

NOTES FROM MAY 16, 1990 FIELD INSPECTION

PROPERTY LOCATION

The subject property is located approximately 18 km south of Golden, near Drybed Creek (Figure 1). Drybed Creek is one of many drainages in the Golden area which are debris torrent prone. A debris torrent can be described as the rapid movement of saturated soil, rock, and other debris down a steep channel (Swanston and Swanson).

FIELD OBSERVATIONS

Features typical of an active fan were documented during this and previous site inspections (The undersigned had previous involvement with this fan in 1984 when a landowner inquired about the availability of government assistance to help protect a residence from the debris torrent hazard).

Three zones were identified:

1. **The initiation and transport zone:** This reach consists of the headwater slopes where the debris torrents start and the steep canyon through which the debris is confined on its route down the mountain. Debris torrents are usually initiated by high intensity rain events and/or rain on snow events which occur following or during an extended period of moderate to heavy rainfall. Saturated slopes, consisting of insitu weathered bedrock, give way to gravitational forces and slide directly into the main stream channel and its tributaries or into draws which feed into the main stream channel and tributaries. During these events, the main stream channel and some of the main tributary channels are scoured clean. Subsequent torrent activity remains possible in spite of the clean channel(s). As mentioned above, inherently unstable slopes provide an unlimited supply of material for transport.
2. **The middle deposition zone:** Coarse debris deposits (large boulders and trees), levees and other lobal features were observed on the land surface where the torrent(s) leave the confines of the canyon (Photos 1 to 3). Scarred and broken-off trees also provided

evidence of recent debris torrent activity. These features were observed on the land surface for hundreds of meters downstream from the apex of the fan in all downslope directions i.e. northwest to southwest.

Debris torrents have gorged a large channel in the land surface ranging up to 4.5 meters deep and 10 meters wide. The slope of the land is 11 degrees. There is a bulldozer trail to the apex on the north side of the fan which provides a preferred route for any future debris torrent events.

3. **The runout zone:** The stream and land surface gradient is milder downstream of the main deposition zone. Material including mud, debris and rock have settled on the land to depths of 0.5 to 1.0 m (Photos 4 & 5). Massive debris torrent deposits were observed on an exposed face of a gravel pit adjacent to Campbell Road (located in Figure 1). Carbon dating procedures would be required to date these deposits.

HISTORICAL INFORMATION

Recorded Events:

In August 1976 debris torrents occurred in many of the creek draws in the Golden area including Drybed Creek (see Water Management Files for more details). The event prompted Mr. Mace, who resided on property at the confluence of Drybed Creek and Birchlands Creek, to construct a deflection berm to protect his residence. According to Mr. Mace, water and silt flowed across his lawn. In 1982, yet another torrent brought more debris down towards Mr. Mace's residence prompting him to move to Golden.

Mr. Mace advised that prior to the 1976 debris torrent Drybed Creek flowed under the road north of his residence.

Air Photography:

The following air photography shows evidence of previous debris torrent activity and channel shifting on the fan:

see also

Report #

Descrip

753

overview soils + Hydrology
Hospital C

653

Canyon Creek Study

Thurber study - Roger's Pass

BC 86087	74 - 76	Aug 2, 1986
BC 7021	246 - 248	Aug 16, 1967
BC 5196	30 - 31	May 4, 1966
BC 1629	50 - 51	Oct 6, 1952

Map Information:

Fan Slope: near Campbell Road (3400' to 3480') = 4 degrees
apex (elev. 4000' to 3500') = 7.3 degrees

Distance from proposed lot 1 to creek at elev. 3900' = 1 km

CONCLUSIONS

1. The proposed subdivision is situated on the Drybed Creek debris torrent fan.
2. The stream channel and debris torrent path is not confined at the apex of the fan.
3. A review of air photographs and field evidence indicates that debris torrents have, in the past, travelled in various directions downslope from the apex onto the fan surface.
4. In recent history, at least two debris torrents have travelled down the Drybed Creek channel to the confluence with Birchlands Creek (1976 and 1982). The air photography also suggests that one occurred in the early 1950's. Severed trees and deposits observed in the field also suggests that the fan is very active.
5. The distance from the apex of the fan to the confluence with Birchlands Creek is approximately the same as from the apex of the fan to proposed lot 1.
5. Because of the apparent geological hazard the Approving Officer should be advised to refuse the subdivision as proposed.

Dwain Boyer
Engineering Section Head
Water Management Branch

FIGURE 1:
DRYBED CREEK MAY 16, 1990
FIELD INSPECTION



Drybed Creek

May 16, 1990

D. Boyer



PHOTO 1: View looking upstream. Note the buried tree stumps unearthed by recent events. Trees were sheared off by previous debris torrent(s). Stumps are approximately 1.5 m below the surrounding level.



PHOTO 2: Looking downstream. This is a good example of a recent channel shift. There is a clear abandoned channel heading downslope as indicated by dashed line.



PHOTO 3: Another view of channel shift shown in photo 2. The old course of the stream and debris flow is shown.



PHOTO 4: View of abandoned channel



PHOTO 5: Recent debris deposits around and against tree.



PHOTO 6: View of the remainder from Mitchell Road. Note Drybed Creek originates from valley to the right.

① RANGES FROM ME 4 1 5000 11/11/12

Apr 24 1990

D. Boyer

Flow	Depth
3400 ft	0 ft
3400	100
3400	510
3400	710
3400	1000
3400	1500
3400	2140
3400	2500
3400	3000
3400	3500
3400	4000
3400	4500

$$T_{\text{ave}} = \frac{1000}{1000}$$

$$\theta = 4^\circ$$

$$T_{\text{ave}} = \frac{500}{5000 - 1000}$$

$$= \frac{100}{3000}$$

$$\theta = -1.3^\circ$$

② Given to front lot to creek $K = 1.0 \text{ km}$
 @ FIVE 3' 11" 1/2" width

③ POINT CASE:

$$\text{Point distance } X_L = \frac{V^2}{G}$$

$$V_u = \frac{8Sh^2}{K\gamma}$$

$$= \frac{8 \left(\frac{85}{1120} \right) (8)^2}{(3)(3)}$$

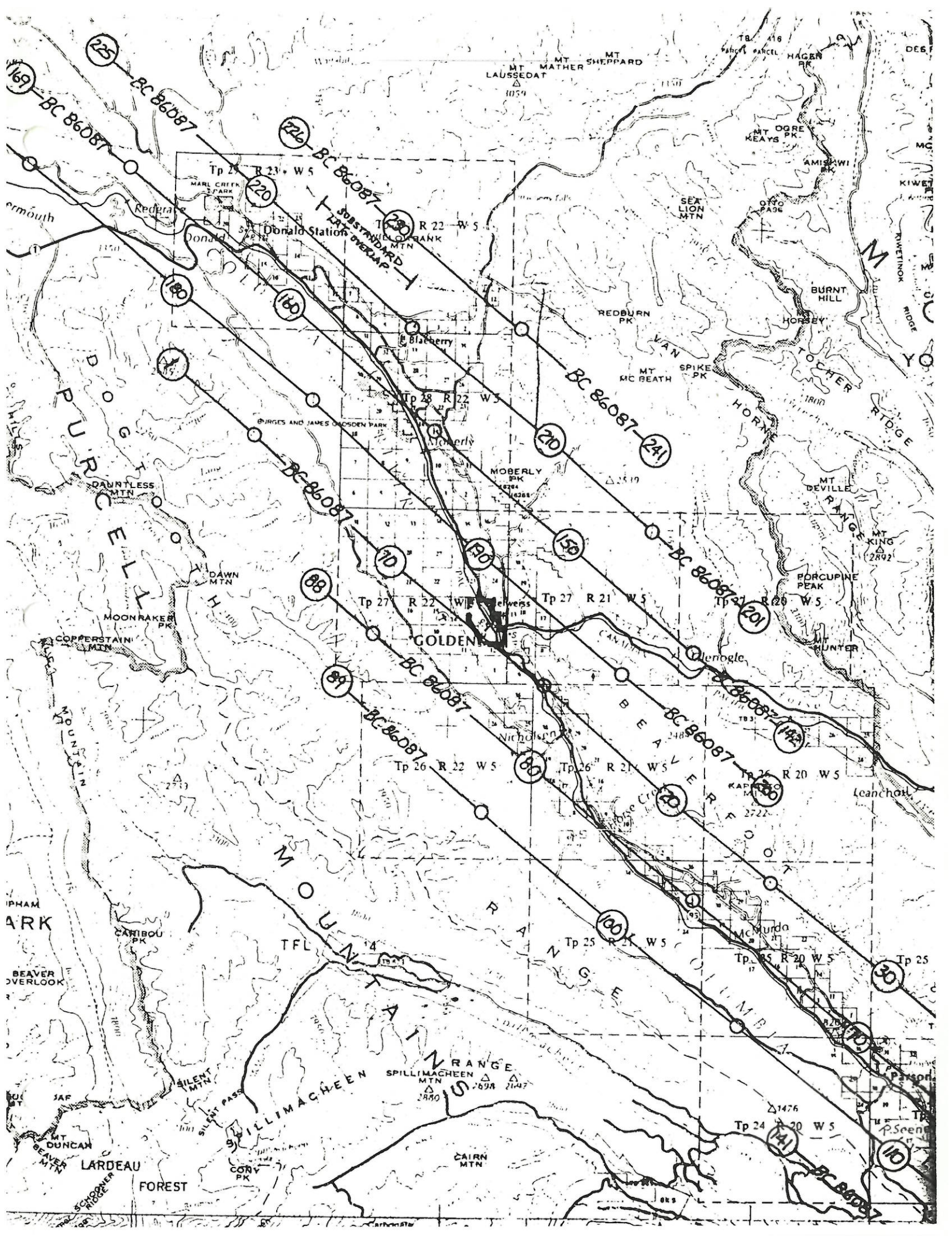
$$= 85.0$$

$$\gamma = 3.0 \text{ KPa/s}$$

$$K = 3 \text{ ft. min.}$$

$$= 3. \text{ ...}$$

$$G =$$



① GRADES FROM ME & 1/2 inch divisions

Apr 24 1970

D. Regier

FLG	A	B	A
340	0		
100	100		
510	510		
710	710		
1270	1270		
20	20		
20	20		
30	30		
80	80		
2140	2140		
2000	2000		
2000	2000		
3130	3130		
3330	3330		
3130	3130		

$$T = \frac{100}{1130}$$

$$\theta = 4^\circ$$

$$T = \frac{500}{3130 - 1270}$$

$$= \frac{500}{1860}$$

$$\theta = 7.3^\circ$$

Apr

② DIST. FROM LOT TO creek = 1.0 Km
@ FLEV 3100 ft contour

③ RUNOUT CALC.

$$\text{Runout distance } X_L = \frac{V^2}{G}$$

$$\begin{aligned} V_u &= 8Sh^2/KY \\ &= 8 \left(\frac{80}{1130} \right) (8)^2 / (3)(3) \\ &= 85.0 \end{aligned}$$

$$Y = 3.0 \text{ KPa}\cdot\text{s}$$

K = 3 for rectangular channel section

Y = 3.0 for 1/2 inch divisions

$$G =$$