

REPORT TO COUNCIL



Date: July 31, 2012
To: City Manager
From: Land Use Management, Community Sustainability (GS)
Application: DP11-0103 **Owner:** Thomas Greenough
Sandra Greenough
Address: 250 Lochview Road **Applicant:** Arda Consultants Ltd.
Subject: Development Permit - Natural Environment/Hazardous Conditions

Existing OCP Designation: Single / Two Unit Residential
Single / Two Unit Residential - Hillside
Existing Zone: A1 - Agriculture 1
P4 - Utilities
Proposed Zone: A1 - Agriculture 1
P4 - Utilities

1.0 Recommendation

THAT Council, receives, for information, the Report from the Land Use Management Department dated July 31, 2012;

AND THAT Council defers consideration of Development Permit No. DP11-0103 for Lot 6, Sections 7 & 8, Township 23, ODYD, Plan 41162, located at 250 Lochview Road, Kelowna, BC to the August 20, 2012 meeting of Council;

AND FURTHER THAT, at the August 20, 2012 meeting of Council, Council will consider the following resolution:

THAT Council NOT authorize the issuance of Development Permit No. DP11-0103 for Lot 6, Sections 7 & 8, Township 23, ODYD, Plan 41162, located at 250 Lochview Road, Kelowna, BC.

2.0 Purpose

The subject property is designated as Natural Environment and Hazardous Condition Development Permit Areas as per OCP Maps 5.5 and 5.6 respectively. Council is being asked to authorize development within a "Natural Environment" Development Permit Area (Okanagan Lake) and in an area designated as "Hazardous Condition" due to steep slopes. The proposed development is contrary to existing City policy and cannot be approved at the staff level¹, which necessitates Council consideration of this Development Permit.

¹ Council consideration is consistent with Development Application Procedures Bylaw (10540) - Schedule 3, Section 2.1.1 - Restriction on Delegation given that the Director of Land Use Management may only issue or amend Natural Environment and Hazardous Conditions Development Permits where the Permit is consistent with OCP DP Guidelines.

A handwritten signature in black ink, appearing to be a stylized name, located in the bottom right corner of the page.

3.0 Land Use Management

The subject property is completely hillside in nature with steep to very steep conditions and which contains hazardous working conditions (e.g. rockfall), especially during land development and construction of buildings and structures. At present the subject property is undeveloped/natural. Not only is the sites topography challenging, but the surficial geology (i.e. talus² slopes) suggests that land development, particularly with respect to road construction could present challenges. See site photos, attached.

The owners are proposing the construction of a dwelling on a relatively flat area located in the northwest of the subject property. The proposed residence requires that existing Lochview Road be extended north along a talus slope to provide vehicular access to the building site. The road extension north through the property appears to be the greatest challenge to developing the site.

As proposed, the development is contrary to Official Community Plan policies which include:

1. the prohibition of development on steep slopes (+30% or greater for a minimum distance of 10 metres); and
2. discouraging roads (public or private) through +30% slope areas except where it can be demonstrated the road will be sensitively integrated and will present no hazards to persons or property, environmental threats or unreasonable servicing or maintenance challenges (see Section 5 below).

The landowner has assembled an applicant team to consider the impacts and challenges of developing in these conditions. Qualified professionals from environmental, geotechnical and forestry/wildland fire disciplines have all been engaged and provided assessments in support of the proposed development. The assessments imply that if the prescriptions are followed, the subject property may be successfully developed for the intended use and the risks and impacts satisfactorily mitigated. As an example, a professional engineer (geotechnical) has stated “the overall slopes are considered to be stable” (Schedule C, attached).

The applicant group has demonstrated extensive due diligence and may in fact be able to develop the site without incident. However, given that the proposed development is not consistent with City policy, staff can neither authorize nor support the proposed development.

Despite the above, staff do recognize that development rights exist for single dwelling housing on the subject property. Staff feel that the subject property can be developed in a manner which minimizes risks associated with the hazardous conditions; while limiting impacts on a sensitive landscape. These goals can be achieved by developing in a location which utilizes existing access to the site rather than extending the access as proposed.

An alternative that would permit the dwelling to be constructed in the proposed location requires access from the north. However, staff have been advised that the owners are unable to secure access from the north.

While City staff are not supporting the proposed development, staff support deferring consideration of this Development Permit at the applicant’s request. The more than two week window between receipt of this report and Council consideration allows the applicant team sufficient time to prepare a response to speak to this report.

² Talus (aka scree) is accumulation of broken rock fragments at the base of crags, mountain cliffs, or valley shoulders.

4.0 Proposal

4.1 Background

The subject property is largely undeveloped at this time, though an access easement through the property allows for access to a number of properties to the north. The site currently exists in a relatively pristine state.

The City did however become aware of an unauthorized development (cabin) on the narrow foreshore of Okanagan Lake. While a License of Occupation was granted by the Province for a moorage structure in 2004, the License did not authorize the cabin which was partially developed below the “high water mark” of Okanagan Lake.

Upon receiving a Development Permit application on the subject property staff sought to have the foreshore restored. To their credit, the subject property owner has accepted staff direction by removing the cabin and restoring the foreshore with native vegetation (summer 2011).

The development being proposed at this time is not anticipated to generate extensive impacts to the lake or the foreshore given the setback from Okanagan Lake.

4.2 Project Description

The proposed development footprint comprises a total area of approximately 4,314 m² within the subject property (~14.9%)³. The proposed hillside development consists of:

- a driveway;
- a single detached dwelling (including pool);
- a detached garage (including turnaround);
- water and sewer service lines;
- a septic system; and
- a tram.

The environmental consultant (Ecoscape Environmental Consultants Ltd.) characterizes the entire subject property as “high-value” (i.e. ESA 2) environmentally sensitive area⁴ with a variety of at-risk (blue-listed) plant communities identified and which results in this assessment.

As proposed, the development would result in the removal of 44 mature trees. The environmental consultant has prescribed a 2:1 replacement consistent with City policy. Thus, a minimum of 88 (large) native trees would be planted to compensate for the loss of mature trees.

4.3 Site Context

The subject property is a relatively large (2.89 ha) property in the Glenmore - Clifton - Dilworth OCP Sector. The subject property is situated west of Clifton Road and is partially fronting Okanagan Lake. The zoning is mostly agricultural, though the agricultural potential is limited given the steepness and geology.

The owners have also purchased the adjacent lot (210 Lochview) to the south which is a 2.58 ha property with similar topography in an effort to improve their development potential. The subject property has approximately 85 metres of frontage on Okanagan Lake, although access to the lake’s foreshore is very difficult from the upland. It is likely that foreshore access will only be available through the installation of a tram.

³ Environmental Assessment of Subject Property Ecoscape Environmental Consultants Ltd, 2012; p. 12.

⁴ ESA 2 is defined as containing physical features, plants, animals and habitat characteristics which contribute toward the overall diversity and contiguous nature of the surrounding natural features.

Specifically, adjacent land uses include:

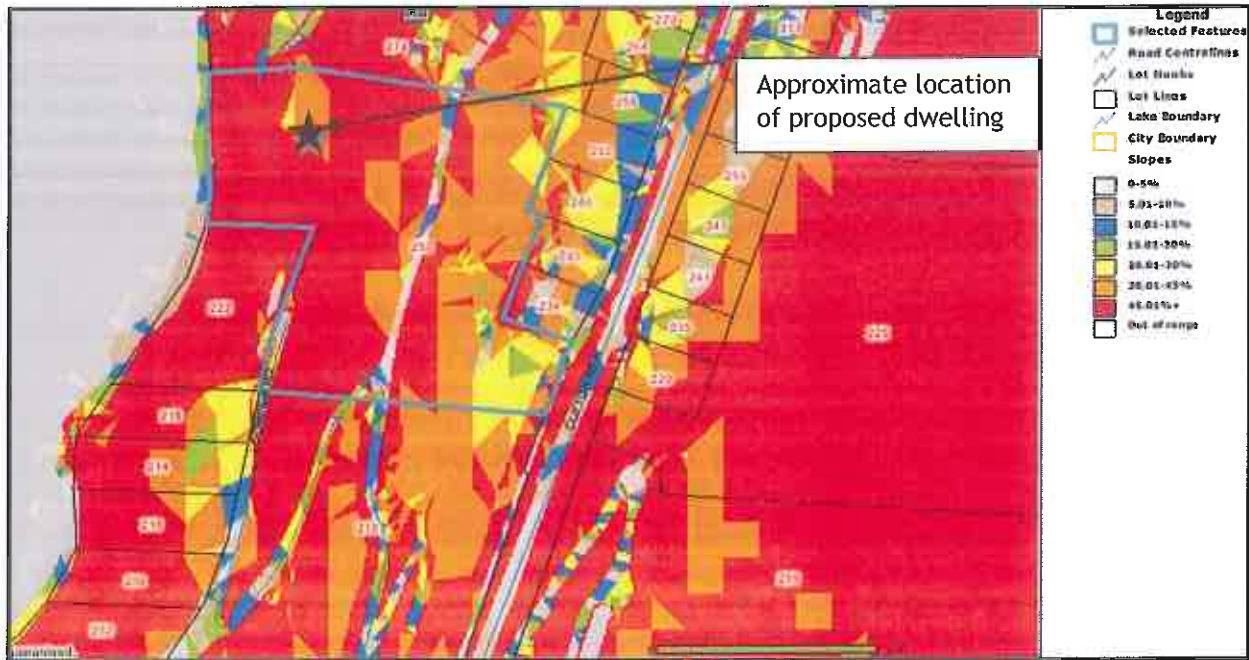
Orientation	Zoning	Land Use
North	A1 - Agriculture P4 - Utilities	Rural/undeveloped Decommissioned water pump station
East	RR3 - Rural Residential 3	Rural residential
South	A1 - Agriculture 1	Rural/undeveloped & rural residential
West	A1 - Agriculture	Rural

Subject Property Map: 250 Lochview Road, Kelowna, BC



4.4 Digital Elevation Model (Slope)

The following map helps to illustrate the nature of the site, with most of the area west of the existing access road in excess of 45% slope (denoted by red). The dwelling is proposed in an isolated area with slopes in the range of 20 to 45%.



5.0 Current Development Policies

5.1 Kelowna Official Community Plan (OCP)

Steep Slopes.⁵ Prohibit development on steep slopes (+30% or greater for a minimum distance of 10 metres) except where provided for in ASPs adopted or subdivisions approved prior to adoption of OCP Bylaw 10500.

Access Through Steep Slopes.⁶ Discourage roads (public or private) through +30% slope areas intended to access lands beyond, except in cases where it can be demonstrated the road will be sensitively integrated (visual and aesthetic impacts minimized) with the natural environment and will present no hazards to persons or property, environmental threats or unreasonable servicing or maintenance challenges.

Habitat Protection.⁷ Plan, design and implement land development and subdivision to protect environmentally sensitive areas. Habitats that provide for at-risk species, at-risk ecological communities and keystone species will be given priority for protection.

Disturbance of steep slopes and hazardous condition areas will be avoided in accordance with City of Kelowna hillside development guidelines⁸.

5.2 Hillside Design Guidelines

Visual Design Guidelines⁹

- Linear roads, utility cuts, retaining walls and uniform building rooflines should be avoided, or mitigated with mature landscaping.

⁵ City of Kelowna Official Community Plan, Policy 5.15.12 (Development Process Chapter).

⁶ City of Kelowna Official Community Plan, Policy 5.15.13 (Development Process Chapter).

⁷ City of Kelowna Official Community Plan, Policy 12.2.1 (Natural Environment DP Chapter).

⁸ City of Kelowna Official Community Plan, Hazardous Condition General Guidelines (Hazardous Condition DP Chapter).

⁹ City of Kelowna Hillside Development Guidelines, p. 5.

Grading/Retaining Design Guidelines¹⁰

- Position driveways to minimize lot grading requirements and reduce the impact on adjoining properties.
- Combine service connections, utilities and utility cuts in a single trench, where necessary.
- Consider alternate road-ends.

Geotechnical and Hydro-geological Design Guidelines¹¹

- Regular monitoring and test results should be provided for all construction, including that on private property.
- Quality assurance systems should be employed by professional consultants.
- Sign-off from the geotechnical engineer(s) should be provided at appropriate stages of construction, such as pre-clearing, pre-site grading, post-site grading, upon substantial completion, before foundation pour, and prior to occupancy.

Environmental and Wildfire Design Guidelines¹²

- Conduct wildfire hazard reduction through accepted practices, such as thinning and removal of fuel sources, which are also designed to improve forest health.

6.0 Technical Comments

6.1 Building & Permitting Department

- Structural and Geotechnical engineering schedules, drawings and specifications required at time of building permit applications along with cross-sections through any proposed landscape / retaining walls.
- A BC land surveyor to establish a safe building line in co-ordination with the geotechnical engineer consultant prior to building permit application.
- Full plans review & comment on the structure(s) at time of building permit(s) application.

6.2 Development Engineering Department

See attached.

6.3 Fire Department

- The access road to the home should be designed to support a fire apparatus and be four metres in width.

7.0 Application Chronology

Date Application Received: June 13, 2011

Authorization by Applicant to Proceed: July 27, 2012

¹⁰ City of Kelowna Hillside Development Guidelines, p. 7.

¹¹ City of Kelowna Hillside Development Guidelines, p. 8.

¹² City of Kelowna Hillside Development Guidelines, p. 9.

8.0 Alternate Recommendation

THAT Council authorize the issuance of Development Permit No. DP11-0103 for Lot 6, Sections 7 & 8, Township 23, ODYD, Plan 41162, located at 250 Lochview Road, Kelowna, BC, subject to the following:

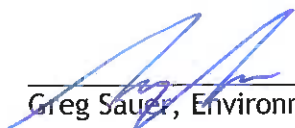
1. The dimensions of and siting of the buildings to be constructed on the land be in general accordance with Schedule "A";
2. The development on the land be in accordance with attached Schedule "B" ("Environmental Assessment", prepared by Ecoscape Environmental Consultants Ltd. and dated February, 2012);
3. The development on the land be in accordance with attached Schedule "C" ("Geotechnical Assessment", prepared by Geoteknik Consulting Ltd. and dated May 5, 2011);
4. The development on the land be in accordance with attached Schedule "D" ("Wildland/Urban Interface Fire Hazard Assessment", prepared by FireWise Management Ltd. and dated May 2011);
5. An executed "Environmental Monitoring Agreement" with a Qualified Environmental Professional;
6. An executed "Authorization to Halt Work" with a Qualified Environmental Professional;
7. The applicant be required to post with the City, a Performance Bonding deposit in the form of Certified Cheque or "Letter of Credit" in the amount of 125% of the estimated value of the restoration and environmental monitoring, valued at \$14,411 (total = \$18,014);
8. The applicant be required to post with the City, a Performance Bonding deposit in the form of Certified Cheque or "Letter of Credit" in the amount of 125% of the estimated value of the wildfire mitigation, to be determined by a qualified professional;

AND THAT issuance of the Development Permit be subject to the receipt of a Hydrogeological Assessment to the satisfaction of the Director, Land Use Management;

AND THAT issuance of the Development Permit be subject to the registration of a Section 219 Restrictive Covenant (No Build) as illustrated on Figure 3 of the "Environmental Assessment";

AND FURTHER THAT the applicant be required to complete the above noted conditions within 180 days of Council approval of the Development Permit application, in order for the permit to be issued.

Report prepared by:


Greg Sauer, Environment & Land Use Planner

Reviewed by:

 Shelley Gambacort, Director, Land Use Management

Attachments:

Subject Property Map (1 page)

Development Engineering Comments (1 page)

Photo Key (1 page)

Site Photos (4 pages)

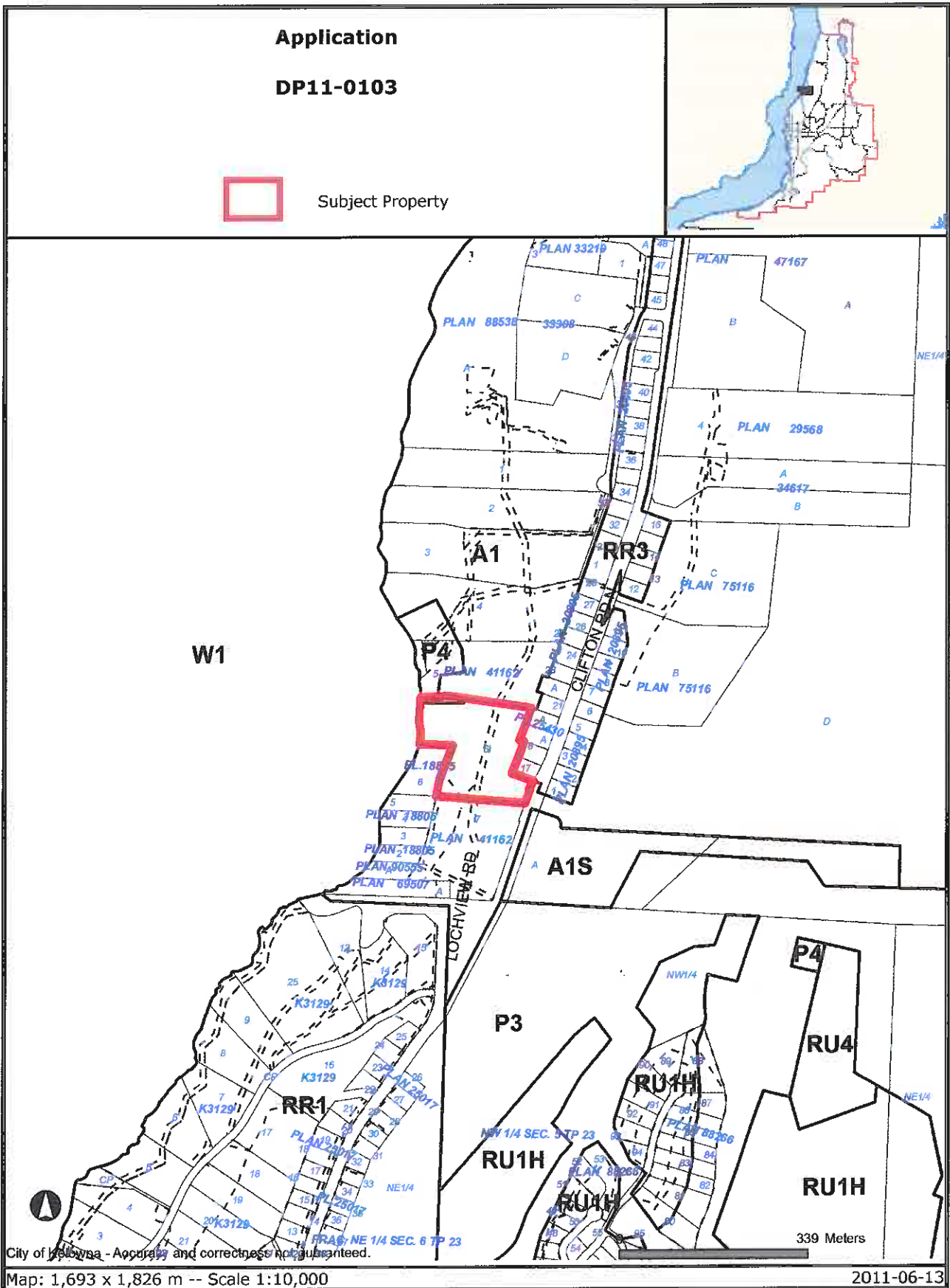
Site Plan - Schedule "A" (1 page)

Environmental Assessment - Schedule "B" (57 pages)

Geotechnical Assessment - Schedule "C" (6 pages)

Wildland Fire Assessment - Schedule "D" (25 pages)

Submission by FH&P Lawyers on Behalf of Applicant (9 pages)



Certain layers such as lots, zoning and dp areas are updated bi-weekly. This map is for general information only. The City of Kelowna does not guarantee its accuracy. All information should be verified.

CITY OF KELOWNA
MEMORANDUM

Date: February 20, 2012
File No.: DP11-0103
To: Land use Management (GS)
From: Development Engineering Manager
Subject: Development Permit Application

LOCATION: 250 Lochview Road
APPLICANT: Arda Consultants Ltd.
LEGAL: Lot 6 Plan 41162

The Development Engineering comments and requirements regarding this development permit application are as follows:

.1) General

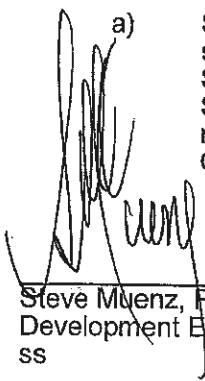
- a) The environmental ramifications of new house construction, landscape features including retaining walls, location of onsite storm disposal systems, protection of existing mature trees and building setbacks from Okanagan Lake must be considered. Development Engineering will defer comment on those issues to the City Environment Manager and the Provincial Government.

.2) Water

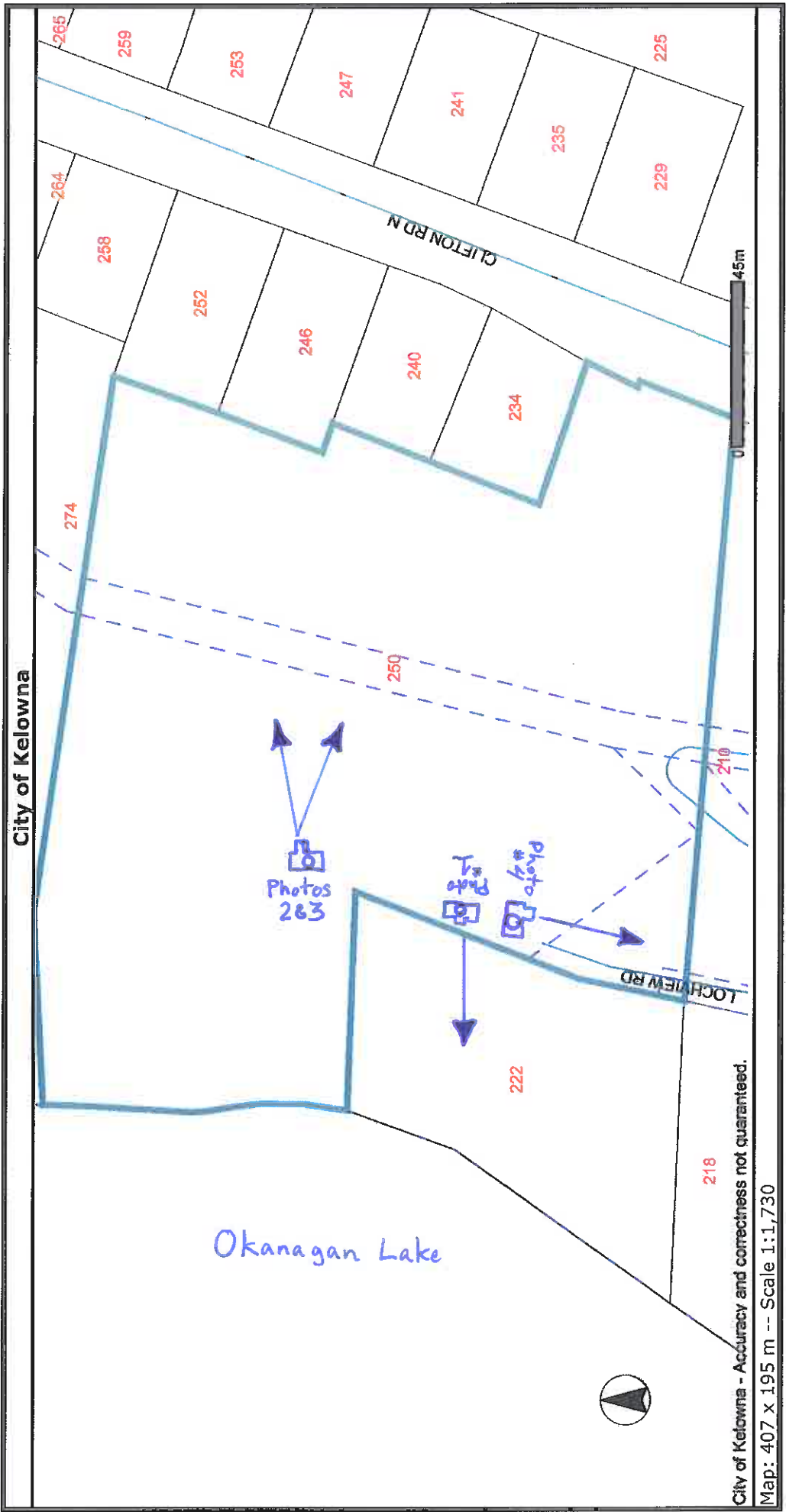
- a) The property is located within the City of Kelowna service area. Provide an adequately sized domestic water service based on the equivalent fixture unit (EFU) count for the proposed development. EFU count will be confirmed at building permit by a City of Kelowna Inspection Services.

.3) Sanitary Sewer

- a) Sanitary sewage is to be handled by an on-site sewage disposal system subject to approval of the Public Health Officer in accordance with the Subdivision, Development and Servicing Bylaw Schedule 4 "Sanitary" Section 2.18. Preliminary approval by the Public Health Officer is required prior to Development Permit. Please contact the Public Health Officer.



Steve Muenz, P.Eng.
Development Engineering Manager
ss



This map is for general information only. The City of Kelowna does not guarantee its accuracy. All information should be verified.

Photo Key

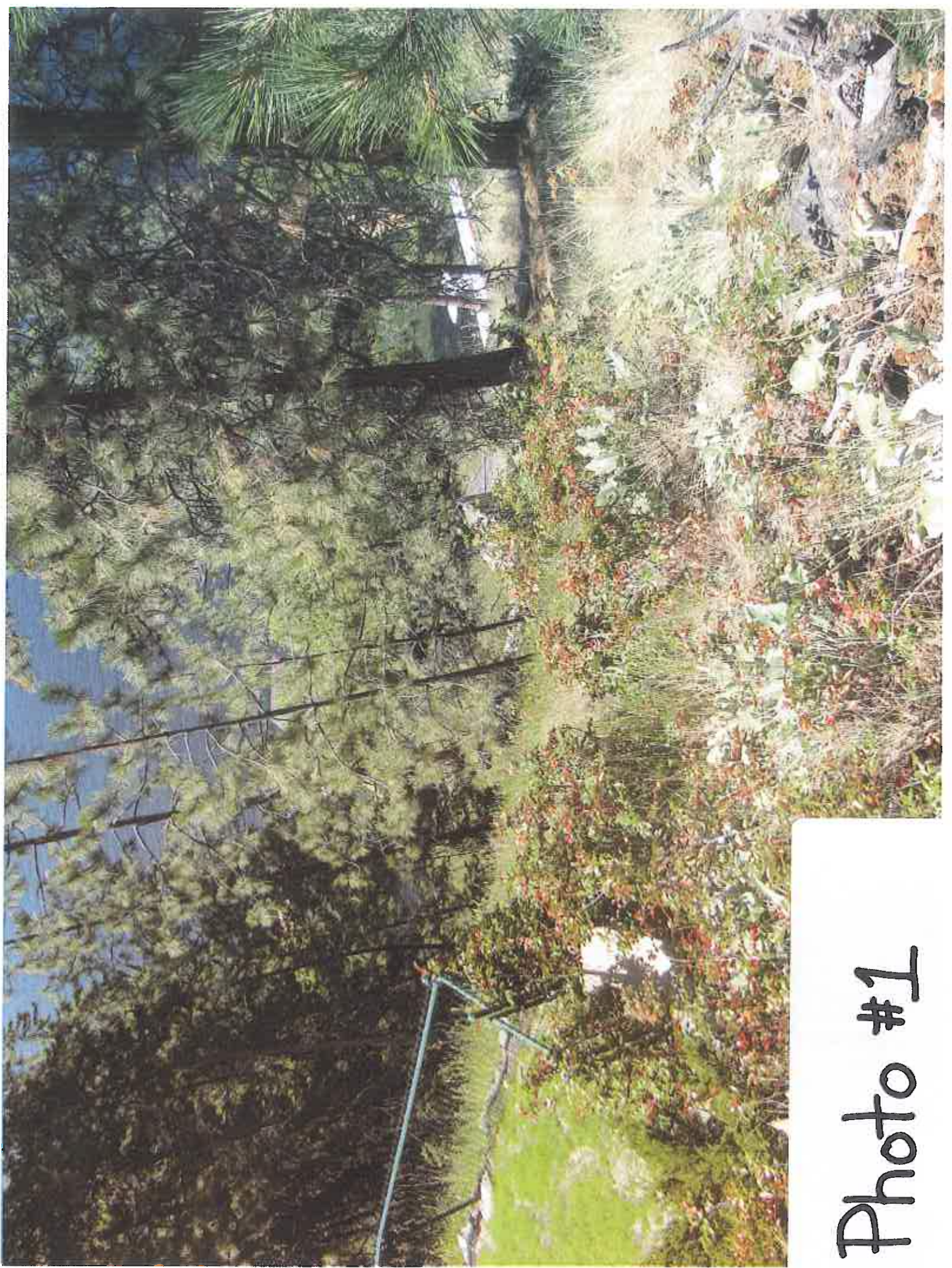


Photo #1



Photo #2

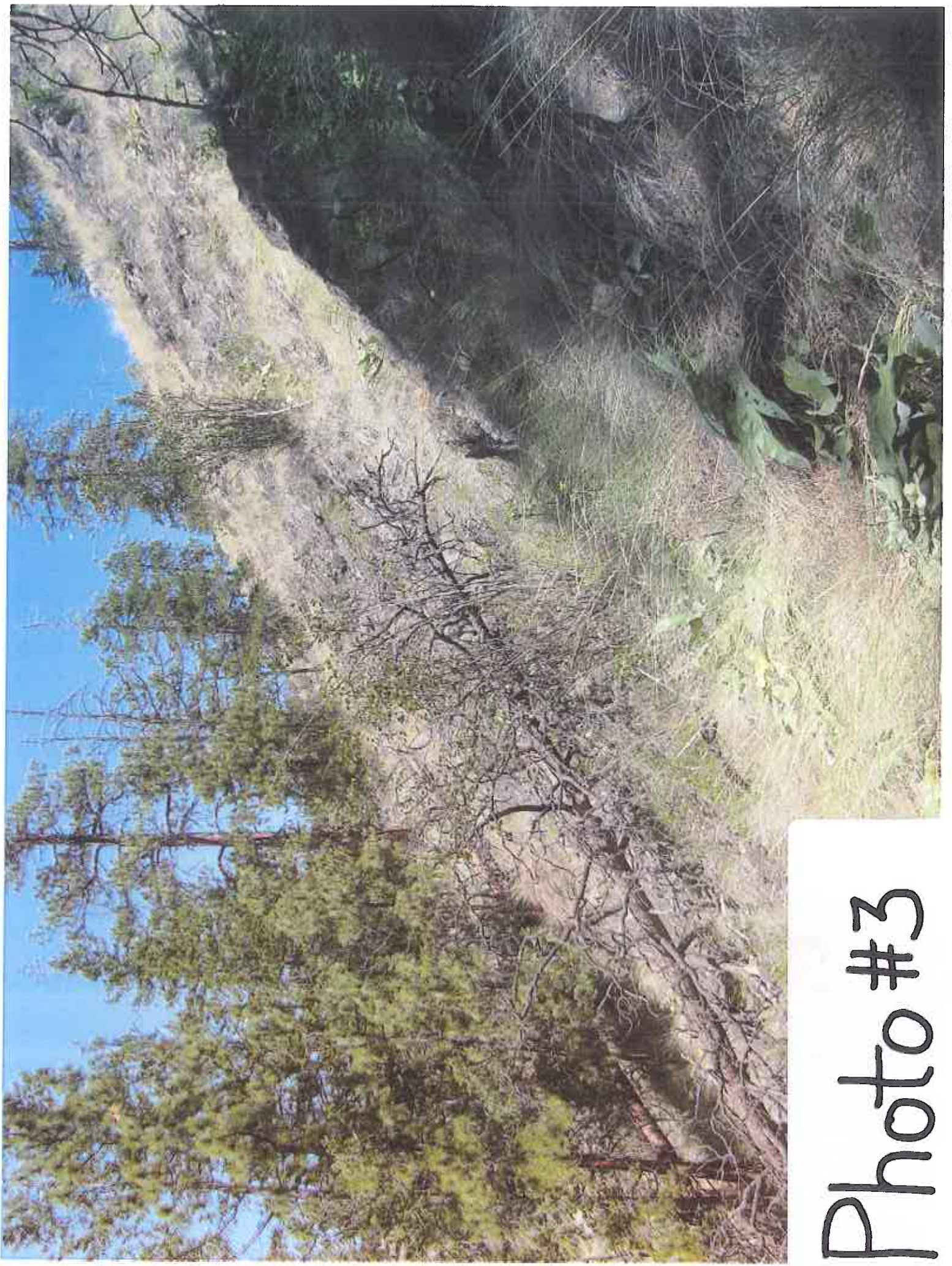


Photo #3

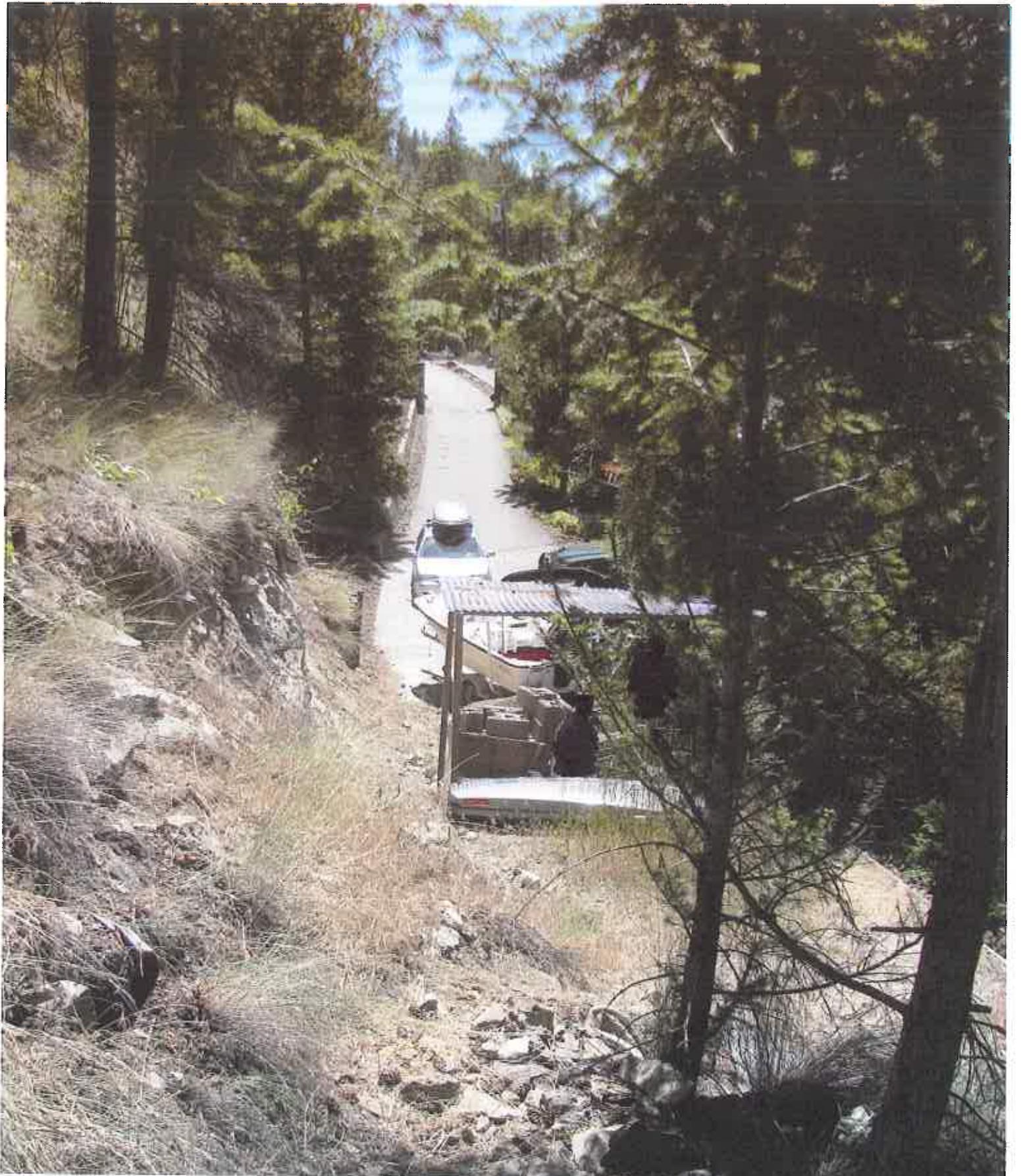
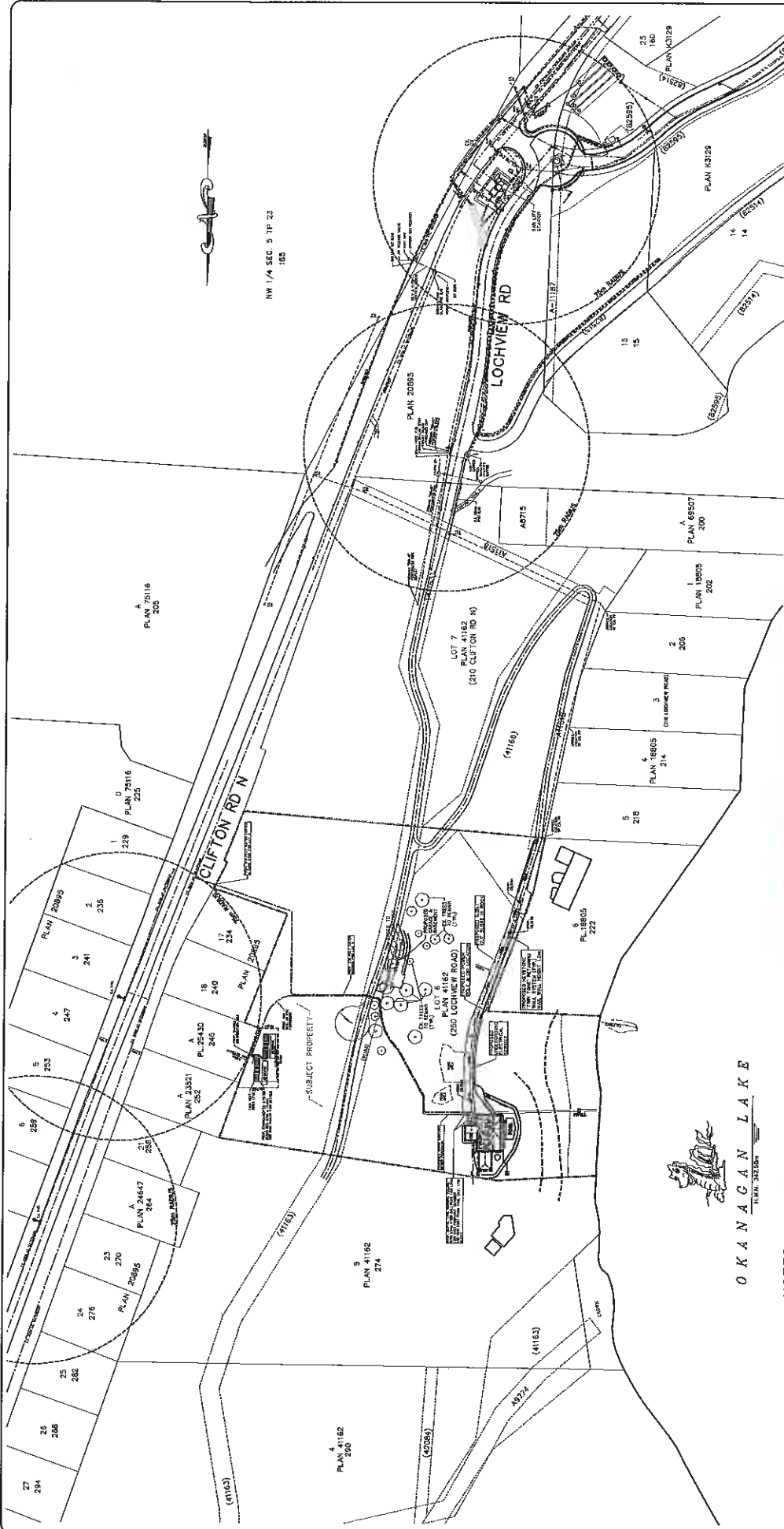


Photo #4



NW 1/4 SEC. 5 TP. 23
185

LEGAL DESCRIPTION
LOT 7 PLAN 41182 SEC. 7 & 8,
TOWNSHIP 23, O.D.Y.D.
CIVIC ADDRESS: 250 LOCHVIEW ROAD

SCHEDULE "A"
This forms part of development
Permit # **DP11-0103**

NOTES
LOCATIONS AND OFFSETS OF EXISTING UTILITIES ARE CORRELATED FROM
EXISTING UTILITIES AND SHALL BE RECORDED BY THE CONTRACTOR PRIOR TO
CONSTRUCTION. ALL UTILITIES NOT NECESSARILY SHOWN.
THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THE LOCATION AND
DEPTH OF ALL UTILITIES PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL
BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS
FROM THE LOCAL GOVERNMENT AND UTILITIES COMPANIES.
ALL WORK TO BE CONSTRUCTED IN ACCORDANCE WITH THE CITY OF KELOWNA
MATERIAL SPECIFICATIONS AND THE CANADIAN STANDARD CODES.
CONTRACTOR TO VERIFY THE LOCATION AND DEPTH OF ALL UTILITIES PRIOR TO
CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL
NECESSARY PERMITS AND APPROVALS FROM THE LOCAL GOVERNMENT AND
UTILITIES COMPANIES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR
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GOVERNMENT AND UTILITIES COMPANIES. THE CONTRACTOR SHALL BE
RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS
FROM THE LOCAL GOVERNMENT AND UTILITIES COMPANIES.

LEGEND	SYMBOL	DESCRIPTION	NO.	DATE	BY	REVISION
2	SW	SEWER (EXISTING)	1	02/25/11	G.E.R.	GENERAL REVISIONS
3	SW	SEWER (PROPOSED)	2	02/25/11	G.E.R.	GENERAL REVISIONS
4	SW	STORM (EXISTING)	3	02/25/11	G.E.R.	GENERAL REVISIONS
5	SW	STORM (PROPOSED)	4	02/25/11	G.E.R.	GENERAL REVISIONS
6	SW	TRANSFORMER	5	02/25/11	G.E.R.	GENERAL REVISIONS
7	SW	UTILITY JUNCTION BOX	6	02/25/11	G.E.R.	GENERAL REVISIONS

DAVID R. FABLES, P. ENG.	DESIGN	G.E.R.
	APPROVED	G.E.R.
	DATE	MAR. 2011
	SCALE	1:1000

Arda Consultants Ltd.	TEL: 250.857.7900	DRAWING NO.	1144.C1
17-2341 APPALACHIA ROAD, KELOWNA, BC, V1Y 9W6	EMAIL: INFO@ARDA.COM	CITY FILE NO.	
THE CITY OF KELOWNA	ENGINEERING DEPARTMENT	JURISDICTION	7
250 LOCHVIEW ROAD		PROPOSED RESIDENCE	
SITE SERVICING PLAN			



OKANAGAN LAKE
TOWN 302528

250 LOCHVIEW ROAD

Lot 6, Plan 41162, Sec. 7 & 8, TWP 23, L.D. 41, ODYD
Kelowna, BC

ENVIRONMENTAL ASSESSMENT

Prepared For:

Tom and Sandra Greenough
#101-199 Pinto Road
Kelowna, B.C.
V1V 2G9

SCHEDULE "B"
This forms part of development
Permit # DP11-0103

Prepared By:

Ecoscape Environmental Consultants Ltd.
#102 - 450 Neave Court
Kelowna, B.C.
V1W 3A1

February, 2012

File No. 11-750



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APPENDICES

- Appendix A: City of Kelowna Environmental Assessment Application Checklist
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1.0 INTRODUCTION

Ecoscope Environmental Consultants Ltd. (Ecoscape) has been retained by Tom and Sandra Greenough (Property Owners) to complete an environmental assessment for a proposed house, detached garage and tram construction at 250 Lochview Road, Kelowna, BC (hereafter referred to as the subject property). The subject property is legally described as Lot 6, Plan 41162, Section 7 & 8, Township 23, Land district 41, ODYD (Figure 1).

This Environmental Assessment (EA) report has been prepared to satisfy the requirements of the City of Kelowna's (COK) Natural Environment Development Permit in accordance with the COK Official Community Plan (OCP) (adopted May, 2011). This report addresses the COK Natural Environment Development Permit Guidelines and environmental assessment application checklist (Appendix A), assesses the aquatic and terrestrial resource values of the subject property, assesses the impacts of the proposed works and subsequently provides mitigation measures to protect and enhance the natural integrity of the subject property.

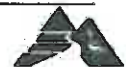
2.0 BACKGROUND AND PROPOSED WORKS

The proposed works includes the construction of a single family dwelling, detached garage, pool, septic system, installation of water and septic service lines, tram for foreshore access and the development of a driveway. Ecoscape understands that the owners would also like to fence the subject property; recommendations for fencing the site are included in Section 6.0. The development footprint consists of an area that is approximately 4,314 m² and includes the following works:

- Proposed residence located within the northwestern section of the subject property and includes a pool.
- Access via a driveway from Lochview Road.
- The construction of a detached garage immediately downslope of Lochview Road.
- The establishment of a turnaround area to the north of the proposed garage (cut location).
- A septic system installed along the eastern boundary of the subject property.

The remainder of the property will be under a covenant (no build/no disturb), with the exception of a square block fronting Clifton Road, Figure 3 details the proposed development area and covenant area. The following areas will be contained within the covenant; however, maintenance and upkeep of the following will be permitted:

- The proposed tram that will extend from the southwest corner of the constructed residence to the foreshore of Okanagan Lake. It will be ~85 m in length and will be supported by concrete footings or screw piles every 6 m (20 ft).



- A water and septic service line that will be installed from the proposed residence to Lochview Road. At Lochview Road the water line will connect to the water main and the septic line will continue to the septic area (along the eastern boundary of the subject property).
- If the owners install fencing at the subject property, it is proposed that maintenance to this fence within the covenant should be permitted.
- During the proposed works some access into the proposed covenant area may be required to install silt fence/rock fall fence. Where possible the fences must be kept within the development footprint and any areas disturbed by fencing during the proposed works will need to be restored upon completion of the project (see Section 7.0).

A previous EA report (June, 2011) was prepared by Ecoscape to address a proposed moorage extension and floatplane lift (within a kokanee red zone) at the subject site. In addition, an environmental management plan (July, 2011) was prepared by Ecoscape for the cabin and gazebo removal within the riparian setback of Okanagan Lake. The cabin and gazebo were removed in August 2011 with riparian native vegetation planting and restoration completed by October, 2011. These assessments were related to the riparian area of the subject property, the current report is to provide an assessment of the upland environment.

3.0 ENVIRONMENTAL ASSESSMENT

A site assessment of the subject property was conducted on November 25, 2011 and February 3, 2012 by Mary Ann Olson-Russello, MSc, RPBio, and Katrina Gousmett, BSc, BIT, Natural Resource Biologists with Ecoscape. A preliminary site assessment to address the riparian area of the subject property was also conducted on May 26, 2011 by Jenine Mylymok, RBTech, Natural Resource Technologist with Ecoscape. The focus of the most recent site visit was on the areas that will be affected by the proposed development.

The following sections detail the data collection methods that were used to assess the subject property and the resulting ecological conditions and values present.

3.1 Terrestrial Ecosystem Mapping

The study area is located along the eastern shoreline of Okanagan Lake, within the Ponderosa pine Okanagan very dry hot variant (PPxh1) biogeoclimatic zone. Areas of the Ponderosa pine zone are generally the driest forested regions in BC, with hot dry conditions in the summer, and cool with little snow in the winter (Lloyd *et al.* 1990).

The ecosystem mapping component of this project incorporated previously described TEM polygons from the most recently updated SEI for the central Okanagan (Haney and Iverson 2009). The existing TEM polygon extents were adjusted and classification changes were made to more accurately describe the polygons at a finer



spatial scale based upon the field inventory and professional judgment. Three separate polygons represented by five different classifications were identified within the subject property and are displayed in Table 1 and Figure 2.

Table 1. Ecosystem communities occurring within the Subject Property

Ecosystem Code	Site Series	Site Series Name	Provincial Status
PC	04	Ponderosa pine - Bluebunch wheatgrass - Cheatgrass	Not yet classified
PF	05	Ponderosa pine - Bluebunch wheatgrass - Rough fescue	Blue
PT	02	Ponderosa pine - Red three-awn	Blue
RZ	-	Road Surface	-
WB	00	Bluebunch wheatgrass-Balsamroot	Red

One of the ecosystem communities is Red-listed, which means that the community is endangered or threatened in BC, and two of the communities are Blue-listed, meaning that they are of special concern. The final ecosystem (PC), has not yet been listed, however, through discussions with provincial staff at the Conservation Data Centre, Ecoscape understands that this ecosystem is in the process of being re-named, and once complete, it will also likely be designated as Blue-listed. The remaining ecosystem code (RZ), is an anthropogenic classification.

3.2 Environmental Sensitivity Analysis

Criteria such as stand, landscape, regional rarity, successional stage, structural complexity, and levels of disturbance were all considered in the determination of environmental sensitivity. Further, wildlife habitats as they relate to species at risk, connectivity, adjacency, and edge effects were also considered. Based upon these criteria, professional judgment was used to determine the sensitivity of the subject property. All three polygons within the subject property were designated as having High environmental sensitivity (Figure 2).

3.3 Vegetation Resource Values

The subject property consisted of an open woodland community with elements of grassland on steep slopes with shallow soils and areas of exposed bedrock (Photo 1).

The environmental assessment included the identification of trees that will be lost due to the proposed development. The line work of the proposed development was used to identify which trees would be impacted. A GPS point was taken at each tree location; and the diameter of the tree at breast height (dbh) was measured. Figure 3 depicts all the 59 trees that were surveyed during the November 25, 2011 and February 3, 2012 site visits. The surveyed trees were subsequently reduced to reflect those that were considered mature. Trees with a dbh of less than 20 cm were classified as pole/sapling; and those with >20 cm dbh were classified as young forest



(mature). Typically, the young forest structural stage includes trees as young as 30 years and extends to 50-80 years (BC Ministry of Forests and BC Ministry of Environment, Lands and Parks, 1998). A tree replacement mitigation plan was prepared for mature trees classified as young forest, while other mitigation measures (e.g. avoidance, relocation, bird boxes) were recommended for the loss of wildlife trees and pole/saplings(see Section 7 below).

Table 2. Summary of Trees (>20 cm dbh) Affected by Development

Species	Statistic	Diameter at Breast Height (cm)	Estimated Age in years (Dickman 1978)
Interior Douglas-fir	n (# of trees)	21	
	Mean	29.3	43
	Min	21.0	33
	Max	49.6	69
Ponderosa Pine	n (# of trees)	23	
	Mean	31.4	64
	Min	20.4	46
	Max	69.5	125

Table 2 provides a summary of the mature trees that will be affected by the proposed development. Twenty-one (21) mature interior Douglas-fir and twenty-three (23) Ponderosa pine occur within the proposed development footprint. Using the dbh measurements that were recorded on site, the age of each tree was estimated using the following equations (Dickman, 1978):

Interior Douglas-fir:

$$\text{Age (years)} = 6.1 + 3.2 * \text{d.b.h. (inches)}$$

Ponderosa Pine:

$$\text{Age (years)} = 13 + 4.1 * \text{d.b.h. (inches)}$$

The average age of the Ponderosa pines was 64 years, while the average age for interior Douglas-fir was 43 years. The oldest and largest tree that occurs within the development footprint is a Ponderosa pine that has an estimated age of 125 years (tree # 7, Table 3). Because this tree is approximately twice the age of most of the other trees on the property, it is considered to be highly valuable from a wildlife perspective. The second most noteworthy tree is a dead Ponderosa pine snag that occurs near the eastern edge of the residential footprint (tree #15, Table 3). Both trees are also labeled on Figure 3. Table 3 provides a complete list of surveyed trees (>20 cm dbh) that are likely to be affected by the proposed development.



Table 3. Trees (>20 cm dbh) Within the Development Footprint

Tree Number	Species	Diameter at breast height (dbh) in cm	Estimated Age (yrs) (as per Dickman 1978)	Proposed Development Area
2	Ponderosa pine	41.7	80	Detached garage
3	Ponderosa pine	26.5	56	Detached garage
4	Ponderosa pine	43.0	82	Detached garage
7	Ponderosa pine	69.5	125	House footprint
8	Ponderosa pine	23.1	50	House footprint
9	Interior Douglas-fir	39.6	56	House footprint
10	Interior Douglas-fir	23.2	35	House footprint
11	Interior Douglas-fir	34.1	49	House footprint
13	Ponderosa pine	31.5	64	House footprint
14	Ponderosa pine	36.5	72	House footprint
15	Ponderosa pine	59.4	109	House footprint
16	Ponderosa pine	21.5	48	House footprint
17	Ponderosa pine	20.4	46	House footprint
18	Ponderosa pine	43.5	83	House footprint
19	Ponderosa pine	27.0	57	House footprint
20	Ponderosa pine	28.3	59	House footprint
22	Interior Douglas-fir	24.4	37	House footprint
23	Ponderosa pine	23.2	50	House footprint
24	Interior Douglas-fir	22.9	35	House footprint
25	Interior Douglas-fir	22.3	34	House footprint
28	Interior Douglas-fir	26.9	40	Driveway footprint
30	Interior Douglas-fir	26.1	39	Driveway footprint
31	Ponderosa pine	21.1	47	Driveway footprint
32	Interior Douglas-fir	49.6	69	Driveway footprint
34	Interior Douglas-fir	27.3	40	Driveway footprint
36	Interior Douglas-fir	22.7	35	Driveway footprint
38	Interior Douglas-fir	21.0	33	Driveway footprint
40	Ponderosa pine	37.0	73	Driveway footprint
41	Interior Douglas-fir	42.3	59	Driveway footprint
43	Interior Douglas-fir	33.4	48	Driveway footprint
44	Interior Douglas-fir	23.2	35	Driveway footprint
48	Interior Douglas-fir	31.0	45	Driveway footprint
49	Ponderosa pine	25.5	54	Driveway footprint
51	Interior Douglas-fir	40.0	56	Driveway footprint
52	Ponderosa pine	26.1	55	Septic footprint
53	Interior Douglas-fir	26.3	39	Septic footprint
54	Ponderosa pine	22.7	50	Septic footprint
55	Interior Douglas-fir	25.1	38	Septic footprint



56	Ponderosa pine	21.1	47	Septic footprint
57	Ponderosa pine	29.4	60	Septic footprint
58	Ponderosa pine	22.2	49	Septic footprint
59	Ponderosa pine	20.9	47	Septic footprint
60	Interior Douglas-fir	29.9	44	Septic footprint
61	Interior Douglas-fir	25	38	Septic footprint

3.3.1 Upland Environment

The upland environment of the subject property occurs within polygon 3 (see Figure 2), which consists of 60% Ponderosa pine-Bluebunch wheatgrass-cheatgrass (PC-PPxh1-04); classified as a young coniferous forest with a warm aspect, 30% Red-listed Bluebunch wheatgrass-Balsamroot (WB-PPxh1-00) herb community and 10 % road (Photos 2 - 5). Several of the young trees in this polygon appeared to have been affected by pine beetle (*Dendroctonus* sp.). This polygon was characterized by shallow soils and exposed rock throughout the site including areas of talus and rock outcrops.

The cut location (turnaround), detached garage, septic system, water and sewer service lines and parts of the driveway and residence footprint occur within this polygon and are detailed below and in Figure 3.

Cut Location

The cut location, displayed on Figure 3 as a turnaround, is located on the eastern side of Lochview Road and contained two Ponderosa pine (*Pinus ponderosa*) and three interior Douglas fir (*Pseudotsuga menziesii* var. *glauca*) pole/saplings (dbh <20 cm) that will be lost due to the proposed works. The understory consisted of tall-Oregon grape (*Mahonia aquifolium*), common snowberry (*Symphoricarpos albus*) with herbaceous and grass species including blue-bunch wheatgrass (*Pseudoroegneria spicata*), arrow leaved balsamroot (*Balsamorhiza sagittata*), fescue (*Festuca* sp.), yarrow (*Achillea millefolium*), fire moss (*Ceratodon purpureus*) and cheatgrass (*Bromus tectorum*) (Photo 2). This area was characterized by shallow soils with exposed fragments of rock.

Garage Footprint

The garage footprint is located immediately west of Lochview Road (Photo 3). On the steep slope adjacent to the road the vegetation consisted of ~95% cheatgrass, <1% snowberry, with the remaining vegetation composed of invasive plant species. At the base of the slope the footprint transitions to a level terrace consisting of a natural community containing Ponderosa pine and interior Douglas fir with an understory of snowberry, Saskatoon, tall-Oregon grape, arrow leaved balsamroot and bluebunch



wheatgrass. The garage footprint contains three Ponderosa pine trees (>20 cm), and a single interior Douglas-fir pole/sapling that will be affected by the development (Figure 3).

The garage footprint consisted of shallow soils with some areas of exposed rock.

Septic System Footprint

The septic system footprint is located along the eastern boundary of the subject property. A septic service line will also be installed from the proposed residence to the septic system area. Access to the septic system area will be via a corridor from Lochview Road, this corridor should follow the proposed septic line footprint where possible. This corridor will be restored upon completion of the proposed works (see Section 7.0). The septic footprint contained a relatively natural community consisting of Ponderosa pine and interior Douglas fir with an understory of snowberry, Saskatoon, tall-Oregon grape, arrow leaved balsamroot, yarrow, bluebunch wheatgrass and cheatgrass (Photo 4). The septic footprint contains six Ponderosa pine trees (>20 cm), four interior Douglas-fir trees (>20 cm) and 14 pole/sapling that will be affected by the development (Figure 3).

The septic footprint had evidence of disturbance including trails, vehicle tracks, grubbing and cleared shrubs/trees. The area contained a large amount of woody debris that had been stored in piles (Photo 4).

Water and Sewer Service Line (from the proposed house to Lochview Road)

There is an existing disturbed area (that may be an existing service line) that extends from Lochview Road downslope towards the residential building footprint. This area will be temporary disturbed in order to install the service lines (water and sewer) from Lochview Road to the proposed residence. The service line footprint will be restored upon completion of the proposed works (see Section 7.0). The vegetation within this service line footprint consisted of bluebunch wheatgrass, common rabbit brush (*Chrysothamnus nauseosus*), pasture sage (*Artemisia frigida*), fescue sp., moss species on exposed rock and a number of invasive plant species including cheatgrass, great mullein (*Verbascum thapsus*), thistle (*Cirsium* sp.) and knapweed (*Centaurea* sp.). No trees occur within the service line footprint.

House and Driveway Footprint

The house footprint occurs in a relatively flat terrace of the subject property, whereas the driveway will traverse a section of steep gully. The house and driveway footprint consisted of Ponderosa pine and interior Douglas fir with common snowberry, tall-Oregon grape, blue elderberry (*Sambucus caerulea*), bluebunch wheatgrass, arrow leaved balsamroot, round leaved alumroot (*Heuchera cylindrica*) and cheatgrass (Photo 5). There were a number of mature and snag Ponderosa pine within the house



and driveway footprint, of particular importance was a snag Ponderosa pine (see tree # 15, Table 3 and Photo 6) and a mature Ponderosa pine (see tree #7, Table 3 and Photo 7). These trees were considered important due to their value as wildlife trees. A wildlife tree is defined as 'any standing dead or live tree with special characteristics that provide valuable habitat for the conservation or enhancement of wildlife' (BC MOE, 2008). The mature Ponderosa pine has the following wildlife tree characteristics:

- Greater than 15m in height
- Greater than 30 cm dbh (interior)
- Tree structure suitable for wildlife (suitable for large nest, hunting perch site etc)
- Largest tree surveyed on site
- Adjacency to riparian habitat

The large snag tree has all of the wildlife tree characteristics outlined above (with the exception of the largest tree for the site) and also has the following characteristics;

- Crevices present (loose bark or cracks suitable for bats)
- Broken top
- Nest cavities

Within the house footprint there are 11 Ponderosa pine and 6 interior Douglas fir trees proposed to be removed. In addition there were 21 pole/saplings proposed for removal. Within the driveway footprint there are 3 Ponderosa pine and 11 interior Douglas fir trees proposed to be removed, and an additional 11 pole/saplings.

Immediately to the east of the house footprint there was a talus slope and the southern section of the house footprint also contained a large area of exposed bedrock (Photos 8 and 9).

Part of the driveway also occurs within polygon 2, which consists of 100% Ponderosa pine – Bluebunch wheatgrass – Rough fescue (PF-PPxh1-05) classified as a young forest with a cool aspect (30-70% slopes) and shallow soils. This area of the subject property is characterized by a steep gully that the driveway will traverse (Photo 10).

3.3.2 Riparian Environment

The most western section of the subject property consisted of two polygons, the PF-PPxh1-05 (discussed above), and polygon 1 which consists of 100% Ponderosa pine - Red three-awn (PT-PPxh1-02); and is classified as young forest on very shallow soils. The tram development footprint occurs within this polygon (Photo 11).

The riparian area of the subject property consisted of vegetated rock outcrops along the northern part of the shoreline and vegetated sloped hillside towards the southern



part of the shoreline. At the time of the May, 2011 site assessment native riparian vegetation included Ponderosa pine, interior Douglas fir, rocky mountain juniper (*Juniperus scopulorum*), tall-Oregon grape, Saskatoon, common snowberry, common rabbit-brush, alder (*Alnus* sp.), rose (*Rosa* sp.), arrow-leaved balsamroot, pasture sage, pinegrass (*Calamagrostis rubescens*), and giant wildrye (*Elymus cinereus*), with red-osier dogwood (*Cornus stolonifera*), willow (*Salix* sp.), and scouring-rush (*Equisetum hyemale*) limited to the foreshore (Photo 12).

Restoration planting also occurred within the riparian area after the removal of a cabin and gazebo from the foreshore area in August, 2011. Restoration works included removal of invasive plant species and planting of native vegetation including 20 native trees, 90 native shrubs and 50 native grass plugs (Photo 13).

3.4 Wildlife Resource Values

Detailed wildlife surveys were not conducted during the site visit; however, incidental avian occurrences included the American Crow (*Corvus brachyrhynchos*), Black-billed Magpie (*Pica hudsonia*), Black-capped Chickadee (*Poecile atricapillus*) and Canada Goose (*Branta canadensis*).

A number of mature and snag trees were identified within the subject property which also contained cavities, these trees would provide potential nesting and roosting sites for various bird species and bats. Evidence of deer was also noted throughout the subject property with deer bedding sites, trails and scat observed within the house and driveway footprint. Throughout the subject property, areas of rock outcrop and talus were observed, these areas could provide valuable habitat for herpetiles such as the Yellow-listed Northern alligator lizard (*Elgaria coerulea*), garter snakes (*Thamnophis* sp.) and potentially the Blue-listed Great Basin gopher snake (*Pituophis catenifer deserticola*).

Species at risk are identified in the context of provincial and national ranking systems. The provincial ranking system applies to species that have been assessed by the BC Conservation Data Centre (CDC). The national ranking system applies to species that have been assessed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). The British Columbia Conservation Data Centre (CDC) was queried for known locations of listed species, and there were no mapped locations of red or blue listed species within the subject property (BC CDC, 2011). Appendix B details a list of flora and fauna that are of conservation or management concern that occur within the Central Okanagan dry hot Ponderosa pine variant; many of these species could potentially utilize the subject property.

3.5 Fisheries Resource Values

Kokanee (*Oncorhynchus nerka*) are the fish species of primary concern with respect to shoreline development and aquatic habitat alteration along Okanagan Lake. A review



of kokanee shore spawning zoning information for Okanagan Lake, as of December 2011, revealed that the subject property is located within the BC Ministry of Environment kokanee Red Zone (Figure 1). Red Zone designation is given to areas where aggregations of greater than 50 spawning fish were observed in recent years (2001-2008), historic shore spawning activity of 1000 or more fish has been documented, proximity to mouths of streams or locations with Western Ridged mussel shells (BC MoE, 2009). The BC Ministry of Environment Red Zone rating is applied to zones recognized as being very important for the long-term maintenance of kokanee productivity.

As many as 870 shore spawning kokanee were documented to spawn within the Red Zone area adjacent the subject property in 2007, with as many as 620 adjacent the subject property in 2010 (BC MoE, 2010). Kokanee spawning clusters with as many as 100 to 850 kokanee have been documented adjacent to the subject property from years 2005 to 2009 (BC MoE, 2010). The occurrence of the larger clusters of spawning kokanee, as well as consistent use of the area in current and historical records illustrates the importance of this section of shoreline for kokanee production. Table 4 provides a summary of fisheries information relating to the subject property.

Table 4. Summary of known fisheries data adjacent 250 Lochview Road.

MOE Okanagan Foreshore Protocol Designation (No Colour, Yellow, Red, Black) (BC MOE, 2009)	Distance to Nearest Kokanee Zone and Designation (BC MOE, 2009)	Okanagan Lake Foreshore Inventory Mapping Segment/substrate description (Schleppe, 2010)
Kokanee Red Zone	Occurs within a Kokanee Red Zone; ~126 m south of a Kokanee Black Zone	Segment 81; 60% cliff/bluff, 20% low rocky shore, 20 % gravel

The subject property occurs along Foreshore Inventory and Mapping (FIM) Segment 81, which is described as being 100% single family, with disturbance occurring over 40% of the approximately 600 m segment (Schleppe, 2010). The shore type along the segment is described as 60% cliff/bluff, 20% rocky shore and 20% gravel beach. The littoral zone width was described narrow (<10m). Moorages along the segment were documented at a density of 18.3 docks/km. The above FIM segment descriptions are relatively consistent with the differing shoreline types exhibited along the subject property.

The FIM describes the shore type in the nearshore area as comprised of 40% bedrock, 20% boulder, 20% cobble and 20% gravel (Schleppe, 2010). During the May, 2011 site assessment substrates in the location of the existing moorage included predominately gravel along the high water level, followed by an approximately 3.5 m band of bedrock. Substrates transitioned to 75% cobble/boulder with 25% fines beyond the bedrock band to the drop-off located approximately 22 m out from the



beginning of the existing moorage. Substrates appeared to be 100% fines below the drop-off; however, wave action obscured visibility into the water during the site assessment.

In addition to kokanee shore spawning, substrates along the subject property may provide suitable spawning, foraging and general living habitat for a number of other native fish species. Table 5 provides a list of native and non-native fish species documented to occur in Okanagan Lake.

Table 5. Species of fish found in Okanagan Lake (BC MoE, 2011).

Common Name	Scientific Name
Eastern Brook Trout	<i>Salvelinus fontinalis</i>
Burbot	<i>Lota lota</i>
Carp	<i>Cyprinus carpio</i>
Chiselmouth	<i>Acrocheilus alutaceus</i>
Cutthroat Trout	<i>Oncorhynchus clarki lewisi</i>
Kokanee	<i>Oncorhynchus nerka</i>
Lake Trout	<i>Salvelinus namaycush</i>
Lake Whitefish	<i>Coregonus clupeaformis</i>
Largescale Sucker	<i>Catostomus macrocheilus</i>
Leopard Dace	<i>Rhinichthys falcatus</i>
Longnose Dace	<i>Rhinichthys cataractae</i>
Longnose Sucker	<i>Catostomus catostomus</i>
Mountain Whitefish	<i>Prosopium williamsoni</i>
Northern Pike	<i>Ptychocheilus oregonensis</i>
Pikeminnow	
Peamouth Chub	<i>Mylocheilus caurinus</i>
Prickly Sculpin	<i>Cottus asper</i>
Pumpkinseed	<i>Lepomis gibbosus</i>
Pygmy Whitefish	<i>Prosopium coulteri</i>
Rainbow Trout	<i>Oncorhynchus mykiss</i>
Redside Shiner	<i>Richardsonius balteatus</i>
Slimy Sculpin	<i>Cottus cognatus</i>
Yellow Perch	<i>Perca flavescens</i>

4.0 SETBACK ASSESSMENT

Riparian setback requirements for the subject property are regulated under the Provincial Riparian Areas Regulation (RAR) and City of Kelowna. Chapter 12 of the COK OCP entitled Natural Environment DP Guidelines addresses the issue of Riparian Management Areas (RMA) and requires that all developments either meet or beat the provincial RAR guidelines. The specific size of the setback/leavestrip is individually determined for each watercourse by guidelines set forth in the COK OCP and by the provincial RAR.



The provincial RAR setbacks from Okanagan Lake are determined by the high water level (HWL) and are based on the Zone of Sensitivity (ZOS) for three different factors:

- Litter fall and insect drop (15 metres);
- Large woody debris, bank, and channel stability (15 metres); and
- Shade (30 metres due south).

The ZOS for each factor was determined and the resulting Streamside Protection and Enhancement Area (SPEA) setback for the subject property is 15 m from the HWL (Figure 3). The COK OCP states that a 15 m RMA is required from Okanagan Lake, therefore a riparian setback of 15 m from Okanagan Lake is proposed for the subject property.

5.0 IMPACT ASSESSMENT

5.1 Terrestrial Resources

The proposed development footprint comprises a total area of approximately 4,314 m² within the 2.89 hectare subject property (~14.9%). As the whole property is considered to be high-value ESA, 4,314 m² of high value ESA will be lost. Within the proposed development footprint, a total of 23 ponderosa pine and 21 interior-Douglas fir trees (>20 cm dbh) will be removed (Table 3), mitigation and compensation for the removal of these trees is addressed in Sections 6.0 and 7.0.

Most potential impacts to terrestrial habitats can be mitigated through the use of Best Management Practices and mitigative measures, however, there is the potential for the following environmental impacts if appropriate measures are not in place:

- There is the potential for the loss of bird or bat habitat through the removal of mature trees and snags.
- The potential for the loss of or harm to nesting avian species if trees are felled within the active nesting period.
- The potential to impact wildlife through loss of habitat, harm through construction activities or disruption to wildlife corridors.
- The potential for the impact to herpetiles through the loss of potentially valuable habitat (talus and rock outcrops) and harm during construction activities.
- The potential for the spread of invasive plant species.



5.2 Riparian and Aquatic Resources

Due to the adjacency of the subject property to Okanagan Lake there is the potential for a negative impact on the riparian and aquatic resources of the subject property, however, with appropriate mitigation measures in place it is thought that these impacts can be largely avoided. There is the potential for the following environmental impacts without appropriate measures in place:

- Due to the steep nature of the subject property there is the potential for construction activities to cause rock fall onto the riparian habitat.
- There is the potential for the release of fine sediments during construction.
- Improper handling and disposal of construction debris could result in the addition of deleterious substances to Okanagan Lake and subsequent negative impacts to fish, wildlife, associated habitat and surface water quality; and
- Improper fuel storage and/or poorly maintained equipment used during construction could create spill potential that could negatively impact fish, wildlife, and associated habitats.

6.0 CONSTRUCTION RECOMMENDATIONS

Construction activities must be contained within the development footprint. This includes any associated earthworks, access to the site, storage of material and any proposed vegetation clearing. Figure 4 provides a mitigation and restoration plan for the subject property. The following recommendations must be followed during the course of construction.

- All works should generally conform to the Develop with Care Guidelines and other standard Best Management Practices for British Columbia found at <http://www.env.gov.bc.ca/wld/BMP/bmpintro.html#second>

6.1 Site Delineation

The proposed development footprint will need to be clearly delineated; this includes the area for the cut location, detached garage, residence, tram and driveway footprint. Delineation of the limit of disturbance will need to occur prior to any site works including earth works to prevent equipment access to environmentally sensitive areas, prevent damage to existing native vegetation and to avoid the proposed no build/no disturb covenant. Delineation of the limit of disturbance will need to remain in place for the duration of construction and restoration activities and should be undertaken with the use of temporary orange snow fencing.



6.2 Site Clearing

- The clearing limits for the proposed development footprint (including access) should be clearly flagged/delineated prior to any site works.
- Vegetation, soil and rock excavated from the development footprint should be taken offsite and disposed of/recycled appropriately, or stored onsite within the development footprint if reuse onsite is proposed. This is with the exception of the large snag tree that is proposed to be relocated on this site (see Restoration Recommendations – Section 7.0). Excavated material must not be stockpiled out of the proposed development footprint.
- Vegetation clearing should not occur during the breeding bird season (i.e., April 1 to July 31) unless appropriate surveys are conducted to ensure harm to avian fauna or their nests do not occur. It is an offence to harm a bird or its eggs during the nesting period, as per the provincial *Wildlife Act* and federal *Migratory Birds Convention Act*. If vegetation clearing is required during this time, a pre-construction nest survey must be conducted by a qualified environmental professional (QEP) to identify and clearly mark active nests and these surveys should generally follow the overview guidelines developed by Environment Canada for active migratory bird nesting surveys.
- All mature trees (>20 cm dbh) removed from the development footprint are subject to replacement, this is discussed in Restoration Recommendations – Section 7.0.
- Vehicles and machinery should be turned off when not in operation. Idling should be minimized whenever possible.
- Equipment should be maintained in good working condition, such that increased emissions are not occurring as a result of mechanical operation.
- Air quality should be managed on site with the implementation of Best Management Practices (BMPs) pertaining to dust control.

6.3 Erosion, Sediment and Deleterious Substance Control

This section addresses minimizing the potential for the introduction of deleterious substances to Okanagan Lake. These recommendations must be adhered to throughout all stages of construction and restoration.

- The release of fine sediments, concrete-laden water or other substances deleterious to the environment (e.g., gasoline, construction debris) must be prevented.



- Silt fence must be installed between the proposed works (i.e. house construction) and Okanagan Lake to mitigate the risks to aquatic resources associated with runoff and sediment transport. Silt fence must be staked into the ground and trenched a minimum of 15 centimeters to prevent flow underneath the fence and must remain taut to prevent material from moving over the fence. Silt fencing should contain sufficient storage capacity to collect runoff and sediment deposition during storm events. Ongoing monitoring and maintenance of the silt fence must occur on a regular basis to ensure adequate function.
- Ensure that onsite machinery is in good operating condition, clean, and free of leaks, excess oil or grease.
- Equipment refueling or servicing should not be conducted within 30 m of Okanagan Lake.
- A spill containment kit should be kept readily available if any equipment (i.e. excavator) is used during construction in case of the accidental release of a deleterious substance to the environment. Any spills of a toxic substance of reportable quantities should be immediately reported to the Provincial Emergency Program 24 hour hotline at 1-800-663-3456 and the RDCO.
- As the driveway alignment traverses a steep gully, additional measures will need to be implemented to avoid rock fall into the riparian area of the subject property and Okanagan Lake. In order to prevent rock fall, a combination of silt fence and rock fall fencing should be used. Fencing should be installed immediately below the driveway alignment, both the silt fence and rock fall fencing will need to be trenched into the ground (minimum of 15 cm) to effectively catch falling debris. This fencing will need to remain in place for the duration of construction and restoration works and will require regular maintenance including removal of rocks. Upon completion of the proposed works, all rocks that will not be used onsite will need to be transported offsite and disposed of appropriately. In addition any areas disturbed by the installation of silt fence/rock fall fence will need to be restored (see Section 7.0). Finally, a culvert or other suitable device should be included in the designs to allow water passage in the gully. Although the gully is dry for long periods of time (potentially in excess of 100 years), flows should be accommodated for in extreme events (e.g., 1 in 200) to prevent possible downstream effects (e.g., roadway failures, debris slides, etc.).

6.4 Foreshore Use

The following recommendations should be undertaken in order to prevent foreshore disturbance during the proposed works;



- No beach grooming, addition of sand, removal or alteration of cobbles/boulders, or removal of riparian vegetation should occur at any time. For example, importing fine substrates (i.e., sand) would constitute a Harmful Alteration Disruption or Destruction (HADD) of fish habitat, a federal offense under Section 35 of the Fisheries Act. There should be no disturbance to substrates occurring along the foreshore of the subject property.
- No works are to occur below the 343 m elevation without having a Provincial Water Act Section 9 Notification application submitted, approved and in the possession of the property owner and contractor.
- No dredging or placement of fill below the lake high water level should occur at any time.

6.5 Invasive Plant Management

The subject property should be regularly monitored for encroachment of invasive plants, particularly in the areas proposed to be left undeveloped. If observed, invasive plants should be manually removed (e.g., pulled by hand) and disposed of appropriately. Mechanical methods may also be appropriate including the use of hand held weed whackers; however, the areas where mechanical methods are proposed would need to be approved by the environmental monitor. Due to the adjacency to Okanagan Lake, the use of herbicides/pesticides is not recommended within the subject property.

Disturbed areas with high potential for invasive plant encroachment should be remediated with a native grass seed mix. The seed mixture should consist of native grass species, including bluebunch wheatgrass, and may potentially contain nonnative grasses that will help with invasive weed control. The environmental monitor should review the seed mix prior to application to ensure that the mix does not contain invasive species.

6.6 Rock Excavation

The proposed works involves rock excavation within the development footprint to enable access to the site. Due to the adjacency of the subject property to Okanagan Lake and to avoid unnecessary disturbance to the surrounding environment it is proposed that 'Ecobust' will be used (www.ecobust.ca). Ecobust is a product that avoids the use of blasting with explosives and is considered to be environmentally safe. Rock areas proposed to be removed will firstly be drilled and subsequently the Ecobust expansion compound will be put in the drill holes. The compound will then fracture the rock over a period of 6-24 hours. In order to limit the required area of disturbance, a small excavator will remove the rock which will then be transported offsite using a single axel dump truck.



The advantages of Ecobust are that compared with blasting there will be no lift, noise, vibrations, dust, fly rock or toxic residue from the explosives during the procedure. However, drilling may cause limited noise, vibrations and dust. The following mitigation measures must be adhered to throughout the duration of construction and restoration activities:

- Dust control measures may need to be implemented during drilling; this may include suppression through the application of water over the bedrock during drilling.
- Material removed during rock excavation should be removed from the subject site and disposed of appropriately; material cannot be stockpiled out of the development footprint.

6.7 Tram Development

The tram is ~ 85m in length and will have a footprint of ~ 255 m² and may require the loss of a few shrubs but removal of mature trees is not proposed. The tram track system will be open and will not preclude the re-establishment and growth of shrubs and ground cover vegetation beneath. The following recommendations are proposed for the tram development;

- To reduce ground disturbance, shrubs occurring within the tram footprint should be cut at the base of the stem at ground level, rather than being dug up at the roots.
- Long term tram maintenance involving occasional trimming of shrubs occurring beneath should be limited to trimming of branches within the rail bed and those which may interfere with proper system function.

6.8 Fencing

Ecoscope understands that the property owners would like to fence the subject property. Fencing can exclude wildlife and impede wildlife movement, therefore the following recommendations are proposed for fencing at the site;

- Where possible limit fencing at the subject property, fencing should be focused around the driveway, proposed residence and detached garage.
- If fencing of the whole property is proposed it is recommended that a low, split rail fence should be used to enable wildlife movement.
- Fencing must not occur within the foreshore area.



7.0 RESTORATION AND COMPENSATION RECOMMENDATIONS

To address the loss of the approximately 4,314 m² of High-value natural land and 44 mature trees; Ecoscape makes the following recommendations, Figure 4 outlines the proposed restoration at the subject property:

- A tree replacement criterion of 2:1 is proposed. Ecoscape anticipates that a total of 23-Ponderosa pine and 21-interior Douglas-fir (>20 cm dbh) will be affected by the proposed development. Therefore, approximately 88 native trees should be planted within the no disturb/no build covenant area. The 2:1 replacement criteria, assumes that the survival rate of replacement trees could be as low as 50%. Because the subject property consists of an open woodland, with interspersed grassland, it is important to ensure the existing open pine/grassland ecosystems are maintained by not over planting with trees. Furthermore, Ecoscape recommends planting the covenant area with almost entirely ponderosa pines. Replacement interior Douglas-fir should only be used within the gully feature where there is a north facing aspect. This is to prevent interior Douglas-fir from out-competing Ponderosa pine, which could result in forest ingrowth and changes to the existing ecosystems. The City of Kelowna has specified that replacement trees should consist of large trees (Email dated Nov. 10, 2011; Todd Cashin). To achieve this and other important considerations, Ecoscape recommends the following:
 - The use of approximately 80 ponderosa pine and 8 interior Douglas-fir (only within the gully feature) that originate from local stock;
 - The environmental monitor will review the location of the replacement trees prior to planting and is able to provide advice on the placement of trees;
 - Saplings should be 4-5 years old (#5 – deep pot size). This age class is deemed the most appropriate to balance the use of larger trees, while also taking into account other considerations such as the availability of local stock, the planting disturbance footprint, and chances for survival. Local nurseries should be contacted early in the development process to ensure that the number and size of local saplings is available at ideal planting times.
 - Saplings should be planted in early spring or fall. If planted in the fall, then they should be watered in the spring, depending on the extent of the rainy season. Limited watering of saplings should occur during the hot summer months but care should be taken not to over water the plants (i.e., provide an unlimited supply) as this will reduce long term survival of the plants because root growth will be reduced.
 - The environmental monitor should be notified prior to site clearing, in order to confirm the number, species and size of trees for



- removal. The restoration planting plan will then be adjusted as required to accurately reflect the 2:1 replacement criterion.
- A survival criterion of greater than 50% for replacement saplings over a two year period is required.
 - As previously mentioned, there are two (2) high value wildlife trees that occur within the residential development footprint. The largest of the trees (~70 cm dbh) is shown on Figure 3 within the area of disturbance, immediately east of the proposed residence. Given the significance of this tree and its adjacency to the edge of disturbance, Ecoscape recommends that construction proceed in such a way that this tree is avoided.
 - For the high value snag that occurs within the footprint of the residence, Ecoscape recommends that this tree be carefully felled and if possible utilized elsewhere within the subject property. Ecoscape understands that the Property Owner has access to specialized equipment (e.g. cranes), which will allow the snag to be repositioned to within 25 m of existing access roads. The following are recommendations pertaining to the re-use of the snag:
 - Due diligence and extreme caution should be used when felling and relocating the snag. As one would expect, the process can be difficult and dangerous.
 - The snag should be placed in a location where it can be positioned in an upright and secure fashion. Other considerations should include a location that is protected from the wind and does not create a falling risk to structures or roads.
 - If this snag is too dangerous to fell and replace in a standing fashion, the other large tree mentioned above should be used in its place. The first priority is to ensure that the large tree is avoided, so this recommendation is only applicable if avoidance is not possible.
 - The following recommendations for “planting a snag” are taken from the Washington Department of Fish & Wildlife (WDFW, 2011):
 - Prior to installation, the base should be cut so the snag will stand upright;
 - Place the snag in a hole that is approximately 1/3 of the height of the snag and firmly tamp soil, gravel or pour a concrete footing around it;
 - Lower the firm, hollow snag over a metal or wooden post that has been securely placed in the ground; and
 - Install wire supports.
 - Following the installation of the septic system and the septic and water lines between Lochview Road and the proposed residence, the areas of disturbance (including the access corridor to the septic system) must be restored. In

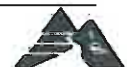


addition, any areas of the subject property that are disturbed by the installation of the temporary silt fence/rock fall fence must be restored. Restoration will include replanting the disturbed areas with bunchgrass plugs and/or a native grass seed mix. Once the construction works are complete, the environmental monitor will GPS the area of disturbance and make specific recommendations for a grass seed mix and number of bunchgrass plantings. As with the replacement saplings, the planting should occur during the cooler months of the year, when plant survival will be maximized. For the purpose of performance bonding (see Section 9), Ecoscape has assumed a combination of grass seed and 250 bunchgrass plugs.

- To compensate for the approximately fifty-two (52) pole/saplings and other shrubs and herbs that will be lost due to the proposed development, Ecoscape recommends that a minimum of 25 bird/bat boxes be constructed and installed within the subject property. The environmental monitor will work with the contractor to identify a range of bird box sizes that will be most suitable for local species.
- Landscaping that surrounds the proposed garage and residence should incorporate native and drought tolerant species. Ecoscape would be pleased to provide a native species list that is appropriate for the site. A formal landscape plan has not yet been prepared for the subject property, if a plan is completed this must be reviewed by the environmental monitor and the City of Kelowna prior to implementation.
- Disturbed areas should be seeded with a native grass seed mix to prevent the establishment of invasive species. Any grass seed used should be certified as Canada #1 Grade by Agriculture Canada. The grass seed mix should be approved by the environmental monitor prior to purchase and use.
- Coconut matting should be used on all slopes in excess of 30%. Coconut matting should be 1.5 - 2 year, biodegradable matting such as North American Green SC150BN. Matting will be installed post seeding as per manufacturers' specifications. Installation of coconut matting on steep slopes will assist in prevention of erosion.

8.0 ENVIRONMENTAL MONITORING

To ensure compliance with the COK Natural Environment DP Guidelines, BMPs and minimize risks to sensitive terrestrial ecosystems, an Environmental Monitor (EM) should be retained during construction and restoration activities. The EM will document compliance with BMPs, mitigation measures, and other recommendations and provide guidance for implementation of operational best practices (e.g., erosion and sediment control). In the event that greater disturbance occurs due to unforeseen



circumstances, the EM will recommend further measures to protect/restore the natural integrity of the site.

- A pre-construction meeting should be held between the EM and the contractor(s) undertaking the work onsite to ensure a common understanding of the mitigation measures and best practices required for the project. At this time the location of silt fence, rock fall fence, and temporary snow fence (to delineate the development footprint) will be discussed.
- The EM will be an appropriately Qualified Environmental Professional (QEP) authorized to halt construction activities should an incident arise that is causing undue harm (unforeseen or from lack of due care) to terrestrial, aquatic or riparian resource values.
- The EM will be onsite during high risk activities, including tree removal and rock excavations. The EM will also be onsite during restoration activities and will oversee the location of native shrub and tree plantings. Environmental monitoring will continue on a weekly to monthly basis during any other construction and restoration activities, the timing of ongoing monitoring will be decided upon in association with the EM and the COK.
- A copy of the development permit will be kept readily available at the site for reference while the work is being conducted.
- Monitoring reports will be submitted to all relevant contractors, the client and the COK. A report will be generated upon the substantial completion of construction and restoration works summarizing the construction and restoration activities undertaken and listing any deficiencies noted throughout the works. A final environmental monitoring site visit and report will be completed two years after planting and restoration activities area complete at the subject property to document survival rates.

9.0 PERFORMANCE BONDING

The City of Kelowna typically requires bonding for 125% of the value of the restoration works and environmental monitoring. The bond shall be sufficient to guarantee faithful performance and that all mitigation measures will be completed and continue to function properly as prescribed. Performance bonds shall remain in effect until the City has been notified, in writing, by the qualified environmental professional (environmental monitor) that the standards bonded for have been met and substantial completion of the works has been satisfied.



A cost estimate has been prepared to address the City of Kelowna performance bond requirements. Ecoscape estimates that the cost for upland restoration and environmental monitoring will be approximately \$18,014 (Table 6).

Table 6. Cost estimate for upland restoration and environmental monitoring.

Item or Vegetation Type	Location	Quantity	Unit	Material Cost	Total Material Cost	Installed Cost	Total Cost
Trees	No Disturb Covenant	88	5-gal (deep)	\$50	\$4,400	\$2,000	\$6,400
Bunchgrass plugs	Service Line Disturbance Footprint	250	plugs	\$2.50	\$625	\$625	\$1,250
Bird boxes	No Disturb Covenant	25	box	\$20.00	\$500	\$500	\$1,000
Native Grass seed mix for disturbed areas							\$200
Estimated costs associated with snag relocation							\$2,000
Erosion Control (including rock fall, silt and snow fencing)							\$500
Environmental Monitoring associated with upland construction							\$3,061
Total							\$14,411
Total + 125%							\$18,014

10.0 CONCLUSION

The subject property generally contains open woodland, grassland and riparian habitats. All three of the TEM polygons within the subject property were classified as having High environmental sensitivity. The proposed works include a residence, driveway, tram, detached garage, septic system and service line placement for septic and water, and will result in the loss of approximately 4,314 m² of High-value habitat. The proposed works are expected to impact forty-four (44) mature trees and approximately fifty-two (52) poles/saplings. Recommendations have been included to address development guidelines, construction, and restoration activities. By following the recommended mitigative measures, the integrity and habitat value of the surrounding terrestrial ecosystem can be maintained.



11.0 CLOSURE

This report has been prepared for the exclusive use of Tom and Sandra Greenough. Ecoscape has prepared this report with the understanding that all available information on the past, present, and proposed conditions of the site have been disclosed. Tom and Sandra Greenough have acknowledged that in order for Ecoscape to properly provide the professional service, Ecoscape is relying upon full disclosure and accuracy of this information.

If you have any questions or comments, please contact the undersigned at your convenience.

Respectfully Submitted,
ECOSCAPE ENVIRONMENTAL
CONSULTANTS LTD.

Prepared by:



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Natural Resource Biologist
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Reviewed by:



Mary Ann Olson Russello, M.Sc., R.P.Bio
Natural Resource Biologist
Direct line: 250-491-7337 ex. 205



12.0 REFERENCES

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- Schleppe, J. 2010. Okanagan Lake Foreshore Inventory and Mapping. Prepared for: Okanagan Collaborative Conservation Program. Prepared by: Ecoscape Environmental Consultants Ltd. Project File: 10-596.
- Washington Department of Fish and Wildlife (WDFW). 2011. Accessed on-line: December 23, 2011. <http://wdfw.wa.gov/living/snags/>





Photo 1: Depicts the open woodland and grassland communities with shallow soils and exposed rock typical of the subject property.



Photo 2: View of the proposed cut location (turnaround) located on the eastern side of Lochveiw Road.





Photo 3: View of the detached garage footprint adjacent to Lochivew Road, three trees will need to be removed in this area (November 25, 2011).



Photo 4: View of the septic system footprint, eight trees will need to be removed in this area (February 3, 2012). Note the disturbance and stockpiles of woody debris.





Photo 5: View of the house footprint which is located on a relatively flat terrace of the subject property (November 25, 2011).



Photo 6: View of a large snag tree located within the house footprint (November 25, 2011).





Photo 7: View of a mature Ponderosa pine and large snag located within the proposed house footprint (November 25, 2011).





Photo 8: View of the rock talus slope located to the east of the proposed house footprint (August 24, 2011).



Photo 9: View of exposed bedrock located to the east of the proposed house footprint (November 25, 2011).





Photo 10: View of the steep gully that the proposed driveway alignment will traverse (August 24, 2011).



Photo 11: View of proposed tram footprint (November 25, 2011).





Photo 12: Depicts some of the native vegetation that occurs along the foreshore (May 26, 2011).



Photo 13: View of restoration that occurred subsequent to the removal of a cabin and gazebo from the riparian area in August, 2011. Plantings were complete in October, 2011. (December 8, 2011).



FIGURES





FIGURE 1
Site Location and Fisheries Information

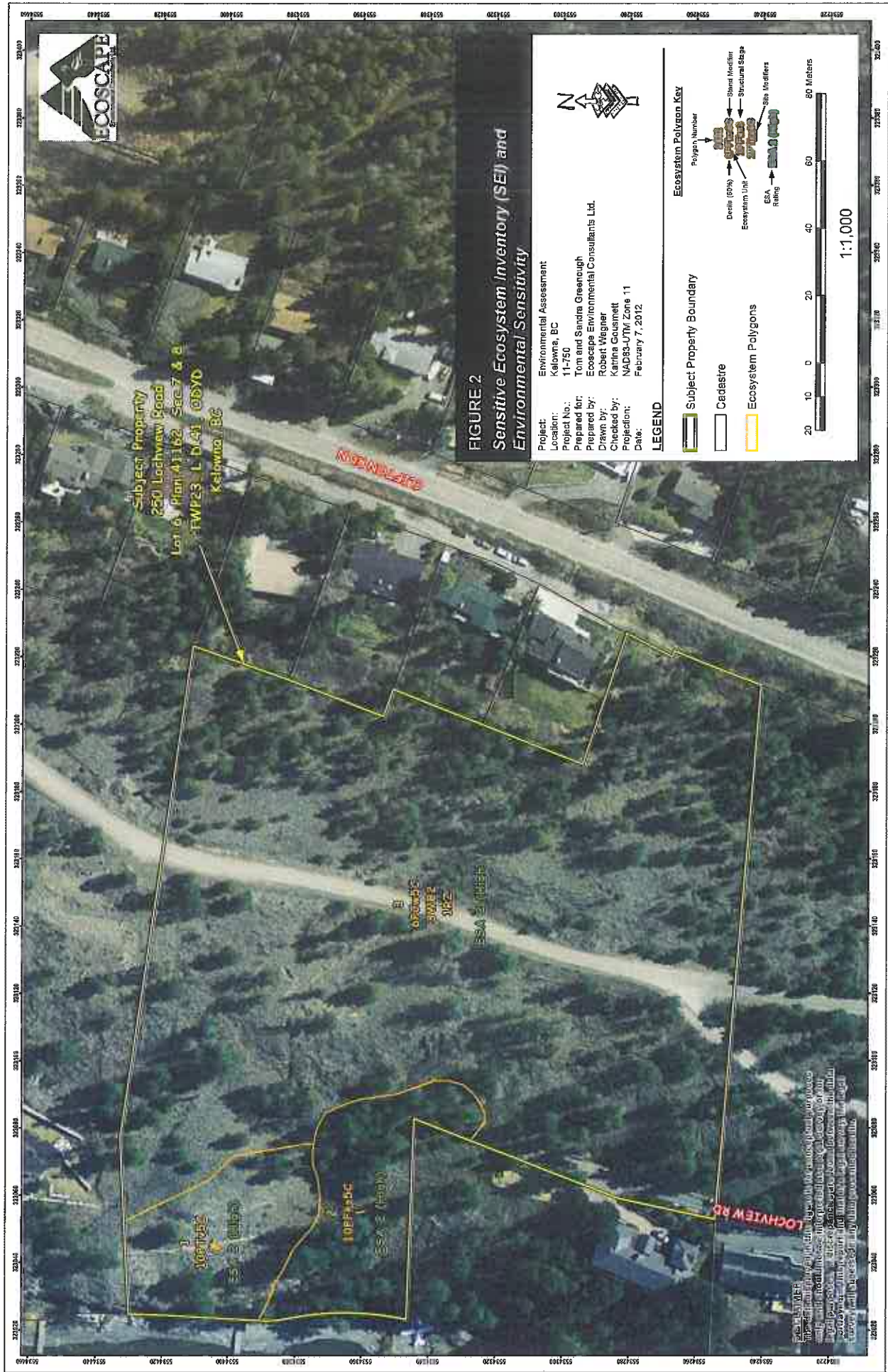
Project: Environmental Assessment
Location: Kelowna, BC
Project No.: 11-050
Prepared for: Tom and Sandra Greenough
Prepared by: Ecoscope Environmental Consultants Ltd.
Checked by: Robert Wagner
Checked by: Robert Wagner
Projection: NAD83-UTM, Zone 11
Date: February 7, 2012

LEGEND

- City
- Regional Location of Subject Property
- Major Highway
- Streams and Rivers
- Forefishes Inventory and Mapping (FIM)
- Municipal Boundary
- City of Kelowna
- Cadastral
- Subject Property Boundary
- Lake
- Ministry of Environment - Kolanee Yellow Zone
- Ministry of Environment - Kolanee Red Zone
- Ministry of Environment - Kolanee Black Zone

ECOSCAPE
Environmental Consultants Ltd.

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Subject Property
 260 Lochview Road
 Lot 6, Plan A1162, Sec 7 & 8
 TWP23 - L D41 - 06YD
 Kelowna, BC

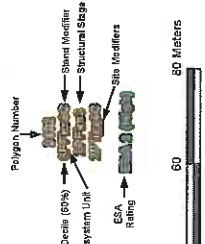
FIGURE 2
Sensitive Ecosystem Inventory (SEI) and Environmental Sensitivity

Project: Environmental Assessment
 Location: Kelowna, BC
 Project No.: 11-750
 Prepared for: Tom and Sandra Greengough
 Prepared by: Eoscape Environmental Consultants Ltd.
 Drawn by: Robert Wiegner
 Checked by: Karina Gousmett
 Projection: NAD83-UTM Zone 11
 Date: February 7, 2012

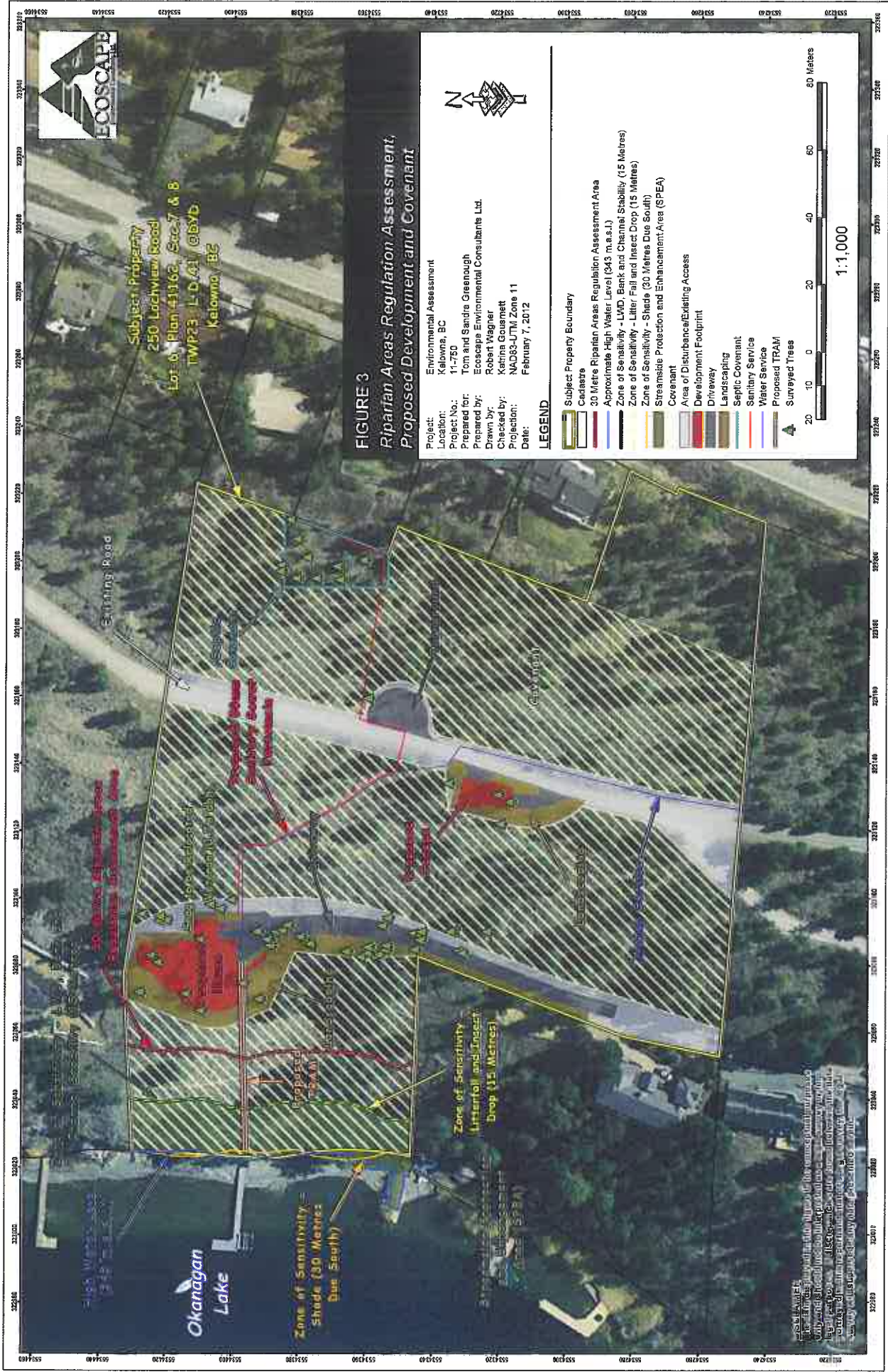
LEGEND

- Subject Property Boundary
- Cadastre
- Ecosystem Polygons

Ecosystem Polygon Key



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Subject Property
 250 Lochview Road
 Lot 6, Plan 41162, Sec 7 & 8
 TWP23 - L.D.01 @BYB
 Kelowna, BC

FIGURE 3
Riparian Areas Regulation Assessment,
Proposed Development and Covenant

Project: Environmental Assessment
 Location: Kelowna, BC
 Project No.: 11-750
 Prepared for: Tom and Sandra Greenough
 EcoScape Environmental Consultants Ltd.
 Drawn by: Robert Wagner
 Checked by: Katrina Goumett
 Projection: NAD83-UTM Zone 11
 Date: February 7, 2012



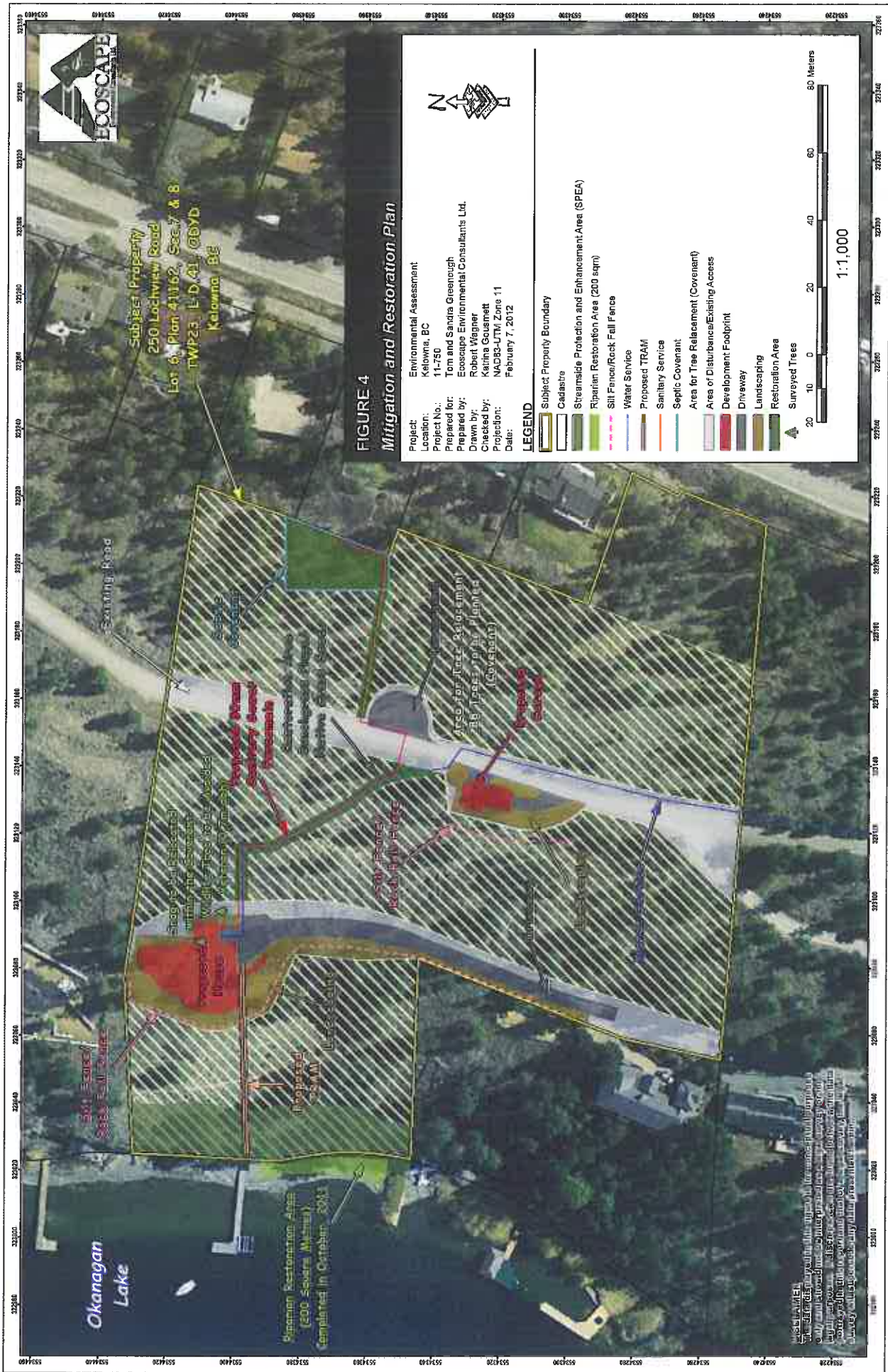
LEGEND

- Subject Property Boundary
- Cadastral
- 30 Metre Riparian Areas Regulation Assessment Area
- Approximate High Water Level (243 m.a.s.l.)
- Zone of Sensitivity - LWD, Bank and Channel Stability (15 Metres)
- Zone of Sensitivity - Litter Fall and Insect Drop (15 Metres)
- Zone of Sensitivity - Shade (30 Metres Due South)
- Streamside Protection and Enhancement Area (SPEA)
- Covenant
- Area of Disturbance/Existing Access
- Development Footprint
- Driveway
- Landscaping
- Septic Covenant
- Sanitary Service
- Water Service
- Proposed TRAM
- Surveyed Trees



1:1,000

NOT TO SCALE
 This is a conceptual plan and does not show the exact location of the proposed development. Only areas that are shown on the plan are intended to be developed. The plan is for informational purposes only and does not constitute a contract or any other legal document. The plan is subject to change without notice. The plan is not to be used for any other purpose.



Subject Property
250 Lochview Road
Lot 4, Plan 411162, Sec. 7 & 8
TWP23, L.D. 41, OBYD
Kelowna, BC

FIGURE 4
Mitigation and Restoration Plan

Project: Environmental Assessment
Location: Kelowna, BC
Project No.: 11-750
Prepared for: Tom and Sandra Greenough
Prepared by: Ecoscape Environmental Consultants Ltd.
Drawn by: Robert Wigner
Checked by: Karina Goumet
Projection: NAD83-UTM Zone 11
Date: February 7, 2012

LEGEND

- Subject Property Boundary
- Cadastre
- Streamside Protection and Enhancement Area (SPEA)
- Riparian Restoration Area (200 sqm)
- Silt Fence/Rock Fall Fence
- Water Service
- Proposed TRAM
- Sanitary Service
- Septic Covenant
- Area for Tree Relacement (Covenant)
- Area of Disturbance/Existing Access
- Development Footprint
- Driveway
- Landscaping
- Restoration Area
- Surveyed Trees



Okanagan Lake

Riparian Restoration Area
(200 Square Meters)
templated in October 2011

NOTES:
1. This plan was prepared for the purpose of providing a visual representation of the proposed mitigation and restoration measures. It is not intended to be used as a legal document. The client is responsible for ensuring that all necessary permits and approvals are obtained before any construction or implementation of the proposed measures.
2. The plan is based on the information provided by the client and the field survey data. The client is responsible for ensuring that the information is accurate and up-to-date.
3. The plan is subject to change without notice. The client is responsible for ensuring that the plan is updated as necessary to reflect any changes to the project or the site conditions.

APPENDIX A - CITY OF KELOWNA ENVIRONMENTAL ASSESSMENT APPLICATION CHECKLIST



CHECKLIST

This checklist outlines the mandatory requirements for a complete submission. Please ensure you have included all required documentation and drawings as part of your professional submission, as incomplete applications will not be accepted. Environment & Land Use staff (2nd floor City Hall) are available to provide assistance and information. Please note further submission materials may be required during application processing. Checklist must be completed by a Qualified Environmental Professional registered in British Columbia.

This checklist applies to:

- ▶ Natural Environment Development Permit
- ▶ Zoning
- ▶ Development Permit and Development Variance Permit
- ▶ OCP Amendment

Description	Included or present onsite?	Justification
Number of copies of report submitted in accordance with the number requested at pre-application or by file manager? Unprotected digital copies of report (.pdf) provided to City?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Updated data files in ESRI shapefile format NAD83 UTM Zone 11 (e.g. SHIM, SEI)?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	These files are available upon request.
Report prepared, signed and sealed by a Registered Professional Biologist (R.P. Bio.) licensed to practice in BC? Report reviewed by a R.P. Bio?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
To your knowledge, have previous environmental reports been prepared for any parcels included in this assessment? If yes, are past reports attached as part of this submission? Have relevant findings and recommendations of other studies been considered and integrated?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Although the environmental assessment for a moorage extension has not been included as a separate document, findings were incorporated into this document.
Do regulations of senior government agencies such as MOE or DFO apply (e.g. RAR or HADD)? Have appropriate senior government staff and other relevant agencies been consulted? Have recommendations been adequately implemented or addressed? Does this report satisfy requirements of other levels of government? Have approvals been received?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	The proposed development occurs on a lake front lot. Therefore, our enclosed figures show the appropriate RAR setbacks.
Do EIA study area boundaries include all lands within development proposal area?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Have potential impacts to air quality and climate change (e.g. carbon sequestration through tree and grassland removal) from this project been addressed?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Are impacts to wildlife, migratory birds and/or habitat (e.g. wildlife trees) expected?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	If mitigative recommendations are followed, then impacts to wildlife should be minimal.
Are federal or provincially-listed species at risk present on site?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	As per the Conservation Data Centre, there are no known mapped occurrences of species at risk within the subject property.
Are indications of heritage resources present?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	
All pre-existing data including but not limited to SHIM, WIM, FIM and SEI reviewed and referenced? Sensitive ecosystems present onsite or within 100 meters of project boundaries? <ul style="list-style-type: none"> • Wetlands • Riparian • Old Forest • Grasslands • Broadleaf Woodlands • Coniferous Woodlands • Sparsely Vegetated 	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	
Field assessment conducted? Follow up field work required due to timing of original assessment?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	
Topographic survey conducted on slopes exceeding 20%? Are appropriate setbacks indicated?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Has disturbance occurred on site? Does the report accurately reflect the site conditions prior to disturbance? Does report anticipate conditions post development?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	This report provides numerous recommendations to limit the disturbance extents to the proposed development footprint. Furthermore, the no build/no disturb covenant will be instrumental in retaining the natural conditions of the surrounding landscape.

Description	Included or present onsite?	Justification
Does report account for off-site developments (both existing and proposed) and the impact on the subject site?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	The proposed development pertains to a single lot and therefore off-site developments were not considered.
Is all data and non-standard methods contributing to results and interpretations either included in the report or appended?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Representative photos (colour) included in report?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Orthophotos used are most up-to-date presently available?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Does location map include legal site description, including lot and plan numbers?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Location map is at an appropriate scale (e.g. 1:50,000)?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Site map at an appropriate scale (e.g. 1:2,000 to 1:5,000)?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Maps printed to scale and in full colour?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Are site profiles and cross-sections sufficient to adequately demonstrate <u>both</u> pre and post development conditions?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Environmentally Sensitive Areas have been stratified (ESA 1, 2, 3 and 4) and mapped? See Environmental Assessment Technical Guidelines. Criteria used to assess ESAs appended to report? ESA 1 or 2 polygons present within the study area boundary? Will proposed development impact or disturb ESA 1 or ESA 2 land? Efforts to avoid ESAs 1&2 demonstrated if proposed for disturbance? Site map overlaid with ESAs and areas to be disturbed?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	The entire property is classified as ESA 2; therefore complete avoidance is not possible. We have recommended avoidance of a mature 69 cm dbh ponderosa pine.
Biophysical inventory provided?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Methodology rationale provided?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Cumulative effects of both construction and inhabitation assessed? Cumulative effects considered using the no action alternative as a baseline to evaluate cumulative effects? Range of actions considered includes <u>all</u> connected and similar actions (related) that could contribute to cumulative effects?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	A cumulative effects section is not included. The cumulative effects of development within the Okanagan Valley, is no doubt significant, however it is considered beyond the scope of this assessment.
Gap analysis and recommendations to fill gaps?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	
References section provided and in a standard format (e.g. APA, MLA)?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Zoning options and covenants recommended?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Draft covenants, statutory right-of-way agreements, and easements provided?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Discussion of how proposal achieves, or does not achieve a no net loss/net gain?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Habitat balance sheet and rationale provided?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	No, rather mitigative recommendations are provided.
Implementation strategy with recommendations provided?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Environmental management plan provided? Environmental monitoring recommended? Metrics for monitoring and reporting included?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	An environmental management plan is provided via a range of recommendations that are meant to reduce environmental impacts.
Confirmation of retention of environmental monitoring obtained (monitoring contract with proponent)? Authorization to halt work provided?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Effectiveness monitoring recommended?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Performance bonding (125%) and maintenance bonding (10%) required?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Performance Bonding Amount \$ 18,014

I hereby declare that all of the above statements, information and materials are accurate and assessments and recommendations are consistent with appropriate industry standards.

Applicant Signature:



Date: _____ February 9, 2012 _____

APPENDIX B - SPECIES OF CONSERVATION AND MANAGEMENT CONCERN



BC Species and Ecosystems Explorer Search Results

Scientific Name	English Name	Provincial	BC List	Status			CF Priority
				COSEWIC	SARA	Global	
<i>Achnatherum thurberianum</i>	Thurber's needlegrass	S1 (2008)	Red			G5 (1987)	1
<i>Acipenser transmontanus</i>	White Sturgeon	S2 (2004)	No Status	E (2003)	1-E (2006)	G4 (2002)	2
<i>Acipenser transmontanus</i> pop. 6	White Sturgeon (Middle Fraser River population)	S2 (2010)	Red	E (2003)		G4T2 (2010)	3
<i>Acrocheilus alutaceus</i>	Chiselmouth	S3S4 (2010)	Blue	NAR (2003)		G5 (1996)	2
<i>Aechmophorus occidentalis</i>	Western Grebe	S1B,S2N (2009)	Red	C (2011)		G5 (1996)	1
<i>Aegolius funereus</i>	Boreal Owl	S4 (2009)	Yellow	NAR (1995)		G5 (1996)	3
<i>Aeshna constricta</i>	Lance-tipped Darner	S2 (2004)	Red			G5 (1985)	2
<i>Agastache urticifolia</i>	nettle-leaved giant-hyssop	S3 (2001)	Blue			G5 (2000)	2
<i>Aloina bifrons</i>		S2S3 (2011)	Blue			G3 (2000)	2
<i>Ambystoma macrodactylum</i>	Long-toed Salamander	S4S5 (2010)	Yellow	NAR (2006)		G5 (2008)	4
<i>Ambystoma mavortium</i>	Blotched Tiger Salamander	S2 (2010)	Red	E (2001)	1 (2003)	G5 (1996)	
<i>Ammodramus savannarum</i>	Grasshopper Sparrow	S1S2B (2009)	Red			G5 (1996)	1
<i>Anaxyrus boreas</i>	Western Toad	S3S4 (2010)	Blue	SC (2002)	1-SC (2005)	G4 (2008)	2
<i>Anguispira kochi</i>	Banded Tigersnail	S3 (2008)	Blue			G5 (2009)	2
<i>Antrozous pallidus</i>	Pallid Bat	S2 (2006)	Red	T (2010)	1-T (2003)	G5 (1996)	2

<i>Apodemia mormo</i>	Mormon Metalmark	S1 (2006)	Red	E (2003)	1-E (2005)	G5 (1998)	1
<i>Ardea herodias herodias</i>	Great Blue Heron, <i>herodias</i> subspecies	S3B,S4N (2009)	Blue			G5T5 (2000)	2
<i>Argia vivida</i>	Vivid Dancer	S2 (2004)	Red	C (2011)		G5 (1990)	2
<i>Asio flammeus</i>	Short-eared Owl	S3B,S2N (2009)	Blue	SC (2008)	3 (2005)	G5 (2008)	2
<i>Athene cunicularia</i>	Burrowing Owl	S1B (2009)	Red	E (2006)	1-E (2003)	G4 (1996)	2
<i>Atriplex argentea</i> ssp. <i>argentea</i>	silvery orache	S1 (2000)	Red			G5T5 (1997)	2
<i>Berula erecta</i>	cut-leaved water-parsnip	S3 (2008)	Blue			G4G5 (1984)	2
<i>Boechera paupercula</i>	tiny sun-cress	S2? (2011)	Red			G2G4 (2004)	
<i>Botaurus lentiginosus</i>	American Bittern	S3B (2010)	Blue			G4 (1996)	2
<i>Bouteloua gracilis</i>	blue grama	S2 (2007)	Red			G5 (1998)	2
<i>Brickellia oblongifolia</i> ssp. <i>oblongifolia</i>	narrow-leaved brickellia	S2S3 (2007)	Blue			G5T5 (1997)	3
<i>Bryoerythrophyllum columbianum</i>	Columbian carpet moss	S2S3 (2011)	Blue	SC (2004)	1-SC (2005)	G3G4 (2008)	2
<i>Buteo lagopus</i>	Rough-legged Hawk	S2S3N (2009)	Blue	NAR (1995)		G5 (1996)	2
<i>Buteo swainsoni</i>	Swainson's Hawk	S2B (2009)	Red			G5 (1996)	2
<i>Butorides virescens</i>	Green Heron	S3S4B (2009)	Blue			G5 (1996)	4
<i>Calamagrostis</i>	plains	S3	Blue			G5	4

<i>montanensis</i>	reedgrass	(2007)				(1986)	
<i>Calcarius pictus</i>	Smith's Longspur	S3S4B (2010)	Blue			G5 (2008)	4
<i>Callophrys affinis</i>	Immaculate Green Hairstreak	S3 (2006)	Blue			G5 (1998)	2
<i>Canis lupus</i>	Grey Wolf	S4 (2010)	Yellow	NAR (1999)		G4 (2006)	3
<i>Carex hystericina</i>	porcupine sedge	S2S3 (2000)	Blue			G5 (1984)	2
<i>Carex pedunculata</i>	peduncled sedge	S2S3 (2001)	Blue			G5 (1984)	2
<i>Carex sychnocephala</i>	many-headed sedge	S3 (2001)	Blue			G4 (1988)	2
<i>Catherpes mexicanus</i>	Canyon Wren	S3 (2005)	Blue	NAR (1992)		G5 (1996)	4
<i>Catostomus platyrhynchus</i>	Mountain Sucker	S2S3 (2010)	Blue	SC (2010)		G5 (2003)	2
<i>Charina bottae</i>	Northern Rubber Boa	S4 (2007)	Yellow	SC (2003)	1-SC (2005)	G5 (2006)	1
<i>Chenopodium subglabrum</i>	smooth goosefoot	S1 (2011)	Red			G3G4 (2009)	
<i>Chlidonias niger</i>	Black Tern	S4B (2009)	Yellow	NAR (1996)		G4 (1996)	3
<i>Chondestes grammacus</i>	Lark Sparrow	S2B (2010)	Red			G5 (2009)	2
<i>Chordeiles minor</i>	Common Nighthawk	S4B (2010)	Yellow	T (2007)	1-T (2010)	G5 (2009)	2
<i>Chrysemys picta</i>	Western Painted Turtle	S3 (2007)	No Status	E/SC (2006)	1	G5 (2005)	2
<i>Chrysemys picta pop. 2</i>	Western Painted Turtle - Intermountain - Rocky Mountain Population	S2S3 (2007)	Blue	SC (2006)	1-SC (2007)	G5T2T3 (2008)	2

<i>Cicindela decemnotata</i>	Badlands Tiger Beetle	S1S3 (2008)	Red			G4 (2008)	2
<i>Cicindela parowana</i>	Dark Saltflat Tiger Beetle	S1 (2008)	Red	E (2009)		G4 (2008)	1
<i>Cicindela pugetana</i>	Sagebrush Tiger Beetle	S3 (2008)	Blue			G4 (2008)	2
<i>Circus cyaneus</i>	Northern Harrier	S4B (2009)	Yellow	NAR (1993)		G5 (2008)	2
<i>Coccyzus americanus</i>	Yellow-billed Cuckoo	SXB (2010)	Red			G5 (2008)	3
<i>Coluber constrictor</i>	Racer	S3 (2007)	Blue	SC (2004)	1-SC (2006)	G5 (2006)	2
<i>Contopus cooperi</i>	Olive-sided Flycatcher	S3S4B (2009)	Blue	T (2007)	1-T (2010)	G4 (2008)	2
<i>Corynorhinus townsendii</i>	Townsend's Big-eared Bat	S3 (2006)	Blue			G4 (1996)	2
<i>Cottus hubbsi</i>	Columbia Sculpin	S3 (2010)	Blue	SC (2010)	1-SC (2003)	G4Q (2001)	2
<i>Couesius plumbeus</i>	Lake Chub	S5 (2010)	Yellow	DD		G5 (1996)	6
<i>Crepis atribarba</i> ssp. <i>atribarba</i>	slender hawksbeard	S1 (2000)	Red			G5T5 (1997)	1
<i>Crepis modocensis</i> ssp. <i>modocensis</i>	low hawksbeard	S1 (2000)	Red			G4G5T4 (1987)	1
<i>Crossidium aberrans</i>		S2S3 (2011)	Blue			G3G5 (1996)	2
<i>Crossidium seriatum</i>		S2S3 (2011)	Blue	C (2011)		G2G4 (2009)	1
<i>Crotalus oreganus</i>	Western Rattlesnake	S3 (2007)	Blue	T (2004)	1-T (2005)	G5 (2006)	2
<i>Cryptantha ambigua</i>	obscure cryptantha	S3 (2006)	Blue			G4 (1988)	4
<i>Cryptomastix mullani</i>	Coeur d'Alene Oregonian	S3S5 (2008)	Blue			G4 (2005)	4

<i>Cyperus erythrorhizos</i>	red-rooted cyperus	S1 (2000)	Red		G5 (1984)	1	
<i>Cyperus squarrosus</i>	awned cyperus	S3 (2001)	Blue		G5 (1993)	2	
<i>Cypseloides niger</i>	Black Swift	S4B (2009)	Yellow	C (2011)	G4 (1996)	2	
<i>Danaus plexippus</i>	Monarch	S3B (2006)	Blue	SC (2010)	1-SC (2003)	G5 (2010)	2
<i>Didymodon brachyphyllus</i>		S1S2 (2011)	Red		G5TNR	3	
<i>Didymodon rigidulus</i> var. <i>icmadophilus</i>		S2S3 (2011)	Blue		G5TNR	2	
<i>Dolichonyx oryzivorus</i>	Bobolink	S3B (2010)	Blue	T (2010)	G5 (2009)	2	
<i>Drepanocladus aduncus</i>		S2S3 (2011)	Blue		G5 (1991)		
<i>Eleocharis engelmannii</i>	Englemann's spike-rush	S1 (2006)	Red		G4G5 (2002)	1	
<i>Eleocharis ovata</i>	ovate spikerush	S1 (2007)	Red		G5 (1992)	1	
<i>Elgaria coerulea</i>	Northern Alligator Lizard	S4S5 (2007)	Yellow	NAR (2002)	G5 (2005)	3	
<i>Empidonax wrightii</i>	Gray Flycatcher	S3B (2010)	Blue	NAR (1992)	G5 (1996)	2	
<i>Enallagma hageni</i>	Hagen's Bluet	S3S4 (2004)	Blue		G5 (1988)	4	
<i>Encalypta spathulata</i>		S2S3 (2011)	Blue		G4 (2011)	2	
<i>Entosthodon rubiginosus</i>	rusty cord-moss	S1 (2011)	Red	E (2004)	1-E (2006)	G1G3 (2006)	1
<i>Epargyreus clarus</i>	Silver-spotted Skipper	S3 (2006)	Blue		G5 (2009)	4	
<i>Epargyreus clarus clarus</i>	Silver-spotted Skipper,	S3 (2006)	Blue		G5T5 (2003)	4	

	<i>clarus</i> subspecies						
<i>Epipactis gigantea</i>	giant helleborine	S2S3 (2000)	Blue	SC (1998)	3 (2005)	G4 (2006)	2
<i>Eremophila alpestris merrilli</i>	Horned Lark, <i>merrilli</i> subspecies	S3S4B (2009)	Blue			G5TU (1997)	4
<i>Erythemis collocata</i>	Western Pondhawk	S3 (2004)	Blue			G5 (2000)	2
<i>Euderma maculatum</i>	Spotted Bat	S3S4 (2006)	Blue	SC (2004)	1-SC (2005)	G4 (1998)	2
<i>Euphagus carolinus</i>	Rusty Blackbird	S3S4B (2010)	Blue	SC (2006)	1-SC (2009)	G4 (2008)	2
<i>Euphyes vestris</i>	Dun Skipper	S3 (2006)	Blue	T (2000)	1-T (2003)	G5 (2006)	2
<i>Falco mexicanus</i>	Prairie Falcon	S1S2B (2010)	Red	NAR (1996)		G5 (1996)	2
<i>Falco peregrinus</i>	Peregrine Falcon	S3B (2011)	No Status	SC (2007)		G4 (2000)	2
<i>Falco peregrinus anatum</i>	Peregrine Falcon, <i>anatum</i> subspecies	S2?B (2010)	Red	SC (2007)	1-T (2003)	G4T4 (2006)	2
<i>Fossaria truncatula</i>	Attenuate Fossaria	S3S4 (2008)	Blue			G5 (2008)	2
<i>Gasterosteus aculeatus</i>	Threespine Stickleback	S5 (2010)	Yellow	SC (1983)		G5 (2008)	6
<i>Gastrocopta holzingeri</i>	Lambda Snaggletooth	S3? (2008)	Blue			G5 (2009)	2
<i>Gaura coccinea</i>	scarlet gaura	S1 (2000)	Red			G5 (1990)	2
<i>Gayophytum ramosissimum</i>	hairstem groundsmoke	S1 (2000)	Red			G5 (1987)	2
<i>Glycyrrhiza lepidota</i>	wild licorice	S3 (2008)	Blue			G5 (1984)	4
<i>Gomphus</i>	Pronghorn	S2S3	Blue			G5	2

<i>graslinellus</i>	Clubtail	(2004)				(1985)	
<i>Gonidea angulata</i>	Rocky Mountain Ridged Mussel	S1 (2008)	Red	E (2010)	1-SC (2005)	G3 (2007)	1
<i>Grimmia plagiopodia</i>		S2? (2011)	Red			G4G5 (1991)	2
<i>Grus canadensis</i>	Sandhill Crane	S4B (2009)	Yellow	NAR (1979)		G5 (1996)	5
<i>Hackelia ciliata</i>	Okanogan stickseed	S3S4 (2006)	Yellow	NAR (2007)		G3G4 (2007)	4
<i>Haliaeetus leucocephalus</i>	Bald Eagle	S5B,S5N (2009)	Yellow	NAR (1984)		G5 (2005)	6
<i>Hedeoma hispida</i>	mock-pennyroyal	S1 (2000)	Red			G5 (1985)	1
<i>Helenium autumnale</i> var. <i>grandiflorum</i>	mountain sneezeweed	S2S3 (2000)	Blue			G5T3T5 (2002)	2
<i>Helianthus nuttallii</i> ssp. <i>rydbergii</i>	Nuttall's sunflower	S1 (2000)	Red			G5T5 (2000)	2
<i>Hemphillia camelus</i>	Pale Jumping-slug	S3 (2008)	Blue			G4 (2006)	2
<i>Hesperia nevada</i>	Nevada Skipper	S3S4 (2006)	Blue			G5 (2006)	2
<i>Heterocodon rariflorum</i>	heterocodon	S3 (2002)	Blue			G5 (1988)	2
<i>Hirundo rustica</i>	Barn Swallow	S3S4B (2009)	Blue	T (2011)		G5 (1996)	2
<i>Hydroprogne caspia</i>	Caspian Tern	S3B (2005)	Blue	NAR (1999)		G5 (1996)	2
<i>Hypericum scouleri</i> ssp. <i>nortoniae</i>	western St. John's-wort	S2S3 (2000)	Blue			G5T3T5 (2002)	3
<i>Hypsiglena chlorophaea</i>	Desert Night Snake	S1 (2007)	Red	E (2011)	1-E (2003)	G5 (2008)	1
<i>Icteria virens</i>	Yellow-breasted Chat	S1S2B (2010)	Red	E (2011)	1-E (2003)	G5 (1996)	1

<i>Idahoia scapigera</i>	scalegod	S2 (2000)	Red			G5 (1987)	2
<i>Larus californicus</i>	California Gull	S3B (2005)	Blue			G5 (1996)	4
<i>Lathrocasis tenerrima</i>	slender gilia	S1 (2000)	Red			G5 (1988)	2
<i>Leptosiphon septentrionalis</i>	northern linanthus	S3 (2006)	Blue			G5 (1990)	4
<i>Lepus townsendii</i>	White-tailed Jackrabbit	SH (2011)	Red			G5 (1996)	2
<i>Libellula pulchella</i>	Twelve-spotted Skimmer	S3 (2004)	Blue			G5 (1985)	4
<i>Limenitis archippus</i>	Viceroy	SX (2006)	Red			G5 (2009)	2
<i>Limnodromus griseus</i>	Short-billed Dowitcher	S2S4B (2005)	Blue			G5 (1996)	3
<i>Lindernia dubia</i> var. <i>dubia</i>	yellowseed false pimpernel	S1 (2008)	Red			G5T5 (2000)	1
<i>Lithobates pipiens</i>	Northern Leopard Frog	S1 (2010)	Red	E (2009)	1-E (2003)	G5 (2002)	1
<i>Lomatium triternatum</i> ssp. <i>platycarpum</i>	nine-leaved desert-parsley	S2 (2001)	Red			G5T3T5 (2002)	2
<i>Lupinus bingenensis</i> var. <i>subsaccatus</i>	Suksdorf's lupine	S2 (2007)	Red			G4G5TN R	3
<i>Lycaena nivalis</i>	Lilac-bordered Copper	S3 (2006)	Blue			G5 (1998)	4
<i>Marsilea vestita</i>	hairy water-clover	S1 (2000)	Red			G5 (1986)	1
<i>Martes pennanti</i>	Fisher	S2S3 (2006)	Blue			G5 (2005)	2
<i>Megascops kennicottii</i>	Western Screech-Owl	S4 (2009)	No Status		1	G5 (2003)	2
<i>Megascops kennicottii</i>	Western Screech-Owl,	S2 (2009)	Red	E (2002)	1-E (2005)	G5T4 (2000)	1

<i>macfarlanei</i>	<i>macfarlanei</i> subspecies)		
<i>Melanerpes lewis</i>	Lewis's Woodpecker	S2B (2009)	Red	T (2010)	1-SC (2003)	G4 (2001)	2
<i>Melanitta perspicillata</i>	Surf Scoter	S3B,S4N (2005)	Blue			G5 (1996)	4
<i>Melica bulbosa</i>	oniongrass	S3 (2011)	Blue			G5 (1988)	
<i>Microbryum vlassovii</i>	nugget moss	S1 (2011)	Red	E (2006)	1-E (2009)	G2? (1997)	1
<i>Mimulus suksdorfii</i>	Suksdorf's monkeyflowe r	S1 (2006)	Red			G4 (1994)	2
<i>Myotis ciliolabrum</i>	Western Small-footed Myotis	S2S3 (2006)	Blue			G5 (1998)	3
<i>Myotis thysanodes</i>	Fringed Myotis	S2S3 (2006)	Blue	DD (2004)	3 (2005)	G4G5 (1998)	3
<i>Numenius americanus</i>	Long-billed Curlew	S3B (2010)	Blue	SC (2011)	1-SC (2005)	G5 (1996)	2
<i>Nycticorax nycticorax</i>	Black- crowned Night-heron	S1N (2005)	Red			G5 (1996)	3
<i>Oncorhynchus kisutch</i>	Coho Salmon	S4 (2000)	Yellow	E (2002)		G4 (2001)	2
<i>Oncorhynchus nerka</i>	Sockeye Salmon	S4 (2000)	Yellow	E (2003)		G5 (2003)	2
<i>Oncorhynchus tshawytscha</i>	Chinook Salmon	S4	Yellow	T (2006)		G5 (1996)	2
<i>Oreohelix strigosa</i>	Rocky Mountainsnail	S3S4 (2008)	Blue			G5Q (2002)	4
<i>Oreohelix subrudis</i>	Subalpine Mountainsnail	S3S4 (2008)	Blue			G5 (2002)	4
<i>Oreoscoptes montanus</i>	Sage Thrasher	S1B (2009)	Red	E (2010)	1-E (2003)	G5 (1996)	1

<i>Orobanche corymbosa</i> ssp. <i>mutabilis</i>	flat-topped broomrape	S3 (2007)	Blue			G4T3? (2000)	2
<i>Orthocarpus barbatus</i>	Grand Coulee owl-clover	S2 (2007)	Red	E (2005)	1-E (2006)	G2G3 (2008)	2
<i>Orthotrichum cupulatum</i>		S2S3 (2011)	Blue			G4G5 (1997)	2
<i>Orthotrichum hallii</i>		S2 (2011)	Red			G4 (2002)	2
<i>Orthotrichum rivulare</i>		S3 (2011)	Blue			G4 (1999)	2
<i>Otus flammeolus</i>	Flammulated Owl	S3S4B (2005)	Blue	SC (2010)	1-SC (2003)	G4 (2000)	2
<i>Ovis canadensis</i>	Bighorn Sheep	S3 (2010)	Blue			G4 (2008)	3
<i>Papilio machaon dodi</i>	Old World Swallowtail, <i>dodi</i> subspecies	S1 (2006)	Red			G5T4T5 (2003)	2
<i>Pectocarya penicillata</i>	winged combseed	S1 (2000)	Red			G5 (1990)	2
<i>Pelecanus erythrorhynchos</i>	American White Pelican	S1B (2009)	Red	NAR (1987)		G4 (2008)	1
<i>Perognathus parvus</i>	Great Basin Pocket Mouse	S2 (2006)	Red			G5 (1996)	2
<i>Persicaria punctata</i>	dotted smartweed	S2S3 (2000)	Blue			G5 (1985)	2
<i>Phacelia heterophylla</i> ssp. <i>virgata</i>	varied-leaf phacelia	S1 (2005)	Red			G4G5T4T5 (2004)	2
<i>Phacelia ramosissima</i> var. <i>ramosissima</i>	branched phacelia	S2 (2011)	Red	E (2005)	1-E (2006)	G5?TNR	1
<i>Phalacrocorax auritus</i>	Double-crested Cormorant	S3B (2005)	Blue	NAR (1978)		G5 (1999)	2
<i>Phalaropus lobatus</i>	Red-necked Phalarope	S3S4B (2005)	Blue	C (2011)		G4G5 (2005)	2

<i>Phlox speciosa</i> <i>ssp. occidentalis</i>	showy phlox	S2 (2008)	Red	T (2004)	1-T (2006)	G5TNR	2
<i>Pholisora catullus</i>	Common Sootywing	S3 (2006)	Blue			G5 (2009)	4
<i>Physaria</i> <i>didymocarpa</i> var. <i>didymocarpa</i>	common twinpod	S2S3 (2000)	Blue			G5T4 (1994)	3
<i>Picoides</i> <i>albolarvatus</i>	White- headed Woodpecker	S1 (2009)	Red	E (2010)	1-E (2003)	G4 (1996)	2
<i>Pituophis</i> <i>catenifer</i>	Gopher Snake	S2S3 (2007)	No Status		1	G5 (2005)	2
<i>Pituophis</i> <i>catenifer</i> <i>deserticola</i>	Gopher Snake, <i>deserticola</i> subspecies	S2S3 (2007)	Blue	T (2002)	1-T (2005)	G5T5 (1996)	2
<i>Plestiodon</i> <i>skiltonianus</i>	Western Skink	S3 (2007)	Blue	SC (2002)	1-SC (2005)	G5 (2005)	1
<i>Pluvialis dominica</i>	American Golden- Plover	S3S4B (2005)	Blue			G5 (2005)	4
<i>Polites sabuleti</i>	Sandhill Skipper	S2 (2006)	Red			G5 (1998)	2
<i>Polites sonora</i>	Sonora Skipper	S1S2 (2006)	Red	SC (2006)	1-SC (2007)	G4 (2006)	1
<i>Polites</i> <i>themistocles</i> <i>themistocles</i>	Tawny-edged Skipper, <i>themistocles</i> subspecies	S3 (2006)	Blue			G5TNR	4
<i>Polystichum</i> <i>kruckebergii</i>	Kruckeberg's holly fern	S2S3 (2000)	Blue			G4 (1993)	3
<i>Pottia wilsonii</i>		S1 (1996)	Red			G3G5 (2000)	1
<i>Promenetus</i> <i>umbilicatellus</i>	Umbilicate Sprite	S3S4 (2008)	Blue			G4 (2000)	2
<i>Pterygoneurum</i> <i>kozlovii</i>	alkaline wing-nerved moss	S2 (2011)	Red	T (2004)	1-T (2006)	G2G3 (2006)	1

<i>Pterygoneurum lamellatum</i>		S1S2 (2011)	Red			G3G5 (2000)	1
<i>Pyrgus communis</i>	Checkered Skipper	S3 (2006)	Blue			G5 (2009)	4
<i>Rana luteiventris</i>	Columbia Spotted Frog	S4 (2010)	Yellow	NAR (2000)		G4 (2008)	2
<i>Recurvirostra americana</i>	American Avocet	S2B (2005)	Red			G5 (1996)	2
<i>Reithrodontomys megalotis</i>	Western Harvest Mouse	S2S3 (2006)	Blue	SC (2007)	1-SC (2009)	G5 (2003)	2
<i>Rhinichthys falcatus</i>	Leopard Dace	S4 (2010)	Yellow	NAR (1990)		G4 (1996)	4
<i>Rhinichthys osculus</i>	Speckled Dace	S2 (2010)	Red	E (2006)	1-E (2009)	G5 (1996)	2
<i>Ribes oxycanthoides</i> ssp. <i>cognatum</i>	northern gooseberry	S1 (2000)	Red			G5T4 (1994)	1
<i>Salvelinus confluentus</i>	Bull Trout	S3 (2004)	Blue	C (2011)		G3 (2003)	2
<i>Satyrium behrii</i>	Behr's Hairstreak	S1 (2006)	Red	T (2000)	1-T (2003)	G5 (2006)	1
<i>Satyrium californica</i>	California Hairstreak	S3 (2006)	Blue			G5 (2009)	4
<i>Satyrium semiluna</i>	Half-moon Hairstreak	S1 (2006)	Red	E (2006)	1-E (2007)	G4 (2007)	1
<i>Schistidium heterophyllum</i>		S2S3 (2011)	Blue			G3G4 (2011)	1
<i>Schoenoplectus americanus</i>	Olney's bulrush	S1 (2000)	Red			G5 (1984)	1
<i>Scutellaria angustifolia</i> ssp. <i>micrantha</i>	small-flowered skullcap	S2S3 (2006)	Blue			G5T3T5 (2003)	2
<i>Senecio hydrophiloides</i>	sweet-marsh butterweed	S1 (2000)	Red			G4G5 (2001)	2
<i>Sidalcea oregana</i> var. <i>procera</i>	Oregon checker-	S1 (2000)	Red			G5T4 (1989)	2

mallow							
<i>Silene spaldingii</i>	Spalding's campion	S1 (2000)	Red	E (2005)	1-E (2006)	G2 (2003)	1
<i>Sorex merriami</i>	Merriam's Shrew	S1 (2010)	Red			G5 (1996)	1
<i>Sorex preblei</i>	Preble's Shrew	S1S2 (2010)	Red			G4 (1996)	1
<i>Spea intermontana</i>	Great Basin Spadefoot	S3 (2010)	Blue	T (2007)	1-T (2003)	G5 (2002)	1
<i>Speyeria aphrodite whitehousei</i>	Aphrodite Fritillary, <i>whitehousei</i> subspecies	S2S3 (2006)	Blue			G5T4 (2001)	2
<i>Speyeria mormonia erinna</i>	Mormon Fritillary, <i>erinna</i> subspecies	S1S2 (2006)	Red			G5T4 (2003)	1
<i>Sphenopholis intermedia</i>	slender wedgrass	S3 (2005)	Blue			G5 (1991)	4
<i>Sphyrapicus thyroideus</i>	Williamson's Sapsucker	S3B (2005)	No Status	E (2005)	1-E (2006)	G5 (1996)	2
<i>Sphyrapicus thyroideus nataliae</i>	Williamson's Sapsucker, <i>nataliae</i> subspecies	S1S2B (2005)	Red	E (2005)	1-E (2006)	G5TU (1997)	1
<i>Sphyrapicus thyroideus thyroideus</i>	Williamson's Sapsucker, <i>thyroideus</i> subspecies	S2B (2005)	Red	E (2005)	1-E (2006)	G5TU (1997)	2
<i>Spiranthes diluvialis</i>	Ute lady's tresses	S1 (2008)	Red			G2G3 (2008)	1
<i>Spizella breweri breweri</i>	Brewer's Sparrow, <i>breweri</i> subspecies	S2B (2005)	Red			G5T4 (1991)	2
<i>Stagnicola apicina</i>	Abbreviate Pondsnail	S2S3 (2008)	Blue			G5 (2003)	2
<i>Sterna forsteri</i>	Forster's Tern	S1B (2005)	Red	DD (1996)		G5 (1996)	2

<i>Sylvilagus nuttallii</i>	Nuttall's Cottontail	S3 (2011)	Blue	SC (2006)	1-SC (2007)	G5 (1996)	2
<i>Symphotrichum frondosum</i>	short-rayed aster	S1 (2011)	Red	E (2006)	1-E (2007)	G4 (1987)	1
<i>Talinum sedifforme</i>	Okanogan fameflower	S4 (2010)	Yellow	NAR (1990)		G4? (2011)	Unable to Determine
<i>Taxidea taxus</i>	American Badger	S1 (2011)	Red	E (2000)	1-E (2003)	G5 (2005)	1
<i>Thermopsis rhombifolia</i>	prairie golden bean	S1 (2000)	Red			G5 (1988)	2
<i>Trifolium cyathiferum</i>	cup clover	S1 (2000)	Red			G4 (1990)	2
<i>Tympanuchus phasianellus columbianus</i>	Sharp-tailed Grouse, columbianus subspecies	S2S3 (2005)	Blue			G4T3 (1996)	2
<i>Tyto alba</i>	Barn Owl	S3 (2009)	Blue	T (2010)	1-SC (2003)	G5 (1996)	2
<i>Valeriana edulis ssp. edulis</i>	edible valerian	S1 (2003)	Red			G5T5 (1997)	1
<i>Vallonia cyclophorella</i>	Silky Vallonia	S3 (2008)	Blue			G5 (2004)	2
<i>Zonitoides nitidus</i>	Black Gloss	S3S4 (2008)	Blue			G5 (2003)	2

Search Summary

Time Performed Tue Dec 13 16:02:26 PST 2011

Results 217 records.

Search Criteria Search Type: Plants & Animals
AND BGC Zone:PP
Sort Order:Scientific Name Ascending

Notes 1. Citation: B.C. Conservation Data Centre. 2011. BC Species and Ecosystems Explorer. B.C. Minist. of Environ. Victoria, B.C. Available: <http://a100.gov.bc.ca/pub/eswp/> (accessed Dec 13, 2011).
2. Forest District, MoE Region, Regional District and habitat lists are restricted to species that breed in the Forest District, MoE Region, Regional District or habitat (i.e., species will not be placed on lists where they occur only as migrants).



consulting ltd
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May 5, 2011

Our Ref.: 210-225

Arda Consultants Ltd.
#7 3304 Appaloosa Road
Kelowna, BC
V1V 2W5

Attention: Mr. David Pauls, P.Eng.

**RE: GEOTECHNICAL ASSESSMENT
PROPOSED RESIDENCE
250 LOCHVIEW ROAD
LOT 6, PLAN 41162
KELOWNA, BRITISH COLUMBIA**

SCHEDULE "C"
This forms part of development
Permit # DP11-0103

Dear Sir:

As requested, Geoteknik Consulting Ltd. has completed a geotechnical assessment of the above referenced residential lot. The purpose of the investigation was to provide a general overview of the subsurface soil, bedrock and groundwater conditions as well as to identify areas that could pose a potential risk to the proposed development when considering the stability of the adjacent slopes. Based on these observations, our comments and recommendations pertaining to the geotechnical aspects of development of the property are provided herein.

The review was conducted by examining aerial photographs of the site as well as available topographic and soil/bedrock information. Subsequent to the above review, a ground reconnaissance and inspection of test pits were undertaken in March and April 2011. The ground reconnaissance included logging the surficial soil/bedrock conditions as well as areas exhibiting potential geotechnical hazards such as slope instability.

geoteknik

1.0 SITE CONDITIONS AND PROPOSED DEVELOPMENTS

The site, which is presently undeveloped, is located along the east side of Okanagan Lake about 7 km north of Kelowna. It is understood that it is proposed to construct a two-storey and ½ residence. Observations and topographic information are shown in detail on Figures 1 and 2. These indicate that the property located along the west side of Lochview Road rises up from Okanagan Lake to form a gently sloping terrace, which is about 20 m wide where the proposed residence is to be located. The lakeside slopes consist of bedrock and stand at angles ranging from 28 to 35 degrees. A typical section illustrating the ground surface profile is shown on Figure 2 and the sections on the drawings by Arda Consultants.

Observations indicate the property supports a growth of wild grasses, underbrush and a few trees. Examination of the aerial photographs together with the results of the ground reconnaissance did not indicate any evidence of past or recent slope instability as well as groundwater seepage discharge.

2.0 SOIL/BEDROCK CONDITIONS

The results of the site inspections indicate that the ground surface in the area of the proposed foundations is covered by dense silty sandy soils 2 m to 3 m in thickness overlying bedrock. Numerous bedrock outcrops were encountered in the area of the proposed residence. The slopes above the proposed residence and access road are covered in numerous areas by talus material with a maximum diameter varying from 400 mm to 600 mm.

3.0 DISCUSSION

3.1 General

In general, it is our opinion that the overall slopes are considered to be stable but local surficial sloughing may occur along the steeper sections of the slope. As a consequence it is recommended that construction not be permitted immediately adjacent to the crest of the slopes and precautionary measures be undertaken as outlined below.

3.2 Slope Stability

We have carried out a detailed review of the stability of the area of the proposed residence including a review of the information in City of Kelowna. A review of the OCP Regulations by the City indicates that the steep slopes are located in a hazardous conditions DP zone.

The development of this property is restricted by these slopes and a setback is required away from the slopes as discussed below. Based on the results of the site specific assessment, it is

our opinion that the addition to the one residence, pool and separate garage can be and are safely located on the proposed lot.

It is recommended that the proposed foundations be constructed a safe building zone along the crest of the slopes. The area to the west towards Okanagan Lake is considered to be a no-disturbance zone. The proposed building area was established based on a line projected at a slope of 1.5 horizontal to 1 vertical drawn from the toe of the slope as shown in detail on Figure 2. The results of the investigation have indicated that shallow dense soil deposits and/or bedrock is encountered along the slope section and the angle of 23 degrees or 1.5 horizontal to 1 vertical is considered to be safe. Accordingly, factors of safety with respect to slope stability would typically exceed about 2, and consequently there is not a concern relative to slope stability on the site. When considering the risk of a slope failure of a development near a hazard zone. We have used the standard geotechnical guidelines which state that the level of risk is acceptable when the potential hazards are less than 2 percent probability of failure occurring in a 50 year period or a return period in the order of 1 in 2500 years.

3.3 Site Preparation and Excavation

It is recommended that all topsoil, organic deposits and other deleterious materials be subexcavated from the plan area of the proposed building sites and roadways. These materials are not considered suitable for structural fill purposes. All fill materials encountered beneath proposed structures should be completely subexcavated to the underlying native deposits and should be replaced with a compacted well graded 75 mm minus crushed granular fill having less than 8% silt and clay sizes.

Temporary excavation side slopes developed in the soils should be cut at angles no greater than 1.25 horizontal to 1 vertical. Permanent excavation side slope should be developed at angles no greater than 1.5 horizontal to 1 vertical. In areas where shallow dense soils are encountered underlain by bedrock an angle of 1 horizontal to 1 vertical may be used. Temporary excavation side slope should be developed at angles no greater than 3/4 horizontal to 1 vertical. It may be required to place a 500 mm thick layer of rock fill materials on top of the exposed soil deposits along the toe of the slope.

3.4 Foundations

Where structures are founded on strong intact rock, free of soil and loose rock fragments, an allowable bearing pressure of 200 KPa can be used in design. In the area of the foundations where the rock surface is sloping at more than 5 degrees, the footings should be anchored to the rock with 25 mm diameter of reinforcing steel grouted into holes in the rock with a length of 0.6 m below the base of the footings. The anchors should be installed at a spacing of 2m.

Grade fills required beneath proposed buildings should consist of 75 mm minus pit run sand and gravel. The excavation spoil material consisting of the mixed and interlayered deposits and/or blasted rock will be suitable for use as general road/parking embankment fills. Fills consisting of the rock fill material may be considered if it is well graded and selectively excavated to ensure that the largest particle size is not exceeding 300 mm. It is also preferable that this material be mixed with a soil component to minimize the presence of voids in the fill section.

The utilities may pass through the bedrock zones. In these areas, it is recommended that an imported layer of bedding sand, a minimum of 100 mm thick, be provided over the base of the bedrock trench.

Backfill placed at the base of the trench or adjacent to the pipes where compaction can only be carried out using light weight equipment should be placed in horizontal lifts not exceeding 150 mm. Where compaction can be carried out using heavy compaction equipment, the backfill should be placed in lifts not exceeding 300 mm in horizontal thickness. Backfill in trenches should be compacted to 95 percent of Standard Proctor maximum dry density (ASTM D698).

It is recommended that grade supported floor slabs be founded on an underslab base course consisting of at least 100 mm of 19 mm minus crushed gravel. This material should be compacted to 100 percent of standard Proctor maximum dry density. (ASTM D698).

The slabs on grade should be structurally separate from all foundation elements and should include a cross joint system to control post construction cracking.

3.5 Retaining or Basement Walls

For design of walls that are restrained against movement, it is recommended that a coefficient of earth pressure at rest, K_o of 0.40 be used. If the walls are permitted to tilt freely 25 mm or more in 3.0 m of wall height, a coefficient of active pressure K_a of 0.3 may be used in the design. A soil unit weight of 2000 kg per cubic meter may be utilized in the design calculations. A positive drainage system should be provided behind the walls to eliminate potential buildup of hydrostatic pressures.

3.6 Earthquake Assessment

The proposed site is considered to be located within Seismic Class C of the current B.C. Building Code (2006), one of the lower risk zones using the data for Penticton. It is recommended to use a design peak ground acceleration of 0.14 m/s^2 for the area of the proposed site characteristic of a 7.5 magnitude earthquake. This value is based on a 2 percent probability of exceedence in fifty years.

3.7 Roadways and Parking Areas

The organic materials within the parking areas/roadways should be subexcavated. It is recommended however, that prior to pavement construction, the subgrade soils be proof rolled by at least 4 passes of a heavy vibratory roller. Any soft or loose zones encountered should be subexcavated and replaced with granular fills as discussed in Section 3.3. Upon completion of the above subgrade preparation, the following minimum pavement design for light traffic can be constructed.

Asphalt	50 mm
Crushed Gravel Base Course	100 mm
Pit run Subbase	200 mm

The base and subbase material should be compacted to 100 percent of standard Proctor maximum dry density (ASTM D698).

3.8 Drainage and Erosion Control

Few, if any surface drainage and erosion difficulties are anticipated. In general all the excavation material will consist of waste rock with a minor amount of silty sand and gravel. No evidence of surface water drainage channels or paths of concentrated flow leading onto or off of the property were observed at the site. No signs of significant runoff flows crossing onto or off of the property were observed. It is considered that these conditions reflect the generally shallow and dense to very dense silty sand and gravel soils at the site which overlie bedrock and thus limiting surface runoff and ground water seepage flows.

We have reviewed the proposed design presented on Arda construction drawing 1144.D1 detailing the works for the drainage. It is recommended to construct an inverted crown on the roadway to ensure that all drainage water is collected. The water should be diverted to a 300 mm thick drainage layer of 75 mm rock fill below the road structure to ensure uniform sheet drainage down the slope. It is also recommended that the CB spacing be 20 m in the uphill drainage trench to prevent drainage water flowing south.

It is recognized that all run-off in the area of the proposed access road should be controlled. It is proposed to construct the road using a system of gabion baskets on both sides of the road which will provide a safe structure when considering the slope stability. During construction it is recommended that a silt fence be installed on the downhill side of the open excavation and stockpile area as shown on Arda Drawing 1144.D2.

We have evaluated the rock fall hazard in detail along the uphill side of the proposed residence and access road. There is no hazard from large rock segments from above Lochview and Clifton Roads as the wide area of the roads will ensure interruption of any falling rocks. The rock falls hazard below Lochview is relatively minor as the slopes stand at angle varying between 25 degrees and 30 degrees and the rock fragments are generally less

than 600 mm in diameter. There are numerous outcrops of bedrock in the area and the rock fragments are generally imbedded into the surficial soil deposits. It is recommended that a rock fall hazard fence and slope netting be installed in the area above the proposed road and residence. Details of the fencing are shown on Arda Drawing 1144.D2. A 4 block high lock block wall may also be considered in the area of the house as an alternative.

It is recommended to construct a trench drain for the disposal of the roof runoff. The total length of trench should be 14 m or two lines of 7 m and located at a distance greater than 5 m from the house. The trench should be 0.6 m wide and 1 m deep with a 100 mm white plastic perforated pipe located 0.3 m from the bottom. The trench should be backfilled with 0.7 m of 25 mm minus drain rock and covered with tar paper or the like before placing 0.3 m of fill materials on top. The roof drain pipes may be connected to both ends of the drain trench. The water should be taken to an in ground 0.9 m diameter catch basin prior to disposal in the trenches to ensure relatively clean water enters the trenches. Foundation drains may discharge rock pits which is located a minimum of 5 m away from the house as shown on Arda Drawing 1144.D1. It was recommended that site grading after completion of construction be such that surface water is not ponded on site near the house. The ground surface should be graded to produce a slope of not less than 2 percent away from the structure.

4.0 SUMMARY

Based on the results of the investigation, the land may be developed safely without influence to down slope or adjacent properties, provided that the work is undertaken in accordance with the recommendations provided. Beyond the specific recommendations provided herein, the work should adhere to the requirements of the British Columbia Building Code.

We trust that the foregoing meets with your current requirements. However, should you have any questions or require additional information please contact this office at your convenience.

Yours very truly,

GEOTEKNIK CONSULTING LTD.



B. Carlsen, M.A.Sc., P.Eng.



Greenough Property
Wildland/Urban Interface
Fire Hazard Assessment

For

250 Lochview Road, Kelowna, BC (Lot 6 Plan 41162)

May 2011

SCHEDULE "D"

This forms part of development

Permit # DP11-0103



FireWise Management

Interface Community Fire Hazard Form

Community: Kelowna Location: 250 Lochview Rd

Forest District: Penticton Zone, Kamloops Region Map Reference: Lot 6 Plan 41162

Completed By: S. Wallis, H. Maddex Date: May 9, 2011

COMMUNITY DESCRIPTION					Points
Fire Weather Potential	Rarely Class 3 & above	Sometimes Class 3 & above	Often Class 3 & above	Long Periods Class 3 & above	
	0 Points	4 Points	10 Points	20 Points	20
Area Description	Strictly Urban	Suburban Scattered Forest	Rural Scattered Forest	Rural Continuous Forest	4
a) Thickness of Duff / Litter	0 Points < 5 cm	2 Points > 5 cm to < 13	4 Points > 13 cm to < 20	6 Points > 20 cm	2
	1 point (2)	3 points	5 Points	6 Points	
Fine & Coarse Debris	None or spread > 5 m apart Not elevated	Scattered branches & tops Not elevated	Scattered branches Grouped, crossed, < 1 m high	Continuous Grouped, crossed, > 1 m high	2
Forest Stand Description	1 Point	2 Points	5 Points	6 Points	6
	Generally Deciduous	Mixed Deciduous & Coniferous	Generally Coniferous	Dense Pine Stand	
Other Vegetation	0 Points	3 Points	6 Points	8 Points	3
	Primarily Domestic	Domestic or Wildland Grasses	Primarily Wildland Brush, Salal, etc.	Primarily Broom or Gorse	
Topographic Features	0 Points	2 Points	4 Points	6 Points	6
	Generally Flat	Gently Rolling	Rolling & Gullied	Many steep areas or rock outcrops	
Values Protected	0 Points	2 Points	4 Points	6 Points	6
	No significant dev: Wildland Values only	Complete Dev: fire Potential perimeter only	Incomplete Dev: fire Potential throughout	Lot sizes larger than one hectare	
b) Recreational Use	2 Points	4 Points	6 Points	6 Points	8
	No signs obvious use	Infrequent use	Frequent use	High use	
c) Fire Potential On Adjacent Lands	2 Points	4 Points	6 Points	8 Points	5
	No significant fire potential	Low fire potential	Medium fire potential	High use	
	0 Points	2 Points	4 Points (5)	8 Points	
Total Points					62

Comments: a) overall is < 5, few large pines with significant duff to 13 cm. b) waterfront houses span ~75% of property edge



Fire Wise Management

Fire Suppression Capabilities

cf 62

Fire Protection	Fully paid Fire Dept. 0 Points	Volunteer fire dept. multiple halls 2 Points	Volunteer fire dept: single hall 6 Points	No local fire protection 10 Points	0
Available Water	Good hydrant Coverage 1 Point	Partial coverage: water within 350m 2 Points	No hydrants but good water supply in 500m 4 Points	No water and poor water supply 6 Points	2
Mutual Aid	Multi - dept mutual aid agreement 0 Points	Limited mutual aid with fire dept 2 Points	Only BCFS aid through agreement 4 Points	No agreement with any agency 6 Points	0
Response Time To Fire	15 minutes 0 Points	↔ 30 minutes 1 2 Points	60 minutes 4 Points	90 minutes 10 Points	1
Access for Emergency Vehicles	Area generally fully accessible (tender truck) 2 Points	↔ Some areas have access problems (Mini pumper) 3 4 Points	Narrow winding road; Bridge load limit (Mini pumper) 5 Points	Significant areas of inaccessibility (air/foot) 6 Points	3
Fire History Of area	0 - 2 Fires 0 Points	2 - 5 Fires 3 Points	5 - 15 Fires 6 Points	15+ Fires 11 Points	3

Other Factors

Frequent High Winds Over 30 km/h	Extensive Areas of steep South or west exposure slopes	Large Scale industrial projects anticipated	Large Scale Recreational project anticipated	Fuel loading due to logging or land clearing activity	Railway activity within the interface zone	Utilities within the interface area	Total Points
0 1 2 3 4 5 6	0 1 2 3 4 5 6	0 1 2 3 4 5 6	0 1 2 3 4 5 6	0 1 2 3 4 5 6	0 1 2 3 4 5 6	0 1 2 3 4 5 6	71 + 12 <hr/> 83

Interface Community Fire Hazard Rating:

0 - 55	Low	Green
56 - 70	Moderate	Yellow
* 71 - 85	High	Orange
86 +	Extreme	Red

Rating:
High

Notes: *c/s. side of building site (neighboring house, airplane/fuel) has a draw (chimney effect) with increased fuel loading - requires thinning and ladder fuel removal.*

Greenough Interface Fire Hazard Assessment 2011

A new interface fire hazard assessment was carried out on May 9, 2011, by FireWise Management, for the Tom Greenough properties. As previously noted the purpose of the assessment process is to evaluate, according to predetermined BC Ministry of Forests Protection Branch standards, the risk level for wildfire.

The featured properties are typical of the ponderosa pine biogeoclimatic zone, with an understory of bluebunch wheatgrass, rough fescue, and arrow-leaved balsam-root. Other species include Saskatoon and Oregon grape. The canopy is mature ponderosa pine (yellow pine) with a minor but well established, maturing sub-canopy of pine and Douglas fir. The latter are more noticeable in gullies and chimneys as a result of directed water run-off plus tree shading from the mature canopy. The topography is steep [to +30 degrees] with rocky areas, and is of west aspect. The fuel loading is variable and the canopy cover is more open than closed. [see attached aerial photo.] Fuel reduction efforts should therefore be quite manageable. The extension of Lochview Road improves access for fire crews, while at the same time further reduces fuel load on the properties.

Fuel mitigation efforts normally include the following:

- thinning individual trees or clumps to achieve 3m between branch tips
- removal of lower branches (ladder fuels) to a minimum of 2.5 – 3m from ground foliage to lower branches
- removal of standing dead trees (exception to an occasional older snag with wildlife tree value)
- removal or chipping of windfalls and branches
- raking/composting of heavy needle build-up from beneath the larger pines as necessary

The assessment form used in the pre-construction stage is the “community” form, as opposed to the individual house “structural” form. Upon completion of a residence it is recommended that a follow-up assessment be carried out, using the structural form, prior to occupancy.

Explanation of selected components:

- Fire Weather Potential – fire weather information is obtained from the Kamloops Fire Centre for the Fintry weather station, in order to determine the average number of days of Class III and higher Danger Rating Level. The Fintry station is considered to be most typical for the North-Central Okanagan Valley floor.

- Duff/litter and Debris categories were rated low overall, generally less than 5 cm. In the open Bunch Grass there is almost zero duff with exposed mineral soil. Typically the largest build-up of the duff layer is beneath the pines that are in clumps, predominantly due to needle drop, from 10 - <20 cm. However, there are also pockets of built-up fuel in the form of branches and windfalls that should be dealt with by removing, or by chipping and composting, to lower the hazard level.
- In reference to the sections on Recreation Use and Fire Potential on Adjacent Lands - there are no signs of recreational use (dirt bikes, ATV's) on the actual property; but there is a minor foot path (with stair access in one case) beneath the homes immediately to the east, at the top of the property on lot 6. On lot 7 there is a wider trail from Lochview that could let a 4x4 vehicle down to access lot 1, plan 18805 and the lake front access road. The potential for fire escape from the homes along the lake front is a very real possibility considering increased summer activity - fuel modifications along this potential front are important.

Fuel Modification Recommendations:

- The duff/surface fuel layer should be kept to a minimum, i.e., one to two centimetres or less, especially in the vicinity of the Yellow Pines.
- The branches that act as ladder fuels should be removed, or reduced in height; the minimum being 2.5 metres between ground fuels and lower branches. **Keeping a ground fire from climbing up into the canopy is a major goal of fuel reduction.**
- Trees, either singly or as a clump, should be spaced to achieve a minimum of three metres clearance between the crowns. [40% crown closure over the property as a whole is considered to be the maximum.] All dead, standing trees [snags] should be removed, as should any windfalls. A snag being preserved as a wildlife tree should have its lower branches (ladder fuel) removed.
- A minimum ten metre defensible space [Zone One], ideally consisting of fire resistant plants and/or non-combustible landscaping materials, should be maintained around the structure. This space should be increased significantly on the down-slope side, due to fires increased rate of spread on steeper slopes. The west aspect, with its effects of increased afternoon heating and drying, compound the problem.
- The surrounding area [Zone Two], with overall fuel reduction, should extend for up to 100 m. from the structure, with additional range on the down slope side.

- **Conclusion:**

The severity of wildfire risk in the Okanagan should not be taken lightly. However, modern building materials and designs, combined with the creation and maintenance of defensible zones, can help to create a home that has the potential to withstand the normal occurrence of wildfires. The onus is on the owner/developer to do their part for the safety of occupants, as well as the protection of neighboring properties and the crown forest resources. [It should be noted that the Ministry of Forests may take a cost recovery position on fires escaping from private property.]

Residents should be aware that the existing road (Lochview) falls short of NFPA 1144 standards for interface road construction for emergency vehicles, as to the length of dead end roads and size and location of turn-a-rounds. This awareness should be factored into neighborhood emergency escape planning.

Private roads and security gates: any future plans for a security gate should include the NFPA "Gate Openings" design standards.

In cases of wildfire occurring upslope from homes below (eg., fire escaping from a structural fire, lightning strike, etc.) the one lane road may be compromised for evacuation purposes. In which case water evacuation may have to be considered. People with watercraft should be prepared to assist Kelowna Fire Department with water evacuation procedures. Residents should contact Kelowna Fire Department re Regional rescue/fire boat emergency protocols. [Residents should plan for this contingency as part of routine neighbourhood emergency planning where risk of entrapment exists.]

Included:

- 1 CD of digital photos of the properties, one each for lots 6 & 7
- Working copies of the assessment forms
- Hard copies of a selection of photos contrasting open areas and dense stands with ladder and other fuels.

Disclaimer

FireWise Management and its agents does not warranty or guarantee the accuracy or completeness of the information, statements and opinions expressed in this assessment, and assume no liability for any damage or loss incurred as a result of the use of the information, statements, or opinions contained in this assessment



210 Clifton Road North, Kelowna, BC.
GPS Coordinates: 49°55'57.77N / 119°27'54.49"W Elevation: 461m
Lot 6, Plan 41162

***Note: Lot markings and coordinates are estimated**



Looking North over Lot 7 and Lot 6

The canopy is mature Yellow Pine (Ponderosa) with a minor but well established, maturing sub-canopy of pine and Douglas fir.



Lot 6 Clifton Road, ponderosa pine biogeoclimatic zone



South end of lot 6 over all the thickness of Duff/Litter is less than 5cm,



Understory of bluebunch wheatgrass, rough fescue, and arrow-leaved balsam-root. Other species include Saskatoon and Oregon grape



The fuel loading is variable and the canopy cover is more open than closed



Dead fall, thick shrubbery and ladder fuel



“Red snag” and windfall debris



Ladder fuels should be removed or reduced in height; the minimum being 2.5m between ground fuels and lower branches.



Open area above proposed building site Lot 6



Brush ladder fuels and immature red snag



Tight spacing, ladder fuels and snag



Tight spacing, windfall and ladder fuels



Talus slope above proposed building site



Large open areas, small clumps with branches, open red snag and windfall



Open areas, exposed mineral soil, immature snag, windfall, ladder fuels



Mature ponderosa with natural lower branch loss, large open area thin duff = low fire potential



Paired mature ponderosa, ladder and ground fuels = high fire potential



Paired mature ponderosas, ladder and ground fuels = high fire potential



Denser spacing above Lochview Road (lot 6)



Looking Southeast above lot 6 and 7 showing large openings in canopy



3"/7.5cm Moderate needle build-up (30cm diameter pine)



Above lot 5 and 6 boundary marker on Lochview Road



Heavy fuel build-up with grasses, Oregon grape and branches



Lot 6 adjacent to last house on lot Lochview Road, ground – ladder and deadfalls



Windfalls, elevated and crossed increasing fuel loading



Brush build-up



Power lines supplying power to lower development



4" / 10cm duff build up, 60cm diameter ponderosa



Relatively open stand, immature trees, and light brush



Path just off of Clifton Road at lot 6 with Oregon grape and trembling aspen, westerly aspect



Windfalls, elevated and crossed increasing fuel loading



Mineral soil #1



Mineral soil #2



Rock outcropping



Fire Hydrant Lochview Road



Lochview Road West access 200 to 222 North 350 to 380



Floatplane on beach below lot 7 and adjacent (south) of lot 6

FH&P

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OUR FILE NO.: 69694

July 27, 2012

City of Kelowna
1435 Water Street
Kelowna British Columbia
V1Y 1J4

Dear Sirs:

Re: Greenough, Tom and Sandra
250 Lochview Road (DP11-0103 – Development Permit)

We write in regards to Development Permit Application DP11-0103 (the “Application”) which will before Council on August 20, 2012 for consideration.

We are advised that Land Use Management takes the position that the Application cannot be approved at staff level as on their interpretation of the Official Community Plan (the “OCP”) the Application does not comply and therefore must receive Council’s approval.

We have reviewed Land Use Managements concerns along with the relevant sections of the Official Community Plan (OCP) and it is our opinion and the opinion of the professionals retained by the applicants (Garry Tomporowski, Architect, and David Pauls Eng., Arda Consultants) that the Application is compliant with the OCP and the permit would in the normal course be issued at the staff level.

This application to Council is somewhat unique in that the procedural bylaw dealing with these applications refers to a Council Committee process before the “relevant Council Committee”. We were advised that the relevant Committee was the Advisory Planning Commission which has been eliminated.

The following are our client’s initial submissions on the Application. We anticipate follow up submissions will be prepared and circulated following our receipt and review of Land Use Management’s Report to Council.

**Re: Greenough, Tom and Sandra
250 Lochview Road (DP11-0103 – Development Permit)**

Approval Process

By way of overview this Application proceeded at staff level under the Development Application Procedures Bylaw No 10540. As per section 2.3 of the bylaw City Council has delegated its authority under section 920 of the *Local Government Act* regarding Development Permits, including the ability to issue, amend or impose restrictions on applications, to the Director of Land Use Management (the “Directors”). While section 920(2) of the *Local Government Act* states that a local government “may” issue a development permit, if any discretion is conferred by this language it is highly circumscribed.

The principles governing the review of the application for development permit have been judicially considered by the British Columbia Court of Appeal which has indicated that the following principles will apply:

- the discretion as referred to above must be exercised quasi-judicially
- objective standards must be utilized as set out in the OCP and as required for development permit objectives
- the local government cannot consider irrelevant or improper matters
- if a local government has erred then the Court can order that the local government issue the development permit

In essence the Courts in British Columbia have determined that the local government does not have the discretion to refuse a development permit when all the applicable requirements have been fulfilled. We submit the Application meet all OCP requirements.

OCP Compliance

The Director has identified four potential concerns regarding the Application. We and our clients’ consultants have reviewed each of those four concerns in detail, and submit that the Application complies with the OCP.

- The four concerns are:
1. Objective 5.15 Policy .12 Steep Slopes
 2. Objective 5.15 Policy .13 Access Through Steep Slopes
 3. Chapter 12 2.1
 4. Hazardous Condition Development Permit Guidelines

Chapter 5 – Development Process

The Director has identified two sections of concern within Chapter 5 of the OCP. As an initial issue we note that Schedule 3, section 2.1.1 (restriction on delegation) of *Bylaw No. 10540*, refers to the permit being compliant with “OCP DP Guidelines”. The OCP contains several chapters of which only four are actual OCP DP Guidelines (being Chapters 12-15). Chapter 5 is

**Re: Greenough, Tom and Sandra
250 Lochview Road (DP11-0103 – Development Permit)**

not a DP Guideline and it is therefore our opinion that it should not have been an obstacle to approval of the development permit at staff level.

1. 5.15 Policy .12 Steep Slopes

Prohibit development on steep slopes (+30% or greater for a minimum distance of 10 metres) except where provided for in ASPs adopted or subdivisions approved prior to adoption of OCP Bylaw 10500.

We submit Policy .12 is not applicable as the properties in question are part of a subdivision which was approved long before the adoption of the current OCP. The development permit relates to Lots 6 and 7, Plan 41162 (250 Lochview Road and 210 Clifton Road North). Plan 41162 was registered on May 26, 1989. Registration of a plan is the final step in the subdivision process; therefore the lots in question are part of a subdivision approved prior to the adoption of OCP Bylaw 10500. As such, it is our opinion the Steep Slope prohibition in Policy .12 is not applicable to the permit in question.

Additionally, if Policy .12 is to be considered, the application complies with the OCP because the site on which the home would be constructed is not on a slope of greater than 30 degrees. Accordingly, Policy .12 does not impede this development permit application.

2. 5.15 Policy .13 Access Through Steep Slopes.

Discourage roads (public or private) through +30% slope areas intended to access lands beyond, except in cases where it can be demonstrated the road will be sensitively integrated (visual and aesthetic impacts minimized) with the natural environment and will present no hazards to persons or property, environmental threats or unreasonable servicing or maintenance challenges.

Policy .13 is not applicable as the development permit in question involves a *driveway*, not a *road*. While the terms *road* and *driveway* are not specifically defined in the OCP, a review of the OCP reveals that the two terms are not analogous. The OCP contains distinct references to both *roads* and *driveways*. For example Chapter 7 on Infrastructure, uses the word *road* extensively and deals with items relating to sidewalks, bike lanes and traffic. This Chapter is illustrative of the fact that the OCP uses the term *road* in a conventional sense to refer to both public and private roads. By contrast the word *driveway* appears more frequently in the Urban Design DP Guidelines which discusses the location and size of driveways, driveway paving materials, and the length of driveways.

Even though the driveway in question is not a *road* within Policy .13, the Greenough's have shown they will take extensive efforts to ensure the driveway in question will be sensitively integrated with the landscape.

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Chapter 12 – Natural Environment DP Guidelines

3. Chapter 12 2.1

Plan, design and implement land development and subdivision to protect environmentally sensitive areas. Habitats that provide for at-risk species, at-risk ecological communities and keystone species will be given priority for protection.

We submit that the development permit is exempt from the *Natural Environment DP Guidelines* as the Greenough's have agreed to place a covenant on the property which effectively protects the entire environmentally sensitive area. Ecoscape, a qualified environmental professional, has opined that the proposed home will have no significant negative impact on the environmentally sensitive areas. See Ecoscape's letter dated March 16, 2012 attached as Schedule 1.

While it is the applicants' position the development permit is exempt from Natural Environment DP Guidelines, the application for the development permit is entirely consistent with the OCP. Schedule 1 (the letter of Ecoscape) confirms that the permit is not only consistent with the OCP but represents a classic case of exactly what the OCP is attempting to create. The Greenough's will be preserving environmental areas classified by Ecoscape as ESA 2 (high value), and that the proposed build site is **"the optimal location for single family residential construction to mitigate impacts to ESA 2 areas"**. Furthermore, **"the proposed development, through the minimization of the development footprint and restoration of disturbed areas and protection of more than 72% of the property, not only fits within the guidelines of the OCP, but is an outstanding example of how development should occur in the Okanagan Valley"**.

Accordingly, the environmental concerns with respect to the applicants' development permit application have been completely addressed and are not contrary to the OCP, but rather an example of what the OCP would like to achieve.

4. Chapter 13 - Hazardous Condition DP Guidelines

"Disturbance of steep slopes and hazardous condition areas will be avoided in accordance with City of Kelowna hillside development guidelines".

Notwithstanding that this concern appears to be a recent addition, the Greenough's application is completely in compliance.

The application for the development permit is consistent with the Hillside Development Guidelines, which guidelines focus on encouraging innovation and flexibility rather than dictating specific standards or requirements. The objectives focus on maintaining the natural features of the hillside and ensuring developments do not dominate the landscape. The proposed development permit is consistent with these objectives as it maintains substantial portions of the property (72%) in its natural undisturbed state. Furthermore, by having a home-site at the central

**Re: Greenough, Tom and Sandra
250 Lochview Road (DP11-0103 – Development Permit)**

location of the lot, the upper portion of the lot retains a natural buffer on Clifton Road. The home-site and driveway are both sensitively incorporated to minimize the visual impacts of the home, consistent with the Hillside Development Guidelines.

Conclusion

In light of the above, we submit the Application is in compliance with the OCP. Furthermore section 5.15 Policy .9 of the OCP permits voluntary dedication in order to achieve both economic and environmental sustainability. The Applicants have indicated a willingness to offer for dedication a portion of the lands in the south east corner which the City would like to use for access to the walkways over the applicants' property. Such a dedication, while as a byproduct disposing of any issues between the applicants and the City, would allow the City to implement protective measures as permitted in section 5.15 Policy .7 of the OCP and result in a net gain of overall preservation of natural areas of the City's terrestrial habitat, consistent with 5.15 Policy .2 of the OCP.

The applicants and their consultants have been working on this matter for a considerable period of time and as you can surmise no doubt at considerable expense. The applicants have taken all the appropriate and necessary steps in seeking their development permit by retaining experienced professionals knowledgeable in their field, and extremely knowledgeable in dealing with the City of Kelowna. In addition to Ecoscape, of which you are aware, we have referred to Garry Tomporowski (architect) and David Pauls (engineer). They on a daily basis advise their clients, including the applicants, on the requirements of the City of Kelowna, and with respect to the bylaws and the OCP related to any approvals to be sought or work to be done. They are of the unassailable opinion that the application for the development permit in these circumstances complies absolutely with the OCP and may be issued at staff level. They feel that it is extremely important for the City to be consistent in its dealing with all applicants failing which they as professionals cannot perform their work in an effective manner.

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In the final result, the proposed development for which the Development Permit was applied is consistent not only with the spirit and language of the OCP, but will also preserve large areas of natural land within the City, and the applicants will have made extensive efforts and will make further efforts during the construction process, to remediate any disturbed areas and preserve the natural state of the property such that it will become **“an outstanding example of how development should occur in the Okanagan Valley”** per Ecoscape.

Thank you for your consideration. We are happy to address any questions you may have with respect to the above.

Yours truly,

FH&P LAWYERS LLP

Per:



DOUG FLANNIGAN

DF/anh/rc

cc: Greg Sauer, Environment & Land Use Planner

SCHEDULE 1



Environmental and Ecological Solutions

March 16, 2012

Project No: 11-750.1

Tom and Sandra Greenough
#101-199 Pinto Road
Kelowna, B.C.
V1V 2G9

Subject: Follow-up to the Environmental Assessment at 250 Lochview Road, Kelowna, B.C.

Ecoscope Environmental Consultants Ltd. (Ecoscape) understands that the City of Kelowna has informed our client (Tom and Sandra Greenough) that the City will not issue a development permit (DP) for a single family residential development at 250 Lochview Road. Rather, City staff has decided that the DP application must go before City Council in April, 2012. Ecoscape has reviewed the meeting minutes from the March 2nd meeting with the City of Kelowna and understands that City staff has outlined two environmental concerns, which they say contravene the policies and guidelines in the most recent City of Kelowna Official Community Plan (OCP) (adopted May, 2011). The two cited concerns consist of disturbance to slopes greater than 30% and development within environmentally sensitive areas (ESA 2 – high value). This letter addresses the latter concern and will highlight how the proposed development, through the minimization of the development footprint, restoration of disturbed areas and protection of more than 72% of the property, not only fits within the guidelines of the OCP, but is actually an outstanding example of how development should occur in the Okanagan Valley.

The objective of the Natural Environment Development Permit Areas is to ensure that negative impacts (disturbance) on environmentally sensitive areas are minimized (City of Kelowna, OCP). Through the proposed restoration and compensation recommendations put forth by Ecoscape, substantial portions of the property (72%) will not undergo any disturbance and will be protected for perpetuity through a no build/no disturb covenant. Furthermore, as consistent with the OCP, non-hardscaped areas disturbed during development will be restored to their native state with the use of vegetative plantings. The requested extent of restoration by the City of Kelowna (email from Todd Cashin; dated November 10, 2011) is beyond what we typically observe for single family developments on rural properties in most municipal settings in the Okanagan. Coupled with this, we have observed numerous properties of similar ecological value developed for agricultural purposes with little or no mitigation.

Our in-depth restoration plan required the planting of more than 85 native trees, the restoration of disturbed grassland with native bunchgrass plugs, the installation of



nest boxes and the relocation of a wildlife snag that occurs within the development footprint. Due to the extent of the recommended restoration, the required bonding was expected to be more than \$18,000. This bonding amount is also considerably greater than most typical single family residential developments.

In the environmental assessment, the entire property was classified as ESA 2 (high value), and this was identified as a concern by the City of Kelowna. The high-value classification includes lands that are in a natural state and contribute to the regional biodiversity and connectivity of the surrounding landscape. Thus, nearly all undisturbed open pine woodlands within the City of Kelowna would be given this designation, as they all meet this criterion. It is important to note that this property was **not** classified as ESA 1 (Very High). It does not include areas with extremely high ecological value that would be considered biodiversity hotspots that should be entirely avoided during development. Furthermore, to our knowledge, it does not include critical habitat/features that are crucial to maintain populations of species at risk (e.g., snake hibernacula). Therefore, the proposed mitigation/restoration is more than sufficient to offset the proposed development in a local and regional context. The proposed non-disturbed lands will maintain connectivity from Okanagan Lake to upland areas beyond the property. Furthermore, for a lakefront property, the land owners have selected an optimal location for a single family residential construction to mitigate impacts to ESA 2 areas. The proposed residence will occur on a flat bench that is set back approximately 30 m from Okanagan Lake. For these reasons, it is our opinion that these proposed works are entirely consistent with the City of Kelowna OCP.

To put it in perspective, the property is 2.89 hectares in size and the proposed development, as defined by the extent of disturbance, will encompass 0.4314 hectares, or 14.9% of the entire property. Seventy-two percent of the property will be placed in a No Build/No Disturb covenant. The Sensitive Ecosystem Inventory (SEI) has classified the subject property as coniferous woodland (WD:co) and this habitat unit encompasses approximately 17% of the City of Kelowna. Thus, the development as proposed would result in a total impact of only 0.12% of this habitat unit within the City of Kelowna. From an ecological perspective, it is impossible to justify that this small loss would affect local or regional species or their habitats. This further supports our claims that this development is consistent with the City of Kelowna OCP.

As the City of Kelowna is well aware, much of the Okanagan Valley consists of unique ecosystems that are rare, in some cases occurring nowhere else in Canada. Because of this, intact valley ecosystems are often classified as high-value habitat. Nevertheless, as apparent by the burgeoning development across the Okanagan Valley, this distinction of high-value habitat (ESA 2) has not prevented development in the past, and nowhere in the recently adopted OCP does it state that future development cannot occur within ESA 2 (high-value) locations. Ecoscape has worked on numerous single family residential developments on Okanagan Lake and within the City of Kelowna, and the approval process appears to be inconsistent with other similar



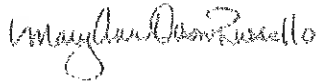
projects. It is our opinion that the development team has gone above and beyond what is typically required to minimize potential impacts, and that the development as proposed is well within the guidelines of the OCP.

This letter has been prepared for the exclusive use of Tom and Sandra Greenough. Ecoscape has prepared this letter with the understanding that all available information on the present and proposed condition of the site has been disclosed. Tom and Sandra Greenough have acknowledged that in order for Ecoscape to properly provide the professional service, Ecoscape is relying upon full disclosure and accuracy of this information.

If you have any questions or comments, please contact the undersigned at your convenience.

Respectfully Submitted,

ECOSCAPE Environmental Consultants Ltd.
Prepared by:



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