

SITE NUMBER AND NAME: S052 Nelson Creek		HIGHWAY & KM: 22:08, 34.25	PREVIOUS INSPECTION DATE: June 15, 2016	INSPECTION DATE: June 1, 2017
LEGAL DESCRIPTION: 10-14-013-02 W5M	NAD 83 COORDINATES: UTM Northing Easting 11 5552067 702482		RISK ASSESSMENT: PF: 7 CF: 2 TOTAL: 14	
AVERAGE ANNUAL DAILY TRAFFIC (AADT): 2,800 (south), (Ref. No. 75120)			CONTRACTOR MAINTENANCE AREA (CMA): 27	

SUMMARY OF SITE INSTRUMENTATION: None	INSPECTED BY: Chris Gräpel (KCB) Peter Roy (KCB) Ross Dickson (AT) Roger Skirrow (AT) Ammar Zaidi (AT)
LAST READING DATE:	

PRIMARY SITE ISSUE: Pavement deformation caused by bearing capacity failure of embankment with deformation towards west. There may be a frost heave component to the pavement deformations.

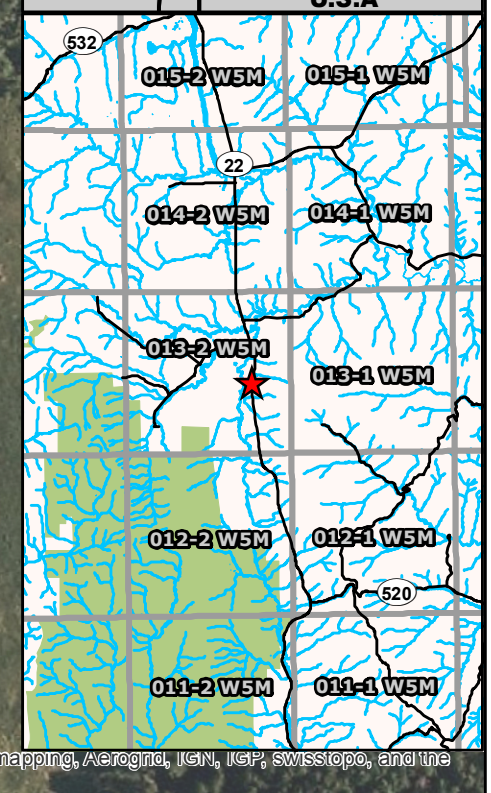
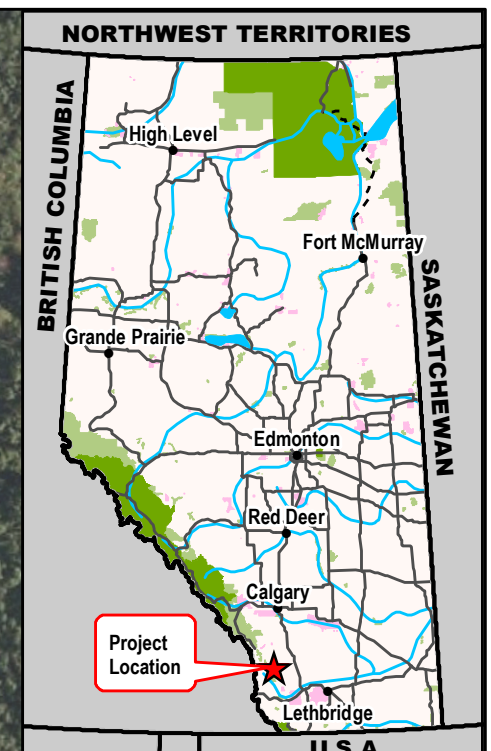
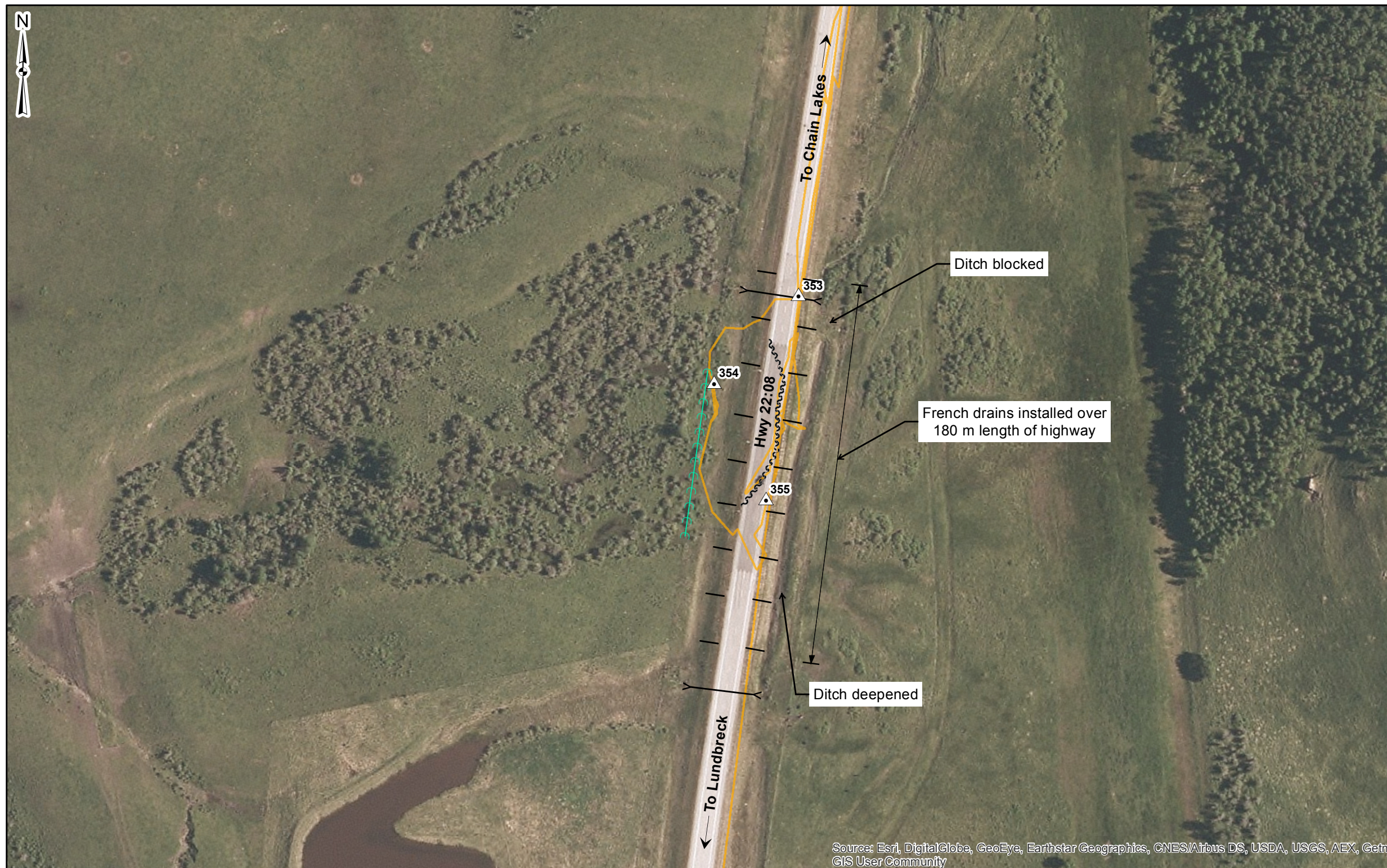
APPROXIMATE DIMENSIONS: Embankment is 3 to 4 m high with slopes of 3H:1V on the east side and 4H:1V on the west side.

DATE OF ANY REMEDIAL ACTION: French drains installed on embankment slopes on both sides of the embankment over a length of approximately 180 m. The French drains were installed about 10 to 15 years ago. Ditch on east side of highway deepened, date unknown. Patching and pavement milling done since 2016 inspection to level out the highway. A new pavement patch is located at waypoint 355.

ITEM	CONDITION EXISTS		DESCRIPTION AND LOCATION	NOTICABLE CHANGE FROM LAST INSPECTION	
	YES	NO		YES	NO
Pavement Distress	X		Cracking, heaved, and uneven pavement surface. Cracks vary in width from tight to 3.5 cm wide. Pavement built up by ~0.3 m at edge and is very steep. On east side of road, arcuate crack was patched over		X
Slope Movement		X	Slope movement most pronounced on west slope with head scarp located across centreline in northbound lane		X
Erosion		X			X
Seepage		X	Water at base of ditch, poor ditch drainage. No sign of drainage from french drains		X
Culvert Distress		X			X

COMMENTS
Overall, higher ground to east of highway, terrain slopes down to the west.
The ditch has been deepened in the past to a depth of 2.5 to 3 m with steepening of the east embankment slope and construction of a narrow bottom width for the ditch (2 m). The ditch drains towards the north until a grade change at the base of the ditch prevents water from reaching the culvert at waypoint 353. The grade change is due to the end of additional ditch excavation to make the ditch deeper.
Exposed soil at base ditch is silt, sandy, very wet, and soft. The failure mechanism of this site could be a bearing capacity failure, exacerbated by frost heaving. A toe roll is present in the west ditch, at waypoint 354.
The french drains appear to be built to dewater to embankment but there is no record of their construction or purpose.
In the short term, AT should install a guardrail of HTCB at the site to mitigate the steep drop off at the edge of the pavement until repairs can be designed and constructed.
A file review should be conducted to obtain available background information (e.g. 1987 borehole data, construction and maintenance records, highway grade line drawings). Depending on the availability of background data, a geotechnical investigation should be conducted with instrumentation to assess groundwater level, depth of movement, and depth of frost penetration (piezometers, inclinometers, and ground temperature cables). Depending on the findings of the geotechnical investigation and instrumentation monitoring, the method of repair may include one or more drains, a gravel shear key, a pile all, toe berm, a geosynthetic reinforced slope, and, if frost heaving is an issue, replacement of frost susceptible fill with non-frost susceptible fill.

Time: 12:31:03 PM
 Date: August 10, 2017
 File: Z:\A\EDM\A05115A03\ABT Southern Region GRMP\A00 Drawings\2017\Section BIMXD\S052_170810.mxd



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerognd, IGN, IGP, swisstopo, and the GIS User Community

Legend

- GPS Track (June 1, 2017)
- ▲ GPS Waypoints (June 1, 2017)
- ~~~~~ Crack
- - - Toe Roll
- > < Culvert
- - - French Drain



NOTES:
 1. HORIZONTAL DATUM: NAD83
 2. GRID ZONE: UTM Zone 11N
 3. IMAGE SOURCE: World Imagery from ESRI
 ArcGIS Online, Image dated July 15, 2012

CLIENT

Alberta
Transportation

Klohn Crippen Berger

PROJECT SOUTHERN REGION GEOHAZARD RISK MANAGEMENT PROGRAM		
TITLE Site Plan S052 - Nelson Creek Hwy 22:08, km 34.25		
SCALE 1:2,000	PROJECT No. A05115A03	FIG No. 1

Photo 1 North extend of pavement distress area. Uneven pavement surface. Patching and asphalt milling done since previous inspection. Photo taken facing south on June 1, 2017.



Photo 2 South extent of site. Note french drains off shoulder of the highway. Photo taken facing north on June 1, 2017.



Photo 3 Deepened narrow ditch with steepened embankment slope on east side of highway. Standing water in ditch. Photo taken facing north on June 1, 2017.



Photo 4 Base of ditch on east side of highway. Ditch unable to drain due change in ditch grade before culvert. Photo taken facing north on June 1, 2017.

