

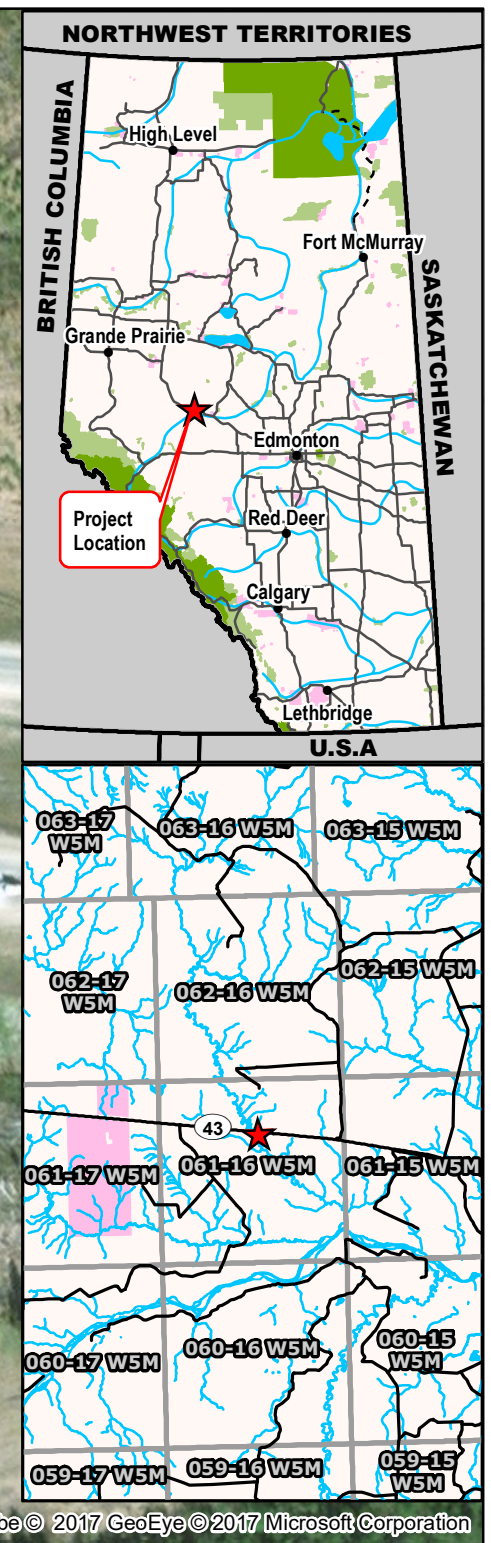
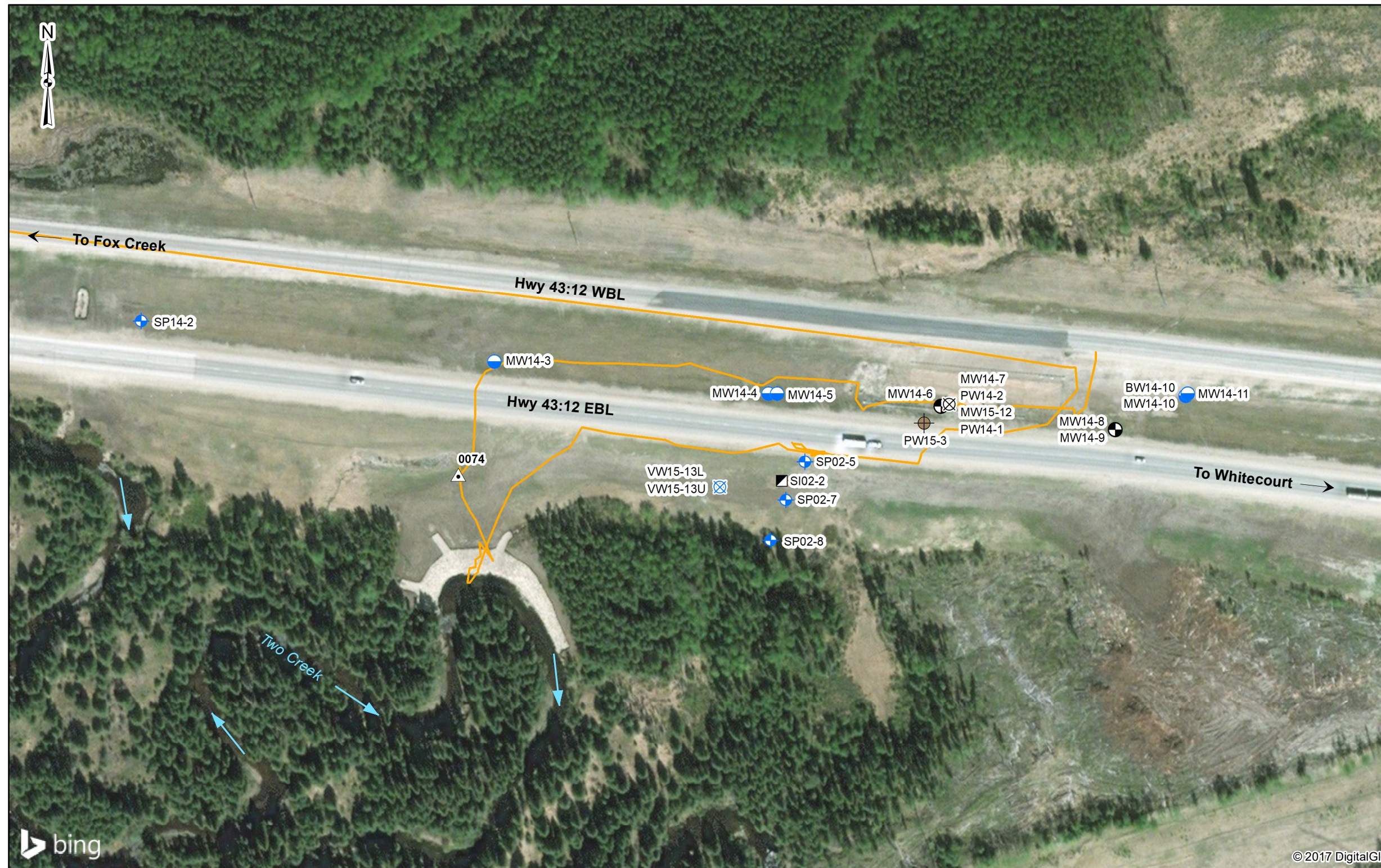
SITE NUMBER AND NAME: GP028 Two Creeks		HIGHWAY & KM: 43:12, 34.473	PREVIOUS INSPECTION DATE: June 18, 2020	INSPECTION DATE: July 19, 2021
LEGAL DESCRIPTION: SW 27-61-16-W5M	NAD 83 COORDINATES: UTM Northing Easting 11 6017213 544193		RISK ASSESSMENT: PF: 11 CF: 5 TOTAL: 55	
AVERAGE ANNUAL DAILY TRAFFIC (AADT): 2900 (west) & 2873 (east) (Reference No. 50431250)			CONTRACT MAINTENANCE AREA (CMA): 508	

SUMMARY OF SITE INSTRUMENTATION: Operational: One SI, six VWP, four standpipes, 8 monitoring wells (six with level loggers), one monitored pumping well. LAST READING DATE: June 28, 2021	INSPECTED BY: Chris Gräpel James Lyons Roger Skirrow (AT) Rocky Wang (AT) Ed Szmata (AT) Max Shannon (AT) Dwayne Lowen (AT MCI)
PRIMARY SITE ISSUE: Landslide cutting across most of the eastbound lanes of the twinned highway and toeing out in the creek. Also, high groundwater levels affecting the pavement subgrade/surface.	
APPROXIMATE DIMENSIONS: Slide about 80 m along highway by 150 m to the creek. Wet subgrade affecting approximately 500 m of eastbound lanes and 60 m of westbound lanes.	
DATE OF ANY REMEDIAL ACTION: In 2003, 1 m deep pavement drains installed beneath the eastbound lane's highway surface, along with a 315 m long, average 2.5 m deep, 400 mm dia. subdrain installed along the median, that outlets via a culvert beneath the eastbound lanes to the creek (the median subdrain was connected to an existing subdrain that was already draining the original westbound lanes). In 2015, installation of two pumps in pump wells with discharge lines connected to the 2003 median subdrain, along with a power connection from the overhead power lines, and a central monitoring station which relays some of the information remotely. Also, Class 2 riprap was keyed into the base of a 100-m length of the north edge of the creek and up along the bank, to protect the creek bank from toe erosion.	

ITEM	CONDITION EXISTS		DESCRIPTION AND LOCATION	NOTICABLE CHANGE FROM LAST INSPECTION	
	YES	NO		YES	NO
Pavement Distress	X		Pavement cracking approx. 0.15 m wide and 0.43 m deep. Approx. 50 mm of pavement settlement in driving lane. Crack starts in shoulder and progresses towards middle of pavement (centreline). Traffic typically changes lanes into passing lane to avoid bump created by settlement.	X	
Slope Movement	X		Pavement settlement (50 mm) and slow movements are being recorded by the one active SI (south of highway)	X	
Erosion	X		Some minor ditch erosion.		X
Seepage		X			X
Culvert Distress	X		Corroding (pavement drain outlet, 3 mbgs) and culvert outlets near instruments are partially blocked with vegetation.		X

COMMENTS
- Both pumps working, previously neither pumped had worked for 2 to 3 years. Pumps were recently replaced with new pumps. Pumps need to be re-set after loss of power.

<ul style="list-style-type: none"> - Looked down vertical CSP risers and viewed water flowing in median drain 	
<ul style="list-style-type: none"> - Pavement cracking extends across EBL centreline and to centre of passing lane but does not continue back to the south (backscarp is not fully formed or reflected in pavement cracking). Cracking pattern does not indicate that slide surface has a fully-formed or, alternatively, had recent movements across the entire backscarp. AT says that the gully to the south of the east flank of the slide is considered to be part of the east flank of the slide zone. Pavement cracking at edge of EBL is 0.43 m deep and 0.15 m wide, with about 3 to 5 cm of vertical deflection of pavement. Traffic was observed switching into the passing lane to avoid uneven pavement. 	
<ul style="list-style-type: none"> - In early spring KCB noted that a delineator was mounted on a steel deck foundation post driven into the cracking on the east flank. The delineator was broken off and re-inserted into the pavement crack, but the deck foundation post left in place by the time of our July 2021 site visit. 	
<ul style="list-style-type: none"> - WP074, outlet of median drain system on south toe of EBL embankment, flowing approximately quarter full, but cobbles in the outlet are impeding flow. 	
<ul style="list-style-type: none"> - Riprap armouring on creek bank in good condition. 	
<p>This report is an instrument of service of Klohn Crippen Berger (KCB). The report has been prepared for the exclusive use of Alberta Transportation (Client) for the specific application to the Central Region Geohazard Risk Management Program (Contract No. CON0022166) and it may not be relied upon by any other party without KCB's written consent.</p> <p>KCB has prepared this report in a manner consistent with the level of care, skill and diligence ordinarily provided by members of the same profession for projects of a similar nature at the time and place the services were rendered. KCB makes no warranty, express or implied.</p> <p>Use of or reliance upon this instrument of service by the Client is subject to the following conditions:</p> <ul style="list-style-type: none"> (i) The report is to be read in full, with sections or parts of the report relied upon in the context of the whole report. (ii) The observations, findings and conclusions in this report are based on observed factual data and conditions that existed at the time of the work and should not be relied upon to precisely represent conditions at any other time. (iii) KCB should be consulted regarding the interpretation or application of the findings and recommendations in the report. 	
<p>Chris Gräpel, M.Eng., P.Eng. Senior Civil Engineer, Associate</p>	



- Legend**
- ▲ GPS Waypoint (July 19, 2021)
 - Barologger (BW)
 - Levelogger (MW)
 - Monitoring Well (MW)
 - Slope Inclinometer (SI)
 - ⊙ Pumping Well (PW)
 - ⊕ Standpipe Piezometer (SP)
 - ⊗ Vibrating Wire Piezometer (PW or MW)
 - ⊗ Vibrating Wire Piezometer (VW)
 - GPS Track (July 19, 2021)
 - Flow Direction

NOTES:
 1. HORIZONTAL DATUM: NAD83
 2. GRID ZONE: UTM Zone 11N
 3. IMAGE SOURCE: Microsoft Bing

CLIENT

Alberta

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PROJECT	GRANDE PRAIRIE SOUTH REGION GEOHAZARD RISK MANAGEMENT PROGRAM	
TITLE	Site Plan GP028 Two Creek Hwy 43:12, km 34.473	
SCALE	PROJECT No.	FIG No.
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Photo 1 The outlets of the twin CSP culverts underlying the westbound lanes of Hwy 43. Photo taken July 19, 2021, facing northeast.



Photo 2 The riprap lined channel at the outlet of the drain pipe underlying the eastbound lanes of Hwy 43. Photo taken July 19, 2021, facing west.



Photo 3 The outlet of the drain pipe underlying the eastbound lanes of Hwy 43 was flowing during the site inspection (WP0074). Photo taken July 19, 2021, facing north.



Photo 4 The riprap at the toe of the highway embankment and outside bend of the creek is in good condition. Photo taken July 19, 2021, facing southeast.



Photo 5 The riprap at the toe of the highway embankment and outside bend of the creek is in good condition. Photo taken July 19, 2021, facing east.



Photo 6 Asphalt cracking in the eastbound travel lane extends from the edge of the asphalt to the centreline. The cracking has worsened since the 2020 inspection. Photo taken July 19, 2021, facing west.



Photo 7 The width of the asphalt cracking in the eastbound travel line is up to 150 mm wide.
Photo taken July 19, 2021.



Photo 8 A delineator post was inserted into the asphalt crack at the edge of the highway before the 2021 inspection. Photo taken July 19, 2021, facing north.

