

SITE NUMBER AND NAME: C065-1, -2, -3, -4, and -5 East of Trochu Slide		HIGHWAY & KM: 585:02, 16.136	PREVIOUS INSPECTION DATE: August 10, 2022 (warranty inspection)	INSPECTION DATE: June 19, 2024
LEGAL DESCRIPTION: 15-22-33-22 W4M	NAD 83 COORDINATES: UTM Northing Easting 12 5746228 359147		RISK ASSESSMENT: C065-1: PF: 1 CF: 5 TOTAL: 5 C065-3: PF: 3 CF: 5 TOTAL: 15 C065-4: PF: 3 CF: 4 TOTAL: 14 C065-5: PF: 3 CF: 4 TOTAL: 14	
AVERAGE ANNUAL DAILY TRAFFIC (AADT): 380 (east) (Ref No. 105290)			CONTRACT MAINTENANCE AREA (CMA): 517	

SUMMARY OF SITE INSTRUMENTATION: Operational: Five slope inclinometers (SIs) installed in 2017 and 2021. Four vibrating wire piezometers (VWPs) installed in 2017. Inoperable: One SI and two VWPS installed in 2017 (removed during 2021 construction). LAST READING DATE: May 15, 2024	INSPECTED BY: Chris Gräpel (KCB) James Lyons (KCB) Tony Penney (TEC) Rocky Wang (TEC)
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PRIMARY SITE ISSUE: Several geohazards along an approximate 1 km long section of H585:02, on the west valley slope of the Red Deer River valley, that are causing pavement distress. C065-1: Slope failure affecting both lanes of H585:02. C065-2: Series of linear and shallow depressions, or troughs, in the pavement surface near the middle of C065. C065-3: Slope failure affecting both lanes of H585:02. C065-4 and -5: Slope failure on the north side of H585:02 and extends into the westbound lane.

APPROXIMATE DIMENSIONS: C065-1: Approximately 50 m along H585:02. C065-2: Approximately 600 m long, 4 m to 8 m wide, and up to 0.1 m deep. C065-3: Approximately 20 m along H585:02. C065-4: Approximately 30 m along H585:02. C065-5: Approximately 30 m along H585:02.

DATE OF ANY REMEDIAL ACTION: Ongoing asphalt patching and paving and speed reduction signs installed. Winter 2021 – two H-pile walls were installed at the C065-4 and -5 subsites as part of Contract No. CON0021394. The H-pile walls (HP360x132) were approximately 10 m deep and 33 m and 16 m long, respectively. In total, 83 piles were driven (56 and 27 H-piles at the C065-4 and -5 sites, respectively). Summer 2021 – the C065-1, -2, and -3 sites were repaired as part of Contract No. CON0021408. C065-1 – the highway embankment was excavated and replaced with geogrid reinforced granular fill (with a shear key and drainpipe installed along the base). C065-2 – the top 1 m of the highway subgrade was removed and replaced with geogrid reinforced granular fill. Drainage improvements were also completed (grading and placing a clay cap along the ditches and installed a 600 mm diameter CSP culvert). C065-3 – the 1 m diameter CSP culvert was replaced, and a gabion basket inlet structure and riprap lined channel were installed at the culvert inlet and outlet, respectively.

ITEM	CONDITION EXISTS		DESCRIPTION AND LOCATION	NOTICABLE CHANGE FROM LAST INSPECTION	
	YES	NO		YES	NO
Pavement Distress	X		C065-1, -3, -4, and -5: No significant changes were observed during 2024 inspection		X
Slope Movement	X		C065-1, -3, -4, and -5: No significant changes were observed during 2024 inspection		X
Erosion		X	C065-2: Erosion in the north and south ditches was not inspected during 2024 inspection		X

Seepage	X		C065-1: No significant change in the seepage from spring and drain outlet was observed during 2024 inspection		X
Culvert Distress		X	N/A – none observed during 2024 inspection.		X

COMMENTS

C065-1:

- The pavement surface along the site is in good condition (Photo 1) indicating the repair is performing well. A pavement dip was observed at the west extent of C065-1 repair and the existing highway subgrade (Photo 2) which may be attributed to differential settlement.
- The highway embankment slope is in good condition and is relatively well vegetated for sites within the Red Deer River valley (Photo 3).
- The drain outlet at the toe of the slope is in good condition (Photo 4). Although no flow was observed during the inspection, there was evidence that the drain is flowing (i.e., ponded water and wet ground at and downstream of the drain outlet, respectively).
- Minimal flow was observed from an existing spring located in the upslope (south) ditch near the west extent of the repair (Photo 5).
- There is ongoing ditch erosion downhill (east) of the C065-1 site (Photo 6). The degree of erosion appears similar as during the August 2022 warranty inspection.

C065-2:

- Not inspected during the 2024 inspection. No significant changes from the August 2022 warranty inspection were observed while driving from the C065-1 to the C065-3 subsites.

C065-3:

- The pavement surface above the slide appears to be in similar condition as during the August 2022 warranty inspection (Photo 7).
- The highway embankment slope upslope and east of the riprap-lined channel is well vegetated and appears to be in good condition (Photo 8).
- The culvert outlet and riprap-lined channel appears to be in good condition (Photo 9).
- The gabion basket inlet structure appears to be in good condition (Photo 10).
- There guardrail impact attenuator for the south guardrail is damaged (Photo 11). KCB suspects the guardrail was likely damaged during snow clearing activities.

C065-4:

- The pavement surface above the slide appears to be in similar condition as the last inspection (Photo 12). The pavement cracking and settlement is isolated to the north (westbound) lane and does not appear to have expanded laterally.
- There is minor settlement above the 2021 H-pile wall where backfill material has settled between the piles (Photo 14).

C065-5:

- Not inspected during the 2024 inspection. No significant changes from the 2022 warranty inspection were observed while driving west from the C065-4 subsite.

Maintenance/Repair/Monitoring Recommendations:

- The site should continue to be regularly inspected by TEC's Maintenance Contract Inspector (MCI) and TEC and KCB should be notified if they observe any changes to the site.

- The inspection frequency should be reduced from annually to once per contract as part of the Central Region Section B Inspections. The site should continue to be read in the spring and fall as part of the Section C Instrumentation Monitoring program.
- The following should be completed by TEC's Highway Maintenance Contractor (HMC):
 - The impact attenuator at the C065-3 site should be repaired.
 - Speed reduction and grooved pavement ahead signs on either side of the site should be removed.
 - The settlement/voids above the H-pile walls should be backfilled with sand and gravel.

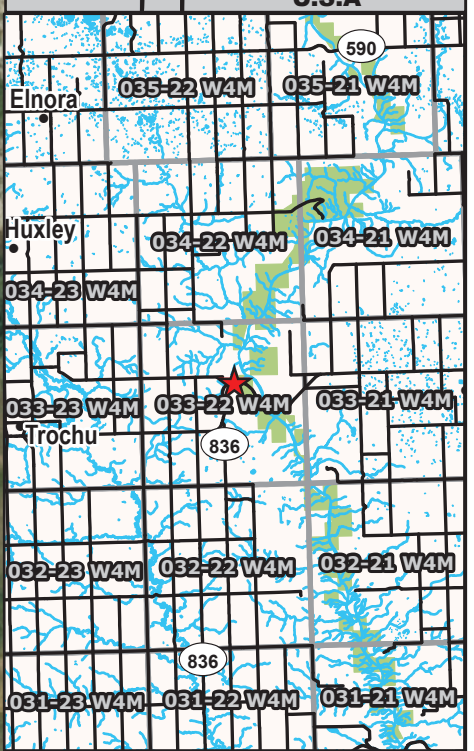
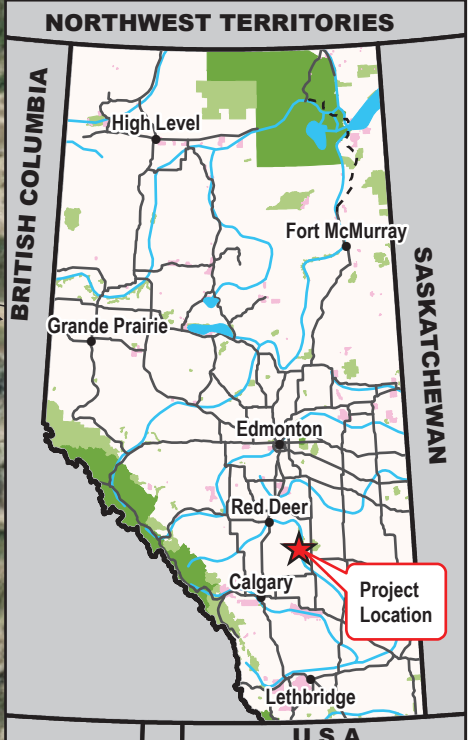
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James Lyons, P.Eng.
Civil Engineer



C065-1 Original Slide:

Photo 1 **The pavement at the C065-1 site is in good condition and no pavement distress was observed. Photo taken June 19, 2024, facing northwest.**



Photo 2 **A dip in the pavement is west (uphill) of the C065-1 site at the repair-existing highway contact. Photo taken June 19, 2024, facing east.**



Photo 3 The slope at the highway embankment repair is in good condition and relatively well vegetated. Photo taken June 19, 2024, facing northwest.



Photo 4 The drain outlet is in good condition. No flow was observed, but there was evidence of recent flow observed at and downstream of the drain outlet. Photo taken June 19, 2024, facing northeast.



Photo 5 Minor flow was observed at a spring located in the south (eastbound) ditch.
Photo taken June 19, 2024, facing west.



Photo 6 There is ongoing ditch erosion in the south (eastbound) ditch east of the C065-1
subsite (east of the 2021 repair). Photo taken June 19, 2024, facing west.



C065-3 Wasp Nest Slide:

Photo 7 Pavement surface at the C065-3 site is in fair condition. Headbox containing two piezometers and one slope inclinometer is in good condition but is covered by a thin layer of sand and gravel. Photo taken June 19, 2024, facing west.



Photo 8 Slope upslope and east of the 1 m diameter CSP culvert and riprap lined outlet channel is in good condition. Photo taken June 19, 2024, facing east.



Photo 9 The riprap lined outlet channel downstream of the 1 m diameter CSP culvert appears to be in good condition. Photo taken June 19, 2024, facing east.



Photo 10 Gabion basket inlet structure appears to be in good condition. Photo taken June 19, 2024, facing northwest.



Photo 11 Impact attenuator for the south (eastbound) guardrail is damaged and was likely damaged during snow clearing activities. Photo taken June 19, 2024, facing east.



C065-4 Lower Slide

Photo 12 Pavement patch above the C065-4 slide appears in similar condition as during previous inspections. Photo taken June 19, 2024, facing west.



Photo 13 The three slope inclinometers (2017 and 2021) installed at the C065-4 site. Locations indicated by red arrows. Photo taken June 19, 2024, facing east.



Photo 14 **Settlement of fill above the 2021 H-pile wall. Photo taken June 19, 2024, facing west.**

