

March 18, 2008

EBA Project: K23101193

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Attention: Ms. Elise Pare, P.Eng.
Project Manager

Dear Ms. Pare:

**Subject: Preliminary Hydrological and Hydrogeological Assessment
for Additional Water Sources
Kicking Horse Mountain Resort, Golden, BC**

1.0 INTRODUCTION

Kicking Horse Mountain Resort Ltd. (KHMR) has retained EBA Engineering Consultants Ltd. (EBA) to provide preliminary hydrological and hydrogeological assessments for additional water sources to support KHMR's planned expansion. This project is intended to identify potential water supply sources and to develop recommendations for further studies. The methodology and results of the current assessment are summarized in this report which serves as a supporting document for the updated Master Development Plan for the resort expansion.

2.0 EXISTING AND PROPOSED WATER DEMAND

The KHMR is located in the Purcell mountain range in Golden, BC, approximately 270 km west of Calgary, AB. The development area consists of ski resort operations, a residential village, golf course, commercial and comprehensive development land uses. The current potable water supply sources for the base village are local wells, which supply approximately 1,050 m³/day to meet resort potable water needs. However, approximately 6,500 m³/day will be needed to meet proposed development requirements at full buildout. Due to extremely limited ground water resources in the immediate resort area, potential surface water sources in Holt Creek, Cedar Creek and the Columbia River and potential groundwater resources in more distant areas need to be assessed to provide additional water

supply capacity for the resort. In addition to water usage for waterworks purposes, KHMR also requires water supply and storage to meet other future water demands including snow making and golf course irrigation. The capacity of a proposed reservoir is approximately 40,000 m³.

3.0 PRELIMINARY HYDROLOGICAL ASSESSMENT

This section summarizes the methodology and results of the preliminary hydrological assessment of surface water sources.

3.1 REVIEW OF BACKGROUND INFORMATION

EBA assembled and reviewed available topographic, climatic and hydrometric information for the region. Major watersheds in the area include Holt Creek, Cedar Creek and the Columbia River. Figure 1 shows the locations of the major watersheds and Figure 2 shows the boundaries for the sub-watersheds of interest.

3.1.1 Watershed Descriptions

The Holt Creek watershed is located approximately 3 km north of KHMR. The approximate drainage area of the Holt Creek watershed is 63.0 km². Holt Creek has three reaches, generally flowing to the east before joining the Columbia River. The average gradient of the watershed is approximately 12% with elevations varying from approximately 2500 m near the headwaters to 750 m at its confluence with the Columbia River. Three diversion points are proposed on the tributaries of Holt Creek, at an elevation of 1280 m. The northern proposed catchment area is 16.7 km²; the middle one is 20.4 km²; and the southern one is 3.7 km². It is proposed that a diversion ditch would be constructed along the 1280 m contour, capturing and conveying stream runoff to a storage reservoir. The median elevations of all three sub-watersheds are approximately 2,150 m.

The Cedar Creek watershed, in which KHMR is located, has a total drainage area of approximately 35.2 km². The watershed varies in elevation from 2300 m near its headwaters to 750 m at its outlet on the Columbia River. Cedar Creek has two tributaries, generally flowing through the resort during the spring freshet. The Cedar Creek watershed shares the north boundary with the Holt Creek watershed and the east and south boundary with the Columbia River Watershed. The total reach length of Cedar Creek is approximately 18.7 km. The average gradient of the Cedar Creek watershed is approximately 6%. Two diversion points are proposed on the tributaries of Cedar Creek, both at an elevation of 1280 m. The northern proposed catchment area is 1.9 km² and the southern one is 3.7 km². The median elevations of two sub-watersheds are approximately 2,150 m.

The Columbia River originates Rocky Mountains of southern British Columbia. It flows 2,000 km from its headwaters to the Pacific Ocean, draining an area of about 673,400 km². Water could be diverted from the Columbia River at an elevation of 750 m. The diversion

point on the Columbia River is located approximately 4 km downhill from the KHMR. The proposed catchment area within the Columbia River watershed is approximately 8,587 km² with a median basin elevation of approximately 1895 m.

3.1.2 Climatic and Hydrometric Data

The Golden A station (ID 1173210, Elevation 784.9 m) is operated by the Meteorological Service of Canada. The station is located at the Golden Airport, relatively close to the sub-watersheds of interest. Climate normals at the Golden A station indicate that the daily mean temperature in the region ranged from -9.7°C in January to 17.1°C in July, over the period 1971 to 2000. The total annual precipitation recorded at the Golden A station is 475.2 mm, with a maximum monthly precipitation of 494 mm in the form of snow, observed in January. The 1971 to 2000 monthly temperature and precipitation at the Golden A station are tabulated in Table 1 and shown in Figure 3.

TABLE 1: MEAN MONTHLY TEMPERATURE (°C) AND PRECIPITATION (mm)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Temp	-9.7	-5.2	0.4	6.2	11.1	14.7	17.1	16.5	11.3	4.9	-2.5	-8.4
Rainfall	4.9	5.1	11	19.6	35.3	45.7	47.7	46.7	38.3	29.9	22.4	6.6
Snowfall	49.4	24.8	10.7	2.5	1	0	0	0	0.4	2.5	29.5	49.3
Precipitation	51.7	29	21.1	22	36.2	45.7	47.7	46.7	38.7	32.5	50.9	53.1

The Water Survey of Canada has a number of hydrometric stations in the region. Table 2 summarizes the station information for the most relevant stations.

TABLE 2: HYDROMETRIC STATION INFORMATION

Station Id	Station Name	Latitude	Longitude	Drainage Area (km ²)	Period of Record	Type
08NB012	Blaeberry River above Willowbank Creek	51°28'53" N	116°58'6" W	588	1970-2006	Natural
08NB016	Split Creek at the Mouth	51°31'37" N	116°53'55" W	81.3	1974-2006	Natural
08NA006	Kicking Horse River at Golden	51°18'0" N	116°58'5" W	1850	1911-2006	Natural
08NA011	Spillimacheen River near Spillimacheen	50°15'28" N	119°4'55" W	1430	1912-2006	Regulated
08NB005	Columbia River at Donald	51°29'0" N	117°10'45" W	9710	1944-2006	Natural

It should be noted that Spillimacheen River hydrometric station is considered to be a regulated station. According to records from the Water Survey of Canada, flow at the Spillimacheen River is regulated by a BC Hydro Power Plant upstream of the station.

3.1.3 Existing Water Allocation Restrictions and Downstream Water Users

A water allocation restriction is a management tool used by the Ministry of Environment Water Stewardship Division staff to alert other Ministry staff of current or potential water allocation concerns. This information is considered, along with all other relevant information, when making future water allocation decisions. A desktop search of existing water allocation restrictions from the database of the Ministry of Environment, Water Stewardship Division, was conducted for Holt Creek, Cedar Creek, and the Columbia River in the Precinct of Golden. The result showed no existing water allocation restriction for these streams of interest.

Information on the existing water licences on Holt Creek, Cedar Creek, and the Columbia River has been obtained from the water licence inventory of the Water Stewardship Division of the Ministry of Environment. Detailed water licence information can be found in Appendix A. The following paragraphs provide general descriptions of the existing water users for each sub-watershed of interest.

There is currently one water licence on Holt Creek (C066012) held by the Golden District Golf & Country Club for irrigation purposes. According to information obtained from the Water Stewardship Division (Mr. Antoine Beriault), the licensed quantities are less than 10% of the 1 in 5-year drought flow. Holt Creek is a promising source in terms of surface water quantity for KHMR's water licence application.

Cedar Creek has one existing water licence (C107742) in place for irrigation purposes and one active water licence application (Z121020) from an Independent Power Producer (IPP). The IPP, which is located downstream of KHMR, has applied for more than the available surface water source in Cedar Creek according to the field monitoring program. If the water licence is granted to the IPP, there will be no capacity for additional water licences on Cedar Creek.

The Columbia River has a total of 16 water licences currently in place within Golden Water District. The purposes of the water licences include storage, power, irrigation, land improvement, and processing. The major water user is BC Hydro & Power Authority. The Columbia River is considered the least favoured choice for surface water diversion, since extensive pumping up the slope would be required.

3.2 WATER AVAILABILITY OF POTENTIAL WATERSHEDS

The objective of this task is to determine the water availability for each sub-watershed of interest by developing and analyzing flow data at potential diversion points. Mean annual runoff, mean annual discharge, mean monthly discharges, and drought flows were estimated for each sub-watershed. In addition, information related to instream flow requirements is discussed.

3.2.1.1 Mean Annual Runoff and Mean Annual Discharge

A regional study was first conducted to determine a mean annual runoff versus median basin elevation relationship. On the basis of location, catchment size and period of record, four hydrometric stations were selected to represent the Holt Creek and Cedar Creek sub-watersheds, and one hydrometric station (08NB005) on the Columbia River was selected to represent the Columbia River sub-watershed. Details of these stations including the mean annual runoffs are tabulated in Table 3.

TABLE 3: REGIONAL HYDROMETRIC STATIONS FOR HOLT AND CEDAR CREEKS

Station No.	Watercourse	Median Basin Elevation (m)	Drainage Area (km ²)	Mean Annual Runoff (mm)	Average of the Mean Annual Runoffs (mm)
08NB012	Blaeberry River	2084	588.0	896	740
08NB016	Split Creek	2109	81.3	689	
08NA011	Spillimacheen River	2028	1430.0	753	
08NA006	Kicking Horse River	2062	1850.0	644	
08NB005	Columbia River (Donald)	1905	9710.0	557	557

The mean annual runoff versus median basin elevation relationship derived from the first four hydrometric stations does not show a strong correlation, probably because the median basin elevations are all quite similar. Using a conservative approach, the basin mean annual runoffs at the Holt and Cedar sub-watersheds were determined by taking the average of the mean annual runoffs of the first four regional hydrometric stations in Table 3. The basin mean annual runoff derived from Columbia River at Ronald hydrometric station was used for the Columbia River sub-watershed at the KHMR area. Table 3 summarizes the results of the regional analysis. By applying the estimated mean annual runoff to the drainage area of each sub-watershed of interest, the mean annual discharge was determined for each potential diversion point (Table 4).

TABLE 4: MEAN ANNUAL RUNOFF AND MEAN ANNUAL DISCHARGE

Sub-watershed	Drainage Area (km ²)	Median Elevation (m)	Mean Annual Runoff (mm)	Mean Annual Discharge (m ³ /s)
North Holt at 1280 m Contour	16.7	2150	740	0.392
Middle Holt at 1280 m Contour	20.4	2150	740	0.479
South Holt at 1280 m Contour	3.7	2150	740	0.087
North Cedar at 1280 m Contour	1.9	2150	740	0.045
South Cedar at 1280 m Contour	3.7	2150	740	0.087
Columbia River at 750 m Contour	8587	1892	557	151.667

The stream flow analysis conducted by the Ministry of Environment, Lands and Parks in 1998 was used as a backup for the study. The British Columbia Streamflow Inventory Normal Annual Runoff (1961-1990) Map indicates that the mean annual runoff in the Holt and Cedar sub-watersheds area is in the range of 700 to 800 mm. This agrees with the results from regional analysis.

3.2.1.2 Mean Monthly Discharge

To determine the mean monthly flows for each sub-watershed of interest, the mean monthly flow distributions from regional stations were examined. Figure 4 shows the monthly flow distribution as a percentage of mean annual discharge for the Blaeberry River, Split Creek, Spillimacheen River and Kicking Horse River hydrometric stations. In general, the seasonal flow patterns of all creeks in the region are characterized by spring flood peaks in May to July due to snowmelt, followed by a steady decline in discharge during the summer and fall. It should be noted that the Spillimacheen River regulated flow data has a monthly flow distribution very similar to that of the Blaeberry and Kicking Horse Rivers. Figure 5 shows the monthly flow distribution for the Columbia River at Ronald station. The seasonal flow distribution of the Columbia River are characterized by summer freshet peaks in June and July, followed by a steady decline in discharge during the summer and fall.

Based on the above analyses, mean monthly flow distributions for the Holt and Cedar Creek sub-watersheds were determined based on the average of the mean monthly flow distributions of the Blaeberry River, Split Creek, Spillimacheen River, and Kicking Horse River. The mean monthly flow distribution for the sub-watershed of the Columbia River was based on the mean monthly flow distribution at the Columbia River at Ronald hydrometric station. The mean monthly discharges for each sub-watershed of interest are tabulated in Table 5.

TABLE 5: MEAN MONTHLY DISCHARGES (m ³ /s)						
Month	Holt North	Holt Middle	Holt South	Cedar North	Cedar South	Columbia
Jan	0.070	0.086	0.016	0.008	0.016	30.875
Feb	0.059	0.073	0.013	0.007	0.013	28.569
Mar	0.058	0.072	0.013	0.007	0.013	32.337
Apr	0.126	0.157	0.028	0.014	0.028	55.267
May	0.638	0.791	0.143	0.073	0.143	208.352
Jun	1.238	1.535	0.278	0.142	0.278	452.025
Jul	1.075	1.333	0.241	0.123	0.241	424.818
Aug	0.669	0.830	0.150	0.077	0.150	270.013
Sep	0.367	0.455	0.082	0.042	0.082	142.357
Oct	0.199	0.247	0.045	0.023	0.045	79.686
Nov	0.122	0.151	0.027	0.014	0.027	51.625
Dec	0.084	0.104	0.019	0.010	0.019	36.663
Annual	0.392	0.479	0.087	0.045	0.087	151.667

3.2.1.3 Drought Runoff Analysis

Drought runoff estimates were determined by developing average 7-day low flow and by using Environment Canada's Low Flow Analysis program. According to the Ministry of Environment Water Stewardship Division Water Officer (Mr. Antoine Beriault), a 1 in 10-year design drought flow return period is appropriate for potable water supplies (waterworks) for a moderate-sized development like KHMR; while 1 in 5-year return period is required for snowmaking and irrigation purpose. For a combined purpose, the 10-year return period should apply, unless KHMR is prepared to forego diversion for snowmaking or irrigation in years of water shortage. .

In particular, the annual drought runoffs were determined for each sub-watershed of interest. Table 6 and Table 7 summarize the drought flow and drought runoff from the low flow analysis. Table 8 shows the potential flow volume based on the 5- and 10-year droughts.

TABLE 6: 7-DAY DROUGHT FLOW ANALYSIS (m³/s)

Return Period (yr)	Holt North	Holt Middle	Holt South	Cedar North	Cedar South	Columbia
2	0.0495	0.0605	0.0110	0.0056	0.0110	22.7
5	0.0437	0.0534	0.0097	0.0050	0.0097	19.7
10	0.0408	0.0498	0.0090	0.0046	0.0090	18.1
20	0.0385	0.0471	0.0085	0.0044	0.0085	16.9
50	0.0361	0.0441	0.0080	0.0041	0.0080	15.4
100	0.0345	0.0422	0.0076	0.0039	0.0076	14.6
200	0.0331	0.0404	0.0073	0.0038	0.0073	13.7
500	0.0314	0.0384	0.0070	0.0036	0.0070	12.8

TABLE 7: 7-DAY DROUGHT RUNOFF ANALYSIS (mm)

Return Period (yr)	Holt North	Holt Middle	Holt South	Cedar North	Cedar South	Columbia
2	93.5	93.5	93.5	93.5	93.5	83.4
5	82.5	82.5	82.5	82.5	82.5	72.2
10	77.1	77.1	77.1	77.1	77.1	66.6
20	72.7	72.7	72.7	72.7	72.7	61.9
50	68.1	68.1	68.1	68.1	68.1	56.7
100	65.2	65.2	65.2	65.2	65.2	53.5
200	62.4	62.4	62.4	62.4	62.4	50.4
500	59.3	59.3	59.3	59.3	59.3	46.9

TABLE 8: 7-DAY 5-YR AND 7-DAY 10-YR DROUGHT FLOW VOLUME (m³)

Return Period (yr)	Holt North	Holt Middle	Holt South	Cedar North	Cedar South	Columbia
5	1,378,071	1,683,392	305,321	156,786	305,321	620,208,000
10	1,286,784	1,571,880	285,096	146,401	285,096	571,852,800

3.2.2 Instream Flow Requirements

As a first approach, the minimum flow requirement for each sub-watershed of interest was assumed to be equivalent to 15% of the mean annual discharge. It is assumed that 15% of the mean annual discharge will be required to be maintained just downstream of the diversion point year round. At a later stage of the design, the recommended flow thresholds in accordance with the British Columbia Instream Flow Guidelines for Fish – Development for Instream Flow Thresholds as Guidelines for Reviewing Proposed Water

Uses will be applied. Additional studies regarding fish presence/absence upstream and downstream of the proposed diversion points and further consultation with agencies such as the Ministry of Environment and Fisheries and Oceans Canada will be required to confirm the detailed instream flow requirements. Table 9 summarizes the preliminary instream flow requirements for all sub-watersheds of interest.

TABLE 9: PRELIMINARY INSTREAM FLOW REQUIREMENTS (m ³ /s)					
Holt North	Holt Middle	Holt South	Cedar North	Cedar South	Columbia (KHMR)
0.0588	0.0719	0.0131	0.0068	0.0131	22.7501

4.0 PRELIMINARY HYDROGEOLOGICAL ASSESSMENT

Substantial groundwater exploration work has been conducted in the immediate resort area with limited success. Therefore, EBA reviewed available bedrock and surficial geologic data as well as available well drilling and production records to identify potentially favourable locations for additional groundwater exploration.

4.1 REGIONAL SETTING AND GEOLOGY

Based on available geologic maps and a published geologic report, the Purcell Thrust Fault forms a prominent geological feature in the resort area. This fault trends along the west side of the Columbia River valley and extends generally parallel to the valley trend. The fault dips towards the southwest and based on available mapping extends through the site property's northeast corner, approximately 500 m northeast of the drilled wells. Bedrock immediately on the east side of the fault is mapped as McKay Group shale interbedded with limestone. Nearer the river the bedrock changes to calcareous mudstone, siltstone and shale. Bedrock west of the fault is mapped as sandstone, limestone, quartzite and marble. Bedrock west of the resort summit and on the western side of the Purcell Mountains is mapped as coarse sedimentary rock with fine mudstone, siltstone and shale. These rock assemblages apparently extend at least 12 km northwest of the resort to Cirque Creek and approximately 16 km southeast of the resort to Twelve Mile Creek. Figure 6 illustrates the generalized geology as mapped for the resort area.

Unfortunately none of these geologic descriptions correspond to rocks exposed in the resort vicinity or encountered during KHMR's drilling activities. Local bedrock exposures and rocks encountered by water supply and test well drilling primarily consist of friable grey to black shale which may be part of the McKay Group shale, covered by glacially-derived till ranging between 2 – 18 m thick. This apparent discrepancy between the observed and mapped geology may be due to an error regarding the mapped location of the Purcell fault.

If the fault were located further east in the Purcell Range the resort may then be located east of the fault and therefore overlay the McKay Group shale as described above. If this is true, the geologic resources report the McKay Group to be approximately 4 km thick and to extend farther than 10 km northwest and southeast of the resort. These rocks do not appear to comprise a good resource for additional groundwater supply.

One available on-line geologic map obtained from the on-line BC Geologic Survey suggests glacially-derived sand and gravel deposits are present in the Columbia River valley bottom and that extensive deposits are present north of the resort area on the east side of the river and adjacent to Holt Creek (Figure 6). Lower Holt Creek also appears incised into the underlying material, which also suggests thick sediments may be present. However, this map also indicates that glacially derived deposits are not present topographically below the resort area and adjacent to the river's west side.

4.2 WELL RECORDS

The on-line BC Water Resource Atlas was used to identify wells with detailed records located along Columbia River in the vicinity of Kicking Horse Mountain Resort. Please note that until 2006 submission of driller's well logs to the BC Ministry of Environment was voluntary, and therefore it is likely that other wells are present but no data is available for these wells.

No drilling records are available for the area east and topographically below the resort and adjacent to the river. The closest well on the west side of the river is located approx 5 km northeast of the resort. The well was drilled to a depth of 50 m and encountered 14 m of sand and gravel underlain by silt graduating to clay to the well total depth. The reported yield for this well was only 164 m³/day.

However, many wells are located approximately 5 to 6 km northeast of the resort in the valley bottom on the east side of the river. Based on drilling records these wells encountered a fairly homogeneous sand and gravel deposit up to 30 m thick that produces water at flows ranging from 0 – 10,900 m³/day.

The average reported yield for 22 wells in this area is 2,560 m³/day. Only four wells reported yields less than 150 m³/day. The wells with the best yields are located north of Kicking Horse River, just downstream from where it joins the Columbia River.

No correlation between well depth and yield was apparent from the available records. Wells drilled to greater depths did not appear have increased well yields. Four of the 22 wells examined were completed at depths greater than 30 m. However, two of these deeper wells produced water at rates less than 490 m³/day while one, extending to 81 m, was dry. In contrast, wells producing yields greater than 2,180 m³/day ranged in depth from approximately 14 to 23 m.

The driller's stratigraphic logs also suggest that this highly productive local aquifer may not be continuous, with clay lenses interspersed within the sand and gravel. Static water levels in the wells vary over small distances and some drillers logs also document boreholes where many zones of gravel were encountered that were not water bearing. In addition, wells situated closer to the river commonly do not have higher yields than those located farther away. These observations suggest significant variations in local stratigraphy and aquifer characteristics are present.

5.0 CONCLUSIONS/RECOMMENDATIONS

5.1 RECOMMENDATIONS ON SURFACE WATER SUPPLY

Based on the results of the preliminary hydrological assessment and information available at the time of this study, the following conclusions and recommendations are presented:

- The Holt Creek watershed has one existing water licence. The sub-watershed of interest within the Holt Creek watershed has a total 10-year drought flow volume of 3,143,760 m³ and a corresponding runoff depth of 77.1 mm. In view of its available water quantity and limited number of water users, we recommend that diversion from Holt Creek be considered with the highest priority.
- Cedar Creek is located close to the KHMR area. The 10-year drought flow volume of Cedar Creek sub-watershed was estimated to be 431,497 m³ at the proposed diversion point. The corresponding runoff depth is 77.1 mm. Cedar Creek has one existing water licence and one active water licence application from an IPP. It should be noted that the IPP has proposed water use of 3 m³/s for the entire year, which takes the full capacity of Cedar Creek. Further consultation with the Ministry of Environment is required to confirm the extents and status of the IPP water licence application.
- The Columbia River within the Water District of Golden has 16 existing water licences. BC Hydro & Power Authority is one of the major water users for power production. The 10-year drought flow volume was estimated to be 571,852,800 m³ at the proposed point of diversion, and the corresponding runoff depth is 66.6 mm. It should be noted that the Columbia River is located approximately 500 m down slope of KHMR. Pumping would be required to obtain water from the Columbia River. Therefore, the Columbia River should be considered the least preferred option.
- To further fulfill the requirements of the water licence applications, environmental studies to determine fish presence/absence in the streams of interest will be required. It is also recommended that flow monitoring be conducted on the streams for future calibration of the preliminary flow estimations.

5.2 RECOMMENDATIONS ON GROUNDWATER SUPPLY

Due to apparently inaccurate geologic mapping data, the location and production abilities of bedrock types that may be present in the resort area are not known. However, the available information suggests the following geologic model:

- If the Purcell fault is located west of the resort area, the poorly producing shale encountered during KHMR's drilling programs likely extends to the southeast and northwest of the resort for distances greater than 10 km. Similar rocks probably extend east and topographically downslope to the Columbia River;
- Quartzite, sandstone, and limestone may exist topographically upslope and west of the resort. Further west and over the summit, the bedrock is mapped as coarse sedimentary rock and fine mudstone, siltstone and shale; and
- In general, productive sand and gravel deposits are present on the east side of the river, and may be present northeast of the resort on the east side of the river near Holt Creek, but are not shown to be present topographically below the resort on the west side of the river.

Based on this geological model, exploring for bedrock groundwater northwest or southeast of the resort along the topographic ridge is unlikely to be the most cost-effective location for significantly increasing the groundwater supply. Only 50% of wells completed within the shale bedrock have been successful and those wells yield a relatively low water supply (less than 200 m³/day). It is likely that similar outcomes will be encountered if drilling is extended along the ridge. However, the advantage to drilling in along the ridge would be low groundwater pumping costs to the resort area due to limited topographic elevation change compared to the resort elevation.

Similarly, as no dependable information regarding the location or production potential of different rock types is available, drilling west and uphill of the resort or on the western side of the Purcell Range may not be effective. In addition, the further uphill a well is drilled, the smaller the groundwater recharge area which supplies the well will be. Wells drilled significantly higher up slope may not be capable of providing the required water volume.

Therefore, due to the potential large yield from alluvial wells, groundwater exploration in glacially-derived alluvial sediments will likely provide the highest potential return on investment. However, as alluvial deposits are apparently not present directly east and topographically below the resort, groundwater exploration into areas north and below the resort area where glacially-derived alluvial deposits may be present may provide an adequate water supply.

As shown in Figure 6, favourable drilling sites may be situated along the south bank of Holt Creek. One proposed drilling site is near the valley bottom where Holt Creek joins the Columbia River. Good road access appears to be present for this area, however a golf course may be located at this site, and drilling access may be difficult to obtain.

A second proposed location is on the topographic ridge north of TW 12 and adjacent to Holt Creek where three branches of Holt Creek converge. Road access may be available for this site and if thin alluvial sediments are encountered, continued drilling into bedrock may result in a productive well.

Drilling along Holt Creek between these two sites may also yield positive results, although insufficient information is available to identify specific recommended drilling locations.

In addition, as KHMR has an established an easement that extends directly downhill from the resort to the Columbia River to route treated waste water for disposal, contrary to published geologic mapping, alluvial sediments and a productive aquifer may be present adjacent to the Columbia River in this vicinity. It may be possible to drill a well and find adequate groundwater supply adjacent to the river and upgradient from the waste water discharge location.

Please note, groundwater produced from wells located close to Holt Creek or the Columbia River may be considered to be under the direct influence of nearby surface water (GUDI), which may result in increased water treatment costs.

Despite the extra costs associated with groundwater exploration downhill and north of the resort, drilling into sand and gravel sediments appears to offer the best chance for obtaining highly productive wells. However, developing a groundwater supply in this area will likely increase water supply costs due to the increased vertical and horizontal pumping requirements.

We recommend conducting field reconnaissance prior to selecting drilling locations to support this desktop evaluation of surface geology and to evaluate the feasibility of recommended drilling locations

6.0 CLOSURE

We trust the information provided in this report meets your needs. This report has been prepared for the exclusive use of Kicking Horse Mountain Resort Ltd. for the specific application to the subject site. This report is to be read in conjunction with the attached General Conditions which form a portion of this report. Any uses of this report by a third party or any reliance on or decisions made, based on this report, are the responsibilities of those third parties. EBA accepts no responsibility for damages, if any, suffered by any third party a result of decisions made or actions taken based on this report. Please contact the undersigned if you require any clarification or further information.

This Issued for Review report is provided solely for the purposes of client review and presents our findings and recommendations to date. Our findings and recommendations are related only through an "Issued for Use" report, which will be issued subsequent to this review. One should not rely on the interim recommendations made herein. Once our report is issued for use, the "Issued for Review" report should be either returned to EBA or destroyed.

Respectfully submitted,
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Attachments:	Figure 1	Major Watershed Boundaries
	Figure 2	Boundaries of Sub-Watersheds of Interest
	Figure 3	Preliminary Assessment of Potential Water Resources, KHMR
	Figure 4	Mean Monthly Hydrographs of Regional Hydrometric Stations
	Figure 5	Mean Monthly Hydrograph of Columbia River Hydrometric Station at Donald
	Figure 6	Generalized Geology and Proposed Drilling Locations
	Appendix A	Water License Reports
	Appendix B	Environmental General Conditions

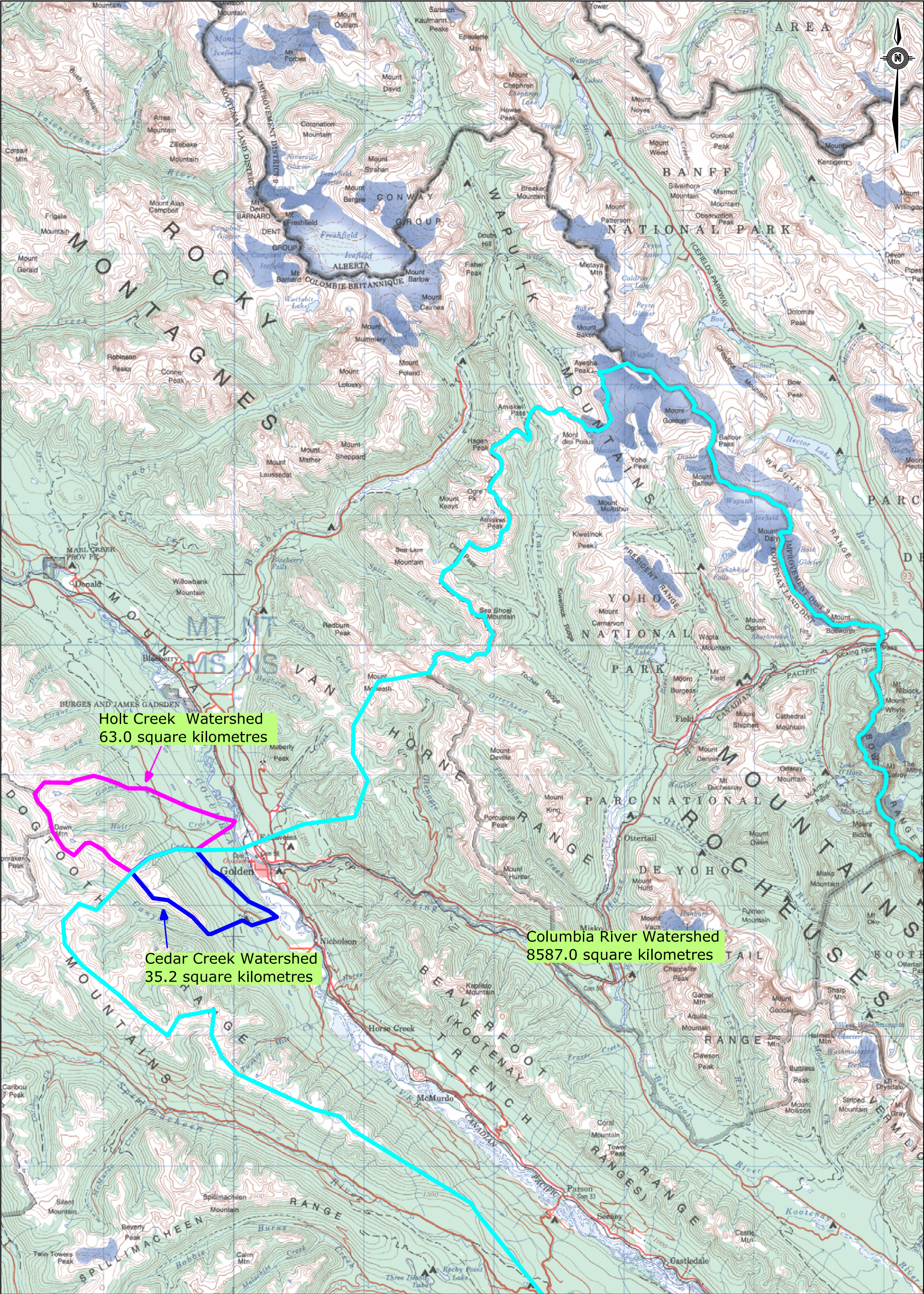
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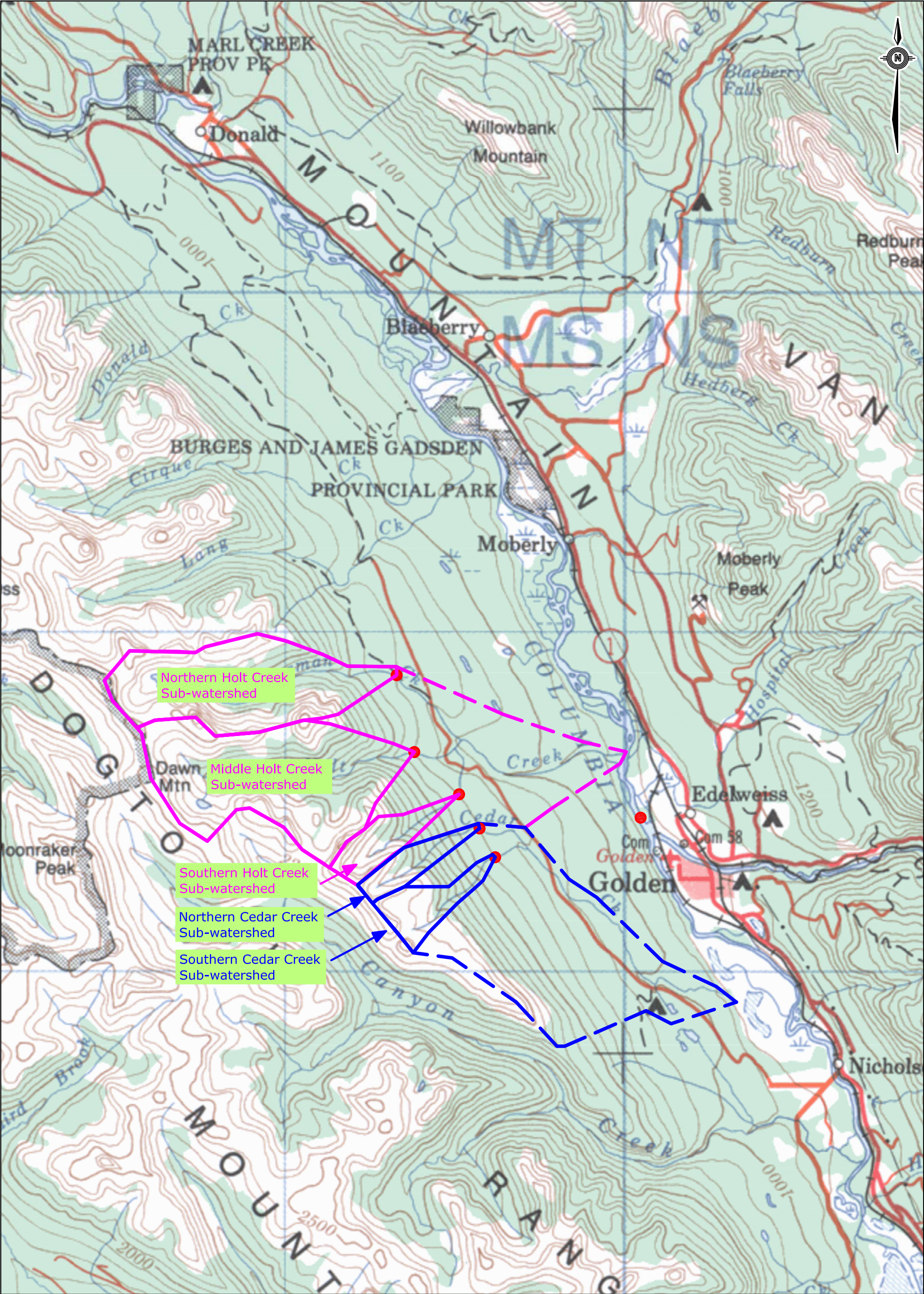


FIGURES





<div>CLIENT</div> <div></div> <div></div> <div><div>EBA Engineering Consultants Ltd.</div><div></div></div>	<div>Preliminary Assessment of Potential Water Resources, KHMR</div> <div>MAJOR WATERSHED BOUNDARIES</div>				<div>Figure 1</div>
	PROJECT NO. K23101193	DWN EL	CKD AC	REV 1	
	OFFICE EBA-VANC	DATE March 17, 2008			



NOTES

- Pink Dash Line - Boundary of the Holt Creek Watershed
- Pink Continous Line - Boundaries of the Holt Creek Sub-watersheds at the Diversion Points
- Blue Dash Line - Boundary of the Cedar Creek Watershed
- Blue Continous Line - Boundaries of the Cedar Creek Sub-watersheds at the Diversion Points
- Red Dots - Proposed Diversion Points

CLIENT



KICKING
HORSE
MOUNTAIN RESORT

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Preliminary Assessment of
Potential Water Resources, KHMR

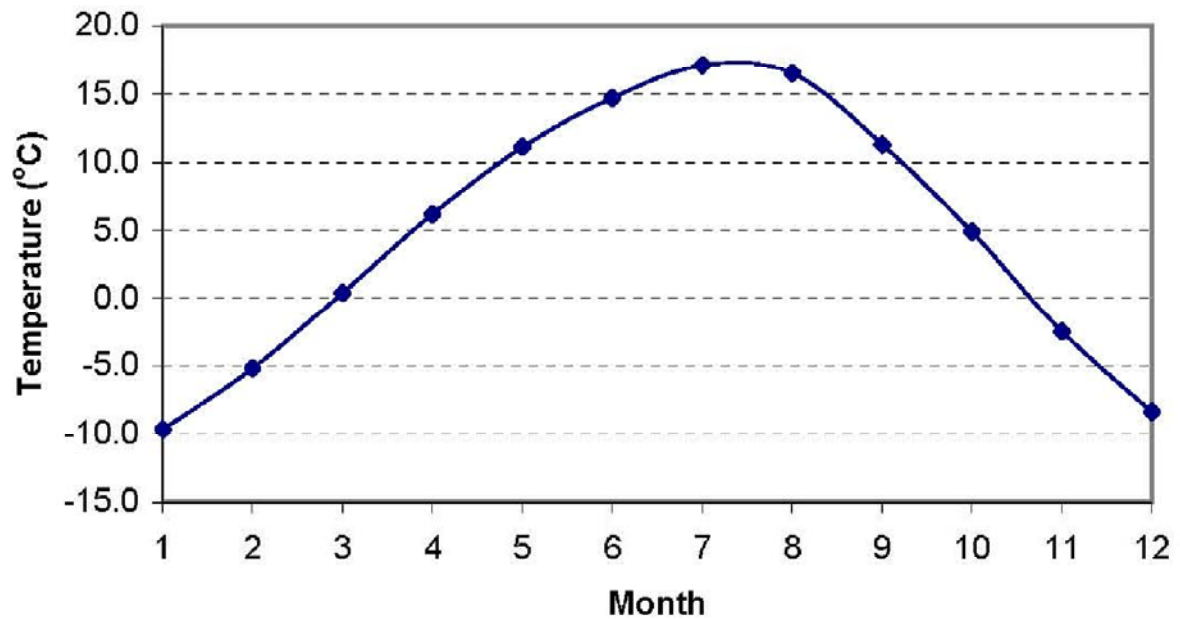
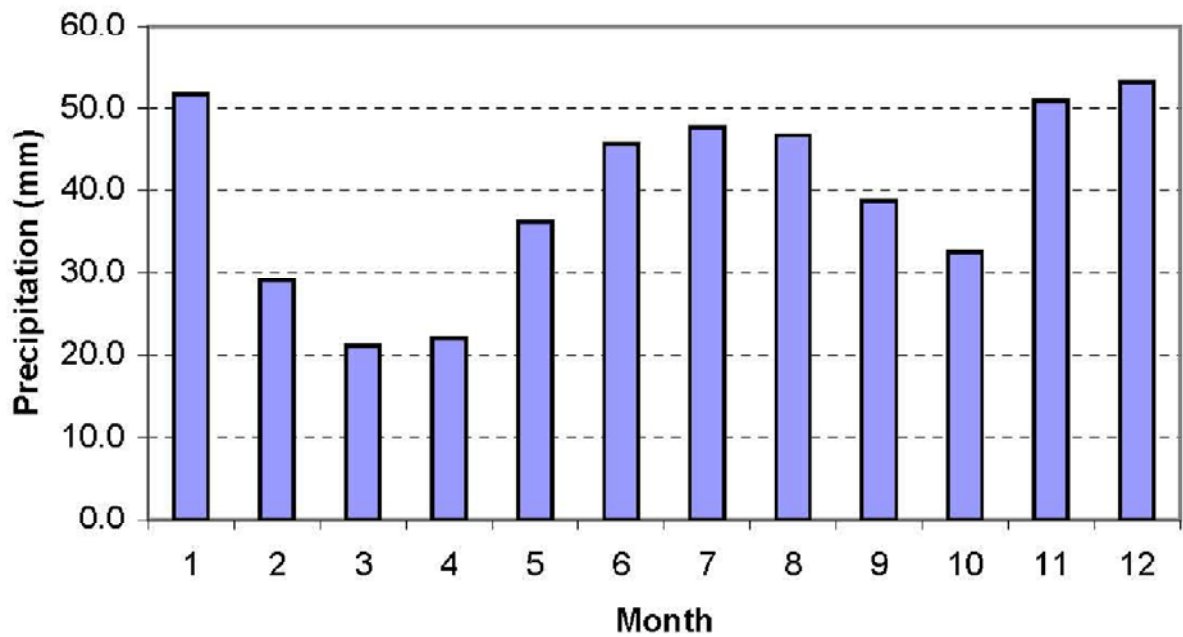
BOUNDARIES OF
SUB-WATERSHEDS OF INTEREST

PROJECT NO.
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EBA-VANC

DWN
EL
DATE
March 17, 2008

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AC
REV
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Figure 2



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Preliminary Assessment of Potential Water Resources, KHRM

MONTHLY TEMPERATURE AND PRECIPITATION AT KICKING HORSE MOUNTAIN RESORT

PROJECT NO.
K23101193

OFFICE
EBA-VANC

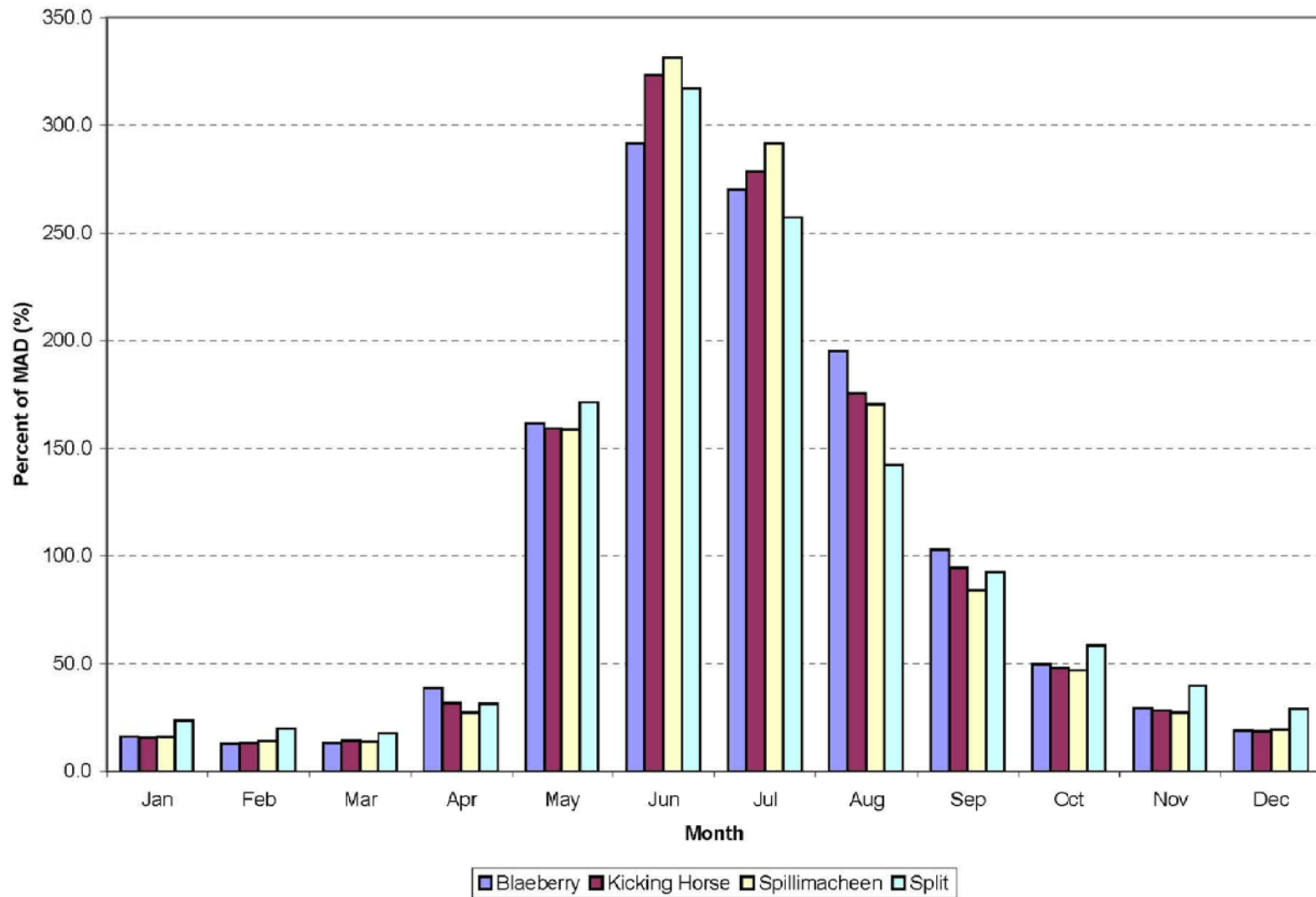
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1

DATE
March 17, 2008

Figure 3



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**KICKING
HORSE**
MOUNTAIN RESORT

**EBA Engineering
Consultants Ltd.**



**Preliminary Assessment of
Potential Water Resources, KHMR**

**MEAN MONTHLY HYDROGRAPHS OF
REGIONAL HYDROMETRIC STATIONS**

PROJECT NO.
K23101193

OFFICE
EBA-VANC

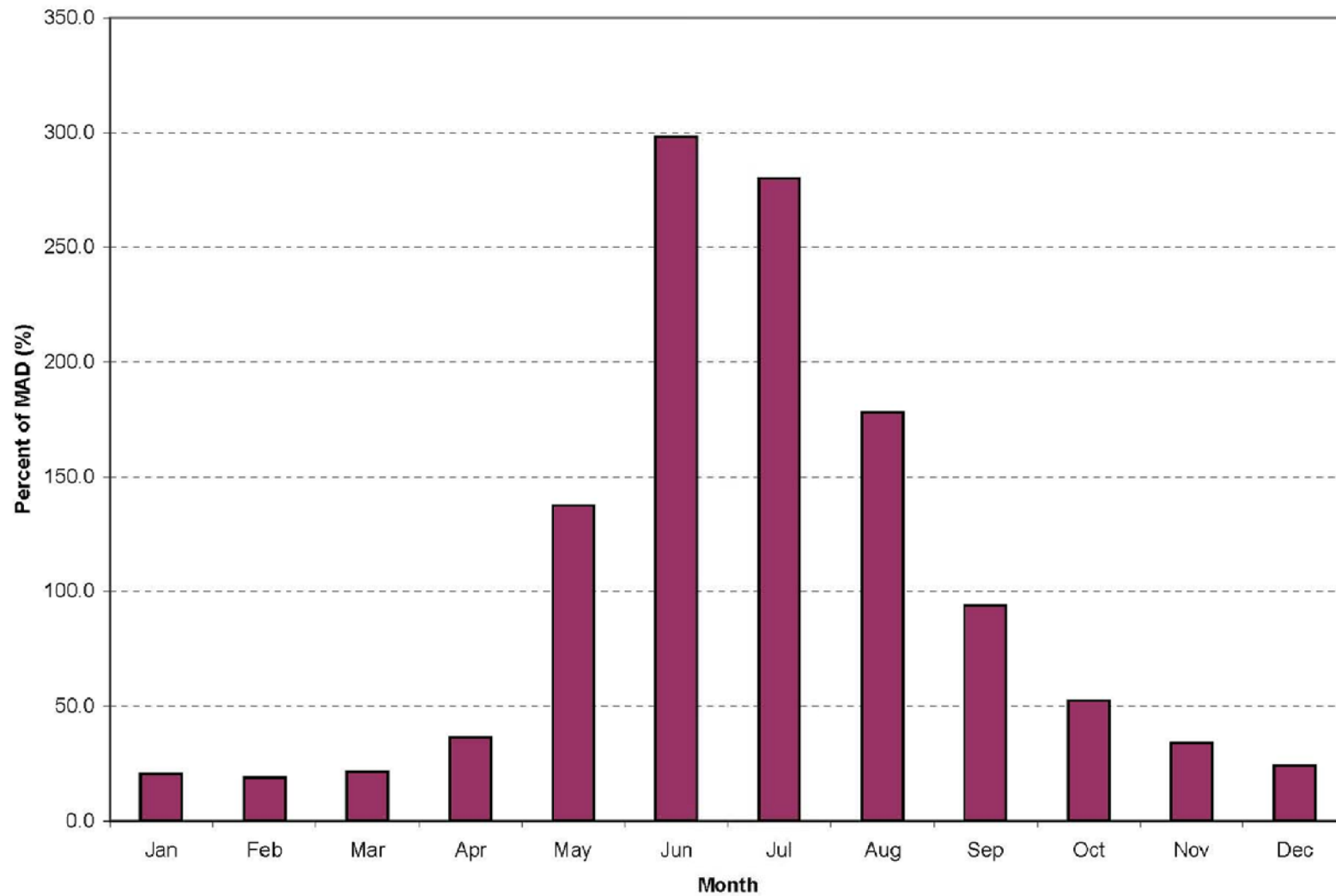
DWN
EL

DATE
March 17, 2008

CKD
AC

REV
1

Figure 4



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Consultants Ltd.**



**Preliminary Assessment of
Potential Water Resources, KHMR**

**MEAN MONTHLY HYDROGRAPH OF COLUMBIA
RIVER HYDROMETRIC STATION AT DONALD**

PROJECT NO.
K23101193

OFFICE
EBA-VANC

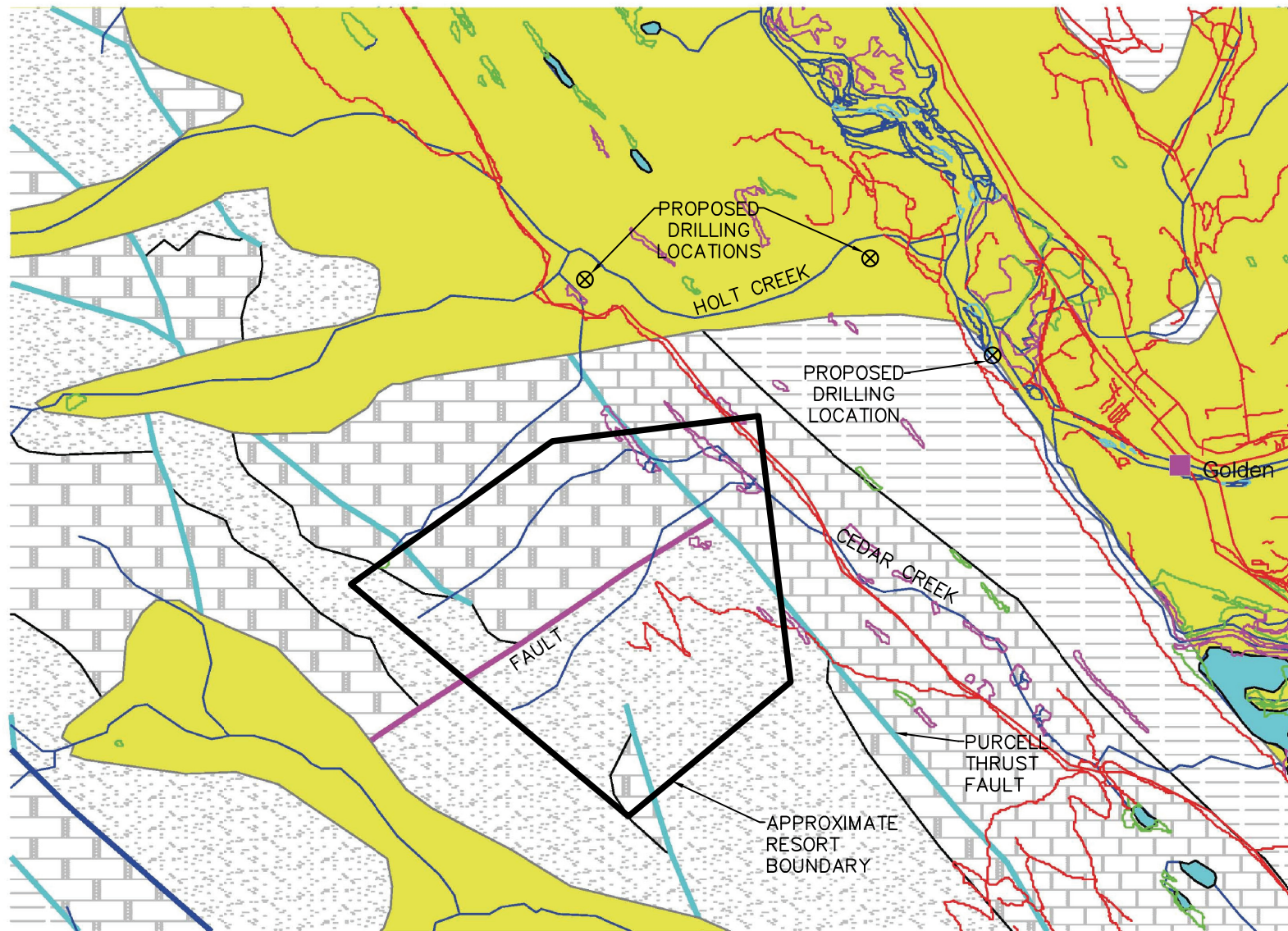
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March 17, 2008

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REV
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Figure 5



LEGEND

- APPROXIMATE RESORT BOUNDARY
- ⊗ PROPOSED DRILLING LOCATION
- SHALE, MUDSTONE
- LIMESTONE, SLATE
- LIMESTONE, MARBLE
- QUARTZITE
- SAND, GRAVEL, TILL

CLIENT



**KICKING
HORSE**
MOUNTAIN RESORT

**EBA Engineering
Consultants Ltd.**



Preliminary Assessment of
Potential Water Resources, KHMR

**GENERALIZED GEOLOGY AND
PROPOSED DRILLING LOCATIONS**

PROJECT NO.
K23101193

OFFICE
EBA-KELOWNA

DWN
MR

DATE
March 17, 2008

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Figure 6

APPENDIX

APPENDIX A WATER LICENSE REPORTS

WATER LICENCES REPORT – HOLT CREEK													
Licence No	WR Map/ Point Code	Stream Name	Purpose	Quantity	Units	Qty Flag	Rediv Flag	Licensee	Water District/Precinct	Licence Status	Process Status	Priority Date	Issue Date
C066012	82.N.035 P (PD24083)	Holt Creek	Watering	334	AF	T	N	Golden District Golf & Country Club PO Box 429 Golden BC V0A1H0	GOL - GOLDEN	Current	N/A	19850415	0

WATER LICENCES REPORT – CEDAR CREEK													
Licence No	WR Map/ Point Code	Stream Name	Purpose	Quantity	Units	Qty Flag	Rediv Flag	Licensee	Water District/Precinct	Licence Status	Process Status	Priority Date	Issue Date
C107742	82.N.026.3 BB (PD68950)	Cedar Creek	Irrigation	240	AF	T	N	Kucera Charles E PO Box 1079 Golden BC V0A1H0	GOL - GOLDEN	Current	Sec. 18 Amendment	19940211	20040408
Z121020	82.N.026.3 (PD79337)	Cedar Creek	Power- General	106	CS	T	N	Robertson Peter Smith Richard PO Box 1079 502 8TH Ave N Golden BC V0A1H0	GOL - GOLDEN	Active Appl.	Applic-Cleared	20050719	0

WATER LICENCES REPORT – COLUMBIA RIVER													
Licence No	WR Map/ Point Code	Stream Name	Purpose	Quantity	Units	Qty Flag	Rediv Flag	Licensee	Water District/Precinct	Licence Status	Process Status	Priority Date	Issue Date
C027068	83D/SE(2-a) A (PD24211)	Columbia River	Storage- Power	7000000	AF	T	N	BC Hydro & Power Authority Generation Plant OP. 6911 Southpoint Dr (E15) Burnaby BC V3N4X8	GOL - KINBASKET	Current	N/A	19610626	0
C032872	2953A MM (PD24596)	Columbia River	Processing	137000	GD	T	N	Shuswap First Nation PO Box 790 Invermere BC V0A1K0	GOL - WINDERMERE	Current	N/A	19670213	0
C037788	82.N.045 R (PD24097)	Columbia River	Conserv.- Stored Water	1500	AF	T	N	Ducks Unlimited (Canada) 954A Laval Cresc Kamloops BC V2C5P5	GOL - DONALD	Current	N/A	19700928	0
C039431	83D/SE(2-a) A (PD24211)	Columbia River	Power- General	65000	CS	T	N	BC Hydro & Power Authority Generation Plant OP. 6911 Southpoint DR (E15) Burnaby BC V3N4X8	GOL - KINBASKET	Current	N/A	19720316	0
C039432	83D/SE(2-a) A (PD24211)	Columbia River	Storage- Power	5000000	AF	T	N	BC Hydro & Power Authority Generation Plant OP. 6911 Southpoint Dr (E15) Burnaby BC V3N4X8	GOL - KINBASKET	Current	N/A	19720316	0
C064876	82.N.045 R (PD24097)	Columbia River	Conserv.- Stored Water	127	AF	T	N	Ducks Unlimited (Canada) 954A Laval Cresc Kamloops BC V2C5P5	GOL - DONALD	Current	N/A	19860116	0
C100954	2952B VV (PD24542)	Columbia River	Land Improve	20	AF	T	N	Radium Resort Inc PO Box 310 Radium Hot Springs BC V0A1M0	GOL - WINDERMERE	Current	N/A	19910215	19950321
C100954	2952B VV (PD24542)	Columbia River	Watering	185	AF	T	N	Radium Resort Inc PO Box 310 Radium Hot Springs BC V0A1M0	GOL - WINDERMERE	Current	N/A	19910215	19950321
C107974	82.N.007.4 DD (PD69117)	Columbia River	Land Improve	0	TF	T	N	Braisher Ormond Wm PO Box 70 Parson BC V0A1L0	GOL - GOLDEN	Current	N/A	19940228	20040308
C110593	2952B VV (PD24542)	Columbia River	Watering	125	AF	T	N	Radium Resort Inc PO Box 310 Radium Hot Springs BC V0A1M0	GOL - WINDERMERE	Current	N/A	19770711	19960313
C114926	2902A N3 (PD75953)	Columbia River	Watering	110	AF	T	N	Fairmont Riverside Golf Estates Ltd 5097 Riverview Rd RR 1 Fairmont Hot Springs BC V0B1L1	GOL - FAIRMONT	Current	N/A	19991214	20010503
C119118	2952 (PD78245)	Columbia River	Land Improve	45	AF	T	N	546761 BC Ltd C/O Mulyk Peter 222 1829 Ranchlands Boulevard NW Calgary Alberta T3G2A7	GOL - WINDERMERE	Current	N/A	20040108	20040531
C119118	2952 (PD78245)	Columbia River	Watering	200	AF	T	N	546761 BC Ltd C/O Mulyk Peter 222 1829 Ranchlands Boulevard NW Calgary Alberta T3G2A7	GOL - WINDERMERE	Current	N/A	20040108	20040531
C119468	2952 (PD78462)	Columbia River	Irrigation	136	AF	T	N	546761 BC Ltd Inc C/O Cronsberry Kent 222 1829 Ranchlands Boulevard NW Calgary AB T3G2A7	GOL - WINDERMERE	Current	N/A	20040429	20050602
F018441	82.N.045 M (PD24100)	Columbia River	Ponds	3.96	CS	T	N	Trans Canada Sort Ltd C/O Paul Ricard 1440 Birch CreS RR 6 Golden BC V0A1H6	GOL - DONALD	Current	Sec. 18 Amendment	19550818	0
F018441	82.N.045 M (PD24100)	Columbia River	Processing	21538.16	GD	T	N	Trans Canada Sort Ltd C/O Paul Ricard 1440 Birch Cres RR 6 Golden BC V0A1H6	GOL - DONALD	Current	Sec. 18 Amendment	19550818	0

APPENDIX

APPENDIX B ENVIRONMENTAL GENERAL CONDITIONS

ENVIRONMENTAL REPORT – GENERAL CONDITIONS

This report incorporates and is subject to these “General Conditions”.

1.0 USE OF REPORT

This report pertains to a specific site, a specific development, and a specific scope of work. It is not applicable to any other sites, nor should it be relied upon for types of development other than those to which it refers. Any variation from the site or proposed development would necessitate a supplementary investigation and assessment.

This report and the assessments and recommendations contained in it are intended for the sole use of EBA's client. EBA does not accept any responsibility for the accuracy of any of the data, the analysis or the recommendations contained or referenced in the report when the report is used or relied upon by any party other than EBA's client unless otherwise authorized in writing by EBA. Any unauthorized use of the report is at the sole risk of the user.

This report is subject to copyright and shall not be reproduced either wholly or in part without the prior, written permission of EBA. Additional copies of the report, if required, may be obtained upon request.

2.0 LIMITATIONS OF REPORT

This report is based solely on the conditions which existed on site at the time of EBA's investigation. The client, and any other parties using this report with the express written consent of the client and EBA, acknowledge that conditions affecting the environmental assessment of the site can vary with time and that the conclusions and recommendations set out in this report are time sensitive.

The client, and any other party using this report with the express written consent of the client and EBA, also acknowledge that the conclusions and recommendations set out in this report are based on limited observations and testing on the subject site and that conditions may vary across the site which, in turn, could affect the conclusions and recommendations made.

The client acknowledges that EBA is neither qualified to, nor is it making, any recommendations with respect to the purchase, sale, investment or development of the property, the decisions on which are the sole responsibility of the client.

2.1 INFORMATION PROVIDED TO EBA BY OTHERS

During the performance of the work and the preparation of this report, EBA may have relied on information provided by persons other than the client. While EBA endeavours to verify the accuracy of such information when instructed to do so by the client, EBA accepts no responsibility for the accuracy or the reliability of such information which may affect the report.

3.0 LIMITATION OF LIABILITY

The client recognizes that property containing contaminants and hazardous wastes creates a high risk of claims brought by third parties arising out of the presence of those materials. In consideration of these risks, and in consideration of EBA providing the services requested, the client agrees that EBA's liability to the client, with respect to any issues relating to contaminants or other hazardous wastes located on the subject site shall be limited as follows:

1. With respect to any claims brought against EBA by the client arising out of the provision or failure to provide services hereunder shall be limited to the amount of fees paid by the client to EBA under this Agreement, whether the action is based on breach of contract or tort;
2. With respect to claims brought by third parties arising out of the presence of contaminants or hazardous wastes on the subject site, the client agrees to indemnify, defend and hold harmless EBA from and against any and all claim or claims, action or actions, demands, damages, penalties, fines, losses, costs and expenses of every nature and kind whatsoever, including solicitor-client costs, arising or alleged to arise either in whole or part out of services provided by EBA, whether the claim be brought against EBA for breach of contract or tort.

4.0 JOB SITE SAFETY

EBA is only responsible for the activities of its employees on the job site and is not responsible for the supervision of any other persons whatsoever. The presence of EBA personnel on site shall not be construed in any way to relieve the client or any other persons on site from their responsibility for job site safety.

5.0 DISCLOSURE OF INFORMATION BY CLIENT

The client agrees to fully cooperate with EBA with respect to the provision of all available information on the past, present, and proposed conditions on the site, including historical information respecting the use of the site. The client acknowledges that in order for EBA to properly provide the service, EBA is relying upon the full disclosure and accuracy of any such information.

6.0 STANDARD OF CARE

Services performed by EBA for this report have been conducted in a manner consistent with the level of skill ordinarily exercised by members of the profession currently practicing under similar conditions in the jurisdiction in which the services are provided. Engineering judgement has been applied in developing the conclusions and/or recommendations provided in this report. No warranty or guarantee, express or implied, is made concerning the test results, comments, recommendations, or any other portion of this report.

7.0 EMERGENCY PROCEDURES

The client undertakes to inform EBA of all hazardous conditions, or possible hazardous conditions which are known to it. The client recognizes that the activities of EBA may uncover previously unknown hazardous materials or conditions and that such discovery may result in the necessity to undertake emergency procedures to protect EBA employees, other persons and the environment. These procedures may involve additional costs outside of any budgets previously agreed upon. The client agrees to pay EBA for any expenses incurred as a result of such discoveries and to compensate EBA through payment of additional fees and expenses for time spent by EBA to deal with the consequences of such discoveries.

8.0 NOTIFICATION OF AUTHORITIES

The client acknowledges that in certain instances the discovery of hazardous substances or conditions and materials may require that regulatory agencies and other persons be informed and the client agrees that notification to such bodies or persons as required may be done by EBA in its reasonably exercised discretion.

9.0 OWNERSHIP OF INSTRUMENTS OF SERVICE

The client acknowledges that all reports, plans, and data generated by EBA during the performance of the work and other documents prepared by EBA are considered its professional work product and shall remain the copyright property of EBA.

10.0 ALTERNATE REPORT FORMAT

Where EBA submits both electronic file and hard copy versions of reports, drawings and other project-related documents and deliverables (collectively termed EBA's instruments of professional service), the Client agrees that only the signed and sealed hard copy versions shall be considered final and legally binding. The hard copy versions submitted by EBA shall be the original documents for record and working purposes, and, in the event of a dispute or discrepancies, the hard copy versions shall govern over the electronic versions. Furthermore, the Client agrees and waives all future right of dispute that the original hard copy signed version archived by EBA shall be deemed to be the overall original for the Project.

The Client agrees that both electronic file and hard copy versions of EBA's instruments of professional service shall not, under any circumstances, no matter who owns or uses them, be altered by any party except EBA. The Client warrants that EBA's instruments of professional service will be used only and exactly as submitted by EBA.

The Client recognizes and agrees that electronic files submitted by EBA have been prepared and submitted using specific software and hardware systems. EBA makes no representation about the compatibility of these files with the Client's current or future software and hardware systems.