

**ALBERTA TRANSPORTATION
GEOHAZARD ASSESSMENT PROGRAM
PEACE REGION – HIGH LEVEL
2017 INSPECTION**



Site Number	Location	Name	Hwy	km
PH011-1 PH011-2	North of Peace River	Whitemud River (km 42.6 and km 43.2)	743:02	42.4 to 42.8 43.2
Legal Description		UTM Co-ordinates		
NE36-87-21-W5M & SW1-88-21-W5M		11U E 487,302	N	6,272,372

	Date	PF	CF	Total
Previous Inspection:	13-June-2016	km 42.6: 5 km 43.2: 9	4 2	20 18
Current Inspection:	21-June-2017	km 42.6: 5 km 43.2: 9	4 2	20 18
Road AADT:	980		Year:	2016
Inspected By:	Roger Skirrow, TRANS Ed Szmata, TRANS		Ken Froese, Thurber Don Proudfoot, Thurber	
Report Attachments:	<input checked="" type="checkbox"/> Photographs		<input checked="" type="checkbox"/> Plans	<input type="checkbox"/> Maintenance Items

Primary Site Issue:	Backslope slumping, minor erosion, and slope ravelling.	
Dimensions:	150 m backslope slump at km 42.3 to km 42.45; repaired culvert embankment from km 42.45 to km 42.7; 50 m backslope ravelling at km 43.2	
Date of Remediation:	2010: Culvert replaced and embankment rebuilt at km 42.6.	
Maintenance:	2017: Ditch cleanout at km 43.2	
Observations:	Description	Worsened?
<input type="checkbox"/> Pavement Distress	Highway is gravel-surfaced.	<input type="checkbox"/>
<input checked="" type="checkbox"/> Slope Movement	<p>KM 42.4 (Bankslope south of culvert):</p> <ul style="list-style-type: none"> Continued west bankslope slumping on the south end of the site leading to debris build up at the ditch. Toe roll still 1.2 m high near north part of this slump. <p>KM 42.6 (Culvert – main site):</p> <ul style="list-style-type: none"> Sideslopes re-constructed in 2010. Tension cracks observed previously have not changed. <p>KM 43.2 (Shale slope north of culvert):</p> <ul style="list-style-type: none"> Additional shallow sloughing of shale slope. Some additional vegetation growth noticed. 	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> Erosion	<p>KM 42.4:</p> <ul style="list-style-type: none"> Erosion of southwest ditch reduced from 0.6 m deep to 0.2 m by roadway gravel. Erosion in southeast ditch similar to 2015. <p>KM 42.6:</p> <ul style="list-style-type: none"> Gully on east sideslope slightly worse, erosion at end of riprap swales near inlet (slightly worse) and outlet (worse) of culvert, and on west sideslope (same). 	<input checked="" type="checkbox"/>

<input checked="" type="checkbox"/> Seepage	Steady flow observed from the subdrain pipe at the culvert outlet; some seepage observed from bolts	<input type="checkbox"/>
<input checked="" type="checkbox"/> Bridge/Culvert Distress	No distress of the culvert (BF77270) observed.	<input type="checkbox"/>
<input type="checkbox"/> Other		<input type="checkbox"/>
Instrumentation:		
None.		
Assessment:		
<p>KM 42.4:</p> <ul style="list-style-type: none"> ▪ The shallow slides located in the west backslope, south of the culvert are not presently affecting the highway but remain active and with signs of fresh movement in 2017. The partial obstruction of the ditch by a 1.2 m high toe roll noted in 2015 was similar in 2016 and 2017. Erosion on the east ditch did not change significantly between 2014 and 2016 and was reduced somewhat in 2017 by roadway gravel in the ditch (likely from snow clearing or grading operations). <p>KM 42.6:</p> <ul style="list-style-type: none"> ▪ A sinkhole, which had developed in the east sideslope during the construction of the new culvert in 2010, has not been visible since the 2013 inspection. A tension crack was noted in the east sideslope in 2014 toward the south end of the site and has not changed since then. The sideslopes appeared to be well groomed and the grass growth is good except for a few localized spots. ▪ The runoff from the road has caused a small gully on the east sideslope above culvert and accumulation of gravel washed away from the road. This had deepened to 0.4 m in 2016 and an accumulation of gravel was observed at the bottom of the gully but was unchanged in 2017. There was additional deflection of the guardrail at the gully; however, it appears to be from snow plow/grader contact. ▪ Flow from the subdrain at the culvert outlet has been steady since installation as has the seepage noted from a few bolts in corrugated steel pipe at the culvert outlet. For the first time since 2013, a trace of flow was observed from the subdrain at the culvert inlet in 2016 but was not observed in 2017. ▪ Erosion is occurring at the end of the east sideslope swale and the culvert inlet riprap. This feature is about 3 m wide and has deepened to 1.3 m at the time of the 2016 inspection and appeared unchanged in 2017. The similar erosion feature at the culvert outlet was similar in size to that measured in 2016; however, a tension crack was noted in 2017 indicating further undercutting. ▪ An erosion feature has been developing on the west sideslope over the last few years. There are two scour features forming on either side of a silt fence with the upslope one about 5 m in length (measured parallel to the adjacent silt fence) and 0.9 m deep in 2016. The scour hole on the downslope side of the silt fence is about 2 m and 3 m long and hasn't changed since 2015. There is an erosion gully leading out of the lower hole which was about 0.3 m wide and 0.35 m deep in 2015 (unchanged in 2016). It is possible that the silt fence may be concentrating surface flow in this area leading the formation and growth of these features. <p>KM 43.2:</p> <ul style="list-style-type: none"> ▪ The shale slope appears to have sufficient global stability and the spalling is considered a maintenance issue. There are no signs of movement in the roadway. The subdued scarp with a good vegetative cover indicates that the sideslope is currently stable. Soil buildup at the toe of the slope had increased in 2016 to about 1.5 m high and there were indications of a shallow scarp developing at the south end. At the time of the 2017 inspection, the accumulation of material at the toe had been recently removed and windrowed further north of the slope. 		

Recommendations:

Short-Term/Maintenance:

- KM 42.4, West Ditch: Remove material from the ditch as required to maintain flow. Excavated material should be disposed of outside of the valley. Erosion protection may be required to minimize downcutting by water flow.
- KM 42.4, East Ditch: The erosion appears to have stabilized for the present; however, consideration could be given to regrading the ditch and lining with erosion control product (ECP) and synthetic ditch checks.
- KM 43.2: Continued to remove material from the ditch as required to maintain flow.

Medium-Term:

- KM 42.6, West Sideslope: The erosion features forming should be excavated and replaced with compacted granular material and protected with ECP. It is recommended that the silt fences at this site be removed as they are no longer required and, at this specific location, may be contributing to erosion.
- KM 42.6: Erosion beneath the riprap at the culvert aprons (both inlet and outlet) should be excavated salvaging the existing rock, backfilled with compacted granular, and regraded and the riprap reinstalled with non-woven geotextile. The repairs should be tied into the riprap aprons to prevent similar issues in the future.

Long-Term:

- KM 42.4, West Backslope: Flatten the backslope to a shallower slope and incorporate 3 m wide benches at 6 m height intervals with controlled drainage paths at the ends of the benches. Re-establish the highway ditch and line it with TRM and synthetic ditch barriers at intervals.

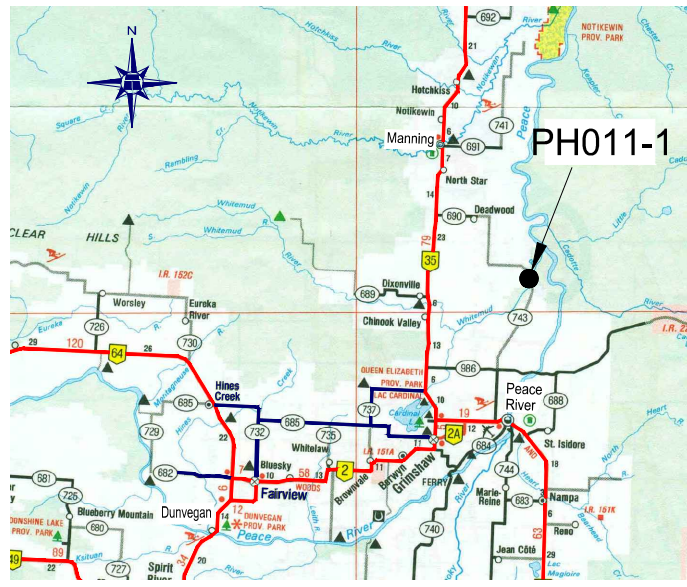
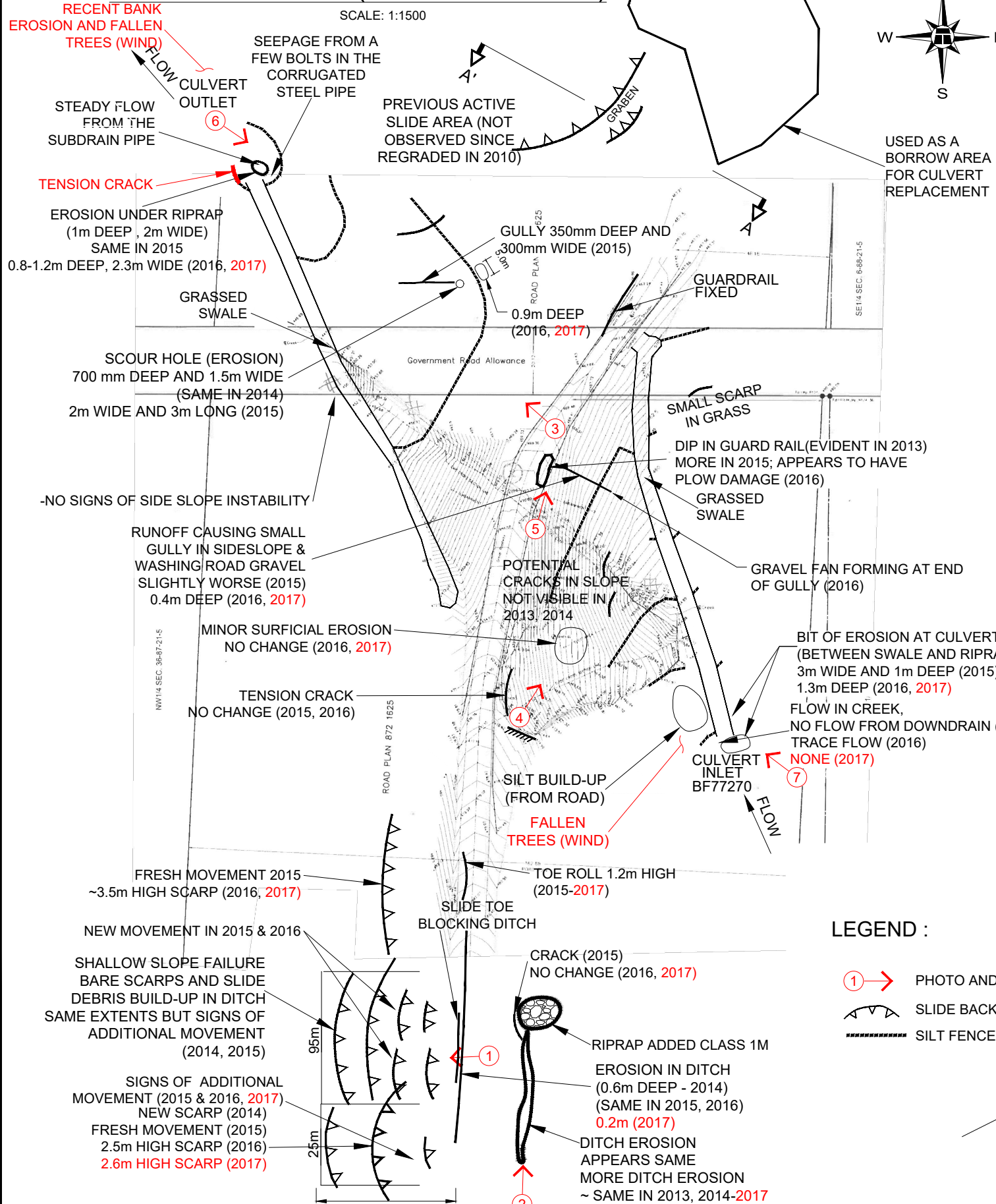
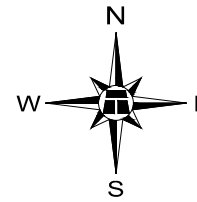
Ongoing Investigation:

- It is recommended that the frequency of GeoHazard inspections be reduced to every other year.

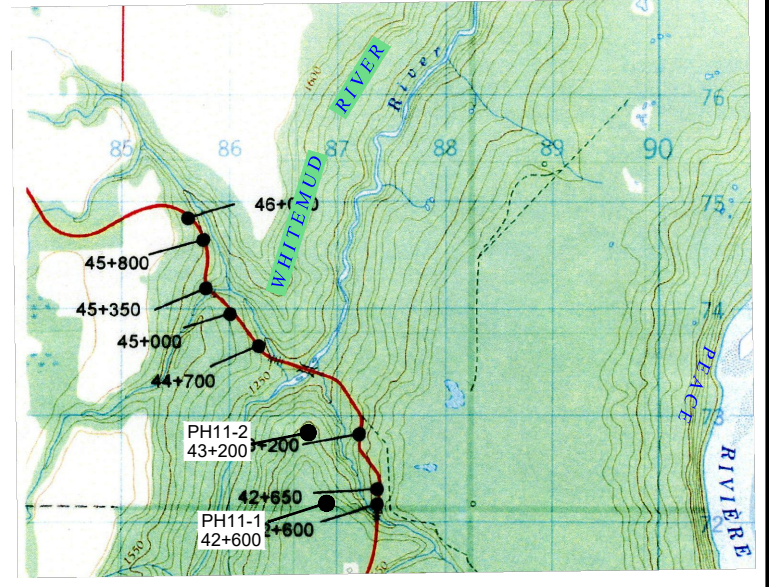
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PH11-1 SITE PLAN (km 42.6 - BF77270)

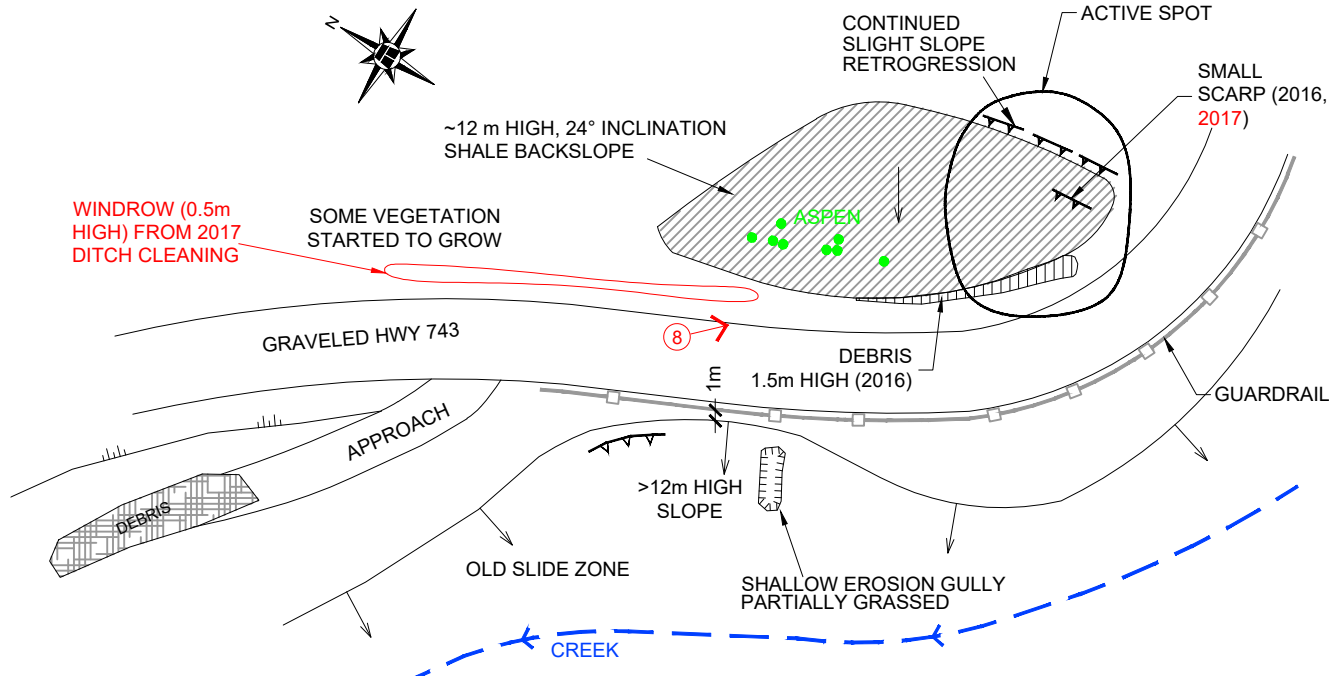
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SITE MAP
NOT TO SCALE



SITE LOCATION MAP
NOT TO SCALE



PH011-2 SITE PLAN (STA. 43+200)

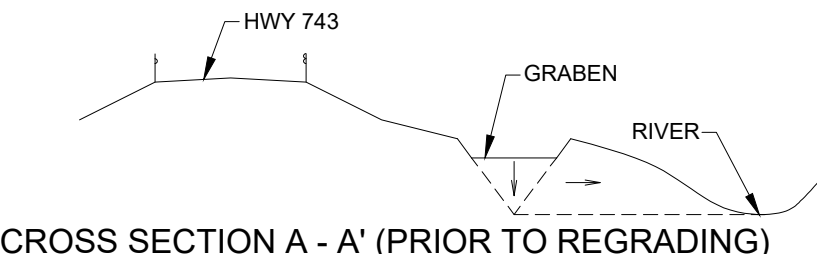
N.T.S.

LEGEND :

- ① → PHOTO AND DIRECTION
- SLIDE BACKSCARP
- SILT FENCE

NOTES :

1. FEATURE LOCATIONS ARE APPROXIMATE.
2. PREVIOUS OBSERVATIONS SHOWN IN BLACK
3. JUNE 2017 OBSERVATIONS SHOWN IN RED



CROSS SECTION A - A' (PRIOR TO REGRADING)



PEACE REGION (PEACE RIVER / HIGH LEVEL)

PH011-1: HWY 743:02 WHITEMUD RIVER, km 42.6 AND km 43.2 GEOHAZARD ASSESSMENTS

DWG No. 13351-PH011-1-1

DRAWN BY	ML
DESIGNED BY	KEF
APPROVED BY	DWP
SCALE	AS SHOWN
DATE	NOVEMBER 2017
FILE No.	13351



THIS PLAN WAS TAKEN FROM AMEC DRAWING RD-11198-P, DATED OCT. 4, 2004



Photo 1 – Looking west at backslope failures at the south end of the site (km 42.4).



Photo 2 – Looking north at east ditch erosion at the south end of the site (km 42.4).



Photo 3 – Looking west toward culvert outlet along west sideslope.



Photo 4 – Looking north at east sideslope above culvert inlet.



Photo 5 – Looking north at along east guardrail.



Photo 6 – Looking northwest at culvert inlet. Note erosion to right of culvert above the riprap (red arrow).



Photo 7 – Looking southeast at culvert outlet. Note erosion below the riprap on the right side of the culvert (red arrow).



Photo 8 – Looking southeast at ravelling shale slope (km 43.2).