MUNICIPALITY OF NORTH Cowichan

PUBLIC HEARING INFORMATION PACKAGE

Zoning Amendment Bylaw No. 3916, 2023

10029 Beach Drive

Public Hearing Notice and Bylaw No. 3916

1. Notice of Public Hearing for **August 16, 2023** at **7:00 p.m.**
2. First Notification of Public Hearing - Twitter and Facebook – published July 31, 2023
3. Second Notification of Public Hearing - Cowichan Valley Citizen – published August 10, 2023
4. Bylaw No. 3916
5. Map of Subject Property

Planning Staff Report

1. Report to July 19, 2023 Regular Council – First and Second Readings of Bylaw No. 3916

Council Minutes

1. Excerpt from July 19, 2023 Regular Council Minutes – First and Second Readings of Bylaw No. 3916, Schedule Public Hearing

Public Comments

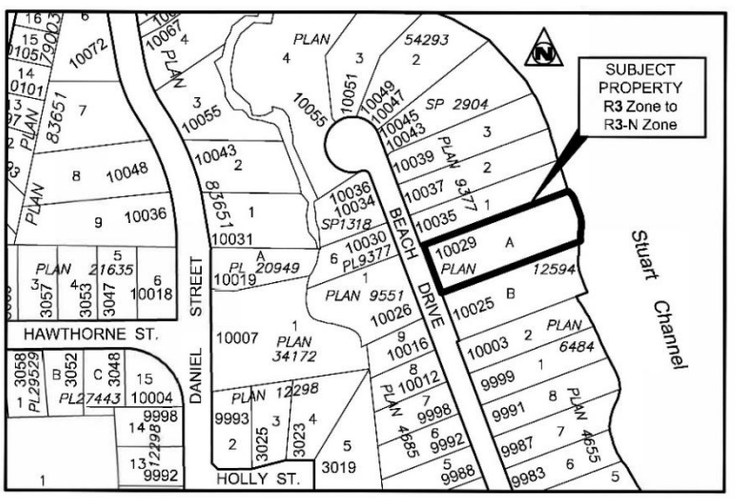
1. No Comments Received To-Date

NOTICE OF PUBLIC HEARING

The Director of Planning and Building gives notice that a Public Hearing will be held at **7:00 p.m.** on **Wednesday, August 16, 2023** to allow Council to receive public input on Bylaw No. 3916 which proposes to amend Zoning Bylaw 1997, No. 2950. As authorized by the *Local Government Act*, this hearing will be conducted by electronic means and members of the public will be provided an opportunity to be heard verbally or by submitting their comments in writing in advance of the hearing. This hearing will be conducted by video conference using the Cisco Webex platform, and though electronic, is open to the public and anyone wishing to participate may do so in person by attending Council Chambers, or by joining the meeting using a computer, smartphone, or tablet. If you wish to participate electronically, please visit www.northcowichan.ca/virtualmeeting for instructions on how you can join this hearing and find the link to join. You may also view the hearing as it is streamed live by going to www.northcowichan.ca/Agendas and click on the 'View Live Stream' link. A copy of the recording will be made available after the hearing on North Cowichan's website for on-demand viewing.

Zoning Amendment Bylaw No. 3916 (10029 Beach Drive), 2023 proposes to amend Zoning Bylaw 1997, No. 2950 by reclassifying 10029 Beach Drive (PID: 004-788-036) from Residential One and Two-Family Zone (R3) to Infill Residential Neighbourhood Zone (R3-N).

The purpose of the Zoning Bylaw Amendment is to allow for a detached accessory dwelling unit on the subject property (PID: 004-788-036) as shown outlined in bold on the map.



PUBLIC INPUT

If you believe your interests in land will be affected by the proposed bylaw, you are encouraged to submit your comments in writing to Mayor and Council by **1:00 p.m.** on **Monday, August 14, 2023**, using any of the writing methods identified below. Comments may also be shared verbally during the Public Hearing, by following the instructions provided below.

1. **In Writing in Advance of the Public Hearing:**

   Written submissions will be accepted by:
   - Email to publicmeetings@northcowichan.ca
   - Mail to Mayor and Council, Municipality of North Cowichan, 7030 Trans-Canada Highway, Duncan BC, V9L 6A1
   - Fax to 250-746-3133
   - In-Person deposited through the mail slot at the Municipal Hall, Main Entrance

2. **Verbally or in Writing at the Public Hearing:**
   - In Person by attending Council Chambers at Municipal Hall, 7030 Trans-Canada Highway, Duncan BC.
   - Virtually by logging in electronically, details and instructions will be available at least one week prior to the Hearing at www.northcowichan.ca/PublicHearings.
   - Written submissions may be submitted during the Public Hearing by presentation to the Corporate Officer or her designate.

PLEASE NOTE: Submissions should reference the bylaw number and include your name and the civic address or legal description of the land affected by the proposal. Please be advised that all submissions, including the individual's name and address will form part of the public record and will be published on North Cowichan's website. Do not include any personal information in your submission that you do not wish to be disclosed, as submissions received are public documents and will not be redacted (with the exception of email addresses on electronic submissions, phone numbers and signatures). Written submissions will not be accepted after the conclusion of the Public Hearing.

Copies of the bylaw and related documents, including public comments received in writing, will be available to inspect online at www.northcowichan.ca/PublicHearings until the close of the Public Hearing. The documents may also be inspected in the Planning Department at the Municipal Hall, Monday to Friday (excluding statutory holidays) between **8:00 a.m.** and **4:00 p.m.** from **July 31, 2023** until close of business on **August 16, 2023**.

Rob Conway
Director, Planning and Building

Personal information is collected by North Cowichan under the authority of s. 26 (c) of the *Freedom of Information and Protection of Privacy Act* for the purpose of administering the Public Hearing. Please direct any questions about personal information to North Cowichan's Privacy Officer by Phone: 250-746-3116, Email: privacy@northcowichan.ca or Regular Mail: 7030 Trans-Canada Highway, Duncan, BC, V9L 6A1

7030 Trans-Canada Highway, Duncan BC V9L 6A1
T: 250-746-3100 F: 250-746-3133 www.northcowichan.ca

MUNICIPALITY OF NORTH Cowichan

North Cowichan @NorthCowichan • 1h

A public hearing for [Zoning Amendment Bylaw No. 3916, is scheduled for 7:00pm on August 16, 2023. Copies of the public notice and bylaw are available on North Cowichan's website at https://loom.ly/sBwgTh0

Load Twitter Analytics

Facebook Preview

Jul 31, 2023 - 8:00 AM PDT

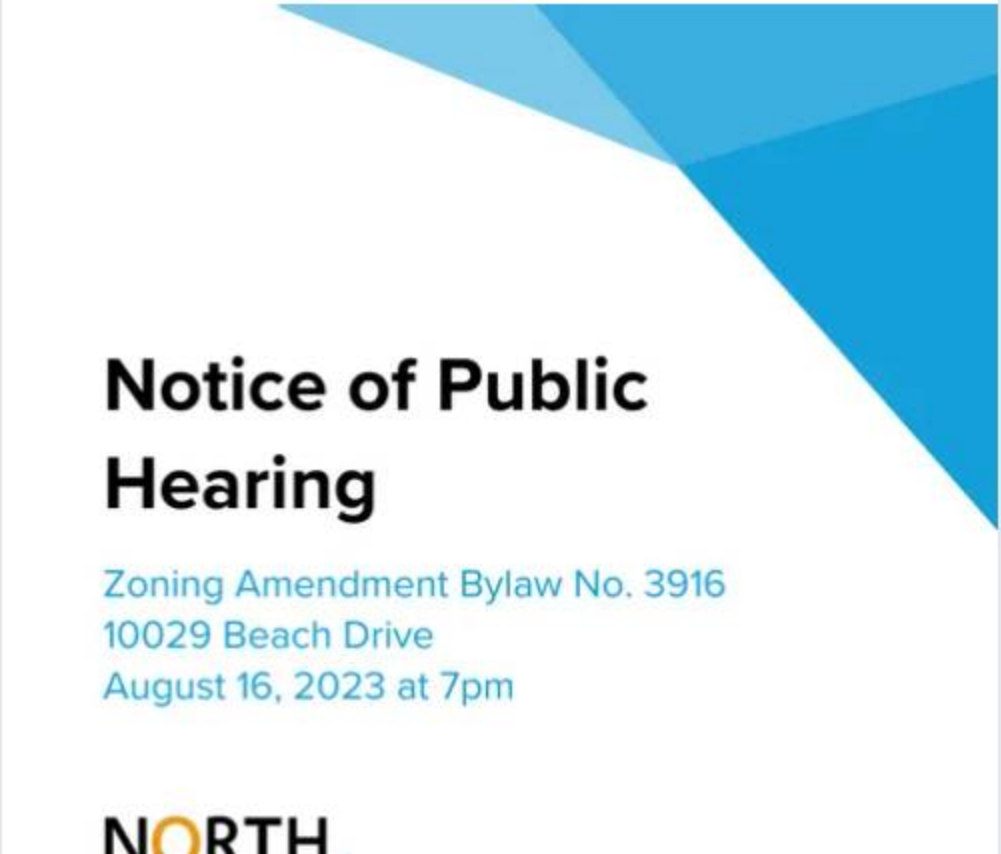
Municipality of North Cowichan

July 31 at 8:00 AM

Council will be conducting a Public Hearing in Council Chambers and by video conference using the Cisco Webex platform at 7:00 p.m. on August 16, 2023 to provide all persons who believe that they are affected by Zoning Amendment Bylaw No. 3916, an opportunity to be heard or to present written submissions to Council.

Those wishing to comment on the bylaw may share their thoughts during the Public Hearing or submit their feedback in writing by email, mail, or by dropping them off at the Municipal Hall before 1:00 p.m. on Monday, August 14, 2023.

The purpose of this amendment is to allow for a detached accessory dwelling unit on the subject property located at 10029 Beach Drive. You can view the bylaw and public notice at https://loom.ly/sBwgTh0

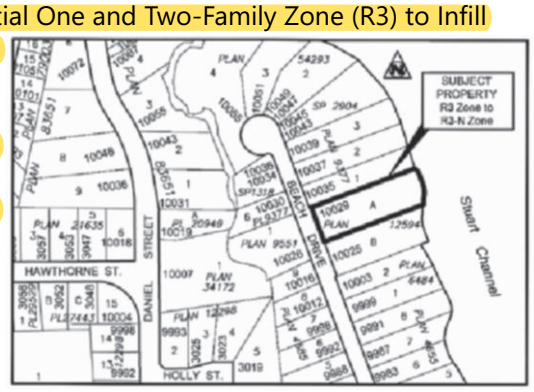


NOTICE OF PUBLIC HEARING

The Director of Planning and Building gives notice that a Public Hearing will be held at **7:00 p.m.** on **Wednesday, August 16, 2023**, to allow Council to receive public input on Bylaws No. 3916 and 3918. As authorized by the *Local Government Act*, these hearings will be conducted by electronic means and members of the public will be provided an opportunity to be heard verbally or by submitting their comments in writing in advance of the hearing. This hearing will be conducted by video conference using the Cisco Webex platform, and though electronic, is open to the public and anyone wishing to participate may do so in person by attending Council Chambers, or by joining the meeting using a computer, smartphone, or tablet. If you wish to participate electronically, please visit www.northcowichan.ca/virtualmeeting for instructions on how you can join this hearing and find the link to join. You may also view the hearing as it is streamed live by going to www.northcowichan.ca/Agendas and click on the 'View Live Stream' link. A copy of the recording will be made available after the hearing on North Cowichan's website for on-demand viewing.

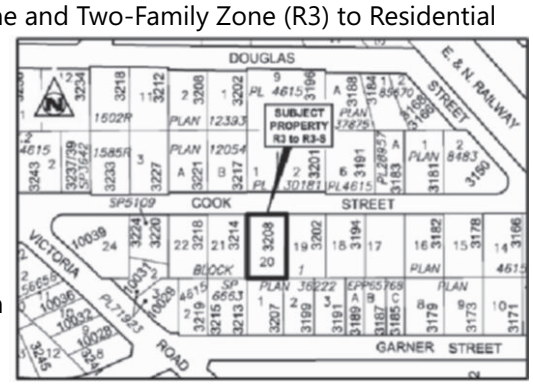
Zoning Amendment Bylaw No. 3916 (10029 Beach Drive), 2023 proposes to amend Zoning Bylaw 1997, No. 2950 by reclassifying 10029 Beach Drive (PID: 004-788-036) from Residential One and Two-Family Zone (R3) to Infill Residential Neighbourhood Zone (R3-N).

The purpose of the Zoning Bylaw Amendment is to allow for a detached accessory dwelling unit on the subject property (PID: 004-788-036) as shown outlined in bold on the map.



Zoning Amendment Bylaw No. 3918 (3208 Cook Street), 2023 proposes to amend Zoning Bylaw 1997, No. 2950 by reclassifying 3208 Cook Street (PID: 005-983-681) from Residential One and Two-Family Zone (R3) to Residential Small Lot Single-Family Zone (R3-S).

The purpose of the Zoning Bylaw Amendment is to facilitate a 2-lot subdivision to allow for small lot residential development on the subject property (PID: 005-983-681) as shown outlined in bold on the map.



PUBLIC INPUT

If you believe your interests in land will be affected by either of the proposed bylaws, you are encouraged to submit your comments in writing to Mayor and Council by **1:00 p.m.** on **Monday, August 14, 2023**, using any of the writing methods identified below. Comments may also be shared verbally during the Public Hearing, by following the instructions provided below.

1. In Writing in Advance of the Public Hearing:

Written submissions will be accepted by:

- Email to publicmeetings@northcowichan.ca
- Mail to Mayor and Council, Municipality of North Cowichan, 7030 Trans-Canada Highway, Duncan BC, V9L 6A1
- Fax to 250-746-3133
- In-Person deposited through the mail slot at the Municipal Hall, Main Entrance

2. Verbally or in Writing at the Public Hearing:

- In Person by attending Council Chambers at Municipal Hall, 7030 Trans-Canada Highway, Duncan BC.
- Virtually by logging in electronically, details and instructions will be available at least one week prior to the Hearing at www.northcowichan.ca/PublicHearings.
- Written submissions may be submitted during the Public Hearing by presentation to the Corporate Officer or her designate.

PLEASE NOTE: Submissions should reference the bylaw number and include your name and the civic address or legal description of the land affected by the proposal. Please be advised that all submissions, including the individual's name and address will form part of the public record and will be published on North Cowichan's website. Do not include any personal information in your submission that you do not wish to be disclosed, as submissions received are public documents and will not be redacted (with the exception of email addresses on electronic submissions, phone numbers and signatures). Written submissions will not be accepted after the conclusion of the Public Hearing.

Copies of the bylaw and related documents, including public comments received in writing, will be available to inspect online at www.northcowichan.ca/PublicHearings until the close of the Public Hearing. The documents may also be inspected in the Planning Department at the Municipal Hall, Monday to Friday (excluding statutory holidays) between **8:00 a.m.** and **4:00 p.m.** from **July 31, 2023**, until close of business on **August 16, 2023**.

Rob Conway, Director of Planning and Building

Personal information is collected by North Cowichan under the authority of s. 26 (c) of the Freedom of Information and Protection of Privacy Act for the purpose of administering the Public Hearing. Please direct any questions about personal information to North Cowichan's Privacy Officer by Phone: 250-746-3116, Email: privacy@northcowichan.ca or Regular Mail: 7030 Trans-Canada Highway, Duncan, BC, V9L 6A1

7030 Trans-Canada Highway | Duncan, BC V9L 6A1

T 250.746.3100 F 250.746.3133 www.northcowichan.ca

NORTH Cowichan

The Corporation of the District of North Cowichan

Zoning Amendment Bylaw

BYLAW NO. 3916

A bylaw to amend Zoning Amendment Bylaw 1997, No. 2950 in order to reclassify 10029 Beach Drive from R3 to R3-N

The Council of The Corporation of The District of North Cowichan, enacts in open meeting assembled, as follows:

Citation

1 This Bylaw may be cited as "*Zoning Amendment Bylaw No. 3916, 2023*".

Amendment

2 That Zoning Bylaw Schedule "C" is amended by reclassifying 10029 Beach Drive (PID: 004-788-036) from Residential One and Two-Family Zone (R-3) to Infill Residential Neighbourhood Zone (R3-N), as shown outline in black in Schedule A attached to and forming part of this Bylaw.

_____

READ a first time on July 19, 2023
READ a second time on July 19, 2023
This bylaw was advertised on the municipality's _____ site on _____, in the Cowichan Valley Citizen and the Chemainus Valley Courier on _____, and was posted to the municipality's public notice places on _____.
CONSIDERED at a Public Hearing on _____.
READ a third time on _____.
COVENANT registered on _____.
ADOPTED on _____.

CORPORATE OFFICER

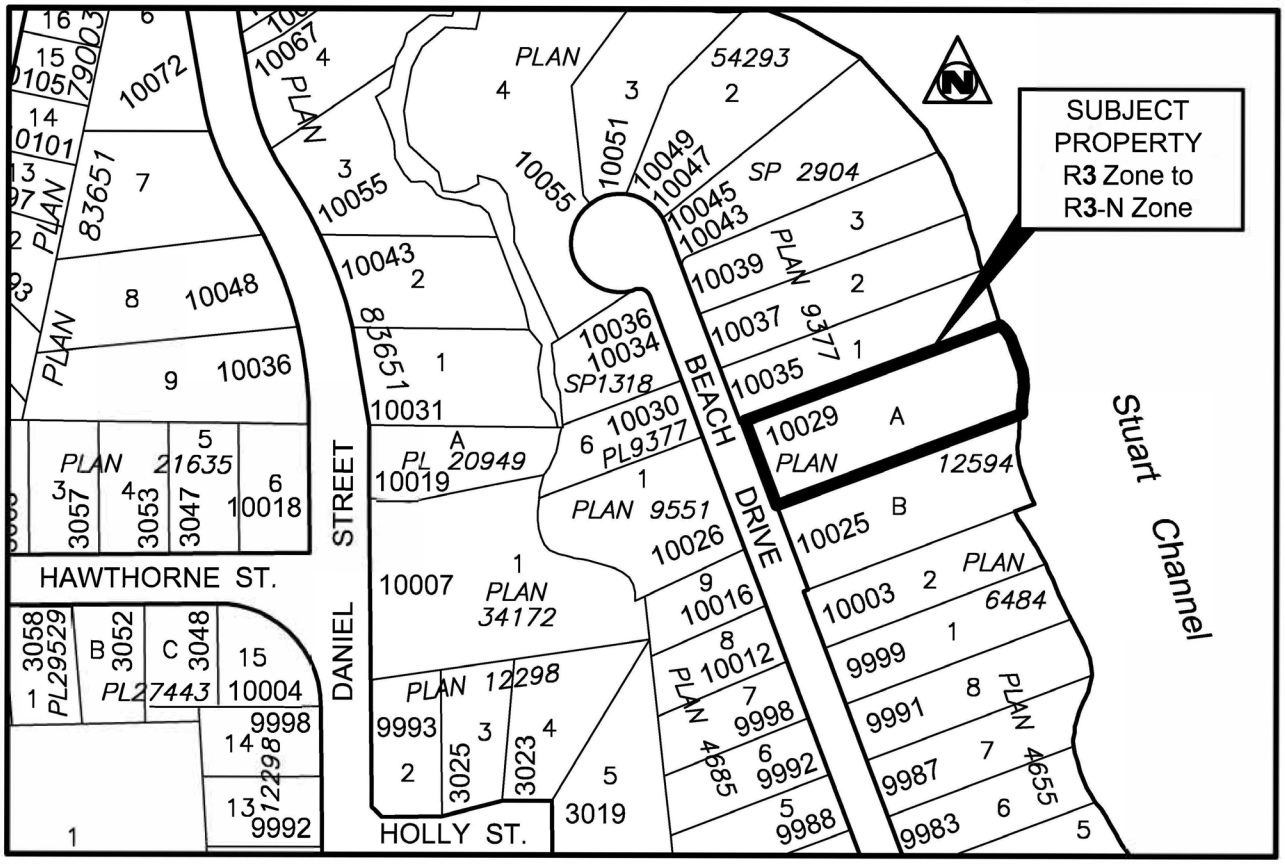
PRESIDING MEMBER

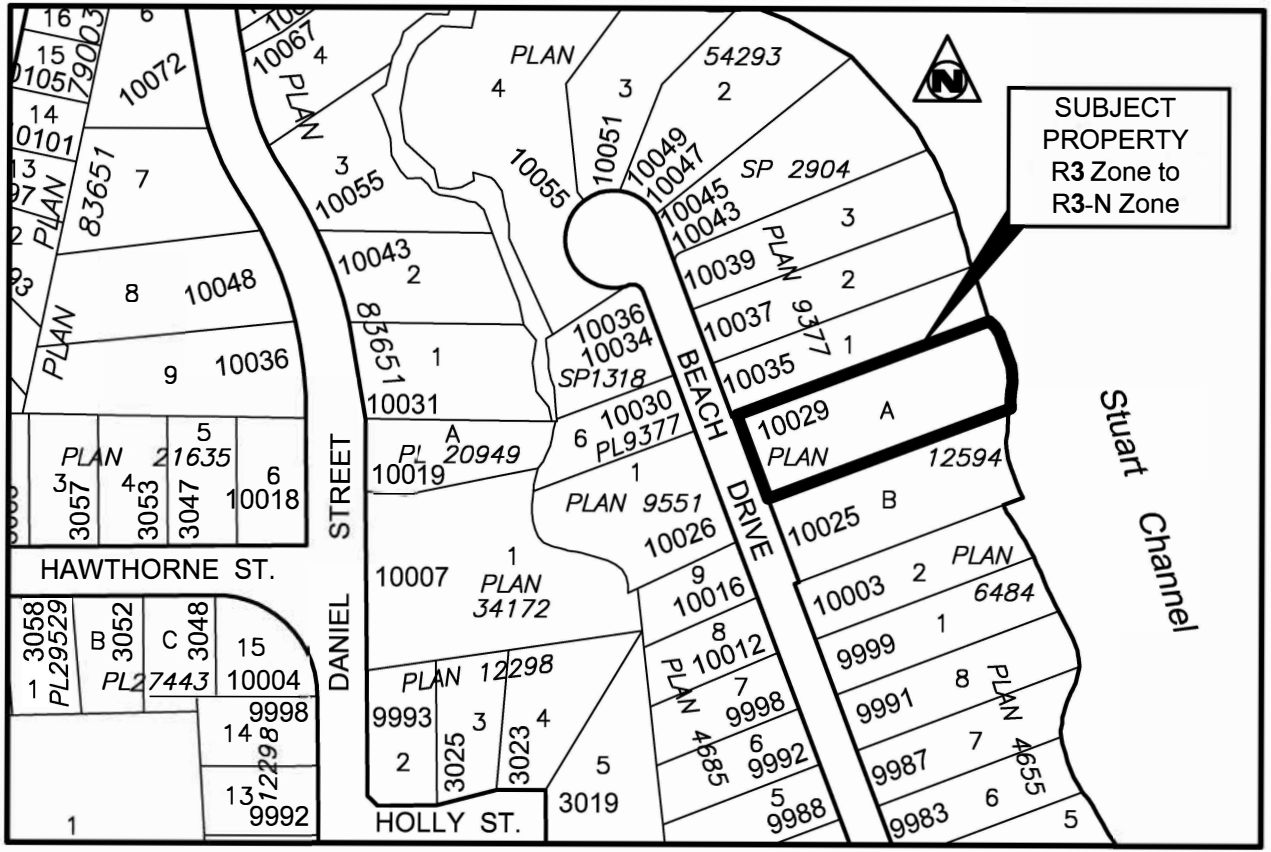
Schedule “A” to accompany “Bylaw No. 3916, 2023”.

Presiding Member

Corporate Officer

SCHEDULE "A"


SUBJECT PROPERTY
R3 Zone to
R3-N Zone
HAWTHORNE ST.
DANIEL STREET
HOLLY ST.
BEACH DRIVE
Stuart Channel
PLAN 21635
PL 20949
PLAN 9551
PLAN 34172
PLAN 12298
PL29529
PL27443
SP 2904
SP1318
PLAN 12594
PLAN 6484
PLAN 4685
PLAN 4655
PL9377
10072
10067
79003
83651
10048
10036
10031
10019
10018
10007
10026
10016
10012
10004
9998
9992
9993
3025
3023
3019
10055
10051
10049
10047
10045
10043
10039
10037
10035
10034
10030
10029
10025
10003
9999
9991
9987
9983
9988
3058
3052
3048
3057
3053
3047


SUBJECT PROPERTY
R3 Zone to
R3-N Zone
N
HAWTHORNE ST.
DANIEL STREET
BEACH DRIVE
HOLLY ST.
Stuart Channel
PLAN 83651
PLAN 21635
PLAN 20949
PLAN 9551
PLAN 34172
PLAN 12298
PLAN 54293
SP 2904
SP1318
PLAN 9377
PLAN 12594
PLAN 6484
PLAN 4685
PLAN 4655
PL29529
PL27443
10072
10067
10055
10051
10049
10047
10045
10043
10039
10037
10035
10036
10034
10031
10030
10029
10026
10025
10019
10018
10016
10012
10007
10004
9998
9993
9992
9991
9988
9987
9983
3058
3057
3053
3052
3048
3047
3025
3023
3019

PLANNING REPORT

Report

MUNICIPALITY OF NORTH Cowichan

Date	July 19, 2023	File: ZB000168
Subject	Zoning Amendment Bylaw No. 3916, 2023 for First and Second Readings	

PURPOSE

To introduce Zoning Amendment Bylaw No. 3916, which proposes to amend Zoning Bylaw 1997, No. 2950 from "Residential One and Two Family R3" to "Infill Residential Neighbourhood R3-N" to permit a detached accessory dwelling unit at 10029 Beach Drive, Chemainus.

BACKGROUND

Property Details

The subject property (Attachment 1) is a 0.23 ha. (0.56 ac.) waterfront lot within the Chemainus Growth Centre zoned Residential R-3. (Attachment 3)

The existing residence, with a suite on the lower level, is situated close to the road. A driveway along the southerly side of the property provides separate access to the suite and a convenient parking place for the tenant. A little lower is a flat terraced area with a detached garage. A pathway at the end of the driveway weaves along the slope leading to the waterfront.

Proposal

The attached orthophoto illustrates the proposal to locate the new accessory dwelling unit (ADU) abutting the existing garage (Attachment 2). The applicants are requesting rezoning to provide an additional residence for their son's growing family (Attachment 4).

Site Considerations

The property is subject to a 30-metre environmental setback area from the waterfront. There is also a creek/ravine (Askew Creek) roughly 50 metres west of the property line and 90 metres from the proposed building site. Given the topography and to confirm that the site can accommodate the proposed residence, a Geotechnical Report (Attachment 5) was submitted with the application. It addresses potential hazards regarding the stability of a coastal slope, coastal flooding, and watercourse flooding.

DISCUSSION

Official Community Plan No. 3900 (OCP) Designation and Policies

The OCP section on Focused Growth and Development describes the type of housing desired in the following statement: "*Focused growth provides for a range of tenures co-ops, co-housing, strata, fee-simples and rentals) in addition to a variety of forms to accommodate all ages and abilities (e.g., young families seeking private yard space, seniors who wish to 'age in place*'…" (p.38)

Within Growth Centres policies, Section 3.1.3 (Defining Success/Objectives of the OCP) states:

- Update the zoning bylaw to contain zones reflective of local plan designation and that align with the OCP land use designations. This may entail the creation of new zones and zoning standards to address specific interests or goals that will allow the development of a greater variety of residential and commercial services. (p.42)
- Develop land in a low-impact, site-adapted manner, integrating natural features and ecological systems. (p.42)

Section 3.2 Land Use Designations includes the following: The Municipality will strive to:

- d. Consider higher-density residential development that is sensitive in scale and appearance to the surrounding residential areas ...,
- b. Permit secondary suites in single-family homes where some of the larger lots may be permitted to have secondary dwellings such as coach houses or garden studios.

The subject property is designated as Residential Neighbourhood. The designation supports "gentle densification" where the infill is permitted, provided neighbourhood character is maintained and does not result in significant nuisance impacts.

The subject property is also within Development Permit Areas 4 (Hazard Lands) because of the steep bank between the proposed building site and the ocean. A development permit may be required before the rezoning application is approved. The applicant has provided a report (Attachment 5) from a qualified professional confirming that the site can be developed safely for the proposed use if the report's recommendations are followed. A detailed site plan showing the location of the proposed ADU and contours is attached (Attachment 6). Conditions for the site's safe development would be established before the issuance of a development permit and building permit.

Proposed Zoning

The R3-N Residential Neighbourhood Zone was recently incorporated into the Zoning Bylaw. Its purpose was to provide a zone that accomplishes the intent of the OCP policies regarding sensitive infill housing, with provisions for ensuring the introduction of ADUs would be done in a considered manner. To that end, the zone has a number of sections regarding the ADU's including density (maximum of two residential buildings and three residential units), maximum gross floor area (120m^2), height (single story 6.2 metres), and a requirement that ownership of the ADU remains on the existing property title to prevent further subdivision.

The applicants are aware of all the requirements in the R3-N zone (Attachment 7), including that a covenant be registered on the title to prevent strata title.

Referral Comments

As part of routine practice, the application was referred to relevant departments. Comments from the Building Department indicate that the building permit will require Schedules from a Geotechnical and Structural Engineer. Any Engineering comments will be addressed through the Building Permit process (currently, none are anticipated).

The application was also sent to the Chemainus Residents Association who responded with the following: *"Based on the information the Chemainus Residents Association has been provided by Mr. Hall, and additional information gleaned from the Municipality of North Cowichan's website, the Chemainus Residents Association has no objection to the proposed development at 10029 Beach Drive, in Chemainus, BC."*

Analysis & Conclusions

This application is consistent with the OCP policy for gentle densification and housing in the Residential Neighbourhood designation. Issues with the site's proximity to the ocean and the steep slope can be addressed through the development and building permit processes. For these reasons, it is recommended that Zoning Amendment Bylaw 3916 be given first and second reading and a public hearing be scheduled, subject to a Section 219 covenant to maintain a single property title (i.e., prohibiting subdivision by strata title) being registered prior to bylaw adoption.

OPTIONS

1. **(Recommended Option)** THAT Council:
   (1) Give first and second readings to Zoning Amendment Bylaw No. 3916, 2023; and,
   (2) Authorize a Public Hearing for Zoning Amendment Bylaw No. 3916, 2023.

2. THAT Council deny Zoning Amendment Application ZB000168 to permit a detached accessory residential dwelling at 10029 Beach Drive.

IMPLICATIONS

If Council gives first and second readings to Zoning Amendment Bylaw No. 2950 and forwards the application to a public hearing, owners and occupants of properties within a 60-metre radius of the subject property will be notified, and advertisements will be placed in the local newspaper in accordance with the requirements of the *Local Government Act* and the *Community Charter*. If the bylaw is adopted, the property owner would be permitted a detached accessory dwelling unit, subject to regulations in the R3-N zone, the Zoning Bylaw, and other applicable bylaws.

If the application is denied, the property owner will not be able to develop the site for an accessory dwelling unit.

RECOMMENDATION

THAT Council:
(1) Give first and second readings to Zoning Amendment Bylaw No. 3916, 2023; and,
(2) Authorize a Public Hearing for Zoning Amendment Bylaw No. 3916, 2023.

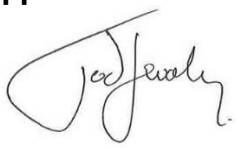
Report prepared by:

Chris Hall
Contract Planner

Report reviewed by:

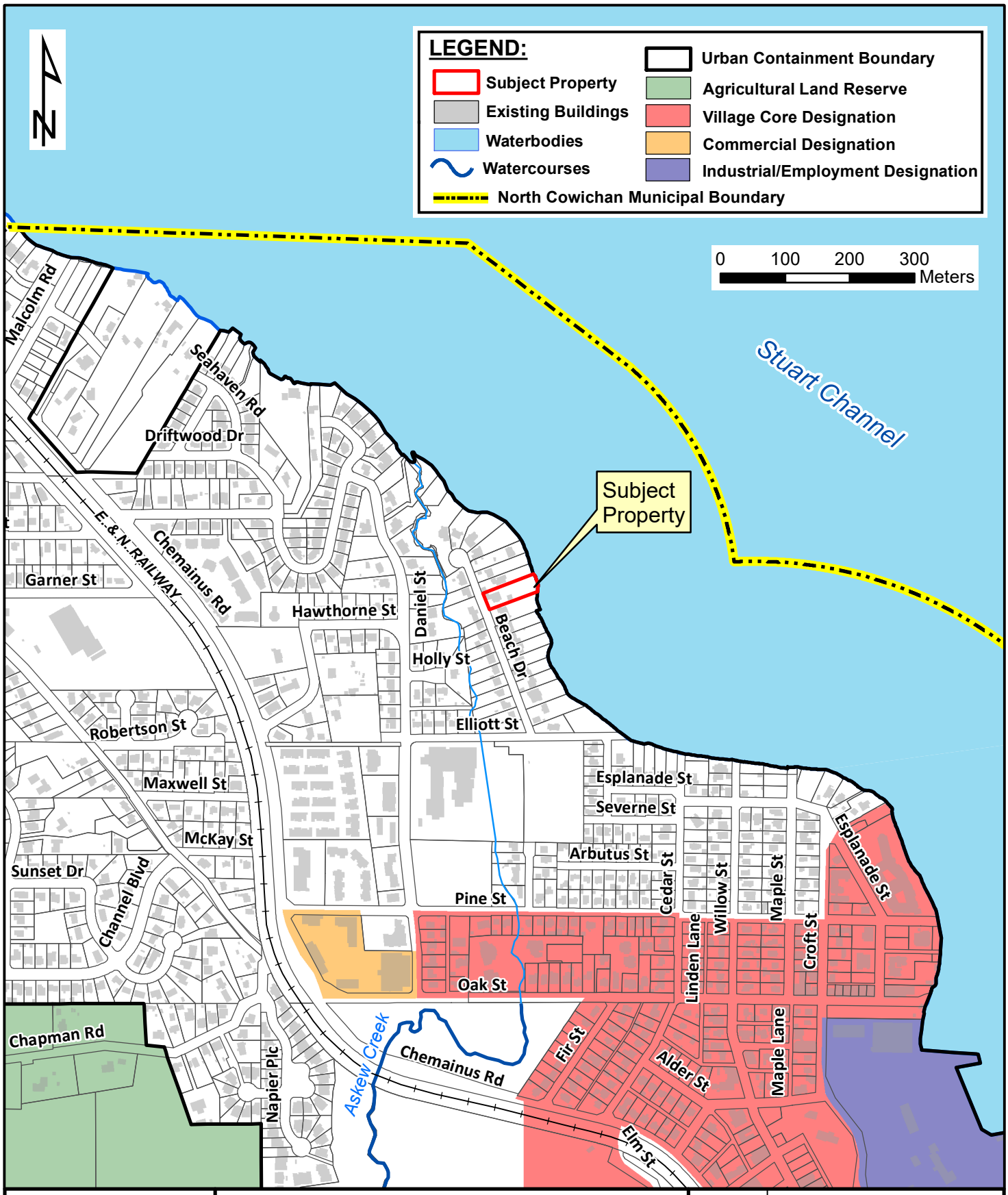
Chris Osborne MCIP, RPP
Acting Director of Planning & Building

Approved to be forwarded to Council:



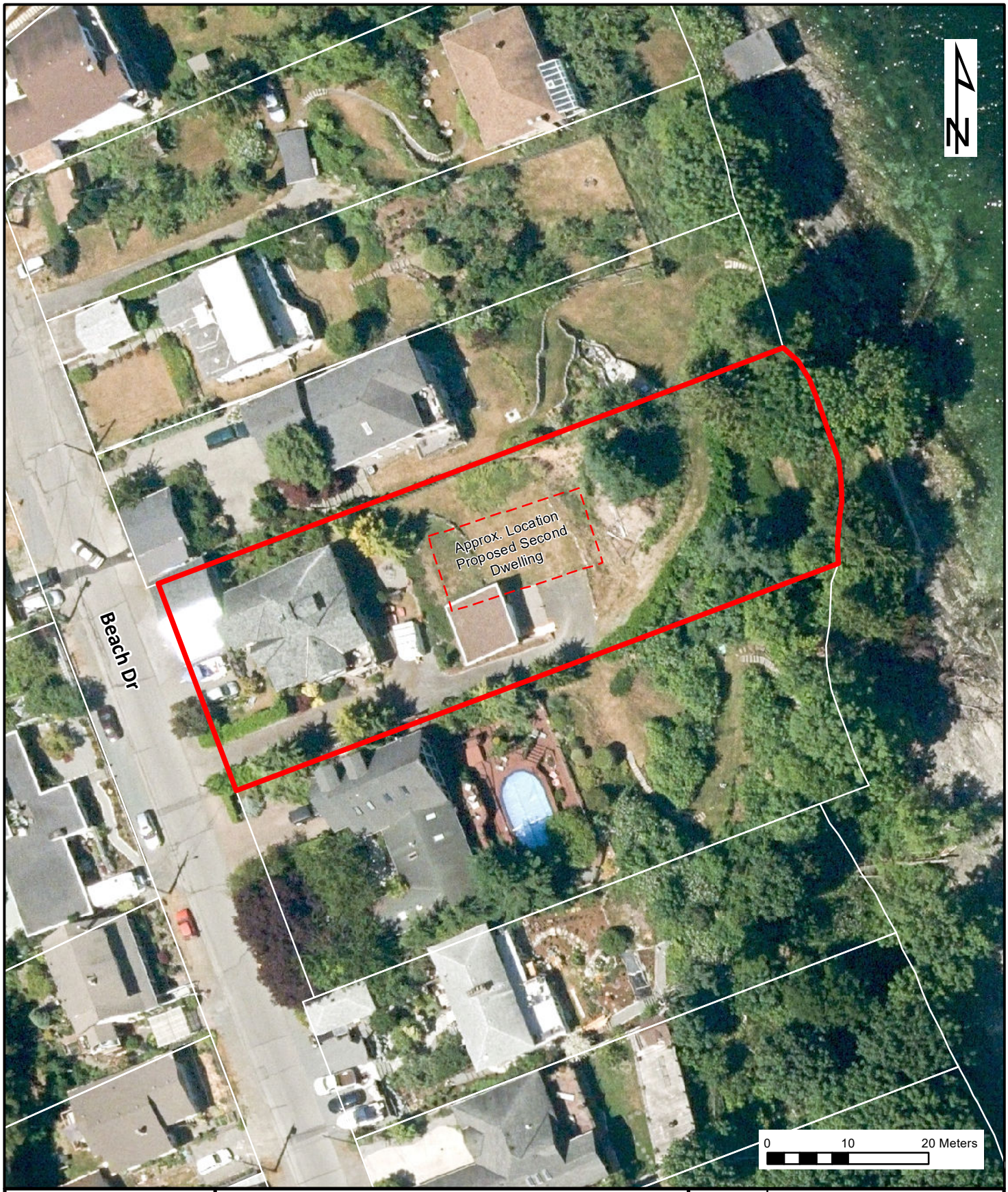
Ted Swabey
Chief Administrative Officer

Attachments:
(1) Location Map
(2) Orthophoto Map
(3) Zoning Map
(4) Letter of Rationale
(5) Geotechnical Report
(6) Site and Contours Plan
(7) Bylaw 3887
(8) Draft Bylaw 3916



MUNICIPALITY OF NORTH Cowichan

LOCATION MAP	DATE:	April 6, 2023
10029 Beach Drive	TYPE:	Zoning Amendment
	FILE#:	ZB000168



MUNICIPALITY OF NORTH Cowichan

ORTHOPHOTO MAP

(Orthophoto is from 2019 aerial photography)

10029 Beach Drive

DATE:	April 6, 2023
TYPE:	Zoning Amendment
FILE#:	ZB000168

MUNICIPALITY OF NORTH Cowichan	ZONING MAP	DATE:	April 6, 2023
	10029 Beach Drive	TYPE:	Zoning Amendment
		FILE#:	ZB000168

September 23, 2021

Letter of Rationale - For proposed development at 10029 Beach Drive

Marlene and I are proposing to build a single family dwelling for our son and his family on our R3 property at 10029 Beach Drive. We have an existing home with a legal suite and are seeking a Zoning Amendment to allow the increased density. The property is in excess of 24,000 sq ft (2230 sq m) and there is plenty of room for a building site without infringing on the EPA 30m setback from the ocean. The site would be serviced by Municipal water and pump up to an existing gravity feed into the Municipal sewer, have its own driveway and parking, and an infiltration system for storm water.

This is an infill project in the Chemainus Sewer System area that fits all the OCP goals for infill within the Chemainus Urban Growth Boundary and provides housing for a young family. There will be very little impact on any neighbours and we are not intruding on the 30m environmentally protected area.

Thank you.

Jon Lefebure

GEOTECHNICAL HAZARD ASSESSMENT

Proposed Single-Family Residence
10029 Beach Drive
Chemainus, BC

Legal Address:
Lot A, Section 19, Range 5, Chemainus District, Plan 12594, PID 004-788-036

Prepared For:
Mr. Jon Lefebure
10029 Beach Drive
Chemainus, BC V0R 1K1
jwlefe@shaw.ca

January 28, 2022

File No.: E0263.03
Revision No.: 00
Prepared by: Jeff Scott, P.Eng.
Reviewed by: Chris Hudec, M.A.Sc., P.Eng.

Lewkowich Engineering Associates Ltd.
1900 Boxwood Road
Nanaimo, BC, V9S 5Y2
250-756-0355 (Office)
250-756-3831 (Fax)
www.lewkowich.com
geotech@lewkowich.com
Permit to Practice Number: 1001802

Lewkowich Engineering Associates Ltd.

DISCLAIMER, ACKNOWLEDGMENTS AND LIMITATIONS

1. Lewkowich Engineering Associates Ltd. (LEA) acknowledges that this report, from this point forward referred to as "the Report," may be used by the Municipality of North Cowichan (MNC) for consideration during applications for development of the property. This Report has been prepared in accordance with standard geotechnical engineering practice solely for and at the expense of Mr. Jon Lefebure. We have not acted for or as an agent of the MNC in the preparation of this Report.
2. The conclusions and recommendations submitted in this Report are based upon information from relevant publications, a visual site assessment of the property, observed and anticipated subsurface conditions, current construction techniques, and generally accepted engineering practices. No other warrantee, expressed or implied, is made.
3. Any future construction shall be carried out within the requirements and recommendations of the Environmental Consultant (if applicable), any defined jurisdictional bylaws, or any existing restrictive covenants, whichever is more stringent. Any environmental setbacks and/or jurisdictional limitations may supersede the recommendations in this Report.
4. This Report was authored, to the best of our knowledge at the time of issuance, with considerations for local requirements specific to the Authority Having Jurisdiction (AHJ) and their standards for the preparation of such reports, the 2018 British Columbia Building Code (BCBC), and current engineering standards. Updates to municipal bylaws, policies, or requirements of the AHJ, or updates to the BCBC and/or professional practice guidelines may impact the validity of this Report.
5. This Report has been prepared by Mr. Jeff Scott, P.Eng., and reviewed by Mr. Chris Hudec, M.A.Sc., P.Eng. Messrs. Scott and Hudec are both adequately experienced and are also members in good standing with the Engineers and Geoscientists of British Columbia (EGBC).

EXECUTIVE SUMMARY

1. The following is a brief synopsis of the property, assessment methods, and findings presented in the Report. The reader must read the Report in its entirety; the reader shall not rely solely on the information provided in this summary.
2. The subject property, 10029 Beach Drive, Chemainus, BC, from this point forward referred to as "the Property," is an oceanfront lot located on the east coast of Vancouver Island within the jurisdictional boundaries of the MNC. At the time of this Report, the proposed development for the Property is a single-family residence of conventional construction methods.
3. The Property is within the MNC Development Permit Area (DPA) 4 – Hazard Lands. Therefore, a site-specific assessment was conducted to identify any potential geotechnical hazards for the Property and the proposed development. Three potential hazards were identified and addressed in this Report; stability of a steep coastal slope, coastal flooding, and watercourse flooding.
4. The findings of this Report conclude the proposed development is sufficiently distant and elevated from both the ocean and watercourse, and therefore will not be impacted by potential flooding.
5. This Report recommends a safe development setback of 10.0m from crest of slope. This Report also provides recommendations to safely encroach into the setback area.
6. The findings conclude the land is considered safe for the use intended, provided the recommendations in this Report are followed.

List of Abbreviations Used in the Report

Abbreviation	Title
AHJ	Authority Having Jurisdiction
BCBC	British Columbia Building Code
DPA	Development Permit Area
EGBC	Engineers and Geoscientists of British Columbia
FCL	Flood Construction Level
FoS	Factor of Safety
GD	Geodetic Datum (CGVD28)
GWL	Ground Water Level
LEA	Lewkowich Engineering Associates Ltd.
MNC	Municipality of North Cowichan
PGA	Peak Ground Acceleration
SLS	Service Limit States
ULS	Ultimate Limit States

TABLE OF CONTENTS

1.0 INTRODUCTION

1.1 General

a. As requested, LEA has carried out a geotechnical hazard assessment of the subject Property with respect to the proposed single-family residential development. This Report provides a summary of our findings and recommendations.

1.2 Background

a. We understand the proposed development consists of a new single-family residence, preferably constructed utilizing conventional construction techniques, including shallow cast-in-place concrete foundations and a wood-framed superstructure.

b. We further understand this will be a second residence constructed on the Property, and the existing single-family residence and detached garage is not planned to be demolished.

c. The Property is located within the jurisdictional limits of the MNC. As per the MNC Official Community Plan[1], the Property is within DPA 4 – Natural Hazard Areas. Therefore, an assessment of the potential natural hazard(s) prepared by a professional engineer with experience in geotechnical engineering is required and shall include recommendations or mitigation strategies with respect to the potential natural hazard(s).

1.3 Assessment Methodology

a. This geotechnical hazard assessment included a desktop review of relevant background information, including applicable bylaws, available development plans, registered covenants on title, aerial photographs, and published geology, topography and floodplain mapping (if any). Please refer to the list of references at the end of this Report.

b. An initial site reconnaissance was carried out on October 15, 2021, to visually assess current site conditions throughout the Property, as well as along the nearby creek corridor.

c. A subsurface geotechnical investigation was carried out on January 17, 2022, using a solid stem auger drill rig (Mobile Acker) provided by Drillwell Enterprises. A single BH (BH 22-01) was completed at a location approximately 6m inland from crest of slope. The BH was advanced to refusal on bedrock at a depth of 13.85m and included in-situ SPT testing at regular intervals. A site plan showing the location of the BH is attached, following the text of this Report.

d. Our assessment included evaluation of the current global stability of the steep coastal slope under both static and seismic conditions. Two-dimensional slope models were developed and assessed using GeoStudio 2020 Slope/W limit equilibrium slope stability analysis software. The slope stability analysis was

completed in order to determine a safe setback from crest of slope for future residential development.

e. This assessment was prepared with consideration for the referenced EGBC *Guidelines for Legislated Landslide Assessments for Proposed Residential Developments in British Columbia*[2], and *Legislated Flood Assessments in a Changing Climate in BC*[3].

2.0 SITE CONDITIONS

2.1 Physical Setting

a. The Property is an oceanfront lot located off the east side of Beach Drive within the northern region of the town of Chemainus. Beach Drive runs along the top of a ridge in a north-south direction, where the land declines to the east towards the ocean (Stuart Channel) and to the west towards a creek ravine (Askew Creek).

b. The Property is immediately bordered by Beach Drive to the west, Stuart Channel to the east, and similar Residential 3 (R3) properties to the north and south. Refer to Figure 2.1 below.

Figure 2.1: Property Location[3]

2.2 Terrain and Features

a. In general, the Property declines from Beach Drive towards the ocean to the east. Based on the attached topographic Site Plan, elevations within the Property range from 27m to approximately 0m GD, for a total vertical relief of 27m. The land has been partially terraced, and the slopes within the Property vary from gentle to steep.

b. The western portion of the Property is developed with an existing residence and a gravel driveway that gently declines off of Beach Drive along the south side of the residence. Continuing east, there is a leveled area behind the residence, followed by an approximately 4m tall, 2 Horizontal to 1 Vertical (2H:1V) slope. An existing detached garage has been constructed into the slope. The driveway continues down the slope to access the garage and a leveled area. We understand this leveled area is the proposed site for the new residence. The leveled area declines into an approximately 2m tall, 2H:1V embankment. We understand the proposed residence preferably includes a daylight style lower level through this embankment.

c. The proposed building site is followed by a steep coastal slope. The coastal slope is approximately 17m tall, and generally steepens as one approaches the ocean, with average slope angles ranging from 25 to 36 degrees based on the topographic Site Plan. However, slope angles up to 45 degrees were observed during the site reconnaissance. A trail switchbacks down the slope to the foreshore. The slope has been partially landscaped, and predominately consists of tall grasses, Ferns and Horsetail, a hedge that borders the upper trail, as well as scattered trees (Fir, Cedar and Maple). The trees on the slope generally displayed vertical growth patterns.

d. An approximately 1.5m tall cast-in-place concrete retaining wall has been constructed along the foreshore / toe of slope. The wall did not show signs of any significant distress. A level sitting area exists between the wall and slope. Refer to the photos below.

Photo 2.2.1: Existing residence as viewed from the proposed building area, looking west.

Photo 2.2.2: Existing garage and driveway, looking northwest.

Photo 2.2.3: Embankment on east side of proposed building area and upper trail, looking northeast.

Photo 2.2.4: Slope conditions and trail, looking north.

Photo 2.2.5: Foreshore conditions, looking north

2.3 Regional Geology

a. Surficial geology mapping indicates the subsurface conditions are comprised of Ground Moraine Deposits of till with lenses of gravel, sand and silt. The glacial till deposits in this area are often overlain by Marine / Glaciomarine Deposits of silt, clay, stoney clay and till-like mixtures[6].

b. Bedrock geology for the area is classified as the Nanaimo Group, comprised of undivided sedimentary rocks from the Upper Cretaceous period, generally consisting of boulder, cobble and pebble conglomerate, coarse to fine sandstone, siltstone, shale and/or coal[7].

2.4 Soil Conditions

a. The subsurface soil conditions as encountered during the BH investigation generally consist of surficial silty sand fill, overlying compact transitioning to dense fine sand with trace to some silt, overlying very dense glacial till, overlying bedrock.

b. The main strata are summarized below in Table 2.4. Detailed descriptions of the subsurface conditions are provided on the attached BH log (BH 22-01).

Table 2.4: Summary of Encountered Soil Strata

Soil Description	Depth in Metres	
	From	To
Silty sand, trace gravel, cobble and organics (roots, rootlets, matter), compact, dark brown, moist (fill)	0.0	0.60
Silty sand, trace to some gravel, trace cobble, compact, light brown to orangey brown, moist	0.60	1.20
Fine sand, trace to some silt (very thin silt to silty sand lenses throughout), compact to dense, grey, moist to wet	1.20	8.40
Sandy silt, firm to stiff, brown, moist	8.40	8.85
Fine sand, trace to some silt, dense, grey, moist to wet	8.85	11.25
Silty sand, some gravel, trace cobble, very dense, bluish grey, moist	11.25	13.85
Bedrock	13.85	

c. Depths are referenced to the existing ground surface at the time of our field investigation. Soil classification terminology is based on the Modified Unified classification system. The relative proportions of the major and minor soil constituents are indicated by the use of appropriate Group Names as provided in ASTM D2488 - 93 and/or D2487 Figures 1a, 1b, and 2. Other descriptive terms generally follow conventions of the Canadian Foundation Engineering Manual.

2.5 Groundwater Conditions

a. The slope was visually inspected for signs of seepage and abnormal groundwater conditions. Although there was no significant seepage observed during our site reconnaissance, the slope did have evidence of being perpetually wet. The Horsetail plants that vegetated the lower half of the slope generally prefer wet soil conditions. Furthermore, we understand the shallow drainage channels that line the trail are frequently discharging water during the winter months.

b. We expect the nearby Askew Creek is a release mechanism for groundwater flows in the area. It is also possible that the creek, which is shown to be at an elevation of approximately 18m GD adjacent the Property, could contribute to seepage through permeable sand and gravel lenses.

c. The BH investigation encounter two groundwater seepage layers; one perched atop a sandy silt layer and one perched atop the lower glacial till soil unit.

d. Groundwater levels can be expected to fluctuate seasonally with cycles of precipitation. Groundwater conditions at other times and locations can differ from those observed at the time of our assessment.

3.0 COVENANT REVIEW

a. As part of our assessment, we have reviewed the legal title of the Property, specifically relative to any restrictive covenants that may impact the conclusions or recommendations made in this Report.

b. At the time of this Report, there were no restrictive covenants registered against the title of the Property.

4.0 SLOPE STABILITY ANALYSIS

4.1 General

a. A pseudo-static limit equilibrium slope stability analysis was carried out using GeoStudio 2020 Slope/W software, employing the Morgenstern-Price method. The software was used to evaluate the slope's resistance to global slope failure by calculating a range of potential slip surfaces, determining the critical FoS and the probable extent of failure within the slope. The analysis was performed for both static and seismic conditions.

b. The slope profile was modeled based on a section through the approximate centerline of the Property and proposed development area, Section A-A, as shown on the attached Site Plan. A wedge of soil was included in the Slope/W model at the toe of slope to account for the retention offered by the seawall.

c. Two failure mechanisms were analyzed; a global (crest to toe) rotational failure, as well as a translational failure through the encountered sandy silt layer.

4.2 Soil Parameters

a. The stability analysis was performed using effective stress conditions and frictional soil parameters as estimated based on the in-situ SPT testing, as well as published soil parameters and based on LEA experience with similar soil conditions. The soil strength parameters are summarized in Table 4.2 below.

Table 4.2: Mohr-Coulomb Soil Parameters

Soil Layer	Unit Weight (kN/m^3)	Effective Friction Angle (degrees)	Effective Cohesion (kPa)
01 Surficial Soils / Fill, compact	20	34	0
02 Sand, compact	20	36	0
03 Sand, dense	22	38	0
04 Sandy silt, stiff	22	32	5
05 Sand, dense	22	38	0
06 Silty sand, very dense	22	40	0
Bedrock	Impenetrable		

4.3 Piezometric Conditions

a. The static piezometric levels adopted for the slope model were based on the GWLs encountered during the BH investigation. The selected piezometric levels conservatively considered higher than recorded GWLs to account for fluctuations in GWLs.

4.4 Seismic Slope Analysis Methodology

a. The EGBC *Guidelines for Legislated Landslide Assessments for Proposed Residential Development in British Columbia*[2] specify that if soil liquefaction or strain softening is not an issue, the slope stability FoS under seismic conditions can be estimated by the methods provided by the guidelines.

b. The guidelines provide a procedure for the calculation of the horizontal earthquake acceleration coefficient k15 (Method 2 of the guidelines), which is used to simulate the design earthquake. A seismic analysis employing the k15 parameter and yielding a FoS greater than or equal to 1.0 is considered acceptable for residential development in accordance with the guidelines. This method was used to determine a safe setback for future development, which corresponds to a computed slip surface having a minimum FoS equal to 1.0 when using the k15 seismic coefficient. Areas within a potential slip surface are estimated to displace 15cm or more, and areas outside the slip surface are estimated to displace less than 15cm.

c. The k15 coefficient was computed to be 0.253g, based on an earthquake moment magnitude (M) of 7.0 and a spectral response acceleration (Sa(0.5)) of 1.026g, for 2% in 50-year ground motions. A list of seismic hazard values for this site are attached to this Report.

d. We note the maximum suggested displacement that is tolerable for normal wood-framed residential construction is 15cm. It is possible some residential buildings could withstand greater displacements, the extent of which can be determined by a Structural Engineer. It is also possible for a Structural Engineer to design a building that can tolerate higher displacements by increasing the structural rigidity of a building. The amount of displacement the Structural Engineer designs a house to resist is determined by the Geotechnical Engineer via slope stability analysis.

4.5 Results

a. The results of the slope stability analysis are summarized in Table 4.5 below.

b. For the purposes of this Report, the crest of slope is defined as the edge of the proposed building site / top of fill embankment as shown on the attached Site Plan.

c. Detailed Slope/W analysis results may also be found attached to this Report. The plots display all computed slip surfaces with a FoS less than the minimum target value. The target minimum FoS is 1.5 for the static condition and 1.0 for the seismic condition.

Table 4.5: Summary of Slope/W Results

Failure Scenario	Seismic Condition Setback Distance from Crest of Slope (m)	Static Condition Setback Distance from Crest of Slope (m)
Global Rotational Failure	10.0	4.0
Failure through sandy silt layer	6.0	0.0

5.0 HAZARD ASSESSMENT

5.1 Steep Slope

5.1.1 General

a. Our preliminary assessment indicates the slope is primarily comprised of dense fine sand with trace to some silt. The dense soils can maintain steep slopes for lengthy periods of time, however are susceptible to erosion and lose strength when saturated or exposed to heavy rain or concentrated overbank runoff. Furthermore, earth movement and slope instability could be accelerated during extreme natural occurrences such as earthquakes or low-frequency storms events.

b. This specific slope has been heavily manicured and landscaped, therefore there was no observation of any naturally occurring erosion or earth movement at the time of our assessment. The majority of the trees on the slope displayed vertical growth patterns, an indication of statically stable surficial soil conditions.

c. While significant groundwater seepage was not observed during the site reconnaissance, there was evidence that this slope may be affected by seepage. This was confirmed during the BH investigation where two seepage layers were encountered.

5.1.2 Recommended Setback

a. Based on slope geometry, subsurface conditions, interpreted mechanisms of slope movement described above, and the results of the slope stability analysis, we recommend a minimum setback of 10.0m from crest of slope.

b. This setback is in general agreement with other slope stability assessments completed by LEA in the area and is associated with seismic displacements of 15cm or less. This setback is intended to mitigate against damage to structures and does not propose to provide any mitigation against damage to land. We consider areas inland of the setback will be subject to a probability of property-damaging landslide occurrence of less than 2% in 50 years.

c. We have attached a marked-up topographic Site Plan that illustrates our interpretation of the crest of slope as well as our recommended setback. The recommended setback shall be surveyed and marked on-site by qualified personnel prior to construction.

d. Ponds, swimming pools and in-ground lawn irrigation systems shall be prohibited within the setback area.

e. Ancillary structures such as sundecks, gazebos and sheds may be located within the setback area, with the understanding that they are not considered occupiable space and are not structurally attached to the residential dwelling. Please note that the potential for loss or damage of these less critical ancillary structures due to slope failure increases as the distance to the crest diminishes. Ultimately it is at the discretion of the AHJ whether a specific ancillary structure is considered occupiable space and be constructed in accordance with the BCBC. LEA can provide further recommendations for construction of ancillary structures within the setback area upon request.

5.1.3 Setback Encroachment

a. We understand the recommended setback extends into the proposed building area and site constraints would make it difficult to construct a dwelling beyond the setback line. It is possible to extend the development into the setback area to a reasonable extent, provided mitigative measures are implemented. Generally, the most feasible mitigative measures are structural measures as designed by a Structural Engineer, which include:

i. Deepening / lowering foundations to bear below the potential slip surface. The required depth of footings will depend on the proposed siting of the residence and the estimated depth to the failure plane. We generally do not recommend lowering conventional strip and pad footings more than ±2.5m for feasible / practical construction. In the event deeper foundations are required, deep foundations (bored piles) could be considered.

ii. Unlike glacial till, the sandy soil subgrade is unlikely to produce vertical scarps during slope failure, as sandy soil slumps under load. This means settlement would occur across the entire length of the building when the slope fails during an earthquake, not one localized area. That type of differential settlement can be accommodated by a structural engineer by designing a stiffer building. If this option is to be explored, additional slope stability modelling would need to be conducted to determine the location where a maximum of 0.45m of vertical displacement would occur. LEA estimates that a setback line at 0.45m of vertical displacement would be 4-5m from the crest of the slope. It is worth noting that if this magnitude of displacement occurs after the design seismic event, the building probably would not be able to be repaired and would have to be torn down.

iii. Utilizing cantilevered foundations for portions of the residence that span into the setback area. This option generally consists of cantilevered grade beams and could be used in combination with deepened footings or pile foundations.

b. Most often the siting of a residence which requires encroachment into a setback area is an exercise between the Owner, Architect and/or Structural Engineer to optimize building size, location, and structural requirements. LEA can provide further recommendations for encroachment into the setback area and geotechnical parameters for pile foundations (if required) once a proposed building site has been finalized. Any proposed building siting shall be reviewed and approved by the Geotechnical Engineer.

5.1.4 Slope Maintenance

a. It should be noted that landslides can occur due to human activity (i.e., excavation, placement of fill, removal of vegetation, etc.) or by failure of civil infrastructure (i.e., leakage/rupture of underground water and sewer mains, stormwater disposal from existing developments, etc.). Minimizing infiltration of water into the slope and setback zone is essential to reducing the risk of slope movement. It is important that water does not pond near the crest of slope. Surface water flow across the slope from precipitation events, collected stormwater or any other drainage system must be prevented from flowing in a concentrated manner down the slope. The concentrated discharge of collected stormwater can lead to erosion, earth movement, or slope failure.

b. The existing native vegetation cover on the slope should be maintained. The slope should not be cleared of vegetation, although select pruning, spiraling, or limbing of trees as directed by a qualified tree

professional or arborist is permissible, subject to bylaw and geotechnical review. Generally, trees should only be cut if their roots are undermined by slope regression or if they are leaning severely. An arborist shall be contacted to direct any topping, pruning or cutting of trees. Exposed soils should be seeded to encourage new growth.

c. Preserve a healthy natural vegetated buffer zone adjacent to cleared / landscaped areas for runoff attenuation which will assist in maintaining stability of surficial cover.

d. Disposal of fills, yard waste, organic debris or excavation spoils shall not be discharged or dumped onto the slope or placed along the slope crest.

5.2 Coastal Flooding

a. The eastern extent of the Property and toe of slope is defined by the Natural Boundary of Stuart Channel. Typical FCLs for this coastal area of Chemainus, which take into account predicted sea level rise to the year 2100, are in the order of 4.5 to 6.5m GD elevation. As per the attached topographic Site Plan, the elevation of the proposed building area is approximately 17 to 19m GD. Furthermore, we understand the setback from the Natural Boundary has been established as 30m. Therefore, the proposed building site is well above typical FCLs and will not be impacted by coastal flooding. A detailed coastal flood assessment is not required.

5.3 Shoreline Protection

a. The toe of slope is aligned with the Natural Boundary of Stuart Channel and is defined by an approximately 1.5m tall cast-in-place concrete retaining wall founded on bedrock. The wall did not display any notable signs of distress and appeared to be in sound condition. The wall is expected to perform satisfactorily for the immediate future.

b. However, it should be noted that over the design life of the development, sea level rise will likely expose the existing shoreline to increased water depths and taller waves impacting the wall, which in turn could increase the frequency of wave overtopping and accelerated erosion of the foreshore area. The Property is currently dependent on the existing sea wall to maintain stability of the foreshore bank and alignment of the Natural Boundary.

c. Vertical sea walls are typically not a preferred revetment design because of their steepness, which tend to be more readily breached / overtopped by waves, which can cause erosion inland of the wall. They can also be more susceptible to scour erosion at their base, thereby exposing wall footings if not founded at sufficient depth or on competent stratum. We note there was no notable scour nor inland erosion observed for this sea wall at the time of our site reconnaissance.

d. We recommend the existing sea wall be regularly monitored by current and future property owners for any notable scour and inland erosion. Any scour, erosion or damage should be immediately repaired to maintain the integrity of the sea wall. If the frequency of overtopping increases to undesirable levels, additional mitigative works such as rip-rap revetment could be installed in the future to help dissipate wave energy.

5.4 Watercourse Flooding – Askew Creek

a. Askew Creek is located approximately 50m west of the Property limits, and approximately 90m from the proposed development area. The creek is roughly 4km long and originates from Chemainus Lake. The creek is contained within culverts beneath Chemainus Secondary School, where it exits at Elliott Street then flows north adjacent to Beach Drive within a well-confined ravine before discharging into the ocean. Adjacent to the Property (i.e., behind 10026 Beach Drive), the ravine is approximately 9m deep. There is currently no hydrometric data for Askew Creek.

b. Considering the adequate 50m separation between the Property and the creek, the 9m deep creek ravine, and the creek flow being control the size of the culvert beneath the school, the Property will not be impacted by potential flooding of Askew Creek. A detailed watercourse flood assessment is not required.

6.0 DESIGN PHASE

6.1 Foundation Design (Shallow Foundations)

a. Prior to construction, the foundation areas should be stripped to remove all unsuitable materials to provide an undisturbed natural subgrade for footing support.

b. Foundation loads should be supported on natural undisturbed material approved for use as a bearing stratum by our office, or structural fill, and may be designed using the following values:

   i. For foundations constructed on compact to dense, naturally deposited, inorganic subgrade, an SLS bearing pressure of 100 kPa, and a ULS of 135 kPa may be used for design purposes.

   ii. For foundations constructed on a minimum thickness of 0.65m of structural fill, as outlined in Section 7.2 of this Report, an SLS bearing pressure of 150 kPa, and a ULS bearing pressure of 200 kPa may be used for design purposes.

c. Exterior footings should be provided with a minimum 0.45m depth of ground cover for frost protection.

d. The Geotechnical Engineer should evaluate the subsurface conditions at the time of construction to confirm that soil and/or groundwater conditions do not materially differ to those observed and inferred during the site reconnaissance and that footings are based on appropriate and properly prepared founding material.

6.2 Seismic Criteria

a. No liquefiable or compressible soils were encountered during our subsurface investigation.

b. Based on the 2018 BCBC, Division B, Part 4, Table 4.1.8.4.A, "Site Classification for Seismic Site Response," the observed and inferred subsurface soil conditions would be classified as "Site Class D" (stiff soil).

6.3 Lateral Earth Pressures

a. Any future retaining wall construction within the Property shall be reviewed by the Structural and/or Geotechnical Engineer(s).

b. Lateral earth pressure coefficients (K) for the design of the cast-in-place retaining walls are outlined in Table 6.3.1. It is assumed that there will be a level (0° from horizontal) backslope and no additional surcharge on the wall. It is noted that the methods employed are estimates and further analysis may be required after dimensions of the proposed structure have been determined.

c. An average soil friction angle of 27° has been used to calculate the lateral earth pressure coefficients. It is assumed that retained soils are free-draining, well compacted, cohesionless sands and gravels, with a unit weight of 21 kN/m^3.

d. Seismic forces used reflect values from the 2015 National Building Code interpolated seismic hazard values for this Property in the MNC which are 0.482g Peak Ground Acceleration (PGA) (2% in 50-year probability) and 0.257g PGA (10% in 50-year probability) (attached).

e. The Mononobe-Okabe Method has been used to calculate the seismic active lateral earth pressure coefficient (K_{aE}). The static active coefficient (K_a) has been calculated using Coulomb's theory. The static passive coefficient (K_p) has been calculated using Rankine's theory. Refer to Table 6.3.1 for design values.

Table 6.3.1 – Lateral Earth Pressure Coefficients

Lateral Earth Pressure Condition	Earth Pressure Coefficient (K)	
Static Active	K_a	0.34
Static Passive	K_p	2.66
Seismic Active	K_{aE}	0.55

f. The thrust resulting from lateral earth pressures under each of the conditions outlined in Table 6.3.1 may be calculated using the relationship in Table 6.3.2. A minimum uniform static load of 20 kPa shall be considered for compaction forces.

Table 6.3.2 – Thrust from Lateral Earth Pressure Relationship

$P = 0.5 * K * \gamma * H^2$
P = Thrust (kN/m length of wall)
K = Lateral Earth Pressure Coefficient
γ = Soil Unit Weight (kN/m^3)
H = Height of Wall (m)

g. The seismic active coefficient provides a value that combines both static and dynamic forces to determine total active thrust (P_{aE}). The static component (P_a) acts through a point that is approximately H/3 above the toe of the wall. The dynamic component (ΔP_{aE}) acts through a point at approximately 0.6H above the toe of the wall. The total active thrust may then be considered to act at a height from the base of the wall using the following relationship in Table 6.3.3.

Table 6.3.3 – Height from Base of Wall for Total Active Thrust

$h = \frac{P_a * \left(\frac{H}{3}\right) + \Delta P_{aE} * (0.6H)}{P_{aE}}$
h = Height from Base of Wall for Total Active Thrust (m)
P_a = Static Active Thrust (kN/m)
P_{aE} = Total Active Thrust (kN/m)
$\Delta P_{aE} = P_{aE} - P_a$ = Dynamic Active Thrust (kN/m)
H = Height of Wall (m)

h. The presented earth pressure coefficients are based on fully drained backfill conditions, through the use of free draining granular backfill and foundation drainage.

7.0 CONSTRUCTION PHASE

7.1 General Excavation – Future Building Site

a. Prior to construction, all unsuitable materials within the proposed building envelope should be removed to provide a suitable base of support. Unsuitable materials include any non-mineral material such as vegetation, topsoil, peat, fill or other materials containing organic matter, as well as any soft, loose, or disturbed soils.

b. Ground water ingressing into any excavations should be controlled with a perimeter ditch located just outside of the building areas, connected to positive drainage.

c. Prior to placement of concrete footings, any bearing subgrade that has been softened, loosened, or otherwise disturbed during the course of construction should be removed, or else compacted following our recommendations for structural fill. Compaction will only be feasible if the soil has suitable moisture content and if there is access to heavy compaction equipment.

d. The Geotechnical Engineer is to confirm the removal of unsuitable materials and approve the exposed competent inorganic subgrade, prior to placement of any structural fill.

7.2 Structural Fill

a. Where fill is required to raise areas that will support buildings or slabs, structural fill should be used. The Geotechnical Engineer should first approve the exposed subgrade in fill areas, to confirm the removal of all unsuitable materials.

b. Structural fill should be inorganic sand and gravel. If structural fill placement is to be carried out in the wet season, material with a fines content limited to 5% passing the 75µm sieve should be used, as such a material will not be overly sensitive to moisture, allowing compaction during rainy periods of weather.

c. Structural fill should be compacted to a minimum of 95% of Modified Proctor maximum dry density (ASTM D1557) in foundation and floor slab areas.

d. Structural fills under foundations and slabs should include the zone defined by a plane extending down and outward a minimum 0.5m from the outer edge of the foundation at an angle of 45 degrees from horizontal to ensure adequate subjacent support. This support zone is shown in Figure 7.2 below.

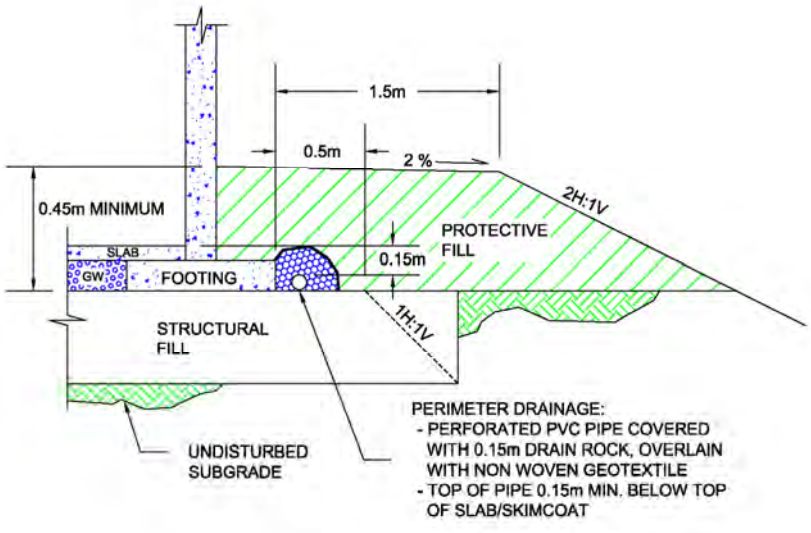


Figure 7.2 – Typical Section, Structural Fill

e. Compaction of fill should include moisture conditioning as needed to bring the soils to the optimum moisture content and compacted using vibratory compaction equipment in lift thicknesses appropriate for the size and type of compaction equipment used.

f. A general guideline for maximum lift thickness is no more than 100mm for light hand equipment such as a "jumping-jack," 200mm for a small roller and 300mm for a large roller or heavy (>500 kg) vibratory plate compactor or a backhoe mounted hoe-pac or a large excavator mounted hoe-pac, as measured loose.

g. It should be emphasized that the long-term performance of buildings and slabs is highly dependent on the correct placement and compaction of underlying structural fills. Consequently, we recommend that structural fills be observed and approved by the Geotechnical Engineer. This would include approval of the proposed fill materials and performing a suitable program of compaction testing during construction.

7.3 Foundation Drainage

a. Our assessment did not identify any abnormal groundwater conditions that would necessitate special foundation drainage measures outside of Part 9 of the 2018 BCBC. Conventional requirements of the 2018 BCBC pertaining to building drainage are considered suitable at this site.

b. We assume the installed foundation and site drainage measures will be inspected and approved by Others (i.e. the Plumbing Inspector for the AHJ) during construction.

7.4 Stormwater Management

a. Runoff from paved areas, roof drains and perimeter foundation drains should be collected and piped to the municipal storm sewer system.

b. In the absence of a municipal storm sewer, collected stormwater could be discharged through solid UV resistant conduit to the base of slope. The conduit should be anchored to the slope to prevent rupture and should include flexible couplings and a tear-away connection at or near the building. The conduit should be discharged at the toe of slope into a dispersion chamber, armoured splash pad or an approved outlet area where erosion can be managed. The conduit must be regularly inspected for leakage by current and future property owners, and immediately repaired if required.

c. Any stormwater infiltration measures (rock pits or similar) should be located outside of the recommended slope setback area and at a minimum distance of 5.0m from any structure.

d. LEA can provide a detailed Stormwater Management Plan upon request.

8.0 CONCLUSIONS

8.1 Local Government Conformance Statement

a. From a geotechnical point of view, and provided the recommendations in this Report are followed, the land can be made safe for the use intended (defined for the purposes of this Report as the construction of a single-family residence of conventional construction methods), through the use of deep foundations,

cantilevered foundations and/or stiffened building as designed by a Structural Engineer, or adjustments to the size and/or location of the building site, with the probability of a geotechnical failure resulting in property damage of less than:

i. 2% in 50 years for seismic events, including slope stability; and

ii. 10% in 50 years for all other geotechnical hazards,

8.2 Geotechnical and Quality Assurance Statement

a. The MNC may request a Geotechnical Engineer to provide professional assurance services during the course of construction. Geotechnical Assurance services include review of the geotechnical components of the plans and supporting documents, and responsibility for field reviews of these components during construction.

9.0 CLOSURE

a. LEA appreciates the opportunity to be of service on this project. If you have any comments, or additional requirements at this time, please contact us at your convenience.

Respectfully Submitted,
Lewkowich Engineering Associates Ltd.

Reviewed By:

January 28, 2022

Jeff Scott, P.Eng.
Geotechnical Engineer

Chris Hudec, M.A.Sc., P.Eng.
Senior Project Engineer

10.0 ATTACHMENTS

1. G.W. Lindberg Land Surveying Inc., Site Plan of Lot A, Section 19, Range 5, Chemainus District, Plan 12594, Dwg No. GWL021-1213-Topo, dated August 25, 2021, marked-up by LEA.
2. LEA, BH22-01 Log.
3. LEA, Slope/W Section A-A Plots with Results (4 Plots).
4. Natural Resources Canada, 2015 National Building Code Seismic Hazard Calculation datasheet.
5. EGBC, Appendix D: Landslide Assessment Assurance Statement.
6. EGBC, Appendix I: Flood Assurance Statement.

11.0 REFERENCES

1. The Corporation of the District of North Cowichan, *Official Community Plan*, Bylaw No. 3450, consolidated July 19, 2018.
2. Engineers and Geoscientists of British Columbia, *Guidelines for Legislated Landslide Assessments for Proposed Residential Developments in BC*, dated May 2010.
3. Engineers and Geoscientists of British Columbia, *Professional Practice Guidelines – Legislated Flood Assessments in a Changing Climate in BC*, Version 2.1, dated August 28, 2018.
4. Geological Survey of Canada Department of Mines and Technical Surveys, *Surficial Geology Duncan British Columbia*, Map 14-1965, Paper 65-24, Sheet 92$\frac{B}{13}$, dated 1966.
5. Province of BC, interactive web-map, *iMapBC*, accessed October 2021.
6. The Corporation of the District of North Cowichan, *Zoning Bylaw*, Bylaw No. 2950, dated 1997.
7. Municipality of North Cowichan, online web-map, accessed October 2021.
8. BC Ministry of Forests, Lands, Natural Resource Operations and Rural Development, *Flood Hazard Area Land Use Management Guidelines*, Amended January 1, 2018.
9. Kerr Wood Leidal Associates Ltd., BC Ministry of Forests, Lands, Natural Resource Operations, *Coastal Floodplain Mapping – Guidelines and Specifications*, dated June 2011.

SITE PLAN OF LOT A, SECTION 19, RANGE 5, CHEMAINUS DISTRICT, PLAN 12594

PID 004-788-036

BCGS 92B.092

Scale = 1: 250

5 2.5 0 5 10 15 20 25 Metres

The Intended plot size of this plan is 432mm in height by 560mm in width (C size) when plotted at a scale of 1:250.

LEGEND

All distances are in metres and decimals thereof.
Elevations are in metres

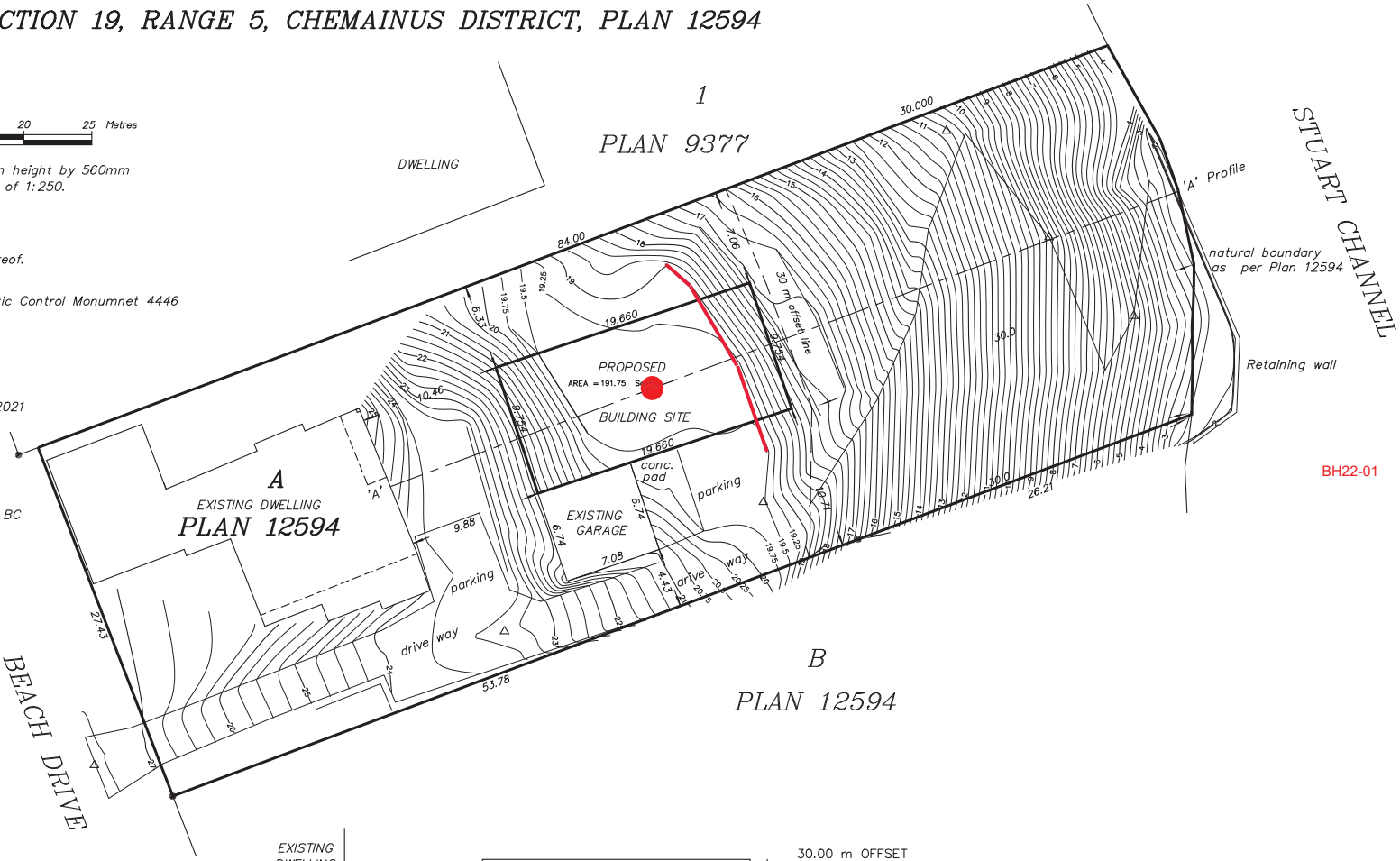
The Datum of the Elevations is derived Geodetic Control Monumnet 4446
Elevation of 26.134 m CVD28BC

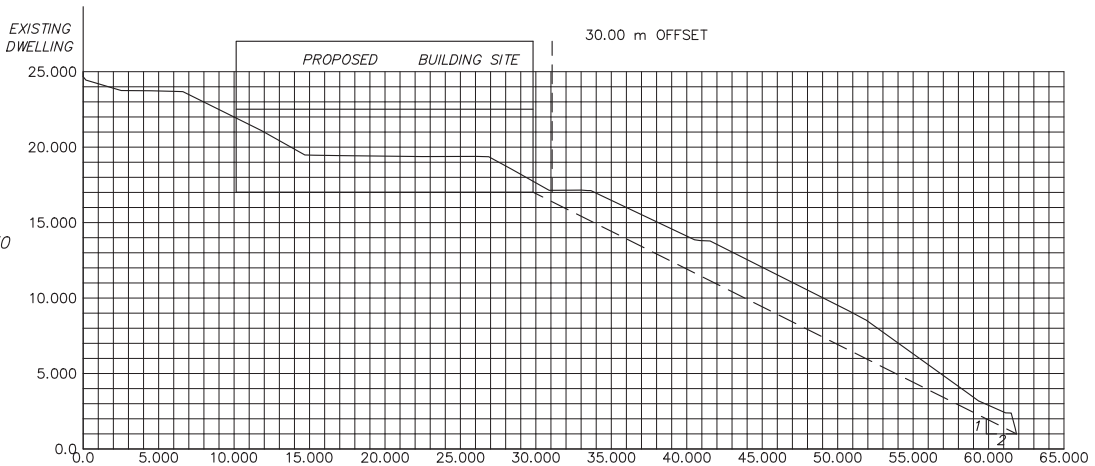
△ denotes traverse hub (spike) placed.

● denotes standard iron post found.

Contour interval = 0.25 metres
Date of Field Surveys: August 5, 10 , 26, 2021

Civic Address : 10029 Beach Drive Chemainus BC





Scale = 1: 250

PROFILE A-A
Scale = 1: 250

FOR DISCUSSIONS AND REZONING APPLICATIONS ONLY

G.W. LINDBERG LAND SURVEYING INC.
Professional Land Surveyor
Surveying & Geomatics Services
9261 Chemainus Road V0R 1K5
Chemainus, B.C. Email gwlindberg@shaw.ca

PROJECT: SITE PLAN

CLIENT : **Marlene Hayes & Jon Lefebure**

Calcs by: GWL
Drawn by: GWL

Date: August 25,2021 Drawing Number: GWL021-1213-Topo

File No. GWL021-1213-TOPO contours PDF

File No. GWL021-1213

Lewkowich Engineering Associates Ltd.

BOREHOLE LOG

File Number: E0263 BH22-01
Client: Jon Lefebure
Project: 10029 Beach Drive, Chemainus, BC
Location: Chemainus, BC

Depth (m)	Soil Symbol	Description	SPT N Value	SPT Blows
0.0		Ground Surface		
		0.0-0.6m Silty sand, trace gavel, cobble and organics (roots, rootlets, matter), compact, dark brown, moist (fill)		
0.5				
		0.6-1.2m Silty sand, trace to some gravel, trace cobble, compact, light brown with some orangey brown patches, moist		
1.0				
		1.2-1.8m Fine sand, trace to some silt, compact to dense, grey/brown, damp		
1.5				
		1.8-6.7m Fine sand, trace to some silt, compact to dense, grey, moist ***Very thin silt, silty sand patches/ bands observed throughout cuttings. Inferred stratified silt/ silty sand lenses throughout run.		2 9 18 9 11
2.0				
2.5				
3.0				
3.5				
4.0				
4.5				
5.0				

SPT Blows ■
10 20 30 40 50 60

Logged By: Paul Simmons, Senior Technician
Reviewed By: Jeff Scott, P.Eng.
Digging Method: Mobile Acker

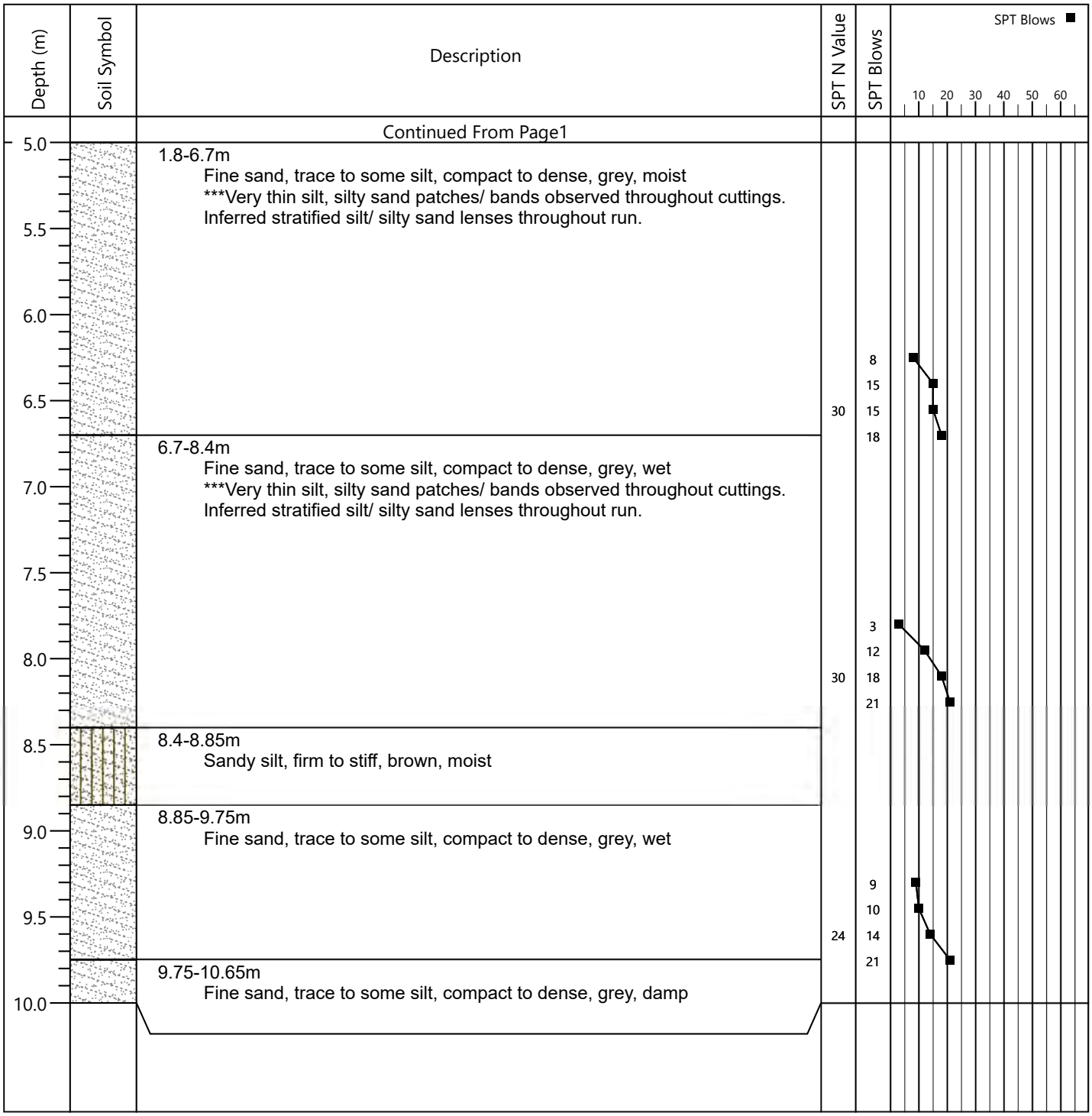
Date: January 17, 2022
Page 1 of 3

1900 Boxwood Road
Nanaimo, British Columbia, V9S 5Y2
Phone: 250-756-0355
Fax: 250-756-3831
Email: geotech@lewkowich.com

Lewkowich Engineering Associates Ltd.

BOREHOLE LOG

File Number: E0263 BH22-01
Client: Jon Lefebure
Project: 10029 Beach Drive, Chemainus, BC
Location: Chemainus, BC



Logged By: Paul Simmons, Senior Technician Date: January 17, 2022
Reviewed By: Jeff Scott, P.Eng. Page 2 of 3
Digging Method: Mobile Acker

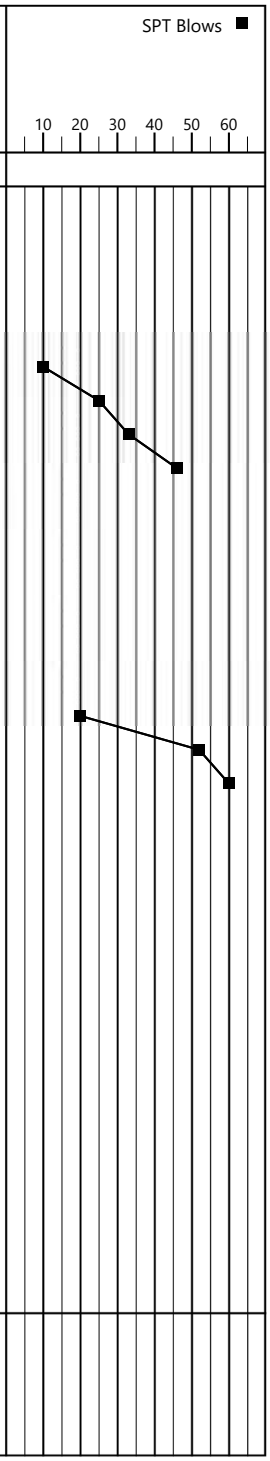
1900 Boxwood Road
Nanaimo, British Columbia, V9S 5Y2
Phone: 250-756-0355
Fax: 250-756-3831
Email: geotech@lewkowich.com

Lewkowich Engineering Associates Ltd.

BOREHOLE LOG

File Number: E0263 BH22-01
Client: Jon Lefebure
Project: 10029 Beach Drive, Chemainus, BC
Location: Chemainus, BC

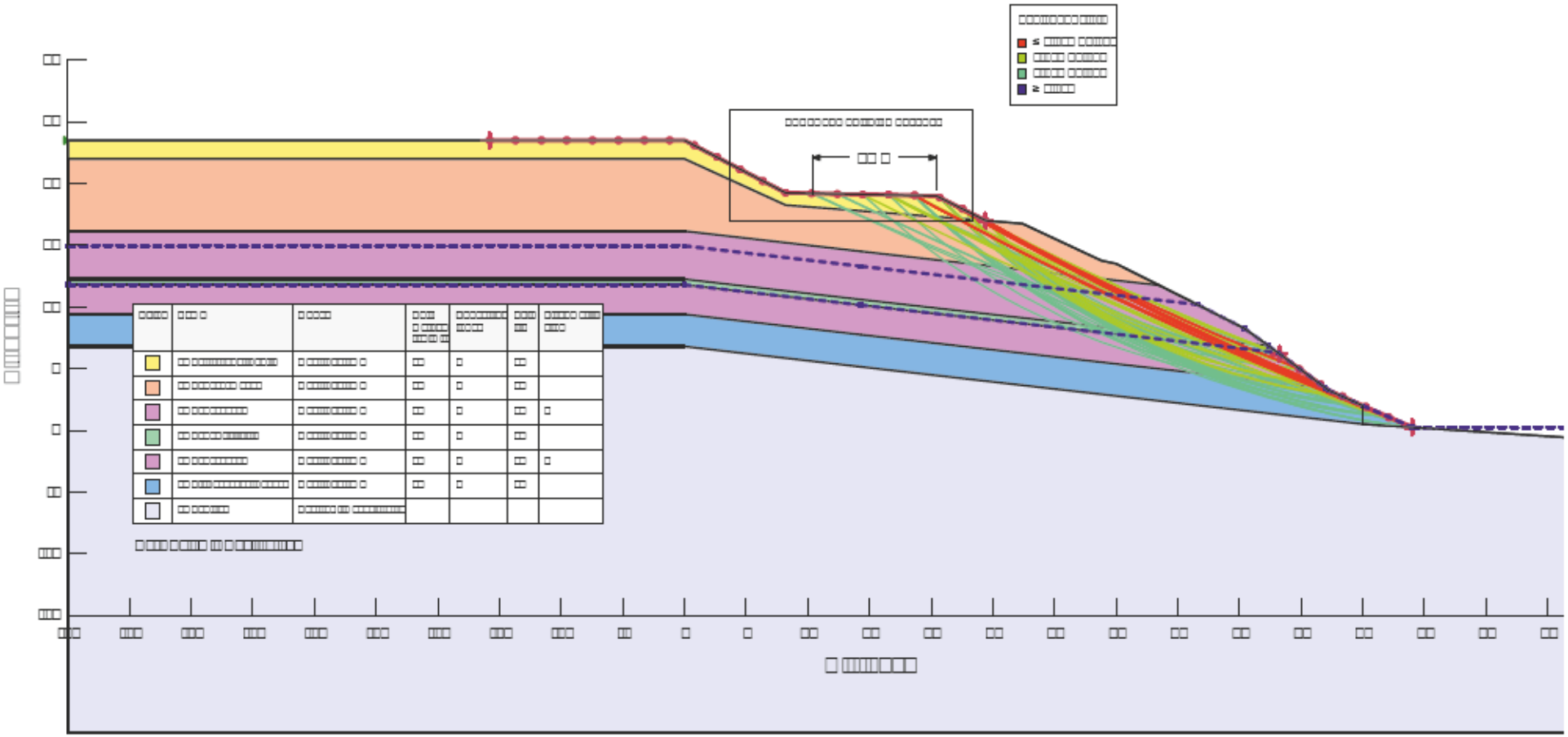
Depth (m)	Soil Symbol	Description	SPT N Value	SPT Blows
		Continued From Page2		
10.0		9.75-10.65m Fine sand, trace to some silt, compact to dense, grey, damp		
10.5				
		10.65-11.25m Fine sand, trace to some silt, compact to dense, grey, wet		10 25
11.0			58	33
		11.25-12.2m Silty sand, some gravel, trace evidence of cobble, very dense, bluish grey, moist		46
11.5				
12.0				
		12.2-13.85m No sample recovery. Drilling advancement from 12.1 to 13.25m was very dense but smooth (inferred sand, silty sand stratum). Drilling advancement from 13.25 to 13.85 was very dense and coarse (inferred silty sand with gravel, cobble stratum). SPT sample collected from 12.1 to 12.8m revealed very dense silty sand.		20 52
12.5			>112	>60
13.0				
13.5		Inferred Bedrock		
14.0		Fill material to 0.6m Groundwater encountered at: 6.7m, and 10.65m Bedrock encountered at 13.85m End of borehole at 13.85m (effective refusal)		
14.5		Grab samples collected at: 1.2 - 1.5m, 1.5 - 3.05m, 3.05 - 4.55m, 4.55 - 6.1m, 6.1 - 6.7m, 6.7 - 7.6m, 8.4- 8.85m, 9.45 - 10.65m, 10.65 - 11.3m, 11.3 - 12.2m		
15.0				

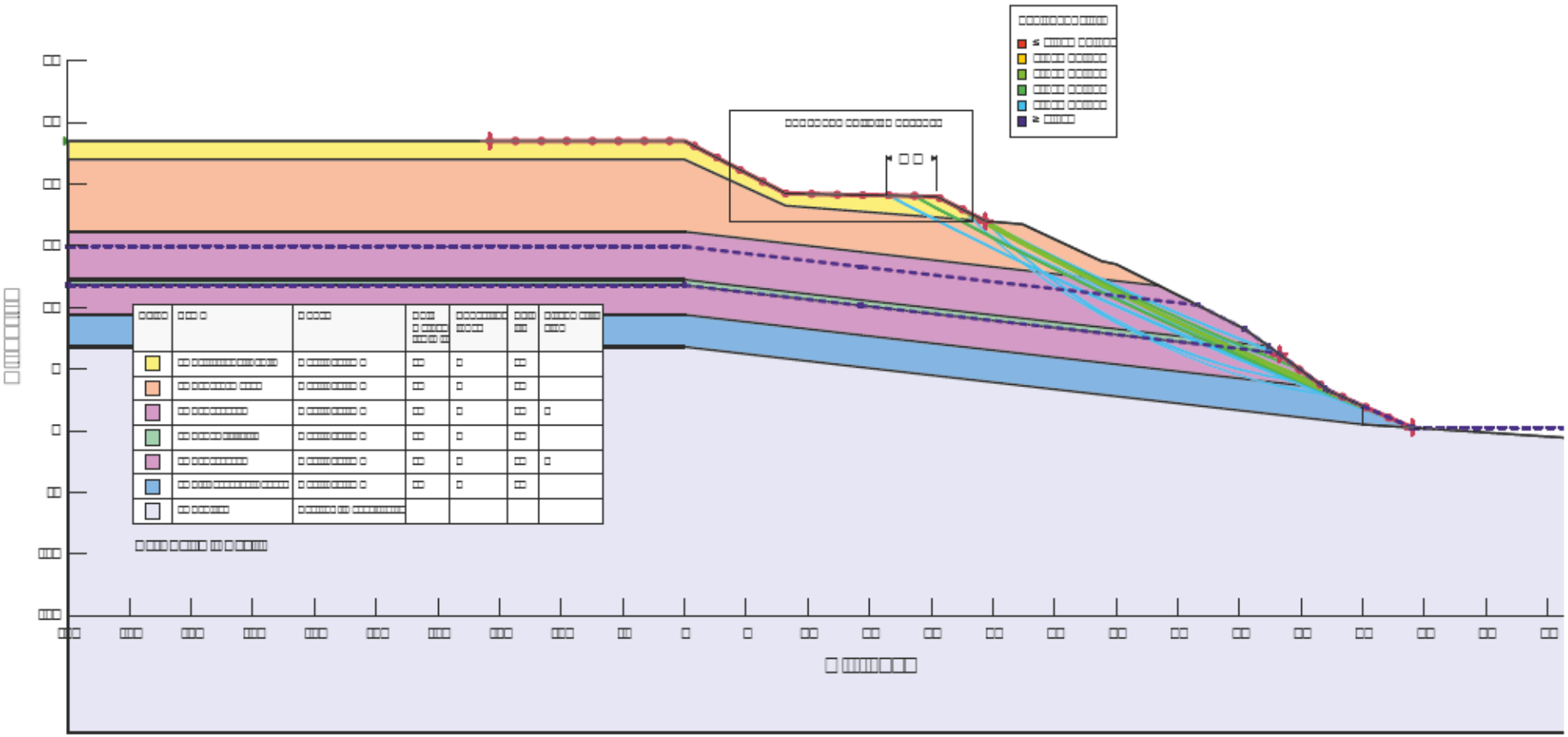


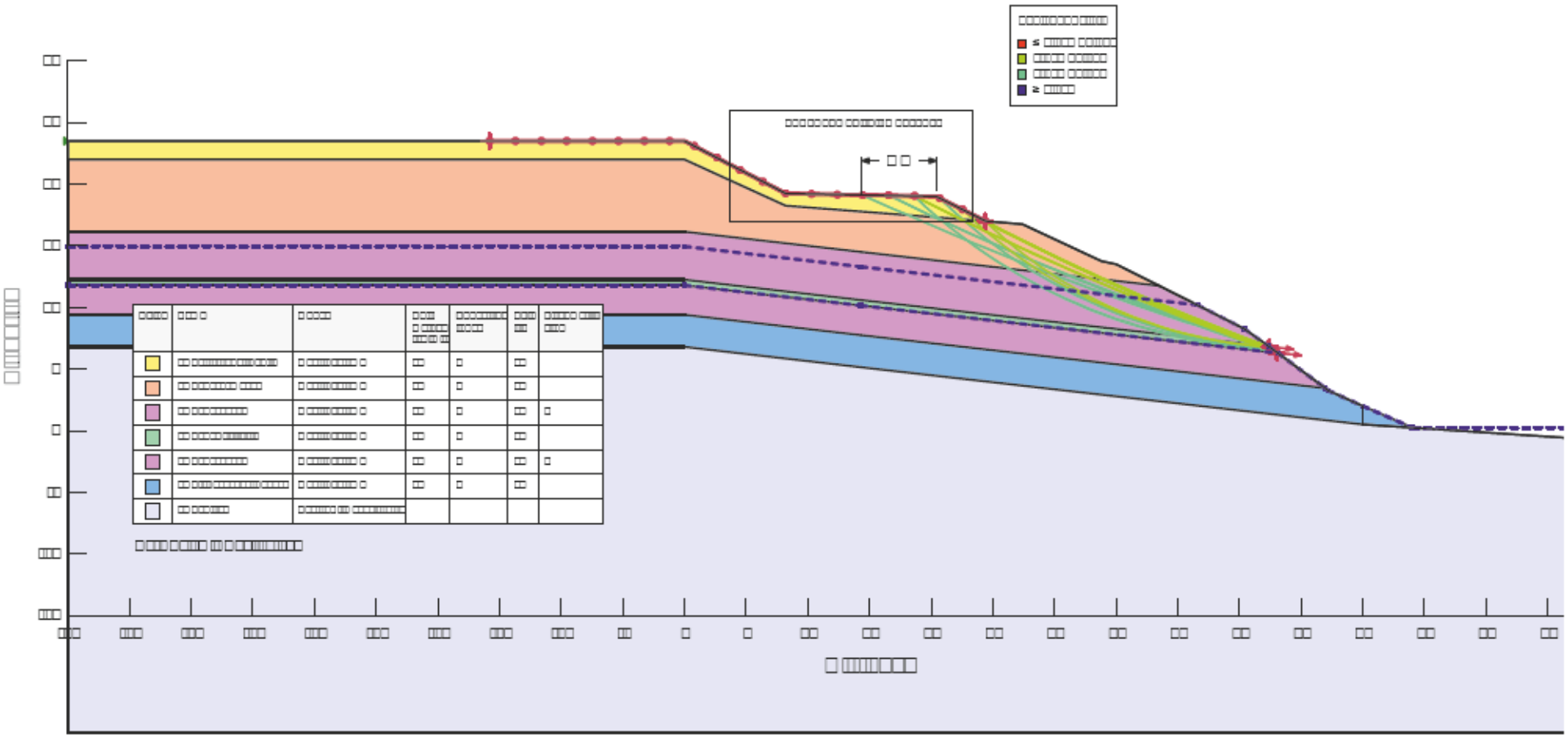
Logged By: Paul Simmons, Senior Technician
Reviewed By: Jeff Scott, P.Eng.
Digging Method: Mobile Acker

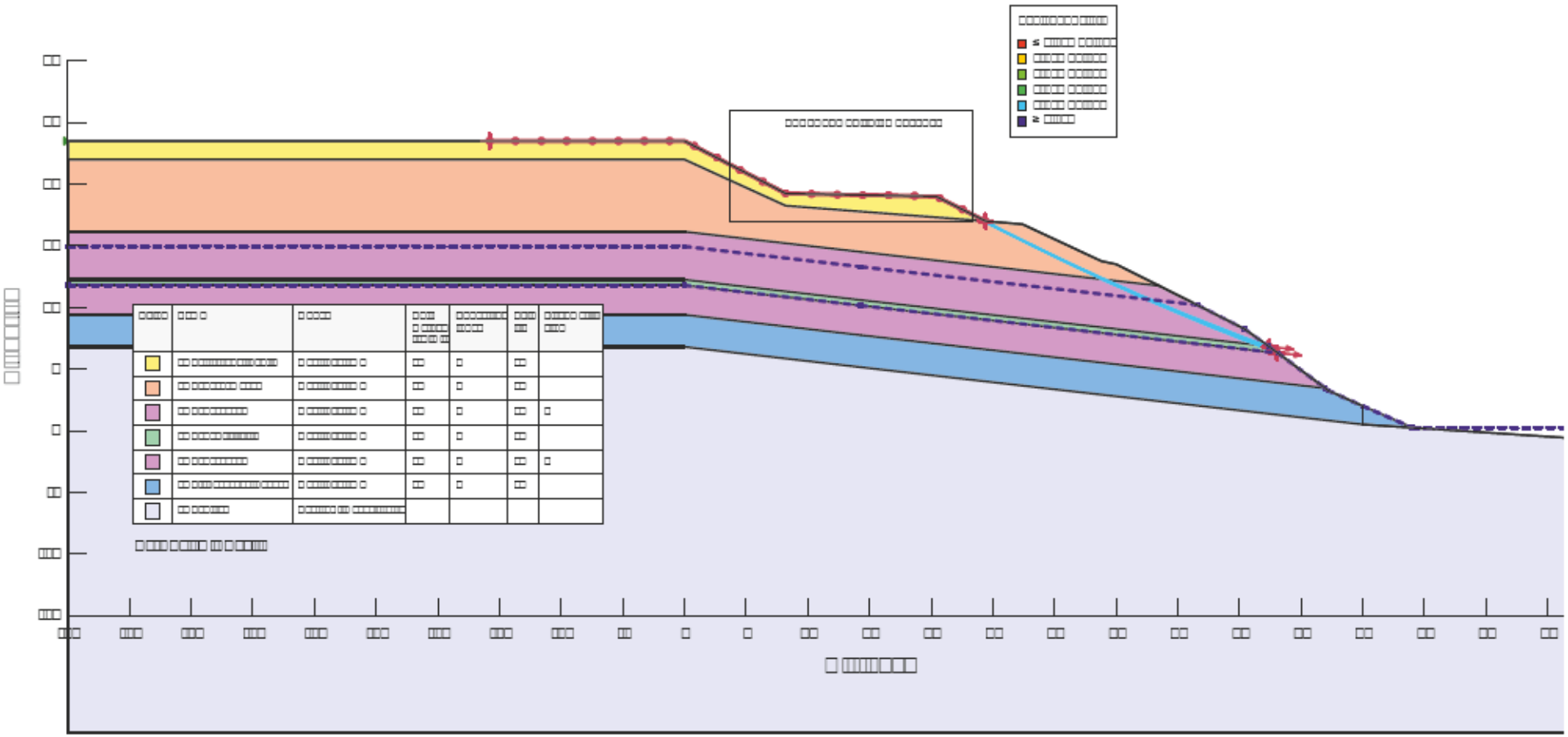
Date: January 17, 2022
Page 3 of 3

1900 Boxwood Road
Nanaimo, British Columbia, V9S 5Y2
Phone: 250-756-0355
Fax: 250-756-3831
Email: geotech@lewkowich.com









2015 National Building Code Seismic Hazard Calculation

INFORMATION: Eastern Canada English (613) 995-5548 français (613) 995-0600 Facsimile (613) 992-8836
Western Canada English (250) 363-6500 Facsimile (250) 363-6565

Site: 48.931N 123.724W **User File Reference:** 10029 Beach Drive, Chemainus 2021-10-18 16:51 UT

Requested by: Jeff Scott, Lewkowich Engineering Associates

Probability of exceedance per annum	0.000404	0.001	0.0021	0.01
Probability of exceedance in 50 years	2 %	5 %	10 %	40 %
Sa (0.05)	0.580	0.420	0.309	0.138
Sa (0.1)	0.889	0.645	0.473	0.210
Sa (0.2)	1.106	0.803	0.592	0.260
Sa (0.3)	1.136	0.824	0.606	0.261
Sa (0.5)	1.026	0.733	0.526	0.215
Sa (1.0)	0.588	0.400	0.275	0.103
Sa (2.0)	0.351	0.231	0.153	0.054
Sa (5.0)	0.109	0.063	0.035	0.011
Sa (10.0)	0.039	0.022	0.012	0.004
PGA (g)	0.482	0.349	0.257	0.112
PGV (m/s)	0.745	0.509	0.353	0.131

Notes: Spectral (Sa(T), where T is the period in seconds) and peak ground acceleration (PGA) values are given in units of g (9.81 m/s^2). Peak ground velocity is given in m/s. Values are for "firm ground" (NBCC2015 Site Class C, average shear wave velocity 450 m/s). NBCC2015 and CSAS6-14 values are highlighted in yellow. Three additional periods are provided - their use is discussed in the NBCC2015 Commentary. Only 2 significant figures are to be used. **These values have been interpolated from a 10-km-spaced grid of points. Depending on the gradient of the nearby points, values at this location calculated directly from the hazard program may vary. More than 95 percent of interpolated values are within 2 percent of the directly calculated values.**

References

National Building Code of Canada 2015 NRCC no. 56190; Appendix C: Table C-3, Seismic Design Data for Selected Locations in Canada

Structural Commentaries (User's Guide - NBC 2015: Part 4 of Division B)
Commentary J: Design for Seismic Effects

Geological Survey of Canada Open File 7893 Fifth Generation Seismic Hazard Model for Canada: Grid values of mean hazard to be used with the 2015 National Building Code of Canada

See the websites www.EarthquakesCanada.ca and www.nationalcodes.ca for more information

APPENDIX D: *LANDSLIDE ASSESSMENT ASSURANCE STATEMENT*

Note: This Statement is to be read and completed in conjunction with the "*APEGBC Guidelines for Legislated Landslide Assessments for Proposed Residential Development in British Columbia*", March 2006/Revised September 2008 ("*APEGBC* Guidelines") and the "2006 BC Building Code (BCBC 2006)" and is to be provided for *landslide assessments* (not floods or flood controls) for the purposes of the Land Title Act, Community Charter or the Local Government Act. Italicized words are defined in the *APEGBC* Guidelines.

To: The *Approving Authority* Date: January 28, 2022 File# E0263

Municipality of North Cowichan

7030 Trans-Canada Hwy, Duncan, BC V9L 6A1

Jurisdiction and address

With reference to (check one):

- ☐ Land Title Act (Section 86) – Subdivision Approval
- ☑ Local Government Act (Sections 919.1 and 920) – Development Permit
- ☑ Community Charter (Section 56) – Building Permit
- ☐ Local Government Act (Section 910) – Flood Plain Bylaw Variance
- ☐ Local Government Act (Section 910) – Flood Plain Bylaw Exemption
- ☐ British Columbia Building Code 2006 sentences 4.1.8.16 (8) and 9.4 4.4.(2) (Refer to BC Building and Safety Policy Branch Information Bulletin B10-01 issued January 18, 2010)

For the Property: Lot A, Section 19, Range 5, Chemainus District, Plan 12594, PID 004-788-036; 10029 Beach Drive, Chemainus, BC

Legal description and civic address of the Property

The undersigned hereby gives assurance that he/she is a *Qualified Professional* and is a *Professional Engineer* or *Professional Geoscientist.*

I have signed, sealed and dated, and thereby certified, the attached *landslide assessment* report on the Property in accordance with the *APEGBC Guidelines*. That report must be read in conjunction with this Statement. In preparing that report I have:

Check to the left of applicable items

- ☑ 1. Collected and reviewed appropriate background information
- ☑ 2. Reviewed the proposed *residential development* on the Property
- ☑ 3. Conducted field work on and, if required, beyond the Property
- ☑ 4. Reported on the results of the field work on and, if required, beyond the Property
- ☑ 5. Considered any changed conditions on and, if required, beyond the Property
- 6. For a *landslide hazard analysis* or *landslide risk analysis* I have:
  - ☑ 6.1 reviewed and characterized, if appropriate, any *landslide* that may affect the Property
  - ☑ 6.2 estimated the *landslide hazard*
  - ☑ 6.3 identified existing and anticipated future *elements at risk* on and, if required, beyond the Property
  - ☑ 6.4 estimated the potential *consequences* to those *elements at risk*
- 7. Where the *Approving Authority* has adopted a *level of landslide safety* I have:
  - ___ 7.1 compared the *level of landslide safety* adopted by the *Approving Authority* with the findings of my investigation
  - ___ 7.2 made a finding on the *level of landslide safety* on the Property based on the comparison
  - ___ 7.3 made recommendations to reduce *landslide hazards* and/or *landslide risks*
- 8. Where the *Approving Authority* has **not** adopted a *level of landslide safety* I have:

- ☑ 8.1 described the method of *landslide hazard analysis* or *landslide risk analysis* used
- ☑ 8.2 referred to an appropriate and identified provincial, national or international guideline for *level of landslide safety*
- ☑ 8.3 compared this guideline with the findings of my investigation
- ☑ 8.4 made a finding on the *level of landslide safety* on the Property based on the comparison
- ☑ 8.5 made recommendations to reduce *landslide hazards* and/or *landslide risks*

☑ 9. Reported on the requirements for future inspections of the Property and recommended who should conduct those inspections.

Based on my comparison between

Check one

- ☐ the findings from the investigation and the adopted *level of landslide safety* (item 7.2 above)
- ☑ the appropriate and identified provincial, national or international guideline for *level of landslide safety* (item 8.4 above)

I hereby give my assurance that, based on the conditions[1] contained in the attached *landslide assessment* report,

Check one

☐ for subdivision approval, as required by the Land Title Act (Section 86), "that the land may be used safely for the use intended"

Check one

- ☐ with one or more recommended registered covenants.
- ☐ without any registered covenant.

☑ for a development permit, as required by the Local Government Act (Sections 919.1 and 920), my report will "assist the local government in determining what conditions or requirements under [Section 920] subsection (7.1) it will impose in the permit".

☑ for a building permit, as required by the Community Charter (Section 56), "the land may be used safely for the use intended"

Check one

- ☐ with one or more recommended registered covenants.
- ☐ without any registered covenant.

☐ for flood plain bylaw variance, as required by the "Flood Hazard Area Land Use Management Guidelines" associated with the Local Government Act (Section 910), "the development may occur safely".

☐ for flood plain bylaw exemption, as required by the Local Government Act (Section 910), "the land may be used safely for the use intended".

Jeff Scott, P.Eng.
Name (print)

January 28, 2022
Date

Jeff Scott
Signature

[1] When seismic slope stability assessments are involved, *level of landslide safety* is considered to be a "life safety" criteria as described in the National Building Code of Canada (NBCC 2005), Commentary on Design for Seismic Effects in the User's Guide, Structural Commentaries, Part 4 of Division B. This states:

"The primary objective of seismic design is to provide an acceptable level of safety for building occupants and the general public as the building responds to strong ground motion; in other words, to minimize loss of life. This implies that, although there will likely be extensive structural and non-structural damage, during the DGM (design ground motion), there is a reasonable degree of confidence that the building will not collapse nor will its attachments break off and fall on people near the building. This performance level is termed 'extensive damage' because, although the structure may be heavily damaged and may have lost a substantial amount of its initial strength and stiffness, it retains some margin of resistance against collapse".

1900 Boxwood Road, Nanaimo, BC V9S 5Y2

Address

250-756-0355

Telephone

(Affix Professional seal here)

If the *Qualified Professional* is a member of a firm, complete the following.

I am a member of the firm Lewkowich Engineering Associates Ltd.
and I sign this letter on behalf of the firm. (Print name of firm)

FLOOD ASSURANCE STATEMENT

Note: This statement is to be read and completed in conjunction with the current Engineers and Geoscientists BC *Professional Practice Guidelines – Legislated Flood Assessments in a Changing Climate in BC* ("the guidelines") and is to be provided for flood assessments for the purposes of the *Land Title Act*, Community Charter, or the *Local Government Act*. Defined terms are capitalized; see the Defined Terms section of the guidelines for definitions.

To: The Approving Authority

Municipality of North Cowichan

7030 Trans-Canada Hwy, Duncan, BC V9L 6A1

Jurisdiction and address

Date: January 28, 2022 LEA File # E0263

With reference to (CHECK ONE):

- ☐ *Land Title Act* (Section 86) – Subdivision Approval
- ☑ *Local Government Act* (Division 7) – Development Permit
- ☑ Community Charter (Section 56) – Building Permit
- ☐ *Local Government Act* (Section 524) – Flood Plain Bylaw Variance
- ☐ *Local Government Act* (Section 524) – Flood Plain Bylaw Exemption

For the following property ("the Property"):

Lot A, Section 19, Range 5, Chemainus District, Plan 12594, PID 004-788-036; 10029 Beach Drive, Chemainus, BC

Legal description and civic address of the Property

The undersigned hereby gives assurance that he/she is a Qualified Professional and is a Professional Engineer or Professional Geoscientist who fulfils the education, training, and experience requirements as outlined in the guidelines.

I have signed, sealed, and dated, and thereby certified, the attached Flood Assessment Report on the Property in accordance with the guidelines. That report and this statement must be read in conjunction with each other. In preparing that Flood Assessment Report I have:

[CHECK TO THE LEFT OF APPLICABLE ITEMS]

___ 1. Consulted with representatives of the following government organizations:

_____

☑ 2. Collected and reviewed appropriate background information

☑ 3. Reviewed the Proposed Development on the Property

☑ 4. Investigated the presence of Covenants on the Property, and reported any relevant information

☑ 5. Conducted field work on and, if required, beyond the Property

☑ 6. Reported on the results of the field work on and, if required, beyond the Property

☑ 7. Considered any changed conditions on and, if required, beyond the Property

8. For a Flood Hazard analysis I have:

- ☑ 8.1 Reviewed and characterized, if appropriate, Flood Hazard that may affect the Property
- ☑ 8.2 Estimated the Flood Hazard on the Property
- ☑ 8.3 Considered (if appropriate) the effects of climate change and land use change
- ___ 8.4 Relied on a previous Flood Hazard Assessment (FHA) by others
- ___ 8.5 Identified any potential hazards that are not addressed by the Flood Assessment Report

9. For a Flood Risk analysis I have:

- ___ 9.1 Estimated the Flood Risk on the Property
- ___ 9.2 Identified existing and anticipated future Elements at Risk on and, if required, beyond the Property
- ___ 9.3 Estimated the Consequences to those Elements at Risk

10. In order to mitigate the estimated Flood Hazard for the Property, the following approach is taken:
___ 10.1 A standard-based approach
___ 10.2 A Risk-based approach
___ 10.3 The approach outlined in the guidelines, Appendix F: Flood Assessment Considerations for Development Approvals
✓ 10.4 No mitigation is required because the completed flood assessment determined that the site is not subject to a Flood Hazard

11. Where the Approving Authority has adopted a specific level of Flood Hazard or Flood Risk tolerance, I have:
___ 11.1 Made a finding on the level of Flood Hazard or Flood Risk on the Property
___ 11.2 Compared the level of Flood Hazard or Flood Risk tolerance adopted by the Approving Authority with my findings
___ 11.3 Made recommendations to reduce the Flood Hazard or Flood Risk on the Property

12. Where the Approving Authority has not adopted a level of Flood Hazard or Flood Risk tolerance, I have:
✓ 12.1 Described the method of Flood Hazard analysis or Flood Risk analysis used
✓ 12.2 Referred to an appropriate and identified provincial or national guideline for level of Flood Hazard or Flood Risk
✓ 12.3 Made a finding on the level of Flood Hazard of Flood Risk tolerance on the Property
✓ 12.4 Compared the guidelines with the findings of my flood assessment
___ 12.5 Made recommendations to reduce the Flood Hazard or Flood Risk

___ 13. Considered the potential for transfer of Flood Risk and the potential impacts to adjacent properties

___ 14. Reported on the requirements for implementation of the mitigation recommendations, including the need for subsequent professional certifications and future inspections.

Based on my comparison between:

[CHECK ONE]

☐ The findings from the flood assessment and the adopted level of Flood Hazard or Flood Risk tolerance (item 11.2 above)
✓ The findings from the flood assessment and the appropriate and identified provincial or national guideline for level of Flood Hazard or Flood Risk tolerance (item 12.4 above)

I hereby give my assurance that, based on the conditions contained in the attached Flood Assessment Report:

[redacted]

☐ For subdivision approval, as required by the *Land Title Act* (Section 86), "that the land may be used safely for the use intended":

[CHECK ONE]

☐ With one or more recommended registered Covenants.
☐ Without any registered Covenant.

✓ For a development permit, as required by the *Local Government Act* (Sections 919.1 and 920), my Flood Assessment Report will "assist the local government in determining what conditions or requirements under [Section 920] subsection (7.1) it will impose in the permit".

✓ For a building permit, as required by the Community Charter (Section 56), "the land may be used safely for the use intended":

[CHECK ONE]

☐ With one or more recommended registered Covenants.
☐ Without any registered Covenant.

☐ For flood plain bylaw variance, as required by the *Flood Hazard Area Land Use Management Guidelines* and the *Amendment Section 3.5 and 3.6* associated with the *Local Government Act* (Section 524), "the development may occur safely".

☐ For flood plain bylaw exemption, as required by the *Local Government Act* (Section 524), "the land may be used safely for the use intended".

I certify that I am a Qualified Professional as defined below.

January 28, 2022
Date

Jeff Scott, P.Eng
Prepared by

Reviewed by

Jeff Scott
Name (print)

Name (print)

Jeff Scott
Signature

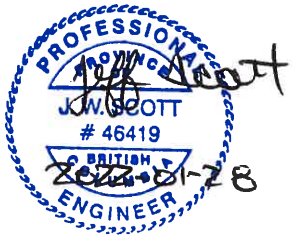
Signature

1900 Boxwood Road
Address

Nanaimo, BC V9S 5Y2

(250) 756-0355
Telephone

jscott@lewkowich.com
Email



(Affix PROFESSIONAL SEAL here)

If the Qualified Professional is a member of a firm, complete the following:

I am a member of the firm Lewkowich Engineering Associates Ltd.
and I sign this letter on behalf of the firm. (Name of firm)

SITE PLAN OF LOT A, SECTION 19, RANGE 5, CHEMAINUS DISTRICT, PLAN 12594

ATTACHMENT 6

PID 004-788-036

BCGS 92B.092

Scale = 1: 250

5 2.5 0 5 10 15 20 25 Metres

The Intended plot size of this plan is 432mm in height by 560mm in width (C size) when plotted at a scale of 1:250.

LEGEND

All distances are in metres and decimals thereof.
Elevations are in metres

The Datum of the Elevations is derived Geodetic Control Monumnet 4446 Elevation of 26.134 m CVD28BC

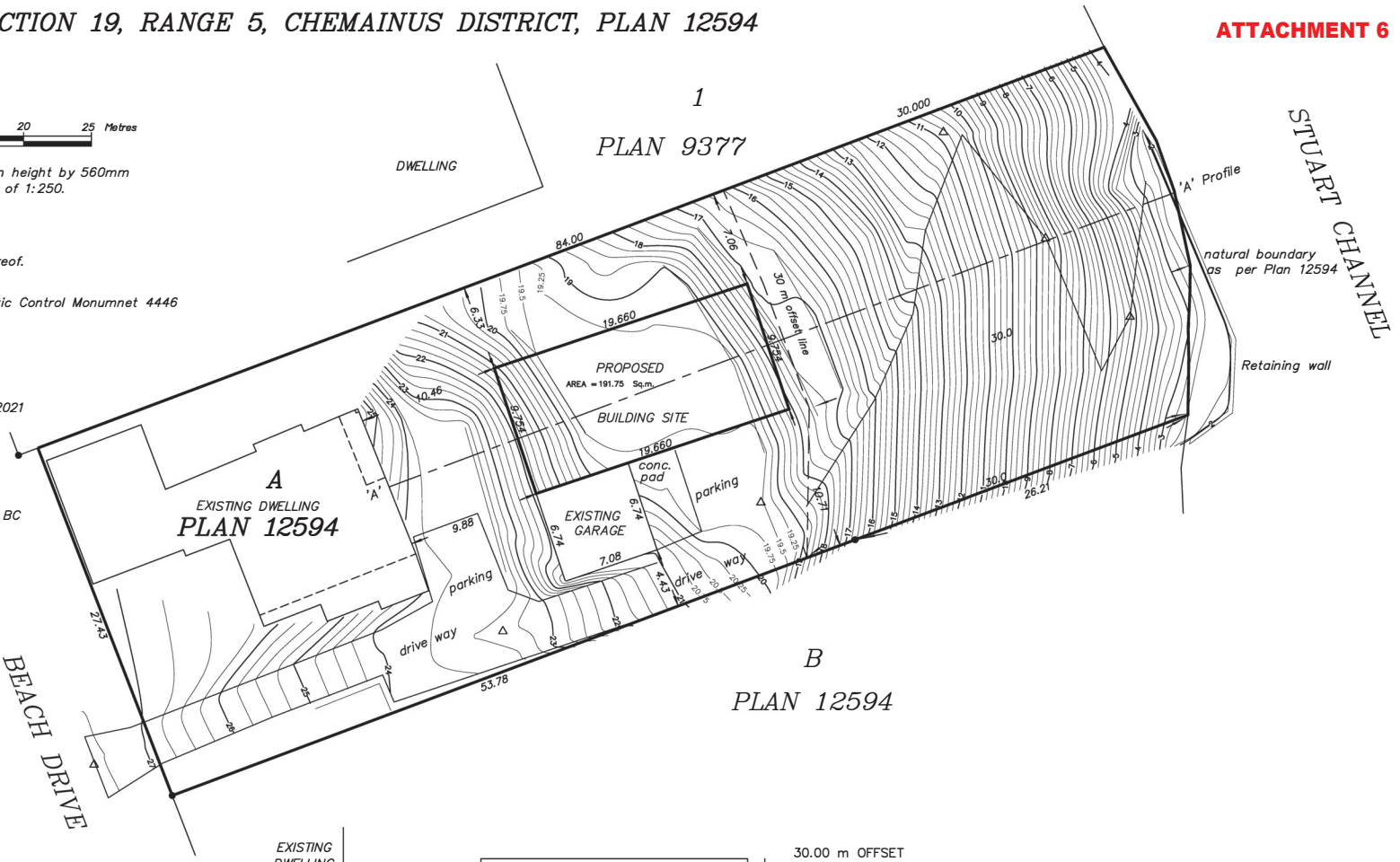
△ denotes traverse hub (spike) placed.

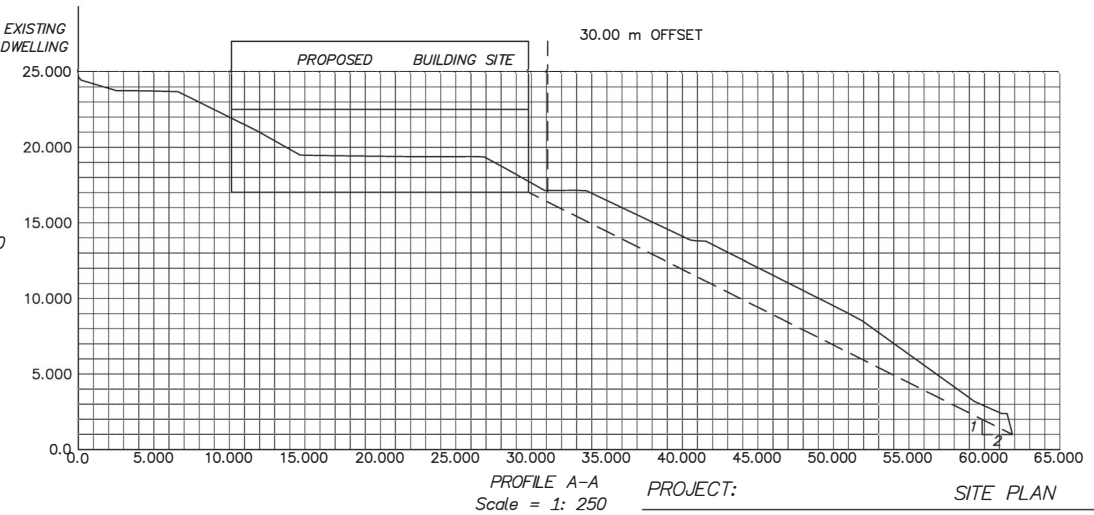
● denotes standard iron post found.

Contour interval = 0.25 metres

Date of Field Surveys: August 5, 10 , 26, 2021

Civic Address : 10029 Beach Drive Chemainus BC





Scale = 1: 250

PROFILE A-A
Scale = 1: 250

FOR DISCUSSIONS AND REZONING APPLICATIONS ONLY

G.W. LINDBERG LAND SURVEYING INC.
Professional Land Surveyor
Surveying & Geomatics Services
9261 Chemainus Road V0R 1K5
Chemainus, B.C. Email gwlindberg@shaw.ca

PROJECT: SITE PLAN

CLIENT : **Marlene Hayes & Jon Lefebure**

Calcs by: GWL
Drawn by: GWL

Date: August 25,2021 Drawing Number: GWL021-1213-Topo

File No. GWL021-1213-TOPO contours PDF

File No. GWL021-1213

MUNICIPALITY OF NORTH Cowichan

I certify this to be a true copy of proposed Bylaw 3887 read by the North Cowichan Municipal Council a 3rd time on Jan. 18, 2023

Corporate Officer

The Corporation of the District of North Cowichan

Zoning Amendment Bylaw (Infill Residential Neighbourhood – R3-N)

Bylaw 3887

The Council of The Corporation of The District of North Cowichan enacts in open meeting assembled as follows:

Title

1 This Bylaw may be cited as "Zoning Amendment Infill Residential Neighbourhood Bylaw No. 3887, 2022".

Amendment

2 Zoning Bylaw, 1997, No. 2950 is amended by adding section 58.4 [Infill Residential Neighbourhood] (R3-N) as follows:

"Permitted Uses

(1) The permitted uses for the R3-N zone are:

Agriculture
Accessory Dwelling Unit
Assisted Living
Bed and Breakfast
Community Care Facility
Home-based Business
Single-Family Dwelling
Supportive Housing

Minimum lot Size

(2) A lot in the R3-N zone must meet the minimum area requirements for the purposes of subdivision as follows:

(a) With public lane access, 500 m^2
(b) Without public lane access, 625 m^2

Minimum Frontage

(3) The minimum permitted frontage in the R3-N zone is 15 m.

Density

(4) The maximum permitted density for the R3-N zone is as follows:
(a) The number of residential buildings shall not exceed two.

(i) No accessory dwelling unit shall be located on a parcel unless the owner of such parcel has, prior to the issuance of a building permit by the Municipality, registered a covenant under Section 219 of the *Land Title Act*: prohibiting the registration of a strata plan under the *Strata Property Act*.

(b) The number of residential units shall not exceed three.

(c) The maximum permitted floor space ratio must not exceed:
(i) 0.5:1 for two dwelling units
(ii) 0.65:1 for three dwelling units

(d) The gross floor area of a detached accessory dwelling unit must not be larger than the principal building and cannot exceed 120 m^2, whichever is less.

Maximum Lot Coverage

(5) The maximum permitted lot coverage of the R3-N zone is 40% of the lot area.

Minimum Setbacks

(6) The minimum permitted setbacks for the R3-N zone are as follows:

(a) Principal Buildings
Yard, Front, 5.0 m
Yard, Side, 2.0 m
Yard, Side when adjacent to a lane or street, 3.0 m
Yard, Rear, 7.5 m

(b) Accessory Buildings and Structures, including Accessory Dwelling Units
Yard, Front 5.0 m
Yard, Side 1.0 m
Yard, Side when adjacent to a street, 3.0 m
Yard, Rear 1.5 m

(7) Minimum permitted setback from the vehicle entrance of a principal or accessory building to a road other than a lane is 5.8 m

(8) Maximum area of wall openings on the second floor of an accessory building may not exceed 20%. The total area containing transparent windows may not exceed 1 m^2 on second floor walls that face neighbouring lots, unless the windows are otherwise translucent or positioned to prevent visual trespass such as sky-lights.

(9) Second floor decks and balconies on accessory building are only permitted as follows:
(a) must primarily face a road, lane, municipal park, or other publicly accessible space
(b) maximum 5.0 m setback from (a)
(c) may not exceed 2.0 m in depth

Minimum Separation Distance

(10) The minimum separation distance between the wall of the principal building and the wall of accessory building containing a dwelling unit is 5.0 m.

Maximum Building Height

(11) The maximum permitted building heights for the R3-N zone are as follows:

(a) Principal Building, 9.0 m
(b) Accessory Building, 6.5 m

Conditions of Use

(12) The conditions of use for the R3-N zone are as follows:

(a) Despite sections 33, 35 and 58.4 (6), the following projections into setback areas are permitted as follows:

(i) primary entrance decks and porches where the top of the deck floor is no more than 1.5 m above existing grade, may project no more than 2.0 m into the front yard,

(ii) decks and balconies on the second storey of the principal building that project no more than 2.0 m (6.56') into the front yard,

(iii) stairs accessing a primary entrance deck, porch or verandas may be located within a front, but may not be closer than 2m from a property line,

(iv) second storey deck projections are prohibited on lots accessed by a panhandle.

(b) Assisted Living, Supportive Housing and Community Care Facilities may be permitted provided that:

(i) the number of residents does not exceed three,

(ii) the use is within a single-family dwelling only, and

(iii) the single family dwelling cannot contain an accessory dwelling unit(s).

(c) Bed and Breakfast may be permitted provided that:

(i) a maximum of three sleeping units,

(ii) must be contained within the a single-family dwelling only, and

(iii) the single family dwelling cannot contain an accessory dwelling unit.

(d) Limited farm sales of agricultural products may be sold directly to the public provided that:

(i) a minimum of 50% of the agricultural products for sale are produced on the land,

(ii) the covered retail sales area does not exceed 100 m^2, and

(iii) the retail sales are clearly ancillary to the farm use.

(e) No fences over 1.2 m in height are permitted in the required yards, front.

(f) No fences over 2.0 m in height are permitted in the required yards, side or rear.

(g) Driveway access must be shared by both the principal building and accessory dwelling unit(s). Second individual driveway access may be considered for corner lots or lots adjacent to a public lane.

(h) Driveway access widths, where lane access is not available, must not exceed 3.0 m of the lot frontage from the property line to the street.

(i) Despite section 21 (1) of this bylaw, one off-street parking stall is required per accessory dwelling unit.

3 Section 43 [Zones] of Zoning Bylaw, 1997, No. 2950 is amended by inserting "Infill Residential Neighbourhood Zone (R3-N)" immediately after the Residential Medium Density Multi-Family Zone (R3-MF) in the list of zones.

4 Schedule "C" of Zoning Bylaw, 1997, No. 2950 is amended by reclassifying 3016 George Street (PID: 031-163-475) from Residential One and Two-Family Zone (R3) to Infill Residential Neighbourhood Zone (R3-N), as shown outlined in black in Schedule A attached to and forming part of this Bylaw.

READ a first time on December 7, 2022
READ a second time on December 7, 2022
This bylaw was advertised in the Cowichan Valley Citizen on January 5, 2023 and January 12, 2023 and posted on the municipality's website and notice board on December 23, 2022
CONSIDERED at a Public Hearing on January 18, 2023
READ a third time on January 18, 2023
APPROVED by Ministry of Transportation and Infrastructure on
COVENANT registered on
ADOPTED on

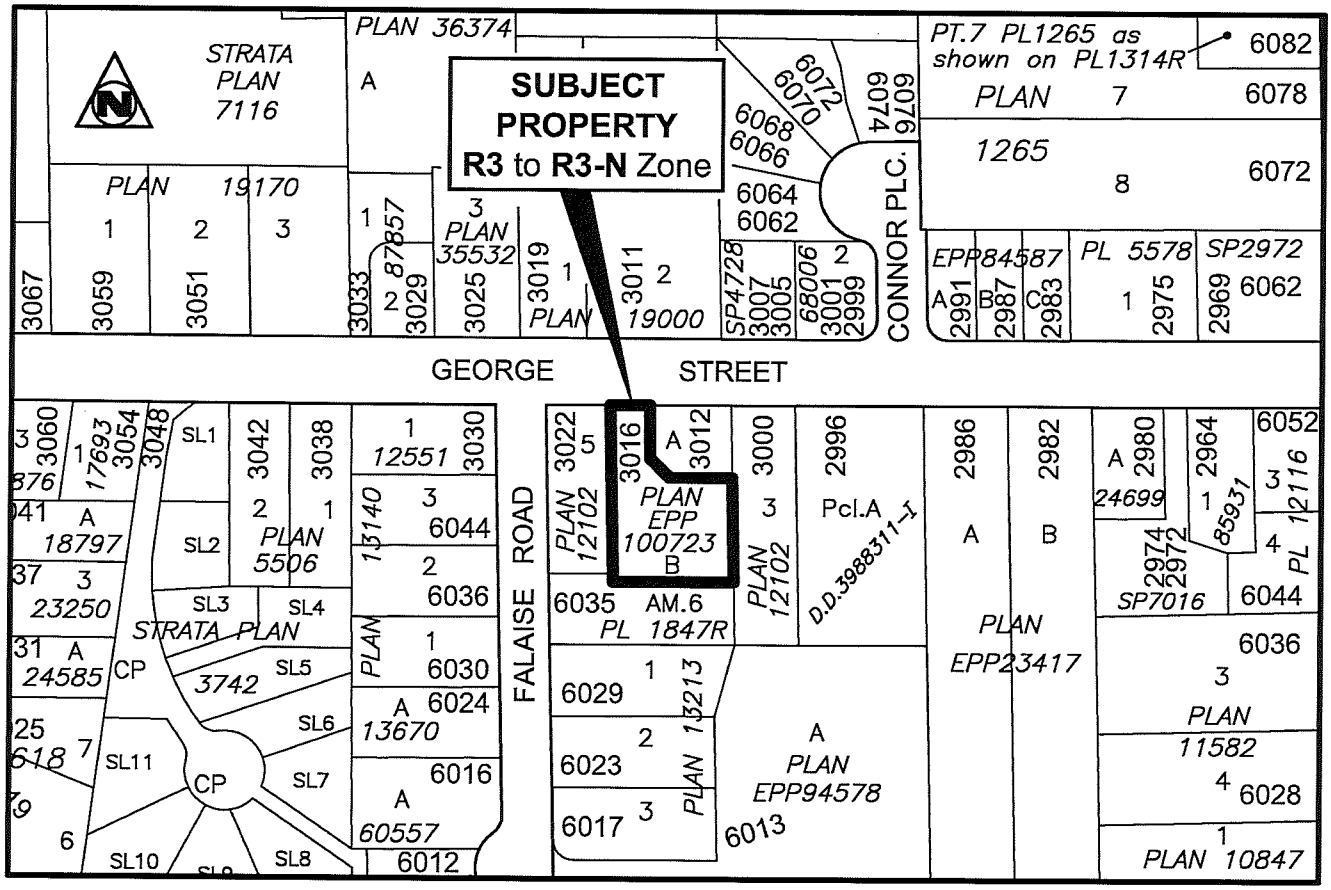
CORPORATE OFFICER

PRESIDING MEMBER

Schedule "A" to accompany "Zoning Amendment Infill Residential Neighbourhood Bylaw No. 3887, 2022".

Presiding Member

Corporate Officer



The Corporation of the District of North Cowichan

Zoning Amendment Bylaw

BYLAW NO. 3916

A bylaw to amend Zoning Amendment Bylaw 1997, No. 2950 in order to reclassify 10029 Beach Drive from R3 to R3-N

The Council of The Corporation of The District of North Cowichan, enacts in open meeting assembled, as follows:

Citation

1 This Bylaw may be cited as "*Zoning Amendment Bylaw No. 3916, 2023*".

Amendment

2 That Zoning Bylaw Schedule "C" is amended by reclassifying 10029 Beach Drive (PID: 004-788-036) from Residential One and Two-Family Zone (R-3) to Infill Residential Neighbourhood Zone (R3-N), as shown outline in black in Schedule A attached to and forming part of this Bylaw.

_____

READ a first time on
READ a second time on
This bylaw was advertised on the municipality's _____ site on _____, in the Cowichan Valley Citizen and the Chemainus Valley Courier on _____, and was posted to the municipality's public notice places on _____.
CONSIDERED at a Public Hearing on _____.
READ a third time on _____.
COVENANT registered on _____.
ADOPTED on _____.

CORPORATE OFFICER

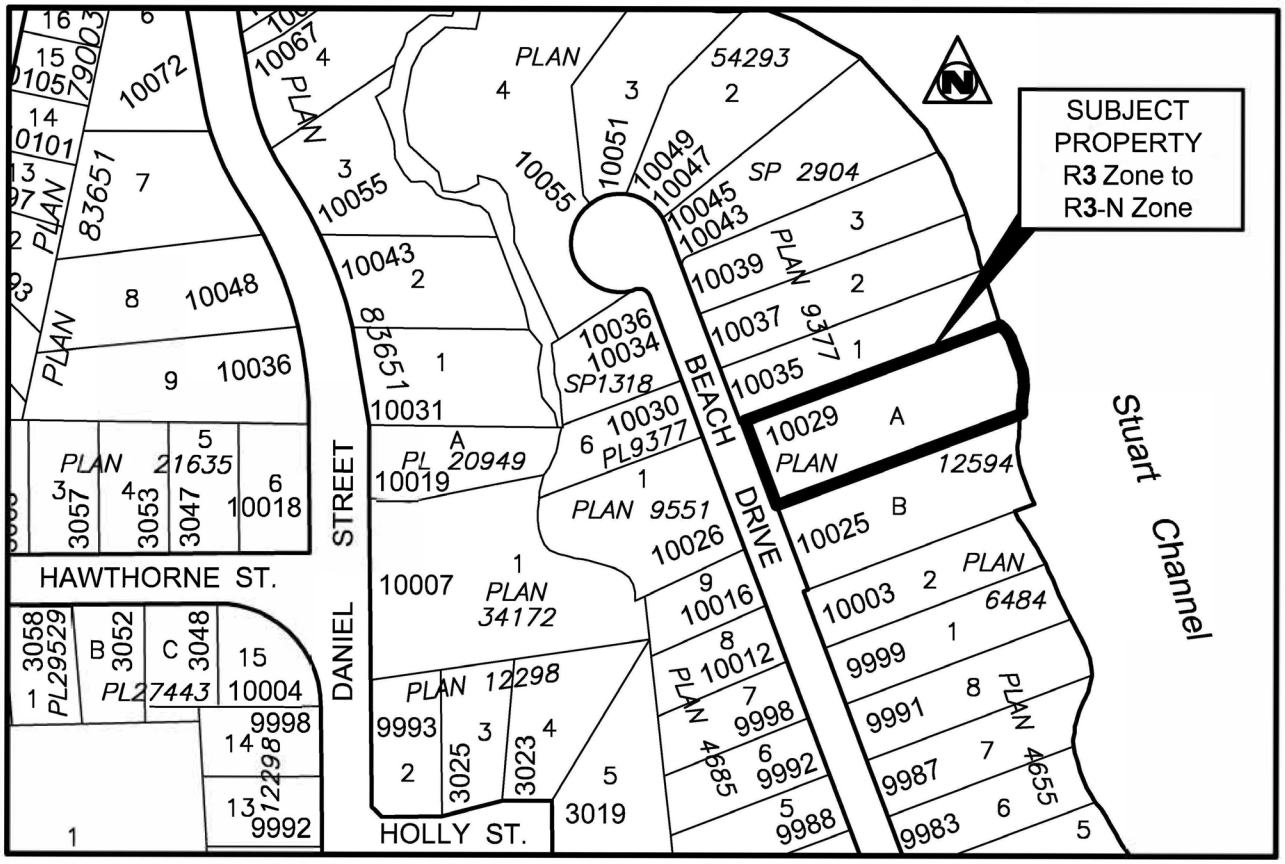
PRESIDING MEMBER

Schedule “A” to accompany “Bylaw No. 3916, 2023”.

Presiding Member

Corporate Officer

SCHEDULE "A"


SUBJECT PROPERTY
R3 Zone to
R3-N Zone
HAWTHORNE ST.
DANIEL STREET
HOLLY ST.
BEACH DRIVE
Stuart Channel
PLAN 83651
PLAN 21635
PL 20949
PLAN 9551
PLAN 34172
PLAN 12298
PLAN 12594
PLAN 6484
PLAN 4685
PLAN 4655
SP 2904
SP1318
PL9377
PL29529
PL27443
10072
10067
10055
10051
10049
10047
10045
10043
10039
10037
10035
10036
10034
10031
10030
10029
10026
10025
10019
10018
10016
10012
10007
10004
9998
9993
9992
9991
9988
9987
9983
3058
3052
3048
3057
3053
3047
3025
3023
3019

COUNCIL MINUTES

(4) consult under Section 476 of the *Local Government Act* with School District 79 in relation to Official Community Plan Amendment Bylaw No. 3914, 2023;

(5) consider Official Community Plan Amendment Bylaw No. 3914, 2023, in conjunction with the North Cowichan 2022 Five-Year Financial Plan; and,

(6) considers Official Community Plan Amendment Bylaw No. 3914, 2023, in conjunction with the Cowichan Valley Regional District Solid Waste Management Plan (as amended) and the Cowichan Valley Regional District Central Sector Liquid Waste Management Plan.

CARRIED

IT WAS MOVED AND SECONDED:
THAT Council defer the following motions, moved, seconded, and severed to the August 16, 2023, Regular Council meeting:

(1) THAT Council give first and second reading to Official Community Plan Amendment Bylaw No. 3914, 2023.

(2) THAT Council give first and second reading to Zoning Amendment Bylaw No. 3915, 2023.

(3) THAT Council direct staff to schedule a public hearing for Official Community Plan Amendment Bylaw No. 3914, 2023, and Zoning Amendment Bylaw No. 3915, 2023.

CARRIED

7.4 Zoning Amendment Bylaw No. 3916, 2023 for first and second readings

IT WAS MOVED AND SECONDED:
THAT Council:

1. Give first and second readings to Zoning Amendment Bylaw No. 3916, 2023; and,
2. Authorize a Public Hearing for Zoning Amendment Bylaw No. 3916, 2023.

CARRIED

7.5 Zoning Amendment Bylaw No. 3918, 2023 for first and second readings

IT WAS MOVED AND SECONDED:
THAT Council:

1. Give first and second readings to Zoning Amendment Bylaw No. 3918, 2023; and,
2. Schedule a Public Hearing for Zoning Amendment Bylaw No. 3918, 2023.

CARRIED

7.6 Miscellaneous Offences and Fines Amendment Bylaw No. 3922 for first three readings

IT WAS MOVED AND SECONDED:
THAT Council give first, second and third readings to Miscellaneous Offences and Fines Amendment Bylaw No. 3922, 2023

CARRIED

8. REPORTS

PUBLIC COMMENTS

(NO COMMENTS RECEIVED TO DATE)