

Photo 1: Arbutus Park circa 1900



Photo 3: Aerial photo circa 1926/32



Photo 2: Approximation of photo 1 re-shot June 2011



Photo 4: Approximation of photo 1 re-shot from bridge, June 2011

# Arbutus Park:

A restoration prescription for an eroding urban shoreline

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An ER390 project

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July 28th, 2011

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Photo 5: An arbutus tree in Arbutus park lodging under extreme erosion

<b>Table of Contents:</b>	<b>Page</b>
Abstract	1
Introduction	1
Location	2
History	2
Methods	5
Equipment	7
Observations	8
Conclusions	12
Recommendations	14
Literature Cited	25

Appendices:

Appendix A: Site Plan	26
Appendix B: Plant List	27

List of Tables:

Table 1: Baseline inventory of understory vegetation	9
Table 2: Baseline inventory of shoreline trees	13

List of Figures:

Figure 1: Map of The Gorge Waterway in 1860	5
Figure 2: Map of The Gorge Waterway in 1885	5
Figure 3: Arbutus Park, present location	6
Figure 4: Historical locations of the McBride and Barnsley homes	6

List of Photos:

Photo 1: Arbutus Park circa 1900	1
Photo 2: Approximation of photo 1 re-shot June 2011	1
Photo 3: Aerial photo circa 1926/32, 92b (226)	1

Photo 4: Approximation of photo 1 re-shot from bridge, June 2011	1
Photo 5: An arbutus tree in Arbutus park lodging under extreme erosion	1
Photo 6: Arbutus tree fallen over into the waterway	6
Photo 7: Exposed soil layers on eroded bank of Arbutus Park	10
Photo 8: Path on Southern side of Arbutus Park leading to a fallen, but living, arbutus tree	22
Photo 9: Heron fishing on the mud flats beside Arbutus Park	22
Photo 10: Mud flats between Arbutus Park and the Selkirk trestle bridge	22
Photo 11: View of Arbutus Park from the Selkirk trestle bridge	22
Photo 12: Stump of the 120 year old arbutus tree cut by the City of Victoria Arbourist Crew	23

## **Abstract:**

Arbutus Park, found in Victoria, BC, borders the Gorge waterway at the mouth of Cecelia Creek. The site is located in the Coastal Douglas Fir Moist Maritime biogeoclimatic zone. The area has seen massive ecological change since European colonization. A baseline inventory has found that the ecological change is diminishing genetic diversity of the native plant populations found within the park. It is suffering from erosion of its banks. The planting of vegetation on the site is a good way to increase the biodiversity of the site and control the erosion of the park's banks. Current management practices of the park have not allowed for a younger generation of trees to become established behind these mature specimens. The City of Victoria Municipality would like to use the park to celebrate Tree Appreciation Day. Certain infrastructure must be put in place to protect the newly planted areas. Restoration efforts should extend into the estuary of Cecelia Creek.

## **Introduction:**

The Gorge Waterway of Victoria BC has been a site of extreme change over the past one hundred years. Industrialization, increased traffic, and urbanization have left little room for intact, functioning native ecosystems. Extreme physical change has come over the landscape since European colonization. This has left wildlife habitat fragmented and eroded.

One of the last natural areas to remain in this area is the shoreline of Arbutus Park. Yet in this location the native vegetation is disappearing too. Erosion is a great concern, as the remaining natural vegetation is precariously perched at the edge the waters of the Gorge waterway. Some of the last of the mature Arbutus trees in the area, which are estimated to be 120 years old [Hook, personal comment], are falling over into the water.

The author of this report was asked to present an ecological restoration plan to address this degradation in the context that it may be a part of the Cecelia Creek Estuary restoration efforts as this estuary borders Arbutus Park. The opportunity later came available for this plan to be included in the Tree Appreciation Day activities of November 6th, 2011. Therefore the deliverables of this project are to include a baseline inventory of the vegetation on the park's banks, as well as a site plan and a planting list.

### **Location:**

Arbutus park lies on the shores of the Gorge waterway, to the Northwest of the Selkirk Water. It encompasses an area of approximately 4500 square meters, with a circumference of 307 meters, of which 136.5m is shoreline [<http://crdatlas.ca>]. The Park's shore runs opposite to the shore of the Galloping Goose Trail before it crosses the Selkirk Trestle Bridge. UTM coordinates are 10N 471773, 5365516 to the park's approximate centre.

### **History:**

The Gorge waterway is the traditional territory of the Straits Salish tribes. Historical records repeatedly refer to the area as being inhabited by the Songhees (Songis) tribe, although this is a general term used for the Lekwegen and Esquimalt bands. Europeans first made an attempt to live on Vancouver Island between 1786 and 1790, but that was far to the North in Nootka Sound in the lands of other tribes. The Europeans began a significant colonization of the Straits Salish lands in 1843 under the initiatives of James Douglas who established Fort Camosun, a Hudson's Bay trading post. Thirteen years later (1856) the area was still only inhabited by 30 full-time settlers [Farstad pg 9]. By 1888 however, a railway existed between Nanaimo and the town of Esquimalt. A local census at that time reported 8,452 Whites, 2,978 Chinese, 101 Indians as inhabitants the area, which was now named Victoria [<http://www.victoriaheritagefoundation.ca/chroncityhistory.html>]. Franz Boas, one of the founding fathers of the discipline of anthropology, describes the population as being more diverse.

“Victoria is a strange place. I have never seen such a mixture of peoples among such a small number of inhabitants. Besides many whites there are a very large number of Chinese, who occupy one section of the city exclusively. There are also many Negroes and Indians.”

Franz Boas, Sept. 19th, 1886

Boas also mentions the Songhis specifically, when he visited Victoria in September 1886, as living “on the other side, a walk of about fifteen minutes across a bridge which crosses a pretty harbour” [Rohner pg 20]. We can conclude that Boas is referring to the 119 Indian Reserve as being across the water to the east of the present

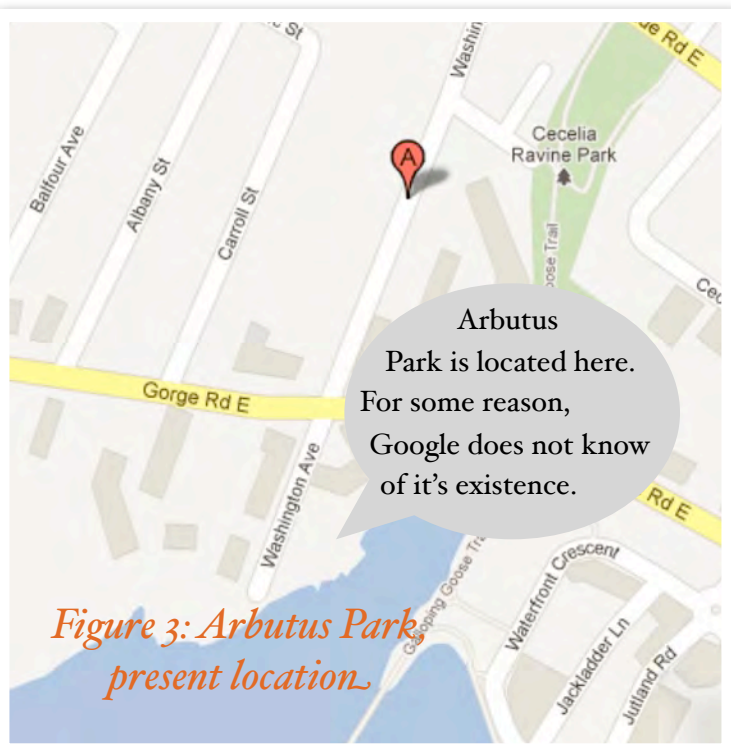


*Figure 2 : Map of area from 1885*

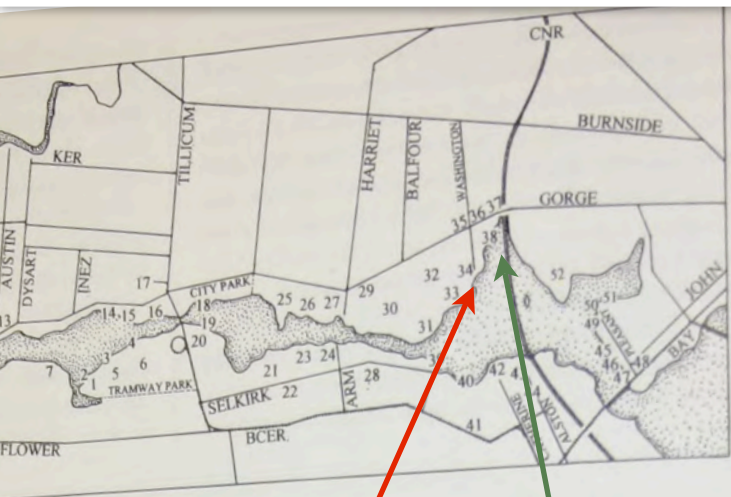
day Arbutus Park (figure 1 and figure 2). He describes the reservation thus, “The houses look very old. They are built of large planks which the Indian had cut, with much labour, from monstrous trees.” [Rohner pg 21] One wishes that Boas was more exact about what qualifies as “monstrous”, but it is understood that very large trees were probably once found in the area of the Selkirk water.

Unfortunately the past tense can also be applied to the Songhees reserve itself, in regards to this location. Minaker informs us that BC Premier Richard McBride moved into a house at the bottom of present day Washington Ave., a roadway which ends at the foot of Arbutus Park. Within the next eight years McBride had overseen “the removal of the Songhees from their original reserve opposite the town to a new site on Admirals Road.” [Minaker, The Gorge pg 23] The changes to the population mirror the changes to the landscape. Tree falling for the logging industry, clearing of lands for European agricultural practices and the fragmentation of habitat by the establishment of roadways are all hallmarks of the European takeover. By 1931 the population was 39,082. By 1996 it was 72,997. [<http://www.victoriaheritagefoundation.ca/chroncityhistory.html>]

Premier MacBride was not the original European settler on the land of present day Arbutus Park however. The land was originally deeded to John Work, an employee of the Hudson’s Bay Company. He owned a large property called Hillside farm which stretched from Mount Tolmie to The Gorge. Cecelia ravine is named after one of his



*Figure 3: Arbutus Park, present location*



from the text.

- 19. Gorge Swimming Baths
- 20. Gorge Hotel, J.B.A.A.
- 21. Collister
- 22. Brown
- 23. Fawcett
- 24. Schwabe
- 25. Wing, VIAA, Auto Camp
- 26. McMicking, Eberts
- 27. Braden
- 28. Dunsmuir
- 29. Ridgway-Wilson
- 30. Snowden, Crow-Baker
- 31. Tiarks, Ellis
- 32. Norris
- 33. Thomson
- 34. Spratt, McBride
- 35. McLennan
- 36. Seabrook
- 37. McLennan
- 38. Barnsley
- 39. Stephen's Boatyard
- 40. Bond's Beach
- 41. Gaudin
- 42. Gray
- 43. Boggs
- 44. Warner, Currie
- 45. O'Reilly
- 46. Tyrwhitt-Drake
- 47. Grant
- 48. Turner
- 49. Pleasant Street Baths
- 50. Moore-Whittington
- 51. Leigh Sawmill
- 52. Cameron Sawmill

*Figure 4: Historical locations of the McBride and Barnsley homes*

daughters, while another of his daughters married Dr. Tolmie.

Tolmie came to own the Northern section of Hillside farm which included a thin stretch of land to the Gorge. [Minaker, *ibid*, pg 13] This land is approximately the location of present day Washington Ave. (refer to figure 3).

The land bordering Cecelia Ravine was later sold, in 1890, to Victoria gunsmith John Barnsley, and the Washington Ave. stretch was sold to industrialist Charles Spratt. Spratt was responsible for building a mansion on the site. This was the one bought by Premier McBride, who gave it the lofty name of "Glenelg" (refer to figure 4). Glenelg is now long torn down. The property is now covered by three apartment blocks and a motel. Arbutus Park only covers 4500 square meters [<http://crdatlas.ca>] and very little of it retains forest cover. This loss of vegetation is one of the keys to the major threat that Arbutus Park is currently facing; erosion.



*Photo 6: Arbutus tree fallen over into the waterway*

## **Methods**

The eroding banks of the shoreline were surveyed to create a baseline inventory of vegetation. This was accomplished by producing a large belt transect line of 120m that was broken into 20m sections for ease for managing the data collected. Six 20m belt transect lines running end to end were created parallel to the shoreline of the park. The 20m sections were further broken down into 5m segments during to time of observing the data, as 5m was decided to be the most effective distance to calculate the percentage area cover of any particular species, especially in areas of dense or diverse plant cover. The transect lines were two metres wide, effectively one metre to each side of the fence line where the fencing occurred. This was done to observe the impact of mowing on limiting the regeneration of vegetation.

The transect lines that were laid out followed the contours of the fencing and bridged the gaps between it. This curved line followed the contours of the shoreline but was set back approximately two to three meters from from the edge of the eroding soil banks. It must be noted, therefore, that the 120m transect line was not straight, but it was comprised of 20m transects that were. The exception was transect four, which was comprised of four segments on different tangents to accommodate the extreme curvature of the shore. The transects also met on different tangents and the data was mentally adjusted for the non-uniform junctions. As the angles did not affect more than half a meter distance at each end of the transects, it is assumed that a margin of error of no more than 5% can be expected for this compromise.

The rationale justifying this compromise in technique is that the line of vegetation on the parks shoreline is very thin. Furthermore, the mowing of the vegetation in the park also follows this shoreline contour. Therefore in order to get a better idea of the natural vegetation, the essentially curved transect avoided large swaths of mown area while also avoiding going over the eroded bank of the shoreline. The final rationale for this method of measuring the data was that the sections of fencing and the large gap between them were also broken into lengths of approximately 20m.

The inventory of the trees along the shoreline was done using a modified form of the point-center quarter method (PCQM). In the case of Arbutus park the trees are so few as to be easily counted. However since the PCQM also orientates the trees around centre points it allows for easy mapping of the resulting data. This information was seen to be useful for the planning of planting of new trees.

Therefore the modified method consisted of establishing equidistant points along the belt transect, rather than the PCQM's usual random points. For the purposes of this study the junction points of the 20m transect lines were used. In another variation, rather than only measure the closest tree in every quadrant of the point, all trees were measured. The rationale for doing this was that the placement of every tree could be mapped out using triangulation by referencing it to any two junction points.

All trees were identified by species, measured for their circumference at chest height (CCH) and their height. At first the calculations of the heights of the trees was attempted by use of a tape measure and an inclinometer. The resulting measurements of distance to the tree and the angle of the inclinometer would then be calculated with the formula:  $\tan(\text{angle}) \times \text{distance from the tree} = \text{tree height}$ . However the lack of an assistant for the work of winding up the tape measure, combined with the an alarming amount of fecal matter from the local dog population, resulted in the method being changed. The new method for measuring the heights of the canopies was to direct a Laser Distance Measure to the underside of the highest branch or leaf on the tree. The measurement was held approximately 1.5m off of the ground, so 1.5m was added to all readings. The method was considered adequate for the needs of this study.

Basic data on the soils of the park was collected. Given the narrowness and fragile nature of the area being studied it was decided that the practice of digging soil pits was not appropriate. The extreme erosion allowed enough of a view into the nature of the subsoils. The soils horizons were examined for their texture by sense of touch and measured for their depth.



*Photo 7: Exposed soil layers on eroded bank of Arbutus Park*

Equipment:

Garmin gps 76Cx

Suunto compass

Macintosh Macbook Pro

Ryobi Laser Distance Measurer

Mastercraft 50m and 10m tape measures

## **Observations:**

**Soil:** The soils of the area are typically Dystric Brunisol Soil great group [Meidinger pg 86]. The humus forms being classified as Xeromors or Moders [Meidinger pg 87].

The upper, or 'a' horizon, of the park's soil is inconsistent. In some places along the shoreline it has been completely eroded away by pedestrian and pet traffic. In other places it is found to be up to 6 cm thick. The places where the soil remains are generally inaccessible due to the growth of shrubs. The b horizon is a silt/clay mix which is 1.8 m deep. The c horizon is a marine clay. Erosion is so extreme that the c horizon is visible.

It should be noted again that Arbutus Park is a site for great historical disturbance. Ploughing, bulldozing and backfilling are all historical occurrences on the site. The park is in fact bisected by a huge underground electrical cable, which would have seen the construction of a deep trench and the mixing and spreading of soils [Hook, personal comment]. It is worth mentioning that while examining the shoreline of Arbutus park the author of this report came across a lot of buried debris underneath the southernmost Arbutus tree. This was puzzling. At first it appeared that the Arbutus tree was planted on top of the debris (a synthetic shoe, chips of concrete flooring and old newspapers). Due to the advanced age of the tree, approximately 120 years, this was impossible. Therefore it must be concluded that decades ago fill was dumped around the roots of the tree, perhaps to slow the erosion process. Filling in the soil gap around the shoreline trees is an option that the City of Victoria may still wish to consider, although it is *not* recommended. New soil may bring pathogens and invasive plant seeds. It will also erode at an accelerated rate unless compacted by machines. Compacting the soil is certain to impact the trees in a negative manner.

**Table One:**  
**Baseline Inventory of Understory Vegetation**

Species	Plot 1	Plot 2	Plot 3	Plot 4	Plot 5	Plot 6
Various Poaceae Species	65%	15%	25%	55%	40%	50%
<i>Symphoricarpos albus</i>	10%	50%	15%	10%	25%	15%
<i>Hedera helix</i>	0	0	30%	5%	20%	25%
<i>Rosa nutkana</i>	40%	10%	1%	5%	0	20
<i>Rosa gymnocarpa</i>	0	0	5%	0	0	0
<i>Holodiscus discolor</i>	0	5%	1%	1%	10%	1%
<i>Pteridium aquilinum</i>	0	1%	0	0	0	0
<i>Rubus ursinus</i>	1%	5%	5%	0	0	0
<i>Vicia americana</i>	0	0	1%	5%	0	0
<i>Lonicera ciliosa</i>	0	5%	5%	5%	0	0
<i>Lonicera hispidula</i>	0	0	0	5%	0	0
<i>Mahonia nervosa</i>	1%	0	1%	0	0	1%
<i>Gaultheria shallon</i>	0	15%	1%	5%	0	0
<i>Taraxacum officinale</i>	0	0	0	5%	0	0
<i>Plantago</i> spp.	0	0	0	5%	0	0
<i>Trifolium</i> spp.	0	0	0	5%	0	5%
<i>Sanicula crassicaulis</i>	0	5%	5%	5%	1%	0
<i>Vinca majora</i>	0	0	0	0	0	10%

## Table Two: Shoreline Tree Measurements

Species	Circumference at Chest Height (cm)	Height (meters)
<i>Salix sp.</i>	n/a	13
<i>Malus sp.</i>	n/a	n/a
<i>Pseudotsuga menziesii</i>	155	10.9
<i>Arbutus menziesii</i>	158	7.2
<i>Malus sp.</i>	n/a	
<i>Arbutus menziesii</i>	227	12.6
<i>Pseudotsuga menziesii</i>	80	8.6
<i>Pseudotsuga menziesii</i>	114	7.1
<i>Pseudotsuga menziesii</i>	149	11.5
<i>Salix sp.</i>	multi-stemmed	n/a
<i>Pseudotsuga menziesii</i>	143	7.5
<i>Malus sp.</i>	88	6.2
<i>Pseudotsuga menziesii</i>	159	12.6
<i>Salix sp.</i>	82	n/a
<i>Pseudotsuga menziesii</i>	262	11.2
<i>Salix sp.</i>	82	4.9
<i>Pseudotsuga menziesii</i>	100	7.7
<i>Salix sp.</i>	87	5.2
<i>Pseudotsuga menziesii</i>	67	4.3
<i>Salix sp.</i>	53	3.1
<i>Salix sp.</i>	n/a	n/a
<i>Pseudotsuga menziesii</i>	108	10.7
<i>Pseudotsuga menziesii</i>	104	8.6
<i>Arbutus menziesii</i>	160	7.7
<i>Pseudotsuga menziesii</i>	123	9.5
<i>Pseudotsuga menziesii</i>	60	4.5
<i>Pseudotsuga menziesii</i>	62	6.7
<i>Arbutus menziesii</i>	149	7.8
<i>Pseudotsuga menziesii</i>	105	9

<i>Pseudotsuga menziesii</i>	93	8.4
<i>Pseudotsuga menziesii</i>	cut down	n/a
<i>Arbutus menziesii</i>	134	10.2
<i>Pseudotsuga menziesii</i>	92	7.1
<i>Arbutus menziesii</i>	144	6.8
<i>Salix sp.</i>	n/a	3
<i>Arbutus menziesii</i>	100	7.2
<i>Arbutus menziesii</i>	84	5.6
<i>Salix sp.</i>	n/a	5.1
<i>Arbutus menziesii</i>	112	6.5
<i>Arbutus menziesii</i>	28	2.8
<i>Taxus brevifolia</i>	30	2.3
<i>Pseudotsuga menziesii</i>	131	8.4
<i>Arbutus menziesii</i>	64	6.9
<i>Arbutus menziesii</i>	135	8.3
<i>Pseudotsuga menziesii</i>	26	2.1
<i>Quercus garryana</i>	87	7.9
<i>Pseudotsuga menziesii</i>	109	9.2
<i>Arbutus menziesii</i>	250	9.6
<i>Arbutus menziesii</i>	134	9.7
<i>Pseudotsuga menziesii</i>	74	6.2
<i>Quercus garryana</i>	28	3.6
<i>Crataegus monogyna</i>	multi-stemmed	3.8
<i>Crataegus monogyna</i>	multi-stemmed	2.1
<i>Malus sp.</i>	multi-stemmed	3.4
<i>Malus sp.</i>	multi-stemmed	3.4
<i>Arbutus menziesii</i>	235	12.8
<i>Pseudotsuga menziesii</i>	132	13.9
<i>Pseudotsuga menziesii</i>	56 snag	
<i>Pseudotsuga menziesii</i>	156	12.4
<i>Pseudotsuga menziesii</i>	n/a	n/a
<i>Pseudotsuga menziesii</i>	n/a	n/a
<i>Pseudotsuga menziesii</i>	n/a	n/a
<i>Arbutus menziesii</i>	n/a	n/a
<i>Arbutus menziesii</i>	n/a	n/a
<i>Crataegus monogyna</i>	n/a	n/a
<i>Quercus garryana</i>	140	n/a

## **Conclusions:**

Analysis of the baseline inventory data using Land Management Handbook 28 (LMH 28) leads to the conclusion that Arbutus park is an example of site series 2, FdPI - Arbutus, of the CDFmm biogeoclimatic zone. The vegetation of this zone is typically:

### TREE LAYER:

*Pseudotsuga menziesii* Douglas-fir

*Quercus garryana* Garry oak

*Arbutus menziesii* Arbutus

### SHRUB LAYER

*Gaultheria shallon* salal

*Mahonia nervosa* dull Oregon-grape

*Rosa gymnocarpa* baldhip rose

*Holodiscus discolor* ocean spray

*Lonicera ciliosa* western trumpet honeysuckle

*Symphoricarpos spp.* snowberry

*Lonicera hispidula* hairy honeysuckle

*Paxistima myrsinites* falsebox

### HERB LAYER

*Polystichum munitum* sword fern

*Melica subulata* Alaska oniongrass

*Moehringia macrophylla* big-leaved sandwort

*Sanicula crassicaulis* Pacific sanicle

*Lathyrus nevadensis* purple peavine

### MOSS LAYER

*Rhytidiadelphus triquetrus* electrified cat's tail moss

*Kindbergia oregana* Oregon beaked moss

*Cladonia spp.* lichen

*Hylocomium splendens* step moss

This list is very consistent with the vegetation found on the site. From the shrub layer, only examples of falsebox (*Paxistima myrsinites*) were not found to be present and braken fern (*Pteridium aquilinum*) was present rather than sword fern (*Polystichum munitum*).

The two alternatives to the site series would occur given varying factors in soil richness or soil moisture content. In fact it is possible that the dryness of the site could have been introduced by the human disturbance of the site and the surrounding areas. Massive alterations to the drainage through the construction of impervious surfaces (i.e. roads, roof-tops) are observable. Even the mowing of the vegetation will contribute to the drying of the site.

If more moisture were present, the park would be an example of site series 1, Fd - Salal of the CDFmm zone. The presence of *Pteridium aquilinum* rather than *Polystichum munitum* also suggests this the case historically. With the establishment of an Fd - Salal site series we would expect a far greater variety of trees to be present. A historical photograph from circa 1900 suggests that this was indeed the case (refer to photograph c. 1900). *Pseudotsuga menziesii* (Douglas-fir) and *Arbutus menziesii* (Arbutus) would remain present, but to these populations would be added,

<i>Acer macrophyllum</i>	big leaf maple
<i>Thuja plicata</i>	western red cedar
<i>Abies grandis</i>	grand fir
<i>Cornus nuttallii</i>	western flowering dogwood

The *Quercus garryana* (Garry oak) is not included in this site series however. Many of the plants in the shrub and herb layers would also be excluded. Yet the *Quercus garryana* was only observed within the northern section of the park. The soils here are indeed richer. So this area could well be considered as a separate site series; 03 Fd - Oniongrass. While this designation, which would see fewer tree species growing on the area, it would make the area a good site for planting a greater frequency of herbaceous plants. It would also include species such as *Dodecatheon hendersonii* (broad-leaved shootingstar) and *Trisetum cernuum* (nodding trisetum).

This being said, the goal of contributing to the celebration of Tree Appreciation Day is a specific objective of this report, and maintaining the integrity of the a FdPI - Arbutus site series is not. Adding the tree species found in the list of the Fd - Salal site series would also contribute to the overall biodiversity of the site; a result that is usually looked upon favourably in this age of climate change, where the balance of these ecosystems is considered to be in peril.

It was also noted during the collection of data for this report that both the *Pseudotsuga menziesii* (Douglas-fir) and the *Arbutus menziesii* (Arbutus) species are currently under attack from diseases and fungal infections. While there is no alternative species given for the role of the *Arbutus menziesii* in the site series, *Pinus contorta contorta* (shorepine) can be a substitute for *Pseudotsuga menziesii* [Meidinger pg 86]. The *Pinus contorta contorta* also has an advantage in an urban setting in that it does not grow as tall as the *Pseudotsuga menziesii*.

Arbutus Park has in fact suffered from vandalism. In one instance a disgruntled citizen took it upon themselves to cut down a Douglas fir at the water's edge. It is suspected that the tree had grown so high as to obstruct the citizen's view of the waterway. Shorepine may not tempt the citizen to further acts of selfishness and increased biodiversity of tree species may ensure the presence of tree cover in the park in the wake of epidemics.

### **Recommendation:**

Summary: Erosion is a natural process and to stop it will starve the rich mud flats of the area of their nutrients. However, accelerated erosion will also cause damage to these ecosystems. It is critical to allow the vegetation on the site to naturally regenerate and protect the shoreline in a natural manner. As human activity is adversely affecting the regeneration of native vegetation, a successive generation of trees should be planted and protected so that they may take over the stabilization of the banks after the trees currently occupying the site have died.

In order help achieve this recommendation, the following techniques are advised:

### ***Extend the fencing to protect natural regeneration;***

Given that the rate of erosion in Arbutus Park is directly related to the amount of vegetation protecting the shoreline, it is recommended that immediate steps be taken to ensure the maximum regeneration of trees and shrubs in the park. The simplest way to do this is to stop mowing as much of the grassy areas as is currently scheduled. The plants are trying to regenerate themselves on the lawn. This is especially true of the wild rose species, the salal and the snowberry which are encroaching onto the lawn from the shoreline; this encroachment is a process that will naturally slow the rate of erosion of Arbutus Park at no cost to the City of Victoria.

The existing fencing should not be removed. It is well established and functional, but so old that it is not worth salvaging. The new fencing should incorporate the existing fencing so as to form an encircled area protected from machinery, dogs and pedestrians. The existing picnic table by the shore, and the concrete slab that it sits on, should be removed and the picnic table relocated at least 10m back from where it currently sits.

The picnic table area is a focal point of people gathering in the park and this volume of traffic is compacting the soils and causing the death of all vegetation, including the grasses, in a large area close to the crumbling embankment. The 10m setback of the picnic table will help to keep park users from gathering too close to the eroding soils, yet still allowing them a view of the waterway and all the recreational benefits of the picnic table.

### ***Increase the Coarse Woody Debris levels on the site:***

The placing of logs and stumps in the park can act as barriers to pedestrian trespassing and enhance the effectiveness of the fencing. The decaying wood is also a necessary link in the food chain called “coarse woody debris”. It will attract insect life that will feed other wildlife in the area. The wood, once decayed, will add much needed nutrients and organic matter to the soils of the park.

Within Arbutus park during the past 18 months, two arbutus, two firs and a cherry tree were seen to have been cut down by the parks staff. The wood was removed from the site. Concern about the removal of the trees was expressed to the author by a local citizen, as one of the firs was a favourite tree of the local woodpecker population. This makes one wonder if the wildlife value of the standing dead trees was assessed. Even if it was and the trees scheduled for falling, it would have been far better to strategically place the tree trunks within the park boundaries and maintain the biomass via the coarse woody debris.

### ***Stop Mowing the Lawn;***

The municipal lawn mowers are also causing severe damage to the Arbutus tree roots. Garry oak seedlings have also been observed to have been destroyed by the mowers. The areas of the damaged roots and the seedling regeneration areas overlap the aforementioned areas of shrub regeneration. These areas should be enclosed by split rail fencing and left to grow on their own accord. The only intervention by the City Parks workers in the area should be to remove invasive plants that may try to establish themselves along with the native species.

### ***Plant Native Trees and Shrubs to Assist Natural Regeneration;***

Especially in the current area of the shoreside picnic table, it is recommended that native shrubs be planted due to the large amount of soil that is currently unprotected by vegetation cover. The planting of larger sized vegetation will also justify

to the public the new fencing, as the fencing will obviously protect the new plantings. There is also currently no Shorepine (*Pinus contorta contorta*) on the site, although it could certainly be present. The period of replanting would be a good opportunity to establish it on the site.

The Shorepine has the advantage of having a lower canopy than trees such as the Douglas fir (*Pseudotsuga menziesii*) and as a result will not interfere with the views of the waterway as much as the latter species. Given that the Douglas firs on the site are also suffering from an outbreak of disease (several have been removed from the Park due to this), the introduction of Shorepine rather than Douglas fir would seem prudent. The presence of Shorepine will increase the effectiveness of the re-planting and increase the park vegetation's resilience through an increase in biodiversity.

### ***Removal of Invasive Plant Species;***

Broom, Periwinkle, and English Ivy have been identified as being on the site. These invasive alien plant species should be removed as quickly as possible. Their aggressive nature will soon outcompete the surviving natural vegetation. Lost will be the native habitat for wildlife that this indigenous vegetation currently provides. The situation may be more tragic because, if the native species are a remnant population of native species and not native species re-introduced from other sites, the gene pool of these plants may be unique to the area. It was noted on one outing that the Pacific sanicle on the site appears to be a strain that has not hybridized with purple sanicle. Perhaps there are unique strains of other species on the site as well. This possibility should be investigated by a Registered Professional Botanist (RPBio). Furthermore, Arbutus Park should have an Invasive Management Plan to deal with the presence of invasive species.

### ***Educational Signage***

It may not be as obvious to the public that the new vegetation is meant to protect the soils and shoreline from accelerated erosion. However, the connection should be made. This will perhaps make the public more sensitive to the delicate character of the shoreline. We can only hope that the public will be more respectful of this fact and use

restraint when tempted to scale the banks, or off-leash their animals. Educational signage is also an opportunity to make the public more aware of the native species within Arbutus Park.

### ***Encourage Changes to the Cecilia Creek Estuary;***

Although the estuary is not the property of the City of Victoria, the estuary is a key factor in the rate of erosion of city property. The massive increase of impermeable surfaces within the creek's watershed as led to massive and sudden deluges of water rushing down the ravine. Many engineered solutions, such as concrete culverts and drains, are in place to remedy the erosion of the creek banks. But this concern stops at the ravines outflow. As a result, the water blasts out of the creek and into the estuary with accelerated force and volume.

Photographs clearly show that this is resulting in massive erosion of the sediments in the estuary; erosion of the mud flats. With the erosion of the mudflats follows the erosion of the banks of Arbutus park as it is nature's way of regenerating the mudflats. But the loss to the City of Victoria parkland is great. Photographs 1 and 4 demonstrate that the distance that the land jutted out into the water, and the angle from which the shore slopes to the water has changed dramatically.

If the accelerated discharge of Cecilia creek cannot be diminished by better watershed management, then it would be better if it was channelled slightly past the estuary rather than into it. Tides and waves could return the sediments and brackish water back into the estuary, but the power of erosion contained within the force of its historically heightened flow will be redirected farther out into the Gorge waterway, where its impact would be minimal. Studies by engineers should be done to confirm this.

### ***Give the public controlled access to the shoreline:***

Stairs should be built, complete with a viewing platform, at the south end of the park to provide people with visual access to the mudflats and waterway. It should be made clear, via unambiguous signage, that people should not leave the platform for personal safety reasons and so as to not degrade the shoreline habitat. The reasoning for this suggestion is that people want access to the shoreline views and the privacy that the



*Photo 8: Path on Southern side of Arbutus Park leading to fallen, but living, arbutus tree*



*Photo 10: Mud flats between Arbutus Park and the Selkirk trestle bridge*



*Photo 11: View of Arbutus Park from the Selkirk trestle bridge*

banks allow them. They make their own pathways down to the waters edge, some of which are not safe and all of which are harmful to the integrity of the parks banks [photo 8]. It is unlikely that their movements will ever be stopped, but the damage may be controlled to a level that precludes damage to the site by controlled access.



*Photo 9: Heron fishing on the mud flats beside Arbutus Park*

The South end of the park is suggested for the access location due to the presence of a significant population of eel grass at the northern end of the park. The eel grass should not be disturbed.

***Follow up the restoration of Arbutus Park by re-establishing the tidal meadow below the park:***

Although the waterway is the jurisdiction of the CRD, it must be mentioned that the planting of appropriate vegetation in the intertidal zone will also buffer the shoreline of the park from erosion. The city of Victoria can help the CRD in these efforts. The City has staff who are trained in the techniques of establishing temporary barriers, such as anchored logs offshore, which can protect the transplanted vegetation as they try to establish themselves.



*Photo 12: Stump of the 120 year old arbutus tree cut by the City of Victoria Arbourist Crew.*

**A final word:**

## **Celebrating the Life of a Tree**

One of the cut down trees mentioned on page 18 (photo 12) that was removed by the Arbourist Crew of the City of Victoria was estimated to be 120 years old. That would mean that this is a tree whose existence was theoretically observed by Premier McBride. It was a tree that had survived the tidal wave of population growth in the area. This arbutus tree was (perhaps is, as it is trying to survive by growing shoots from the trunk) a living organism whose existence had been witnessed by 6 separate generations of human beings. It is a truly remarkable, as a human, to consider an organism of this longevity.

Yet this remarkable neighbour was brought down without the knowledge of most people in the neighbourhood. Only a few humans in a position of power were aware of the plan to remove this living creature. This plan eventually carried out by one person with a chainsaw in less than a quarter of an hour. How many witnessed the act is not known.

And here is the point the author wishes to make in closing;

We are planting trees to recognize their role in our ecosystems, in our cultures and in our aesthetic sense of beauty. Yet we do not recognize the value of these trees when it is time to

remove them. There is no public event. Their removal is not acknowledged. It is usually done quietly and discreetly, so as not to upset too many people. But people will be upset none the less, as well they should be. Citizens should be upset about their governing bodies not keeping them informed.

Citizens should be given the opportunity to celebrate the life of a tree at its end, as well as at its beginning. In fact the precedent to inform the public about tree removal has already been established. When a row of chestnut trees was to be cut down in downtown Victoria, the action was announced *in advance of the event*. [[http://www.victoria.ca/cityhall/departments\\_compar\\_prkchestnut.shtml](http://www.victoria.ca/cityhall/departments_compar_prkchestnut.shtml)]. Local newspapers and radio informed the public weeks before the cutting, so that their concerns could be addressed. Local governments should extend this courtesy when any of the public's trees, especially those of greater than 100 years in age, are slated for removal. If all tree removals were publicly announced before the fact, then people could collectively consider the loss; not merely of an ornament of aesthetic value in their park, but also of an organism which has played a role in maintaining the integrity of the ecosystem.

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### **Sources of Figures and Photos:**

Figures 1, 2 and 4 were taken from Minaker, 1998

Figure 3 was taken from Google maps

Photograph 1 was taken from Minaker, 1998

Photograph 3 was from Aerial Photo from the Government of BC collection  
id# 92b 1926/32 A226(86)

All other photographs were taken by the author

Appendix A was created using the CRD Atlas Online

### **Websites** (last visited 28/July/2011):

<http://crdatlas.ca>

<http://www.for.gov.bc.ca/hfd/pubs/Docs/Tr/Tr040.htm>

<http://www.jstor.org/stable/3783769>

<http://www.victoriaheritagefoundation.ca/chroncityhistory.html>

[http://www.victoria.ca/cityhall/departments\\_compar\\_prkchestnut.shtml](http://www.victoria.ca/cityhall/departments_compar_prkchestnut.shtml)

### **Acknowledgements:**

My thanks go to Fred Hook and the staff of City of Victoria Parks, Val Schaefer and the Faculty of UVic's Environmental Studies Department, Thomas Munson, the staff of the Central Branch of the Greater Victoria Public Library, the staff of UVic's MacPherson library, and my family.

# Appendix A

## Site Plan



### Important

This map is for general information purposes only. The Capital Regional District (CRD) makes no representations or warranties regarding the accuracy or completeness of this map or the suitability of the map for any purpose. This map is not for navigation. The CRD will not be liable for any damage, loss or injury resulting from the use of the map or information on the map and the map may be changed by the CRD at any time.

Printed Sun, May 29, 2011

### Arbutus Park

re-planting area

### Regional Community Atlas

Capital Regional District  
gis@crd.bc.ca  
<http://www.crd.bc.ca>



## Appendix B

### Planting list:

Species		Quantity
TREE LAYER		
<i>Acer macrophyllum</i>	big leaf maple	8
<i>Thuja plicata</i>	western red cedar	8
<i>Abies grandis</i>	grand fir	12
<i>Cornus nuttallii</i>	western flowering dogwood	12
<i>Pseudotsuga menziesii</i>	Douglas-fir	50
<i>Quercus garryana</i>	Garry oak	20
<i>Arbutus menziesii</i>	<i>Arbutus</i>	30
<i>Pinus contorta contorta</i>	Shorepine	40
SHRUB LAYER		
<i>Gaultheria shallon</i>	salal	12
<i>Mahonia nervosa</i>	dull Oregon-grape	12
<i>Rosa gymnocarpa</i>	baldhip rose	75
<i>Holodiscus discolor</i>	ocean spray	15
<i>Lonicera ciliosa</i>	western trumpet honeysuckle	24
<i>Symphoricarpos spp.</i>	snowberry	0
<i>Lonicera hispidula</i>	hairy honeysuckle	24
<i>Paxistima myrsinites</i>	falsebox	40
HERB LAYER		
<i>Polystichum munitum</i>	sword fern	10
<i>Melica subulata</i>	Alaska oniongrass	150 plugs