# GEOHAZARD RISK MANAGEMENT PROGRAM
## North Central Region – Edson Area
## 2013 Inspection Report

| Site Number | Site Name | Hwy | km |
|---|---|---|---|
| NC15 | Pile Retaining Wall (North of Edson) | 748:02 | 6.2 |

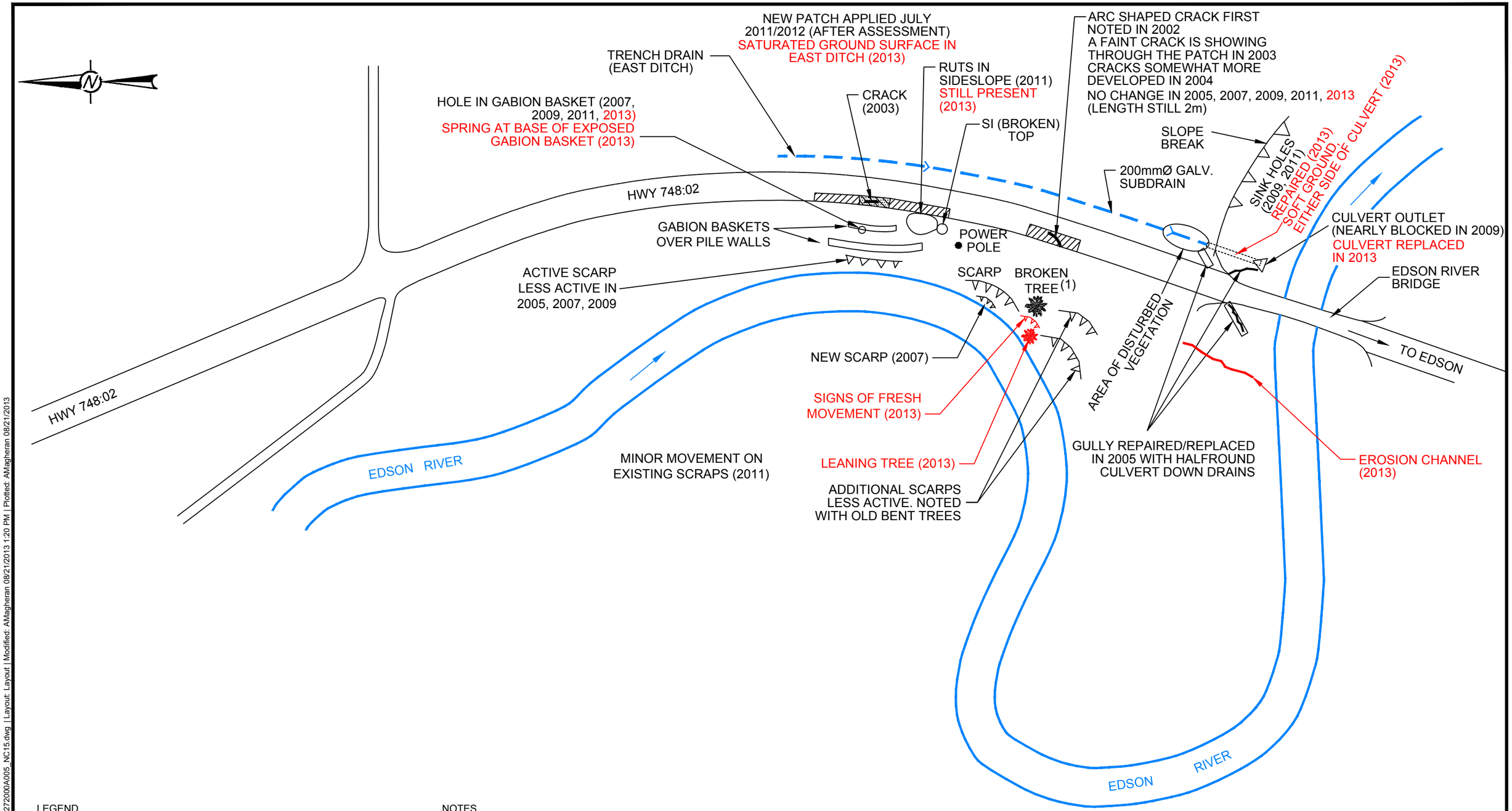
| Legal Land Description | UTM Coordinates (NAD83) | | |
|---|---|---|---|
| NW10-54-17-W5M | Zone 11U | N5945148 | E537511 |
| **Operational Site Instrumentation** | **Slope Inclinometers** | | 0 |
| | **Pneumatic Piezometers** | | 0 |
| | **Vibrating Wire Piezometers** | | 0 |
| | **Standpipe Piezometers** | | 0 |
| **Date of Last Instrumentation Readings** | N/A | | |

| | Date | PF | CF | Rating |
|---|---|---|---|---|
| **Current Inspection** | June 26, 2013 | **8** | **3** | **24** |
| **Previous Inspection** | May 17, 2011 | **8** | **3** | **24** |
| **Report Attachments** | ☒ Photographs (7 pages) | ☒ Site Plans (1 page) | | |

| | Golder | Alberta Transportation |
|---|---|---|
| **Inspected By** | Ian Darrach; Eric Leishman | Roger Skirrow; Howard Hawley |
| **Date of Remediation** | Pile wall and gabion baskets installed in 1999 | |
| **Recent Maintenance** | Asphalt patch and seal coat applied in 2012 due to poor ride quality | |
| **Primary Site Issue** | Embankment slumping below the highway, likely due to high groundwater levels | |

| Observations | Description and Location | Change From Previous Inspection | |
|---|---|---|---|
| ☒ Pavement Distress | Crack reflecting through patch | ☒ Yes | ☐ No |
| ☐ Culvert Distress | | ☐ Yes | ☐ No |
| ☐ Bridge Distress | | ☐ Yes | ☐ No |
| ☒ Slope Movement | Fresh movement observed on/near existing scarps | ☒ Yes | ☐ No |
| ☒ Erosion | Minor erosion on west side of north abutment | ☒ Yes | ☐ No |
| ☒ Seepage | Spring, moss growth at base of gabian basket | ☒ Yes | ☐ No |
| ☐ Other | | ☐ Yes | ☐ No |

| | |
|---|---|
| **Discussion** | The crack in the south patch (see Figure 1) has started to reflect through the patch that was applied in 2012. Currently, the crack is less than 5 mm in width with 0 mm differential. The crack begins in the shoulder of the west lane and extends through the first third of the SBL, as shown in Photo 1. The crack appears to be taking the same shape as the previous crack.<br><br>New slope movement was observed near the existing scarps to the south of the pile wall. Tension cracks and freshly exposed earth were found in these areas, in addition to soft, saturated ground and leaning trees (see Photos 2 to 4). Further, the ground surface was hummocky below the scarps, as the slope gradually bulges towards the river, as noted in Photo 5. No new movement was observed in the scarp below the pile walls.<br><br>A subsidence of approximately 600 mm in height was observed in the upper gabion wall. A hole in the gabion wall was also observed at this location, as shown in Photo 6, as well as a spring and moss growth.<br><br>Surface erosion and seepage were observed on the west side of the north bridge abutment, as shown in Photos 7 and 8. The erosion gulley observed was approximately 800 mm wide, between 100 and 150 mm deep and about 12 m long. Photo 8 shows seepage flowing into the south end of the gulley.<br><br>The culvert on the east side of the north abutment was replaced in 2012 with a half round culvert, anchored by steel pins embedded into the ground (see Photo 9). The ground surface beneath the coconut matting on either side of the culvert was observed to be soft and saturated. The ground surface in the east ditch was found to be saturated as well, from the bridge to the intersection to the north. Standing water was observed in this ditch approximately 100 m south of the intersection, as seen in Photo 10. |
| **Assessment** | Based on the above observations, the pile walls constructed in 1999 appear to be performing satisfactorily. Some seepage was noted through the upper gabion wall, at the location of the hole in the gabian basket; however, this does not appear to be affecting the performance of the wall.<br><br>Although the crack to the south of the pile walls has reflected through the patching, there is no vertical differential at this time. The fresh slope movement observed near the existing scarps downslope of this crack is likely due to higher water levels (both groundwater and the river level) resulting from increased precipitation over the last two years. There is the potential for future regression of the scarps to the pavement surface, as well as river erosion of the toe of the slope. |
| **Recommendations** | Short term recommendations include:<br><br>▪ Sealing pavement cracks as necessary to reduce surface water infiltration into the slope;<br>▪ Regular observations of the pavement crack to the south of the pile wall; and,<br>▪ Repairing the rutting on the west embankment slope to reduce the potential for ponding water.<br><br>Long term recommendations would comprise improving the drainage at the site. Finger drains into the slope should be considered to reduce the groundwater level within the embankment. The drains could consist of trenches filled with free draining gravel wrapped in a geotextile, and should be daylighted downslope.<br><br>The crack to the south of the retaining wall should be monitored on a regular basis for signs of further distress. It is recommended that inspections be conducted annually. Instrumentation should be considered if further distress is observed in the pavement. |




## LEGEND

- RECENTLY PATCHED AREAS SUMMER 2002
- RECENTLY PATCHED AREAS SUMMER 2004

## NOTES

1. GAP MEASURED BETWEEN MARKS NOTCHED IN TREE:
   - -660mm IN 2004
   - -670mm IN 2005
   - -706mm IN 2007
   - -NOT MEANINGFUL IN 2009
2. FEATURE LOCATIONS ARE APPROXIMATE
3. 2013 FEATURES SHOWN IN RED

## REFERENCE

DRAWING OBTAINED FROM THURBER. PROJECT No.: 15-16-258, DATE: AUGUST 2011 ORIGINAL SCALE: 1:2000

0 40 80 120
SCALE (APPROX.) METRES

PROJECT
ALBERTA TRANSPORTATION
GEOHAZARD MONITORING PROGRAM

TITLE
**NC15 NORTH OF EDSON RIVER BRIDGE**

Golder Associates

| | | | | |
|---|---|---|---|---|
| PROJECT No. | 13.1376.0027.2000 | | FILE No. | 13137600272000A005 |
| DESIGN | EL | 2013-07-31 | SCALE | AS SHOWN |
| CADD | SLC | 2013-08-12 | | |
| CHECK | EL | 2013-08-21 | | |
| REVIEW | IDD | 2013-08-21 | | |

**FIGURE 1**

L:\2013\1376\13-1376-0027\2000\21001313760027200005_NC15.dwg | Layout: Layout | Modified: AMagheran 08/21/2013 1:20 PM | Plotted: AMagheran 08/21/2013

**PHOTO 1:** Pavement crack south of retaining wall reflecting through patch, less than 5 mm wide.

**PHOTO 2:** Freshly exposed earth in scarps south of pile wall.

**PHOTO 3:** Leaning tree at toe of slope, south of pile wall.

**PHOTO 4:** Tension cracks in slope below crack south of pile wall.

**PHOTO 5:** Hummocky terrain/toe bulge, south of pile wall.

**PHOTO 6:** Hole in upper gabion wall.

**PHOTO 7:** Erosion gulley, west side of north bridge abutment.

**PHOTO 8:** South end of erosion gulley, west side of north bridge abutment. Note seepage and standing water.

**PHOTO 9:** Half round culvert installed in 2012.

**PHOTO 10:** Standing water in east ditch, ~100 m south of intersection; facing north.