

# **Crystal Mountain Ski Resort Expansion**

## **Master Plan**

A STUDY OF THE EXPANSION POTENTIAL OF THE CRYSTAL MOUNTAIN SKI AREA  
WEST OF KELOWNA, B.C., IN RESPONSE TO THE GUIDELINES OF THE  
COMMERCIAL ALPINE SKIING POLICY OF BRITISH COLUMBIA

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This December 2006 Master Plan is an update of a compendium of studies initiated in 1999 with a Formal Proposal and advanced in 2001, 2002 and 2003 with a Master Plan that was included in a Master Development Agreement between Crystal Mountain and the Province of British Columbia in 2003.

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- *Final Environmental Assessment* (June 2001) ENKON Environmental Ltd.
- *Wildlife Inventory – Addendum: Expanded Study Area* (September 2001) ENKON Environmental Ltd.
- *Environmental Assessment Addendum Report* (June 2006) ENKON Environmental Ltd

**APPENDIX B****Traffic Study:**

- *Traffic Impact Study*, McElhanney Consulting Services Ltd.

**APPENDIX C****Archaeology:**

- *Archaeological Overview Assessment*, Kutenai West Heritage Consulting Ltd.

**APPENDIX D****Civil Engineering Drawings**

McElhanney Consulting Services Ltd.

**APPENDIX E****Water Studies and Reports:**

- *Groundwater Availability Assessment* (Aug. 2002) Golder Associates Ltd.
- *Test Well Drilling and Groundwater Potential Evaluation*, (April 2006) Golder Associates Ltd.
- *Preliminary Water Demand Supply Assessment Report* (April, 2006) McElhanney Consulting Services Ltd.

**APPENDIX F**

Letter from Chief Brian Eli, Westbank First Nation

**APPENDIX G**

Parking Chart, Schedule C – Comprehensive Phasing Chart and Building statistics

**APPENDIX H****Design Guidelines**

**APPENDIX I**

**Fire Studies and Reports:**

- *Wildfire Interface Management Report*, Field Forestry Services, Inc. and
- *Establishment of a Volunteer Fire Department at Crystal Mountain Resort*, Field Forestry Services, Inc.

**APPENDIX J**

11 x 17 Pocket Plans

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**LIST OF POCKET PLANS**

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**Plan #            Name**

E ..... Existing Ski Runs + Ski Lifts

A ..... Schedule A: Base Area and Controlled Recreational Area

PH..... Schedule C: Phasing Plan

P ..... Mountain Area Plan

B ..... Base Area Plan

C ..... Resort Core

D ..... Proposed Development Areas

CL ..... Crown Land – Purchased and Leased

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**APPENDIX OF ABBREVIATIONS**

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- |            |  |
|------------|--|
| 1. LWBC    | Land and Water B.C. Inc                        |
| 2. BOD     | Biodegradable Oxygen Demand                    |
| 3. CASP    | Commercial Alpine Skiing Policy                |
| 4. CCC     | Comfortable Carrying Capacity                  |
| 5. CDC     | Conservation Data Centre                       |
| 6. CRA     | Controlled Recreation Area                     |
| 7. CTC     | Canadian Tourism Commission                    |
| 8. CWSAA   | Canadian West Ski Area Association             |
| 9. DEM     | Digital Evaluation Model                       |
| 10. DM     | District Municipality                          |
| 11. DRAA   | Design Review and Approval Authority           |
| 12. EA Act | Environmental Assessment Act                   |
| 13. FRBC   | Forest Renewal BC                              |
| 14. IDF    | Interior Douglas Fir                           |
| 15. LRMP   | Land and Resource Management Plan              |
| 16. MELP   | Ministry of Environment Lands and Parks        |
| 17. MoT    | Ministry of Transportation                     |
| 18. MS     | Montana Spruce                                 |
| 19. ND4    | Natural Disturbance (Type 4) (Fire)            |
| 20. OP     | Official Plan                                  |
| 21. OSLRMP | Okanagan Shuswap Land Resource Management Plan |
| 22. Pt     | Parts  |

23. RDCO	Regional District of Central Okanagan
24. SAOT	Skiers at one time
25. TSS	Total Suspended Solids
26. UV	Ultra Violet
27. VMZ	Visual Management Zone
28. VQO	Visual Quality Objectives



## EXECUTIVE SUMMARY

### Overview:

Studies have indicated that there is potential for the expansion of the Crystal Mountain Resort Ski Area near Westbank, B.C., due to its easy access from the Coquihalla Connector Highway and Kelowna, as well as its good snow and unique climatic conditions. With only three lifts, the current ski area is small, but it has substantial expansion capability. The adjacent mountains can provide for a greater skiable vertical drop, from the summit of Mount Last to the area below Mount Clements and Mount Miller (providing about 700 metres/2,300 feet of vertical drop). The views from the top of the proposed main lift gondola to the summit of Mount Last capture a panorama of mountains and Okanagan Lake and provide a good location for re-establishing the teahouse that once existed at the top of Mount Last.

Ski resort development on Crown land in B.C. is subject to the Commercial Alpine Skiing Policy (CASP) administered by the Ministry of Tourism, Sports and the Arts (formerly Land and Water B.C. Inc.). The *Environmental Assessment Act* review process may also come into play. The proposed resort area is below the requirements established by the Environmental Assessment Office regarding an expansion of an existing ski resort. Environmental issues have been reviewed by B.C. Environment as part of an Advisory Review Committee rather than through the *Environmental Assessment Act* review process.

The review must take into account all factors that may affect the project, and particularly the local government's land use legislation or policies in the area. In this case, the Regional District of Central Okanagan does not have an Official Community Plan or zoning that applies to this area, which is currently Crown land. The Master Plan process has therefore been done in consultation with a variety of stakeholders that include the Regional District, and a concurrent process is expected for Regional District zoning and Official Community Plan for the area. The Interim Agreement process was the start of the Commercial Alpine Skiing Policy process.

The Interim Agreement, signed in March 2001, was to adopt the Formal Proposal presented in August 2000, and to authorize the preparation and submission of a Master Plan proposal. Changes are possible during the Master Plan and Master Development Agreement process to address desired improvements by agencies and the Owner. Minor changes to further address identified issues may also be permitted by the Province at any time, subject to provincial review and approval. The Master Plan was approved by the Province in May 2002, and a Master Development Agreement was concluded in August 2003. In 2006 the Province offered to update the Master Development Agreement with a new agreement based on the new template provided by the Province for all Mountain Resorts in British Columbia.

### The Process:

While the Commercial Alpine Skiing Policy sets out the minimum procedural steps, the Formal Proposal casts a broad net at an early stage to identify all the issues, and to determine public acceptance of the project. The expansion concept has been discussed with individuals, stakeholders, interest groups, ski hill managers and government agencies and the benefit of those meetings has been incorporated into the Master Plan proposal. Following the approval of the Master Plan, a Master Development Agreement is created to allow the implementation of the Master Plan. An Official Community Plan Amendment and rezoning are then required by the Regional District in

order to administer the implementation of the Master Plan with local government resources.

**Scope of the Master Plan Document:**

The main volume of the Master Plan Document is divided into four parts: 1. Background; 2. Socio Economic Analysis, 3. Preliminary Environmental Audit and 4. the Master Plan proposal. Exhibits follow at the end of each part. A separate Confidential Supplement of financial strategies and projections was provided to those Government specialists who must evaluate the proposal's financial strength. Part 3, the Preliminary Environmental Audit is also supplemented by the addition of a detailed Environmental Audit as an Appendix. A brief summary of the four parts is set out below.

**Part I: Background**

This part reviews the site history, location, climate and other influencing factors, and continues to look at the existing operations, the project goals and objectives, a vision for the project, and the project team coordinated by Pheidias Development Management Corporation. It concludes with an analysis of the tourism market in the Kelowna area, which is one of the most significant influences. The site has all the essential components for a resort expansion.

**Part II: Socio Economic Analysis**

This includes statistics on population and economic potential and their overview. Kelowna has a broad economic base, growing population and an established full range of services, all suggesting that demand for vacation homes and residential real estate will resume within the next 2 to 3 years, along with greater demand for family recreation activities. Kelowna also has excellent air access and many existing recreational attractions, which will work together to facilitate a growing tourism market. Existing services should be able to expand comfortably to accommodate the resort at Crystal and to appeal both to the local population and to visitors. As for marketing residential units in the expanded resort the number of units to be marketed each year will represent only a small percentage of the number being built and Crystal will have the benefit of a unique location, quality and recreation facilities suggesting better than average market potential for the target market of people seeking comfortable family vacations in good climatic conditions.

**Part III: Environmental Audit**

The Environmental analysis was conducted by environmental specialists. The central Okanagan area is characterized by rolling mountains of spruce and Douglas fir and pine. Drainages near Crystal Mountain include Jack Creek, Law Creek, Powers Creek, and Trapanier Creek. Fish are not present in the upper stretches of these creeks near the resort but trout and salmon occur further downstream near Okanagan Lake. Much of the surrounding area is watershed. It also provides cut areas for timber operations, which may present visual management challenges if the issue were not resolved by a cooperative approach. The area has a full range of wildlife for such habitat. There will be some impact as a result of the cutting of trees for the new ski slopes, although it is anticipated that all wildlife impacts can be successfully managed. The net impact is not anticipated to be significant according to the detailed analysis made.

**Part IV: Proposal**

Detailed ski slope planning have continued through the Master Plan stage and ski lift alignments will be refined by on site surveys prior to construction. Photos and surveys to date show support for the rationale behind the scheme generally shown in this proposal. The construction of a new main lift/gondola will follow the new fixed grip chair installed in year 2000. These two lifts will be supplemented by 10 other new lifts to open up a broad range of terrain for all abilities and ski-in and ski-out opportunities for the base area residential development.

The ultimate vertical drop will be about 700 metres with all the lifts having a total Comfortable Carrying Capacity of up to 9,360. The resort will be built in phases both on the mountain and in the base area. As mountain facilities are built, the base area will expand to include the accommodations that are outlined in the following table. A golf course will become a key component of the summer activities that will transform the resort into a year round vacation area, one of the fundamental objectives of the proposed expansion.

**Table ES-1: Base Area Accommodation and Other Facilities**

ACCOMMODATION TYPE	NO. OF UNITS	NO. OF BED UNITS
Hotels	3 @ 100 rooms at 2 bed units per guest room	600
Bed and Breakfast	5 units at average 10 bed units each	50
Condominiums	135 units at average 3 bed units each	405
Townhouses	139 units at average 4 bed units each	556
Single Family Chalets	365 chalets at average 6 bed units each	2190
Employee Housing	10 units at average 3 bed units each	30
First Nations Joint Venture – Condominiums	25 units at average 3 bed units each	75
First Nations Joint Venture – Chalets	22 units at average 4 bed units each	88
	<b>Total Bed Unit Count:</b>	<b>3994</b>
<b>NOTES ON OTHER FACILITIES:</b>		
Commercial Outlets:	<ul style="list-style-type: none"> <li>About 20,000 sq.ft. up to 80,000 sq.ft. at full buildout, according to market demand</li> </ul>	
Daylodge (including cafeteria, washrooms, lockers, ticket booth, brown bag lunchroom, daycare, administrative offices, ski patrol, ski rental facilities, etc.)	<ul style="list-style-type: none"> <li>Up to 25,000 sq.ft.</li> </ul>	
Teahouse:	<ul style="list-style-type: none"> <li>Up to 1,200 sq.ft.</li> </ul>	
Visitor/Interpretive Centre	<ul style="list-style-type: none"> <li>About 2,000 sq. ft.</li> </ul>	

Conference Centre and Exhibition Area:	<ul style="list-style-type: none"><li>• About 30,000 sq.ft. or according to market demand</li></ul>
Golf Course	<ul style="list-style-type: none"><li>• 18 holes</li></ul>
Non-Ski Recreation Facilities:	<ul style="list-style-type: none"><li>• Other summer and winter activities yet to be decided (eg. tennis courts, toboggan runs, playing field, etc.)</li></ul>

Services will include water from new wells, augmenting the existing well, a new sewage system with a tertiary treatment plant, electricity, geothermal energy supply, propane gas and a volunteer fire fighters' station. The resort development will be built in stages to respond to market requirements and to respond to project design guidelines to ensure continual quality and consistency of image.

In completing a Master Plan, the proposal has been fine tuned as part of a process of consultation with the provincial government and through its various ministries and agencies, local government, First Nations, and a variety of stakeholders within the area. Public consultation is part of the process which was completed according a timetable set by the Province (See Table IV-10). An Official Community Plan amendment and rezoning of the First Phase have been applied for at the Regional District of Central Okanagan in order to implement the approved Master Plan.

## **PART I : BACKGROUND**

### **1. INTRODUCTION**

The existing ski resort area at Crystal Mountain has expansion opportunities that can provide both enhanced ski facilities as well as year round recreational facilities. In this context a resort base area of hotels and residential accommodations and services can be created to serve both the immediate resort facilities as well as the surrounding attractions of the Okanagan Valley. This Master Plan Proposal examines the background factors, considerations, goals, objectives, and impact mitigation strategies for expansion of the existing resort. It also presents a concept for the development of both the mountain area and base area at Crystal Mountain into a full service, all-seasons resort.

### **2. SITE HISTORY**

Crystal Mountain is a ski area that is located at the base of Mount Last and was originally developed by a local family as a small ski hill for the people of Westbank.

The ski resort was originally opened on December 9, 1967 by Pat and Allan McLeod under the name of Last Mountain Ski Resort. Mount Last rises to the highest elevation above the resort area and was named in 1967 after Herbert and Charlotte Last, an English couple who had owned the land now occupied by the resort since 1909 and ran the general store and post office in Westbank. In the first year of operation, the resort sold 150 family ski passes. In the early days, there was a teahouse at the top of the main lift. It was open during the summer for the first three years. A ski school club was created for youngsters. The resort later was passed to John Barley and in 1992 it was sold to the Tschanz family from Lenzerheide, Switzerland, and the company name was changed to Crystal Mountain Resorts Ltd. The name was changed to Crystal Mountain to remind people of the snow, something bright and fun. The current operation offers 70 seasonal jobs. Since the beginning, the resort has offered both day skiing and night skiing to allow for evening fun and training to families interested in beginner and intermediate skiing. At the 30<sup>th</sup> anniversary of the resort, in 1997, there was considerable excitement and discussions started regarding the development of the resort with a year-round expansion, based on its location as the closest hill to Kelowna and as the closest Okanagan ski resort to Vancouver.



Herbert and Charlotte Last

Crystal Mountain is planning to keep its current name for the time being. The resort company that will create the expansion has been called Crystal Ski & Golf Resort Inc. and it has retained the name of Crystal Mountain Resort Ltd. for its subsidiary in charge of the ski area. While it is recognized that there are ski areas of the same name in Washington State and Michigan State, it is considered acceptable to identify this ski area as Crystal Mountain, B.C. As an example of a similar situation, Vancouver, B.C. could be confused with a city of the same name in Washington State, but this has not appeared to be a problem. Crystal Mountain, B.C., is well known regionally by its current name

and it intends to build and expand on its existing goodwill.

### 3. LOCATION, CLIMATE AND ACCESS

The original request of the Owner was to investigate possibilities and further explore the potential of resort development in the region. What attracted attention were the climate, the proximity to market areas and to airport access, and the goodwill of the people and of the local leaders.

#### 3(a) Resort Location

Crystal Mountain is located in the Okanagan region of British Columbia with the nearest large city being Kelowna (see Exhibit I-1). The ski resort itself is located north of Glenrosa, on the mountains above Westbank, west of Kelowna. It has good potential for development of a resort on the gentle slopes of the Okanagan Valley, at an elevation that avoids most of the winter fog, and it has ample room to expand the skiable terrain.

The ski resort area at Crystal Mountain is one of the primary attractions to Westbank during the winter months. The ski area base is located at the upper terminus of the Glenrosa Road, which runs from Highway 97 up the mountain to the ski resort area. The Glenrosa interchange was recently rebuilt and provides easy access from the nearby Coquihalla Connector, or Highway 97c, connecting Vancouver and the Lower Mainland to Westbank and Kelowna (see Exhibit I-2).

Crystal Mountain is approximately 9 kilometres west of the Westbank community, which provide an existing infrastructure and an existing capable workforce. Local literature describes Westbank as follows: The community of Westbank is located on the west side of Okanagan lake opposite the city of Kelowna. Like most of the Central Okanagan, Westbank is a popular tourist destination as well as a popular location for those seeking a relaxed lifestyle.

Westbank is growing rapidly as a residential community but it is also evolving into a prosperous business centre. As with any area that feels rapid population growth, opportunities for commercial and industrial development abound. Westbank is known as an area of quality, yet affordable housing. It is poised for the experience of growth rates that will likely exceed the national average.

The site is located in a region where primary industries are forestry and tourism. The population of the region has made Kelowna and surrounding area the primary service centre





in the interior of B.C. Industry and tourism have generated a vibrant regional community that has some of the best prospects for future growth in western Canada.

Topography and a technical site review are explained in the ski area concept presentation and in the environmental section.

### 3(b) Climate

Among the site analysis criteria, the climate is of extreme importance. It is sufficient to note here that the area has conditions very favourable to supporting powder snow skiing and a variety of other outdoor activities, both summer and winter. At an elevation of over 1000 metres, the base of the mountain is well positioned to remain above the winter fog that often hangs over the lake below. This makes the mountain location more desirable in winter, allowing for sunshine when Kelowna is below the cloud cover.

The excellent climate of the region is well known. Westbank is in a semi-arid desert climate with over 2,000 hours of sunlight per year. The average July temperature is 24 degrees Celsius and the average January temperature is -1.6 degrees Celsius.

As a comparison, while bad weather data of resorts such as Whistler are not advertised, by experience one would estimate the number of days of heavy precipitation, rain, or poor visibility at approximately half of the season for the Whistler region.

### 3(c) Access

Road access to the site is gained from newly upgraded Glenrosa Interchange near the Coquihalla Connector just west of the core of Westbank. The Westbank and Kelowna regions support a large number of residential and recreational facilities, and therefore have a substantial transportation network in place. The road from the Glenrosa Interchange to the resort is approximately 12.5 Km long, mostly through residential subdivisions, and then through a beautiful forest. Okanagan Lake is visible from the viewpoints. The road was recently upgraded and re-paved.



The main traffic corridor to the region is Highway 97c, the Coquihalla Connector, which connects Kelowna to Vancouver with a major freeway. Highway 97, from Osoyoos and the U.S. border through Penticton and up to Kelowna, Vernon and Kamloops provides the connection from the South to the North. Highway 97 represents the spine of the local regional traffic. Highway 97A provides a shortcut from Highway 97 to Sicamous and Revelstoke, connecting to the Trans Canada Highway and to Calgary and Alberta. Despite the greater distance, the Okanagan region is almost as popular with Alberta tourists as it is with the Greater Vancouver population.

Bus service to Westbank is excellent and the town is currently served (in addition to local buses to and from Kelowna by 6 Greyhound buses a day from Vancouver to Westbank

alone.

**Table I-1: Distances to Crystal Mountain from Major Western Cities**

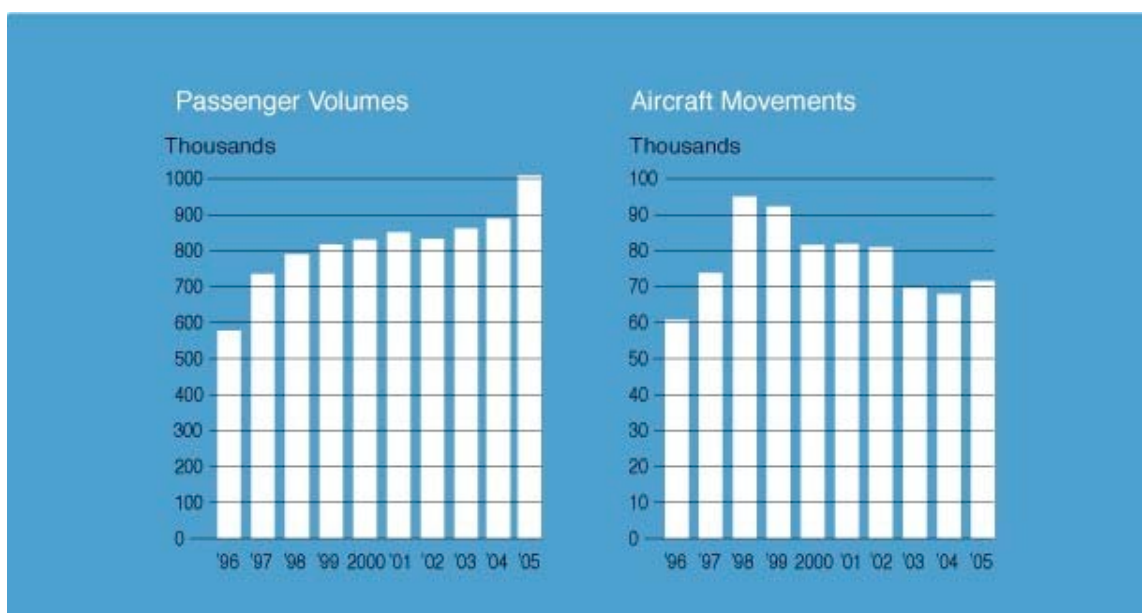
Distance to Crystal from	Kilometres	Miles
Vancouver (downtown), BC	361	226
GVRD Boundary, BC	325	203
Chilliwack, BC	253	158
Kelowna, BC	19	12
Penticton, BC	49	31
Vernon, BC	63	39
Kamloops, BC	156	98
Golden, BC	449	281
Victoria, BC	442	276
Calgary, AB	617	386
Lake Louise, AB	433	271
Banff, AB	489	306
Mt. Baker, WA	420	263
Seattle, WA	480	294
Spokane, WA	379	237

Crystal Mountain is near Kelowna International Airport, at a distance of approximately 35 km (23 miles), but it can also be accessed with a comfortable drive from the Vancouver International Airport. The resort is efficiently serviced by the existing regional and international airways system. Transoceanic flights presently land in Vancouver, Seattle and Calgary. These cities are conveniently connected by several airlines and many flights per day to Kelowna. In addition, Kelowna is expanding a network of continental flights, linking its airport directly to the major North American cities. Air Canada, Westjet, Alaska Airlines, Horizon Air offer multiple flights per day branching from Kelowna to various cities in British Columbia, Alberta, Alaska, and Washington. The airport operates scheduled flights to major hubs in Seattle, Vancouver, Calgary and Toronto as well as large markets including Victoria, Edmonton and Las Vegas. Passenger traffic at Kelowna International Airport has grown from 317,995 passengers in 1994 to 808,550 in 1999 to 1,078,800 in 2005, making it the 10<sup>th</sup> busiest airport in Canada by passengers handled.



**Table I-2: Approximate Travel Distances from Crystal Mountain to Local Airports**

Distance from Crystal Mountain to	Kilometres	Miles
Kelowna Airport	35	22
Penticton Airport	60	35
Vancouver International Airport	386	241

**Table I-3: Passenger Volumes and Aircraft Movements Kelowna International Airport<sup>1</sup>**<sup>1</sup> Source: <http://www.city.kelowna.bc.ca>

**Table I-4: Phases of Kelowna International Airport Terminal Expansion**

<b>PHASE 1 - \$1.513 MILLION</b>
<ul style="list-style-type: none"> <li>• Realignment of terminal frontage road and construction of a new railway crossing</li> <li>• New Parking Control equipment</li> <li>• Completed November 1998</li> </ul>
<b>PHASE 2 - \$11.529 MILLION</b>
<ul style="list-style-type: none"> <li>• Expansion of air terminal building from 31,000 sq. feet to 75,000 sq. feet</li> <li>• Upgrading of International arrivals area</li> <li>• Addition of Canada customs offices</li> <li>• Ten additional airline check-in counters</li> <li>• Expansion of food, beverage and retail concessions space</li> <li>• Addition of second level public airside viewing lounge</li> <li>• Seismic upgrade of existing structure</li> <li>• Started in November 1998, completed December 1999</li> </ul>
<b>PHASE 3 - \$600,000</b>
<ul style="list-style-type: none"> <li>• Expansion of main terminal building apron to the south to accommodate an additional commercial aircraft parking gates</li> <li>• Started and completed in the year 2000</li> </ul>
<b>PHASE 4 - \$1.1 MILLION</b>
<ul style="list-style-type: none"> <li>• Add 2 low-level loading bridges and walkway system to the south end of the air terminal building</li> <li>• Started and completed in the year 2000</li> </ul>
<b>PHASE 5 – \$4 MILLION</b>
<ul style="list-style-type: none"> <li>• Expansion of air terminal building apron to the south to accommodate one large commercial aircraft parking gate and 3 commuter aircraft gates</li> <li>• Addition of high level loading bridge and associated walkways to International Arrival area</li> <li>• Started and completed in 2004</li> </ul>

#### **4. CURRENT OWNERSHIP**

The current owners have been studying how to improve the ski area for several years. The ownership is held by Crystal Ski & Golf Resort Inc., whose main stakeholders are Mr. David Tschanz, of Lenzerheide, Switzerland, and his son Winston. Lenzerheide is a beautiful year-round Swiss resort, which ranks among the best in Switzerland and in Europe. Mr. Tschanz has been a developer in his home town and is also one of its past Mayors. Winston Tschanz lived in British Columbia for several years, earning a civil engineering degree at the University of British Columbia and working at Crystal Mountain during the first years of the new ownership. He married a Canadian and returned to Switzerland. He then became an executive of the Bosch company of Germany, and was recently posted in Hong Kong to manage the affairs of Bosch in the Far East. He is a Director of Crystal Ski & Golf Resort Inc. His father, David Tschanz, is Chairman of the Board. Crystal Ski & Golf Resort Inc. owns Crystal Mountain Resort Ltd., the ski area operator.

Improvements and an expansion are now needed for the long term viability of the ski hill and for its financial well being. This would be in keeping with the expansion of Westbank's population and with local expectations. The recognition of a need for expansion lead to discussions with and the engagement of Pheidias Development Management and the Oberti Resort Design group of Vancouver to prepare the expansion plans and to direct the project team.

#### **5. CURRENT OPERATIONS AT CRYSTAL MOUNTAIN**

The Crystal Mountain operating season runs from about mid-December to the end of March. During this period, regular operating days are Thursday through Sunday, Christmas week and local Spring Break week. = This accounts for a total of approximately 70 operating days per season. Since the mid 1980s, annual skier visits have remained somewhat static, ranging from 20,000 to 25,000 skier visits per season. A new triple chair was installed in the summer 2000 and skier visits have started to improve. A bed base and summer golfing season are the next steps.

The existing ski terrain at Crystal Mountain includes approximately 20 ski runs accounting for a total of approximately 65 hectares (160 acres) of developed terrain. Of these, 5 ski runs are illuminated for night skiing. The existing ski runs are well conceived in terms of following the natural fall line and optimizing use of the mountain. The longest ski run is 1.6 kilometres (1 mile) long. In addition to the ski runs, some of the terrain between the cleared runs offers excellent tree skiing. The ski runs are classified as Easy (4 runs) Intermediate (7 runs) and Difficult (7 runs) with an ideal mix of terrain.

The Controlled Recreation Area (CRA) being used and the skiable terrain, however, have remained within the pre-existing boundaries and will not expand until after the construction of the golf course and the first new lift into the area to the west of the existing CRA, despite the approval of the expanded tenure under the Master Development Agreement.



The ski runs at Crystal are currently served by a triple chair lift imported from Switzerland, one Mueller Double Chairlift and a T-Bar, a Doppelmayr. The Double Chairlift and T-Bar can also operate at night. Though predominantly of older vintage, the lifts are in good operating condition. The Triple

Chair and the Double Chair access intermediate terrain, and the T-Bar lifts access primarily novice and beginner terrain. Some expert terrain is also accessed by the lifts, but it consists of mainly short drops leading to small gulleys. The existing location of the ski lifts provides for functional skier access to all of the developed skiing at Crystal. The beginner area is physically separated from the rest of the ski area, providing a protected learning environment. The area is already well known as being ideally suited as a place to learn to ski and snowboard.

Located at the base of the ski area is a two-storey daylodge with a ticket and sales office and cafeteria, a pub/lounge, a ski patrol facility, a ski school, a ski rental shop, a maintenance area, and a parking lot. The buildings are generally clean and functional but are old and out of character with contemporary expectations and would benefit from reconstruction. A new daylodge and golf club house is expected to be the first building of the expansion project.

In addition to providing for alpine skiing, the base area acts as a support point for the nearby Cross Country ski trails, which are well developed on the southern side and the lower elevations of the mountain. Crystal may be able to help in the development of Cross Country ski trails at higher elevations. Snow shoe enthusiasts also use the base area for their activities

Currently, Crystal has no summer mountain facility attractions, but it has held summer sporting events, which were well received, in the area.

**Table I-5: Existing Ski Area Summary**

Total Skiable Area (Hectares)	65
Number of Ski Trails	20
Total Length of Ski Trails (km)	15
Longest Run (km)	2
Highest Elevation (metres)	1,375
Lowest Elevation (metres)	1,175
Vertical Drop (metres)	200
Night Skiing Vertical (metres)	175
Fixed Grip Triple Chair capacity (skiers/hour)	1600
Length (metres)	1200
Ride time	7.5 minutes
Double Chair capacity (skiers/hour)	900
Length (metres)	815
Ride time	6 minutes
Green T-Bar capacity (skiers/hour)	1000
Length (metres)	350
Ride time	2 minutes
Total Number of Ski Lifts	3
Number of Chairs	2
Number of Surface Lifts	1
Total Uphill Capacity (skiers/hour)	3,500
Average Temperature	-4 c (25 F)
Annual snowfall	310 cm (122 in)
Average Base	170 cm (67 in)
Snowmaking	none required
Groomed acreage	80 acres
Other acreage	160 acres
Terrain mix	30%/50%/ 20%

**Table I-6: Winter Average Daytime High Temperatures at Crystal Mountain**

	January	February	March	December
1995	---	---	---	-6°C
1996	-12°C	-10°C	-3°C	-10°
1997	-4°	-3°	+1°	-5°
1998	-6°	+1°	+3°	-7°
1999	-2°	-2°	+2°	n/a

Source – Based on Crystal Mountain Resorts Ltd. on site average of recorded daily temperatures at lodge.

**Table I-7: Winter Average Base Depth of Snow at Bottom of Lift**

	January	February	March	December
1995	---	---	---	---
1996	---	---	---	63 cm.
1997	104 cm.	128 cm.	145 cm.	27 cm.
1998	126 cm.	150 cm.	143 cm.	44 cm.
1999	151 cm.	196 cm.	226 cm.	---

Source – Based on Crystal Mountain Resorts Ltd. on site average of recorded daily snow depth at lodge.

## 6. PROJECT GOALS AND OBJECTIVES

One of the Owner's goals is to add one major lift to the summit as a means of opening up as much skiable terrain as possible, and to facilitate access to the north and east faces of the mountain with additional lifts that will permit skiing in the best snow. It is also expected that a teahouse at the mountaintop may allow the main lift to remain open year round as a viewpoint and as a place to go and have tea, coffee, or a meal with a view.

Such an expansion of the ski area would justify opening the ski area seven days a week and building a hotel and vacation homes at the base that will accommodate weekday guests. The area is considered ideal for family skiing and snowboarding, for peaceful and affordable holidays, and the terrain is ideal for the establishment of a top-flight ski and snowboarding school. Good nordic skiing is also expected to complement the sporting opportunities in winter in cooperation with the local Telemark Cross-Country Ski Club.

The plan will allow for a number of hotel and bed and breakfast rooms, and a number of condominiums, townhouses and single family chalets to achieve up to approximately 3,994 beds at final build out. A golf course, spa, and tennis facilities are planned to allow the hotel rooms and the supporting facilities to stay open in the summer. This will facilitate the development of commercial activities, such as restaurants and shops, that will be able to operate year-round.

Another goal is the establishment of a travel centre with an activities' booking facility to be developed in conjunction with local interests on the main access to Westbank in the proximity of the Glenrosa interchange at the Coquihalla Connector. This centre would also advertise Westbank and Crystal Mountain as a tourist destination and is proposed to be part of the project if sufficient local interest can be found to support it.

The Owner's detailed goals and objectives are set out below as a Ski Area Master Plan for the Crystal Mountain Ski Area, according to the provisions of the Commercial Alpine Skiing Policy (CASP) of the Province of B.C. Thereafter the intent is to enter into a Master Development Agreement with the Province. It is the Owner's hope that the Province and the Regional District of the Central Okanagan will be cooperating to utilize a parallel process of consultation, review and approval and that the conclusion of the Master Plan under CASP and modification of the Regional District's Official Community Plan (OCP) for the area will be undertaken concurrently, allowing for appropriate zoning to be in place soon after the Provincial approval is granted.

## **7. THE PROPONENT**

The Proponent is the current Owner, Crystal Ski & Golf Resort Inc., which is proposing to expand and develop the Crystal Mountain Ski Area.

Pheidias Development Management Corporation (Pheidias) of Vancouver, B.C. is managing the approvals process on behalf of the Proponent, and is the prime consultant jointly with Oberti Resort Design. The mountain resort is operated by Crystal Mountain Resorts Ltd., the ski area operator of the Proponent, which is owned by the Proponent. The current President and Director of Crystal Mountain Resort Ltd., Mr. David Tschanz, is also Chairman of the Board of Directors of the Proponent, Crystal Ski & Golf Resort Inc., which will provide the investment that will be necessary for the development through a Limited Partnership and other joint venture and investment opportunities. Development control will continue to be maintained by the current ownership. The Limited Partnership structure will be open to Canadian and international investment by sophisticated investors. Pheidias, in cooperation with other B.C. consultants and with the mountain managers, provides local expertise as Prime Consultant and development manager.

## **8. THE PROJECT TEAM**

The Group of Consultants led by Pheidias has been working on the project since the fall of 1998. Other key members of the consulting team that have contributed to this project include Glenn Stewart of ENKON Environmental Ltd., which has conducted the environmental audit, Brian Wills of Lynnparks Consulting Ltd., which has prepared the base of the socio-economic analysis for the project, and Rob Parkinson of McElhanney Engineering Consultants Ltd. which is providing civil engineering and surveying consulting services. Ian Renton of BMR Golf International Ltd. and Gene Bates of Bates Design Inc. together with Fred Couples will be providing consulting services for the golf course design. Base area design and physical master planning is provided by Oberti Resort Design, a division of Oberti Oberti Architecture and Urban Design Inc. Poma of Canada through its Vernon office has provided preliminary proposals and engineering expertise for the placement and design of the lift infrastructure, together with the operator. Golder Associates is providing geotechnical and hydrological expertise through its Kelowna office. The design team has also been assisted by the expertise provided by the manager of Crystal Mountain, Mike Morin, the past Director of Crystal Mountain Ski School, John Armstrong, and by a noted forestry consultant from Westbank, Bob Christie, of Bob Christie Forest Consulting Ltd.

The consulting team has considerable exposure to projects and issues in the ski industry in British Columbia, North America and Europe. It previously generated Kicking Horse Mountain Resort near Golden, B.C., which was recognized as being the first new ski resort in B.C. in twenty-five years. The project team has been involved with ski area and resort projects since the founding of Whistler Village and surrounding areas; recently it has been involved with proposals and designs for the Callaghan Valley, Whistler Village North, Creekside redevelopment at Whistler, Jumbo Glacier Resort, Kicking Horse Mountain Resort (formerly Whitetooth and Golden Peaks Resort) and Kimberley. Former Premier Dosanjh called Kicking Horse Mountain Resort the most successful new ski resort proposal in British Columbia in the last twenty-five years.

## **9. TOURISM AND RECREATION POTENTIAL FOR CRYSTAL MOUNTAIN**

### **9(a) Tourism and Tourism Potential in B.C.**

Tourism is an important and growing industry in B.C. Currently the largest volume of tourism traffic and most of the facilities are concentrated in Whistler, Vancouver and Victoria, but the Okanagan region is also well established and destined to grow steadily as facilities are made available to the travelling public because of its superior climate.

The sunny and dry temperate climate is what has made the Okanagan grow and what has exposed it to a population growth that has been among the fastest in Canada. Currently the region is served by an international airport that is expanding and that is served by several airlines and frequent flights, bringing its good climate within easy travel distance of cities such as Seattle so that they too can escape the coastal rain for the drier Okanagan interior.

The greatest growth of tourism in the past has been along the coast, where the major population centres were born because of the ports. Climatic considerations will soon bring greater exposure to areas such as the Okanagan. This is one of the reasons why the Kelowna metropolitan area is already the largest population centre in B.C. after Vancouver and Victoria and is expected to attract more people in the settlement areas and more tourists for its amenities in the future.



**Table I-8: Tourism Volume and Value, 1996**

	VISITORS			REVENUE		
REGION	NON-RESIDENT	B.C. RESIDENT	ALL VISITORS COMBINED	NON-RESIDENT	B.C. RESIDENT TOTAL	ALL REVENUE COMBINED
Vancouver Island	4,485,000	5,413,000	9,898,000	1,791,000	770,000	2,561,000
Victoria	3,355,000	2,166,000	5,521,000	1,236,000	285,000	1,521,000
Vancouver Coast & Mountains	8,845,000	6,406,000	15,251,000	2,512,000	898,000	3,410,000
Vancouver (GVRD)	6,124,000	3,383,000	9,507,000	2,085,000	593,000	2,678,000
Whistler	1,106,000	921,000	2,027,000	352,000	171,000	523,000
Thompson Okanagan - South	2,261,000	2,565,000	4,826,000	417,000	325,000	742,000
Thompson Okanagan - North	2,968,000	1,992,000	4,960,000	277,000	216,000	493,000
Cariboo	684,000	1,040,000	1,724,000	65,000	133,000	198,000
B.C. Rockies - West	1,563,000	929,000	2,492,000	184,000	121,000	305,000
B.C. Rockies - East	3,049,000	549,000	3,598,000	344,000	57,000	401,000
B.C. Rockies - North						
B.C. Rockies - Northeast	301,000	393,000	694,000	90,000	46,000	136,000
B.C. Rockies - Northwest	593,000	1,600	2,100	139,000	286,000	425,000
TOTAL	11,946,000	18,656,000	30,602,000	5,818,000	2,852,000	8,670,000
OVERNIGHT	10,090,000	10,762,000	20,852,000	5,718,000	2,198,000	7,916,000

Source: Economic Development Commission, RDCO

The RDCO has a total population estimated at 137,000 people, and the Okanagan region extending from Penticton to Vernon has a population basin of approximately 250,000, roughly within an hour's driving distance from Crystal Mountain. Population growth has been steady and exceeding 50% in the last ten years. In the Lower Mainland roughly another 600,000 people live in the region between Hope and Surrey, which is in the range of about two to three and one half hours driving distance from Crystal Mountain, its powder and its sun.

B.C. has excellent ski areas, starting with Whistler, rated the number one ski resort in North America, and including well-known destinations such as Sun Peaks, Silver Star, Big White, Apex, Panorama, Kimberley, Fernie, and Kicking Horse Mountain Resort. But there is always room for improvement, for something different and for a new clientele looking at different types of vacations.

**Table I-9: Profile of Average Kelowna or Central Okanagan Visitor**

• AVERAGE PARTY SIZE	2.64 visitors
• AVERAGE AGE	37 years
• AVERAGE LENGTH OF STAY	3.9 days
• AVERAGE DAILY EXPENDITURE (PER PERSON)	\$95.47
<i>PURPOSE OF VISIT:</i>	
• BUSINESS	11 %
• PLEASURE	73 %
• FAMILY / RELATIVES	16 %
<i>ACCOMMODATIONS USED:</i>	
• HOTEL	19 %
• MOTEL	23 %
• BED & BREAKFAST	8 %
• CAMPGROUND / RV	24 %
• FAMILY / RELATIVES	16 %
• OTHER	10 %

*Source: Kelowna Visitor and Convention Bureau*

**Table I-10: General Activities of Visitor**

<b>Activity:</b>			
Tourist Attractions	19%	Shopping	14%
Lake	11%	Tours	10%
Orchard/Wine	14%	Culture	5%
Hiking/Biking	11%	Skiing	3%
Golf	5%	Convention	1%
Sports	6%	Community	1%

Source: Kelowna Visitor and Convention Bureau

## **9(b) Tourism from Canada and the U.S.**

### **9(b)(i) By Automobile**

The main markets by automobile will be Westbank, Kelowna, the Okanagan Valley, Kamloops and the Lower Mainland. If the ski school and the quality that are proposed gain a strong reputation, then it is likely that people will travel from as far as Calgary and parts of Washington State, including Seattle.

### **9(b)(ii) By Air and Automobile**

Assuming that the reputation mentioned above were achieved and successfully marketed, it is possible that people would fly into Kelowna and drive to Crystal Mountain. Similarly, travellers from overseas driving from Vancouver International Airport may find their way to Westbank and to Crystal Mountain, either for Crystal as a destination by itself, or to visit the Okanagan region as a whole, with Crystal as one of several destinations.

## **9(c) Tourism from Asia**

Asian tourism has primarily focused on Whistler and Banff, but a large segment of that market is still open to affordable winter and summer vacations in a region with a favourable climate. Banff is known for its occasional extreme wind and cold in winter, and Whistler is known for its potentially rainy weather. There is market room for a superior ski school on a safe mountain gifted with powder and a gentle climate, particularly as an entry level to the alpine experience and the mountains of Canada. This is particularly true for both Japanese tourists and those from Taiwan and other parts of Asia who wish to have an experience on the snow.

**9(c)(i)      *Tourism from Japan***

Despite its initially modest regional orientation, the future Japanese opportunity for the Crystal Mountain project cannot be overemphasized.

Japanese outbound travel has grown at an exceptional rate over the past 30 years, from 130,000 visits abroad in the mid 1960s to 15.5 million in the mid 1990s. Incentives to travel include a substantial appreciation of the yen against foreign currencies, government programs that actually encourage outbound travel, changes in Japanese lifestyle, and extremely competitive promotional efforts by the travel industry. Despite the slowing of economic growth, industry observers count on the fact that more than 20 million Japanese will travel overseas annually. Support by the Japanese Ministry of Transport for increased bi-directional tourism has been provided through its program "Two-Way Tourism 21," aimed at promoting broad-based international tourism into the 21st century.

Japan is a sophisticated market of growing importance that is undergoing considerable change in travel purchase behaviour. Japanese consumers are becoming wiser and more selective, seeking value over brand. Although tour group travel is still significant, there is an increase in independent travel and a tendency toward staying longer in one place and in "off-peak" seasons and looking for affordable holidays. The composition of Japanese overseas travellers is more varied than ever before, including new segments (e.g., "full-moon couples -- 45 to 54 years") and those from new fast-growing regions, particularly Kansai and Tokai. All these changes require a long-term commitment to the market and bear a significant impact on the Canadian marketing program in Japan in order to adequately respond to these new consumer needs. In addition, the competition for a greater share of this shifting yet lucrative market is becoming increasingly intense. Australia and nearby Asian destinations remain key competitors, fueled significantly by major marketing campaigns and Japanese investment in those regions. The United States also continues to receive a large number of Japanese visitors.

Despite economic difficulties, Japan ranks as Canada's most important overseas market in terms of tourism revenues, generating almost a billion dollars in gross revenues (excluding international airfares). With per trip spending of approximately \$1,120 and per day spending of approximately \$190 (the highest yield per day of any of our major markets), the Japanese travelers are a desirable clientele.

Japanese travel to Canada is a key contributor to the tourism sector, which has a significant impact in the Canadian economy. In 1995, tourism activities provided close to half a million jobs for Canadians and contributed \$41.8 billion to our gross domestic production. Tourism is ranked fourth in terms of export earnings, and the tourism industry has important links to other sectors of the Canadian economy. Japanese businesses are investing in the Canadian tourism sector, particularly in hotel and resort properties throughout Canada, including Toronto, Banff, Vancouver, Whistler and Victoria. Japanese interest in the golf course development for the summer at Crystal Mountain has already been expressed. Major Japanese travel companies have established their own operations and liaison offices in Canada, creating employment and displaying their long-term commitment to promoting Canada as a travel destination. These companies are also a potential client of the winter and summer sporting schools planned for Crystal Mountain.

In recognition of the growing economic importance of tourism, the Canadian Tourism Commission (CTC) is spending a substantial yearly budget to promote tourism from Japan, and the proposed project at Crystal Mountain is expecting to benefit from this program as well as from the Provincial initiatives and the direct contacts of the development and consulting team.

To effectively capitalize upon the increasing potential of the Japanese market, the project will also study and initiate programs to further enhance Japanese interest. A step in this direction will be to understand more about the types of Japanese visitors that come to Canada. To this end the consulting team is cultivating its contacts with the Japanese tour operators, established over ten years ago.

In addition, Air Canada and the other international air carriers are aggressively promoting tourism to Canada during the eight off-peak months (October to May). This promotion is required to fully utilize airport and aircraft seat capacity, and it will find an important outlet in those areas that offer affordable vacations in good climatic conditions, such as the future Crystal Mountain.

#### **9(d) Tourism in the Okanagan, Kelowna and Westbank**

Both winter and summer tourism are already well developed in the Okanagan region, one of the favourite destinations of British Columbians and already recognized internationally, both in North America and overseas. In winter Silver Star, Big White and Apex have already established the reputation for powder and sunny skies of the region as an ideal destination for powder skiing.

In the summer numerous golf courses, the lakes and the wineries have made the Okanagan one of the most popular areas not only for British Columbians, but also for Albertans and for Americans, especially from Washington State.

Westbank and Kelowna also represent the midway point for a large summer movement of tourists from the Canadian Rockies and the National Parks to Vancouver and the Pacific Coast, and vice versa. The area is best known for Lake Okanagan and its water activities as well as for its wineries, particularly in the shoulder season.

#### **9(e) Tourism Economy**

Tourism generates \$835 million in gross revenues in the Okanagan Valley annually. The average visitor stays 3.9 days and spends \$95.47 per day. The success of tourism in the region however is noted by statistical data that indicates that 96% of visitors say they will return to the Kelowna area.

The most popular accommodations were private homes and cottages of friends, followed by hotels and motels.

It is difficult to count precisely the number of tourist bed units of the region, because they are defined differently in various statistics and because private home guests and cottages shared with friends are not counted. For the purpose of this proposal, we first present a table of the number of rooms available in various accommodation facilities in the RDCO.

**Table I-11: Number of Tourist Rooms Available in the RDCO**

	FACILITIES	ROOMS
HOTELS	16	1385
VACATION RENTALS	18	779
MOTELS	36	1140
OTHER	5	330
<b>TOTAL:</b>	<b>75</b>	<b>3634</b>

Source: BC Stats, Tourism Room Revenue Annual 1998

Assuming two beds per room this provides 7268 tourist bed units in hotels and other commercial tourism facilities.

Allowing a proportion of one visitor or tourist bed per ten resident beds, then in a Regional District of approximately 150,000 there would be another 15,000 tourist beds, as a conservative estimate, for a total of more than 22,000 tourist bed units in the region.

Because the summer is the high tourist season, it would be reasonable to presume that there is an existing over capacity of tourist beds in winter, which could benefit to some extent from additional winter activities at Crystal Mountain and would provide additional beds for day skiers on the mountain.

## 9(f) Key Market Segments of Tourism

### 9(f)(i) Touring

Weather, scenic beauty, central location contribute to make this the largest market segment of tourists, people who travel to enjoy the sun and the scenery, with relaxing sightseeing. This market is ideally suited for affordable vacation homes in a nice forest setting in a central mountain location, the healthiest part of the region in which to stay. This market segment is also ready for health centres and spas.

The tourist market seems to be characterized by a majority of sightseers, with only 3% skiing, and 5%, golfing. This would seem to indicate that like elsewhere in B.C. there is a strong potential for growth of the leading sporting activities, such as skiing and golfing, evidenced by the growth pattern of the last twenty years where new skiing or golfing product has been offered. Sporting activities, especially those that are tastefully and carefully designed, seem to be supply driven.

### 9(f)(ii) Outdoor Sports

This market segment is primarily orientated towards skiing and snowboarding in winter and golfing in the summer. Many other activities are also catered to. Hiking, cycling, canoeing, water sports, fishing and trail riding are also popular in the summer. In winter, cross-country skiing and snowshoeing are popular in addition to

downhill skiing.

The region extending from Osoyoos to Sicamous may well be considered the Palm Springs of the North in the summer, with nearly 100 golf courses spread over the entire region (the Palm Springs area counts over 130 golf courses). The Okanagan alone has over 50 golf courses, with Crystal Mountain being ideally located near its centre.

**Table I-12: List of Okanagan Golf Courses**

Name	City	Region	Size	Type
Aspen Grove Golf Club	Winfield	North Okanagan	27-holes	Public
Bear Course of the Okanagan Golf Club	Kelowna	Central Okanagan	18-holes	Semi-Private
Bell Mountain Golf Course	Kelowna	Central Okanagan	N/A	N/A
Birchdale Par 3	Enderby	North Okanagan	9-holes	Municipal
Central Park Golf Club	Kelowna	Central Okanagan	9-holes	Public
Cherry Grove Golf & Country Club	Oliver	South Okanagan	9-holes	Semi-Private
Coldstream Golf Club	Lumby	North Okanagan	9-holes	Public
Desert Springs Golf Club	Osoyoos	South Okanagan	9-holes	Public
Fairview Mountain Club	Penticton	South Okanagan	18-holes	Public
Fairview Par 3	Kelowna	Central Okanagan	18-holes	Public
Gallagher's Canyon Golf & Country Club	Kelowna	Central Okanagan	27-holes	Semi-Private
Harvest Golf Club	Kelowna	Central Okanagan	18-holes	Public
Highlands Golf Short-Game Excellence	Vernon	North Okanagan	Practice	Public
Hillview Golf Club	Vernon	North Okanagan	18-holes	Private
Hyde Mountain on Mara Lake Golf Course	Vernon	North Okanagan	18-holes	Public
Inkameep Canyon Desert Golf Course	Penticton	South Okanagan	18-holes	Public
Kelowna Golf & Country Club	Kelowna	Central Okanagan	18-holes	Public
Kelowna Orchard Greens	Kelowna	Central Okanagan	9-holes	Public
Kelowna Springs Golf Club	Kelowna	Central Okanagan	18-holes	Semi-Private
Lake Okanagan Resort	Kelowna	Central Okanagan	9-holes	Municipal
Lakers Golf Club	Vernon	North Okanagan	9-holes	Public
Lumby Golf Club	Lumby	North Okanagan	9-holes	Municipal
Mabel Lake Golf & Country Club	Enderby	North Okanagan	9-holes	Public
McCulloch Orchard Greens	Kelowna	Central Okanagan	9-holes	Public
Michaelbrook Ranch Golf Club	Kelowna	Central Okanagan	18-holes	Semi-Private

Mission Creek Golf Club	Kelowna	Central Okanagan	18-holes	Public
Okanagan Golf Club	Kelowna	Central Okanagan	18-holes	Public
Osoyoos Golf & Country Club	Osoyoos	South Okanagan	27-holes	Public
Penticton Golf & Country Club	Penticton	South Okanagan	18-holes	Public
Pine Hills Golf & Country Club	Penticton	South Okanagan	18-holes	Public
Pleasant Valley Par 3	Penticton	South Okanagan	9-holes	Public
Ponderosa Golf Club	Peachland	Central Okanagan	18-holes	Public
Predator Ridge Golf & Country Club	Vernon	North Okanagan	18-holes	Semi-Private
The Quail Course at The Okanagan Golf Club	Kelowna	Central Okanagan	18-holes	Public
River Ridge Golf Course	Lumby	North Okanagan	9-holes	Public
Riverside Golf	Penticton	South Okanagan	9-holes	Municipal
Royal York Golf Course	Armstrong	North Okanagan	9-holes	Public
Sage Mesa Golf & Country Club	Penticton	South Okanagan	9-holes	Public
Salmon Arm Golf Club	Salmon Arm	North Okanagan	18-holes	Public
Shadow Ridge Golf Club	Kelowna	Central Okanagan	18-holes	Public
Shannon Lake Golf Course	Westbank	Central Okanagan	9-holes	Semi-Private
Spallumcheen Golf & Country Club	Vernon	North Okanagan	27-holes	Semi-Private
St. Andrews by the Lake Golf Course	Penticton	South Okanagan	9-holes	Public
Sumac Ridge Golf Course	Summerland	Central Okanagan	9-holes	Municipal
Summerland Golf & Country Club	Summerland	Central Okanagan	18-holes	Semi-Private
Sunset Ranch Golf Club	Kelowna	Central Okanagan	18-holes	Public
Totem Par 4 Golf Course	Penticton	South Okanagan	9-holes	Public
Tower Ranch Golf Resort (Under Construction)	Kelowna	Central Okanagan	N/A	N/A
The Rise Golf Resort (Under Construction)	Vernon	North Okanagan	N/A	N/A
Twin Lakes Golf Resort	Penticton	South Okanagan	18-holes	Public
Vernon Golf & Country Club	Vernon	North Okanagan	18-holes	Semi-Private
Vintage Hills Golf Course	Kelowna	Central Okanagan	18-holes	Public

### 9(f)(iii) *Conferences and Other Incentive Travel*

This is a growing segment of the market well developed around the major hotels of the region. The development of the new multi purpose arena and the expansion of the Okanagan Grand Hotel and Conference Centre in Kelowna has further increased the size of this market segment, to the benefit of all the other activities.



**9(f)(iv) Education**

There is a growing population of approximately 25,000 students in the public and private educational system of the region, providing another strong base for winter and summer sports. Westbank itself has several elementary schools in the Glenrosa area just below Crystal Mountain, including Helen Gorman Elementary, Glenrosa Elementary and Westbank Elementary. Westbank has the nearest secondary school, George Pringle Secondary School. The broader Kelowna area is also home to several private schools. The University of British Columbia Okanagan in Kelowna provides the nearest university.

In conclusion, the area is best known for the lake and water activities in the summer, and for the wineries particularly in the shoulder season, but skiing and golfing have a promising future, and can be the catalyst for the improvement of tourism facilities.

**9(g) Comparable Resorts and Competition**

Big White is the other existing ski facility in the Kelowna Area. It has an overall advertised vertical drop of 777 m (2,550 ft) with about 100 runs (divided into 26% beginner runs, 56% intermediate runs, and 18% expert runs). The base area is at an elevation of about 1,755 m (5000 ft) and the summit is at 2,319 m (7,606 ft). There are also 13 km (8 miles) of ground cross-country trails and ample hotel and restaurant facilities. The average January temperature is -9°C and in April, +2°C. There are nine lifts, including four detachable quad chairs, four fixed grip chairlifts and a T-Bar. It has about 6,000 bed units of accommodation. It is therefore larger and higher than Crystal, but it is also further from the centre of Kelowna and the communities to the West and South of Lake Okanagan. By contrast, Crystal is immediately adjacent to the residential area of the Kelowna/Westbank area, and can therefore be expected to attract more local families and tourists from the Kelowna area. There is a potential market looking for good climate, a family holiday area and a good sports training school much closer to their home. Crystal is also positioned much closer to the travel route to and from the Lower Mainland area.

Big White will likely continue to attract more individual destination skiers, but properly expanded, Crystal will provide a different quality experience and a desirable environment more suitable for a family or as a niche destination.

Silver Star and Apex are the other two major ski resorts in the region. Like Big White they are larger than Crystal, but they are even harder to get to from Kelowna or from the Lower Mainland and Vancouver.

Apex has a top elevation of 2,195 m (7,200 ft) and a vertical drop of 610 m (2,000 ft). It has four lifts, including one detachable quad chair, one fixed grip chair, one T-Bar and one grip tow. It has a new daylodge.

Silver Star has a top elevation of 1,914 m (6280 ft) and a vertical drop of 762 m (2,500 ft). It has two detachable quad chairlifts, three fixed grip chairlifts, two T-Bars and one grip tow. The terrain is divided into 30% beginner runs, 50% intermediate runs and 20% expert ski runs. Silver Star and Big White have recently consolidated under one ownership.

**9(h) Visitor Centre Potential**

The Glenrosa interchange on Highway 97, just north of the arrival of the Coquihalla Connector from Vancouver towards Kelowna is strategically located to accommodate the first major tourist attraction point on the entire trip from Vancouver to the Okanagan. This interchange, or a suitable location nearby along the access to Westbank, could become an important magnet for the highway traffic. With an appropriate design of signs and with an attractive Visitor Centre building, a tourist commercial and communication services centre could be located in the appropriate location. This could include an interpretive centre and exposure to other important valley tourism activities, perhaps including the Okanagan winery activities. Although there is currently a seasonal visitor centre on the Coquihalla Connector, and another in the commercial centre of Westbank, these facilities could then be combined or reinforced in conjunction with a new Visitor Centre at the Glenrosa Interchange. Shuttle bus service could be provided from this center to commercial and activity destinations in the area, including Crystal Mountain. A shuttle service would help reduce traffic on Glenrosa road.

There is an opportunity to establish a full service Visitor Centre with an activities booking facility to be developed with other local interests. At present there is a seasonal visitor centre for the Okanagan on the Coquihalla Connector and another operated by the Chamber of Commerce near McDonalds in Westbank. One combined new Visitor Centre near the new Glenrosa interchange at the Coquihalla Connector could advertise Westbank as a tourist destination, including new skiing and resort facilities at Crystal Mountain. It could also provide information on the Okanagan area generally, as well as on new skiing and resort facilities at Crystal Mountain, and could include museum displays, an interpretive centre, washrooms, souvenirs and gifts, and coffee facilities. This would depend on the level of local interest that could be found to support the initiative.

Westbank, as the gateway to the Okanagan, already has an important tourism function and it is already developing quickly with facilities that range from improved shopping and sleeping accommodation to golf courses.

Westbank is privileged to have a growing young population that is eager to engage in sporting activities and to support the necessary services. Its location and population combined make this an ideal community to become the regional base for an expanded ski area, which will serve better the region in winter and offer opportunities for its golf pros in the summer. It can become a specialty "boutique area" for a different, family oriented and school oriented clientele.

The Okanagan area economy is based on diverse resources and enterprises of which tourism already comprises a significant sector. An expanded Crystal Mountain and its Visitor's Centre will both draw from and reinforce the broad economic base of the area. The Crystal expansion appears to be a timely and logical expansion of the general existing tourist infrastructure, and would help bring greater recognition and additional clientele to the area. The new Visitor's Centre would facilitate this process.

**9(i) Tabulation of Relevant Tourism Statistics for Kelowna and Surrounding Region*****Table I-13: Average Kelowna Hotel Occupancy***

HOTEL OCCUPANCY	
1996	62.88%
1997	66.28%
1998	65.55%

*Source Kelowna Visitor and Convention Bureau****Table I-14: Group Tours Overnighing in Kelowna***

GROUP TOURS	
1988	469
1997	1,986
1998	1,811

***Table I-15: Convention Delegates in Kelowna***

Convention Delegates	
1988	20,000
1997	59,870
1998	58,463

*Source: Kelowna Visitor and Convention Bureau*

**Table I-16: Hotel Report of Room Operations by Location Year to December 1998**

Location	Occupancy Percentage			Average Daily Rate			Available Room Revenue		
	1998 %	1997 %	change %	1998 \$	1997 \$	change %	1998 \$	1997 \$	change %
British Columbia	62.8	66.2	5.2	112.06	108.45	3.3	70.32	71.82	2.1
Greater Vancouver	69.1	74.4	7.1	122.01	120.51	1.2	84.36	89.71	8.0
Airport (Richmond)	72.9	80.5	9.4	97.07	99.98	2.9	70.78	80.46	12.0
Downtown Vancouver	70.4	75.5	8.8	143.09	140.04	2.2	100.77	105.77	4.7
Other Vancouver	62.3%	67.3%	7.5%	\$88.13	\$88.28	0.2%	\$54.90	\$59.42	7.6%
Vancouver Island	63.8%	63.0%	1.2%	\$104.13	\$98.01	6.2%	\$66.38	\$61.74	7.5%
Campbell River	53.0%	59.4%	10.7%	\$73.89	\$73.26	0.9%	\$39.16	\$43.50	10.0%
Courtenay	54.8%	55.5%	1.4%	\$66.12	\$60.92	8.5%	\$36.20	\$33.81	7.1%
Greater Victoria	72.1%	69.9%	3.2%	\$115.66	\$108.77	6.3%	\$83.37	\$75.99	9.7%
Nanaimo	52.5%	54.4%	3.4%	\$71.55	\$71.77	0.3%	\$37.55	\$39.00	3.7%
Parksville/Qualicum Beach	53.4%	51.0%	4.6%	\$95.59	\$93.33	2.4%	\$51.00	\$47.60	7.1%
Other Vancouver Island	52.8%	54.3%	2.7%	\$103.52	\$97.25	6.4%	\$54.68	\$52.78	3.8%
Whistler Resort Area	51.7%	52.1%	0.7%	\$154.29	\$145.34	6.2%	\$79.81	\$75.72	5.4%
Other British Columbia	54.1	57.6	5.9	\$76.32	\$71.98	6.0	\$41.28	\$41.39	0.3
Kamloops	52.9	56.8	6.9	\$74.03	\$73.02	1.4	\$39.14	\$41.45	5.6
Kelowna	<b>63.2</b>	<b>62.2</b>	<b>1.7</b>	<b>80.35</b>	<b>72.92</b>	<b>10.2</b>	<b>50.82</b>	<b>45.33</b>	<b>12.1</b>
Penticton	55.7%	54.2%	2.8%	\$71.00	\$67.96	4.5%	\$39.56	\$36.83	7.4%
Prince George	61.1%	73.1%	16.5%	\$84.39	\$80.42	4.9%	\$51.53	\$58.80	12.4%
Smithers	50.9%	53.3%	4.6%	\$61.88	\$59.58	3.9%	\$31.46	\$31.76	0.9%
Terrace	49.6%	53.8%	7.9%	\$69.63	\$68.51	1.5%	\$34.51	\$36.86	6.4%
Vernon	36.4%	45.8%	20.6%	\$73.19	\$65.58	11.6%	\$26.64	\$30.06	11.4%
William's Lake	50.4%	57.9%	12.9%	\$50.11	\$44.29	13.1%	\$25.26	\$25.63	1.4%
Other BC Communities	52.0%	55.1%	5.8%	\$77.71	\$74.33	4.5%	\$40.41	\$40.95	1.3%
Canada	67.4%	66.8%	1.0%	\$99.59	\$93.59	6.4%	\$67.15	\$62.51	7.4%

Source: Pannell Kerr Forster Consulting Inc., 1999

**Table I-17: Origins of Overnight Travelers to the South Thompson-Okanagan, 1996**

Non-Resident Visitor Origin	Overnight Visitors %	B.C. Resident Visitor Origin	Overnight Visitors %
Regional Canada	56%	Greater Vancouver Regional District	50%
Regional US	16%	Vancouver Island	9%
Long Haul Canada	9%	North	3%
Long Haul US	8%	South	37%
Asia/Pacific	2%		
Europe	8%		
Other Overseas	1%		

Source: B.C. Visitor Study: Report on Traveling in B.C., South Thompson-Okanagan, 1996

**Table I-18: Visitor Origin to Kelowna (to end of 1998)**

VISITOR ORIGIN TO KELOWNA			
B.C.	39.10%	Other Canada	5.35%
Alberta	18.30%	WA/OR/CA	5.21%
Saskatchewan	3.81%	Other USA	3.00%
Manitoba	2.74%	Overseas	17.08%
Ontario	5.41%		

## 10. A VISION FOR THE NEW CRYSTAL MOUNTAIN RESORT

The vision for the new resort is for an expansion of the ski area to the better parts of the mountain, primarily by means of lifts opening higher terrain and accessing Mount Miller to the West, in addition to a year round development with a summer golf course as central components of the project. The planning concept will start with low density accommodation and will be completed with quality hotel facilities once a sufficient size and market recognition is achieved. The modest development size seems to be suitable for the type of ski area being studied, which should cater to a different market rather than compete against larger ski areas gifted with bigger mountains, such as Whistler or Big White. Crystal Mountain will be the destination of choice for those who seek easier access and easier skiing conditions. The resort will create a safe and relaxing environment for people who wish to learn the winter and summer sports and have a comfortable destination for a family vacation.



The expanded ski area will not only be the closest to Kelowna, but will also be within easy travel distance from the Lower Mainland, expanding the area of interest to a population that is already favourably exposed to the Okanagan and its good climate.

Present uses of the land, in addition to general recreation, ranching, forestry, wildlife, and winter skiing by means of two Chairlifts and a T-Bar lift include: hiking, nordic skiing, snowmobiling, guide and outfitting, and hunting when permitted. The proposed land use will add skiing in designated locations, golf, tennis and a resort base which will include hotels, ancillary commercial facilities, residential multiple dwelling units in the form of apartments and townhouses and some single family dwellings.

The mountain area will be expanded from the existing three lifts and associated runs to a number of new lifts and runs that will eventually expand westward and to the north beyond Mount Last. The expansion to Mount Last (1,500 metres asl) combined with a new lift on the east face of Mount Miller to its west side (800 metres asl) will provide a vertical drop of approximately 700 metres (2,300 feet). The vertical drop will not exceed that of some of the other ski hills in the Okanagan but the emphasis will be on family skiing, not extreme or expert skiing.

The project proposal is to begin with the construction of a golf course, followed by the addition of a the lifts needed to expand the skiable terrain to Mount Miller. This will create a year-round vacation area that will place both Crystal and Westbank more clearly on the tourist map. The lift system should cover the entire vertical drop available for skiing in winter and help advertise Crystal as a desirable skiing experience. There will be a lift to the top, planned as a gondola, that will also be open for sight seeing in the summer, inviting the summer traffic to stop in Westbank to ride the lift and see the vistas from the teahouse at the top of Mount Last.

The forests and the lake views to the east and south of the planned Crystal Mountain teahouse will provide beautiful scenery. This scenic grandeur provides the kind of magical setting that is characteristic of so many popular mountaintops.

The base of the resort area will be expanded to include new resort residential areas (single family

chalets and condo units), golf course facilities and a resort core area with a small number of hotel units and retail space to support the resort and mountain facilities. The key for the expansion will be to maintain and develop the four-season recreation component including winter skiing/snowboarding, golfing, summer events/festivals and a number of other recreation and tourist venues.

The golf course and the lift system in winter would justify the investment required for a substantial hotel at the resort base, with a complementary bed base of condominiums, townhouses and single family chalets, in a character consistent of mountain and National Parks' architecture, but rustic and contemporary, using natural materials, particularly stone and wood. The design envision two 100 to 200 room hotels, and 600 to 800 units of other types, for a total of approximately 4,000 beds.

Nestled in the trees, the resort will be complementary to the surrounding scenery, while giving it a new dimension of character and excitement.

A Visitor Centre is planned to be part of the project, including an activities' booking facility. This is to be developed in conjunction with local interests near the Coquihalla Connector, and it will advertise Westbank as a tourist destination.

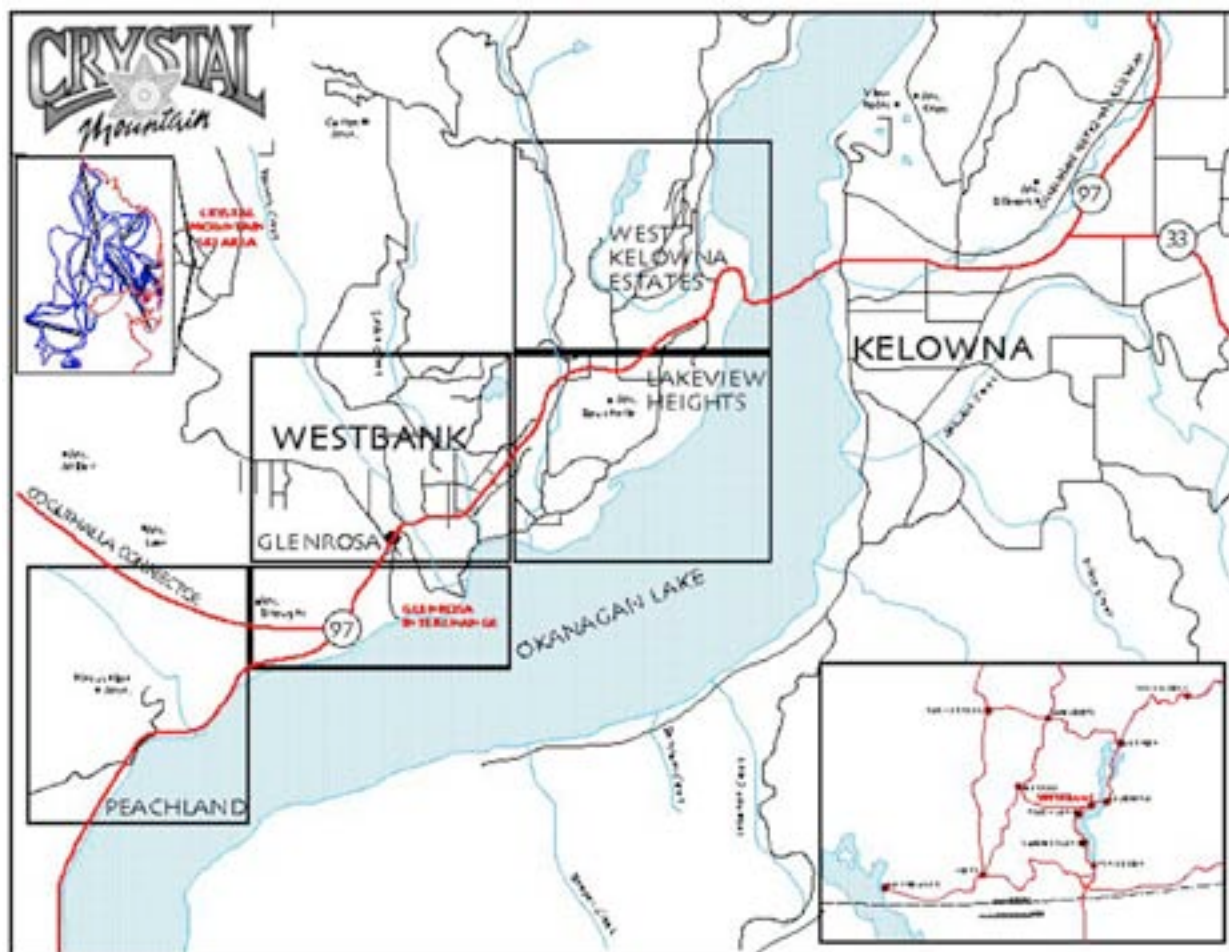


EXHIBIT I-1: Location Map Highlights

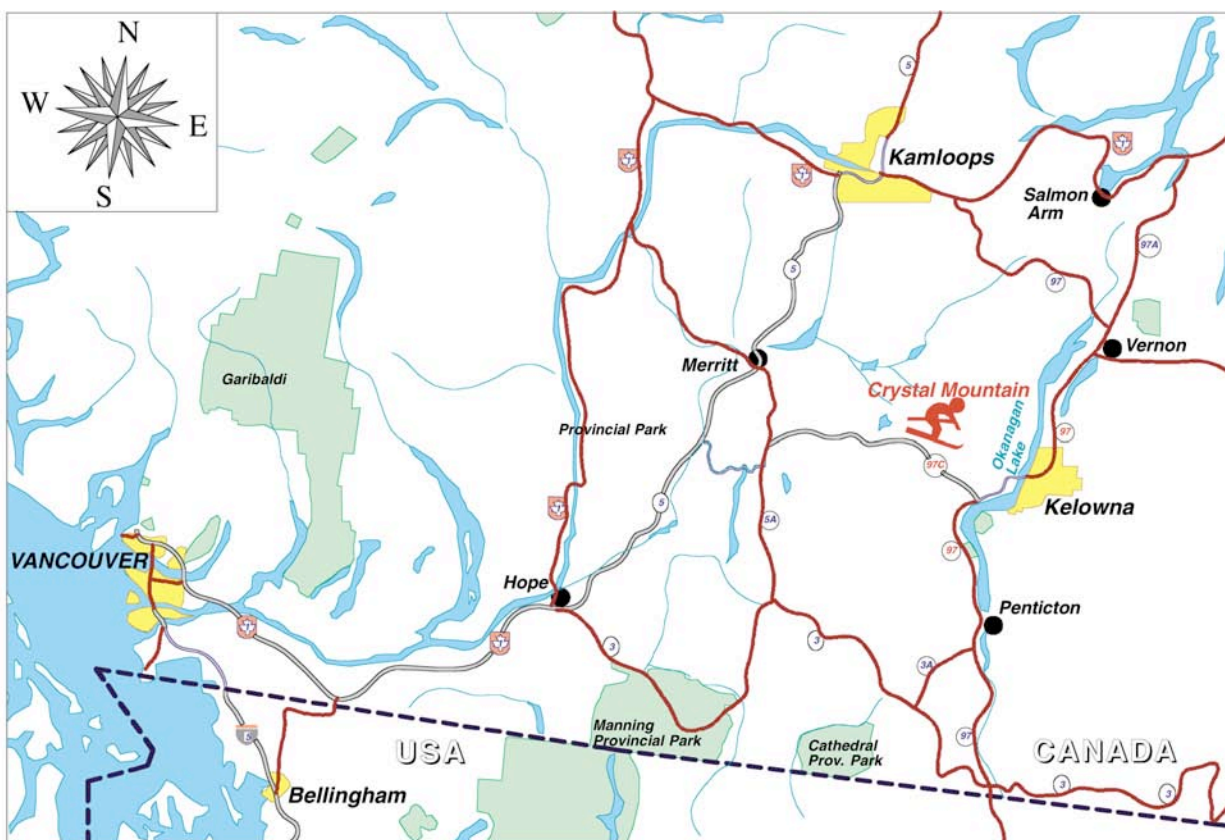




EXHIBIT I-2: Location Map of Kelowna and Westbank

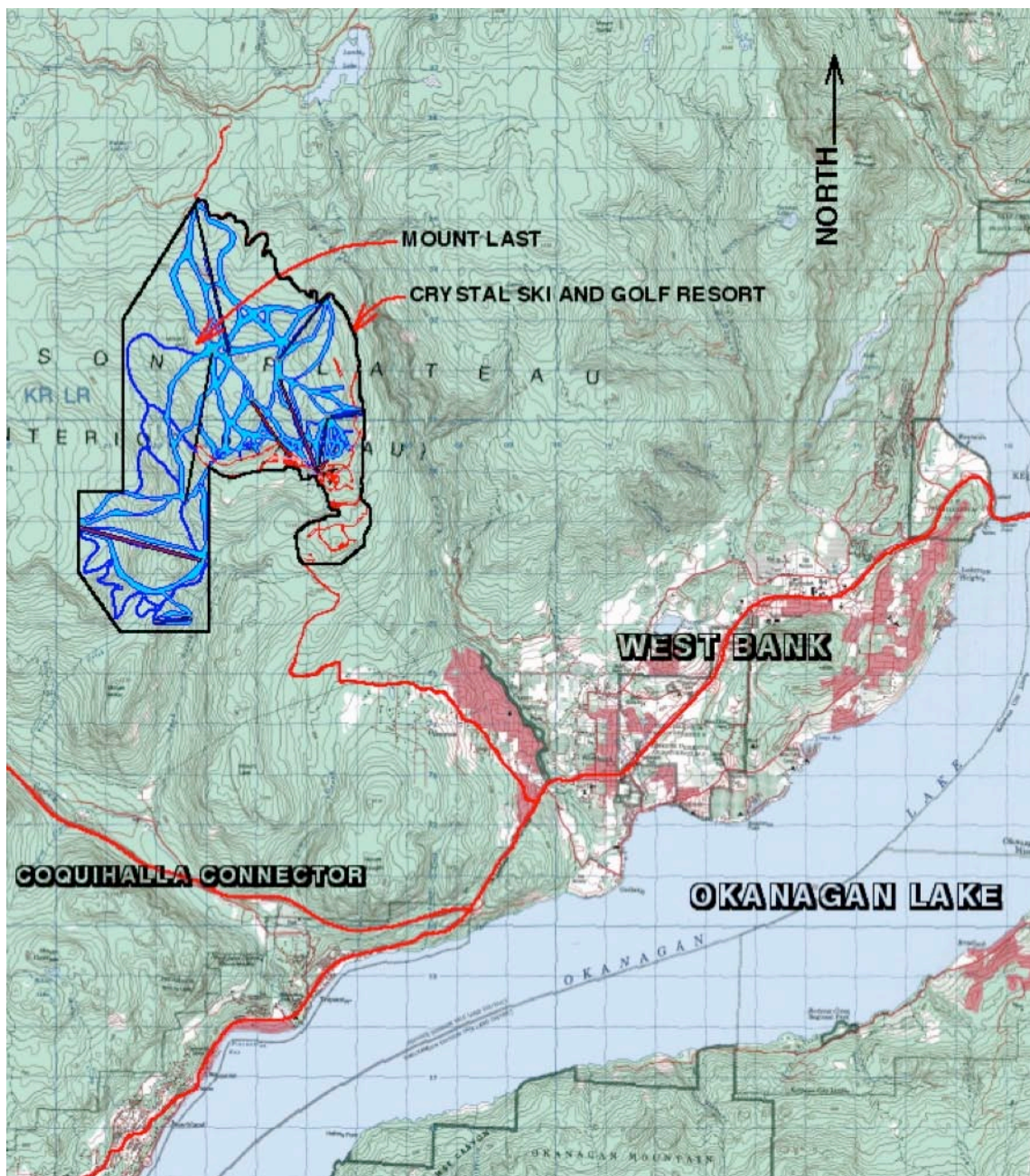


## EXHIBIT I-3: Road Map Showing Crystal Mountain

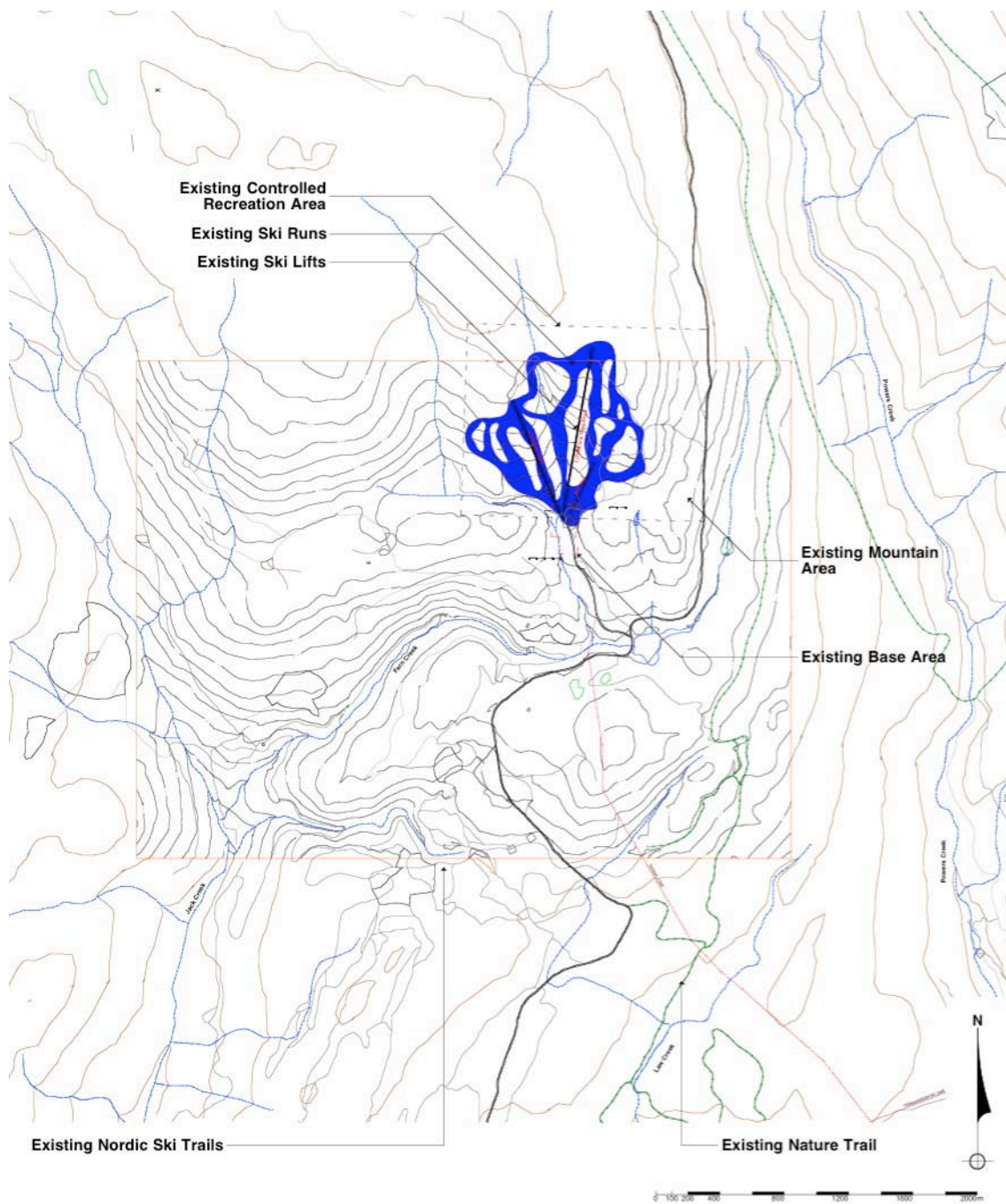




**EXHIBIT I-4: Topographic Map**

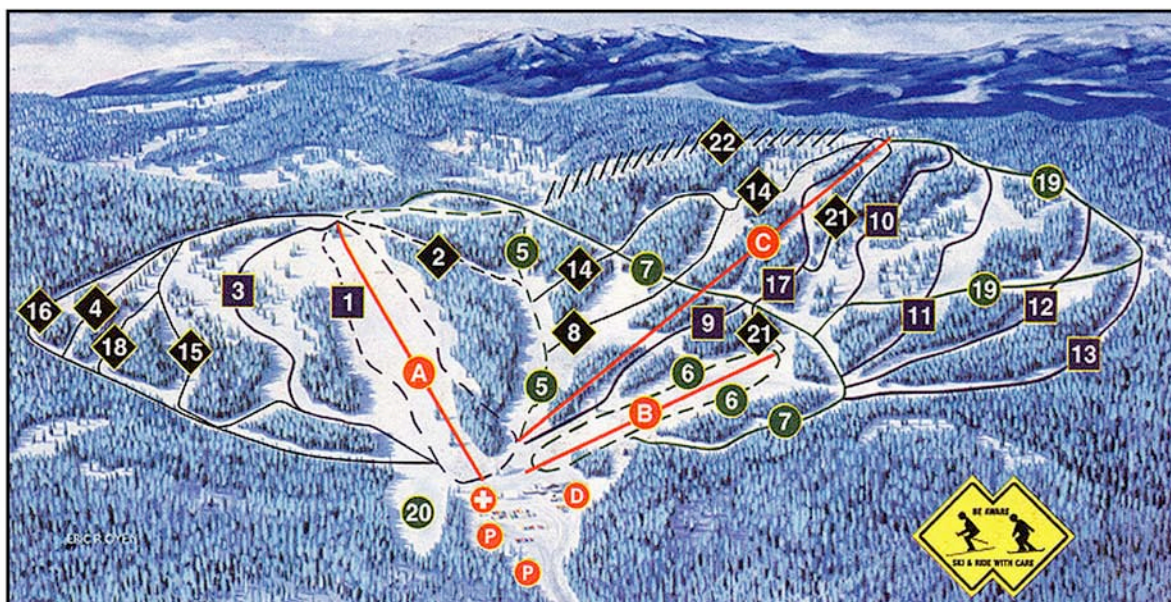


## EXHIBIT I-5: Existing Ski Runs and Lifts in Context





## EXHIBIT I-6: Existing Ski Runs and Trails

**SKI TRAILS**

- Easy
- More Difficult
- ◆ Most Difficult
- Night Skiing
- + First Aid
- D Day Lodge
- P Parking

- |  |              |  |                              |
|--|--------------|--|------------------------------|
| <span style="color: yellow;">●</span> 1  | Centennial   | <span style="color: purple;">■</span> 12 | Run Out                      |
| <span style="color: yellow;">●</span> 2  | Gulley       | <span style="color: purple;">■</span> 13 | Stump Run                    |
| <span style="color: purple;">■</span> 3  | Webber Skid  | <span style="color: black;">◆</span> 14  | Ski School Cliff             |
| <span style="color: black;">◆</span> 4   | Shakey Knees | <span style="color: black;">◆</span> 15  | Jiri's Yump                  |
| <span style="color: yellow;">●</span> 5  | Easy Out     | <span style="color: black;">◆</span> 16  | Make It Last                 |
| <span style="color: yellow;">●</span> 6  | Bunny Blue   | <span style="color: purple;">■</span> 17 | Cannonball                   |
| <span style="color: green;">●</span> 7   | Long Trail   | <span style="color: black;">◆</span> 18  | Marvin's Mistake             |
| <span style="color: black;">◆</span> 8   | Wha-Hoo      | <span style="color: green;">●</span> 19  | Snow Dancer                  |
| <span style="color: purple;">■</span> 9  | Rankin's Rut | <span style="color: green;">●</span> 20  | Snow Bowl                    |
| <span style="color: green;">●</span> 10  | Go Again     | <span style="color: black;">◆</span> 21  | Orange T-Line                |
| <span style="color: purple;">■</span> 11 | Side Slipper | <span style="color: black;">◆</span> 22  | McLeod's Glades (future run) |

**MOUNTAIN STATISTICS**

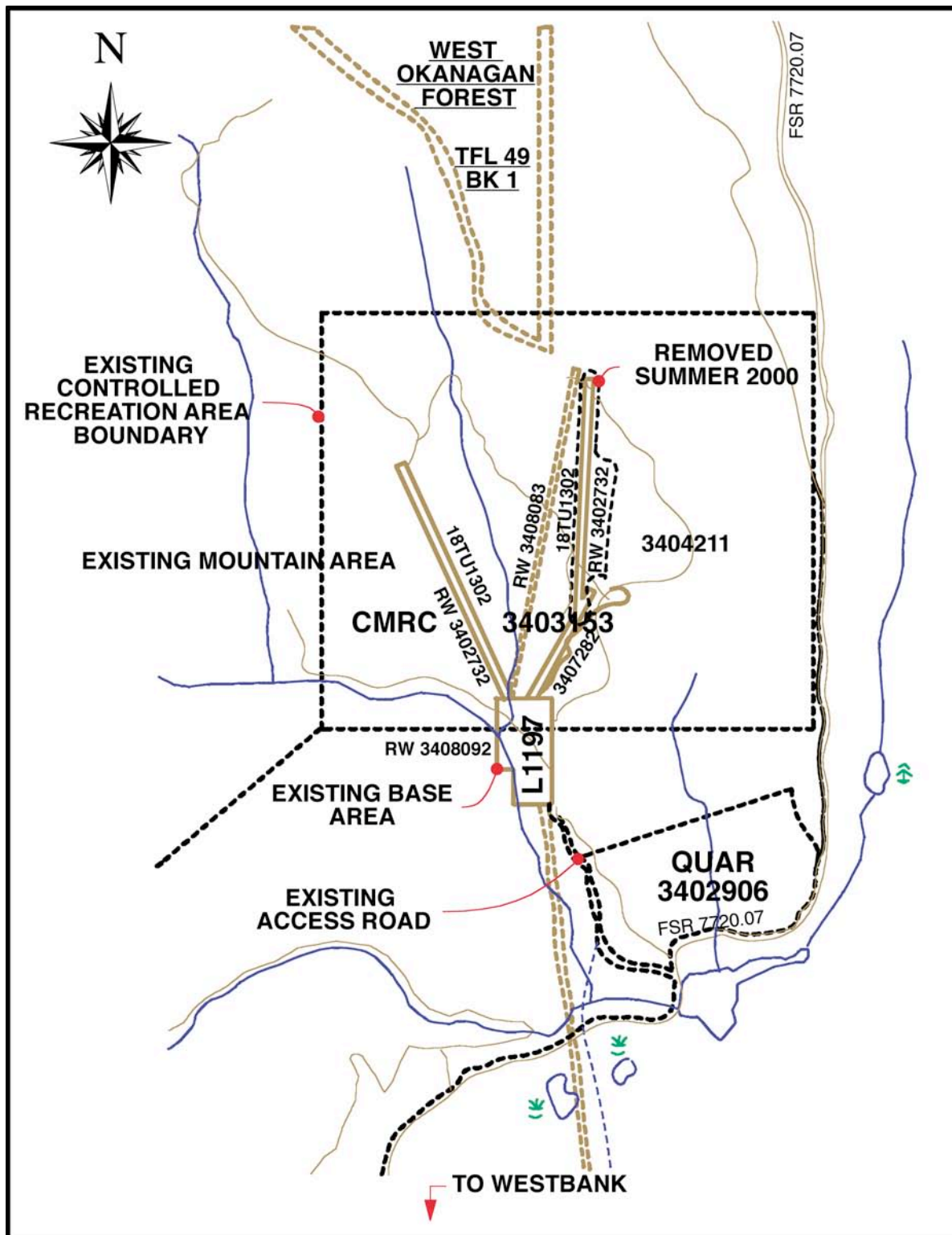
Lifts	Length	Vertical
<span style="color: red;">—A—</span> Blue Chair	815m/2650ft	175m/573ft
<span style="color: red;">—B—</span> Green Tee Bar	350m/1150ft	72m/235ft
<span style="color: red;">—C—</span> New 2000 Chair	1100m/3575ft	204m/663ft

Base Elevation: 1228m/4024ft  
 Top Elevation: 1440m/4724ft  
 Vertical: 212m/700ft  
 Average Cumulative Snowfall: 310cm/122in  
 Terrain: Novice 30%  
 Intermediate: 50%  
 Difficult: 20%

**EXHIBIT I-7: View of Existing Ski Runs**

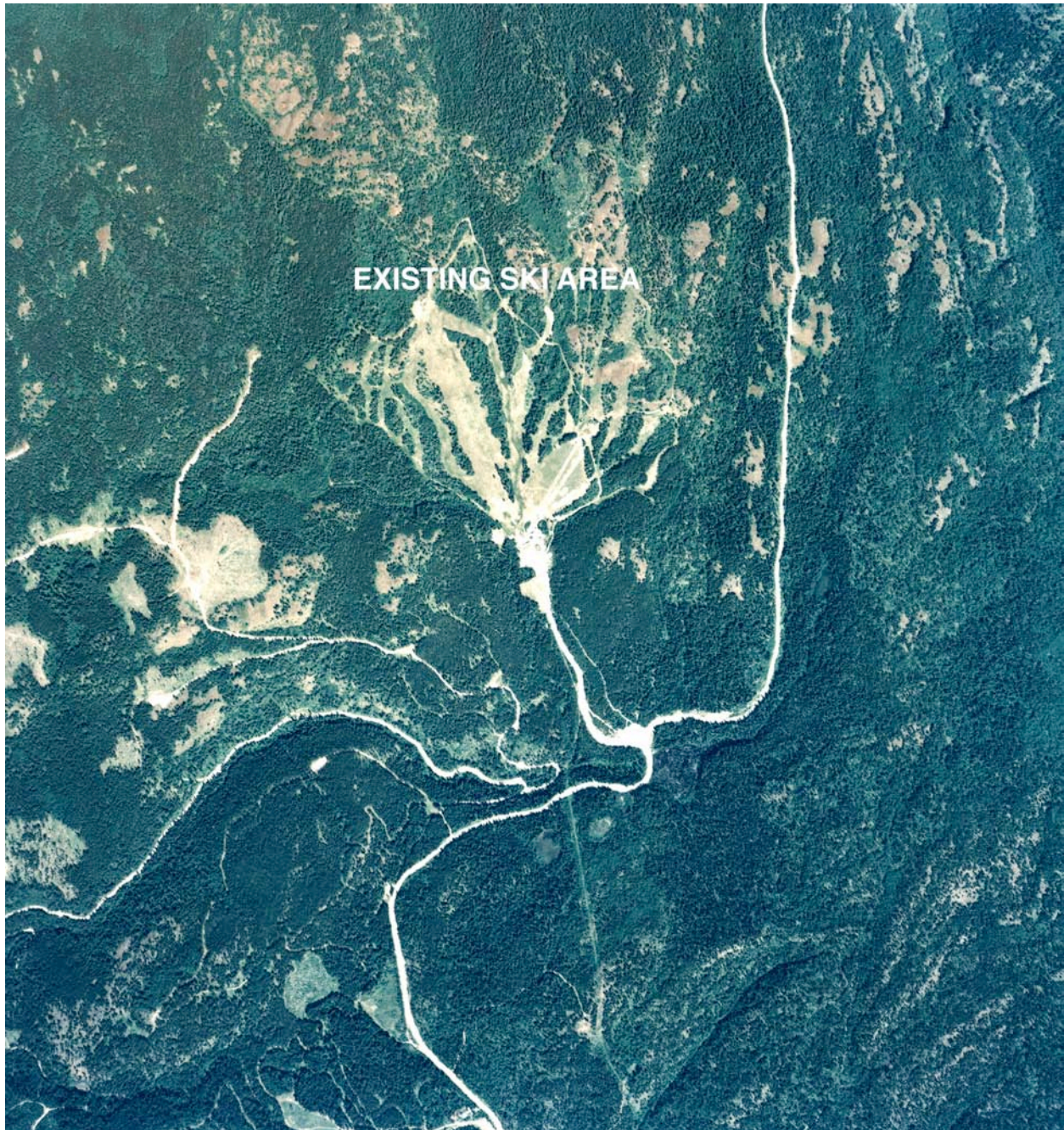


EXHIBIT I-8: Existing Tenure Areas at Crystal Mountain





**EXHIBIT I-9: Aerial View of Existing Facility at Crystal Mountain Resort**







***PHOTO I-1: Existing Skiable Terrain***

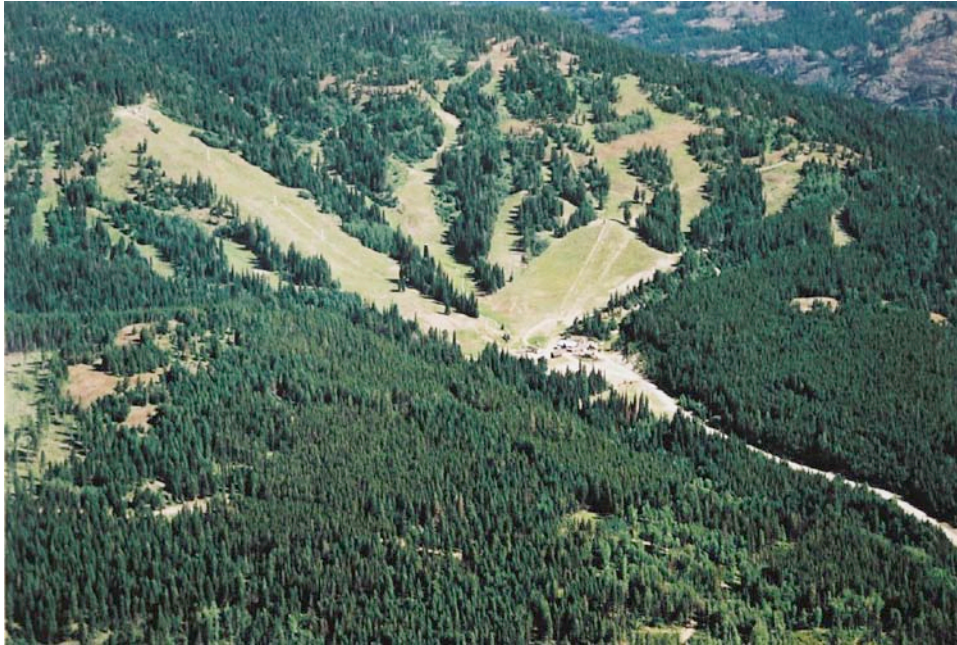


***PHOTO I-2: Existing Skiing Conditions***



***PHOTO I-3: Existing Road Conditions***





***PHOTO I-4: View of Existing Ski Area in Summer***



***PHOTO I-5: Nordic Skiers Chalet and Crystal Mountain***



***PHOTO I-6: Rolling Ski Terrain***





***PHOTO I-7: Existing T-Bar***



***PHOTO I-8: Connecting Trails***



***PHOTO I-9: Connecting Trails***





***PHOTO I-10: View of Forestry Road and Powers Creek Canyon - Part of Crystal Mountain***



***PHOTO I-11: View of Westbank, Kelowna and Ski Hill***



***PHOTO I-12: View of Westbank and Ski Hill***



***PHOTO I-13: View of Kelowna and Westbank***





***PHOTO I-14: Shannon Lake Golf Course in Westbank***



***PHOTO I-15: Proposed Golf Course Area***





***PHOTO I-16: North Side of Mount Last***



***PHOTO I-17: Mount Last in Summer***



***PHOTO I-18: Mount Last Expansion Area***



***PHOTO I-19: North Side of Mount Last Showing Lambly Lake***





***PHOTO I-20: Nordic Skiers***



***PHOTO I-21: Young Skiers at Crystal Mountain***



***PHOTO I-22: Easy Tree Skiing***



***PHOTO I-23: Road Access from Kelowna to Westbank (Glenrosa Interchange)***





***PHOTO I-24: Powder Skiing on Gentle Ski Terrain***

**PART II : SOCIO ECONOMIC ANALYSIS,****1. ECONOMY OF THE REGION,**

**Market Area Defined** - for the following section on social and economic analysis, the primary market area for the Crystal Mountain Resort Expansion is taken as consisting of the Regional District of Central Okanagan (RDCO), including the City of Kelowna the Municipality of Peachland, Westbank including electoral areas G and H, and the Westbank Indian Reserve. In 1999, these four areas of the Central Okanagan Regional District had a population of 136,000 as shown in Table II-1. The District of Lake Country comprising Oyama, Carr's Landing, Okanagan Centre and Winfield are of less importance due to the location further north of Kelowna. Electoral area I is also of lesser importance due to its close proximity to the Big White Resort. However, for the section on social and economic analysis we will focus on the entire Central Okanagan Regional District (RDCO), comprising a total of 150,000 persons in 1999 as shown in Table II-1, although the extended region may encompass a larger population basin of up to 250,000 people.

**1(a) Population and Demographics of the RDCO,****1(a)(i) Population of the RDCO**

The population of the RDCO has almost doubled over the last twenty years as presented in Table II-2. Population growth was not significant in the mid eighties but rose to a high of 6.5% in the early 1990s and has fallen back to a more moderate pace of 2-3% in recent years. As demonstrated in Table II-2, the majority of the increase in population in recent years comes from in-migration to the area compared to the natural increase in population (i.e. number of births plus the number of deaths).

**Table II-1: Population Distribution - Crystal Mountain Primary Market Area**

Area	1991 Population	1996 Population	1991-1996 % Change	1999 Population
City of Kelowna	75,953	89,442	17.8%	98,130
Peachland DM	3,459	4,524	30.8%	4,958
Electoral Areas G & H (Westside)	17,770	22,901	28.9%	25,183
Reserves (IR 9,10 and Duck Lake Reserve)	<u>4,574</u>	<u>7,221</u>	<u>57.9%</u>	<u>7,754</u>
	<u>101,756</u>	<u>124,088</u>	<u>21.9%</u>	<u>136,025</u>
Lake Country	7,622	9,007	18.2%	9,934
Electoral Area I ( Joe Rich - Ellison)	<u>2,468</u>	<u>3,446</u>	<u>39.6%</u>	<u>4,041</u>
RDCO	<u>111,846</u>	<u>136,541</u>	<u>22.1%</u>	<u>150,000</u>

Source: Kelowna and the Central Okanagan Economic Profile - 2000

**Table II-2: Population Growth RDCO - 20 years**

Year	Natural Increase	Net Migration	Population	Growth Rate
1978	359	795	76,850	1.5%
1979	346	1,813	79,009	2.8%
1980	330	3,894	83,233	5.3%
1981	383	4,240	87,856	5.6%
1982	493	1,225	89,574	2.0%
1983	403	623	90,600	1.1%
1984	456	840	91,896	1.4%
1985	426	-334	91,988	0.1%
1986	497	290	92,775	0.9%
1987	363	1,965	95,103	2.5%
1988	299	2,598	98,000	3.0%
1989	276	4,024	102,300	4.4%
1990	409	5,990	108,699	6.3%
1991	469	5,505	114,673	5.5%
1992	442	6,996	122,111	6.5%
1993	468	6,482	129,061	5.7%
1994	514	4,331	133,906	3.8%
1995	524	3,591	138,021	3.1%
1996	500	3,391	141,912	2.8%
1997	368	3,851	146,131	3.0%
1998	210	3,463	149,804	2.5%

Source: Kelowna and the Central Okanagan Economic Profile – 2000

**1(a)(ii)****Population Projection**

Presented in Table II-3 is a projection population for the RDCO from 1999 to 2015. The average growth rate is projected to be 2.1 % over the projection period. The current slowdown in the years 1999 and 2000 is only temporary and growth is expected to continue but at a slightly slower pace than the previous 15 years. The growth will result in an additional 50,000 persons added to the RDCO within the next 15 years.



**Table II-3: Projected Population Growth RDCO**

Year	Population	Natural Increase	Net Migration	Growth Rate
1999	151,101	304	993	0.9%
2000	152,341	244	996	0.8%
2001	155,400	217	2,842	2.0%
2002	159,346	201	3,745	2.5%
2003	163,424	190	3,888	2.6%
2004	167,508	182	3,902	2.5%
2005	171,544	168	3,868	2.4%
2006	175,508	157	3,807	2.3%
2007	179,469	161	3,800	2.3%
2008	183,514	157	3,888	2.3%
2009	187,671	159	3,998	2.3%
2010	191,843	165	4,007	2.2%
2011	196,015	162	4,010	2.2%
2012	200,204	166	4,023	2.1%
2013	204,430	164	4,062	2.1%

Source: Kelowna and the Central Okanagan Economic Profile – 2000

### 1(a)(iii) Demographics

#### 1(a)(iii)(A) Age Distribution

Age distribution for the RDCO is presented in Table II-4. RDCO has a higher proportion in the 65 and over age group of approximately 5% compared to BC as demonstrated in Table II-4. However, a majority of persons moving into the RDCO are not moving to retire but are coming with their families to work or start a business. The percentage of migrants over 65 years old is only 7% compared to the resident population of 17%.

**Table II-4: Age Distribution of the RDCO and the B.C. Population in 1996**

Age Group	RDCO	BC
0-4	5.9%	6.3%
5-24	25.5%	26.5%
25-44	29.4%	30.7%
45-64	22.2%	21.8%
65+	17.1%	12.8%

Source: Kelowna and the Central Okanagan Economic Profile – 2000

The size of the older segments of the population of the RDCO are increasing. However, the in-migration of younger persons into the RDCO does have an offsetting effect. The overall projected change by age group over the next fifteen years is not that material as presented in Table II-5. The 45-64 year old age group will increase by 6% and there will be accompanying decreases in the younger categories.

Table II-5 demonstrates there will be an absolute increase in population in all age groups and this is an important factor when considering the impact on the proposed Crystal Mountain development. The likely buyers of real estate will fall into the 25-65 year old groups, both representing a significant portion of the increase in the population.

**Table II-5: Projected Population by Age Group - RDCO**

	0-4	05-14	15-24	25-44	45-64	65+	All Ages
<b>1996</b>							
(in thousands)	8.3	24	12.1	42.4	31.2	23.9	141.9
%	5.8%	16.9%	8.5%	29.9%	22.0%	16.8%	100.0%
<b>2016</b>							
(in thousands)	11	28.9	16.9	59.5	60.8	40.2	217.2
%	5.1%	13.3%	7.8%	27.4%	28.0%	18.5%	100.0%
Change in %	-0.8%	-3.6%	-0.7%	-2.5%	6.0%	1.7%	
Increase in population(000's)	2.7	4.9	4.8	17.1	29.6	16.3	75.3

Source: Kelowna and the Central Okanagan Economic Profile – 2000

## 1(a)(iii)(B)

*Ethnic Origin*

Presented in Table II-6 is a breakdown of the ethnic origin of residents of the RDCO. The percentage distribution compared to the rest of British Columbia is similar except for the under representation of persons of Chinese and East Indian origin and the over representation of persons of German origin and Europeans in general. The strong European influence helps support the outdoor recreation lifestyle focus that is common place in the Okanagan.

**Table II-6: Ethnic Origin - RDCO**

Ethnic Origin	No. of Persons	% Distribution	
		RDCO	BC
Non Aboriginals	132,490	97.9%	96.2%
Single Origins:	68,180	50.4%	55.9%
European	40,660	30.1%	23.0%
Asian	1,320	1.0%	99.3%
Other	26,005	19.2%	23.4%
Multiple Origins	67,100	49.6%	44.1%
Aboriginal People	2,785	2.1%	3.8%
Total	135,280	100.0%	100.0%

Source: Statistics Canada 1996 Census

## 1(a)(iii)(C)

*Household Size, Marital Status and Gender*

Details of household size, marital status and gender were not provided as the statistics for the RDCO closely parallel the results for the general British Columbia population and should have no significance to the development potential of Crystal Mountain.

## 1(a)(iii)(D)

*Education*

Historically the RDCO residents had similar levels of education to the rest of British Columbia but lag behind in percentage of university degrees as demonstrated in Table II-7 (8.8% in the RDCO compared with 13.6% in British Columbia). However, the percentage of persons with a university degree for the year 2000 will be 13.3% of the population representing a significant gain. These gains are mainly attributed to the in-migration of

university educated people and to the degree granting status awarded to the Okanagan University College in 1989. Okanagan University College has made significant advances in accreditation, award winning educational technologies innovation, distance education and course offerings enhancing learning opportunities within the RDCO.

**Table II-7: Educational Attainment**

	RDCO - 1996	RDCO - 2000	BC - 1996
Population 15 years and over	108,835	117,101	2,954,700
Less Than Grade 9	7.7%	9.7%	7.4%
Grade 9 - 13 Without Certificate	25.6%	27.7%	23.7%
Grade 9 -13 With Certificate	12.3%	12.4%	12.9%
Trades Certificate or Diploma	4.2%	3.5%	3.5%
Other Non-University Without Certificate	6.8%	8.2%	7.4%
Other Non-University With Certificate	22.4%	20.6%	19.7%
University Without Degree/Certificate	12.2%	4.5%	11.9%
University With Degree/Certificate	<u>8.8%</u>	<u>13.3%</u>	<u>13.6%</u>
	<u>100%</u>	<u>100%</u>	<u>100%</u>

Source: Kelowna and the Central Okanagan Economic Profile – 2000

Okanagan University College (now the University of British Columbia Okanagan) is also a significant employer in the region as demonstrated by the breakdown of employees in Table II-8.

**Table II-8: OUC Employees as of Fall 1999**

Position Type	Number
Administrators	90
Faculty College Professors	297
Non-Instructional Faculty	21
Faculty Lab Instructors	26
Vocational Instructors	127
Support Staff	<u>296</u>
Total	<u>857</u>

Source: Okanagan University College

#### 1(a)(iv)

#### **Household Income**

Average household income in the Central Okanagan (RDCO) has always been slightly lower than the British Columbia provincial average as demonstrated in Table II-9. Reasons contributing to a lower than average income compared to the rest of British Columbia are:

- A larger proportion of retired people that do not have employment income.
- A higher than average proportion of smaller, non-unionized companies.
- A higher proportion of the labour force that is self-employed. Often these are very small businesses with high expenses.
- The lifestyle attracts a higher % of social assistance recipients than some other areas.

**Table II-9: Household Income Data, 1996**

Income	B.C.	RDCO	Kelowna	Peachland	Lake Country	Westside/ Westbank
<10,000	7.4%	5.0%	5.1%	6.2%	6.8%	3.6%
10,000-19,999	15.0%	17.5%	18.8%	17.3%	14.3%	12.6%
20,000-29,999	12.9%	16.0%	16.8%	16.5%	14.0%	11.7%
30,000-39,999	12.0%	13.4%	13.2%	14.6%	15.1%	11.7%
40,000-49,999	11.0%	11.9%	11.3%	14.6%	11.7%	12.3%
50,000 +	41.6%	36.2%	34.7%	31.1%	38.1%	48.1%
Average	\$50,667	\$46,162	\$45,546	\$43,490	\$46,762	\$51,988

Source: Statistics Canada, Census 1996

There has been a small improvement in recent years in the level of income relative to the rest of British Columbia as demonstrated in Table II-10.

Historically Crystal Mountain has attracted low to medium income families and younger persons looking for an affordable recreation opportunity. The proposed new Crystal Mountain Development is targeted at the middle income level for those who can only afford one primary residence that functions both as a family home and a resort getaway.

**Table II-10: Household Income Data, 1996**

Area	1981	1986	1991	1996	2000
RDCO	\$23,577	\$29,471	\$41,693	\$46,162	\$45,098
B.C.	\$26,171	\$33,497	\$46,909	\$50,667	\$49,253
RDCO vs BC	90.1%	88.0%	88.9%	91.1%	91.6%

Source: Kelowna and the Central Okanagan Economic Profile – 2000

**1(a)(v) Economy of the RDCO****1(a)(v)(A) Labour Force**

The total Central Okanagan (RDCO) labour force comprising persons 15 years of age or over who are employed or unemployed and actively seeking work has been estimated at 76,564 for the year 2000. Presented in Table II-11 is a summary of the employed and unemployed labour force for the last 10 years. The number of employed persons has grown by approximately 20,000 over the last 10 years representing 41 % growth in the number of persons employed. The unemployment rate dropped from 12.3 % in 1991 to 9.3 % in 1997 and has subsequently risen to 10.5 % for the year 2000.

**Table II-11: Job Creation in the RDCO**

Labour Force	1991	1995	1996	1997	1999	2000
Employed	48,510	62,400	62,480	64,200	71,507	68,533
Unemployed	<u>6,785</u>	<u>6,800</u>	<u>6,680</u>	<u>6,550</u>	<u>8,503</u>	<u>8,031</u>
Total Labour Force	<u>55,295</u>	<u>69,200</u>	<u>69,160</u>	<u>70,750</u>	<u>80,010</u>	<u>76,564</u>
Unemployment Rate	<u>12.3%</u>	<u>9.8%</u>	<u>9.7%</u>	<u>9.3%</u>	<u>10.6%</u>	<u>10.5%</u>

Source: Kelowna and the Central Okanagan Economic Profile – 2000

Presented in Table II-12 is the projected growth in the labour force for the economic sector from 1995-2005. This demonstrates the highest growth is expected to be in business services driven by the high technology sector and the manufacturing goods producing sector.

**Table II-12: Projected Growth in the Labour Force by Economic Sector, 1995-2005**

Sector	1995 Labour Force	2005 Labour Force	Change in Labour Force	% of Total Change
Business Services <sup>1</sup>	8,300	11,380	3080	37%
Goods Producing	17,060	19,090	2,030	24%
Accommodation, Food, Beverage & Other Services	9,600	11,030	1,430	17%
Government, Health & Education	11,900	12,900	1,000	12%
Transport, Communication & Utilities	3,600	4,230	630	8%
Retail & Wholesale	<u>11,210</u>	<u>11,440</u>	<u>230</u>	<u>3%</u>
Total	<u>61,670</u>	<u>70,070</u>	<u>8,400</u>	<u>100%</u>

Source: Kelowna and the Central Okanagan Economic Profile – 2000

<sup>1</sup> Includes High Technology Sector



The economy of the RDCO is widely diversified as demonstrated by the breakdown of the labour force by economic sector as presented in Table II-13. The RDCO is not dependent upon a single industry. Sectors with a large labour force include manufacturing, construction, retail trade and health and social services.

**Table II-13: Total Labour Force by Economic Sector**

Sector	1991	% Breakdown 1991	1996	% Breakdown 1996
Agriculture	2,355	4.3%	2,560	3.8%
Fishing & Trapping	35	0.1%	10	0.0%
Logging & Forestry	705	1.3%	605	0.9%
Mining	510	0.9%	310	0.5%
Manufacturing	5,380	9.9%	7,180	10.7%
Construction	5,835	10.7%	6,975	10.4%
Transportation & Storage	1,975	3.6%	2,070	3.1%
Communications & Utilities	1,925	3.5%	1,960	2.9%
Wholesale Trade	2,435	4.5%	3,245	4.8%
Retail Trade	8,160	15.0%	9,860	14.7%
Finance & Insurance	1,655	3.0%	1,895	2.8%
Real Estate & Insurance	1,385	2.5%	1,690	2.5%
Business Services	2,470	4.5%	3,700	5.5%
Government Services	2,315	4.3%	2,395	3.6%
Educational Services	2,895	5.3%	3,620	5.4%
Health & Social Services	4,955	9.1%	6,940	10.3%
Accommodation, Food & Beverage Services	4,910	9.0%	6,210	9.2%
Other Services	<u>4,430</u>	<u>8.2%</u>	<u>6,045</u>	<u>9.0%</u>
Total	<u>54,330</u>	<u>100.0%</u>	<u>67,270</u>	<u>100.0%</u>

Source: Kelowna and the Central Okanagan Economic Profile – 2000

The majority of businesses or about 88 % of the firms in the RDCO had less than 20 employees. However, there are a number of significant employers in the region as presented in Table II-14. Several businesses such as Western Star Trucks and Kelowna FlightCraft have gained a world wide reputation for their manufacturing expertise and have undergone significant growth in recent years.

**Table II-14: Major Employers**

Name	No. of Employees
School District #23	2,549
Kelowna General Hospital	2,300
Western Star Trucks	1,416
Okanagan University College	1,100
BC Tel	725
City of Kelowna	600
Lake City Casino	480
BC Fruit Packers Co-op	400
Riverside Forest Products	350
Sun-Rype Products Ltd.	350
Kelowna Flightcraft Air Charter	350
Big White Ski Resort (Seasonal)	300
The Grand Okanagan Resort	285
Gorman Brothers Lumber Ltd.	250
Northside Steel Fabricators	250
Interior Savings Credit Union	215
Campion Marine	215
Kelowna Daily Courier	207
Costco Wholesale Corporation	201
Revy Home and Garden	190
Coast Capri Hotel	187
Kelowna Worksyd	180
SRI Homes	174
Ramada Lodge Hotel	155
Olsten Health Services	150

Source: Kelowna and the Central Okanagan Economic Profile – 2000

**1(a)(vi) Industry Segments**

RDCO and Kelowna is the largest trading centre between Greater Vancouver and Alberta. RDCO has been able to maintain a healthy economy that can be attributed to a number of prosperous retail chains and manufacturing companies conducting business here.

**1(a)(vi)(A) Construction**

Construction has been a major activity in the RDCO as demonstrated by the ten-year history of building permits as presented in Table II-15. Construction activity was particularly heavy from 1991-1993 for a total value of construction exceeding \$215 million per year. In recent years construction activity has stabilized between \$175-200 million annually.

**Table II-15: Value of Building Permits in the RDCO - \$ millions**

Year	Residential	Industrial/ Commercial	Institutional/ Government	Total
1989	116.1	24.0	25.9	166.0
1990	136.2	22.6	7.6	166.4
1991	166.3	56.0	39.6	261.9
1992	201.4	61.9	17.8	281.1
1993	176.3	47.8	44.4	268.5
1994	139.9	44.8	10.2	194.9
1995	115.2	37.1	20.9	173.2
1996	139.2	44.8	25.8	209.8
1997	147.2	47.9	15.7	210.8
1998	93.0	72.8	6.1	171.9
1999	99.8	54.7	38.3	192.8

Source: Kelowna and the Central Okanagan Economic Profile – 2000

Residential construction has slowed in recent years as demonstrated in Table II-16. The number of new housing starts has dropped to approximately 30% of the previous high levels obtained in 1992. The drop in the annual number of housing starts is due to slower economic and population growth, consumer confidence and stiff competition from the resale market.

Recent housing starts in the Kelowna area have been lower than in recent years. Nevertheless, there are still about 629 new houses started and the proposed number of housing units at Crystal in any one year would only represent a small percentage of that total. The unique quality, location and target market should give units at Crystal better than average market even if the general market did not improve as expected.

Although there have only been 828 residential units built in the past year in the Kelowna area, the 340 residential units proposed at Crystal Mountain will likely be built over a 7 year period, meaning that it still only represents about 5% of the current show market and would represent less of the market in the improved economy anticipated.

**Table II-16: Annual Housing Starts**

Year	Houses	Row & Semi-Detached Units	Apartments & Condos	Total	Average House Price(Kelowna)
1989	1,257	210	613	2,080	\$102,196
1990	1,257	203	608	2,068	\$124,428
1991	1,294	300	623	2,217	\$135,030
1992	1,484	372	763	2,619	\$159,009
1993	1,149	238	584	1,971	\$174,901
1994	918	321	255	1,494	\$177,632
1995	776	262	167	1,205	\$179,955
1996	859	216	307	1,382	\$180,000
1997	988	321	427	1,736	\$190,000
1998	751	88	0	848	\$190,000
1999 (YTD Nov.)	629	103	96	828	n/a

Source: CMHC

**1(a)(vi)(B)**

**Manufacturing**

The RDCO has approximately 300 businesses engaged in the manufacturing sector. Presented in Table II-17 is the value of manufacturing shipments from 1990-1996 demonstrating the growth and development of the manufacturing sectors. Major manufacturers in the RDCO region include Riverside Forest Products, Sun Ripe Products Ltd. and Western Star Trucks. Other manufacturing operations include the production of wine, boats, aerospace products, communications equipment, modular homes and steel fabrication.

**Table II-17: Value of Manufacturing Shipments**

Year	Wood(000's)	Metal Fabricating (000's)	Other(000's)	Total	Total Employees	Wages & Salaries (millions)
1990	\$99.8	\$42.8	\$374.6	\$517	3,480	\$114.8
1991	\$111.8	\$39.8	\$311.7	\$463	3,169	\$112.5
1992	\$59.6	\$41.7	\$433.7	\$535	3,717	\$129.1
1993	\$153.9	\$48.0	\$438.2	\$640	4,271	\$143.6
1994	\$189.1	\$48.3	\$652.6	\$890	4,828	\$171.3
1995	\$203.9	\$53.5	\$918.5	\$1,176	5,349	\$193.3
1996	\$205.1	\$56.1	\$769.8	\$1,031	4,802	\$180.7

Source: BC Stats

**1(a)(vi)(C)****Wholesale and Retail Trade**

Retail sales have increased by 57.8 % in the RDCO since 1990 comparable to the 54.7 % increase in British Columbia during the same period. Retail sales grew strongly in the late 1990s compared to the middle 1990 period. Kelowna's position as the major retail and wholesale service centre in the interior of British Columbia is expected to continue in the future. All major chain stores are represented in Kelowna including Wal-Mart, Costco, The Brick, The Bay, Sears, Zellers, The Gap, Eddie Bauer, Chapters etc. As of December 1998 the Central Okanagan (RDCO) had approximately 8 million square feet of retail service and commercial space.



**Table II-18: Retail Sales Totals - \$ millions**

Year	RDCO Total Sales	% Change	BC Total Sales	% Change
1990	\$937	n/a	\$24,200	N/a
1991	\$913	-2.5%	\$23,537	-2.7%
1992	\$973	6.6%	\$24,433	3.8%
1993	\$981	0.9%	\$26,348	7.8%
1994	\$1,019	3.8%	\$29,032	10.2%
1995	\$1,022	0.3%	\$30,837	6.2%
1996	\$1,058	3.6%	\$31,252	1.3%
1997	\$1,099	3.8%	\$32,848	5.1%
1999	\$1,401	27.5%	\$34,882	6.2%
2000	\$1,478	5.4%	\$37,438	7.3%

Source: Kelowna and the Central Okanagan Economic Profile – 2000

#### 1(a)(vi)(D)

#### Agriculture

The agricultural sector of the RDCO continues to grow and develop as evidenced by the indicators presented in Table II-19. Total farm capital grew from \$506 million in 1991 to \$767 million in 1996, a 51.6 % change. Total farm income for the same period grew from \$47 million to \$61 million an improvement of 30%.

Kevin Day, a successful rancher from Kelowna, operates in the area considered for ski area expansion under a Livestock Grazing License and Crystal Mountain is planning to continue to cooperate in this activity.

RDCO is a major fruit growing region in the Province of British Columbia and has approximately 1,000 fruit growers. B.C. Tree Fruits, the British Columbia Fruit Board and the British Columbia Fruit Growers Association all maintain head offices in Kelowna. Sun Ripe Products Ltd. a grower and processing outlet is also located in Kelowna.

The Okanagan Valley has developed into an international wine growing region due to its ideal climate and terrain. In the RDCO there is a total of 9 wineries producing wines of intense bouquet and flavour.

**Table II-19: Size of the Agricultural Sector in the RDCO**

Indicator	1991	1996	% Change
Total Area of Farms (acres)	64,516	78,500	21.7%
Area of Tree Fruits	10,398	9,201	-11.5%
Area of vegetables	215	238	10.7%
Hay	4,837	N/A	N/A
Grain	614	1,143	86.2%
Unimproved Land	35,199	46,500	32.1%
Total Farm Capital	\$506,447,526	\$767,548,730	51.6%
Total Wages Paid	\$14,168,000	\$17,520,036	23.7%
Total Farm Income	\$47,119,053	\$61,368,658	30.2%
Cattle	7,596	6,133	-19.3%
Sheep	671	875	30.4%
Poultry	67,490	48,194	-28.6%

Source: Kelowna and the Central Okanagan Economic Profile – 2000

## 1(a)(vi)(E)

*Tourism*

Tourism is an important economic sector of the RDCO economy. The tourism statistics are covered within the Tourism market section of this report. Presented below is a brief summary of tourism highlights from the Kelowna Visitors and Convention Bureau and the B.C. Visitors Report.

## Tourism Highlights:

- Tourism generates approximately \$835 Million in the Okanagan Valley annually.
- The Okanagan is ranked third in the province in terms of the value of tourism revenue generated annually.
- The average visitor spends 3.9 days in Kelowna and spends approximately \$95.47 per day on accommodation, food entertainment, transportation and other costs.
- 53% of visitors come to Kelowna in the summer; 20% visit in the autumn, 18% in the spring and 10% in the winter.
- 96% of visitors surveyed said they would return to Kelowna, 51% of those within one year, and the remaining 49% within five years.
- The close working relations between tourism-related organizations in Vernon, Kelowna and Penticton play an important role in developing

industry as a whole.

- The Convention/Meetings/Tournaments market has tripled in size in the past eight years. Completion of Kelowna's multi purpose facility in 1999 will provide further incentive for this market to come to Kelowna and the Central Okanagan.

**1(a)(vi)(F)**

***Forestry***

Forestry continues to be a major industrial activity in the region. There were a total of 82 firms involved in logging and forest industries in the RDCO in 1996. Of these firms 6 businesses have more than 20 employees. Major companies include Riverside Forest Products that operates a large integrated sawmill and veneer plywood plant in Kelowna. Other major companies include Gorman Brothers, Radomski Log Homes, Canadian Japan Chopstick Corp. and a number of smaller sawmills.

Gorman Brothers is the main operator in the area considered for the ski area expansion.

**1(a)(vi)(G)**

***Mining***

Mining in the Central Okanagan (RDCO) is now non existent and new opportunities are not anticipated. The area is still active in exploration.

**1(a)(vi)(H)**

***High Technology***

RDCO has seen rapid growth that has resulted in a sizeable technology community. According to B.C. Stats, the Central Okanagan is now the third largest high tech area in the Province of British Columbia. Employment is approximately 2,500-3,000 persons with an estimated annual GDP of approximately \$120 million. The technology industry in the Okanagan is relatively young with most firms less than 5 years old.

The quality of life in the RDCO has become a significant factor in attracting employees into the region. Due to this factor and the availability of infrastructure and resources, the high technology sector in the Okanagan can be expected to continue at a high growth rate of between 10-20 %. Due to the strategic importance of the high technology sector to the Okanagan economy the Okanagan High Technology Council has been formed to act as a voice for the high technology sector in the region. The Council has developed a marketing theme of "Silicon Vineyard" to describe the booming high tech sector in the Okanagan Valley.

**1(a)(vii)**

***Transportation***

The centre piece of transportation in the RDCO is the Kelowna International Airport that is the second fastest growing airport in North America. The airport is currently undergoing a \$20 million expansion over the next 5 years. Presented in Table II-20 is a summary of the growth and the pattern of traffic over the last 10 years. The

availability of low cost fares from Westjet Airlines has stimulated air travel in recent years. Lower cost air fares and higher flight frequencies in the Kelowna airport has enabled Silver Star Mountain and Big White Mountain to successfully source overseas skier markets. The low cost air fares have also enabled travel by residents from other parts of British Columbia into the Okanagan for mini vacations.

**Table II-20: Passenger Traffic at Kelowna International Airport**

Year	Passenger Traffic
1988	398,034
1989	382,369
1990	395,206
1991	320,986
1992	312,492
1993	306,053
1994	317,995
1995	348,711
1996	582,042
1997	741,547
1998	799,662
1999	815,056
2000	836,564

Source: Kelowna International Airport

**1(a)(viii) *Impact of Social and Economic Factors of the RDCO on the Proposed Crystal Mountain Development***

RDCO has many social and economic factors that create a positive development climate for Crystal Mountain:

- RDCO has a healthy diversified economy.
- Population growth in the RDCO is expected to continue with significant immigration from other areas of the province.
- A large % of the growth in population in the RDCO is from employed young families.
- A large portion of RDCO residents are in middle income levels looking for value priced recreation opportunities at a convenient distance.

**1(a)(ix)      *Impact on Local Community Services***

Contacts were made with local community service providers to identify the impact of permanent residents at Crystal Mountain Resort on local services.

**1(a)(ix)(A)      *Schools***

Schooling will be provided by Helen Gorman Elementary, Glenrosa Middle School and George Pringle Secondary Schools. These schools are administered by School District #23 in Kelowna. The facility planner from the school district estimates the real estate units planned for Crystal Mountain Resort may generate up to approximately 20 school children from the single family chalets and vacation homes planned for the area. The schools have the capacity to absorb this potential increase in the number of children. Children from Crystal Mountain Resort would have to be bussed to school and paying for this service, if required, would be a concern for the School District.

**1(a)(ix)(B)      *Hospital Services***

Residents in Westbank are provided hospital services at Kelowna General Hospital. The addition of the small number of real estate units at Crystal Mountain Resort and its tourist activity would have an insignificant impact on the hospital services. Any problems with the delivery of hospital services are related to general health delivery problems in the Province and not to the additional demand from development planned for Crystal Mountain Resort.

**1(a)(ix)(C)      *Parks and Recreation***

Parks and recreation services are provided to the Westbank area by the Regional District of Central Okanagan. There is currently a shortage of recreation facilities, in particular soccer fields and baseball diamonds for the Westbank area. Park planners would be pleased to review the plans for Crystal Mountain Resort and determine if solutions can be worked out for both parties that would enhance the recreation facilities in the area. Crystal Mountain itself, however, would add a large recreation area to the region.

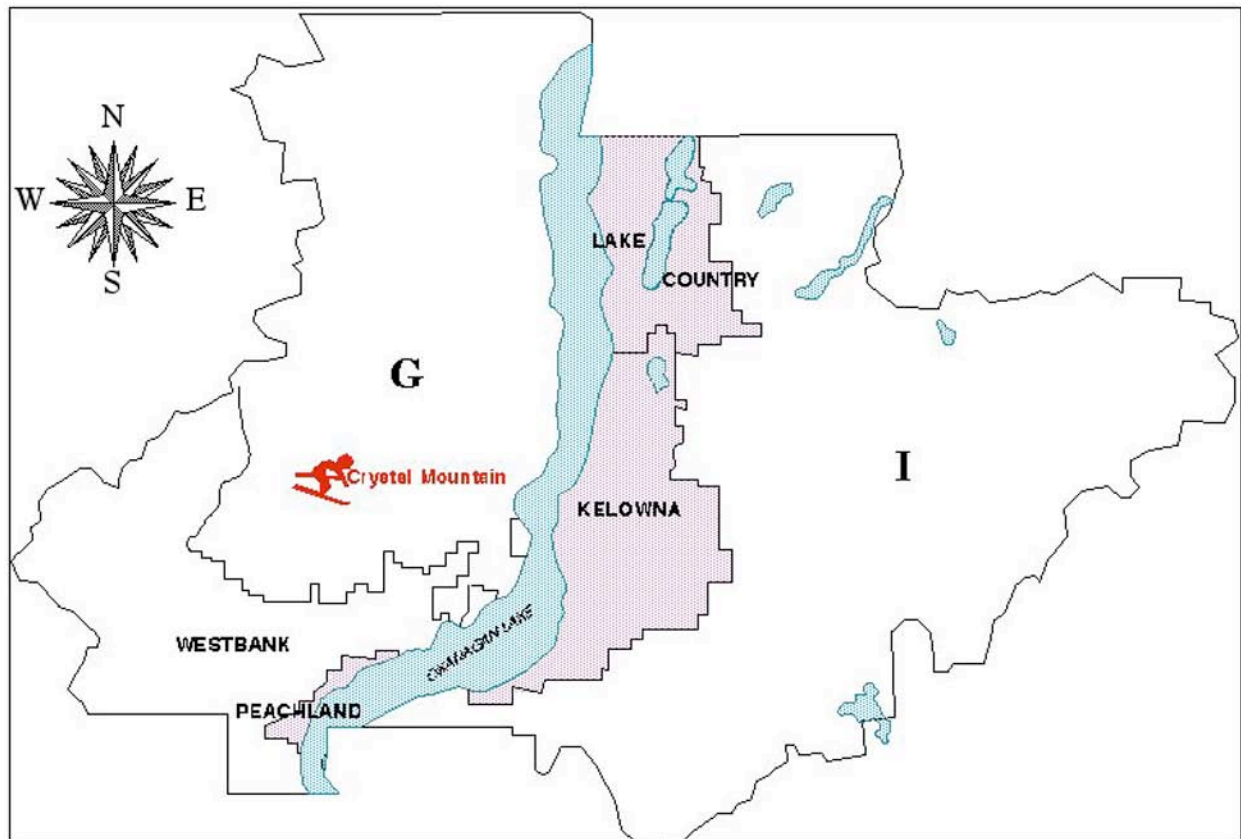
**1(a)(ix)(D)      *Municipal Services***

Westbank and the area that includes Crystal Mountain Resort is an unincorporated area that is provided municipal services by the Regional District of the Central Okanagan (RDCO). Water is provided by a local irrigation district. The RDCO sees no impact on municipal services with the addition of the number of real estate units planned for Crystal Mountain Resort. The only area of potential concern is the additional traffic that will be added to the access road and the potential impact on local residents. The impact of traffic on the access road will be addressed in conjunction with the Ministry of Transportation as the project phases will require in the development of Crystal Mountain, taking into account the experience of the



other mountain resorts and neighbouring population centres.

**EXHIBIT II-1: Regional District Boundaries Showing Electoral Area**





## PART III : ENVIRONMENTAL AUDIT.

### 1. INTRODUCTION

Crystal Mountain is currently planning an expansion of the facility near Westbank to include additional ski runs, lifts and residential/commercial development in the base area.

Since the existing Crystal Mountain ski hill already has tenure for approximately 900 acres to operate the existing ski hill, and the proposed development is an expansion, the project is not subject to review under the provincial *Environmental Assessment Act* (EA Act) process. However, it is subject to environmental review by an inter-agency committee under the provincial Commercial Alpine Ski Policy (CASP) process. The mountain area will be expanded from the existing three lifts and associated runs to a number of new lifts and runs that will encompass the area to the north beyond Mount Last. The expansion to Mount Last (1,500 metres asl) combined with a new lift into the Powers Creek drainage (800 metres asl) will provide a vertical drop of approximately 700-750 metres. The vertical drop does not compete with some of the other ski hills in the Okanagan but the emphasis is on family skiing, not extreme or expert skiing.

The base area will be expanded to include new residential areas (single and condo units), golf course(s), and a resort core area with a small number of hotel units and retail space to support the base area and mountain facilities. The resort is planned as a family oriented “regional” resort to draw clientele primarily from Kelowna, Westbank, Peachland, Summerland, Penticton and as far away as Vancouver. The key for the expansion will be to maintain and develop the four-season recreation component including winter skiing/snowboarding, golfing, summer events/festivals and a number of other recreation and tourist venues.

This environmental report identifies the environmental resources, concerns and issues associated with the proposed development of Crystal Mountain Expansion. Additionally, it provides conceptual mitigation measures and management plans to be used during the initial design and planning phase of the project to reduce or eliminate potential impacts of the proposed expansion on the environment. Guiding principles for sustainability including site design, building design and construction, water management, energy management, and waste management/recycling are also provided.

## 2. BIOGEOCLIMATIC ZONES AND PLANT COMMUNITIES.

The proposed mountain and base area expansion lands lie within the Montane Spruce (MS) and Interior Douglas fir (IDF) zones.

The project site is located in the Central Okanagan Regional District of BC and is identified as a Resource Management Zone Type 4 (Natural Disturbance Type 4, fire; OSLRMP Draft #6). The ecosystem is characterized by frequent low intensity fires and is described as a fire maintained system. A general biodiversity objective for the area is to retain all ecological elements and processes, including species richness, distribution and diversity. The area is defined to contain an intermediate biodiversity emphasis in the OP Management Guidelines section 2, and there is a low biodiversity emphasis for the remainder of the area.

The proposed mountain and base area expansion lands lie within the MSdm2, IDFdk2, IDFxh1 zones. A mature and/or old growth Engleman's spruce, Douglas fir and Lodgepole pine community primarily dominate the site. Riparian communities are associated with three stream courses including Powers Creek to the east, Law Creek along the southeast and Jack Creek to the west and southwest. These streams provide the bulk of annual run-off from the site into Okanagan Lake.

Table III-1 identifies BC Conservation Data Centre's Vascular Plant Tracking List of Rare Plants that are known to occur in the Kamloops Forest District and may occur on the proposed expansion lands.

**Table III-1: Vascular Plant Tracking List of Rare Plants in Kamloops Forest District**

Common Name	Scientific Name	Study Site BEC Zone
Bluebunch Wheatgrass ®	Elymus spicatus	IDFxh1/02 IDFxh1/03 MSdm2/02
Common Juniper ®	Juniperus communis	MSdm2/02
Hybrid White Spruce (B)	Picea engelmannii x glauca	MSdm2/07 MSdm2/01 MSdm2/05
Horsetail (B)	Equisetum spp.	MSdm2/07
Leafy moss (B)	Minium blytti	MSdm2/07
Falsebox (B)	Paxistima myrsinites	MSdm2/01
Red-stemmed feathermoss (B)	Pleurozium scherberi	MSdm2/01
Gooseberry (B)	Ribes lacustre	MSdm2/05
Grouseberry (B)	Vaccinium scoparium	MSdm2/05
Trembling Aspen ®	Populus tremuloides	IDFxh1a
Common Snowberry ®	Symphoricarpos albus	IDFxh1a
Kentucky Bluegrass ®	Poa pratensis	IDFxh1a
Douglas fir (B)	Pseudotsuga menziesii	IDFxh1/02

		IDFxh1/03
Ponderosa Pine (B)	Pinus ponderosa	IDFxh1/02 IDFxh1/03

“(R)” Indicate Red listed species “(B)” Indicate Blue listed species

Forest inventory mapping define the proposed expansion lands as containing primary tree stands composed of lodgepole pine, Douglas fir, Engleman's spruce, and to a lesser extent some ponderosa pine with an average age of 41-120 years. Riparian zones along Jack, Law and Powers Creeks are primarily composed of tree stands aged 41-100 years with dominant species composition of lodgepole pine, Douglas fir and Engleman's spruce.

### 3. FISHERIES.

Jack, Law and Trepanier Creeks are important habitat for fish and wildlife. Jack and Law Creek drain into a larger stream, Trepanier Creek to the south that eventually flows into Okanagan Lake.

The only fish species documented to be of regional concern to this project are rainbow trout (*Onchyrhynchus mykiss*) (FISS mapping) and Kokanee salmon (FISS Database and Ministry pers. comm. D. Tesch). Both of these species have been identified in Powers and Jack Creeks by the FISS Database, 1999. B. Janz of Penticton MELP has pointed out that rainbow trout and Kokanee salmon are present in the watershed along the base of Powers Creek to Highway 97 where a potential culvert barrier may obstruct/prevent upstream migration. Further, there exists a natural waterfall barrier to fish movement approximately 500 metres upstream from this Highway 97 culvert.

The lower portion of Powers Creek is a known spawning area for Kokanee salmon, while the lower portion of Trepanier Creek is a known spawning area for both Kokanee salmon and rainbow trout.

A report by Wildstone Resources Ltd. (1996) identified rainbow trout in Jack Creek. This report identifies rainbow trout, and potentially eastern brook trout as being present in Jack Creek along the main stem from Trepanier Creek to the headwaters. Kokanee salmon are likely restricted to upstream migration from Trepanier Creek due to a natural barrier (waterfall) about a kilometer upstream of Okanagan Lake. Their presence in Jack Creek is unlikely. There is no fish presence documented from approximately 1,000 metres elevation to the headwaters of the east arm of Jack Creek (D. Tesch). Additionally, there have been no fish identified in two west branches of Jack Creek at elevations approximately 856 metres and 960 metres.

Two branches of Law Creek headwaters encroach onto the study site. There is currently insufficient knowledge of fisheries populations about this stream but comments with Mr. B. Michael, MELP indicates that the headwaters of Law Creek are very dry and likely would not be able to support fish populations.

### 4. COMMUNITY WATERSHED.

The mountain is located in a community watershed that provides potable water for residents at its base.

Streams/springs located near the base, around the mountain expansion lands are not directly



associated with domestic ground water supply, and they do not provide a potable water supply to any residents in the area. The streams of Trepanier, Powers and Jack Creek have been identified as having water users associated with them.

Powers Creek watershed covers a total of 310,090 hectares and encompasses the study site along the east. It is the source of potable water for 38 domestic users, one of which is the Waterworks Local Authority for the town of Westbank, which uses approximately 182,500,000 gallons/year. For the remaining domestic and commercial users this includes a withdrawal of approximately 378,598 gallons/year.

There is a Forest Resource BC (FRBC) community watershed water quality-monitoring site located along Powers Creek at approximately 600 meters elevation.

The Trepanier Creek watershed is the largest and is also defined as a community watershed. It comprises a total of 310,065 hectares. Trepanier Creek is not included within the boundary of the study site but its hydrological flows are provided, in part by Jack Creek from the study site. This stream is a supply of potable water to a total of 89 water users. There are 45 water Irrigation users that consume 1,210.2 acrefoot of water, primarily held in storage, 43 domestic water users that consume a total of 31,252 imperial gallons per day and the Peachland Waterworks Authority, which uses 1,825,000 imperial gallons/year.

## **5. VIEWSCAPES**

Viewscapes associated with the project area are important for recreational enjoyment for residents of the adjacent towns and villages of Westbank and Glenrosa as well as a source of tourism. Visual landscape management activities are also important for future resource management. The proposed expansion lands lie within the Visual Management Zone 1 and 2 (VMZ) as defined by the Okanagan - Shuswap LRMP. These VMZs have been mapped according to the Ministry of Forests' visual landscape inventory procedures and standards, and have had input from the LRMP. Further, this area has had a series of Visual Quality Objectives (VQO) from the LRMP applied to it. These represent a level of public acceptability for visual alteration as a result of landscape planning.

Areas of the study site, which lie on the south face of Mount Last, have been defined by the LRMP as being VMZ 1. This area is declared a "scenic area" and has adopted VQO under the Forest Practice objectives and strategies of the LRMP. The areas to the north of the project site have been identified in the LRMP as Zone 2. This area is not scenic and does not have established VQO. Here the main focus should be in designing and implementing resource management activities that blend into the natural landscape.

## **6. SOIL STABILITY**

Primary concerns associated with soil stability to be addressed by the civil engineers in their design and construction specifications for the proposed expansion lands include landslides or debris flows in steep areas along the:

- West adjacent to Jack Creek headwaters;
- To the west of the ski hill base; and

- Areas along the north face around the headwaters of Powers and Jack Creek.

## 7. WILDLIFE RESOURCES

The Conservation Data Centre (CDC) does not show any recorded sites of Wildlife Habitat Areas to date; therefore there are no Wildlife Habitat Areas of concern in the project area (pers. comm. E. Maynard, CDC BC). Protected areas associated with the study site are still under consideration by the LRMP at the time of this document's compilation.

Table III-2 lists the number of red (endangered) and blue (threatened) listed wildlife species that could potentially occur on the site, although none have been confirmed as being present.

**Table III-2: CDC Rare Vertebrate Animal Tracking List**

Conservation Data Centre's Rare Vertebrate Animal Tracking List (Penticton Forest District Species List) and their likely occurrence in the project area (April 26, 1999)			
Species	Latin Name	BC Status	COSEWIC Status
<b>Birds</b>			<b>April 1999 status</b>
Lark Sparrow	<i>Chondestes grammacus</i>	Red	Not at Risk
*Western Screech-Owl	<i>Otus kennicottii macfarlanei</i>	Red	Indeterminate
American Peregrine Falcon	<i>Falco peregrinus anatum</i>	Red	Threatened
Brewer's Sparrow, Breweri	<i>Spizella breweri breweri</i>	Red	Not at Risk
Burrowing Owl	<i>Athene cunicularia</i>	Red	Endangered
Ferruginous Hawk	<i>Buteo regalis</i>	Red	Vulnerable
Grasshopper Sparrow	<i>Ammodramus savannarum</i>	Red	Not at Risk
Prairie Falcon	<i>Falco mexicanus</i>	Red	Not at Risk
Sage Grouse	<i>Centrocercus urophasianus</i>	Red	Extirpated
Sage Thrasher	<i>Oreoscoptes montanus</i>	Red	Endangered
Swainson's Hawk	<i>Buteo swainsoni</i>	Red	Not at Risk
Upland Sandpiper	<i>Bartramia longicauda</i>	Red	Not at Risk
White-Headed Woodpecker	<i>Picoides albolarvatus</i>	Red	Threatened
Yellow-Breasted Chat	<i>Icteria virens</i>	Red	Threatened
Long-Billed Curlew	<i>Numenius americanus</i>	Blue	Vulnerable
American Avocet	<i>Recurvirostra americana</i>	Blue	Not at Risk
American Bittern	<i>Botaurus lentiginosus</i>	Blue	Not at Risk
Barn Owl	<i>Tyto alba</i>	Blue	Endangered

Conservation Data Centre's Rare Vertebrate Animal Tracking List (Penticton Forest District Species List) and their likely occurrence in the project area (April 26, 1999)			
Species	Latin Name	BC Status	COSEWIC Status
Bobolink	<i>Dolichonyx oryzivorus</i>	Blue	Not at Risk
California Gull	<i>Larus californicus</i>	Blue	Not at Risk
Canyon Wren	<i>Catherpes mexicanus</i>	Blue	Not at Risk
*Flammulated Owl	<i>Otus flammeolus</i>	Blue	Vulnerable
Gray Flycatcher	<i>Empidonax wrightii</i>	Blue	Not at Risk
Great Blue Heron	<i>ardea herodias</i>	Blue	Vulnerable
*Lewis's Woodpecker	<i>Melanerpes lewis</i>	Blue	Vulnerable
*Sandhill Crane	<i>Grus canadensis</i>	Blue	Not at Risk
Sharp-Tailed Grouse	<i>Tympanuchus phasianellus</i>	Blue	Not at Risk
Short-eared owl	<i>Asio flammeus</i>	Blue	Vulnerable
White-Throated Swift	<i>Aeronautes saxatalis</i>	Blue	Not at Risk
*Williamson's Sapsucker	<i>Sphyrapicus thyroideus</i>	Blue	Not at Risk
Bald Eagle	<i>Haliaeetus leucocephalus</i>	Yellow	Not at Risk
Redhead	<i>Aythya americana</i>	Yellow	Not at Risk
Ring-Billed Gull	<i>Larus delawarensis</i>	Yellow	Not at Risk
Rough-Legged Hawk	<i>Buteo lagopus</i>	Yellow	Not at Risk
<b>Mammals</b>			
*Pallid Bat	<i>Antrozous pallidus</i>	Red	Vulnerable
*Northern Long-Eared Myotis	<i>Myotis septentrionalis</i>	Red	Not at Risk
California Bighorn	<i>Ovis canadensis californiana</i>	Blue	Not at Risk
Fisher	<i>Martes pennanti</i>	Blue	Not at Risk
*Fringed Myotis	<i>Myotis thysanodes</i>	Blue	Vulnerable
Great Basin Pocket Mouse	<i>Perognathus parvus</i>	Blue	Not at Risk
*Nuttall's Cottontail	<i>Sylvilagus nuttallii</i>	Blue	Vulnerable
*Spotted Bat	<i>Euderma maculatum</i>	Blue	Vulnerable
*Townsend's Big-Eared Bat	<i>Corynorhinus townsendii</i>	Blue	Not at Risk
*Western Harvest Mouse	<i>Reithrodontomys megalotis</i>	Blue	Vulnerable
*Western Small-Footed Myotis	<i>Myotis ciliolabrum</i>	Blue	Not at Risk

Conservation Data Centre's Rare Vertebrate Animal Tracking List (Penticton Forest District Species List) and their likely occurrence in the project area (April 26, 1999)			
Species	Latin Name	BC Status	COSEWIC Status
<b>Reptiles</b>			
Night Snake	<i>Hypsiglena torquata</i>	Red	Not at Risk
*Gopher Snake	<i>Pituophis catenifer deserticola</i>	Blue	Not at Risk
*Painted Turtle	<i>Chrysemys picta</i>	Blue	Not at Risk
*Racer	<i>Coluber constrictor</i>	Blue	Not at Risk
*Rubber Boa	<i>Charina bottae</i>	Blue	Not at Risk
Western Rattlesnake	<i>Crotalus viridis</i>	Blue	Not at Risk
<b>Amphibians</b>			
*Tiger Salamander	<i>Ambystoma tigrinum</i>	Red	Not at Risk
Tailed Frog	<i>Ascaphus truei</i>	Red	Not at Risk
*Northern Leopard Frog	<i>Rana pipiens</i>	Red	Endangered
Great Basin Spadefoot	<i>Spea intermontana</i>	Blue	Vulnerable

Table III-3 describes which wildlife species could occur within the Montane Spruce and Interior Douglas fir zones of the proposed ski hill expansion lands.

**Table III-3: Wildlife Species Occurring in Montane Spruce and Interior Douglas Fir Zones**

Habitat	Habitat Distribution in Study Site	Characteristic Potential and Representative Wildlife Species in the Montane Spruce MSDm <sup>2</sup> ) Zone	Wildlife Species at Risk
Young seral forest	Extensive	Moose, Mule Deer, Black Bear, Lynx, Coyote, Little Brown Myotis, Snowshoe Hare, Porcupine, Heather Vole, Deer Mouse, Masked Shrew  Northern Hawk Owl, Northern Pygmy-owl, Ruffed Grouse, Three-toed Woodpecker, Black-backed Woodpecker, Wilson's Warbler, Rufous Hummingbird, Pine Grosbeak, Western Tanager, Dark-eyed Junco, Audubon's Warbler	
Mature coniferous forest	Moderate	Moose, Mule Deer, Cougar, Lynx, Coyote, Black Bear, Fisher, Marten, Red Squirrel, Snowshoe Hare, Silver-haired Bat, Little Brown Myotis, Southern red-backed Vole, Deer Mouse, Masked Shrew  Barred Owl, Black-backed Woodpecker, Three-toed Woodpecker, Stellar's Jay, Red Crossbill, Golden-crowned Kinglet, Mountain Chickadee, Red-breasted Nuthatch.	
Riparian areas, Wetlands, open meadows (clearcuts), Floodplain and streams	Common	Moose, Mule Deer, Black Bear, Coyote, Long-tailed Weasel, Little Brown Myotis, Water Vole, Deer Mouse, Western Jumping Mouse, Meadow Jumping Mouse  Ruffed Grouse, American Dipper  Northern Leopard Frog, Western Painted Turtle	Northern Leopard Frog
Old-growth and mature coniferous forest	Moderate	Rocky Mountain Elk, Mule Deer, White-tailed Deer, Black Bear, Cougar, Coyote, Big Brown Bat, Hoary Bat, Red Squirrel, Southern Red-backed Vole  Northern Pygmy-owl, Pileated Woodpecker, Clark's Nutcracker, Red-naped Sapsucker, Red-breasted Nuthatch, Red-tailed Hawk, Pacific Tree Frog	Flammulated Owl, Williamson's Sapsucker, Rubber Boa
Young seral forest	Extensive	Moose, Rocky Mountain Elk, Mule Deer, White-tailed Deer, Black Bear, Cougar, Coyote, Badger, Northern Pocket Gopher	



Habitat	Habitat Distribution in Study Site	Characteristic Potential and Representative Wildlife Species in the Montane Spruce MSDm <sup>2</sup> ) Zone	Wildlife Species at Risk
		Ruffed Grouse	
South aspect IDF	Abundant	Rocky Mountain Elk, Mule Deer, White-tailed Deer, Black Bear, Cougar, Coyote, Badger, Big Brown Bat, Northern Pocket Gopher  White-breasted Nuthatch	Western Yellow-bellied Racer, Rubber Boa, Townsend's Big Eared Bat, Flammulated Owl, White-headed Woodpecker, California Bighorn Sheep, Gopher Snake

Although the location of this project results in wildlife impacts that are lower than they might otherwise be, any development which occupies space, alters natural ecosystems and introduces relatively large numbers of people into natural environments has the potential to affect some species. The kinds of effects that will or could result from this project are summarized in Table III-4. Most potential effects are of limited significance because of their relatively small geographic extent and/or because they can be substantially mitigated.

**Table III-4: Wildlife Impacts**

Impact	Contributing Factors	Main Species of Concern
Permanent Habitat Loss	<ul style="list-style-type: none"> <li>Hotels, condos, housing, restaurant roadways and supporting infrastructure</li> </ul>	<ul style="list-style-type: none"> <li>Terrestrial forest dwelling species</li> </ul>
Habitat Alteration	<ul style="list-style-type: none"> <li>Mainly clearing of new ski trails</li> <li>Storm drainage effects on wetland</li> </ul>	<ul style="list-style-type: none"> <li>Terrestrial forest dwelling species</li> <li>Wetland wildlife</li> </ul>
Wildlife Disturbance and/or habitat avoidance due to construction activity	<ul style="list-style-type: none"> <li>Noise and Human activity assoc. with construction of lifts, buildings and roads</li> </ul>	<ul style="list-style-type: none"> <li>Grizzly bear, ungulates</li> </ul>
Undesirable bear-human interactions	<ul style="list-style-type: none"> <li>Increased number of hikers in bear country</li> <li>Attraction to food wastes in resort, housing or housing areas</li> </ul>	<ul style="list-style-type: none"> <li>Nesting birds, small mammals</li> </ul>
Avalanche control	<ul style="list-style-type: none"> <li>Noise from explosive devices</li> </ul>	<ul style="list-style-type: none"> <li>Potential Mountain Goats</li> </ul>

Closure of hunting	<ul style="list-style-type: none"> <li>Public safety</li> </ul>	<ul style="list-style-type: none"> <li>Big game &amp; upland birds</li> </ul>
Traffic collisions with Wildlife	<ul style="list-style-type: none"> <li>Improved road design and increased traffic volumes</li> </ul>	<ul style="list-style-type: none"> <li>Deer, small mammal</li> </ul>

Habitat alteration is primarily caused by forest clearing for new ski trails. This is the most geographically widespread effect of the project, and can have both positive and negative consequences for wildlife. Most of clearing will be in the mountain face of stands aged 21 to 140 years. Based on examination of existing runs, the new ski runs will support grass-forb, low shrub-herb, or shrub-dominated communities.

The existing ski runs support a variety of herb and shrub communities, from dense, tall grass-fireweed stands on moist low elevation sites, to sparse shrub-juvenile conifer stands on steep, rocky terrain. It is anticipated that a similar range of vegetation type will develop on the new ski trails. Based on the kinds of vegetation present on existing runs and wildlife occurrence on the site the following kinds of wildlife use would be predicted for the new runs:

- Mule and white-tailed deer: spring/early summer grazing on herbaceous vegetation plus some use of new leafage on shrubs.
- Black bear: spring grazing on herbaceous vegetation (particularly in moist sites); summer use of berries on shrubby sites;
- Hare: use of herbaceous summer forage; spring and fall use of shrubby sites;
- Small mammals: cover and forage for voles in dense herbaceous growth (mostly moist sites); deer mouse use of shrub stands; chipmunk use of berries and seeds;
- Birds: nesting habitat for a few species which utilize edge and open areas; foraging habitat (insects, seeds, berries) for species which nest in adjacent forest;
- Predators: open hunting areas for owls, hawks, ermine and coyotes to hunt small mammals.

In general, the ski runs are expected to create species diversity that will result in greater habitat diversity from present. The ski trail habitats are expected to produce more forage in the form of herbaceous material, woody browse and berries than the forest stands that they replace. These changes will benefit some species, as noted above. On the other hand, forest removal for ski trails will have negative consequences for those species that depend primarily on mature forest stands, and/or require forest-interior conditions. This includes, for example, marten, rubber boa, American Marten, Sandhill Crane, Fisher, and cavity-nesting birds. However, many of those species (e.g. marten, fisher rubber boa and songbirds) do forage to some extent in openings that are adjacent to forest stands. The over-all fauna of the region is not entirely mature forest or old-growth dependant, having evolved over thousands of years in an environment where recurring wildfire created early seral stages,(characteristic of the NDT 4 habitat) often arranged in linear patterns. To some extent, the proposed new runs will be analogs of those natural forest disturbance regimes. It is not possible to analyze positive and negative effects of ski trail clearing for each wildlife species. However, we believe that negative effects are unlikely to outweigh positive ones.

Recreational disturbance by passive outdoor recreation does not usually have significant negative

consequences for wildlife, although exceptions can occur. There have been numerous studies of the impacts of *industrial* disturbance (e.g. logging; highways; pipeline constructing; aircraft; blasting; seismic exploration) on selected wildlife, however recreational disturbance has received little attention, presumably because it is not viewed as a significant threat in most areas. High levels of back-country use in the National Parks demonstrates that most wildlife species can co-exist in normal abundance with considerable *non-threatening* human activity. The most common exception to this involves confrontations between people and bears and cougars.

Wildlife disturbance in winter is most unlikely because, at this season, most birds have migrated south, bears are hibernating, and most ungulates are likely on winter ranges outside the project area. In addition, almost all recreational use is concentrated in the resort/housing area or along ski lifts and downhill runs. That kind of activity is not known to have caused wildlife disturbance impacts at other ski areas of this type.

In summer there is a greater *potential* for recreational disturbance of wildlife because more species are in the area and some hikers will venture beyond the developed downhill or nordic ski trails. However, as noted earlier, passive outdoor recreation of this kind is not usually a concern.

Construction-caused disturbance is primarily a concern in the lower areas proposed for development; along the edges of riparian zones of Powers, Law and Jack Creek headwaters. Attributes of construction to be considered would be the drilling and blasting. Those activities have the potential to cause undesirable disturbance of wildlife. The significance of such construction-related impacts however, is tempered to some extent by their relatively short-term duration. Although they may cause some inconvenience to wildlife by causing temporary avoidance of active construction areas, this is very unlikely to have any consequences for survivorship.

## **8. Golf Course**

A fertilizer and pesticide management plan will be included in the design and maintenance program for the proposed Crystal Mountain Golf Course to address concerns about possible leaching and runoff with impacts to water users, fish and wildlife of Law, Jack and Powers Creeks

### **8(a) Fertilizer and Pesticide Management Plan**

The following conceptual fertilizer and pesticide management plan will provide an effective set of guidelines to be used for the operation of the golf course. The plan is intended to minimize the potential for runoff or leaching of fertilizers and pesticides to surface drainages, including water features. Field studies (Krause and Niemczyk 1989, Watschke et al. 1989) have demonstrated that both runoff and leaching of pesticides and fertilizers from well-managed turf are negligible. The fertilizer and pesticide management plan includes guidelines for producing a well managed healthy turf. The plan also includes a list of pesticides that will not pose a threat to fish, wildlife or livestock. The fertilizer and pesticide management guidelines are based on review of recent literature and on discussions with British Columbia golf course supervisors and Ministry of Water, Land and Air Protection, Pesticide Management Branch personnel.

The following fertilizer and pesticide management plan is intended to provide guidelines for chemical management rather than rigid protocols. The actual fertilizers and pesticides applied will vary somewhat depending upon soil and turf conditions. To ensure that the

guidelines are applied properly, the golf course should employ a fully trained and experienced golf course superintendent, who will be responsible for all aspects of course maintenance, including chemical management.

#### **8(b) Fertilizer Management**

The primary objective of a fertilizer management plan is to ensure that the turf receives the necessary nutrients in the required amounts and at the proper time. This will produce a healthy turf, while reducing the potential for leaching of excess nutrients.

Fertilizer consists of nitrogen (N), phosphorus (P), and potassium (K), and in some cases, trace elements. Due to its solubility in water, nitrogen is the fertilizer component with the greatest potential for runoff or leaching. Phosphorus is immobile in soil and only likely to be lost through erosion, which is unlikely on a golf course. The leaching potential of potassium is somewhat lower than that of nitrogen, and no undesirable impacts to water quality have been associated with potassium leaching from fertilization. Therefore, the fertilizer management plan emphasizes nitrogen management.

The recommended fertilization rates and other management techniques are based on published literature (Petrovic 1989, Zontek 1990, Mugaas et al. 1991) and discussions with local golf course superintendents. These recommendations assume "average" conditions and, in practice, may vary depending upon the results of soil tests, final decisions on course construction, and observations of turf health.

Fertilizer requirements of different areas of the golf course will also vary. Therefore, the management plan is presented by area (greens and tees, fairways, roughs).

##### **8(b)(i) General Maintenance Practices**

Fertilizers should be applied conservatively, using the lowest rate required to produce healthy turf. More frequent applications of smaller amounts of fertilizer (0.25 to 0.5 lb. N per 1000 ft<sup>2</sup>) should be used in preference to a few, large applications, to reduce the potential for loss through runoff or leaching. Lower rates may be used on putting greens to achieve better control of growth.

Slow-releasing nitrogen sources, such as sulphur-coated urea (SCU), isobutylidene diurea (IBDU), or other cold water insoluble nitrogen, will be emphasized. A minimum of 50% of any nitrogen application to fairways and 65% of any nitrogen application to greens and tees will be in one of these forms.

Nitrogen should not be applied during hot, dry periods when irrigation requirements are high; nor should it be used in late fall, when, it can promote the growth of turf diseases such as grey snow mold (leading to fungicide applications).

Several other precautions will be taken to ensure that nutrients from fertilizers do not enter water features. Fertilizers should be applied in a manner that maintains a buffer zone around water features. A gravity spreader (rather than a rotary spreader) should be used near ponds to further reduce the possibility of granules entering the water.

The golf course should be irrigated conservatively to reduce the potential for runoff or leaching. This should include heavier, less frequent watering rather than light, frequent applications of water. Light irrigation (0.25 to 0.5 inches of water) should follow applications containing quick-release fertilizers to move the fertilizer off the foliage and into the ground. This irrigation should help to prevent runoff and fertilizer burn.

All bulk fertilizers should be transferred to the application equipment in a dedicated fertilizer storage/preparation facility designed to contain and allow cleanup of any spills. Spilled fertilizers should never be flushed into the storm drainage system.

Fertilizer applications should be based on soil tests. Soil testing should begin during the construction phase. It should be done every one to two years after that, depending upon the type of turf grown. Putting greens may be tested several times per year. Soil testing should be supplemented periodically with plant tissue analysis to identify potential nutrient problems.

#### **8(b)(ii)      *Application Rates for Greens and Tees***

Greens and tees are the most heavily managed areas of a golf course. The player's perception of the golf course is based primarily on the appearance of the greens. They therefore receive the highest rates of fertilizer applications. Tees may be fertilized at a similar rate to greens or at a somewhat lower rate (60% to 70% of the rate for greens), depending upon the maintenance standards and budget determined for the course.

An appropriate fertilization rate (per 1000 ft<sup>2</sup>) for established bentgrass greens is 0.5 to 0.7 lb. N per growing month (or about 4.5 to 5.0 lb. per growing season), 1 to 2 lb. P per growing season, and 3.5 lb. K or more per growing season. The actual amounts of phosphorus and potassium applied should be based on the results of soil tests. The fertilizer requirements likely should be higher while the turf is becoming established, particularly if USGA specification sand greens are constructed.

Fertilization should begin in spring and continue through the growing season. The first fertilizer application of the year should normally be a complete fertilizer (N-P-K), and may have high nitrogen content (1 lb. N/1000 ft<sup>2</sup>). Nitrogen should continue to be applied approximately every four weeks at a rate of about 0.5 lb./ 1000 ft<sup>2</sup>, with some additional, light applications if required to maintain turf quality. There usually are two phosphorus applications annually (spring and fall), but an additional, light application may be made at mid-season (June). Potassium is normally applied three to five times per season, in an N-K or N-P-K mix. One mid-season fertilizer application may include iron or a trace element package (calcium, magnesium, copper, sulphur, zinc, molybdenum, manganese and iron).

#### **8(b)(iii)      *Application Rates for Fairways***

The appropriate fertilization rate for bentgrass/fescue fairways is approximately 3 lb. N, 1.0 to 2.0 lb. P, and 2.0 to 3.0 lb. K per 1000 ft<sup>2</sup> per season. The fertilizer should be delivered in four or five applications. Two to three of these applications should



contain phosphorus.

**8(b)(iv)      *Application Rates for Roughs***

Fertilizer may be applied to limited areas of manicured rough, which is mowed during the growing season. The rough should be fertilized at a rate equivalent to 1.0 to 2.0 lb. N, and about 1.0 lb. each of P and K per 1000 ft<sup>2</sup> per season. The fertilizer should be applied in three to four applications.

**8(c)      Pesticide Management**

**8(c)(i)      *Integrated Pest Management***

The primary focus of the pesticide management plan should be to minimize pesticide use by employing an integrated pest management (IPM) program. Major components of an IPM program include:

- Establishing tolerance levels for pests (disease, weeds, insects), monitoring the pests, and treating only when the pre-determined tolerance level is exceeded;
- Using effective alternatives to pesticides when they are available;
- When pesticides are required, using the "least toxic" alternative (a pesticide characterized by low water solubility, low leachability, and low acute toxicity to fish and wildlife); and
- Using pesticides at the minimum effective application rate.

For golf courses, an essential component of IPM is an emphasis on maintaining healthy turf, which minimizes the need for chemical control of weeds, insects, and diseases. Measures to maintain a healthy turf include:

- Constructing greens and tees to provide a base that will not compact;
- Reducing stress to turf by constructing greens and tees of sufficient size to handle the expected traffic and providing cart paths and requiring their use;
- Providing adequate surface and subsurface drainage;
- Managing snow to minimize accumulations and accelerate melting: Spreading dark organic material will accelerate snow melt; snow blowing equipment and snow fences can be used to distribute snow evenly;
- Selecting, where available, turf species and cultivars that are resistant to the locally endemic diseases such as grey snow mold, Fusarium, and take-all patch: a blend of different cultivars or species having resistance to different diseases can provide superior overall performance;
- Using high quality seed stock that includes an analysis of the types and numbers of weed seeds contained in the product;
- Providing adequate irrigation;

- Watering early in the morning rather than in the evening to reduce the potential for promoting diseases;
- Fertilizing, aerating, and overseeing adequately to develop a dense, healthy turf; and
- Paying particular attention to fall cultivation: aerating, top dressing with compost, and avoiding fertilization in late fall when active growth may lead to damage from cold and/or disease.

**8(c)(ii)*****Pesticide Selection***

The fungicides are the class of pesticides most frequently applied on local golf courses. They are applied most commonly to control grey snow mould, although Fusarium and take-all patch sometimes are problems during the summer. In addition, damping-off fungus is a potential problem on new turf.

All registered pesticides are considered environmentally safe if applied in accordance with approved manufacture's instructions. However, chemicals with  $LC_{50} < 1.0$  mg/L are considered highly toxic to fish and generally will be used with caution at the Crystal Mountain Golf Course. The more toxic fungicides would only be used in special cases, if other chemicals proved ineffective. For example, benomyl might be required to treat damping-off fungus on new greens.

Herbicides registered for use on golf courses and used locally to control broadleaf weeds include dicamba, 2,4-D (amine), and mecoprop, which are often used in combination. Roundup (glyphosate) can be used for total vegetation control on areas such as cart paths. None of the herbicides listed is highly toxic to fish. The most toxic herbicide, Roundup, is virtually immobile once it comes in contact with soil and is highly unlikely to enter local streams. Therefore, any of these herbicides may be used on the Crystal Mountain Golf Course.

Turf insects are generally not a problem locally, but it will be necessary to control mosquitoes and possibly blackflies in the golf course ponds. It may be possible to co-ordinate treatment for mosquito larvae with the regional district's mosquito control program. This program entails treatment with the biological agent *Bacillus thuringiensis* Berliner var. *israeliensis*, which also is effective for blackfly larvae. Adult populations of mosquitoes and blackflies should be monitored closely. Treatment for adults (with malathion) should be implemented only if and when populations exceed a predetermined threshold level. To maximize the threshold, golfers should be encouraged to use personal methods against mosquitoes (e.g. long sleeved shirts and pants and repellents).

Biological controls should be implemented as they become available. Current research involves biological controls for several turf diseases. Such products should be tested at the Crystal Mountain Golf Course when and if they become available locally. They should be used regularly, if they prove effective and are safe.

**8(c)(iii)*****Pesticide Application***

The golf course supervisor and/or other maintenance personnel should hold a British

Columbia Pesticide Applicator's Certificate. A certified Pesticide Applicator should be responsible for any pesticide use on the golf course. Any other persons preparing or applying pesticides should be provided with adequate instruction.

The golf course superintendent or greens keeper should determine when a disease or weed problem requires chemical treatment. Fungicide treatments should normally be limited to the greens and tees. Fairways should only be treated in unusual circumstances involving severe disease, and roughs will not be treated at all. The greens keepers normally should avoid the use of herbicides on greens and tees, where the turf typically is shallow-rooted and could be damaged by these chemicals.

All pesticides should be applied only for their registered purpose and in accordance with approved manufacturer's instructions. To ensure against the possible entry of pesticides into streams, applicators should adhere to the Pesticide Management Guideline that a 10-m pesticide free zone be maintained around any golf course water features that discharge to natural watercourses. Any vegetated buffers around water features should also remain pesticide free. In addition, wherever practical, heavily managed areas (greens and tees) should be set back at least 10-m from golf course water features. Pesticides should not be applied on any portions of greens or tees that may be less than 10-m from the water features.

All pesticides should be prepared in a dedicated area designed to contain spills. Equipment used to apply pesticides should also be cleaned in the dedicated area.

Cleaning should be done in a manner that will protect water quality. Rinsate should never be poured down sink drains or into the storm sewer system. If practical, it should be reapplied to an appropriate area of turf or saved and used as make-up water for a future batch of the same pesticide. If these recycling measures prove impractical, the rinsate should be disposed in a manner approved by the British Columbia Ministry of Environment.

#### **8(c)(iv) Chemical Storage Facility**

Fertilizers and pesticides should be stored and prepared for use in a manner that will prevent their accidental release to the environment. The storage facility should be located at least 100-m away from all streams. It should have an impermeable floor and otherwise be constructed such that any potential chemical spills can be contained within the storage area for clean up. Enough cleanup material should be kept on hand to deal with a spill of twice the volume of the largest container in the building. If floor drains are provided, they should empty to holding tanks rather than to the storm sewer.

The pesticide storage and preparation areas should be in a separate room isolated from the fertilizer area and from any other facilities, particularly employee lunchrooms. Any floor drain in the pesticide storage area should lead to a holding tank that is separate from the tank draining the fertilizer storage area. This arrangement should avoid cross contamination and allow recovery and reuse of spilled pesticide or fertilizer.

The pesticide storage area should incorporate a number of safety features. It should

be adequately ventilated (the atmosphere will be turned over at least six times per hour). The facility should meet the local fire code and be supplied with a separate fire alarm and fire extinguisher. A separate area should be dedicated to storage for protective equipment and notebooks containing Material Safety Data Sheets for all hazardous materials used on site.

The pesticide storage area should meet the requirements outlined in the B.C. *Pesticide Control Act*. It should remain locked at all times when it is unattended. The outside door should carry a sign which states, "WARNING - CHEMICAL STORAGE - AUTHORIZED PERSONS ONLY". Only the golf course supervisor or other authorized persons should be allowed to enter the pesticide storage area. The local fire department should be notified of the presence of pesticides on the premises.

The above noted measures, which are intended to become part of the development mandatory strategies, will effectively eliminate the well known concerns raised by earlier golf course developments, and achieve similar environmental results to a complete pesticide ban without the disadvantages of a draconian program, which may not be implemented by an operator.

## 9. CONCLUSIONS

Based on existing baseline resource information on fish and wildlife habitat, forest resources (including old growth), terrain information and surface/groundwater resources, significant impacts from siting mountain and base area facilities have been avoided to a large degree. However, there will still be impacts to forest resources and associated wildlife habitat from the development of ski lifts and runs and base area commercial/residential units and access roads. Impacts to wildlife from forest removal will likely result in a species shift from mature forest dwelling wildlife to wildlife that prefer edge habitat and early seral stage vegetation. In addition, careful siting and management of wastewater treatment facilities will be required to avoid impacts to surface and groundwater users in the base area. It is anticipated that these impacts can be managed through the implementation of stormwater management plans, erosion and control plans, spill contingency plans, riparian setbacks and fertilizer and pesticide plans.

Prior to finalization of the master plan, additional information on specific fish and wildlife resources, natural hazard areas, old growth forests and surface and groundwater resources have been acquired to assist in more detailed planning of the mountain and base areas. This activity will continue into the detailed engineering phase.

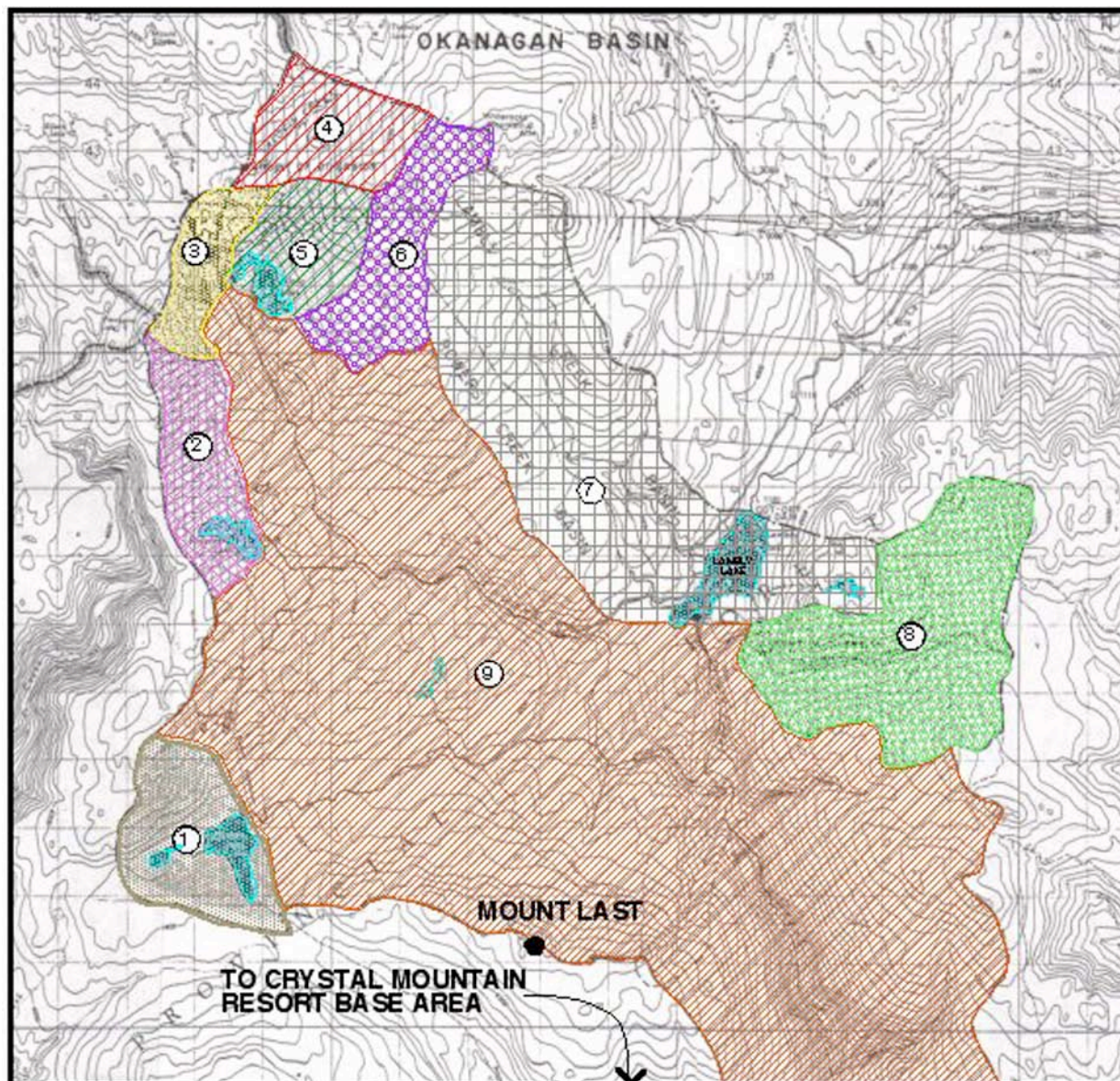
## 10. ACKNOWLEDGEMENTS

We gratefully acknowledge the assistance of E. Maynard and others of the Planning and Assessment Office, Ministry of Environment (formerly Ministry of Water, Land and Air Protection), for their most valuable assistance in project information collection and direction, B. Lincoln for his input on wildlife issues and concerns, D. Tesch's assistance on fisheries concerns, B. Michael for information on water resource issues and concerns, J. Bryan for his assistance on waste concern issues, R. Venables, and G. Hatch who provided mapping and information for this report. The Conservation Data Centre (CDC) also provided information on red and blue listed fish and wildlife species.

The additional study undertaken prior to completing the Master Plan proposal is attached as Appendix A.

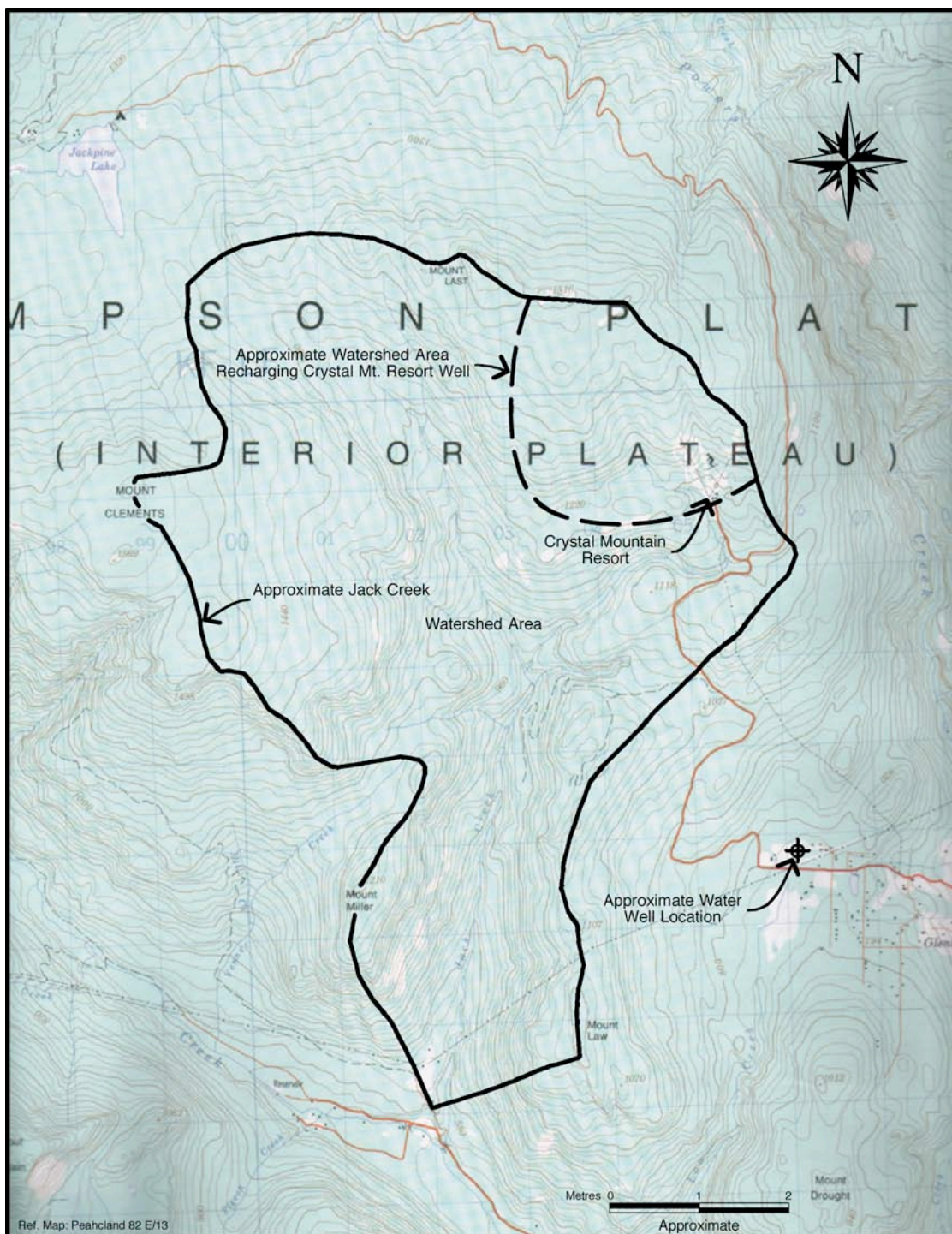


EXHIBIT III-1: Powers Creek Watershed Area (Hatched Area)





## EXHIBIT III-2: Jack Creek Watershed Area



## **PART IV : THE MASTER PLAN**

### **1. MOUNTAIN AREA DEVELOPMENT CONCEPT**

#### **1(a) Statement of Objectives**

The purpose of the study and of the proposal is:

1. to answer questions regarding the viability and expansion potential of the area.
2. to create an ultimate development plan concept.
3. to determine the sustainability of the development.

The studies carried out since 1998 years and summarized in this report have determined that an expansion would create an economically viable and environmentally sustainable recreational resort area and this report is setting out below the ultimate development potential and targets for the area.

#### **1(b) The Concept**

The concept of the recreational area consists in combining winter and summer recreation through the expansion of an improved ski and snowboarding area in winter with golfing and other summer recreational activities.

The vision of the ski area is developed on the attributes of a good climate, good quality snow and a moderate vertical drop. The plan is to expand upward and laterally to gain access to a greater vertical drop and to the best terrain for skiing and snowboarding, and to improve the reputation of the area as an attractive and affordable destination for family recreation. It will offer an enjoyable learning experience in a forested setting and a mild climate, with much sunshine and enough powder snow to allow easy skiing on groomed runs and among the trees. The experience will be complemented by improving and expanding resort commercial facilities and opportunities for overnight accommodation. The project is planned so that the resort may become not only a regional destination, but will also attract people from further away, particularly from the Lower Mainland of B.C., who are looking for safe and comfortable family fun and recreation. The Base Area development concept is described further in Part IV, Section 2. The Mountain Area development concept is described below:

#### **1(c) Mountain Area Analysis**

The elevation of the base resort village will be approximately 1,173 metres (3,848 feet). It is an average elevation for a ski resort in British Columbia and is comparable to that of Mount Washington on Vancouver Island and Sun Peaks near Kamloops. This elevation, combined with the weather patterns in the area, helps to keep a good snow cover at the proposed site location, and provides an ideal climate for golfing in the summer.

For comparative purposes, the approximate base elevations of other ski resorts are shown in Table IV-1 below.

**Table IV-1: Base Elevations**

Mountain/Resort	Base Elevation
Apex, Canada	5,197 ft. / 1,575 m
Big White, Canada	5,760 ft. / 1,755 m
Crystal Mountain, Canada	3,848 ft. / 1,173 m
Fernie, Canada	3,504 ft. / 1,068 m
Kicking Horse Mountain Resort, Canada	4,140 ft. / 1,262 m
Lake Louise, Canada	5,450 ft. / 1,662 m
Mont Tremblant, Canada	869 ft. / 265 m
Mount Hood, USA	5,834 ft. / 1,779 m
Mount Bachelor, USA	5,800 ft. / 1,768 m
Mount Washington, Canada	3,680 ft. / 1,122 m
Panorama, Canada	3,600 ft. / 1,098 m
Silver Star, Canada	5,280 ft. / 1,609 m
Sun Peaks, Canada	4,117 ft. / 1,255 m
Sunshine Village, Canada	7,086 ft. / 2,160 m
Whistler, Canada	2,214 ft. / 675 m

### **1(c)(i) Vertical Drop Determination**

The proposed site can accommodate a large number and variety of runs of average vertical drop. A vertical drop of about 325 metres (1,066 feet) exists from the top of Mount Last, which is approximately 1,500 metres (4,921 feet) high, to the resort base which is at approximately 1,175 metres (3,855 feet) elevation. Most of the ski runs will cover a vertical drop of approximately 500 metres (1,640 feet), from a top elevation of 1,500 metres (4,921 feet) to a bottom elevation of 1,000 metres (3,280 feet). A possible total vertical drop of approximately 700 metres (2,297 feet) can be achieved by combining lifts from the highest point of Mt. Last to the lowest point on the east face of Mt. Miller on the west side of the resort, which is at approximately 800 metres (2,624 feet) elevation.

The terrain of the area is generally represented by gentle slopes, which means that more terrain would be needed to achieve longer vertical drops. Some steep terrain, however, can also be found. The area can incorporate a large variety of ski runs, with the emphasis being on runs of easy to intermediate difficulty. It is estimated that a

breakdown of ski runs will be in the range of 30% beginner, 50% intermediate and 20% expert.

The total vertical of about 700 m (2,297 feet) will be an adequate ski resort rating, comparing satisfactorily with that of other resorts in the region, and with most of those in central and eastern Canada and USA.

For comparative purposes, the approximate vertical drops of various other ski resorts are included below:

**Table IV-2: Comparison of Vertical Drops**

Mountain/Resort	Vertical Drops
Apex, Canada	2,000 ft. / 605m
Big White, Canada	2,550 ft. / 778m
Crystal Mountain, Canada	2,299 ft. / 700m ( <i>proposed</i> )
Fernie, Canada	2,811 ft. / 857m
Kicking Horse Mountain Resort, Canada	4,085 ft. / 1,245m
Lake Louise, Canada	3,250 ft. / 991m
Mont Tremblant, Canada	2,131 ft. / 649m
Mount Hood, USA	2,500 ft. / 762m
Mount Bachelor, USA	3,100 ft. / 945m
Mount Washington, Canada	1,600 ft. / 487m
Panorama, Canada	3,800 ft. / 1,160m
Silver Star, Canada	2,500 ft. / 760m
Sun Peaks, Canada	2,891 ft. / 881m
Sunshine Village, Canada (main area)	1,870 ft. / 570m
Whistler, Canada	5,006 ft. / 1,526m

The expanded Crystal Mountain will not surpass Big White or Silver Star, but it will have a greater vertical drop than Mount Washington or Apex. Its vertical drop will be suitable for a boutique resort that will offer a family oriented experience with a focus on a superior snow-sports school, as well as offering exceptional recreation and vacation value at reasonable cost.

**1(c)(ii)**

***Ski Slope Suitability Model***

A ski terrain suitability analysis has been prepared for the greater Crystal Mountain area, covering the slopes surrounding Mount Last. Each area has been examined for



elevation ranges, slope conditions, solar aspects and shadows. As it is customary today, the analysis has been carried out by computer modelling, but it is still the same as the traditional slope analysis of planning techniques established well before the advent of computer modelling. The computer generated mountain model allows for a faster and more flexible technique to arrive at the qualitative analysis that the planner must make for each slope that will support lifts and ski runs. Following the straight analysis of sun exposure, shadows, slopes and elevations, the qualitative sum of the influencing factors may be summarized in a colour scheme that outlines the range from poor suitability to greatest suitability for the various areas of the mountain. The model used in this presentation is limited by the large scale topography used for the preliminary studies, but is corroborated by ground truthing and by extensive aerial reconnaissance. The Crystal Mountain area is clearly an area primarily comprised of gentle slopes and therefore is easier to analyze without the expectation of surprising detailed information in the future that would require planning modifications after the preliminary stage.

Finding the most suitable skiable terrain is the objective of the analysis. This has already been achieved to a great extent, but further on-site visits and more detailed topography will be undertaken before each new lift installation. A survey is anticipated for each lift line prior to execution which will permit accurate positioning for the final layout.

Topographic maps of the Crystal area are currently available at 1:20,000 scale. Contour intervals vary between 5m for the resort base area up to 20m for the proposed Controlled Recreation Area and beyond. These contour lines have been digitized and are translated into a digital elevation model (DEM). In addition, the available maps include information about the ground conditions which have also been digitized.

From the DEM the computer sorts out various slopes and factors that influence snow retention and snow quality. For the gentle terrain of Mount Last and surrounding areas it can be expected that the 1:20,000 topography has sufficient resolution to reveal enough topographic detail for conceptual ski trail layouts. McElhanney Engineering has added computer interpolations of critical areas for further analysis.

Consideration of known soils and geologic constraints in this area increases the confidence in the preliminary modelling that has been done. Other factors, such as prevailing winds, proximity to the base, sensitive environmental areas, and distribution of wildlife may require refinement of the model. Site specific information will be gathered on the ground by flagging ski runs. The assistance of a ski lift construction company will be utilized to evaluate practical lift lines and survey the best alignments. There is no replacement for site specific knowledge and practical experience for locating skiing and snowboarding routes. In this respect, the local knowledge of the ski hill operator has proven most useful. The operator will continue to provide valuable advice to the planning team as the project progresses.

A pod analysis of uniformly skiable terrain is valid to size the potential of most lifts by category of users, but it overlooks a year round use concept of lifts. Year round use of a least one lift to the top is important for Crystal Mountain. Consequently that major lift has not been designed from ski pod analysis but from major planning considerations, including summer use.

**1(c)(iii)      *Digital Terrain Modelling***

Suitability modelling has been pioneered by planners for ski areas since the 1970s. Landscape architecture and civil engineering computer modelling programs were firstly utilized for ski area modelling. Today a number of programs can be utilized to digitize mountain information and to analyze it.

The digital terrain model for the Crystal Mountain expansion covers an area of approximately 6 square kilometres. Digital modelling is utilized as an aid in planning but the actual qualitative analysis and mountain planning is done before and after the computer modelling on two dimensional mapping and area cross sections, with the resultant value judgements incorporated in the final digitized information of the computer model. The modelling then provides a mathematical verification of the feasibility based on the planner's evaluations and design input. This allowed earlier theories of computerized ski pod computer modelling to be advanced. However, over time and experience, they have proven unsatisfactory because of limited ski area planning and design considerations in the past hiding behind the appearance of mathematical modelling. The preconceived notions of the planners generally have led them to use DEM techniques, primarily for illustration purposes. In reality, creative planning is originated by the knowledge of the designer, who then uses digital tools and information to present the proposed plan.

Consideration of the most desirable viewpoints has been an additional factor in the design of the Master Plan, including the location of the mountain area new amenities, such as the teahouse at the top.

There are many factors that cannot be expressed with fixed numerical schemes. To allow good dispersal of teaching slopes and to avoid congestion of mixed traffic patterns, many ski runs will be extended down to the 1,000 metre (3,280 feet) elevation. Some runs will extend down to the lower elevations, extending even as low as 800 metres (2,625 feet) to achieve the maximum vertical drop. To collect skiers from the residential development and from day parking, using the target of 8% minimum grade glide paths, there will be a network of trails and short lifts. Experience will indicate where snowmaking would be beneficial in the future, especially to increase the length of season at lower elevations.

**1(c)(iv)      *Snowmaking Considerations***

The lower elevations of the ski area could extend their season with snowmaking, although Crystal Mountain has operated every year (with only one exception in the mid 1980s) without snowmaking, and natural snow is much preferred by skiers. While the area benefits from adequate snowfall, snowmaking may be a bonus. Snowmaking will ensure an early season opening, and can be a benefit and effective marketing tool during periods of minimal snow conditions. It is planned that the treated water of the tertiary sewer treatment plant be utilized for snowmaking in winter and for golf course irrigation in the summer.

In some other ski areas, snowmaking has been required to make more durable snow for the high traffic corridors. This kind of snowmaking is not envisioned for Crystal because areas of congestion will be reduced as much as possible by the layout of

lifts and trails, and by a low density ski run and trail design. The organization of glide paths will integrate all future summer and winter trail corridors, and these are the runs that may need the most attention in terms of snow cover. Snow making is part of current planning and will assist in creating a longer season and easier maintenance of the glide paths.

#### **1(d) Ski Slope Planning**

The mountain planning process will require more field time along actual lift and trail alignments, which will be carried out when the survey of the lift lines is done before construction. Ground truthing will be carried out with the assistance of the ski area operator and of a ski lift construction company. The report currently prepared contains a best estimate of carrying capacity and appropriate development of the site.

Photographs, maps, and reports from the ski area operator have been carefully studied since 1998. Site visits starting in March 1999 and reviews with the ski area operator are the basis for the preliminary plan. Lift alignments are shown for a proposed year-round lift to the mountaintop, capable of operating all year and for several major additional proposed lifts for winter sports. The plan makes provision for smaller future lifts to optimize the use of the area. Except for the new triple chair, the existing lifts will be relocated and electrified. The new, more modern, fixed grip triple chairlift that was installed in Summer 2000 by Crystal Mountain in cooperation with Poma Leitner of Canada helped to create an initial momentum for the planned expansion. The chairlift is located on its planned alignment, reaching the top of the higher T-Bar, which it replaced.

#### **1(e) New Ski Lift Planning**

##### **1(e)(i) Main Lift**

The main lift is initially planned as a fixed grip pulse gondola with the capability of adding gondolas in the future. Given a moderate transport capacity for the new Crystal Mountain main lift, at 600 people per hour, a phased plan is proposed for its construction. The lift may be transformed to a detachable system and capacity may be doubled in the second phase of the project.

There are successful examples of pulse lifts, particularly in Europe, and this project seems to be suitable for this type of design. Initial costs will be substantially lower during the first stage of construction. Initial operation may be as a pulse lift with a reduced number of gondolas, with gondola cabins added later as demand increases. An hourly capacity with a limited number of gondolas of 600 persons per hour is considered to be more than adequate for the opening phases of the project, especially since in winter the gondola will be flanked by chair no.1, with up to 1,600 people per hour design capacity, and by quad chair #4 to the west, with a 1,200 people per hour design capacity.

In the subsequent development stages, the number of gondola cabins, preferred primarily for the comfort of summer visitors and evening restaurant guests, will be increased. Design capacity may reach 1,200 persons per hour by providing new

stations and mechanisms to transform the lift into a detachable gondola lift.

**1(e)(ii)      *Summer Use of Main Lift***

The main lift will provide year round operation. There is reason to expect sufficient summer use to keep the lift operating throughout summer, resulting from both proper advertising and the proximity of the nearby access to the Coquihalla Connector leading to Vancouver.

The top terminal area has been selected to accommodate this year round use. A sizable area for the top terminal and for a view restaurant is available at various locations near the 1,500 m (4,921 ft.) elevation. The precise location of the terminal and restaurant is to be selected carefully on the ground for optimum orientation towards the best views. The initial summer capacity for the gondola will be 600 persons per hour. The final summer capacity of the gondola is projected at 1,200 persons per hour. The top terminal and the teahouse will be carefully positioned to follow the recommendations of the environmental consultants and to avoid sensitive areas that have been identified. The teahouse will be the only mountaintop restaurant with a view available in the region and accessible by gondola, and it should be a desirable destination in the summer for golf vacationers in the evening, for day visitors and for special events, creating a year round focus with as quality restaurant.

**1(e)(iii)      *Winter Use of Main Lift***

During winter operations, the main lift will provide weather-protected mountaintop access to most ability groups. An easy route and additional intermediate and more advanced runs will be available from the summit. Severe weather capable of shutting down operations would be quite exceptional for the area and is not normally anticipated.

Severe weather is not an important concern for Mount Last because it is not exposed to the winds and to the weather patterns of taller mountains in the Coastal Ranges or in the Rockies.

Compared to other mountains and resorts, the selected top terminal site at Crystal Mountain is more manageable for winter operation. There are no cornices or dangerous exposures, as the site gently slopes down in all directions. Avalanche hazard is also generally not an issue, although the potential for localized slides in steeper areas will be carefully examined in the expanded ski area management plan.

**1(e)(iv)      *Lifts and Ski Runs for Skiing and Snowboarding***

The design philosophy of modern lifts is to reduce the number of lifts by increasing the capacity and by reducing the ride time. This can create crowding of ski runs that have been designed for slower, lower capacity fixed grip lifts. In the past, the conventional design assumption was that time on the ski hill would be spent 1/3 waiting in line, 1/3 riding the lift and 1/3 skiing down. It is now more common to have practically no waiting line, and the ride will take less than half the time usually

assumed for conventional skier distribution.

Therefore in the guidelines for the ski area development at Crystal Mountain, to promote skiing and snowboarding in a comfortable and unimpeded space, trails at Crystal should be developed with a target of 100 skiers per hour per 10 metres of trail width. The accumulated trail width should be increased when slopes exceed 45% and it should not be less than 5 metres in width per 100 skiers per hour, except for glide paths. Glide paths (or cat tracks) may traverse sections that are too steep for fall line skiing and can transfer lower ability skiers from upper benches to the base.

The most important consideration for glide paths is that the minimum gradient per 50 metres section is maintained at 8-10% slope. The lower gradient of about 8% would be used in areas with lower ability use and upper grades of about 10% should be the norm for inclusion of expedient snowboard movement. A width of 6 metres is desirable to guarantee unimpeded traffic flow. The glide paths can deliver up to 1000 persons per hour when this specification is met. Trail planning is always done in conjunction with lift layout, and in this project it will be carried out to provide for low density skiing in keeping with the overall project concept. Low density and relaxed skiing will also be an important consideration in future marketing for people looking for less competitive holidays and the relaxation of places like Crystal Mountain. Management has reviewed these guidelines and is planning to follow them in the future ski run development.

#### **1(e)(v) Detachable Lifts**

Today, most ski area owners take pride in advertising detachable lifts. Although there are several successful ski areas that have stayed with fixed grip lifts, the norm is to build lifts offering less than 10 minute ride times. Most of the shorter lifts, especially lifts for teaching or for high-altitude skiing, remain fixed grip. There is also the alternative of providing fixed grip lifts with rolling surfaces at the departure point to allow greater rope speed, and therefore greater capacity, almost similar to that of detachable lifts. The initial pulse lift gondola may be converted to a detachable system when traffic will justify it. At Crystal the first phase will be well served by using fixed grip lifts in view of the lower density skiing that is preferred. As the market will grow and the ski runs will be expanded, the option of detachable lifts may be considered in following phases, especially for the longer lifts.

#### **1(e)(vi) Fixed Grip Lifts and Surface Lifts**

Shorter lifts, primarily beginner lifts, special ski pod lifts and connector lifts, will be in the traditional form of fixed grip chairlifts and where practical, surface lifts, such as T-Bars and platter lifts. At this stage of the development of the lift industry, all fixed grip chairlifts will likely be proposed in the form of quad chairs, in view of the fact that the cost is nearly the same as that of smaller chair type of installations. It is also possible to generate higher capacities and speeds almost equivalent to those of detachable lifts by supplying a rolling mat at the departure point, allowing skiers to be picked up by faster moving fixed grip chairs because the skiers are brought up to speed by the moving mat, as mentioned before.



In addition to the main gondola installation, proposed initially as pulse lift, the design presents three other major chairlifts, which may be of the faster fixed grip type or of detachable type. The other minor lifts will be shorter and will be a fixed grip type of lift, which should be adequate for the ski runs they serve.

The design will provide access to the slopes on the east face of Mount Miller to the west of Mount Last. This seems to be a most promising expansion area, able to provide approximately 700 metres (2,297 feet) of fall line. In the end, the ski area design allows access to new ski runs on the north face of Mount Last (in part already opened up by logging). This particular area seems to be promising in terms of snow quality, of interesting terrain and of vertical drop, providing over 500 meters (1,640 feet) of fall line. The ski area manager, Mike Morin, has been monitoring snow conditions in these locations and is satisfied with their potential.

The second priority of the design is to allow easy access to skiing both from the parking areas for day skiers and from the residential bed base of the resort. People will have the opportunity of skiing to and from many of the project locations, whether for day skier parking or for overnight accommodation.

The following Table IV-3 (Preliminary Mountain Area Development Statistics) shows each of the new lifts proposed and its projected comfortable carrying capacity. That table includes the lift (A1) constructed in 2000, through a separate application. The other lifts are numbered, but the sequence of construction may not necessarily be as shown.

**Table IV-3: Notes on Existing Mountain Area Lift Statistics**

Lift Description	Design Capacity	Disposition
#A - Mueller double-fixed grip	900 pph	to be moved to become Lift 8
#B - Doppelmayr (Blue) T-Bar	1000 pph	to be removed
#C – Triple chair - fixed grip	1600 pph	to become no. 1 lift

Table IV-4: Preliminary Mountain Area Development Statistics

LIFT SCHEDULE <sup>1</sup>										
Phase	No.	Type	Elevation (m)		Vertical	Length	Design Capacity	CCC/SAOT <sup>3</sup>	Bed Units <sup>4</sup>	
			(Base)	(Top)			(people/hour)			
Existing	A	Fixed Grip Chair <sup>5</sup>	1,175	1,345	170	832	900	400	260	
P1	1	Fixed Grip Triple Chair <sup>2</sup>	1,175	1,370	195	1,060	1,600	960	624	
P1	2	T-Bar	1,175	1,230	55	256	1,000	700	455	
P1	3	Magic Carpet (Ski School)	1,180	1,185	5	103	300	120	78	
Subtotal							3,800	2,180	1,417	
P2	4	Fixed Grip Quad Chair <sup>2</sup>	1,220	1,430	210	1,391	1,200	750	488	
P2	5	Detachable Quad Chair	1,050	1,510	460	3,004	2,000	1,500	975	
P2	6	Fixed Grip Quad Chair <sup>2</sup>	935	1,440	505	2,600	1,200	750	488	
P2	7	Main Lift - Pulse Gondola	1,175	1,450	275	1,949	600	460	299	
Subtotal							5,000	3,460	2,249	
P3	A	Fixed Grip Chair <sup>5</sup>	1,175	1,345	170	832	(900)	(400)	(260)	
P3	8	Fixed Grip Chair <sup>2,6</sup>	1,220	1,370	150	667	900	400	260	
P3	9	Fixed Grip Quad Chair <sup>2</sup>	850	1,150	300	768	1,200	750	488	
P3	10	Fixed Grip Quad Chair <sup>2</sup>	1,180	1,490	310	1,623	1,200	750	488	
P3	11	Detachable Quad Chair	1,150	1,510	360	3,080	2,000	1,700	1,105	
Subtotal							4,400	3,200	2,080	
Total							13,200	8,840	5,746	
1. Lift numbers to be checked on latest plans.						Total Estimated CCC				8,840
2. Fixed grip chairs could be capable of a greater design capacity and higher speed by the addition of rolling departure mats.						Total Lift Design Capacity				13,200
3. CCC = Comfortable Carrying Capacity SAOT = Skiers At One Time						Total Vertical Drop (approx.)				650 to 700 m
4. Bed Unit calculation is based on 65% of CCC for a Regional / Destination Ski Area						Last Updated: Oct 31, 2006				
5. To be removed and relocated as lift #8.										
6. Relocated existing Lift A.										

Table IV-5: Phasing Plan

		Unit Summary		
PHASE - 1	Dwelling Type	Bed Units (per unit)	Units	Bed Units
	Single Family Chalets	6	42	252
	SFC (First Nations)	4	0	0
	Condominiums	3	99	297
	Condominiums (First Nations)	3	25	75
	Bed and Breakfasts	10	4	40
	Townhomes	4	139	556
	Hotel Units	2	0	0
	Employee Housing	3	0	0
	<b>Total</b>		<b>309</b>	<b>1,220</b>
PHASE - 2	Dwelling Type	Bed Units (per unit)	Units	Bed Units
	Single Family Chalets	6	115	690
	SFC (First Nations)	4	22	88
	Condominiums	3	36	108
	Condominiums (First Nations)	3	0	0
	Bed and Breakfasts	10	0	0
	Townhomes	4	0	0
	Hotel Units	2	200	400
	Employee Housing	3	0	0
	<b>Total</b>		<b>373</b>	<b>1,286</b>
<b>Cumulative Bed Units - Phases 1 + 2</b>				<b>2,506</b>
PHASE - 3	Dwelling Type	Bed Units (per unit)	Units	Bed Units
	Single Family Chalets	6	208	1,248
	SFC (First Nations)	4	0	0
	Condominiums	3	0	0
	Condominiums (First Nations)	3	0	0
	Bed and Breakfasts	10	1	10
	Townhomes	4	0	0
	Hotel Units	2	100	200
	Employee Housing	3	10	30
	<b>Total</b>		<b>319</b>	<b>1,488</b>
<b>Cumulative Bed Units - All Phases</b>				<b>3,994</b>

Please see also: *Phasing Plan Pocket Map and Development Areas Plan Pocket Map.*

## 2. RESORT BASE AREA DEVELOPMENT CONCEPT

### 2(a) Planning and Development Principles

Many North American mountain resorts have grown over time with little initial master planning, responding to immediate growth needs in a sporadic manner. Many began around mining towns or pre-existing recreation facilities which were slowly expanded and improved responding to emerging markets requirements with minimum investment and with scattered improvements.

The first reaction to this situation, physically exemplified by the state of Whistler in 1976, was the creation of the Resort Municipality of Whistler, of the Commercial Alpine Ski Policy of the Province of B.C. and of the original Master Plan of Whistler, which deliberately set out to recreate a kind of European alpine village atmosphere, following the model of the new village of Vail. The Whistler example took twenty years and many bankruptcies (including that of the Whistler Land Corporation) before being able to establish itself, but it is now considered the model development for new resorts, being imitated and developed from as far as Mont Tremblant and Mammoth Mountain, surpassing even the models of Vail and Beaver Creek.

Despite the final and overwhelming success of the Whistler Blackcomb development, one should be careful about reviewing the Whistler model, which should not be followed blindly. The Whistler model depends on certain marketing and real estate development techniques that are not necessarily possible to repeat and that require a large critical mass of capital and a booming, or recession proof, economy.

Whistler emerged from its earlier difficult times reaching success in the period 1988 – 2003, which was a significant period of economic growth initially for Vancouver and later for North America in general. The ideal development model that we are looking for should be able to grow and to sustain itself also in smaller economies and in periods of economic recessions, basing its economic well being on the need for recreation that is basic to mankind and that is stable despite the ups and downs of the economy, provided it is genuine and affordable.

The planning model that we are looking for should work aesthetically with more genuine forms, without the need of whimsical imitations which tend to become distasteful over time, and which produce an architectural burden that easily make places fake and unnecessarily costly, with the danger of becoming empty in an economic downturn. Planners who look for the European appearance easily overlook that the pleasant appearance of the European village is the complex product of a real response to culture and need over time, which is reflected in the meaningful architecture that forms the pretty picture.

It is therefore imprudent to copy the forms without understanding the need that generated them, with the risk of creating an architectural pastiche that will quickly be recognized as a false representation. The downside of producing a mere appearance, without an adequate economic function to sustain it, is that it may generate capital investment that may not generate adequate revenues. It may contribute to the failure of the resort or of its commercial enterprises in the initial stages. It is noteworthy that at Whistler perhaps the most popular plaza is the one served by the parking area between the IGA and the liquor store, contrary to many planning theories, and that the mountain plaza of the original village stroll only came to life when the major hotels were built around it, and gave life to it, so that in the evening

strollers would not have the closed ticket office at Carlton Lodge as the terminus of their walk.

Crystal Mountain will try to be "real" and genuine, developing in a logical linear growth that as much as possible will avoid exposing the public to crossing construction areas to go from one built place to another. It will start with the construction of a new Daylodge and Golf Club House. The resort will then grow with the construction of vacation homes in locations where it is possible to ski in and out, with exposure to sun and views. This will establish the first nucleus of residences in such a way that they will become the end and the first plaza of a pedestrian stroll of shops and restaurants that will become the centre of the resort. The two ends of the stroll will be anchored by the activity of a hotel, and the growth of the heart of the resort will be timed to coincide with hotel construction, with each hotel creating a plaza in front of it. This is the true village tradition, where plazas were created to serve real activities and true centres of residential density, as well as to achieve a visual focus. A convention hotel will form the human focus that churches provided at the heart of the residential communities of the past, although it is hoped that room and financing for at least a multi-denominational chapel will be found later, in a prominent location in the centre of the resort. The Master Plan drawings, design guidelines and conceptual sketches illustrate how the planning vision will unfold over time.

## **2(b) Base Area Project Standards**

### **2(b)(i) *Architectural Theme and General Design Characters***

The architecture will emphasize the use of natural materials, particularly wood and stone, in their real architectural functions with a rustic orientation in the tradition exemplified in part by Arts and Crafts and by the mountain architecture of the National Parks, and it will be particularly inspired by the genuine tradition of rustic architecture of western Canada. Except for the hotels, height will be kept to the low rise height permissible under the B.C. Building Code for wood frame construction, possibly over one storey of concrete construction for the commercial ground floor. It is planned that the hotels may reach a greater height, up to six or eight storeys, but that they will be designed with sloping roofs in the style of mountain architecture, according to the design guidelines.

Beyond the high density core of the resort there will be areas of townhouses, to be developed in clusters but constructed in linear progression, and of single family dwellings, which are planned to provide for the largest residential component, in conformity with the character of the Central Okanagan region.

The central and guiding concept is to create a resort with a village atmosphere with three main functional nodes and three major defined phases, the daylodge, the boutique hotel and the convention hotel. The resort will be designed to avoid the loose but overbuilt look that so often occurs in new developments. Various stages within the phasing will determine resort growth according to the speed of economic development. The planned, slow rate of growth, emanating from three different development areas and the single family dwelling areas will be more in keeping with the historical way, true to purpose, in which village development has occurred in Europe, and will result in a higher quality of design and development.



To assist this process, it is intended that all development in the area be under one overall architectural guideline and control system, as detailed below. The anticipated slow development pace will greatly increase the possibility of creating something more natural and true to the mountain character that is expected for the resort.

The gradual growth of the resort will also allow the identification on a step-by-step basis of the real needs for on-site staff accommodation. It can be planned progressively according to the development of the resort. It is anticipated that initially there will be only minimal staff accommodation, because of the proximity to Westbank and Kelowna.

One of the directions to ensure a mountain character calls for limiting automobile access to the resort base area with most automobile parking and all the day skiers' parking out of the way of the resort pedestrians. It is intended that automobile traffic in the resort nodes will not be permitted except for loading and unloading for overnight visitors so that a pedestrian character is maintained. Access by public transportation and tour buses should be encouraged, and is anticipated to be a main component of the access pattern.

Snow removal will be facilitated by both the low density of the proposed resort and the openness of the pedestrian areas. In the design of each building and of the overall plan, areas for roof snowfall and for snow removal accumulation on the ground will be identified. Drainage will be designed with consideration for snow management in the winter season.

## **2(b)(ii)**

### ***Design Control***

The intent is not to restrict or to confine the freedom of the designers and builders, but rather to ensure that the architectural concept and execution of each building is in keeping with the basic standards and with the overall plan that the developer and its designer have set for the resort. To ensure the appropriate year round aesthetic character at the base area of the resort, a high level of landscape attention will also be called for, with the intention of maintaining and recreating a natural forested setting.

The project must achieve a quality mountain atmosphere. Architectural character reflecting the successful design tradition of western mountain architecture and of the National Parks (ranging from the small mountain lodge tradition to the majesty of the Canadian Pacific hotels) will be encouraged in order that the resort will have a character reflecting both a recognized Western Canadian heritage and a mountain tradition.

Control will be achieved through two sources of authority:

- 1) by the developer, Crystal Mountain, through a covenant registering the requirement to comply with a building scheme as outlined in the Master Plan and Design Guidelines. Crystal Mountain's approval will be a condition precedent to any application for permit;

- 2) by the local Government through the Development Permit process.

**2(b)(iii)      *Design Guidelines***

The members of the project team have studied in detail, on site and in photographic records, the resort design of hundreds of resorts in Europe and in North America, and have discussed resort design with other architects, planners and developers and have reviewed detailed design guidelines of places ranging from Whistler, B.C., to Deer Valley, Utah, and have produced Design Guidelines for a number of projects, including Kicking Horse Mountain Resort in B.C.

The Design Guidelines for Crystal Mountain have been prepared by Oberti Resort Design to create an identifiable and cohesive design character for the resort by utilizing a fairly limited vocabulary of design features that reinforce the notion of a desirable mountain retreat.

The Design Guidelines are located in Appendix H.

**2(b)(iv)      *Resort Fire Prevention and Control***

In addition to expanded services of shops and skiers' facilities, the resort will create its own volunteer Fire Department station (please see section **2(k)(xvi)**). The B.C. Building Code and Fire Code will be followed in the resort development. It is planned that there will be a Mountain Resort Association managing the interests of all the independent participants in the development.

Because the resort is situated in a heavily forested environment, particular consideration will be given to fire prevention and protection. A variety of guidelines to reduce and control the threat of fire will be incorporated into the design and materials used in the resort:

**2(b)(iv)(A)      *Defensible Space***

A surrounding perimeter that resists the spread of fire will be incorporated into building design. Combustible materials, including natural ground and ladder fuels will be removed from the area surrounding each building to create a buffer between potential fire paths and the building structure.

**2(b)(iv)(B)      *Building Location***

Structures on a slope will be placed at least 10 metres back from any ridge or cliff.

**2(b)(iv)(C)      *Roofing***

Because retardant treatments are only effective for a period of time, roofing materials will be limited to asphalt shingles, metal, clay tile and concrete products. The pitch of the roof is important as well, the steeper the roof pitch the harder for embers to remain there.

**2(b)(iv)(D)*****Vents***

The vents around attics, under-eave soffit vents, and chimneys are one way embers may enter a building. Vents and chimneys will be required to be covered with non-combustible wire mesh no larger than 3 mm (1/8 inch).

**2(b)(iv)(E)*****Siding***

Although stucco is less fashionable for resort architecture, wood siding is susceptible to ignition by radiant heat and materials such as stucco and masonry stand up much better under heat and exposure. Stucco may be used in combination with heavy timber and stone to achieve a traditional mountain architecture style as well as a timeless contemporary structural appearance.

**2(b)(iv)(F)*****Additional Structures***

Outbuildings such as decks, porches, and fences should also receive strong fire prevention attention. A combustible wood fence or trellis attached to a home acts as a fuel bridge, leading a fire right to the structure. Masonry or metal will be used as a protective barrier between fences and structures. Firewood shall not be stored under decks or porches. The underside of decks and porches will be enclosed with non-combustible screening or siding. Elevated decks on a hillside are in the direct line of a fire moving up-slope. Terraced patios will be recommended instead.

For Fire Protection Services please see section **2(i)(xvi)**.

**2(b)(iv)(G)*****Sprinklers***

All buildings shall be sprinklered until when a local fire department is fully established and will provide the level of service expected under the B.C. Building Code.

**2(c) Base Area Concept**

The resort is planned to grow gradually in various stages as a staging area for a winter and summer recreation area centred primarily on skiing/snowboarding in winter and golfing in summer. Considerations that are fundamental to the Crystal Mountain expansion project indicate that the next lift should be an access lift to the higher part of the mountain. This will open up the best views from the top and a much larger and higher skiable terrain, especially to the west of Mount Last. The initial residential development will finance the expansion and complement it by providing longer term users.

The initial phase will complement the ski area with overnight accommodation. This will be planned both to include hotel-lodge buildings and bed and breakfast type accommodation. The first phase will start near the current base of the lifts, with lodging that will provide overnight accommodation in winter and summer and single family chalets that will respond to initial needs and augment the bed base.

The resort will expand to include condominiums, commercial facilities, townhouses and single family chalets, as shown in Table IV-3 (Preliminary Base Area Accommodation and Other Facilities), and to achieve access to Mount Miller as the first ski area expansion beyond the current south face of Mount Last.

The organizational concept is a classic design in the Alpine tradition consisting of three fundamental components: the lodge accommodation, the resort base core area, and the single family chalet area.

Crystal Mountain will control development in stages, from a central nucleus organized around the initial main lift and lodge, and surrounded by shops connected by a pedestrian promenade.

The initial nucleus will be focused on the main lift and will grow with condominium apartments and timeshare units, and townhouses along a road east and above the current road leading to the parking as shown in Exhibit IV-2 at the end of this chapter (Conceptual Base Area Plan).

At completion, the resort will include all the necessary services, including a small volunteer firefighters' station with one truck, a private security office, a first aid emergency station, garbage collection and temporary storage facility buildings, and the necessary commercial and convention facilities including meeting facilities for public groups such as a Mountain Resort Association that will help manage the interests of individual participants. Over time limited convention facilities near a hotel and specialized educational programs, which may expand into a conference center, will be developed. For the approaching tourist, the resort will appear from the improved road with an archway of buildings bridging over the road leading into a square containing the pedestrian access to the Daylodge and the lift station. The gateway leading to the main hotel plaza may include a traditional clock tower.

Proceeding through the gateway the visitor will go through a rising pedestrian path leading to the first hotel square. This will be the first node around which most of the initial lodging will be developed.

The design is planned to create a promenade from one node to the other, rather than creating a hub in the middle of the resort, in the traditional style of Alpine villages, contrary to the new style of instant ski resorts, like Tignes, Les Menuires or Jackson Hole, where the main lift station becomes a high density centre of the village. The reason is that the resort should not feel like sleeping accommodation around a skiing superstore. It should have a true village structure and go from one square to another as to a changing visual and emotional focus of real functions, catering equally to skiers and non-skiers. It should have more emphasis on visual and physical relaxation, and after skiing activities, than on the sport for the sake of the sport. It is also important to allow the opportunities for separation of the overnight guests from the day visitors. The higher density residential area will be on a knoll directly accessible from the ski runs.

The lifts will still be within a convenient distance from the resort centre and the distance will be utilized to collect skiers and snow boarders from the more distant components of the resort, like the single family chalets and the townhouses, which will be located to provide both ski-in and ski-out access.

A preliminary phasing plan for the resort is outlined in the concept plans. The resort will be

compact and will have a relatively high density in the central portion, to minimize the foot print. Height will be limited to three storeys, except for the main lodges and hotels, which may rise to a greater height, perhaps equivalent to three to four more storeys, bringing total height to six or eight storeys. Steep roofs will be emphasized, contributing to a slightly greater impression of height than the number of storeys would indicate.

The main hotels will be able to stand out among the other buildings with a stronger presence, and be a focus for the resort. Sections of major hotels of up to six or eight storeys would be permitted. It is anticipated that the core area of the resort proper, excluding the single family chalets and townhouses, may cover less than 6.5 hectares of land. The total resort development area, including the single family chalet area and the expanded ski area base and parking facilities, may cover approximately 150 hectares in a low density forested setting. This should not be confused with the larger Controlled Recreation Area, covering about 2,900 hectares, which includes the skiable terrain surrounding all the ski runs (approximately 550 hectares) and the golf course (approximately 65 hectares). Open spaces surrounding the Controlled Recreation Area and dedicated to riparian areas and ecological reserves between the height of land and the urbanized area to the south will comprise approximately 4,000 hectares<sup>2</sup>. Open spaces to the north west and east are practically limitless. The design is directed to maintain the quality of the environment and the feeling of open spaces in a forested setting.

A buffer zone of working forest is expected to continue to surround the Control Recreation Area.

The preliminary design will focus on creating compulsory building envelopes, on implementing design character through mandatory guidelines, and creating a building sequence determined by the design stages of the three project Phases. In order to minimize the foot print, it is proposed that internal roads will be kept to a maximum of 50' rights-of-way, and that day traffic will be limited to access to parking in the resort itself and to drop-off points. Public access by bus will be encouraged, starting shuttle buses from Westbank and Kelowna as soon as economically feasible.

It is conceivable that the entire central resort base area may be developed under a bare land Strata Title concept, to avoid unsightly road regulations and waste of space. Each subdivision application will be made with this principle in mind. At that time the decision will be finalized regarding whether to make an application for a development in condominium or as fee simple lots.

A golf course area will provide summer activity. The course will be on land leased from the Crown to the owner/developer and its golf course operator.

In winter, the skiing will be augmented by skating, sleigh, snow shoeing and luge runs, and by the excellent Nordic ski trails, which will be rebuilt where necessary to allow for the overall plan implementation. The area can be a paradise for cross-country skiers because of its elevation and climate. The area will also allow outdoor skating and luge runs in natural conditions for a good part of the winter. The concept of a film centre focusing on professional

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<sup>2</sup> In order to put this in perspective, the Resort Municipality of Whistler covers an area of over 12,500 hectares, and the ski area of Whistler / Blackcomb encompasses an area (including the valley that links them) of over 4,500 hectares. The total of Whistler today amounts to an area of over 17,000 hectares, under different tenures, which is roughly four times the total proposed future recreation area of Crystal, at maximum future planned potential.



skating may be another possibility, due to the proximity to Vancouver and its film studios and the good weather of the area. Meeting and convention facilities designed to maintain the occupancy levels during the traditional shoulder months are also among the future opportunities.

**2(c)(i) *Daylodge, Hotel Accommodation, Resort Base Core Area and Single Family Chalets***

A daylodge will be located near the main base lift station, including the ticket office and rental shops, other shops and a restaurant to serve the skiers as well as the guests in a condominium building to be attached to it. This will be the first building complex, and it will be designed as if it were a hotel, perhaps to be built in two stages.

As soon as financing will permit a nearby hotel will provide additional overnight accommodation. It will be an elegant complex designed with substantial use of stone and heavy timber, in a contemporary style derived from the style and tradition of western North American mountain architecture, which has some of its most interesting examples in National Parks heritage architecture. It will be placed near the forest at the base of the ski runs, in a position that will allow a sunny exposure. Skiers will be within easy walking distance of the lift and should be able to return to the mountain lodge on skis, with a short walk.

The first mountain lodge/hotel may include 100 bedrooms with two beds each, of which a certain number may be rooms that can be joined to form suites and could be run according to time share management standards. It is expected that the hotel will also manage a number of condominium units.

The room size standards for the hotel component will follow major hotel chain design specifications. There will be a lower level for hotel vehicle storage and mountain equipment storage, as well as for mechanical services, special hotel requirements, laundry facilities, hotel and restaurant provisions, cold storage, garbage rooms, etc. The main floor will include the entry lobby, the reception and manager's offices, and access to restaurants and a coffee shop. The main floor will also include meeting rooms, health club facilities and other public and commercial spaces. This floor will be a two storey high concrete structure, which will serve as a base to three storeys of hotel room floors in heavy timber construction. The top floor will be below steep sloping roofs, which will allow for some suite loft suites with high sloping ceilings. All rooms are expected to have orientation to interesting views. In conjunction with the hotel there will be indoor and outdoor pool facilities and tennis courts. The outdoor swimming pool will utilize the space that is most exposed to the sun.

The area between the mountain lodge and lift station will provide for shops, a pharmacy and a general store. The lift station will be complemented by the new day lodge facilities, including ticket office, ski patrol and first aid station, day skiers' coffee shop, delicatessen, ski rental shop, guest relations and management offices.

The mountain lodge may be designed so that it may be built in stages; one hotel wing in the first summer; the other wing the following summer, which can be built separately.

Day skiers will be parking in the day parking area or be transported by bus from the Visitors' Centre, the major hotels and the downtown Westbank and Kelowna areas. It is anticipated that a portion of the hotel guests will arrive by tour bus. To entertain family members who are not skiing, areas for snow play, ice skating and a new toboggan area will be considered during master plan implementation.

The first phase of the Crystal Mountain expansion will also be designed to allow the early development of as many bed and breakfast operations as possible, because these small operators would be ideally suited for the type of project that is envisioned, providing affordable quality accommodation and generating an early bed base for the planned expansion. A number of townhouses and of single family chalets will be included in the first phase.

On completion of the expansion, it is the owner/developer's intent that at least 50% of overnight accommodation units be assigned to the mountain's rental pool following existing marketing strategies typical of B.C. mountain resorts. It is expected that in this type of mountain resorts a voluntary strategy will be a successful tool and will generate a majority participation in the rental pool. The owner/developer has the ability to adjust marketing strategy through the various Phases of the project to achieve the planned objective for the final number of warm beds.

#### **2(c)(ii)      *Resort Base Expanded Core Area***

This will be the second phase, up hill and at the foot of the main ski runs adjacent to the resort. The location will complement the main lift departure point at the base of Crystal Mountain. The resort base will develop in stages, from a central nucleus organized around a traditional square, and surrounded by shops connected by pedestrian walkways. The resort will grow with apartment units (including condominium and timeshare units), and townhouses. In the end the base area will include all the necessary services, including a small firefighters' station with one truck, a security office, a first aid emergency station, a garbage collection and temporary storage facility, and the necessary commercial shops, food and beverage and meeting facilities to serve the resort area.

Summer use on the mountain may include bird watching, and botanical tours near the top of the main lift/gondola. In keeping with the year-round concept of the resort, it is planned that in addition to the golf course, tennis courts, swimming pools and a number of other summer activities, potentially provided by independent contractors, will be provided in or around the village to augment and enhance other summer uses of the resort.

#### **2(c)(iii)      *Single Family Chalets***

The area of individual chalets will be the third component of the project. It is intended that single family chalets will be developed on lots along resort roads on the North West, North East and southern areas of the site, distributed over well treed areas. They will be developed according to mandatory design and landscaping guidelines that will reinforce the forest atmosphere by distributing the dwellings among the trees. Ideally, some of the homes will be log homes, or will have a rustic architecture

in keeping with that of log homes. Architectural guidelines will be part of the Master Development Agreement and will be incorporated in covenants or a statutory building scheme for those areas, and they will be enforced with the assistance of the local government.

The following table (Table IV-6) shows the base area accommodation breakdown, which would provide an expanded plan of about 3,994 bed units of overnight accommodation, which is a moderate target expansion under the criteria set in the *Guidelines to the Commercial Alpine Skiing Policy* of the Province.

**Table IV-6: Base Area Accommodation and Other Facilities**

ACCOMMODATION TYPE	NO. OF UNITS	NO. OF BED UNITS
Hotels	3 @ 100 rooms at 2 bed units per guest room	600
Bed and Breakfast	5 units at average 10 bed units each	50
Condominiums	135 units at average 3 bed units each	405
Townhouses	139 units at average 4 bed units each	556
Single Family Chalets	365 chalets at average 6 bed units each	2190
Employee Housing	10 units at average 3 bed units each	30
First Nations Joint Venture – Condominiums	25 units at average 3 bed units each	75
First Nations Joint Venture – Chalets	22 units at average 4 bed units each	88
	<b>Total Bed Unit Count:</b>	<b>3994</b>
<b>NOTES ON OTHER FACILITIES:</b>		
Commercial Outlets:	<ul style="list-style-type: none"> <li>About 20,000 sq.ft. up to 80,000 sq.ft. at full buildout, according to market demand</li> </ul>	
Daylodge (including cafeteria, washrooms, lockers, ticket booth, brown bag lunchroom, daycare, administrative offices, ski patrol, ski rental facilities, etc.)	<ul style="list-style-type: none"> <li>Up to 25,000 sq.ft.</li> </ul>	
Teahouse:	<ul style="list-style-type: none"> <li>Up to 1,200 sq.ft.</li> </ul>	
Visitor/Interpretive Centre	<ul style="list-style-type: none"> <li>About 2,000 sq. ft.</li> </ul>	
Conference Centre and Exhibition Area:	<ul style="list-style-type: none"> <li>About 30,000 sq.ft. or according to market demand</li> </ul>	
Golf Course	<ul style="list-style-type: none"> <li>18 holes</li> </ul>	

**2(c)(iv)      *Footprint Concept***

The resort design is the result of a study of the cumulative constraints on development and the evaluation of all factors affecting the area. The consequence is a relatively low overall density with a more concentrated density in the area that is anticipated to have the least impact. The conceptual drawings at the end of this document show the location and size of the footprint of the proposed development. The resort core area higher density development is expected to be about 11 hectares. The resort base area, including all the townhouses, single family dwellings, and the golf course, will comprise a total of approximately 445 hectares.

**2(c)(v)      *Landscaping Concept***

The intent is to create a resort that will enhance the experience of living close to nature and to recreate the natural forest setting of the area. It is not intended that the resort buildings will generate gardens or other artificial landscaping that would have not been found in the area originally; rather, all buildings should be set in natural landscaping as if the original forest had been left largely undisturbed. Only openings for access, fire protection, views and sun, with original grass and plant materials will be permitted.

**2(c)(vi)      *Parking, Road and Pedestrian System***

Parking is divided between day and visitor parking and resident parking; in accordance with CASP recommendations. Day and visitor parking is divided in several areas to be developed in phases according to the growth of the lift capacity. The owner will seek permission from the Ministry of Highways to re-grade the gravel pit after extractions in order that it may be used as additional parking for the resort. It is planned that the gravel pit area will become an important overflow day skier parking area partially served by lift #3 and partially served by a shuttle bus. The road network is planned to provide access to the residential and commercial areas including servicing needs. Parking for overnight visitors will be based on an average of one car per 3 bed units and tandem parking will be permitted where ownership will be the same or valet parking will be offered. The road design is developed to avoid interference with B.C. Environment recommended set backs and to allow both easy servicing and smaller right of ways to maintain the forested setting. It is planned that BC Highways' gravel pit will be re-levelled after each use to accommodate day parking. The tobogganing currently taking place there will be relocated near the resort.

The design also envisions bus service and the avoidance of local driving, to achieve a recreational setting where the central core of the development is exclusively pedestrian. Trails will lead from the residential units to the "pedestrian stroll" which will form the heart of the development.

**2(d)      *Master Plan Implementation***

Following the CASP process, the development envisioned in the Master Plan may be

implemented according to various local governance models, through a Regional District or special resort governance models. The implementation of the Master Plan is currently conceived on the governance model provided by the local Regional District under the Local Government Act, and Crystal Mountain is pursuing an application for an Official Community Plan and rezoning with the Regional District of Central Okanagan (RDCO).

## **2(e) Introduction to the Community Plan**

### **2(e)(i) Purpose**

The need to carry out more detailed plans known as Official Community Plans is set out in Section 871 of the *Local Government Act*:

“After a regional growth strategy has been adopted, the minister may require a municipality or regional district to adopt, within a time specified by the minister, an official community plan, a zoning bylaw or a subdivision servicing bylaw for an area that is covered by the regional growth strategy and to which no such plan or bylaw currently applies.”

An Official Community Plan (OCP) should contain, apart from other matters that may be required by the Minister, a statement of broad social, economic and environmental objectives to be achieved by its implementation, as well as a statement of the policies of the Regional Board on the general form and character of the future land use pattern in the area covered by the OCP.

The Master Plan has been prepared in accordance with the provincial CASP to follow both provincial and regional strategies and should also be the basis for the amended OCP, modified to include the Crystal Mountain Master Plan. In preparing the Master Plan as a basis for the OCP, consideration is given to:

- the probable social, environmental and economic consequences of proposed policies;
- the stated objectives, policies and programs of the government;
- the suitability of land for various uses;
- land area requirements for uses related to projections of population and economic growth; and
- the prevention of pollution of air, water and land.

According to Section 875 of the Local Government act, the purpose of an Official Community Plan is as follows:

“(1) An official community plan is a statement of objectives and policies to guide decisions on planning and land use management, within the area covered by the plan, respecting the purposes of local government.

(2) To the extent that it deals with these matters, an official community plan should work towards the purpose and goals referred to in section 849



*[regional growth strategy goals].”*

It is clearly the intent of the legislation that an Official Community Plan provide specific guidance for the future development within the plan area, prior to detailed design and engineering.

The OCP for Crystal Mountain will guide and manage the land use pattern and maximize the efficient use of all resources within the community plan area in accordance to the goals of the Growth Management Strategy for the RDCO as well as with the provincial policies and with CASP.

It will establish specific land use areas thereby minimizing land use conflicts that would inhibit the orderly development and utilization of the resources.

In summary, the purposes of the OCP are to establish:

- a cooperative planning process implementing the Master Plan approved by the Province in accordance with CASP.
- a basis for implementing actions, such as detailed design and engineering

#### **2(e)(ii)**

##### ***Planning Process***

The Official Community Plan represents a primary planning document and it is based on the final public input of the CASP process during the Master Plan's preparation.

The planning process requires that the Regional District review the Master Plan and the public input following provincial approval before the OCP can be adopted by by-law by a majority vote of the Regional Directors of the RDCO.

In addition to a mandatory public hearing on the proposed OCP, Section 879 (Consultation during OCP development) of the *Local Government Act* stipulates:

“(1) During the development of an official community plan, or the repeal or amendment of an official community plan, the proposing local government must provide one or more opportunities it considers appropriate for consultation with persons, organizations and authorities it considers will be affected.”

It must be noted that the local government may utilize the extensive public consultation of the provincial process as being part of the regional process as well.

#### **2(e)(iii)**

##### ***Official Regional Plan***

The Regional District is regulated by the “Regional District of Central Okanagan Official Regional Plan By-law No. 851,” which was adopted in June, 2000 and which provides a general land use planning framework for the entire Regional District.

The Master Plan is a more comprehensive land use plan, more detailed in content, and locally significant, but it must be in conformity with the principles, objectives, and

policies of the Official Regional Plan and the Growth Management Strategy for the RDCO in order to be adopted as an Official Community Plan by the RDCO.

The alternatives for development and change within the community plan are considered in accordance with the goals expressed in the Official Regional Plan. Until now Crystal Mountain has been largely ignored in the planning process and the Master Plan presented to the Province has filled the gap.

#### **2(e)(iv) Growth Management Strategy**

The Growth Management Strategy for the RDCO (Schedule “A” to Bylaw No. 851) was adopted on June 26, 2000. The Strategy establishes a regional vision and a set of common regional goals, growth management objectives and general policies which are to be considered and reflected by the community plans. It represents a commitment to cooperation among governments and agencies and is an agreement to work together on common issues to find common solutions.

The following quotation cites the growth management objectives outlined by the Growth Management Strategy for the RDCO. These objectives are used to evaluate community plans, actions and investments made by the municipalities and the regional district.

“Major Growth Management Objectives:

- Improve the quality of life through enhancement of the arts, culture, tourism, and recreation opportunities within the region.
- Cooperate to enhance the efficiency and effectiveness of local government, and the regulatory clarity and consistency across the region.
- Ensure the financial well being of our municipalities and region through limitations on sprawl and the efficient use of land, resources, energy, and infrastructure.
- Coordinate future growth with the provision of adequate and affordable infrastructure.
- Reduce traffic congestion and improve the transportation system.
- Expand the economic base of the region’s towns and rural communities.
- Protect the integrity of the agriculture and forest land base.
- Improve the range of housing opportunities to meet the social and economic needs of the region.
- Improve regional air and water quality, and generally promote development that sustains and enhances the environment.
- Protect the scenic quality of the region and preserve significant features, open space and cultural heritage resources.”

The Master Plan and future OCP is designed to respond to the first objective and to comply with all the other objectives.

**2(e)(v) Plan Format**

The Master Plan is based upon the basic principles as outlined in the Provincial Commercial Alpine Ski Policy (CASP). These principles were derived from extensive study of local and international resorts, input from the public, government committees, and members of the Regional Boards. It is intended to be the basis of the OCP.

The OCP includes a series of sections designed to focus on resource and land use issues within the study area. The following section, *2(f) Official Community Plan*, specifies the goals, objectives and policies related to specific map designations as may be adopted by the Regional Boards. Further, the administrative framework for the Plan and implementation procedures are included. The text and maps shall constitute this Plan. Supplementary information in support of the Plan are included in the Master Plan report under separate sections which detail the physical, environmental and socio-economic components of the study area. The other sections of the Master Plan report should form part of the Official Community Plan for the Development Permit approval process, and should keep local and provincial government requirements in harmony, as well as serve as supportive documentation and guidelines.

**2(f) Official Community Plan**

The Official Community Plan along with the Growth Management Strategy for the RDCO provides a statement of goals, principles, objectives, and policies for the present and future land use and development in the region surrounding the Crystal Mountain area.

The development strategy is based on the following goals:

- Provision of means to achieve orderly and efficient development;
- To achieve the wise use of renewable and non-renewable resources;
- Preservation of environmentally significant or unique areas;
- Develop policies in support of promoting a diversified economy for the community;
- Retain resort character through development which recognizes and conserves the natural environment and tourism activities;
- Attain the orderly conversion of those areas that may achieve resort development status during the term of the OCP.

The Official Community Plan is intended to provide guidance to the Regional Board and Committees of the RDCO, the Ministry of Sustainable Resources, LWBC, and other affected government ministries as they continue to administer and plan within the study area under the powers conferred upon them. It will also provide private citizens and interested groups with a framework within which development proposals and actions will be considered, thereby removing any uncertainty as to what land use will be permitted.

It is the intent of the Plan to establish the Regional Board's vision with respect to land use allocation, particularly community land use, and in doing so, being particularly sensitive to resource use and resource values in the area. General location criteria will be established to

provide guidance to the Regional Board. The Plan will therefore provide a basis for implementing regulatory by-laws, such as a zoning by-law, and for the regulation and control of land use and development.

**An Official Community Plan proposal has been submitted to the Regional District and is available as a separate document from this Master Plan.**

The Crystal Mountain Official Community Plan is the result of the work undertaken under the Provincial Commercial Alpine Skiing Policy in order to obtain approval for the expansion of the Crystal Mountain Ski Area according to a new Master Plan. The Master Plan is normally expected to be administered by a local Government. The Regional District of Central Okanagan is expected to be the local Government and to approve the Official Community Plan for the area. Zoning processes will be provided by local government under the *Local Government Act*. The area covered by the Official Community Plan will be designated by the Regional District as a Comprehensive Development Zone, where individual project components will require both a Development Permit and a Building Permit. The Development Permit will verify compliance with the Master Plan and the Official Community Plan and the Building Permit will verify compliance with the B.C. Building Code.

The Official Community Plan for Crystal Mountain is therefore complementary to the Master Plan, designed to outline the development concept more clearly through a series of policy statements, design guidelines, and processes to be followed in order to obtain Development Permit approvals.

The area has been studied in the Master Plan prepared under the provincial approval process and its boundary at the outer limit is defined by the Controlled Recreation Area, which outlines the maximum extent of the recreation area. Within this area are the ski lift and the golf course that represent the main recreational infrastructure. A much smaller area, which represents the development area, is set aside for the built environment of the resort. This area may be identified as the Community Plan Area, as distinct from the wider Recreation Area.

The concept and the planning process are those outlined in the Master Plan document, but they share the Community Objectives and Policies outlined in the strategy of the existing local government authority, which is the Regional District of Central Okanagan.

The Regional District shares recreational development policies with the provincial Commercial Alpine Skiing Policy, intended to promote environmentally sensitive and sustainable recreational projects. The Regional District emphasizes appropriate development controls to implement the vision of the project and to control the final result of the built environment. The area being studied is not included in the Agricultural Land reserve or in the Forest Land Reserve.

## **2(g) Resort Zoning and Development Sites**

Zoning has not proven to be an ideal urban design tool, but the overall site was studied for its potential under several criteria and planned for a comprehensive development zone and development permit area, taking into account:

1. Slope

2. Sun exposure
3. Environmental constraints
4. Road and service access
5. Link with project amenities, particularly golf and skiing
6. Exposure to views
7. Fit with the forest setting
8. Relationship with project activities
9. Links to trails
10. Peace and privacy

Clusters were then identified for the main activities' nodes of the resort, centred around the daylodge and the main hotels, and then surrounding clusters of areas to be designated for the residential components, according to the vision of the resort described in the conceptual sections of the Master Plan.

Resort Zoning is described in the proposed Official Community Plan.

## **2(h) Development Permit Area Requirements**

The *Local Government Act* provides the authority for the Regional District's powers to regulate the Form and Character of the development. The Form and Character are established in the approved Master Plan under CASP and more particularly are defined in the part of the Master Plan that is contained in the chapter titled "The Base Area Development Concept and Resort Community Plan", including guidelines and maps and in the Design Guidelines included in Appendix H.

In addition to a Development Permit, and as a precondition, all developments will be required to have Crystal Mountain's approval.

## **2(i) Site Services**

### **2(i)(ii) Roads and Traffic Volumes**

The road to Crystal Mountain is a provincial road maintained by the Ministry of Transportation, under the South Okanagan District Highways Office, based in Penticton. Snow clearing is provided up to the gates of the ski area. While the roads in lower Glenrosa are dedicated, it appears that the roads above are provincial by virtue of Section 4 of the *Highways Act*. Access is provided by a recently completed freeway interchange which is the last on Highway 97c, the Coquihalla Connector, before entering Westbank from the West or the South, or the first interchange for traffic traveling West.

The current access road appears to be adequate to service the needs of the First Phase of the expansion plan and, with some improvements, to the completion of the the Crystal Mountain expansion project, insofar as the traffic generated by the project is concerned, and current projections for the region are taken into account.



A traffic study prepared by McElhanney Consulting Services has been completed and is included as Appendix B.

## **2(i)(ii) Water**

### **2(i)(ii)(A) General**

Infrastructure services are well developed for the Westbank community near Crystal Mountain. The RDCO has current expansion programs for its services, which are already extended to the Glenrosa area near Crystal Mountain. Several servicing alternatives and the costs involved in connecting the future development to RDCO system have been considered.

#### **a) Servicing options:**

The existing local domestic water supply in Westbank is provided by the Westbank Irrigation District (WID) . The WID provides water service in the Glenrosa area up to Gates Road. There are no current plans for expansion of that water supply service. North of that service, properties are served by individual wells such as the one at Crystal Mountain. Originally, in 2000, the WID was planning to build a new supply main along Powers Creek, together with a new chlorination plant immediately east of the existing ski area boundary, but that system would have only provided intake supply water to the existing system. In meetings with Patrick Poulin and with the Board of Trustees of the WID it was noted that the current system and the current service area are not intended to serve the Crystal Mountain base area, but there may be potential for expansion of that service and the service area at some future time.

In the following years the Westbank Irrigation District changed plans and it is currently building a water treatment plant, with an intake from Powers Creek, at a elevation that is below the Crystal Mountain base area. Connection to the WID might have been a future possibility, and it was hoped that the golf course developer might negotiate some supply from the WID, but currently an expansion of the area serviced by the WID uphill towards Crystal Mountain would not be economically feasible. and this option has not been pursued. In order to start the first phase of the project and to service the golf course it will be necessary to utilize groundwater that will be available from independent aquifers accessed by wells located to the north side of the mountain. Wells in appropriate locations will serve the base area. There is no intent to utilize surface water for additional or new intakes. The engineers and the consultants of the Owner have been in touch with the WID and have kept the new administrator, Mr. Brian Jamieson, informed.

#### **b) The current starting option:**

In order to plan for an early start and to obtain private project financing, an agreement in principle has been made by Crystal Mountain with Corix (formerly Terasen) to provide water services from from wells on the North side of the mountain at appropriate elevations. Water supply will increase

gradually over the years, ahead of development. The water system would be supplied from one or more drilled wells.

One of these wells is already in existence, it was drilled as part of the program completed in 2005 based on the Exploratory Permit received from the Province. It has been tested and is appropriate for potable water supply. Additional wells will be tested and a report on their performance and water quality will become part of the permit application. McElhanney Consulting and Golder Associates have provided preliminary design reviews and information. Indications are that the combined yield of the wells will be required to be of the order of 20m<sup>3</sup> per day initially, to 100m<sup>3</sup> per day, and finally 500 to 600m<sup>3</sup> per day at buildout. It is anticipated that if the new wells have similar water chemistry to the existing well, water quality will be within all the Canadian Drinking Water Standard parameters. Ultimate development might require a total water volume of up to 700 m<sup>3</sup> per day as a peak requirement, but requirements will depend on many design factors that will be determined before construction stage for each phase. Currently the detailed design is limited to the first phase.

The wells will pump water to a ground-level concrete reservoir above the resort in a suitable location hidden among the trees. It will be planned to supply all of the resort by gravity. Due to the differences in elevation across the site, the service area will be divided into pressure zones; these will be fed by gravity through a pressure reducing valve station.

The water mains throughout the base area will be sized for fire flow as well as domestic use. To assist fire fighting capabilities all buildings are expected to be sprinklered. Buildings over four storeys will be of non-combustible construction, but most will be of combustible construction.

The water supply to the existing ski resort base area comes from one well on the site plus a license to draw water from Sitmar Creek. The existing well has been tested for a maximum capacity of 30 gallons/minute, equal to 163 m<sup>3</sup>/day, although the recommended flow is 20 m<sup>3</sup>/day. The Sitmar Creek license is for 2000 gallons/day, equal to 67.5 m<sup>3</sup>/day, and it may be used for irrigation or other auxiliary purposes. Reports on the new well have been prepared by Golder Associates and are included in Appendix E.

In summary, the resort will be serviced by a water distribution system including wells, storage facilities, watermains, valves, hydrants, service connections, and reservoirs generally in accordance with the standards and specifications set out in the Regional District of Central Okanagan Subdivision and Development Servicing Bylaw No 704.

The water source will be drilled wells, in addition to the existing well, capable of delivering water at the rate required to supply potable water to the resort. Well development will conform to Provincial and Regional District of Central Okanagan guidelines. An engineer specializing in groundwater hydrology will test and verify the water quantity and quality. The Proponent is still planning to negotiate an agreement with the Westbank Irrigation District for the final phases of the project, if possible, Either in cooperation with the Westbank

Irrigation District or directly by Corix, the public utility company that is expected to supply water to Crystal Mountain, it should also be feasible and economical to offer water supply by gravity to the Upper Glenrosa residents by means of a connection to Crystal Mountain's water supply system.

The water distribution system will be designed to deliver water in adequate quantities and at adequate pressures for both domestic use and fire flows. Fire flows will be based on the most recent publication by the Fire Underwriter's survey.

Crystal Mountain is aware of the concerns of nearby water users and it is clear that the expansion will be dependent from and limited by the combined amount of water that will be made available to the project reservoirs by wells in appropriate locations.

See also Appendix D: Servicing Plans.

2(i)(ii)(B)

*Water Demand*

The water demand for the proposed ski resort expansion is affected by several major factors:

1. The operation of the resort will, by its nature, result in greater water demand in winter, because unlike most of the Okanagan valley winter will be a tourist high season at Crystal. Thus, to some extent, the normal published figures for water use, including the one used by the approving agencies, are not appropriate since they are significantly weighted by summer outdoor use conditions, such as lawn watering, which are not applicable to Crystal Mountain, where lawns are not part of permissible landscaping, except for the golf course, which is dealt with separately.
2. Resorts are typically never close to maximum occupancy. For example, the highly successful Whistler/ Blackcomb resort has an overall high season occupancy ranging from 70% in 1987/88 to 57% in 1997/98. Its occupancy averaged less than 65% over this 11-year period.
3. This resort, in recognition of concerns of nearby users and general public awareness of scarcity of water in the area, will employ water conservation strategies to minimize its overall water consumption. This distinguishes this resort from most others. Again, these measures are not accounted for in the normal published figures for water use.

2(i)(ii)(C)

*Average Day Water Demand*

For the purpose of determining the required water supply for the resort, it has been decided that an appropriate type of water demand is an Average Day Water Demand, which would allow to compare data with those of urbanized areas. This method of calculation, however, may overstate the requirements for Crystal Mountain, which is planned to be a tourist resort, not part of an urbanized area of permanent settlement and related uses.

It is assumed that the resort's water distribution system will be designed to provide for peak flow requirements, such as instantaneous and daily/ hourly domestic flow variations, fire suppression, etc. This would be accomplished through incorporation of a potable water storage reservoir within the water distribution system. The volume of water stored in a water reservoir is not considered an additional water demand. It represents an "off-line" quantity of water available for withdrawal for operational/ flow equalization purposes, which gets slowly replenished from the water source.

For the purpose of initial water demand calculations, we have assumed full ski season occupancy and water demand based on the *Health Act* Regulation (B.C. Reg. 411/85) Appendix 1. We have used this water demand criteria recently for the Kicking Horse Mountain Resort in Golden, B.C. We understand the Ministry advocates the use of these criteria, and that projects are approved by the approving agencies on that basis. These criteria also apply to water use tariffs set by water utilities and approved by the Ministry, at least in the first years of operation until actual measured water use data can be demonstrated. The water demand calculated under these conditions is tabulated in the following table:

**Table IV-7: Estimated Average Day Water Demand at Full Occupancy  
(Without Water Conservation Measures)**

Item	Facility/Type/ Service	No. of Facilities	Demand Unit Type	No. of Demand Units	Demand (m <sup>3</sup> /day)	Total Demand (m <sup>3</sup> /day)
<b>Phase I – Stage 1</b>						
1.	Day Employees	-	employee	70	0.09	6
2.	New Day Lodge	1	m <sup>2</sup> catering	250	0.11	28
3.	Single Family Chalets	42	bed unit	252	0.23	58
4.	Townhouses	139	bed unit	556	0.23	128
5.	Condominiums attached to Day Lodge	25	bed unit	75	0.23	17
6.	Condominiums	25	bed unit	75	0.23	17
7.	Bed & Breakfast	4	bed unit	40	0.23	9
						<u>263 m<sup>3</sup></u>
<b>Phase I – Stage 2</b>						
8.	Condominiums	74	bed unit	222	0.23	51
						<u>51 m<sup>3</sup></u>
<b>Phase II</b>						
9.	Day Employees	-	employee	40	0.09	4
10.	Single Family	115	bed unit	690	0.23	159

Chalets						
11.	Single Family Chalets (First Nations)	22	bed unit	88	0.23	20
12.	Condominiums	36	bed unit	108	0.23	25
13.	Hotel (100 Rooms)	2	m <sup>2</sup> catering	600	0.11	66
			bed unit	400	0.23	92
			employee	66	0.09	6
						<u>372 m<sup>3</sup></u>

**Phase III**

14.	Hotel (100 Rooms)	1	m <sup>2</sup> catering	300	0.11	33
			bed unit	200	0.23	46
			employee	40	0.09	3
15.	Bed & Breakfast	1	bed unit	10	0.23	2
16.	Single Family Chalets	208	bed unit	1,248	0.23	287
17.	Employee Housing	10	bed unit	30	0.23	7
18.	Day Employees	-	employee	65	0.09	6
						<u>384 m<sup>3</sup></u>

**Total Average Day Demand at Full Occupancy**  
(Without Water Conservation Measures)**1,070 m<sup>3</sup>**

The following notes apply to the above water demand estimate:

In the estimate, "bed units" are intended to equal the number of people. The number of facilities to be constructed and the allocation of the number of bed units for each facility is in accordance with the resort's Master Development Plan.

- The summer water demand generated by the summer resort residents or visitors and the golf course is dealt with separately in Section 2(i)(iii)(G).
- The estimate of water demand for each bed unit is 230 litres per day (50 igps). This is estimated to be the total daily demand regardless of whether or not the units have kitchen facilities. It is assumed that the residents will either eat in the units or in the restaurants and, in either case, the water consumption will be similar. The water demand for a day-employee is estimated at 90 litres per day. The water demand for common areas (i.e., day lodge and hotel catering areas) is estimated at 110 litres per m<sup>2</sup>.

For comparative purposes, it may be useful to consider the water demand in another way, as follows:



At ultimate development, the maximum Comfortable Carrying Capacity (CCC) or Skiers At One Time (SAOT) will be approximately 9,360 skiers. The number of skiers within individually owned housing facilities, such as single-family homes, chalets, townhouses and condominiums, is taken at a generous approximation of 80%. The number of skiers within commercially rented housing facilities, such as hotels and bed and breakfast units, are taken at a generous approximation of 95%. The unit water rate for a day skier is taken at the high rate of approximately 50 litres per day. The estimate of water demand is then arrived at as follows:

- 3,229 BU (S.F. lots, condominiums, townhouses) at 80% skier/facility type utilization rate = 2,615 skiers;
- 640 BU (hotels, bed and breakfast) at 95% skier/facility type utilization rate = 608 skiers;
- Potential maximum number of day skiers =  $9,360 - 2,615 - 608 = 6,137$ .

Therefore, the total maximum demand may be accrued as follows:

- 6,137 day skiers @  $0.05 \text{ m}^3/\text{day} = 307 \text{ m}^3$
- 3,309 skiers/non-skiers in residential units @  $0.23 \text{ m}^3/\text{day} = 761 \text{ m}^3$
- 245 day-employees @  $0.09 \text{ m}^3/\text{day} = 22 \text{ m}^3$

**Total estimated average winter day water demand at full build out and full occupancy =  $1,090 \text{ m}^3$**

This estimate is slightly higher. However, the first estimate was arrived at using more detailed estimating tools. The average winter day demand (without water conservation measures) and theoretical full occupancy is proposed to be established as  $1,070 \text{ m}^3/\text{day}$ .

#### 2(i)(ii)(D)

##### *Reduction of Average Day Water Demand*

It is realized that in the absence of an adequate, and usually relatively inexpensive, groundwater supply within the resort area, the cost of developing or bringing supplementary water to the resort area will likely be higher. With that in mind, and in recognition of concerns of the nearby water users about the perception of general scarcity of water in the region and the need for conservation, Crystal Mountain will incorporate water conservation and sustainable design concepts into the Master Plan. The water conservation strategy for Crystal Mountain is presented in Section 2(i)(iii)(I) below.

#### 2(i)(ii)(E)

##### *Average Day Demand with Water Conservation Measures*

While there are many areas in North America that have adopted water conservation strategies, the scope of these strategies varies widely. In most of those areas, these strategies are applied to existing built-up areas through gradual replacement of plumbing fixtures and change in personal use habits.

Consequently, there are no published water use rates reflecting water conservation measures that could be readily applied to a new development such as Crystal Mountain.

In order to assess the water demand at Crystal Mountain under the water conservation scenario, it was necessary to estimate the effect the various water saving measures may have on the published water use rates (without the water conservation measures). It is acknowledged that this method is not supported by statistical data of flows actually measured from similar developments. It is also acknowledged that although the resort will be positioned as an affordable skiing alternative, skiers, whether day-skiers or resident-skiers in owned or rented units, may represent a relatively more affluent segment of society. They may be less receptive to water saving strategies than other segments of society. The developer, however, has a large degree of control, especially through restrictive covenants that may be established at the beginning of each project component.

The reduced water rates, therefore, represent the fixed or built-in measures, such as water saving plumbing fixtures and domestic/ commercial appliances and building envelope equipment, adjusted by a perceived change in personal water use habits.

The water demand calculated under these conditions is tabulated in the following table:

**Table IV-8: Estimated Average Day Water Demand at Full Occupancy  
(With Water Conservation Measures)**

Item	Facility/Type/ Service	No. of Facilities	Demand Unit Type	No. of Demand Units	Demand (m <sup>3</sup> /day)	Total Demand (m <sup>3</sup> /day)
<b>Phase I – Stage 1</b>						
1.	Day Employees	-	employee	70	0.068	5
2.	New Day Lodge	1	m <sup>2</sup> catering	250	0.083	20
3.	Single Family Chalets	42	bed unit	252	0.161	41
4.	Townhouses	139	bed unit	556	0.161	90
5.	Condominiums attached to Day Lodge	25	bed unit	75	0.173	13
6.	Condominiums	25	bed unit	75	0.173	13
7.	Bed & Breakfast	4	bed unit	40	0.184	7
						<u>189 m<sup>3</sup></u>
<b>Phase I – Stage 2</b>						

8.	Condominiums	74	bed unit	222	0.173	38 <u>38 m<sup>3</sup></u>
<b>Phase II</b>						
9.	Day Employees	-	employee	40	0.068	3
10.	Single Family Chalets	115	bed unit	690	0.161	111
11.	Single Family Chalets (First Nations)	22	bed unit	88	0.161	14
12.	Condominiums	36	bed unit	108	0.173	19
13.	Hotel (100 Rooms)	2	m <sup>2</sup> catering	600	0.088	51
			bed unit	400	0.184	74
			employee	66	0.072	5
						<u>277 m<sup>3</sup></u>
<b>Phase III</b>						
14.	Hotel (100 Rooms)	1	m <sup>2</sup> catering	300	0.088	26
			bed unit	200	0.184	37
			employee	40	0.072	3
15.	Bed & Breakfast	1	bed unit	10	0.184	2
16.	Single Family Chalets	208	bed unit	1,248	0.161	201
17.	Employee Housing	10	bed unit	30	0.161	5
18.	Day Employees	-	employee	65	0.068	4
						<u>278 m<sup>3</sup></u>
<b>Total Average Day Demand at Full Occupancy</b> (Without Water Conservation Measures)						<u><b>782 m<sup>3</sup></b></u>

Therefore, the reduction of the water demand due to the incorporation of a water conservation program would be estimated at approximately 27 percent.

2(i)(ii)(F)

*Peak Water Demands*

The normal ratios used for calculating peak day water demands from average day water demands are not appropriate for a ski resort. The usages generating peak flows are mostly associated with outdoor summer use such as lawn/ garden irrigation, cooling, car and driveway washing, etc.

We would expect that the peak day flow for the residential/ commercial components of the resort, which would occur in the winter, would be in the order of 1.25 times the average day flow, specifically 981m<sup>3</sup>/day.

We would expect that the peak hour domestic flow for the residential/commercial component of the resort, which would occur in the winter, would be approximately 2.00 times the peak day flow, specifically 1,570m<sup>3</sup>/day.

Peak flow rates due to the combination of summer resort residents and visitors, and irrigation will be driven by the golf course.

2(i)(ii)(G)

*Monthly, Seasonal and Yearly Distribution of the Water Demand*

Winter Season – Ski Operation

The Master Development Plan for Crystal Mountain expects a maximum winter season operation of 110 days. It is also expected that the average winter resort occupancy will not exceed 75 percent. Therefore, the winter season cumulative water demand would be calculated as follows:

$$\text{Total Volume} = (782 \text{ m}^3/\text{day}) \times (110 \text{ days}) \times (75\% \text{ occupancy}) = 64,515\text{m}^3.$$

Summer Season – Golf Course Irrigation

It is assumed that only the greens of the planned 18 hole golf course would be irrigated during the months of April through October. The area of the 18 holes is approximately 26.30 hectares.

Rainfall data for Crystal Mountain was not available during the preparation of this report. Therefore, records from the Kelowna Airport weather station were used instead. The monthly evapotranspiration at that station is 677 mm. Based on consumptive use, precipitation, monthly mean temperature, and percent annual daytime hours per month, as per the Blaney-Criddle Method, the annual required irrigation is 543 mm. Thus, the total yearly volume of water required for the irrigation of the golf course can be determined as follows:

$$\text{Total Yearly Volume} = (26.30 \text{ ha.}) \times (10,000 \text{ m}^2/\text{ha}) \times 0.543 \text{ m} = 142,809\text{m}^3.$$

On a monthly basis, this volume is distributed as shown below:

**Table IV-9: Estimated Golf Course Irrigation Requirements**

Month	Required Irrigation (mm)	Required Irrigation (% Total)	Monthly Required Irrigation (m <sup>3</sup> /mth)
April	35	6.40	9,140
May	54	9.90	14,138
June	89	16.35	23,349
July	152	27.95	39,916
August	118	21.72	31,018

September	59	10.87	15,523
October	37	6.81	9,725
	<b>543</b>	<b>100.00</b>	<b>142,809 m<sup>3</sup></b>

Thus, the highest average daily irrigation demand occurs in the month of July and is approximately 1,288 m<sup>3</sup>/day. Additional volume of water would be required if more than the greens, or larger area than assumed, would be irrigated.

Crystal Mountain originally planned constructing the golf course in the later phases of the resort development, for the most part due to economic considerations. It was noted that such a phasing plan could, as an additional benefit, reduce the required total capacity of the water source. As discussed further in Section 2(i)(vii), serious consideration should be given to the re-use of treated wastewater for the irrigation of the golf course. The ski operation is estimated to generate approximately 63,690 m<sup>3</sup> of total wastewater for the season at build-out, which is about 45% of the total irrigation requirement for the golf course. The wastewater could be stored in an impoundment (i.e., facultative lagoon) for re-use in the summer. Obviously, more wastewater would be available in the later stages of development. However, Crystal Mountain is securing a development agreement with a developer and the golf course is currently planned for the initial stages of the resort development.

The golf course irrigation volume requirement may be further supplemented by surface water from runoff and snowmelt from impoundments strategically located throughout the area.

The above irrigation requirements are based on the Kelowna Airport weather data. The airport is at an elevation 429 m, while the golf course is at an approximate elevation 1,100 m. The golf course may have heavier rainfall patterns and a lower evapotranspiration. This may result in a smaller irrigation demand than is estimated in the above table.

In conclusion, if the current development scenario will create a first development phase that will include the golf course, the initial water requirements will be set by the golf course. The ski area and tourist bed development would require only a fraction of the water utilized by the golf course, which would be supplied with the treated wastewater of the tertiary sewer treatment plant plus an amount of direct water supply from well water and water storage areas.

The final irrigation demands will be set at the detailed design stage and should respect the water conservation measures outlined in Section 2(i)(iii)(I) below.

#### 2(i)(ii)(H)

#### *Requirements for Water Supply Quantity and Water Supply Source*

It is expected that there will likely be a combination of water supply sources



depending on the type of development (i.e., ski resort operation, golf course) and upon the location / altitude (i.e., ski resort at a higher elevation, golf course at a lower elevation).

Primary focus of providing the water supply will obviously be the ski resort operation. The water demand for the resort can be summarized as follows:

- Average winter day demand at full occupancy (without water conservation measures) = 1,070 m<sup>3</sup>/day.
- Average winter day demand at full occupancy (with water conservation measures) = 782 m<sup>3</sup>/day.
- Average winter day demand at maximum expected occupancy of 75% (with water conservation measures) = 579 m<sup>3</sup>/day.
- Peak winter day demand at maximum expected occupancy of 75% (with water conservation measures) = 736 m<sup>3</sup>/day.

The “Canadian Drinking Water Standards and Guidelines” recommend that water supply should be designed for at least 110% of the projected peak daily design flow. Therefore, it should be recommended that the water supply source should have a total sustained capacity of approximately 810 m<sup>3</sup>/day. However, abnormally high occupancy rates and conservative considerations have been utilized to arrive at the above noted calculations in order to provide a very conservative scenario. More accurate calculations would probably shave 20% to 25% from these calculations and it should be reasonably expected that an actual water supply in the range of 700 m<sup>3</sup>/day will be more than adequate for the resort once the data from the first years of operations are available and are utilized to determine future requirements.

The Golder Associates *Report on Assessment of Aquifer Pumping Test Existing Well near Proposed Crystal Mountain Resort Expansion, Westbank, B.C.*, dated January 17, 2002, estimates the total recharge rate of the Jack Creek watershed to be in the order of 85 l/min to 425 l/min. This translates to 122 m<sup>3</sup>/day to 612 m<sup>3</sup>/day. However, the Owner's intent is to ensure that the water sources be located on the North side of the mountain, and in the report dated August 27, 2002 (Appendix E), Golder Associates recommends the locations where to drill future wells.

The initial recommendation had been that Crystal Mountain apply to the Westbank Irrigation District to secure as much as possible of the full amount of water requirements as noted at 2(i)(iii)A(a) of the original Master Plan (2003). The current plan for Crystal Mountain is to achieve its ultimate water requirements via groundwater wells in order to expedite the start of the ski hill improvement and expansion project. Certainly, if water were to be obtained directly from the WID less water would need to be utilized from other sources of water supply. Ultimately, the incremental development at the resort, through the planned phases, will have to be proportionate to (or limited by) the total sustained capacity of the water source, but it appears that the available groundwater will be adequate for the total project, and perhaps for the residents of Upper Glenrosa as well.

The current plan envisions a modified phasing program according to which the golf course would no longer be a separate component to be developed later. Based on the intention of the golf course developer to start the golf course in Phase One, the water supply design has been modified to include irrigation of the golf course from the beginning, and without a supply from the WID, which is currently not available.

It is also proposed that in order to economize on the supply and utilization of water, water conservation measures be adopted, according to the powers granted to the developer under CASP, and that the sewer treatment plant include tertiary treatment to allow the reuse of water for irrigation and snow making.

2(i)(ii)(I)

*Water Conservation Measures*

The total sustained capacity of the water supply source is contingent upon incorporation of a water conservation strategy into the Master Plan for Crystal Mountain. The details of the proposed water conservation strategy are presented below.

Introduction, Objectives and Outline of the Water Conservation Measures

The extent of the resort's expansion will depend upon the potable water production of proposed wells, the availability of external water supply from the potential connection to the Westbank Irrigation District's water supply main along Powers Creek, impoundments of runoff and snow melt water, and water conservation and re-use measures.

In recognition of the concerns of the nearby water users, and the awareness of the public of the general scarcity of water and the need for conservation in the region, water conservation principles will be incorporated as part of the sustainable design concepts into the Crystal Mountain Ski Resort Expansion development.

The water conservation strategy for Crystal Mountain should consider the following range of conservation measures at the levels of planning, design, construction, operation and maintenance by the water utility company, and public awareness and education:

- Universal water metering;
- Water accounting and loss control;
- Incentive producing water costing and pricing practices;
- Non-combustible building construction where possible;
- Sprinkler systems in all buildings;
- Impounding of runoff and snow melt water;
- Landscape efficiency;
- Water system pressure management;

- Water saving plumbing fixtures;
- Water saving domestic / commercial appliances and building envelope equipment;
- Water re-use and recycling; and
- Water conservation awareness program.

The above water conservation measures can be further described as follows:

#### Universal Water Metering

It has been shown in many studies that metered water systems typically save substantial amounts of water compared to unmetered water systems. Universal water metering includes both source water metering and service connection metering. Source water metering is essential for water accounting purposes by the water utility. Service connection metering is needed to more accurately track water use and bill customers for their usage. It also informs the customers how much water they are using. All water provided free of charge for public use should also be metered in order to accurately account for water. Source meters and service connection meters should be read at the same relative time in order to facilitate accurate comparisons and analysis. Meters should be tested for accuracy on a regular basis. It is also important that the meters are properly sized to prevent under or over-registering. These practices will allow for effective leak detection and repairs as part of the normal operation and maintenance program.

#### Water Accounting and Loss Control

A water accounting system will help track water throughout the system and identify areas that may need attention, particularly large volumes of non-account water. Non-account water includes unmetered water as well as water that is metered but not billed. Non-account water should be analyzed to identify recoverable losses and leaks in the system. The water utility company should institute a comprehensive leak detection and repair strategy. This strategy should include regular on-site testing with leak detection equipment. A loss prevention program including pipe inspection, cleaning, lining and other maintenance efforts should compliment the loss control program.

#### Incentive Water Costing and Pricing

The value of costing and pricing as a conservation strategy is in involving the water customers in understanding the true value of water, and conveying information about that value through prices. A water utility will need to be created and operate the water system under the Certificate of Convenience and Public Necessity (CNCP). The water utility will use cost-of-service accounting, consistent with generally accepted practices established by the CNCP. The customer's bill should correspond to their water usage. Any changes in the water tariff by the water utility will require an application to and approval from the water comptroller's office. The water tariff rate should be structured to promote conservation.

### Non-Combustible Building Construction Where Possible

The Master Plan gives serious consideration to fire suppression systems in building structures. All major buildings and buildings over four storeys in height will be non-combustible and have sprinklers. All combustible buildings will have sprinklers. We recommend that the single family and bed and breakfast buildings should also have sprinklers, as the cost of providing sprinkling for small building structures is no longer prohibitive.

### Impounding Runoff and Snow Melt Water

Consideration will be given to strategic placement of water impoundment storage areas throughout the development. Runoff and snow melt intercepting ditches or swales should be located and graded such as to channel the surface water into the impoundments. These impoundments would, depending on their location throughout the resort development, have a dual function of storing water for irrigation and/or fire fighting purposes.

### Landscape Efficiency

Outdoor water usage drives maximum-day demand, particularly where a part of the ski resort development is a golf course. The maximum-day demand, in turn, drives the demand for larger water supply and storage, transmission and treatment facilities. Outdoor usage is often the greatest source of water demand in a resort development; therefore, reducing the outdoor usage can be a very effective water conservation strategy. The land use vision for the Crystal Mountain's village core area, with commercial and higher density residential component of development, will promote minimal man-made landscaped areas using hard landscaping and low water use landscaping in a natural forest setting as much as possible. The single family and bed and breakfast areas of development will be landscaped to blend with the natural forest setting and avoid a city-type grass lawn landscaping as outlined in the Master Plan. Particular attention will be paid to implementation of water conservation principles to the proposed golf course. The golf course developer must be aware of the resort's water conservation program from the early planning stage. The golf course or landscape architect should have an extensive Xeriscape experience. Xeriscape is an efficiency-oriented approach to landscaping that encompasses the following essential principles: planning and design; limited turf areas; efficient irrigation; soil improvement; mulching; use of lower water demand plants; and appropriate maintenance. The use of turf areas should be limited to where absolutely necessary, for areas such as greens, tees, landing areas, picnic areas, outside lunch areas, etc. Turf should be limited or excluded from roughs. In non-turf areas only low water use plant material should be used. Consideration should be given to dual watering systems with sprinklers for turf and low volume irrigation for plants, trees and shrubs. Tensiometer moisture probes should be used to automatically monitor the irrigation system along with other usual metering, timing and water sensing devices. The irrigation system should maximize the use of surface water from impoundments strategically located throughout the area and properly treated wastewater. The amount of irrigation should be determined by the evapotranspiration rate. The clubhouse should employ the

same conservation principles as other major buildings in the resort including sprinkling, efficient fixtures and appliances.

#### Water System Pressure Management

Reducing water pressure in the distribution system can save a significant quantity of water. It can decrease leakage, amount of flow through the open fixtures, as well as stresses on pipes and joints, which may result in leaks. System-wide pressure management during the design stage should ensure that pressures in the system exceeding 45 – 50 psi are eliminated through a proper placement of pressure-reducing valve stations in the system. The reductions in pressure should obviously not compromise the integrity of the water system or quality of service for customers. Pressure-reducing valves or regulators in the buildings should fine-tune the best pressure range in individual buildings.

#### Water Saving Plumbing Fixtures

The importance of water conservation through the installation of water conserving plumbing fixtures is generally recognized by the public. In British Columbia, it is now identified in a separate building regulation, pursuant to Section 692 of the *Municipal Act*, entitled “Water Conservation Plumbing Regulation”. At the present time, the regulation addresses the demand side of water efficiency measures only through the inclusion of water efficient devices and fixtures by specifying maximum flow rates and flush cycles. Sanitary piping systems within the buildings that control the use of other water-efficient measures (i.e., graywater re-use) are not yet included in the regulation.

The design and construction of commercial and residential components of the resort, from single-family homes to hotels, should feature the following water-saving plumbing fixtures:

- High efficiency lavatory and kitchen faucets. These devices use 1.9 to 8.3 l/min compared with standard faucets using 11 to 19 l/min.
- High efficiency showerheads. These devices use 3.8 to 9.5 l/min compared with standard showerheads using 11 to 19 l/min.
- Low consumption direct type or flush type toilets. These devices do not use more than 6 l/flush compared to the watersaver water closets, which use 13.35 l/flush.
- Low consumption direct type or flush type urinals. These devices do not use more than 5.7 l/flush. The water supply to urinal flush tanks equipped for automatic flushing should be controlled with a timing device in order to limit operation during normal working hours.
- Low flow aerators should be used on faucets where applicable / possible.

#### Water Saving Domestic/Commercial Appliances and Building Envelope Equipment



Consideration and encouragement should be given to the use of water-saving appliances, equipment and measures including the following:

- Front loading, horizontal axis, clothes washing machines. Such machines typically use 30 percent less water and 40 – 50 percent less energy than the top loading machines.
- High water (and energy) efficient automatic dishwashers. This refers to both domestic and commercial dishwashers.
- Air conditioning units and cooling equipment. Water used in cooling equipment, such as air compressors, should be minimized in accordance with the manufacturer's recommendations.
- Hot water instant demand system. Some of these systems typically utilize electronically controlled pump / recirculating loop and gas heat.
- Installation of water heaters as close to the point of use as possible and well insulated hot water piping.
- User of water softeners should be restricted due to the frequent refresh cycling and high water consumption. As well, the water softeners could jeopardize the potential of the effluent to be used for the irrigation of the golf course.

#### Water Re-Use and Recycling

Water re-use, also synonymously known as reclamation or recycling, is re-using treated wastewater for beneficial purposes such as agricultural, golf course and landscape irrigation; cooling and industrial processes; groundwater recharge, toilet flushing, wetlands and recreational water impoundments; etc. Commonly, the source of recycled water is municipal wastewater. Recycled water requires adequate treatment (settling, filtering, disinfection, etc.) before it can be used again. As with any water source that is not properly treated, health problems could arise from exposure or drinking due to disease-causing organisms and other contaminants.

The current preferred option in the Master Plan is to utilize tertiary wastewater treatment and to re-use the treated wastewater for the irrigation of the golf course. The golf course will require the single highest water demand within the resort. This could free considerable amounts of water from potable water sources, which will have to be developed (groundwater and/or surface water from the Westbank Irrigation District's planned supply main to be located in the proximity of the resort).

Utilization of graywater re-use systems was also considered, but is not recommended for the following reasons:

- Most graywater re-use systems thus far are abandoned or achieve less than 10% re-use efficiency within five years.
- The economic payback time is often longer than the system life.
- Many such systems consume so much energy and extra materials, while saving comparatively little water, that they do not make sound investment

sense. Many such systems are often technologically overbuilt using additional pumps, valves, filters, dual plumbing, and often use a lot of electricity.

- Claims made for package systems on the market are often greatly inflated and difficult to verify. While there are exceptions to the rule, they are generally very expensive, especially for small housing units, and many do not work.
- Water re-use standards and plumbing codes and regulations in British Columbia do not adequately govern the design and operation of graywater systems.

#### Water Conservation Awareness Program

Public information and education are critical to the success of any conservation program. It is recommended that Crystal Mountain adopt a water conservation awareness program strategy early in the resort's development stage. Direct savings can be made when customers change their water use habits. Public education alone may not produce the same amount of sustained water savings as other more direct approaches but it can greatly enhance the effectiveness of other conservation measures. Customers that are informed and involved are more likely to support the water utility company's conservation planning goals. An information and education program should explain all of the costs involved in supplying potable water to Crystal Mountain and demonstrate how water conservation practices will provide water users with long-term savings.

### **2(i)(iii) Water Supply Program**

The Owner has chosen a qualified public utility provider, Corix (formerly Terasen), who is expected to undertake the servicing program.

Based on the information available regarding the phasing of the project McElhanney Consulting Ltd. is expected to complete the design of a system that will be sourcing water from the wells to be located under the supervision of Golder Associates, in areas outlined in the report included in Appendix E.

The wells will pump water from aquifers identified below the north side of Mount Last to ground level reservoirs above the resort in suitable locations hidden among the trees. It is planned that the reservoirs will supply all the resort components by gravity; the service areas will be divided into pressure zones which will be fed by gravity through pressure reducing valve stations. The watermains throughout the base area will be sized for fire flow as well as domestic use. There will be only limited need for fire hydrants as all the major buildings will be sprinklered.

Winter will initially be the busy season at Crystal. Summer use will grow gradually and is expected to parallel the maximum winter occupancy at buildout. It is noteworthy that unlike much of the Okanagan Valley base, none of the summer activities will require greater water consumption than the winter activities, except for the golf course. At buildout it is anticipated that the golf course irrigation demands will

equal the total demand of the resort. If there was no reuse or recycling of water this would mean that the water supply would have to be approximately doubled. This is one of the reasons why the reuse of water through a tertiary treatment wastewater plant has been chosen an appropriate solution for the project, both from a point of view of conservation and of economy of services. In winter, some of the reused water may be utilized for snow making, but it is also expected that water will be stored at strategic locations in the resort and that stored water will complement golf course irrigation in the summer. These storage locations may be utilized also as additional provisions to enhance fire fighting capabilities.

If the golf course will become part of the development in the initial stage of the project, the water supply will need to be provided almost entirely from direct sources at the outset, with only partial reuse provided by the initial stage of the sewer treatment plant. As the project progresses to build out, the proportion of reused water will increase to the maximum level and replace direct sourcing of water from the wells for the golf course. The engineering design will provide for a gradual replacement of well water with reused water for the golf course irrigation.

## **2(i)(iv) Hydrogeologic Review**

Golder Associates Ltd. (Golder) has prepared an initial groundwater assessment for the proposed Crystal Mountain Resort development, in Westbank, B.C. (see *Groundwater Availability Assessment* included in Appendix E). The purpose of this assessment is to assess what impact, if any, additional groundwater well development for the proposed resort expansion would have on nearby surficial water courses and downgradient groundwater and surface water users. The preliminary groundwater assessment has included a review of existing water wells in the area, as contained in the Ministry of Environment (formerly Water, Land and Air Protection) water well database.

### **2(i)(iv)(A) Site Description and Hydrogeologic Conditions**

Crystal Mountain is located approximately 10 km northwest of Westbank, B.C. at an elevation of around 1,200 m above sea level. The ski area is situated in the northeast corner of the Jack Creek Watershed, and two small tributaries of the creek flow through the existing ski area in a southerly direction. The proposed development at Crystal Mountain includes the construction of additional ski lifts, ski runs, and resort accommodations. The proposed expansion would see the ski runs and lifts extend into the neighbouring watersheds, however, water well development would likely remain in the current watershed area. According to a preliminary assessment by McElhanney Consulting Ltd., it is anticipated that the volume of water necessary to support the initial phase of the proposed development will range from an initial 20 m<sup>3</sup>/d, to 100 m<sup>3</sup>/d, to approximately 600 m<sup>3</sup>/d, with a total required water volume for the ultimate development of approximately 1,300 m<sup>3</sup>/d. Conservation measures as described in 2(i)(iii)(I) and prepared by McElhanney Consulting Ltd. indicate an ultimate water volume requirement of 797 m<sup>3</sup>/day.

Based on Golder's experience, the regional surficial geology in the area of

Crystal Mountain Resort consists primarily of glacial till and shallow bedrock. As such, it can be inferred that the creeks in the area are generally supported on a fine grained soils, with little interaction with the underlying groundwater table. Although Golder has not conducted any groundwater investigations as part of this assessment, the available information suggests that groundwater is generally encountered in the bedrock. The inferred regional direction of groundwater flow (based on topography) is towards the southeast, towards the valley bottom.

2(i)(iv)(B)

*Technical Background*

Surface water courses such as lakes and rivers are the most easily accessible sources of water for drinking water use, however, they are often susceptible to contamination from human or natural activities. Groundwater is often a safer source for domestic drinking water use due to the filtration provided by soil. The interaction of surface water with groundwater can occur in three ways:

- Surface water features that receive their water directly from groundwater, called "gaining" features, are susceptible to variations in groundwater flow.
- Surface water features that lose water to the groundwater table, called "losing" features, may be affected by a variation in groundwater levels, but more often are affected by changes in precipitation and runoff.
- Surface water features supported on surficial soil layers consisting of impermeable fine grained soils such as clays or glacial tills, have very little interaction between the surficial water course and the underlying groundwater table.

Note that surface water features such as streams, creeks and rivers can interact with groundwater in all three of the ways listed above, at varying points along the course of the feature.

Groundwater in bedrock aquifer systems is generally confined to flows in fractures or shear zones, with usually the rock itself being impermeable. For comparison, in unconsolidated aquifers (i.e. sand and gravel), flow occurs through the permeable soil deposits. The volume of water available and speed of water transport in a bedrock aquifer depends largely upon the size and characteristics of the fractures in the rock.

Groundwater recharge typically occurs in the uplands and higher portions of a watershed, whereas groundwater discharge to streams, creeks and lakes typically occurs in the valley bottoms and lower portions of a watershed.

2(i)(iv)(C)

*B.C. Environment Water Well Review*

A review of BC Environment's water well database for the area around Crystal Mountain Resort indicated that one water well, operated by Crystal Mountain, was present in the area. According to the well log for the existing water well, glacial till (which is relatively impermeable) is present from the

ground surface to a depth of 12 m, and is underlain by bedrock. The main water bearing fractures in the bedrock are present at 57 m and 60 m below the ground surface.

A review of BC Environment's water well database indicated that the nearest registered water wells were located approximately 4 km to the southeast of the resort, outside the Jack Creek watershed area (Exhibit III-2). A brief review of these well logs indicated that groundwater was encountered at depths of approximately 90 m to 120 m below ground surface, in bedrock.

2(i)(iv)(D)

*Discussion*

Based on the preliminary review of available information, Golder does not anticipate that the use of groundwater in the Crystal Mountain Resort area will have a significant detrimental affect on nearby surface water flows. This is due to the surface water flows being largely isolated from the underlying groundwater in the bedrock by up to 12 m of low permeability glacial till and another 45 m of bedrock. Further, as most of the groundwater extracted for use at the site will be re-introduced to the subsurface as naturally renovated or treated effluent, that there will be little net loss to the local groundwater system. Based on the available information, it is also unlikely that groundwater use at the resort would affect other water wells, as the nearest wells appear to be approximately 4 km away and in another watershed.

2(i)(iv)(E)

*Conclusions*

In order to confirm subsurface conditions in the area of the resort, and to assess the volume of groundwater available from within the bedrock aquifer, a water balance review will be conducted for the area. In addition, water wells locations will be selected and the wells be drilled and tested to ensure that the necessary volume of water to sustain the proposed development is available prior to construction.

2(i)(iv)(F)

*Monitoring Program*

As noted above, Golder has been assessing water supply options at the proposed Crystal Mountain Resort development in Westbank, B.C. While only preliminary information is available at this time, it appears that there is the potential to obtain water supply from drilled wells for the initial stages of the development. Additional aquifer testing and well drilling will be required in order to confirm the yield of water available from drilled wells for each subdivision component of the project. It is noted that, while wells are the preferred initial source of water for the project to start, a connection to the Westbank Irrigation District water supply system will continue to be investigated for later stages in the project.

It is understood that there is public concern regarding the proposed use of groundwater as a water supply source for the initial phases of the development. The concern being that groundwater use by Crystal Mountain Resort would be at the expense of other users in the area and that they may

no longer have sufficient water for their needs. The purpose of the following is to provide additional information regarding the care that would be taken to determine that the extraction of groundwater for Crystal Mountain Resort would *not* adversely affect other well users in the area.

To assess whether wells for Crystal Mountain Resort would affect neighbouring wells, Golder recommends, and the owner plans to implement, the following components of a hydrogeological study for the first development phase and each subsequent phases:

- Conducting an aquifer pumping test on the existing Crystal Mountain water well,
- Drilling one or more additional wells in hydrogeologically favourable areas,
- Conducting an aquifer pumping test on additional drilled wells,
- A thorough analysis of all data by a Registered Professional Geoscientist to assess the long term potential for wells at Crystal Mountain Resort, with consideration given to other users and requirements in the area,
- Water level and well yield assessment of private water wells in the area to determine the status of existing wells prior to additional groundwater extraction by Crystal Mountain Resort,
- Installation of groundwater monitoring wells to monitor water levels at Crystal Mountain Resort and downgradient areas over time.

This process has been carried out at similar sites and is considered an effective and scientific way to determine the capabilities of an aquifer, such that adverse effects to existing well users does not occur. Golder is confident that this process will also be effective in assessing aquifer capabilities at Crystal Mountain Resort, and the Owner is planning to follow the above noted procedures as part of its future subdivision applications.

## **2(i)(v) Well Drilling Program**

Crystal Mountain has concluded an agreement in principle with a qualified public utility company to receive water and sewer services. It is anticipated that the utility will take the lead in the design and construction of the services, using the same consultants and the planning work provided by Crystal Mountain as part of the Master Plan process. It is expected that the utility will require confirmation of zoning approvals in order to prepare the final design and apply for construction permits. In order to expedite this process Crystal Mountain commissioned a preliminary *Groundwater Availability Assessment* report prepared by Golder Associates, dated August 27, 2002 (Appendix E), outlining proposed well drilling areas, and requested permission to drill from the Province. Permit number 339 039 was issued by the Province on January 20, 2003, following appropriate consultations. Crystal Mountain's program is to have the public utility company conclude the detailed design of the infrastructure and to complete the final drilling program as soon as the Regional District's zoning approvals indicate that the project planning permission to proceed, subject to all the other required permits and approvals, is available. The



engineering consultants and the utility companies that are interested in the project are satisfied that appropriate aquifers are accessible and adequate for the entire project, based on water re-use for golf irrigation purposes.

## **2(i)(vi) Sewerage**

The average daily wastewater flow for the ski season at total build out is estimated to be at 579 m<sup>3</sup>/day.

### Options:

#### a) Sewer connection:

The existing regional sanitary sewer currently serves the lower Glenrosa area of Westbank up to Rosedale Court. North and west of the end of the sewer line there are individual septic disposal systems. Sewer extension design for possible construction over the next several years, depending upon the outcome of petitions in the service area, has been anticipated. The extension of a trunk sewer line would present a possible alternative to an independent system at Crystal Mountain, but would have depended on terms and time factors for becoming part of the existing trunk sewer and treatment plant service areas. The existing Westbank Treatment Plant is on Gellatly Road, south of Highway 97 above Lake Okanagan. Connection to the RDCO sewer system, if economically feasible, would have been an option. A connection of adequate size to the nearest available point in the Glenrosa area indicated a potential requirement of a sewer line along the access road to Crystal Mountain extending down a distance of approximately 10 kilometres. However, both water conservation and economic reasons indicate that it will be necessary to build an on site tertiary treatment plant and re-use the water for irrigation of the golf course.

#### b) Tertiary sewer treatment plant (selected option):

An independent system is currently planned to drain to a sewage treatment facility located on the south side of the Controlled Recreation Area in an appropriate location defined and shown on the engineering drawings that are included in Appendix D.

Such a sewage treatment plant itself is expected to be constructed pursuant to a design/build proposal from the wastewater industry. An option, at this time, is a sewage treatment system similar to the one from Ecofluid, constructed recently at the Kicking Horse Mountain Resort in Golden, B.C. The Ecofluid system in Golden uses an Upflow Sludge Blanket Filtration (USBF) process. The performance guarantee is for: BOD<sub>5</sub> < 10mg/l; TSS 10mg/l; NH<sub>4</sub> N < 1mg/l; and, Pt < 1mg/l. Sludge concentration is estimated at a fairly high 4.5 to 6% resulting in relatively low costs for trucking the sludge away. The system includes UV disinfection. The Ecofluid's USBF process system was also recently installed at the Sun Peaks Ski Resort near Kamloops. Tertiary treatment is necessary to guarantee the reusability of the wastewater.

An advanced tertiary treatment will be provided, as it may be required prior to discharge, so that the effluent can be utilized for golf course irrigation and snow

making in winter. The sewage plant could be built in stages to keep up with the progress of development. The effluent may drain by way of pipe to an approved outfall according to the Ministry of Environment application requirements based on the recommendations of the Environmental Impact Study.

Crystal Mountain has negotiated an agreement in principle with a qualified public utility company for the provision of water and sewer services, and the sewer treatment plant is expected to be owned and operated by the public utility company.

**2(i)(vii)*****Solid Waste Collection and Disposal Systems***

The Central Okanagan Regional District (RDCO) operates the Westside Landfill site at Asqwith Road, in Westbank, about 8 kilometres from the Glenrosa area. RDCO has a mandatory Blue Bag Recycling program in place and requires separation of newspaper and cardboard from other wastes. Various waste collection requirements are set out in Bylaw 580. Regular weekly curbside garbage collection is provided to the top of the Glenrosa area for collection of up to 2 bags of garbage per property. There are also four unlimited yard waste collections per year. Properties at Crystal Mountain should provide space for both regular waste and recyclable waste. The extension of garbage collection to Crystal will be explored, in conjunction with the special waste management provisions that will be necessary to deter scavenging wildlife and vermin in this wilderness fringe to the Westbank area. Unlike the Glenrosa area, Crystal Mountain will not utilize curbside garbage collection.

Domestic solid waste will be dropped off by residents at the resort transfer stations and will be collected from there and either recycled or disposed of in the refuse disposal site. The refuse disposal site accepts municipal, residential, commercial and industrial wastes. All domestic waste will be placed in fully enclosed waste transfer stations, which will be designed as closed, odourless, and predator proof structures. A recognized waste management hauler will be retained to collect and remove the recyclable materials and solid waste from the resort. The non-recyclable refuse will be disposed of at the landfill site. It will be required that all residents keep refuse in enclosed predator proof areas before dropping it off at the resort transfer station. Disposal will be by contract and may be eventually administered by a Mountain Resort Improvement District if established. Residents may also drop off their own waste at the disposal site upon payment of the appropriate fee. At the outset, the hotel and commercial facilities will contract for their own collection.

The focus will be placed on waste minimization and recycling programs. Dedicated bins will be provided for recyclable products such as cans, glass, paper and plastics. An enclosed recycling depot will be strategically located within the resort complex to ensure cooperation of residents and guests and to keep garbage away from scavenging wildlife.

Recycling and refuse bins will be provided at ski lifts and at the Teahouse. These bins will be collected daily and dropped off at the central waste storage facility.

Food and organic wastes will be generated mainly by the catering and restaurant facilities at the hotel and commercial facilities and at the mountain top teahouse. Separate food waste containers will be provided at these locations.

Hotel and commercial facilities will contract for their own collection. To assist in the odourless qualities of the waste transit building, consideration will be given to freezing waste in the transfer station, especially during the summer months.

**2(i)(viii)      *Hazardous and Special Wastes***

Storage collection and disposal of hazardous and special wastes at Crystal Mountain will be prohibited, unless those who may generate that refuse will have made prior arrangements to contract directly for its proper disposal. Special arrangements must be made for hazardous wastes, as they are not accepted at any Regional District refuse disposal facility. Prohibited materials at the Regional District Refuse Disposal Site include animal carcasses, lead acid batteries, sludge, log yard waste, smoldering ashes, passenger vehicle tires, and commercially generated OCC (Old Corrugated Cardboard).

**2(i)(viii)(A)      *Household Hazardous Waste***

Hazardous household waste includes all consumer products that are corrosive, toxic, reactive or flammable (paints, solvents, cleaners, etc.). The major users of the household products will be residents and maintenance staff of the resort. Where the resort operations of Crystal Mountain generate household hazardous waste, it will arrange for its proper disposal.

**2(i)(viii)(B)      *Special Waste***

Special waste that will be generated includes waste oils and lubricants, refuse from the First Aid facility, and refuse from certain commercial facilities. As refuse from the first aid facility may be considered as Bio-Medical waste, consideration will be given to the co-management of this waste with the hospital in Kelowna. The Ministry of Environment will be consulted on appropriate ways to handle special waste and handling will comply with established legislation and regulation.

Maintenance facilities will be equipped with conventional storage and handling equipment for used oils and lubricants. These used oils and lubricants will be collected and managed by a recognized recycling facility. These exist in B.C.

A recognized waste management organization will be retained to collect and dispose of these special wastes by the operation responsible for their production.

**2(i)(ix)      *Drainage Systems***

All drainage systems will be designed in accordance with Regional District of Central Okanagan Subdivision and Development Servicing Bylaw No 704. The drainage system will be designed to protect water quality of the receiving water bodies.

Stormwater will be directed to an acceptable discharge point, such as a major creek with adequate capacity. Stormwater management will incorporate lot grading, surface infiltration, sub-surface disposal, detention and other methods to limit the peak run-off from the development. Most of the storm drainage system within the resort will consist of grassed roadside ditches discharging to the minor natural watercourses on the mountain. These grassed ditches enhance stormwater quality through filtration and infiltration and provide snow storage during winter months.

Major drainage systems will first discharge to a constructed water quality/siltation pond before entering natural channels. The main functions of the ponds will be to improve water quality and to provide spill containment and detention where necessary. All proposed works affecting natural drainage courses would be forwarded to the Ministry of Environment for review and approval.

Streamside protection areas will be established along designated streams in accordance with the Provincial Streamside Protection Regulations and the Regional District of Central Okanagan guidelines. Setbacks will be established to protect natural features in accordance with the regulations.

Construction drainage will be provided according to Ministry of Environment guidelines.

**2(i)(x)*****Stormwater and Snowmelt Management***

The proposed development is located on the southern flank of Mount Last. The area slopes gently towards Jack Creek to the south of the development area. This is predominantly a forested area with some small natural meadows and several open cut blocks.

From the ski resort base area, which is situated at elevation 1,175 m., the terrain slopes towards the south to an elevation of approximately 580 m. at Okanagan Lake. The region between the resort area and Okanagan Lake contains a series of small valleys and ridges between sections of moderately sloping terrain. These valleys are generally well drained but contain a few marshy/swampy areas and a small lake which originated from an inadequate culvert.

The overall drainage in the area of the resort is to the south, following the sloping topography toward Trepanier Creek as Shown in the Jack Creek Watershed Area Plan (see Exhibit III-2). The development will initially redirect the run-off in the southwesterly direction at a number of locations, towards Jack Creek. All run-off from the development area eventually reaches Trepanier Creek.

Drainage services for small areas, such as parking lots and building envelopes, will most likely be designed based on rainfall events as estimated from regional intensity-duration-frequency curves (IDF curves).

Please see also Appendix D: Servicing Plans.

## 2(i)(x)(A)

*Development Considerations*

Stormwater and snowmelt run-off from the uphill ski areas will occur primarily as overland sheet flow and concentrated flow in numerous channels and small creeks criss-crossing the development site. This run-off will be intercepted by cut-off ditches on the uphill side of the development and routed around into the closest receiving streams. In open areas outside of the development the run-off will be intercepted by roadside ditches and pass through culverts under the roads.

The concentrated base area of development near the central resort will be serviced with piped storm drains. Where possible, the discharge from ditches and storm drains will be routed through the system of natural and man-made lakes and lowlands scattered downstream of the development site. This will provide a certain measure of storm water quality and quantity control through natural biofiltration and uncontrolled detention. Opportunities will be explored to enhance this detention or to provide additional detention elsewhere at the site to mitigate the effects of an increase in run-off due to the proposed development.

Efforts will be made to maintain existing hydrologic patterns at the site by reducing the amount of diversions. Drainage areas, as delineated in the Jack Creek Watershed Area Plan (see Exhibit III-2), will remain unchanged. Although, local diversions near the base facilities will be provided to reduce the risk of erosion and water quality problems, overall run-off patterns will be maintained. This is particularly important with respect to maintaining base flows in creeks.

Interceptor cut-off ditches, creek or channel diversions and ditches in general will be designed with minimal gradients, where possible. Where necessary, check dams, riprap armouring and other means of erosion protection will be utilized to ensure erosion does not occur during periods of substantial run-off.

The Development Plan will ensure no land disturbance will occur within the Jack Creek 200 year flood plain. As shown in the Jack Creek Watershed Area Plan (See Exhibit III-2), Jack Creek runs from northeast to south along the face of the mountain through a natural depression.

The Development plan will ensure potential for storm water contamination by automotive petroleum products is minimized. This may be accomplished by construction of biofiltration swales intercepting run-off from parking lots and maintenance areas and by implementation of oil separators. Segregation of run-off that could be contaminated from run-off that is not exposed to contaminants will help reduce the cost of treatment facilities.

## 2(i)(x)(B)

*Implementation Considerations*

Crystal Mountain recognises that storm water and snowmelt run-off can have a significant impact on the receiving environment. Hence the development will incorporate erosion control and pollution control measures to prevent deterioration of the watershed. During both the construction and post-

construction phases of the project, Crystal Mountain will focus on implementing the most applicable Best Management Practices (BMPs) to control the quality of run-off water. These will be in accordance with the project's Environmental Analysis as well as the "Land Development Guidelines for the Protection of Aquatic Habitat" (DFO/MoELP, 1992).

Soil erosion and subsequent downstream deposition during construction is of particular concern since construction activity has the potential for significant impacts on water quality and aquatic habitat. During the construction period, at-source erosion control techniques will include:

- Minimum land clearing in advance of construction
- Timely revegetation of bare areas after construction
- Diversion ditches
- Riprap and other protection at location most susceptible to erosion
- Limiting land clearing operations to dryer seasons.

The environmental analysis, together with the results of the hydrological study, will provide the basis for the design of drainage facilities, such as culverts, stream crossings, storm drains, sediment control facilities and other aspects of the Storm Water and Snowmelt Management Plan.

#### **2(i)(xi)      *Electrical Power***

Crystal has planned to utilize the existing right of way and power line in the project. Following an inspection by B.C. Hydro, it is understood that the line may be utilized as it is for the initial phase and then may require only a change of conductors and replacement of poles for the following residential phases of the project. The project is proceeding on the basis of assurances of adequate supply of power by B.C. Hydro at normal rates. B.C. Hydro is expected to supply the necessary power from Glenrosa and to provide local distribution in the resort. A possible alternative to electrical distribution by B.C. Hydro would be the creation of an independent utility to distribute power and charge customers directly. In that scenario, the power line and right of way would be retained by the new independent utility. In addition to the existing single phase power line, Crystal has its own 550 kilowatts power generator, which will provide emergency power supply for the future. The power generator is supplied by an above ground 1000 gallons double wall tank.

With the assistance of Corix, the public utility services provider, Crystal Mountain is planning to utilize geothermal energy for heating wherever possible, and therefore to reduce the project's dependence on electricity.

#### **2(i)(xii)      *Communications***

The installation of appropriate telephone lines along the existing alignment of the power lines by Telus is a possible form of service. An alternative is a satellite telephone system that could be provided by Telus or an independent utility.



**2(i)(xiii)      *Emergency Services Generally***

In the RDCO area, fire, police and ambulance services are handled separately. Fire protection services are provided by a fire protection district serving an area that extends from Glenrosa to the Okanagan Lake, while police and ambulance services are part of a broader service area. There is a “911” service to call emergency services.

Other emergency services such as search-and-rescue and emergency response programs are coordinated by the local emergency coordinator or through the RCMP who in turn call upon trained volunteers.

Crystal Mountain is planning to review emergency services, and any related agreements that may be in place before building construction begins.

In relation to emergency services, Crystal Mountain will arrange for its ski hill operations to employ a certified professional ski patrol with basic paramedic training to provide for stabilization and transfer of injured skiers to facilities in Kelowna. The ski patrol will provide search-and-rescue operations within the Controlled Recreation Area and will call in regional search-and-rescue volunteers on an as-needed basis and in accordance with industry standards.

**2(i)(xiv)      *Fire Protection Services***

There are several options for the provision of full fire protection services at Crystal Mountain. One option is contracting for services with the nearest fire department. A second option is the creation of a single fire services district to include Crystal Mountain, Glenrosa and the surrounding area. In the first option, the fire department would require additional equipment to improve its response time to Crystal Mountain, while in the second option, a new fire hall, acting alone or as a satellite hall, would be required at the resort, with equipment to industry standards. Mutual aid agreements between different fire protection services could combine to reinforce fire protection in all areas. Generally, a fire protection service will be in accordance with the provision of the guidelines in “Establishing and Operating a Fire Department” and with the office of the Fire Commissioner, both under the wing of the Minister of Community Services.

The initial fire protection at Crystal itself will likely be a volunteer fire department. An independent fire service will be created to provide fire protection at the resort area, utilizing on-site equipment and trained volunteers, drawn from ski patrol and other ski resort employees. It is possible that fire protection services during construction and build-out will be contracted with the Regional District’s Fire Department.

In considering the best way to provide fire protection services, consideration must be given to insurance implications for property owners, the provision of sprinklers in buildings where service is from a great distance, and the opportunities for utilizing trained fire fighters to reinforce search-and-rescue and paramedic skills at the base of the resort. Building design will take into consideration the requirements of the Insurance Advisory Organization. Crystal has been in touch with the operators of other ski area fire protection services and will continue to consult with facilities such

as at Sun Peaks and Silver Star, to draw from their experiences.

A report on the fire protection program envisioned for Crystal Mountain, prepared by Dave Field Consulting, is enclosed as Appendix I.

*See also 2(b)(iv) Resort Fire Prevention and Control.*

**2(i)(xv)      *Police Services***

The RCMP provincial police services have a detachment based in Westbank, which serves a broad area that includes Crystal Mountain. Services to Crystal Mountain will be operated from Westbank and will include the usual traffic patrol and investigation services as well as operating a crime prevention and ski watch program. There is not expected to be an immediate need for an increase in detachment size as a result of the development of Crystal Mountain, because ski areas do not generate a great deal of crime. Search-and-rescue operations are dispatched by the RCMP utilizing the volunteers under the Provincial Emergency Preparedness Program. The RCMP works along with search-and-rescue teams on an as-needed basis. A security office has been proposed for the base area at Crystal Mountain which will serve as a dispatch centre for necessary security services, including RCMP.

**2(i)(xvi)      *Medical and Ambulance Services***

Kelowna General Hospital provides acute care, extended care and continuing care facilities. The hospital now serves the area and is capable of providing services to Crystal Mountain. As population grows in the future, so too will the Province have to expand the hospital facilities.

Paramedical services generally will be provided at the ski area in conjunction with the certified professional ski patrol services. Injuries will be dealt with at the resort to stabilize victims. The ambulance facility in the resort area will be located near the base area of the Resort. Patients will be transferred to Kelowna Hospital as necessary.

Ambulance service is currently available to the Crystal area through the District Ambulance Service, which provides coverage to a broad area. This independent service is based in Kelowna. On-site ambulance service will be provided according to industry standards when skier volumes reach a certain level and could be provided as an improvement district service.

### 3. CONSULTATION PROCESS

#### 3(a) Public Support

The draft Master Plan was prepared following discussions with the current manager of Crystal Mountain, with the Director of Planning and the Economic Development Officer of the RDCO, with a group of B.C. Government staff and local stakeholders and with staff of the British Columbia Assets and Lands Corporation. Preliminary environmental reports indicated that there are reasonable prospects for an expansion of the ski area, subject to studies that followed, to the CASP review and approval process, and to the RDCO's additional review and approval. The Formal Proposal submitted according to CASP to the Province and to RDCO received a unanimous vote of support by the Board of the RDCO.

Preliminary unofficial presentations to community leaders and First Nations indicated that the expansion of the ski hill is seen with positive expectations by the local population, in Westbank and in Kelowna, its initial primary ski and golf market. Prior to submitting the draft Master Plan proposal to the Province and to the RDCO, Crystal Mountain held an Open House to discuss the project with the public on May 24, 2001, at the Westbank Community Hall. The project was well received and a number of comments were noted and forwarded to LWBC. The Master Plan includes a response to the questions raised by Government agencies and public following extensive consultations during the summer of 2001. Crystal Mountain and its plans for expansion enjoy wide public support. The Province approved the Master Plan in May 2002.

#### 3(b) First Nations

The Okanagan Native Alliance is currently involved with the B.C. Government in general treaty negotiations. The Aboriginal Relations Office, or an appropriate representative of the First Nations has been consulted through a process arranged by B.C. Assets and Land Corporation which acknowledged the higher level relationship between First Nations and the Province. The Owner has drawn from the knowledge and advice of the local First Nation's members through on-going private meetings. The Westbank First Nation has been as friendly with representatives of Crystal Mountain as the Methow were described by David Thompson in 1811: "They lifted up their arms and hands toward the skies, praying for our safety and return to them," (*Okanagan Sources*, page 95). It is in this spirit that Councillor Raf DeGuevara read a letter of support from the Chief and Council at the start of the Open House on July 19, 2001, at the Westbank Community Centre (attached as Appendix F).

The Westbank First Nation has been active with other developers and has supported the development of a public golf course in Westbank, which will reinforce the area as a recreation and tourism destination. The Crystal Mountain expansion proposal may provide opportunities for development and investment by the Westbank First Nations Development Company. A hotel or other type of residential development project is being discussed as an entry into the tourism business, to be owned and operated by the Westbank First Nation development company in cooperation with Crystal Mountain. It may also provide a means of exposing visitors to some of the traditional art and design themes of the Okanagan First Nations.

The Daylodge and the proposed Teahouse on the top of Mount Last may provide room for a interpretive themes that may include the natural and archaeological history of the area covering both pre-contact and post-contact historical information. Of concern to First Nations in the expansion of the ski resort are matters such as the preservation or protection of various bushes and shrubs providing traditional berries or medicines as well as any culturally modified trees. An archaeological study has been completed and is included in Appendix C.

Crystal Mountain has an ongoing relationship with First Nations and plans to expand this relationship with job opportunities and by exploring joint venture development opportunities. Crystal Mountain has met regularly, even if unofficially, with the Chief and Council members to discuss its plans and to receive advice and maintains a business liason through the Westbank First Nation Development Company. It has also discussed the concept of a Visitor's Centre. Joint Venture development ideas will be pursued with the Westbank First Nation Development Company. Consultation with the Westbank First Nations is arranged formally by the Province of B.C. and relations between Crystal Mountain and the First Nation are required to be only at the business level, through the Westbank First Nation Development Company.

### **3(c) Local Government**

The Regional District of Central Okanagan is not only a stakeholder in the ski resort expansion, and part of the agency review committee coordinated by B.C. Assets and Land Corporation, but it is also the authority having jurisdiction over the resort area, which will provide the context for many services to the resort.

One of the most important review processes with the Regional District is the land use and planning process involved in making provisions for the proposed uses within the context of the Regional Growth Strategy Plan, the Official Community Plan and zoning bylaws. In preliminary meetings with the RDCO it was agreed that the process for creation of a comprehensive development plan can be concurrent with the CASP process. Building inspection and permit services will also be handled by the Regional District. Crystal Mountain and its consultants met regularly since the summer 2000 with Regional District staff. It also presented the preliminary concept of the project to the RDCO Board and its Advisory Environmental Committee in March 2001 and in April 2001 respectively. On March 14, 2001 the RDCO Board passed a unanimous resolution of support for the concept of the project, directing staff to assist the applicant in the review and approval process to achieve an early start to the project. An application for an amendment to the Official Community Plan and rezoning of the First Phase was made during the Master Plan approval process in 2001, however, prior to first reading, in May 2002, the lawyer hired by the RDCO to draft an agreement with the Regional District (an agreement intended to be similar to the Master Development Agreement being prepared by the Province) included conditions that conflicted with provincial policy. The application was abandoned.

Following further discussions with RDCO staff and policy presentations by provincial staff, a Memorandum of Understanding was signed by Province, RDCO and Crystal Mountain representatives. In accordance with the Memorandum, Crystal Mountain prepared a preliminary servicing program that included on-mountain drilling explorations to determine feasibility of groundwater services prior to re-submitting the application. Following the completion of engineering reports and preliminary design a new application was prepared and presented during the Summer 2006.

**3(d) Provincial Government Agencies**

The expansion of an existing ski area requires an application under the Commercial Alpine Skiing Policy of the Province (CASP). This application process is similar to the review process envisioned under the 1995 *Environmental Assessment Act* (EA Act), but it is less onerous because the Inter-Agency Committee that manages the process is normally smaller and it has a better proven track record. Applications for expansion of existing areas and below a certain size are exempted from the more complex procedure of the EA Act and this application is based on the condition that it will be processed under CASP. The Whitetooth Ski Area near Golden (now called Kicking Horse Mountain Resort) recently was the subject of an application made under similar circumstances and this application is based on that precedent.

The process is started with the presentation of a Formal Proposal and the conclusion of an Interim Agreement with the Province. The Interim Agreement confirms the terms of CASP for the project and sets the stage for the review of the Master Plan application. In order to have the permits and to acquire the Crown land necessary for the development, the proposal requires the Provincial Government's review and approval of the Master Plan and processing of a Master Development Agreement with the Ministry of Tourism, Sports and the Arts (formerly the B.C. Assets and Land Corporation) according to CASP.

Many provincial government agencies have an interest in the ski resort expansion at Crystal Mountain and many took part in the review process as members of an inter-agency review committee that convened on several occasions to review details and balance interests in working toward a Master Plan for the resort. Some of the interested ministries included the Ministry of Water, Land and Air Protection, Ministry of Forests, Ministry of Transportation and Highways, Ministry of Municipal Affairs, Ministry of Health, and the Ministry of Mines, together with B.C. Assets and Land Corporation, which coordinated the CASP process.

Crystal Mountain and its team of Consultants have met with Government staff on various occasions since the summer 2000 and have met with the Interagency Committee coordinated by LWBC. Following an extensive review and public consultation the Master Plan was approved in May 2002 and the Master Development Agreement was signed in August 2003. An updated Master Development Agreement was prepared in 2006, according to the latest provincial template for mountain resort creation.

**3(d)(i) Forestry Issues****3(d)(i)(A) Forestry Economy**

Westbank is the home of a lumber mill operated by Gorman Bros. Lumber Ltd. which has one of the main forestry operations in the area considered for the ski area expansion at Crystal Mountain. Public forest lands are included within the central part of the Okanagan Timber Supply Area and private forest lands provide some additional timber resources. Riverside Forest Products Ltd., the major forestry firm, operates a large integrated sawmill and veneer-plywood plant in Kelowna. In 1998, the lumber mill had a shift capacity of 125 mmfbm and the plywood plant had a shift capacity of 125mmsf. Other forest activities include a log home mill (Radomski Log homes Ltd.), a chopstick mill (Canada Japan Chopstick Corp.), and a number

of other non- integrated sawmills.

There were a total of 82 firms involved in logging and forestry in the Central Okanagan Regional District in 1996. Of these firms, six businesses have more than 20 employees. The wages paid by firms involved in processing of forestry products in the RDCO was \$46.7 million in 1996.

3(d)(i)(B)

*Forestry Interests*

Much of the proposed Controlled Recreation Area is covered with forested areas that will require ongoing management. These will surround the base area of the resort as well as the mountain area, and will require cooperation among the Ministry of Forests, B.C. Assets and Land Corporation, the forestry companies and the Owner.

The northern part of the proposed Controlled Recreation Area (CRA) is within a tree farm license area (TFL 49) which is part of the operations of Riverside Forest Products Ltd. The southern and western parts of the proposed CRA are part of the area held by Gorman Bros. Lumber Ltd. under a forest license. These and other forestry interests will be expanded upon in the Master Plan.

In the meantime, the Owner has met with Nick Arkle, Chief Forester of Gorman Brothers and also with Mike Doiron, Forestry Planner, Glen Dick, Operations Forester and Bob Harrison, Woodlands Manager at Riverside Forest Products Ltd.

Preliminary meetings with representatives of Gorman Bros. Lumber Ltd. have indicated a cooperative approach to facilitating ski resort expansion while continuing to provide for harvest areas. Mapping provided by Gorman Bros. Lumber Ltd. indicates that the proposed location of ski hill facilities is workable with only minor adjustments. Their volume based cutting licenses seem to provide sufficient flexibility to adjust scheduling and precise locations for further cuts in the area of the ski resort.

Preliminary meetings with Riverside Forest Products Ltd. indicated a cooler response toward the idea of a ski area expansion that would encroach on its land based tenure and create more potential constraints on future visual landscape units derived from a visual quality objective (VQO) analysis. That concern is even more significant because of the recent impact on visual quality objectives caused by construction of the Coquihalla Connector that provides a viewpoint over some of the same terrain to the north of the ski resort but from a different direction. The Land and Resource Management Plan (LRMP) has also proposed a protected (park) area in the nearby Lacoma Creek/Trepanier Creek catchment area, which is also north of the proposed ski resort creating some further restrictions on future cut area. The Owner believes that with some cooperation among the various players, it should be possible to overcome any significant concerns. The Owner has suggested that the following initiatives may help to minimize impact of the ski resort expansion on Riverside Forest Products. First, a term of the Master Development Agreement with the Province could prevent or stop the ski operator from objecting to nearby visible forestry operations. Second, an



agreement with Ministry of Forests could waive all claims to require usual VQO studies from potential viewpoints at the ski hill location. Third, the Owner will support a request to the Crown to find alternative territory to replace areas used for ski runs and ski lifts, or institute a program where certain ski runs are relocated and replanted every 5 or 10 years or so to reflect a more typical working forest environment. The Owner sees no real reason why active forestry operations cannot co-exist with an expanded ski area. **Above all, the Owner has offered that actual expansion on the North Slope of Mount Last (that is, construction of lift #11 and #12 and related ski runs) will not be pursued without a prior agreement with the forestry tenure holder, Riverside Forest Products, Ltd., so as to satisfy their concerns regarding forestry issues and their continued operations.** General forestry issues of concern to both the forestry companies and the Owner are set out below, including more discussion of visual quality objectives, which appear to be a significant concern to forestry companies.

3(d)(i)(C)

*Forestry and Environmental Issues Interface*

The Preliminary Environmental Audit in the Appendix to this Formal Proposal covers many matters that overlap between wildlife concerns and forestry concerns. Reference to that Appendix indicates a forested area including Douglas fir, Engelmann's spruce, lodgepole pine and Ponderosa pine ranging from about 41 to 120 years.

While matters of pesticide, herbicide and fertilizer control are dealt with for the golf course area, some of the same principles will apply to forest areas within the portion of the 3,000 acre (1,200 hectares) watershed area that overlaps parts of the proposed Controlled Recreation Area. This includes the drainage areas of parts of Powers Creek and Trepanier Creek, as well as catchments of any other creeks that are subject to water licenses. A list of the water licenses is included in the environmental audit appendix. The area of sensitive watershed above Powers Creek is likely to become less significant when the proposed new supply pipe is constructed along the creek by the Westbank Irrigation District. The intake will be at Bear Lake, well north of the CRA. Likewise, the water supply catchment area will move further north.

3(d)(i)(D)

*Timber Values and Future Operations*

One of the concerns about ski areas being excluded from the land base of the Provincial Forest is the loss of allowable cut that may be allocated to forest licensees. The disadvantages of leaving the Controlled Recreation Area within the Provincial Forest land base are the problems of scheduling for the harvesting of a ski run with the licensee, and the fact that licensees perceive a reduction in the area where they may cut, thus pressuring the Ministry of Forests to make other timbered land available. The Ministry of Forests still gets its stumpage fees but with more time expended on the process. The balance of interests among ministries dealing with forests, lands and employment and investment initiatives will likely continue as the

basis for the dialogue necessary to facilitate consensus of approach on these matters which no doubt arise in the establishment or expansion of every ski resort in the Province.

This Master Plan calls for exclusion of only a small portion of the Controlled Recreation Area at the designated resort base from the Okanagan Timber Supply Area. Such limited exclusion will facilitate freehold sale of land for core resort development plus the general area for use as the ski resort base.

The base area is to be logged selectively in the first instance but not subject to immediate reforestation. There would obviously have to be some flexibility in the silviculture policy for reforestation for ski hill base area and golf course use. The result is that the vast majority of the Controlled Recreation Area may stay within the Provincial Forest and provide an opportunity for continued liaison with the Ministry of Forests over the years of mountain area development.

As mentioned, through the approval of the Master Plan, the Owner plans to include in the Master Development Agreement the concept that it would not oppose the continued use of areas within the Controlled Recreation Area for forestry operations. This should be a way to ensure forestry companies that the ski operator would support views of cut areas resulting from forestry operations nearby. In fact, the teahouse at the top of Mount Last could serve in part as an interpretive centre for the forest industry in the Interior, and some of the nearby trails, ski runs and clearings could be used for an interpretive trail network for the public by forestry companies harvesting in the area to increase awareness of forest based activities.

3(d)(i)(E)

*Pests*

The proposed resort area will be managed in cooperation with the Ministry of Forests to minimize the occurrence of potentially destructive pests in the specific species such as Douglas fir, Engleman spruce and lodgepole pine found in the CRA. Where infestations occur, the necessary level of treatment will be undertaken. There may be areas of spruce bud worm, mountain pine beetle or fir bark beetle in the proposed Controlled Recreation Area. There may also be some root rot. Where clearing is necessitated due to pests, reforestation will follow.

3(d)(i)(F)

*Forest Fires*

The proposed resort will be managed within the context of the *Forest Practices Code Act* of B.C. to prevent and control wildfire. Cooperation with Ministry of Forests activities will facilitate the disposal of logging slash in the mountain area of the Controlled Recreation Area. Such activities should have only minimal impact on the operation of the resort. Precaution in design will be necessary to avoid or reduce urban interface fire as part of the plan to take precaution against forest fires.

The natural forests surrounding Crystal Mountain are a source of scenic beauty to the skiers and other visitors. To lose this amenity to a forest fire

would significantly decrease the experience from a visual perspective and probably result in lower visitors numbers. As the proposed expansion moves forward with the addition of a new lodge and other structures, the potential impact for a devastating loss from fire is even more serious. It is for these reasons that a Fire Hazard Reduction plan is an integral component of the Master Plan.

There are four main options available to bring about a reduction of the fire hazard on the mountain, which can be summarized as follows:

- vegetation management
- water sources
- structural options
- emergency procedures

Each of these topics will be discussed in more detail in the following paragraphs.

The goal of vegetation management is to reduce or eliminate flammable vegetation around existing or new structures. In our opinion, this could be accomplished through the use of cleared fire breaks, which would be ski runs, located in strategic locations surrounding the proposed lodge, condominiums and hotels. Consistent with Crystal Mountain's current clearing practices of removing all debris from these areas and planting to grass, continuing this methodology will ensure a series of fire safe zones surrounding these structures. It is also important to reduce the fire hazard in the wooded areas between the runs through fuel reduction measures such as the cleaning out of all dead and down material on the forest floor. In conjunction with this procedure these areas should be spaced to ensure that there is at least three metres between each tree to be retained. Pruning of the lower limbs to a height of 2.5-3.0 metres will further reduce the hazard.

Water is the most effective firefighting tool available. The construction of small holding ponds throughout the entire controlled recreational area (CRA) would provide a ready source of water in case of fire. The ski runs should be assessed in order to locate natural depressions, sources of run-off water, intermittent streams and other areas where cisterns could be constructed to provide a uniformly spaced network of available water supplies. It is recommended that Crystal Mountain consider the purchase of an older skidder equipped with a 500-gallon tank, a forestry fire pump, 2-3 lengths of hose, an approved nozzle and some basic fire-fighting tools such as a shovel and polaski. The purchase of a high volume gasoline powered pump for filling the tank would also be a valuable asset. This will ensure that Crystal Mountain employees would be able to quickly respond to a fire anywhere on the mountain. A portable fire cache containing the required number of fire tools should be assembled for use by a larger crew should conditions warrant. Design plans for the golf course should include the incorporation of ponds close to the proposed structures that could double as a visual amenity as well as a reservoir for fire use if necessary.

Next to the construction and maintenance of a defensible space, use of fire-safe structural options are the most important fire protection measure that Crystal Mountain could implement. The roof is the most vulnerable component of the structure and seems to indicate whether or not a fire will consume the building. It would be important to consider Class A rating roofing materials such as fiberglass composition shingles or metal for installation on the buildings to aid in their protection should a fire occur. Construction materials such as rock, concrete or cement stucco as siding material may increase the ability of the building to withstand the damage caused by airborne firebrands and embers that may come to rest against the walls of the structure. It would be prudent to use non-combustible or fire-resistant materials on the decks to minimize the chance of any burning embers starting an even larger fire in the building. Sprinklering buildings will be an alternative to many of the above noted measures.

A major forest fire on or near Crystal Mountain would create an immediate emergency. Since the mountain is outside the Westside Fire Protection District, responsibility to control the fire rests with the Ministry of Forests. Response time by professional firefighters would be dependent on other fires burning, aircraft availability, or driving time for a crew based in Penticton. Crystal Mountain will develop an Emergency Response Procedure Manual and have copies of a summary document available to every employee. Topics covered could include such items as:

- key personnel and phone numbers
- critical shut-off locations for power & fuels
- marshaling points
- disaster warning system (fire alarm)
- evacuation routes and destinations

These are but a few of the necessary topics, however a complete manual would be far more comprehensive.

Following approval of the Master Plan, and prior to the advent of any construction a detailed Fire Hazard Assessment will be conducted and a comprehensive report prepared. Such a document will guide the activities of Crystal Mountain and minimize the potential danger to the facilities from wildfire.

### 3(d)(i)(G)

#### *Salvage Operations*

Salvage harvests may be required to recover any timber damaged by fire, insects, disease or wind throughout the proposed Controlled Recreation Area, and are to be planned in consultation with the Ministry of Forests and affected stakeholders, subject to achieving timely salvage that will mitigate adverse impacts to adjacent forests and minimize loss to salvageable fibre.

## 3(d)(i)(H)

*Buffer Zone*

Crystal Mountain will be able to have some control on uses within the Controlled Recreation Area according to provincial policies and precedent. In addition it will require a general prohibition on development, particularly regarding additional commercial overnight accommodation and restaurant facilities or ski lift construction in a buffer zone area of the crown land around the Controlled Recreation Area. The idea of a buffer zone is to recognize the recreational character of Crystal Mountain and the large capital to be invested in the recreational infrastructure and related expansion and to recognize the importance of open spaces complementing the recreation area. These open spaces will also help ensure the long term sustainability of the surrounding environment and of the recreational concept being presented. The prohibition of development, generally described as “parasitic development”, will apply to the area immediately adjacent to the Controlled Recreation Area, and particularly to the area between Crystal Mountain and the Administrative Boundary outlined in the Westside Official Community Plan adopted by the Regional District on February 7, 2005 and illustrated in the Development Permit Areas map included in Schedule “D” – Bylaw #1050.

## 3(d)(i)(I)

*Public Commercial Recreation Areas*

The expansion plan for Crystal Mountain will take Ministry of Forests *Back Country and Wilderness Recreation Program* into consideration in finalization of its layout at Master Plan stage. The Ministry of Forests has permitted development of a network of cross-country (Nordic) ski trails that will be partly within the Controlled Recreation Area. The Nordic ski society currently maintains the trails as discussed elsewhere. Special consideration is to be given to Nordic Ski trails that already exist both within the Buffer Zone. The scope of existing back country vehicular recreation uses will also be reviewed to accommodate Ministry programs while maintaining the safety and integrity of the ski area. Motorized off road vehicles will be restricted in the Controlled Recreation Area. This will be analyzed further as part of the Master Plan.

## 3(d)(i)(J)

*Visual Quality Objectives*

It was understood that the round table discussions leading up to the final draft LRMP (May 2000) acknowledged that it would not be possible or reasonable to have visual quality objectives apply to ski resorts or that ski resorts be used as a viewpoint to limit surrounding timber operations. In that draft of the LRMP it is not entirely clear what visual landscape management practices are appropriate although they are recommended in conjunction with the construction of recreation and tourism facilities. However, the LRMP notes that these activities are not regulated by the Forest Practices Code, and therefore such development is not legally required to comply. Non-forestry development activities are said to be exempt from any legal requirements to conduct visual impact assessment. It is also noted that visual quality objectives can not in themselves block development activities and that the Ministry of Forests will assist in providing information on viewpoints. Considering the two perspectives in new development in a

forested area, it is not entirely clear which of these principles refer to views of the recreation development from afar and which principles refer to views from the recreation area looking over nearby landscapes. Certainly the Master Plan will expand upon these questions.

An analysis of nearby cut blocks indicates that no cut block is visible from the existing ski resort. The nearest visible clearcut blocks from the ski area are about 10 km (6 miles) away and therefore have little impact now and will have less when the replanting has grown. The north facing ski runs are visible from the Bear Creek Main (Haul Road) but are of minor visual impact compared with other clearcuts adjacent to that road.

The ski runs at Crystal are only visible from a distance of about 19 km (12 miles) across the lake or from about the same distance to the south. The ski runs themselves will be areas of cut that will not be replanted during the life of the ski resort. The harshness of any view of boundaries of the ski resort runs will be reduced through glading.

There are existing cut licenses to the north of Mount Last held by Riverside Forest Products Ltd. There is also a Small Business Forest Enterprise Program chart area to the north as well which is an area where no replanting would be done by the contractors although the Forest Service provides for replanting.

The aesthetics of the northern and western mountain sides are affected by the tree stands, but the Whistler experience, as well as many other sites, indicate that the skiing public is quite prepared to utilize a working forest for a ski area and to make the best of it. The tree harvesting in this project will be considered complementary to the ski runs development and not in conflict with it. In fact, where tree cutting has already provided openings, the ski runs can easily be expanded to make the best of the added terrain.

3(d)(i)(K)

#### *Other Forestry Interests*

##### Grazing Permit

There are other non exclusive rights that affect the lands at Crystal Mountain.

A grazing permit from the Ministry of Forests includes the area of the proposed resort expansion and large tracts of land surrounding the proposed Controlled Recreation Area. That permit is held by Kevin Day. In summer cattle will graze on the cleared runs at Crystal Mountain. New runs proposed for clearing in the expansion plan will be seeded and will improve the scope for grazing while areas of land sold as part of the base area development will limit further grazing. It is expected that there should be a net gain for grazing in the area. Some of the concerns related to grazing relate to the potential for cattle to contaminate drinking water (although well water is the preferred source of potable water) - and the use of straw bails around ski lift support columns that attract cattle but may present a risk to cattle if they eat the hay bail twine. One solution is to remove the bails while cattle are on the hill.



Arrangements for temporary or permanent fencing of some of the main ski runs may be necessary to accommodate both grazing and other summer resort uses. It is not unusual to have a grazing permit on ski hills in the summer and another nearby example is Apex Alpine Mountain. However, cattle should obviously be kept away from the ski resort base area and golf course area to reduce the nuisance of cattle droppings and flies. Crystal Mountain and the Golf Course developer will work with the grazing permit holder to achieve the best possible working solution.

#### Range Use Concerns

The following concerns are noted:

The Crown Range and unfenced private land area including lands within the controlled recreation area or within or outside of Provincial Forest or Tree Farm License are used for livestock grazing, currently under Grazing License with Mr. Kevin Day. Crystal Mountain plans to divert this livestock use from forested or natural grassland areas or areas being developed more towards the ski run areas. Concerns that arise or potential incompatibility between owners or livestock operations or changes to the Range use Plan presently being used by Mr. Kevin Day are to be referred back to Penticton Forest District, Range section. Range use and levels of use must be retained.

No disturbance to livestock barriers (natural including timber or fencing), livestock water sources, pipelines or other water development, livestock access trails, corrals or other improvements is allowed without specific written authorization from the Ministry of Forestry. No restriction to livestock access or hazards to livestock or to be created, left or allowed to develop. Garbage left after the ski season on the runs or around base area must be removed so that it does not present hazard to livestock or wildlife. Specific summer activity including non-event activity will need to be regulated and scheduled so as not to cause conflict with livestock grazing.

All soil disturbances should be minimized. All soil disturbances must be immediately seeded at a minimum rate of 30 kg/ha with a Common #1 or better quality suitable forage seed mix free of noxious weeds. Legumes must be suitably nitrogen inoculated prior to seed mixing and seeding. On harsh sites or where top soil has been substantially removed a heavier seeding rate, fertilizer, slope stabilizers or seed stickers may additionally be required. Successful forage establishment (greater than 70% ground cover establishment within one season after the initial disturbance) is the owner's responsibility.

Perimeter fencing to "Stockproof" standards is required on the golf course development, residential and base operation areas. The usual standard is F.S. 5-strand barbed wire fence. Due to high recreation use, alternatives to this may be proposed, approved and constructed at the proponent's expense. All soil disturbances associated with constructing this fence must be re-vegetated as described above. No gates or breaks are to be allowed in the fence other than on designated public access roads or additional access to be built to satisfy fire protection requirements or as per discussions with

Penticton District, Range section. 12-foot minimum width cattleguards with adjacent 3.5 meter wire gates will be required on roads. Fence design and locations must be approved with Range Licensee and Penticton Forest District, Range section.

#### Nordic Ski Trails

Recreation interests include the Telemark Cross Country Ski Club, a large nonprofit society representing an important and diverse group of recreational skiers. The existing cross-country ski network will be preserved in the resort expansion plan wherever possible. Coordination will address the summer use of trails and ski runs for outdoor recreation such as interpretive trails and use by mountain bikes. Motorcycles and dirt bike use should be limited. Most of the area should restrict use of motorized vehicles. Such use must be limited to control soil erosion and motor noise. Summer use of cross-country ski trails, especially those around the proposed golf course may provide opportunities for bird watching or botanical interpretive trails. Shown in Exhibits 5 and 6 at the end of this chapter are plans of the scope of the existing cross-country ski trails. Current initiatives include construction of more trails nearer to the base area. Discussions have taken place with the members and the president of the Telemark Cross Country Ski Club to review ways of integrating cross-country ski facilities with the golf course and the services available in the resort base area. There may be potential for shared season passes and mutual control of access points to both the cross-country trails and downhill trails.

#### Relationship with the Telemark Cross Country Ski Club

The Owner hopes to continue the good relationship with the Telemark Cross Country Ski Club, which is expected to continue to operate as at present, and will likely expand and improve the existing cross-country trail facilities in the future. It is planned that the Crystal Mountain operator and its guests will cooperate for the mutual enjoyment of the mountain and of its facilities with the cross-country skiers. The Owner has met over a period of two years initially with the past President of the Telemark Cross Country Ski Club, Paul Meidel, as well as with other members and successive Presidents, including Emile Brokx and Clyde Gilbert, to discuss some of the opportunities for mutual cooperation.

Telemark appointed a design committee headed by Emile Brokx to liaise with the Crystal design team. The design team has met with Telemark representatives since the fall of 1999 and has made major efforts to design and redesign the project to serve both Crystal's expansion needs and the requirements developed by Telemark. The last challenge was how to develop a golf course without conflict with some Nordic skiers, who requested exclusive use of most of the area proposed in 1999 for the future golf course.

The response of the design team has been to develop a new area, linked through part of the gravel reserve of the Ministry of Transportation, which made it possible to design a golf course without encroaching on the areas claimed by the Nordic skiers. However, subject to a future agreement with

the Telemark Cross Country Ski Club, Crystal must reserve the opportunity to develop a golf course in the prime area below the ski hill, as originally planned. Crystal will undertake not to submit this future design without prior agreement with Telemark, with which it wishes to maintain a cooperative relationship. In the meantime, the proposed development in the Master Plan has been restricted to remain North of the upper trails, with lot lines separated from the upper trails by a minimum of 30 metres, effectively creating the complete separation requested by the most uncompromising members of the Telemark Ski Club.

The following Table outlines the history of the above noted discussions and of the development of the Nordic ski trails next to Crystal Mountain:

**Table IV-10: Chronology of Development of Crystal Rim Trail**

TXC = Telemark Cross Country Ski Club CMR = Crystal Mountain Resort MoF = Ministry of Forests CASP = Commercial Alpine Ski Policy LWBC = Land and Water B.C. Inc.	
<b>TXC</b>	Request for expansion approval to MoF, 3 Phases <i>July 30, 1997</i>
<b>TXC</b>	MoF approval of Phases 1 and 2. Approval in principle for Phase 3, subject to stakeholder referrals <i>January 22, 1998</i>
<b>CMR</b>	Meeting with President of TXC, who asked for their support to expand the XC trails <i>August 12, 1999</i>
<b>CMR</b>	Meeting at Crystal with agencies <i>October 26, 1999</i>
<b>TXC</b>	Mapping of Crystal Rim Trail to MoF <i>March 3, 2000</i> "Except for future minor modifications to trails, Phase 3 should complete the trail system for Telemark"
<b>CMR</b>	Formal CASP application <i>August 15, 2000</i>
<b>TXC</b>	Letter of support for logging plan from Crystal Mtn <i>October 25, 2000</i>
<b>TXC</b>	Logging plan approved by MoF <i>October 25, 2000</i>
<b>CMR</b>	MoF response <i>January 30, 2001</i> : No mention of recreational conflict or the X-C ski trails
<b>CMR</b>	MoF response <i>April 5, 2001</i> : No mention of recreation concerns
<b>CMR</b>	Interim Agreement issued <i>April 11, 2001</i> by Province for 2 years, effective <i>March 16, 2001</i>
<b>CMR</b>	Community Open House <i>May 24, 2001</i> , Westbank – TXC opposed to golf course expansion into lower Nordic Ski Trails area and to First Nations project near Nordic Ski Trails
<b>CMR</b>	CASP Open House to review Master Plan <i>July 18, 2001</i> – Westbank – TXC reviews revised drawings – opposed to proximity of residential housing to Crystal Rim Trail, some concern with shared use of golf course

	and trail areas in new upper Nordic Ski area
<b>CMR/TXC</b>	Joint site inspection of Telemark Crystal Rim Trail to study Master Plan revisions <i>August 8, 2001</i>
<b>CMR/TXC</b>	Meetings to review Master Plan Revisions <i>August 15, 2001</i>
<b>CMR/TXC</b>	Meetings to review Master Plan Revisions <i>August 27, 2001</i>
<b>CMR</b>	CASP Open House to review Master Plan <i>September 26, 2001</i> – WFN community center – TXC opposed to shared use of golf course and trail tenure to overlap
<b>CMR</b>	CASP Open House to review Master Plan <i>November 28, 2001</i> – Crystal Mountain – Plans show golf course relocated away from trail, all residential separated by a buffer. TXC opposed to residential NW of trail and to tenure overlap.
<b>TXC</b>	Letter to MoF, attaching operating plan for 2001-2002 indicating that the “Crystal Rim Trail was completed in December of 2000... There are no other significant projects planned. We will continue to work with Crystal Mountain Development Corporation on an expansion plan for Crystal Mountain that will be acceptable to both parties” <i>July 11, 2001</i>
<b>TXC</b>	Letter to MoF re: map notation amendment “The Northern boundary of the trail area is to be extended to include the most northerly part of the new Crystal Rim trail.” <i>July 20, 2001</i>
<b>TXC</b>	Amended copy of map notation sent to TXC from MoF <i>July 30, 2001</i> (Roger Venables noted that a mapping error was made by including a portion of the License of Occupation for Crystal Mountain and that this would be corrected.)

#### Timber Tenure Administration

The plan indicates that application for the Controlled Recreation Area (CRA) is to retain its Provincial Forest designation with exception of the designated resort base. Crystal Mountain may then be issued a License of Occupation for the CRA. All existing tenures or uses within the CRA will be recognized as ‘prior use’ and will be continued. As such existing major licensees who operate in this vicinity may choose to pursue harvesting operations in accordance with the owner’s plans under tenures and permits issued to the respective companies.

The owner may apply for a License to Cut under which authorized timber removal may occur. The License to Cut may authorize a person to cut or remove, or both, timber on the land. Under Section 51 of the *Forest Act*, the District Manager may issue a license to cut with requirement for the ski hill to cut and deck the timber, to be sold by the Small Business Forest Enterprise Program at a later date. This District Manager will need to consider the volumes generated and the impact to Forest Service Reserve annual apportionment available in the future.

**3(d)(ii) Ministry of Environment****3(d)(ii)(A) Guide Outfitting, Hunting and Fishing, Trapper**

In addition to matters set out in the Environmental Audit (Appendix A) the administration of Guide Outfitters and Hunting and Fishing interests comes under the management of the Ministry of Environment (Fish and Wildlife Branch), which issues licenses for commercial angling and guide outfitting. These licenses, however, provide only the right to harvest specific wildlife resources. We understand that a Guide Outfitters Certificate authorizes the licensee for this area to provide guiding services to non-residents for the purposes of taking game, and that big game animals included in the certificate are elk, deer, moose, goats, black bear, grizzly, and cougar. The territory to which the certificate applies is much larger than the Crystal Mountain ski area and the expansion being proposed is not expected to significantly alter hunting opportunities in the area. It is hoped that resort guests may be able to share some of the nearby hunting and fishing opportunities through the services of local guide outfitters. It is hoped that resort plans will enhance such opportunities and Crystal Mountain will strive to pursue ongoing consultation to this end.

While additional details may still be needed on existing outfitter and trapper licenses and the extent of annual catch in the proposed Controlled Recreation Area, preliminary contacts have been made with outfitter Marc Hubbard and trapper Clarence Fenton. Marc Hubbard advises that he hunts throughout the area with dogs and that his game includes cougar, lynx and bobcat. In meeting with Clarence Fenton, he indicated that his trapping area covers a wide area and that he does not see the expansion of the ski area as a concern as long as he can continue to access the area. Mr. Fenton shared his unique knowledge of the area with the Owner. He expressed an interest in expanding his business to guide interpretive tours, an activity in which his son would be interested. The Owner and the trapper agreed that as the project progresses his interest will be treated fairly, with an amicable evaluation of compensation, which will be based on the percentage of loss of territory, and which might be mitigated by a cooperative agreement for guided tours with Crystal Mountain.

Parts of the expanded ski area are currently used by the Peachland Sportsman Club for fishing and hunting. The schedule and scope of these activities may have to be restricted in consultation with the group and the Province to ensure public safety during the ski season and throughout the year in areas of other outdoor recreation activity. In meeting with Gerry Kneller and discussions with others in the area, mule deer constitute much of the game sought in the area. The mule deer apparently migrate in large numbers in early autumn between Mount Last and Mount Clements, although as the snow falls the deer move on to lower terrain and ski activity itself should cause no conflict. Moose and deer utilize the area currently studied, but the expansion of the resort is not expected to significantly affect these populations, which are known to adapt to change and to golfing resorts such as in Banff and Jasper. A slight reduction in the hunting area is also not

expected to significantly alter existing patterns. It has been reported that Jack Creek has been subjected to occasional flooding, and both temporary and permanent drainage management plans will take particular care to avoid any increased occurrence of flooding problems and to contribute to flooding control.

### **3(d)(iii) Ministry of Transportation**

The Ministry of Transportation (MoT) provides services related to road construction, road standards, road maintenance and snow plowing, allocation of reserves for roads and gravel and subdivision approval. Meetings of the Interagency Committee were convened by before Master Plan completion and approval to review these various aspects with MoT district representatives. The subdivision approval and road dedication process will continue to be key to development of the base area at Crystal Mountain, as each development phase will require Ministry's approval. One particular matter for discussion was the existence of a gravel reserve area at the entrance to the resort, part of which could be utilized, especially for access and parking. There are private gravel pits in the Westbank area located near the lake, which will also be utilized by the Ministry of Transportation.

This gravel reserve area is a large Ministry of Transportation sand and gravel quarry located north of the intersection of the Powers Creek Forest Service Road and the road to Crystal Mountain base area. The supply of sand and gravel in this reserve area is located at the west end of the reserve with potential volume of about 20,000 cubic metres of material. The deposits are generally very sandy. The plan for the resort expansion initially avoided most of this area for proposed development but the Owner has been advised by LWBC that MoT will return the use of this area to the Crown. The current small area of gravel excavation is used for tobogganing in winter but poses risks of conflict with traffic on the road near the foot at the shore of the swampy lake. It is intended to relocate the tobogganing area closer to the resort and to utilize the gravel reserve area for parking on gravel surface for day skiers. On the east side of the gravel reserve area it is proposed to create a link for the golf course between the main area of the proposed resort and the golf course area, which has been revised to avoid conflicts with the Telemark Cross Country Ski Club nordic ski activities.

At the request of the RDCO, a traffic study has been prepared by McElhanney. It is included as Appendix B of this Master Plan. There are no surprises in the traffic projections being made, and examples such as Silver Star, accessed from Vernon, indicate what may be expected over the development time of the project. Some improvement of signage and sidewalk conditions over time will contribute to enhance traffic safety in the area. The Ministry of Transportation has been dealing efficiently and satisfactorily with similar projects elsewhere.

A new interchange for the Glenrosa exit from the Coquihalla freeway connector was recently built and the current road connecting the Glenrosa area to Crystal Mountain was paved in the fall of 2000, which will facilitate improved year round access to the resort area.

The ski area operator was planning to request permission from time to time from the



Ministry of Transportation to do the necessary levelling and to make the area suitable for parking so that the area may offer day parking for the public when not in use as a gravel source, but it is now understood that the Crown may make these arrangements directly.

### 3(e) Local Affordability and Participation

It is planned that the project will enhance the local enjoyment of the mountain, not decrease it. Lift ticket prices for residents of Westbank and the Kelowna region will be kept at special prices through early ski pass sales and general prices will be studied to keep Crystal as the most affordable mountain experience in the region.

Local cooperation and participation in the development will be encouraged. It is anticipated that the project, although quite limited in size, will have multiple ownership both in terms of development units and of operations. In particular it is expected that identifiable economic initiatives, such as mountain shops and restaurants, will be locally owned and operated. Individual ownership of various land parcels and of strata titled spaces will make this possible. The Owner is planning to meet and study the project with the local operators. Multiple ownership will allow operations to be aided by a resort association in accordance with the *Mountain Resort Associations Act*.

### 3(f) Other Interests

There are and will be a variety of other interests in the expansion of the ski resort area at Crystal Mountain. Where those interests are not addressed through the process of review with provincial or local government agencies, they can be reviewed during the public open house information sessions to be conducted by Crystal Mountain.

### 3(g) CASP Process and Approvals

The Formal Proposal was kept below the threshold for a review under the *Environmental Assessment Act* (EA Act) Review Process. New resorts that have a base area of over 150 hectares, provide over 2,000 bed units of accommodation, or produce more than 800 cubic metric of waste water are reviewed under the EA Act. The Formal Proposal called for a resort base of about 149 hectares (excluding the area for a proposed golf course, which is expected to be about 138 hectares); accommodation providing 1,990 bed units and estimated waste water of 788 cu metres. Nevertheless, existing resort facilities that are expanded are not necessarily bound by these criteria. Following clarification of acceptable limits for this expansion, which was received by letter from the Environmental Assessment Office, an increase in bed units was made part of this Master Plan proposal in order to provide the best resort expansion for the circumstances. The CASP process and the EA Act process are similar in terms of environmental studies and government agencies reviews, but are different in terms of size of review committee and effective time and cost of process. The design and size of the Master Plan proposal is based on the correct balance of Comfortable Carrying Capacity of the ski area and number of resort beds as recommended by the Commercial Alpine Skiing Policy guidelines. For the commercial success of the resort, it is important to have the potential to achieve the right balance and critical mass. The right balance allows the project to become sustainable over the long term.

The ski area design will allow a Comfortable Carrying Capacity that would support a bed base of approximately 6,500 skiers. The resort design is based on a bed base of slightly less than 4,000 bed units, which is a reasonable long term sustainable resort size for the enjoyment of the mountain's recreation potential.

The process of review under the Commercial Alpine Skiing Policy involves a detailed environmental review by the provincial Inter-Agency Committee established by provincial agencies and by the committee established by RDCO, as well as a series of meetings and reviews with various interests, and provides for a process of fine tuning as the proposal moves toward conclusion of a Master Plan and Master Development Agreement. The following Table indicates the originally projected proposed timetable for the review and approval process. In reality the local government approval process and the provincial process did not achieve the planned harmonization and the local government process was effectively started in 2006.

**Table IV-11: Proposed Timetable for CASP and RDCO Processes (1999)**

STAGE	REMARKS	DATE
FORMAL PROPOSAL STAGE	<ul style="list-style-type: none"> <li>preliminary concept and considerations together with additions as suggested by informal reviews with other interested parties</li> </ul>	JUN-AUG 2000
REFERRALS	<ul style="list-style-type: none"> <li>Distribution of Formal Proposal to referral agencies</li> <li>Government referral agencies and others review and respond</li> </ul>	AUG 2000
FORMAL PROPOSAL RESPONSES	<ul style="list-style-type: none"> <li>First meeting with Agency Review committee</li> <li>Amendments to Proposal</li> </ul>	AUG-APR 2001
INTERIM AGREEMENT	<ul style="list-style-type: none"> <li>Conclude terms of Interim Agreement with Province and Owner</li> </ul>	MAR 2001
PREPARATION OF MASTER PLAN	<ul style="list-style-type: none"> <li>Proponent completes Master Plan based on available information and fieldwork, on issues identified and government responses</li> </ul>	MAY 2001
REVIEW OF MASTER PLAN	<ul style="list-style-type: none"> <li>Proponent distributes Master Plan to referral agencies for review and approval</li> </ul>	JUN 2001
PUBLIC INPUT	<ul style="list-style-type: none"> <li>Proponent advertises and conducts open houses in Westbank to present final Master Plan and to show resolution of identified issues</li> </ul>	JUN-NOV 2001
MASTER PLAN ADOPTION	<ul style="list-style-type: none"> <li>Final Master Plan is adopted by</li> </ul>	JAN 2002
MASTER DEVELOPMENT AGREEMENT PROCESS (MDA)	<ul style="list-style-type: none"> <li>Province provides template for Master Development Agreement</li> <li>Negotiations are conducted and concluded</li> <li>The MDA process includes terms of operation and government charges as well as the form of licenses and rights of way</li> </ul>	FEB 2002

LOCAL GOVERNMENT LAND USE BYLAW	<ul style="list-style-type: none"> <li>Regional District of Central Okanagan to review the plan and provide for any necessary reviews for amendment to satisfy requirements for its regional growth strategies plan, official community plan and specific zoning bylaws</li> <li>Public Hearing</li> <li>Rezoning</li> </ul>	OCT-MARCH 2002
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### 3(h) Public Consultation, Meetings and Presentations

The Owner has held a number of public information meetings to explain the Master Plan concept and to make it publicly known. Crystal Mountain expects to finalize the plan and to follow the technical approval process in an open manner with full public involvement, to ensure that the plans reflect the best possible development concept. The Owner is committed to going ahead with a development proposal that the Regional District, as well as the Province, will support.

Meetings with the B.C. Assets and Lands Corporation to evaluate the opportunities for a proposal to expand Crystal Mountain began in 1999 with a meeting on October 26, 1999 on the Mountain with the consultants and a following meeting at the Regional District's Office. Meetings with BC Forests, BC Environment and BC Highways staff followed, as well as on going meetings with Regional District Staff. Formal presentations were made to the Inter-Agency Review Committee established by the Province, to the Board of Directors of the Regional District and the Environmental Advisory Committee of the Regional District. Public presentations were made to the Westbank Chamber of Commerce and to the Westbank community with an Open House held on May 24, 2001. The Owner met local stakeholders and has maintained continuous contact with the Westbank First Nation through the Westbank First Nation Development Company, which is expected to become an active participant in the project. A public consultation process was completed in the winter of 2002 as described in the following table:

**Table IV-12: List of Meetings with Government Representatives and Public Prior to 2003 Master Plan Approval**

DATE	LOCATION	PARTICULARS
March 27, 1999	<i>Crystal Mountain</i>	• British Columbia Assets and Lands Corporation meeting
August 3, 1999	<i>Kamloops</i>	• meeting
August 12, 1999	<i>Westbank</i>	• Telemark Ski Club meeting
October 26, 1999	<i>Crystal Mountain</i>	• Telemark Ski Club and local stakeholders meeting
October 26, 1999	<i>Kelowna</i>	• Regional District of Central Okanagan meeting
March 9, 2000	<i>Kelowna</i>	• Crystal Mountain meeting

May 16, 2000	<i>Penticton</i>	• B.C. Forests meeting
August 3, 2000	<i>Kelowna</i>	• Westbank First Nation private meeting
August 3, 2000	<i>Kelowna</i>	• City and Mayor of Kelowna meeting
August 4, 2000	<i>Kamloops</i>	• meeting
September 4, 2000	<i>Crystal Mountain</i>	• Crystal Mountain meeting
September 7, 2000	<i>Penticton</i>	• B.C. Forests meeting
September 18, 2000	<i>Westbank</i>	• Interagency Committee meeting
November 22, 2000	<i>Kelowna</i>	• Presentation at Westbank Chamber of Commerce meeting
November 22, 2000	<i>Kelowna</i>	• Westbank First Nation private meeting
November 22, 2000	<i>Kelowna</i>	• Regional District of Central Okanagan meeting
March 14, 2001	<i>Kelowna</i>	• Westbank First Nation private meeting
March 14, 2001	<i>Kelowna</i>	• Planning and Environment Committee of the Board of Directors Regional District of Central Okanagan meeting
March 15, 2001	<i>Vancouver</i>	• meeting
April 26, 2001	<i>Kelowna</i>	• Environmental Advisory Committee of the Regional District of Central Okanagan meeting
April 26, 2001	<i>Kelowna</i>	• Westbank First Nation private meeting
May 24, 2001	<i>Crystal Mountain</i>	• Crystal Mountain Open House presentation
June 26, 2001	<i>Peachland</i>	• Corporation of the District of Peachland meeting
July 6, 2001	<i>Westbank</i>	• Crystal Mountain meeting
July 6, 2001	<i>Westbank</i>	• Chamber of Commerce and Rotary Club meeting
July 6, 2001	<i>Kelowna</i>	• Regional District of Central Okanagan meeting
July 6, 2001	<i>Kelowna</i>	• Westbank First Nation private meeting
July 6, 2001	<i>Kelowna</i>	• Telemark Ski Club representatives meeting
July 6, 2001	<i>Westbank</i>	• Peachland Sportsman's Association meeting
July 19, 2001	<i>Kelowna</i>	• Westbank First Nation private meeting
July 19, 2001	<i>Westbank</i>	• Crystal Mountain Open House presentation
July 20, 2001	<i>Westbank</i>	• Chamber of Commerce, Westbank First Nation meeting
July 20, 2001	<i>Westbank</i>	• BC Hydro meeting
July 20, 2001	<i>Westbank</i>	• Telemark Ski Club representatives meeting

July 20, 2001	<i>Westbank</i>	• Glenrosa Community Association meeting
July 21, 2001	<i>Westbank</i>	• West Bank Irrigation District meeting
July 21, 2001	<i>Westbank</i>	• Telemark Ski Club representatives meeting
August 7, 2001	<i>Kelowna</i>	• Regional District of Central Okanagan meeting
August 7, 2001	<i>Kelowna</i>	• Westbank First Nation private meeting
August 7, 2001	<i>Kelowna</i>	• Peachland Voters Association and Westbank Neighbourhood Association meeting
August 8, 2001	<i>Kelowna</i>	• Regional District of Central Okanagan meeting
August 8, 2001	<i>Westbank</i>	• Telemark Ski Club representatives meeting
August 14, 2001	<i>Westbank</i>	• Westbank Irrigation District Board of Trustees
August 15, 2001	<i>Kelowna</i>	• Regional District of Central Okanagan meeting
August 15, 2001	<i>Kelowna</i>	• Assistant Fire Chief meeting
August 15, 2001	<i>Westbank</i>	• Telemark Ski Club representatives meeting
August 15, 2001	<i>Kelowna</i>	• Westbank First Nation private meeting
August 27, 2001	<i>Kelowna</i>	• Westbank First Nation private meeting
Sept. 5, 2001	<i>Westbank</i>	• Westbank Fire Protection District trustees meeting
Sept. 6, 2001	<i>Kelowna</i>	• Westbank First Nation private meeting
Sept. 20, 2001	<i>Crystal Mountain</i>	• Fall Fest presentation
Sept. 26, 2001	<i>Westbank</i>	• Crystal Mountain Open House presentation
Oct. 17, 2001	<i>Westbank</i>	• Westbank First Nation private meeting
Oct. 18, 2001	<i>Kelowna</i>	• Telemark Ski Club representatives meeting
Nov. 28, 2001	<i>Crystal Mountain</i>	• Crystal Mountain Open House presentation
Jan. 8, 2002	<i>Westbank</i>	• Telemark Ski Club representatives, B.C. Forests and meeting
Jan. 9, 2002	<i>Westbank</i>	• Westbank First Nations private meeting
Jan. 9, 2002	<i>Kelowna</i>	• Regional District of Central Okanagan meeting

**Table IV-13: List of Meeting Participants and Contacts Prior to 2003 Master Plan Approval**

ORGANIZATION	PARTICIPANTS
British Columbia Assets & Land Corporation ( )	<ul style="list-style-type: none"> <li>Psyche Brown</li> <li>Cassie Doyle</li> <li>J.T. Hall</li> <li>Bill Irwin</li> <li>George McKay</li> </ul>
BC Hydro	<ul style="list-style-type: none"> <li>Bob Dedemus</li> </ul>
City of Kelowna	<ul style="list-style-type: none"> <li>Walter Grey, Mayor</li> <li>Ron Cannon</li> <li>Robert Hobson</li> <li>Sharon Shepherd</li> </ul>
Economic Development Commission	<ul style="list-style-type: none"> <li>Colleen Bond</li> <li>Robert Fine</li> </ul>
Kutenai West Heritage Consulting	<ul style="list-style-type: none"> <li>Robert Lackowicz</li> <li>Martin Handly</li> </ul>
Ministry of Water, Land and Air Protection/ Ministry of Environment	<ul style="list-style-type: none"> <li>Jane Bender</li> <li>Dr. J. E. Bryan</li> <li>Mike Ladd</li> <li>R.C. Lincoln</li> <li>Bill Michael</li> <li>Mike Watkins</li> </ul>
Ministry of Forests	<ul style="list-style-type: none"> <li>Jerome Jang</li> <li>Roger C. Venables</li> <li>Barbara Pryce</li> </ul>
Ministry of Health	<ul style="list-style-type: none"> <li>Greg Bettel</li> </ul>
Ministry of Transportation	<ul style="list-style-type: none"> <li>Lynda Lochhead</li> <li>Ed Sanders</li> </ul>
District of Peachland	<ul style="list-style-type: none"> <li>George Waldo, Mayor</li> <li>Phyllis Papineau</li> </ul>
District of Lake Country	<ul style="list-style-type: none"> <li>Rolly Hein, Mayor</li> </ul>
Grazing	<ul style="list-style-type: none"> <li>Kevin Day</li> </ul>
Peachland Sportsman Association	<ul style="list-style-type: none"> <li>Gerry Kneller,</li> <li>Glen Lundin</li> <li>Darren Schlamp</li> </ul>
Regional District of Central Okanagan	<ul style="list-style-type: none"> <li>Katherine Adsett</li> <li>Ken Arcuri</li> <li>Aaron Dinwoodie</li> <li>Ron Fralick</li> <li>Steve Gormley</li> <li>Mary-Ann Graham</li> <li>H.J. Hettinga</li> <li>Jason Johnson</li> <li>Len Novakowski</li> <li>Ray Paterson</li> <li>Ian Pooley</li> <li>K. Roth</li> </ul>



Telemark Ski Club	<ul style="list-style-type: none"> <li>Clyde Gilbert, Emile Brokx, Paul Meidel, Design Committee</li> </ul>
Trapping	<ul style="list-style-type: none"> <li>Clarence Fenton</li> </ul>
Westbank First Nation	<ul style="list-style-type: none"> <li>Chief Brian Eli</li> <li>Raf DeGuevara</li> <li>Dolores Leask</li> <li>Roxanne Lindley</li> <li>Chad Paul</li> <li>Dr. T.J. Raybould</li> <li>Mickey Werstiuk</li> </ul>
Westbank Irrigation District	<ul style="list-style-type: none"> <li>Mark Coleman</li> <li>Patrick Poulin</li> </ul>
Westside Fire Protection District	<ul style="list-style-type: none"> <li>Joe Strocen</li> <li>Everett Taylor</li> <li>George Young</li> <li>David Cousins</li> <li>David Knowles</li> <li>Kelly Hills</li> </ul>

#### **4. RESORT GOVERNANCE AND ADMINISTRATION**

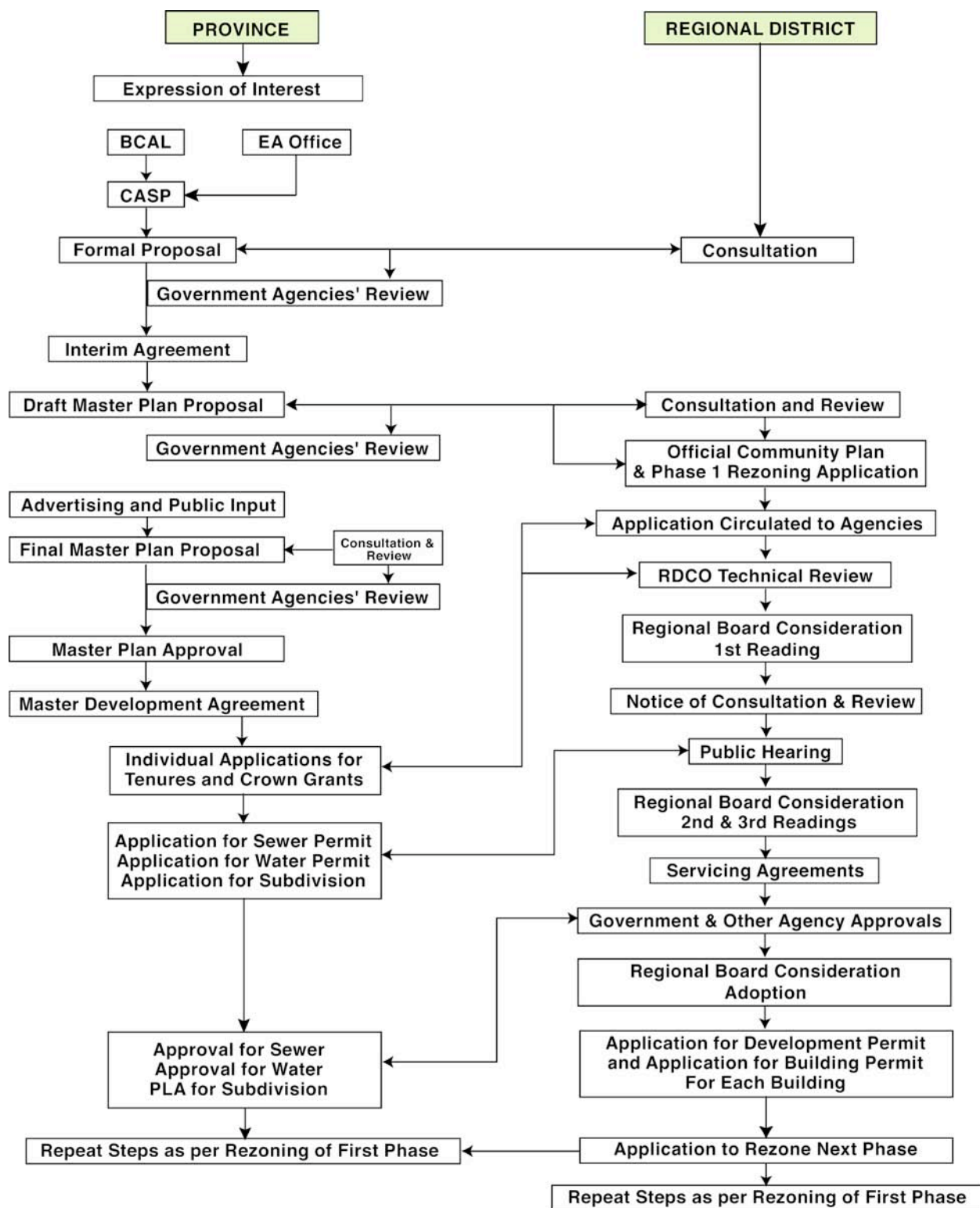
##### **4(a) General: Expansion Approval Process**

The area of the proposed resort base is within Area G of the Regional District of Central Okanagan, just above Westbank. While the application under the Commercial Alpine Skiing Policy is in progress, it is expected that the Regional District of Central Okanagan will set in motion a public process which, following the Formal Proposal, will gauge the public response to the proposal. The Regional District Official Community Plan (OCP) does not currently include the area of the proposed base area or its expansion so there will be no conflict with the O.C.P. Following a Public Hearing the Regional District will be able to rezone the land and to allow the project to proceed. The Planning Department of the RDCO has suggested a Comprehensive Development Plan (CDP) be adopted for the Area that is covered by the Master Plan. Only at the end of this complex process can the expansion be permitted and started.

At the time of subdivision, jurisdiction lies with the Ministry of Transportation, unless the Regional District seeks to acquire that jurisdiction. The City of Kelowna does not have jurisdiction on the ski area, but the Owner is planning to include it in the information process and to count on its support during the approval process and afterwards. It is hoped that the project will be viewed with favour both by elected representatives and public, in view of the fact that the residents of Westbank and the Kelowna population will be the main beneficiaries of the improved and expanded recreation area and they will be its nearest urban client base.

At the Provincial level, the project appears to be consistent with the Okanagan-Shuswap Land Resource and Management Plan (LRMP). The nearest area designated for protection (Park) under the plan is an area surrounding Lacoma Creek northwest of Mount Clements but not affecting any of the expanded Controlled Recreation Area. A detailed analysis of the project proposal and the LRMP has been prepared in conjunction with Government staff.

The approval process is complex and is on-going. The table below indicates the major steps required.

**Table IV-14: Rough Diagram of Approval Process**

**4(b) Mountain Resort Associations Act**

The *Mountain Resort Associations Act* came into force in 1995. It was designed to assist in the development and expansion of ski areas. The Act provided for the establishment of various degrees of governance for ski areas. Sun Peaks was transitioned into the Act in 1995 by Cabinet order. Kicking Horse Mountain Resort was declared a Mountain Resort Area by the Minister in 2000. The Columbia Shuswap Regional District thus gained the benefit of property taxes without any cost or liability for any services.

After designation of a ski area as an official Mountain Resort Area there are a few options for the governance of the resort, including the formation of a Mountain Resort Association and formation of a Mountain Improvement District and later of a Mountain Resort Municipality. A Mountain Resort Association allows the different commercial operators and owners in a ski area to pool their resources to achieve joint marketing efforts and to facilitate the operation of the Mountain Resort Area. Funds for a Mountain Resort Association are raised through a special annual property assessment.

A Mountain Resort Improvement District or Municipality is a democratic local government similar to municipal councils. It may be granted special powers with respect to using development cost charges, providing additional work and services and providing for development permits according to more detailed guidelines in an Official Community Plan.

Crystal Mountain is interested in pursuing the objective of the marketing efforts available through a Mountain Resort Association during the course of the development, and expects to achieve the implementation of the Master Plan through the regulatory processes provided by the Regional District, starting with an amendment to the Official Community Plan and rezoning of the first phase.

**4(c) Management Structure for the Development**

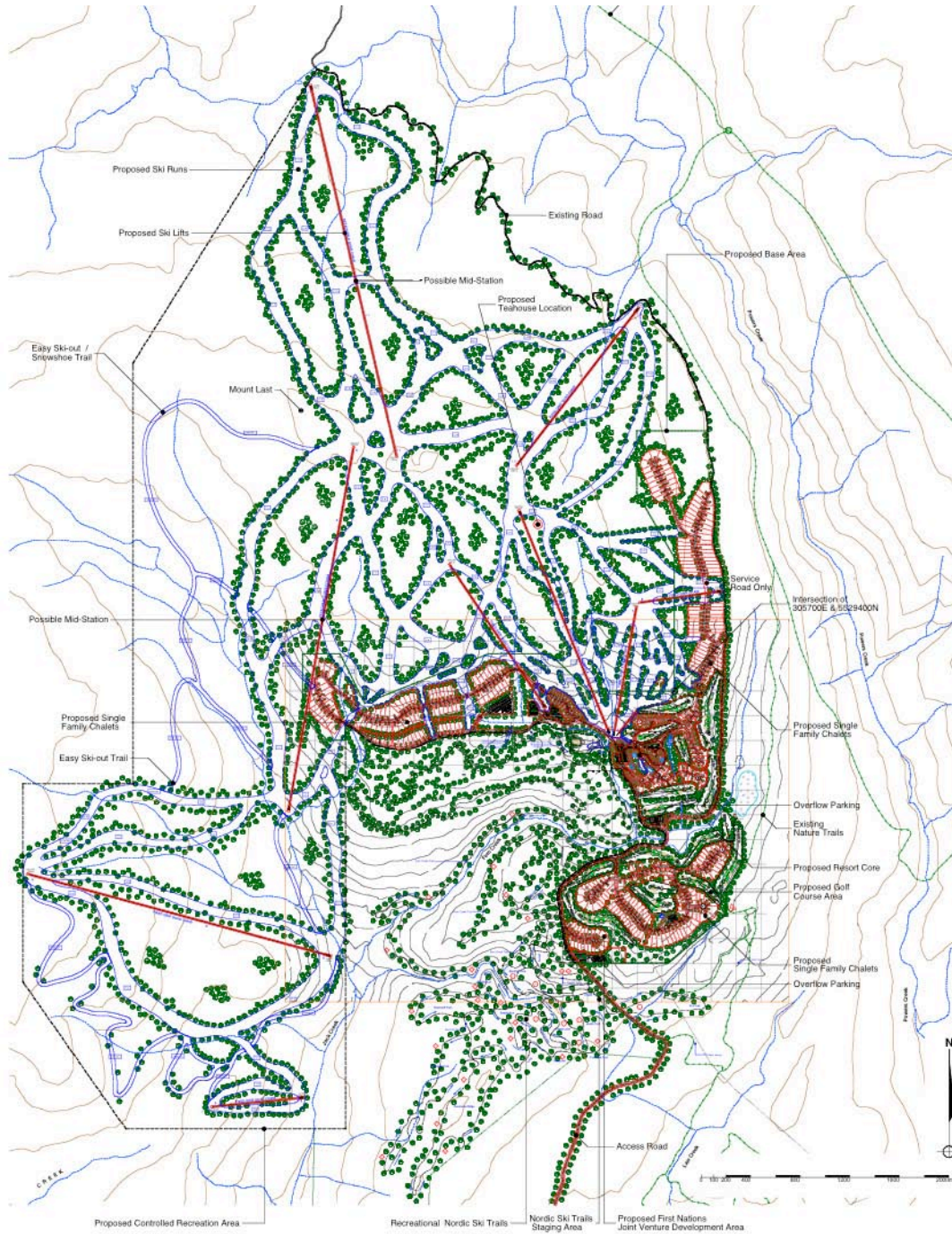
The project is being carried forward by the Owner, Crystal Ski & Golf Resort Inc. as managing General Partner of a Limited Partnership. The Limited Partnership is a way to provide for added equity financing to the project, and it is open to local investors, as well as to out-of-Province investors. In addition, it is anticipated that a number of joint ventures or special purpose companies will be formed for the main project components, such as the main hotel, the golf course and other major capital intensive project components, which may include other major investors. It is anticipated that local developers will participate by acquiring project components, be they as large as the major hotel or as small as single lots for chalets. Local investment and participation will be encouraged.

**4(d) Rental Pool**

It is a well-known resort development issue that resorts need “warm beds”. To this end the project is designed to include three hotels and several bed and breakfast operations. But in addition to that Crystal Mountain will initiate a unit rental management operation, which will administer the condominiums, townhouses and single family dwellings that will participate. On completion of the expansion, it is the owner/developer's intent that at least 50% of overnight accommodation units be assigned to the mountain's rental pool following existing

marketing strategies typical of B.C. mountain resorts. It is expected that in this type of mountain resorts a voluntary strategy will be a successful tool and will generate a majority participation in the rental pool. The owner/developer has the ability to adjust marketing strategy through the various Phases of the project to achieve the planned objective for the final number of warm beds.



**EXHIBIT IV-1: Preliminary Conceptual Mountain Area Plan**

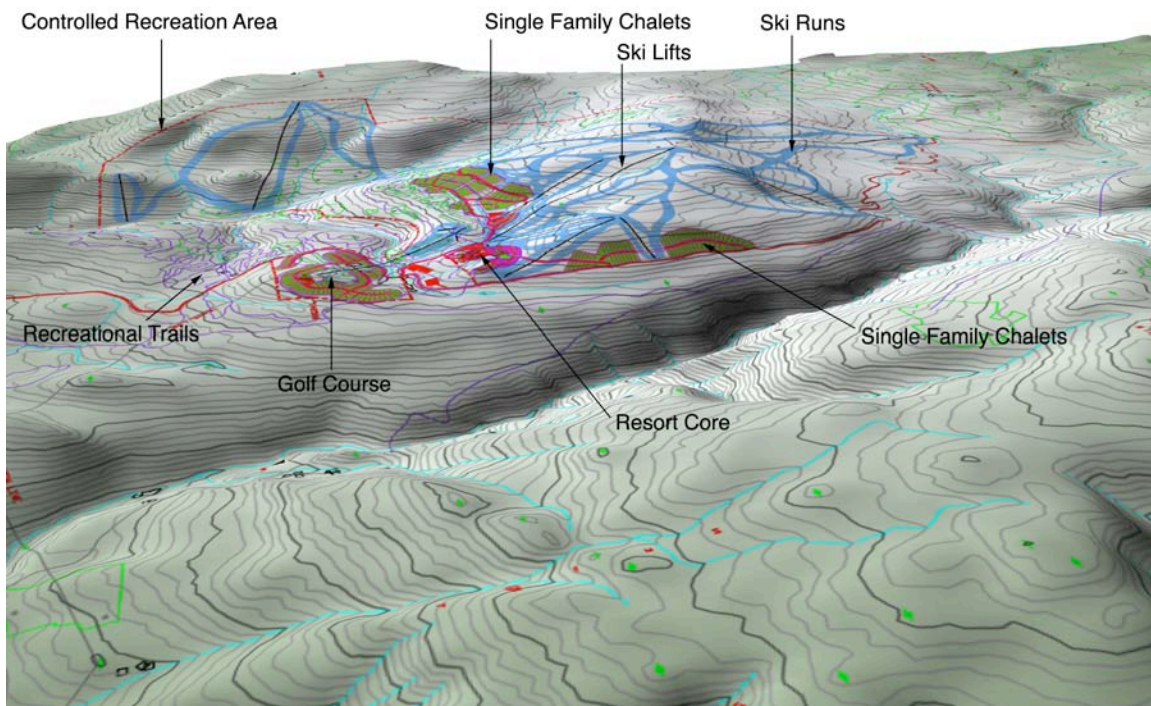
See "Pocket Plans" folder for larger image of this exhibit.

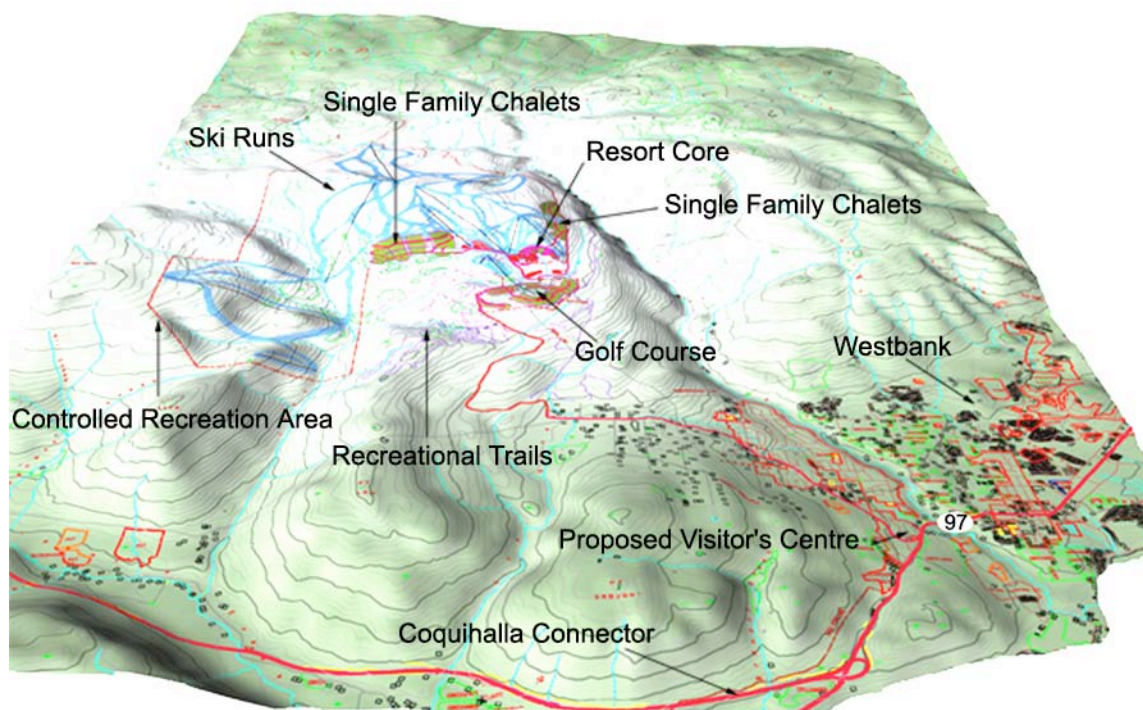




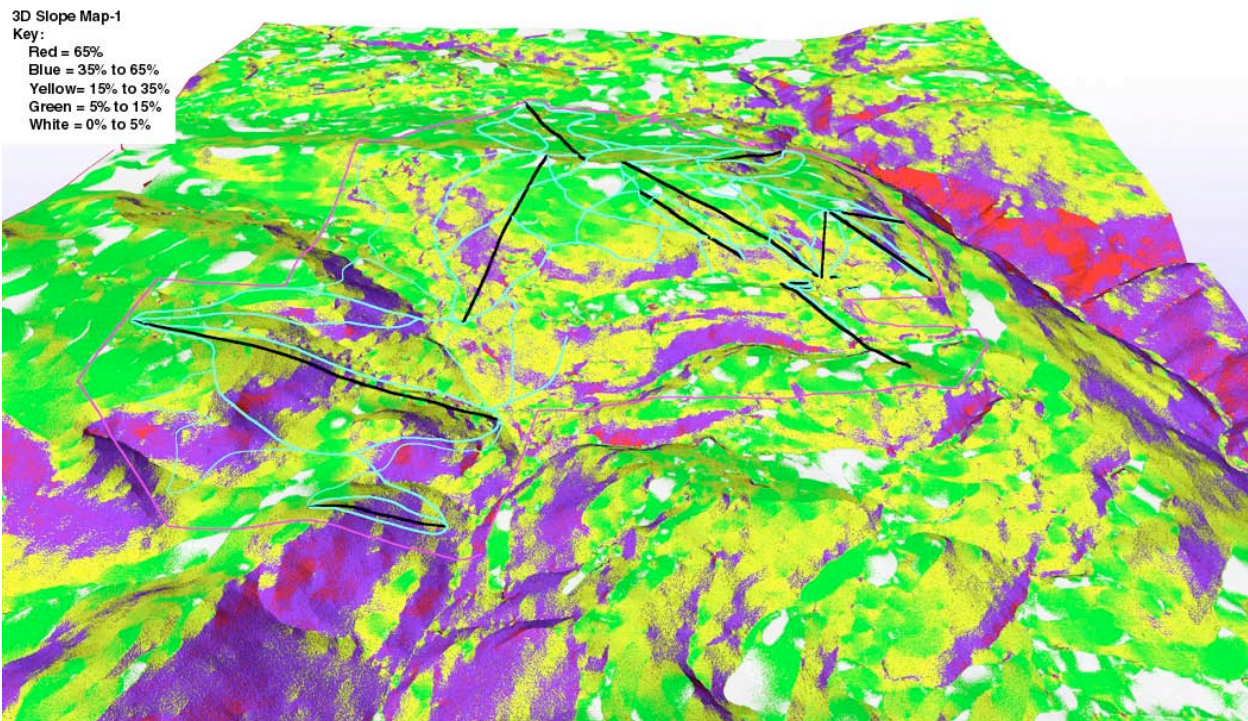


**EXHIBIT IV-3: 3-Dimensional Model - Preliminary Conceptual Aerial View**



**EXHIBIT IV-4: 3 Dimensional Model - Preliminary Conceptual Aerial View (2)**

## EXHIBIT IV-5: 3-Dimensional Slope Analysis Model 1





**EXHIBIT IV-6: 3-Dimensional Slope Analysis Model 2**

3-D Slope Map-2

Key:

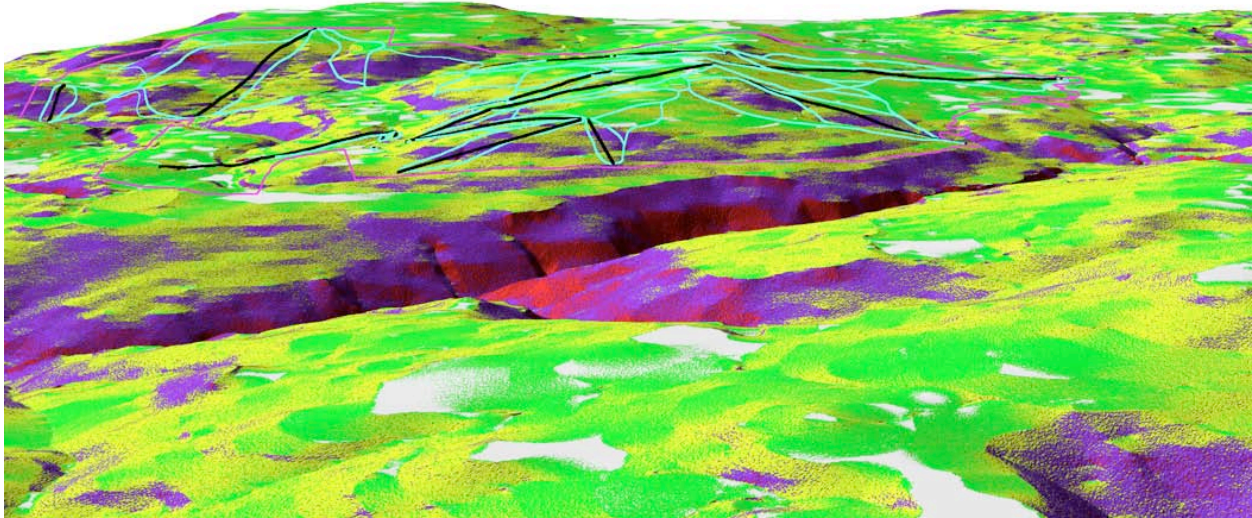
Red = 65%

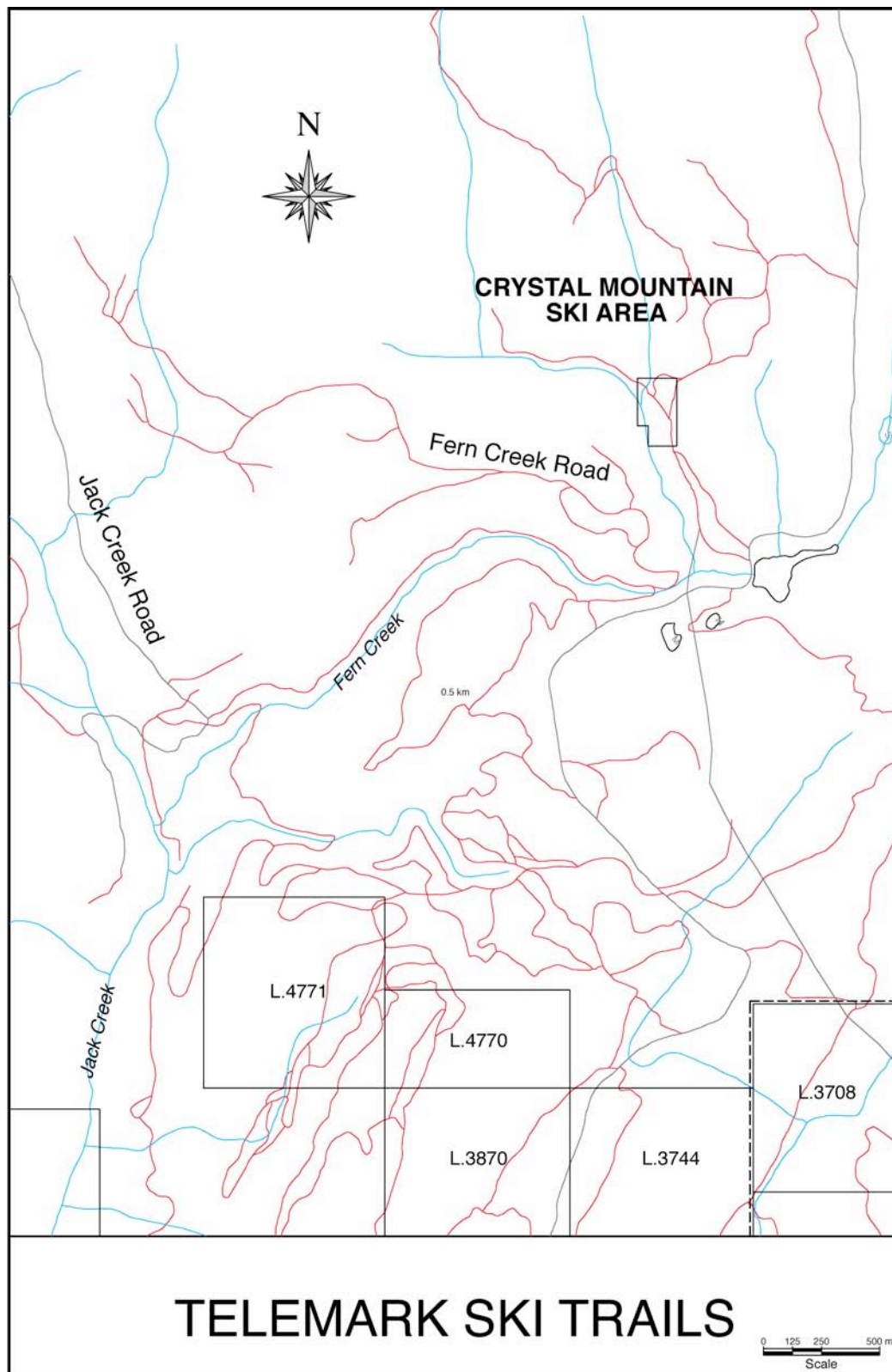
Blue = 35% to 65%

Yellow = 15% to 35%

Green = 5% to 15%

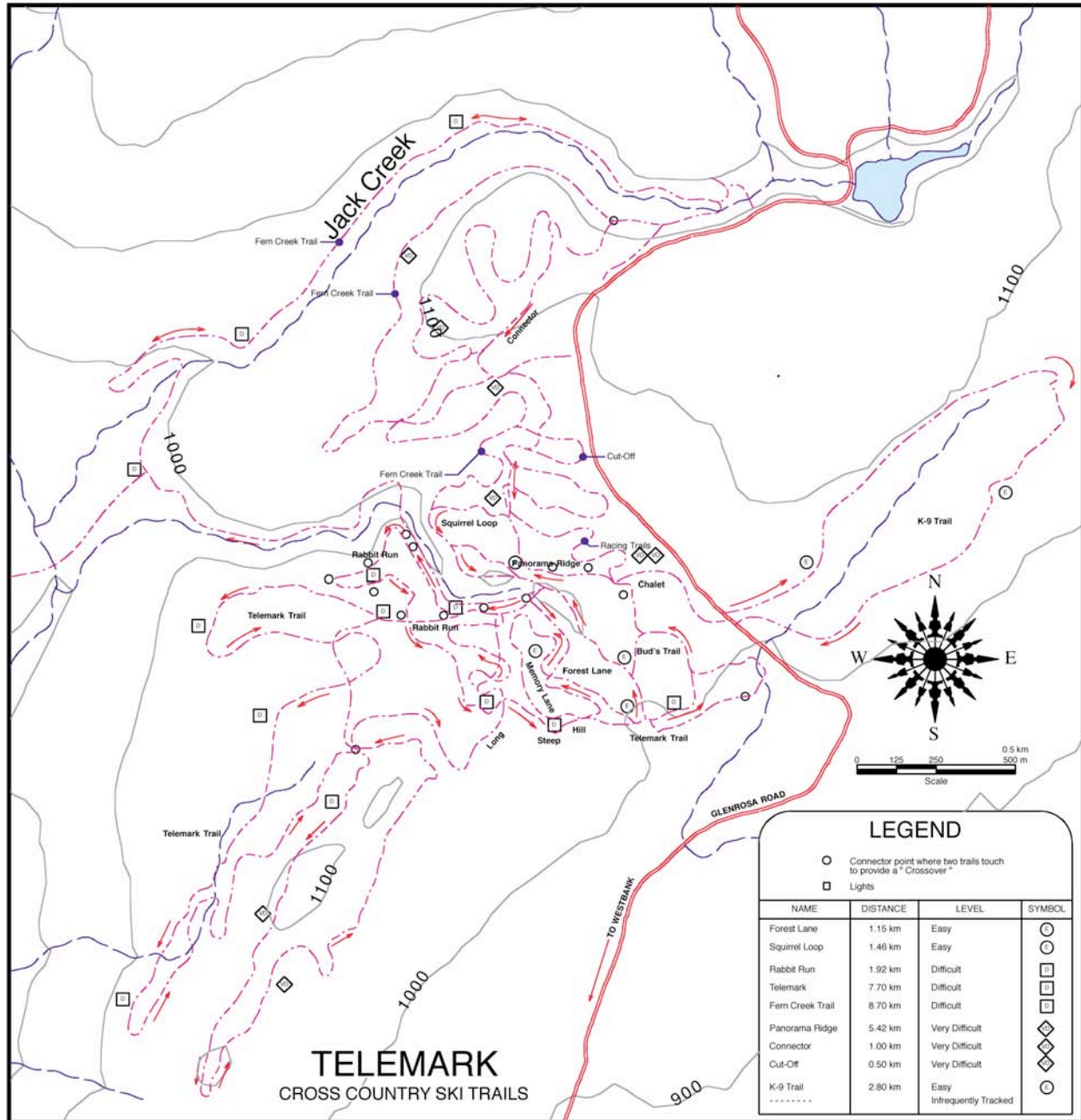
White = 0% to 5%



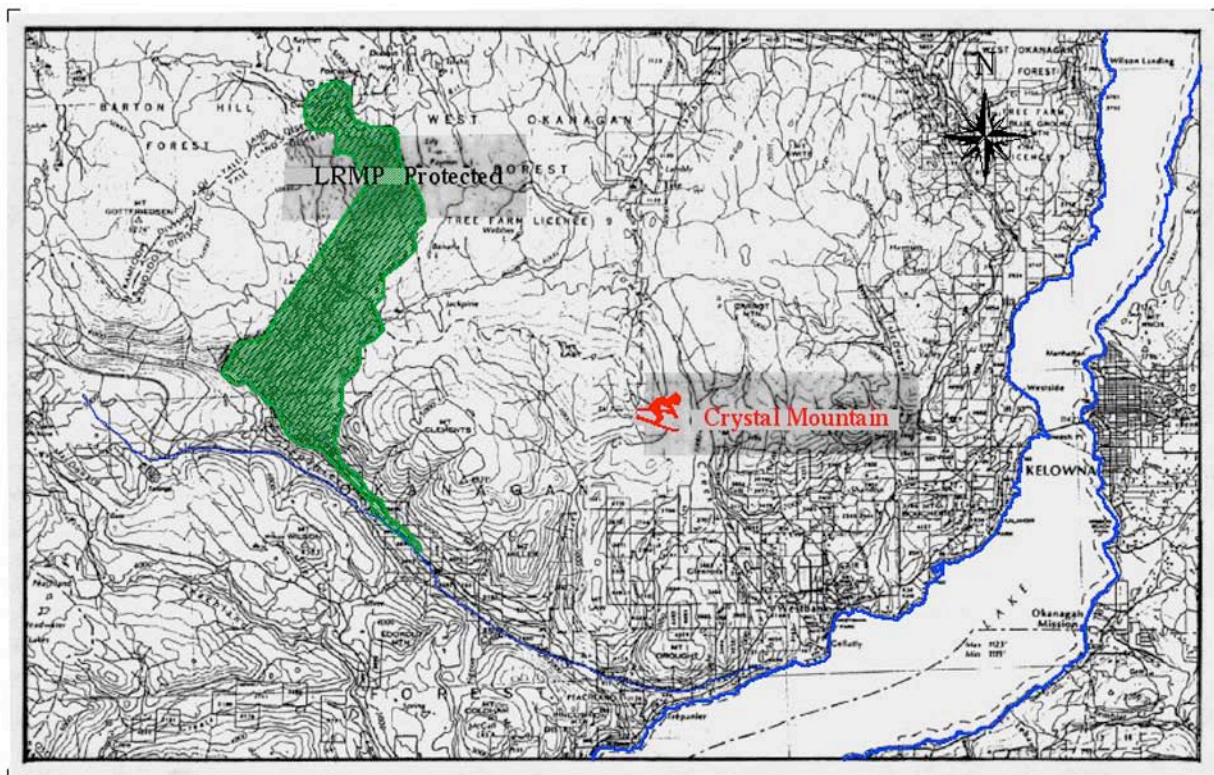
**EXHIBIT IV-7: Existing Nordic Ski Trails - Northern Trails**



## EXHIBIT IV-8: Existing Nordic Ski Trails - Southern Trails



## EXHIBIT IV-9: Location of Protected Area and the Land Resource Management Plan





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