

# STAFF REPORT

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**Date:** October 15, 2013

**File No.:** SS-DP-2013.5  
SS-SUB-2006.12  
**X-Ref.:** SS-DVP-2013.6

**To:** Salt Spring Island Local Trust Committee for Meeting of October 24, 2013

**From:** Caitlin Brownrigg, Planner 1, Local Planning Services

**CC:** Brent Taylor

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**Re: Development Permit Application**

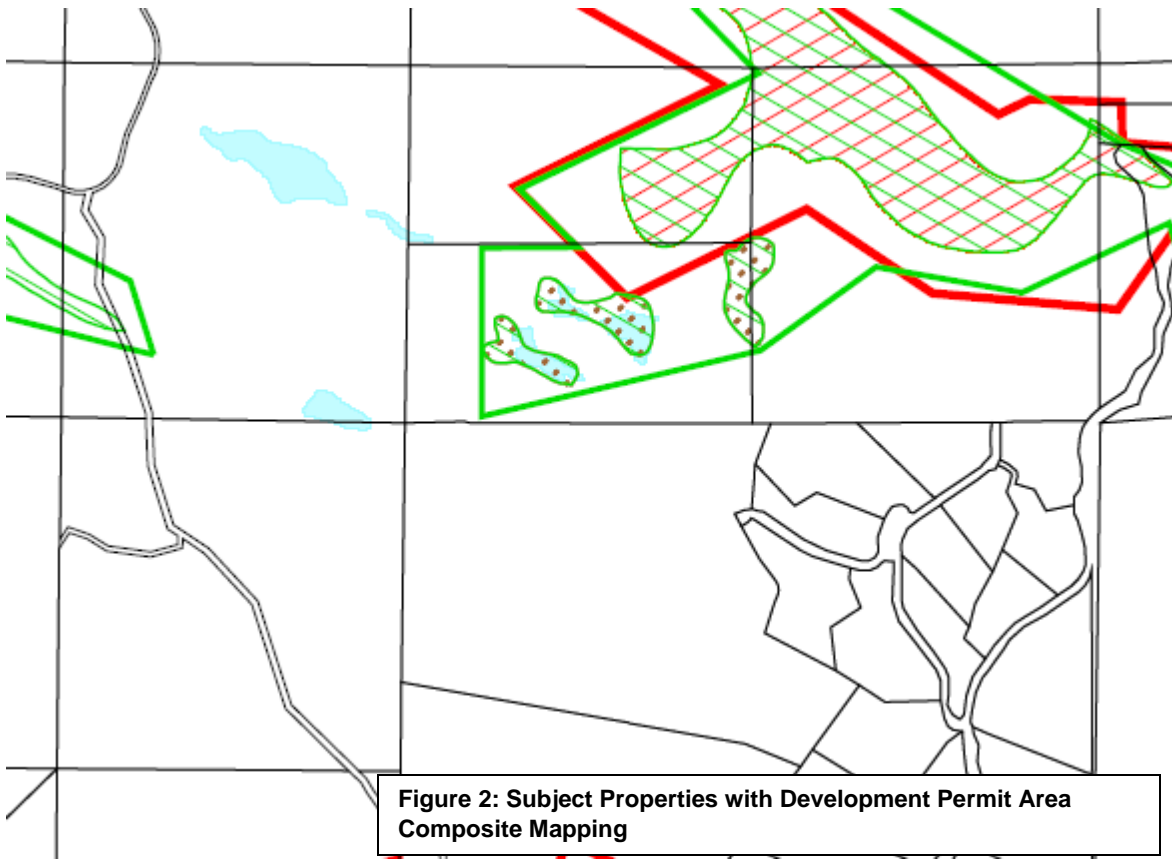
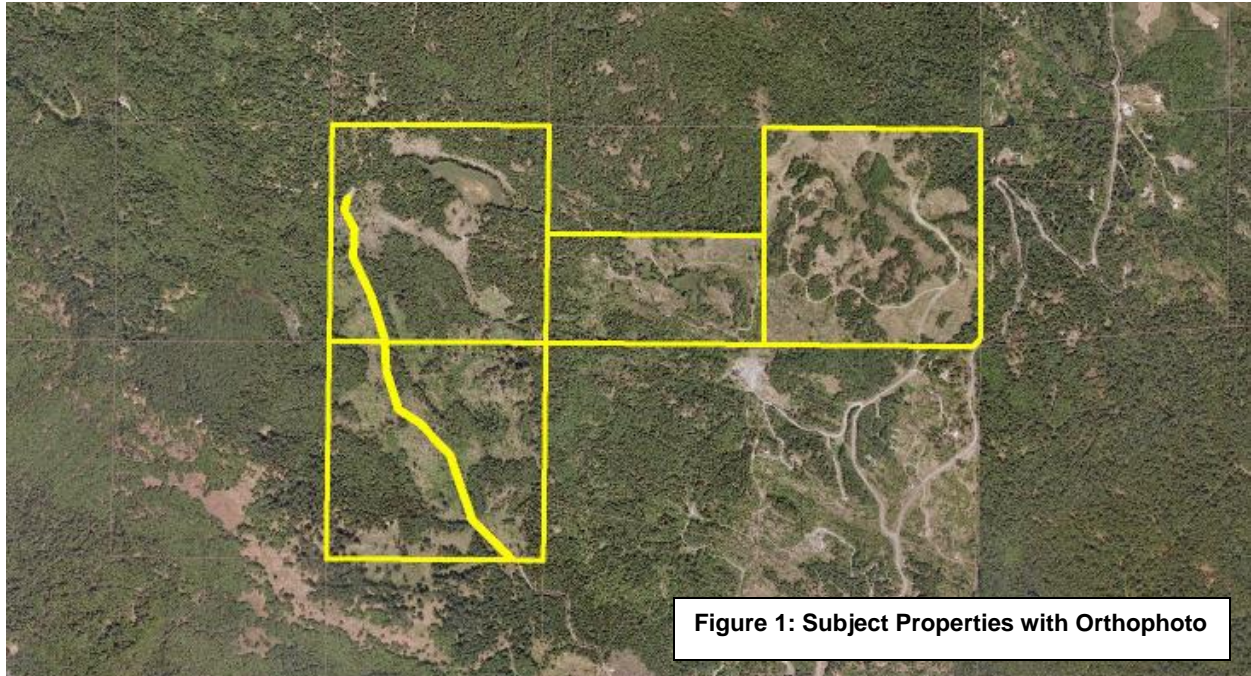
**Owner:** Skywater Capital Corp and Robert and Chandra Hershey-Lear  
**Applicant:** Polaris Land Surveying  
**Location:** 344 Anna's Drive, 1611 Musgrave Road, Mount Tuam Road  
The Southeast 1/4 of Section 44, The South 1/2 of the Southwest 1/4 of Section 43, The Remainder of the Southeast 1/4 of Section 43 and the Northeast 1/4 of Section 37, All of South Salt Spring Island, Cowichan District

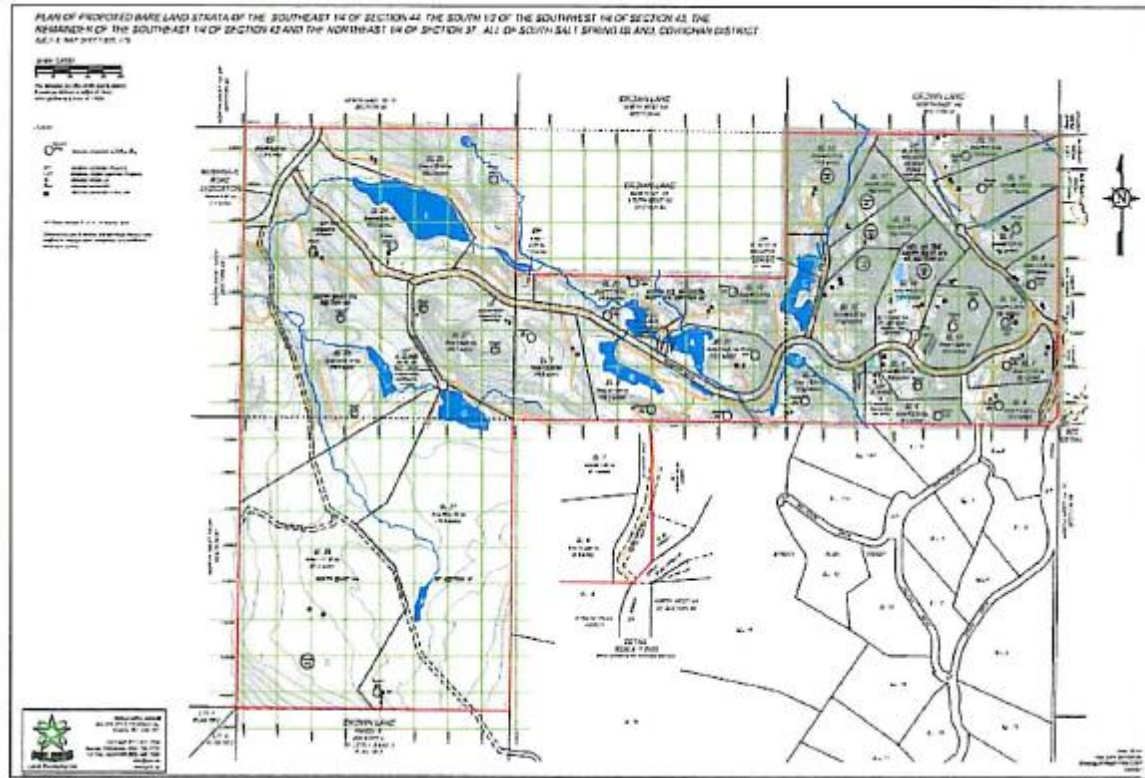
## THE PROPOSAL:

This Development Permit is required as a condition of subdivision application SS-SUB-2006.12. The subdivision will create new lots in an area that has several significant wetlands.

## SITE CONTEXT:

Subdivision application SS-SUB-2006.12 is a 27 lot bare land strata subdivision proposal. There are four parent lots totaling 222.561 hectares (63.967 ha + 32.118 ha + 63.062 ha + 63.414 ha). Three of the lots are zoned Forestry 1 and one lot is zoned Rural Upland 1. There are a number of significant wetlands on the subject properties. Several of them are included in Development Permit Area 4. The subject properties border the Mount Tuam Ecological Reserve to the south, the Alvin Indridson Nature reserve to the west, and the Hope Hill Crown lands to the north. Mt Tuam Strata is to the south. Musgrave Road runs across the western corner of one of the parent parcels.





**Figure 3: Proposed Subdivision Layout with Wetland Mapping**

### Official Community Plan

The subject properties are in:

- Development Permit Area 4: Lakes, Streams, and Wetlands
- Development Permit Area 6: High Soil Erosion Hazard

### Development Permit Area 6: High Soil Erosion Hazard

The applicant will seek an exemption to Development Permit Area 6 requirements under the following exemption clause:

- *E.6.1.3 e. development on, or subdivision of, a property that is in accordance with a report submitted to the Islands Trust, prior to development or subdivision commencing, that has been prepared by a geotechnical engineer or an engineer with expertise relevant to the applicable matter, and has been conducted in accordance with the recommendations contained in the report addressing slope instability and soil erosion hazards.*

### Development Permit Area 4: Lakes, Streams, and Wetlands

The objectives of this Development Permit Area are:

- *E.4.3.1 To protect the quality of drinking water supplies.*
- *E.4.3.2 To protect fish habitat.*
- *E.4.3.3 To protect sensitive riparian habitat and the unique species that depends upon it.*

#### **E.4.4 Guidelines for New Development**

*E.4.4.1 All work that takes place in this Development Permit Area should be done in a way that minimizes degradation in water quality and disturbance to natural drainage patterns.*

- Wetlands were mapped prior to the beginning of development. The applicant does not propose development within the wetlands. The applicant has provided a report from Anderson Civil Consultants Inc. dated May 17, 2013 states that the proposed configuration of roads and driveways will not significantly alter the natural drainage patterns.

*E.4.4.2 All work that takes place on land within 10 m of the natural boundary of a lake or stream (or within 300 m of Maxwell Lake) or within a wetland should be planned and carried out in a way that is consistent with the Land Development Guidelines for the Protection of Aquatic Habitat (Appendix 7).*

- The applicant submitted a report prepared by a qualified Biologist that made recommendations pursuant to "Develop With Care" Provincial Guidelines that have been incorporated into the proposed Development Permit.

*E.4.4.3 Native vegetation and trees are to be retained or replaced to control erosion, protect banks and protect fish and wildlife habitat.*

- The applicant proposes to maintain natural vegetation surrounding the wetlands. This is also a recommendation within the report prepared by the Biologist and has been incorporated into the proposed Development Permit.

*E.4.4.4 New roads and septic fields should not be located in this Development Permit Area. If such a location cannot be avoided, then the design and construction of the road or septic field should be supervised by a qualified professional to ensure that the objectives and guidelines of this Area are met. Septic systems that are adjacent to lakes or to streams that drain to lakes should be designed to minimize both nutrient loading and coliform contamination of lake waters.*

- The applicant does not propose to locate septic fields in the wetlands. The applicant has provided a plan of roads and driveways that is included in the proposed Development Permit.

*E.4.4.5 Where this Area includes unique native species dependent on riparian habitat which have been identified by a qualified professional as worthy of particular protection, their habitat areas should be left undisturbed. If development is permitted, it should be undertaken only under the supervision of a professional who is qualified in environmental protection, with advice from the Ministry of Environment, the Department of Fisheries and Oceans, or Environment Canada.*

- The Biologist's report notes native species that depend on the wetlands for habitat. The applicant does not propose to disturb the habitat that has been identified. One of the conditions of the proposed Development Permit is a follow up report from a Biologist.

*E.4.4.6 To assist in the preparation of development permits for larger projects, the Local Trust Committee could request an applicant to provide a report, prepared by a qualified professional with experience in surface water management and the protection of habitat. The report should indicate the type of conditions that should be incorporated into the development permit to achieve the objectives and comply with the guidelines of this Development Permit Area.*

- The applicant has submitted report prepared by a qualified Biologist. This report contained recommendations that have been incorporated into the proposed Development Permit. The applicant has submitted a report prepared by Anderson Civil

Consultants Inc. dated May 17, 2013. This report indicates that the proposed development will not have a significant impact on surface water runoff.

#### ***E.4.5 Guidelines for Subdivision***

*E.4.5.1 If a proposed land subdivision is to create additional new lots within this Development Permit Area, then any new lots, roads, building sites, septic fields and driveways should be located and constructed in a way that meets the objectives of this Area. A covenant should be registered against the part of the property that is within this Area to guide future development and meet the objectives of this Area.*

- The proposed lot layout will not create lot lines across wetlands. A plan of driveways is attached to the proposed Development Permit that demonstrates that driveways and roads will not be built through the identified wetlands. Any change to the driveway plans that proposes to situate the driveways closer to the wetlands will require a Development Permit amendment.

#### **Land Use Bylaw**

The subject properties are zoned Forestry 1 (F1) and Rural Uplands 1 (RU1). The density and lot configuration proposed by subdivision application SS-SUB-2006.12 is permitted by zoning. The subdivision makes use of the lot averaging provisions in the Land Use Bylaw to cluster the development of the lots. The subdivision is in compliance with most of the regulations of the Land Use Bylaw; a forthcoming application addresses a Development Variance Application (SS-DVP-2013.6) to permit lots in more than one zone. Further, the applicant is requesting a frontage waiver to permit the proposed subdivision layout.

#### **Islands Trust Fund:**

The subject properties are not adjacent to any Islands Trust Fund properties,

#### **Sensitive Ecosystems and Hazard Areas:**

Portions of the subject properties have been identified as sensitive ecosystems by the Islands Trust Sensitive Ecosystem mapping. The subject properties are in Development Permit Area 4 and Development Permit Area 6. The applicant has indicated that they will seek an exemption for Development Permit Area 6 requirements by submitting a report from a qualified Geotechnical Engineer.

#### **Archaeological Sites:**

Based on the data provided by the Provincial Remote Access to Archaeological Data, there are no known archaeological sites or areas of significant potential to contain unknown but protected archaeological sites on the subject property.

#### **Covenants:**

There are several easements and statutory rights of way registered on the subject properties.

Bylaw Enforcement:

There are no current Islands Trust Bylaw Enforcement files on the subject property.

**STAFF COMMENTS:**

The proposed Development Permit and development proposal are substantially consistent with the guidelines for Development Permit Area 4. The guidelines in Development Permit Area 4 do not suggest a referral to APC. Staff advise LTC that it could choose to refer the application to APC or it could approve the Development Permit as attached.

**RECOMMENDATION:**

THAT the Salt Spring Island Local Trust Committee approve issuance of Development Permit SS-DP-2013.5 for The Southeast 1/4 of Section 44, The South 1/2 of the Southwest 1/4 of Section 43, The Remainder of the Southeast 1/4 of Section 43 and the Northeast 1/4 of Section 37, All of South Salt Spring Island, Cowichan District (Polaris Land Surveying, Anna's Drive Musgrave Road, Mt Tuam Road).

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Prepared and Submitted by:

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Caitlin Brownrigg

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Date

Concurred in by:

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Leah Hartley

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Date

**Appendix 1: Proposed Development Permit**



# **PROPOSED**

## **SALT SPRING ISLAND LOCAL TRUST COMMITTEE DEVELOPMENT PERMIT SS-DP-2013.5**

TO: Skywater Capital Corp and Robert and Chandra Hershey-Lear

1. This Development Permit (the "Permit") applies to land described below and all buildings, structures and other developments therein:

The Southeast 1/4 of Section 44, The South 1/2 of the Southwest 1/4 of Section 43, The Remainder of the Southeast 1/4 of Section 43 and the Northeast 1/4 of Section 37, All of South Salt Spring Island, Cowichan District

2. Development Permit SS-DP-2013.5 is authorized as follows:

1. Development shall occur substantially in accordance with the report by Kathleen Reimer MSc. dated September 10, 2013 and attached to this Permit as Schedule 1.
2. Development shall occur substantially in accordance with the report by Anderson Civil Consultants Inc. dated May 17, 2013 and attached to this Permit as Schedule 2.
3. Development shall occur substantially in accordance with the following recommendations in Kathleen Reimer's report:
  1. There should be no further disturbance of Development Permit Area 4 (DPA 4). This includes new road building, tree cutting, wood removal, or septic field preparation
  2. There should be no inadvertent lowering of wetland water levels. For example, no existing roadway culverts should be lowered in any way that would result in draining of the wetland habitat.
  3. Wherever possible the wetland water storage capacities should be restored to their natural levels.
  4. The riparian areas on the property between Hope Hill and Mount Tuam should be maintained in a natural state. These zones should not be fenced because they serve as wildlife corridors.
  5. Several old growth wildlife trees were identified by the Biologist. The large old growth trees in or near the riparian areas of the prospered new strata lots should be retained.

4. Development shall be monitored by a Professional Biologist to protect environmental values including animal life and shoreline habitat.
5. Driveways shall be located substantially according to Plan No. 1.
6. The applicant shall submit a post-development report from a professional biologist to Islands Trust detailing compliance with the Development Permit conditions.

All in accordance with Plan No. 1, Plan No. 2, and Schedule 1, attached to and forming part of this Permit, and signed by the Deputy Secretary of the Islands Trust.

3. This authorization is subject to the following conditions:
  1. Any alterations requiring a development permit and not specifically authorized in this Permit may require a new Development Permit or a Development Permit Amendment.
  2. This is NOT a Building Permit, nor does it remove any obligation on the Permittee to obtain other approvals necessary for the lawful completion of the development.

**AUTHORIZING RESOLUTION FOR THE ISSUANCE OF THIS DEVELOPMENT PERMIT  
PASSED BY THE SALT SPRING ISLAND LOCAL TRUST COMMITTEE THIS \_\_ DAY OF \_\_,  
2013.**

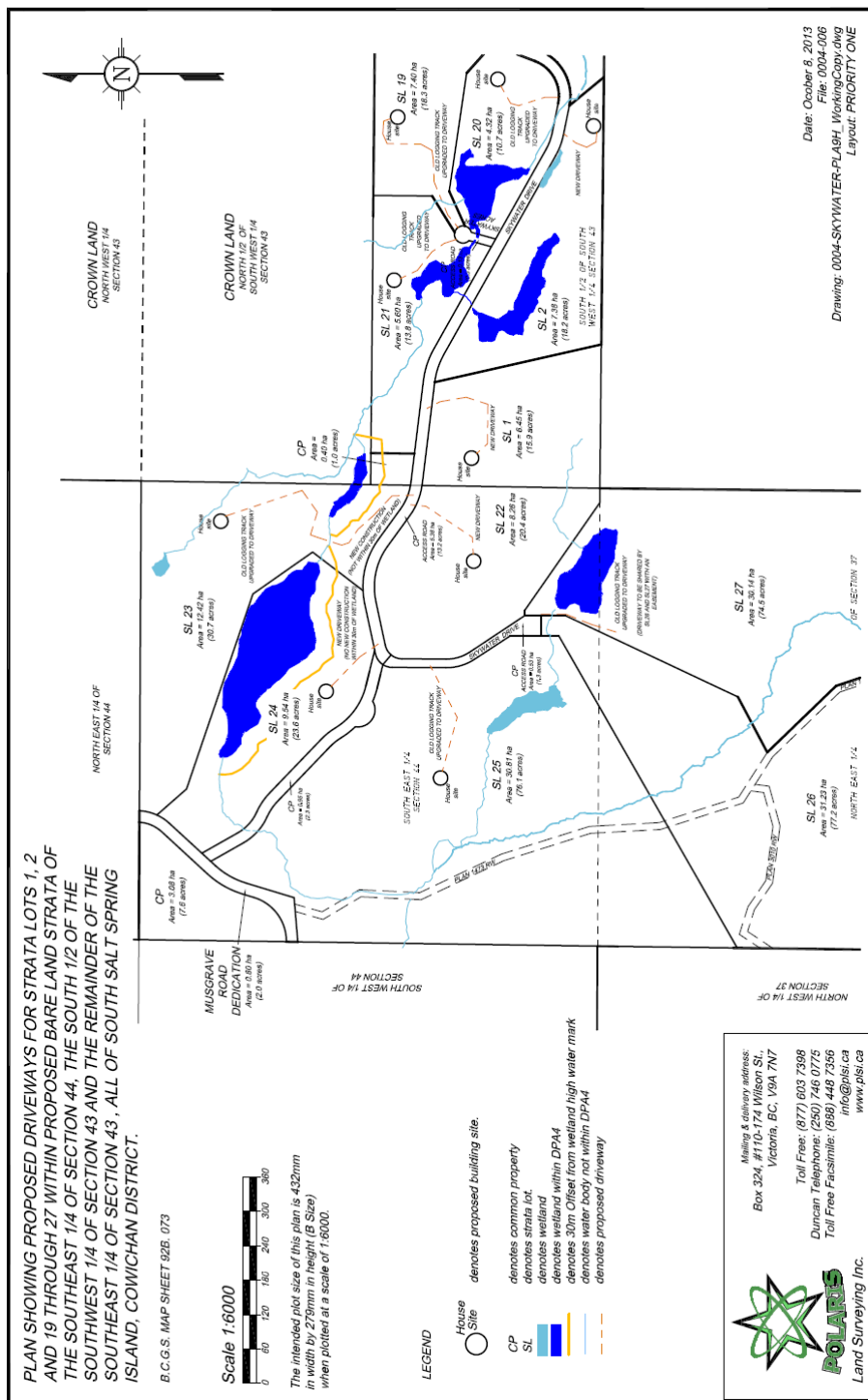
\_\_\_\_\_  
**DEPUTY SECRETARY, ISLANDS TRUST**

\_\_\_\_\_  
**DATE OF ISSUANCE**

**IF THE DEVELOPMENT DESCRIBED HEREIN IS NOT COMMENCED BY THE \_\_TH DAY  
OF \_\_\_\_, 2015 THIS PERMIT AUTOMATICALLY LAPSES.**



## Plan No. 1

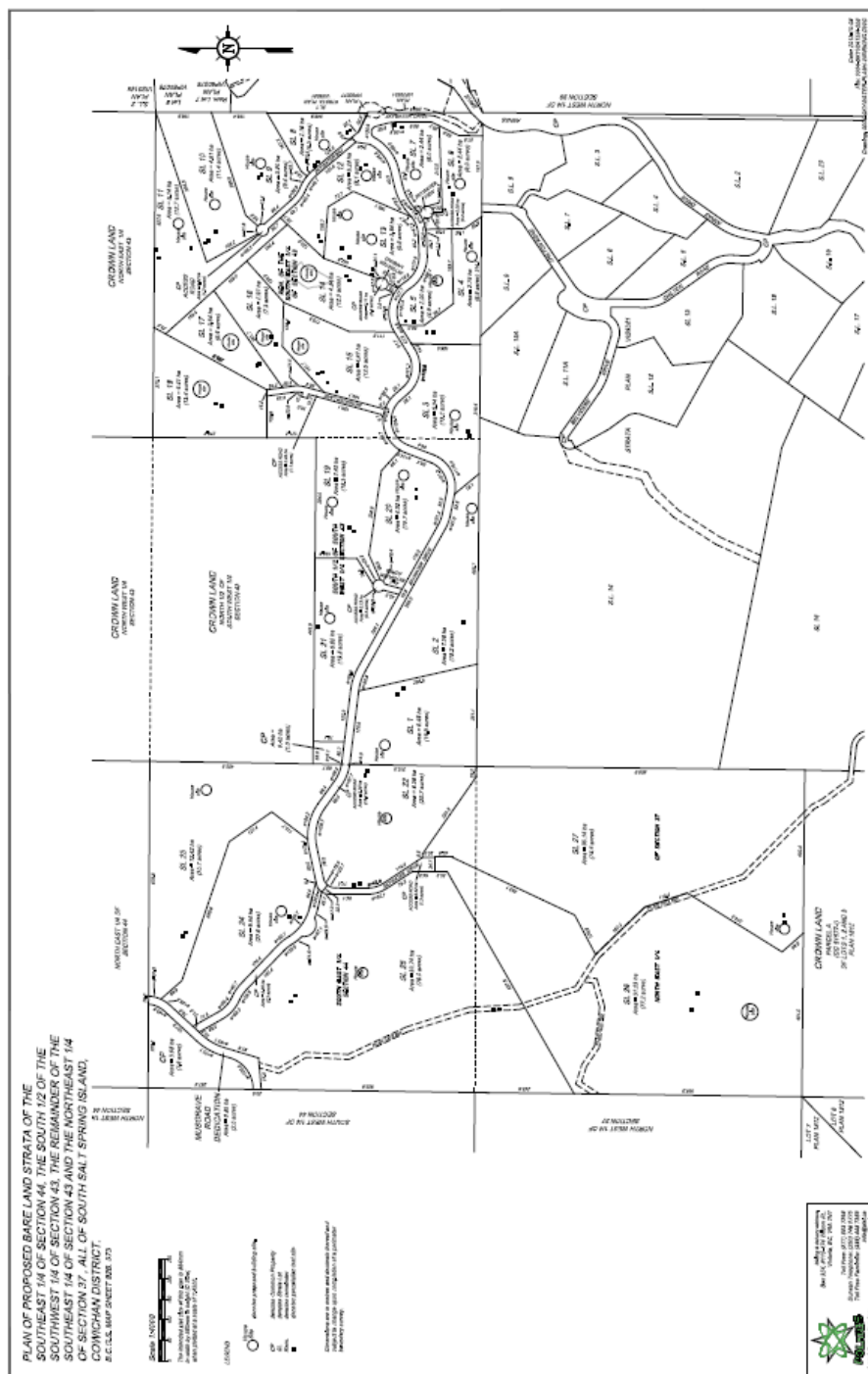


I hereby certify this to be Plan No. 1, which is attached to and forms part of Development Permit SS-DP-2013.5.

Deputy Secretary, Islands Trust

Date Issued

## Plan No. 2



I hereby certify this to be Plan No. 2, which is attached to and forms part of Development Permit SS-DP-2013.5.

Deputy Secretary, Islands Trust

Date Issued



**Kathleen Reimer MSc.,  
Registered Professional Biologist  
Island Stream and Salmon Enhancement Society  
Box 289, Ganges P.O.  
Salt Spring Island, B.C. V8K 2V9**

[kathyreimer@shaw.ca](mailto:kathyreimer@shaw.ca)

To: Mr. Brent Taylor  
Polaris Land Surveying Inc.  
Box 324 #110-174 Wilson St.,  
Victoria, B.C. V9A 7N7

Sept. 10, 2013

**Regarding: Skywater proposed strata development, Sections 43, 44 and 37, South Salt Spring Island. Development Permit Areas for Wetland and Stream habitat**

Dear Mr. Taylor,

We have visited the site and reviewed the plan of the proposed strata development (Map1). We have noted that this 266 hectare land parcel has several wetlands that are both identified as sensitive ecosystems and Islands Trust DPA-4 areas. Five of the individual wetlands are currently designated DPA-4 under Islands Trust Bylaws.

Please note that wetland area A is shown as two separate wetlands on the DPA 4 map. The provincial government's Riparian Areas Regulation would also apply to the proposed development as the four larger wetlands and the associated small water courses flow through the nearby ecological reserve into Cable Creek (aka Big Creek), which is classified as existing and potential fish habitat. The smaller wetlands on Section 37 and the south boundary of Section 44 drain into Fullers Creek which flows west toward Musgrave Landing. Fullers Creek is presently not classified as fish bearing. All the streams on the proposed strata development properties are seasonal.

The wetland boundaries and watercourses were all mapped for this strata development by a B.C. Land Surveyor using a Trimble Geo HX GPS with a Tornado antenna. This information is shown in Map 1.

Map 2 shows the subject site, the watershed information, old growth trees, and the nearby protected areas.

I hereby certify this to be Schedule No. 1 which is attached to and forms part of Development Permit SS-DP-2013.5.

Deputy Secretary, Islands Trust

Date Issued

Map 3 shows that the larger wetlands have peat soils (van Vliet et al, 1985). The provincial governments mapping project has also identified all four of these wetlands as sensitive ecosystems (Map 4) (Ward et al., 1998).

The following is an excerpt from the Development Permit Areas-4 description.

#### DPA-4 Guidelines

E.4.4.1	All work that takes place in this Development Permit Area should be done in a way that minimizes degradation in water quality and disturbance to natural drainage patterns.
E.4.4.3	Native vegetation and trees are to be retained or replaced to control erosion, protect banks and protect fish and wildlife habitat.
E.4.4.4	New roads and septic fields should not be located in this Development Permit Area. If such a location cannot be avoided, then the design and construction of the road or septic field should be supervised by a qualified professional to ensure that the objectives and guidelines of this Area are met. Septic systems that are adjacent to lakes or to streams that drain to lakes should be designed to minimize both nutrient loading and coliform contamination of lake waters.
E.4.4.5	Where this Area includes unique native species dependent on riparian habitat which have been identified by a qualified professional as worthy of particular protection, their habitat areas should be left undisturbed. If development is permitted, it should be undertaken only under the supervision of a professional who is qualified in environmental protection, with advice from the Ministry of Environment, the Department of Fisheries and Oceans, or Environment Canada.
E.4.4.6	To assist in the preparation of development permits for larger projects, the Local Trust Committee could request an applicant to provide a report, prepared by a qualified professional with experience in surface water management and the protection of habitat. The report should indicate the type of conditions that should be incorporated into the development permit to achieve the objectives and comply with the guidelines of this Development Permit Area.

Wetland areas A, B, E and G (Map1) are within the Islands Trust DPA-4. The existing roads are presently being upgraded. Most of the riparian zones are undisturbed and maintenance of these existing access roads should not adversely affect the DPA wetlands provided that there is no additional tree removal.

The proposed development plan (Map 1) shows that there are no building sites or new roads within the DPA-4 area or the 30 metre Riparian Areas Regulation (RAR) assessment zone on the more sensitive south side of the wetlands.

The watercourses that flow from wetland areas that drain into Cable Creek would require an RAR assessment. However, the building sites are over 10 metres from the two small seasonal streams (10 m is the usual RAR setback for small island water courses and the north side of wetlands).

The following pages summarize the existing environmental resources on the Skywater properties and outline the procedures that should be observed during the proposed strata development.

## **Riparian Areas Regulation (RAR) requirements**

This provincial and federal government regulation requires that all new developments with streams or wetlands involved must have an assessment completed by qualified personnel in order to determine what setback will be required and to prevent damage to the water courses and riparian areas. The RAR assessment zone is 30 metres from the high water mark.

The following excerpt from the Riparian Areas assessment guidelines defines which watercourses are subject to the regulation.

**RIPARIAN AREAS REGULATION** definition - stream "includes any of the following that provides fish habitat:

- (a) a watercourse, whether it usually contains water or not;
- (b) a pond, lake, river, creek, brook;
- (c) a ditch, spring or wetland that is connected by surface flow to something referred to in paragraph (a) or (b)."

Side channels, intermittent streams, seasonally wetted contiguous areas are included by the definition of a stream which includes active floodplains and wetlands connected to streams.

Because there is potential and existing fish habitat downstream on Cable Creek, (Photographs 13-14), these definitions apply to the wetlands on the Skywater development.

The undisturbed zone that is determined by the assessment is known as the Streamside Protection and Enhancement area or SPEA. The usual SPEA for wetlands where trees are the main riparian vegetation is 15 metres. The south side of a wetland, however, is a full 30 metres because of shade requirements. Figure 1 illustrates how a wetland SPEA is calculated.

On the proposed Skywater development there are no activities apart from road maintenance planned within the 30 metre assessment zone on the south side of all four wetland areas. The locations of the house sites are clearly shown on the development plan (Map 1). These sites are also over 10 metres from the seasonal streams that drain all the wetland areas.

## **Description of Skywater property Riparian Area vegetation**

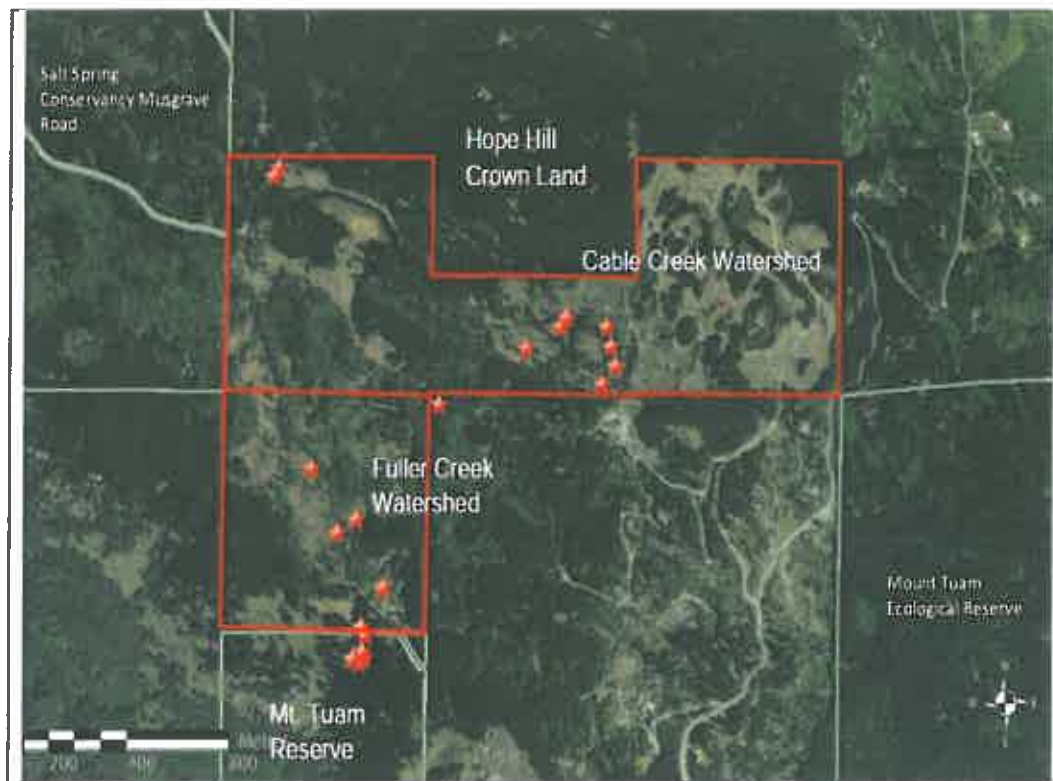
The property was managed as a forestry operation for many years and has been logged several times. It has recently been replanted with Douglas fir and white pine seedlings. There are a few larger second growth trees remaining and there are several old growth fir trees on the two properties (Photo 10, Map 2). They are not presently used as raptor nest trees but they are an integral part of the wildlife corridors that presently exist between the nearby protected Hope Hill-Mt. Tuam areas. They are used as perch trees for larger birds such as eagles and owls and should not be disturbed.



In general the riparian areas along the several small watercourses are intact (Photograph 7, 8, 9) except for some near wetland area A which were logged by previous owners (Photograph 12). These streams are seasonal and the wetlands, especially wetland C and G, provide year round water for birds and wild life (Photograph 3).

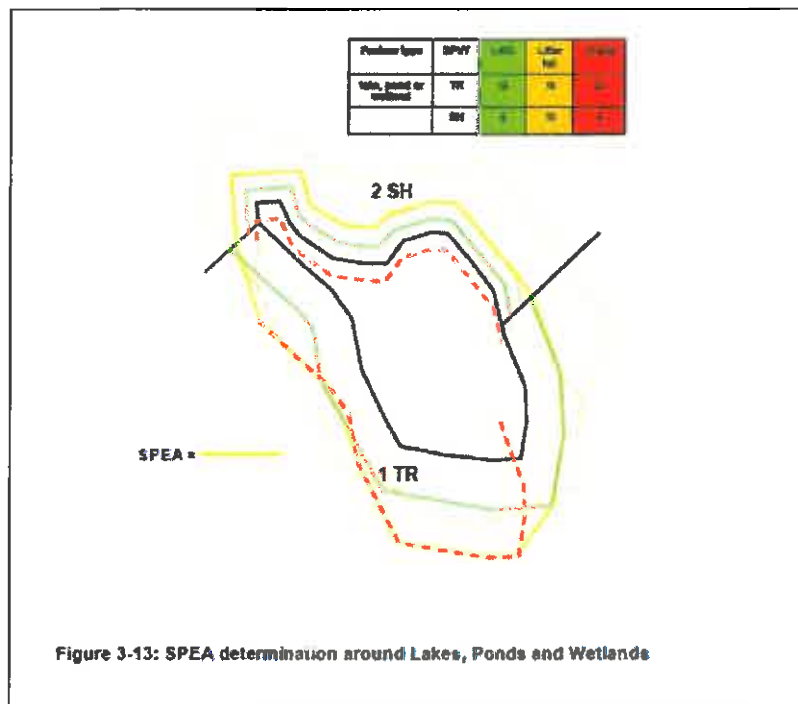
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**Map 2. Orthophoto showing subject site (outlined in red), Protected Areas near Mt. Tuam, Watershed information, Old growth Douglas fir perch trees (red stars)**

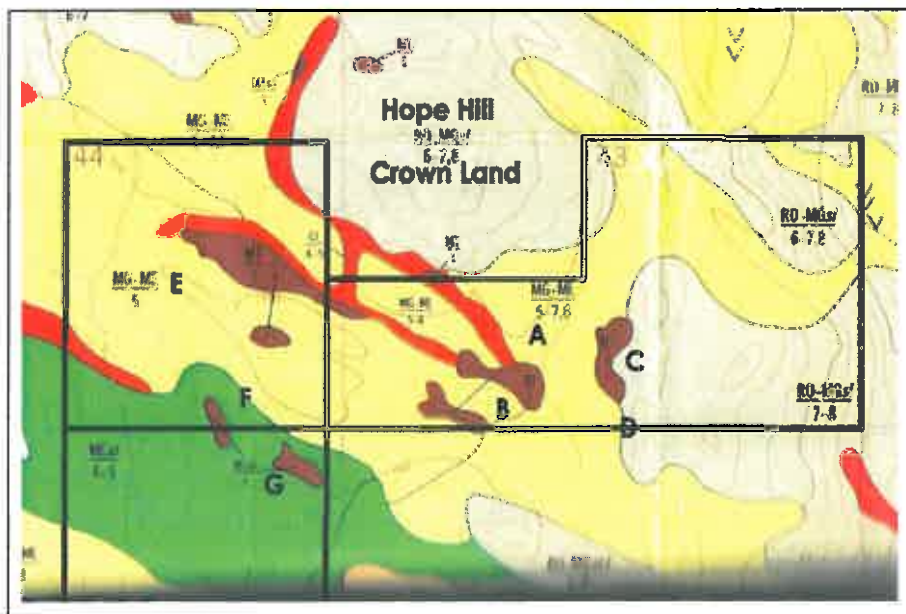




**Figure 1. Riparian Areas regulation determination of Stream Protected Areas for wetlands (From RAR assessment manual)**



**Map 3. Soils of the Hope Hill area showing approximate wetland location and Metchosin or peat (brown) soils (from van Vliet et al, 1985).**



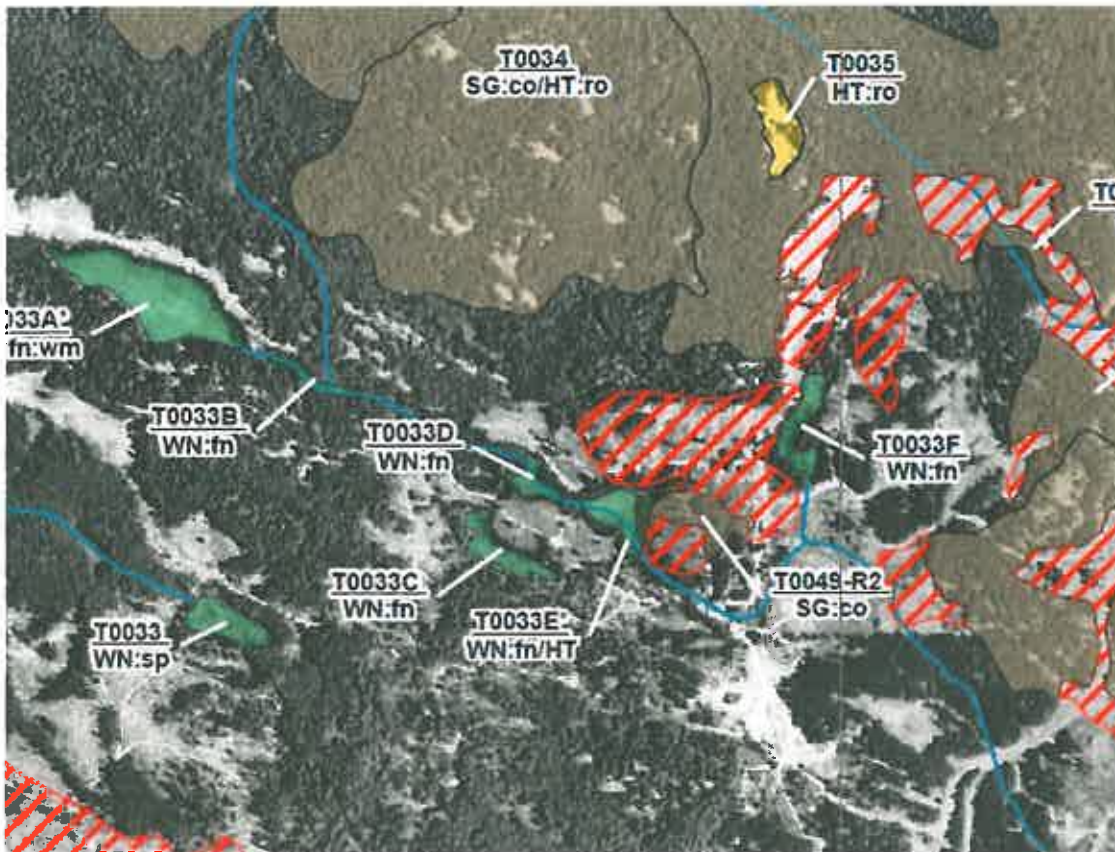
## Skywater Development Sensitive Ecosystems

Ward et al, 1998 have mapped sensitive ecosystems on the southern Gulf Islands. The process has also included a considerable amount of ground truthing and public input. The results can be found on the BC Provincial Government Web site: <http://www.env.gov.bc.ca/sei/> Map number 92B073

All of the larger wetlands on Section 43 and 44 have been identified as Sensitive Ecosystems (Map 4). The small wetland G on the boundary of Sections 37 and 44 is also in DPA 4 and shown on the Sensitive Ecosystem maps.

They are somewhat protected by the Islands Trust Development Permit Area 4 mainly because of their peat soils. The wetlands support a great deal of biodiversity because they are the main source of year round water for mammals, birds, amphibians and other wildlife. There are very few other fresh water sources in this area of the island. The riparian areas also provide important wildlife corridor connectivity between the Hope Hill lands and the large protected areas near Mt. Tuam.

### Map 4. Sensitive Ecosystems Map



From Ward et al., 1998

## **Develop with Care recommendations for the protection of environmentally valuable resources**

Develop with Care (DWC), the provincial Ministry of Environment guideline for land development provides information for planners and Land Developers. These new standards are being promoted as the model for all land development in British Columbia. Two of the most important environmentally valuable assets that they define are listed below.

1. **Riparian areas.**  
“Even very small wetlands and riparian areas are important for biodiversity. Most wildlife use wetlands at some point in their life cycle”.
2. **Specialized Habitats**
  - “Snags (wildlife trees) are often teeming with insect life: therefore they provide a food source for birds such as woodpeckers. As snags rot, birds and animals will use cavities in the tree for shelter and nest sites”.
  - “Mature, large-limbed trees may provide nesting and roosting sites for raptors”

The wetlands of the Skywater property are unique sensitive ecosystems and biologically productive features for this part of Salt Spring Island. They also provide the only year round water for the wildlife that live there.

### **Recommendations for Skywater land development**

1. There should be no further disturbance within the DPA-4 zone-this includes new road building, tree cutting, wood removal, or septic field preparation.
2. There should be no inadvertent lowering of wetland water levels. For example, no existing roadway culverts should be lowered in any way that would cause draining of the wetland habitat.
3. Wherever possible the wetland water storage capacities should be restored to their natural levels.
4. The riparian areas on the property between Hope Hill and Mount Tuam should be maintained in a natural state. Because these zones also serve as wildlife corridors they should not be fenced to prevent wildlife from using them. These riparian areas and the associated watercourses should be protected by the Riparian Areas Regulation.
5. Several old growth wildlife trees were located. As part of the development the large old growth trees in or near the riparian areas of the proposed new strata lots should be retained.

Please let me know if you need more information.

Kathleen Reimer MSc.

Registered Professional Biologist



## List of References

BC Conservation Data Centre: Terrestrial Information Mapping Service [web application]. 2004. Victoria, British Columbia, Canada. Available:

[http://maps.gov.bc.ca/imf406/imf.jsp?site=rrid\\_tib\\_ti](http://maps.gov.bc.ca/imf406/imf.jsp?site=rrid_tib_ti)

**Sensitive ecosystems inventory, web site** <http://www.env.gov.bc.ca/sei/>

BC Ministry of Environment: 2006. Develop with Care: Environmental Guidelines for Urban and Rural Land Development in British Columbia. , Environmental stewardship department. Web site: <http://www.env.gov.bc.ca/wld/documents/bmp/devwithcare2012/DWC-Section-4.pdf>

National Audobon Society. 1979. Field Guide to North American Reptiles and Amphibians , Knopf Inc. New York

Pojar, Jim and McKinnon, A., 1994. Plants of Coastal British Columbia. Lone Tree Publishing Vancouver B.C.

Van Vliet, L. et al, 1985. Soils of the Gulf Islands and Salt Spring Island. Soil Survey report #43. Agriculture Canada publication

Ward, P.G., G. Radcliffe, J. Kirkby, J. Illingworth and C. Cadrin, 1998. Sensitive Ecosystems Inventory: East Vancouver Island and Gulf Islands. 1993-1997. Volume 1. Methodology, Ecological Descriptions and Results. Technical Report Series No. 320. Canadian Wildlife Service. Pacific and Yukon Region, British Columbia.



**Photograph 1. Wetland Area A. The vegetation is mainly sedges and second growth trees**



**Photograph 2 Wetland area B**



**Photograph 3 Wetland Area C. There is year round water in this important wetland**



**Photograph 4 Wetland Area D. Below the main access road**





**Photograph 5. Wetland E. An old homestead site is located on the south side and the land was used for farming in the early 1900s.**



**Photograph 5a. Close-up view of sedges in wetland E**





**Photograph 6. Wetland G. The most natural of all the Skywater area wetlands. There are cattails and native water lilies present. This area drains into Fullers Creek which is not known to be fish bearing**



**Photograph 7. The intact riparian area along the upper reaches of Fullers Creek**



**Photograph 8. Small seasonal Creek drains from Wetland E into Wetland area A**



**Photograph 9. Riparian area along seasonal creek draining Wetland Area C toward Cable creek**





**Photograph 10. Old growth perch tree near wetland area A. There are several perch trees in the south-west quarter of section 43 (Map 2)**



**Photograph 11. Replanted forest on north side of wetland area A. The Skywater properties were logged and replanted several times during the 1900s**



**Photograph 12. Logged section of seasonal watercourse near wetland area A**





**Photograph 13. Orthophoto from CRD atlas showing the estuary of Cable Creek**



**Photograph 14. Cable Creek upstream of the estuary Aug. 6, 2013 -pockets of water seen**





**ANDERSON CIVIL**  
*Consultants Inc.*

I hereby certify this to be Schedule No. 2  
which is attached to and forms part of  
Development Permit SS-DP-2013.5.

Deputy Secretary, Islands Trust

Date Issued

Ministry of Transportation and Infrastructure  
Vancouver Island District  
3<sup>rd</sup> Floor, 2100 Labieux Road  
Nanaimo, BC V9T 6E9

MoTI file: 01-001-24610  
File: 2235A  
May 17, 2013

**Attention: Debbie O'Brien, AScT**  
**Acting Provincial Approving Officer**

Dear Debbie,

**Re: Skywater Capital Corp.**  
**Proposed Bare Land Strata Subdivision**  
**SE ¼ of Sec. 44, S ½ of the SW ¼ of Section 43, Remainder of the SE ¼ of**  
**Section 43, and the NW ¼ of Section 37, all of South Salt Spring Island,**  
**Cowichan District**  
**Drainage Study**

This drainage study is provided in support of the proposed subdivision of four lots on Salt Spring Island. This report is prepared in response to Item 7 of the PLA issued on 26 April, 2013, and is intended to also address the issues raised in Item 3 in the Islands Trust subdivision referral form dated 24 April, 2013.

In preparation of this report we have reviewed the following:

- Plan of Proposed Subdivision by Polaris Land Surveying Inc. dated 3 May, 2013.
- Salt Spring Island Land Use Bylaw 355 (consolidated to May 2011).
- Islands Trust Subdivision Referral Form dated 24 April, 2013, file number SS-SUV-2006.12.
- MoTI PLA dated 30 April, 2013, file number 01-001-24610.
- BC MoT Supplement to TAC Geometric Design Guide, June 2007, Section 1010.
- MMCD Design Guidelines Manual
- Stormwater Planning, A Guidebook for British Columbia.
- Regional Community Atlas Mapping by CRD.
- Site topographic contour mapping (1.0 m contour interval) provided by Polaris Land Surveying Inc.

We first visited the site for the purposes of this study on 5 November, 2012 and completed an extensive review of the topography, existing roads and tracks, and the alignment of the proposed upgraded access road. We have since completed field reviews of the surrounding territory, including the strata subdivision to the south and the lands accessible from the Musgrave Landing Road (Figure 1).

The subject land was originally heavily forested with second growth mixed deciduous and conifer trees. The land has been logged of merchantable timber and extensively cleared and remediated to remove the remaining logging debris. Original logging roads and accesses used for previous logging are being redeveloped for the purpose of the current project.

Salt Spring Island is a naturally dry area lying in the rain shadow of Vancouver Island. None of the water courses, with the exception of Creeks A and B locally, show any evidence of high flows or of scouring from past rainstorm events.

The lands proposed for subdivision (Figure 2) are located between an elevation of 350 m and 500 m, south of Hope Hill and north of Mt. Tuam.

The surface drainage configuration of each existing lot is significantly different:

- The NE  $\frac{1}{4}$  of Section 37 drains to the northwest and includes minor seasonal watercourses. No development of access roads is proposed and includes only 2 house sites with driveways. Due to the limited development of very large lots, there will be no detectable impact on the runoff.
- The SE  $\frac{1}{4}$  of Section 44 includes a few small seasonal watercourses lying NW / SE. In the northern part, adjacent to the slopes of Hope Hill lies a manmade wetland. This has seasonal outlet overflows to the west and to the east. Development in this lot includes the access road running east to west and a single common driveway. The access road will follow the old logging road on the dry ridge between the two seasonal watercourses. The common driveway will partly follow the original logging tracks and will have no negative impact on runoff.
- The South  $\frac{1}{2}$  of SW  $\frac{1}{4}$  of Section 43 lies between the two main areas. The land includes a number of wetlands created by ridges trending east / west. Water flows in from the  $\frac{1}{4}$  section to the west and from Hope Hill to the north. This property includes one of only two significant creeks in the project (Creek A). The creek follows a stable watercourse and will be crossed once by the access road. From recent observations, this creek is seasonal or intermittent. Except for one crossing, the driveways will have negligible impact on this creek or environmentally sensitive areas.
- The Remainder of SE  $\frac{1}{4}$  of Section 43 is the eastern part of the development. It includes several steep knolls and drainage is split with the south part flowing south and the north part to the north. Creek A from the west crosses the southwest corner and flows south and through the adjacent Mount Tuam Strata. The majority of this land flows to the north. A second creek (Creek B) flows from west to east north of the development (Figure 3). From an earlier investigation conducted in July 2011 on an adjacent property to the east, this creek is seasonal. A very steep slope crosses the northeast corner of the land; this represents the face of the mountain range lying west of Fulford Harbour. This slope has no direct impact on the drainage on or from the development, but has a significant impact on the configuration of the Anna's Drive access to the proposed subdivision and to the Mount Tuam Strata to the south.

For rainwater runoff calculations, additional reference resources in RTAC Drainage Manual, Volume 1 and Volume 2 were used (Figure 4). The closest IDF curve is for Victoria International Airport and an additional 10% was added to the intensities to account for the increased elevation and exposure (Figure 5). The following calculation identifies potential increase in runoff as a result of the proposed on-site development.





### Drainage Basin, Creek A (Figure 3)

Total Area = 951,000 m<sup>2</sup>

6 building sites	House	300 m <sup>2</sup>
	Parking	200 m <sup>2</sup>
	Access	250 m <sup>2</sup> x 4 = 1,000 m <sup>2</sup>
	Total:	1,500 m <sup>2</sup>

Coefficient of runoff pre-development C = 0.50

Coefficient of runoff post-development

$$= \frac{(6 \times 1.50 \times 0.9) + (942 \times 0.50)}{951}$$

$$= 0.504$$

The increase in runoff from development is not mathematically significant (<1%).

### Design Flow at Culvert:

Total area	95.1 ha
Average slope	7.25%
Basin length	2,200 m
$t_c$	= 95 min
$i_{10}$	= 14 mm/hr
$i_{100}$	= 20 mm/hr

$$Q = \frac{CiA}{360} \text{ m}^3/\text{s}$$

$$Q_{10} = 1.86 \text{ m}^3/\text{s}$$

$$Q_{100} = 2.65 \text{ m}^3/\text{s}$$

### Drainage Basin, Creek B (Figure 4)

Total Area = 769,500 m<sup>2</sup>.

11 building sites:	House	300 m <sup>2</sup>
	Parking	200 m <sup>2</sup>
	Access	150 m <sup>2</sup> x 4 = 600 m <sup>2</sup>
		1,100 m <sup>2</sup>
	Total (11)	12,100 m <sup>2</sup>
Common driveways:	900 x 5.5	= 4,950 m <sup>2</sup>
Common Access Road:	400 x 7	= 2,800 m <sup>2</sup>
Total developed area:		= 19,850 m <sup>2</sup>

Coefficient of runoff pre-development, C = 0.50

Coefficient of runoff post-development

$$= \frac{(19.85 \times 0.9) + (749.65 \times 0.50)}{769.5}$$

$$= 0.51$$

The increase in runoff from development is not mathematically significant.



The sub-basins of Creek B show no identifiable watercourses. The flows are decentralised and diffuse.

The drainage calculations are for each of the principal catchments of two creeks which pass through or close to the site. In the case of Creek A, the only crossing will be the main access road (Figure 3); otherwise only individual driveways will cross watercourses.

Based on inlet control for culvert sizing, and a maximum headwater depth not exceeding the diameter, the in-line culvert on Creek A is recommended at 1,200 mm diameter for  $Q_{10}$ .

The common property access road runs from the east edge of the development at Anna's Drive, generally along the catchment boundary between Creek A and Creek B and towards the west boundary of the development. Other than Creek A, there are no existing identifiable creeks crossing the proposed access road. Culverts have been designed under this road to convey storm runoff from one side to the other and maintain the existing watershed definition established by the original topography. The culvert diameters have been set at a nominal 400 mm for maintenance reasons. All the localized design flows are within the inlet capacity of this diameter.

The drainage from the southeast corner of the development flows in an easterly direction overland, without any identified watercourses (Figure 3). The existing road access includes a number of small diameter culverts which avoids any significant accumulation of flow in the uphill side ditch. Locally, 400 mm diameter culverts will be constructed under this section of access road to maintain the diffuse nature of the flow in an easterly direction.

The original property has been extensively logged and only approximately 20% tree cover remains. Since the end of logging, extensive debris cleanup has been completed and natural regeneration is showing extensive re-growth of seedlings throughout the site. Within the next 10 to 20 years, this will become a significantly forested land again and the runoff coefficient will be materially reduced from the current conditions.

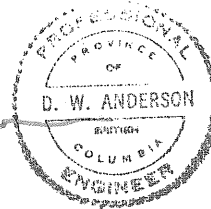
The drainage systems for the subdivision have been designed generally in accordance with Section 5.7 of the Salt Spring Island Land Use Bylaw #355 and are in compliance with the requirements of Sections 4.4 and 4.5. The objective of the drainage design of the access roads and driveways is to maintain the existing drainage pattern and not create any material increase in the runoff at any location.

Based on our site visits, it is our opinion that the existing drainage will maximise the amount of precipitation that percolates into the ground, will minimise the direct overland runoff and will minimise the impact on the quality and quantity of groundwater. The continuity of the existing surface drainage systems will be maintained and will not contribute to scouring and erosion.



If you require any additional information or detail on the drainage for this site, please do not hesitate to contact us directly at this office.

**Yours truly,  
AndersonCivil Consultants Inc.**



**Douglas W. Anderson, P.Eng**

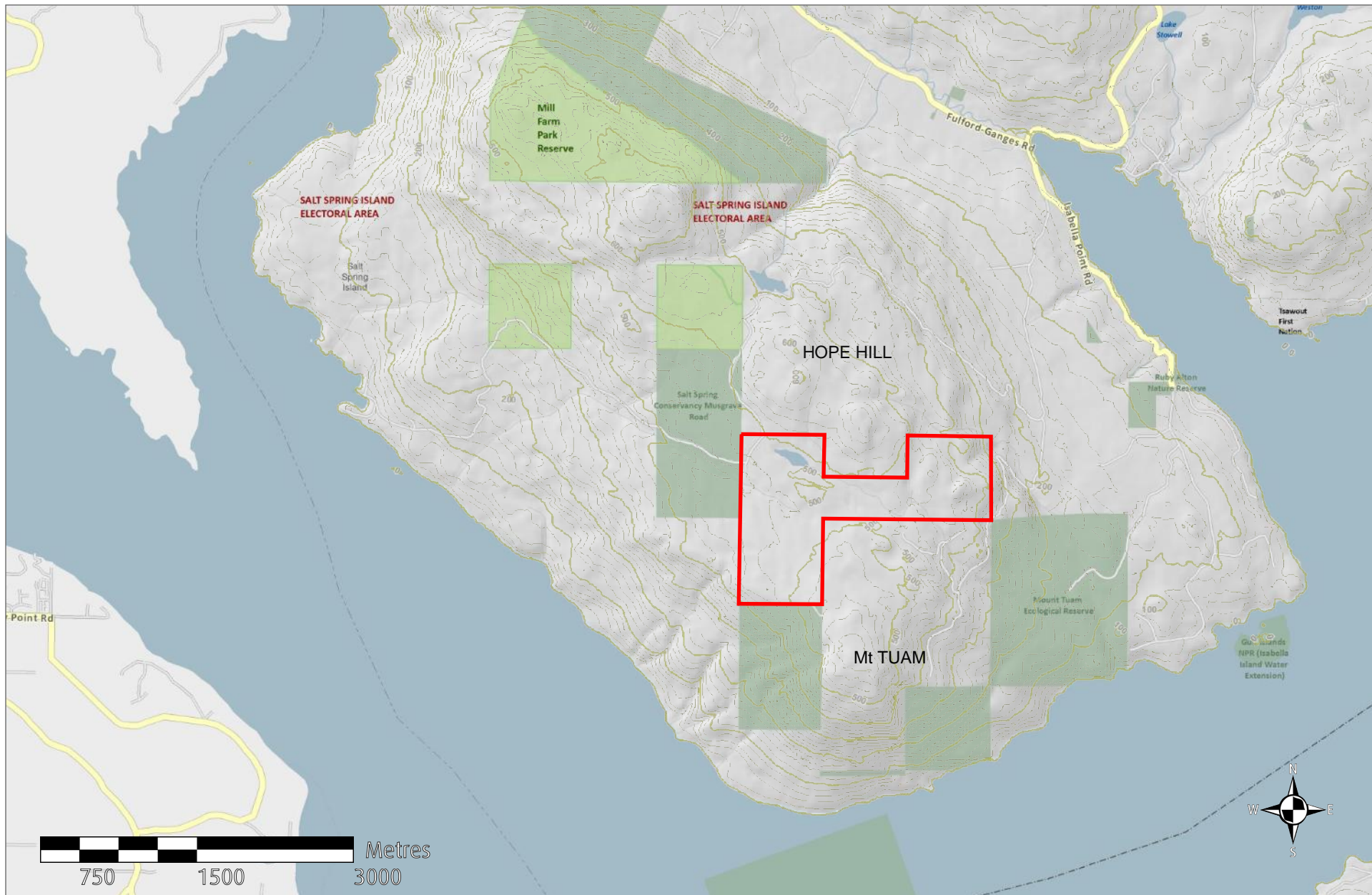
DWA/cr

Enclosures

cc: Skywater Capital Corp, Attn: Al Langard  
Polaris Land Surveying Inc. Attn: Brent Taylor

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### Important

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Printed Fri, May 10, 2013

## SKYWATER DEVELOPMENT

Site Location

### Regional Community Atlas

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

CRD  
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PLAN OF PROPOSED BARE LAND STRATA OF THE SOUTHEAST 1/4 OF SECTION 44, THE SOUTH 1/2 OF THE SOUTHWEST 1/4 OF SECTION 43, THE REMAINDER OF THE SOUTHEAST 1/4 OF SECTION 43 AND THE NORTHEAST 1/4 OF SECTION 37, ALL OF SOUTH SALT SPRING ISLAND, COWICHAN DISTRICT.

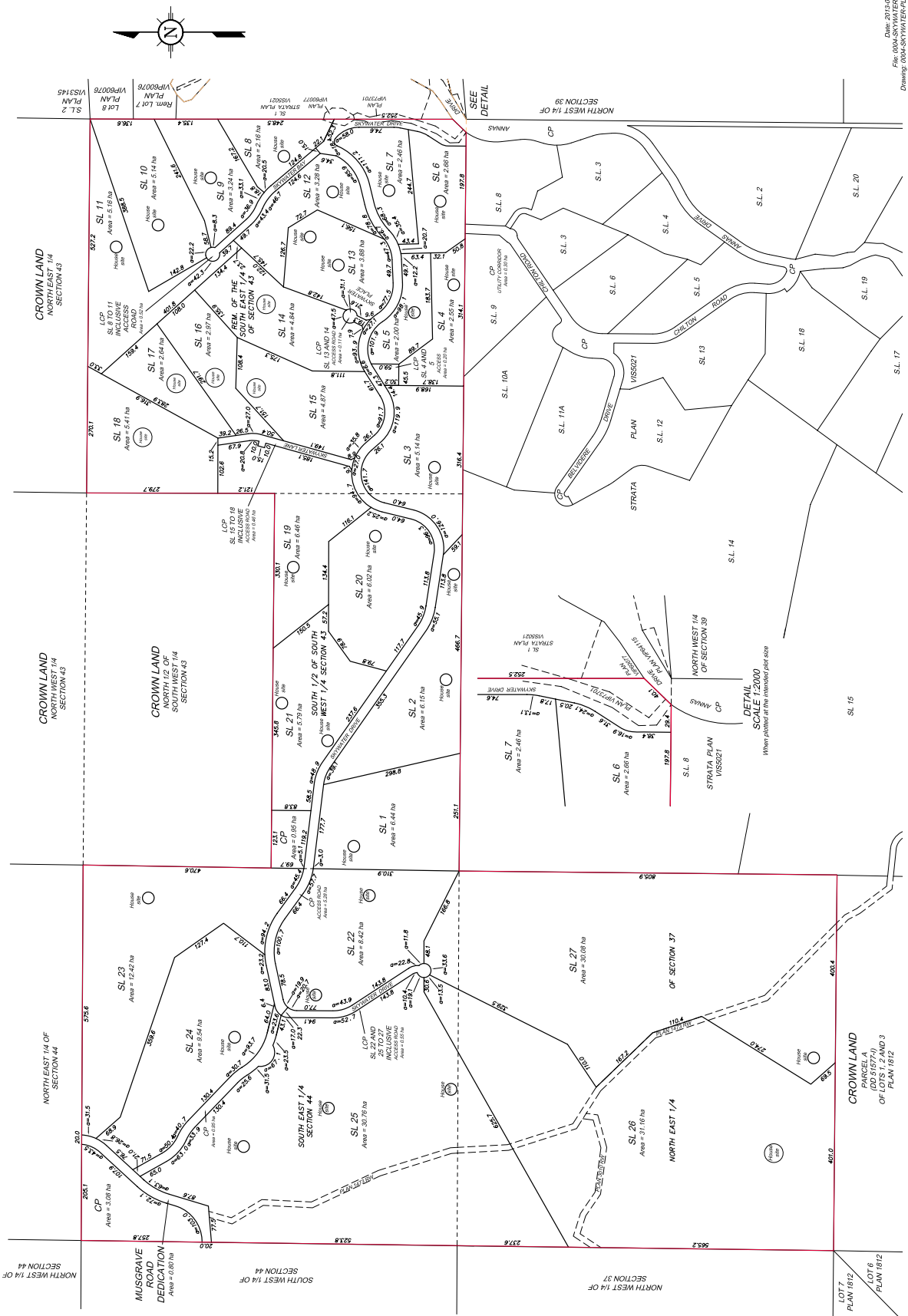
B.C.G.S. MAP SHEET 92B 073

Scale 1:4000

The area shown on this map is shown in white by 500mm in height (D Size) when plotted at a scale of 1:4000.

LEGEND

- House
- CP denotes proposed building site
- CP denotes Common Property
- LCP denotes Limited Common Property
- Rem. denotes remainder
- denotes parcelation first site
- CP Road Access 8, 20 or 15 metres wide.
- Dimensions are in metres and decimals thereof and subject to change upon completion of a perimeter boundary survey.



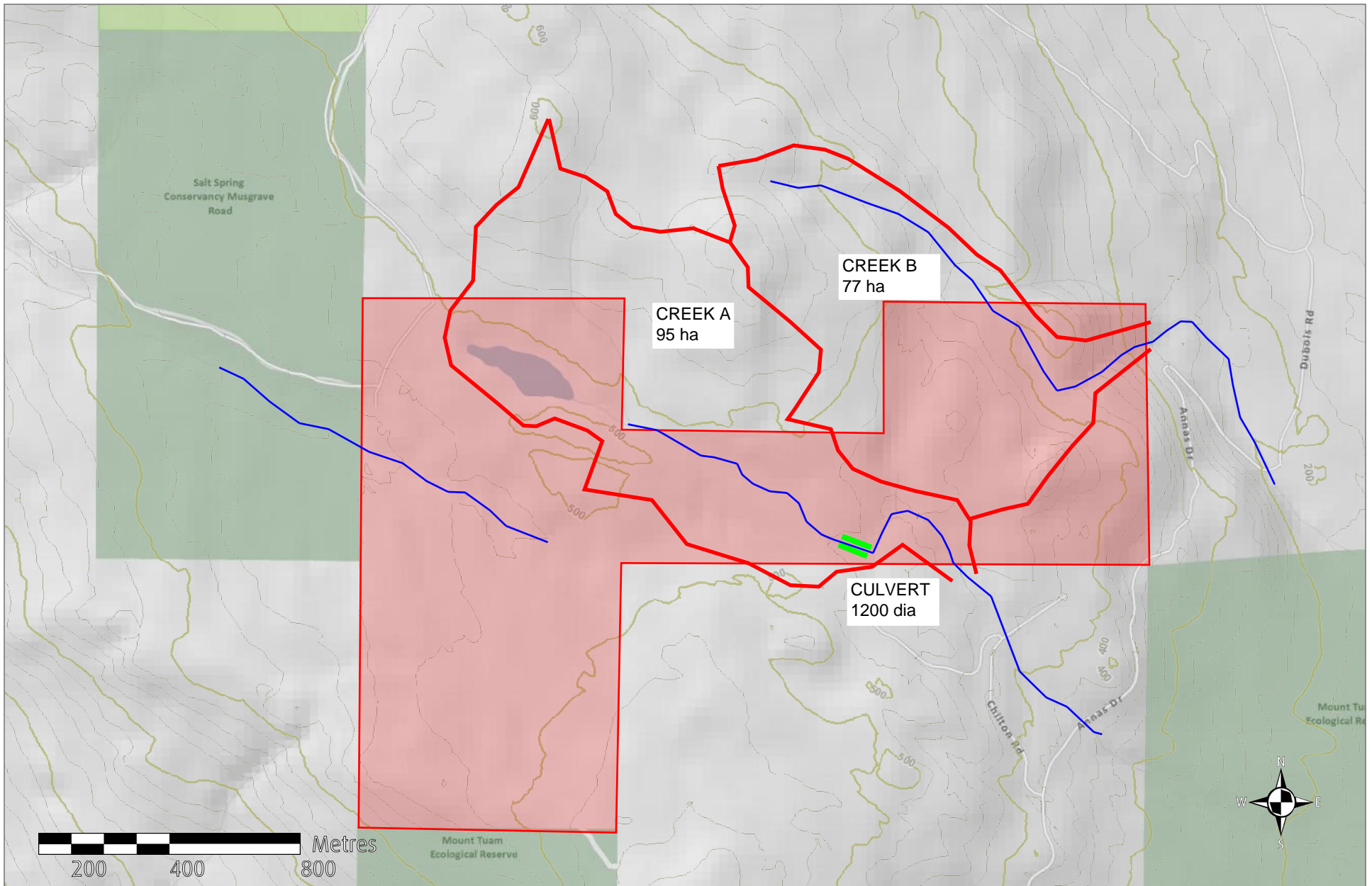
Map 4 delivery address:  
Box 324, #110-174 Wilson St.  
Victoria, BC, V8N 1W7  
Tel Free: (877) 652 7289  
Duncan Tel: (250) 449 7289  
Tel Free Facsimile: (888) 449 7286  
info@pac.ca  
www.pac.ca



Date: 2012-05-03  
File: 0004-SKY-WATER-006  
Drawing: 0004-SKY-WATER-006  
Layout: P-010

FIGURE 2





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## SKYWATER SUBDIVISION

Catchment Areas, Creeks A & B

### Regional Community Atlas

Capital Regional District  
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basins and for simple urban systems. The formula takes account of the runoff coefficient as well as slope and distance.

$$t_c = 3.26 [(1.1 - C) L^{0.5} / S^{0.33}] \quad (2.4.2)$$

where  $t_c$  = time of concentration, min

$C$  = runoff coefficient

$L$  = distanced travelled, m

$S$  = slope of travel path, %.

Travel times for individual surfaces along the path of flow should be summed to find the total time of concentration. For distances of 350 m or less, the curves in Figure 2.4.1 can be used. No maximum area is specified for this method, but a suggested limit is one square kilometre.

**SCS Upland Method (7)** This method is limited to basins or sub-basins up to 10 square kilo-

metres, and applies to overland flow and flow in gullies and grassed waterways. It does not allow for variations of soil type, and may therefore underestimate times for very permeable basins. From Figure 2.4.2 the velocity and hence travel time for each type of surface can be determined, and the individual times summed to give the time of concentration.

**SCS Curve Number Method** This method, which is somewhat more complex than the others, was developed by the SCS (7) to determine lag times (see Figure 2.7.1 for definition of lag time,  $T_L$ ) in natural basins up to approximately 10 square kilometres for developing synthetic unit hydrographs. Preliminary indications are that the results achieved are more realistic than those given by other methods. The method requires that soil/land use characteristics be quantified in terms of the SCS curve numbers described in Subsection 2.2.3. The curve number method takes account of soil type, cover or land use,

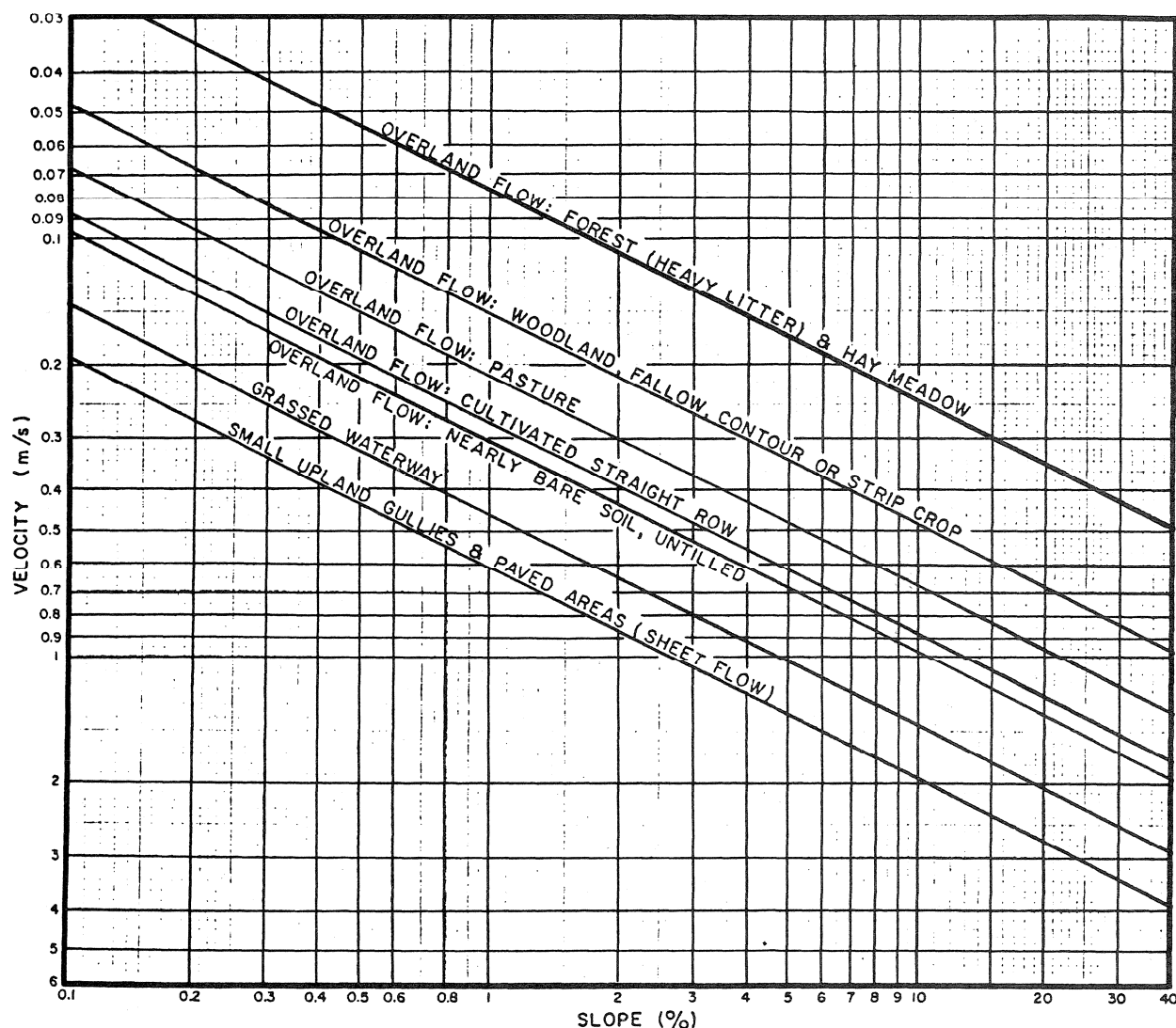


Figure 2.4.2 — Upland method for estimating time of concentration (7)



# Short Duration Rainfall Intensity–Duration–Frequency Data

2011/05/17

## Données sur l'intensité, la durée et la fréquence des chutes de pluie de courte durée

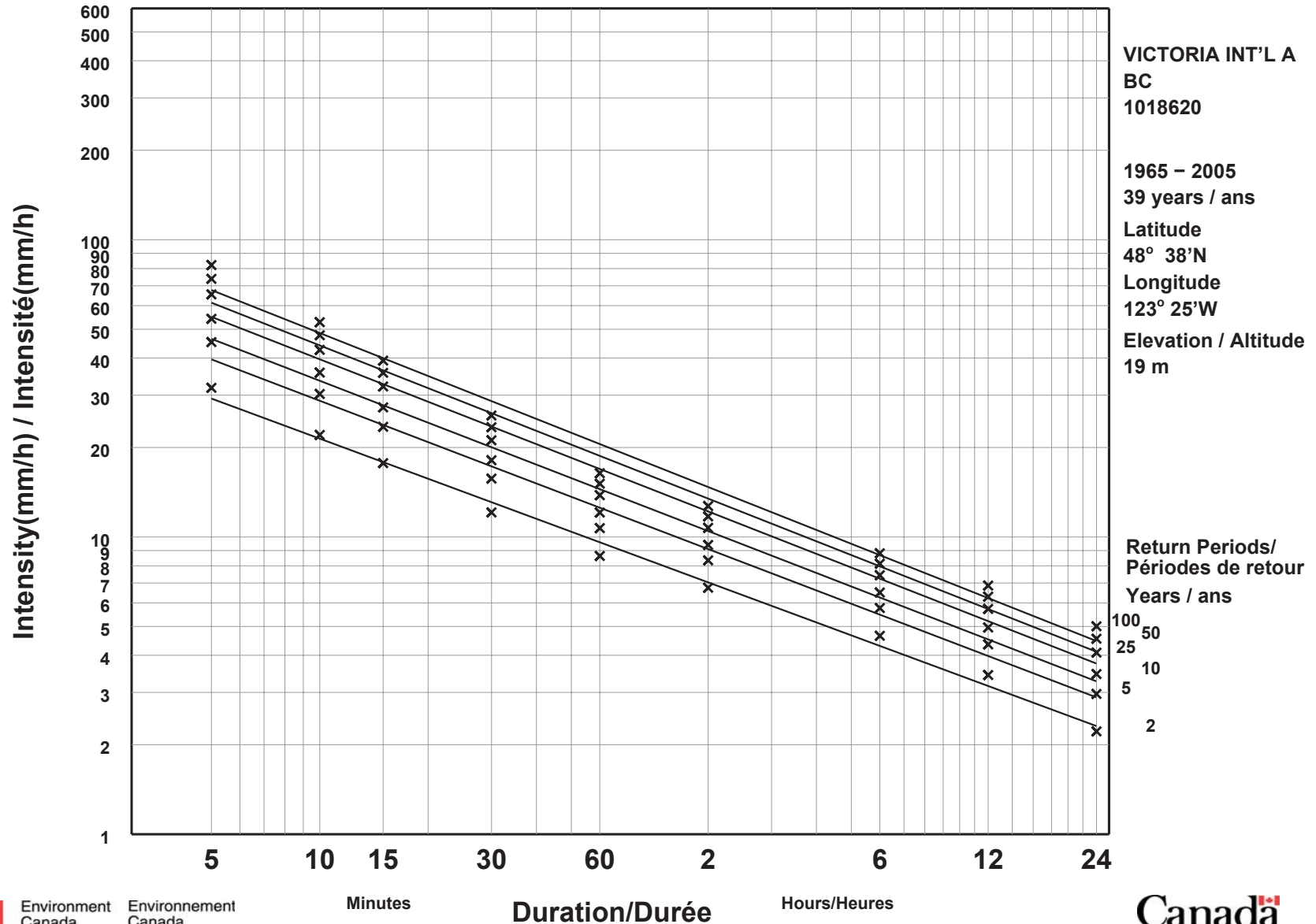


FIGURE 5



Environment  
Canada

Environnement  
Canada

Minutes

Duration/Durée

Hours/Heures

Canada