Alberta Transportation

Karl Engineering Consultants Ltd.

PEACE REGION – GRANDE PRAIRIE
GEOHAZARD RISK ASSESSMENT
SITE INSPECTION FORM

SITE NUMBER	SITE NAME	HIGHWAY & KM	PREVIOUS INSPECTION DATE:	INSPECTION DATE:
GP-25	(i)New Haul Road to Mine Extension (ii)*Mudslide (previous) at McIntyre Mine Access	Hwy 40:36	July 13, 2012	May 24, 2013

LEGAL DESCRIPTION	NAD 83 COORDINATES	Previous RISK ASSESSMENT
		PF: 5 CF: 2 TOTAL: 10 (*2007) *Risk (post 2012)remains to be assessed after Haul Road completion*

SUMMARY OF SITE INSTRUMENTATION:	INSPECTED BY:
No instrumentation installed.	(i)KarlEng: Karl Li, Justin Kei (ii) AT: Ed Szmata, Ted Prue, Rocky Wang In the company of ***McIntyre Mine personnel:***

PRIMARY SITE ISSUE:
(Reiterated from previous report)

*Previously (*prior to 2010 Haul Road Construction for Mine Extension)*

(i) Runout of mudslide debris onto highway occurred (*around 2006). Source of debris from hinterland mountainous catchment area above backslope of highway.
- An debris entrapment pond was graded (*2006-2007) at top of backslope to provide temporary storage and a delay of debris flow. Any occurrence of such debris runout will be a highway safety and maintenance concern.
- With construction of New Haul Road, the previous mud slide concern may not recur in future. This remains to be reviewed.

With current (2010-2011) construction of New Haul Road to Mine Extension

(ii) The landscape drainage topography of hinterland catchment areas will be substantially modified by the earthworks undertaken for the New Haul Road. The Mine is responsible for design and construction of the works. It is understood that earthwork works will include:
- Roll out berm and Rock traps
- Dyke and ponds for sedimentation
- Road embankments and drainage measures
    - Including rock drainage basal layers and culverts at fill at gully crossings
- Others, etc.

(iii) Due to proximity of the New Haul road construction to Hwy 40, it is important to monitor any adverse effect of such new “Mine Road” construction work on future drainage performance

(s.a. any recurrence of mud flow debris runout) and other slope stability concerns.
APPROXIMATE DIMENSIONS: Previous (2006) mudslide debris runout was located at highway junction with MyIntyre Mine Access.
DATE OF ANY REMEDIAL ACTION: (Reiterated from previous report) (i) (2006-2007*) A small entrapment pond was constructed at bench at top of backslope (ii) (2010-2011) A new haul road to New Mine Extension will re-landscape and modify the whole backslope hinterland mountain area. Future drainage modification of area may or may not invite recurrence of debris runout(s).

ITEM	CONDITION EXISTS		DESCRIPTION AND LOCATION	NOTICABLE CHANGE FROM LAST INSPECTION	
	YES	NO		YES	NO
SLOPE MOVEMENT (rock dump construction alongside highway corridor)	x	x	i)May be a potential slope monitoring issue ii)Long term stability of a steep rock dump constructed along side existing highway corridor - ***Mine Dump planning*** iii)Rock dump being constructed at 0.75H:1V with intermediate benches iv) Rock dump with be deactivated to 2H:1V allowing intermediate benches to be filled Potential of debris flow runout may render safety of highway at risk		
EROSION		x	n/a		
SEEPAGE		x	n/a		
CULVERT DISTRESS		x	n/a		

COMMENTS:
In current 2013 site visit, it was learned that

i) The mine haul road extension project is about complete

Other previous comments on the site remain effective. The followings are reiterated:

ii) Immediately above and adjacent the highway, the work completed will include

- the planned haul road
- the rock dump (i.e. highway dump) alongside above Hwy 40 . It is understood that the dump slopes were constructed at 37 degrees, and with intermittent benches (i.e. switch back roads), the final slopes will be likely finished off at 26 degrees (after reactivation of intermittent benches) as the long term slope angle.

ii) The current rock dump (i.e. highway dump) was being monitored by "real time" instrumentations including (a) radar prism(s) and (b) conventional slope indicator+piezometers.

iii) It was observed a line of rock check "wire trap" barrier was constructed.

(As indicated in earlier report)

iv) The whole scheme of earthworks, drainage measures and other structural constructions for the new haul road will effectively change the whole landscape and drainage pattern of the area above existing highway backslope. The area will be modified as a “Mining Operation Site” versus the natural mountain hinterland of previous times where natural runoff flowed.

v) The new “Mining Access” works being constructed may or may not invite future concerns of gravity transport of soils+rock (s.a. mudslide debris runout) and/or other slope distress problem. It is advisable to overview such development at a time when it is substantially complete (likely around early 2013).

Important Note:
This form assessment is an update for current year only. Please refer to the detailed assessment provided as in earlier Reports for background understanding of this site.
END

Photo 1

Looking north (towards Grande Prairie) - Panorama of River Valley

- Smoky River to right of photo
- Milner Power Plant at centre and depth of photo
- New Haul Road Construction at left of photo (reshaping of mountain and construction access road for mining)

Photo 1a

Looking west at mountain upland area being reshaped by mining equipments

- Cutting of benches to construct switch back zipzap haul road
- Rock fill dump constructed along roadway to form steep new backslopes (replacement of native mountain slopes)

Note: Photos taken on June, 2013

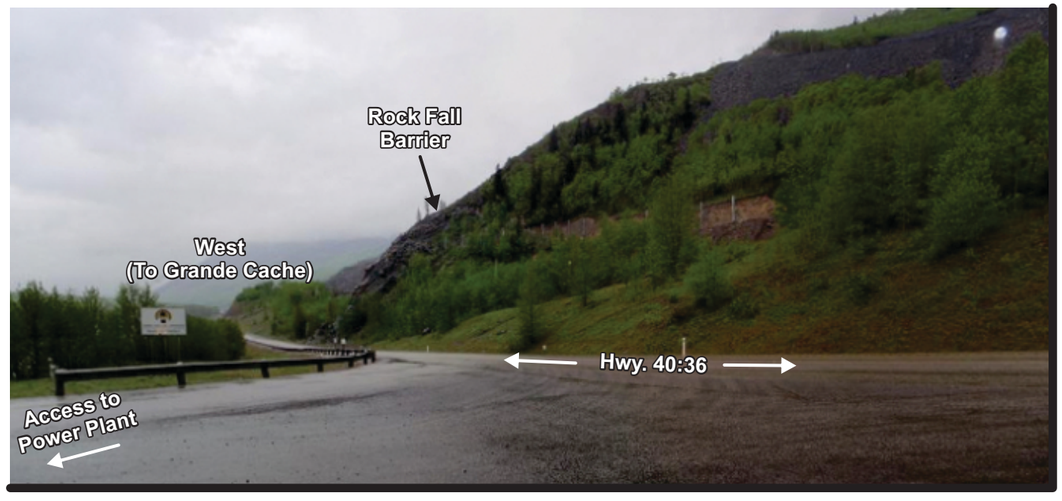

Photo 2
Looking towards west (Grand Cache) from Power Plant access
• Rock trap fence construction along backslope above highway

Photo 2a
Close up of rock trap fence

Photo 2b
Close up of rock trap fence

Photo 2c
Close up of rock trap fence

Note: Photos taken on June, 2013

Photo 3
A view of a portion of mine operation area

Photo 3a
A settling pond inside the mine

Photo 3b
Heavy Hauler (240 ton) for transport of mine materials

Note: Photos taken on June, 2013