

**ALBERTA TRANSPORTATION  
GEOHAZARD ASSESSMENT PROGRAM  
PEACE REGION – SWAN HILLS  
2022 INSPECTION**



Site Number	Location	Name	Hwy	km
SH012-8 SH012-9	Little Smoky River	Little Smoky River Valley, North Hill – Sites #8 and #9	744:02	19.70-19.83 19.83-20.0*
<b>Legal Description</b>		<b>UTM Co-ordinates</b>		
Site 8: SW21-76-22-W5M		11U E 477,815	N	6,161,486
Site 9: 21-76-22-W5		11U E 477,887	N	6,161,592

	Date	PF	CF	Total
<b>Previous Inspection:</b>	2-Jun-2020	10	4	Site 8: 40
		10	4	Site 9: 40
<b>Current Inspection:</b>	31-May-2022	10	4	Site 8: 40
		11	4	Site 9: 44
<b>Road AADT:</b>	230	<b>Year:</b>	2022	
<b>Inspected By:</b>	Rishi Adhikari, TRANS Ed Szmata, TRANS Max Shannon, TRANS		Ken Froese, Thurber Mark Gallego, Thurber	
<b>Report Attachments:</b>	<input checked="" type="checkbox"/> Photographs <input checked="" type="checkbox"/> Plans <input type="checkbox"/> Maintenance Items			

<b>Primary Site Issue:</b>	Highway traverses deep-seated, retrogressive landslides with ongoing creep movements due partly to erosion at toe by the Little Smoky River and Peavine Creek resulting in cracking and sagging of the pavement surface at numerous locations. Approx. 4 km of the highway crosses this unstable north valley slope. Site #8 is 65 m above and 400 m away from the Peavine Creek and Site #9 is 65 m above and 435 m away.	
<b>Dimensions:</b>	Site 8: 130 m length of highway affected by cracking and distortion Site 9: 170 m length of highway affected by cracking and distortion (* Extended from km 19.95 in 2017)	
<b>Date of Remediation:</b>	<u>1988:</u> 6 m deep subdrain installed in upslope ditch from Sta. 19+600 to 20+300. <u>2011 (Site 9):</u> Sinkhole in highway filled with gravel and the suspect culvert (piping) was replaced.	
<b>Maintenance:</b>	2013, 2014, 2015: Routine crack sealing, milling, and patching, as required. <u>Spring 2017:</u> ACP patching, sideslopes regraded; guardrail removed through SH12-9 <u>Fall 2017:</u> Patch over entire length of both sites <u>Spring 2019:</u> Milling over portions of both sites 2020: Line painting 2021: From 1.06 m (at km 19.7) up to 0 m (at km 19.79) of vertical grade readjustment (downward) and 50 mm overlay	
<b>Observations (Site 8):</b>	<b>Description</b>	<b>Worsened?</b>
<input checked="" type="checkbox"/> Pavement Distress	Site was recently overlaid. Some of the previous longitudinal and traverse cracks have reflected through.	<input type="checkbox"/>
<input checked="" type="checkbox"/> Slope Movement	Site is located on an active deep-seated landslide moving toward the Peavine Creek.	<input type="checkbox"/>

<input type="checkbox"/> Erosion		<input type="checkbox"/>
<input type="checkbox"/> Seepage		<input type="checkbox"/>
<input type="checkbox"/> Bridge/Culvert Distress		<input type="checkbox"/>
<input type="checkbox"/> Other		<input type="checkbox"/>
<b>Observations (Site 9):</b>	<b>Description</b>	<b>Worsened?</b>
<input checked="" type="checkbox"/> Pavement Distress	Site was recently overlaid. Some of the previous longitudinal and traverse cracks have reflected through. There is surface distortion over the crack pattern.	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> Slope Movement	Site is located on an active deep-seated landslide moving toward the Peavine Creek. This site crosses over a sag pond/graben with several dips in the highway.	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> Erosion	Small gully in backslope.	<input type="checkbox"/>
<input type="checkbox"/> Seepage		<input type="checkbox"/>
<input checked="" type="checkbox"/> Bridge/Culvert Distress	Culvert at km 19.93: hanging outlet was repaired with sideslope regrading in 2017 but is starting to scour again.	<input checked="" type="checkbox"/>
<input type="checkbox"/> Other		<input type="checkbox"/>
<b>Instrumentation:</b> None		
<b>Assessment:</b>		
<p>The overall valley slope is moving as several separate slide blocks in response to the toe erosion and downcutting of two different rivers resulting in numerous scarps, sag ponds, and differential movement zones going in slightly different directions. The highway intersects the scarps of these blocks at several locations resulting in an uneven highway surface and cracking.</p> <p>Site 8: Previously observed longitudinal and traverse cracks have been removed since the 2021 highway overlay. Only hairline cracks were observed during the 2022 inspection. As observed in previous inspections, distortion of the pavement surface is not as significant as Site 9. Given the overall valley condition, continued creep movement is expected which may manifest as increased crack lengths, widths, and height differential as well as vertical pavement distortion.</p> <p>Site 9: The crack pattern has reflected through recent 2021 highway overlay. It appears that the cracks follow the previously observed major scarp crack, which roughly parallels the highway through this site and may result in further vertical distortion of the pavement surface. Given the overall valley condition, continued creep movement is expected which may manifest as increased crack lengths, widths, and height differential as well as vertical pavement distortion.</p>		
<b>Recommendations:</b>		
<p>Short-Term:</p> <ul style="list-style-type: none"> <li>▪ Road maintenance should continue as necessary to maintain a safe roadway surface and may consist of ACP milling, patching, and crack sealing.</li> </ul> <p>Medium-Term:</p> <ul style="list-style-type: none"> <li>▪ Culvert outlet at km 19.93 (Site 9): consideration should be given to placing some riprap at the outlet (there is none currently) to minimize downcutting through recently regraded slope.</li> </ul>		

- Consideration should be given to regrading the ditches at the north end of Site 9 to allow the ponded water to drain.

Long-Term:

It is understood that, at this time, the only long-term remediation option under consideration is realignment of the entire north hill section of Highway 744. However, given the high cost of this option and as it is a low volume highway, it is unlikely that realignment will be undertaken in the near future. Consideration is also being given to a shorter realignment which would include both of these sites as they currently require frequent maintenance.

Ongoing Investigation:

It is recommended that the annual Geohazard inspection should continue as scheduled.

**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

Mark Gallego, P.Eng.  
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.

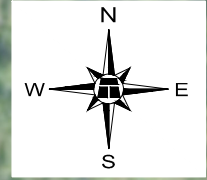
### 6. RELEASE OF POLLUTANTS OR HAZARDOUS SUBSTANCES

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.





2019 MILLING MATERIAL USED TO REGRADE DITCH

LOW SPOT IN DITCH 2018: WET WITH PONDED WATER

HWY SURFACE HAD BACK TILT

km 19.8

MAIN SLIDE SCARP NOT VISIBLE THROUGH RECENT GRADING

DIP

SH012-9

SH012-8

SAG POND

SLOUGH

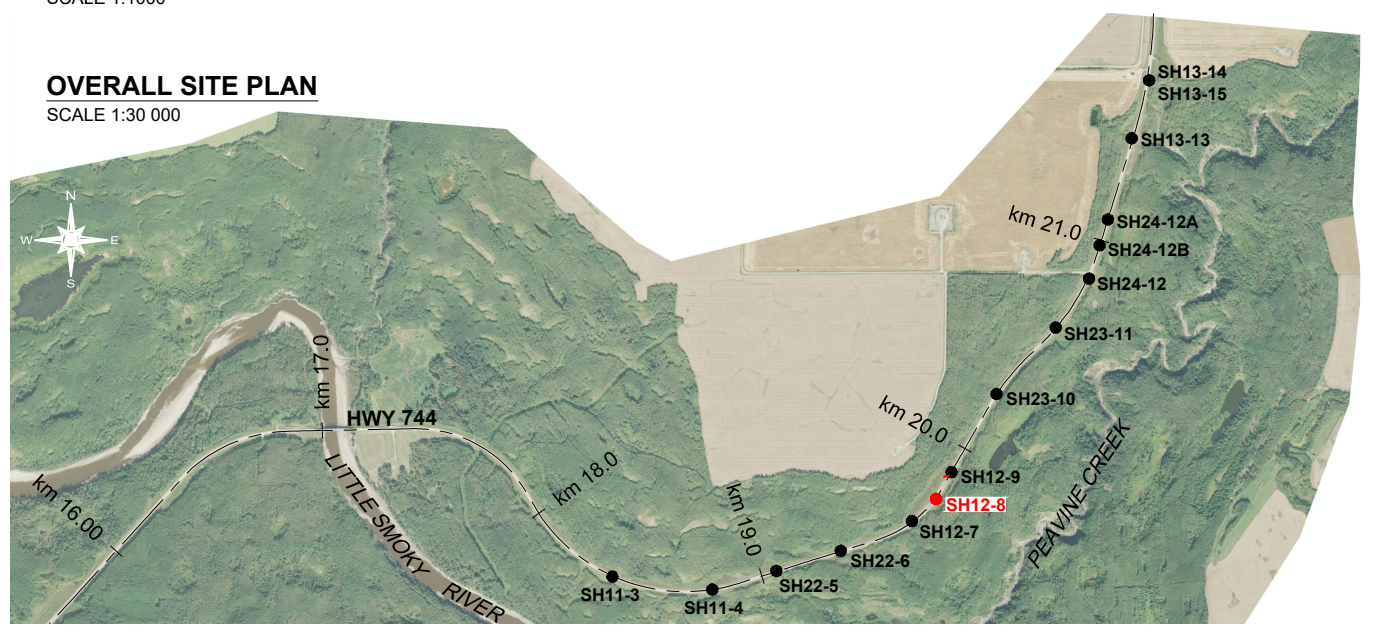
SH012-8

SH022-7

km 19.7

**DETAILED SITE PLAN**  
SCALE 1:1000

**OVERALL SITE PLAN**  
SCALE 1:30 000

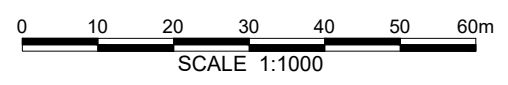


**LEGEND**

- GUARDRAIL
- ① DIRECTION AND NUMBER OF PHOTO

**NOTES**

1. FEATURE LOCATIONS ARE APPROXIMATE.
2. JUNE 2022 OBSERVATIONS SHOWN IN RED.
3. CRACK AND PATCH PATTERNS RESET AS HWY 744 WAS OVERLAID IN SUMMER 2021.
4. GUARDRAIL AND CULVERT LOCATIONS TAKEN FROM MCINTOSH PERRY AS-BUILT DRONE SURVEY (JULY 2021).



SATELLITE IMAGE FROM VALTUS IMAGERY (DATED 2014)



**PEACE REGION (SWAN HILLS)**

**SH012-8: HWY 744:02 LITTLE SMOKY RIVER VALLEY  
2022 SITE INSPECTION PLAN**

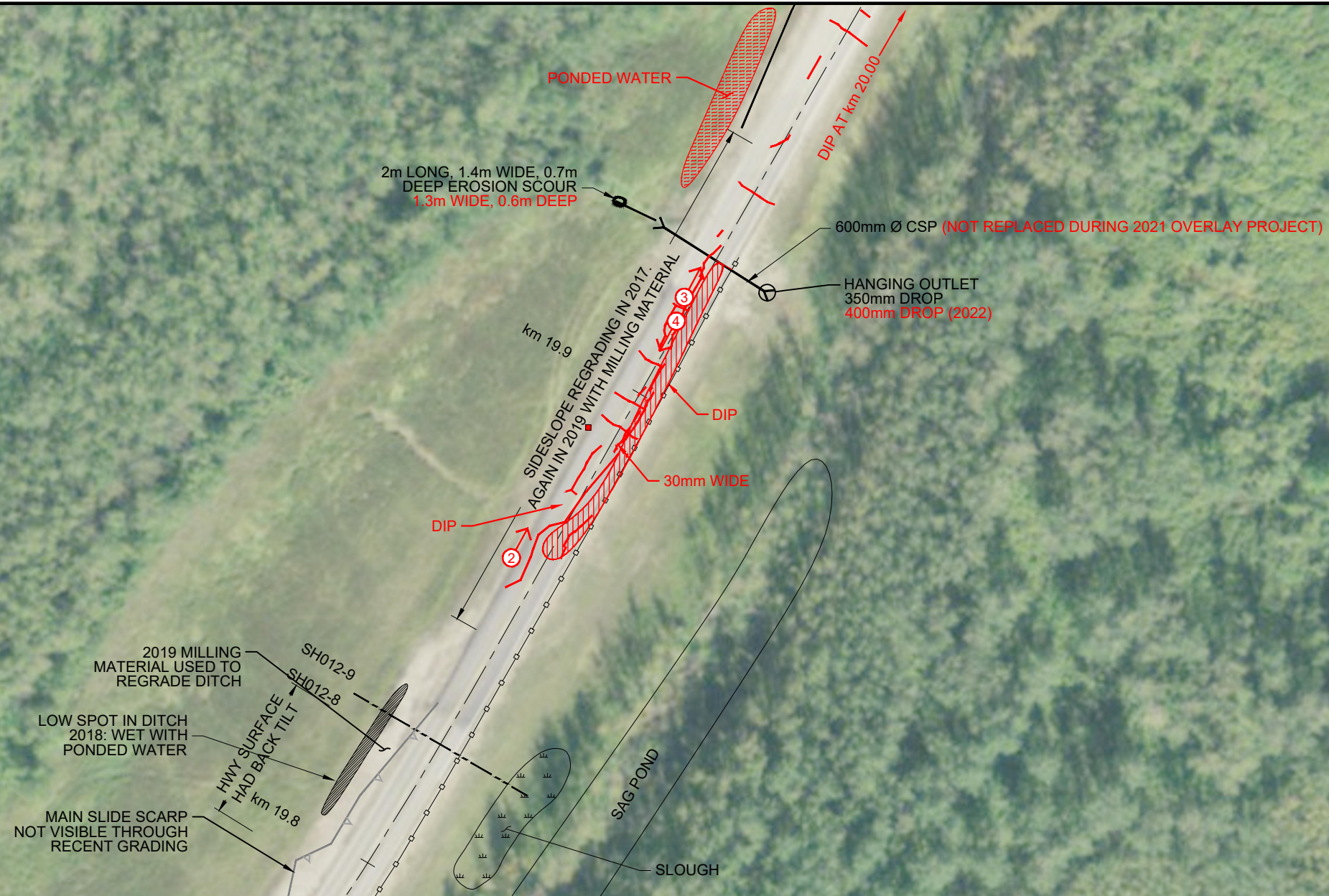
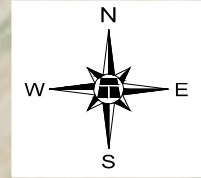
DWG No. 32121-SH012-8

DRAWN BY	ML
DESIGNED BY	MG
APPROVED BY	DWP
SCALE	AS SHOWN
DATE	OCTOBER 2022
FILE No.	32121



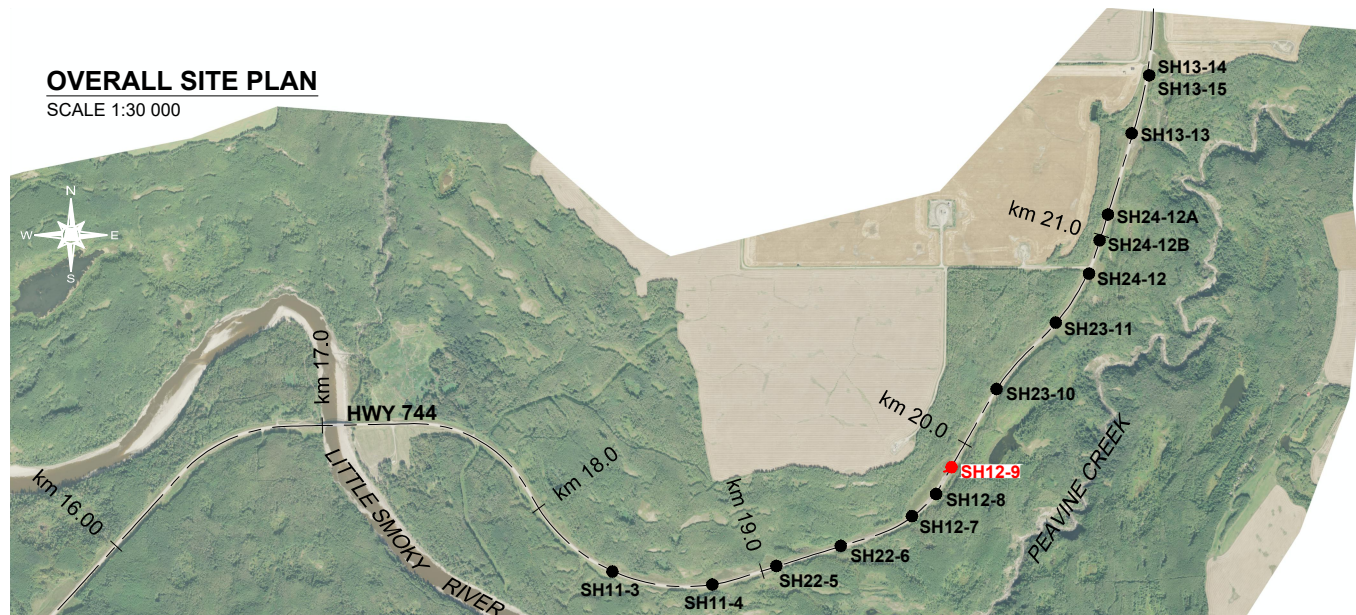


H:\32000\32121 AT GRMP Peace River District 2021-2025\CAD\2022 GEOHAZARD\KEF\32121 SH012-9 OCTOBER 13, 2022.dwg - 9 - Oct. 13, 2022



**DETAILED SITE PLAN**  
SCALE 1:1000

**OVERALL SITE PLAN**  
SCALE 1:30 000

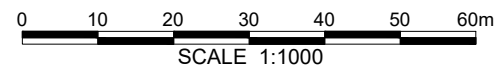


**LEGEND**

- GUARDRAIL
- ◆ RED TEMPORARY HAZARD SIGN
- ①➔ DIRECTION AND NUMBER OF PHOTO

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Photo 1, Site 8 – Looking southwest from the northeast end of Site SH012-8. Previous main scarp crack not clearly visible during inspection.



Photo 2, Site 9: Looking northeast at crack in highway surface over main slide scarp that is reflecting through the recent highway overlay.





Photo 3, Site 9: Looking northeast at cracking near northeast end of site.



Photo 4, Site 9: Looking southwest at crack along main slide scarp.