

SITE NUMBER AND NAME: S015 Crowsnest Rockfall		HIGHWAY & KM: 3:02, 3.431	PREVIOUS INSPECTION DATE: May 20, 2022	INSPECTION DATE: May 30, 2024
LEGAL DESCRIPTION 14-05-008-05 W5M	NAD 83 COORDINATES: UTM Northing Easting 11 5499651 669776		RISK ASSESMENT: PF: 15 CF: 4 TOTAL: 60 (Mesh) PF: 15 CF: 2 TOTAL: 30 (Gabion)	
AVERAGE ANNUAL DAILY TRAFFIC (AADT): 5880 (west), 5900 (east) (Ref. No. 70000005)			CONTRACTOR MAINTENANCE AREA (CMA): 26	

SUMMARY OF SITE INSTRUMENTATION: None LAST READING DATE: N/A	INSPECTED BY: Chris Grapel (KCB) Peter Roy (KCB) Kristen Tappenden (TEC) Alex Frotten (TEC)
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PRIMARY SITE ISSUE: Rockfall hazard; debris falling down a ravine onto the highway, debris falling onto highway from the slope west of the ravine.

APPROXIMATE DIMENSIONS: Rock slope is approximately 75 m high, feeding into a ravine approximately 20 m wide. Rock slope to the west of the ravine extends approximately 300 m.

DATE OF ANY REMEDIAL ACTION: Large reinforced gabion barrier wall constructed in fall 2016 to stop debris from falling onto highway. Used conveyor belts are placed on the upslope side of the barrier to reduce the possibility of barrier wall damage from rock falls. An attenuation mesh was also installed in 2016 and extends approximately 220 m to the west and 280 m to the east of the ravine. Rockfall debris was cleaned from behind the gabion barrier in November 2023 by the Highway Maintenance Contractor (HMC).

ITEM	CONDITION EXISTS		DESCRIPTION AND LOCATION	NOTICABLE CHANGE FROM LAST INSPECTION	
	YES	NO		YES	NO
Pavement Distress	X		Rock strikes on pavement	X	
Slope Movement		X	Rock falls, retrogression of erosion gully at top of slope.		X
Erosion	X		Surface runoff erosion under concrete barriers at edge of highway and standing water in east ditch.		X
Seepage		X	None observed.		X
Culvert Distress		X			X

COMMENTS

No significant changes to the site overall. Barrier prevents rockfall in the ravine from impacting the highway.

In 2023, rockfall debris (up to 250 mm in diameter) was noted by the HMC to have fallen onto and across the highway west of the ravine where the attenuation mesh is installed. During the 2024 inspection, a 150 mm diameter rockfall particle was noted on the north side of the highway, which could have fallen from the slope across the highway.

There are several potential rockfall source sites above the top of the attenuation mesh that could generate enough rockfall velocity or trajectory to bounce over the rockfall fence, avoiding the mesh, to the highway and ditch below.

The trajectory of the larger (250 mm in diameter) particle noted by the HMC in 2023 that reached the westbound lane is not known, one of the possible trajectories could be addressed by extending the jersey barrier to the west approximately 120 m to help prevent higher energy rock fall particles discharging from the base of the attenuation mesh.

Two piles of rock debris (>2 m³ and >5 m³) were observed at the toe of the rock slope in the south ditch, west of the concrete jersey barrier. These debris piles were at the locations where the rock strikes and rock debris were observed on the highway surface.

The gabion wall appears to be in good condition. Multiple conveyor belts have been dislodged due to wind or rock strikes. The belts should be reattached to the back of the gabion wall for protection.

Maintain and repair barrier as needed. Rockfall debris is building up behind the barrier and should be removed. Mesh on adjacent rock slopes was placed to create safe access for contractors to clean out behind the wall.

The brow of the ravine slope is moving back to the west. During the 2024 site visit, multiple large blocks with the potential of rolling downslope were observed. Goat activity on the rock face also appears to be dislodging gravel and rocks from the ravine.

The mesh base cable has torn away from the mesh in places due to rockfall impacts. The cable has parted in one place, possibly due to a loose joint. The cable should be repaired and reattached to the mesh.

The longitudinal cracking of the pavement observed during the 2022 inspection was not visible due to recent paving overlay.

Two culverts are in place to stop surface runoff erosion from undermining the northeast upslope corner of barrier. At the time of inspection, the culverts were clear of rockfall debris. The culverts should be cleared of any debris to allow proper drainage on an as needed basis.

Discussed Remedial Actions:

- Clean out rock debris from ditch regularly.
- Extended jersey barrier approximately 120 m to the west to help prevent higher energy rock fall particles from discharging from the base of the attenuation mesh
- The mesh cable base should be repaired and reattached to the mesh in areas where damaged.
- A rockfall analysis should be completed to assess source material zones above the attenuation mesh and to assess if the attenuation mesh is installed high enough on the slope to prevent debris from bouncing over the top.

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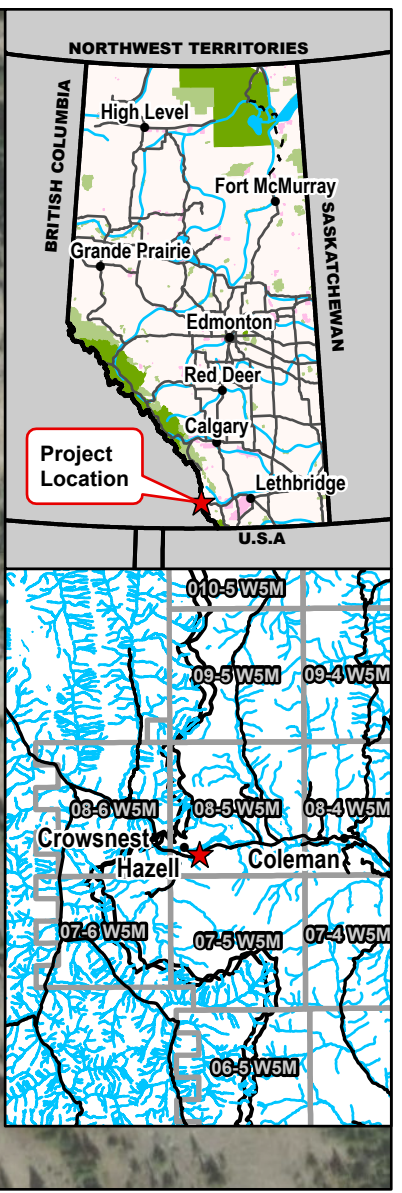
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


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Peter Roy, P.Eng.
Civil Engineer

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Legend

-  Culvert
-  Jersey Barrier
-  Rockfall Zone
-  Rockfall Mesh
-  Barrier Wall

NOTES:
 1. HORIZONTAL DATUM: NAD83
 2. GRID ZONE: UTM ZONE 11N
 3. IMAGE SOURCE: ESRI, MAXAR, EARTHSTAR GEOGRAPHICS AND THE GIS USER COMMUNITY.

CLIENT




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Metres

PROJECT
SOUTHERN REGION GEOHAZARD RISK MANAGEMENT PROGRAM

TITLE
Site Plan
S015 - Crowsnest Rockfall
Hwy 3:02, km 3.431

SCALE 1:2,000 PROJECT No. A05116A03 FIG No. 1

Photo 1 Rock slope with wire meshing south of Hwy 3. Photo was taken facing southeast on May 30, 2024.



Photo 2 Rock slope with wire meshing south of Hwy 3. Potential rockfall source from ravine above wire mesh. Photo was taken facing south on May 30, 2024.



Photo 3 Rock fall debris located on north side of highway which may have travelled across the highway. Photo was taken facing southeast on May 30, 2024.



Photo 4 Rock fall debris at the base of the wire mesh and ditch along the rock slope. Photo was taken facing west on May 30, 2024.



Photo 5 Cable at the base if the wire mesh separated in multiple locations. Photo was taken facing southeast on May 30, 2024.



Photo 6 Debris accumulated behind gabion barrier. Photo was taken facing west on May 30, 2024.



Photo 7 Rubber mats on south side of gabion wall have become detached and should be reinstalled to protect gabions from rockfall damage. Photo taken facing north on May 30, 2024.

