



CASCADE ENVIRONMENTAL
RESOURCE GROUP LTD

Initial Environmental Review

Bunbury Lands D.L 2291, Whistler, B.C.



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- An Environmental Impact Assessment.



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1 INTRODUCTION

1.1 Background

The subject property at 2501 Gondola Way, District Lot 2291 is located southeast of Highway 99, at the top of Whistler Creek South area of Whistler BC (Map 1). The western boundary of the property lies adjacent to the Bayshores residential development of Brandywine Way and extends eastward to the boundary of Big Timber Court and borders the Heritage Peaks Trail development of Kadenwood to the south. The site has a total area of 4.23 ha that ranges in elevation from 720 m to approximately 800 m. The property is predominantly forest cover indicative of coastal western hemlock forests. To date, District Lot 2291 has three existing single-family homes.

The property is legally described as District Lot 2291 (PID: 006-984-801), New Minister District Group 1 and is contained in the RMOW land use zone RS-E1. The RS-E1 zone (Residential Single Estate One) allows the following uses on the subject property:

- a. Auxiliary buildings and auxiliary uses
- b. Auxiliary residential dwelling unit provided it is serviced by a community sewer system that is located in a sewer specified area serviced by: (Bylaw No. 1621)
 - i. A sewage treatment plant with a design treatment capacity or greater than 500 cubic metres per day; or
 - ii. A sewage holding tank, the installation and operation of which complies in all respects with "Public and Private Sewer Usage Regulation Bylaw No. 551, 1987.
- c. Detached dwelling; and
- d. Park and playground

The property has an area of 3.97 ha, exclusive of the road bisecting the site, which has an area of 0.25 ha. Land owner Paul Bunbury proposes to subdivide the existing lot. The proposed subdivision will include five single family lots, parkland and road easements.

The purpose of this Initial Environmental Review (IER) is to review and assess the condition, ecosystem integrity, habitat potential, species present (plant and animal), and aquatic features on or adjacent to a development parcel. It includes a discussion of the environmental regulatory framework that may affect development activities and provide alternatives for mitigation or resolution. Potential constraints and recommendations are provided to inform and facilitate the environmental review and approval process.

This IER is an update of a previous IER, Initial Environmental Review Bunbury Lands D.L. 2291, Whistler, BC (Cascade 2001).

1.2 The Project Team

Field investigations were conducted by Simon Fry, B.Sc., B.I.T., Candace Rose-Taylor, M.Sc., R.P., Bio. Mapping support was provided by Nicola Church, B.A., M.Sc. (G.I.S.). Dave Williamson, B.E.S., Q.E.P., Certified Terrestrial Ecosystem Mapper, provided review for the assessment. All project team members have extensive experience in conducting environmental inventories, reviews and assessments.

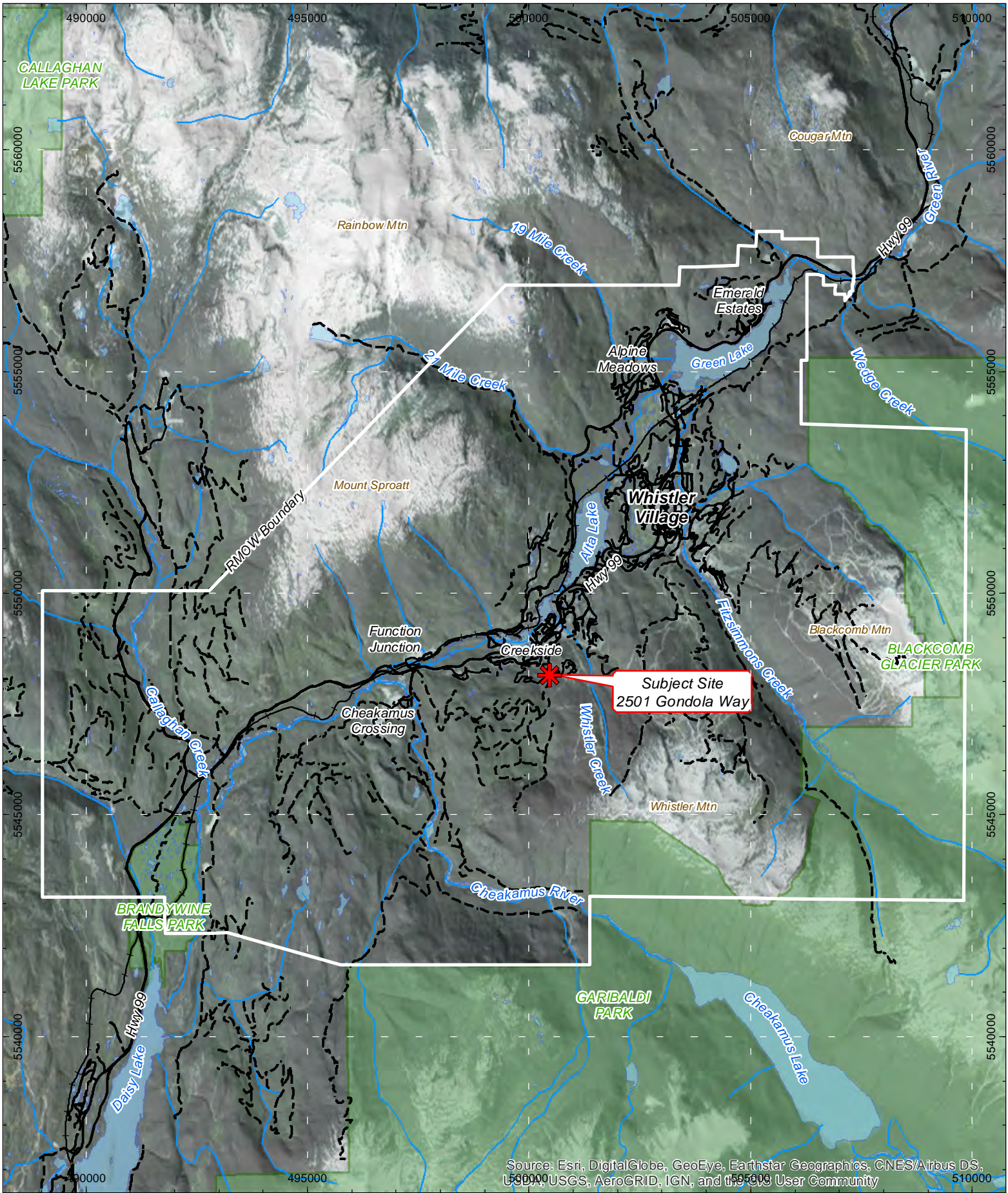
1.3 Methodology

Prior to visiting the subject property, aerial photographs, Forest Cover Mapping, RMOW Ecosystem Mapping and environmental reports relevant to the site were reviewed.

On-site reconnaissance of the site occurred on December 15, 2017. Ecosystem polygons on the subject site previously identified in the 2001 Cascade IER were investigated in the field to update and confirm Terrestrial Ecosystem Mapping (TEM) codes.

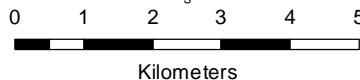
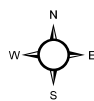


Vegetation existing on the site was inventoried and wildlife presence identified through visual observations, scat, bird songs, tracks and feeding signs where present. Potential wildlife for the area's habitats that were not observed during the site visits are described using the BC Conservation Data Centre(CDC), a centralized BC government database of information on species and ecological communities (BC MOE, 2017). Valued ecosystem components such as riparian corridors, old growth (i.e. veteran) and habitat trees were also recorded during the survey.



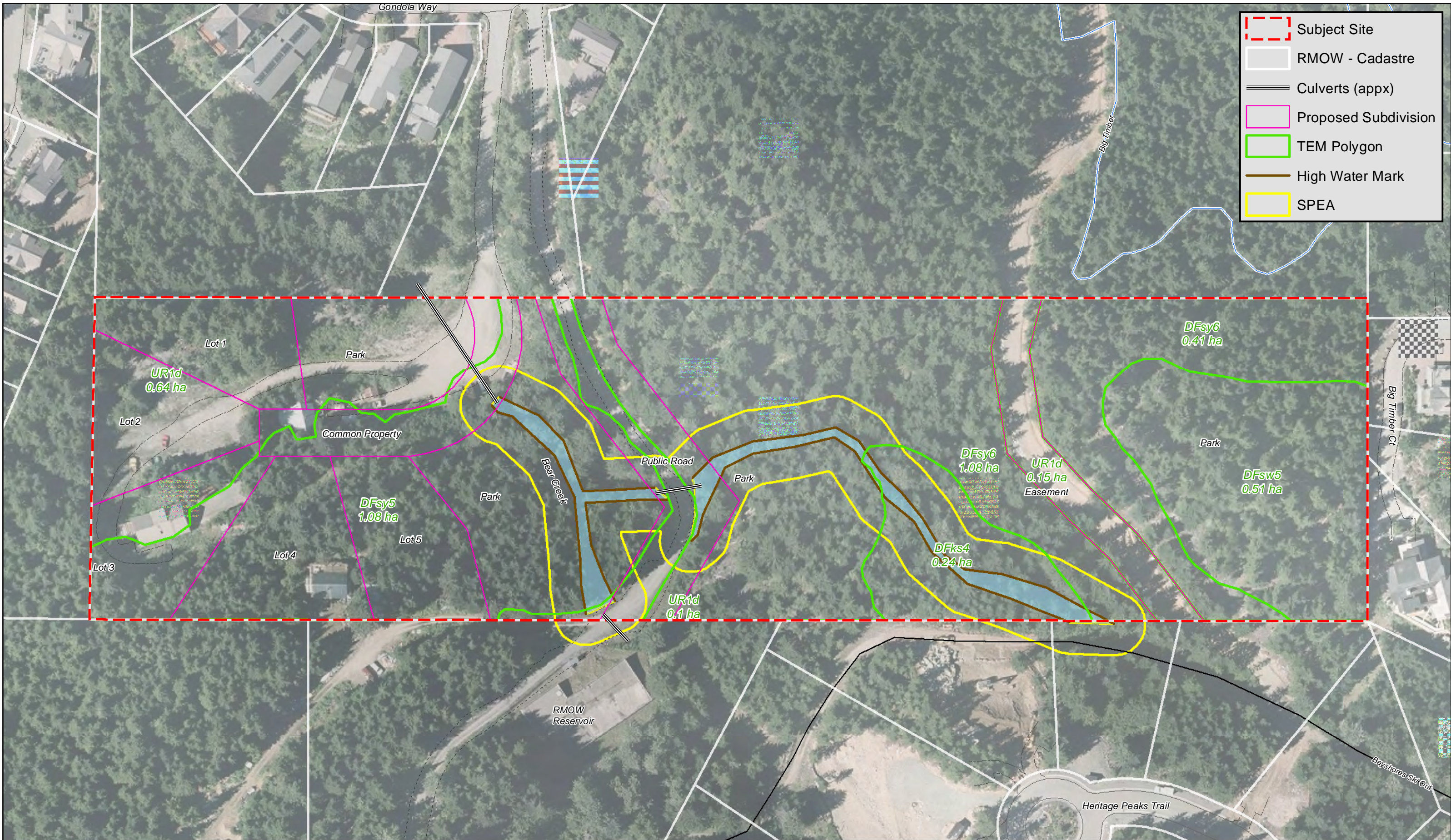
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

GIS Cartographer: Todd Hellinga
 Date: December 22, 2017
 CERG File#: 165-01-04
 Projection: UTM 10N NAD83
 Orthophoto: ESRI

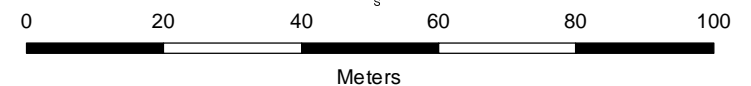
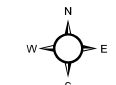


Location

Initial Environmental Review
 2501 Gondola Way
 Whistler, British Columbia



GIS Cartographer: Todd Hellinga
 Date: January 5, 2018
 CEREG File#: 165-01-04
 Projection: UTM Zone 10N NAD83
 Orthophoto/Data: RMOW



Initial Environmental Review

2501 Gondola Way
 Whistler, British Columbia



2 EXISTING ENVIRONMENTAL CONDITIONS

2.1 Physical Environment

2.1.1 Climate

The study area lies within the Eastern Pacific Ranges Ecoregion, within the Coast Mountains Ecoprovince in southern British Columbia (Demarchi, 1996). The climate is principally influenced by frontal systems moving in from the Pacific Ocean and over the Coast Mountains to the Interior. This transitional climate is characteristically moist and cool in the winter. The climate is also associated with heavy snowfall at higher elevations (Campbell et al., 1990; Green and Klinka, 1994). Summers are relatively cool, although hot dry spells are frequent. Mean annual precipitation for the Whistler valley is 800.6 mm rainfall, and 657.4 cm snowfall (Alta Lake, 1951 to 1980, Whistler, 1971 to 2000, Climate Normals, Environment Canada, 2017).

2.1.2 Geology

The subject lands lie within the Southern Coast Mountains and are underlain by granitic rock of the Coast Plutonic Complex. This Complex is characterized by gneisses and granitoid rocks with dykes and septae of metavolcanic and metamorphosed rocks. These reflect a complex history of volcanic activity, magmatic intrusion and uplift (Monger and Journeay, 1994 and Schiefer et al., 2010).

2.1.3 Geomorphology

The Whistler Valley was formed during Pleistocene epoch glaciations and subsequent glacial-fluvial action and mass-wasting in the form of rock and debris flows released by frost heaving, erosion, and seismic activity. The resulting features of the terrain consist of glacial till, glaciogenic colluvial soils overlying morainal materials or bedrock. The subject area was mapped by the Ministry of Energy, Mines and Petroleum Resources (MEMPR) as Quartz diorite intrusive rock (MEMPR 1992)

2.1.4 Hydrology

An unnamed tributary to Write-off Creek drains the study area known locally as Bear Creek and herein named for clarification purposes within this report. Bear Creek enters at two points on the property. On the southeast portion of the property it flows eastward approximately 265 m through the center of the site. On the Southern border it enters from the south and flows approximately 50 m before converging with the southeast portion (Map 2). Bear Creek drops a calculated 70 m gradient at steep gradients between 35 to 45%. The channel width ranges from 1.5 m to 3.3 m with an average width of 2.7 m.

Both lengths of Bear Creek are culverted under the Baxter reservoir access road and converge 20 m downstream entering a second culvert before exiting the site boundary. The creek flows into a Write-off Creek via a steep waterfall and meets its confluence at Alpha Lake.

2.2 Terrestrial Environment

2.2.1 Soils

Previous soil mapping of the study site reveals the presence of Lithic Orthic Humo- Ferric Podzols as being the dominant soil series throughout the site. This soil series is commonly associated with the well drained, bedrock controlled, forested slopes of the Whistler area. Along with the Lithic Orthic Humo- Ferric Podzols, Lithic Folisols tend to be the dominant soil series of the upper portion of the property (Luttmerding, 1971). These soils which consist of shallow stony and gravelly colluvium and thin organics overlying bedrock are characterized by their rapid drainage (Luttmerding, 1971).

The lower portion of the site is congruent with the soil series found throughout the property, with the addition of Orthic Humo-Ferric Podzols. This soil type is identified as being gravelly, stony colluvium and ablation till over loamy basal till. Drainage of this soil series is characterized as moderately well drained (Luttmerding, 1971). Soil processes that are characteristic of this subarctic forest include Mor humus



formation (associated with the accumulation of acid organic matter), leaching, eluviation, and illuviation (Meidinger and Pojar, 1991).

2.2.2 Vegetation

2.2.2.1 Vegetation Associations

During the ecological survey conducted on December 15, 2017, it was determined that the subject lands consist of forested vegetation intersected by an access road to Baxter reservoir, fire service road to Heritage Peaks Trail and three single home developments. The existing native vegetation consists of a variation of pole/ sapling (structural stage 4), young forest (structural stage 5) and young/mature (structural stage 6) coniferous forest vegetation association. A description of this structural stage provided in Table 1. Vegetation identified in the subject area is listed in Table 2.

Table 1: Vegetation Age Class Descriptions

Structural Stage Code	Interpretation
1 Sparse/Bryoid	<ul style="list-style-type: none"> - Community is in initial stages of primary and secondary development - Bryophytes and lichens often dominant - Times since disturbance typically <20 years but may be 50-100 + years in areas with little or no soil - Shrub and herb cover <20 % of total area - Tree cover < 10 % of total area
2a/b/c/d Herb	<ul style="list-style-type: none"> - Early successional stage or edaphic herb community - 2a forb dominated - 2b graminoid dominated, including grasses, sedges, reeds and rushes - 2c aquatic plant dominated, but not 2b plants - 2d dwarf shrub dominated, low growing woody shrubs
3a/b Shrub	<ul style="list-style-type: none"> - Shrub dominated communities maintained by environmental conditions or disturbance - 3a low shrub < 2 metres tall - 3b tall shrub < 10 metres tall - Tree cover <10 %
4 Pole/Sapling	<ul style="list-style-type: none"> - Densely stocked trees - Self-thinning not yet evident - Time since disturbance usually < 40 years
5 Young Forest	<ul style="list-style-type: none"> - Stocking density persists - Self-thinning not yet evident - Time since disturbance usually 40-80 years
6 Mature Forest	<ul style="list-style-type: none"> - Trees established after the last disturbance have matured - A second cycle of shade-tolerant trees may have become established - Time since disturbance generally 80–250 years
7 Old Forest	<ul style="list-style-type: none"> - Structurally complex stands composed mainly of shade-tolerant and regenerating tree species - Snags and coarse woody debris in all stages of decomposition typical - Time since disturbance >250 years
Modifiers B – Broadleaf C – Coniferous M – Mixed	<ul style="list-style-type: none"> - Broadleaf stands composed of > 75 % broadleaf tree cover - Coniferous stands composed of > 75 % coniferous tree cover - Mixed stands neither coniferous nor broadleaf compose > 75 % of the total tree cover

Table 2: Vegetation identified within the Subject Lands.

Common Name	Scientific Name
Trees	
Amabilis fir	<i>Abies amabilis</i>
Douglas maple	<i>Acer glabrum</i>
Red alder	<i>Alnus rubra</i>
Black cottonwood	<i>Populus basamifera trichocarpa</i>
Douglas-fir	<i>Pseudotsuga menziesii</i>
Western yew	<i>Taxus brevifolia</i>
Western redcedar	<i>Thuja plicata</i>
Western hemlock	<i>Tsuga heterophylla</i>
Shrubs	
Sitka alder	<i>Alnus sitchensis</i>
Kinnikinnick	<i>Arctostaphylos uva-ursi</i>
Red-osier dogwood	<i>Cornus stolonifera</i>
Western teaberry	<i>Gaultheria ovatifolia</i>
False azalea	<i>Menziesia ferruginea</i>
Devils club	<i>Oplopanax horridus</i>
Falsebox	<i>Rubus spectabilis</i>
Black huckleberry	<i>Vaccinium membranaceum</i>
Oval-leaved blueberry	<i>Vaccinium ovalifolium</i>
Red huckleberry	<i>Vaccinium parvifolium</i>
Forbs	
Goat's beard	<i>Aruncus dioicus</i>
Prince's pine	<i>Chimaphila umbelata</i>
Queen's cup	<i>Clintonia uniflora</i>
Bunchberry	<i>Cornus canadensis</i>
Rattlesnake-plantain	<i>Goodyera oblongifolia</i>
Twinflower	<i>Linnaea borealis</i>
One-sided wintergreen	<i>Orthilia secunda</i>
Ferns and Horsetails	
Sword fern	<i>Polystichum munitum</i>
Mosses and Lichens	
Common witch's hair	<i>Alectoria sarmentosa</i>
Step moss	<i>Hylocomium splendens</i>
Red-stemmed feathermoss	<i>Pleurozium schreberi</i>

2.2.2.2 Biogeoclimatic Zone Classification (CWHms1)

The subject site is part of the Southern Moist Submaritime (ms) Coastal Western Hemlock Southern (1) Variant (Green & Klinka, 1994). This biogeoclimatic zone occurs in subarctic areas of the Coast Mountains at elevations ranging from 650 to 1 350 m. Within this biogeoclimatic subzone, a number of different site series were identified. The site series classification reflects subtle changes in microclimate and soil conditions, which reflect on the plant species composition within the unit. The different site series are further classified into Terrestrial Ecosystem Units based on the structural stage of the vegetation and the geomorphology of the site.

2.2.2.3 Terrestrial Ecosystem Mapping

Four observational plots were conducted to confirm TEM code data of the 4 polygons previously delineated during the Casacde 2001 IER study of the lands. Five polygons were described due to vegetation growth in the study area and are explained below.



Polygon 1 -TEM Code DF – Site Series 03 (FdHw – Falsebox)

POLYGON 1 TEM CODE DERIVATION					
Decile	Shallow soils and soils are moister than normal.			Single storied; closed forest stand dominated by the overstory crown class.	
10	DF	sy	5	s	C
	FdHw – Falsebox		Young Forest		Coniferous



Photo 1: Polygon 1 DFsy5sc ecosystem features facing north. December 15, 2017.



Photo 2: Polygon 1 DFsy5sc ecosystem features facing southeast. December 15, 2017.

This polygon represents areas of young forest. This second growth forest was observed on the lower slopes surrounding the single family developments. The polygon is characterized by its northern aspect and slopes which exceed 25%. The forest stand is composed of western hemlock and amabilis fir, with some Douglas fir and western redcedar. Estimated tree heights range within 10 – 15 m. The canopy closure representative of this polygon is approximately 50%. Average tree diameter at breast height (DBH) of this polygon ranged from 9 – 14 cm.

Ground cover consists of falsebox, black huckleberry, oval-leaved blueberry, prince’s pine, pipecleaner moss, and some one-sided wintergreen. A large amount of arboreal lichen growth was also observed within the polygon.



Polygon 2 -TEM Code DF – Site Series 03 (FdHw – Falsebox)

POLYGON 2 TEM CODE DERIVATION					
Decile	Shallow soils and soils are moister than normal.			Multistoried; all crown classes well represented	
10	DF	sy	6	m	C
	FdHw – Falsebox		Mature Forest		Coniferous



Photo 3: Polygon 2 DFsy6mc ecosystem features facing east. December 15, 2017.



Photo 4: Polygon 2 DFsy6mc ecosystem features facing north. December 15, 2017.

Polygon 2 represents areas of mature forest. Selectively harvested in 1958, this second growth forest is the dominant forest cover of the study site. Its western aspect and slopes in excess of 25% characterize the topography of this polygon. The forest stand is composed of western hemlock and amabilis fir, with some Douglas fir and western redcedar. Pacific yew is also occasionally observed, particularly in areas with poor drainage. Estimated tree heights range within 15 – 25m. The canopy closure representative of this polygon ranged from 30-36%. With the exception of the odd veteran tree, average DBH of this polygon ranged from 36 – 41 cm.

Ground cover consists of falsebox, black huckleberry, oval-leaved blueberry, prince’s pine, pipecleaner moss, and some one-sided wintergreen. Red alder, cottonwood, pacific willow, devils club and douglas maple were observed in the riparian corridors of this polygon. A large amount of arboreal lichen growth was also observed within the polygon.



Polygon 3: TEM Code DF – Site Series 03 (FdHw – Falsebox)

POLYGON 3 TEM CODE DERIVATION					
Decile	Shallow soils and westerly aspect.			Multistoried; all crown classes well represented	
10	DF	sw	5	m	C
	FdHw – Falsebox		Young Forest		Coniferous



Photo 5: Polygon 3 DFsw5mc ecosystem features facing east. December 15, 2017.



Photo 6: Polygon 3 DFsw5mc ecosystem features facing west from Big Timber Court. December 15, 2017.

The forest structure of polygon 3 includes both young and mature forest attributes. Selective harvesting of the past has resulted in a mixed age class and subsequently variable structural stage. The stand is comprised primarily of young forest cover, with a low density of veteran trees. Typical tree species include western hemlock, amabilis fir, Douglas fir and the occasional western redcedar. Estimated tree heights for Douglas fir ranged from 18 - 25m with DBH values of 30-45. Amabilis fir and western hemlock measurements revealed average heights of 23 meters and DBH values of 30 - 45cm. Veteran trees attained heights of 30 –35m, and measured 70-90cm in diameter. Canopy cover is estimated at 30 – 35%. This polygon’s western aspect and steep slopes of 38% have resulted in slightly drier soils than those observed in unit DFsy5.

Shrubby and herbaceous species in this polygon are also typical of site series DF. Observed species include false azalea, black huckleberry, Alaskan blueberry, princes pine and some queens cup



Polygon 4- TEM Code DF – Site Series 03 (FdHw – Falsebox)

POLYGON 4 TEM CODE DERIVATION					
Decile 10	Shallow soils and westerly aspect.			Single storied; closed forest stand dominated by the overstory crown class.	
	DF	sw	4	s	C
	FdHw – Falsebox		Pole/Sapling		Coniferous



Photo 7: Polygon 4 DFsw4sc ecosystem features facing north. December 15, 2017.



Photo 8: Polygon 4 DFsw4sc ecosystem features facing north. December 15, 2017.

This Polygon represents an area of pole/sapling structure. The second growth forest of this site is characterized by its high density of sapling-sized trees. Located in a draw with a northern aspect, this terrain slopes at an average of 42%. Tree cover representative of this site includes amabilis fir and western hemlock. Estimated tree heights range between 8 and 15m, with crown closure averaging 35%. DBH ranged from 5 –20 cm.

At the time of present and previous site visits, ground cover of this polygon was covered under snow pack. Using adjacent cover and available shrub, it is expected that shrubby and herbaceous vegetation are typical of site series DF, with falsebox, black huckleberry, princes pine and bunch berry being the predominant species.

Polygon 5 UR

This site designation is representative of an anthropogenic site series, and is not considered a natural site. Existing forest cover and associated vegetation has been removed and subsequent development has occurred.

2.2.2.4 Rare and Endangered Plant Species and Ecological Communities

In BC, there are two governing bodies involved with the ranking of species and/or ecological communities at risk. At the national level, the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) provides advice to the *Species at Risk Act* (SARA), and at the provincial level, the Conservation Data Centre (CDC) manages the BC Status List.



The Canadian government created SARA in 2002 to complement the Accord for the Protection of Species at Risk (a national effort to identify and protect threatened and endangered wildlife and their associated habitats across the country). COSEWIC is the scientific body responsible for assigning the status of species at risk under SARA. This system uses the following terminology:

- Extinct (XX)
- Extirpated (XT)
- Endangered (E)
- Threatened (T)
- Special concern (SC)
- Not at risk (NAR)
- Data deficient (DD)

A species that is listed as Endangered, Extirpated or Threatened is included on the legal list under Schedule 1 of the Act and is legally protected under the Act with Federal measures to protect and recover these species in effect.

The BC CDC designates provincial red or blue list status to animal and plant species, and ecological communities of concerns (BC MOE, 2017). The red list includes indigenous species or subspecies considered to be endangered or threatened. Endangered species are facing imminent extirpation/extinction, whereas threatened groups or species are likely to become endangered if limiting factors are not reversed. The blue list includes taxa considered to be vulnerable because of characteristics that make them particularly sensitive to human activities or natural events. Although blue listed species are at risk, they are not considered endangered or threatened. Yellow listed species are all those not included on the red or blue list and may be species which are declining, increasing, common, or uncommon. Table 3 to Table 5 below include CDC listed (i.e. rare and threatened) species that have the potential to occur on the subject site; species designated as SARA Schedule 1 are also noted. This potential is based on broad habitat preferences delineated by forest district and biogeoclimatic zone, and refined by habitat type available in the subject site. Forest habitat type was selected to identify potential listed species for the purposes of this report. Potential occurrences are then designated as unlikely or possible based upon species specific habitat requirements and an on-site assessment of those habitats. Note that a comprehensive evaluation of the study area for each species was not possible due to time constraints, seasonal migration patterns, and the transient nature of some species. A comprehensive field survey for rare and endangered species should be undertaken prior to clearing for those specific species identified as 'possible' from the Potential Occurrence column in the tables below.

Table 3: Rare and endangered plant species potentially occurring in the study area.

Common Name <i>Scientific name</i>	Status		Habitat Requirements	Potential Occurrence
	BC List	SARA Status		
Geyer's Onion <i>Allium geyeri</i>	Blue		Moist meadows, banks, and rock outcrops in the lowland, steppe and montane zones; infrequent on Vancouver Island and in the Fraser and Thompson River valleys. Closest known occurrence is Owl Creek, Pemberton.	Unlikely- rock outcrops in Polygon 3 DFsw5mC but has not been observed in the Whistler Biodiversity Project*



Common Name <i>Scientific name</i>	Status		Habitat Requirements	Potential Occurrence
	BC List	SARA Status		
Washington springbeauty <i>Claytonia washingtoniana</i>	Red	-	Moist to drier, steep mossy rock outcrops and forests in the lowland and montane zones. Closest known occurrence is one mile north of Lizzy Creek, on Port Douglas-Pemberton Road.	Unlikely- Polygon 3 DFsw5mC contains steep mossy rock outcrops but has not been noted in the Whistler Biodiversity Project*
Whitebark pine <i>Pinus albicaulis</i>	Blue	1 - E	Montane forests and on thin, rocky, cold soils at or near timberline at an elevation of 1300-3700 m in the sub-alpine to alpine zones.	Unlikely- subject site on elevations of -700-800 m.
Blunt-sepaled starwort <i>Stellaria obtusa</i>	Blue		Wet to moist meadows and strembanks in the montane zone above 500 m.	Unlikely- riparian areas within subject site, however, has not been noted in the Whistler Biodiversity Project*

Source: BC Ecosystems Explorer, Ministry of Environment,*source from Whistler Biodiversity Project.

Rare and Endangered Ecological Communities

The term "ecological" is a direct reference to the integration of non-biological features such as soil, landform, climate and disturbance factors. The term "community" reflects the interactions of living organisms (plants, animals, fungi, bacteria, etc.), and the relationships that exist between the living and non-living components of the community. Currently, the most common ecological communities that are known in BC are based on the Vegetation Classification component of the Ministry of Forests and Range Biogeoclimatic Ecosystem Classification, which focuses on the terrestrial plant associations of BC's native plants.

Large tracts of undisturbed plant communities are considered ecologically more important than disturbed / fragmented or second growth communities. Vegetation on the subject lands consists of forest in variations of pole/sapling young forest and mature structural stage. One Blue listed ecological community exists within the subject lands and is described in Table 4.

Table 4: Rare and endangered ecological communities occurring on the site.

Site Series Name Common Name <i>Scientific name</i>	TEM Code	Status BC List	BCG Zone	Polygons	Structural stage	Size of polygon (ha)
Douglas-fir - western hemlock / falsebox <i>Pseudotsuga menziesii</i> - <i>Tsuga heterophylla</i> / <i>Paxistima myrsinites</i>	DF	Blue	CWHms1/03	1	5	1.08
				2	6	1.64
				3	5	0.51
				4	4	0.24



2.2.3 Wildlife and Wildlife Habitat

2.2.3.1 Wildlife

2.2.3.1.1 Birds

Bird species expected to be present during the previous Cascade 2001 IER are included below. Chesnut-backed chickadees (*Parus rufescens*), golden crowned kinglets (*Regulus setrapa*) and dark eyed juncos (*Junco hyemalis*) were particularly plentiful. Additional avian species observed included brown creeper (*Certhia americana*), gray jay (*Perisoreus canadensis*), northwestern crow (*Corvus caurinus*), pileated woodpecker (*Dryocopus pileatus*), red-breasted nuthatch (*Sitta canadensis*), Steller's jay (*Cyanocitta stelleri*), varied thrush (*Ixoreus naevius*), and winter wren (*Troglodytes troglodytes*).

Other resident bird species expected to occur include American robin (*Turdus migratorius*), bald eagle (*Haliaeetus leucocephalus*), black-capped chickadee (*Poecile atricapillus*), northern goshawk (*Accipiter gentilis*), blue grouse (*Dendragapus obscurus*), downy woodpecker (*Picoides pubescens*), hairy woodpecker (*Picoides villosus*), northern flicker (*Colaptes auratus*), northern saw-whet owl (*Aegolius acadicus*), pine siskin (*Carduelis pinus*), red-breasted sapsucker (*Sphyrapicus ruber*) and ruffed grouse (*Bonasa umbellus*) (Ricker et al., 1996).

Bird species expected to occur in the breeding season and during migration include brown-headed cowbird (*Molothrus ater*), cedar waxwing (*Bombycilla cedrorum*), Cooper's hawk (*Accipiter cooperii*), Hammond's flycatcher (*Empidonax hammondi*), hermit thrush (*Catharus guttatus*), MacGillivray's warbler (*Oporornis tolmiei*), merlin (*Falco columbarius*), olive-sided flycatcher (*Contopus borealis*), orange-crowned warbler (*Vermivora celata*), Pacific-slope flycatcher (*Empidonax difficilis*), red-winged blackbird (*Agelaius phoeniceus*), ruby-crowned kinglet (*Regulus calendula*), rufous hummingbird (*Selasphorus rufus*), solitary vireo (*Vireo solitarius*), Swainson's thrush (*Catharus minimus*), swallows, Townsend's solitaire (*Myadestes townsendi*), Townsend's warbler (*Dendroica townsendi*), warbling vireo (*Vireo gilvus*), western tanager (*Piranga ludoviciana*), western wood-pewee (*Contopus sordidulus*), Wilson's warbler (*Wilsonia pusilla*), and yellow-rumped warbler (*Dendroica coronata*).

2.2.3.1.2 Mammals

During previous site visits conducted by Cascade in 2001 three mammal species were positively identified to be utilizing the study site habitat features. Mammals observed included snowshoe hare (*Lepus americanus*) (scat), coyote (*Canis latrans*) (scat) and Douglas squirrel (*Tamiasciurus douglasi*) (visual). Due to the proximity of the study site to developed areas, it is unlikely to support home range habitat requirements of specific wide-ranging mammals. It is possible that the study site could provide foraging habitat for black bear (*Ursus americanus*) and mule deer (*Odocoileus hemionus*). Bobcat (*Lynx rufus*), short-tailed weasel (*Mustela erminea*) and marten (*Martes americana*) are other possible carnivores present within the site.

Smaller, and more local mammal species likely include the dusky shrew (*Sorex obscurus*), vagrant shrew (*Sorex vagrans*), long-tailed vole (*Microtus longicaudus*) and deer mouse (*Peromyscus maniculatus*).

2.2.3.1.3 Amphibians and Reptiles

No amphibians were observed during site visits in 2001 or on December 15, 2017. The surveyed region does not include aquatic features that characterize suitable amphibian habitat.



2.2.3.2 Rare and Endangered Wildlife Species

Table 5: Rare and endangered wildlife potentially occurring in the study area.

Common Name <i>Scientific name</i>	Status		Habitat Requirements	Potential Occurrence
	BC List	SARA		
Northern Goshawk <i>Accipiter gentilis laingi</i>	Red	Threatened	Coastal forests of BC, especially central and northern coastal islands. Closest known occurrence is the Gulf Islands	Unlikely-not no coastal habitat
Great blue heron <i>Ardea herodias fannini</i>	Blue	Special Concern	Aquatic areas <0.5 m deep, fish bearing streams and rivers, undisturbed nesting in tall trees. Closest known occurrence is Lost Lake.	Unlikely-watercourse on site unlikely to be fish bearing.
Vivid Dancer <i>Argia vivida</i>	Blue		Spring fed stream or pools, usually associated with hot springs, in the montane region	Unlikely- no hot springs on site.
Green heron <i>Butorides virescens</i>	Blue	-	Aquatic areas, especially slow moving, shallow waters with good riparian cover. Known to occur in the Whistler area.*	Unlikely-watercourse on site unlikely to be fish bearing.
Marbled murrelet <i>Brachyramphus marmoratus</i>	Blue	Threatened	Coastal areas within 2 km of shore, occasionally on rivers and lakes within 20 km of the ocean in old growth forest. Closest known occurrence is Toba River.	Unlikely- not on coast or in old growth forest
Coastal Tailed Frog <i>Ascaphus truei</i>	Yellow	Special Concern	Clear, cold swift-moving mountain streams with coarse substrates in older forest sites.	Unlikely-no suitable amphibian habitat on site.
Olive-sided flycatcher <i>Contopus cooperi</i>	Blue	Threatened	Mixed coniferous-deciduous forest with old growth snags along forest edges. Known to occur in the Whistler area.*	Unlikely-coniferous forest on site.
Northern rubber boa <i>Charina bottae</i>	Yellow	Special Concern	Woodlands, forest clearings, patchy chaparral, meadows, and grassy savannas, generally not far from water; also riparian zones in arid canyons and sagebrush in some areas.	Unlikely- no clearings or grassy savannas.
Common nighthawk <i>Chordeiles minor</i>	Yellow	Threatened	Mountains and plains in open coniferous forest, savanna, grassland and towns.	Unlikely- not in open coniferous forest.
Evening Grosbeak <i>Coccothraustes vespertinus</i>	Yellow		Coniferous (primarily spruce and fir) and mixed coniferous- deciduous woodland, second growth, and occasionally parks; in migration and winter in a variety of forest and woodland habitats, and around human habitation.	Possible -coniferous forest on site.
Black Swift <i>Cypseloides niger</i>	Blue		Nests behind or next to waterfalls and wet cliffs, on sea cliffs and in sea caves.	Unlikely- site not near ocean



Common Name <i>Scientific name</i>	Status		Habitat Requirements	Potential Occurrence
	BC List	SARA		
Properius duskywing <i>Erynnis properius</i>	Red	-	Open Garry oak or mixed woodlands with associated food plants. Closest known occurrences are the Gulf Islands.	Unlikely- no Gary Oak on site.
Peregrine falcon <i>Falco peregrinus anatum</i>	Red	Special Concern	Cliff edges near water, interior rivers and wetlands. Known to occur in the Whistler area.*	Unlikely- no cliff edges near water on site.
Wolverine <i>Gulo gulo luscus</i>	Blue	-	A range of habitat types from valley bottoms to alpine meadows, strongly associated with the presence of large ungulate prey.	Unlikely- no ungulates on site.
Barn swallow <i>Hirundo rustica</i>	Blue	-	Open areas, fields, ponds with vertical nesting habitat, especially buildings. Known to occur in the Whistler area.*	Possible -site in a closed forest canopy.
Pacific Water Shrew <i>Sorex bendirii</i>	Red	Endangered	Semi-aquatic; moist riparian habitats of streams and marshes below 850 m in coniferous/mixed forests usually within 200 m of water. ⁴	Unlikely-Riparian habitat near site, however, closest occurrence in Squamish and not listed by Whistler Biodiversity Project.
Mountain goat <i>Oreamnos americanus</i>	Blue	-	Alpine and subalpine habitat; steep grassy talus slopes, grassy ledges of cliffs, or alpine meadows. Usually at timberline or above. May seek shelter and food in stands of spruce or hemlock in winter.	Unlikely-not above timberline
Sinuuous Snaketail <i>Ophiogomphus occidentis</i>	Blue	-	Sunny stream banks and sandy lakeshore beaches at low elevations	Unlikely-stream banks vegetated with riparian cover
Fisher <i>Martes pennanti</i>	Blue	-	Low to mid-elevation large tracts (>100 ha) dense forests <2500 m in elevation.	Unlikely-subject site under 100 ha.
Sharp-tailed Snake <i>Contia tenuis</i>	Red	Endangered	In British Columbia, the Sharp-tailed Snake occurs in low-elevation woodland habitats dominated by Douglas-fir, arbutus and/or Garry oak. The snakes are often found in small openings on talus rocky outcrops and on warm hillsides	Unlikely-no talus rocky slopes.
Keen's myotis <i>Myotis keenii</i>	Blue	-	Associated with coastal forest habitat. Mostly, but not restricted to, old growth.	Unlikely-no coastal or old growth habitat.



Common Name <i>Scientific name</i>	Status		Habitat Requirements	Potential Occurrence
	BC List	SARA		
Band-tailed pigeon <i>Patagioenas fasciata</i>	Blue	Special Concern	Coniferous and mixed deciduous lowland forests. Known to occur in the Whistler area.*	Possible- coniferous woodland on subject land.
Northern spotted owl <i>Strix occidentalis</i>	Red	Endangered	Old growth, dense, multi-layer canopy coniferous forest with a range of snags and nesting hollows available.	Possible- in Polygon 2 and 3, coniferous woodland on site.
Western toad <i>Anaxyrus boreas</i>	Yellow	Special Concern	Various upland habitats around ponds, lakes, reservoirs, and slow-moving rivers and streams.	Unlikely- no suitable amphibian habitat on site. .
Northern Red-legged Frog <i>Rana aurora</i>	Blue	Special Concern	Wetlands, pools, and riparian areas of upland forests	Unlikely- no pools or wetlands on site.
Grizzly bear <i>Ursus arctos</i>	Blue		Non-forested or partially forested sites with a wide range of foraging opportunities and choice of habitats. Closest known occurrence is the Sproatt/Callaghan valley area.	Unlikely- site fragmented by roads and development.

Source: BC Ecosystems Explorer, Ministry of Environment. *Whistler Naturalists Society, 2005.

2.3 Aquatic Environment

A review of existing aquatic biophysical information for water-bodies on and adjacent to the project area was conducted. A Riparian Area Assessment was conducted by Cascade personnel on Bear Creek on November 10, 2010.

Bear Creek was found to have a step pool morphology, with a mean gradient of 40% and a mean bankfull width of 2.7 meters. The substrate consists mainly of cobble and gravel, with some fines. Breakdown was recorded as 50% cobble, 40% gravel and 10% fines.

Bear Creek flows into Write-off Creek via a steep waterfall; Write-off Creek is a fish-bearing watercourse connected to Alpha Lake (900-097600-12900-53800). Write-off Creek is accessible to Alpha Lake fish populations from Cheakamus Way to Alpha Lake. According to habitat wizard BC, Alpha Lake supports populations of rainbow trout (*Oncorhynchus mykiss*), kokanee salmon (*Oncorhynchus nerka*), and an unidentifiable trout (BC MOE, 2017b).

The confluence of Bear Creek to Write-off Creek includes a steep waterfall, a potential barrier to fish passage. A 2.5-meter rock fall is located in the creek immediately upstream off the Baxter reservoir access road. Two culverts exist within the subject, and also present potential barriers to the movement of fish. Due to the steep grade of the stream and the natural and anthropogenic barriers to movement, it is unlikely that Bear Creek would support any fish species within the subject site. However it does provide critical resources and nutrient to downstream fish habitat within Write-off Creek.

2.4 Socio-Economic Conditions

2.4.1 Cultural and Heritage Resources



The site is within the traditional territories of the Squamish and Lil'wat Nations, as mapped within their respective Land Use Plans. They have historical ties to the land that include utilization of the natural resources of the Whistler Valley area (Squamish Nation, 2001) (St'át'imc First Nation, 2004).

An archeological investigation was not conducted as part of this study; however an archaeological data request was made to the Archaeology Branch of the Ministry of Forests, Lands and Natural Resource Operations on December 20, 2017. According to Provincial records there are no known archaeological sites recorded on the subject property.

2.4.2 Other Undertakings in the Area

2.4.2.1 Timber Harvesting

Using iMap BC no active or retired forest authorizations, timber licenses and licence to cut authorizations are located on the subject property (iMap BC 2017).

2.4.2.2 Mining

Using iMap BC one active Placer No Registration Reserve encompasses the subject lands for the Whistler Resort: Interest ID 329124 (iMap BC 2017). A reserve may be established for a number of reasons as listed in section 22(2) of the Mineral Tenure Act and section 21(2) of the Coal Act, but the most common are to either prohibit registration of a claim or to restrict the rights acquired. A "No Registration" reserve prohibits the acquisition of a mineral and/or placer claim (BC Gov 2017).

No current or historical coal, mineral and placer claims exist on the subject lands (iMap BC 2017).

2.4.2.3 Recreation and Tourism

No recreational trails exist within the subject lands. The Bayshores Ski Out Trail runs parallel to the outside of the southeastern property boundary. Big Timber mountain bike trail is located outside of the northeastern section of the subject property boundary.

2.4.2.4 Anthropogenic Features

Upon site investigation, three single family lot homes are located on site within the south western section of the property boundary with associated access trails and roads. A large cleared gravel car allotment is located in the northwestern section of the property. A gravel access road intersects the property north to south in the centre of the property servicing the RMOW Baxter reservoir. A fire service road intersects the property in the east in a north south direction leading from heritage peaks trail roadway.

2.4.2.5 Adjacent Land Use

The subject site is bounded by the Gondola Way residential developments to the north, Big Timber Crescent residential developments to the east, Heritage Peaks Trail residential developments to the south, RMOW Baxter reservoir to the southwest and Bayshores residential developments on Brandywine Way to the west.

2.5 Valued Ecosystem Components

2.5.1 Wildlife Trees

Wildlife trees include significant standing snags, veteran trees, and trees with broken tops. These trees are important as perching areas for raptors, and provide foraging and nesting sites for woodpeckers, small owls and other cavity nesters. The exposed rocky ridges of polygon 3 DFsw5mc are intermittently covered with veteran trees. Occasional large snags with good cavity-nesting potential are scattered throughout, and feeding signs of red-breasted sapsucker and pileated woodpecker were observed in these areas.



2.5.2 Rocky Outcrops

The dry and exposed rocky outcrops provide habitat for unique plant species such as lodgepole pine, parsley fern, Saskatoon, mosses, and lichens. Because of inaccessibility to logging operators, large veteran Douglas-fir are still present, providing potential raptor perch sites. These areas are also likely used by coyote and bobcat as sunning or vantage points.

2.5.3 Wildlife Movement Corridors

Wildlife tend to use routes with particular features when moving across the landscape to forage for food, disperse, find mates, or locate breeding sites. These features can include such things as cover, shade, vegetation, water or surface characteristics.

Scale is also a significant factor in determining the suitability of a landscape; larger animals with home ranges covering hundreds of kilometers (e.g. grizzly bear) have far different movement corridor requirements than some amphibians (e.g. Western toad) whose corridor requirements are measured in meters.

Creeks, riparian habitats, and rocky ridges are natural movement corridors for wildlife at a smaller scale. These areas connect habitats within the subject property to adjacent forested areas. As the subject site is surrounded by residential development and roadways it is unlikely to provide wildlife movement at larger scale. Roads are generally associated with lower animal densities and species diversity than areas free from road influence (Trombulak & Frissell, 1999).

2.5.4 RMOW Valued Habitats

The RMOW WhistlerMap tool identifies Bear Creek within the subject Lands and its associated 30 m riparian buffer. The RMOW WhistlerMap identifies the subject land as void of vegetation in the west section and a mix of low elevation second growth forest with a majority of pole/sapling and young forest in the east of the property (RMOW 2017).



3 ENVIRONMENTAL CONSTRAINTS

3.1 RMOW Environmental Sensitivity & Development Constraints (Protection of the Natural Environment)

Protection of Wetland and Riparian Ecosystems

The subject lands are located in the Whistler OCP development permit area for protection of wetland and riparian ecosystems shown on schedule J (RMOW 1994).

Bear Creek and its associated Streamside Protection Enhancement Area (SPEA) are inherently protected by the *Riparian Areas Regulation* (RAR) of the BC *Fish Protection Act* as it is connected by surface water to downstream fish bearing watercourses. This will allow protection of riparian vegetation, stream bank stability, protection of fish habitat and control of erosion and sediment release.

An RAA conducted by Cascade in 2010 calculated a SPEA buffer width of 10 m for the tributary on site. No disturbance of vegetation or soil within the SPEA is permitted under the RAR. The RAR report was filed with the province on December 12, 2010 (Assessment # 1851). The updated subdivision lot plans and RAR assessment will be filed with the province accompanying this IER report. Any future development on the lots will need to be situated outside of the SPEA and plans sent as an updated RAR assessment before a development permit is acquired.

3.2 Physical Environment

3.2.1 Climate

Climate in the study area presents no obvious constraints or concerns with respect to land transfer or development.

3.2.2 Geology

Bedrock at or near the surface represents a constraint to development in that it is expensive to excavate and is generally impermeable. Consequently, the distribution of bedrock will influence the location of any road, residential, and infrastructure development in the study area. Building within the development portion of the project area should proceed only after the appropriate geotechnical investigations.

3.2.3 Geomorphology

Steeply sloping, bedrock-controlled topography imposes development constraints associated with excavation, residential layout, and access routes.

3.2.4 Hydrology

Surface and near-surface runoff could be significant in the study area given the climate, topography, and generally impervious nature of the bedrock underlying shallow soils and litter. Although Bear creek appears to be confined within bedrock controlled channel over portions of its length, it flows through a modified forest landscape and is restricted by culverts in at least one location. The flooding potential of the tributary has not been assessed. Culverts require maintenance to ensure unobstructed flow, especially during and after flood events.

3.3 Terrestrial Environment

3.3.1 Soils

Development constraints associated with the soil types found in the project area relate to the shallow depth to bedrock, which makes excavation for residential and infrastructure development more difficult and costly. This may also be an attribute, as removal of deep layers of material unsuitable for building will be unlikely.

3.3.2 Vegetation

The vegetation on the subject property does not present any obvious constraints or concerns to rezoning or development. Polygon 1DFsy5sc and polygon 5 UR of the study area is planned for subdivision for residential lots and potential development. Young forest and disturbed features found within both polygons do not provide constraints to development.

Polygon 2 DFsy6mc, 3 DFsw5mc and 4 DFks4sc will be dedicated to park land and forest stands will be preserved. Polygon 2 DFsy6mc was found to contain mature forest and Polygon 3 DFsw5mc was found to contain large veteran trees, both high wildlife habitats will not be affected by development of the subdivided lot.

3.3.3 Rare and Endangered Plant Species and Ecological Communities

There are no known occurrences of any plant species at risk in the subject lands, nor were any observed during the site investigations.

Ecological Communities at Risk

Polygon 1 DFsy5sc which is planned for residential subdivision and potential development does consist of one blue listed ecological community. However with regards to ecological communities, large tracts of undisturbed plant communities are considered ecologically more important than disturbed/ fragmented second growth communities. As the area was selectively harvested up to 35 years ago and is fragmented by adjacent residential development the ecological community does not pose a constraint to subdivision and development.

Polygon 2 DFsy6mc, Polygon 3 DFsw5mc and Polygon 4 DFks4sc also contain blue listed ecological communities and are planned for dedication to park land preserving the mature occurrences on the subject site.

3.3.4 Wildlife and Wildlife Habitat Constraints

All trees on the subject lands provide potential nesting sites for a range of bird species. The BC *Wildlife Act* states:

A person commits an offence if the person, except as provided by regulation, possesses, takes, injures, molests or destroys

- (a) *A bird or its egg,*
- (b) *The nest of an eagle, peregrine falcon, gyrfalcon, osprey, heron or burrowing owl or,*
- (c) *The nest of a bird not referred to in paragraph (b) when the nest is occupied by a bird or its egg.*

Development may be constrained by the *Wildlife Act* if tree removal occurs during the nesting bird season of April 1 to September 1, or if any raptor nests are found on the site. Should tree removal occur within the nesting bird season, a songbird nesting survey should be conducted in the proposed clearing area to avoid contravention of the *Wildlife Act*.

3.3.4.1 Rare and Endangered Animal Species Constraints

The following listed species are identified as potentially occurring on the subject lands.

- Evening grosbeak
- Band-tailed pigeon
- Barn Swallow
- Northern Spotted Owl

Evening Grosbeak

Evening Grosbeak (yellow) is a large robust finch which travels and forages in flocks throughout much of the year. Its habitat is Coniferous (primarily spruce and fir) and mixed coniferous-

deciduous woodland, second growth, occasionally parks and around human habitation (BC MOE 2017).

Suitable habitat exists within the subject lands and should forest clearing occur for future development in the residential subdivision within the breeding season, April 1 to July 31, a bird nest survey must be conducted.

Band-tailed Pigeon

The band-tailed pigeon (Blue; 1-SC) breeds in western regions of the Americas from coastal BC to northern Argentina. Those that breed in south coastal BC often winter in California; however, a few remain in BC for the winter. In BC, these pigeons breed in scattered monogamous pairs from near sea level to 760 m elevation in edges and openings in mature coniferous, mixed and deciduous forest, yards, city parks, wooded groves, open bushland, golf courses and orchards. In BC, they aggregate in favored feeding areas that offer flowering and berry-producing trees and shrubs, from spring through fall. They are also noticeable in BC when relatively large flocks migrate in the fall. Population declines were historically due to overhunting; however, population surveys suggest stabilization of the population between 1998 and 2008. Forestry may negatively affect their habitat creating dense second-growth forest with few berry-producing shrubs. (COSEWIC, 2008)

Suitable habitat exists within the subject lands and should forest clearing occur for potential future development of the residential subdivision within the breeding season, April 1 to July 31, a bird nest survey must be conducted. Particular attention should be focused along forest edges and openings within the study area. Any active nests will be protected with a species-specific buffer until vacated.

Barn Swallow

The barn swallow (Blue) habitat requires open areas frequently near water and nests in barns or other buildings, under bridges, in caves or cliff crevices, usually on vertical surface close to the ceiling. It flies over open land and water foraging on insects (BC MOE 2017a).

Potential Habitat exists on site in the open areas around the single family developments. Should forest clearing occur for potential future development of the residential subdivision within the breeding season, April 1 to July 31, a bird nest survey must be conducted.

Northern Spotted Owl

Throughout its range, the Spotted Owl is strongly associated with mature and old, late successional coniferous and mixed-coniferous forests. These forests are typically characterized by an uneven-aged cohort of trees; a multi-layered, relatively closed canopy; numerous large trees with broken tops, deformed limbs, and large cavities; and numerous large snags and accumulations of logs and downed woody debris (Chutter et al. 2004).

Spotted Owls do not build their own nests, but depend on naturally occurring or previously constructed nest sites that typically possess nest platforms that are at least 50 cm in diameter. Nest sites include broken treetops, tree cavities, abandoned raptor nests, mistletoe brooms, and debris accumulations captured in clusters of branches (Chutter et al. 2004).

Potential habitat for Northern Spotted Owl could occur on the mature forest polygons within Polygon 2 and Polygon 3 which displayed snags and wildlife trees. As both these polygons are planned to be dedicated to park land the habitat will not be affected. Polygon 1 and Polygon 5 do not possess the correct forest habitat for the spotted owl such as snags and wildlife trees. However, should forest clearing occur for potential future development of the residential subdivision within the breeding season, April 1 to July 31, a nest search should be conducted prior to clearing.

3.4 Aquatic Environment

Bear Creek will be protected by a 10 m SPEA buffer under the RAR, see section 3.1 for additional details.

3.5 Socio-Economic Constraints

3.5.1 Cultural and Heritage Resources

An archaeological data request was made to the Archaeology Branch of the Ministry of Forests, Lands and Natural Resource Operations on December 19, 2017. The results found no known archeological sites to exist within the subject lands, however, if an archaeological site is encountered during any future development, activities must be halted and the appropriate authorities consulted as archaeological sites are protected under the *Heritage Conservation Act*.

3.5.2 Other Undertakings in the Area

3.5.2.1 Timber Harvesting

Timber harvesting presents no obvious constraints or concerns for the rezoning or future development on the subject lands.

3.5.2.2 Mining

Mining presents no obvious constraints or concerns for the rezoning or future development of the subject lands.

3.5.2.3 Recreation and Tourism

Recreational and tourism values will not be affected by the rezoning and any future development within the subject Lands.

3.5.2.4 Anthropogenic Features

Anthropogenic features do not pose any constraints or concerns for rezoning or development on the subject lands. The single family homes on the site may remain or be redeveloped on the land at the owners discretion. The fire roads and access roads remain within the rezoning site plans and are not affected by rezoning or development.

3.5.2.5 Adjacent Land Use

Adjacent land use does restrict rezoning or future development within the subject lands.

3.6 Valued Ecosystem Components

3.6.1 Wildlife Trees

The veteran trees intermittently identified throughout the northeastern portion of the subject will be dedicated to park land and will be preserved and not affected by development. As subdivision and rezoning of the residential lots is to occur within Polygon 1 DFsy5mc, no wildlife trees will cause a constraint to rezoning or development as the young forest stage has not allowed significant wildlife trees to form in this area.

3.6.2 Wildlife Movement Corridors

Rezoning and any future development do not pose any concerns to wildlife movement corridors. The riparian area of Bear Creek will be preserved by its associated SPEA to and allow for small scale movement corridors.



3.6.3 RMOW Valued Habitat

As discussed in section 3.1 the identified riparian buffer identified on the subject lands by RMOW mapping will be preserved with a calculated 10 m wide SPEA from the high water mark of the tributary.



4 RECOMMENDATIONS AND CONCLUSIONS

This report details the baseline conditions found on site and investigates environmental constraints to development at 2501 Gondola Way. Based on the information reviewed and the conditions observed, the following recommendations are made to minimize potential negative environmental impacts on the site arising from future development:

- The requirement to avoid harm to raptors' nests or any nesting birds during the nesting bird season of April 1 to September 1.
- Prior to any land clearing, a survey of the trees to be cleared should be conducted to identify the location of any raptor nests and active bird nests including the rare and endangered band-tailed pigeon, evening grosbeak, northern spotted owl and barn swallow potentially occurring on site. Raptor nests and any active birds' nests found during clearing must be adequately protected by a forested buffer as per Section 34 of the *Wildlife Act*.
- Bear Creek and its associated SPEA is protected by the RAA and must not be impacted or encroached by development. An updated RAR assessment must be filed with the province if and when housing development plans have been finalized for the 5 residential lot subdivision to show location of the development outside of the SPEA.
- Site preparation and construction works should be monitored by a QEP or environmental monitor.

The following plans are recommended:

- A snow management strategy should be implemented to ensure that snow originating from the site is not directed and / or deposited into forest, riparian or aquatic habitats.
- Future development and construction on the property should follow guidelines and recommendations outlined in: *Develop with care: Environmental Guidelines for Urban and Rural Land Development in British Columbia* (MOE, 2014) and *Land Development Guidelines for the Protection of Aquatic Habitat* (DFO, 1993). This includes best management recommendations for storm water, pollution prevention and wildlife and ecosystem management.
- Mitigation measures outlined in the RAR assessment filed with the Ministry of Forests, Lands and Natural Resource Operations must be followed to ensure protection of the SPEAs and compliance with the *Riparian Areas Regulation*.
 - Encroachment in the SPEA can be prevented by placement of construction fence on the SPEA boundary.
 - Sediment fencing should be installed where necessary (as determined by the Environmental Monitor) to prevent discharge of sediment laden water into the SPEA during development.
- A Qualified Environmental Professional must be retained to monitor works. The monitoring schedule for development will include a site visit at the start of the construction phase of the project to ensure that staking and fencing of the SPEA boundary is complete. Additional site visits are required to be made by the QEP periodically throughout construction to ensure that the measures to protect the SPEA are implemented and maintained. A follow-up visit will be made at the completion of the construction so that the QEP can prepare a report to submit to the BC MOE RAR website database.

5 REFERENCES

- BC Ministry of Environment. BC Conservation Data Centre: BC Species and Ecosystems Explorer. <http://a100.gov.bc.ca/pub/eswp/>. Website accessed December 18, 2017.
- BC Ministry of Environment (BC MOE). 2014. Develop with care: Environmental Guidelines for Urban and Rural Land Development in British Columbia . Website <http://www.env.gov.bc.ca/wld/documents/bmp/devwithcare/DWC-Cover.pdf> Accessed on: December 18, 2017.
- BC Ministry of Environment (BC MOE). 2017b. Habitat Wizard. Website: <http://maps.gov.bc.ca/ess/sv/habwiz/> Accessed on: December 18, 2017.
- Campbell, R. Wayne, Neil K. Dawe, Ian McTaggart-Cowan, John M. Cooper, Gary W. Kaiser, Michael C.E. McNall. 1990-97. The Birds of British Columbia, Volumes I,II and III. Royal British Columbia Museum, Victoria, B.C.
- Cascade Environmental Resource Group Ltd. 2000. Intial Environmental Review, Bunbury Lands, D.L. 2291, Whistler, BC, prepared for Alex Bunbury, Whistler, BC.
- Chutter, M.J., Blackburn, I., Bonin, D., Buchanan, J., Costanzo, B., Cunnington, D., Harestad, A., Hayes, T., Heppner, D., Kiss, L., Surgenor, J., Wall, W., Waterhouse, L., and Williams, L. 2004. Recovery Strategy for the Northern Spotted Owl (*Strix occidentalis caurina*) in British Columbia. Prepared for the BC Ministry of Environment, Victoria, BC. 74 pp.
- COSEWIC. 2008. COSEWIC Assessment and Status Report on the Band-tailed Pigeon (*Patagioenas fasciata*) in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vii. + 42 pp.
- Department of Fisheries and Oceans. 1993. Development Guidelines for the Protection of Aquatic Habitat, <http://www.dfo-mpo.gc.ca/Library/165353.pdf>, accessed on December 18, 2017.
- Demarchi, D. A. 1996. An Introduction to the Ecoregions of British Columbia. Draft document from the Wildlife Branch, BC Ministry of Environment, Lands, and Parks.
- Department of Energy, Mines, and Resources. 1992. Whistler 92J/2 (1:50,000 scale NTS Map). Canada Centre for Mapping.
- Environment Canada. Climate Normals 1981 – 2010. Website: http://climate.weather.gc.ca/climate_normals/index_e.html. Accessed December 18, 2017.
- Government of BC. [Getting Started with Reserves - Province of British Columbia](#), Website Accessed on December 18, 2017.
- Green, R.N. and K. Klinka. 1994. A Field Guide to Site Identification and Interpretation for the Vancouver Forest Region. Land Management Handbook No .28. Ministry of Forests. Victoria, B.C.
- iMapBC. <http://www2.gov.bc.ca/gov/content/governments/about-the-bc-government/databc/geographic-data-and-services/imapbc>. Website accessed December 18, 2017.
- Luttmerding, H.A. 1971. Soil Survey of the Alta Lake Area. Report and map from the Soils Division, BC Department of Agriculture.
- Luttmerding, H.A., Demarchi, D.A., Lea, E.C., Meidinger, D.V., Vold, T. 1990. Describing Ecosystems in the Field. MOE Manual 11, Second Edition, Victoria, BC.



- Meidinger, D. and J. Pojar. 1991. Ecosystems of British Columbia. BC Ministry of Forests. Victoria, B.C.
- Monger, J.W.H. and J.M. Journeay. 1994. Guide to geology and tectonic evolution of the Southern Coast Mountains. Geological Survey of Canada. OpenFile, 2490, Vancouver, Canada
- Schiefer, E., M.A. Hassan, B. Menounos, C.P., Pelpola, and O. Slaymaker 2010. Interdecadal patterns of total sediment yield from a montane catchment, southern Coast Mountains, British Columbia, Canada. *Geomorphology*. 1881, 207-212
- Resort Municipality of Whistler. 1994. Official Community Plan.
- Resort Municipality of Whistler. WhistlerMap. <http://maps.whistler.ca/WhistlerMap/Default.aspx>. Website accessed December 18, 2017.
- Ricker, N., V. Troup and M. Gotz. 1996. Checklist of Whistler Birds. Published by Birdbrain Photography.
- Squamish Nation, Land and Resources Committee, 2001. Xay Temixw Land Use Plan. Website: www.squamish.net/PDF/archives/land/XayFirstDraft.pdf
- St'át'imc Preliminary Draft Land Use Plan 2004, Lillooet, BC. <http://www.statimc.net/report/part1.pdf>
- Trombulak, S., and Frissell, C. 2000, Review of Ecological Effects of Roads on Terrestrial and Aquatic Communities, *Conservation Biology*, vol. 14, no. 1