GEOHAZARD RISK MANAGEMENT PROGRAM
North Central Region – Edson / Stony Plain Area

2019 Inspection Report

Site Number	Site Name		Hwy	km
NC59	Little Paddle River Slide		43:16	41.4
Legal Land Description	SW 31-57-8-W5M			
UTM Coordinates (NAD 83)	Zone 11U	N5981523	E619300	
Operational Site Instrumentation	**Slope Inclinometers**		3	
	Pneumatic Piezometers		4	
	Vibrating Wire Piezometers		0	
	Standpipe Piezometers		0	
Date of Last Instrumentation Readings	May 8, 2019			

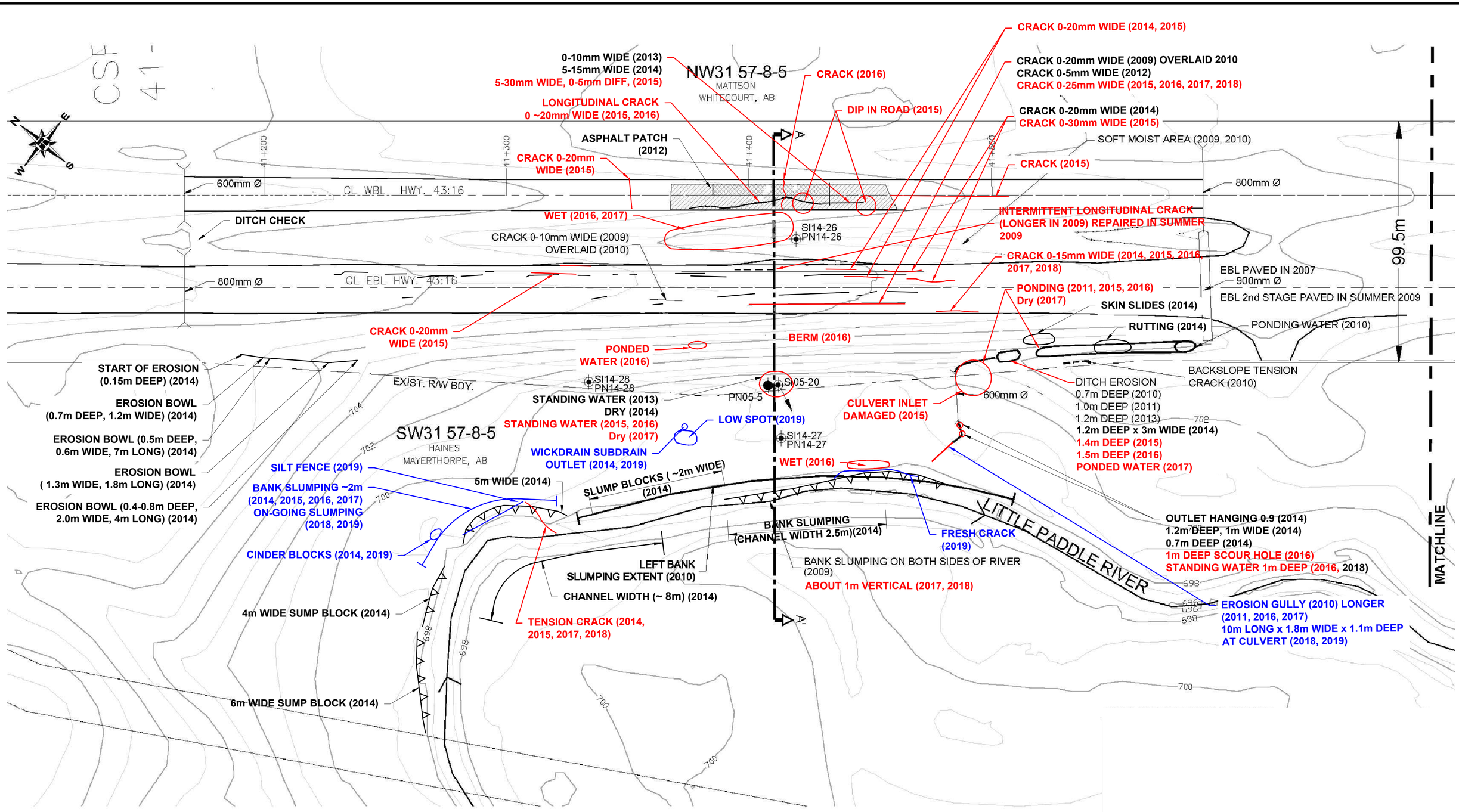
Risk Assessment	Date	PF	CF	Risk Ranking
Current Inspection	May 14, 2019	3	4	12
Previous Inspection	May 30, 2018	3	4	12
Report Attachments	☒ Photographs (7 photos)	☒ Site Plans (2 page)		

	Stantec	Alberta Transportation
Inspected By	Leslie Cho, Junwen Yang, and Xiteng Liu	Kristen Tappenden, Paul Macaraeg, Kathleen Davis, and Tim Germyn
Date of Remediation	2006 – slide mass was partly excavated and rebuilt with a 3 m high berm, wick drains, and stone columns	

Recent Maintenance	Westbound lane patched in summer 2013		
Primary Site Issue	Main Slide Site: Movement in the high plastic clay layer above the high-plastic clay-clay till interface and high pore water pressures. Bridge Abutment Site: Fill settlement of headslope, surface water drainage and bank erosion.		
Observations	**Description and Location**	**Change from Previous Inspection**	
☒ Pavement Distress	- Pavement cracking on both HWY43 eastbound and westbound	☐ Yes	☒ No
☒ Culvert Distress	- Top of culvert outlet slightly deformed	☐ Yes	☒ No
☐ Bridge Distress		☐ Yes	☐ No
☒ Slope Movement	- Creep movement observed in slope inclinometer readings	☐ Yes	☒ No
☒ Erosion	- Erosion on both banks of the Little Paddle River - Erosion/scouring at culvert outlet southeast of SI14-27	☐ Yes	☒ No
☐ Seepage		☐ Yes	☐ No
☐ Other		☐ Yes	☐ No

Discussion	Per AT's direction, the bridge site was not visited during this inspection. As such the current report will be focused on the Main Slide Site shown in Figure 1. Figure 2 showing the Bridge Site is based on 2018 observations. Pavement cracking was observed on both the eastbound and westbound lanes. No obviously new cracks were observed. A 10 m long by 1.8 m wide by 1.1 m deep erosion gully was observed in 2018 at the outlet of the 600 mm diameter culvert southeast of SI05-20. During the current inspection, the gully was found to be full of water and slow flowing as shown in Photos 1 and 2. There appears to be continual riverbank erosion with new scarps and ongoing slumping as shown in Photos 3 to 6.

Assessment	The slide is moving within the high plastic clay layer just above the interface with the underlying clay till. This slide is likely driven by high pore water pressures as well as erosion of the embankment toe by the Little Paddle River. The slope inclinometers continue to show creep movement with the highest rate of movement being observed at SI05-20 with an annualized rate of movement of approximately 2 mm/yr. A continuing trend of slightly increasing piezometric pressures is being observed in TH14-27 and TH14-28. Given the standing water and wet ground conditions observed at site, surface drainage continues to be an issue.
Recommendations	Short term recommendations include sealing cracks to reduce surface water infiltration into the slope and pavement structure. Stantec has completed a remediation design and tender package consisting of installing a pile wall. The tender package is currently with AT. Instrumentation readings at the site should continue to be collected semi-annually, with site inspections completed annually.



NOTES :

1. FEATURE LOCATIONS ARE APPROXIMATE
2. 2012 TO 2013 OBSERVATIONS FROM GOLDER ASSOCIATES FIGURE 1 (DATE SEPTEMBER 6, 2013) SHOWN IN BLACK
3. SEPTEMBER 3, 2014 OBSERVATIONS SHOWN IN BLACK
4. 2015 TO 2018 OBSERVATIONS SHOWN IN RED
5. 2019 OBSERVATIONS SHOWN IN BLUE

LEGEND

- PNEUMATIC PIEZOMETER (PN)
- SLOPE INCLINOMETER (SI)
- DIRECTION OF MOVEMENT IN SLOPE INCLINOMETER
- CULVERT SUBDRAIN INLET/OUTLET

REFERENCE

THURBER ENGINEERING LTD. PROJECT#15-16-326
ORIGINAL SCALE 1:1000 DATE AUGUST 2011.
1m CONTOURS FROM LIDAR PROVIDED BY ALBERTA TRANSPORTATION.

0 20 40 60 80 m

Stantec
STANTEC CONSULTING
400-10220 103 AVENUE NW
EDMONTON, ALBERTA, CANADA
T5J 0K4

ALBERTA TRANSPORTATION
GEOHAZARD MONITORING PROGRAM
NC59 LITTLE PADDLE RIVER
MAIN SLIDE SITE PLAN

DRAWN WW / MK	CHECK XL	APPROVE LC
DATE 16 JUL 2019	SCALE AS SHOWN	PROJECT # 123312435

FIGURE - 1 -

VERTICAL MEASUREMENT FROM BOTTOM OF CONCRETE TO TOP OF ABUTMENT FILL				
	a		b	
	ABUTMENT FACE	AT H-PILES	ABUTMENT FACE	AT H-PILES
SEPT 2014	200mm	450mm	200mm	450mm

SETTLEMENT OF HEADSLOPE FILL UNDER ABUTMENT
(2009, 2010, 2014, 2015)
SLIGHTLY WORSE (2011)
UP TO 120mm (2016)
UP TO 200mm (2017, 2018)

PONDED WATER
NOT OBSERVED IN 2008/2009
MINOR AMOUNT IN 2010
NOT OBSERVED (2011)
PONDED WATER SATURATED GROUND (2012)
DRY (2014)
PONDED WATER AND SATURATED GROUND (2015, 2016)
SATURATED (2017)

BANK EROSION PROGRESSING (2015)
NO CHANGE (2017)
LEANING TREE FELL OVER (2018)

EROSION GULLY UP TO 500mm (2016, 2018)

CRACK (2016)

SURFACE EROSION (2015, 2016)

TENSION CRACK (2015)

2mm SEPARATION BETWEEN BRIDGE ABUTMENT AND CONCRETE DRAINAGE SWALE (2015)

CRACK BETWEEN BRIDGE DECK AND ASPHALT APRON (2009) GROUTED IN LATE JUNE 2009

CORROSION ON EXPOSED H-PILES (2013)

CORROSION ON EXPOSED H-PILES (2013, 2014, 2015, 2017, 2018)

SCARP (NOT OBSERVED SINCE 2007)

SCARP (2010, 2011)

CRACKS (2018)

EROSION ON BOTH SIDES OF RIPRAP APRON (2009)
UP TO 0.6m DEEP (2010)
1.0m (2011)
1.5m DEEP (NW) AND 1.0m DEEP (SE) (2013)
1.5m DEEP, 2.5-3m WIDE AND 1.1m DEEP, 1.5m WIDE, 4m LONG (2014)
~~1.5m DEEP ON WEST SIDE AND 1.0m ON DEEP EAST SIDE~~ (2014, 2015, 2016, 2017)
2 m DEEP x 10 m LONG x 10 m WIDE (2018)

DIVERSION CHANNEL

EXIST. R/W BDY.
CL WBL HWY. 43:16
CL EBL HWY. 43:16
EXIST. R/W BDY.
MATCHLINE
42
42+000
800mm Ø
800mm Ø
60-70 m
LITTLE PADDLE RIVER
THREE RIVERS GAS CO-OP 26.67mm N.G. PIPELINE

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ORIGINAL SCALE 1:1000 DATE AUGUST 2011.
1m CONTOURS FROM LIDAR PROVIDED BY ALBERTA TRANSPORTATION.

0 20 40 60 80 m
SCALE METERS

Stantec

STANTEC CONSULTING
10160-112 STREET
EDMONTON ALBERTA CANADA

ALBERTA TRANSPORTATION
GEOHAZARD MONITORING PROGRAM
NC59 LITTLE PADDLE RIVER
BRIDGE SITE PLAN

DRAWN	WW / MK	CHECK	XL	APPROVE	LC
DATE	14 AUG. 2018	SCALE	AS SHOWN	PROJECT #	123312435

FIGURE - 2 -

Reference: 2019 Annual Inspection Photographs at NC59 – Little Paddle River Slide
File Number: 123312435

Photo 1: Eroded channel at culvert outlet southwest of SI14-27 filled with water. Looking northeast.

Photo 2: Eroded channel at culvert outlet southwest of SI14-27 filled with water. Looking west.

Photo 3: Retrogressing scarp along well vegetated slope and banks. Looking southeast.

Photo 4: Well vegetated banks and slopes at the northwest bend in the river. Looking northwest.

Photo 5: Slumping along southeast meander. Some fresh cracks visible. Looking southeast.

Photo 6: River bank erosion and slumping along. Looking northwest.

Photo 7: Low spot at subdrain outlet. No water observed at outlet. Looking southeast.