

**DISTRICT OF STEWART
MOUNT RAINEY AVALANCHE PROGRAM**

**MINISTRY OF TRANSPORTATION
SNOW AVALANCHE PROGRAMS
AVALANCHE SAFETY RECOMMENDATIONS**

December 2001

Table of Contents

INTRODUCTION	3
AVALANCHE FORECAST AREAS	3
INDUSTRIAL BYPASS ROAD.....	3
EASTERN PORTION OF THE STEWART TOWN SITE.....	3
TRAINING	3
TRAINING SUBJECTS.....	3
1. <i>Avalanche Observations</i>	3
2. <i>Safety Procedures</i>	4
3. <i>Rescue Procedures</i>	4
TRAINING COURSES.....	4
<i>Training Plan</i>	4
INFORMATION SESSIONS:	5
MOUNT RAINEY AVALANCHE SAFETY MEASURES	5
RESCUE CACHE EQUIPMENT.....	5
AVALANCHE RESCUE TRANSCEIVERS.....	6
RADIO EQUIPMENT.....	6
MAINTENANCE VEHICLE EQUIPMENT.....	6
AVALANCHE SEARCH AND RESCUE PLANS	6
PLAN DISTRIBUTION.....	6
AVALANCHE SEARCH AND RESCUE PLAN - UPDATING.....	7
SIGNS	7
AVALANCHE PATH IDENTIFICATION SIGNS.....	7
AVALANCHE AREA WARNING SIGNS.....	7
OPERATIONAL PROCEDURES AND HAZARD FORECASTS	8
OPERATIONAL PROCEDURES.....	8
AVALANCHE FORECASTS.....	8
GENERAL WINTER OPERATIONAL PROCEDURES.....	8
SPECIFIC OPERATIONAL PROCEDURES.....	9
<i>LOW FORECAST</i>	9
<i>MODERATE FORECAST</i>	9
<i>CONSIDERABLE FORECAST</i>	9
<i>HIGH FORECAST</i>	10
<i>EXTREME FORECAST</i>	10
MT. RAINEY AVALANCHE AREA CLOSURE DETAILS	10
CLOSURE PROCEDURES.....	10
STANDARD BY-PASS ROUTE CLOSURE LOCATIONS.....	11
CLOSURE LOCATION REQUIREMENTS.....	11
TOWN SITE AVALANCHE EVACUATION PLAN	11

SNOW AVALANCHE SAFETY RECOMENDATIONS FOR MOUNT RAINEY, DISTRICT OF STEWART

Introduction

A portion of the Stewart town site has been identified as being at risk from avalanches which may occur from the west facing slopes of Mount Rainey. This assessment was prepared for the District of Stewart by Peter Schaerer, P Eng, of the firm Chris Stethem and Associates and the findings are contained in the November 1994 report; *Snow Avalanche Hazard Lines, District of Stewart*.

The District of Stewart has asked the Ministry of Transportation (MoT) to assist it in dealing with the avalanche danger in the Plunging Avalanche Hazard Area. In this document the MoT recommends avalanche safety measures for the protection of persons working, traveling or residing within the District of Stewart avalanche hazard areas.

An Avalanche Hazard Forecast provided by MoT for the District of Stewart Plunging Snow Hazard Area will assist Stewart in determining when to apply or cease the application of the recommended avalanche safety measures as defined in this document.

Avalanche Forecast Areas

Industrial Bypass Road

The Industrial bypass road provides the main haul route for heavy commercial traffic through Stewart. Winter maintenance is performed by the District of Stewart. This road is affected by flow, powder and plunging avalanches. Depending on avalanche forecast levels, restricted activities or road closures will be recommended.

Eastern Portion of the Stewart town site

This is the area, which may be affected by powder and plunging avalanche activity. When the avalanche hazard forecast reaches the Extreme level, evacuation of this area will be recommended.

TRAINING

Training Subjects

The District of Stewart should ensure that all personnel involved in snow avalanche - related activities be trained and knowledgeable in accordance with this document. Training programs should include District of Stewart management and field personnel and representatives from all other agencies involved. The District of Stewart should ensure the training of new hires and winter seasonal personnel at time of hire. The District of Stewart should keep records indicating the avalanche training history of all District of Stewart staff.

All avalanche training should be taken from Ministry - approved instructors/organizations. The Ministry will supply the District of Stewart with the names of approved training agencies. As an alternative, the Ministry will provide, if requested by Stewart, an annual training session for District staff who should attend avalanche safety training.

Training should be undertaken in three main areas, as outlined below.

1. Avalanche Observations

All personnel should:

- a) be able to identify the two different kinds of avalanches;

- b) record standard avalanche observations.

2. Safety Procedures

All personnel should:

- a) be able to recognize avalanche terrain and the safe areas within avalanche areas;
- b) understand the importance of having warm clothing available inside machinery in case of burial;
- c) know the correct procedures to follow when buried by an avalanche;
- d) know the correct procedures to follow when an avalanche affects a road or the town site;
- e) know where all other personnel working in the avalanche areas are during hazardous periods;
- f) know the correct procedures to follow regarding the use of heavy equipment in avalanche areas;
- g) know the basic indicators of changes in snowpack stability and the need to report these.

3. Rescue Procedures

All personnel should know the procedures for:

- a) locating and using rescue equipment;
- b) using avalanche rescue beacons;
- c) using an Avalanche Search and Rescue Plan, including:
 - initiating a rescue operation;
 - the line of command for rescue;
 - support information (additional personnel, equipment, etc.);
- d) specific avalanche rescue techniques.

Training Courses

Training Plan

Canadian Avalanche Association Training Schools (CAATS):

CAATS offers a five day Transportation and Resource Industry course for supervisors and those who make decisions directly affecting the safety of employees and the public. The Ministry is prepared to cover the enrollment fee of one District of Stewart participant on this course, as necessary. The following should attend:

- District of Stewart supervisors responsible for maintenance in avalanche areas.

Ministry Approved One-day Avalanche Safety Courses

These courses are conducted annually for Ministry and Maintenance Contractor personnel who work within provincial avalanche areas. These courses should be required of all personnel who operate in District of Stewart avalanche areas or who may assist in an avalanche rescue within the District of Stewart.

The following should attend one-day avalanche safety courses annually:

- District of Stewart Supervisors responsible for maintenance in avalanche areas;
- All maintenance personnel who work in avalanche areas;
- staff from other agencies who commonly work in avalanche areas.

One-day Avalanche Courses – Once in Three Year Interval

A minimum of once every three years the following should attend the one-day avalanche safety courses:

- All other District of Stewart staff who may be used as second party personnel in an avalanche rescue.
- District of Stewart General Managers and Operations Managers if they have not attended a CAATS Transportation and Resource Industry course in the past five years.

Follow-up Rescue Training

The District of Stewart is responsible for organizing and conducting annual and monthly follow-up training sessions. All District of Stewart personnel who work within the avalanche area should participate in these sessions.

The follow-up sessions should cover:

Monthly (from December to March)

- Rescue Transceiver Practice
- Probing Practice

Annually (just prior to the commencement of winter)

- Terrain Familiarization
- Rescue Plan Familiarization
- Mock Rescue

The District of Stewart should keep records of avalanche follow-up training and a list of the District of Stewart staff who have attended these sessions. These sessions are intended as local refreshers about the specifics of the local avalanche hazard area(s) and the resources available in the event of an avalanche hazard and/or incident. Mock rescues should be planned by the District of Stewart to assess the preparedness to appropriately respond to an avalanche related emergency situation. The District of Stewart should ensure that all personnel who work in snow avalanche hazard areas attend the mock rescue training sessions.

Information Sessions:

The District of Stewart Maintenance Supervisor and personnel responsible for area closures and evacuations should attend an annual pre-winter meeting with the Ministry, Snow Avalanche Programs. This meeting should occur prior to winter operations. Agenda items should include a discussion on the status of training issues, rescue plans, evacuation plan, by-pass road sweep and closure procedures, public information sessions/notices, content of Ministry forecast forms and respective responsibilities of all involved agencies in the Stewart Avalanche Program.

Mount Rainey Avalanche Safety Measures

Avalanche Safety Measures ensure safety to individuals and facilities that may be affected by avalanches. Avalanche Safety Measure for the District of Stewart include the provision of training for appropriate staff, an evacuation plan for the town site area within the plunging snow hazard line in addition to the following:

Rescue Cache Equipment

In Stewart the Ministry Highway Maintenance Contractor will be responsible for storage and maintenance of the Avalanche Search and Rescue equipment provided by the Province. The District of Stewart should be familiar with the location of and trained in the use of this equipment. The avalanche rescue equipment supplied by the Ministry for each avalanche hazard area is standard. The rescue cache is identified with standard Ministry signs.

Avalanche Rescue Transceivers

The District of Stewart should define the requirement for rescue transceivers and supply rescue transceivers to District of Stewart personnel. The District of Stewart should ensure that all personnel who use avalanche rescue transceivers are trained in their use. This training should be in accordance with the training requirements of this document.

Radio Equipment

Radio communication in avalanche areas is essential, and is used in a variety of ways. Rescue operations require the use of radio equipment.

A radio "Check in" system should be used by the District of Stewart when working in an avalanche hazard area. This will improve safe travel and maintenance procedures and assist in keeping track of changing conditions.

Warnings of changes in the Avalanche Forecast for specific areas should be broadcast over the radio to alert all operational personnel.

Maintenance Vehicle Equipment

In addition to radio equipment, the District of Stewart should supply and ensure that all maintenance vehicles or equipment working in snow avalanche hazard areas are equipped with the following:

- shovel,
- WCB Basic first aid kit,
- flashlight,
- wool blanket,
- flagging vest,
- sectional snow avalanche rescue probe,
- an accessible Snow Avalanche Rescue instruction sheet (supplied by MoT)

All of this equipment will help in the event that either the operator or another vehicle is involved in an avalanche accident.

AVALANCHE SEARCH AND RESCUE PLANS

Plan Distribution

The District of Stewart should designate employees who will respond to an avalanche search and rescue effort within the Mt. Rainey avalanche areas. Plans should be readily accessible in vehicles, office locations and homes to ensure efficient response.

Any revisions to the rescue plans (names, telephone numbers etc.) should be made by the District of Stewart immediately through the avalanche season. If requested, the Ministry will advise Stewart in the maintenance and upkeep of Avalanche Search and Rescue Plans to ensure that they are current and efficient.

All persons identified in the Mt. Rainey Avalanche Search and Rescue Plan should:

- participate in annual one-day avalanche awareness training courses;
- attend annual avalanche rescue plan familiarization sessions;
- participate in mock rescue simulation sessions.

An Avalanche Search and Rescue Plan inventory and distribution list should be maintained by the District of Stewart. In addition, a generic accident site Avalanche Search and Rescue Plan should be placed in the front pocket of each “First Party” rescue pack. In addition:

- The District of Stewart should maintain all rescue plans in good order, and keep them accessible in their designated locations.
- The District of Stewart should ensure that all personnel are trained and knowledgeable in the following:
 - location of Avalanche Search and Rescue Plans;
 - use of Avalanche Search and Rescue Plans.

Avalanche Search and Rescue Plan - Updating

The District of Stewart should update the plans annually. To aid in this process, the District of Stewart should perform the following:

- Return the plans to the designated employee at the end of the season (no later than July 1);
- Supply the designated employee with any information needed for plan updating in the early fall (no later than October 1).

SIGNS

Avalanche Path Identification Signs

Individual small, yellow or orange signs with the number and/or name of each avalanche path are located along the highway near the runout zone of each avalanche. The names, numbers and descriptions of the avalanche paths are provided on the Avalanche Strip Maps for each avalanche area.

- These signs identify individual avalanche paths, and will simplify the discussion of locations in storm conditions, identification of avalanche hazard locations, and the subsequent recording of avalanche deposits.
- These signs should remain in place throughout the year.
- The District of Stewart should ensure all personnel working or travelling through avalanche hazard areas are aware of the location and use of these signs.
- The District of Stewart is responsible for the maintenance of the avalanche path I.D. signs.

Avalanche Area Warning Signs

Avalanche area warning signs, stating “Avalanche Area, Do Not Stop” should be used to identify hazardous areas consisting of single avalanche paths or groups of paths. The end of the hazardous area is identified by “End of Avalanche Area” signs. The signs are intended to prevent vehicles from stopping in these areas as a preventive avalanche related safety measure. The Ministry will provide avalanche warning signs and make arrangements to have them installed. Once in place, the District of Stewart should:

- Maintain signs to ensure they are readable at all times.
- Erected just prior to the avalanche season and taken down/covered immediately after the season ends.

The District may wish to consider the use of folding signs or sign covers which can be used to ease the amount of maintenance required.

OPERATIONAL PROCEDURES AND HAZARD FORECASTS

Operational Procedures

Throughout the winter season the District of Stewart should adhere to **general** and **specific** winter operational procedures when working within its avalanche areas. These procedures will ensure that work is conducted effectively, efficiently and safely within an avalanche area. **“General Winter Operational Procedures”** are activities and responsibilities, which the District of Stewart should adhere to throughout the winter season. **“Specific Operational Procedures”** are restrictions, activities and responsibilities based on the avalanche forecast which the District of Stewart should adhere to throughout the specific forecast period.

Avalanche Forecasts

The Ministry, Snow Avalanche Programs will provide Avalanche Forecasts to define the expected avalanche size, frequency and proximity to District of Stewart facilities. These forecasts are based on a progressive five level scale of low, moderate, considerable, high and extreme. For each forecast level there are Specific Operational Procedures. These procedures should be followed in order to ensure safety to District of Stewart staff and facilities within the Mt. Rainey Plunging Snow Hazard Line.

Mt. Rainey Avalanche Forecasts:

- Are produced when there is a change or update in the Avalanche Forecast as determined by the Ministry Snow Avalanche Technician;
- Are provided to the District of Stewart by telephone, fax and /or posted electronically;
- Identify the area of concern and may include the expected duration of the forecast and the reason for the change in forecast level;

General Winter Operational Procedures

The District of Stewart should ensure that all crews working within an avalanche area are aware of the **“General Winter Operational Procedures”** and that work is conducted in accordance with them.

The District of Stewart employees should:

- be able to identify avalanche terrain locations and areas within the District that can be affected by avalanches.
- Be able to monitor and report changes in the following to the Ministry Snow Avalanche Technician as soon as possible:
 - Avalanche occurrence observations
 - Basic indicators of snowpack stability
 - Current weather observations
- Immediately notify the Ministry Snow Avalanche Technician of avalanche occurrences;
- Ensure avalanche barrier gates and turnarounds are free of snow and that gate locks are not frozen
- Monitor weather forecasts;
- Receive, post and disseminate Mt. Rainey Avalanche Forecasts (issued by the Ministry) to personnel immediately upon first receipt, and have a communications mechanism available which ensures that staff coming to work on subsequent shifts are informed of the current Avalanche Forecast;
- Ensure that avalanche rescue equipment is maintained and ready for use;
- Ensure that correct avalanche safety measures are practiced;

- Be prepared for and/or implement delays and/or road closures as required by the Specific Operational Procedures or as requested by the Ministry, Snow Avalanche Technician.

Specific Operational Procedures

Specific Operational Procedures define the restrictions, activities and responsibilities of the District of Stewart specific to the Avalanche Forecast level. The District of Stewart should follow these procedures for the duration of the Avalanche Forecast period. The District of Stewart should ensure that all crews working within the avalanche area are aware of these procedures and that work is conducted in accordance with the specific procedures for each Avalanche Forecast level.

LOW FORECAST

Avalanches are unlikely OR Small avalanches are possible but are expected to terminate far above the valley.

Actions: When the Avalanche Forecast is **LOW** the District of Stewart should proceed with normal winter operation procedures. The District of Stewart should:

- Be prepared to implement delays and/or by-pass road closures and/or evacuations as recommended by the Ministry, Snow Avalanche Technician.

MODERATE FORECAST

Small avalanches are probable but are expected to terminate above the valley. AND/OR Large avalanches are possible, but are expected to terminate far above the by-pass route.

Actions: When the Avalanche Forecast is **MODERATE** the District of Stewart should:

- Ensure there are no District of Stewart personnel or members of the public working outside of their vehicles within the Mt. Rainey Plunging Avalanche Hazard area;
- Ensure that there is no equipment working beyond the traveled lane and shoulders of the bypass route within the Mt. Rainey Plunging Avalanche Hazard area;
- Report weather conditions and avalanche occurrence observations as necessary and/or as requested by the Ministry Snow Avalanche Technician.
- Be prepared to implement delays and/or by-pass road closures and/or evacuations as recommended by the Ministry, Snow Avalanche Technician.

CONSIDERABLE FORECAST

Small avalanches are expected to reach the valley bottom AND/OR Large avalanches are probable, but are expected to terminate above the bypass route. Snow dust events may affect the bypass route and town site.

Actions: When the Avalanche Forecast is **CONSIDERABLE** the District of Stewart should:

- Establish and maintain communications with Ministry Snow Avalanche Technician regarding current and expected avalanche forecast conditions;
- Notify Ministry Snow Avalanche Technician immediately after observing NEW avalanche occurrences on any of the Mt. Rainey Avalanche Paths;
- Ensure there are no District of Stewart personnel or members of the public working outside of their vehicles within the Mt. Rainey Plunging Avalanche Hazard area;
- Institute communications check upon leaving and entering the Mt. Rainey Plunging Avalanche Hazard areas (communication checks to occur at least every 30 minutes) or plow in tandem.
- Ensure there is no stationary equipment operating within the Mt. Rainey Plunging Avalanche Hazard area;

- Be prepared to implement delays and/or by-pass road closures and/or evacuations as recommended by the Ministry, Snow Avalanche Technician.

HIGH FORECAST

Avalanches hazardous to traffic are expected to affect the by-pass route. AND/OR Snow dust is expected to affect the town site.

Actions: When the Avalanche Forecast is **HIGH** the District of Stewart should:

- Close and sweep the section of the by-pass route affected by plunging avalanches (between road closure points). All persons should vacate this area immediately following a High forecast announcement;
- Ensure there is no equipment or personnel working within the Mt. Rainey Plunging Avalanche Hazard areas except for:
 - District of Stewart vehicles use to close and sweep the by-pass route;
 - Ministry Snow Avalanche Programs vehicles and personnel (as directed by the Ministry Snow Avalanche Technician).
- Be prepared to implement town site evacuations within the area defined by the Mt. Rainey Plunging Avalanche Hazard area as recommended by the Ministry, Snow Avalanche Technician.

EXTREME FORECAST

Large avalanches are expected to affect the by-pass route and the town site.

Actions: When the Avalanche Forecast is **EXTREME** the District of Stewart should:

- Close and sweep the section of the by-pass route affected by plunging avalanches (between road closure points). All persons should vacate this area immediately following an Extreme forecast announcement;
- Ensure there is no equipment or personnel working within the Mt. Rainey Plunging Avalanche Hazard areas;
- Be prepared to implement town site evacuations within the area defined by the Mt. Rainey Plunging Avalanche Hazard area as recommended by the Ministry, Snow Avalanche Technician.

Mt. Rainey Avalanche Area Closure Details

Closure Procedures

The District of Stewart should sweep and close the By-pass route as recommended by the Ministry, Snow Avalanche Technician. This will likely only be recommended during periods when the Mt. Rainey Avalanche Paths are rated at High or Extreme avalanche forecast levels.

Traffic control and by-pass route closures within the area affected by plunging snow from the Mt. Rainey paths should be performed by the District of Stewart, as recommended by the Ministry, Snow Avalanche Technician. If requested, the Ministry will advise the District of Stewart in the development and maintenance of effective by-pass route sweep and closure procedures.

The District of Stewart should ensure that personnel who are familiar with by-pass road closure procedures are available when by-pass closures are recommended by the Ministry, Snow Avalanche Technician. The District of Stewart should designate at least one person to liaise with Ministry avalanche personnel throughout the duration of a by-pass route closure.

The District of Stewart should conduct closure procedures as follows:

- The District of Stewart should designate one person who is familiar with closure locations and procedures to be responsible for supervising the closure. This person will be the only contact for the Ministry Snow Avalanche Technician with respect to closure information.
- Barrier gates should be lowered then manned or locked.
- The District of Stewart should ensure that the closure area is secured by a sweep of the area.
- The sweep vehicles should be adequately equipped for use in adverse road and weather conditions and should be in radio contact with personnel outside of the avalanche area.

Standard By-Pass Route Closure Locations

The closure locations for the By-pass route are at the avalanche barrier gates. Gate locations are outside the boundaries of the Mt. Rainey Plunging Avalanche Hazard area.

Closure Location Requirements

- The location of the gates must be approved by the Ministry Snow Avalanche Programs
- They must be located so that lineups of traffic are on near level terrain, free of avalanche hazard, and have turning space suitable for transport trucks.
- Two or three Type B standard flashing warning lights (with battery pack) with red lenses must be fastened to each arm to ensure that the gates are visible in the worst storm conditions.
- The Ministry will cover the expense of obtaining and installing avalanche closure gates, however, once installed, the District of Stewart should maintain gates in good working order by cleaning, repairing, sandblasting and repainting as necessary.

Town Site Avalanche Evacuation Plan

Evacuation of the area inside the Mt. Rainey Plunging Avalanche Hazard Area should be implemented by the District of Stewart as recommended by the Ministry, Snow Avalanche Technician.

Evacuation of persons who reside within the Mt. Rainey Plunging Avalanche Hazard Area should be undertaken by the District of Stewart using a plan developed in accordance with the Emergency Program Act.

THIS AGREEMENT dated for reference December 13, 2001

BETWEEN:

THE DISTRICT OF STEWART

A Municipal Corporation incorporated pursuant to
the Municipal Act, R.S.B.C. 1979, c. 290
Box 460, Stewart, British Columbia V0T 1W0

("Stewart")

AND:

**HER MAJESTY THE QUEEN IN RIGHT OF THE
PROVINCE OF BRITISH COLUMBIA** as represented
by the Minister of Transportation

PO Box 9850 STN PROV GOVT, Victoria, British Columbia
V8W 9T5

("the Ministry")

WHEREAS:

- A. Stewart is located at the northern end of the Portland Canal in British Columbia;
- B. The townsite and adjacent area are at the base of Mount Rainey, a high-risk avalanche area;
- C. The Ministry has responsibility for maintenance to the following roads:
 - (a) Highway 37A which travels from the Meziadin Junction at Highway 37 to the northern boundary of Stewart; and
 - (b) The major road through the commercial and retail area of Stewart which travels from the northern boundary of Stewart where it connects to Highway 37 to the U.S. border near Hyder, which road has been designated as arterial;hereinafter referred to as the "Ministry's Roads".
- D. A portion of the townsite has been identified as being at risk of damage from avalanches from Mount Rainey, which portion is outlined in red on Schedule "A" ("Plunging Snow Hazard Area");

- E. The Ministry's Snow Avalanche Program is active in the Stewart area to monitor and deal with avalanche hazard on the Ministry's Roads;
- F. Stewart has asked the Ministry to assist it in dealing with the avalanche danger in the Plunging Snow Hazard Area;
- G. The Ministry has agreed to assist Stewart by providing, from time to time as needed, avalanche information as set out herein:

ACCORDINGLY, the parties agree as follows:

1. Responsibility of Stewart for Avalanche Risk

- 1.01 The parties acknowledge that the responsibility, as between the parties, for carrying out operational safety measures in Stewart to deal with avalanche hazard (as and when it occurs) is the sole responsibility of Stewart and not the Ministry. The Ministry's role is limited to supporting Stewart's responsibility in this respect by providing Stewart with information and recommendations as set out herein.

2. Ministry Services

- 2.01 The Ministry will collect, monitor and assess weather data, snowpack data and avalanche occurrence data for the purpose of determining avalanche forecast levels applicable to the Plunging Snow Hazard Area.
- 2.02 The Ministry will provide the avalanche forecast levels to Stewart in a timely manner, which forecast levels are described in an Operational Plan which is Schedule "B" to this agreement.
- 2.03 The Ministry will provide recommendations as to how Stewart should respond to the different forecast levels, which recommendations are described in Schedule "B" to this agreement.

- 2.04 If requested by Stewart, the Ministry Snow Avalanche Programs will provide constructive comments regarding the design, content and implementation of the Stewart Avalanche Evacuation Plan.

3. Stewart Covenants

- 3.01 Stewart shall prepare and submit to the Provincial Emergency Program, for their review and comment, an avalanche evacuation plan for the Plunging Snow Avalanche Hazard Area.
- 3.02 The plan shall be submitted to the Provincial Emergency Program for review and comment within 4 weeks of the reference date of this agreement.
- 3.03 It shall be the responsibility of Stewart to respond appropriately to the Ministry avalanche forecast levels and any accompanying recommendations.

4. Risk Acknowledgement

- 4.01 Stewart acknowledges that the methods used in forecasting where and when a snow avalanche will occur is imprecise and that:
- i) avalanches may occur which are not forecasted; and
 - ii) avalanches may not occur when they are forecasted.

5. Indemnity

- 5.01 Stewart agrees to indemnify the Ministry for any loss or expense incurred by the Ministry as a result of anything done by the Ministry pursuant to this agreement whether or not the Ministry is negligent.

6. Waiver

6.01 Stewart hereby waives any claim it may acquire against the Ministry (or the Ministry's employees or contractors) arising from anything done by in furtherance of the Ministry's obligations under this agreement.

7. Representations and Warranties

7.01 Stewart represents and warrants to MOTH that:

- (i) all necessary proceedings have been taken and done to authorize the execution and delivery of this agreement by Stewart and this agreement has been properly executed by Stewart;
- (ii) the completion of the transactions contemplated hereby will not constitute a breach by Stewart of any statute, bylaw or regulation.

8. Severance

8.01 If any provision of this agreement or the application thereof to any person or circumstance is invalid or unenforceable to any extent, the remainder of this Agreement and the application of such provision to any other person or circumstance will not be affected or impaired thereby and will be valid and enforceable to the extent permitted by law.

9. No Waiver

9.01 No waiver by either party of a breach or default by the other party in the observance, performance or compliance of any of its obligations under this Agreement will be effective unless it is in writing, and no such waiver will be deemed or construed to be a waiver of any other breach or default and failure or delay on the part of either party to complain of an act or failure of the other party or to declare such other party in default, irrespective of how long such failure or delay continues, will not constitute a waiver by such party of any of its rights against the other party.

10. Time

10.01 Time will be of the essence of this Agreement.

11. Notices

11.01 Any notice, document, statement, report or demand desired or required to be given or made under this Agreement will be in writing and sent to the following addresses:

If to MOTH:

Ministry of Transportation
Snow Avalanche Programs
PO Box 9850 STN PROV GOVT
Victoria, British Columbia
V8W 9T5

If to Stewart:

District of Stewart
Box 460
Stewart British Columbia
V0T 1W0

12. Miscellaneous

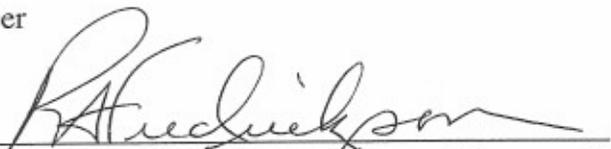
12.01 Stewart acknowledges that the Ministry is not obliged to install and use any other monitoring devices than those that are in place as of the date of this agreement.

12.02 Either party can bring this contract to an end on 30 days notice to the other.

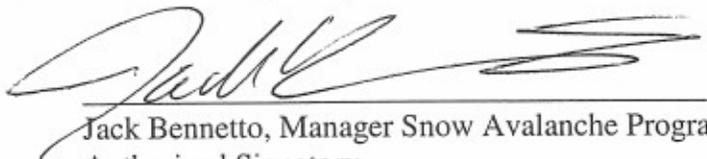
12.03 This Memorandum shall represent the entire agreement between the parties and shall replace any other agreements on the matters contained herein.

Executed on December 13, 2001, by
Her Majesty the Queen in Right of the
Province of British Columbia as represented
by the Minister of Transportation

per



Reg Fredrickson, District Highways Manager, Bulkley-Lakes District
Authorized Signatory



Jack Bennetto, Manager Snow Avalanche Programs
Authorized Signatory

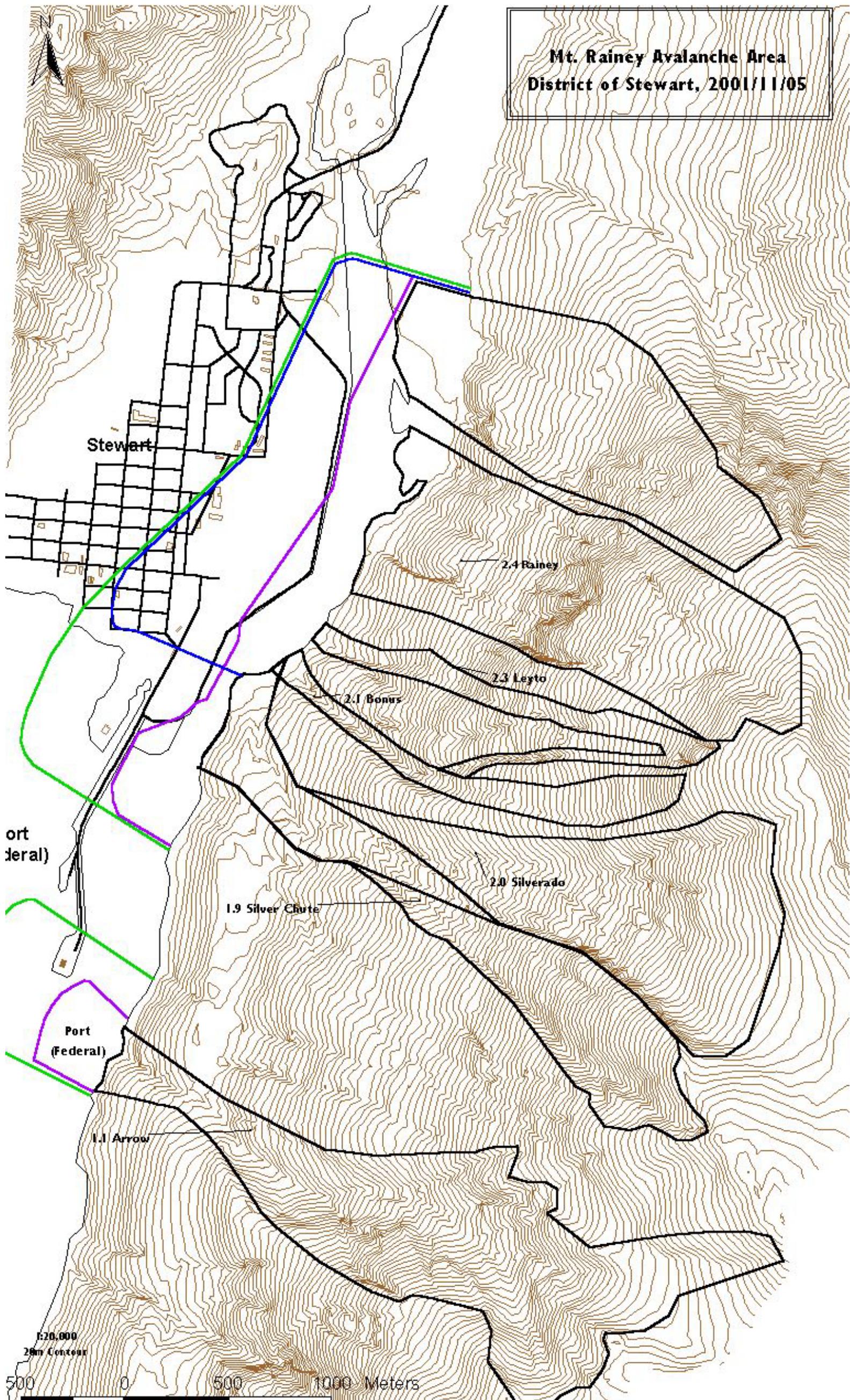
Executed on Dec 13th, 2001 by
The Corporation of the District of Stewart

per:



Mark Edgeson, Mayor of Stewart
Authorized Signatory

**Mt. Rainey Avalanche Area
District of Stewart, 2001/11/05**



Stewart

Port Jeral)

Port (Federal)

1.1 Arrow

1.9 Silver Chute

2.1 Bonus

2.0 Silverado

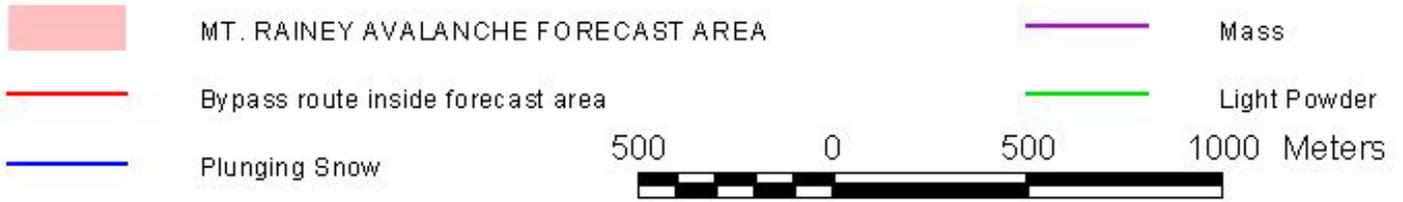
2.3 Leyto

2.4 Rainey

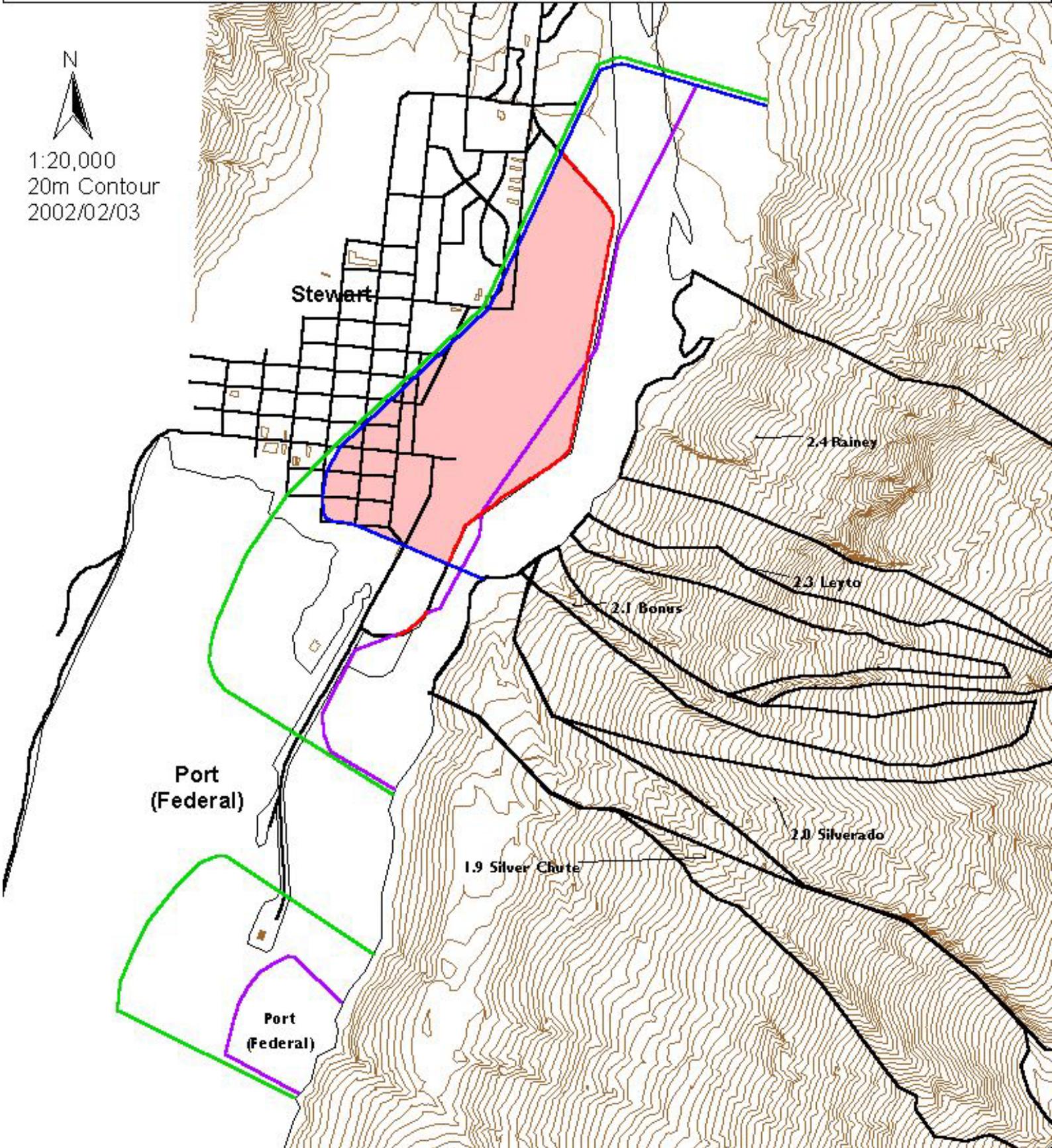
1:20,000
20m Contour

500 0 500 1000 Meters

AVALANCHE HAZARD FORECAST AREA, Mt. Rainey, District of Stewart



N
1:20,000
20m Contour
2002/02/03



AVALANCHE HAZARD LINES, Mt. Rainey, District of Stewart



Plunging Snow



Mass



Light Powder

500 0 500 Meters



1:20,000
20m Contour
2001/11/05

Stewart

2.4 Rainey

2.3 Leyto

2.1 Bonus

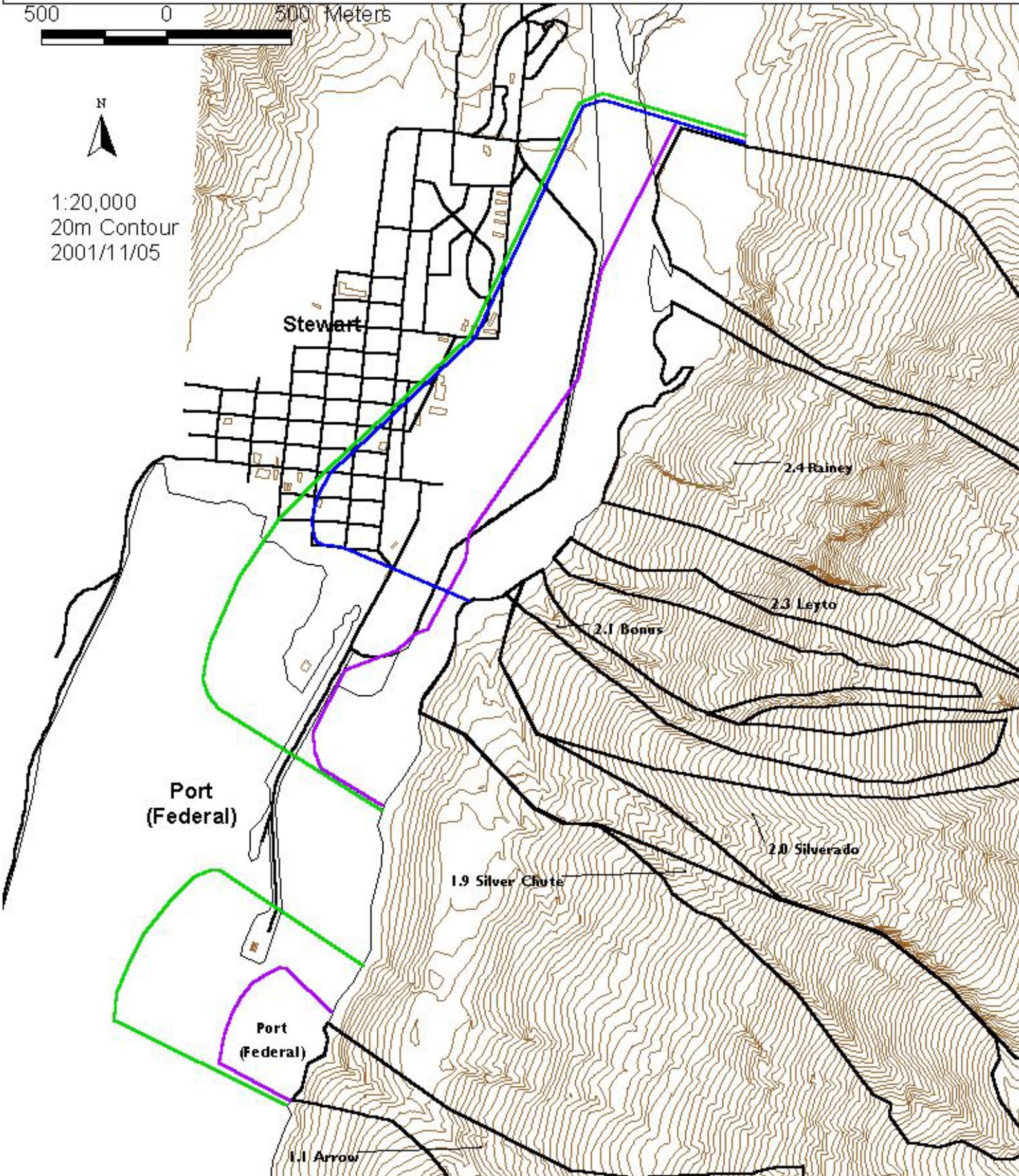
2.0 Silverado

1.9 Silver Chute

Port
(Federal)

Port
(Federal)

1.1 Arrow



MOUNT RAINEY – DISTRICT OF STEWART AVALANCHE PROGRAM

AVALANCHE FORECASTS AND SPECIFIC OPERATIONAL PROCEDURES

AVALANCHE FORECAST	DEFINITION	ACTION RECOMMENDED
LOW	Avalanches are unlikely. OR Small avalanches are possible but are expected to terminate far above the valley.	<p>When the Avalanche Forecast is LOW the District of Stewart should proceed with normal winter operation procedures. The District of Stewart should:</p> <ul style="list-style-type: none"> • Be prepared to implement delays and/or by-pass road closures and/or evacuations as recommended by the Ministry, Snow Avalanche Technician.
MODERATE	Small avalanches are probable but are expected to terminate above the valley. AND/OR Larger avalanches are possible, but are expected to terminate far above the by-pass route.	<p>When the Avalanche Forecast is MODERATE the District of Stewart should:</p> <ul style="list-style-type: none"> • Ensure there are no District of Stewart personnel or members of the public working outside of their vehicles within the Mt. Rainey Plunging Avalanche Hazard area; • Ensure that there is no equipment working beyond the traveled lane and shoulders of the bypass route within the Mt. Rainey Plunging Avalanche Hazard area; • Report weather conditions and avalanche occurrence observations as necessary and/or as requested by the Ministry Snow Avalanche Technician. • Be prepared to implement delays and/or by-pass road closures and/or evacuations as recommended by the Ministry, Snow Avalanche Technician.
CONSIDERABLE	Small avalanches are expected to reach the valley bottom AND/OR Large avalanches are probable, but are expected to terminate above the bypass route. AND/OR Snow dust events may affect the bypass route and town site.	<p>When the Avalanche Forecast is CONSIDERABLE the District of Stewart should:</p> <ul style="list-style-type: none"> • Establish and maintain communications with Ministry Snow Avalanche Technician regarding current and expected avalanche forecast conditions; • Notify Ministry Snow Avalanche Technician immediately after observing NEW avalanche occurrences on any of the Mt. Rainey Avalanche Paths; • Ensure there are no District of Stewart personnel or members of the public working outside of their vehicles within the Mt. Rainey Plunging Avalanche Hazard area; • Institute communications check upon leaving and entering the Mt. Rainey Plunging Avalanche Hazard areas (communication checks to occur at least every 30 minutes) or plow in tandem. • Ensure there is no stationary equipment operating within the Mt. Rainey Plunging Avalanche Hazard area; • Be prepared to implement delays and/or by-pass road closures and/or evacuations as recommended by the Ministry, Snow Avalanche Technician.
HIGH	Avalanches hazardous to traffic are expected to affect the by-pass route. AND/OR Snow dust is expected to affect the town site.	<ul style="list-style-type: none"> • When the Avalanche Forecast is HIGH the District of Stewart should: • Close and sweep the section of the by-pass route affected by plunging avalanches (between road closure points). All persons should vacate this area immediately following a High forecast announcement; • Ensure there is no equipment or personnel working within the Mt. Rainey Plunging Avalanche Hazard areas except for: <ul style="list-style-type: none"> • District of Stewart vehicles use to close and sweep the by-pass route; • Ministry Snow Avalanche Programs vehicles and personnel (as directed by the Ministry Snow Avalanche Technician). • Be prepared to implement town site evacuations within the area defined by the Mt. Rainey Plunging Avalanche Hazard area as recommended by the Ministry, Snow Avalanche Technician.
EXTREME	Large avalanches are expected to affect the by-pass route and the town site.	<p>When the Avalanche Forecast is EXTREME the District of Stewart should:</p> <ul style="list-style-type: none"> • Close and sweep the section of the by-pass route affected by plunging avalanches (between road closure points). All persons should vacate this area immediately following an Extreme forecast announcement; • Ensure there is no equipment or personnel working within the Mt. Rainey Plunging Avalanche Hazard areas; • Be prepared to implement town site evacuations within the area defined by the Mt. Rainey Plunging Avalanche Hazard area as recommended by the Ministry, Snow Avalanche Technician.

§ Clean up and Removal of Avalanche Deposits §

- The District of Stewart should not commence clean up of avalanche deposits until advised by the Ministry Snow Avalanche Technician that it is safe to do so.