Alberta INFRASTRUCTURE AND TRANSPORTATION

CENTRAL REGION GEOHAZARD RISK ASSESMENT SITE INSPECTION FORM

Klohn Crippen Berger

SITE NUMBER AND NAME	HIGHWAY & KM	PREVIOUS INSPECTION DATE	INSPECTION DATE
H857:04 Frost Heave	4		**May 14, 2007**
LEGAL DESCRIPTION	NAD 83 COORDINATES	RISK ASSESMENT PF: 9 CF: 6 TOTAL: **54**	

SUMMARY OF SITE INSTRUMENTATION:	INSPECTED BY:
None LAST READING DATE:	PROFESSIONAL ENGINEER OF ALBERTA DARREN W. RATCLIFFE

PRIMARY SITE ISSUE: Frost Heave resulting in damage claims to vehicles

APPROXIMATE DIMENSIONS: 150 m long highway section

DATE OF ANY REMEDIAL ACTION:

ITEM	CONDITION EXISTS		DESCRIPTION AND LOCATION	NOTICABLE CHANGE FROM LAST INSPECTION	
	YES	NO		YES	NO
Pavement Distress	X		Standing water in ditches		X
Slope Movement		X			X
Erosion		X			X
Seepage		X			X
Culvert Distress		X			X

COMMENTS

Refer to attached photos and figures.

A 150 m long section of Highway 857:04 about 4 km north of H16A in Vegreville suffers severe pavement distress due to frost heave in winter months. Standing water was observed in the ditches and the surrounding topography is essentially flat.

To remediate highway frost heave situations, three approaches may be adopted:

- Improve subsurface drainage to reduce the availability of water to be drawn to the freezing front.
- Replace the subsurface clay materials with non-frost susceptible material (e.g. gravel).
- Install insulation to prevent the subsurface materials from freezing.

In this case, the existing site grades do not permit effective drainage of the surface water or below-grade groundwater conditions. Cost estimates are presented in the Tables below for replacing the subsurface materials or providing insulation. Mobilization and traffic accommodation are assumed the same for both cases and have not been included in the cost estimates.

Material Replacement

In this approach, a depth of about 1.5 m will require excavation and replacement with pitrun gravel. The excavated clay material will need to be disposed off site. It is assumed that the road base gravels will be reused.

Item	Unit	Rate	Total
Remove surfacing and stockpile base gravels		LS	$10,000
Common Excavation (dispose off-site)	3,000 m³	$20	$60,000
Pitrun Gravel Supply and Compact	3,000 m³	$40	$120,000
Replace Road base		LS	$5,000
Asphalt Surfacing	525 T	$75	$40,000
			$235,000

Insulation

This approach is illustrated in Figure 2 using the insulation product “Frostwick” from Diamond J Industries Ltd. To install the insulation, the road surface and base gravels are removed and the subgrade material is excavated to a depth of about 0.5 m. The insulation is placed at this depth and the excavated subgrade material, road base gravels and surfacing are replaced.

Item	Unit	Rate	Total
Remove surfacing and stockpile base gravels		LS	$10,000
Common Excavation	750 m³	$20	$15,000
Insulation Supply and Install	1,800 m²	$55	$99,000
Replace Fill and Road base		LS	$20,000
Asphalt Surfacing	525 T	$75	$40,000
			$184,000

Based on the cost comparison of the two methods, it is recommended to adopt the insulation remediation method at this site. Further details about the Frostwick system can be obtained from Diamond J Industries Ltd.

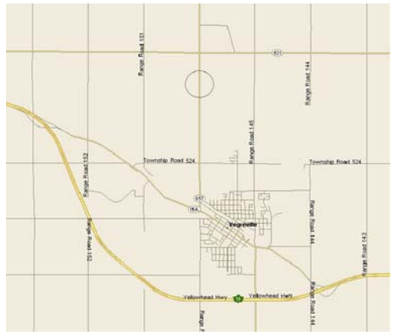
MICROFILM DATE

PWSS PLAN No.

DRAWING No.

CENTER CODE No.

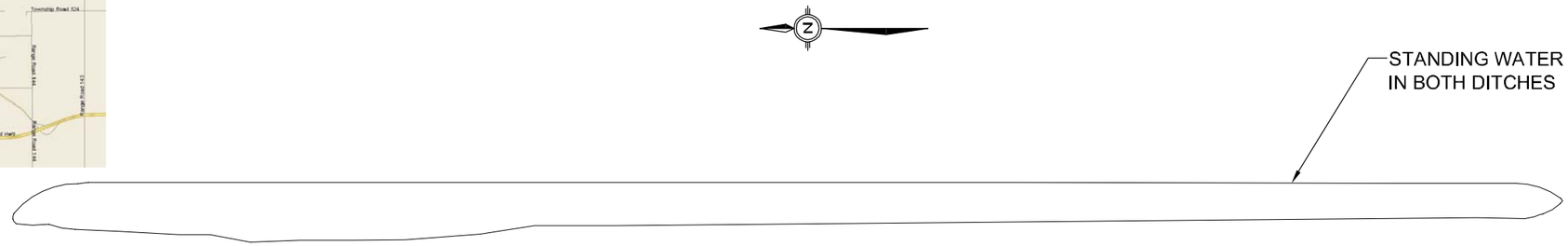
PROJECT FILE No. A3038A01.C08.FIG-1.dwg



KEY PLAN

NOTE:

1. PHOTOS TAKEN MAY 15, 2007.



LOOKING SOUTH

PERMIT	SEAL	MARK	DESCRIPTION OF REVISIONS	DATE	DWN.	ENG.
		F				
		E				
		D				
		C				
		B				
		A				

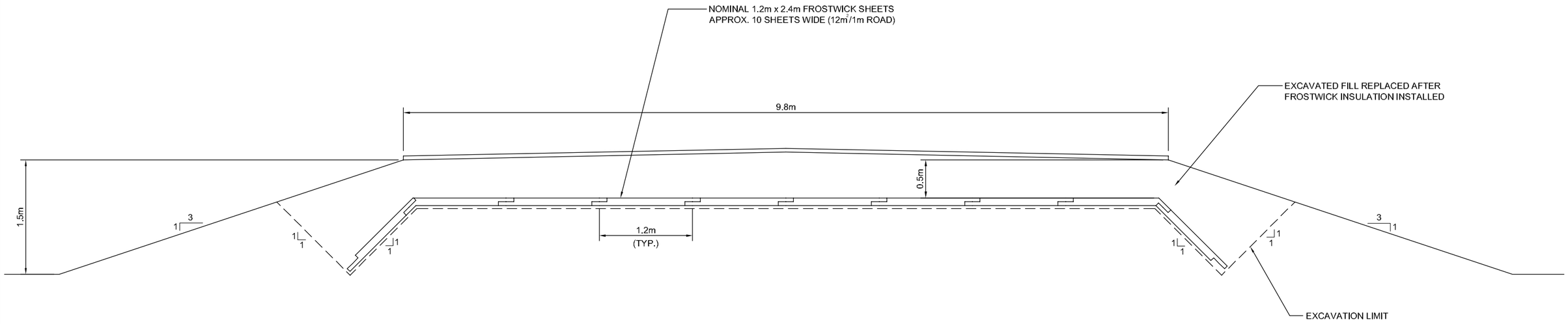
DESIGNED BY	APPROVED BY
DWR	DR
DRAWN BY	CHECKED BY
MD	DR
SCALE	
N.T.S	

CONSULTANT

Klohn Crippen Berger

Alberta
INFRASTRUCTURE AND
TRANSPORTATION

PROJECT	CENTRAL REGION		
	GEOHAZARD RISK ASSESSMENT		
TITLE	H857 : 04 Km 4 FROST HEAVE SITE PLAN		
DATE	SHEET	DRAWING No.	REV.
MAY 2007	1 of 2	FIGURE 1	



FROSTWICK INSULATION DETAIL

PERMIT	SEAL	MARK	DESCRIPTION OF REVISIONS	DATE	DWN.	ENG.
		F				
		E				
		D				
		C				
		B				
		A				

DESIGNED BY	APPROVED BY
DWR	DR
DRAWN BY	CHECKED BY
MD	DR

SCALE 1:1 000 0 10 20 m

CONSULTANT: Klohn Crippen Berger

Alberta INFRASTRUCTURE AND TRANSPORTATION

PROJECT: CENTRAL REGION

GEOHAZARD RISK ASSESSMENT

TITLE: H857 : 04 Km 4 FROST HEAVE HIGHWAY
FROSTWICK INSULATION STANDARD DETAIL

DATE	SHEET	DRAWING No.	REV.
MAY 2007	2 of 2	FIGURE 2