

SITE INSPECTION FORM

SITE NUMBER AND NAME: GP006 Sheep Creek Embankment (Three Teardrops Slide)		HIGHWAY & KM: 40:36, 21.779	PREVIOUS INSPECTION DATE: July 12, 2019	INSPECTION DATE: June 14, 2022
LEGAL DESCRIPTION: NW 30-58-07-W6M	NAD 83 COORDINATES: UTM Northing Easting 11 5990716 366584		RISK ASSESSMENT: PF: 1 CF: 4 TOTAL: 4	
AVERAGE ANNUAL DAILY TRAFFIC (AADT): 396 (north) & 409 (south) (Reference No. 60403650, 2021)			CONTRACT MAINTENANCE AREA (CMA): 504	

SUMMARY OF SITE INSTRUMENTATION: Operable: Four slope inclinometers (SIs), one pneumatic piezometer (PN), ten vibrating wire piezometers (VWPs), and four standpipe piezometers (SPs) installed in 1998 or 2019. Inoperable: Three SIs and three PNs installed in 1998. LAST READING DATE: June 22, 2022	INSPECTED BY: Chris Gräpel (KCB) Courtney Mulhall (KCB) Ed Szmata (AT) Kristen Tappenden (AT) Max Shannon (AT)
--	--

PRIMARY SITE ISSUE: Landslide in Hwy 40:36 embankment repaired in 2020 with binwall. Highway fill placed in side-hill arrangement on west valley slope of Smoky River. Slide movements were affecting both lanes of highway.

APPROXIMATE DIMENSIONS: An approximate 190-m length of highway was being affected. Highway embankment is approximately 25 m high.

DATE OF ANY REMEDIAL ACTION: 2019 – highway reduced to one lane, gravel added to west shoulder, and temporary traffic lights put in place in response to rapid slide movement. 2020 – binwall (60 bins total) constructed along east side of highway with two subdrains in wall; asphalt ditch constructed between guardrail (modified thrie-beam) and binwall that conveys surface water runoff to a riprap-lined channel at north end of bin wall; mid-slope bench constructed below highway and binwall; horizontal-drains (29 drains total, 13 pairs of two and 3 single) drilled from toe of slope below highway and binwall; and drainage gallery constructed below upslope/west highway ditch. Prior to binwall construction, ongoing crack sealing and pavement patching was required, and original Three Teardrops slide excavated (date unknown).

ITEM	CONDITION EXISTS		DESCRIPTION AND LOCATION	NOTICABLE CHANGE FROM LAST INSPECTION	
	YES	NO		YES	NO
Pavement Distress	X		Cracking and dips previously observed in both lanes prior to binwall construction. Some cracking currently present in both lanes, likely due to binwall taking up load from slide mass.	X	
Slope Movement	X		Slide (and SIs) movements appear to have decreased since binwall construction completed but may increase in response to freshet and/or periods of prolonged and/or heavy rainfall.		X
Erosion	X		Some minor rill erosion forming below rolled erosion control product on east side of highway.		X
Seepage	X		Some drains discharging water at toe of slope.		X
Culvert Distress		X	No culverts observed by KCB.		X

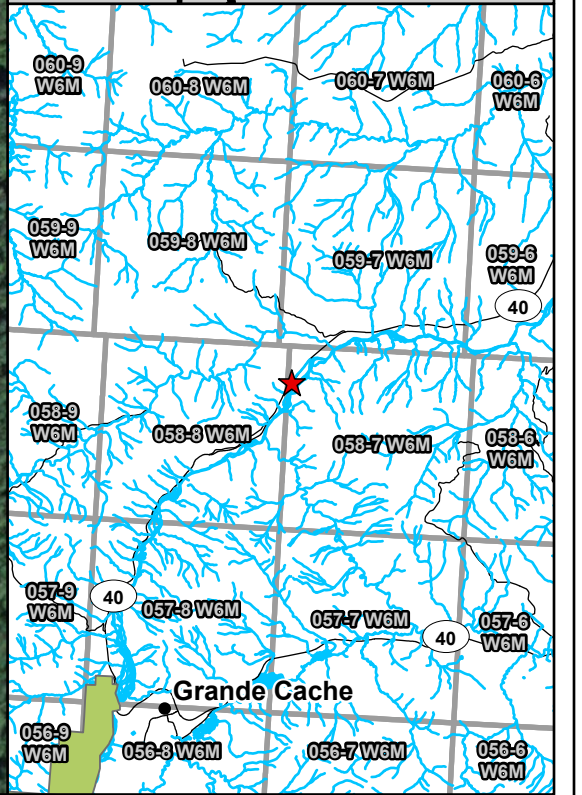
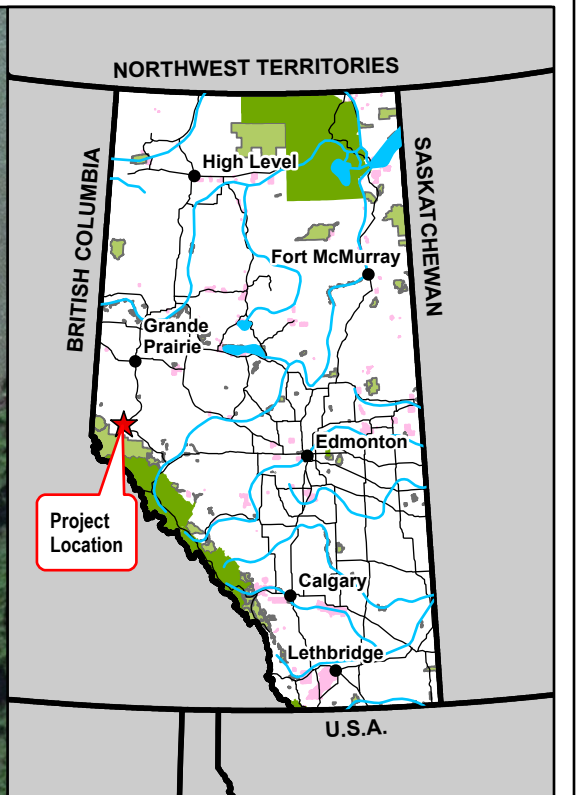
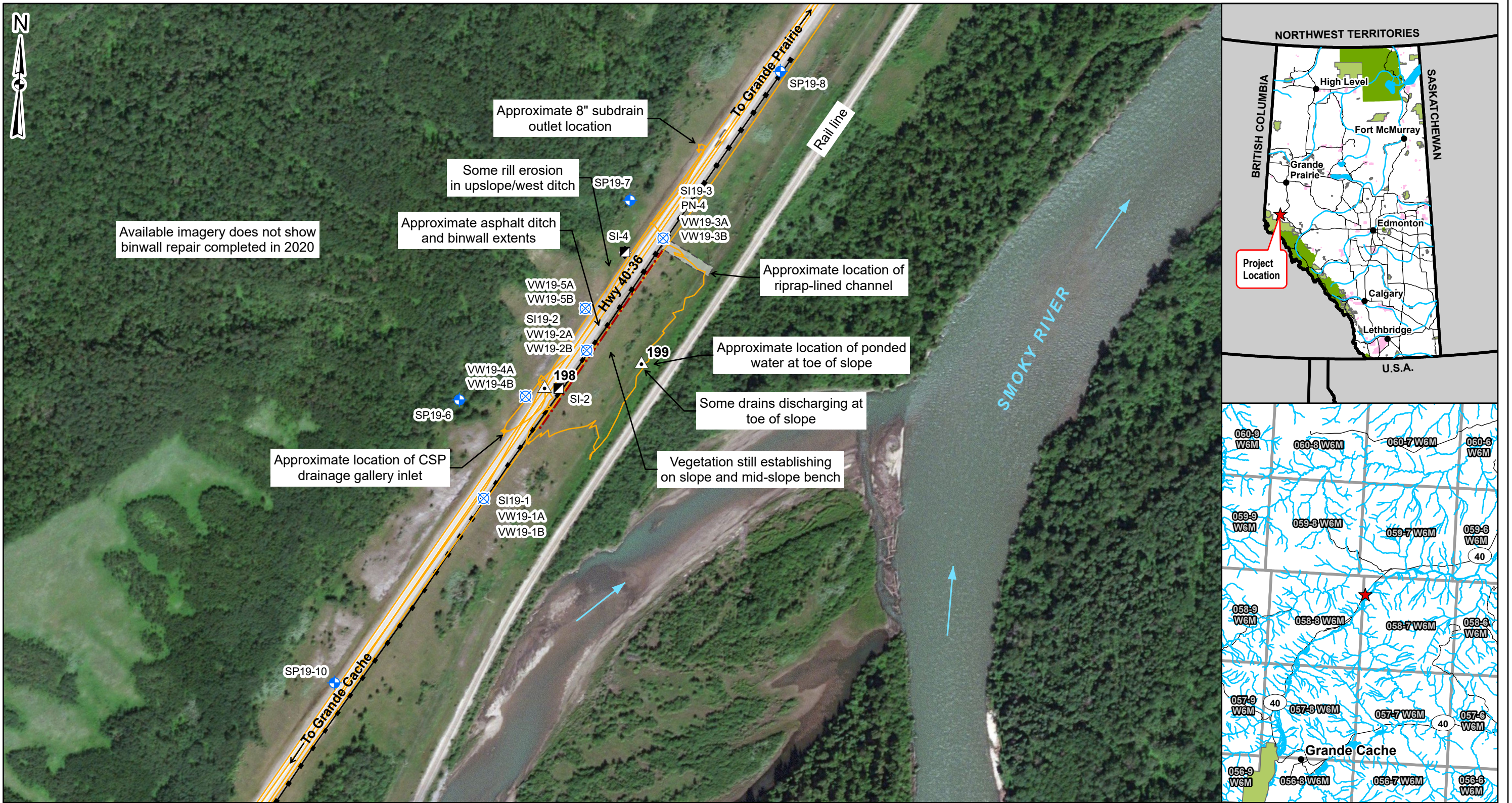
COMMENTS
Vegetation still establishing on slope and mid-slope bench below highway and binwall.
A couple horizontal drains at toe of slope flowing and a few trickling. Mostly at mid to north end of binwall where wet conditions were encountered during construction. Pond of water in front of flowing drain at WP199.
Pore pressures recorded in some piezometers have decreased, which could be attributed to the installation of drains during 2020 binwall construction.
Sloughing and riprap settlement around outlets of horizontal drains at toe of slope. Conglomerate and clay shale used as riprap around outlets of horizontal drains already showing signs of deterioration.
More flow around 8-in diameter subdrain in upslope/west ditch then out drain outlet.
<u>Maintenance/Repair/Monitoring Recommendations:</u> <ul style="list-style-type: none"> • Continue to maintain and clean ditch and existing subdrain system. • Inlet of CSP drainage gallery sticks up approximately 0.5 m above ditch bottom and is a potential roadside hazard to motorists who go off the highway. Insulation around inlet is also deteriorating. A guardrail could be installed along west side of highway to protect against this roadside hazard.
<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 Peace Region (Grande Prairie District – South) 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) The report is based on information provided to KCB by the Client or by other parties on behalf of the client (Client-supplied information). KCB has not verified the correctness or accuracy of such information and makes no representations regarding its correctness or accuracy. KCB shall not be responsible to the Client for the consequences of any error or omission contained in Client-supplied information. (iv) KCB should be consulted regarding the interpretation or application of the findings and recommendations in the report. (v) This report is electronically signed and sealed and its electronic form is considered the original. A printed version of the original can be relied upon as a true copy when supplied by the author or when printed from its original electronic file.



PEACE REGION
(GRANDE PRAIRIE DISTRICT – SOUTH) GRMP
SITE INSPECTION FORM



<p>Chris Gräpel, M.Eng., P.Eng. Senior Civil Engineer, Associate</p>	
--	--



Legend

- ◆ Approximate Pneumatic Piezometer Location
- ▣ Approximate Slope Inclinator Location
- ⊕ Approximate Standpipe Piezometer Location
- ⊗ Approximate Vibrating Wire Piezometer Location
- ▲ GPS Waypoint (June 14, 2022)
- GPS Track (June 14, 2022)
- Flow Direction
- - - Binwall Extent
- Guardrail
- ▭ Riprap-Lined Channel



NOTES:
 1. HORIZONTAL DATUM: NAD83
 2. GRID ZONE: UTM ZONE 11N
 3. IMAGE SOURCE: 2022 MICROSOFT CORPORATION, 2022 MAXAR CNES, DISTRIBUTION AIRBUS DS

CLIENT



PROJECT
 PEACE REGION (GRANDE PRAIRIE DISTRICT-SOUTH)
 GEOHAZARD RISK MANAGEMENT PROGRAM

TITLE
 Site Plan
 GP006 - Sheep Creek Embankment
 (Three Teardrops Slide)
 Hwy 40:36, km 21.779

SCALE 1:3,000 PROJECT No. A05116A01 FIG No. 1

Inspection Photographs

Photo 1 Binwall and mid-slope bench on downslope/east side of Hwy 40:36. Vegetation still establishing on slope and mid-slope bench. Photo taken June 14, 2022, facing northeast.



Photo 2 Toe of slope below highway and binwall. Photo taken June 14, 2022, facing northeast.



Photo 3 Outlet of horizontal drain (circled in white) flowing at WP 199. Ponded water at toe of slope below highway and binwall. Photo taken June 14, 2022 facing northwest.

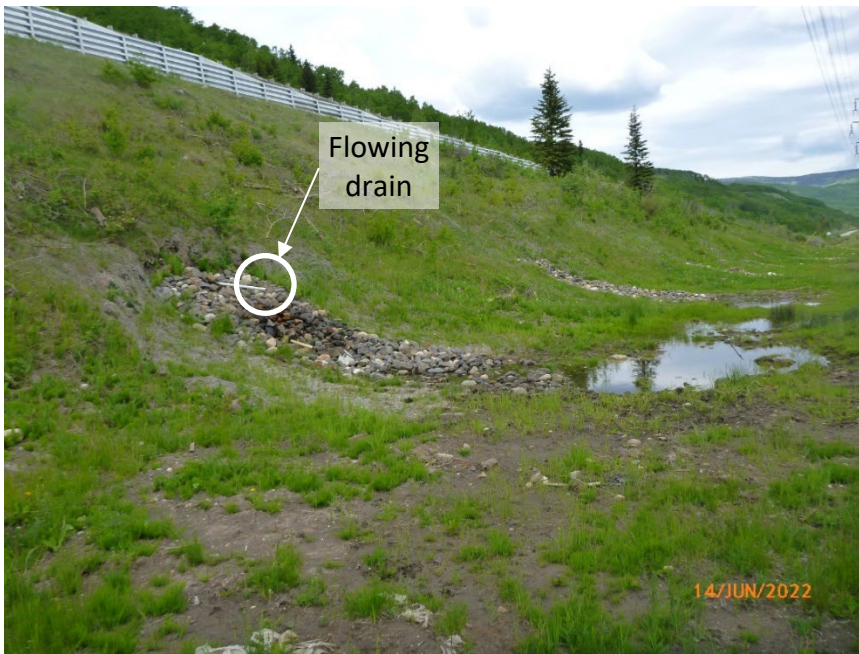


Photo 4 Binwall and mid-slope bench along downslope/east side of Hwy 40:36. Vegetation still establishing on slope and mid-slope bench. Photo taken June 14, 2022 facing southwest.



Photo 5 Riprap-lined channel at north end of binwall that conveys flows from asphalt ditch between guardrail and binwall to toe of slope. Photo taken June 14, 2022, facing northwest.



Photo 6 Connection between asphalt ditch between guardrail and binwall, and top of riprap-lined channel at north end of binwall. Photo taken June 14, 2022, facing south.



Photo 7 Asphalt ditch between guardrail and binwall. Some cracking in pavement surface of Hwy 40:36 likely due to binwall taking up load from slide mass. Inlet of CSP drainage gallery (circled in white) in upslope/west ditch of Hwy 40:36. Photo taken June 14, 2022, facing southwest.



Photo 8 Some cracking in pavement surface of Hwy 40:36 likely due to binwall taking up load from slide mass. Photo taken June 14, 2022, facing north.



Photo 9 Check dams and outlet of CSP subdrain in upslope/west ditch of Hwy 40:36. Photo taken June 14, 2022, facing southwest.



Photo 10 Inlet of CSP drainage gallery in upslope/west ditch of Hwy 40:36. Note inlet of CSP drainage gallery sticks up approximately 0.5 m above ditch bottom and is a potential roadside hazard to motorists who go off highway. Insulation around inlet is also deteriorating. Photo taken June 14, 2022, facing northeast.

