

**ALBERTA TRANSPORTATION AND ECONOMIC  
CORRIDORS  
GEOHAZARD ASSESSMENT PROGRAM  
PEACE REGION – SWAN HILLS  
2024 INSPECTION**



Site Number	Location	Name	Hwy	km
SH022-5 SH022-6	Little Smoky River	Little Smoky River Valley, North Hill – Sites #5 and #6	744:02	19.00-19.14 19.20-19.53
<b>Legal Description</b>		<b>UTM Co-ordinates</b>		
Site 5: SW21-76-22-W5M		11U E 477,204	N	6,161,204
Site 6: SW21-76-22-W5M		11U E 477,479	N	6,161,291

	Date	PF	CF	Total
<b>Previous Inspection:</b>	31-May-2022	10 9	4 3	Site 5: 40 Site 6: 27
<b>Current Inspection:</b>	4-June-2024	10 9	4 3	Site 5: 40 Site 6: 27
<b>Road AADT:</b>	270		<b>Year:</b>	2023
<b>Inspected By:</b>	Rishi Adhikari, TEC Robert Senior, TEC		Ken Froese, Thurber Roger Skirrow, Thurber	
<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>	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 #5 is 60 m above and 505 m away from the Little Smoky River and Site #6 is 65 m above and 460 m away.		
<b>Dimensions:</b>	Site 5: 145 m length of highway affected by cracking and distortion Site 6: 330 m length of highway affected by cracking and distortion		
<b>Date of Remediation:</b>	May have been a significant overlay at both Sites #5 and #6 incorporating GBC “sandwich.” in fall of 2015 or spring of 2016.		
<b>Maintenance:</b>	Routine ACP crack sealing, milling, and patching (2014 and 2015), when required. 2017: Patched (portion of Site #6) 2019: Patched EBL over most of Site #5 and both lanes over most of Site #6; spot-patching of larger cracks at both sites; milling at both sites 2020: Gravel fill placed on slumping sideslope at Site 5 2021: Highway overlay (50mm), culvert replacement		
<b>Observations (Site 5):</b>	<b>Description</b>	<b>Worsened?</b>	
<input checked="" type="checkbox"/> Pavement Distress	Pavement cracking is more prevalent but is still faint.	<input checked="" type="checkbox"/>	
<input checked="" type="checkbox"/> Slope Movement	Site is located on an active deep-seated landslide moving toward the Little Smoky River. There is a significant scarp located about 20 m downslope from the pavement edge at km 19.06. A new slide formed at the edge of pavement in 2020 at km 19.07 and continues to move. The embankment slope at this location appears to have been regraded prior to the 2024 inspection.	<input type="checkbox"/>	
<input type="checkbox"/> Erosion		<input type="checkbox"/>	
<input type="checkbox"/> Seepage		<input type="checkbox"/>	

<input checked="" type="checkbox"/> Bridge/Culvert	Culvert at km 19.07: inlet is partially blocked and too high.	<input checked="" type="checkbox"/>
<input type="checkbox"/> Other		<input type="checkbox"/>
<b>Observations (Site 6):</b>	<b>Description</b>	<b>Worsened?</b>
<input checked="" type="checkbox"/> Pavement Distress	Some of the previous longitudinal and traverse cracks have reflected through.	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> Slope Movement	Site is located on an active deep-seated landslide moving toward the Little Smoky River. This site crosses over a sag pond/graben.	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> Erosion	The ditch was lined with erosion control products during the 2021 overlay.	<input type="checkbox"/>
<input type="checkbox"/> Seepage		<input type="checkbox"/>
<input checked="" type="checkbox"/> Bridge/Culvert	SWSP culvert installed at km 19.23 is not draining. Pondered water observed at inlet and outlet.	<input checked="" type="checkbox"/>
<input type="checkbox"/> Other		<input type="checkbox"/>

**Instrumentation:** None.

**Assessment:**

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.

**Site 5:**

Cracks continue to re-appear on the road surface after the highway was overlaid in 2021. 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. The scarp and toe roll noted in 2019 at km 19.06 were obscured by grading activities on the slope and around the culvert outlet. The culvert outlet was cleared of obstruction.

**Site 6:**

Cracks continue to re-appear on the road surface after the highway was overlaid in 2021. 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. From the 2022 inspections, the previously observed erosion feature at km 19.40 was repaired with a portion of the north ditch regraded and erosion controls measures installed including matting and GeoRidges. The portion of the north ditch that doesn't have the erosion control measures in place has cattails present, indicating poor drainage over a portion of the ditch. The smooth wall steel pipe culvert installed in 2021 that replaced the old culvert is not draining; pooled water was observed at the inlet and outlet during the 2022 and 2024 inspections.

**Recommendations:**

**Short-Term:**

- Road maintenance activities of milling and patching should continue as necessary to maintain a safe roadway surface. Cracks should be sealed to minimize the infiltration of rain fall and snow melt into the crack network.

**Medium-Term:**

- Preliminary engineering should be undertaken for short-term repair of the 2020 slide at km 19.07. Consideration should be given to replacing and extending the culvert at this location at the same time to ensure that the discharge is controlled (elephant trunk down to sag pond). It is anticipated that a local excavation and replacement with geo-grid reinforced gravel will be the simplest solution; the potential for the lower slide at km 19.06 to retrogress into the highway at this location should also be considered in the design.
- Although the culvert at km 19.07 (Site 5) was just installed in 2021, it should be replaced as the inlet is too high to adequately drain the upslope sag pond and limit infiltration as shown in Photo 1.
- The grading at the culvert outlet at km 19.23 (Site 6) should be re-evaluated to determine if the water can be drained away from the outlet to limit ponding and infiltration.

**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, and this study is currently being undertaken by CIMA+. Consideration is also being given to a shorter realignment which will occur farther up the slope and will likely not include Site #5 but will likely connect with the existing alignment at Site #6.

**Ongoing Investigation:**

- It is recommended that the biennial 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.

Roger Skirrow, P.Eng.  
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.

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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.

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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.

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### 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

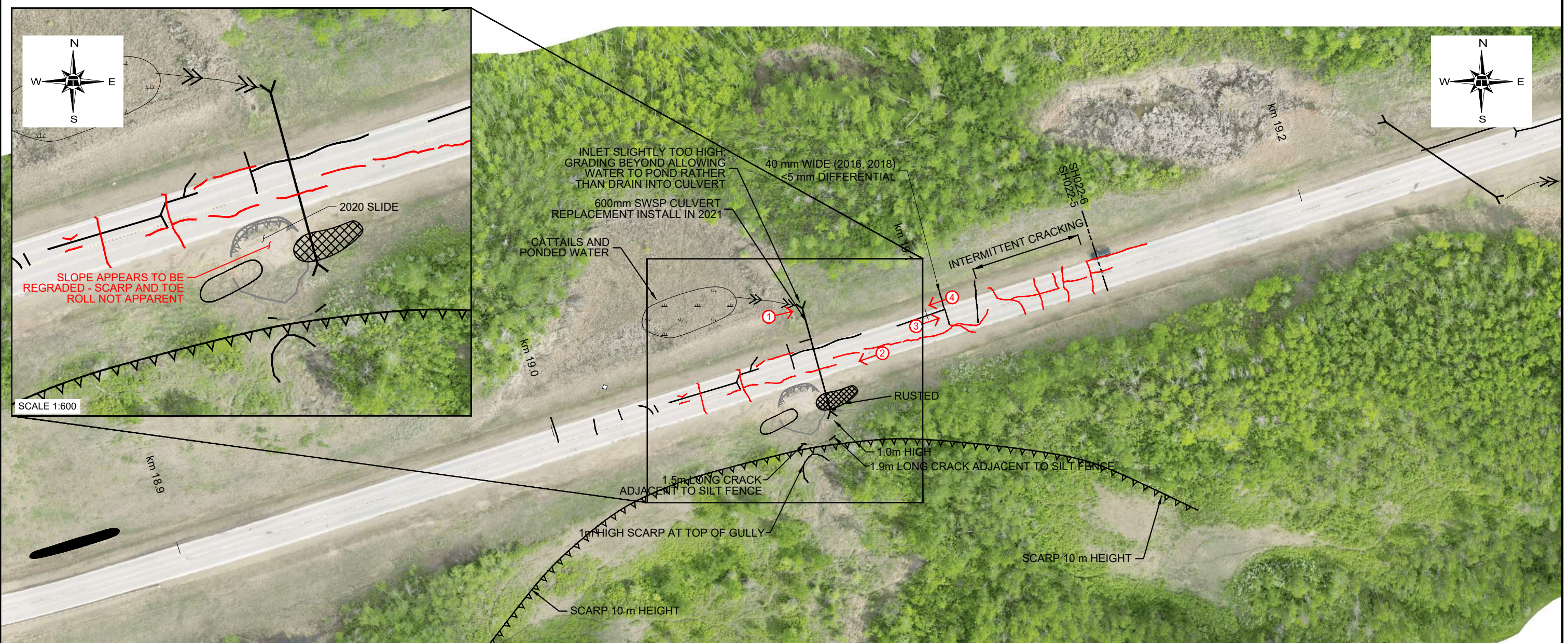
Geotechnical engineering and environmental consulting projects often have the potential to encounter pollutants or hazardous substances and the potential to cause the escape, release or dispersal of those substances. Thurber shall have no liability to the Client under any circumstances, for the escape, 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.

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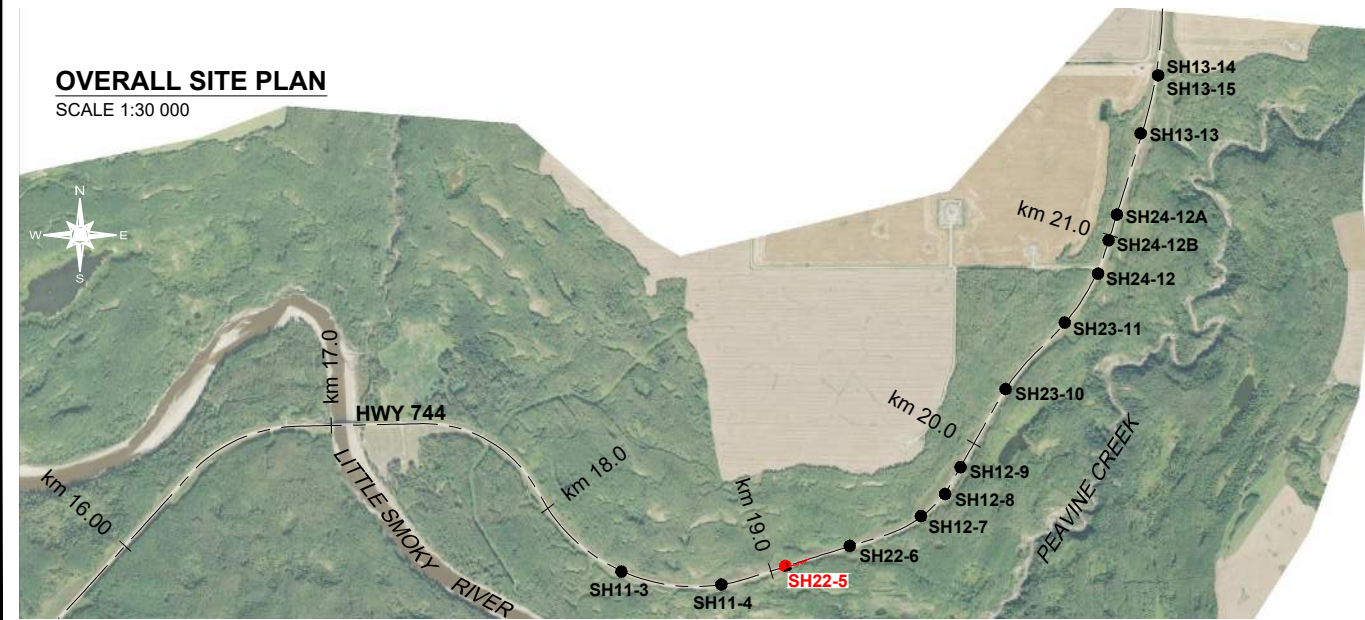


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**DETAILED SITE PLAN**  
SCALE 1:1000

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

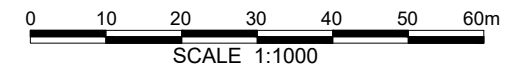


**LEGEND**

- CULVERT
- GUARDRAIL
- CURVE SIGN
- DIRECTION AND NUMBER OF PHOTO

**NOTES**

1. FEATURE LOCATIONS ARE APPROXIMATE.
2. JUNE 2024 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).



ORTHOIMAGE DERIVED FROM UAV IMAGERY FLOWN BY THURBER IN JUNE 2024  
OVERALL SITE PLAN IMAGE: SATELLITE IMAGE FROM VALTUS IMAGERY (DATED 2014)



**PEACE REGION (SWAN HILLS)**

**SH022-5: HWY 744:02 LITTLE SMOKY RIVER VALLEY  
2024 SITE INSPECTION PLAN**

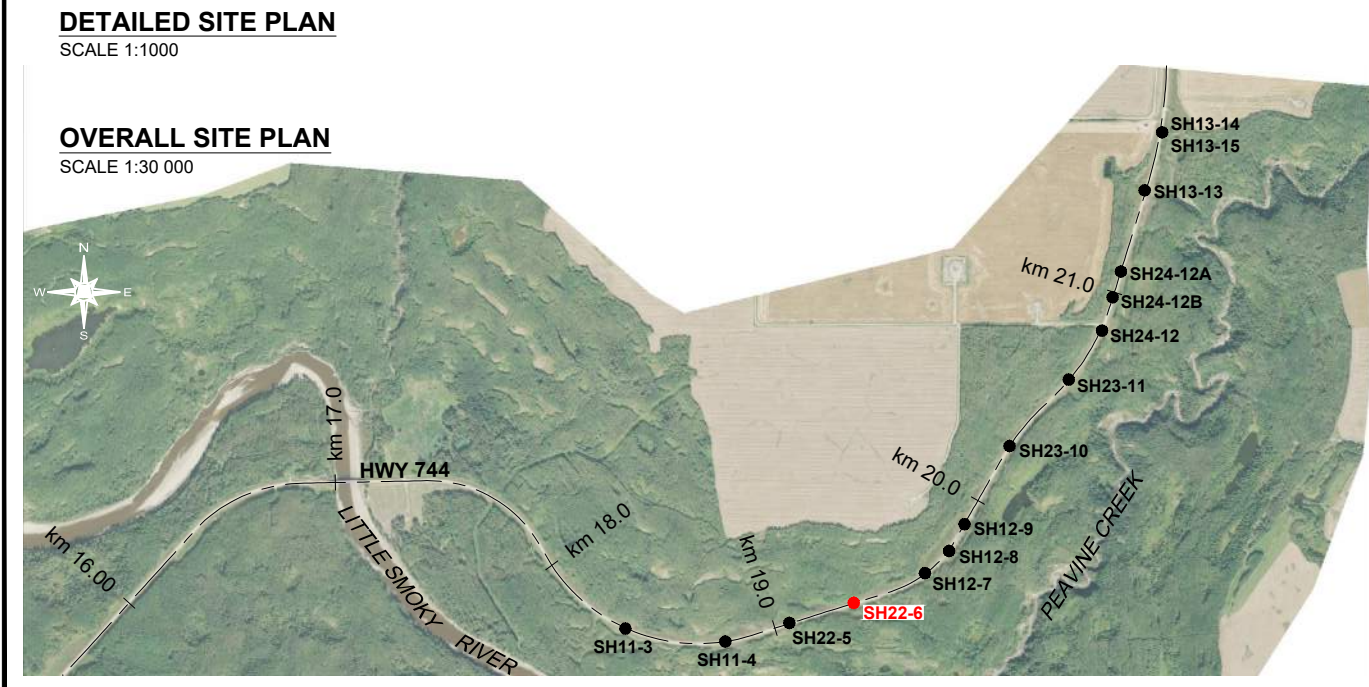
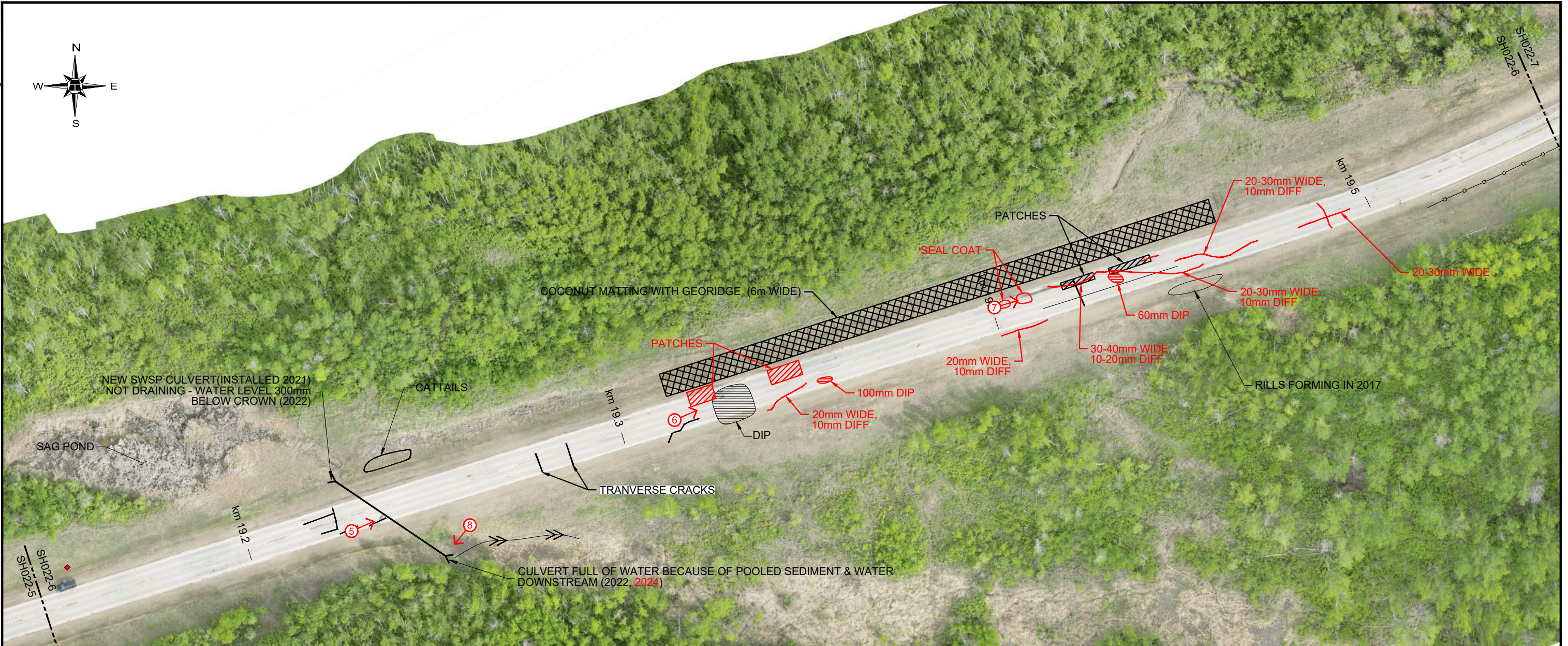
**DWG No. 32121-SH022-5**

DRAWN BY	KLP
DESIGNED BY	MG
APPROVED BY	RKS
SCALE	AS SHOWN
DATE	OCTOBER 2024
FILE No.	32121



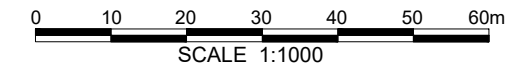


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- LEGEND**
- CULVERT
  - GUARDRAIL
  - RED TEMPORARY HAZARD SIGN
  - ASPHALT PATCH
  - DIRECTION AND NUMBER OF PHOTO

- NOTES**
1. FEATURE LOCATIONS ARE APPROXIMATE.
  2. JUNE 2024 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).



ORTHOIMAGE DERIVED FROM UAV IMAGERY FLOWN BY THURBER IN JUNE 2024  
OVERALL SITE PLAN IMAGE: SATELLITE IMAGE FROM VALTUS IMAGERY (DATED 2014)

**PEACE REGION (SWAN HILLS)**

**SH022-6: HWY 744:02 LITTLE SMOKY RIVER VALLEY  
2024 SITE INSPECTION PLAN**

**DWG No. 32121-SH022-6**

DRAWN BY	KLP
DESIGNED BY	MG
APPROVED BY	RKS
SCALE	AS SHOWN
DATE	OCTOBER 2024
FILE No.	32121

**THURBER ENGINEERING LTD.**





**Photo 1, Site 5 – Looking northeast at ponded water at culvert inlet at km 19.07.**



**Photo 2, Site 5 – Looking west at crack pattern on the eastbound lane.**





**Photo 3, Site 5 – Looking northeast at intermittent cracking between km 19.10 to km 19.13.**



**Photo 4, Site 5 – Looking southwest along the north ditch.**





**Photo 5, Site 6 – Looking northeast at cracks on the road south of the culvert.**



**Photo 6, Site 6 – Looking northeast near km 19.3. Dip noted on eastbound lane and recent patches observed on westbound lane.**





**Photo 7, Site 6 – Looking northeast at matting and GeoRidges installed in the north ditch. Cracking observed through patches along the fog line.**



**Photo 8, Site 6 – Looking southwest at culvert outlet that has pooled water because it is not draining.**