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October 2nd 2024

Ms. Kelsea Fielden, Planning Department

Development Services
City of Colwood
3300 Wishart Road
Colwood, BC
V9C 1R1

Re: 499 Royal Bay Drive - Rezoning Application

On behalf of GableCraft Homes (the Applicant), Placemark is pleased to submit this application for a zoning amendment to the existing RBCD1 Zone for the property located at 499 Royal Bay Drive. Please accept this letter and attached documentation as the formal Rezoning Application for the property legally described as:

Parcel ID: 025-625-837
Legal Description: Lot 31, Plan VIP 75021

The intent of this application is to permit the subdivision and development of 11 detached single-family homes and enable public dedication of 2.26 acres to expand Promenade Park.

We look forward to working with the City of Colwood on achieving a successful outcome for the land. Should you have any questions over the course of your review, please do not hesitate to contact the undersigned.

Paul Fenske
Principal

Placemark Design

604-505-7996
fenske@placemark.ca

499 ROYAL BAY DRIVE

REZONING APPLICATION

October 2024

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ROYAL BAY
A SEASIDE COMMUNITY

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499 Royal Bay Drive

Rezoning Concept

Introduction

The 499 Royal Bay Drive parcel is located adjacent Promenade Park in the northwest of Colwood's Royal Bay community. Centrally positioned in the enclave of predominantly single-family homes, the lands sit above Latoria Road to the south and Perimeter Park and Royal Bay Secondary School to the east.

Historically designated for an elementary school in the 1998 Royal Bay Land Use Plan, the parcel has since been released by School District 62 – leaving the lands undeveloped and their potential for housing and community benefit unrealized.

The purpose of this Application is to amend the existing RBCD1 Zone to enable development of 11 new single-family detached homes on the parcel while securing the natural condition of the lands through a 2.26-acre dedication to expand Promenade Park.

Description of Rezoning Proposal

The 5.54-acre 499 Royal Bay Drive parcel is designated as *Controlled Growth Area - Neighbourhood* within the City of Colwood OCP and is part of the Royal Bay Comprehensive Development 1 Zone (RBCD1) under Zoning Bylaw 151. The RBCD1 zone permits a total maximum density of 119 detached dwellings, 6 duplex dwellings, and 103 attached housing units. At current build-out, 7 attached housing units remain unbuilt within the permitted density. Based on the Provincial housing policy directives and OCP policy, it is understood that a more dense townhome proposal would also be feasible on the lands.

The intent of this Application is to initiate a RBCD1 Zone text amendment to remove the remaining 7 attached housing units from the permitted density in favour of 11 fee simple detached housing units to be developed on 499 Royal Bay Drive. Royal Bay Drive will provide frontage for 6 proposed homes with 5 fronting on a new cul-de-sac local road.

Of the parcel's 5.5 acres, 2.53 acres (46%) is proposed for single family housing and retained landscape buffers, 0.69 acres (12%) for public road ROW and driveway access, 0.06 acres for a public path (1%), and 2.26 acres (41%) for public park- expanding Promenade Park to include the forested summit and trail connections.

City Policy Alignment

The rezoning proposal for 499 Royal Bay Drive supports OCP policy objectives for the applicable Neighbourhood land use designation, as well as other City of Colwood plans, policies and bylaws as summarized in the following Table 1.

Table 1 | 499 Royal Bay Drive Policy Alignment

Official Community Plan (2018)	
Policy	**Rezoning Proposal Policy Alignment**
Policy 7.2.17 Uses	✓ The proposal provides single-detached residential homes
Policy 7.2.18 Built Form	✓ Ground-oriented homes are expected to be 2 storeys and will not exceed 3 storeys ✓ Homes will not exceed 1.2 FAR
Policy 7.2.19 Other Directions	✓ Maintains the character and scale of the surrounding single-detached neighbourhood by permitting single-detached homes in lieu of the attached homes permitted under the current RBCD1 zoning ✓ Improves the pedestrian public realm by providing new public local street ROW with sidewalk and street trees, as well as new public path linking the new cul-de-sac with Portwell Place, and formalizing existing trails through the expanded Promenade Park ✓ Creates pedestrian permeability through the neighbourhood with new path and dedicated trails providing connectivity to the Frequent Transit Network on Latoria Road ✓ Further supports neighbourhood commercial in Royal Bay by providing new homes within a 10-minute walk of the Royal Bay Commons ✓ Protects natural assets by designating 2.26 acres of the parcel as Public Park with retained landscape where practicable
Climate Action Plan (2023)	
Action	**Rezoning Proposal Action Alignment**
Action T2-3 Expand Pedestrian Spaces	✓ Expands pedestrian network with formalized trail connections through expanded Promenade Park
Action N2-3 Protect and Restore Biodiversity	✓ Protects forest landscape in perpetuity through no disturbance landscape buffer and public dedication of 2.26 acres to expand Promenade Park

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Table 1 (continued) | 499 Royal Bay Drive Policy Alignment

Parks and Recreation Master Plan (2021)	
Action	**Rezoning Proposal Action Alignment**
C3.6 Require new developments to provide neighbourhood active transportation routes	✓ Provides new active transportation routes via new local street sidewalk and path, as well as formalizing trail connections through expanded Promenade Park
C3.7 Aim to develop new local off-road pedestrian or cycling routes each year	✓ Publicly dedicates off-road pedestrian trail connections through expanded Promenade Park
C17.2 For all parks with significant trail amenities, provide wayfinding signage that includes map and trail information	✓ Provides Parkland Improvement Development Cost Charge (DCC) funds through development of homes, which may be used by the City for trail amenities including wayfinding signage
Urban Forest Bylaw No. 1735 (2021)	
Requirement	**Rezoning Proposal Conformance**
Management of Protected Trees per Bylaw Definition	✓ Management of Protected Trees in proposed development areas will be conducted per Bylaw requirements

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Site Adaptive Planning and Design

As a greenfield site, planning for 499 Royal Bay Drive has been completed with consideration of the Site Adaptive Planning and Design framework outlined in Section 18.4 of the OCP.

Topography

A comprehensive Site Analysis was undertaken using 1m lidar to understand topographic conditions and constraints. The land is generally flat where homes are proposed, rising approximately 10m to form a summit along the eastern side adjacent Promenade Park. Steep slopes (>30%) are limited to small areas surrounding the eastern summit as well as a narrow band on the northwest perimeter resulting from the road prism of Royal Bay Drive.

The 499 Royal Bay Drive Site Analysis mapping including Aerial, Landform, Slope, and Aspect Analysis Plans are provided in Appendix A.

Environmental Assessment

An Environmental Assessment for the property was completed by a Registered Professional Biologist to understand potential constraints and provide recommendations for environmental protection. The report documented two ditches, both unconnected by surface water to fish habitat and therefore not protected by the Riparian Areas Protection Act (RAPR).

The Environmental Assessment Report is provided in Appendix C.

Design Interventions

Adaptive Planning and Design interventions incorporated into the 499 Royal Bay Drive proposal include:

- Siting of homes on gentle lands where there is no significant existing public use, with frontage and access from either Royal Bay Drive or Portwell Place;
- Dedication of trails and pathways connecting to the neighbourhood's existing pedestrian network;
- Retention of natural forest within both the Promenade Park expansion and a forested 8m wide no disturbance buffer between new and existing homes;
- Preservation of the forested summit on the east side of the parcel within the expanded Promenade Park; and,
- Construction of a bioswale/raingarden feature within the new local road ROW to promote retention and infiltration of rainwater.

Housing Need and Demand

The City of Colwood Housing Needs Assessment (2018) projected 710 new Detached Homes from 2018-2028 to meet housing needs. In April 2024, the Province announced Colwood as one of the priority municipalities that will receive housing targets under the Housing Supply Act.

The current RBCD1 zoning allows for 7 townhomes to be developed on the parcel. Higher density townhome development would also be feasible based on OCP policy and Provincial housing supply policy. This form of development, however, would conflict with the character of the existing neighbourhood.

The proposed 499 Royal Bay Drive Rezoning will provide 11 new detached single-family homes to assist the City meet its housing targets. Suitable for families, these new homes will be located within a 10-minute walk (800m) of schools, parks and shopping in the Royal Bay neighbourhoods, as well as the new Transit Exchange on Latoria Boulevard.

As the parcel is currently undeveloped, the rezoning will not result in any displacement of existing tenants.

Project Benefits and Amenities

The proposal will secure the following social, environmental, economic, and amenity benefits for both the Royal Bay neighbourhood and City of Colwood.

Social

- 11 new homes for families within walking distance of schools, parks, and neighbourhood shopping
- Securing expansion of Promenade Park through public dedication of 2.6 acres of the parcel

Environmental

- Retention of natural forest and urban tree canopy in public park dedication and no disturbance landscape buffers

Economic

- New Development Cost Charges for 11 single-family homes, including Parkland Improvement DCCs
- New annual property tax revenue for 11 single-family homes
- Positive employment impacts from home construction

Infrastructure

- Utilizes existing civil infrastructure (streets + utilities)

Amenities

- New trail connections linking to the existing trails within the expanded Promenade Park

Note: it is understood the current RBCD1 Community Amenity Contribution requirement of $3,000 per dwelling unit will apply to the 11 new single family homes.

Neighbourhood Conditions and Impacts

Addressing Historic Uncertainty

Since being released from its original intended use as an elementary school by School District 62, the future of 499 Royal Bay Drive has remained unresolved and uncertain. The existing RBCD1 zoning currently permits 7 attached townhome units to be developed on the parcel. This development form would conflict with the character of the existing single-family neighbourhood on Royal Bay Drive and would likely result in clearing of greenfield forest for private strata amenity space rather than dedication of public park.

Maintaining Neighbourhood Character

The proposed rezoning amendment would permit new homes that maintain the existing neighbourhood character and complete Royal Bay Drive with continuity of building form and scale. The proposed new local road ROW will align with the existing Royal Bay Drive intersection to promote safety, reduce conflict, and provide easy access to the designated Collector Street of Wishart Road.

Expanding Parks + Preserving Nature

The proposal will improve the neighbourhood through dedication of 2.26 acres of the parcel to expand Promenade Park. This public dedication will legitimize the current use of the informal trail network on the lands, which are perceived as park but are, in fact, private. Formalizing this 2.26-acre area and trail system as City park is a significant public benefit - resolving the misalignment of public perception and legal ownership.

A proposed 8m wide retained landscape buffer between new and existing homes will be protected with a no disturbance covenant, reducing impacts on the existing neighbourhood and provide formal trail connections to improve pedestrian permeability.

Consulting the Community

The general development concept for this rezoning application - single family homes with a new public cul-de-sac - was presented to neighbours at an information session hosted by the Applicant on July 24, 2024. The majority of households in attendance were supportive of the concept and expressed a preference for the parcel to be resolved by the current owner. There is concern in the neighbourhood that the parcel will be developed as a higher-density townhomes that conflict with neighbourhood character should it be sold to another developer. The Consultation Summary for the public engagement event is provided in Appendix C.

Crime Prevention Through Environmental Design (CPTED)

The proposal aligns with CPTED principles by placing much of the parcel under City stewardship through public park dedication and by siting new single-family homes to provide natural surveillance with “eyes-on-the-park/street”. Existing unsanctioned trails on the parcel will be formalized with controlled access points to reduce opportunities for property crime.

Traffic + Active Transportation

Active Transportation

The proposal supports the City's Active Transportation Network with new public trail connections through the expanded Promenade Park. These trails improve pedestrian permeability of the neighbourhood by providing off-street connections that link to existing trails in Perimeter Park and destinations in the Royal Bay neighbourhood.

Parking

The proposed 11-lot development will meet the City's parking requirements, with each home featuring private driveways and garages. The proposal also provides visitor parking spaces, including 4 stalls in the central bulb of the new cul-de-sac and 3 off-street stalls for the expanded Promenade Park.

Transportation Impact Assessment

Bunt & Associates traffic engineers were retained to complete a Transportation Impact Assessment for the proposed development, which is provided in Appendix C.

The proposed development is forecast to generate approximately 8 vehicle trips (2 entering, 6 exiting) during the AM peak hour and 11 vehicle trips (7 entering, 4 exiting) during the PM peak hour and future traffic conditions are, therefore, expected to remain within acceptable performance thresholds. The intersections at Royal Bay Drive & Promenade Crescent and Wishart Road & Royal Bay Drive were both determined to have an "A" rating for Level of Service, representing optimal, minimal delay conditions.

The Traffic Impact Assessment report included the following recommendations:

- Implementing an all-way stop configuration at the Royal Bay Drive/ Promenade Crescent and Royal Bay Drive/Site Access intersections to better manage traffic movements and improve pedestrian crossing safety;
- Ensure that foliage/landscaping and any other potential obstructions are kept clear in the sight triangles;
- Remove the hedges on both sides of the road to enhance sightlines and facilitate safer pedestrian crossings; and,
- Consider additional traffic calming measures, such as speed limit signs, speed feedback signs, raised crosswalks/intersections, curb bulges, and speed humps.

Municipal Infrastructure

Given the original neighbourhood design for an elementary school, the existing servicing capacity more than accommodates the proposed single-family homes. A conceptual site servicing Civil Engineering Memorandum has been prepared by On Point Project Engineers Ltd to describe the infrastructure servicing requirements for the proposed single-family subdivision (See Appendix C).

Water

Water service to the site can be provided from an existing 200mm main on Royal Bay Drive, or an existing 200mm diameter service stub installed at the end of the Portwell Place cul-de-sac.

Sanitary

The 200mm main on Royal Bay Drive has ample capacity for the six proposed lots fronting the road. The lots in the proposed cul-de-sac can be serviced by the extension of the sanitary stub off Portwell Place.

Rainwater

The proposed lots fronting Royal Bay Drive can be serviced by the 300mm main on this street or through connection to the Portwell Place storm system. The lots to be developed in the proposed cul-de-sac can be serviced via the existing storm-system at the north end of Portwell Place cul-de-sac.

Appendix A | Rezoning Plan Set

- Aerial Analysis
- Landform Analysis
- Slope Analysis
- Aspect Analysis
- Site Constraints Plan
- Rezoning Development Concept
- Street Network Plan
- Active Transportation Network Plan

CITY OF COLWOOD
499 ROYAL BAY DRIVE

AERIAL ANALYSIS

LEGEND	OCTOBER 2024
Site Boundary	2.24 ha | 5.54 ac
Property Line	
Statutory Right of Way	
5m Contour Interval	
1m Contour Interval	

0 5 10 25 50 100m

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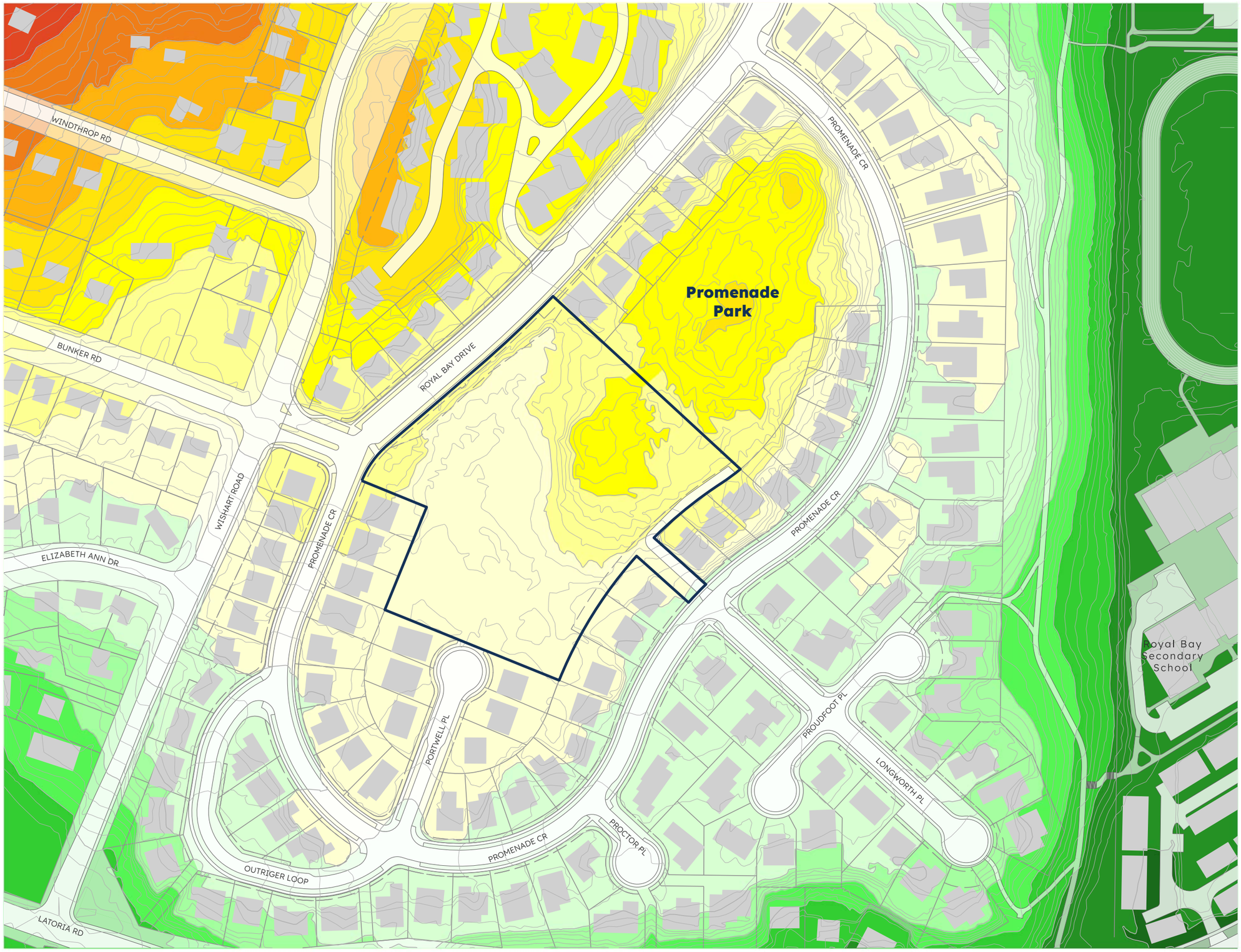
CITY OF COLWOOD
499 ROYAL BAY DRIVE

LANDFORM ANALYSIS



LEGEND — OCTOBER 2024

- Site Boundary — 2.24 ha | 5.54 ac
- Property Line
- Statutory Right of Way
- 5m Contour Interval
- 1m Contour Interval
- Existing Buildings

LANDFORM ANALYSIS

- Above 110m
- 105m - 110m
- 100m - 105m
- 95m - 100m
- 90m - 95m
- 85m - 90m
- 80m - 85m
- 75m - 80m
- 70m - 75m
- 65m - 70m
- 60m - 65m
- 55m - 60m
- 50m - 55m
- Below 50m

0 5 10 25 50 100m

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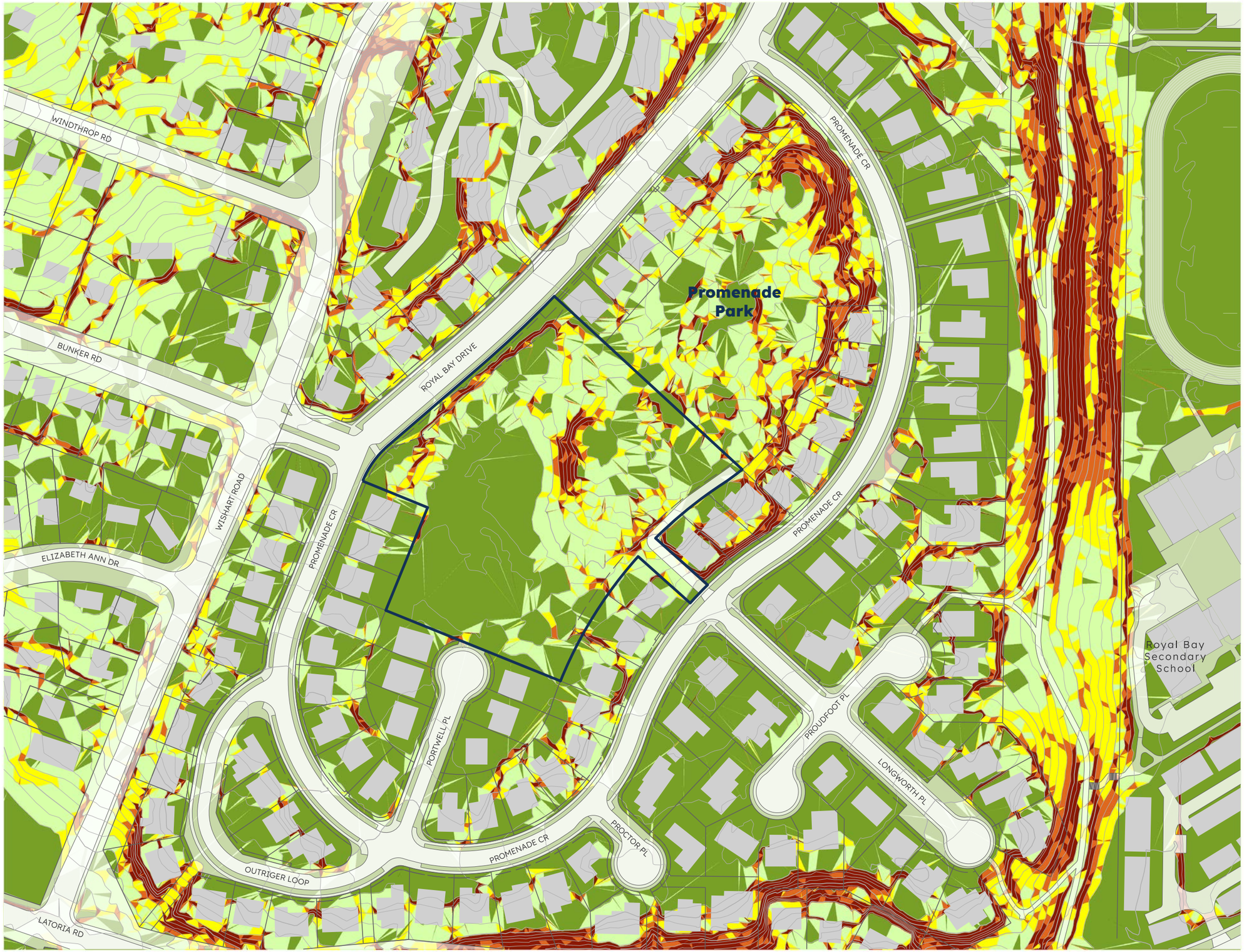
CITY OF COLWOOD
499 ROYAL BAY DRIVE

SLOPE ANALYSIS



LEGEND — OCTOBER 2024

- Site Boundary — 2.24 ha | 5.54 ac
- Property Line
- Statutory Right of Way
- 5m Contour Interval
- 1m Contour Interval
- Existing Buildings

SLOPE ANALYSIS

- 0-10% Slope | Flat
- 10-20% Slope | Gentle
- 20-30% Slope | Hillside
- 30-40% Slope | Steep
- +40% Slope | Extreme

0 5 10 25 50 100m

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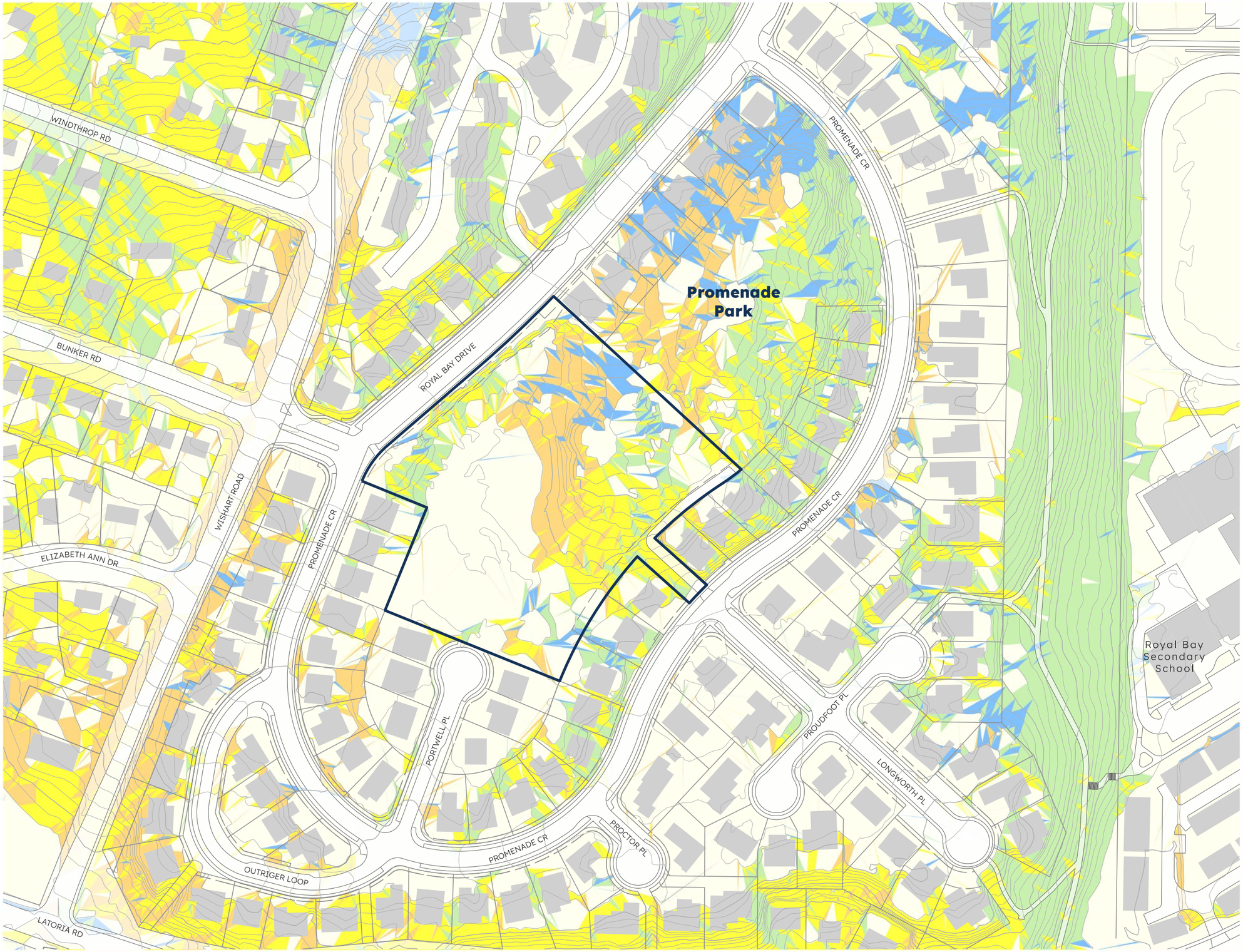
DESIGN + DEVELOPMENT

CITY OF COLWOOD
499 ROYAL BAY DRIVE

ASPECT ANALYSIS



LEGEND — OCTOBER 2024

- Site Boundary — 2.24 ha | 5.54 ac
- Property Line
- Statutory Right of Way
- 5m Contour Interval
- 1m Contour Interval
- Existing Buildings

ASPECT ANALYSIS

- Aspect not Significant (Slope <10%)

NORTH
WEST — *Sunset*
EAST — *Sunrise*
SOUTH — *Midday*

0 5 10 25 50 100m

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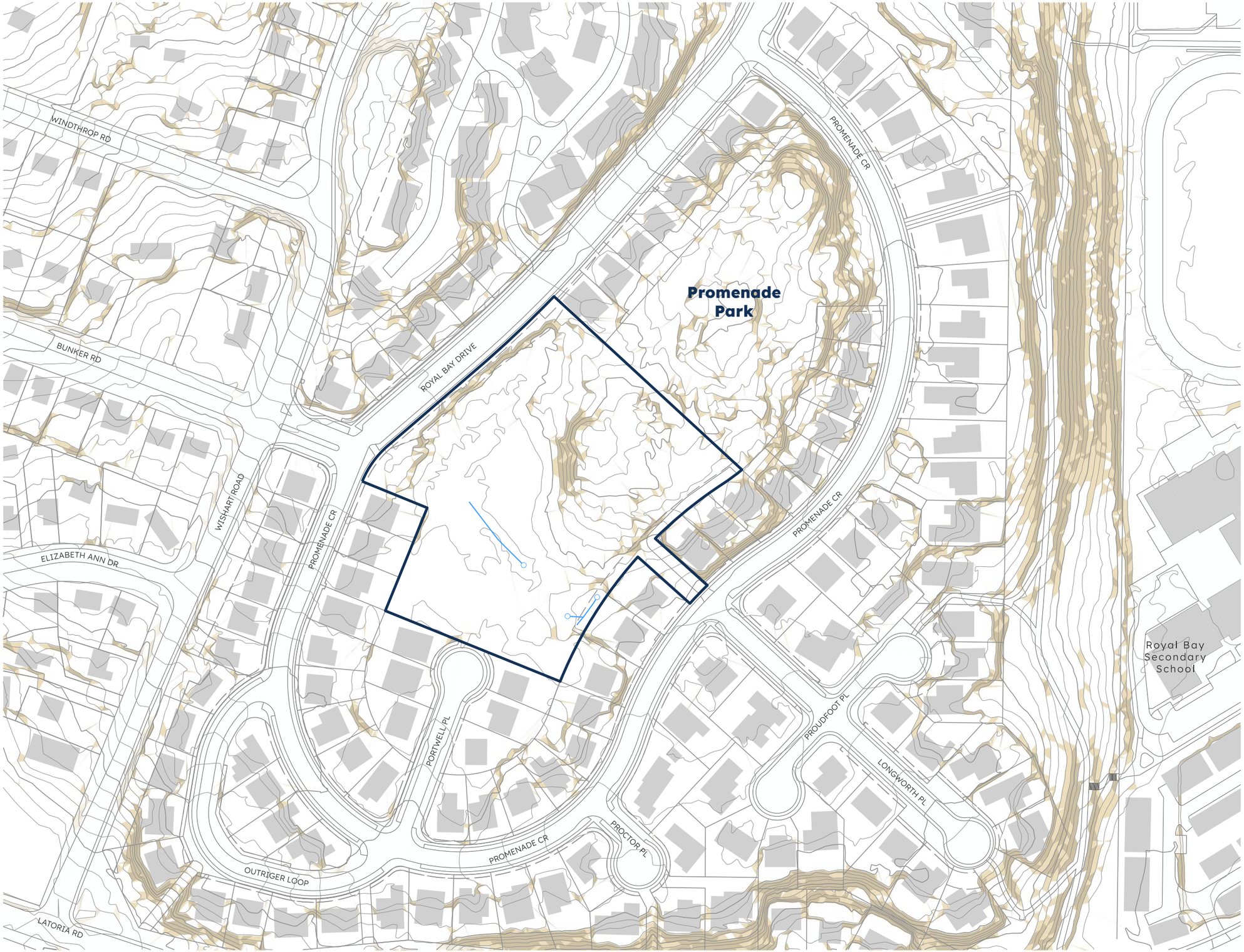
CITY OF COLWOOD
499 ROYAL BAY DRIVE

SITE CONSTRAINTS PLAN



LEGEND — OCTOBER 2024

Site Boundary	2.24 ha | 5.54 ac
Property Line	
Statutory Right of Way	
5m Contour Interval	
1m Contour Interval	
Existing Buildings	

SITE CONSTRAINTS

- 30-40% Slope | Steep
- +40% Slope | Extreme

ENVIRONMENTAL CONSTRAINTS

- Ditch + Culvert

0 5 10 25 50 100m

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CITY OF COLWOOD
499 ROYAL BAY DRIVE

REZONING
DEVELOPMENT CONCEPT

LEGEND		OCTOBER 2024
	Site Boundary	2.24 ha | 5.53 ac
	Property Line | Existing	
	Property Line | Proposed	
	Non-Disturbance Covenant | Proposed	

LAND USE		0.97 ha | 2.40 ac
46%	Single Family | Fee Sim	1.05 ha | 2.59 ac
41%	Public Park	0.22 ha | 0.53 ac
12%	Public Road ROW	2.24 ha | 5.53 ac
1%	Public Path Access	0.02 ha | 0.06 ac
100%	Total	2.24 ha | 5.54 ac

0 5 10 25 50 100m

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CITY OF COLWOOD
499 ROYAL BAY DRIVE

STREET NETWORK PLAN

LEGEND — OCTOBER 2024

Site Boundary	2.24 ha | 5.54 ac
Property Line | Existing	
Property Line | Proposed	
Non-Disturbance Covenant | Proposed	
1m Contour Interval	
Trail Network	

STREET HIERARCHY

- Arterial Road
- Collector Road
- Local Road
- Strata Road
- Residential Lane

0 5 10 25 50 100m

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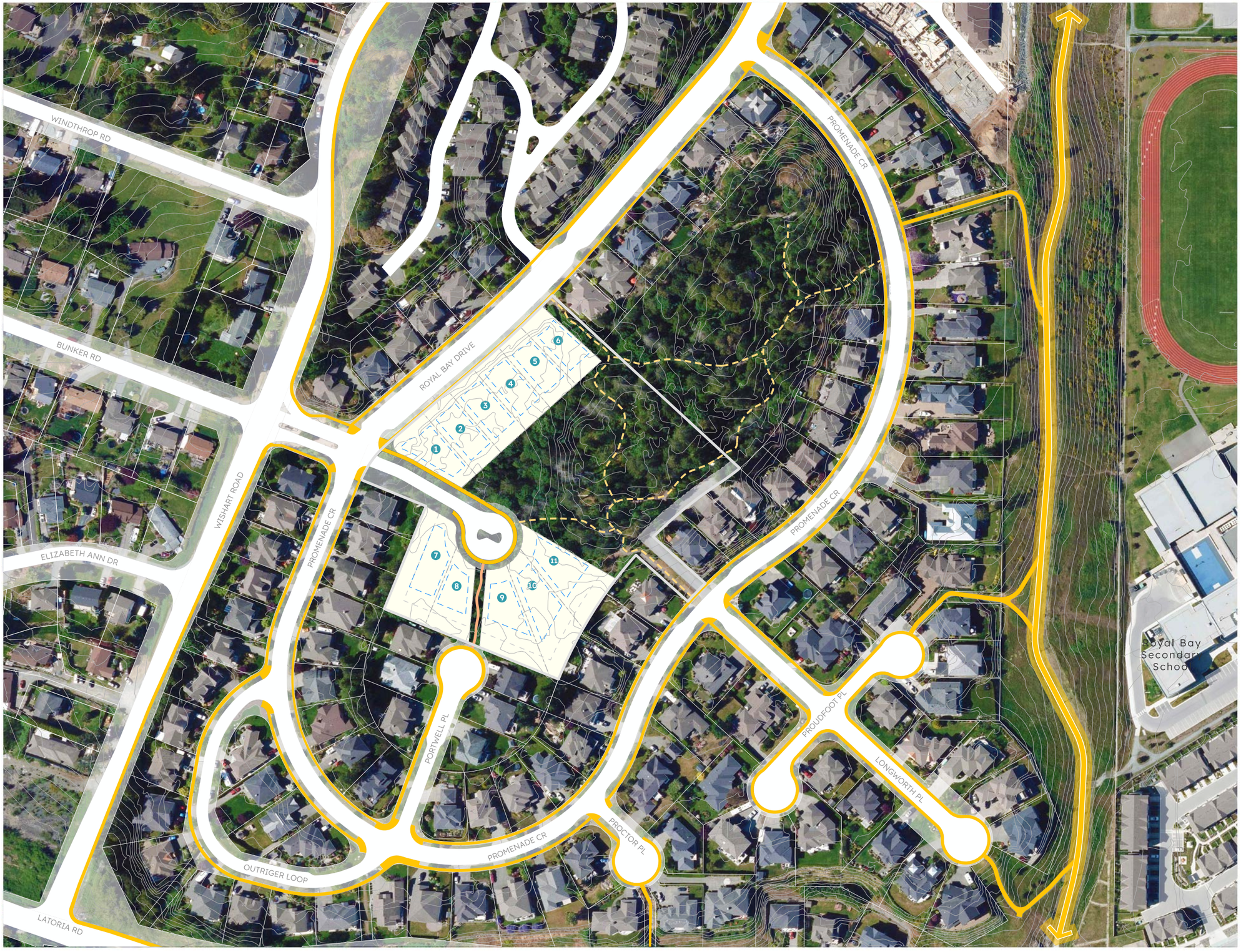
CITY OF COLWOOD
499 ROYAL BAY DRIVE

ACTIVE TRANSPORTATION NETWORK PLAN



LEGEND — OCTOBER 2024

Site Boundary	2.24 ha | 5.54 ac
Property Line | Existing	
Property Line | Proposed	
Non-Disturbance Covenant | Proposed	
1m Contour Interval	

ACTIVE TRANSPORTATION

- Multi Use Pathway
- Sidewalk
- Proposed Concrete Trail
- Existing Trail

0 5 10 25 50 100m

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Appendix B | Application Forms

- Signed Agent Authorization Form
- Parcel Title Certificate
- Legal Lot Plan
- Proposed Subdivision Sketch Plan

Subdivision Plan of Part of Lot 1, Sections 39 & 40, Esquimalt District, Plan VIP 75020.

EV32937
Jk

Plan VIP 75021

Deposited in the Land Title Office at Victoria, B.C. this 3 day of April 2003.

Registrar

B.C.G.S. 92B.043

Scale 1:750

Metres
7.5 0 7.5 15 22.5 30 37.5

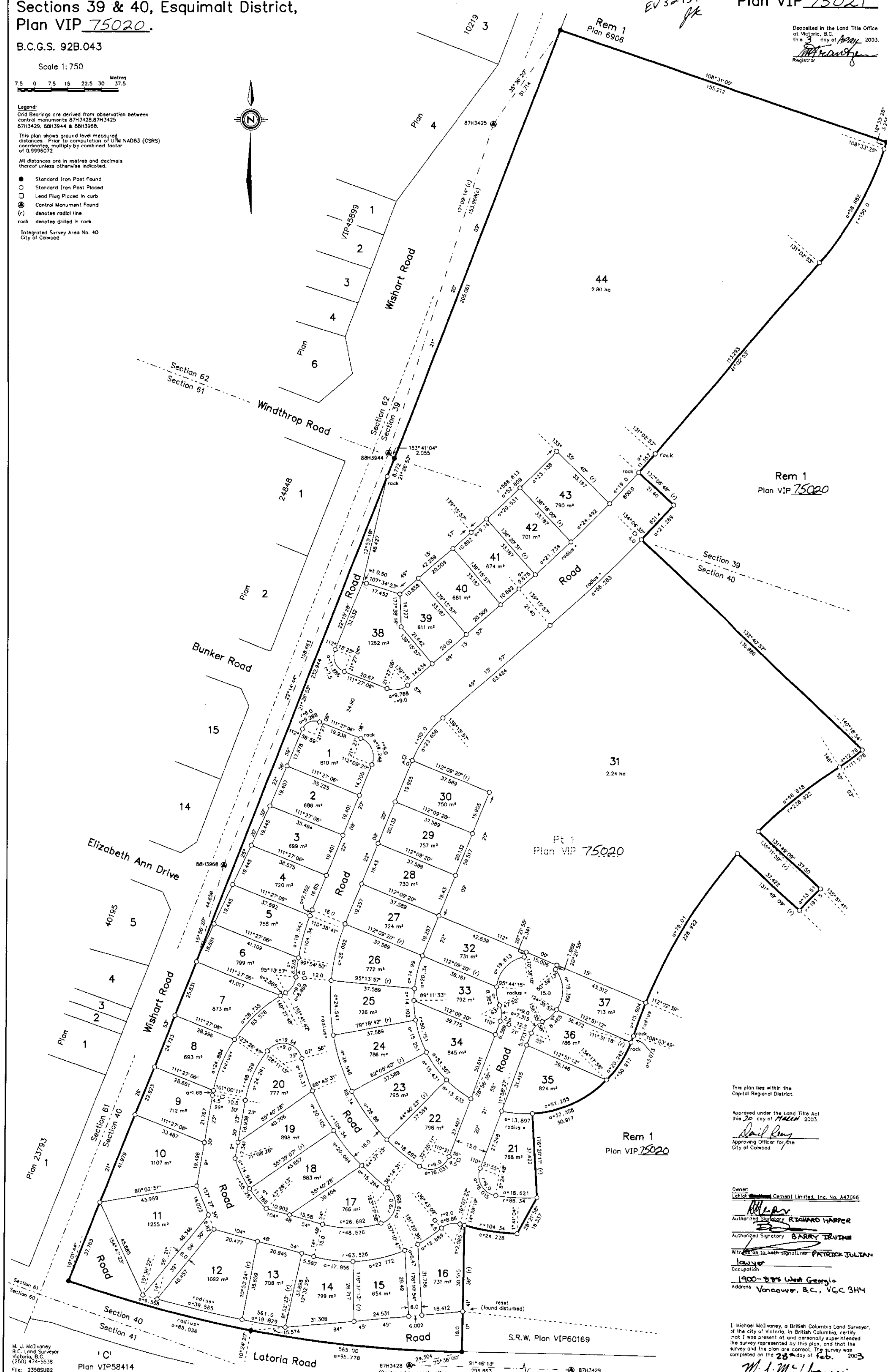
Legend:
Grid Bearings are derived from observation between control monuments 87H3428,87H3425 87H3429, 88H3944 & 88H3968.

This plan shows ground level measured distances. Prior to computation of UTM NAD83 (CSRS) coordinates, multiply by combined factor of 0.9996072

All distances are in metres and decimals thereof unless otherwise indicated.

- ● Standard Iron Post Found
- ○ Standard Iron Post Placed
- □ Lead Plug Placed in curb
- ◬ Control Monument Found
- (r) denotes radial line
- rock denotes drilled in rock

Integrated Survey Area No. 40
City of Colwood



M. J. McIlvaney
B.C. Land Surveyor
Victoria, B.C.
(250) 474-5538
File: 2358SUB2

This plan lies within the Capital Regional District.

Approved under the Land Title Act this 20 day of March 2003.

Approving Officer for the City of Colwood

Owner:
Lehigh Cement Limited, Inc. No. A47066

Authorized Signatory RICHARD HARPER

Authorized Signatory BARRY IRVINE

Witness as to both signatures PATRICK JULIAN

lawyer
Occupation

1900-885 West Georgia
Address Vancouver, B.C., V6C 3H4

I, Michael McIlvaney, a British Columbia Land Surveyor, of the city of Victoria, in British Columbia, certify that I was present at and personally superintended the survey represented by this plan, and that the survey and the plan are correct. The survey was completed on the 28th day of Feb. 2003

M. J. McIlvaney B.C.L.S.

Sketch Plan of Proposed Subdivision of Lot 31, Section 40, Esquimalt District, Plan VIP75021.

7.5 0 7.5 15 22.5 30 37.5 Metres

The intended plot size of this plan is 560 mm in width by 432 mm in height (C size) when plotted at a scale of 1:750

Legend:

City of Colwood
Zone= RBCD1

Area Table	
Proposed Lot 2	0.915 ha
Proposed Sec 219 Non-Disturbance Covenant	0.160 ha (789+815m²)
Future Walkway area to be dedicated when Proposed Lot 1 developed	0.0247 ha (247 m²)
Total Area	1.10 ha

16 September 2024

McIlvaney Riley Land Surveying Inc.
#113 - 2244 Sooke Road
Victoria, B.C. V9B 1X1
(250) 474-5538
www.mrls.ca

File: 7102SubProp2

Appendix C | Application Reports

- Environmental Assessment Report
- Consultation Summary
- Conceptual Civil Servicing Memo
- Transportation Impact Assessment



ENVIRONMENTAL ASSESSMENT

FOR 499 ROYAL BAY DRIVE, COLWOOD BC

PREPARED FOR:
MEADOW DEVELOPMENTS LTD.
365 LATORIA BOULEVARD
VICTORIA, BC, V9C 0L7

AND

CITY OF COLWOOD
3300 WISHART ROAD
COLWOOD, BC, V9C 1R1

CORVIDAE PROJECT #2023-023
JULY 2024

CORVIDAE
ENVIRONMENTAL CONSULTING INC

6526 WATER STREET, SOOKE, BC

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Photo 9. Trail at northern extent of property. July 29, 2024. 20

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CAVEAT

This Environmental Assessment (EA) has been prepared with the best information available at the time of writing, including the City of Colwood Official Community Plan, communications with the client, a site visit, review of site plans and design drawings and other documentation relevant to the project. This EA has been developed to assist the project in remaining in compliance with relevant environmental regulations, acts and laws pertaining to the project and to identify and mitigate the expected impacts of the project.

1 INTRODUCTION

Corvidae Environmental Consulting Inc. (Corvidae) is pleased to provide this Environmental Assessment (EA) for the sale of 499 Royal Bay Drive in Colwood, BC (the property) (PID: 025-625-837; LOT 31, PLAN 75021). The property is currently zoned as Royal Bay CD1 (RBCD1) and is undeveloped. property boundaries are shown in Figure 1, denoted by the red polygon.

The property is currently utilized by locals for recreation, as the northeast boundary is shared with Promenade Park and several trails extend from the park onto the property. Most of the property is forested with some small mossy outcrops. There are intermittent low areas with standing water in the winter with no connectivity and no watercourses on site with the exception of the ditch to the south. The property is not within an Environmental Development Permit Area, but does occur within the Form, Character, and Sustainability Development Permit Area (DPA).

This document addresses the requirements outlined in Part D of the City of Colwood Bylaw No. 1700, provides a detailed assessment on the environmental conditions on the Site, potential impacts of the proposed development, and recommendations for the protection of environmentally sensitive features and methods to minimize impacts of the proposed development.

1.1 OBJECTIVES

The purpose of this EA is to assess the current terrestrial and riparian environments onsite, identifying terrestrial and aquatic habitat, sensitive ecosystems, and wildlife habitat, including wildlife trees, nests, and any other wildlife features. This EA also identifies the presence of threatened or endangered species on or around the property, which includes a 2-kilometre (km) buffer around the property boundaries. As part of the EA, Corvidae completed a detailed field assessment to document biophysical features, habitat and verify available ecosystem inventory data. From this information potential impacts of future development have been determined and mitigations provided to protect the natural environment, its ecosystems and associated biological diversity.

Property Location and Environmental Features

Wildlife tree
Culvert
Drain Main
Ditch
Site Features
Property Boundary

N

0 25 50 100 Meters

Project: 499 Royal Bay Road | Sources: City of Colwood, Capital Regional District

CORVIDAE ENVIRONMENTAL CONSULTING INC

Rev. #	Date
0	March 16, 2023
1	July 22, 2024

Corvidae Project No.
COR-2023-023

Figure 1

1.2 REGULATORY FRAMEWORK

This environmental assessment is designed to comply with the provisions set out in the City of Colwood Official Community Plan (OCP) for development permit areas and for compliance with the provisions for environmental protection contained in the following relevant legislation:

Municipal

- City of Colwood OCP, Bylaw No. 1700 (City of Colwood 2018)

  Form, Character, and Sustainability DPA

  Objectives

  24.1.d. Ensure the sensitive integration of development with topography and other natural features through the application of adaptive planning principles.

  24.1.e. Ensure the compatibility of development with surrounding built and natural environment that protects existing neighbourhood character.

The guiding principle for the use of Development Permits is found within the *Local Government Act*. Development Permit Areas can be designated for purposes such as, but not limited to: protecting, enhancing and restoring the biodiversity and ecological values and functions of environmentally sensitive areas; fostering compatibility between development, existing land uses and environmentally sensitive areas; maintaining connectivity between sensitive ecosystems; and protecting water quality and quantity.

The property is not within an Environmental DPA, therefore, a DP addressing tree protection is not required. With the proposed tree clearing on the property, a Tree Management Permit will be applied for with the City of Colwood, permitting the removal and securing either the cash-in-lieu contribution or replacement deposit, to be determined at the time of approval. A 2:1 replacement ratio is required for this proposed plan; every replacement tree is subject to a $250 cash-in-lieu contribution or replanting deposit.

Provincial

- Wildlife Act (1996)
- Invasive Species Council of BC
- *Weed Control Act* (1996, current as of October 2016)

Federal

- Migratory Birds Convention Act (1994)
- Species at Risk Act (SARA) (2002)
- Fisheries Act (2019)

2 SCOPE OF WORK

Corvidae completed an environmental assessment for the property and documented the ecological features. Background information was reviewed, including applicable databases. The following features were documented and provided in this report:

- Areas of sensitivity,
- Areas of habitat and biodiversity values,
- Plant communities and plant species on the property,
- Potential wildlife presence and wildlife habitat,
- Soil types and terrain,
- Surface water flow patterns.

Following the field assessment, the biophysical features were mapped, and buffer areas have been identified. Mitigations to minimize the impacts of the proposed residential development on the environment have been provided in Section 6.

3 METHODS

3.1 DESKTOP REVIEW

Baseline biophysical conditions were compiled by reviewing the best available data and information including existing reports for the area and conducting searches of online provincial and federal databases:

- BC Conservation Data Centre (BC CDC 2023a and 2023b).
- BC HabitatWizard (Province of BC 2023).
- Aerial photographs of the property (Google Earth 2023).
- CRD mapping system and database (CRD 2023).
- City of Colwood GIS Mapping (City of Colwood n.d.)
- Colwood Official Community Plan Bylaw No. 1700 (City of Colwood 2018).

3.2 FIELD ASSESSMENT

A field assessment of the property was completed by a Qualified Environmental Professional (QEP) from Corvidae. The assessment included characterization of vegetation and habitat types, wildlife sign and species observations, wildlife habitat, surface water flow patterns, and assessed the current conditions of the property.

4 ENVIRONMENTAL SITE ASSESSMENT

Corvidae completed a site visit on March 8th, 2023, and again July 29, 2024. Photographs of the property are provided in Appendix A.

4.1 LAND USE

The property borders Promenade Park to the northeast and is bound by Royal Bay Drive to the northwest, and residential properties on all other sides. It is undeveloped, aside from some trails which extend from the adjacent park. Areas in proximity to the residential areas are more disturbed with a high concentration of invasive species and some piles of yard waste, while areas near to the park are more native.

4.2 CLIMATE AND BIOGEOCLIMATIC ZONE

The property is located within the Coastal Douglas-fir (CDF) biogeoclimatic zone, specifically in the Moist Maritime Coastal Douglas-fir Subzone (CDFmm) (BC CDC 2023b). The CDFmm occurs at low elevations (<150 m) along southeast Vancouver Island, the southern Gulf Islands, and part of the Sunshine Coast. The CDFmm has the mildest climate in Canada. This subzone has a long growing season with warm, dry summers and mild, wet winters.

4.3 TERRAIN AND SOILS

Soils in the CDF biogeoclimatic zone are generally derived from morainal, colluvial, and marine deposits, and are typically Brunisols, grading with increased precipitation to Humo-Ferric Podzols (Nuszdorfer et al. 1991). Soils on the property are described as rapidly drained, Orthic Dystric Brunisols (BC SIFT 2018). Generally, the terrain slopes downward moderately from northeast to southwest, with some outcrop areas at the northeast.

The Site consists of rocky outcrops, low hummocky areas, and a combination of moderately to rapidly draining soils. The soil textures range from silty loam to silty clay loam. The photos (Appendix A) show the site features and terrain.

The terrain generally slopes from west to east. There are two ditched areas on site with no connectivity to watercourses or any surface water features in the neighbourhood.

4.4 VEGETATION

Dry forests in the CDFmm zone are typically dominated by Douglas-fir (*Pseudotsuga menziesii*), arbutus (*Arbutus menziesii*), and western redcedar (*Thuja plicata*). Grand fir (*Abies grandis*) and shore pine (*Pinus contorta* var. *contorta*) may also be present. Salal (*Gaultheria shallon*), dull Oregon-grape (*Mahonia nervosa*), ocean spray (*Holodiscus discolor*), baldhip rose (*Rosa gymnocarpa*), and red huckleberry (*Vaccinium parvifolium*) are common in the shrub layer. Bracken fern (*Pteridium aquilinum*), snowberry (*Symphoricarpos albus*), grasses, and pacific sanicle (*Sanicula crassicaulis*) are common in the herb layer. Oregon beaked-moss (*Eurhynchium oreganum*), step moss (*Hylocomium splendens*), and electrified cat's-tail moss (*Rhytidiadelphus triquetrus*) dominate the well-developed moss layer (Nuszdorfer et al. 1991).

The property is predominantly second-growth mixed forest composed of Douglas-fir, western redcedar, bigleaf maple and red alder. The tree canopy is open in many areas. The understory consists of salal, oceanspray, sword fern, dull Oregon-grape, and several invasive species. Areas to the southwest are disturbed and degraded by invasives, predominantly dense thickets of Himalayan blackberry. Vegetation communities in the northeast are more natural and include mossy outcrops with arbutus and a diversity of native flowering plants.

Five invasive plant species were observed on the property: Himalayan blackberry, English ivy, English holly, scotch broom, and spurge-laurel. These are listed as "Control" species as per the Coastal Invasive Species Committee (2023). It is recommended that efforts to control these species are focused within high value conservation areas. Measures to remove and prevent invasive species are discussed in Section 6 of this report. All vegetation species noted during the July 2024 field visit are included below in Table 1.

Table 1. Plant species observed on site during the July 29, 2024, field visit.

Common Name	Scientific Name	BC Provincial Status[1]	*SARA* Schedule 1 Status[2]
Arbutus	*Arbutus menziesii*	Yellow	--
Bigleaf maple	*Acer macrophyllum*	Yellow	--
Bracken fern	*Pteridium aquilinum*	Yellow	--
Common snowberry	*Symphoricarpos albus*	Yellow	--
Douglas-fir	*Pseudotsuga menziesii*	Yellow	--
Dull Oregon-grape	*Mahonia nervosa*	Yellow	--
Electrified cat's-tail moss	*Rhytidiadelphus triquetrus*	Yellow	--
English holly	*Ilex aquifolium*	**Invasive**; Exotic	--
English ivy	*Hedera helix*	**Invasive**; Exotic	--
Grand fir	*Abies grandis*	Yellow	--
Grass species	*Poa* sp.	--	--
Hairy honeysuckle	*Lonicera hispidula*	Yellow	--
Himalayan blackberry	*Rubus armeniacus*	**Invasive**; Exotic	--
Licorice fern	*Polypodium glycyrrhiza*	Yellow	--
Miner's lettuce	*Claytonia perfoliata ssp. perfoliata*	Yellow	--
Oceanspray	*Holodiscus discolor var. discolor*	Yellow	--
Oregon beaked-moss	*Kindbergia oregana*	Yellow	--
Oxeye daisy	*Leucanthemum vulgare*	Exotic	--
Pacific sanicle	*Sanicula crassicaulis*	Yellow	--
Pacific water-parsley	*Oenanthe sarmentosa*	Yellow	--
Pacific yew	*Taxus brevifolia*	Yellow	--
Rattlesnake plantain	*Goodyera oblongifolia*	Yellow	--
Red alder	*Alnus rubra*	Yellow	--
Salal	*Gaultheria shallon*	Yellow	--
Salmonberry	*Rubus spectabilis*	Yellow	--
Scotch broom	*Cytisus scoparius*	**Invasive**; Exotic	--
Sedge sp.	*Carex sp.*	--	--
Shortspur seablush	*Plectritis brachystemon*	Yellow	--
Small-leaved blinks	*Montia parvifolia*	Yellow	--

Common Name	Scientific Name	BC Provincial Status[1]	*SARA* Schedule 1 Status[2]
Snowdrop sp.	*Galanthus sp.*	Exotic	--
Spurge-laurel	*Daphne laureola*	**Invasive**; Exotic	--
Skunk cabbage	*Lysichiton americanus*	Yellow	--
Sword fern	*Polystichum munitum*	Yellow	--
Tall Oregon-grape	*Mahonia aquifolium*	Yellow	--
Trailing blackberry	*Rubus ursinus*	Yellow	--
Western redcedar	*Thuja plicata*	Yellow	--
Woodland madia	*Anisocarpus madioides*	Yellow	--
Yerba buena	*Clinopodium douglasii*	Yellow	--

[1] BC CDC 2023a
[2] Government of Canada 2023

4.5 WILDLIFE

Existing trees on the property may provide nesting and roosting habitat for birds, including migratory songbirds, year-round resident species, raptors, and owls. No nests were observed; however, the assessment was completed outside of the general nesting window for most bird species. There are several wildlife trees on the property, identified in Figure 1. These trees show significant signs of use by woodpeckers and other wildlife and may provide nesting habitat to cavity nesting species. Additionally, several dead and dying trees occur on the property which may become valuable wildlife trees.

During the assessment, a black-tailed deer was observed foraging and a deer skeleton was observed on the property. No amphibians are reptiles were observed during the assessment. However, the lower areas and rocky outcrops may provide habitat for amphibians and reptiles respectively.

During the site assessment the species in Table 2 were observed on or near the property.

Table 2. Wildlife Species observed on site during the March 8, 2023, field visit.

Common Name	Scientific Name	BC Provincial Status[1]	*SARA* Schedule 1 Status[2]
Anna's hummingbird	*Calypte anna*	Yellow	--
Black-tailed deer	*Odocoileus hemionus*	Yellow	--
Brown creeper	*Certhia americana*	Yellow	--
Chestnut-backed chickadee	*Poecile rufescens*	Yellow	--
Dark-eyed Junco	*Junco hyemalis*	Yellow	--
Fox sparrow	*Passerella iliaca*	Yellow	--
Golden-crowned sparrow	*Zonotrichia atricapilla*	Yellow	--
House finch	*Haemorhous mexicanus*	Yellow	--
House sparrow	*Passer domesticus*	Exotic	--
Northern flicker	*Colaptes auratus*	Yellow	--
Pacific wren	*Troglodytes pacificus*	Yellow	--
Red-breasted nuthatch	*Sitta canadensis*	Yellow	--
Song sparrow	*Melospiza melodia*	Yellow	--
Spotted towhee	*Pipilo maculatus*	Yellow	--

[1] BC CDC 2023a; [2] Government of Canada 2023

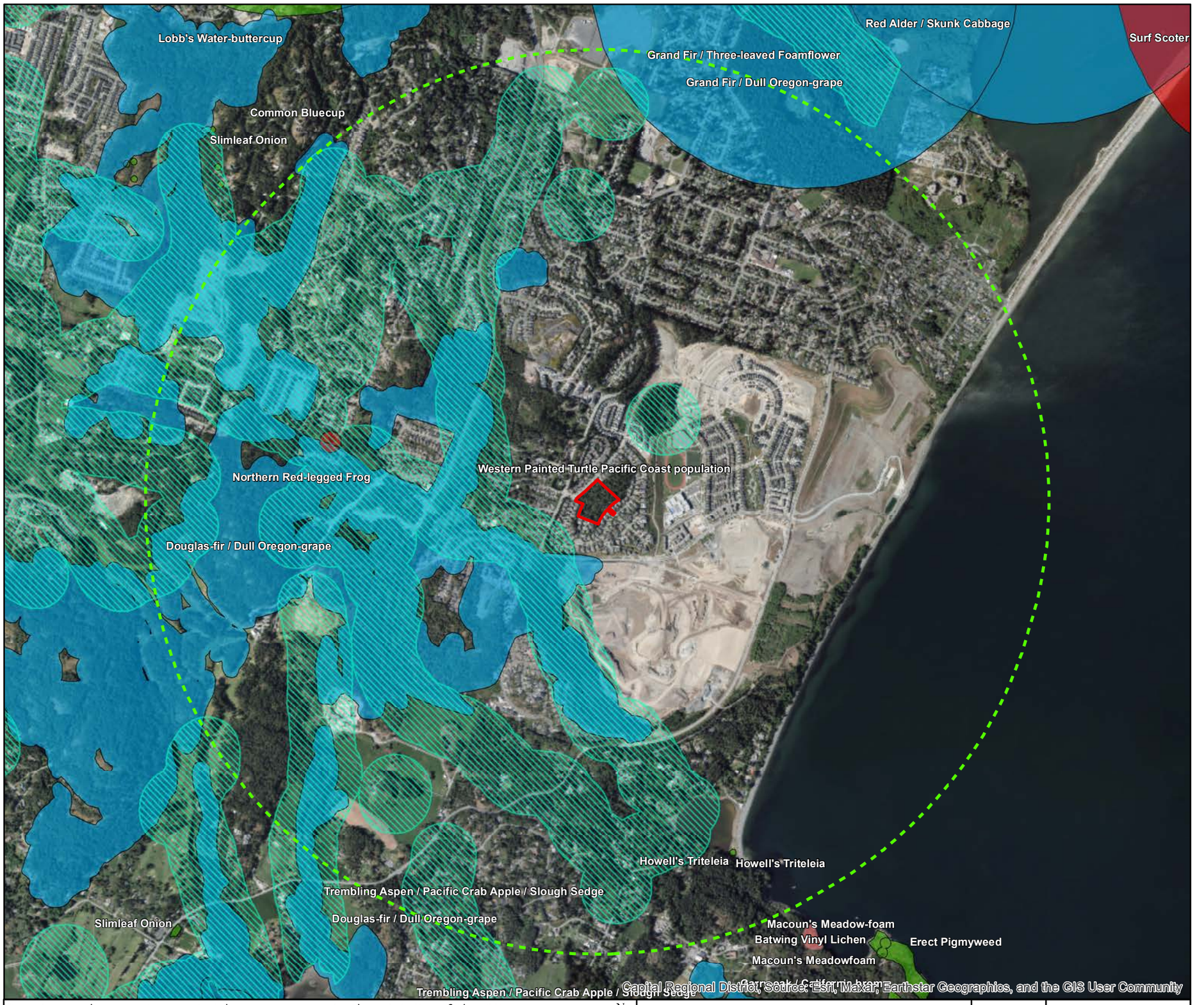
4.6 SPECIES AT RISK

A query of the BC CDC iMap tool yielded one masked occurrence that overlaps the property, and two species at risk and three ecosystem at risk occurrences within a 2 km radius of the property (BC CDC 2023b) (Table 3). The location of these occurrences in relation to the property is provided in Figure 2. None of the species or ecosystems listed in Table 3 were detected during the site assessment, nor was suitable habitat identified on the property for the species mentioned.

Table 3. Species at risk that may occur in the vicinity of 499 Royal Bay Drive, Colwood, BC.

Common Name	Scientific Name	BC Provincial Status[1]	*SARA* Schedule 1 Status[2]
Species			
Howell's triteleia	*Triteleia howellii*	Red	Endangered
Northern Red-legged Frog	*Rana aurora*	Blue	Special Concern
Ecosystems			
Douglas-fir / dull Oregon-grape	*Pseudotsuga menziesii / Mahonia nervosa*	Red	n/a
Grand fir / three-leaved foamflower	*Abies grandis / Tiarella trifoliata*	Red	n/a
Grand fir / dull Oregon-grape	*Abies grandis / Mahonia nervosa*	Red	n/a

[1] BC CDC 2023a; [2] Government of Canada 2023



Species and ecosystems at risk occurrences in the vicinity of the Site

N

Critical Habitat

- Property Boundary
- 2 km area around property boundary
- Batwing Vinyl Lichen
- Western Painted Turtle Pacific Coast population

Species at Risk

- Ecological Community
- Vascular Plant
- Vertebrate Animal

0 500 1,000 2,000 Meters

Project: 499 Royal Bay Road | Sources: City of Colwood, Capital Regional District

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Figure 2

5 POTENTIAL ENVIRONMENTAL EFFECTS

This report has been prepared only for the sale of the property. There is currently no development proposed. In the future, should development of the property be proposed, a separate report will be required. In general, the potential impacts of future development of the property on the environment are:

- Impacts on sensitive ecosystem areas, such as riparian areas,
- Loss of native vegetation and spread of invasive plant species,
- Change in wildlife habitat availability and wildlife mortality risk,
- Sediment movement in the project area.

The residual environmental impacts of future activities on the property will be reduced by the implementation of the mitigation and restoration measures recommended in Section 6 of this report.

VEGETATION

The effects of trees and vegetation removal may include loss of biodiversity of plant species and increased susceptibility to invasive plants not only in cleared areas but also in adjacent plant communities. Vegetation and plant communities immediately adjacent to cleared areas may experience changes due to windthrow and changes in microclimate (increased light and moisture penetration).

INVASIVE SPECIES

Invasive plants are particularly adept at colonizing degraded plant communities and disturbed soils. Invasive plants establish readily in disturbed areas as they have a wide ecological tolerance and grow and propagate quickly. The effects of invasive plant establishment may be the reduction or displacement native species by capturing resources and occupying habitats.

WILDLIFE AND WILDLIFE HABITAT

Loss and alteration of terrestrial habitat can result in the loss of habitat for wildlife species. Tree and shrub clearing can directly alter or remove wildlife habitat. Noise from site preparation and construction may temporarily disturb and displace remaining wildlife.

EROSION AND SEDIMENT

Removal of vegetation during construction exposes soil to erosion and can result in the movement of sediment on the property. Damage or degradation of soil surfaces during construction can include loss of soil structure, increased erosion, and soil compaction.

6 RECOMMENDED ENVIRONMENTAL PROTECTION MEASURES

The mitigation measures provided in this report are designed to protect sensitive ecosystems and were developed in accordance with:

- The City of Colwood OCP (City of Colwood 2018),
- Procedures for Mitigating Impacts on Environmental Values (Environmental Mitigation Procedures) (BC Ministry of Environment [MOE] 2014a),
- Develop with Care 2014: Environmental Guidelines for Urban and Rural Land Development in British Columbia (Government of BC 2014), and
- Environmental Best Management Practices for Urban and Rural Land Development in British Columbia (BC Ministry of Water, Land and Air Protection 2004).

VEGETATION

Areas disturbed by project construction that are not part of the permanent footprint should be replanted with native trees and shrubs and/or seeded with native seed mix. Overall recommended planting density is approximately one plant per 1 to 2 m^2 of disturbed space, and 3 m^2 for trees.

The purpose of using native species is to reduce irrigation maintenance in the future. The optimal time for revegetation is in the fall, prior to the wet winter season. However, planting at any time of the year (with irrigation as needed) is acceptable to prevent invasive species.

For tree removal, a Tree Management Permit will be applied for with the City of Colwood, for either a cash-in-lieu contribution or replacement deposit, to be determined at the time of approval. A 2:1 replacement ratio is required for this proposed plan; every replacement tree is subject to a $250 cash-in-lieu contribution or replanting deposit.

INVASIVE SPECIES

There is a high density of invasive vegetation on the property, specifically blackberry. Remove invasive species in areas planned for park space, as well as areas of new construction. Invasive weed control is difficult for established populations. Invasive species should be removed using the most appropriate methods, at the correct time of year, and plant material must be disposed of correctly to avoid re-establishment or spread. Following removal, re-seed bare soil with desirable, competing vegetation. Details of removal methods for the invasive species onsite are provided below in Table 4.

Table 4. Removal and disposal methods for invasive species

Species	Removal Method	Removal Timing	Plant Disposal
English ivy	Can be removed by hand pulling and cutting of vines. Roots should be pulled so no rooted portions re-grow.	Removal should occur in the fall, when plants are easier to remove due to moist soil conditions.	Burned or bagged and disposed of properly in a landfill. Do not compost.
Himalayan blackberry	Can be removed by pulling or cutting the canes from the ground. If possible, dig out the roots, paying careful attention not to damage nearby vegetation.	Removal should occur in the spring and early summer before they produce berries as canes that are cut as the plant is producing flowers are least likely to re-sprout.	Burned or bagged and disposed of properly in a landfill. Do not compost.
English holly	English holly can be removed by hand pulling small seedlings or cutting mature trees at ground level removing all plant material.	Removal is best done before flowering to eliminate seed production.	Holly does not root again once removed, so it can also be piled to desiccate on site. Can be bagged and disposed of properly in a landfill. Do not compost.
Scotch broom	Avoid disturbing the soil which can stimulate dormant broom seeds to sprout. Small broom plants can be pulled easily from the ground by hand without disturbing the soil. Larger plants should be cut below the root crown using loppers or a pruning saw.	Scotch broom removal should occur mid-April through early June, when in flower and before its seed pods begin to open.	Bagged and disposed of properly in a landfill or burning. Do not 'recycle' garden debris or compost.
Spurge-laurel	Spurge-laurel can be removed by pulling small plants or cutting larger plants just below the soil. Spurge laurel stems may re-sprout after cutting and numerous seedlings may germinate so repeated site visits are necessary. Always wear gloves when handling spurge laurel because it produces a noxious substance which can cause severe eye and skin irritation. Avoid spreading berries during removal.	Can be removed year-round.	Removed plants should be bagged and disposed of properly in a landfill. Do no transport inside an enclosed vehicle as the plants can cause respiratory irritation.

Mitigation measures to control and minimize the spread of invasive weeds on the site include:

- Clean all machinery before arrival onto the site to ensure that more weed seeds and other propagules (e.g., pieces of root) are not brought into the project area.
- If fill or topsoil is imported from external areas, ensure that it is from a weed-free source.

Soil should not be left exposed until landscaping. Disturbed areas should be seeded with fast growing vegetation such as a mix with a native clover or seed mix to compete with weed species, fix nitrogen and provide soil stabilization right after clearing.

WILDLIFE AND WILDLIFE HABITAT

Mitigation measures to minimize impacts on wildlife and wildlife habitat include:

- Vegetation clearing should be completed outside of the migratory bird window (prior to March 15th or after August 31st; Government of Canada 2018). If vegetation clearing is scheduled within the sensitive time period for breeding birds, a QEP should conduct nest search surveys a maximum of 2-3 days prior to the start of activities. If an active nest is discovered during nest searched or clearing activities, the nest will be subject to site-specific mitigation measures (e.g., protective buffer around the nest or unobtrusive monitoring) until the young have naturally fledged/left the area. Multiple nest sweeps may be required. Nest search areas include both vegetation and onsite, man-made structures that are scheduled for removal.
- If clearing is scheduled between January 1 and August 15, a raptor nest survey should be completed by a QEP prior to clearing.
- Avoid additional removal of established trees or shrubs, where practical (outside of the project footprint), except for identified danger trees that cannot be avoided.
- Retain wildlife trees where feasible.

EROSION AND SEDIMENT CONTROL

The primary focus of erosion and sediment control planning is erosion control; if there is no erosion then there is no sediment. Mitigation options to minimize the potential effects of the project on the natural environment include:

- Heed weather advisories and scheduling work to avoid wet, windy and rainy periods that may result in high flow volumes and/ or increase erosion and sedimentation.
- Minimize amount of time soils are exposed by seeding and planting as soon as disturbance is complete. Cover exposed soil areas with tarps if for a prolonged period or during rainfall events.

7 CONCLUSION

The biophysical features at 499 Royal Bay Drive have been presented in this report. If development is proposed in the future, implementation of the mitigation and restoration measures recommended in this report, including invasive species removal and the implementation of erosion and sediment control measures, will minimize the impacts of future development on the environment.

Report Prepared By:

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Senior Biologist, Corvidae Environmental Consulting Inc.

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APPENDIX A – SITE PHOTOGRAPHS

Photo 1. West view near entrance to property off Promenade Crescent. March 8, 2023.

Photo 2. View of low, isolated wet area in rainy season, no wetland vegetation, no connectivity. March 8, 2023

Photo 3. Piles of yard waste at entrance to the property off Portwell Place. March 8, 2023.

Photo 4. Southern extent of property with dense Himalayan blackberry and footpath. March 8, 2023.

Photo 5. Rocky outcrop in southeast corner of property. March 8, 2023.

Photo 6. View west of southeastern ditch. March 8, 2023.

Photo 7. Culvert at southeastern ditch. March 8, 2023.

Photo 8. View south of southeastern ditch. March 8, 2023.

Photo 9. Trail at northern extent of property. July 29, 2024.

Photo 10. Trail at northern extent of property. March 8, 2023.

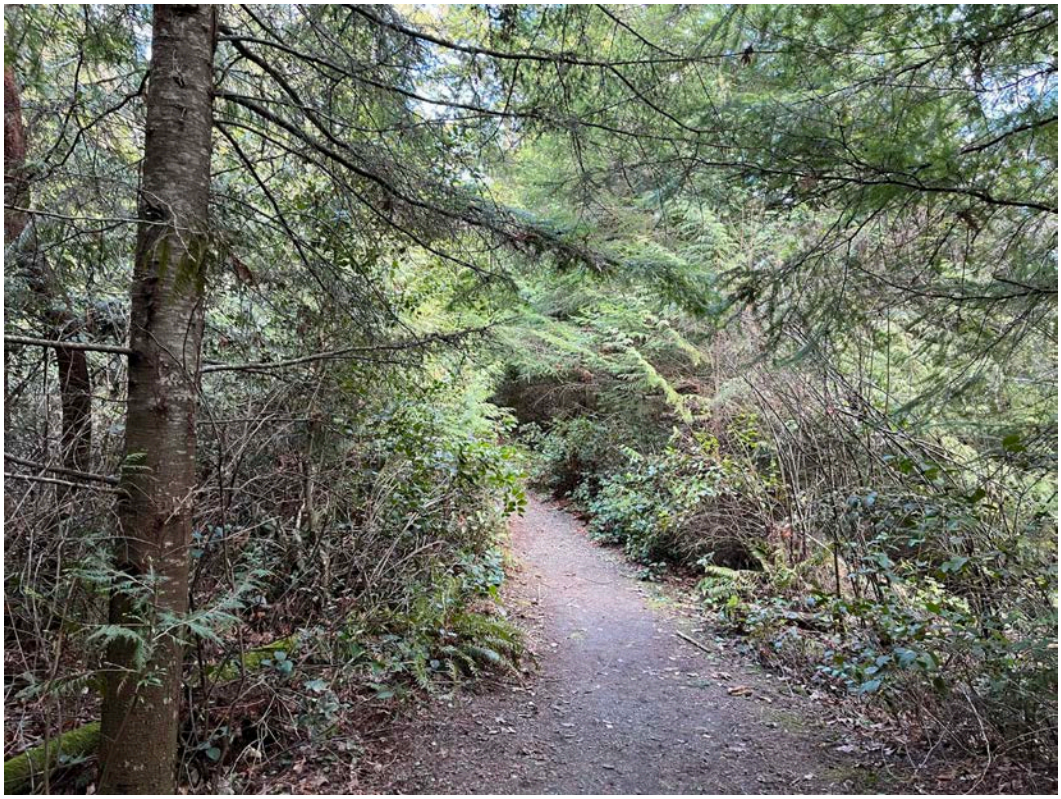


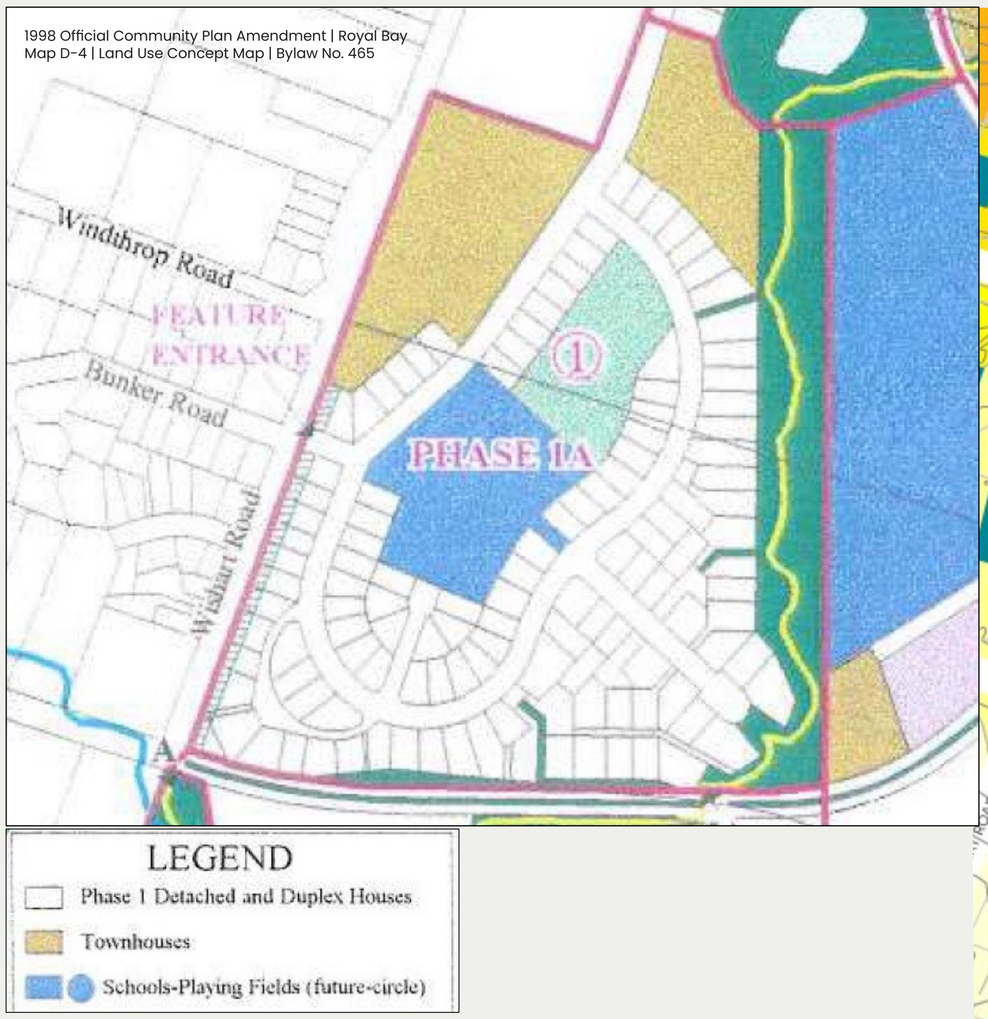
Photo 11. Rocky outcrop in eastern portion of property. February 6, 2023.

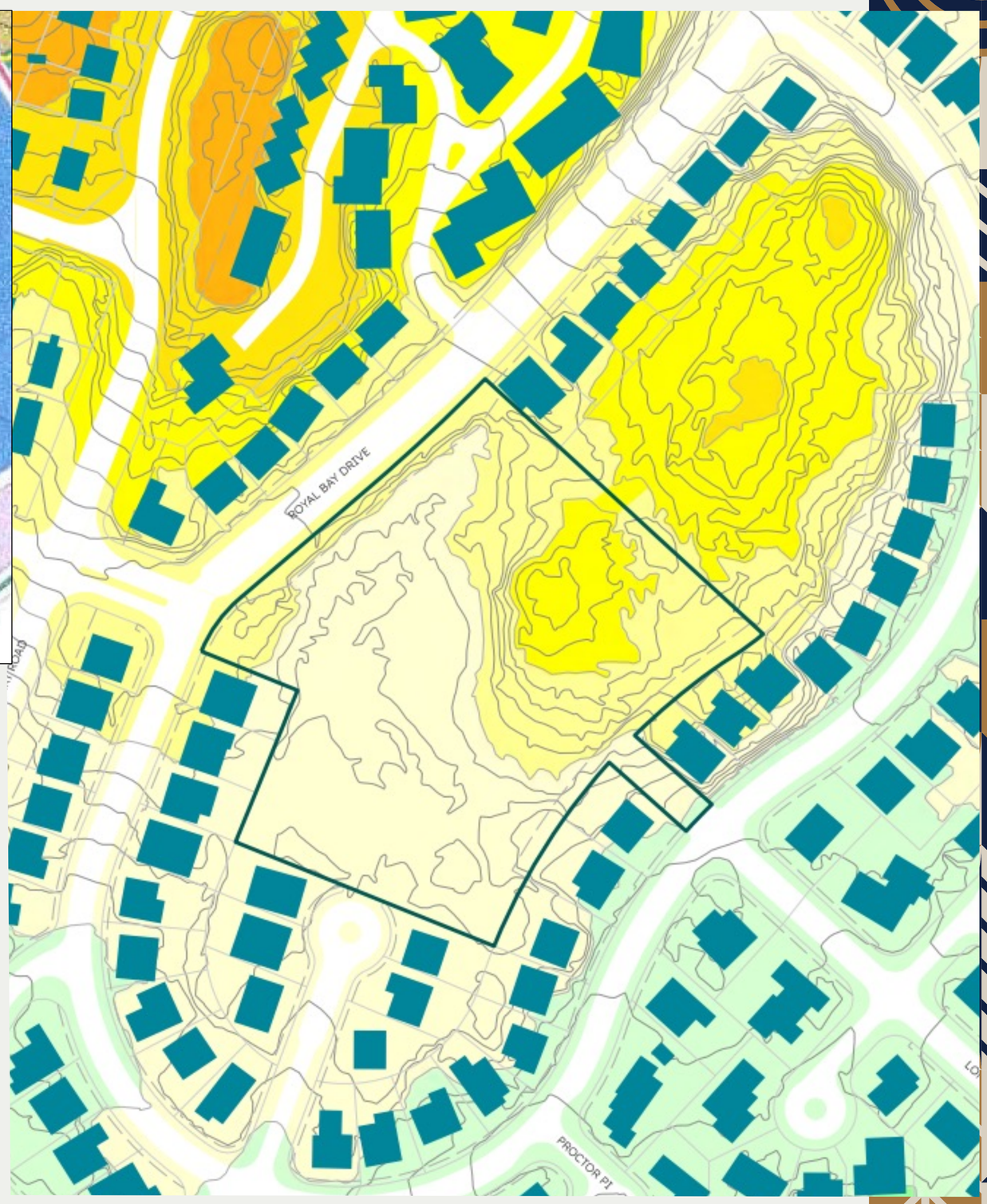
Photo 12. Forest area to the north. July 29, 2024.

Site History

Parcel Size: 5.5 Acres

Site condition: Forested; undulating rocky topography with large rock plateau with excellent views





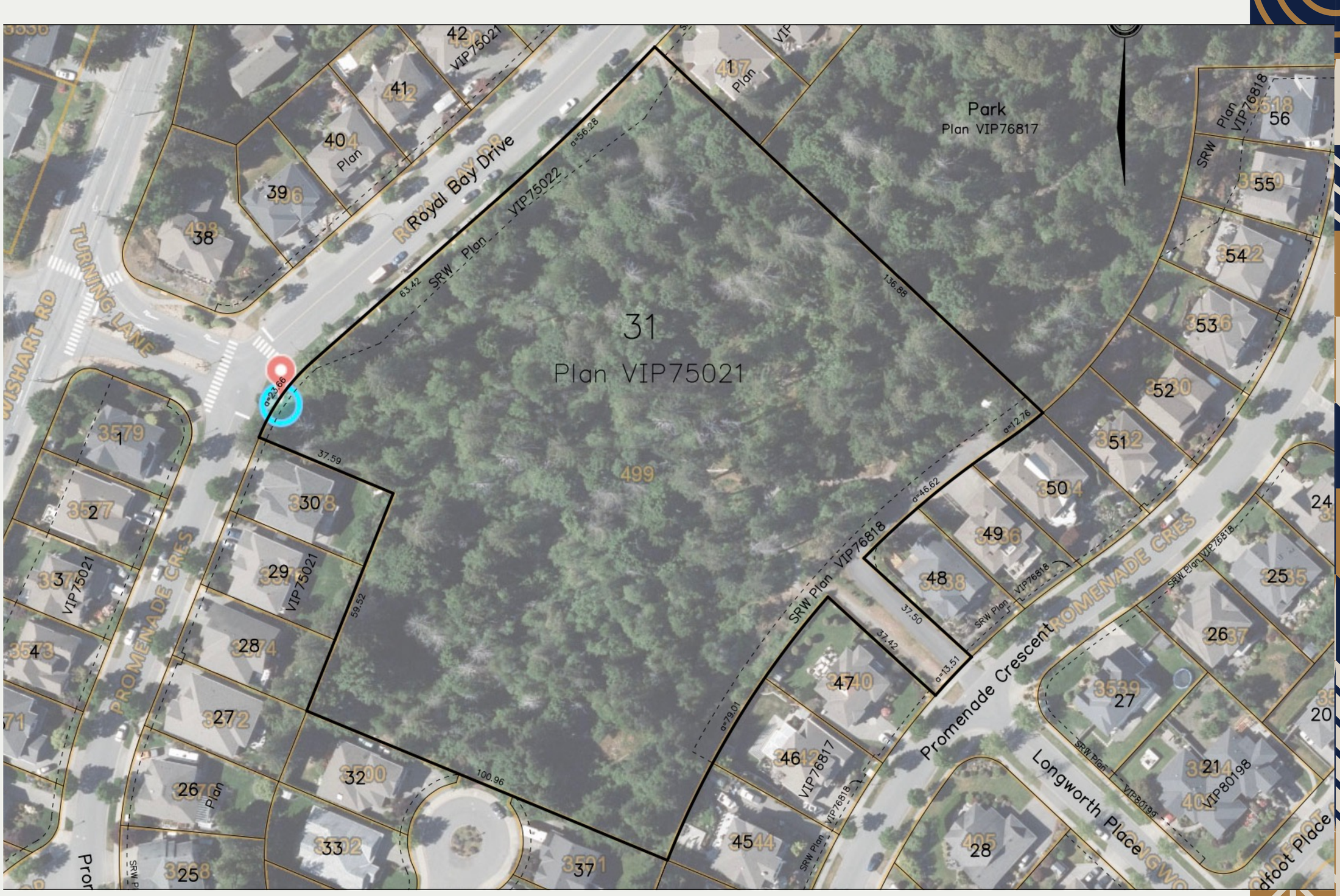
- In 1998 the parcel was designated within the Royal Bay Land Use Plan to be an elementary school site.

- Currently zoned for townhome development, with no specific parkland requirement.
- In the current zoning the maximum number of single-family homes has been reached within upper Royal Bay.

August 22, 2023 - What we heard.

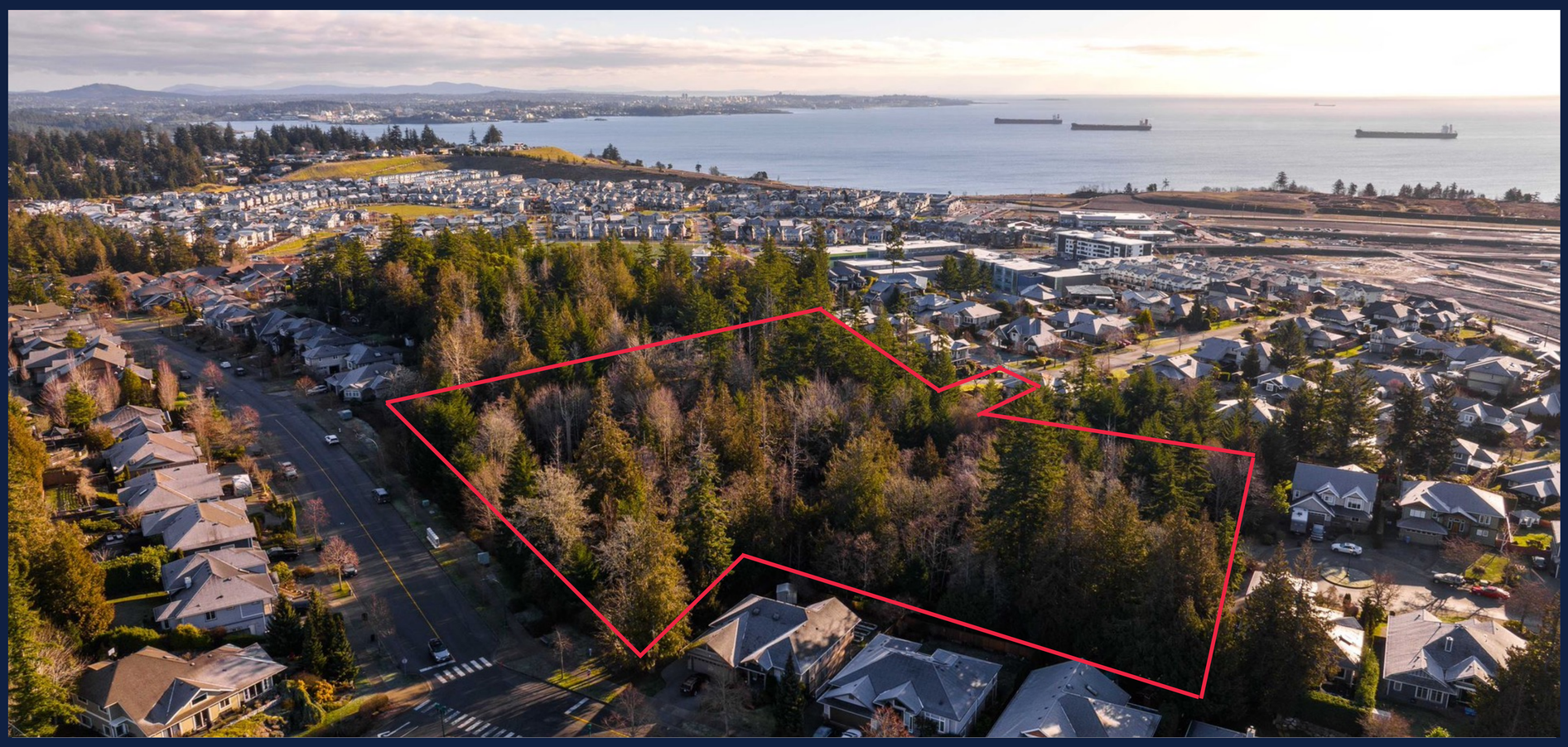
Location: Royal Colwood Golf Club

Attendance: Approximately 70 to 100 homeowners

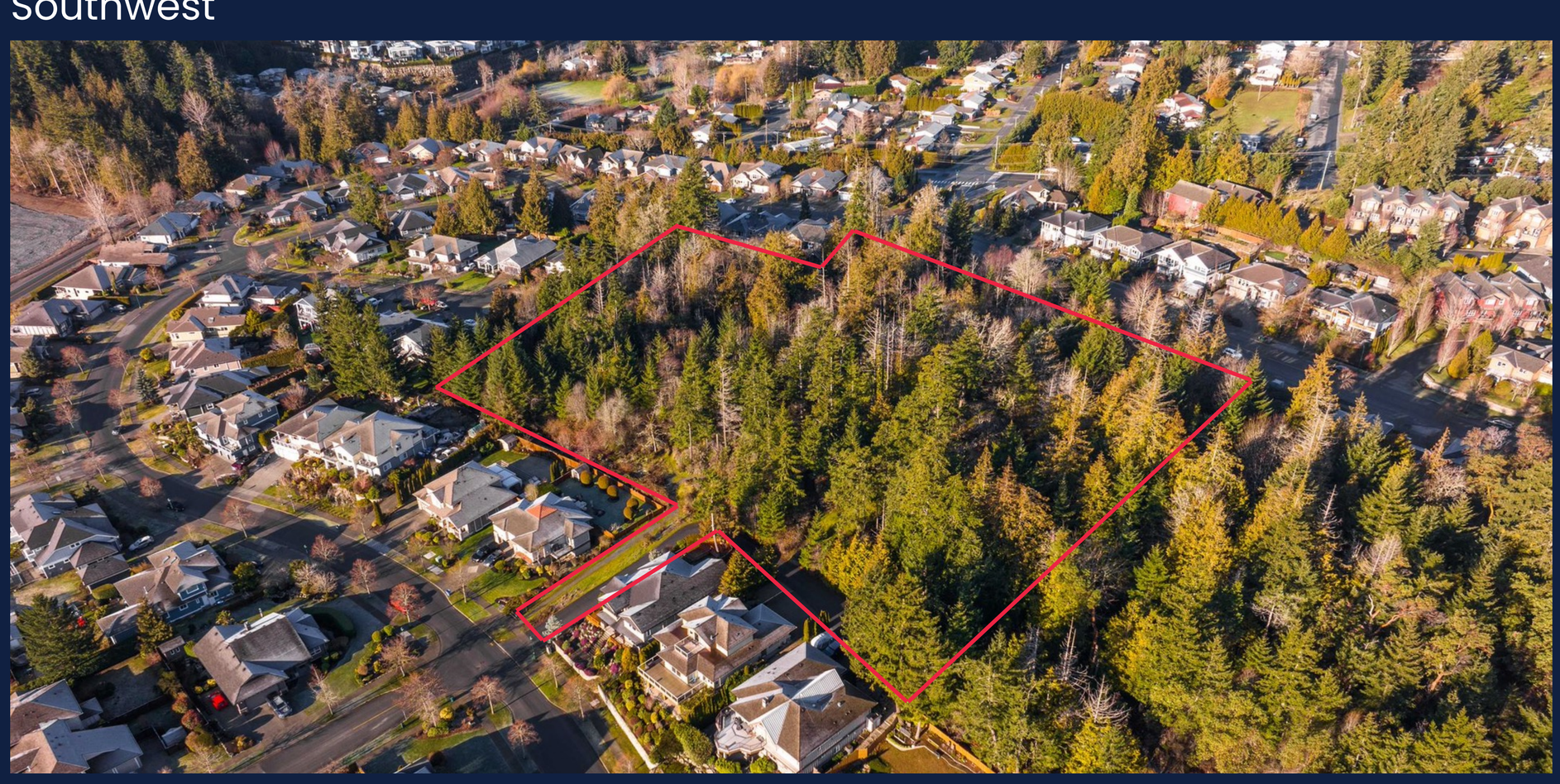


- Keep as much parkland as possible, the trail network is important to the residents.
- Community members would support Gablecraft Homes in rezoning to build 16-17 single-family homes on this parcel instead of townhomes.
- Residents would prefer that these homes be built similiar to existing properties, in design, size, quality and character.
- Residents would prefer to work with Gablecraft on developing the parcel, over selling it off to a new developer.

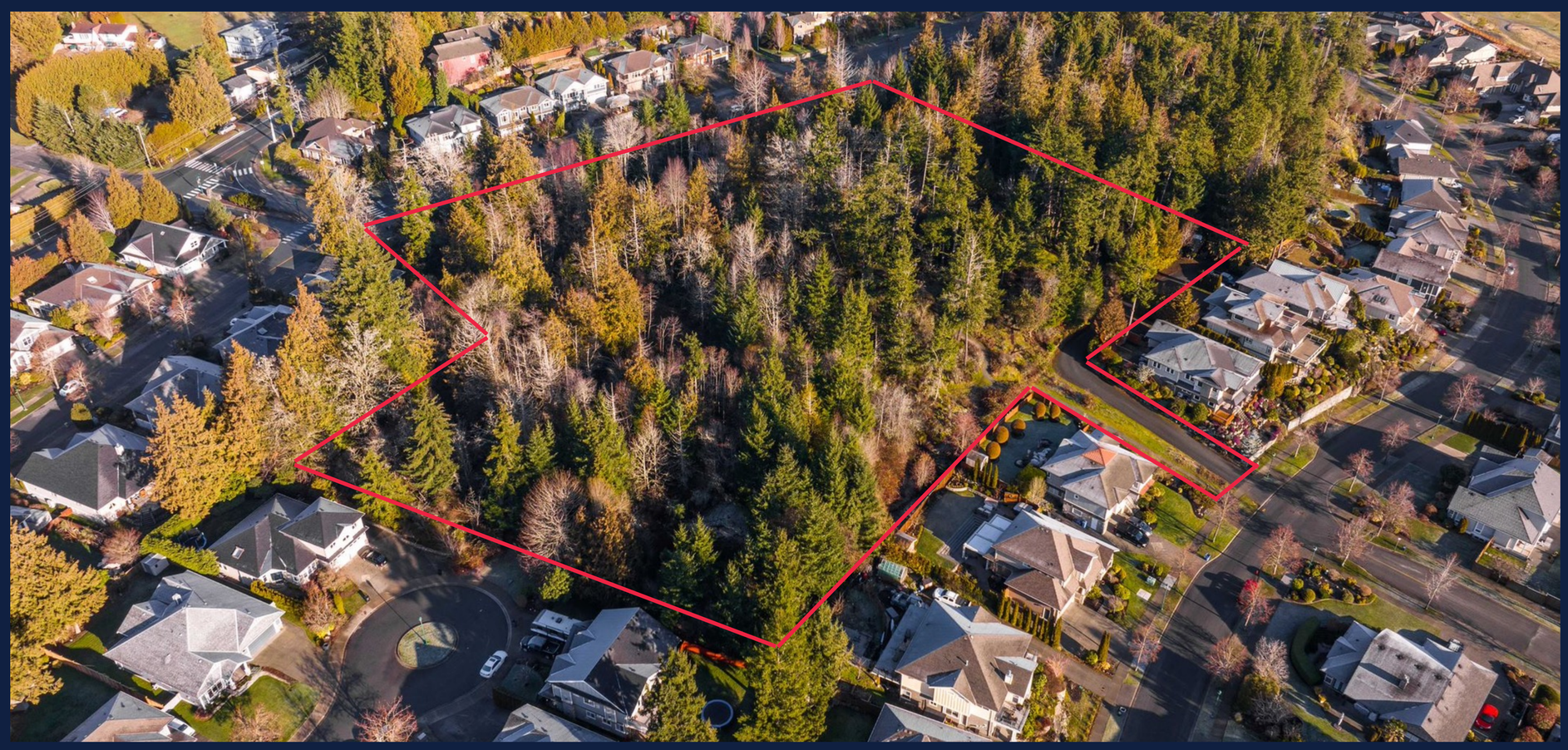
Northeast



Southwest

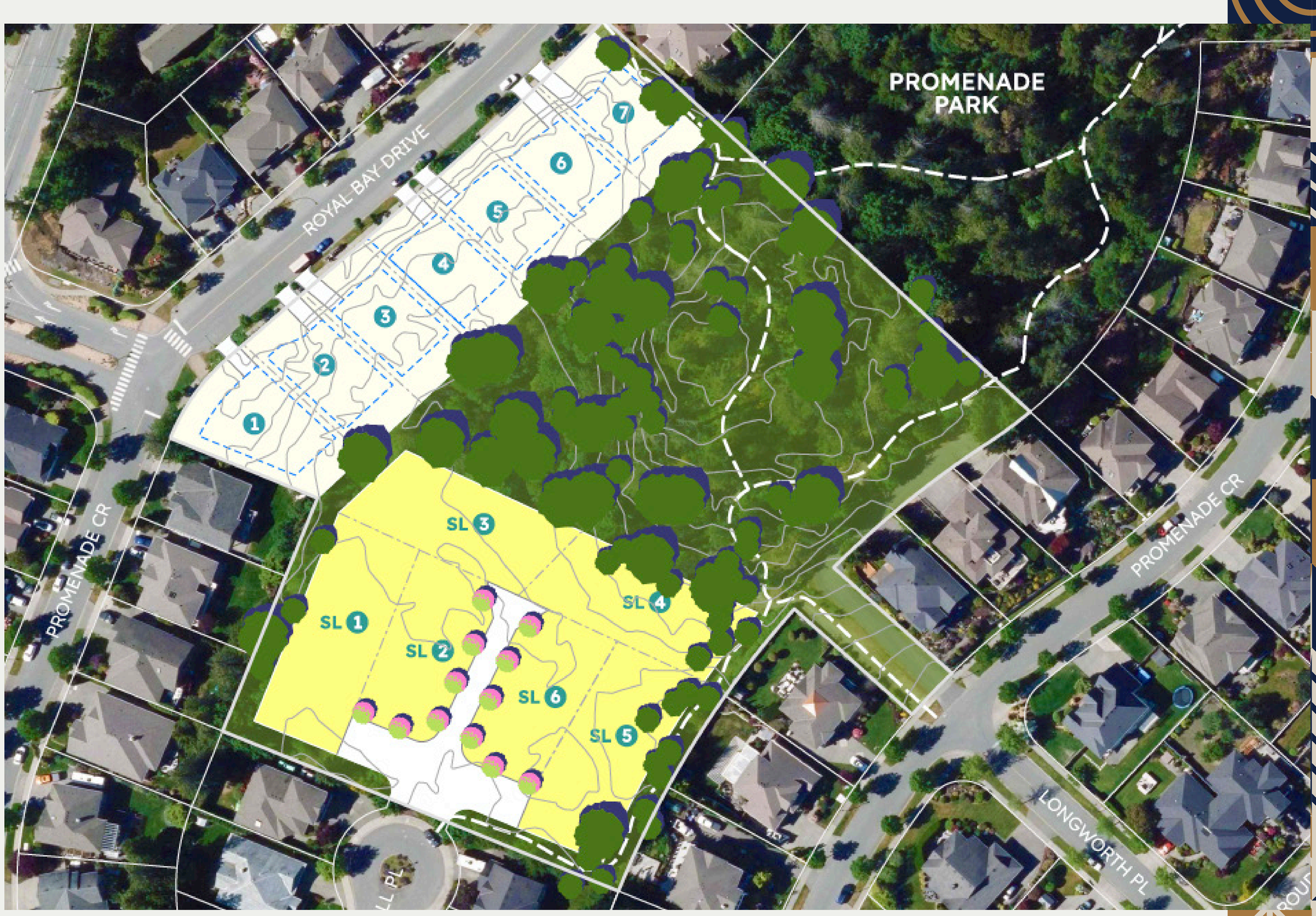


Northwest



Concept 1

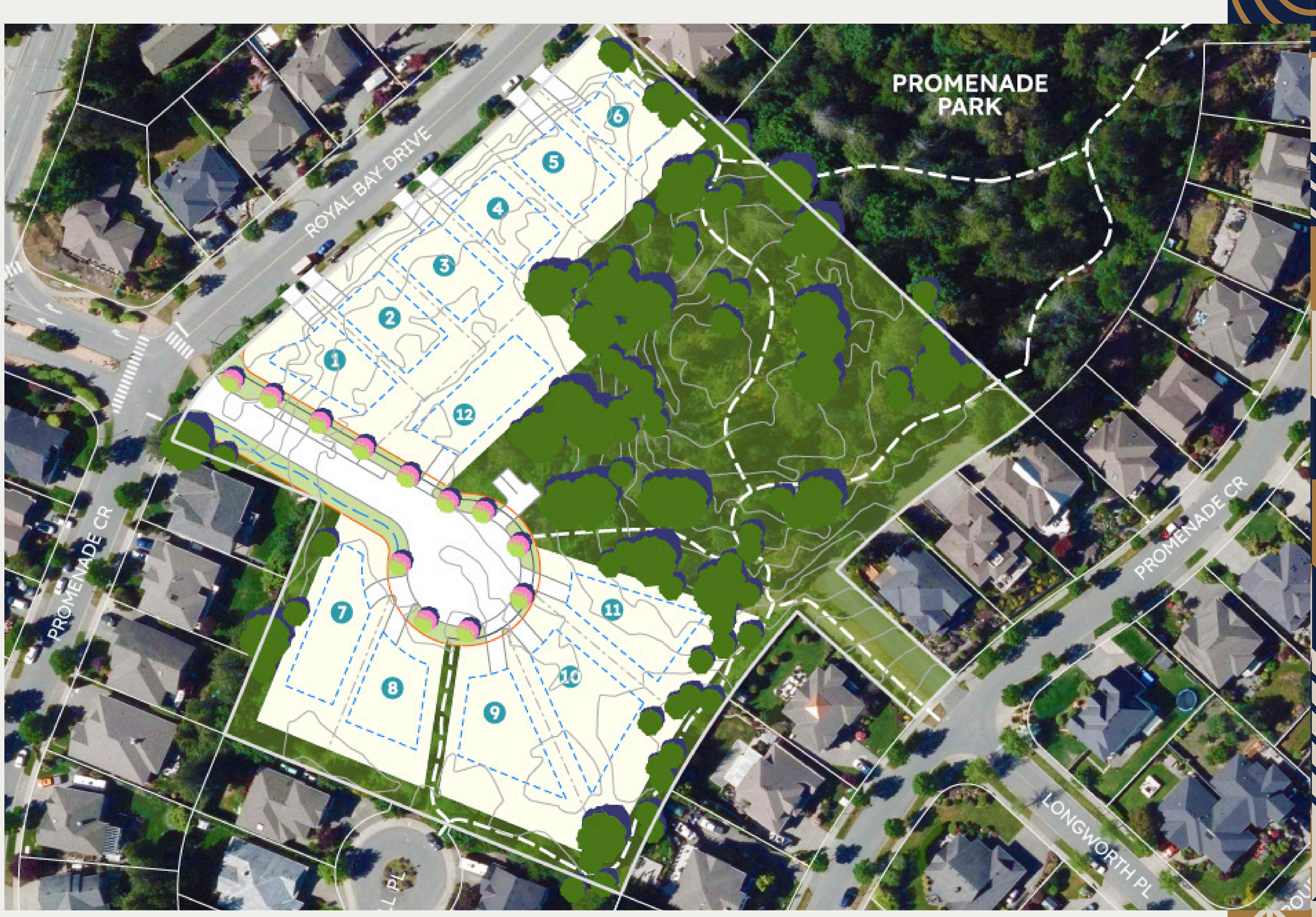
~2.7 acres of designated public park with 3 points of access to the trail network.



- Access to lots from Royal Bay Drive and Portwell Place.
- 13 single-family lots ranging in size from 7,146 sf to 12,091 sf.
- A statutory building scheme on title would govern the form and character of the buildings to preserve the aesthetic of the neighbourhood.

Concept 2

~2.6 acres of designated public park with 4 points of access.



- Access to lots from Royal Bay Drive only.
- 12 single-family lots ranging in size from 6,923 sf to 12,216 sf.
- A statutory building scheme on title would govern the form and character of the buildings to preserve the aesthetic of the neighbourhood.

Concept 3

Sell off the parcel of land to a new builder for development.

- The parcel would not have any building restrictions other than the current zoning with City of Colwood.

July 4, 2024 - What we heard.

Location: #206 - 345b Latoria Boulevard

Time: 4:00 - 6:00 p.m.

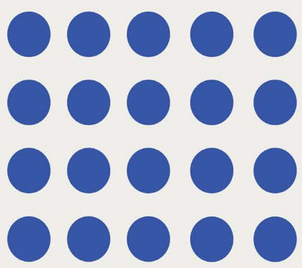
Attendance: 35 people | 22 Households

Concept 1

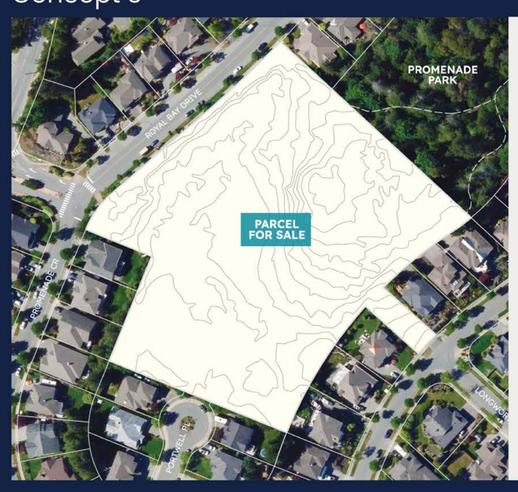
Household Votes:

Concept 2

Household Votes:



Concept 3



Household Votes:

- Overwhelming preference for Concept 2 to be used for rezoning application.
- Traffic study would be required at Promenade Crescent and Royal Bay Drive intersection.

499 Royal Bay Drive Subdivision

Conceptual Civil Servicing Memorandum

Prepared for:
GableCraft Homes

Prepared by: Chase Vogler
OnPoint Project Engineers
111-957 Langford Parkway
Victoria, BC V9B 0A5
T: (250) 812-1639
www.oppel.ca

August 8, 2024

1.0 INTRODUCTION

This memo is prepared to demonstrate the access and servicing availability for the existing lot located at 499 Royal Bay Drive (Figure 1). The lot is located within the community of Royal Bay in Colwood, BC. Servicing availability is based on the existing utilities within adjoining roads. Existing servicing locations were used from Colwood record drawings and utility information provided from BC One Call to determine availability for this subdivision.

The engineering considerations are summarized in the following subsections.

2.0 SITE INFORMATION

The approximate area of the site is 2.2 hectares and is bounded by Royal Bay Drive to the northwest, Promenade Park to the north, and residential lots to the south, west, and east. The main point of access to the site will be off Royal Bay Drive, with the opportunity for expanding the existing walking path connections to other adjacent roads and Promenade Park.

Figure 1: Neighborhood Proximity (Colwood.ca)

The site is currently forested and undeveloped. It has a steep elevation decline off the back of the existing sidewalk on Royal Bay Drive, with a climb up in areas and then it gradually slopes down towards a low point to the south where it meets the end of the existing Portwell Place cul-

de-sac. The Royal Bay Drive frontage is shown in Figure 2 below. The frontage contains several utility infrastructure boxes that will need to be considered when doing the overall design.

Figure 2: View of the site from Royal Bay Drive facing east

3.0 ENGINEERING CONSIDERATIONS

Considerations for utility services are as follows:

3.1 Water System

3.1.1 Existing Infrastructure

Water service to the site can be provided from an existing 200mm main on Royal Bay Drive, or an existing 200mm diameter service stub installed at the end of the Portwell Place cul-de-sac. The Capital Regional District (CRD) is the water service provider for these mains.

3.1.2 Water Servicing

Maximum Daily Demand being added to the existing system has been calculated using the population factors from the CRD Engineering Specifications:

Table 3.1.2.1 Water Servicing - Equivalent Population

	Persons/unit	Equivalent Population
12 Lot Subdivision	3.2	38.4

According to the CRD Engineering Specification, residential water demand is calculated as follows:

- Average Daily Demand (ADD) 545 litres/capita/day
- Maximum Daily Demand (MDD) 2.5 times ADD (approx. 1,360 litres/capita/day)
- Peak Hour Demand (PHD) 1.4 times MDD (approx. 1,900 litres/capita/day)

Based on population equivalent from the twelve lots in Table 3.1.2.1, the MDD for the proposed subdivision is 0.61 L/s. A summary of the water demands for the proposed subdivision is shown below.

Table 3.1.2.2 499 Royal Bay Drive Subdivision Water Demands

	Equivalent Population	Average Daily Demand		Maximum Daily Demand		Peak Hour Demand	
	(Persons)	(L/min)	(L/s)	(L/min)	(L/s)	(L/min)	(L/s)
499 Subdivision (12 Lots)	38.4	14.53	0.24	36.33	0.61	50.87	0.85

3.1.3 Fire Protection

The CRD specifies that single family areas with more than 3m separation can have a maximum hydrant spacing of 150m. There are two existing fire hydrants near the site. While one of the hydrants will likely need to be adjusted to free up driveway access to Lot 6, there are no additional hydrants required to develop the twelve lots as they will be within 150m of the existing hydrants.

3.2 Storm Water Management System

3.2.1 Existing Infrastructure

There is a 300mm PVC storm main running along Royal Bay Drive that fronts the site from the west. This is a shallow main roughly 2-3 meters below the pavement. Additionally, there is a 200mm storm stub extending past Portwell Place into the south perimeter of the proposed site. Overland flow routes in the proposed subdivision that are currently forested, would flow towards the low points at Portwell Place and Promenade Crescent.

3.2.2 Storm Servicing

Proposed Lots 1-6 can be serviced by the 300mm main on Royal Bay Drive. Each lot will require a 100mm service connection. To minimize the number of cuts in the existing curb and asphalt a dual service should be considered. The dual service is outlined in Colwood's

Engineering Bylaw 2000, under drawing SSD S8. Further discussions with the City of Colwood should be had to consider the use of a dual service for these six lots.

The six lots to be developed in the proposed cul-de-sac can be serviced via the existing storm system at the north end of Portwell Place cul-de-sac. Due to current grading of the site, getting these lots gravity fed to Royal Drive is not practical. The current 200mm stub at Portwell Place will not have sufficient capacity to service the site given current storm runoff standards for a 1:10-year storm. As such, the 8m 200mm stub would need to be removed and replaced with a 300mm main service for the site that ties to existing DMH 14. The service would be extended to the new cul-de-sac through a Statutory Right of Way (S.R.W.) in favor of the City of Colwood between Lots 8 and 9. The storm main extension would allow for the six lots and the cul-de-sac catch basins that capture run off from the road surface and adjacent boulevard to be serviced.

3.2.3 Emergency Storm Route

The City of Colwood – Bylaw 2000 – requires flows up to the 1:200-year storm event to be conveyed via surface paths and roadways. It is assumed such storm events are larger than pipes can handle and should not be factored in the analysis. The proposed cul-de-sac will follow the existing grading in the area; so therefore, slope towards the bulb of the cul-de-sac. Runoff would need to be safely conveyed to Portwell Place and Promenade Crescent where it could continue to be conveyed safely down the road corridors. The property line adjacent to Portwell Place is the low point of the site. The utility SRW between Lots 8 and 9 would be utilized as an overland path if the double CBs at the low point of the cul-de-sac were beyond capacity. The tree protection area at the back of Lots 7-11 would direct runoff from the lots to Portwell Place and prevent runoff from entering the existing adjacent lots. Existing portions of the park at the northern end of the site can continue to flow east towards Promenade Crescent. Therefore, no storm detention is necessary for this site.

3.3 Sanitary Sewer System

3.3.1 Existing Infrastructure

There is a 200mm PVC sanitary main along Royal Bay Drive that fronts the site from the west. The sanitary main runs above the storm main and is quite shallow at roughly 2.0m below pavement. Additionally, there is a 200mm sanitary stub extending past the Portwell Place cul-de-sac, into the south perimeter of the proposed development site.

3.3.2 Sanitary Servicing

The 200mm main on Royal Bay Drive has ample capacity for the six proposed lots fronting the road. Similar to the storm service connections, each lot will require their own individual connection. To minimize the number of cuts in the existing road and tie-ins to the existing main, Colwood's dual servicing connections detail should be utilized. This is outlined in Drawing SSD S8 of Bylaw 2000.

The six lots in the proposed cul-de-sac can be serviced by the extension of the sanitary stub off Portwell Place. The 200mm stub has sufficient capacity to service the six lots. It can be extended to the cul-de-sac through the utility SRW and run parallel to the proposed storm main.

3.3.3 Sanitary Sewer Loads

The following design parameters, consistent with the Royal Bay Master Sanitary Plan by KWL (2021), are used in the calculation of sewer demand loads:

- Per Capita Residential Flow: 250 litres/day/capita
- Inflow & Infiltration (I&I): 20,000 litres/ha/day
- Population Factors:
    - Single Family 2.7 persons/unit

Sanitary loads are based on equivalent populations and peaking factors (which are a function of the contributing populations). Refer to table 3.3.3.1 below for equivalent population numbers pertaining to the proposed site.

Table 3.3.3.1 Sanitary Servicing - Equivalent Population

	Persons/unit	Equivalent Population
12 Lot Subdivision	2.7	32.4

Sanitary peaking factors (PF) were determined using the Harmon Peaking Factor Equation, as follows (where P is the population in thousands).

$$PF = 1 + \frac{14}{4 + \sqrt{P}}$$

The peaking factor for the proposed development site is 4.35 as shown in Table 3.3.3.2 below.

Table 3.3.3.2 Sanitary Peak Flow Determination

Equivalent Population	32.4
Peaking Factor	4.35
Residential Flow (L/day/person)	200
Peak Flow (L/s)	0.33
Inflow and Infiltration (Ha)	1.19
Inflow and Infiltration Rate (L/day/Ha)	20,000
Combined Peak Wet Weather Flow (L/s)	0.60

3.4 Other Utilities

3.4.1 BC Hydro

There is existing power running along the Royal Bay Drive boulevard adjacent to the site. Coordination with BC Hydro will be necessary to detail servicing the proposed lots along Royal Bay Drive off the existing infrastructure. Electrical conduit will need to be installed along the boulevard of the proposed cul-de-sac to reach Lots 7-12. BC Hydro will need to coordinate the necessary Hydro boxes required for the additional services.

3.4.2 Communications

Telus and Rogers communication lines run along Royal Bay Drive boulevard, similar to BC Hydro. Further coordination with the communication companies will be required to understand how the existing infrastructure can service the six proposed lots that will be adjacent to it. Communications conduit will need to be installed along the boulevard of the proposed cul-de-sac to reach Lots 7-12. There will also need to be additional communication pull boxes installed in the cul-de-sac boulevard.

3.4.3 FortisBC

FortisBC has a 60mm diameter Distribution Pressure Polyethylene gas mainline located along the west side of Royal Bay Drive. There is also a 42mm diameter Polyethylene service header gas line stubs at the end of Portwell Place. Space would be limited to extend the service from Portwell Place to service the homes in the cul-de-sac and likely not a feasible option. If gas is

a desirable option for the twelve proposed lots it would likely need to come from Royal Bay Drive.

4.0 Closing

This conceptual servicing report was prepared by On Point Project Engineers Ltd. to provide a preliminary review of the required services for the 499 Royal Bay Drive subdivision development. We have outlined items within the report to be cognizant of as the design moves forward. Most notably, the upsizing of the storm main stub coming into the proposed subdivision from Portwell Place cul-de-sac and the lot servicing of lots 1-6 from existing Royal Bay Drive. Further consideration should be given to the subdivision layout. Another option to service lots 1-6 on Royal Bay Drive would be to provide an SRW at the back of lots 1-6 on the west side of lot 12. Due to the natural grading of the site, it would be assumed walkout style homes would be constructed along Royal Bay Drive; thus, allowing the potential for servicing Lot 1-6 from the back and have the drain and sewer for all twelve lots flow to Portwell Place. Hydro, communications, and gas servicing will require further coordination with those companies to understand the full implications of servicing the subdivision.

Please find attached within Appendix A Conceptual Surface and Utility Design drawings of the proposed 12 lot subdivision development.

Should you have any comments or questions, please contact the undersigned.

Prepared By:

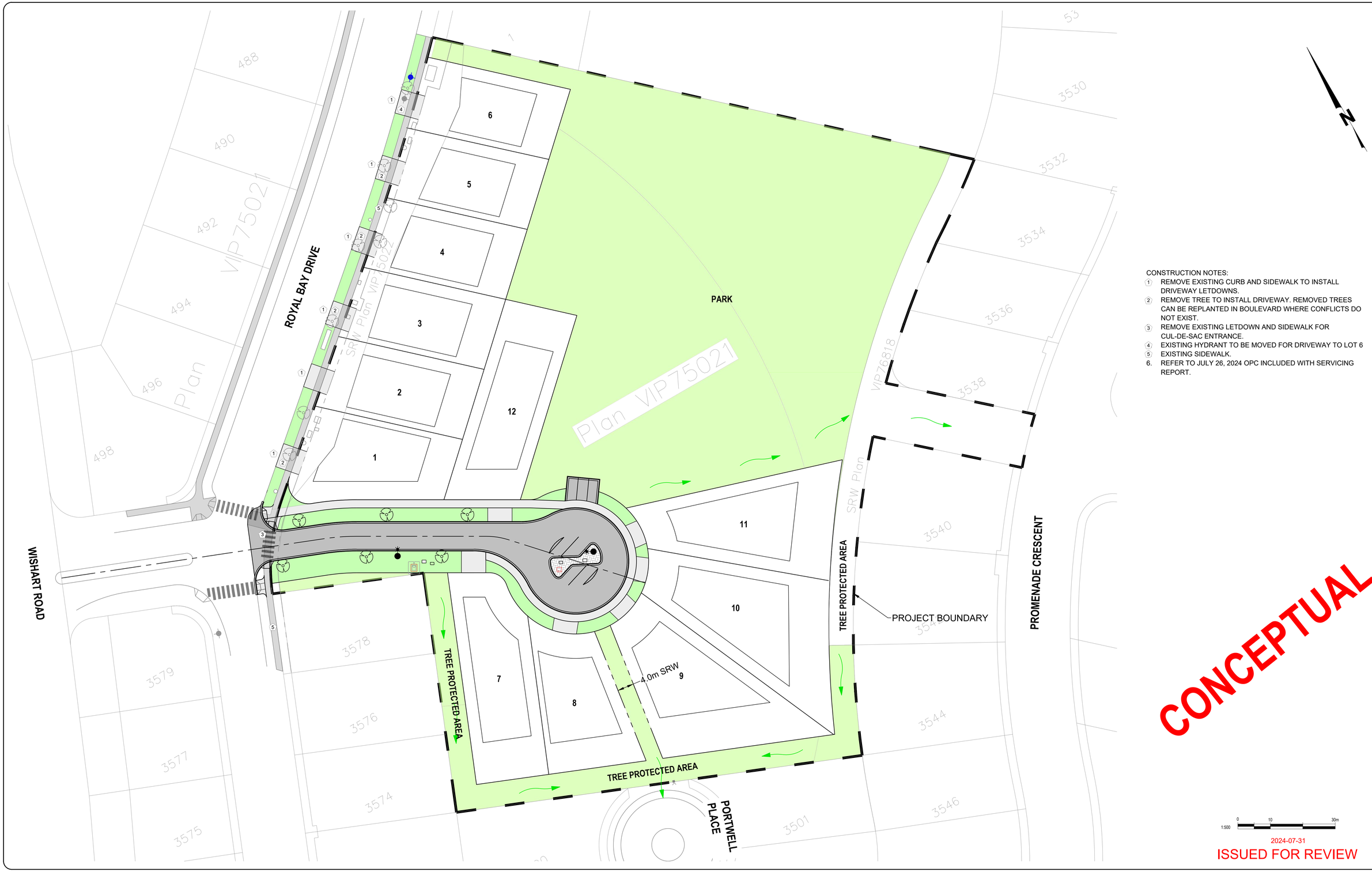
Chase Vogler, P.Eng.

Reviewed By:

Peter Hibbert, P.L.Eng.

APPENDIX A

- Surface Works Design Plan
- Utilities Design Plan



CONSTRUCTION NOTES:

1. REMOVE EXISTING CURB AND SIDEWALK TO INSTALL DRIVEWAY LETDOWNS.
2. REMOVE TREE TO INSTALL DRIVEWAY. REMOVED TREES CAN BE REPLANTED IN BOULEVARD WHERE CONFLICTS DO NOT EXIST.
3. REMOVE EXISTING LETDOWN AND SIDEWALK FOR CUL-DE-SAC ENTRANCE.
4. EXISTING HYDRANT TO BE MOVED FOR DRIVEWAY TO LOT 6
5. EXISTING SIDEWALK.
6. REFER TO JULY 26, 2024 OPC INCLUDED WITH SERVICING REPORT.

CONCEPTUAL

1:500 0 10 30m

2024-07-31

ISSUED FOR REVIEW

ONPOINT
PROJECT ENGINEERS LTD.
TEL: 250 478-7875 WWW.OPPEL.CA
SUITE 111 - 957 LANGFORD PKWY VICTORIA BC V9B 0A5

Contractor must check and verify all dimensions and conditions on site and report any discrepancies to engineer prior to proceeding with work.

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ISSUED No.	DESCRIPTION	DATE
1	ISSUED FOR REVIEW	2024-07-26

REVISED No.	DESCRIPTION	DATE	SIGN
A	REVISED CUL-DE-SAC RIGHT-OF-WAY	2024-07-31	DEC

DESIGN: ZT
DRAWN: ZT
ENGINEER: CV

SEAL PERMIT TO PRACTICE

ROYAL BAY DRIVE SUBDIVISION

ROYAL BAY DRIVE SUBDIVISION
GABLECRAFT HOMES

499 ROYAL BAY DRIVE SUBDIVISION DESIGN

ON POINT PROJECT No. 415-01
GOVERNING AUTHORITY FILE No. ----
SHEET 1 OF 2
REV A
ON POINT DRAWING No. 415-01-SK001

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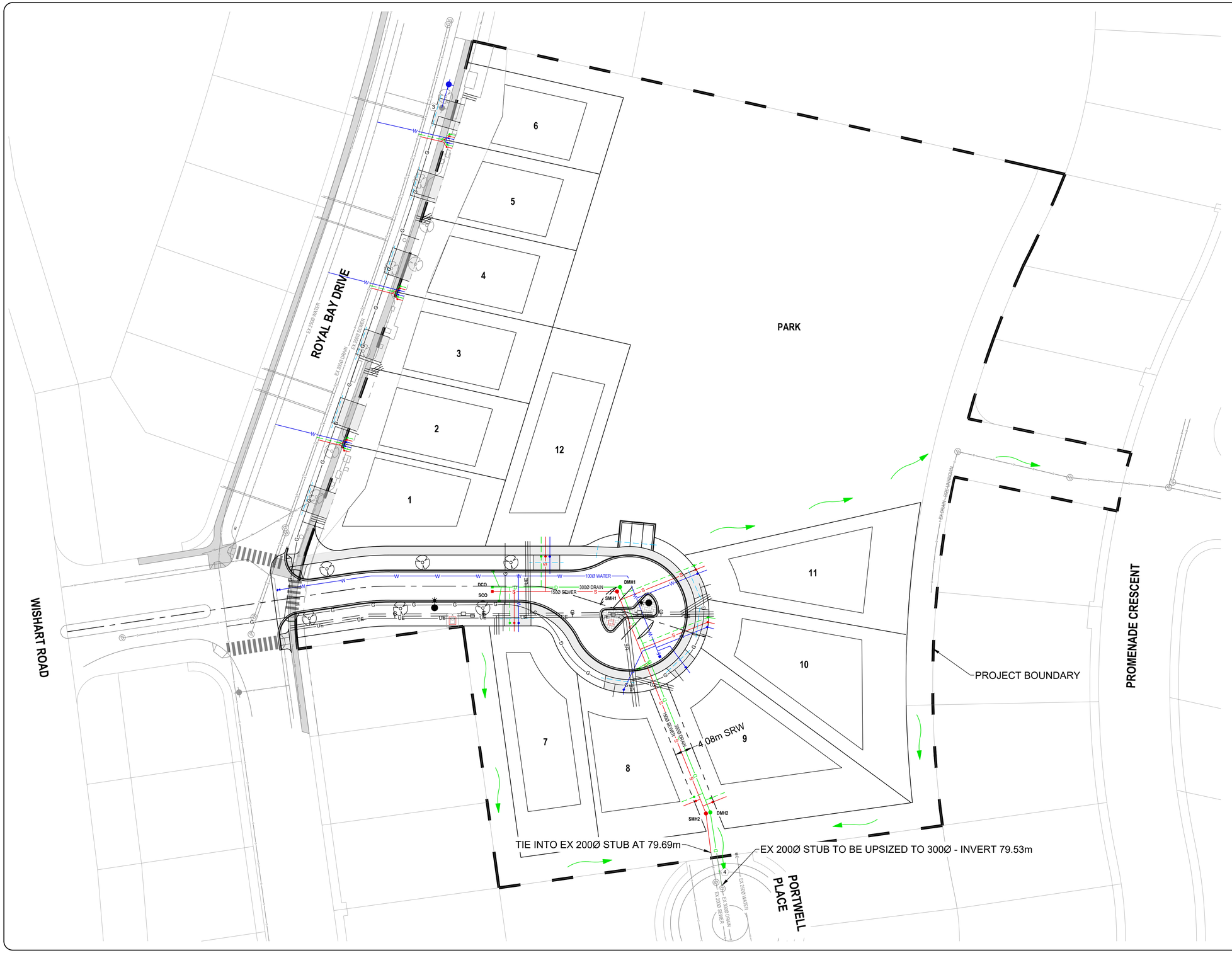

LEGEND

	PROPOSED	EXISTING
SANITARY SEWER	S	
WATER MAIN	W	
STORM DRAIN	D	
GAS MAIN	G	
ELECTRIC	UE	
IRRIGATION		
EMERGENCY OVERLAND FLOW		
STORM DRAIN MANHOLE		D
CATCHBASIN		
STORM DRAIN CLEANOUT		
STORM INSPECTION CHAMBER		
STORM END CAP		
SANITARY SEWER MANHOLE		S
SANITARY CLEANOUT		
SANITARY INSPECTION CHAMBER		
SANITARY END CAP		
WATER VALVE		
WATER METER		
FLUSH VALVE		
FIRE HYDRANT		

CONSTRUCTION NOTES:

1. SHALLOW UTILITY DESIGN TO BE CONFIRMED WITH CORRESPONDING AUTHORITIES.
2. EXISTING CAPACITY TO BE CONFIRMED BY CITY OF COLWOOD.
3. 90 DEGREE BEND WITH THRUST BLOCK INSTALLED TO MOVE EXISTING HYDRANT.
4. EXISTING 8m OF 200mm STORM STUB TO BE REMOVED. 300mm MAIN TO BE INSTALLED IN ITS PLACE.
5. TREES SHOWN ON ROYAL BAY DRIVE ARE EXISTING. TREES IN CUL-DE-SAC ARE PROPOSED.

CONCEPTUAL

1:500 0 10 30m

2024-07-31

ISSUED FOR REVIEW

ONPOINT
PROJECT ENGINEERS LTD.
TEL: 250-478-7875 WWW.OPENG.CA
SUITE 111 - 957 LANGFORD PKWY VICTORIA BC V9B 0A5

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ISSUED No.	DESCRIPTION	DATE
1	ISSUED FOR REVIEW	2024-07-26

REVISED No.	DESCRIPTION	DATE	SIGN
A	REVISED CUL-DE-SAC RIGHT-OF-WAY	2024-07-31	DEC

DESIGN: ZT
DRAWN: ZT
ENGINEER: CV

SEAL PERMIT TO PRACTICE

ROYAL BAY DRIVE SUBDIVISION

ROYAL BAY DRIVE SUBDIVISION
GABLECRAFT HOMES

499 ROYAL BAY DRIVE SUBDIVISION
UTILITIES DESIGN

ON POINT PROJECT No. 415-01
GOVERNING AUTHORITY FILE No. ----
SHEET 2 OF 2
REV: A
ON POINT DRAWING No. 415-01-SK002

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August 21, 2024
08-24-0054

Ben Mycroft
Director of Development
Gablecraft Homes.
3588B Quarry Street
Colwood, BC
V9C 0S4

VIA E-MAIL: bmycroft@gablecraft.ca

Dear Ben:

Re: 499 Royal Bay Drive Rezoning, Royal Bay, Colwood
Transportation Review – Version 1

As requested, Bunt & Associates Engineering Ltd. has conducted a Transportation Review for the proposed single-family development at 499 Royal Bay Drive in the City of Colwood, BC. This letter provides an overview of the proposed development, reviews the existing transportation network, assesses future traffic operations at the study intersections, confirms zoning bylaw requirements for the site, and evaluates site access and design. Additionally, it includes a review of speed observations and recommended traffic calming measures along the Royal Bay Drive site frontage.

We trust this will assist with the rezoning stage of the development's application process. Please do not hesitate to reach out should you have any questions or comments.

Yours truly,
Bunt & Associates

Abdifatah Idle, EIT
Transportation Analyst

Tyler Thomson, MCIP RPP PTP
Associate | Senior Transportation Planner

Reviewed by: Christephen Cheng, M.Eng., P.Eng.

1. INTRODUCTION

GableCraft Homes (GableCraft) is proposing the development of 12 single-family homes at 499 Royal Bay Drive in Colwood, BC. The site is currently undeveloped and is occupied by a wooded area adjacent Promenade Park. Access to the site is proposed from Royal Bay Drive/Promenade Crescent, with a planned road extension east of the intersection of Royal Bay Drive/Promenade Crescent. This extension is primarily intended to serve private vehicles, service vehicles, and emergency access as a private road connection, and is not expected to accommodate public traffic. Additionally, the planned extension is anticipated to align with the Royal Bay Drive leg to the west of the site, forming a 4-leg intersection. **Exhibit 1.1** presents the site location.

Bunt & Associates Engineering Ltd. (Bunt) has been retained to provide transportation engineering and planning services in support of the proposed development at 499 Royal Bay Drive. As per the City of Colwood's Transportation Impact Assessment (TIA) guidelines, the development, which will generate 11 two-way vehicle trips during the peak hour, requires a Level 1 Multi-Modal Review.

While the proposed development's projected vehicle trip generation would not trigger the need for a detailed operational assessment, based on the City of Colwood's Transportation Impact Assessment (TIA) guidelines, it is understood that residents in the area have concerns about traffic/vehicle speeds and sightlines in the area where the development is proposed. Therefore, this Transportation Review has been prepared to support the rezoning application for the development and address resident concerns.

The report is structured as follows:

- **Section 2** introduces the proposed development content;
- **Section 3** describes the existing transportation network in the vicinity of the site;
- **Section 4** reviews site vehicle trip generation and future traffic operations;
- **Section 5** outlines the development plan and access review and identifies potential mitigation measures to manage vehicle speeds and maintain clear sightlines for pedestrians at the study intersections.
- **Section 6** provides conclusions and recommendations.

O:\Dept BC\Projects\2024\08-24-0054 499 Royal Bay Drive Rezoning\5.0 Deliverables\5.1 Report\Graphics

Exhibit 1.1

Site Location

499 Royal Bay Dr Rezoning
08-24-0054 August 2024

bunt & associates

2. PROPOSED DEVELOPMENT

The proposed development at 499 Royal Bay Drive will comprise of 12 single-family homes, with access provided via a planned road extension from Royal Bay Drive/Promenade Crescent-Royal Bay Drive, leading to a cul-de-sac. This extension is primarily intended to serve private vehicles, service vehicles, and emergency access as a private road.

Parking for the development will meet the City's requirements with each home featuring private driveways and garages.

In addition to these residential parking provisions, seven (7) visitor parking spaces will be available: four (4) located on the cul-de-sac island and three (3) in the north corner of the cul-de-sac, while on-street parking is also provided for use by visitors on Royal Bay Drive.

Exhibit 2.1 presents the proposed site plan.

O:\Dept BC\Projects\2024\08-24-0054 499 Royal Bay Drive Rezoning\5.0 Deliverables\5.1 Report\Graphics

Exhibit 2.1
Site Plan

499 Royal Bay Dr Rezoning
08-24-0054
August 2024

bunt & associates

3. EXISTING CONDITIONS

3.1 Road Network

The project is situated on Royal Bay Drive, classified as a local road. To its west, Wishart Road serves as a key collector road, providing connections to arterial roads: Metchosin Road and Latoria Road. Surrounding the site, the primary land use is residential, characterized by the CD18 and RBCD1 zoning designations.

Table 3.1 summarizes the existing street characteristics

Table 3.1: Existing Street Characteristics

STREET	CLASSIFICATION	NUMBER OF TRAVEL LANES	POSTED SPEED	PARKING FACILITIES	ACTIVE TRANSPORTATION FACILITIES
Royal Bay Drive/Promenade Crescent	Local	1 NB 1 SB	N/A	Free on-street Parking on both sides	Sidewalks on both sides; Multi-use pathway**
Wishart Road	Collector	1 NB 1 SB	50 km/h	No parking	Sidewalk on east side only; Intermittent painted bike lane

** Only on the section north of Regency Place

3.2 Transit Network

Several transit routes offer public transportation options within proximity to the site. Bus stops serving routes 52, 54, and 59 are located to the west and south of the site. Bus stops for route 54 are situated close to the intersection of Wishart Road and Latoria Road, this route is within a 10-minute walk of the site (i.e., an 800m radius).

Route 54 travels along Wishart Road. Route 52 and 59 travel along Latoria Road to the east and west respectively.

Existing bus stops and service frequencies within the surrounding area are presented below in **Tables 3.2** and **Table 3.3,** respectively**.** Currently, these transit services are local serving and are somewhat infrequent, however BC Transit has identified Latoria Road as a future Frequent Transit Network (FTN) corridor.

Table 3.2: Transit Stops within 800m Walking Distance of Site

STOP LOCATION	DIRECTION	STOP #	AMENITY	ROUTES SERVICED	WALKING DISTANCE
Wishart/Royal Bay Drive	North-South	101508 104092	Stop pole & bench; and stop pole	54	~100m
Latoria at Wishart	East-West	101511 101533	Stop pole; stop pole &bench	52, 54, and 59	~350 m

Table 3.3: Existing Transit Service Frequency

ROUTE		STOP	WEEKDAY SERVICE SPAN		HEADWAY (MIN.)				
#	DIRECTION		START	END	AM	MID-DAY	PM	EVENING	WEEKEND
52*	North-South	104091 101496	08:40	15:54	-	-	60	-	-
54*	East	101511	05:57	20:52	120	120	120	120	120
59	North	104091	07:14	20:49	60	120	60	120	120

*One additional service occurs at a 20min headway in the PM, 2.32 PM on Friday only and 3.30 PM on Monday-Thursday.

Exhibit 3.1 shows the multi-modal network near the site including the transit network and the cycling and pedestrian networks.

3.3 Cycling & Pedestrian Networks

3.3.1 Cycling Network

The current cycling network around the area consists of intermittent and discontinuous painted bike lanes on Wishart Road. There are also painted bike lanes on Veterans Memorial Parkway and off-street multi-use pathways to the north and east of the site, located off Promenade Crescent. However, there are plans for a neighbourhood bikeway on Royal Bay Drive north of Regency Place. This bikeway will pass through Regency Place and connect to Wishart Road. Additionally, there are plans to add painted buffered bike lanes along Wishart Road, which is identified as a proposed priority cycling route in the City's Draft Active Transportation Network Plan. The proposed bike lanes on Wishart Road will connect to the planned protected bike lanes on Latoria Road to the south and Metchosin Road to the north. Both Latoria and Metchosin Roads will feature these protected bike lanes. Further north, there's a multi-use trail running parallel to Dressler Road, and along Wishart Road in Royal Bay. This trail links to the multi-use paths adjacent to Ryder Hesjedal Way and connecting to facilities on Painter Road to the north.

3.3.2 Pedestrian Network

Concrete sidewalks are provided on both sides of Royal Bay Drive, meeting Wishart Road at the junction of Wishart Road, Bunker Road, and Royal Bay Drive. From Wishart Road, the sidewalk extends southward to Latoria Road on the east side of Wishart Road. Latoria Road features intermittent sidewalks and offers connections to the City's trail network at Latoria Creek Park. A multi-use path to the west of the site links Regency Place with Wishart Road. Notably, the City's Draft Active Transportation Network Plan designates Wishart Road as a priority pedestrian route within its long-term network. Further, the site will connect to the trail/sidewalk network in Royal Bay to the north and around Murray's Pond. These anticipated connections will enhance the site's connectivity to nearby neighborhoods, crucial destinations, and facilities.

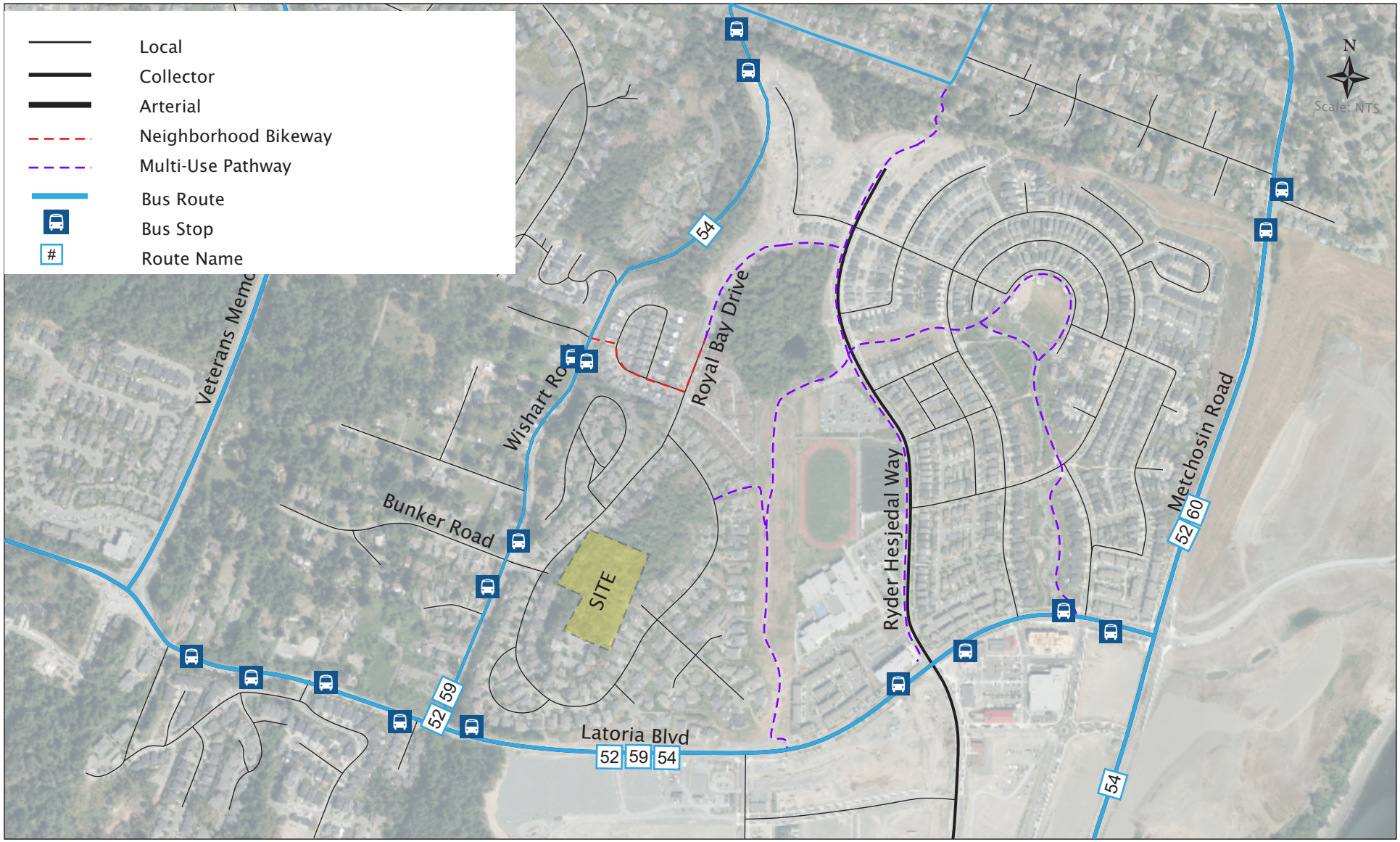

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Exhibit 3.1

Transportation Network

499 Royal Bay Dr Rezoning
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3.4 Existing Traffic Volumes

3.4.1 Traffic Data Collection Program

Bunt conducted traffic counts (all modes) on Thursday, August 1, 2024, covering the weekday morning (7:30 am to 8:30 am) and afternoon (4:00 pm to 5:00 pm) peak traffic periods of the study intersections. A site visit was also conducted at this time to document the existing conditions for sightlines as well as speed observations. **Table 3.4** provides a summary of the traffic count data of study intersections.

Table 3.4: Summary of Available and Counted Traffic Data

INTERSECTION	DATE OF COUNT	PEAK HOURS	
		AM	PM
Royal Bay Drive/Promenade Crescent - Royal Bay Drive	Thursday, August 1, 2024	7:30-8:30	4:00-5:00
Wishart Road & Royal Bay Drive/Bunker Road	Thursday, August 1, 2024	7:30-8:30	4:00-5:00
OVERALL STUDY AREA PEAK HOUR		7:30-8:30	4:00-5:00

As indicated, the overall peak hour occurs from 7:30 to 8:30 AM for the morning peak and from 4:00 to 5:00 PM for the afternoon peak.

Figure 1: Existing Traffic Volumes

These volumes are used to develop future background and total traffic volumes for the future operational assessment in Section 4.

4. FUTURE TRAFFIC CONDITIONS

This section outlines the performance thresholds, background traffic, site trip generation, and future traffic operations.

4.1.1 Performance Thresholds

The operations of study area intersections and access points were assessed using the methods outlined in the 2000 Highway Capacity Manual (HCM), using the Synchro 11 analysis software, build 11.1.3. The traffic operations were assessed using the performance measures of Level of Service (LOS) and volume-to-capacity (V/C) ratio.

The LOS rating is based on average vehicle delay and ranges from "A" to "F" based on the quality of operation at the intersection. LOS "A" represents optimal, minimal delay conditions while a LOS "F" represents an over-capacity condition with considerable congestion and/or delay. Delay is calculated in seconds and is based on the average intersection delay per vehicle.

Table 4.1 below summarizes the LOS thresholds for the six Levels of Service, for both signalized and unsignalized intersections.

Table 4.1: Intersection Level of Service Thresholds

LEVEL OF SERVICE	AVERAGE CONTROL DELAY PER VEHICLE (SECONDS)	
	SIGNALIZED	UNSIGNALIZED
A	≤10	≤10
B	>10 and ≤20	>10 and ≤15
C	>20 and ≤35	>15 and ≤25
D	>35 and ≤55	>25 and ≤35
E	>55 and ≤80	>35 and ≤50
F	>80	>50

Source: Highway Capacity Manual

The volume to capacity (V/C) ratio of an intersection represents ratio between the demand volume and the available capacity. A V/C ratio less than 0.85 indicates that there is sufficient capacity to accommodate demands and generally represents reasonable traffic conditions in suburban settings. A V/C value between 0.85 and 0.95 indicates an intersection is approaching practical capacity; a V/C ratio over 0.95 indicates that traffic demands are close to exceeding the available capacity, resulting in saturated conditions. A V/C ratio over 1.0 indicates a very congested intersection where drivers may have to wait through several signal cycles. In downtown and Town Centre contexts, during peak demand periods, V/C ratios over 0.90 and even 1.0 are common.

As agreed with the City of Colwood in previous projects, the performance thresholds that were used to trigger consideration of roadway or traffic control changes are listed below:

Unsignalized Intersections and Roundabouts:

- Individual movement Level of Service = LOS E or better, unless the volume is very low in which case LOS F may be considered acceptable.

In interpreting of the analysis results, note that the HCM methodology reports performance differently for various types of intersection traffic control. In this report, the performance reporting convention is as follows:

- For unsignalized two-way stop-controlled intersections: HCM 2000 LOS and V/C output is reported just for individual lanes as the HCM methodology does not report overall performance. SimTraffic estimated queues and delays have also been reported, as the HCM 2000 methodology does not directly take into account the gaps afforded by adjacent signalized intersections;

- For unsignalized All-way Stop controlled intersections: HCM 2000 unsignalized LOS is reported for the overall intersection as well as by intersection approach LOS. The HCM 2000 methodology does not report an overall V/C ratio for All Way Stop controlled intersections. Degree of Utilization calculated with the HCM 2000 methodology is reported for individual movements in place of V/C, which is not part of the HCM 2000 report.

The performance reporting conventions noted above have been consistently applied throughout this document and the detailed outputs are provided in **Appendix B**.

4.1.2 Future Conditions Analysis Assumptions

In our analysis, default Synchro parameters were used in the analysis, except:

- Overall intersection Peak Hour Factor (PHF) was applied to each movement.
- Heavy vehicle percentage was set for each movement as observed in the field.
- Pedestrian volumes and conflicting bicycles were entered as observed in the field.
- The Royal Bay Drive/Promenade Crescent and Royal Drive/Site access was modelled as an All-way Stop (compared with the current two-way stop), in the future to help manage traffic movements at this location.

4.2 Traffic Forecasts

4.2.1 Background Traffic Forecasts

Background traffic is traffic that would be present on the road network if the site did not redevelop. For the purposes of this study, a linear growth rate of 2% per year was applied to the existing volumes (2024) to establish Opening Day (2027) horizon Background traffic volume estimates as a conservative approach.

4.3 Trip Generation Estimate

For this review, trip generation was estimated for a typical weekday AM and PM peak hour based on trip rates listed in the Institute of Transportation Engineers' (ITE) *Trip Generation Manual (11th Edition)*. **Table 4.2** below summarizes the ITE vehicle trip generation rates for the proposed land use.

Table 4.2: ITE Vehicle Trip Rates

LAND USE	INDEPENDENT VARIABLE	LAND USE CODE	VEHICLE TRIP RATES					
			AM PEAK HOUR			PM PEAK HOUR		
			IN	OUT	RATE	IN	OUT	RATE
Single-family detached	Dwelling Units	210	25%	75%	0.70	63%	37%	0.94

Applying the above rates, **Table 4.3** below summarizes the estimated vehicle trip generation for the development.

Table 4.3: Estimated Site Vehicle Trip Generation

LAND USE	QUANTITY	VEHICLE TRIPS					
		AM PEAK HOUR			PM PEAK HOUR		
		IN	OUT	TOTAL	IN	OUT	TOTAL
Single-family detached	12	2	6	8	7	4	11

The proposed development is expected to generate approximately 8 and 11 two-way vehicle trips during the AM and PM peak hours, respectively. This translates to one vehicle every 7 to 8 minutes during the AM peak hour and one vehicle every 5 to 6 minutes during the PM peak hour. This nominal increase in traffic is not anticipated to have a noticeable impact on the surrounding road network operations.

4.3.1 Trip Distributions & Assignment

Vehicle trips were distributed to the road network based on existing traffic patterns and assigned to the network based on logical routing assumptions for the proposed development.

4.4 Total Traffic

Total traffic on the study network was forecasted by combining background traffic volumes and the estimated new site trips. The Opening Day (2027) total traffic operations are summarized in **Table 4.4**

Table 4.4: Opening Day (2027) Total Vehicle Operations

INTERSECTION/ TRAFFIC CONTROL	MOVEMENT	AM			PM		
		LOS	V/C	95TH Q (M)	LOS	V/C	95TH Q (M)
Royal Bay Drive/Promenade Crescent & Royal Bay Drive *(All way stop)*	EBLTR	A	0.05	13	A	0.13	14
	WBLTR	A	0.01	8	A	0.00	4
	NBLTR	A	0.08	13	A	0.05	14
	SBLTR	A	0.02	12	A	0.02	11
Wishart Road & Royal Bay Drive/Bunker Road *(Minor street stop controlled)*	EBLTR	A	0.02	8	B	0.01	6
	WBLT	A	0.02	7	B	0.03	10
	WBR	A	0.07	-	A	0.04	-
	NBL	A	0.00	0	A	0.00	0
	NBTR	A	0.04	0	A	0.05	0
	SBL	A	0.02	3	A	0.06	8
	SBTR	A	0.03	0	A	0.06	0

As shown, future traffic conditions including with the addition of site traffic and other future background growth are expected to be well within acceptable performance thresholds. Both study intersections are shown to operate well within capacity and remain fully operational with the proposed level of traffic. Moreover, no queuing issues were identified for any movements.

It is important to note that this analysis assumes that the intersection at Royal Bay Drive/Promenade Crescent and Royal Bay Drive/Site Access would function with an all-way stop configuration. The intent of this traffic control configuration is to help safely manage traffic movements entering the neighbourhood compared with the current two-way stop configuration. An all-way stop configuration is also intended to help improve crossing conditions for pedestrians crossing the west leg of the intersection by requiring vehicles to stop before proceeding through the intersection.

5. SITE ACCESS & SITE DESIGN REVIEW

5.1 Site Access & On-Site Vehicle Circulation

Vehicular access to the site is proposed from the Royal Bay Drive/Promenade Crescent-Royal Bay Drive intersection, facilitated by a planned private road extension eastward leading to a cul-de-sac. Bunt has conducted a swept path analysis using AutoTURN software to evaluate the functionality of passenger vehicle access and circulation, as well as waste collection and fire truck access.

Additionally, Bunt reviewed the sightlines at the proposed site access and the adjacent intersection at Wishart Road & Royal Bay Drive to ensure that adequate visibility is provided. The results and key findings of these analyses are discussed in this section, with detailed drawings illustrating these movements available in **Appendix A**.

Exhibit A.1 demonstrates the maneuvers of a standard P-TAC (passenger vehicle) entering and exiting the site access concurrently. As shown in the exhibit, no maneuvering issues are anticipated.

Exhibit A.2 illustrates waste collection vehicle (MSU) maneuvers. The analysis indicates that no issues are anticipated.

Exhibit A.3 details fire truck access in the event of an emergency. While no major issues were identified, Bunt recommends adding a drivable/mountable curb to ensure the fire truck can adequately maneuver through the cul-de-sac. Alternatively, interior parking could be adjusted.

5.2 Sightline Review

Exhibit A.4 illustrates the sight distance requirements at the site access (Proposed site access & Royal Bay Drive/Promenade Crescent), as outlined by the Transportation Association of Canada (TAC). Bunt measured an available sight distance of 110 metres for vehicles turning left and 98 metres for vehicles turning right from the proposed site access. The required sight distance is calculated as 105 for left-turning vehicles and 95 for right-turning vehicles. This confirms that available sight distance at the proposed site access location (cul-de-sac) is more than adequate, providing clear sightlines for drivers provided that foliage/landscaping and other obstructions are kept clear within the identified sight triangles. **Figures 2**, and **3** show the views to the south and to the north, respectively from the proposed site access location. It is recommended to ensure that foliage/landscaping and any other potential obstructions are kept clear in the sight triangles.

Exhibit A.5 illustrates the sight distance requirements at the intersection of Wishart Road and Royal Bay Drive, as outlined by TAC. Bunt measured an available sight distance of approximately 110 metres for vehicles turning left and 105 metres for vehicles turning right from Royal Bay Drive. The required sight distance is calculated as 105 for left-turning vehicles and 95 for right-turning vehicles. This confirms that the available sight distance at Royal Bay Drive & Wishart Road is more than adequate, providing clear sightlines for drivers provided that foliage/landscaping and other

obstructions are kept clear within the identified sight triangles**Figures 4**, and **5** show the views to the south and to the north, respectively along Wishart Road from Royal Bay Drive.

Figure 2: View to South (left) from Proposed Site Access

Figure 3: View to North (Right) from Proposed Site Access

Figure 4: View to South (left) from Wishart Road & Royal Bay Drive

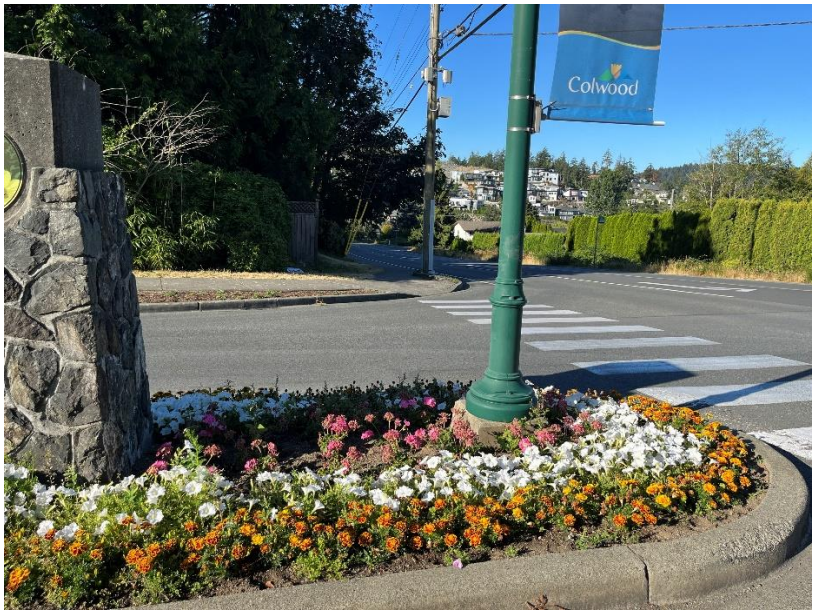

Figure 5: View to North (Right) from Wishart Road and Royal Bay Drive

5.3 Speed Survey Analysis and Findings

There have been concerns in the neighborhood about speeding issues along Royal Bay Drive site frontage. In response, Bunt collected speed data at the location during both the morning (7:30 AM - 8:30 AM) and evening (4:00 PM - 5:00 PM) peak periods, recording the speed of a total of 30 vehicles. The results of the speed observations are presented in **Table 5.2,** while the speed observation summary is presented in **Table 5.3**.

Table 5.2: Recorded Speed Surveys Along Royal Bay Drive

RECORDED SPEEDS (KM/H)		
SAMPLE #	7:30 AM - 8:30 AM	4:00 PM - 5:00 PM
1	46	42
2	51	38
3	47	32
4	32	40
5	33	42
6	38	41
7	35	44
8	27	43
9	42	38
10	41	32
11	48	30
12	47	32
13	38	43
14	47	40
15	43	46

Table 5.3: Recorded Speed Surveys Along Royal Bay Drive

SPEED OBSERVATION SUMMARY	
Average Speed (Km/h)	40
85th percentile Speed (Km/h)	47
50th percentile speed (Km/h)	41
Lowest recorded speed (km/h)	27
Highest recorded speed (km/h)	51

The results revealed an average speed of 40 km/h, with the 85th percentile speed at 47 km/h and the 50th percentile speed at 41 km/h. The lowest recorded speed was 27 km/h, while the highest was 51 km/h. These findings suggest that vehicle speeds observed along Royal Bay Drive are generally within acceptable limits, with most vehicles operating at or below the 85th percentile speed. However, it is worth noting that the concern of speeding could still be valid, as Bunt's survey was limited to 30 observations and speeding may occur outside the observed times as indicated by anecdotal information provided to GableCraft from nearby residents.

5.4 Pedestrian Crossing Sightlines (Royal Bay Drive/Promenade Crescent-Royal Bay Drive

During the site visit, Bunt observed poor pedestrian sightlines at the Royal Bay Drive/Promenade Crescent-Royal Bay Drive intersection, largely due to trees and hedges along the boulevard. To illustrate these concerns, **Figures 6 through 8** provide views of the west leg from various approaches at the pedestrian crossing. Given these observations, we recommend the removal of the hedges on both sides of the road to improve sightlines and ensure safer pedestrian crossings at the intersection. Additionally, the proposed addition of an all-way stop would further enhance safety by effectively managing traffic movements and creating a safer environment for pedestrians.

Figure 6: View to West Leg Approaching the Southwest Corner at Pedestrian Crossing

Figure 7: View to West Leg at Pedestrian Crossing

Figure 8: View to West Leg Approaching the Northwest Corner at Pedestrian Crossing

5.5 Potential Safety and Traffic Calming Mitigations

While speeding was not observed to be an issue during the site visit, anecdotal information provided to GableCraft from nearby residents indicates speeding and failure to obey traffic control signs is a concern on Royal Bay Drive and at the proposed site access location. To address potential speeding issues and enhance overall traffic and pedestrian safety, the following mitigation measures could be considered:

5.5.1 Additional Speed Limit Signage

During Bunt's site visit, it was observed that Royal Bay Drive lacked speed limit signage. This absence of signage, combined with the wide roadway likely contributes to the speeding issues reported, as drivers may not be adequately reminded of the speed limit. To address this, Bunt recommends installing clear and visible speed limit signs throughout the area, complemented by speed feedback signs. These measures would effectively remind drivers of the speed limit and encourage compliance, thereby enhancing overall traffic safety along Royal Bay Drive.

5.5.2 Speed Feedback Signs

Speed feedback signs have recently gained popularity in low-volume residential streets due to their effectiveness in promoting safe driving behaviors. These electronic signs display the speed of approaching vehicles and alert drivers when they are exceeding the speed limit. By providing immediate feedback, speed feedback signs encourage drivers to slow down and adhere to posted speed limits. **Figure 9** below shows an example of a speed feedback sign.

Figure 9: Example of Speed Feedback Sign

5.5.3 Curb Bulges/Mid-Block Curb Extensions

Curb bulges, also known as mid-block curb extensions, are an effective traffic calming measure designed to improve pedestrian safety and manage vehicle speeds. By extending the curb line into the roadway, these features narrow the street width, which naturally encourages drivers to reduce their speeds as they navigate through the area. Additionally, curb bulges shorten the crossing distance for pedestrians, making it safer and more convenient to cross the road. This measure is particularly beneficial in areas with moderate to high pedestrian activity, as it enhances visibility and promotes safer interactions between pedestrians and vehicles.

5.5.4 Raised Crosswalks/Raised Intersections

Raised crosswalks are another potential traffic calming measure to consider, especially given the road's relatively low volumes. This effective strategy is designed to enhance pedestrian safety and encourage drivers to reduce their speeds. By elevating the crosswalk above the level of the surrounding roadway, raised crosswalks become highly visible to drivers, serving as a physical reminder to slow down. **Figure 10** below shows an example of a raised crosswalk.

Figure 10: Example of Raised Crosswalk

5.5.5 Speed Humps

Speed humps is another widely used traffic calming measure that helps reduce vehicle speeds on residential streets and other low-speed areas. Unlike speed bumps, which are more abrupt, speed humps have a longer, gentler profile that encourages drivers to slow down without causing discomfort or damage to vehicles. By strategically placing speed humps along a roadway, they effectively moderate traffic flow, making the area safer for pedestrians and other road users. This measure is particularly effective in reducing speeding in neighborhoods, near schools, and in areas with high pedestrian activity.

While the discussed traffic calming measures offer potential solutions, it is important to consider additional alternatives and conduct further exploration to identify the most suitable options for this specific location. Additionally, the City of Colwood has established traffic calming measures and procedures to address traffic concerns throughout the City, which may provide further guidance and support in finding an effective solution. Further, it is important to note that the noted concerns are relative to existing conditions on the road network and are not the result of the development. As such, it is recommended the city explore appropriate traffic calming solutions to address residents' concerns.

6. CONCLUSIONS & RECOMMENDATIONS

- The proposed development comprises 12 single-family homes.
- Access will be provided via a planned road extension from Royal Bay Drive/Promenade Crescent, leading to a cul-de-sac. This extension will primarily serve private vehicles, service vehicles, and emergency access as a private road.
- The project is forecasted to generate approximately 8 vehicle trips (2 entering, 6 exiting) during the AM peak hour and 11 vehicle trips (7 entering, 4 exiting) during the PM peak hour.
- Future traffic conditions, including site traffic and background growth, are expected to remain within acceptable performance thresholds, with both study intersections operating well within capacity.
- Bunt recommends implementing an all-way stop configuration at the Royal Bay Drive/Promenade Crescent and Royal Bay Drive/Site Access intersections to better manage traffic movements and improve pedestrian crossing safety.
- Parking for the development will meet the City's requirements, with each home featuring private driveways and garages.
- Site access was reviewed using AutoTURN, with no maneuvering issues identified.
- Sightlines measured at both the proposed site access and the Wishart Road & Royal Bay Drive intersection have been confirmed to be more than adequate, exceeding the required sight distances as per TAC standards. However, It is recommended to ensure that foliage/landscaping and any other potential obstructions are kept clear in the sight triangles.
- The site visit revealed poor pedestrian sightlines at the Royal Bay Drive/Promenade Crescent-Royal Bay Drive intersection, largely due to trees and hedges along the boulevard. Bunt recommends removing the hedges on both sides of the road to enhance sightlines and facilitate safer pedestrian crossings.
- Speed observations conducted along Royal Bay Drive revealed an average speed of 40 km/h, with the 85th percentile speed at 47 km/h. Bunt recommends considering additional traffic calming measures, such as speed limit signs, speed feedback signs, raised crosswalks/intersections, curb bulges, and speed humps. Further exploration is needed to determine the most suitable solution for this location.

APPENDIX A

Swept Path Analysis

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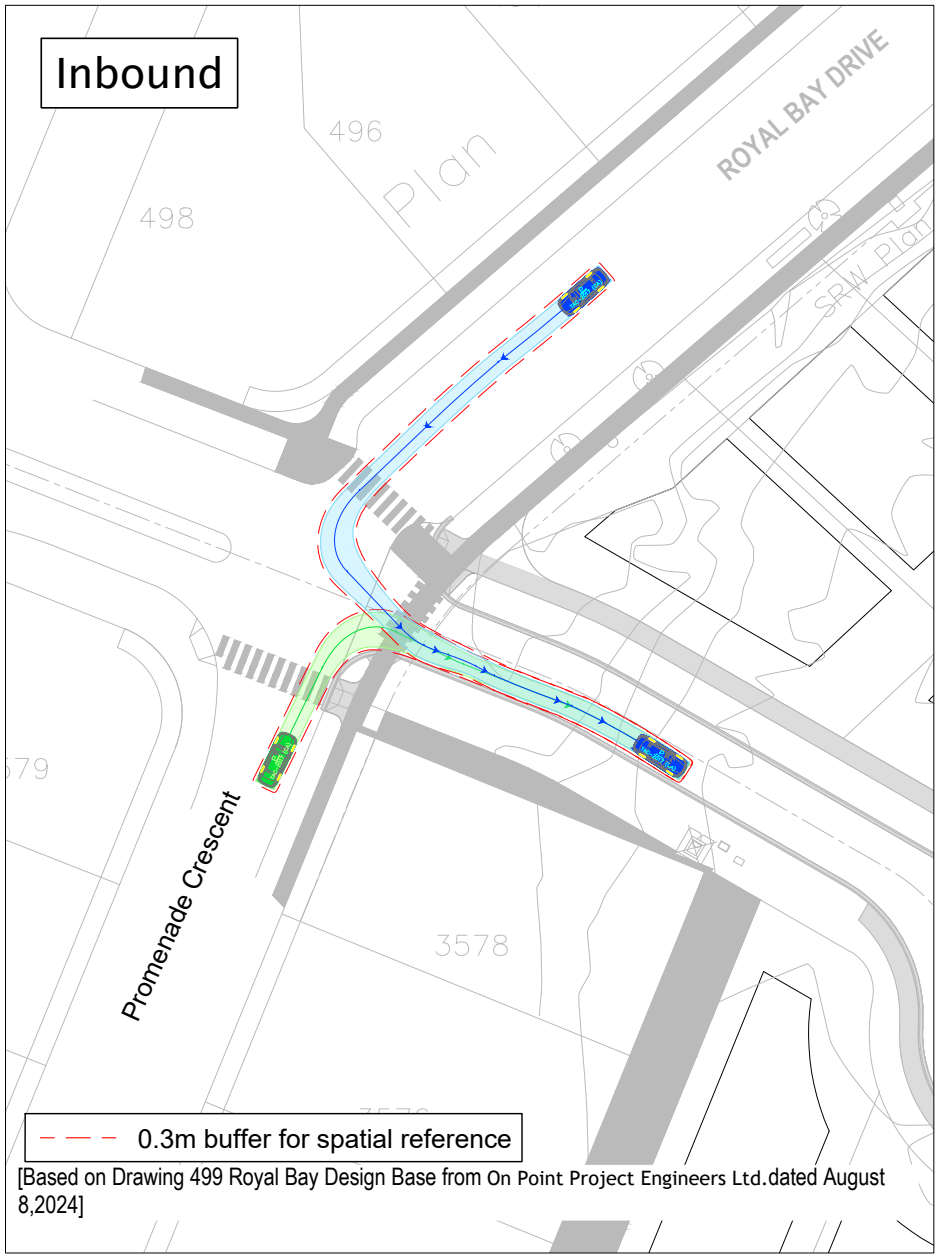

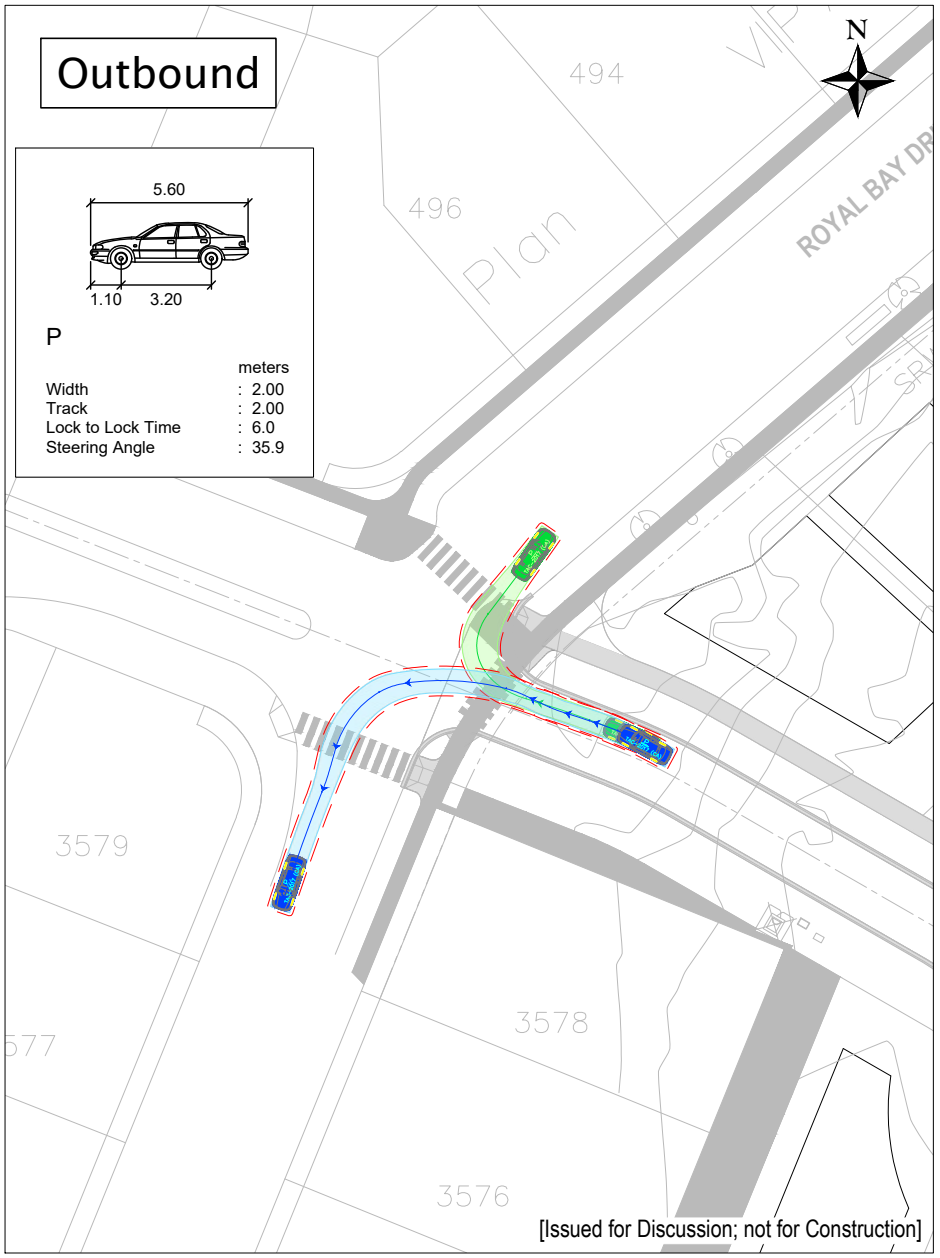

Exhibit 1

Passenger Vehicle - Ingress/Egress

499 Royal Bay Dr Rezoning

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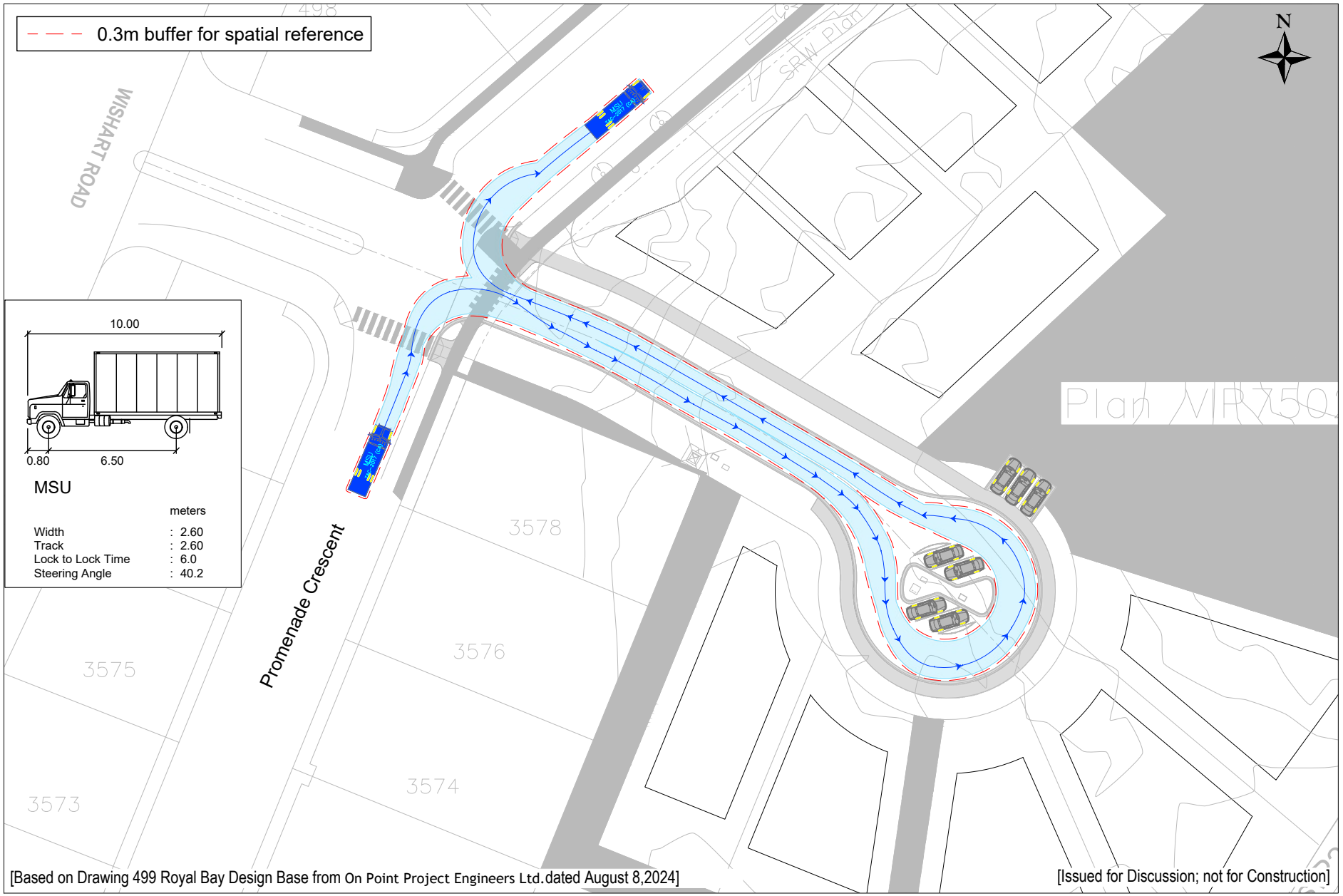

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Exhibit 2

Waste Collection Maneuvers

499 Royal Bay Dr Rezoning

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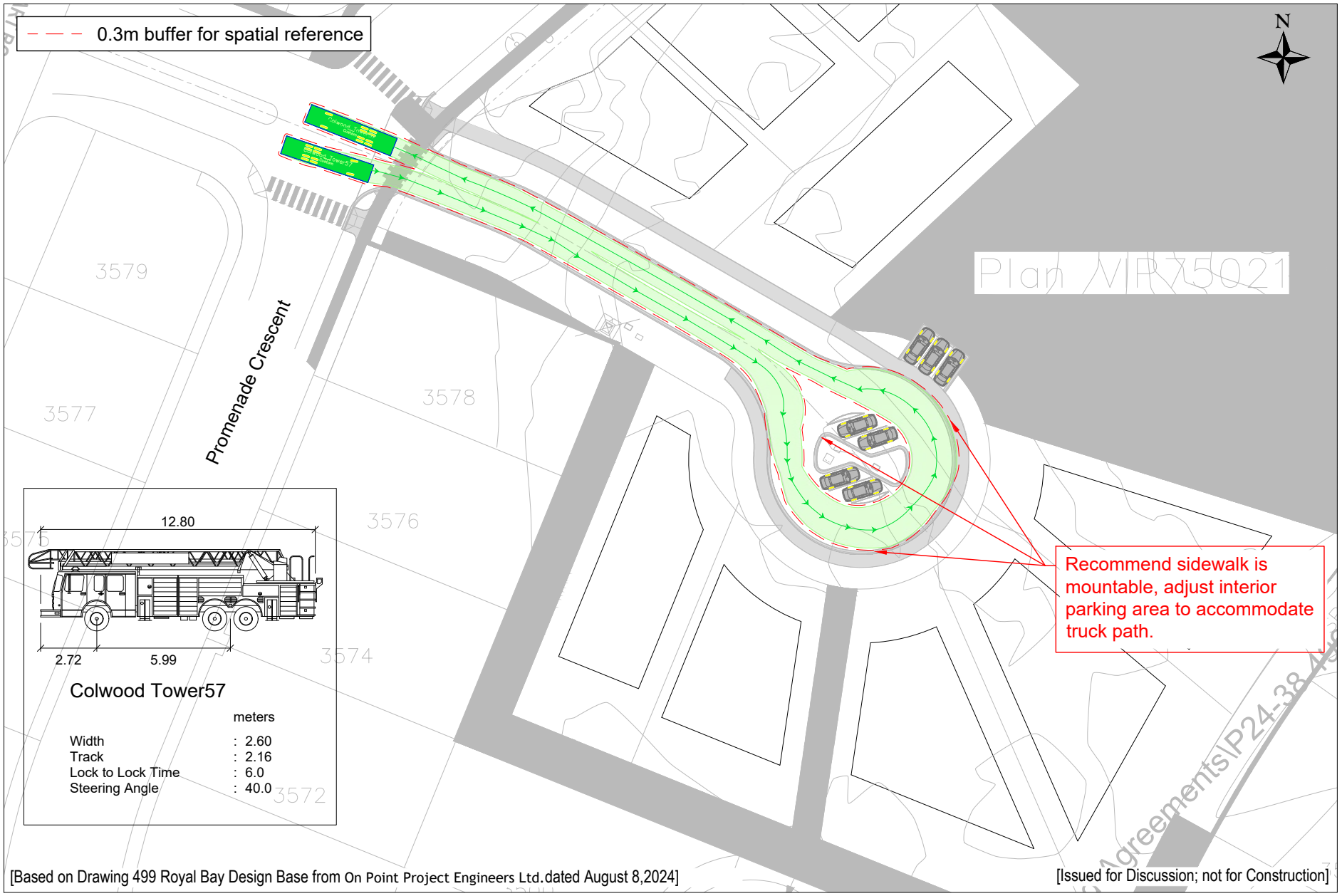

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Exhibit 3

Fire Truck Maneuvers

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Exhibit 4

Site Access Sight line

499 Royal Bay Dr Rezoning

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Exhibit 5

Wishart Road @ Royal Bay Drive Sight Line

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APPENDIX B

Synchro Outputs

Intersection: 1: Wishard Rd & Bunker Rd/Royal Bay Dr

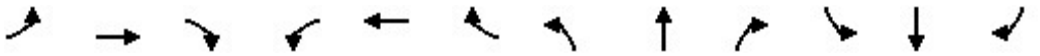
Movement	EB	WB	SB
Directions Served	LTR	LT	L
Maximum Queue (m)	4.4	8.7	5.2
Average Queue (m)	1.1	3.3	1.7
95th Queue (m)	5.8	10.2	8.0
Link Distance (m)	124.3	32.8	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			50.0
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 2: Promenade Crescent & Royal Bay Dr & Site Access

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	13.3	3.2	10.4	8.7
Average Queue (m)	9.3	0.6	6.9	3.8
95th Queue (m)	14.1	4.2	13.8	10.8
Link Distance (m)	32.8	64.6	79.9	118.1
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

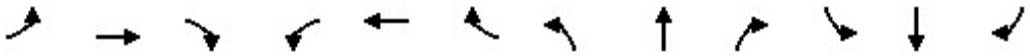
Network wide Queuing Penalty: 0



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	0	2	18	0	43	4	58	25	81	92	7
Future Volume (Veh/h)	5	0	2	18	0	43	4	58	25	81	92	7
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	5	0	2	19	0	44	4	60	26	84	95	7
Pedestrians					4						1	
Lane Width (m)					3.6						3.6	
Walking Speed (m/s)					1.2						1.2	
Percent Blockage					0						0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	336	364	98	350	355	78	102			90		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	336	364	98	350	355	78	102			90		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	100	100	97	100	96	100			94		
cM capacity (veh/h)	562	529	957	573	535	979	1490			1500		

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	7	19	44	4	86	84	102
Volume Left	5	19	0	4	0	84	0
Volume Right	2	0	44	0	26	0	7
cSH	637	573	979	1490	1700	1500	1700
Volume to Capacity	0.01	0.03	0.04	0.00	0.05	0.06	0.06
Queue Length 95th (m)	0.3	0.8	1.1	0.1	0.0	1.4	0.0
Control Delay (s)	10.7	11.5	8.9	7.4	0.0	7.5	0.0
Lane LOS	B	B	A	A		A	
Approach Delay (s)	10.7	9.6		0.3		3.4	
Approach LOS	B	A					

Intersection Summary				
Average Delay	3.9			
Intersection Capacity Utilization	22.8%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	71	7	29	0	4	0	38	1	0	0	1	19
Future Volume (vph)	71	7	29	0	4	0	38	1	0	0	1	19
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	76	7	31	0	4	0	40	1	0	0	1	20

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	114	4	41	21
Volume Left (vph)	76	0	40	0
Volume Right (vph)	31	0	0	20
Hadj (s)	0.00	0.03	0.25	-0.54
Departure Headway (s)	4.0	4.2	4.4	3.7
Degree Utilization, x	0.13	0.00	0.05	0.02
Capacity (veh/h)	872	839	784	946
Control Delay (s)	7.6	7.2	7.7	6.7
Approach Delay (s)	7.6	7.2	7.7	6.7
Approach LOS	A	A	A	A

Intersection Summary				
Delay	7.5			
Level of Service	A			
Intersection Capacity Utilization	28.2%	ICU Level of Service	A	
Analysis Period (min)	15			

Intersection: 1: Wishard Rd & Bunker Rd/Royal Bay Dr

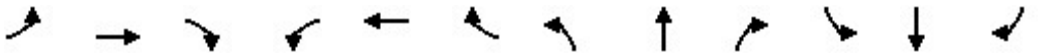
Movement	EB	WB	SB
Directions Served	LTR	LT	L
Maximum Queue (m)	7.0	6.9	0.8
Average Queue (m)	2.1	2.9	0.3
95th Queue (m)	8.3	9.5	3.0
Link Distance (m)	124.3	32.8	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			50.0
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 2: Promenade Crescent & Royal Bay Dr & Site Access

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	9.1	7.6	9.7	9.5
Average Queue (m)	6.2	1.9	8.0	4.2
95th Queue (m)	12.5	7.6	13.0	11.8
Link Distance (m)	32.8	64.6	79.9	118.1
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

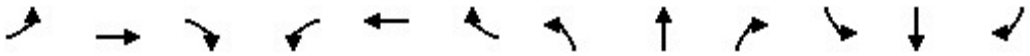
Network wide Queuing Penalty: 0



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	0	1	9	4	60	1	53	8	21	43	2
Future Volume (Veh/h)	10	0	1	9	4	60	1	53	8	21	43	2
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	11	0	1	10	5	68	1	60	9	24	49	2
Pedestrians					7						5	
Lane Width (m)					3.6						3.6	
Walking Speed (m/s)					1.2						1.2	
Percent Blockage					1						0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	168	176	50	172	172	76	51			76		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	168	176	50	172	172	76	51			76		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	98	100	100	99	99	93	100			98		
cM capacity (veh/h)	721	701	1018	773	705	975	1555			1495		

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	12	15	68	1	69	24	51
Volume Left	11	10	0	1	0	24	0
Volume Right	1	0	68	0	9	0	2
cSH	739	749	975	1555	1700	1495	1700
Volume to Capacity	0.02	0.02	0.07	0.00	0.04	0.02	0.03
Queue Length 95th (m)	0.4	0.5	1.8	0.0	0.0	0.4	0.0
Control Delay (s)	9.9	9.9	9.0	7.3	0.0	7.4	0.0
Lane LOS	A	A	A	A		A	
Approach Delay (s)	9.9	9.1		0.1		2.4	
Approach LOS	A	A					

Intersection Summary				
Average Delay	4.4			
Intersection Capacity Utilization	24.4%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	17	2	11	0	6	0	50	0	0	0	0	17
Future Volume (vph)	17	2	11	0	6	0	50	0	0	0	0	17
Peak Hour Factor	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74
Hourly flow rate (vph)	23	3	15	0	8	0	68	0	0	0	0	23

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	41	8	68	23
Volume Left (vph)	23	0	68	0
Volume Right (vph)	15	0	0	23
Hadj (s)	-0.02	0.03	0.23	-0.57
Departure Headway (s)	4.1	4.2	4.3	3.5
Degree Utilization, x	0.05	0.01	0.08	0.02
Capacity (veh/h)	858	839	824	1003
Control Delay (s)	7.3	7.2	7.6	6.6
Approach Delay (s)	7.3	7.2	7.6	6.6
Approach LOS	A	A	A	A

Intersection Summary				
Delay	7.3			
Level of Service	A			
Intersection Capacity Utilization	25.7%	ICU Level of Service	A	
Analysis Period (min)	15			

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DESIGN + DEVELOPMENT

ROYAL BAY
A SEASIDE COMMUNITY