APPENDIX E

Ecological Sensitivity Analysis based on Vegetation, Habitat and Watercourse Values (VHW)

Goals of the Analysis

The goals of conducting an ecological sensitivity analysis for Burnaby Mountain Conservation Area are:

- to identify the *relative* importance and sensitivity of areas on Burnaby Mountain;
- to identify and preserve areas deemed to be more sensitive; and
- to assist in making decisions regarding land use on the mountain.

Standard Environmental Components

Standard environmental components normally considered in environmental sensitivity analyses are:

Geology:	landforms, soils, slope, erosion susceptibility
Hydrology:	presence of streams, drainage, quality of aquatic habitat
Vegetation:	rare plant species or associations, successional stage
Wildlife:	quality, diversity, and potential use of habitat; connectivity and movement corridors
Social:	cultural or historic resources, public safety, recreation or scenic values.

For the purpose of this analysis, only vegetation, habitat and watercourses (VHW) were considered in the ranking. A decision was made to exclude human use as a component in order to assess relative sensitivity independent of existing conservation area uses or disturbances. A separate ranking for "degree of disturbance" was given to each polygon for comparison, although this was not factored into the overall VHW ranking. Cultural and historical resources were also excluded as these are limited on the mountain to areas which have already been developed.

Terrain sensitivity is an important component from an engineering and human use perspective. Terrain sensitivity was assessed but was not factored into the overall ranking for two reasons. First, it was felt that including terrain sensitivity in the overall ranking would skew the results of the analysis given the extreme topography in some sub-areas of the conservation area. Second, available data allowed for only a rough assessment of potential erodability based on slope and soil characteristics. A thorough slope stability assessment should be done for any major engineering works. A separate ranking was used to show relative terrain sensitivity that can be cross referenced with the VHW map for design and planning purposes.

VHW Rankings

Using the polygons previously defined for vegetation communities, VHS rankings were assigned. All polygons were given a ranking for each of the three components considered (vegetation, habitat and watercourses). All rankings were based on a five-point scale where Class 1 was considered the most sensitive and Class 5 the least sensitive. An overall VHW ranking was determined by averaging the individual rankings for vegetation, habitat and watercourses. All three categories were weighted equally.

A. Primary Categories

Watercourses

Classes for watercourses were based on the presence and quality of streams and aquatic habitat. For example, polygons which contained sections of Stoney Creek, a known fish-bearing stream, were ranked Class 1 under this category.

Class	*Description*
1	Presence of known fish-bearing streams with high potential to sustain fish.
2	Presence of known fish-bearing streams with low potential to sustain fish (e.g., due to factors such as slope, impediments, etc.). Likely contains fish in lower reaches outside of the conservation area.
3	Presence of watercourses which do not currently sustain fish, but which have a moderate to high potential to support fish due to their habitats.
4	Presence of non-fish bearing streams with little or no potential to sustain fish.
5	No streams are found within the polygon.

Vegetation Communities

Classes for vegetation were based on three factors: relative availability of the plant community on the mountain, potential for rare plants, and occurrence of conifer regeneration. The regeneration of conifers was considered important from the perspective of forest diversity over time. For example, a polygon that contained a common plant association (e.g., alder-maple), had a low probability for rare plants, but contained conifers in the understorey would be considered Class 4. If conifer regeneration was not occurring, the polygon would be ranked Class 5.

Class	Only example of community	Community is relatively rare	Community is common	Potential for rare plants*	Conifer Regeneration
1	✓			L, M or H	
2		✓		H	
or		✓		L, M	✓
or			✓	H	✓
3		✓		L, M, or H	
or			✓	H	
4			✓	L or M	✓
5			✓	L	

L=low; M=moderate; H=high

Habitat

Habitat sensitivity was based on previous assessments of the suitability of habitats for each of three indicator species: deer, bats, and woodpeckers. For example, if habitat suitability for a polygon was high for deer, moderate for bats and moderate for woodpeckers, the overall habitat sensitivity rating would be HMM or Class 2.

Class	*Description*
1	HHH **or** HHM
2	HHL **or** HMM
3	MMM **or** LMH **or** HLL
4	MML
5	LLM **or** LLL

* L=low; M=moderate; H=high

B. Secondary Categories

Terrain Sensitivity

Terrain sensitivity was determined by considering slope, soil conditions, and presence of watercourses. For example, if a polygon contained a slope greater than 30% it was automatically ranked Class 1 - unsuitable for future development or recreational use.

Class	*Slope*	*Description*
1	> 30%	Terrain is unsuitable for recreational use and/or facility development due to steep slopes.
2	20-30%	Terrain is potentially unstable. Soils are erodable and/or there is a high volume of streams within the polygon.
3	< 20%	Terrain is mostly stable, but there may be potential for instability during periods of high runoff due to the number and distribution of streams.
4	< 20%	Terrain is gentle and there is a low probability of slope instability. The polygon is minimally developed at this time.
5	< 20%	Terrain is currently developed and felt to be highly stable for further use and/or development.

Degree of Disturbance

Degree of disturbance was determined by considering the amount of human disturbance within or adjacent to the polygon. For example, a polygon that contained a few low use trails but no other signs of disturbance, was ranked Class 4. These rankings do not reflect 'sensitivity' but rather degree of disturbance. It is possible to have a polygon which is highly sensitive and highly disturbed, or conversely, a polygon which is highly disturbed but not sensitive ecologically.

Class	*Description*
1	Presence of buildings, roads, pavement or large clearings
2	Presence of utility lines, small structures, small clearings
3	Presence of high use trails, or, many low use trails
4	Presence of some low to moderately used trails
5	No trails or developments present