Denman Island Local Trust Committee
Regular Meeting Agenda

Date:	October 21, 2014
Time:	10:30 am
Location:	Denman Seniors Hall
	1111 Northwest Rd, Denman Island, BC

Pages

1. CALL TO ORDER

2. APPROVAL OF AGENDA

3. CHAIR'S REPORT

4. TRUSTEES' REPORT

5. MINUTES

   5.1 Local Trust Committee Meeting Minutes dated September 16, 2014 – for adoption — 4 - 16

   5.2 Section 26 Resolutions Without Meeting Log dated October 9, 2014 — 17 - 17

   5.3 Denman Island Advisory Planning Commission Minutes - none

   5.4 Denman Island Marine Advisory Planning Commission Draft Minutes - none

6. BUSINESS ARISING FROM MINUTES

   6.1 Follow-up Action List dated October 9, 2014 - attached — 18 - 20

7. APPLICATIONS AND PERMITS

   7.1 DE-DP-2014.2 (2600 Swan Road - Stoneman)

      7.1.1 Staff Report dated October 14, 2014 — 21 - 148

      Report attachments 2 - 12 available upon request

8. DELEGATIONS

9. TOWN HALL SESSION

10. CORRESPONDENCE

(Correspondence received concerning current applications is considered with the application)

11. REPORTS

11.1 Work Program

11.1.1	Top Priorities Report and Projects Report dated October 9, 2014	149 - 150

11.2 Applications Log dated October 9, 2014 151 - 156

11.3 Trustee and Local Expenses

11.3.1	Expenses posted to Month Ending September, 2014	157 - 157

11.4 Policies and Standing Resolutions 158 - 159

12. LOCAL TRUST COMMITTEE PROJECTS

13. NEW BUSINESS

14. BYLAWS

15. ISLANDS TRUST WEBSITE

15.1 Denman Island Web Pages

The Denman Island Local Trust Committee Website can be found at: http://www.islandstrust.bc.ca/islands/local-trust-areas/denman.aspx

16. CLOSED MEETING

The Denman Island Local Trust Committee closes the next part of the October 21, 2014 business meeting to discuss matters pursuant to Section 90(1)(d) of the Community Charter to consider adoption of Closed Meeting Minutes and that Staff be invited to attend this meeting.

17. RECALL TO ORDER

Rise and Report from Closed Meeting

18. NEXT MEETING DATE

Tuesday, November 25, 2014 at 10:30 am at the Denman Seniors Centre, 1111 Northwest Road, Denman Island, BC.

19. TOWN HALL SESSION - Time Permitting

20. ADJOURNMENT

Denman Island Local Trust Committee
Minutes of Regular Meeting

Date:	**September 16, 2014**
Location:	**Denman Seniors Hall** **1111 Northwest Rd, Denman Island, BC**
Members Present	**Peter Luckham, Chair** **David Graham, Local Trustee** **Laura Busheikin, Local Trustee**
Staff Present	**Rob Milne, Island Planner** **Vicky Bockman, Recorder**
Others Present	**There were approximately 8 members of the public-am** **There were approximately 2 members of the public-pm**

1. CALL TO ORDER

Chair Luckham called the meeting to order at 10:30 am. He acknowledged that the meeting is being held in traditional territory of the Coast Salish First Nations. He welcomed the public and introduced himself, the Local Trustees, Staff and Recorder.

2. APPROVAL OF AGENDA

The following additions to the agenda were presented for consideration:

10.3 Letter from Denman Conservancy Association dated September 12, 2014

10.4 Letter from Denman Island Residents Association dated September 8, 2014

10.5 Letter from Dr. J. Balke dated September 8, 2014

10.6 Email from Des and Sandy Kennedy dated September 13, 2014

10.7 Email from Kal Holsti dated September 14, 2014

10.8 Letter from Anne Siegel dated September 15, 2014

Consideration was given to change 5.1 Local Trust Committee Special Meeting Minutes dated July 15, 2014 to read “5.1 Local Trust Committee Meeting Minutes dated July 15,

2014".

By general consent the agenda was adopted as amended.

3. CHAIR'S REPORT

Chair Luckham commented that Trust Council was recently held on Keats Island and noted that the meeting provided an opportunity to reflect on accomplishments that the Islands Trust has achieved during this term. He reported that he and other Islands Trust representatives will be attending the upcoming Union of BC Municipalities 2014 convention.

4. TRUSTEES' REPORT

Trustee Busheikin remarked that she appreciated the review of the term accomplishments at the recent Trust Council. She commented that many Trustees will be returning to the new term which will add depth and experience to the work being done, and acknowledged that she is saddened that Chair Malcolmson will not be returning. She noted that she was pleased with the outcome of the meeting in August with the K'omoks First Nation.

Trustee Graham observed that the Trust Council provides a forum for Trustees to gather four times a year to bring awareness to communities of the work that Islands Trust is doing as well as informing Trustees of local issues which are often shared in common among islands. He noted that he recently attended a Financial Planning Committee meeting where work is beginning on the next budget cycle. He announced that he will not be returning as a Trustee in the next term.

5. MINUTES

5.1. Local Trust Committee Special Meeting Minutes dated July 15, 2014 – for adoption

The following amendments to the minutes were presented for consideration:
Page 3, item 10.1 heading: change "June" to "Jane"; and
Page 6, resolution DE-2014-044: remove the superfluous bullet at the end of the resolution.

By general consent the minutes were adopted, as amended.

5.2. Section 26 Resolutions Without Meeting Log dated September 2, 2014 - attached

Chair Luckham reviewed the Resolutions Without Meeting Log for information.

6. BUSINESS ARISING FROM MINUTES

6.1. Follow-up Action List dated September 2, 2014 - attached

Planner Milne presented the Follow-up Action List and provided updates on the status of outstanding items.

6.2. Denman Local Trust Committee - K'omoks First Nation Joint Protocol - for discussion

Chair Luckham commented that productive first steps have been made in building a relationship between the Denman Local Trust Committee and the K'omoks First Nation and provided a brief review of a recent meeting.

There was discussion of the differences between terms "Protocol" and "Memorandum of Understanding" and Trustees considered that a Memorandum of Understanding might be a more useful tool for the Local Trust Committee to consider in this circumstance.

Chair Luckham advised interested public in attendance that the K'omoks First Nation has committed to assist in either cleaning up beach debris or bringing a problem to the attention of a responsible party if advised of a concern.

7. APPLICATIONS AND PERMITS

7.1. DE-DVP-2014.1 (Servo)

Staff Report dated August 27, 2014 - attached

Planner Milne presented the Staff Report for consideration of a proposed Development Variance Permit which requests a variance of the width to depth ratio due to the panhandle configuration of proposed Lot B and the requirement for frontage greater than 10% of the lot perimeter for Proposed Lot B. Trustees discussed concerns that had been brought to their attention and requested clarity regarding issues including road access, covenants and aquifer/water impact. The applicant was in attendance to address questions raised. Planner Milne advised that he is not aware of a process that would allow adjacent landowners to be informed of technical reviews of subdivision requirements by the Ministry of Transportation and Infrastructure. Discussion followed on possible mechanisms that the Local Trust Committee might utilize in the future, such as new language in the subdivision regulations section, to add protection against impacts to the aquifer that might result from subdivisions.

Trustee Graham spoke to the motion declaring that in his nine years of experience as a Trustee he has seen several applications for variance of the width to depth ratio requirement approved, and suggested that the next Local Trust Committee consider a revision of this regulation.

DE-2014-051
It was MOVED and SECONDED,
that the Denman Island Local Trust Committee:
1. approve Development Variance Permit DE-DVP-2014.1 to Odelja Servo for Proposed Lot B on Lot 2, Section 12, Denman Island, Nanaimo District, Plan 54063; and
2. waive the 10% frontage requirement of the Local Government Act.

CARRIED

7.2. DE-DP-2014.1 (Comox Valley Regional District - Parks Department)

Staff Report dated September 2, 2014 - to be distributed

Planner Milne reviewed the Staff Report which addresses the proposal to construct the second section of the multi-use Denman Cross-Island Trail which requires a development permit as the trail encroaches into the Development Permit Area #4 wetland for approximately 152 metres.

Karen Albert, Comox Valley Regional District Parks Planner was in attendance, summarized the project, and answered questions that arose. She advised that the impact will be small and that Dr. J. Balke has been hired as the environmental monitor on the project. She confirmed that property owners and affected entities such as the Denman Island Memorial Society, The Old School, Denman Conservancy and the Denman Island United Church have been consulted on the proposed work.

Trustees acknowledged that this is a project that the community supports and expressed their appreciation to the Comox Valley Regional District for undertaking this work in a thorough manner that will serve to protect pedestrians, children, and bicycle riders on these rural roads. They also appreciated the hiring of local residents whenever the tender process allows.

DE-2014-052
It was MOVED and SECONDED,
that Development Permit DE-DP-2014.1 (CVRD) be approved and issued in accordance with Schedules “A”, “B”, “C” and “D” attached to the permit.

CARRIED

10. CORRESPONDENCE

Correspondence specific to an active development application and/or project will be received by the Denman Island Local Trust Committee when that application and/or project is on the agenda for consideration.

10.2. Letter dated August 15, 2014

Don Cadden, Regional Director, BC Parks regarding Designation of Denman Island Lands - attached

Planner Milne explained the contents of the letter which informed the Local Trust Committee that of the four Denman Island parcels not included in the protected area designation process in 2013, three parcels are not considered suitable by BC Parks' staff for addition to the provincial protection areas system. He reported that these three parcels are the Denman Island Quarry, McFarlane Road and Morrison Marsh properties and that that the Ministry of Environment is preparing to transfer the administration of these parcels to the Minister of Forests, Lands and Natural Resource Operations.

Trustees expressed concern that these properties have significant ecological value and their protection is important. They also noted that these properties were part of a commitment made to the community as a part of a development settlement. They indicated that options need to be identified and explored to ensure the protection of these parcels. Discussion followed on possible options to consider including the following:

Karen Albert, Comox Valley Regional District (CVRD) Parks Planner, was in attendance and was asked if CVRD might consider discussion of placing these properties under their parks program or under a license of operation. She responded that if requested, options might be considered and explored by the Board;

Chair Luckham recognized an attendee who wished to make a comment. Simon Palmer suggested that it might be appropriate to initiate a community discussion regarding the disposition of the lands as there might be other uses identified in conjunction with preservation of the land, such as for community housing; and

Trustees discussed writing a letter in response to the correspondence from BC Parks. They noted that several pieces of correspondence on the agenda had concerned this issue and that the summary of the value of the lands presented in agenda item 10.5 could be helpful in the creation of the letter.

DE-2014-053
It was MOVED and SECONDED,
that the Denman Island Local Trust Committee request that staff write a letter to Don Cadden, Regional Director, BC Parks, for the Chair's signature, expressing disappointment with BC Parks' decision to exclude these parcels from previously agreed upon protection by Park land status and requesting an opportunity to discuss other options for the future of these lands.

CARRIED

By general consent the meeting was adjourned at 12:00 pm for a break and presentation of the Community Stewardship Award to the Association of Denman Island Marine Stewards. The meeting reconvened at 12:30 pm.

8. DELEGATIONS

There were no Delegations.

9. TOWN HALL SESSION

A community member asked if a review of B&B regulations is going to be a priority for the incoming Trustees. In a follow-up question she asked if the standing resolution restricting bylaw enforcement on home based guest accommodation regulations would be ending in December, 2014. She indicated that it had been understood that it would continue until the Local Trust Committee has reviewed the regulations, pointing out that the definition of kitchen is not clear and that operators are in fear of fines that might be assessed. She asked that the moratorium be extended until the review has been completed.

Trustees clarified the process, indicating that existing Top Priorities and Projects List will be passed to the new Trustees who will be setting the priorities for their work program. They suggested that community members may attend meetings to identify topics of concern that they wish the Local Trust Committee to consider. Trustees explained that other priorities have taken precedence over the guest accommodation review and confirmed that an extension of the bylaw enforcement moratorium may be considered prior to the end of the term.

10. CORRESPONDENCE

10.1. Email dated August 11, 2014

Ralph McCuaig, Margie Gang and Marion & Oliver Cobb regarding Extention of Moratorium on Enforcement of the Tourism-Related Prohibitions of Bylaw No. 186- attached

Trustees considered the options of extending the moratorium which is due to expire on December 31, 2014 at this time or to defer the decision to the next

Local Trust Committee.

DE-2014-054
It was MOVED and SECONDED,
that the Denman Island Local Trust Committee renew Standing Resolution No. DE-065-2013 to be extended to December 31, 2015.

CARRIED

In speaking to the motion Trustees explained that this resolution will not bind the incoming Local Trust Committee to a commitment to extend the moratorium as they could choose to rescind it; however it will make a statement that this Local Trust Committee believes that it is a good idea. Trustees cautioned that economic decisions should not be based on an impression or expectation that the moratorium will be extended by the next Local Trust Committee.

By general consent agenda item 10.2 was moved to follow item 7.2.

10.3. Letter from Denman Conservancy Association dated September 12, 2014

Received.

10.4. Letter from Denman Island Residents Association dated September 8, 2014

Received.

10.5. Letter from Dr. J. Balke dated September 8, 2014

10.6. Email from Des and Sandy Kennedy dated September 13, 2014

Received.

10.7. Email from Kal Holsti dated September 14, 2014

Received.

10.8. Letter from Anne Siegel dated September 15, 2014

Received.

11. REPORTS

11.1. Work Program

11.1.1. Top Priorities Report and Projects Report dated September 4, 2014 - attached

Trustees discussed removing and adding items to the Top Priorities Report.

Trustee Graham commented that while he supports these changes to the Top Priorities report, he does also want to see the item "Review of the OCP/LUB regarding implementation of the Farm Plan" occur.

Trustee Busheikin remarked that the Local Trust Committee has not abandoned the Farm Plan. She indicated that while the Committee does want to work on the review, at this time there is not a surge of community concern on this issue. She observed that the Farm Plan is being used and has been a useful tool to address some issues.

DE-2014-055
It was MOVED and SECONDED,
that the Denman Island Local Trust Committee amend its Top Priorities List as follows:

1. remove item nos. 1 and 2;
2. move "Implementing Riparian Areas Regulations" to the top of the list;
3. add "Creation of Memorandum of Understanding with K'omoks First Nation" as item no. 2; and
4. move "Review of visitor accommodation regulation" from the Projects to the Top Priorities as item no. 3.

CARRIED

DE-2014-056
It was MOVED and SECONDED,
that the Denman Island Local Trust Committee remove the item "Affordable Housing Strategy" from the Projects List.

CARRIED

DE-2014-057
It was MOVED and SECONDED,
that the Denman Island Local Trust Committee add as an Activity to the Farm Plan project: "Include consideration of Exploring Food Security in the Islands Trust Area in the final report".

CARRIED

11.2. Applications Log

11.2.1. Report dated September 4, 2014 - attached

Planner Milne summarized the report and provided updates.

11.3. Trustee and Local Expenses

11.3.1. Expenses posted to end of July, 2014 - attached

Received.

11.3.2. Expenses posted to end of August, 2014 - attached

Received.

11.4. Policies and Standing Resolutions

11.4.1. Report– attached for information

The report was received for information and was addressed at agenda item 10.2.

BREAK AND PRESENTATION OF COMMUNITY STEWARDSHIP AWARD TO THE ASSOCIATION OF DENMAN ISLAND MARINE STEWARDS

12. LOCAL TRUST COMMITTEE PROJECTS

12.1. Denman Housing Needs

12.1.1. Staff Report dated August 25, 2014 regarding Response to EC Review of Proposed Bylaw No.211 - attached

Planner Milne summarized the Staff Report regarding the Executive Committee review of proposed Bylaw No. 211 and the recommended change in wording. He commented that staff believes that the replacement language would work equally well.
Chair Luckham acknowledged that the Local Trust Committee has been advised that given the nature of the change there is no requirement to proceed to a further Public Hearing.

DE-2014-058
It was MOVED and SECONDED,
that the Denman Island Local Trust Committee rescind third reading of proposed Bylaw No. 211 cited as “Denman Island Land Use Bylaw, 2008, Amendment No. 1, 2014”.

CARRIED

DE-2014-059
It was MOVED and SECONDED,
that the Denman Island Local Trust Committee amend proposed Bylaw No. 211 cited as "Denman Island Land Use Bylaw, 2008, Amendment No. 1, 2014" by deleting the existing text in 5(a) of item 3 of Schedule "A" and replacing it with the following:
"Either the dwelling unit or secondary suite is occupied by the owner of the dwelling unit; or the dwelling unit or the secondary suite is occupied by a person other than the owner who has responsibility for managing the property, including dealing with complaints of neighbours arising from the occupancy of the property".

CARRIED

DE-2014-060
It was MOVED and SECONDED,
that the Denman Island Local Trust Committee give third reading to proposed Bylaw No. 211 cited as "Denman Island Land Use Bylaw, 2008, Amendment No. 1, 2014", as amended.

CARRIED

DE-2014-061
It was MOVED and SECONDED,
that the Denman Island Local Trust Committee re-submit proposed Bylaw No. 211 to the Executive Committee for further review and consideration of approval.

CARRIED

12.2. Riparian Areas Regulation - Next Steps - for discussion

Planner Milne reported on the Open House presentation that occurred and indicated that in his assessment the attendees were supportive of the proposed bylaws. He considered that the Open House had been an effective way to present the material and gauge the response of the general community. He suggested that the Local Trust Committee consider moving the draft bylaws forward. Discussion followed on possible next steps which included giving first reading to start the conversation with the community on this issue and referral of the proposed bylaws to agencies for comments.
Trustees acknowledged that there is no budget to reassess, review or conduct additional Riparian Areas Regulation mapping based on individual concerns that might be expressed, noting that small discrepancies would not necessarily be meaningful in the context of the bylaws.

Planner Milne determined that it is necessary for the draft Riparian Areas Regulation bylaws to be assigned identifying bylaw numbers prior to giving first reading and advised that first reading may be given by the Resolution Without Meeting process.

DE-2014-062
It was MOVED and SECONDED,
that the Denman Island Local Trust Committee request staff to initiate a Resolutions Without Meeting to give first reading to Riparian Areas Regulation draft bylaws.

CARRIED

13. NEW BUSINESS

13.1. 2015-16 Budget Submissions

13.1.1. Memorandum dated August 18, 2014 - attached

Trustees discussed the 2015-2016 budget submission for the Denman Island Local Trust Committee.

The allocation for Protocol Agreement with K'omoks First Nation was discussed with the following key points noted:

The project focus is to improve relationship and the budget should include funding for a strategy that includes a community workshop to engage and stimulate that understanding;

A Memorandum of Understanding has been recommended by the Local Trust Committee as the preferred agreement which is a simpler document without high-level protocol work; and

The savings recognized from using a Memorandum of Understanding versus a Protocol Agreement is estimated to be sufficient to fund the suggested workshop; no change in the cost for the project is necessary.

DE-2014-063
It was MOVED and SECONDED,
that the second item on Attachment 2 of the Budget Request be changed to "Memorandum of Understanding and relationship building with K'omox First Nation and that the wording under the Description column be changed to "Host community relationship building exercises".

CARRIED

DE-2014-064
It was MOVED and SECONDED,
that the Denman Island Local Trust Committee approve and forward the draft 2015-16 Project Budget submission to Financial Planning Committee, as amended.

CARRIED

13.2. Comox Valley Regional District Rural Official Community Plan Referral

13.2.1. Memorandum dated August 28, 2014 - attached

Trustees discussed their interests and comments that might be provided in this referral.

DE-2014-065
It was MOVED and SECONDED,
that the Denman Island Local Trust Committee respond to the Referral Form on File 6480-25 as “Interests unaffected” with a comment provided as follows: The Local Trust Committee would like to be appraised of the work being done on the new action item “to develop an area plan to balance the interests between residential users and aquaculture operators in the Baynes Sound area”.

CARRIED

13.3. Denman Island Communications Material Review - for discussion

There was no action taken on this agenda item at this time.

14. BYLAWS

14.1. Proposed Bylaw No. 211 cited as "Denman Island Land Use Bylaw, 2008, Amendment No. 1, 2014"- for further consideration

This item was discussed at agenda item 12.1.1.

15. ISLANDS TRUST WEBSITE

Denman Pages - for discussion

The Denman Island Local Trust Committee Website can be found at:

http://www.islandstrust.bc.ca/islands/local-trust-areas/denman.aspx

Trustees requested additions to the website as follows:
post the overlay mapping from the Riparian Areas Regulation presentation;· post a direct

link to Denman Island Crown Land Profiles to the Community Profile or other appropriate area; and after every meeting post a “Highlights from Meeting” near the front of the website using information in Trustee Graham’s report in the Grapevine. Trustee Graham will forward this report to the web administrator.

17. TOWN HALL SESSION

None.

18. ADJOURNMENT

5. MINUTES

5.3. Denman Island Advisory Planning Commission Minutes - none

None.

5.4. Denman Island Marine Advisory Planning Commission Draft Minutes - none

None.

16. NEXT MEETING DATE

Tuesday, October 21, 2014 at 10:30 am at the Denman Seniors Hall, 1111 Northwest Road, Denman Island, BC

Tuesday, October 21, 2014 at 10:30 am at the Denman Seniors Hall, 1111 Northwest Road, Denman Island, BC

_____

Peter Luckham, Chair

Certified Correct:

_____

Vicky Bockman, Recorder

RWM From: September 02, 2014 To: October 09, 2014

Denman Island

Resolution #	Action	Resolution Description	Resolution Date
2014-03	In Favour	"That the Denman Island Local Trust Committee give First Reading to Bylaw No. 212, cited as "Denman Island Official Community Plan (Denman Island) Bylaw 185, Amendment No. 2, 2014" and Bylaw No. 213, cited as "Denman Island Land Use Bylaw 186, Amendment No. 2, 2014", and that, the Denman Island Local Trust Committee direct staff to refer Bylaw Nos. 212 and 213 to public agencies and First Nations."	Oct 08, 2014
2014-02	In Favour	"That Denman Island Local Trust Committee direct staff to revise the legal description of development variance permit No. DE-DVP-2014.1, approved in resolution DE-2014-051, to read as follows: Lot 2, Section 12, Denman Island, Nanaimo District, Plan VIP56102."	Oct 09, 2014

Islands Trust

Follow Up Action Report w/ Target Date

Denman Island
Jul-15-2014

No.	Activity	Responsibility	Target Date	Status
1	Posting of the notice of the RAR Open House on the website along with the staff report and maps.	Rob Milne		On Going

Sep-16-2014

No.	Activity	Responsibility	Target Date	Status
1	**DE-2014-053** that the Denman Island Local Trust Committee request that staff write a letter to Don Cadden, Regional Director, BC Parks, for the Chair's signature, expressing disappointment with BC Parks' decision to exclude these parcels from previously agreed upon protection by Park land status and requesting an opportunity to discuss other options for the future of these lands.	Rob Milne		On Going
1	**DE-2014-054** that the Denman Island Local Trust Committee renew Standing Resolution No. DE-065-2013 to be extended to December 31, 2015.	Lisa Webster-Gibson		Done
1	?**DE-2014-055** that the Denman Island Local Trust Committee amend its Top Priorities List as follows: 1. remove item nos. 1 and 2; 2. move 'Implementing Riparian Areas Regulations' to the top of the list; 3. add 'Creation of Memorandum of Understanding with K'omoks First Nation' as item no. 2; and 4. move 'Review of visitor accommodation regulation' from the Projects to the Top Priorities as item no. 3.	Rob Milne		Done

1	**DE-2014-056** that the Denman Island Local Trust Committee remove the item "Affordable Housing Strategy" from the Projects List.	Rob Milne	Done
1	**DE-2014-057** that the Denman Island Local Trust Committee add as an Activity to the Farm Plan project: 'Include consideration of Exploring Food Security in the Islands Trust Area in the final report'.	Rob Milne	Done
1	**DE-2014-058** that the Denman Island Local Trust Committee rescind third reading of proposed Bylaw No. 211 cited as 'Denman Island Land Use Bylaw, 2008, Amendment No. 1, 2014'. **DE-2014-059** that the Denman Island Local Trust Committee amend proposed Bylaw No. 211 cited as 'Denman Island Land Use Bylaw, 2008, Amendment No. 1, 2014' by deleting the existing text in 5(a) of item 3 of Schedule 'A' and replacing it with the following: 'Either the dwelling unit or secondary suite is occupied by the owner of the dwelling unit; or the dwelling unit or the secondary suite is occupied by a person other than the owner who has responsibility for managing the property, including dealing with complaints of neighbours arising from the occupancy of the property'. **DE-2014-060** It was MOVED and SECONDED, that the Denman Island Local Trust Committee give third reading to proposed Bylaw No. 211 cited as 'Denman Island Land Use Bylaw, 2008, Amendment No. 1, 2014', as amended. **DE-2014-061** that the Denman Island Local Trust Committee re-submit proposed Bylaw No. 211 to the Executive Committee for further review and consideration of approval.	Lisa Webster-Gibson	Done

1	**DE-2014-062** that the Denman Island Local Trust Committee request staff to initiate a Resolutions Without Meeting to give first reading to Riparian Areas Regulation draft bylaws.	Lisa Webster-Gibson	Done
1	**DE-2014-065** that the Denman Island Local Trust Committee respond to the Referral Form on File 6480-25 as "Interests unaffected" with a comment provided as follows: The Local Trust Committee would like to be appraised of the work being done on the new action item "to develop an area plan to balance the interests between residential users and aquaculture operators in the Baynes Sound area".	Rob Milne	Done
1	Trustees requested additions to the website as follows: post the overlay mapping from the Riparian Areas Regulation presentation;· post a direct link to Denman Island Crown Land Profiles to the Community Profile or other appropriate area; and after every meeting post a "Highlights from Meeting" near the front of the website using information in Trustee Graham's report in the Grapevine. Trustee Graham will forward this report to the web administrator.	Rob Milne	On Going

STAFF REPORT

Date: October 14, 2014 File No.: DE-DP-2014.2 (Stoneman)

To: Denman Island Local Trust Committee
For meeting of October 21, 2014

From: Rob Milne, Island Planner

CC: Francesca Marzari, Young Anderson
Miles Drew, Bylaw Enforcement Coordinator

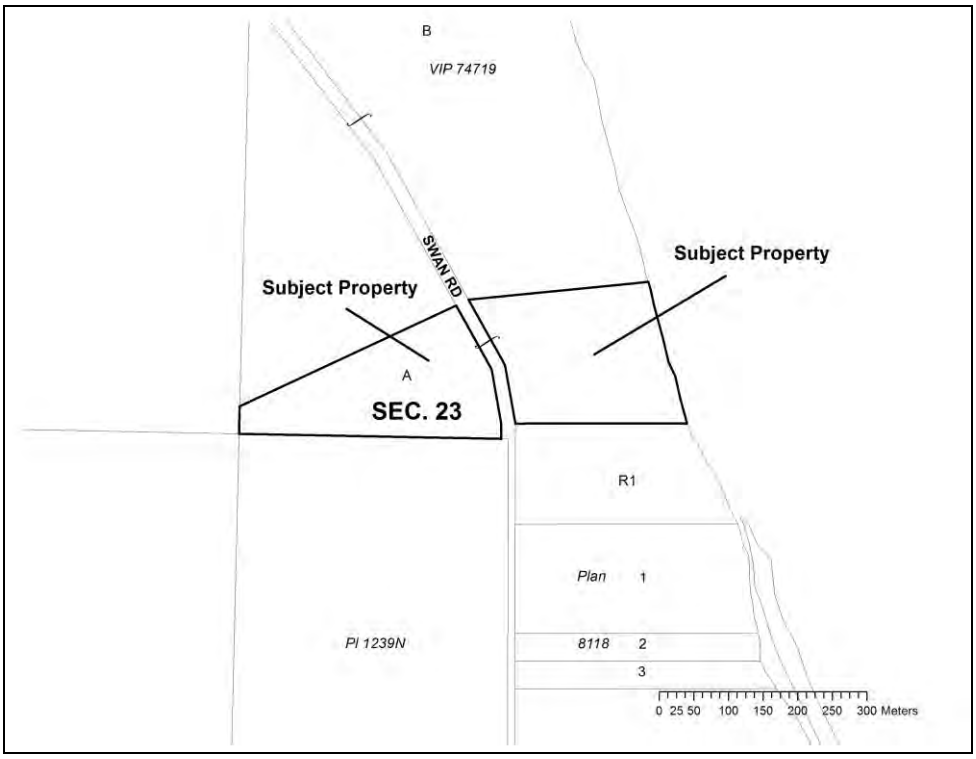
Re: Development Permit Application – Lot A, Section 23, Denman Island, Nanaimo District, Plan VIP74719
Owner: Dan and Debra Stoneman
Applicant: Dan Stoneman
Location: 2600 Swan Road, Denman Island

THE PROPOSAL

The Applicant has applied for a development permit to authorize the following development on the above property:

1. **The existing house and associated outbuildings;**
2. **The existing drainage works;**
3. **The trimming and pruning of trees to enhance property values;**
4. **The existing excavation of the crest of the bluff directly east of the house;**
5. **The removal of trees and vegetation since 2005, including the removal of small trees and vegetation in the area of the crest and the beach access stairway;**
6. **The construction of a beach access stairway in its current form;**
7. **The additional removal of trees and vegetation more than 15 metres from the crest of the bluff for the purposes of farming; and**
8. **The removal of unspecified hazard trees on the bluff slope and perimeter.**

(The "proposed developments")



2011 Orthophoto

BACKGROUND

Existing Development Permits

Development Permit DE-DP-03-99, is registered against the property and allows for the clearing and harvesting of trees on the majority of the property, and prohibits land alteration within 50 metres of the crest of Komas Bluff.

Contrary to the clause 1(a) of DE-DP-03-99 and Section 920(1)(d) of the *Local Government Act*, portions of the buffer area were cleared by the previous land owner, Ellis. A court order was issued prohibiting any land alterations within the 50 metre buffer area and on the face of the bluff without a further development permit. The extent of remediation of that breach was settled by consent order signed by the current owners and applicants. The present application would amend or replace that permit to the extent that it seeks land alterations within 50 metres of the crest of the bluff and on the face and toe of the bluff. The issuance of a development permit in this area would also bring the Property into compliance with the court order that there be no land alterations in this area without a development.

When issued, Clause 1(c) of DE-DP-03-99 also required the planting of Christmas trees on the cleared portions of the property more than 50 metres from the bluff crest. That condition was imposed pursuant to the repealed Development Permit Area No. 7: Forest Cover, which was found to be invalid by the courts. Clause 1(c) of DE-DP-03-99 was subsequently removed by DE-DP-2013.2 which amended the original development permit.

Development Permit DE-DP-2002.1, is registered against the property and authorized a subdivision of the property. The development authorized in the permit has been completed. No amendment of this development permit is required.

Court Proceedings

In ***Stoneman v. Denman Island Local Trust Committee*, 2013 BCSC 218,** the court found that the Stonemans had breached the *Local Government Act* by altering land and constructing the buildings and structures currently on the property (both within the 50 m Buffer, and within the DPA beyond the Buffer) without a development permit. The Court ordered the removal of all works and structures (and remediation in accordance with further terms to be decided) that the Stonemans did not obtain a development permit for.

The Stonemans appealed the 2013 BC Supreme Court decision, and in **Stoneman v. Denman Island Local Trust Committee, 2013 BCCA 517**, released December 3, 2013 the Order of Mr. Justice Curtis at the BC Supreme Court was upheld. As a result, all land alterations, buildings and works that are not approved by way of this development permit application are subject to the order (upheld on appeal) that they be removed.

The Court of Appeal specifically rejected the application by the Stonemans for the issuance of a development permit for the present development on the Property without further conditions. In this regard, the Court of Appeal stated as follows:

> *VI. The Stoneman's' Mandamus Application*
>
> *[97] In their Petition, the Stonemans sought relief in the nature of mandamus:*
>
> > *…compelling the DILTC [Denman Island Local Trust Committee] without further requirements to issue a development permit validating the present*

development of the property to replace development permits DE-DP-03-99 and DE-DP-2002.1 currently registered on title.

…

[99] As I understand the Stonemans' case, the gravamen of their complaint is that the DILTC was endeavouring to obtain as a condition of the requested development permit, remediation works on the lands which were not required by Justice Groberman after he reviewed the expert reports prepared following his indication that he would issue a mandatory injunction covering some form of such works on the Ellis and Stoneman lands. …

[101] The DILTC deals with this issue at paragraphs 104 to 106 of its Factum:

> *104. Only the first requirement related to the remediation ordered in Ellis and it was nothing more than the entering of the consent order in that respect. This condition was fully consistent with the orders in Ellis, and addressed the increased instability of the bluff caused by Mr. Ellis as recommended by the 2006 Thurber report.*
>
> *105. The remaining three requirements did not relate to any remediation requirements related to Mr. Ellis' unlawful clearing of the Stonemans' property. They were entirely based on the Stonemans' own geotechnical report as to what was required to ensure the safety and longevity of the proposed new development (the house, garage, drainage works, land clearing and cultivation) in relation to the identified ongoing instability of the bluff. That report specifically included a recommendation that planting be completed in accordance with the 2003 Madrone report, as well as drainage and siting requirements.*
>
> *106. The development permit conditions incorporating the recommendations of the 2006 EBA report for the new development were specifically authorized by s. 920(7.1) and (11) of the Local Government Act, and Guideline 3 of the Komas Bluff DPA.*

…

[104] Justice Curtis dealt with this issue at paragraph 36 of his reasons:

> *[36] The petitioner claims in the alternative, an order of mandamus compelling the Denman Island Local Trust Committee to issue a development permit validating the present development on the property without further requirements. In support of their position it is argued that in dealing with the permit, the Trust Committee based its decisions on improper considerations. Having reviewed the evidence, I find no merit in that submission.*

[105] I agree with this conclusion. I cannot discern anything improper in the conditions attached to the issuance of the development permit.

[106] I also note the point made by the DILTC that the current development on the property differs in a number of significant respects from that proposed in the Stonemans' noted application. Accordingly, there is no application covering the existing development before the DILTC or this Court. And there is certainly no application covering the excavated path works and drainage works at the crest of the Bluff and the stairs constructed by the Stonemans down the face of the Bluff. These works were undertaken by the Stonemans in complete defiance of the terms of Bylaw 111 and the decision in Ellis.

Between the appeal dismissal and the date of writing this report, a number of events have occurred that are relevant to the development permit application subject of this report. They are listed below with referenced letters attached to this report.

December 4, 2013 – Counsel for the Stonemans wrote to counsel for the Local Trust Committee advising that his clients wished to proceed as follows:

1. As to all requirements for stair removal and remediation within 50 meters of the bluff, they will await the remediation report [then in preparation by Golder] and order contemplated in Justice Curtis' decision and comply;
2. As to the house and related structures more than 50 meters from the bluff, our clients will submit a fresh or amended development permit application confined to those structures and they respectfully request direction from DILTC to identify what needs to be provided beyond the material provided in their application earlier this year to secure the permit.

March 24, 2014 – Golder Associates completed the geotechnical report for the purpose of addressing necessary re-vegetation and remediation actions as a result of the breach of the development permit requirements, as well as to provide the necessary guidance for the issuance of a development permit for the house and associated buildings that the Stonemans had indicated they wished to retain. (Attached)

March 31, 2014 – Counsel for the Local Trust Committee provided to the Stonemans' legal counsel a copy of the geotechnical report prepared by Golder Associates.

April 3, 2014 - Received letter from counsel for the Stoneman's to say Mr. Stoneman is now representing himself.

April 14, 2014 – Mr. Stoneman responded to the Golder Report, and indicated he was not prepared to apply for a development permit or consent to the remediation based on the Golder Report.

April 23, 2014 – Counsel for the Local Trust Committee wrote to the Stonemans and urged them to apply for a development permit to retain the house based on the recommendations in the Golder Report.

July 7, 2014 - Counsel for Local Trust Committee appeared before Mr. Justice Leask with respect to the remediation requirements for the Stoneman property. Mr. Justice Leask ordered an adjournment of the application to allow the Stonemans to make a new development permit application to the Local Trust Committee, supported by a new geotechnical report that considered the Golder recommendations.

July 10, 2014 - Counsel for Local Trust Committee wrote to the Stoneman's outlining the development permit application requirements given the July 7 direction from Mr. Justice Leask. (Attached)

August 22, 2014 – Tetra Tech EBA Inc, retained by the Stonemans, issued draft geotechnical report for review.

August 29, 2014 – Golder wrote to EBA outlining where the Golder analysis and recommendations differ from that in the draft EBA report. (Attached)

September 5, 2014 - Counsel for Local Trust Committee wrote to EBA regarding their review of the draft geotechnical report provide by the Stonemans. This letter advises that the report in draft form contains limitations and conditions that would prevent the Local Trust Committee from relying on it in the context of a development permit application, and sets out minimum requirements with respect to the matters that should be addressed in the final report in order to

support the issuance of a development permit for the proposed/existing developments. (Attached)

September 9, 2014 - EBA released final report with no changes from draft. (Attached)

September 24, 2014 - Development permit application from the Stonemans received in Islands Trust Northern Office. (Attached)

CURRENT PLANNING STATUS OF SUBJECT LANDS:

Land Use / Zoning Bylaw:

The property is zoned Agricultural (A) in the Denman Island Land Use Bylaw No. 148.

The land below the natural boundary of the property is zoned Marine Conservation (W1) zone. The only permitted structures in this zone are marine navigation aids, moorage buoys, and signs. No stairs or access structures are permitted in this zone.

Official Community Plan:

The portion of the property where the proposed and existing developments are located is designated as within Development Permit Area No. 1: Komas Bluff (the Komas Bluff DPA) in the Denman Island Official Community Plan Bylaw No. 185.

The designation of the Komas Bluff DPA is to protect development from hazardous conditions, specifically erosion, land slip and subsidence. One objective of the Komas Bluff DPA is "To protect areas of unstable terrain from increased risk of slope failure and/or erosion due to cutting or removal of trees and other development." It is understood that this objective is to be considered in the context of protecting present and future development in the area.

The development permit area guidelines for the Komas Bluff DPA are incorporated into the Land Use Bylaw. These guidelines are the criteria that the Local Trust Committee must consider in determining whether or not to issue a permit for the specific development proposed in the Komas Bluff DPA. The relevant guidelines of the Komas Bluff DPA are as follows:

> Guideline 1
> Some properties or portions of properties may be in more than one development permit area; in this case, the guidelines of all development permit areas may apply.
>
> Guideline 2
> In order to assist the Denman Island Local Trust Committee in determining conditions to be included in a development permit, the applicant will be required to provide, at their own expense, a geotechnical report certified by a professional engineer with experience in geotechnical engineering who is acceptable to the Trust Committee. The report must indicate that the proposed tree cutting, buildings, structures, land alteration, roads, driveways, or other proposed developments would not cause any potential erosion of soil or contribute to any land slip, rock fall, mud flow, sloughing, or water degradation.
>
> Guideline 3
> No permanent building should be permitted in any area subject to sloughing or damage from sloughing.

Guideline 4
No part of a septic tank, deposit field, or irrigation system should be constructed in any portion of the site that is subject to sloughing or damage from sloughing or in any area containing unstable soil or water which is subject to degradation.

Guideline 5
Notwithstanding the drainage bylaw provisions or requirements, drainage facilities should be required to divert drainage away from any areas subject to sloughing or damage from sloughing.

Guideline 6
Trees or other vegetation should be retained or replanted in order to control erosion along the top or the face of the bank.

Guideline 7
All new lots created by subdivision should provide for suitable building sites in areas not subject to sloughing.

Guideline 8
Subdivision applications should make provisions for clustering lots in areas away from the hazard area.

Guideline 9
Prior to issuing a development permit, the local trust committee may require security in an amount acceptable to the local trust committee.

Guideline 10
On receipt of a final report or written request, as stipulated in the development permit, the local trust committee shall return the security, minus any amount required to correct any unsafe conditions caused by a contravention of a condition in the development permit (see Appendix B).

Guideline 11
Development permits issued in Development Permit Area No. 1: Komas Bluff should contain a condition stating that a letter must be submitted by a time specified in the development permit indicating that the work has been completed in accordance with the terms and conditions of the development permit.

Guidelines 1, 7, and 8 are not relevant to this application, as there are no additional development permit areas applicable to this property, and there is no application for a subdivision or creation of new lots.

This report will review the proposed developments in relation each of the relevant guidelines, and evaluate the extent to which the proposed and existing development for which a permit is sought complies with those guidelines.

CURRENT APPLICATION AND REPORTS

This application includes both a Siting and Use Permit Application and a Development Permit Application for the 8 developments listed at page 3 of the development permit application (also listed above at page 1 of this staff report).

This staff report considers only the Development Permit application. It should be noted, that if the development permit is approved, before an SUP could be issued, elevations for the existing or any proposed buildings would have to be provided.

In support of this current application the applicant has provided a geotechnical report prepared by Tetra Tech EBA Inc., dated September 9, 2014 with reference to some of the aspects of the existing development (the "2014 Tetra Tech EBA Report").

As agreed initially by counsel for the Stonemans, and later in the Court proceedings before Mr. Justice Leask, the report prepared by Golder Associates dated March 24, 2014 (the "2014 Golder Report") may also be considered by the Local Trust Committee in relation to this development permit application.

It should be noted that while both the 2014 Golder and 2014 Tetra Tech EBA Reports have been prepared for possible use in litigation, only the Golder Report has been authorized for use by Golder for the purposes of reliance by third parties, including future owners and the Local Trust Committee. The authorized scope, purpose and use of each report is reviewed below:

The 2014 Golder Report

The purposes of the Golder Report are twofold: (1) to address the remediation requirements to be considered by the Court in relation to Mr. Justice Curtis' order, (upheld on appeal), for removal of all non-permitted works and remediation of the property; and (2) to address the request from counsel for the Stonemans to provide guidance with respect to what works would be necessary to approve a development permit for the house and structures on the Property. Both purposes required a review and consideration of the purpose and guidelines of the Komas Bluff DPA. The purposes of the 2014 Golder Report are described at the first paragraph of that Report as follows:

> *Based on this information and the visual site reconnaissance, this report and the attached appendices present an assessment and professional opinion on the impact of the excavations, structures, the removal of vegetation, changes to site drainage conditions, and other modifications to the original site conditions on the stability of shoreline bluff slopes in the context of the Komas Bluff Development Permit Guidelines. This report also presents a geotechnical engineering opinion with respect to the long term suitability and stability of the existing residence location, as well as comments and recommendations on remediation measures to address noncompliance with the Development Permit requirements for the Site, including but not limited to drainage and subdrainage improvements, as well as a planting I revegetation plan to mitigate the impacts of the excavations, installation of structures and removal or damage to the vegetation which has occurred at the Site.*

There are no stated limitations on the ability of the Local Trust Committee or future property owners from relying on the opinions and recommendations of this Report. Pages 16-17 provide a summary of how the opinions and recommendations in the Report relate to each of the relevant Komas Bluff DPA Guidelines.

The 2014 Tetra Tech EBA Report

The 2014 Tetra Tech EBA Report, states that it is prepared for the following purpose:

> *After consultation with Golder Associates Ltd. (Golder), Tetra Tech EBA Inc. (Tetra Tech EBA) (previously EBA Engineering Consultants Ltd.) provides a professional opinion from a geotechnical perspective on the Golder Remediation Plan, dated March 24, 2014, for your property at 2600 Swan*

Road, Denman Island. Our understanding is that this draft report will be submitted to the BC Supreme Court.

The Report contains a very brief part at part 3.2 on page 2 regarding compliance with Komas Bluff DPA Guidelines, which states as follows:

> *Eleven Guidelines have been developed for the Komas Bluff DPA of which Numbers 2,3,4,5, and 6 have some relevance to the geotechnical aspects of the site. A copy of these guidelines is attached as Appendix B of this document. It is our understanding that, if permit applicants meet these guidelines, a permit will be issued.*
>
> *It is our opinion that Tetra Tech EBA geotechnical reports have met these five Komas Bluff DPA guidelines and that the development has not increased the potential for slope instability and/or erosion; and in fact the enhanced drainage from the Stoneman property may well have decreased the risk of slope failures and erosion.*

With the exception of a discussion of Guideline 5 regarding drainage on pages 9-10 (discussed below), the 2014 Tetra Tech EBA Report does not discuss the Komas Bluff DPA Guidelines any further. Nor does the Report state which previous EBA reports are relied on to support the current development for which a permit is sought, and how these reports addressed the guidelines in relation to the proposed developments in this permit application.

Section 7.0 "Limitations of Report" states that:

> *This report and its contents are intended for the sole use of Dr. Dan Stoneman and his agents. It is acknowledged that this report will be used by the BC Supreme Court in assessing what requirements must be met by the Stonemans to allow a permit to be issued. Tetra Tech EBA Inc. (Tetra Tech EBA) does not accept any responsibility for the accuracy of any of the data, the analysis, or the recommendations contained or referenced in the report when the report is used or relied upon by any Party other than Dr. Dan Stoneman, or for any Project other than the proposed development at the subject site. Any such unauthorized use of the report is at the sole risk of the user. Use of this report is subject to the terms and conditions stated in Tetra Tech EGA's Services Agreement. Tetra Tech EBA's General conditions are provided in Appendix E of this report.*

The General Conditions in Appendix E of the 2014 EBA Report provide:

> *1.0 USE OF REPORT AND OWNERSHIP*
>
> *This report and the conditions contained within it are intended for the sole use of Tetra Tech EBA's Client. Tetra Tech EBA does not accept any responsibility for the accuracy of any of the data, the analyses or the recommendations contained or referenced in the report when the report is used or relied upon by any party other than Tetra Tech EBA's Client unless otherwise authorized in writing by Tetra Tech EBA. Any unauthorized use of the report is at the sole risk of the user.*
>
> *3.0 ENVIRONMENTAL AND REGULATORY ISSUES*
>
> *Unless stipulated in the report, Tetra Tech EBA has not been retained to investigate, address or consider and has not investigated, addressed or considered any environmental or regulatory issues associated with the development on the subject site.*

In a letter dated September 5, 2014 (attached) counsel for the Local Trust Committee advised Mr. Patrick and Mr. Hall of Tetra Tech EBA of the our concerns related to this disclaimer:

> *The current draft report contains conditions and limitations that prevent the use of the report by the Local Trust Committee for regulatory purposes, including, the issuance of a development permit. Part 7.0 of the draft report, and 1.0 and 3.0 of General Conditions are of particular concern in this regard. The conditions also prevent future owners from being able to rely on the report in the event that a development permit is issued on the basis of the report. These limitations and conditions will have to be removed or modified to expressly permit reliance on the report by the Local Trust Committee for the purposes of issuing a development permit, as well as by future holders of such a permit, before the report can be relied upon by the local Trust Committee for that purpose*.

The letter also went on to advise that plans and specifications for each of the works which were the subject of the development permit application must be provided as part of the development permit application pursuant to Bylaw No. 71. However, the applicants did not alter the scope of the Tetra Tech EBA report after this letter, and Tetra Tech EBA finalized the Report with these limiting conditions in place and with no detailed review of how each of the proposed works met the development permit guidelines.

From these conditions it is apparent that EBA does not intend their 2014 report to be relied upon by third parties, including the Local Trust Committee or future owners of the property. In addition, the report is not intended to specifically address regulatory issues, such as development permit requirements, that pertain to the development. This may explain the cursory treatment of the Development Permit Area Guidelines at Part 3.2 of the Report.

These limitations and conditions prevent the Local Trust Committee, and future owners, from relying upon the 2014 EBA report with respect to the development permit application under consideration. A development permit issued for the existing development will be relied upon by all future owners, and the Local Trust Committee must consider their interests as well as those of the current property owners.

REVIEW OF PROPOSED DEVELOPMENTS IN RELATION TO THE GUIDELINES

Each of the proposed developments for which a development permit is requested in this application must be evaluated in light of the Komas Bluff DPA Guidelines. The proposed developments for which a development permit is sought are as follows:

1. The existing house and associated outbuildings;
2. The existing drainage works;
3. The trimming and pruning of trees to enhance property values;
4. The existing excavation of the crest of the bluff directly east of the house;
5. The removal of trees and vegetation since 2005, including the removal of small trees and vegetation in the area of the crest and the beach access stairway;
6. The construction of a beach access stairway in its current form;
7. The additional removal of trees and vegetation more than 15 metres from the crest of the bluff for the purposes of farming; and
8. The removal of unspecified hazard trees on the bluff slope and perimeter.

This staff report will review each proposed development in relation to the Guidelines.

1. The Existing House and Associated Outbuildings

According to the survey plan submitted by the applicant, the existing dwelling is now sited 57.6 metres from the new top of bank. The existing garage is sited 86.6 metres from the crest of the bluff. The McElhanney topographical survey prepared for Golder and Associates shows the setback of the house from the crest at 58.8 metres, and the septic system in the same general setback area.

A. Applicable Guidelines

Guidelines 2 and 3 are the most relevant to the consideration of the application for a development permit for the existing house and outbuildings. Guideline 4, which applies to the existing septic tanks and systems for the house is also relevant, as it is presumed that the applicant wishes for those works to also be approved.

These Guidelines provide as follows: [Italics added for emphasis]

> **Guideline 2*: In order to assist the Denman Island Local Trust Committee in determining conditions to be included in a development permit, the applicant will be required to provide, at their own expense, a geotechnical report certified by a professional engineer with experience in geotechnical engineering who is acceptable to the Trust Committee. *The report must indicate that the proposed* tree cutting, *buildings, structures*, land alteration, roads, *driveways*, or other proposed developments *would not cause any potential erosion of soil or contribute to any land slip, rock fall, mud flow, sloughing,* or water degradation.**
>
> **Guideline 3: *No permanent building should be permitted in any area subject to sloughing or damage from sloughing.***
>
> **Guideline 4*: No part of a septic tank, deposit field, or irrigation system should be constructed in any portion of the site that is subject to sloughing* or damage from sloughing or in any area containing unstable soil or water which is subject to degradation.**

The existing house, structures and driveway engage Guideline 2 because these developments have the effect of collecting and concentrating drainage in the area of downspouts, perimeter drains and ditches within the Komas Bluff DPA. The 2014 Golder Report states at Part 6.2 that:

> *As described previously, it is my professional opinion that the primary concern and adverse impact on the stability and rate of regression of the bluff is caused by the increased and concentrated flow of surface runoff from the cleared lands, as well as hard surfaces and structures towards and onto the bluff slopes resulting from the unauthorized land alterations and construction performed by the current property owners, including:*
>
> - *The construction of the residence and garage;*
> - *The construction of related hard surface, septic systems, and accessory structures within the Site and Komas Bluff development permit area;*
> - *The excavation and construction of drainage works within the Site and Komas Bluff development permit area; and*

- *The clearing of trees and vegetation since 2006, including the excavation and construction of the path and stairs at the crest and down the face of the bluff in 2010 – 2012.*

Guideline 3 is obviously engaged by the construction of the house and garage as permanent buildings, and raises, in particular, the adequacy of the setback from the area of the Bluff that is subject to sloughing or damage from sloughing.

Guideline 4 is engaged as the plans submitted show that that a septic system has been installed adjacent to the house within the Komas Bluff DPA.

B. Relevant Geotechnical Reports

Both the 2014 Golder Report and the 2014 EBA Report address these guidelines to some extent.

Golder's opinion is that the residence, garage, septic system and associated hard surfaces can be addressed geotechnically to meet Guidelines 2 and 3, provided that the drainage and re-vegetation measures they recommend are implemented:

> *7.0 KOMAS BLUFF DEVELOPMENT PERMIT GUIDELINES*
>
> *Based on review of the available information and visual site reconnaissance, it is Golder's professional opinion that the excavations, structures, the removal of vegetation and other modifications to the original site conditions have caused adverse impact on the stability of shoreline bluff slopes and other adverse environmental effects. Provided that the recommended remediation measures, including but not limited to drainage and subdrainage improvements, as well as a planting / revegetation plan, are carried out, it is also our opinion that these measures will mitigate the impacts of the excavations, installation of structures and removal or damage to the vegetation which has occurred at the Site and meet the intent of the Kamas Bluff Development Permit Guidelines applicable to this Site, as described below.*
>
> *Guideline 2:*
>
> *It is our opinion that the recommended remediation measures, which include enhancement and additional planting of vegetation on and above the crest of the Kamas bluff slopes, removal of the existing stairway and decommissioning / removal of existing drainage pipe systems on the slopes, as well as enhancement of surface runoff drainage and subdrainage conditions would not cause potential erosion of soil or contribute to bluff instability, including but not limited to land slip, mud flow, sloughing or water degradation, and will address, to the greatest extent possible, the increased risks of bluff instability and land slip attributable to the current works on the Site, as identified in this report.*
>
> *Guideline 3:*
>
> *Due to the ongoing, natural process of shoreline toe erosion of the generally fine grained Quadra Sediments, as well as the steep slopes of the bluff, it is my opinion that it is not feasible to prevent periodic slope failures, slumps or slower creep-type movements. However, provided that the recommended remediation measures are carried out, it is my opinion that the existing permanent buildings at the Site are located beyond the area subject to sloughing or damage from*

sloughing over a time period significantly in excess of the normal design life of such buildings, typically 75 to 100 years.

Guideline 4:

No part of the existing septic tank and tile field, the proposed infiltration field, and the check dams are to be constructed on that portion of the Site that is subject to sloughing or damage from sloughing or in an area containing unstable soil or water which is subject to degradation.

These summary statements are based on a broader analysis of site observations and research set out at sections 5.4-5.5 of the Report, excerpts of which are below:

5.4 Slope Stability

Although these soil strata are considered to be very strong when intact and undisturbed as a result of being highly loaded and compressed as the Vashon Drift till was deposited under the glacial ice, it is my opinion that these generally fine grained soils are moderately to highly susceptible to erosion and shallow slope failures as a result of concentrated surface water flow over the crest of the bluff, loss of support due to undermining of the toe of slope caused by storm wave or current induced erosion, and removal of vegetation on and above the crest of the bluff slope. In addition, locally concentrated groundwater seepage discharge from sandy layers within the upper, near vertical scarp faces of the bluff can result in "piping" and local undermining of the scarp face, resulting in failures along the crest of slope. My observations and opinions are consistent with those provided in the Thurber 2004 report.

…

It is my opinion, and I concur with the EBA 2012 opinion, that such local failures and bluff regression occur intermittently, such that the crest of the bluff will remain relatively unchanged for several years, and then regress locally by a limited amount (of the order of 1 to 3 m) in the absence of adverse changes in site and drainage conditions upslope of the bluff. However, as described above, the present installation of ditches, hard surfaces, removal of vegetation, and other changes in site conditions which direct concentrated water flows towards the crest of the bluff will, in my opinion, result in more rapid erosion, slope failures and regression of the bluff.

5.5 Shoreline Erosion and Setback of Residence

As observed during my site reconnaissance and inspection, and reported in other information made available for my review, there is ongoing erosion at the toe of the bluff slopes, likely due to periodic storm wave events and possible current induced scour….

As described previously, the lower slopes of the bluff are standing at slope angles varying between about 30 and 38 degrees from horizontal. However, I observed that these slopes, even where well established tree and vegetation cover is present, exhibit "pistol butting" and tilting of trees, evidence of slope creep or shallow slumping. It is my opinion and experience that a long term stable slope angle for these generally fine grained, and loose to compact slide debris soils overlying the undisturbed Quadra Sediments would be approximately 2 Horizontal to 1 Vertical (26 degrees). As such, it is my opinion that regression

of the toe of the overall slopes will induce periodic movements or failures of these lower slopes, resulting in loss of support and intermittent failures of the upper, steep to near vertical slopes at the crest of the bluff, such that regression of the crest of the bluff will occur at the same overall rate as that of the toe of slope. However, it is also my opinion that more frequent erosion, failures and more rapid regression of the crest of the bluff has and will continue to occur unless suitable and effective drainage and revegetation remediation measures, as described below, are implemented and maintained.

The 2014 Tetra Tech EBA Report disagrees with Golder's conclusions in this regard. Tetra Tech EBA's opinion is expressed in various locations in its report, and includes the following opinions that are relevant to these Guidelines:

5.4 Construction Setback

It was agreed that the setback of the house and other structures is sufficient to protect the Stoneman home and buildings beyond their anticipated 100 year lifespan if appropriate maintenance to maintain drainage of vegetation, and monitoring are carried out. It is noted that monitoring procedures consisting of assessing the location of the slope crest, assessing if the slope is being undermined, and ensuring that drainage pipes are not damaged, as recommended by Tetra Tech EBA, are in place. [at page 5]….

6.0

It is concluded that:

- *There is no evidence of significant, ongoing erosion on the Stoneman property;*
- *The potential for another major runoff/seepage event has been greatly reduced by the blocking of Highways culverts which in 2002/2003 resulted in an episodic event of erosion and landslide (Appendix D);*
- *Monitoring systems are in place to monitor drainage pipes and repair or redirect flow to a backup pipe should pipe failure occur; and,*
- *Should there be pipe failure the result would be small scale erosion confined to a small area and not threaten the overall Stoneman development.*

Tetra Tech EBA is of the opinion that further remediation is not required at this time to enhance bluff stability or to protect the Stonemans development of the property.

Although, the 2014 Tetra Tech EBA Report does not specifically review the requirements of Guideline 2, it does state:

It is our opinion that Tetra Tech EBA geotechnical reports have met these five Komas Bluff DPA guidelines and that the development has not increased the potential for slope instability and/or erosion; [page 2, part 3.2]

The 2014 Tetra Tech EBA Report does not provide the Local Trust Committee with any further guidance as to how its previous reports should be considered or applied in the context of the current application. However, attached to this staff report is a review of the previous reports prepared by EBA and how they may relate to the current application.

It is staff's opinion that these reports do not generally support the current residence in its current location in the absence of engineered and approved drainage works, and the implementation of a re-vegetation plan. The Local Trust Committee came to the same conclusion when it approved a development permit for the residence with a greater setback and subject to these conditions in 2006. That decision was upheld by the BC Court of Appeal in 2013.

Golder was requested to, and did comment on the 2014 Tetra Tech EBA report, before it was finalized. In relation to the above statements, Golder stated as follows in its letter to EBA of August 29, 2014:

> *Section 5.4 – Construction Setback*
>
> *It was agreed that the setback of the Stoneman residence and other structures is sufficient to protect these facilities beyond their anticipated 100 year lifespan, "provided that the recommended remediation measures are carried out to address the unauthorized land alterations and construction performed by the current lands owners" (See (Golder Section 5.4 and the recommendations on remedial measures, section 6.0). It was not agreed that maintenance of the existing drainage pipes and vegetation, together with periodic monitoring of the slope crest and undermining of the slope itself, wold be sufficient.*
>
> *6.0 Conclusions*
>
> *There was no agreement between Tetra Tech and Golder with respect to the conclusions I, iii, and iv:*
>
> *i. Golder does not agree that there is no evidence of significant, ongoing erosion on the Stoneman property. It is Golders's opinion that crest regression, resulting from erosion, slope stability and shoreline toe erosion is ongoing and significant, although the individual events occur episodically, at differing times, locations and extent along bluff slopes, and these events cannot be predicted in advance. In addition, the rate of erosion of the bluff slopes has increased significantly since about 2000 resulting in part from the disturbance of the bluff and the concentration of drainage as described in Section 6.1 of the Golder report. The purpose of the recommended remedial measures presented in the Folder report is to reduce this regression to the long term values and mitigate the effects of the current landowner's development, such that the Stoneman residence and other structures remain outside the zone of risk of damage or loss over a time period equal or greater that the typical 75 to 100 year design of such facilities.*
>
> *ii. Golder agrees with Tetra Tech that blockage of the Highway culverts should be maintained such that no concentrated runoff from offside properties is directed towards the crest of the bluff slopes, with resulting increased risk and magnitude of erosion and landslide activity, as occurred on or about 002/2003.*
>
> *iii. Golder does not agree with Tetra Tech's conclusion that suitable and effective monitoring systems are in place to monitor drainage pipes installed on the bluff slopes and to repair or redirect flow should failure occur. No description or details of such a monitoring system is presented in the Tetra Tech report.*

iv. *Golder does not agree that a drain pipe failure would result only in small scale erosion and the Tetra Tech report does not provide specific and detail analyses and other information t justify this conclusion. It is Golder's opinion that other drainage control measures, such as the infiltration field concept in the Golder report, are necessary to protect the residential development on the property and would provide more effective drainage control, and significantly less risk of increased bluff slope erosion or failure, than the existing drainage works on the property due to the significant risk of leaks or failure of drainage piping extending to and onto the bluff slopes.*

It should also be noted that the conclusion of the 2014 Tetra Tech EBA Report that the land alterations in the Komas Bluff DPA would not and did not increase the potential for slope stability and erosion is not only contrary to Golder's conclusions, but also inconsistent with the geotechnical opinion of Thurber Engineering in 2004. That report, which was accepted and relied upon by the Court in 2005, found that disturbance of the trees, vegetation, and the concentration of drainage in the Komas Bluff DPA would increase the rate of sloughing and erosion on the property.

With respect to the Guideline requiring the septic system to be located in an area that is not subject to sloughing, the septic system is installed to the north of the dwelling as shown on the surveyed plan. It appears to be set back between 56 and 86 metres from the crest of the bluff.

None of the previous EBA reports, nor the 2014 Tetra Tech EBA report, address the location of the septic system and whether its current location is subject to damage from sloughing or information that the property beyond the house is also not subject to sloughing. However, the Tetra Tech EBA report does state that there is no significant erosion or sloughing on the property generally.

The 2014 Golder Report addresses Guideline 4 primarily in relation to the proposed irrigation system for the recommended revegetation. However it does state that the septic system should not be located in an area subject to sloughing. It can also be inferred from that report that the requirements to ensure that the house is adequately set back would apply equally to the adjacent septic system components.

C. Staff Recommendations

Both the 2014 Golder Report and the 2014 Tetra Tech EBA Report support the current location of the residential house, garages, and associated buildings, subject to conditions. However the conditions, and the bases for those conditions, differ.

The 2014 Golder Report identifies ongoing and accelerated slope instability on the property in the area of the Komas Bluff attributed to the construction of the house, drainage works, staircase structure, and the excavation and vegetation removal at the bluff crest and face, and states that the current house location is not supported unless remedial steps are taken to address drainage and re-vegetation of the Property.

The 2014 Tetra Tech EBA Report identifies no significant slope instability and requires only that the current owner continue to perform regular unspecified monitoring and maintenance of the plastic drainage pipes down the face of the Bluff.

Staff recommends that the Local Trust Committee incorporate the recommendations in the 2014 Golder Report as conditions of the issuance of a development permit to address the requirements of Guidelines 2, 3 and 4 in relation to the proposed house and associated buildings. The reasons for this recommendation can be summarized as follows:

- The 2014 Golder Report's conclusion that the existing clearing, excavation and drainage works at the bluff crest and slope of the property have and will continue to contribute to slope instability, erosion and sloughing is consistent with previous geotechnical reports prepared with respect to the property, including the 2004 Thurber Report;
- The 2014 Golder Report conclusion that the property will continue to experience significant periodic slope movements and instability is consistent with all previous reports, including those prepared by EBA prior to 2014;
- The 2014 Golder Report provides technical analysis and support for its recommendations;
- The 2014 Golder Report is prepared by a very senior geotechnical engineer, but it also draws on the expertise of a senior hydrogeologist in relation to drainage issues, and a senior landscape architect in relation to vegetation issues;
- The 2014 Golder Report is intended to be relied on for the purposes of considering a development permit application to approve the existing house and outbuildings by both the Local Trust Committee and future owners;
- The conclusion of the 2013 Tetra Tech EBA Report that there is no significant ongoing erosion on the subject property is not consistent with a number of other geotechnical reports prepared with respect to the subject property, including previous EBA reports, the Thurber Reports, and the conclusions of Golder. It is also inconsistent with documented sloughing and erosion of the Bluff since 2007 in the area of the excavation, vegetation and tree removal at the crest and face of the bluff and the stair way structure;
- The conclusion of the 2014 Tetra Tech EBA Report that no re-vegetation plan is recommended for the subject property is inconsistent with both the 2006 and 2007 EBA Reports for this property, as well as the 2014 Golder Report;
- The conclusion of the 2014 Tetra Tech EBA Report that the current drainage works are acceptable provided that unspecified appropriate maintenance and monitoring are carried out is inconsistent with EBA's previous recommendations for improved drainage works, and the conclusions of the 2004 Thurber Report as well as the 2014 Golder Report; and
- The 2014 Tetra Tech EBA Report provides its recommendations and conclusions for the use and reliance of its client only. Neither the Local Trust Committee, nor future owners, are entitled to rely on the data used or the recommendations provided on that basis. In the case of the required maintenance and monitoring there is no provision for how this would be provided by future owners relying on any permit that is issued.

Overall, staff consider that the 2014 Golder report provides a level of technical analysis which is not present in the September 9, 2014 Tetra Tech EBA report, as well as detailed recommendations with respect to measures deemed necessary to maximize slope stability due to the unauthorized and unpermitted development carried out by the applicant. The recommendations of the Golder report align more strongly with the previous EBA reports and the Thurber Reports than do those of the report submitted by the applicant with the development permit application, and address Guideline 2 without the conditions and limitations on the use of the report for this purpose.

Staff also has a number of more specific concerns regarding the vegetation and drainage analysis and recommendations in the 2014 Tetra Tech EBA Report, which will be described in more detail in those sections. These concerns also relate to the conclusion of the 2014 Tetra

Tetra Tech EBA Report that the house and outbuildings are sufficiently set back, and that nothing more than maintenance and monitoring of existing vegetation and drainage is required to ensure the longevity of the house and associated outbuildings on the Property.

In contrast to the 2014 Tetra Tech EBA Report, the 2014 Golder Report does include a set of recommendations, including remediation measures, aimed at the long-term protection of the development on the property that is consistent with the Guidelines and the previous reports establishing the active erosion and sloughing of the bluff. In response to Guideline 2, the Golder report, on page 16, states that:

> *It is our opinion that the recommended remediation measures, which include enhancement and additional planting of vegetation on and above the crest of Komas bluff slopes, removal of the existing stairway and the decommissioning / removal of existing drainage pipe systems on the slopes, as well as enhancement of the surface runoff drainage and subdrainage conditions would not cause potential erosion of soil or contribute to bluff instability, including but not limited to land slip, mud flow, sloughing or water degradation, and will address, to the greatest extent possible, the increased risks of bluff instability and land slip attributable to the current works on the Site, as identified in this report.*

Staff recommends that the 2014 Golder Report be relied upon to allow the issuance of a development permit for the proposed development of the existing house and associated outbuildings.

2. The Existing Drainage Works

The application package includes a site plan which shows the approximate location and the size of drainage pipes installed on the subject property. It also shows the "drainage distribution cistern" within the 50 metre buffer, and approximately 10 metres from the crest of the bluff. The information also indicates that drainage from eave troughs on the house, as well as flows from other site drainage are collected and directed to the base of the bluff in an enclosed pipe.

The current drainage system is most comprehensively described at Part 5.1 of the 2014 Golder Report generally as follows:

> *It is understood through discussions with the homeowner that a sub-surface drainage system collects runoff from the roof leaders and groundwater from the drain tile surrounding the house foundation. The collected flows are conveyed east across the Site to the cistern shown in Figure 2 and then down the bluff slopes through a network of corrugated plastic pipes (see Plate A-20) to discharge at about the toe of these slopes. It is further understood that a sub-surface drain tile intercepting shallow groundwater flows extends north from the cistern as shown in Figure 2. Outflow from this drain tile is combined with the flows from the house and is directed over the crest of the bluff slopes. Site observations generally agree with the reported positions and functions of the sub-surface drainage system.*

The McElhanney topographical survey prepared for Golder and Associates shows an existing interceptor drain close to the modified top of bank, and the cistern set back 26 metres.

Photographs of the existing "enclosed pipe" and other drainage works can be reviewed at Appendix A to the 2014 Golder Report. These enclosed pipes consist of black plastic corrugated pipes connected with red tape (plate A-20), and run from the collector drain (Plate A-

18) down the face of the bluff, where they are exposed. Additional photographs taken by bylaw enforcement staff are also attached for reference.

A. Applicable Guidelines

The drainage works are relevant, as discussed above, to the overall development of the property, including the requirement that works not increase the rate of sloughing and erosion under Guideline 2, and that buildings and structures are adequately setback.

In addition, Guideline 5 is relevant to a consideration of the application to approve the current drainage works:

> ***Guideline 5: Notwithstanding the drainage bylaw provisions or requirements, drainage facilities should be required to divert drainage away from any areas subject to sloughing or damage from sloughing.***

The issue of drainage with respect to the bluff area is one of the more significant issues related to the development permit. As discussed at some length above in relation to the proposed house and other buildings, it is also an area where the two reports offer different opinions on this issue.

B. Relevant Reports

As stated above, the current drainage works currently direct drainage towards and down the face of the bluff, albeit within plastic corrugated pipes. Golder and Tetra Tech EBA disagree as to whether this meets Guideline 5 to direct drainage away from any areas subject to sloughing, and whether this will accelerate sloughing and erosion of the property generally.

Golder's conclusion in this regard can be found at Part 6.1 and 6.2 of the 2014 Golder Report:

> *As described previously, it is my professional opinion that the primary concern and adverse impact on the stability and rate of regression of the bluff is caused by the increased and concentrated flow of surface runoff from the cleared lands, as well as hard surfaces and structures towards and onto the bluff slopes resulting from the unauthorized land alterations and construction performed by the current property owners ….*
>
> *Due to the ongoing, natural process of shoreline toe erosion of the generally fine grained Quadra Sediments, as well as the steep slopes of the bluff, it is my opinion that it is not feasible to prevent periodic slope failures, slumps or slower creep-type movements. It is also my opinion that these failures or movements can and will occur on an episodic basis along the entire bluff slope at this property and the locations and timing of such ground movements or failures cannot be predicted.* Consequently, the current drain pipe installations or other potential drainage systems located on or adjacent to the bluff are not suitable for long term drainage control. Further, the presence of such pipes or other systems and land alterations directing concentrated water flows to and onto the slopes has created an increased risk of rapid erosion and downcutting, as well as slope failure in the probable event of leakage or breakage of such installations due to ground movements of the bluff. [Emphasis added] ….
>
> ***Drainage***
>
> *As described in the memorandum by Mr. C. Coles, P. Eng., attached as Appendix D, due to the anticipated retrogression of the embankment, the*

regular inspection and maintenance of the existing drainage network of corrugated plastic pipes which extends over the escarpment are not considered viable in the long term. In order to provide long term water management on the site it is recommended that the network of corrugated plastic drainage pipes directed towards and extending onto and down the bluff slopes be decommissioned as shown in Figure 2.

In order to mitigate the impacts of the property development and to reduce the potential for concentrated flows reaching the embankment the 2014 Golder Report recommends a number of modifications to the existing drainage works, including the construction of an extended interceptor trench, an infiltration field to accept flows from the roof and foundation drains of the house, and measures to increase the functional storage in the existing pond and ditch systems.

Golder also incorporates the use of vegetation to address the control of drainage toward the bluff. At Part 6.3 the 2014 Golder Report states:

As described in the memorandum prepared by Mr. D. Reid, FCSLA (see Appendix E), the remediation objectives described below include enhancement of vegetation cover to create and maintain a woody vegetation buffer zone adjacent to the crest of slope to reduce the risk of shallow erosion of the near surface soils above and on the bluff and improve control of surface water runoff flows related to the current property owner's unauthorized works. These actions will serve to reduce the risk or rapid erosion and downcutting of the top soil layers of the bluff, but will not prevent periodic deeper slope failures.

Golder concludes that Guideline 5 can be met as follows:

Guideline 5:

Suitable and effective design and installation of the recommended drainage and subdrainage facilities, as well as the revegetation and planting plan will, in Golder's opinion, reduce, divert and/or slow concentrated drainage paths away from areas subject to sloughing or damage from sloughing.

The Tetra Tech EBA Report addresses drainage at Section 5.6, of their report. Tetra Tech EBA refers to Guideline 5 and states:

The only practical way to drain water away from the bluff (so as to meet this guideline) is to collect the water and convey it in pipes to the base of the bluff. Tetra Tech EBA recommended this for the flow in the ditches down the property boundaries, see Appendix D, as well as an option for drainage from the house and related structures.

Golder agrees that drainage to the base of the bluff is preferable to controlled seepage to the bluff face, however the key issue was the reliability of the piping down the slope. Mr. Butler maintains that the pipe could leak or be damaged if there is slope movement and this could add to the deterioration of the slope.

Dr. Stoneman had measured the discharge from the existing pipe at beach level on several occasions during significant rainfall events and states that the maximum flow he has measured is 1.5 gallons/minute or 7 litres/minute. This equates to a litre every 8 ½ seconds, similar to the flow from a garden hose.

Such a flow discharged onto the slope would certainly result in some erosion of the surficial, weathered soils/colluvium and/or small scale instability, however it is likely this would be confined to a small area along the pipe alignment and would be no deeper than the thickness of the weathered surficial soils because the underlying materials are resistant to erosion, unlike the Quadra sands evident well north of this property. Such a localized occurrence would not be a threat to the Stonemans' buildings.

It is understood that none of the existing piping and drainage infrastructure was designed or supervised by a professional engineer and no information has been provided that any sort of engineering inspections took place during its installation. Tetra Tech EBA specifically states that they cannot certify or stamp the drainage plans for the existing drainage works:

Tetra Tech EBA did not design or observe any of the construction on the Stoneman property. Therefore, Tetra Tech EBA cannot certify/stamp plans by third parties.

The 2014 Tetra Tech EBA Report concludes that the current drainage infrastructure in place for the conveyance of site drainage over the bluff to its base is adequate as it stands.

In the August 29, 2014 letter Golder responded to the statement that it agrees that drainage to the base of the bluff is preferable to controlled seepage to the bluff face as follows:

Golder does not agree that collection and discharge of water from the Stoneman residence or other facilities and structures in existing piping extending down the bluff slope is a suitable or "preferable" drainage treatment, due to the risk and likelihood that the pipes on the slope will be damaged and leak or fail completely due to slow creep movement of the near surface soils on the slope, as well as larger movements of failure, which cannot be predicted in advance.

It should be noted that in Section 6, "Conclusions" of the Tetra Tech EBA report it is stated that:

Monitoring systems are in place to monitor drainage pipes and repair or redirect flow to a backup pipe should pipe failure occur.

Staff has reviewed the 2014 Tetra Tech EBA report and the application package, both of which were submitted in support of the current development permit application which is the focus of this report. Staff was unable to locate any reference to the suggested monitoring system in the current application materials. It would appear, however, to rely on the presence and diligence of Mr. Stoneman as the property owner, particularly throughout the rainy season. This is not a safe assumption to apply to all future property owners, or to island property owners in general.

Staff also reviewed the 2011 Orthophoto submitted with the application which identifies the size and location of the drainage pipelines which have been installed on the subject property. That orthophoto with its information overlay clearly shows a drainage system which collects water from the residence and crest of the bluff and the location of the pipeline conveying the water to the bluff base. It also shows other pipelines which have been installed on the property which do not connect to the house/bluff drainage system. The orthophoto does not, however, indicate or otherwise mention the backup pipe which is suggested item (iii) of Section 6 of the Tetra Tech EBA report.

Previous reports in relation to the proposal to approve the current drainage works were also reviewed. The 2004 Thurber report concluded that:

In my opinion the bluff slopes are too steep and unstable allow install buried pipes or steep rock lined (riprap) channels from crest to beach level…Geotechnical engineering advice will be required to secure storm water

drains on the unstable bluff and to design outlet structures to resist storm wave damage. Once installed, the drains will require continuous inspection and long term maintenance programs…These factors suggest that the concept of pipe conveyance of ditch water to beach level is not feasible.

The 2006 EBA report recommends that runoff from hard surfaces, "be collected and piped to the base of the bluff for discharge," and that, "surface run-off from the property must be managed such that there is no concentrated flow over the crest of the bluff."

The 2007 EBA report recommends that the pond on the property be lined to limit ex-filtration, or that another cut-off ditch be connected to the existing ditch. It also recommended that the water in the ditches at the North and South side of the property be collected to control the discharge over the bluff with a pipe, armoured swale or erosion resistant conduit, with a discharge point carefully constructed at the base of the slope to avoid erosion.

The 2012 EBA report does not review the existing drainage in any detail. It does recommend to the owners that they regularly monitor their drainage pipes. The limitations of the report prevent the reliance on the report for regulatory purposes or by future owners. With respect to drainage systems, the report's conditions state "Specific design detail of such systems should be developed or reviewed by the geotechnical engineer." The 2014 Tetra Tech EBA report clarifies that EBA did not develop, review or supervise the construction of the drainage system.

C. Staff Review and Recommendations

It is of significant concern that the 2014 Tetra Tech EBA Report relies on the following statement for its conclusions with respect to both the drainage works specifically, and the adequacy of the works generally in relation to the ongoing instability of the property:

Dr. Stoneman had measured the discharge from the existing pipe at beach level on several occasions during significant rainfall events and states that the maximum flow he has measured is 1.5 gallon/minute or 7 litres/minute. This equates to a litre every 8 ½ seconds, similar to the flow from a garden hose.

In the absence of information regarding expertise, measurement methodology, the time of year and the intensity, duration and overall rainfall during those events the value of these measurements is questionable. While the Report expressly relies on this data, the Report also states:

Tetra Tech EBA Inc. (Tetra Tech EBA) does not accept any responsibility for the accuracy of any of the data, the analysis, or the recommendations contained or referenced in the report when the report is used or relied upon by any Party other than Dr. Dan Stoneman.

As this data forms the basis for the conclusion related to the most significant issues associated with the development under application – whether the current drainage works are sufficient to ensure that the conveyance of water from the developed area of the property does not cause an ongoing risk of major sloughing and erosion-and no other parties are entitled to rely on that data, this conclusion is of very limited use to the Local Trust Committee.

Overall, the current network of drainage pipes installed by the applicant, do <u>not</u> divert drainage away from areas subject to damage by sloughing and erosion. Nor have they been designed by an engineer, or sealed by an engineer, as is recommended in the 2004 Thurber report, and as was required for approval in 2006 by the Denman Island Local Trust Committee.

In addition, all of the EBA engineering reports raise serious issues about the requirement for ongoing frequent maintenance and monitoring of the current drainage system, and the potential

for significant instability and sloughing to occur in the event of a failure of the current network of pipes, junctions and cisterns. The 2014 Golder Report and 2004 Thurber Report also raise significant concerns that the current drainage works will fail at some point as a result of the ongoing natural erosion and sloughing of the bluff, even after the natural rate of erosion is restored. Failure of the current works would mean highly concentrated flows directed directly onto the face of the bluff.

In addition, staff are concerned that there is no feasible way for a development permit to enforce frequent ongoing monitoring and maintenance by the property owner. The permit must consider whether the proposed development, as designed, will ensure drainage is generally kept away from areas prone to sloughing and erosion.

In this regard, the 2014 Golder Report provides specific recommendations for alterations to the current drainage works to ensure that the existing pond functions effectively and that drainage is generally directed away from the bluff crest and slope, which is an area subject to sloughing and erosion. These recommendations are consistent with Guideline 5, while the Tetra Tech EBA recommendations that continue to direct drainage toward the bluff are not. Staff therefore recommend that the proposed drainage works be approved with the changes and modifications recommended by Golder.

3. The Trimming and Pruning of Trees to Enhance Property Values

While the application does not specifically identify any specific trees that have been trimmed or pruned, or that are intended to be trimmed or pruned, it is apparent that some clearing, trimming and pruning has already occurred. It is inferred that the creation and maintenance of a water view from the existing residence is at least one of the purposes of this application.

The applicant has applied for a permit to approve the existing removal of trees and vegetation since 2005 as Item 5 of the proposed developments (discussed below). The proposed development of continued and ongoing pruning and trimming of trees is addressed separately here.

The view towards the water from the residence is shown in the Golder Report at Figure 5.

A. Applicable Guidelines

Like the other proposed developments, the clearing, trimming and pruning of trees engages Guideline 2, which is discussed above. A report is necessary to indicate that it will not increase the rate of sloughing and erosion on the property. In addition, this aspect of the proposed developments engages the requirements of Guideline 6:

> ***Guideline 6: Trees or other vegetation should be retained or replanted in order to control erosion along the top or the face of the bank.***

B. Relevant Reports

This is one aspect of the proposed development that the 2014 Tetra Tech EBA Report submitted by the applicant with the application generally supports the Golder recommendations.

This issue is addressed at 6.3 of the Golder Report as follows:

> *Figure 5 shows the view from immediately north of the existing residence. One could surmise that the vegetation removal along the central area at the top of the bluff has been for the purpose of allowing a cleared view towards the seascape, including the nearby Hornby Island and distant Mainland Mountains. As shown in Figure 5, it is not necessary to have clearing to the*

> *ground surface at the top of the bluff in order to have a reasonable view maintained from the existing residence. The proposed 'Planting Extents' on Figure 5 shows an area that could be maintained with dense leaf cover and woody vegetation, while at the same time providing visual access to the seascape through a 'View Corridor' in the area shown on Figure 4 and 5.*
>
> *Whereas there is nothing in the Development Permit Guidelines that guarantees an applicant can open view corridors through the buffer zone, it is possible that a thorough application with a quantified proposal for limited vegetation view clearing could have led to permission to remove select vegetation elements in the 'View Corridor', but outside the 'Planting Extents' area as shown on Figures 4 and 5, subject to leaving a full leaf cover and vegetation roots within the 'Planting Extents' area.*

Figures 4 and 5 of the 2014 Golder Report provide for the maintenance of a view corridor in the area directly east of the residence that generally allows the trimming and pruning in the identified "Natural Regeneration Area" on the face of the bluff slope, and in the "Replanting Area" at the crest.

Golder allows for trimming and pruning in the Natural Regeneration Area view corridor, and generally has recommended the planting of low growing shrubs in this area for that purpose. The permitted trimming and pruning is only contemplated, however, in the context of the specific replanting and vegetation maintenance requirements in the remainder of the Report.

In the Natural Regeneration area, the 2014 Tetra Tech EBA Report endorses the Golder recommendations:

> *Where appropriate, (e.g., bluff pullback area) the Stonemans will allow natural regeneration to continue, consistent with Golder's recommendation. [p 6]*

Other than this reference, the Tetra Tech EBA Report does not consider the proposed trimming and pruning.

Staff considers that approval of the trimming and pruning of some trees and vegetation is supported by a geotechnical report (2014 Golder) and meets Guideline 2 provided that the trimming and pruning is conducted in accordance with the recommendations of that Report. Staff are satisfied that the trimming and pruning that is allowed for in the Natural Regeneration Area and Replanting Area shown on Figures 4 and 5 of the Golder Report is consistent with Guideline 6, provided that all of the planting that is recommended in that Report is carried out.

4. The Existing Excavation of the Crest of the Bluff

5. The Existing Removal of Trees and Vegetation Since 2005

These two proposed developments can be considered together, as they relate to retroactive approval by development permit of the excavation and clearing of an area at the crest and on the face of the bluff.

A. Applicable Guidelines

Guidelines 2 and 6 are both relevant to this "proposed" pre-existing development.

Under Guideline 2 the Local Trust Committee must first consider whether these developments caused any erosion or contributed to land slip or sloughing. Under Guideline 6 the Local Trust Committee must consider whether trees and vegetation have been retained or replanted to control erosion along the top and the face of the bank.

B. Relevant Reports

The 2014 Golder Report concludes that the development activities by the landowner, including the excavation and the tree and vegetation removal, have contributed to the increased erosional activity along the bluff face of the subject property.

This conclusion is also consistent with the conclusions of the 2004 Thurber Report regarding previous excavations and tree removal in this area.

Previous engineering reports, including several by EBA, have recognized the relationship between vegetation removal and an increased risk of bluff erosion. Several previous engineering reports prepared by EBA have recommended the retention of existing vegetation and re-vegetation as approaches to limit the risks of increased erosional activity related to development of the subject property.

The 2014 Tetra Tech EBA report does state globally "that the development has not increased the potential for slope instability and/or erosion." However, it does not specifically address what development it is referring to in this statement. Given that this conclusion is not explained, and contradicts earlier recommendations in other reports regarding the need to retain mature trees at the crest of the bluff, it is unlikely that this statement was intended to specifically endorse the excavation and tree removal in this location.

The 2002, 2006, and 2007 EBA reports all recommended retention of vegetation. The 2006 and 2007 EBA reports recommended re-vegetation, as does the 2004 Thurber report, for the purposes of controlling erosion, and protecting the residential development.

Overall, there are no geotechnical reports that indicate that the clearing of trees and vegetation on the face and crest of the bluff, and the excavation of the crest of the bluff itself, would not cause erosion or contribute to land slip and sloughing submitted. Guideline 2 has therefore not been met with respect to this development.

The existing land alterations and tree and vegetation removal did not comply with Guideline 6, as trees and vegetation were removed rather than retained.

Going forward, however, it is possible for the Local Trust Committee to consider how best to address this Guideline in the context of the current development of the Property.

In this regard, the 2014 Golder Report provides recommendations for the restoration of the stability of the bluff slope and crest, primarily through removal of the drainage works and staircase structure in this area, and the implementation of a re-planting plan.

Section 6.3, "Revegetation" of the Golder report addresses vegetation retention and remediation that is generally consistent with Guideline 6. This section provides a rationale in support of these activities as well as a table of recommended species (Table 1) which are recommended for restoration of the stability of the bluff slope and crest .

The Report states:

> *The Vegetated Areas shown on Figure 4 (Existing Forested Area to Remain, Natural Regeneration Area, and Replanting Area) are the minimum areas required for initial woody vegetation maintenance and replanting based on conditions in 2013. It is recognized that, irrespective of this planting's ability to mitigate shallow surface erosion, long term eventual westward migration of the crest of escarpment is likely due to toe erosion and/or deep-seated slope movements.*

It concludes that the recommended planting, together with the removal of the drain piping and staircase, will control erosion on the crest and slope of the bluff if implemented. With respect to Guideline 6 it states:

Guideline 6:

The recommended tree and other vegetation retention, as well as additional planting and revegetation plan and the removal of the stairway and drain piping on the slopes, will, in our opinion, control shallow erosion along the top or face of the bank.

The 2014 Tetra Tech EBA Report also recommends some vegetation management.

As discussed above, it endorses the Golder recommendations in the "Natural Regeneration Area" identified in the 2014 Golder Report.

With respect to the Replanting Area between the residence and the bluff, where the excavation, tree and vegetation removal occurred, it states that "the Stonemans have already re-vegetated" and that Messrs. Patrick and Butler agreed they were not experts in the field of vegetation and *could not further this discussion."*

C. Staff Recommendations

Staff recommends that the Local Trust Committee issue a development permit for the existing tree removal and crest excavation on the basis of the recommendations of the 2014 Golder Report. Although these developments would not, in the opinion of staff, have been supported or supportable under Guidelines 2 or 6, the 2014 Golder Report provides a means to address the acceleration of sloughing and erosion likely caused by these developments, and the retention and replacement of trees to control erosion, to the extent that this is possible.

While Messrs. Patrick of Tetra Tech EBA and Butler of Golder may not have expertise in the field of what planting is appropriate, Mr. Reid is responsible for the development of the replanting recommendations in the Golder Report, and he does have the necessary expertise in this area. Staff recommends the implementation of the re-vegetation plan and drainage plan developed by Golder as a means to address Guideline 2 to ensure that the development has as little impact on the stability of the bluff as possible, and to address Guideline 6 as a means to retain trees and vegetation to control erosion.

6. The Construction of the Existing Beach Access Stairway

This aspect of the application also relates to a request for retroactive approval of the existing stair structure on the face of the bluff slope. This stair structure involved the removal of vegetation down the face of the slope, and there is visual evidence of sloughing and erosion in the area of its construction.

Photographs of the stair structure are at Plate A-21 of the 2014 Golder Report and pages 5 and 11 of the 2014 Tetra Tech EBA Report.

A. Applicable Guidelines

Guideline 2 is relevant to this existing development. In addition, Guideline 3 requires that no permanent building be located in an area subject to sloughing.

Under Guideline 2 the Local Trust Committee must first consider whether the construction of this staircase caused any erosion or contributed to land slip or sloughing.

Guideline 3 is generally applicable to permanent buildings, and as such may not be directly concerned with stair structures. Nevertheless, this Guideline gives rise is a reminder of the effect of the ongoing sloughing and erosional processes on the face of the bluff on any new or proposed structures.

B. Relevant Reports

The 2014 Golder Report concludes that the development activities by the landowner, "including the excavation and construction of the path and stairs at the crest and down the face of the bluff" has had an adverse impact on the stability and rate of regression of the bluff.

This conclusion is consistent with the conclusions of the 2004 and 2006 Thurber Report regarding the excavation of a path at the crest of the bluff on the Property directly to the north of this property.

As part of the recommendations to address the excavation and tree removal in this area, Golder recommends the dismantling of the existing structure, which is located in the Natural Regeneration Area on Figure 4:

> *Within the Natural Regeneration Area as mapped on Figure 4:*
>
> - *Remove the existing structure at the foot of the stairs, and restore the beach to the pre-development natural beach condition. Remove the existing log-based stair structure. Seed any remaining disturbed areas with a grass / clover mix similar to adjacent seeded areas.*
> - *Allow natural regeneration of Red Alder and related native understorey species to proceed, with the objective that a full leaf and root cover of exposed soils will occur, with gradual succession towards evergreen species.*

This is also an element of Golder's conclusion as to how Guideline 6 can be met on this property despite the removal of trees and vegetation at the crest and on the slope of the property:

> *Guideline 6:*
>
> *The recommended tree and other vegetation retention, as well as additional planting and revegetation plan and the removal of the stairway and drain piping on the slopes, will, in our opinion, control shallow erosion along the top or face of the bank.*

The 2014 Tetra Tech EBA report also considers the stair structure. At Section 5.3 the Report states:

> *Golder and Tetra Tech EBA agree that the stairs, pictured below, have no significant impact on bluff stability. We note that they provide easy access for monitoring toe erosion and drainage discharge. Their construction is in accordance with Tetra Tech EBA recommendations for a stairway on the adjoining property that the stairs be above ground with minimal disturbance to the bluff slope. This construction is on logs above the slope with only one end resting on the bluff slope, allowing vegetation below to thrive. Golder's recommendation they be removed arises strictly from Denman Island Local Trust Committee land use / permit issues. Removal will disturb existing vegetation and, at least in the short term, could increase bluff instability and/or erosion potential locally. In the event their removal is ordered, Golder supports the land alteration necessary on the bluff slope to create a path to the beach. It is noted that the alignment, design, and construction of this path would need the input of a geotechnical engineer.*

In the August 29, 2014 letter from Golder the author denies any agreement on that point stating that, “Golder and Tetra Tech did not agree that the stairs have no significant impact on bluff stability” stating that the construction of the staircase structure caused “significant impact on bluff stability.” The letter also questions the ability of the structure to withstand both shoreline erosion and slope failure.

The letter goes on to state that any alternate proposal for a path would require detailed geotechnical and drainage engineering as well as vegetation specialist design and supervision.

C. Staff Recommendations

Staff does not recommend approval of the existing staircase structure for a number of reasons.

First, the issuance of a permit to regularize the existing house, buildings, excavation, and tree removal is supported only on the basis of the implementation of the 2014 Golder Report recommendations, which include dismantling of the staircase, and the natural regeneration of trees and vegetation in that area.

Second, there is no report that states that the construction of the staircase structure did not cause erosion or contribute to land slip and sloughing. To the contrary, the 2014 Golder Report clearly finds that it did so contribute. The 2014 Tetra Tech Report does not directly address the question of the impact of the construction of the stairs, but only of their dismantling.

Putting this disagreement aside, the survey which was prepared by a British Columbia Land Surveyor and submitted by the applicant as part of their application clearly shows the base of the staircase to be located beyond the natural boundary of the property. This is also confirmed in the 2013 topographical survey of the property prepared by McElhanney, which finds that the present natural boundary is very close to the natural boundary established in the Land Title Office in 2002.

It is also relevant to note that the stumps, fill and grass growing at the base of the stair structure shown on photographs are the product of fill placed by the applicant (apparently excavated from the toe of the bluff slope). Photographs showing the excavation of the toe of the bluff, the placement of logs and fill, and the seeding of the fill, are part of the court record in *Stoneman v. Denman Island local Trust Committee*.

The base of the stair structure is therefore not located on the subject property. In addition, it is located in the W-1 zone, which does not permit this type of structure. A development permit cannot vary this zoning requirement.

As such the Denman Island Local Trust Committee is unable to issue a development permit for the existing stair structure.

It may be possible that an alternative beach access proposal prepared by a professional engineer that addresses the Komas Bluff DPA Guidelines, could be developed. The application materials including the 2014 Tetra Tech EBA Report do not provide the necessary information for the consideration of an alternative beach access contained entirely on the property, nor does this application request such an approval.

7. The Additional Removal of Trees and Vegetation More than 15 Metres from the Crest of the Bluff

This aspect of the application relates to the additional removal of trees on the property, essentially between 50 metres of the crest of the bluff previously authorized, and 15 metres of the crest of the bluff proposed. Figure 4 of the Golder Report generally shows the “Existing

Forested Area" on the property. This development, if approved, would authorize the removal of much of the forest cover at the south end of the property, and some at the north end as well, although there is no plan or survey showing the location of a 15 metre setback.

A. Applicable Guidelines

Guidelines 2 and 6 are generally applicable to this proposed development. Generally, the clearing of trees engages Guideline 2, which is discussed above. A report is necessary to indicate that the proposed tree clearing will not cause erosion or contribute to sloughing of the property. In addition, this aspect of the proposed developments engages the requirements of Guideline 6 requiring trees and vegetation to be retained or replanted along the top of the bluff.

B. Relevant Reports

The Golder Report identifies all forested area on the Property as "Existing Forested Area to Remain." Within this area, the Golder Report recommends the following:

> *Within the Existing Forested Area to Remain as mapped on Figure 4:*
>
> - *No further removal to be undertaken of existing trees or native woody vegetation.*
> - *Allow natural forest succession to occur, including gradual spreading of native woody plants to replace existing grassy areas.*
> - *No limbing, topping, or pruning of standing trees to be undertaken.*
> - *Removal of vegetation shall be limited to removal of non-native invasive species (Himilayan Blackberry, Broom, Holly, Laurel, Eurasian herbaceous weeds).*

The rationale behind this recommendation is stated at Part 6.3 of the Report:

> *To improve slope stability and reduce surface runoff with revegetation, two elements are important to function: a dense system of deep roots and multi-layered surface structure provided by woody plants, and a 100% leaf cover over the soil surface, with a predominance of evergreen (winter) leaf cover to mitigate rain impact in the rainy season. These functions would have been provided by the pre-development woody cover shown in Plate 8-1.*
>
> *…*
>
> *On this basis, our revegetation requirements include a combination of replanting and natural succession to create a complete woody vegetation buffer of leaf and root cover in a continuous band that extends from the waterfront natural boundary to an area that extends west of the Top of Bank, typically to the east side of the existing and recommended Interceptor Trench and Drain, as shown on Figure 4.*

On Figure 4, the tree cover at the south end of the property is stated to remain "as surface overflow dissipater" in the area of the existing ditches leading from the existing retention pond.

The 2014 Tetra Tech EBA Report addresses the proposed removal of trees beyond 15 metres from the bluff obliquely at pages 7 and 8 of the Report. On page 7, the Tetra Tech EBA Report recommends retention of the existing both mature trees and understory within 15 metres from the bluff crest. On page 8, Tetra Tech EBA states that with respect to the forest cover beyond 15 metres of the bluff crest:

> *As long as there is vegetation cover to reduce the potential for surface erosion, there is no significant geotechnical basis for preserving forest cover. However, one of the other advantages to having trees in this area is that the roots absorb water, thus reducing the amount of seepage that discharges at the bluff. The existing interceptor drain replaces this reduction in seepage due to the roots absorbing water.*

In its August 29 comment on the Tetra Tech EBA Report, Golder responds that, in their opinion, the interceptor drain solution is problematic for slope stability as it still concentrates runoff near the crest of the bluff, which is why they have recommended decommissioning of the existing interceptor drain, and a replacement drain and swale to be combined with the retention of the forest cover on the property.

C. Staff Recommendations

Staff recommends that the application to clear the remaining existing trees and vegetation beyond 15 metres from the crest of the bluff be permitted only in accordance with the limited vegetation removal approved in this area in the 2014 Golder Report.

While the Tetra Tech EBA Report would support greater removal of trees and vegetation, that Report does not adequately address the type of vegetation that it says should remain in the place of the Forest Cover. Nor does it explain how this recommendation is consistent with Guideline 6 for the retention of trees at the top of the bluff. The Report does acknowledge that the remaining forest cover does serve a geotechnical purpose in controlling discharge of water from the bluff.

Overall staff consider that the 2014 Golder Report relies on the appropriate expertise in the area of types, amounts and extent of tree and vegetation cover to address the Guidelines on this property.

9. The Removal of Unspecified Hazard Trees

The development permit application also includes a request that a development permit be issued to authorize the removal of unspecified “hazard trees.”

A. Applicable Guidelines

This proposed development also engages Guidelines 2 and 6.

B. Relevant Reports

The Tetra Tech EBA Report does not identify any existing hazard trees currently on the Property, though it does show a picture of a “typical hazard tree” on page 8. That photograph has been provided to staff before, and is many years old. It is not known whether the tree shown in the photograph is still on the property. There is no indication from either Tetra Tech EBA or Golder that they noted or photographed any current trees on the property that they considered hazardous.

The rationale for the removal of unspecified hazard trees is stated in Section 5.5(b) of the Tetra Tech *EBA Report under “Agricultural Setback” where it is stated that:*

> *There was agreement [between Golder and Tetra Tech EBA] that hazard trees susceptible to falling down the slope represent a potential hazard to people walking the beach below and should be removed. It was agreed that if this was*

the case, the tree should be cut down, but the stump/roots left in place. Trees should only be removed if they are a clear threat to human health and safety.

It should be noted that in a letter dated August 29, 2014 (attached) the author of the Golder report denies the claim that there was agreement with respect to hazard trees and in that letter advises Tetra Tech EBA that:

Contrary to the Tetra Tech report, there was no agreement that hazard trees susceptible to falling down the slope represent a potential hazard to people walking on the beach below and should be removed. It is Golder's opinion that a hazard tree along or near the crest of the bluff slope would not fall onto the beach but would be retained on the tree covered bluff slope. While some local damage to the tree and vegetation cover on the bluff slope is likely to occur in the event of a hazard tree failure, the woody debris would provide short term protection against erosion and natural regeneration of the tree and understory cover on the slope would occur within a short time period. Golder and Tetra Tech did agree that trees should only be removed if they are a clear threat to human health and safety.

C. Staff Recommendations

Normally, in cases where it is proposed to remove a tree within a development permit area with Guidelines that require retention of trees, the applicant is required to have a hazard tree assessment prepared by a qualified specialist such as a registered arborist. This report would assess the need for the tree's removal as well as recommend appropriate methods for its removal. The Tetra Tech EBA report does not identify any such trees or provide any recommendations with respect to the impact of the removal of that tree.

In the absence of any report identifying a hazardous tree on the property, and any consensus between the geotechnical experts as to whether a hypothetical tree should be removed, staff does not recommend the issuance of a development permit for this purpose.

SECURITY AND OTHER CONDTIONS

Guidelines 9 and 10 address the requirement for security prior to the issuance of a development permit in the Komas Bluff DPA. They provide as follows:

Guideline 9: Prior to issuing a development permit, the local trust committee may require security in an amount acceptable to the local trust committee.

Guideline 10: On receipt of a final report or written request, as stipulated in the development permit, the local trust committee shall return the security, minus any amount required to correct any unsafe conditions caused by a contravention of a condition in the development permit (see Appendix B).

The requirement to provide a security, typically in the form of a renewable letter of credit, is a standard tool available to local government to ensure that funds are available to either complete required conditions or works, or to address deficiencies in a development project should that be considered necessary. They are a tool used to protect the public interest and are cancelled once it has been documented that all permit conditions have been fulfilled and the project has received final approval. The security provided typically represents a percentage of the total expected costs of the required works.

With respect to this development permit application, given the history associated with the subject property and the unauthorized development activities for which approval is being sought, this is an option that the Local Trust Committee may wish to consider if they decide to impose any of the drainage or replanting related conditions recommended in the 2014 Golder Report as conditions of the development permit.

Attached to this report is an estimate of costs which has been prepared by Golder, in consultation with civil and landscaping contractors on Vancouver Island. This estimate was requested by the Islands Trust and reflects the anticipated costs of fully implementing the recommendations of the Golder report including the dismantling of the stairway on the bluff slope, with a 20% contingency, which is fairly standard.

Security is often a condition of a development permit payable upon issuance of a building permit, or some other event. In this case, as the main residence has already been constructed, staff simply recommend that security be paid in a reasonable time, and suggest December 31, 2014 for this purpose.

Guideline 11: Development permits issued in Development Permit Area No. 1: Komas Bluff should contain a condition stating that a letter must be submitted by a time specified in the development permit indicating that the work has been completed in accordance with the terms and conditions of the development permit

In this case, most of the "proposed" development has already been completed. The draft development permit therefore provides for certification of completion of the recommended replanting and drainage conditions by specified dates as a condition of the permit.

CONCLUSION

The Applicant has applied for a development permit to authorize the following development on the above property:

1. The existing house and associated outbuildings;
2. The existing drainage works;
3. The trimming and pruning of trees to enhance property values;
4. The existing excavation of the crest of the bluff directly east of the house;
5. The removal of trees and vegetation since 2005, including the removal of small trees and vegetation in the area of the crest and the beach access stairway;
6. The construction of a beach access stairway in its current form;
7. The additional removal of trees and vegetation more than 15 metres from the crest of the bluff for the purposes of farming; and
8. The removal of unspecified hazard trees on the bluff slope and perimeter.

Most of these proposed developments are supported, with conditions, by the geotechnical reports prepared by Tetra Tech EBA and Golder. Specifically, developments 1-5 and 7 all have some geotechnical support, subject to recommendations and conditions developed by the engineers. Where these Reports differ, staff generally recommends reliance on the Golder recommendations, for the reasons stated in this report.

Although the Tetra Tech EBA report submitted with this application does not state that remediation works or re-vegetation are required, none of the previously submitted reports

supported the excavation and tree and vegetation removal within 15 metres of the crest of the bluff, or on the face of the bluff. None of these works are stated to comply with the guidelines of the Komas Bluff DPA. Furthermore, the 2004 Thurber report, and the 2014 Golder Report, state that these activities will increase the rates of erosion and slumping of the property. This is of even greater concern, as they are located directly in front of the constructed residence.

With respect to the stairs, both survey plans submitted clearly show the structure supporting the stairs to be below the natural boundary of the property, as registered in the land title office in 2003. It is not on the applicant's property, and is located in the W1 Zone, where it is not permitted. This development permit cannot vary the uses permitted in the W1 zone, even assuming consent of the Province as property owner.

With the exception of the 2014 Tetra Tech EBA report, which supports the removal of "hazard trees susceptible to falling down the slope" no other engineering reports, including previous reports prepared by EBA, have been provided to support the removal of trees and vegetation within 15 metres from the top of bank. All of the reports received to date recommend or require retention of remaining trees and vegetation on the property within 15 metres of the bluff and on the face of the bluff. Also, as articulated in Appendix E, a technical memorandum prepared by David Reid, FCSLA, who has extensive experience in revegetation and slope stability issues, Golder does not support the removal of vegetation and trees within 15m of the bluff and their report provides a revegetation plan to remediate previous removal activities.

No report has been provided to identify the presence of any hazardous trees. Most of the reports since the clearing by Ellis in 2004 support retaining the remaining trees on the property, with the exception of the 2014 Tetra Tech EBA report.

It is the understanding of staff that the submission of the Tetra Tech EBA and Golder reports was intended to provide the tools and information necessary for the Denman Island Local Trust Committee to be able to consider a development permit for the unauthorized works and development that have taken place on the subject property.

As was identified and discussed in the "Current Application" portion of this report, the Tetra Tech EBA report contains significant limitations and conditions that expressly state that the report cannot be used for the purposes for which it was submitted.

These disclaimers prevent the Local Trust Committee and future owners from relying upon the report with respect to the development permit application under consideration, or the information, data, analysis and recommendations embodied within the 2014 Tetra Tech EBA Report.

The conditions and limitations within the Tetra Tech EBA report clearly states that the data, analysis and recommendations contained within that report are not to be used or relied upon unless authorized by EBA. As demonstrated in the September 5, 2014 letter a modification of these limitations was sought, but not received.

It is therefore, the conclusion of staff that the stated developments can be approved, subject to conditions based upon the findings and recommendations of the Golder Associates Report.

RECOMMENDATIONS:

1. That the Denman Island Local Trust Committee approve and issue development permit DP-DE-2014.2 (Stoneman) in accordance with the site survey in Schedule "A" and subject to the conditions and recommendations of the Golder Associates report dated March 24, 2014 in Schedule "B" both of which are attached to and form part of the development permit, and that an Irrevocable Letter of Credit, or certified cheque, in the

amount of $191,676 be provided as a condition of the issuance of DP-DE-2014, to be returned at such time as all conditions and recommendations listed in the development permit have been completed.

2. That the Denman Island Local Trust Committee not issue a development permit for the following developments applied for on the property:
    a. The construction of a beach access stairway in its current form;
    b. The removal and/or management of unspecified hazard trees on the bluff slope and perimeter;

Respectfully submitted by:

Rob Milne	October 14, 2014
Rob Milne RPP, MCIP Island Planner	Date
Courtney Simpson	October 14, 2014
Courtney Simpson, RPP MCIP Regional Planning Manager	Date

Appendices

Appendix ‘A’’ Review of previous reports

Appendix ‘B’ Pre-2014 Site Photos

Attachments:

1. Development Permit DE-DP-2014.2
2. Development Permit Application and related correspondence
3. Tetra Tech EBA Geotechnical Report, September 9, 2014
4. Addendum to Aug 2014 Tetra Tech EBA Submission
5. Site Survey prepared by Peter Mason, BCLS dated May 24, 2013
6. Golder Associates Geotechnical Review and Assessment dated March 24, 2014
7. Golder, Geotechnical Review and Comments of Draft Tetra Tech EBA report
8. Correspondence from Young Anderson to Debra and Daniel Stoneman, dated July 10, 2014

9. Correspondence from Young Anderson to Bob Patrick and Brian Hall of Tetra Tech EBA regarding Limits on Use of the Tetra Tech EBA geotechnical report
10. Golder Associates, Order of Magnitude Budget Estimate, dated September 30, 2014.
11. Previous Geotechnical reports submitted:
    a. Bob Patrick, P. Eng., EBA Engineering Consultants Ltd. dated September 17, 2012 regarding composition of slope and regression of the crest;
    b. R.A. Patrick, P. Eng., EBA Engineering Consultants Ltd. dated March 3, 2009 regarding proposed stairway on the neighbouring property owned by Mr. Ellis;
    c. R.A. Patrick, P. Eng., EBA Engineering Consultants Ltd. dated March 18, 2009 regarding geotechnical re-assessment of intended usage as farmland;
    d. R.A. Patrick, P. Eng., EBA Engineering Consultants Ltd. dated March 13, 2007 regarding slope setback and drainage measures;
    e. D. Smith, P. Eng., Thurber Engineering Ltd. dated April 4, 2006 regarding remediation on Komas Bluffs;
    f. R.A. Patrick, P. Eng., EBA Engineering Consultants Ltd. dated March 9, 2006 related to a siting and use permit application;
    g. R.A. Patrick, P. Eng., EBA Engineering Consultants Ltd. dated January 17, 2005 regarding geotechnical assessment of intended usage as farmland;
    h. R.A. Patrick, P. Eng., EBA Engineering Consultants Ltd. dated November 9, 2004 related to intended farming on the property
    i. R.A. Patrick, P. Eng., EBA Engineering Consultants Ltd, dated June 11, 2002 related to the lot line boundary adjustment
12. Additional site-specific Thurber Reports:
    a. 2004 Thurber Report
    b. 2013 Thurber Letter clarifying 2006 Thurber Report

DENMAN ISLAND LOCAL TRUST COMMITTEE

DEVELOPMENT PERMIT DE-DP-2014.2

TO: Daniel Stoneman and Debra Stoneman

This Development Permit (the "Permit") applies to land described as:

PID: 025-563-246
Lot A, Section 23, Denman Island, Nanaimo District, Plan VIP74719

And authorizes the following developments in Development Permit Area No. 1: Komas Bluff:

(a) The existing house, garage, woodshed, garden shed, septic system and driveway, as shown on Schedule A of this Permit;

(b) Drainage works in accordance with part 6.2 and Figures 2 and 3 of the Golder Associates dated March 24, 2014 (Schedule B);

(c) The trimming and pruning of trees to enhance property views strictly in accordance with part 6.3 and Figures 4 and 5 of the Golder Associates dated March 24, 2014 (Schedule B);

(d) The existing excavation of the crest of the bluff, and the existing removal of trees and vegetation, in the area shown on Figure 4 of the dated March 24, 2014 as the “Natural Regeneration Area,” strictly in accordance with the recommendations set at 6.3 of the Golder Associates (Schedule B);

(e) The additional removal of trees and vegetation more than 15 metres from the crest of the bluff in the area shown as “Existing Forested Area to Remain” at Figure 4 of the Golder Associates dated March 24, 2014, strictly in accordance with the recommendations set out for the Existing Forest Area to Remain at 6.3 of the Golder Associates (Schedule B) and to be limited to the following non-native invasive species: Himalayan Blackberry, Broom, Holly, Laurel, Eurasion herbaceous weeds.

This permit does *not* apply to or authorize the following works:

(f) The construction of a beach access stairway;

(g) The removal and/or management of unspecified hazard trees on the bluff slope and perimeter.

The development authorized above within Development Permit Area No. 1: Komas Bluff is only permitted in accordance with the following conditions:

1. All works shall be completed in accordance with the recommendations contained within the Golder Associates report dated March 24, 2014 which is attached to and forms part of this permit as Schedule "B".

2. All developments and conditions shall be completed in accordance with the following terms:

Drainage Works

(a) Detailed designs of the drainage works described at 6.2 and Figures 2 and 3 of the Golder Associates (the "Drainage Works") shall be completed by a qualified professional registered with the BC Association of Professional Engineers and Geoscientists and provided to the Denman Island Local Trust Committee on or before February 15, 2015;

(b) All Drainage Works shall be completed on or before July 15, 2015;

(c) The Drainage Works shall be inspected and approved by a qualified professional, and the record of inspection and approval provided to the Denman Island Local Trust Committee, on or before July 31, 2015; and

(d) The network of corrugated plastic drainage pipes directed towards and extending onto and down the bluff slopes shall be decommissioned as recommended at 6.2 and shown on Figure 2 of the Golder Associates on or before August 15, 2015.

(e) If the setback between the crest of the bluff and the interceptor trench drain becomes less than 10 m at any point, the interceptor trench shall be decommissioned and re-established at a minimum distance of 15 m from the crest at that time;

(f) No additional developments, including impermeable surfaces (such as roofs or paved driveways), shall be permitted within the Komas Bluff Development Permit Area on the Property without a development permit;

Replanting Area

(g) Dismantling of the existing structure at the foot of the stairs and associated log-based stair structure, and restoration of the beach to pre-development natural beach condition shall be completed on or before February 15, 2015 as recommended in Section 6.3 of the Golder Associates report.

(h) Detailed design of the "Replanting Area" shall be prepared by a qualified Landscape Architect in accordance with Schedule B and provided to the Denman Island Local Trust Committee on or before February 15, 2015;

(i) Detailed design of the "Replanting Area" shall be prepared by a qualified Landscape Architect who is a member in good standing with the British Columbia Society of Landscape Architects in accordance with Schedule B and provided to the Denman Island Local Trust Committee on or before February 15, 2015;

(j) The required replanting shall be carried out by a landscape contractor in good standing with the British Columbia Nursery Trades Association and an irrigation contractor in good standing with the Irrigation Industry Association, with a guarantee and maintenance contract as set out in the attached Schedule A, on or before July 15, 2015;

(k) The irrigation and planting shall be inspected and approved by the qualified Landscape Architect, and the record of inspection and approval provided to the Denman Island Local Trust Committee, together with a copy of the maintenance contract and guarantee, on or before July 31, 2015;

(l) The property owner shall provide a report prepared by a qualified Landscape Architect on or before July 31, 2020, confirming plant establishment performance conditions have been met, and the irrigation system decommissioned appropriately, in accordance with the recommendations of 6.3 the Golder Associates;

(m) No additional land alterations, or tree or vegetation removal, shall occur within the Development Permit Area without a development permit.

3. The property owners shall provide security in the form of an irrevocable letter of credit, or certified cheque, in the amount of $191,676 on or before December 31, 2014. The security shall be returned upon completion of the works set out at conditions 2(a-d) and (h-l) of this Permit.

This permit does not relieve the applicant from complying with the provisions of *the Denman Island Official Community Plan Bylaw No. 185, 2009* and the *Denman Island Land Use Bylaw No. 186, 2008.*

AUTHORIZING RESOLUTION PASSED BY THE DENMAN ISLAND LOCAL TRUST COMMITTEE THIS 21ST DAY OF OCTOBER, 2014.

_____ _____

Deputy Secretary, Islands Trust **Date Issued**

DEVELOPMENT PERMIT NO. DE-DP-2014.2

Schedule "A"

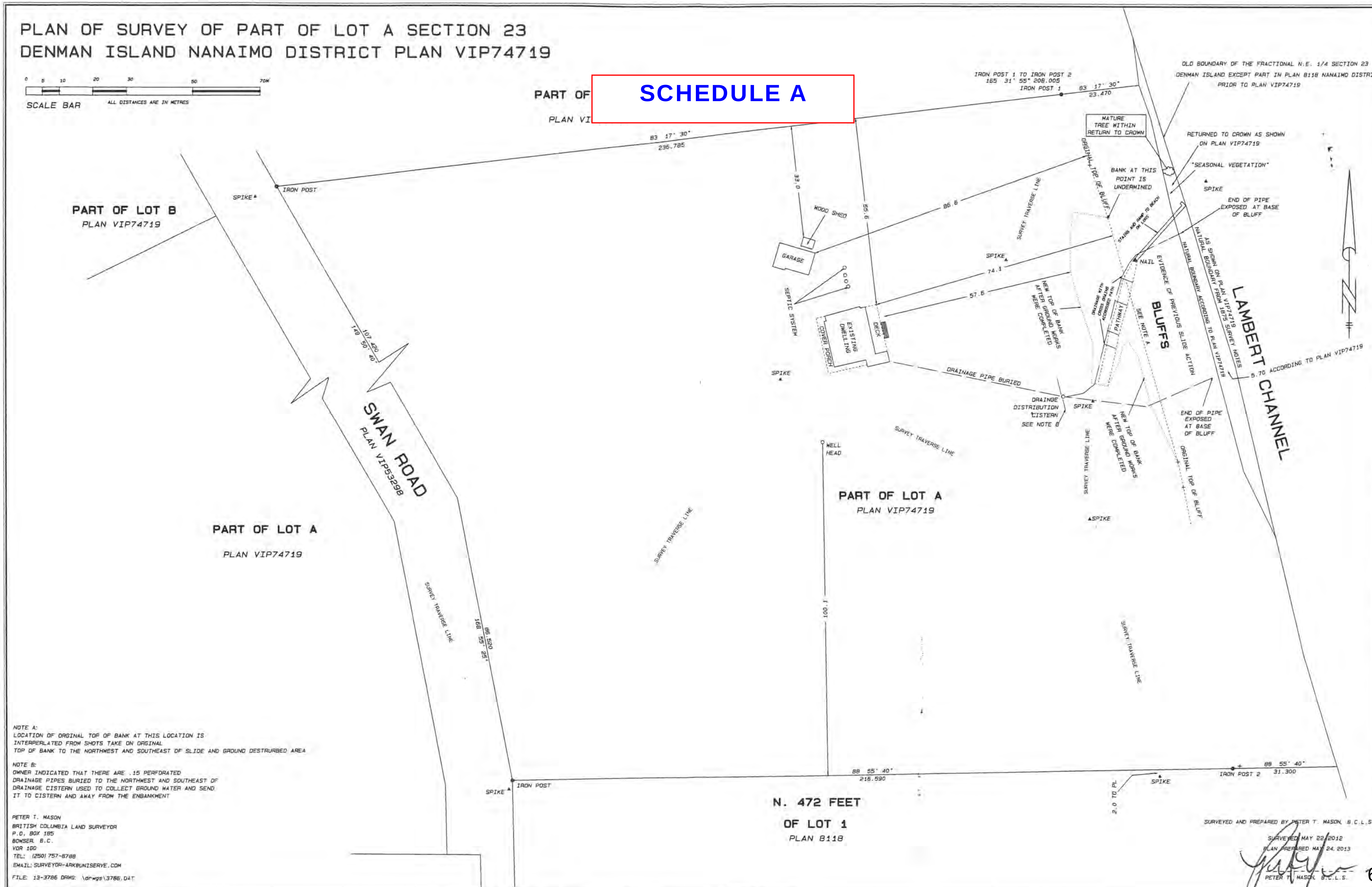
Site Survey

DEVELOPMENT PERMIT NO. DE-DP-2014.2

Schedule "B"

Golder Associates Report Dated March 14, 2014

SCHEDULE A


PLAN OF SURVEY OF PART OF LOT A SECTION 23
DENMAN ISLAND NANAIMO DISTRICT PLAN VIP74719
SCALE BAR
ALL DISTANCES ARE IN METRES
PART OF LOT B
PLAN VIP74719
IRON POST
SPIKE
SWAN ROAD
PLAN VIP53298
PART OF LOT A
PLAN VIP74719
SURVEY TRAVERSE LINE
GARAGE
WOOD SHED
SEPTIC SYSTEM
EXISTING DWELLING
COVER PORCH
DECK
DRAINAGE PIPE BURIED
DRAINGE DISTRIBUTION CISTERN
SEE NOTE B
WELL HEAD
BLUFFS
SEE NOTE A
LAMBERT CHANNEL
MATURE TREE WITHIN RETURN TO CROWN
RETURNED TO CROWN AS SHOWN ON PLAN VIP74719
"SEASONAL VEGETATION"
BANK AT THIS POINT IS UNDERMINED
END OF PIPE EXPOSED AT BASE OF BLUFF
ORIGINAL TOP OF BLUFF
NEW TOP OF BANK AFTER GROUND WORKS WERE COMPLETED
EVIDENCE OF PREVIOUS SLIDE ACTION
NATURAL BOUNDARY ACCORDING TO PLAN VIP74719
AS SHOWN ON PLAN VIP74719 NATURAL BOUNDARY FROM 1875 SURVEY NOTES
5.70 ACCORDING TO PLAN VIP74719
OLD BOUNDARY OF THE FRACTIONAL N.E. 1/4 SECTION 23 DENMAN ISLAND EXCEPT PART IN PLAN 8118 NANAIMO DISTRICT PRIOR TO PLAN VIP74719
IRON POST 1 TO IRON POST 2 165 31' 55" 208.005
IRON POST 1
IRON POST 2
N. 472 FEET OF LOT 1
PLAN 8118
NOTE A:
LOCATION OF ORGINAL TOP OF BANK AT THIS LOCATION IS INTERPERLATED FROM SHOTS TAKE ON ORGINAL TOP OF BANK TO THE NORTHWEST AND SOUTHEAST OF SLIDE AND GROUND DESTRURBED AREA
NOTE B:
OWNER INDICATED THAT THERE ARE .15 PERFORATED DRAINAGE PIPES BURIED TO THE NORTHWEST AND SOUTHEAST OF DRAINAGE CISTERN USED TO COLLECT GROUND WATER AND SEND IT TO CISTERN AND AWAY FROM THE ENBANKMENT
PETER T. MASON
BRITISH COLUMBIA LAND SURVEYOR
P.O. BOX 185
BOWSER, B.C.
V0R 1G0
TEL: (250) 757-8788
EMAIL: SURVEYOR-ARK@UNISERVE.COM
FILE: 13-3786
SURVEYED AND PREPARED BY PETER T. MASON, B.C.L.S.
SURVEYED MAY 22, 2012
PLAN PREPARED MAY 24, 2013
PETER T. MASON, B.C.L.S.

Golder Associates

SCHEDULE B

March 24, 2014

Reference No. 1314470099-004-L-Rev0

Ms. Francesca Marzari
Young Anderson
1616 - 808 Nelson Street
Box 12147, Nelson Square
Vancouver, BC
V6Z 2H2

SENIOR LEVEL REVIEW AND ASSESSMENT
BLUFF STABILITY, DRAINAGE AND REMEDIATION PLAN
2600 SWAN ROAD, DENMAN ISLAND, BC

Dear Ms. Marzari,

As authorized, Golder Associates Ltd. (Golder) has carried out an integrated visual site reconnaissance of the existing site conditions at the 2600 Swan Road Site, as well as senior level review and assessment of available information on the above-mentioned site and existing structures or facilities. Based on this information and the visual site reconnaissance, this report and the attached appendices present an assessment and professional opinion on the impact of the excavations, structures, the removal of vegetation, changes to site drainage conditions, and other modifications to the original site conditions on the stability of shoreline bluff slopes in the context of the Komas Bluff Development Permit Guidelines. This report also presents a geotechnical engineering opinion with respect to the long term suitability and stability of the existing residence location, as well as comments and recommendations on remediation measures to address noncompliance with the Development Permit requirements for the Site, including but not limited to drainage and subdrainage improvements, as well as a planting / revegetation plan to mitigate the impacts of the excavations, installation of structures and removal or damage to the vegetation which has occurred at the Site.

I am aware of my duty under Rule 11-2 of the British Columbia Supreme Civil Rules to assist the Court, and not assume the role of an advocate for any party, and I certify that this report is made in conformity with that duty, and that if called on to give testimony, I will do so in conformity with that duty. I am the person primarily responsible for the opinions expressed in this report. In addition, I have relied on the observations, opinions and recommendations provided by Mr. Chris Coles, P. Eng. on the impact of surface runoff and subsurface drainage aspects of the property, and by Mr. David Reid, FCSLA, on the impact of previous removal or modification of vegetation cover and planting / revegetation measures, as presented in Appendices D and E, respectively.

Golder Associates Ltd.
500 - 4260 Still Creek Drive, Burnaby, British Columbia, Canada V5C 6C6
Tel. +1 (604) 296 4200 Fax: +1 (604) 298 5253 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

1.0 QUALIFICATIONS

The undersigned, Richard C. Butler, P. Eng., Principal, has in excess of 40 years of experience in all aspects of geotechnical engineering investigation, design, project management and provision of specialist construction services for a wide range of heavy industry, infrastructure, and urban geotechnical engineering projects within British Columbia, across Canada and internationally. Mr. Butler has provided senior level geotechnical engineering services and project management as part of numerous multi-disciplinary studies and projects in which both engineering and environmental aspects must be taken into consideration.

Mr. Butler acted as co-chair of the Task Force of the Association of Professional Engineers and Geoscientists of BC which developed the Guidelines for Geotechnical Engineering Services for Building Projects, and as an internal reviewer for the March 2006 APEGBC Guidelines for Legislated Landslide Assessments for Proposed Residential Development in British Columbia. He contributed to the Pipeline Research Council International, Inc. January 2009 publication titled "Guidelines for Constructing Natural Gas and Hydrocarbon Pipelines through Areas Prone to Landslide and Subsidence Hazard". He has also acted as an expert witness or senior reviewer in many varied, complex and often sensitive projects throughout British Columbia.

The landscape architectural and revegetation professional opinion has been provided by David Reid, FCSLA, a Principal of Golder Associates and its Environmental Planning and Design Practice Leader within the Golder Sustainable Communities Division.

Mr. Reid practices as both a land use planner and a landscape architect, and is heavily involved in green infrastructure planning and design. Many projects have focused on water – ranging from watershed planning to water conservation strategies, and waterfront improvements to watercourse restoration. He has written design and technical guidelines for low impact development, with a focus on the role of plants and soils in ecosystem services in the urban and developed environment, as well as the integration of best management practices into developments and waterfronts. As well as professional development in bio-technical engineering, Mr. Reid has also been project director and designer on constructed projects that incorporate these innovations. Recent, relevant project experience includes several waterfront and slopes parks developments in Nanaimo, Campbell River, and Courtenay. David has also authored engineering standards on sediment and erosion control, and low impact development, for City of Nanaimo, City of Campbell River, and for Metro Vancouver.

Chris Coles, M.A.Sc., P. Eng., is an Associate and senior water resource engineer based in Golder's Abbotsford office. He has over 17 years of consulting experience and has been extensively involved in many water management and flood protection studies, with applications covering a broad range of public and private sector clients. Chris' technical specialties include hydrology, river engineering, floodplain assessment, sediment transport and erosion protection.

Mr. Coles' recent experience includes being a member of the APEGBC internal review committee for the development of the 2012 Professional Practice Guidelines for Legislated Flood Assessments for BC. Mr. Coles has also conducted numerous flood hazard assessments associated with residential and commercial properties throughout BC. Mr. Coles is responsible for the hydrotechnical opinions expressed in this report.

A copy of resumes is attached as Appendix C.

2.0 AVAILABLE INFORMATION

The following information was made available to Golder for review and assessment in preparation of this report:

- EBA Engineering Consultants Ltd. letter to Mr. Dean Ellis, titled "Preliminary Slope Stability Assessment, Swan Road Property, Denman Island, BC", dated June 11, 2002;
- McElhanney Associates plan VIP 74719 titled "Subdivision Plan of the East ½ of the North West ¼ of Section 23, Except Part in Plan VIP53298, and the Fractional North East ¼ of Section 23, Except part in Plan 8118, All of Denman Island, Nanaimo District", dated December 20, 2002;
- Madrone Environmental Services Ltd. report to Mr. Dean Ellis, titled "Planting Recommendations for Erosion Control for Ellis Property, Komas Bluff, Denman Island", dated October 30, 2003;
- Thurber Engineering Ltd. letter report to Lidstone, Young, Anderson titled "Denman Island Trust Committee v. Francis Dean Ellis, Your File 00002-0506", dated June 21, 2004;
- EBA Engineering Consultants Ltd. letter to Mr. Dean Ellis, titled "2600 and 2626 Swan Road, Denman Island, Geotechnical Assessment of Intended Usage as Farmland", dated January 17, 2005;
- EBA Engineering Consultants Ltd. letter to Dr. D. Stoneman, titled "2600 Swan Road, Denman Island, BC, Geotechnical Assessment", dated March 9, 2006;
- Thurber Engineering Ltd. letter to Mr. Sukhbir Manhas of Lidstone, Young, Anderson, titled "Denman Island Local Trust Committee v. Francis Dean Ellis et al, Supreme Court of BC Vancouver Registry No. S011090, Remediation Report", dated April 4, 2006;
- EBA Engineering Consultants Ltd. letter to Mr. Dan Stoneman, titled "2600 Swan Road, Denman Island, BC", dated March 13, 2007;
- Court of Appeal for British Columbia document titled "Denman Island Local Trust Committee v. Ellis", date stamped November 8, 2007;
- Denman Island Land Use Bylaw, Bylaw No. 186, 2008, as amended by the Denman Island Local Trust Committee, Consolidated November 2011;
- Peter T. Mason, B.C.L.S plan titled "Plan of Survey of Part of Lot A Section 23, Denman Island Nanaimo District Plan VIP74719" dated May 24, 2012;
- EBA Engineering Consultants Ltd. letter to Mr. Dan Stoneman and Mr. Dean Ellis, titled "2600 and 2626 Swan Road, Denman Island BC, Composition of Slope and Regression of Crest", dated September 12, 2012;
- Supreme Court of British Columbia document titled "Reasons for Judgment, Stoneman v. Denman Island Local Trust Committee, 2013 BCSC 218", dated February 2, 2013;
- Thurber Engineering Ltd. letter to Ms. Francesca Marzari of Young Anderson, titled "Remediation of Lots A and B of Section 23, Denman Island, Nanaimo District Plan VIP4719, Geotechnical Assessment", dated July 13, 2013;
- McElhanney Associates Drawing No. T-1, titled "Topographic Survey Plan, Part of Lot A, Section 23, Denman Island, Nanaimo District, Plan VIP74719, 2600 Swan Road", dated August 2, 2013;

- M. R. Russ, B.C.L.S partial plan, titled "Plan Showing Survey of Komas Bluff 50m Setback Line and Perimeter Boundaries of the East ½ of Northwest ¼ of Section 23, Except that Part in Plan VIP563298, and the Fractional Northeast ¼ of Section 23, Except Part in Plan 8118, All of Denman Island, Nanaimo District", dated September 7 (year not stated); and
- Undated 2011 Orthophoto illustrating site conditions and DPA # 1 – Komas Buff, at 2600 Swan Road and adjacent lands.

In addition to the information provided to Golder, the Geological Survey of Canada Paper 77-17 by J. J. Clague, titled "Quadra Sand: A Study of the Late Pleistocene Geology and Geomorphic History of Coastal Southwest British Columbia", dated 1977 was also reviewed as part of this assessment and opinion.

3.0 LIST OF FACTS AND ASSUMPTIONS

In preparation of our assessment and professional opinion presented in this report, we have been advised that we may rely upon the following facts and assumptions, as generally found by the Court in this and related proceedings.

1) In or about 2000, the Site was cleared of trees up to 50 m from the crest of the bluff, leaving a 50 m treed "buffer", in accordance with a development permit authorizing that clearing.

2) In or about 2002 – 2004, the previous owner of the property, Mr. Ellis, cleared a substantial portion of the trees in the buffer on the Site, rounded the crest of the bluff in one portion of the Site, and excavated drainage ditches along the southern and northern boundaries of the property, generally as described in the 2004 Thurber report. The subject Site includes all of Polygons 9 and 10 described in that report, and the southern portion of Polygon 8.

3) In 2005, the BC Supreme Court declared that Mr. Ellis had breached the Local Government Act by altering land in the Komas Bluff Development Permit Area without a development permit, enjoining Mr. Ellis from making any further land alterations within the buffer and ordered Mr. Ellis to "undertake rehabilitative measures on the Lands to restore the Komas Bluffs to a level of stability sufficient to protect existing and future development on or around the Lands from accelerated slope failure, erosion or other hazardous conditions related to the Defendant Ellis's breach of s 920(1)(d) of the *Local Government Act,* such measures to be specified by further order of this Court, either upon application of the Parties, or as consented to by the Parties".

4) In 2006, Thurber Engineering provided the 2006 Thurber report for this purpose, and the current property owners, as well as Mr. Ellis, and the Denman Island Local Trust Committee, accepted the recommendations of that report for the purposes of the court ordered remediation. A consent order was accepted by the Court incorporating these recommendations.

5) In 2006, the current property owners also made an application to construct a house and garage on the Site, within the Komas Bluff Development Permit Area, but outside the buffer area, and submitted the 2006 EBA report for this purpose.

6) The Denman Island Local Trust Committee authorized the issuance of a development permit for the construction, conditional upon the siting of the buildings and related drainage works being approved by EBA through the provision of sealed plans for attachment to the permit, and the planting being completed as recommended in the 2006 EBA report.

7) EBA did not provide approved site plans or drainage plans for the construction of the house, garage and drainage works. EBA did provide the 2007 EBA report in relation to the construction.

8) In late 2006 and 2007, the property owners proceeded to construct a house, garage, other structures and hard surfaces, and drainage works on the Site without a development permit.

9) Starting in or about 2010, the property owners proceeded to clear land and excavate a path, drainage works, and to construct stairs down the face of the bluff in front of their residence which has resulted in the current state of development of the Site.

For the most part, I have relied upon my own observations and those of Messrs. C. Coles and D. Reid as the basis for my opinions and recommendations.

4.0 VISUAL SITE RECONNAISSANCE

On August 9, 2013, R. Butler, C. Coles, and D. Reid of Golder carried out a detailed visual reconnaissance of the 2600 Swan Road property, from Swan Road east to the toe of the bluff (the Site), as well as the adjacent shoreline area, see Figure 1. Hand held clinometer measurements of the slope angles were conducted from selected locations along both crest and toe of the bluff. The reconnaissance was carried out in the presence of Mr. Geoff Kinnear of the Islands Trust. Messrs. Dan Stoneman and Dean Ellis were also present during Golder's reconnaissance. Weather conditions during the reconnaissance were dry, with limited cloud cover. Photographs of site and slope conditions were obtained for record purposes.

Figure 2 attached following the text of this report illustrates the current site conditions, including the ground surface contours, the existing tree cover above the crest of the bluff slopes, and the locations of the residential features and other facilities which have been developed within the Site, as well as the current and previously determined crest of slope and natural boundary positions. The following presents a summary of my observations.

The observations and assessments of Messrs. C. Coles and D. Reid related to surface and subsurface drainage conditions, as well as current vegetation and tree cover are presented Appendices D and E, respectively, and are not repeated herein. Photographs of relevant features are presented in Appendices A and B.

4.1 Observations – R. C. Butler, P. Eng.

As illustrated in Figure 1 and Plate A-1, see Appendix A, the Stoneman residence, garage and other ancillary features are located within the north central portion of the overall Site, with access from Swan Road along a gently sloping, gravel surfaced, single lane driveway. A drainage swale is located along the west (downslope) perimeter of the driveway and discharges into a ditch leading to a pond (see Plate A-2), located to the south of the road and southwest of the residential buildings. Another shallow swale directs runoff from the northwest portion of the overall Site to a culvert under the driveway which discharges into the driveway swale and ditch to the pond. As illustrated in Plates A-1 to A-4, the land west of and around the residence, as well as the area between the pond and the tree covered zone near the crest of the bluff slopes within the southeast corner of the Site, has sparse, low grass cover and slopes gently towards the bluff.

Swan Road, adjacent to the Site, is also gravel surfaced, and has an open drainage ditch along the west (upslope) perimeter of the road (see Plate A-5) which intercepts surface runoff and shallow seepage from lands to the west and directs the collected flows south along the Swan Road beyond the 2600 Swan Road property. The outlet of a concrete box culvert crossing the road located a short distance south of the southwest corner of the 2600 Swan Road Site was located but field observations indicated that the upstream end of the culvert was blocked or buried rendering it ineffective. Relatively coarse sand and gravel soils are exposed in the side slopes and base of this ditch along Swan Road, as illustrated in Plate A-6. Based on clinometer measurements, Swan Road and the ditch dip at about 5 percent grade to the south adjacent to the property, with the road and ditch grade becoming slightly flatter (about 2 percent) to the south of the property.

To the east of Swan Road, there is a vegetation covered berm of varying height up to approximately 1.5 m above the road surface and a small, irregular swale between the berm and road surface. This smaller swale generally drains to the south to a nominal 0.3 m diameter culvert beneath the driveway entrance and discharges into a larger ditch located a short distance south of the 2600 Swan Road Site. However, visual observations indicate that the berm was constructed using extensive coarse woody debris, likely from tree clearing operations, and that water flowing along the swale penetrates into and likely through the berm onto the Site at least locally.

Plate A-7 shows the existing, previously developed drainage ditch which is approximately 1.5 to 2 m deep, and extends east from Swan Road towards the crest of the bluff along an irregular alignment within or a short distance south of the south property line of the Site. A ditch from the pond also discharges into this ditch, as illustrated in Figure 2. A short distance east of the outlet from the pond, the ditch is filled and blocked by fill, including cobble and boulder sizes, as shown in Plate A-8. However, a shallow channel or ditch has been recently excavated within the adjacent property, close to and roughly paralleling the common property line, as shown in Plates A-9 and A-10, and extends close to the crest of the bluff. Although the survey illustrated in Figure 2 shows the new, shallow ditch as being directly connected to the older, deeper ditch within the 2600 Swan Road Site, a direct connection between the ditches was not observed at the time of the site visit.

Within the southeast portion of the 2600 Swan Road Site, extensive, well established tree cover and understorey vegetation is present along and extending back some 30 to 50 m behind the crest of the bluff, as illustrated in Plate A-11. No ditch or other evidence of concentrated surface drainage flow paths was observed adjacent to the crest of the bluff within the Site. Along much of the crest of the bluff, the upper 6 to 8 m height of the overall slope is very steep to near vertical and locally overhanging. Although the near vertical scarp below the crest of the bluff has little or no vegetation cover, the mature trees at or near the crest of the bluff are typically near vertical, with no indication of loss of support. Well established, thick deciduous (alder) tree cover and vegetation is present on the slopes below the scarp, see Plates A-11 and A-12. Locally, some individual trees at the crest of the bluff have tilted or developed "pistol butt" curvature, see Plate A-13, but no evidence of significant ground movement or cracking adjacent to such trees was observed.

Similar, although less extensive, well established tree and understorey cover was observed along the bluff near the northeast corner of the Site, see Plate A-15. As in the case of the southeast corner of the Site, no evidence of a ditch or other concentrated surface drainage flow path was observed adjacent to the crest of the bluff.

In contrast, within the central portion of the bluff area of the Site, the tree cover becomes increasingly limited, with observations of stumps between remaining trees, see Plate A-14, as well as less extensive understorey vegetation beneath the remaining trees. To the east of the residence, all of the tree cover has been cleared on and above the regraded ("rounded") bluff slopes where the path and stairway to the beach were constructed, as illustrated in Plates A-16 and A-17. Low grassy vegetation cover has developed on these excavated and regraded slopes, with some small deciduous tree growth observed locally, see Plate A-18. At the time of the site inspection, the grassy vegetation was dry and sparse, with the soil surface exposed locally, in contrast (see Plates A-11 and A-12) to the dense, typically green ground cover and understorey growth in those areas having tree cover.

A near vertical cut face or slump scarp composed of layered silty sand, with trace small gravel sizes is present locally near the toe of the cut slope for the path, as illustrated on Plate A-19. Below the path, the slope angle was measured to be about 40 degrees.

At the transition from the path to the elevated log stairway structure, corrugated plastic drain piping and several connections between the various pipe installations, see Plate A-20, are exposed. To the north of the elevated stairway, grass and other low vegetation, as well as some small tree cover have become established over the previously cleared or slide area, see Plate A-21. As shown in Figure 2 and as observed, the stacked log base of the stairway is located offshore of the current natural boundary, and storm log debris is present at and locally inland of the base of the stairway.

As illustrated in Plate A-22, well established, dense tree cover and vegetation are present over most of the lower slopes of the bluff, and extends down to the high tide line and present natural boundary of the site. Plates A-23 (an erosion or slope failure a short distance south of the regraded zone) and A-24 (a failure near the south property line) illustrate the revegetation of the lower slopes in areas which have subject to relatively recent failures or erosion of the steep, near vertical scarp near the crest of the bluff and the slopes below. Both of these failure or erosion zones were observed to be approximately 10 to 20 m width. Based on approximate clinometer measurements, the lower slopes are typically standing at angles ranging from approximately 30 to 38 degrees from horizontal. However, relatively frequent "pistol butting" and/or tilting of the tree cover on these slopes was observed, indicating that at least portions of the lower slopes are subject to continuing creep movements or shallow slumping.

Steep and locally undercut soil faces are present at or close to the shoreline, with the exposed soils consisting of layered silty sand or sandy silt, trace to some gravel (see Plate A-25), similar to the soil strata exposed above the path. Locally undercut soil faces along the shoreline, as well as storm log debris, are also present adjacent to the discharge outlet of the corrugated plastic drain piping, as shown in Plate A-26. The drain pipe appears to have been installed at or at shallow depth below ground surface on the bluff slope, and no evidence of erosion or a splash pad scour protection was observed at the pipe outlet.

5.0 PROFESSIONAL ASSESSMENT AND OPINION

5.1 Bluff Geology and Subsurface Conditions

As described in Clague (1977) and various documents (Thurber 2004, EBA 2012) provided for my review, and based on my observations, the subsurface conditions underlying the 2600 Swan Road Site, adjacent lands and the bluff consist of a thin surficial layer of sandy to gravelly soil, interpreted as being deposited as shoreline or beach deposits as the plateau of Denman Island emerged from beneath the sea near or following the end of the last Ice Age. These sandy and gravelly soils are exposed along the ditch west of Swan Road and, in all probability, extend over the entire property to the crest of the bluff. The thickness of this deposit is described as about 1 m (Thurber 2004), which is consistent with my observations at the road ditch.

This sandy or gravelly layer is underlain by very dense and strong, glacial till (Vashon Drift) deposited when the last glaciation advanced over Denman Island. Although this glacial till is generally fine grained, containing a mixture of silt, sand and lesser clay content, such that it has low permeability, it also contains larger cobble and boulder sizes, which were observed locally within the property and mantling the beach below the bluff. In the absence of detailed geotechnical test hole information and the presence of extensive tree and understorey vegetation on the bluff slopes, the thickness of the glacial till deposit is not known but, in my opinion, is likely to be limited to a few to several metres.

The glacial till, in turn, is underlain by a sequence of soil types and strata deposited in a marine (below water level) environment prior to or during the advance of the last glaciation. Although differing names have been used to describe these soils, the Quadra Sediments or Quadra Formation (Clague 1977, Thurber 2004, EBA 2012) comprises three soil units, in increasing depth below the base of the Vashon Drift glacial till:

- Quadra Sand – glaciofluvial, well sorted, fine to coarse sand, with interlayers or interbeds of silt and gravel;
- Upper Cowichan Head Formation – stratified, horizontally bedded fluvial and estuarine silt, sand and gravel; and
- Lower Cowichan Head Formation – stratified, horizontally bedded, marine plant bearing, silt, sand, clay, gravel and including shell-bearing diamicton.

These subsurface conditions are consistent with my observations of visible exposures along the bluff at the 2600 Swan Road property. Within the very steep to near vertical scarps forming the upper portion of the undisturbed bluff, I observed the presence of stratified, generally horizontally bedded soils, with local seepage from zones or layers of sand or silty sand. Similar, typically thin sandy layering with seepage was also observed at an exposure near the toe of slope. My observations are consistent with those presented in the Thurber 2004 and EBA 2012 letter reports, in that extensive, thick deposits or layers of the upper Quadra Sand stratum were not identified on the Site.

5.2 Site Drainage

As described in the memorandum by Mr. C. Coles, P. Eng., attached as Appendix D, the Site drains to the east. The catchment area associated with the Site is generally limited to the property boundaries and receives limited off-site drainage. The blockage shown in Figure 2 and Plate A-8 appears to be effectively preventing a direct connection between the existing onsite surficial drainage network (onsite ponds and ditches) and the crest of the bluff. It is anticipated that, during wet periods, the ditches and pond would fill, providing storage of the collected flows until overtopping occurs at a low spot along the bank of the ditches or pond.

It is understood through discussions with the homeowner that a sub-surface drainage system collects runoff from the roof leaders and groundwater from the drain tile surrounding the house foundation. The collected flows are conveyed east across the Site to the cistern shown in Figure 2 and then down the bluff slopes through a network of corrugated plastic pipes (see Plate A-20) to discharge at about the toe of these slopes. It is further understood that a sub-surface drain tile intercepting shallow groundwater flows extends north from the cistern as shown in Figure 2. Outflow from this drain tile is combined with the flows from the house and is directed over the crest of the bluff slopes. Site observations generally agree with the reported positions and functions of the sub-surface drainage system.

5.3 Slope Stability

Although these soil strata are considered to be very strong when intact and undisturbed as a result of being highly loaded and compressed as the Vashon Drift till was deposited under the glacial ice, it is my opinion that these generally fine grained soils are moderately to highly susceptible to erosion and shallow slope failures as a result of concentrated surface water flow over the crest of the bluff, loss of support due to undermining of the toe of slope caused by storm wave or current induced erosion, and removal of vegetation on and above the crest of the bluff slope. In addition, locally concentrated groundwater seepage discharge from sandy layers within the upper, near vertical scarp faces of the bluff can result in "piping" and local undermining of the scarp face, resulting in failures along the crest of slope. My observations and opinions are consistent with those provided in the Thurber 2004 report.

Due to the presence of the glacially overconsolidated Quadra Sediments forming the bluff, it is my professional opinion that slope failures or slumps and regression of the bluffs will occur as a series of shallow, localized, slab-like failures of the upper scarp zone and, in the case of the looser slide debris forming a mantle on the lower slopes, downslope creep movements and/or slump failures.

Figure 2 includes the results of a detailed survey of the crest of the bluff (top of bank) carried out by McElhanney Associates as part of the recent topographic mapping of the 2600 Swan Road Site, and presented in its drawing dated August 2, 2013, as well as the top of bank identified in a survey conducted in September 2000. As shown, for those areas of the bluff outside the zone which was regraded as part of construction of the path and stairway on the bluff slopes, there has been no significant change in the top of bank of the bluff over a period of approximately 13 years. However, regression of the top of bank of the bluff of up to about 4 m is indicated to have occurred near the southeast corner of the Site. The presence of bluff regression at this location is consistent with my observations of the relatively recent slide debris on the lower slopes below this portion of the bluff. In addition, the Thurber 2004 report describes the presence of a landslide which had occurred on the bluff slopes where concentrated surface water discharged onto the slope from a drainage ditch which had been excavated along the south property line.

It is my opinion, and I concur with the EBA 2012 opinion, that such local failures and bluff regression occur intermittently, such that the crest of the bluff will remain relatively unchanged for several years, and then regress locally by a limited amount (of the order of 1 to 3 m) in the absence of adverse changes in site and drainage conditions upslope of the bluff. However, as described above, the present installation of ditches, hard surfaces, removal of vegetation, and other changes in site conditions which direct concentrated water flows towards the crest of the bluff will, in my opinion, result in more rapid erosion, slope failures and regression of the bluff.

5.4 Shoreline Erosion and Setback of Residence

As observed during my site reconnaissance and inspection, and reported in other information made available for my review, there is ongoing erosion at the toe of the bluff slopes, likely due to periodic storm wave events and possible current induced scour. The EBA 2012 letter presents a summary of the various estimates of toe erosion, ranging from 20 to 40 mm/year (Thurber 2004, 2006) to 300 mm/year for Quadra Sand slopes (Holden 1987), and concludes that regression of the crest of the bluff slopes at the Site will be 5 to 10 m (50 to 133 mm/year) over the 75 to 100 year design life of a residential structure.

Figure 2, obtained from the August 2, 2013 McElhanney Associates survey, includes the alignments of the current (2013) bottom of bank and present natural boundary, as well as the natural boundary determined as part of the 2000 survey (from Plan VIP74719) and from 1875 survey notes. Based on comparison of the 1875 and 2013 bottom of bank (natural boundary) alignments, the toe of the bluff has regressed 4 to 8 m (29 to 58 mm/year along the north portion of the 2600 Swan Road Site, and 2.5 m or less (18 mm/year) along the south portion of the Site over a 138 year period. Locally, near the southeast corner of the Site and in the vicinity of the slope failure and landslide (Thurber 2004), the toe of the current slope has extended seaward from the 1875 bottom of bank as a result of the relatively recent landslide.

Comparison between the 2000 and 2013 surveys of the natural boundary indicates that the toe of the bluff slopes has regressed between nominal values and 2.5 m (192 mm/year) along the north portion of the Site, with largest regression occurring near the stairway, while toe regression along the south portion of the Site typically ranges from 1 to 1.5 m (77 to 115 mm/year), except near the southeast corner of the Site as described above. Based on these changes, it is my opinion that there has been an increase in the rate of erosion and regression of the toe of the slope since 2000, and that the land alterations within the 2600 Swan Road Site contributed to this increase.

The lesser rate of toe regression along the south portion of the bluffs is consistent with my observations that there are more extensive and higher shoals (sandbars) offshore of the south portion of the Site, such that it is likely or probable that these features reduce the impact of storm wave events on erosion of the toe of the slope.

As described previously, the lower slopes of the bluff are standing at slope angles varying between about 30 and 38 degrees from horizontal. However, I observed that these slopes, even where well established tree and vegetation cover is present, exhibit "pistol butting" and tilting of trees, evidence of slope creep or shallow slumping. It is my opinion and experience that a long term stable slope angle for these generally fine grained, and loose to compact slide debris soils overlying the undisturbed Quadra Sediments would be approximately 2 Horizontal to 1 Vertical (26 degrees). As such, it is my opinion that regression of the toe of the overall slopes will induce periodic movements or failures of these lower slopes, resulting in loss of support and intermittent failures of the upper, steep to near vertical slopes at the crest of the bluff, such that regression of the crest of the bluff will occur at the same overall rate as that of the toe of slope. However, it is also my opinion that more frequent erosion, failures and more rapid regression of the crest of the bluff has and will continue to occur unless suitable and effective drainage and revegetation remediation measures, as described below, are implemented and maintained.

As illustrated on the cross sections presented in Figure 3, the setback of the existing residence, garage, and septic system from the current crest of the bluff slopes is located approximately 15 m beyond an allowance for a 15 m of long term toe regression as well as a 2 Horizontal to 1 Vertical overall long term stable bluff slope, provided that the recommended remediation and mitigative measures are implemented.

Consequently, it is my professional opinion that these residential structures and facilities are not at risk of damage or loss due to regression of the bluff within a time period significantly greater than the normal maximum design life of such facilities, typically 75 to 100 years, provided that the recommended remediation measures are carried out to address the unauthorized land alterations and construction performed by the current property owners, as described below.

6.0 REMEDIATION MEASURES

6.1 General

As described previously, it is my professional opinion that the primary concern and adverse impact on the stability and rate of regression of the bluff is caused by the increased and concentrated flow of surface runoff from the cleared lands, as well as hard surfaces and structures towards and onto the bluff slopes resulting from the unauthorized land alterations and construction performed by the current property owners, including:

- The construction of the residence and garage;
- The construction of related hard surface, septic systems, and accessory structures within the Site and Komas Bluff development permit area;
- The excavation and construction of drainage works within the Site and Komas Bluff development permit area; and
- The clearing of trees and vegetation since 2006, including the excavation and construction of the path and stairs at the crest and down the face of the bluff in 2010 – 2012.

The remediation measures described below include both enhancement of vegetation cover within the area adjacent to the crest of slope, and reduction as well as enhanced control of surface water runoff flows.

Due to the ongoing, natural process of shoreline toe erosion of the generally fine grained Quadra Sediments, as well as the steep slopes of the bluff, it is my opinion that it is not feasible to prevent periodic slope failures, slumps or slower creep-type movements. It is also my opinion that these failures or movements can and will occur on an episodic basis along the entire bluff slope at this property and the locations and timing of such ground movements or failures cannot be predicted. Consequently, the current drain pipe installations or other potential drainage systems located on or adjacent to the bluff are not suitable for long term drainage control. Further, the presence of such pipes or other systems and land alterations directing concentrated water flows to and onto the slopes has created an increased risk of rapid erosion and downcutting, as well as slope failure in the probable event of leakage or breakage of such installations due to ground movements of the bluff.

Only the recommended remediation measures should be carried out. Specifically, no disturbance or modification of the crest and lower slopes of the bluff or development of drainage works that direct concentrated surface or subsurface flows towards the bluff should be permitted.

6.2 Drainage

As described in the memorandum by Mr. C. Coles, P. Eng., attached as Appendix D, due to the anticipated retrogression of the embankment, the regular inspection and maintenance of the existing drainage network of corrugated plastic pipes which extends over the escarpment are not considered viable in the long term. In order to provide long term water management on the site it is recommended that the network of corrugated plastic drainage pipes directed towards and extending onto and down the bluff slopes be decommissioned as shown in Figure 2. In order to mitigate the impacts of the property development and to reduce the potential for concentrated flows reaching the embankment the following works are recommended:

- Construct an interceptor trench extending North and South from the existing cistern as shown in Figures 2 and 3 (see Denman Island Land Use Bylaw 2008 Komas Bluff Guideline 5);
- It is anticipated that the crest of the escarpment will continue to migrate westward in the long term and if unmitigated will eventually compromise the interceptor trench. It is recommended that the setback of the interceptor trench to the crest of the escarpment, defined as the top of slopes that are steeper than 2 horizontal to 1 vertical, be monitored at least every 10 years, with a report presenting an assessment and recommendations related to site drainage conditions prepared by a qualified professional registered with the British Columbia Association of Professional Engineers and Geoscientists. When the setback between the crest of the bluff and the interceptor trench drain becomes less than 10 m at any point on the Site, it is recommended that the interceptor trench be decommissioned and re-established at a minimum distance of 15 m from the crest at that time (see Denman Island Land Use Bylaw 2008 Komas Bluff Guideline 4);
- Construct an infiltration field to accept flows from the dwelling roof leaders and foundation drains (Guideline 5);
- In order to increase the functional storage in the pond and ditch system, construct check dams in the existing ditch system as shown in Figures 2 and 3 (see Denman Island Land Use Bylaw 2008 Komas Bluff Guideline 5), and;

- It is recommended that no additional impermeable surfaces (such as roofs or paved driveways) be permitted within the Site without the review and approval by a qualified professional registered with the British Columbia Association of Professional Engineers and Geoscientists and a development permit where required. It is Golder's opinion that such works would have the potential to increase runoff resulting in increased erosion and sloughing, contrary to Denman Island Land Use Bylaw 2008 Komas Bluff Guideline 2.

The proposed mitigation works are presented conceptually. Detailed designs should be completed by qualified professionals registered with the British Columbia Association of Professional Engineers and Geoscientists. After completion, all of the recommended works should be inspected and approved by qualified professionals registered with the British Columbia Association of Professional Engineers and Geoscientists.

6.3 Revegetation

As described in the memorandum prepared by Mr. D. Reid, FCSLA (see Appendix E), the remediation objectives described below include enhancement of vegetation cover to create and maintain a woody vegetation buffer zone adjacent to the crest of slope to reduce the risk of shallow erosion of the near surface soils above and on the bluff and improve control of surface water runoff flows related to the current property owner's unauthorized works. These actions will serve to reduce the risk or rapid erosion and downcutting of the top soil layers of the bluff, but will not prevent periodic deeper slope failures.

To improve slope stability and reduce surface runoff with revegetation, two elements are important to function: a dense system of deep roots and multi-layered surface structure provided by woody plants, and a 100% leaf cover over the soil surface, with a predominance of evergreen (winter) leaf cover to mitigate rain impact in the rainy season. These functions would have been provided by the pre-development woody cover shown in Plate B-1.

Figure 5 shows the view from immediately north of the existing residence. One could surmise that the vegetation removal along the central area at the top of the bluff has been for the purpose of allowing a cleared view towards the seascape, including the nearby Hornby Island and distant Mainland Mountains. As shown in Figure 5, it is not necessary to have clearing to the ground surface at the top of the bluff in order to have a reasonable view maintained from the existing residence. The proposed 'Planting Extents' on Figure 5 shows an area that could be maintained with dense leaf cover and woody vegetation, while at the same time providing visual access to the seascape through a 'View Corridor' in the area shown on Figure 4 and 5.

Whereas there is nothing in the Development Permit Guidelines that guarantees an applicant can open view corridors through the buffer zone, it is possible that a thorough application with a quantified proposal for limited vegetation view clearing could have led to permission to remove select vegetation elements in the 'View Corridor', but outside the 'Planting Extents' area as shown on Figures 4 and 5, subject to leaving a full leaf cover and vegetation roots within the 'Planting Extents' area.

On this basis, our revegetation requirements include a combination of replanting and natural succession to create a complete woody vegetation buffer of leaf and root cover in a continuous band that extends from the waterfront natural boundary to an area that extends west of the Top of Bank, typically to the east side of the existing and recommended Interceptor Trench and Drain, as shown on Figure 4. Figure 4 shows three map areas of woody vegetation buffer: Existing Forested Area to Remain, Natural Regeneration Area, and Replanting Area.

Required woody vegetation buffer extends from the natural boundary at the sea, to lines measured westward from the Top of Bank, shown on Figure 4. Top of Bank is defined as the line shown as Top of Bank from the survey dated September 2000, as shown on Figure 4, with the Replanting Area extending to the east side of the Interceptor Trench and Drain, and the Existing Forested Area to Remain extending to the limits of the existing forest on the property. Figure 4 also illustrates Existing Forest to Remain along the south property boundary up to the central ditch from the pond. This part of the Existing Forest to Remain will provide improved surface erosion resistance in the case of a large storm event that creates concentrated surface or subsurface flows from the existing or improved ditch system.

The Vegetated Areas shown on Figure 4 (Existing Forested Area to Remain, Natural Regeneration Area, and Replanting Area) are the minimum areas required for initial woody vegetation maintenance and replanting based on conditions in 2013. It is recognized that, irrespective of this planting's ability to mitigate shallow surface erosion, long term eventual westward migration of the crest of escarpment is likely due to toe erosion and/or deep-seated slope movements. The setback of the woody vegetation buffer to the crest of the escarpment shall be monitored at least every 10 years and the buffer area shall be extended if the west boundary of the buffer area is within 10 m of the crest at any point within the Site and re-established a minimum of 30 m from the crest, or as required to align with a corresponding relocation of the Interceptor Trench. 'Crest' is defined as the top of bank above slopes that are steeper than 2 horizontal to 1 vertical, so does not refer to the existing 'Modified Top of Bank' as shown on Figure 4. The future woody vegetation buffer, beyond the initial replanting required by these recommendations, could be achieved by either natural regeneration (no mow zones) or by replanting, or some combination of the two approaches, as determined by a Qualified Professional at the time of future substantial slope movements.

In concept, the proposed replanting areas will extend from immediately seaward (east) of the proposed interceptor trench and drain installed initially or replaced in the future, as described in Section 6.2.

In addition to the woody vegetation buffer, a full cover of deep rooted grasses and legumes, including red clover or alfalfa, must be maintained from the woody vegetation buffer westward to a line 50 m west from the crest of the bluff. This herbaceous cover was present at the time of the site visit of 2013.

Revegetation and maintenance requirements for each woody vegetation buffer map area are listed below.

Existing Forested Area to Remain

Within the Existing Forested Area to Remain as mapped on Figure 4:

- No further removal to be undertaken of existing trees or native woody vegetation.
- Allow natural forest succession to occur, including gradual spreading of native woody plants to replace existing grassy areas.
- No limbing, topping, or pruning of standing trees to be undertaken.
- Removal of vegetation shall be limited to removal of non-native invasive species (Himilayan Blackberry, Broom, Holly, Laurel, Eurasian herbaceous weeds).

Natural Regeneration Area

Within the Natural Regeneration Area as mapped on Figure 4:

- Remove the existing structure at the foot of the stairs, and restore the beach to the pre-development natural beach condition. Remove the existing log-based stair structure. Seed any remaining disturbed areas with a grass / clover mix similar to adjacent seeded areas.
- Allow natural regeneration of Red Alder and related native understorey species to proceed, with the objective that a full leaf and root cover of exposed soils will occur, with gradual succession towards evergreen species.
- No further removal to be undertaken of existing trees or native woody vegetation, except that pruning or topping of trees shall not be required but if voluntarily undertaken shall be limited to within the 'View Corridor', and in no cases shall native vegetation removal occur within the 'Planting Extents' area shown on Figures 5.
- Removal of vegetation shall be limited to removal of non-native invasive species (Himilayan Blackberry, Broom, Holly, Laurel, Eurasian herbaceous weeds).

Replanting Area

Within the Replanting Area as mapped on Figure 4:

- Increase the chances of replanting survival by preparing a planting bed, through rototilling into a 200 mm depth of existing soils a 75 mm depth of fully composted fish compost.
- All shrub species should be guaranteed nursery stock for successful planting.
- Where feasible, plant stock should be a minimum of two years old, and in a minimum #1 pot.
- Plantings shall be installed at a maximum spacing of 900 mm on centre.
- The correct scientific (Latin) name should be used when ordering planting stock and tags should be left attached for future field identification until approval of planting by the Landscape Architect.
- Fruiting shrubs should be planted to promote recolonization by seed.
- Stock should be planted in late fall (October to November) or early spring (March – April).
- Plants that do not survive the first growing season shall be replaced. At the end of the second growing season, at least 80% of plants shall be in a fully established and growing state. Replanting as necessary to meet 80% survival shall be completed after the second growing season, with a further year's warranty and maintenance extended until the plant establishment performance target is met.
- Plant species selected for the project (Table 1) are native to the Coastal Douglas Fir moist maritime (CDFmm) biogeoclimatic zone which encompasses Denman Island, and are commonly found in riparian foreshore areas throughout the region. Many of the selected species are also recommended by DFO[1] as suitable for establishing riparian vegetation during restoration projects. Shrub species will establish a dense vegetative cover to establish sufficient rainfall interception, and with a general maximum height of 1.5 meters (m), a viewing corridor to the Lambert Channel should be maintained.

[1] DFO. 2006. *Riparian Areas and Revegetation Pacific Region Operational Statement*. Available online: http://www-heb.pac.dfo-mpo.gc.ca/decisionsupport/os/pdfs/riparian_vegetation_e.pdf. Accessed December 13, 2013.

Table 1: Recommended Riparian Shrub Species

Common Name	Scientific Name
Shrubs	
dull Oregon-grape	*Mahonia nervosa*
Salal	*Gaultheria shallon**
baldhip rose	*Rosa gymnocarpa**
common snowberry	*Symphoricarpos albus**
Herbs	
Bracken	*Pteridium aquilinum*
* denotes fruit-bearing species as per DFO (2006)	

- Planted stock should be field fit/clustered under the direction of detailed plans prepared by a Landscape Architect (member in good standing of the British Columbia Society of Landscape Architects).
- All plants, and planting and growing medium, shall meet the requirements of the BC Landscape Standard. Native soils shall be tested by an approved soil testing laboratory, and soil amendments required shall follow the recommendations of the laboratory so that the amended growing medium meets the requirements of the BC Landscape Standard.
- To encourage optimum growing medium temperature and moisture, install a 50 mm layer of landscape bark mulch to the surface of all Replanting Area.
- Due to the exposed and droughty conditions of the Replanting Area, a low–volume drip irrigation system shall be installed, and programmed by a weather-based irrigation controller, to provide minimum water needed for plant establishment, but to avoid over-watering that would reduce slope stability. The irrigation system shall be shut off and winterized by blowing dry, for periods between October 15 and May 1 each year of its operation. This system shall be disconnected from water supply and abandoned as soon as plants are established – but no later than 4 years after the year of initial planting.
- All works in the Replanting Area shall be subject to detailed design by a qualified Landscape Architect (member in good standing of the British Columbia Society of Landscape Architects), installation by an approved Landscape and Irrigation Contractor (members in good standing of the British Columbia Nursery Trades Association, and the Irrigation Industry Association of British Columbia, respectively, by trade), and field review and approval of as-built conditions by the Landscape Architect. The same Landscape and Irrigation Contractor, subject to satisfactory performance as determined by the Landscape Architect, shall provide guarantee and maintenance services under contract until plant establishment performance conditions are met, and the irrigation system is de-commissioned. A minimum maintenance period of two years is required, with possible extension of that maintenance period if plant establishment performance is not met to 5 years from the date of initial planting. Release from the plant establishment requirements is subject.to satisfactory plant establishment performance field review and corresponding written authorization by the Landscape Architect.
- In addition to the native planting of the Replanting Area, allow natural regeneration of trees and related native understorey species to proceed, with the objective that a full leaf and root cover of exposed soils will occur.

- No further removal to be undertaken of existing trees or native woody vegetation, except that pruning or topping of trees shall not be required but if voluntarily undertaken shall be limited to within the 'View Corridor', and in no cases shall native vegetation removal occur within the 'Planting Extents' area shown on Figures 5. The existing coniferous trees shown on Figure 5 outside the View Corridor shall remain and be allowed to grow, including growth into the View Corridor outside the Planting Extents. Deciduous trees that grow into the view area outside the Planting Extents shown on Figure 5 are allowed to be topped or pruned, but this topping or pruning is not a requirement.

Other removal of vegetation in the Replanting Area shall be limited to removal of non-native invasive species (Himilayan Blackberry, Broom, Holly, Laurel, Eurasian herbaceous weeds).

7.0 KOMAS BLUFF DEVELOPMENT PERMIT GUIDELINES

Based on review of the available information and visual site reconnaissance, it is Golder's professional opinion that the excavations, structures, the removal of vegetation and other modifications to the original site conditions have caused adverse impact on the stability of shoreline bluff slopes and other adverse environmental effects. Provided that the recommended remediation measures, including but not limited to drainage and subdrainage improvements, as well as a planting / revegetation plan, are carried out, it is also our opinion that these measures will mitigate the impacts of the excavations, installation of structures and removal or damage to the vegetation which has occurred at the Site and meet the intent of the Komas Bluff Development Permit Guidelines applicable to this Site, as described below.

Guideline 2:

It is our opinion that the recommended remediation measures, which include enhancement and additional planting of vegetation on and above the crest of the Komas bluff slopes, removal of the existing stairway and decommissioning / removal of existing drainage pipe systems on the slopes, as well as enhancement of surface runoff drainage and subdrainage conditions would not cause potential erosion of soil or contribute to bluff instability, including but not limited to land slip, mud flow, sloughing or water degradation, and will address, to the greatest extent possible, the increased risks of bluff instability and land slip attributable to the current works on the Site, as identified in this report.

Guideline 3:

Due to the ongoing, natural process of shoreline toe erosion of the generally fine grained Quadra Sediments, as well as the steep slopes of the bluff, it is my opinion that it is not feasible to prevent periodic slope failures, slumps or slower creep-type movements. However, provided that the recommended remediation measures are carried out, it is my opinion that the existing permanent buildings at the Site are located beyond the area subject to sloughing or damage from sloughing over a time period significantly in excess of the normal design life of such buildings, typically 75 to 100 years.

Guideline 4:

No part of the existing septic tank and tile field, the proposed infiltration field, and the check dams are to be constructed on that portion of the Site that is subject to sloughing or damage from sloughing or in an area containing unstable soil or water which is subject to degradation. The recommended irrigation is to be temporary and of short term duration, solely to permit and enhance initial revegetation above the crest of the bluff slopes, and is to be permanently decommissioned once the vegetation is established. The setback of the interceptor trench to the crest of the escarpment shall be monitored at least every 10 years and shall be decommissioned if within 10 m of the crest and re-established a minimum of 15 m from the crest. 'Crest' is defined as the top of bank above slopes that are steeper than 2 horizontal to 1 vertical.

Guideline 5:

Suitable and effective design and installation of the recommended drainage and subdrainage facilities, as well as the revegetation and planting plan will, in Golder's opinion, reduce, divert and/or slow concentrated drainage paths away from areas subject to sloughing or damage from sloughing.

Guideline 6:

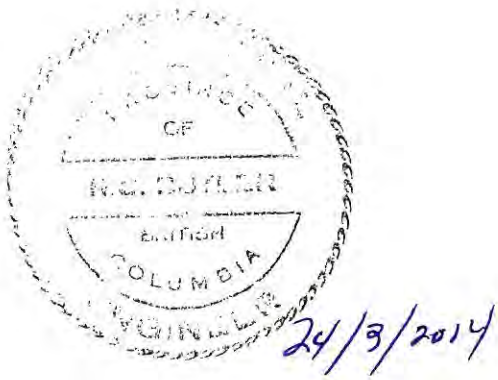
The recommended tree and other vegetation retention, as well as additional planting and revegetation plan and the removal of the stairway and drain piping on the slopes, will, in our opinion, control shallow erosion along the top or face of the bank.

8.0 CLOSURE

We trust that this information is sufficient for your immediate requirements. Should you have any questions or require additional information, please do not hesitate to contact the undersigned.

Yours very truly,

GOLDER ASSOCIATES LTD.



Richard C. Butler, P.Eng., FEC
Principal

RCB/sn

Attachments: Figure 1: Key Plan
Figure 2: Site Plan
Figure 3: Typical Cross Sections
Figure 4: Planting Plan
Figure 5: Planting Diagram
Appendix A: Photographs – Visual Site Reconnaissance, 2600 Swan Road, Denman Island, BC, August 9, 2013
Appendix B: Photographs – Visual Site Reconnaissance, 2600 Swan Road, Denman Island, BC, August 9, 2013
Appendix C: Résumés
Appendix D: Technical Memorandum, C. Coles, P. Eng.
Appendix E: Technical Memorandum, D. Reid, FCSLA

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NOTES

1. COORDINATE SYSTEM SHOWN IS NAD83 UTM ZONE 10.
2 IMAGE OBTAINED FROM BING MAPS FOR ARCHGIS PUBLISHED BY MICROSOFT CORPORATION, REDMOND, WA, DATED MAY 2009

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PROJECT
YOUNG ANDERSON
2600 SWAN ROAD
DENMAN ISLAND, BC

TITLE
KEY PLAN

Golder Associates

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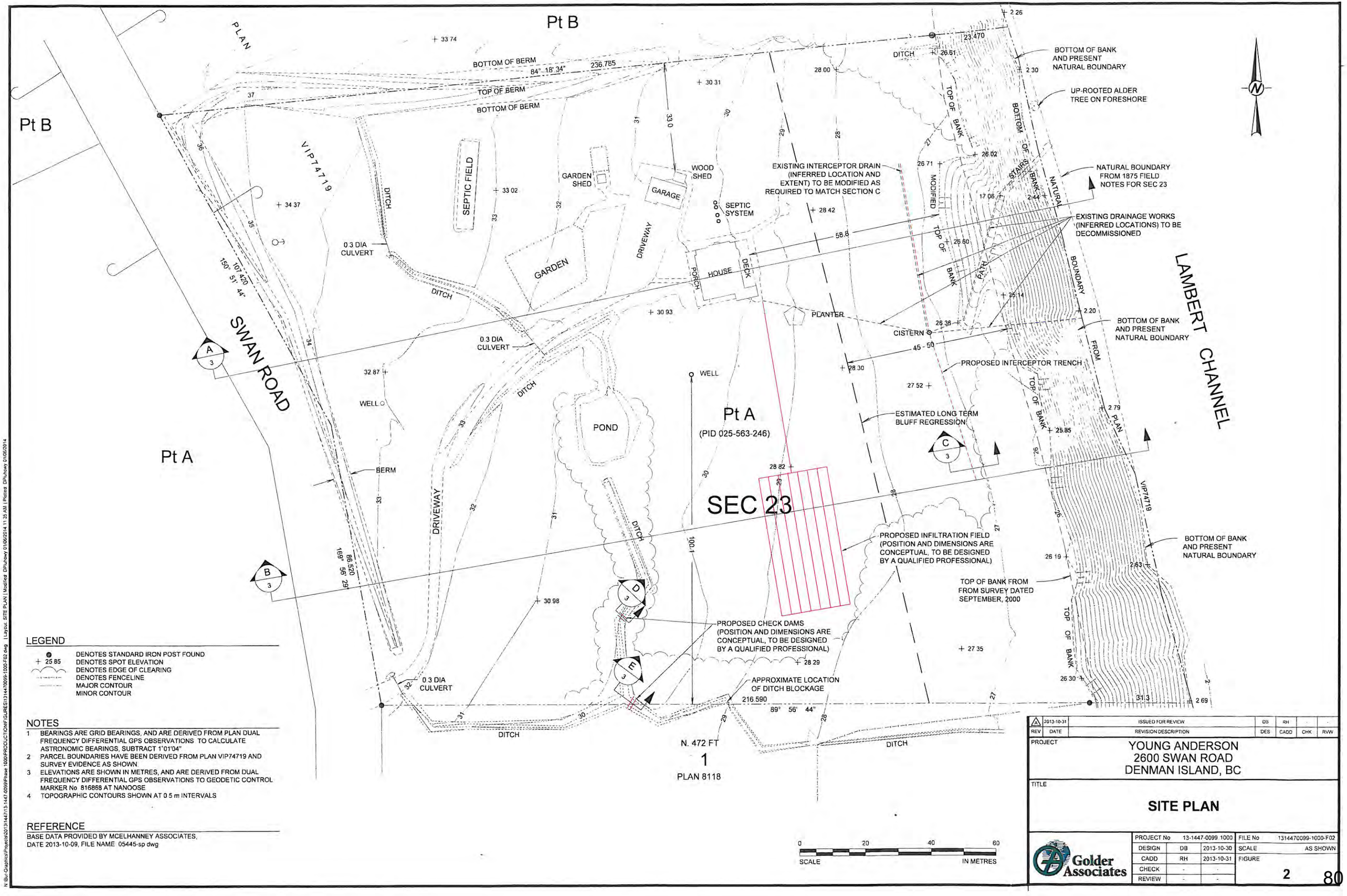

LEGEND

●	DENOTES STANDARD IRON POST FOUND
+ 25.85	DENOTES SPOT ELEVATION
	DENOTES EDGE OF CLEARING
	DENOTES FENCELINE
	MAJOR CONTOUR
	MINOR CONTOUR

NOTES

1. BEARINGS ARE GRID BEARINGS, AND ARE DERIVED FROM PLAN DUAL FREQUENCY DIFFERENTIAL GPS OBSERVATIONS TO CALCULATE ASTRONOMIC BEARINGS, SUBTRACT 1°01'04"
2. PARCEL BOUNDARIES HAVE BEEN DERIVED FROM PLAN VIP74719 AND SURVEY EVIDENCE AS SHOWN
3. ELEVATIONS ARE SHOWN IN METRES, AND ARE DERIVED FROM DUAL FREQUENCY DIFFERENTIAL GPS OBSERVATIONS TO GEODETIC CONTROL MARKER No 816868 AT NANOOSE
4. TOPOGRAPHIC CONTOURS SHOWN AT 0.5 m INTERVALS

REFERENCE

BASE DATA PROVIDED BY MCELHANNEY ASSOCIATES, DATE 2013-10-09, FILE NAME 05445-sp dwg

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PROJECT

YOUNG ANDERSON
2600 SWAN ROAD
DENMAN ISLAND, BC

TITLE

SITE PLAN

Golder Associates

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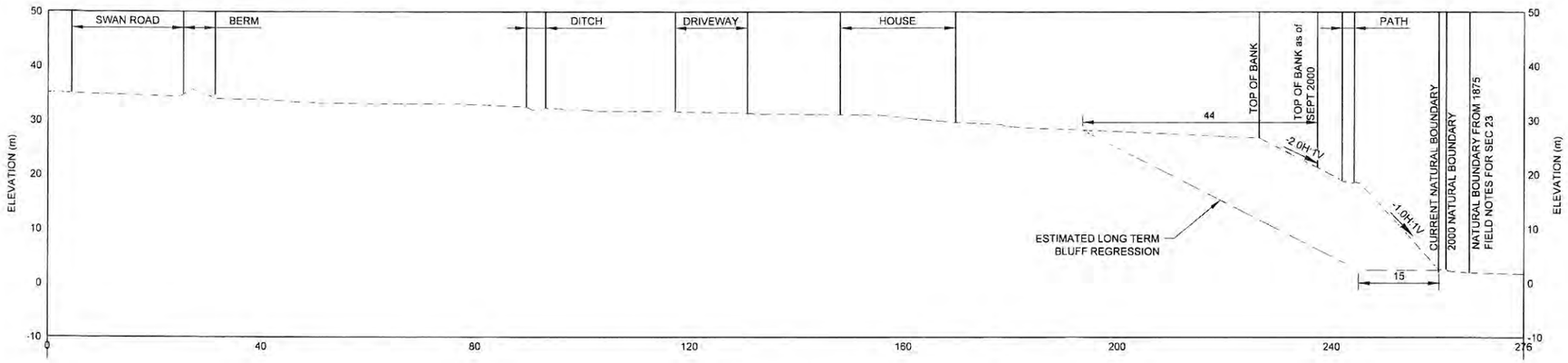

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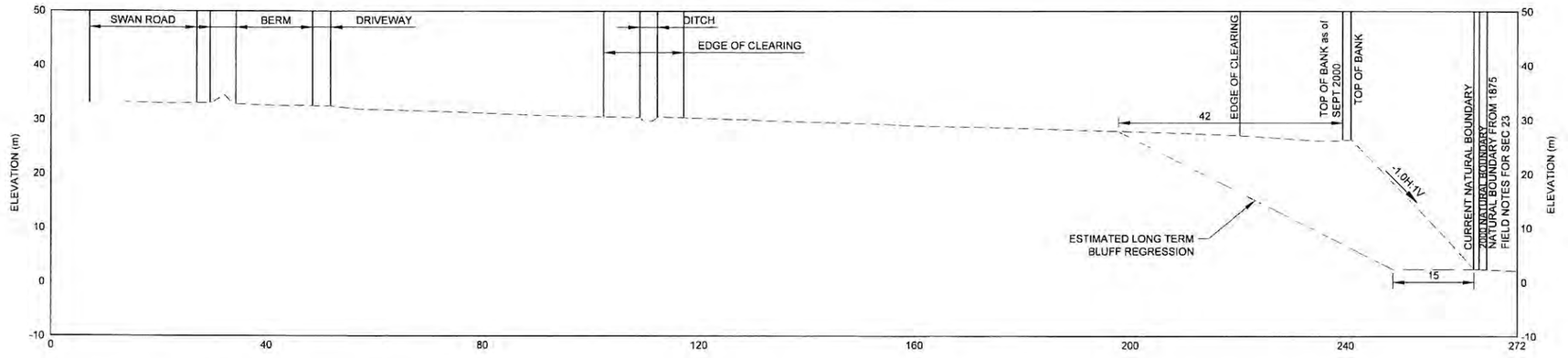

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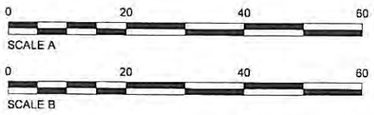

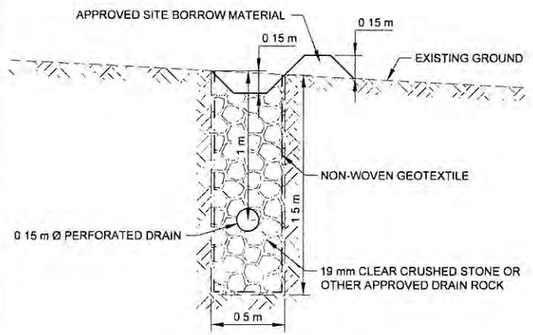

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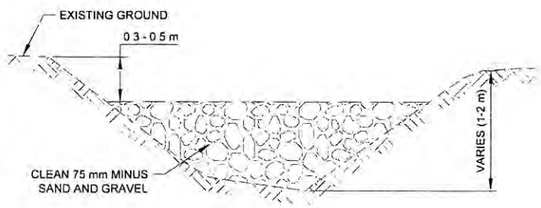

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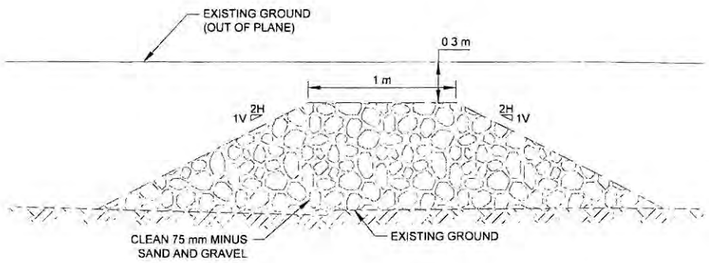

SCALE B (E/2) PROPOSED CHECK DAM TYPICAL CROSS-SECTION

NOTES

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REFERENCE

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DATE 2013-10-09, FILE NAME 05445-sp.dwg

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PROJECT

YOUNG ANDERSON
2600 SWAN ROAD
DENMAN ISLAND, BC

TITLE

TYPICAL CR0SS-SECTIONS

Golder Associates

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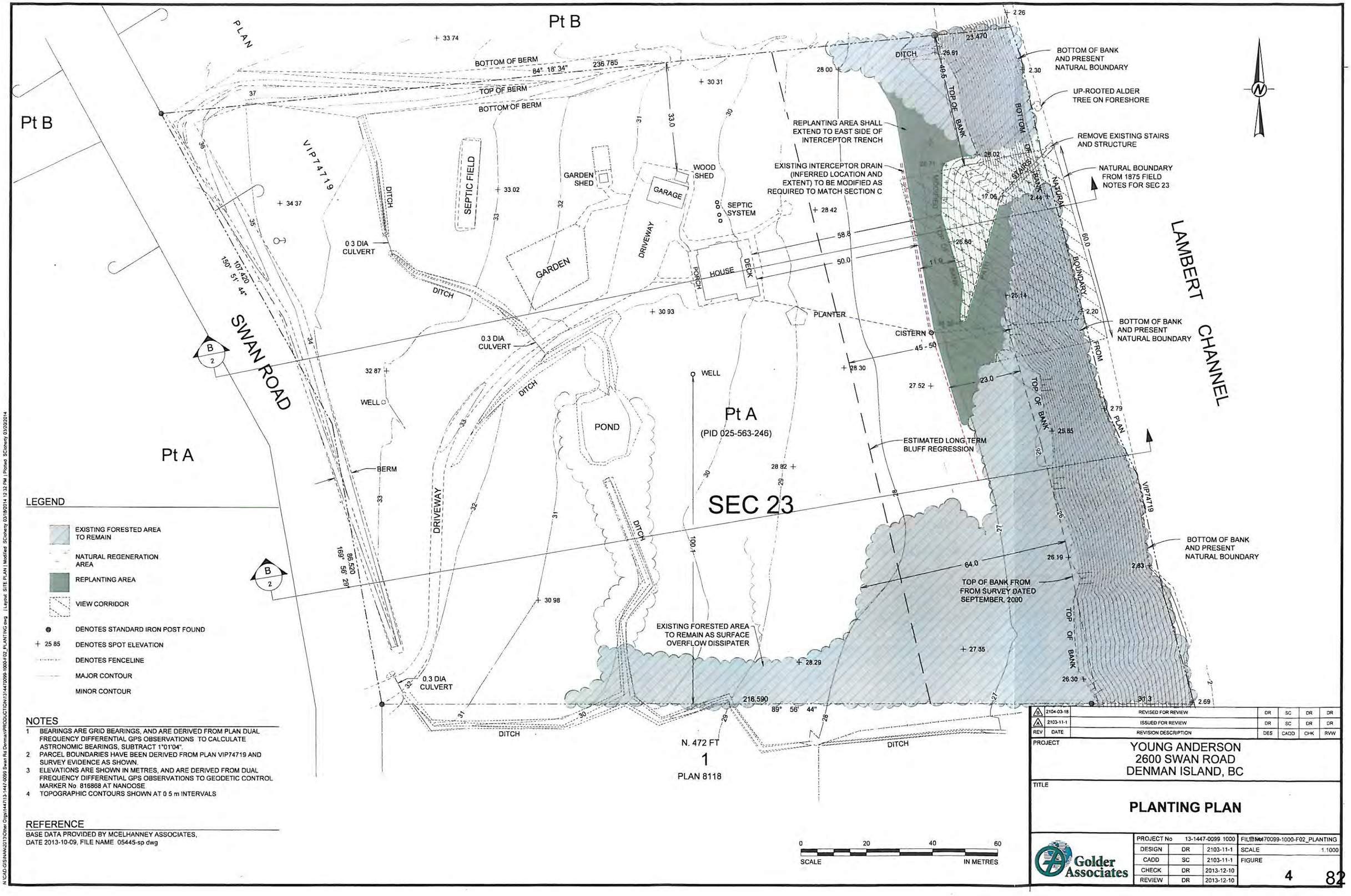

LEGEND

- EXISTING FORESTED AREA TO REMAIN
- NATURAL REGENERATION AREA
- REPLANTING AREA
- VIEW CORRIDOR
- DENOTES STANDARD IRON POST FOUND
- + 25 85 DENOTES SPOT ELEVATION
- DENOTES FENCELINE
- MAJOR CONTOUR
- MINOR CONTOUR

NOTES

1. BEARINGS ARE GRID BEARINGS, AND ARE DERIVED FROM PLAN DUAL FREQUENCY DIFFERENTIAL GPS OBSERVATIONS TO CALCULATE ASTRONOMIC BEARINGS, SUBTRACT 1°01'04".
2. PARCEL BOUNDARIES HAVE BEEN DERIVED FROM PLAN VIP74719 AND SURVEY EVIDENCE AS SHOWN.
3. ELEVATIONS ARE SHOWN IN METRES, AND ARE DERIVED FROM DUAL FREQUENCY DIFFERENTIAL GPS OBSERVATIONS TO GEODETIC CONTROL MARKER No 816868 AT NANOOSE.
4. TOPOGRAPHIC CONTOURS SHOWN AT 0 5 m INTERVALS

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PROJECT

YOUNG ANDERSON
2600 SWAN ROAD
DENMAN ISLAND, BC

TITLE

PLANTING PLAN

Golder Associates

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REVIEW	DR	2013-12-10	

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PLANTING EXTENTS

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PROJECT

YOUNG ANDERSON
2600 SWAN ROAD
DENMAN ISLAND, BC

TITLE

PLANTING DIAGRAM

Golder Associates

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Appendix A

Photographs – Visual Site Reconnaissance, 2600 Swan Road, Denman Island, BC, August 9, 2013

Plate A-1: Looking northeast along gravel surfaced driveway and drainage swale towards Stoneman residence and garage.

Note: - Gently sloping ground surface along driveway and swale towards residence.

- Low, sparse grass cover and lack of tree cover.

Plate A-2: Looking south along ditch into pond from swale along driveway.

Note: - Small trees around pond but sparse grass cover and exposed soil at surface on and above ditch side slopes.

Plate A-3: Looking northwest from driveway along shallow swale or ditch above inlet of culvert under driveway.

Note: - Exposed piping or utility conduit crossing swale.

- Moderate tree cover in northwest corner of property but sparse grass cover and exposed soil at surface along and adjacent to swale.

Plate A-4: Looking southeast across ditch into pond towards treed area adjacent to bluff slopes.

Note: - Gently sloping ground surface, with sparse dry grass or hay cover in foreground, dipping towards bluff.

- Well casing extending above ground surface in grass area.

Plate A-5: Looking south along drainage ditch on west (upslope) perimeter of gravel surfaced Swan Road.

Note: - Ponded water and damp soil indicating seepage present locally along ditch, even during dry weather conditions.

- Gentle (approximately 5 percent) slope of ditch and drain to south along 2600 Swan Road frontage.

Plate A-6: Close-up of coarse sand and gravel or gravelly sand exposed along drainage ditch on west (upslope) perimeter of Swan Road.

Plate A-7: Looking east at previously developed drainage ditch extending towards bluff near south property line of 2600 Swan Road.

Note: - Well established vegetation along and within 1.5 to 2 m deep ditch, plus adjacent tree cover.

Plate A-8: Fill plug, including boulder sizes, at east end of existing, previously developed ditch near south property line.

Note: - Lack of evidence of concentrated overland flow beyond plugged ditch or connection to newly excavated channel on adjacent property to south.

Plate A-9: Looking southeasterly at recently excavated channel or drainage ditch extending towards crest of bluff within adjacent property, and close to south property line.

Plate A-10: Close-up of recently excavated channel or drainage ditch on adjacent property, close to south property line.

Note: - Loose, disturbed fine grained soils or fill within and adjacent to excavated channel.

Plate A-11: Looking north along crest of bluff within southeast corner of property.

Note: - Extensive, generally vertical, mature coniferous tree cover extending up to crest of bluff.

- Well established, extensive understory and ground cover within treed area.

Plate A-12: Close-up of steep, near vertical or overhanging upper scarp of bluff in southeast corner of property.

Note: - Vertical to slightly tilted mature trees immediately adjacent to crest of bluff.

- Extensive, well established deciduous (alder) tree cover and understorey vegetation on bluff slopes below upper scarp.

Plate A-13: Looking northerly along crest of bluff in southeast corner of property.

Note: - "Pistol butt" curvature or tilting of some trees at crest of bluff, but adjacent intact, well established trees and ground cover, as well as old tree toppled onto upper slope of bluff.

- Well established deciduous tree cover on slopes below but rising above crest of bluff scarp.

Plate A-14: Looking north towards central portion of property, with residence in background.

Note: - Stumps in foreground, and widely spaced remaining tree cover, plus local smaller coniferous trees.

- Change from green, dense ground cover in treed area to dry, sparse grass or hay cover in cleared area.

Plate A-15: Looking north towards treed area near bluff in northeast corner of property.

Note: - Change from dry, sparse grass or hay cover in cleared area to green, dense ground cover in tree covered area.

Plate A-16: Looking south across regraded upper slopes of bluff in central portion of property and path constructed on bluff slope.

Note: - Dry, sparse grass or hay ground cover in regraded area, with small, local understorey or deciduous tree growth in foreground, and extensive tree cover above bluff in background.

Plate A-17: Looking east from about crest of regraded bluff slope towards residence and garage.

Note: - Dry and short grass or hay cover between crest of slope to and beyond residence.

- Ground surface dipping from residence towards crest of regraded slope.

Plate A-18: Looking southerly up path constructed on excavated and regraded bluff slopes.

Note: - Sparse grass and low underbrush cover on steep cut bank above coarse, cobble filled collector drain along upslope edge of path.

Plate A-19: Near vertical soil exposure above path on regraded bluff slope.

Note: - Generally fine grained silty sand to sandy silt, with trace to some small gravel sizes, with thin, near horizontal layering.

Plate A-20: Exposed, corrugated plastic piping and connections between three drain or subdrain systems at the transition from the path to the stairs on the regraded slope.

Note: - Red tape seal or cover at connections between various piping.

Plate A-21: Looking east at stacked log supported elevated stairs on lower portion of the bluff slopes.

Note: - Well established grass and minor small tree cover on previously cleared or slide area north of the stairs.

- Extensive deciduous tree and understorey cover to the south of stairs and north of cleared/slide area.

- Storm log debris and beach sediments extending to and inland of base of stairs.

Plate A-22: Looking south along shoreline and toe of bluff slopes.

Note: - Extensive, well established tree cover on slopes, extending to toe of slope.

- Coarse, rounded gravel, cobbles and boulders exposed at surface along intertidal zone and extending up to toe of slope.

Plate A-23: Looking west up previous erosion or slope failure along bluff to the south of regraded slopes and constructed path and stairs.

Note: - Steep to near vertical and locally overhanging scarp, with exposed fine silty and sandy soils inn background.

- Well established ground cover vegetation on lower portion of slide failure and runout area.

Plate A-24: Looking west up previous erosion or slope failure near south property line, with exposed, near vertical scarp in background and slide debris on lower slopes in foreground.

Note: - Small deciduous tree growth, tilted or with "pistol butt" curvature, within slide debris zone.

Plate A-25: Steep to near vertical soil exposure near toe of slope north of stairs.

Note: - Fine grained silty and sandy soils, with near horizontal layering.

- Possible small erosion cavity or seepage "pipe" near the top of the soil exposure.

Plate A-26: Looking at discharge outlet of corrugated plastic drain pipe at toe of bluff slopes south of stairs.

Note: - Drain piping on or locally at shallow depth below ground surface of bluff slopes, with red tape cover or seal at pipe joints.

- Near vertical, locally undermined toe of bluff slopes, with storm log debris and cobbles or boulders extending up to pipe outlet.

Appendix B

Photographs – Visual Site Reconnaissance, 2600 Swan Road, Denman Island, BC, August 9, 2013

Plate B-1: Vegetation remaining in un-disturbed areas west of top of bank.

Note: - Douglas fir trees in a closed canopy, with understorey of mixed evergreen (salal, sword fern, young coniferous trees) and deciduous (salmonberry, bracken fern, etc.), with few grasses.

Plate B-2: Vegetation remaining in semi-disturbed areas west of top of bank.

Note: - Douglas fir trees in a semi-closed canopy, with understorey of mixed evergreen (salal, sword fern, young coniferous trees) and deciduous (salmonberry, bracken fern, etc.), with grasses intermixed in localized disturbed areas.

Plate B-3: Vegetation remaining in uncleared areas on waterfront slope areas east of top of bank.

Note: - Dominant tree cover of red alder, isolated cedar, with understory of salmonberry, some thimbleberry and limited rushes.

Plate B-4: Vegetation typical of areas of recently disturbed slopes where herbaceous seeding has taken place.

Note: - Seeded grass and legume cover has germinated in all but vertical faces, and young red alder are volunteering in various densities across the disturbed areas.

Plate B-5: Vegetation in proposed replanting area west of the existing top of bank.

Note: - The gently sloping area that has been planted with grasses and legumes has been mown and does not support woody vegetation.

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Appendix C

Résumés

Education

M.E.Sc. Soil Mechanics and Foundation Engineering, University of Western Ontario, 1967

B.E.Sc. Civil Engineering, University of Western Ontario, 1966

Burnaby

Employment History

Golder Associates Ltd. – Burnaby, BC
Associate then Principal (1976 to Present)

Responsible for supervision and direction of Geotechnical Section. Also responsible for overall senior technical review and assistance in business development for four regional offices in British Columbia. Involvement extends from conceptual planning and site selection studies to detailed investigation, foundation design, construction supervision, and expert review for a wide variety of projects in Canada and many international locations. Senior technical reviewer for services to forest resource sector in British Columbia, including geotechnical aspects of pulp and paper mills, terrain analysis, watershed and gully assessments, and forest service road development and deactivation. Act as senior level reviewer and expert witness for a wide variety of geotechnical projects, including transportation, land use, residential, and marine or heavy industrial development.

Golder Associates Ltd. – Toronto then Burnaby (from 1974)
Geotechnical Engineer then Senior Geotechnical Engineer (1967 to 1976)

Project Engineer responsible for a wide variety of investigations and geotechnical design for projects throughout Canada and internationally, including the West Indies, Kuwait, Saudi Arabia, Greece, Turkey, Peru, and Pakistan.

PROJECT EXPERIENCE – NATURAL HAZARDS, LANDSLIDE ASSESSMENT AND STABILISATION

Investigation, design recommendations, and construction inspection services for:

Montrose Park Landslide Investigation Burnaby, BC	Monitoring, design, and construction services during installation of permanent soil nail slope stabilisation treatment.
Slesse Park Fraser Cheam Regional District, BC	Geotechnical reconnaissance and review of slope failures and potential future natural hazards, development of recommendations on zoning and future development criteria.
Sechelt Regional District Sechelt, BC	Geotechnical review of regional subsurface conditions and natural hazard potential, recommendations on development permit zoning and future development criteria.
Cheekye Area Squamish, BC	Review of debris flow and debris flood natural hazards, recommendations on future development criteria.
Chines Slopes Coquitlam, BC	Coquitlam Chines landslide and debris flows, subsequent mapping and recommendation on development constraints.
Tsawwassen Bluffs Delta, BC	Tsawwassen bluffs stability investigation and subdivision development constraints, Delta, BC.
Rail Slope Failures Grand Forks and Surrey, BC	Landslide failure and remedial treatment, Burlington Northern Rail line, Grand Forks and Surrey, BC.
Sloping Terrain Guidelines North Vancouver, BC	Urban development design guidelines for sloping terrain, North Vancouver, BC.
Westwood Plateau Slopes Coquitlam, BC	Westwood Plateau slope stability and development guidelines, Coquitlam, BC.

PROJECT EXPERIENCE – MINE FACILITIES AND TAILINGS DAMS

Geotechnical investigations, senior-level reviews, and design recommendations for:

Galmoy Development Republic of Ireland	Geotechnical and microgravity geophysical investigations, design of lined tailings dam facility within karstic terrain.
Waste Dump Logan Lake, BC	Treatment measures and scheduling of filling operations over weak peat terrain to maintain waste dump stability.
An Tai Bao Coal Mine Peoples Republic of China	Foundation treatment of collapsible loess soils for major mine preparation structures of 40,000 ton/day.

Tailings Dam Northern Peru	Treatment measures to stabilise and permit expansion of existing 25 m tailings dam in known seismic area.
Centromin, Atacocha, and Cia. Minas Buenaventura Peru	Evaluation of existing dams, remedial treatment designs, and recommendations on development of new tailings disposal dam.
Crown Pillar Removal Ignace, ON	Evaluation of alternative overburden stripping methods within saturated and weak soils, review and construction inspection during dredging of 800,000 m3 of overburden for crown pillar removal.

PROJECT EXPERIENCE – PORTS, MARINE FACILITIES & TERMINALS

Investigations, geotechnical designs, and construction services.

Major marine and port facilities, including:

Container Terminal Pavement Rehabilitation Port of Vancouver, BC	Review of previous geotechnical investigations by Golder Associates and others, as well as previous pavement design and proposed alternatives. Conduct of visual survey and non-destructive load deflection Benkelman beam measurements using fully loaded Taylor TEC-950L container handling vehicle to map areas of differing subgrade support. Design and monitoring of construction of first of multi-year phased pavement rehabilitation treatment using recycled asphalt pavement as sub-base for new pavement.
Ferry Terminal Rehabilitation Saltery Bay, BC	Geotechnical investigation and design of new pile support for Berth 2 of ferry terminal ramp towers. Rock socketted piles selected and designed due to presence of highly variable thickness of loose liquefiable silts or loose sand fill overlying steeply dipping granitic bedrock. Periodic monitoring and review of piling conducted during construction.
Jetty Reconstruction Montserrat, West Indies	Development of design criteria for lateral and vertical pile capacity for main jetty, as well as driving requirements into variable and coarse volcanic sediments, review, and evaluation of actual installation.
Grain Terminal Berth Prince Rupert, BC	Rock socketted pipe pile foundations for Prince Rupert Grain Terminal berths for 150,000 DWT shipping.
Coal Terminal Berth Prince Rupert, BC	Socketted pipe piling support in faulted, sheared rock as berth support for 250,000 DWT shipping at Ridley Coal Terminal.
Port Qasim Port Development Pakistan	Port Qasim Port development, including initial investigation and evaluation of suitable pier and wharf foundations types — spill-through pile supported piers and berth for 100,000 DWT or larger shipping for oil jetty, grain terminal, and bulk loading facility, plus concrete caisson marginal wharf for 40,000 DWT shipping.
Pioneer Grain Terminal North Vancouver, BC	Evaluation of pile supported pier for 100,000 DWT shipping at Pioneer Grain Terminal, detailed marine investigation, design, and construction services for alternative cellular cofferdam wharf/terminal foundation system, including geotechnical input to corrosion protection.

Oil Jetty and Cargo Harbour Kuwait	Concrete pile foundations for oil jetty extension to serve 100,000 DWT tankers at Shuaiba Port and associated cargo harbour, including assessment of aggregate sources suitable for use under marine corrosion conditions.
Cement Plant Barge and Export Berth Delta, BC	Precast concrete piling for barge and export berthing for cement plant complex, and subsequent review and recommendations on repairs of damage resulting from barge collision.
Ferry Terminal and Dhow Harbour Kuwait	Investigations and design alternatives for Ras El Ard ferry terminal and Kuwait Gulf Dhow harbour.
	Shoreline and erosion control treatments, including:
Barnet Marine Park Seawall Burnaby, BC	Investigations, design, and preparation of specifications for installation of 1.1 km shoreline wall feature utilising precast concrete units.
Lonsdale Quay Park North Vancouver, BC	Design criteria for alternative precast concrete units, reinforced earth sections for seawalk.
Lost Lagoon Perimeter Walkway Vancouver, BC	Investigation and recommendations on shoreline treatment and erosion control criteria.
	Container and Bulk Handling Terminals, including:
CP Intermodal Yard Pitt Meadows, BC	Geotechnical investigation, including detailed boreholes, CPT testing, monitoring and review of test preload on weak compressible clays and silts at site. Plate bearing tests on subgrade soils as well as proposed fills and at existing intermodal yard where asphalt pavement over cement treated base used. Benkelman beam load deflection testing of existing yard using fully loaded container terminal vehicle. Analysis, comparative design and selection of pavement structure considering asphalt, PCC, paver stone surfacing and roller compacted concrete alternatives.
Pulp Storage and Gearlocker Buildings Lynnterm, Port of Vancouver, BC	Geotechnical investigations, analysis and design of building foundations, slab on grade support and surrounding pavements for heavily loaded pulp storage building, including analysis and comparative design of PCC and roller compacted concrete floor slabs and asphalt pavement subject to heavy pulp carrier loads. Site preparation and foundations of integrated pulp, paper, and sawmill complex including barge pier facilities.

PROJECT EXPERIENCE – LAND RECLAMATION AND RESIDENTIAL DEVELOPMENT

Residential Development Potential Mission, BC	Review of available data, field reconnaissance, and preparation of preliminary geotechnical and biophysical rating of suitability and land use constraints for 1,000 ha site.

Residential Subdivisions in Peat Terrain Richmond, BC	Phased site filling and preloading, use of lightweight fills to accommodate settlements, and wick drains to accelerate consolidation of very weak, compressible peats and silts for residential subdivisions encompassing in excess of 40 ha in total.
Multi-family Residential Development Coquitlam, BC	Review of alternative foundation treatment measures, design, specifications for dynamic compaction treatment and field monitoring for phased development of multi-family residential complex.
Citadel Heights Residential Subdivision Port Coquitlam, BC	Multi-phase development of previous gravel pit area for mixed single and multi-family residential subdivision, including identification of previous spoil fill areas, recommendations on site grading, road and services construction.
Residential Complex Burnaby, BC	Combined geotechnical and environmental investigations for multi-phase Oakalla residential development including roads and services within previous prison property.
Land Reclamation Planning Pakistan	Review of available data, reconnaissance, and preparation of preliminary geotechnical rating and land reclamation criteria for various uses as part of Master Planning Study.
Land Use and Reclamation Needs Fraser Valley, BC	Review of available data, assessment of natural hazard potential, foundation support constraints, and land reclamation needs for commercial/industrial uses, Master Planning Study.
Shoreline Land Improvement Vancouver/North Vancouver, BC	Design and construction inspection including monitoring of ground vibrations during dynamic consolidation treatment of random shoreline fills, use of pile and shallow foundations in treated fill for commercial and high density residential developments.

PROJECT EXPERIENCE – TRANSPORTATION AND UTILITIES

Investigations, geotechnical recommendations, and field services for numerous buried services, roads, streets, highways, and rail lines within British Columbia and Ontario, including:

Barnet Highway Burnaby, BC	Detailed investigations and development of overall design for Barnet Highway reconstruction, including stabilisation measures for existing slide areas and earthquake effects.
Arusha - Mwanza Highway Tanzania	On-site laboratory testing and design for 77 km Makuyuni - Oldeani section of Arusha - Mwanza Highway, traversing the Great Rift valley scarp, complex saline, tropical, and volcanic materials.
Majma'ah - Kuwait Highway Saudi Arabia	On-site geotechnical and materials laboratory testing and staff training, alignment selection, design, and preparation of technical specifications for 485 km Majma'ah - Kuwait border highway.

Queensborough Rail Realignment New Westminster, BC	Realignment and construction of rail line across weak peats and filled areas, including use of preloading.
Pavement Surveys Lower Mainland, BC	Benkelman Beam and geotechnical investigations to determine subgrade characteristics and causes of pavement structure failure or inadequate performance in Burnaby and Surrey.
Schoolhouse Road Upgrading Coquitlam, BC	Upgrading and widening of existing Schoolhouse Road in weak, peat terrain, including use of staged preloading, construction monitoring, and evaluation of impact on services.
Pitt River Water Main Crossing Pitt Meadows, BC	Detailed overwater investigations and analyses of stability and support capacity of dredged cut for major water supply line crossing of Pitt River.
Buried Services in Peat Terrain Burnaby, BC	Investigations, review of available data, and development of revised design concepts for services located within weak, compressible peat terrain.
Steep Gradient Sewers in Peat Terrain Surrey, BC	Regional subsurface data collection, investigations, and development of geotechnical criteria for steep gradient sewer design within weak terrain.

PROJECT EXPERIENCE – COMMERCIAL AND INDUSTRIAL STRUCTURES

Geotechnical investigations and designs, construction services for commercial and industrial facilities:

Cement Plant Complex Delta, BC	Evaluation of pile foundations, design of vibrocompaction stone column treatment, and shallow foundations for very heavily loaded cement plant complex on deep, delta deposits subject to liquefaction, preloading to reduce deep seated settlements, construction monitoring of vibrocompaction treatment.
Industrial Building Extension Delta, BC	Design, including consideration of earthquake induced liquefaction, and field services during installation of pipe piles for major industrial extension.
Shopping Centre Redevelopment Vancouver, BC	Analyses and design for multi-phase upgrading and reconstruction of mall complex including conceptual design treatments to increase load carrying capacity of existing foundations and provision of additional support.
Commercial Complex North Vancouver, BC	Evaluation, design, specifications, and field monitoring of dynamic compaction site and foundation improvement treatment for multi-tenant commercial facility.
Warehousing, Office Complex Delta, BC	Investigation, development of design concepts permitting use of shallow foundations and preload treatment, warehousing and office complex.
Food Retail Store Coquitlam, BC	Investigation, development of concepts, detailed design, and construction services for 10,000 m2 food and retail store in weak, compressible soils requiring piles to 50 m depth, preloading and methane gas control measures.

Export Grain Terminal Prince Rupert, BC	Site selection, foundation design, and construction inspection for 3,000,000 ton/year export grain terminal facility.
Chlor-alkali Plant Yugoslavia	Monitoring, senior engineering review, and recommendations on treatment of excess vibrations of chlorine compressor foundations.
Cement Plant Brazil	Senior engineering review of foundation piling requirements for cement plant complex on tropical residual soils.

PROJECT EXPERIENCE – FOREST PRODUCTS FACILITIES

TMP Newsprint Mill Wuzhou, Peoples Republic of China	Preliminary geotechnical investigation of proposed newsprint mill, including detailed boreholes, test pitting, and initial geological mapping of primary and alternate sites as input to feasibility study and cost estimates for proposed newsprint mill, including cuts to 60 m depth in highly weathered rock, fills to 15 m over partially desiccated clays with soft clay at depth. Initial assessment of suitability for foundation support of paper machine, mill buildings, and facilities including log sort and dock.
OSB Plant Barwick, ON	Detailed review of preliminary investigation data, preparation and overall supervision of detailed geotechnical investigation to determine potential for shallow foundation support and site grading requirements for new Oriented Strand Board mill underlain by glacial lake clays. Design of foundation and excavation requirements for heavily loaded and settlement sensitive chippers, former, and press as well as structure and high volume log sort yard.
Machine No. 6 and 7 Modernisation Fort Frances, ON	Investigation and analyses of static and dynamic load carrying capacities and response of pushed or drilled pipe piles and small diameter minipiles through soft clays immediately adjacent to existing overstressed original timber piles as part of modernisation of pulp mill. Detailed field review, consultation, and analysis of load testing on contractor's proposed modifications.
Paper Mill Reconstruction Port Mellon, BC	Specialist geotechnical review and design input during detailed investigations, design, and construction inspection of major paper mill reconstruction and modernisation program. Due to highly complex subsoil conditions, varying from random old and new fills, alluvial and deltaic silts, sands, and gravels to till and bedrock, foundation treatment for paper machine, equipment, and structures required use of a wide variety of methods including dynamic compaction, vibrocompaction stone columns, compaction grouting, and rock socketted piling.
Pulp, Paper, and Sawmill Silifki, Turkey	Site preparation and foundations of integrated pulp, paper, and sawmill complex including barge pier facilities.
TMP Paper Mill Balikesir, Turkey	Site preparation and foundation designs for TMP paper mill complex.
Machine No. 7 Modernisation Fort Frances, ON	Caisson foundations through soft clays immediately adjacent to existing overstressed original timber piles as part of modernisation of pulp mill.

Grinder Room Coquitlam, BC	Pile foundations and vibration isolation treatment for grinder room in weak soils, green veneer plant.
Paper Machine Modernisation Kenora, ON	Shallow foundations for dynamically loaded machine room footings on loose aeolian sand deposits, adjacent to existing heavily loaded footings.
Log Sort and Handling Facilities British Columbia	Investigations and design of log sort or handling facilities to support high-capacity, heavily loaded equipment, Vancouver Island, Coquitlam, and Burns Lake, BC.

PROJECT EXPERIENCE – WATER STORAGE, HYDROELECTRIC DAMS AND DYKES

Investigations and design recommendations for:

Agios Georgios Dam Greece	Agios Georgios earthfill dam to 75 m.
Palialona Dam Greece	Palialona (140 m) concrete arch dam site and seepage control measures from karstic reservoir zones.
Flood Control Dykes Fraser River, BC	Numerous flood control dykes, pump stations along the Fraser River.

PROJECT EXPERIENCE – FOREST RESOURCE INDUSTRIES: FOREST ROADS

Queest Mainline Shuswap Lake Area, BC	Geotechnical reconnaissance and terrain assessment of road alignment, including hazard identification and recommendations on construction.
Logging Road Stafford Lake, BC	Geotechnical evaluation of three alternative 10-km logging road routes. Subsequent detailed terrain stability assessment and construction recommendations for preferred route.
Spius Creek Mainline Spius Creek, BC	Geotechnical reconnaissance and assessment of slope stability along Spius Creek Mainline, including design recommendations on remedial measures for road upgrading.
Logging Road Stafford Lake, BC	Terrain stability assessments for logging road routes to a number of cut blocks.
Logging Road Deception Creek Area, BC	Reconnaissance for road and logging activity, hazard identification, and engineering recommendations on road alignment and construction.
Logging Road Zeballos, BC	Geotechnical evaluation and recommendations for proposed logging road in difficult terrain.

Logging Road Boston Bar, BC	Geotechnical evaluation and recommendations for soil erosion problems along logging road Community Watershed.
Logging Road Terrace, BC	Investigation of rock slide on logging road and alternate route study.
Slope Failure Port Mellon, BC	Investigation of slope failures, Rainy River Valley.
Logging Road Zeballos, BC	Investigation of cut slope stability on logging road and recommendation of mitigative options.
Logging Road Vavenby, BC	Investigation of slide area on logging road.
Logging Road Tahsis, BC	Investigation of slide on logging road.
Logging Road Fraser Canyon, BC	Inspection of logging road cuts.
Big Sheep Mountain Lillooet, BC	Geotechnical reconnaissance, hazard identification, and construction recommendations.
Madsen Creek Road Lillooet, BC	Geotechnical reconnaissance, hazard identification, and construction recommendations.
Two Mile Lake 100 Mile, BC	Geotechnical reconnaissance and preliminary terrain assessment for Blocks R and S including hazard identification and engineering recommendations.
Hasseman Creek Kamloops, BC	Geotechnical reconnaissance of proposed road alignment and alternatives including hazard identification and engineering recommendations.

PROJECT EXPERIENCE – FOREST RESOURCE INDUSTRIES: TERRAIN ANALYSIS AND WATERSHED ASSESSMENT

Kamloops TSA Kamloops, BC	Terrain analysis, geotechnical reconnaissance, and initial hazard assessment for proposed development in community watersheds, including mitigative recommendations.
Lawless Creek Kamloops, BC	Geotechnical reconnaissance and Level A terrain survey including hazard identification and engineering recommendations.
East Blackpool Area Kamloops, BC	Geotechnical reconnaissance and Level A terrain survey including hazard identification and engineering recommendations.
Lawless Creek Kamloops, BC	Geotechnical reconnaissance and terrain assessment of four cutblocks in salvage area including hazard identification and engineering recommendations.

PROFESSIONAL AFFILIATIONS

Registered Professional Engineer, British Columbia and Ontario

Member, International Society of Soil Mechanics and Geotechnical Engineering

Member, Earthquake Engineering Research Institute

Associate Member, American Society of Civil Engineers

PUBLICATIONS

Other

Static and Seismic Stress-Deformation Analyses of a Deep Soil Mix Wall, 4th International FLAC Symposium on Numerical Modeling in Geomechanics, 2006.

Guidelines for Geotechnical and Geo-Environmental Investigations, Member of Task Force acting on behalf of the Canadian Geotechnical Society, 1996 to present.

Guidelines for Geotechnical Engineering Services for Building Projects, Co-Chair of Task Force of the Association of Professional Engineers and Geoscientists of British Columbia, 1994 to 1996.

Embankments on Peatland, International Workshop on Engineering Characteristics and Behaviour of Peat, Sapporo, Japan, March 1995.

Ground Improvement and Testing of Random Fills and Alluvial Soils (with U. Atukorala and D. Wijewickreme), Transportation Research Record No. 1369, January 1992.

"Ground Improvement using Dynamic Compaction", Geotechnical News, Vol. 9, June 1991.

"Deep Seated Consolidation Settlements in the Fraser River Delta" (with C.B. Crawford and N.R. McCammon), Canadian Geotechnical Journal, Vol. 28, 1991.

Soils in British Columbia with Reference to Geotechnical Processes for Trench Excavation (with H. Hawson), British Columbia Waste and Water Association, March 1980.

Concepts in Reclamation and Development of Muskeg Terrain (with H. Hawson), 16th Annual Muskeg Research Conference, October 1975.

Education

M.A.Sc. Civil Engineering, Dalhousie University, Halifax, NS, 2004

B.Sc. Civil Engineering, University of New Brunswick, Fredericton, NB, 1994

Certifications

Professional Engineer, Provinces of British Columbia and Ontario

Golder Associates Ltd. – Abbotsford

Employment History

Golder Associates Ltd. – Abbotsford, BC

Associate (2011) and Senior Water Resources Engineer (1998 to Present)

Technical specialist involved in water resource studies, including flood protection, floodplain assessment, watershed planning, water resource management and environmental impact assessments.

Dalhousie University – Halifax, NS

Researcher (1997 to 1997)

Wrote custom software and used the MODFLOW model to investigate theories associated with increased yield due to sand production in oil wells.

Jacques Whitford Environment Ltd. – Moncton, NB

Engineer In Training (1995 to 1996)

Conducted and prepared reports for Phase I and II Environmental Site Assessments. Conducted and prepared reports for monthly monitoring of contaminated groundwater sites. Constructed hydrologic and hydraulic models.

Fundy National Park – Alma, NB

Hydrologic Modelling and Data System Consultant (1994 to 1995)

Collected and interpreted survey, hydrologic, and atmospheric data. Applied this information to hydrologic modelling. Aided in the design of a database system, wrote custom software for data manipulation, and wrote reports outlining methodology and standards.

PROJECT EXPERIENCE – FLOOD PROTECTION

APEGBC Professional Practice Guidelines – Flood Assessments
Burnaby, BC

Part of the APEGBC review task force contributing to the development of Professional Practice Guidelines – Legislated Flood Assessments in a Changing Climate in BC. The intent of the document was to guide professionals in the practice of flood assessments in BC.

Flood Hazard Assessment
British Columbia

Conducted numerous flood hazard assessments associated with residential and commercial properties throughout BC. The assessments provide an evaluation of the flood hazards associated with the subject properties and present mitigative strategies to address these hazards.

Chilliwack West Dike Upgrade – Chilliwack River / Vedder Canal
Chilliwack, BC, Canada

Hydrologic lead for the design of dike upgrade works along a 3.8 km reach of the Chilliwack River and the Vedder Canal. Dike upgrades included raising the crest of the dike to meet the current provincial design flood standards and evaluation of seismic stability of the dike under various flood conditions.

Fitzsimmons Creek Management Study
Whistler, BC, Canada

Constructed a hydraulic numerical model of Fitzsimmons Creek to evaluate the extent of flooding and the adequacy of the existing dike network under extreme flood conditions. This analysis was also used to evaluate various gravel management strategies for the creek.

Surrey Dike Infrastructure Inventory - 2012
Surrey, BC

Managed a dike infrastructure inventory for the 120 km of dikes under the jurisdictions of the City of Surrey, Surrey, and Colebrook Diking Districts. This inventory included the cataloguing and characterization of over 300 pieces of infrastructure (floodboxes, culverts, pump stations and spillways), related to these diking systems.

The data compiled for each piece of infrastructure were summarized on infrastructure data sheets with entries including position, material, size, photos, general condition and any visible maintenance requirements. Maintenance requirements were further categorized as high, medium, or low priority based on severity and potential consequence.

Bank Stabilization Works – Fraser River at Surrey
Surrey, BC

Provided design input, review and construction monitoring for bank stabilization works at BC Hydro Tower 542/3 located on the south bank of the Fraser River. A significant scour hole developed in the bed of the river adjacent to Tower 542/3 resulting in bank and dike failure and significant the movement in two of the tower footings. Riprap was placed to arrest further scour at the tower site and to provide stabilization of the bank allowing remediation of the tower.

Bank Stabilization Dike Protection - Fraser River at Ridgedale
Abbotsford, BC

Design of bank stabilization works for a 200-m reach on the south bank of the Fraser River. Fluvial processes had resulted in bank failures which were threatening the adjacent Matsqui dike. Stabilization works were designed to be built entirely using water-based machinery.

Bank Stabilization Dike Protection - Fraser River at Nicomen Island
Nicomen Island, BC

Planned, designed, prepared permit applications and provided construction inspection services for 100 m of bank stabilization works which were constructed on the north bank of the Fraser River. Fluvial processes had resulted in bank failures which were threatening the adjacent Nicomen Island Dike.

Dike Protection Works -Fraser River at Barnston Island
Barnston Island, BC

Designed and provided construction inspection services for erosion and dike protection works along Barnston Island in the Fraser River. Shoreline erosion from river flows and wave action from passing vessels were threatening the dike. A combination of self-launching and conventional shoreline armouring was used to protect the dike.

Bella Coola Flood – Emergency Response
Bella Coola, BC, Canada

Geotechnical and hydrotechnical assessment for restoration works to Highway 20 between Bella Coola and Anahim Lake, following an extreme flooding event. Golder's role was in support of ministry staff, road crews and environmental services to restore the road system. As a Site Engineer, responsibilities included site inspections, design of the restoration of flood protection works, bridge abutments and road embankments, construction monitoring, invoice and budget review and tracking and completion reporting.

Horn Creek Bank Stabilization
Abbotsford, BC

Planned, designed, prepared permit applications, specifications and provided construction inspection services for the construction of several sections of bank stabilization and channel restoration works along Horn Creek. The works included gabion and riprap bank stabilization, the installation of large woody debris and extensive riparian planting.

Sewage Lagoon Berm Protection Works
Pouce Coupe, BC

Design of bank stabilization works for a 400 m reach on the bank of the Pouce Coupe River. Fluvial processes had resulted in bank failures and the initial phases of berm failure which were threatening the loss of containment of the adjacent sewage lagoon. Mitigation works were designed to provide a balance between damage to aquatic habitat and the consequence of berm failure.

Bank Stabilization Works – Scott Creek
Coquitlam, BC

Designed and conducted post-construction inspection services for bank protection and stabilization works at multiple locations along Scott Creek where increased storm runoff had resulted in erosion and slope failures which threatened residential developments.

Whonnock Lake Water Level Control
Maple Ridge, BC

Planned, designed, and provided inspection services for water-level control berm to stabilize water levels in Whonnock Lake. Project included fish passage considerations and compensatory works for aquatic, terrestrial, and amphibian species.

Debris Deflection Berm Design
Chilliwack, BC

Design of a debris deflection berm for the protection of several drinking water reservoir tanks. Debris flows along Popkom Creek necessitated the construction of a debris flow deflection berm to protect the reservoir tanks from damage. Tasks included detailed design, specifications and construction inspection.

Debris Flow Protection Works Inspection
Chilliwack, BC

Conducted annual inspection of debris flow protection works. These works, which were designed and constructed by Golder, included debris training berms and a debris containment basin. The purpose of the inspection was to evaluate the current condition of the flood protection works and to identify any required maintenance for these works.

PROJECT EXPERIENCE – HYDROLOGY/HYDRAULICS

Surface Water Study
Horn River Basin, BC

The analysis of the hydrologic setting within the Horn River Basin. The main objective of the study was to gain additional understanding of the surface water availability in the Horn River Basin and potential for water scarcity as gas development activities continue to expand. The results of this study are currently being used to assists regulators and surface water allocation decision makers identify risk and gaps in surface water information.

Water Availability Assessment
Horn River Basin, BC

A regional level hydrologic assessment of the Horn River Basin was conducted to evaluate water availability to support the identification of watersheds with the potential to support petroleum development operations.

SmartCentres Storm Water Management, Planning, and Design
Surrey, BC

Assessed the pre- and post-development hydrologic conditions at the site of a 30-ha retail development. The study included the evaluation of pre- and post-development hydrologic conditions and downstream erosion potential. This study also involved the design of low impact development features in order to meet DFO guidelines.

Fisheries and Oceans Canada Storm Water Assessment and Design
Campbell River, BC

Investigation and analyses of the urban drainage flowing into the Campbell River Harbour. The study included the numerical modelling of the catchment area and the design of infrastructure to improve the runoff quality flowing into the harbour.

Petroleum Development Road Stream Crossing Design
Horn River Basin, BC

Analyzed six stream crossings for a petroleum development road. All stream crossings were designed according to the BC MoT Supplement TAC Geometric Design Guide. The project also included the estimation of scour depths and the design of scour protection measures.

Gas Pipeline River Crossing Assessment - Pitt River
Coquitlam, BC, Canada

A hydraulic assessment of the risk of scour uncovering Terasen's existing natural gas pipeline crossing the Pitt River near its confluence with the Fraser River. A two dimensional hydraulic model (RMA10) of the confluence of the Fraser and Pitt Rivers was developed and calibrated and the existing conditions were evaluated. The model was modified to include a proposed blanket of riprap scour protection over the pipeline and the conditions were re-evaluated to assess the possible effects of such works on adjacent structures such as bridge piers and other pipelines.

Groundwater and Surface Water Interaction Study
Halton Region, ON

Conducted a field investigation, measuring groundwater levels and water flows in several streams throughout the West Sixteen Mile Creek watershed. Conducted a statistical analysis on the historical record of flows in Sixteen Mile Creek.

Contaminated Site Cleanup
Sydney Tar Ponds, Sydney, NS

This study was conducted in association with the proposed on-site encapsulation of the contaminated sediments within the Sydney Tar Ponds. The study investigated the capping of the pond and the construction of a channel through the cap to convey Muggah Creek and Coke Oven Brook. Constructed a hydrologic model to estimate storm runoff hydrographs associated with the study area, and then constructed a hydraulic model to estimate the water levels and flow velocities associated with various channel configurations.

PROJECT EXPERIENCE – POWER GENERATION

BC Hydro ILM Environmental Impact Assessment Lower Mainland, BC	Hydrologic Lead for an environmental impact assessment of the construction and operation of a 250-km-long, high voltage, overhead electric transmission line. The project included the evaluation of over 500 stream crossings.
BC Hydro NTL Environmental Program Management Terrace to Bob Quinn Lake, BC	Provided design input and senior review for several fish habitat compensation projects which were key components of the implementation phase of the Northwest Transmission Line (NTL).
Flow Monitoring and Analysis Spuzzum, BC	Designed, installed, and maintained three continuous flow monitoring stations on Spuzzum Creek for a three-year period. Tasks included the interpretation and statistical analysis of results. Recorded flow data were used to synthesise a long-term hydrograph which was used in the design of a run-of-the-river power generating station.
Environmental Impact Assessment Pickering A Nuclear Generating Station Pickering, ON	Hydrotechnical field investigation lead. Tasks included delineating flow paths and drainage boundaries and installation of equipment for the measurement of flows and the collection of water samples. Identified and assessed potential issues and impacts associated with the station' return to service.
Thermal Plume Modelling - Pickering Nuclear Generating Station Pickering, ON	Constructed a three-dimensional, finite element, hydraulic circulation computer model. The model simulates the lake currents and the thermal discharges from the Pickering Nuclear Generating Station to Lake Ontario. This modelling was conducted to aid in the evaluation of the effects of restarting the Pickering A Nuclear Generating Station on the aquatic habitat in Lake Ontario, near the station.
Contaminant Transport Modelling and Spill Event Simulator-Pickering Nuclear Generating Station Pickering, ON	Constructed a contaminant transport model based on the hydraulic circulation model that was used to simulate the thermal plume trajectories. Three-dimensional hydrodynamic and water quality simulations for various operational, spill, and lake conditions were conducted. The estimates produced by this model were used to construct a tool to assist plant operators at the Pickering Nuclear Generating Station with improved emergency response in the event of a tritium spill to Lake Ontario.

PROFESSIONAL AFFILIATIONS

Association of Professional Engineers of Ontario

Association of Professional Engineers and Geoscientists of British Columbia

Education

Green Roof 201 and 301 Short Courses, Vancouver, BC, 2007

Visual Resource Management Short Course, Vancouver, BC, 1994

Fish Forestry Guidelines Short Course, Vancouver, BC, 1994

Biotechnical Slope Protection and Erosion Control Short Course, University of Michigan, Ann Arbor, Michigan, 1990

Bachelor of Landscape Architecture, University of Guelph, Guelph, Ontario, 1975

Golder Associates Ltd. – Nanaimo

Landscape Architect

David has been pioneering new areas of practice for more than 37 years. David practices as both a land use planner and a landscape architect, and is heavily involved in green infrastructure planning and design. Many of David's projects have focused on water—ranging from watershed planning to water conservation strategies, and waterfront improvements to watercourse restoration. David has been instrumental as liaison among levels of government, local government departments, and the development community. His many innovative contributions include key titles in the Stewardship Series, Metro Vancouver's Stormwater Source Control Design Guidelines and their Irrigation Best Management Practice Guide, Regional District of Nanaimo Action for Water program, and Kelowna's Outdoor Water Conservation Initiative. David has applied policy and design guidelines into local government Official Community Plans, Development Permits, Zoning and Subdivision Bylaws, and Water Regulations. He also has been project director and designer on many constructed projects that incorporate these best practices. Most recently David has been active in planning for adaptation to climate change, including Sea Level Rise and related coastal planning and shoreline design strategies. David's passion is to 'make sustainable development standard practice'. His clients are proceeding rapidly towards that goal.

Employment History

Golder Associates Ltd. – Nanaimo and Vancouver, BC
Principal/Environmental Planning Practice Leader/Senior Landscape Architect (2011 to Present)

Reflecting opportunities for greater geographic and interdisciplinary reach, merged with Golder Associates 8000 person worldwide company. This allowed continued service to existing clients and expanded multidisciplinary teamwork for projects across Canada and internationally.

HB Lanarc Consultants Ltd. – Nanaimo and Vancouver, BC
Principal/Landscape Architect (2008 to 2011)

Organized a merger of Lanarc Consultants and Holland Barrs, to create HB Lanarc serving BC and western Canada clients. Grew to a vibrant consultancy of 40.

Lanarc Consultants Ltd. – Nanaimo, BC
Principal/Landscape Architect (1986 to 2008)

Created Lanarc Consultants, and established a growing practice servicing communities on Vancouver Island and serving senior government agencies. Also involved with local governments in BC Lower Mainland, and heavily involved with SFU UniverCity.

Pacific Landplan Collaborative Ltd. – Vancouver and Nanaimo, BC
Principal/Landscape Architect (1976 to 1985)

Youngest of five principals that established this new national practice. Started the Vancouver office, and grew it to 10 prior to growing a branch office on Vancouver Island. As well as many development and institutional projects, undertook leading projects at Stanley Park in Vancouver, Brighouse Park in Richmond, and in Nanaimo's waterfront and downtown.

D.W. Graham Associates – Ottawa, ON
Landscape Architect (1975 to 1976)

Consulting projects focussed on housing, office and university site plans. Contributed to visual resource management and land use planning for hydro transmission corridor studies.

PROJECT EXPERIENCE – WATERSHED, ENVIRONMENTAL, AND GREEN INFRASTRUCTURE PLANNING

Concert Properties Sea Level Rise Adaptation at Harbourside
North Vancouver, BC

Project Director for strategic and detailed advice on how this major 3-block rezoning can address the risks of Sea Level Rise (SLR). Working closely within the developer's consulting team, leading the Golder team of planners, landscape architects and engineers in advising on building Flood Construction Levels appropriate for Year 2020 and 2100, and integrating the SLR strategy into the architectural and waterfront design. Also providing companion sustainability advising services on site and building performance and related targets.

Courtenay Integrated Flood Management Study
Courtenay, BC

Providing land use adaptation and community engagement services as a subconsultant to a team of water resource engineers. Building public and first nations consensus around immediate and long-term adaptations to increasing risk of river flooding and estuary Sea Level Rise.

Sechelt Waterfront Sea Level Rise Adaptation
Sechelt, BC

Provided design charette, land use, parks/trails and community engagement services to support a team of coastal and water resource engineers addressing erosion and Sea Level Rise impacts in this small coastal community. Facilitated workshops, on-line surveys, and development of guidelines.

Guidelines for Management of Coastal Flood Hazard Land Use
British Columbia

Coauthor of a Provincial Guideline for BC on adaptation of coastal land uses to increasing risks from Sea Level Rise (SLR). Reviewed precedents worldwide, and created a policy framework for British Columbia, with John Readshaw and Harriet Rueggeberg.

Playland Sustainability Strategy
Vancouver, BC

Providing sustainability consulting services with Forrec Consultants to City of Vancouver, for a major expansion and redevelopment of Playland at the Pacific National Exhibition and Hastings Park site. The plan incorporates stormwater concepts to support a future daylighting of the local stream, plus developing analyses, policies and targets to support water conservation, energy, GHG, waste management, and greening, towards an application of the City of Vancouver's Greenest City Action Plan.

Metro Vancouver Irrigation Best Practices Guidelines
Greater Vancouver, BC

As part of Metro Vancouver's Smartsteps program for business, created guidelines for building managers to improve existing landscape and irrigation systems, in order to address current issues of wasteful outdoor water use. Included a series of calculators and benefit:cost tools, checklists, tips and guidelines.

City of Calgary Low Impact Development Guidelines
Calgary, AB

Provided strategic consulting and engagement services to an engineering team to develop City of Calgary guidelines for absorbent landscape, bioswales and bioretention aspects of Low Impact Development. Worked with in-house soils specialists to refine soils standards to meet infiltration criteria while being appropriate to Calgary conditions. Undertook detailed review of chinook-appropriate plant materials. Facilitated client and stakeholder communications.

Metro Vancouver Stormwater Source Control Design Guidelines
Greater Vancouver, BC

As prime consultant, led a worldwide precedent review of stormwater low impact practices in climates similar to Vancouver. Led creation of posters, technical design guidelines, outline specifications, and design illustrations. Scope of guidelines covered absorbent landscape, infiltration swales, rain gardens, green roof and infiltration structures.

Landscape + Irrigation Water Conservation Strategy, City of Kelowna
Kelowna, BC

Completed a major outdoor water conservation program in collaboration with local WaterSmart and City staff. Created public outreach brochures, a series of 6 video shorts, development permit guidelines, engineering standards, and water use regulations. The work includes a Landscape Water Budget calculator. Led technical presentations and facilitated a series of events with industry in Kelowna. Provided support through interdepartmental liaison, bylaw adoption and public roll-out.

Engineering Design Standards, Campbell River, 2007 Version
Campbell River, BC

Led a team of landscape architects, civil and transportation engineers to create an innovative set of engineering standards that integrate stormwater source controls, erosion and sediment control, and other current best practices. Facilitated an industry stakeholder group, interagency and utility coordination, and led creation of typical cross sections, details, design and construction standards and specifications. Supported bylaw review, piloting, and subsequent adoption of the standards.

Byrne Creek Integrated Stormwater Management Plan (ISMP)
Burnaby, BC

Provided stakeholder facilitation, land use and stormwater source control advice to an engineering group writing this ISMP. Worked to identify strategies to improve watershed health as redevelopment of streets and land use occurs in this built-out watershed. Have provided similar services on several other ISMPs.

Partington Creek Integrated Watershed Management Plan
Coquitlam, BC

As a companion assignment to our neighbourhood planning study, worked with in-house specialists and consulting engineers to provide stormwater source control, land use, and stakeholder engagement services in support of an ISMP for this planned new community of 10,000 people.

Stormwater Planning: A Guidebook for British Columbia
British Columbia

With Kim Stephens, co-authored a policy manual and guideline for the Province of British Columbia. Provided stormwater source control, land use, design process, risk-based methodology, and select writing and illustration of the document and associated pilot study.

UniverCity (Simon Fraser University) Environmental Design
Burnaby, BC

Led the environmental design and approvals that were critical to successful startup of the award-winning UniverCity community at SFU. As part of a large multi-disciplinary team, facilitated local government environmental and fisheries approvals, and integrated stormwater, water quality, tree and upland habitat protection into the urban design of this high density community. With in-house specialists, completed detail design of phase one environmental works, and assisted with field reviews during construction of site erosion control, vegetation management, daylighted watercourses and constructed wetlands.

Action for Water, Regional District of Nanaimo
Nanaimo, BC

Led, with Harriet Rueggeberg, policy and program development to address watershed and groundwater risks within this rapidly growing regional district on Vancouver Island. Provided stakeholder facilitation and planning advice, developed the action plan, and established program priorities and budgets. Created video and presentation support for a successful funding referendum. Follow-on assignments with the appointed 'Drinking Water and Watershed Protection Coordinator' used GIS and stakeholder (community) mapping techniques to summarize key issues in the watersheds and groundwater of the region.

Water Conservation and Reuse Research
Nanaimo, BC

For the Regional District of Nanaimo, led a research project to review 'fit for use' water strategies from around the world, and how they might apply to this coastal region. Created a technical report and presentations that highlighted opportunities for water conservation and rainwater harvesting. Reviewed the limitations of blackwater and greywater reuse. Summarized incentives and motivators for implementation.

Urban Forest Master Plan, City of North Vancouver
North Vancouver, BC

Led a review of the benefit:cost of the City of North Vancouver's urban street tree collection. Incorporated software and expertise from the US Department of Agriculture Forest Service, to calculate the benefits in greenhouse gas or other pollutant mitigation, stormwater management, property values, and energy use. A benefit:cost ratio of 5:1 was determined. Provided urban forest guidelines, standards, and presentations.

Environmental Protection Programs
British Columbia

Created Environmental Protection Programs for both the City of Campbell River and the City of North Vancouver. In both cases, the plan established priorities and a 5-year Action Plan with budgets and assigned roles to implement practical improvements in environmental performance.

Estuary Management Plan
Campbell River, BC

Provided mapping, land use, recreation analysis and writing service to Witty Planning Consultants and the City of Campbell River to create a management plan to help restore the Campbell River Estuary from its former industrial uses.

Watercourse Daylighting Projects (various)
British Columbia

In a series of projects, have supervised concepts and detail designs for constructed watercourses. Cumulatively, this has restored several kilometers of functioning watercourse habitat. Key projects have included Haig-Brown Kingfisher Creek (Campbell River), Thain Creek (North Vancouver), Morningstar Creek (RDN), Creekway Park (Vancouver), and UniverCity (SFU). Provided key input to proposed Smith Creek relocation/restoration in West Kelowna.

PROJECT EXPERIENCE – COMMUNITY AND NEIGHBOURHOOD PLANNING

Cowichan Valley Environmental Strategy
Cowichan Valley Regional District, BC

With in-house specialists, creating a framework for environmental management in this regional district between Nanaimo and Victoria on Vancouver Island. Provided key input on carrying capacity and precedent approaches that have been successful in prior projects.

Capital Regional District Otter Point Official Community Plan Review
Victoria, BC

Facilitated a review of the Official Community Plan for a rural area of the Capital Regional District near Victoria, BC. Led extensive public process, creation of community mapping, displays and presentations, on-line surveys, and related policy discussions.

Surrey Green Infrastructure Network
Surrey, BC

Led the mapping and stakeholder review of a green infrastructure network across this rapidly growing city. With ecologists and GIS specialists, organized a scientific approach to identifying ecological hubs, sites and corridors to create a linked network of habitats. Facilitated a review of implementation approaches among City and senior government agencies.

Surrey Blueways Study
Surrey, BC

Worked with the agricultural community and other stakeholders to create a management plan for recreational use of Surrey's waterways - in particular the Serpentine and Nicomekl Rivers.

Dawson Creek Development Permit Guidelines
Dawson Creek, BC

Created development permit guidelines for water conservation for this northern town's Official Community Plan.

Partington Creek Village Neighbourhood Plan
Coquitlam, BC

With in-house specialists, led an extensive neighbourhood planning process for this new community of 10,000 people. Integrated plan directions for slope-sensitive road, trail and subdivision patterns, land use distribution including residential, schools, parks and mixed use village. Coordinated carefully with the parallel prize-winning Integrated Stormwater Management Plan. Facilitated stakeholder, staff committees and public process, including related presentation materials.

Nunns / Quinsam Neighbourhood Plan
Campbell River, BC

Facilitated a neighbourhood planning process in a key future urban growth area of the City. Provided land use and development concepts, parks, trails and environmental guidelines. Incorporated these factors with steep slopes, creek riparian areas, and the existing City Greenway trail and future Willis Road extension.

Smart Growth Plan, North Campbell River
Campbell River, BC

Created a neighbourhood plan for the northern quadrant of the City, including former industrial lands adjacent to the Campbell River. The project included full land use planning, building massing guidelines, movement networks and environmental planning. Worked with consulting biologists and created development permit guidelines for shoreline conservation and restoration. In-house specialists provided 3D visualizations in support of successful plan adoption.

Parks and Greenway Strategic Plan, Green Necklace
City of North Vancouver, BC

In two assignments, created a Parks and Greenways plan for the City, that established policies, plans and guidelines, focusing on a reinstatement of the heritage 'Green Necklace' from the original town plan. Worked closely with City staff, advisory committee, and Council for successful adoption. Created a video animation showing existing and future key changes to the Green Necklace.

Mt. Washington Alpine Resort Comprehensive Rezoning Process
Comox Valley, BC

Completed rezoning concepts and documents and led a facilitation process, towards a successful rezoning application for this unique subalpine resort on Vancouver Island.

Rural Comox Valley (Area C + D) Community and Greenway Planning
Comox Valley, BC

In two separate assignments, provided rural neighbourhood plans for electoral areas of the Comox Valley. The work was focused on containment of land use sprawl, plus provisions for regional green space and trails networks. Facilitated a series of country hall meetings. Created an 'options video' as a key tool.

Campbell River Official Community Plans
Campbell River, BC

Involved in a series of updates to Campbell River's Official Community Plan. In most recent reviews, provided detailed language and development permit wording integrating aquatic, terrestrial, shoreline, water conservation and other environmental guidelines.

Qualicum Beach Official Community Planning (several projects)
Qualicum Beach, BC

Over a period of 30 years, provided regular review and updates to the Town of Qualicum Beach's Official Community Plan. In early years, added parks, green space, trail and environmental aspects of the plan. In the last review, the consulting assignment covered all components. Have provided related services in neighbourhood planning and public outreach, on-line surveys, and presentations.

Nanaimo Landscape in City Streets Study, Engineering Standards
Nanaimo, BC

Produced landscape and engineering cross sections, detail designs and specifications that are incorporated in the City's engineering standards. These guidelines integrate landscape, street trees, watering systems, and growing medium into surface and utility design and construction management.

Landscape and Screening Provisions, City of Nanaimo Zoning Bylaw
Nanaimo, BC

Authored the first landscape and screening provisions in the City's Zoning Bylaw. Addressed the need for certainty and yet reasonable flexibility in landscape treatments.

Kingfisher Creek Watershed and Development Management Plan
Campbell River, BC

Working for a large local landowner / developer, created a neighbourhood plan for a major new community. Facilitated a cooperative arrangement with the Haig-Brown Kingfisher Creek Society, local and senior governments, leading to both plan adoption and major habitat enhancements in the watershed.

Courtenay Riverway Planning
Courtenay, BC

Created the first policy guidelines and concepts for the 'Riverway' along the Courtenay River. Incorporated into the City's Official Community Plan, the policies have led to the completion of a successful mixed use neighbourhood plus a continuous waterfront walk/greenway system that is a focal point of the City. Provided detail design of many parks/trail segments.

Development Planning (various)
British Columbia

Completed services to support development applications (Courverdon, Island Timberlands, Concert Properties, Insight Developments, SFU Community Trust and various clients) in rezoning, subdivision, urban design, environmental design, or parks/landscape design. Project uses have ranged from single family to high density residential, commercial, industrial, transportation, and in communities ranging from villages to metropolitan contexts.

PROJECT EXPERIENCE – PARKS AND URBAN DESIGN

Creekway Park, Vancouver
Vancouver, BC

Assisting in-house specialists with planning and detail design of Creekway Park. This new daylighted stream and walk/bike connection will link New Brighton Park and Hastings Park. The project is tendered, on budget, and entering construction.

Robron Athletic Park Master Plan and Detail Design
Campbell River, BC

With in-house specialists, completed a Master Plan and related community engagement to guide phased improvements ($6M budget) including synthetic turf fields, sand-based grass fields, spectator areas, parking, utilities, lighting, trails, planting and buffers, as well as field house location. Provided detail design and specifications that are 'shovel ready'. Phase 1 - lacrosse box and tennis improvements - are constructed and well utilized. Fund-raising for subsequent phases is underway.

North Okanagan Parks and Trails Standards
North Okanagan Regional District, BC

With in-house specialists, creating parks and trails standards for this interior BC regional district and its component municipalities (Coldstream, Vernon). The new standards are very comprehensive, addressing park classification, facility checklists, standard details for a wide range of outdoor sports, trails and parks facilities, related design, construction and maintenance specifications. The objective is to create a decisive set of standards for creation and administration of a lasting parks legacy.

Calgary Trails Improvements
Calgary, AB

In two separate projects for Calgary Parks, and in coordination with in-house geotechnical specialists, provided site assessment, planning, and detailed guidelines for trails and adjacent environmental/slope hazard mitigation.

Port Alberni Waterfront and Uptown Urban Design
Port Alberni, BC

Completed a waterfront, land use and streetscape urban design to link the waterfront and uptown retail area of Port Alberni. Worked jointly with the City and the Port Authority. Included concepts for improved cruise ship support facilities, redevelopment of underutilized waterfront lands, and streetscape improvements and land use infill to create an inviting urban area for tourism development.

Maritime Heritage Park
Campbell River, BC

Assisted in the early conversion of a former sewage tank building into what is now the Maritime Heritage Museum in Campbell River. In a recent assignment, created parks plans (with in-house specialists) to provide waterfront trail, shoreline restoration including green shores, and upland stair access in the adjacent city lands.

Nanaimo Waterfront Parks and Trails System (several projects)
Nanaimo, BC

Provided parks and detail design for several projects on Nanaimo's waterfront walkway. The showcase project is Swy-a-lana Lagoon, by which the Port of Nanaimo began the transformation of Nanaimo's waterfront. Projects that followed included land base for the waterfront 'Lighthouse Bistro', Petro-Canada Park, and Cameron Island with in-house specialists. Recent projects have considered waterfront improvements in Departure Bay and in the Assembly Wharf areas.

Town of View Royal Parks and Trails Plan
View Royal, BC

Completed, with in-house specialists, a parks and trails strategy for this town near Victoria. Included policies, capital budgets, and a focus on improvements to existing parks and linkages.

Campbell River Parks Strategic Plans
Campbell River, BC

With PERC Consultants, created the first Parks Strategic Plan for the City in 2006. The project reviewed parks trends, gaps, and need for new facilities or quality improvements. Recommendations and a detailed 10-year budget were created. By facilitating public process, and working with Council, the plan was adopted. A follow-up assignment, including a video production, led to the adoption of a Parks Parcel Tax which provided ongoing funding. Completed a five-year review of the program in 2012, which highlighted many successes, including the City using the program to raise funds from outside sources that exceeded the City investment.

Simms Millennium Park, Standard Park, Lagoon Park, and Riverway Implementation
Courtenay, BC

In a series of projects for the City of Courtenay, created detail designs and supervised construction of much of the 'Riverway' waterfront open space and trails system. A showcase is Simms Millennium Park, which took a disused area and created both salmon habitat side channels and cultural showcase/farmers market area. A second innovation is the conversion of the prior sewage lagoon into salmon and waterfowl habitat, with trails and viewing platforms overlooking the Comox Estuary, the River, and the activity of the Courtenay AirPark.

First Nation / City / Provincial Parks Liaison
Nanaimo, BC

Facilitated a co-management process for Newcastle Marine Provincial Park. This was the first application of BC Parks in this arrangement, where representatives of the Snuneymuxw First Nation, City of Nanaimo, and BC Parks undertook a joint review of the Park Management Plan.

Provincial Parks Improvements
British Columbia

Project Director for a series of improvement projects at Provincial Parks, including Rathtrevor, Little Qualicum Falls, and Cape Scott. Provided detail design of the new 'accessible' soft surface trail between the Mt. Washington Nordic Lodge Area and the Paradise Meadows trails system. Also supervised an implementation plan for the Vancouver Island North Coast trail project.

Willow Point Park Master Plan and Implementation
Campbell River, BC

Created the first comprehensive master plan for the major community sports park in Campbell River. Following adoption of the Master Plan, produced detail design for park development, including major sports field complexes, trails, irrigation, and phased improvements and provided construction-related services.

North Island College Campuses
Courtenay and Port Alberni, BC

With in-house specialists, provided site planning, walk/plaza, and hard/soft landscape design for these two community college campuses.

Port Hardy Waterfront and Nature Trail
Port Hardy, BC

In a series of assignments, provided planning and design studies to guide improvements to this rural town's waterfront. Included pier and urban waterfront design for the central pier area, as well as a waterfront trails system along the estuary and riverfront to provide tourism infrastructure.

PROJECT EXPERIENCE – HIGHWAY/STREETSCAPE, RECREATION, AND VEGETATION MANAGEMENT

Arterial Streetscape Projects
Vancouver Island, BC

Provided consulting services to Parksville, Gold River, Courtenay and Nanaimo on roadside and landscape improvements associated with arterial roadway improvements. Cumulatively, these services improved over 10 kilometres of urban roadway.

Inland Island Highway, Pat Bay Highway
Vancouver Island, BC

Consulted to several engineering teams and BC Transportation on aesthetics, recreation and roadside factors. Projects included three interchanges on the Pat Bay Highway near Victoria, and early/ innovative sections of the Inland Island Highway near French Creek.

Nanaimo Parkway
Nanaimo, BC

Consulted in four different engineering teams for the 17 km Nanaimo Parkway - providing leadership on highway aesthetics, roadside and recreation factors. Conceived the concept of this becoming a Parkway, and applied the principles of the Manual of Aesthetic Design Practice to achieve an efficient and attractive corridor through Nanaimo for both local and tourist traffic.

Island Highway Improvement Concepts
Campbell River, BC

Created design concepts for a 6 kilometre corridor of waterfront - addressing both waterfront parks and the arterial highway corridor. Led a team with transportation and civil engineers to create a comprehensive and phased redevelopment program with a $50M budget. The project includes a multi-use waterfront trail system, roadside bikeways, transit facilities, turning lanes, improved storm drainage, lighting and planting. Provided stakeholder engagement - both technical and community. The project is being implemented in phases, with about 1/3 of the 6 km constructed.

Fifth Street Revitalization, Courtenay
Courtenay, BC

Supervised the detail design of streetscape improvements which increased the ambience of this very successful urban main street.

Comox Street Revitalization
Comox, BC

Provided detailed urban and streetscape design services as part of a main street redevelopment project in this seaside town. Created context-appropriate designs for lighting, street furniture, paving, and banners that reflected the maritime heritage of Comox.

PROJECT EXPERIENCE – VIDEO PRODUCTIONS

Video and Multimedia Projects, for a variety of local governments and agencies
British Columbia

Using a digital studio, creates videos that are adapted to a wide variety of formats, including Blu-ray, DVD, web and iPad. They are used on client websites, as part of live presentations, and made available for stakeholder use. Titles have included:

- Constructed Watercourses, for City of Vancouver
- Waterfront Trails, for City of North Vancouver
- 2016 Olympics Video, Rio de Janeiro (Portuguese with English subtitles)
- Water Conservation Video Series (6 titles), for City of Kelowna
- Active Transportation, for BC Recreation and Parks Assn/health partners
- Cycle Plan Precedents, for Town of Qualicum Beach
- Action for Water, for Regional District of Nanaimo
- Stormwater, the Forgotten Resource, for City of Nanaimo
- UniverCity, Five Years in Five Minutes, for a real estate conference
- Planning Options for Area C, for Comox Strathcona Regional District
- Difficult Choices - Neighbourhood Plan, for City of Nanaimo
- Parks and Greenways Plan Options, for City of North Vancouver
- Surrey Blueways Program, for City of Surrey
- Recreation Precedents and Options, for City of Campbell River

SUPPLEMENTAL SKILLS

Speaking Engagements

An experienced communicator, who is often a keynote or session speaker at professional or outreach events. Speaking engagements have included one or more presentations to:

- *Federation of Canadian Municipalities*
- *Association of Professional Engineers and Geoscientists BC*
- *Planning Institute of BC*
- *BC Parks and Recreation Association*
- *British Columbia Society of Landscape Architects*
- *British Columbia Water and Waste Association*
- *Columbia Basin Trust*
- *Trails and Pathways National Symposium, Alberta*
- *Green Building Saskatchewan, Saskatoon*
- *South Saskatchewan Watershed Society*
- *Real Property Institute of Canada, Montreal*

Outreach Programs

As a leader in development of new or evolving environmental policy, Mr. Reid has been a key presenter in several outreach programs, including:

- *Highway Aesthetics training programs - events across BC*
- *Community Greenways outreach - several locations*
- *Sea Level Rise Adaptation workshops - two events*
- *Stream Stewardship - several events*
- *Kelowna Outdoor Water Conservation outreach - five events*
- *Stormwater Planning - several events*

PROFESSIONAL AFFILIATIONS

Fellow of the Canadian Society of Landscape Architects (FCSLA)

Member, Irrigation Industry Association of British Columbia

PUBLICATIONS

Web Documents

Readshaw, J., Reid, D., Rueggeberg, H. 2011. Guidelines for Management of Coastal Flood Hazard Land Use, Climate Change Adaptation Guidelines for Sea Dikes and Coastal Flood Hazard Land Use, BC Ministry of Environment.

Reid, D. et al. Stormwater Source Control Design Guidelines. 2005. Greater Vancouver Sewerage and Drainage District (Metro Vancouver).

Reid, D., Smith, B. 2005. A Guide to Using and Developing Trails in Farm and Ranch Areas. Vancouver. BC Ministry of Agriculture, Fisheries and Food.

Books

Stephens, Kim, Patrick Graham, David Reid et al. 2002. *Stormwater Planning: A Guidebook for British Columbia*. Vancouver, Environment Canada, BC Environment.

Nener, Jennifer, David Reid, Doug Backhouse et al. 1997. *Watershed Stewardship: A Guide for Agriculture*. Vancouver, Fisheries and Oceans Canada.

Reid, David, Bill Buholzer, Legal Review et al. 1997. *Stewardship Bylaws: A Guide for Local Government*. Vancouver, Fisheries and Oceans Canada, BC Environment.

Backhouse, Doug, David Reid et al. 1995. *Community Greenways: Linking Communities to Country and People to Nature*. Victoria, BC, BC Environment, Fisheries and Oceans Canada.

Reid, David, Doug Backhouse et al. 1994. *Stream Stewardship: A Guide for Planners and Developers*. Vancouver, BC, Fisheries and Oceans Canada, BC Environment.

Reid, David, Doug Backhouse et al. 1991. *Manual of Aesthetic Design Practice*. Victoria, Province of British Columbia, Ministry of Transportation and Highways.

Chapters

Lefebvre, D., Fisher, S., Reid, D. et al. 2004. Managing Stormwater. Landscape Guide for Canadian Homes. Canada Mortgage and Housing Corporation.

Appendix D

Technical Memorandum, C. Coles, P. Eng.

Golder Associates

TECHNICAL MEMORANDUM

DATE March 20, 2014 **REFERENCE No.** 1314470099-005-TM-Rev0

TO Ms. Francesca Marzari
Young Anderson

FROM Christopher Coles, P.Eng. **EMAIL** ccoles@golder.com

DRAINAGE OBSERVATIONS, PROFESSIONAL OPINION AND RECOMMENDATIONS
2600 SWAN ROAD, DENMAN ISLAND, BC
AUGUST 9, 2013

Golder Associates Ltd. carried out a visual site reconnaissance of the existing site conditions at the 2600 Swan Road Site. This memorandum presents the author's observations of drainage conditions at the above referenced Site and the lands immediately surrounding the Site on August 9, 2013, as well as my assessment and professional opinion on the impact on the drainage conditions at the Site due to the excavations, structures, the removal of vegetation and other modifications to the original site conditions and drainage. This memorandum also presents comments and recommendations on drainage and sub-drainage improvements and remediation measures.

I am aware of my duty under Rule 11-2 of the British Columbia Supreme Civil Rules to assist the Court, and not assume the role of an advocate for any party, and I certify that this report is made in conformity with that duty, and that if called on to give testimony, I will do so in conformity with that duty. I am the person primarily responsible for the opinions expressed in this report.

1.0 OBSERVATIONS – 2600 SWAN ROAD SITE

The bounds of the Site are illustrated on Figures 1 and 2. The Site drains to the east. The catchment area associated with the property is generally limited to the property boundaries to the north and south and Swan Road to the west. The Site and receives limited off-site drainage. Swan Road is immediately adjacent to the Site on the west side. The ditch along the west (upslope) side of the road conveys collected flows south along the Swan Road beyond the 2600 Swan Road property. The outlet of a concrete box culvert crossing the road located a short distance south of the southwest corner of the Site was located but field observations indicated that the upstream end of the culvert was blocked or buried rendering it ineffective.

On the east side of Swan Road adjacent to the Site there was a small swale along the road. This swale generally drains to the south to a nominal 0.3 m diameter culvert beneath the driveway entrance and discharges into a larger ditch located a short distance south of the Site.

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As shown in Figure 2, a ditch which is approximately 1.5 to 2 m deep, extends east from Swan Road towards the crest of the bluff along an irregular alignment within or a short distance south of the south property line of 2600 Swan Road. A ditch from a pond, located on the property, joins this ditch. At the time of the site visit there was no flow in the pond or in the ditch. The blockage shown in Figure 2 and Plate A-8 appeared to be effectively preventing a direct connection between the existing onsite surficial drainage network (onsite ponds and ditches) and the crest of the bluff. It is anticipated that, during wet periods, the ditches and pond would fill, providing storage of the collected flows until overtopping occurs at a low spot along the bank of the ditches or pond.

Another shallow channel or ditch, which appeared to have been recently excavated within the adjacent property, was observed close to and roughly paralleling the common property line. This shallow channel extended east close to the crest of the bluff. Although the survey illustrated in Figure 2 shows the shallow channel as being directly connected to the deeper ditch at the 2600 Swan Road property boundary, a direct connection between the ditch and the channel was not observed at the time of the site visit.

It is understood through discussions with the homeowner that a sub-surface drainage system collects runoff from the roof leaders and groundwater from the drain tile surrounding the house foundation. The collected flows are conveyed east across the property to the cistern shown in Figure 2 and then down the bluff slopes through a network of corrugated plastic pipes (see Plate A-20) to discharge at about the toe of these slopes. It is further understood that a sub-surface drain tile intercepting shallow groundwater flows extends north from the cistern as shown in Figure 2. Outflow from this drain tile is combined with the flows from the house and is directed over the crest of the bluff slopes. Site observations generally agree with the reported positions and functions of the sub-surface drainage system.

2.0 ASSESSMENT, PROFESSIONAL OPINION AND RECOMMENDATIONS

Based on both previous and recent geotechnical engineering assessments and professional opinions that the bluff escarpment slopes will continue to retrogress, it is my professional opinion that regular inspection and maintenance of the existing drainage network of corrugated plastic pipes which extends over the escarpment are not considered viable in the long term. In order to provide long term water management on the site, it is recommended that the network of corrugated plastic drainage pipes directed towards and extending onto and down the bluff slopes and the associated works be decommissioned as shown in Figure 2. In order to mitigate the impacts of the property development and to reduce the potential for concentrated flows reaching the embankment the following works are recommended:

- Construct an interceptor swale extending North and South from the existing cistern as shown in Figures 2 and 3 (see Denman Island Land Use Bylaw 2008 Komas Bluff Guideline 5);
- It is anticipated that the crest of the escarpment will continue to migrate westward in the long term and if unmitigated will eventually compromise the interceptor trench. It is recommended that the setback of the interceptor trench to the crest of the escarpment, defined as the top of slopes that are steeper than 2 horizontal to 1 vertical, be monitored at least every 10 years with a report presenting an assessment and recommendations related to site drainage conditions prepared by a qualified professional registered with the British Columbia Association of Professional Engineers and Geoscientists. When the setback between the crest of the bluff and the interceptor trench drain becomes less than 10 m at any point on the Site, it is recommended that the interceptor trench be decommissioned and re-established at a minimum distance of 15 m from the crest at that time (see Denman Island Land Use Bylaw 2008 Komas Bluff Guideline 4);

- Construct an infiltration field to accept flows from the dwelling roof leaders and foundation drains as shown in Figure 2 (Guideline 5);
- In order to increase the functional storage in the pond and ditch system, construct check dams in the existing ditch system as shown in Figures 2 and 3 (see Denman Island Land Use Bylaw 2008 Komas Bluff Guideline 5); and
- It is recommended that no additional impermeable surfaces (such as roofs or paved driveways) be permitted within the Site without the approval by a qualified professional registered with the British Columbia Association of Professional Engineers and Geoscientists and a development permit where required. It is Golder's opinion that such works would have the potential to increase runoff resulting in increased erosion and sloughing contrary to Denman Island Land Use Bylaw 2008 Komas Bluff Guideline 2.

The proposed mitigation works are presented conceptually. Detailed designs should be completed by qualified professionals registered with the British Columbia Association of Professional Engineers and Geoscientists. After completion, all of the recommended works should be inspected and approved by qualified professionals registered with the British Columbia Association of Professional Engineers and Geoscientists.

GOLDER ASSOCIATES LTD.

C T Coles Mar 20, '14

PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA C. T. COLES 29149

Christopher Coles, M.A.Sc., P.Eng.
Associate, Senior Water Resources Engineer

CTC/sn

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Appendix E

Technical Memorandum, D. Reid, FCSLA

Golder Associates

TECHNICAL MEMORANDUM

DATE March 21, 2014 **REFERENCE No.** 1314470099-006-TM-Rev0

TO Ms. Francesca Marzari
Young Anderson

CC Chris Coles; Richard Butler

FROM David Reid, FCSLA **EMAIL** David_Reid2@golder.com

SENIOR LEVEL REVIEW AND ASSESSMENT
IMPACT OF SITE MODIFICATIONS AND PLANTING / REVEGETATION REMEDIAL MEASURES
2600 SWAN ROAD, DENMAN ISLAND, BC

Golder Associates Ltd. (Golder) has carried out an integrated visual site reconnaissance of the existing site conditions at the 2600 Swan Road Site, as well as senior level review and assessment of available information on the above-mentioned site and existing structures or facilities. Based on this information and the visual site reconnaissance, this technical memorandum presents an assessment and professional opinion on the impact of the removal of vegetation and other modifications to the original site conditions on the stability of shoreline bluff slopes and other adverse environmental effects, as well as comments and recommendations on planting and revegetation remediation measures to mitigate the impacts of the excavations, installation of structures and removal or damage to the vegetation which has occurred at the site.

I am aware of my duty under Rule 11-2 of the British Columbia Supreme Civil Rules to assist the Court, and not assume the role of an advocate for any party, and I certify that this report is made in conformity with that duty, and that if called on to give testimony, I will do so in conformity with that duty. I am the person primarily responsible for the opinions expressed in this report.

1.0 OBSERVATIONS – D. REID, FCSLA

Mr. Reid has reviewed the typical species and regeneration that are present on the waterfront area of the site. Photographs illustrating my observations are presented in Appendix II of the overall report.

Plate B-1 shows the dense multi-level vegetation that would be typical of un-disturbed areas west of the top of the bank. These include a dominant canopy of Douglas Fir, with a dense understorey of mixed evergreen and deciduous plants, including young trees. There is almost complete evergreen leaf cover of the surface provided by the combination of these plants. Grass species are of limited presence.

Plate B-2 shows an area of semi-disturbed woods immediately south of the cleared central area above the bank. Douglas and Grand Fir trees form a partial canopy, with younger fir trees starting and broken areas of shrub ground cover. Disturbed areas around stumps show grassy species, with edges being invaded by bracken fern.

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Plate B-3 shows typical vegetation species in uncleared areas on the waterfront slope east of the top of bank. Red Alder dominates this slope, with isolated Red Cedar. Shrub understorey includes Salmonberry, and some Thimbleberry. Localized areas of rushes are present in wetter seeps.

Plate B-4 shows typical conditions of recently disturbed slopes. Seeding of grasses and legumes appears to have been completed. Red Alder is volunteering across most of these areas, with dense clusters visible in the photograph, but small saplings are also distributed across most unmown areas.

Plate B-5 shows conditions in the central area of the waterfront immediately west of the existing top of bank. This central area has been cleared of all woody vegetation, and is maintained at the time of inspection as mown herbaceous vegetation.

Figure 4 classifies proposed vegetation treatments between the waterfront and an area to the west from the top of bank as determined from the survey dated September 2000. The extent of existing treed / woody vegetation areas is mapped as 'Existing Forested Area to Remain'. The 'Natural Regeneration Area' and 'Replanting Area' areas shown in this waterfront zone are recently disturbed and dominated by grasses and legumes at the time of field review.

2.0 REMEDIATION MEASURES

2.1 General

The remediation measures described below include enhancement of vegetation cover to create and maintain a woody vegetation buffer zone adjacent to the crest of slope to reduce the risk of shallow erosion of the near surface soils above and on the bluff and improve control of surface water runoff flows.

2.2 Revegetation

As described above, the remediation objectives are to enhance woody vegetation cover within a buffer zone adjacent to the crest of the slope, to reduce as well as enhance control of surface water runoff flows. These actions will serve to reduce the risk or rapid erosion and downcutting of the top soil layers at the top of the bluff, but will not prevent periodic deeper slope failures.

To improve slope stability and reduce surface runoff with revegetation, two elements are important to function: a dense system of deep roots and multi-layered surface structure provided by woody plants, and a 100% leaf cover over the soil surface, with a predominance of evergreen (winter) leaf cover to mitigate rain impact in the rainy season. These functions would have been provided by the pre-development woody cover shown in Plate B-1.

Figure 5 shows the view from immediately north of the existing residence. One could surmise that the vegetation removal along the central area at the top of the bluff has been for the purpose of allowing a cleared view towards the seascape, including the nearby Hornby Island and distant Mainland Mountains. As shown in Figure 5, it is not necessary to have clearing to the ground surface at the top of the bluff in order to have a reasonable view maintained from the existing residence. The proposed 'Planting Extents' on Figure 5 shows an area that could be maintained with dense leaf cover and woody vegetation, while at the same time providing visual access to the seascape through a 'View Corridor' in the area shown on Figure 4 and 5.

Whereas there is nothing in the Development Permit Guidelines that guarantees an applicant can open view corridors through the buffer zone, it is possible that a thorough application with a quantified proposal for limited vegetation view clearing could have led to permission to remove select vegetation elements in the 'View Corridor', but outside the 'Planting Extents' area as shown on Figures 4 and 5, subject to leaving a full leaf cover and vegetation roots within the 'Planting Extents' area.

On this basis, our revegetation requirements include a combination of replanting and natural succession to create a complete woody vegetation buffer of leaf and root cover in a continuous band that extends from the waterfront natural boundary to an area that extends west of the Top of Bank in the distances shown on Figure 4. Figure 4 shows three map areas of woody vegetation buffer: Existing Forested Area to Remain, Natural Regeneration Area, and Replanting Area.

Required woody vegetation buffer extends from the natural boundary at the sea, to lines measured westward from the Top of Bank, shown on Figure 4. Top of Bank is defined as the line shown as Top of Bank from the survey dated September 2000, as shown on Figure 4. The west sides of the initial woody vegetation buffer are shown on Figure 4 – with Replanting Area generally extending to the east side of the Interceptor Trench and Drain, and Existing Forested Area to Remain extending to the limits of existing forest on the property. Figure 4 also illustrates Existing Forested Area to Remain along the south property boundary up to the central ditch – this part of the Existing Forested Area to Remain will provide improved surface erosion resistance in the case of a large storm event that creates concentrated surface or subsurface flows from the existing or improved ditch running south from the existing pond.

The Vegetated Areas shown on Figure 4 (Existing Forested Area to Remain, Natural Regeneration Area, and Replanting Area) are the minimum areas required for initial woody vegetation maintenance and replanting based on conditions in 2013. It is recognized that, irrespective of this planting's ability to mitigate shallow surface erosion, long term eventual westward migration of the crest of escarpment is likely due to toe erosion and/or deep-seated slope movements. The setback of the woody vegetation buffer to the crest of the escarpment shall be monitored at least every 10 years and the buffer area shall be extended if within 10 m of the crest and re-established a minimum of 30 m from the crest or as required to align with a corresponding relocation of the Interceptor Trench. 'Crest' is defined as the top of bank above slopes that are steeper than 2 horizontal to 1 vertical, so does not refer to the existing 'Modified Top of Bank' as shown on Figure 4. The future woody vegetation buffer, beyond the initial replanting required by these recommendations, could be achieved by either natural regeneration (no mow zones) or by replanting, or some combination of the two approaches, as determined by a Qualified Professional at the time of future substantial slope movements.

In concept, the proposed replanting areas will extend from immediately seaward (east) of the proposed interceptor trench and drain installed initially or replaced in the future, as described in Section 6.2.

In addition to the woody vegetation buffer, a full cover of deep rooted grasses and legumes, including red clover or alfalfa, must be maintained from the woody vegetation buffer westward to a line 50m west from the crest of the bluff. This herbaceous cover was present at the time of the site visit of 2013.

Revegetation and maintenance requirements for each woody vegetation buffer map area are listed below.

Existing Forested Area to Remain

Within the Existing Forested Area to Remain as mapped on Figure 4:

- No further removal to be undertaken of existing trees or native woody vegetation.
- Allow natural forest succession to occur, including gradual spreading of native woody plants to replace existing grassy areas.
- No limbing, topping, or pruning of standing trees to be undertaken.
- Removal of vegetation shall be limited to removal of non-native invasive species (Himilayan Blackberry, Broom, Holly, Laurel, Eurasian herbaceous weeds).

Natural Regeneration Area

Within the Natural Regeneration Area as mapped on Figure 4:

- Remove the existing structure at the foot of the stairs and the associated log-based stair structure, and restore the beach to the pre-development natural beach condition. Seed any remaining disturbed areas with a grass / clover mix similar to adjacent seeded areas.
- Allow natural regeneration of Red Alder and related native understorey species to proceed, with the objective that a full leaf and root cover of exposed soils will occur, with gradual succession towards evergreen species.
- No further removal to be undertaken of existing trees or native woody vegetation, except that pruning or topping of trees shall not be required but if voluntarily undertaken shall be limited to within the 'View Corridor', and in no cases shall native vegetation removal occur within the 'Planting Extents' area shown on Figure 5.
- Removal of vegetation shall be limited to removal of non-native invasive species (Himilayan Blackberry, Broom, Holly, Laurel, Eurasian herbaceous weeds).

Replanting Area

Within the Replanting Area as mapped on Figure 4:

- Increase the chances of replanting survival by preparing a planting bed, through rototilling into a 200 mm depth of existing soils a 75mm depth of fully composted fish compost.
- All shrub species should be guaranteed nursery stock for successful planting.
- Where feasible, plant stock should be a minimum of two years old, and in a minimum #1 pot.
- Plantings shall be installed at a maximum spacing of 900 mm o.c.
- The correct scientific (Latin) name should be used when ordering planting stock and tags should be left attached for field identification until approval of planting by the Landscape Architect.
- Fruiting shrubs should be planted to promote recolonization by seed.

- Stock should be planted in late fall (October to November) or early spring (March – April).
- Plants that do not survive the first growing season shall be replaced. At the end of the second growing season, at least 80% of plants shall be in a fully established and growing state. Replanting as necessary to meet 80% survival shall be completed after the second growing season, with a further year's warranty and maintenance extended until the plant establishment performance target is met.
- Plant species selected for the project (Table 1) are native to the Coastal Douglas Fir moist maritime (CDFmm) biogeoclimatic zone which encompasses Denman Island, and are commonly found in riparian foreshore areas throughout the region. Many of the selected species are also recommended by DFO[1] as suitable for establishing riparian vegetation during restoration projects. Shrub species will establish a dense vegetative cover to establish sufficient rainfall interception, and with an approximate maximum height of 1.5 meters (m), a viewing corridor to the Lambert Channel should be maintained.

Table 1: Recommended Riparian Shrub Species

Common Name	Scientific Name
Shrubs	
dull Oregon-grape	*Mahonia nervosa*
Salal	*Gaultheria shallon**
baldhip rose	*Rosa gymnocarpa**
common snowberry	*Symphoricarpos albus**
Herbs	
Bracken	*Pteridium aquilinum*
* denotes fruit-bearing species as per DFO (2006)	

- Planted stock should be field fit/clustered under the direction of detailed plans prepared by a Landscape Architect (member in good standing of the British Columbia Society of Landscape Architects).
- All plants, and planting and growing medium, shall meet the requirements of the BC Landscape Standard. Native soils shall be tested by an approved soil testing laboratory, and soil amendments required shall follow the recommendations of the laboratory so that the amended growing medium meets the requirements of the BC Landscape Standard.
- To encourage optimum growing medium temperature and moisture, install a 50 mm layer of landscape bark mulch to the surface of all Replanting Area.
- Due to the exposed and droughty conditions of the Replanting Area, a low–volume drip irrigation system shall be installed, and programmed by a weather-based irrigation controller, to provide minimum water needed for plant establishment, but to avoid over-watering that would reduce slope stability. The irrigation system shall be shut off and winterized by blowing dry, for periods between October 15 and May 1 each year of its operation. This system shall be operated until plantings are established and free-growing, and then disconnected from water supply and abandoned as soon as plants are established – but no later than 4 years after the year of initial planting.

[1] DFO. 2006. *Riparian Areas and Revegetation Pacific Region Operational Statement*. Available online http://www-heb pac.dfo-mpo gc.ca/decisionsupport/os/pdfs/riparian_vegetation_e pdf. Accessed December 13, 2013

- All works in the Replanting Area shall be subject to detailed design by a qualified Landscape Architect (member in good standing of the British Columbia Society of Landscape Architects), installation by an approved Landscape and Irrigation Contractor (members in good standing of the British Columbia Nursery Trades Association, and the Irrigation Industry Association of British Columbia respectively by trade), and field review and approval of as-built conditions by the Landscape Architect. The same Landscape and Irrigation Contractor, subject to satisfactory performance as determined by the Landscape Architect, shall provide guarantee and maintenance services under contract until plant establishment performance conditions are met, and the irrigation system is de-commissioned. A minimum maintenance period of two years is required, with possible extension of that maintenance period if plant establishment performance is not met to up to 5 years from the date of initial planting. Release from the plant establishment requirements is subject to a satisfactory plant establishment performance field review and corresponding written authorization by the Landscape Architect.
- In addition to the native planting of the Replanting Area, allow natural regeneration of trees and related native understorey species to proceed, with the objective that a full leaf and root cover of exposed soils will occur.
- No further removal to be undertaken of existing trees or native woody vegetation, except that pruning or topping of trees shall not be required but if voluntarily undertaken shall be limited to within the 'View Corridor', and in no cases shall native vegetation removal occur within the 'Planting Extents' area shown on Figure 5. The existing coniferous trees shown on Figure 5 outside the View Corridor shall remain and be allowed to grow, including growth into the View Corridor outside the Planting Extents. Deciduous trees that grow into the View Corridor area outside the Planting Extents shown on Figure 5 are allowed to be topped or pruned, but this topping or pruning is not a requirement.
- Other removal of vegetation in the Replanting Area shall be limited to removal of non-native invasive species (Himilayan Blackberry, Broom, Holly, Laurel, Eurasian herbaceous weeds).

3.0 CLOSURE

Should you have any questions or require additional information, please do not hesitate to contact us.

GOLDER ASSOCIATES LTD.

David Reid, FCSLA
Principal

DR/mkc

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APPENDIX A

Review of Previous Applicant Submitted Reports

The Applicant has provided the following nine geotechnical reports in support of his previous application, with reference to different aspects of the existing and proposed development on the subject property.

1. R.A. Patrick, P. Eng., EBA Engineering Consultants Ltd, dated June 11, 2002 related to the lot line boundary adjustment;
2. R.A. Patrick, P. Eng., EBA Engineering Consultants Ltd. dated November 9, 2004 related to intended farming on the property;
3. R.A. Patrick, P. Eng., EBA Engineering Consultants Ltd. dated January 17, 2005 regarding geotechnical assessment of intended usage as farmland;
4. R.A. Patrick, P. Eng., EBA Engineering Consultants Ltd. dated March 9, 2006 related to a siting and use permit application;
5. D. Smith, P. Eng., Thurber Engineering Ltd. dated April 4, 2006 regarding remediation on Komas Bluffs (this report was prepared for litigation and includes a second part relating to the adjoining property that is not included by the Applicant);
6. R.A. Patrick, P. Eng., EBA Engineering Consultants Ltd. dated March 13, 2007 regarding slope setback and drainage measures;
7. R.A. Patrick, P. Eng., EBA Engineering Consultants Ltd. dated March 3, 2009 regarding proposed stairway on the neighbouring property owned by Mr. Ellis;
8. R.A. Patrick, P. Eng., EBA Engineering Consultants Ltd. dated March 18, 2009 regarding geotechnical re-assessment of intended usage as farmland; and
9. Bob Patrick, P. Eng., EBA Engineering Consultants Ltd. dated September 17, 2012 regarding composition of slope and regression of the crest.

All of these reports were also submitted by the applicants to the Court in support of their argument that they were entitled to the issuance of a development permit for the current development on their property without further conditions. This application was dismissed by the the BC Supreme Court, and that decision was upheld by the Court of Appeal.

In addition, the Denman Island Local Trust Committee also had the Thurber Engineering Report dated June 2004 which at the time provided the most comprehensive review of the geology of the property available. The Denman Island Local Trust Committee also received a letter of clarification from Dave Smith of Thurber Engineering in relation to the 2006 Thurber Report dated July 9, 2013. Both of these reports are also attached.

Report 1: The June 11, 2002 EBA Engineering Consultants Ltd

This report was completed prior to alteration of the land by the removal of vegetation within the 50 metre buffer area. It recommends retention of all mature trees in the 50 metre buffer area. Land clearing for agricultural use was not considered or supported by this report and the geotechnical conditions have most likely changed due to the vegetation removal. Even if the report was still relevant, the report concludes that the recommendations “are intended to be preliminary and subject to more detailed study prior to site development”.

Report 2: The November 9, 2004 EBA Engineering Consultants Ltd.

This report provided with the application is stamped “draft” and is not signed and cannot be considered in support of an application.

Report 3: The January 17, 2005 EBA Engineering Consultants Ltd.

This report is related to land conditions that have been significantly altered since 2005 on the Property and does not pertain to the current proposed developments. Therefore, this report is irrelevant to the application.

Report 4: The March 9, 2006 EBA Engineering Consultants Ltd.

This report was requested by the Applicant in support of the construction of the residence and farming up to 15 metres from the crest of the bluff. Key recommendations of this report which were ignored by the are:

- that the residence be sited a minimum of 80 metres from the crest of the Bluff;
- that runoff from hard surfaces should be collected and piped to the base of the bluff and not allowed to run over the bluffs;
- that irrigation should not be used and if it is used then soil moisture sensors and controlled application must be used to avoid excess watering;
- that planting as per the October 2003 Madrone Report must be undertaken;
- that farming activity should not take place within 15 metres of the crest of the bluff; and
- that surface runoff from the property be managed so that there is no concentrated flow over the crest of the bluff.

This report formed the basis of the Local Trust Committees decision to issue a development permit for the then proposed residence and garage, and farming up to 15 metres from the crest of the bluff, subject to the provision of plans incorporating the above conditions. That permit was never issued, as the applicant declined to complete the stated conditions.

Report 5: The April 4, 2006 Thurber Engineering Ltd.

This report was prepared as part of previous litigation in regards to remediation of the bluffs, and is to be read together with the 2004 Thurber report. It related to the land alterations performed by Mr. Ellis. It found that the diversion of the ditches as recommended in the 2004 Thurber Report had been completed, and did not recommend any further specific remediation for the applicants’ property, other than allowing the bluff to remain undisturbed and naturally re-stabilize over time to its then increased rate of erosion. In a clarification letter dated July 9, 2013, Thurber clarified that Thurber relied on the fact that there would be no further land alterations within the 50 metre buffer on the applicants’ property (as required by the court order and DE-DP-1999-03).

This report has some relevance to the approval of the path and stairs excavated at the crest of the property. The only specific remediation recommended in the report was for a similar attempt to build a path to the beach on Mr. Ellis’ adjacent property. The report recommended that the “notch” or excavation created for this purpose be intensively re-vegetated to control erosion.

Overall, the report does not support the proposed development in this development permit application.

Report 6: The March 13, 2007 EBA Engineering Consultants Ltd.

This report is a letter to "document our observations and recommendations regarding the geotechnical aspects of the slope setback and drainage measures" for the property, following upon the Local Trust Committee's resolution requiring EBA to sign off on the site plan and drainage plan proposed for the development. At the time of the site visit made by Mr. Patrick in December, 2006 the dwelling and other improvements were "under construction." The engineer recommends:

1. that the 66 metre setback that existed at the time of Mr. Patrick's site visit in December, 2006 was suitable for the residence, but regression should be monitored;
2. that final grading on the south side of the house should be such that any surface water is directed away from the structure;
3. that "either the pond be lined to limit the ex-filtration, or that another cut-off ditch be constructed between the pond and the top of the bluff. This ditch could be connected to the existing ditch leading from the pond;"
4. that discharge from ditches at the north and south sides of the property is collected and discharged at the base of the slope, and that this discharge is carefully constructed to avoid erosion; and
5. a new re-vegetation plan be prepared to address the increased instability of the bluff, as the Madrone recommendations were no longer considered adequate.

No drainage plan or site plan was provided or approved in relation to these recommendations for attachment to the permit.

In 2007, staff indicated that they would be prepared to recommend issuance of a development permit incorporating these revised recommendations. The applicant declined to proceed any further. Since this report was provided the land has been altered in ways that are contrary to the recommendations:

1. The setback for the house is now 57.6 metres from the top of the bank, therefore the recommendation that the then 66 metre setback is sufficient is no longer applicable to the current development.
2. Substantial vegetation and land has been cleared and excavated within 15 metres of the crest of the bluff and on the face of the bluff.
3. The report states the Applicant proposed an infiltration gallery south of the house and 50 metres from the top of the bluff. The current survey shows a "cistern" much closer than 50 metres from the top of the bluff but does not provide setback measurements. Mr. Patrick's comments about the suitability of the infiltration field rely on it being 50 metres from the top of the bank, noting that groundwater flow to the slope should not be increased, and the 50 metre distance will assist in dispersing any seepage. Therefore this aspect of the report is also inapplicable to the current development of the property.

Overall, the report supports the possibility of approving the residence and a drainage plan for the property, but not in the current configuration. The report does not support the excavation, pathway and stairs, and vegetation and tree removal within 15 metres of the crest of the bluff and on the face of the bluff.

Report 7: The March 3, 2009 EBA Engineering Consultants Ltd.

This report was prepared for the neighbouring property owner, Mr. Ellis, in relation to a proposed stairway to the beach on the adjacent property. It makes no reference to being

provided for consideration in relation to regulatory requirements, and does not refer to the development permit area guidelines.

The report does not address any of the development permit area guidelines. Specifically it does not "indicate that the proposed tree cutting, buildings, structures, land alteration, roads, driveways, or other proposed developments would not cause any potential erosion of soil or contribute to any land slip, rock fall, mud flow, sloughing, or water degradation" as required by Guideline 2.

Report 8: The March 18, 2009 EBA Engineering Consultants Ltd.

This report relates entirely to the property owned by Mr. Ellis adjacent to the subject property in relation to its use for hay production and the apparently successful re-vegetation of the attempted path to the beach (the "notch") in accordance with the consent order remediation.

This report makes no mention of the subject property or any of the proposed development in this application.

Report 9: The September 17, 2012 EBA Engineering Consultants Ltd.

The focus of this report is on the soil composition of the subject property, indicating that a previous EBA report misnamed the deposit as "Quadra Sand" instead of "Quadra Sediment or Cowichan Head Formation." The report does not recant any of the previous EBA findings that the property is unstable and subject to landslip and erosion.

The report provides an analysis of the expected regression of the bluff as of August 2012, and concludes that the residence located 65+ metres from the bluff is acceptable, with regular monitoring, from a geotechnical perspective. There is no indication that measurements were taken of this setback, and it appears to be an assumption of the setback as opposed to a determination. The report mentions surface pipes down the bluff, but does not comment on their appropriateness with respect to the recommendations in the March 9, 2006 report or the Komas Bluff DPA guidelines.

Critically, this is not a report prepared for the purposes of a development permit application. It is limited to the "sole use of Mr. Dan Stoneman and/or Mr. Dean Ellis," and no responsibility is taken for its contents if relied upon by anyone other than those two individuals. The general conditions of the report state:

> Unless stipulated in the report, EBA has not been retained to investigate, address or consider and has not investigated, addressed or considered any environmental or regulatory issues associated with development of the subject site.
>
> Because of the nature of geological deposits, the judgmental nature of geotechnical engineering, as well as the potential of adverse circumstances arising from construction activity, observations during site preparation, excavation and construction should be carried out by a geotechnical engineer.

The report does not meet the requirements of Guideline 2, in that it does not indicate that the proposed and completed tree cutting, buildings, structures, land alteration, roads, driveways, or other proposed developments would not cause any potential erosion of soil or contribute to any land slip, rock fall, or sloughing.

With respect to Guideline 3 regarding an appropriate setback for the construction of the house, the following reports are relevant:

(1) The 2006 EBA report, which recommends a setback of 80 metres for a residential building;

(2) The 2007 EBA report which states that the then existing 66 metre setback from the top of bank “is suitable,” but that ongoing monitoring of the bank is required;

(3) The 2012 EBA report which approves of a 65+ metre setback (though not specifically for regulatory purposes), with required monitoring of the bluff, and in particular the drainage works down the face of the bluff.

Together, these reports suggest that a permanent building that is set back less than 80 metres will require monitoring to ensure that the building is not subject to damage from sloughing, and that if and when further bank regression occurs additional geotechnical work may be required to secure the building.

At best the reports support a 65 metre setback for permanent buildings.

None of these reports state that a building located 57.6 metres from the crest of the bluff will not be subject to damage from sloughing during the life of the building.

Appendix ‘B’

Pre-2014 Site Photos

Islands Trust

Top Priorities

Denman Island

No.	Description	Activity	Received/Initiated	Responsibility	Target Date	Status
1	Implementing Riparian Areas Regulations	Mapping of all streams and wetlands on Denman Island and amending DPA 4 to comply with RAR. RFP re-issued October 8th	Aug-03-2010	Rob Milne	Sep-01-2014	On Going
2	Development of a Memorandum of Understanding with K'omoks First Nation.		Sep-16-2014	Rob Milne		On Going
3	Review of vistor accommodations regulations	Proposed focus of review is on allowing the provision of cooking facilities for guests.		Rob Milne		On Going

Islands Trust

Projects

Denman Island

No.	Description	Activity	Received/Initiated	Status
1	A Protected Area Network on Denman Island		Mar-15-2011	On Going
1	Housekeeping project	1. Land Use Bylaw definition of intensive agriculture; remove "and excluding feedlots". 2. Formatting of Agriculture definition	Aug-15-2011	On Going
1	Regulations governing wind towers and Ocean Loop Geo-Exchange Systems.	Monitor recommendation from Trust Council.	Aug-15-2011	On Going
1	Regulation limiting the gross floor area of a dwelling		Oct-25-2011	On Going
1	Regulations to promote greenhouse gas emissions reduction.		Oct-25-2011	On Going
1	Review and Update of Development Procedures Bylaw No. 71		Dec-11-2012	On Going
1	Review of OCP/LUB regarding implementation of Denman Island Farm Plan and ensuring food security.	Include consideration of Exploring Food Security in the Islands Trust Area in the final report	Apr-02-2013	On Going
1	DCLTA Rural Affordable Housing Project Final Report dated June 20, 2013	Consideration of recommendations	Oct-22-2013	On Going
1	Review of visitor accommodations regulations.	Focus of the review is to be on allowing the provison of cooking facilites for guests.	Nov-26-2013	On Going

Applications w/ Status - Denman Island Status: Open

Applications

Development Permit

File Number	Applicant Name	Date Received	Purpose
DE-DP-2006.2	Daniel/Debra Stoneman **Planner:** Courtney Simpson	Aug-31-2006	The use of presently cleared areas within the Komas Bluff permit area for agricultural use.

Planning Status

Status Date: Apr-04-2011

No change: waiting for info from applicant.

Status Date: Feb-04-2010

No change

Status Date: May-01-2009

No change

File Number	Applicant Name	Date Received	Purpose
DE-DP-2011.2	Ella Day **Planner:** Marnie Eggen	Mar-21-2011	For barn sited within DP #1: Komas Bluff

Planning Status

Status Date: Jul-29-2013

File passed on to Bylaw enforcement

Status Date: Oct-05-2012

Letter sent to applicant re: further info required

Status Date: Nov-01-2011

Awaiting info from applicant

File Number	Applicant Name	Date Received	Purpose

DE-DP-2013.1	Daniel & Debra Stoneman **Planner:** Courtney Simpson	Jun-17-2013	

Planning Status

Status Date: Jul-16-2013

Staff report to July 16 LTC meeting. LTC resolved to not issue permit but to amend 1999 development permit.

Status Date: Jul-16-2013

Staff preparing development permit amendment

Status Date: Jun-24-2013

Planner Reviewing File

File Number	Applicant Name	Date Received	Purpose
DE-DP-2014.2	Daniel & Debra Stoneman **Planner:** Rob Milne	Sep-29-2014	

Planning Status

Development Variance Permit

File Number	Applicant Name	Date Received	Purpose
DE-DVP-2011.1	Ella Day **Planner:** Marnie Eggen	May-13-2011	Barn on property line

Planning Status

Status Date: Jul-29-2013

no change; file passed on to bylaw enforcement

Status Date: Nov-09-2012

BCLS survey confirms barn sited on lot line; Applicant intends to apply for lot line adjustment

Status Date: Oct-05-2012

Letter sent to applicant requesting further information otherwise issue will be transfered over to bylaw enforcement

File Number	Applicant Name	Date Received	Purpose
DE-DVP-2014.1	Sandy Grant BC Land Surveyor **Planner:** Rob Milne	Jul-03-2014	Require variance from Section 944(1)(a) of the LGA with respect to road frontage and Section 2.8.6 of the LUB with respect to the 1/3 depth to width ratio for proposed Lot B

Planning Status

Status Date: Sep-02-2014

Notices posted and hand delivery complete.

Status Date: Sep-02-2014

Notices posted and hand delivery complete.

Status Date: Aug-28-2014

Notice period - Thursday, September 4, 2014 - Monday, Sepetmber 15, 2014

Rezoning

File Number	Applicant Name	Date Received	Purpose
DE-RZ-2011.1	Denman Community Land Trust Association **Planner:** Courtney Simpson	Aug-10-2011	Density transfer from density bank or density increase for one unit of affordable housing.

Planning Status

Status Date: May-27-2014

All related Bylaws adopted and distributed.

Status Date: Apr-24-2013

Agency / First Nation referrals sent in relation to bylaws

Status Date: Mar-12-2013

Legal review of houisng agreement complete

Subdivision

File Number	Applicant Name	Date Received	Purpose
DE-SUB-2011.5	Steven Carballeira (Graeb/Charles King Medical Inc. (1691 Lacon Rd) **Planner:** Linda Prowse	Mar-28-2011	to create 2 lots

Planning Status

Status Date: Mar-21-2013

Water quality and quantity tests received as well as final subdivision plan. E-mail sent to MOTI signing off on subdivision

Status Date: Nov-24-2011

Preliminary Layout Approval received

Status Date: May-05-2011

Referral Response sent to MOTI, LTC and applicant

File Number	Applicant Name	Date Received	Purpose
DE-SUB-2013.1	David Critchley	Feb-19-2013	2 lot subdivision 2016 Northwest Road (I. Brons/Denman Community Land Trust)

Planner: Courtney Simpson

Planning Status

Status Date: Jun-13-2013

PLA received

File Number	Applicant Name	Date Received	Purpose
DE-SUB-2013.2	Henning Nielsen **Planner:** Marnie Eggen	Dec-12-2013	

Planning Status

Status Date: Jun-17-2014

Received final subdivisino plan and water reports. Final signoff sent to MOTI and applicant on June 17, 2014

Status Date: Jan-14-2014

PLA with conditions received January 14, 2014

Status Date: Dec-23-2013

Subdivision referral report sent to DILTC, MOTI and applicant.

File Number	Applicant Name	Date Received	Purpose
DE-SUB-2014.1	Henning Nielsen **Planner:** Marnie Eggen	Feb-04-2014	Davidson Road 2 Lot subdivision

Planning Status

Status Date: Mar-18-2014

Referral response emailed to MOTI

File Number	Applicant Name	Date Received	Purpose
DE-SUB-2014.2	Sandy Grant BC Land Surveyor **Planner:** Rob Milne	May-20-2014	2 lot subdivision

Planning Status

Siting and use Permit

File Number	Applicant Name	Date Received	Purpose

DE-SUP-2006.7	Daniel/Debra Stoneman **Planner:** Courtney Simpson	Aug-31-2006	Agricultural (including buildings consistent with ALR legislation)

Planning Status

Status Date: Jan-08-2009

On hold pending outcome of court case

File Number	Applicant Name	Date Received	Purpose
DE-SUP-2009.14	Jean Ella Day	Nov-02-2009	2900 SWAN RD One 26 foot high barn.

Planner: Marnie Eggen

Planning Status

Status Date: Jun-30-2011

On hold until outcome of DP and DVP.

Status Date: Mar-03-2011

New info submitted by applicant indicates bld sited on lot line; options provided to applicant

Status Date: Jan-20-2011

Applicant submitted partial application

File Number	Applicant Name	Date Received	Purpose
DE-SUP-2014.10	Daniel & Debra Stoneman **Planner:** Rob Milne	Sep-29-2014	Residence, Garage, Chicken House, Beach Stairs, Woodshed

Planning Status

File Number	Applicant Name	Date Received	Purpose
DE-SUP-2014.7	Thomas Provencal **Planner:** Teresa Rittemann	Jul-18-2014	1 residence; 1 storage shed; 1 workshop; 1 greenhouse-geodesic dome

Planning Status

Status Date: Oct-09-2014

File still on hold. Awaiting applicant to apply for a DVP.

Status Date: Sep-08-2014

Applicant has asked for a copy of the DVP guide and application form as he is unable to print it. It will be mailed asap. This file will be on hold until a DVP file is set up and addressed.

Status Date: Aug-28-2014

Discussion with Courtney and with applicant regarding setback and height requirements. Applicant will advise whether or not he still wishes to pursue a Development Variance Permit

Islands Trust

LTC EXP SUMMARY REPORT F2015

Invoices posted to Month ending September 2014

615 Denman	Invoices posted to Month ending September 2014	Budget	Spent	Balance
65000-615	LTC "Trustee Expenses"	500.00	755.10	-255.10
LTC Local				
65200-615	LTC - Local Exp - LTC Meeting Expenses	2,500.00	1,385.72	1,114.28
65210-615	LTC - Local Exp - APC Meeting Expenses	750.00	0.00	750.00
65220-615	LTC - Local Exp - Communications	300.00	0.00	300.00
65230-615	LTC - Local Exp - Special Projects	750.00	0.00	750.00
TOTAL LTC Local Expense		4,300.00	1,385.72	2,914.28
Projects				
73001-615-3001	Denman RAR	2,500.00	94.53	2,405.47
73001-615-4025	Denman Housing Review	2,500.00	670.87	1,829.13
TOTAL Project Expenses		5,000.00	765.40	4,234.60

Denman Island Local Trust Committee

POLICIES AND STANDING RESOLUTIONS

No	Meeting Date	Resolution No.	Issue	Policy
1.	May 1, 2012	DE-041-2012	Enforcement Policy on Guest accommodation	It was It was **MOVED** and **SECONDED**: 1. That as the Denman Island Local Trust Committee intends to review the home based guest accommodation regulations in Bylaw No. 186 bylaw enforcement activity is restricted where the guest accommodation provides the following unlawful facilities: 1. a second set of cooking facilities is provided in a lawful dwelling for the use of guests; 2. accessory buildings are used as bedrooms for guest accommodation provided that no more than three bedrooms exist in total; 2. That despite section 1 and 2 above bylaw enforcement activity will not be restricted if: 1. there are issues related to health, safety, or environmental damage; 2. there is a written complaint about bona fide serious nuisance issues such as noise or parking congestion related to the guest accommodation; 3. That nothing in this enforcement policy should be interpreted as giving permission to violate the Land Use Bylaw and the Denman Island Trust Committee may change this policy at any time and may give direction to expand enforcement activities at any time without notice; 4. That unless the Denman Island Local Trust Committee extends the effective period on this enforcement policy it expires on December 31, 2012 or when the guest accommodation regulation review is complete, whichever is the sooner.
2.	October 22, 2013	DE-065-2013	Enforcement Policy on Guest accommodation	It was **MOVED** and **SECONDED**, that the Denman Island Local Trust Committee renew Standing Resolution No. DE-041-2012 to be extended to December 31, 2014.

3.	September 16, 2014	DE-2014-054	Enforcement Policy on Guest accommodation	It was **MOVED** and **SECONDED**, that the Denman Island Local Trust Committee renew Standing Resolution No. DE-065-2013 to be extended to December 31, 2015.