

**ALBERTA TRANSPORTATION AND
ECONOMIC CORRIDORS
GEOHAZARD ASSESSMENT PROGRAM
PEACE REGION (GRANDE PRAIRIE DISTRICT - NORTH)
2024 INSPECTION**



Site Number	Location	Name	Hwy	km
PH026	Eureka River North Hill	Sites #3, #5 and #6	726:02	10.1
Legal Description		UTM Co-ordinates (NAD83)		
SW13/SE14-86-8-W6		11 N 6258740	E 368408	

	Date	PF	CF	Total
Previous Inspection:	June 1, 2023	13	4	52 (Site 3)
		9	5	45 (Sites 5 and 6)
Current Inspection:	May 8, 2024	3	4	12 (Site 3)
		9	5	45 (Sites 5 and 6)
Road AADT:	460		Year:	2023
Inspected By:	Nicole Wilder, Don Proudfoot (Thurber) Rocky Wang, Robert Senior (TEC)			
Report Attachments:	<input checked="" type="checkbox"/> Photographs <input checked="" type="checkbox"/> Plans <input checked="" type="checkbox"/> Maintenance Items			

Primary Site Issue:	Slide scarp at Site #3 crossing highway at 2 locations was repaired in 2013. Two other slide areas (Site #5 & #6) developing further north, likely linked as one larger slide. A new landslide that occurred in 2017 at Site #3 in the west sideslope between the upper pile wall and the bridge culvert was repaired in 2023.	
Dimensions:	Main slide at Site 3 was about 60 m long by 100 m wide. Slide Sites 5/6 are in the order of 200 m wide (along the highway) by 200 m long. The slide at the south end of Site 3 was about 20 m wide along the highway and 35 m (avg. toward the river) in a 12 m high embankment slope.	
Date of any remediation:	Main Slide Site 3 was remediated in 2013 with 2 pile walls and riprap. The slide between the pile wall and bridge culvert was repaired in 2023 by excavation, installing a subdrain and sheet piles, placing gravel backfill, and placing riprap, done in conjunction with a Highway 726 overlay.	
Maintenance:	Prior to the 2023 overlay there was semi-continuous patching and crack sealing at all three sites. The north end of the guardrail and impact attenuator at Site 3 were repaired/replaced in 2021.	
Observations:	Description	Worse?
<input checked="" type="checkbox"/> Pavement Distress	In conjunction with overlaying the highway in 2023, the pavement through these sites is in very good condition.	<input type="checkbox"/>
<input checked="" type="checkbox"/> Slope Movement	Slides at Sites 5 and 6 continue to creep, which will require periodic future pavement maintenance.	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> Erosion	At Site 3: There are some small erosion rills on the sparsely vegetated area between the highway and the upper pile wall, some drilling on the west embankment north of the 2023 slide repair, and another rill on the east highway embankment sideslope.	<input type="checkbox"/>
<input checked="" type="checkbox"/> Seepage	There is a seepage area in the east ditch opposite the north end of the upper pile wall.	<input type="checkbox"/>
<input type="checkbox"/> Bridge/Culvert Distress		<input type="checkbox"/>

<input checked="" type="checkbox"/> Other	Maintenance issues that require attention: loose gutter grate and silt/debris filled concrete gutter. The exposed concrete on the top of the upper pile wall is spalling. The handrail was separated at one location on the pile wall. Also, there was minimal grass growth on the west embankment around the 2023 slide repair area.	<input checked="" type="checkbox"/>
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Instrumentation: Last Read on May 27, 2024

SI08-1: Sheared off at 4.9m depth in 2009 (Prev. movement zones at 5m & 7m). SI08-2: Sheared off at 9.8m depth in 2008 (Prev. move zones at 9 & 13m). SI08-3: Sheared off at 7.9m depth in 2009 (Prev. move zones at 8 & 13m). SI11-5: Sheared off at 8.7m depth in 2014 (Prev. move zone at 9m). SI11-6: Sheared off at 17.1m depth in 2014 (Prev. move zone at 18m). SI11-7: Sheared off at 16.7m depth in 2013 (Prev. move zone at 18.5m). SI11-3 showed 3 mm/yr above 4 m depth since the fall of 2023, before that showed no significant movement since the fall of 2021 reading; and no significant movement between the time of 2018 to 2020; but had previously moved at an average rate of ~5 mm/year at a depth above 4 m since the spring of 2014. SI11-4 showed no significant movement above a 10m depth since spring 2017, and has averaged <1mm/yr since spring, 2014.

Upper Wall: SI12-P9U (North end), SI12-P17U (center), and SI12-P26U (South end), all showed negligible movements over both the length of waler & pile, and the length of pile only. The 6 anchor load cells indicated continued load stabilization with loads that vary between 173 kN to 224 kN per anchor (fluctuations varying between a gain of 0 to 1 kN/anchor since the fall of 2023), compared to the initial peak load stressing of about 250 to 260 kN per anchor. The design load was 300 kN/anchor, but the anchor lock-off load was 240 kN.

Lower Wall over the length of the piles: SI12-P3L (North end), SI12-P9L (center), and SI12-P14L (South end), all showed negligible (ie. <1 mm/yr) movement over this most recent reading cycle. Historically since installation in the fall of 2012, SI12-P3L and SI12-P9L have averaged about 1.5 mm/yr movement, while SI12-P14L has averaged about <0.5 mm/yr, all downslope towards the river.

Water levels (all BGS) in: PN11-3 at 13.5m; and VW11-7 at 16.1m.

Assessment:

At Site #3, construction to repair a series of translational slide blocks along a common deep-seated slip plane was completed in 2013. This featured: a 120 m long tied-back pile wall along the west side of the existing highway and included excavation of soil and incorporation of lightweight fill along the existing highway alignment; an additional 60 m long lower cantilever pile wall located nearer the River below Site 3 to keep the soil from eroding into the river and remain intact below the tied back pile wall; and armoring the toe of the River with Class 2 Riprap.

In the upper wall at Site #3, the 3 SI's have generally indicated negligible movement over the last 4 years. Over the last few years, there appears to be some oscillating fluctuations in the movements between spring and fall, which temporarily reverse the short-term directional movements in SI12-P9U and SI12-P17U, and to some extent in SI12-P26U. The load cells indicate the latest anchor load readings fluctuated between about 0% and <1%, but the anchor loads are showing the general relaxation trend is slowing or possibly even reversing the last few years. This indicates that in general (since 2017 and excluding the oscillating fluctuations), the piles ceased being pulled upslope and are beginning to reach a state of equilibrium with the soil. In the lower cantilever wall, all 3 SI's indicate negligible movements towards the river over the last 4 years and appear to be stabilizing. Based on these readings and site observations, the two walls, sheet piles, and riprap have effectively stabilized the original large landslide at Site 3.

The seepage from the pavement GBC first observed in 2016 south of the upper pile wall, and ongoing weathering of the fill, were the likely causes of the slide that occurred south of the upper pile wall in 2017. The seepage likely saturated the GBC and embankment fill with time, which created a weak soil mass that eventually failed, carrying the material down into the river.

Pavement deflections and alligator cracks had showed up in both lanes (southbound lane worse) near each end of the upper pile wall where the lightweight (Geofoam) fill ends. The southbound lane ACP was in poor shape from the south end of the slide area to about 11 m north of the south end of the wall. Also, map cracking existed quite extensively over the pavement adjacent to the upper pile wall. This was surmised to be due to flexing of the pavement structure overtop of the Geofoam in response to heavy truck traffic, and different thermal characteristics from freeze-thaw compared to total soil bedding. Some of the pavement distress was remediated by placing asphalt patches at the north end of the wall in 2020 and 2021. The 2023 pavement rehabilitation over this highway pavement segment and subsequent overlay as part of Contract #21542 that was managed by McIntosh Perry Inc., left this area with a new, smooth and unblemished surface.

Also as part of this Paving Contract #21542, TEC approved repairs as undertaken by Thurber in the 2023 detailed design and tender, to the Site 3 slide that occurred between the upper pile wall and bridge culvert, which consisted of: Excavated the slumped material in the west highway embankment, and disposed the material outside and away from the valley crests; Installed a drainage geosynthetic and a subdrain system along the base of the excavated slump; Installed sheet piles along the slide toe and adjacent to the arch culvert, to minimize river inflow and to provide support for excavation adjacent to it; Installed temporary sheet piles adjacent to the highway/pile wall for excavation support (which were removed after backfilling); Extended the subdrains through the lower portion of the re-built slope to outlet on the riprap adjacent to the river; Installing additional Class 2 riprap along the toe of the repaired area adjacent to the river to prevent future toe erosion; Re-built the new highway embankment using compacted gravel to re-establish the existing slope and to surround the subdrains; and then completed with Topsoil Replacement, Seeding, and Soil Coverings. Based on our 2024 inspection, these repairs appear to have stabilized this smaller landslide area.

The exposed concrete along the top of the upper pile wall is spalling. This was attributed to weaker than design strengths on this material, for which the contractor was penalized for low strengths at that time.

Slide features at/between Sites 5 and 6 have not changed significantly over the last few years. The inclinometers installed in 2011 (SI's 11-5, -6 and -7, which were previously showing movements in the order of 15 to 25 mm/year) had all sheared off by 2015, while SI's 11-3 and 11-4 which are located very near the top of the slide scarp show negligible movement. This indicates creep movements are occurring at both Sites 5 and 6, in addition to between them, at depths as deep as 18.5 m below ground surface. This more closely defines the slide boundary between Sites 5 and 6 and outlines the edge of a single larger slide moving towards the river.

Recommendations:

Maintenance

Consider covering the slope in between the pavement and the upper wall with hand placed asphalt, as there is sparse grass growth here and some rilling has formed.

It was understood that the Site 3 pile wall should be added to the Bridge File yearly maintenance program, which would include gutter (concrete swale) cleaning at the same time as bridge deck cleaning occurs.

- 1) Clean the gutter of soil/debris buildup under the handrail adjacent to the west side of the highway, and securely fasten the loose gutter grate.
- 2) The spalled concrete on the surface of the upper pile wall should be repaired by placing a proper concrete sealant over the entire exposed surface to prevent any further degradation.
- 3) A steel sleeve could be installed over the gap in the handrail.
- 4) Install a grate that was missing on the subdrain outlet from the 2023 slide repairs performed between the pile wall and bridge culvert.

Short Term

Paving Contract #21542 in 2023 involved a pavement overlay to be applied to the highway throughout the valley crossing section. It was recommended that prior to placing the overlay, consideration be given to doing a full depth subgrade repair to improve the strength of the pavement and better bridge over the softer geofoam zone, by: Excavating the majority of the 0.7 m of clay subgrade to near the surface of the geofoam; Replacing the clay subgrade to compaction specifications; Installing geogrid in the compacted GBC; then repaving these areas, however, this was not included in the contract. The new overlay will add some support to the pavement structure but if extensive map cracking reappears, the above noted remedial measures could be considered at that time.

Long Term

Thurber performed a preliminary geotechnical investigation and design (see Report dated July 17, 2009), which outlined various remediation alternatives/costs consisting of three major highway re-alignment options (two of which utilize the existing crossing), a minor highway re-alignment, or constructing pile walls at each site individually. TEC is considering which alternative to pursue in respect of costs and future planning. A functional planning study was completed by Morrison Hershfield Ltd. in 2012, which recommended Option #1B be adopted – i.e., a major re-alignment which utilizes the existing crossing but is perpendicular to the river and raises the crossing grade elevation but passes through the farmyard. A separate recommendation for armouring the river along the downstream toe of Slide Site 3 for the minor re-alignment and individual site repairs was also provided in Thurber's report, but this was already performed as extra work for the Site 3 slide repair contract.

The major highway re-alignment is still considered the best long-term recommendation, since the slip surfaces at Sites 5 and 6 are too deep to stabilize with a cost-effective pile wall.

CLOSURE

It is a condition of this letter report that Thurber's performance of its professional services will be subject to the attached Statement of Limitations and Conditions.

Don Proudfoot, P.Eng.
Principal | Senior Geotechnical Engineer

Barry Meays, P.Eng.
Senior Geotechnical Engineer



STATEMENT OF LIMITATIONS AND CONDITIONS

1. STANDARD OF CARE

This Report has been prepared in accordance with generally accepted engineering or environmental consulting practices in the applicable jurisdiction. No other warranty, expressed or implied, is intended or made.

2. COMPLETE REPORT

All documents, records, data and files, whether electronic or otherwise, generated as part of this assignment are a part of the Report, which is of a summary nature and is not intended to stand alone without reference to the instructions given to Thurber by the Client, communications between Thurber and the Client, and any other reports, proposals or documents prepared by Thurber for the Client relative to the specific site described herein, all of which together constitute the Report.

IN ORDER TO PROPERLY UNDERSTAND THE SUGGESTIONS, RECOMMENDATIONS AND OPINIONS EXPRESSED HEREIN, REFERENCE MUST BE MADE TO THE WHOLE OF THE REPORT. THURBER IS NOT RESPONSIBLE FOR USE BY ANY PARTY OF PORTIONS OF THE REPORT WITHOUT REFERENCE TO THE WHOLE REPORT.

3. BASIS OF REPORT

The Report has been prepared for the specific site, development, design objectives and purposes that were described to Thurber by the Client. The applicability and reliability of any of the findings, recommendations, suggestions, or opinions expressed in the Report, subject to the limitations provided herein, are only valid to the extent that the Report expressly addresses proposed development, design objectives and purposes, and then only to the extent that there has been no material alteration to or variation from any of the said descriptions provided to Thurber, unless Thurber is specifically requested by the Client to review and revise the Report in light of such alteration or variation.

4. USE OF THE REPORT

The information and opinions expressed in the Report, or any document forming part of the Report, are for the sole benefit of the Client. NO OTHER PARTY MAY USE OR RELY UPON THE REPORT OR ANY PORTION THEREOF WITHOUT THURBER'S WRITTEN CONSENT AND SUCH USE SHALL BE ON SUCH TERMS AND CONDITIONS AS THURBER MAY EXPRESSLY APPROVE. Ownership in and copyright for the contents of the Report belong to Thurber. Any use which a third party makes of the Report, is the sole responsibility of such third party. Thurber accepts no responsibility whatsoever for damages suffered by any third party resulting from use of the Report without Thurber's express written permission.

5. INTERPRETATION OF THE REPORT

- a) Nature and Exactness of Soil and Contaminant Description: Classification and identification of soils, rocks, geological units, contaminant materials and quantities have been based on investigations performed in accordance with the standards set out in Paragraph 1. Classification and identification of these factors are judgmental in nature. Comprehensive sampling and testing programs implemented with the appropriate equipment by experienced personnel may fail to locate some conditions. All investigations utilizing the standards of Paragraph 1 will involve an inherent risk that some conditions will not be detected and all documents or records summarizing such investigations will be based on assumptions of what exists between the actual points sampled. Actual conditions may vary significantly between the points investigated and the Client and all other persons making use of such documents or records with our express written consent should be aware of this risk and the Report is delivered subject to the express condition that such risk is accepted by the Client and such other persons. Some conditions are subject to change over time and those making use of the Report should be aware of this possibility and understand that the Report only presents the conditions at the sampled points at the time of sampling. If special concerns exist, or the Client has special considerations or requirements, the Client should disclose them so that additional or special investigations may be undertaken which would not otherwise be within the scope of investigations made for the purposes of the Report.
- b) Reliance on Provided Information: The evaluation and conclusions contained in the Report have been prepared on the basis of conditions in evidence at the time of site inspections and on the basis of information provided to Thurber. Thurber has relied in good faith upon representations, information and instructions provided by the Client and others concerning the site. Accordingly, Thurber does not accept responsibility for any deficiency, misstatement or inaccuracy contained in the Report as a result of misstatements, omissions, misrepresentations, or fraudulent acts of the Client or other persons providing information relied on by Thurber. Thurber is entitled to rely on such representations, information and instructions and is not required to carry out investigations to determine the truth or accuracy of such representations, information and instructions.
- c) Design Services: The Report may form part of design and construction documents for information purposes even though it may have been issued prior to final design being completed. Thurber should be retained to review final design, project plans and related documents prior to construction to confirm that they are consistent with the intent of the Report. Any differences that may exist between the Report's recommendations and the final design detailed in the contract documents should be reported to Thurber immediately so that Thurber can address potential conflicts.
- d) Construction Services: During construction Thurber should be retained to provide field reviews. Field reviews consist of performing sufficient and timely observations of encountered conditions in order to confirm and document that the site conditions do not materially differ from those interpreted conditions considered in the preparation of the report. Adequate field reviews are necessary for Thurber to provide letters of assurance, in accordance with the requirements of many regulatory authorities.

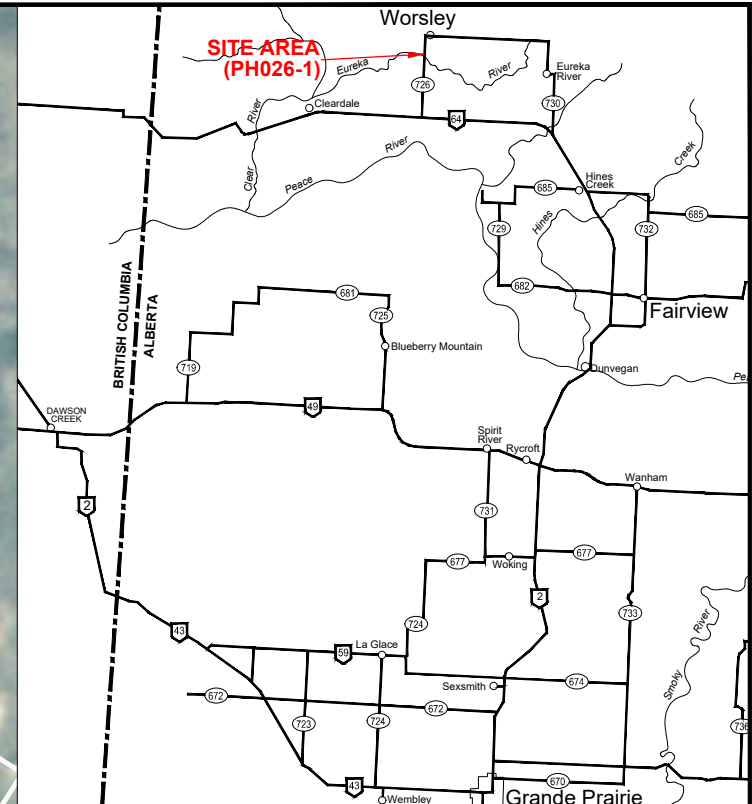
6. RELEASE OF POLLUTANTS OR HAZARDOUS SUBSTANCES

Geotechnical engineering and environmental consulting projects often have the potential to encounter pollutants or hazardous substances and the potential to cause the escape, release or dispersal of those substances. Thurber shall have no liability to the Client under any circumstances, for the escape, release or dispersal of pollutants or hazardous substances, unless such pollutants or hazardous substances have been specifically and accurately identified to Thurber by the Client prior to the commencement of Thurber's professional services.

7. INDEPENDENT JUDGEMENTS OF CLIENT

The information, interpretations and conclusions in the Report are based on Thurber's interpretation of conditions revealed through limited investigation conducted within a defined scope of services. Thurber does not accept responsibility for independent conclusions, interpretations, interpolations and/or decisions of the Client, or others who may come into possession of the Report, or any part thereof, which may be based on information contained in the Report. This restriction of liability includes but is not limited to decisions made to develop, purchase or sell land.

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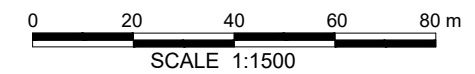


NOTE

1. SLIDE FEATURES RECORDED USING A HAND HELD GPS.
2. SITE 5 AND SITE 6 MAY OUTLINE THE EDGE OF A SINGLE SLIDE SPANNING BETWEEN THE TWO AREAS.
3. FOR UPDATED CRACKS / PATCHES, SEE DWG No. 32123-PH026-2 TO 32123-PH026-4.

LEGEND

- ← SLIDE MOVEMENT DIRECTION
- TEST HOLE LOCATIONS
- 9m DEPTH BELOW GROUND OF SHEAR ZONE IN SLOPE INCLINOMETER



**PEACE REGION (GRANDE PRAIRIE DISTRICT - NORTH)
PH026 HWY 726:02 SOUTH OF WORSLEY,
SITES #3, #5 & #6**

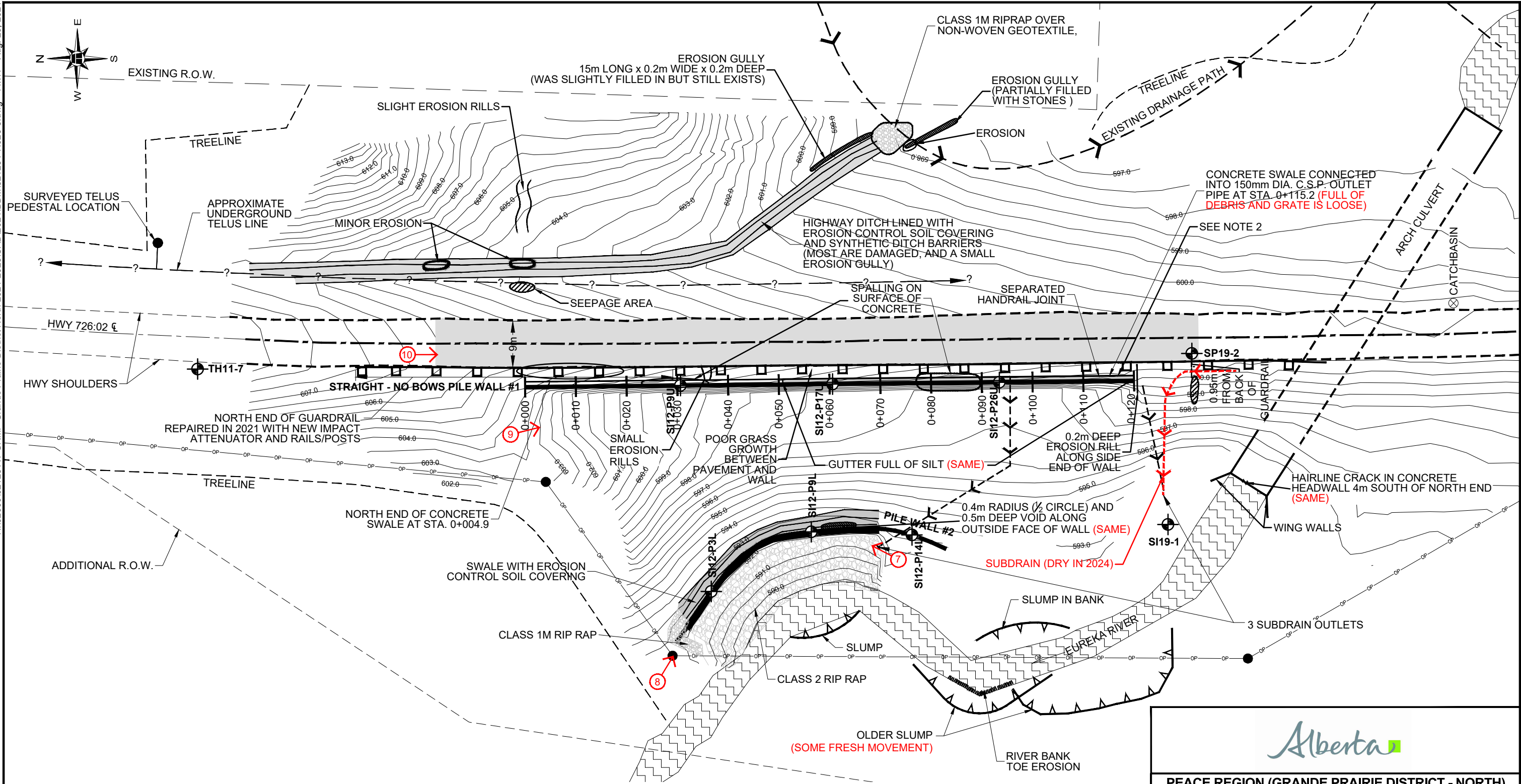
2024 PH026 INSPECTION PLAN

DWG No. 32123-PH026-1

DRAWN BY	ML
DESIGNED BY	BDM
APPROVED BY	DWP
SCALE	1:1500
DATE	MAY 8, 2024
FILE No.	32123



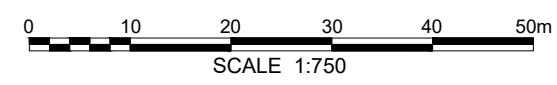
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- NOTES:**
- CONDITIONS ON MAY 8, 2024 SHOWN IN RED.
 - GUTTER GRATE IS LOOSE AND GUTTER IS FULL OF DIRT AND NEEDS CLEANING (AT MAINTENANCE).
 - HIGHWAY 726:02 WAS OVERLAYED IN FALL OF 2023.
 - REFER TO DWG NO. 32123 PH026-4 FOR ADDITIONAL DETAILS OF 2023 SLIDE REPAIRS BETWEEN ARCH CULVERT AND UPPER PILE WALL.

LEGEND

	NEW GUARDRAIL
	POWER POLE AND GUY WIRES
	2012 INSTRUMENTS LOCATED IN THE PILE WALLS
	PHOTO AND DIRECTION
	SLIDE SCARP / CRACK
	ACP PATCH
	SUBDRAINS (3)



Alberta

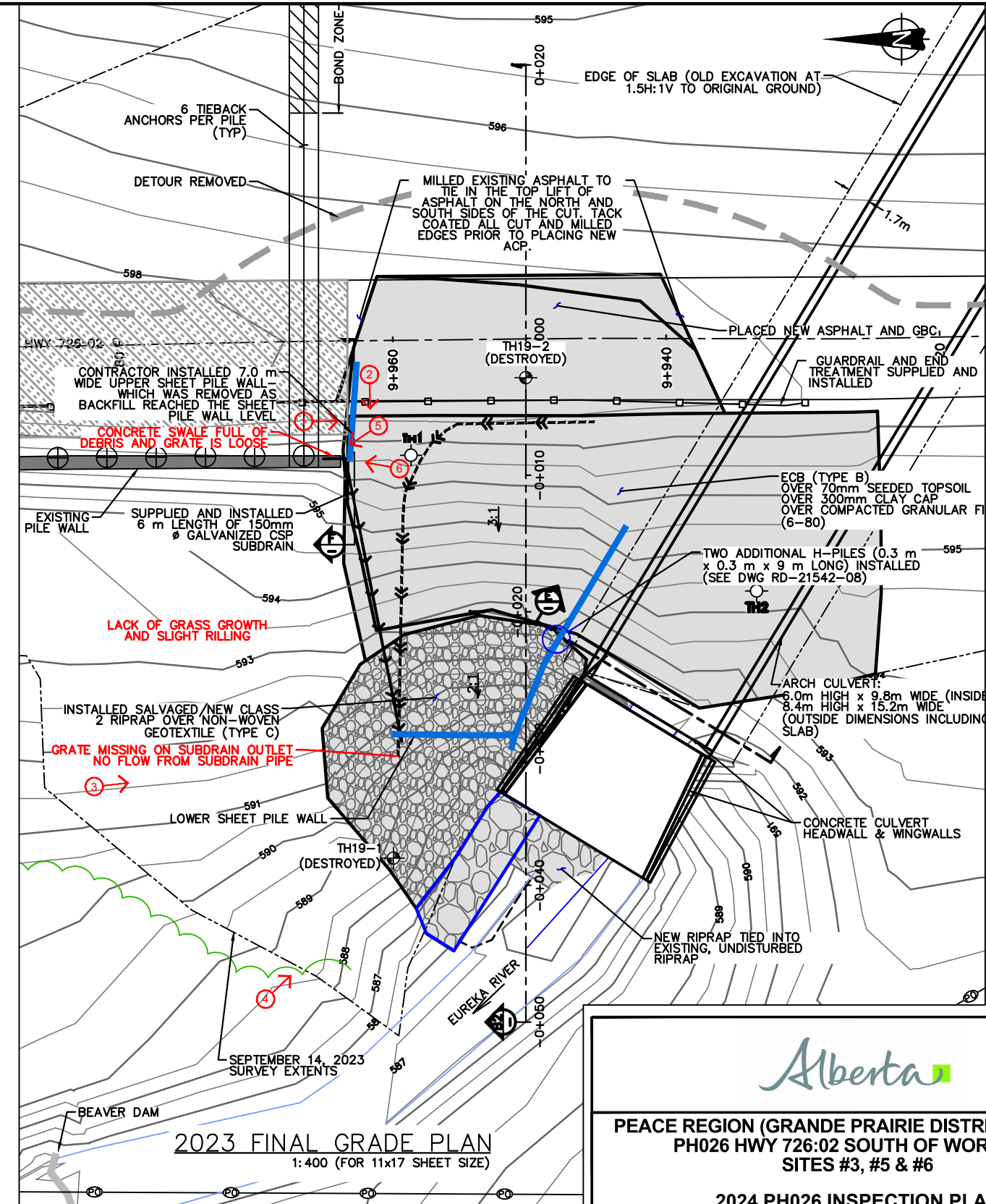
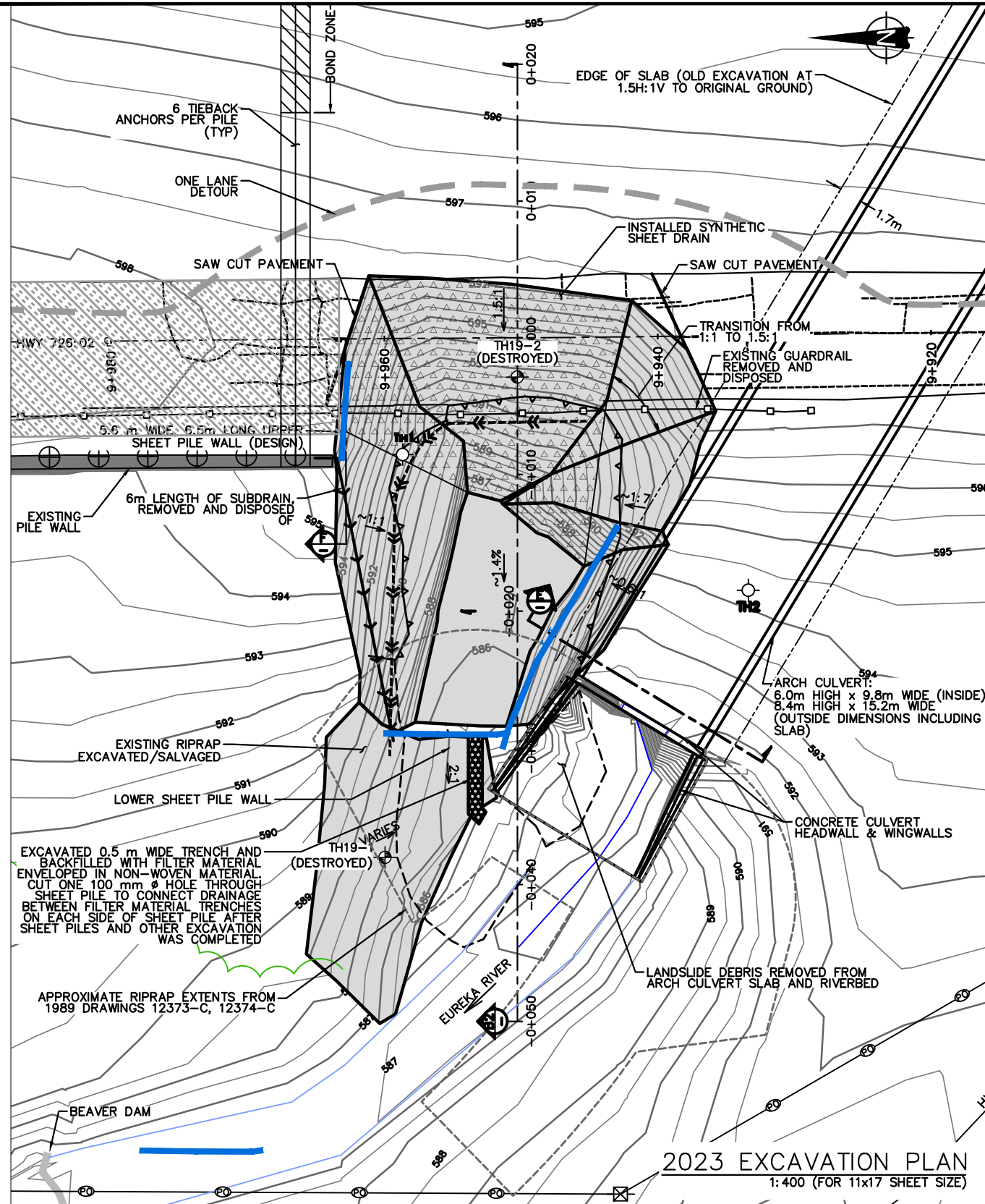
**PEACE REGION (GRANDE PRAIRIE DISTRICT - NORTH)
PH026 HWY 726:02 SOUTH OF WORSLEY,
SITES #3, #5 & #6**

2024 PH026 INSPECTION PLAN

DWG No. 32123-PH026-3

DRAWN BY	ML
DESIGNED BY	BDM
APPROVED BY	DWP
SCALE	1:750
DATE	MAY 8, 2024
FILE No.	32123

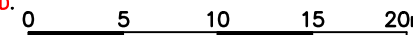
THURBER ENGINEERING LTD.



LEGEND

	PERFORATED 150mm Ø GALVANIZED CSP SUBDRAIN PIPE (MIN 1%)
	SOLID 150mm Ø GALVANIZED CSP SUBDRAIN PIPE
	BURIED EPS GEOFOAM
	SYNTHETIC SHEET DRAIN
	PHOTO AND DIRECTION
	SHEET PILE WALL

- NOTES:**
1. ORIGINAL GROUND SURFACE SURVEYED BY McINTOSH PERRY CONSULTING ENGINEERS LTD. ON AUGUST 26, 2019 AND ON SEPTEMBER 28, 2021. SITE FEATURES ONLY REFLECT THE SURVEY DATA, AND MAY VARY AT THE TIME OF TENDERING THE PROJECT.
 2. DETOUR OUTLINE IS APPROXIMATE
 3. EXCAVATION LIMITS ARE APPROXIMATE. EXCAVATION REMOVED MATERIAL DISTURBED BY THE LANDSLIDE AND BASE OF EXCAVATION WAS EXTENDED TO SURFACE OF SAND AND GRAVEL OR INTACT CLAY TILL TO THE SATISFACTION OF THE CONSULTANT
 4. AS-BUILT GROUND SURFACE SURVEYED BY McINTOSH PERRY CONSULTING ENGINEERS LTD. ON SEPTEMBER 14, 2023
 5. CONDITIONS ON MAY 8, 2024 SHOWN IN RED.



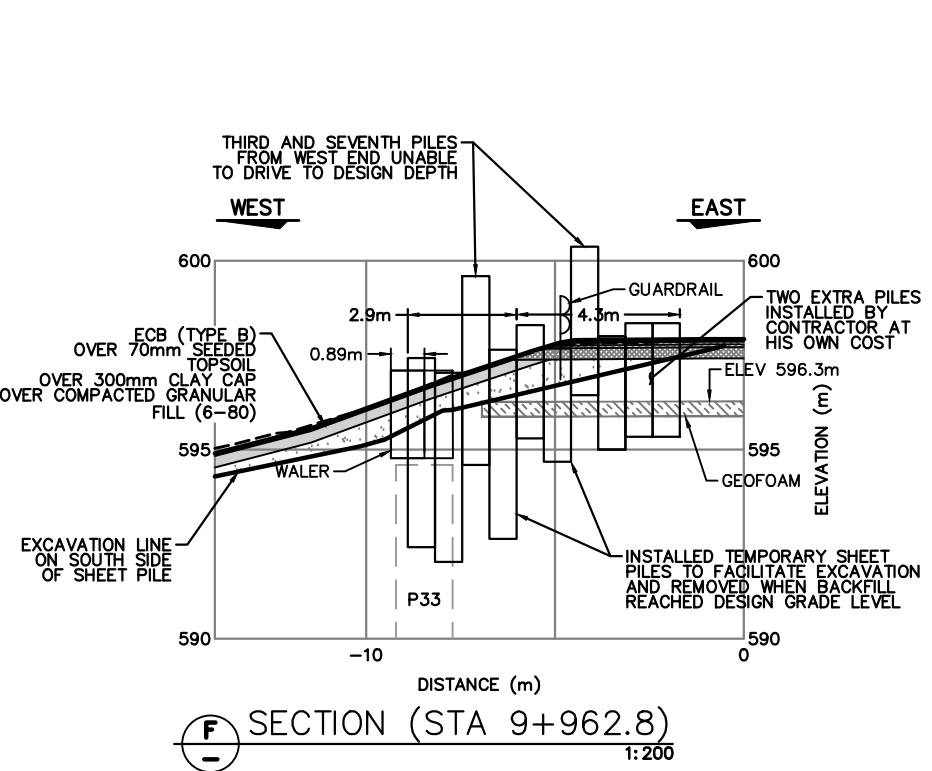
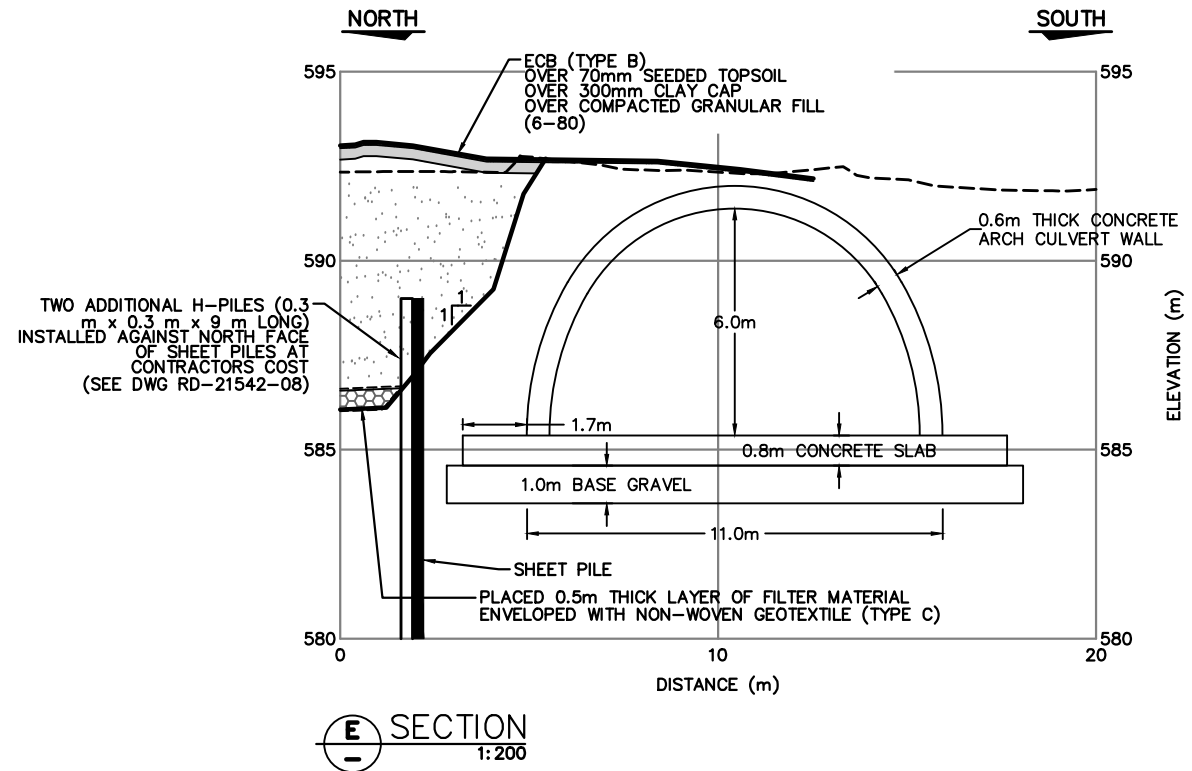
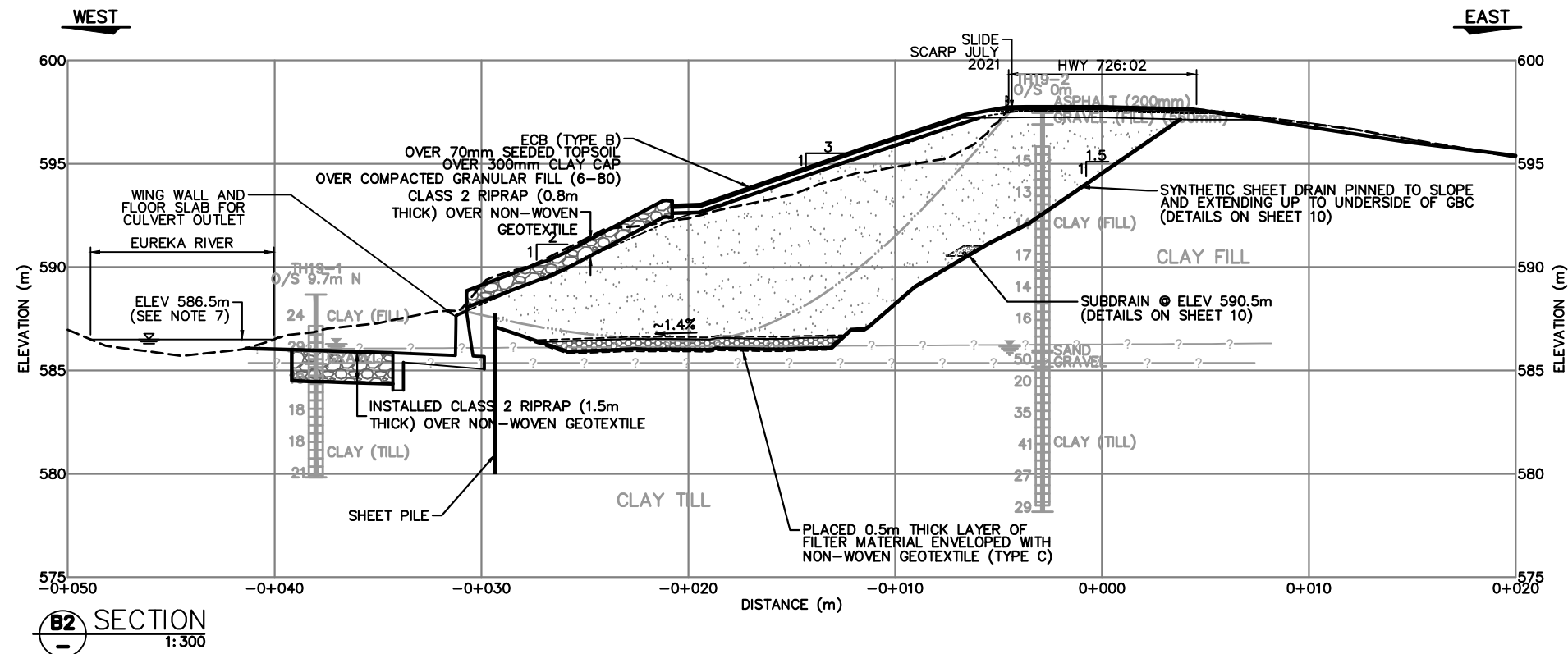
**PEACE REGION (GRANDE PRAIRIE DISTRICT - NORTH)
PH026 HWY 726:02 SOUTH OF WORSLEY,
SITES #3, #5 & #6**

2024 PH026 INSPECTION PLAN

DWG No. 32123-PH026-4

DRAWN BY	ML
DESIGNED BY	BDM
APPROVED BY	DWP
SCALE	1:400
DATE	MAY 8, 2024
FILE No.	32123

THURBER ENGINEERING LTD.



- LEGEND**
- ORIGINAL GROUND SURFACE (SURVEYED AUGUST 26, 2019 AND ON SEPTEMBER 28, 2021)
 - 15 SPT N VALUE
 - STANDPIPE PIEZOMETER SCREENED INTERVAL
 - WATER LEVEL IN PIEZOMETER (JULY 16, 2021)
 - ASSUMED SLIDE SURFACE
 - 2014 AS-BUILT GROUND SURFACE (SURVEYED BY WSP)

- NOTES:**
1. DATA CONCERNING THE VARIOUS STRATA HAVE BEEN OBTAINED AT THE TEST HOLE LOCATIONS ONLY. THE SOIL STRATIGRAPHY BETWEEN TEST HOLES HAS BEEN INFERRED FROM GEOLOGICAL EVIDENCE AND SO MAY VARY FROM THAT SHOWN.
 2. ALL ELEVATIONS PRIOR TO 2019 ADJUSTED BY -3.2m TO MATCH McINTOSH PERRY CONSULTING ENGINEERS LTD.'S NEW DATUM ESTABLISHED 2021.
 3. TH19-1 AND TH19-2 OBTAINED FROM THURBER PRELIMINARY REPORT #24993 DATED NOVEMBER 21, 2019
 4. TH1 & TH2 OBTAINED FROM AT'S DRAWINGS #DD1071A AND DD1071B (1987)
 5. PILE WALL DETAILS OBTAINED FROM THURBER CONSTRUCTION SUMMARY REPORT #15-85-86 DATED JANUARY 30, 2018 (APPENDIX A - AS-CONSTRUCTED DRAWINGS)
 6. ARCH CULVERT DETAILS OBTAINED FROM AT AS-CONSTRUCTED DRAWINGS # 12375-C, 12376-C, 12377-C (1989)
 7. RIVER WATER LEVEL ON AUGUST 26, 2019. WATER LEVELS WILL VARY.

Alberta

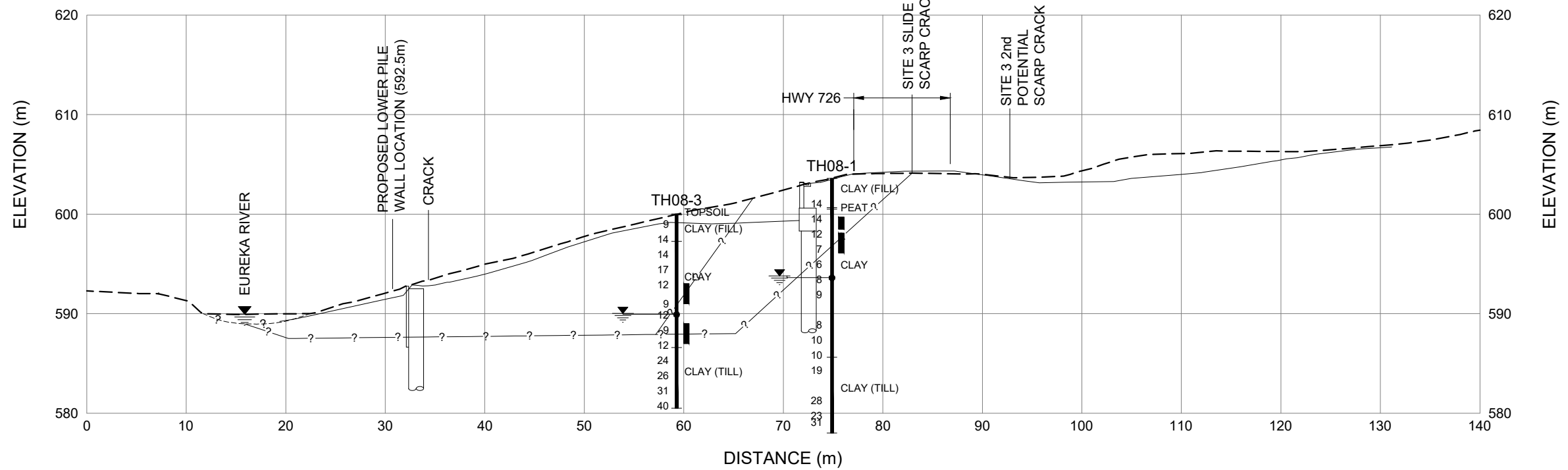
**PEACE REGION (GRANDE PRAIRIE DISTRICT - NORTH)
PH026 HWY 726:02 SOUTH OF WORSLEY,
SITES #3, #5 & #6**

2024 PH026 CROSS - SECTIONS B2, E AND F

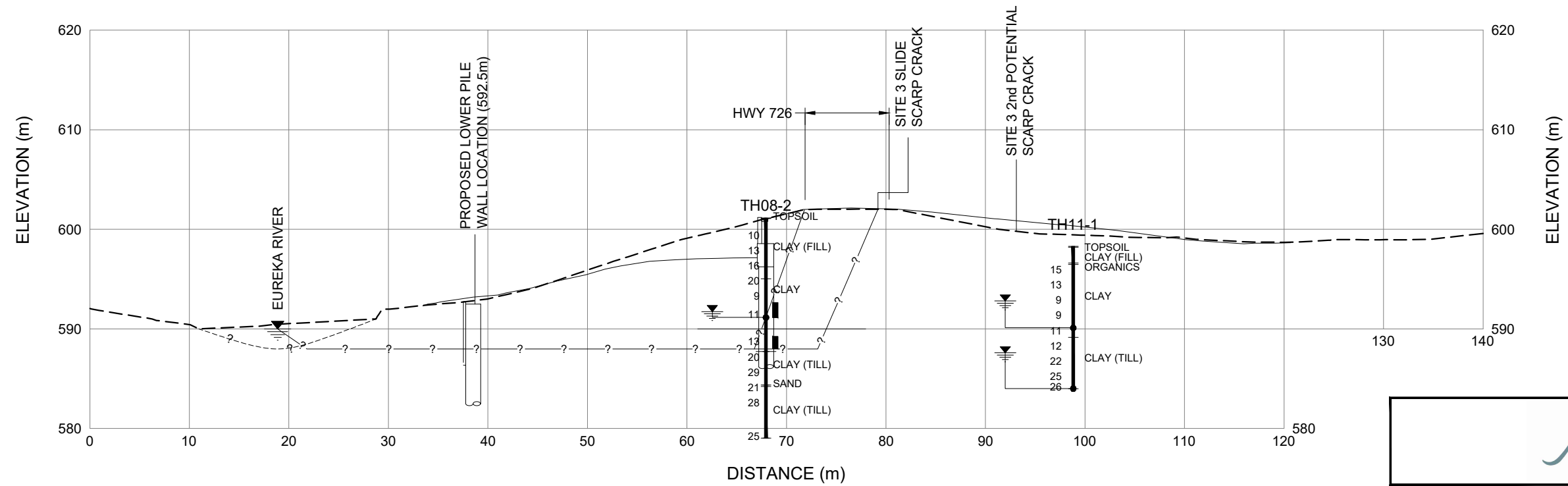
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DESIGNED BY	BDM
APPROVED BY	DWP
SCALE	AS SHOWN
DATE	MAY 8, 2024
FILE No.	32123

THURBER ENGINEERING LTD.



SECTION A-A'



SECTION B-B'

LEGEND

- SPT N VALUE
- WATER LEVEL IN PIEZOMETER, JUNE 4, 2011
- INFERRED SLIDE SURFACE
- INFERRED GROUND SURFACE BELOW RIVER
- PIEZOMETER TIP LOCATION IN TEST HOLES
- MOVEMENT ZONE IN INCLINOMETERS
- ORIGINAL GROUND SURFACE (LIDAR)
- AS - BUILT GROUND SURFACE (SURVEY)

NOTES

1. DATA CONCERNING THE VARIOUS STRATA HAVE BEEN OBTAINED AT THE TEST HOLE LOCATIONS ONLY. THE SOIL STRATIGRAPHY BETWEEN TEST HOLES HAS BEEN INFERRED FROM GEOLOGICAL EVIDENCE AND SO MAY VARY FROM THAT SHOWN.
2. THE CROSS SECTIONS ARE BASED ON OCTOBER 2007 LIDAR & 2013 SURVEY INFORMATION. THE TEST HOLE ELEVATIONS WERE CONVERTED FROM GENIVAR'S SURVEY INFO.



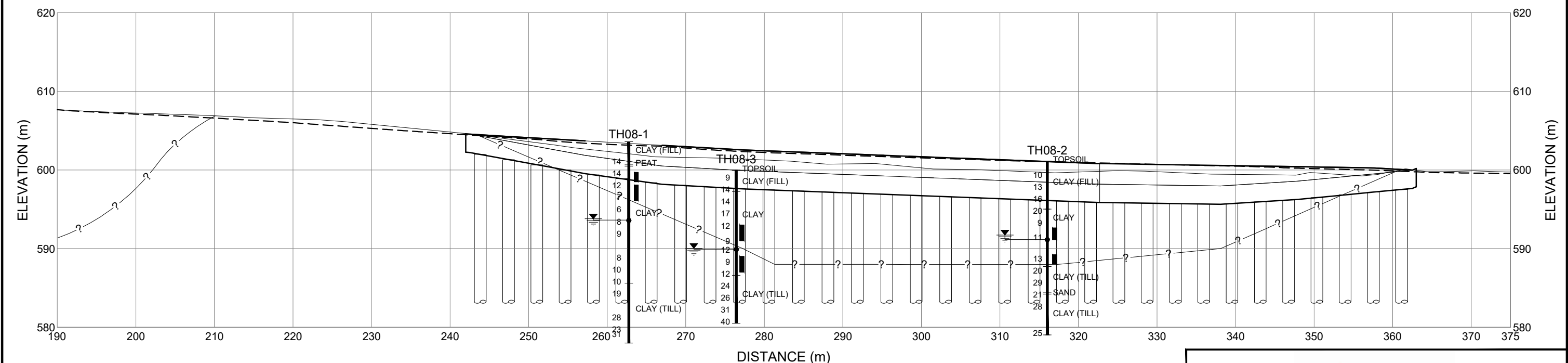
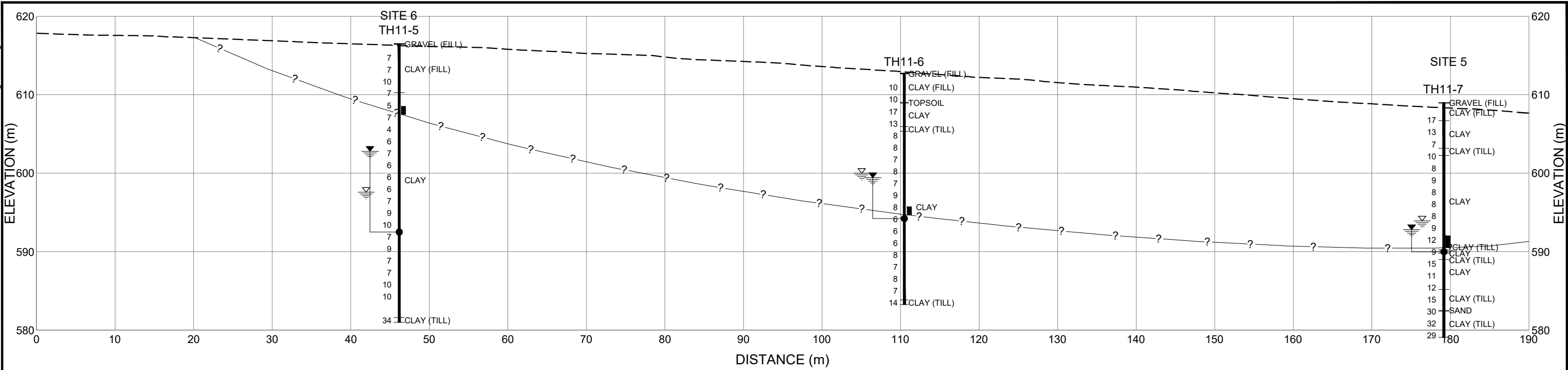
PEACE REGION (GRANDE PRAIRIE DISTRICT - NORTH)
PH026 HWY 726:02 SOUTH OF WORSLEY,
SITES #3, #5 & #6

CROSS-SECTIONS A-A' & B-B'

DWG No. 32123-PH026-6

DRAWN BY	ML
DESIGNED BY	BDM
APPROVED BY	DWP
SCALE	1:500
DATE	MAY 8, 2024
FILE No.	32123





LEGEND

- SPT N VALUE
- WATER LEVEL IN PIEZOMETER, JUNE 4, 2011
- WATER LEVEL IN PIEZOMETER, SEPTEMBER 20, 2014
- INFERRED SLIDE SURFACE
- PIEZOMETER TIP LOCATION IN TEST HOLES
- MOVEMENT ZONE IN INCLINOMETERS
- ORIGINAL GROUND SURFACE (LIDAR)
- AS - BUILT GROUND SURFACE (SURVEY)

NOTES

1. DATA CONCERNING THE VARIOUS STRATA HAVE BEEN OBTAINED AT THE TEST HOLE LOCATIONS ONLY. THE SOIL STRATIGRAPHY BETWEEN TEST HOLES HAS BEEN INFERRED FROM GEOLOGICAL EVIDENCE AND SO MAY VARY FROM THAT SHOWN.
2. THE CROSS SECTIONS ARE BASED ON OCTOBER 2007 LIDAR & 2013 SURVEY INFORMATION. THE TEST HOLE ELEVATIONS WERE CONVERTED FROM GENIVAR'S SURVEY INFO.



**PEACE REGION (GRANDE PRAIRIE DISTRICT - NORTH)
PH026 HWY 726:02 SOUTH OF WORSLEY,
SITES #3, #5 & #6**

CROSS-SECTION C-C'

DWG No. 32123-PH026-7

DRAWN BY	ML
DESIGNED BY	BDM
APPROVED BY	DWP
SCALE	1:500
DATE	MAY 8, 2024
FILE No.	32123





Photo 1 – Looking south along the west highway embankment south of the upper pile wall at the 2023 landslide repairs at Site 3.



Photo 2 – Looking west at the slide repairs and arch culvert outlet from the south end of the upper pile wall at Site 3. Note the bank slump on the outside bend of the river.



Photo 3 – Looking southwest at the lower slide repairs and arch culvert at Site 3.



Photo 4 – Looking southeast at the slide repairs and the arch culvert outlet area at Site 3.



Photo 5 – Looking north at the top of pile wall gutter drain and loose cover plate at site 3. This needs to be cleaned.



Photo 6 – Looking north at the south end of the pile wall at Site 3. If runoff begins to develop at this area, it will need to be built up with additional clay infill, then topsoiled/seeded/covered.



Photo 7 – Looking north at the lower pile wall area at Site 3, the riprap behind it, and the river.



Photo 8 – Looking south along the lower pile wall, riprap, and river at Site 3.



Photo 9 - Looking south along the upper pile wall and downslope embankment at Site 3.



Photo 10 – Looking south along the highway from the north end of the pile wall of Site 3.



Photo 11 - Looking north along the highway and east ditch from the south end of the scarp of Site 5.



Photo 12 - Looking north along the east ditch at SI 11-3, where the slide scarp runs along the ditch between Sites 5 and 6.



Photo 13 - Looking north along the east highway edge where the slide scarp crosses the highway at Site 6.



Photo 14 - Looking south along the west side of the highway where the slide scarp crosses at Site 6.