Appendices to Meeting Notes

South Shawnigan Creek Water Quality Monitoring Study

Meeting on Draft Monitoring Study Design

June 28, 2016

This document contains four appendices to the meeting notes for the June 28, 2016 meeting on the South Shawnigan Creek Water Quality Monitoring Study:

Appendix 1 – Overview presentation by facilitator, Sally Rudd, Compass Resource Management

Appendix 2 – Presentation by independent qualified professional, Brenda Miskimmin, Associated Environmental. Note that a number of changes to monitoring sites, parameters and timing were made following this meeting; please refer to the final report for an accurate study design.

Appendix 3 – Monitoring Sites agreed to at June 28, 2016 meeting

Appendix 4 – Map of soil dumps monitored by Ministry of Environment in November 2012

Appendix 1 – Overview presentation by facilitator, Sally Rudd, Compass Resource Management

South Shawnigan Creek Water Quality Monitoring Study

Meeting on Draft Study Design

June 28, 2016
Victoria, BC

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Welcome!

- **Cindy Meays,** A/Deputy Director, Regional Operations Branch, Environmental Protection Division, Ministry of Environment
- **Sally Rudd**, Compass Resource Management

Meeting Objectives

- Review and seek input on a draft Monitoring Study Design prepared by an independent qualified professional based on the South Shawnigan Creek Water Quality Monitoring Study Terms of Reference (TOR)
- Review and discuss the next steps for implementing the Monitoring Study and reporting the results.

Introductions

- Name
- Affiliation
- Brief description of your interest(s) in the Shawnigan Creek Water Quality Monitoring Study

Agenda

June 28, 2016		
Item	***Lead***	***Time****
Welcome	Cindy Meays, Ministry of Environment	10:30 a.m.
Introduction, Meeting Objectives & Agenda Review	Sally Rudd, Compass Resource Management (Facilitator)	10:40 a.m.
Draft Monitoring Study Design (Presentation)	Brenda Miskimmin, Ph.D., R.P.Bio, Associated Environmental Consultants Inc. (Monitoring Study Contractor)	11:00 a.m.
LUNCH 12:00 to 1:00 (not provided)		
Draft Monitoring Study Design (Group Discussion) • Monitoring sites • Monitoring parameters • Monitoring frequency • Reporting results • Mid-point meeting to review results	Facilitator / Monitoring Study Contractor	1:00 p.m.
Parking Lot Topics (other monitoring needs and interests)	Facilitator	3:00 p.m.
Wrap-up & Next Steps	Facilitator	3:45
4:00 pm – Adjourn		
*Times are approximate, breaks will be taken at appropriate times and the meeting will be adjourned early if all		

Housekeeping

- Bathrooms…
- In the case of fire alarm…
- Please put phones on silent

My role as facilitator is to…

- Be a substantively neutral third-party that supports this group in achieving collective objectives
- Document input on the Draft Monitoring Study Design

Proposed Ground Rules

- Treat others with respect
- Challenge ideas, not people
- Seek common ground (aim for agreement)
- Share the floor
- Use the Parking Lot

Background on Terms of Reference

Timeline

- March 2016: Ministry of Environment (MOE) proposes a water quality monitoring study for South Shawnigan Creek and releases a draft Terms of Reference (TOR) for input to interested parties
- Early May: TOR finalized and competitive bid process starts to select an independent qualified professional to do the study
- Late May: Associated Environmental (AE) wins bid to undertake study
- June: Brenda Miskimmin (AE) prepares draft monitoring study design in line with TOR

Interested Parties who were sent draft TOR (& provided input)

- Cowichan Valley Regional District
- Malahat First Nation
- Cowichan Tribes
- Shawnigan Residents Association
- Environment Canada
- Cobble Hill Holdings Ltd.
- Vancouver Island Health Authority
- Ministry of Energy and Mines

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Summary of Key Input on TOR

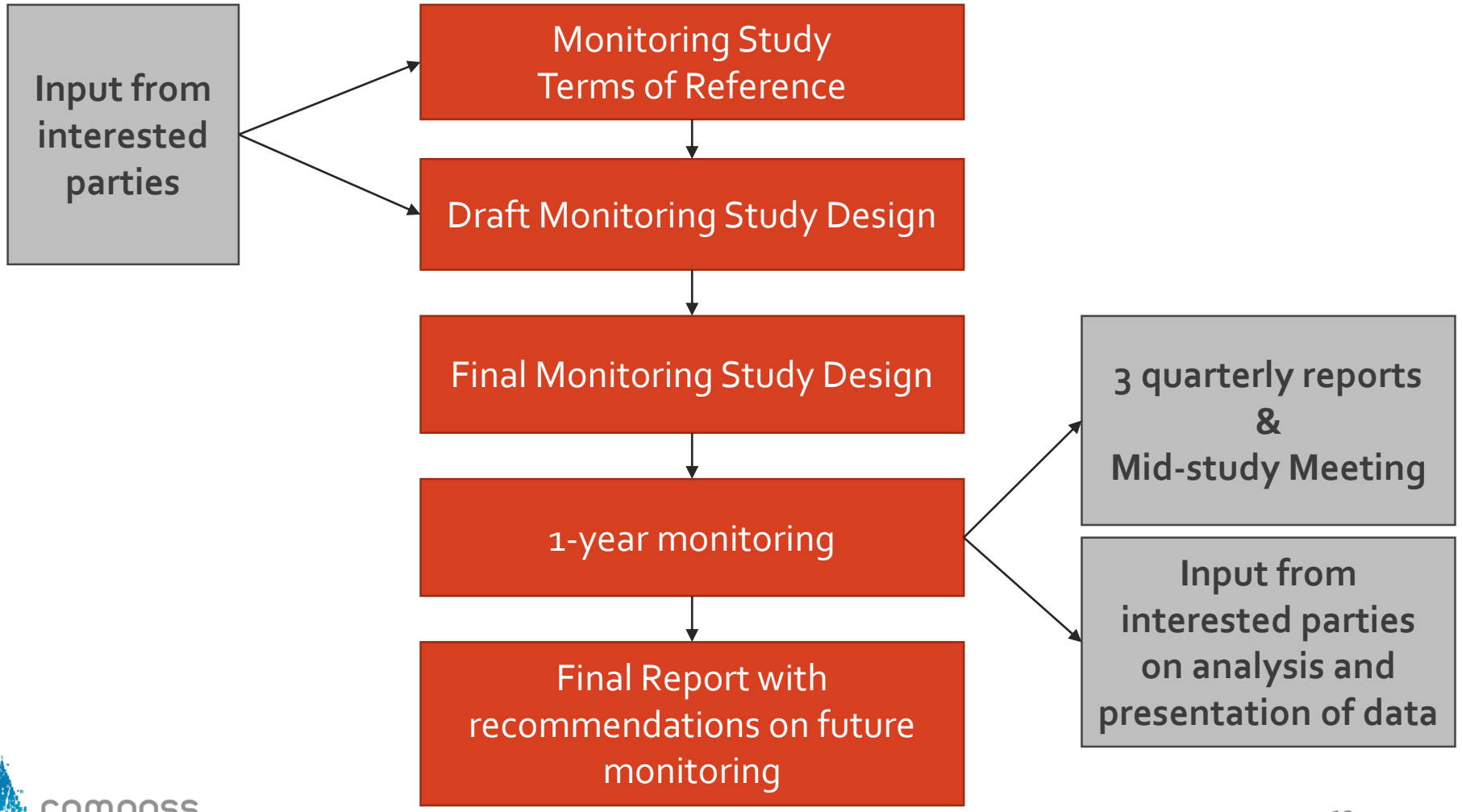
- Widespread support was voiced for the water quality monitoring study and the contracting of an independent qualified professional.
- Purpose statement in TOR modified to include “assess how surface water quality does or does not degrade along South Shawnigan Creek”.
- Added a specification that there should be a sampling site to measure natural background levels (or as far upstream as possible).
- For additional transparency, added that the qualified professional will send their reports with data and analysis to MOE and all interested parties at the same time.

Monitoring Study Purpose

Monitoring data will be used to:

- Establish current water quality at the monitoring sites.
- Assess water quality along South Shawnigan Creek including key tributaries – in particular, assess how surface water quality does or does not degrade along South Shawnigan Creek and how surface water quality compares to BC water quality guidelines.
- Determine if existing permitted activities on Stebbings Road Lot 23 or historical activities on Lot 21 are impacting downstream water quality.
- Determine if other activities in the watershed are impacting water quality in South Shawnigan Creek.
- Augment data already being collected by the ministry and the Permittee to assess effectiveness of the EMA Permit.
- Inform potential updates (if necessary) to Shawnigan Lake Community Watershed and Tributaries WQO.

Monitoring Study Process



Monitoring Study Scope & Process

Scope in Terms of Reference and Contract:

Surface water quality

South Shawnigan Creek and key tributaries

Monitoring purpose

Budget for independent qualified professional and lab analysis

Independent qualified professional makes a recommendation "that in her professional opinion best addresses the interests of all parties within the available budget for the study"

- Sites
- Parameters
- Frequency & Timing

MOE has final decision making authority on Monitoring Study Design

Draft Monitoring Study Design

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Thank you!

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Sally Rudd: srudd@compassrm.com

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Phone: 604-641-2875
www.compassrm.com

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Appendix 2 – Presentation by independent qualified professional, Brenda Miskimmin, Associated Environmental.

Note that a number of changes to monitoring sites, parameters and timing were made following this meeting; please refer to the final report for an accurate study design.

Associated Environmental

South Shawnigan Creek Water Quality Monitoring

Proposed study design

Brenda Miskimmin, Ph.D., R.P.Bio.

28 June 2016

CANADA'S BEST MANAGED COMPANIES
Platinum member

Outline

- Background & Reason for the study
- How we will measure water quality
- Where are the proposed sites?
- What do we propose to measure?
- What is the proposed sample timing?
- Overall study schedule
- How **you** can help to finalize the study design

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Background

What's it all about?

South Shawnigan Creek

- Local people in the area are concerned about water quality related to disturbances in the watershed
- Are there WQ changes related to disturbances along the creek?
- Specifically, is South Island Aggregates permitted activity influencing water quality?
- Are there other disturbances influencing water quality in the creek?

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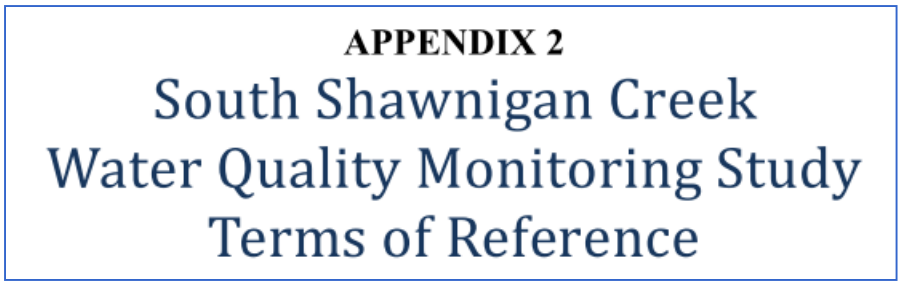
Independent Assessment

- Some water quality data are available
- Collected by Ministry of Environment and the Permittee
- Independent assessment requested
  - Impartial, unbiased, scientifically defensible design proposed
- Terms of Reference provided


APPENDIX 2
South Shawnigan Creek
Water Quality Monitoring Study
Terms of Reference

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How are measurements made?

Field and laboratory

In the field

- Multi meter
  - Measures some parameters on site
  - pH, temperature, conductivity, oxygen
  - Record in field notes

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Laboratory measurements

- Sample bottles
  - Plastic – inorganics like metals

  - Amber glass – organics

Keep cold with ice packs

Preserve if required

Courier to lab

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Site selections

Sampling site guidance - TOR

- near the permitted activities and other sites in the area with the potential to contribute to degraded water quality on South Shawnigan Creek
  - including: near a seepage area of **Lot 21**; the ephemeral creek on or near **Lot 23**; and additional sites upstream and downstream of the main flows (e.g., upstream and downstream of Lot 21 and Lot 23 ephemeral creek; and upstream and downstream of key tributaries to South Shawnigan Creek such as Van Horne Creek).
- Plus a site upstream of disturbance (control)
- Approximately 8 sites selected

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Site Selection Considerations

1. Answers the important questions
   - Can we detect parameters of concern if they were present?
   - Are there confounding factors like non-point sources?
2. Accessibility
   - Can we get to the preferred sites? Alternatives?
3. Safety
   - Fast flows, slippery, steep slopes

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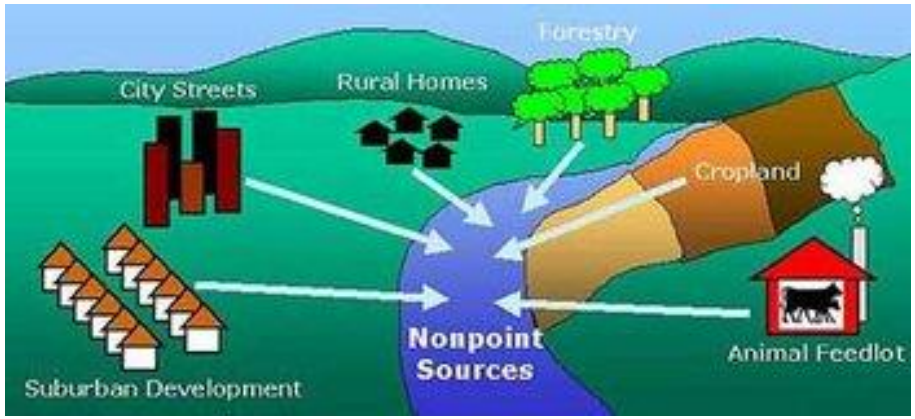
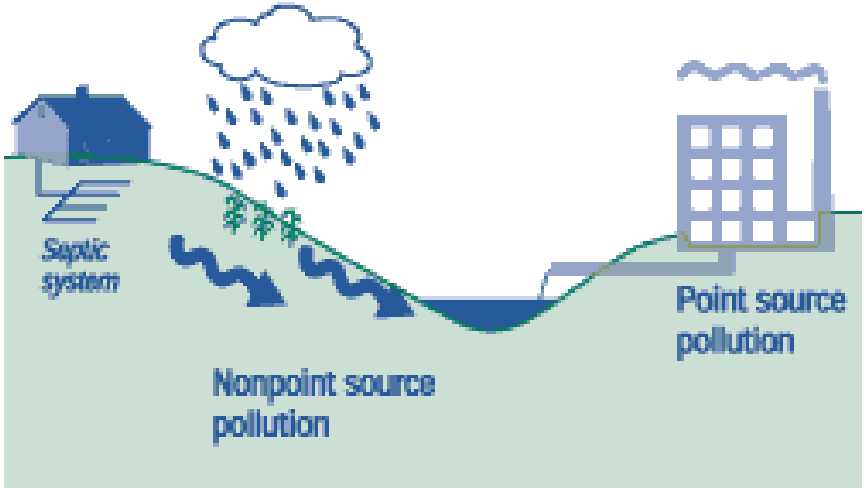
Non-point vs point sources

- Non-point = Diffuse runoff from numerous origins – difficult to isolate



- Point sources =discharged from a single source like a pipe



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Shawnigan L watershed

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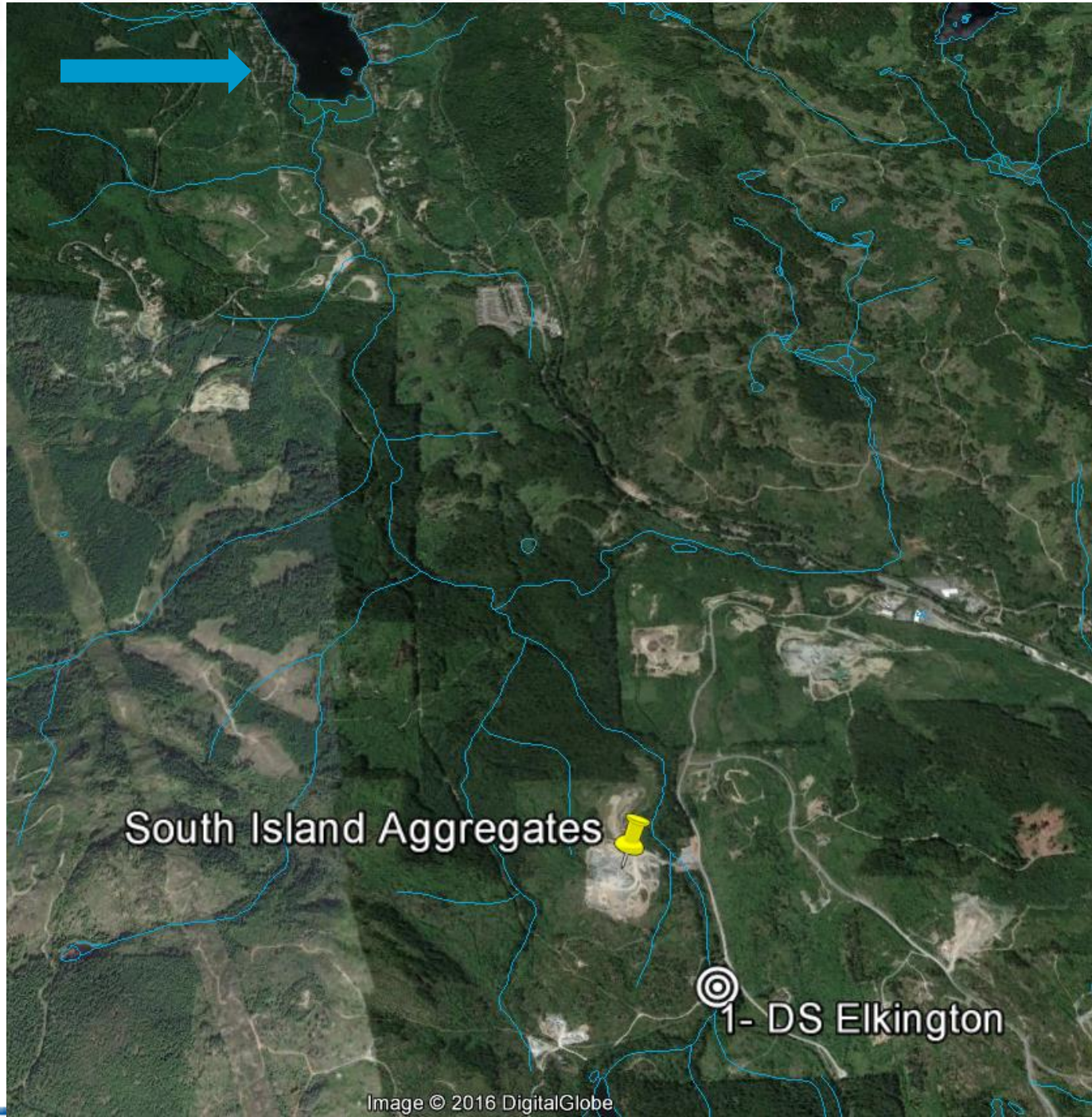
Maps…

A complex watershed with diverse disturbances

Shawnigan Lake



Sep 26/2015

Near SIA (courtesy Aqua-tex)

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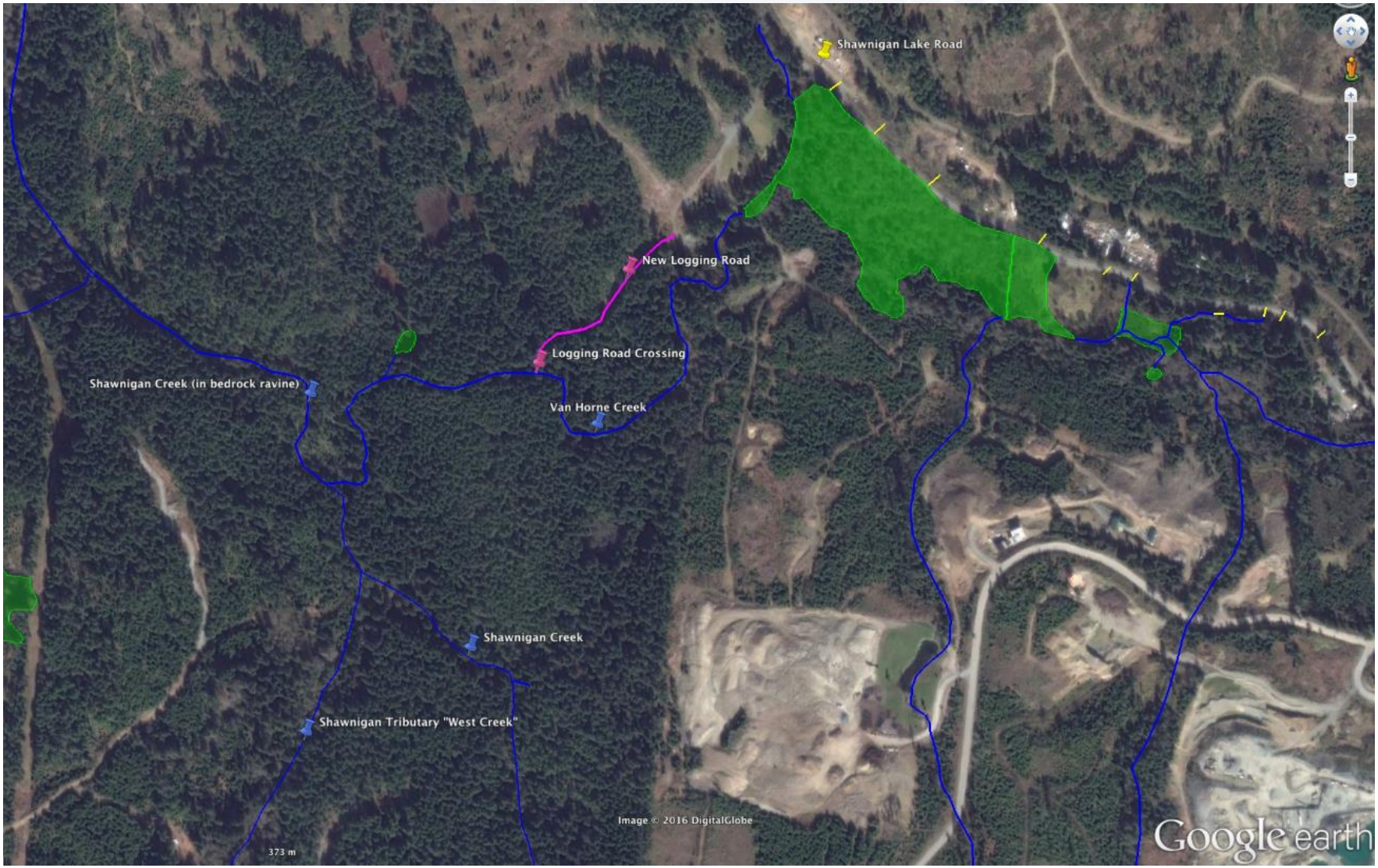

Van Horne Ck area (courtesy Aqua-tex)

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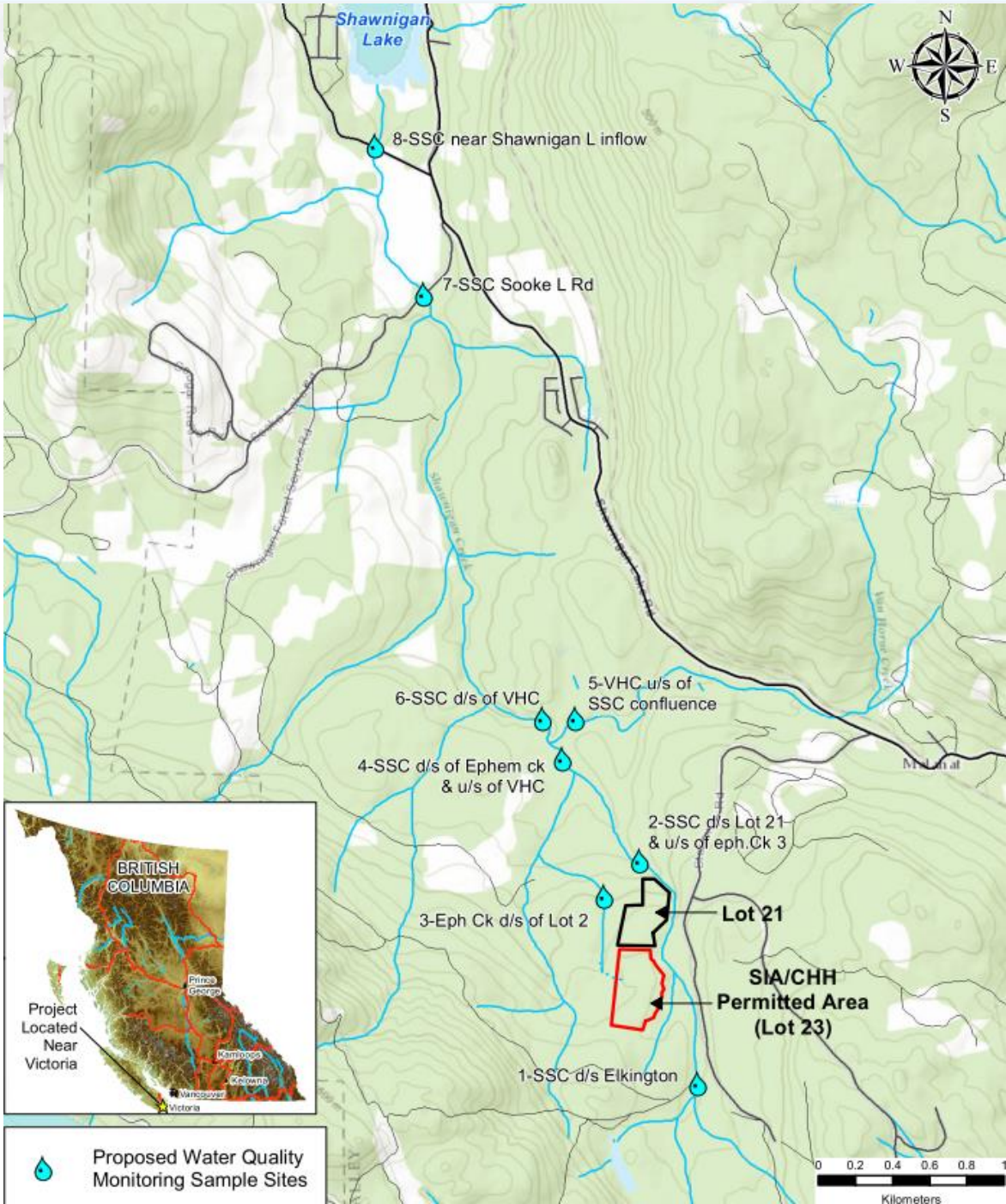
Design…

Proposed sites

- Upstream (control)
- Downstream of SIA
- u/s and d/s of Van Horne Ck
- Far downstream
- Lake inflow

DISCUSSION?



Parameters to monitor

Parameters

- Field (meter):
  - pH;
  - water temperature (ºC);
  - electrical conductivity (µS/cm); and
  - dissolved oxygen (mg DO/L).

- Laboratory:
  - total suspended solids (TSS);
  - nutrients (e.g., total phosphorus, nitrogen species)
  - hardness (e.g., calcium, magnesium);
  - sodium;
  - chloride;
  - total and dissolved organic carbon (TOC, DOC);
  - total metals (e.g., Al, Fe, Mn, Cu, As, Cr, Ni, Zn);
  - organic contaminants (Permit, S. 1.2.3)

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Permitted Organic Parameters

- styrene;
- polycyclic aromatic hydrocarbons (PAHs);
- benzene, toluene, ethylbenzene, xylene (BTEX);
- methyl tertiary butyl ether (MTBE);
- volatile petroleum hydrocarbons (VPH);
- light and heavy extractable petroleum hydrocarbons (LEPH/HEPH);
- chlorinated hydrocarbons;
- phenolic substances; and
- glycols.

Water Solubility

- Some parameters are likely to be found in water
  - = water soluble

- Some parameters are not very soluble in water & are more likely to be associated with particles, sediments, organic matter
  - = water insoluble

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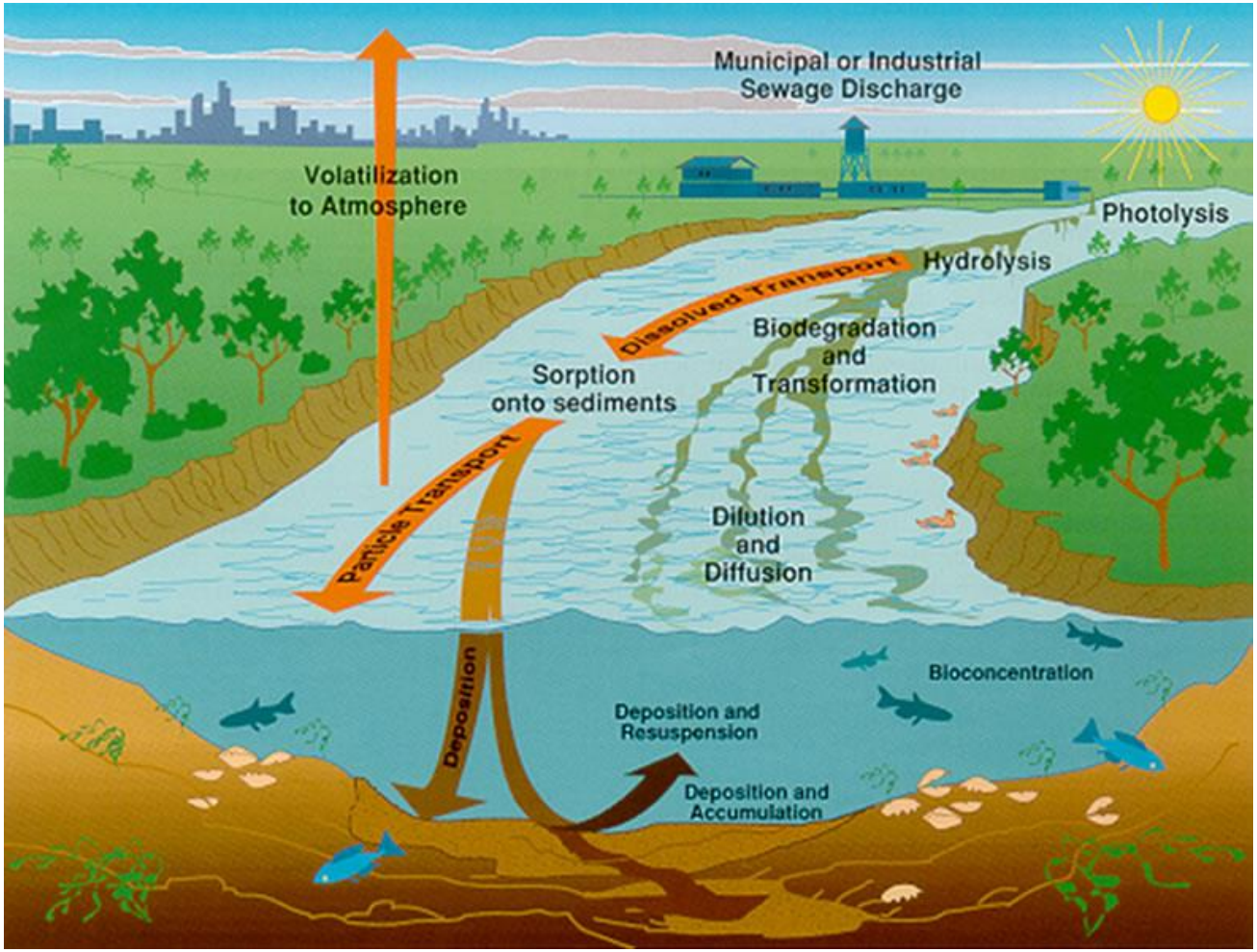
Chemical Fate and Transport



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When to sample

Timing of Sampling

- 1 year study starting July 2016
- Monthly sampling, except:
  - 5 samples in 30 days for some parameters with guidelines requiring this frequency
  - 5 in 30 to be done in late summer (August) and during the fall rainy season (November)
- Where parameters are not detected (organics), reduce the number of parameters except at key sites - $budget limitations

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Schedule

Activity	Scheduled Date(s)
Study design workshop	June 28
Final date for comments on study design	June 30
Finalized study design submitted to group	July 8
Regular sampling dates (proposed): 5-in-30 day sampling dates:	Mid months: July 2016 through June 2017 5 dates from August 16 - September 15 (dry) 5 dates from October 18 – November 15 (rainy)
Quarterly summary reports	Within 2 weeks of receipt of lab results Approximately mid-October, mid-January, mid-April
Meeting to present results (6 month) – discussion of results to date	Late January 2017
Final report (following receipt of June sampling trip lab results)	July 2017
Final workshop on results of study and next steps	Late July 2017

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Reporting

- Data will be statistically analyzed
  - Differences between sites
  - Differences upstream vs downstream
  - Differences at sites over time
- Comparison to relevant WQ guidelines
  - Protection of aquatic life
  - Human health (recreation, domestic use)
  - Shawnigan L watershed & tributaries WQ objectives

Feedback… Next Steps…

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SURFACE TENSION

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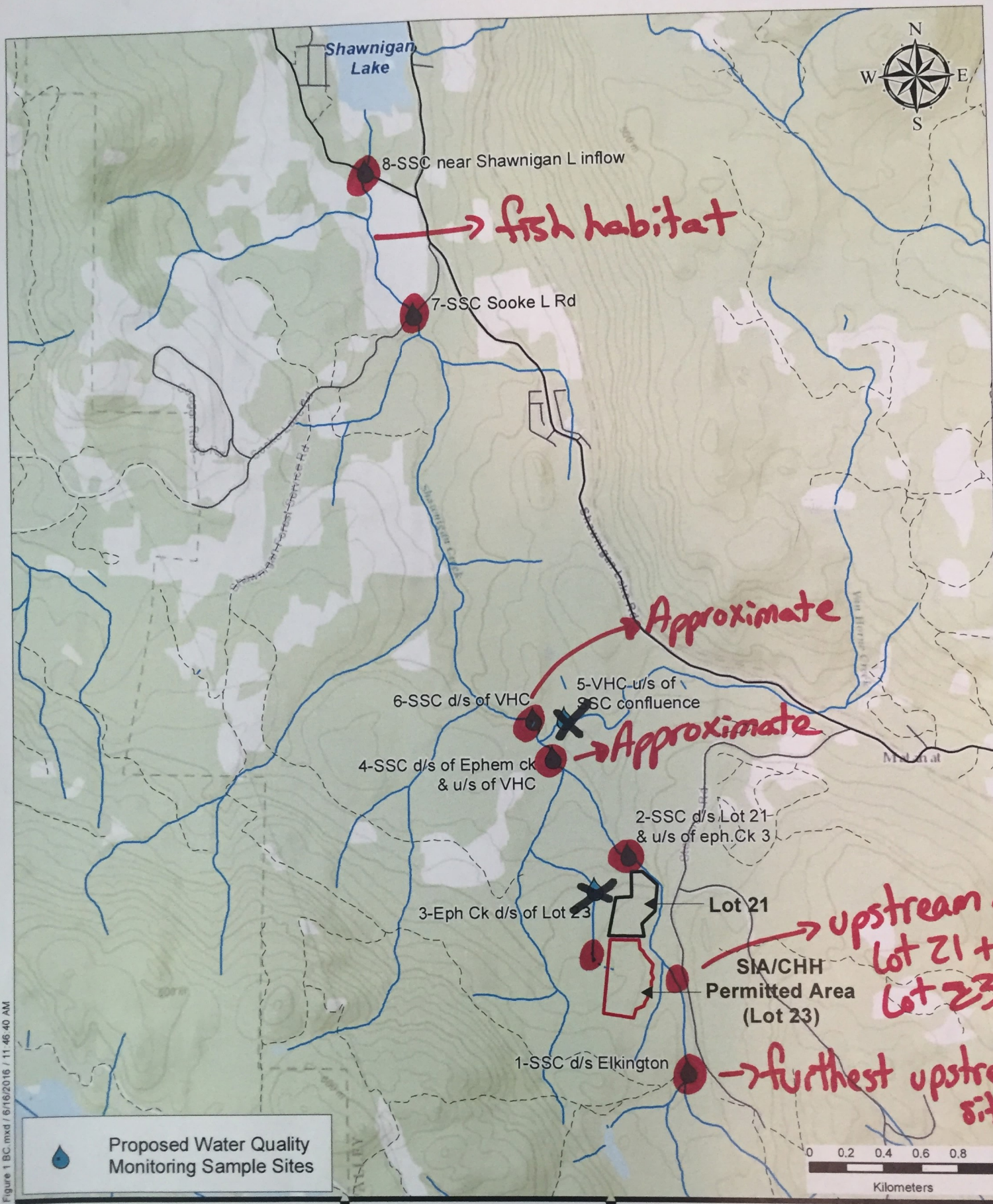
Appendix 3 – Monitoring Sites agreed to at June 28, 2016 meeting

(agreed to sites are shown with red dots)



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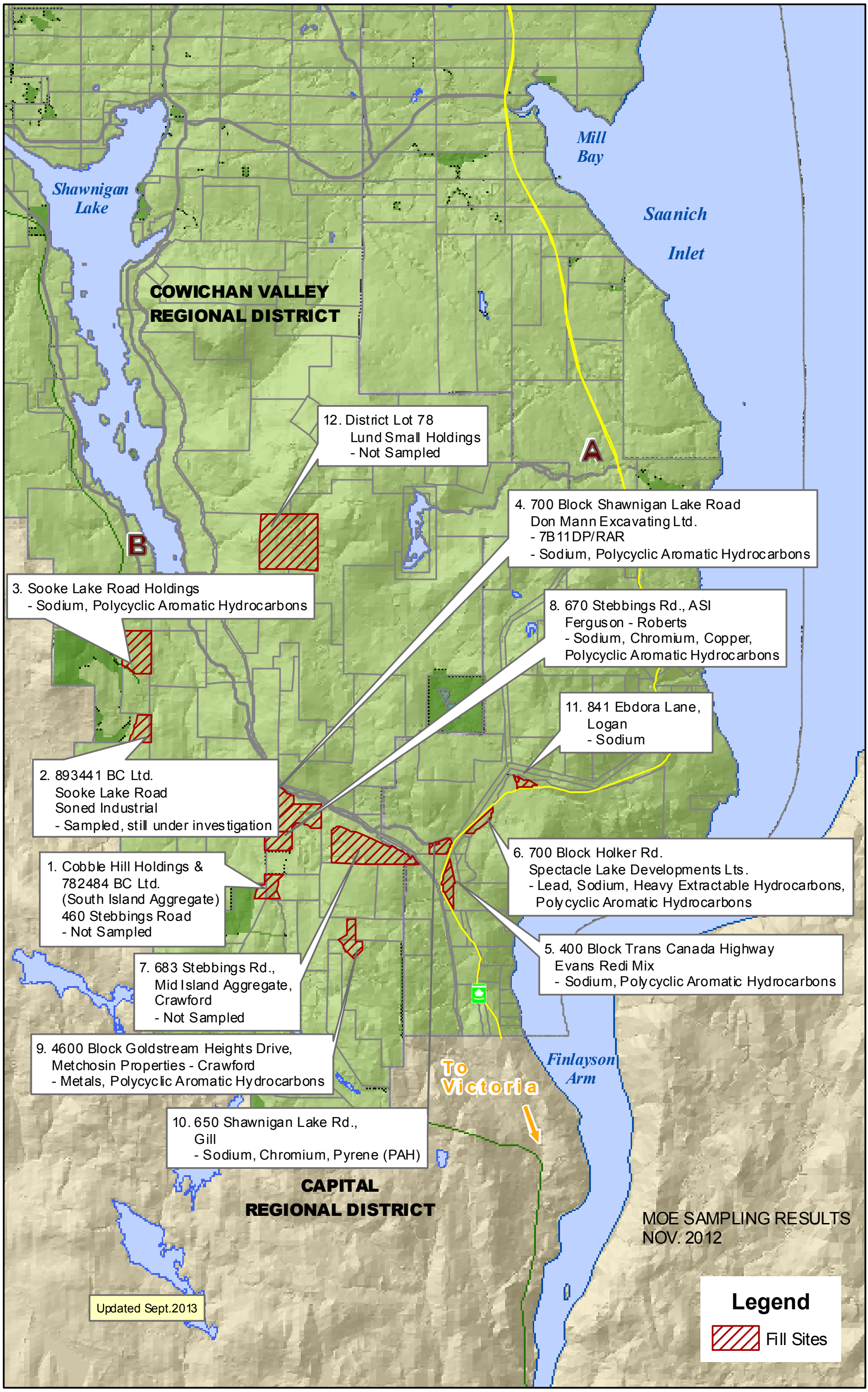
PROJECT NO.: 2016-8097.000.000
DATE: June 2016
DRAWN BY: DA

FIGURE 2-1: PROPOSED WATER QUALITY MONITORING STATIONS ON AND NEAR SOUTH SHAWNIGAN CREEK

South Shawnigan Creek Water Quality Monitoring Study

Appendix 4 – Map of soil dumps monitored by Ministry of Environment in November 2012


Shawnigan Lake
Mill Bay
Saanich Inlet
COWICHAN VALLEY REGIONAL DISTRICT
A
B
12. District Lot 78
Lund Small Holdings
- Not Sampled
4. 700 Block Shawnigan Lake Road
Don Mann Excavating Ltd.
- 7B11DP/RAR
- Sodium, Polycyclic Aromatic Hydrocarbons
3. Sooke Lake Road Holdings
- Sodium, Polycyclic Aromatic Hydrocarbons
8. 670 Stebbings Rd., ASI
Ferguson - Roberts
- Sodium, Chromium, Copper,
Polycyclic Aromatic Hydrocarbons
11. 841 Ebdora Lane,
Logan
- Sodium
2. 893441 BC Ltd.
Sooke Lake Road
Soned Industrial
- Sampled, still under investigation
1. Cobble Hill Holdings &
782484 BC Ltd.
(South Island Aggregate)
460 Stebbings Road
- Not Sampled
6. 700 Block Holker Rd.
Spectacle Lake Developments Lts.
- Lead, Sodium, Heavy Extractable Hydrocarbons,
Polycyclic Aromatic Hydrocarbons
5. 400 Block Trans Canada Highway
Evans Redi Mix
- Sodium, Polycyclic Aromatic Hydrocarbons
7. 683 Stebbings Rd.,
Mid Island Aggregate,
Crawford
- Not Sampled
9. 4600 Block Goldstream Heights Drive,
Metchosin Properties - Crawford
- Metals, Polycyclic Aromatic Hydrocarbons
To Victoria
Finlayson Arm
10. 650 Shawnigan Lake Rd.,
Gill
- Sodium, Chromium, Pyrene (PAH)
CAPITAL REGIONAL DISTRICT
MOE SAMPLING RESULTS
NOV. 2012
Updated Sept.2013
Legend
Fill Sites