> Culvert Distress	<ul style="list-style-type: none"> - Standing water at new culvert outlet. 	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
<input type="checkbox"/> Bridge Distress		<input type="checkbox"/> Yes	<input type="checkbox"/> No
<input checked="" type="checkbox"/> Slope Movement	<ul style="list-style-type: none"> - Pavement cracks reflecting through patches - Possible tension cracks south of S11 	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
<input checked="" type="checkbox"/> Erosion	<ul style="list-style-type: none"> - Erosion along north east and south edge of riprap drainage channel 	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
<input type="checkbox"/> Seepage		<input type="checkbox"/> Yes	<input type="checkbox"/> No
<input type="checkbox"/> Other		<input type="checkbox"/> Yes	<input type="checkbox"/> No

Discussion	<p>Pavement cracking appeared to be relatively unchanged as shown in Photo 1 and 2.</p> <p>The previous culverts at the site were removed and reconstructed in 2016 as directed through AT's bridge department. It was noted during the Spring 2017 readings that instruments were destroyed consisting of SP2, SP3, and SI1. SI1 was also noted to be infilled with soil. As part of the reconstruction, a saw cut was used to remove a portion of the roadway. The southern saw cut location can be seen in Photo 2. The new culverts now drain into and out of a riprap lined channel as shown in Photo 3. Straw rolls were placed upslope and to the west of the new drainage channel.</p> <p>The previous twin culvert outlet was replaced by a 2120 mm diameter SPCSP culvert and lined with riprap as shown in Figure 4. Straw rolls were placed upslope from the culvert outlet. A new beaver dam was observed during this inspection. Similar to the 2016 inspection, a treed gully was observed downstream from the culvert outlet.</p> <p>Significant erosion was observed along the natural swale to the south and along the northeast and southern edge of the drainage channel as shown in Photos 5 and 6.</p> <p>The seepage on the west shoulder of the road noted in 2015 was not observed at the time of this inspection.</p> <p>A possible tension crack appeared to be developing south of SI1 as shown in Photo 7. The crack was approximately 10 mm wide and about 200 mm long.</p> <p>Photos of the overall slope are shown in Photos 8 and 9.</p>
Assessment	<p>The water level in SP1 has been decreasing since Spring 2017 from 0.7 m below ground surface (bgs) to its current levels at about 1.2 mbgs.</p> <p>Currently, no SIs are operational at the site. However, the Fall 2016 readings showed a rate of movement of 144 mm/yr in SI2 which is the highest it has ever been. This spike in slope movements is likely due to the recent culvert replacement at the site. The recent Spring 2017 readings showed that the movements have slowed down to 18 mm/year in SI2 suggesting that slope movements are on-going. The most recent rate is at a higher rate than prior to the culvert replacement. The ground crack observed south of SI1 provides further evidence of slope movement. It is understood that the culvert replacement did not address any of the slope stability issues.</p> <p>The recent construction activity and rise in water levels between 2015 and 2017 may be contributing to the ongoing slope movements. If remedial measures are not taken, the slide mass will likely continue to move and lead to further deformation to the pavement surface.</p>

Recommendations	<p>It is recommended that short-term remediation measures should be taken. This may include sealing pavement cracks to reduce surface water infiltration into the slope and pavement structure. Clearing of the treed gully downstream from the culvert may also help to promote drainage.</p> <p>It is recommended that replacement instruments be installed to monitor pore pressure and slope movements.</p> <p>Remediation strategies at this site may include flattening the slope or constructing a berm on the east side of the highway. Installation of a pile wall may also be considered. Due to the high groundwater levels on both sides of the slope, drainage measures should be considered on both sides of the road.</p> <p>On-going monitoring of this site is recommended including the semi-annual instrumentation readings and the annual inspection.</p>
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-  SLOPE INCLINOMETER INSTALLED BY JACQUES WHITFORD (2006)
-  STANDPIPE PIEZOMETER INSTALLED BY JACQUES WHITFORD (2006)

NOTES

1. FEATURE LOCATIONS ARE APPROXIMATE
2. PREVIOUS OBSERVATIONS SHOWN IN BLACK
3. 2015-17 OBSERVATIONS SHOWN IN RED
4. 2018 OBSERVATIONS SHOWN IN BLUE

REFERENCE

THURBER PROJECT No. 15-16-258
AUGUST 2011 ORIGINAL SCALE 1:2000



STANTEC CONSULTING
10160-112 STREET
EDMONTON ALBERTA CANADA

ALBERTA TRANSPORTATION
GEOHAZARD MONITORING PROGRAM
NC36 LAZY "S" SLIDE
SITE PLAN

DRAWN WW / MK	CHECK CDM	APPROVE ID
DATE 13 AUG. 2018	SCALE AS SHOWN	PROJECT # 123312435

FIGURE - 1

Reference: 2018 Annual Inspection Photographs at NC36 – Lazy ‘S’ Slide
File Number: 123312435



Photo 1: Pavement cracking on northbound lane. Looking north.



Photo 2: Dip in northbound lane unchanged. Saw cut visible. Looking west.

Reference: 2018 Annual Inspection Photographs at NC36 – Lazy 'S' Slide
File Number: 123312435



Photo 3: Culvert draining into riprap lined channel. Looking south.



Photo 4: New 2120 mm diameter culvert outlet with riprap lining west of highway. Looking east.

Reference: 2018 Annual Inspection Photographs at NC36 – Lazy ‘S’ Slide
File Number: 123312435



Photo 5: Erosion approximately 150 mm wide at northeast side of riprap channel.



Photo 6: View of east slope. Erosion channel leading to rip rap. Looking south

Reference: 2018 Annual Inspection Photographs at NC36 – Lazy ‘S’ Slide
File Number: 123312435



Photo 7: Ground crack south of JW-S11



Photo 8: View of east slope. Looking south.

Reference: 2018 Annual Inspection Photographs at NC36 – Lazy ‘S’ Slide
File Number: 123312435



Photo 9: View of west slope. Looking south.