

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



**THURBER ENGINEERING LTD.**

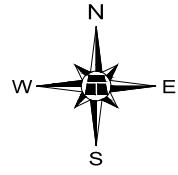
Site Number	Location	Name	Hwy	km
PH 76	~5 km W. Cleardale	Culvert Slide	64:02	30.15
Legal Description		UTM Co-ordinates (NAD 83)		
SW6-85-10-W6		11V N 6246803	E 340894	

	Date	PF	CF	Total
<b>Previous Inspection:</b>	June 1, 2016	11	4	44
<b>Current Inspection:</b>	June 1, 2017	2	4	8 (Construction Complete in July, 2017)
<b>Road AADT:</b>	460		<b>Year:</b>	2016
<b>Inspected By:</b>	Don Proudfoot, Barry Meays (Thurber); Ed Szmata, Ken Szmata, Rocky Wang (AT)			
<b>Report Attachments:</b>	<input checked="" type="checkbox"/> Photographs <input checked="" type="checkbox"/> Plans <input checked="" type="checkbox"/> Maintenance Items			

<b>Primary Site Issue:</b>	A slide took place in May, 2015 on the south side of the highway shoulder, embankment, and ditch, adjacent to the east side of a 2.3 m high x 2.1m span SPE bridge culvert.		
<b>Dimensions:</b>	Slide dimensions ~22 m long along the embankment x ~27 m wide along the highway (with an additional 14m long crack along the south shoulder extending overtop of and further west of the SPE).		
<b>Date of any remediation:</b>	South embankment slide and ditch were repaired in 2016/17, by excavating the slide, and re-building the embankment with 6-80 gravel, and riprap re-placement around the culvert outlet and south ditch. The north highway embankment failed at this location about 20 years ago, and was repaired by excavating the failed material, placement of geotextile, and backfilling with pitrun gravel.		
<b>Maintenance:</b>	Asphalt overlay in 2008.	<b>Worsened?</b>	
<b>Observations:</b>	<b>Description</b>	<b>Yes</b>	<b>No</b>
<input checked="" type="checkbox"/> Pavement Distress	The excavation for the slide repair that extended into the pavement of the EB lane was temporarily placed with compacted gravel at surface (to be removed and replaced with ACP in the future).	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Slope Movement	The south embankment slide was repaired in 2017.	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Erosion	The south ditch and culvert outlet riprap erosion was repaired in 2017.	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Seepage		<input type="checkbox"/>	<input type="checkbox"/>

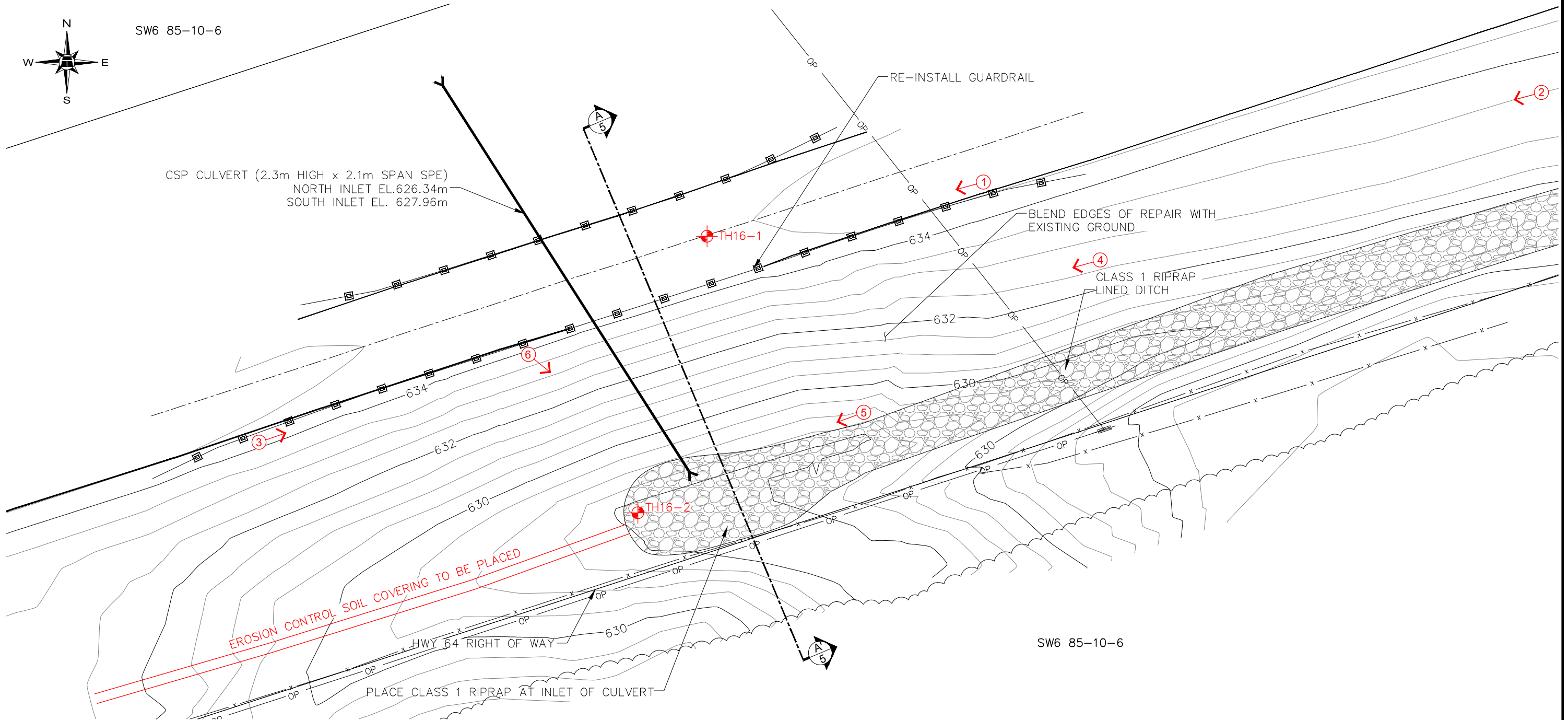
<input type="checkbox"/> Bridge/Culvert Distress	The SPE culvert (BF77806) was not damaged by the slide (in-service date 1974).	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Other		<input type="checkbox"/>	<input type="checkbox"/>
<b>Instrumentation:</b> None			
<b>Background/Assessment:</b>  <p>The cause of the recent approximate 8 m high south embankment slide appeared to be due to an embankment slope too steep (22° or 2.5H:1V) for the highly plastic clay composition material, in conjunction with contributing highway runoff ditch erosion along the embankment toe. The slide may have also been a somewhat progressive failure, due to gradual weakening of the clay fill by the weathering processes consisting of freeze thaw and wetting and drying cycles leading to a loss of cohesion.</p> <p>The existing SPE culvert was not damaged by the south slide, as the existing sandbag armour around the inlet was intact. The slide repairs consisted of excavation and backfill extending around the edges of the outlet due to observed cracks extending west of the culvert location.</p> <p>In August, 2016, a test hole was drilled on the highway, and a topographic survey was completed to provide data for the detailed design.</p> <p>The south embankment slide was repaired in 2016/17 under Contract 14524, using the region's Highway Maintenance Contractor (LaPrairie). The repairs consisted of:</p> <ol style="list-style-type: none"> <li>1 Subexcavating the failed slide mass down to intact clay, below ditch level;</li> <li>2 Rebuilding the slope with imported 6-80 gravel, placed and compacted in thin horizontal lifts, benched into the intact slope surface, utilizing a gravel shear key to stabilize the slide area;</li> <li>3 Some of the more suitable excavated clay was used to provide a covering layer overtop the gravel as the finished slope surface to shed runoff, with the excess removed from site;</li> <li>4 A subdrain was installed along the base of the slide excavation surface, to drain any subsurface water that may enter the rehabilitated slide mass;</li> <li>5 The existing Class 1 Riprap along the runoff ditch was salvaged and re-instated and replenished with new Riprap over non-woven geotextile along a new contoured ditch beyond the new slope; and</li> <li>6 The available topsoil was salvaged and replaced over the finished embankment surface and seeded. Erosion control soil covering was also placed over the east and west highway ditches leading into the riprap.</li> </ol> <p>At the driveway approach east of this slide site, the maintenance contractor replaced the existing 600 mm CSP with a 900 mm CSP beneath the driveway approach sometime in 2015, with a slightly lower invert elevation, to avoid water backup at this resident's property.</p>			
<b>Recommendations:</b>  <p>In the short term, monitor the slide and ditch repaired area for movements, settlement or erosion.</p>			

H:\1300013351 Geohazard Assessment - Peace RiverHigh Level (CON0017602)\Drafting\2017\BDM\13351 PH76- FIGURE 1-3.dwg - F1 - Dec. 22, 2017



SW6 85-10-6

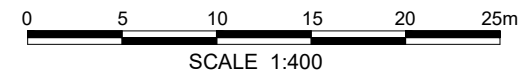
CSP CULVERT (2.3m HIGH x 2.1m SPAN SPE)  
NORTH INLET EL.626.34m  
SOUTH INLET EL. 627.96m



SW6 85-10-6

**LEGEND**

- FENCE LINE
- APPROXIMATE TREE LINE
- APPROXIMATE GUARD RAIL LOCATIONS
- OVERHEAD POWER LINE
- STREAMBED CENTERLINE
- OVERHEAD POWER POLE
- APPROXIMATE TEST HOLE LOCATION
- HWY 64 SURFACE
- PHOTO & DIRECTION



**NOTES :**

1. JUNE 1, 2017 OBSERVATIONS SHOWN IN RED
2. PICTURE 3 TO 6 TAKEN IN JULY, 2017 DURING FINAL INSPECTION.



**PEACE REGION (PEACE RIVER/HIGH LEVEL)  
PH076-1 HWY 64:02 km 30.1 TO 30.2**

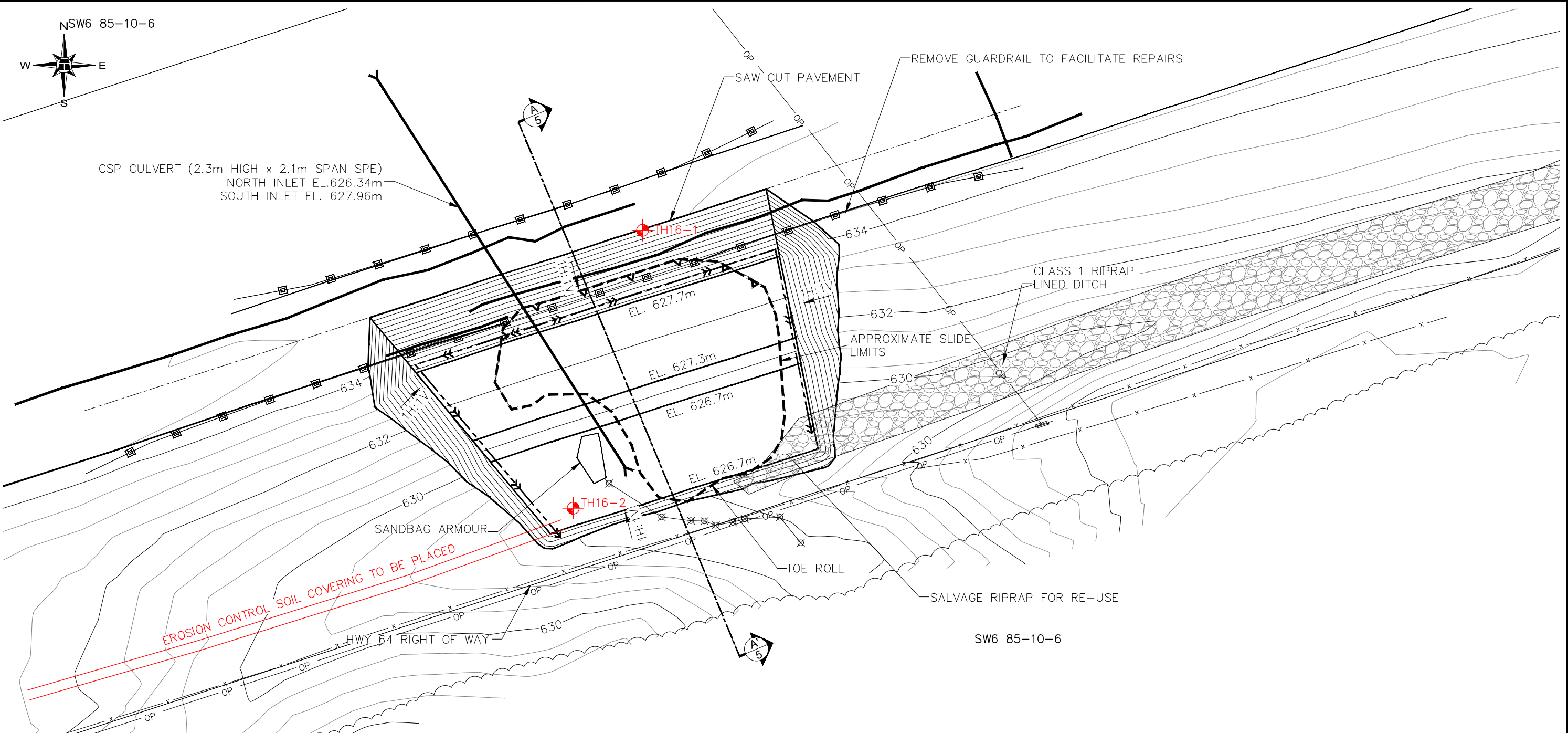
**2017 PH076-1 INSPECTION  
DESIGN FINAL GRADE**

**FIGURE PH076-1-1**

DRAWN BY	ML
DESIGNED BY	BDM
APPROVED BY	DWP
SCALE	1:400
DATE	JUNE 1, 2017
FILE No.	13351



H:\1300013351 Geohazard Assessment - Peace River/High Level (CON0017602)\Drafting\2017\BDM\13351 PH76-FIGURE 1-3.dwg - F2 - Dec. 22, 2017

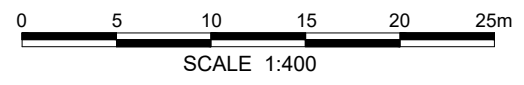


**LEGEND**

- SURFACE CRACK
- SLIDE SCARP
- FENCE LINE
- APPROXIMATE TREE LINE
- APPROXIMATE GUARD RAIL LOCATIONS
- OVERHEAD POWER LINE
- STREAMBED CENTERLINE
- OVERHEAD POWER POLE
- APPROXIMATE TEST HOLE LOCATION
- HWY 64 SURFACE

**NOTES :**

- 1. JUNE 1, 2017 OBSERVATIONS SHOWN IN RED



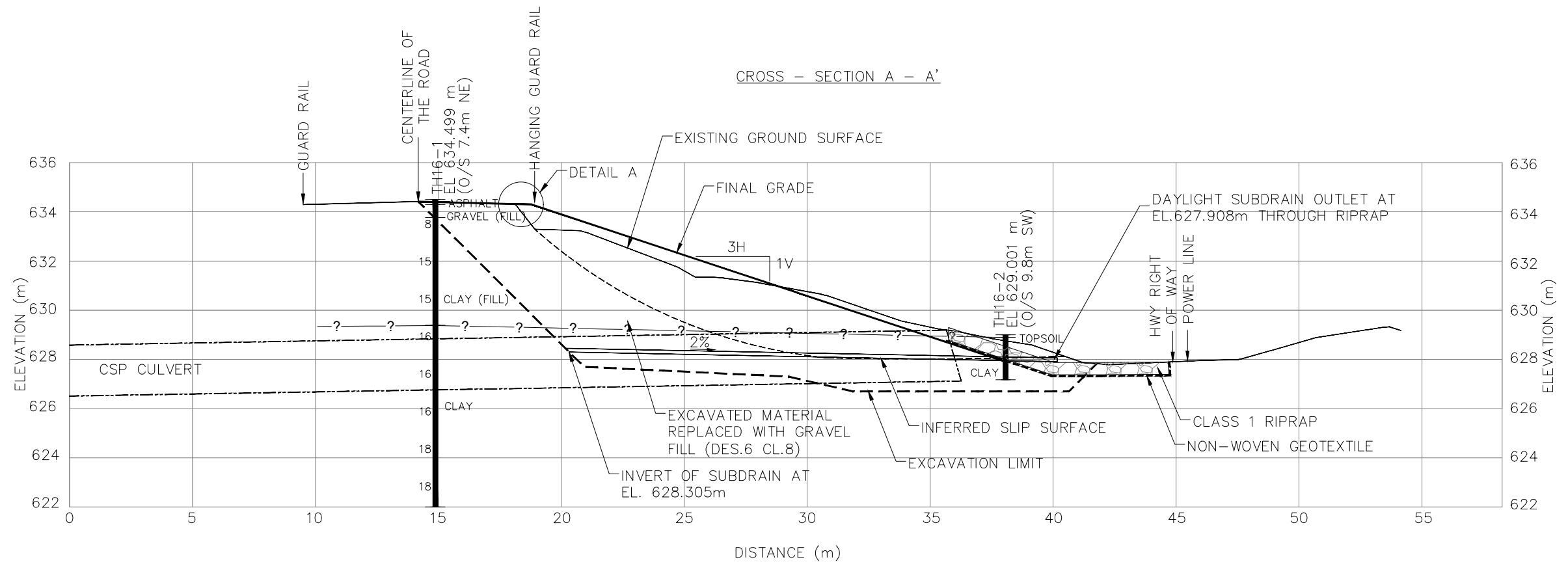
**PEACE REGION (PEACE RIVER/HIGH LEVEL)  
PH076-1 HWY 64:02 km 30.1 TO 30.2**

**2017 PH076-1 INSPECTION  
DESIGN EXCAVATION PLAN**

**FIGURE PH076-1-2**

DRAWN BY	ML
DESIGNED BY	BDM
APPROVED BY	DWP
SCALE	1:400
DATE	JUNE 1, 2017
FILE No.	13351

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Transportation

**PEACE REGION (PEACE RIVER/HIGH LEVEL)  
PH076-1 HWY 64:02 km 30.1 TO 30.2**

**2017 PH076-1 INSPECTION  
CROSS - SECTION A - A'**

**FIGURE PH076-1-3**

DRAWN BY	ML
DESIGNED BY	BDM
APPROVED BY	DWP
SCALE	1:200
DATE	JUNE 1, 2017
FILE No.	13351



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Photo 1 – Looking west along the highway over the repaired slide area.



Photo 2 – Looking west along the south highway embankment slide area from the east end (construction on-going).



Photo 3 – Looking east along the repaired highway embankment (July, 2017).



Photo 4 – Looking west along the repaired south hwy embankment (July, 2017).



Photo 5 – Looking west across the freshly riprapped culvert outlet (July, 2017).



Photo 6 - Looking south over the new embankment and culvert outlet area (July, 2017).