
ALBERTA TRANSPORTATION LANDSLIDE RISK ASSESSMENT

SECTION A: GEOTECHNICAL FILE REVIEW

NORTH CENTRAL REGION

SITE NC79: WEDGEWOOD SLIDE

LEGAL LOCATION:	SE 8-52-25-W4
NEAREST LANDMARK:	1 km SOUTH OF LESSARD ROAD EXIT 14 ON ANTHONY HENDAY ROAD
Highway Control Section:	HWY 216:06, km 13.1
Date of Initial Observation:	2013
Date of Last Inspection:	2017
Last Inspected By:	Stantec Consulting Inc.
Instruments Installed:	None
Instruments Operational:	N/A
Risk Assessment:	Slide – $PF(9) \cdot CF(3) = RL (27)$ Erosion – $PF(8) \cdot CF(3) = RL (24)$
Last Updated:	September 2017 – Stantec Consulting Ltd.



1. LOCATION

The site is located at the southwest leg of the Anthony Henday ring road (Hwy 216:06, km 13.08), approximately 1 km south of the Exit 14 to Lessard Road. The legal land description is SE 8-52-25-W4.

2. GENERAL DESCRIPTION OF SLOPE INSTABILITY

Site NC79 is located along the Wedgewood Creek Ravine, a small tributary to the North Saskatchewan River. The site consists of a divided 4 lane highway that was constructed in 2004 as part of the southwest Anthony Henday Drive (AHD) development. The ravine valley is approximately 20 m below the bridge crossing and slopes were originally constructed at a 3H:1V grade. A study was conducted by EBA in 2001 of an old "inactive slide" at the current slide location. The "inactive slide" top portion was trimmed off as part of the 2004 highway construction.

The site was inspected by EBA and two slump failures (north and south slide) located west of the southbound lane on the upper valley slope were highlighted in the site inspection report dated May 31, 2013. The slide was approximately 15 m to 20 m wide and 5 m deep. The north slide extended to the valley toe and into the Wedgewood Creek while south slide was contained within the slide mass. It is believed that the slides were caused by a combination of fill that was placed during the construction of the north approach resulting in blockage of ground seepage and overland surficial flow that bypassed undersized and/or blocked catch basin manholes.

Separate from the two slides, multiple erosion areas were also observed along the bridge headslope, on the pedestrian trail, and storm water outfall northeast of the northbound lane. The erosion at these locations provides additional evidence of overland surficial flow due to blocked and/or undersized catch basins.

3. GEOLOGICAL/GEOTECHNICAL CONDITIONS

PHYSIOGRAPHIC REGION

Eastern Alberta Plains

BEDROCK GEOLOGY

Bedrock geology found on this site belongs to Horseshoe Canyon Formation, consisting of clay shale, sandstone interbedded with siltstone, and bentonitic mudstone. Based on the water well records, bedrock is anticipated to be shallower than 45 m.

SURFICIAL GEOLOGY

The site is located in an area of glaciolacustrine sediments overlain by highway embankment fill. The valley slopes of the Wedgewood Creek tributary generally comprise of colluvial deposits overlying bedrock belonging to Horseshoe Canyon Formation.



SITE STRATIGRAPHY

Four boreholes were advanced in January 2003 by AMEC for instrumentation installation. The boreholes were drilled on the south and north benches for the bridge pier and upslope from the bench abutments. The boreholes were drilled to depths of approximately 16.5 m and 22.5 m below ground surface. The stratigraphy encountered within the borehole investigation generally consisted of embankment fill overlying clay and/or silt, overlying, A rafted clay shale layer was found in two boreholes in within the clay till layer. No bedrock was encountered based on the borehole logs.

HYDROGEOLOGY

The hydrogeology map shows that the groundwater and surface water tends to drain from the uplands toward Wedgewood creek. The groundwater yields typically between 2 L/sec to 8 L/sec.

4. CHRONOLOGY

GENERAL

As documented by Alberta Transportation, reports from previous inspection and construction activities in the area highlighted that the valley slopes were part of the 2004 AHD development. In mid-October 2012, slope instability was observed by an environmental consultant (Pisces Environmental Consulting Services) undertaking environmental work along the Wedgewood Creek Ravine. Pisces had noted slump banks encroaching into the creek. Subsequently, the first inspection was conducted by EBA in 2013.

No long-term remediation was recorded in the historical data.

2003

AMEC drilled four (4) boreholes for installing slope inclinometers as part of design and construction of the AHD crossing over Wedgewood Creek.

2004

According to the EBA call-out report, the crossing at Wedgewood Creek was constructed in 2004 as part of the AHD development. The ravine valley is approximately 20 m below the bridge crossing and slopes were originally constructed at a 3H:1V grade.

2012

In 2012, Pisces Environmental Consulting Services observed slumping of the slope that encroached into the creek.



2013

EBA responded to a call-out request. Observations from the call-out include two slides located southwest of the highway. The slides are known as the north and south slides.

The slides were measured to be approximately 15 m to 20 m wide and 5 m deep. The north slide extended to the valley toe and encroached into the Wedgewood Creek while south slide was contained within the slide mass.

2015

In 2015, silt fences were observed along the creek valley but the exact year of the installation is unknown. The slide debris run-out was found to be partially blocking the creek. Erosion was also observed along the bridge headslope, on the pedestrian trail, and storm water outfall. Erosion and slumping around the stormwater outfall structures located north of the northbound lane on either side of the creek appears to have worsened considerably with the concrete drainage pipe behind the outfall exposed. The gabion baskets at the outfalls were significantly deformed.

2016

Erosion upslope from the west outfall had progressed considerably. The concrete drainage pipe upslope from the outfall had displaced by about 250 mm with water flowing under and around the drop structure.

2017

Erosion and slumping around the stormwater outfall appears to be worsening every year. Separation of the concrete drainage pipe at the east outfall was observed. Water was flowing under the outfall structure

5. GEOTECHNICAL INSTRUMENTATION

Currently, there are no instruments installed at the site.

6. REFERENCES

Alberta Transportation, Geotechnical Files.

Alberta Energy Regulator, October 17, 2005, "Hydrogeological map of the Edmonton area (southwest segment), Alberta, NTS 83H (part)."

Alberta Energy Regulator, 2013, "Alberta Geological Survey Map 600 – Bedrock Geology of Alberta,"

Alberta Energy Regulator, 2013, "Alberta Geological Survey Map 601 – Surficial Geology of Alberta,"



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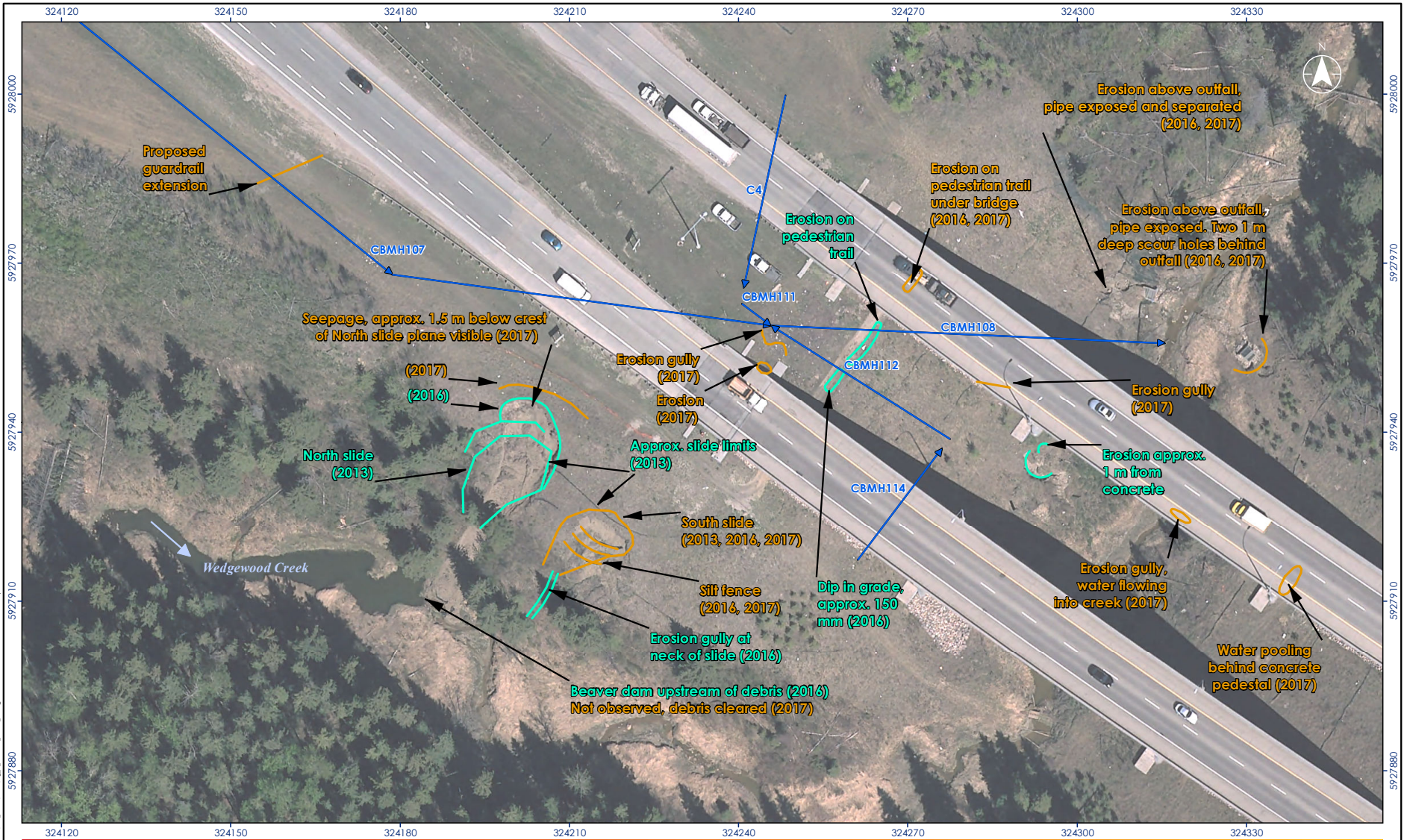
AMEC Earth & Environmental Limited, January 20, 2003, "AHD – Wedgewood Ravine Crossing: Draft Borehole Logs for Slope Inclinerometers Installed," File: EG08899.

Pisces Environmental Consulting Services Ltd., July 15, 2013, "Slope failure near the Anthony Henday Drive crossing of Wedgewood Creek."

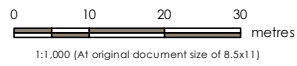
EBA a Tetra Tech Company, August 16, 2013, "Call-out Report Anthony Henday Drive (Hwy 216) km 13+620, Southbound Lane Wedgewood Ravine West Valley Slope: Slide at northwest Approach to bridge (BF-85012)," File: E12103001-02.

Stantec Consulting Ltd., June 27, 2016, "North Central Region – Edson/Stony Plain Area: 2016 Inspection Report," File: 123312435.

Tetra Tech EBA, June 17, 2015, "Stony Plain Region Geohazard Risk Assessment Site Inspection Form: NC 79 – Landslide near Wedgewood Creek,"



- Previous Observation
- 2017 Observation
- Buried Pipe



- Notes**
1. Coordinate System: NAD 1983 UTM Zone 12N
 2. Base features: Geogratis, ©Department of Natural Resources Canada. All rights reserved.
 3. Imagery: City of Edmonton, Transportation (2015)

Project Location: 12331/2435
 City of Edmonton
 Alberta
 Prepared by MK on 2017-06-19
 Quality Review by JC on 2017-06-19
 Approved by LC on 2017-07-11

Client/Project:
 Alberta Transportation
 Geohazard Monitoring Program
 NC79 Wedgewood Creek Bridge

Figure No.
 1

Title
Site Plan

