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25 kV Overhead Distribution Line

Management Plan

P18036-Management Plan

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Sea to Sky Gondola 25 kV Overhead Distribution Line

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Sea to Sky Gondola 25 kV Distribution Line Management Plan

1.0 Background

1.1 Project Overview

This management plan relates to the Sea to Sky Gondola Summit electrification project with respect to the construction of an access road network, the clearing of the proposed License of Occupation, and the construction of a 25 kV overhead distribution line for the Sea to Sky Gondola located approximately 2.8 km South of Squamish B.C.

1.2 Investigative Work

All investigative work has been carried out as part of the project approval process.

1.3 Confirmation of Safety Plan

The project and associated Contractors will all meet the standards as dictated by the BC Occupational Health and Safety Regulation administered through WorkSafeBC.

1.4 First Nation Consultation

First Nation consultation has been on-going through the various stages of this project including from project conception to the submission for a License of Occupation.

2.0 Locations

2.1 Description

The project is located approximately 2.8 km south of Squamish British Columbia.

Refer to Sea to Sky Gondola – Overview Map.pdf for precise location.

2.2 Location Justification

The routing of the 25 kV distribution line was chosen in this location to limit the impact on First Nations, natural resources, visuals, environmental and other special interest groups. In addition, the routing is directly adjacent to established access corridors and therefore any new clearing associated with the License of Occupation is kept to a minimum and further reducing the total foot print of the project. Other routings were considered but the total impact was much greater than the route chosen.

2.3 Seasonal Expectation of Use

The main access roads to be utilized for this project are the Mamquam FSR, the Stawamus-Indian FSR and the Shannon FSR. All of the road sections associated with these roads to be utilized in the construction of this project are currently active and therefore being actively maintained. Upgrading of these roads other than routine maintenance is not expected to be required. However, it is anticipated that major work will be done on the Stawamus River crossing in 2022 (Station 1+155 Stawamus-Indian Main FSR, 4823.01). This should not affect the construction of the overhead line as the overhead line construction is anticipated to occur after the construction of the Stawamus River crossing. As the Sea to Sky Gondola is part of the working group with respect to the Stawamus bridge replacement project, coordination with the overhead line construction will be done to avoid any conflict associated with the two projects. Any new access trails that need to be constructed and roads that need to be reconstructed unless instructed otherwise by the Ministry of Forests, Range, Natural Resource Operations and Rural Development, (FLNRORD) will be deactivated and revegetated as required after construction and energization of the overhead line is complete.

3.0 Infrastructure and Improvements

3.1 New Facilities and Infrastructure

3.1.1 License of Occupation Clearing

A License of Occupation for the overhead lines will need to be cleared. This proposed License of Occupation will be variable in width from 20 to 30 metres depending on elevation, length of span, side hill steepness and the maximum swing of the overhead cables.

Falling of timber will utilize hand falling techniques and, as necessary, roads could be closed for short periods of time to ensure public safety. It is anticipated that a front end loader or other type machine will work in conjunction with the hand falling crews to ensure the roads are kept open as much as possible. It is anticipated that all merchantable timber will be brought to roadside for processing. As to the processing and hauling of this wood, this will be dictated in the terms of the Occupant License to Cut (OLTC) and is not known at this time. However, it is known that the merchantable timber wood will either be removed by the Sea to Sky or by another licensee. All merchantable timber will be loaded and transported to an approved scaling facility. As a major portion of the proposed License of Occupation is directly adjacent to existing access roads, tracked loaders will be utilized to yard the wood to roadside. If the wood is located off the existing access roads, ground, based, cable or aerial yarding techniques will be utilized. Wood will be processed at the roadside and waste piled for chipping or burning. Depending upon waste levels and acceptable amounts of debris left for fire hazard considerations, harvesting debris will be dealt by the following methods:

• Scattered - Waste will be scattered and left lying flat on the ground where possible but will not exceed the amounts as dictated by Schedule 7 of the Forest Fire Prevention and Suppression Regulation, Part 6, Division 2 Hazard Assessment and Abatement or where it will hamper the construction of the overhead line.

• Burning - Excessive material will be piled and burned as required. Burning will take place in the late Fall when suitable burning conditions are present.

• Chipping - Where burning is not possible excessive debris will be chipped and the chips scattered within the 25 kV License of Occupation area. Chips can also be utilized for temporary road construction.

3.1.2 Silviculture Harvesting Techniques to be Utilized

Essentially the area under the License of Occupation will be broken down into two types. They are:

- Full clearing of all target species area
- Danger and hazard tree area

It is expected that within the full clearing of all target species area, all species of vegetation that can grow taller than 4.0 metres at maturity will be cut down and within the Danger/Hazard Tree Area only those trees that are a safety to the workers on the ground (Danger Trees) or trees that pose a danger to the 25 kV overhead line (dead, dying and leaning) will be removed.

For more details on location, please refer to the Clearing Plan Maps.

3.1.3 Construction of Road Network

In order to construct the 25 kV overhead line and clear the proposed License of Occupation area, some roads will need to be constructed. The road network will mainly consist of existing maintained Forest Service Roads and existing non status roads. In addition, four short access trails will need to be constructed to gain access

to the License of Occupation. Currently, the Sea to Sky Gondola has or will get Road Use Permits for the Mamquam FSR (9283.01), the Stawamus-Indian Main FSR (4823.01) and the Shannon FSR (4823.02). Since no road permit roads are being utilized, road use agreements with other Licensees will not be required. All Non Status Roads fall within the Licence of Occupation being applied for by the project. All new access trails will be located within the applied for Licence of Occupation and will therefore not require additional permitting.

With respect to the 25 kV overhead line construction, all Non Status Roads and new access trails will be temporary (single season use) in nature and not ballasted unless the road is required to haul timber, in which case the roads will be surfaced with appropriate ballast material to allow for the safe hauling of timber. Both Non Status roads and access trails will be deactivated after construction of the 25 kV overhead line. This includes the removal of all drainage structures and the establishment of cross ditches. In addition, any over steepened slopes will be pulled back as required to ensure the road is left in a stable manner. All exposed soil will be grass seeded with a standard reclamation mix after deactivation is complete.

The only exception to proceeding with deactivation is if a Non Status Road or access trail can be used by another Licensee or user group. In this case, provided approved by FLNRORD, the road or access trail will not be deactivated. In addition, because the road network will be accessing harvestable timber, there may be roads that existing Forest Licensees may request be left open after construction is complete. Once again, the road would not be deactivated but the Licensee would be expected to take over responsibility for the road and transfer the road to their own road permit.

Road and access trail construction will mainly utilize overland construction techniques although side cast construction techniques may be required if the side slopes are steeper than 20%. Although drilling and blasting is not anticipated, wherever possible, drilling and blasting of rock will be avoided in the construction of roads and access trails. In addition, ballasting is also to be avoided wherever possible and if required, only material generated from ditch construction (and subgrade construction where road out-sloping is proposed) will be used provided the material is suitable. If the material is not suitable, small borrow pits will be created at suitable ballast material sites along the length of the new road. These borrow pits will be resloped upon completion of the project during the deactivation stage.

With respect to drainage, all natural drainage patterns will be maintained during construction. The access plan will utilize existing drainage structures where possible so new drainage structures can be avoided. (i.e. If both banks of a fish creek are

accessible without having to build a new drainage structure, a new drainage structure will not be built even if requires driving a long distance to get to the other side of the creek). Where this is not possible, for temporary road stream crossings of non-fish bearing creeks and where the creek does not flow directly into fish bearing water, temporary drainage structures such as fords, will be constructed since the roads will be used during periods of low flow and the number of cycles each road is used will be very limited.

Closed bottom culverts will be installed at creek crossings for haul roads that cross non fish bearing creeks. For any fish creeks, creek crossing will be avoided and if that is not possible, open bottom clear span wood culverts will be utilized. These crossings will be long enough to avoid any in stream works and to prevent encroachment, the sill logs will stay outside the normal highwater mark of the creeks.

3.1.4 Construction of a 25 kV Overhead Line

The design of the 25 kV overhead line will consist largely of single pole structures except at some deflections or large crossings where multiple pole (2 to 3) structures will be constructed. The overhead line is approximately 5.5 km in length and consists of approximately 82 structures. The average spacing of the structures is approximately 67 metres but will range between 12.7 to 171.8 metres horizontal distance depending on topography.

The pole sites will be excavated by machine except in areas that are environmentally or historically significant. In these areas the holes will be dug by hand if possible. Wherever possible in rocky ground conditions, rock hammers will be utilized. Where rock hammers are not suitable, drilling and blasting may be required. All excavated material, if suitable, will be used as fill to support the structure. No excavated material will be removed from site. Where poor soil quality is encountered, caissons (vertically set galvanized corrugated metal pipes), will be used and if required, crushed rock will be used to support the caisson. This crushed rock will come from off- site. The 25 kV overhead line design will follow all relevant CSA and WorkSafeBC standards.

All holes for power poles are less than 2 m³ in volume and are to be temporarily excavated and then back filled with the original excavated material. All excavated material will be placed directly adjacent to the pole and replaced as backfill once the pole has been installed. It is anticipated that most holes will be 6.5 feet (1.98m) deep.

With respect to a summary of what roads are to be constructed, the following tables list the roads and access trails. In addition, the road network can be reviewed on any

of the attached Management Plan Maps.

3.2 Access

3.2.1 New Access Trails

Roadway/ Proposed	Station to Station		Road Length (km)	Existing Proposal	Existing Road Classification	Road Permittee Information and Road Use Agreements	Traffic Volume		Mitigation of Traffic Effects
Connection							Construction	Operations	
connection							Phase	Phase	
Branch 31	0+000	0+056	0.056	Proposal	Temporary	Within proposed LOO	10 cycles total	N/A	Road just for project
Branch 76	0+000	0+135	0.135	Proposal	Temporary	Within proposed LOO	10 cycles total	N/A	Road just for project
Branch 77	0+000	0+076	0.076	Proposal	Temporary	Within proposed LOO	10 cycles total	N/A	Road just for project
Branch 80	0+000	0+262	0.262	Proposal	Temporary	Within proposed LOO	10 cycles total	N/A	Road just for project
Grand Total New Access Trails			0.529						

Since all these roads are relatively short, it is anticipated that these access trails will not be required to haul timber. However they will be used to skid logs and provide access to construction crews to erect the structures. Therefore, some ballasting will be required. In addition, all new access trails are fully within the License of Occupation Area and for the most part intersect with Non Status Roads and therefore FSR road junction permits will not be required for these roads. However, Branch 80 does intersect with the Shannon FSR and therefore a temporary FSR intersection permit will be required for this particular road.

3.2.2 Non Status Roads

Roadway/	Station to Station		Road Length (km)	Existing Proposal	Existing Road Classification	Road Permittee Information and Road Use Agreements	Traffic Volume		
Connection							Construction Phase	Operations Phase	Effects
SH2400	0+000	0+026	0.026	Existing	Retired R016527, ID SH2400	To be reconstructed under Licence of Occupation	5 cycles total	N/A	None Required
Spur B	0+000	0+443	0.443	Existing	Non Status Road	To be reconstructed under Licence of Occupation	20 cycles total	N/A	None Required
Total Non-Status Roads			0.469						

These are existing historic roads that will require varying degrees of improvement before they can be safely used. Both of these roads connect to the Shannon FSR all intersections are already constructed and have been previously used.

3.2.3 Forest Service Roads

Roadway/	Station to Station		Road Length (km)	Existing Proposal	Existing Road Classification	Road Permittee Information and Road Use Agreements	Traffic Volume		Mitigation of Traffic
Proposed Connection							Construction Phase	Operations Phase	Effects
Mamquam FSR	0+000	3+816	3.816	Existing	FSR 9283.01	To be provided	20 cycles per day	N/A	Traffic control will be required during construction to ensure public safety and coordination with other users will be done prior to construction
Stawamus Indian FSR	0+000	1+490	1.490	Existing	FSR 4823.01	To be provided	20 cycles per day	N/A	Traffic control will be required during construction to ensure public safety and coordination with other users will be done prior to construction
Shannon FSR	0+000	3+162	3.162	Existing	FSR 4823.02	To be provided	20 cycles per day	N/A	Traffic control will be required during construction to ensure public safety. Since the Sea to Sky Gondola and the public are the main users of this road and there is generally no forestry activities, as long as the road is kept open periodically during the day and all night, there should be no issues.
Total Forest Service Road Requirements			8.468						

3.3 Utility Requirements and Sources

The project consists of the construction of a 5.5 km, 25 kV overhead distribution line from point of interconnection at the junction between the Mamquam FSR and the Power House Springs Road to the Sea to Sky Gondola Summit. The overhead power line will consist of three phases and be on predominantly single pole structures except at deflections and long spans where 2 pole structures may be required. The average width of the License of Occupation will be between 20 and 30 metres wide depending on elevation and terrain.

All lines will be constructed to CSA standards.

3.4 Water Supply

For the construction of the 25 kV collector line and associated feeder lines, no water supply will be required.

3.5 Waste Collection, Treatment and Disposal

Construction waste will be collected and brought back to bins located at the construction yard each day where it will disposed of accordingly, taking care to recycle metals and separate out wood.

Washroom "port-a-potty" facilities will be rented and cleaned on a weekly or on an as required basis. All waste materials will be disposed of by the "port-a-potty" rental company at an appropriate facility.

4.0 Environmental

4.1 Land Impacts

4.1.1 Vegetation Removal

All vegetation that can grow higher than 4 metres at maturity (Target Species) will be removed within 7.5 metres either side of the powerline centreline. In addition, any dead, dying and leaning trees that pose a safety hazard to workers or a hazard to the overhead lines will be removed within the Danger/Hazard tree area.

The vegetation removal types by area is as follows:

Clearing Unit	Area
	(ha)
Proposed Clearing of all Target Species	11.9
Proposed Additional Danger/Hazard Tree Area	13.8

Total (License of Occupation Area)	25.7

Vegetation will be cut down by the following methods:

- Mechanical Harvester and Processor Merchantable timber on slopes less than 40% will be harvested using a mechanical harvester.
- Hand Falling On slopes greater than 40% wood will be hand felled.
- Hand Slashing Since a machine free zone will be maintained in riparian areas, any trees that need to be removed that cannot be done by reaching into the riparian area with a mechanical harvester will be felled by hand. Hand slashing will also be done in non–merchantable areas where the slope is greater than 40%.
- Mowing In those areas of non-merchantable timber and where the slopes are less than 40%, mechanical mowing and brushing units will be utilized.

All debris will be scattered, burnt, or chipped and scattered depending on location and the amount of debris. The amount of acceptable debris will be dependent on the fire hazard assessment that will be completed after initial harvesting.

For more details, please refer to the Clearing Plan Maps.

4.1.2 Soil Disturbance

Construction of temporary access trails required to clear the License of Occupation area and to construct the25 kV overhead line will cause some soil disturbance. This disturbed soil will be kept to a minimum and will be seeded with an appropriate seed mix when construction work is completed.

Except for the construction of roads, no grubbing will be required.

4.1.3 Riparian Encroachment

Clearing will be required within riparian areas for construction of the 25 kV overhead lines. All clearing activities within 30 m of all riparian features within the proposed License of Occupation area will follow practices described in BC Hydro's "Approved Work Practices for Managing Riparian Vegetation" (AWPRV) dated October 26, 2003 – Final version 1.0.

In addition, any clearing within 30m of a riparian feature will adhere to the Department of Fisheries and Oceans (DFO) Pacific Region Operational Statements for Overhead Line Construction (version 3.0).

4.1.4 Pesticides and Herbicides

No pesticides or herbicides will be used during the construction of the 25 kV overhead line.

All wooden poles used in the construction of the 25 kV overhead line will be treated with Penta Chlorophenol to a retention of 0.60 lbs assay in accordance with CSA 080.4. The placement of these poles will be outside top of bank as per the Department of Fisheries and Oceans (DFO) Pacific Region Operational Statements for Overhead Line Construction (version 3.0).

4.1.5 Visual Impacts

A majority of the overhead distribution line is located directly adjacent to established road corridors. Since the License of Occupation overlaps with these road right of ways, the full License of Occupation will not have to be cut and therefore the additional impact to visuals will be minimal. In the Danger/Hazard tree removal areas since only individual trees will be removed, removal of vegetation in this area will not have any impact. There will be some increased ability to see the road since the License of Occupation area is below the road in some areas but because of the varied nature of the area (lots of visible rock with no vegetation), the absorption capability of the area is quite high and the increased visibility of the road will not be too intrusive. However since the section from structure 75 to 77 is going directly downhill, there will be increased visibility from the third peak of the Stawamus Chief as well as from the some of the Sea to Sky hiking trails. Although this section is only approximately 130 metres long and 20 metres wide, to mitigate this visual impact, the Sea to Sky Gondola are going to promote the establishment of a community of low growing herbaceous species within the License of Occupation area to provide ground cover and therefore a lessening of the visual impact.

4.1.6 Archaeological Sites

There has been one archaeological site (DkRS-10) identified along the 25 kV overhead distribution line. To prevent the requirement for an Archaeological Site Alteration permit under Section 12 of the BC Heritage and Conservation Act, the Sea to Sky Gondola worked with the Squamish First Nation to find alternate routing that did not impact on this site. In addition, a portion of the routing of the 25 kV overhead distribution line is within an area identified in the Sea to Sky LRMP as being a culturally sensitive zone. Once again, the Sea to Sky Gondola worked with the Squamish First Nation to ensure the proposed overhead line did not negatively impact on the cultural sensibilities of the site.

During construction, a chance find procedure will be followed to ensure there is no impact to

any unknown cultural or heritage sites along the overhead line routing. In addition, the Sea to Sky Gondola will follow any recommendations as indicated by the Squamish First Nation during the construction phase of this project. This will most likely involve having a monitor on site during pole placement. If a new archaeological site is found, based on the recommendations of the Squamish First Nation, a site alteration permit will be submitted and followed as required.

Please refer to the Cultural and Heritage Mapping associated with this management plan for location of Archaeological site and Culturally Sensitive Zone.

4.1.7 Construction Methods/Materials

The 25 kV overhead line will consist mainly of single pole structures. These poles will be treated (refer to Section 4.1.5) Douglas fir poles approximately 45 to 80 feet in height depending on clearance requirements. All lines will be three phase with a neutral below. The line will allow for adequate clearance as dictated in the relevant CSA standard as well as the clearance requirements as requested by FLNRORD with respect to the Forest Service Roads.

All materials being used on this project have been used extensively throughout the province and will be located so they do not cause any environmental issues.

All material will be trucked to the site using on-highway sized equipment.

In areas that cannot be reached by conventional methods, the use of a helicopter for removing logs, placing poles and stringing lines may be required. This is not planned for at this time.

4.2 Atmospheric Impacts

4.2.1 Sound, Odor, Gas or Fuel Emissions

The project is generally located away from any residential property in an area that is considered part of the working forest. The noise associated with this project is similar to the noise associated with timber harvesting activities. This includes:

- Heavy equipment building roads.
- Mowing and falling units for timber harvesting.
- Blasting or rock hammering of holes.
- Cranes used in the installation of poles.
- Equipment used in the stringing of the lines.

There will not be an odour associated with this project except for the odour caused by engine emissions. These emissions are similar to that of logging and road building equipment but should not affect local wildlife.

There will not be any disturbance to wildlife or nearby residents from gas emissions.

If burning is utilized to reduce fire hazard and remove harvesting debris, there will be emissions created from the burning of the wood waste. Although the emissions cannot be prevented during burning, burning will only occur on those days that there is an acceptable ventilation index as indicated by the Ministry of Environment.

In addition, both the clearing contractor and line contractor will be instructed to have a Spill Prevention and Emergency Response Plan that will be followed to firstly prevent any spills and secondly to ensure that in the unlikely event of a spill, the spill is dealt with in an appropriate manner.

4.3 Water or Land Covered by Water Impacts

Drainage Effect

The project will not cause any changes to land drainage. All natural watercourses will be maintained.

4.3.1 Public Access

The current existing road network will not be altered to accommodate the construction of the 25 kV overheadline and feeders lines.

During access trail construction, timber falling and yarding as well during the construction of the overhead line especially during any periods when blasting will be required, public access will be restricted to ensure safety. There are numerous mountain bike trails, hiking trails and climbing routes in the vicinity of the Licence of Occupation area and therefore it will be very important to ensure that anybody participating in these activities near active construction sites be informed and restricted to safe areas only. Adequate signage will be erected to ensure the public is kept informed. In addition, for Forest Service Road closures, FLNRORD will be informed and they will ensure it is posted on their road web site.

4.3.2 Flood Potential

The project will not result in an increased risk of flooding.

4.4 Fish and Wildlife Habitat

4.4.1 Disturbance to Wildlife or Wildlife Habitat

There will be work within the riparian areas of streams and wetlands. This work will consist of land clearing and the placement of poles. All clearing within a riparian area will follow practices describedin BC Hydro's "Approved Work Practices for Managing Riparian Vegetation" (AWPRV) dated October 26, 2003 – Final version 1.0.

In addition, any clearing within 30m of a riparian feature will adhere to the Department of Fisheries and Oceans (DFO) Pacific Region Operational Statements for Overhead Line Construction (version 3.0).

Since road deactivation of all temporary roads and revegetation of all exposed mineral soil will be completed after construction is complete, no increased long term erosion or sedimentation should occur from the construction of the 25 kV overhead line.

No water diversion is required for the construction of this project.

After reviewing the provincial data base, there are no polygons of identified SARA listed species in the area of the 25 kV overhead power line License of Occupation.

5.0 Socio-Community

5.1 Land Use

The project is located approximately 2.8 km south of Squamish B.C. and is heavily used by First Nations, hikers, mountain bikers, climbers and off road enthusiasts. In addition, although not currently active it is part of the Sea to Sky Natural Resource District working forest. During construction, there will be short durations when these activities in the area will not be possible to ensure safety for all users. The public will be informed of these potential delays with signage and traffic control as necessary. In addition, FLNRORD will be notified to ensure any planned closures of the FSR are posted prior to them occurring.

In addition, the site is located in close proximity to the Stawamus Chief Provincial Park. However this park is far enough away from the constructions activities that use of the Park should not be impacted. However, sound from construction especially from drilling and blasting will be heard in the park.

The construction of the overhead line should not affect any land owners or other crown license or lease holders in the area (Refer to the Tenure and Lot Boundaries Maps to see locations). If there may be a potential impact to any of the identified tenure holders or

property owners, they will be contacted prior to construction and mitigation strategies agreed to and put in place to ensure any existing infrastructure is not compromised.

In addition, the location of the 25 kV overhead line overlaps with various forestry tenures. These include cutting permits, road permits, designated WTRA's and Old Growth Management Areas. We will work with the Licensees to ensure we have the proper permits in place such as Road Use Permits/Agreements and provide them information on the location of the 25 kV License of Occupation area and associated roads so they are able to make the necessary site plan amendments. With respect to OGMA's and WTRA's, we will work with the Licensees and FLNRORD to find appropriate replacement areas that will not impact the Licensee's operations. Please refer to the Land Use Maps that shows the locations of WTRA's, OGMA's etc.

5.1.1 Land Management Plans and Regional Growth Strategies

The Sea to Sky Land and Resource Management Plan will be addressed in the approval process for the project.

5.2 Socio-Community Conditions

Wherever possible and to be consistent with the commitments made in the project, Local Contractors will be sought for key roles in the clearing and construction of the 25 kV License of Occupation area and overhead line.

5.2.1 Adjacent Users or Communities

The project will not restrict public access for adjacent landowners and tenure holders in the area unless WorkSafeBC rules and regulations dictate otherwise. Restrictions may be required if the activities being carried out during construction and clearing create a safety risk to the public such as falling or mowing (risk of falling trees or flying objects). Once construction is complete, there will be no restrictions.

5.2.2 Existing Services

There will not be an increased demand on existing services.