

FIELD FORESTRY SERVICES, INC.

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Establishment of a Volunteer Fire Department at Crystal Mountain Resort

Crystal Mountain (the Proponent) stated numerous goals in the Crystal Mountain Ski Area Master Plan (the 'Plan') Expansion Proposal. One of these goals was the establishment of a volunteer fire department (Part IV Section 2b(iv) and 2i(xviii)).

This report will provide a framework based on the manual from the Office of the Fire Commissioner entitled, "Establishing and Operating a Fire Department" (the Manual).

Basic Fire Department Requirements

1.0 Communications

Effective fire protection begins with a good communications system. The objective of the fire department will be to quickly respond to all emergency calls. This will ensure that the goal of minimizing loss of life and property due to fires from any source will be achieved on a consistent basis.

1.1 Public to Fire department

Most fire alarms are transmitted and received via the telephone. The alarm should be received on a single dedicated line for fire emergencies only. The system should electronically record the time, date and contents of the call for future reference. Services can be provided 24 hours a day by utilizing an answering service during off-duty times.

Locating the scene of an emergency within the Base Area Boundary will be greatly enhanced if an area wide numbering system is used to assign a distinct number to every building. Occupants should be instructed of the significance of this number,

which should be posted near the telephone, when reporting an emergency. These numbers must be plainly posted so as to be visible from the road.

1.2 Fire department to volunteers

There must be a reliable method of alerting and dispatching the volunteers and fire fighting equipment. Personal pagers are a reliable means of contacting the volunteers. The dispatch centre will need to obtain a radio frequency from

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Industry Canada in order for fire fighters to talk to each other and equipment operators once at a scene. Every mobile equipment operator and fire officer should be issued a hand-held portable radio.

1.3 Fire department to Mutual Aid Agreement holders

Effective communications are especially vital to fire ground operations during mutual aid. A province-wide Command and Control frequency is available from the Office of the Fire Commissioner. This provides each fire department with a recognized common radio frequency that will ensure efficient and rapid placement of apparatus, assignment of responsibilities and regular status updates.

1.4 Fire department to other agencies (eg. MOF, RDCO)

While communication with the governing agency will be important, the emphasis here will be communication during emergency situations. Wildfires may require co-operation with the Ministry of Forests Protection division fire fighting crews under two scenarios. When a wildfire within the Controlled Recreation Area (CRA) boundary prompts the local government to request assistance from the Forest Service and when the Forest Service asks for assistance for fighting wildfires adjacent to the CRA. The portable radios carried by the senior volunteer fire department officers must be programmed with the Forest Service frequencies to coordinate the efficient deployment of manpower and equipment resources.

2.0 Emergency Core Services

The Master Plan Proposal makes a commitment to organize a volunteer fire department commensurate with the growth of the proposed development. As such, the emergency services offered initially can be expected to grow as the resort development progresses. For example, the Sun Peaks Fire and Rescue department just recently purchased a \$145,000 vehicle capable of providing efficient first responder services to motor vehicle accidents, medical emergencies and bush fires. The volunteers are ecstatic as now they don't have to drive their personal vehicles to the scene of an emergency and are not jeopardizing their safety driving to night-time calls.

2.1 Fire fighting equipment and apparatus

An entire section of the Manual is devoted to the purchase of fire apparatus. Traditional fire apparatus includes, the triple combination engine, the ladder truck, aerial devices, mini pumpers for initial attack, the tender, and an auxiliary truck for rescue and specialized services. Standards for the minimum requirements of fire fighting apparatus have been developed by the Underwriters' Laboratories of Canada (ULC).

While an engine and a tender are recommended for a new rural fire department that doesn't have a water distribution system, consideration should be given to the topography of the resort when designing the purchase tenders. Steep grades in excess of 6% will require vehicles with more horsepower and improved braking systems, which will be more expensive. The standards are designed for apparatus operating below 600m above sea level (ASL). The resort village is situated at an elevation of 1173 metres. Compounding the apparatus requirements is the

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proposal to develop chalets in a natural setting and minimize the width of road right of ways. This may require highly maneuverable apparatus, which may limit the options available and increase capital costs.

The implementation of FireSmart building codes and the installation of sprinkler systems as proposed in the Master Plan will undoubtedly have a significant impact on the size of apparatus ultimately required for the ski resort.

Appendix 5 of the Manual specifies the minimum equipment required for mobile water tenders and engines.

2.2 Training requirements

The National Fire Protection Association (NFPA) has developed standards for fire service training which have been adopted throughout British Columbia. The training program should be designed with the actual fire problems expected in the resort area in mind. The International Fire Service Training Association (IFSTA) at Oklahoma State University has developed a manual specifically for volunteer fire departments.

As the resort is developed, the pool of volunteers will likely increase as full-time residents relocate to the resort. The initial recruitment will be restricted to ski resort and golf course personnel. Due to the seasonal nature of these activities, there should not be a deficit of volunteers, although a Mutual Aid Agreement may provide more stability of trained and experienced fire fighters.

2.3 Design of Fire Station

The Manual dedicates an entire section to the locating and design of the fire station. The site should be level and provide for entry through at least one rear door that permits drive through traffic in the apparatus room. A functional design will centre around the apparatus room. A single truck station should be at least 25 ft. wide, whereas a multi-truck station will need at least 20 ft per truck. The Manual recommends situating the station on a secondary road, away from heavily traveled roads or one-way streets.

2.4 Financial budgeting

The Master Plan proposes three fire service models, namely, contracting to the Glenrosa fire department, amalgamating the resort into the Regional District of the Central Okanagan, or creating an independent Mountain Resort Improvement District. In each case, taxation of commercial and residential occupants is the preferred method of funding the fire services. The level of fire services provided will be determined by the risk that the taxpayers are willing to assume personally. A Community Fire Protection Master Plan will be useful for identifying when specific resources will be required as the resort progresses through each development stage.

2.5 First Responder Program

As the resort develops into a community, the need for an emergency medical response team may emerge. The Sun Peaks Improvement District recently ordered a custom designed vehicle that provides motor vehicle accident coverage, thus reducing the demand on limited highway rescue services from Kamloops. With the increased destination traffic over the Coquihalla Connector, the time

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may come when a First Responder vehicle will be considered a valuable asset at Crystal Mountain Resort. With FireSmart building codes and reduced risk of wildfires, this type of program may become a priority for the volunteer fire department. The ski patrol staff may already have much of the specialized training required, only requiring the specialized equipment.

2.6 Staffing

2.6.1 Risk management

The Workers' Compensation Board has standards for the personal protective equipment required for fire fighters under Part 31 of the Occupational Health and Safety Regulations. The Fire Chief will be responsible for full compliance with these regulations.

Life and disability insurance should be offered for volunteers.

2.6.2 Compensation

The trend in the industry has been for volunteers to be "paid on call". Sun Peaks resort pays their semi-volunteers \$15 per call out. This compensates them for wear and tear on their personal clothing and vehicles. It also enables them to collect WCB if they are injured while on call and cannot perform their regular occupational duties.

3.0 Organization

In order to be classified as "recognized", a fire department should operate as an agency under a local government. The Provincial Government has endorsed the creation of a Mountain Resort Improvement District, although the Proponents prefer to be associated with the Regional District of the Central Okanagan (RDCO).

3.1 RDCO, establish under Local Government Act, Part 24

3.2 Improvement District, Local Government Act, Part 23

3.3 Features and benefits of each option

Crystal Mountain is currently pursuing an application to the Regional District of the Central Okanagan for an Official Community Plan to cover the Community Plan Area (the Village) which will allow for the necessary rezoning (Part IV Section 2d).

4.0 Water Supply

The definition of a "recognized" fire department, requires there to be an adequate water supply for fire suppression purposes.

4.1 Source

Water can be supplied from natural sources, such as ponds, lakes, rivers and streams, or from man-made structures like fire hydrants, cisterns, reservoirs, tenders, and tanks.

4.2 Reliability

Natural water sources should be studied during dry periods and cold weather to determine their reliability.

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4.3 Water tenders

Methods of refilling a tanker should be confirmed. Accessibility may change during the seasons. Pumps and large diameter hoses may be required to relay water from nearby sources.

A legal Mutual Aid Agreements should be entered into with Glenrosa.

5.0 Resort Population

The local fire risk is partly dependent upon the people using the resort facilities. The Master Plan Part IV Section 2f(viii) anticipates that about 30 staff members will be residents and there will be approximately 3890 beds for visitors, with a bed unit occupancy average in the 40% to 50% range, according to industry standards. While it is impractical to expect anyone to accurately determine the servicing needs of this number of people, recent trends show that it is largely the Baby-boomer generation that is purchasing resort properties in BC. It is therefore possible that a number of the vacation homes may be used by permanent or seasonal residents as they reach retirement. Retirees will typically progress through three stages of retirement. The first stage is when they are healthy and relatively active. The second phase will see them becoming more home-bodies. The final stage is when they will require daily living assistance. This potential demographic shift will require careful monitoring by the Fire Chief and local government administrators.

5.1 Initial development (Phase I Stage 1 & 2)

Assuming that all the single family chalets, townhouses and condominiums planned in the two stages of Phase 1, as projected in Table IV-7 of the Master Plan, are habituated in the first five years, then there could potentially be 220 units built, housing a maximum of 440 people, depending on occupancy. An additional 50 units of First Nations condos and chalets and bed and breakfast retreats would contribute another 100 residents. Refer to TABLE 1 below for an itemized summary of projected resident population growth.

5.2 5 – 10 years development (Phase II)

An additional 190 people may appear at the completion of the second phase of development. The population could be at 730 by the end of Phase II.

5.3 100% Build-out (Phase III)

By the end of the last phase, in about 20 years, there could be 959 permanent or part-time occupants of the residential units.

TABLE 1 PROJECTED RESIDENT POPULATION GROWTH BY PHASE

PHASE	B & B	CONDO	TOWNHOUSE	CHALET	FIRST NATIONS		OCCUPANTS
					CONDO	CHALET	
1 -1	0	0	65	42	25	0	264
1 – 2	3	55	0	58	0	22	276
2	3	0	74	113	0	0	190

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3	2	80	0	147	0	0	229
TOTAL BEDS	8	135	139	360	25	22	959

5.4 Seasonal fluctuations

The incidence of fires and emergencies can be expected to have some kind of relationship to the number of people on site. So the needs of a volunteer fire department should be assessed based on full capacity. Seasonal fluctuations will impact not only the availability of volunteers but also the frequency of occurrences.

5.4.1 Residents

Without firm numbers from a census, it will be impractical to speculate on how many residents will be on site at any one time. The statistics provided in the Master Plan Proposal however, give a rough idea of the potential number of residents that should be budgeted for. Communication with the Fire Chief at other similar-sized resorts such as Sun Peaks and Silver Star is encouraged to compare their experiences during winter and summer operations.

5.4.2 Tourists

If there is 100% occupancy of all available rental bed units, TABLE 2 below shows that the level of emergency services will need to roughly double once Phase II is completed in order to keep up with the increased influx of tourists. There will be another 50% increase as Phase III nears completion. A 100% occupancy is a theoretical number. Even on peak days it is never attained. Average occupancy per bed unit is in the 40% to 50% range. Average occupancy per room is in the 50% to 60% range.

TABLE 2 PROJECTED TOURIST* POPULATION GROWTH BY PHASE

PHASE	B & B	CONDO	TOWNHOUSE	CHALET	FIRST NATIONS		TOURISTS
	x 6	x 1	x 2	x 4	CONDO x 1	CHALET x 2	
1 -1	0	0	130	168	25	0	323
1 -2	18	55	0	232	0	44	349
2	18	0	148	452	0	0	618
3	12	80	0	588	0	0	680
TOTAL BEDS	48	135	278	1440	25	44	1970

* The tourist numbers are derived from TABLE IV-6 in the Master Plan Proposal by subtracting two bed units from each capacity to account for two residents in each type of accommodation.

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Table 3 below, shows that the most significant increase in tourists will occur once the two proposed hotels are built during Phase II. There will be an additional 30% more visitors to the ski hill due to the hotels in Phase II. By the time the resort is totally built-out, there will be over 1,000 additional guests using the winter facilities.

It must be emphasized that the ratio of employees to guests will probably decrease from winter to summer activities. This will coincide with the time of year that poses the greatest risk of a wildfire occurring.

TABLE 3 PROJECTED EMPLOYEE & TOURIST POPULATION GROWTH BY PHASE PER COMMERCIAL OPERATIONS.

PHASE	HOTEL GUESTS	EMPLOYEE HOUSING		RESIDENT EMPLOYEES	TOTAL
		FIRST NATIONS	HOTEL		
1 -1	0	0	0	0	0
1 -2	0	0	0	0	0
2	400	0	0	0	400
3	200	0	0	30	230
TOTAL BEDS	600	0	0	30	630

5.4.3 Employees

Seasonal fluctuations of employees will have the greatest impact during the summer months, when the risk of a wildfire will be the greatest, if they are deemed to constitute the majority of the volunteers for the fire department. Also, there may be a significant difference in the degree of emergency medical training between summer and winter-time employees. Having to conduct annual training sessions twice a year for new recruits could considerably increase the operational expenses.

Table 3 shows that the greatest risk will be during the first phase of development when there will not be almost any resident employees available for evening shifts. This may be the opportune time to make arrangements with the Glenrosa fire department for paid services. The ski hill operator will not want to intentionally jeopardize the safety of their customers in the event that the ski patrol staff that are trained in emergency first aid are called off site to attend to a motor vehicle accident under the contractual terms of a Mutual Aid Agreement.

6.0 Fire Prevention Program

The Master Plan recognizes the importance of meeting the British Columbia Building Code and Fire Code requirements. Crystal Mountain will further reduce the probability of a wildfire entering or leaving the property by implementing the FireSmart guidelines to be prepared by a Registered Professional Forester this Summer.

6.1 Enforcement

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The Crystal Mountain will be relying on the experienced staff at the RDCO for building and occupancy permits.

6.2 Public Education

It is far more beneficial to prevent or reduce fires through fire safety education than to depend solely on the fire suppression capabilities of the volunteer fire department. All residents of the resort should be provided with a FireSmart booklet. Visitors should have emergency numbers provided and be familiar with their street and location.

7.0 Mutual Aid Agreements

Mutual aid occurs when an emergency exceeds the available resources of the department requesting the aid from one or more fire departments. Mutual aid agreements take precedence over Fire Protection Agreements.

7.1 Glenrosa and Westbank Fire Departments

An extension of Mutual Aid is called Automatic Aid. By enrolling with the Provincial Emergency Plan, dispatchers could send the closest available apparatus and personnel to the scene of an emergency. The responding department gets paid for their time until the home fire department arrives at the scene, when the incident would revert to a mutual aid call. There is a one hour minimum charge billed directly to the governing jurisdiction.

8.0 Legal

8.1 Fire Bylaws

The local government will need a fire bylaw before it has the authority to create a fire department at Crystal Mountain Resort. The bylaw also gives the authority for the fire department to function. Authority to enter a premise must be stipulated under the bylaw. The Fire Chief gets the authority to enforce the Standing Orders from the bylaw.

9.0 Funding

The local government and fire department administrators must determine how much the people receiving fire protection are willing to pay. They will also ascertain the amount of risk that the people are willing to assume, which will give the administrators direction on which services are desired. Base services should be funded through a property assessment tax. Sun Peaks fire department purchased their Mountain Rescue Vehicle with money that had been donated through a fundraising campaign.

9.1 Range of Services

It can be expected that the ski patrol staff will be providing the initial services during Phase 1 construction. Once the resort base area has been completely built-out and the taxation base has stabilized, the local government administrators will be able to assess the needs of the resort community and make budgets for sustainable levels of service.

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9.2 Capital budget

Budget planning should be at least five years into the future, with 10, 15 and 20 year capital expenditure projections. These budgets should be reviewed annually and revised according to current and proposed community trends.

9.3 Operational budget

Categories of operational budgets include administration, fire suppression, First Responder program, fire prevention program, training, support services, discretionary fund, and an equipment reserve. Some operations may initially be considered for contracting out. Maintenance, training, master planning, communications, and fee-for-fire suppression services may be more affordable initially until the tax base can support hiring these staff.

10.0 Land Use

The Master Plan Proposal defines the Controlled Recreation Area to encompass approximately 2900 hectares. The majority of this land will be used for the downhill ski runs and golf course. The smaller, developed area within the CRA is referred to in the Master Plan (Part IV Section 2g) as the Community Plan Area (CPA).

Within the CPA, Part IV Section 2h(iii) of the Plan describes various types of Permitted Uses for the resort. Accommodation will be available in :

- i) Residential housing ranging from high density condominiums to low density single family chalets, as well as multi-family townhouses and duplexes and
- ii) Commercial structures such as hotels and bed and breakfast establishments.

Commercial buildings will include :

- i) Restaurants and retail stores
- ii) Service areas for maintenance shops, an ambulance and the fire department station.

Open spaces will include :

- i) Downhill ski runs
- ii) Cross-country ski trails
- iii) Greenspaces and parks
- iv) Golf course

10.1 Resort

The fire apparatus and training of the volunteers must be matched to the commercial structures expected to be built in the resort village area. Strict adherence to the building codes will definitely alleviate some of the potential emergencies within the village area.

10.2 Residential

The single family chalets, townhouses, duplexes, and bed and breakfast facilities will be designed to Fire Smart standards. Landscaping will also conform to these guidelines. This too will greatly reduce the severity of loss of property or life.

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11.0 Commercial Building Design

The Master Plan (Part IV Section 2b(iv)) indicates that all structures will be designed according to the BC Building Code and Fire Code, which are provincial requirements. The Proponent has amended the Master Plan to include Fire Smart building and landscaping guidelines. The probability of a wildfire entering or leaving the CRA and Base Area will be greatly reduced once the Fire Hazard Mitigation Prescription, to be developed this Summer by a professional forester, is implemented.

11.1 Fire Department Apparatus requirements

The Fire Chief and the local government administrators will be able to specify the type and size of fire apparatus and equipment required for a volunteer fire department once building permits are issued for the hotels, day lodge, retail stores, and condominiums.

12.0 Fire Hazard Mitigation Prescription

The Proponent has amended the Master Plan with the addition of a commitment to develop and implement a fire hazard mitigation prescription. This report is delayed temporarily until the area is free of snow and permits an assessment of existing risks by a professional forester.

12.1 Fire Smart guidelines

Crystal Mountain agrees to abide by the recommendations of the fire hazard report which will incorporate the guidelines of the Fire Smart Manual.

13.0 Master Plan

The fire department should use a Master Plan to guide its activities. The plan should cover a period of three to five years, be continuously updated and published regularly. It should be an integral part of the budget and approved by the local governing body.

13.1 Programs

One basic premise of a comprehensive fire protection plan is that it is far more beneficial to prevent or reduce fires through fire safety education and built-in fire protection features for buildings, rather than to rely entirely on the fire suppression capabilities of the fire department.

13.2 Costs

Effective planning will aid the accuracy of financial forecasting and identify present service levels and future demands.

14.0 Operational Guideline Manual

A fire department requires a set of Operational Guidelines to provide the framework for expected performance standards of the fire department members. It is expected that liability claims will be significantly reduced if an operational guideline manual is implemented as part of the department's risk management strategy.

Areas that could be covered in an operational guideline manual include; conduct, obedience of orders, attendance, training, emergency response standards, safety

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procedures, personal protective equipment, dangerous goods, maintenance of equipment, fire prevention, promotional policies, and appointment of staff and officers. All personnel should be familiar with this manual.

Learning how to complete a task for the first time should never be experienced by a volunteer under stressful conditions, so practices must follow a regular regime every month.

The manual should also contain a Respiratory Protection Program, which includes a Self Contained Breathing Apparatus Program and information on introducing an Occupational Safety and Health Plan.

14.1 Further information on the Fire Department Operational Guidelines manual prepared by the Cowichan Valley Regional District is available online at www.fcabc.bc.ca/

15.0 Pre-fire Plans

Pre-fire planning is simply knowing about specific areas and buildings within Crystal Mountain's jurisdiction if a fire occurs. Premises can be stratified into groups according to their occupancy and building size.

Crystal Mountain should review NFPA 1420, Recommended Practice for Pre-Incident Planning for Warehouse Occupancies in order to look at a standard pre-fire plan. A pre-fire plan would include information about any exposure hazards, hazardous material storage, water main sizes, hydrant locations, alternate sources of water, location of utilities, street name and address. The map of the building should highlight normal and forcible entry points.

Submitted by

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