



**SOUTHERN REGION GEOHAZARD ASSESSMENT
ANNUAL ASSESSMENT REPORT
2007**

Submitted to:

Alberta Infrastructure and Transportation
Calgary, Alberta

Submitted by:

AMEC Earth & Environmental,
a division of AMEC Americas Limited
Calgary, Alberta

November 2007

CG25263



November 6, 2007
CG25263

Mr. Roger Skirrow, M.Sc., P.Eng.
Alberta Infrastructure and Transportation
2nd Floor, Twin Atria Building
4999 – 98 Avenue
Edmonton, AB T6B 2X3

Dear Roger:

**Re: Southern Region Geohazard Assessment
Annual Assessment Report, 2007**

Please find enclosed one copy of the 2007 Annual Assessment Report. Also included is an unbound copy of the appendices for inclusion in the appropriate site binders and a CD containing electronic copies of the report files. Copies of these items have also been sent to Ross Dickson of Alberta Infrastructure and Transportation in Calgary.

If you have any questions or require any further information, please do not hesitate to contact the undersigned at (403) 569-6529.

Yours truly,
**AMEC Earth & Environmental,
a division of AMEC Americas Limited**

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Associate Geological Engineer

AB

c: Ross Dickson – AIT

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1.0 INTRODUCTION

AMEC Earth & Environmental (AMEC), a division of AMEC Americas Limited (AMEC), has been retained by Alberta Infrastructure and Transportation (AIT) to conduct annual assessments of identified geohazard sites in the Southern Region. This work is being done in conjunction with semi-annual instrumentation monitoring at several of the identified geohazard sites.

This report presents the results of the 2007 annual assessments along with recommendations for continued assessment, monitoring and additional work where required. The enclosed CD contains electronic copies of the report files.

This work has been authorized by AIT under Consulting Services Agreement CE044/2004.

2.0 BACKGROUND

AIT has implemented a Geotechnical Risk Management Plan (GRMP) in order to estimate the risk levels of geohazard events at specific sites and to assist AIT in the prioritization of mitigative works. This work has been conducted in the past by AIT personnel and since 2000 by outside geotechnical consultants with the work being awarded on a regional basis. AMEC has been awarded the assignment of conducting this work for the Southern Region since the spring of 2000.

The GRMP includes the estimation of a Risk Level for each site that is assessed. The estimated Risk Level is expressed as a number ranging from 1 to 200 that is calculated as the product of a Probability Factor and a Consequence Factor assigned to each site on the basis of annual site assessments, geotechnical instrumentation readings, and other information for each specific site. The descriptions for these factors are listed on Tables A1 to A3 in Appendix A. Table A1 lists general descriptions for these factors, as provided by AIT. Tables A2 and A3 list the sets of probability and consequence factors specific to rockfall hazards and debris flows, respectively, as developed by AMEC for AIT during a recent geohazards review of the Highway 40/Highway 541 corridor.

3.0 FIELD PROGRAM

The annual assessments were performed on June 18 to 21, 2007 for the following sites.

June 18, 2007

S2 – Priddis

S7 – Millarville

S10 – Highway 762 S10(C)

S8 – Fisher Creek

S22 – Highway 762 “S” Curve

S10 – Highway 762 S10(A)

S1 – Jumpingpound Creek

S3 – Cochrane

June 19, 2007

S12 – Spray Lakes Road
S17 – Highway 40 – Mount Baldy Rock Cut
S18 – Highway 40 – Galatea Creek Through-Cut
S19 – Highway 40 – King Creek
S20 – Highway 541 – Highwood House Rock Cut
S21 – Highway 541 – Highwood Base Road Creek
S16 – Chain Lakes Site

June 20, 2007

S15 – Crowsnest Lake Rockfall Barrier
S14 – Bellevue Sites
S27 – Highway 3 – Windmill
S28 – Highway 3A At Range Road 2-2A
S23 – Highway 507:02 – East Of Mill Creek
S24 – Highway 507 – Eastbound Lane Site and Westbound Lane Site
S4 – Willow Creek
S25 – Highway 3 – Monarch

June 21, 2007

S5 – Chin Coulee
S26 – Highway 41 – Elkwater
S29 – Highway 1 – Seven Persons Creek

Each site was visited by Andrew Bidwell of AMEC along with Roger Skirrow and Rocky Wang of AIT. Ross Dickson of AIT participated in the site visits on June 19 to 21, 2007.

Each site was assessed visually and measurements and notes of site features were recorded using field reconnaissance level techniques. Digital photographs of site features were also taken.

4.26 S29 – HIGHWAY 1 – SEVEN PERSONS CREEK

Site Description and Background

This site is located on Highway 1, on the southeast approach to the crossing over Seven Persons Creek within the city of Medicine Hat, AB. Please refer to Figure S29-1 in Appendix S29 for an illustration of the site location.

The highway is oriented southeast/northwest at this site and is divided with two lanes in both directions. The highway crosses the Seven Persons Creek valley via a large embankment over a culvert. The embankment sideslopes are at roughly 2H:1V inclination. The valley depth is in the order of 30 m. There are through-cuts at the upper portion of each valley slope. The creek channel is relatively small and underfit within the flat-bottomed valley floor. Photo S29-1 shows an overview of the site and the creek valley.

This site consists of a segment of the westbound lanes just westbound of the cut/fill transition on the southeast approach to the creek where AIT personnel had noted a diagonal crack across the road surface and a noticeable dip in the road grade in 2006. The 2007 inspection was the first site inspection as part of the Southern Region GRMP.

Site Assessment

The site assessment was performed on June 21, 2007. The weather at the time of the site assessment was clear and warm with a strong wind.

The site assessment consisted of a visual review of the highway surface and median around the crack noted above, along with a traverse of the valley slope and cut slope northeast of the highway.

Observations

The following points summarize the observations made during the site assessment. Please also refer to Appendix S29 for photographs of the site.

- A diagonal crack was visible across the westbound lanes (Photos S29-2 and S29-3). The road surface had also settled around the crack with a noticeable dip in the road grade as vehicles drove over it. The crack was located just downslope (westbound) from the cut/fill transition along the highway. The fill thickness below the crack was estimated to be approximately 3 to 5 m.
- There was cracking in the concrete median strip that appeared to be an extension of the crack in the westbound lane. See Photos S29-4 and S29-5.
- There did not appear to be any corresponding damage to the eastbound lanes. There was a single crack perpendicular to the eastbound lanes (Photo S29-6), however it did not appear to be of the same nature as the westbound lane cracking. There was possibly very slight dip in the road grade in the eastbound lane.

Assessment and Risk Level

The cracking and settlement of the road surface in the westbound lanes and the cracking in the concrete median strip may be the result of settlement of the underlying road fill and possibly movement of the underlying creek valley slope. However, the magnitude of the damage is relatively minor and a definitive geohazard at this site cannot be confirmed on the basis of the available information.

It appears that the cracking and settlement of the westbound lanes has been treated as a maintenance issue to date. There does not appear to be a significant short-term risk to the highway. Therefore, AMEC recommends the following Risk Level values for this site:

- Probability Factor of 5 based on the possibly active settlement but with a slow to indeterminate rate.
- Consequence Factor of 1 to reflect the magnitude of damage to the road surface to date.

Therefore, the recommended Risk Level for this site is 5.

Recommendations

AMEC recommends that a follow-up annual inspection be performed in 2008 in order to check if the cracking and settlement has worsened since the June 2007 inspection. If it has not, then the annual inspections for this site can likely be discontinued.

5.0 SUMMARY

A list of the sites, ranked by current recommended Risk Level, is presented in Table A4 in Appendix A for reference. This table also shows:

- Which sites have been recommended for further assessment (e.g. site investigation).
- Which sites have been recommended for repair work, and whether or not the recommended repair work is pending.

6.0 CLOSURE

This report has been prepared for the exclusive use of Alberta Infrastructure and Transportation for the specific project described herein. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it are the responsibility of such third parties. AMEC Earth & Environmental, a division of AMEC Americas Limited cannot accept responsibility for such damages, if any, suffered by any third party as a result of decisions made or actions based on this report. This report has been prepared in accordance with accepted geotechnical engineering practices. No other warranty, expressed or implied, is made.

We trust that this meets your needs at this time. Please contact the undersigned if you have any questions or require any further information.

Respectfully Submitted,

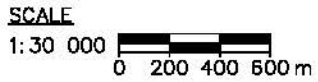
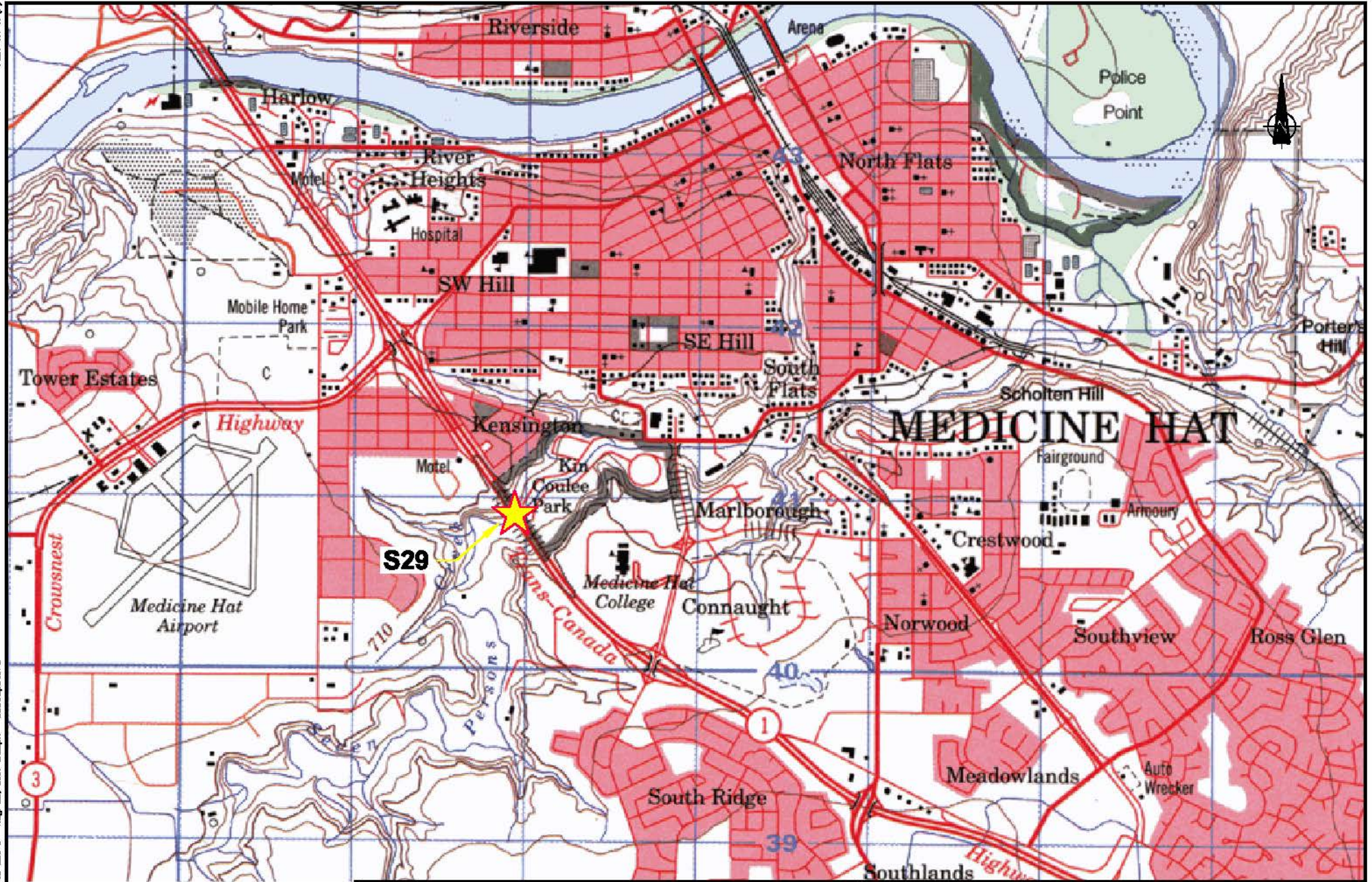
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APEGGA Permit To Practice No. P-04546

Reviewed by:

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amec Earth & Environmental

CLIENT: **Alberta**
INFRASTRUCTURE AND TRANSPORTATION

PROJECT: SOUTHERN REGION GEOHAZARD ASSESSMENT				
TITLE: LOCATION PLAN S29 - SEVEN PERSONS CREEK				
DATE: AUGUST 2007	JOB No.: CG25263	CAD FILE: 25263L01.dwg	FIGURE No.: S29-1	REV. A



Photo S29-1– June 2007 (top)
Facing northwest across the site and the Seven Persons Creek valley. The location with the cracking and settlement of the westbound lanes and cracking of the concrete median strip is marked.



Photo S29-2– June 2007 (bottom)
Closer view of the cracking in the westbound lanes.



Photo S29-3– June 2007 (upper left)
Facing northwest along the highway and across the cracking and settlement area in the westbound lanes.



Photo S29-4– June 2007 (upper right)
Facing southeast/uphill along the concrete median strip. The cracking in the concrete appears to follow the alignment of the cracking in the westbound lanes.



Photo S29-5– June 2007 (lower left)
Another view of the cracking in the concrete median strip.



Photo S29-6– June 2007 (lower right)
An old crack perpendicular to the eastbound lanes and in the same general area as the more well-defined cracking in the westbound lanes.